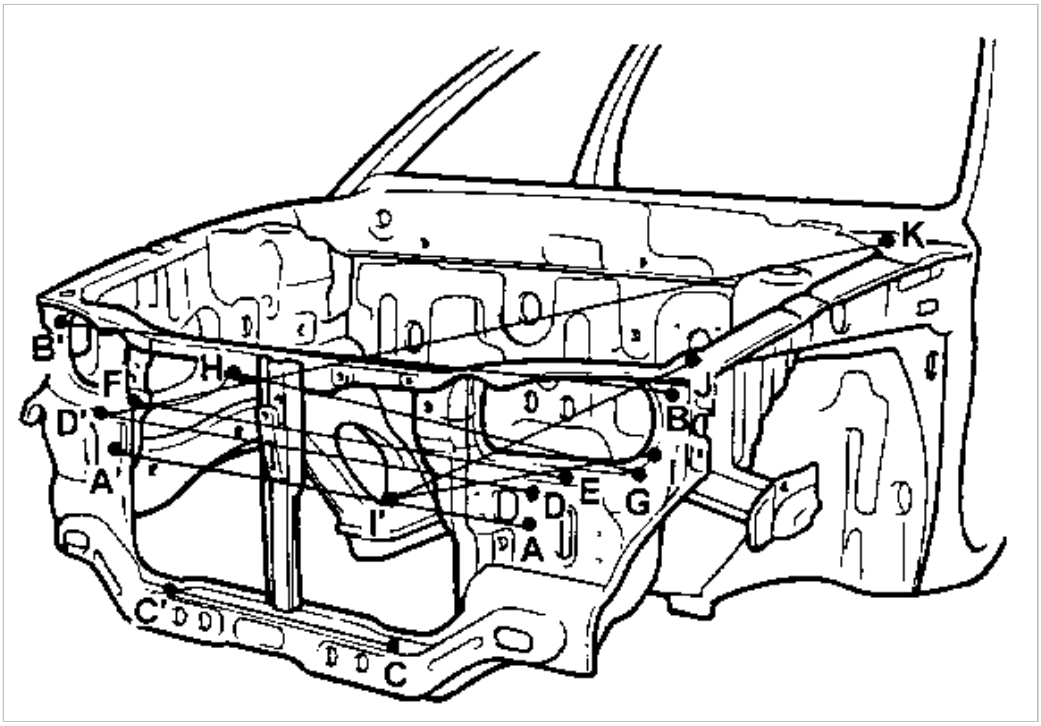
ACCENT(X3) > 1998 > G 1.5 SOHC > Body (Interior & Exterior)

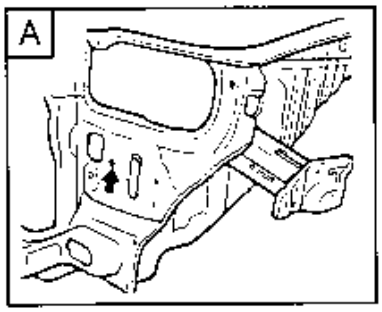
Body (Interior & Exterior) > Body Dimensions > ENGINE COMPARTMENT

ENGINE COMPARTMENT

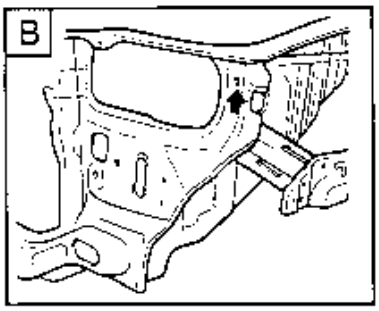


These dimensions indicated in this figure are actual-measurement dimensions.

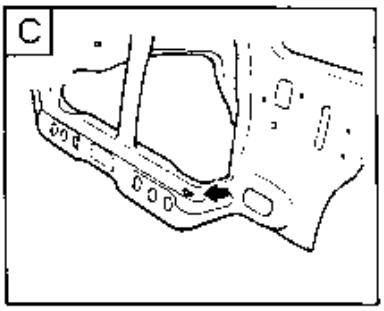
Point symbol	A-A'	B-B'	C-C'	D-D'	E-F	G-H	I-I'	J-I'
Length (mm)	830	1222	500	970	1053	942	670	1197
Point symbol	K-D'							
Length (mm)	1345							



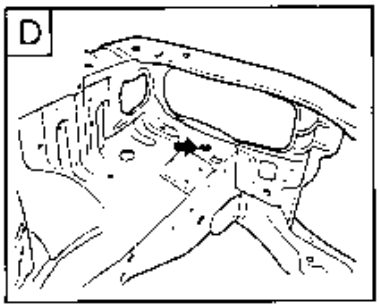
Front bumper mounting hole
(Ø13)



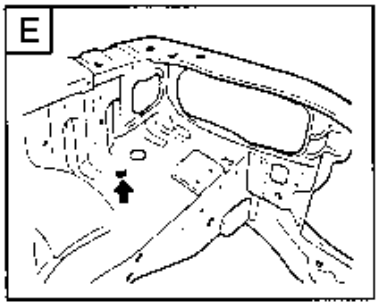
Tooling hole
(Ø10)



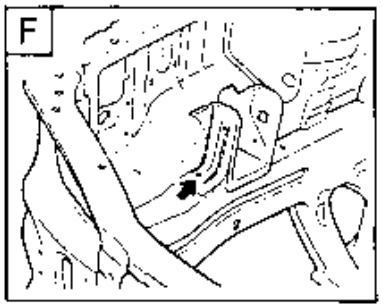
Wiring fixing hole
(Ø7)



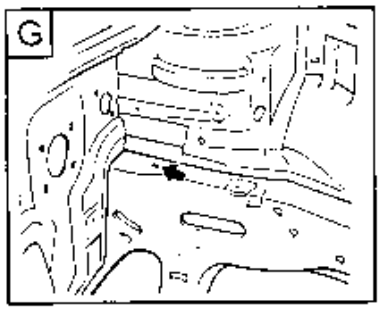
Wiring fixing hole
(Ø7)



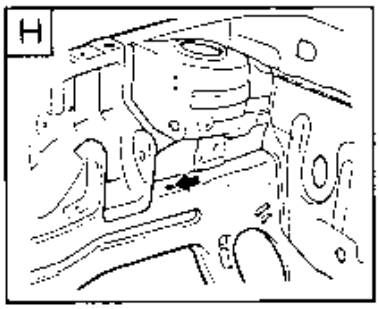
Battery tray mounting hole
(Ø11)



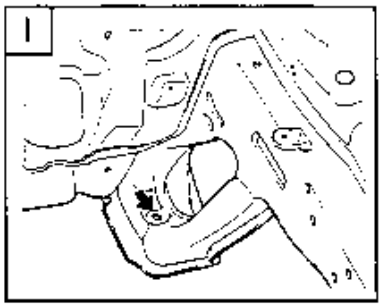
ABS mounting hole
(Ø11)



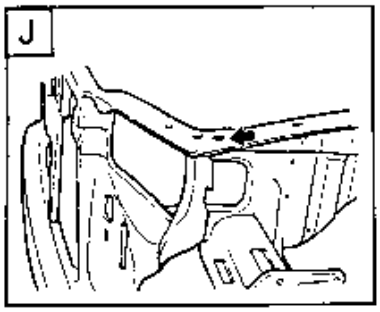
Fuel tube fixing hole
(Ø7)



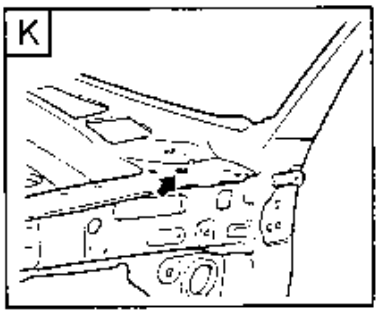
Power steering tube fixing hole
(□8)



Stabilizer bar mounting hole
(Ø9)



Fender mounting hole
(Ø10)



Fender mounting hole
(Ø10)

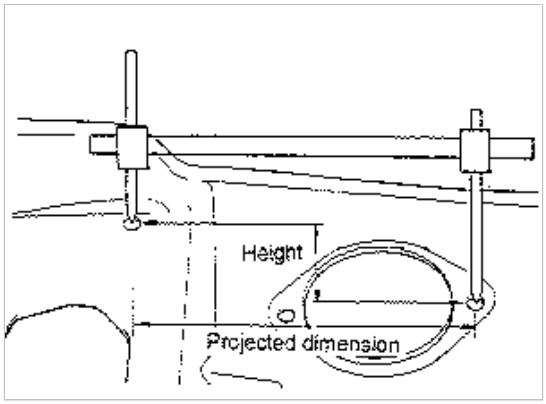
Body (Interior & Exterior) > Body Dimensions > GENERAL DIMENSIONS

GENERAL DIMENSIONS

a. Basically, all measurements in this manual are taken with a tracking gauge.
b. When a measuring tape is used, check to be sure there is no elongation, twisting or bending
c. For measuring dimensions, both projected dimension and actual-measurement dimension are used in this manual.

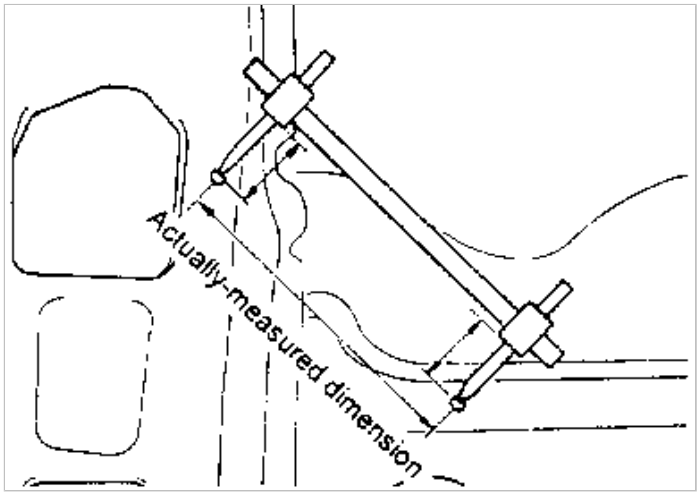
PROJECTED DIMENSIONS

1. These are the dimensions measured when the measurement points are projected into the reference plane, and are the reference dimensions used for body alterations.
2. If the length of the tracking gauge probes are adjustable, make the measurement by lengthening one probe by the amount equivalent to the difference in height of the two surfaces.



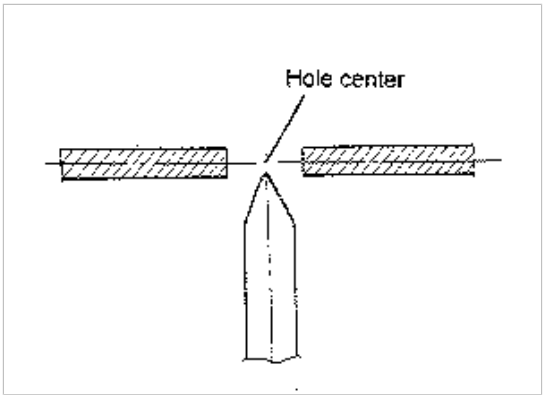
ACTUAL-MEASUREMENT DIMENSIONS

1. These dimensions indicate the actual linear distance between measurement points, and are the reference dimensions for use if a tracking gauge is used for measurement.
2. Measure by first adjusting both probes to the same length (a=A').
   Check the probes and gauge itself to make sure there is no free play.



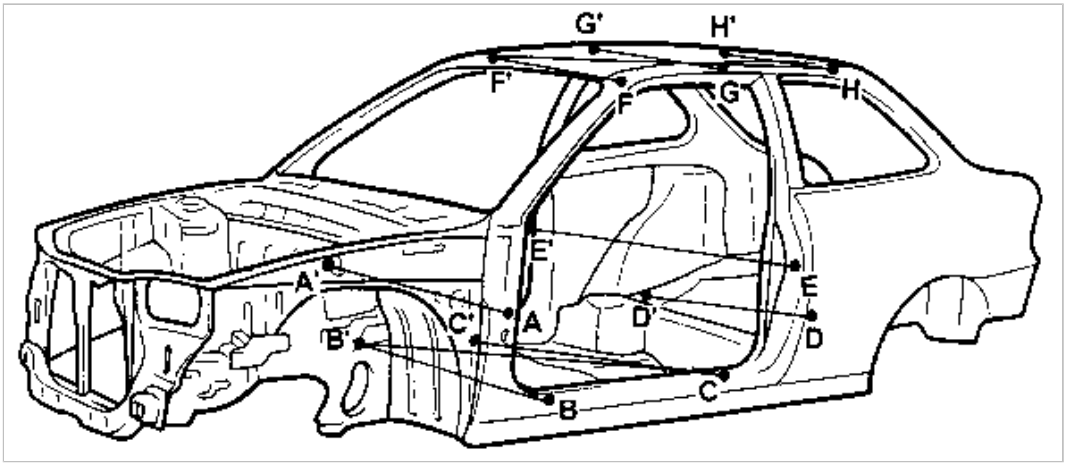
MEASUREMENT POINT

1. Measurements should be taken at the center of hole.



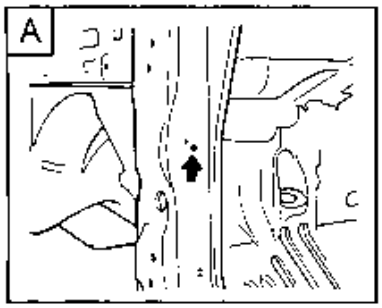
Body (Interior & Exterior) > Body Dimensions > INTERIOR (3 DOOR)

INTERIOR (3 DOOR)

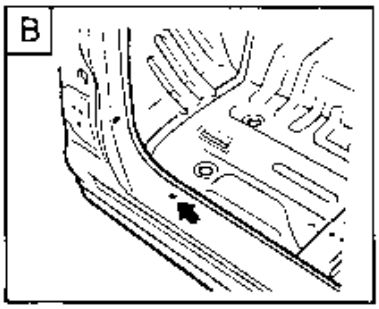


These dimensions indicated in this figure are actual-measurement dimensions.

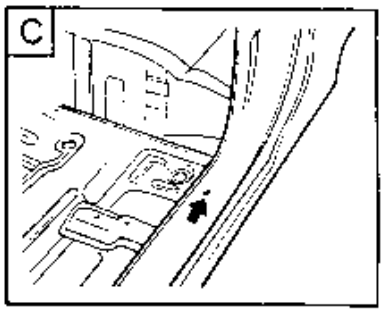
Point symbol	A-A'	B-B'	C-C'	D-D'	E-E'	F-F'	G-G'	H-H'
Length (mm)	1378	1368	1388	1040	1450	960	924	698
Point symbol	B'-C	F'-H						
Length (mm)	1578	1430						



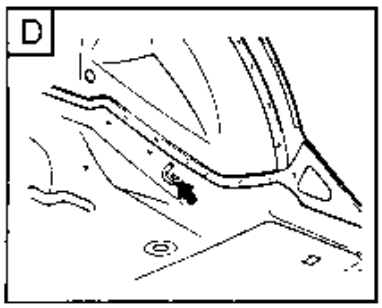
Door checker mounting hole (Ø10)



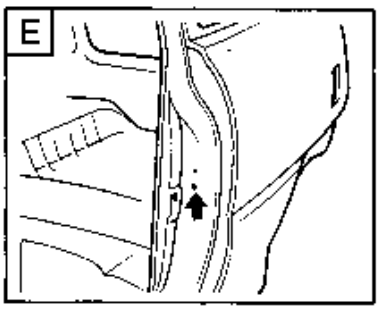
Door scuff mounting hole (□7)



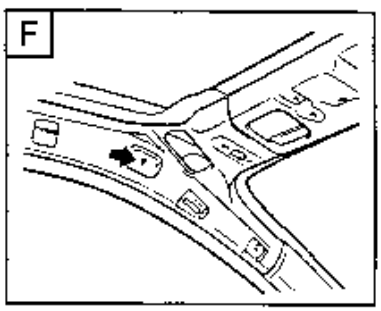
Door scuff mounting hole (□7)



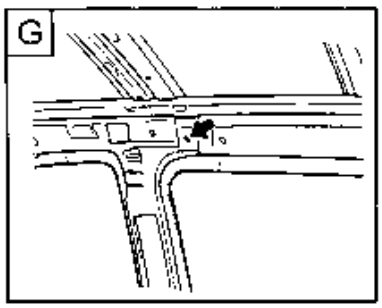
Rear seat belt side mounting hole (Ø18)



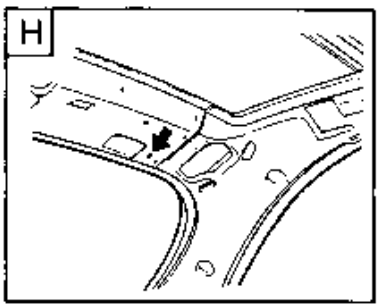
Door striker mounting hole (Ø11.5)



Roof assist handle mounting hole (Ø6.6)



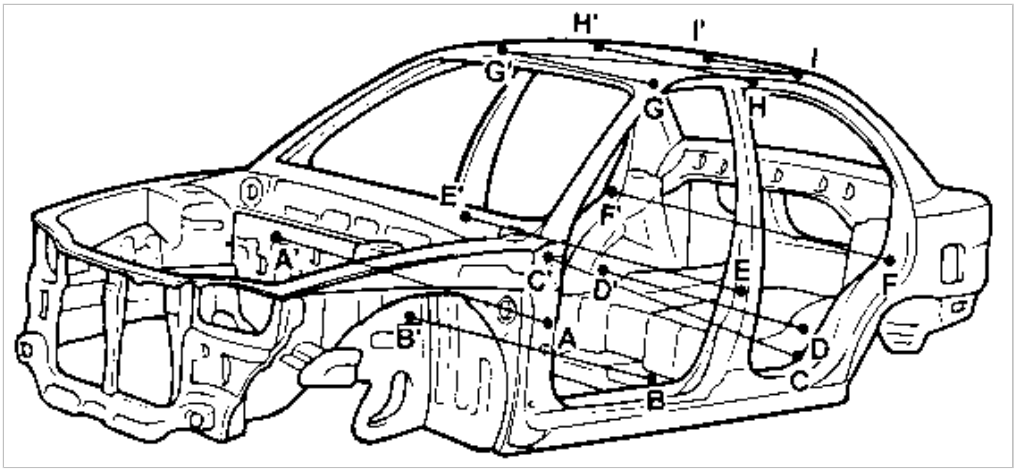
Wiring fixing hole (Ø7)



Head lining mounting hole (Ø7)

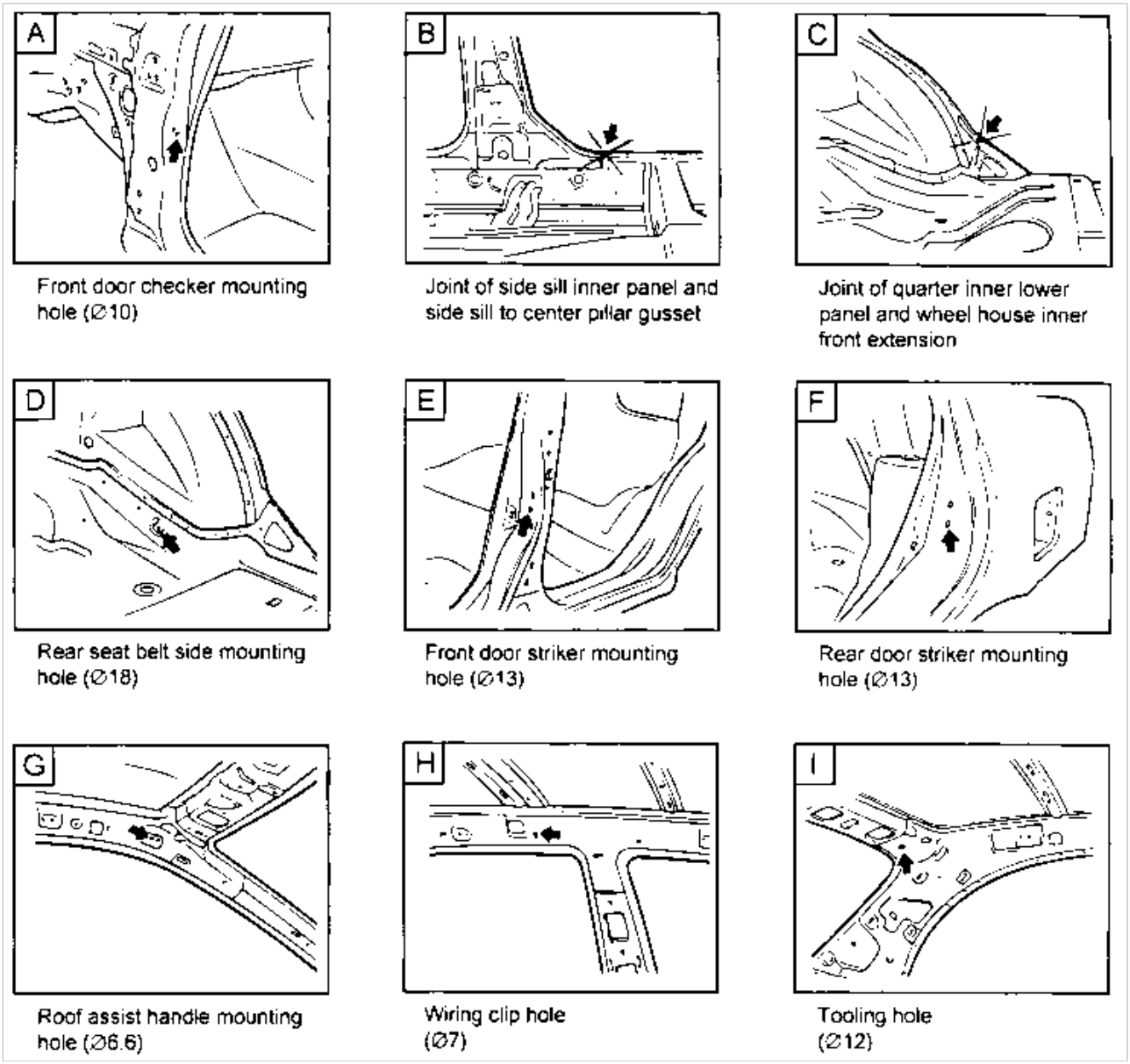
Body (Interior & Exterior) > Body Dimensions > INTERIOR (4 DOOR)

INTERIOR (4 DOOR)



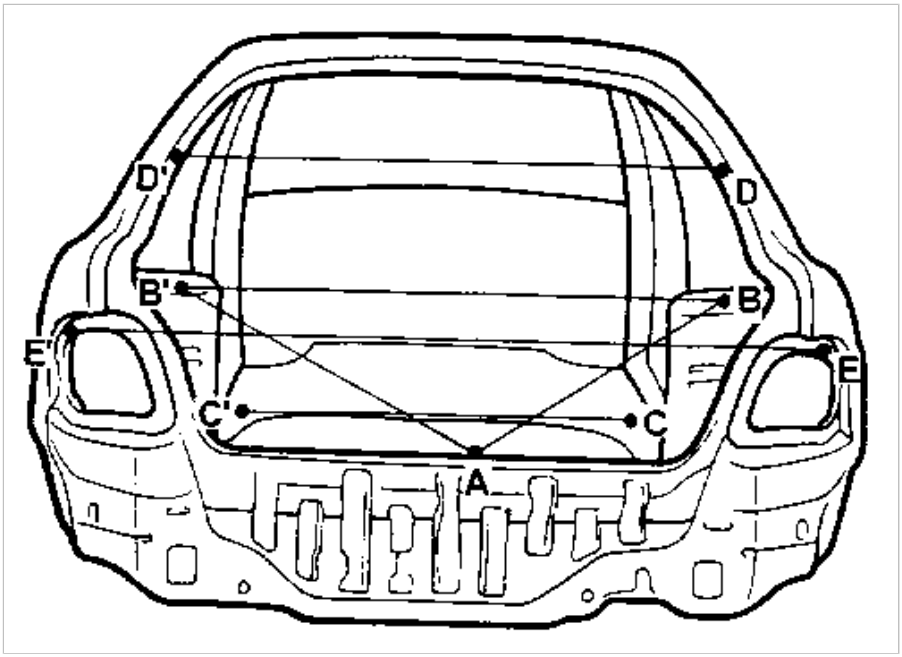
These dimensions indicated in this figure are actual-measurement dimensions.

Point symbol	A-A'	B-B'	C-C'	D-D'	E-E'	F-F'	G-G'	H-H'
Length (mm)	1378	1323	1327	1040	1436	1432	959	920
Point symbol	I-I'	G'-I						
Length (mm)	840	1447						



Body (Interior & Exterior) > Body Dimensions > LUGGAGE COMPARTMENT (3 DOOR)

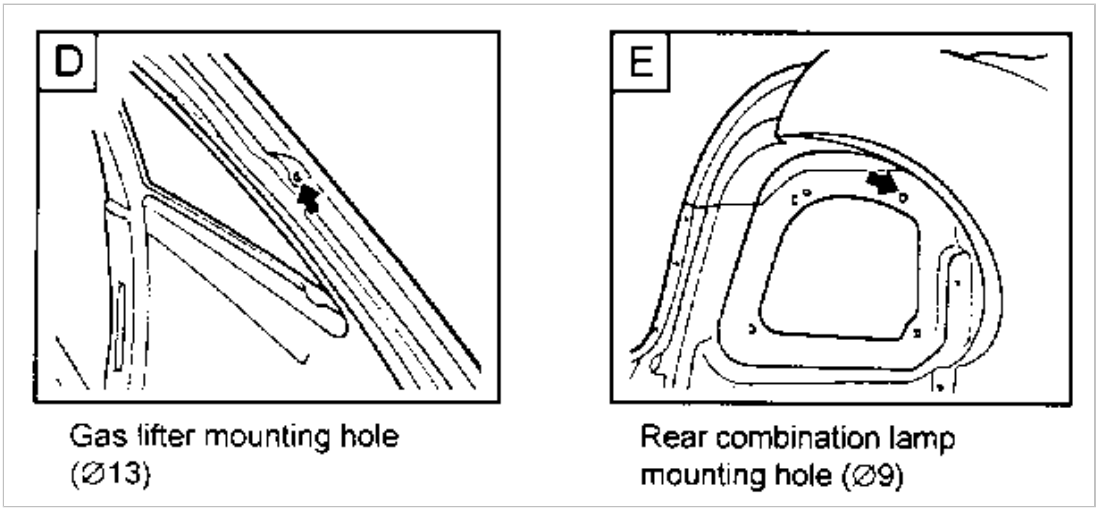
LUGGAGE COMPARTMENT (3 DOOR)



These dimensions indicated in this figure are actual-measurement dimensions.

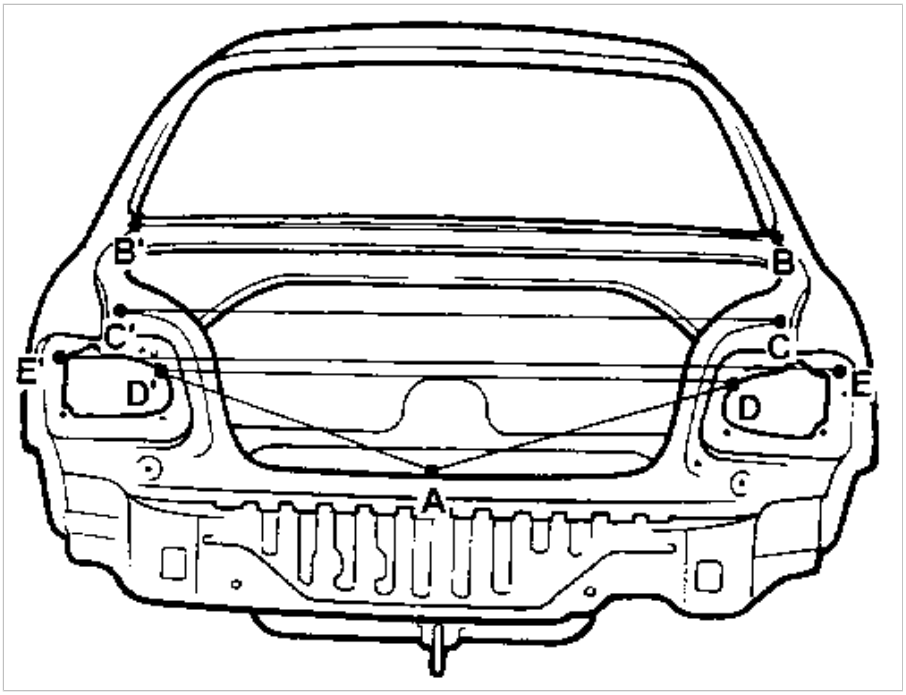
Point symbol	A-B	A-B'	B-B'	C-C'	D-D'	E-E'
Length (mm)	869	893	1166	944	1157	1342

[redacted]



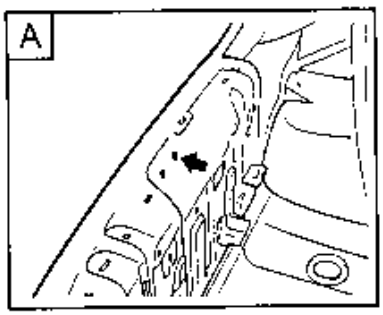
Body (Interior & Exterior) > Body Dimensions > LUGGAGE COMPARTMENT (4 DOOR)

LUGGAGE COMPARTMENT (4 DOOR)

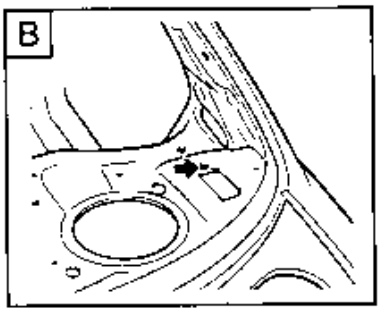


These dimensions indicated in this figure are actual-measurement dimensions.

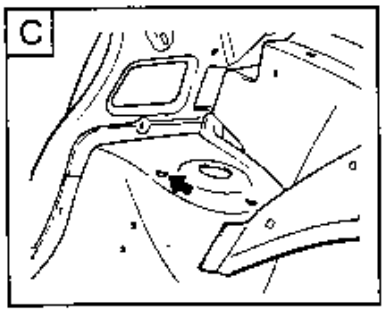
Point symbol	A-D	A-D'	B-B'	C-C'	D-D'	E-E'
Length (mm)	964	944	1074	1166	944	1370



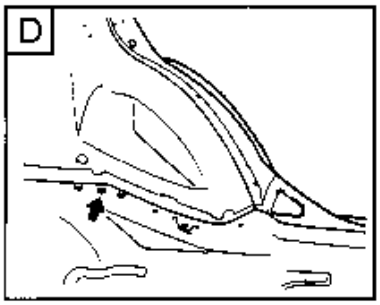
Truck lid striker mounting hole (Ø7)



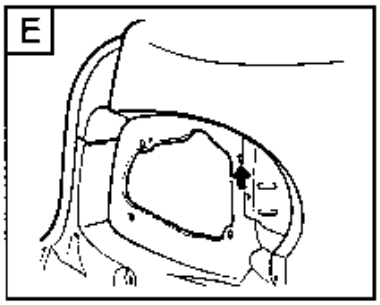
Trunk lid hinge mounting hole (Ø10)



Rear suspension mounting hole (Ø9)



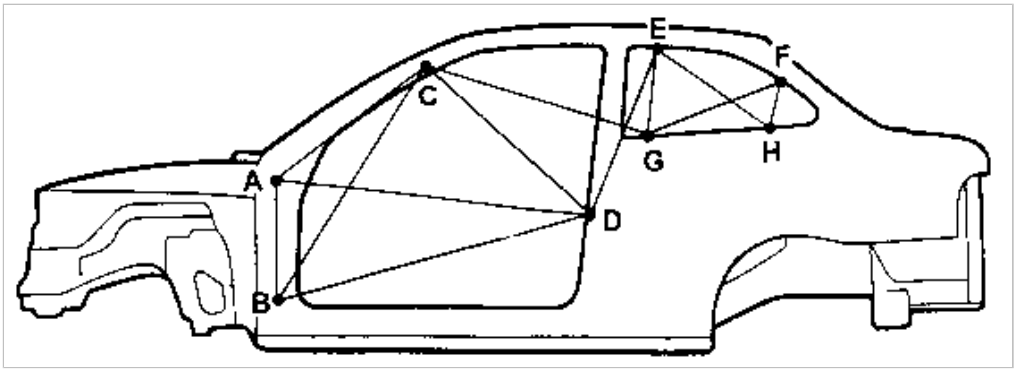
Seat back lower side mounting hole (Ø14)



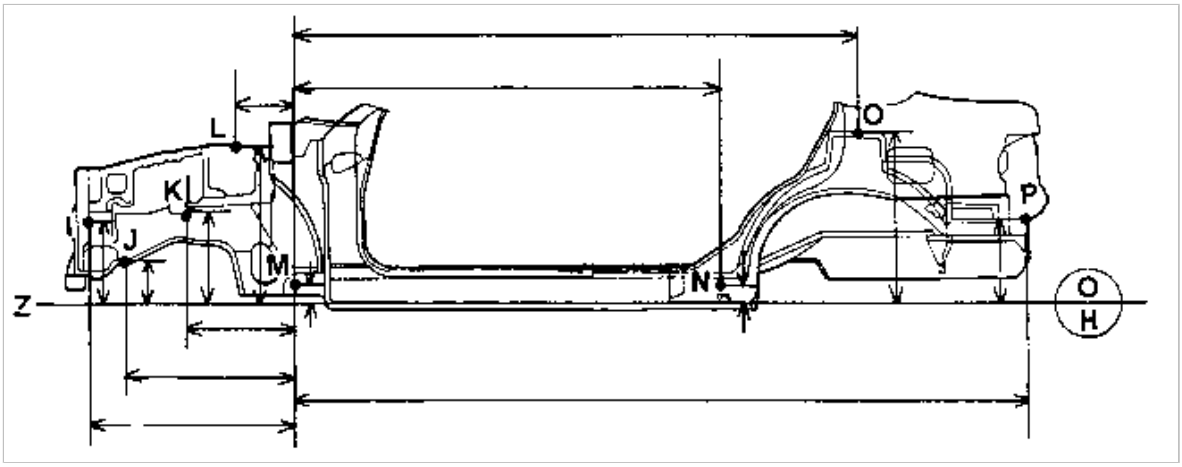
Rear combination lamp mounting hole (Ø9)

Body (Interior & Exterior) > Body Dimensions > SIDE BODY (3 DOOR)

SIDE BODY (3 DOOR)



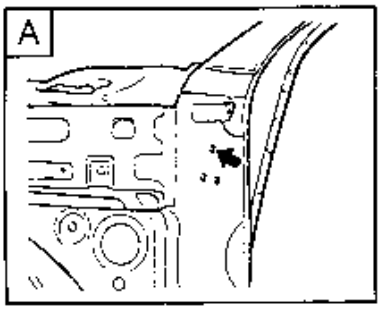
These dimensions indicated in this figure are actual-measurement dimensions.



These dimensions indicated in this figure are actual-measurement dimensions.

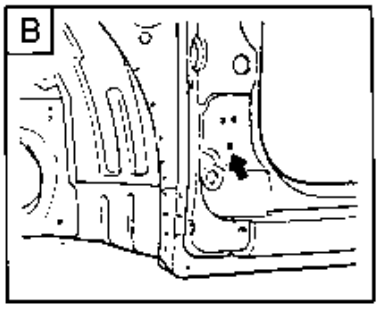
Point symbol	A-B	A-C	A-D	B-C	B-D	C-D	D-E	C-G
Length (mm)	370	1100	1209	1314	1215	741	750	537
Point symbol	E-F	E-G	E-H	F-G	F-H	G-H	I-Z	J-Z
Length (mm)	418	390	582	522	238	516	265	128
Point symbol	K-Z	L-Z	M-Z	N-Z	O-Z	P-Z	I-M	J-M
Length (mm)	284	562	30	53	595	261	795	680
Point symbol	K-M	L-M	M-N	M-O	M-P			
Length (mm)	478	224	1718	2187	2850			

A



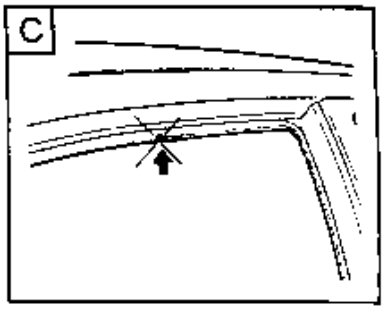
Door hinge mounting hole
(Ø12)

B



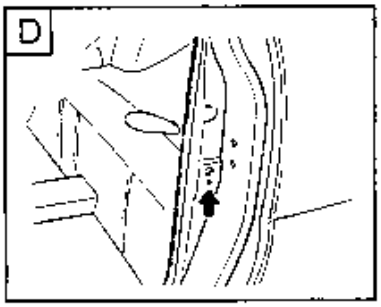
Door hinge mounting hole
(Ø12)

C



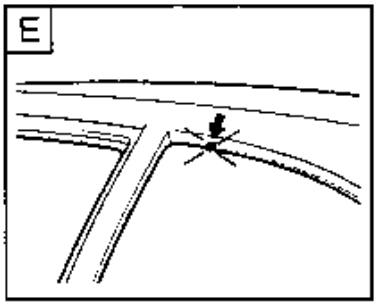
Side body outer positioning
notch

D



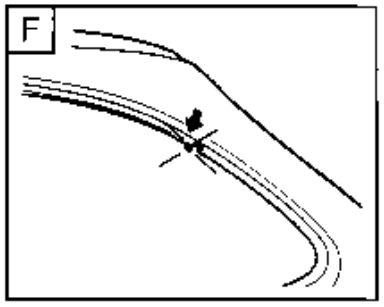
Door switch mounting hole
(Ø8)

E



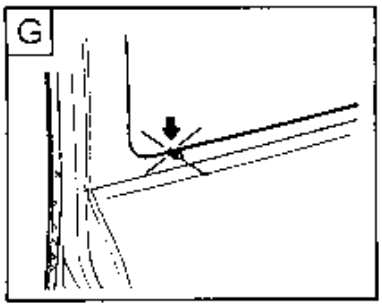
Quarter fixed glass positioning
notch

F



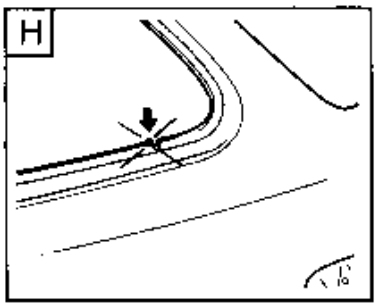
Quarter fixed glass positioning
notch

G



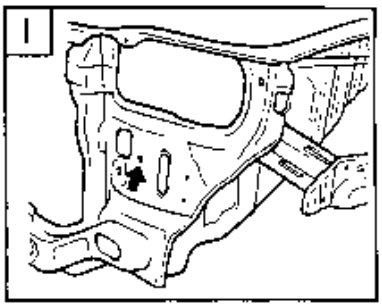
Quarter fixed glass positioning
notch

H



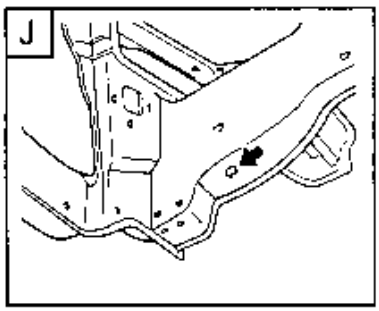
Quarter fixed glass positioning
notch

I



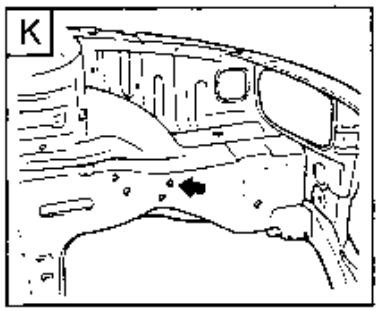
Front bumper mounting hole
(Ø13)

J



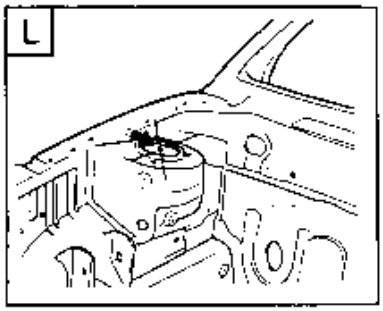
Tooling hole
(Ø25)

K

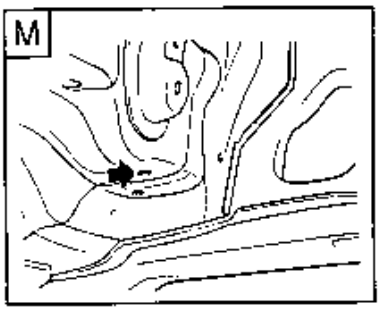


T/M mounting hole
(Ø15)

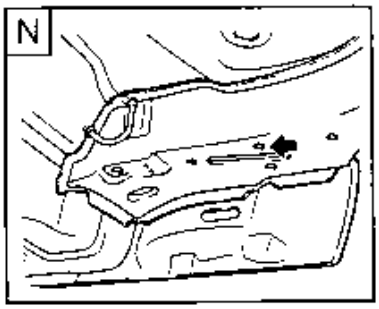
L



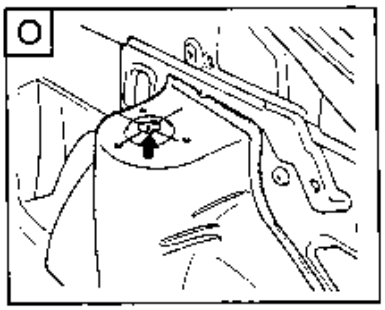
Front strut hole
(Ø83)



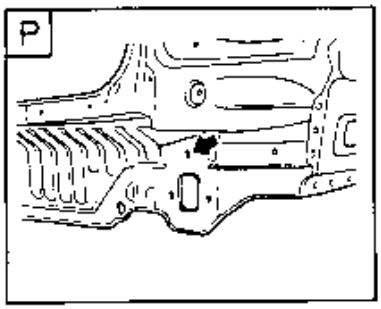
Engine center member mounting hole (Ø18)



Trailing arm mounting hole (Ø13)



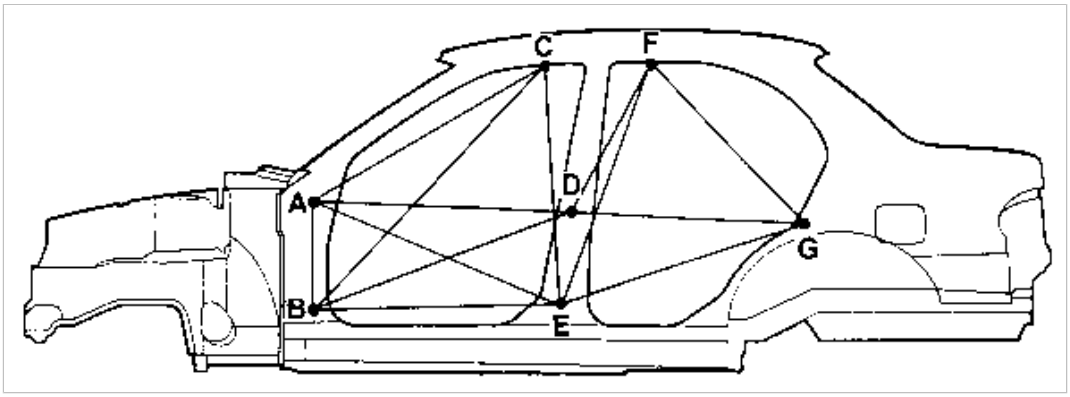
Rear suspension hole (Ø34)



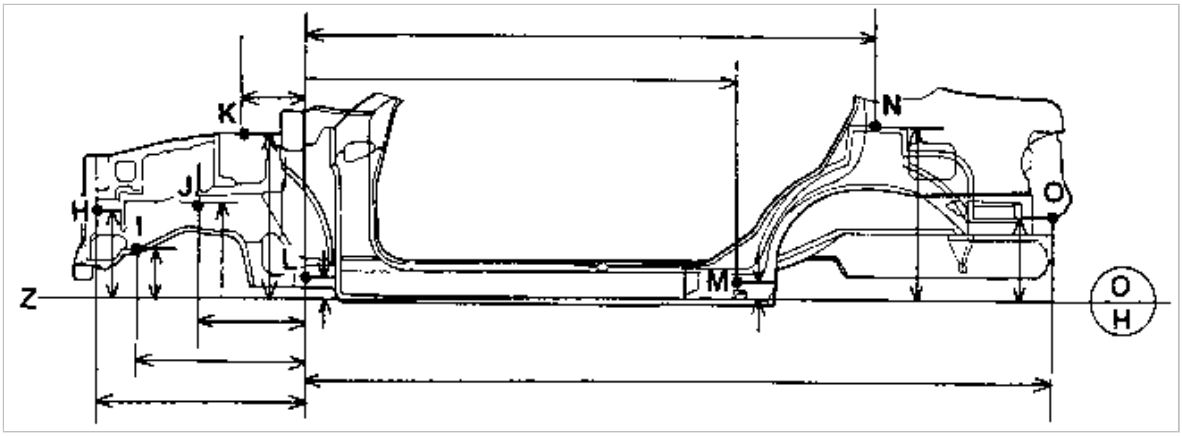
Rear bumper mounting hole (Ø14)

Body (Interior & Exterior) > Body Dimensions > SIDE BODY (4 DOOR)

SIDE BODY (4 DOOR)

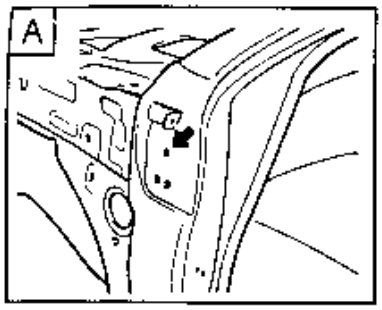


These dimensions indicated in this figure are actual-measurement dimensions.

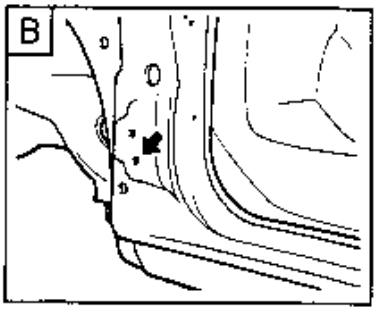


These dimensions indicated in this figure are projected dimensions.

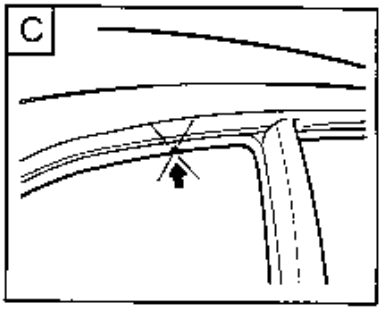
Point symbol	A-B	A-C	A-D	A-E	B-C	B-D	B-E	C-E
Length (mm)	370	1054	1006	1032	1275	1076	971	881
Point symbol	D-F	D-G	E-F	E-G	F-G	H-Z	I-Z	J-Z
Length (mm)	621	844	950	934	792	265	128	284
Point symbol	K-Z	L-Z	M-Z	N-Z	O-Z	H-L	I-L	J-L
Length (mm)	562	30	53	595	261	795	680	478
Point symbol	K-L	L-M	L-N	L-O				
Length (mm)	224	1718	2187	2850				



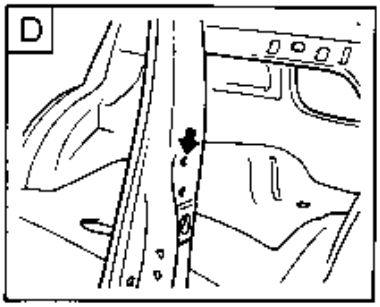
Front door hinge mounting hole (Ø12)



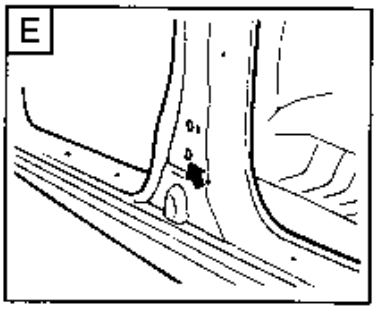
Front door hinge mounting hole (Ø12)



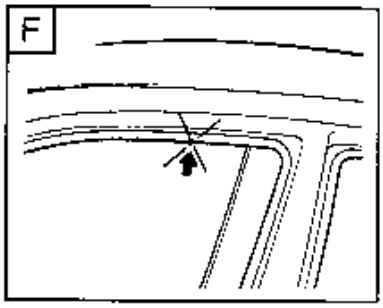
Side body outer positioning notch (Front section)



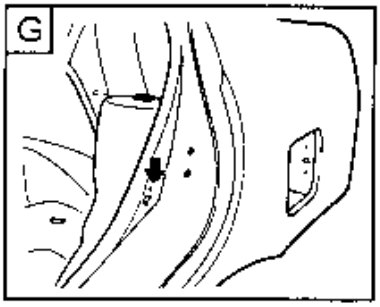
Rear door hinge mounting hole (Ø12)



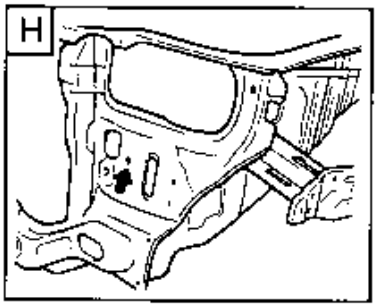
Rear door hinge mounting hole (Ø12)



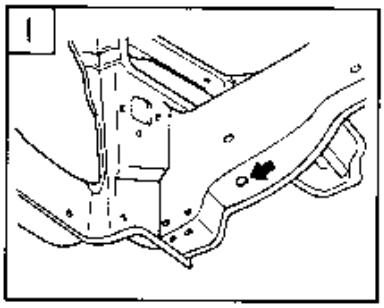
Side body outer positioning notch (Rear section)



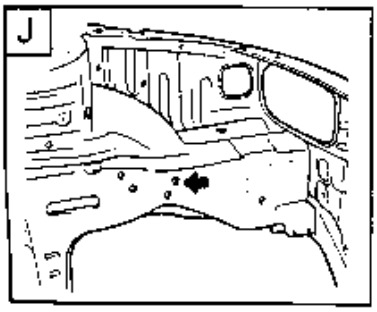
Door switch mounting hole (Ø8)



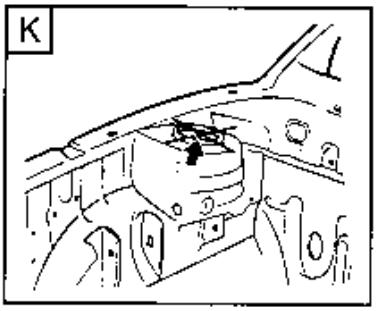
Front bumper mounting hole (Ø13)



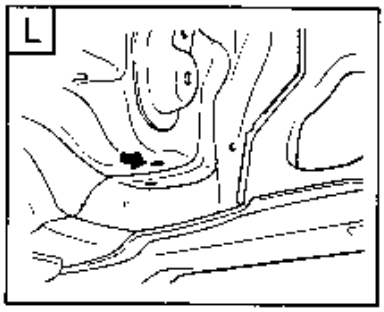
Tooling hole (Ø25)



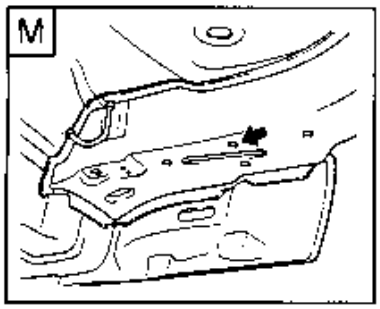
T/M mounting hole (Ø15)



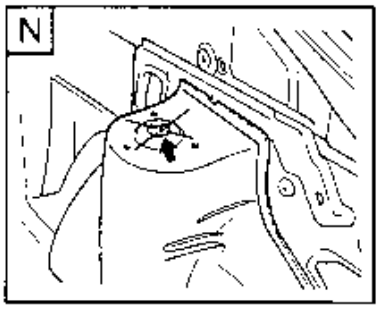
Front strut hole (Ø83)



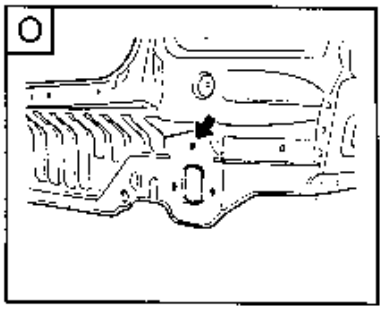
Engine center member mounting hole (Ø18)



Trailing arm mounting hole
(Ø13)



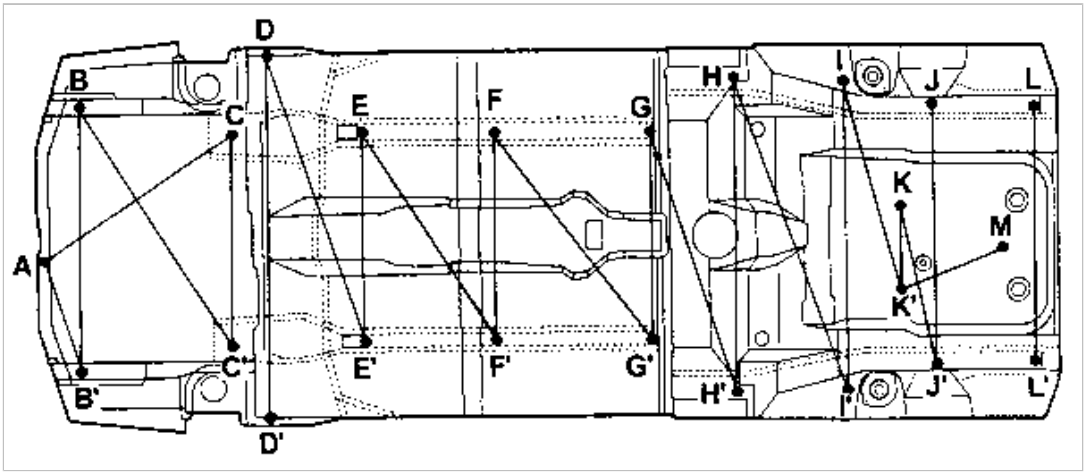
Rear suspenson hole
(Ø34)



Rear bumper mounting hole
(Ø14)

Body (Interior & Exterior) > Body Dimensions > UNDER BODY

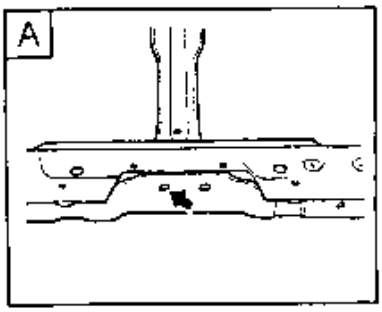
UNDER BODY



These dimensions indicated in this figure are actual-measurement dimensions.

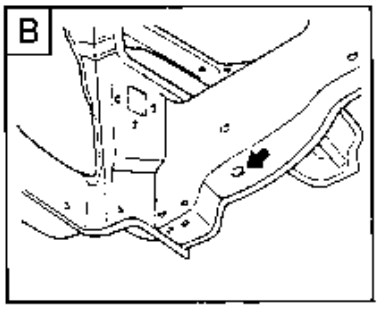
Point symbol	A-B'	B-B'	A-C'	B-C'	C-C'	D-D'	C-D'	E-E'
Length (mm)	490	928	760	957	658	1350	1065	744
Point symbol	D-E'	F-F'	E-F'	G-G'	F-G'	H-H	G-H	I-I
Length (mm)	1054	720	933	720	852	1091	947	981
Point symbol	H-I'	K-K'	I-K'	J-J'	K-J'	L-L'	J-L'	M-K'
Length (mm)	1093	300	689	950	651	929	1051	539

A



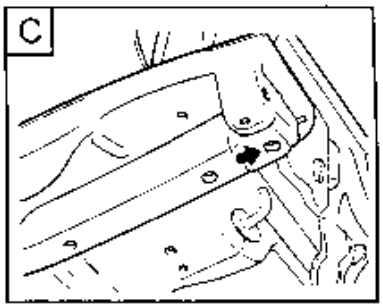
Center member mounting hole
(Ø14)

B



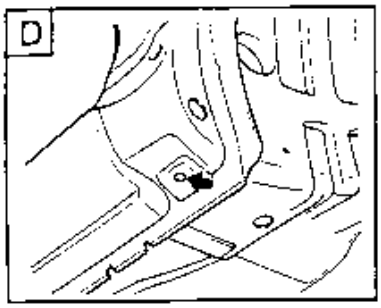
Tooling hole
(Ø25)

C



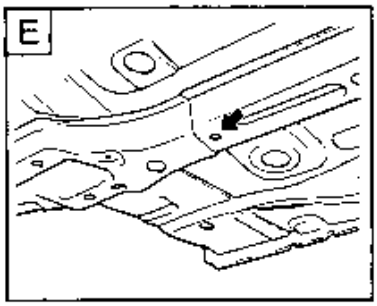
Front lower arm mounting hole
(Ø13)

D



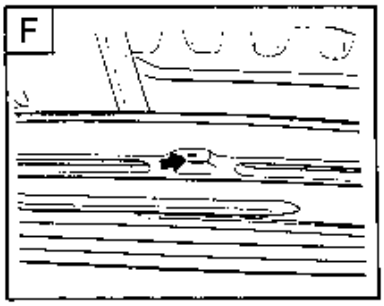
Fender mounting hole
(Ø8)

E



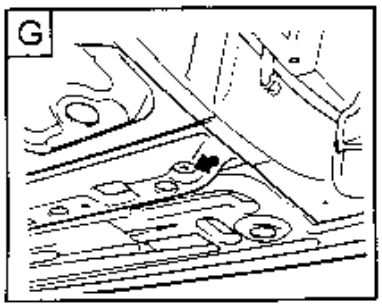
Tooling hole
(Ø12)

F



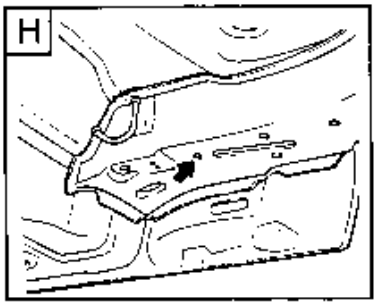
Fuel & brake tube protector
mounting hole (Ø6.6)

G



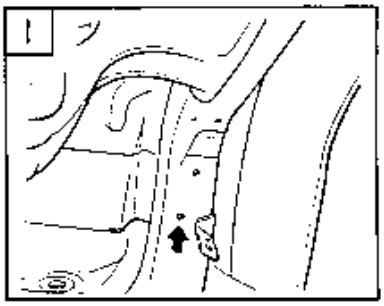
Fuel & brake tube protector
mounting hole (Ø6.6)

H



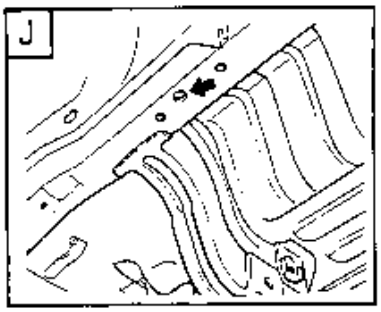
Rear trailing arm mounting
hole (Ø13)

I



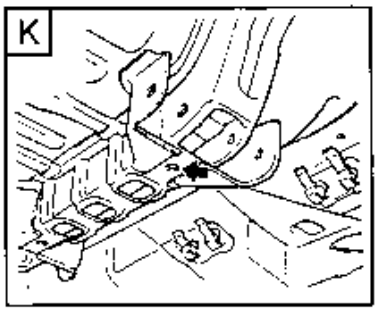
Stabilizer bar mounting hole
(Ø12)

J



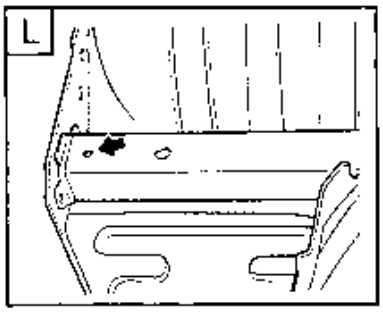
Tooling hole
(Ø20)

K

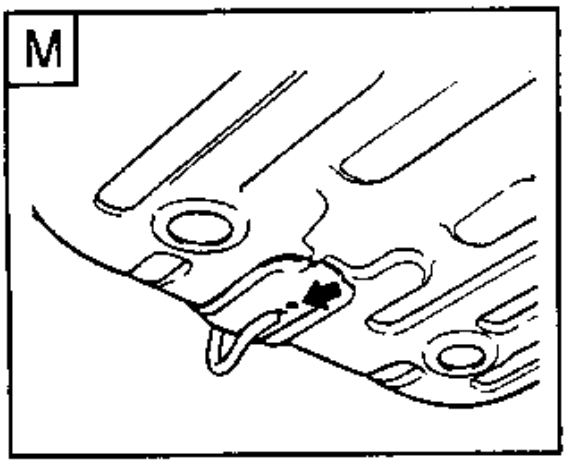


Tooling hole
(Ø15)

L

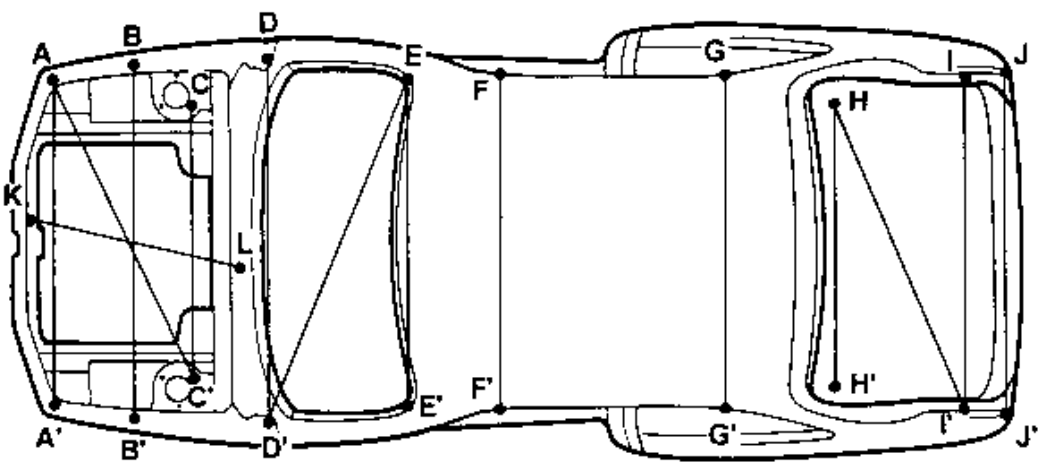


Tooling hole
(Ø14)



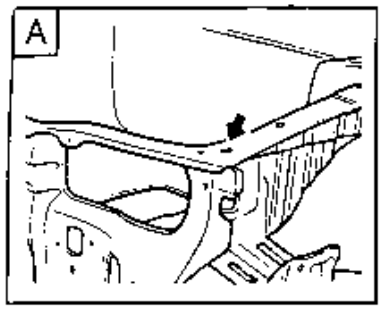
Body (Interior & Exterior) > Body Dimensions > UPPER BODY (3 DOOR)

UPPER BODY (3 DOOR)

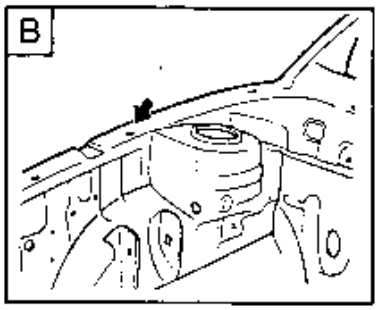


These dimensions indicated in this figure are actual-measurement dimensions.

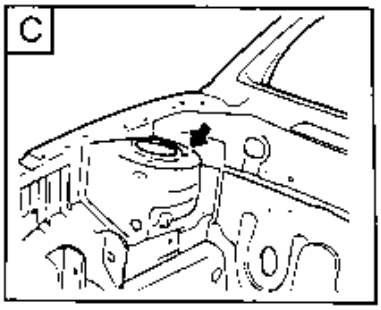
Point symbol	A-A'	A-C'	B-B'	C-C'	D-D'	E-D'	E-E'	F-F'
Length (mm)	1232	1244	1284	1008	1272	1352	922	995
Point symbol	G-G'	H-H'	H-I'	I-I'	J-J'	K-L		
Length (mm)	1036	625	1170	1198	1227	855		



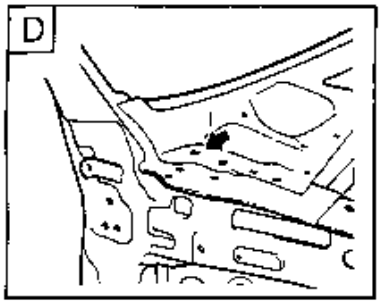
Fender mounting hole
(Ø10)



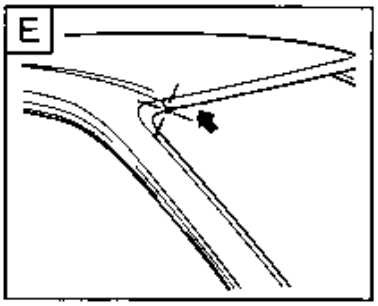
Fender mounting hole
(Ø6.6)



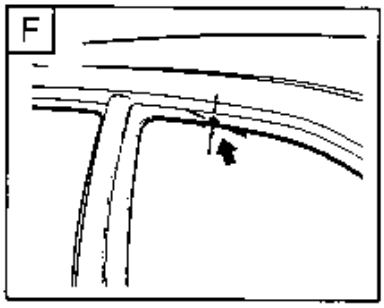
Front strut mounting hole
(Ø9)



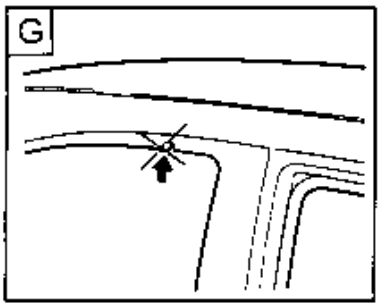
Hood hinge mounting hole
(Ø12)



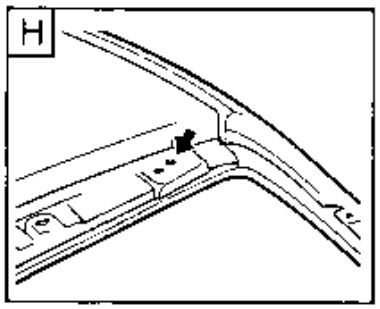
Joint of roof panel and front pillar



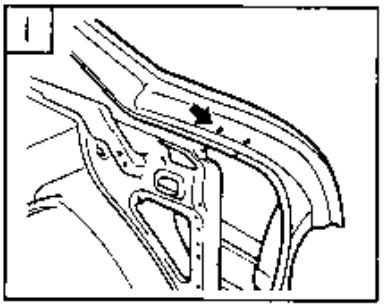
Side body outer positioning notch (front section)



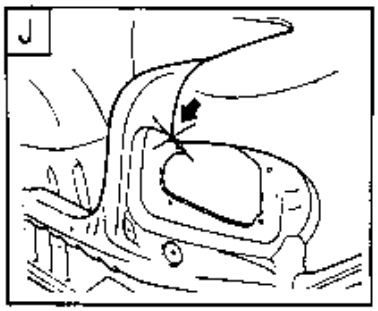
Quarter fixed glass positioning notch



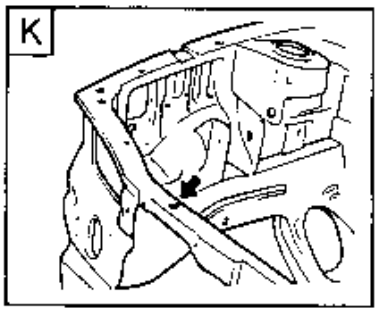
Tail gate hinge mounting hole
(Ø12)



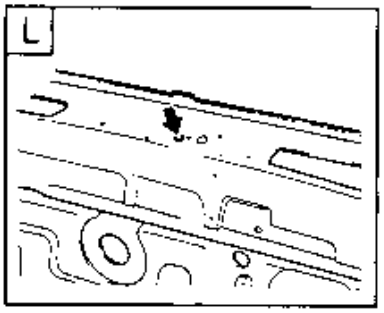
Tail gate guide bumper mounting hole (Ø8)



Corner of quarter panel



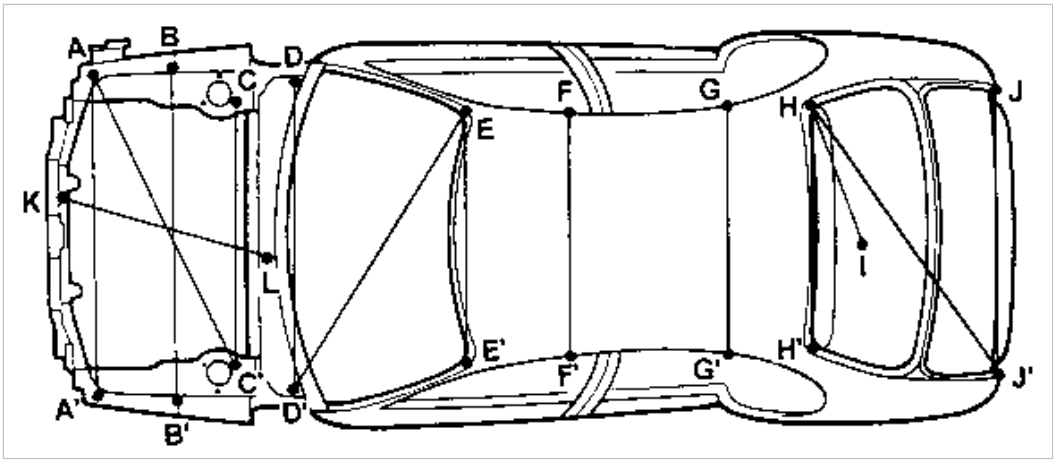
Radiator mounting hole
(Ø6.6)



Paint drain hole
(Ø7)

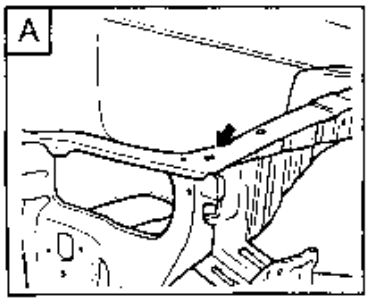
Body (Interior & Exterior) > Body Dimensions > UPPER BODY (4 DOOR)

UPPER BODY (4 DOOR)

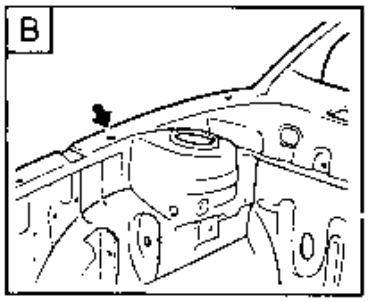


These dimensions indicated in this figure are actual-measurement dimensions.

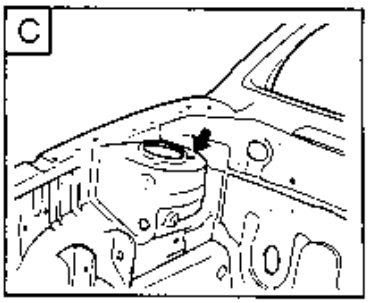
Point symbol	A-A'	A-C'	B-B'	C-C'	D-D'	E-D'	E-E'	F-F'
Length (mm)	1232	1244	1284	1008	1272	1352	922	995
Point symbol	G-G'	H-H'	H-I'	H-J'	J-J'	K-L		
Length (mm)	993	880	626	1400	1172	855		



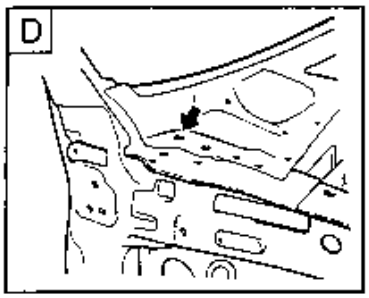
Fender mounting hole
(Ø10)



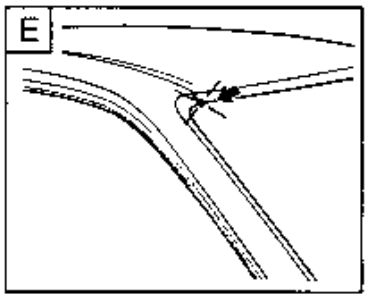
Fender mounting hole
(Ø6.6)



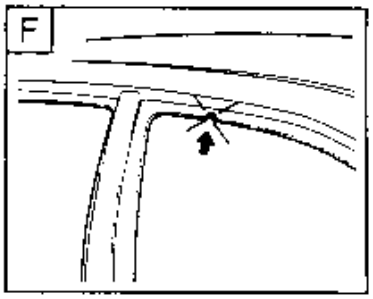
Front strut mounting hole
(Ø9)



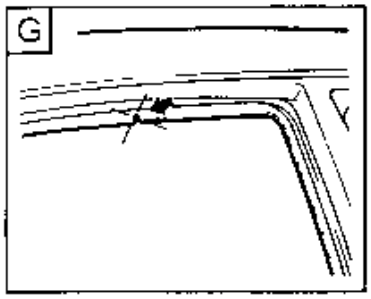
Hood hinge mounting hole
(Ø12)



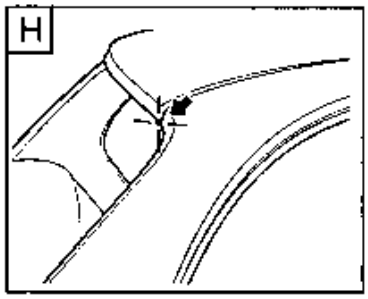
Joint of roof panel and front pillar



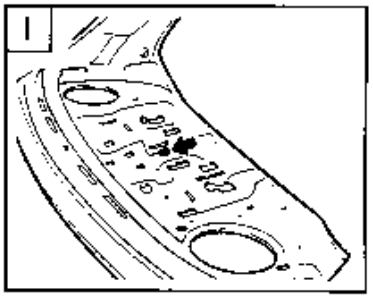
Side body outer positioning notch (front section)



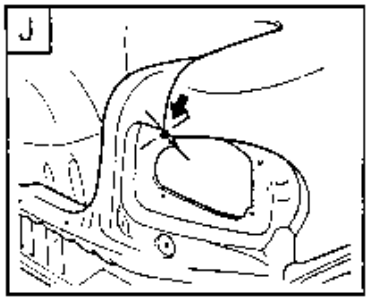
Side body outer positioning notch (Rear section)



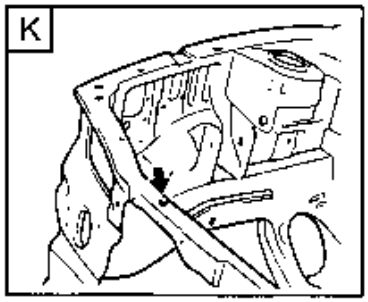
Joint of quarter panel and roof panel



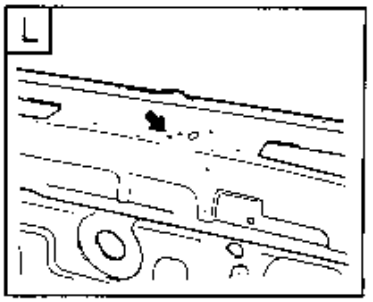
Chile rest anchor mounting hole
(Ø12)



Corner of quarter panel



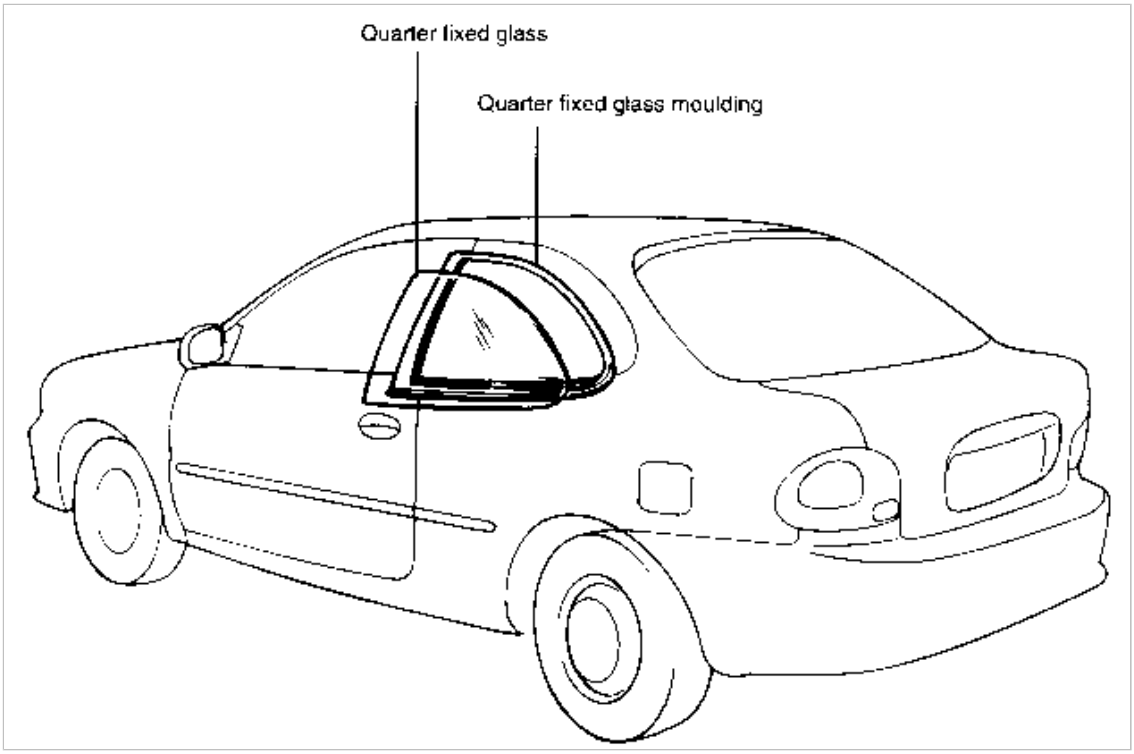
Radiator mounting hole
(Ø6.6)



Paint drain hole
(Ø7)

Body (Interior & Exterior) > Body Paneling & Side Glass > Quarter Glass > COMPONENTS

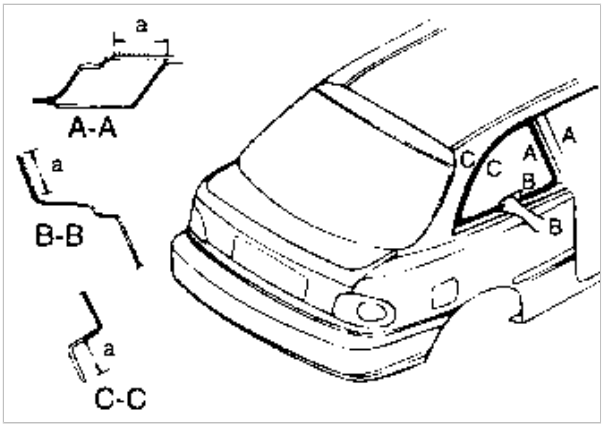
COMPONENTS



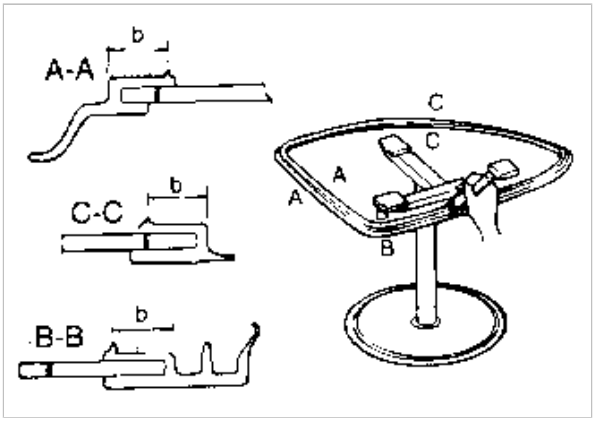
Body (Interior & Exterior) > Body Paneling & Side Glass > Quarter Glass > INSTALLATION

INSTALLATION

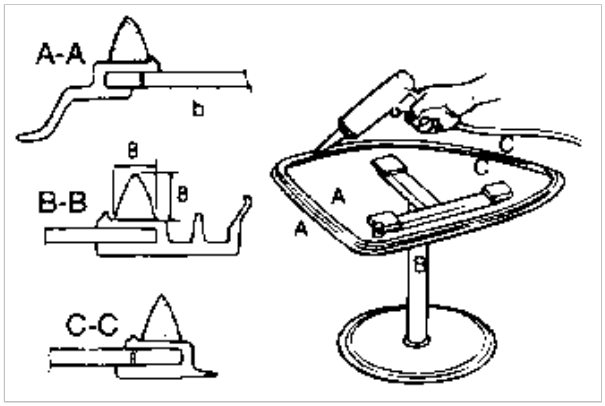
1. Clean the quarter fixed glass moulding assembly with gauze.



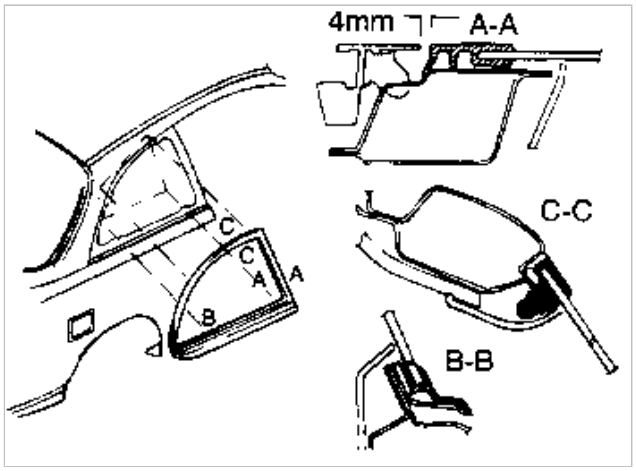
2. Apply a primer to the glass and the glass moulding assembly.



3. Apply the sealant to the entire circumference of the glass.
   Install the glass to the body within five minutes.



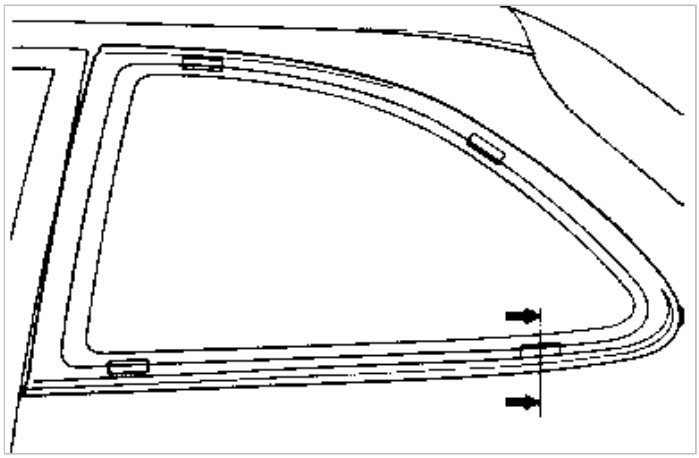
4. To install quarter fixed glass, tighten the glass moulding installing nuts after setting it to the quarter fixed glass hole.



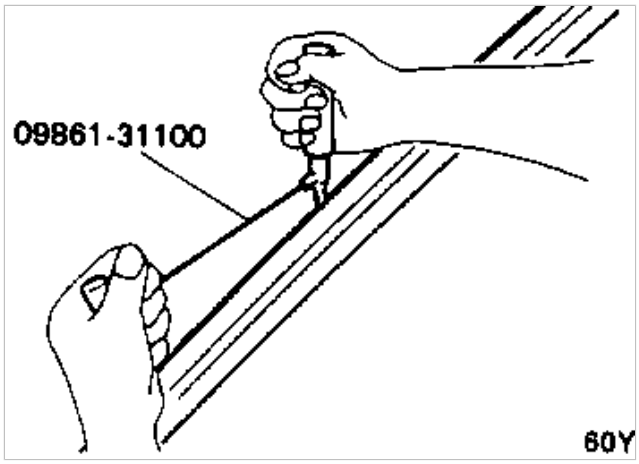
Body (Interior & Exterior) > Body Paneling & Side Glass > Quarter Glass > REMOVAL

REMOVAL

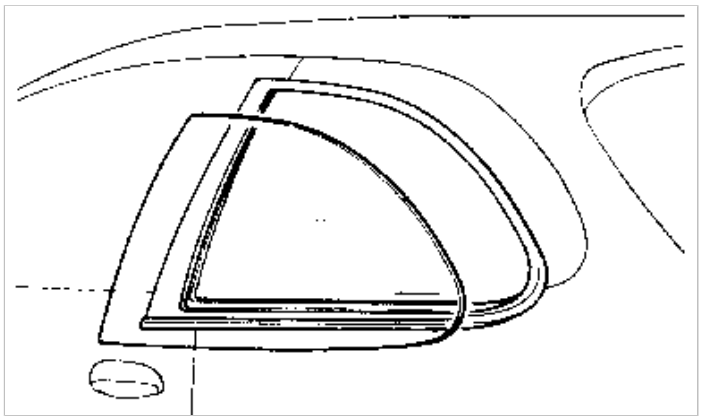
1. Remove the center pillar upper trim and the quarter inner trim, then loosen the glass moulding installing nuts.



2. After removing the quarter fixed glass moulding, cut the sealant using the special tool.

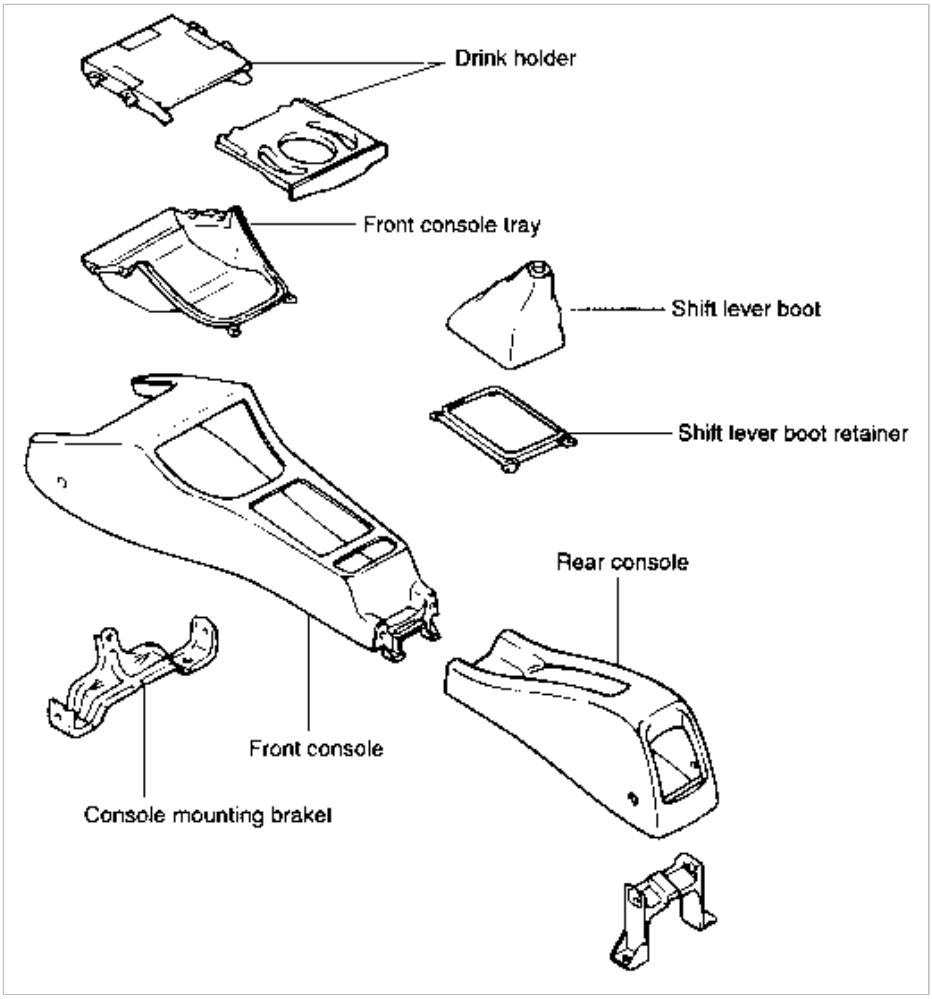


3. Remove the quarter fixed glass.



Body (Interior & Exterior) > Console & Interior Trim > Console > COMPONENTS

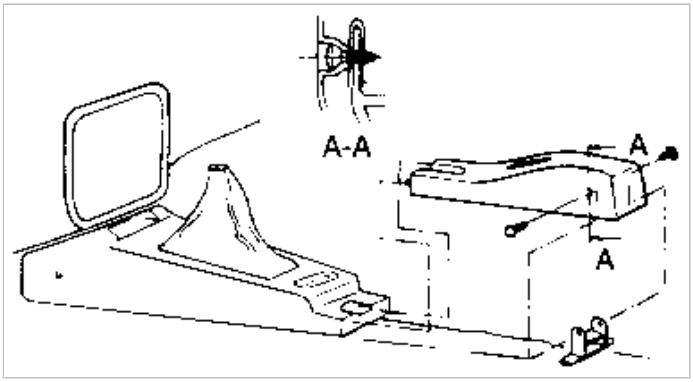
COMPONENTS



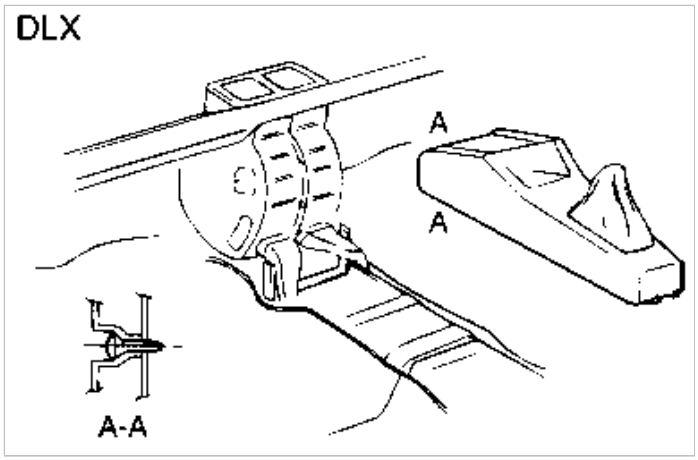
Body (Interior & Exterior) > Console & Interior Trim > Console > REMOVAL

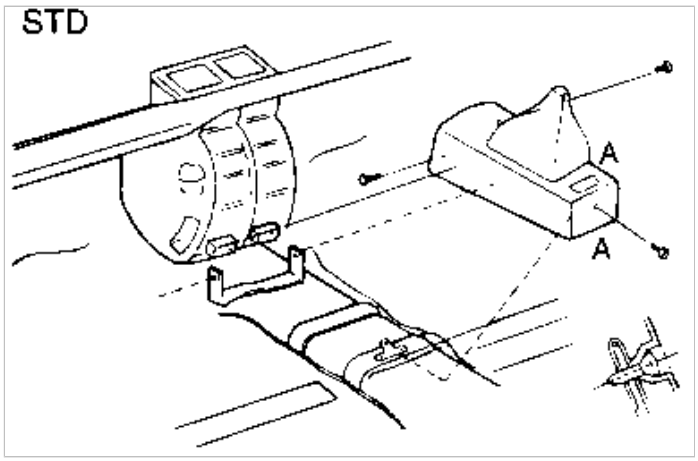
REMOVAL

1. Remove the rear console mounting screws, and then pull out the rear console.



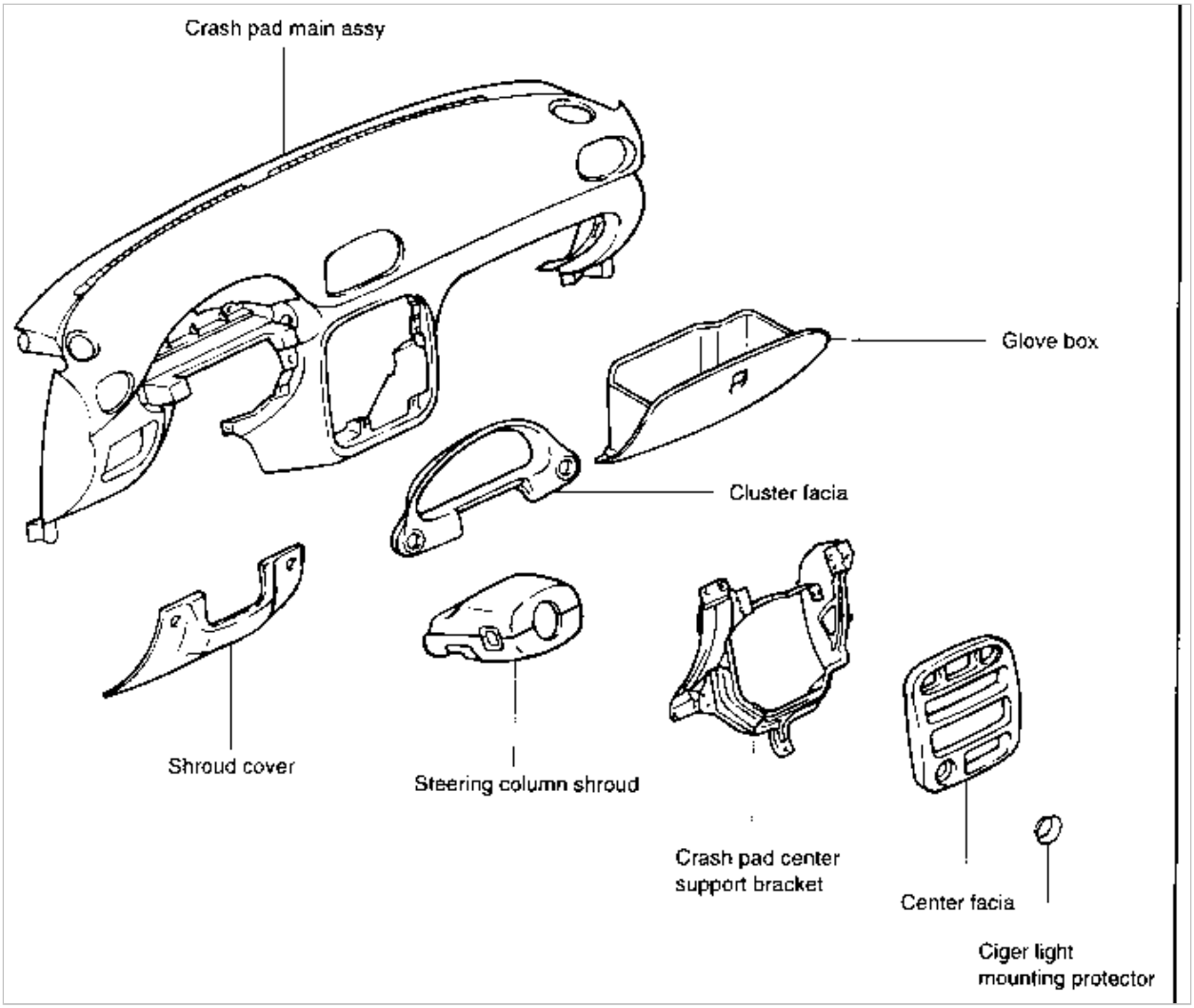
2. Remove the transaxle control lever.
3. Remove the front console assembly and then disconnect the connectors.





Body (Interior & Exterior) > Console & Interior Trim > Crash Pad > COMPONENTS

COMPONENTS



Body (Interior & Exterior) > Console & Interior Trim > Crash Pad > INSTALLATION

INSTALLATION

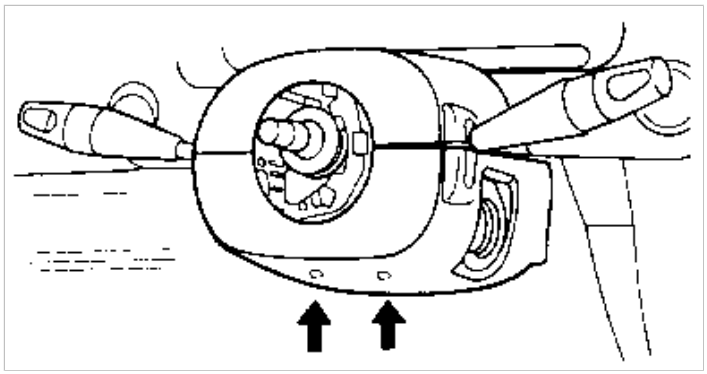
Installation is the reverse of the removal procedure.

Connect all of the connectors securely.

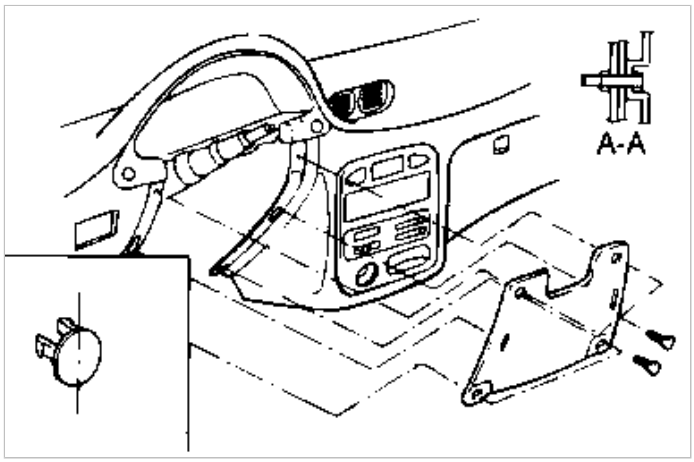
Body (Interior & Exterior) > Console & Interior Trim > Crash Pad > REMOVAL

REMOVAL

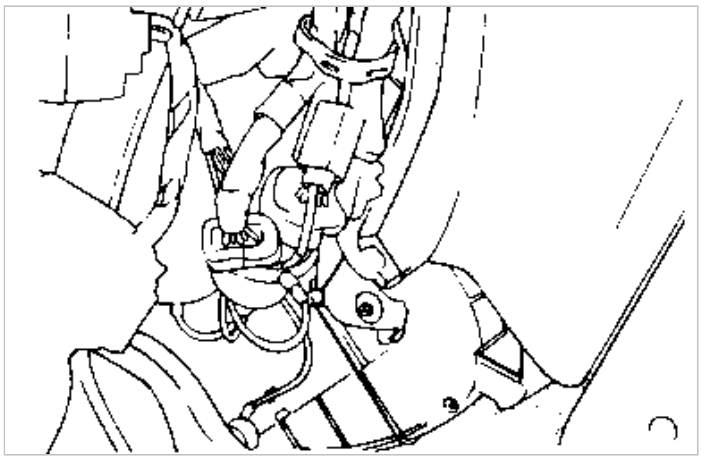
1. Remove the steering wheel, steering column lower and upper shroud.



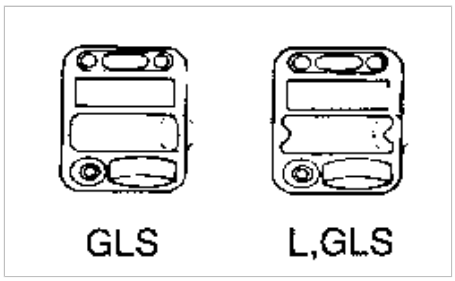
2. Remove the shroud under cover assembly.

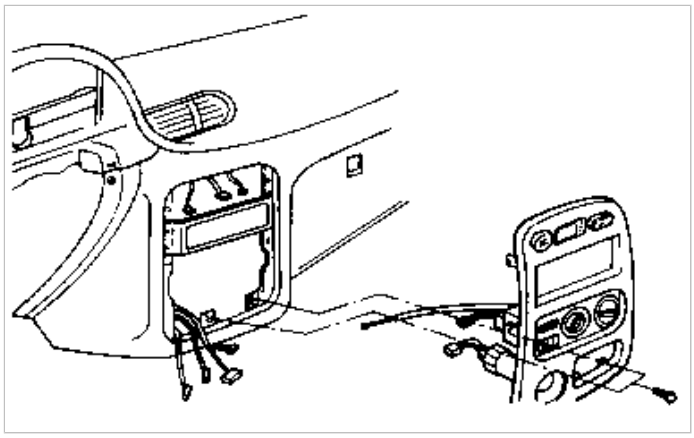


3. Disconnect the air temperature control cable.

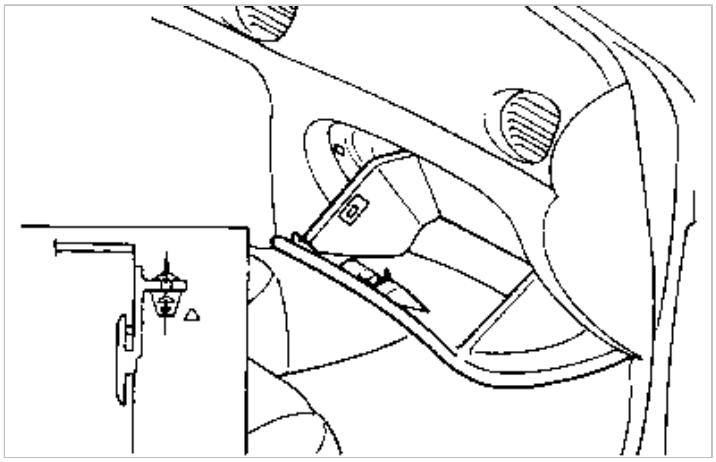


4. Remove the center facia panel assembly and then disconnect the connector.

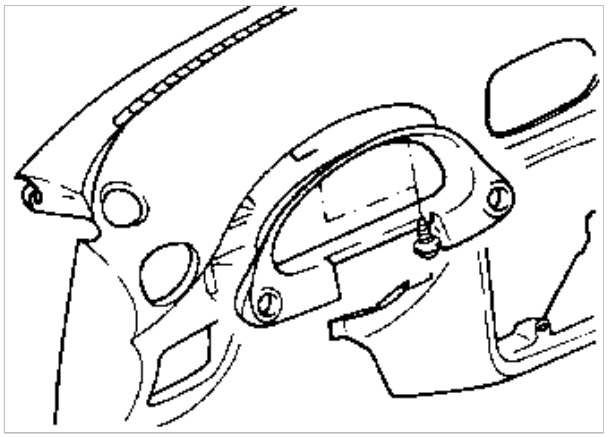




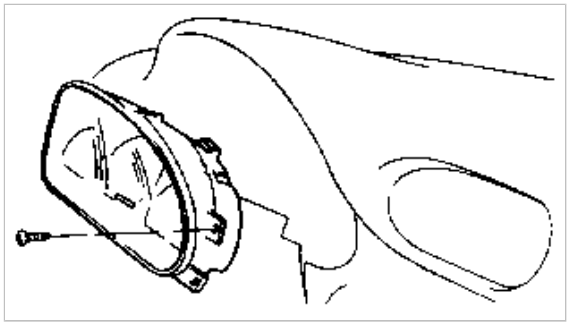
5. Remove the glove box assembly.



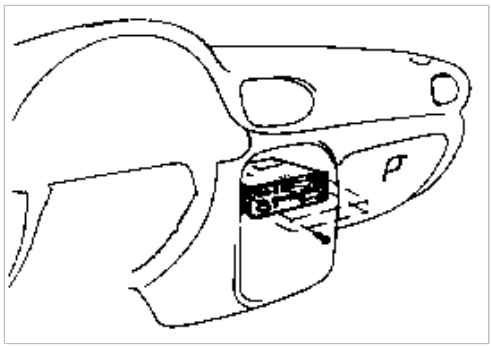
6. Remove the cluster facia and disconnect the connectors.



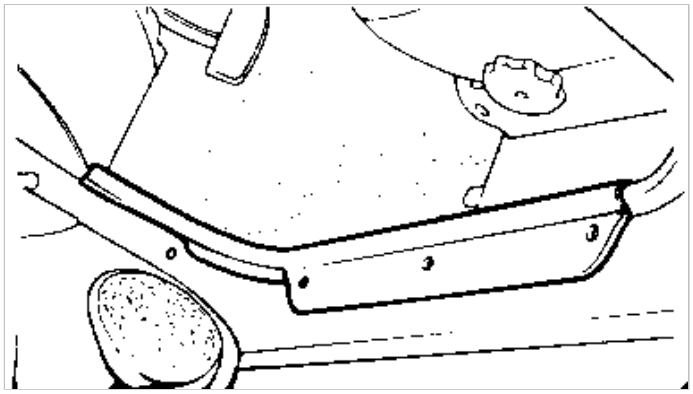
7. Remove the cluster.



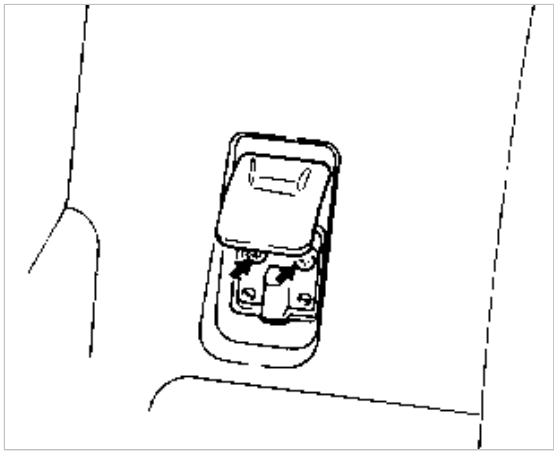
8. Remove the radio and disconnect the connectors.



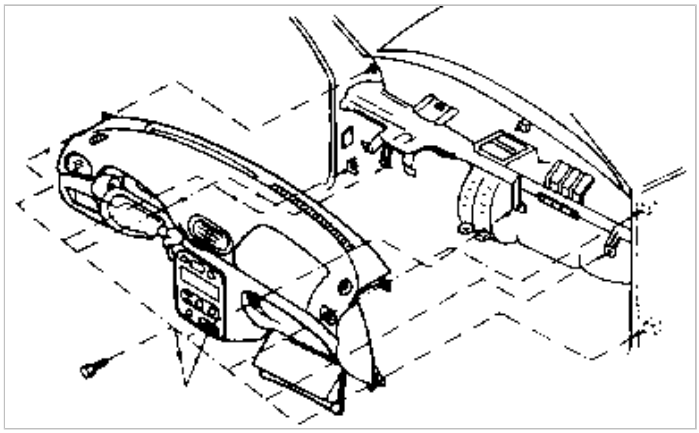
9. Remove the door scuff trim and fuse box.



10. Remove the hood release cable and switch bezel.



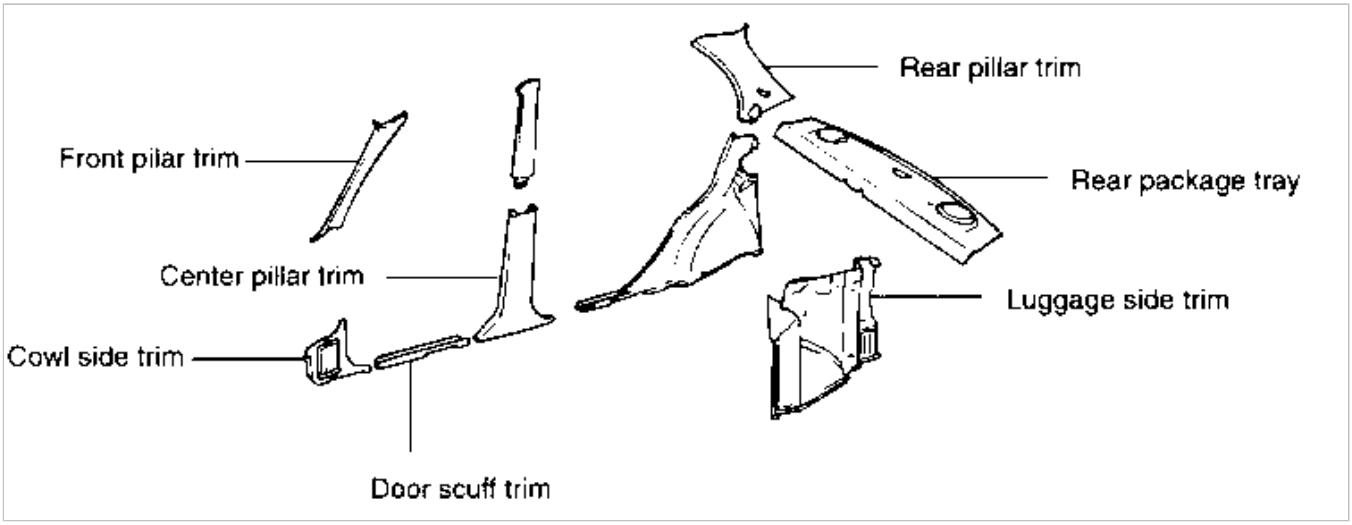
11. Remove the main crash pad.



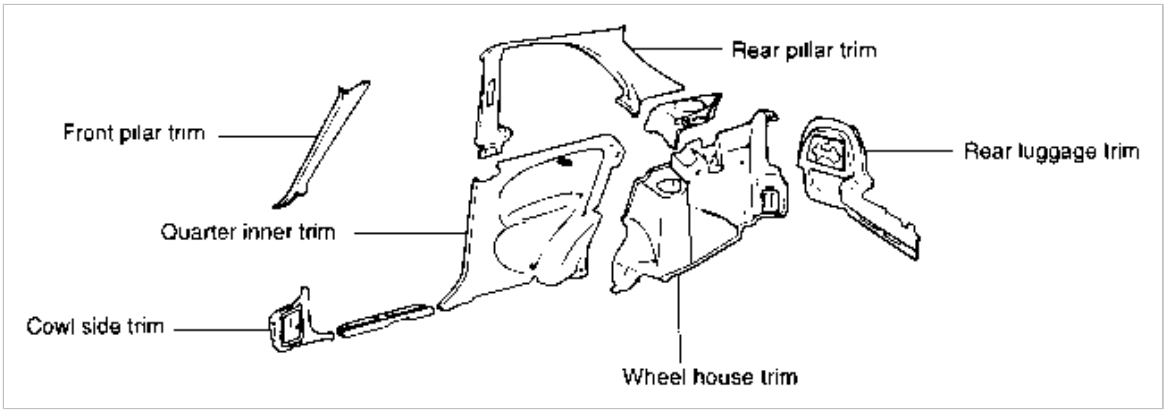
Body (Interior & Exterior) > Console & Interior Trim > Interior Trim > COMPONENTS

COMPONENTS

4 - DOOR



3 - DOOR

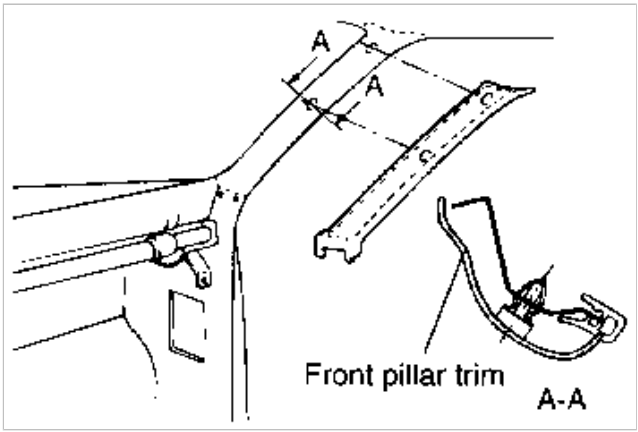


Body (Interior & Exterior) > Console & Interior Trim > Interior Trim > REMOVAL

REMOVAL

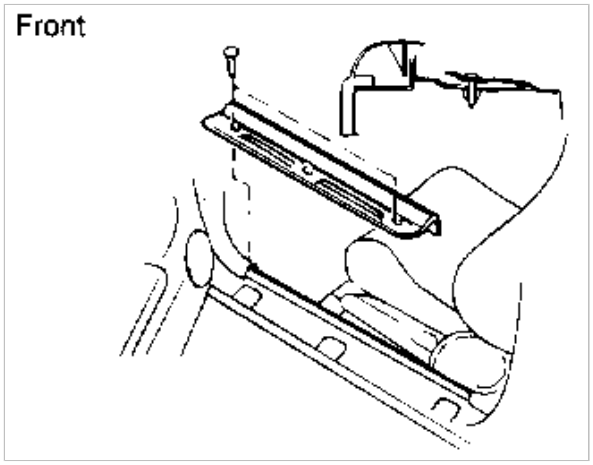
FRONT PILLAR TRIM

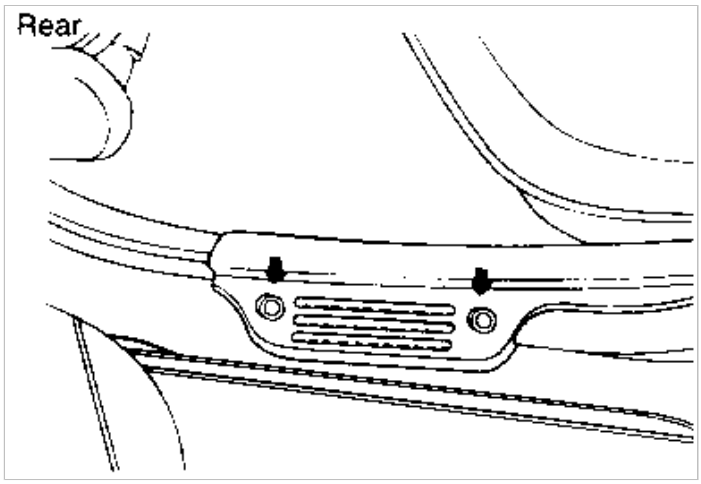
1. Remove the front pillar trim with a screwdriver.



DOOR SCUFF TRIM (4-DOOR)

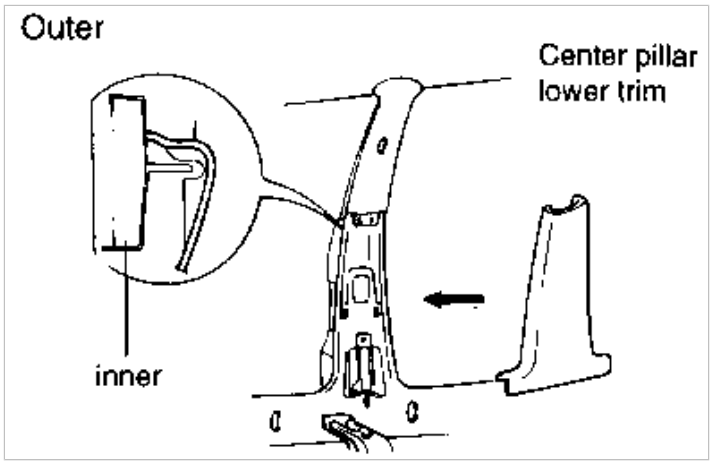
1. Remove the screws from the door scuff trim.
2. Remove the door scuff trim.

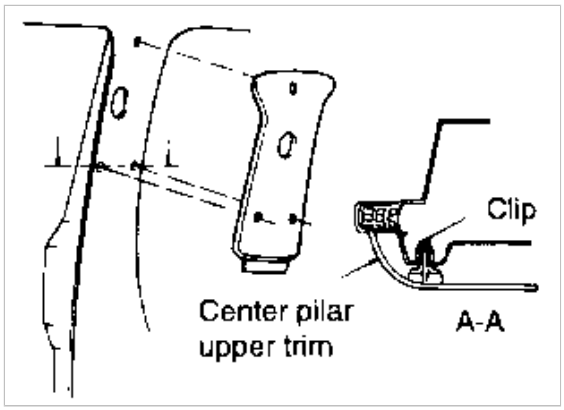




CENTER PILLAR TRIM

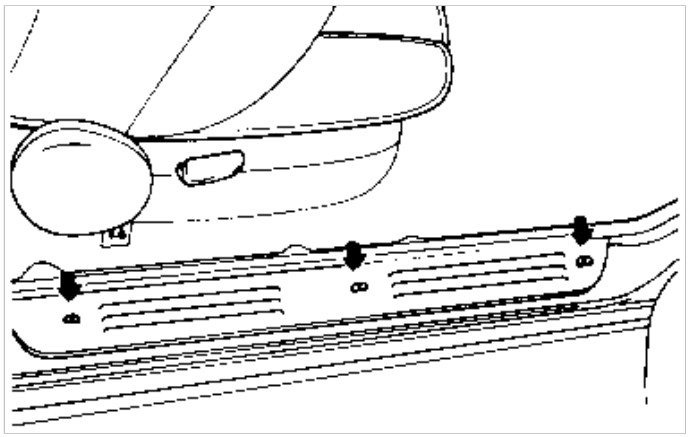
1. Remove the center pillar lower trim.
2. Remove the front seat belt upper anchor plate mounting bolt.
3. Using a screwdriver, pry out the clips and remove the center pillar trim.





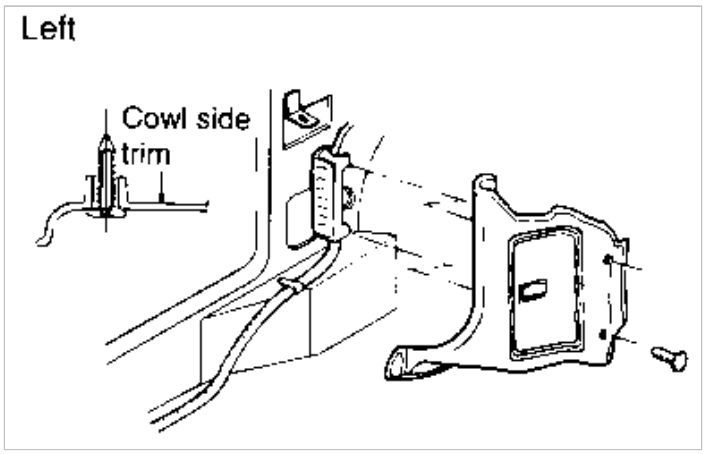
DOOR SCUFF TRIM (3-DOOR)

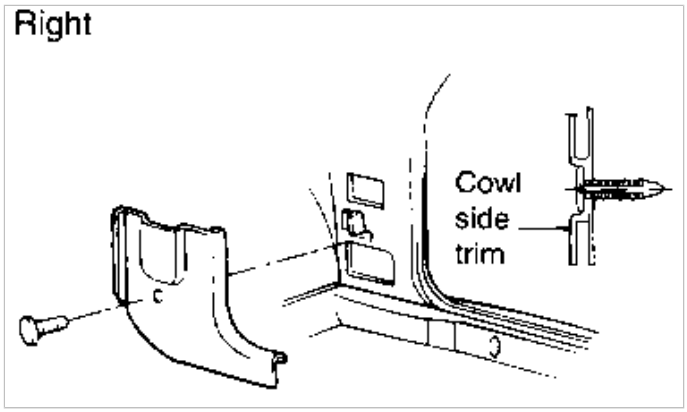
1. Remove the door scuff trim with a screwdriver.



COWL SIDE TRIM

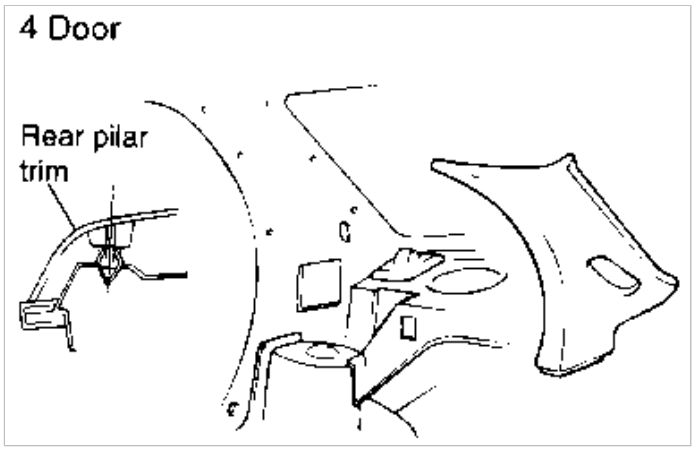
1. Remove the cowl side trim mounting screws, and then remove the cowl side trim.

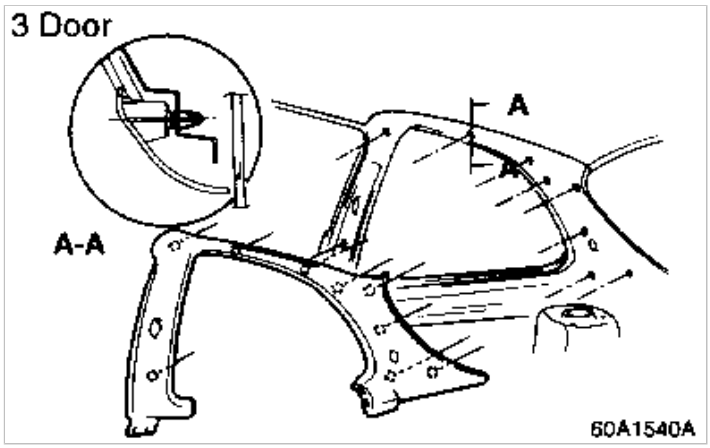




REAR PILLAR TRIM

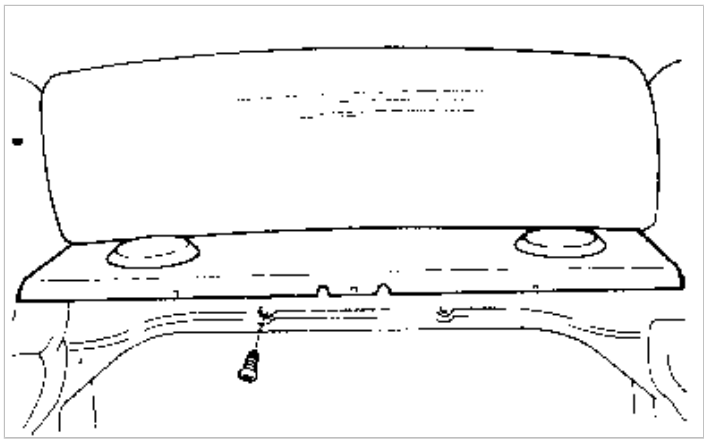
1. Remove the bolt from the rear seat lower anchor.
2. Remove the quarter trim.
3. Using a screwdriver, remove the rear pillar trim.





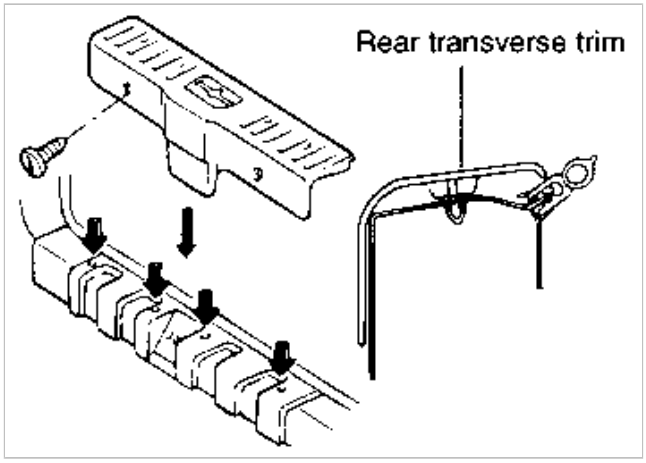
REAR PACKAGE TRAY TRIM

1. Remove the rear package tray trim mounting plugs and the rear package tray trim.



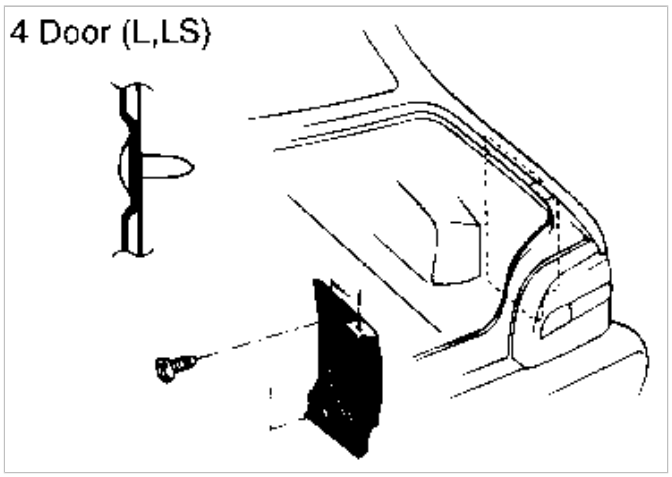
REAR TRANSVERSE TRIM

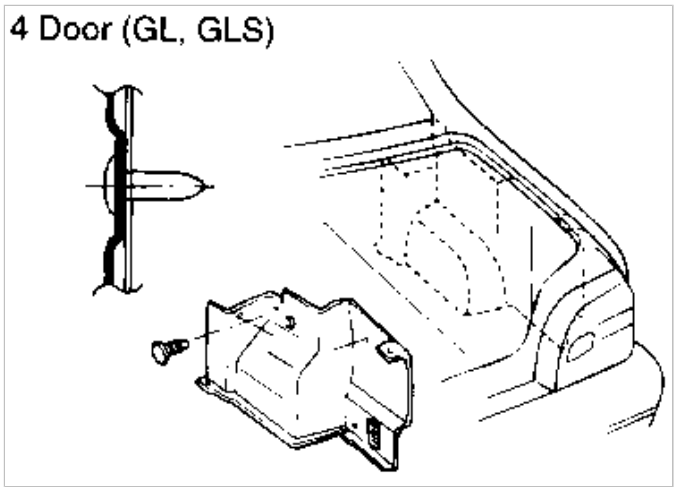
1. Remove the transverse trim mounting fasteners and the rear transverse trim.

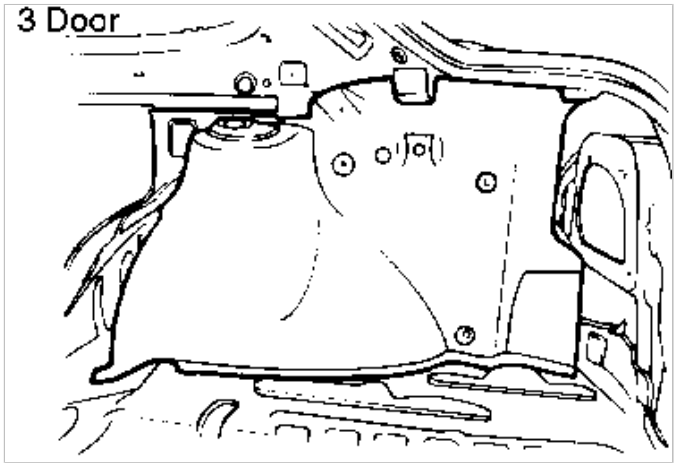


LUGGAGE SIDE TRIM

1. Remove the plugs from the luggage side protector.

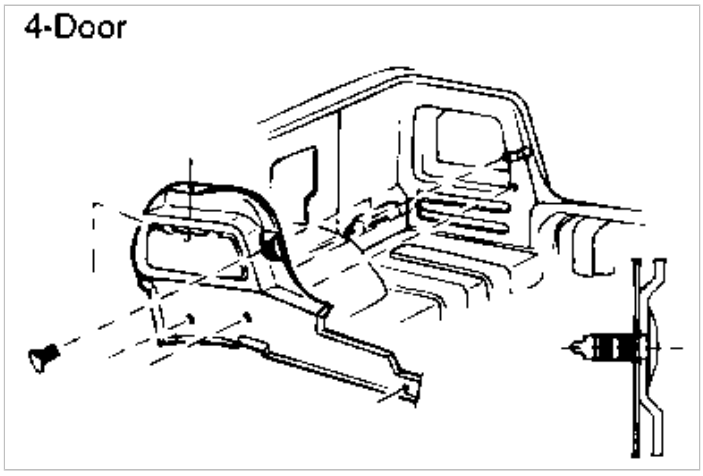






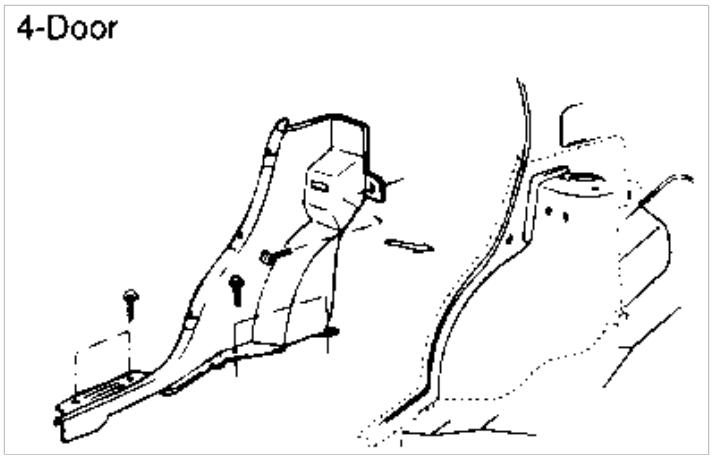
LUGGAGE REAR TRIM

1. Remove the luggage rear trim after removing the trunk lid weatherstrip.



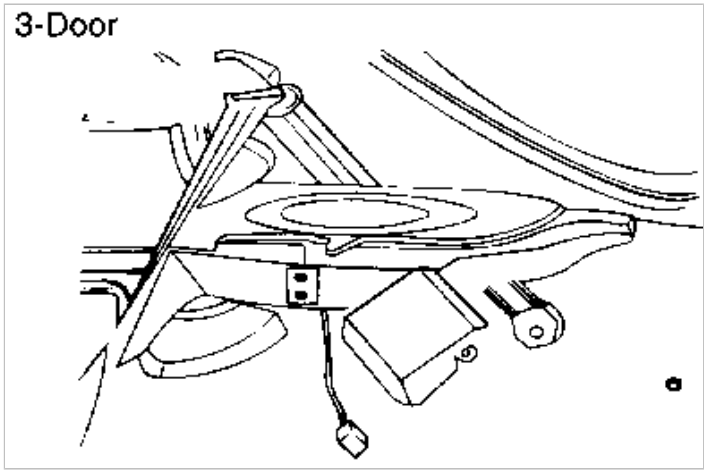
WHEEL HOUSE TRIM

1. Remove the rear seat cushion.
2. Remove the covering shelf side trim.
3. Remove the wheel house trim with a screwdriver.

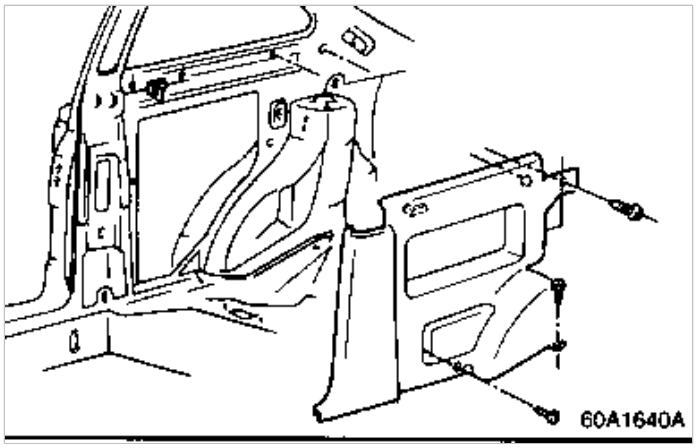


QUARTER INNER TRIM (3-DOOR)

1. Remove the door scuff trim.
2. Remove the cover shelf side trim.

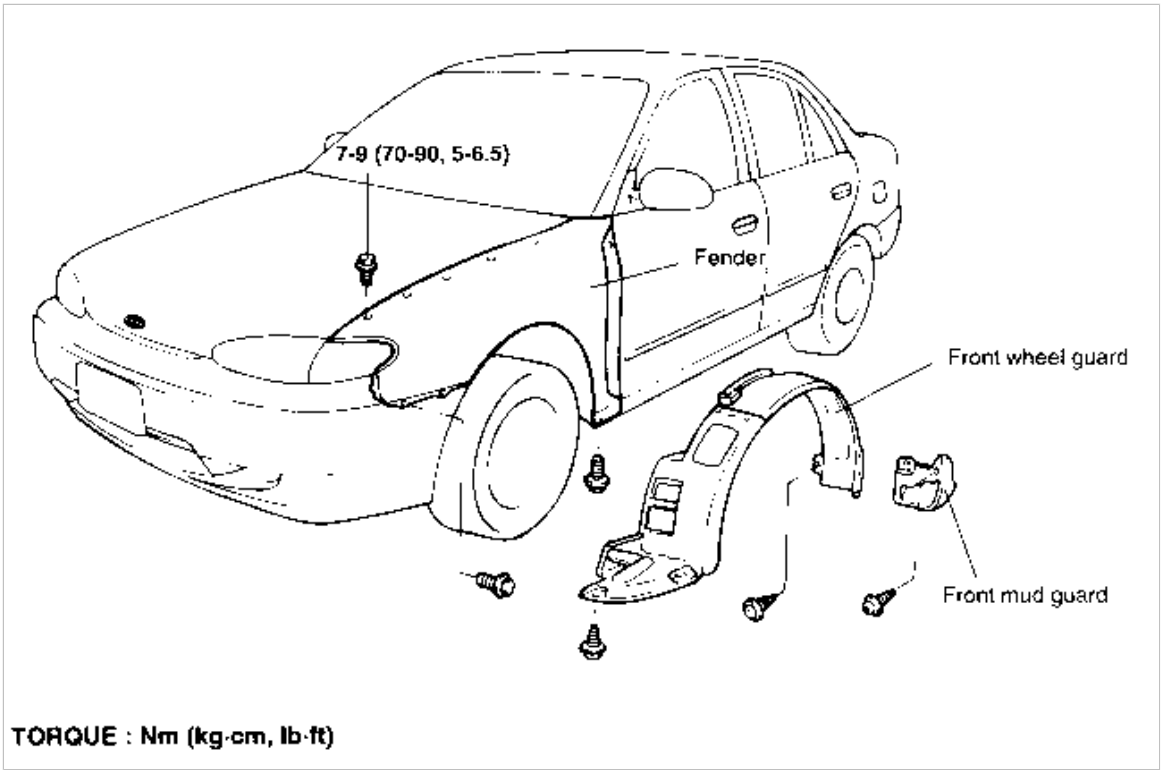


1. Remove the quarter inner trim.



Body (Interior & Exterior) > Fenders > Fender > COMPONENTS

COMPONENTS

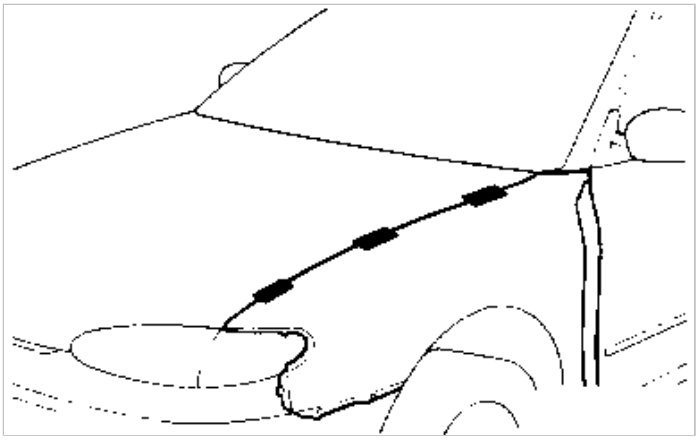


TORQUE : Nm (kg·cm, lb·ft)

Body (Interior & Exterior) > Fenders > Fender > INSTALLATION

INSTALLATION

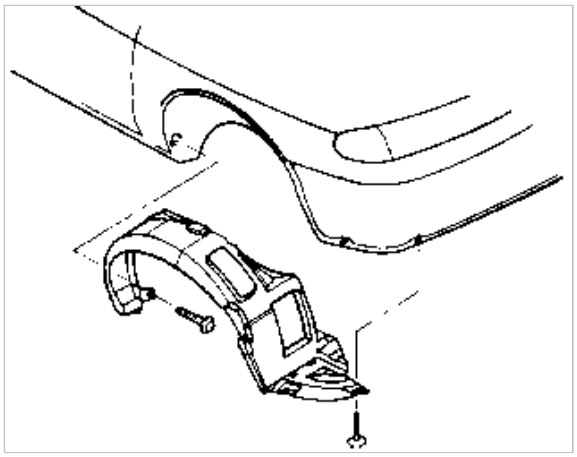
1. Installation is the reverse of the removal procedure.
   In order to prevent the fender mounting bolts area from forming rust, apply tape sealer between the fender and the body panel.



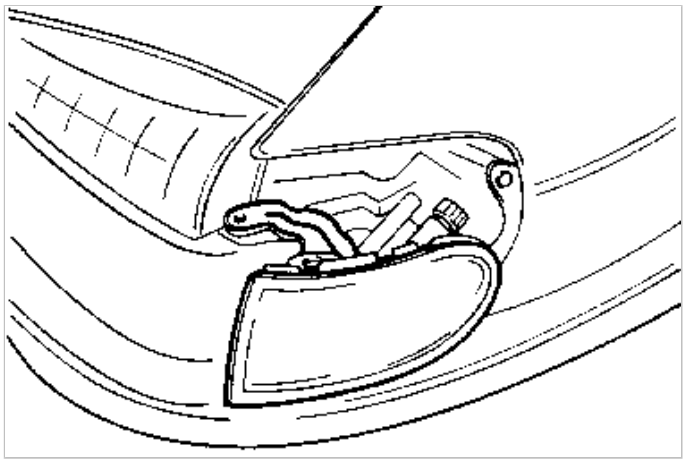
Body (Interior & Exterior) > Fenders > Fender > REMOVAL

REMOVAL

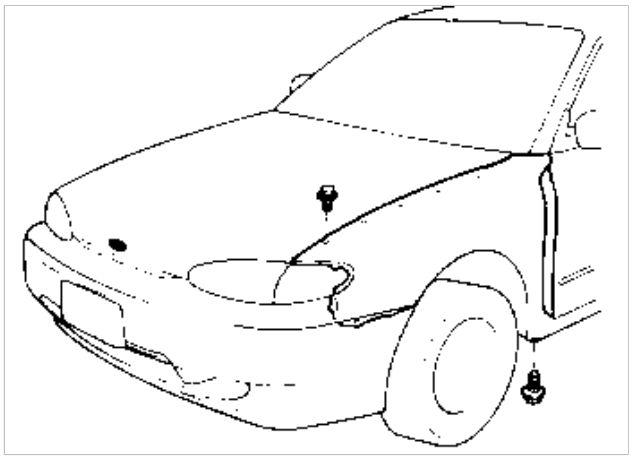
1. Remove the mud guard and wheel guard by loosening the screws.



2. Disconnect the turn signal lamp connector.
3. Remove the turn signal lamp. Remove the hood stay rod and grommet when removing the left fender.



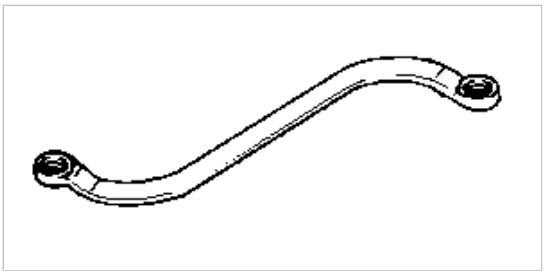
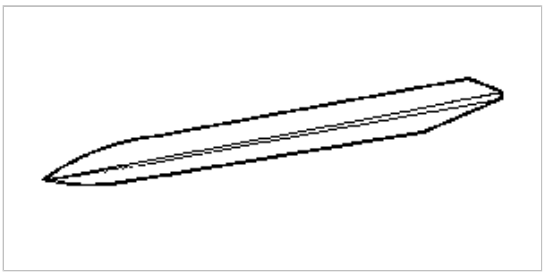
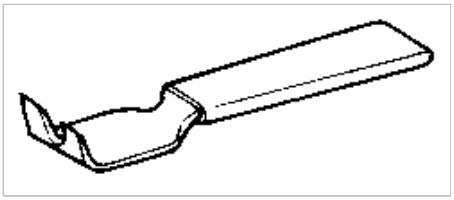
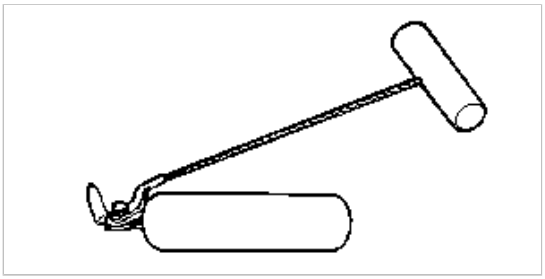
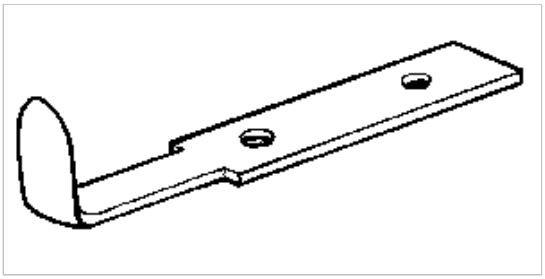
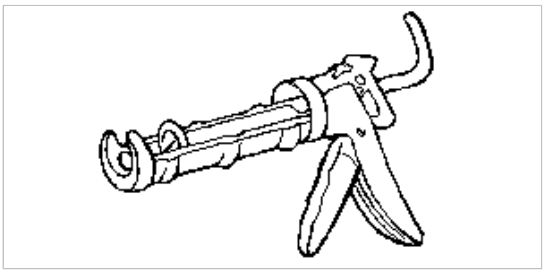
4. Remove the fender mounting bolts.
   Be careful to avoid damaging the paint.

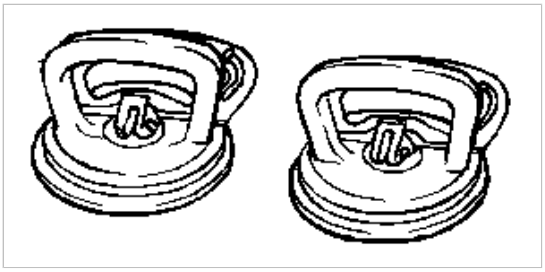
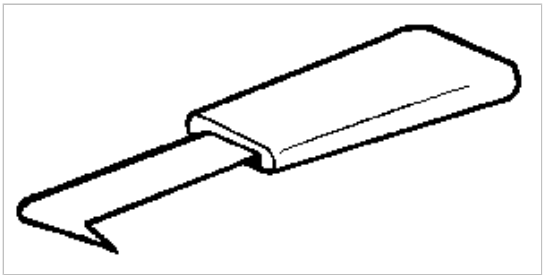


Body (Interior & Exterior) > General > SPECIAL TOOLS

SPECIAL TOOLS

Tool (Number and name)	**Illustration**	**Use**
09793-21000		Adjustment, removal and installation of the door

Door hinge adjusting wrench		hinge
09800-21000 Ornament remover		Trim removal
09853-31000 Head lining clip remover		Removal of the head lining clips
09861-31100 Sealant cut-out tool		Cutting the sealant for the windshield glass (use with 09861-31200)
09861-31200 Sealant cutting blade		Cutting the sealant for the windshield glass (use with 09861-31100)
09861-31300 Sealant gun		Application of the sealant to the windshield glass
09681-31400 Glass holder		Removal and installation of the windshield glass

		
09681-31000 Windshield glass moulding remover		Removal of the windshield glass moulding

Body (Interior & Exterior) > General > SPECIFICATIONS

SPECIFICATIONS

Hood

Type	Rear hinged, front opening type

Front door

Construction	Front hinged, full door construction
Regulator system	Wire drum type
Locking system	Pin-fork system

Rear door

Construction	Front hinged, full door construction
Regulator system	Wire drum type
Locking system	Pin-fork system

Trunk lid

Type	Torsion bar type

Tailgate

Type	Inner hinged, gas lift type

Quarter swivelling window

Type	Front hinged, rear opening type

Glass thickness mm (in.)

Windshield glass (Laminated clear, tinted)	5 (0.20)
Door glass	3.2 (0.13)
Rear fixed glass	3.2 (0.13)

Rear window glass	3.2 (0.13)
Tailgate window glass	3.2 (0.13)
Quarter swivelling glass	3.2 (0.13)

Seat

Front seat travel	225 mm (8.9 in.) by 15 mm (0.6 in.) steps

Seat belt

Driver side	3 point type with E.L.R.
Passenger side and outboard rear side	3 point type with C.L.R.
Rear center	2 point type with static

E.L.R.: Emergency Locking Retractor

C.L.R.: Combination Locking retractor

Body (Interior & Exterior) > General > TIGHTENING TORQUE

TIGHTENING TORQUE

Front and rear doors

|	Nm	kg.cm	lb.ft
Door hinge to body	35-42	350-420	26-31
Door hinge to door	13-26	130-260	9-19

Trunk lid

|	Nm	kg.cm	lb.ft
Trunk lid hinge to body	7-9	70-90	5-6.5
Trunk lid hinge to trunk lid	7-9	70-90	5-6.5

Tailgate

|	Nm	kg.cm	lb.ft
Tailgate hinge to body	7-9	70-90	5-6.5
Tailgate hinge to tailgate	7-9	70-90	5-6.6

Hood

|	Nm	kg.cm	lb.ft
Hood hinge to body	22-27	220-270	16.2-20
Hood hinge to hood	22-27	220-270	16-19.5
Hood latch to body	7-11	70-110	5-8

Seat

|	Nm	kg.cm	lb.ft

Front seat to floor nut	24-36	240-360	17.4-26
Front seat to floor bolt	35-55	350-550	25.3-40
Rear seat back tilting bracket	17-26	170-260	12-19

Seat belt

	Nm	kg.cm	lb.ft
Front seat belt buckle	40-55	400-550	29-40
Front seat belt retractor to center pillar	40-45	400-450	29-40
Rear seat belt anchor attaching bolt	40-45	400-450	29-40

Body (Interior & Exterior) > General > TROUBLESHOOTING

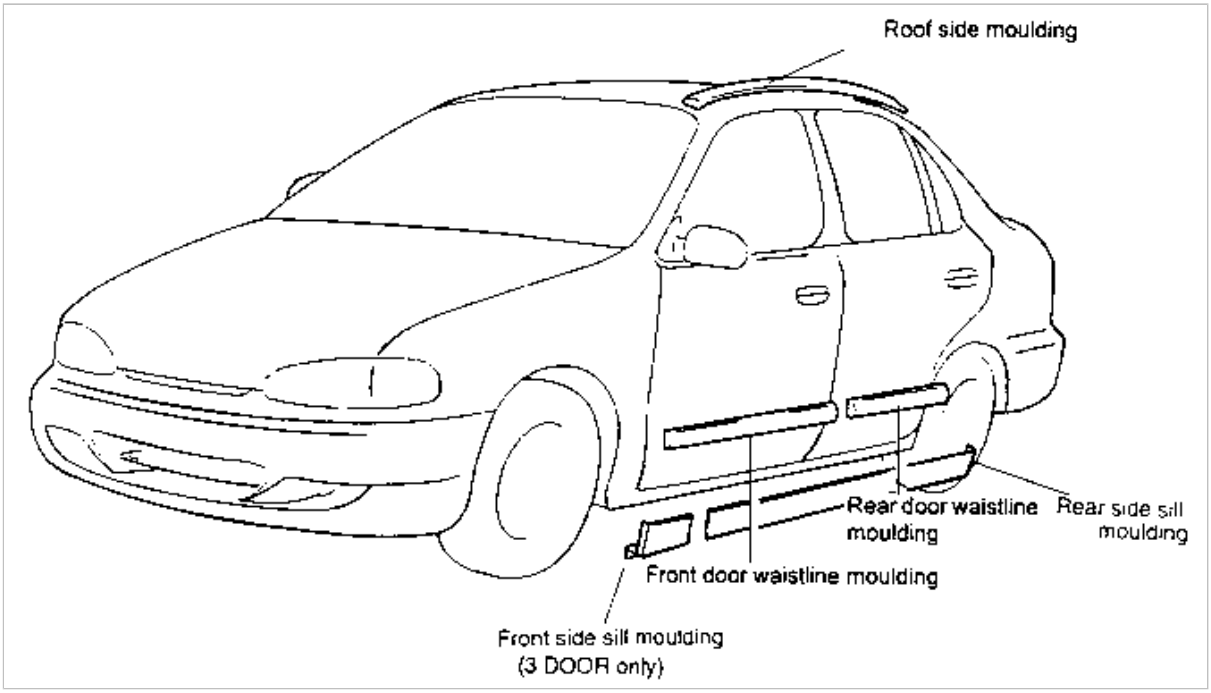
TROUBLESHOOTING

Symptom	Probable cause	Remedy
Sunroof Water leaks	Dust accumulated in drainage of housing assembly	Clear dust from inside of drain pipe
	Clogged drain pipe	Blow air into drain pipe to remove dust
	Broken or dislocated drain pipe, defective or cracked clip	Check pipe installation and flange contact
	Deteriorated roof lid weatherstrip	Replace
	Excessive roof lid-to-body clearance and improperly fitted weatherstrip	Adjust
Wind noise	Loose or deformed deflector	Retighten or replace
Roof lid makes noise when moved	Foreign matter lodged in guide rail	Check drive cable and guide rails for foreign matter
	Loose guide rails and lid	Retighten
Motor runs but lid does not move or moves only halfway	Foreign matter lodged in guide rail	Check drive cable and guide rails for foreign matter
	Incorrect engagement of motor pinion with drive cable	Check for loose motor installation and damaged pinion
	Decrease in clutch slipping force of motor	Adjust
	Increased lid sliding resistance or interference of lid with drive cables, weatherstrip, etc. due to maladjustment of lid	Adjust or replace
Noise in motor (Clutch slipping noise made in motor when lid is fully opened or closed is not unusual noise.)	Incorrect engagement of motor pinion with drive cable	Check pinion installation and retighten motor
	Worn or damaged motor pinion bearing	Replace motor assembly
	Worn or deformed drive cable	Replace
Door glass fails to operate up and down	Incorrect window glass installation	Adjust position
	Damaged or faulty regulator arm or regulator	Correct or replace

Door does not open or close completely	Incorrect door installation	Adjust position
	Defective door check	Correct or replace
	Door hinge requires grease	Apply grease
Hood does not open or close completely	Striker and latch not properly aligned	Adjust
	Incorrect installed hood	Adjust
	Incorrect hood bumper height	Adjust
Water leak through windshield and rear window	Defective seal	Fill will sealant
	Defective flange	Correct
Wind noise around door	Weather-strip not holding firmly	Adjust fit of door
	Improperly installed weather-strip or setting of weather-strip	Repair or replace
	Improperly closed door	Adjust
	Improperly fit door	Adjust
	Improper clearance between door glass and division channel	Adjust
	Deformed door	Repair or replace

Body (Interior & Exterior) > Grille, Molding & Bumpers > Body Side Moldings > COMPONENTS

COMPONENTS



Body (Interior & Exterior) > Grille, Molding & Bumpers > Body Side Moldings > INSTALLATION

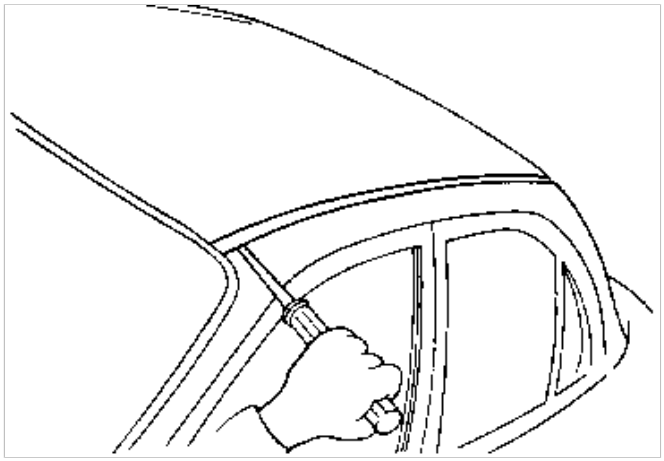
INSTALLATION

1. Installation is the reverse of the removal procedure.
   If necessary, replace any damaged clips.

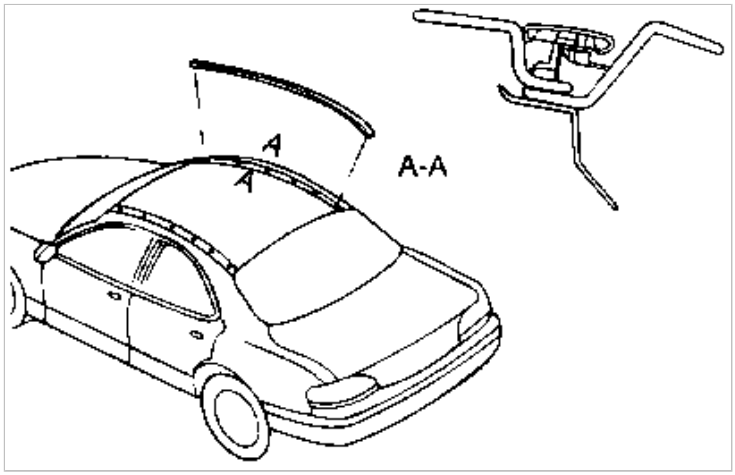
Body (Interior & Exterior) > Grille, Molding & Bumpers > Body Side Moldings > REMOVAL

REMOVAL

1. Pry the roof moulding with a flat tip screwdriver as shown in the illustration.
   When prying with a flat tip screwdriver, wrap it with protective tape to prevent damage.
   Take care not to scratch the body and roof moulding. Use protective tape on the body.



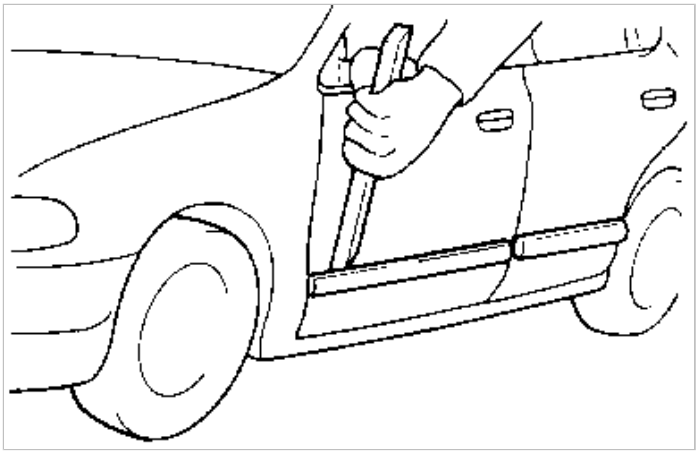
2. Pull the roof moulding up, then remove the roof moulding.



Body (Interior & Exterior) > Grille, Molding & Bumpers > Body Side Moldings > WAISTLINE MOULDING

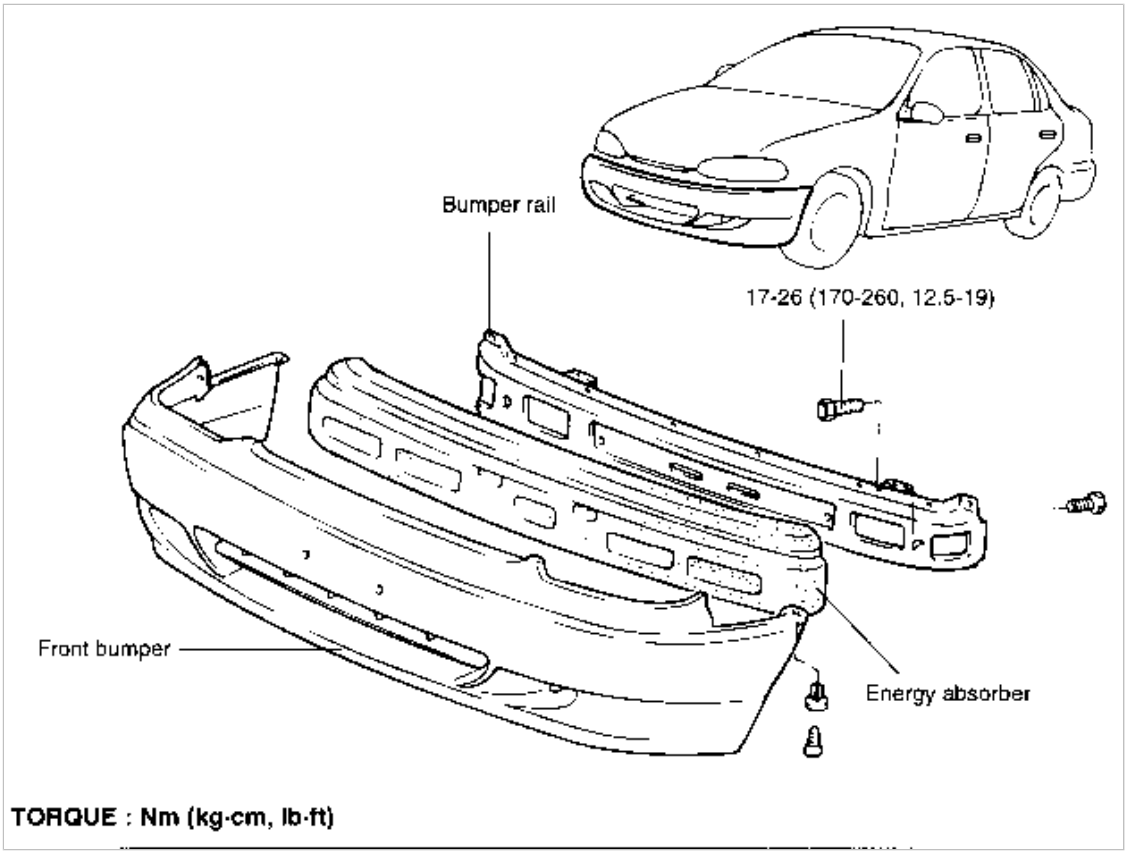
WAISTLINE MOULDING

1. Beginning from either end, remove the waistline moulding using Special tool (09800-21000) from the front and rear doors.
   Take care not to scratch or bend the door mouldings.



Body (Interior & Exterior) > Grille, Molding & Bumpers > Bumper > FRONT BUMPER

FRONT BUMPER



Body (Interior & Exterior) > Grille, Molding & Bumpers > Bumper > INSTALLATION

INSTALLATION

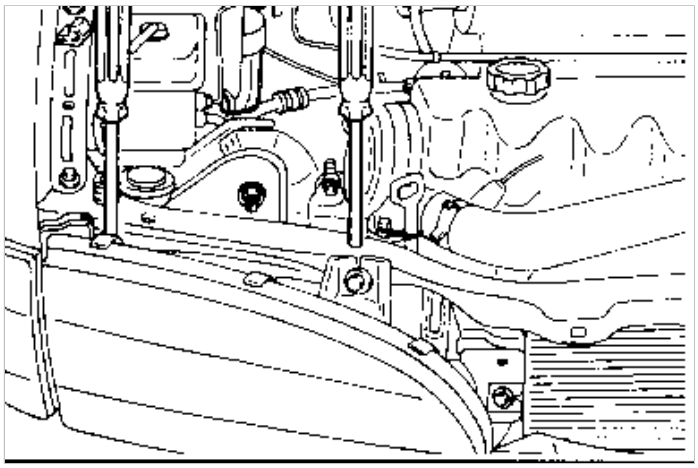
Installation is the reverse of the removal procedure.

Body (Interior & Exterior) > Grille, Molding & Bumpers > Bumper > INSTALLATION

INSTALLATION

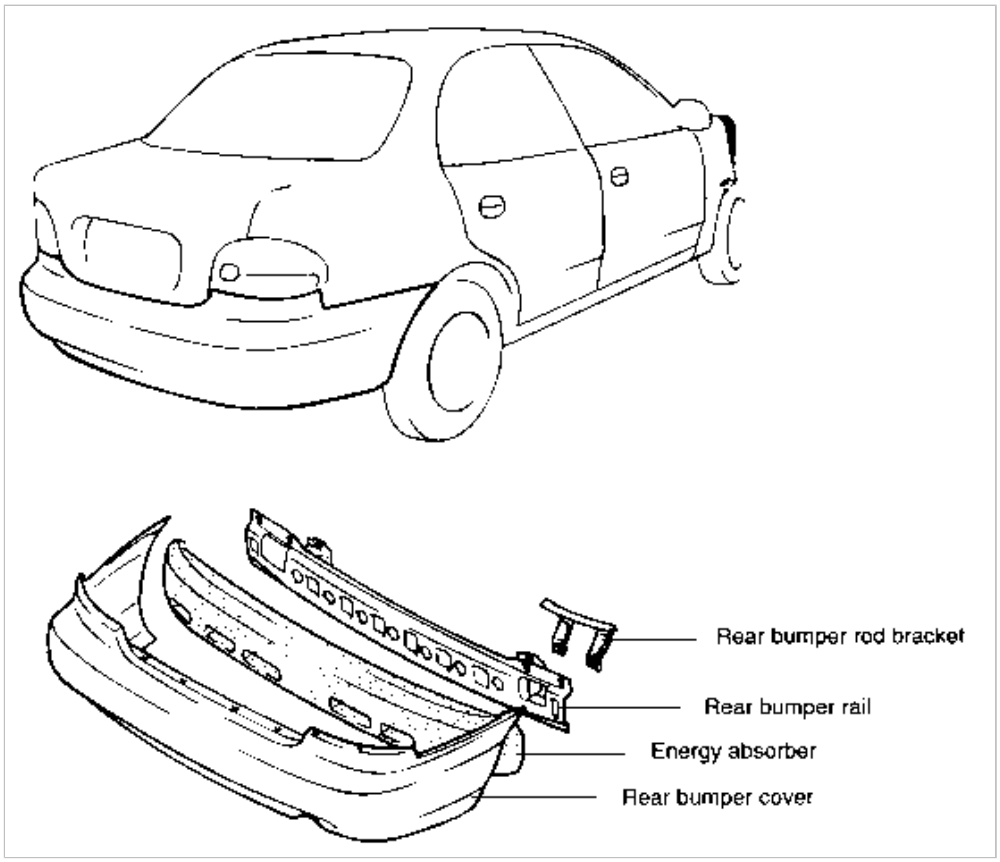
Installation is the reverse of the removal procedure.

Be sure to adjust the front head lamp alignment after installing the front bumper (refer to 90 Group's body electrical system)



Body (Interior & Exterior) > Grille, Molding & Bumpers > Bumper > REAR BUMPER

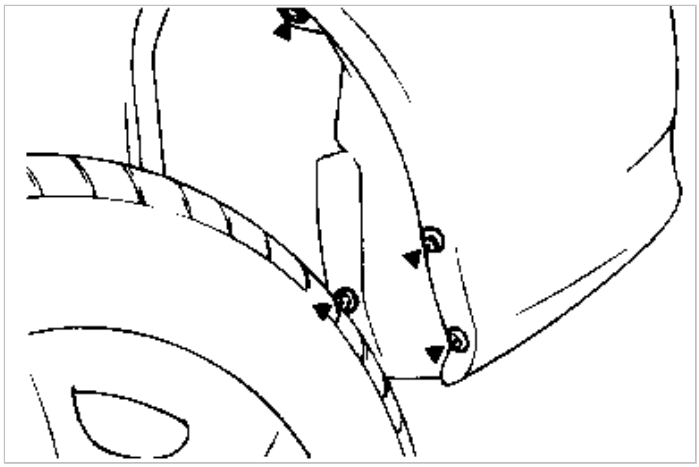
REAR BUMPER



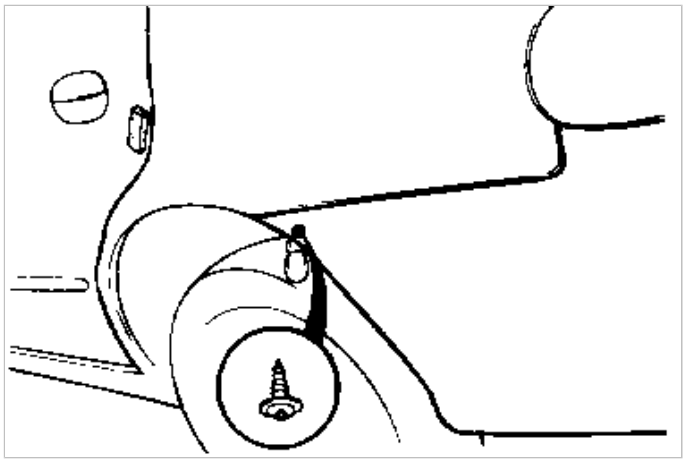
Body (Interior & Exterior) > Grille, Molding & Bumpers > Bumper > REMOVAL

REMOVAL

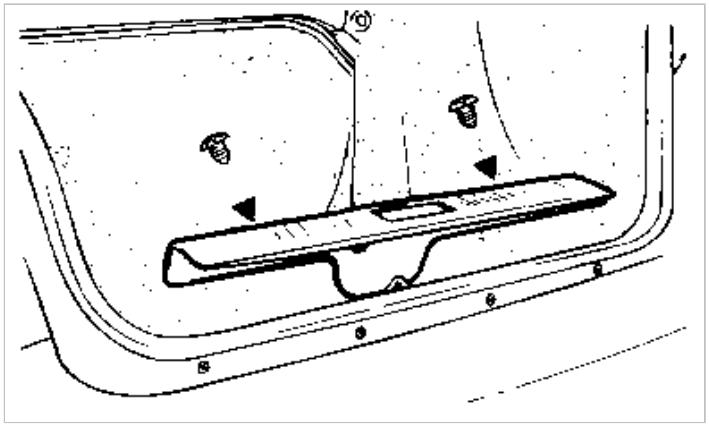
1. Remove the wheel guard.



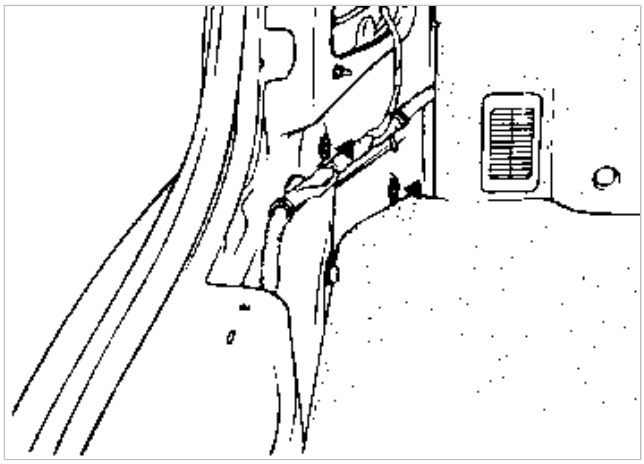
2. Remove the tapping screw mounted on the quarter panel.



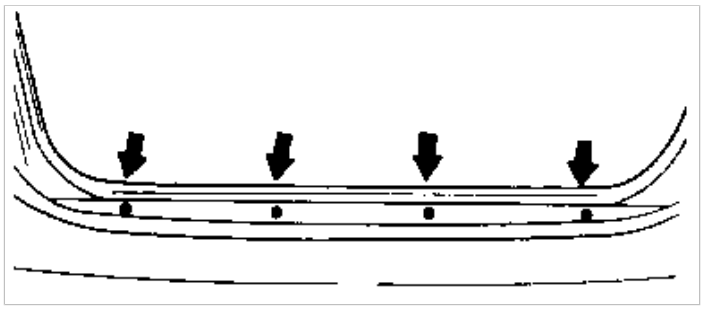
3. Remove the rear garnish and trunk trim.



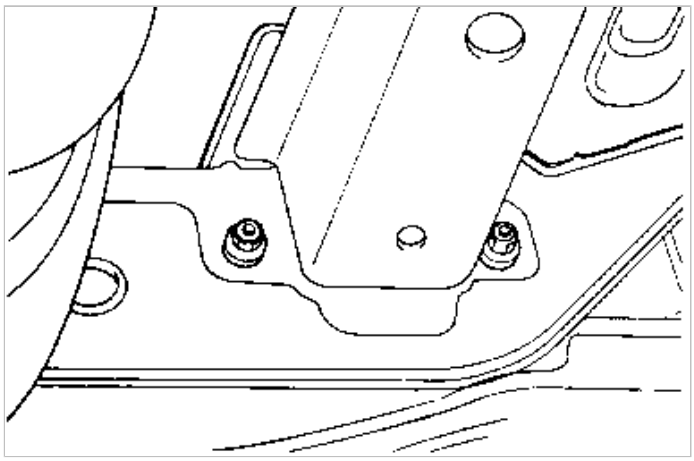
4. Remove the side mounting flange bolts on the quarter panel.



5. Remove the tapping screw mounted on the back panel.



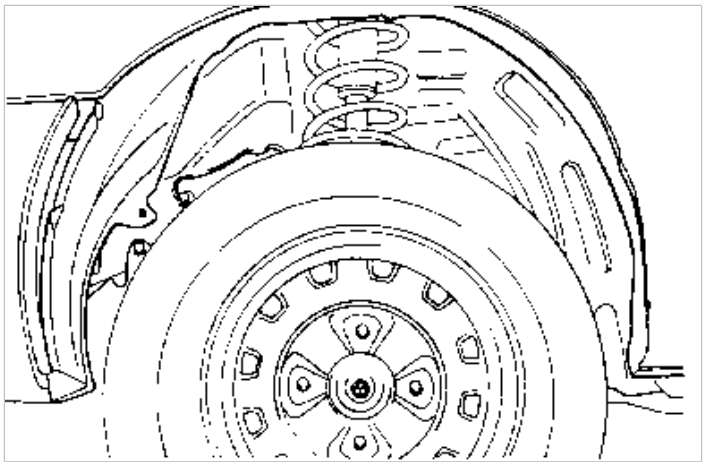
6. Loosen the bumper stay installing bolts from under the vehicle and in the trunk room.



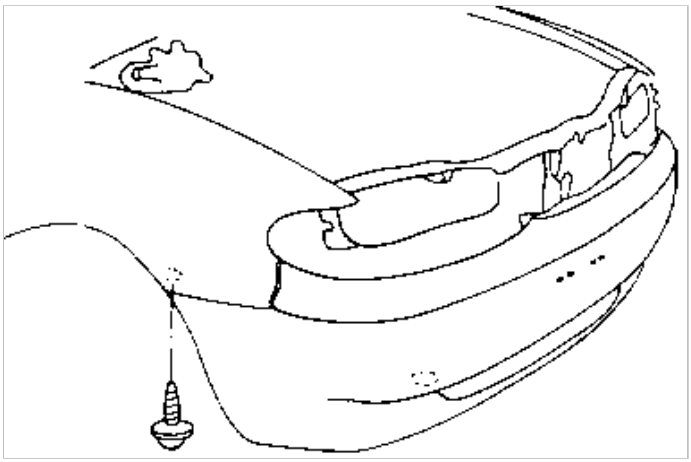
Body (Interior & Exterior) > Grille, Molding & Bumpers > Bumper > REMOVAL

REMOVAL

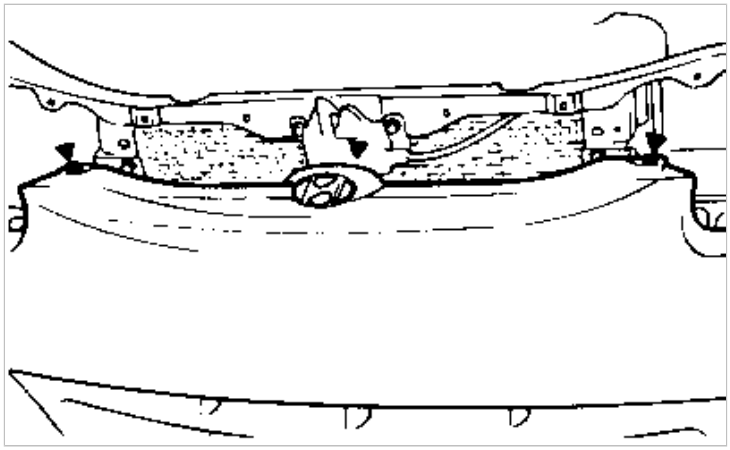
1. Remove the front turn signal lamp and head lamp.
2. Remove the front wheel guard.



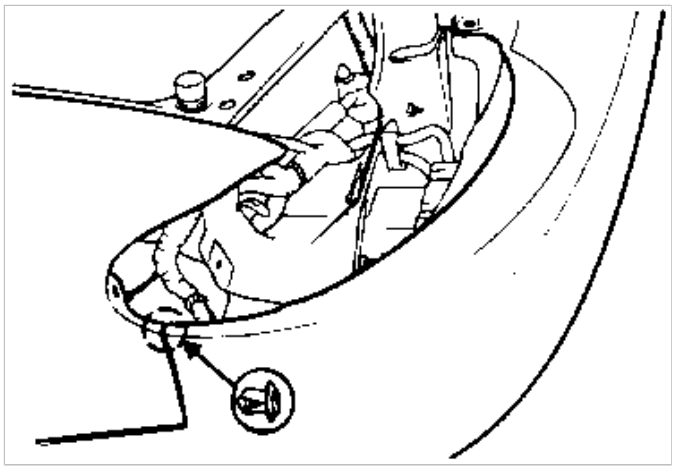
3. Remove the tapping screw mounted on the fender panel.



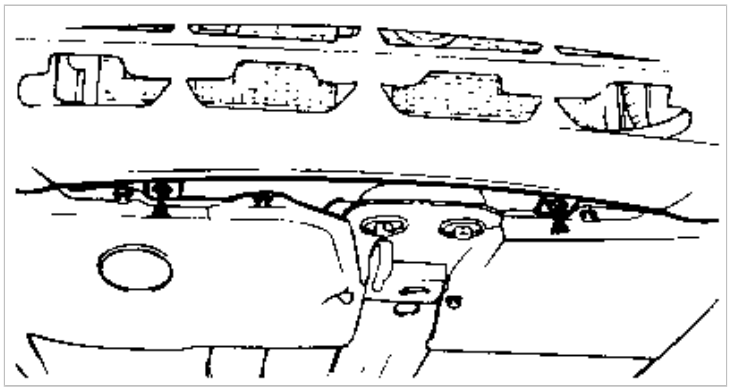
4. Remove the step tapping screw mounted on the radiator upper member.



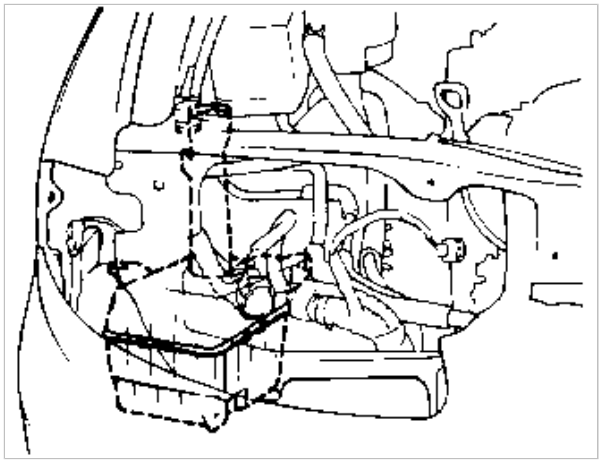
5. Remove the retainer mounted on the fender panel.



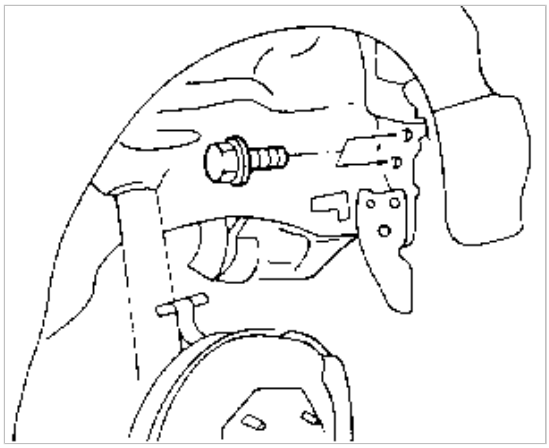
6. Lift the vehicle up, then remove the retainers on the lower member.



7. Remove the washer reservoir tank.

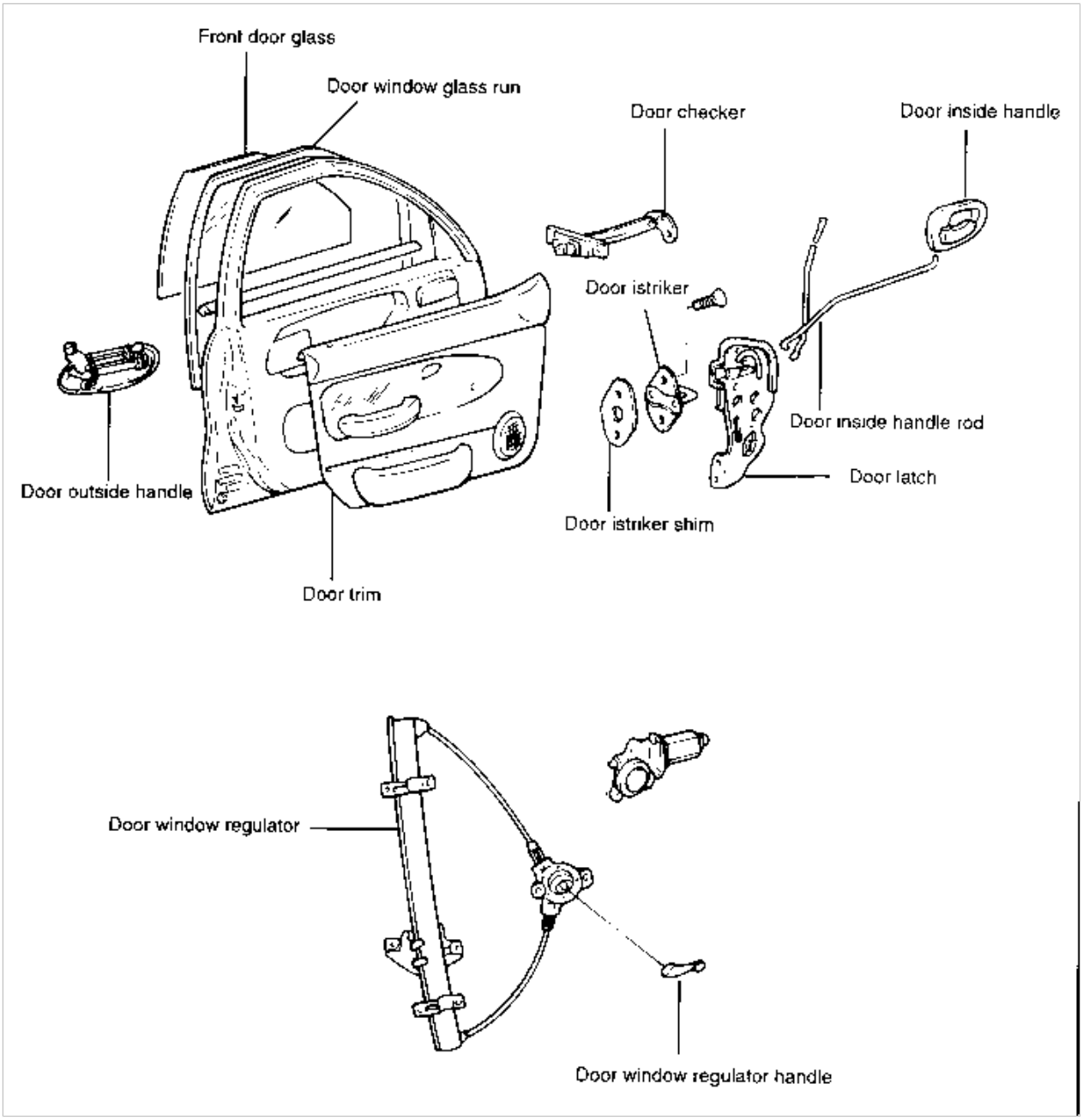


8. Remove the bumper stay-to-body bolts.



Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Front Door > COMPONENTS

COMPONENTS



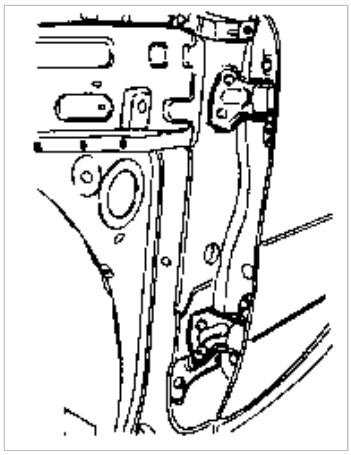
Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Front Door > DOOR POSITION ADJUSTMENT

DOOR POSITION ADJUSTMENT

Check for flush fit with the body, then check for equal gap between the front and rear, and top and bottom door edges and the body.

The door and body edges should also be parallel. Adjust at the hinge with the Special Tool (09793-21000).

Attach protective tape to the fender edges near the place where the hinge is installed.

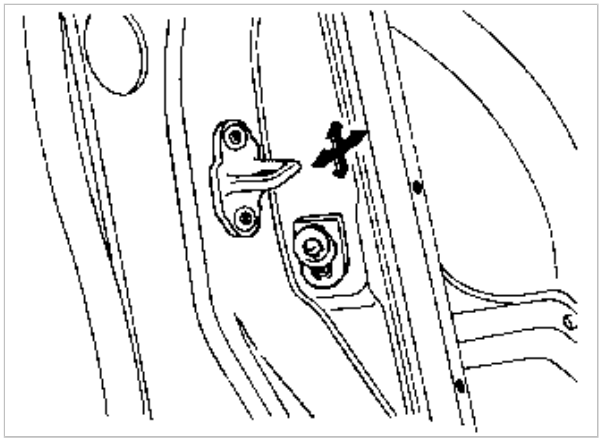


Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Front Door > DOOR STRIKER ADJUSTMENT

DOOR STRIKER ADJUSTMENT

Make sure the door is not loose and that it latches securely without slamming. If necessary, adjust the door as follows:

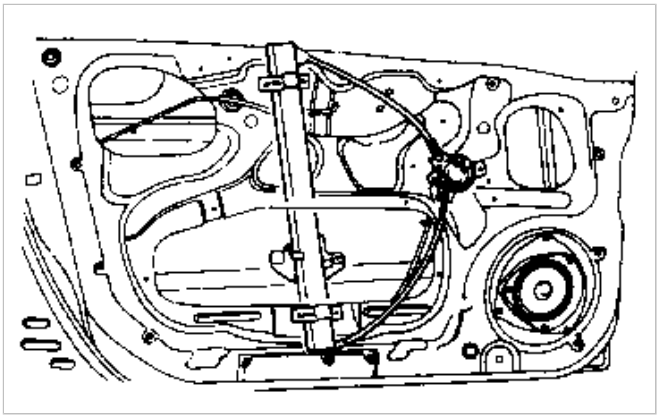
1. Draw a line around the striker plate for reference.
2. Loosen the striker screws and move the striker IN or OUT to make the latch fit tighter or looser. Move the striker UP or DOWN to align it with the latch opening. Then lightly tighten the screws and recheck.
   Hold the outside handle out and push the door against the body to be sure the striker allows a flush fit.



Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Front Door > GLASS ADJUSTMENT

GLASS ADJUSTMENT

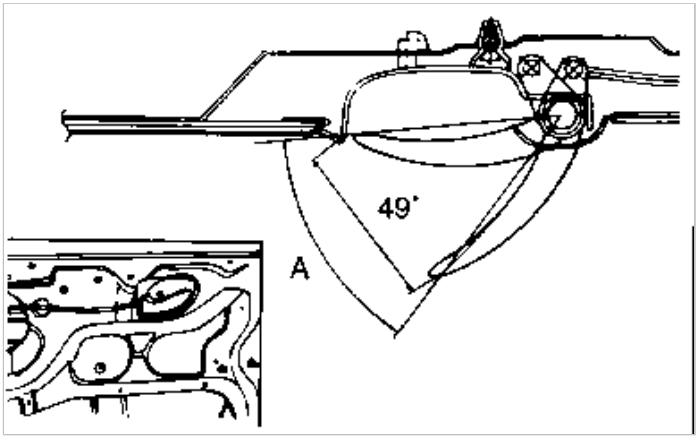
If the glass does not fit evenly when closed, adjust the slant of the glass in the front-to-back direction.



Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Front Door > INSIDE DOOR HANDLE ADJUSTMENT

INSIDE DOOR HANDLE ADJUSTMENT

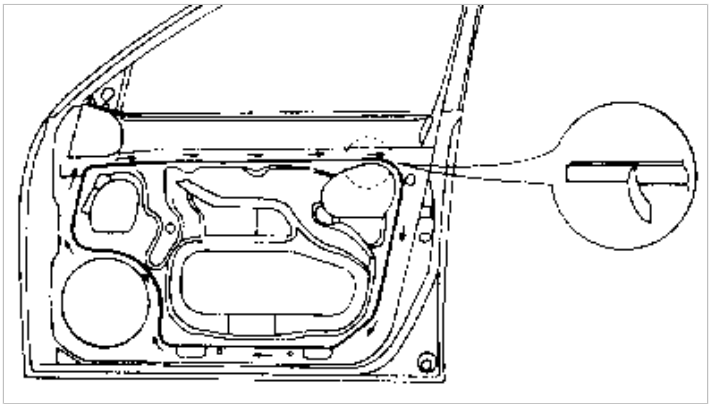
Adjust the inside handle play by adjusting the mounting position in the IN-to-OUT direction



Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Front Door > INSTALLATION

INSTALLATION

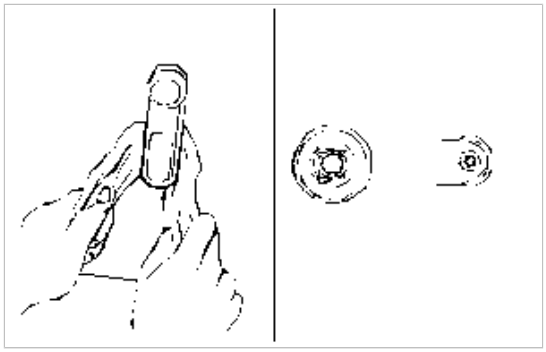
1. Installation is the reverse of removal procedure.
2. When installing the door trim seal, butyl tape should not be placed over the door trim fastener mounting area.



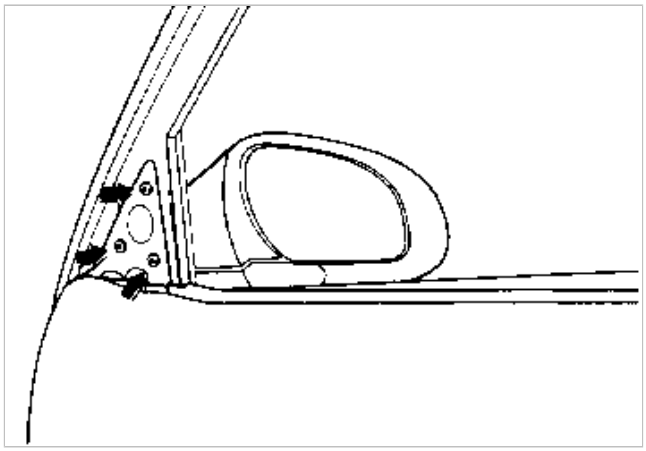
Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Front Door > REMOVAL

REMOVAL

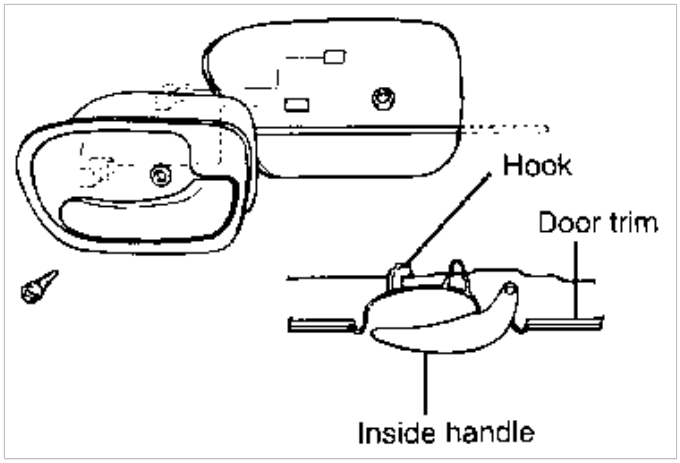
1. Remove the door window regulator handle and clip using a piece of cloth (manual type only).



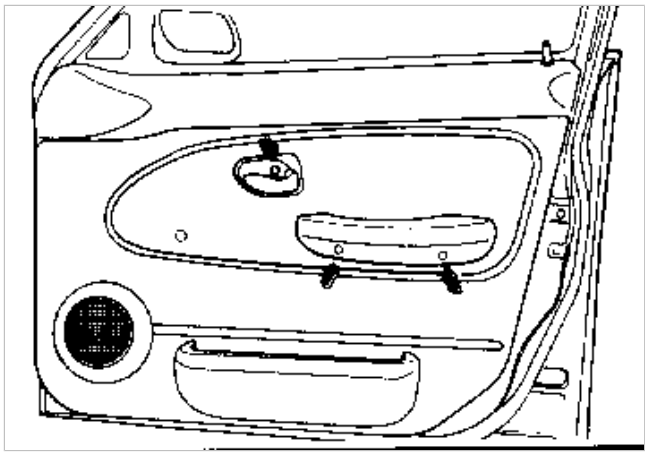
2. Remove the quadrant inner cover.
3. Remove the rear view mirror mounting screws and then remove the rear view mirror.



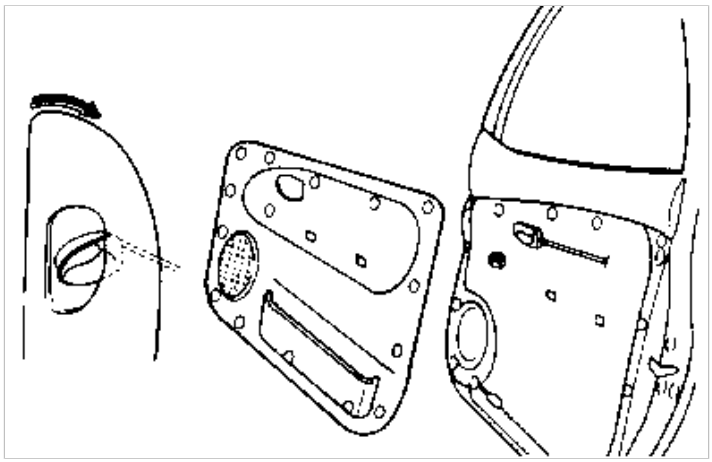
4. Loosen the inside handle mounting screw and then push the inside handle toward the door hinge. Separate the inside handle from the door trim.



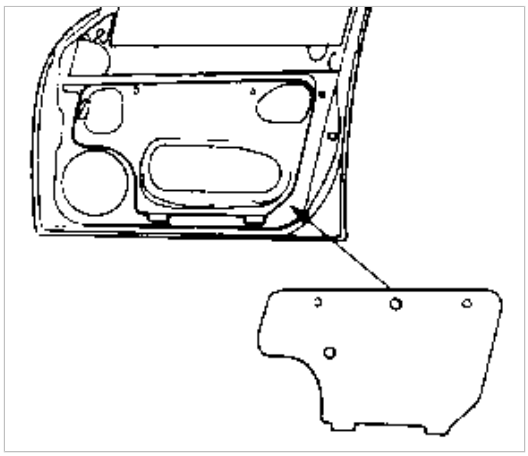
5. Remove the following items in order.
   (1) Safety lock knob.
   (2) Arm rest



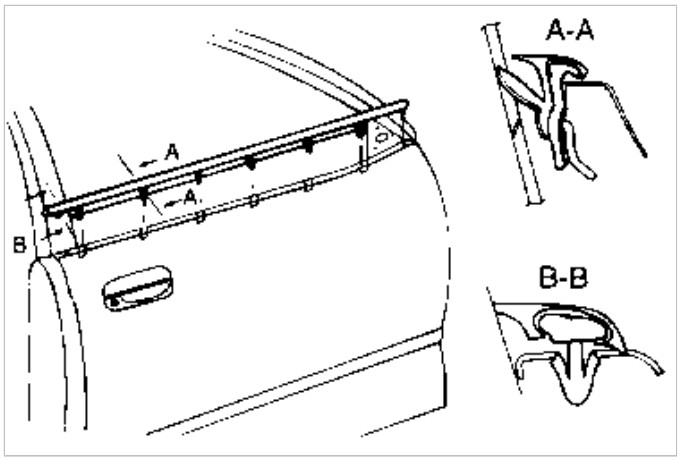
6. Insert a screwdriver between the trim fasteners and door panel to pry it loose. Disconnect the connectors.



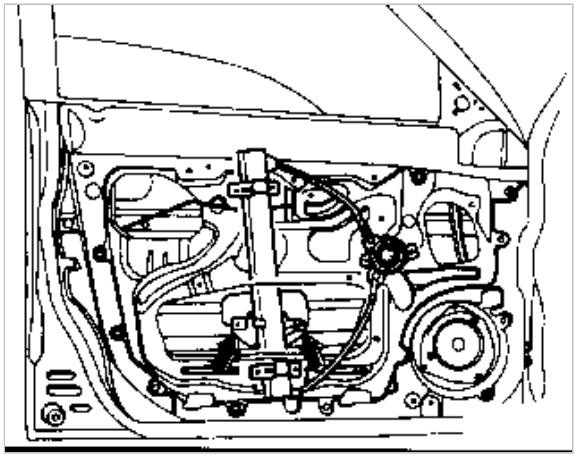
7. Remove the door trim seal.



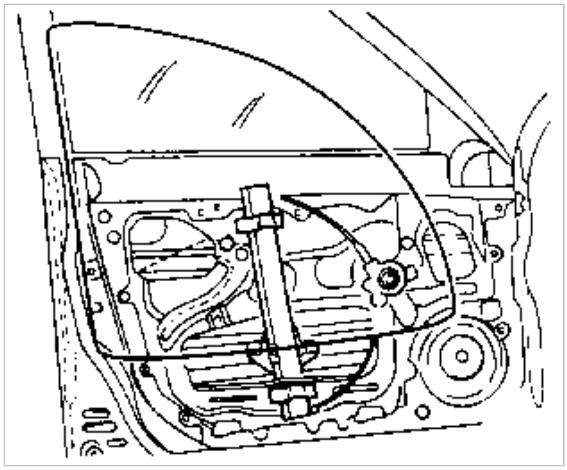
8. Remove the front door belt outside weatherstrip.



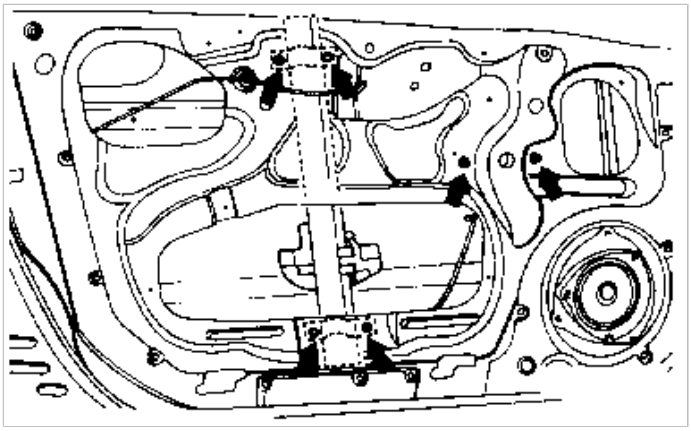
9. Remove the carrier plate bolts from the regulator channel.



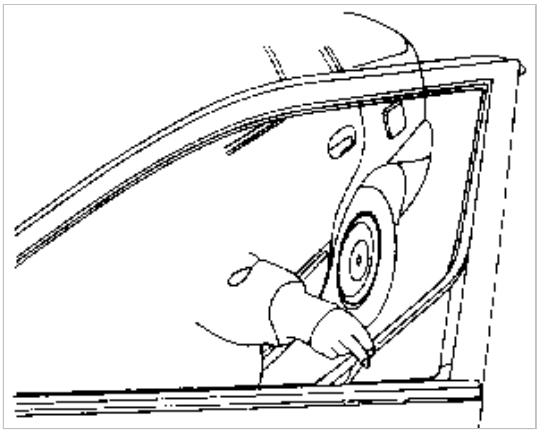
10. Pull out the door glass through the window slot.



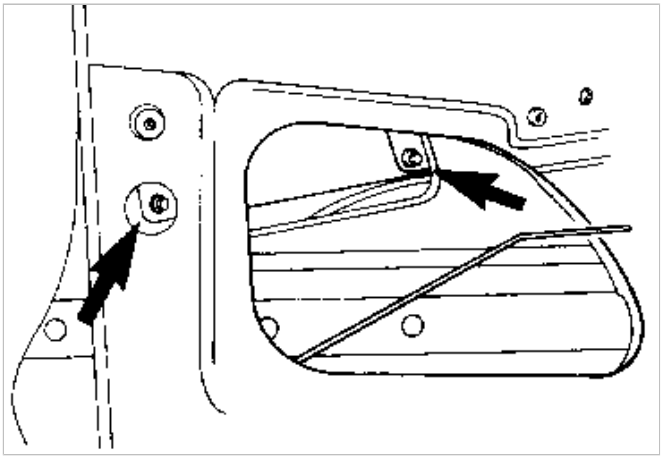
11. Remove the door regulator channel mounting bolts and then remove the door regulator assembly.



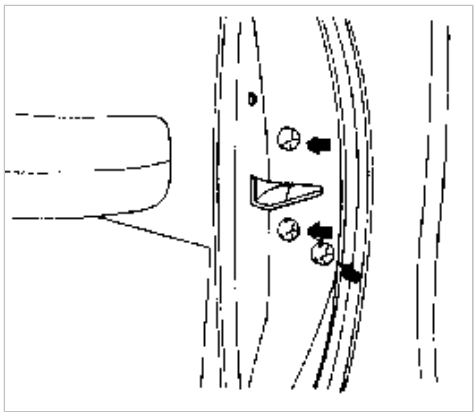
12. Remove the window glass run.



13. Remove the outside door handle mounting bolts. Disconnect the outside door handle rod from the outside door handle at the position shown.



14. Remove the door latch and lock actuator.

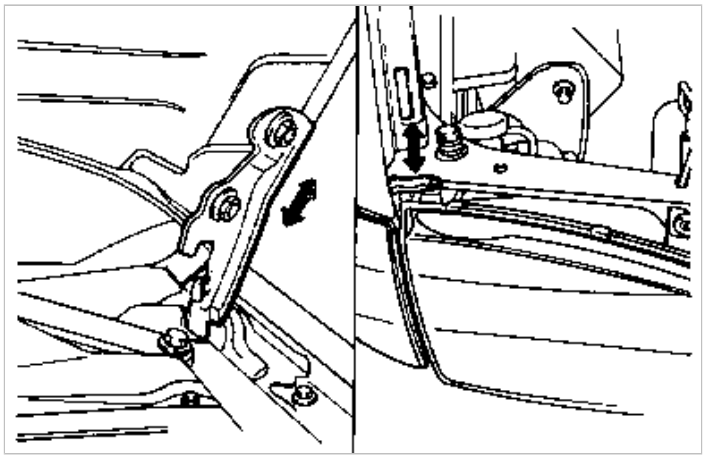


Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Hood > ADJUSTMENT

ADJUSTMENT

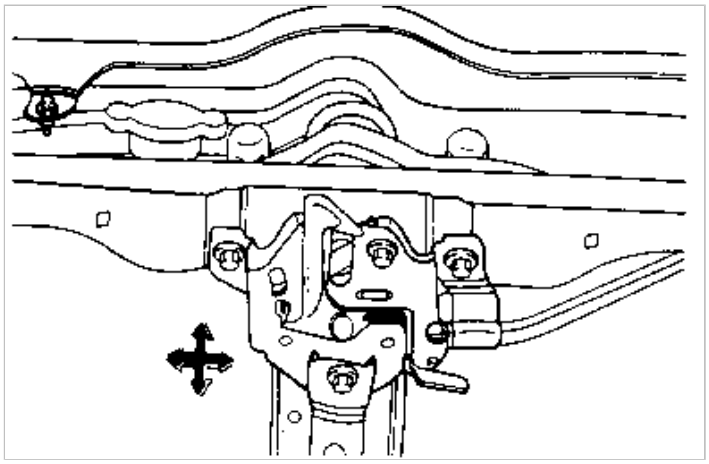
HOOD HINGES

1. Loosen the hood hinge mounting bolt.
2. Adjust the longitudinal and lateral positions of the hood by utilizing the oblong holes in the hinge.
3. Adjust front edge of hood in vertical direction by adjusting the hood stop adjusting bolts.



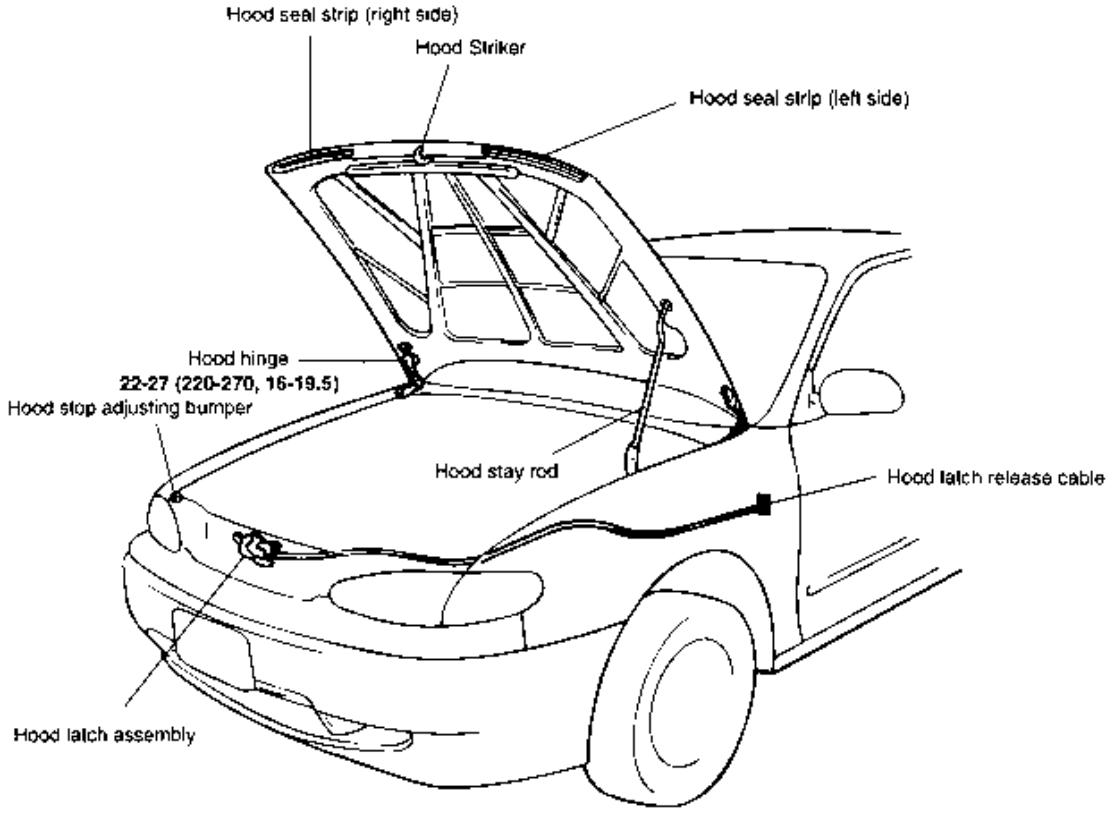
HOOD LATCH

1. Loosen the hood lock mounting bolts.
2. Adjust the alignment of the hood latch by adjusting the longitudinal and lateral position of the lock, and by adjusting the height of the hood.



Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Hood > COMPONENTS

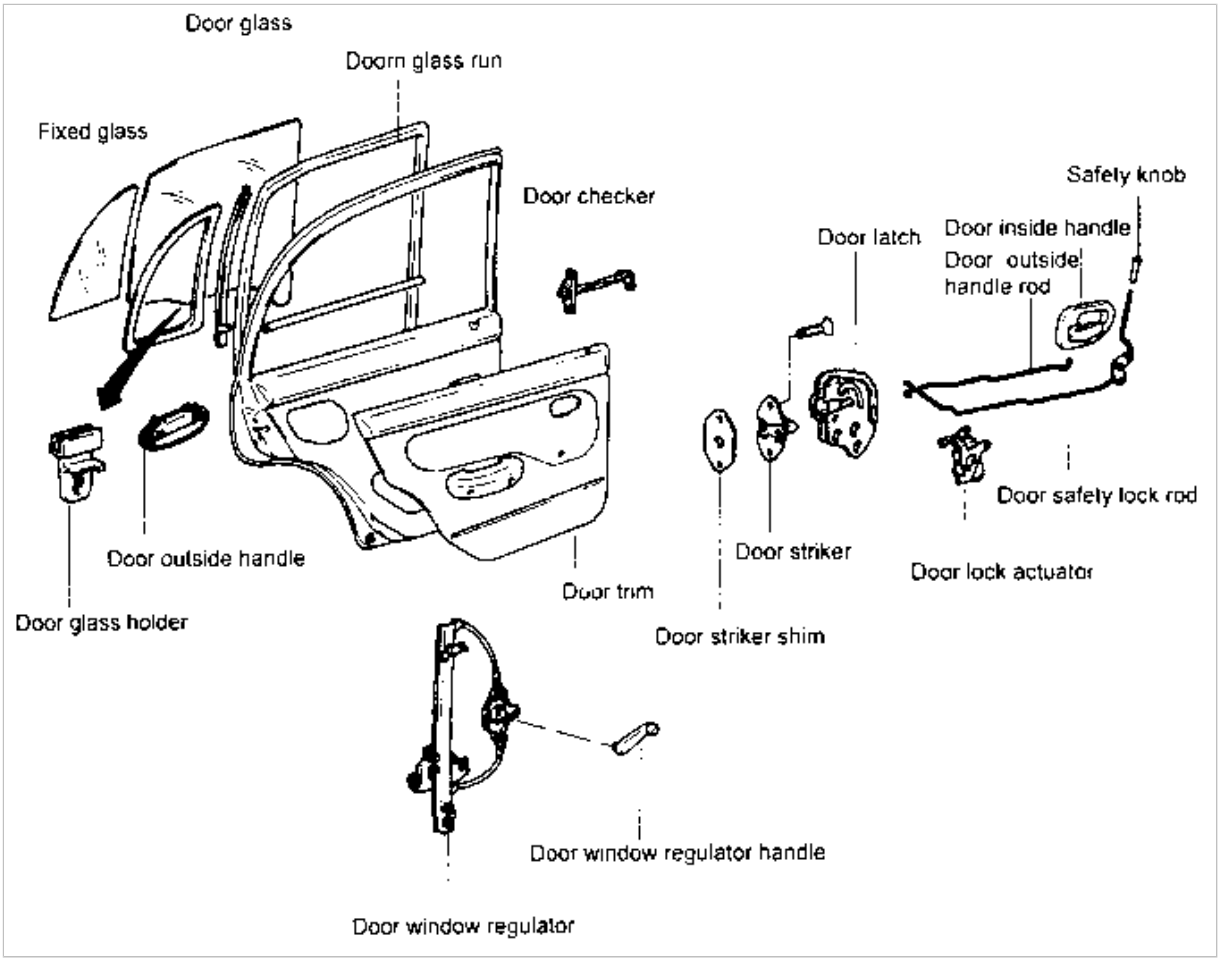
COMPONENTS



TORQUE : Nm (kg·cm, lb.ft)

Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Rear Door > COMPONENTS

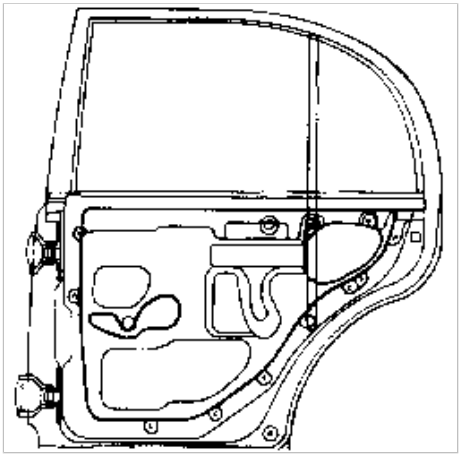
COMPONENTS



Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Rear Door > INSTALLATION

INSTALLATION

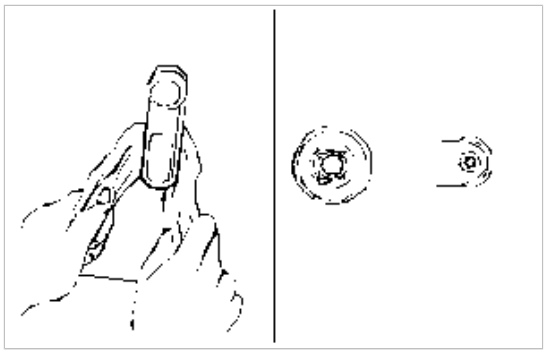
1. Installation is the reverse of the removal procedure.
   When installing the door trim seal, butyl tape should not be placed over the door trim fastener mounting area.



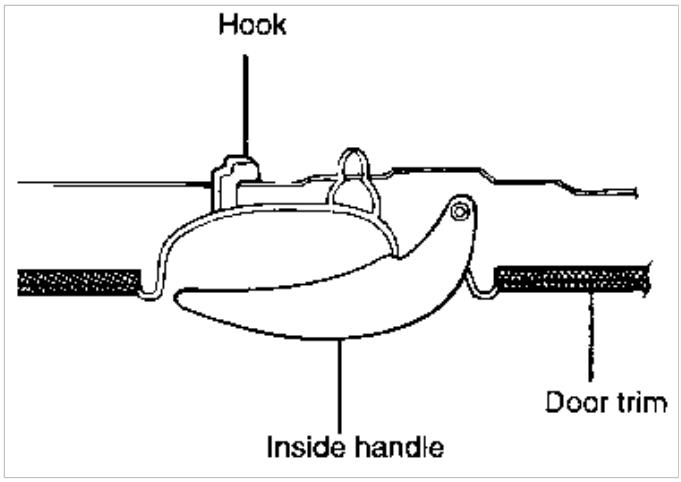
Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Rear Door > REMOVAL

REMOVAL

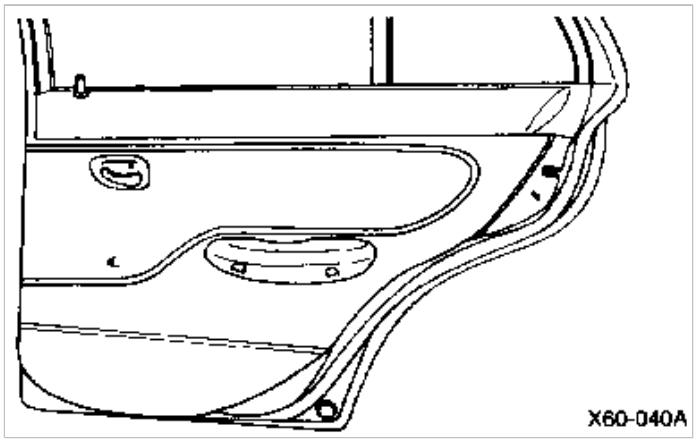
1. Remove the door window regulator handle and clip using a piece of cloth (Manual type only). Remove the door safety lock knob.



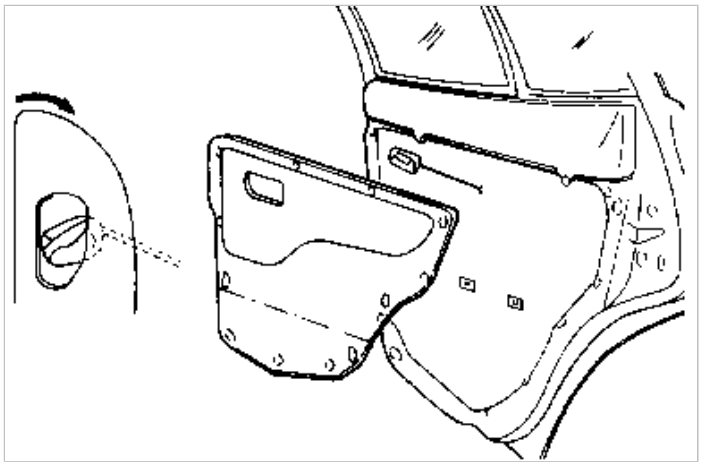
2. Loosen the inside handle mounting screw and then push the inside handle toward the door hinge. Separate the inside handle from the door trim.



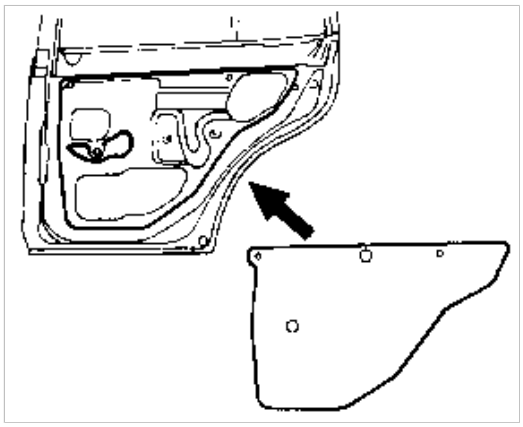
3. Remove the following items in order.
   (1) Safety lock knob.
   (2) Arm rest.



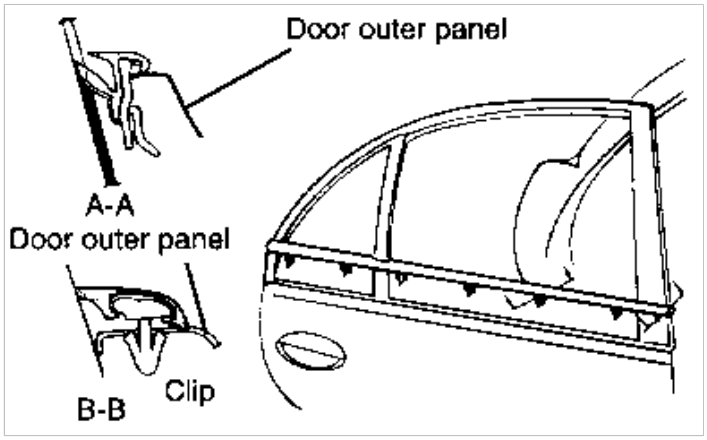
4. Insert a screwdriver between the trim fasteners and the door panel to pry it loose. Disconnect the electrical connectors.



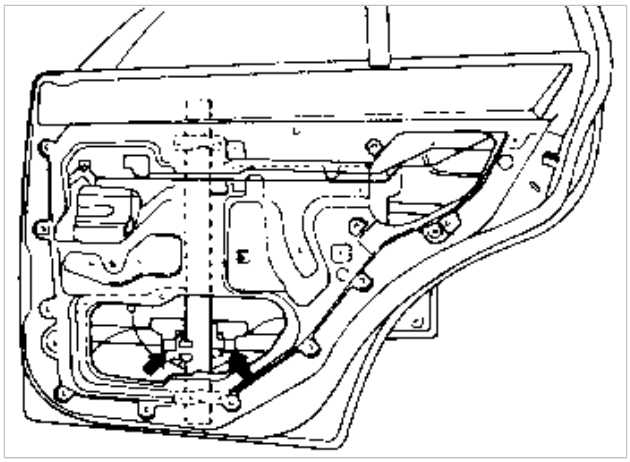
5. Remove the door trim seal.



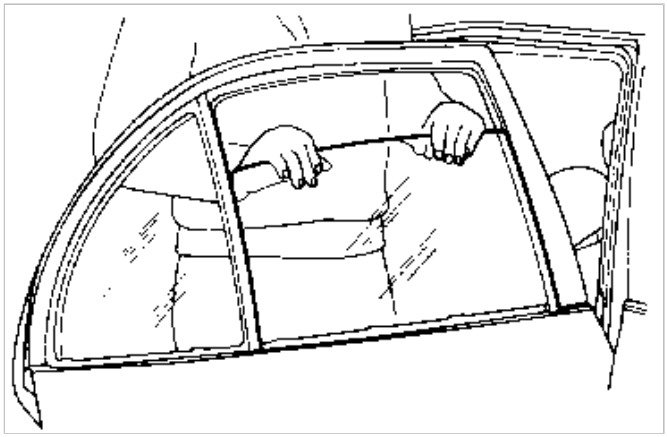
6. Remove the rear door outside belt weatherstrip.



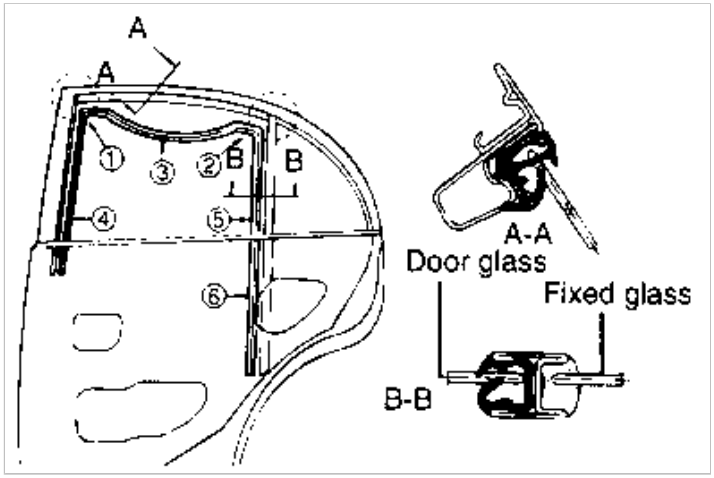
7. Remove the carrier plate bolts from the regulator channel.



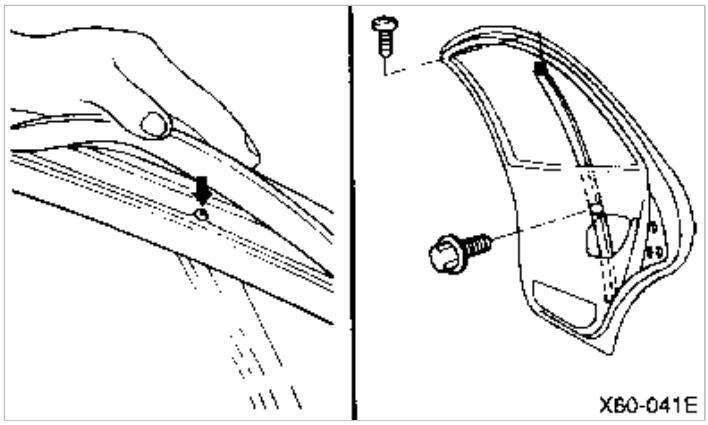
8. Remove the door glass.



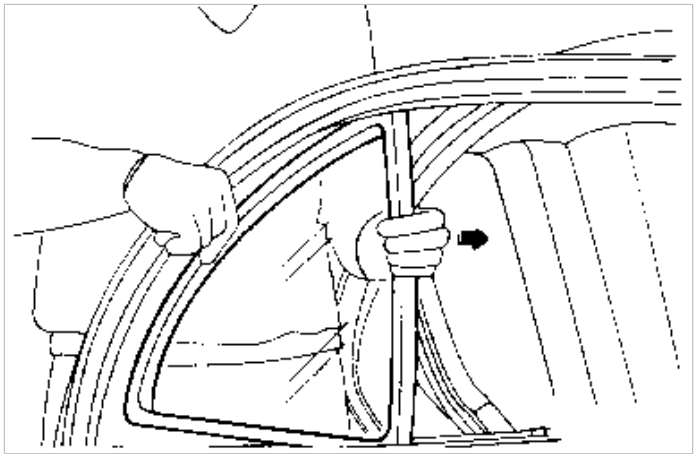
9. Remove the door glass run.
(Installing procedure : 1-2-3-4-5-6).



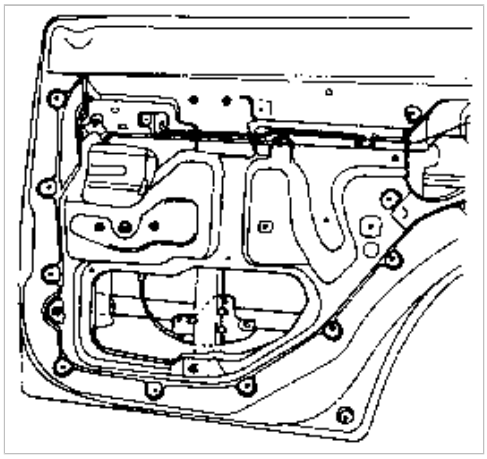
10. Remove the fixing screws and the bolts of the division channel. Remove the division channel.



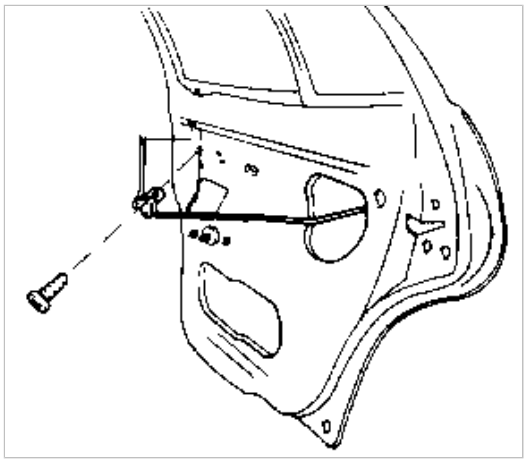
11. Remove the fixed glass.



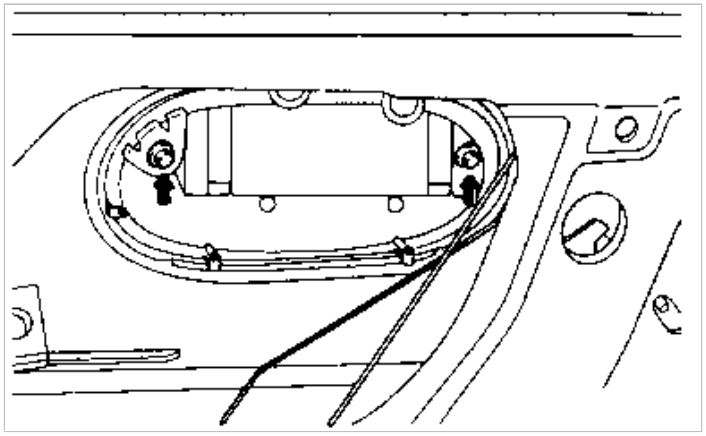
12. Remove the door regulator channel mounting nuts and then remove the door regulator assembly. Remove the inside handle from the rod.



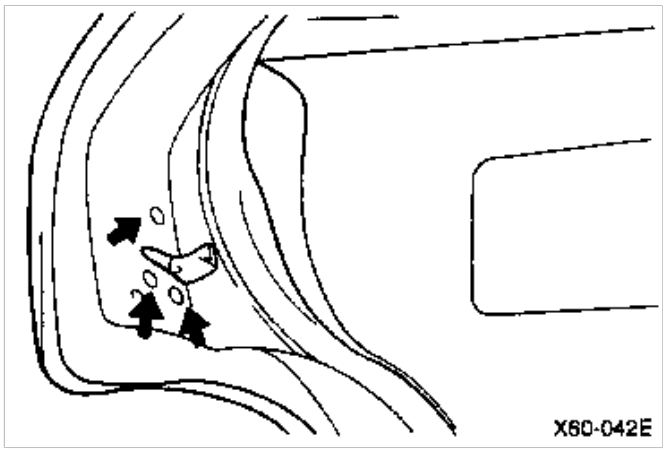
13. Remove the safety lock rod mounting screw, and then remove the rod from the latch assembly.



14. Remove the door latch and door lock actuator.



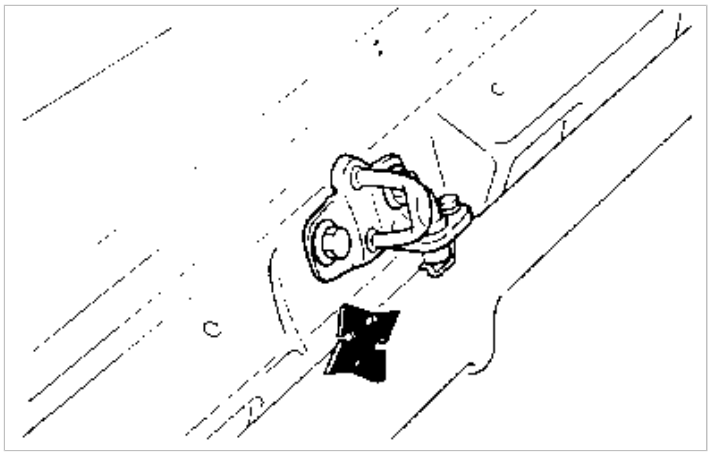
15. Remove the outside handle mounting bolts.



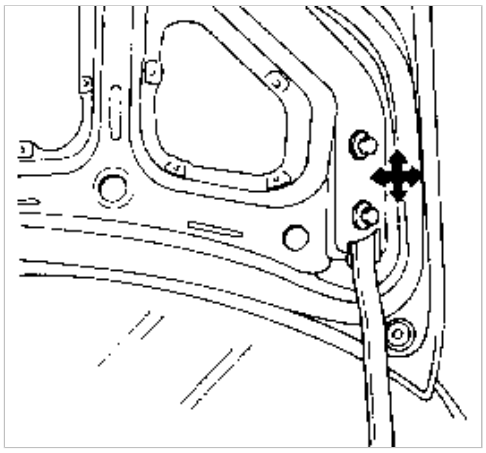
Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Trunk Lid/Tailgate > ADJUSTMENT

ADJUSTMENT

1. Adjust the striker up or down, and right or left until the trunk lid is flush with the rear edge of the body.



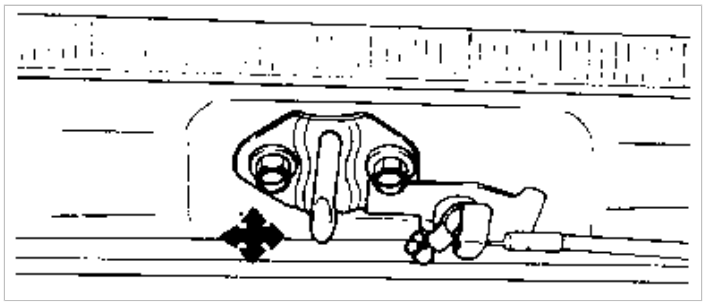
2. Adjust the trunk hinges to down and right to left as necessary to equalize the gap between the lid and body.



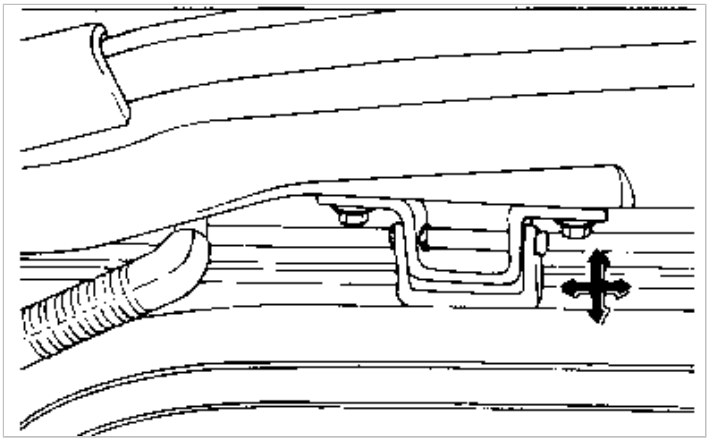
Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Trunk Lid/Tailgate > ADJUSTMENT

ADJUSTMENT

1. Adjust the striker up or down, and right or left until the tailgate is flush with the rear edge of the body.

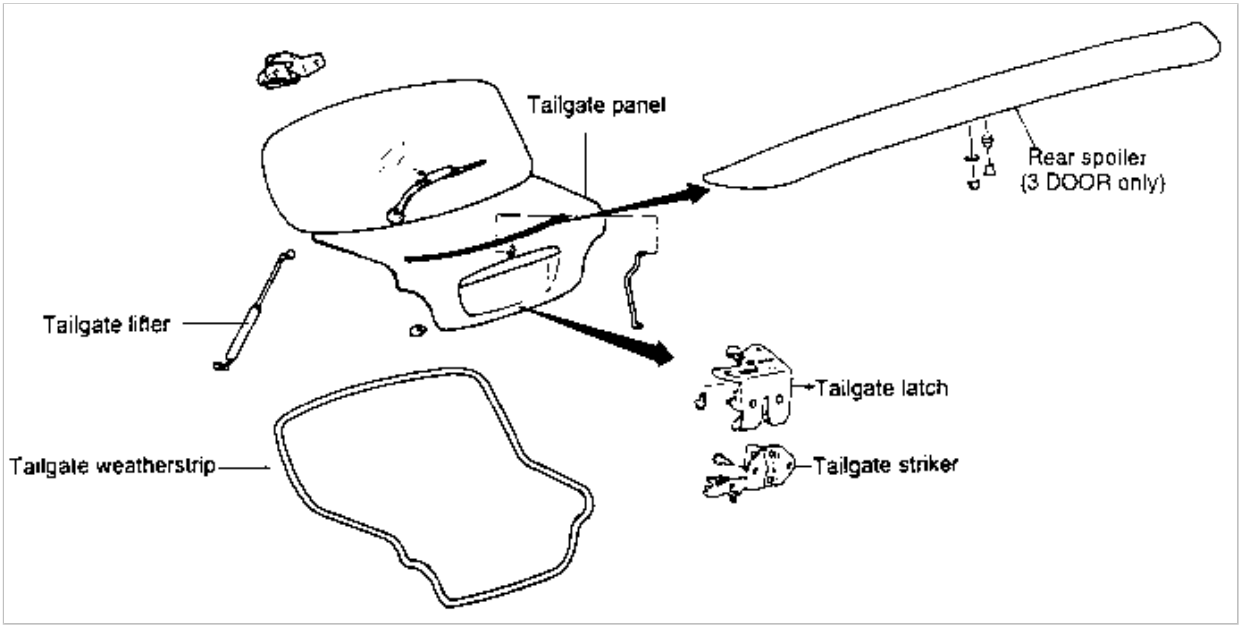


2. Adjust the tailgate hinges up or down, and right or left as necessary to equalize the gap between the tailgate and body.



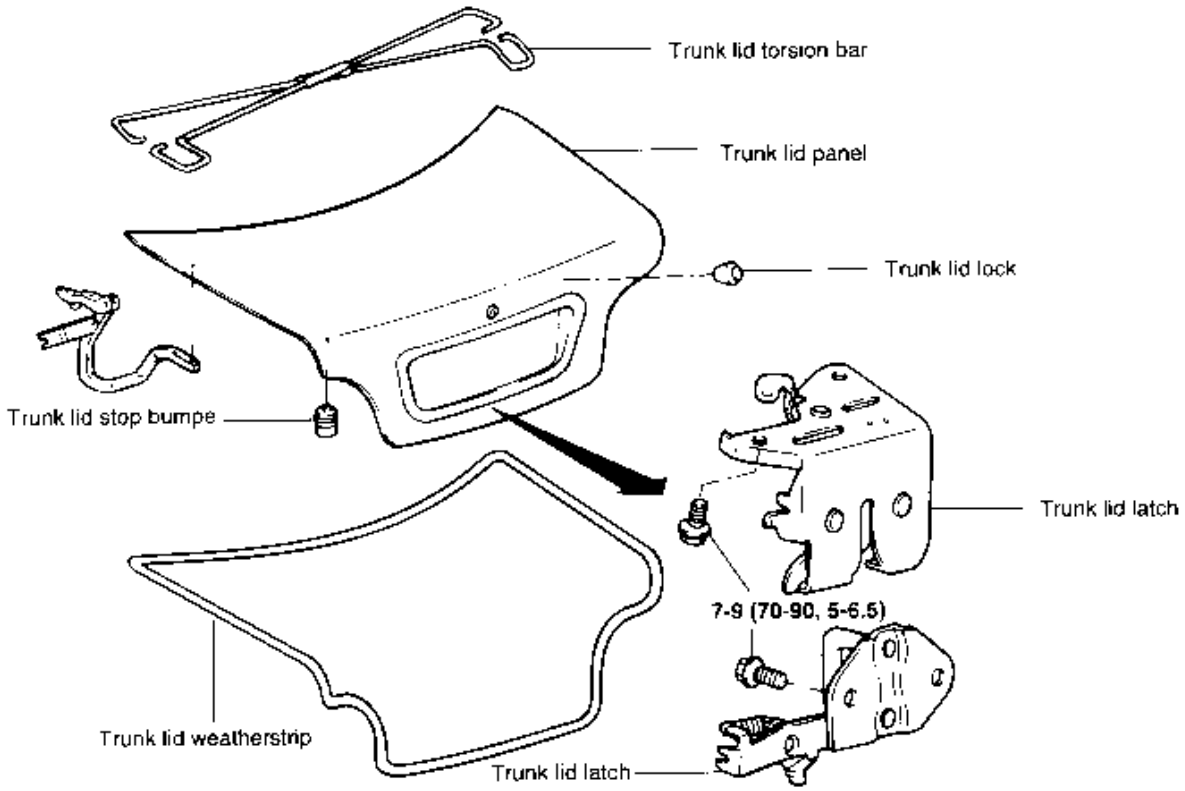
Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Trunk Lid/Tailgate > COMPONENTS

COMPONENTS



Body (Interior & Exterior) > Hood, Doors & Trunk Lid > Trunk Lid/Tailgate > COMPONENTS

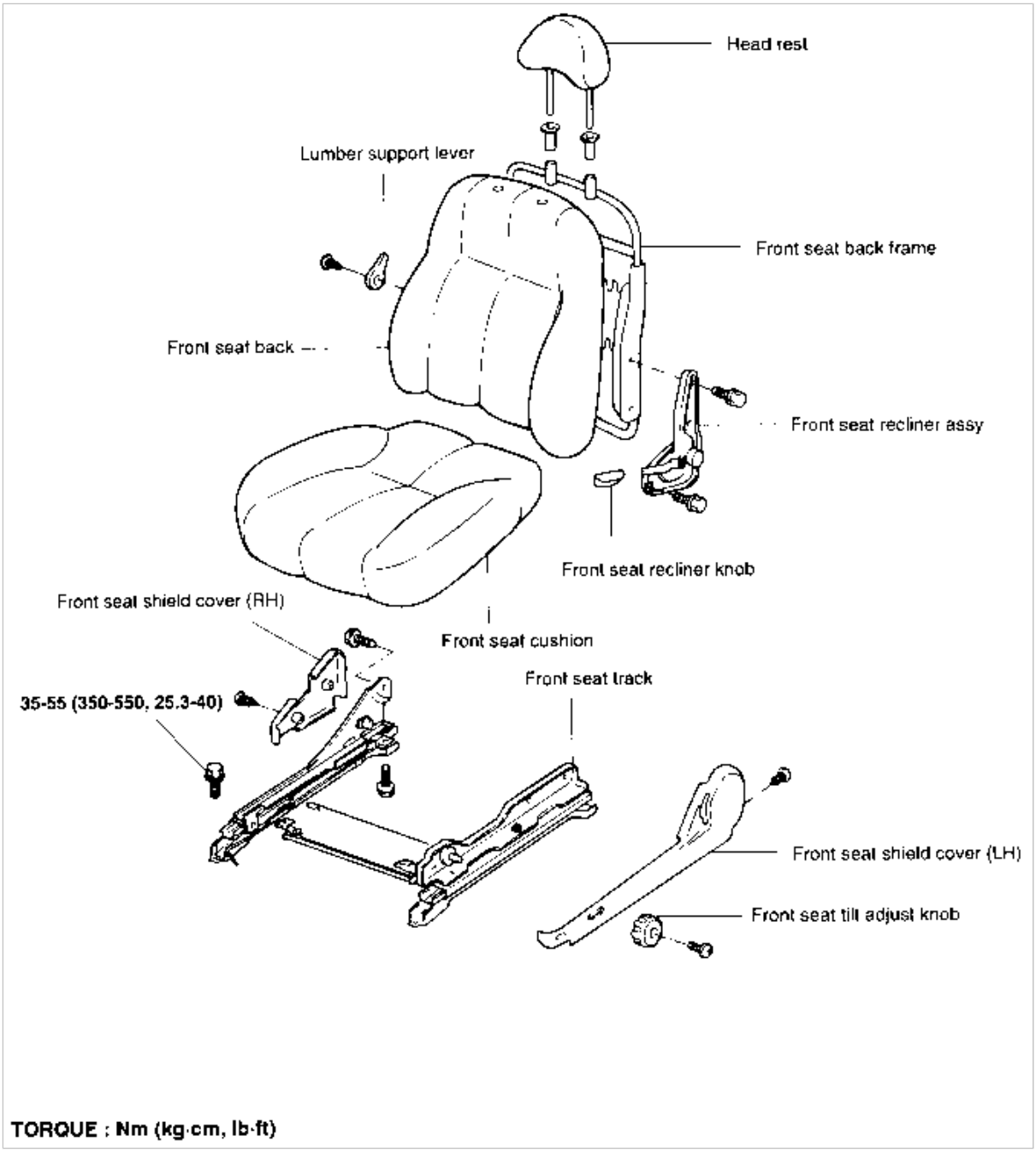
COMPONENTS



TORQUE : Nm (kg·cm, lb·ft)

Body (Interior & Exterior) > Seats > Front Seat > COMPONENTS

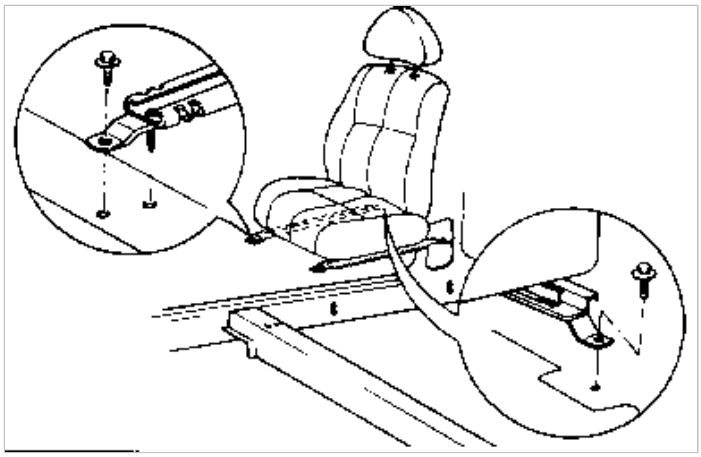
COMPONENTS



Body (Interior & Exterior) > Seats > Front Seat > INSTALLATION

INSTALLATION

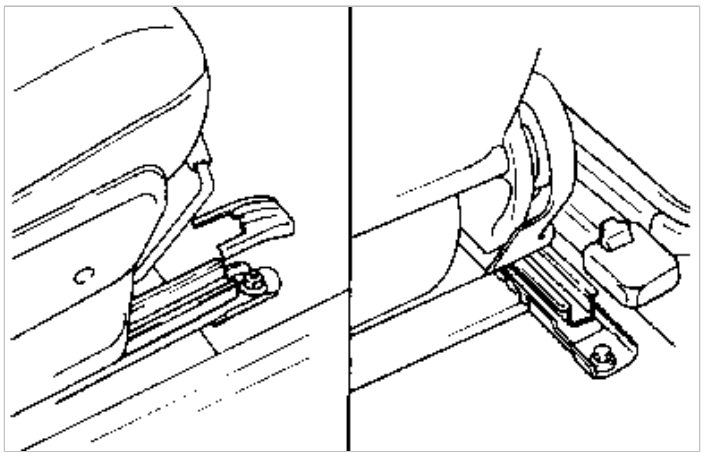
1. Install the front seat assembly after inserting the guide pin A on the body hole.



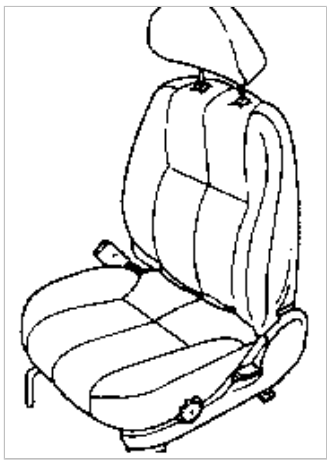
Body (Interior & Exterior) > Seats > Front Seat > REMOVAL

REMOVAL

1. Pull out the front seat mounting cover.

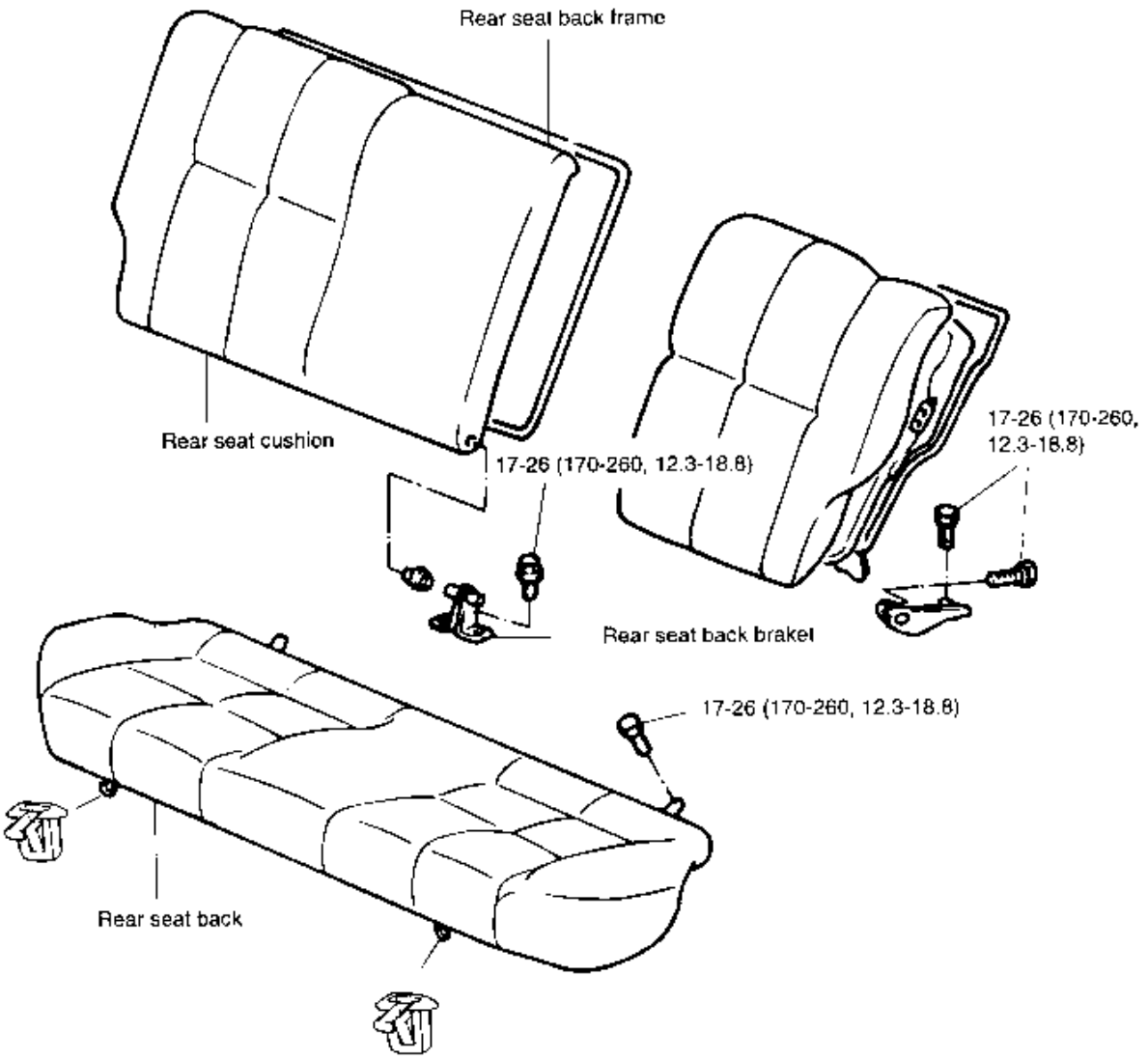


2. Remove the front seat assembly.



Body (Interior & Exterior) > Seats > Rear Seat > COMPONENTS

COMPONENTS

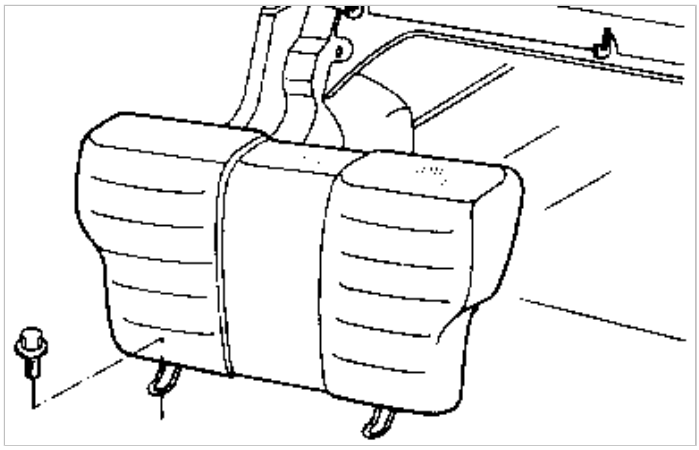


TORQUE : Nm (kg-cm, lb-ft)

Body (Interior & Exterior) > Seats > Rear Seat > INSTALLATION

INSTALLATION

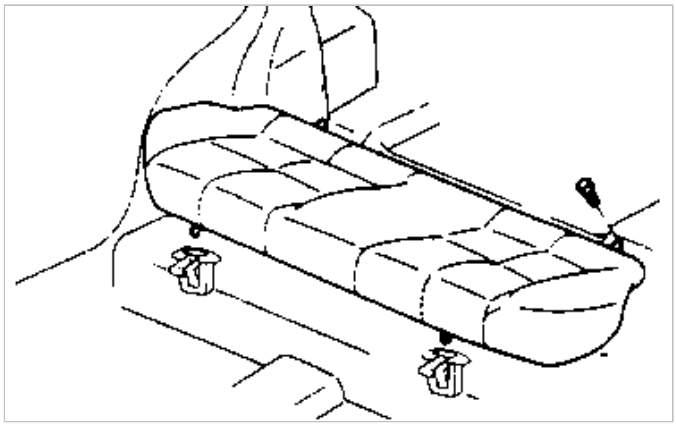
1. Installation is the reverse of the removal procedure.
2. When installing the rear seat back, tighten the mounting bracket after inserting the hook (A) on bracket (B).



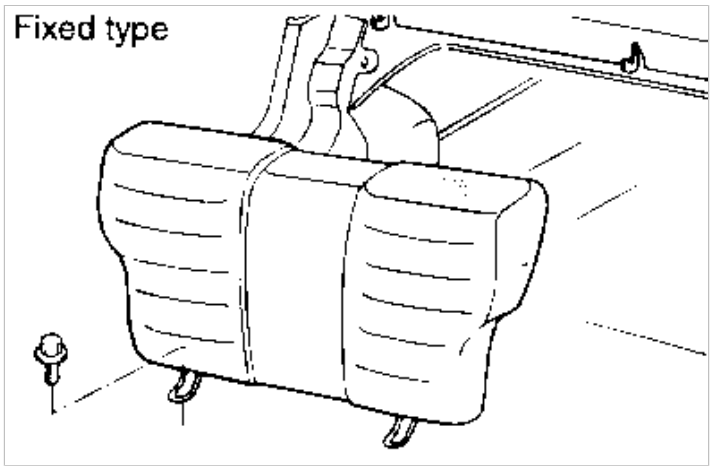
Body (Interior & Exterior) > Seats > Rear Seat > REMOVAL

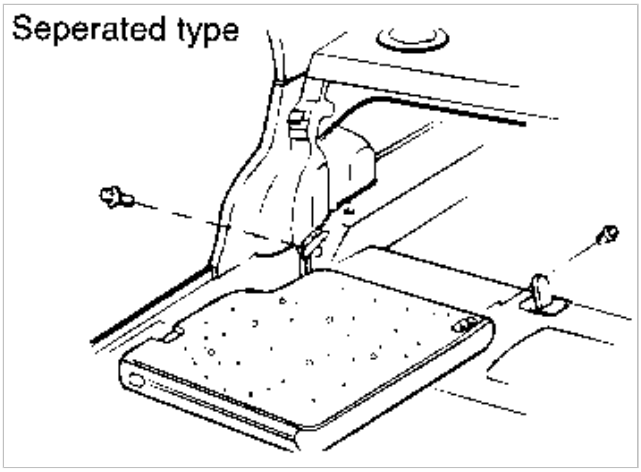
REMOVAL

1. Loosen the rear seat cushion mounting bolts and then remove the rear seat cushion.



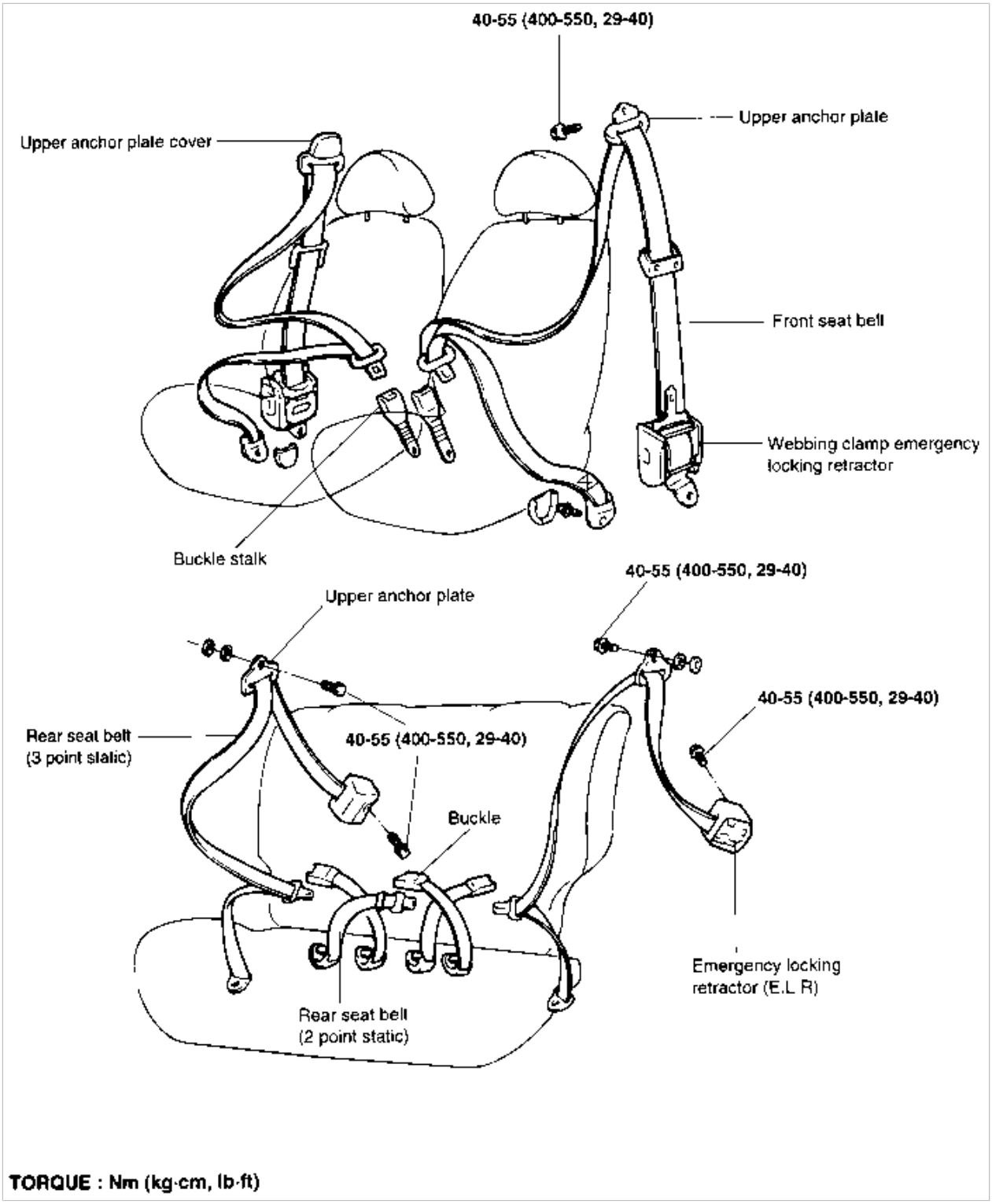
2. Loosen the rear seat mounting bolts and then remove the seat back (fixed type).
   Recline the rear spilt back forward and then loosen the mounting bracket.
   Remove the seat back (Separated type).





Body (Interior & Exterior) > Seats > Seat Belt > COMPONENTS

COMPONENTS



Body (Interior & Exterior) > Seats > Seat Belt > INSTALLATION

Installation

Installation is the reverse of the removal procedure.

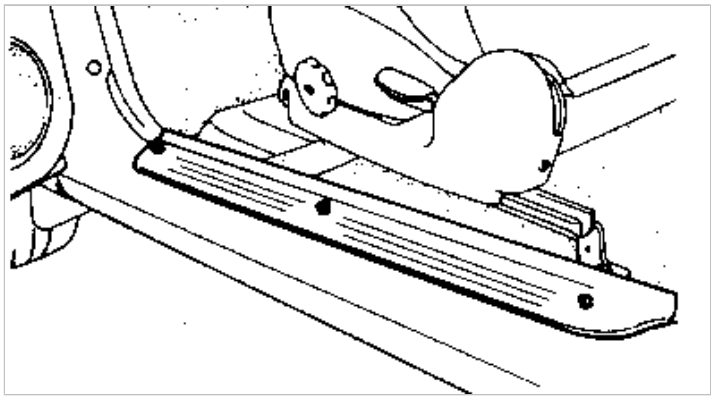
Body (Interior & Exterior) > Seats > Seat Belt > REMOVAL

REMOVAL

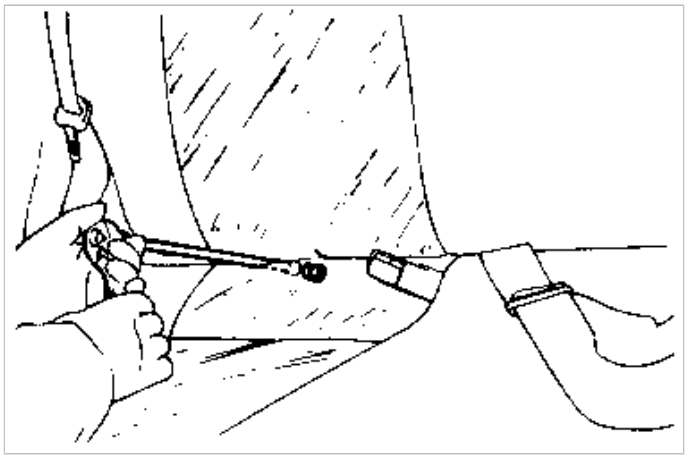
FRONT SEAT BELT

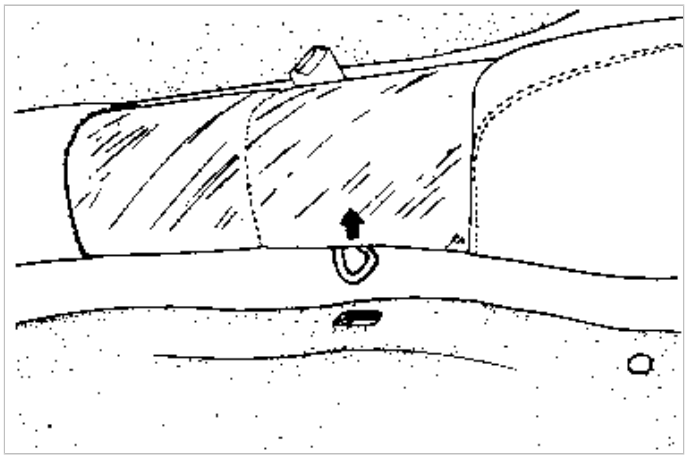
FOR 3 DOOR

1. Remove the door scuff trim.

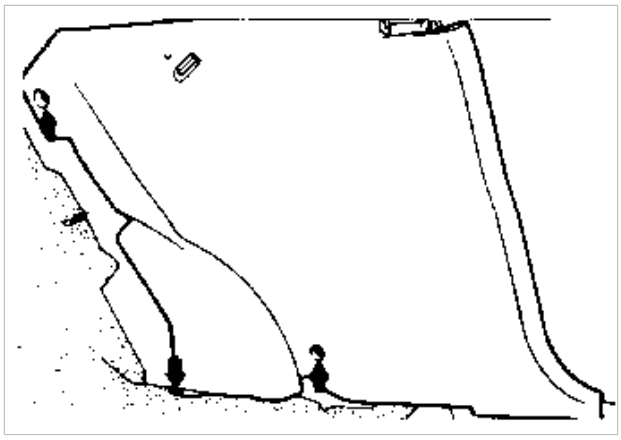


2. Remove the rear seat cushion mounting bolts (2EA) from the rear seat cushion.

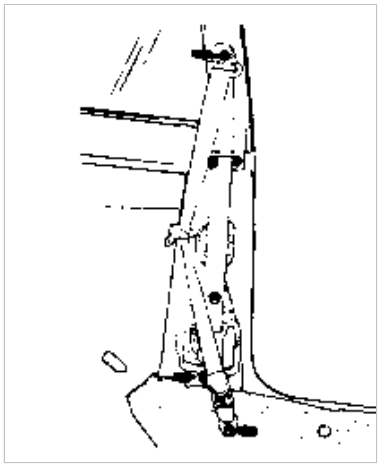




3. Remove the quarter inner trim mounting screw (3EA) and take out the quarter inner trim.



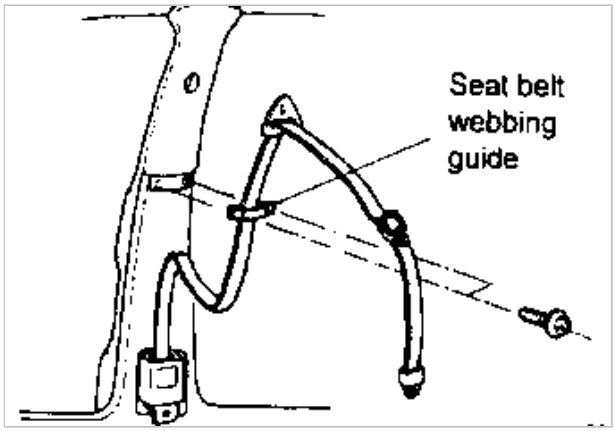
4. Remove the seat belt upper and lower mounting bolts and seat belt guide mounting screw (2EA) from the front seat belt.



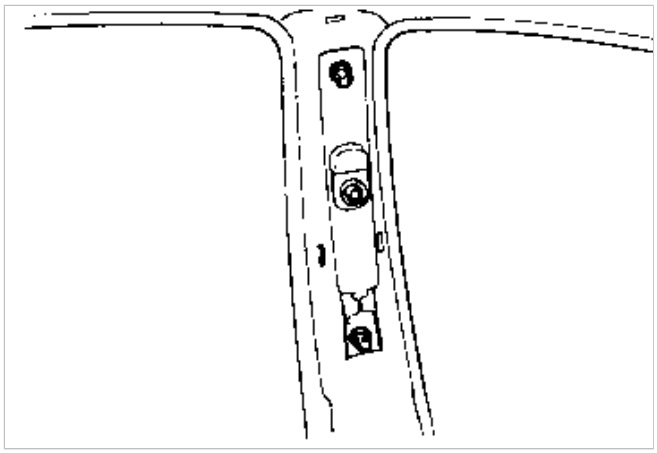
FRONT SEAT BELT

FOR 4 DOOR

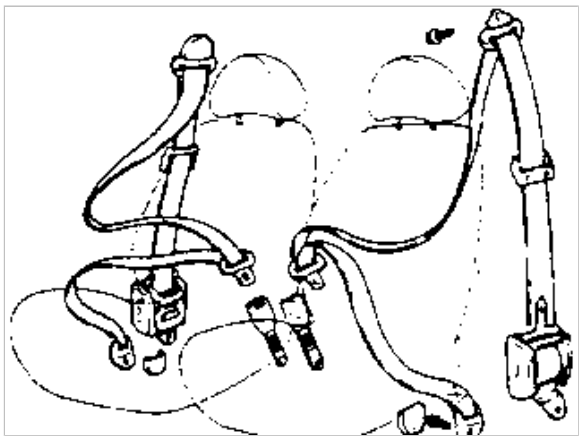
1. Remove the seat belt webbing guide and center pillar upper trim.



2. Remove the front seat belt height adjuster mounting bolts from the height adjuster.

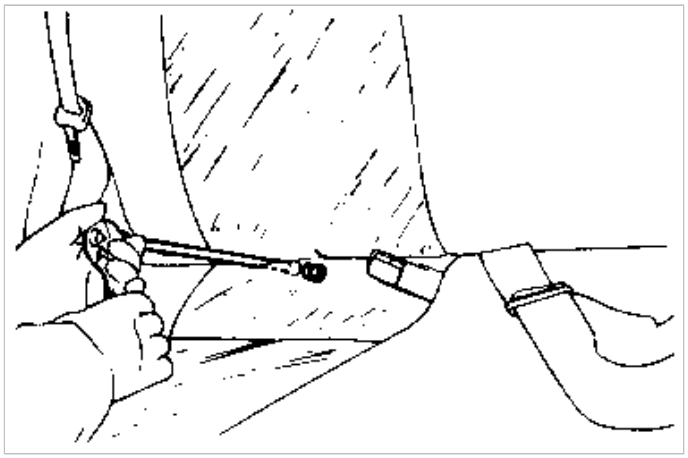


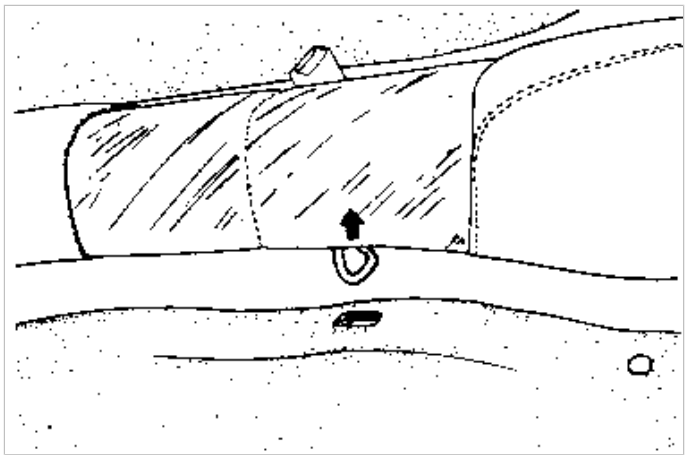
3. Remove the front seat belt assembly.



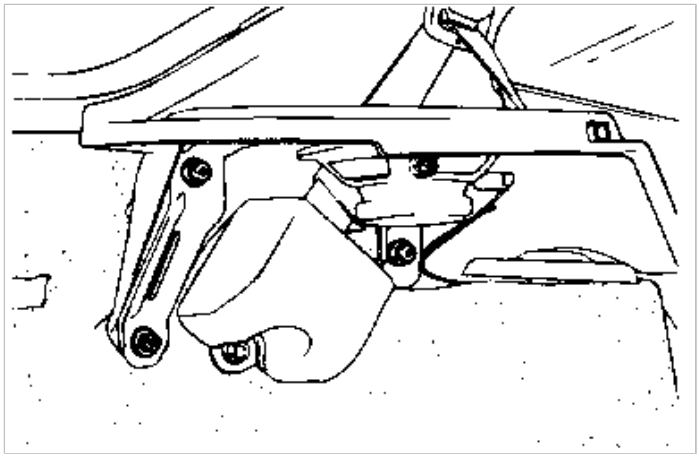
REAR SEAT BELT

1. Remove the rear seat cushion mounting bolts (2EA) from the rear seat cushion.

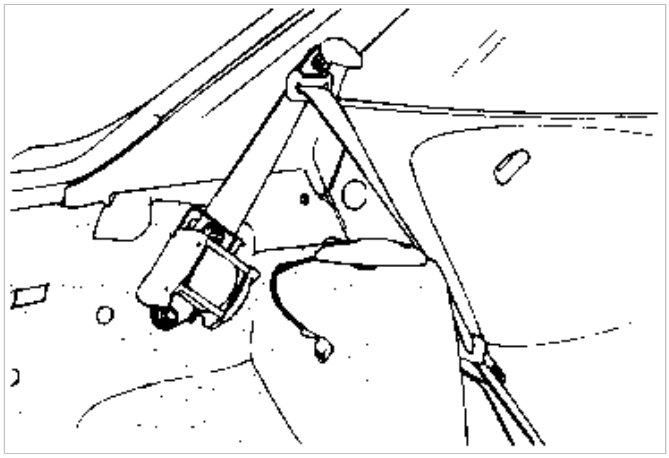


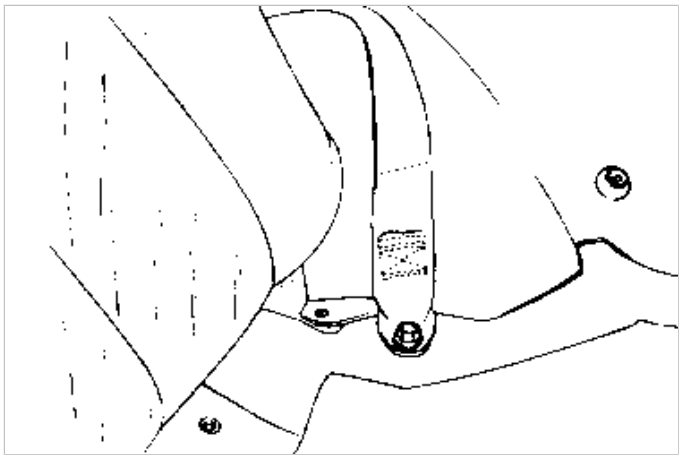


2. Remove the covering shelf center trim and side trim mounting bolts (4EA). Disconnect the rear speaker connector.



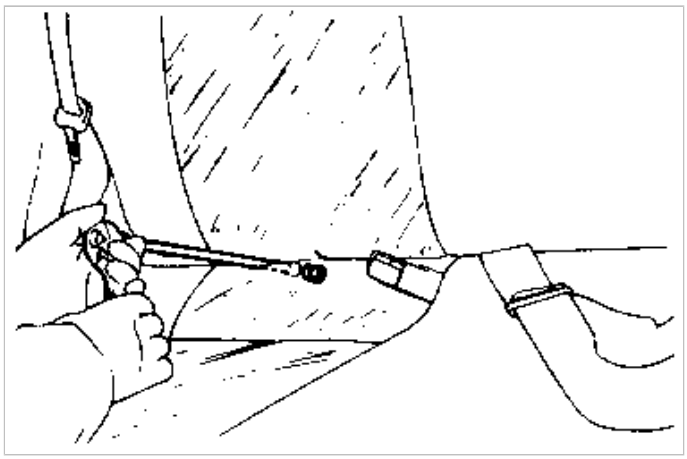
3. Remove the front seat belt upper and lower mounting bolts from the rear seat belt.

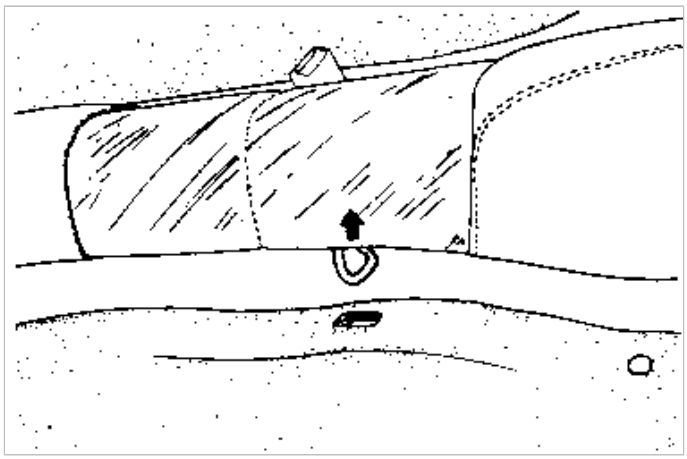




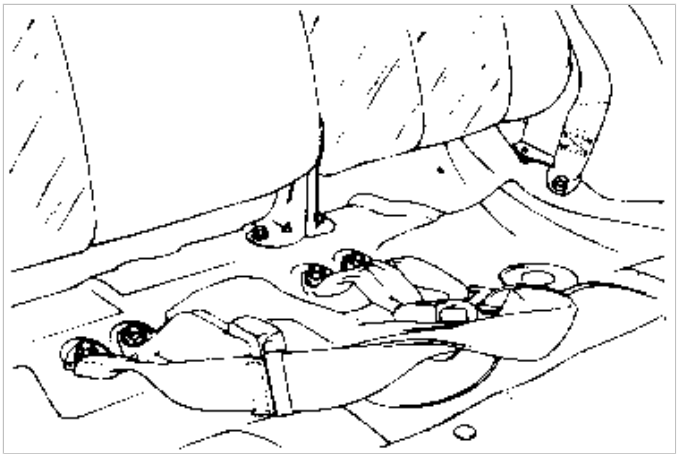
REAR SEAT LAP BELT AND BUCKLE

1. Remove the rear seat cushion mounting bolts (2EA) from the rear seat cushion.



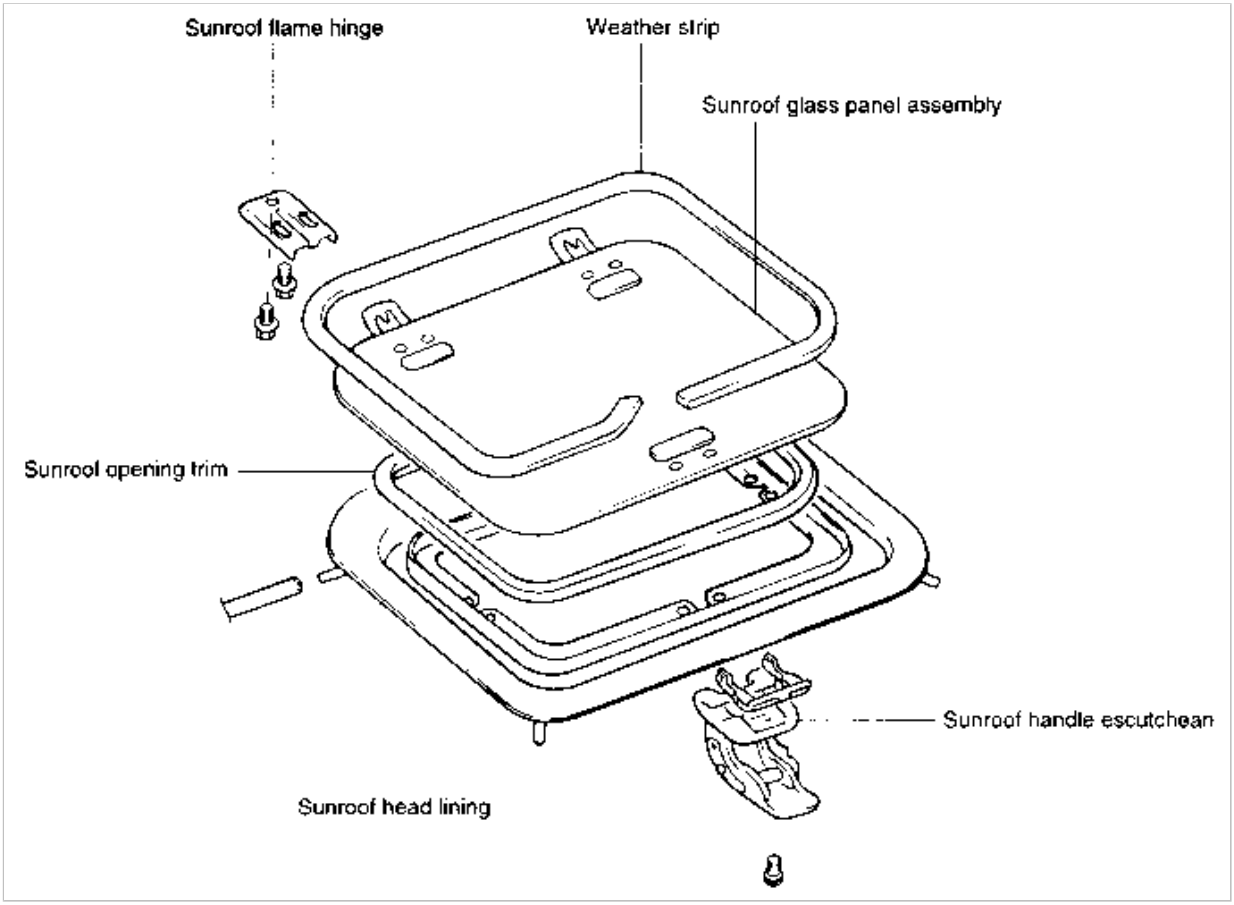


2. Remove the rear seat lap belt and buckle.



Body (Interior & Exterior) > Sunroof/Moonroof > COMPONENTS

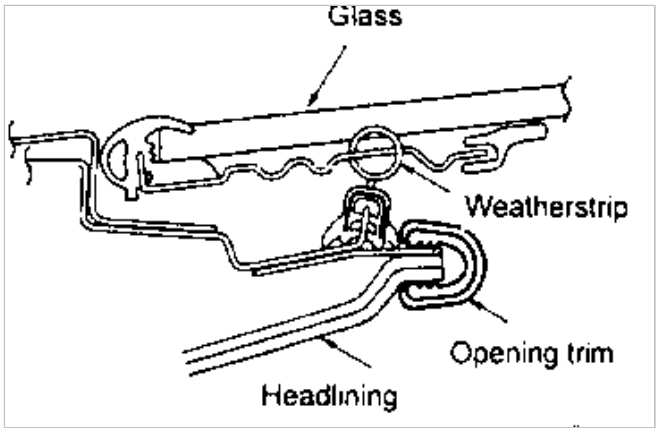
COMPONENTS



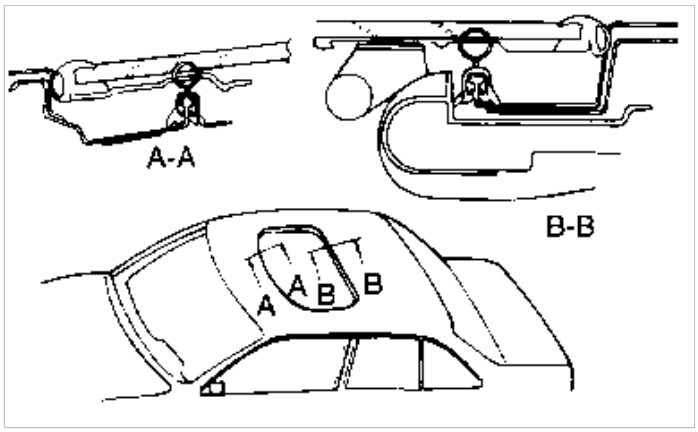
Body (Interior & Exterior) > Sunroof/Moonroof > INSTALLATION

INSTALLATION

1. Installation is the reverse of the removal procedure.



2. When installing the sunroof opening trim, make sure that there is no gap between the trim and the headlining.

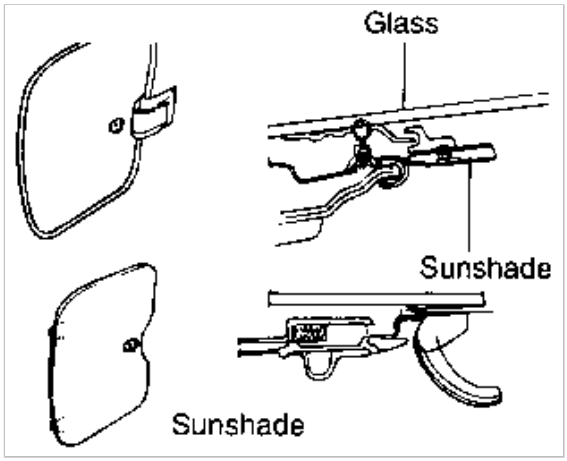


Body (Interior & Exterior) > Sunroof/Moonroof > REMOVAL

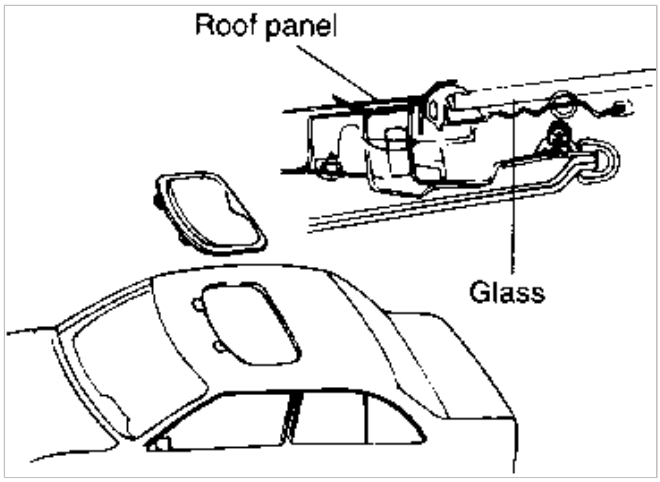
REMOVAL

1. To remove the sunroof, first remove the following parts:
   (1) Overhead console lamp assembly
   (2) Sunvisor and inside rear view mirror
   (3) Front pillar
   (4) Roof assist handle

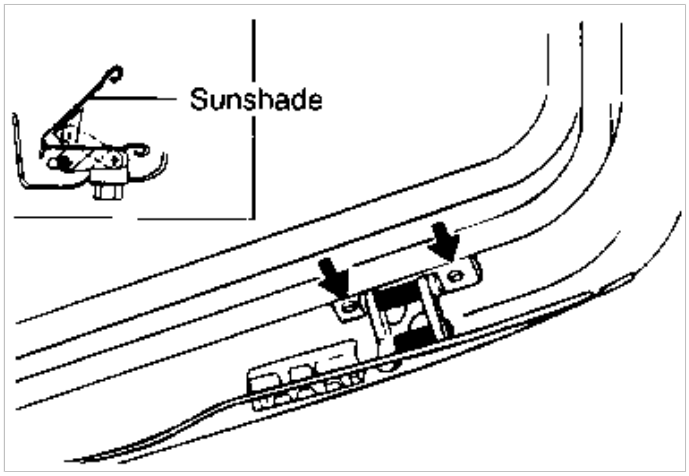
2. Remove the sunshade assembly from the sunroof glass.



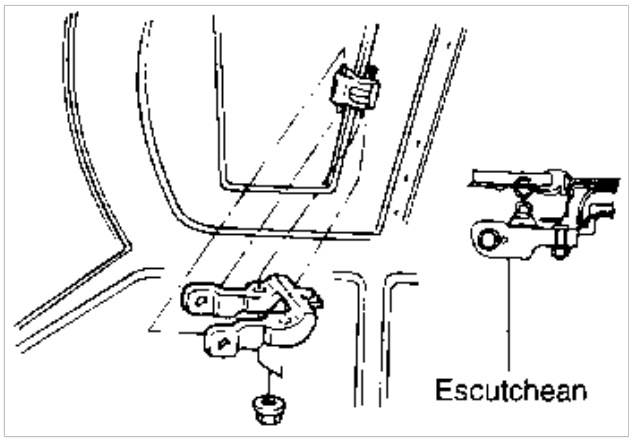
3. Remove the sunroof glass assembly from the frame hinge.



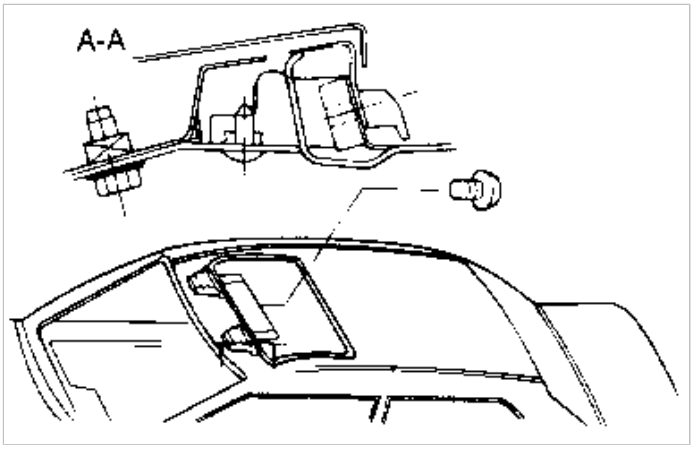
4. Remove the sunroof deflector.



5. Remove the sunroof handle escutcheon and the sunroof handle base plate.



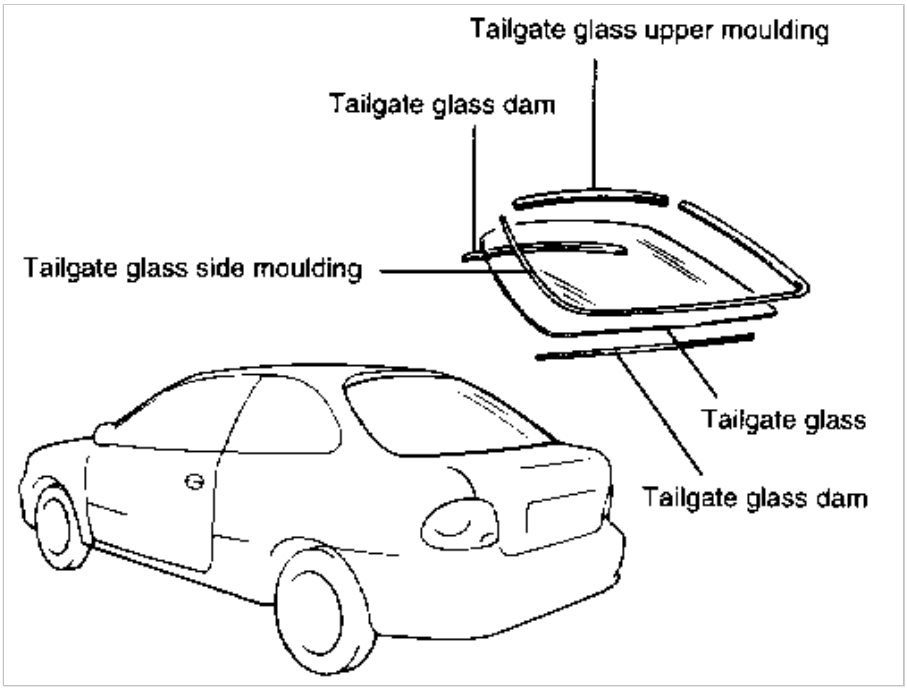
6. Remove the sunroof frame hinge.



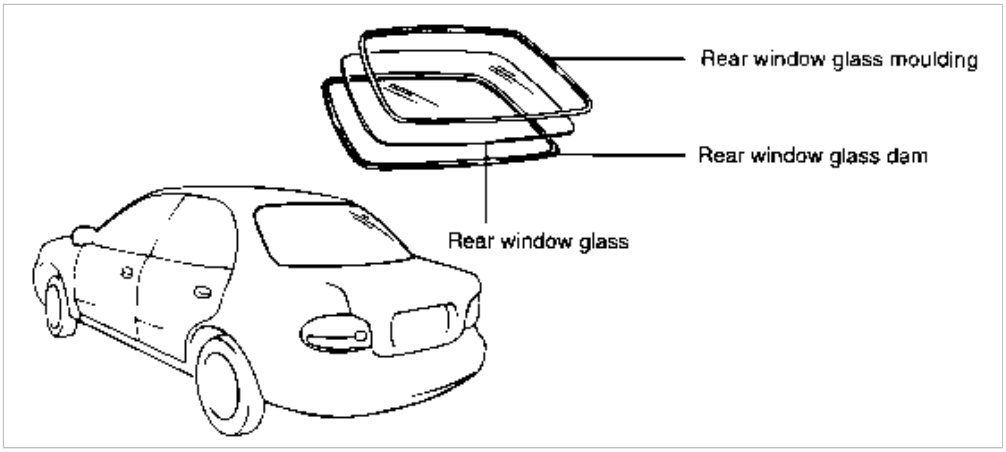
Body (Interior & Exterior) > Windshield & Rear Window > Rear Window Glass > COMPONENTS

COMPONENTS

3 Door model



4 Door model

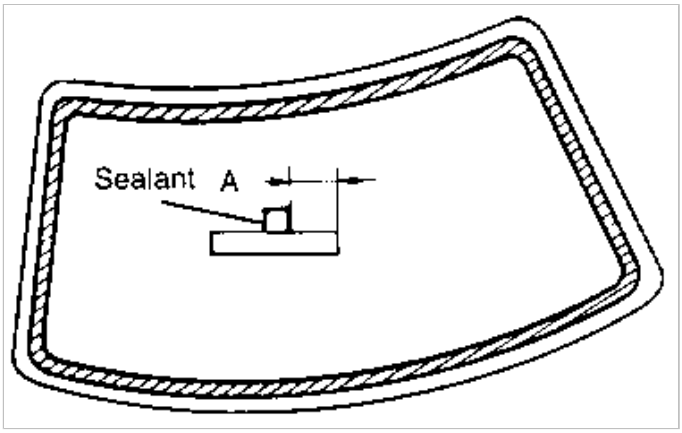


Body (Interior & Exterior) > Windshield & Rear Window > Rear Window Glass > INSTALLATION

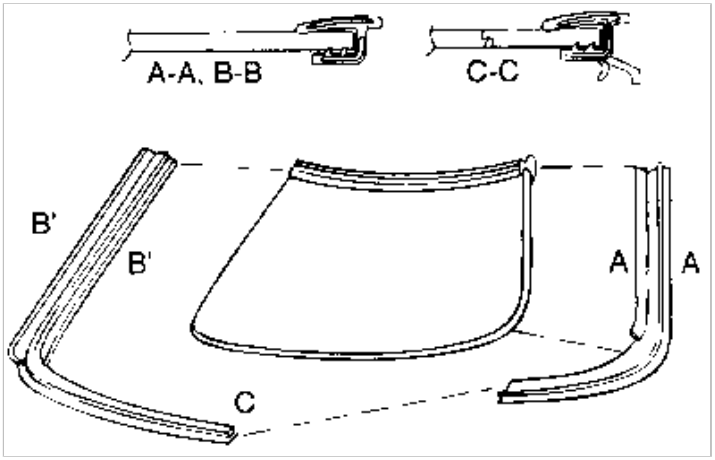
INSTALLATION

1. To contain the sealant during installation, glue the rubber dam to the inside surface of the rear window glass around the entire edge as shown.

A	3 Door model	13 mm (0.51 in.)
A	4 Door model	12 mm (0.47 in.)

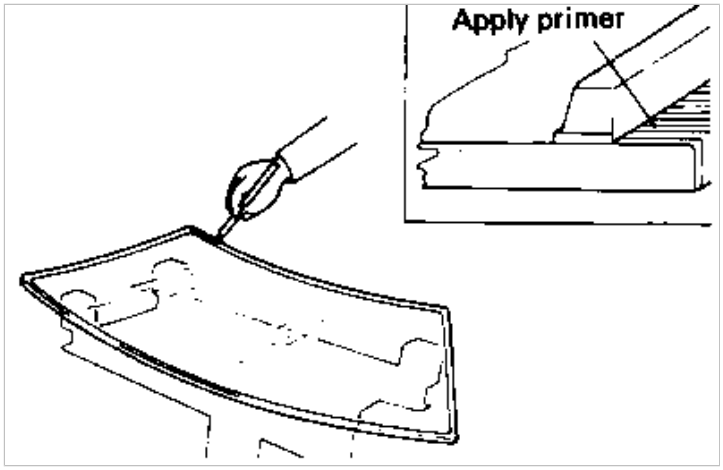


2. Install the rear window glass moulding to the rear window glass.

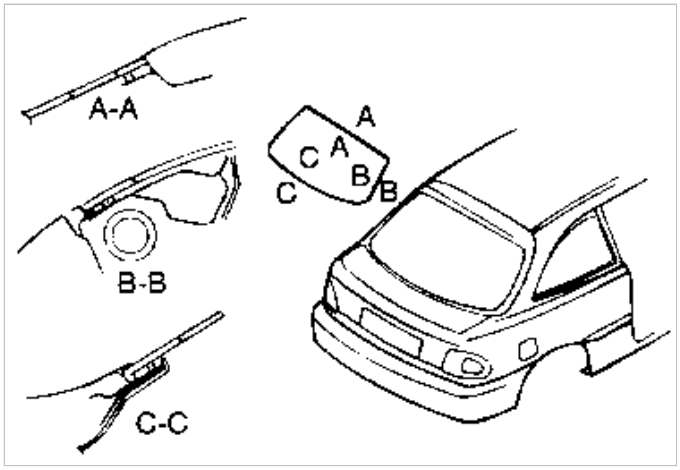


3. Apply a light coat of glass primer to the outside of the dam.
   a. Do not apply body primer to the glass.

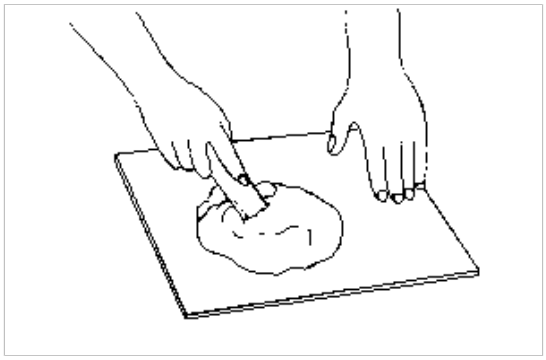
b. Never touch the primed surfaced with your hand. If you do, the adhesive may not body to the glass properly, causing a leak after the windshield is installed.
c. Keep water, dust and abrasive materials away from the primed surface.



4. Apply a light coat of body primer to the original sealant remaining around the window opening flange. The glass should be installed 10 minutes after you apply the primer.

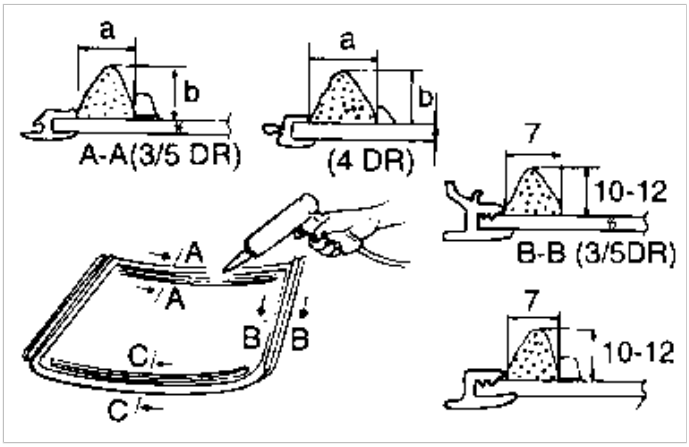


5. Thoroughly mix all the sealant and hardener together on a glass or metal plate with a putty knife.
   a. Clean the plate with a sponge and alcohol or wax or grease remover before mixing.
   b. Follow the instructions that come with the sealant.

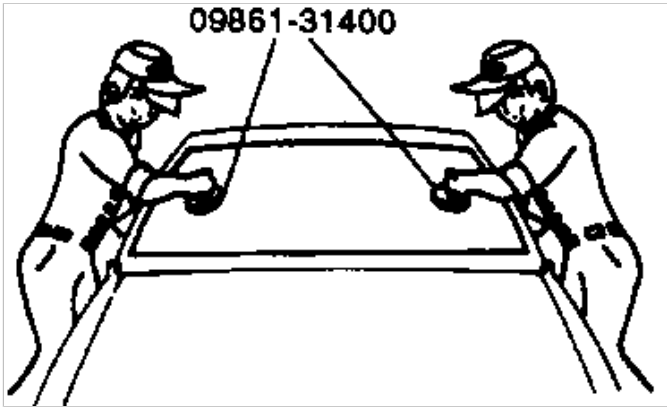


6. Pack adhesive into the cartridge (avoid air pockets) to ensure continuous delivery. Put the cartridge in a caulking gun or Sealant Gun, and run a bead of adhesive around the edge of the glass as shown.
   Apply the adhesive within 5 minutes after applying the glass primer.

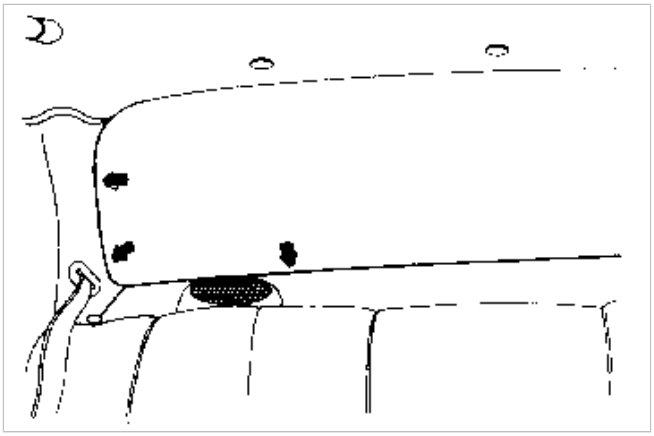
	3 Door	4 Door
a	7 mm (0.27 in)	8 mm (0.31 in)
b	10 - 12 mm (0.39 - 0.47 in)	9 mm (0.35 in)



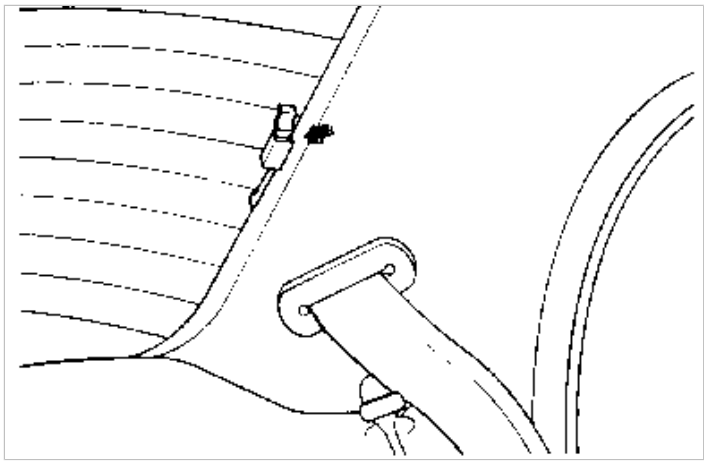
7. Using the special tool, install the rear window glass.



8. Install the rear package trim, rear pillar trim and seat belt anchor bolts.



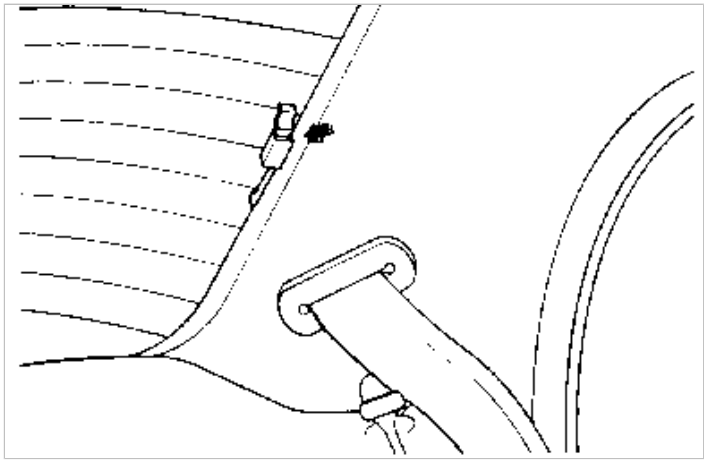
9. Install the rear defogger wire connector.



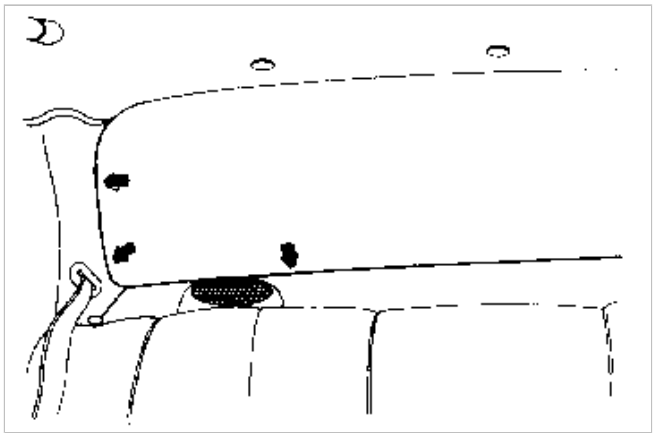
Body (Interior & Exterior) > Windshield & Rear Window > Rear Window Glass > REMOVAL

REMOVAL

1. Remove the defogger wire connector

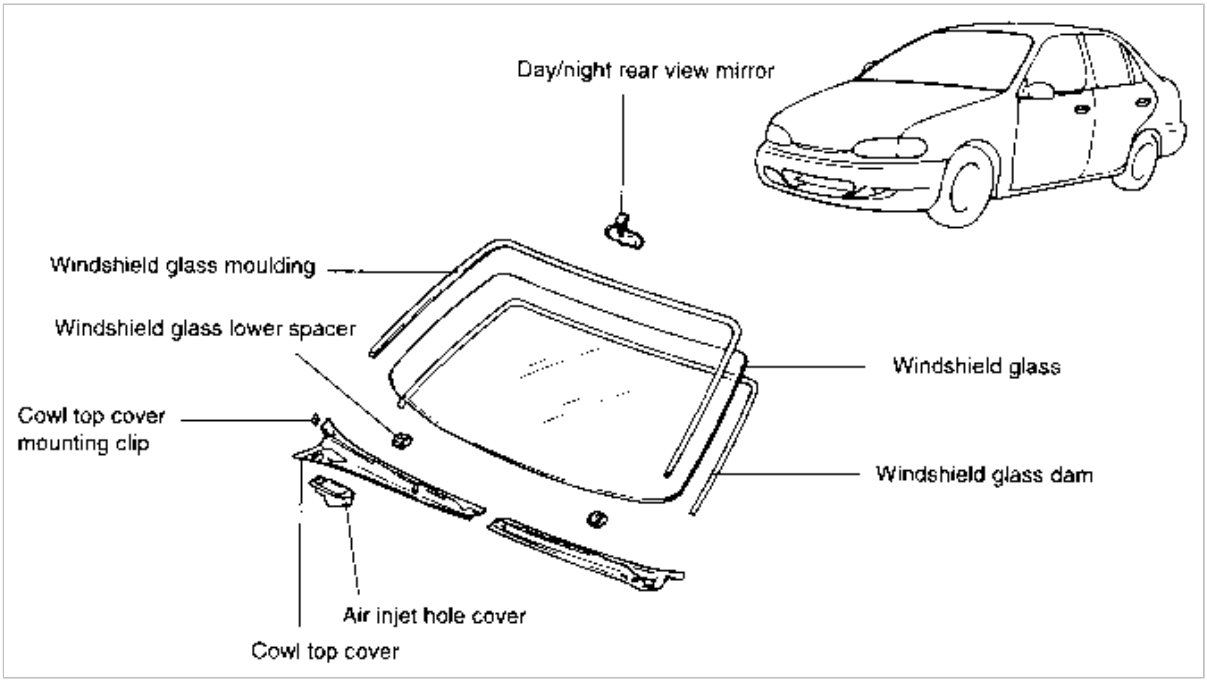


2. To remove the rear window glass, first remove the following parts:
   (1) Rear pillar trim
   (2) Rear seat belt anchor bolt
   (3) Package tray trim
3. Remove the rear window glass assembly



Body (Interior & Exterior) > Windshield & Rear Window > Windshield > COMPONENTS

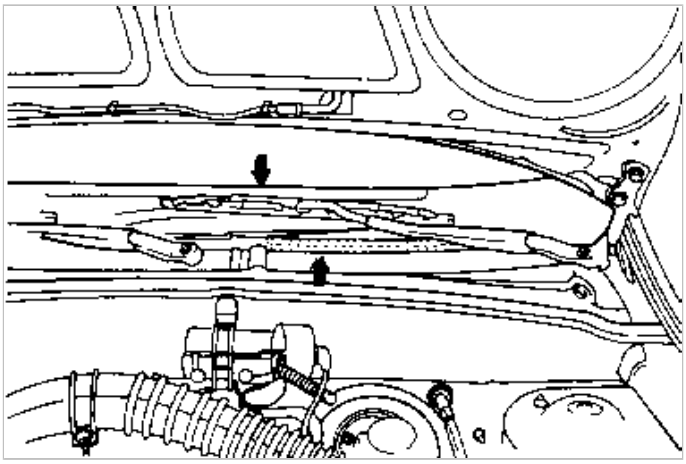
COMPONENTS



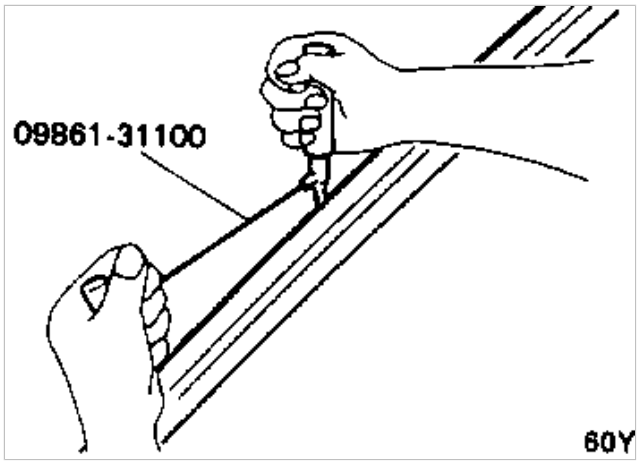
Body (Interior & Exterior) > Windshield & Rear Window > Windshield > REMOVAL

REMOVAL

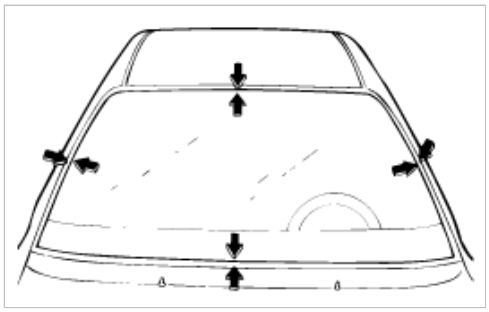
1. To remove the windshield, first remove the following parts:
   (1) Front pillar trims
   (2) Wiper arms
   (3) Cowl top cover
   (4) Windshield glass moulding



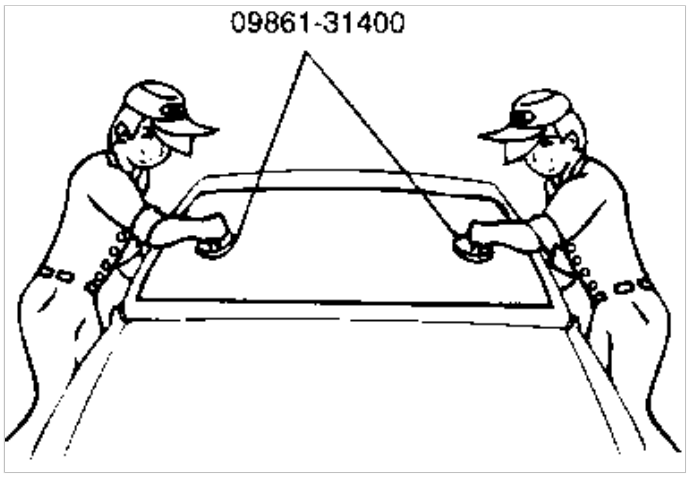
2. Use the special tool (09861-31100) to cut through the windshield sealant.



3. Make mating marks on the glass and body if the glass is to be reinstalled.
   Use chalk or equivalent to make mating marks on the glass and body.



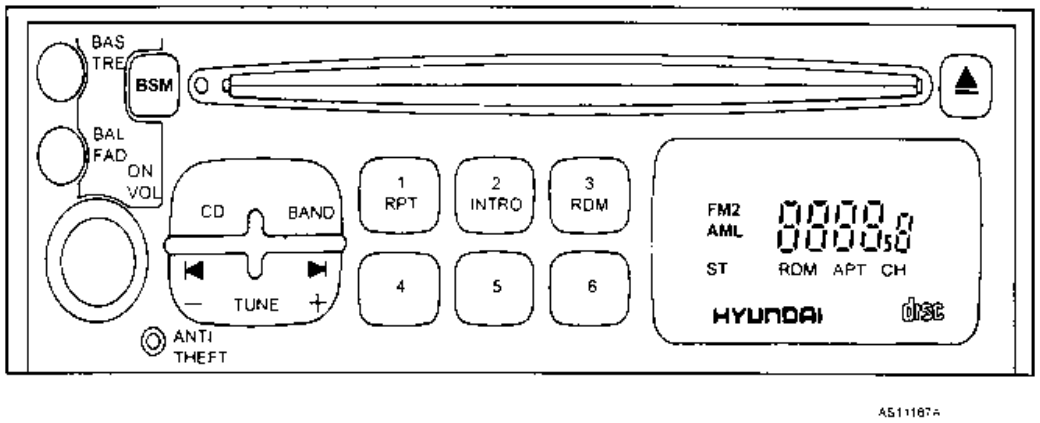
4. Take out the windshield glass with special tool, Glass Holder.

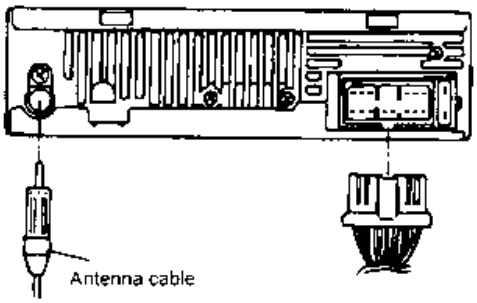


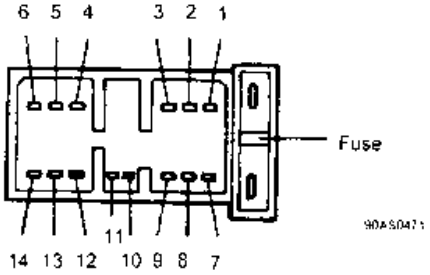
ACCENT(X3) > 1998 > G 1.5 SOHC > Body Electrical System

Body Electrical System > Audio & Antenna > COMPONENTS

COMPONENTS







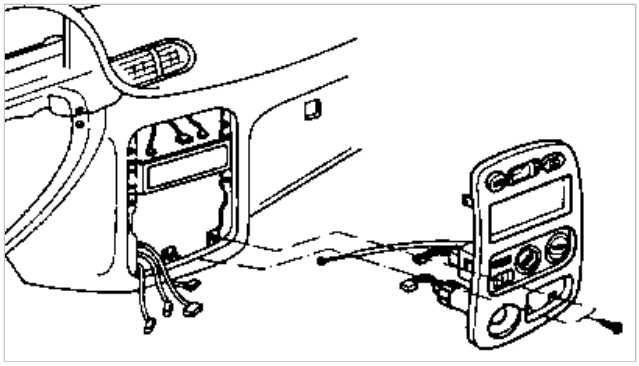
Connecto No. : 1 16

Terminal NO	Description
1	ILL (-)
2	Speaker rear RH (-)
3	Speaker front RH (-)
4	Speaker front LH (-)
5	Sepaker rear LH (-)
6	Power antenna
7	ILL (+)
8	Speaker rear RH (+)
9	Speak front RH (+)
10	ACC (+)
11	Battery (+)
12	Speaker front LH (+)
13	Speaker rear LH (+)
14	Ground

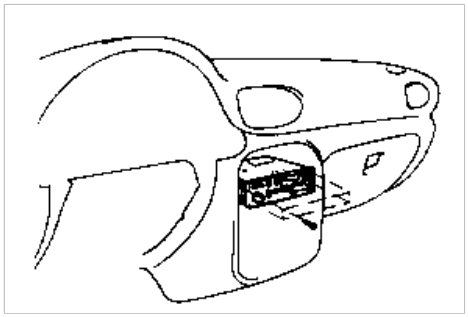
Body Electrical System > Audio & Antenna > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

1. Remove the ash tray.
2. Remove the center lower crash pad facia panel mounting screws.



3. Pull out facia panel.
4. Remove the audio mounting screws.
5. Remove the audio from the mounting bracket.
6. Disconnect the wiring and antenna cable.
7. Replace in reverse order of preceding steps.



Body Electrical System > Audio & Antenna > SERVICE INSTRUCTION

SERVICE INSTRUCTION

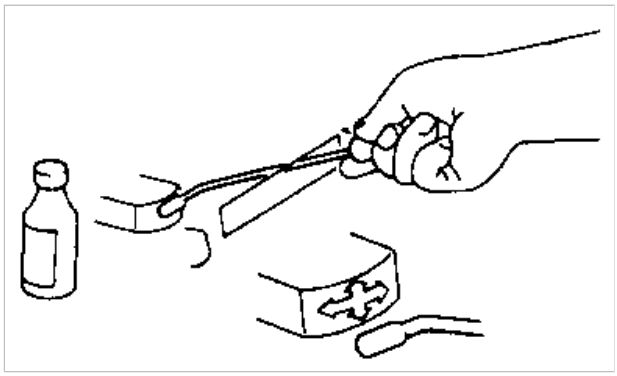
FUSE REPLACEMENT

Be sure to use the specified fuse when making a replacement.

Substituting with a higher capacity or connection without a fuse may result in damage to the unit.

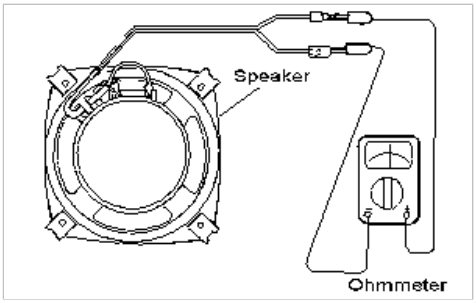
TAPE PLAYER HEAD AND CAPSTAN CLEANING

1. To obtain optimum performance, clean the head and capstan as often as necessary, depending upon frequency of use and cleanliness of tape.
2. To clean the tape head and capstan, use a cotton swab dipped in ordinary rubbing alcohol.
   Wipe the head and capstan.



SPEAKER CHECKING

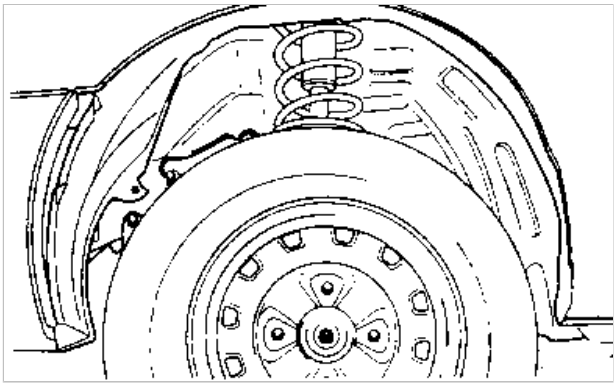
1. Use an ohmmeter to check the speaker.
   If an ohmmeter indicates the impedance of the speaker when checking between the speaker (+) and speaker (-) of the same channel, the speaker is good.
2. If a clicking sound is emitted from the speaker when the ohmmeter plugs touch the speaker terminals, the speaker is okay.



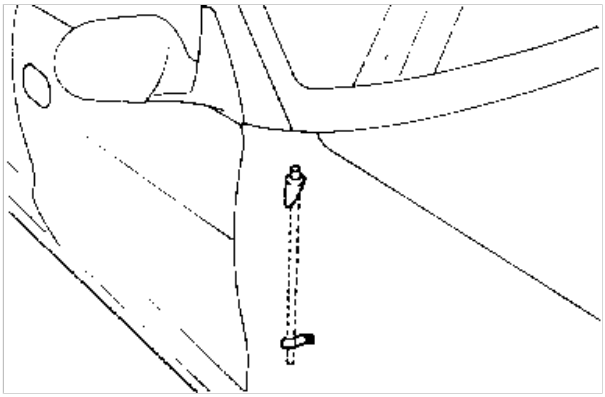
Body Electrical System > Audio & Antenna > Antenna > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

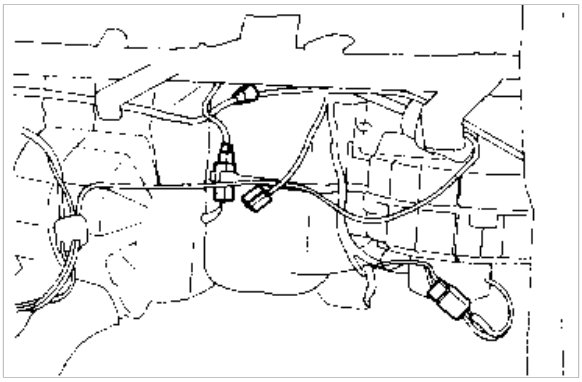
1. Remove the front wheel guard and antenna mounting bolt.



2. Remove the antenna mounting nut.



3. Disconnect the wiring and antenna cable.
4. Remove the antenna assembly.
5. Installation is the reverse order of preceding steps.



Body Electrical System > Audio & Antenna > Radio > INSTALLATION OF RADIO EQUIPMENT

INSTALLATION OF RADIO EQUIPMENT

The electronic control system computers have been designed so that external radio waves will not interfere with their operation.

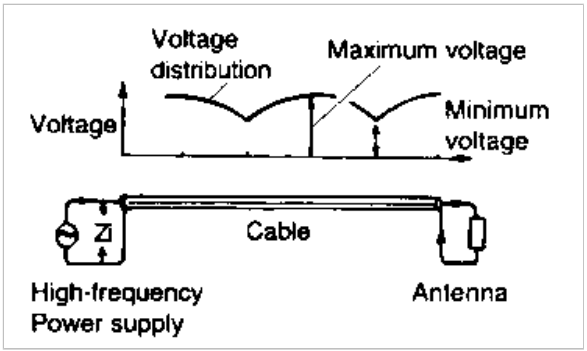
However, if the antenna or cable of the amateur transceiver is routed near the computers, it may affect the operation of the computers, even if the output of the transceiver is no more than 25W.

To protect each of the computers from interference by transmitter (hum, transceiver, etc.) the following should be observed.

1. Install the antenna on the roof or rear bumper.
2. Because radio waves are emitted from the coaxial cable of the antenna, keep it 200 mm (8 in.) away from the computers and the wiring harness. If the cable must cross the wiring harness, route it so that it runs at right angles to the wiring harness.
3. The antenna and the cable should be well matched, and the standing-wave ratio should be kept low.
4. A transmitter having a large output should not be installed in the vehicle.
5. After installation of transmitter, run the engine at idle, emit radio waves from the transmitter and make sure that the engine is not affected.

STANDING-WAVE RATIO

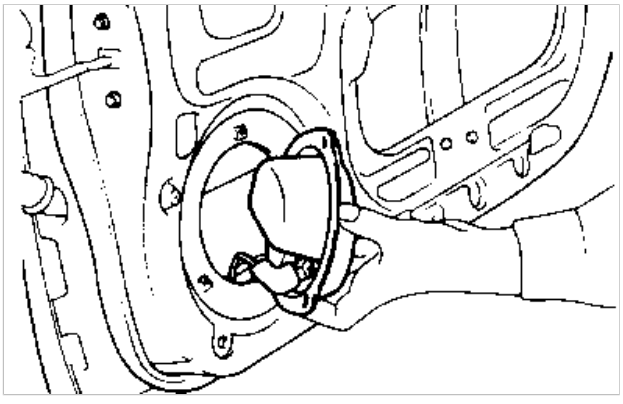
If an antenna and a cable having different impedance are connected, the input impedance Zi will vary in accordance with the length of the cable and the frequency of the transmitter, and the voltage distribution will also vary in accordance with the location. The ratio between this maximum voltage and minimum voltage is called the standing-wave ratio. It can also be represented by the ratio between the impedance of the antenna and the cable. The amount of radio waves emitted from the cable increases as the standing-wave ratio increases, and this increases the possibility of the electronic components being adversely affected.



Body Electrical System > Audio & Antenna > Speakers > DOOR SPEAKER--REMOVAL AND INSTALLATION

DOOR SPEAKER--REMOVAL AND INSTALLATION

1. Remove the door trim.
2. Remove the speaker mounting bolts (3 point).
3. Disconnect the speaker connector.
4. Remove the speaker assembly.

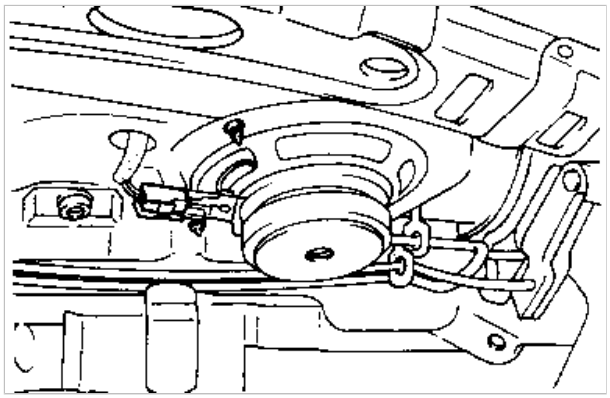


5. Replace in reverse order of the preceding steps.

Body Electrical System > Audio & Antenna > Speakers > REAR SPEAKER--REMOVAL AND INSTALLATION

REAR SPEAKER--REMOVAL AND INSTALLATION

1. Remove the package tray.
2. Remove the speaker grille mounting screw.
3. Disconnect the speaker connector.
4. Remove the speaker mounting screw.



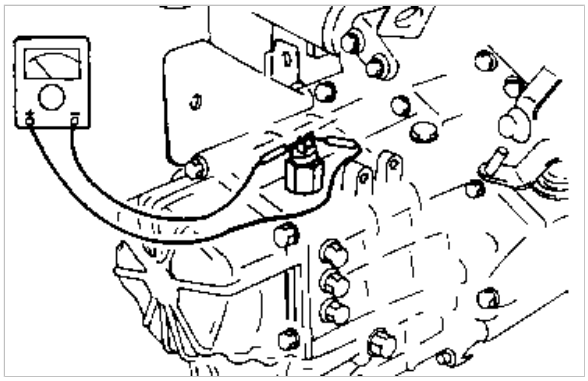
5. Installation is the reverse order of removal.

Body Electrical System > Back Up Lamps > Back Up Lamp Switch > BACK UP LAMP SWITCH (M/T)

BACK UP LAMP SWITCH (M/T)

1. Remove the back up lamp switch connector.
2. Check for continuity between terminals.

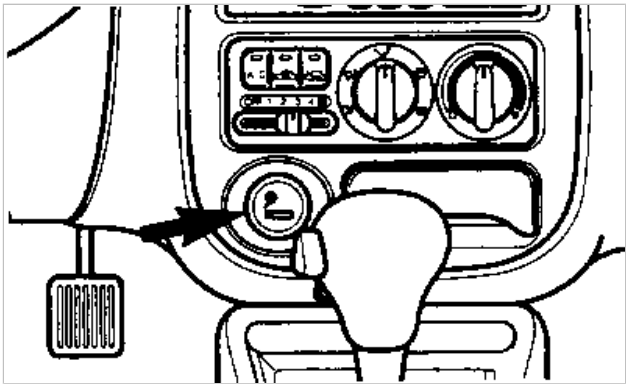
Gear shift position	1	2
No back up		
Back up	o	o



Body Electrical System > Cigarette Lighter/Power Outlet > Cigarette Lighter > INSPECTION

INSPECTION

1. Take out the plug.
2. Examine the element spot connection for remnants of tobacco and other material.
3. Use an ohmmeter to check for continuity of the element.
   a. When using a plug-in type of accessory, do not use anything with a load of more than 120W.
   b. It is recommended that only the lighter be inserted into the holder.

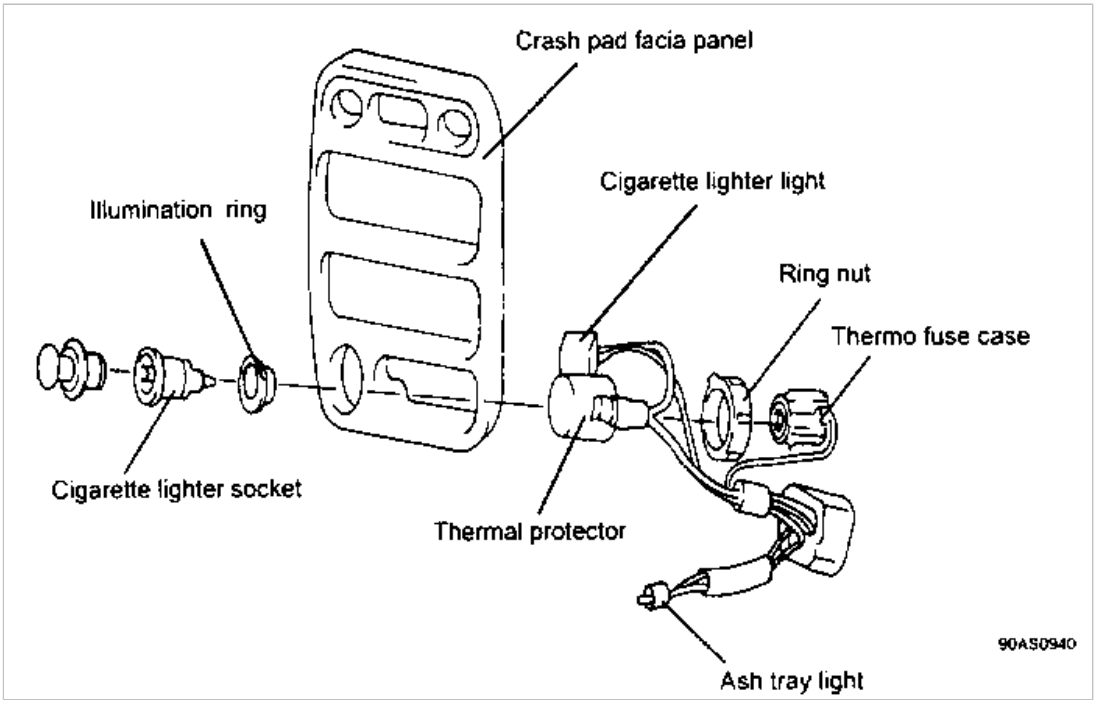


Body Electrical System > Cigarette Lighter/Power Outlet > Cigarette Lighter > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

1. After removing the ashtray, remove the facia panel mounting 2 screws.
2. Then disconnect the 3-p connector from cigarette lighter.
3. Disconnect thermal fuse case from the socket end.
4. Remove the ring nut and separate the cigarette lighter socket from the thermal protector.

When installing the cigarette lighter, align each lug on the illumination ring and cigarette lighter socket with the groove of the hole, then position the bulb case on the thermal protector between the stoppers of the center panel.

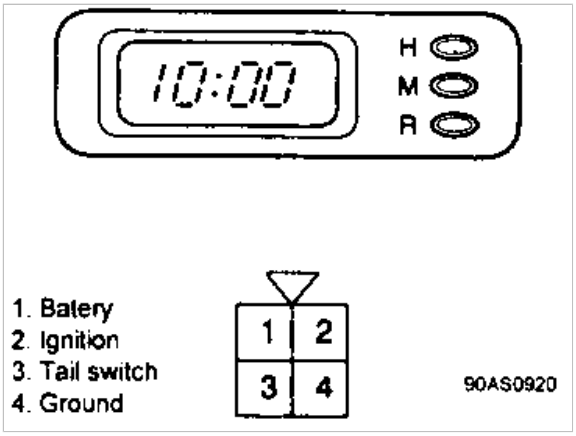


Body Electrical System > Clock > Clock > GENERAL TEST

GENERAL TEST

Inspect each terminal for applicable table.

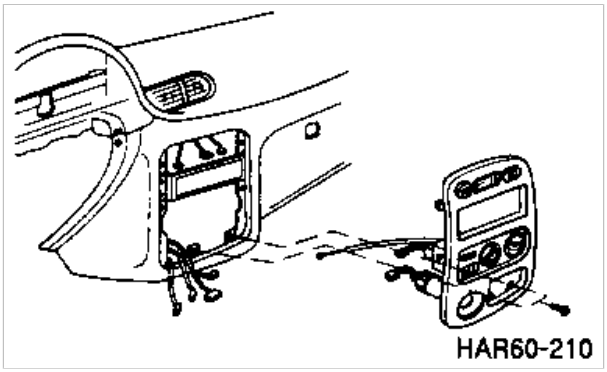
Terminal	Condition	Indication
1	Constant	Battery voltage
2	Ignition switch ON	Battery voltage
3	Tail lamp switch ON	Battery voltage
4	Constant	Continuity



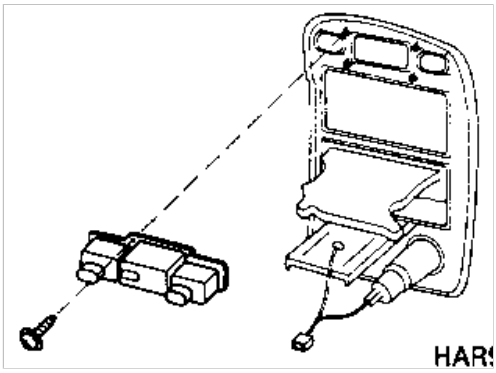
Body Electrical System > Clock > Clock > REMOVAL

REMOVAL

1. Remove the center facia panel.



2. Disconnect the wiring connectors.
3. Remove the digital clock mounting screw.



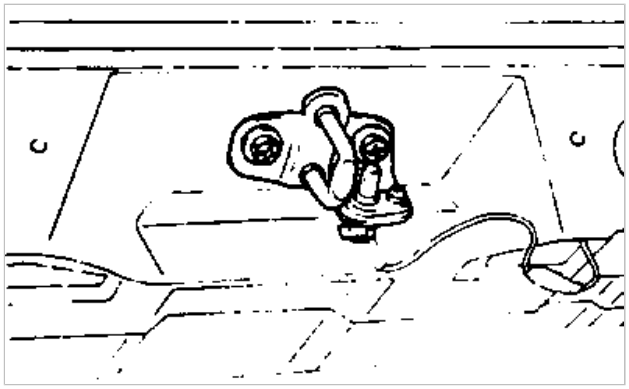
The clock is composed of delicate electronic components containing crystal oscillator, transistor, etc. Specialized technical skill is needed to repair the internal mechanism of this clock. Do not attempt to disassemble it. If the clock itself is malfunctioning, replace the entire assembly.

Body Electrical System > Courtesy & Trunk Lamps > Luggage Compartment Lamp > GENERAL TEST

GENERAL TEST

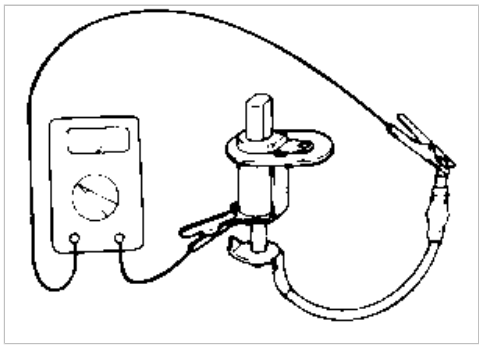
LUGGAGE COMPARTMENT LAMP SWITCH

1. Disconnect the negative battery terminal.
2. Remove the luggage compartment lamp switch from the trunk lid striker.
3. Disconnect the connector from the rear harness.



4. Check for continuity between terminal and body while pushing the rod.

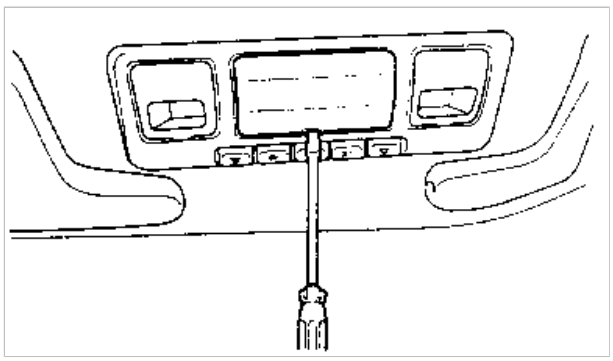
Switch rod condition	Continuity
Pushed (OFF)	Non-conductive(infinite Ω)
Released (ON)	Conductive (0 Ω)



Body Electrical System > Courtesy & Trunk Lamps > Room Lamp > OVERHEAD CONSOLE LAMP (VEHICLES WITH SUNROOF)

OVERHEAD CONSOLE LAMP (VEHICLES WITH SUNROOF)

1. Disconnect the battery negative terminal.
2. Using a screw driver, detach the overhead console lamps lens.



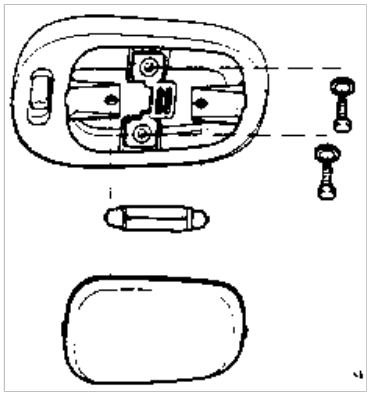
3. Remove the lamp assembly from the head lining by loosening 2 screws.
4. Disconnect the connector from the roof harness.
5. Installation is the reverse order of removal.

Body Electrical System > Courtesy & Trunk Lamps > Room Lamp > ROOM LAMP

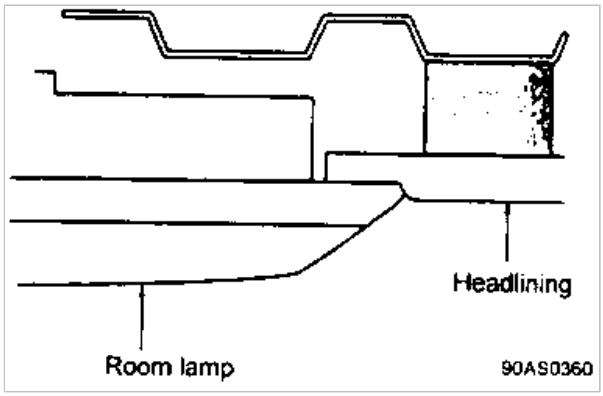
ROOM LAMP

1. Disconnect the battery negative terminal.

2. Using a screw driver, detach the room lamp lens.
3. Remove the lamp assembly from the head lining by loosening 2 screws.
4. Disconnect the connector from the roof harness.



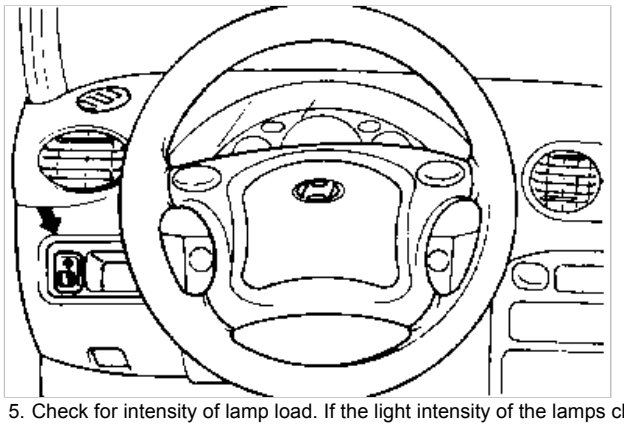
5. Installation is reverse order of removal.
6. While installing, check whether or not there is a gap between the contact and the head lining assembly.



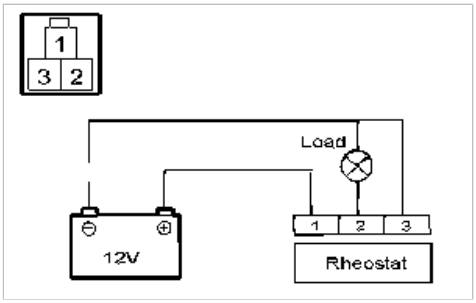
Body Electrical System > Dash, Console & Switch Lamps > Rheostat > INSPECTION

INSPECTION

1. Disconnect the battery negative terminal.
2. Remove the coin box assembly.
3. Disconnect the rheostat from crash pad harness.
4. Remove the rheostat from the coin box.



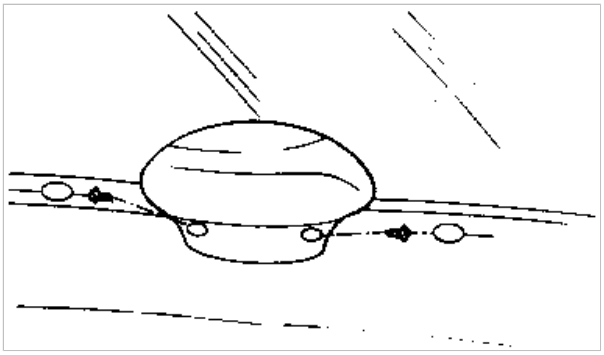
5. Check for intensity of lamp load. If the light intensity of the lamps changes smoothly without any flickering when the rheostat is turned, the rheostat is normal.



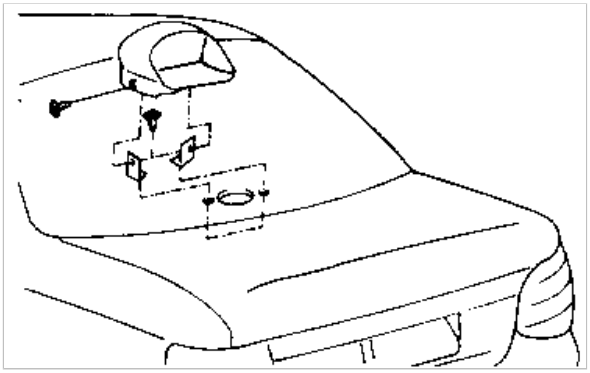
Body Electrical System > Exterior Lamps > Center High Mount Stop Lamp > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

1. Disconnect the battery negative terminal.
2. Using a screw driver, detach 2 blanking covers on both sides of the lamp.
3. Loosen the mounting screws.



4. Remove the lamp assembly from the rear package trim.
5. Disconnect the connector from main harness.
6. Installation is the reverse order of removal.

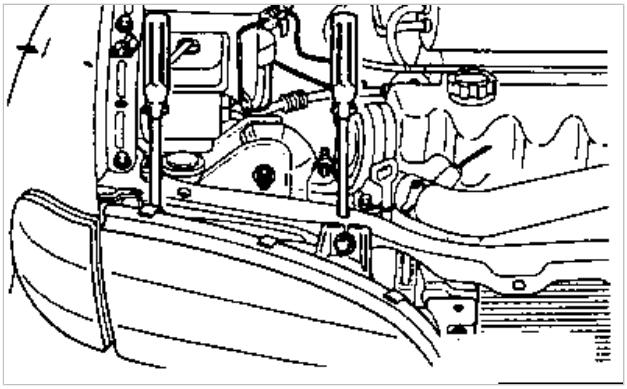


Body Electrical System > Exterior Lamps > Right Headlamp > HEADLAMP (FOG LAMP WITH SPORTY PACK) AIMING WITH SCREEN

HEADLAMP (FOG LAMP WITH SPORTY PACK) AIMING WITH SCREEN

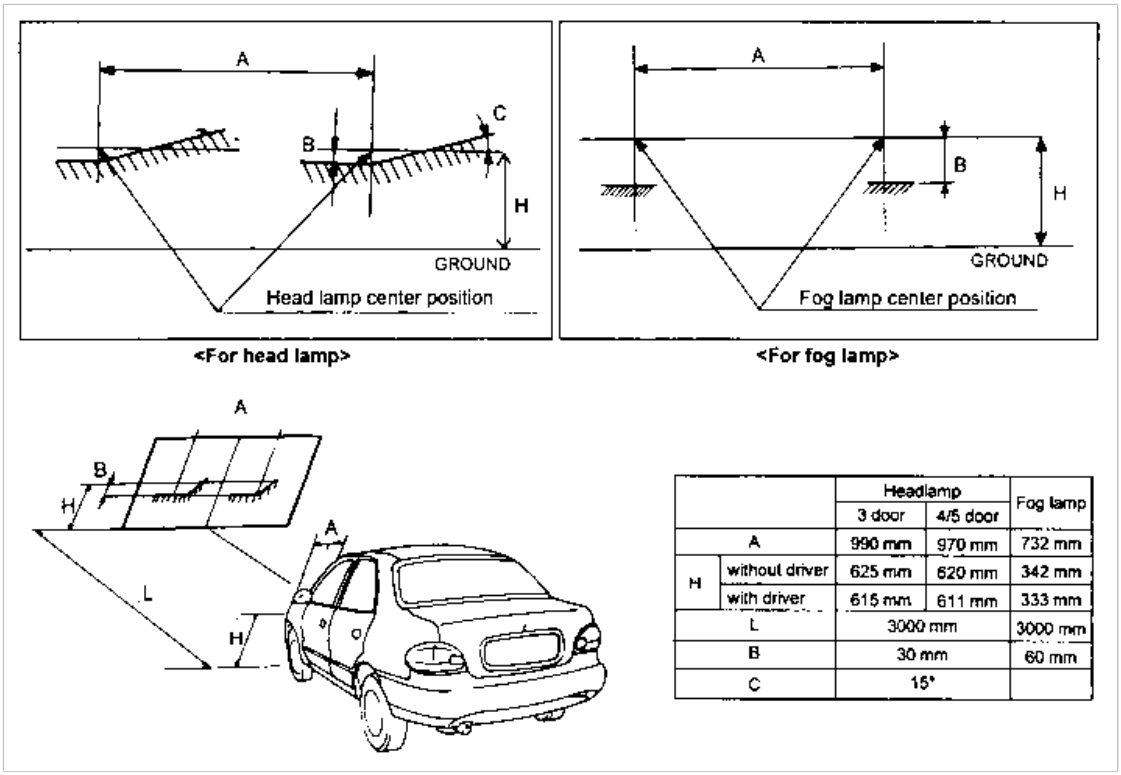
The headlamps should be aimed with the proper beam-setting equipment, and in accordance with the equipment manufacturer's instruction.

If there are any regulations pertinent to the aiming of headlamps in the area where the vehicle is to be used, adjust so as to meet those requirements.



Alternately turn the adjusting bolts to adjust the headlamp aiming. If beam-setting equipment is not available, proceed as follows.

1. Inflate the tires to the specified pressure and remove the load from the vehicle except a driver, spare tire, tool.
2. The vehicle should be placed on the flat floor.
3. Draw vertical lines (vertical lines passing through respective headlamp centers) and a horizontal line (horizontal line passing through center of headlamps) on the screen.
4. With the headlamp and battery normal condition, aim the headlamps. Make the vertical and horizontal adjustment of the lower beam to the standard values by using the adjusting knobs.

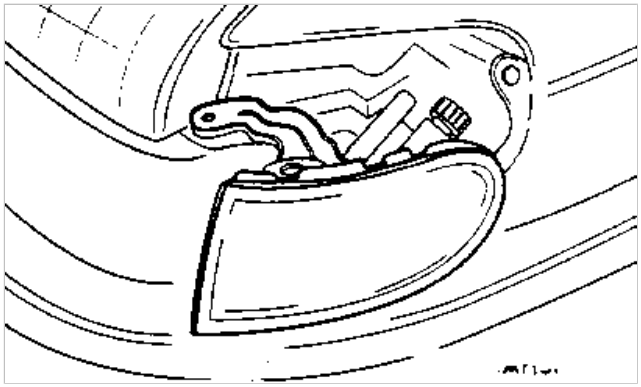


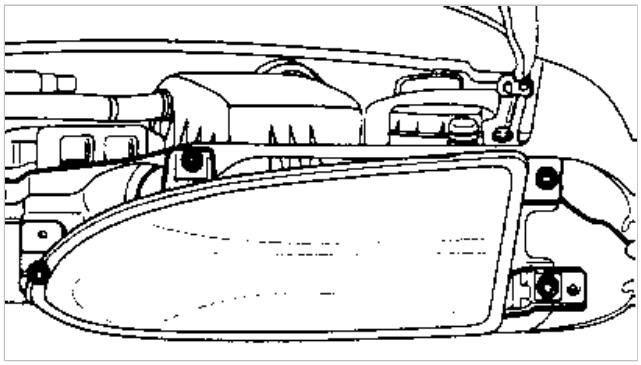
		Headlamp		Fog lamp
		3 door	4/5 door	
A		990 mm	970 mm	732 mm
H	without driver	625 mm	620 mm	342 mm
	with driver	615 mm	611 mm	333 mm
L		3000 mm		3000 mm
B		30 mm		60 mm
C		15°		

Body Electrical System > Exterior Lamps > Right Headlamp > REPLACEMENT

REPLACEMENT

1. Remove the front turn signal lamp.
2. Disconnect the head lamp connector.
3. Remove the head lamp.
4. Installation is the reverse order of removal procedure.

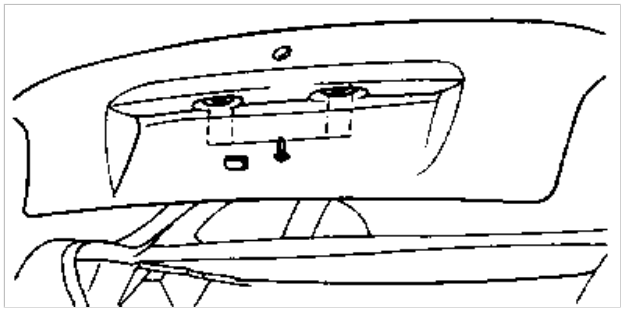




Body Electrical System > Exterior Lamps > Right License Plate Lamp > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

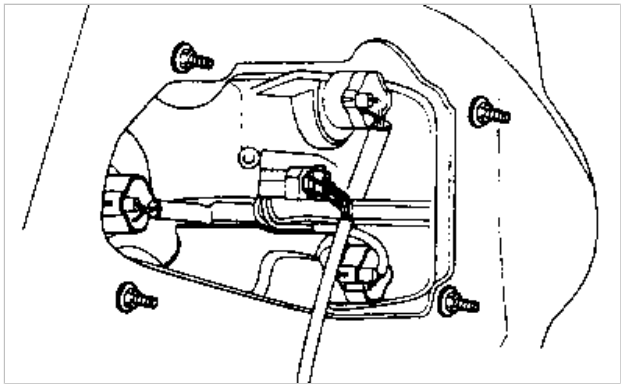
1. Disconnect the battery negative terminal.
2. Remove the licence plate lamp assembly.
3. Disconnect the connector from the harness.
4. Installation is the reverse order of removal.



Body Electrical System > Exterior Lamps > Taillamps > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

1. Remove the trunk inner trim.
2. Disconnect the harness connector.
3. Remove the rear combination lamps by loosening the nuts.

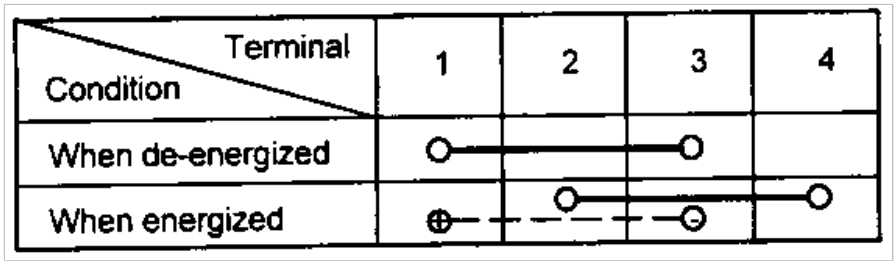


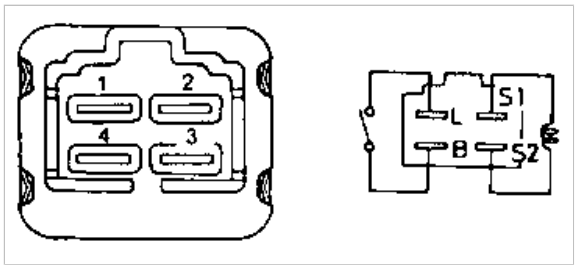
4. Installation is the reverse order of removal procedure.

Body Electrical System > Fuse/Relay Box Details > Headlamp Relay > INSPECTION

INSPECTION

1. Remove the head lamp and tail lamp relays from the engine compartment relay.
2. Check for continuity between the terminals.

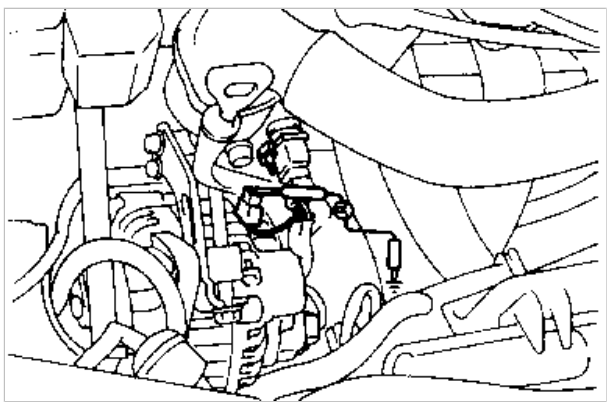




Body Electrical System > Gauges > Engine Coolant Temperature Gauge > OPERATION CHECK (IN-VEHICLE)

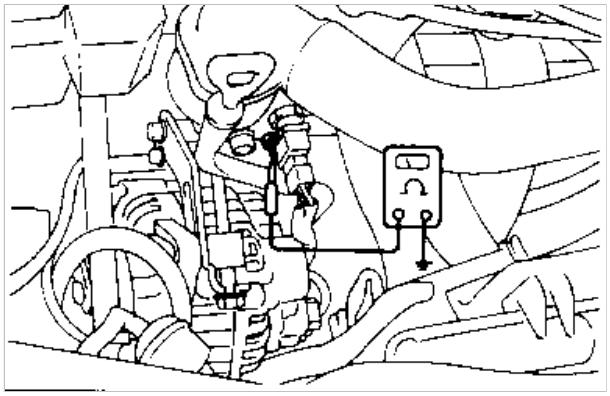
OPERATION CHECK (IN-VEHICLE)

1. Remove the harness connector from water temperature sender located in engine compartment.
2. Ground the harness side connector via 12V, 1.4W bulb.
3. Turn the ignition switch to ON position.
4. Check to be sure that the test bulb flashes and that the indicator moves.



INSPECTION

Using an ohmmeter, measure the resistance between terminal and ground.



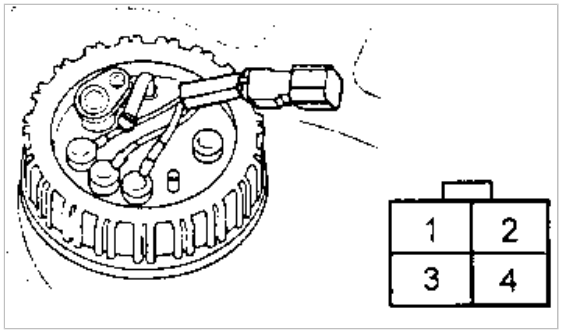
If the resistance is out of specification, replace the sender.

Temperature °C	60	85	110	125
Resistance Ω	118	47.3	23.4	15.3

Body Electrical System > Gauges > Fuel Gauge > FUEL GAUGE OPERATION CHECK (IN-VEHICLE)

FUEL GAUGE OPERATION CHECK (IN-VEHICLE)

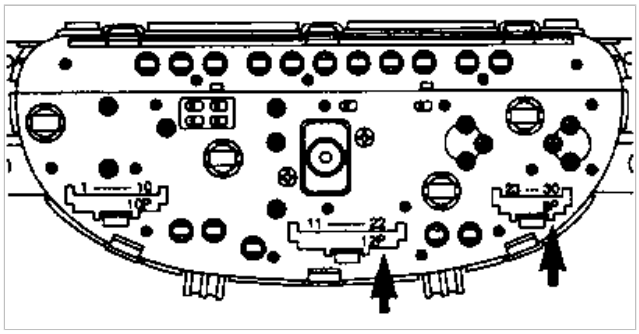
1. Remove the rear seat cushion and disconnect the fuel sender connector from fuel sender.
2. Ground the harness side connector (terminal 2) via 12V, 3.4W bulb.



3. Turn the ignition switch to the ON position.
4. Check that the test bulb flashes and that the indicator moves gradually to the "F" position.

FUEL GAUGE INSPECTION

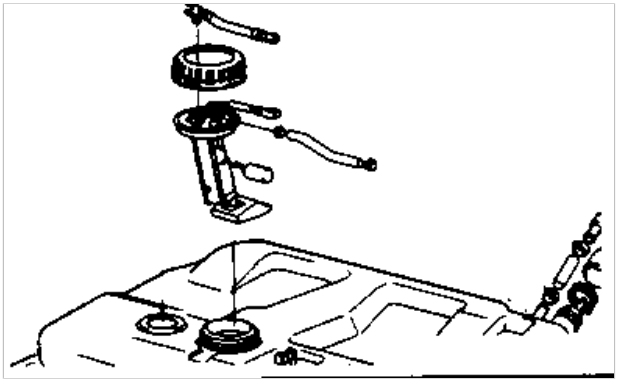
1. Remove the instrument cluster.
2. Measure the resistance between terminals. (Terminals No: DLX-No.24, 29/STD-No.27, 22)
   If the resistance value is extremely low, there may be a short in the coil; if it is extremely high, there may be a broken wire or some other problem in the coil.



FUEL SENDER INSPECTION

1. Remove the rear seat cushion.

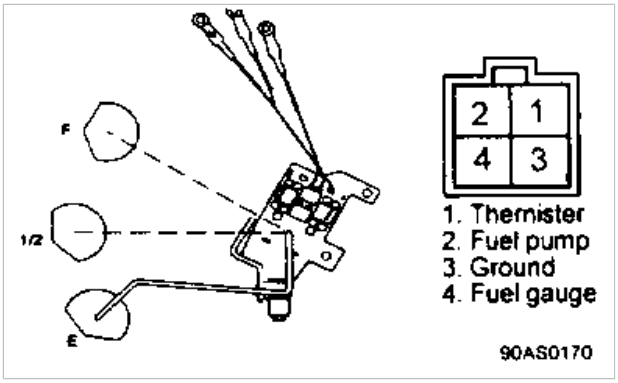
2. Remove the fuel tank cover retaining screws.
3. Remove the fuel sender assembly.



4. Using an ohmmeter, measure the resistance between terminals 3 and 4 at each float level.

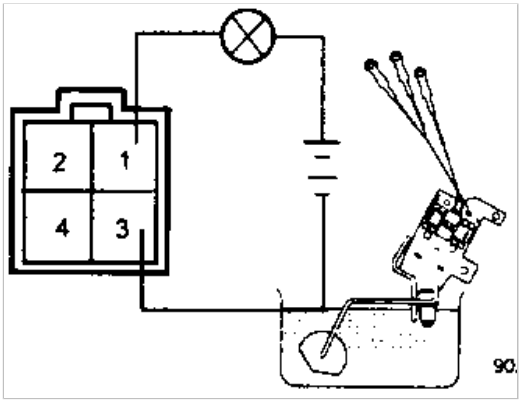
Float position	E	1/2	F
Resistance Ω	110 ± 1	32.5 ± 1	3 ± 1

5. Check that resistance changes smoothly when the float moves from "E" to "F."



LOW FUEL LEVEL SENSOR INSPECTION

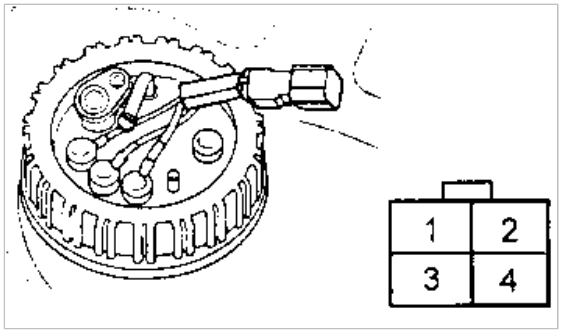
1. Connect the sender with a test lamp (12V, 3.4W) to the battery and immerse it in water.
2. The lamp should be off while thermistor is submerged in the water, and should illuminate when the sender is taken out of the water.
   If there is a malfunction, replace the fuel sender as an assembly.
   After completing this test, wipe the sender dry and install it in the fuel tank.



Body Electrical System > Gauges > Fuel Gauge Sender > FUEL GAUGE OPERATION CHECK (IN-VEHICLE)

FUEL GAUGE OPERATION CHECK (IN-VEHICLE)

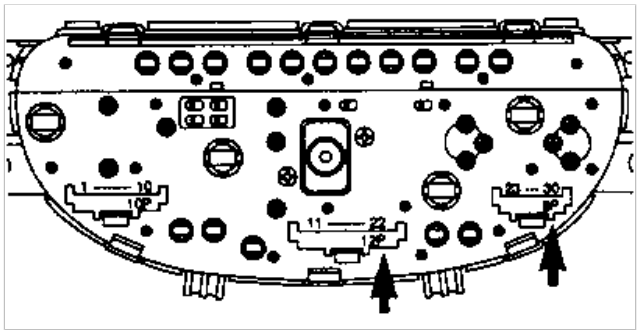
1. Remove the rear seat cushion and disconnect the fuel sender connector from fuel sender.
2. Ground the harness side connector (terminal 2) via 12V, 3.4W bulb.



3. Turn the ignition switch to the ON position.
4. Check that the test bulb flashes and that the indicator moves gradually to the "F" position.

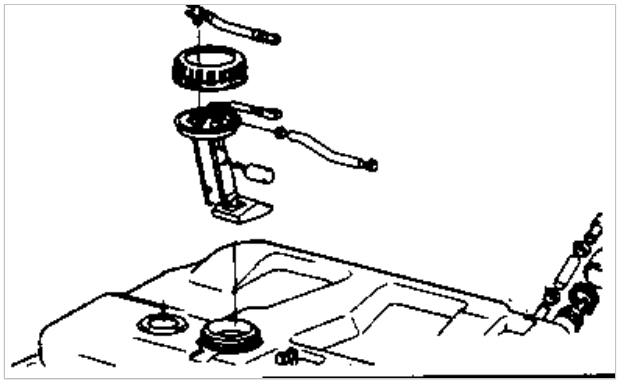
FUEL GAUGE INSPECTION

1. Remove the instrument cluster.
2. Measure the resistance between terminals. (Terminals No: DLX-No.24, 29/STD-No.27, 22)
   If the resistance value is extremely low, there may be a short in the coil; if it is extremely high, there may be a broken wire or some other problem in the coil.



FUEL SENDER INSPECTION

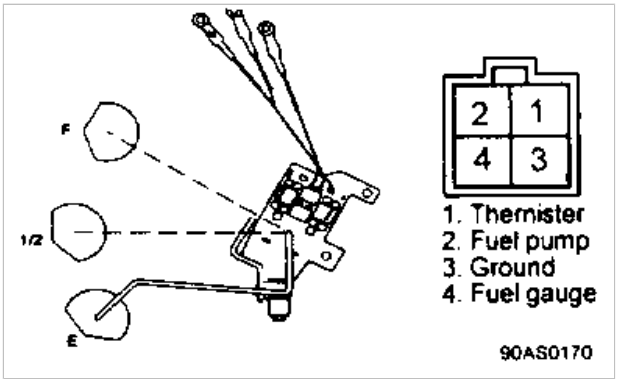
1. Remove the rear seat cushion.
2. Remove the fuel tank cover retaining screws.
3. Remove the fuel sender assembly.



4. Using an ohmmeter, measure the resistance between terminals 3 and 4 at each float level.

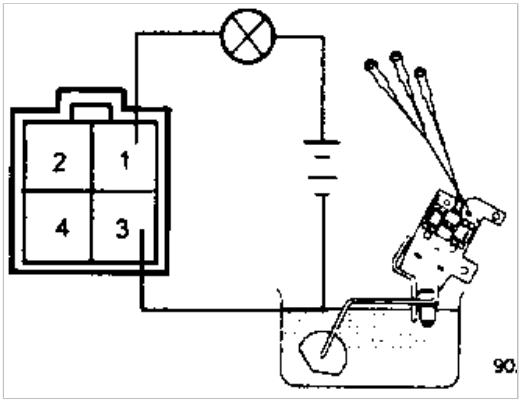
Float position	E	1/2	F
Resistance Ω	110 ± 1	32.5 ± 1	3 ± 1

5. Check that resistance changes smoothly when the float moves from "E" to "F."



LOW FUEL LEVEL SENSOR INSPECTION

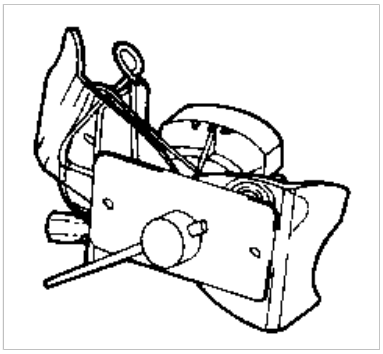
1. Connect the sender with a test lamp (12V, 3.4W) to the battery and immerse it in water.
2. The lamp should be off while thermistor is submerged in the water, and should illuminate when the sender is taken out of the water.
   If there is a malfunction, replace the fuel sender as an assembly.
   After completing this test, wipe the sender dry and install it in the fuel tank.



Body Electrical System > Gauges > Tachometer > ON-VEHICLE INSPECTION

ON-VEHICLE INSPECTION

1. Connect the High scan to the diagnosis connector in the fuse box, or install a tachometer.
2. With the engine started, compare the readings of the tester with that of the tachometer. Replace tachometer if difference is excessive.



Condition	Standard(RPM)	1000	2000	3000	4000	5000	6000	7000
at 1.35V(Normal Temp)	Tolerance(RPM)	±100	±150	±200	±200	±200	±250	±300
at 10-15V(-30°C - +80°C)	Tolerance(RPM)	±150	±175	±225	±300	±350	±400	±450

Body Electrical System > General > SPECIFICATIONS

SPECIFICATIONS

AUDIO

Items	Items	H 810 (H820)	HMR 30
Audio	Rated output	Max 22W X 2	Max 20W X 2
	Volume control type	Rotary	Rotary
Radio	Band	AM/FM	AM/FM
	Turning type	E.T.R	E.T.R
	Frequency range/channel	AM: 530-1710 KHz / 10	AM: 530-1710 KHz / 10
	Range	FM: 87.9-109.9 MHz/200 KHz	FM: 87.9-109.9 MHz/200 KHz
Tape player	Operating type	Auto reverse	|
Antenna	Type	Telescopic manual type	Telescopic manual type
	Electrostatic capacitance	80 PF 75 Ω	80 PF 75 Ω

RHEOSTAT

Items	Specifications
Rated Voltage	DC 12
Operating Voltage Range	DC 10V - DC 15V
Rated load	40W (lamp load)
Rotation degree Range of knob	0°- 200°

FUSIBLE LINKS

|	Circuit	Rated Capacity	Housing Color
A	Generator	100A	Dark blue
B	Battery	50A	Red
C	Power window	20A	Blue
D	Radiator fan	20A	Blue
E	ABS controls	20A	Blue
F	Ignition switch	30A	Pink
G	ABS controls	30A	Pink
H	Lamps	30A	Pink
I	ECM	20A	Blue

INSTRUMENT

Instrument Cluster

Type	Package type (flexible P.C.B. with push connection)
Illumination lamps	12V 3.4 W x 4, 14V 3W x1
Illumination color	Yellow white

Indicator and Warning Lamps

Type	Bulb wattage (W)	Illumination color
Battery charge	1.2	Red
Oil pressure	1.2	Red
Door ajar	1.2	Red
Brake warning	1.2	Red
Low fuel	3.0	Amber
Direction indicator (LH, RH)	1.2	Green
High beam	3.0	Blue
Seat belt warning	1.2	Red

Over-drive OFF	1.2	Amber
MIL*	1.2	Amber
ABS	1.2	Amber
Airbag	1.2	Red

*MIL = Malfunction Indicator Lamp (or Check Engine)

LIGHTING

Wattage of Lamps

Items	Specifications
Headlamp (High/Low)	65/45W
Front fog lamp (with 3DR sporty pack)	55W
Front turn signal and tail lamp	28/8W
Rear combination lamp: Back-up lamp	27W
Rear combination lamp:Turn signal lamp	27W
Rear combination lamp:Side marker	5W
Rear combination lamp:Stop and tail lamp	27/8W
License plate lamp	8W
Room lamp (center)	10W
Luggage lamp	5W
High mounted stop lamp	17W
Map lamp	8W
Overhead console lamp(with sunroof)	8W*2, 10W

Flasher unit

Items	Specifications
Blinking frequency:Turn signal	85±10 C/M
Blinking frequency:Hazard warning	80±12 C/M

CIGARETTE LIGHTER

Items	Specifications
Maximum power consumption	120 W
Insulation resistance	Min. 5MΩ (with DC 500V Megger Tester)
Return time	13 ± 5 sec. (after pushing the lighter in)
Break temperature of fuse °C (°F)	138-151°C (278.4-303.4°F)

CLOCK

Items	Specifications
Rated voltage	DC 12V
Operating voltage range	DC 6V - DC 16V
Operating temperature range	-30° - 80°C (-24 - 176°F)
Current consumption(with 13V supply)	Without display illuminated: 1mA or less

SEAT BELT TIMER

Items	Specifications
Regulated voltage	DC 12V
Operating voltage	DC 10V - 15V

Operating temperature	40°C - 80°C
Insulation Resistance	min. 100MΩ(with the DC 500V Megger Tester)
Regulated load	12V, 1.25W

HORN

Items	Specifications
Type	Flat type
Rated voltage	DC 12V
Rated current	3.5A (at DC 12V) or less
Sound level	110 ±5 dB (at DC 12V, 2M)
Operating voltage range	DC 10V - DC 14.5V
Operating temperature range	-40°C - +80°C(-42°F - +174°F)
Insulation resistance	min, 1MΩ(with DC 500V Megger Tester)
Fundamental frequency -Low pitch	350±20 Hz (at DC 12V)
Fundamental frequency -High pitch	415±20 Hz (at DC 12V)

REMOTE CONTROL MIRROR

Items	Specifications
Remote control mirror actuator	|
Rated voltage	DC 12V
Rated current	60 mA (Max. 150 mA)
Adjustment angle	9° (up, down, left, right)
Remote control mirror switch	|
Rated voltage	DC 12V
Rated current	0.2A (Max. 0.5A)

REAR HEATED (DEFOGGER) GLASS

Items	Items	Specifications
Rear heated (defogger) switch	Rated voltage	DC 12V
	Operating force	0.3 - 1.0 kg
	Insulating resistance	min. 5MΩ(with DC 500 V Megger Tester)
	Indicator lamp	1.2W
Rear heated glass	Rated voltage	DC 12V
	Power consumption	180 ± 10%
Rear heated timer	Rated voltage	DC 13V
	Consumption current	max 0.2A
	Rated load	DC 12V 200W

AUTOMATIC TRANSAXLE AND KEY LOCK CONTROL SYSTEM

Items	Items	Specifications
Control module	Rated voltage	DC 12V
	Operating voltage range	DC 10 - 16V
	Operating temperature range	-30°C - +80°C(-22°F - +176°F)
	Rated load	min. 1A(at solenoid load)
A/T solenoid	Rated voltage	DC 12V
	Rated current	1A (min. 2A)
	Operating voltage range	DC 10 - 16V

	Operating force: Initial pull force	0.4 kg.cm(at 12V, 20°C)
	Operating force: Spring force	0.2 kg.cm(at 12V, 20°C)
	Operating force: Holding force	1.5 kg.cm(at 12V, 20°C)
Key lock solenoid	Operating voltage range	DC 10 - 16V
	Operating temperature range	-30°C - +80°C(-22°F - +176°F)
	Exciting current	max 0.9A
	Operating force: Pull-in force	min. 1.17 kg.cm(at DC 7.5 ± 0.1V)
	Operating force: Holding force	min. 0.25 kg.cm(at DC 6 ± 0.1V)
Parking position switch	Rated load	1A (resistance load, at DC 12V)
	Operating force	0.8 ± 0.2 kgf
	Operating temperature range	-30°C - +80°C(-22°F - +176°F)

REAR WASHER SWITCH

Items	Items	Specifications
Rated load	Wiper switch	DC 12V, 4A
	Washer switch	DC 12V, 4A
	Operating force	0.3 - 0.7 kg.f
	Operating temperature range	-30°C - 80°C

INTERMITTENT WIPER RELAY

Items	Specifications
Voltage	DC 12V
Operating voltage range	DC 9 - 16V
Operating temperature range	-30°C - +80°C
Load capacity range	max. 6A

POWER WINDOW

Items	Items	Specifications
Power window motor	Type	DC motor and reduction gear
	Rated voltage	DC 13.5V
	Rated current (at 30 kg.cm load)	8A or less
	No-load current	3A or less
	Lock (80 kg.cm or more) current	19A or less
	Circuit breaker: Trip time	3 - 5.5 sec
	Circuit breaker: Trip current	17A
Power window switch	Rated load	|
	Rated current	DC 12V, 10A
	Motor load state	DC 12V, 20a

Body Electrical System > General > TROUBLESHOOTING

Troubleshooting

Audio

There are five areas where a problem can occur: the wiring harness, the radio, the cassette tape deck, the speaker, and the antenna. Troubleshooting will enable you to isolate the problem to a particular area.

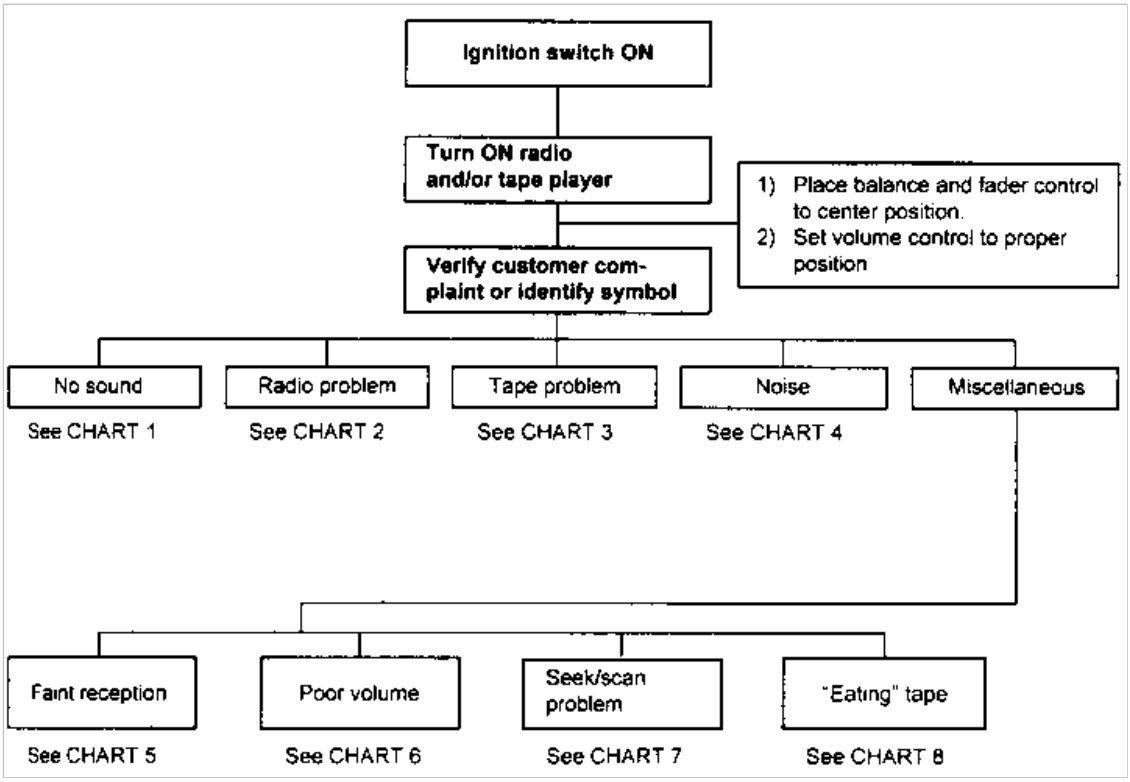
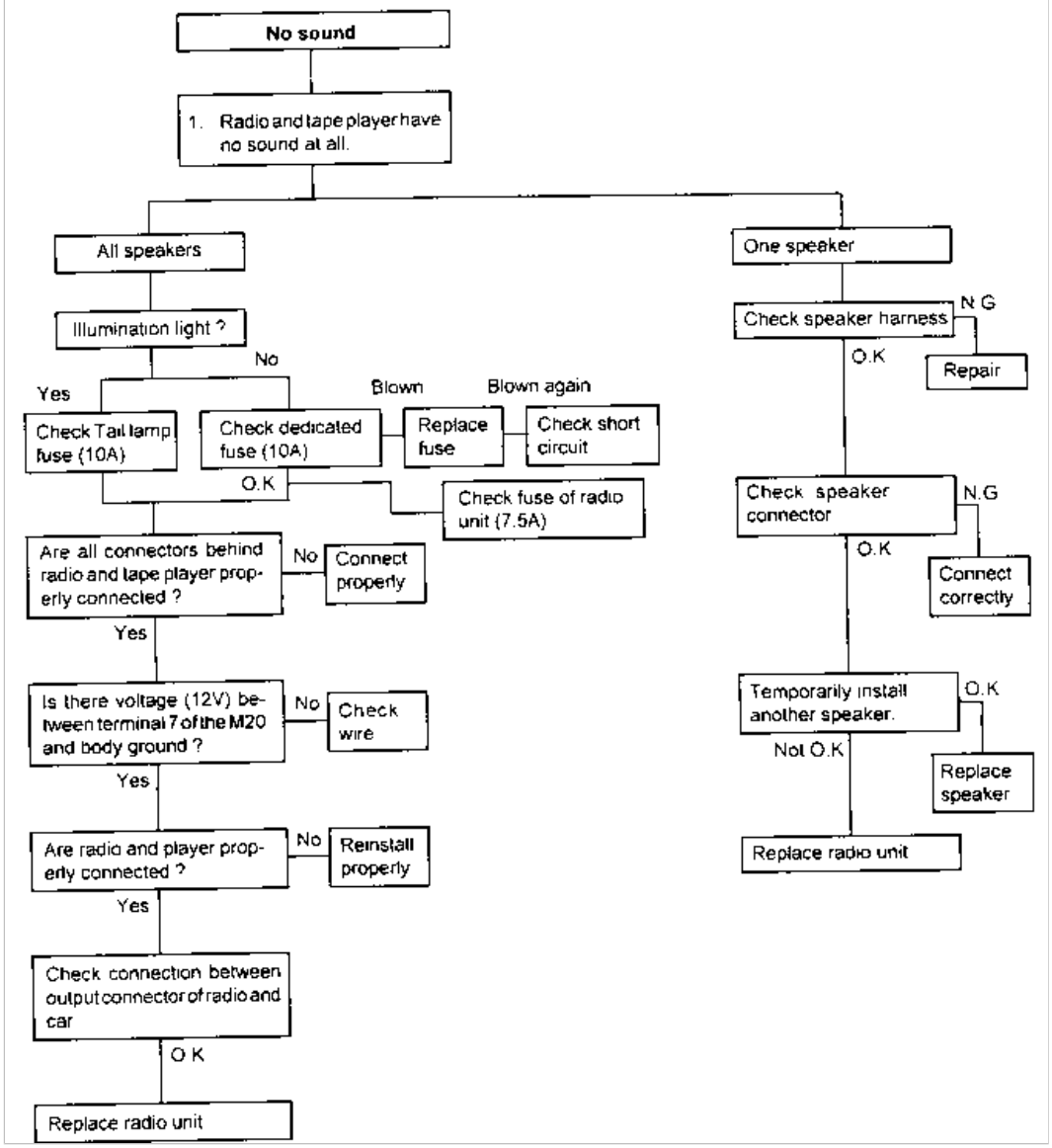

Ignition switch ON
Turn ON radio and/or tape player
1) Place balance and fader control to center position.
2) Set volume control to proper position
Verify customer complaint or identify symbol
No sound
Radio problem
Tape problem
Noise
Miscellaneous
See CHART 1
See CHART 2
See CHART 3
See CHART 4
Faint reception
Poor volume
Seek/scan problem
"Eating" tape
See CHART 5
See CHART 6
See CHART 7
See CHART 8

Chart 1

CHART 1



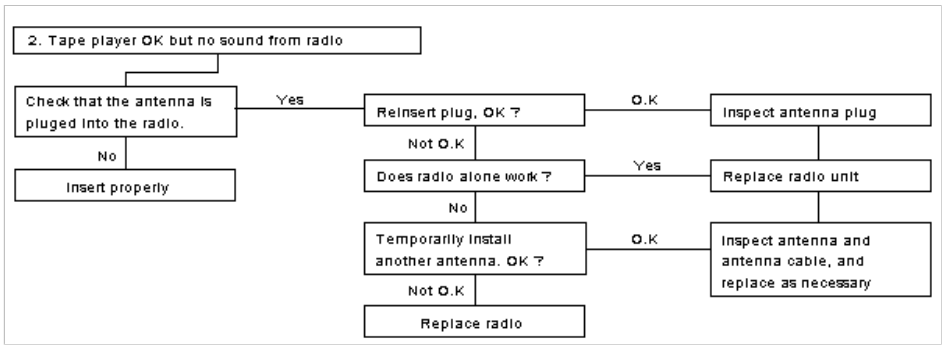


Chart 2

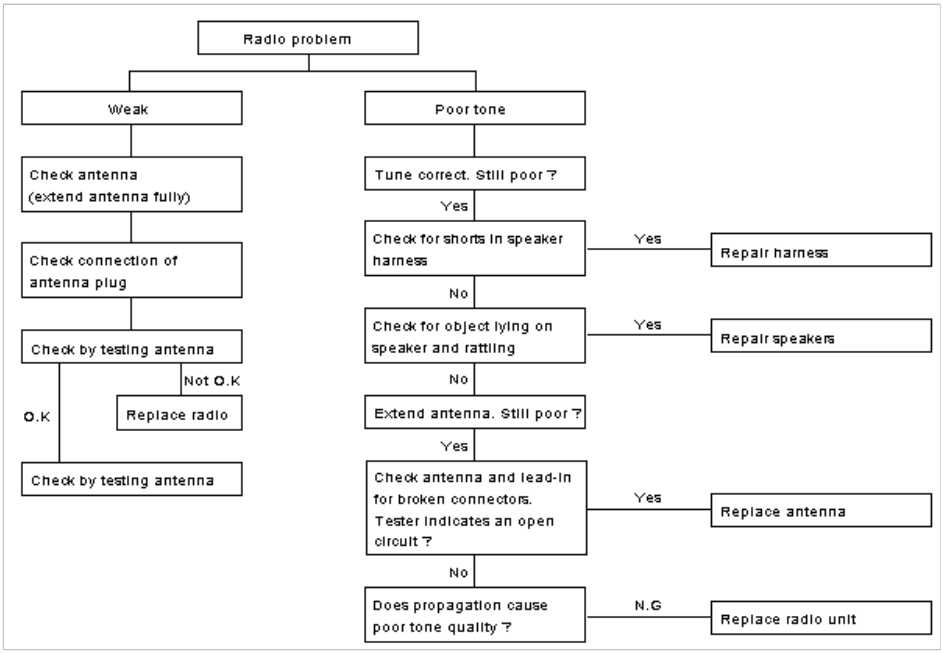

Radio problem
Weak
Poor tone
Check antenna (extend antenna fully)
Check connection of antenna plug
Check by testing antenna
Not O.K
Replace radio
O.K
Check by testing antenna
Tune correct. Still poor ?
Yes
Check for shorts in speaker harness
Yes
Repair harness
No
Check for object lying on speaker and rattling
Yes
Repair speakers
No
Extend antenna. Still poor ?
Yes
Check antenna and lead-in for broken connectors. Tester indicates an open circuit ?
Yes
Replace antenna
No
Does propagation cause poor tone quality ?
N.G
Replace radio unit

Chart 3

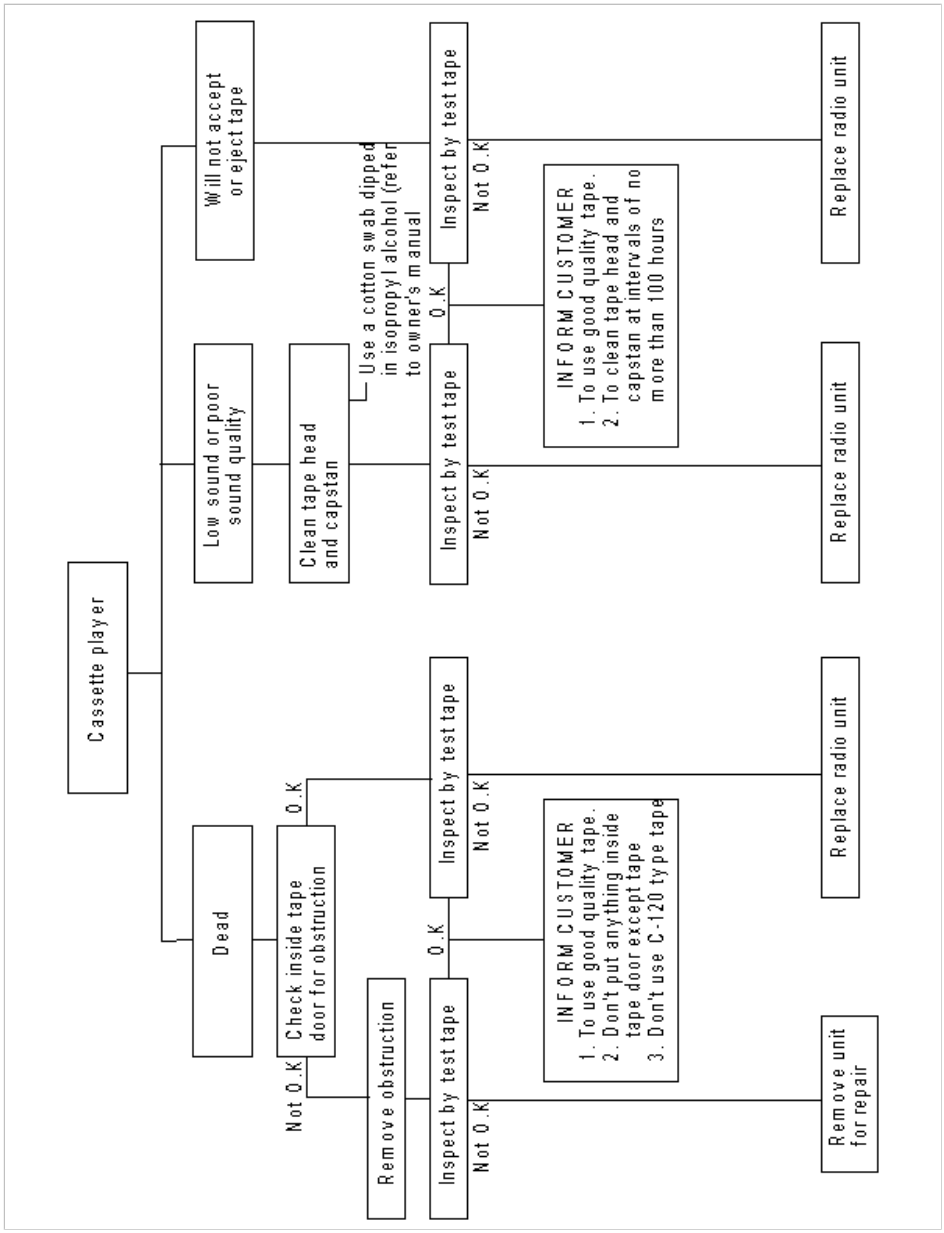
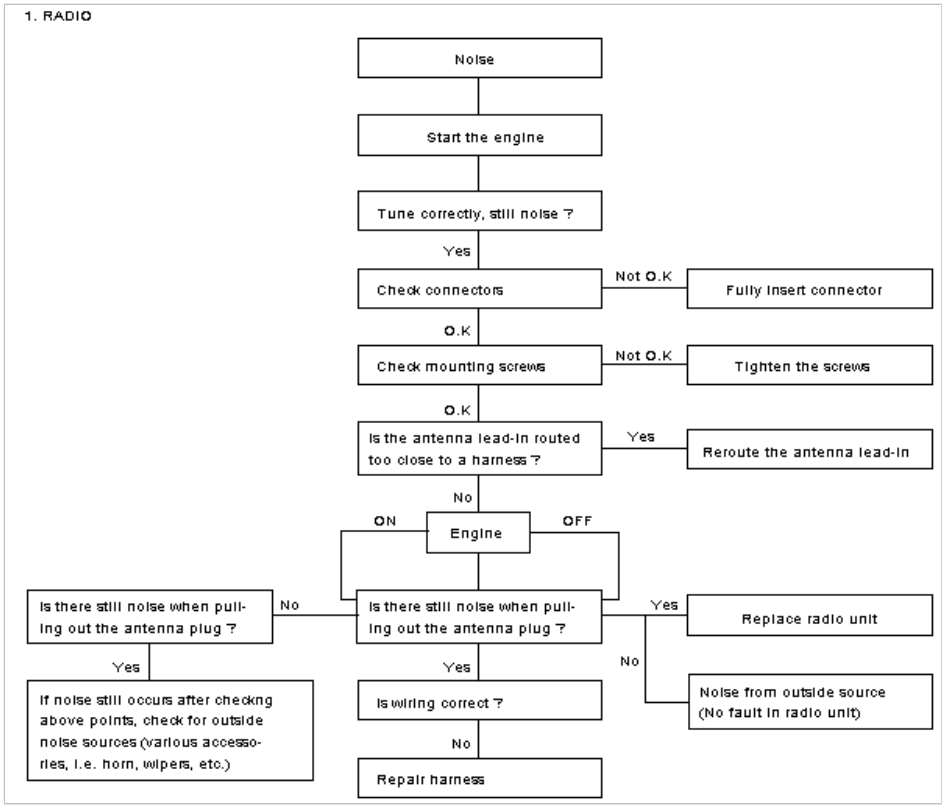

Cassette player
Will not accept or eject tape
Low sound or poor sound quality
Dead
Clean tape head and capstan
Use a cotton swab dipped in isopropyl alcohol (refer to owner's manual
Check inside tape door for obstruction
Remove obstruction
Inspect by test tape
Not O.K
O.K
INFORM CUSTOMER
1. To use good quality tape.
2. To clean tape head and capstan at intervals of no more than 100 hours
INFORM CUSTOMER
1. To use good quality tape.
2. Don't put anything inside tape door except tape
3. Don't use C-120 type tape
Replace radio unit
Remove unit for repair

Chart 4


1. RADIO
Noise
Start the engine
Tune correctly, still noise ?
Yes
Check connectors
Not O.K
Fully insert connector
O.K
Check mounting screws
Not O.K
Tighten the screws
O.K
Is the antenna lead-in routed too close to a harness ?
Yes
Reroute the antenna lead-in
No
ON
Engine
OFF
Is there still noise when pulling out the antenna plug ?
No
Is there still noise when pulling out the antenna plug ?
Yes
Replace radio unit
Yes
No
If noise still occurs after checkng above points, check for outside noise sources (various accessories, i.e. horn, wipers, etc.)
Yes
Is wiring correct ?
No
Noise from outside source (No fault in radio unit)
No
Repair harness

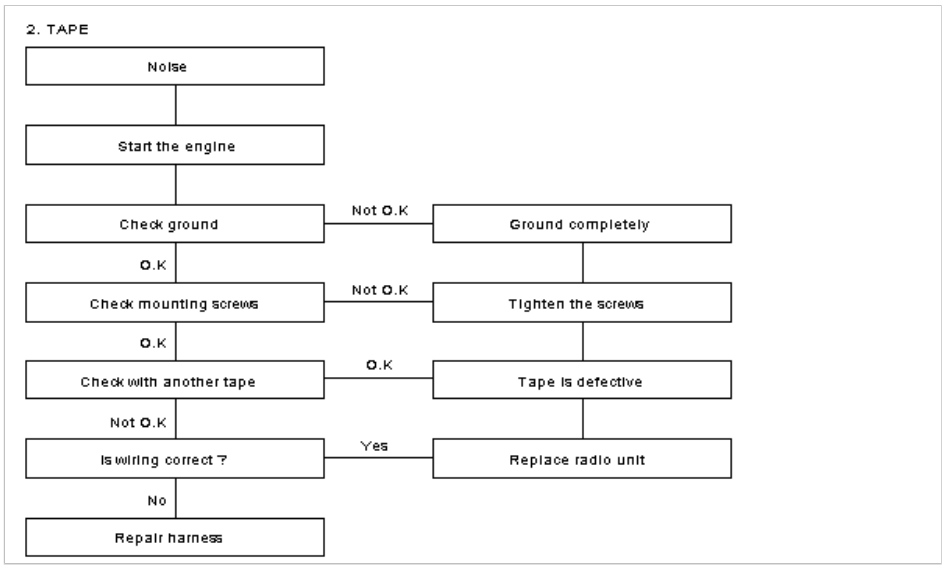

2. TAPE
Noise
Start the engine
Check ground
Not O.K
Ground completely
O.K
Check mounting screws
Not O.K
Tighten the screws
O.K
Check with another tape
O.K
Tape is defective
Not O.K
Is wiring correct ?
Yes
Replace radio unit
No
Repair harness

Chart 5

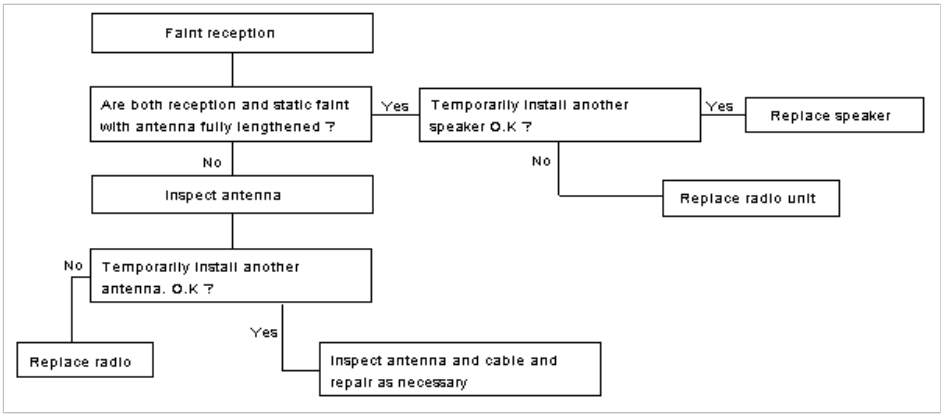


Chart 6

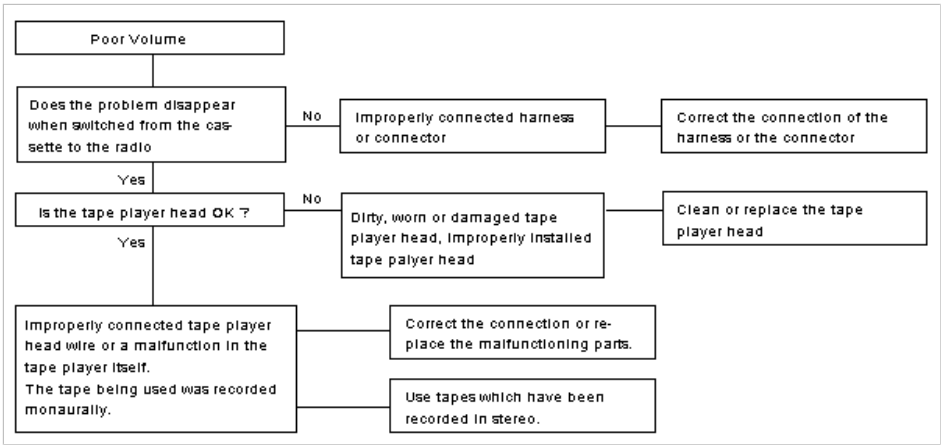


Chart 7

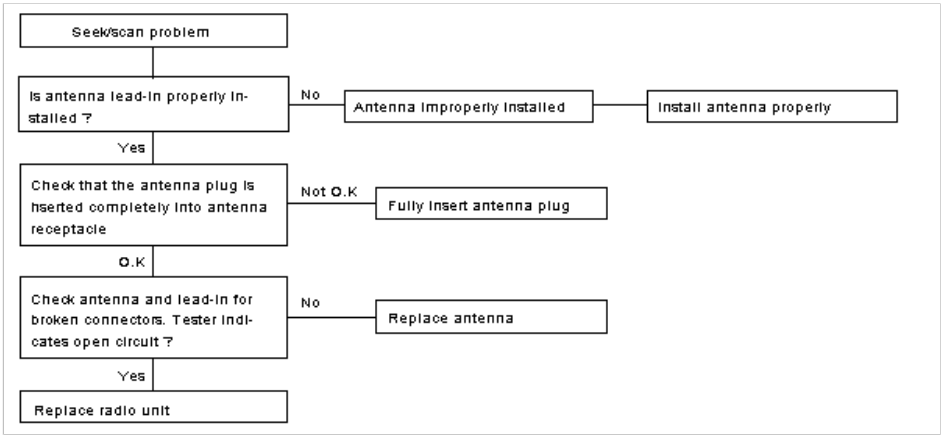
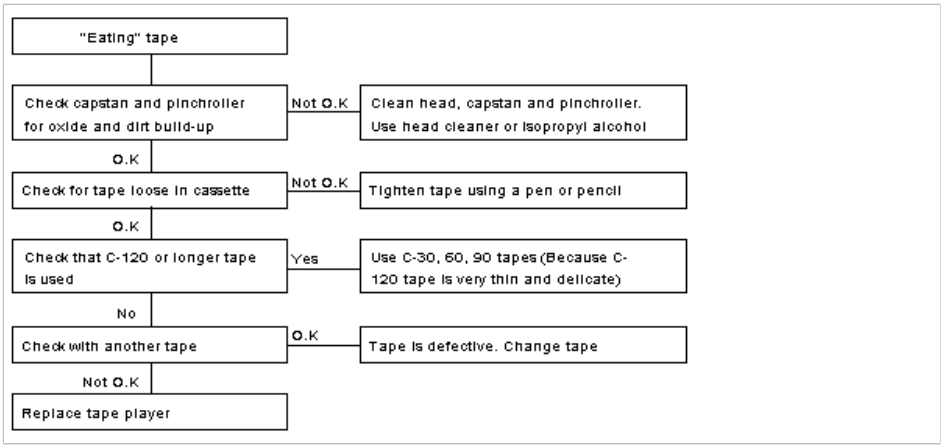


Chart 8



Gauges

Symptom	Possible cause	Remedy
Speedometer does not operate	No. 5, 10 fuse (10A) blown	Check for short and replace fuse
	Speedometer faulty	Check speedometer
	Reed switch faulty	Check the switch located within the speedometer
	Wiring faulty	Repair if necessary
Tachometer does not operate	No.5, 10 fuse (10A) blown	Check for short and replace fuse
	Tachometer faulty	Check tachometer
	Wiring Faulty	Repair if necessary
Fuel gauge does not operate	No.5, 10 fuse (10A) blown	Check for short and replace fuse
	Fuel gauge faulty	Check gauge
	Fuel sender faulty	Check fuel sender
	Wiring faulty	Repair if necessary
Low fuel warning lamp does not light	No.5, 10 fuse (10A) blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Fuel level sensor faulty	Check switch
	Wiring or ground faulty	Repair as necessary
Water temperature gauge does not operate	No.5, 10 (10A) fuse blown	Check for short and replace fuse
	Water temperature gauge faulty	Check gauge
	Water temperature sender faulty	Check sender
	Wiring or ground faulty	Repair if necessary
Oil pressure warning lamp does not light	No.5, 10 (10A) fuse blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Oil pressure sender faulty	Check sender
	Wiring or ground faulty	Repair if necessary
Low brake fluid warning lamp does not light	No.5, 10 (10A) fuse blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Brake fluid level warning switch faulty	Check switch
	Park brake switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Open door warning lamp does not light	No.5, 10 (10A) fuse blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Door switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary

POWER DOOR MIRRORS

Symptom	Probable cause	Remedy
All mirrors do not operate	Fusible link (30A, for IGN) blown	Replace
	No. 13 fuse (15A) blown	Check the circuit and replace fuse
	Poor ground (G04)	Clean and retighten the ground terminal mounting bolt
	Defective mirror switch	Check the switch Replace as necessary
	Open circuit in wires or loose or disconnected connector	Repair or replace
One mirror does not operate	Defective mirror switch	Check the switch
	Defective LH (RH) mirror actuator	Replace the actuator
	Open circuit in wires or loose or disconnected connector	Repair or replace

WINDSHIELD WIPER

Symptom	Probable cause	Remedy
Wipers do not operate or return to off position	Wiper fuse (No.: 7, 8) blown	Check for short and replace fuse
	Wiper motor faulty	Check motor
	Wiper switch faulty	Check switch
	Wiring or ground faulty	Repair as necessary
Wipers do not operate in INT position	Intermittent relay faulty	Check intermittent relay
	Wiper switch faulty	Check switch
	Wiper motor faulty	Check motor
	Wiring or ground faulty	Repair as necessary

INSTRUMENTS AND WARNING SYSTEM

Symptom	Probable cause	Remedy
Speedometer does not operate	No. 5 fuse (10A) blown	Check for short and replace fuse
	Speedometer faulty	Check speedometer
	Reed switch faulty	Check the switch located within the speedometer
	Wiring faulty	Repair if necessary
Tachometer does not operate	No. 10 fuse (10A) blown	Check for short and replace fuse
	Tachometer faulty	Check tachometer
	Wiring faulty	Repair if necessary
Fuel gauge does not operate	No. 10 fuse (10A) blown	Check for short and replace fuse
	Fuel gauge faulty	Check gauge
	Fuel sender faulty	Check fuel sender
	Wiring faulty	Repair if necessary
Low fuel warning lamp does not light	No. 10 fuse (10A) blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Fuel level sensor faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Water temperature gauge does not operate	No. 10 fuse (10A) blown	Check for short and replace fuse
	Water temperature gauge faulty	Check gauge
	Water temperature sender faulty	Check sender
	Wiring or ground faulty	Repair if necessary
Oil pressure warning lamp does not light	No. 10 fuse (10A) blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Oil pressure sender faulty	Check sender
	Wiring or ground faulty	Repair if necessary

Low brake fluid warning lamp does not light	No. 10 fuse (10A) blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Brake fluid level warning switch faulty	Check switch
	Park brake switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary
Open door warning lamp does not light	No. 5 fuse (10A) blown	Check for short and replace fuse
	Bulb burned out	Replace bulb
	Door switch faulty	Check switch
	Wiring or ground faulty	Repair if necessary

LIGHTING

Symptom	Probable cause	Remedy
One lamp does not light (all exterior)	Bulb burned out	Replace bulb
	Socket, wire or ground faulty	Repair as necessary
No headlamp light	Fusible link (30A) blown	Replace sub-fusible link
	Headlamp relay faulty	Check relay
	Lighting switch faulty	Check switch
	Wiring or ground faulty	Repair as necessary
Tail and license lamps do not light	Tail fuse blown	Replace fuse and check for short
	Fusible link blown (30A)	Replace fusible link
	Taillamp relay faulty	Check relay
	Lighting switch faulty	Check switch
	Wiring or ground faulty	Repair as necessary
Stop lamps do not light	Stop fuse (No. 4) blown	Replace fuse and check for short
	Stop lamp switch faulty	Adjust or replace switch
	Wiring or ground faulty	Repair as necessary
Stop lamps stay on	Stop lamp switch faulty	Adjust or replace switch
Instrument lamps do not light (taillamps light)	Lamp control rheostat faulty	Check rheostat
	Wiring or ground faulty	Repair as necessary
Turn signal lamp does not flash on one side	Bulb burned out	Replace bulb
	Turn signal switch faulty	Check switch
	Wiring or ground faulty	Repair as necessary
Turn signal lamps do not operate	Fusible link (30A) blown	Replace bulb
	Turn signal fuse (No. 9) blown	Replace fuse and check for short
	Turn signal flasher faulty	Check flasher
	Turn signal switch faulty	Check switch
	Wiring or ground faulty	Repair as necessary
Hazard warning lamps do not operate	Fusible link (30A) blown	Replace fusible link
	Hazard fuse (No. 3) blown	Replace fuse and check for short
	Turn signal flasher faulty	Check flasher
	Hazard switch faulty	Check switch
	Wiring or ground faulty	Repair as necessary
Flasher rate too slow or too fast	Lamps are of a wattage smaller or larger than is specified for use	Replace lamps
	Defective flasher unit	Replace unit
Back up lamps do not light	Back up fuse blown	Check for short, replace fuse
	Back up lamp switch faulty	Check switch
	Damaged wiring or poor grounding	Repair as necessary
Overhead console and luggage lamp do not light	Fusible link (50A) blown	Replace fusible link

	No. 5 (10A) fuse blown	Check for short and replace fuse
	Wiring or ground faulty	Repair as necessary

POWER WINDOW

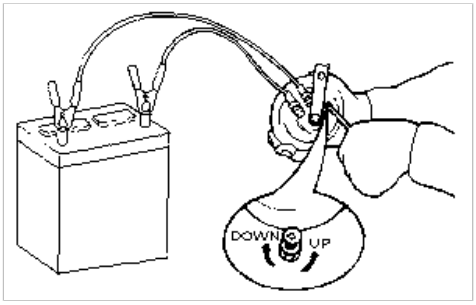
Symptom	Probable cause	Remedy
All windows do not operate by switch	Fusible link (20A, for IGN) blown	Repair as necessary
	No. 16 fuse (10A) blown	Check the circuit and replace fuse
	Poor ground (G05)	Clean and retighten the ground terminal mounting bolt
	Defective power window switch	Check the switch Replace as necessary
	Open circuit in wires or loose or disconnected connector	Repair or replace
Driver's side window only does not operate	Defective power window switch	Check for LH (RH in case of RHD vehicle) switch
	Defective LH (RH) motor or circuit breaker	Replace the motor
	Open circuit in wires or loose or disconnected connector	Check the harness and the connector
Passenger's side window only does not operate	Defective power window switch	Replace the switch
	Defective motor or circuit breaker	Replace the motor
	Wiring faulty or disconnected connector	Repair as necessary

Body Electrical System > Horns > Horn > ADJUSTMENT

ADJUSTMENT

Operate the horn, and adjust the tone to a suitable level (by turning the adjusting screw).

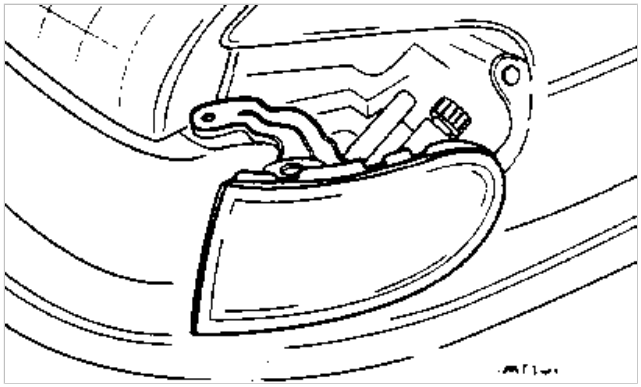
After the adjustment, apply a small amount of paint around the screw head to keep it from loosening.



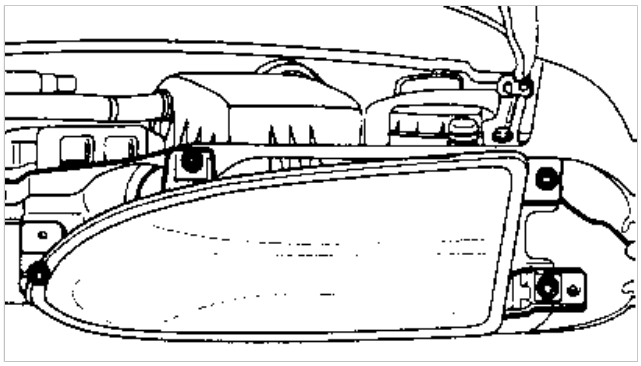
Body Electrical System > Horns > Horn > REMOVAL

REMOVAL

1. Disconnect the negative cable from the battery.
2. Remove the left turn signal lamp.



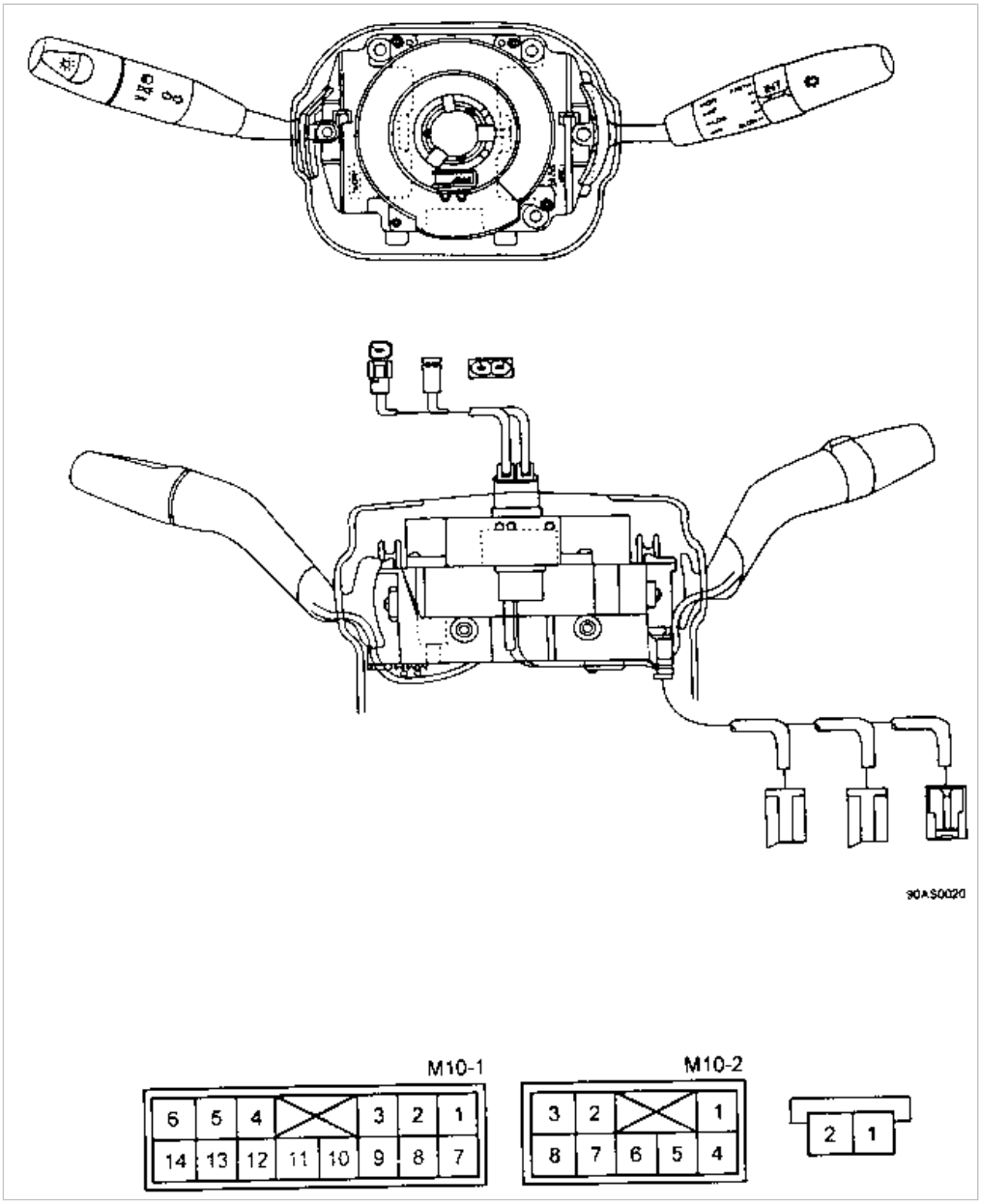
3. Remove the left head lamp and the horn attaching bolt.
4. Disconnect the horn connector and remove the horn.



Body Electrical System > Indicators > Multi-Function Switch > COMPONENTS

COMPONENTS

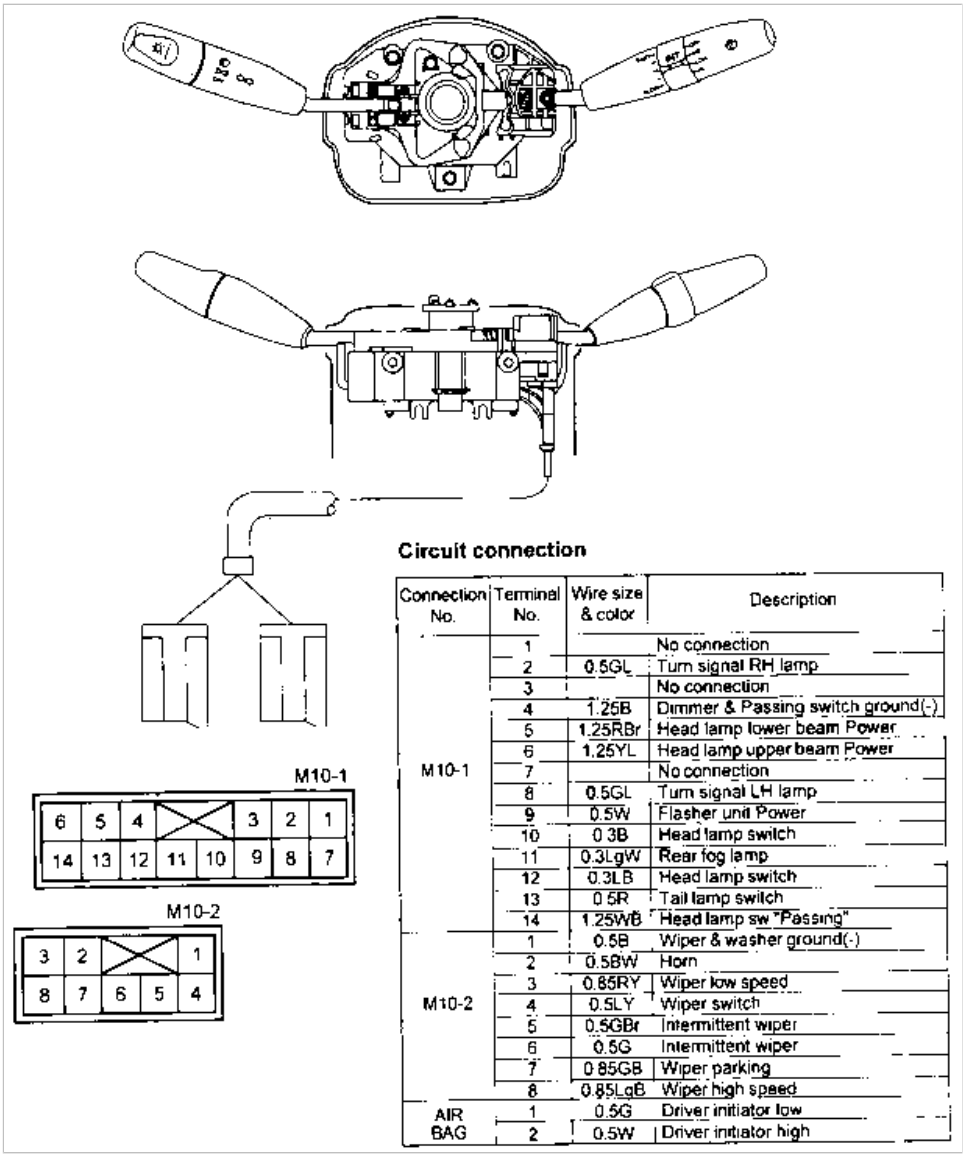
MULTI-FUNCTION SWITCH (WITH AIRBAG)



Body Electrical System > Indicators > Multi-Function Switch > COMPONENTS

COMPONENTS

MULTI-FUNCTION SWITCH (WITHOUT AIRBAG)



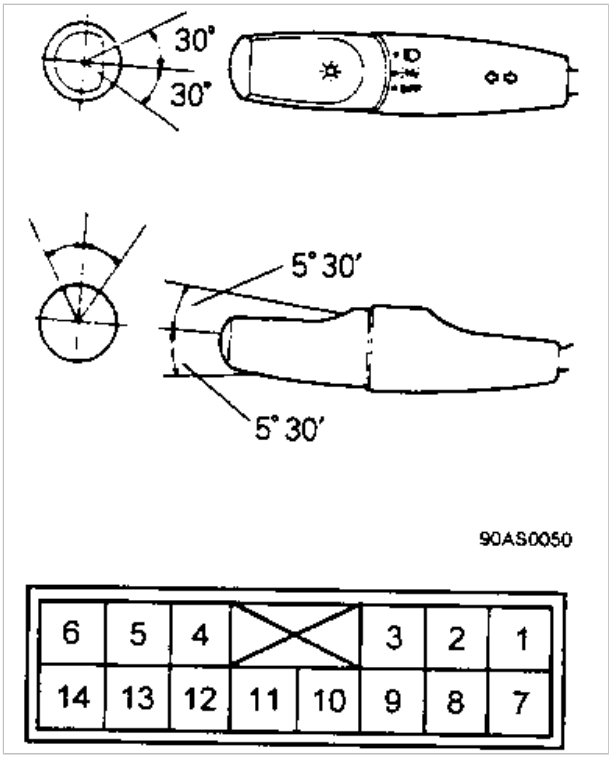
Circuit connection

Connection No.	Terminal No.	Wire size & color	Description
M10-1	1		No connection
	2	0.5GL	Turn signal RH lamp
	3		No connection
	4	1.25B	Dimmer & Passing switch ground(-)
	5	1.25RBr	Head lamp lower beam Power
	6	1.25YL	Head lamp upper beam Power
	7		No connection
	8	0.5GL	Turn signal LH lamp
	9	0.5W	Flasher unit Power
	10	0.3B	Head lamp switch
	11	0.3LgW	Rear fog lamp
	12	0.3LB	Head lamp switch
	13	0.5R	Tail lamp switch
	14	1.25WB	Head lamp sw "Passing"
M10-2	1	0.5B	Wiper & washer ground(-)
	2	0.5BW	Horn
	3	0.85RY	Wiper low speed
	4	0.5LY	Wiper switch
	5	0.5GBr	Intermittent wiper
	6	0.5G	Intermittent wiper
	7	0.85GB	Wiper parking
	8	0.85LgB	Wiper high speed
AIR BAG	1	0.5G	Driver initiator low
	2	0.5W	Driver initiator high

Body Electrical System > Indicators > Multi-Function Switch > INSPECTION

INSPECTION

With the multifunction switch in each position, make sure that continuity exists between terminals as shown below.



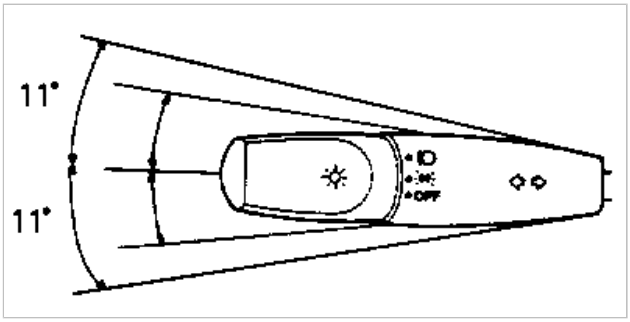
6	5	4			3	2	1
14	13	12	11	10	9	8	7

LIGHTING SWITCH (CONNECTOR NO.: M10-1)

Terminal / Position	10	11	12	13
OFF				
I	○	—	—	○
II	○	○	○	○

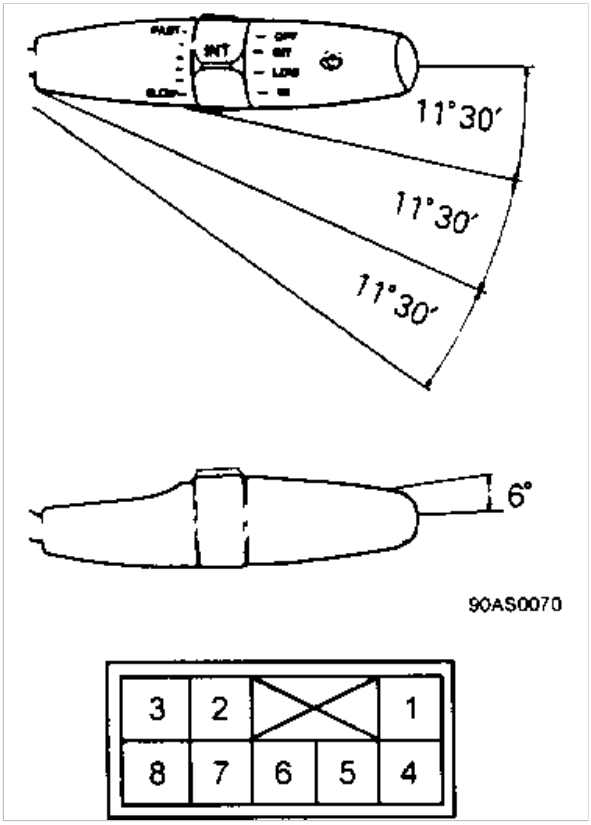
DIMMER AND PASSING SWITCH (CONNECTOR NO.: M10-1)

Terminal / Position	4	5	6	14
HU	○	—	○	
HL	○	○		
P	○	—	○	○



TURN SIGNAL SWITCH (CONNECTOR NO.: M10-1)

Hazard switch / Position	Terminal 2	8	4
OFF — L	●	●	
OFF — N			
OFF — R	●		●



WIPER SWITCH (CONNECTOR NO.: M10-2)

Position / Terminal	1	3	5	6	7	8
OFF		●			●	
INT	●	●	●	●	●	
LOW	●	●				
HIGH	●					●

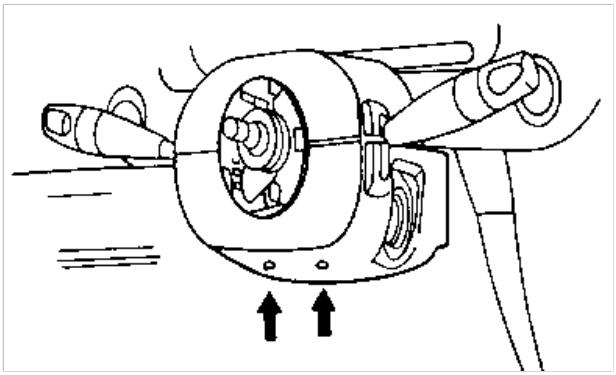
WASHER SWITCH (CONNECTOR NO.: M10-2)

Terminal / Position	1	4
OFF		
ON	○———	———○

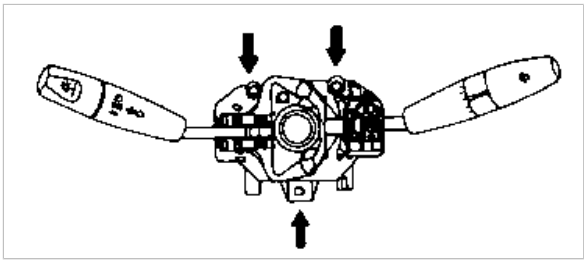
Body Electrical System > Indicators > Multi-Function Switch > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

1. Disconnect the battery ground cable.
2. Remove the steering wheel.
3. Remove the steering column shroud.



4. Disconnect the harness connectors.
5. Remove the 3 straps.
6. Remove the multifunction switch assembly by loosening the 4 screws shown in the illustration.

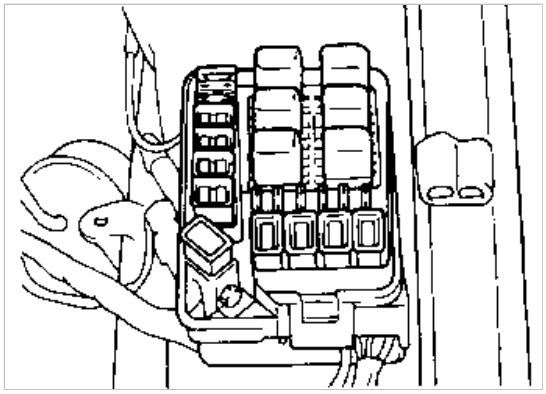


7. Installation is the reverse order of the removal procedure.

Body Electrical System > Power Distribution > Relay Box (Engine Compartment) > INSPECTION

INSPECTION

1. Check for a burnt fusible link with an ohmmeter (fusible link must be removed from holder prior to testing).
2. If a fusible link burns out, there is a short or some other problem in the circuit. Carefully determine the cause and correct it before replacing the fusible link.
   The fusible link will burn out within 15 seconds if a higher current than specified flows through the circuit.



Body Electrical System > Power Mirrors > Power Door Mirror > MIRROR ACTUATOR

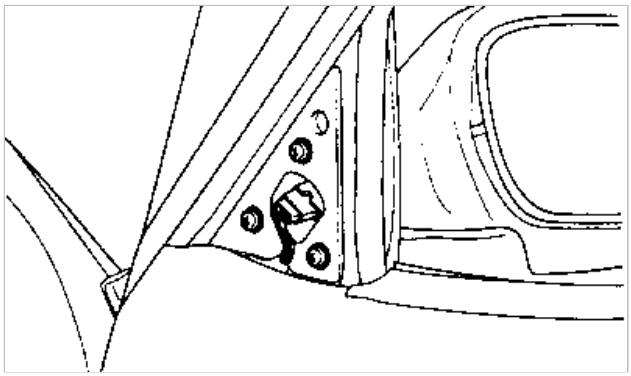
MIRROR ACTUATOR

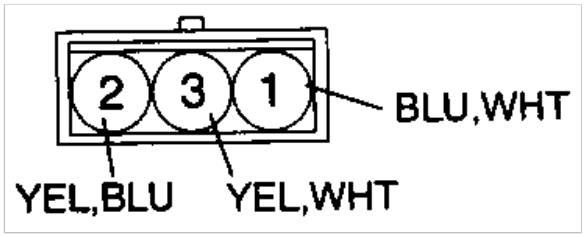
INSPECTION

Apply battery voltage to each terminal as shown in the table, and confirm that the mirror operates properly.

Defection	UP	DOWN	LEFT	RIGHT
(Terminal) 1	+	-	|	|
(Terminal) 2	|	|	+	-
(Terminal) 3	-	+	-	+

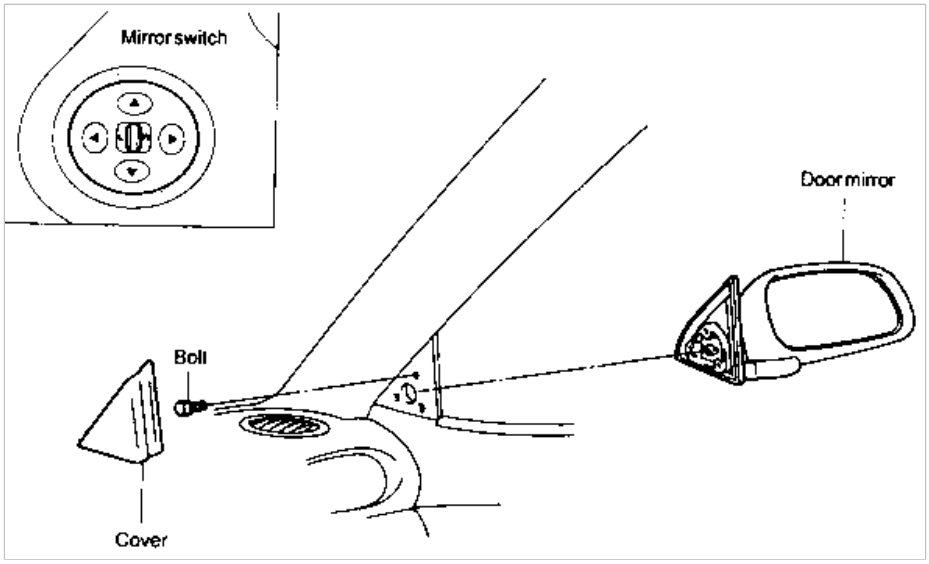
+, - ; indicates connection of terminals between the accouter and the battery.





Body Electrical System > Power Mirrors > Power Door Mirror > REMOTE CONTROL MIRROR

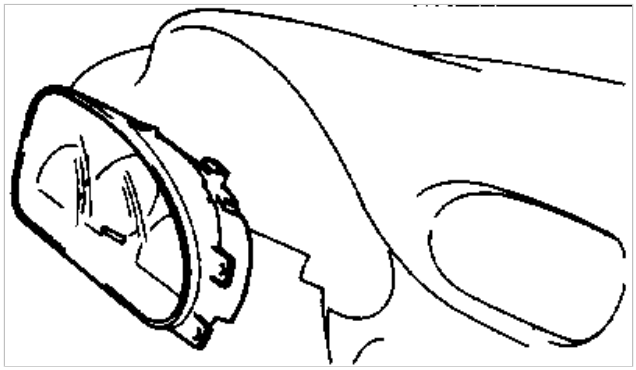
REMOTE CONTROL MIRROR



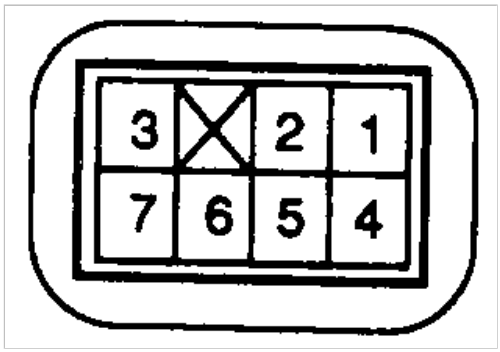
Body Electrical System > Power Mirrors > Power Door Mirror Switch > INSPECTION

INSPECTION

1. Remove the mirror switch from the cluster facia panel.



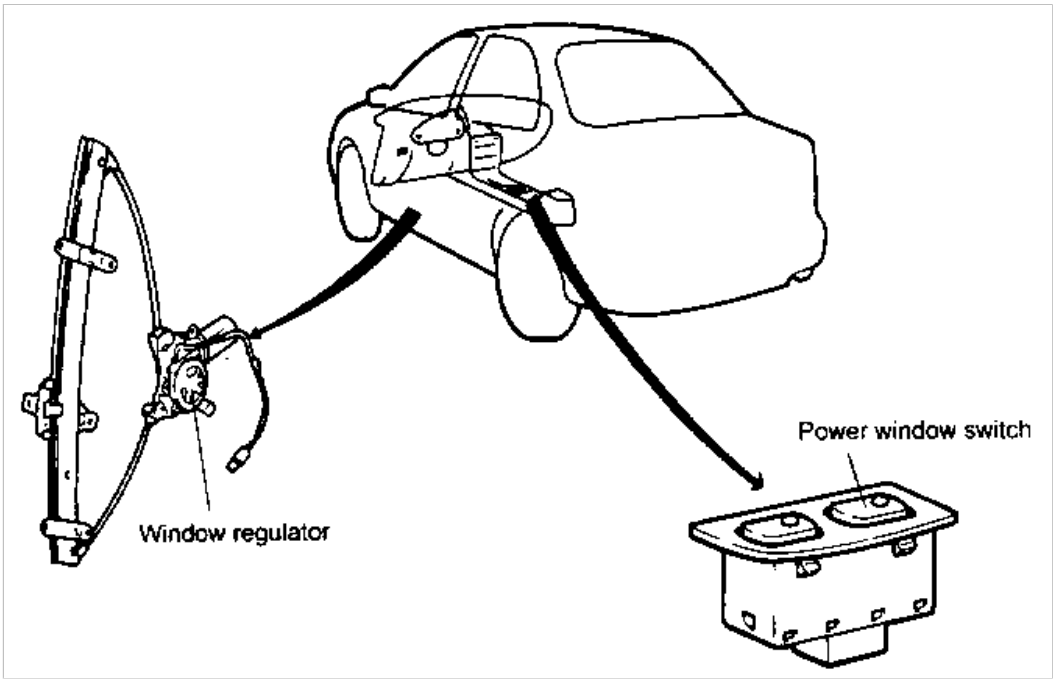
2. Operate the switch and check for continuity between the terminals. If continuity is not as specified, replace the mirror switch.



Class	Position	Terminal 1	2	3	4	5	6	7
LH	UP	O			O		O	O
	DOWN	O			O		O	O
	LEFT	O			O	O		O
	RIGHT	O			O	O		O
RH	UP	O		O	O			O
	DOWN	O		O	O			O
	LEFT	O		O	O			O
	RIGHT	O	O		O			O

Body Electrical System > Power Windows > Power Window > COMPONENTS

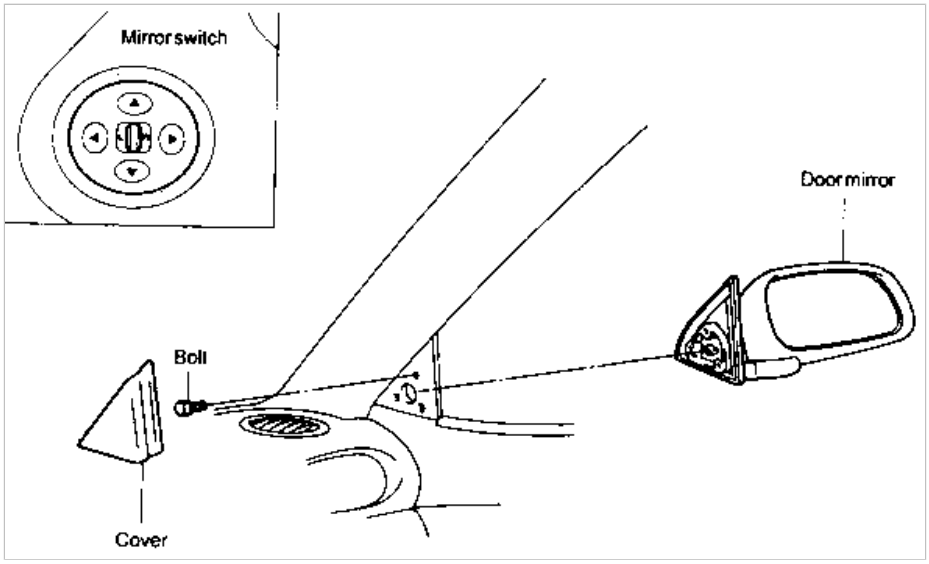
COMPONENTS



Body Electrical System > Power Windows > Power Window > INSPECTION OF POWER WINDOW MOTOR

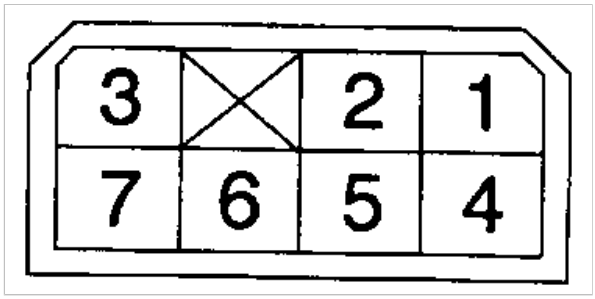
INSPECTION OF POWER WINDOW MOTOR

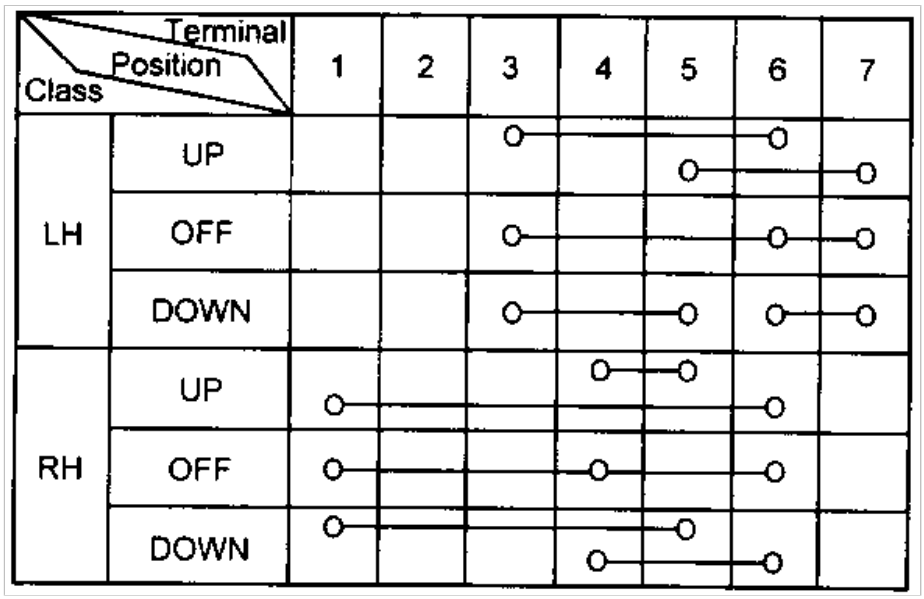
1. After applying the power to the motor, check the smooth operation while changing the polarity in turn.
2. If the operation is not specified, replace the motor.



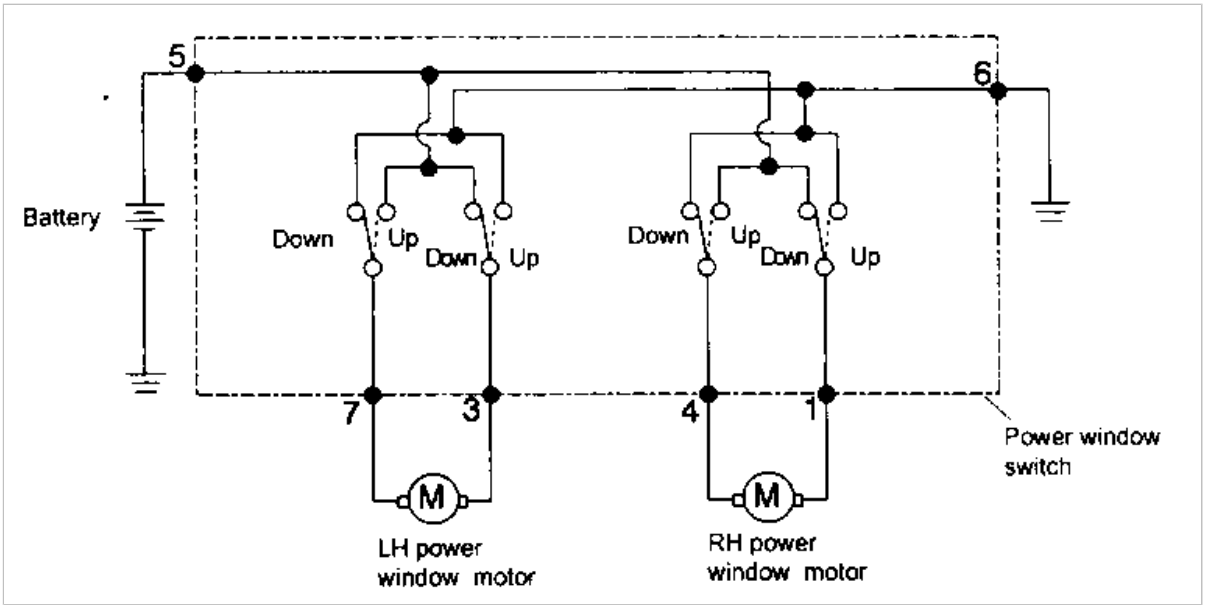
INSPECTION OF POWER WINDOW SWITCH

1. Remove the switch from the door grip handle.
2. Check for continuity between the terminals.



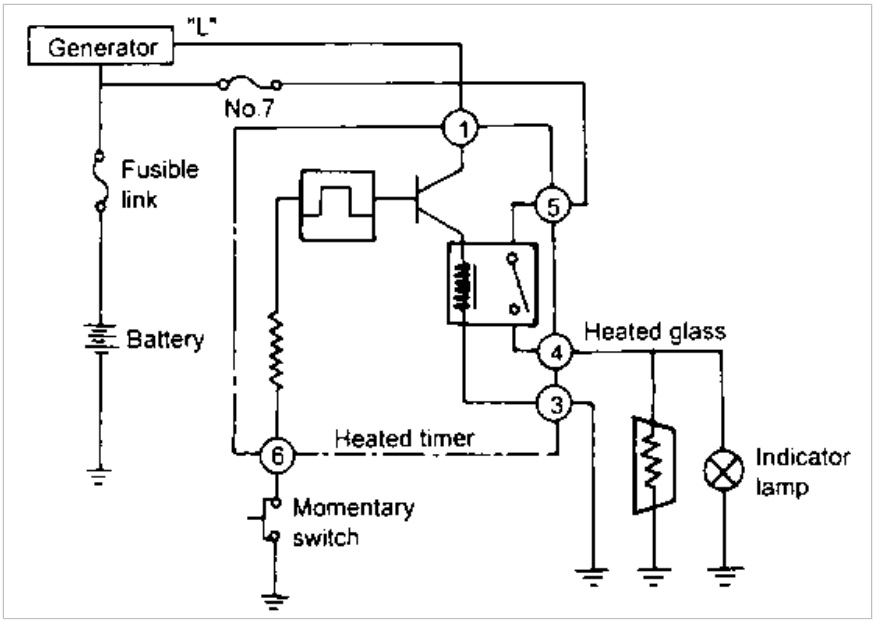


CIRCUIT DIAGRAM



Body Electrical System > Rear Defogger > Printed Heater Line > CIRCUIT DIAGRAM

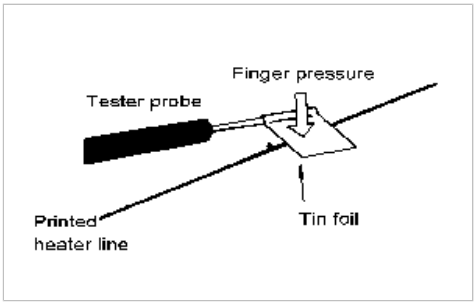
CIRCUIT DIAGRAM



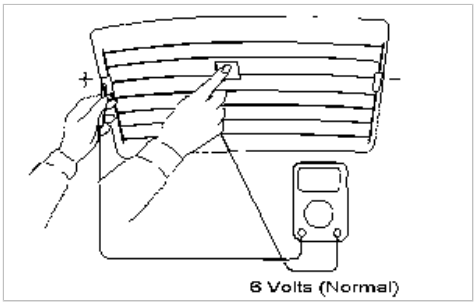
Body Electrical System > Rear Defogger > Printed Heater Line > PRINTED HEATER LINE CHECK

PRINTED HEATER LINE CHECK

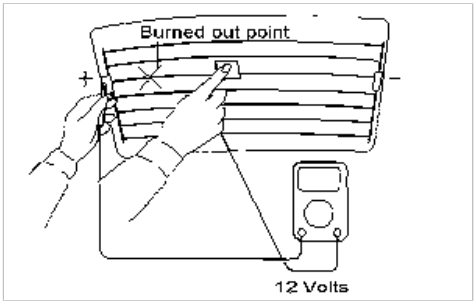
Wrap tin foil around the end of the voltmeter test lead to prevent damaging the heater line. Apply finger pressure on the tin foil, moving the tin foil along the grid line to check for open circuits.



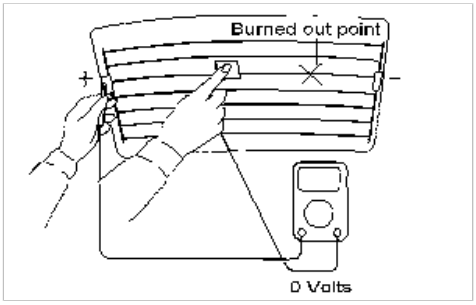
1. Turn on the defogger switch and use a voltmeter to measure the voltage of each heater line at the glass center point. If a voltage of approximately 6V is indicated by the voltmeter, the heater line of the rear window is normal.



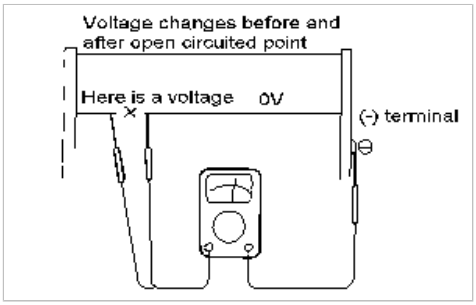
2. If a heater line is burned out between the center point and (+) terminal, voltmeter indicates 12 volts.



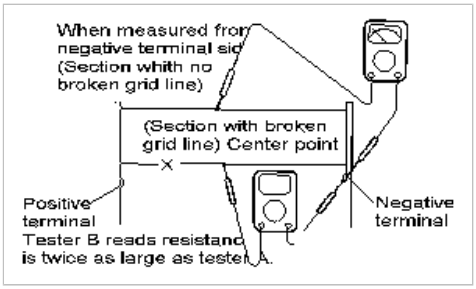
3. If a heater line is burned out between the center point and (-) terminal, the voltmeter indicates 0 volts.



4. To check for open circuits, slowly move the test lead in the direction that the open circuit seems to exist. Try to find a point where a voltage is generated or changes to 0V. The point where the voltage has changed is the open-circuited point.



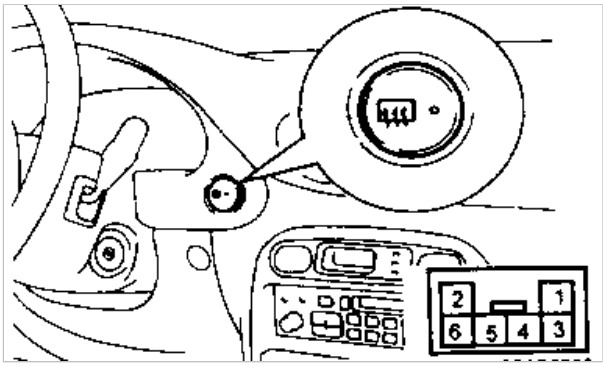
5. Use an ohmmeter to measure the resistance of each heater line between a terminal and the center of a grid line and between the same terminal and the center of one adjacent heater line after another. The section involving a broken heater line indicates resistance twice that in the other section. In the affected section, move the test lead to a position where resistance sharply changes.

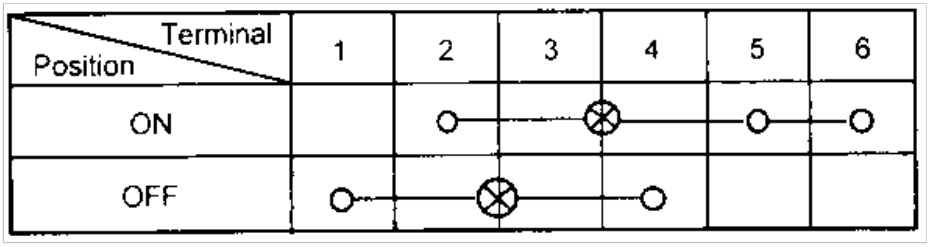


Body Electrical System > Rear Defogger > Rear Window Defogger Switch > INSPECTION

INSPECTION

Disconnect the heated switch connector from the wiring harness. Operate the switch, and check the continuity between the terminals.





If continuity is not as specified, replace switch.

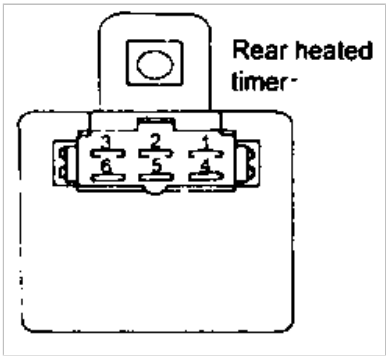
Body Electrical System > Rear Defogger > Rear Window Defogger Timer Module > INSPECTION

INSPECTION

If the heated switch is depressed while the ignition switch is ON, the heated timer operates for 15 ± 3 minutes.

Even while the heated timer is in operation, depressing the heated switch again or turning the ignition switch OFF, the heated timer operation will stop.

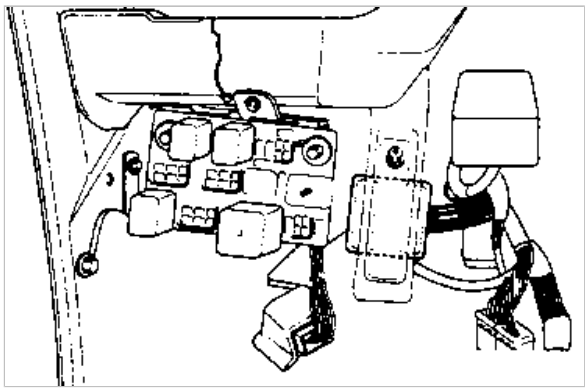
If the system operates properly, the original heated timer is faulty.



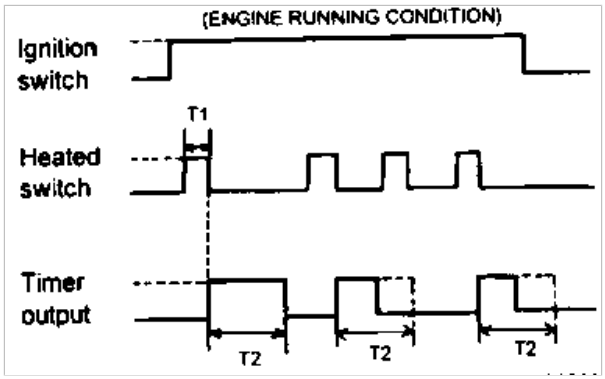
Body Electrical System > Rear Defogger > Rear Window Defogger Timer Module > REAR WINDOW HEATED TIMER

REAR WINDOW HEATED TIMER

1. After removing the shroud under cover, remove the rear window heated timer.

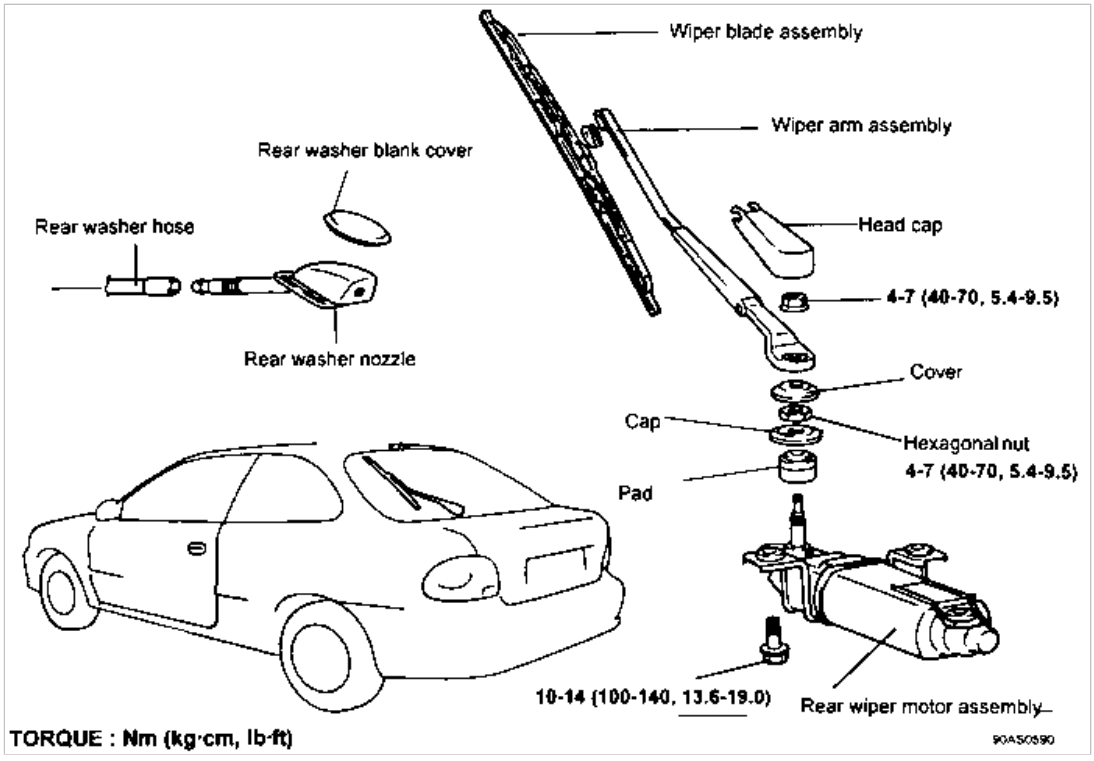


2. Time Specification:
   T1 : MAX 0.5 sec.
   T2 : 15 ± 3 min.



Body Electrical System > Rear Wiper/Washer > Rear Washer Motor > COMPONENTS

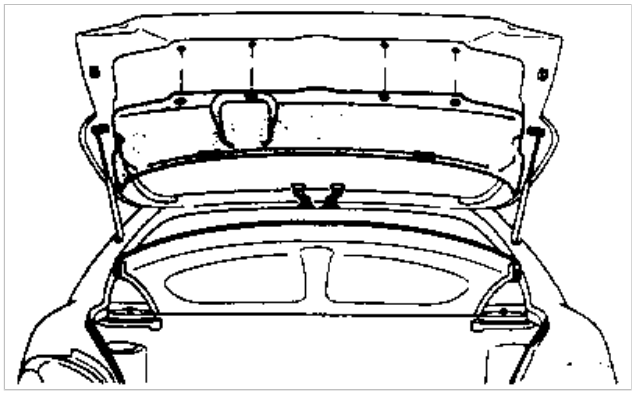
COMPONENTS



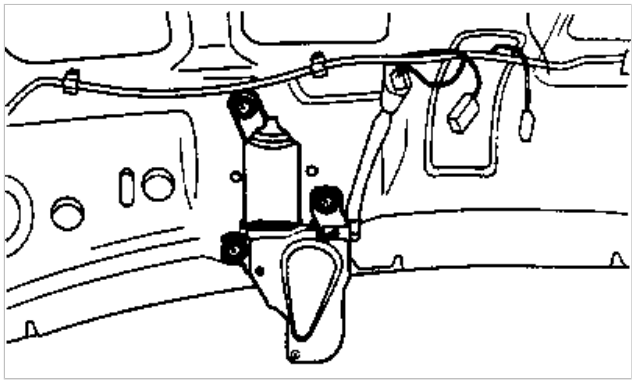
Body Electrical System > Rear Wiper/Washer > Rear Washer Motor > REMOVAL

REMOVAL

1. Remove the rear wiper arm assembly.
2. Remove the tailgate trim.



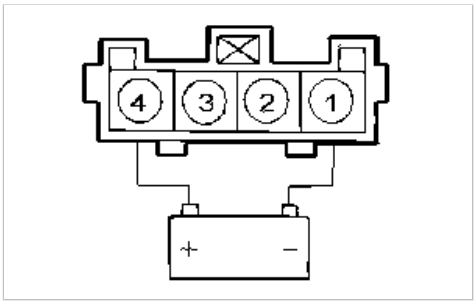
3. Remove the rear wiper motor from the tailgate.



Body Electrical System > Rear Wiper/Washer > Rear Washer Motor > SPEED OPERATION CHECK

SPEED OPERATION CHECK

1. Remove the connector from the rear wiper motor.
2. Attach the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 1.



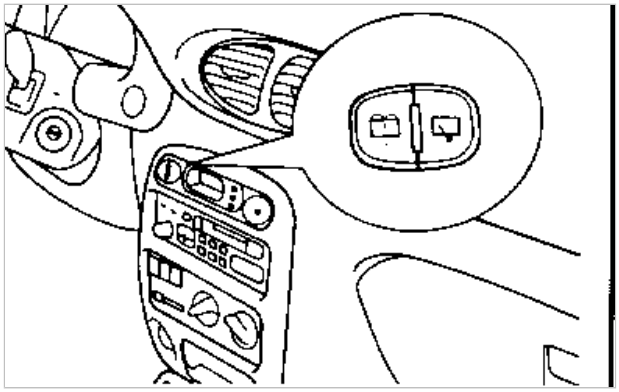
3. Check that the motor operates.

Body Electrical System > Rear Wiper/Washer > Rear Wiper and Washer Switch > INSPECTION

INSPECTION

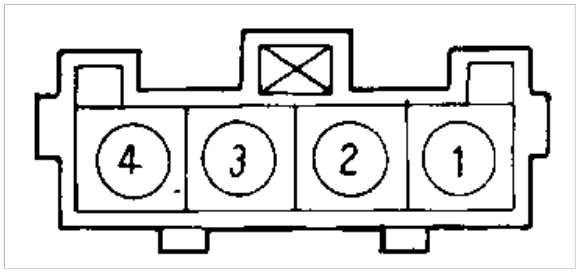
Rear Washer Switch

1. Remove the center facia panel.
2. Remove the rear wiper and washer switch from the facia panel.



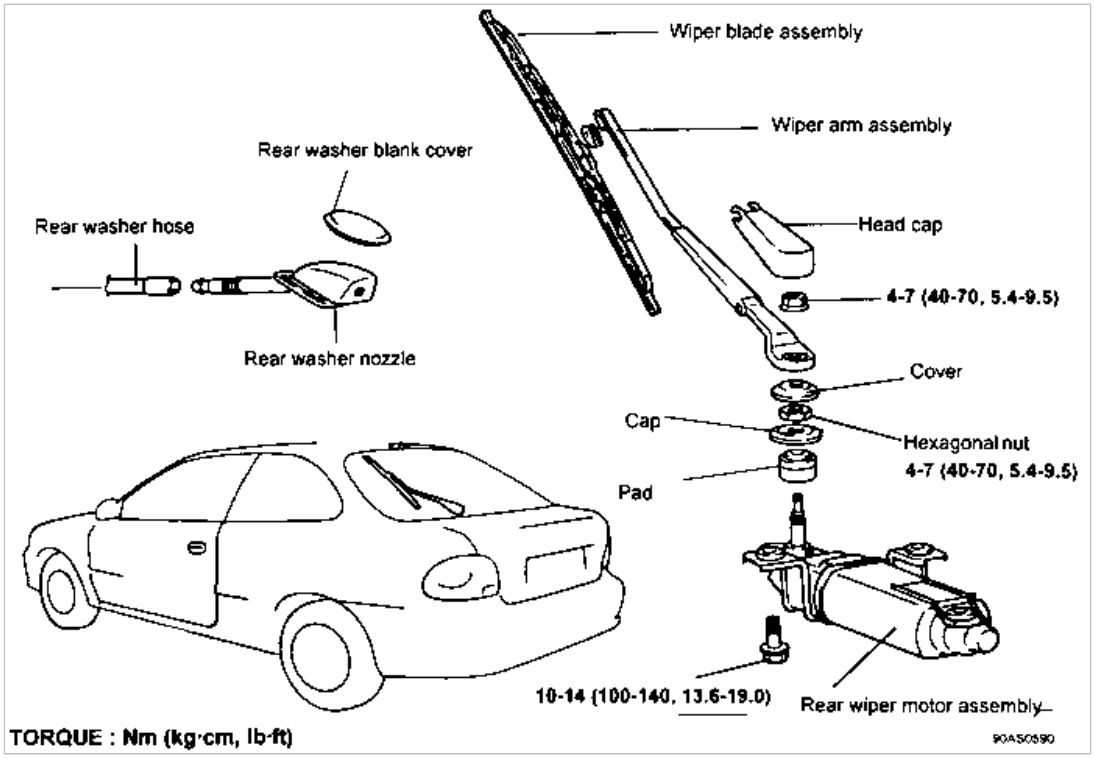
3. Check for continuity between terminals.

Mode	Terminal	1	2	3	4
Wiper Switch	ON		o—o		
	OFF	o—o			
Washer Switch	ON			o—o	



Body Electrical System > Rear Wiper/Washer > Rear Wiper Motor > COMPONENTS

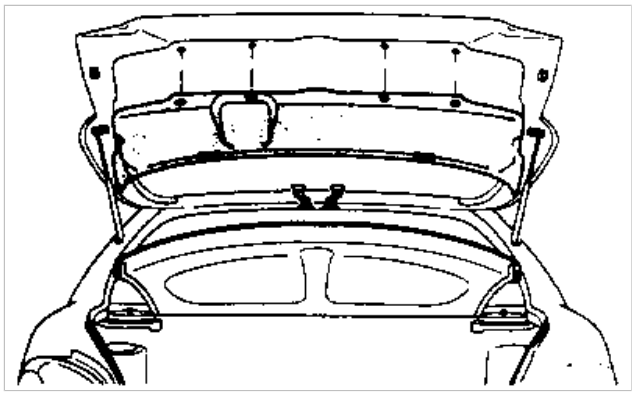
COMPONENTS



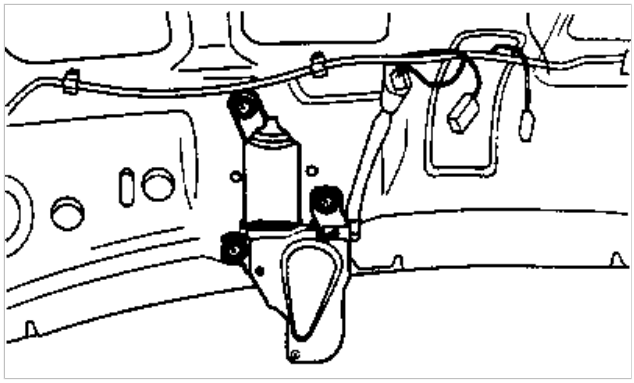
Body Electrical System > Rear Wiper/Washer > Rear Wiper Motor > REMOVAL

REMOVAL

1. Remove the rear wiper arm assembly.
2. Remove the tailgate trim.



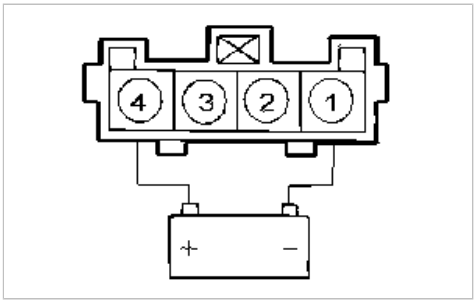
3. Remove the rear wiper motor from the tailgate.



Body Electrical System > Rear Wiper/Washer > Rear Wiper Motor > SPEED OPERATION CHECK

SPEED OPERATION CHECK

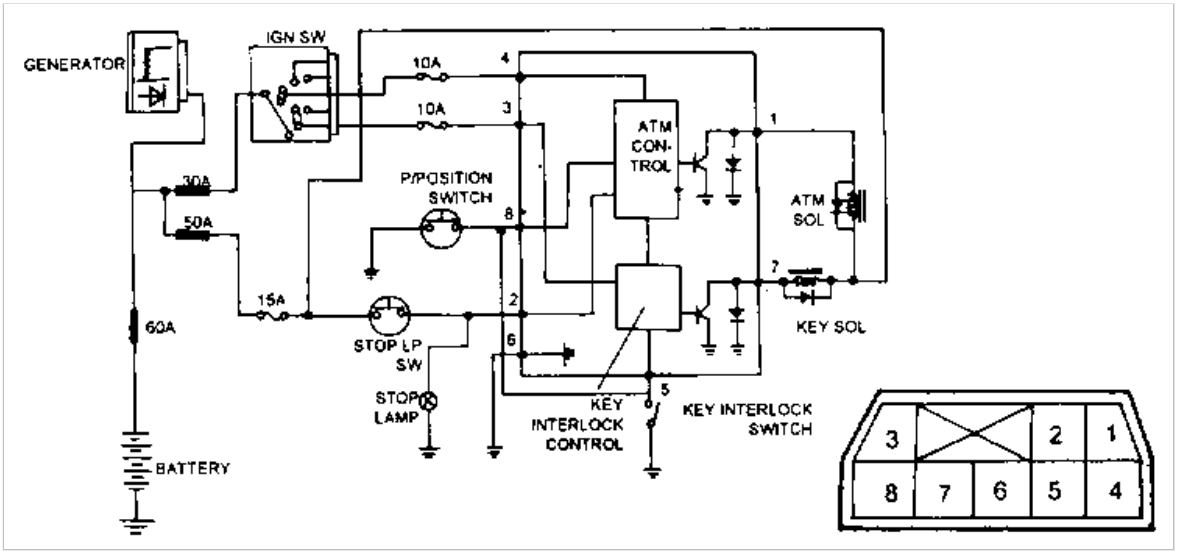
1. Remove the connector from the rear wiper motor.
2. Attach the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 1.



3. Check that the motor operates.

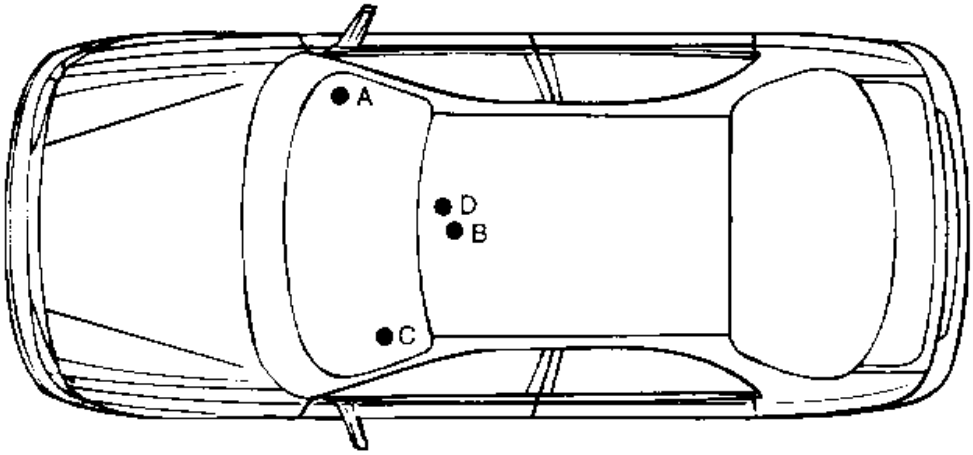
Body Electrical System > Security System > CIRCUIT DIAGRAM

CIRCUIT DIAGRAM



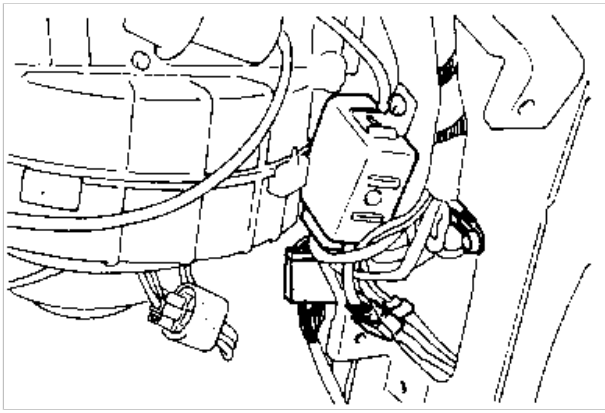
Body Electrical System > Security System > COMPONENT LAYOUT

COMPONENT LAYOUT

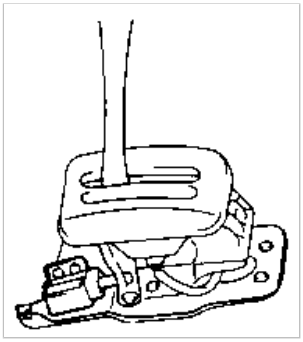


A. Cowl side panel
B. Shift lever assembly
C. Ignition key
D. Shift lever assembly

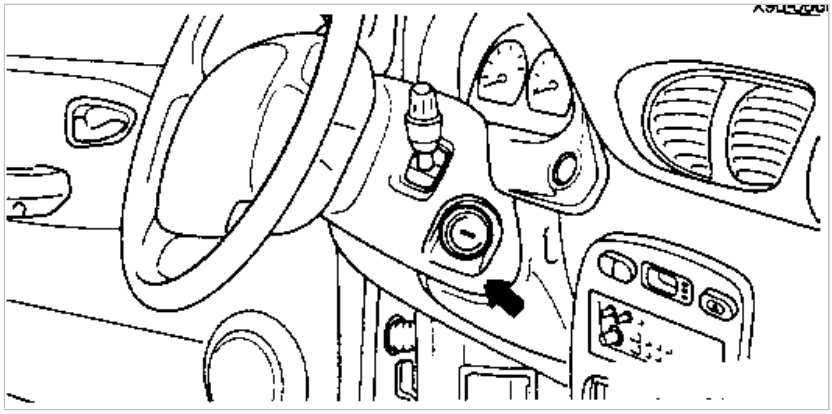
A. Control module



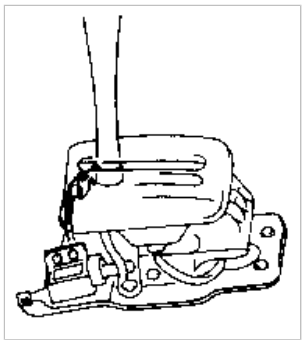
B. A/T solenoid



C. Key lock solenoid

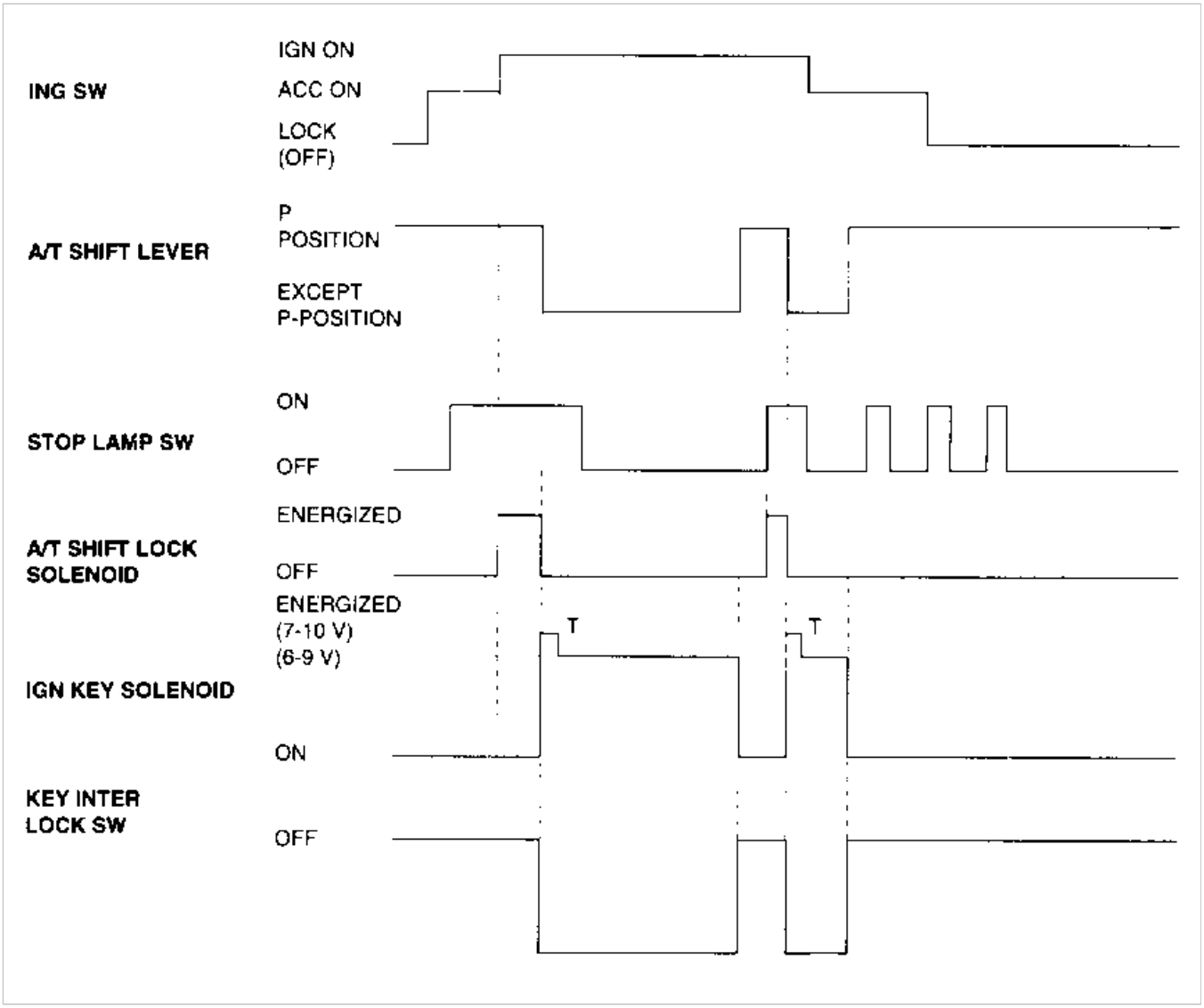


D. P/Position switch



Body Electrical System > Security System > TIMING CHART

Timing Chart

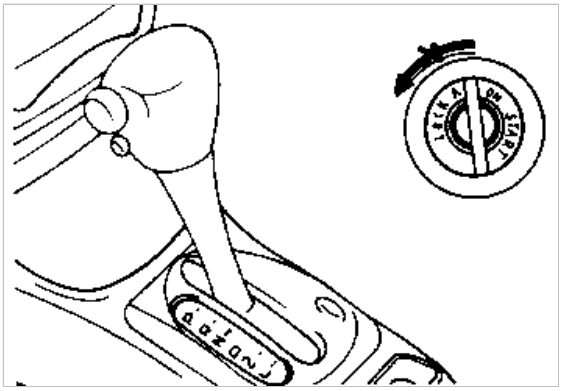


Body Electrical System > Security System > Automatic Transmission And Key Lock Control Module > SYSTEM CHECK

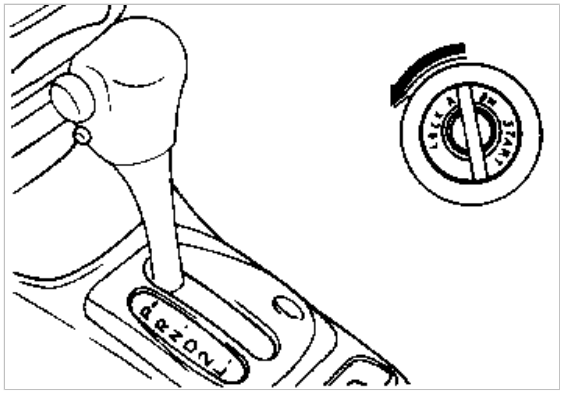
SYSTEM CHECK

KEY LOCK

1. Check that the ignition key cannot be turned to "LOCK" (OFF) position, when the position of the shift lever is not in "P" position.

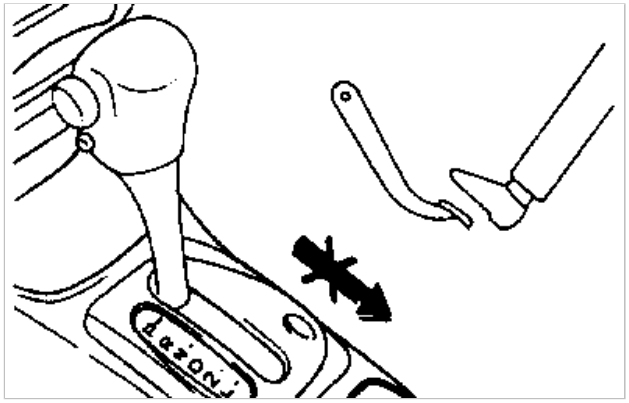


2. Check that the ignition key turns to the "LOCK" (OFF) position, when the shift lever is set to the "P" position.

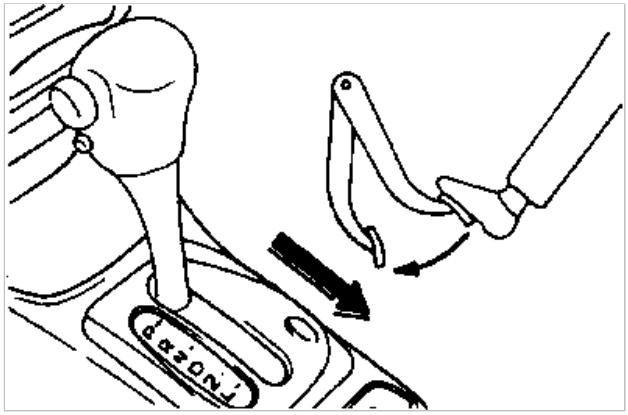


SHIFT LOCK

1. Check that under the following conditions, the shift lever cannot be moved from the "P" position to any other position.
   IGNITION KEY POSITION: "ON"
   BRAKE PEDAL: NOT DEPRESSED
   BUTTON: PRESSED



2. Check that under the following conditions, the shift lever can be moved from the "P" position to the other position.
   IGNITION KEY POSITION: "ON"
   BRAKE PEDAL: DEPRESSED
   BUTTON: PRESSED

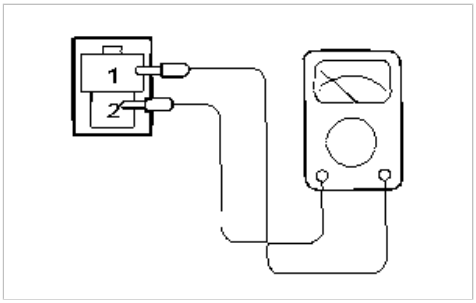


Body Electrical System > Security System > Key Lock Solenoid > INSPECTION

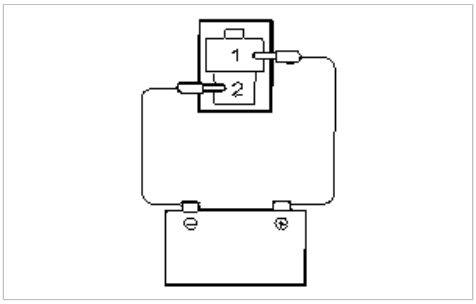
INSPECTION

AUTOMATIC TRANSAXLE SOLENOID

1. Remove the solenoid connector.
2. Using an ohmmeter, measure the resistance between terminals.

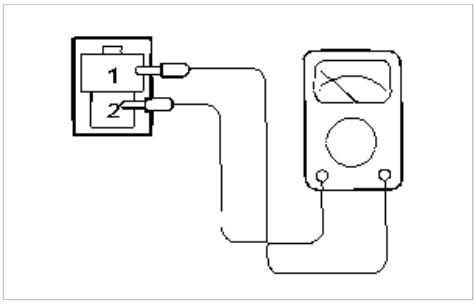


3. Attach the positive (+) lead from the battery to terminal 1, and the negative (-) lead to terminal 2.
4. Check that an operation noise can be heard from the solenoid.

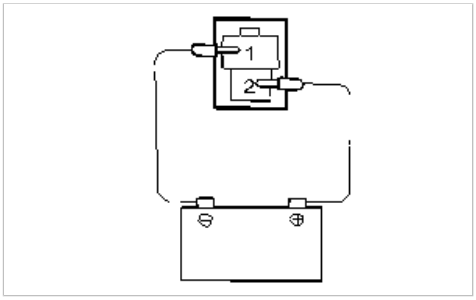


KEY LOCK SOLENOID

1. Remove the solenoid connector.



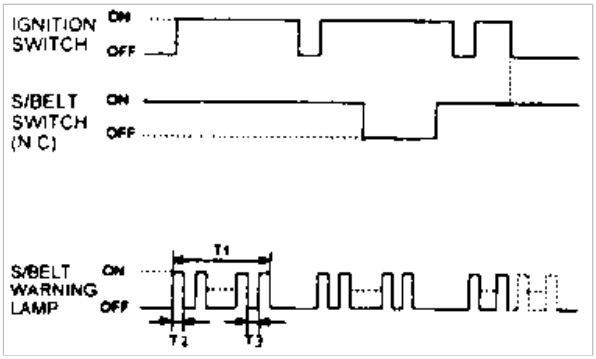
2. Using an ohmmeter, measure the resistance between terminals.
3. Attach the positive (+) lead from the battery to terminal #2 and the negative (-) lead to terminal 1.
4. Check that an opening noise can be heard from the solenoid.



Body Electrical System > Security System > Seat Belt Timer Module > INSPECTION

INSPECTION

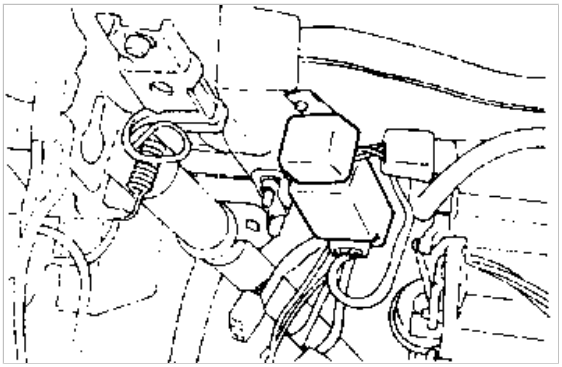
1. Time characteristic
2. T1: 6 ± 1 sec
   T2, T3: 0.3 ± sec



Body Electrical System > Security System > Seat Belt Timer Module > REMOVAL

REMOVAL

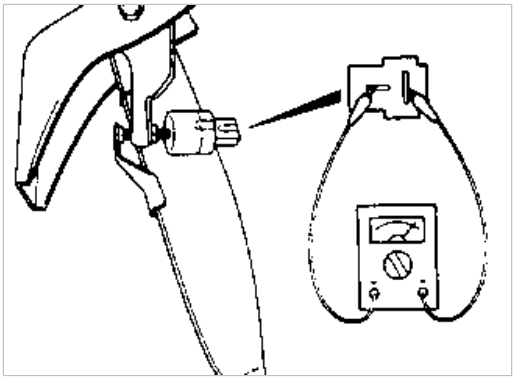
After removing the shroud under cover, remove the seat belt timer relay from the lower mounting bracket.



Body Electrical System > Shift and Key Lock Control System > Stop lamp Switch > INSPECTION

INSPECTION

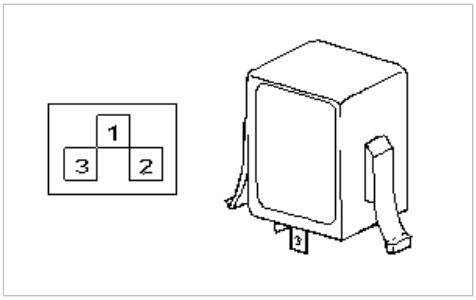
1. Remove the stop lamp switch connector located at brake pedal bracket.
2. Make sure that there is continuity between terminals 1 and 2 when the brake pedal is depressed.
3. Ensure that no continuity exists between the terminals when the pedal is released.



Body Electrical System > Turn/Hazard Lamps > Flasher Unit > GENERAL TEST

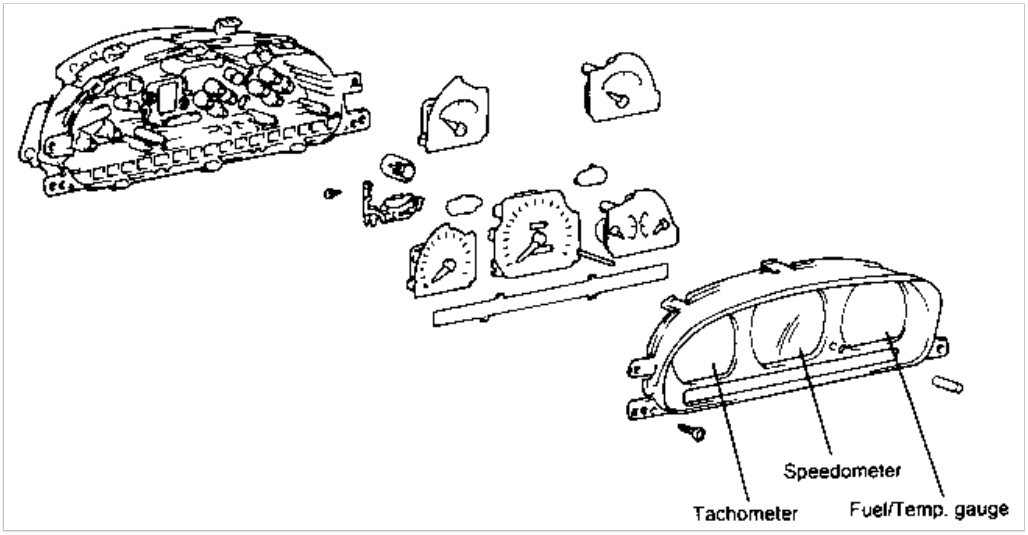
GENERAL TEST

1. Remove the flasher unit from the relay box in passenger compartment.
2. Connect the positive (+) lead from the battery to terminal B and the negative (-) lead to terminal E.
3. Connect the two turn signal lamps parallel to each other to terminal L and E, check that the bulbs turn on and off.
   The turn signal lamps should flash 60 to 120 times per minute. If one of the front or rear turn signal lamps has an open circuit, the number of flashes will be more than 120 per minute. If the operation is not as specified, replace the flasher unit.



Body Electrical System > Warning Indicators > COMPONENTS

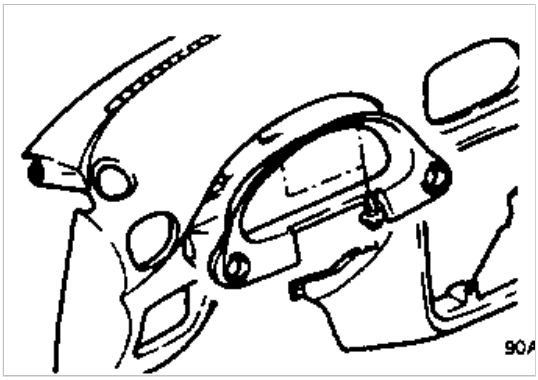
COMPONENTS



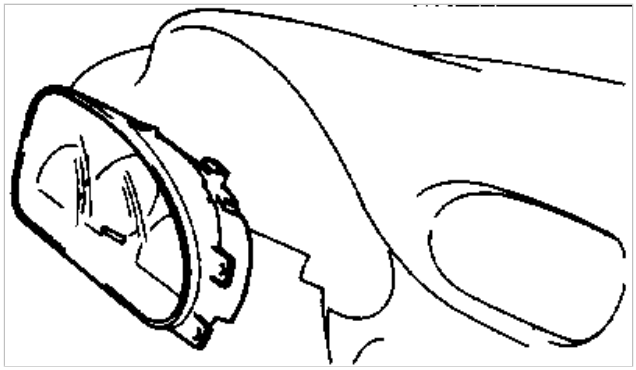
Body Electrical System > Warning Indicators > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

1. Disconnect the battery ground cable.
2. Remove the shroud under cover.
3. Remove the cluster facia panel.



4. Remove the cluster retaining screws and carefully pull rearward enough to disengage speedometer cable.
5. Carefully pull cluster away from instrument panel and disconnect cluster wiring from instrument circuit board.
6. Installation is the reverse order off removal.



Body Electrical System > Warning Indicators > SERVICE SPECIFICATIONS

SERVICE SPECIFICATIONS

SPEEDOMETER - Eddy current push connection type

Speed (MPH)	Tolerance (MPH)	Speed (km/h)	Tolerance (km/h)
10	+2.5 0	20	+4 0
20	+2.5 0	40	+4 0
40	+2.5 0	60	+5 +1
60	+3.5 +0	80	+6 +1
80	+4.5 +1.5	100	+7 +2
100	+5.5 +2.5	120	+8 +3
120	+6.5 +3.5	140	+9 +4
		160	+10 +5
		180	+11 +6
		200	+12 +7

TACHOMETER - Electronic type (Air-Cored)

Condition	at 1.35V(Normal Temp)	at 10-15V(-30°C - + 80°C)
Standard(RPM)	Tolerance (RPM)	Tolerance (RPM)
1,000	±100	±150
2,000	±150	±175
3,000	±200	±225
4,000	±200	±300
5,000	±200	±350
6,000	±250	±400
7,000	±300	±450

FUEL GAUGE - Air core type (pointer remaining type)

Fuel level	E (Empty)	1/2	F (Full)
Scale angle	-30 °	0°	+30 °
Tolerance	±2.4°	± 5°	±2.4°
Tolerance when assembled with fuel sender	+0° -5.6°	±10°	+7.1° 0°
Resistance (ohms)	95	32.5	6.5

Pointer must not fall "E" Point and indicate continuously full level when turned OFF ignition

TEMPERATURE - Air core type

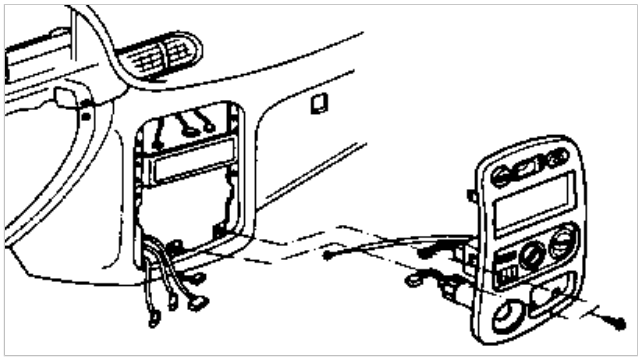
Temperature (°C)	60	85	110	125	Red warning zone

Scale angle	-30°	-7°	-7°	30°	123°
Tolerance	±2.5	+2°	-3°	±5°	|
Tolerance when assembled with temperance	-	-2.8 + 3.5	-3.5 + 4.5	-3.5 + 4.7	|

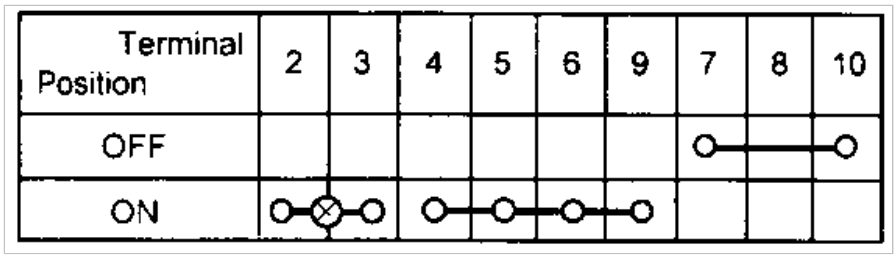
Body Electrical System > Warning Indicators > Hazard Switch > INSPECTION

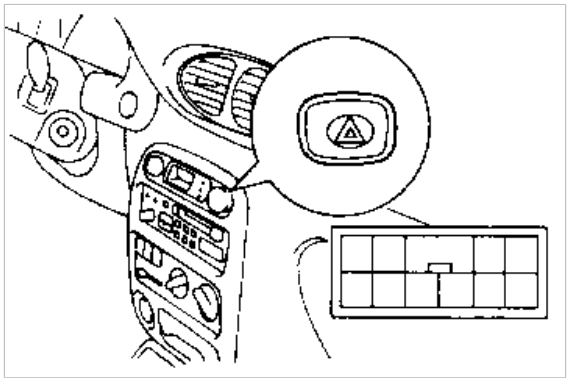
INSPECTION

1. Disconnect the negative battery terminal.
2. Remove the hazard switch from the cluster facia panel.
3. Disconnect the connector from the harness.
4. Remove the hazard switch locked at digital clock.



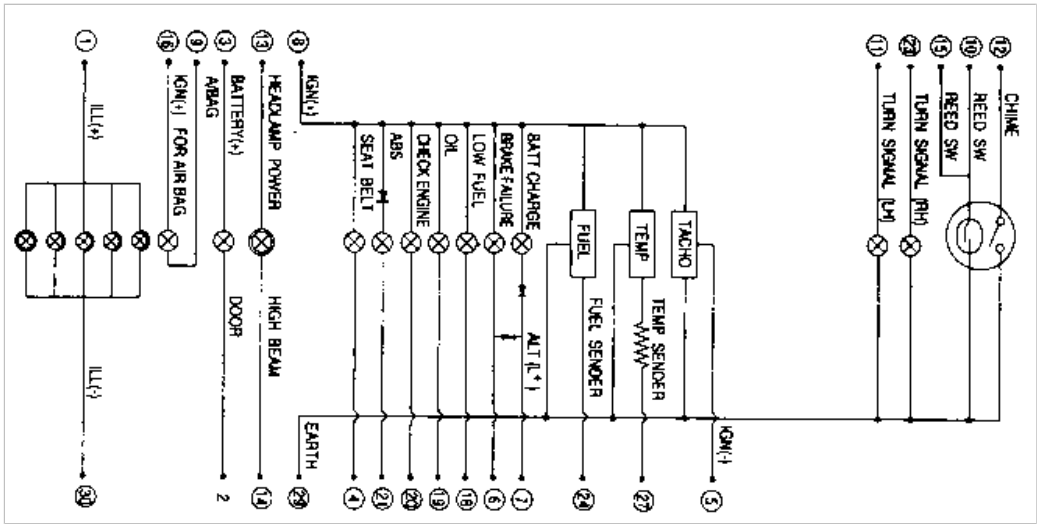
5. Check for continuity between terminals.





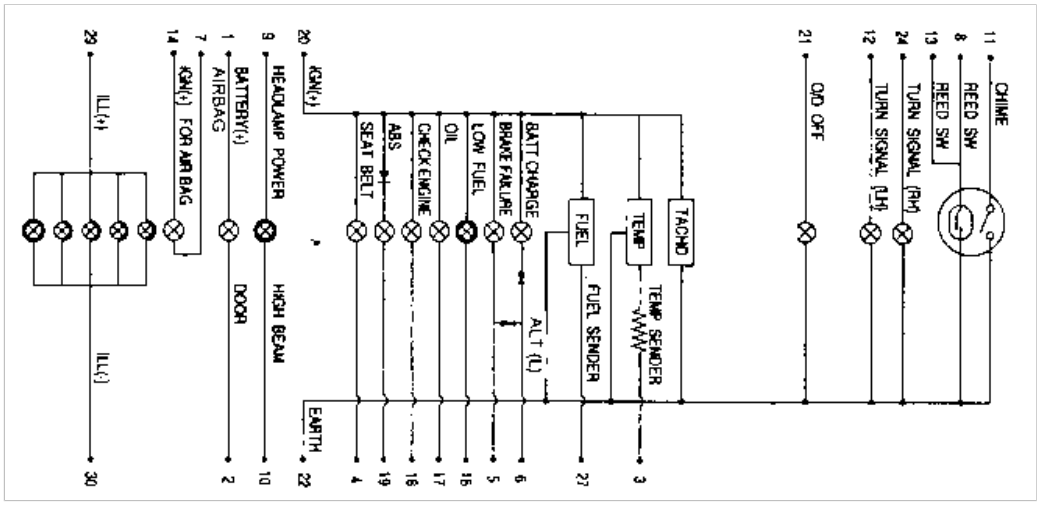
Body Electrical System > Warning Indicators > Printed Circuit Board > PRINTED CIRCUIT BOARD--CIRCUIT DIAGRAM (DELUXE TYPE)

Printed Circuit Board--CIRCUIT DIAGRAM (DELUXE TYPE)



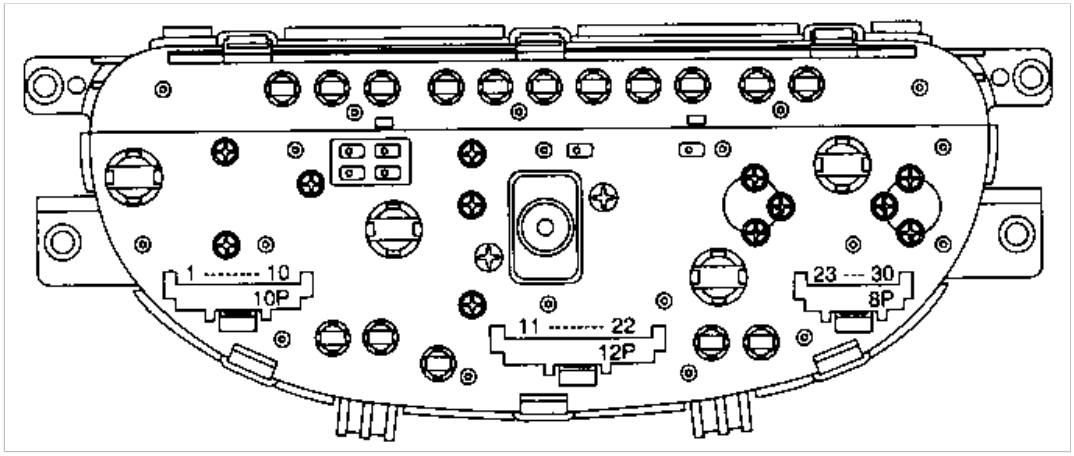
Body Electrical System > Warning Indicators > Printed Circuit Board > PRINTED CIRCUIT BOARD--CIRCUIT DIAGRAM (STANDARD TYPE)

Printed Circuit Board--CIRCUIT DIAGRAM (STANDARD TYPE)



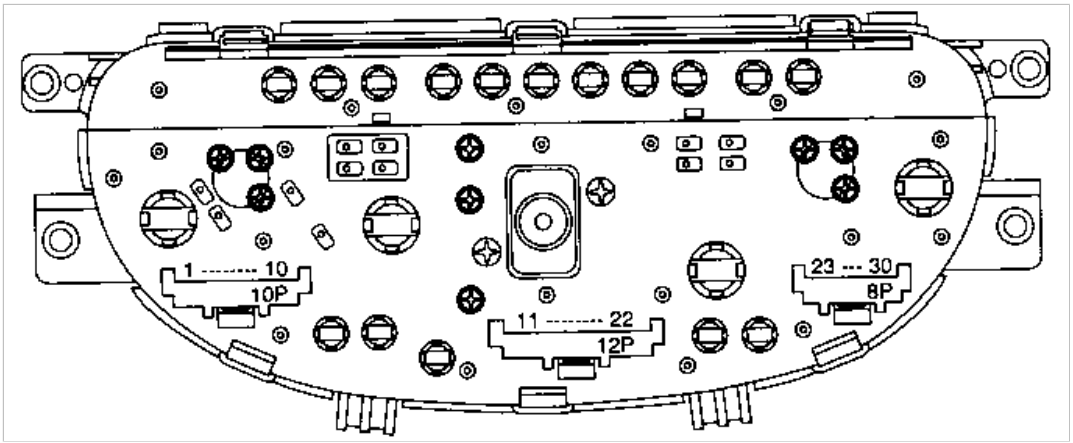
Body Electrical System > Warning Indicators > Printed Circuit Board > PRINTED CIRCUIT BOARD--DELUXE TYPE

Printed Circuit Board--DELUXE TYPE



Body Electrical System > Warning Indicators > Printed Circuit Board > PRINTED CIRCUIT BOARD--STANDARD TYPE

Printed Circuit Board--STANDARD TYPE

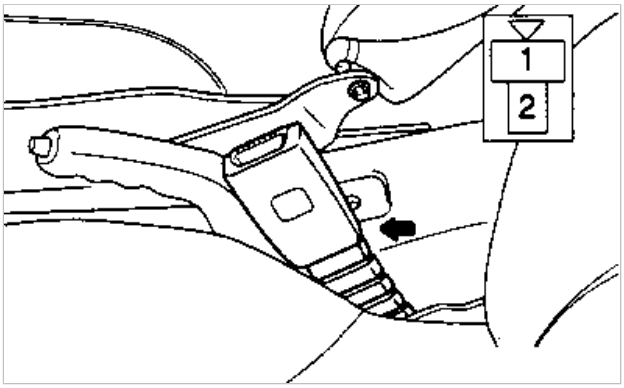


Body Electrical System > Warning Indicators > Seat Belt Warning Lamp > INSPECTION

INSPECTION

SEAT BELT SWITCH INSPECTION

1. Disconnect the connector from the switch. Check for continuity between terminals.



Seat belt condition	Continuity
Fastened	Non-conductive (infinite Ω)
Not fastened	Conductive (0 Ω)

SEAT BELT WARNING LAMP INSPECTION

With the ignition switch turned ON, ensure that the lamp glows.

Seat belt condition	Warning lamp
Fastened	Off
Not fastened	Glows for about six seconds

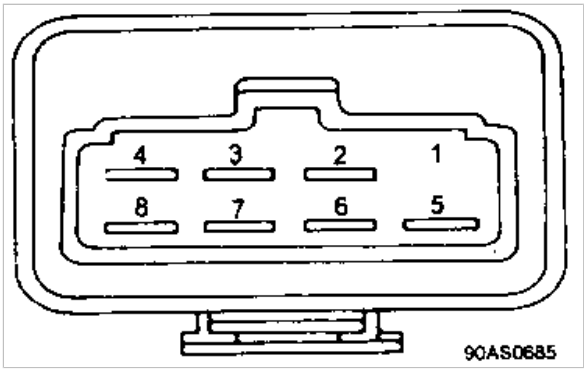
Body Electrical System > Windshield Wiper/Washer > Intermittent Wiper/Washer > INSPECTION

INSPECTION

The intermittent relay operating time is controlled by variable resistance.

If the problem has been traced to the intermittent relay, replace it with a new one.

Check for proper operation. If the system operates properly, the original intermittent relay was faulty.



1. Wiper
   (1) Operating characteristic
   (2) T1: 0.5 sec or below
   T2: Time required for the wiper to rotate 1 cycle.
   T3: 1.5 ± 0.7 (vr=0KΩ) -10K.5 ±3 sec (vr=50KΩ)
   (3) Variable resistor (VR) : 50 ± 10 KΩ
   (4) Relay operation noise: Below 50dB/20cm

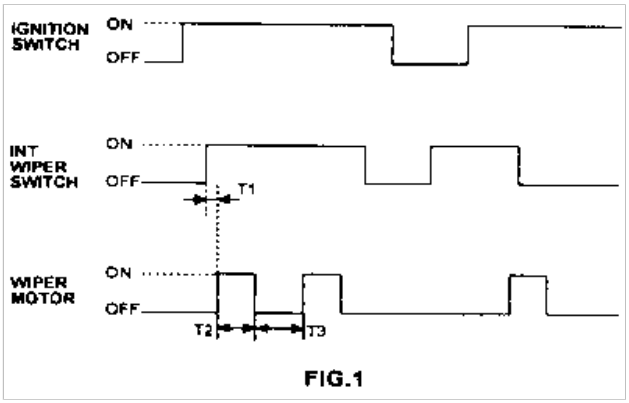


FIG.1

2. Washer
   (1) Operating characteristic
   (2) T1 : 0.4 - 1.2 sec
   T2 : 2.0 - 4.7 sec
   (3) This function has priority to the intermittent wiper operation.

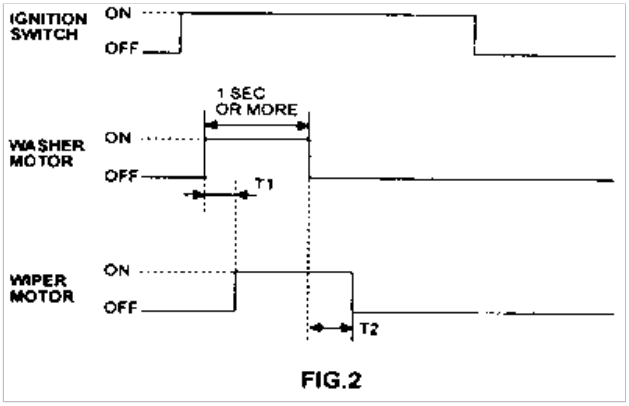


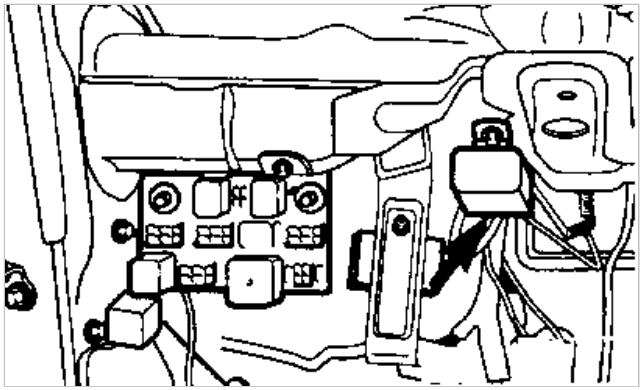
FIG.2

Body Electrical System > Windshield Wiper/Washer > Intermittent Wiper/Washer > INTERMITTENT WIPER RELAY

INTERMITTENT WIPER RELAY

REMOVAL

After removing the shroud under cover, remove the intermittent wiper relay from the cowl cross member (left bottom side of the driver's seat).

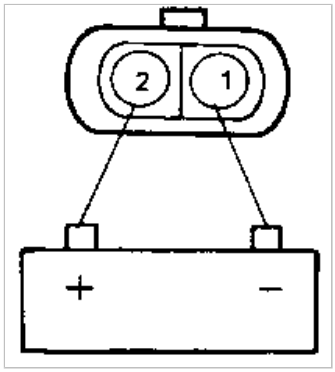


Body Electrical System > Windshield Wiper/Washer > Windshield Washer > INSPECTION

INSPECTION

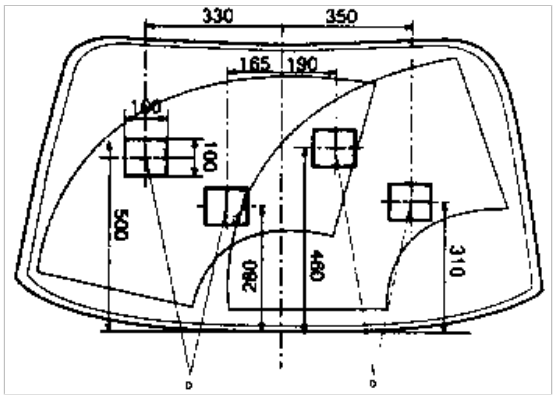
WASHER MOTOR

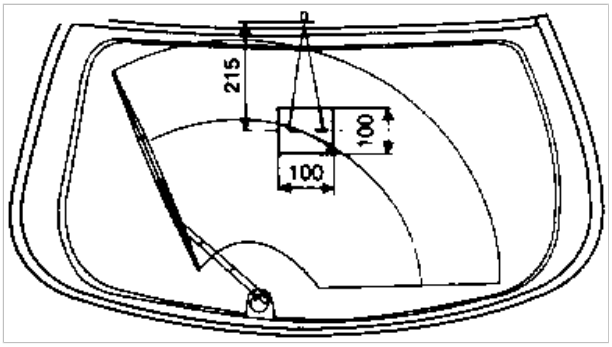
1. With the washer motor installed to the washer tank, fill the washer tank with washer fluid.
2. Attach the positive (+) lead from the battery to terminal 2, and negative (-) lead to terminal 1.
3. Check that the washer motor runs and washer fluid is ejected.



SERVICE ADJUSTMENT PROCEDURES

1. Check the washer fluid contact point.
2. Adjust the washer fluid contact point by using a metal wire to move the washer nozzle ball.

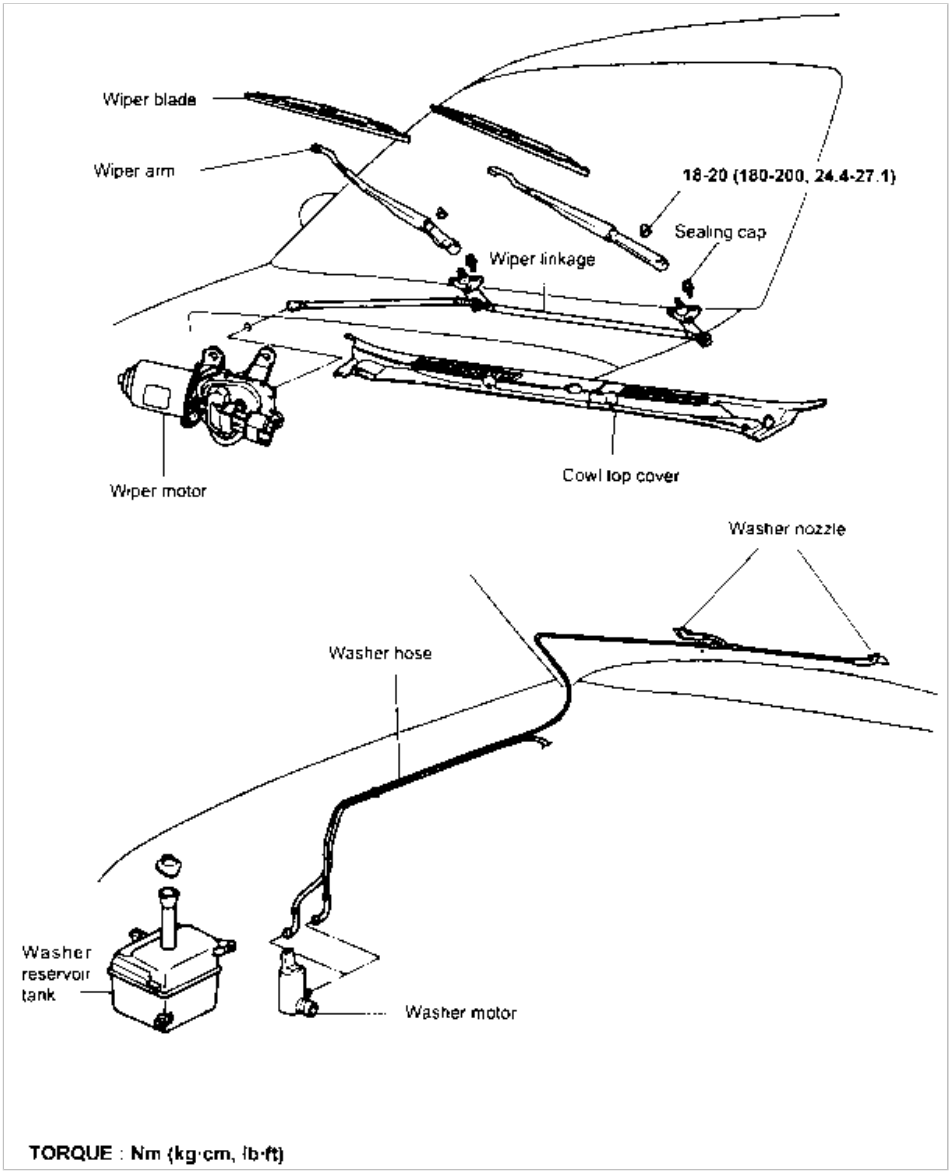




3. If the amount of washer fluid is too small, check for clogged, bent or crushed washer piping. Check the chipped points too, because the tube might be crushed.

Body Electrical System > Windshield Wiper/Washer > Windshield Wiper > COMPONENTS

COMPONENTS

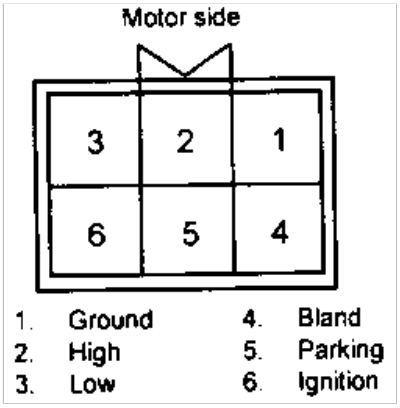


Body Electrical System > Windshield Wiper/Washer > Windshield Wiper > INSPECTIONS OF WIPER MOTOR

INSPECTIONS OF WIPER MOTOR

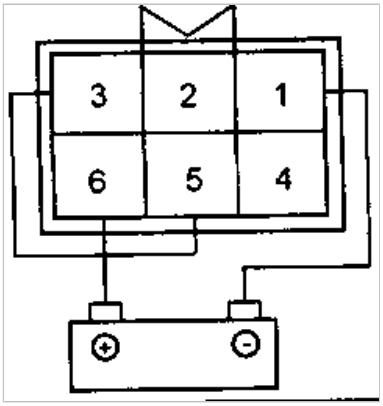
SPEED OPERATION CHECK

1. Remove the connector from the front wiper motor.
2. Attach the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 3.
3. Check that the motor operates at low speed.
4. Connect the positive (+) lead from the battery to terminal 6 and the negative (-) lead to terminal 2.
5. Check that the motor operates at high speed.



AUTOMATIC STOP OPERATION CHECK

1. Operate the motor at low speed.
2. Stop motor operation anywhere except at the off position by disconnecting terminals 3 and 5.
3. Connect terminals 3 and 5.



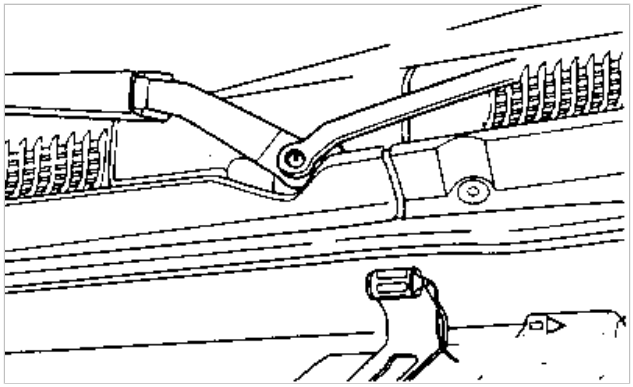
4. Connect the positive (+) lead from the battery to terminal 6.
5. Check that the motor stops running at the off position after the motor operates again.

Body Electrical System > Windshield Wiper/Washer > Windshield Wiper > REMOVAL AND INSTALLATION

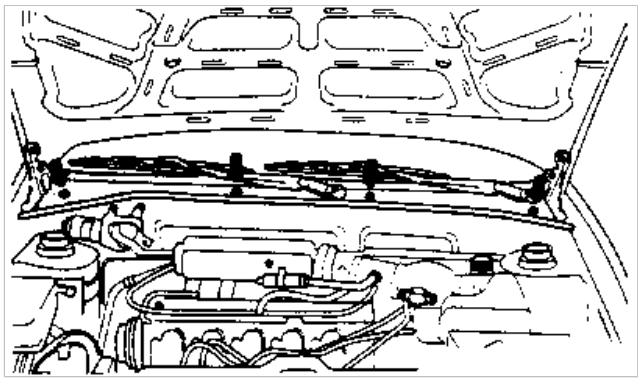
REMOVAL AND INSTALLATION

REMOVAL

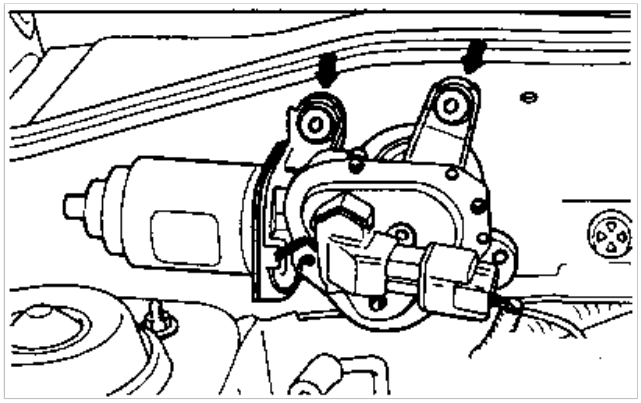
1. Remove the wiper arm mounting nut.
   Care must be taken not to scratch the engine hood.
2. Remove wiper arm and blade assembly.



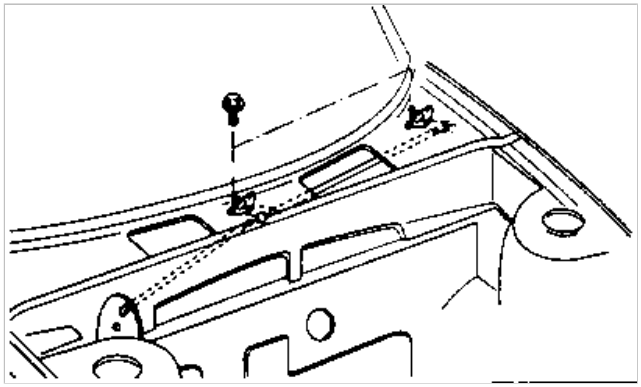
3. Remove the cowl top fastener.
4. Remove the cowl top cover.
5. Remove the wiper connector.



6. Remove the wiper motor mounting bolt.
7. Disconnect the motor from the link and remove the motor assembly.
   When removing the wiper motor only, follow only steps 5 through 7.



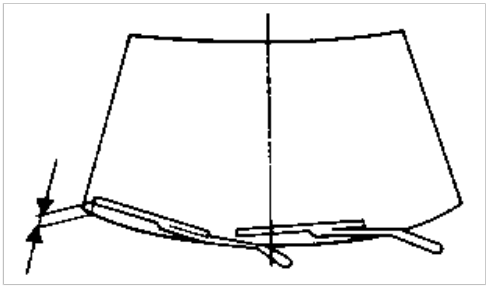
8. Remove the wiper link mounting bolt.
9. Take out the wiper link assembly from the cowl top panel.



INSTALLATION

1. Installation is the reverse order of removal.
2. Pivot the wiper arm in order for it to be in the specified position when it is stopped.

	Distance	Standards
Front	Between the end of the blade tip and the front deck panel	30 ± 5 mm
Rear	Between the end of the blade tip and the LH rear pillar	150 ± 5 mm



ACCENT(X3) > 1998 > G 1.5 SOHC > Brake Systems

Brake Systems > Anti-lock Brake System > ANTI-LOCK BRAKE SYSTEM

ANTI-LOCK BRAKE SYSTEM

The ABS is a brake system which controls the wheel cylinder hydraulic pressure of all four wheels during sudden braking and braking on slippery road surfaces, preventing the wheels from locking. The ABS provides the following benefits.

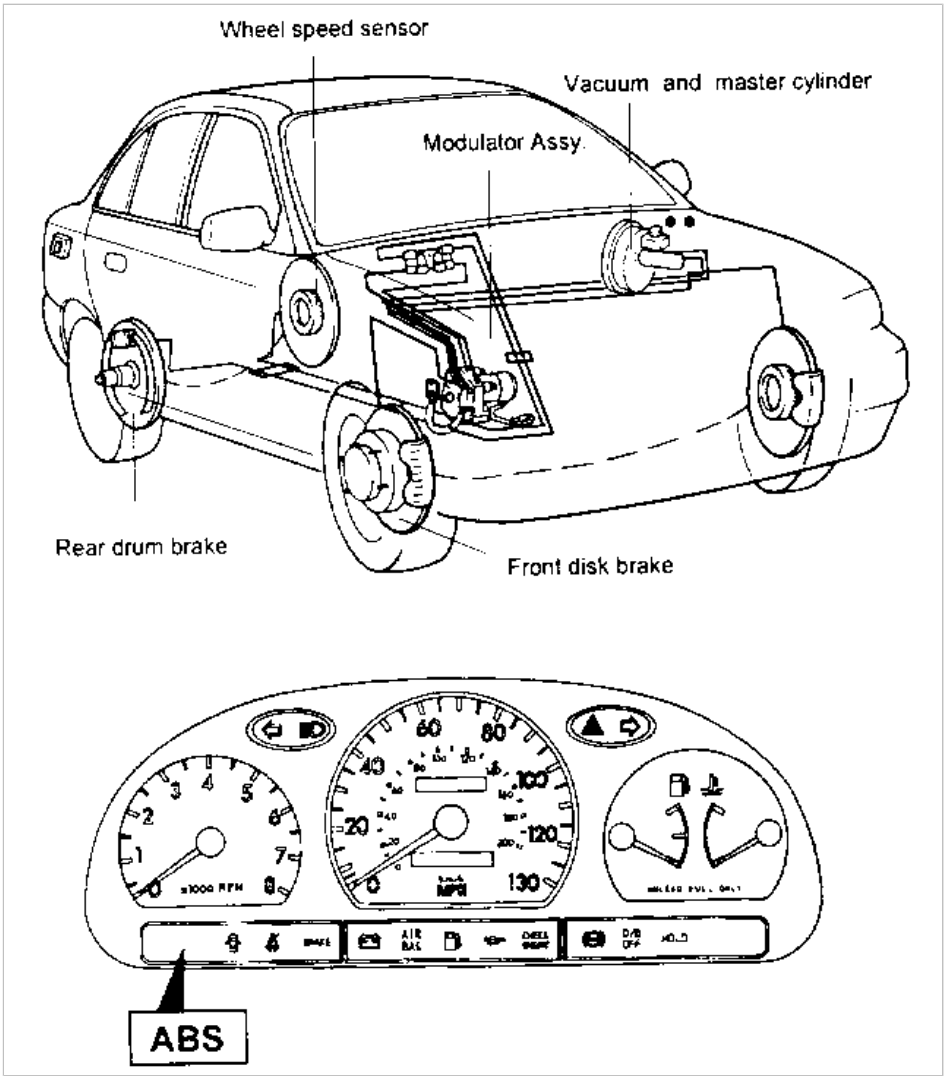
a. Enables steering around an obstacle with a greater degree of certainty even when panic braking.

b. Enables stopping in a panic brake while keeping the effect upon stability and steerability to a minimum, even on curves.

In case a malfunction occurs, a diagnosis function and fail-safe system have been included for serviceability.

Brake Systems > Anti-lock Brake System > COMPONENTS

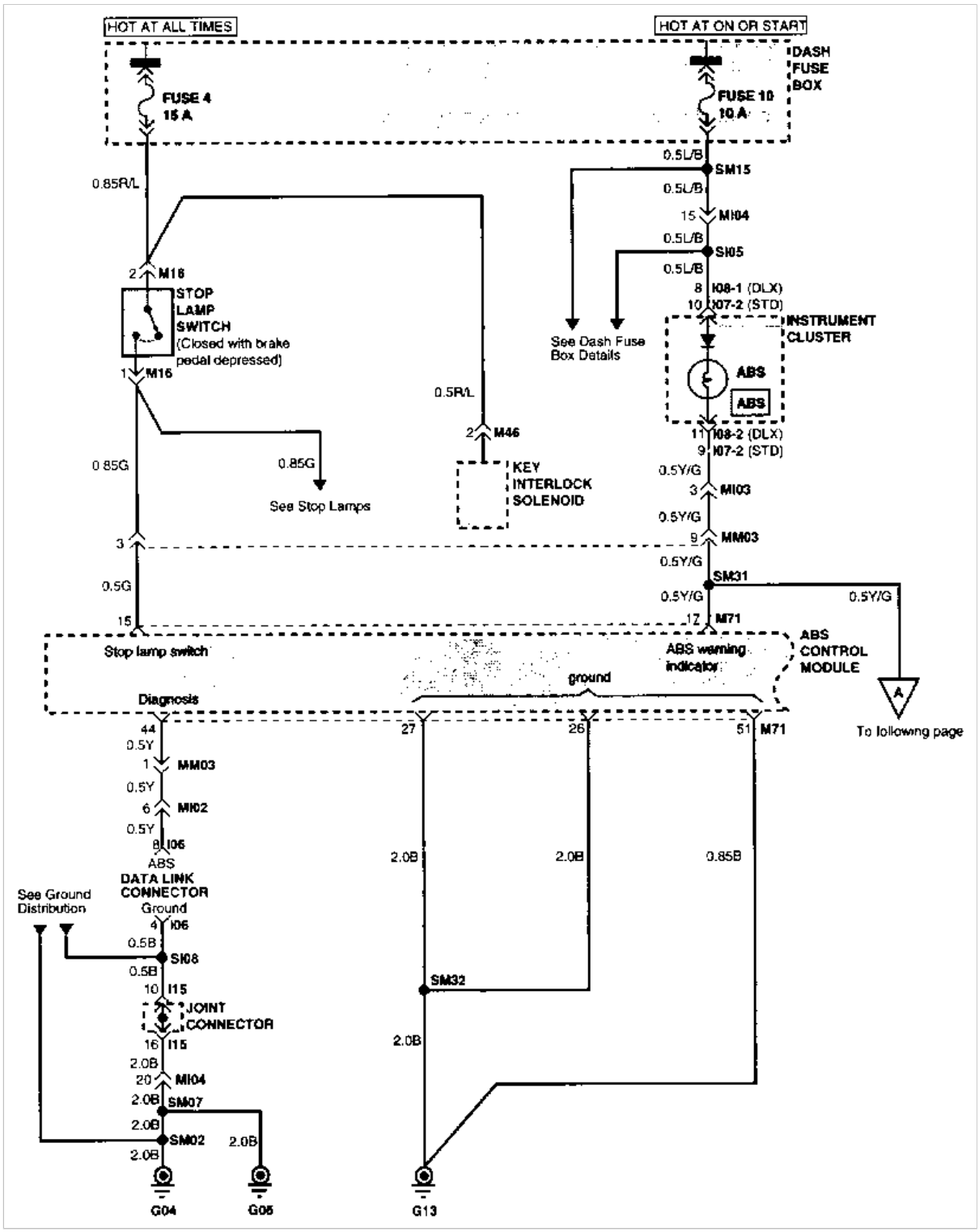
COMPONENTS



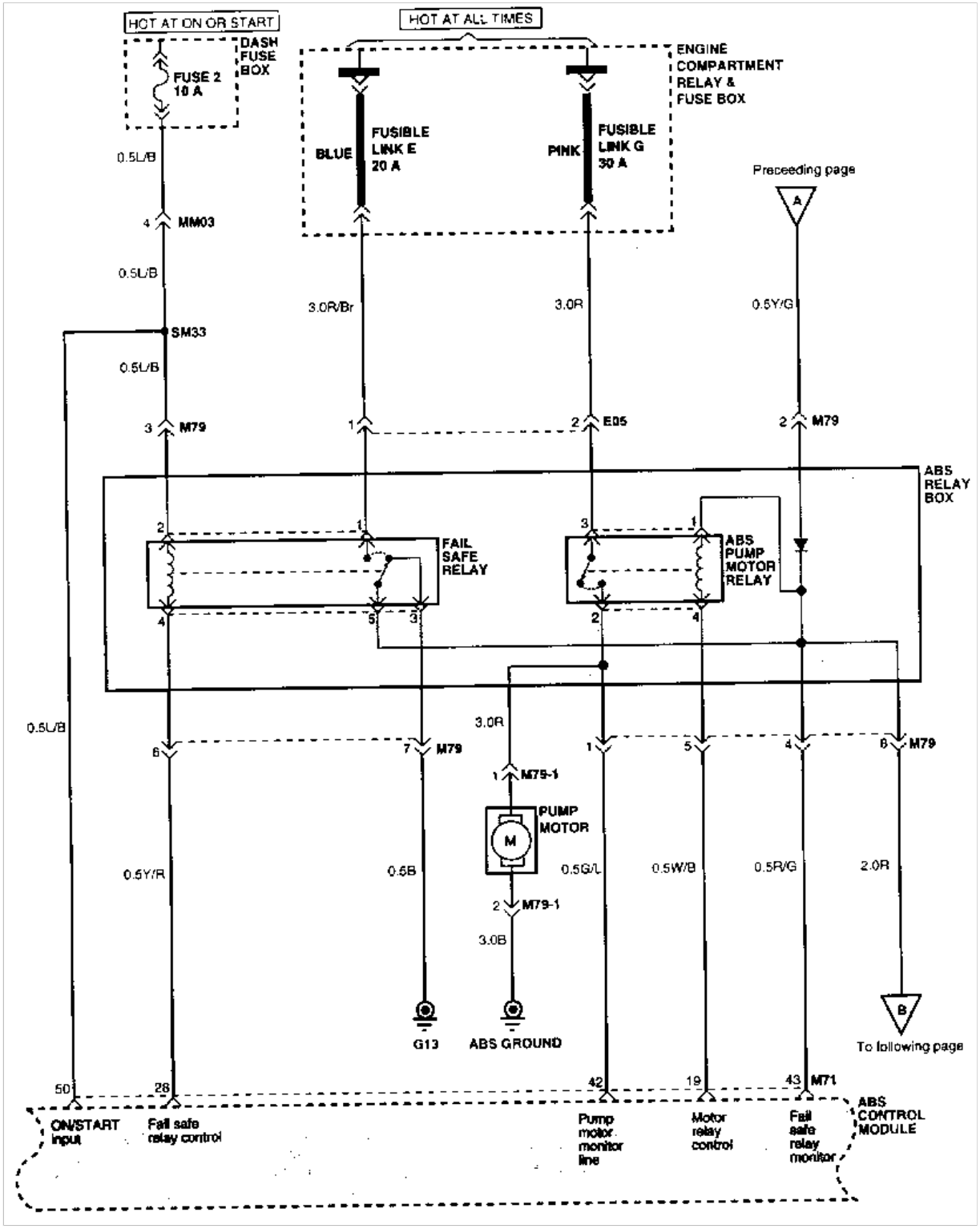
Brake Systems > Anti-lock Brake System > SCHEMATIC DIAGRAMS

SCHEMATIC DIAGRAMS

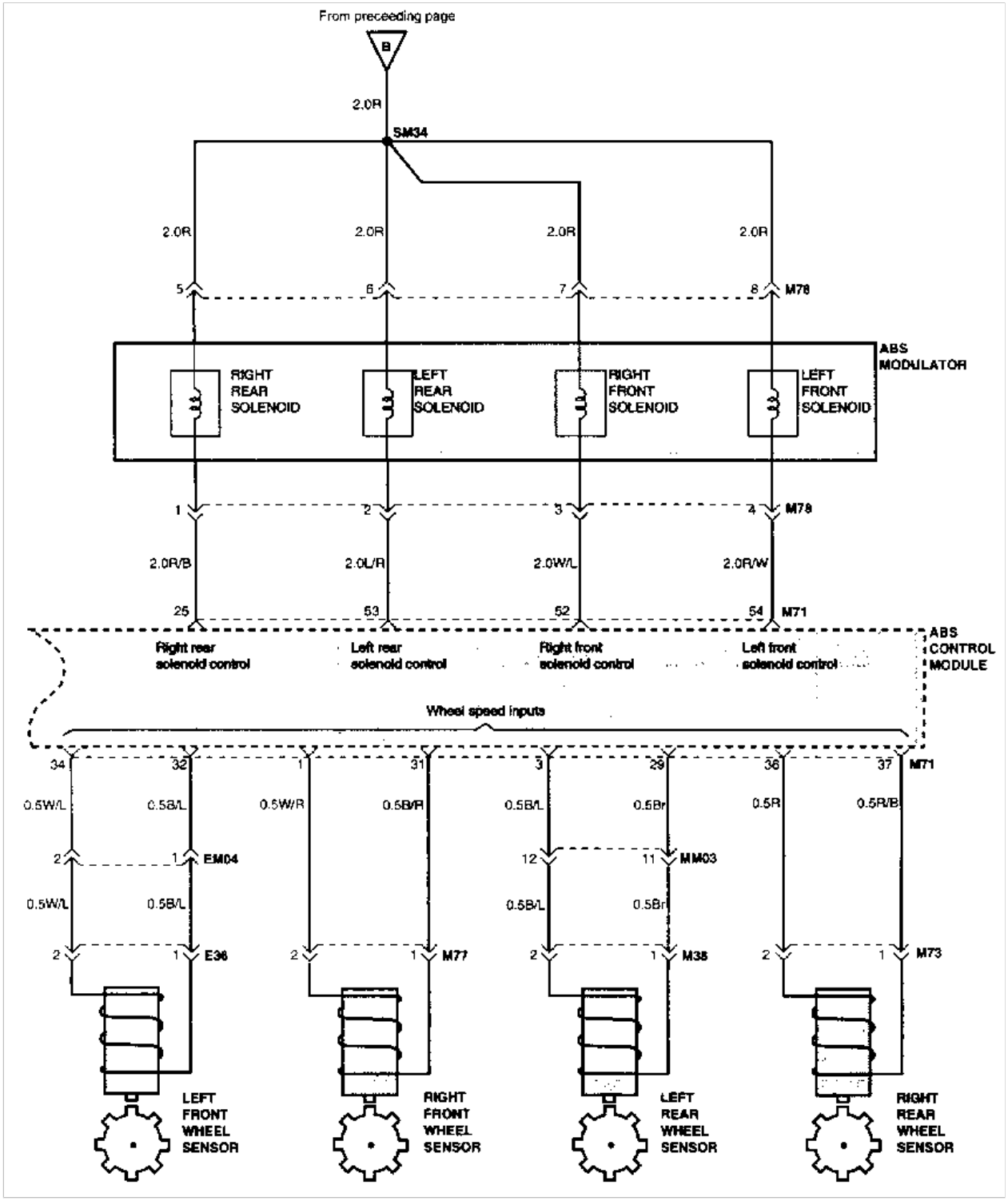
SCHEMATIC DIAGRAM (1)



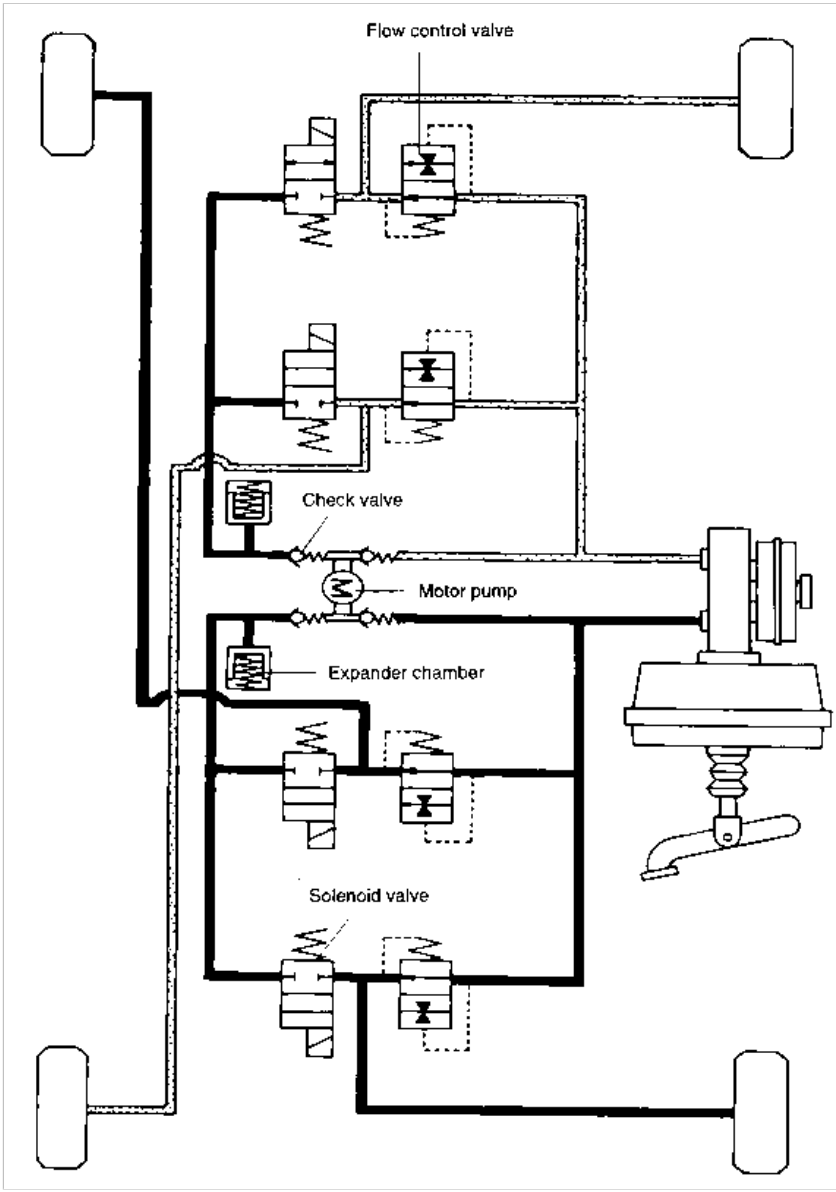
SCHEMATIC DIAGRAM (2)



SCHEMATIC DIAGRAM (3)



HYDRAULIC SYSTEM DIAGRAM

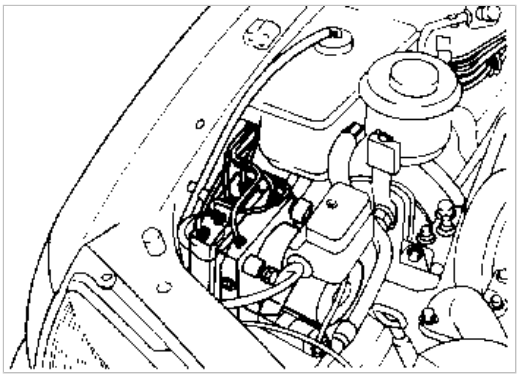


Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (ABS MODULATOR CIRCUIT - SHORT B+)

TROUBLESHOOTING (ABS MODULATOR CIRCUIT - SHORT B+)

The modulator consists of four solenoid valves, one expander chamber per brake circuit, and a hydraulic pump.

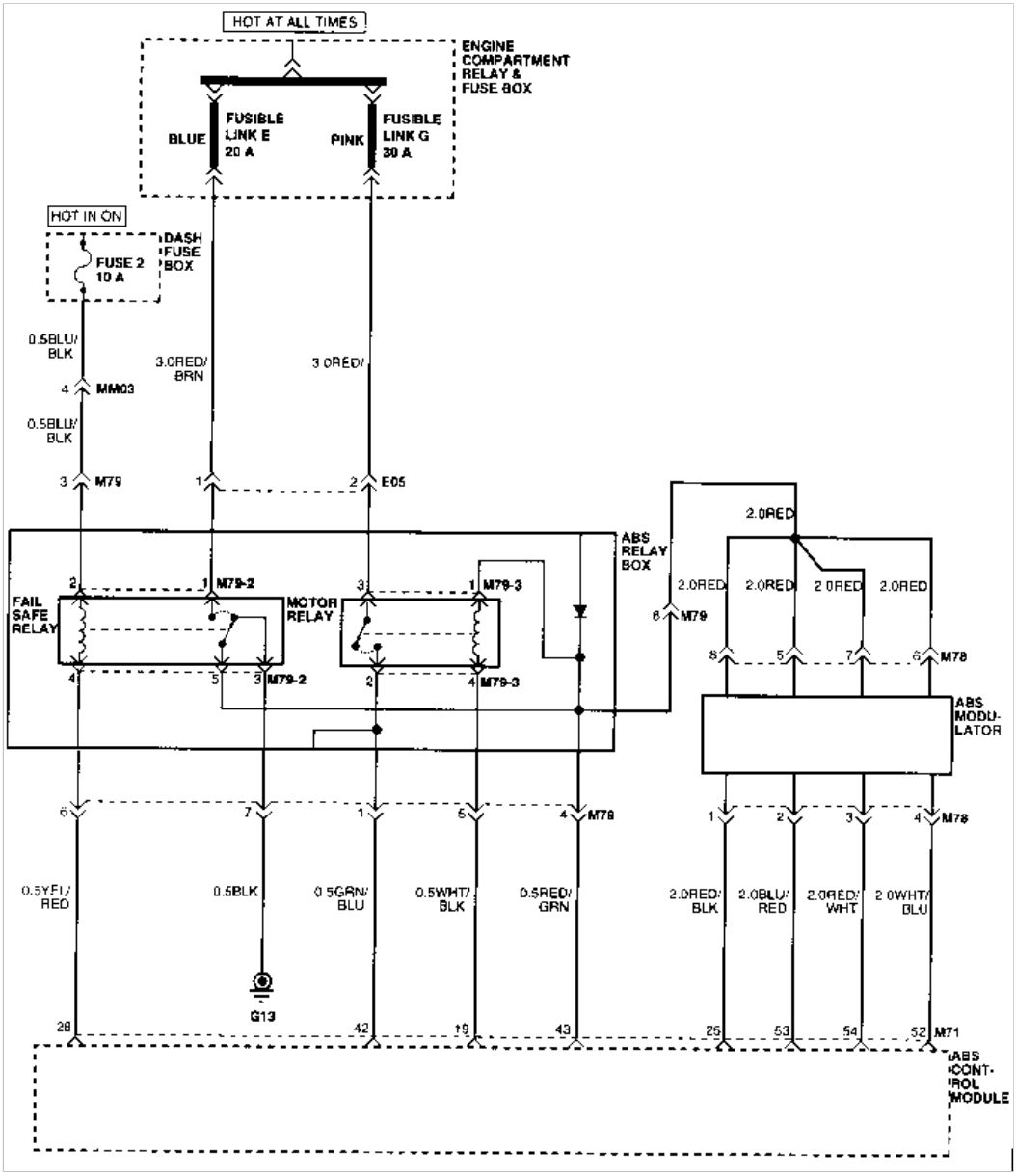
The ABSCM activates the solenoid valves and controls the pressure to the wheel calipers.



SRI flash pattern	Symptom	Possible Cause

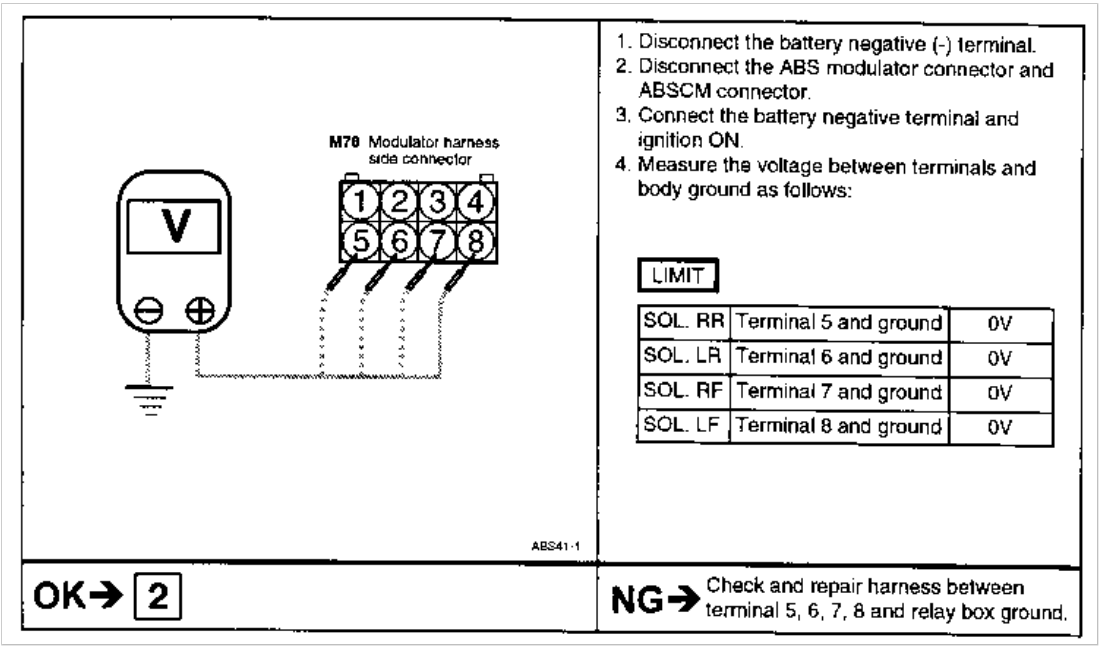
21	LF solenoid valve short circuit to 12V	a. ABS Modulator b. ABS Relay box c. Harness or connector between ABSCM and modulator
23	RF solenoid valve short circuit to 12V	
25	LR solenoid valve short circuit to 12V	
27	RR solenoid valve short circuit to 12V	

WIRING DIAGRAM



INSPECTION PROCEDURE

1. Check for voltage between each terminal of the ABS modulator harness



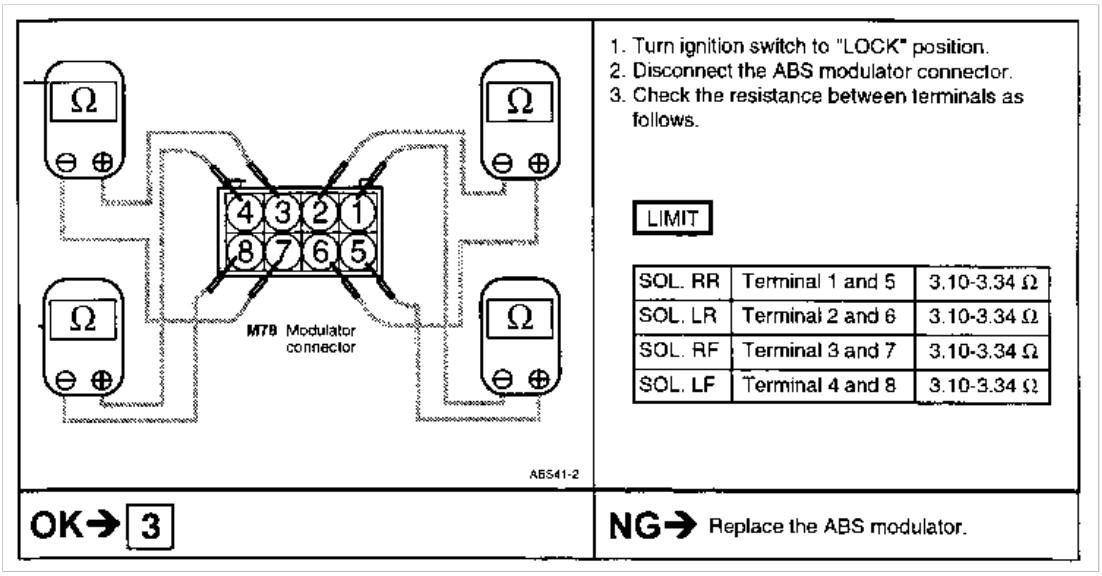
1. Disconnect the battery negative (-) terminal.
2. Disconnect the ABS modulator connector and ABSCM connector.
3. Connect the battery negative terminal and ignition ON.
4. Measure the voltage between terminals and body ground as follows:

LIMIT		
SOL. RR	Terminal 5 and ground	0V
SOL. LR	Terminal 6 and ground	0V
SOL. RF	Terminal 7 and ground	0V
SOL. LF	Terminal 8 and ground	0V

OK→ 2

NG→ Check and repair harness between terminal 5, 6, 7, 8 and relay box ground.

2. Check the ABS-Modulator



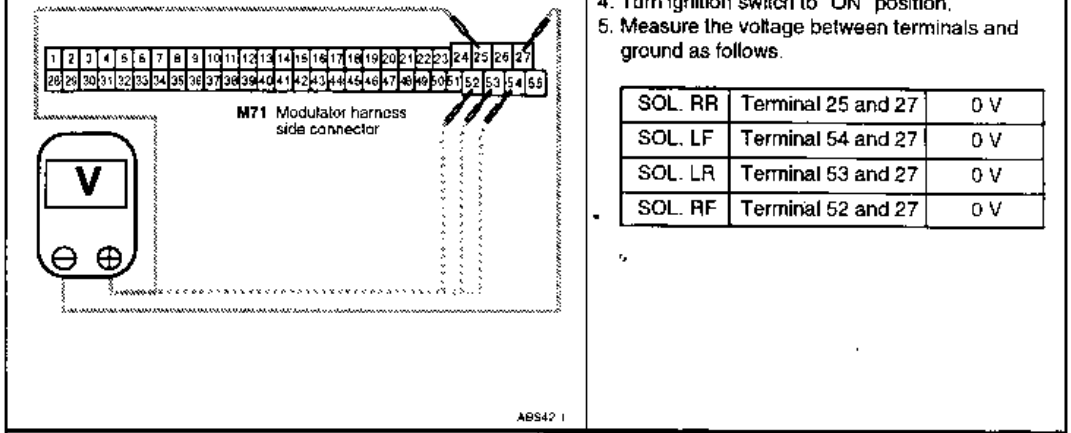
1. Turn ignition switch to "LOCK" position.
2. Disconnect the ABS modulator connector.
3. Check the resistance between terminals as follows.

LIMIT		
SOL. RR	Terminal 1 and 5	3.10-3.34 Ω
SOL. LR	Terminal 2 and 6	3.10-3.34 Ω
SOL. RF	Terminal 3 and 7	3.10-3.34 Ω
SOL. LF	Terminal 4 and 8	3.10-3.34 Ω

OK→ 3

NG→ Replace the ABS modulator.

3. Check the ABSCM harness



1. Disconnect the battery negative (-) terminal.
2. Disconnect ABSCM connector.
3. Connect the battery negative (-) terminal.
4. Turn ignition switch to "ON" position.
5. Measure the voltage between terminals and ground as follows.

SOL. RR	Terminal 25 and 27	0 V
SOL. LF	Terminal 54 and 27	0 V
SOL. LR	Terminal 53 and 27	0 V
SOL. RF	Terminal 52 and 27	0 V

OK→ Reconnect the ABSCM and recheck from step 1.

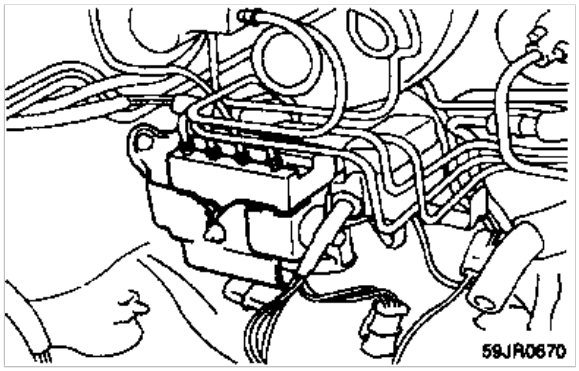
NG→ Repair the harness

Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (ABS MODULATOR CIRCUIT)

TROUBLESHOOTING (ABS MODULATOR CIRCUIT)

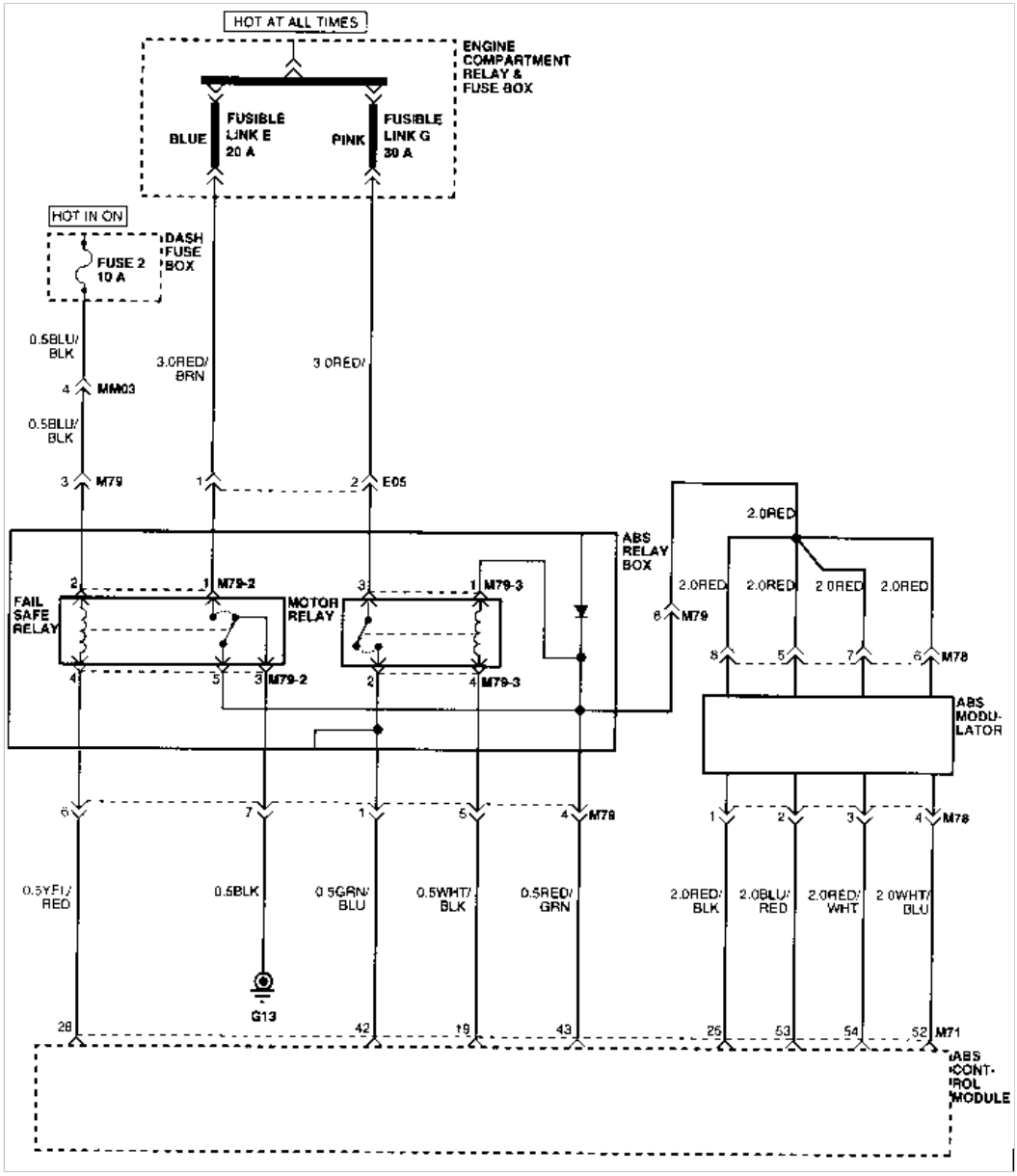
The modulator consists of four solenoid valves, one expander chamber per brake circuit, and a hydraulic pump.

The ABSCM activates the solenoid valves and controls the pressure to the wheel calipers.



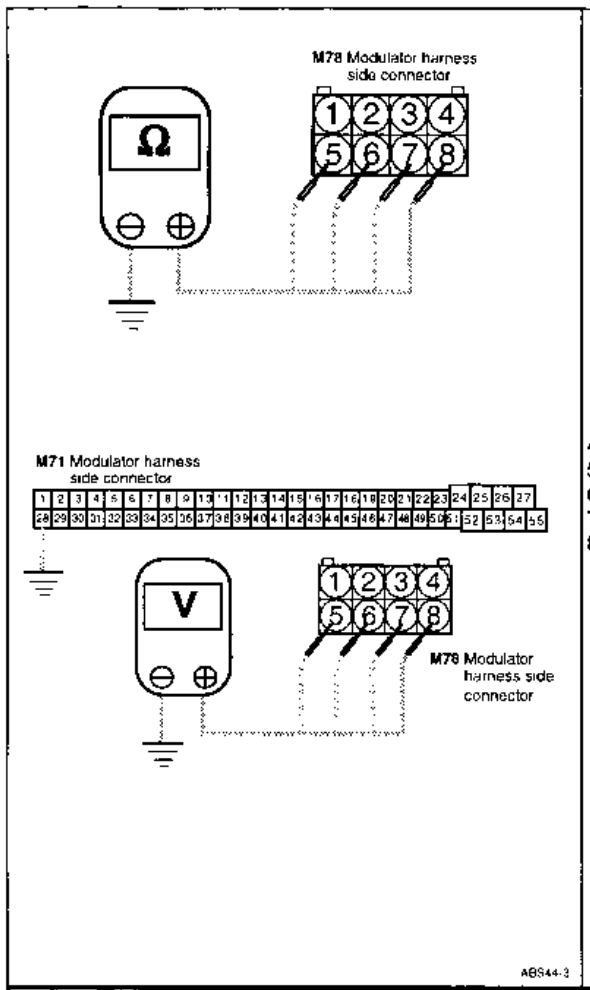
SRI flash pattern	Symptom	Possible Cause
22	LF solenoid valve open or short-circuit to ground	a. ABS Modulator b. ABS Relay Box c. Harness or connector between the ABSCM and modulator
24	RF solenoid valve open or short-circuit to ground	
26	LR solenoid valve open or short-circuit to ground	
28	RR solenoid valve open or short-circuit to ground	

WIRING DIAGRAM



INSPECTION PROCEDURE

1. Check for continuity between each terminal of the ABS modulator harness.



1. Disconnect the battery negative (-) terminal.
2. Disconnect the ABS modulator connector and ABSCM connector.
3. Check for continuity between the terminals and body ground as follows.

LIMIT

SOL. RR	Terminal 5 and ground	Continuity
SOL. RL	Terminal 6 and ground	Continuity
SOL. FR	Terminal 7 and ground	Continuity
SOL. FL	Terminal 8 and ground	Continuity

4. Disconnect the ABSCM connector.
5. Ground ABSCM connector terminal 28.
6. Connect the battery negative terminal.
7. Turn ignition switch to "ON" position.
8. Measure voltage between terminals and body ground as follows.

LIMIT

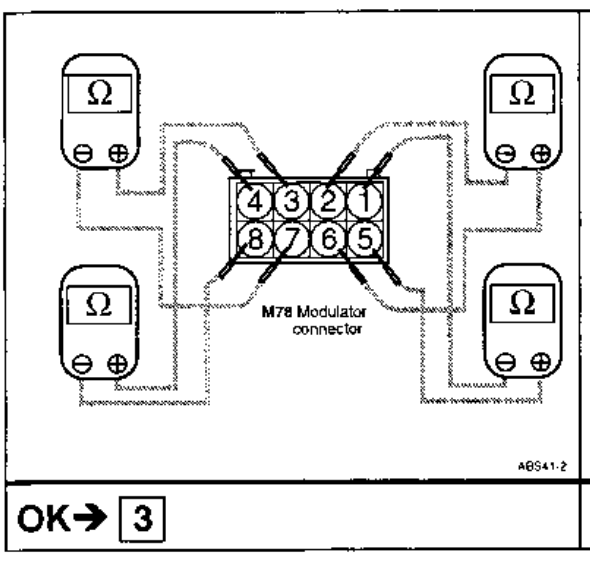
SOL. RR	Terminal 5 and ground	9.0-14.2 V
SOL. RL	Terminal 6 and ground	9.0-14.2 V
SOL. FR	Terminal 7 and ground	9.0-14.2 V
SOL. FL	Terminal 8 and ground	9.0-14.2 V

OK→ 2

NG→ Check and repair the harness between terminal 5, 6, 7, 8 and relay box ground.

SOL. : SOLENOID

2. Check ABS Modulator.



1. Turn ignition switch to "LOCK" position.
2. Disconnect the ABS modulator connector.
3. Check the resistance between the terminals as follows.

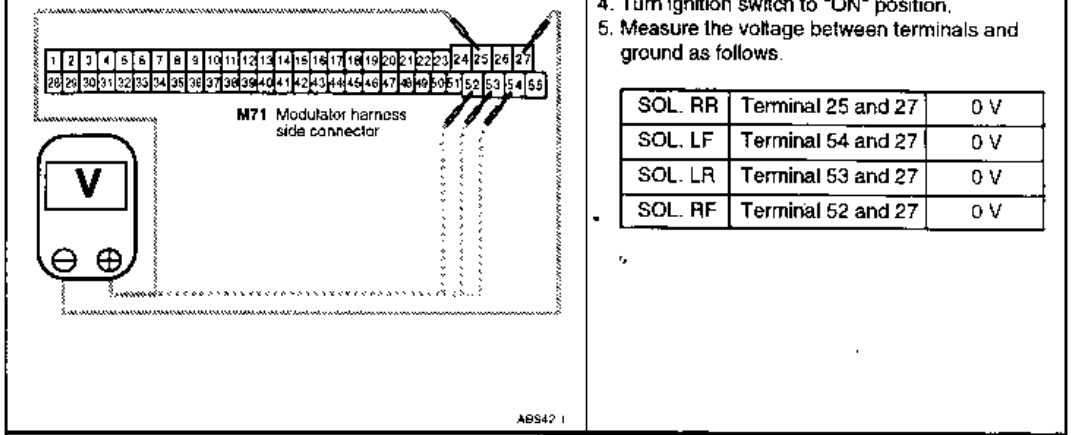
LIMIT

SOL. RR	Terminal 1 and 5	3.10-3.34 Ω
SOL. RL	Terminal 2 and 6	3.10-3.34 Ω
SOL. FR	Terminal 3 and 7	3.10-3.34 Ω
SOL. FL	Terminal 4 and 8	3.10-3.34 Ω

OK→ 3

NG→ Replace ABS modulator.

3. Check ABSCM harness.



1. Disconnect the battery negative (-) terminal.
2. Disconnect ABSCM connector.
3. Connect the battery negative (-) terminal.
4. Turn ignition switch to "ON" position.
5. Measure the voltage between terminals and ground as follows.

SOL. RR	Terminal 25 and 27	0 V
SOL. LF	Terminal 54 and 27	0 V
SOL. LR	Terminal 53 and 27	0 V
SOL. RF	Terminal 52 and 27	0 V

OK→ Reconnect the ABSCM and recheck from step 1.

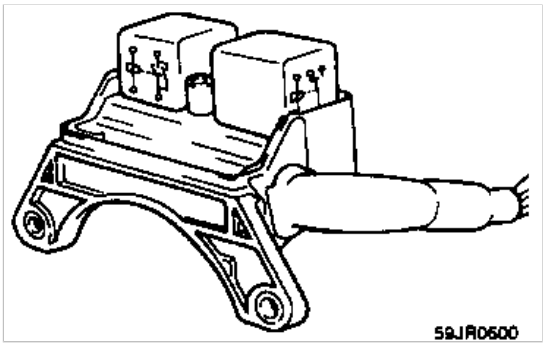
NG→ Repair the harness

Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (ABS RELAY BOX CIRCUIT - FAIL SAFE RELAY)

TROUBLESHOOTING (ABS RELAY BOX CIRCUIT - FAIL SAFE RELAY)

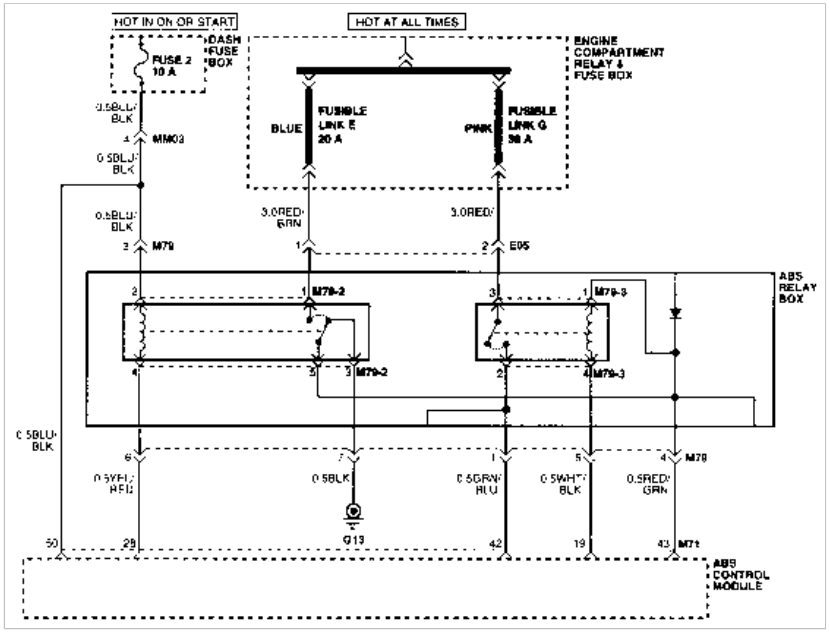
Fail safe relay supplies battery voltage to the modulator. After the ignition switch is turned ON, the relay goes on if the initial check is good.

If a problem occurs in the ABS system, the ABSCM disables the relay and the ABS is disabled.



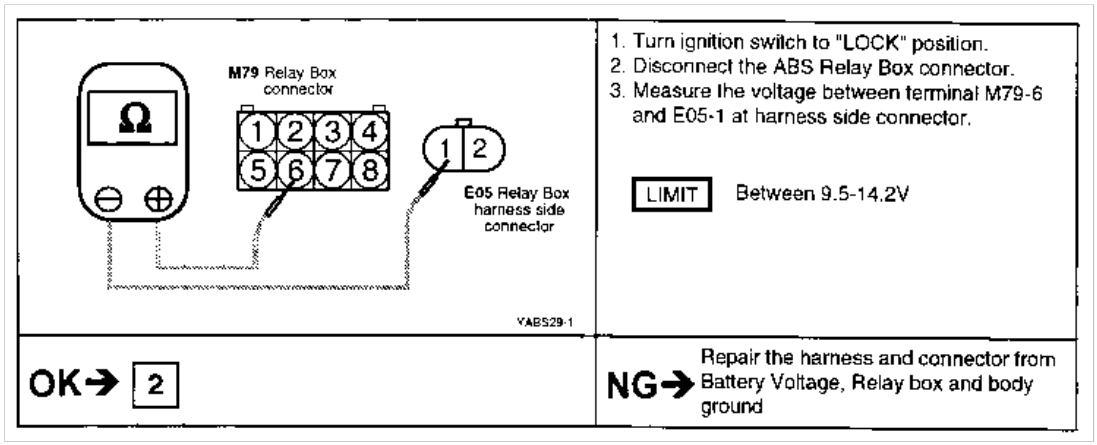
SRI flash pattern	Symptom	Possible Cause
41	Fail safe relay not set activeContact signal stays closed	a. Fail safe relay b. Harness between relay box and ABSCM c. ABSCM
42	Fail safe relay set activeContact signal does not stay closed	a. Fail safe relay b. Harness between relay box and power source c. Harness between relay box and ABSCM d. ABSCM
43	Fail safe relay coil not OK	

WIRING DIAGRAM

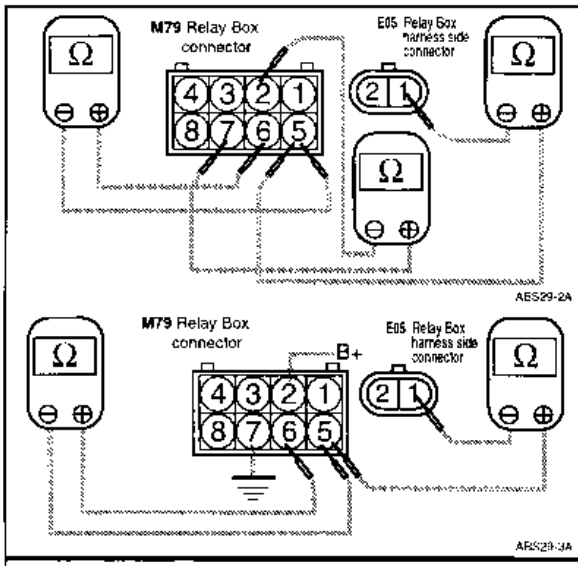


INSPECTION PROCEDURE

1. Check ABS power supply



2. Check the ABS Relay Box (Fail safe relay)



1. Turn ignition switch to "LOCK" position.
2. Disconnect the ABS Relay Box connector.
3. Check for continuity between as follows.

LIMIT

Terminal 5,6	Continuity
Terminal M79-5, E05-1	No continuity
Terminal 2,7	Continuity

4. Apply battery voltage between terminal 2 and 7.

Caution
Never attempt to continue 2 sec. or more

5. Check for continuity as follows.

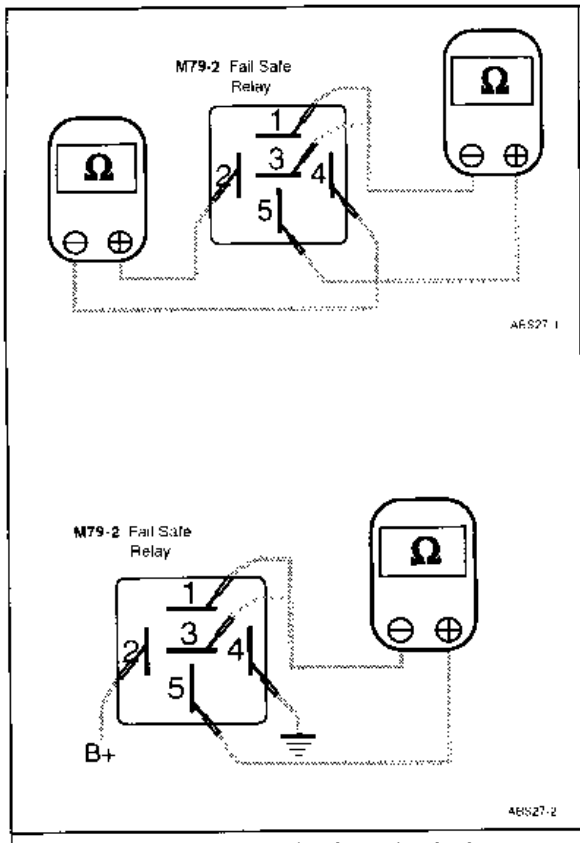
LIMIT

Terminal 5,6	No continuity
Terminal M79-5, E05-1	Continuity

OK→ 4

NG→ 3

3. Check the Fail safe relay



1. Turn ignition switch to "LOCK" position.
2. Remove the Relay-box cover.
3. Remove the Fail-safe relay.
4. Check for continuity between terminals as follows.

LIMIT

Terminals 2 and 4	Continuity
Terminals 1 and 5	Noncontinuity
Terminals 3 and 5	Continuity

5. Apply battery voltage between terminals 2 and 4.

Caution
Never attempt to continue 2 sec. or more.

6. Check for continuity between terminals as follows.

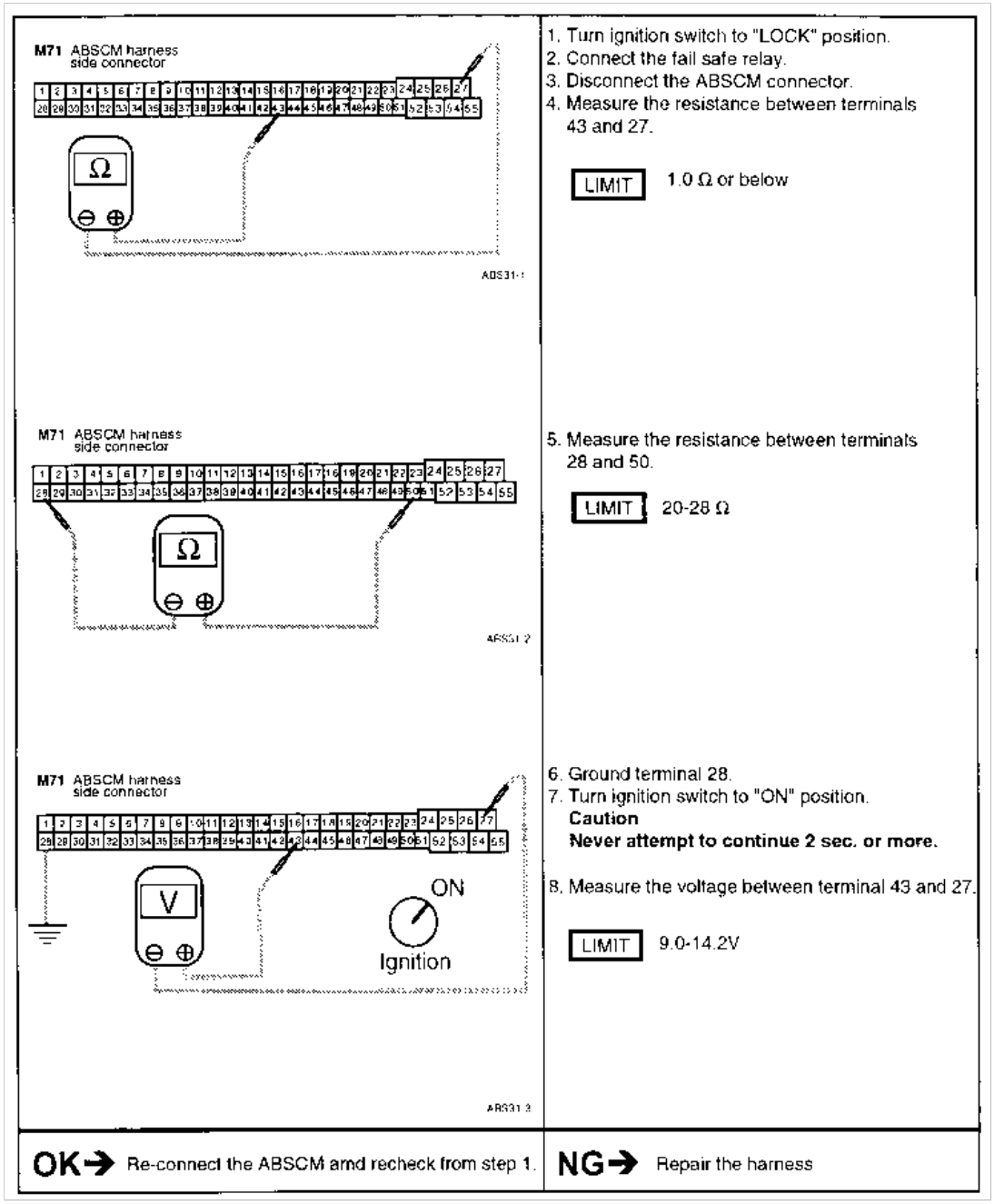
LIMIT

Terminals 1 and 5	Continuity
Terminals 3 and 5	No continuity

OK→ Re-connect fail-safe relay and recheck from step 1.

NG→ Replace the Fail safe relay

4. Check the ABSCM harness



1. Turn ignition switch to "LOCK" position.
2. Connect the fail safe relay.
3. Disconnect the ABSCM connector.
4. Measure the resistance between terminals 43 and 27.

LIMIT 1.0 Ω or below

5. Measure the resistance between terminals 28 and 50.

LIMIT 20-28 Ω

6. Ground terminal 28.
7. Turn ignition switch to "ON" position.
   Caution
   Never attempt to continue 2 sec. or more.
8. Measure the voltage between terminal 43 and 27.

LIMIT 9.0-14.2V

OK→ Re-connect the ABSCM amd recheck from step 1.

NG→ Repair the harness

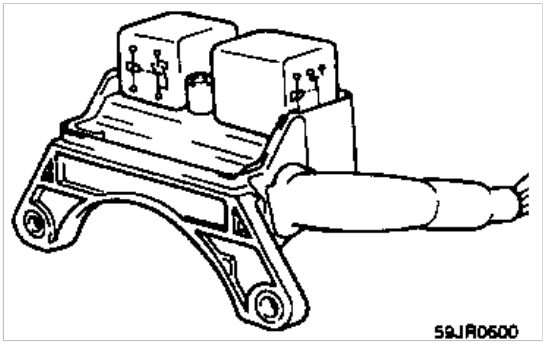
Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (ABS RELAY BOX CIRCUIT - MOTOR PUMP RELAY, SHORT B+)

TROUBLESHOOTING (ABS RELAY BOX CIRCUIT - MOTOR PUMP RELAY, SHORT B+)

The motor pump relay supplies battery voltage to the motor pump.

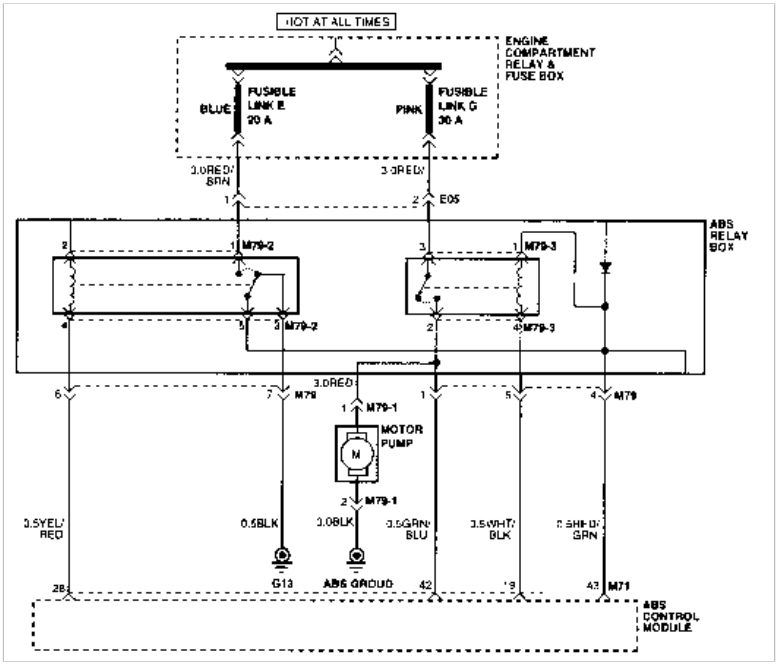
The ABSCM switches the motor relay ON and operates the ABS motor pump.

If a problem occurs in the ABS system, the ABSCM disables the motor pump relay.



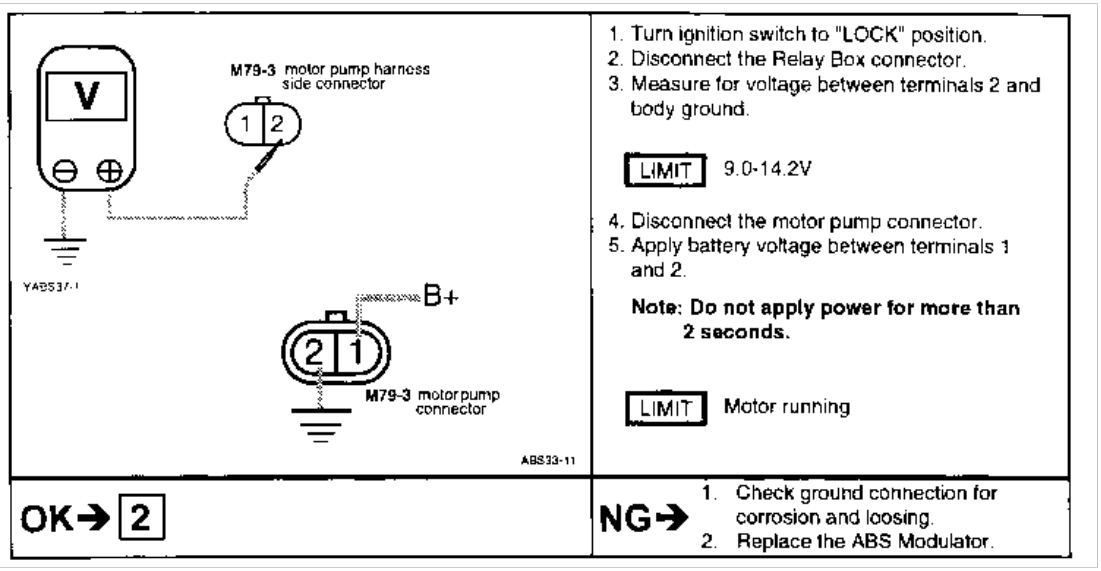
SRI flash pattern	Symptom	Possible Cause
35	Motor pump does not operate	a. Motor pump b. Motor pump relay c. Harness between the ABS and relay box d. Harness between power supply and relay box
37	Motor pump relay circuit short to battery	a. Motor pump relay b. ABSCM c. Harness between the relay box and the ABSCM
38	Motor pump short to 12V or circuit open	a. Motor pump relay b. Harness between the ABS modulator and the relay box c. Harness between the power supply and the relay box d. Motor pump

WIRING DIAGRAM



INSPECTION PROCEDURE

1. Check for voltage between the Relay Box terminal E06-1 and BODY GND. Check motor pump.



1. Turn ignition switch to "LOCK" position.
2. Disconnect the Relay Box connector.
3. Measure for voltage between terminals 2 and body ground.

LIMIT 9.0-14.2V

4. Disconnect the motor pump connector.
5. Apply battery voltage between terminals 1 and 2.

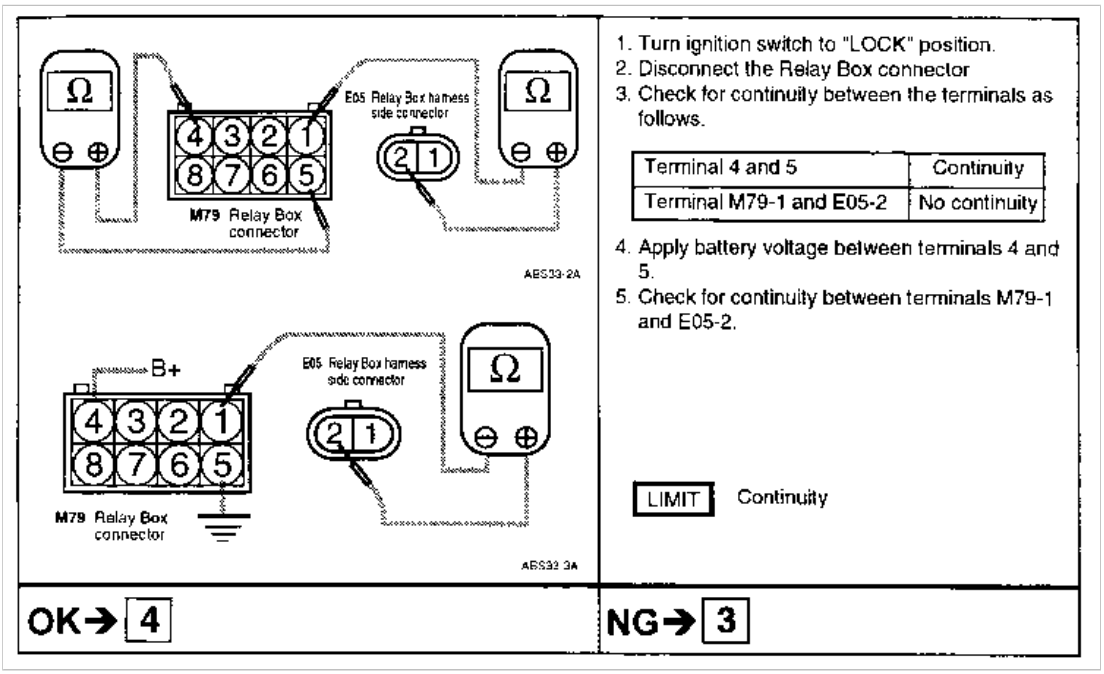
Note: Do not apply power for more than 2 seconds.

LIMIT Motor running

OK→ 2

NG→
1. Check ground connection for corrosion and loosing.
2. Replace the ABS Modulator.

2. Check ABS-Relay Box (Motor pump relay)



1. Turn ignition switch to "LOCK" position.
2. Disconnect the Relay Box connector
3. Check for continuity between the terminals as follows.

Terminal 4 and 5	Continuity
Terminal M79-1 and E05-2	No continuity

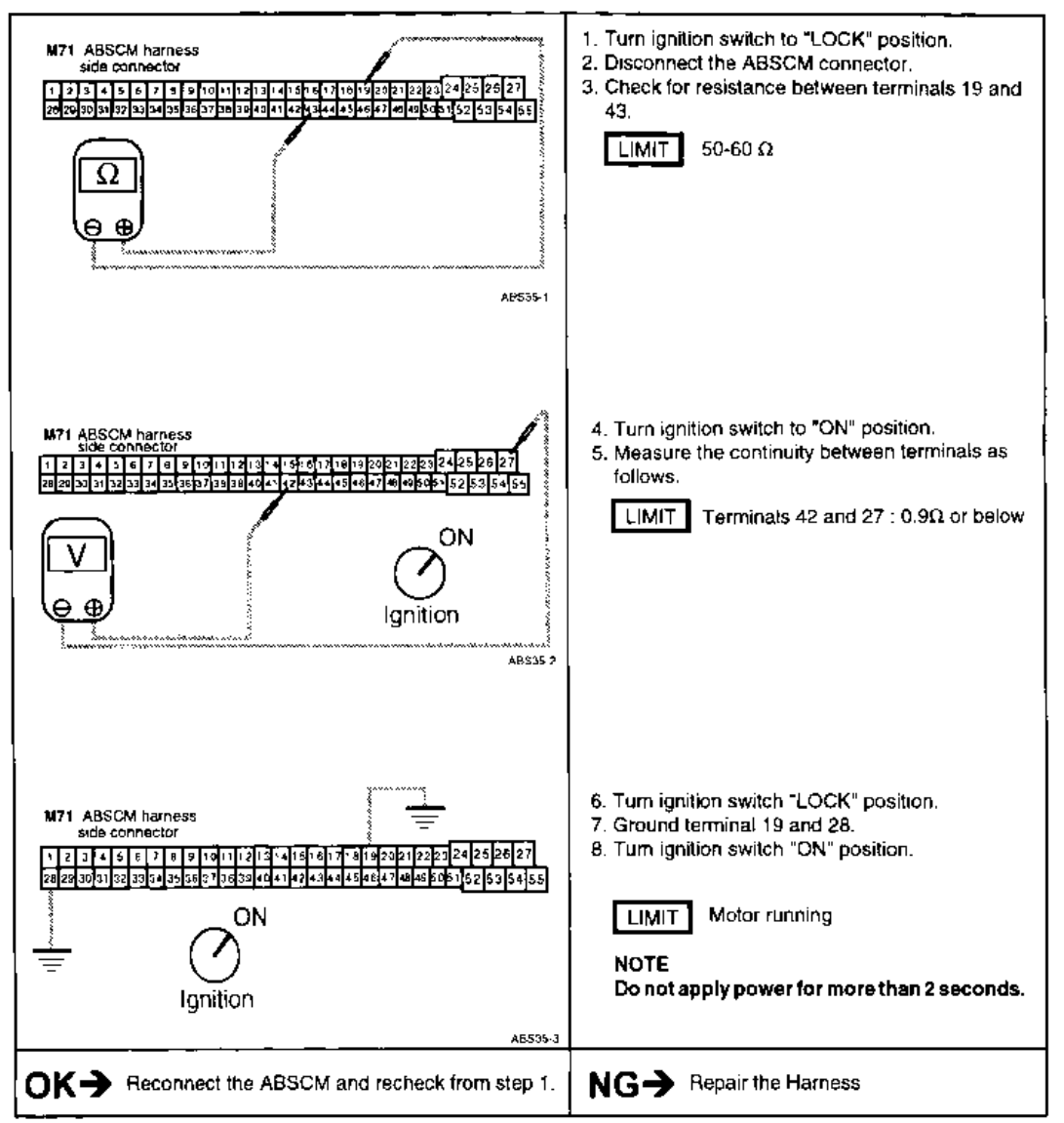
4. Apply battery voltage between terminals 4 and 5.
5. Check for continuity between terminals M79-1 and E05-2.

LIMIT Continuity

OK→ 4

NG→ 3

3. Check resistance between each terminal of ABSCM connector

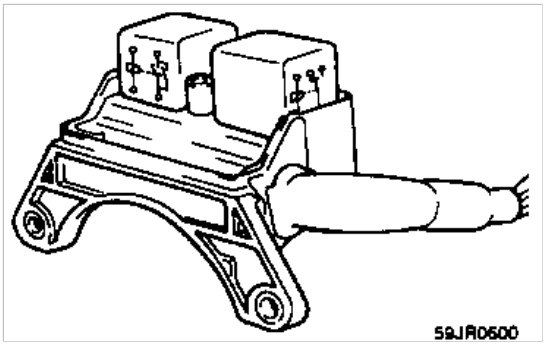


Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (ABS RELAY BOX CIRCUIT - MOTOR PUMP RELAY, SHORT GND)

TROUBLESHOOTING (ABS RELAY BOX CIRCUIT - MOTOR PUMP RELAY, SHORT GND)

The motor pump relay supplies battery voltage to the motor pump. The ABSCM switches the motor relay ON and operates the ABS motor pump.

If a problem occurs in the ABS system, the ABSCM disables the motor pump relay.

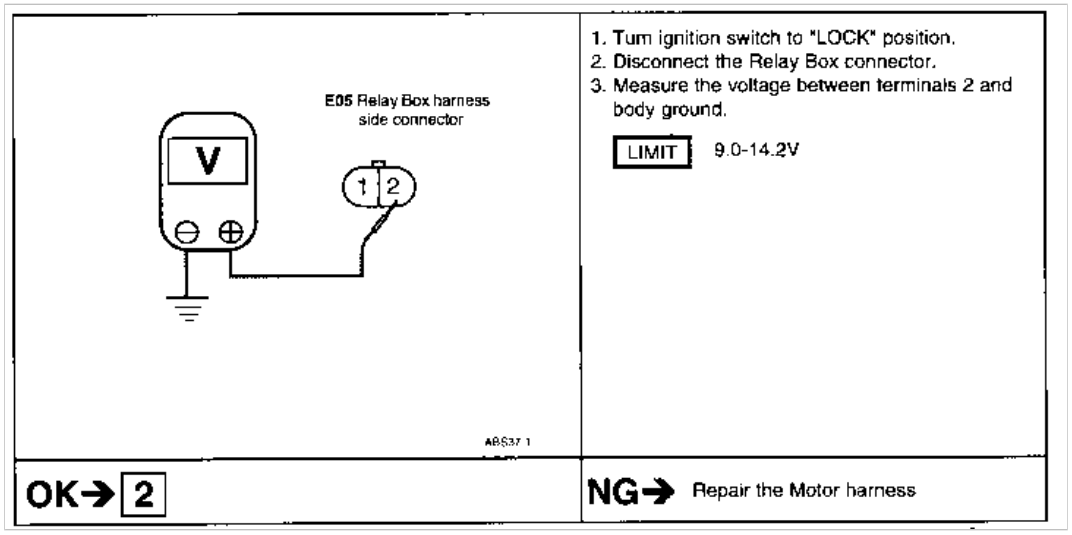


SRI flash pattern	Symptom	Possible Cause
36	Motor pump relay circuit open or short to ground	a. Motor pump relay

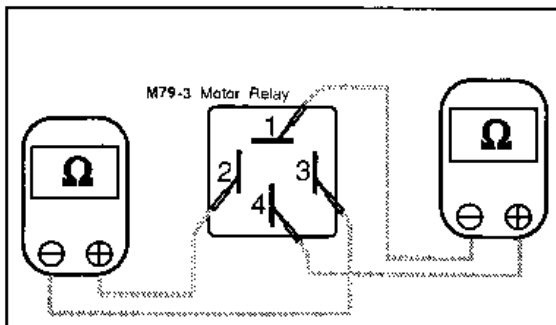
		b. ABSCM c. Harness between the relay box and the ABSCM d. Harness between the power supply and the relay box
39	Motor pump short to ground	a. Motor pump relay

INSPECTION PROCEDURE

1. Check for voltage between the Relay Box terminal E05 and BODY GND.



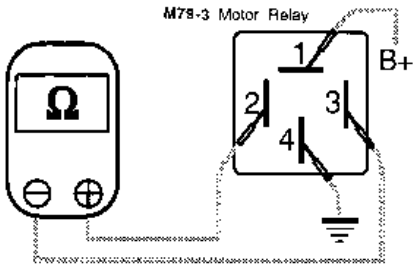
2. Check the Motor pump relay.



1. Turn ignition switch to "LOCK" position.
2. Remove the Relay-box cover.
3. Remove the Motor pump relay.
4. Check for continuity terminals between as follows.

LIMIT

Terminals 1 and 4	Continuity
Terminals 2 and 3	No continuity



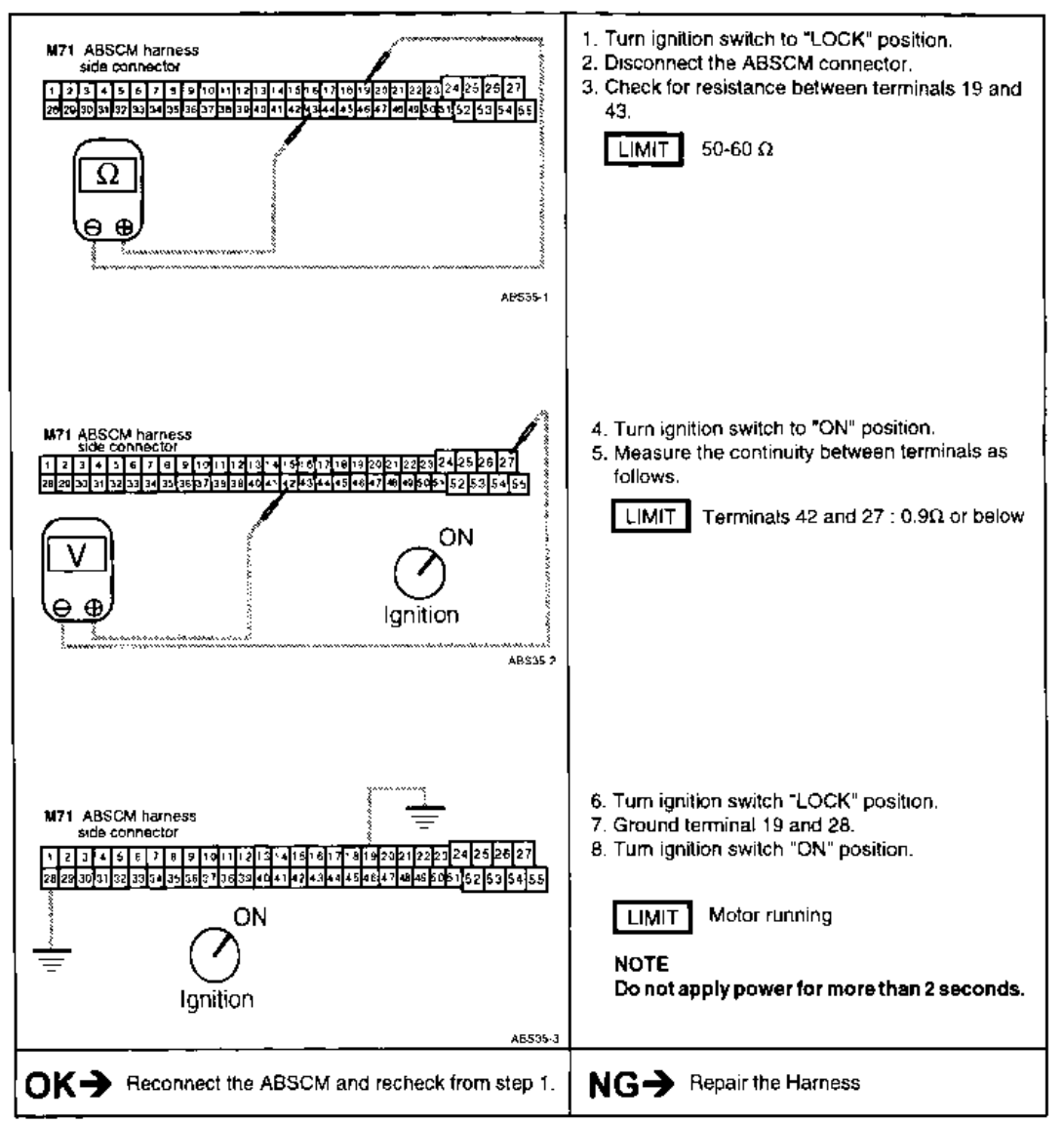
5. Apply battery voltage between terminals 1 and 4.
6. Check for continuity between terminals 2 and 3.

LIMIT Continuity

OK → Reconnect motor relay

NG → Replace the Motor pump relay

3. Check for resistance between each terminal of the ABSCM connector.

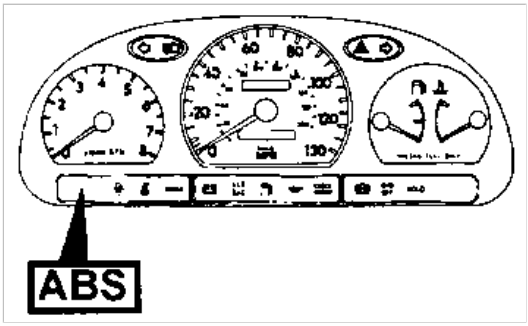


Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (ABS SRI CIRCUIT)

TROUBLESHOOTING (ABS SRI CIRCUIT)

If trouble occurs, the ABSCM lights the ABS-SRI while at the same time terminating ABS operation. At this time, the ABSCM records a diagnostic code in memory.

If the ABSCM detects a fault in the Anti-Lock Brake System, the ABSCM turns the ABS SRI on and disables the ABS. At the same time a trouble code is stored in the ABSCM memory.



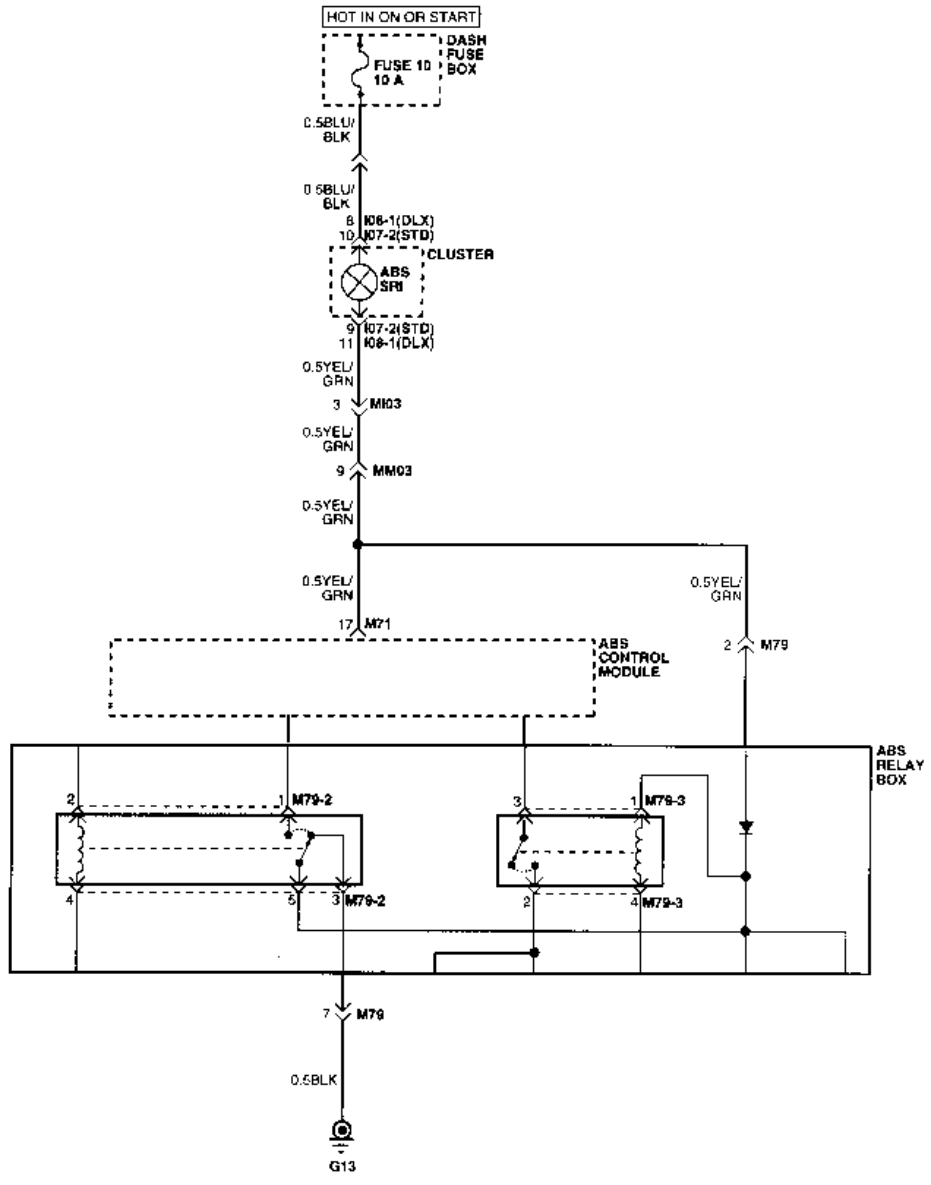
Symptom	Possible Cause
Service Reminder Indicator short to ground	a. Service Reminder Indicator

	b. Box (Fail Safe Relay) c. Fuse
Service Reminder Indicator diode not OK	
Service Reminder Indicator short to 12V	
Service Reminder Indicator open circuit	

Troubleshooting

ABS Service Reminder Indicator ON	Go to procedure 1 (below)
ABS Service Reminder Indicator OFF	Go to procedure 6 (below)

WIRING DIAGRAM

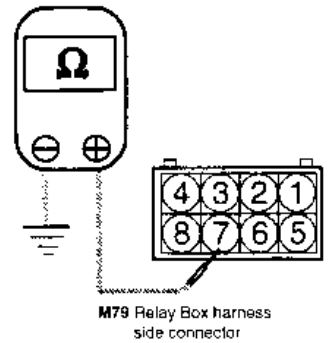


INSPECTION PROCEDURE

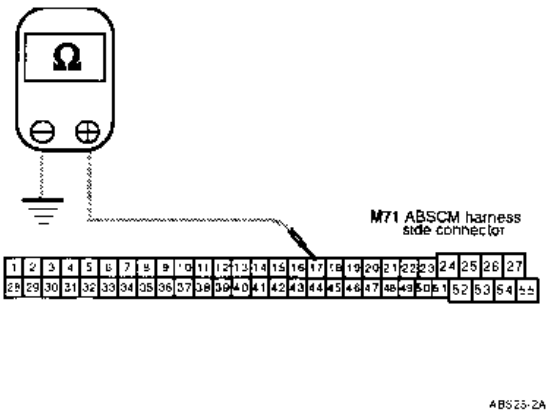
1. Check the ABS Service Reminder Indicator circuit without Relay-Box

ABS LAMP OFF	1. Disconnect the battery negative terminal. 2. Disconnect the ABSCM connector. 3. Remove the ABS Relay-Box connector, while ignition switch "LOCK". 4. Connect the battery negative (-) terminal. 5. Turn ignition switch to ON position. 6. Check the SRI condition. LIMIT Lamp OFF
OK→ 3	NG→ Goto step 4

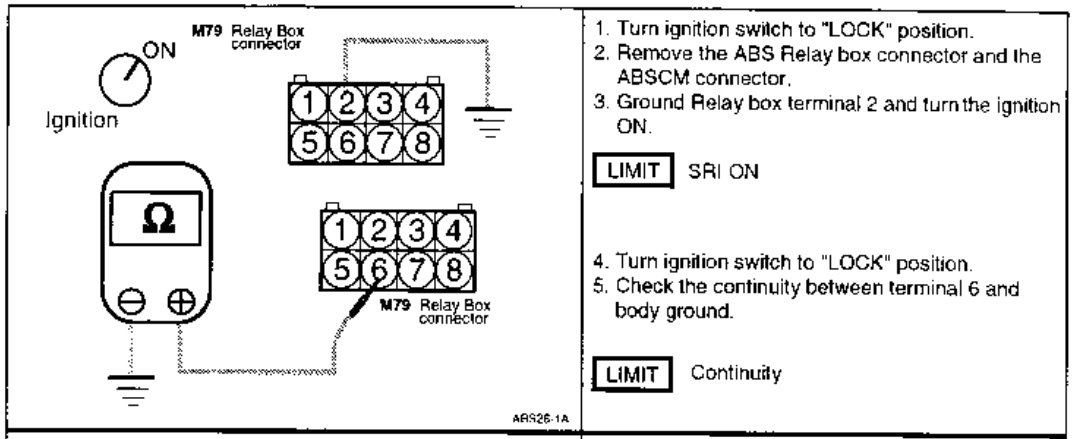
2. Check the ABS Relay-Box harness

 **M79** Relay Box harness side connector	1. Turn ignition switch to "LOCK" position. 2. Disconnect the Relay Box connector. 3. Check the continuity between the Relay-Box harness terminal 7 and body ground. LIMIT No continuity
	NG→ Repair the harness

3. Check the ABS connector harness

	1. Disconnect the battery negative terminal. 2. Disconnect the ABSCM connector. 3. Check the continuity between ABSCM connector harness pin No.17 and body ground. LIMIT No continuity
OK→ Re-connect the ABSCM and recheck from step 1.	NG→ Repair the harness

4. Check the fuse SRI Circuit



1. Turn ignition switch to "LOCK" position.
2. Remove the ABS Relay box connector and the ABSCM connector.
3. Ground Relay box terminal 2 and turn the ignition ON.

LIMIT SRI ON

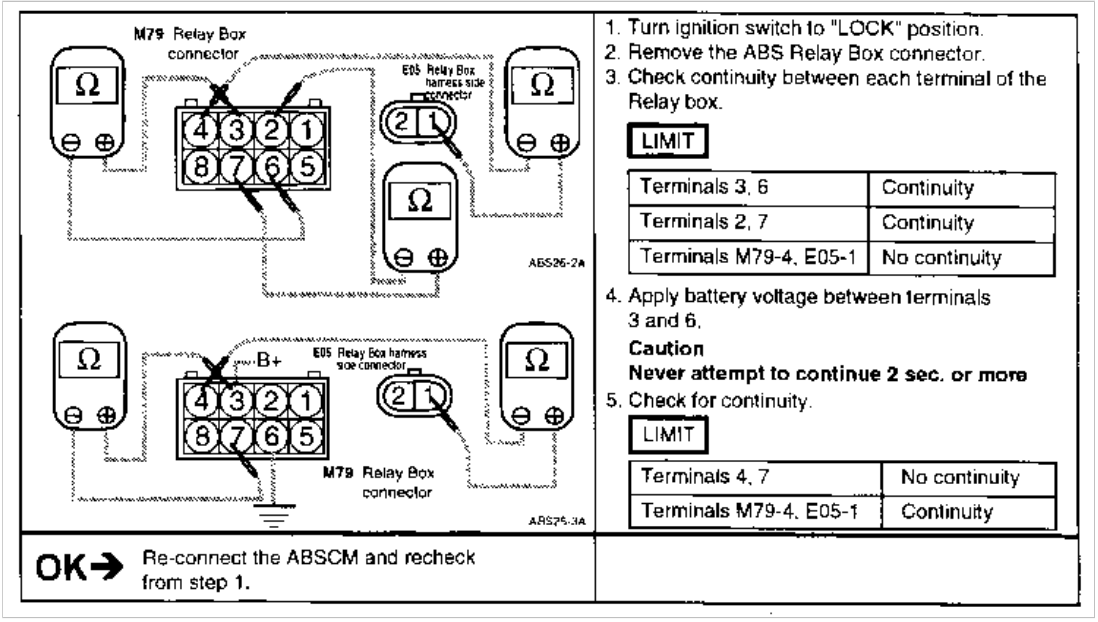
4. Turn ignition switch to "LOCK" position.
5. Check the continuity between terminal 6 and body ground.

LIMIT Continuity

OK→ 7

NG→ Repair the harness

5. Check the ABS-Relay Box (Fail safe relay)



1. Turn ignition switch to "LOCK" position.
2. Remove the ABS Relay Box connector.
3. Check continuity between each terminal of the Relay box.

LIMIT

Terminals 3, 6	Continuity
Terminals 2, 7	Continuity
Terminals M79-4, E05-1	No continuity

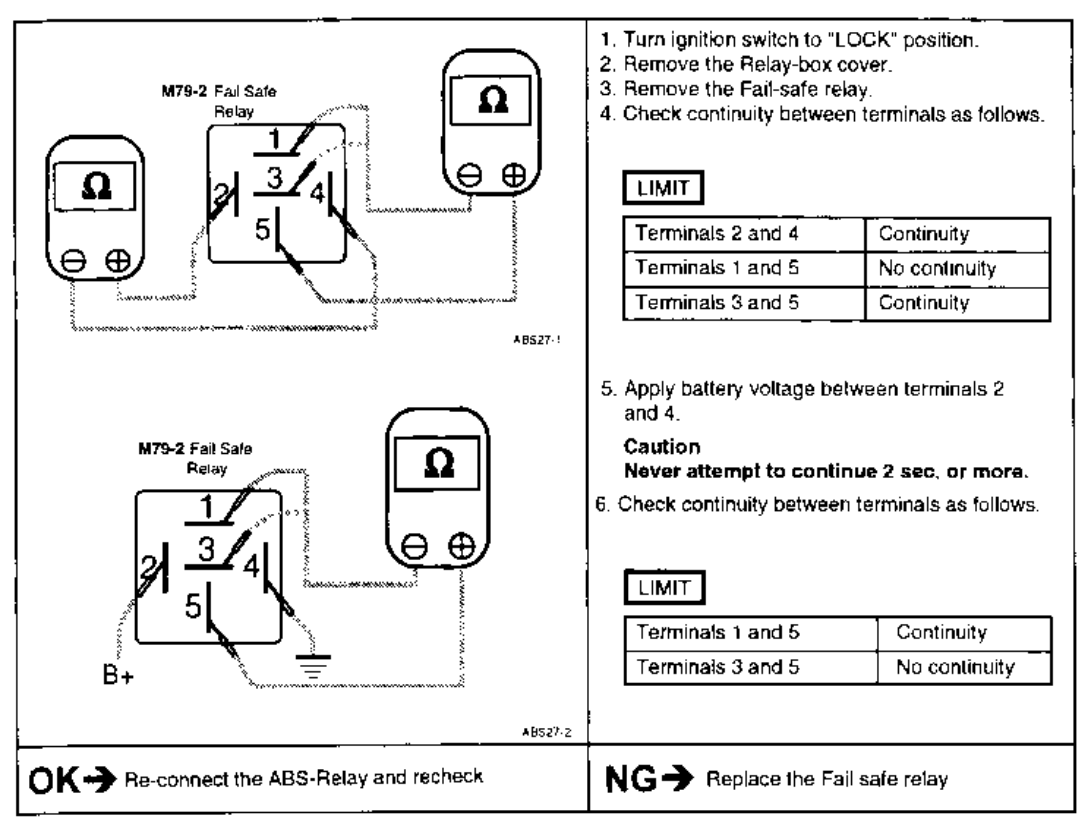
4. Apply battery voltage between terminals 3 and 6.
   Caution
   Never attempt to continue 2 sec. or more
5. Check for continuity.

LIMIT

Terminals 4, 7	No continuity
Terminals M79-4, E05-1	Continuity

OK→ Re-connect the ABSCM and recheck from step 1.

6. Check the Fail safe relay



1. Turn ignition switch to "LOCK" position.
2. Remove the Relay-box cover.
3. Remove the Fail-safe relay.
4. Check continuity between terminals as follows.

LIMIT

Terminals 2 and 4	Continuity
Terminals 1 and 5	No continuity
Terminals 3 and 5	Continuity

5. Apply battery voltage between terminals 2 and 4.

Caution
Never attempt to continue 2 sec. or more.

6. Check continuity between terminals as follows.

LIMIT

Terminals 1 and 5	Continuity
Terminals 3 and 5	No continuity

OK → Re-connect the ABS-Relay and recheck

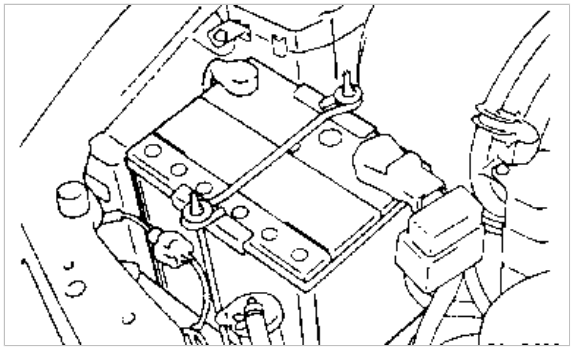
NG → Replace the Fail safe relay

Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (CIRCUIT INSPECTION)

TROUBLESHOOTING (CIRCUIT INSPECTION)

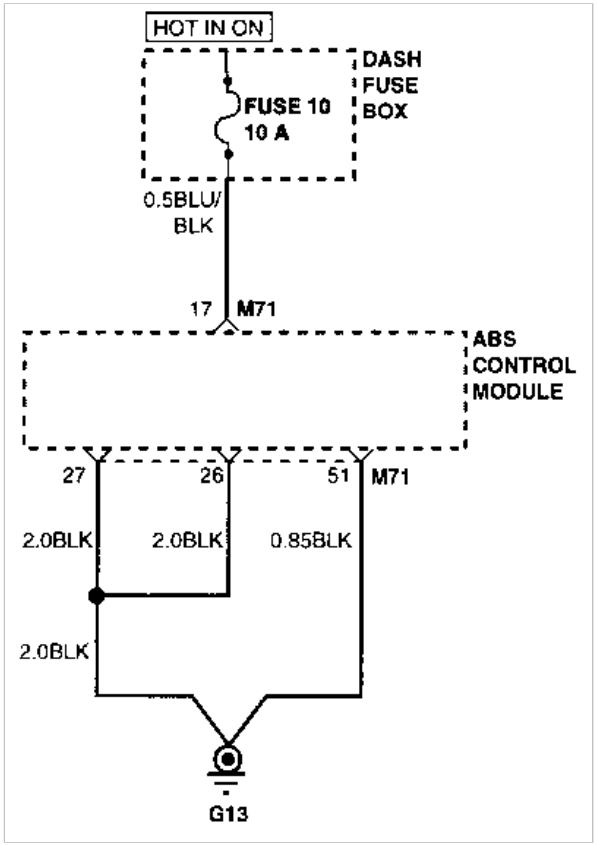
POWER SOURCE VOLTAGE

Detection of battery out of the function range for the system.



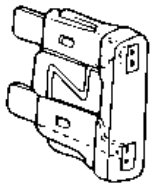
Symptom	Possible cause
ABSCM power supply voltage is 8.9V or below	a. Battery b. Charging circuit c. Harness connector between battery and ABSCM, ABSCM and body ground
ABSCM power supply voltage is 10.2V or higher	

WIRING DIAGRAM

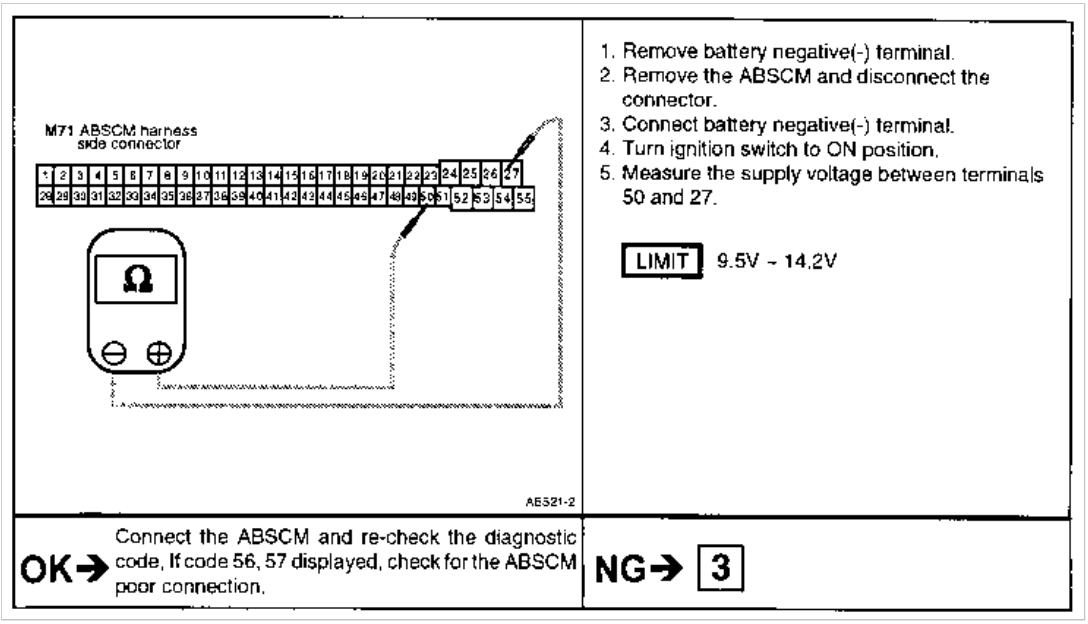


INSPECTION PROCEDURE

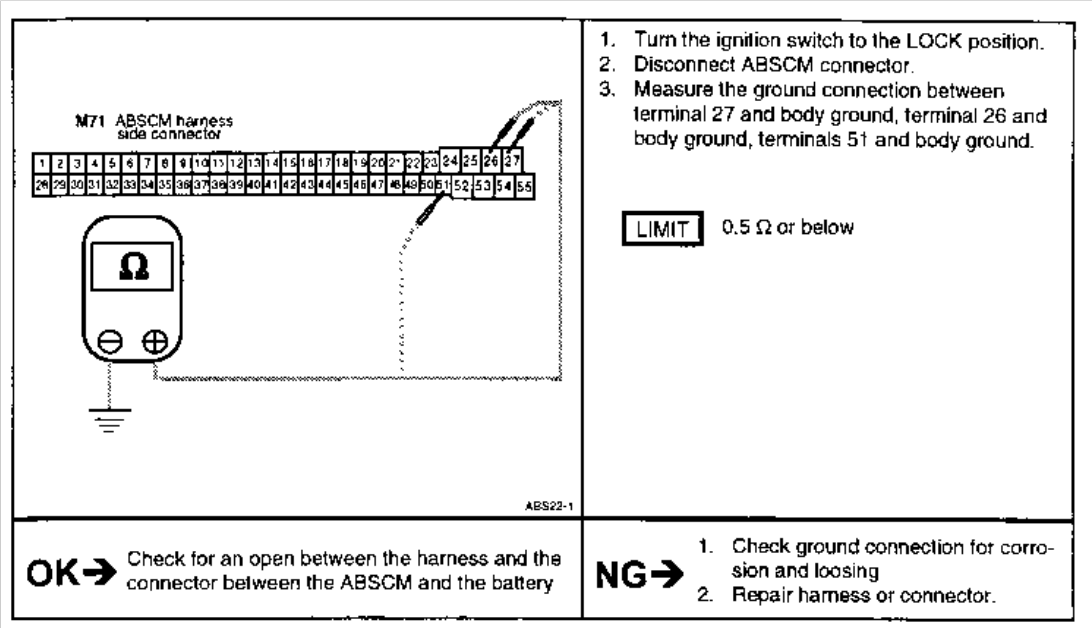
1. Check the ABSCM fuse.

 59ASD150	1. Remove the FUSE 10 and Inspect in the DASH FUSE BOX. LIMIT Continuity
OK → 2	NG → Replace Fuse 10 then recheck.

2. Check voltage between Battery (+) and GND of ABSCM connector.



3. Check continuity between the ABSCM connector GND and Body GND.

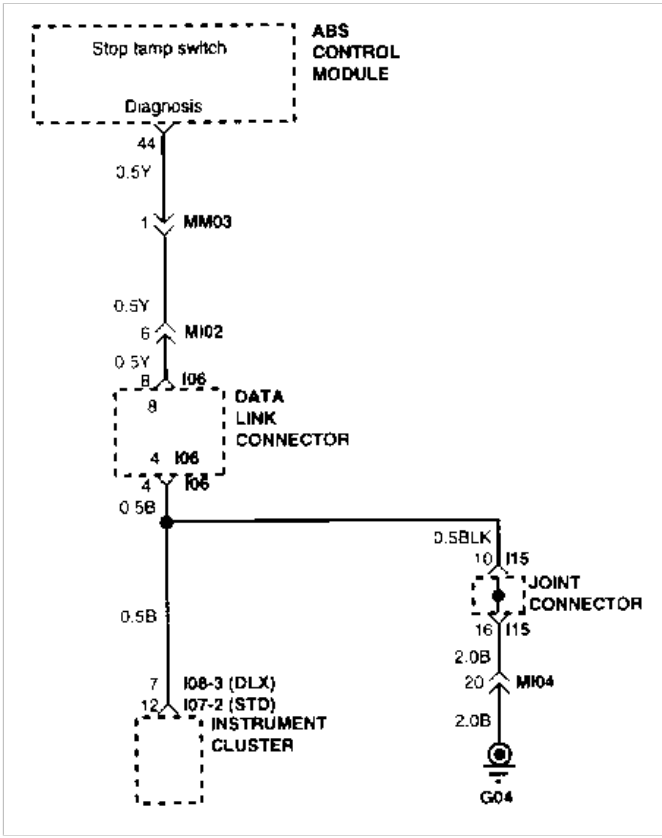


Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (DATA-LINK CIRCUIT)

TROUBLESHOOTING (DATA-LINK CIRCUIT)

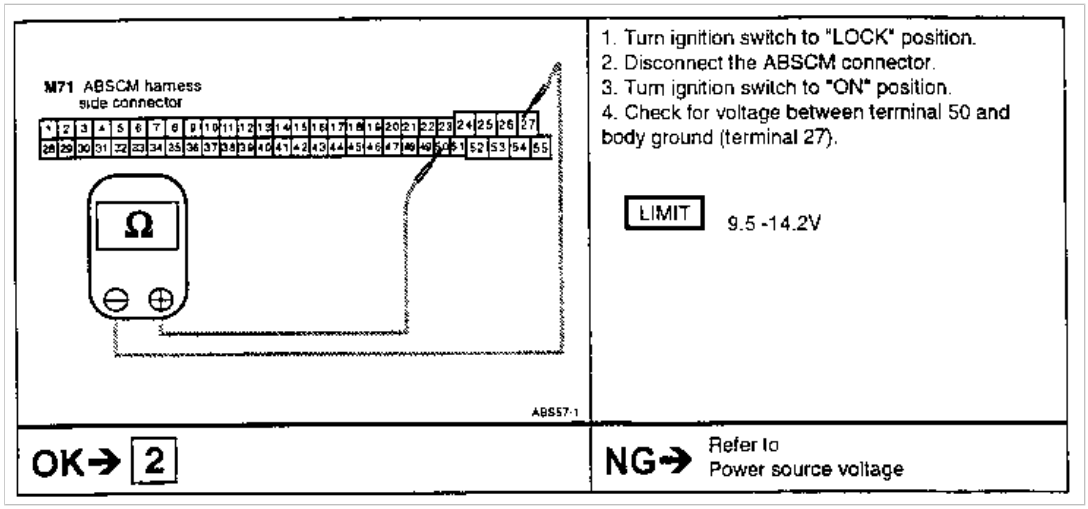
When a fault is detected the ABSCM, a code is stored in the ABSCM memory. The SCAN TOOL can be used to read the codes in the ABSCM memory.

WIRING DIAGRAM

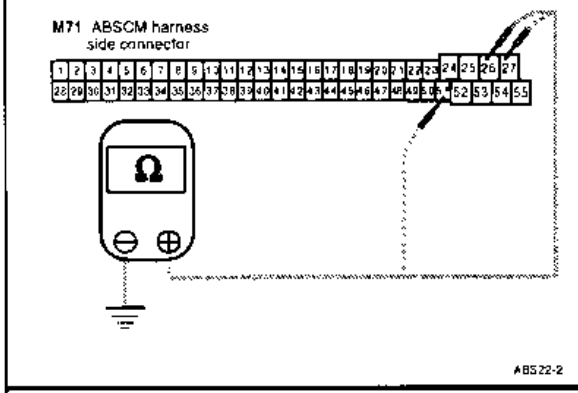


INSPECTION PROCEDURE

1. Check for voltage supply of ABSCM.



2. Check continuity between the ABSCM connector GND and Body GND.



1. Turn the ignition switch to the "LOCK" position.
2. Measure the ground connection between terminal 27 and body ground, terminal 26 and body ground, terminals 51 and body ground.

LIMIT : 0.5Ω or below

NG→
1. Check ground connection for corrosion and loosing.
2. Repair harness or connector.

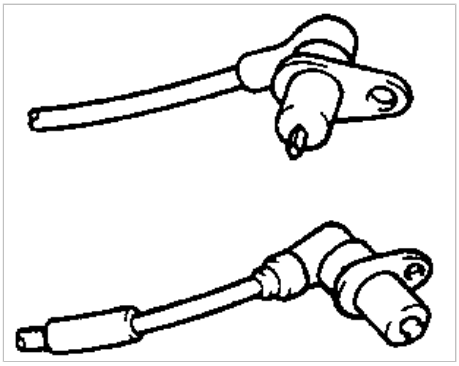
Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (SPEED SENSOR CIRCUIT - AIR GAP SYMPTOM)

TROUBLESHOOTING (SPEED SENSOR CIRCUIT - AIR GAP SYMPTOM)

At each wheel hub there is a tone wheel and an inductive sensor, which supplies the wheel speed information to the ABSCM. The sensor is comprised of a magnet and a pole piece surrounded by a coil. When the tone wheel rotates adjacent to the sensor pole piece, an alternating current signal is generated in the coil with a frequency proportional to wheel speed.

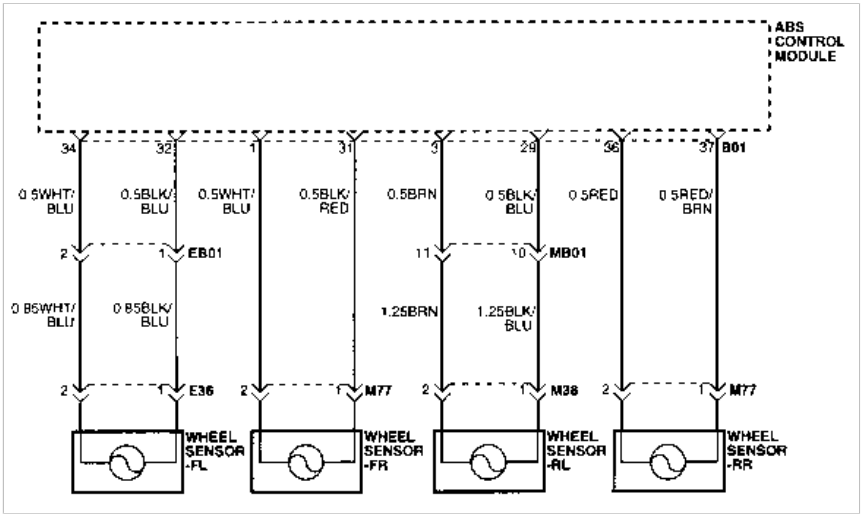
A special integrated circuit in the ABSCM translates the generated AC signal to a square wave.

This square wave is used by the microprocessor to operate the ABS.



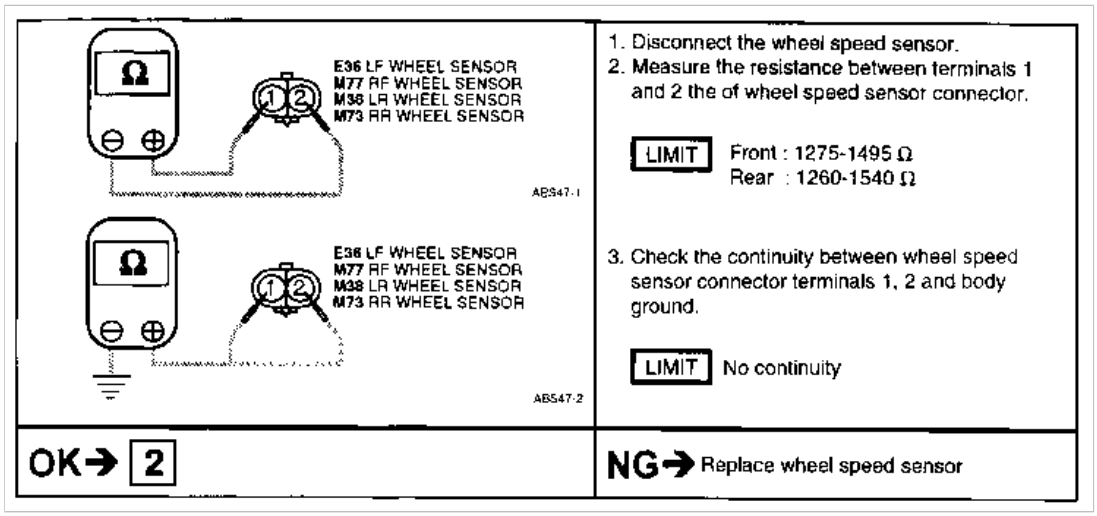
SRI flash pattern	Symptom	Possible Cause
31	Air gap ON sensor LF incorrect	a. Wheel speed sensor air gap b. Wheel speed sensor c. Harness or connector between the wheel speed sensor and ABSCM d. ABSCM
32	Air gap ON sensor RF incorrect	
33	Air gap ON sensor LR incorrect	
34	Air gap ON sensor RR incorrect	

WIRING DIAGRAM

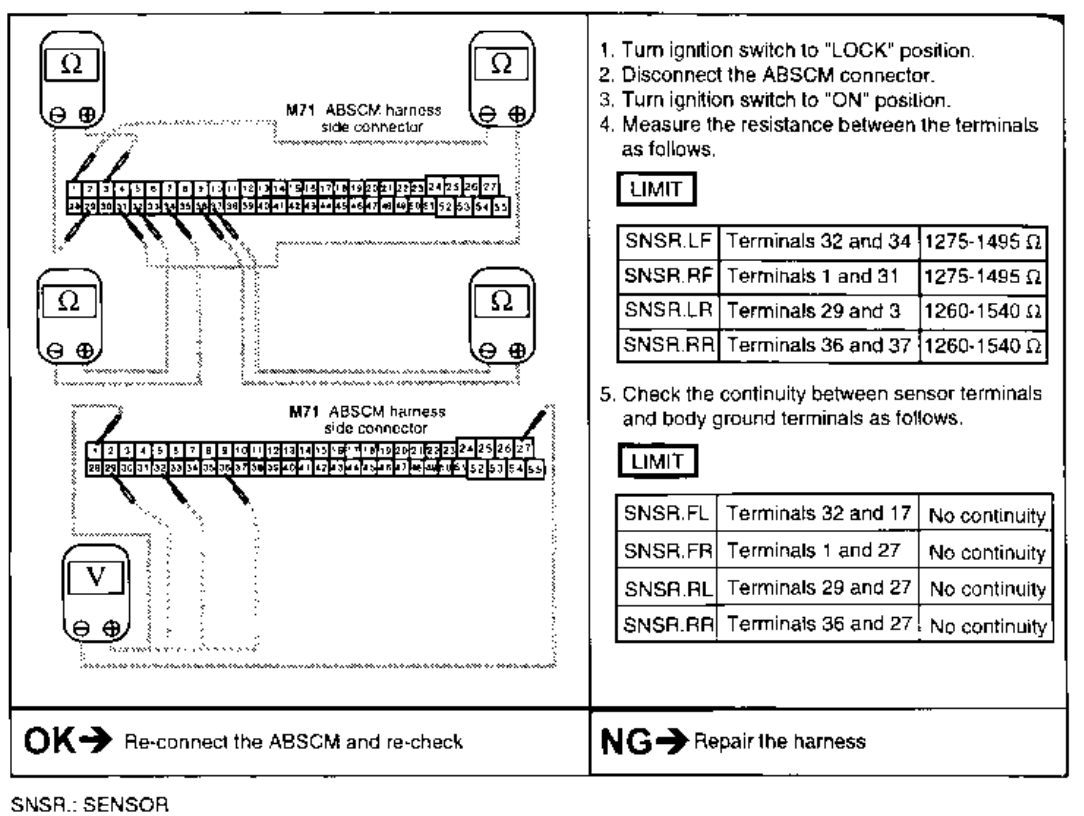


INSPECTION PROCEDURE

1. Check Wheel Speed Sensor



2. Check the harness and the connector between the ABSCM and each wheel speed sensor



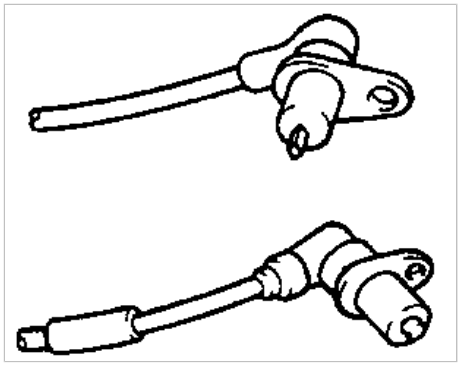
Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (SPEED SENSOR CIRCUIT - SHORT GND)

TROUBLESHOOTING (SPEED SENSOR CIRCUIT - SHORT GND)

At each wheel hub there is a tone wheel and an inductive sensor, which supplies the wheel speed information to the ABSCM. The sensor is comprised of a magnet and a pole piece surrounded by a coil. When the tone wheel rotates adjacent to the sensor pole piece, an alternating current signal is generated in the coil with a frequency proportional to wheel speed.

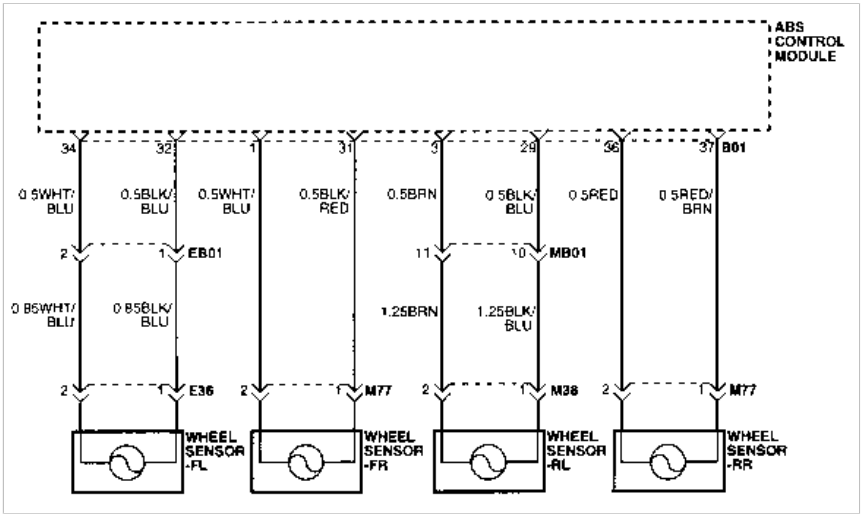
A special integrated circuit in the ABSCM translates the generated AC signal to a square wave.

This square wave is used by the microprocessor to operate the ABS.



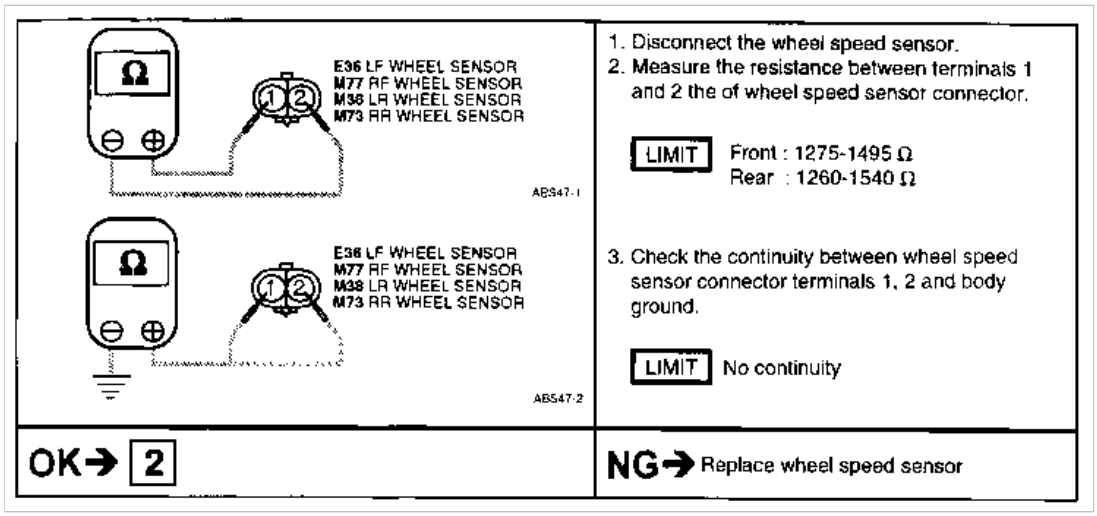
SRI flash pattern	Symptom	Possible Cause
66	Sensor LF circuit short to ground	a. Wheel speed sensor b. Harness or connector between the wheel speed sensor and ABSCM c. ABSCM
67	Sensor RF circuit short to ground	
68	Sensor LR circuit short to ground	
69	Sensor RR circuit short to ground	

WIRING DIAGRAM

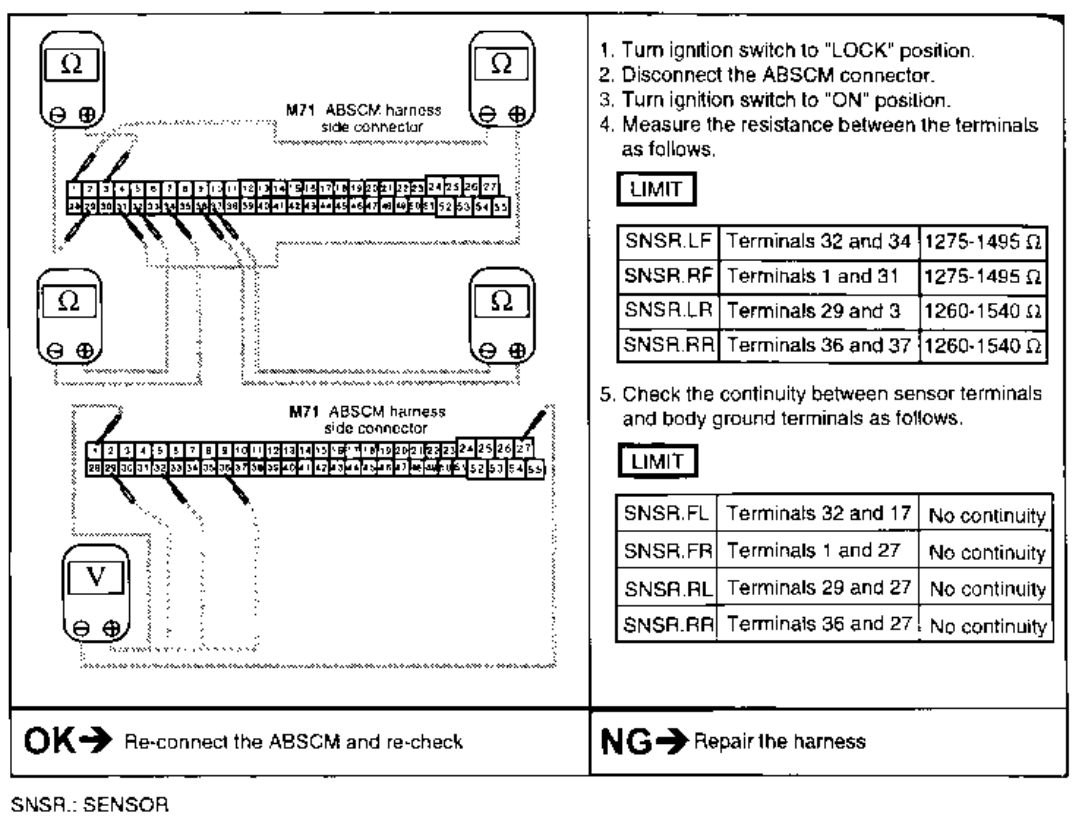


INSPECTION PROCEDURE

1. Check Wheel Speed Sensor



2. Check the harness and the connector between the ABSCM and each wheel speed sensor



SNSR.: SENSOR

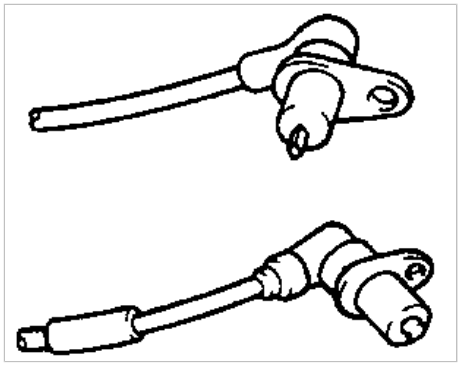
Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (SPEED SENSOR CIRCUIT - SHORT TO B+)

TROUBLESHOOTING (SPEED SENSOR CIRCUIT - SHORT TO B+)

At each wheel hub there is a tone wheel and an inductive sensor, which supplies wheel speed information to the ABSCM. The sensor is comprised of a magnet and a pole piece surrounded by a coil. When the tone wheel rotates adjacent to the sensor pole piece, an alternating current signal is generated in the coil with a frequency proportional to wheel speed.

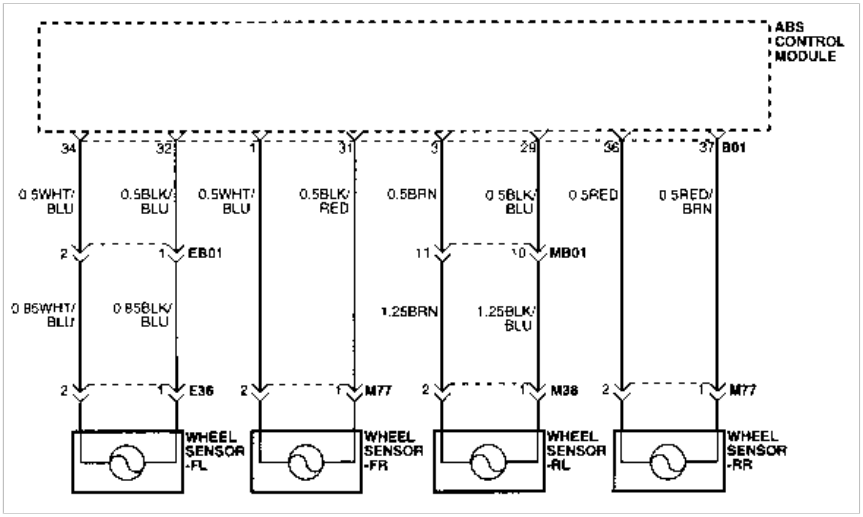
A special integrated circuit in the ABSCM translates the generated AC signal to a square wave.

This square wave is used by the microprocessor to operate the ABS.



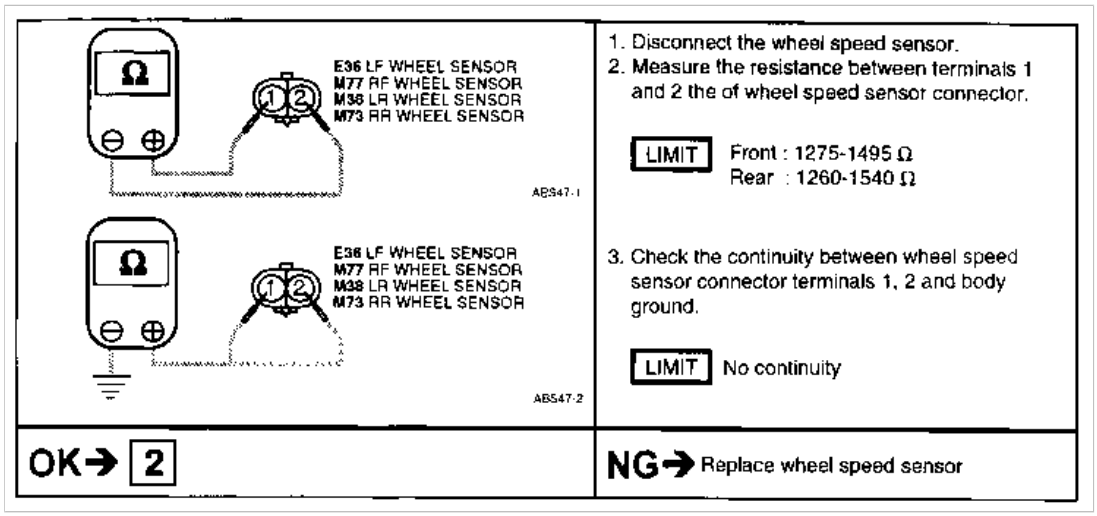
SRI flash pattern	Symptom	Possible Cause
62	Sensor LF circuit open or short to 12V	a. Wheel speed sensor b. Harness or connector between the wheel speed sensor and ABSCM c. ABSCM
63	Sensor RF circuit open or short to 12V	
64	Sensor LR circuit open or short to 12V	
65	Sensor RR circuit open or short to 12V	

WIRING DIAGRAM

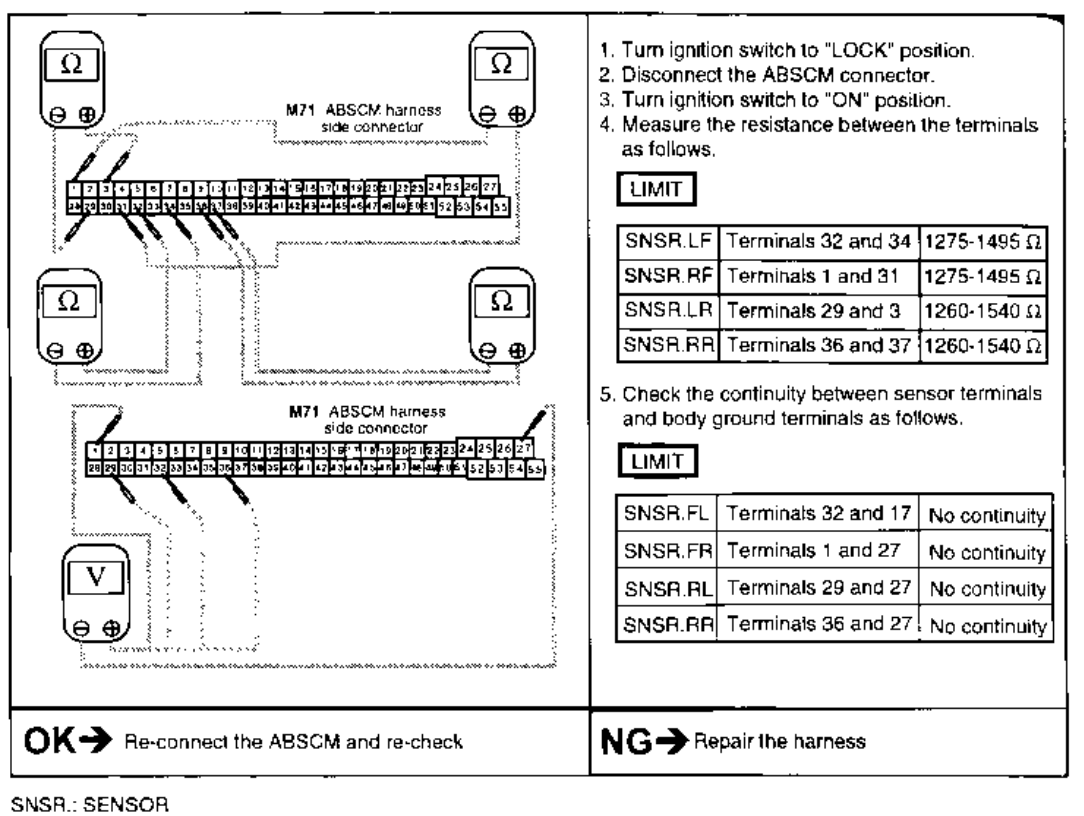


INSPECTION PROCEDURE

1. Check Wheel Speed Sensor.



2. Check the harness and connector between the ABSCM and each wheel speed sensor.



SNSR.: SENSOR

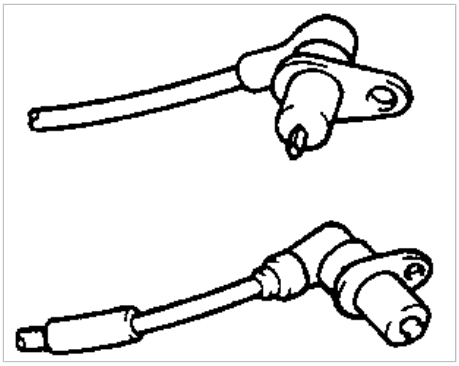
Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (SPEED SENSOR CIRCUIT - SPEED JUMP SYMPTOM)

TROUBLESHOOTING (SPEED SENSOR CIRCUIT - SPEED JUMP SYMPTOM)

At each wheel hub there is a tone wheel and an inductive sensor, which supplies the wheel speed information to the ABSCM. The sensor is comprised of a magnet and a pole piece surrounded by a coil. When the tone wheel rotates adjacent to the sensor pole piece, an alternating current signal is generated in the coil with a frequency proportional to wheel speed.

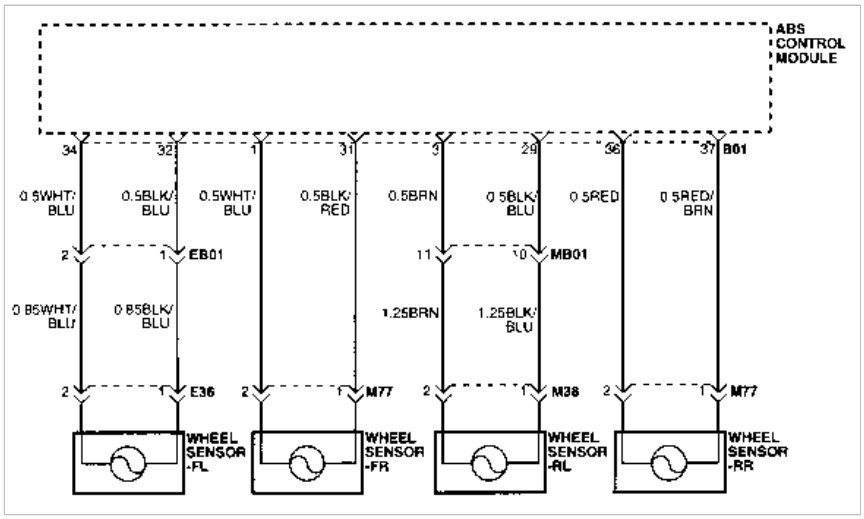
A special integrated circuit in the ABSCM translates the generated AC signal to a square wave.

This square wave is used by the microprocessor to operate the ABS.



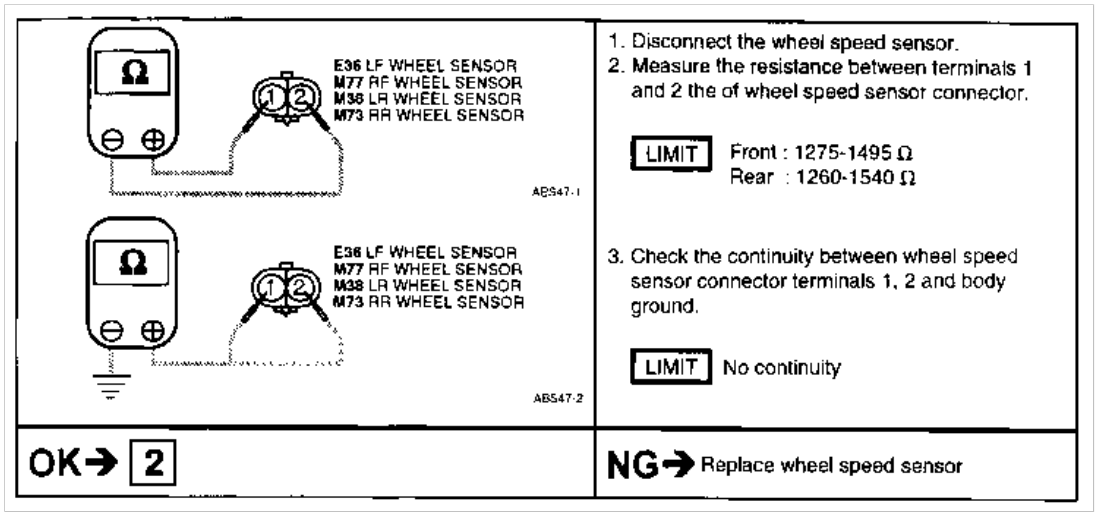
SRI flash pattern	Symptom	Possible Cause
71	Speed jump on the exciter wheel FL	a. Tone wheel b. Wheel speed sensor c. Harness or connector between the wheel speed sensor and the ABSCM d. ABSCM
72	Speed jump on the exciter wheel FR	
73	Speed jump on the exciter wheel RL	
74	Speed jump on the exciter wheel RR	
19	Check the tone wheels	a. Tone wheel b. Wheel speed sensor and harness

WIRING DIAGRAM

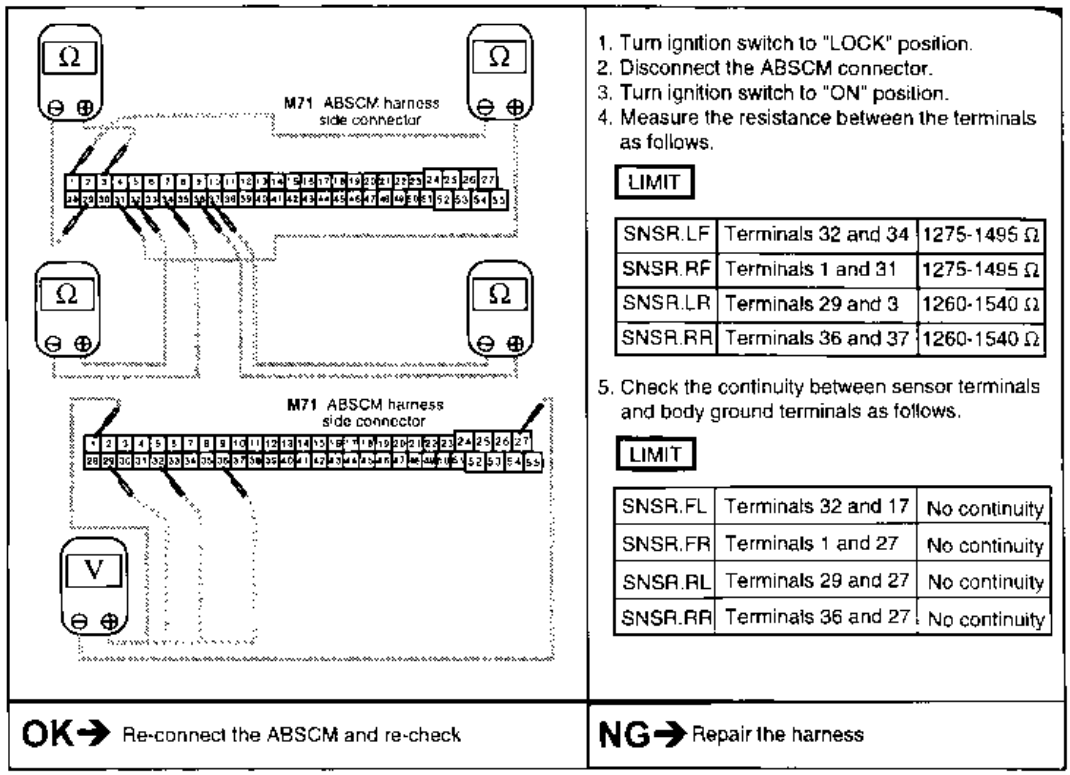


INSPECTION PROCEDURE

1. Check Wheel Speed Sensor



2. Check the harness and the connector between the ABSCM and each wheel speed sensor



1. Turn ignition switch to "LOCK" position.
2. Disconnect the ABSCM connector.
3. Turn ignition switch to "ON" position.
4. Measure the resistance between the terminals as follows.

LIMIT

SNSR.LF	Terminals 32 and 34	1275-1495 Ω
SNSR.RF	Terminals 1 and 31	1275-1495 Ω
SNSR.LR	Terminals 29 and 3	1260-1540 Ω
SNSR.RR	Terminals 36 and 37	1260-1540 Ω

5. Check the continuity between sensor terminals and body ground terminals as follows.

LIMIT

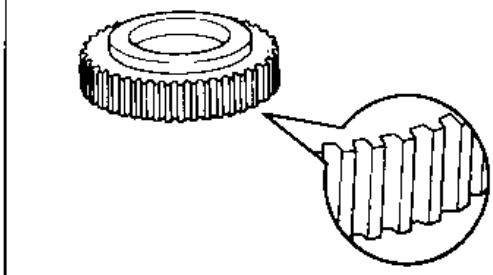
SNSR.FL	Terminals 32 and 17	No continuity
SNSR.FR	Terminals 1 and 27	No continuity
SNSR.RL	Terminals 29 and 27	No continuity
SNSR.RR	Terminals 36 and 27	No continuity

OK → Re-connect the ABSCM and re-check

NG → Repair the harness

SNSR.: SENSOR

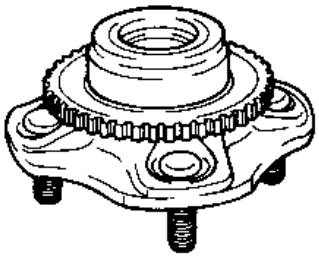
3. Check tone wheel and sensor installation



Front

- o Remove the front tone wheel
- o Check the tone wheel teeth for missing or scratches.

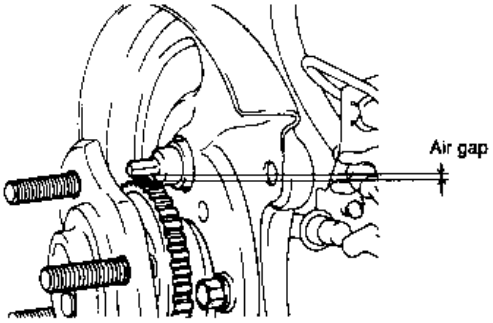
LIMIT Tone wheel OK



Rear

- o Check the tone wheel teeth for missing or scratches.

LIMIT Tone wheel OK



ALL

- o Check the air gap between the wheel speed sensors and the tone wheel teeth.

LIMIT FRONT : 0.2-1.1 mm(0.008-0.043in.)
REAR : 0.2-1.2 mm(0.008-0.047in.)

OK→ Re-connect the ABSCM and re-check

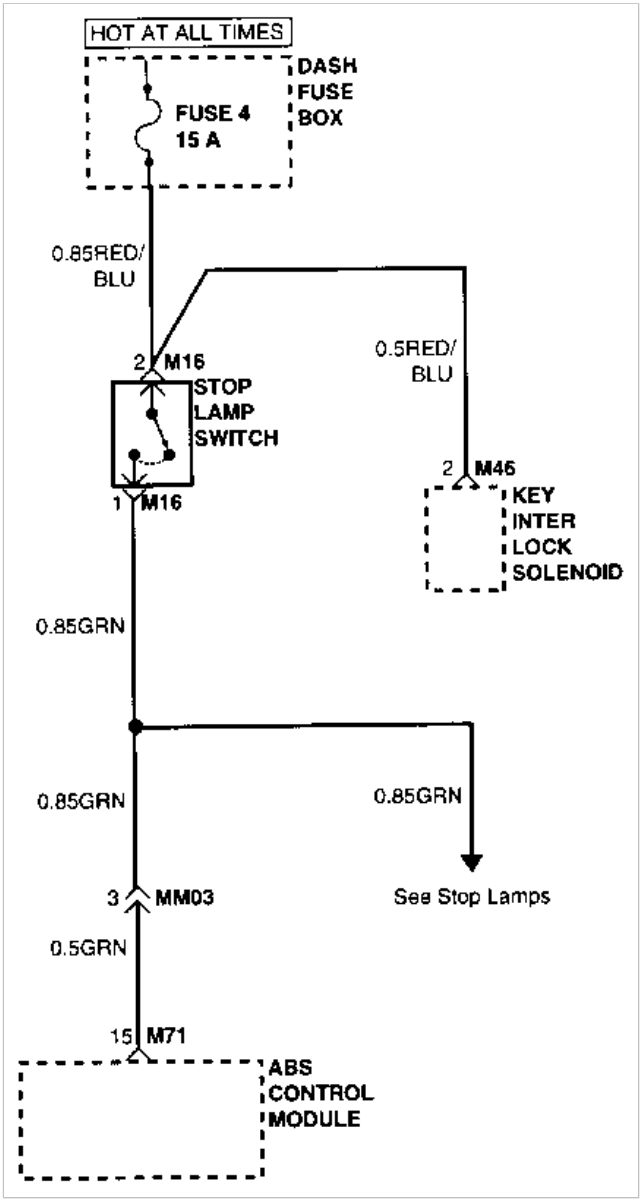
NG→ Replace the components.

Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (STOP LAMP SWITCH CIRCUIT)

TROUBLESHOOTING (STOP LAMP SWITCH CIRCUIT)

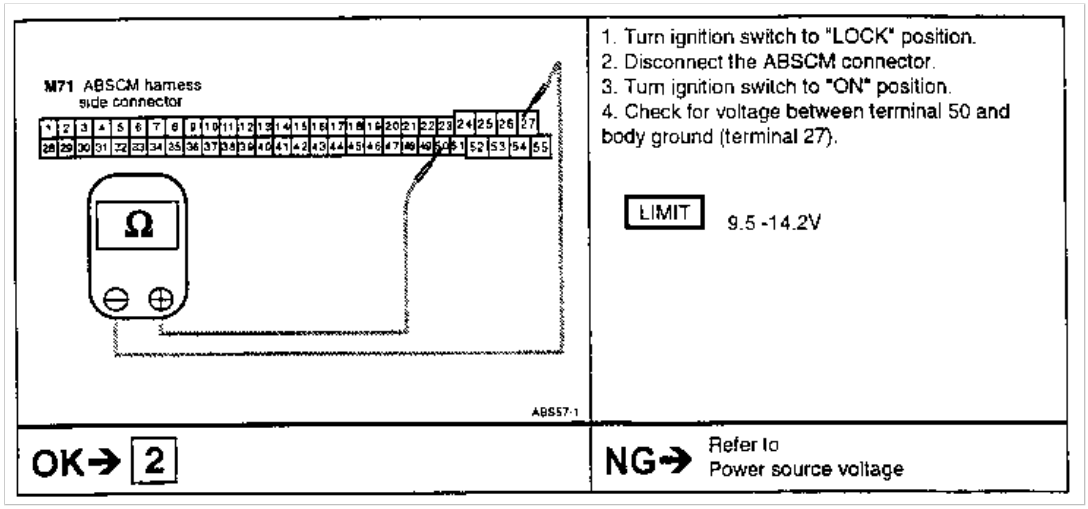
The stop lamp switch senses whether the brake pedal is depressed or released, and sends the signal to the ABSCM.

WIRING DIAGRAM



INSPECTION PROCEDURE

1. Check the stop lamp switch circuit



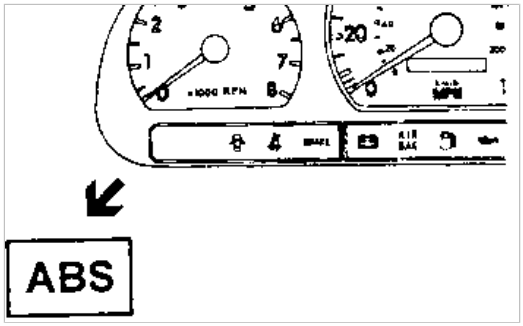
Brake Systems > Anti-lock Brake System > TROUBLESHOOTING (SYSTEM DIAGNOSIS STEP)

TROUBLESHOOTING (SYSTEM DIAGNOSIS STEP)

INDICATOR CHECK

When the ignition switch is turned on, check that the ABS SRI goes ON for 6 seconds.

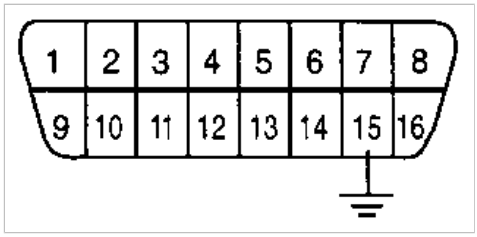
If the SRI is not illuminated immediately after ignition on, the ABS fail safe relay may be at fault.



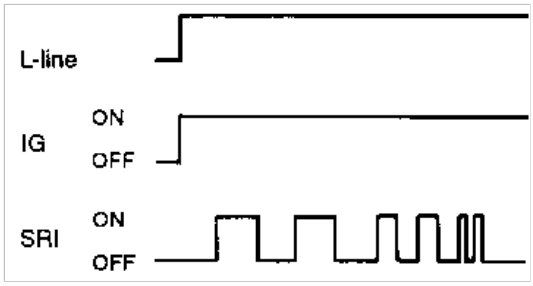
SRI CODE CHECK

With the ignition switch turned ON and "L" terminal of data link connector shorted to ground, diagnostic trouble code No. can be checked, if faults are detected, with reading of SRI lamp flash.

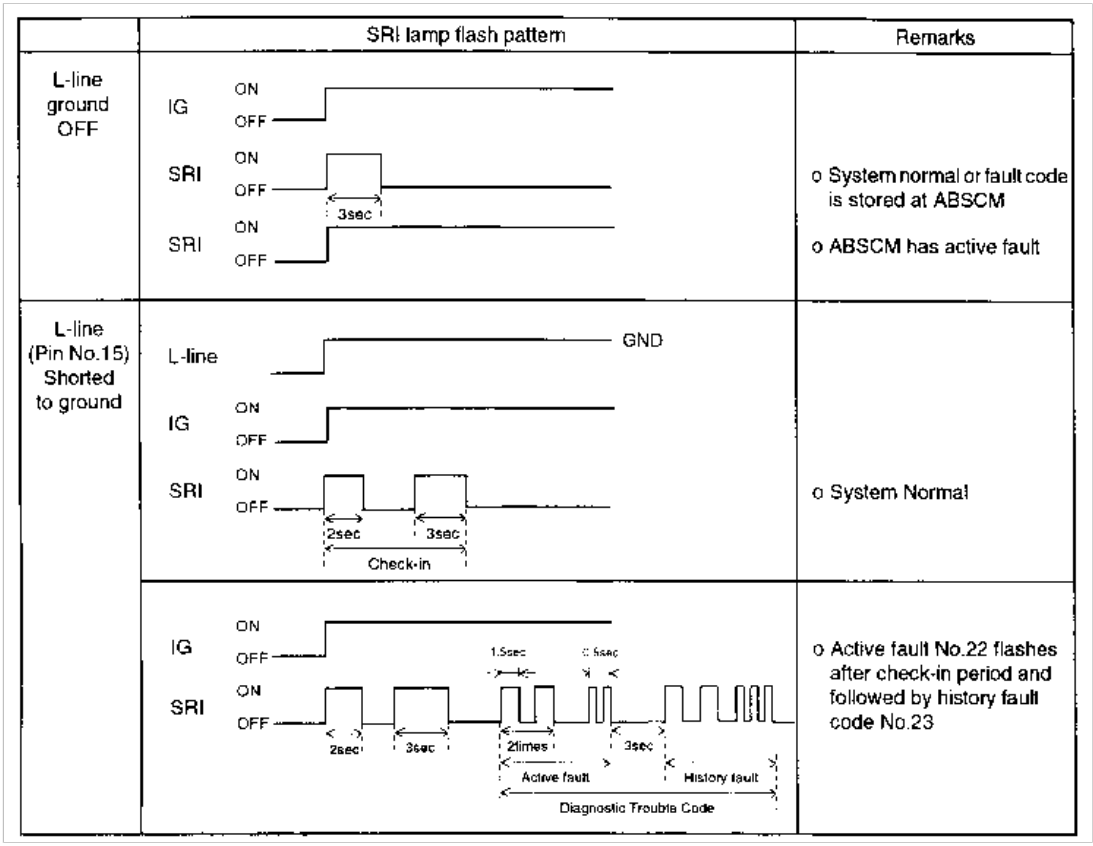
1. Ground the "L" terminal (Pin No. 15) of data link connector with suitable wire, otherwise fault code cannot be accessed.



2. Turn the ignition switch on.
3. SRI lamp will be illuminated for 2 seconds and followed by 3 seconds illumination meaning "Check-in" signal then read the following "Diagnostic trouble code".
4. First digit of Diagnostic trouble code is determined by the number of long flashes (1.5 sec.) and after the following 2 seconds break second digit is determined by the number of short flashes (0.5 sec.)
5. Once the SRI lamp flashing is completed, next active trouble code or history trouble code stored at ABSCM will be followed after 3 sec. break while the "L" terminal is shorted to ground or the ignition switch is ON.



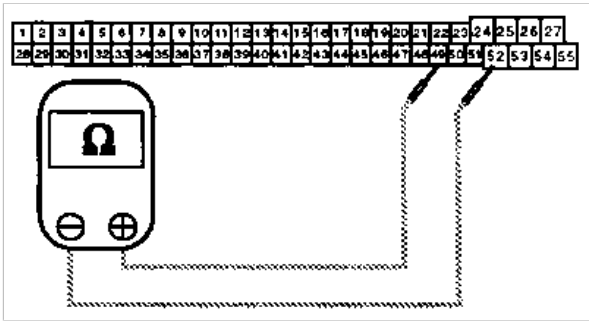
6. Diagnostic Trouble code will be retained in the ABSCM until the ignition has been switched ON and the vehicle speed exceeded 8km/h 20 times.



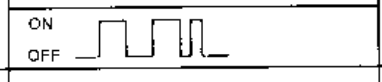
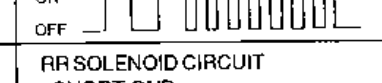
CONNECTOR CHECK

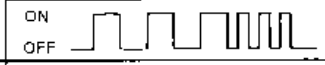
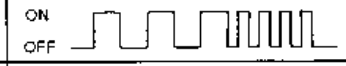
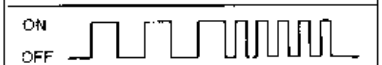
1. Remove the battery negative (-) terminal.
2. Disconnect the connectors and check that the terminals follow the troubleshooting procedure.

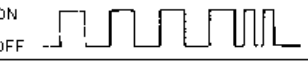
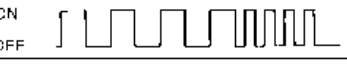
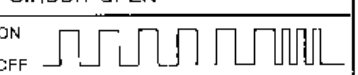
When you check terminals, be sure to use a small pin so as not to damage the connector terminals.

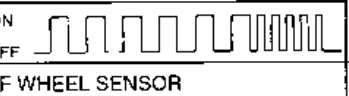
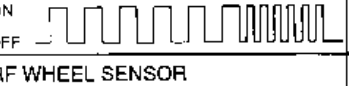
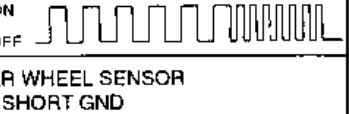
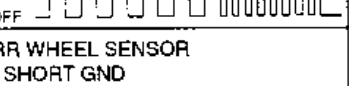
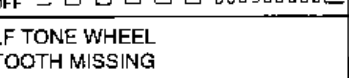
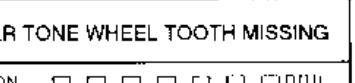
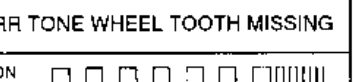
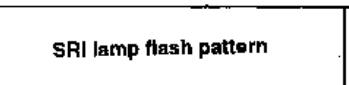


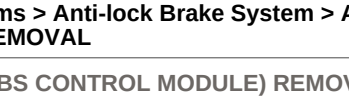
Diagnostic Trouble Code Chart

Diagnostic trouble code No.	SRI lamp flash pattern	Diagnosis item	Check Item
19	DEFECTIVE TONE WHEEL 	CHECK THE TONE WHEELS	Check for a defective tone wheel on a wheel.
21	LF SOLENOID CIRCUIT - SHORT BATT 	LEFT FRONT SOLENOID	Detection for short circuit to +12 Volt for the left front solenoid.
22	LF SOLENOID CIRCUIT - SHORT GND 	LEFT FRONT SOLENOID	Detection for open circuit or short circuit to GND for the left front solenoid.
23	RF SOLENOID CIRCUIT - SHORT BATT 	RIGHT FRONT SOLENOID	Detection for short circuit to +12 Volt for the right front solenoid.
24	RF SOLENOID CIRCUIT - SHORT GND 	RIGHT FRONT SOLENOID	Detection for open circuit or short circuit to GND for the right front solenoid.
25	LR SOLENOID CIRCUIT - SHORT BATT 	LEFT REAR SOLENOID	Detection for short circuit to +12 Volt for the left rear solenoid.
26	LR SOLENOID CIRCUIT - SHORT GND 	LEFT REAR SOLENOID	Detection for open circuit or short circuit to GND for the left rear solenoid.
27	RR SOLENOID CIRCUIT - SHORT BATT 	RIGHT REAR SOLENOID	Detection for short circuit to +12 Volt for the right rear solenoid.
28	RR SOLENOID CIRCUIT - SHORT GND 	RIGHT REAR SOLENOID	Detection for open circuit or short circuit to GND for the right rear solenoid.

Diagnostic trouble code No.	SRI lamp flash pattern	Diagnosis item	Check Item
31	LF WHEEL SPEED SENSOR AIR GAP 	LEFT FRONT SENSOR	Detection for the air gap of the tone wheel. This detection will be activated if all wheel speeds are zero and the ABS-function is not active.
32	RF WHEEL SPEED SENSOR AIR GAP 	RIGHT FRONT SENSOR	Detection for the air gap of the tone wheel. This detection will be activated if all wheel speeds are zero and the ABS-function is not active.
33	LR WHEEL SPEED SENSOR AIR GAP 	LEFT REAR SENSOR	Detection for the air gap of the tone wheel. This detection will be activated if all wheel speeds are zero and the ABS-function is not active.
34	RR WHEEL SPEED SENSOR AIR GAP 	RIGHT REAR SENSOR	Detection for the air gap of the tone wheel. This detection will be activated if all wheel speeds are zero and the ABS-function is not active.
35	MOTOR PUMP 	MOTOR PUMP	Check for faulty or seized up of motor pump.
36	MOTOR PUMP RELAY - SHORT GND 	MOTOR RELAY CIRCUIT	Detection for a open circuit or a short circuit to GND from the motor pump relay.
37	MOTOR PUMP RELAY - SHORT BATT 	MOTOR RELAY CIRCUIT	Detection for a short circuit to +12 Volt from the motor pump relay.
38	MOTOR PUMP CIRCUIT - SHORT BATT 	PUMP MOTOR	Detection for a short circuit at the motor pump
39	MOTOR PUMP CIRCUIT - SHORT GND 	PUMP MOTOR	Detection for a short circuit to GND at the motor pump
41	FAIL SAFE RELAY CIRCUIT - SHORT 	FAIL SAFE RELAY	Fail safe relay contacts are short circuit.

Diagnostic trouble code No.	SRI lamp flash pattern	Diagnosis item	Check Item
42	FAIL SAFE RELAY CIRCUIT - OPEN ON OFF 	FAIL SAFE RELAY	Fail safe relay contacts are open circuit
43	FAIL SAFE RELAY COIL ON OFF 	FAIL SAFE RELAY COIL	The current from the fail safe relay is too high or too low
44	ABS SRI CIRCUIT - SHORT GND ON OFF 	SERVICE REMINDER INDICATOR	Detection of a short circuit of the Service Reminder Indicator (Permanently on)
45	ABS SRI DIODE - OPEN ON OFF 	SERVICE REMINDER INDICATOR DIODE	Detection for a open circuit of the diode for the Service Reminder Indicator ABS.
54	ABS SRI CIRCUIT - SHORT BATT ON OFF 	SERVICE REMINDER INDICATOR	Detection for a short circuit to +12V of the Service Reminder Indicator
55	ABS SRI CIRCUIT - OPEN ON OFF 	SERVICE REMINDER INDICATOR	Detection for a open circuit of the Service Reminder Indicator ABS.
56	BATTERY VOLTAGE - LOW ON OFF 	BATTERY VOLTAGE	Battery voltage out of the function range (Under voltage) for the system.
57	BATTERY VOLTAGE - HIGH ON OFF 	BATTERY VOLTAGE	Battery voltage out of the function range (Over voltage) for the system.
62	LF WHEEL SENSOR - CIRCUIT OPEN ON OFF 	LEFT FRONT SENSOR CIRCUIT	Sensor open circuit or short to 12 Volt detection for the left front wheel
63	RF WHEEL SENSOR - CIRCUIT OPEN ON OFF 	RIGHT FRONT SENSOR CIRCUIT	Sensor open circuit or short to 12 Volt detection for the right front wheel.

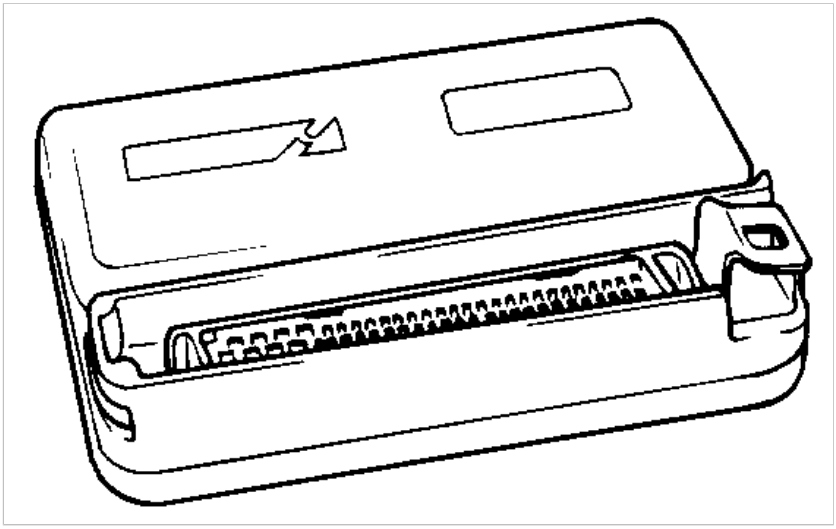
Diagnostic trouble code No.	SRI lamp flash pattern	Diagnosis item	Check Item
64	LR WHEEL SENSOR - CIRCUIT OPEN ON / OFF 	LEFT REAR SENSOR CIRCUIT	Sensor open circuit or short to 12 Volt detection for the left rear wheel.
65	RR WHEEL SENSOR - CIRCUIT OPEN ON / OFF 	RIGHT REAR SENSOR CIRCUIT	Sensor open circuit or short to 12 Volt detection for the right rear wheel.
66	LF WHEEL SENSOR - SHORT GND ON / OFF 	LEFT FRONT SENSOR CIRCUIT	Sensor short to GND detection for the left front wheel
67	RF WHEEL SENSOR - SHORT GND ON / OFF 	RIGHT FRONT SENSOR CIRCUIT	Sensor short to GND detection for the right front wheel.
68	LR WHEEL SENSOR - SHORT GND ON / OFF 	LEFT REAR SENSOR CIRCUIT	Sensor short to GND detection for the left rear wheel.
69	RR WHEEL SENSOR - SHORT GND ON / OFF 	RIGHT REAR SENSOR CIRCUIT	Sensor short to GND detection for the right rear wheel.
71	LF TONE WHEEL TOOTH MISSING ON / OFF 	LEFT FRONT TONE WHEEL	Detection for missing teeth on the tone wheel or speed jumps over-100g on the left front wheel.
72	RF TONE WHEEL TOOTH MISSING ON / OFF 	RIGHT FRONT TONE WHEEL	Detection for missing teeth on the tone wheel or speed jumps over-100g on the right front wheel.
73	LR TONE WHEEL TOOTH MISSING ON / OFF 	LEFT REAR TONE WHEEL	Detection for missing teeth on the tone wheel or speed jumps over-100g on the left rear wheel.
74	RR TONE WHEEL TOOTH MISSING ON / OFF 	RIGHT REAR TONE WHEEL	Detection for missing teeth on the tone wheel or speed jumps over -100g on the right rear wheel.

Diagnostic trouble code No.	SRI lamp flash pattern	Diagnosis item	Check Item
77	ABS CONTROL MODULE ON / OFF 	ABSCM ERROR	Check for ABSCM (ABS Control module) error.

Brake Systems > Anti-lock Brake System > Anti-Lock Braking System Control Module > ABSCM (ABS CONTROL MODULE) REMOVAL

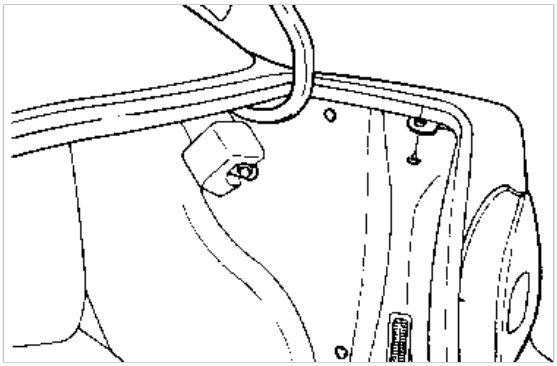
ABSCM (ABS CONTROL MODULE) REMOVAL

ABSCM (ABS Control Module)

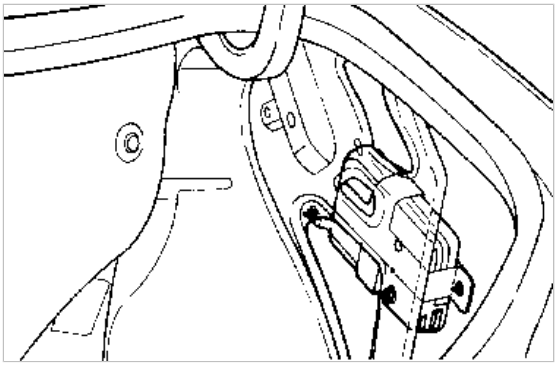


REMOVAL

1. Remove the right luggage side trim.

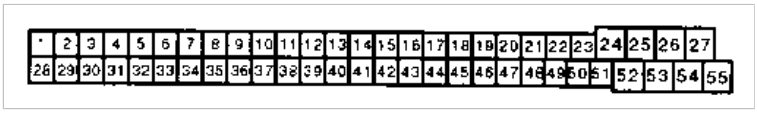


2. Remove the ABSCM mounting bolts and ABSCM.



Brake Systems > Anti-lock Brake System > Anti-Lock Braking System Control Module > ABSCM CONNECTOR (M71, ABSCM HARNESS SIDE CONNECTOR)

ABSCM CONNECTOR (M71, ABSCM HARNESS SIDE CONNECTOR)



PIN NO	PLUG ASSIGNMENT	I/O
1	SENSOR RIGHT FRONT	I
3	SENSOR LEFT REAR GROUND	I
13	MIL FLASH CODE	0
15	BRAKE LIGHT SWITCH	I

17	ABS SRI	O
19	MOTOR RELAY DRIVE	O
25	SOLENOID REAR RIGHT	O
26	GROUND FOR SOLENOIDS	I
27	GROUND FOR SOLENOIDS	I
28	F/SF RELAY DRIVE	O
29	SENSOR LEFT REAR	I
31	SENSOR RIGHT FRONT GND	I
32	SENSOR LEFT FRONT	I
34	SENSOR LEFT FRONT GND	I
36	SENSOR RIGHT REAR	I
37	SENSOR RIGHT REAR GND	I
42	MOTOR MONITOR LINE	I
43	F/SF RELAY MONITOR	I
44	DLC INPUT/OUTPUT	I/O
50	IGNITION SIGNAL	I
51	CONTROLLER GROUND	I
52	SOLENOID RIGHT FRONT	O
53	SOLENOID LEFT REAR	O
54	SOLENOID LEFT FRONT	O

I: INPUT

O: OUTPUT

F/SF: Fail safe

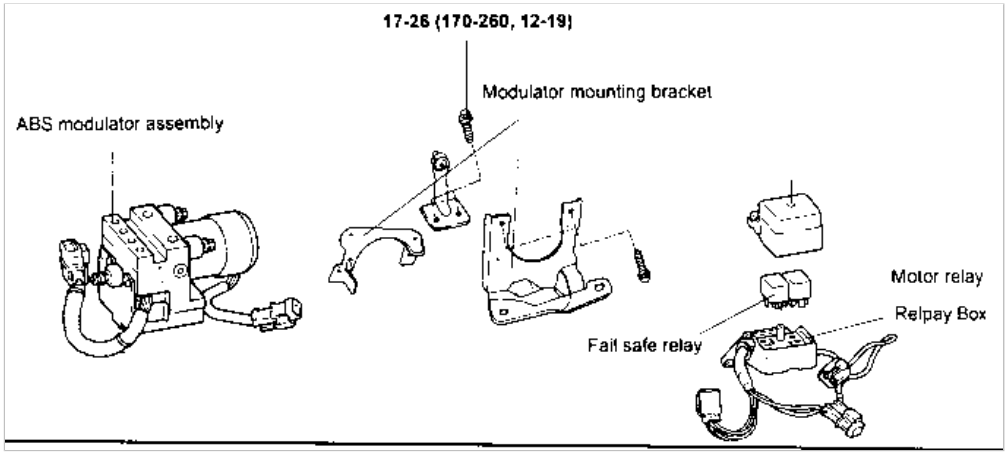
MIL: Malfunction Indicator Light

SRI: Service Reminder Light

DLC: Data Link connector

Brake Systems > Anti-lock Brake System > Anti-Lock Braking System Modulator > COMPONENTS

COMPONENTS



Brake Systems > Anti-lock Brake System > Anti-Lock Braking System Modulator > INSTALLATION

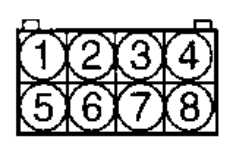
INSTALLATION

1. Follow the reverse order of removal.
2. Tighten the modulator mounting bolts and brake tube nuts to the specified torque.
3. Bleed the brake system.

Brake Systems > Anti-lock Brake System > Anti-Lock Braking System Modulator > MODULATOR CONNECTOR (M78,

HARNESS SIDE)

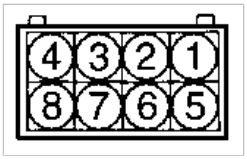
MODULATOR CONNECTOR (M78, HARNESS SIDE)



PIN NO.	PLUG ASSIGNMENT
1	RIGHT REAR SOLENOID GND
2	LEFT REAR SOLENOID GND
3	RIGHT FRONT SOLENOID GND
4	LEFT FRONT SOLENOID GND
5	RIGHT REAR SOLENOID GND
6	LEFT REAR SOLENOID GND
7	RIGHT FRONT SOLENOID GND
8	LEFT FRONT SOLENOID gnd

Brake Systems > Anti-lock Brake System > Anti-Lock Braking System Modulator > RELAY BOX CONNECTOR (M79, HARNESS SIDE)

RELAY BOX CONNECTOR (M79, HARNESS SIDE)

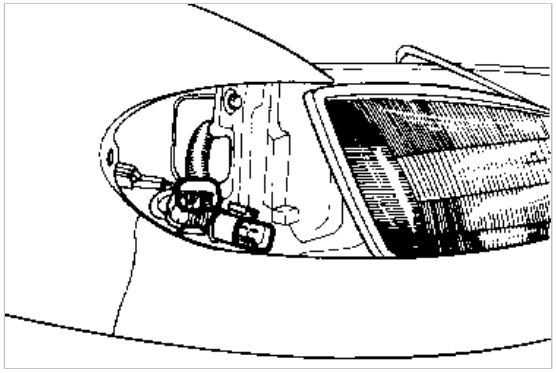


PIN NO	PLUG ASSIGNMENT
1	RIGHT REAR SOLENOID GND
2	LEFT REAR SOLENOID GND
3	RIGHT FRONT SOLENOID GND
4	LEFT FRONT SOLENOID GND
5	RIGHT REAR SOLENOID GND
6	LEFT REAR SOLENOID GND
7	RIGHT FRONT SOLENOID GND
8	LEFT FRONT SOLENOID gnd

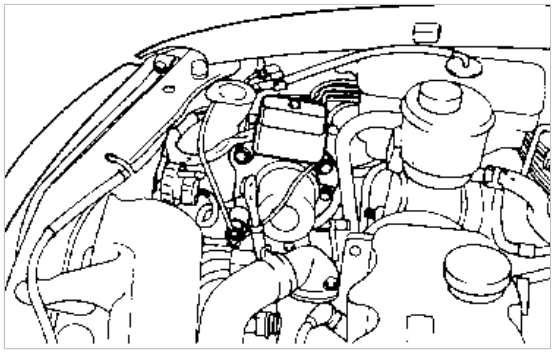
Brake Systems > Anti-lock Brake System > Anti-Lock Braking System Modulator > REMOVAL

REMOVAL

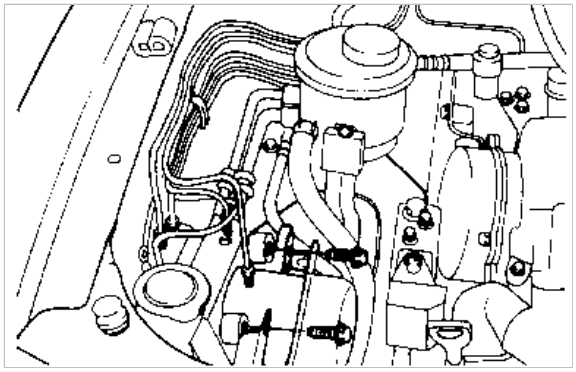
1. Remove the right-hand turn signal lamp.
2. Disconnect the ABS relay harness inside fender.



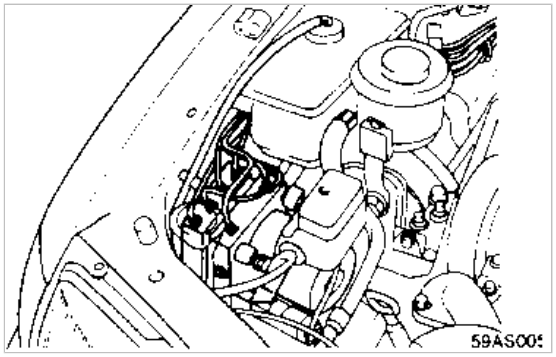
3. Disconnect motor pump harness and remove the ABS relay box mounting bolts.



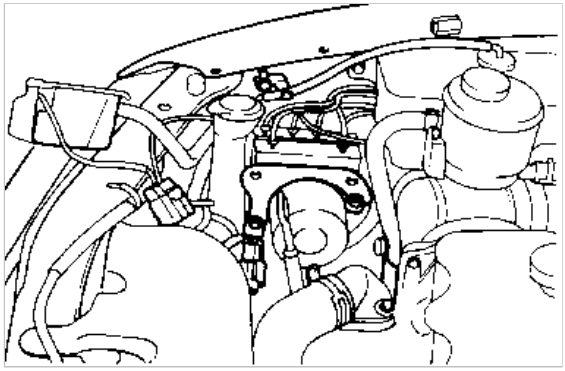
4. Remove the relay box from relay box mounting bracket.
5. Detach the motor pump harness connector from the relay box mounting bracket and remove the relay box mounting bracket from the modulator.



6. Remove engine coolant reservoir.
7. Disconnect the brake tubes from the ABS modulator.



8. Remove the modulator mounting bolts and the ABS modulator from modulator mounting bracket.
   a. Never attempt to disassemble the ABS modulator.
   b. The modulator must be transported and stored in upright position and with sealed ports. The modulator must not be drained.

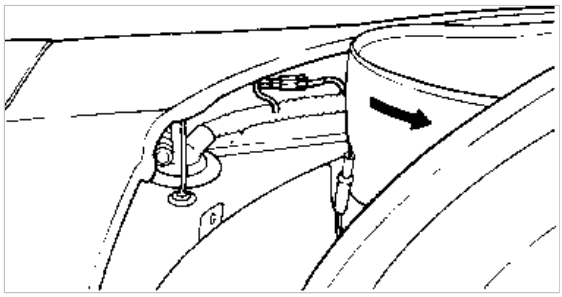


Brake Systems > Anti-lock Brake System > Anti-Lock Braking System Wheel Speed Sensor > DISASSEMBLY

DISASSEMBLY

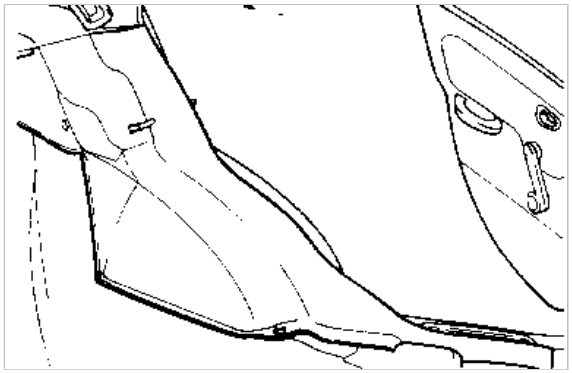
FRONT WHEEL SPEED SENSOR

1. Remove the front wheel speed sensor mounting bolt.
2. Remove the front wheel speed sensor after letting the wheel guard down by removing some of the wheel guard mounting screws and disconnecting the wheel speed sensor connector.



REAR WHEEL SPEED SENSOR

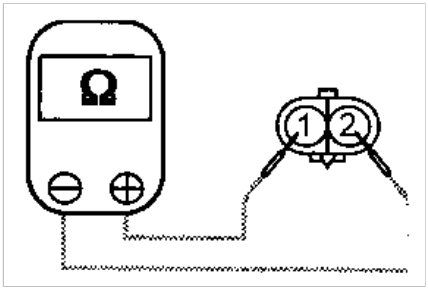
1. Remove the rear seat cushion.
2. Remove the rear pillar trim assembly.
3. Remove the tire assembly.
4. Remove the rear wheel speed sensor after disconnecting the wheel speed sensor connector.



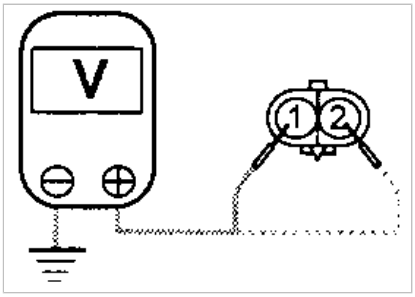
Brake Systems > Anti-lock Brake System > Anti-Lock Braking System Wheel Speed Sensor > INSPECTION

INSPECTION

1. Connect an ohmmeter between the wheel speed sensor terminals and measure the resistance.

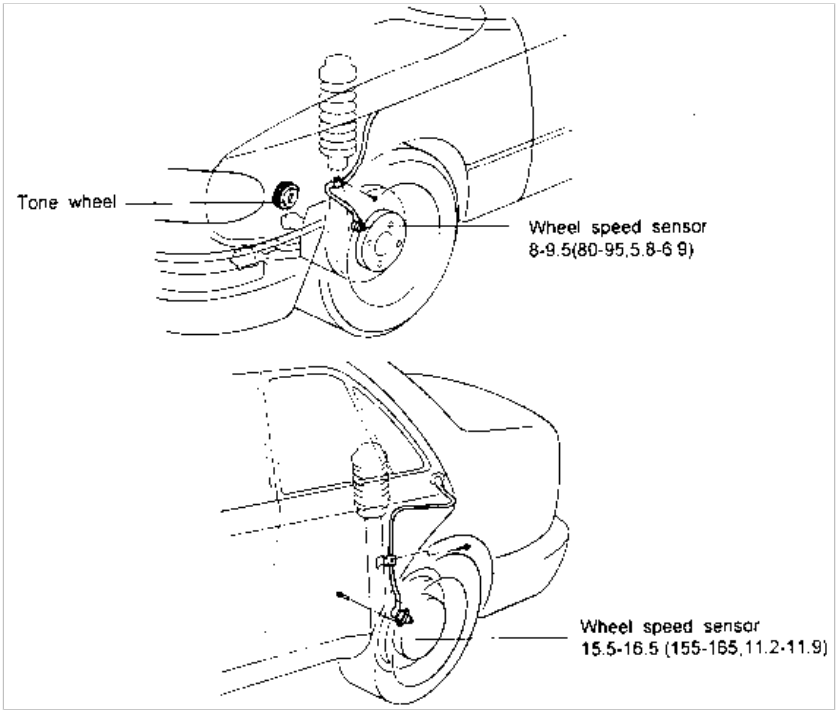


2. Connect a voltmeter between the wheel speed sensor terminals, and measure the voltage by turning the wheel.
   Set the voltmeter to measure AC voltage.
   Service standard: AC voltage detected.



Brake Systems > Anti-lock Brake System > Anti-Lock Braking System Wheel Speed Sensor > WHEEL SPEED SENSOR

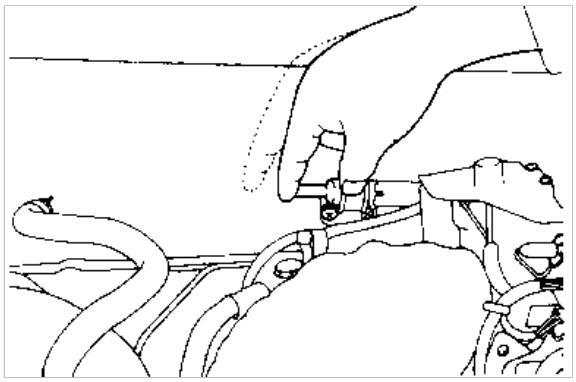
WHEEL SPEED SENSOR



Brake Systems > Conventional Brake System > Brake Booster > CHECK VALVE OPERATION TEST

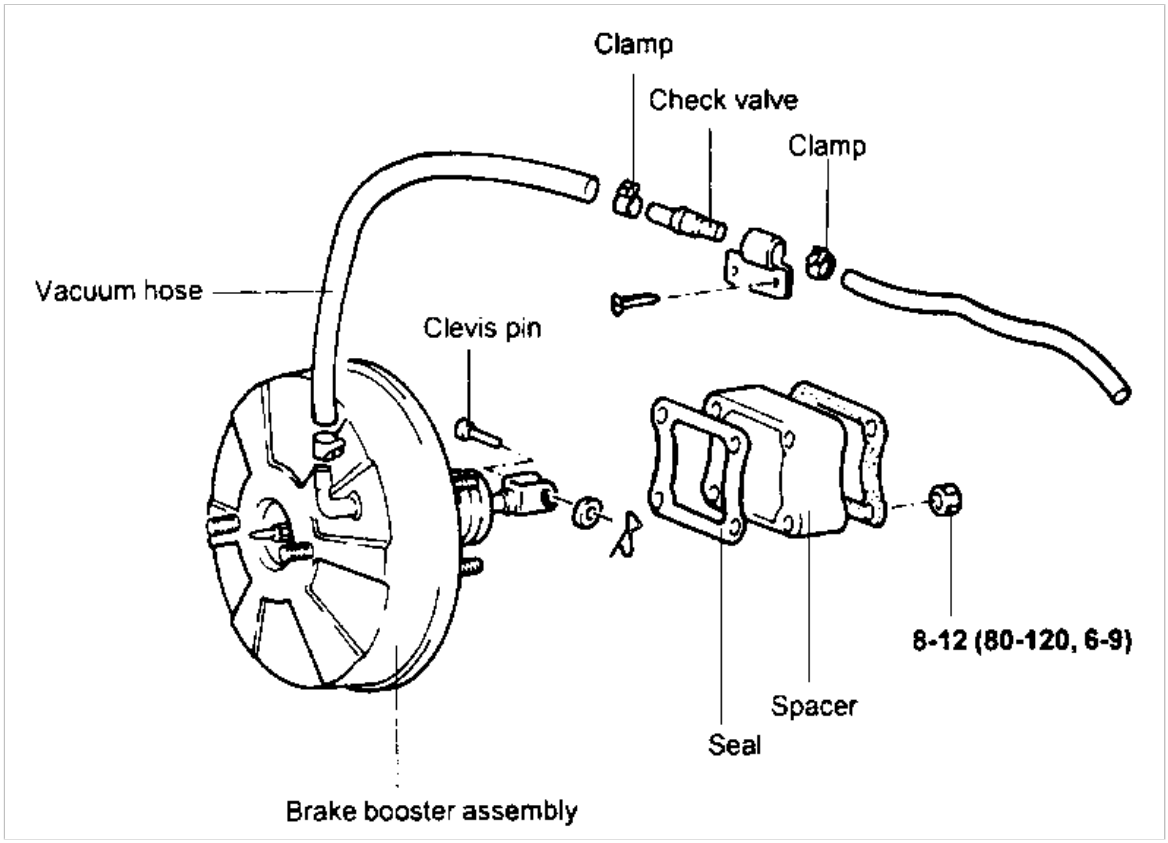
CHECK VALVE OPERATION TEST

1. Remove the booster hose from the check valve.
2. Start the engine.
3. Plug the check valve hole with a finger.
4. Check on the basis of finger touch that vacuum is present.



Brake Systems > Conventional Brake System > Brake Booster > COMPONENT

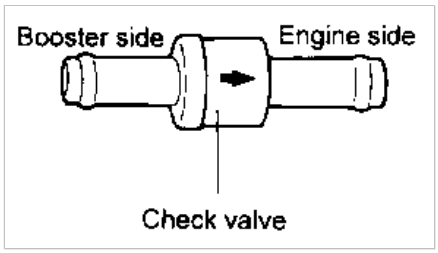
COMPONENT



Brake Systems > Conventional Brake System > Brake Booster > INSTALLATION

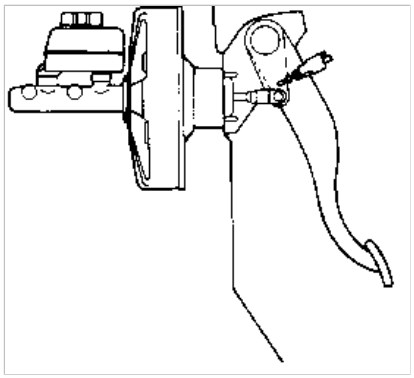
INSTALLATION

1. When the booster assembly is installed, replace the packing at each end of the booster mounting holder, if necessary.
2. Install brake booster and tighten the mounting nuts.



3. Connect clevis to brake pedal with clevis pin and install the split pin to the clevis pin.

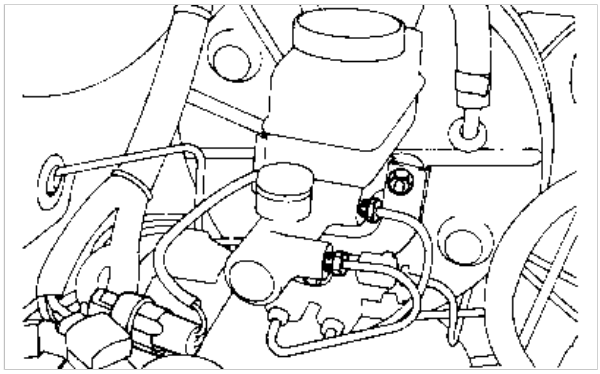
4. Install master cylinder and connect the brake tube to the master cylinder.
5. Connect vacuum hose to brake booster.
6. Pay attention to the direction of the check valve when installing.
7. Fill brake reservoir with brake fluid and bleed the system.
8. Check for fluid leakage.
9. Check and adjust the brake pedal.
10. After installation, apply sufficient grease to the clevis and brake pedal contacting points.



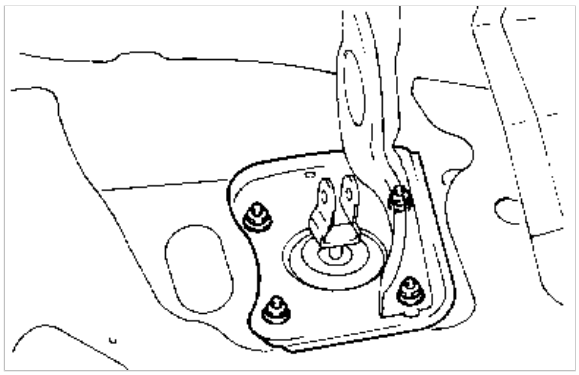
Brake Systems > Conventional Brake System > Brake Booster > REMOVAL

REMOVAL

1. Disconnect the brake tube from the master cylinder.
2. Remove the master cylinder.
   Do not allow brake fluid to remain on a painted surface. Wash it off immediately.

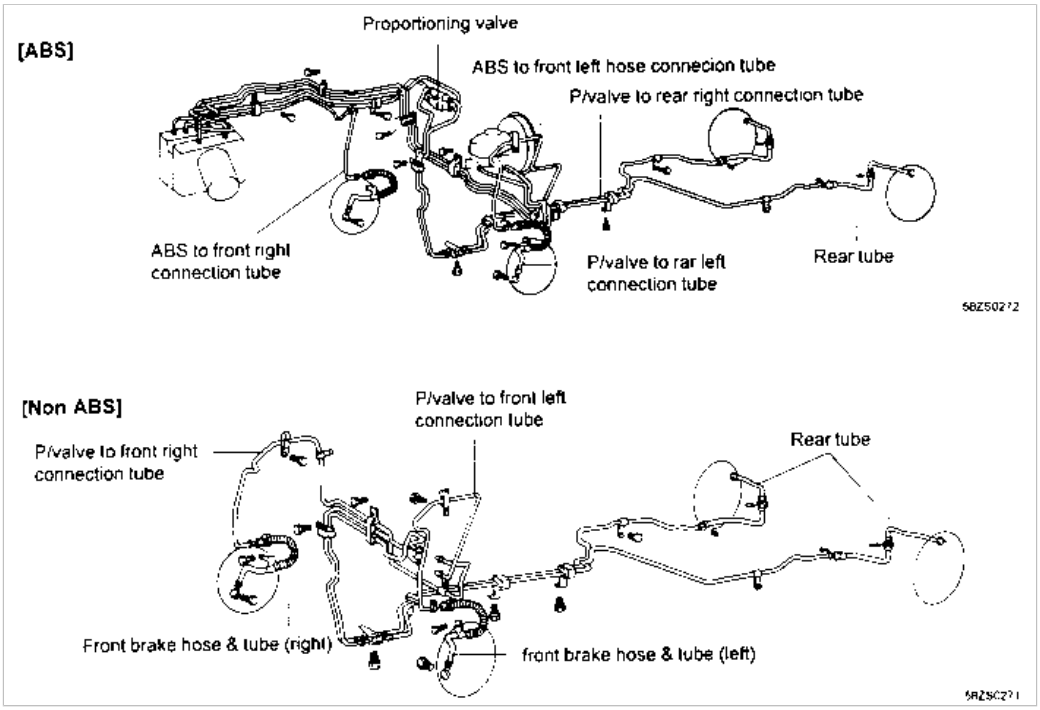


3. Disconnect the vacuum hose from the booster.
4. Remove the operating rod from the brake pedal.
5. Remove the stop lamp switch.
6. Loosen the booster mounting nuts.
7. Lift out the booster assembly.



Brake Systems > Conventional Brake System > Brake Line > COMPONENT

COMPONENT



Brake Systems > Conventional Brake System > Brake Line > INSPECTION

INSPECTION

1. Check the brake lines for cracks, crimps and corrosion.
2. Check the brake hoses for cracks, damage and leakage.
3. Check the brake line flare nuts for damage and leakage.

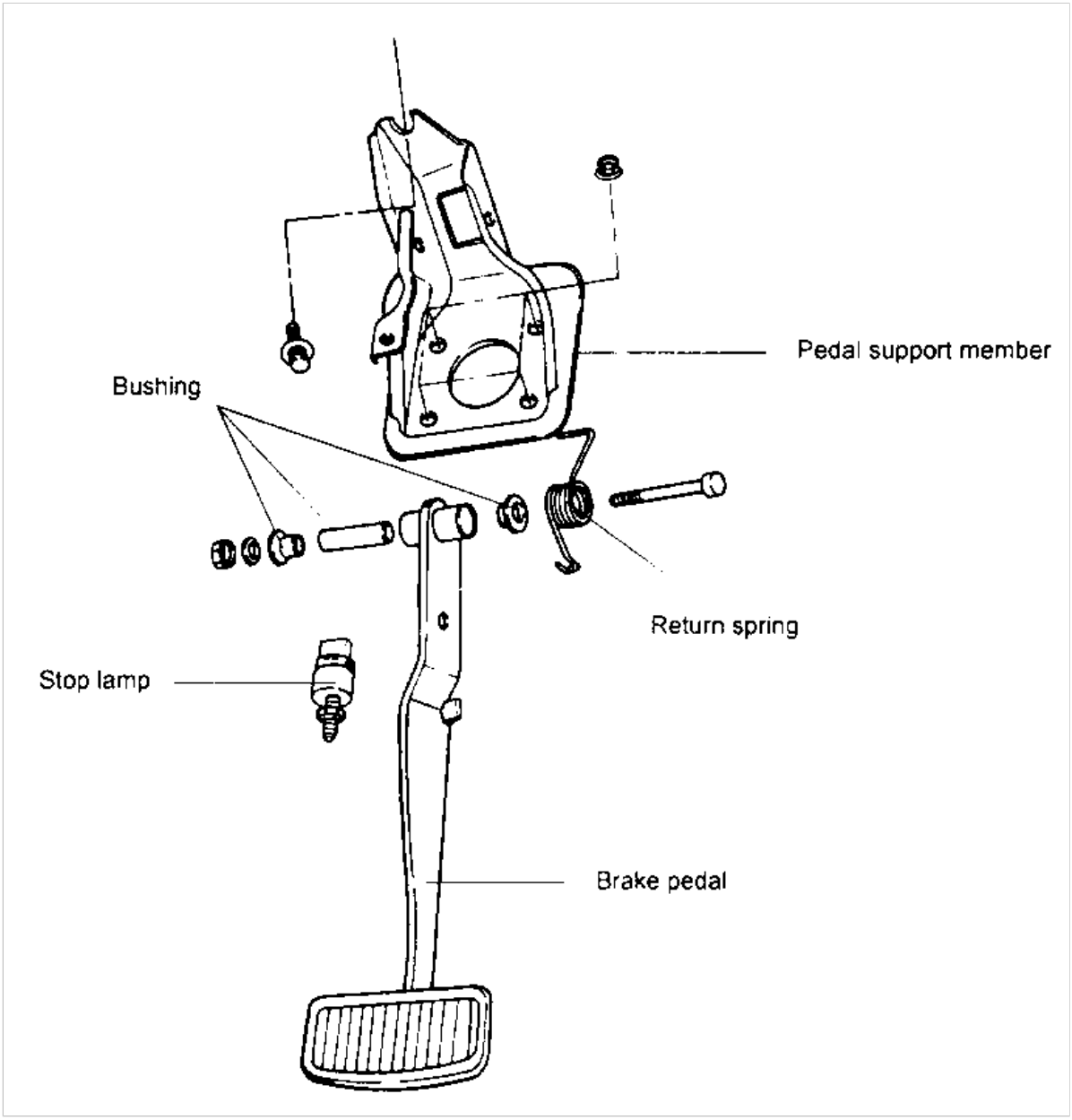
Brake Systems > Conventional Brake System > Brake Line > REASSEMBLY

REASSEMBLY

1. Install the brake hoses without twisting them.
2. The brake tubes should be installed away from sharp edges, weld beads or moving parts.
3. Tighten the connections to the specified torque.

Brake Systems > Conventional Brake System > Brake Pedal > COMPONENTS

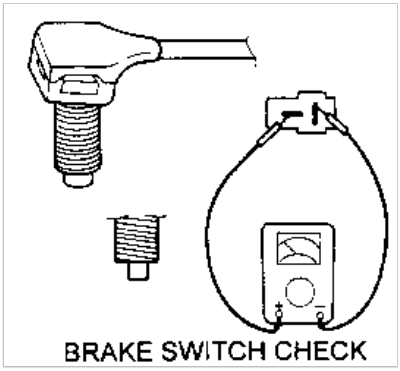
COMPONENTS



Brake Systems > Conventional Brake System > Brake Pedal > INSPECTION

INSPECTION

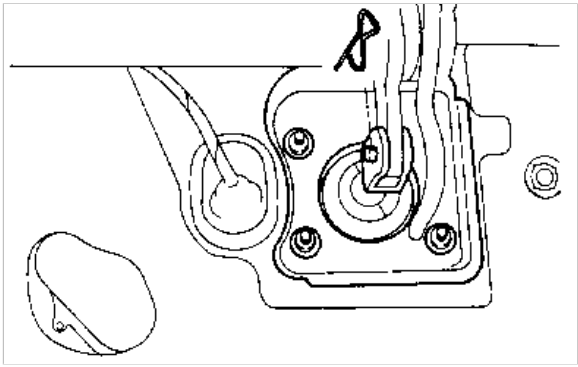
1. Check the bushing for wear.
2. Check the brake pedal for distortion.
3. Check the brake pedal return spring for damage.
4. Check the stop lamp switch
   (1) With an ohmmeter connected to the stop lamp switch terminals, check for continuity.
   (2) If there is no continuity when the plunger is depressed and there is continuity when the plunger is released, the stop lamp switch is normal



Brake Systems > Conventional Brake System > Brake Pedal > REASSEMBLY

REASSEMBLY

1. Apply chassis grease to the sliding surface of the brake pedal and operating rod clevis pin.
   Be sure to install the split pin on the operating rod clevis pin.

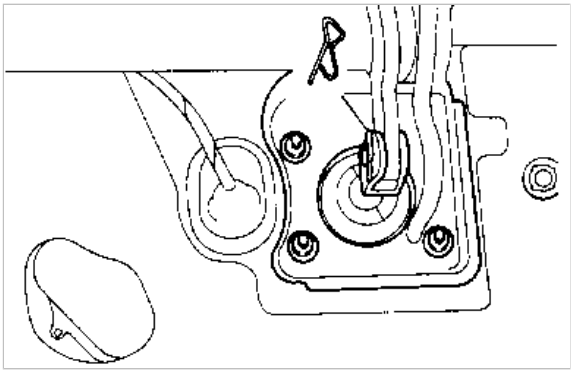


2. Install the brake pedal assembly and tighten the flange nuts (booster mounting nuts) and bolt.
3. Adjust the brake pedal height and free play.
4. Install the stop lamp switch.

Brake Systems > Conventional Brake System > Brake Pedal > REMOVAL

REMOVAL

1. Remove the stop lamp switch.
2. Remove the flange nuts (4EA) and bolt (1EA) of the brake mounting bracket.
3. Remove the clevis pin.



4. Remove the brake pedal assembly.

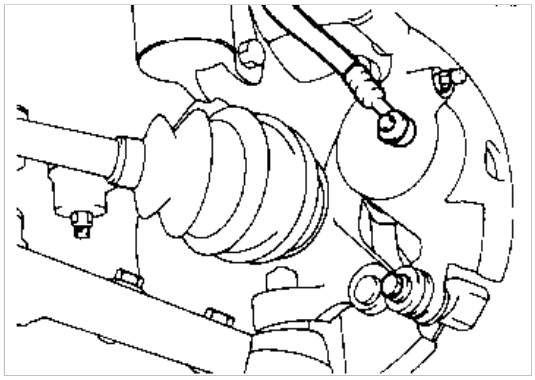
Brake Systems > Conventional Brake System > Caliper Assembly > DISASSEMBLY

DISASSEMBLY

1. Remove the wheel and tire.
2. Disconnect the brake hose.

Plug the brake hose, do not allow brake fluid to run out.

3. Remove the cylinder mounting bolt.
4. Remove cylinder and pads.
5. Remove the caliper mounting bolts (2EA) from knuckle.
6. Remove the carrier.

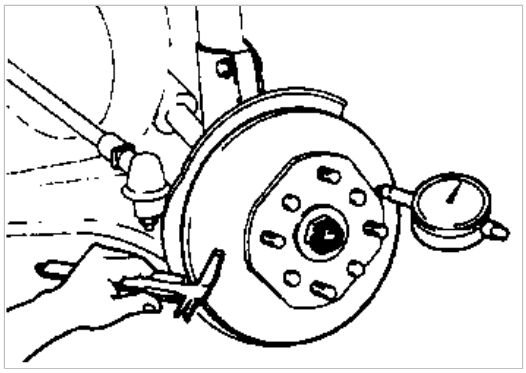


Brake Systems > Conventional Brake System > Caliper Assembly > INSPECTION

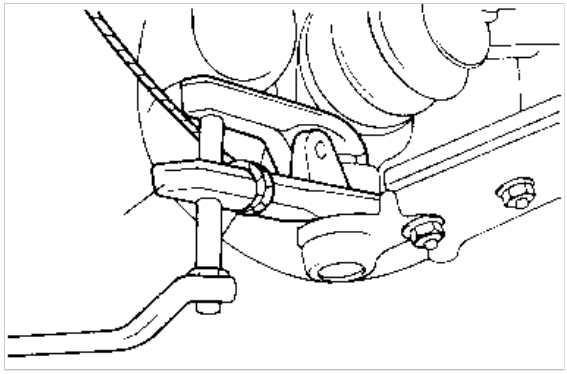
INSPECTION

1. Check the caliper for wear, damage, cracks and rust.
2. Check the piston for rust, damage, cracks and wear on the outer surface.
3. Check the sleeve and pin for damage and rust.
4. Check the pad spring and boots for damage.
5. Check the carrier for damage, rust, wear and cracks.
   a. Do not use sand paper on the piston surface.
   b. All rubber parts must be replaced with new parts.
6. Inspect the disc using a caliper and dial gauge.

|	Standard value	Service limit
Thickness of disc mm (in.)	19 (0.75)	17 (0.67)
Total runout of front axle assembly mm (in.)	-	0.05 (0.0020)

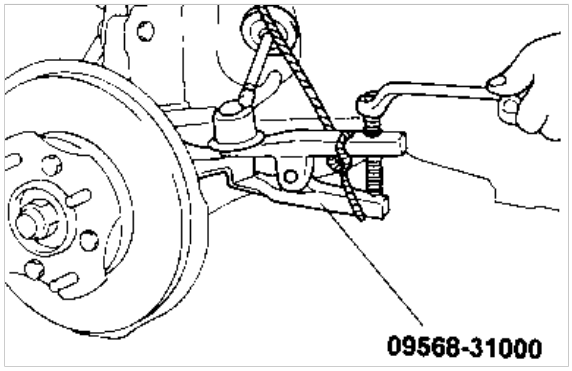


7. If necessary, replace the brake disc.
   (1) Remove the hub caps.
   (2) Remove the drive shaft nut.
   (3) Jack up the vehicle and support it with jack stands.
   (4) Remove the wheel and tire.
   (5) Remove the front wheel brake assembly from the knuckle and suspend it with a wire.

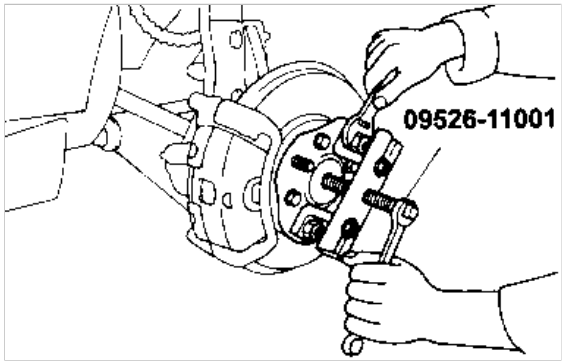


(6) Disconnect the lower arm ball joint from the knuckle using the Special Tool (09568-31000)

(7) Disconnect the tie rod end ball joint from the knuckle using the Special Tool (09568-31000).

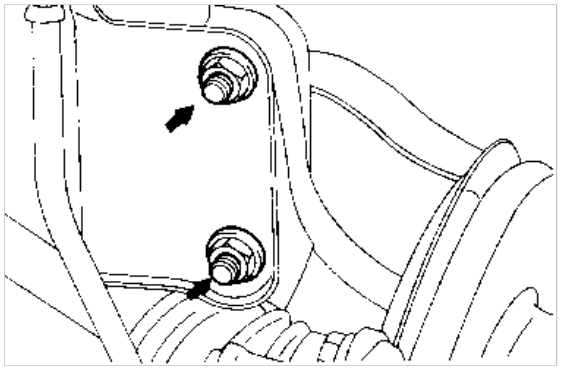


(8) Disconnect the drive shaft from the hub using the special tool (09526-11001).

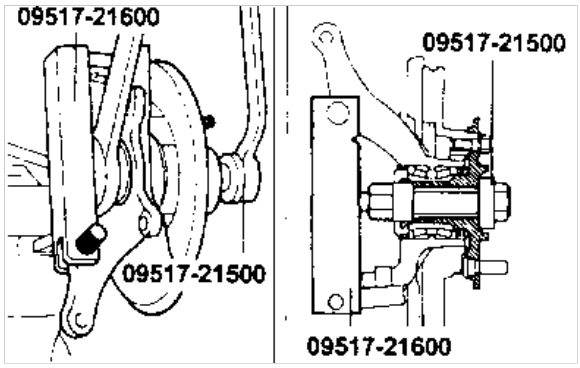


(9) Remove the hub and knuckle as an assembly from the strut.

(10) Remove the disc mounting bolts. (4EA).



(11) Install the special tools as illustrated.



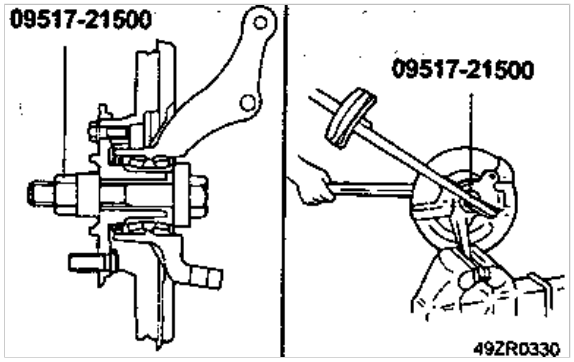
(12) Remove the hub from knuckle by turning the special tool.
   a. Be sure to use the special tool.
   b. If the hub and knuckle are disassembled by striking with a hammer, the bearing will be damaged.

(13) Replace the brake disc with new one.

(14) Apply the specified multipurpose grease to the bearings and inside surface of the hub.

(15) Remove inner oil seal.

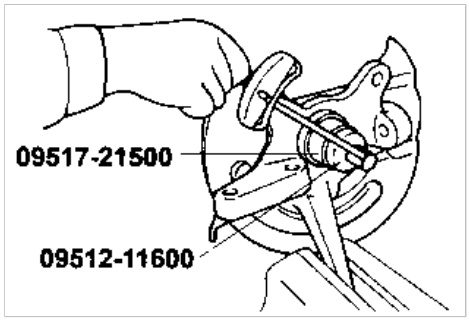
(16) Tighten the hub to the knuckle to 230 Nm (2,350 kg.cm, 167 lb.ft) with the Special Tool (09517-21500).



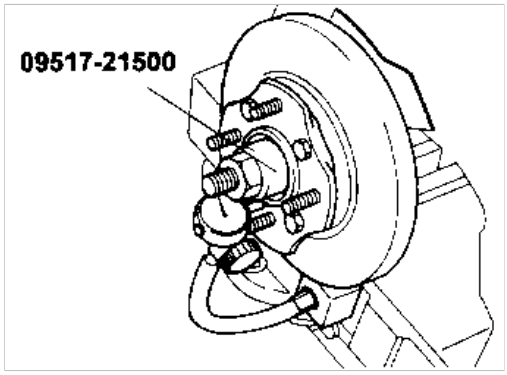
(17) Rotate the hub to seat the bearing.

(18) Measure the hub bearing starting torque.

(19) If the starting torque is 0 Nm (0 in. lbs.), measure the hub bearing axial play.



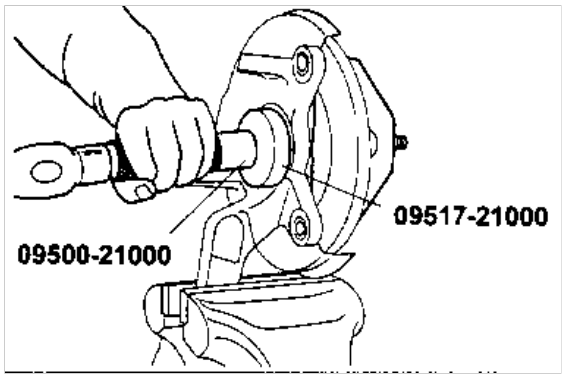
(20) If the hub axial play exceeds the limit while the nut is tightened to 230 Nm (2,350 kg.cm, 167 lb.ft), the bearing, hub and knuckle have not been installed correctly. Repeat the disassembly and assembly procedure.



(21) Remove the Special Tool.

(22) Apply the specified multipurpose grease to the bearing and to the inside of the knuckle.

(23) Drive the oil seal (drive shaft side) into the knuckle until it contacts the bearing outer race using Special Tools.



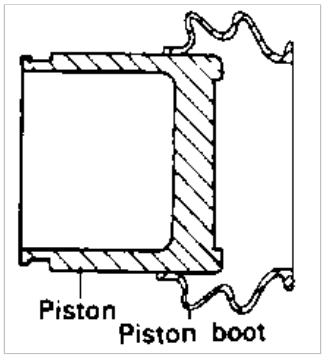
(24) Apply the specified multipurpose grease to the lip of the oil seal.

(25) Install front wheel brake assembly, hub and knuckle to the specified torque.

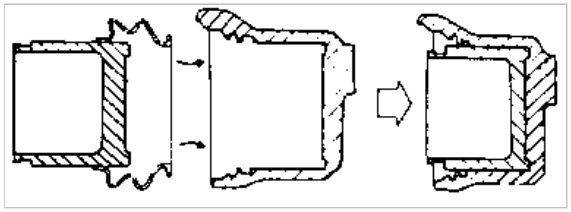
Brake Systems > Conventional Brake System > Caliper Assembly > REASSEMBLY

REASSEMBLY

1. Clean all components with isopropyl alcohol except the pads and shim.
2. Apply rubber grease to the piston seal and install the piston seal in the cylinder.

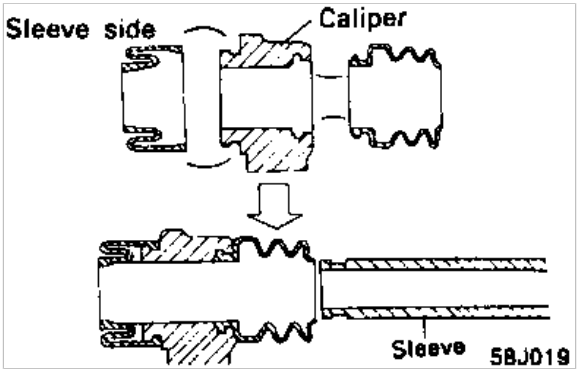


3. Assemble the piston and piston boots according to the following procedure.
   (1) Apply rubber grease to the caliper bore, outside surface of the piston and piston boot.
   (2) Install the piston boot on the piston as illustrated.



   (3) Insert the piston boot in the inner groove of caliper and slide the piston into the caliper.

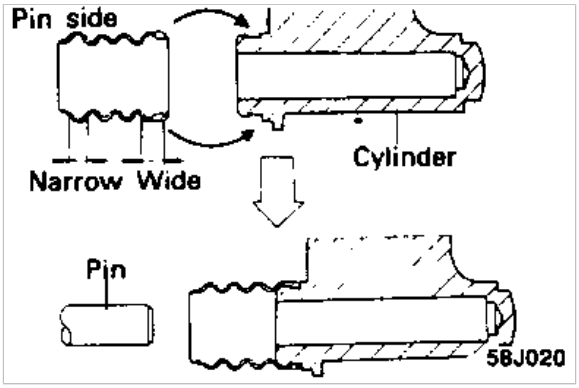
4. Assemble the sliding parts according to the following procedure.
   (1) Apply rubber grease to the outside surface of the sleeve and pin, pin and sleeve bore of the caliper, pin boot and sleeve boot.
   (2) Insert the boots into the groove of the caliper.



5. Install the pads.
   Do not apply grease to the disc or pads.
6. Tighten the brake hose connecting bolt.

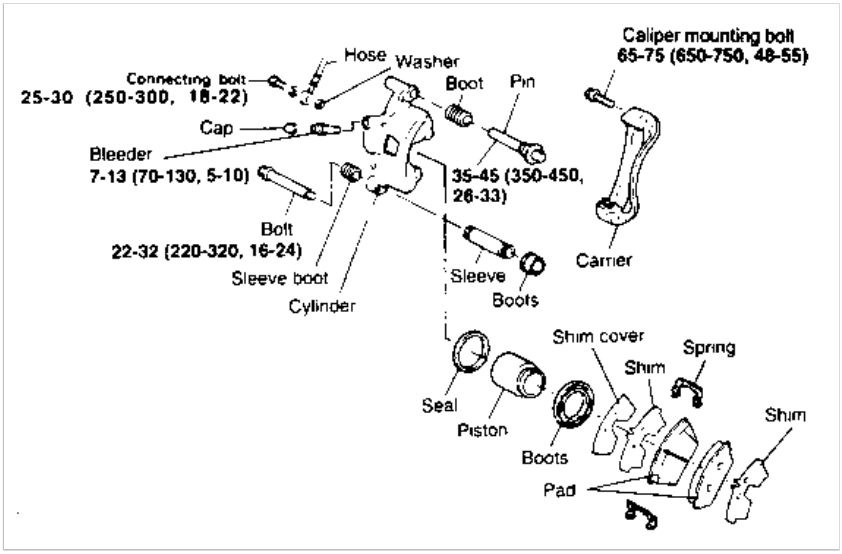
Tightening torque	Nm (kg.cm, lb.ft)
Sliding pin	34-44 (350-450, 26-33)
Sliding bolt	22-31 (220-320, 16-23)
Carrier mounting bolt	64-74 (650-750, 48-54)
Brake hose mounting oil bolt	25-29 (250-300, 18-22)

   a. Check that the surface of the pin and bolts are not damaged before tightening.
   b. Bleed the system.
      Depress the pedal several times and check for fluid leakage from all connecting parts.



Brake Systems > Conventional Brake System > Front Disc Brake > COMPONENTS

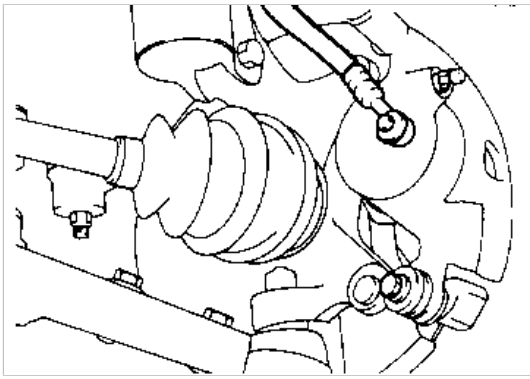
COMPONENTS



Brake Systems > Conventional Brake System > Front Disc Brake > DISASSEMBLY

DISASSEMBLY

1. Remove the lower bolt and lift the caliper assembly up and out of the way . Secure it with wire or some other retaining method.
2. Remove the pads.
   Do not depress the brake pedal while disassembling the pads.



Brake Systems > Conventional Brake System > Front Disc Brake > INSPECTION

INSPECTION

a. Check the pads for wear or oil contamination and replace, if necessary.
   The pads for the right and left wheels should be replaced at the same time. Never "split" or intermix brake pad sets. All four pads must be replaced as a complete set.

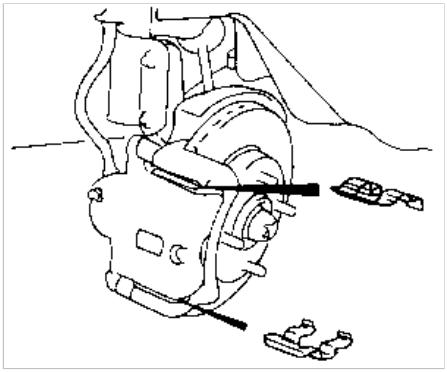
	Standard value	Service limit
Pad thickness mm (in.)	9.0 (0.394)	1.0 (0.039)

b. Check the shims for damage or deformation.

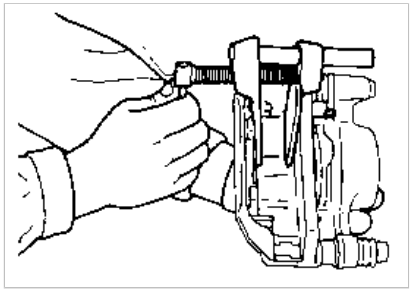
Brake Systems > Conventional Brake System > Front Disc Brake > REASSEMBLY

REASSEMBLY

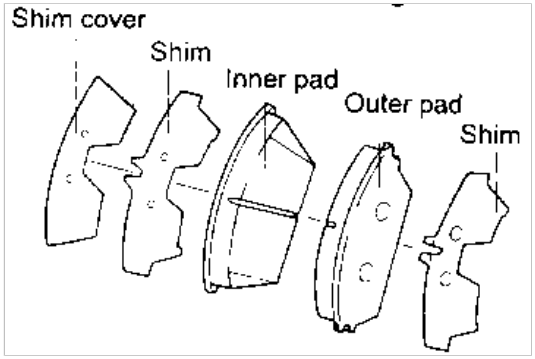
1. Install the pad clips.
2. Install the pads onto each pad clip.
   Position the pad with its wear indicator toward the disc side and facing upward.



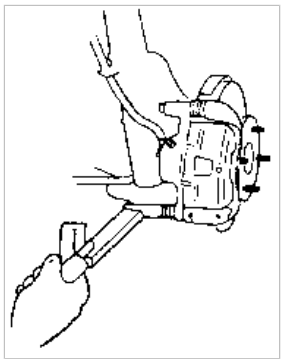
3. Seat the piston in the cylinder using Special Tool (09581-11000).



4. Install the new pads. The shims are attached to the each pad as illustrated.
   Never apply grease to the disc or pads.



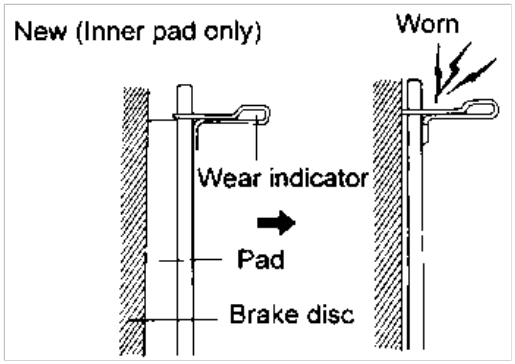
5. Install the bolt and tighten to the specified value.



Brake Systems > Conventional Brake System > Front Disc Brake > REPLACEMENT OF BRAKE PADS

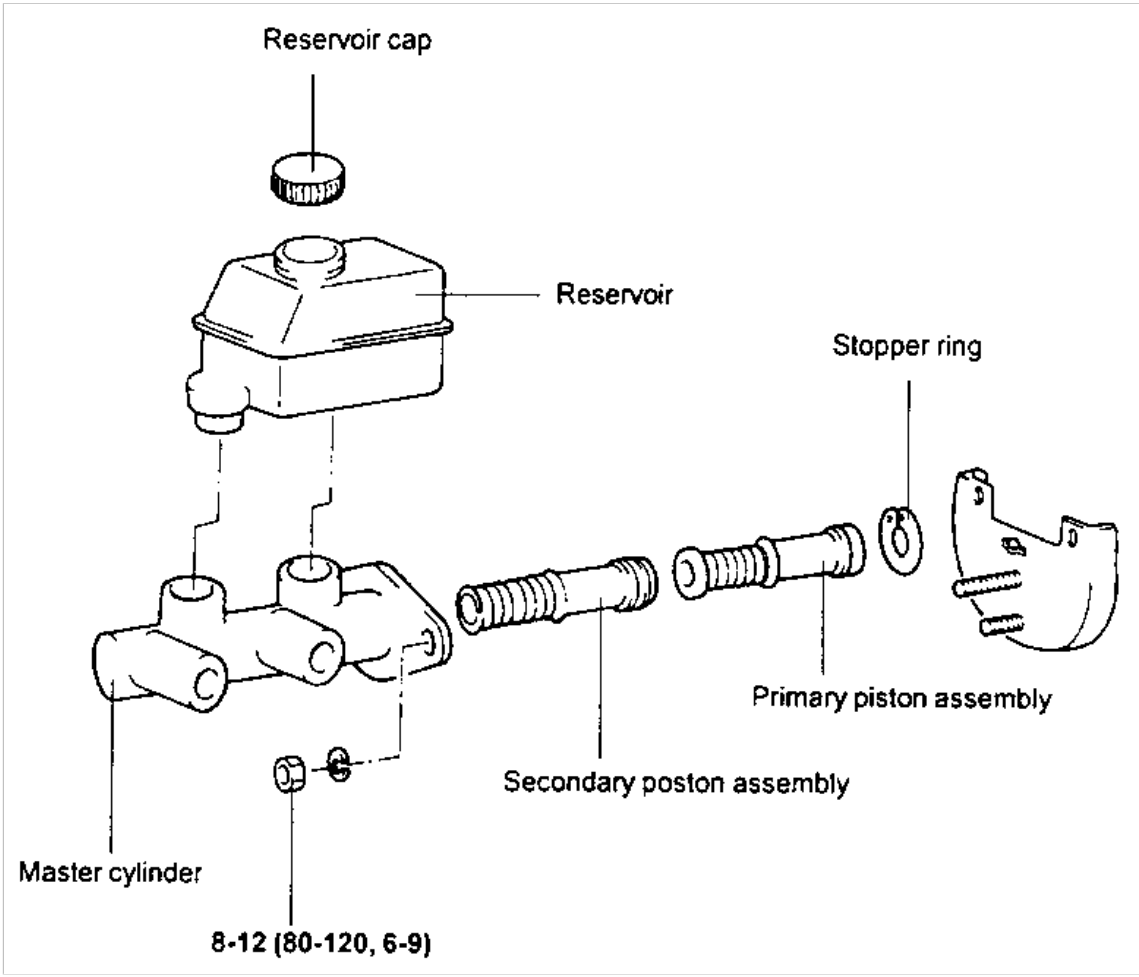
REPLACEMENT OF BRAKE PADS

The brake pads have wear indicators that contact the brake disc when the brake pad thickness becomes 2 mm (0.08 in.). The wear indicators will generate a squealing sound to warn the driver.



Brake Systems > Conventional Brake System > Master Cylinder > COMPONENTS

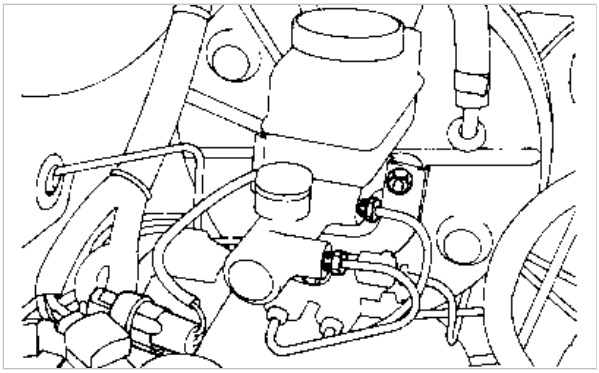
COMPONENTS



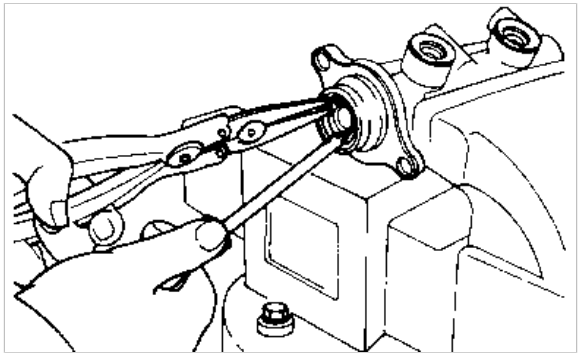
Brake Systems > Conventional Brake System > Master Cylinder > DISASSEMBLY

DISASSEMBLY

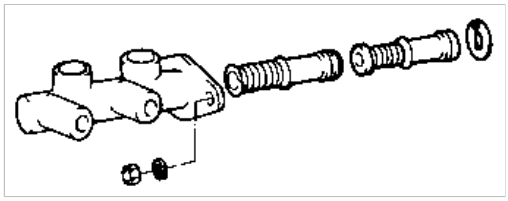
1. Remove the fluid level warning device connector.
2. Disconnect the brake lines from the master cylinder, and plug the open ports.
   Do not allow brake fluid to remain on a painted surface. Wash it off immediately.
3. Remove the master cylinder mounting nuts. Disconnect the proportioning valve mounting bracket, then lift out the master cylinder.



4. Remove the reservoir cap and drain the brake fluid into a suitable container.
5. Remove the reservoir from the master cylinder.
   If necessary, support the master cylinder in a vise at its flange, not at its bore.



6. While depressing the piston, remove the snap ring.
7. Remove the primary and secondary piston from master cylinder body.
   a. Be careful not to damage the cylinder bore.
   b. Do not disassemble the primary and secondary piston assemblies.



Brake Systems > Conventional Brake System > Master Cylinder > INSPECTION

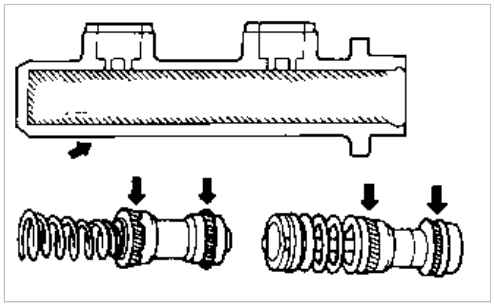
INSPECTION

1. Check the inner surface of the master cylinder body for rust or scoring.
2. Check the primary and secondary pistons for rust, scoring, wear, damage or deterioration.
3. Check the primary and secondary piston spring for deterioration.

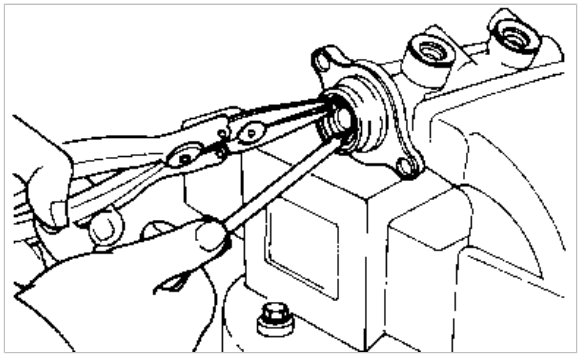
Brake Systems > Conventional Brake System > Master Cylinder > REASSEMBLY

REASSEMBLY

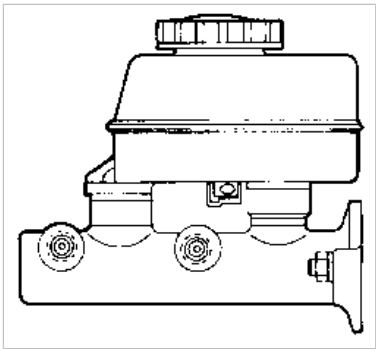
1. Apply the specified brake fluid to the inner surface of the master cylinder body and to the outside of the secondary and primary pistons.



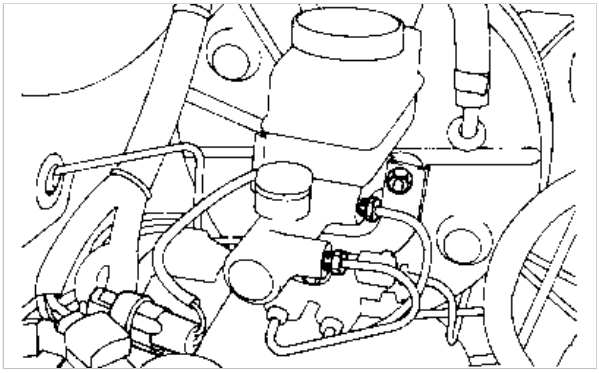
2. Carefully insert the spring and secondary piston assembly in the master cylinder bore.
3. Carefully insert the primary piston assembly in the master cylinder bore.
4. Depress the primary piston and install the retaining ring in the cylinder bore groove as illustrated.



5. Install the reservoir cap on the master cylinder.
6. Lubricate the two grommets at both inside and outside with genuine brake fluid and then insert them into the master cylinder body.
   Whenever the reservoir is replaced, the grommets must also be replaced.
7. Press the reservoir into the grommets with the fluid level indicator socket facing inboard. The reservoir should snap in place indicating that it is secure as illustrated.



8. Connect the fluid level warning connector in the socket on the reservoir.
9. Install the master cylinder on the brake booster with two nuts.
10. Connect two brake tubes and fluid level warning connector.



11. Fill the master cylinder reservoir with brake fluid and bleed the system.

Brake Systems > Conventional Brake System > Proportioning Valve > PROPORTIONING VALVE

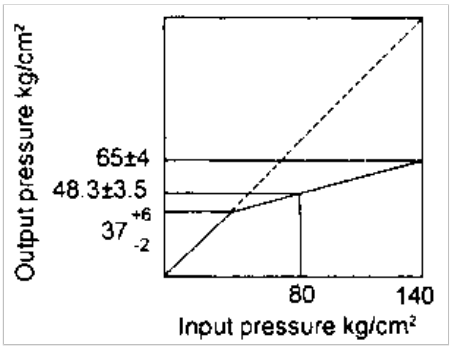
PROPORTIONING VALVE

Do not disassemble the proportioning valve. The proportioning valve regulates the distribution of fluid pressure to the front and rear brakes to prevent skidding in the event of rear wheel lock and to obtain a higher brake efficiency.

Brake Systems > Conventional Brake System > Proportioning Valve > PROPORTIONING VALVE FUNCTION TEST

PROPORTIONING VALVE FUNCTION TEST

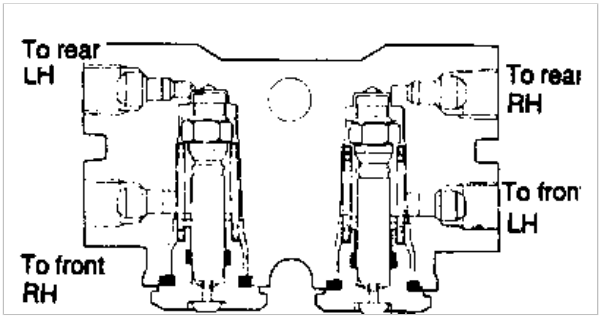
1. Connect two pressure gauges, one input side and one to the output side of the proportioning valve.
   Be sure to bleed the system after you connect the pressure gauge.
2. With the brakes applied, measure the input pressure and the output pressure. If the measured pressures are within the ranges as illustrated, the proportioning valve is good.
3. Reconnect the brake lines in their original positions and bleed the system.
   This figure shows characteristic of the proportioning valve during pressure increase.



Brake Systems > Conventional Brake System > Proportioning Valve > PROPORTIONING VALVE INSTALLATION

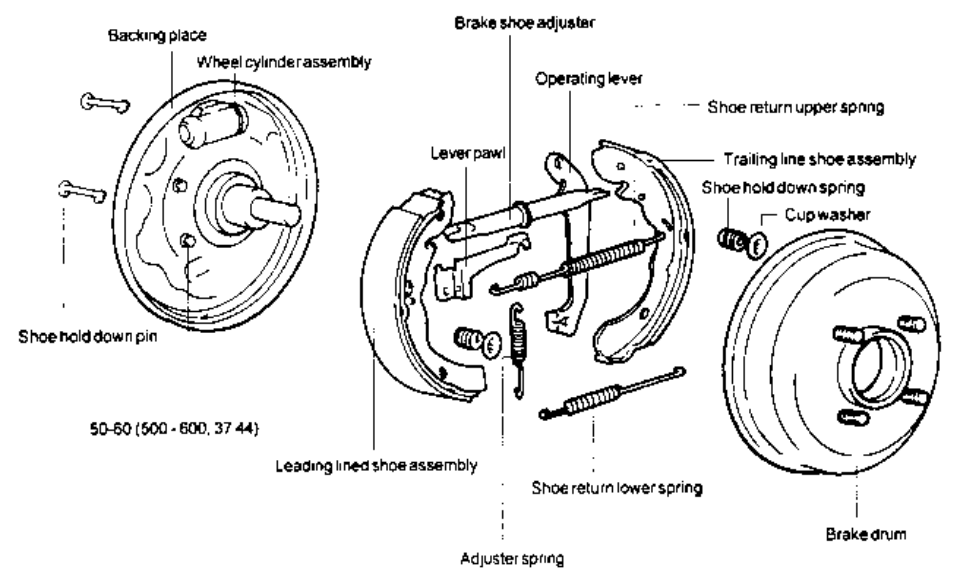
PROPORTIONING VALVE INSTALLATION

1. Install the brake lines according to the illustration.
2. Tighten the flare nuts and bleed the system.



Brake Systems > Conventional Brake System > Rear Drum Brake > COMPONENTS

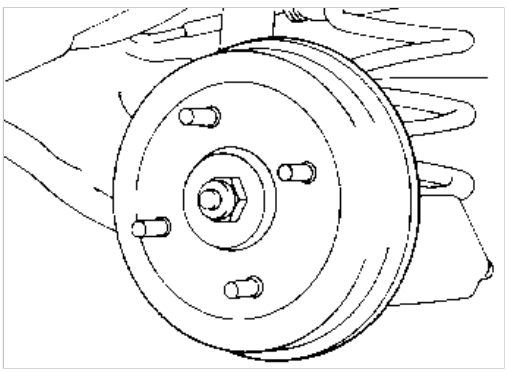
COMPONENTS



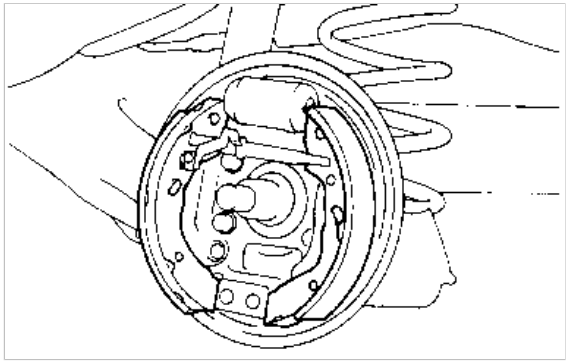
Brake Systems > Conventional Brake System > Rear Drum Brake > DISASSEMBLY

DISASSEMBLY

1. After removing the wheel, remove the brake drum.
2. Remove the shoe hold down spring, the automatic adjuster spring and adjuster lever.



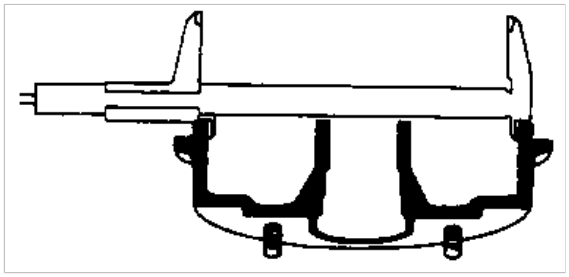
3. Spread the shoes and remove the shoe adjuster.
4. Remove the shoe to shoe spring and shoe hold down spring.



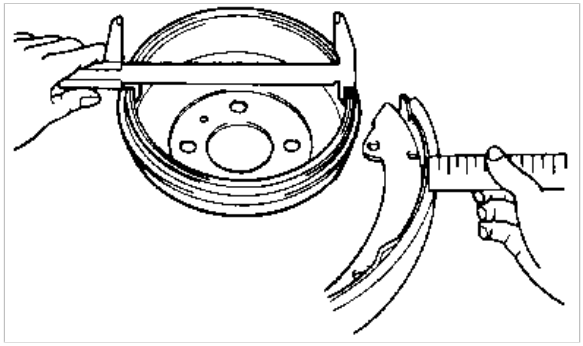
Brake Systems > Conventional Brake System > Rear Drum Brake > INSPECTION

INSPECTION

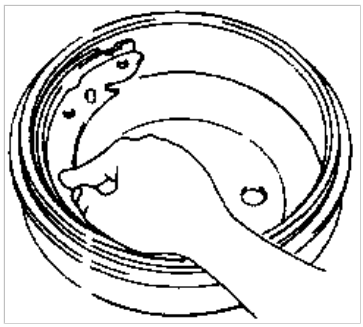
1. Measure the brake drum inside diameter. Check the runout of brake drum using a dial indicator.



2. Measure the brake shoe lining thickness.



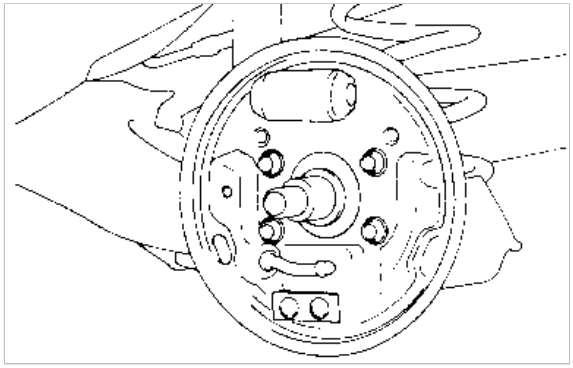
3. Inspect the brake lining and drum for proper contact.
4. Inspect the wheel cylinder outside for excessive corrosion and damage.
5. Inspect the backing plate for wear or damage.

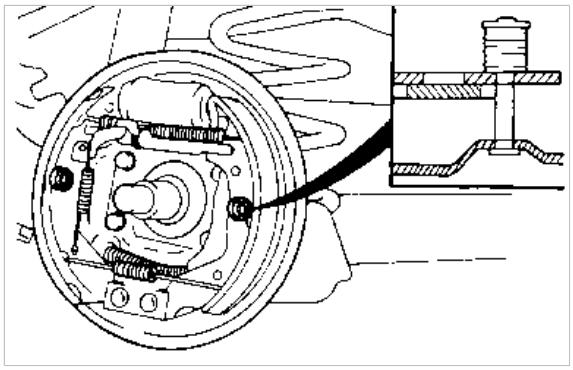


Brake Systems > Conventional Brake System > Rear Drum Brake > REASSEMBLY

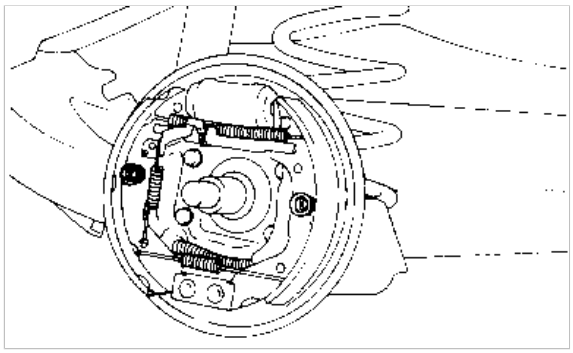
REASSEMBLY

1. Apply the specified grease to the locations indicated in the illustration and to each component.
   a. Shoe and backing plate contact surfaces
   b. Shoe and anchor plate contact surfaces





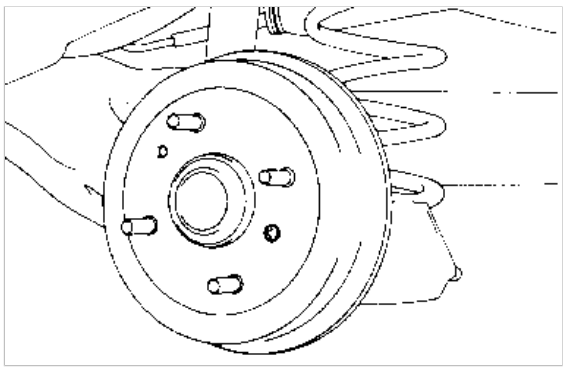
2. Install the shoe hold down pin.
3. Assemble the return spring with the push rod shorted.
4. After assembling the drum components, pull the parking brake lever all the way up several times.



Brake Systems > Conventional Brake System > Rear Drum Brake > WHEEL CYLINDER REPLACEMENT

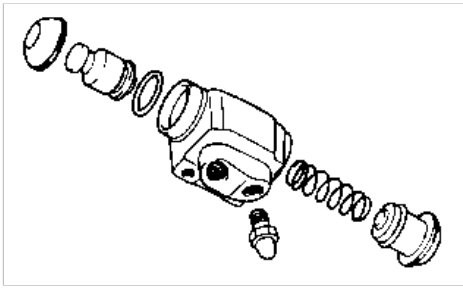
WHEEL CYLINDER REPLACEMENT

1. Remove the brake shoe.
2. Disconnect the brake tube.
3. Remove the wheel cylinder assembly.



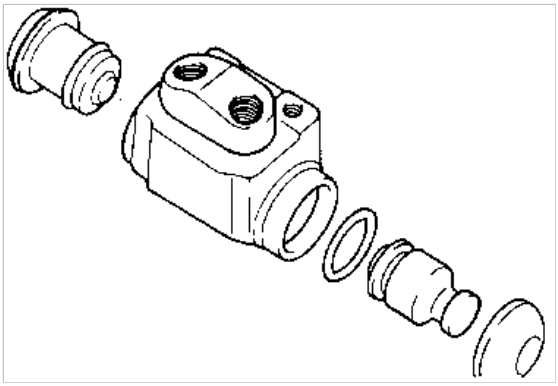
4. Remove the dust boot.

5. Remove the piston and piston cup.
6. Drive out the return spring.



7. Before assembling the wheel cylinder, inspect the following points.
   a. Check the cylinder and piston for wear, damage and rust.
   b. Check the cylinder body for damage and cracks.
   c. Check the contact surface of the piston and shoes for wear.
   d. Check the piston spring for looseness.
8. Assembly is the reverse of the removal procedure.
   a. Clean the cylinder and inner part with isopropyl alcohol before assembly.
   b. Apply enough brake fluid to piston cups and cylinder.
   c. Be sure to use new piston cups and dust boots.

   Be careful not to lose the steel ball in the bleeder.



Brake Systems > General > SERVICE STANDARD

SERVICE STANDARD

Standard Value

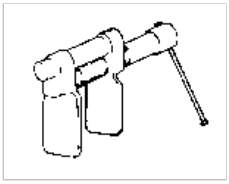
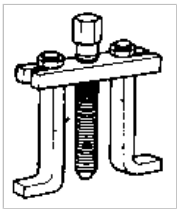
Brake pedal height	169.4 mm (6.6 in.)
Brake pedal stroke	145 mm (5.70 in.)
Stop lamp switch outer case to pedal stopper clearance	0.5-1.0 mm (0.020-0.040 in.)
Brake pedal free play	3-8 mm(0.117-0.312 in.)
Brake pedal to floorboard clearance	50 mm (1.969 in.) or more
Booster push rod to master cylinder piston clearance	0 (at 500 mmHg vacuum)
Parking brake lever stroke when lever assembly is pulled with 196N (20 kg, 44 lb force)	6-7 clicks

Service Limit

Front disc brake pad thickness	1.0 mm (0.039 in.)
Front disc thickness (minimum)	17 mm (0.069 in.)
Front disc runout	0.06 mm (0.0024 in.)
Drum brake lining thickness	1.0 mm (0.039 in.)
Brake drum I.D. (maximum)	180 mm (7.09 in.)
Wheel cylinder to piston clearance	0.15 mm (0.006 in.)

Brake Systems > General > SPECIAL TOOLS

SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
Piston expander(09581-11000)		Retraction of the front disc brake piston
Axle shaft puller(09526-11001)		Removal or installation of front hub and disc.

Brake Systems > General > SPECIFICATIONS

SPECIFICATIONS

Master cylinder

Type	Tandem
I.D.	20.64 mm (0.813 in.)
Fluid level warning sensor	Provided

Brake Booster

Type	Vacuum
Effective dia.	220 mm (8.66 in.)
Boosting ratio	4.0 : 1

Proportioning Valve

Cut-in pressure (Split point)	3.43 Mpa(35 kg/cm2, 498 psi)
Decompression ratio	3.7 : 1

Front Brake

Type	Floating type with ventilated disc
Disc O.D.	242 mm (9.53 in.)
Disc thickness	19 mm (0.75 in.)
Pad thickness	8.8 mm (0.347 in.)
Cylinder I.D.	51.1 mm (2.01 in.)

Rear Brake

Type	Leading-trailing drum
Drum I.D.	180 mm (7.09 in.)
Brake lining thickness-Leading	4.8 mm (0.189 in.)
Brake lining thickness-Trailing	4.6 mm (0.181 in.)
Cylinder I.D.	19.05 mm (0.75 in.)
Clearance adjustment	Automatic

Parking Brake

Type	Mechanical brake acting on rear wheels
Braking type	Lever type (cam shape)
Cable arrangement	V type

ABSCM (ABS Control Module)

Operating voltage range	9.0-16.2V
Power consumption	150 mA or below
Control fuse	3A
Operating temperature range	-4° to +80°C

Service Reminder Indicator

Power consumption	1.2W
Service Reminder Indicator fuse	10A

Modulator

Operating voltage range	9.0-16.2V
Rated voltage	12A
Pump Motor fuse	30A
Solenoid fuse	20A
Operating temperature range	-40°C to 120°c

Brake Systems > General > TIGHTENING TORQUE

TIGHTENING TORQUE

	Nm	Kg.cm	lb.ft
Master cylinder to booster mounting nut	8-12	80-120	6-9
Brake booster mounting nut	8-12	80-120	6-9
Brake booster vacuum hose fitting to surge tank	8-12	80-120	6-9
Bleeder screw: Front	7-13	70-130	5-10
Bleeder tube screw : Rear	7-9	70-90	5-7
Brake tube flare nut, brake hose	13-17	130-170	9-12
Proportioning valve mounting nut	8-12	80-120	6-9
Caliper guide rod bolt	22-31	220-310	16-24
Caliper pin bolt	35-45	350-450	26-33
Caliper assembly to knuckle	65-75	650-750	48-55
Brake hose to front caliper	25-30	250-300	18-22
Backing plate mounting bolt	50-60	500-600	37-44

Brake Systems > General > TROUBLESHOOTING

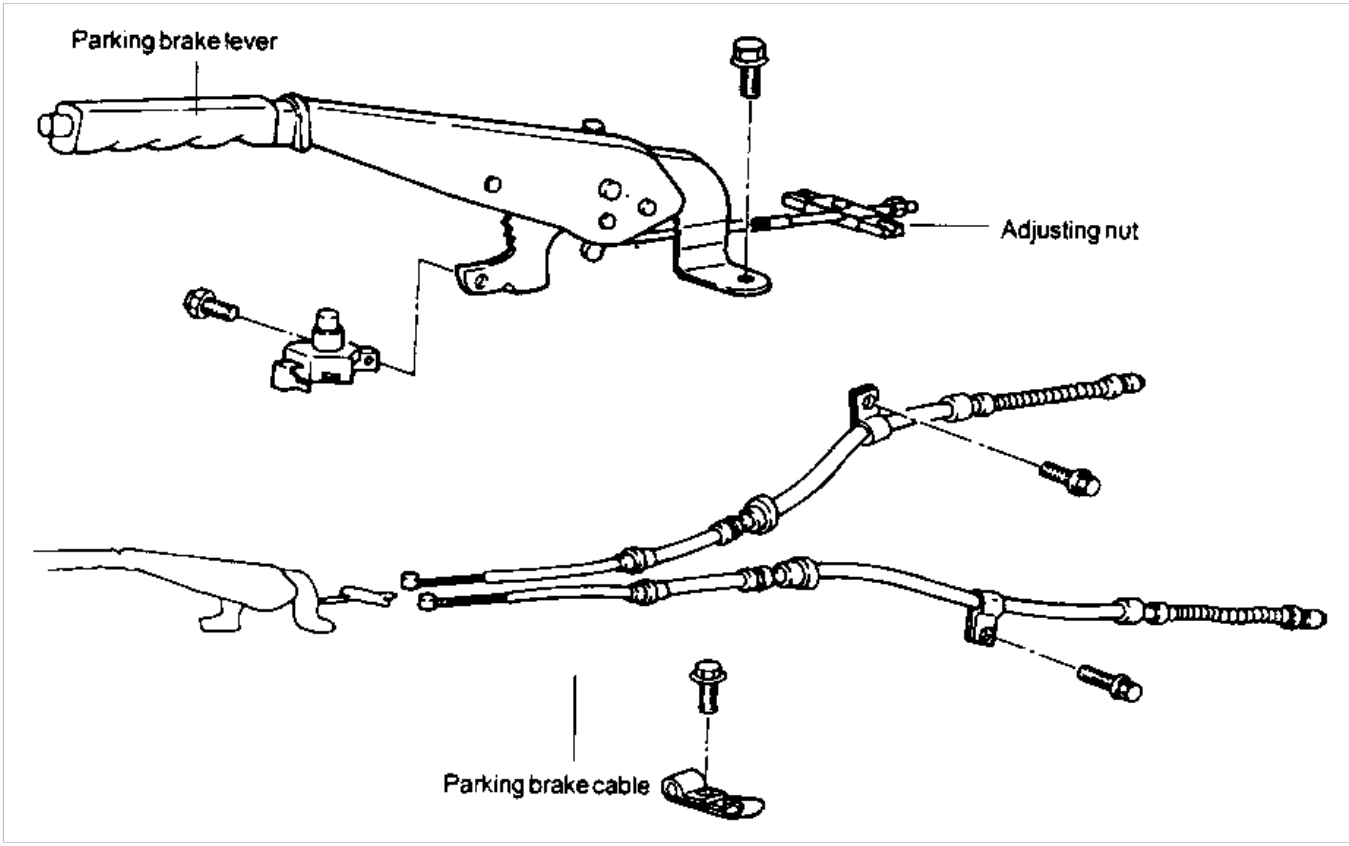
TROUBLESHOOTING

Symptom	Probable cause	Remedy
Noise or vibration when brakes are applied	Backing plate or caliper improperly mounted	Correct
	Loose backing plate or caliper mounting bolts	Retighten
	Unevenly worn or cracked brake drum or brake disc	Replace
	Foreign material in brake drum	Clean
	Seized pad or lining contact surface	Replace
	Excessive caliper to pad assembly clearance	Correct
	Uneven pad contact	Correct
	Lack of lubrication in sliding parts	Lubricate
	Loose suspension parts	Retighten
Vehicle pulls to one side when brakes are applied	Difference in left and right tire inflation pressure	Adjust
	Improper front wheel alignment	Adjust
	Inadequate contact of pad or lining	Correct

	Grease or oil on pad or lining surface	Replace
	Drum eccentricity or uneven wear	Replace
	Incorrect wheel cylinder installation	Correct
	Auto adjuster malfunction	Correct
Insufficient braking power	Low or contaminated brake fluid	Replenish or change
	Air in brake system	Bleed the system
	Brake booster malfunction	Correct
	Inadequate contact of pad or lining	Correct
	Grease or oil on pad surface	Replace
	Auto adjuster malfunction	Correct
	Overheated brake rotor due to dragging of pad or lining	Correct
	Restricted brake line	Correct
	Proportioning valve malfunction	Replace
Increased pedal stroke (Reduced pedal to floorboard clearance)	Air in brake system	Bleed the system
	Brake fluid leaks	Correct
	Auto adjuster malfunction	Correct
	Excessive push rod to master cylinder clearance	Adjust
Brake drag	Incomplete release of parking brake	Correct
	Incorrect parking brake adjustment	Adjust
	Weak brake pedal return spring	Replace
	Restricted master cylinder return port	Correct
	Broken rear drum brake shoe return spring	Replace
	Lack of lubrication in sliding parts	Lubricate
	Defective master cylinder check valve or piston return spring	Replace
	Insufficient push rod to master cylinder clearance	Replace
Insufficient parking brake function	Worn brake lining	Replace
	Grease or oil on lining surface	Replace
	Parking brake cable sticking	Replace
	Auto adjuster malfunction	Correct
	Excessive parking brake lever stroke	Adjust the parking brake lever stroke or check the parking brake cable routing

Brake Systems > Parking Brake System > Parking Brake > COMPONENTS

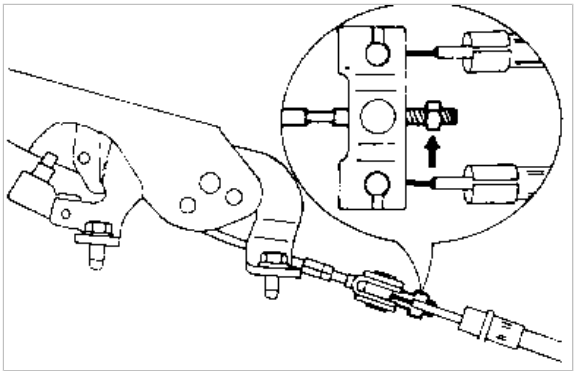
COMPONENTS



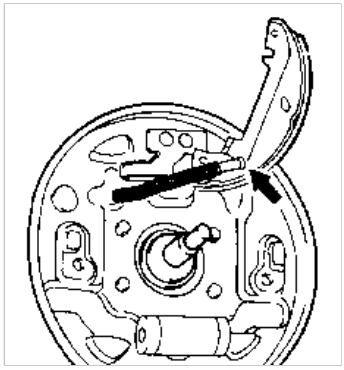
Brake Systems > Parking Brake System > Parking Brake > DISASSEMBLY

DISASSEMBLY

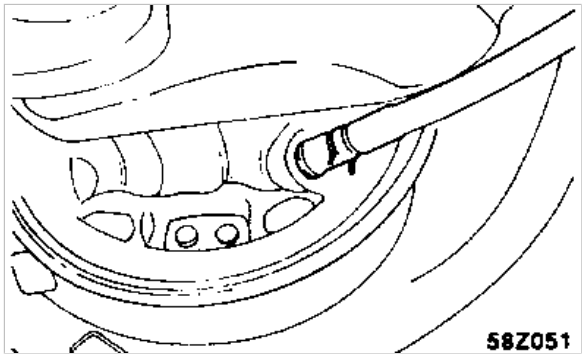
1. Remove the rear console.
2. Loosen the adjusting nut and detach the parking brake cable.
3. Detach the parking brake switch assembly.
4. Remove the parking brake lever assembly.



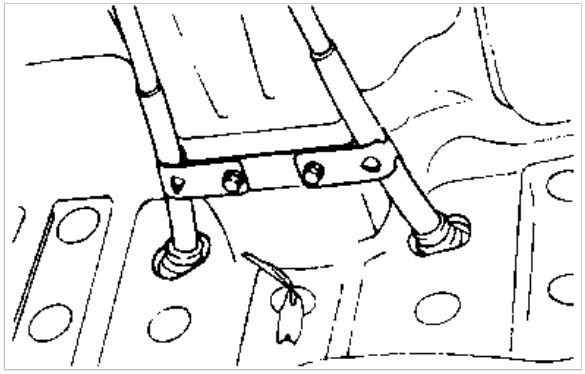
5. Remove the wheel and tire.
6. Remove the brake drum.
7. Remove the brake shoes as outlined before.
8. Detach the parking brake cable from the brake shoe.



9. Remove the parking brake cable retaining in the rear of the backing plate.



10. Remove the rear seat cushion assembly and roll up the carpet.
11. Loosen the parking brake cable clamp and remove the parking brake cable assembly.



Brake Systems > Parking Brake System > Parking Brake > INSPECTION

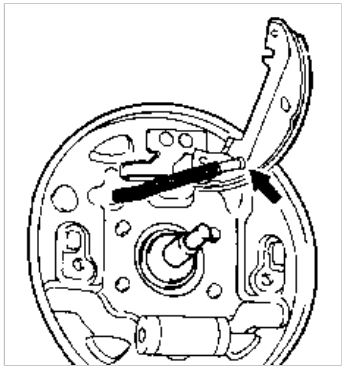
INSPECTION

1. Check the parking brake switch operation.
2. Check the parking brake lever ratchet for wear.
3. Check the parking brake cable for fraying or damage.

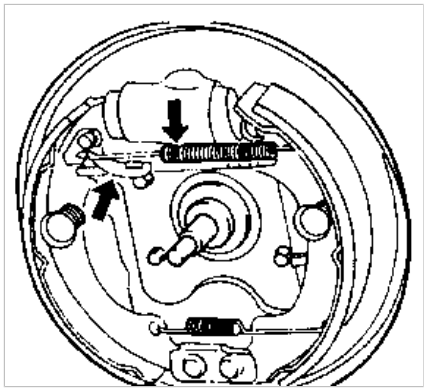
Brake Systems > Parking Brake System > Parking Brake > REASSEMBLY

REASSEMBLY

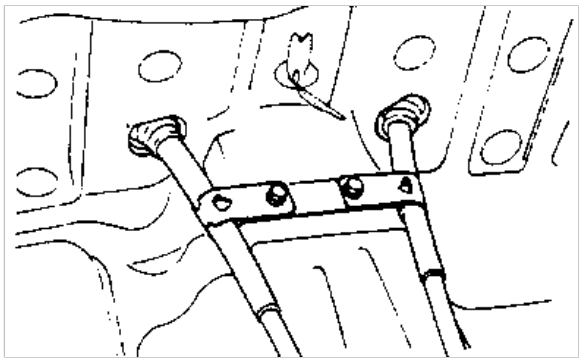
1. Check the parking brake cables for left and right identification marks and install accordingly.



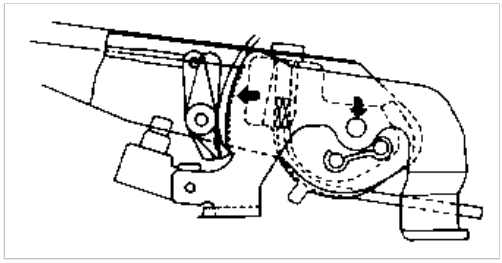
2. Move the adjust lever all the way back when installing the shoe-to-shoe spring.



3. Install the grommets in the direction shown in the illustration.



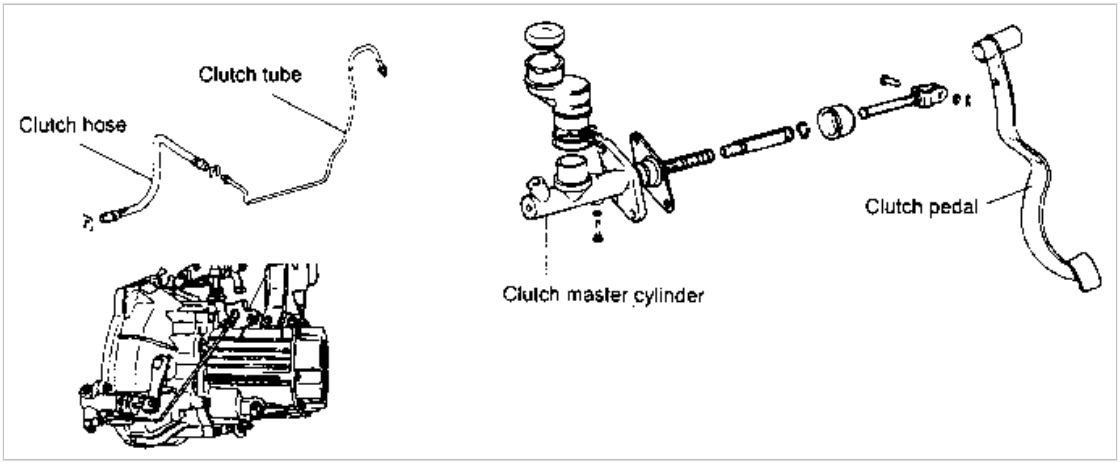
4. Apply a coating of the specified grease to the sliding parts of the ratchet plate and ratchet pawl.
5. After installing the cable adjuster, adjust the parking brake lever stroke.



ACCENT(X3) > 1998 > G 1.5 SOHC > Clutch System

Clutch System > Clutch Components > Clutch Control > COMPONENTS

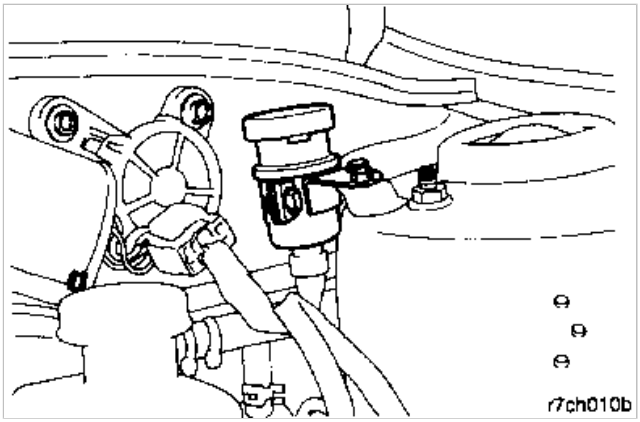
COMPONENTS



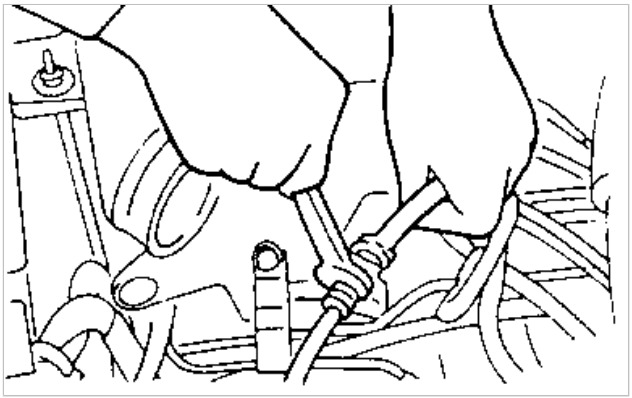
Clutch System > Clutch Components > Clutch Control > DISASSEMBLY

DISASSEMBLY

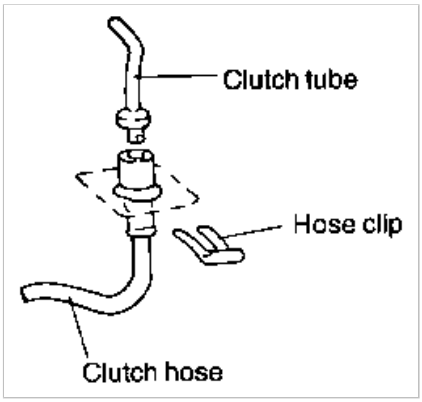
1. Drain the clutch fluid through the bleed plug.
2. Remove clevis pin, washer and cotter pin.
3. Disconnect the clutch line (master cylinder side).
4. Remove the master cylinder mounting bolt.



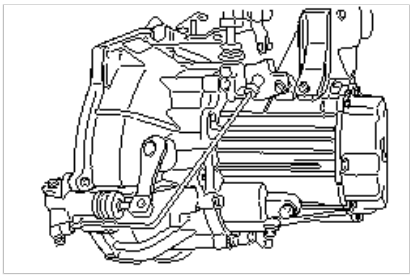
5. Remove the clutch line clips.
6. Hold the nut on the clutch hose and loosen the flare nut on the clutch line.



7. Remove the clip from the clutch hose and remove clutch hose from bracket.



8. Remove the clutch line.
9. Disconnect the clutch tube (release cylinder side).



Clutch System > Clutch Components > Clutch Control > INSPECTION

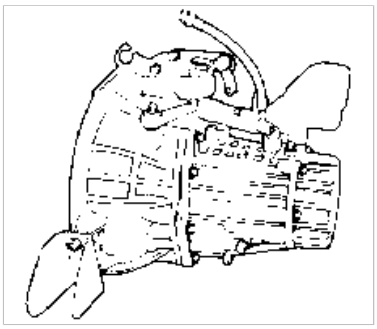
INSPECTION

Check the clutch hose or tube for cracks or clogging.

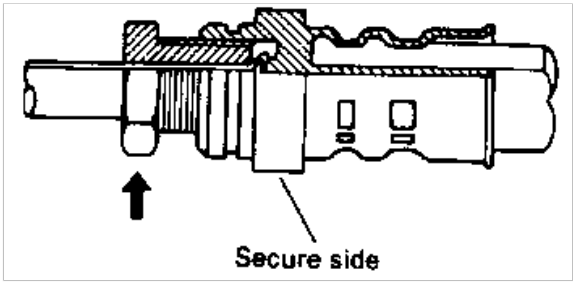
Clutch System > Clutch Components > Clutch Control > REASSEMBLY

REASSEMBLY

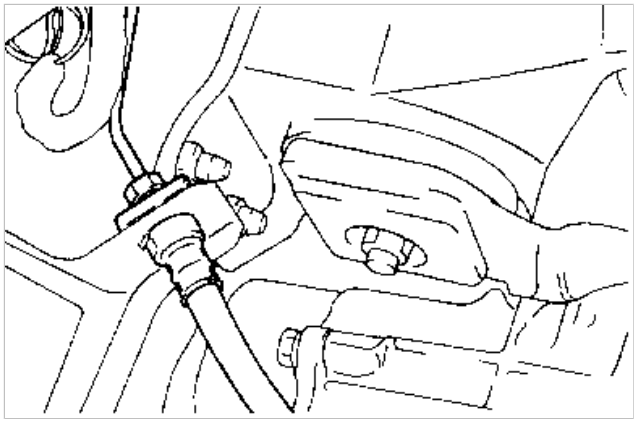
1. Connect the clutch tube (clutch hose side).



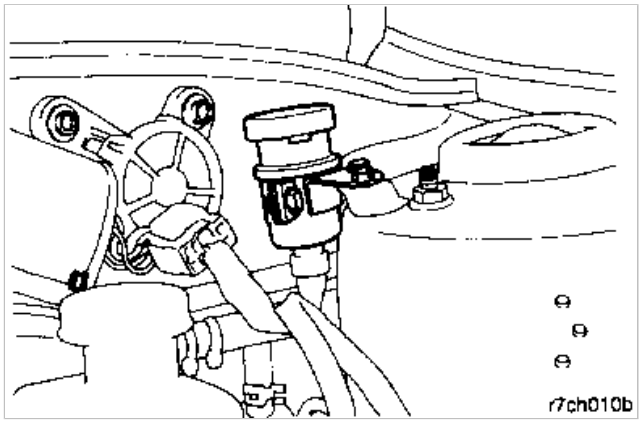
2. Temporarily tighten the flare nut by hand, and then tighten it to the specified torque, being careful that the clutch hose does not become twisted.



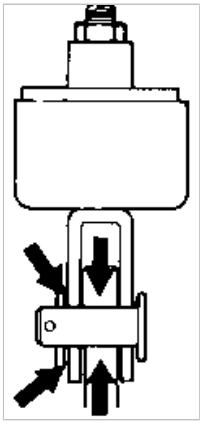
3. Install the clutch tube and clips.



4. Install the master cylinder.

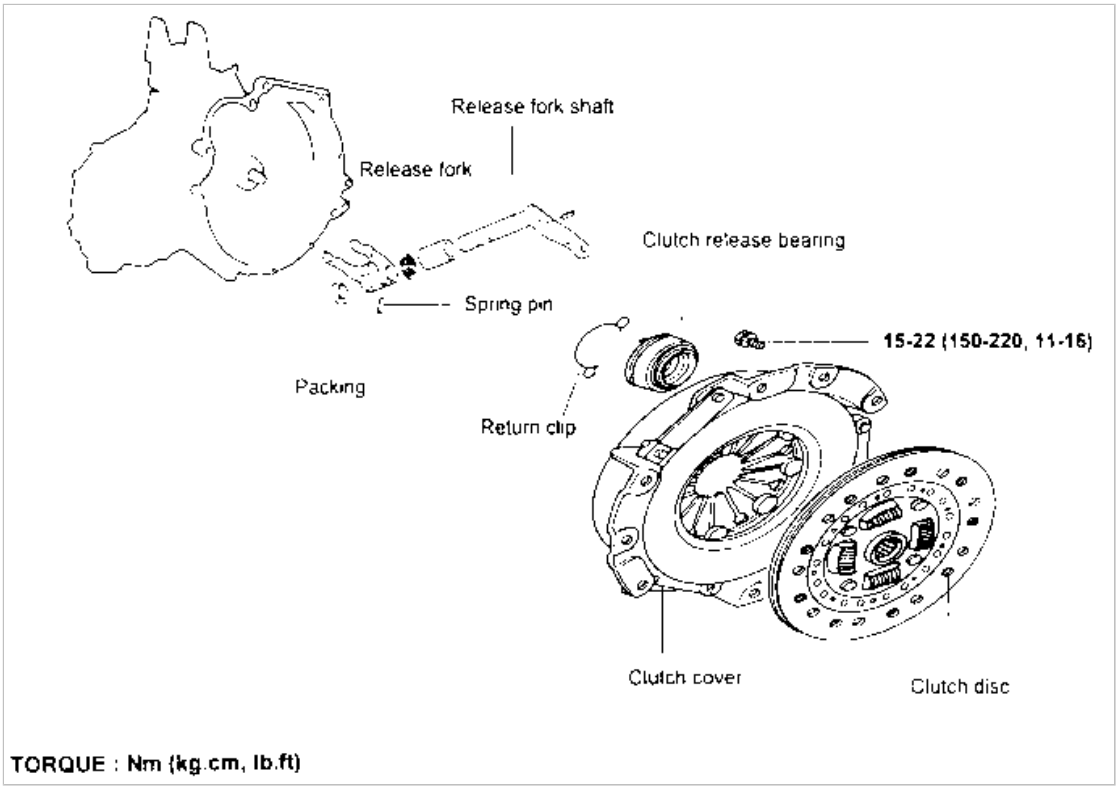


5. Apply the specified grease to the clevis pin and washer.
   Specified grease: Wheel bearing grease SAE J310a, NLGI No. 2
6. Install the push rod to the clutch pedal.
7. Refill the clutch master cylinder with fluid.
8. Bleed the system.



Clutch System > Clutch Components > Clutch Cover And Disc > COMPONENTS

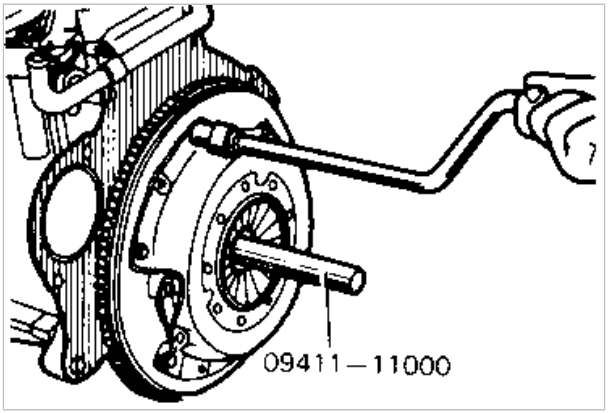
COMPONENTS



Clutch System > Clutch Components > Clutch Cover And Disc > DISASSEMBLY

DISASSEMBLY

1. Drain the clutch fluid and transaxle gear oil.
2. Remove the transaxle assembly.
3. Insert the special tool (09411-11000) in the clutch disc to prevent the disc from falling.
4. Loosen the bolts which attach the clutch cover to the flywheel in a star pattern. Loosen the bolts in succession, one or two turns at a time, to avoid bending the cover flange.
   DO NOT clean the clutch disc or release bearing with cleaning solvent.



Clutch System > Clutch Components > Clutch Cover And Disc > INSPECTION

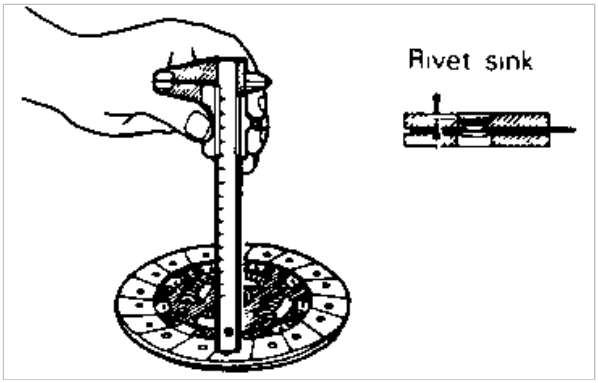
INSPECTION

CLUTCH COVER ASSEMBLY

1. Check the diaphragm spring end for wear and uneven height. Replace if wear is evident or height difference exceeds the limit.
2. Check the pressure plate surface for wear, cracks and color change.
3. Check the rivets for looseness and replace the clutch cover assembly if necessary.

CLUTCH DISC

1. Check the facing for loose rivets, uneven contact, deterioration due to seizure, adhesion of oil or grease and replace clutch disc if defective.
2. Measure the rivet sink and replace the clutch disc if it is out of specification.



3. Check for torsion spring play and damage and if defective, replace the clutch disc.
4. Clean the splines on the input shaft and install the clutch disc. If the disc does not slide smoothly or if play is excessive, replace the clutch disc and/or the input shaft.

CLUTCH RELEASE BEARING

The release bearing is packed with grease. Do not use cleaning solvent or oil.

a. Check the bearing for seizure, damage or abnormal noise. Also check the diaphragm spring contacting points for wear.
b. Replace the bearing if the release fork contacting points are worn abnormally.

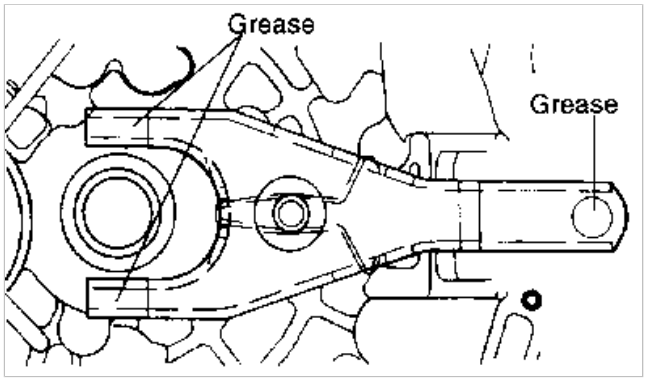
CLUTCH RELEASE FORK

a. If there is abnormal wear at the point of contact with the bearing, replace the release fork assembly.

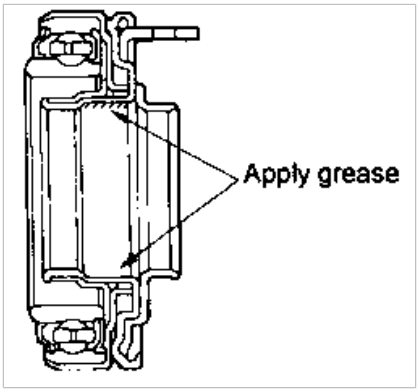
Clutch System > Clutch Components > Clutch Cover And Disc > REASSEMBLY

REASSEMBLY

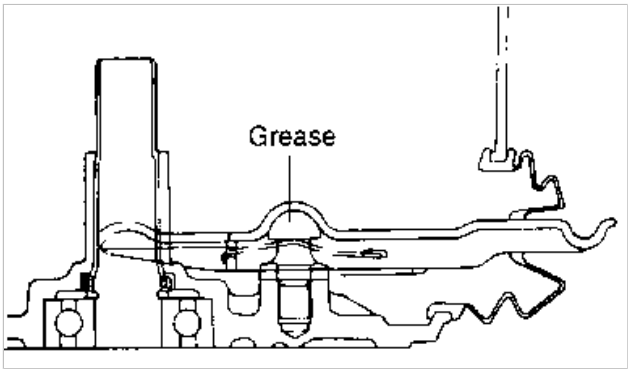
1. Apply multipurpose grease to the release bearing contact surfaces and the release cylinder contact surface of the clutch release fork assembly. When installing the clutch, apply grease to each part, but be careful not to apply excessive grease; it can cause clutch slippage and judder.



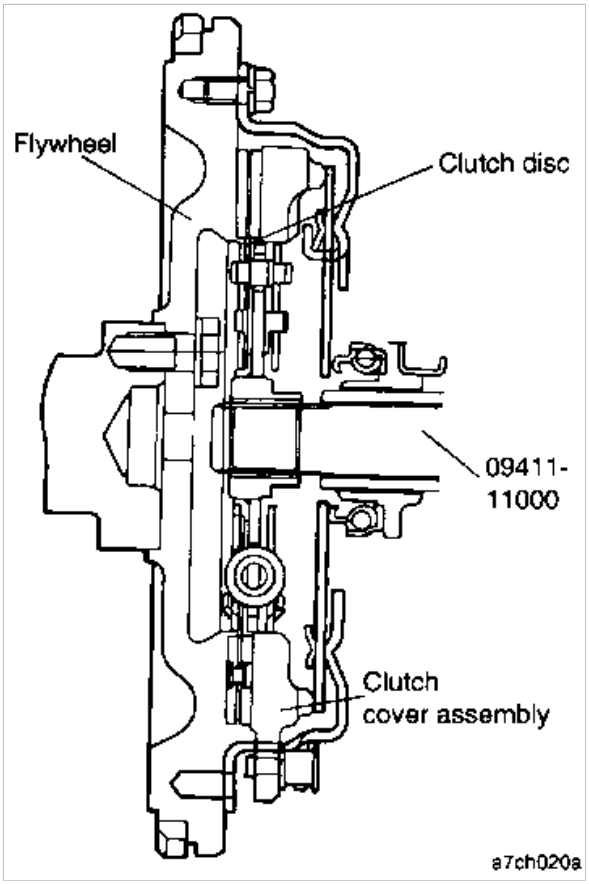
2. Apply multipurpose grease into the groove of the release bearing.
   Grease : MOLYWHITE TA No. 2



3. Apply multipurpose grease to clutch release lever fulcrum contact surface of the clutch release fork assembly.
   Grease : MOLYWHITE TA No. 2



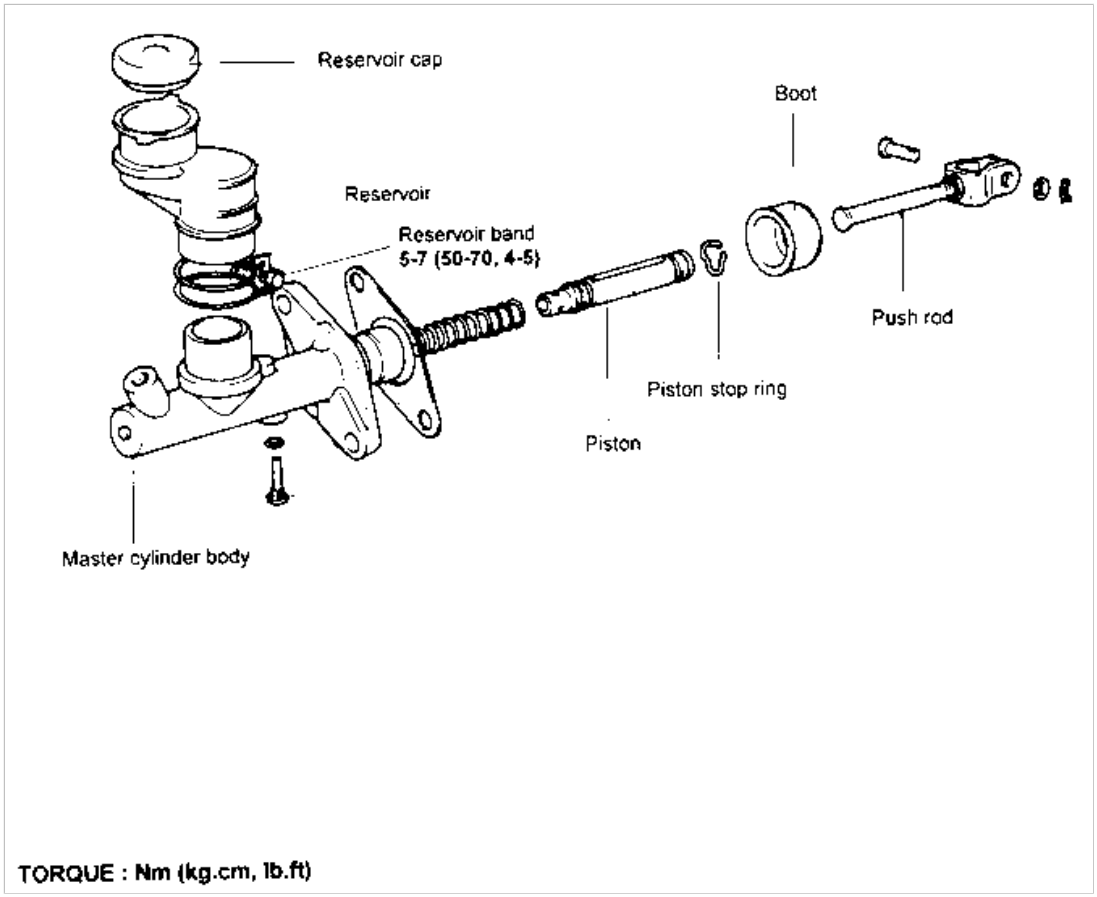
4. Clean the surfaces of the flywheel and pressure plate thoroughly with fine sandpaper or crocus cloth, and make certain that all oil or grease has been removed.
5. Apply a small amount of multipurpose grease to the clutch disc splines and input shaft splines.
   Grease : MOLYWHITE TA No. 2
   Do not apply more grease than necessary. Too much grease could clutch slip or judder.
6. Using the special tool (09411-11000), install clutch disc to flywheel. When installing the clutch disc, be sure that the surface having the manufacturers stamp is towards the pressure plate side.



7. Install the clutch cover assembly onto the flywheel and install six (6) bolts through the clutch cover into the flywheel.
8. Diagonally tighten the bolts.
   Tighten the bolts, one or two turns at a time, in succession, to avoid bending the cover flange.
9. Remove the special tool.
10. Install the transaxle. (Refer to GROUP 43 - Manual Transaxle Assembly.)
11. Adjust the clutch pedal free-play.

Clutch System > Clutch Components > Clutch Master Cylinder > COMPONENTS

COMPONENTS



Clutch System > Clutch Components > Clutch Master Cylinder > DISASSEMBLY

DISASSEMBLY

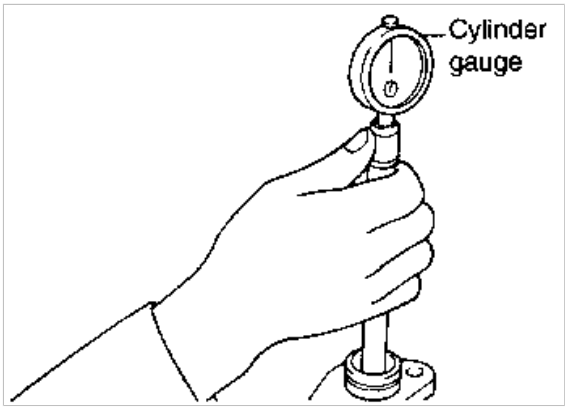
1. Remove the piston stop ring.
2. Pull out the push rod and piston assembly.
3. Remove the reservoir band, reservoir cap and reservoir.

a. Do not damage the master cylinder body and piston assembly.
b. Do not disassemble the piston assembly.

Clutch System > Clutch Components > Clutch Master Cylinder > INSPECTION

INSPECTION

1. Check the inside of cylinder body for rust, pitting or scoring.
2. Check the piston cup for wear or distortion.
3. Check the piston for rust, pitting or scoring.
4. Check the clutch tube line for clogging.
5. Measure the master cylinder inside diameter with a cylinder gauge and the piston outside diameter with a micrometer.



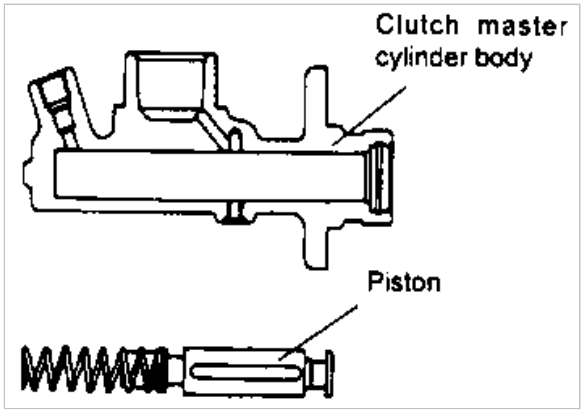
Measure the inside diameter of master cylinder at three places (bottom, middle, and top), in perpendicular directions.

6. If the master cylinder-to-piston clearance exceeds the limit, replace the master cylinder and/or piston assembly.

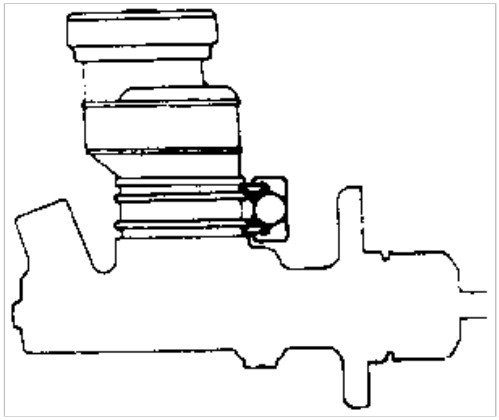
Clutch System > Clutch Components > Clutch Master Cylinder > REASSEMBLY

REASSEMBLY

1. Apply the specified fluid to the inner surface of the cylinder body and to the outside of the piston assembly.
   Specified fluid : Brake fluid DOT 3
2. Install the piston assembly.
3. Install the push rod.

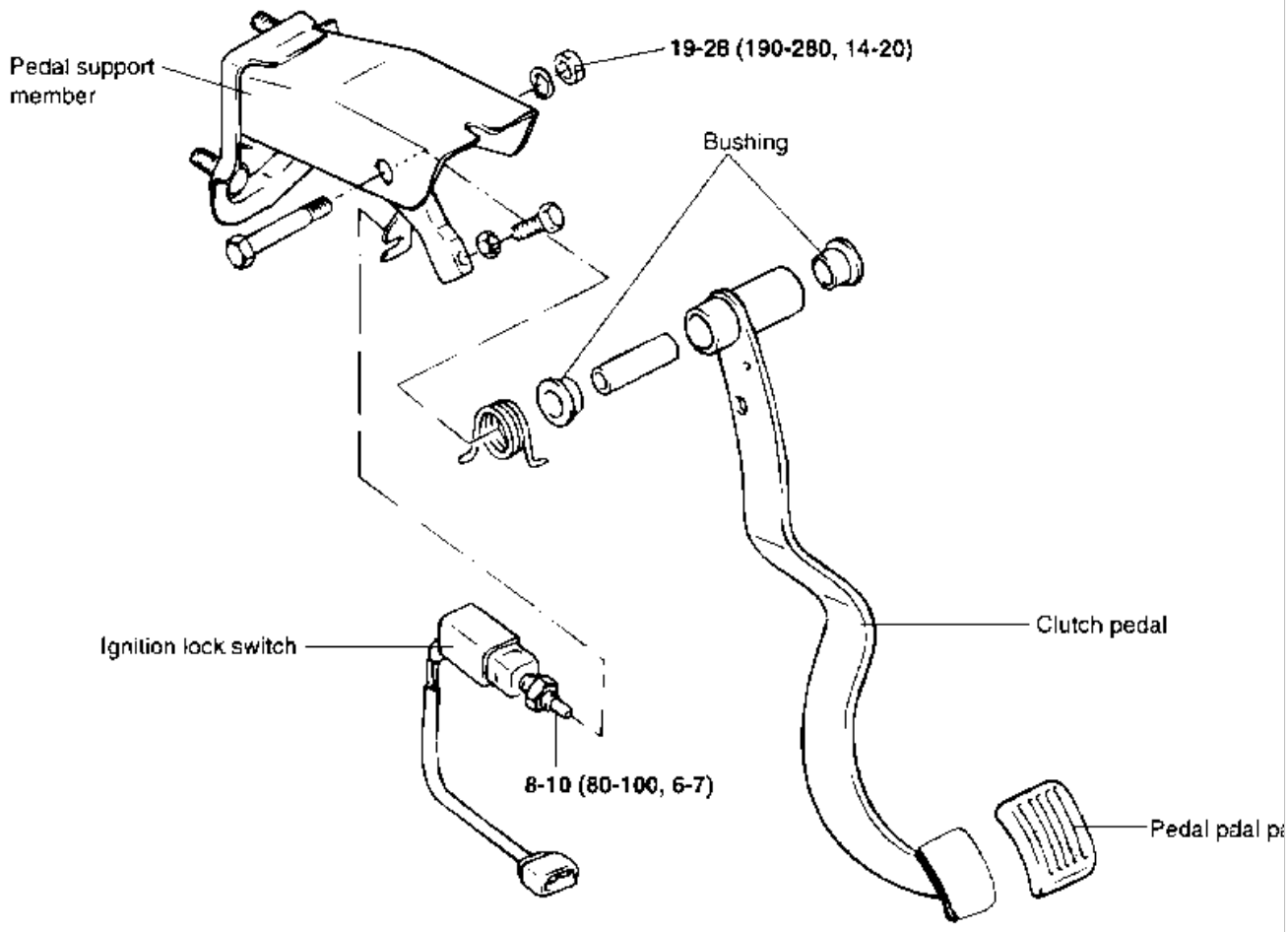


4. Install the reservoir to the master cylinder body.



Clutch System > Clutch Components > Clutch Pedal > COMPONENTS

COMPONENTS

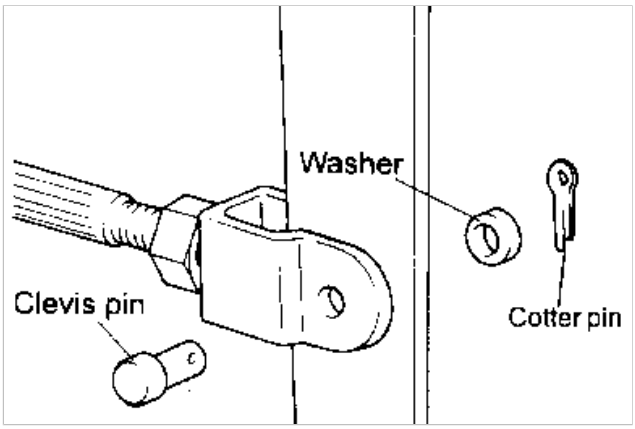


TORQUE : Nm (kg.cm, lb.ft)

Clutch System > Clutch Components > Clutch Pedal > DISASSEMBLY

DISASSEMBLY

1. Remove the cotter pin, washer and clevis pin.
2. Remove the clutch pedal mounting bolt.



Clutch System > Clutch Components > Clutch Pedal > INSPECTION

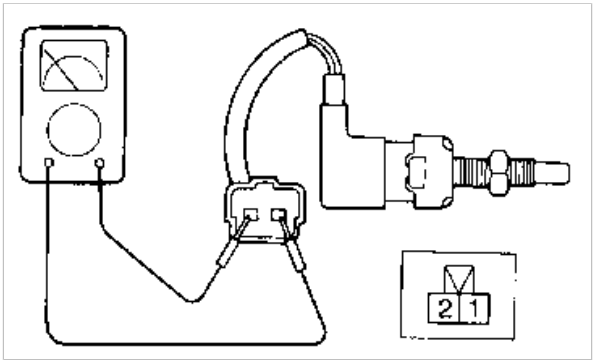
INSPECTION

1. Check the pedal shaft and bushing for wear.
2. Check the clutch pedal for bending or twisting.
3. Check the return spring for damage or deterioration.
4. Check the pedal pad for damage or wear.

IGNITION LOCK SWITCH INSPECTION

Check for continuity between terminals.

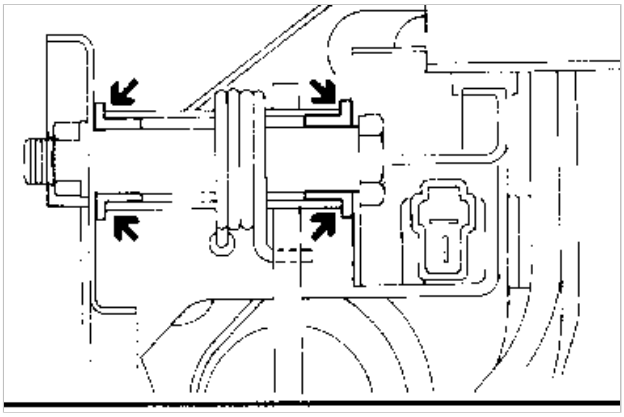
Condition \ Terminals	1	2
Pushed	○———	———○
Free		



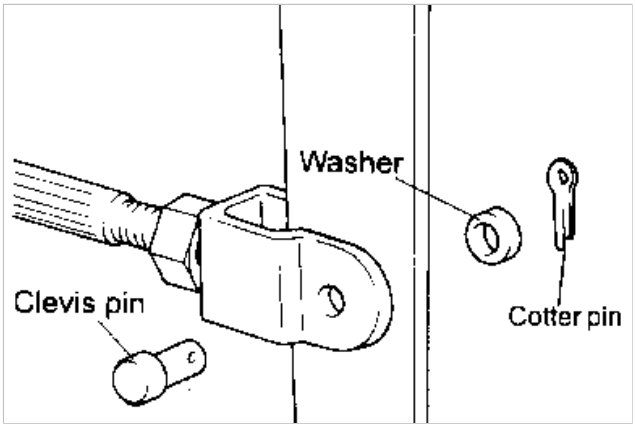
Clutch System > Clutch Components > Clutch Pedal > REASSEMBLY

REASSEMBLY

1. Installation is reverse of removal.
2. Apply multi-purpose grease to the bushings.



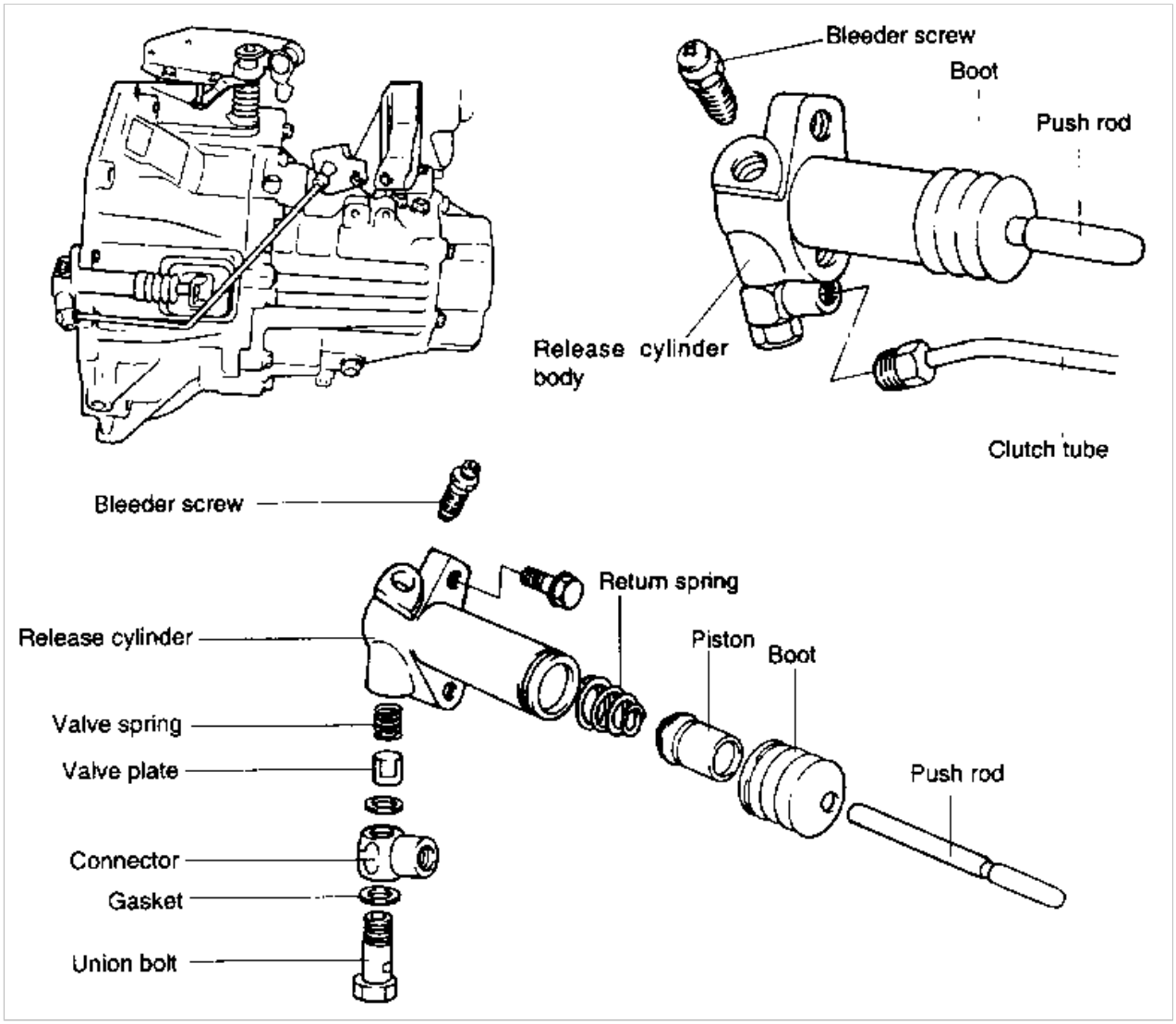
3. Apply the multi-purpose grease to the clevis pin and washer.



4. Install the push rod to the clutch pedal.
5. Adjust the clutch pedal clevis pin play.

Clutch System > Clutch Components > Clutch Release Cylinder > COMPONENTS

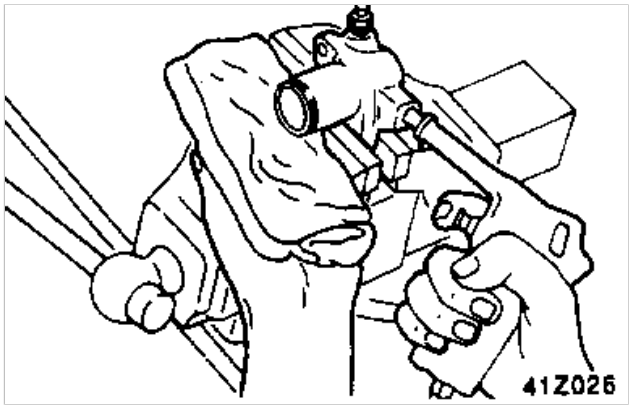
COMPONENTS



Clutch System > Clutch Components > Clutch Release Cylinder > DISASSEMBLY

DISASSEMBLY

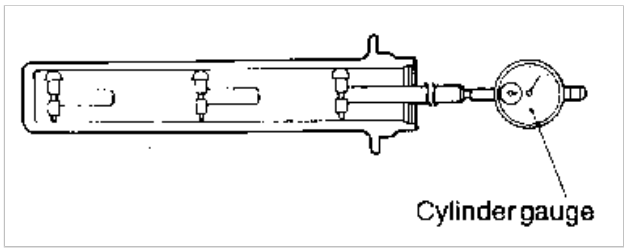
1. Disconnect the clutch tube.
2. Remove the clutch release cylinder mounting bolt.
3. Remove the valve plate, spring, push rod and boot.
4. Remove any dirt from the piston bore opening of the release cylinder.
5. Remove the piston from the release cylinder using compressed air.
   a. Cover with rags to prevent the piston from popping out and causing injury.
   b. Apply compressed air slowly to prevent the fluid from splashing in your eyes or on your skin.



Clutch System > Clutch Components > Clutch Release Cylinder > INSPECTION

INSPECTION

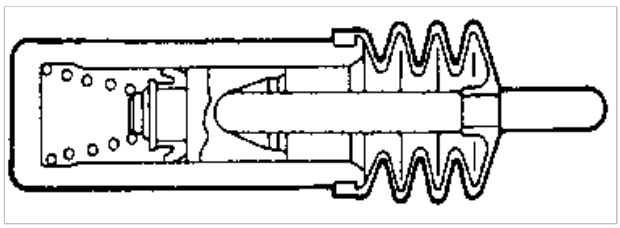
1. Check the clutch release cylinder for fluid leakage.
2. Check the clutch release cylinder boots for damage.
3. Check the release cylinder bore for rust and damage.
4. Measure the release cylinder bore at three locations (bottom, middle and top) with a cylinder gauge and replace the release cylinder assembly if the bore-to-piston clearance exceeds the limit.



Clutch System > Clutch Components > Clutch Release Cylinder > REASSEMBLY

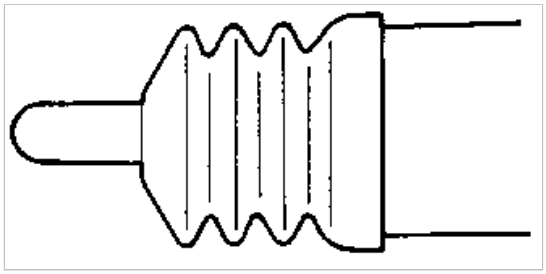
REASSEMBLY

1. Apply specified brake fluid to the release cylinder bore and the outer surface of the piston and piston cup, and push the piston cup assembly into the cylinder.
   Use the specified fluid : Brake fluid DOT 3
2. Install the valve plate, push rod and boot.

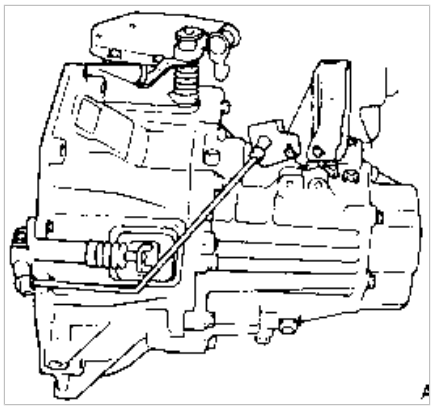


3. Coat the clevis pin with the specified grease. Align the hole in the end of the release cylinder push rod with that of the clutch release fork shaft, and insert the clevis pin into the holes.

Specified grease : MOLYWHITE TA No. 2



4. Install the clutch release cylinder and the clutch tube.

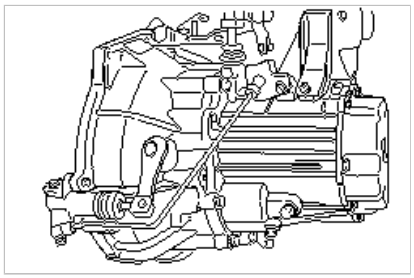


Clutch System > General > BLEEDING

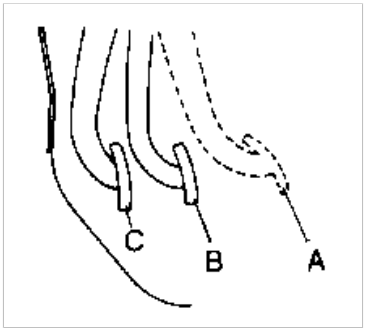
BLEEDING

Whenever the clutch tube, the clutch hose, and/or the clutch master cylinder have been removed, or if the clutch pedal is spongy, bleed the system.

Use the specified fluid. Avoid mixing different brands of fluids.
Specified fluid: SAE J1703 (DOT 3)



1. Loosen the bleeder screw at the clutch release cylinder.
2. Push the clutch pedal down slowly until all air is expelled.
3. Hold the clutch pedal down until the bleeder is retightened.
4. Refill the clutch master cylinder with the specified fluid.
   The rapidly repeated operation of the clutch pedal in B-C range may cause the release cylinder's position to be forced out from the release cylinder body during the air bleeding; re-press the clutch pedal after it returns to the "A" point completely.



Clutch System > General > LUBRICANTS

LUBRICANTS

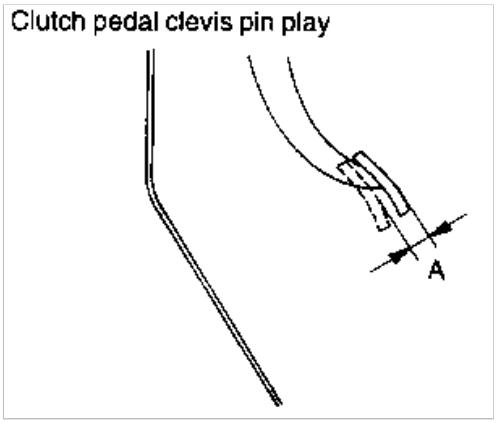
Item	Specified lubricant	Quantity
Contact surface of release bearing and fulcrum of clutch release fork	MOLYWHITE TA NO. 2	As required
Inner surface of clutch release bearing	MOLYWHITE TA NO. 2	As required
Inner surface of clutch release cylinder and outer circumference of piston and cup	Brake fluid DOT 3	As required
Inner surface of clutch disc spline	MOLYWHITE TA NO. 2	As required
Inner surface of clutch master cylinder and outer circumference of piston assembly	Brake fluid DOT 3	As required
Clutch master cylinder push rod, clevis pin and washer	Wheel bearing grease SAE J310a, NLGI No. 2	As required
Clutch pedal shaft and bushing	SAE J310a, Chassis grease, NLGI No. 1	As required
Contact portion of release fork to release cylinder push rod	MOLYWHITE TA NO. 2	As required
Input shaft spline	MOLYWHITE TA NO. 2	As required

Clutch System > General > SERVICE ADJUSTMENT PROCEDURES

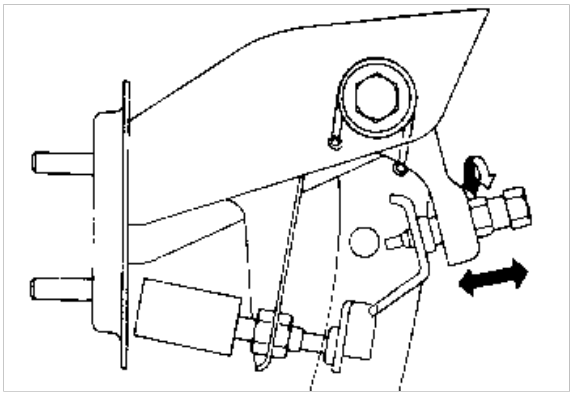
SERVICE ADJUSTMENT PROCEDURES

CLUTCH PEDAL INSPECTION AND ADJUSTMENT

1. Measure the clutch pedal clevis pin play (measured at the face of the pedal pad.)



2. If the clutch pedal clevis pin free-play is not within the standard value range, adjust as follows:
   (1) Turn and adjust the bolt, then secure by tightening the lock nut.

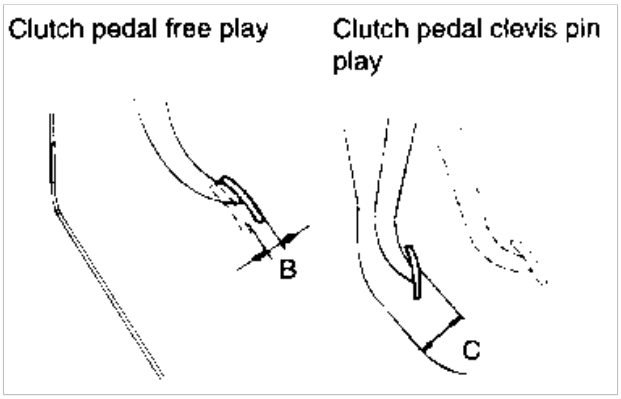


   After the adjustment, tighten the bolt until it reaches the pedal stopper, and then tighten the lock nut.

   (2) Turn the push rod to agree with the standard value and then secure the push rod with the lock nut.
   When adjusting the clutch pedal height or the clutch pedal clevis pin play, be careful not to force the push the rod toward the master cylinder.

3. After completing the adjustments, check that the clutch pedal free play (measured at the face of the pedal pad) and the distance between the

clutch pedal (the face of the pedal pad) and the toeboard when the clutch is disengaged, are within the standard value ranges.



4. If the clutch pedal free play and the distance between the clutch pedal and the firewall when the clutch is disengaged do not meet with the standard values, it may be the result of either air in the hydraulic system or a faulty master cylinder or clutch. Bleed the air, or disassemble and inspect the master cylinder or clutch.

Clutch System > General > SERVICE STANDARD

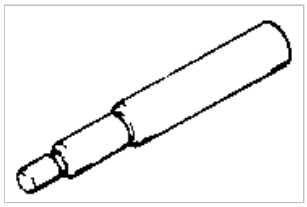
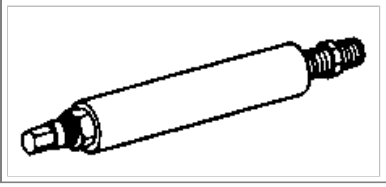
SERVICE STANDARD

Item	Unit : mm (in.)
Clutch disc thickness [When free]	8.7 ± 0.3(0.34 ± 0.01)
Clutch pedal free play	6-13 (0.24-0.52)
Clutch pedal to floor board clearance (When the clutch is disengaged)	90 (3.6)
Clutch pedal stroke	145 (5.7)

Limit	Unit : mm (in.)
Clutch disc rivet sink	0.3 (0.012)
Diaphragm spring end height difference	0.5 (0.02)
Clutch release cylinder clearance to piston	0.15 (0.006)
Clutch master cylinder clearance to piston	0.15 (0.006)

Clutch System > General > SPECIAL TOOLS

SPECIAL TOOLS

Tool (Number and Name)	Illustration	Use
09411-11000Clutch disc		Installation of clutch disc
09414-24000Lock pin remover		Removal of lock pin

Clutch System > General > SPECIFICATIONS

SPECIFICATIONS

Clutch operating method	|	Hydraulic type
Clutch disc	Type	Single dry with diaphragm
	Facing diameter (Outside x Inside) mm (in.)	200 x 130(7.9 x 5.1)
Clutch cover assembly	Type	Diaphragm spring strap
	Setting load N (lb)	3,300-3,800 (742-854)
Clutch release cylinder	I.D. mm (in.)	20.64 (0.81)
Clutch master cylinder	I.D. mm (in.)	15.87 (0.62)

I.D. : Inside diameter

Clutch System > General > TIGHTENING TORQUE

TIGHTENING TORQUE

Item	Nm	kg.cm	lb.ft
Clutch pedal to pedal support member (clutch pedal bracket)	19-28	190-280	14-20
Clutch pedal support member	17-21	170-210	12-15
Clutch master cylinder to firewall	9-14	90-140	7-10
Clutch tube flare nut	13-17	130-170	9-13
Clutch tube bracket	4-6	40-60	3-4
Reservoir band	5-7	50-70	4-5
Clutch release cylinder	15-22	150-220	11-16
Clutch release cylinder union bolt	20-25	200-250	15-18
Clutch cover assembly	15-22	150-220	11-16

Clutch System > General > TROUBLESHOOTING

TROUBLESHOOTING

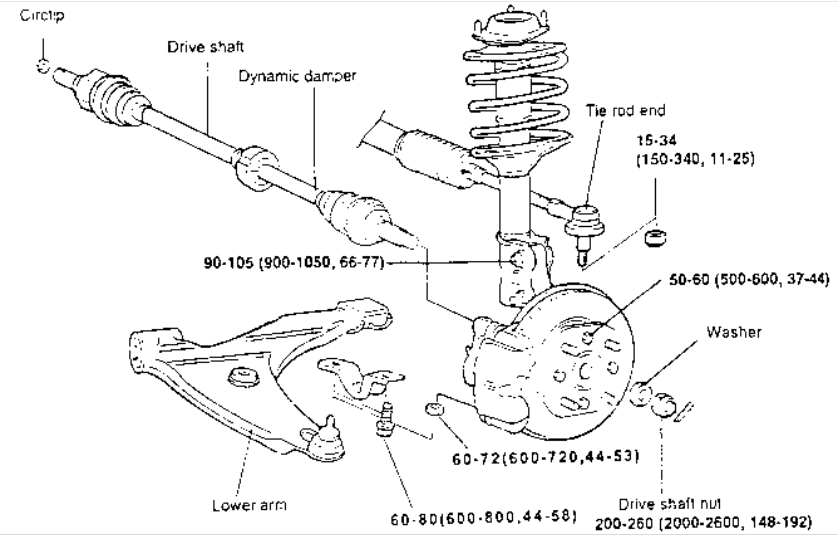
Symptom	Probable cause	Remedy
Clutch slipping a. Car will not respond to engine speed during acceleration b. Insufficient car speed c. Lack of power during uphill driving	Insufficient pedalfree play	Adjust
	Clogged hydraulic system	Correct or replace parts
	Excessive wear of clutch disc wear	Replace
	Hardened clutch disc facing, or oil on surface	Replace
	Damaged pressure plate or flywheel	Replace
	Weak or broken pressure spring	Replace
Difficult gear shifting (gear noise during shifting)	Excessive pedal free play	Adjust
	Hydraulic system fluid leaks, air trapping or restriction	Repair or replace parts
	Unusual wear or corrosion of clutch disc spline	Replace
	Excessive vibration (distortion) of clutch disc	Replace
Clutch noisy - A noise is heard when clutch is not used	Insufficient free-play of clutch pedal	Adjust
	Excessive clutch disc wear	Replace

Clutch noisy - A noise is heard after clutch is disengaged	Unusual wear and/or damage of release bearing	Replace
Clutch noisy - A noise is heard when clutch is disengaged	Insufficient grease on the sliding surface of bearing sleeve	Repair
	Improperly installed clutch assembly or bearing	Repair
A noise is heard when the car is moved with the clutch partially engaged	Damaged pilot bushing	Replace
Hard pedal effort when clutch is not used	Insufficient lubrication of clutch pedal shaft	Repair
	Insufficient lubrication of spline part of clutch disc	Repair
	Insufficient lubrication of clutch release lever shaft	Repair
	Insufficient lubrication of front bearing retainer	Repair
Hard to shift or will not shift	Excessive clutch pedal free play	Adjust
	Faulty clutch release cylinder	Repair release cylinder
	Clutch disc out of true, runout is excessive or lining broken	Inspect clutch disc
	Spline on input shaft or clutch disc dirty or burred	Repair or replace
	Faulty clutch pressure plate	Replace
Clutch slips	Insufficient clutch pedal free play	Adjust
	Restricted hydraulic system	Repair or replace parts
	Clutch disc lining oily or worn out	Replace
	Faulty pressure plate	Replace
	Release fork binding	Inspect release fork
Clutch grabs/chatters	Oily or worn out clutch disc lining	Replace
	Faulty pressure plate	Replace
	Bent clutch diaphragm spring	Replace
	Torsion spring worn or broken	Replace clutch disc
	Loose engine mounts	Repair as necessary
Clutch noisy	Clutch pedal bushing damaged	Replace
	Loose part inside housing	Repair as necessary
	Worn or dirty release bearing	Replace
	Release fork or linkage binding	Repair as necessary

ACCENT(X3) > 1998 > G 1.5 SOHC > Drive Shaft & Axle

Drive Shaft & Axle > Drive Shaft > Front Drive Shaft Assembly > COMPONENTS

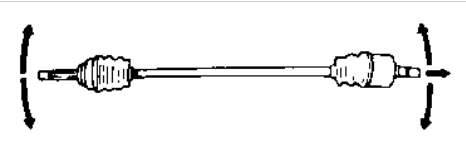
COMPONENTS



Drive Shaft & Axle > Drive Shaft > Front Drive Shaft Assembly > INSPECTION

INSPECTION

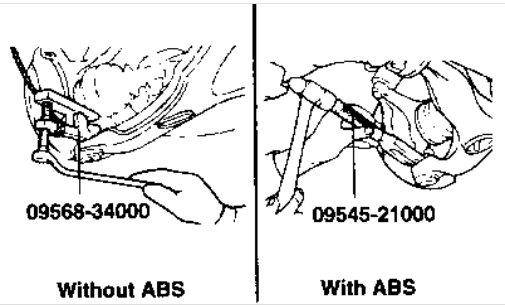
1. Check the drive shaft boots for damage and deterioration.
2. Check the ball joints for wear and operating condition.
3. Check the splines for wear and damage.



Drive Shaft & Axle > Drive Shaft > Front Drive Shaft Assembly > REMOVAL

REMOVAL

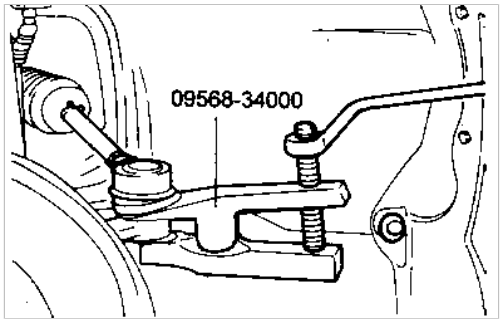
1. Remove the hub caps and loosen the drive shaft nut.
2. Lift up the vehicle and remove the tires.



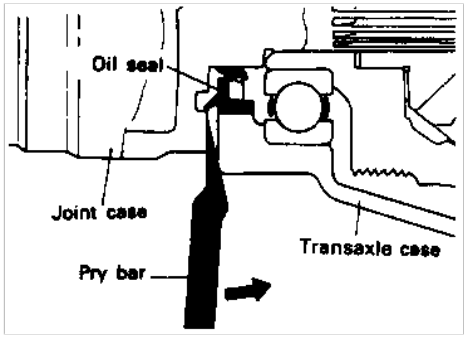
3. Disconnect the tie rod end ball joint from the knuckle.

Be sure to tie a cord to the special tool and to a nearby part.

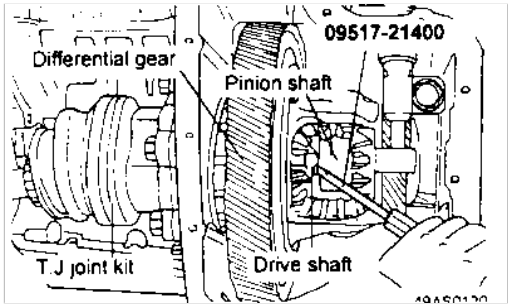
4. Disconnect the lower arm ball joint from the lower arm.



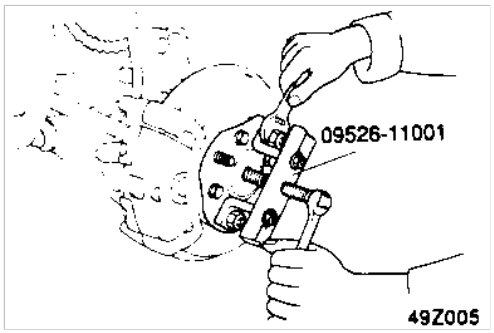
5. Drain the transaxle fluid.
6. Insert a pry bar between the transaxle case and joint case (D.O.J), and pry the drive shaft from the transaxle case.
   a. Be sure to apply the pry bar to the rib of the transaxle case.
   b. Do not insert the pry bar too deep, as this may cause damage to the oil seal. [max. depth : 7 mm (0.28 in.)].



7. Pull out the drive shaft from the transaxle case.
   a. Place a shop towel in the hole of the transaxle case to prevent contamination.
   b. Support the drive shaft properly.
   c. Replace the retainer ring each time the drive shaft is removed from the transaxle case.
   d. For automatic transaxle equipped vehicles, insert a pry bar into the groove of the drive shaft to remove the drive shaft from the transaxle.
   e. Do not pull on the drive shaft; doing so will damage the T.J.: be sure to use the pry bar.

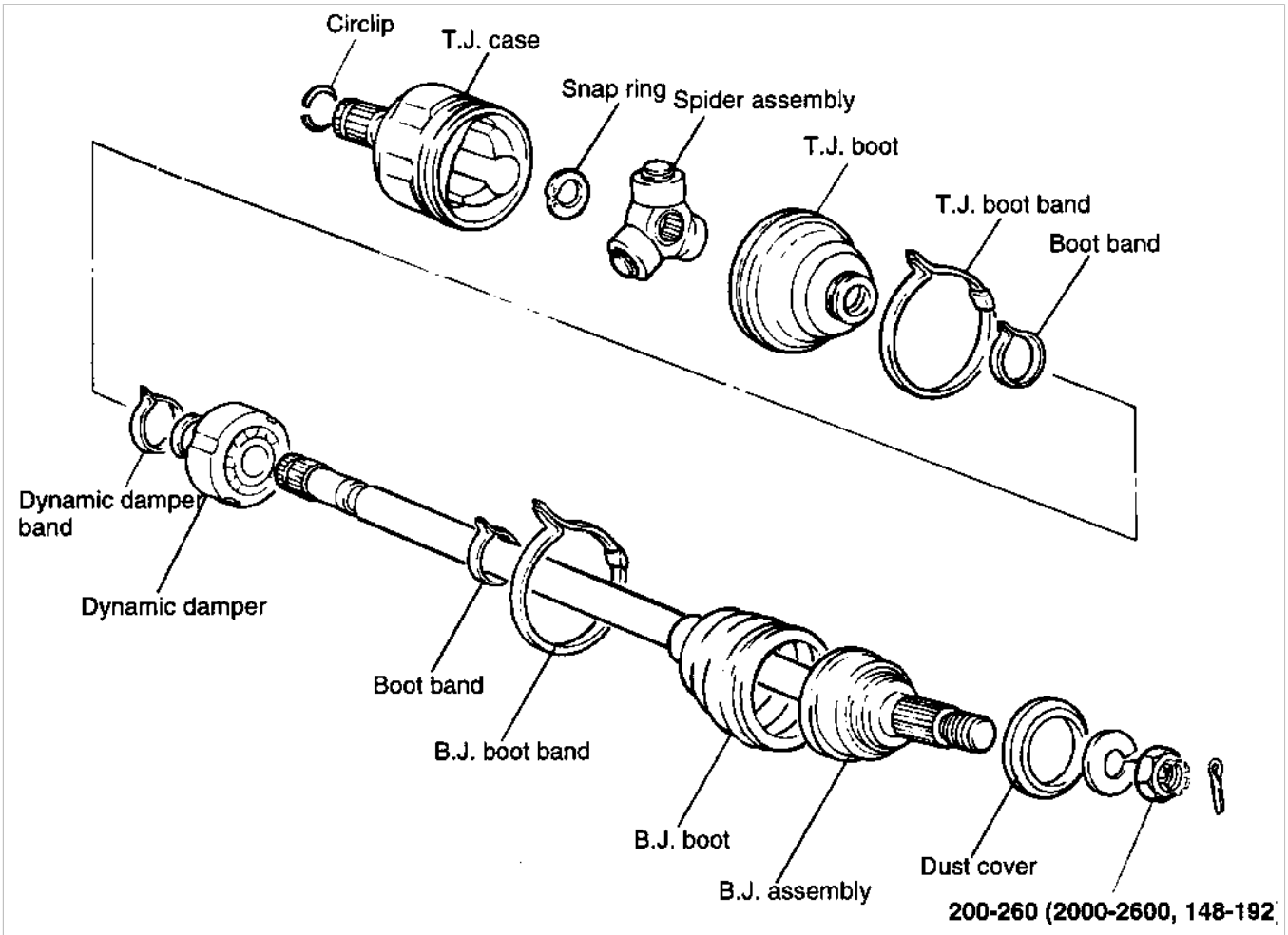


8. Using special tool (09526-11001), force the drive shaft out of the hub.
   When the drive shaft is forced out, keep the spacer from falling out of place.



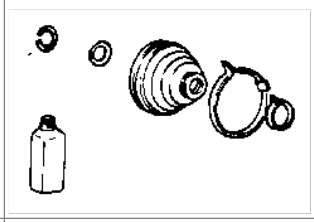
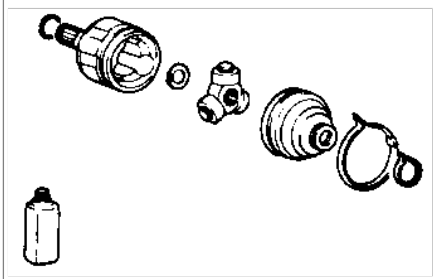
Drive Shaft & Axle > Drive Shaft > Front Driveshaft > COMPONENTS

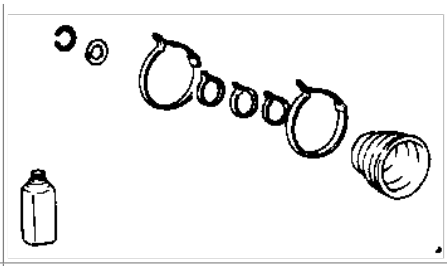
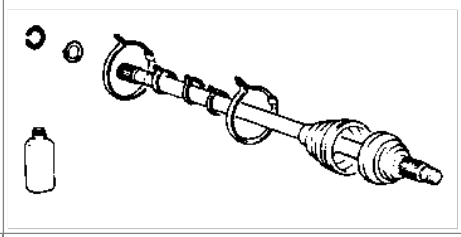
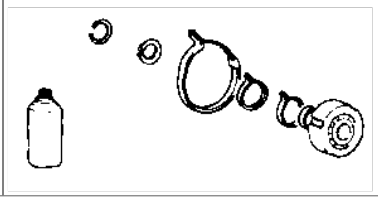
COMPONENTS



TORQUE : Nm (kg·cm, lb·ft)

REPAIR KITS

Kit name	Illustration	Contents
T.J. Boot kit		a. Circlip b. Snap ring c. T.J. boot d. T.J. boot band e. Boot band f. Grease
T.J. joint kit		a. Circlip b. T.J. case c. Snap ring d. Spider assembly e. T.J. boot f. T.J. boot band g. Boot band h. Grease
B.J. boot kit		a. Circlip b. Snap ring c. T.J. boot band d. Boot band e. Dynamic damper band f. Boot band

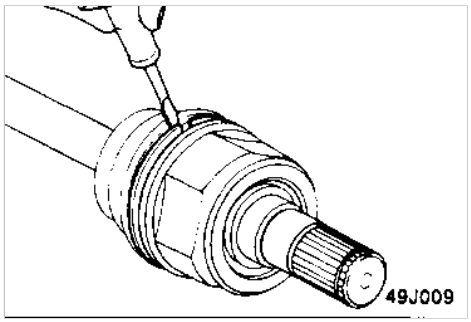
		g. B.J. boot h. Grease
B.J. joint and shaft kit		a. Circlip b. Snap ring c. T.J. boot band d. Boot bands e. Dynamic damper band f. B.J. boot band g. B.J. boot h. B.J. assembly i. Grease
Damper kit		a. Circlip b. Snap ring c. T.J. boot band d. Boot bands e. Dynamic damper band f. Dynamic damper g. grease

Drive Shaft & Axle > Drive Shaft > Front Driveshaft > DISASSEMBLY

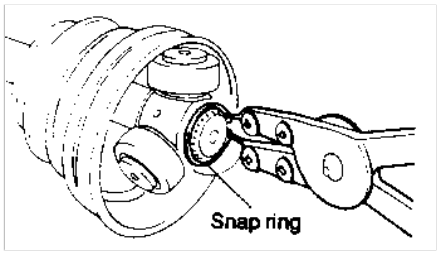
DISASSEMBLY

a. Do not disassemble the B.J. assembly.
b. The drive shaft joint uses special grease. Do not substitute with another type of grease.
c. The boot band should be replaced with a new one.

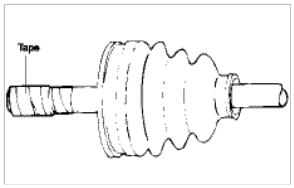
1. Remove the T.J. boot bands and pull the T.J. boot from the T.J. case.
   Be careful not to damage the boot.



2. Remove the snap ring and spider assembly from the drive shaft.
3. Clean the spider assembly.



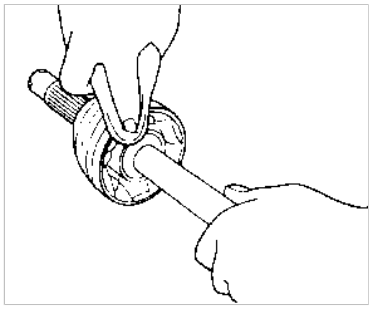
4. Remove the B.J. boot bands and pull out the T.J. boot and B. J. boot.
   If the boot is to be reused, wrap tape around the drive shaft splines to protect the boot.



Drive Shaft & Axle > Drive Shaft > Front Driveshaft > INSPECTION AFTER DISASSEMBLY

INSPECTION AFTER DISASSEMBLY

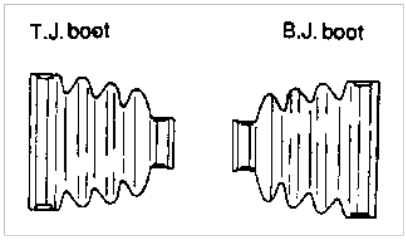
1. Check the driver shaft spline part for wear or damage.
2. Check for entry of water and/or foreign material into B.J.
3. Check the spider assembly for roller rotation, wear or corrosion.
4. Check the groove inside T.J. case for wear or corrosion.
5. Check the dynamic damper for damage or cracking.



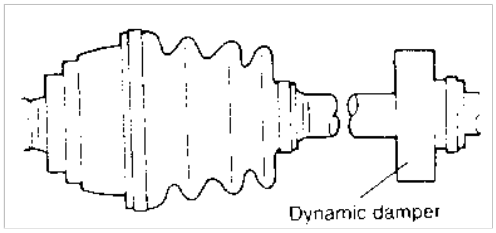
Drive Shaft & Axle > Drive Shaft > Front Driveshaft > REASSEMBLY

REASSEMBLY

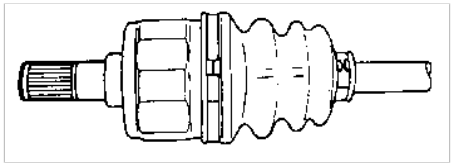
1. Wrap tape around the drive shaft splines (T.J. side) to prevent damage to the boots.
2. Apply grease to the drive shaft and install the boots.



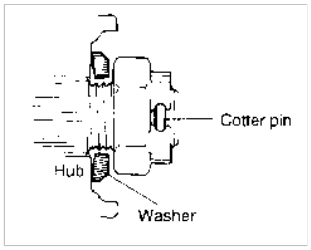
3. To install the dynamic damper, keep the B.J. and shaft in a straight line and secure the dynamic damper in the direction illustrated and install the small boot band.



4. Apply grease into the T.J. boot and install the boot.



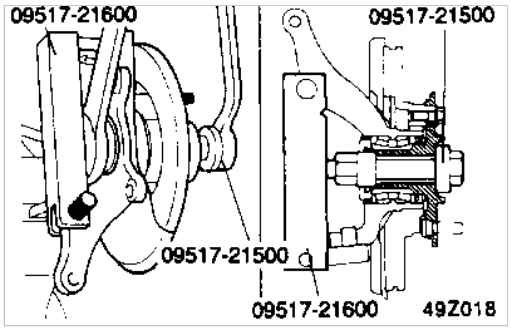
5. Tighten the T.J. boot bands.
6. Add grease to the B.J. as much as wiped away at the time of inspection.
7. Install the boots.
8. Tighten the B.J. boot bands.
9. To control the air in the T.J. boot, keep the specified distance between the boot bands when they are tightened.
10. Tighten the following parts to the specified torque.
11. Install a new retainer ring each time the drive shaft is removed from the transaxle.
12. Install the washer under the drive shaft nut as shown in the illustration.



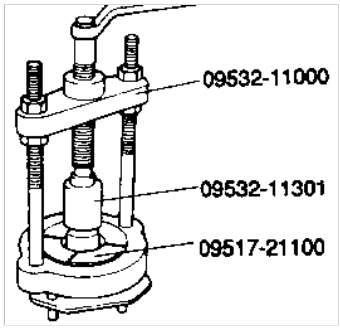
Drive Shaft & Axle > Front Axle > Front Hub/Knuckle > BEARING REPLACEMENT

BEARING REPLACEMENT

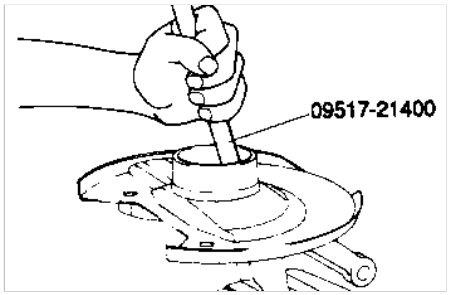
1. Install the special tools as illustrated.
2. Remove the hub from the knuckle by turning the special tool.
   a. Be sure to use the special tool.
   b. If the hub and knuckle are disassembled by striking with a hammer, the bearing will be damaged.
3. Secure the knuckle in a vise.
4. Remove the brake disc from the hub.



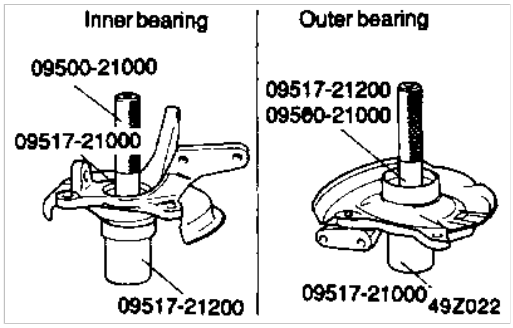
5. Remove the outer bearing inner race from the hub using special tools (09532-11000, 09532-11301, 09517-21100).



6. Remove the oil seal and inner bearing inner race from the knuckle.
7. Drive out the bearing outer races from the knuckle using the special tools.
   If either the outer or inner race needs replacement, they must be replaced as a set.

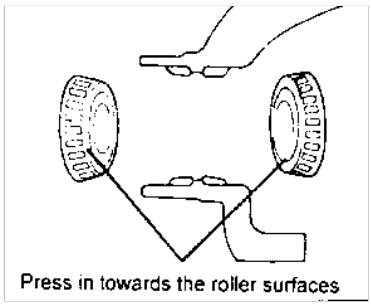


8. Apply the specified multipurpose grease to the outside surface of the bearing outer race.
9. Install the bearing outer race into the knuckle with Special Tools (09500-21000, 09517-21000, 09517-21200).



10. Install the disc to the hub, and torque to specification.

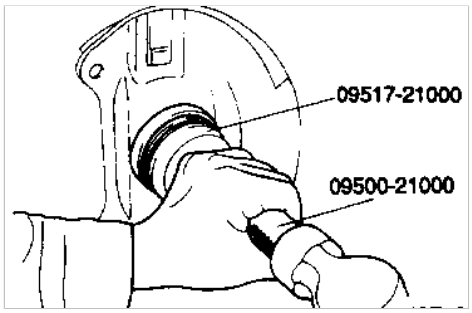
11. Apply the specified multipurpose grease to the bearings and inside surface of the hub.



12. Place the outside bearing inner race into the knuckle.

13. Drive the oil seal (hub side) into the knuckle with the special tools.

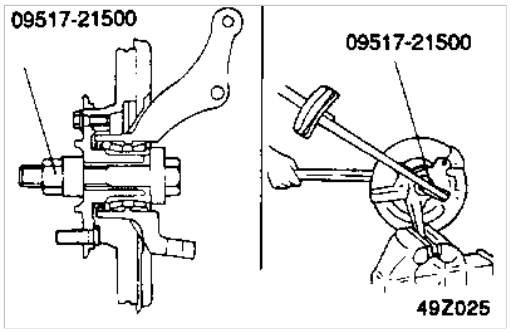
14. Apply the specified multipurpose grease to the lip of the oil seal and to the surfaces of the oil seal which contact the hub.



15. Place the inner bearing into the knuckle.

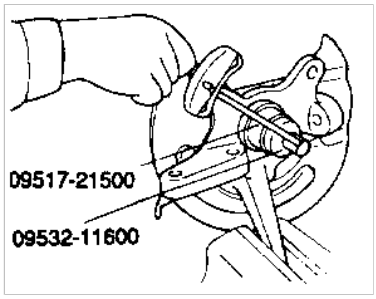
16. Tighten the hub to the knuckle to 230 Nm (2,350 kg.cm, 167 lb.ft) with the Special Tool (09517-21500).

17. Rotate the hub to seat the bearing.

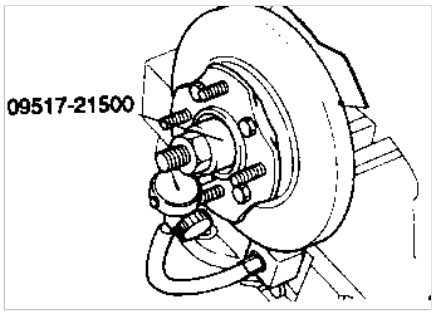


18. Measure the hub bearing starting torque.

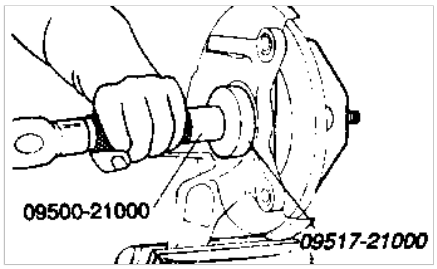
19. If the starting torque is 0 Nm (0 lb.in), measure the hub bearing axial play.



20. If the hub axial play exceeds the limit while the nut is tightened to 235 Nm (2,350 kg.cm, 167 lb.ft), the bearing, hub and knuckle have not been installed correctly. Repeat the disassembly and assembly procedure.

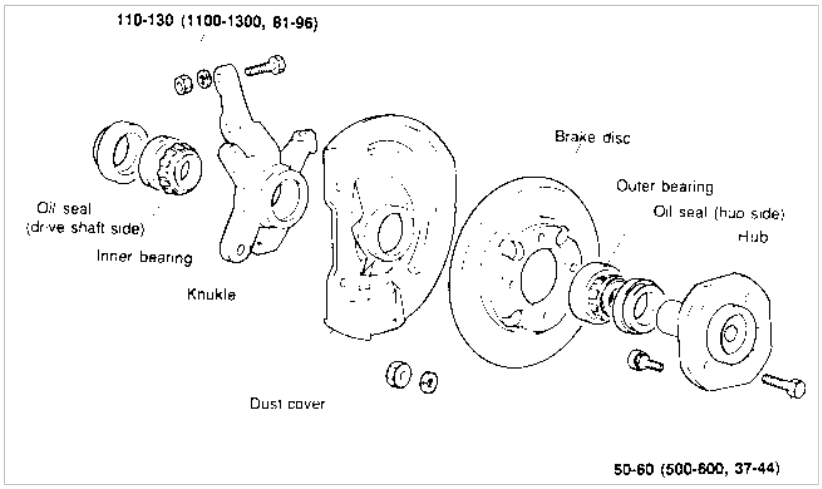


21. Remove the special tool.
22. Apply the specified multipurpose grease to the bearing and to the inside of the knuckle.
23. Drive the oil seal (drive shaft side) into the knuckle until it contacts the bearing outer race using special tools.
24. Apply the specified multipurpose grease to the lip of the oil seal.
25. Install the parts to the torque specifications.
26. Lower the vehicle to the ground and tighten the knuckle to the lower arm ball joint connecting bolt.



Drive Shaft & Axle > Front Axle > Front Hub/Knuckle > COMPONENTS

COMPONENTS



Drive Shaft & Axle > Front Axle > Front Hub/Knuckle > INSPECTION

INSPECTION

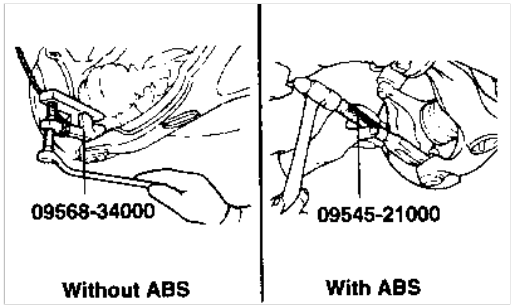
a. Check the hub for cracks and the splines for wear.
b. Check the oil seal for cracking or damage.

c. Check the brake disc for scoring and damage.
d. Check the steering knuckle for cracks.
e. Check for a defective bearing. (Refer to "Wheel bearing troubleshooting.")

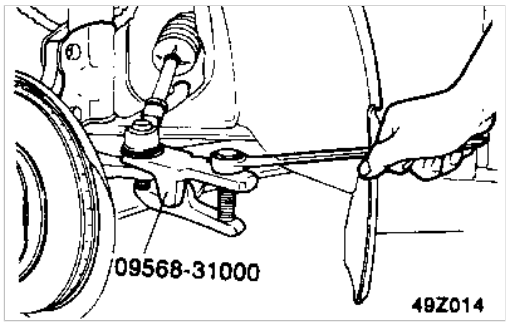
Drive Shaft & Axle > Front Axle > Front Hub/Knuckle > REMOVAL

REMOVAL

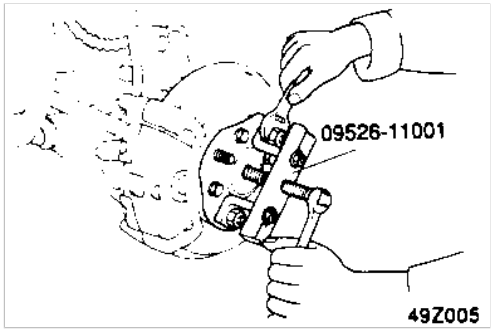
1. Remove the hub caps and the drive shaft nut.
2. Jack up the vehicle and support it with jack stands.
3. Remove the wheel and tire.
4. Remove the front brake assembly from the knuckle and suspend it with a wire.
5. Disconnect the lower arm ball joint from the knuckle using the special tool.



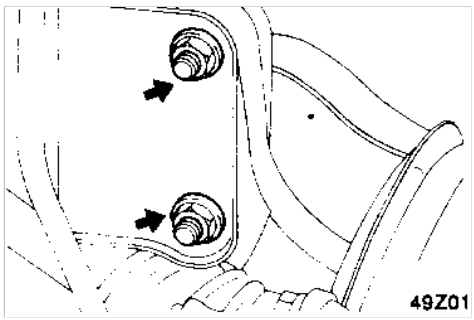
6. Disconnect the tie rod end ball joint from the knuckle using the special tool.
   a. Be sure to tie the cord of the special tool to the nearby part.
   b. Loosen the nut, but do not remove it.



7. Disconnect the drive shaft from the hub using the special tool.



8. Remove the hub and knuckle as an assembly from the strut.



Drive Shaft & Axle > General > LUBRICANTS

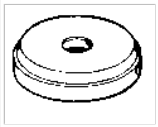
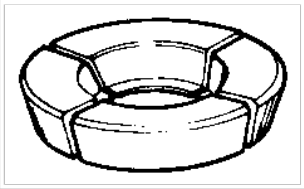
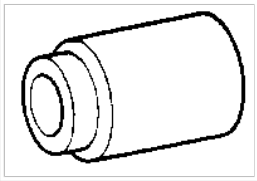
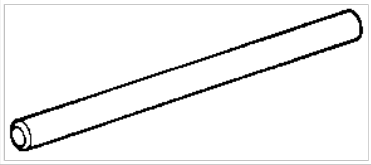
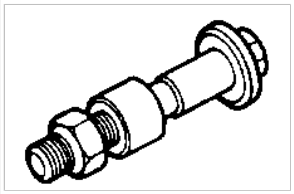
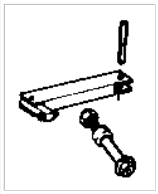
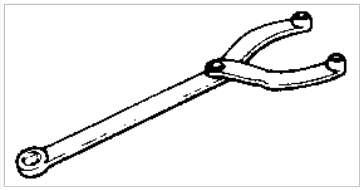
LUBRICANTS

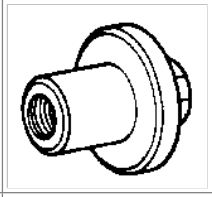
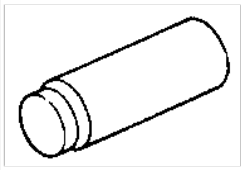
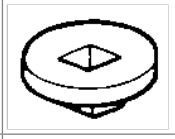
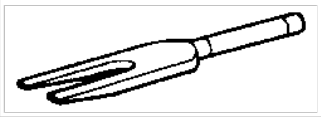
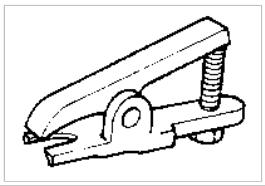
T.J.-B.J. type drive shaft

	Recommended lubricant	Quantity
B.J. boot grease	CENTOPLEX 278 M/ 136K	85 ± 6 gr.(Joint : 40 ± 3 gr.,Boot : 45 ± 3 gr.)
T.J. boot grease	KLK TJ 41-182 (MS511-50)	95 ± 6 gr.(Joint : 60 ± 3 gr.,Boot : 35 ± 3 gr.)

Drive Shaft & Axle > General > SPECIAL TOOLS

SPECIAL TOOLS

Tool (Number and Name)	Illustration	Use
09500-21000Bar		Installation of oil seal and bearing.
09517-21000Oil seal installer		Press fit for the front wheel bearing oil seal. (use with 09500-21000) Press fit for the front wheel bearing outer race. (use with 09500-21000)
09517-21100Hub bearing remover		Removal of front wheel bearing. (user with 09532-11000, 09532-11301)
09517-21200Front axle base		Press-fitting of the front wheel bearing outer race.(use with 09517-21000, 09500-21000).
09517-21400Drift		Removal of front hub bearing outer race.
09517-21500Front hub remover and installer		Removal & installation of the front hub. (use with 09517-21600)
09517-21600Knuckle arm bridge		Removal of the front hub. (use with 09517-21500)
09517-21700End yoke holder		Holding of the front wheel when installing and removing the front axle shaft.
09529-21000Wheel alignment gauge attachment		Front wheel alignment for aluminum wheel.

		
09532-11000Tapered roller bearing puller		Removal of front wheel bearing. (use with 09532-11301, 09517-21100)
09532-11301Puller cup		Removal of front wheel bearing. (use with 09517-21100, 09532-11000)
09532-11600Pre-load socket		Measuring of front wheel bearing pre-load. (use with 09517-21500, 30 mm socket and torque wrench)
09526-11001Axle shaft puller		Removal of the drive shaft from the front hub.
09545-21000Ball joint remover		Removal of the front lower arm ball joint. (with ABS)
09568-34000Ball joint remover		Separation of the tie rod end ball joint and lower arm ball joint

Drive Shaft & Axle > General > SPECIFICATION

SPECIFICATION

Drive shaft

Joint type	Outer	B. J.
	Inner	T. J.
Length (Joint to joint)	Left	384 (15.12)
	Right	679 (26.73)
Maximum permissible joint angle	B. J.	45° or more
	T. J.	22.5° or more

B. J. : Birfield joint

T. J. : Tripod joint

Drive Shaft & Axle > General > TIGHTENING TORQUE

TIGHTENING TORQUE

I	Nm	Kg.cm	lb.ft
Drive shaft nut	200-260	2000-2600	148-192

Knuckle to strut assembly	75-90	750-900	55-66
Lower arm ball joint to knuckle	60-72	600-720	44-53
Tie rod end to knuckle	15-34	150-340	11-25

Drive Shaft & Axle > General > TROUBLESHOOTING

TROUBLESHOOTING

Symptom	Probable cause	Remedy
Vehicle pulls to one side	Galling of drive shaft ball joint	Replace
	Wear, rattle or galling wheel bearing	Replace
	Defective front suspension and steering	Adjust or replace
Vibration	Wear, damage or bending of drive shaft	Replace
	Drive shaft rattle and hub serration	Replace
	Wear, rattle or sintering of wheel bearing	Replace
Shimmy	Improper wheel balance	Adjust or replace
	Defective front suspension and steering	Adjust or replace
Excessive noise	Wear, damage or bending of drive shaft	Replace
	Drive shaft rattle and hub serration	Replace
	Drive shaft rattle and side gear serration	Replace
	Wear, rattle or galling of wheel bearing	Replace
	Loose hub nut	Adjust or replace
	Defective front suspension and steering	Adjust or replace

Drive Shaft & Axle > General > WHEEL BEARING TROUBLESHOOTING

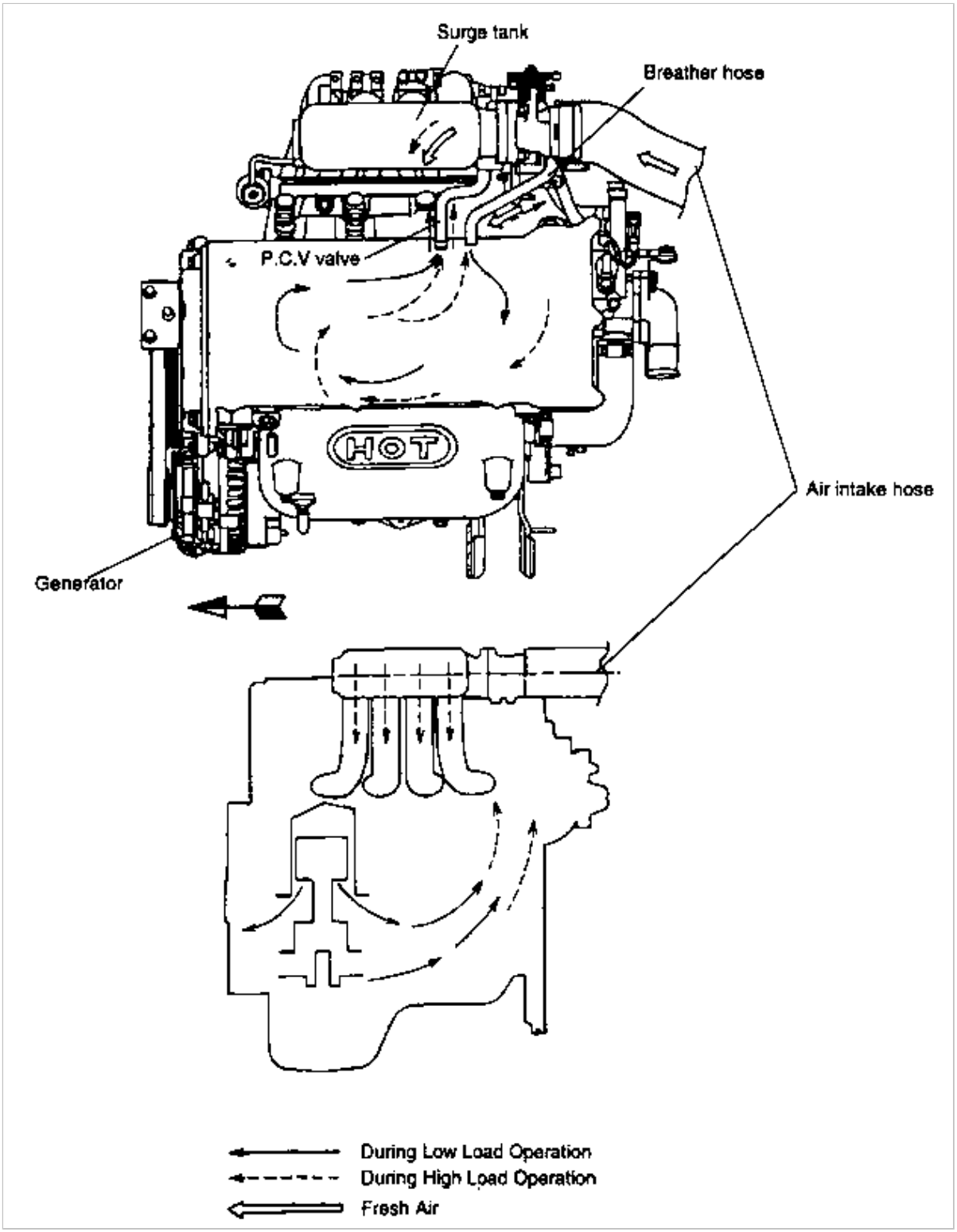
WHEEL BEARING TROUBLESHOOTING

Symptom	Probable cause	Remedy
Bent cage	Cage damage due to improper handling or tool usage	Replace bearing
Galling	Metal smears on roller end due to overheating, lubricant problem or overloading.	Replace bearing Check seals, check for proper lubrication
Cracked inner race	Race cracked due to improper fit, cocking or poor bearing seats.	Replace bearing
Etching	Bearing surfaces appear gray or grayish black in color with related etching away of material usually at roller spacing	Replace bearing Check seals, check for proper lubrication
Brinelling	Surface indentations, on race surface caused by rollers either under impact loading or vibration while the bearing is not rotating.	Replace bearing
Heat discolora-tion	Heat discoloration is dark blue resulting from overload or no lubricant (Yellow or brown color is normal)	Replace bearing Check seals and other parts
Fatigue spalling	Flaking of surface metal resulting from fatigue	Replace bearing Clean all related parts

ACCENT(X3) > 1998 > G 1.5 SOHC > Emissions Control System

Emissions Control System > Crankcase Emission Control System > CRANKCASE EMISSION SYSTEM

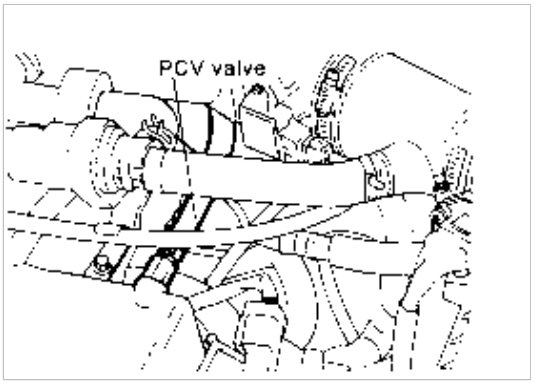
CRANKCASE EMISSION SYSTEM



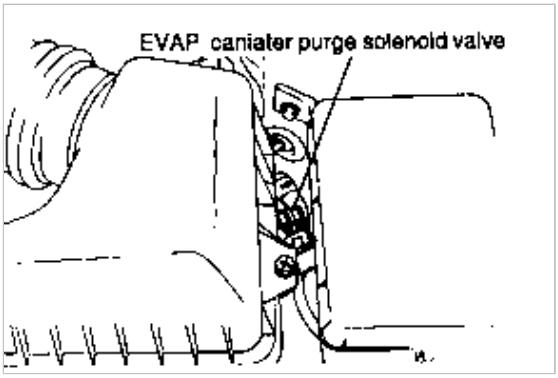
Emissions Control System > Crankcase Emission Control System > EMISSION CONTROL SYSTEM

EMISSION CONTROL SYSTEM

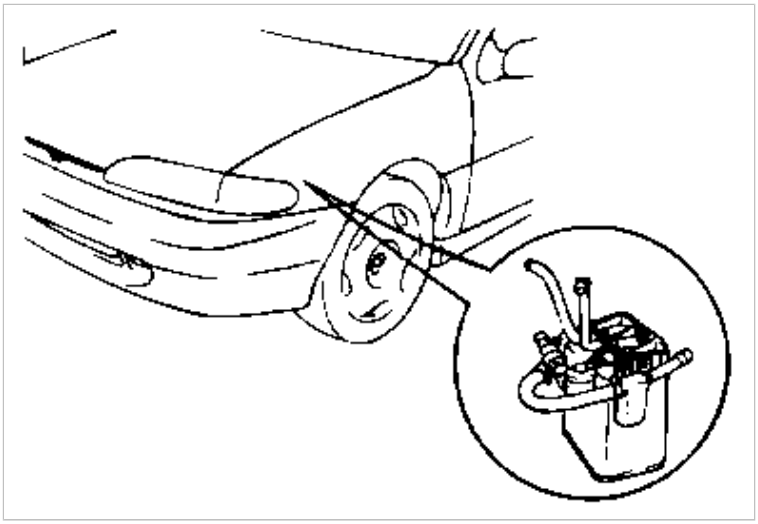
A: PCV Valve



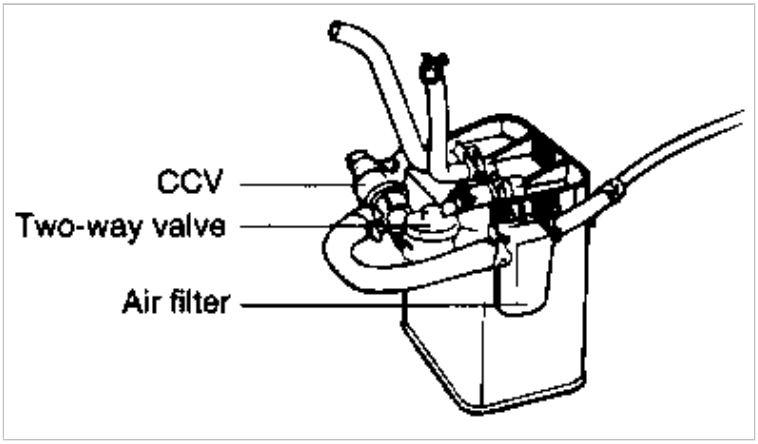
B: EVAP Canister Purge Solenoid Valve



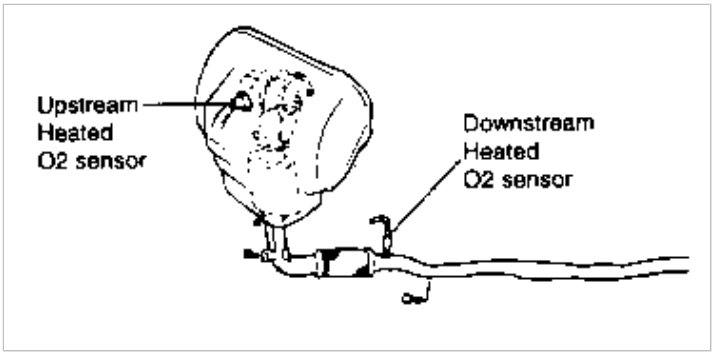
C: Evaporative Emission Canister



D: Two-way Valve



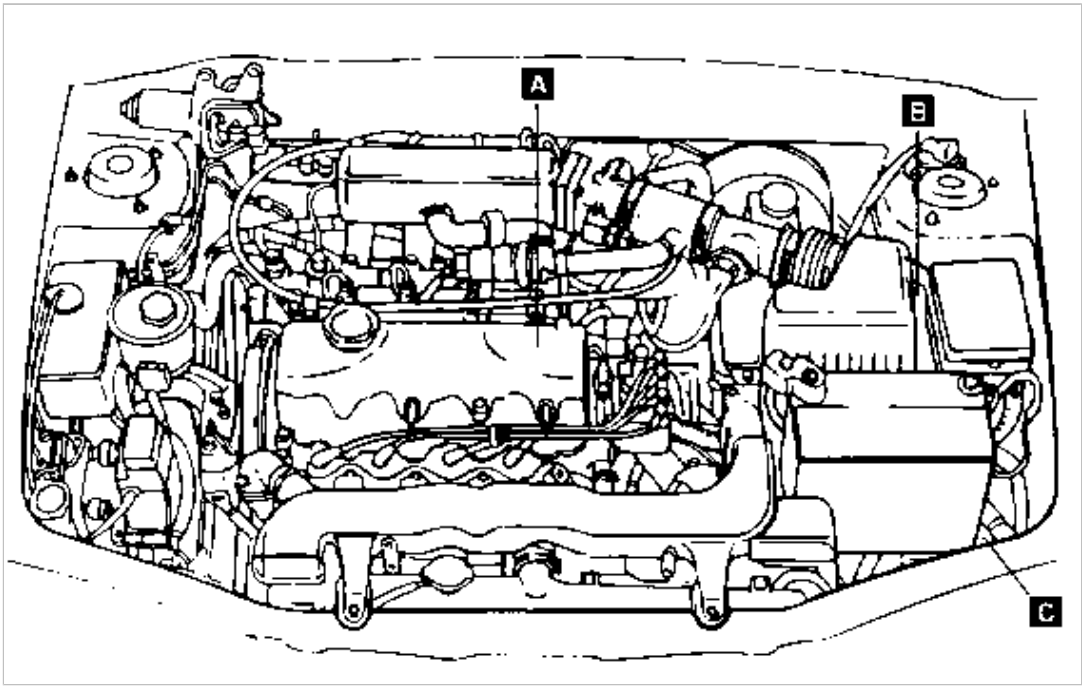
E: Close Coupled Catalytic Converter



CCC: Close coupled catalytic converter

Emissions Control System > Crankcase Emission Control System > EMISSION CONTROLS LOCATION

EMISSION CONTROLS LOCATION

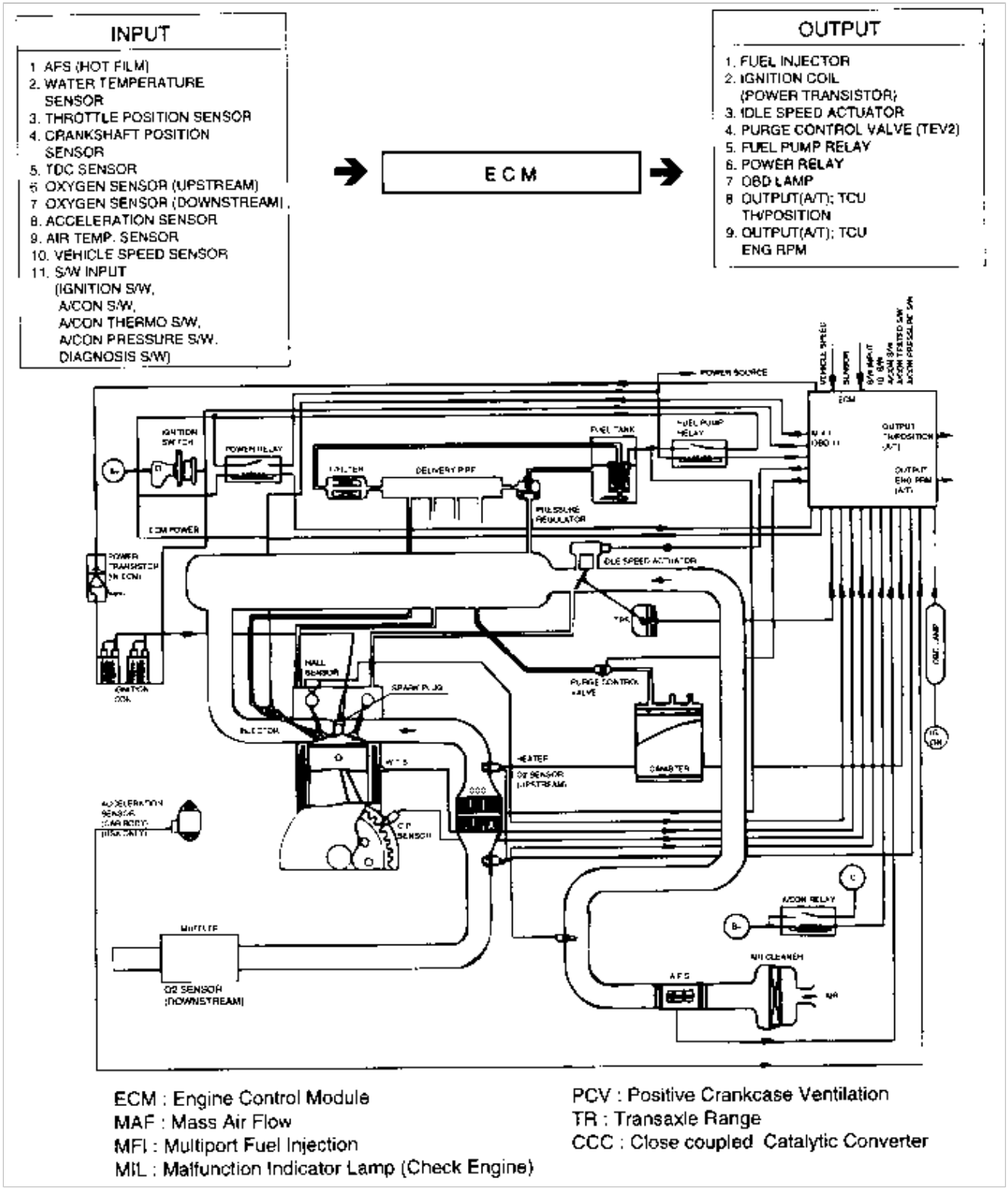


a. A: PCV valve

b. B: Evaporative control solenoid valve (for EVAP)
c. C: Canister
d. D: Two-way valve, Canister close valve (CCV)
e. E: Close coupled catalytic converter

Emissions Control System > Crankcase Emission Control System > ENGINE CONTROL SYSTEM DIAGRAM (ECFI)

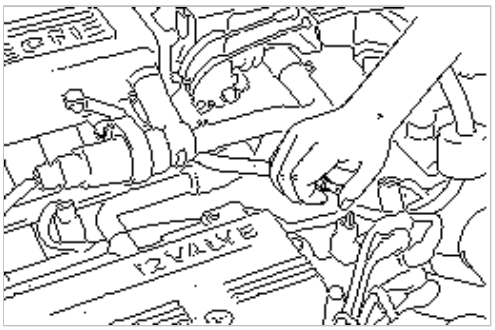
Engine Control System Diagram (ECFI)



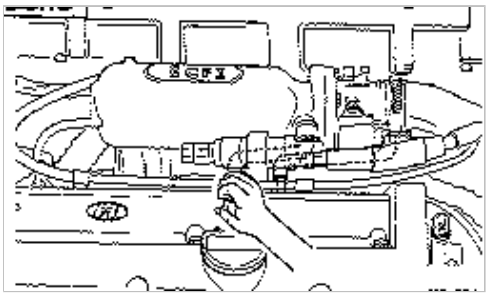
Emissions Control System > Crankcase Emission Control System > Positive Crankcase Ventilation (PCV) Valve > REMOVAL

Removal

1. Disconnect the ventilation hose from the positive crankcase ventilation (PCV) valve. Remove the PCV valve from the rocker cover and reconnect it to the ventilation hose.



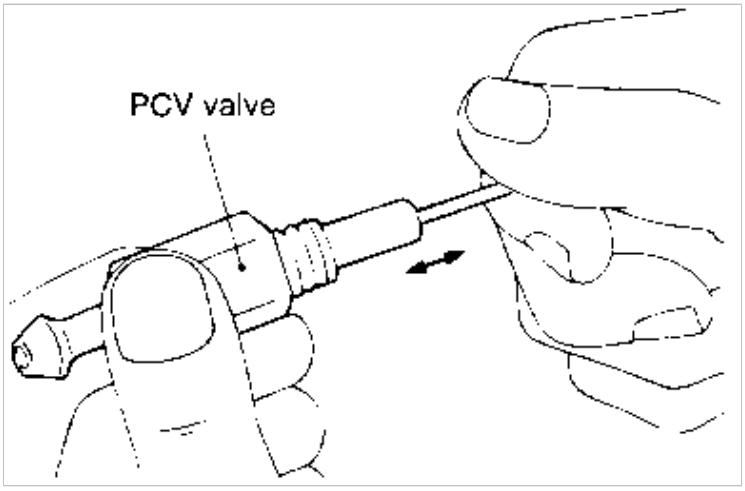
2. Run the engine at idle and put a finger on the open end of the PCV valve and make sure that intake manifold vacuum is felt.
   The plunger inside the PCV valve will move back and forth.



3. If vacuum is not felt, clean the PCV valve and ventilation hose in cleaning solvent or replace if necessary

INSPECTION

1. Remove the positive crankcase ventilation valve.
2. Insert a thin stick into the positive crankcase ventilation valve from the threaded side to check that the plunger moves.



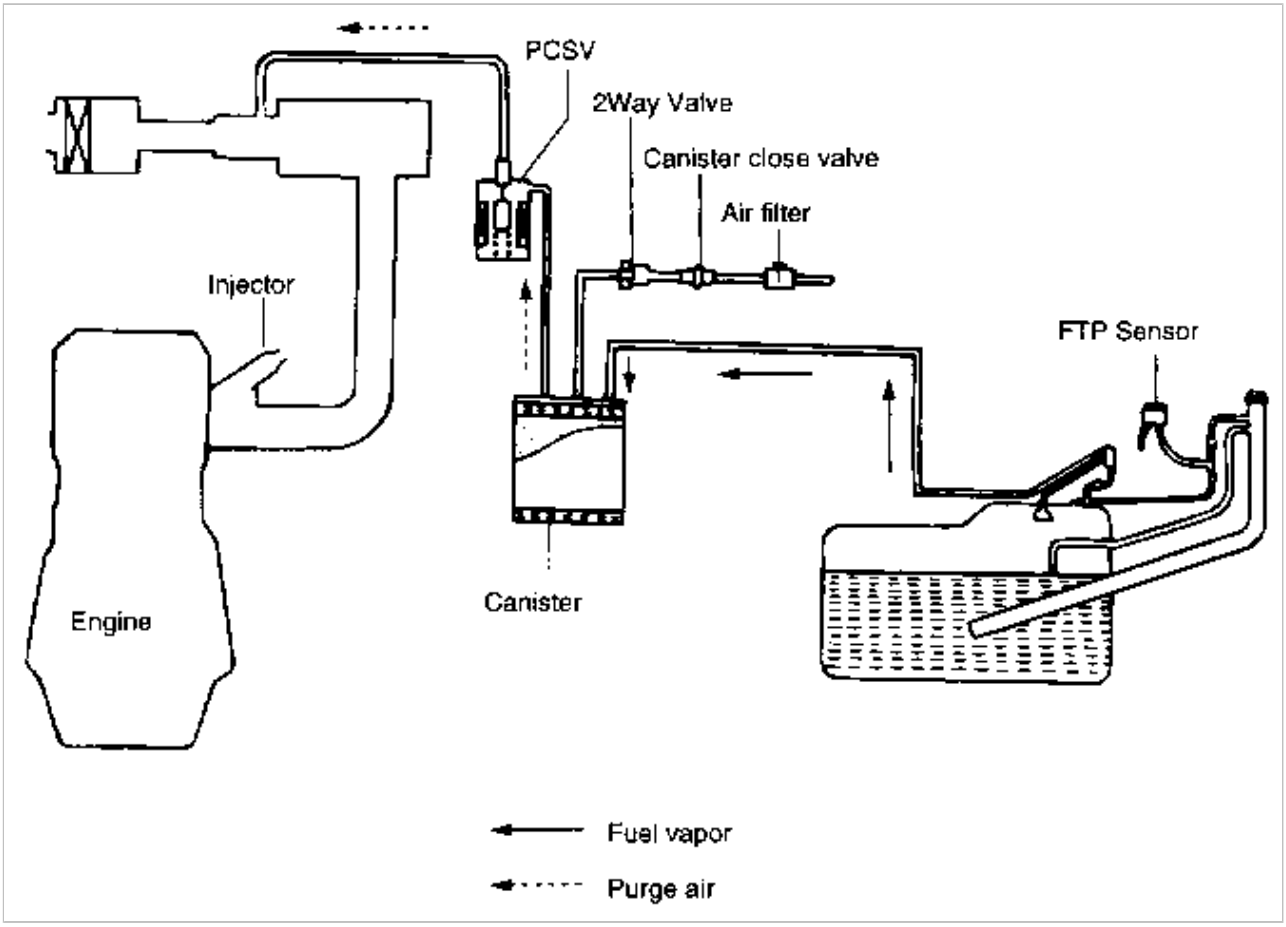
3. If the plunger does not move, the positive crankcase ventilation valve is clogged. Clean it or replace.

INSTALLATION

Install the positive crankcase ventilation valve and tighten to specified torque.

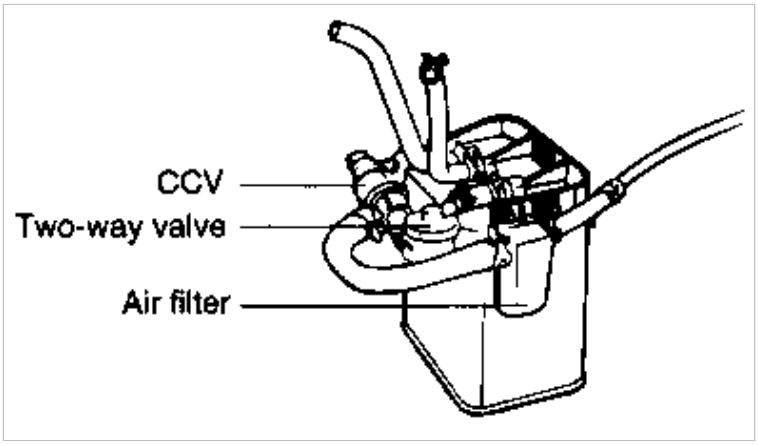
Emissions Control System > Evaporative Emission Control System > COMPONENTS

COMPONENTS



Emissions Control System > Evaporative Emission Control System > Evaporative (EVAP) Canister > INSPECTION

INSPECTION



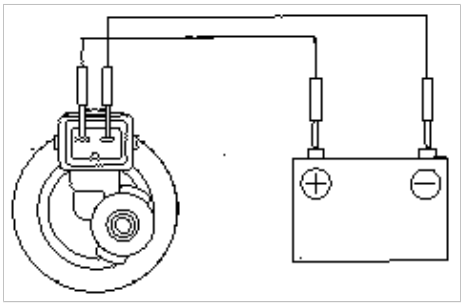
1. Look for loose connections, sharp bends or damage to the fuel vapor lines.
2. Look for distortion, cracks or fuel leakage.
3. After removing the EVAP canister, inspect for cracks or damage.

Emissions Control System > Evaporative Emission Control System > Evaporative (EVAP) Canister Purge Solenoid Valve > INSPECTION

Inspection

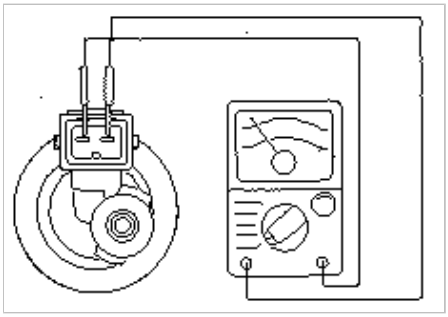
When disconnecting the vacuum hose, make an identification mark on it so that it can be reconnected to its original position.

1. Disconnect the vacuum hose from the solenoid valve.
2. Detach the harness connector.
3. Connect a vacuum pump to the nipple to which the red-striped vacuum hose was connected.
4. Apply vacuum and check when voltage is applied to the evaporative emission canister purge solenoid valve and when the voltage is discontinued.



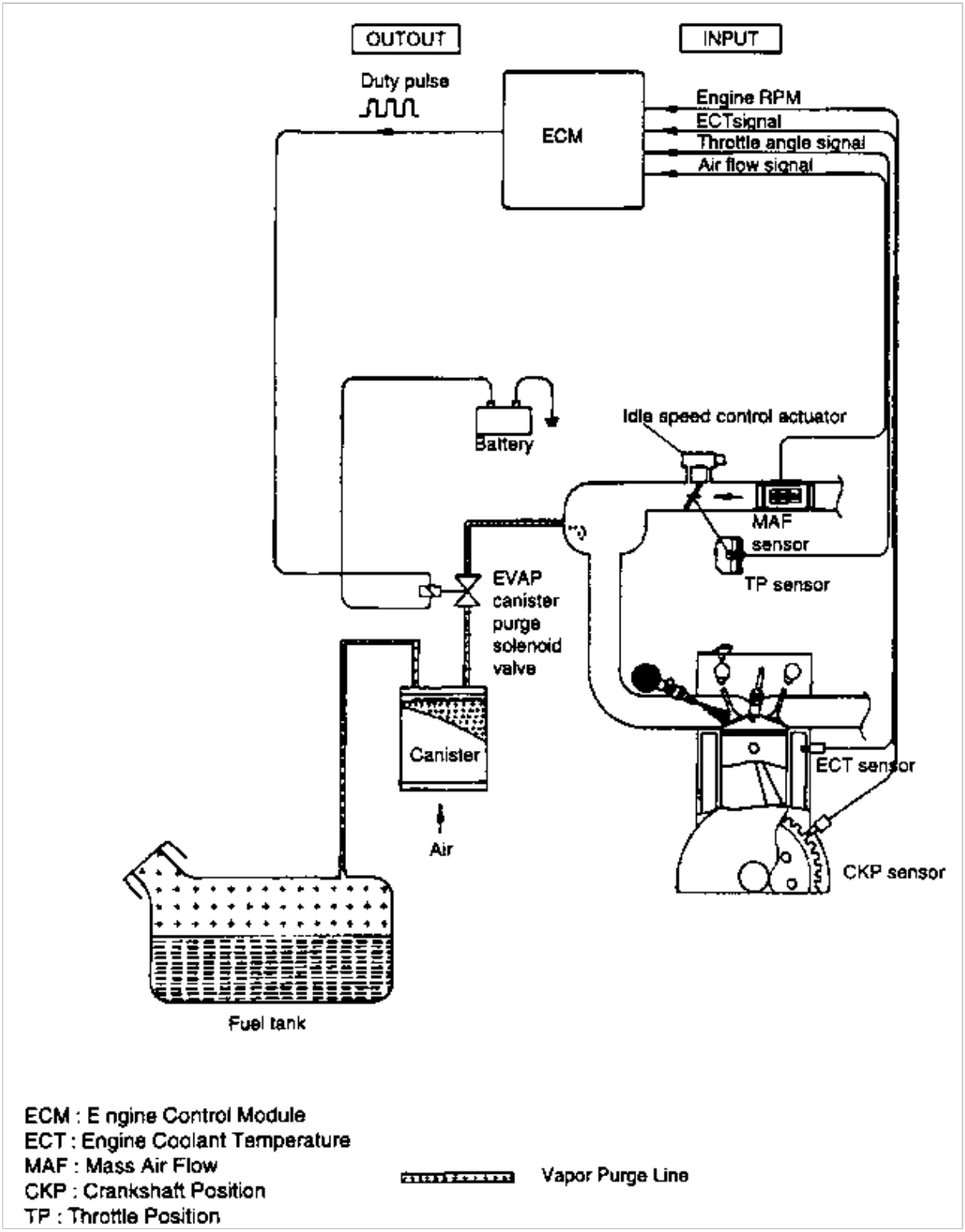
Battery voltage	Normal condition
When applied	Vacuum is released
When discontinued	Vacuum is maintained

5. Measure the resistance between the terminals of the solenoid valve.



Emissions Control System > Evaporative Emission Control System > Evaporative (EVAP) Canister Purge Solenoid Valve > PURGE CONTROL SYSTEM

PURGE CONTROL SYSTEM

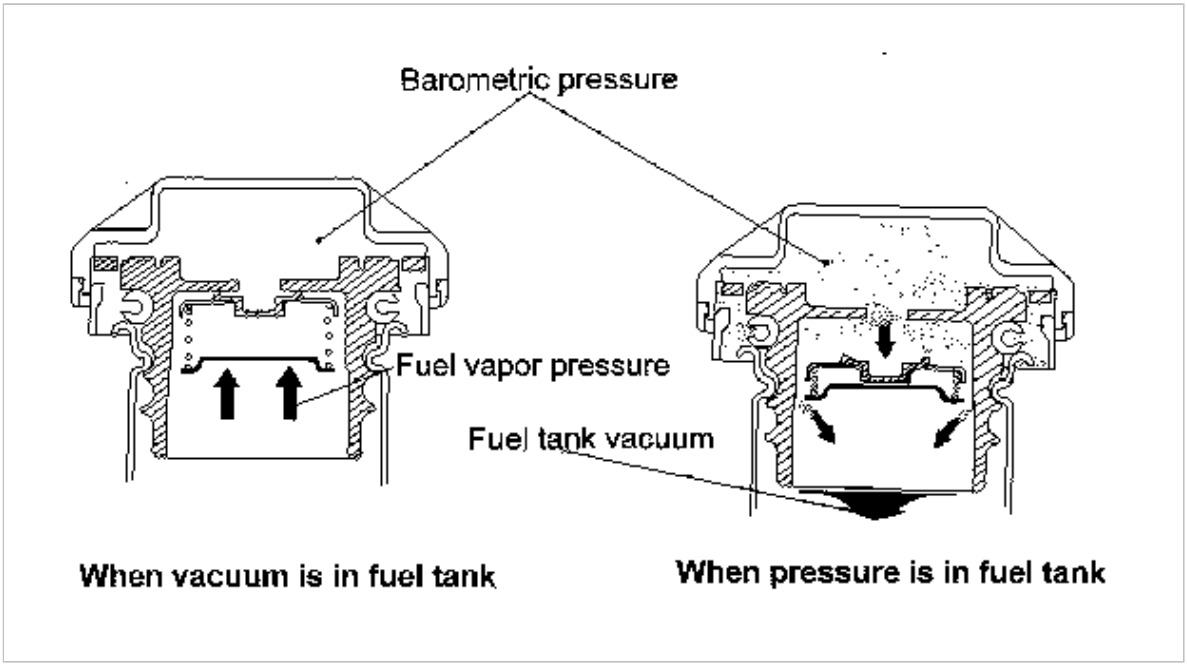


Emissions Control System > Evaporative Emission Control System > Fuel Filler Cap > FUEL FILLER CAP

FUEL FILLER CAP

The fuel filler cap is equipped with a vacuum relief valve to prevent the escape of fuel vapor into the atmosphere.

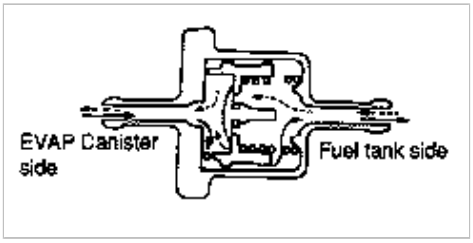
Check the gasket of the fuel filler cap for damage or deformation. Replace the cap it necessary.



Emissions Control System > Evaporative Emission Control System > Overfill Limiter (Two-Way Valve) > INSPECTION

INSPECTION

To inspect the overfill limiter (two-way valve), refer to Group 31 Fuel Tank.



Emissions Control System > Exhaust Emission Control System > EXHAUST EMISSION CONTROL SYSTEM

Exhaust Emission Control System

Exhaust emissions (CO, HO, NOx) are controlled by a combination of engine modifications and the addition of special control components.

Modifications to the combustion chamber, intake manifold, camshaft and ignition system form the basic control system.

These systems have been integrated into a highly effective system which controls exhaust emissions while maintaining good driveabillity and fuel economy.

AIR/FUEL MIXTURE RATIO CONTROL SYSTEM

MULTIPORT FUEL INJECTION (MFI) SYSTEM

The MFI system employs the signals from the heated oxygen sensor to activate and control the injector installed in the manifold for each cylinder, thus precisely regulating the air/fuel mixture ratio and reducing emissions.

This in turn allows the engine to produce exhaust gases of the proper composition to permit the use of a three way catalyst. The three way catalyst is designed to convert the three pollutants (1) hydrocarbons (HC), (2) carbon monoxide (CO), and (3) oxides of nitrogen (NOx) into harmless substances. There are two operating modes in the MFI system.

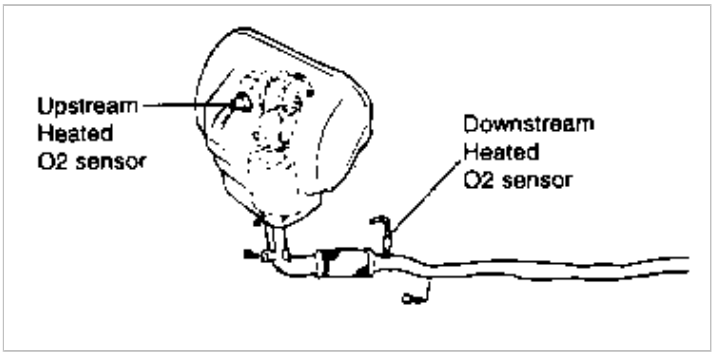
1. Open loop air/fuel ratio is controlled by information programmed into the ECM.
2. Closed loop air/fuel ratio is varied by the ECM based on information supplied by the oxygen sensor.

Emissions Control System > Exhaust Emission Control System > Three-Way Catalytic Converter (TWC) > INSPECTION

INSPECTION

Inspect for damage, cracking or deterioration. Replace if faulty.

The catalytic converters require the use of unleaded gasoline only. Leaded gasoline will destroy the effectiveness of the catalysts as an emission control device.
Under normal operating conditions, the catalytic converters will not require maintenance. However, it is important to keep the engine properly tuned. Engine misfiring may cause overheating of the catalysts. This may cause heat damage to the converters or vehicle components. This situation can also occur during diagnostic testing if any spark plug cables are removed and the engine is allowed to idle for a prolonged period of time.



Emissions Control System > Exhaust Emission Control System > Three-Way Catalytic Converter (TWC) > PRECAUTIONS

PRECAUTIONS

If large amounts of unburned gasoline flow into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and be sure to explain them to your customer.

1. Use only unleaded gasoline.
2. Avoid prolonged idling. Avoid running the engine at fast idle speed for more than 10 minutes and at idle speed for more than 20 minutes.
3. Avoid spark jump test. Spark jump only when absolutely necessary. Perform this test as rapidly as possible and, while testing, never race the engine.
4. Avoid prolonged engine compression measurement. Engine compression tests must be made as rapidly as possible.
5. Do not run engine when fuel tank is nearly empty. This may cause the engine to misfire and create an extra load on the converter.
6. Avoid coasting with ignition turned off and prolonged braking.
7. Do not dispose of used catalyst along with parts contaminated with gasoline or oil.

Emissions Control System > General > SERVICE STANDARD

SERVICE STANDARD

Evaporative emission canister purge solenoid valve	
Coil resistance	26Ω (at 20°C [68°f])

Emissions Control System > General > SPECIFICATIONS

SPECIFICATIONS

Components	Function	Remarks
Crankcase Emission System	HC reduction	|
Positive crankcase ventilation (PCV) valve		Variable flow rate type

Components	Function	Remarks
Evaporative Emission System	HC reduction	|
Evaporative Emission Canister		|
EVAP Canister Purge Solenoid Valve		Duty control solenoid valve

Components	Function	Remarks
Exhaust Emission System	|	|
MFI system (air-fuel mixture control device)	CO,HC,NOx reduction	Heated oxygen sensor feedback type
Three-way catalytic converter	CO,HC,NOx reduction	Monolith type

MFI: Multiport Fuel Injection

EVAP: Evaporative emission

Emissions Control System > General > TIGHTENING TORQUE

TIGHTENING TORQUE

|	Nm	kg.cm	lb.ft
Positive crankcase ventilation valve	8-12	80-120	6-8

Emissions Control System > General > TROUBLESHOOTING

TROUBLESHOOTING

Symptom	Probable cause	Remedy
Engine will not start of hard to start	Vacuum hose disconnected or damaged	Repair or replace
	Malfunction of the EVAP Canister Purge Solenoid Valve	Repair or replace
Rough idle or engine stalls	Vacuum hose disconnected or damaged	Repair or replace
	Malfunction of the PCV valve	Replace
	Malfunction of the evaporative emission canister purge system	Check the system; if there is a problem, check its component parts
Excessive oil consumption	Positive crankcase ventilation line clogged	Check positive crankcase ventilation system

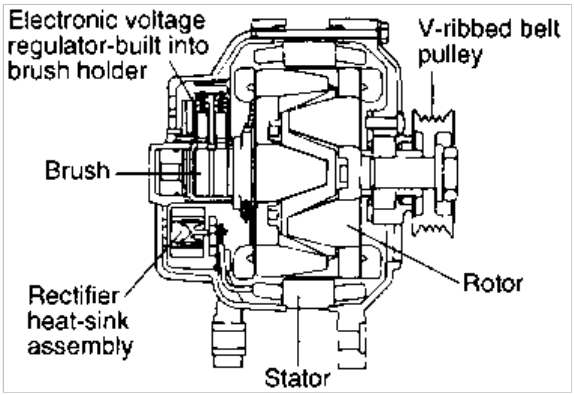
ACCENT(X3) > 1998 > G 1.5 SOHC > Engine Electrical System

Engine Electrical System > Charging System > GENERAL INFORMATION

GENERAL INFORMATION

The charging system includes a battery, a generator with a built-in regulator, and the charging indicator light and wire. The generator has six built-in diodes (three positive and three negative), each rectifying AC current to DC current. Therefore, DC current appears at generator "B" terminal.

In addition, the charging voltage of this generator is regulated by the battery voltage detection system. The main components of the generator are the rotor, stator, rectifier, capacitor brushes, bearings and V-ribbed belt pulley. The brush holder contains a built-in electronic voltage regulator.



Engine Electrical System > Charging System > INSPECTION OF CHARGING SYSTEM

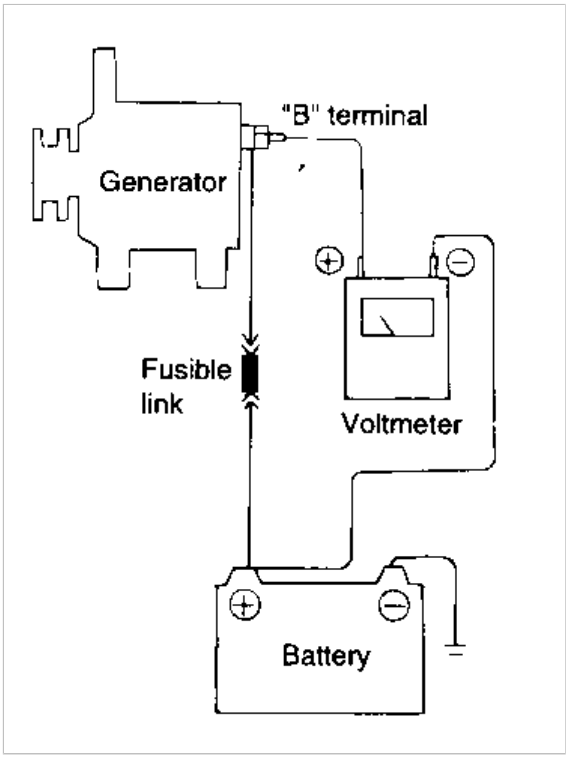
INSPECTION OF CHARGING SYSTEM

VOLTAGE DROP TEST OF GENERATOR OUTPUT WIRE

This test determines whether or not the wiring between the generator "B" terminal and the battery (+) terminal is good by the voltage drop method.

PREPARATION

1. Turn the ignition switch to "OFF".
   To find abnormal conditions of the connection, actions should not be taken on the two terminals and each connection during the test.
2. Connect a digital voltmeter between the generator "B" terminal and battery (+) terminal. Connect the (+) lead wire of the voltmeter to the "B" terminal and the (-) lead wire to the battery (+) terminal.



CONDITIONS FOR THE TEST

1. Start the engine.
2. Turn on the headlamps, blower motor and so on. Then, read the voltmeter under this condition.

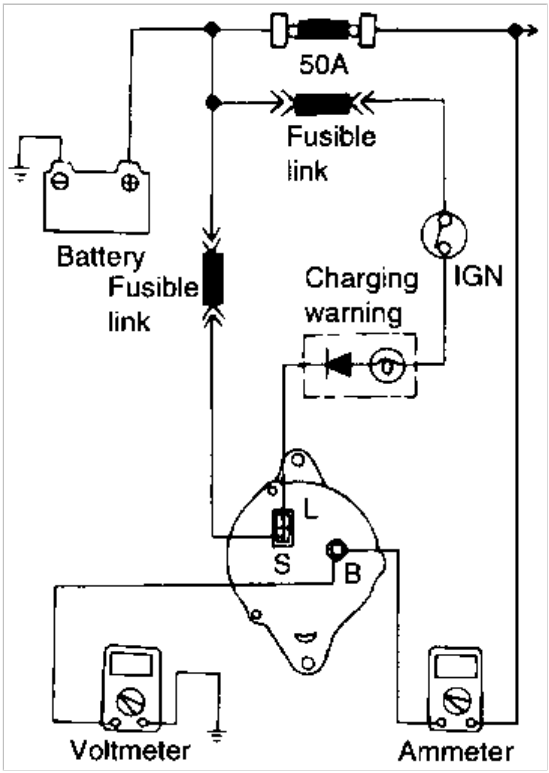
RESULT

1. It is okay if the voltmeter indicates the standard value. Standard value: 0.2V max.
2. If the voltmeter indicates a value that is higher than expected (above 0.2V max.), poor wiring is suspected. In this case check the wiring from the generator "B" terminal to the fusible link to the battery (+) terminal. Check for loose connections, color change due to an overheated harness, etc. Correct them before testing again.
3. Upon completion of the test, set the engine speed at idle. Turn off the head lamps and the ignition switch.

OUTPUT CURRENT TEST

This test judges whether or not the generator gives an output current that is equivalent to the nominal output.

PREPARATION



1. Prior to the test, check the following items and correct as necessary.
   (1) Check the battery installed in the vehicle to ensure that it is in good condition. The battery checking method is described in "BATTERY".
   The battery that is used to test the output current should be one that has been partially discharged. With a fully charged battery, the test may not be conducted correctly due to an insufficient load.
   (2) Check the tension of the generator drive belt. The belt tension check method is described in the section "COOLING".
2. Turn off the ignition switch.
3. Disconnect the battery ground cable.
4. Disconnect the generator output wire from the generator "B" terminal.
5. Connect a DC ammeter (0 to 100A) in series between the "B" terminal and the disconnected output wire. Be sure to connect the (-) lead wire of the ammeter to the disconnected output wire.
   Tighten each connection securely, as a heavy current will flow. Do not rely on clips.
6. Connect a voltmeter (0 to 20V) between the "B" terminal and ground. Connect the (+) lead wire to the generator "B" terminal and (-) lead wire to a good ground.
7. Attach an engine tachometer and connect the battery ground cable.
8. Leave the engine hood open.

TEST

1. Check to see that the voltmeter reads the same value as the battery voltage. If the voltmeter reads 0V, and open circuit in the wire between the generator "B" terminal and battery (-) terminal, a blown fusible link or poor grounding is suspected.
2. Start the engine and turn on the headlights.
3. Set the headlights to high beam and the heater blower switch to HIGH, quickly increase the engine speed to 2,500 rpm and read the maximum output current value indicated by the ammeter.

After the engine startup, the charging current quickly drops. Therefore, the above operation must be done quickly to read the maximum current value correctly.

RESULT

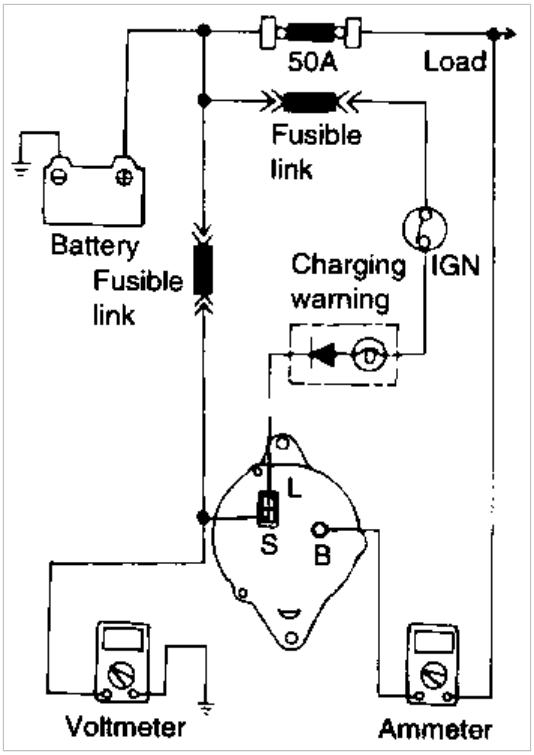
1. The ammeter reading must be higher than the limit value. If it is lower but the generator output wire is in good condition, remove the generator from the vehicle and test it.
   a. The nominal output current value is shown on the nameplate affixed to the generator body.
   b. The output current value changes with the electrical load and the temperature of the generator itself. Therefore, the nominal output current many not be obtained. If such is the case, keep the headlights on the cause discharge of the battery, or use the lights of another vehicle to increase the electrical load. The nominal output current may not be obtained if the temperature of the generator itself or ambient temperature is too high. In such a case, reduce the temperature before testing again.
2. Upon completion of the output current test, lower the engine speed to idle and turn off the ignition switch.
3. Disconnect the battery ground cable.
4. Remove the ammeter and voltmeter and the engine tachometer.
5. Connect the generator output wire to the generator "B" terminal.
6. Connect the battery ground cable.

REGULATED VOLTAGE TEST

The purpose of this test is to check that the electronic voltage regulator controls voltage correctly.

PREPARATION

1. Prior to the test, check the following items and correct if necessary.
   (1) Check that the battery installed on the vehicle to see the it is fully charged. For battery checking method, see "BATTERY."
   (2) Check the generator drive belt tension. For belt tension check, see section, "COOLING."
2. Turn ignition switch to "OFF."
3. Disconnect the battery ground cable.
4. Connect a digital voltmeter between the "S(L)" terminal of the generator and ground. Connect the (+) lead of the voltmeter to the "S(L)" terminal of the generator. Connect the (-) lead to good ground or the battery (-) terminal.
5. Disconnect the generator output wire from the generator "B" terminal.
6. Connect a DC ammeter (0 to 100A) in series between the "B" terminal and the disconnected output wire. Connect the (-) lead wire of the ammeter to the disconnected output wire.
7. Attach the engine tachometer and connect the battery ground cable.



TEST

1. Turn on the ignition switch and check to see that the voltmeter indicates the following value.
   If it reads 0V, there is an open circuit in the wire between the generator "S(L)" terminal and the battery and the battery (+), or the fusible link is blown.

2. Start the engine. Keep all lights and accessories off.
3. Run the engine at a speed of about 2,500 rpm and read the voltmeter when the generator output current drops to 10A or less.

RESULT

1. If the voltmeter reading agrees with the value listed in the Regulating Voltage Table below, the voltage regulator is functioning correctly. If the reading is other than the standard value, the voltage regulator or the generator is faulty.

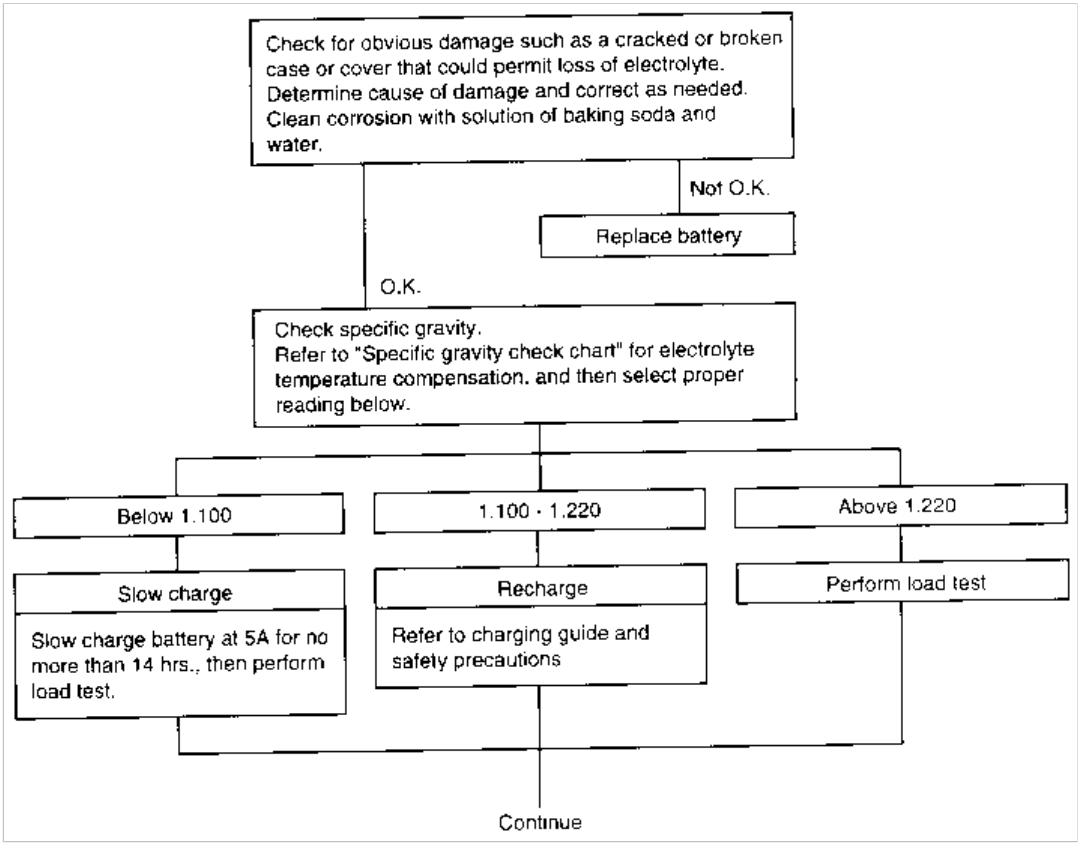
REGULATING VOLTAGE TABLE

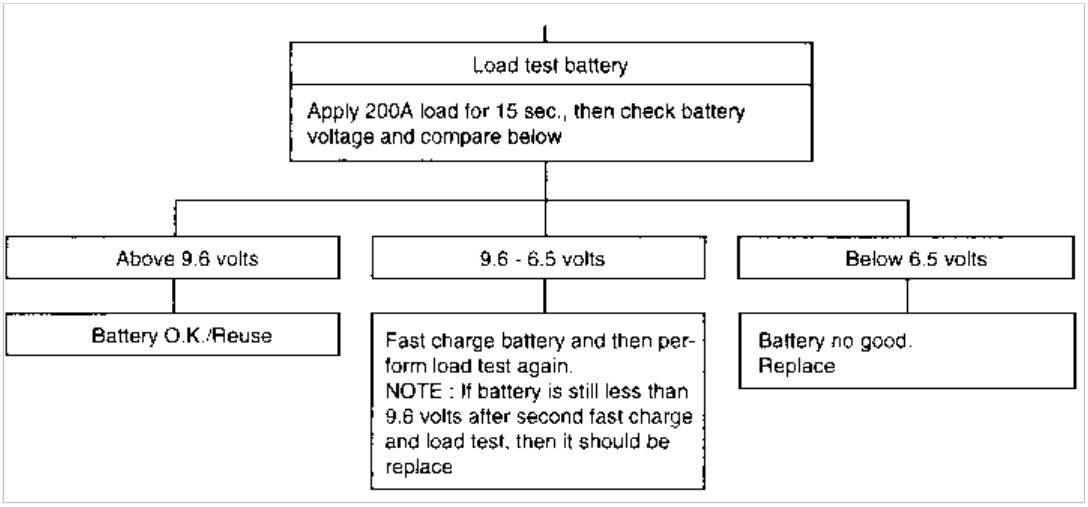
Voltage regulator ambient temperature °C(°F)	Regulating voltage V
-20 (-4)	14.2-15.4
20 (68)	13.9-14.9
60 (140)	13.4-14.6
80 (176)	13.1-14.5

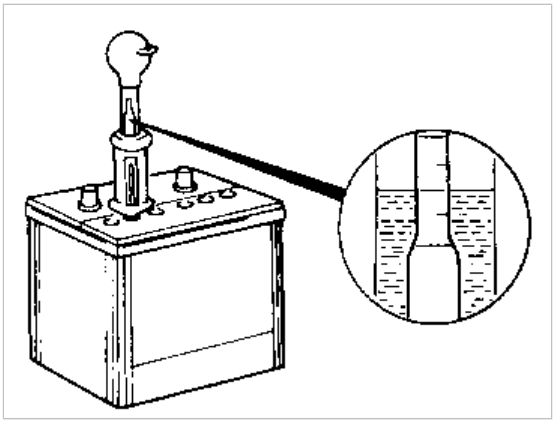
2. Upon completion of the test, reduce the engine speed to idle, and turn off the ignition switch.
3. Disconnect the battery ground cable.
4. Remove the voltmeter and ammeter and the engine tachometer.
5. Connect the generator output wire to the generator "B" terminal.
6. Connect the battery ground cable.

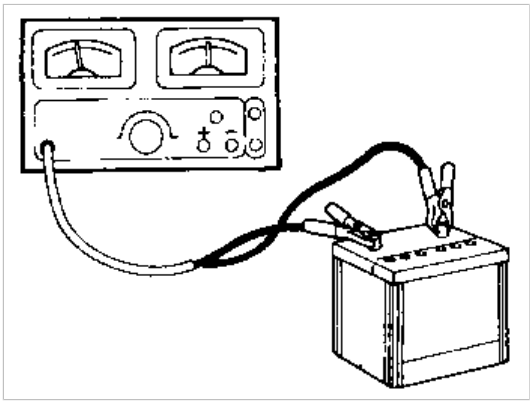
Engine Electrical System > Charging System > Battery > BATTERY VISUAL INSPECTION (1)

BATTERY VISUAL INSPECTION (1)









SPECIFIC GRAVITY CHECK CHART

The specific gravity of battery electrolyte changes with temperature. Heat thins the solution and lowers the specific gravity. Cold thickens the solution and raises the specific gravity.

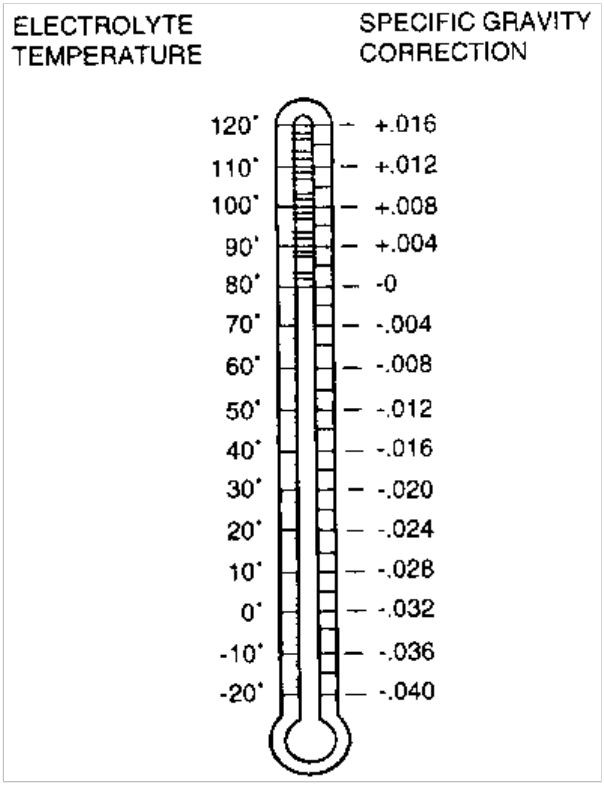
A fully charged battery should have a specific gravity between 1.260 and 1.280, with the electrolyte temperature at 80°F. The specific gravity reading must be corrected by adding 4 points (.004) for each 10°F above 80°F or subtracting 4 points for every 10°F below 80°F.

For example : The hydrometer reading is 1.280, and the electrolyte temperature reading is 10°F. According to the chart below, the specific gravity must be lowered by 0.028 points. The true corrected reading is 1.252.

280 - 0.028 = 1.252

You should never take a hydrometer reading immediately after water has been added. The water and electrolyte must be mixed by either charging for a few minutes at a low rate or by allowing the battery to sit for an hour.

A difference of 50 points (0.050) or more between one or more cells indicates a defective battery. It should be replaced.

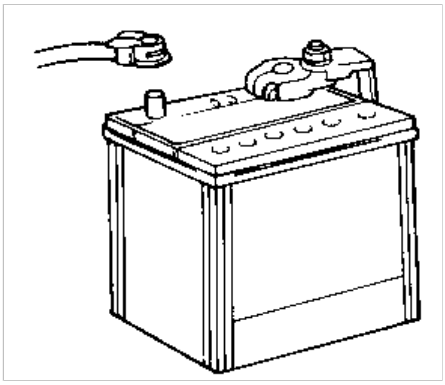


BATTERY CHARGE RATE

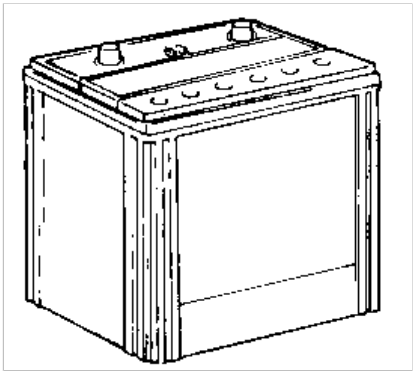
Specific gravity	Slow charge (5A)	Fast charge (20A)
Below 1.100	14 hours	4 hours
100-1.130	12 hours	3 hours
130-1.160	10 hours	2.5 hours
160-1.190	8 hours	2.0 hours
190-1.220	6 hours	1.5 hours
Above 1.220	4 hours	1.0 hours

BATTERY VISUAL INSPECTION (2)

1. Make sure ignition switch is in the Off position and all accessories are Off.
2. Disconnect the battery cables (negative first).



3. Remove the battery from the vehicle.
   Care should be taken in the event the battery case is cracked or leaking, to protect your skin from the electrolyte. A suitable pair of rubber gloves (not household type) should be worn when removing the battery.



4. Inspect the battery carrier for damage caused by the loss of acid from the battery. If acid damage is present, it will be necessary to clean the area with a solution of clean warm, water and baking soda. Scrub the area with a stiff brush and wipe off with a cloth moistened with baking soda and water.
5. Clean the top of the battery with the same solution as described in Step (4).
6. Inspect the battery case, and cover, for cracks. If cracks are present, the battery must be replaced.
7. Clean the battery posts with a suitable battery post cleaner.
8. Clean the inside surface of the terminal clamps with a suitable battery terminal cleaning tool. Replace damaged or frayed cables and broken terminal clamps.
9. Install the battery in the vehicle.
10. Connect the cable terminals to the battery post, making sure the top of the terminal are flush with the top of the post.
11. Tighten the terminal nut securely.
12. Coat all connections with light mineral grease after tightening.
    When batteries are being charged, an explosive gas forms beneath the cover of each cell. Do not smoke near batteries being charged or which have recently been charged. Do not break live circuits at the terminals of the batteries being charged. A spark will occur where the circuit is broken. Keep all open flames away from the battery.

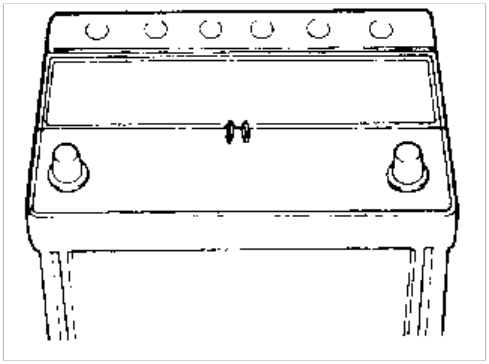
Engine Electrical System > Charging System > Battery > DESCRIPTION

DESCRIPTION

The maintenance-free battery is, as the name implies, totally maintenance free and has no removable battery cell caps.

Water never needs to be added to the maintenance-free battery.

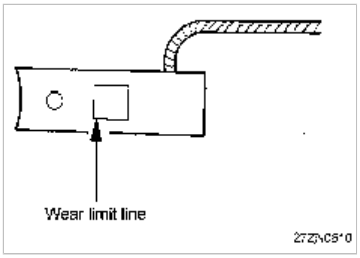
The battery is completely sealed, except for small vent holes in the cover.



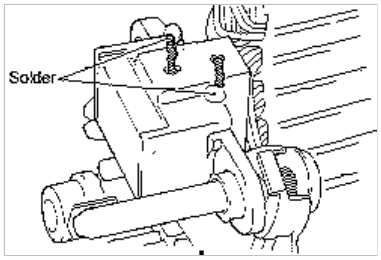
Engine Electrical System > Charging System > Generator (GEN) > BRUSH REPLACEMENT

BRUSH REPLACEMENT

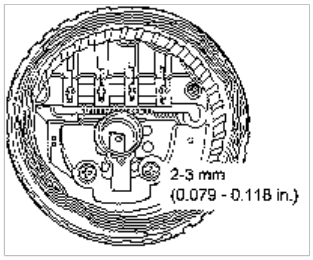
Replace the brushes if they are worn to limit line.



1. Unsolder the pigtail and remove the old brush and spring.



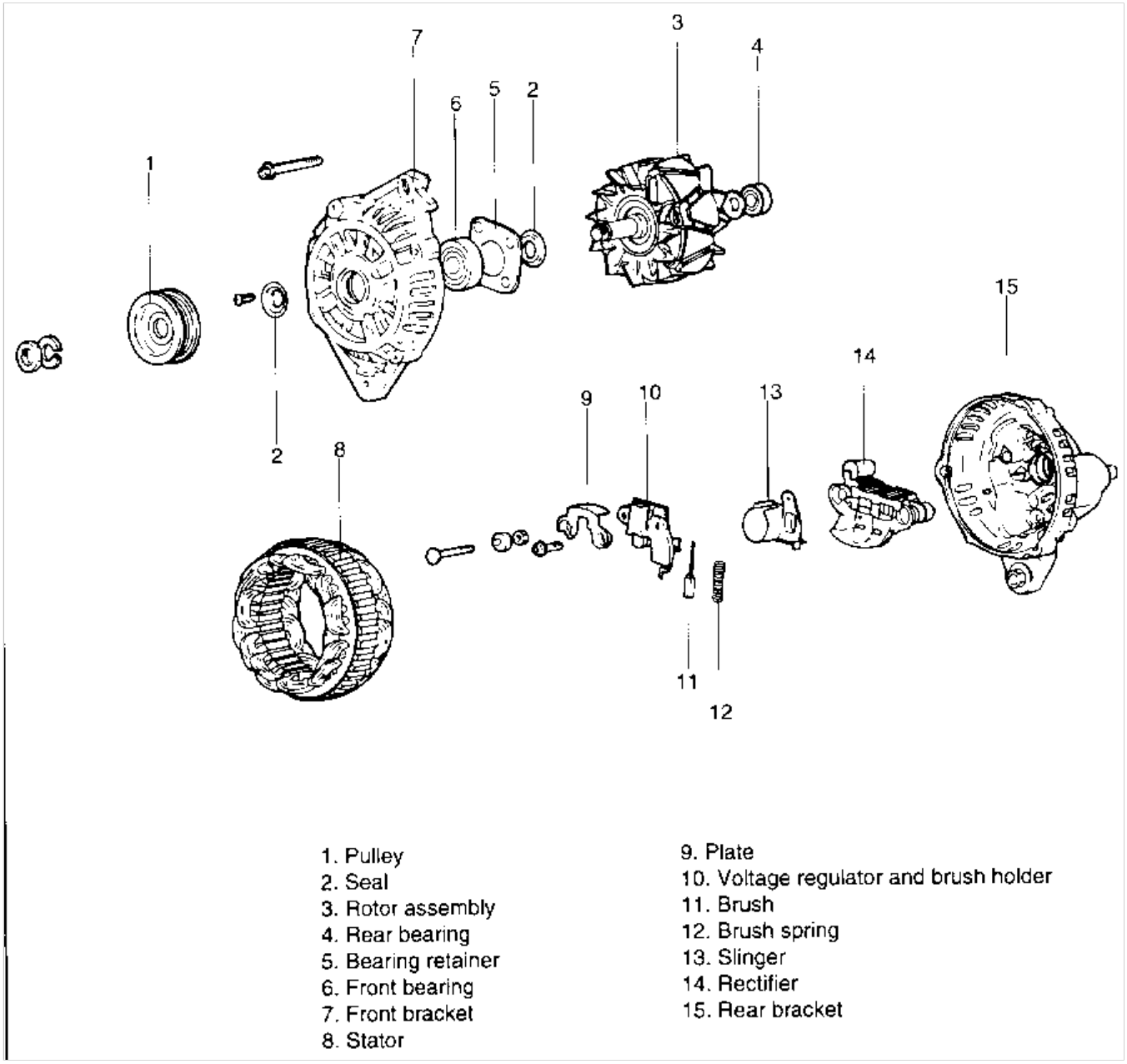
2. Install the brush spring and a new brush in the brush holder.
3. Insert the brush to where there is a space 2 to 3 mm (0.079 to 0.118 in.) between the limit line and the end of the brush holder.
4. Solder the pigtail to the brush holder.



Engine Electrical System > Charging System > Generator (GEN) > COMPONENTS

Components

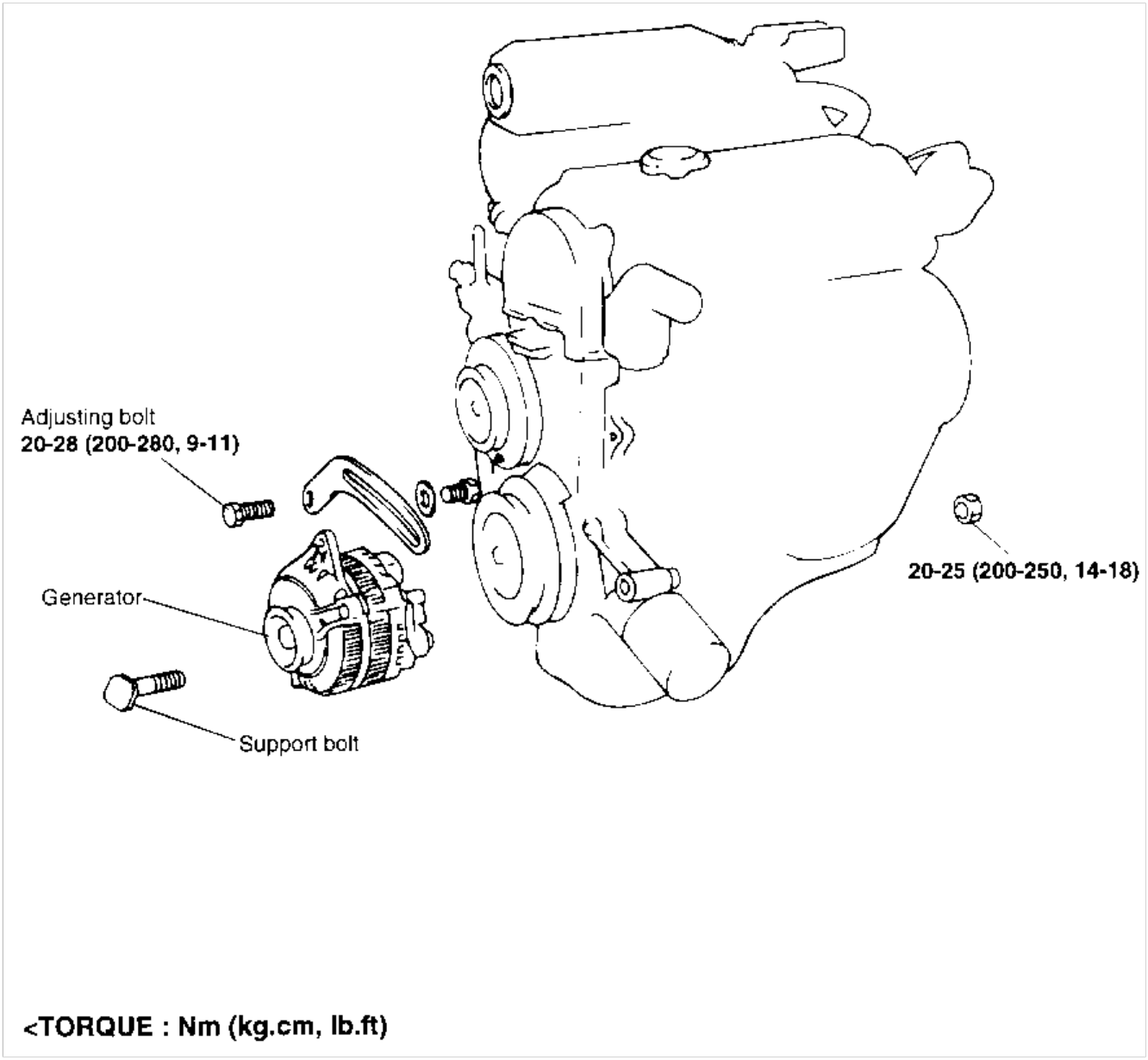
75A



Engine Electrical System > Charging System > Generator (GEN) > COMPONENTS

Components

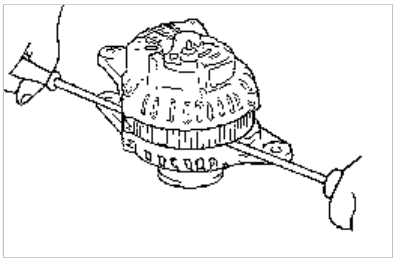
75A



Engine Electrical System > Charging System > Generator (GEN) > DISASSEMBLY (75A)

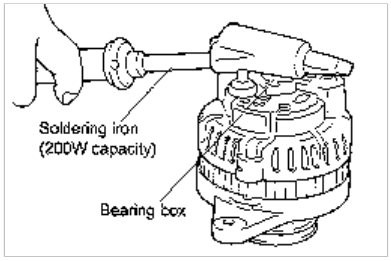
DISASSEMBLY (75A)

1. Remove the four through bolts.
2. Insert a flat screwdriver between the front bracket and stator core, and pry downward.

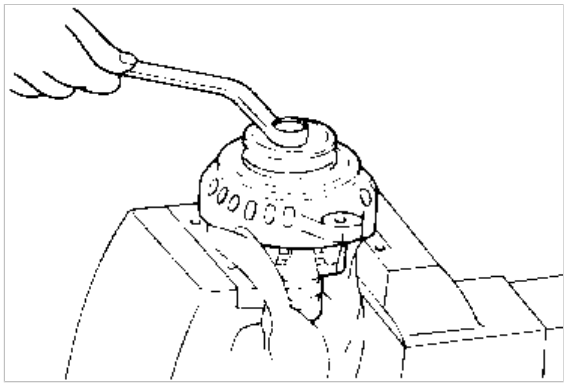


a. Do not insert the screwdriver too deeply, as there is a danger of damaging the stator coil.

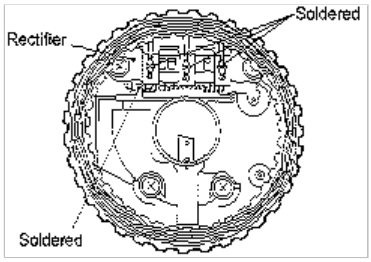
b. The rear cover may be hard to remove because a ring is used to lock the outer race of the rear bearing. To facilitate removal of rear cover, heat just the bearing box section with a 200-watt soldering iron.
Do not use a heat gun, as it may damage the diode assembly.



3. Secure the rotor in a vise with the pulley side up.
   Be careful that the vise jaws do not damage the rotor.
4. Remove the pulley nut, then remove the spring washer, the pulley, and the spacer.
5. Remove the front bracket and two seals.
6. Remove the rotor from the vise.
7. Remove the brush holder screws, rectifier screws, and nut from the B terminal.
8. Remove the stator assembly from the rear bracket.



9. Detach the slinger from the brush holder.
10. When the stator is to be removed, unsolder the three stator leads to the main diodes on the rectifier.
    a. When soldering or unsoldering, use care to make sure that heat of soldering iron is not transmitted to the diodes for a long period.
    b. Use care that excessive force is not exerted on the leads of the diodes.
11. When separating the rectifier from brush holder, unsolder the two plates soldered to the rectifier.

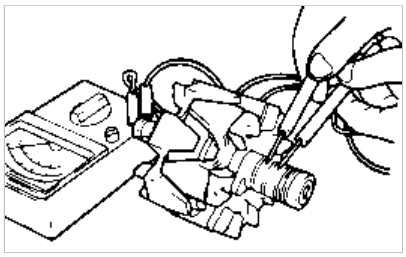


Engine Electrical System > Charging System > Generator (GEN) > INSPECTION (75A)

INSPECTION (75A)

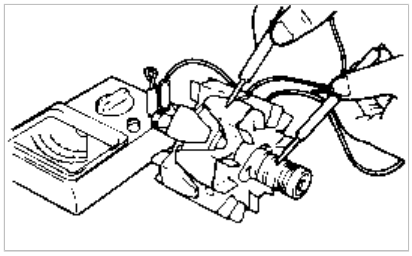
ROTOR

1. Check the rotor coil for continuity. Check to make sure that there is continuity between the slip rings. If resistance is extremely low, it means that there is a short. If there is no continuity or if there is a short circuit, replace the rotor assembly.
   Resistance value : Approx. 3.1 Ω



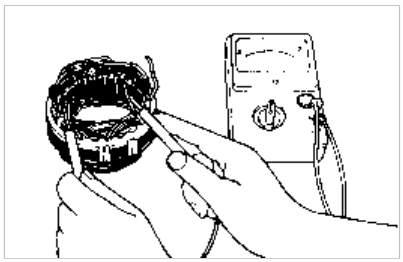
2. Check the rotor coil for ground. Check to make sure that there is no continuity between slip the ring and the core.

If there is continuity, replace rotor assembly.

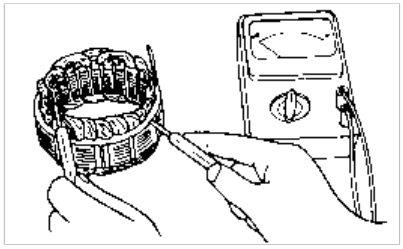


STATOR

1. Make a continuity check on the stator coil. Check to make sure that there is continuity between the coil leads.
   If there is no continuity, replace stator assembly.



2. Check the coil for grounding. Check to make sure that there is no continuity between the coil and the core.
   If there is continuity, replace the stator assembly.

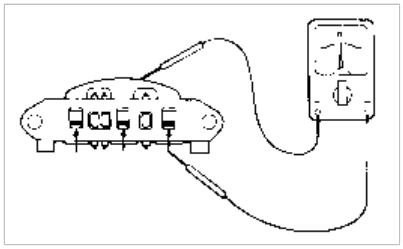


RECTIFIERS

POSITIVE RECTIFIER TEST

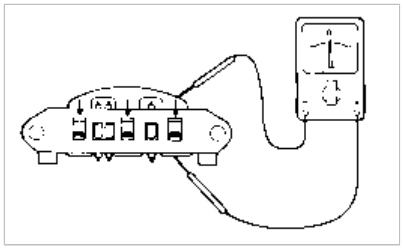
Check for continuity between the positive rectifier and stator coil lead connection terminal with an ohmmeter. The ohmmeter should read continuity in only one direction. If there is continuity in both directions, a diode is shorted.

Replace the rectifier assembly.



NEGATIVE RECTIFIER TEST

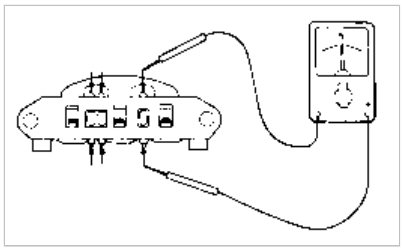
Check for continuity between the negative rectifier and the stator coil lead connection terminal. The ohmmeter should read continuity in only one direction. If there is continuity in both directions, a diode is shorted, and the rectifier assembly must be replaced.



DIODE TRIO TEST

Check the three diodes for continuity by connecting an ohmmeter to both ends of each diode. Each diode should have continuity in only one direction.

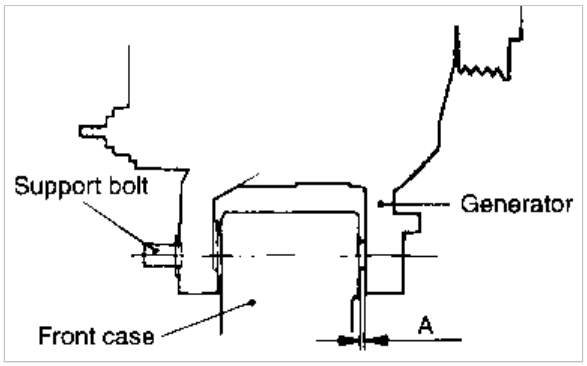
If continuity is present in both directions, a diode is defective and the heatsink assembly must be replaced.



Engine Electrical System > Charging System > Generator (GEN) > INSTALLATION

INSTALLATION

1. Position the generator and insert the support bolt. (Do not attach the nut.)
2. Push the generator forward and determine how many spacers (thickness: 0.198 mm) should be inserted between the front leg of the generator and the front case (space A in the illustration). (There should be enough spacers so that they do not fall out when you let go of them.)
3. Insert the spacers (space A in the illustration), attach the nut, and complete the installation.

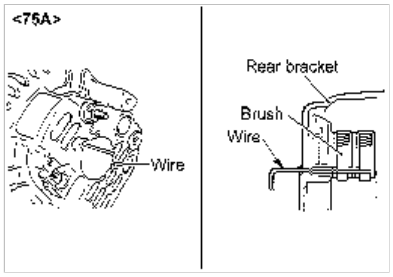


Engine Electrical System > Charging System > Generator (GEN) > REASSEMBLY

REASSEMBLY

Perform reassembly in the reverse order of disassembly, paying attention to the following:

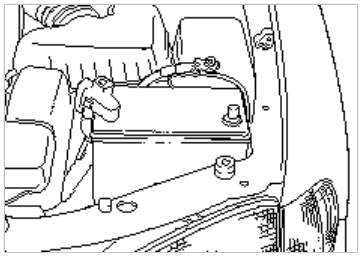
Before the rotor is attached to the rear bracket, insert a wire through the small hole in the rear bracket to lock the brush. After the rotor has been installed, the wire can be removed.



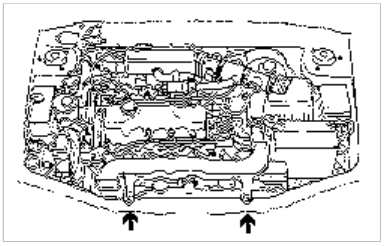
Engine Electrical System > Charging System > Generator (GEN) > REMOVAL

REMOVAL

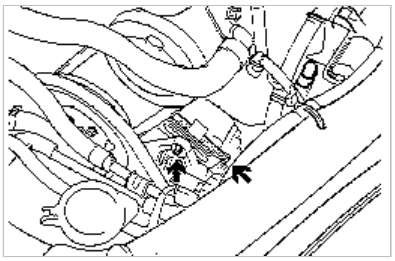
1. Disconnect the negative terminal from battery and disconnect the radiator fan connector and condenser fan connector.



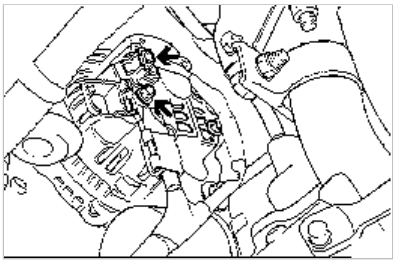
2. Remove the radiator mounting bolts.



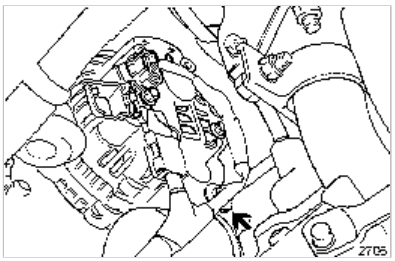
3. Loosen the belt tension adjusting bolt and remove the mounting bolt. Then, lift the vehicle on the jack.



4. Disconnect the generator connector and remove the B+ terminal cable.



5. Remove the belt and detach the generator mounting bolt and nut. Then, remove the generator assembly while raising the radiator by hand.



Engine Electrical System > General > SPECIFICATIONS

SPECIFICATIONS

Ignition Coil

Description	Specification
Type	Mold dual coil
Primary coil resistance	0.5 ± 0.05Ω
Secondary coil resistance	12.1 ± 1.8kΩ

Spark Plug

Description	Specification
Type - NGK	BKR5ES-11
Type - Champion	RC9YC4, RC10YC4
Plug gap	1.0-1.1 mm (0.039-0.043 in.)

Starter Motor

Description	Specification

Type	Direct drive type
Rated output	12V 0.7 kW, 0.9 kW (with power steering, A/T)
Rated time	30 sec.
No-load characteristics: Terminal voltage	11.5V
Amperage	60A or less
Maximum speed	6,600 rpm or more, 6,500 rpm or more
No. of pinion teeth	8
Pinion gap mm (in.)	0.5 - 2 (0.0197-0.079)

Generator

Description	Specification
Type	Battery voltage sensing
Rated output	13.5V 75A
Voltage regulator type	Electronic built-in type
Regulator setting voltage	14.4 ± 0.3V
Temperature compensation	-10 ± 3mV/°C

Battery

Description	Specification
Type	MF 55Ah
Ampere hours (5 HR)	44 Ah or more
Ampere hours (20 HR)	55 Ah or more
Cold cranking [at -17.8°C (0°F)]	433A or more
Reserve capacity	90 min.
Specific gravity [at 25°C (77°F)]	1,280 ± 0.01

COLD CRANKING AMPERAGE is the amperage that battery can deliver for 30 seconds and maintain a terminal voltage of 7.2 or greater at a specified temperature. RESERVE CAPACITY RATING is the amount of time a battery can deliver 25A and maintain a minimum terminal voltage of 10.5 at 26.7°C (80° f).

Engine Electrical System > General > TROUBLESHOOTING

TROUBLESHOOTING

IGNITION SYSTEM

Trouble condition	Probable cause	Remedy
Engine will not start or is hard to start. (Cranks OK)	Ignition coil faulty	Inspect ignition coil
	High tension cable faulty	Inspect high tension cable
	Spark plugs faulty	Replace plugs
	Ignition wiring disconnected or broken	Inspect wiring
Rough idle or stalls	Spark plugs faulty	Replace plugs
	Ignition wiring faulty	Inspect wiring
	Ignition coil faulty	Inspect ignition coil
	High tension cord faulty	Inspect high tension cord
Engine hesitates/poor acceleration	Spark plugs faulty	Replace plugs
	Ignition wiring faulty	Inspect wiring
Poor fuel economy	Spark plugs faulty	Replace plugs

CHARGING SYSTEM

Trouble condition	Probable cause	Remedy

Charging warning indicator does not light with ignition switch "ON" and engine off	Fuse blown	Check fuses
	Light burned out	Replace light
	Wiring connection loose	Tighten loose connections
	Electronic voltage regulator faulty	Replace voltage regulator
Charging warning indicator does not go out with engine running. (Battery requires frequent recharging)	Drive belt loose or worn	Adjust tension or replace cables
	Battery cables loose, corroded or worn	Repair or replace cables
	Fuse blown	Check fuses
	Fusible link blown	Replace fusible link
	Electronic voltage regulator or generator faulty	Test generator
	Wiring faulty	Repair wiring
Charging warning indicator does not go out with engine running. (Battery requires frequent recharging)	Drive belt loose or worn	Adjust tension or replace drive belt
	Wiring connection loose or open circuit	Tighten loose connection or repair wiring
	Fusible link blown	Replace fusible link
	Poor grounding	Repair
	Electronic voltage regulator or generator faulty	Test generator
	Battery life	Replace battery
Overcharging	Electronic voltage regulator faulty	Replace voltage regulator
	Voltage sensing wire faulty	Repair wire

STARTING SYSTEM

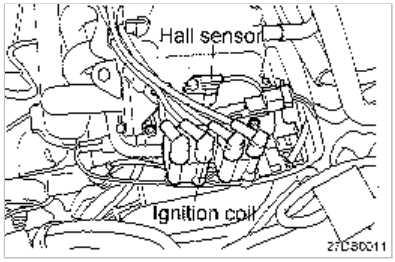
Trouble condition	Probable cause	Remedy
Engine will not crank	Battery charge low	Charge or replace battery
	Battery cables loose, corroded or worn	Repair or replace cables
	Transaxle range switch faulty (Vehicle with automatic transaxle only)	Adjust or replace switch
	Fusible link blown	Replace fusible link
	Starter motor faulty	Repair starter motor
	Ignition switch faulty	Replace ignition switch
Engine cranks slowly	Battery charge low	Replace plugs
	Battery cables loose, corroded or worn	Inspect wiring
	Starter motor faulty	Inspect ignition coil
Starter keeps running	Starter motor faulty	Replace plugs
	Ignition wiring faulty	Inspect wiring
Starter spins but engine will not crank	Short in wiring	Repair wiring
	Pinion gear teeth broken or starter motor faulty	Repair starter motor
	Ring gear teeth broken	Replace flywheel ring gear or torque converter

Engine Electrical System > Ignition System > GENERAL INFORMATION (SOHC)

GENERAL INFORMATION (SOHC)

Ignition timing is controlled by the electronic control ignition timing system. The standard reference ignition timing data for the engine operation conditions are programmed in the memory of the engine control module (ECM).

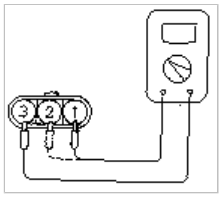
The engine conditions (speed, load, warm-up condition, etc.) are detected by various sensors. Based upon these sensor signals and the ignition timing data, signals to interrupt the primary current are sent to the ECM. The ignition coil is activated, and timing is controlled this way.



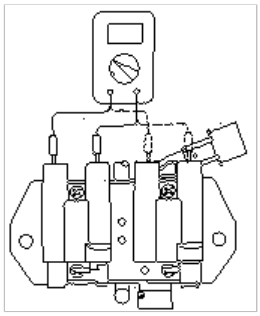
Engine Electrical System > Ignition System > Ignition Coil (SOHC) > CHECKING IGNITION COILS

CHECKING IGNITION COILS

1. **Measurement of the primary coil resistance.**
   Measure the resistance between connector terminals 3 and 1 (the coils at the No. 1 and No. 4 cylinder sides) of the ignition coil, and between terminals 3 and 2 (the coils at the No. 2 and No. 3 cylinder sides).

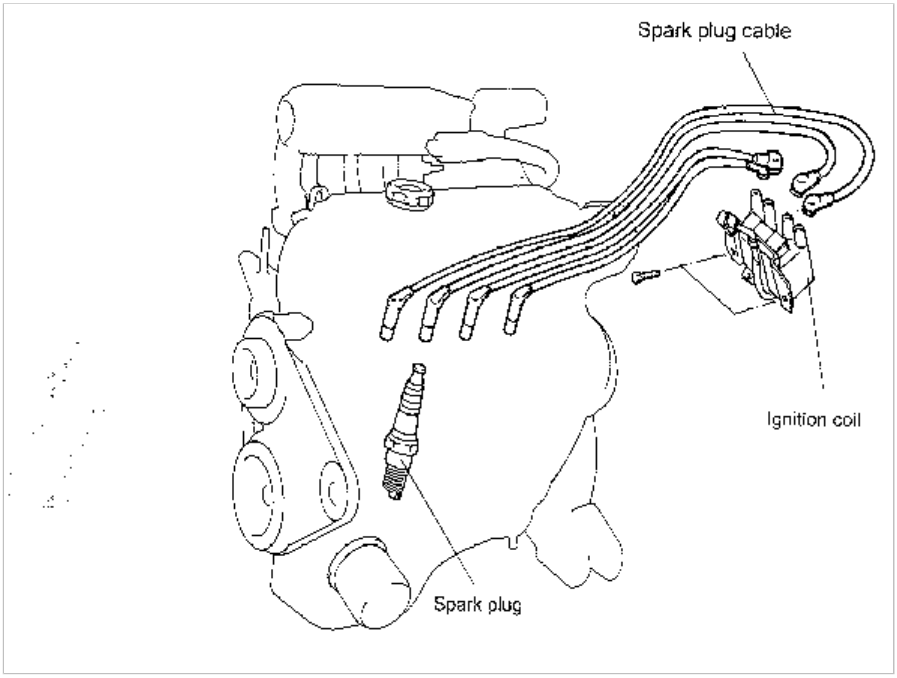


2. **Measurement of the secondary coil resistance.**
   Measure the resistance between the high-voltage terminal for the No. 1 and No. 4 cylinders, and between the high-voltage terminals for the No. 2 and No. 3 cylinders.
   Be sure, when measuring the resistance of the secondary coil, to disconnect the connector of the ignition coil.



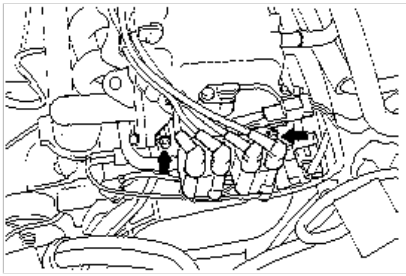
Engine Electrical System > Ignition System > Ignition Coil (SOHC) > COMPONENTS

Components



Engine Electrical System > Ignition System > Ignition Coil (SOHC) > REMOVAL AND INSTALLATION

Removal and Installation

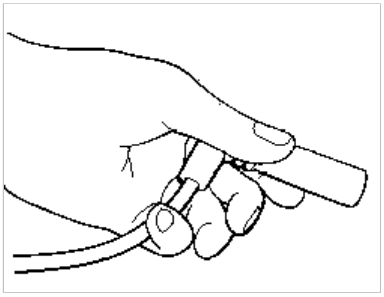


1. Disconnect the battery ground cable.
2. Disconnect the lead wire and high voltage cable.
3. Remove the ignition coil mounting bolt and remove the ignition coil assembly.
4. Installation is the reverse order of removal.

Engine Electrical System > Ignition System > Spark Plug > SPARK PLUG INSPECTION AND CLEANING

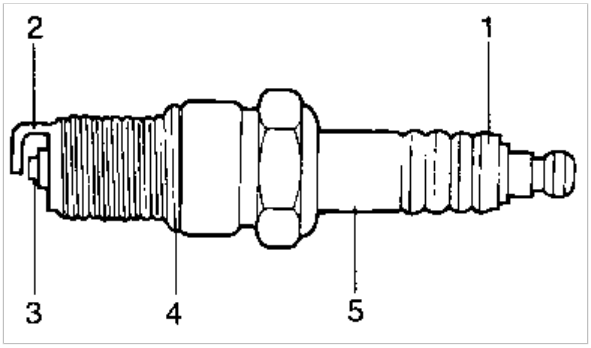
SPARK PLUG INSPECTION AND CLEANING

1. Disconnect the spark plug cable from the spark plug.
   Pull on the spark plug cable boot when removing the spark plug cable, not the cable, as it may be damaged.
2. Using a spark plug wrench, remove all of the spark plugs from the cylinder head.
   Take care not to allow contaminants to enter through the spark plug holes.

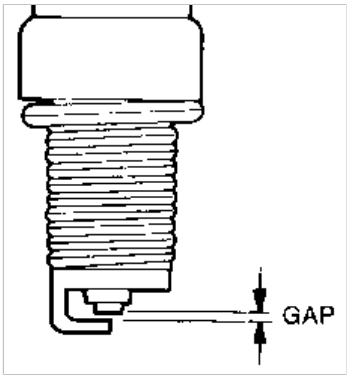


3. Check the spark plugs for the following :
   a. Broken insulator

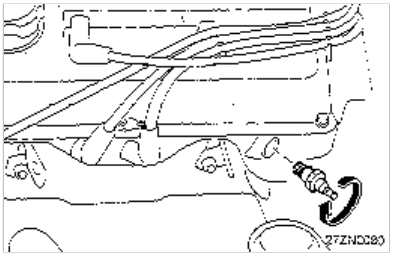
b. Worn electrode
c. Carbon deposits
d. Damaged or broken gasket
e. Condition of the porcelain insulator at the tip of the spark plug



4. Check the spark plug gap using a wire gap gauge, and adjust if necessary.



5. Reinsert the spark plug and tighten to the specified torque.
If it is over torqued, damage to the thread portion of cylinder head might result.



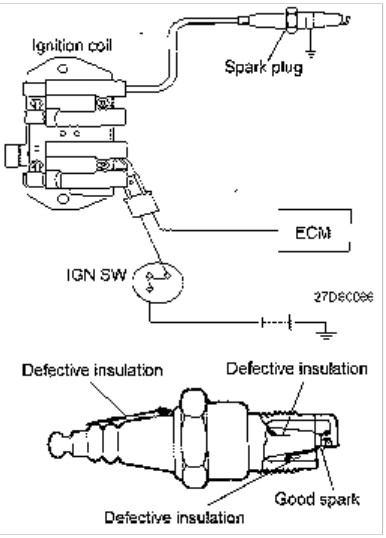
ANALYZING SPARK PLUG

Engine conditions can be analyzed by the tip deposits near the electrode.

Condition	Dark deposits	White deposits
Description	a. Too rich a fuel mixture b. Low air intake	a. Too lean a fuel mixture b. Advanced ignition timing c. Insufficient plug tightening

SPARK PLUG TEST (WHEN ENGINE CAN BE CRANKED)

Connect the spark plug cable. Ground the outer electrode (main body), and crank the engine. In the atmosphere, only short sparks are produced because of the small discharge gap. If the spark plug is good, however, sparks will occur in the discharge gap (between the electrodes). If spark plug is defective, no sparks will occur because of a leak through the insulation.

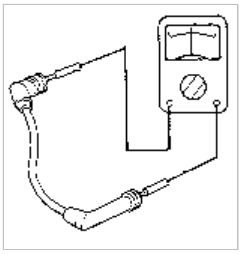


CHECKING SPARK PLUG CABLES

1. Check the cap and outer shell for cracks.
2. Measure the resistance
   Spark plug cable (SOHC)

No. 1	No. 2	No. 3	No. 4
4.8kΩ	10kΩ	7.3kΩ	12kΩ

Resistance should not be higher than 10,000Ω per foot of cable. If resistance is higher, replace the cable.



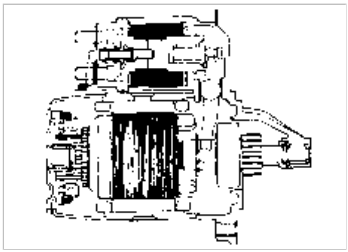
Engine Electrical System > Starting System > GENERAL INFORMATION

GENERAL INFORMATION

The starting system includes the battery, starter motor, solenoid switch, ignition switch, inhibitor switch (A/T only), connection wires and the battery cables.

When the ignition key is turned to the start position, current flows and energizes the starter motor's solenoid coil. The solenoid plunger and clutch shift lever are activated, and the clutch pinion engages the ring gear. The contacts close and the starter motor cranks.

In order to prevent damage caused by excessive rotation of the starter armature when the engine starts, the clutch pinion gear overruns.

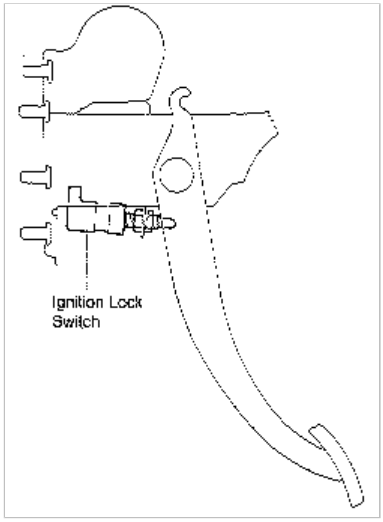


Engine Electrical System > Starting System > Clutch Start System > INSPECTION OF CLUTCH START SYSTEM (IGNITION LOCK SYSTEM)

INSPECTION OF CLUTCH START SYSTEM (IGNITION LOCK SYSTEM)

CHECK CLUTCH PEDAL

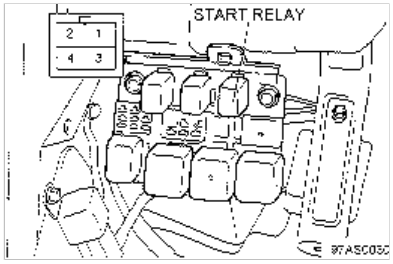
Check that pedal height, pedal freeplay and clutch pedal clevis pin play are correct. (Refer to clutch group.)



CHECK STARTER RELAY

Remove the starter relay and check continuity between the terminals. If the continuity is not as specified, replace the relay.

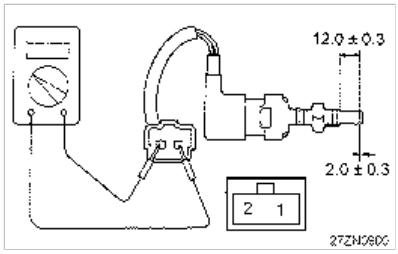
Condition \ Terminal	S1 (3)	S2 (5)	L (1)	B (2)
When de-energized	○——	——○		
When energized	○——	——○	○——	——○



CHECK IGNITION LOCK SWITCH

Check for continuity between terminals.

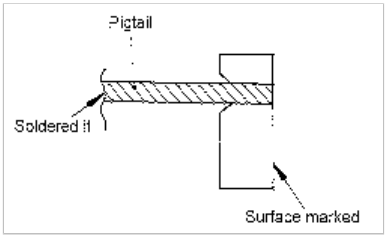
Condition \ Terminal	1	2
Pushed	○——	——○
Free		



Engine Electrical System > Starting System > Starter > BRUSH REPLACEMENT

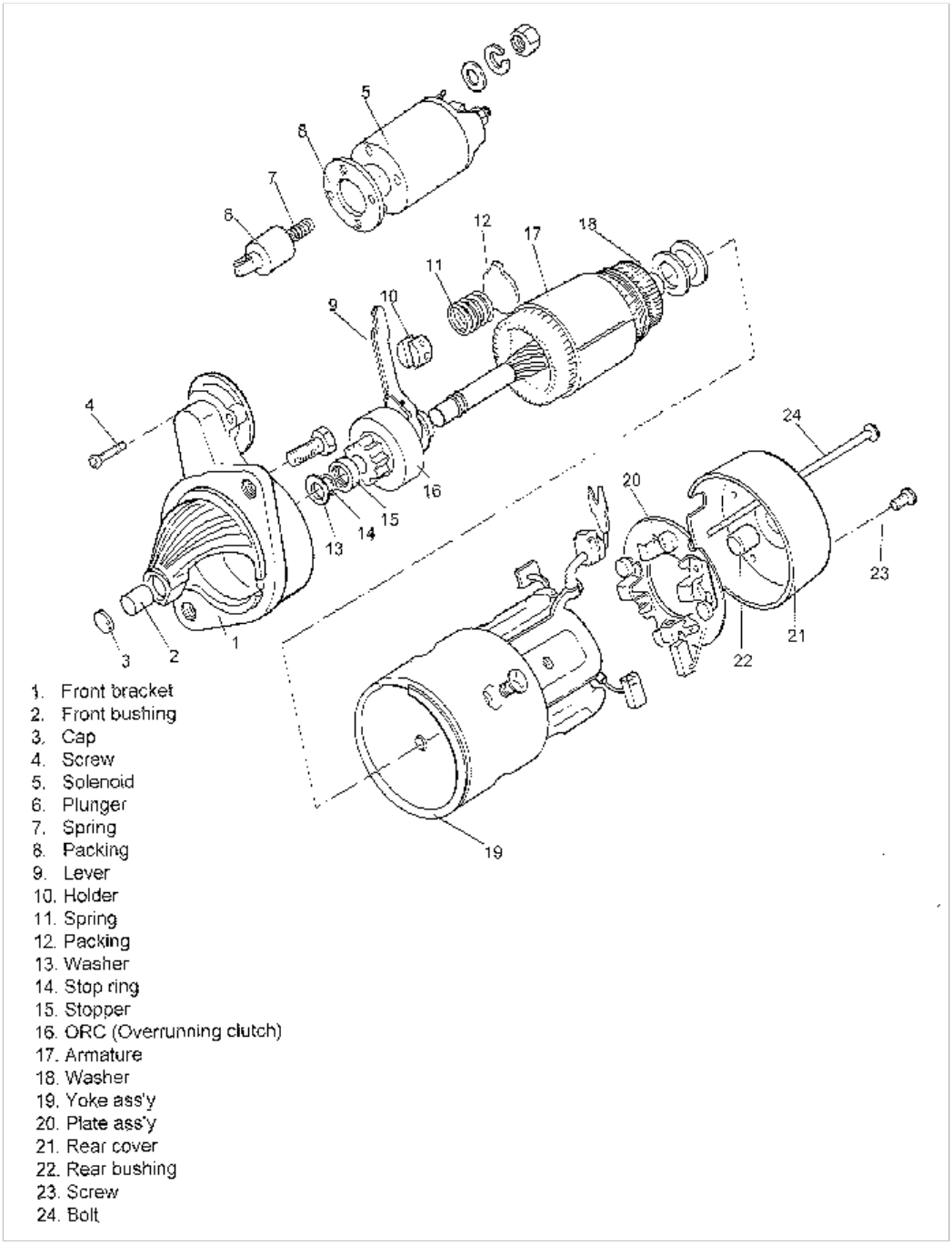
BRUSH REPLACEMENT

1. Remove the worn brush while taking care not to damage the pigtail.
2. Sand the pigtail end with sandpaper to ensure a good soldering joint.
3. Solder the end of the pigtail.



Engine Electrical System > Starting System > Starter > COMPONENTS

Components

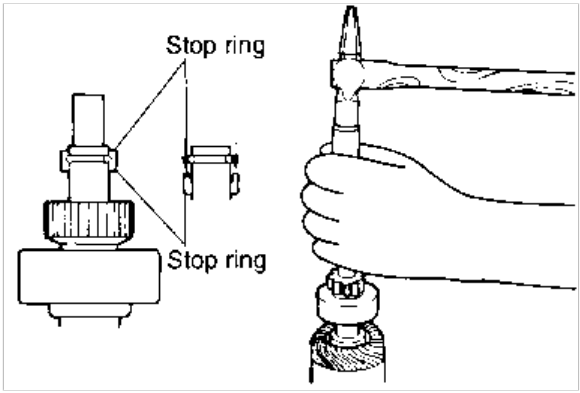


Engine Electrical System > Starting System > Starter > DISASSEMBLY

DISASSEMBLY

To remove the overrunning clutch from the armature shaft, the stop ring must be removed.

Move the stop ring toward the pinion and remove the snap ring. Now the stop ring can be removed from shaft.

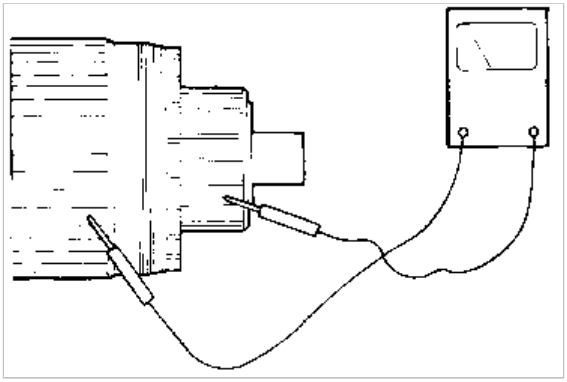


Engine Electrical System > Starting System > Starter > INSPECTION (AFTER DISASSEMBLY)

INSPECTION (AFTER DISASSEMBLY)

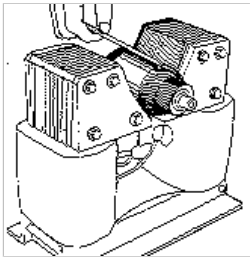
ARMATURE COIL GROUND TEST

Using an ohmmeter, check to make sure that there is no continuity between the commutator and the armature coil core. If there is continuity, replace armature assembly.



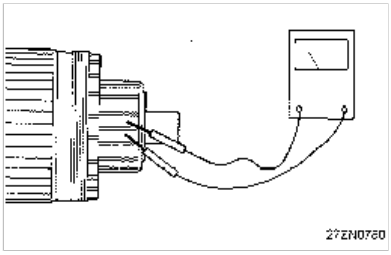
ARMATURE COIL SHORT-CIRCUIT TEST

Test the armature coil in a growler. Replace the coil if there are signs of a short. If the blade attached to the core vibrates while the core is turned, the armature is shorted.



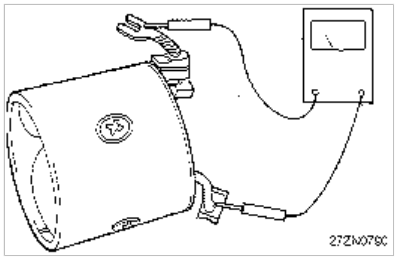
ARMATURE COIL OPEN-CIRCUIT TEST

Using an ohmmeter, check for continuity between the commutator segments. If there is no continuity, the commutator segments are open. Replace the armature assembly.



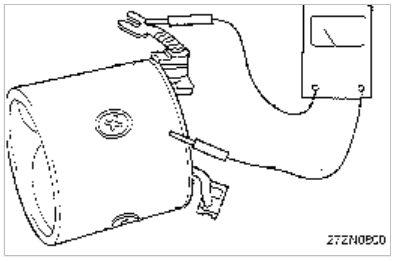
FIELD COIL OPEN-CIRCUIT TEST

Using an ohmmeter, check the field coil for continuity. If there is no continuity, the field coil is open. Replace the field coil assembly.



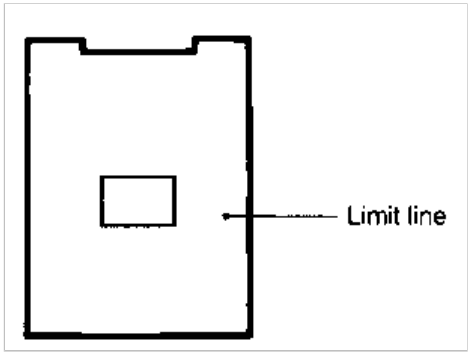
FIELD COIL GROUND TEST

With the field coil mounted to the yoke, check for continuity between the field coil and the yoke using an ohmmeter. If there is continuity, replace the field coil.



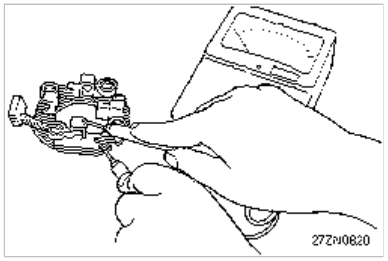
BRUSH

A brush worn down to the wear limit line should be replaced.



BRUSH HOLDER

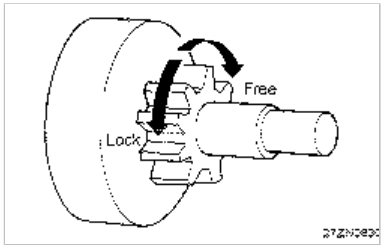
Check for continuity between the (+) side brush holder and brush holder base. If there is continuity, replace the holder assembly.



OVERRUNNING CLUTCH

Inspect the pinion and spline teeth for wear or damage. Replace if damaged. Also inspect the flywheel ring gear for damage.

Rotate the pinion. It should turn freely in a clockwise direction, and lock when turned counterclockwise.

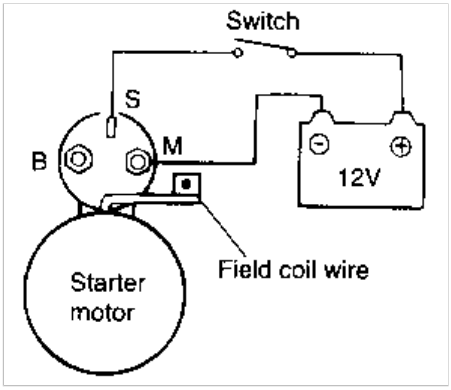


Engine Electrical System > Starting System > Starter > INSPECTION (AFTER REMOVAL)

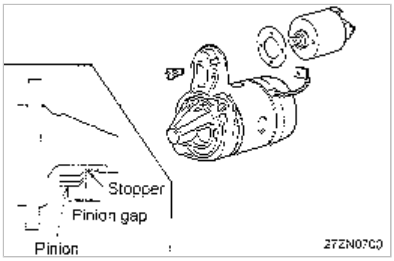
INSPECTION (AFTER REMOVAL)

PINION GAP ADJUSTMENT

1. Disconnect the wire from the M-terminal.
2. Connect a 12V battery between the S-terminal and the M-terminal.
3. Set the switch to "ON," and the pinion will move out.
   This test must be performed quickly (in less than 10 seconds) to prevent coil from burning.

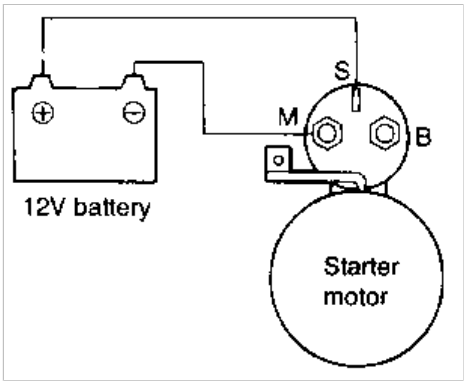


4. Check the pinion to stopper clearance (pinion gap) with a feeler gauge. If the pinion gap is out of specification, adjust by adding or removing washers between the solenoid and the front bracket.



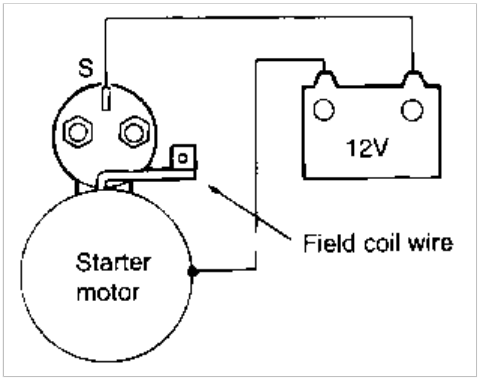
SOLENOID PULL-IN TEST

1. Disconnect the connector from the M-terminal.
2. Connect a 12V battery between the S-terminal and M-terminal.
   This test must be performed quickly (in less than 10 seconds) to prevent the coil from burning.
3. If the pinion moves out, the pull-in coil is good. If it doesn't, replace the solenoid.



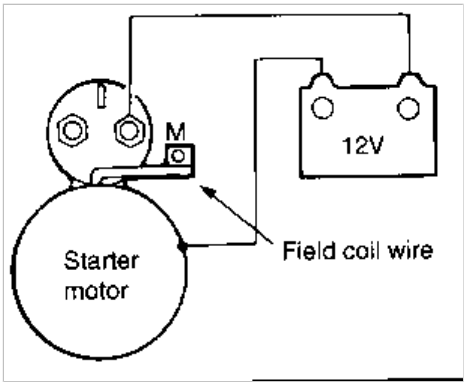
SOLENOID HOLD-IN TEST

1. Disconnect the connector from the M-terminal.
2. Connect a 12V battery between the S-terminal and the body.
   This test must be performed quickly (in less than 10 seconds) to prevent the coil from burning.
3. If the pinion remains out, everything is in order. If the pinion moves in, the hold-in circuit is open. Replace the magnetic switch.



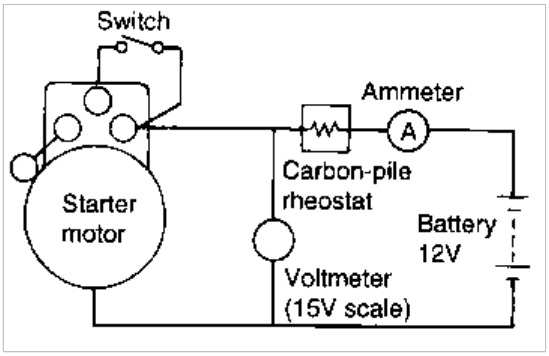
SOLENOID RETURN TEST

1. Disconnect the connector from the M-terminal.
2. Connect a 12V battery between the M-terminal and the body.
   This test must be performed quickly (in less than 10 seconds) to prevent the coil from burning.
3. Pull out the pinion and then release it. If the pinion returns quickly to its original position, everything is in order. If it doesn't, replace the solenoid



PERFORMANCE TEST (NO-LOAD)

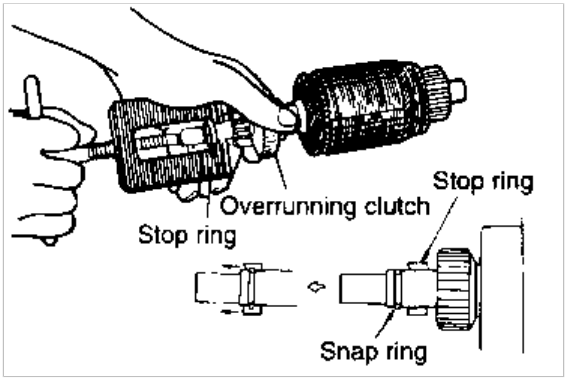
1. Make the no-load circuit test as shown.
2. After adjusting the rheostat until the battery voltage shown on the voltmeter reads 11.5 volts, confirm that the maximum amperage draw is within the specifications and that the starter motor turns smoothly and freely.



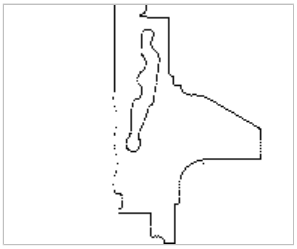
Engine Electrical System > Starting System > Starter > REASSEMBLY

REASSEMBLY

1. Install the overrunning clutch to the front end of the armature shaft.
2. Install the stop ring and the snap ring from the front end of the armature shaft. Push the stop ring all the way toward the snap ring.

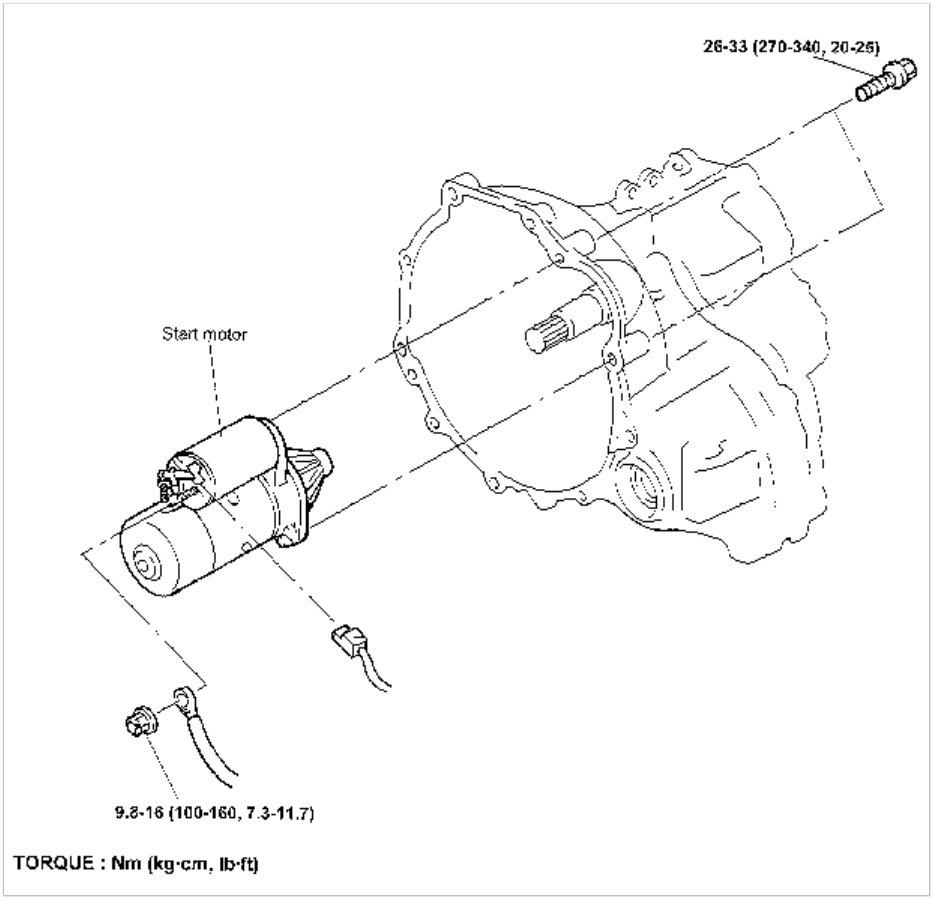


3. When the lever is mounted to the front bracket, pay attention to its direction. If it is mounted in a reverse direction, the pinion will remain in an outward position and fail to operate properly.



Engine Electrical System > Starting System > Starter > STARTER

STARTER



1. Disconnect the battery ground cable.
2. Remove the speed meter cable and the shift cable.
3. Disconnect the starter motor connector and terminal.

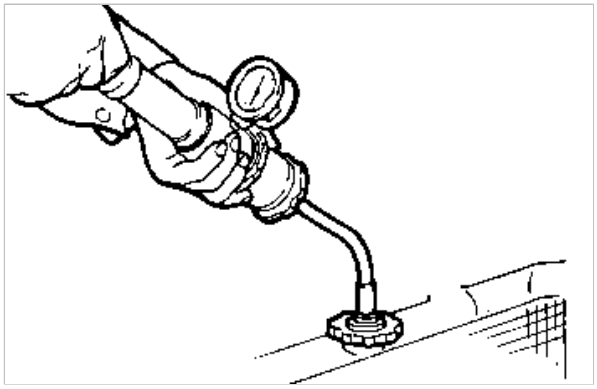
4. Renove the starter motor assembly.
5. Installation is the reverse order of removal.

ACCENT(X3) > 1998 > G 1.5 SOHC > Engine Mechanical System

Engine Mechanical System > Cooling System > COOLANT LEAK CHECK

COOLANT LEAK CHECK

1. Wait until radiator is cool (less than 38°C, 100°F). Loosen radiator cap.
2. Confirm that the coolant level is up to the filler neck.
3. Install a radiator cap tester to the radiator filler neck and apply 139.3 kPa (19.9 psi, 1.4 kg/cm2) pressure. Maintain pressure for two minutes, while checking for leakage from the radiator, hoses or connections.



Radiator coolant may be extremely hot. Do not open the system while hot, or scalding water could spray out, causing personal injury. Allow vehicle to cool before servicing this system.
Be sure to completely clean away any moisture from the places checked. When the tester is removed, be careful not to spill any coolant from it. it. Be careful, when installing and removing the tester and when testing, not to deform the filler neck of the radiator.

4. If there is leakage, repair or replace the appropriate part.

Engine Mechanical System > Cooling System > SERVICE STANDARD

SERVICE STANDARD

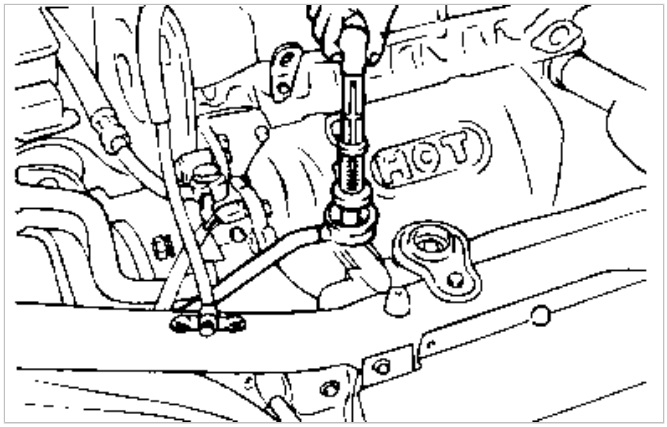
Standard Value

Antifreeze	Mixture ratio of anti-freeze in coolant
ETHYLENE GLYCOL BASE FOR ALUMINUM	50%

Engine Mechanical System > Cooling System > SPECIFIC GRAVITY TEST

SPECIFIC GRAVITY TEST

1. Measure the specific gravity of the coolant with a hydrometer.
2. Measure the coolant temperature, and calculate the concentration from the relation between the specific gravity and temperature. Use the following table for reference.



RELATION BETWEEN COOLANT CONCENTRATION AND SPECIFIC GRAVITY

The following table is applicable only to the specified high quality ethylene glycol (antifreeze) coolant.

Coolant temperature °C (°F) and specific gravity					Freezing temperature °C (°F)	Safe operating temperature °C (°F)	Coolant concentration (Specific volume)
10 (50)	20 (68)	30 (86	40 (104)	50 (122)			
1.054	1.050	1.046	1.042	1.036	-16 (3.2)	-11 (12.2)	30%
1.063	**1.058**	1.054	1.049	1.044	-20 (-4)	**-15 (5)**	35%
1.071	1.067	1.062	1.057	1.052	-25 (-13)	-20 (-4)	40%
1.079	1.074	1.069	1.064	1.058	-30 (-22)	-25 (-13)	45%
1.087	1.082	1.076	1.070	1.064	-36 (-32.8)	-31 (-23.8)	50%
1.095	1.090	1.084	1.077	1.070	-42 (-44)	-37 (-35)	55%
1.103	1.098	1.092	1.084	1.076	-50 (-58)	-45 (-49)	60%

Example

The safe operating temperature is -15°C (5°F) when the measured specific gravity is 1.058 at coolant temperature of 20°C (68°F)

If the concentration of the coolant is below 30%, the anti-corrosion property will be adversely affected. In addition, if the concentration is above 60%, both the anti-freeze and engine cooling properties will decrease, adversely affecting the engine. For these reasons, be sure to maintain the concentration level within the specified range. Do not mix brands of coolant.

RECOMMENDED COOLANT

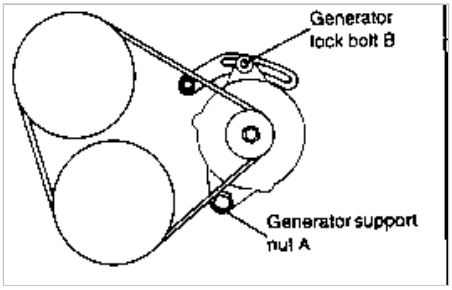
Antifreeze	Mixture ratio of anti-freeze in coolant
ETHYLENE GLYCOL BASE FOR ALUMINUM	50%

Engine Mechanical System > Cooling System > Accessory Drive Belts > DRIVE BELT AND PULLEY

DRIVE BELT AND PULLEY

DISASSEMBLY

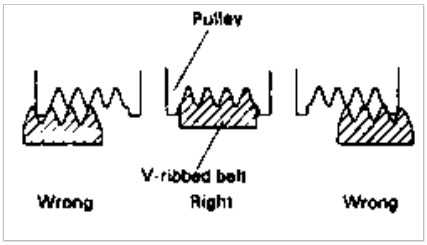
1. Loosen the coolant pump pulley bolts
2. Loosen the generator support nut.
3. Loosen the generator lock bolt, and remove the belt.
4. Remove the coolant pump pulley bolts and water pump pulley.



Engine Mechanical System > Cooling System > Accessory Drive Belts > DRIVE BELTS INSPECTION AND ADJUSTMENT

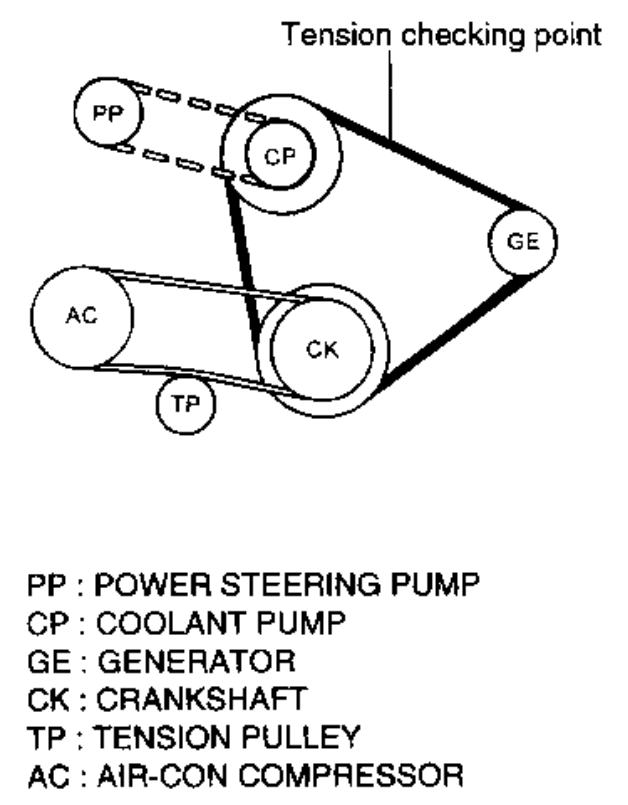
DRIVE BELTS INSPECTION AND ADJUSTMENT

1. Check that the belts are not damaged and are properly fit into the pulley grooves.
   a. When installing the V-ribbed belt, check that the V-ribs are properly in alignment.
   b. If noise or slippage is detected, check the belt for wear, damage, or breakage on the pulley contact surface, and check the pulley for scoring.



2. First set the belt tension by using the tension pulley. Turn the crankshaft twice clockwise.
   If the tension is measured before turning the crankshaft twice clockwise, the measured value is incorrect because the tension is unequal at point A, B and C as shown below.
   STANDARD VALUE: 1.5L SOHC ENGINE

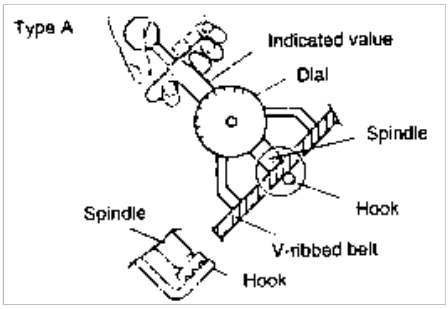
Drive Belt	New belt	Used Belt	Inspection
For Generator	65-75	40	35-50
For Power Steering Pump	55-70	38-48	-
For Air Conditioning Compressor	60-70	32-40	25-50



3. If the measured specification is not within the specification, adjust it.

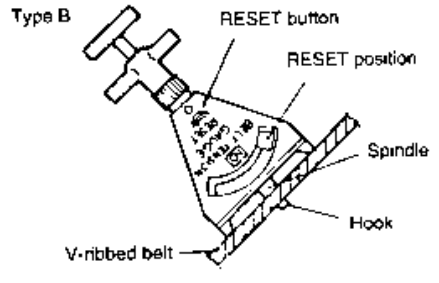
Type A Tension Gauge

Do not let the dial section of the tension gauge contact other objects during measurement.



Type B Tension Gauge

1. When measuring, be sure to turn reset button in the arrow direction to set the gauge needle to the RESET position.



2. If the tension gauge is removed from the belt, the needle will still indicate the tension. Read the tension after removing the gauge.

The following cautions should be observed while checking or adjusting belt tension.

a. Do not depend on your hand or finger feelings as these are not accurate and result in belt slippage and/or slip noise. Always use the tension gauge.
b. Be sure to adjust belt tension to the specification.
c. If the belt tensions is checked after tightening the adjustment screw (or bolt) only, tension can be varied while tightening the mounting bolt (or nut).

So, checking of the belt tension should be done after tightening both the adjustment screw (or bolt) and the mounting bolt (or nut) completely and adjusted if necessary.

New Belt: It means the tension value when installing new belt. A belt that has been running for less than 5 minutes.

Used belt: It means the tension value when installing used belt.

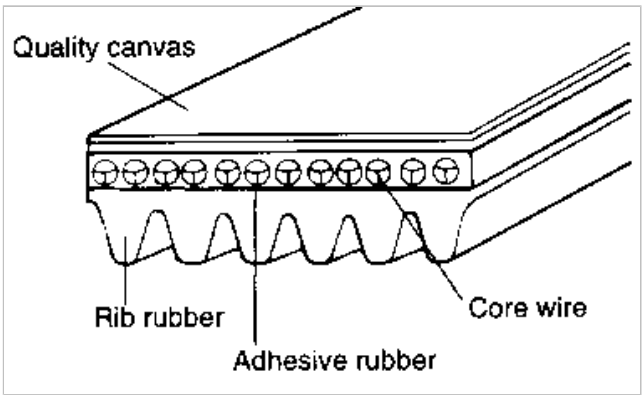
Inspection: It means the tension value after using the belt.

Engine Mechanical System > Cooling System > Accessory Drive Belts > INSPECTION

INSPECTION

Check the following items and replace if defective:

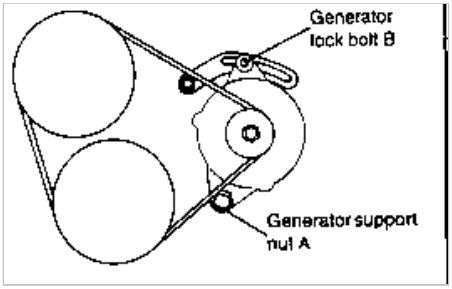
1. Check the belt surface for damage, peeling or cracks.
2. Check the belt surface for oil or grease.
3. Check the belt for worn or hardened areas.
4. Check the surface of the pulley for cracks or damage.



Engine Mechanical System > Cooling System > Accessory Drive Belts > REASSEMBLY

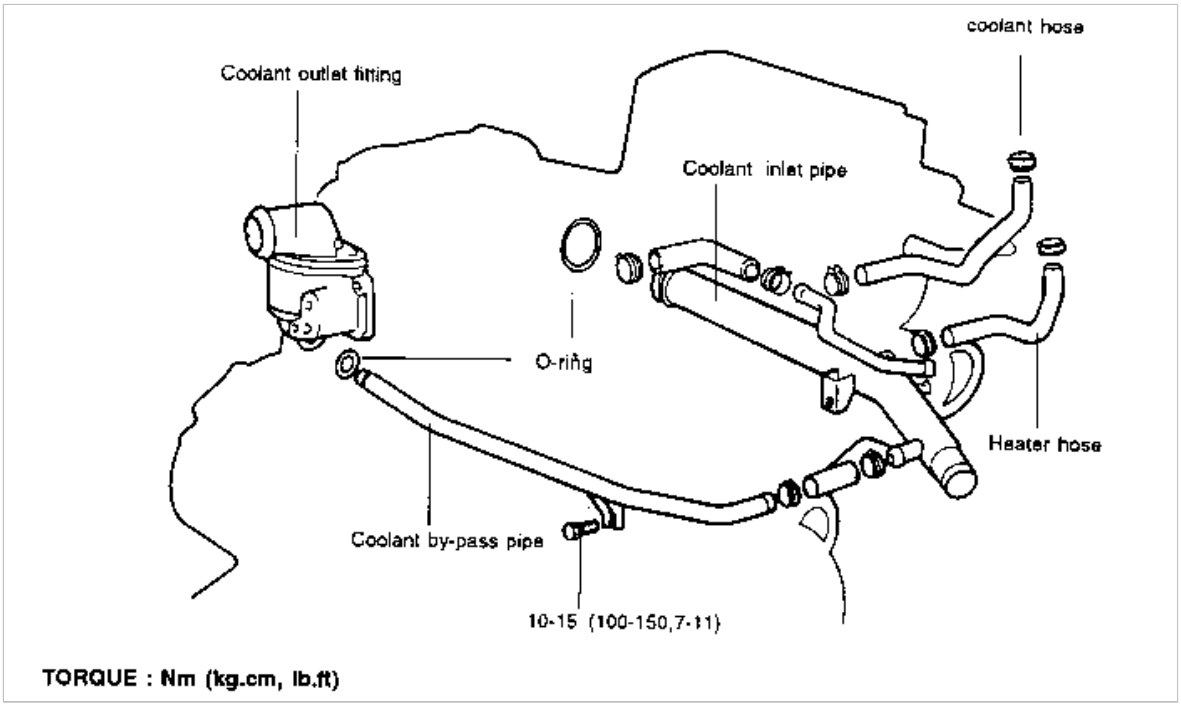
Reassembly

1. Install the water pump pulley to the water pump pulley bracket and tighten the bolts firmly.
2. After installing the belt, adjust the belt tension. See "DRIVE BELTS INSPECTION AND ADJUSTMENT"



Engine Mechanical System > Cooling System > Engine Coolant Hoses/Pipes > COMPONENTS

Components



Engine Mechanical System > Cooling System > Engine Coolant Hoses/Pipes > INSPECTION

INSPECTION

1. Check the coolant pipe and hoses for cracks, damage, or restrictions.
2. Replace if necessary.

Engine Mechanical System > Cooling System > Engine Coolant Hoses/Pipes > REASSEMBLY

Reassembly

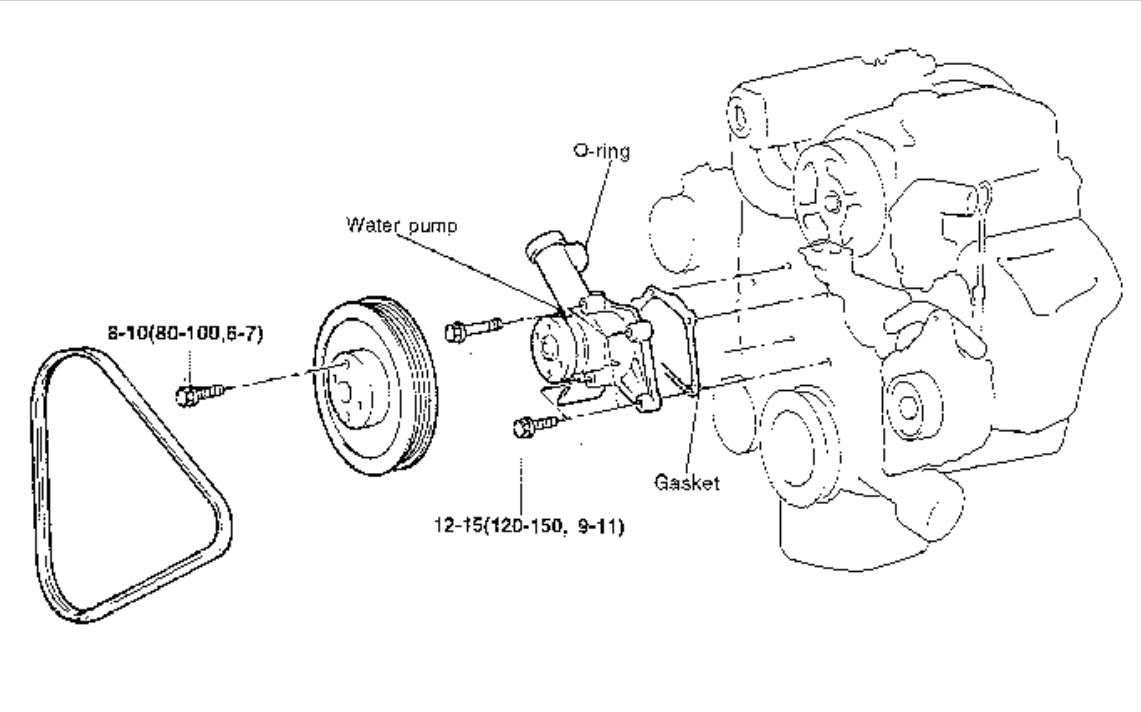
1. Fit the O-ring in the groove provided at the coolant inlet pipe end. Wet the O-ring with coolant and insert the coolant inlet pipe.
2. Make sure that there is a yellow mark on the inlet coolant hose. Then, keeping the yellow mark in the direction of the coolant inlet pipe, fit the hose to the pipe to the end of the yellow mark.

a. Do not apply oil or grease to the coolant pipe O-ring.

b. Keep the coolant pipe connections free of sand, dust, etc.
c. Insert the coolant pipe fully into the coolant pump.
d. Do not reuse O-ring. Replace it with a new one.

Engine Mechanical System > Cooling System > Engine Coolant Pump > COMPONENTS

Components



Engine Mechanical System > Cooling System > Engine Coolant Pump > DISASSEMBLY

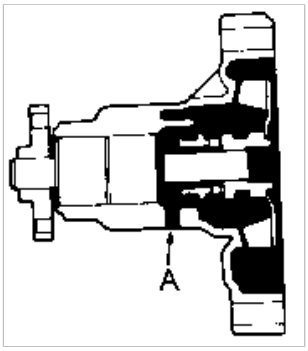
Disassembly

1. Drain the coolant and disconnect the radiator outlet hose and engine coolant bypass hose from the engine coolant pump.
2. Remove the drive belt and engine coolant pump pulley.
3. Remove the timing belt covers and the timing belt idler.
4. Remove the engine coolant pump mounting bolts, then remove the generator brace.
5. Remove the engine coolant pump assembly from the cylinder block.

Engine Mechanical System > Cooling System > Engine Coolant Pump > INSPECTION

INSPECTION

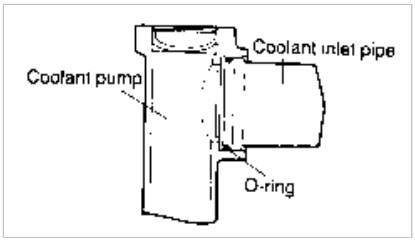
1. Check each part for cracks, damage or wear. Replace the coolant pump assembly if necessary.
2. Check the bearing for damage, abnormal noise and sluggish rotation. Replace the coolant pump assembly if necessary.
3. Check for coolant leakage. If coolant leaks from hole "A," the seal is defective. Replace the coolant pump assembly.



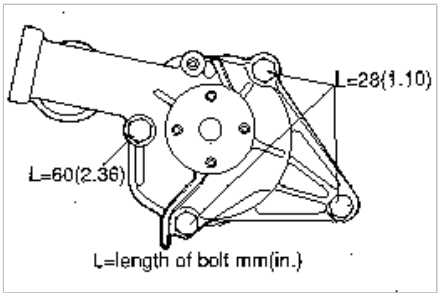
Engine Mechanical System > Cooling System > Engine Coolant Pump > REASSEMBLY

Reassembly

1. Clean the gasket surfaces of the engine coolant pump body and the cylinder block.



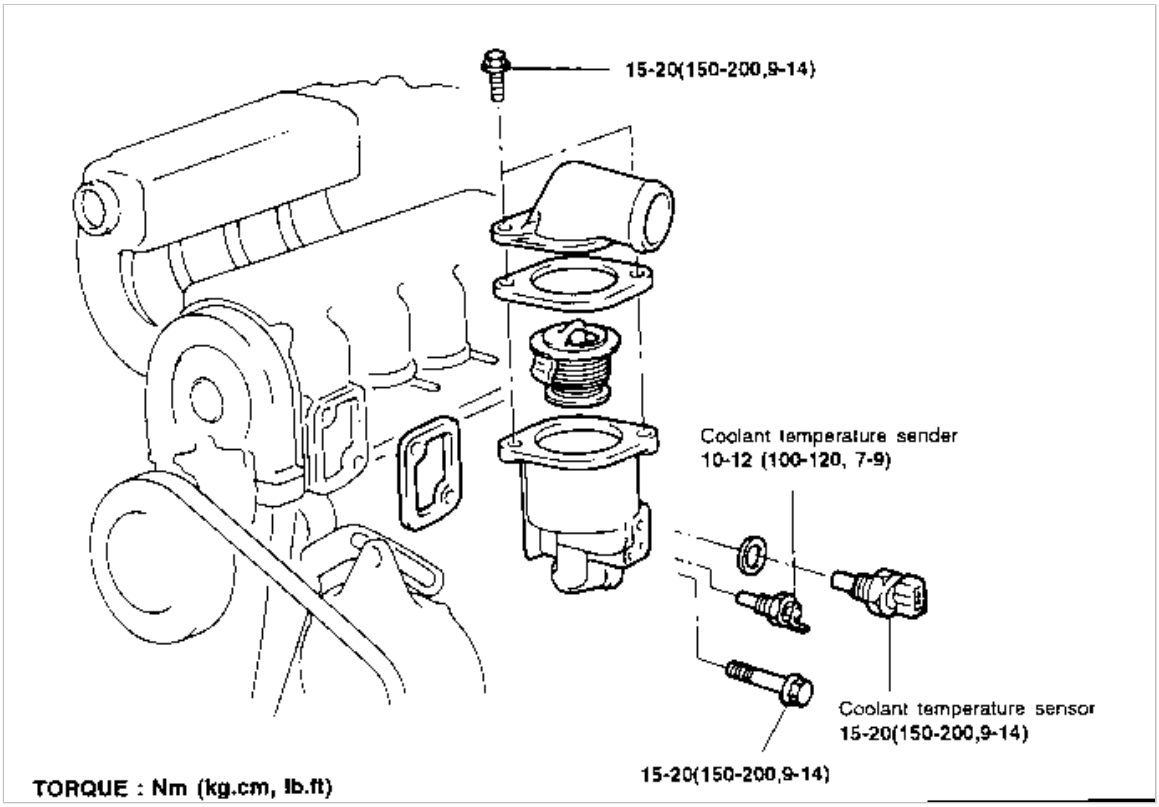
2. Install new engine coolant pump gasket to the coolant pump and tighten the bolts to specified torque.



3. Install the timing belt tensioner and timing belt. Adjust the timing belt tension. Refer to the engine section for procedures.
4. Install the timing belt covers.
5. Install the coolant pump pulley and drive belt, and then adjust the belt tension.
6. Refill the system with clean coolant.
7. Run the engine and check for leaks.

Engine Mechanical System > Cooling System > Engine Coolant Temperature (ECT) Sensor > COMPONENTS

Components



Engine Mechanical System > Cooling System > Engine Coolant Temperature (ECT) Sensor > DISASSEMBLY

Disassembly

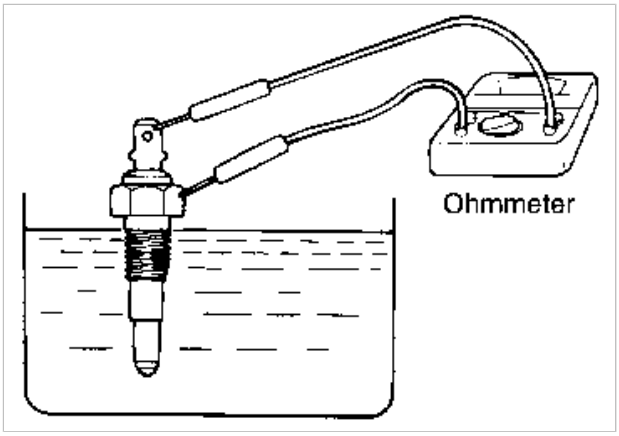
1. Drain the coolant down to gauge unit level or below.
2. Disconnect the battery ground cable and disconnect the engine harness connector from the sender and sensor.
3. Remove the sender and sensor.

Engine Mechanical System > Cooling System > Engine Coolant Temperature (ECT) Sensor > INSPECTION

INSPECTION

Coolant Temperature Sender

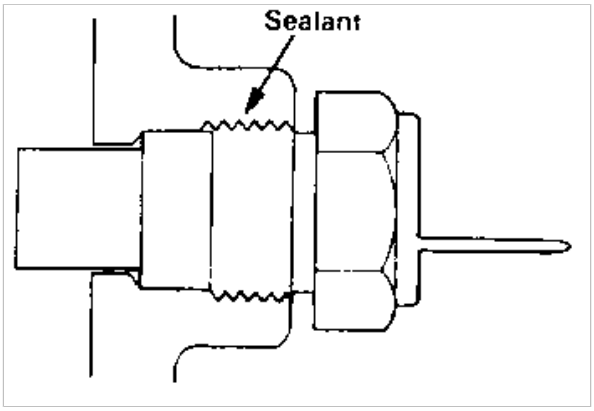
1. Heat the engine coolant temperature gauge by submerging it in hot water.
2. Check that the resistance is within the specified range.



Engine Mechanical System > Cooling System > Engine Coolant Temperature (ECT) Sensor > REASSEMBLY

Reassembly

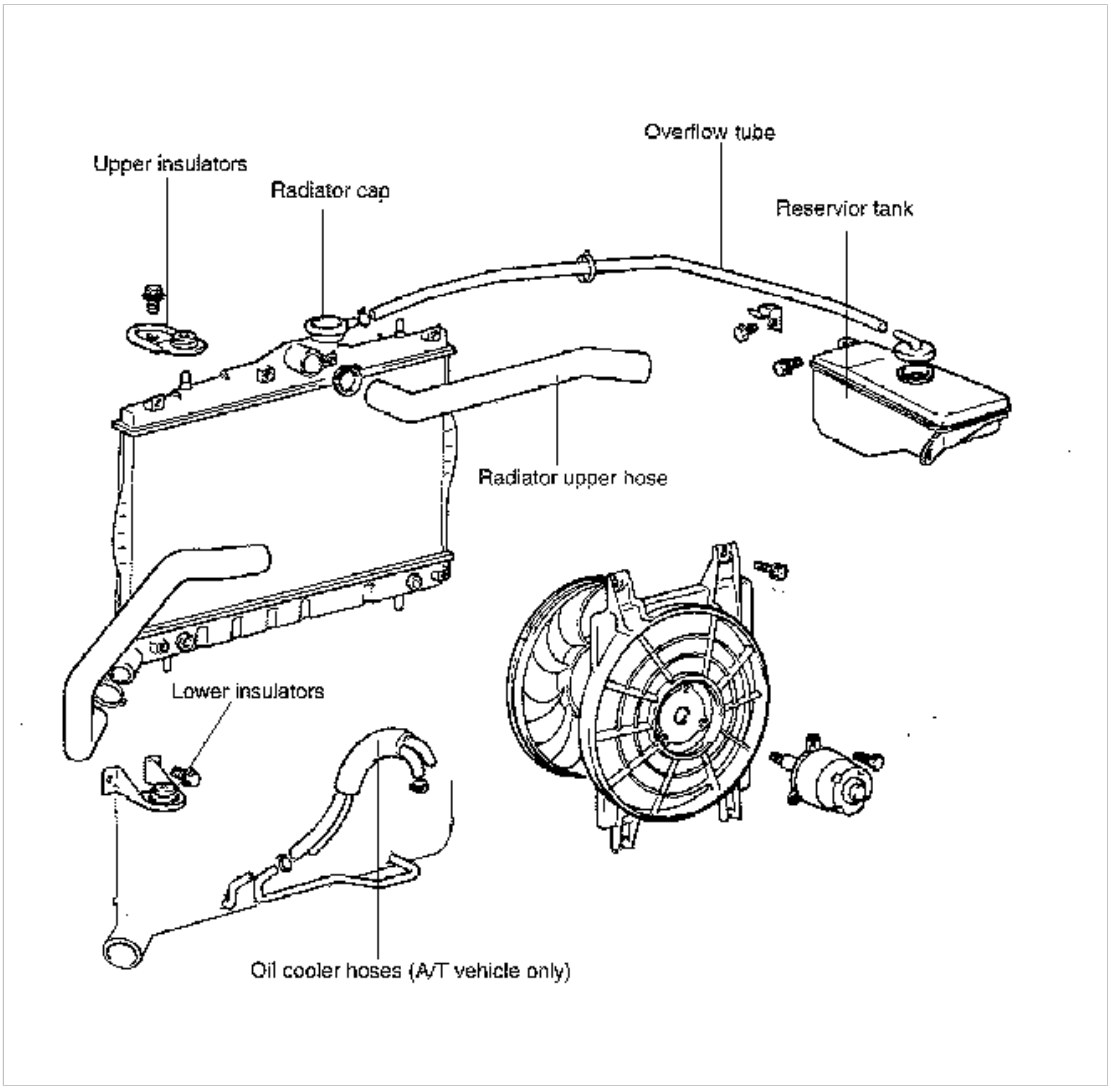
1. Apply sealant to the threaded portion and tighten to the specified torque.



2. Connect the harness connector to the coolant temperature sender, coolant temperature sensor.
3. Connect the battery to ground cable.
4. Refill the system with the clean coolant.

Engine Mechanical System > Cooling System > Radiator > COMPONENTS

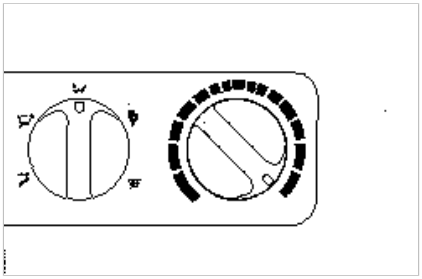
Components



Engine Mechanical System > Cooling System > Radiator > DISASSEMBLY

Disassembly

1. Disconnect the radiator fan motor connector.
2. Set the temperature of the heater control to the hot position.



3. Loosen the radiator drain plug to drain coolant.
4. Disconnect the upper and lower hose and overflow tube.
5. For vehicles with automatic transaxles, disconnect the oil cooler hoses from the automatic transaxle.
   Plug the ends of the oil cooler hoses and the automatic transaxle fittings to prevent transaxle fluid from spilling out and foreign material from entering.
6. Remove the radiator mounting bolts.
7. Remove the radiator together with the fan motor.

8. Remove the fan motor from the radiator.

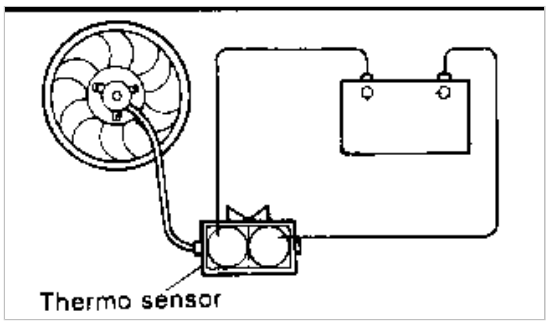
Engine Mechanical System > Cooling System > Radiator > INSPECTION

INSPECTION

1. Check the radiator for bent, broken or plugged fins.
2. Check the radiator for corrosion, damage, rust or scale.
3. Check the radiator hoses for cracks, damage or deterioration.
4. Check the reservoir tank for damage.
5. Check the radiator cap spring for damage.
6. Pressure test the cap using a cooling system checker.
7. Check the radiator cap seal for cracks or damage.

RADIATOR FAN MOTOR

1. Check that the radiator fan rotates when battery voltage is applied to the terminals (as shown in figure).
2. Check that abnormal noises are not produced while the motor is turning.



A/C SWITCH	RADIATOR FAN MOTOR	REMARK
OFF	OFF	|
	ON	1. Coolant temperature is higher than 95°C (205°F) 2. CTS fails
ON	ON	IG. KEY is turned on

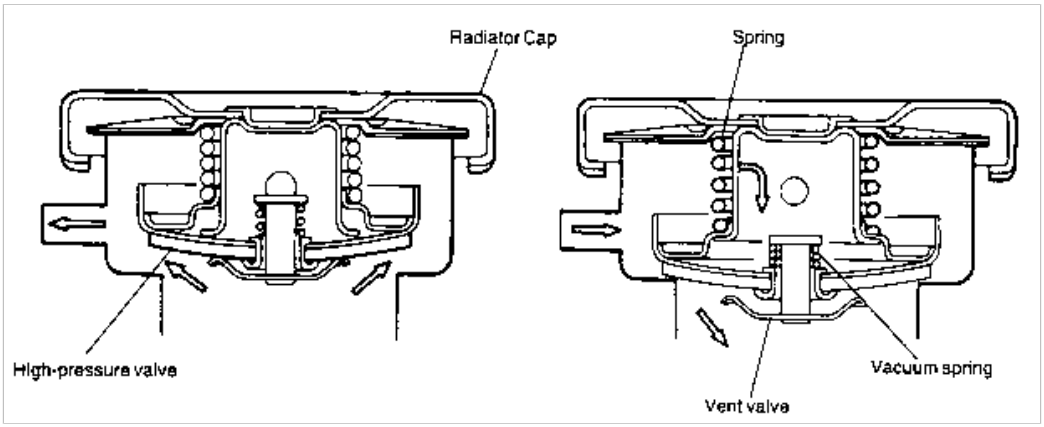
Engine Mechanical System > Cooling System > Radiator > REASSEMBLY

Reassembly

1. Fill the radiator and reservoir tank with clean coolant mixture.
2. Run the engine until the thermostat opens, and then stop the engine.
3. Remove the radiator cap, add coolant up to the filler neck of the radiator, then fill the reservoir tank to the upper level.
4. Check that there is no leakage from the radiator, hoses or connections.

Engine Mechanical System > Cooling System > Radiator Cap > COMPONENTS

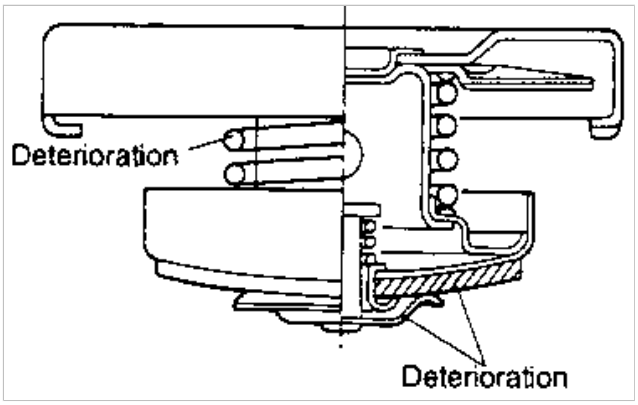
COMPONENTS



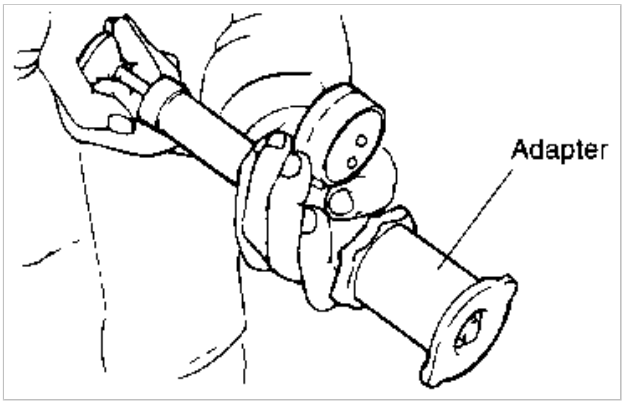
Engine Mechanical System > Cooling System > Radiator Cap > INSPECTION

Inspection

1. Check the radiator cap for damage, cracks and deterioration.



2. Attach a radiator cap tester to the radiator.
3. Pump the tester until the pointer stabilizes.

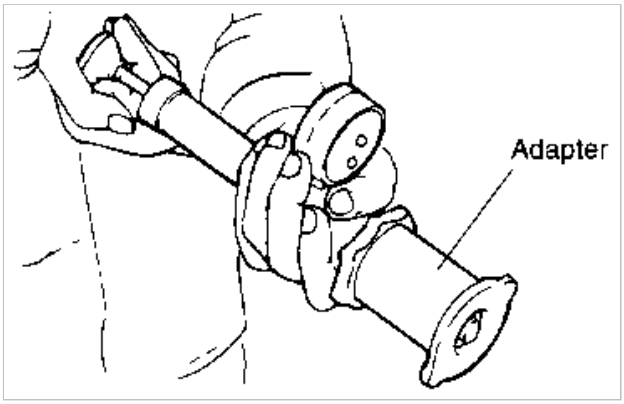


4. If the pointer stays constant for 10 seconds at a point exceeding the service limit, the radiator cap is good.

Engine Mechanical System > Cooling System > Radiator Cap > RADIATOR CAP PRESSURE TEST

RADIATOR CAP PRESSURE TEST

1. Use an adapter to attach the cap to the tester.

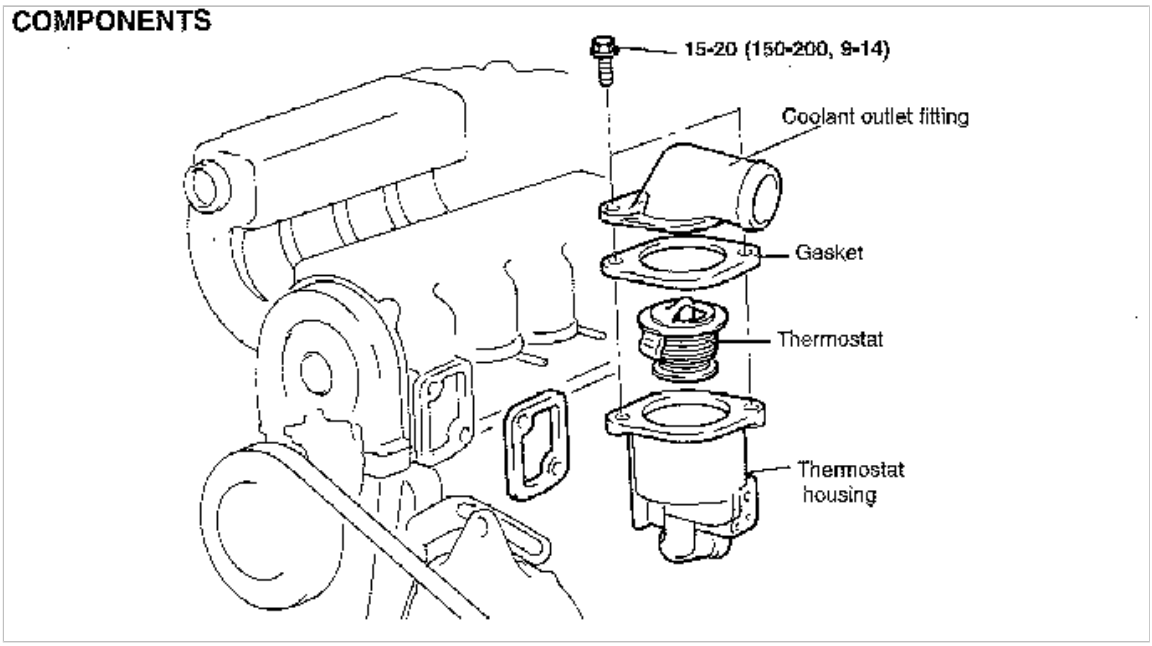


2. Increase the pressure until the gauge stops moving.
3. Check that the pressure level is maintained at or above the limit.
4. Replace the radiator cap if the reading does not remain at or above the limit.

Be sure that the cap is clean before testing, since rust or other foreign material on the cap seal will cause an incorrect indication.

Engine Mechanical System > Cooling System > Thermostat > COMPONENTS

Components



Engine Mechanical System > Cooling System > Thermostat > REASSEMBLY

Reassembly

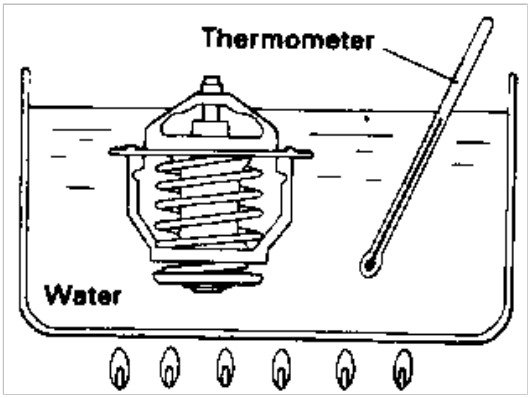
1. Check that the flange of the thermostat is correctly seated in the socket of the thermostat housing. If the thermostat is installed in the wrong direction, the bottom of the thermostat will touch the rib inside the intake manifold, making it impossible for the thermostat to operate properly.
2. Install a new gasket and the coolant outlet fitting.
3. Refill the system with clean coolant.

Engine Mechanical System > Cooling System > Thermostat > REMOVAL AND INSPECTION

REMOVAL AND INSPECTION

1. Drain the coolant down to thermostat level or below.

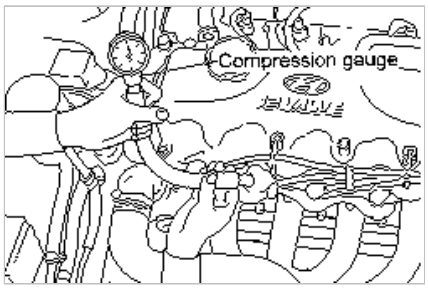
2. Remove the coolant outlet fitting and gasket.
3. Remove the thermostat.
4. Immerse thermostat in hot coolant to check proper valve opening temperature. Replace if necessary.



Engine Mechanical System > Cylinder Head Assembly > Cylinder Head > CHECKING COMPRESSION PRESSURE

CHECKING COMPRESSION PRESSURE

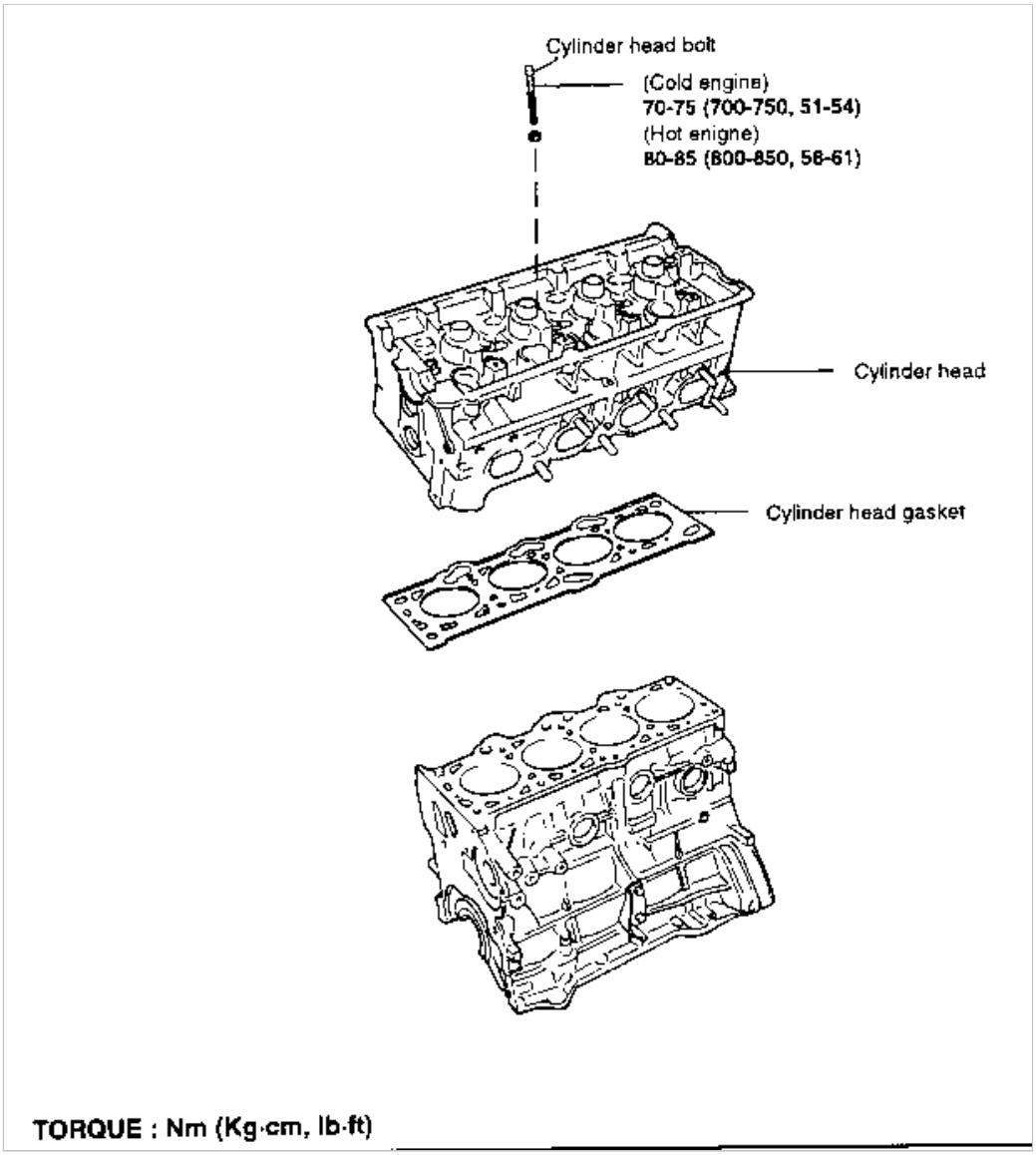
1. Before checking compression, check the engine oil level. Make sure the starter motor and battery are in normal operating condition.
2. Start the engine and wait until engine coolant temperature reaches 80-95°C (176-205°F)
3. Stop the engine and disconnect the spark plug cables.
4. Remove the spark plugs.
5. Crank the engine to remove any foreign objects in the cylinders.
6. Screw the compression gauge into the spark plug hole.



7. Fully open the throttle.
8. Crank the engine and read the gauge.
9. Repeat steps 6 through 8 on all cylinders, making sure that the pressure differential for each of the cylinders is within the specified limit.
10. If a cylinder's compression or pressure differential is below the specification, add a small mount of oil through the spark plug hole and repeat steps 6 through 9.
    (1) If the addition of oil brings the compression up, it is possible that there is wear between the piston ring and cylinder wall.
    (2) If compression remains the same, valve seizure, poor valve seating or a compression leak from the cylinder head gasket are all posible causes.
    (3) Reinstall the spark cables.

Engine Mechanical System > Cylinder Head Assembly > Cylinder Head > COMPONENTS

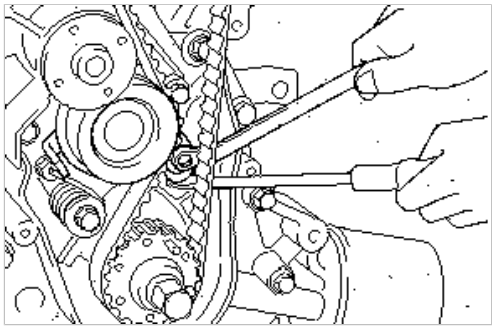
Components



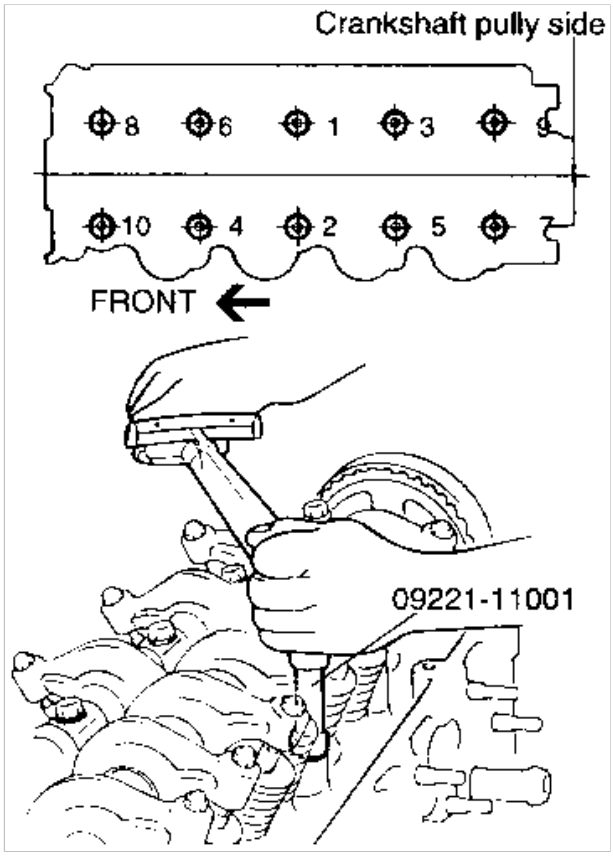
Engine Mechanical System > Cylinder Head Assembly > Cylinder Head > DISASSEMBLY

Disassembly

1. Drain the coolant and disconnect the upper radiator hose.
2. Remove the breather hose (between the air cleaner and the rocker cover).
3. Remove the air-intake hose.
4. Remove the vacuum hose, fuel hose and water hose.
5. Remove the cables from the spark plugs. The cables should be removed by holding the boot portion.
6. Remove the ignition coil.
7. Remove the surge tank.
8. Remove the intake manifold.
9. Remove the heat protector and exhaust manifold assembly.
10. Remove the water pump pulley and the crankshaft pulley.
11. Remove the timing belt cover.
12. Move the timing belt tensioner pulley toward the water pump and temporarily secure it.
13. Remove the timing belt.
14. Remove the rocker cover.



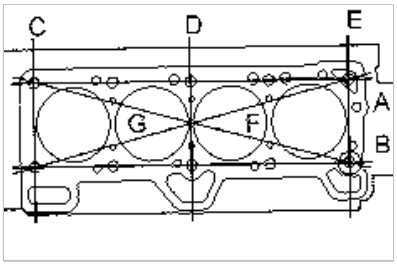
15. Remove the cylinder head assembly. The cylinder head bolts should be removed by using Special Tool, Cylinder Head Bolt Wrench (09221-11001), in the sequence as shown in the illustration.
16. Remove the gasket pieces from the cylinder block top surface and cylinder head bottom surface.
    Make sure that the gasket pieces do not fall in the engine.



Engine Mechanical System > Cylinder Head Assembly > Cylinder Head > INSPECTION

INSPECTION

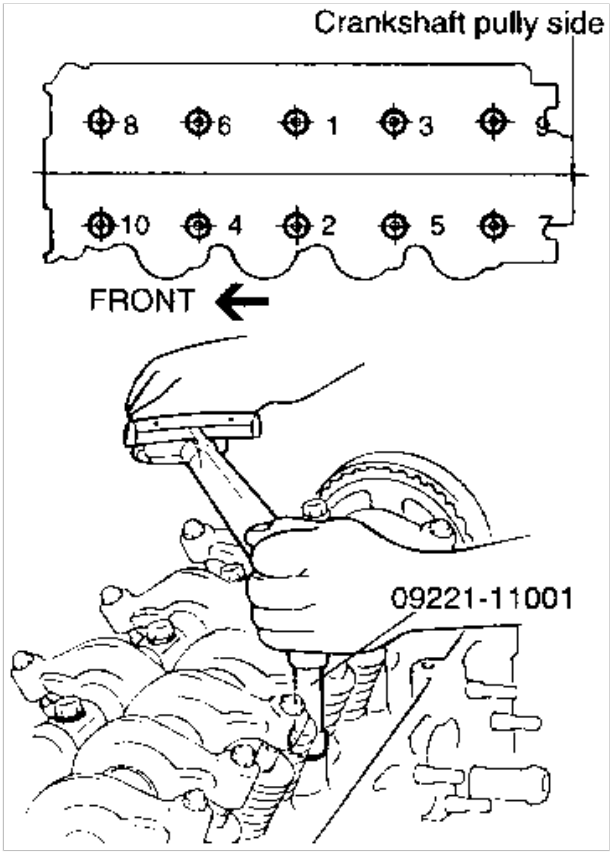
1. Check the cylinder head for cracks, damage and coolant leakage.
2. Remove scale, sealing compound and carbon deposits completely. After cleaning oil passages, apply compressed air to make certain that the passages are not clogged.
3. Check the cylinder head gasket surface for flatness by using a straight edge from the direction of A, B, as shown.
   If flatness exceeds service limit in any direction, either replace the cylinder head, or lightly machine the cylinder head gasket surface.



Engine Mechanical System > Cylinder Head Assembly > Cylinder Head > REASSEMBLY

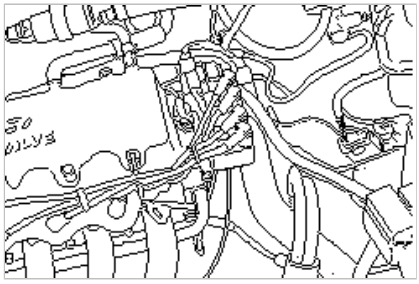
Reassembly

1. Clean all gasket surfaces of the cylinder block and the cylinder head.
2. Install a new cylinder head gasket onto the cylinder head assembly. Do not apply sealant to the gasket and do not reuse the old cylinder head gasket.
3. Install the cylinder head bolts. Starting at top center, tighten all cylinder head bolts in sequence as shown in illustration, using the Cylinder Head Bolt Wrench (09221-11001). Repeat the procedure, retightening all cylinder head bolts to the specified torque.



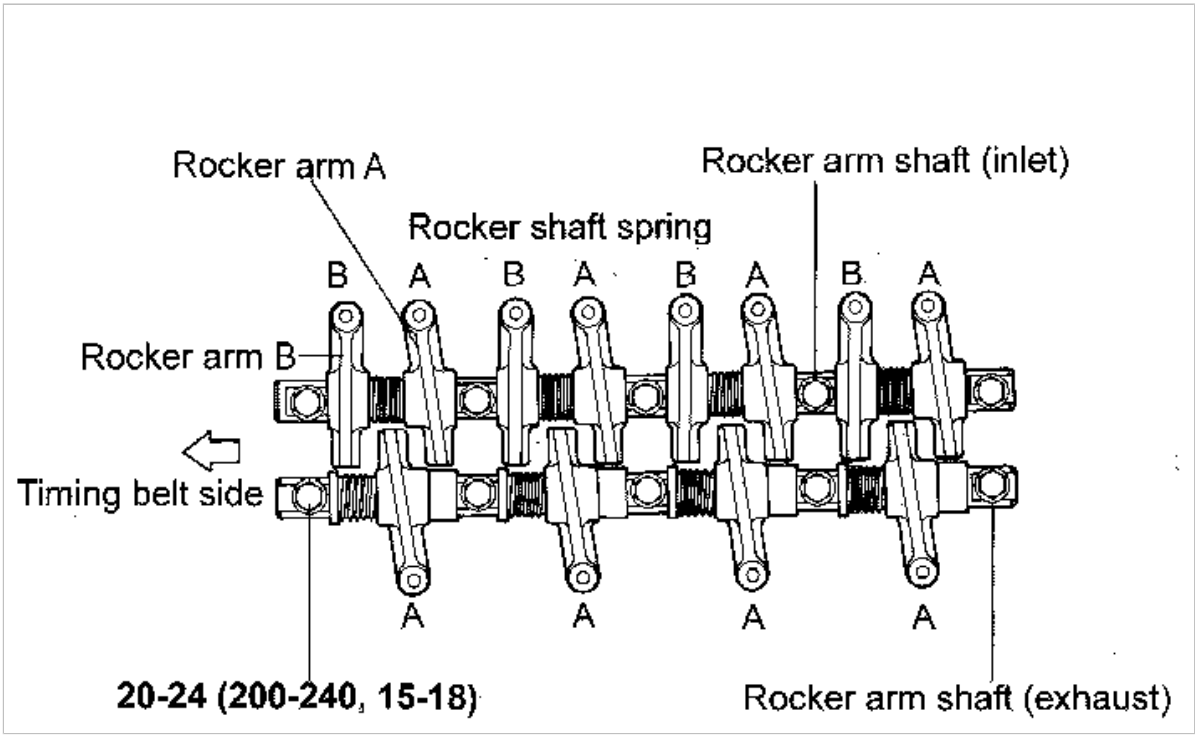
4. Move the timing belt tensioner pulley toward the water pump and temporarily secure it.
5. Install the timing belt on the camshaft sprocket, making sure that the tension side is tightened by turning the camshaft sprocket in reverse, and that all timing marks are in alignment.
6. Adjust the timing according to "Timing Belt."
7. Install the rocker cover and tighten the bolts to the specified torque.
8. Install the timing belt cover.
9. Install the new intake manifold gasket and the intake manifold. Tighten the nuts and bolts to the specified torque.
10. Install the new exhaust manifold gasket and the exhaust manifold. Tighten the exhaust manifold attaching nuts to the specified torque.
11. Install the surge tank and tighten the nuts and bolts to the specified torque.
12. Install the ignition coil.

13. Install the air intake hose.
14. Connect the vacuum hose, fuel hose and water hose.
15. Install breather hose.



Engine Mechanical System > Cylinder Head Assembly > Rocker Arms > COMPONENTS

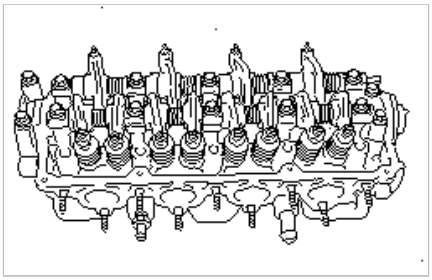
COMPONENTS



Engine Mechanical System > Cylinder Head Assembly > Rocker Arms > DISASSEMBLY

Disassembly

1. Remove the breather hose and PCV valve.
2. Remove the timing belt cover.
3. Remove the rocker cover.
4. Loosen the flange bolts and remove the rocker arm shaft, rocker arms and rocker arm shaft springs as an assembly.
5. Remove the bolts, the rocker arms and arm shaft springs from the rocker arm shaft.

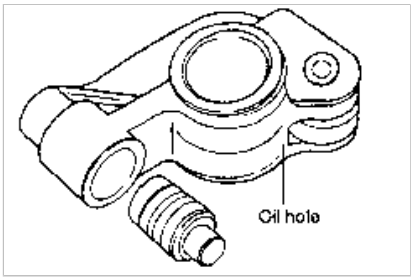


Engine Mechanical System > Cylinder Head Assembly > Rocker Arms > INSPECTION

INSPECTION

ROCKER ARM

1. Check the rotation of roller. Replace if it is not smooth or worn.
2. Check the rocker face. Replace if it is damaged or pressed.
3. Check hydraulic lash adjust (HLA) face that contacts the valve stem.
   If badly worn or damaged, replace the HLA.



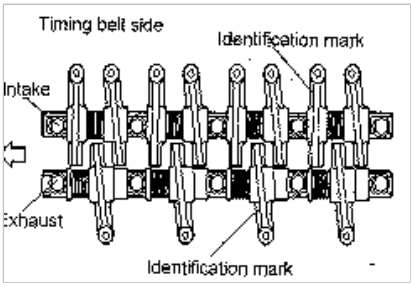
ROCKER ARM SHAFT

a. Check the rocker arm shafts for damage. Replace as necessary.
b. Check the oil hole whether clogged or not.

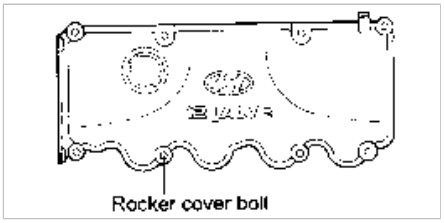
Engine Mechanical System > Cylinder Head Assembly > Rocker Arms > REASSEMBLY

Reassembly

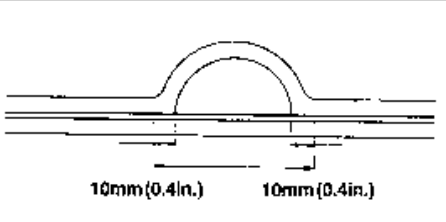
1. Install the rocker arms and rocker arm shaft springs to the rocker arm shafts. Install the rocker arm shaft to the cylinder head.
   Tighten the rocker arm shaft mounting bolts to the specified torque.



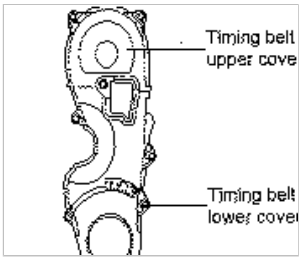
2. When installing the rocker arms, shafts, and springs, note the difference between the A and B type rocker arms and that exhaust side needs only A type rocker arms.
3. Install the rocker cover and tighten the bolts to the specified torque.



a. Sealant must be applied to top surface of cylinder head and cam cap and area of application as shown in figure.
b. The proper amount of sealant must be used to prevent the sealant from pushing excessive amounts.
c. Use sealant of specified brands or equivalent.
d. Sealant (Three bond No 1212D aluminum color or equivalent) application place (4 place).



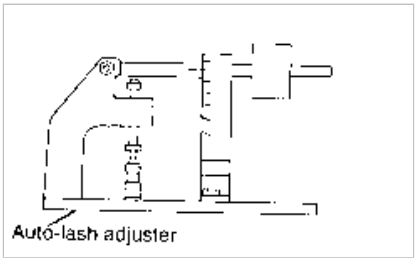
4. Install the timing belt cover.
5. Install the air cleaner.
6. Install the breather hose and PCV hose.



Engine Mechanical System > Cylinder Head Assembly > Valves > AUTO LASH ADJUSTER LEAK DOWN TEST

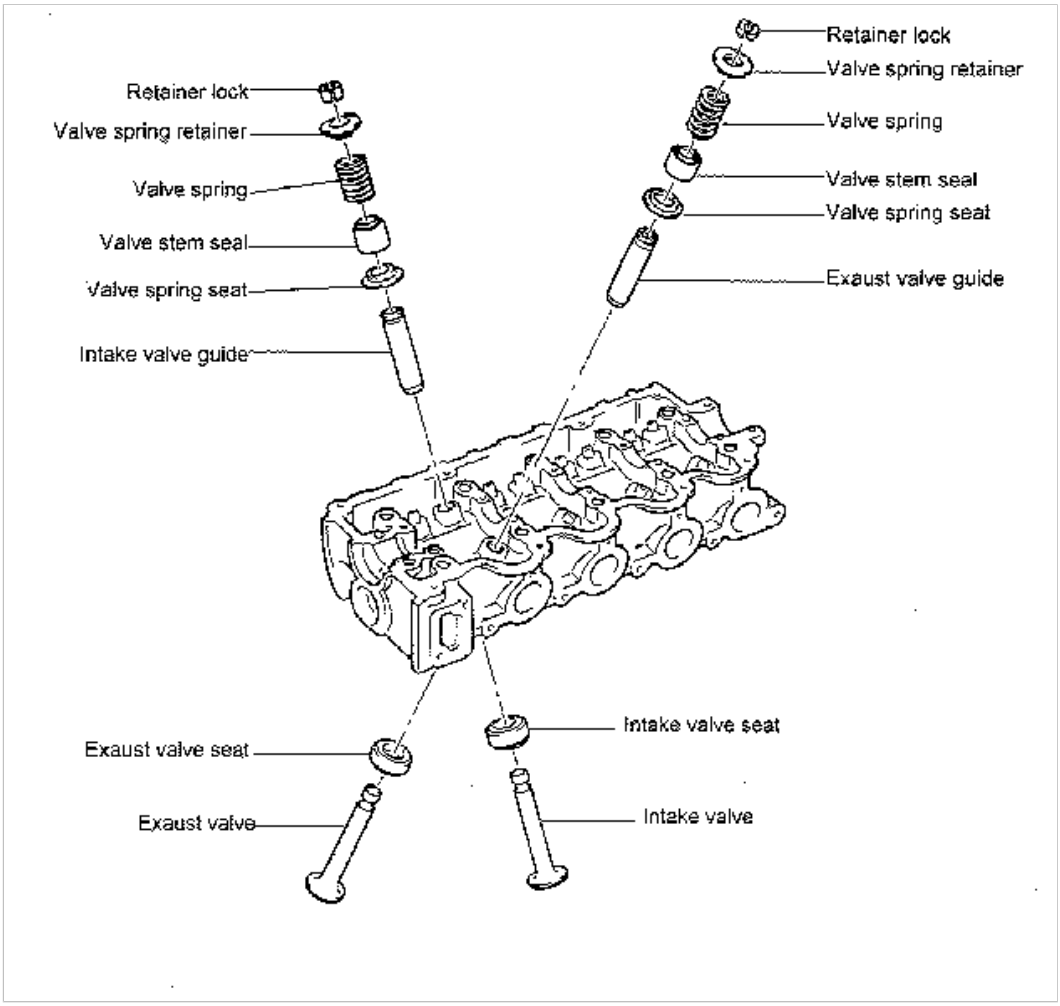
AUTO LASH ADJUSTER LEAK DOWN TEST

1. Set auto-lash adjuster in a special tool (009246-32300) as shown.
2. After the plunger has fallen slightly (0.2-0.5 mm [0.008-0.020 in.]), measure the subsequent fall-down rate.
   (1) If a leak-down tester is not available, check the auto-lash adjuster as follows.
   (2) Check if there is any abnormal noise with idling at normal operating temperature.
   (3) If there is abnormal noise, air bleeding from the auto lash adjuster should be needed.



Engine Mechanical System > Cylinder Head Assembly > Valves > COMPONENTS

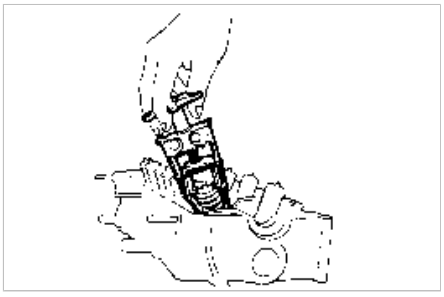
Components



Engine Mechanical System > Cylinder Head Assembly > Valves > DISASSEMBLY

Disassembly

1. Using the special tool, valve spring remover and installer (09222-22100), remove the retainer lock. Next, remove the spring retainer, valve spring, spring seat and valve.
   Keep these parts in order so that they can be reinstalled in their original positions.
2. Remove the valve stem seals with pliers, and discard.
   Do not reuse the valve stem seals.

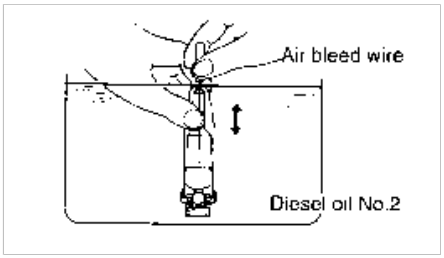


Engine Mechanical System > Cylinder Head Assembly > Valves > HYDRAULIC LASH ADJUSTER

HYDRAULIC LASH ADJUSTER

Bleeding Auto Lash Adjuster

1. While inserting an air bleed wire into the hole of the auto lash adjuster, move the plunger up and down 4 or 5 times.



2. Remove the air bleed wire and push the plunger strongly with your finger. If it moves even slightly, repeat steps 1 and 2. If the plunger moves even after repeating the steps several times, replace the auto-lash adjuster.
   a. Since the auto-lash adjuster is a precision part, take care that foreign objects, such as dirt, are not present when servicing. Do not attempt to disassemble the auto-lash adjuster. Use clean diesel oil for cleaning the auto-lash adjuster.
   b. The fully bled auto-lash adjuster should be held in upright position to make sure the Diesel oil in the adjuster is not split.

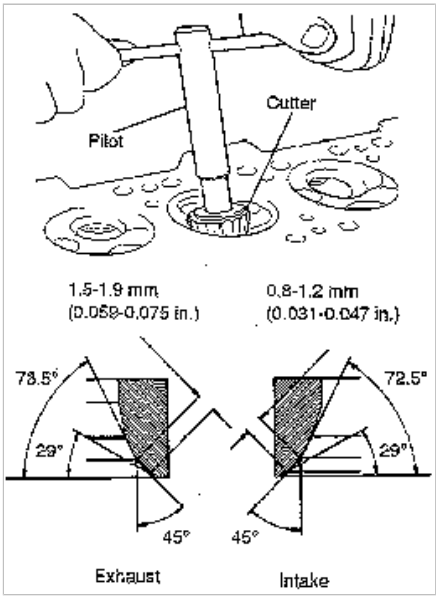
Engine Mechanical System > Cylinder Head Assembly > Valves > INSPECTION

Inspection

VALVE SEAT INSERT

Check the valve seat for evidence of overheating and improper contact with the valve face. Recondition or replace the seat, if necessary.

Before reconditioning the seat, check the valve guide for wear. If the valve guide is worn, replace it, then recondition the seat. Recondition the valve seat with a valve seat grinder or cutter. The valve seat contact width should be within specifications and centered on the valve face.

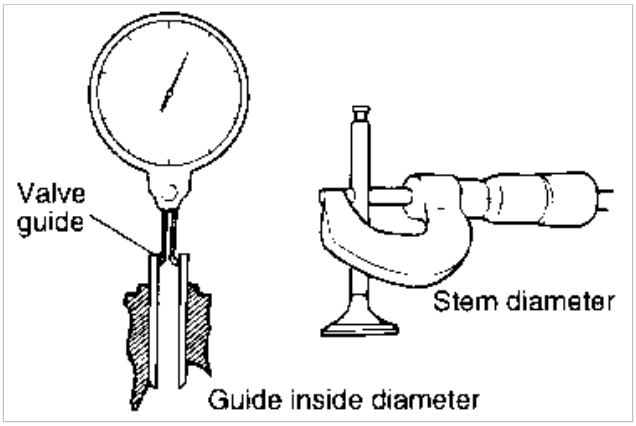


Engine Mechanical System > Cylinder Head Assembly > Valves > INSPECTION

INSPECTION

Valve Guides

Check the valve stem-to-guide clearance. If the clearance exceeds the service limit, replace the valve guide with the next oversize part.



Engine Mechanical System > Cylinder Head Assembly > Valves > INSPECTION

Inspection

VALVE GUIDE OVERSIZES

Size mm (in.)	Size mark	Cylinder head hole size mm (in.)
0.05 (0.002) O.S.	5	11.05-11.068 (0.435-0.4354)
0.25 (0.010) O.S.	25	11.25-11.258 (0.429-0.4432)
0.50 (0.020) O.S.	50	11.50-11.508 (0.4528-0.4531)

Engine Mechanical System > Cylinder Head Assembly > Valves > INSPECTION

INSPECTION

Valve Spring

1. Check the valve spring free length and tension. If they exceed the service limit, replace the spring.
2. Using a square, test the squareness of each spring. If a spring is excessively out of square, replace it.

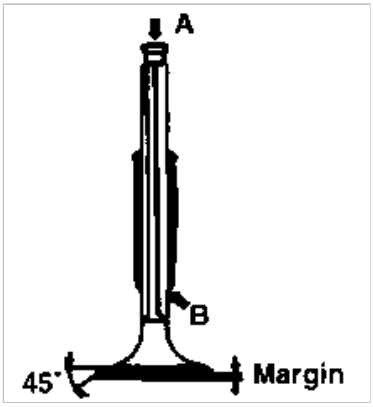
Engine Mechanical System > Cylinder Head Assembly > Valves > INSPECTION

INSPECTION

Valves

Check each valve for wear, damage and distortion of head and stem at B. Repair or correct, if necessary. If stem end A is pitted or worn, resurface as necessary. This correction must be limited to a minimum. Also resurface the valve face.

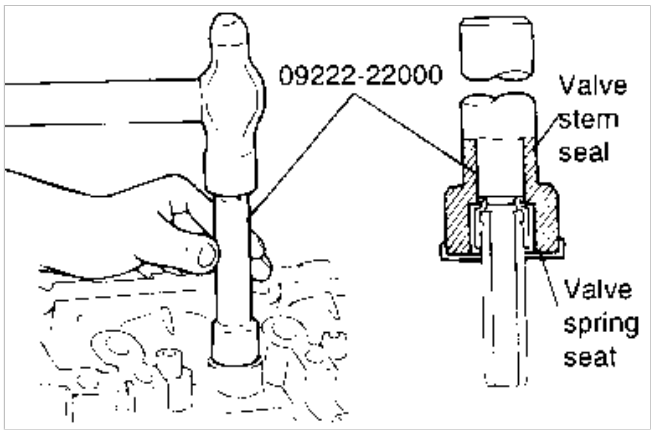
Replace the valve if the margin has decreased to less than the service limit.



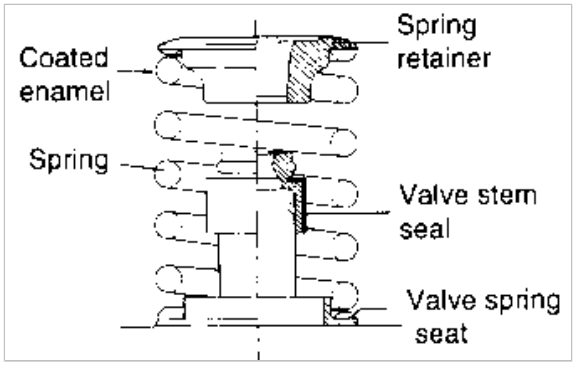
Engine Mechanical System > Cylinder Head Assembly > Valves > REASSEMBLY

Reassembly

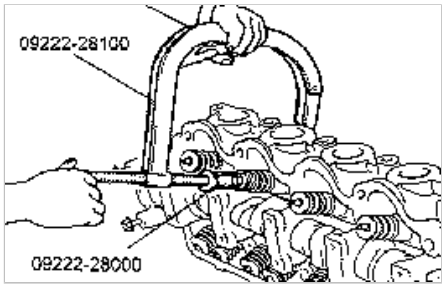
a. Clean each part before assembly.
b. Apply engine oil to sliding and rotating parts.
1. After installing the spring seat, fit the stem seal onto the valve guide.
   To install, fit the seal in by lightly tapping the Special Tool, Valve Stem Oil Seal Installer (09222-22000).
   The seal is installed in the specified position by means of the special tool. Incorrect installation of the seal will adversely affect the lip I.D. and eccentricity, resulting in oil leaking down the valve guides. Therefore, when installing, be careful not to twist the seal. Do not reuse old stem seals.



2. Apply engine oil to each valve. Insert the valves into the valve guides. Avoid using force when inserting the valve into the seal. After insertion, check to see if the valve moves smoothly.
3. Install springs and spring retainers. Valve springs should be installed with the enamel coated side toward the valve spring retainer. Valve springs should be installed with the enamel coated side toward the valve spring retainer.



4. Using special tool, Valve Spring Remover and Installer, compress the spring. Be careful that the valve stem seal is not distorted by the bottom of the retainer. Then install the retainer locks. After installing the valves, make certain that the retainer locks are properly installed.
5. Install the cylinder head. Refer to "Cylinder Head."

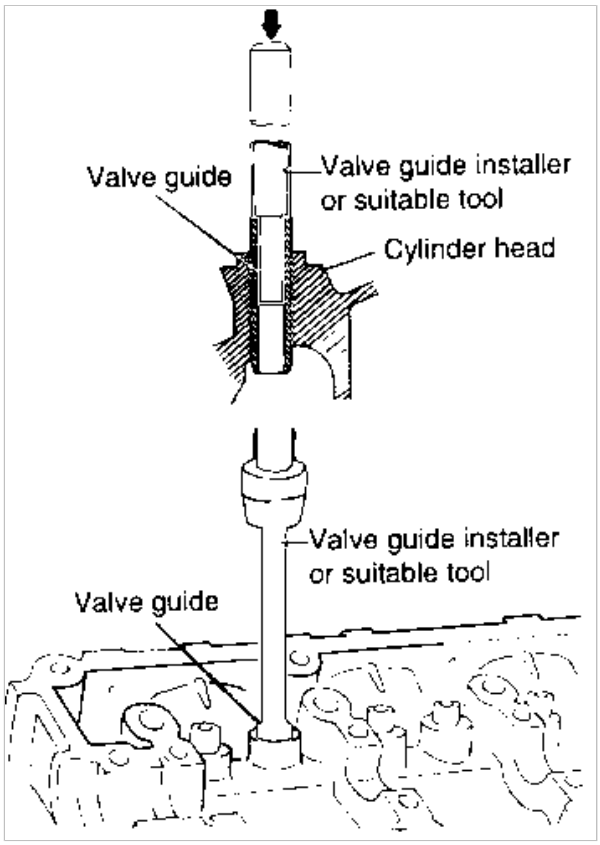


Engine Mechanical System > Cylinder Head Assembly > Valves > VALVE GUIDE REPLACEMENT PROCEDURES

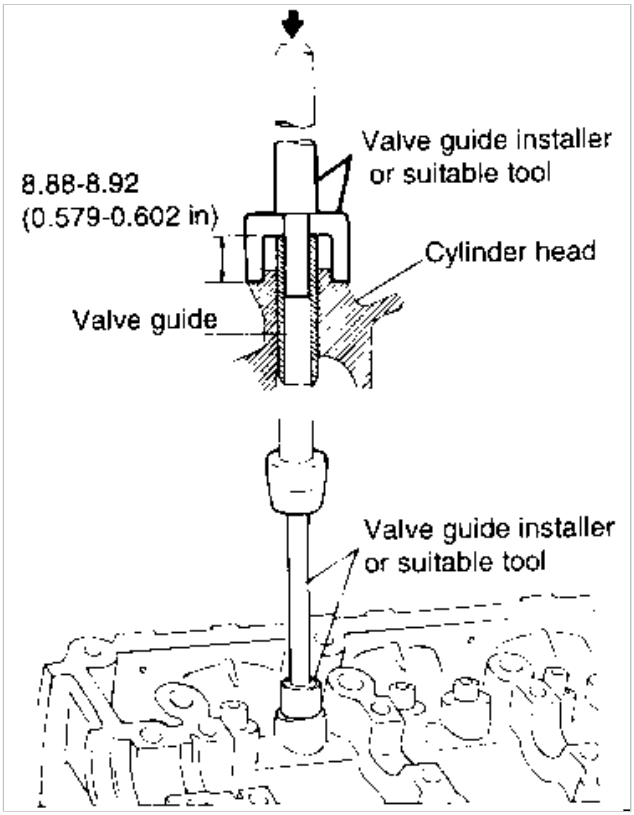
VALVE GUIDE REPLACEMENT PROCEDURES

The valve guide is installed using a press fit. Using a Valve Guide Installer (09221-22000) or suitable tool, replace the valve guide described in the following procedure.

1. Using the Valve Guide installer push rod, push the valve guide out toward the cylinder block with a press.
2. Machine the valve guide insert hole in the cylinder head to the specified oversize of the new valve guide.



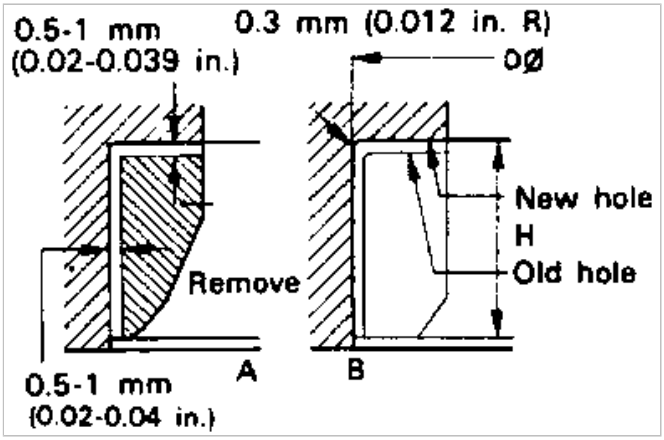
3. Using the Valve Guide Installer or suitable tool, press fit the valve guide. Using the valve guide installer makes it possible to press fit the valve guide to a predetermined height. Install the valve guide from the top of the cylinder head. Note that intake and exhaust valve guides differ in length (42.7mm [1.68 in.] for intake and 39.1mm [1.54 in.] for exhaust).
4. After installing the valve guides, insert new valves and check the clearance.
5. Whenever valve guides are replaced, check for valve-to-seat contact, and recondition the valve seats as necessary.



Engine Mechanical System > Cylinder Head Assembly > Valves > VALVE SEAT INSERT REPLACEMENT PROCEDURE.

VALVE SEAT INSERT REPLACEMENT PROCEDURE.

1. Any valve seat insert that has been worn over the service limit should be removed at normal temperature after cutting away most of the insert wall, using valve seat cutters, as shown in Fig A.



2. After removing the seat insert, machine the seat insert bore using a reamer or a cutter. Cut to the size shown in the table.

Valve Seat Insert Oversizes

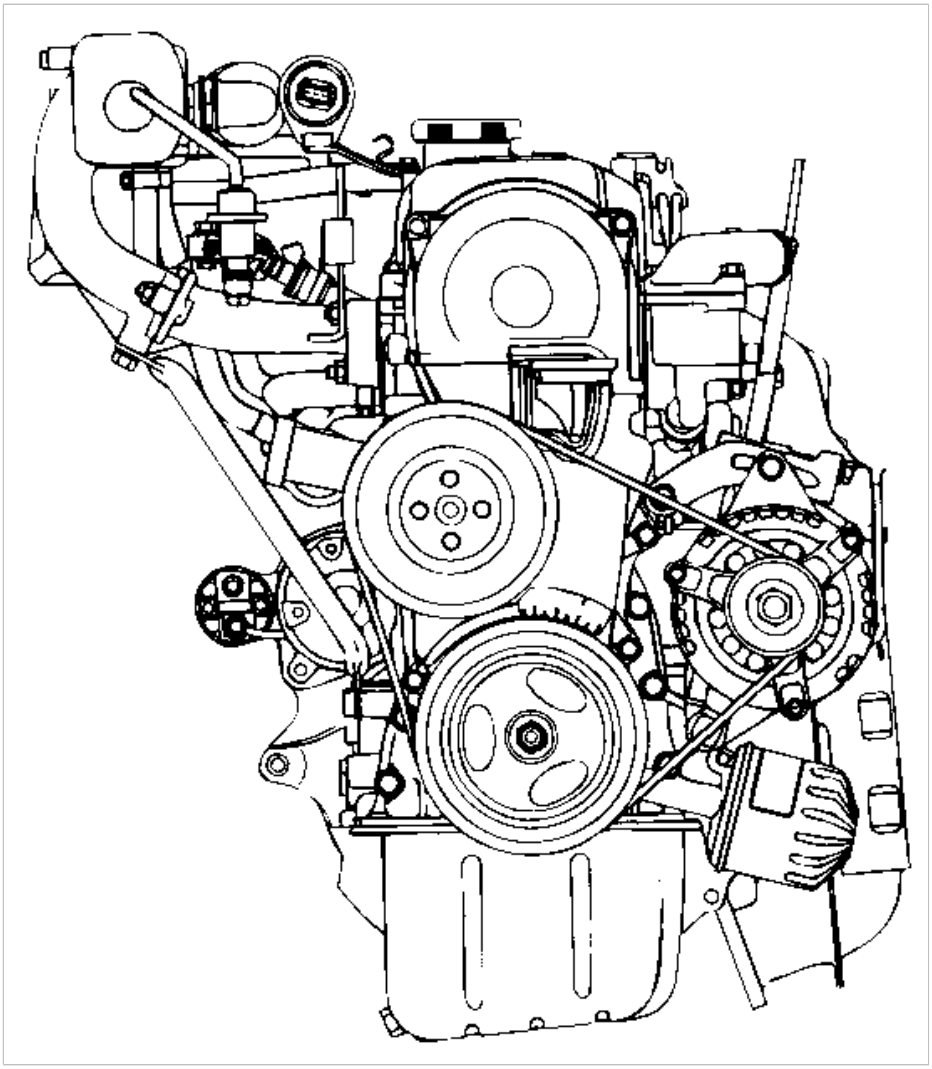
Description	Size mm (in.)	Size mark	Seat insert height H mm (in.)	Cylinder head I.D. mm (in.)
Intake valve seat insert	0.3 (0.012) O.S.	30	5.1-5.3 (0.201-0.209)	28.80-28.821(1.134-1.135)
	0.6 (0.024) O.S.	60	5.4-5.6 (0.213-0.220)	29.10-29.121(1.146-1.147)
Exhaust valve seat	0.3 (0.012) O.S.	30	5.9-6.1 (0.232-0.240)	34.30-34.325(1.350-1.351)
	0.6 (0.024) O.S	60	6.2-6.4 (0.244-0.252)	34.60-34.625(1.362-1.363)

3. Heat the cylinder head to about 250°C (480°F) and press in the oversize seat insert. The oversize seat insert should be at normal room temperature for installation. After installing a new valve seat insert, resurface the valve seat using the same procedure described in the first paragraph of "Valve Seat Insert" (above).

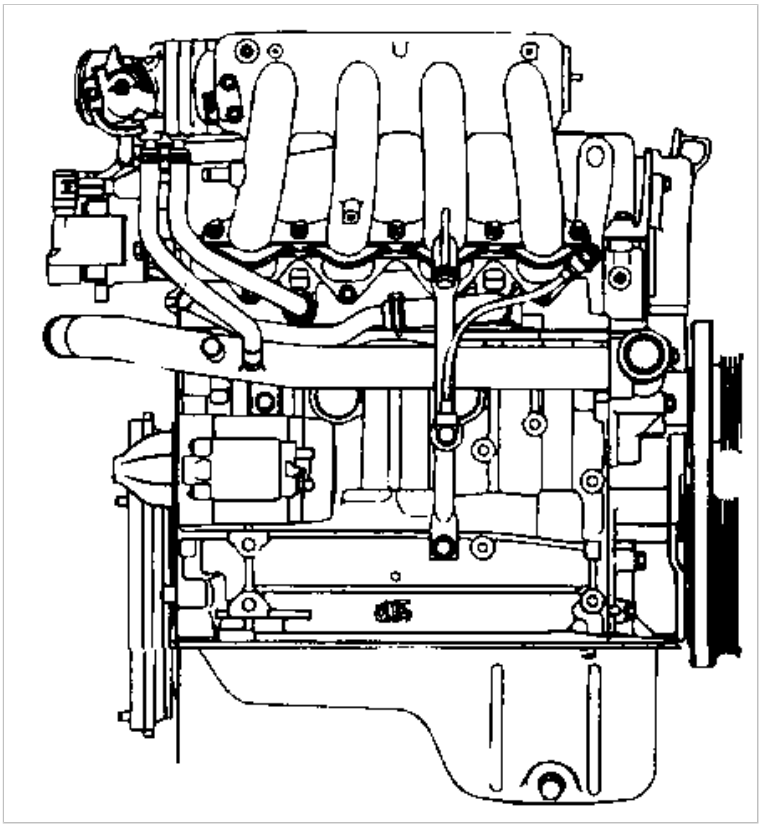
Engine Mechanical System > Engine Block > NEW ALPHA ENGINE APPEARANCE

NEW ALPHA ENGINE APPEARANCE

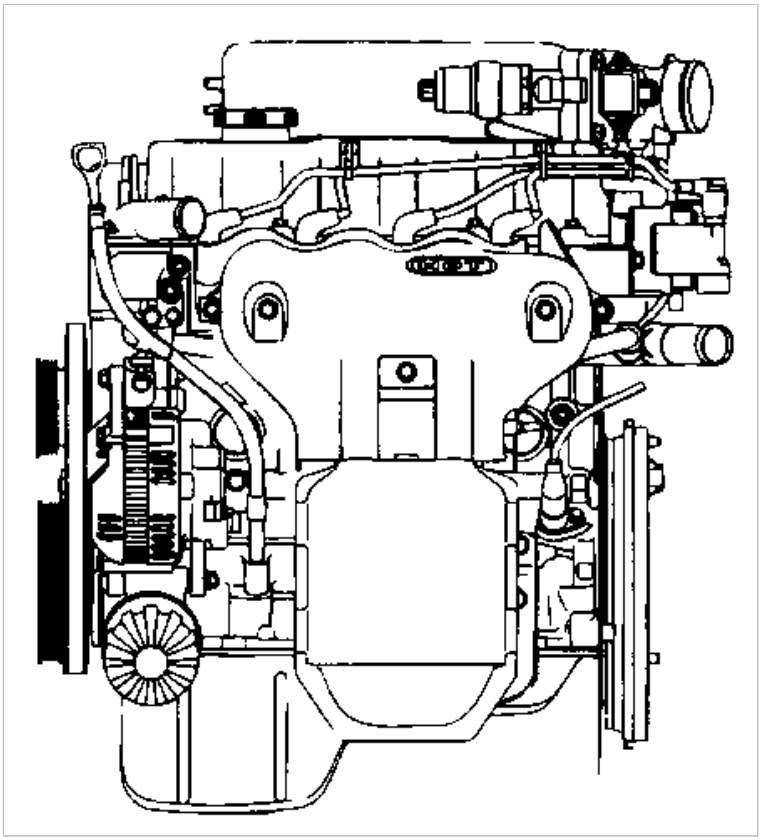
FRONT VIEW



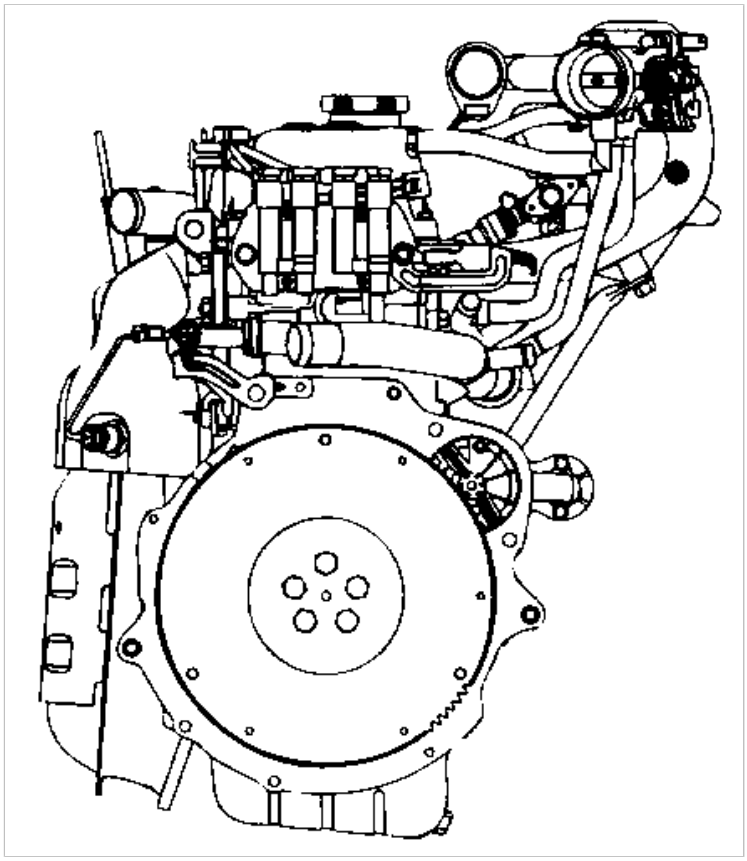
RIGHT VIEW



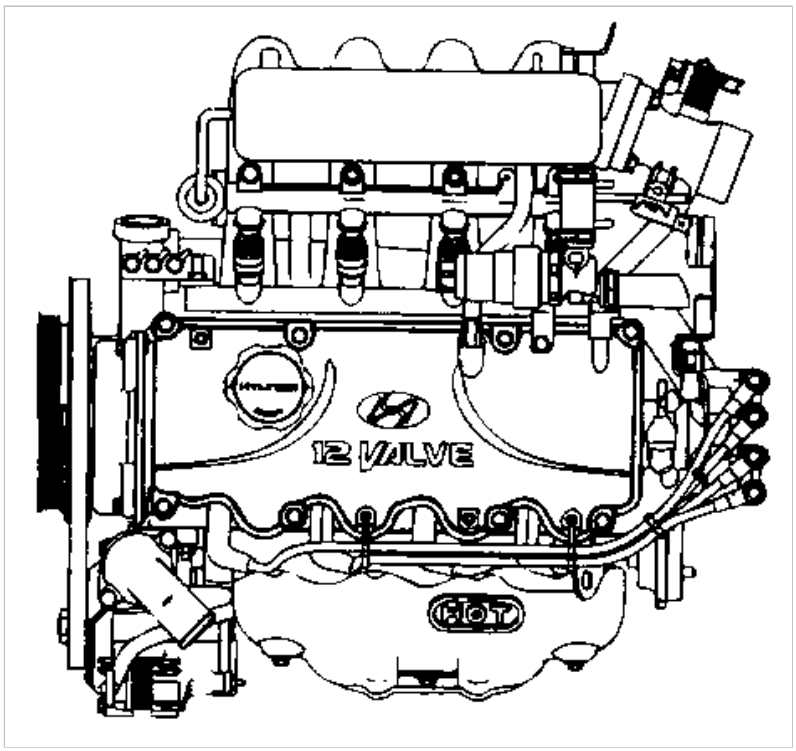
LEFT VIEW



REAR VIEW

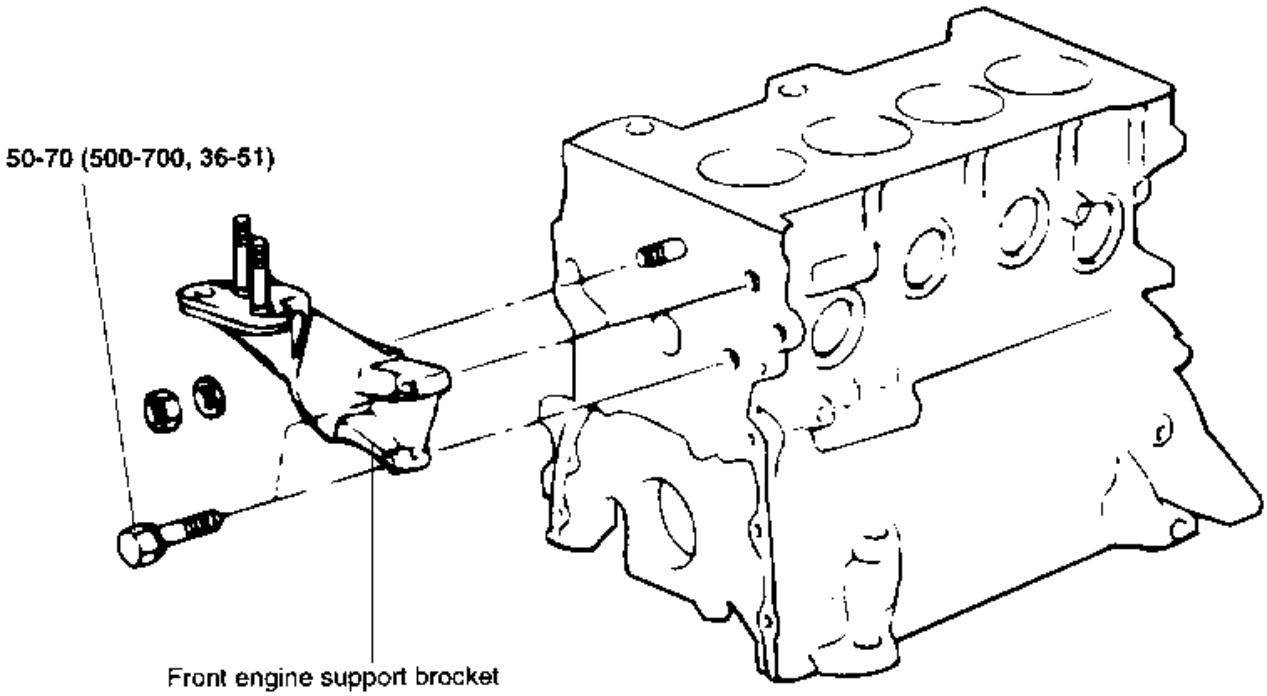


TOP VIEW



Engine Mechanical System > Engine Block > Cylinder Block > COMPONENTS

Components

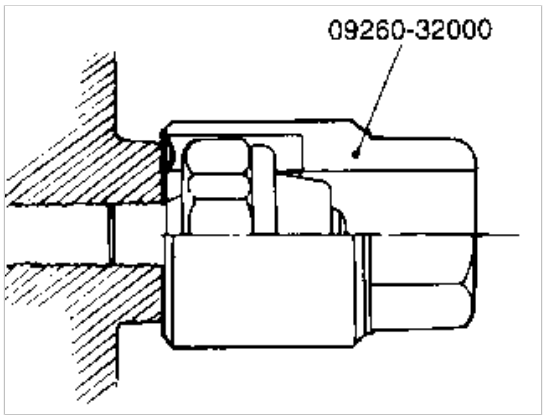


TORQUE : Nm (kg·cm, lb·ft)

Engine Mechanical System > Engine Block > Cylinder Block > DISASSEMBLY

Disassembly

1. Remove the cylinder head, timing belt, front case, flywheel, piston and crankshaft.
2. Using the special tool (09260-32000), remove the oil pressure switch.

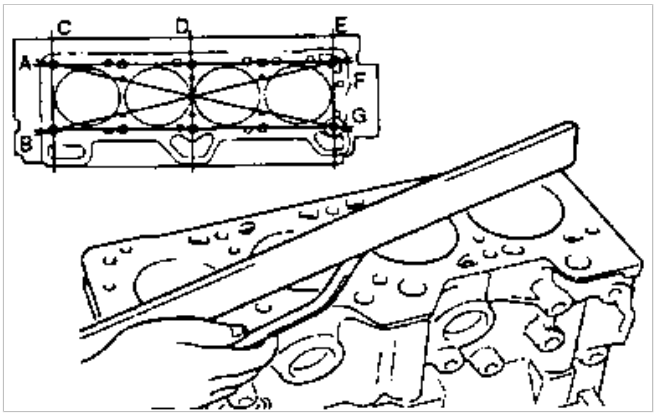


Engine Mechanical System > Engine Block > Cylinder Block > INSPECTION

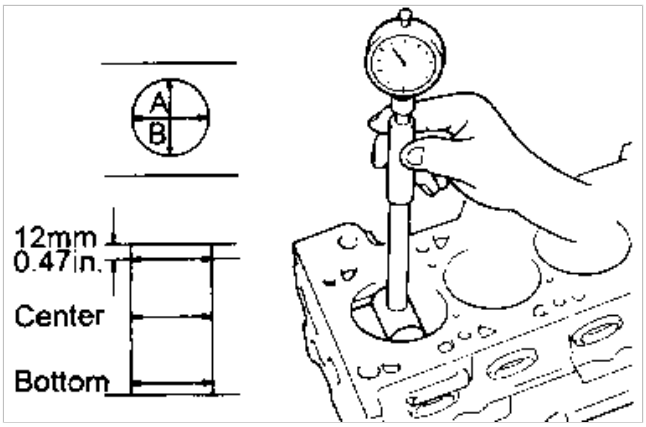
INSPECTION

Cylinder Block

1. Visually check the engine block for scores, rust and corrosion. Also check for cracks or any other defects. Repair or replace the block if defective.
2. Using a straight edge and feeler gauge, check the block top surface for warpage. Make sure that the surface is free from gasket chips and other foreign matter.



3. Measure the cylinder bore with a cylinder gauge at three levels in the directions A and B. If the cylinder bores show more than the specified out-of-round or tape, or if the cylinder walls are badly scuffed or scored, the cylinder block should be rebored and honed. New oversize pistons and rings must be fitted. Measuring points are as shown.

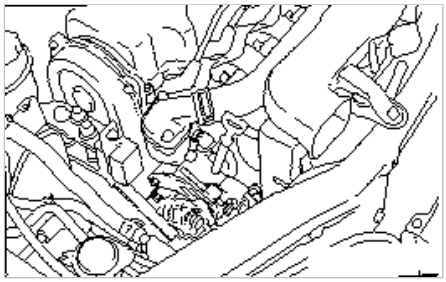


4. If a cylinder ridge exists, cut away with a ridge reamer.
5. Oversize pistons are available in four sizes
6. When boring the cylinder bore to oversize, keep the specified clearance between the oversize piston and the bore, and make sure that all pistons used are of the same oversize.
   The standard measurement of the piston outside diameter is taken at a level 12 mm (0.47 in.) above the bottom of the piston skirt and across the thrust faces.

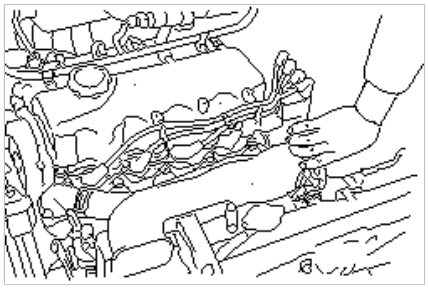
Engine Mechanical System > Engine Block > Engine and Transaxle Assembly > DISASSEMBLY

Disassembly

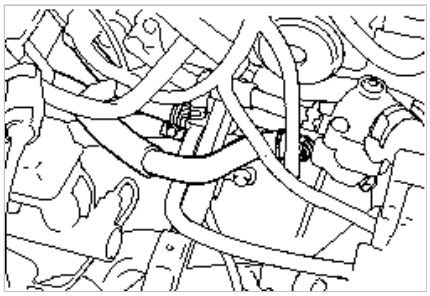
1. Remove the battery.
2. Detach the air cleaner.
3. Disconnect the backup lamp and engine harness connectors.
4. For vehicles with 5-speed manual transaxles, disconnect the select control valve connector.
5. Disconnect the connectors for the generator harness and the oil pressure gauge wiring.
6. Drain the engine coolant.
7. For vehicles with automatic transaxles, disconnect transaxle oil cooler hoses.
   When disconnecting the hoses, make identification marks to avoid making mistakes when reconnecting them.
   Be careful not to spill oil or fluid from hoses. Plug the openings to prevent foreign material from entering.



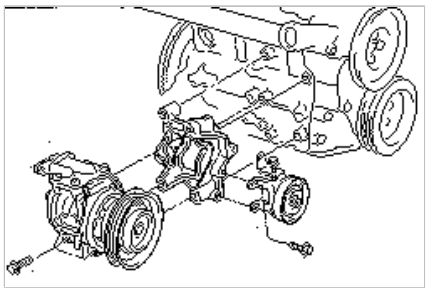
8. Disconnect the radiator upper and lower hoses on the engine side, then remove the radiator assembly.
9. Disconnect the engine ground.
10. Disconnect the brake booster vacuum hose.
11. Remove the main fuel line, and the return and vapor hoses from the engine side.
    To reduce the residual pressure in the hoses, refer to Group Fuel System "Fuel filter replacement."



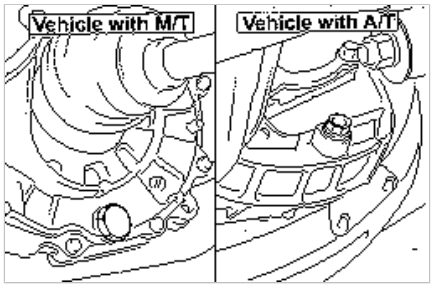
12. Disconnect the heater hoses (inlet and outlet) on the engine side.
13. Disconnect the accelerator cable at the engine side.
14. For vehicles with manual transaxles, remove the clutch cable from the transaxle.
15. For vehicles with automatic transaxles, remove the control cable from the transaxle.
16. Disconnect the speedometer cable from the transaxle.



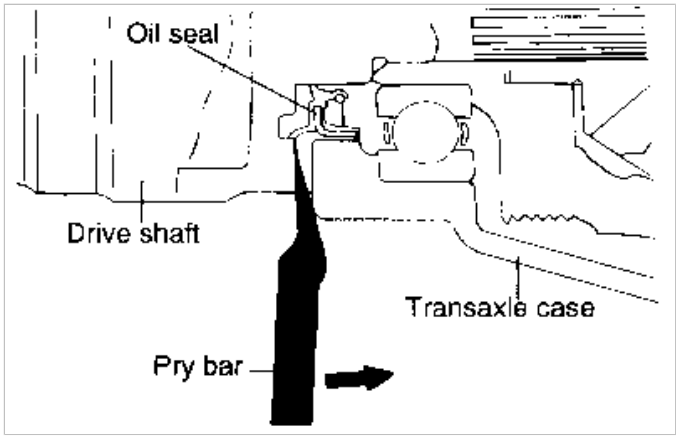
17. Disconnect the air conditioner compressor from the mounting bracket.
18. Jack up the vehicle.



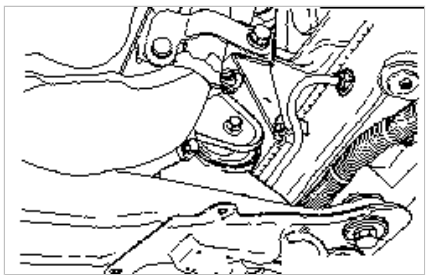
19. Drain the transaxle oil (or fluid).
20. Disconnect the front exhaust pipe from the manifold.
    Use wire to suspend the exhaust pipe from the bottom of the vehicle.
21. For vehicles with manual transaxles, remove the shift control rod and extension rod.
22. Remove the lower arm ball joint bolts and the stabilizer bar at the point where it is mounted to the lower arm.



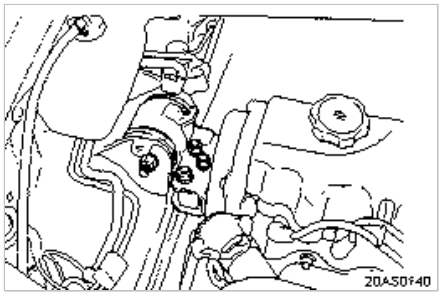
23. Remove the drive shafts from the transaxle case.
    a. Plug the holes of the transaxle case to prevent entry of foreign material.
    b. Install new circlips on the drive shafts when reassembling.
24. Hang the lower arm and drive shaft from the body with a string.
25. Attach a cable to the engine, and use a chain hoist to lift the engine just enough to pull cable tight.



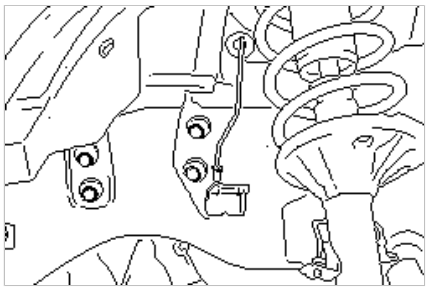
26. Remove the front roll stopper.
27. Separate the rear roll stopper.
28. For vehicle with a manual transaxle, remove the roll rod.



29. Remove the engine mounting insulator bolts.
30. Remove the engine mounting bracket from the engine.
31. Slowly raise the engine (to the extent that the engine and transaxle weights are not applied to the mounting portions) and temporarily hold it in the raised position.
    Check that all cables, hoses, harnesses, connectors etc. are disconnected from the engine.
32. Remove the caps from inside the right fender shield and remove the transaxle mount bracket bolts.



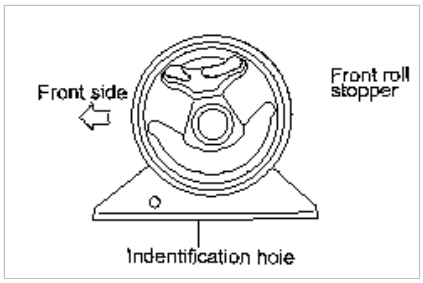
33. Remove the left mount insulator bolt.
34. While directing the transaxle side downward, lift the engine and transaxle assembly up and out of the vehicles.



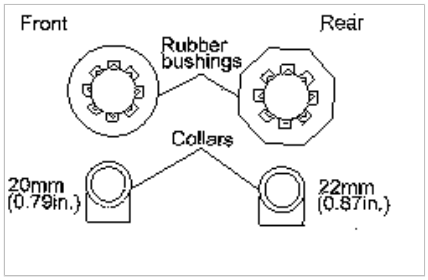
Engine Mechanical System > Engine Block > Engine and Transaxle Assembly > REASSEMBLY

Reassembly

1. While checking the connections of the harnesses, pipes, hoses, etc., and making sure that none of them are being caught, damaged, etc., install the engine and transaxle assembly.
2. When the engine and transaxle assembly is installed, temporarily tighten the front roll stopper.

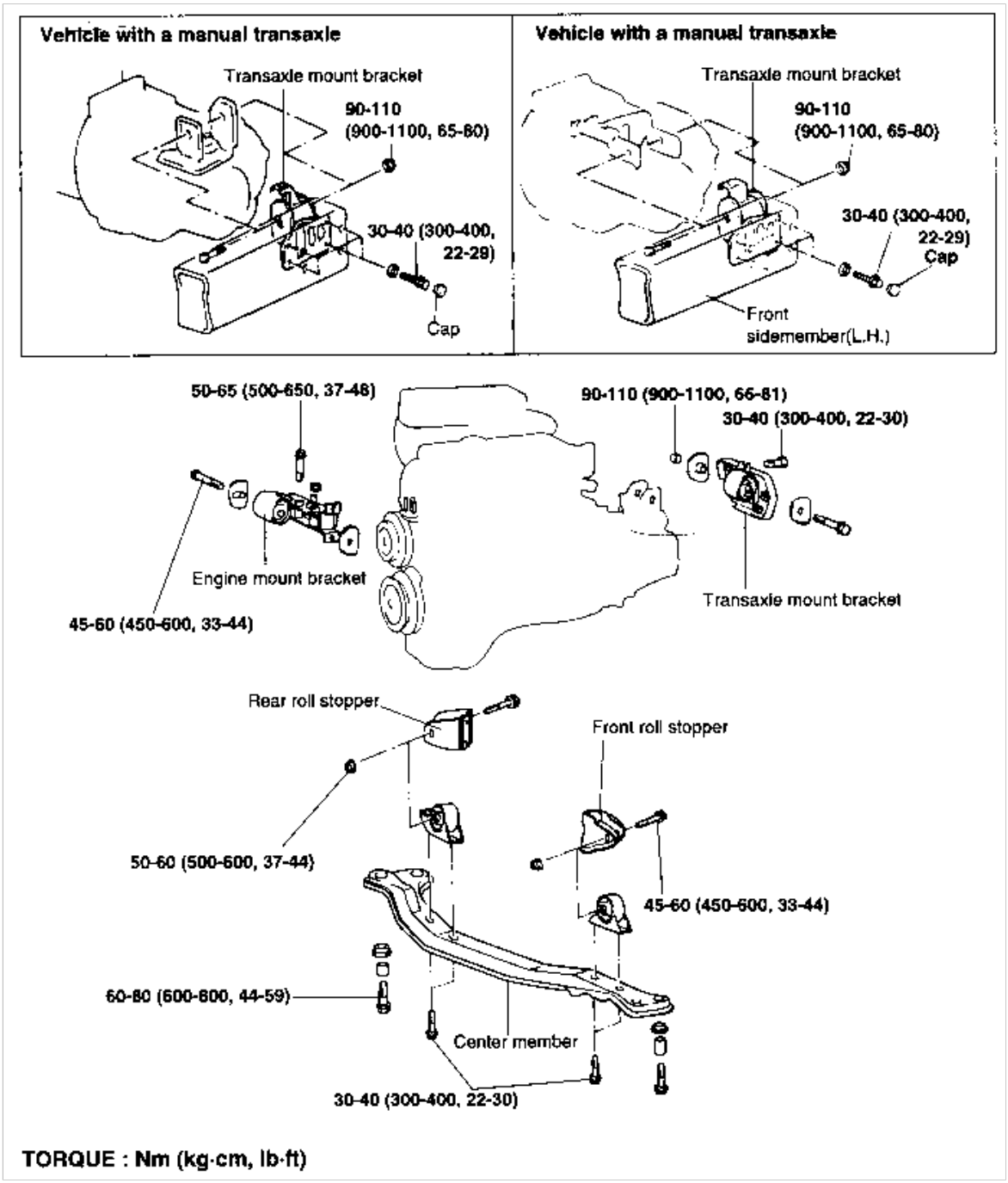


3. The front and rear center member rubber bushings and collars are different.
4. After the weight of the engine and transaxle assembly has been put on each insulator, tighten to specified torque.
5. Reassemble all of the components removed during disassembly. Be especially careful to properly secure all components, including fuel, electrical and fluid pipe connections.
6. Refill the coolant and check for leaks.
7. Refill the transaxle fluid, test its operation, and check for leaks.
8. Check the operation of the transaxle control cable and accelerator cable. Adjust as necessary.
9. Check for proper operation of each of the various gauges.



Engine Mechanical System > Engine Block > Engine Mounts > COMPONENTS

Components



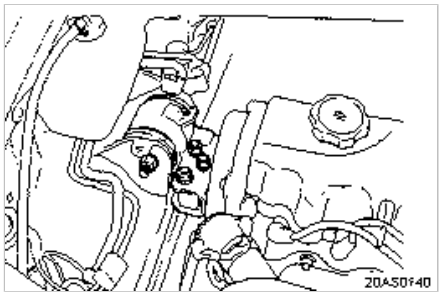
Engine Mechanical System > Engine Block > Engine Mounts > DISASSEMBLY

Disassembly

Attach an engine hoist to the engine hooks, and raise the engine just enough so there is no pressure on the insulators.

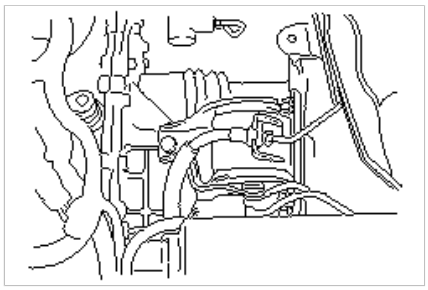
Engine Mounting

1. Remove the engine mount insulator bolts.
2. Remove the engine mount bracket from the engine.

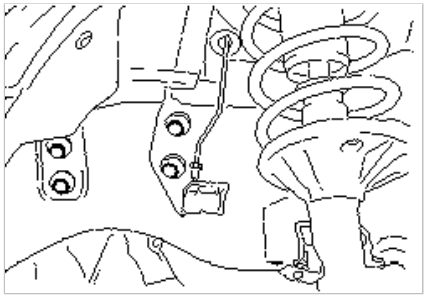


Transaxle

1. For vehicles with a 5-speed manual transaxle, remove the select control valve.
2. Remove the transaxle mount bolt.

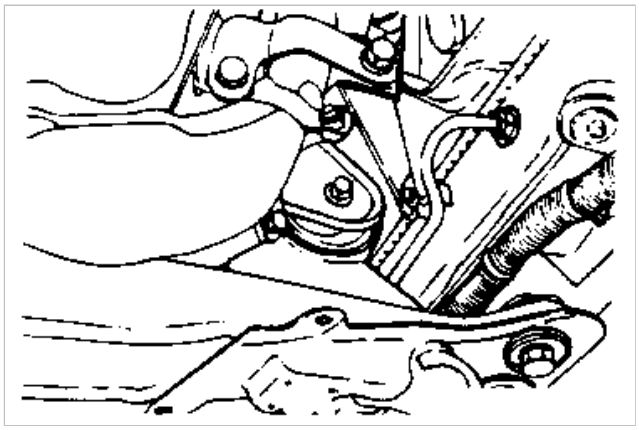


3. Detach the cap from inside the right fender shield. Remove the transaxle mounting bolts.
4. Remove the transaxle bracket.



Front Roll Stopper

Remove the front roll stopper bracket from the center member.

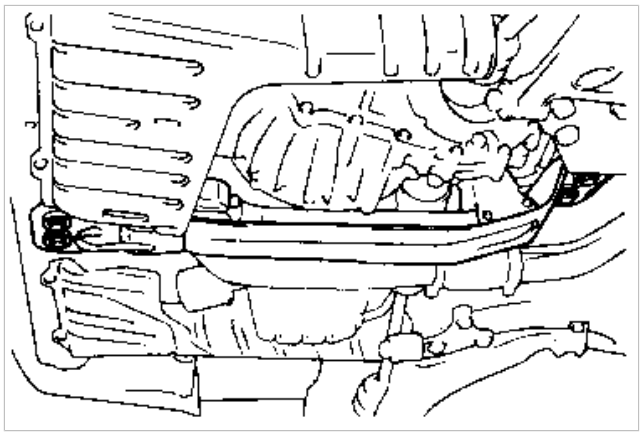


Rear Roll Stopper

Remove the rear roll stopper from the center member.

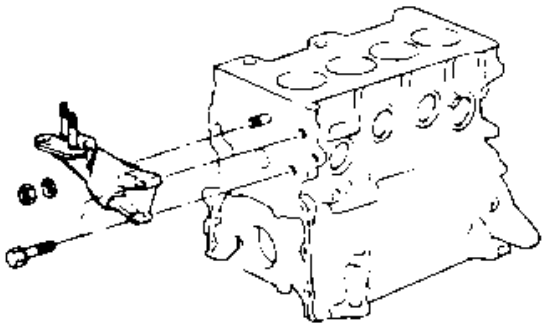
Center member

1. Remove the under cover (R.H.).
2. Remove the front roll stopper mounting bolts.
3. Remove the rear roll stopper mounting bolts.
4. Remove the center member from the body.



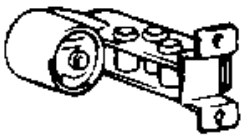
Engine Mechanical System > Engine Block > Engine Mounts > INSPECTION ITEMS

INSPECTION ITEMS



<For Engin>

a. Engine mounting

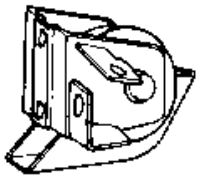


<For Transaxle>

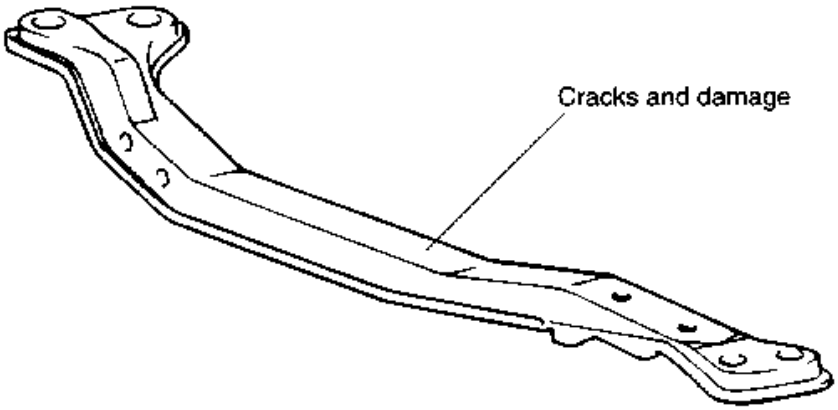
a. Transaxle mounting

b. Front roll stopper

c. Rear roll stopper



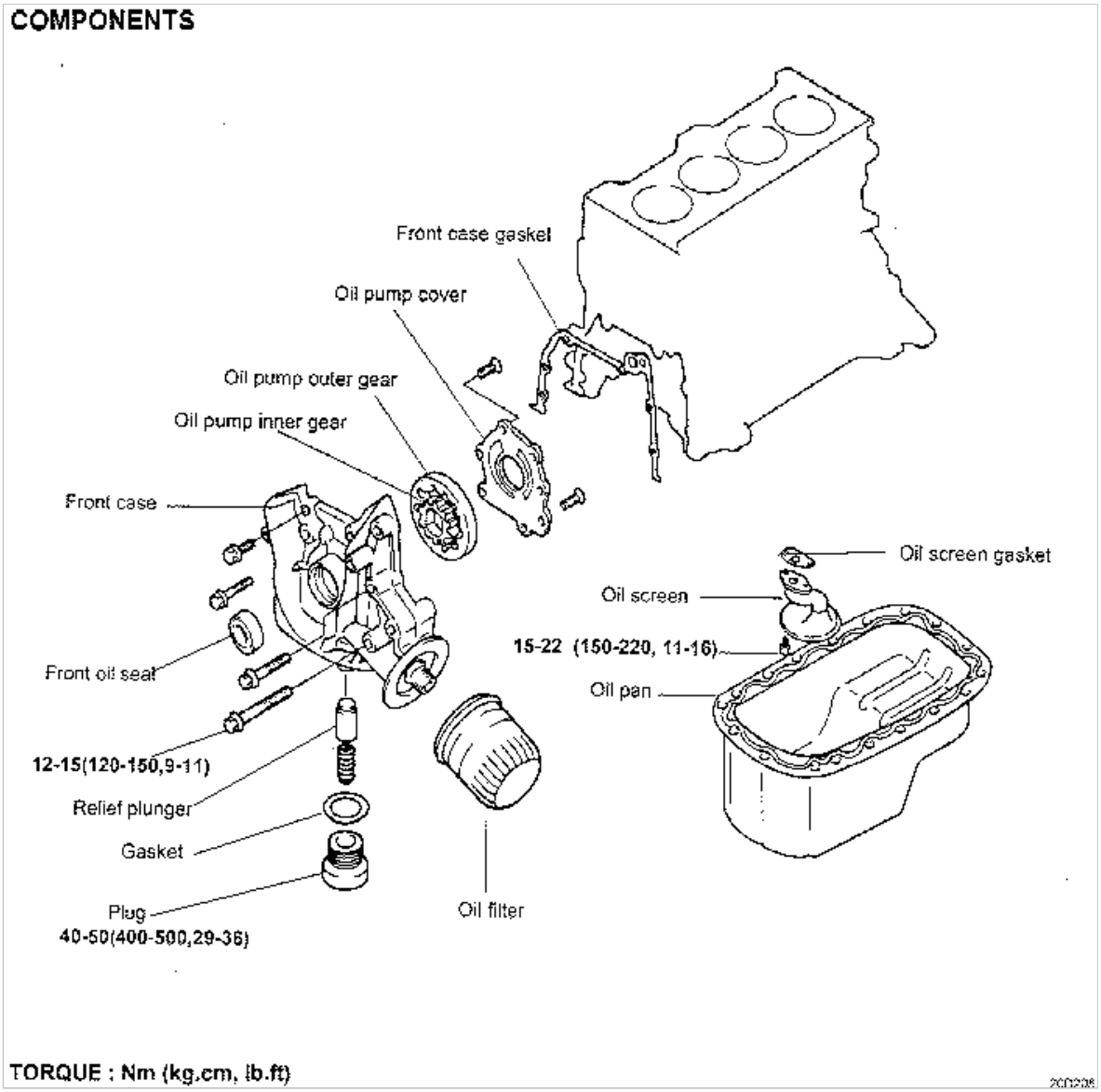
d. Center member



TORQUE : Nm (kg·cm, lb·ft)

Engine Mechanical System > Engine Block > Front Case > COMPONENTS

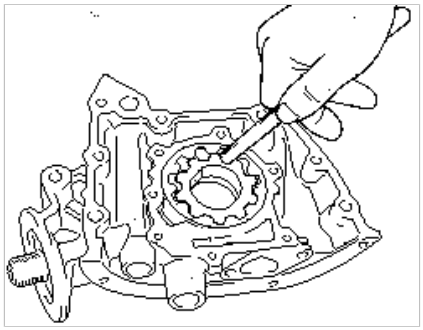
Components



Engine Mechanical System > Engine Block > Front Case > DISASSEMBLY

DISASSEMBLY

1. Remove the timing belt. Refer to "Timing Belt."
2. Remove all the oil pan bolts.
3. Remove the oil pan.
4. Remove the oil screen.
5. Remove the front case assembly.
6. Remove the oil pump cover.
7. Remove the inner and outer gears from the front case. The mating marks on the inner and outer gears indicate the direction of installation. Make sure that the inner and outer gears are installed as shown.
8. Remove the plug and remove the relief spring and relief plunger.



Engine Mechanical System > Engine Block > Front Case > INSPECTION

INSPECTION

Front Case

1. Check the front case for cracks or damage. Replace as necessary.
2. Check the front oil seal for worn or damaged lips. Replace if defective.

OIL PAN AND OIL SCREEN

1. Check the oil pan for failure, damage or cracks. Replace if defective.
2. Check the oil screen for failure, damage and cracks. Replace if defective.

FRONT CASE AND OIL PUMP COVER

Worn (especially stepped) or damaged surfaces contacting gears.

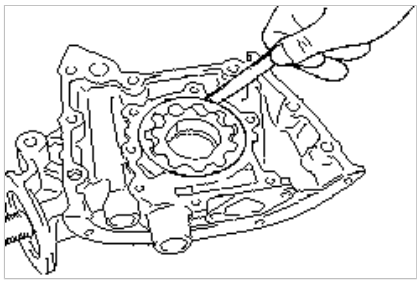
RELIEF VALVE AND SPRING

1. Check sliding condition of the relief valve inserted in the front case.
2. Inspect for distorted or broken relief valve spring.

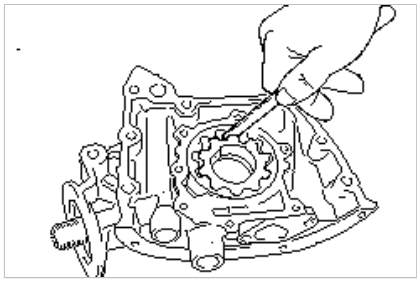
Engine Mechanical System > Engine Block > Front Case > OIL PUMP GEARS

OIL PUMP GEARS

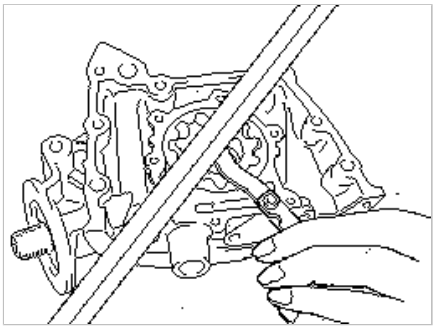
1. Worn or damaged gear teeth surfaces.
2. Clearance between outer gear and front case.

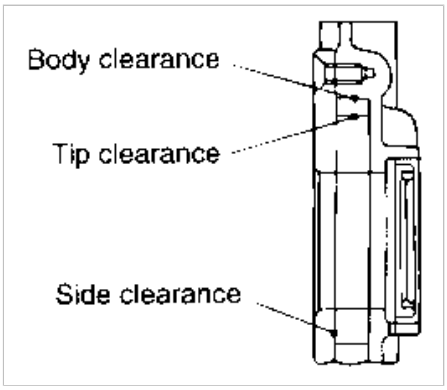


3. Check the tip clearance on the pump rotor.



4. Check the axial clearance on the outer pump rotor.



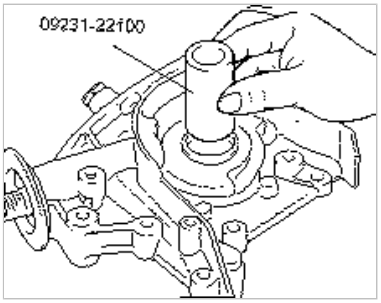


Engine Mechanical System > Engine Block > Front Case > REASSEMBLY

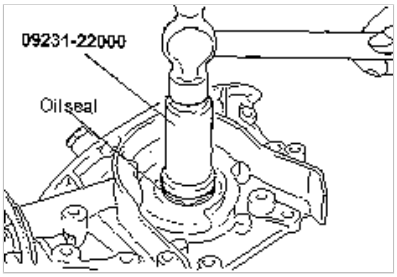
Reassembly

OIL SEAL

1. Inspect for worn, distorted or damaged lips.
2. Check for elongated spring ring.
3. Install Special Tool, Crankshaft Front Oil Seal Guide (09231-22100), to the front end of the crankshaft. Apply engine oil to the outer surface of the oil seal guide, and install the new oil seal along the guide by hand, until it touches front case. Always use a new oil seal when reassembling.

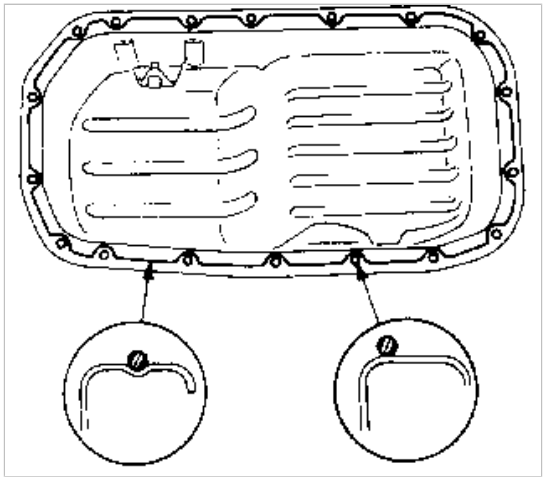


4. Use Special Tool, Crankshaft Front Oil Seal Installer (09231-22000), to install the oil seal.



5. Install the crankshaft sprocket, timing belt and crankshaft pulley. Refer to "Timing Belt."
6. Install the oil screen.
7. Clean both gasket surfaces of the oil pan and the cylinder block.

8. Apply sealant into the groove of the oil pan flange as shown.
   a. Apply sealant approx. 4 mm (0.16 in.) in thickness.
   b. After application of sealant, do not exceed 15 minutes before installing the oil pan.
9. Install the oil pan and tighten the bolts to the specified torque.

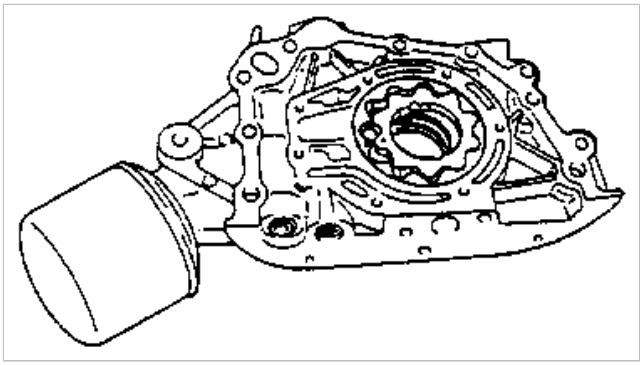


Engine Mechanical System > Engine Block > Front Case > REASSEMBLY

Reassembly

Oil Pump

1. Install the outer and inner gears into the front case. Make sure that the inner and outer gears are installed in the same direction as shown.



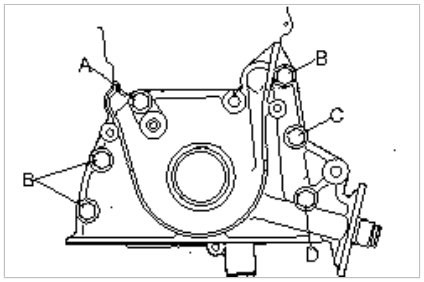
2. Install the oil pump cover and tighten the bolts to the specified torque. After the bolts have been tightened, check to ensure that the gear turns smoothly.
3. Install the relief valve and spring. Tighten the plug to the specified torque. Apply engine oil to the relief valve.

Engine Mechanical System > Engine Block > Front Case > REASSEMBLY

REASSEMBLY

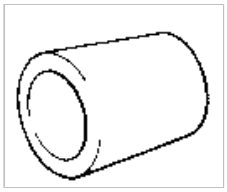
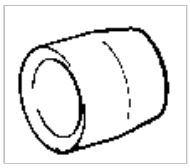
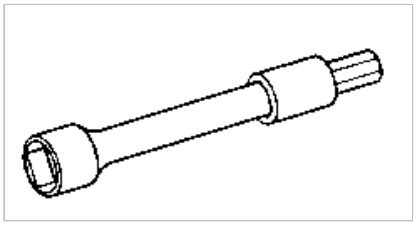
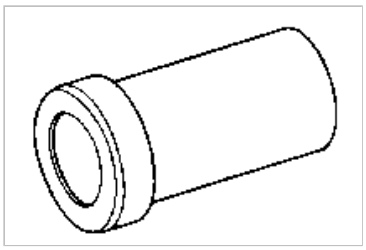
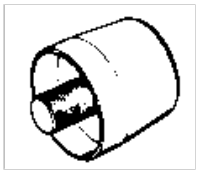
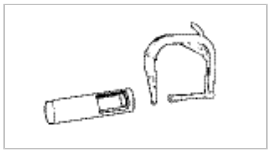
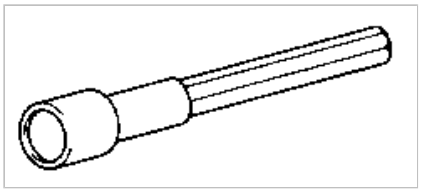
Front Case

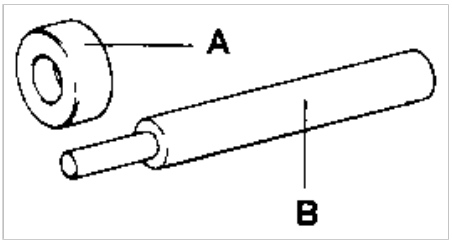
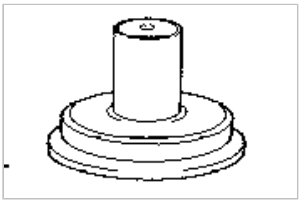
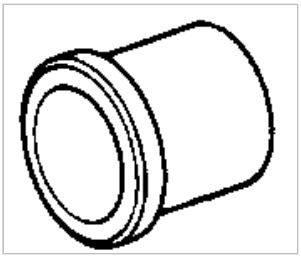
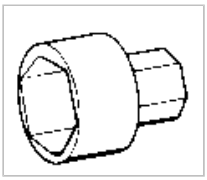
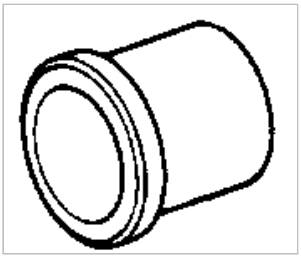
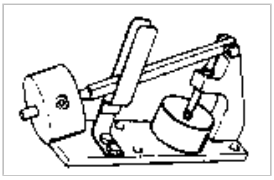
Install the front case assembly with a new gasket, and tighten the bolts to the specified torque.



Engine Mechanical System > General > SPECIAL TOOLS

SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
Crankshaft front oil seal installer 09231-22000		Installation of the crankshaft front oil seal (use with 09231-22100)
Crankshaft front oil seal guide 09231-11001		Installation of the crankshaft front oil seal (use with 09214-21000)
Cylinder head bolt wrench 09221-21000		Removal and tightening of the cylinder head bolt
Camshaft oil seal installer 09221-21000		Installation of the camshaft oil seal (use with 09221-21100)
Camshaft oil seal guide 09221-21100		Used as a guide when pressing in the camshaft oil seal (Used with 09221-21000)
Valve spring remover and installer 09222-28000		Removal and installation of the inlet or exhaust valve
Valve stem oil seal installer 09222-22001		Installation of the vale stem oil seal
Valve guide installer 09221-22000 A/B		Removal and installation of the valve guide

		
Crankshaft rear oil seal installer 09231-21000		1) Installation of the engine rear oil seal 2) Installation of the crankshaft rear oil seal
Piston pin setting tool insert 09235-22000		Removal and installation of the piston pin (use with 09234-33001)
Oil pressure switch wrench 09260-32000		Removal and installation of the oil pressure switch
Mounting bushing remover and installer 09216-22000		Removal and installation of engine mounting bushing (Use with 09216-22100)
Leak down tester 09246-32000		Test for leak down of auto lash adjuster

Engine Mechanical System > General > SPECIFICATIONS

SPECIFICATIONS

General

Description	Specification
Type	In-line 12 valve OHC
Number of cylinders	4
Bore	75.5 mm (2.97 in.)

Stroke	83.5 mm (3.29 in.)
Total displacement	1495 CC
Compression ratio	10.0
Firing order	1-3-4-2
Idle R.P.M	800± 100
Ignition timing at idling speed	BTDC 9°±5°/800 rpm

Valve Timing

Description	|	Specification
Intake valve	Opens (BTDC)	12°
	Closes (ABDC)	52°
Exhaust valve	Opens (BBDC)	52°
	Closes (ATDC)	12°

Cylinder Head

Description	Specification	Limit
Flatness of gasket surface	Max. 0.05 mm (0.0020 in.)	0.1 mm (0.0039 in.)
Flatness of manifold mounting surface	Max. 0.15 mm (0.0059 in.)	0.3 mm (0.0118 in.)
Oversize rework dimensions of valve seat hole: Intake	0.3 mm (0.012 in.) O.S.	28.8-28.821 mm (1.134-1.135 in.)
	0.6mm (0.024 in.) O.S	29.1-29.121 mm 1.146-1.1467 in.)
Oversize rework dimensions of valve seat hole: Exhaust	0.3mm (0.012 in.) O.S.	34.3-34.325 mm (1.350-1.351 in.)
	0.6mm (0.024 in.) O.S.	34.6-34.625 mm (1.362-1.363 in.)
Oversize rework dimensions of valve guide hole (both intake and exhaust)	0.05mm (0.002 in.) O.S.	11.05-11.068 mm (0.435-0.4357 in.)
	0.25mm (0.010 in.) O.S.	11.25-11.268 mm (0.443-0.4436 in.)
	0.50mm (0.020 in.) O.S.	11.50-11.518 mm (0.453-0.4535 in.)

Camshaft

Description	Specification	Limit
Cam height: Intake	42.8575 mm (1.6873 in.)	42.3575 mm (1.6676 in.)
Cam height: Exhaust	42.7624 mm (1.6825 in.)	42.2642 mm (1.6628 in.)
Journal O.D.	30 mm (1.181 in.)	|
Bearing oil clearance	0.045-0.085 mm (0.0020-0.0035 in.)	|
End play	0.07-0.28 mm (0.003-0.011 in.)	|

Valve

Description	Specification
Stem O.D.: Intake	5.97-5.955 mm(0.235-0.234 in.)
Stem O.D.: Exhaust	5.965-5.95 mm(0.235-0.234 in.)

Description	Specification
Face Angle:	45-45.3°

Thickness of valve head (margin)

Description	Specification	Limit

Intake	1.1 mm (0.043 in.)	0.8 mm (0.031in.)
Exhaust	1.4 mm (0.055 in.)	1.0 mm (0.039 in.)

Valve stem to valve guide clearance

Description	Specification	Limit
Intake	0.03-0.06 mm (0.0012-0.0024 in.)	0.10 mm(0.0039 in.)
Exhaust	0.035-0.065 mm (0.0014-0.0026 in.)	0.5 mm(0.019 in.)

Valve guide

Description	Specification
Installed dimension O.D.: Intake	11 mm (0.4331 in.)
Installed dimension O.D.: Exhaust	11 mm (0.4331 in.)
Service size	0.05, 0.25, 0.50 mm, (0.002, 0.010, 0.020 in.) oversize

Valve seat insert

Description	Specification
Width of seat contact:Intake	0.8-1.2 mm(0.031-0.047 in.)
Width of seat contact: Exhaust	1.5-1.9 mm(0.059- 0.075 in.)
Seat angle	45°
Oversize	0.3mm (0.012in.),0.6mm (0.024in.)

Valve spring

Description	Specification
Free length	42.03 mm (1.655 in.)
Load	24.7±1.2 kg/34.5 mm at height
	54.6±2.7 kg/25.9 mm at height
Installed height	34.5 mm (1.358 in.)
Squareness	1.5° or less

Cylinder block

Description	Specification
Cylinder bore	75.50-75.53 mm(2.9724-29736 in.)
Out-of-roundness and taper of cylinder bore	Less than 0.01 mm(0.0004 in.)
Clearance with piston	0.02-0.04 mm(0.0008-0.0016 in.)

Piston

Description	Specification
O.D.	75.47-75.50 mm(2.9713-2.9724 in.)
Service size	0.25, 0.50, 1.00 mm (0.010, 0.020, 0.030, 0.039 in.) oversize

Piston ring

Description	Specification	Limit

Side clearance: No. 1, No. 2	0.04-0.085 mm (0.0016-0.0033in.)	0.1 mm (0.004 in.)
End gap (1.5L):No. 1	0.20-0.50 mm (0.0078-0.0196 in.)	1 mm (0.0394 in.)
End gap (1.5L):No. 2	0.37-0.52 mm (0.0078-0.0196 in.)	1 mm (0.0394 in.)
End gap (1.5L):Oil ring side rail	0.25-1.00 mm (0.0078-0.0394 in.)	1 mm (0.0394 in.)
Service size	0.25, 0.50, 0. 750, 1.00 mm (0.010, 0.020, 0.030, 0.039 in.)	|

Connecting rod

Description	Specification	Limit
Bend	0.05 mm (0.0019 in.) or less	|
Twist	0.1 mm (0.0394 in.) or less	|
Connecting rod big end to crankshaft side clearance	0.10-0.25mm(0.0039-0.0098 in.)	0.4mm(0.0157 in.)

Connecting rod bearing

Description	Specification
Oil clearance	0.024-0.042 mm(0.0009-0.0016 in.)
Undersize	0.25 mm, 0.50 mm, 0.75 mm (0.01 in., 0.02in., 0.03 in.)

Crankshaft

Description	Specification
Pin O.D.	45 mm (1.7717 in.)
Journal O.D.	50 mm (1.9685 in.)
Bend	0.03 mm or less
Out-of-roundness, taper of journal and pin	0.005 mm (0.0004 in.) or less
End play	0.05-0.175 mm (0.0020-0.0069 in.)
Undersize rework dimension of pin: 0.25 mm (0.010 in.)	44.725-44.740 mm (1.7608-1.7614 in.)
Undersize rework dimension of pin: 0.50 mm (0.020 in.)	44.475-44.490 mm (1.7509-1.7516 in.)
Undersize rework dimension of pin: 0.75 mm (0.030 in.)	44.225-44.240 mm (1.7411-1.7417 in.)
Undersize rework dimension of journal: 0.25 mm (0.010 in.)	49.727-49.742 mm (1.9578-1.9483 in.)
Undersize rework dimension of journal: 0.50 mm (0.020 in.)	49.477-49.492 mm (1.9479-1.9485 in.)
Undersize rework dimension of journal: 0.75 mm (0.030 in.)	49.227-49.242 mm (1.9380-1.9386 in.)

Flywheel

Description	Specification	Limit
Runout	0.1 mm(0.0039 in.)	0.13 mm(0.0051 in.)

Oil pump

Description	Specification
Clearance between outer circumference and front case.	0.12-0.18 mm(0.0047-0.0070 in.)
Clearance between rotor axial side and front case	0.04-0.085 mm(0.0016-0.0033 in.)
Tip clearance between outer and inner rotor	0.0025-0.069 mm(0.0010-0.0027 in.)
Engine oil pressure at engine idle speed	147 KPa(1.5 kg/cm2 21.33 psi)
Relief spring: Free height	46.6 mm (1.8346 in.)
Relief spring: Load	6.1 kg at 40.1 mm(13.42 lb at 1.578 in.)

Cooling method	Water-cooled, Pressurized, Forced circulation with electrical fan	|
Coolant	Quantity	6 lit(7 U.S. qts.,6.9 Imp. qts.)
Radiator	Type	Pressurized corrugated fin type
	Performance	38000 Kcal/h
Radiator Cap	Main valve opening pressure	81.4-108kPa (11.8-15.6 psi., 0.83-1.1 kg/cm2)
	Vacuum valve opening pressure	-6.86 kPa (-1.00 psi, -0.07 kg/cm2) or less
Coolant Pump	Centrifugal type impeller	|
Thermostat	Type	Wax pellet type with jiggle valve
	Valve opening temperature	88°C (190°F)
	Full-opening temperature	100°C (212°F)
	Valve lift, fully open	8.5 mm (0.33 in) or more at 100°C (212°F)
	Identification mark	88 (Stamped on flange)
Drive belt	Type	V-ribbed belt
Engine coolant temperature gauge unit	Type	Thermistor type
	Resistance	90.5-117.5 Ω at 70°C (68°F)
		21.3-26.3 Ω at 115°C (239°F)
Engine coolant temperature sensor	Type	Thermistor type
	Resistance	2.27-2.273 kΩ at 20°C (68°F)
		0.322-0.298 kΩ at 80°C (176°F)
	Switching temperature	Switches "ON" at 90°C (205°F) or more
Automatic transaxle	Performance	1,200 Kcal/h
Air cleaner	Type	Dry type
	Element	Unwoven cloth type
Exhaust pipe	Muffler	Expansion resonance type
	Suspension system	Rubber hangers

Engine Mechanical System > General > TIGHTENING TORQUE

TIGHTENING TORQUE

Item	Nm	kg.cm	lb.ft
Cylinder Block	|	|	|
Front engine support bracket bolt and nut	30-42	300-420	22-30
Left engine support bracket bolt	30-42	300-42	22-30
Oil pressure switch	13-15	130-150	9.4-11
Cylinder head	|	|	|
Cylinder head bolt-cold engine	70-75	700-750	51-54
Cylinder head bolt-hot engine	80-85	800-850	58-61
Intake/manifold bolts or nuts	15-20	150-200	11-14
Exhaust manifold nut	15-20	150-200	11-14
Rocker cover bolt	8-10	80-100	6-7
Rocker arm shaft bolt	20-24	200-240	14-17
Camshaft bolt	20-27	200-270	14-20
Rear plate bolt	8-10	80-100	6-7

Main Moving	|	|	|
Connecting rod cap nut	32-35	320-350	23-26
Crankshaft bearing cap bolt	55-60	550-600	40-44
Fly wheel M/T bolt	130-140	1300-1400	94-101
Drive plate A/T bolt	130-140	1300-1400	94-101
Timing Belt	|	|	|
Crankshaft sprocket bolt	140-150	1400-1500	103-111
Camshaft sprocket bolt	80-100	800-1000	59-74
Timing belt tensioner bolt	20-27	200-270	14-20
Timing belt cover bolt	10-12	100-120	7-9
Front case bolt	12-15	120-150	9-11

M/T : Manual Transaxle

A/T : Automatic Transaxle

Item	Nm	kg.cm	lb.ft
Engine Mounting	|	|	|
Right mounting insulator (large) nut	90-110	900-1100	68-80
Right mounting insulator (small) nut	50-60	500-600	32-43
Right mounting bracket to engine nuts and bolts	50-65	500-650	36-47
Transaxle mount insulator nut	90-110	900-1100	65-80
Transaxle insulator bracket to side member bolts	30-40	300-400	22-29
Rear roll stopper insulator nut	50-60	500-600	33-43
Rear roll stopper bracket to center member bolts	45-60	450-600	36-43
Front roll stopper insulator nut	45-60	450-600	33-43
Front roll stopper bracket to center member bolts	30-40	300-400	22-29
Center member to body bolts	60-80	600-800	43-58
Oil filter	12-16	120-160	9-12
Oil pan bolts	6-8	60-80	4-6
Oil pan drain plug	35-45	350-450	25-33
Oil screen bolts	15-22	150-220	11-16
Timing belt upper cover bolts	10-12	100-120	7-9
Timing belt lower cover bolts	10-12	100-120	7-9
Surge tank to inlet manifold nuts and bolts	15-20	150-200	11-14
Cooling System	|	|	|
Generator support and nut	20-25	200-250	14-18
Generator lock bolt	15-22	150-220	11-16
Generator brace mounting bolt	20-28	200-280	14-20
Coolant pump pulley	8-10	80-100	6-7
Coolant pump bolt	12-15	120-150	9-11
Coolant temperature gauge unit	10-12	100-120	7-9
Coolant temperature sensor	15-20	150-200	11-14
Coolant outlet fitting bolt	17-20	170-200	12-14
Thermostat housing bolt	15-20	150-200	11-14
Intake and Exhaust System	|	|	|
Air cleaner body mounting bolts	8-10	80-100	7-7

Resonator mounting bolts	4-6	40-60	2.9-4.3
Intake manifold to cylinder head nuts and bolts	15-20	150-200	11-14
Surge tank stay to cylinder block bolts	18-25	180-250	13-18
Throttle body to surge tank bolts	15-20	150-200	11-14
Exhaust manifold to cylinder head nuts	15-20	150-200	11-14
Exhaust manifold cover to exhaust manifold bolts	15-20	150-200	11-14
Oxygen sensor to exhaust manifold	50-60	500-600	36-43
Front exhaust pipe to exhaust manifold nuts	30-40	300-400	22-29
Front exhaust pipe bracket bolts	30-40	300-400	22-29
Front exhaust pipe to catalytic converter bolts	40-60	400-600	29-43
Catalytic converter to main muffler assembly nuts	30-40	300-400	22-29

M/T : Manual Transaxle

A/T : Automatic transaxle

Engine Mechanical System > General > TROUBLESHOOTING

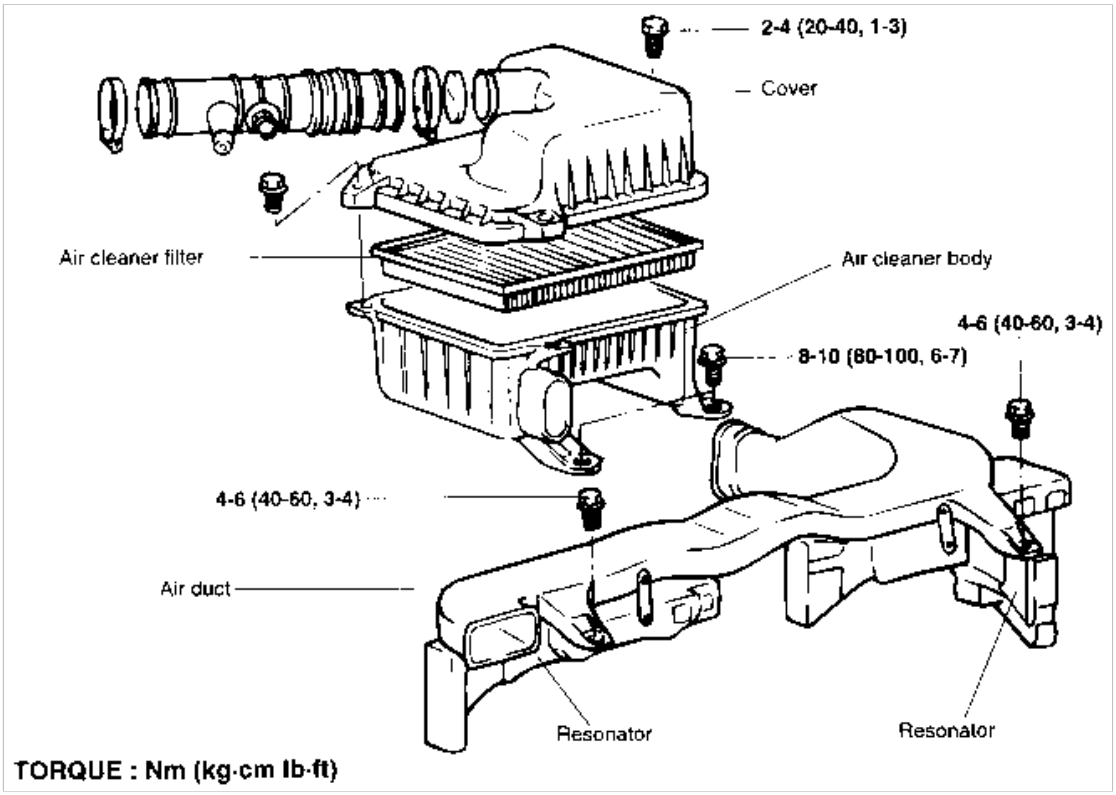
TROUBLESHOOTING

Symptom	Probable cause	Remedy
Low compression	Blown cylinder head gasket	Replace gasket
	Worn or damaged piston rings	Replace rings
	Worn piston or cylinder	Repair or replace piston and/or cylinder block
	Worn or damaged valve seat	Repair or replace valve and/or seat ring
Oil pressure drop	Low engine oil level	Check engine oil level
	Faulty oil pressure switch	Replace
	Clogged oil filter	Replace
	Worn oil pump gears or cover	Replace
	Thin or diluted engine oil	Change and determine cause
	Oil relief valve stuck (open)	Repair
	Excessive bearing clearance	Replace
High oil pressure	Oil relief valve stuck (closed)	Repair
Excessive engine rolling and vibration	Loose engine roll stopper (front, rear)	Re-tighten
	Loose transaxle mount bracket	Re-tighten
	Loose engine mount bracket	Re-tighten
	Loose center member	Re-tighten
	Broken transaxle mount insulator	Replace
	Broken engine mount insulator	Replace
	Broken engine roll stopper insulator	Replace
Noisy valves	Thin or diluted engine oil (low oil pressure)	Change
	Worn or damaged valve stem or valve guide	Replace
	HLA abnormal operation	Speed the engine up (for venting) or Replace the HLA
Connecting rod and/main bearing noise	Insufficient oil supply	Check engine oil level
	Thin or sir diluted engine oil	Change and determine
	Excessive bearing clearance	Replace
Timing belt noise	Incorrect belt tension	Adjust belt tension

Symptom	Probable cause	Remedy
Low coolant level	Leakage of coolant:	
	Heater or radiator hose	Repair or replace parts
	Faulty radiator cap	Tighten or replace clamps
	Thermostat housing	Replace gasket or housing
	Radiator	Repair or replace
	Engine coolant pump	Replace parts
Clogged radiator	Foreign material in coolant	Replace coolant
Abnormally high coolant temperature	Faulty thermostat	Replace parts
	Faulty radiator cap	Replace parts
	Restriction to flow in cooling system	Clear restriction or replace parts
	Loose or missing drive belt	Adjust or replace
	Faulty engine coolant pump	Replace
	Faulty temperature sender of wiring	Repair or replace
	Faulty electric fan	Repair or replace
	Insufficient coolant	Refill coolant
Abnormally low coolant temperature	Faulty thermostat	Replace
	Faulty temperature sender or wiring	Repair or replace
Leakage from oil cooling system	Loose connections	Retighten
	Cracked or damaged; hoses, pipes or oil cooler	Repair or replace
Inoperative electrical	Damaged: Thermo sensor, Electrical motor, Radiator fan relay, Wiring	Repair or replace
Exhaust gas leakage	Loose connections	Retighten
	Broken pipe or muffler	Repair or replace
Abnormal noise	Detached baffle plate in muffler	Replace
	Broken rubber hanger	Replace
	Pipe or muffler contacting vehicle body	Correct
	Broken pipe or muffler	Repair or replace

Engine Mechanical System > Intake & Exhaust System > Air Cleaner (ACL) > COMPONENTS

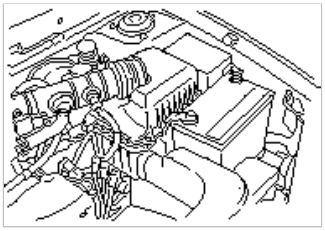
Components



Engine Mechanical System > Intake & Exhaust System > Air Cleaner (ACL) > DISASSEMBLY

Disassembly

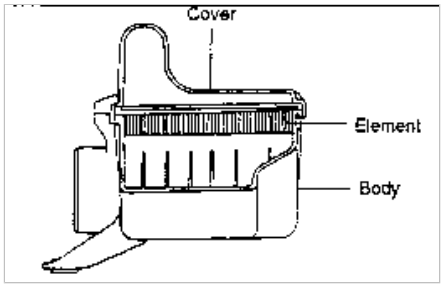
1. Remove the air duct connected to the air cleaner.
2. Disconnect the intake air temperature sensor harness.
3. Remove the air intake hose from the air cleaner side.
4. Remove the air cleaner cover and filter.
5. Remove the air cleaner mounting bolts and remove the air cleaner.



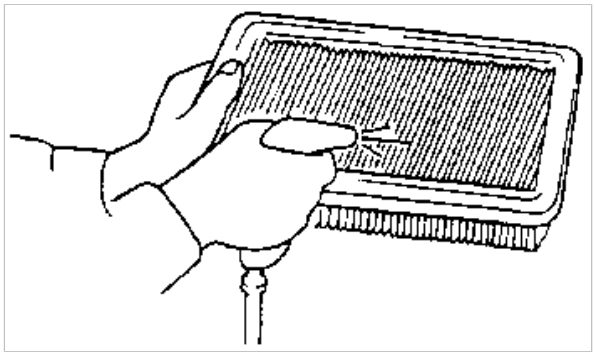
Engine Mechanical System > Intake & Exhaust System > Air Cleaner (ACL) > INSPECTION

INSPECTION

1. Check the air cleaner body, cover, or packing for distortion, corrosion or damage.
2. Check the air duct for damage.
3. Check the resonator for distortion or damage.



4. Check the air cleaner element for restriction, contamination or damage.
   If the element is slightly restricted, remove dust and other contaminants by blowing air from the upper side through the element.
5. Check the air cleaner housing for restrictions, contamination or damage.

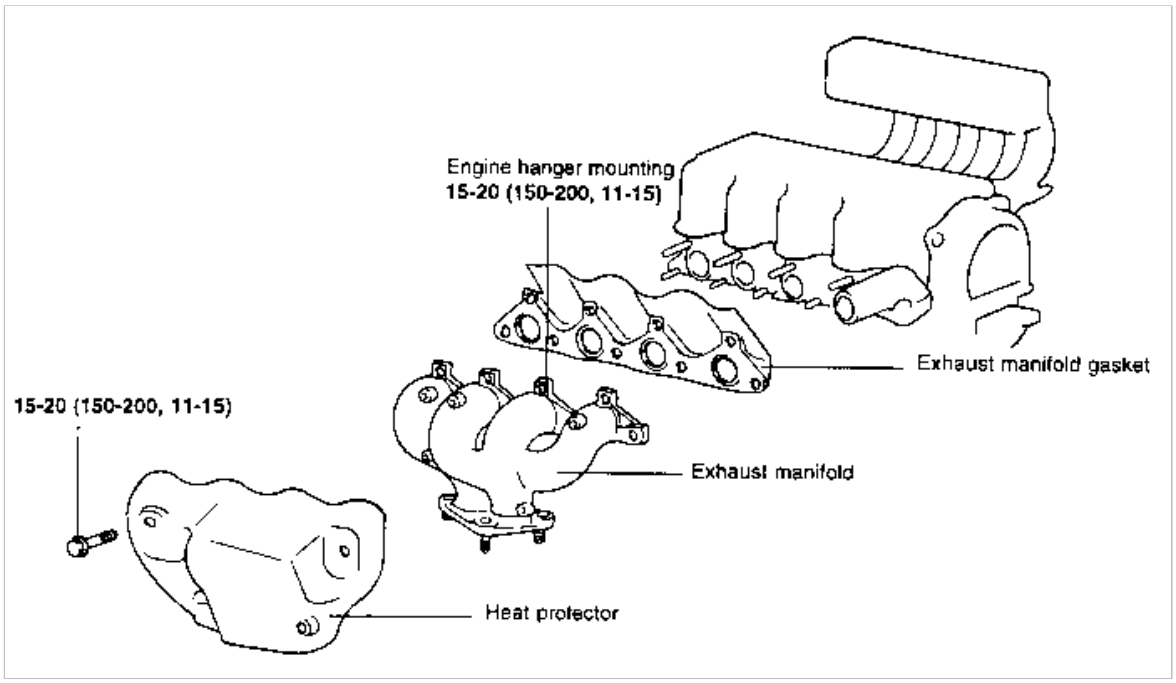


INSTALLATION

Installation of the air cleaner is the reverse order of removal.

Engine Mechanical System > Intake & Exhaust System > Exhaust Manifold > COMPONENTS

Components



Engine Mechanical System > Intake & Exhaust System > Exhaust Manifold > INSPECTION

INSPECTION

EXHAUST MANIFOLD

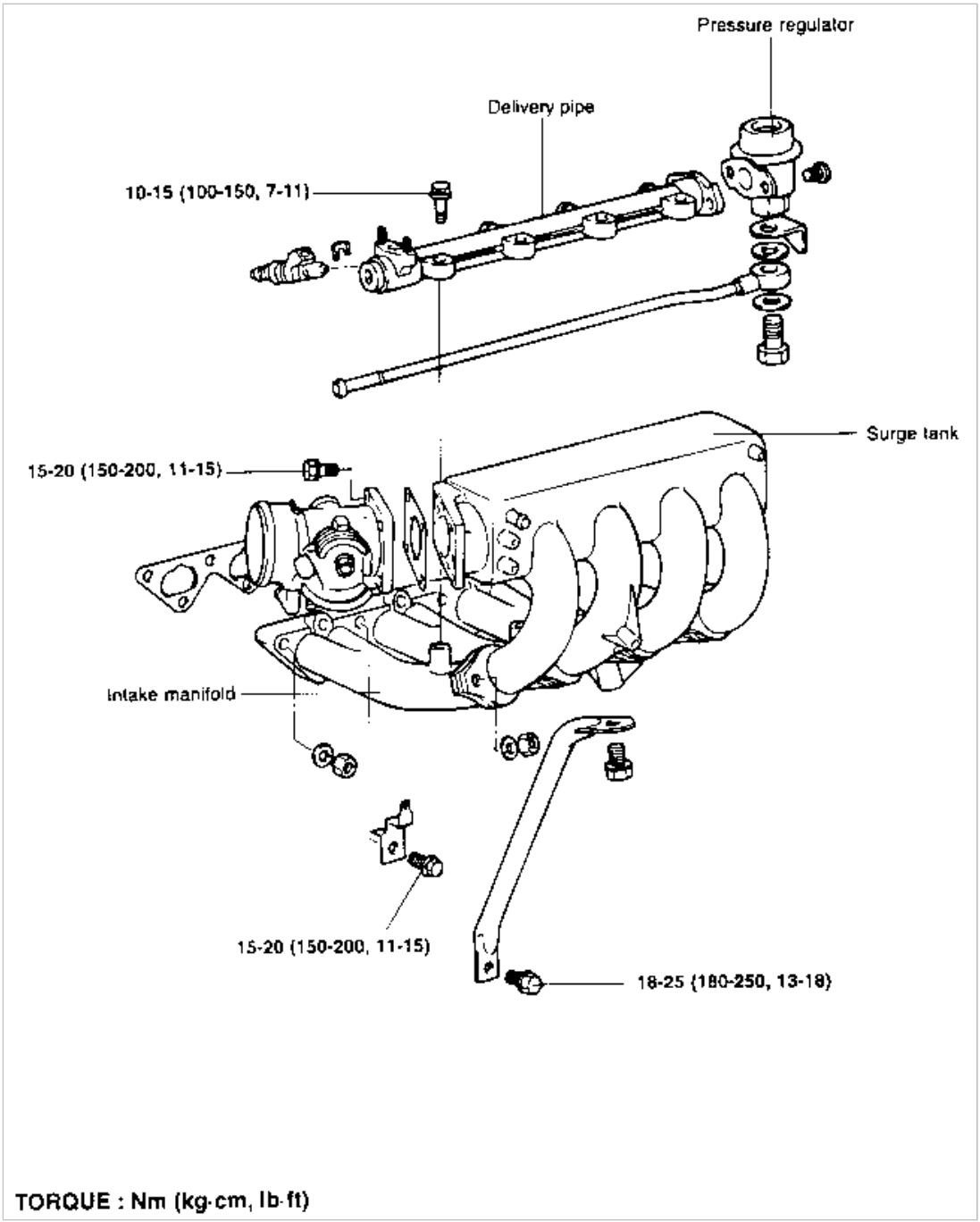
Check for damage or cracking.

EXHAUST MANIFOLD GASKET

Check for flaking or damage of the gasket.

Engine Mechanical System > Intake & Exhaust System > Intake Manifold > COMPONENTS

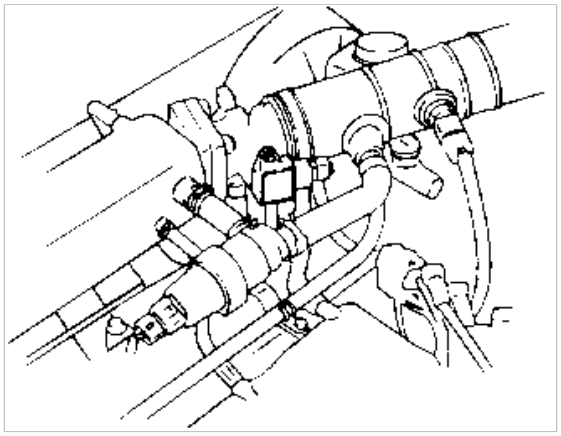
Components



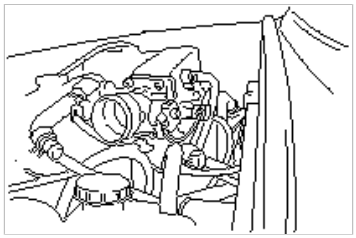
Engine Mechanical System > Intake & Exhaust System > Intake Manifold > DISASSEMBLY

Disassembly

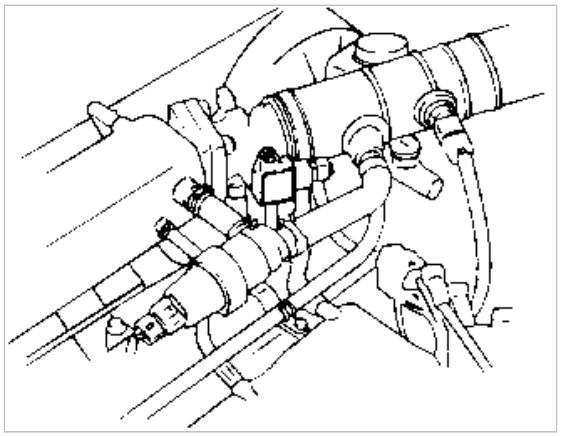
1. Remove the idle speed actuator.



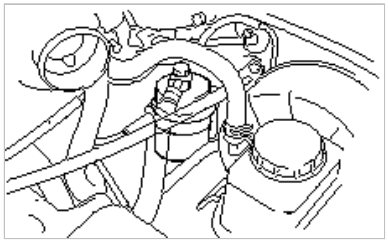
2. Remove the intake air hose connected to the throttle body.



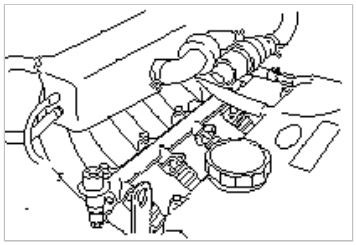
3. Remove the accelerator cable.



4. Remove the P.C.V. hose and brake booster vacuum hoses.
5. Disconnect the vacuum hose connections.
6. Disconnect the high pressure fuel hose connection after relieving pressure in the fuel pipe line to prevent fuel overflow.



7. Remove the surge tank stay.
8. Remove the surge tank assembly and gasket.
9. Disconnect the fuel injector harness connector.
10. Remove the delivery pipe with the fuel injectors and pressure regulator attached.
    Be careful not to drop the injectors when removing the delivery pipe.
11. Remove the insulator from the intake manifold and disconnect the heater hose.
12. Remove the intake manifold.



Engine Mechanical System > Intake & Exhaust System > Intake Manifold > INSPECTION

INSPECTION

SURGE TANK

Check the surge tank for defects or cracks. Replace if necessary.

INTAKE MANIFOLD

Check for damage or cracking of any part.

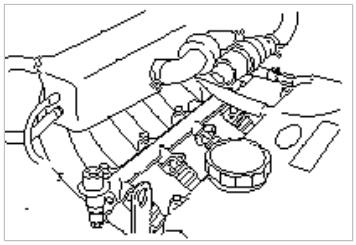
AIR HOSE

Check for damage or cracking of any part.

Engine Mechanical System > Intake & Exhaust System > Intake Manifold > INSTALLATION

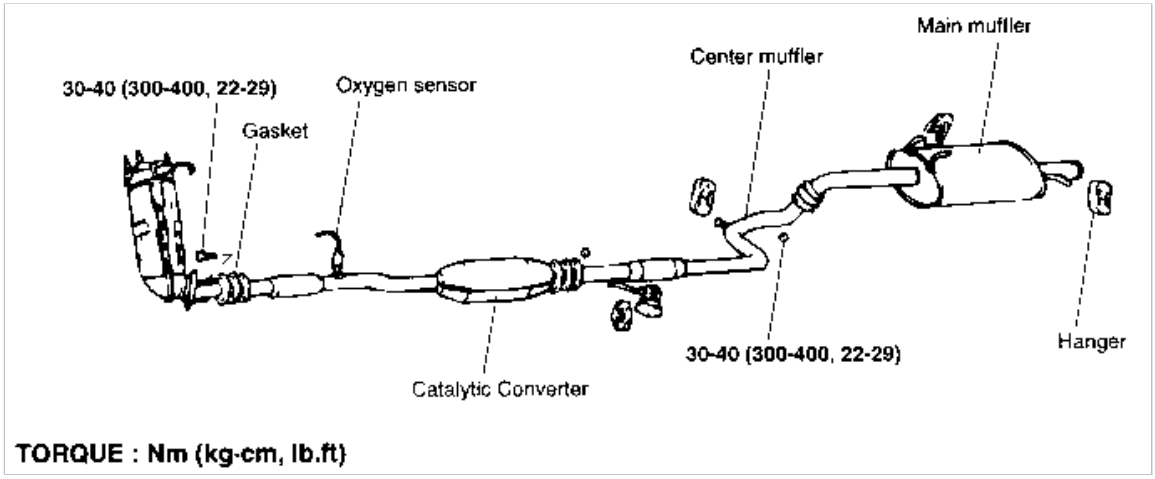
INSTALLATION

1. Install the delivery pipe with the fuel injectors and pressure regulator attached.
   Be careful not to drop the injectors when removing the delivery pipe.
2. Ensure that insulators are correctly inserted into the delivery pipe hole.



Engine Mechanical System > Intake & Exhaust System > Muffler > COMPONENTS

COMPONENTS



TORQUE : Nm (kg-cm, lb.ft)

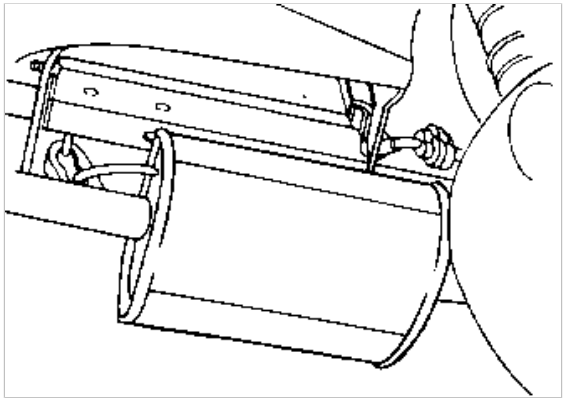
Engine Mechanical System > Intake & Exhaust System > Muffler > DISASSEMBLY

Disassembly

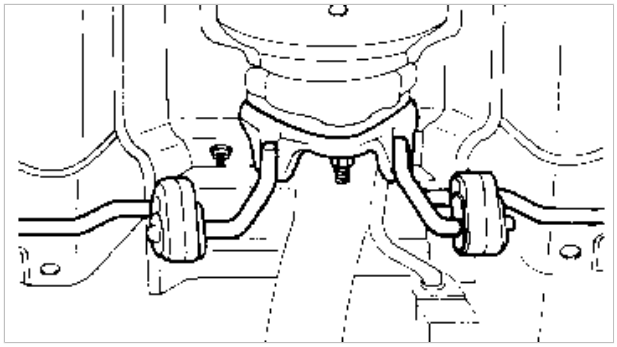
MAIN MUFFLER

Before removing or inspecting the exhaust system, ensure that the exhaust system has cooled sufficiently.

1. Disconnect the main muffler from the center muffler.

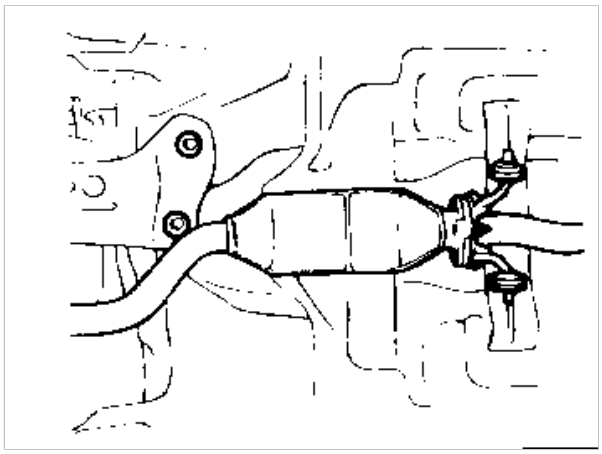


2. Remove the rubber hangers and take out the main muffler.

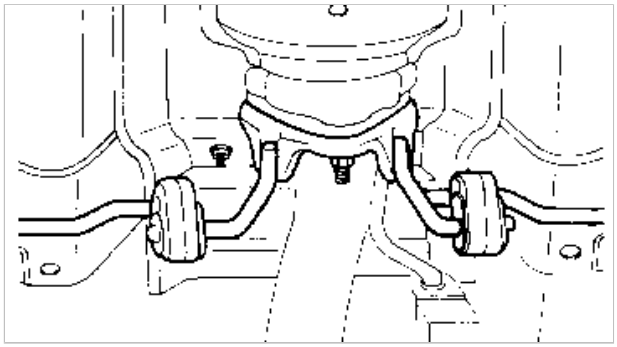


CENTER MUFFLER

1. Remove the center muffler assembly from the front exhaust pipe.

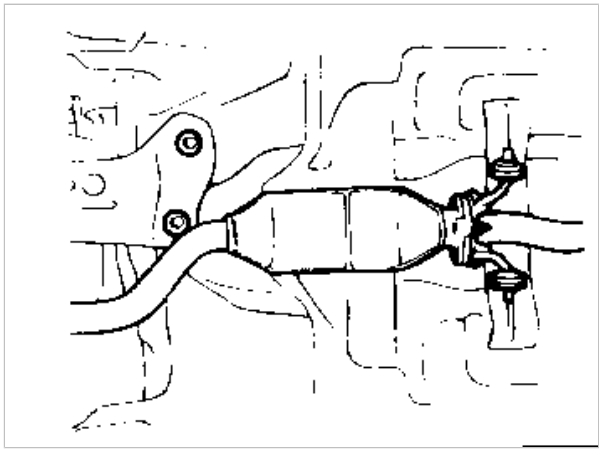


2. Remove the rubber hanger, then remove the center muffler.



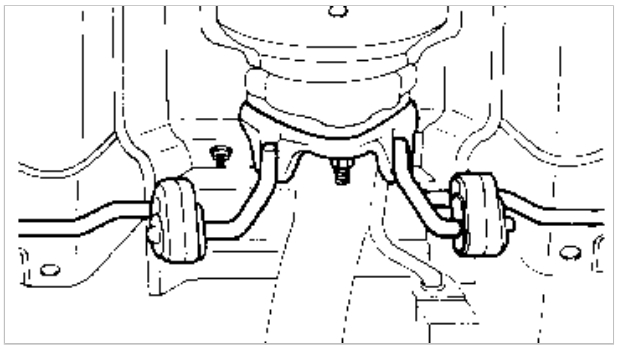
CATALYTIC CONVERTER

1. Remove the catalytic converter from the exhaust manifold.



FRONT EXHAUST PIPE

1. Remove the O2 sensor connector.
2. Remove the front exhaust pipe from the catalytic converter (unleaded vehicle) or exhaust manifold (leaded vehicle).
3. Remove the front exhaust pipe clamp bolt and remove the center muffler mounting nut.



Engine Mechanical System > Intake & Exhaust System > Muffler > INSPECTION

INSPECTION

1. Check the muffler and pipes for corrosion and damage.
2. Check the rubber hanger and bands for deterioration and cracks.

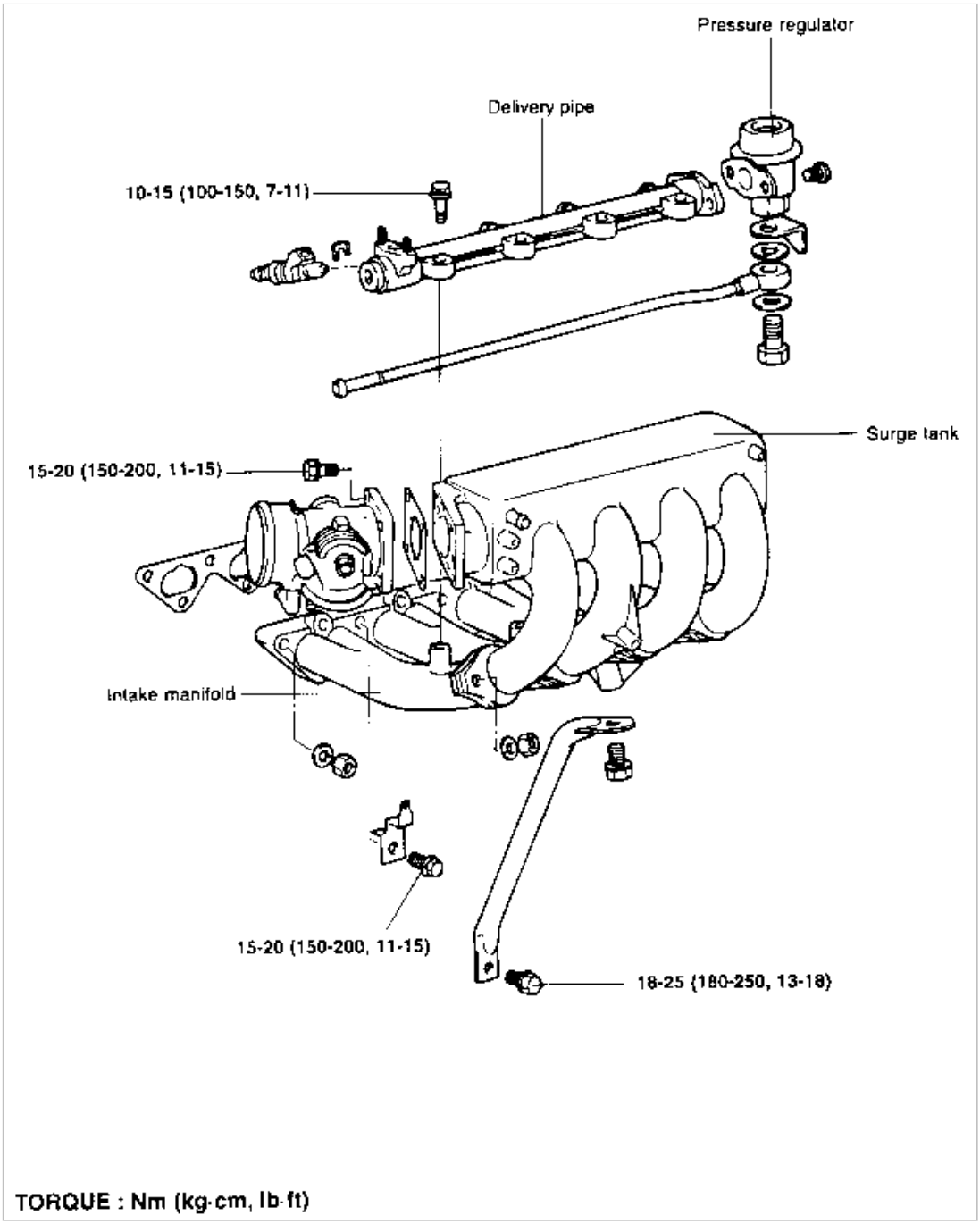
Engine Mechanical System > Intake & Exhaust System > Muffler > REASSEMBLY

Reassembly

1. Temporarily install the catalytic converter assembly, the front exhaust pipe, the center exhaust pipe, and the main muffler, in that order.
2. Tighten the parts securely. Make sure there is no interference with any body components.

Engine Mechanical System > Intake & Exhaust System > Surge Tank > COMPONENTS

Components

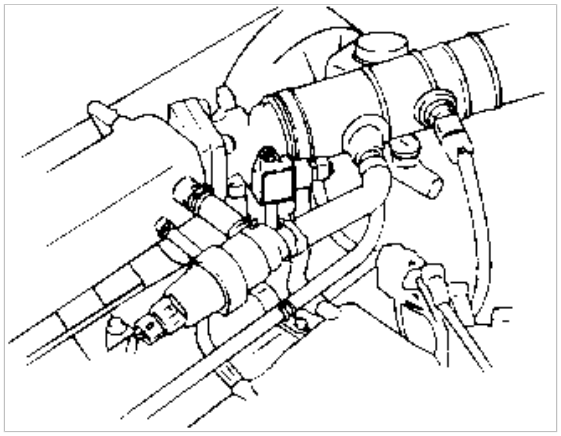


TORQUE : Nm (kg·cm, lb·ft)

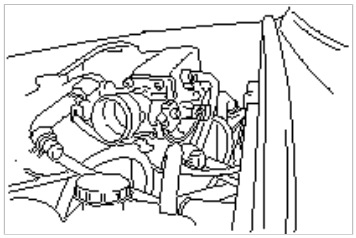
Engine Mechanical System > Intake & Exhaust System > Surge Tank > DISASSEMBLY

Disassembly

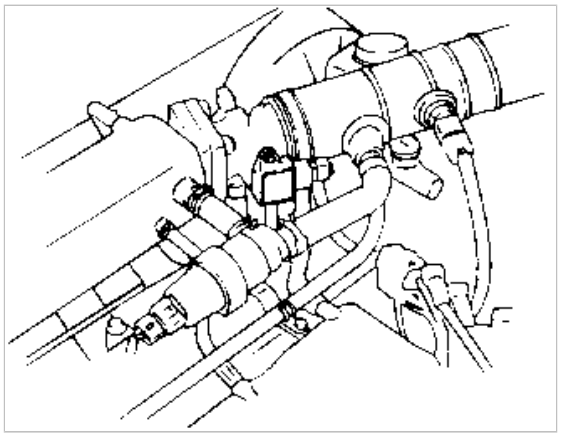
1. Remove the idle speed actuator.



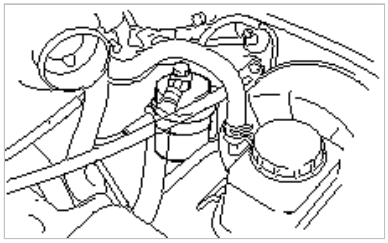
2. Remove the intake air hose connected to the throttle body.



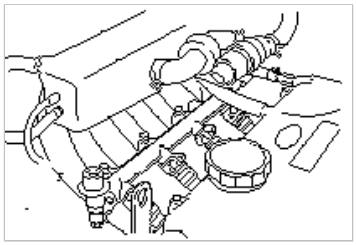
3. Remove the accelerator cable.



4. Remove the P.C.V. hose and brake booster vacuum hoses.
5. Disconnect the vacuum hose connections.
6. Disconnect the high pressure fuel hose connection after relieving pressure in the fuel pipe line to prevent fuel overflow.



7. Remove the surge tank stay.
8. Remove the surge tank assembly and gasket.
9. Disconnect the fuel injector harness connector.
10. Remove the delivery pipe with the fuel injectors and pressure regulator attached.
    Be careful not to drop the injectors when removing the delivery pipe.
11. Remove the insulator from the intake manifold and disconnect the heater hose.
12. Remove the intake manifold.



Engine Mechanical System > Intake & Exhaust System > Surge Tank > INSPECTION

INSPECTION

SURGE TANK

Check the surge tank for defects or cracks. Replace if necessary.

INTAKE MANIFOLD

Check for damage or cracking of any part.

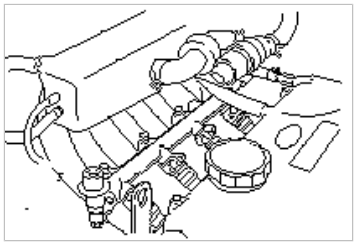
AIR HOSE

Check for damage or cracking of any part.

Engine Mechanical System > Intake & Exhaust System > Surge Tank > INSTALLATION

INSTALLATION

1. Install the delivery pipe with the fuel injectors and pressure regulator attached.
   Be careful not to drop the injectors when removing the delivery pipe.
2. Ensure that insulators are correctly inserted into the delivery pipe hole.

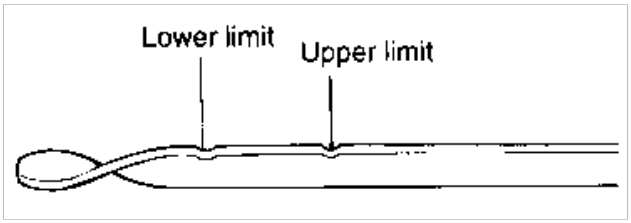


Engine Mechanical System > Lubrication System > Engine Oil > INSPECTION

Inspection

CHECKING ENGINE OIL

1. Position the vehicle on a level surface.
2. Warm up the engine.
   If a vehicle has been out of service for a prolonged period of time, warm up the engine for approximately 20 minutes.
3. Stop the engine, wait 2 or 3 minutes, then check the oil level after engine oil drains to the oil pan.
4. Check that the engine oil level is within the level range indicated on the oil dipstick. If the oil level is found to have fallen to the lower limit (the mark), refill to the "F" mark.



When refilling, use the same type of engine oil.

5. Check that the oil is not dirty or contaminated with coolant or gasoline, and that it has the proper viscosity.

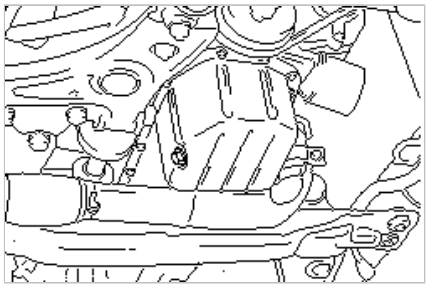
Engine Mechanical System > Lubrication System > Engine Oil > REPLACEMENT

Replacement

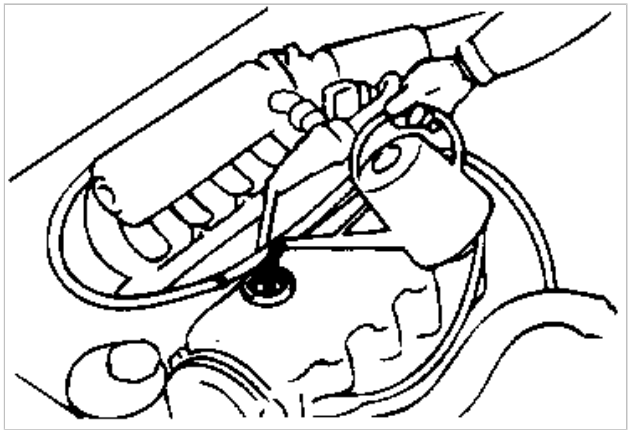
CHANGING ENGINE OIL

Be careful not to burn yourself, as the engine oil is hot.

1. Run the engine until it reaches normal operating temperature.
2. Stop the engine.
3. Remove the oil filler cap (on rocker cover) and the drain plug (on the oil pan). Drain the engine oil.



4. Re-install and tighten the drain plug to the specified torque.
5. Fill new engine oil through the oil filler.
   a. Cover the generator with a shop towel before pouring the engine oil to ensure that if oil spills, it will not drop on the generator.
   b. Use a funnel to pour in the engine oil.



6. Install the oil filler cap.
7. Start and run the engine.
8. Stop the engine and then check the oil level. Add oil if necessary.

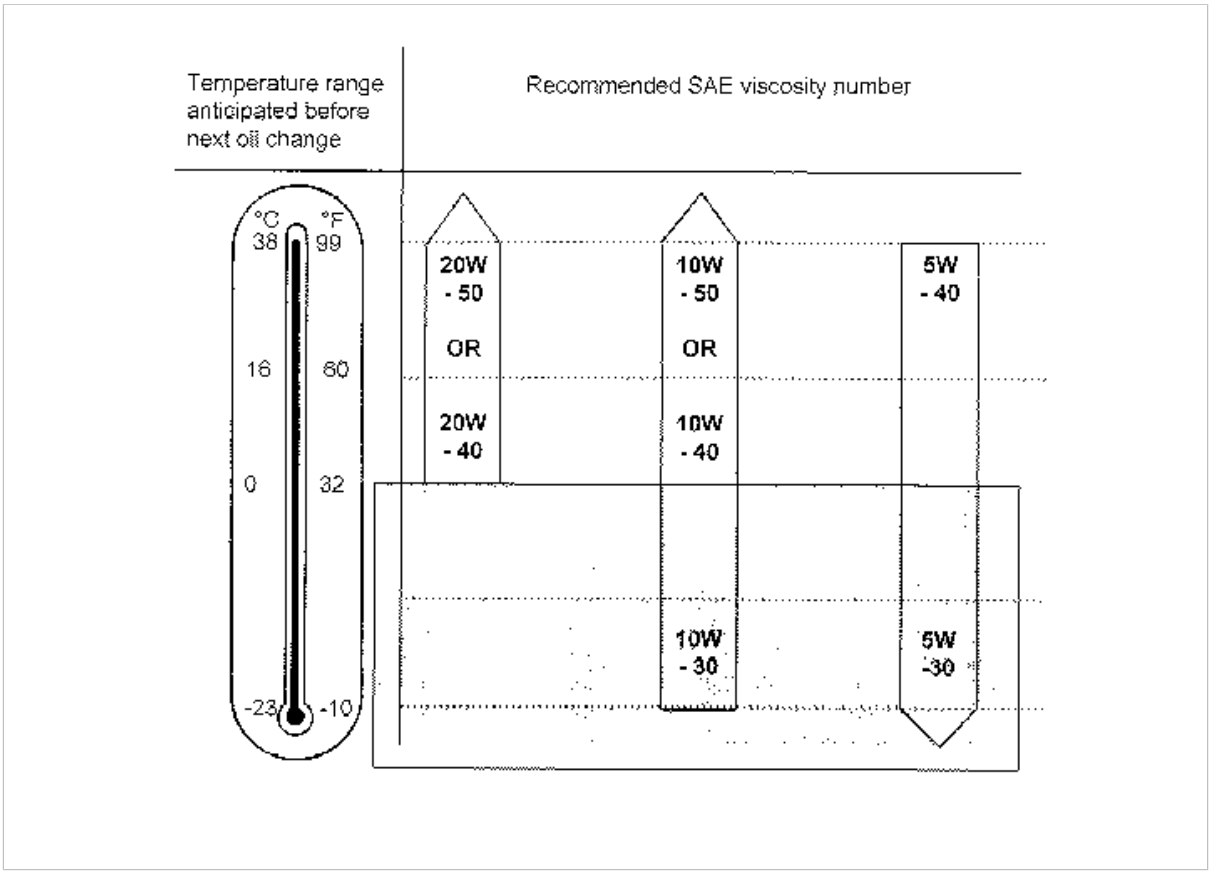
Engine Mechanical System > Lubrication System > Engine Oil > SELECTION OF LUBRICANTS

SELECTION OF LUBRICANTS

Engine Oil

Recommended API classification: SG OR SG/CD

Recommended SAE viscosity grade:



For best performance and for maximum protection of all engines for all types of operation, select only those lubricants which:

a. Conform to the requirements of API classification.

b. Have proper SAE grade number for expected temperature range.

Lubricants which do not have both an SAE grade number and an API service classification on the container should not be used.

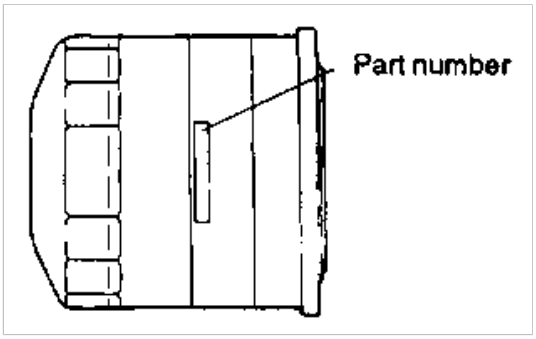
Engine Mechanical System > Lubrication System > Oil Filter > GENERAL INFORMATION

General Information

Replacing Oil Filter

Filter Selection

All Hyundai engines are equipped with a high quality, throw-away oil filter. This filter is recommended as a replacement filter on all vehicles. The quality of replacement filters varies considerably. Only high quality filters should be used to assure the most efficient service. Make sure that the rubber gasket from the old oil filter is completely removed from the mating surface on the engine block, before installing the new filter.

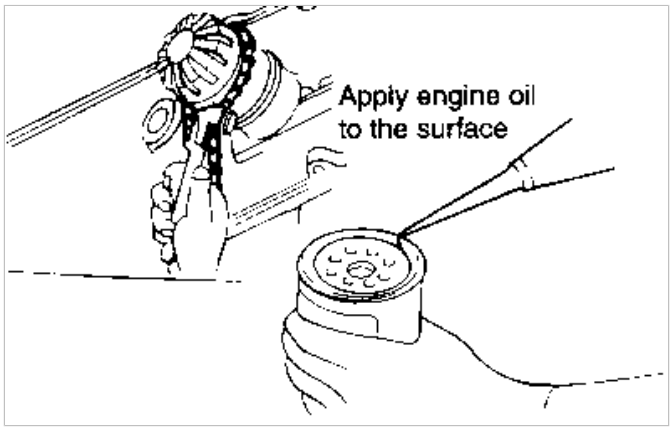


Engine Mechanical System > Lubrication System > Oil Filter > REPLACEMENT

Replacement

Be careful not to burn yourself, as the engine and engine oil are hot.

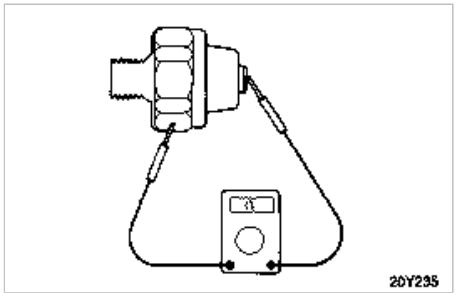
1. Use a filter wrench to remove the oil filter.
2. Before installing the new oil filter on the engine, apply clean engine oil to the surface of the rubber gasket.
3. Tighten the oil filter by hand.
4. Run the engine to check for engine oil leaks.
5. After stopping the engine, check the oil level and add oil as necessary.



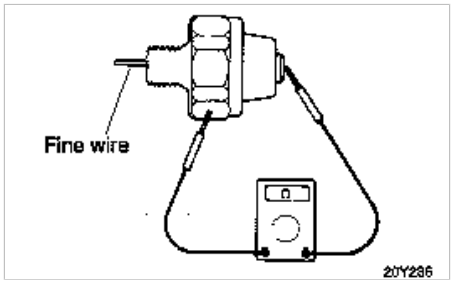
Engine Mechanical System > Lubrication System > Oil Pressure Switch > INSPECTION

INSPECTION

1. Check the continuity between the terminal and the body with an ohmmeter.
   If there is no continuity, replace the oil pressure switch.



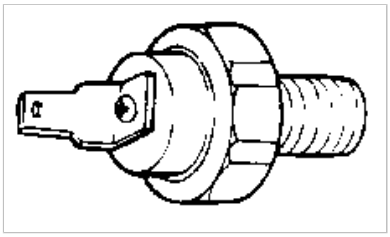
2. Check the continuity between the terminal and the body when the fine wedge is pushed. If there is continuity even when the fine wedge is pushed, replace it.
3. If there is no continuity when a 50 KPa (70 psi) vacuum is applied through the oil hole, the switch is operating properly. Check to see that air doesn't leak. If air leaks, the diaphragm is broken. Replace the switch.



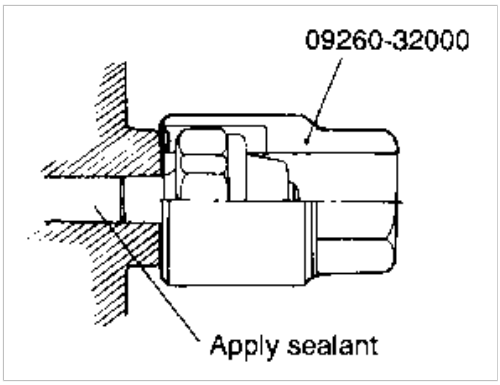
Engine Mechanical System > Lubrication System > Oil Pressure Switch > OIL PRESSURE SWITCH

OIL PRESSURE SWITCH

1. If "OIL PRESSURE" indicating lamp lights when ignition switch is set to "ON" and goes out when engine is started and runs at idle, then everything is in order. If "OIL PRESSURE" lamp does not light when ignition switch is set to "ON," check switch, lamp and wiring.



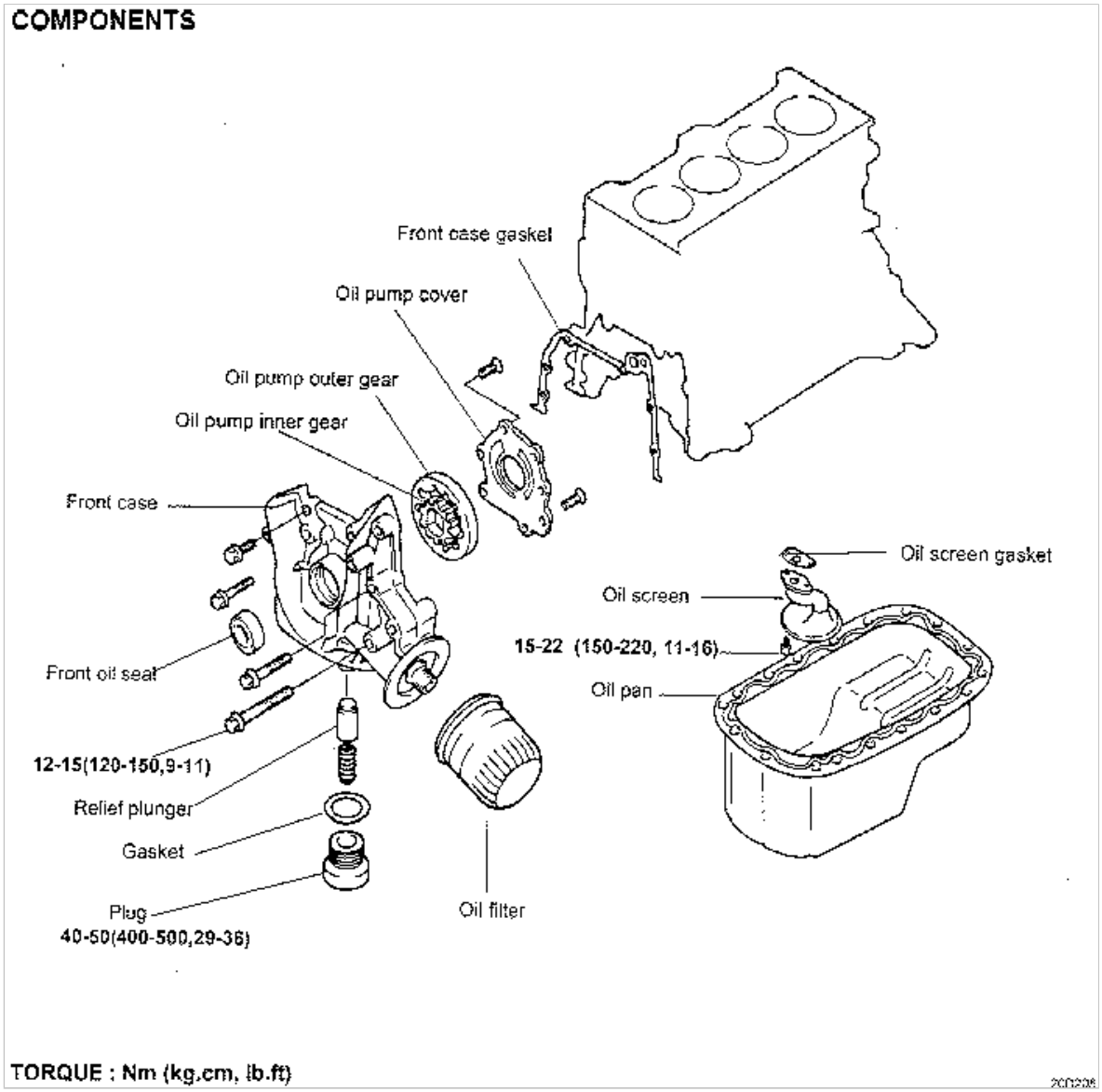
2. If there is current flow when ignition switch is set to "ON" and if there is no current flow when engine is running at idle, switch is good. If switch is good, check lamp and wiring.
3. Using the special tool (09260-32000), tighten the switch to the specified torque.



Do not overtorque the oil pressure switch

Engine Mechanical System > Lubrication System > Oil Pump > COMPONENTS

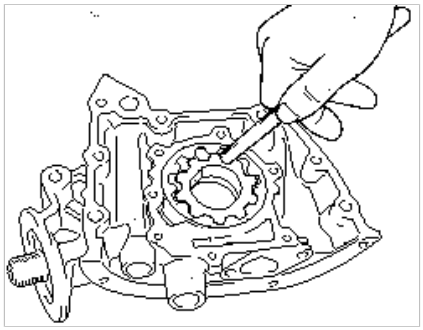
Components



Engine Mechanical System > Lubrication System > Oil Pump > DISASSEMBLY

DISASSEMBLY

1. Remove the timing belt. Refer to "Timing Belt."
2. Remove all the oil pan bolts.
3. Remove the oil pan.
4. Remove the oil screen.
5. Remove the front case assembly.
6. Remove the oil pump cover.
7. Remove the inner and outer gears from the front case. The mating marks on the inner and outer gears indicate the direction of installation. Make sure that the inner and outer gears are installed as shown.
8. Remove the plug and remove the relief spring and relief plunger.



Engine Mechanical System > Lubrication System > Oil Pump > FRONT CASE AND OIL PUMP COVER

FRONT CASE AND OIL PUMP COVER

Worn (especially stepped) or damaged surfaces contacting gears.

Engine Mechanical System > Lubrication System > Oil Pump > INSPECTION

Inspection

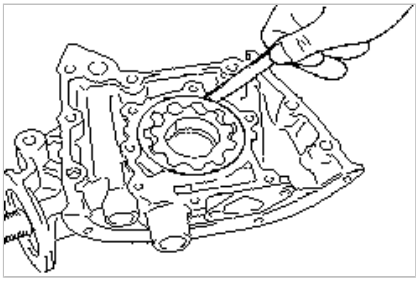
OIL PAN AND OIL SCREEN

1. Check the oil pan for failure, damage or cracks. Replace if defective.
2. Check the oil screen for failure, damage and cracks. Replace if defective.

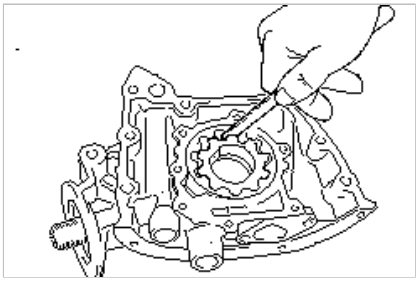
Engine Mechanical System > Lubrication System > Oil Pump > OIL PUMP GEARS

OIL PUMP GEARS

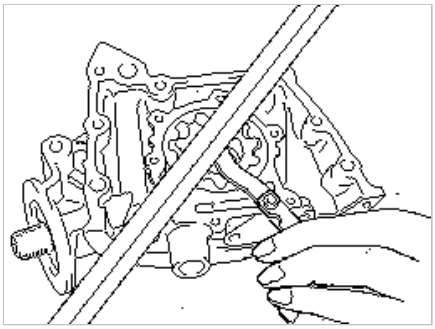
1. Worn or damaged gear teeth surfaces.
2. Clearance between outer gear and front case.

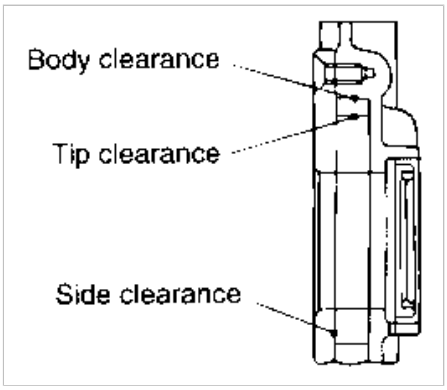


3. Check the tip clearance on the pump rotor.



4. Check the axial clearance on the outer pump rotor.



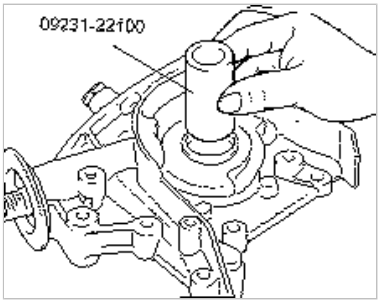


Engine Mechanical System > Lubrication System > Oil Pump > REASSEMBLY

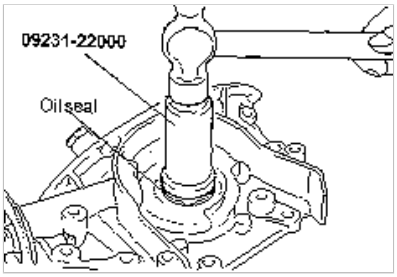
Reassembly

OIL SEAL

1. Inspect for worn, distorted or damaged lips.
2. Check for elongated spring ring.
3. Install Special Tool, Crankshaft Front Oil Seal Guide (09231-22100), to the front end of the crankshaft. Apply engine oil to the outer surface of the oil seal guide, and install the new oil seal along the guide by hand, until it touches front case. Always use a new oil seal when reassembling.

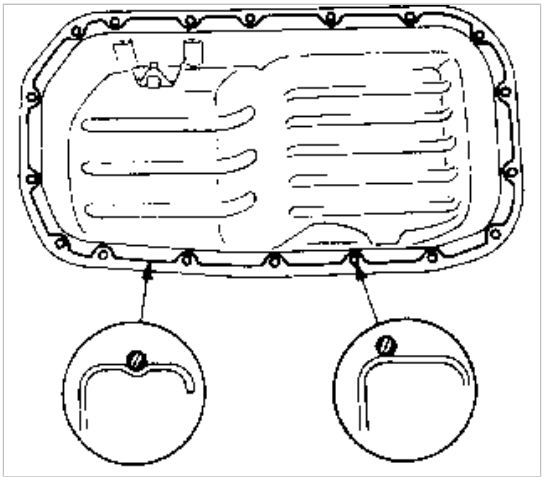


4. Use Special Tool, Crankshaft Front Oil Seal Installer (09231-22000), to install the oil seal.



5. Install the crankshaft sprocket, timing belt and crankshaft pulley. Refer to "Timing Belt."
6. Install the oil screen.
7. Clean both gasket surfaces of the oil pan and the cylinder block.

8. Apply sealant into the groove of the oil pan flange as shown.
   a. Apply sealant approx. 4 mm (0.16 in.) in thickness.
   b. After application of sealant, do not exceed 15 minutes before installing the oil pan.
9. Install the oil pan and tighten the bolts to the specified torque.

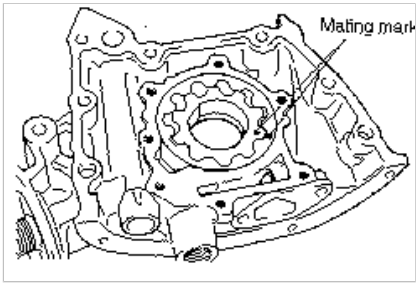


Engine Mechanical System > Lubrication System > Oil Pump > REASSEMBLY

Reassembly

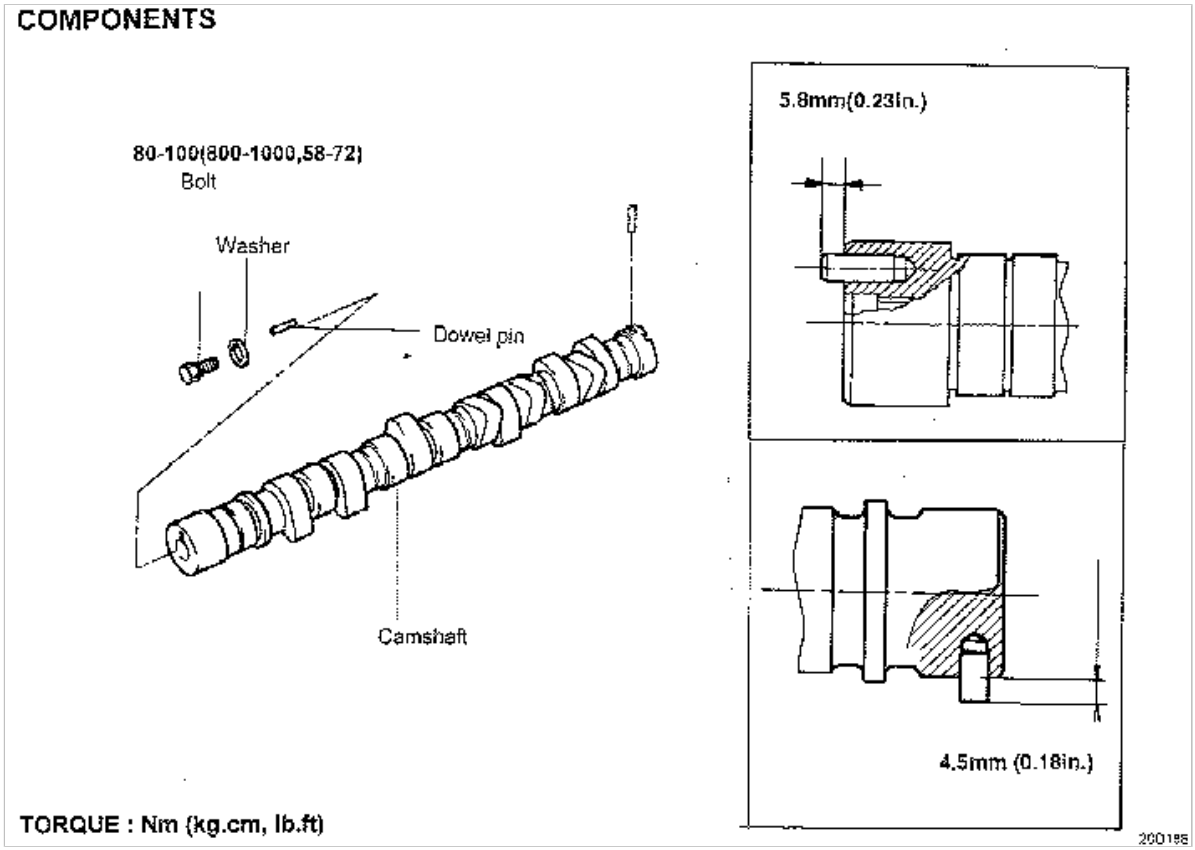
Oil Pump

1. Install the outer and inner gears into the front case. Make sure that the inner and outer gears are installed in the same direction as shown.
2. Install the oil pump cover and tighten the bolts to the specified torque. After the bolts have been tightened, check to ensure that the gear turns smoothly.
3. Install the relief valve and spring. Tighten the plug to the specified torque. Apply engine oil to the relief valve.



Engine Mechanical System > Main Moving System > Camshaft > COMPONENTS

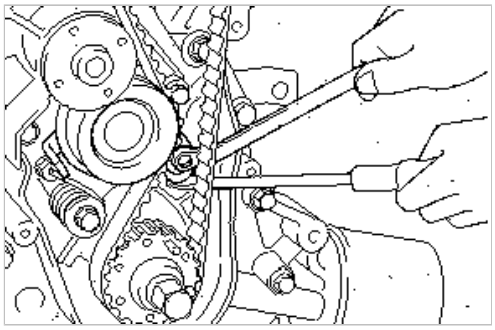
Components



Engine Mechanical System > Main Moving System > Camshaft > DISASSEMBLY

Disassembly

1. Disconnect the breather hose and the PCV hose.
2. Remove the water pump pulley and crankshaft pulley.
3. Remove the timing belt cover.
4. Move the timing belt tensioner pulley toward the water pump and temporarily secure it.
5. Remove the timing belt from the camshaft sprocket and the timing belt.
6. Remove the camshaft sprocket.
7. Remove the ignition coil assembly.

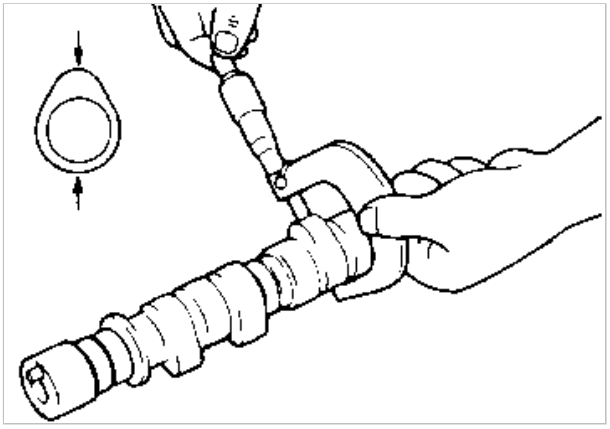


8. Remove the rocker cover.
9. Remove the rocker arm shaft assembly. Refer to "Rocker Arms and Rocker Arm Shafts."
10. Remove the camshaft bearing caps.
11. Remove the camshaft.

Engine Mechanical System > Main Moving System > Camshaft > INSPECTION

INSPECTION

1. Check the camshaft journals for wear. If the journals are badly worn, replace the camshaft.
2. Check the cam lobes for damage. If the lobe is damaged or worn excessively, replace the camshaft.



3. Check the cam surface for abnormal wear or damage, and replace if necessary.
4. Check each bearing for damage. If the bearing surface is excessively damaged, replace the cylinder head assembly or camshaft bearing cap, as necessary.

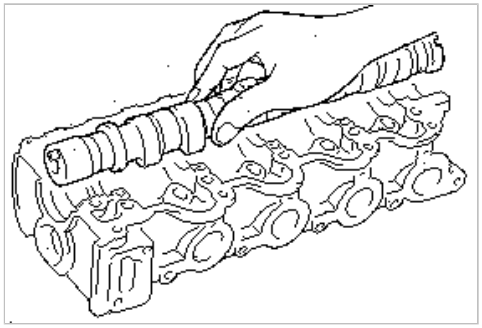
Oil Seal (camshaft front)

1. Check the lips for wear. If lip threads are worn, replace.
2. Check the oil seal lip contacting surface of camshaft. If it is worn is stages, replace the camshaft.

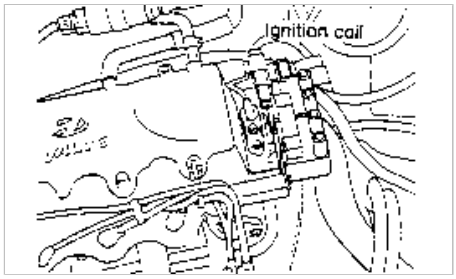
Engine Mechanical System > Main Moving System > Camshaft > REASSEMBLY

Reassembly

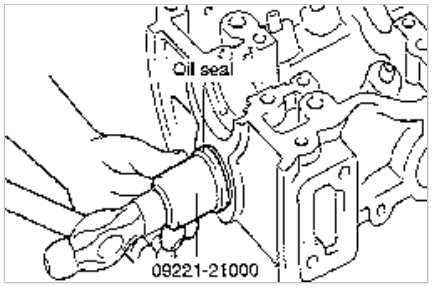
1. Install the camshaft after lubricating the journal of the camshaft with engine oil.
2. Install the camshaft bearing caps.



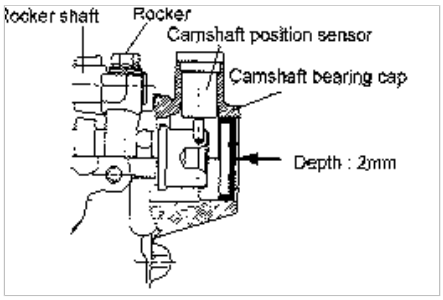
3. Install the ignition coil.
4. Install the rocker arm and rocker arm shaft.
   Refer to "Rocker Arms and Rocker Arm Shafts" section.



5. Using special tools, Camshaft Oil Seal Installer (09221-21000), press fit the camshaft oil seal. Be sure to apply engine oil to the external surface of the oil seal.
   Insert the oil seal along the camshaft front end and install by driving the installer with a hammer until the oil seal is pulley seated.



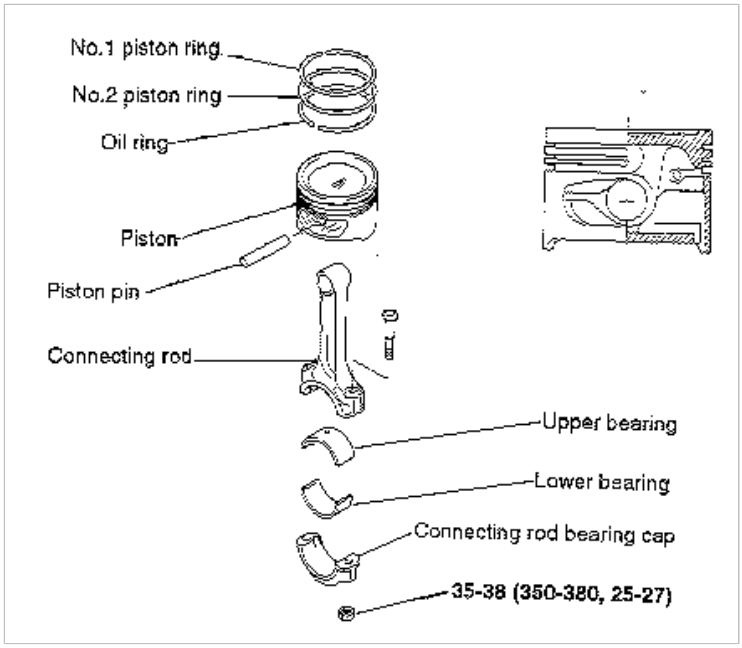
6. Install the camshaft sprocket and tighten the bolts to the specified torque.



7. Align the camshaft sprocket and crankshaft sprocket timing marks. The piston in the No. 1 cylinder will then be at the top dead center on the compression stroke.
8. Install a gasket in the rocker cover groove.
9. Temporarily install the rocker cover.
10. Start the engine and run it at idle.
11. Install the rocker cover and tighten the bolts to the specified torque.
12. Install the timing belt cover.
13. Install the water and pump pulley and crankshaft pulley.

Engine Mechanical System > Main Moving System > Connecting Rod > COMPONENTS

Components

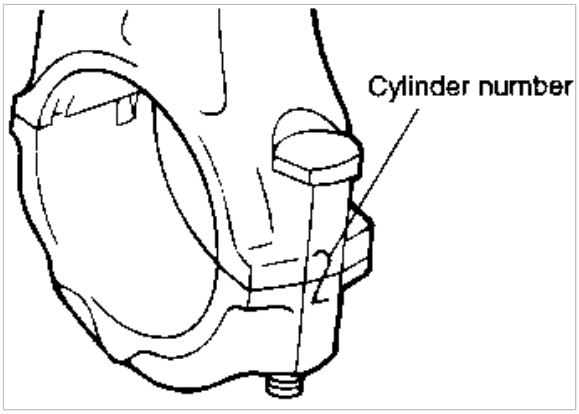


Engine Mechanical System > Main Moving System > Connecting Rod > DISASSEMBLY

Disassembly

Keep the bearings in order with their corresponding connecting rods (according to cylinder numbers) for proper reassembly.

1. Remove the connecting rod cap nuts, then remove the caps and the big end lower bearing.

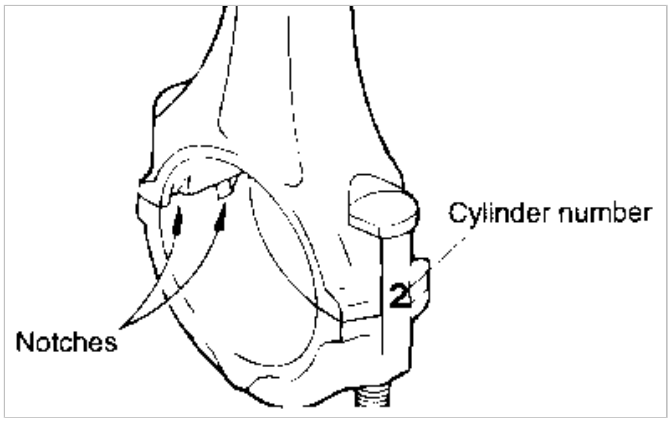


2. Push each piston-connecting rod assembly toward the top of the cylinder.

Engine Mechanical System > Main Moving System > Connecting Rod > INSPECTION

Inspection

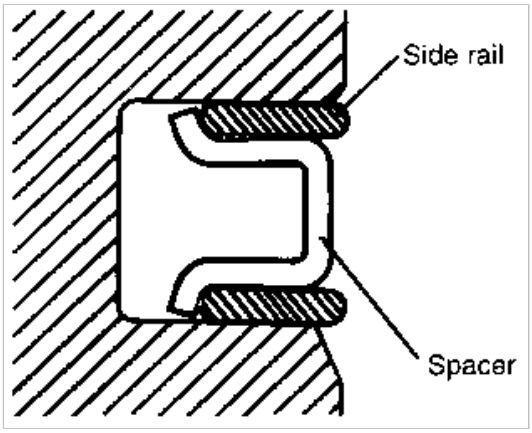
1. When reinstalling, make sure that the cylinder numbers put on the connecting rod and cap at disassembly match.
   When a new connecting rod is installed, make sure that the notches for holding the bearing in place are on the same side.
2. Replace the connecting rod if it is damaged on the thrust faces at either end. Also, if step wear or a severely rough surface of the inside diameter of the small end is apparent, the rod must also be replaced.
3. Using a connecting rod aligning tool, check the rod for bend and twist. If the measured value is close to the repair limit, correct the rod by a press. Any connecting rod that has been severely bent or distorted should be replaced.



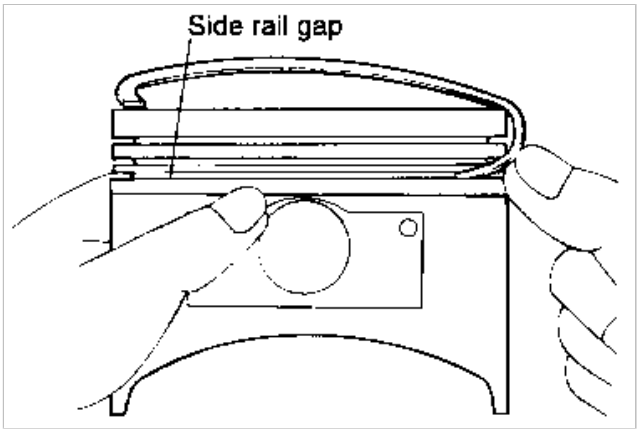
Engine Mechanical System > Main Moving System > Connecting Rod > REASSEMBLY

Reassembly

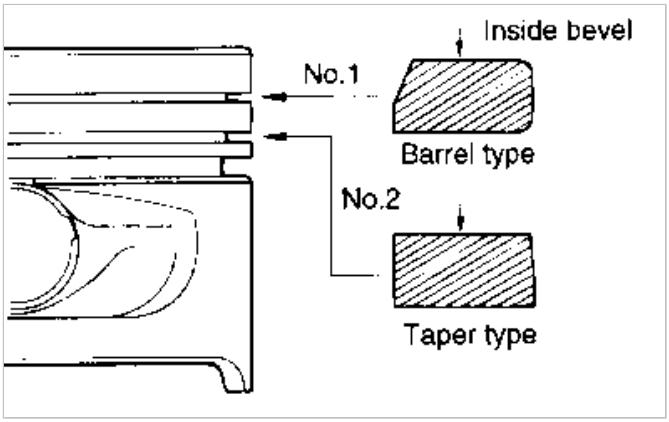
1. Install the spacer.



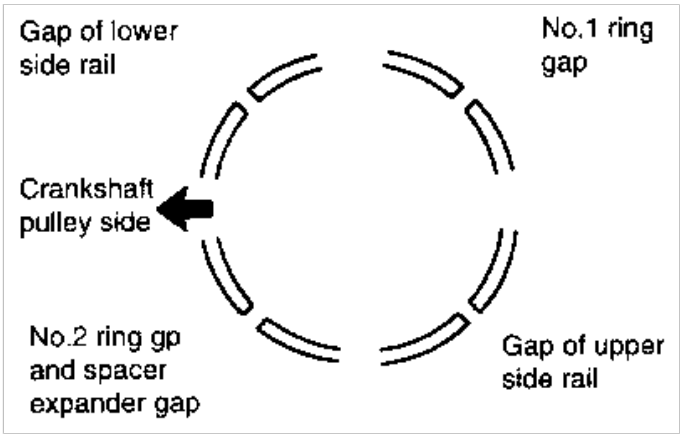
2. Install upper side rail. To install side rail, first put one end of side rail between piston ring groove and spacer, hold it down firmly, then press down with your finger the portion to be inserted into groove as illustrated.
   Do not use piston ring expander when installing side rail.
3. Install lower side rail using the same procedure as in Step 2.



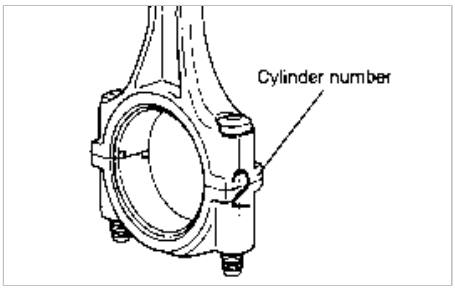
4. Using piston ring expander, install No. 2 piston ring.
5. Install No. 1 piston ring.



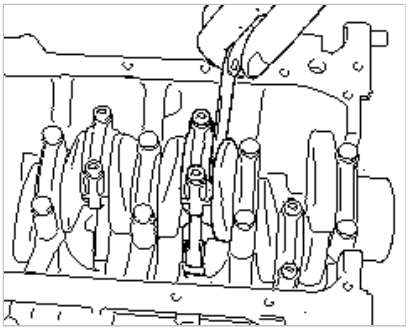
6. Apply engine oil around piston and piston rings.
7. Position each piston ring end gap as far apart from neighboring gaps as possible. Make sure that gaps are not positioned in side rail thrust and pin directions.
8. Hold piston rings firmly in a piston ring compressor as you insert them into cylinder.



9. Make sure that front mark of piston and front mark (identification mark) of connecting rod are directed toward front of engine.
10. When connecting rod cap is installed, make sure that cylinder numbers put on rod and cap at disassembly match.
11. When new connecting rod is installed, make sure that notches for holding bearing in place are on same side.
12. Tighten the connecting rod cap nuts.

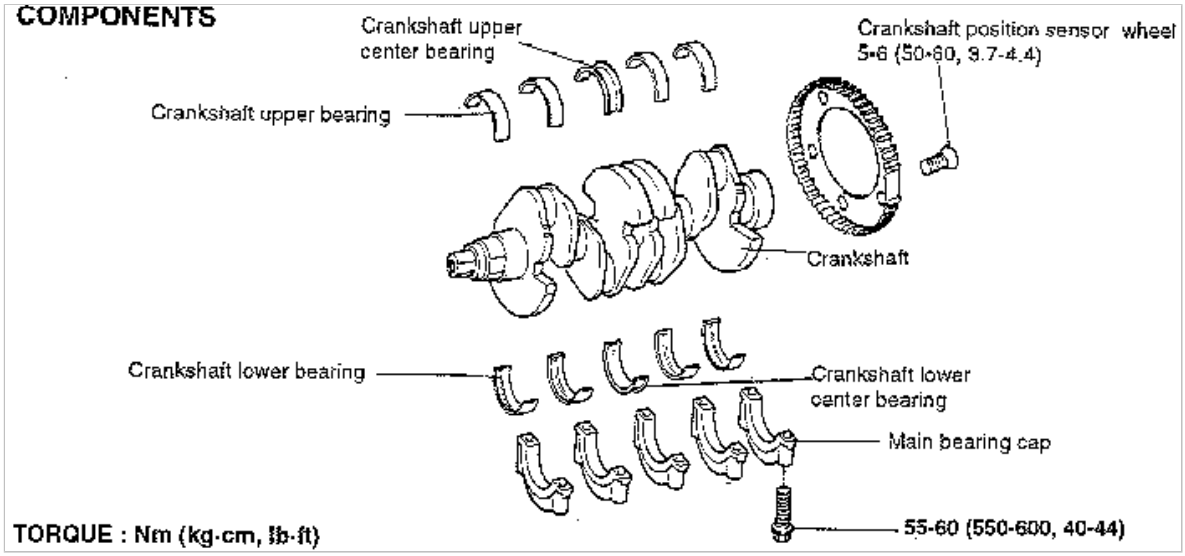


13. Check connecting rod side clearance.



Engine Mechanical System > Main Moving System > Crankshaft > COMPONENTS

Components



Engine Mechanical System > Main Moving System > Crankshaft > DISASSEMBLY

Disassembly

1. Remove the timing belt train, front case, flywheel cylinder head assembly and oil pan. For details, refer to respective chapters.
2. Remove the rear plate and the rear oil seal.
3. Remove the connecting rod caps.
4. Remove the main bearing caps and remove the crankshaft. Keep the bearings in order by cap number.
5. Remove the crankshaft position sensor wheel.

Mark the main bearing caps to permit reassembly in the original position and direction.

Engine Mechanical System > Main Moving System > Crankshaft > INSPECTION

INSPECTION

Crankshaft

1. Check the crankshaft journals and pins for damage, uneven wear and cracks. Also check oil holes for clogging. Correct or replace any defective part.
2. Inspect out-of-roundness and taper of crankshaft journal and pin.

Main Bearings and Connecting Rod Bearings

Visually inspect each bearing for peeling, melt, seizure and improper contact. Replace the defective bearings.

Oil Clearance Measurement

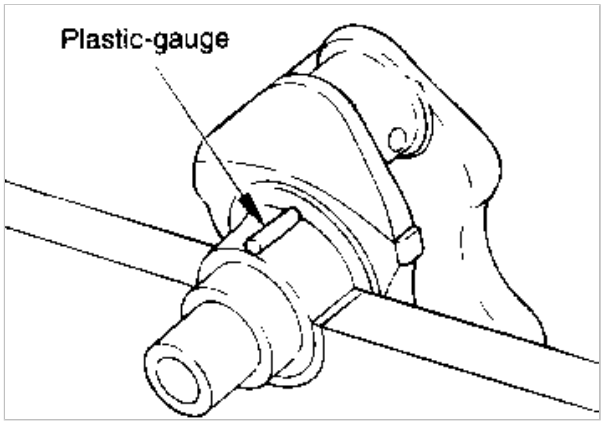
To check the oil clearance, measure outside diameter of the crankshaft journal and the crank pin and inside diameter of the bearing. The clearance measurement is the difference between the measured outside and inside diameters.

Oil Clearance Measurement

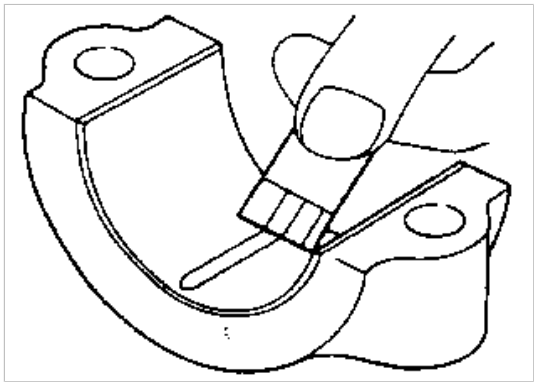
Plastigauge Method

Plastigauge may be used to measure the clearance.

1. Remove oil, grease and any other dirt from bearings and journals.
2. Cut plastigauge to the same length as the width of the bearing and place it in parallel with the journal, off oil holes.



3. Install the crankshaft, bearings, and caps. Tighten them to the specified torques. During this operation, do not turn the crankshaft. Remove the caps. Measure the width of the plastigauge at the widest point using the scale printed on the gauge package. If the clearance exceeds the repair limit, replace the bearing.
   Should the standard clearance not be obtained even after bearing replacement, the journal should be ground to a recommended under size, and a bearing of the same size should be installed.

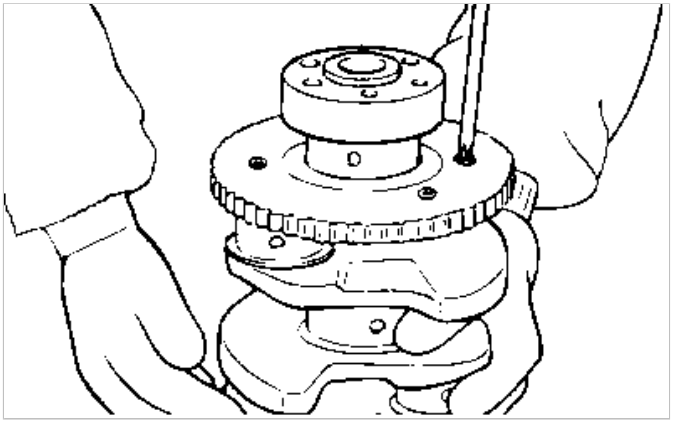


Oil Seal

Check front and rear oil seals for damage or worn lips. Replace any seat that is defective.

Crankshaft position sensor wheel

1. Remove the crankshaft position sensor wheel.
2. Check the crankshaft position sensor wheel for damage, cracks and wear, and replace if necessary.
3. Check the clearance between sensor wheel and crank position sensor with depth gauge.

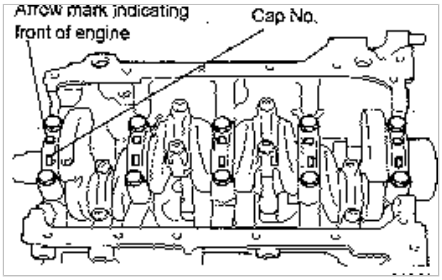


   a. Measure the depth of the top of sensor wheel teeth and the outside of transaxle housing.
   b. Measure the difference between sensor length and depth.
   c. Sensor length is the distance between the end of sensor and inner point of contacting face.

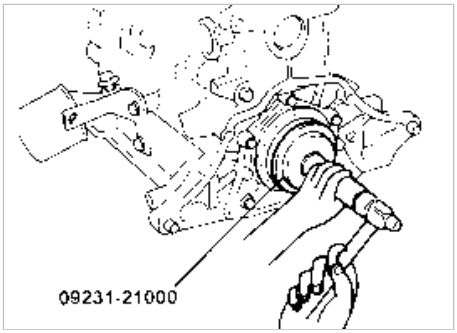
Engine Mechanical System > Main Moving System > Crankshaft > REASSEMBLY

Reassembly

1. Install the upper main bearing inserts in the cylinder block.
   When reusing the main bearings, remember to install them by referring to the location marks made at the time of disassembly.
2. Install the crankshaft. Apply engine oil to the journals.
3. Install bearing caps and tighten cap bolts to the specified torque in the sequence of the center, No. 2, No. 4 front and rear caps.
   Cap bolts should be tightened evenly in 2 to 3 stages before they are tightened to the specified torque.
   The caps should be installed with the arrow mark directed toward the crank pulley side of engine. Cap numbers must be corrected.

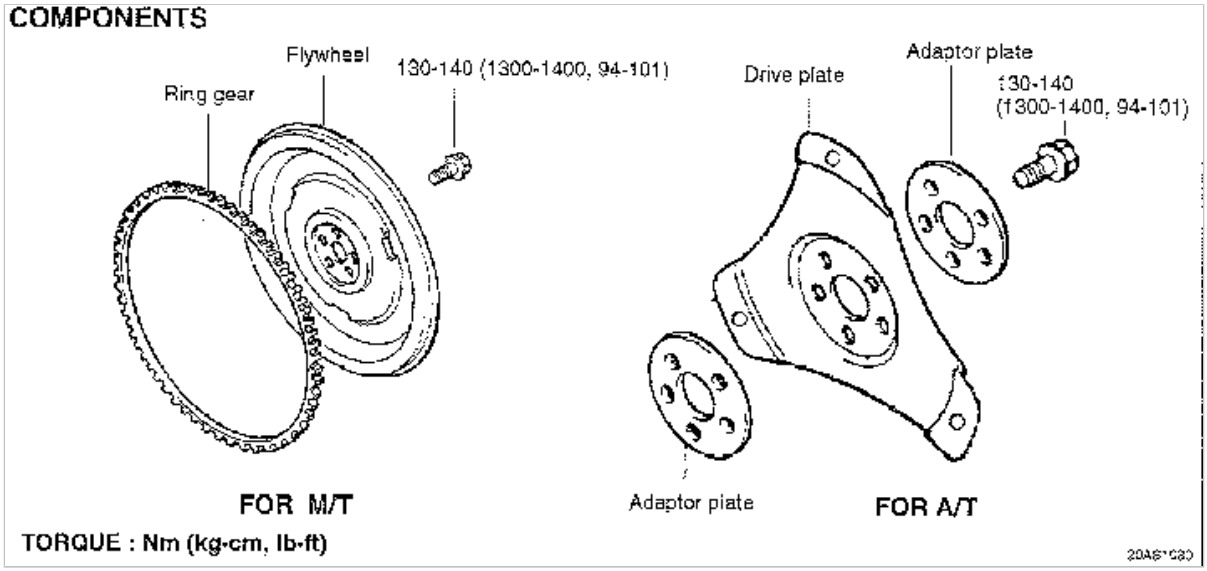


4. Make certain that the crankshaft turns freely and has the proper clearance between the center main bearing thrust flange and the connecting rod big end bearing.
5. Install the oil seal in the crankshaft rear oil seal case. Use Special Tool, Crankshaft Rear Oil Seal Installer (09231-11000) as shown. Press fit the oil seal all the way in, being careful not to misalign it.
6. Install the rear oil seal case and gasket. Tighten the five bolts.
   Apply engine oil to the oil seal lips and crankshaft at the time of installation.
7. Install the rear plate and tighten the bolts.
8. Install the connecting rod caps. Refer to "Piston and Connecting Rods."
9. Install the flywheel, front case, oil pan and timing belt. For further details, refer to the respective chapters.



Engine Mechanical System > Main Moving System > Flywheel > COMPONENTS

Components



M/T : Manual Transaxle Vehicles

A/T : Automatic Transaxle vehicles

Engine Mechanical System > Main Moving System > Flywheel > DISASSEMBLY

Disassembly

1. Remove the transaxle and clutch.
2. Remove the flywheel.

Engine Mechanical System > Main Moving System > Flywheel > INSPECTION

INSPECTION

1. Check the clutch disc contacting surface of the flywheel for damage and wear. Replace the flywheel if excessively damaged or worn.
2. Check the clutch disc contacting surface of the flywheel for runout.
3. Check the ring gear for damage, crack and wear, and replace if necessary.

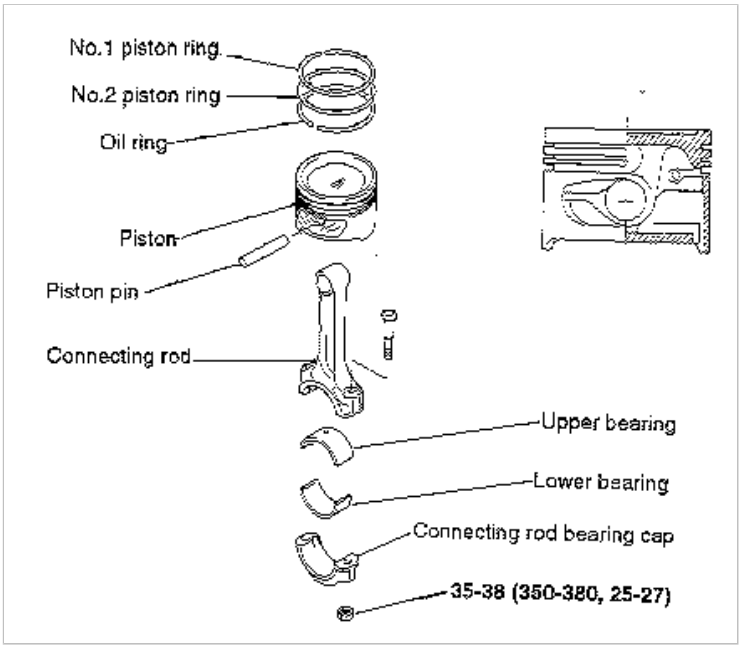
Engine Mechanical System > Main Moving System > Flywheel > REASSEMBLY

Reassembly

Install the flywheel assembly and tighten the bolts to the specified torque.

Engine Mechanical System > Main Moving System > Piston > COMPONENTS

Components



Engine Mechanical System > Main Moving System > Piston > INSPECTION

INSPECTION

Piston and Piston Pins

a. Check each piston for scuffing, scoring wear, and other defects.
Replace any piston that is defective.
b. Check each piston ring for breakage, damage and abnormal wear. Replace the defective rings. When the piston requires replacement, also replace the rings.
c. Check the piston pin fit in the piston pin hole. Replace any defective piston and pin assembly. The piston pin must be smoothly pressed by hand into the pin hole (at room temperature).

Piston Rings

a. Measure the piston ring side clearance. If the measured value exceeds the service limit, insert a new ring in a ring groove to measure the side clearance. If the clearance still exceeds the service limit, replace the piston and rings together. If it is less than the service limit, replace only the piston rings.
b. To measure the piston ring end gap, insert a piston ring into the cylinder bore. Position the ring at right angles to the cylinder wall by gently pressing it down with a piston. Measure the gap with a feeler gauge. If the gap exceeds the service limit, replace the piston ring.

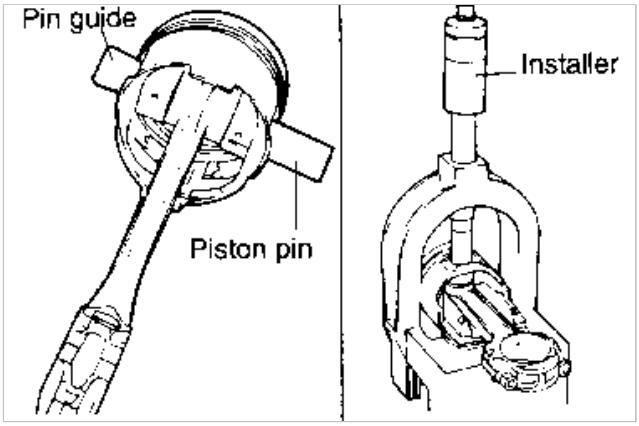
Item	Standard - mm (in.)	Limit - mm (in.)
Piston ring end gap No. 1	0.15-0.30 (0.0059-0.0018)	1 (0.039)
Piston ring end gap No. 2	0.25-0.40 (0.008-0.0014)	1 (0.039)
Oil ring side rail end gap	0.2-0.7 (0.0078-0.00275)	1 (0.039)

When replacing the ring without correcting the cylinder bore, check the gap with the ring positioned at the bottom of the ring travel.
When replacing a ring, use a ring of the same size.
The mark can be found on the upper side of the ring next to the end.

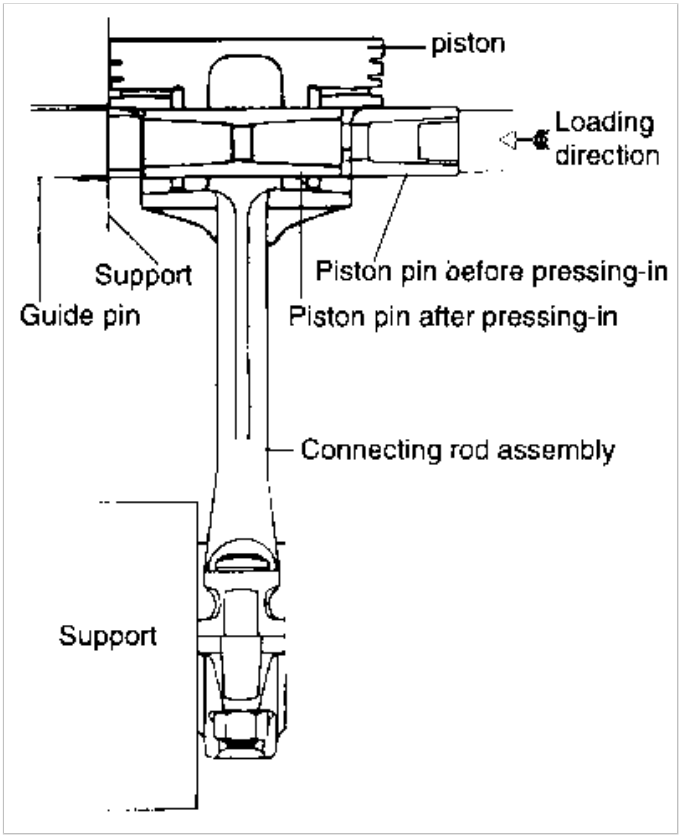
Engine Mechanical System > Main Moving System > Piston > INSTALLATION

Installation

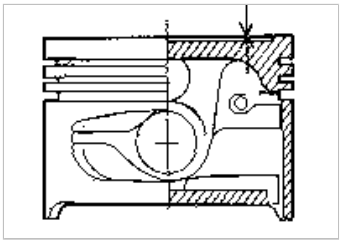
1. Install proper pin guide through piston and into connecting rod. Hand tap pin guide into piston for proper retention. Drop piston pin into the other side of the piston.
The pin guide centers the connecting rod in the piston. When the piston, connecting rod, piston pin and pin guide assembly are positioned on the fork of the tool, the pin guide will also center this assembly in the tool. If too small a pin guide is used, the piston assembly will not be located centrally in the tool, and damage may occur to the fork and/or insert of the tool.



2. Install piston assembly onto fork assembly of tool. Tool will support connecting rod at the piston pin. Be sure to slide the piston assembly onto the fork until the pin guide contacts the fork insert.



3. Adjust the installing arbor to the proper length by turning the numbered sleeve on the lettered shaft until the specified alpha-numeric setting from the application chart is obtained. Turn knurled nut to lock numbered sleeve on shaft.
4. Insert the installing arbor through the hole in the arch of the tool. Press piston pin into the connecting rod until the sleeve on the installing arbor contacts the top of the tool arch. The pin guide will fall out of the connecting rod as the piston pin is pressed in.
DO not exceed 5000 pounds of force when stopping the installing arbor sleeve against the arch.

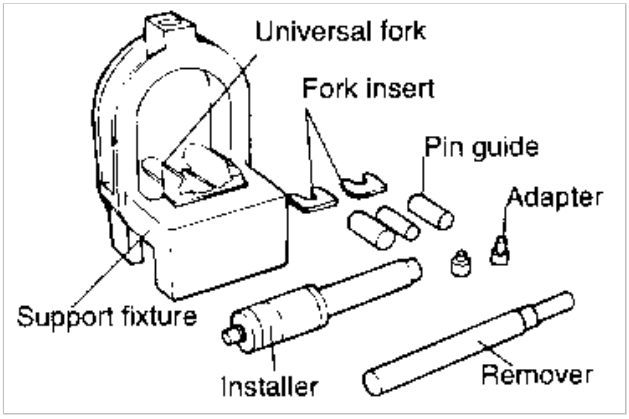


Engine Mechanical System > Main Moving System > Piston > PISTON PIN REMOVAL & INSTALLATION

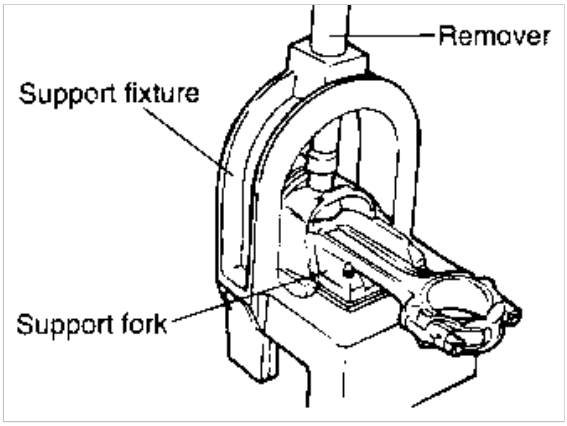
PROCEDURES

PISTON PIN REMOVAL & INSTALLATION PROCEDURES

1. Use the special tools (09234-33001) to disassemble and reassemble the piston and connecting rod.



2. Place the proper insert in the fork of the tool. Position the insert between the connecting rod and the piston.
3. Insert the proper removal tool through the hole in the arch of the tool.
   Center the piston, rod and pin assembly with the removal arbor.

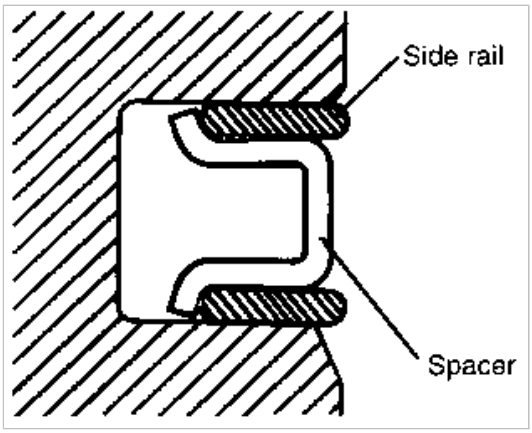


4. Press the piston pin out of the connecting rod.

Engine Mechanical System > Main Moving System > Piston > REASSEMBLY

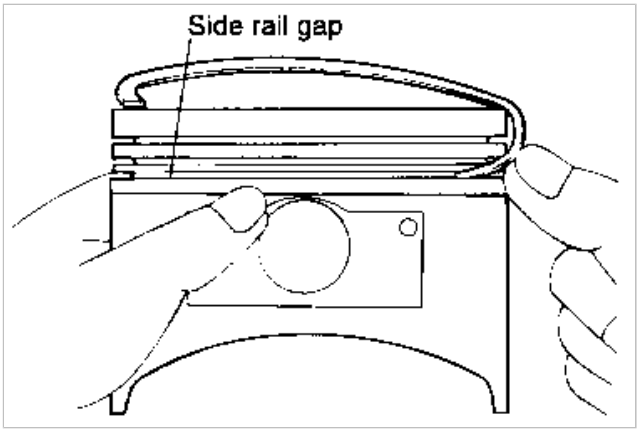
Reassembly

1. Install the spacer.

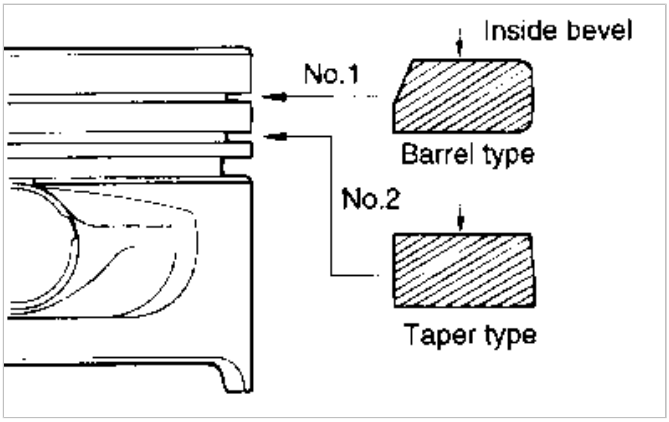


2. Install upper side rail. To install side rail, first put one end of side rail between piston ring groove and spacer, hold it down firmly, then press down with your finger the portion to be inserted into groove as illustrated.
   Do not use piston ring expander when installing side rail.

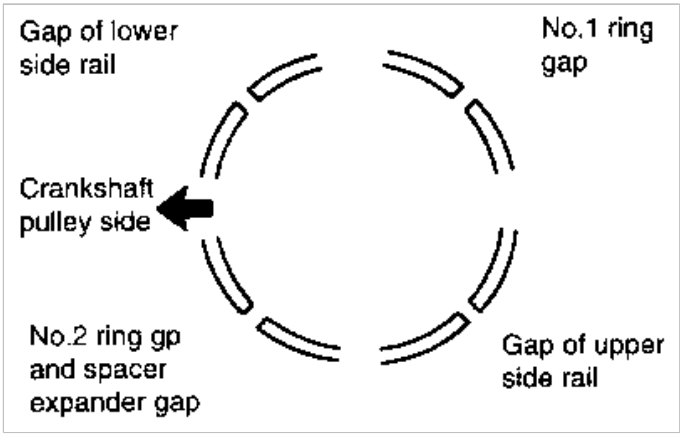
3. Install lower side rail using the same procedure as in Step 2.



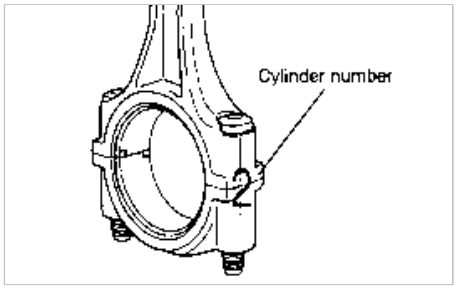
4. Using piston ring expander, install No. 2 piston ring.
5. Install No. 1 piston ring.



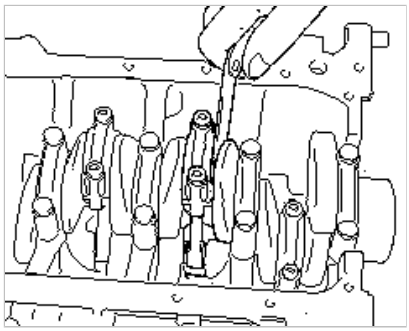
6. Apply engine oil around piston and piston rings.
7. Position each piston ring end gap as far apart from neighboring gaps as possible. Make sure that gaps are not positioned in side rail thrust and pin directions.
8. Hold piston rings firmly in a piston ring compressor as you insert them into cylinder.



9. Make sure that front mark of piston and front mark (identification mark) of connecting rod are directed toward front of engine.
10. When connecting rod cap is installed, make sure that cylinder numbers put on rod and cap at disassembly match.
11. When new connecting rod is installed, make sure that notches for holding bearing in place are on same side.
12. Tighten the connecting rod cap nuts.



13. Check connecting rod side clearance.



Engine Mechanical System > Timing System > Timing Belt > ADJUSTMENT

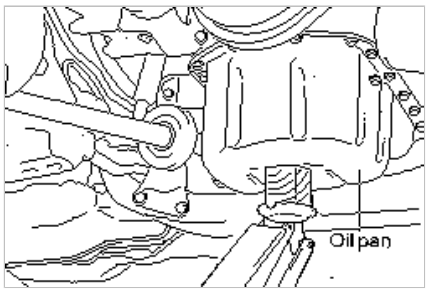
Adjustment

Timing Belt Tension Adjustment Procedure

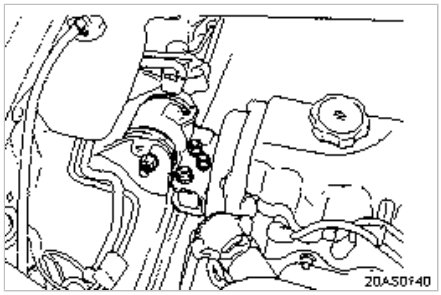
The timing belt has an automatic tension adjusting mechanism.

Adjustment can be made as follows:

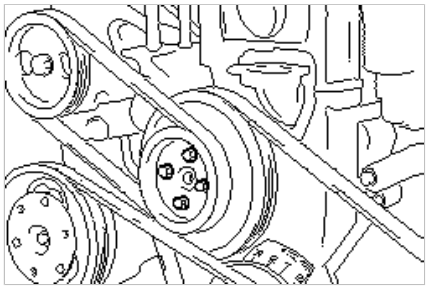
1. Turn the steering wheel fully counterclockwise.
2. Apply a wood block under the engine oil pan and carefully raise the engine.
   Jack up only slightly to prevent engine damage.



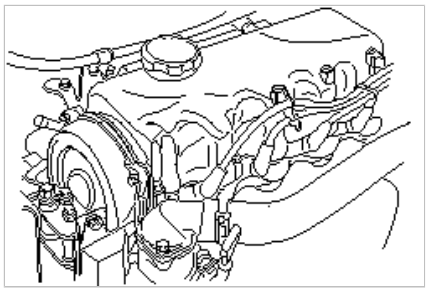
3. Remove the engine left mount bracket.



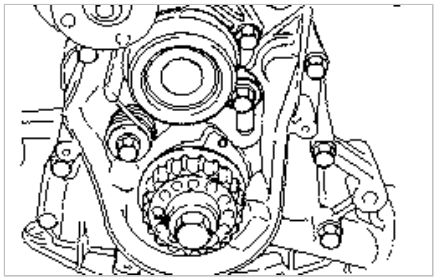
4. Remove the water pump pulley.
5. Remove the crankshaft pulley.



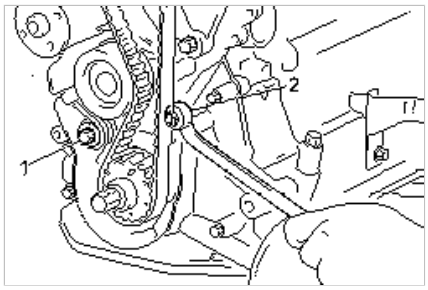
6. Remove the timing belt upper cover.



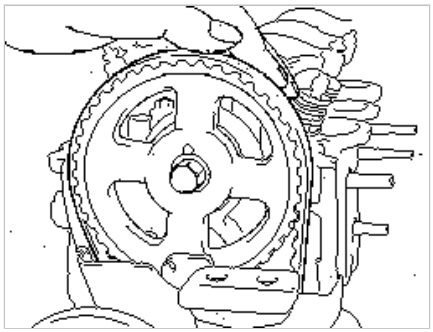
7. Check the belt for cracking, peeling or other damage. Be sure to carefully check the entire length of the belt.
8. Rotate the crankshaft so that the No. 1 piston is at top dead center of the compression stroke. In other words, align the timing mark on the camshaft sprocket with that on the cylinder head.
   Note that the crankshaft should be turned clockwise, not counterclockwise. Turning the crankshaft counterclockwise will cause the tension to become improperly adjusted.



9. Remove the timing belt lower cover.
10. Loosen the tensioner mounting bolts 1 and 2 in that order as shown to give the timing belt spring tension.

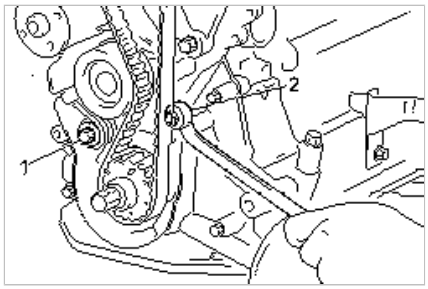


11. Check the belt to ensure that it is not out of position.

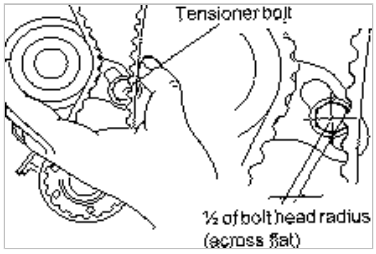


12. Tighten the tensioner attaching bolts 2 and 1 in that order as shown. If the bolt 1 is tightened first, the tensioner will move with the bolt and

cause the belt to become overtightened.

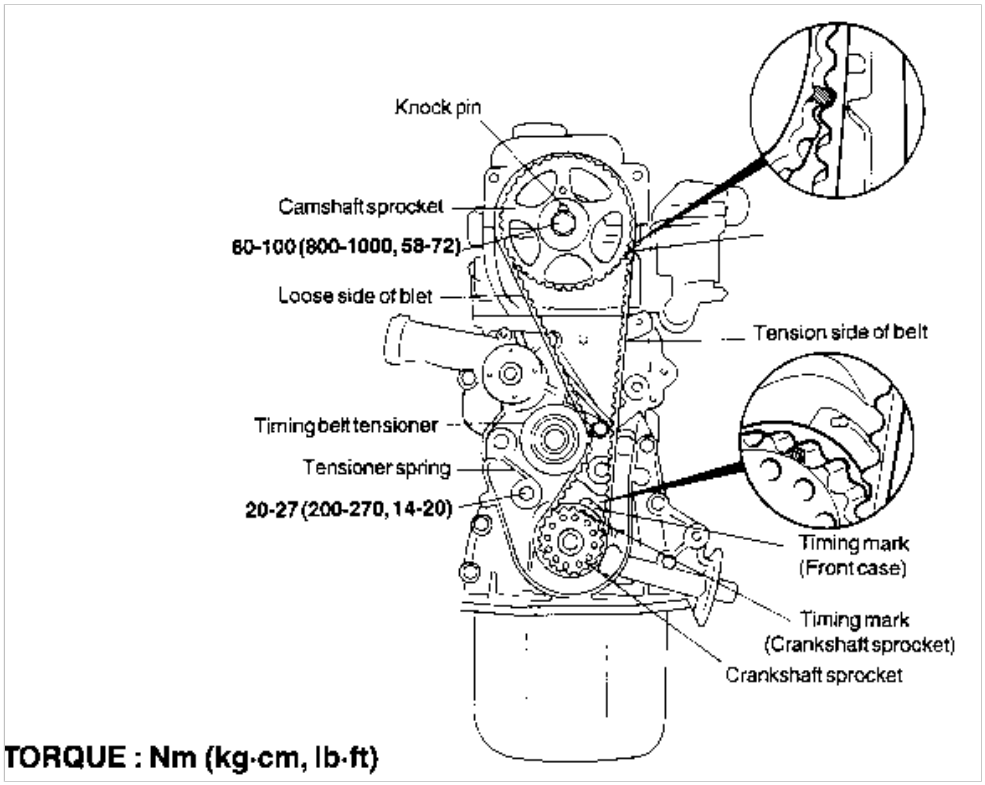


13. Give the crankshaft one turn in operating direction (clockwise) and realign crankshaft sprocket timing mark with the top dead center position.
    Do not turn the crankshaft in a counterclockwise direction.
14. Loosen the tensioner attaching bolts 1 and 2 in that order as shown.
15. Retighten the tensioner attaching bolts 2 and 1 in that order as shown to the specified torque.
16. Recheck the belt tension. When the tensioner and the tension side of the timing belt are pushed in horizontally with a moderate force (approx. 49 N [1 lb]), the timing belt cog end is approx. half of the tensioner mounting bolt head radius (across flats) away from the bolt head center.



Engine Mechanical System > Timing System > Timing Belt > COMPONENTS

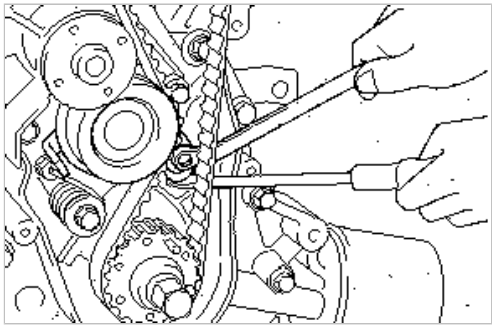
COMPONENTS



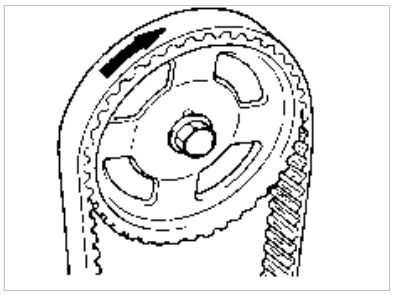
Engine Mechanical System > Timing System > Timing Belt > DISASSEMBLY

DISASSEMBLY

1. Loosen the water pump pulley bolt.
2. Loosen the alternator bolt.
3. Remove the water pump pulley and belt.
4. Remove the crankshaft pulley.
5. Remove the timing belt cover.
6. Move the timing belt tensioner pulley toward the water pump, and temporarily secure it.
7. Remove the camshaft from the camshaft sprocket.
8. Remove the camshaft sprocket.



9. Remove the timing belt.
   If the timing belt is reused, make an arrow mark indicating the turning direction (or the front of the engine) to make sure that the belt is reinstalled in the same direction as before.
10. Remove the crankshaft sprocket bolts. Remove the crankshaft sprocket and flange.
11. Remove the timing belt tensioner.

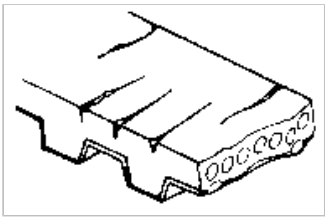
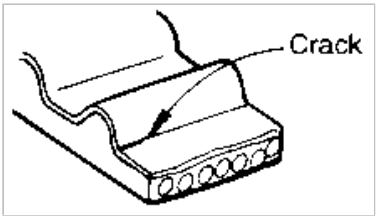
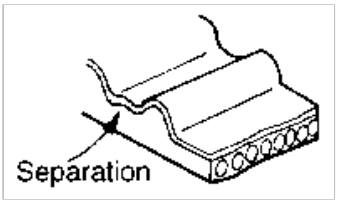
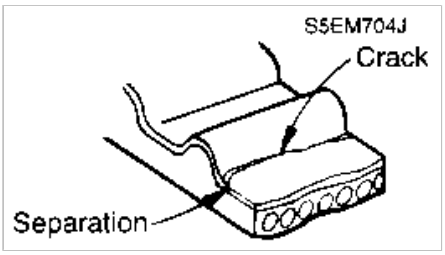
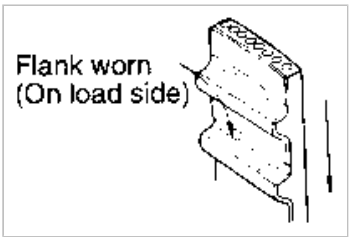
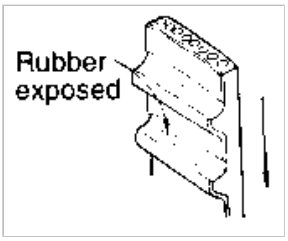
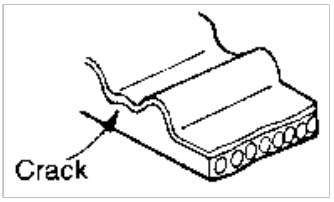


Engine Mechanical System > Timing System > Timing Belt > INSPECTION

INSPECTION

1. Check the belt for oil or dust deposits. Replace, if necessary. Small deposits should be wiped away with a dry cloth or paper. Do not clean with solvent.
2. When the engine is overhauled or belt tension adjusted, carefully check the belt. If any of the following flaws are evident, replace the belt.

Description	Flaw conditions
1. Hardened back surface rubber	Back surface glossy. Non-elastic and so hard that when your fingernail is pressed into it, no mark is produced.
	

2. Cracked back surface rubber	
3. Cracked or separating canvas	  
4. Badly worn teeth (initial stage)	Canvas on load side tooth flank worn (Fluffy canvas fibers, rubber gone and color changed to white, and unclear canvas texture)
	
5. Badly worn teeth (last stage)	Canvas on load side tooth flank worn down and rubber exposed (tooth width reduced)
	
6. Cracked tooth bottom	
7. Missing tooth	

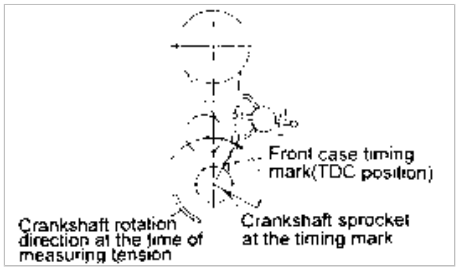
	
8. Side of belt badly worn	NOTE Normal belt should have precisely cut sides as if cut by a sharp knife.
9. Side of belt cracked	

Engine Mechanical System > Timing System > Timing Belt > INSPECTION

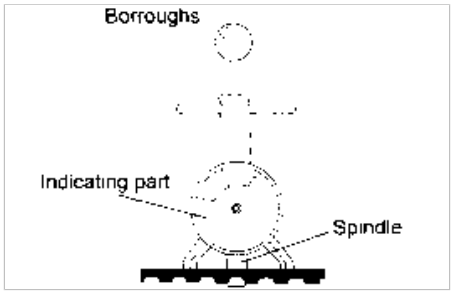
Inspection

TENSION MEASURING PROCEDURE (When using a tension gauge)

1. Rotate the crankshaft in a counterclockwise direction to position of 90 degrees before top dead center as shown in the illustration. Make sure the valves are adjusted properly.



2. Measure the belt tension in the middle of the tension side span using the tension gauge. (BORROUGHS BT-33-73F TYPE)
   Timing belt tension (in cool condition): 9.5-16.5 Kg (20.9-26.4 lb.)
   a. Put arm on bottom of belt teeth. Put spindle on the middle of belt back surface.
   b. Keep hand off of indicating part.

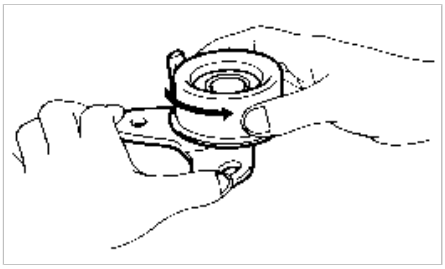


Engine Mechanical System > Timing System > Timing Belt > INSPECTION

INSPECTION

Sprockets and Tensioner

1. Check the camshaft sprocket, crankshaft sprocket, tensioner pulley, and idler pulley for abnormal wear, cracks, or damage. Replace as necessary.
2. Inspect the tensioner pulley and the idler pulley for easy and smooth pulley rotation and for play or noise. Replace as necessary.

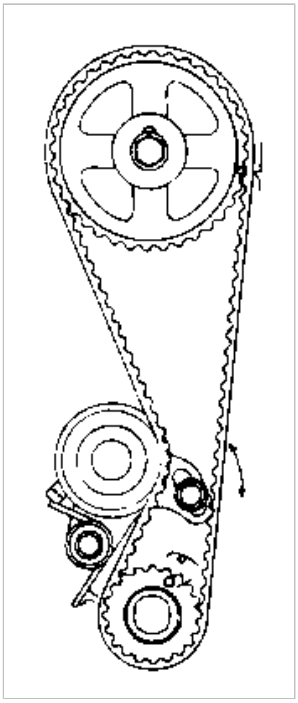


Engine Mechanical System > Timing System > Timing Belt > INSTALLATION

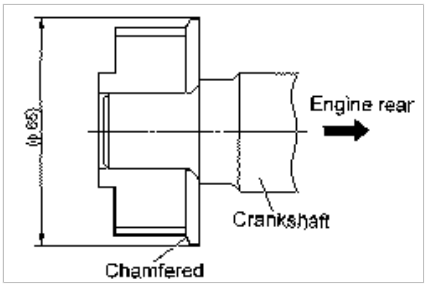
Installation

TENSIONER INSTALLATION PROCEDURE

1. Temporarily fasten timing belt tensioner in such a position as to place its pulley nearest to the water pump (pulley may touch water pump body).
2. After installing the tensioner, the crankshaft sprocket and the camshaft sprocket, match the timing mark of each sprocket as shown in the illustration.
   Rotate the crankshaft until the No.1 cylinder is at top dead center on the compression stroke.



a. Be sure to install the flange in the correct direction (chamfered part shows front of engine).
b. When installing the camshaft sprocket, make sure that the pin on the camshaft fits small hole in pulley.

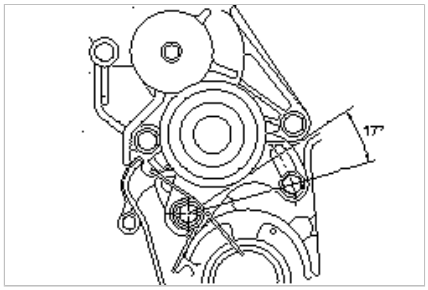


Allow tensioner to remain in assembled state. It must be installed temporarily as follows.

a. Temporarily tighten the tensioner as shown in the illustration, so that one extended end of the spring tensioner is assembled to the bend of the tensioner bracket as imaginary line (wheel spring tensioner is inoperative and not loaded).
b. Then set extended end of tensioner spring at front case with drive, etc.

3. Install the timing belt so as not to allow slack to the tension side.

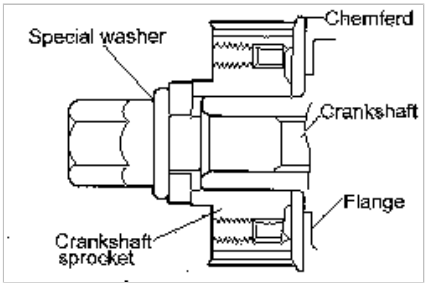
Make sure that all timing marks are at their correct position with the tension side in a strained state by applying force to the camshaft sprocket in a counterclockwise direction.



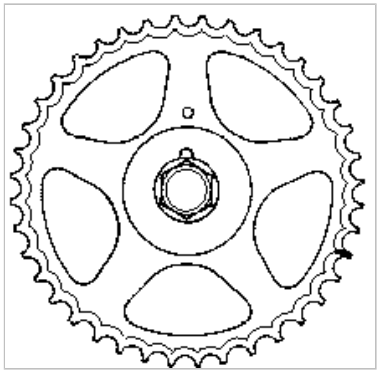
Engine Mechanical System > Timing System > Timing Belt > REASSEMBLY

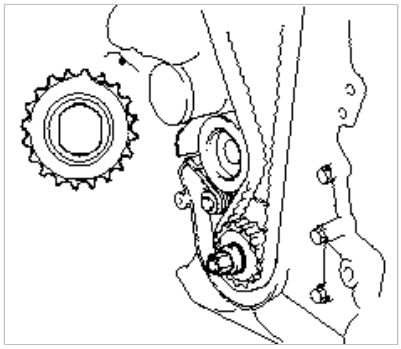
Reassembly

1. Install the flange and crankshaft sprocket as shown. Pay close attention to their mounting directions.

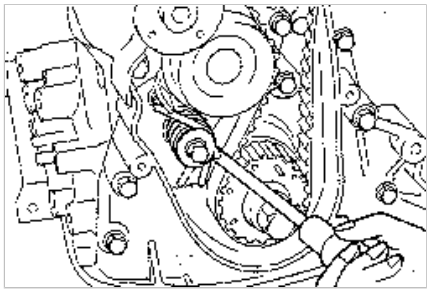


2. Install the camshaft sprocket and tighten the bolt to the specified torque.
3. Align the timing marks of the camshaft sprocket and crankshaft sprocket with the No.1 piston placed at top dead center on its compression stroke.

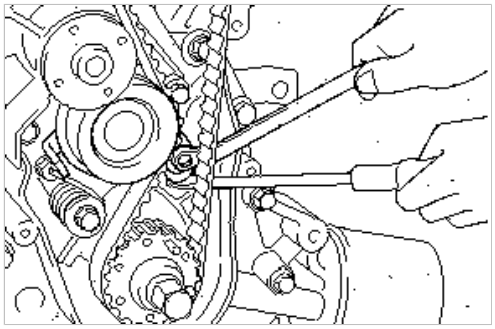




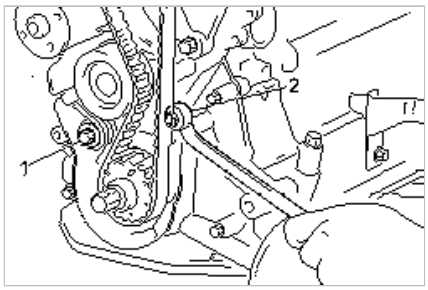
4. To install the timing belt tensioner, first mount the tensioner, spring, and spacer. Temporarily tighten the bolts. Next, temporarily tighten the tensioner long hole side washer and bolts. Install the bottom end of the spring against the front case as shown in the illustration.



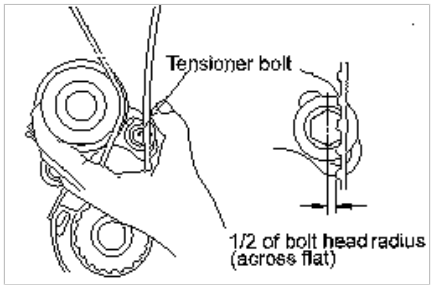
5. Secure the tensioner, postponed towards the water pump.
6. Install the timing belt on the crankshaft sprocket.
7. Install the timing belt on the camshaft sprocket. When the timing belt is installed on the camshaft sprocket, make sure that the tension side is tight. Then, check to ensure that when the tension side is tightened by turning the camshaft sprocket in a reverse direction, all timing marks are in line.



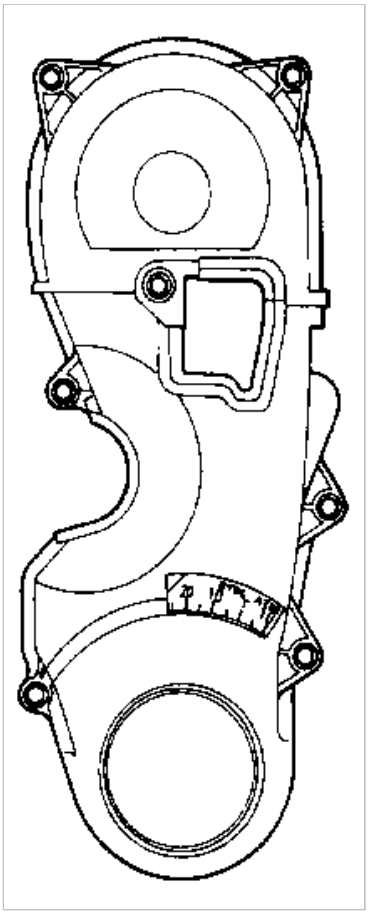
8. Loosen the tensioner mounting bolts 1 and 2 in that order as shown. This will apply spring tension to the timing belt only. Check the belt to ensure that it is not out of position.
9. Tighten the tensioner tightening bolts 1 and 2 in that order. If the bolt 1 is tightened first, the tensioner will move with the belt in the direction that the belt is tightened.
10. Give the crankshaft one turn in operating direction (clock-wise) and realign crankshaft sprocket timing mark with the top dead center position.
    Do not turn the crankshaft in a counterclockwise direction. The crankshaft should turn smoothly.



11. Loosen the tensioner attaching bolt 1 and 2 in that order.
12. Tighten the tensioner attaching bolts 2 and 1 in that order to the specified torque.
13. Then recheck the belt tension. Verify that when the tensioner and the tension side of the timing belt are pushed in horizontally with a moderate force [approx. 49N (11lb)], the timing belt cog end is aprox. ½ of the tensioner mounting bolt head radius (across flats) away from the bolt head center.



14. Install the timing belt cover.



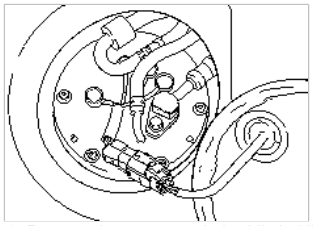
15. Install the crankshaft pulley. In the case, make sure that the crankshaft sprocket pin fit the small hole in the pulley.
16. Install the fan belt and adjust the belt tension.
17. Install the water pump pulley
18. Install V-belt and adjust the belt tension.

ACCENT(X3) > 1998 > G 1.5 SOHC > Fuel System

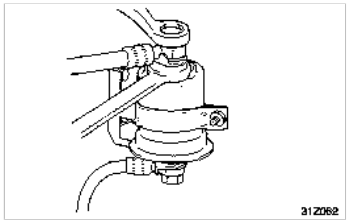
Fuel System > Fuel Delivery System > FUEL PRESSURE TEST

FUEL PRESSURE TEST

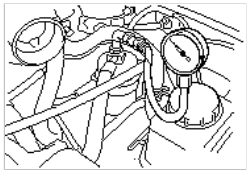
1. Reduce the internal pressure of the fuel pipes and hoses by the following procedures:
   (1) Disconnect the fuel pump harness connector after removing the rear seat cushion.
   (2) Start the engine and, after it stops by itself, turn the ignition switch to the OFF position.
   (3) Disconnect the battery negative (-) terminal.
   (4) Connect the fuel pump harness connector.



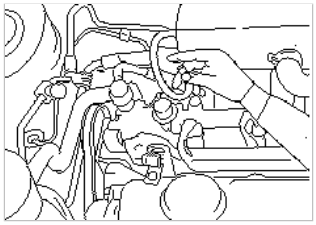
2. Remove the upper eye bolt while holding the fuel filter nut securely.
   Cover the hose connection with a shop towel to prevent splashing of fuel caused by residual fuel pressure in the fuel line.



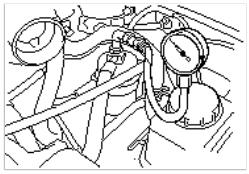
3. Using the fuel pressure gauge connector (09353-24000), install the fuel pressure gauge (09353-24100) to the fuel filter. Tighten the bolt to the specified torque.



4. Connect the battery's negative (-) terminal.



5. Apply battery voltage to the terminal for the pump drive and activate the fuel pump. Then, with fuel pressure applied, check that there is no fuel leakage from the pressure gauge or connection part.
6. Start the engine and let it idle.
7. Disconnect the vacuum hose from the pressure regulator and plug the hose end. Measure the fuel pressure at idle.
8. Measure the fuel pressure when the vacuum hose is connected to the pressure regulator.

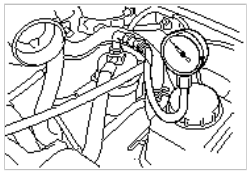


9. If the results of the measurements made in steps (7) and (8) are not within the standard value, use the table below to determine the probable causes, and make the necessary repairs.

Condition	Probable cause	Remedy
Fuel pressure too low	a. Clogged fuel filter. b. Fuel leakage to the return side, caused by poor seating of the fuel-pressure regulator. c. Low discharge pressure of the fuel pump.	a. Replace fuel filter. b. Replace fuel pressure regulator. c. Check the in-tank fuel hose for leakage or replace the fuel pump.
Fuel pressure too high	a. Sticking fuel-pressure regulator. b. Clogged or bent fuel return hose or pipe.	a. Replace fuel pressure regulator b. Repair or replace hose or pipe.

There is no difference in fuel pressure when the vacuum hose is connected and when it is not.	a. Clogging, or damaged vacuum hose of the nipple. b. Sticking or poor seating of the fuel-pressure regulator.	a. Repair or replace the vacuum hose or the nipple. b. Repair or replace hose or pipe.

10. Stop the engine and check for a change in the fuel pressure gauge reading, which should hold for approximately 5 minutes. If the gauge indication drops, observe the drop rate.



Determine the causes according to the following table.

Condition	Probable cause	Remedy
Fuel pressure drops slowly after engine is stopped	a. Injector leakage	a. Replace injector
Fuel pressure drops immediately after engine is stopped	a. The check valve within the fuel pump is open	a. Replace fuel pump

11. Reduce the fuel pressure in the fuel line.
12. Disconnect the hoses and the gauge.
    Cover on the hose connection with a shop towel to prevent splashing of fuel caused by fuel residual pressure in the fuel line.
13. Replace the O-ring of the end of the hose.
14. Connect the fuel hose to the delivery pipe and tighten with the specified torque.
15. Check for fuel leakage.

Fuel System > Fuel Delivery System > IDLE SPEED CHECK PROCEDURES

IDLE SPEED CHECK PROCEDURES

Before adjusting check that the spark plugs, injectors, idle speed control actuator ISC actuator, compression etc. are normal.

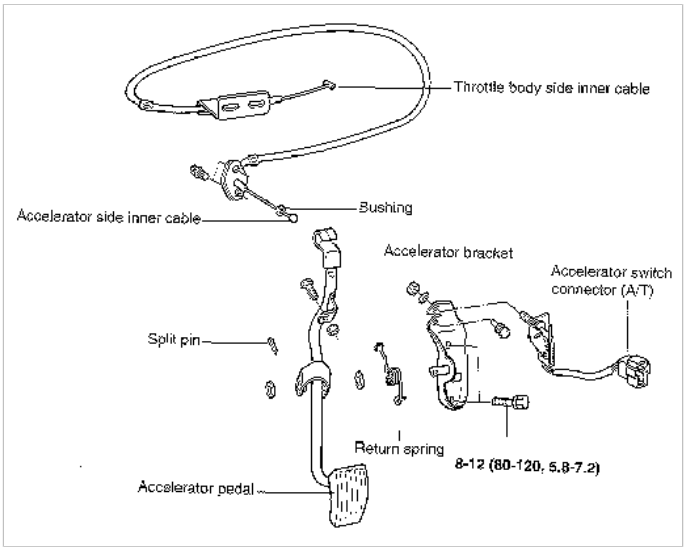
Checking conditions

a. Engine coolant temperature is 80 to 95°C (176 to 205°F).
b. Lights, electric cooling fan and all accessories are off.
c. Transaxle is in neutral ("P" of "N" range for A/T vehicles).
d. Steering wheel is in straight forward position (vehicles with ppower steering).

1. Connect the Generic Scan Tool to the data link connector at lower crash pad.
2. Start and run the engine at curb idle speed.
3. Run the engine for more than 5 seconds at an engine speed of 2,000 to 3,000 rpm.
4. Run the engine at idle for 2 minutes.
5. Read the idling rpm.

Fuel System > Fuel Delivery System > Accelerator Pedal > COMPONENTS

Components



Fuel System > Fuel Delivery System > Accelerator Pedal > INSPECTION

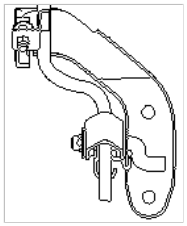
INSPECTION

1. Check the inner and outer cable for damage.
2. Check the cable for smooth movement.
3. Check the accelerator arm for deformation.
4. Check the return spring for deterioration.
5. Check the connection of the bushing to end metal fitting.
6. Check the properly operating of the accelerator switch.

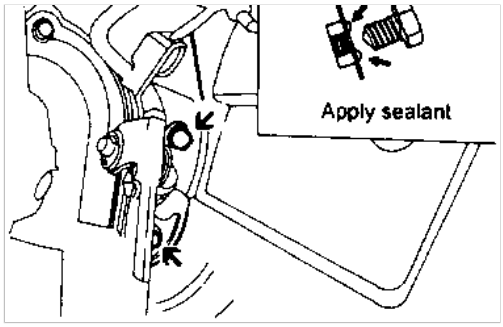
Fuel System > Fuel Delivery System > Accelerator Pedal > INSTALLATION

INSTALLATION

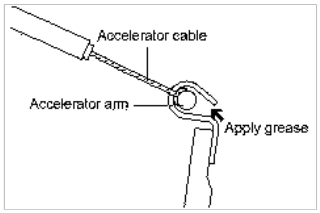
1. When installing the return spring and accelerator arm, apply multi-purpose grease around each moving point of the accelerator arm.



2. Apply sealant to the bolt mounting hole, and tighten the accelerator arm bracket.



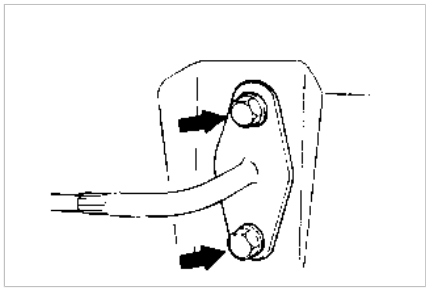
3. Securely install the resin bushing of the accelerator cable on the end of the accelerator arm.
4. Apply multipurpose grease around the cable end.



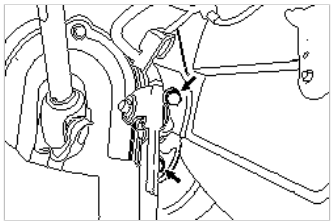
Fuel System > Fuel Delivery System > Accelerator Pedal > REMOVAL

REMOVAL

1. Remove the bushing and inner cable of the accelerator arm side.



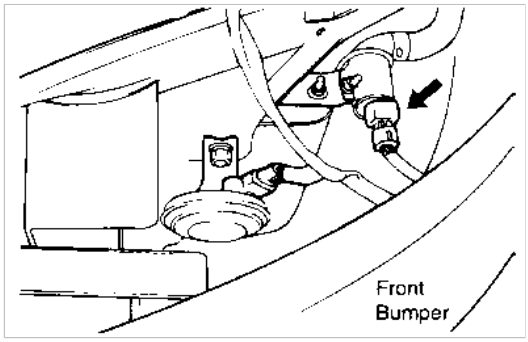
2. After disconnecting the accelerator switch connector, loosen the bolts of the accelerator arm bracket and remove.



Fuel System > Fuel Delivery System > Canister Close Valve > CANISTER CLOSE VALVE

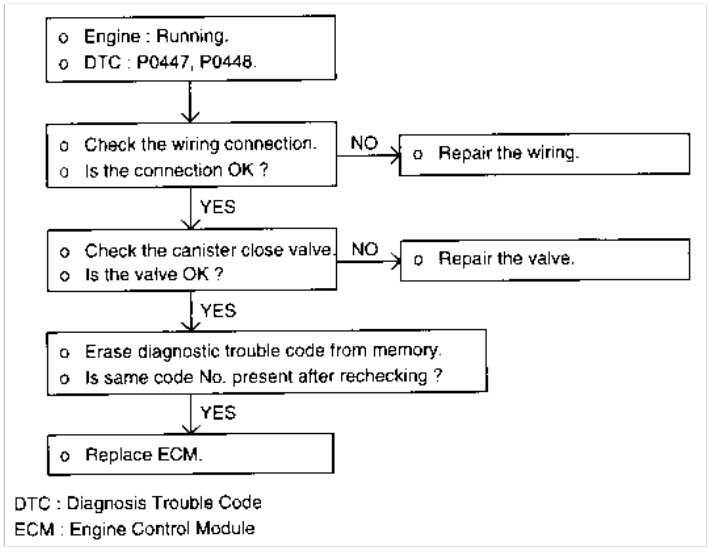
CANISTER CLOSE VALVE

The canister close valve is an ON/OFF type which controls the inner pressure of fuel tank caused by fuel evaporation. It is used to close the evaporative system and to observe tank pressure respectively with the fuel tank pressure sensor.



Fuel System > Fuel Delivery System > Canister Close Valve > DTC - P0447, P0448

DTC - P0447, P0448

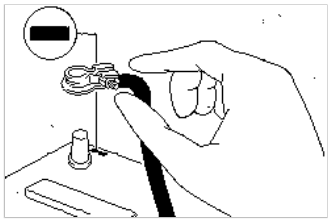


DTC : Diagnosis Trouble Code
ECM : Engine Control Module

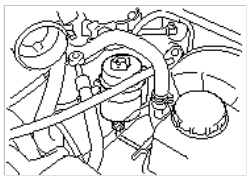
Fuel System > Fuel Delivery System > Fuel Filter > FUEL FILTER REPLACEMENT

FUEL FILTER REPLACEMENT

1. Reduce the internal pressure of the fuel pipes and hoses by completing the following operations.
   (1) Disconnect the fuel pump harness after removing the rear seat cushion.
   (2) Start the engine after it stalls. Turn the ignition switch OFF.
   (3) Disconnect the battery negative (-) terminal.
   (4) Connect the fuel pump harness connector.
2. Remove the eye bolts while holding the fuel filter nuts securely.

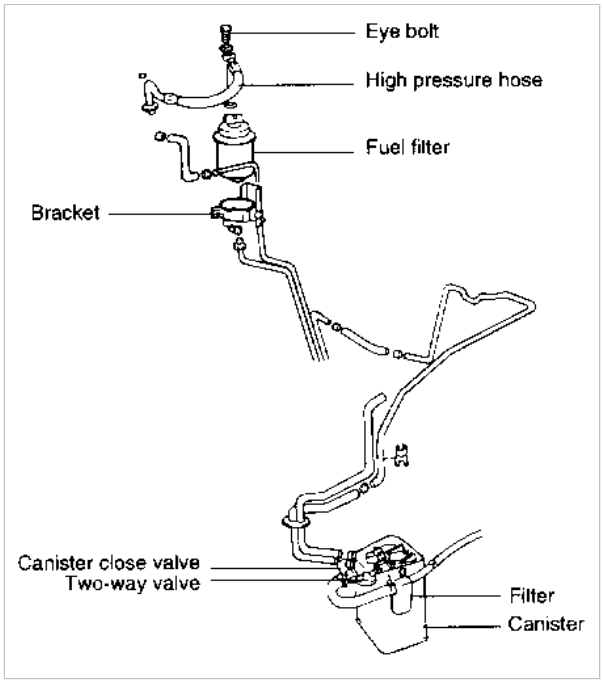


3. Cover with a shop bolt while holding the fuel filter nuts securely.
4. Remove the fuel filter mounting bolts, then remove the fuel filter from the fuel filter clamp.
5. After replacing the fuel filter, check for fuel leaks.



Fuel System > Fuel Delivery System > Fuel Line > COMPONENTS

COMPONENTS



Fuel System > Fuel Delivery System > Fuel Line > INSPECTION

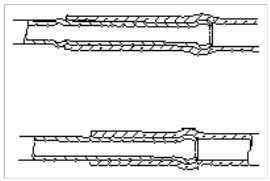
INSPECTION

1. Check the hoses and pipes for cracking, bending, deformation or restrictions.
2. Check the canister for restrictions.
3. Check the fuel filter for restrictions and damage. If a problem is found, repair or replace parts as necessary.

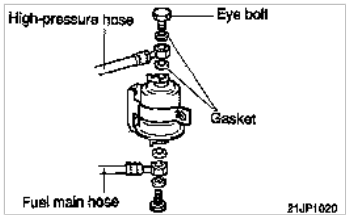
Fuel System > Fuel Delivery System > Fuel Line > INSTALLATION

INSTALLATION

1. Install the fuel vapor hose and return hose.
   a. If the fuel line has stepped section, connect the fuel hose to the line securely, as shown in the illustration.
   b. If the fuel line does not have a stepped section, connect the fuel hose to the line securely.



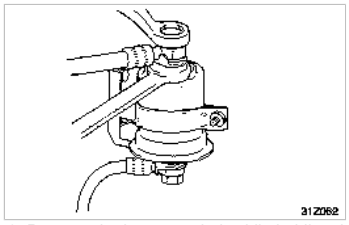
2. Install the fuel filter, and tighten the fuel filter bracket.
3. Insert the main line on the filter and tighten the eye bolts while holding the fuel filter nuts.
4. Install the clips and make sure that they do not interfere with other components.



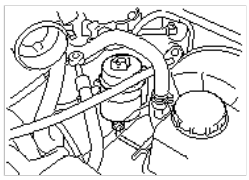
Fuel System > Fuel Delivery System > Fuel Line > REMOVAL

REMOVAL

1. Remove the upper eye bolt while holding the fuel filter nut securely and remove the high pressure fuel hose.
   a. Be sure to reduce the fuel pressure before disconnecting the fuel line and hose, otherwise fuel will spill out.
   b. Cover the hose connection with a shop towel to prevent splashing of fuel that could be caused by residual pressure in the fuel line.

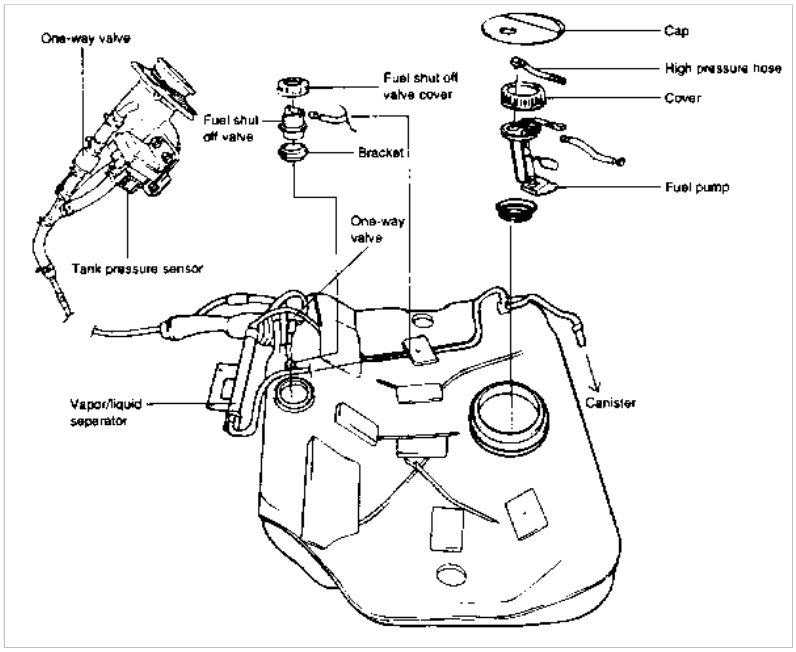


2. Remove the lower eye bolt while holding the fuel filter nut assembly.
3. Remove the fuel filter mounting bolts, then remove the fuel filter from the bracket.
4. Remove the fuel return hose and line.
5. Remove the fuel vapor hose and line.



Fuel System > Fuel Delivery System > Fuel Tank > COMPONENTS

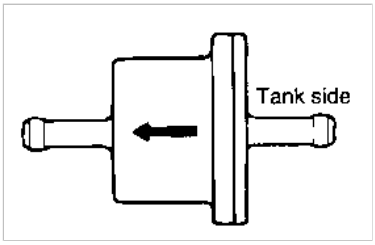
COMPONENTS



Fuel System > Fuel Delivery System > Fuel Tank > INSPECTION

INSPECTION

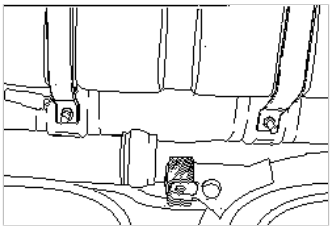
1. Check the hoses and the pipes for cracks or damage.
2. Check the fuel tank cap for proper operation.
3. Check the fuel tank for deformation, corrosion or cracking.
4. Check the inside fuel tank for dirt or foreign material.
5. Check the in-tank fuel filter for damage or restriction.
6. Test the one-way valve for proper operation.
7. To check the one-way valve, lightly breathe into the inlet and outlet. If air passes one-way only, then the valve is good.



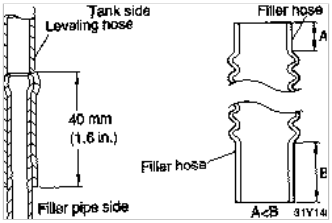
Fuel System > Fuel Delivery System > Fuel Tank > INSTALLATION

INSTALLATION

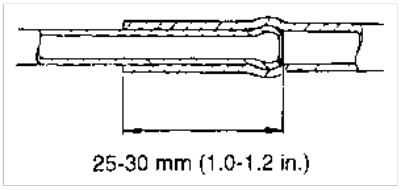
1. Confirm that the pad is fully bonded to the fuel tank, and install the fuel tank by tightening the self-locking nuts.



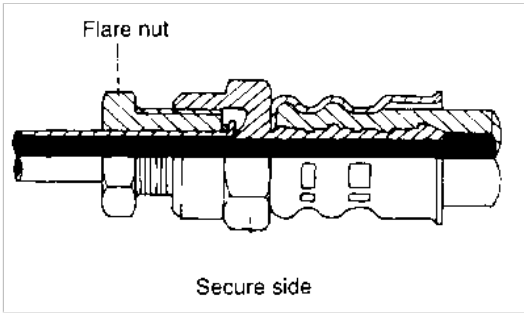
2. Connect the leveling hose to the tank and approximately 40mm (1.6 in.) at the filler neck.
3. When connecting the filler hose, the end with the shorter straight pipe should be connected to the tank side.



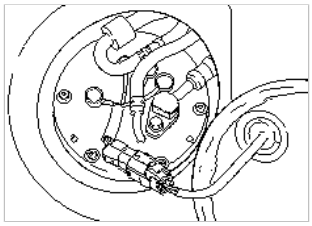
4. Connect the vapor hose and return hose. When attaching the fuel hose to the line, be sure that the hose is attached as shown in the illustration.



5. To connect the high pressure hose to the fuel pump, temporarily tighten the flare nut by hand, and then tighten it to the specified torque. Be careful that the fuel hose does not twist.
   When tightening the flare nut, be careful not to bend or twist the line to prevent the fuel pump connection from being damaged.



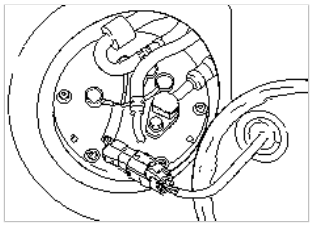
6. Connect the electrical fuel pump connector.
7. Tighten the drain plug to the specified torque.



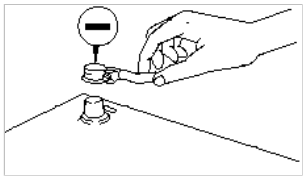
Fuel System > Fuel Delivery System > Fuel Tank > REMOVAL

REMOVAL

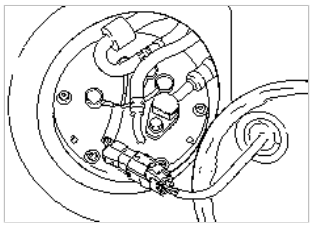
1. Remove the rear seat cushion.
2. To reduce the internal pressure of the fuel lines and hoses, first start the engine and then disconnect the electrical fuel pump connector.
   Be sure to reduce the fuel pressure before disconnecting the fuel main pipe and hose otherwise fuel will spill out.



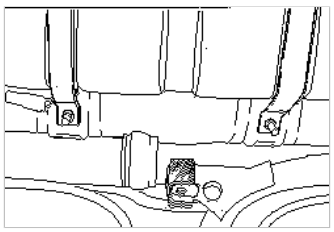
3. Disconnect the battery cable form the negative terminal of the battery.



4. Remove the high pressure hose and fuel return hose.
5. Lift up the vehicle.
6. Remove the drain plug and drain the fuel.
7. Detach the fuel fill hose and leveling hose.
8. Support the fuel tank with a jack.

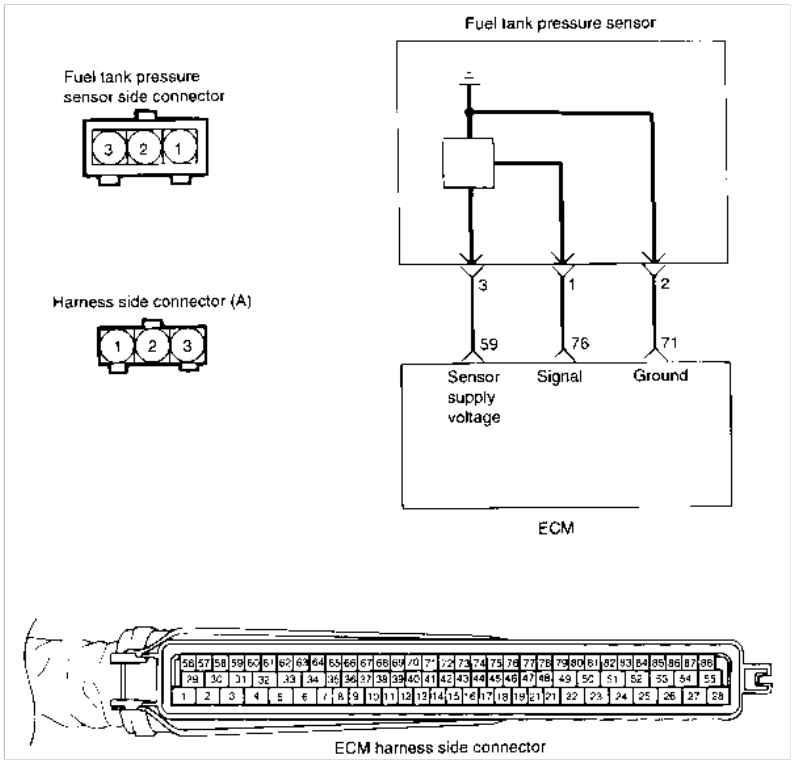


9. Remove the fuel tank bands.
10. Remove the fuel tank.



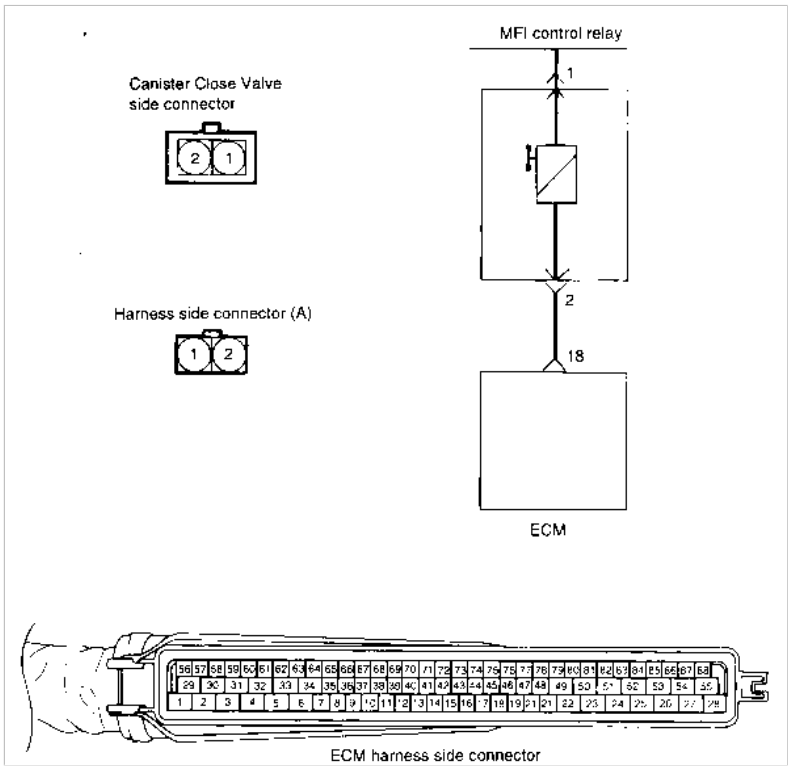
Fuel System > Fuel Delivery System > Fuel Tank Pressure Sensor > CIRCUIT DIAGRAM

CIRCUIT DIAGRAM



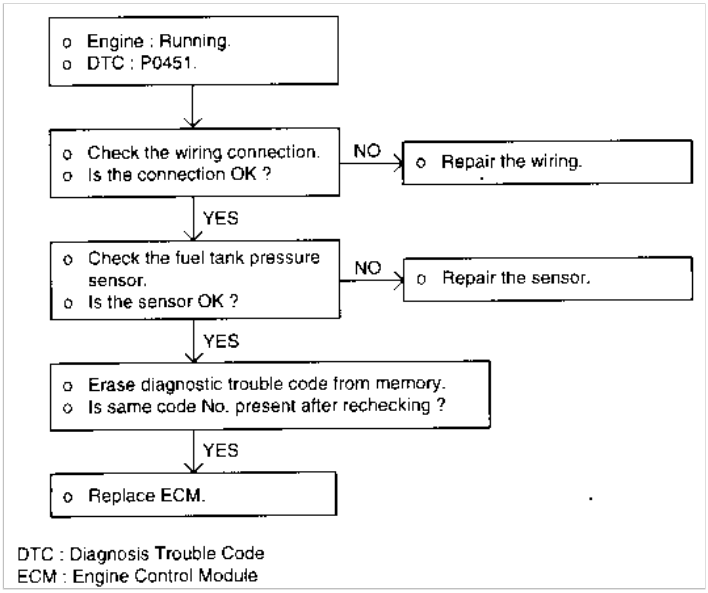
Fuel System > Fuel Delivery System > Fuel Tank Pressure Sensor > CIRCUIT DIAGRAM

CIRCUIT DIAGRAM



Fuel System > Fuel Delivery System > Fuel Tank Pressure Sensor > DTC - P0451 (FUEL TANK PRESSURE SENSOR)

DTC - P0451 (FUEL TANK PRESSURE SENSOR)

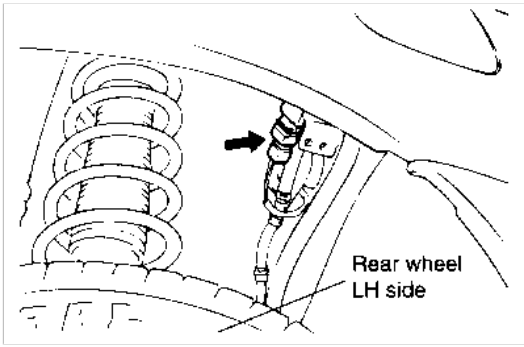


DTC : Diagnosis Trouble Code
ECM : Engine Control Module

Fuel System > Fuel Delivery System > Fuel Tank Pressure Sensor > FUEL TANK PRESSURE SENSOR

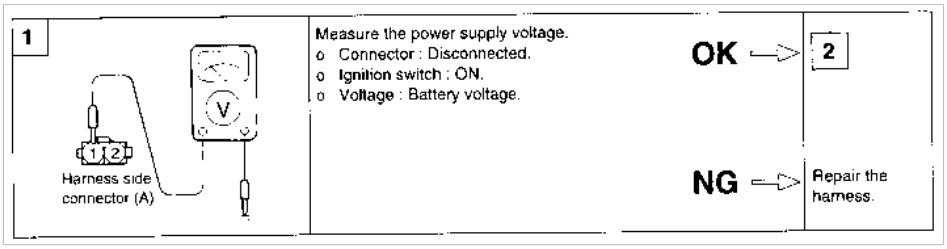
FUEL TANK PRESSURE SENSOR

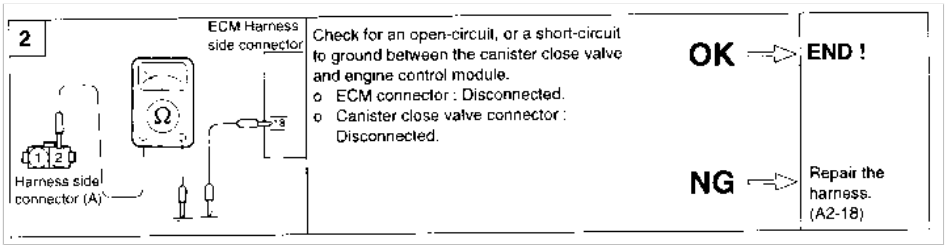
The fuel tank pressure sensor is a pressure sensitive variable resistor. It measures the change of pressure in the fuel tank and monitors leakage detection. It used to close the evaporative system and observes tank pressure respectively with canister close valve.



Fuel System > Fuel Delivery System > Fuel Tank Pressure Sensor > HARNESS INSPECTION

HARNESS INSPECTION



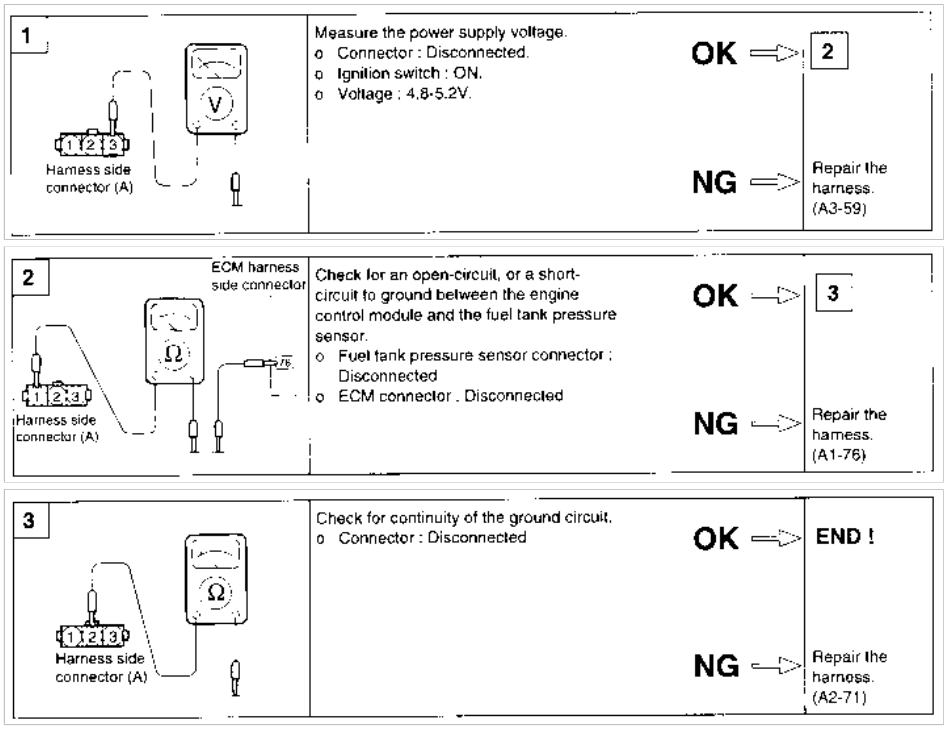


VALVE INSPECTION

Refer to EC GROUP - Emission Control system

Fuel System > Fuel Delivery System > Fuel Tank Pressure Sensor > HARNESS INSPECTION PROCEDURES

HARNESS INSPECTION PROCEDURES

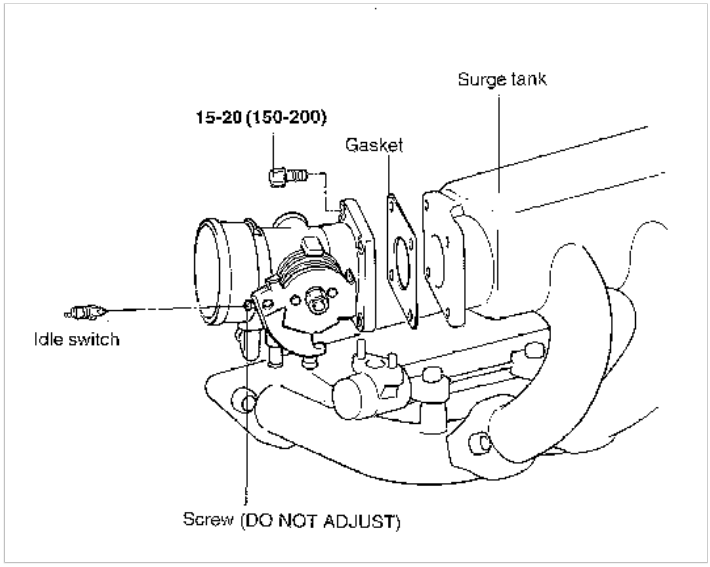


SENSOR INSPECTION

Refer to EC GROUP - Emission Control system

Fuel System > Fuel Delivery System > Throttle Body > COMPONENTS

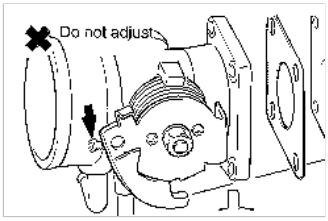
Components



Fuel System > Fuel Delivery System > Throttle Body > INSPECTION

INSPECTION

1. Check the throttle body for cracks.
2. Check for restriction of the vacuum port or passage.
3. Check for interference when moving the accelerator cable.
   a. Throttle valve set screw was adjusted in the production line with the air volume (0.516 ± 5% g/sec) during idling. So please DO NOT ADJUST IT voluntarily.
   b. When the idle RPM is out of specification, check the relevant sensors and their input or output value first.
   c. The throttle body does not need to be cleaned because carbon in throttle body does not affect the system operating at all.

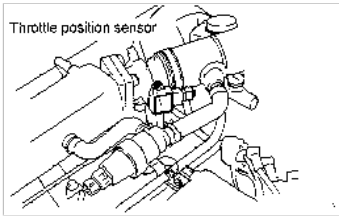


Fuel System > Fuel Delivery System > Throttle Body > REMOVAL

REMOVAL

The throttle valve must not be removed.
Remove the throttle position sensor.

Except when necessary for replacement, the throttle position sensor must not be removed.



Fuel System > General > BASIC TROUBLESHOOTING

BASIC TROUBLESHOOTING

When checking engine trouble, it is important to start with an inspection of the basic systems. If one of the following conditions exists, (A) engine start failure, (B) unstable idling or (C) poor acceleration, begin by checking the following basic systems.

a. Power supply
1) Battery
2) Fusible link
3) Fuse
b. ECM ground
c. Fuel supply
1) Fuel line
2) Fuel filter
3) Fuel pump
d. Ignition system
1) Spark plug
2) High-tension cable
3) Ignition coil
4) ECM
e. Emission control system
1) PCV system
2) Vacuum leak
f. Others
1) Ignition timing
2) Idle speed

Trouble with the MFI system is often caused by poor contact of the harness connectors. It is important to check all harness connectors and verify that they are securely connected.

Fuel System > General > DTC Troubleshooting Chart

DTC Troubleshooting Chart

Fault Code No.	Comment	Component	MIL on
P0102	Mass air flow circuit low input	Mass Air Flow Sensor	Yes
P0103	Mass air flow circuit high input		
P0112	Intake air temp. circuit low input	Intake Air Temperature Sensor	Yes
P0113	Intake air temp. circuit range		
P0116	Eng. coolant temp. circuit range	Engine Coolant Temperature Sensor	Yes
P0117	Eng. coolant temp. circuit low input		
P0118	Eng. coolant temp. circuit high input		
P0121	TPS circuit range (TPS voltage does not agree with MAF sensor)	Throttle Position Sensor	Yes
P0122	TPS circuit low input		
P0123	TPS circuit high input		
P0130	O2 sensor circuit malfunction	Upstream Oxygen Sensor	Yes

P0131	02 sensor circuit low voltage		
P0132	02 sensor circuit high voltage		
P0133	02 sensor circuit slow response		
P0134	02 sensor circuit no activity detected		
P0135	02 sensor heater circuit malfunction	Upstream Oxygen Sensor Heater	Yes
P0136	02 sensor circuit malfunction	Downstream Oxygen Sensor	Yes
P0137	02 sensor circuit low voltage		
P0138	02 sensor circuit high voltage		
P0141	02 sensor heater circuit malfunction	Downstream Oxygen Sensor Heater	Yes
P0201	Injector cyl. 1, circuit malfunction	Injector	Yes
P0202	Injector cyl. 2, circuit malfunction		
P0203	Injector cyl. 3, circuit malfunction		
P0204	Injector cyl. 4, circuit malfunction		

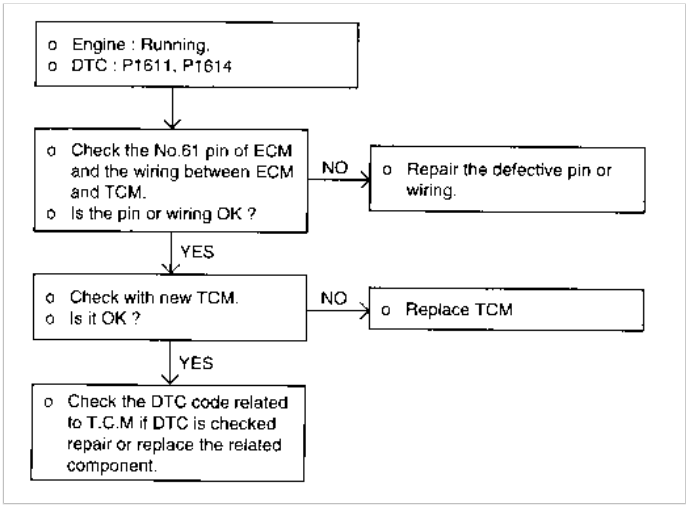
Fault Code No.	Comment	Component	MIL on
P0300	Random misfire detected	Catalyst damage (you should repair immediately)	Yes and Blinking
P0301	Cylinder 1 misfire detected		
P0302	Cylinder 2 misfire detected		
P0303	Cylinder 3 misfire detected		
P0304	Cylinder 4 misfire detected		
P0326	Knock sensor circuit range	Knock Sensor	No
P0335	Crankshaft position sensor circuit malfunction	Crankshaft Position Sensor	Yes
P0336	Crankshaft position sensor circuit range		
P0342	Camshaft position sensor circuit low input	Camshaft Position Sensor	Yes
P0343	Camshaft position sensor circuit high input		
P0421	Warm up catalyst efficiency below threshold	Catalyst	Yes
P0442	Main catalyst efficiency, below threshold	Evaporative Emission Control System	Yes
P0443	Purge control valve circuit malfunction		
P0444	Purge control valve circuit open	Evaporative Emission Control System Valve	Yes
P0445	Purge control valve circuit shorted		
P0446	Evaporative emission control system canister close valve permanently closed	Evaporative Emission Control System	Yes
P0447	Evaporative emission control system, ventilation control valve, short circuit to ground	Canister Close Valve	Yes
P0448	Evaporative emission control system, ventilation control valve, short circuit to battery voltage		
P0451	Evaporative emission control system, pressure sensor, signal not plausible	Tank Pressure Sensor	Yes
P0452	Evaporative emission control system, pressure sensor, signal low		
P0453	Evaporative emission control system pressure sensor, signal high		
P0455	Evaporative emission control system incorrect purge flow	Evaporative Emission Control System	Yes

Fault Code No.	Comment	Component	MIL on
P0501	Vehicle speed sensor range	Vehicle Speed Sensor	Yes
P0506	Idle rpm lower than expected	Idle Control Valve	Yes
P0507	Idle rpm higher than expected		
P0562	System voltage low	Power Supply	Yes
P0563	System voltage higher		
P0605	Internal control module ROM error	ECM	Yes
PI123	Long term fuel trim additive air, system too rich	Fuel System	
PI124	Long term fuel trim additive, air system too lean		
PI127	Long term fuel trim multiplicative, system too rich		
PI128	Long term fuel trim multiplicative, system too lean		
P1510	Idle control valve opening coil circuit shorted	Idle Control Valve	Yes
P1513	Idle control valve opening coil circuit open		
P1552	Idle control valve closing coil circuit shorted		
P1553	Idle control valve closing coil circuit open		
P1586	Encoding signal circuit not rational	MT/AT Encoding	Yes
P1605	Rough road sensor circuit malfunction	Acceleration Sensor	Yes

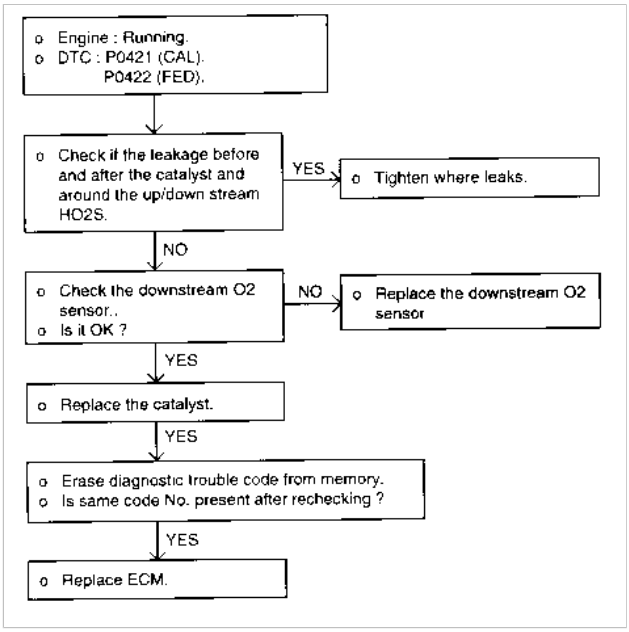
P1606	Rough road sensor not rational		
P1611	MIL request signal circuit low input	MIL-on Request Line	Yes
P1614	MIL request signal circuit high input		
P1624	MIL-on request signal	TCU	Yes
P1665	Power stage group A, malfunction	Wiring Harness ECM	Yes
P1670	Power stage group B, malfunction		No

TROUBLESHOOTING PROCEDURES

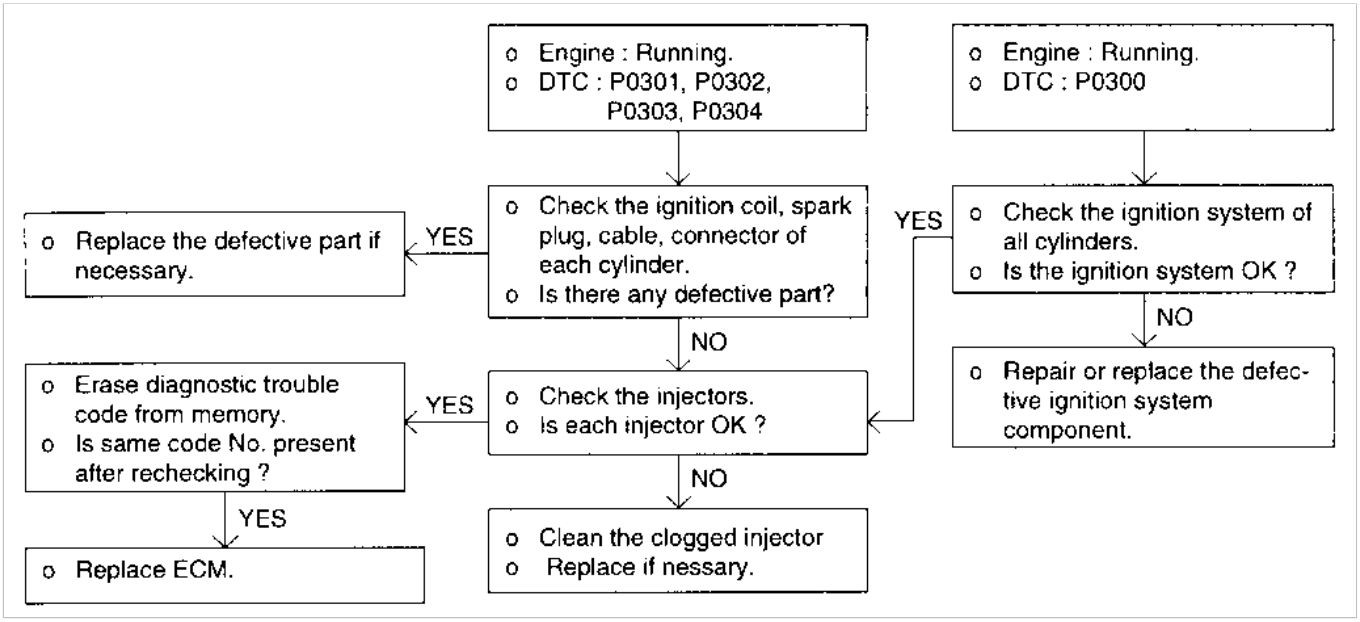
MIL (Malfunction Indicating Light) -- ON Request Signal



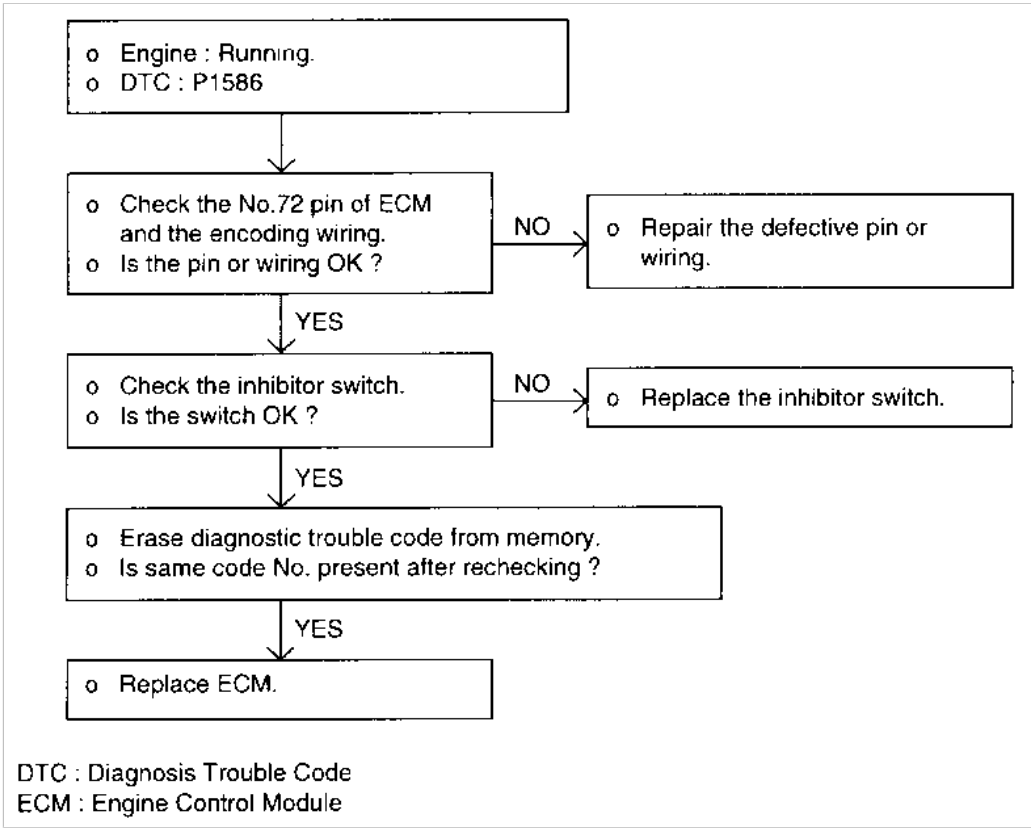
Catalyst



Misfire



Manual Transaxle/Automatic Transaxle Encoding



Fuel System > General > SEALANTS

SEALANTS

Items	Specifications
Engine coolant temperature sensor ass'y	LOCTITE 962T or equivalent
Engine coolant temperature sender	Three bond No. 2310 or equivalent

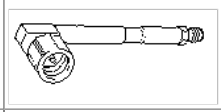
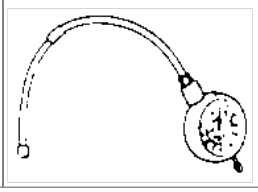
Fuel System > General > SERVICE SPECIFICATIONS

SERVICE SPECIFICATIONS

Items	Specifications
Basic ignition timing	BTDC 9° ± 5°
Basic idle rpm	800 ± 100rpm
Idle speed when air conditioning is on	820 ± 100rpm
Throttle position sensor resistance	0.7 - 3.4 kΩ
Throttle position sensor output voltage at curb idle	0.1 - 0.875V
Mass air flow sensor output voltage	0-5V
Intake air temperature sensor resistance	2.0 - 3.0 kΩ at 20°C (68°F)
EVAP canister purge solenoid valve resistance	20 - 32Ω
Engine coolant temperature sensor resistance 20°C (68°F)	1.0 - 4.0 kΩ
Engine coolant temperature sensor resistance 80°C (176°F)	0.24 - 0.40 kΩ
Heated oxygen sensor output voltage	0 - 1V
Camshaft position sensor output voltage	0 - 5V
Idle rpm	700 - 900Hz
3000 rpm	2800 - 3200Hz
Injector coil resistance	15.9 ± 0.35Ω
Idle speed control actuator control frequency	100hz

Fuel System > General > SPECIAL TOOLS

SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
09353-24000Fuel pressure gauge connector		Connection of fuel pressure gauge to delivery pipe for measurement of fuel pressure.
09353-24100Fuel pressure gauge & hose		

Fuel System > General > SPECIFICATIONS

SPECIFICATIONS

Fuel

Items	Specifications
Tank capacity	45 lit. (11.9 U.S. gal, 9.9 Imp.gal.)
Return system	Equipped
Filter	High pressure type

Fuel pump

Items	Specifications
Type	Electrical, in-tank type
Driven by	Electrical motor

Throttle body

Items	Specifications
Throttle position sensor(TP Sensor)	Variable resistor type

Input sensors

Items	Specifications
Mass air flow sensor(MAF Sensor)	Hot film type
Knock sensor (SOHC only) (KS)	Piezoelectric type
Intake Air Temperature sensor (IAT Sensor)	Thermistor type
Throttle position sensor(TPS)	Variable resistor type
Engine coolant temperature sensor (ECT Sensor)	Thermistor type
Heated oxygen sensor (HO2S)	Zirconia sensor type (Heated)
Vehicle speed sensor	Reed switch type
Camshaft position sensor(CMP Sensor)	Hall effect sensor type
Crankshaft position sensor (CKP Sensor)	Magnetic piezo ceramic type
Acceleration sensor	Piezoelectric type
Fuel Tank Pressure (FTP) sensor	Piezo-Resistivity

Output actuator

Items	Specifications
Injector type and number	Electromagnetic type, 4
Ignition coil	Power transistor, Molded coil type driven by power transistor built in ECM
EVAP canister purge solenoid valve	Duty type
Fuel pump relay	Duty type
Power relay	Duty type
Idle speed control actuator (ISC Actuator)	Double coil rotary valve type
Canister Close Valve (CCV)	ON/OFF Type

Fuel pressure regulator pressure

Items	Specifications
Regulator pressure	300kpa (3.06 kg/cm2, 43.5 psi)

Fuel System > General > SYSTEM CHECK

System Check

MFI SYSTEM INSPECTION

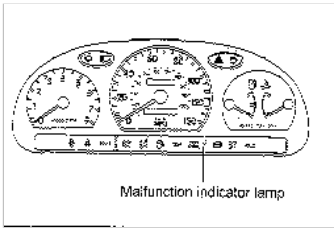
If the MFI system components (sensors, ECM, injector, etc.) fail, interruption or failure to supply the proper amount of fuel for various engine operating conditions will result. The following situations may be encountered.

1. Engine is hard to start or does not start at all.
2. Unstable idle
3. Poor driveability

If any of the above conditions is noted, first perform an inspection by self-diagnosis and subsequent basic engine checks (ignition system malfunction, incorrect engine adjustment, etc.), and then inspect the MFI system components.

MALFUNCTION INDICATOR LIGHT (MIL)

An On Board Diagnostic lamp comes on to notify the driver that there is any problems on the vehicle.



However MIL will go off automatically after 3 subsequent sequential trips without same malfunctions.

Immediately after the ignition switch is turn on (ON position), the malfunction indicator light is lit continuously to indicate that the malfunction indicator light operates normally.

The following items will be indicated by the MIL:

a. Catalyst
b. Fuel system
c. Mass Air Flow Sensor
d. Intake Air Temperature Sensor
e. Engine Coolant Temperature Sensor
f. Throttle Position Sensor
g. Upstream Oxygen Sensor
h. Downstream Oxygen Sensor Heater
i. Downstream Oxygen Sensor

j. Upstream Oxygen Sensor Heater
k. Injector
l. Misfire
m. Crankshaft Position Sensor
n. Camshaft Position Sensor
o. Evaporative Emission Control System
p. Vehicle Speed Sensor
q. Idle Control Valve
r. Power Supply
s. ECM
t. MT/AT Encoding
u. Acceleration Sensor
v. MIL-on Request Signal
w. Power Stage

MALFUNCTION INDICATOR LIGHT (MIL) INSPECTION

1. After turning on (ON position) the ignition key, check that the light illuminates continuously without engine running.
2. If the light does not illuminate continuously without engine running, check for an open circuit in harness, blown fuse and blown bulb.

SELF-DIAGNOSIS

The ECM monitors the input/output signals (some signals at all times and the others under specified conditions). When the ECM detets an irregularity, it memorizes the diagnostic trouble code, and outputs the signal to the self-diagnosis output terminal. The diagnosis results can be read out with the Scan Tool (ST). Diagnostic trouble codes (DTC) will remain in the ECM as long as battery power is maintained. The diagnostic trouble code will, however, be erased when the battery terminal or the engine control module (ECM) connector is disconnected or erased by the Generic Scan Tool.

CHECKING PROCEDURE (SELF-DIAGNOSIS)

a. When battery voltage is low, diagnostic trouble codes cannot be read. Be sure to check the battery for voltage and other conditions before starting the test.
b. Diagnostic memory is erased if the battery or the ECM connector is disconnected. Do not disconnect the battery before the diagnostic trouble codes are completely read and recorded.

Inspection Procedures (Using Generic Scan Tool

1. Turn OFF the ignition switch.
2. Connect the scan tool to the data link connector on the coin box.
3. Turn ON the ignition switch.
4. Use the scan tool to check the diagnostic trouble code.
5. Repair the faulty part from the diagnosis chart.
6. Erase the diagnostic trouble code.
7. Disconnect the scan tool.

Fuel System > General > TIGHTENING TORQUE

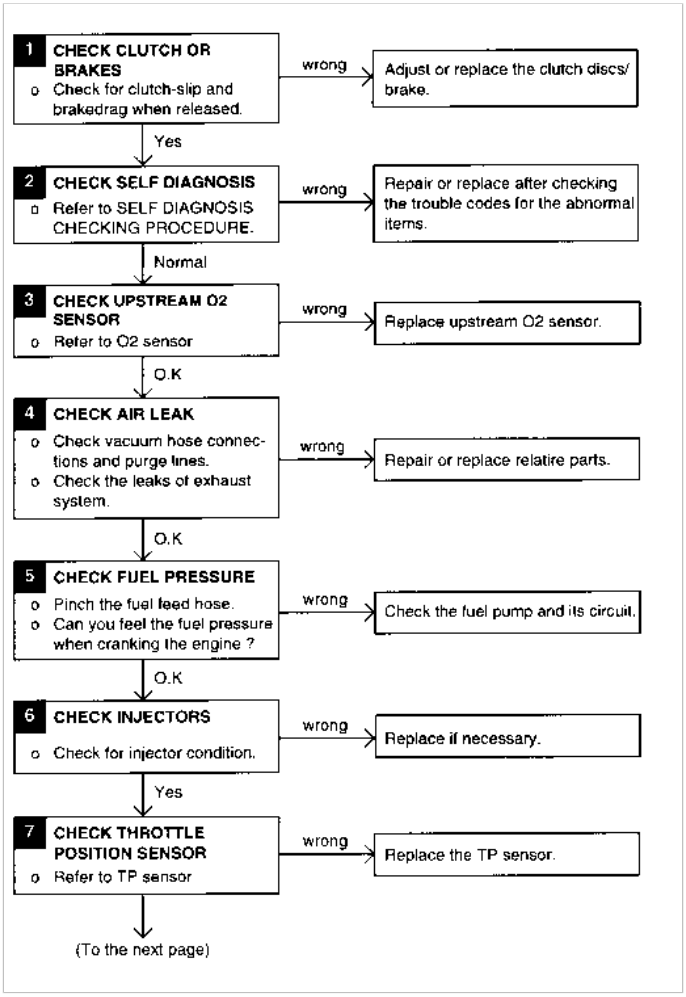
TIGHTENING TORQUE

Items	Nm	Kg.cm	lb.ft
Fuel delivery pipe installation bolts	10-15	100-150	7-11
Fuel pressure regulator bolts	4-6	40-60	3.0-4.4
Heated oxygen sensor	50-60	500-600	37-44
Crankshaft position sensor installation bolts	9-11	90-110	7-8
Knock sensor installation bolt	16-25	160-250	12-18
Engine coolant temperature sensor	15-20	150-200	11-15
Throttle position sensor installation blots	1.5-2.5	15-25	1.1-1.8
High pressure hose and fuel filter	25-35	250-350	18-25
High pressure hose and fuel tank	30-40	300-400	22-29
Throttle body to sure tank bolts	15-20	150-200	11-15
Fuel tank drain plug	15-25	150-250	11-18

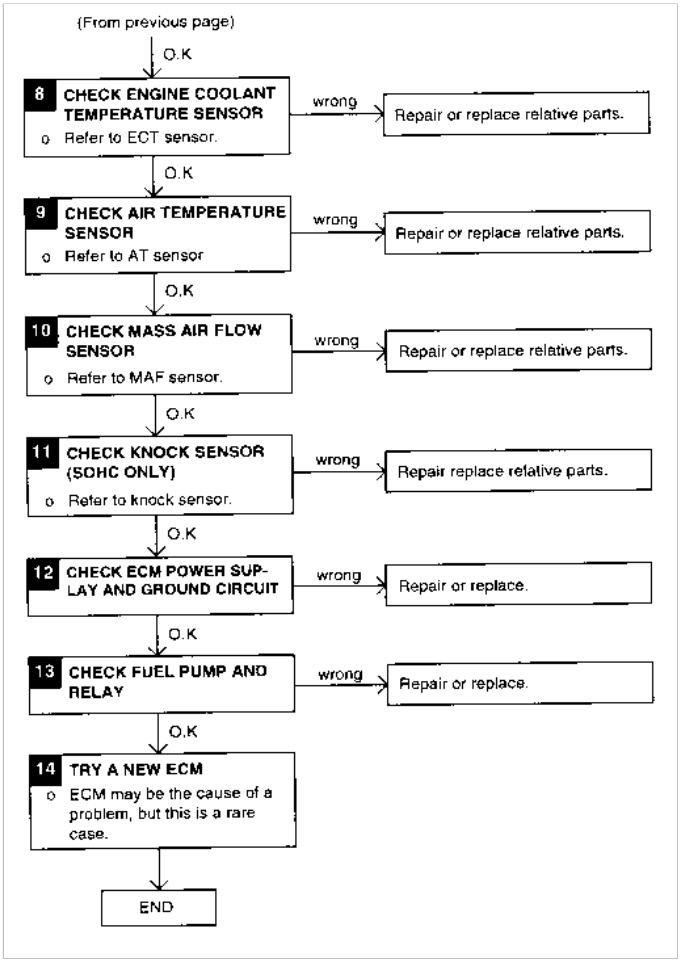
Fuel System > General > TROUBLESHOOTING (ENGINE HESITATES OR ACCELERATES POORLY)

TROUBLESHOOTING (Engine Hesitates or Accelerates Poorly)

Case C: Engine hesitates or accelerates poorly (Figure 1)



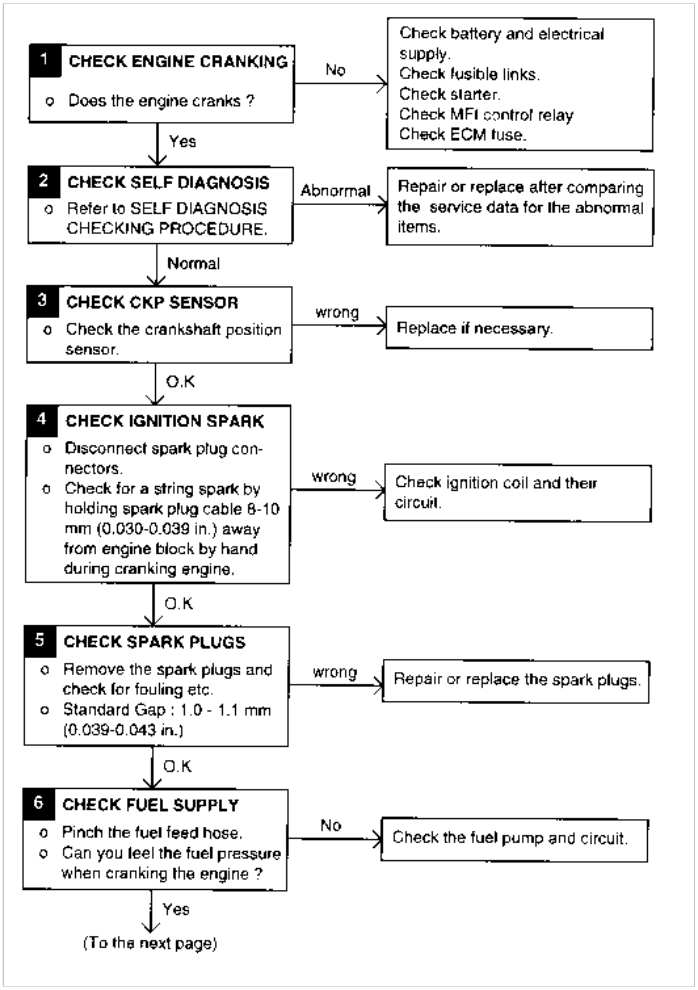
Case C: Engine hesitates or accelerates poorly (Figure 2)



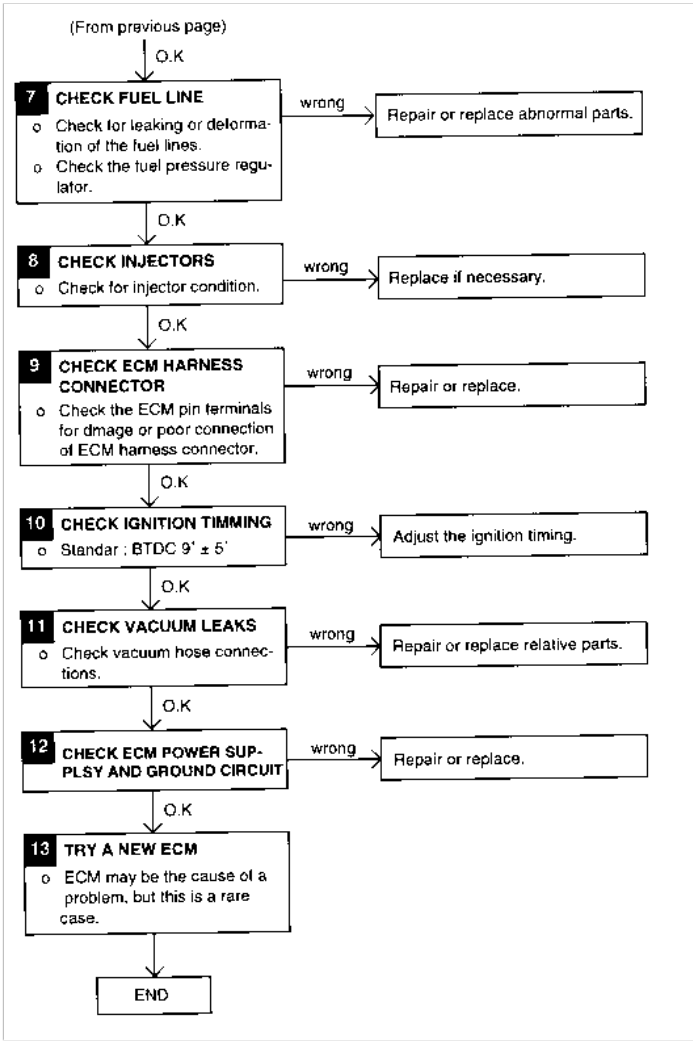
Fuel System > General > TROUBLESHOOTING (HARD TO START OR DOES NOT START)

TROUBLESHOOTING (Hard to Start or Does Not Start)

Case A: Hard to start or does not start (Figure 1)



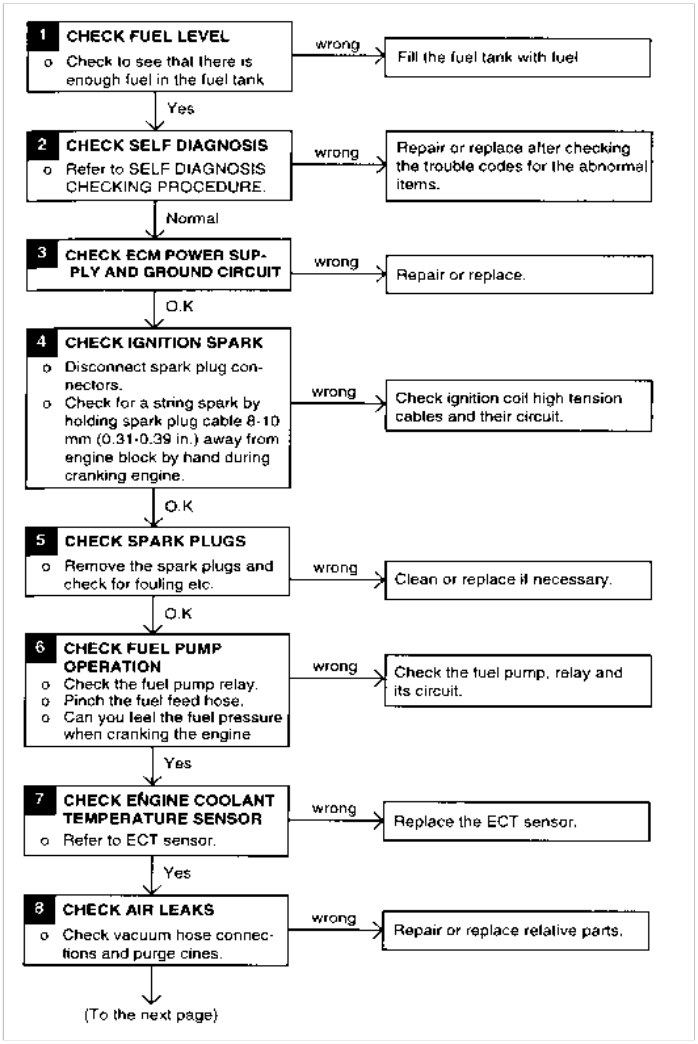
Case A: Hard to start or does not start (Figure 2)



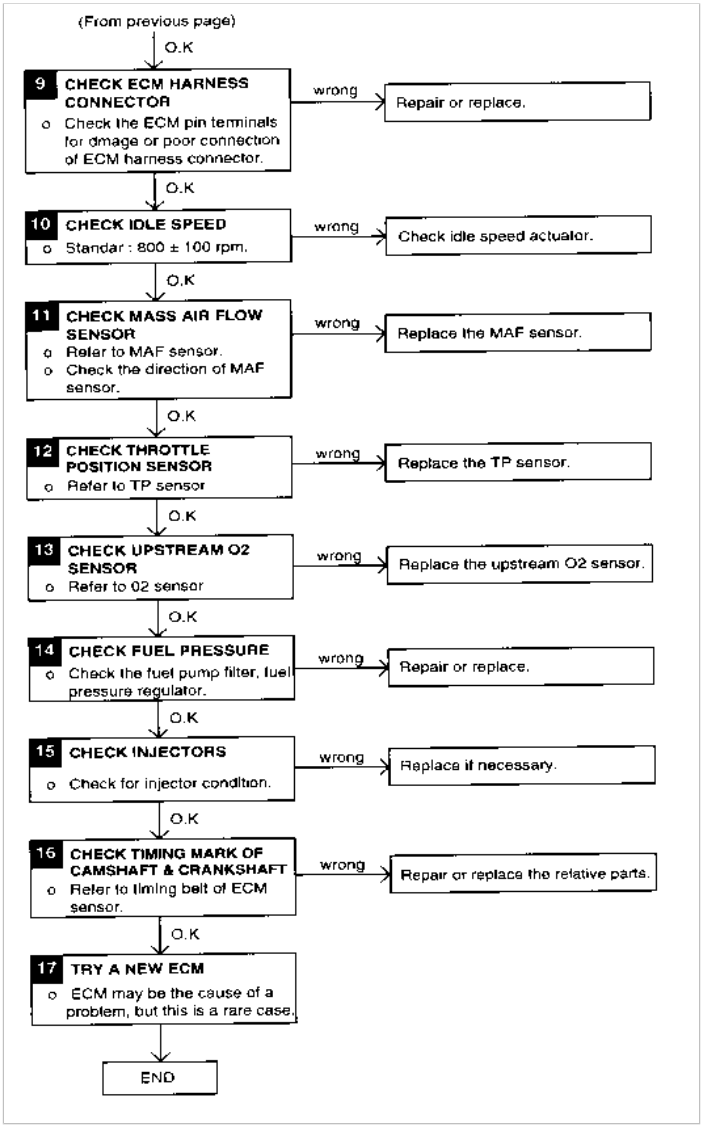
Fuel System > General > TROUBLESHOOTING (ROUGH IDLE OR ENGINE STALLS)

TROUBLESHOOTING (Rough Idle or Engine Stalls)

Case B: Rough idle or engine stalls (Figure 1)



Case B: Rough idle or engine stalls (Figure 2)



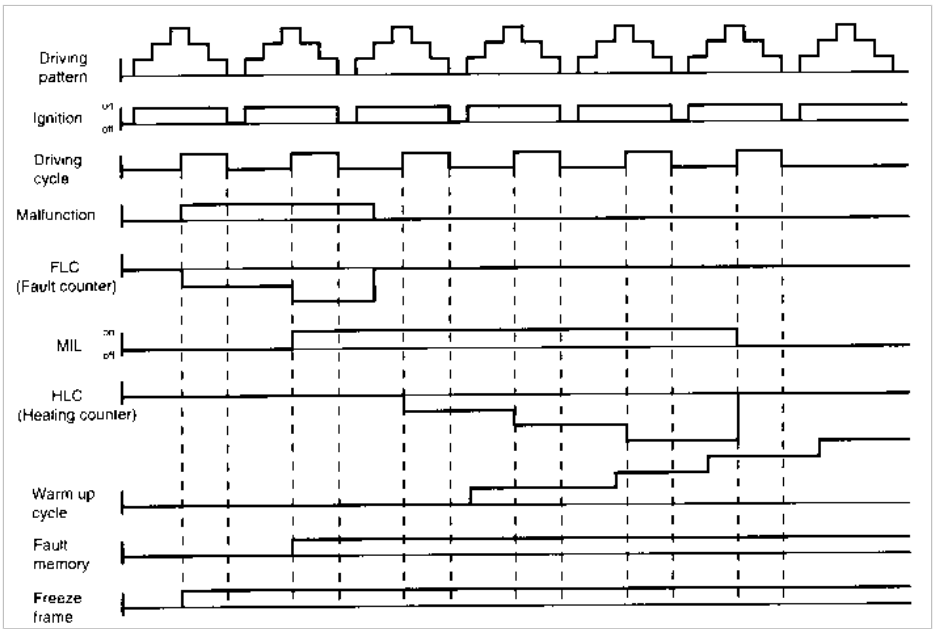
Fuel System > General > TROUBLESHOOTING GUIDE CHART

Troubleshooting Guide Chart

Main Symptoms / Sub-Symptoms / Check points	STARTING							Poor Idling					Poor Driving	
	Unable to start			Hard to start										
	Does not crank	Starter runs but engine does not crank	Incomplete combustion	Cranks slowly	Usually	When the engine is cold	When the engine is hot	Incorrect fast idle	High idle speed	Low idle speed	Rough idling	Engine hesitates or accelerates poorly	Surging	Knocking
Starter relay	1													
Starter	2	2		1										
PNP SW [A/T] or Clutch start SW [M/T]	3													
Flywheel [M/T] or Drive plate [A/T]		4												
Mass air flow sensor circuit			3							3	10	7		
Idle speed control actuator			4		3	3	3	3	3	2	7			2
Fuel pressure regulator			5		5	5	5				4	11	1	
ECT sensor circuit			6		4	1	1	2	2	1	2	8	6	
Compression			7		8						8	5		
Piston ring			8		9						9			
Ignition timing					10						11	14		
Timing mark			9								12			
Injectors			10		13	8	8		7	4	13	15	4	
ECM			11		14	9	9	4	8	5	14	16	5	
A/C circuit				2					6					
Connecting rod bearing				3										
Crankshaft bearing				4										
Fuel quality					1	2	2				1	3	3	
Spark plug					2						3	4	2	
Fuel pump					6	6	6				5	12		
Fuel lines					7	7	7				6	13		
Ignition circuit			2		11									3
Intake air temp. sensor circuit					12	4	4		4			9		1
Accelerator pedal link								1	1					
TP Sensor circuit									5			6		
Cylinder head											15			
Clutch [M/T]												1		
Brakes drag when released												2		
Oxygen sensor circuit												10		
Crankshaft position sensor		3												
Battery voltage		1	1											

Main Symptoms / Sub-Symptoms / Check points	Engine Stalls			Others			
	Soon after starting	After accelerator pedal depressed	After accelerator pedal released	During A/C ON	Excessive fuel	Engine overheats	Engine over cools
Fuel quality	1				2		
Fuel pressure regulator	2	4					
Fuel pump	3						
Fuel lines	4	5					
ISC actuator	5		1	2			
MAF sensor circuit	6	1	2		13		
ECT sensor circuit	7				11		
Injectors	8	6			10		
ECM	9	7	3	3	18		
TP Sensor circuit		2			12		
Spark plug		3			6	8	
A/C circuit				1	14		
Fuel leakage					1		
Accelerator pedal link					3		
Clutch [M/T]					4		
Brakes drag when released					5		
Compression					7		
Piston ring					8		
Ignition timing					9		
Oxygen sensor circuit					15		
Intake air temp. sensor circuit					16		
Coolant leakage						1	
Cooling fan						2	1
Thermo switch						3	
Radiator and radiator cap						4	2
Thermostat						5	
Timing belt						6	
Engine coolant pump						7	
Oil pump						9	
Cylinder head						10	
Cylinder block						11	
ECT sender						12	3
Crankshaft position sensor	10	8	4	4			

OBD-II System Operating Chart



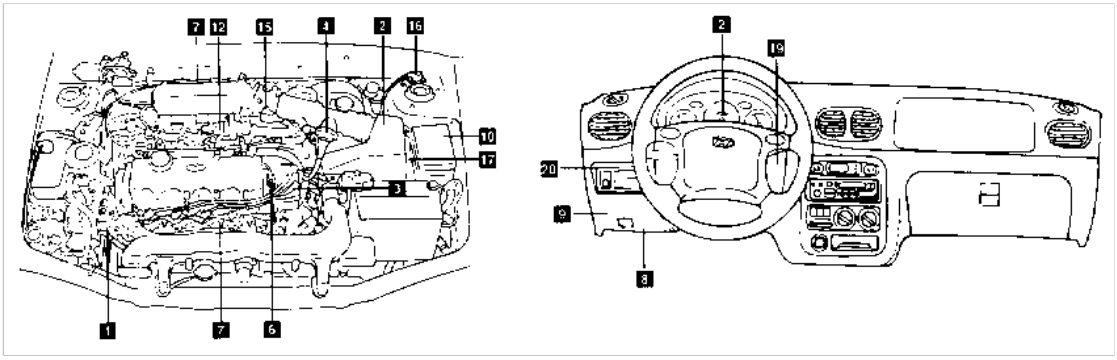
1. When the same malfunction is detected and maintained during subsequent sequential two driving cycles, MIL will automatically light up.
2. MIL will go off automatically after 3 subsequent sequential driving cycles without same malfunctions.

3. After the ECM first detects a malfunction, a diagnostic trouble code is recorded when the engine is restarted and the same malfunction is re-detected. However, for misfire and CKP sensor, diagnostic trouble codes are recorded on the first detection of the malfunction.
4. After recording the diagnostic trouble code, if the ECM dos not re-detect the malfunction for 80 warm-up cycles, the diagnostic trouble code will be erased automatically from the ECM memory.

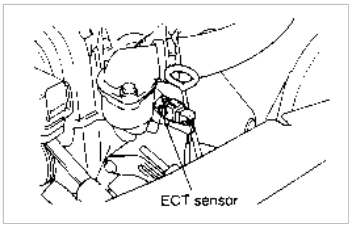
a. A "warm-up cycle" means sufficient vehicle operation such that the coolant temperature has risen by at least 40 degrees Fahrenheit from engine starting and reaches a minimum temperature of 160 degrees Fahrenheit.
b. A "driving cycle" consists of engine startup, vehicle operation beyond the beginning of closed loop operation.

Fuel System > MFI Control System > LOCATION OF MFI COMPONENTS (1.5L SOHC ENGINE)

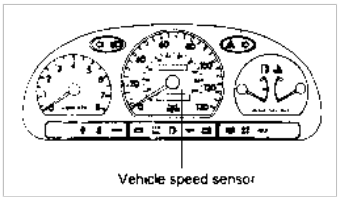
LOCATION OF MFI COMPONENTS (1.5L SOHC ENGINE)



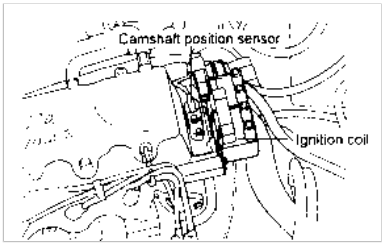
1. Engine coolant temperature sensor (ECT sensor)



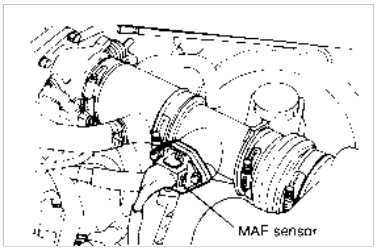
2. Vehicle speed sensor (VSS)



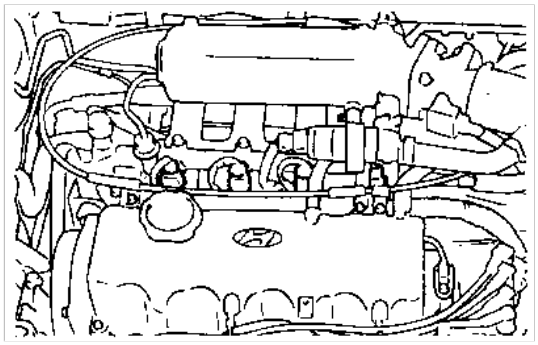
3. Ignition coil



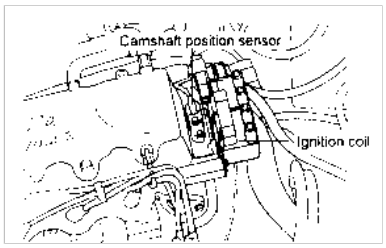
4. Mass air flow (MAF) sensor



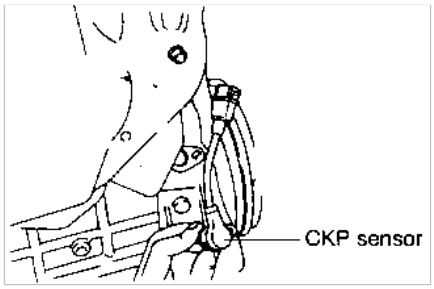
5. Injector



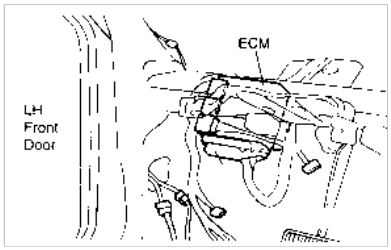
6. Camshaft position sensor (CMP sensor)



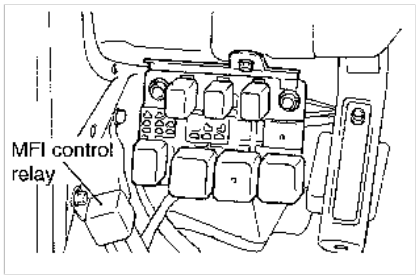
7. Crankshaft position (CKP) sensor



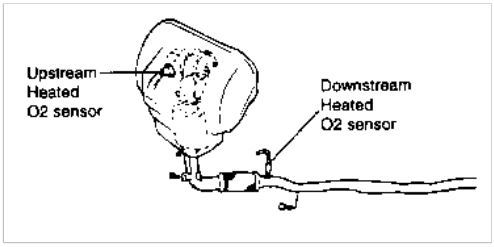
8. Engine control module (ECM)



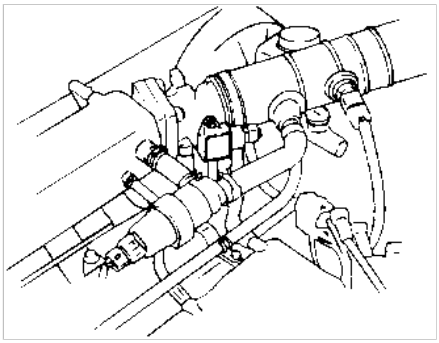
9. MFI control relay



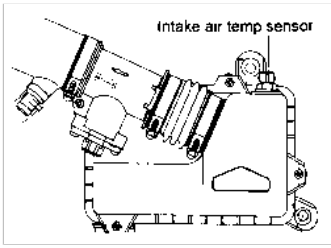
11. Heated oxygen sensor (HO2S)



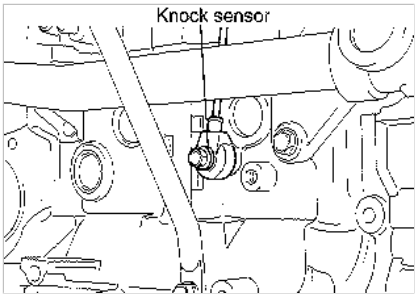
12. Idle speed control actuator (ISC actuator)



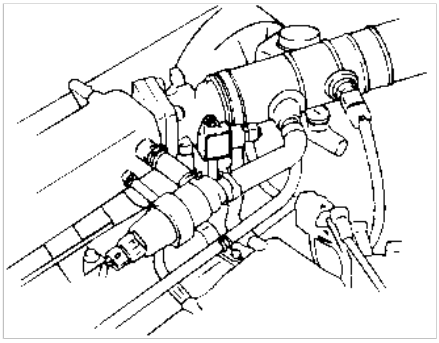
13. Intake air temp sensor



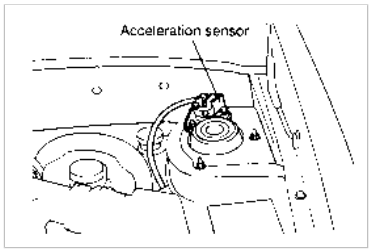
14. Knock sensor



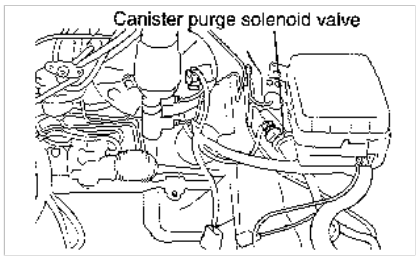
15. Throttle position sensor (TP sensor)



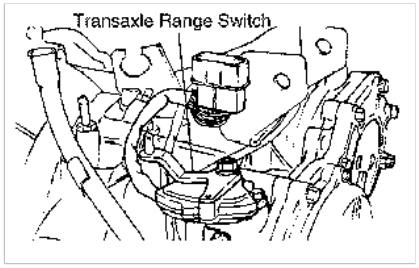
16. Acceleration sensor



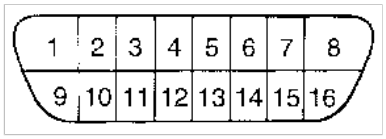
17. Evaporative emission canister purge solenoid valve



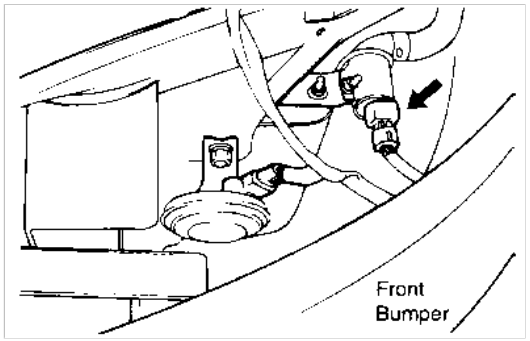
18. Transaxle range switch



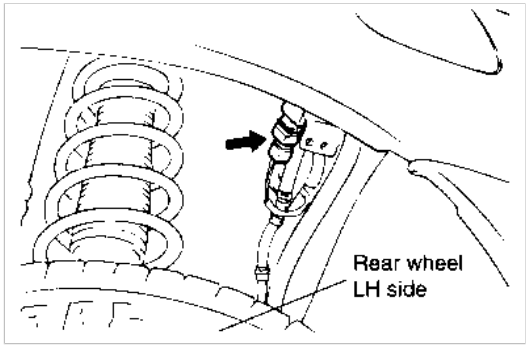
20. Data link connector



21. Canister Close Valve (CCV)

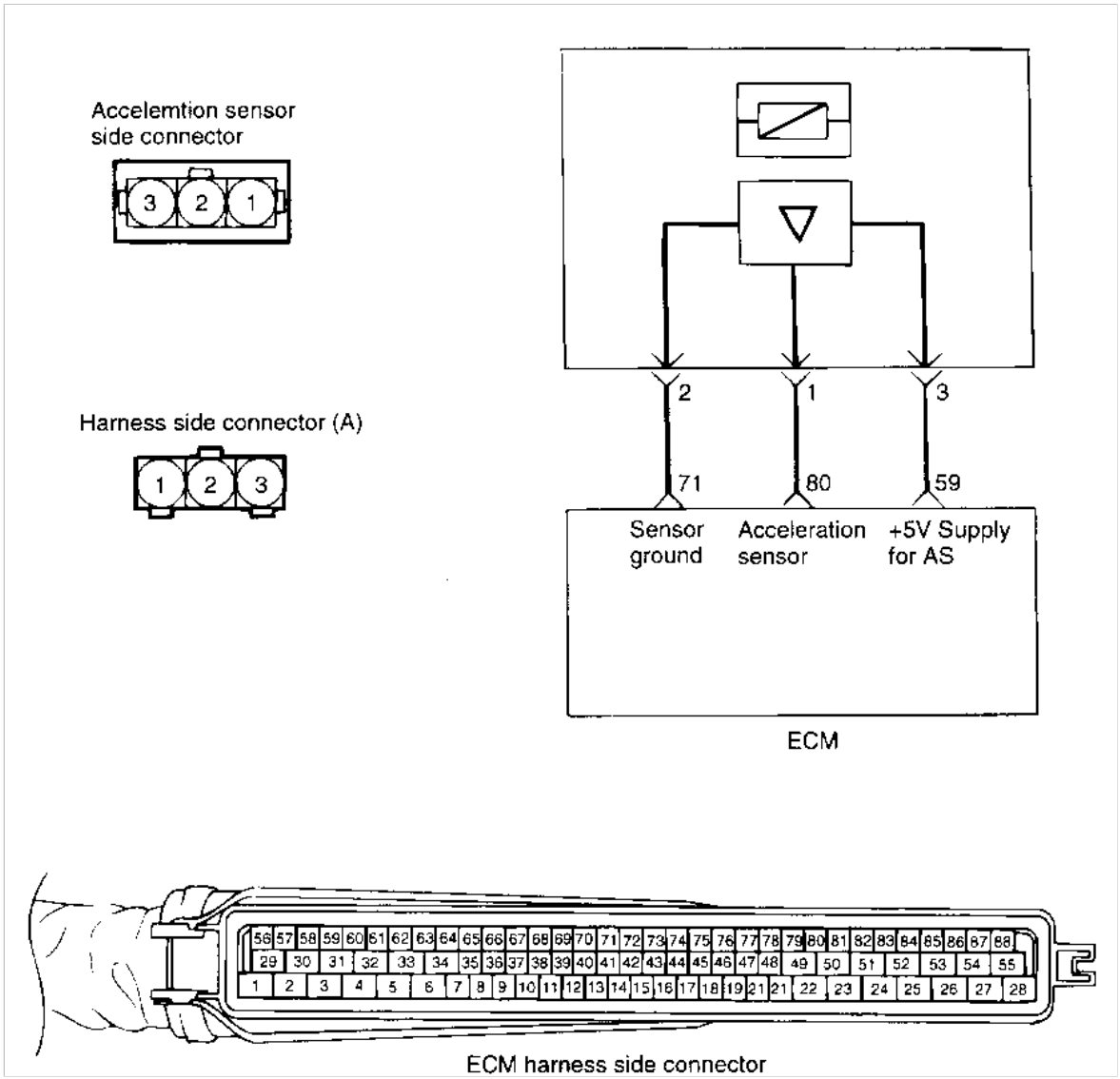


22. Fuel Tank Pressure (FTP) Sensor



Fuel System > MFI Control System > Accelerator Sensor > CIRCUIT DIAGRAM

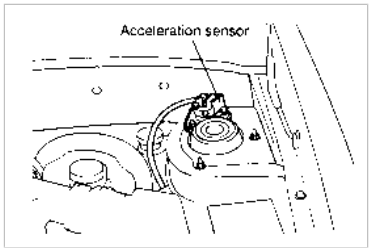
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Accelerator Sensor > DESCRIPTION

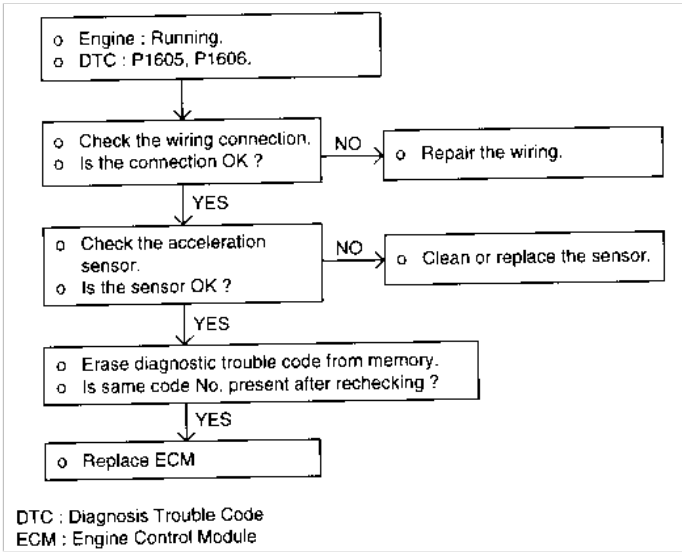
DESCRIPTION

The acceleration sensor is attached to the engine room of driver's side. While driving, the rough road condition is sensed by the acceleration sensor and the ECM uses this input signal to avoid the wrong misfire detection.



Fuel System > MFI Control System > Accelerator Sensor > DTC - P1605, P1606 (ACCELERATION SENSOR)

DTC - P1605, P1606 (ACCELERATION SENSOR)



TROUBLESHOOTING HINTS

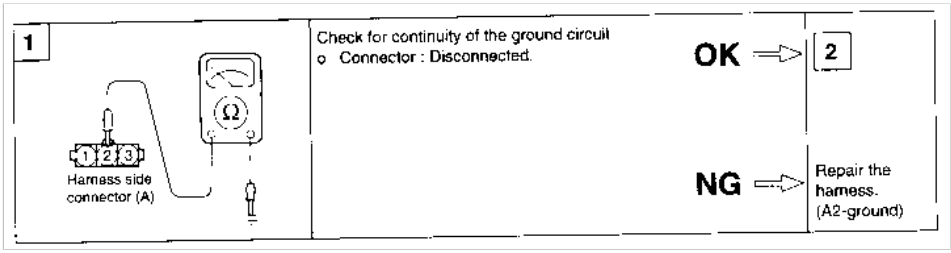
When abnormal output voltage occurs at stop position of vehicle or acceleration sensor is operated beyond normal operating zone.

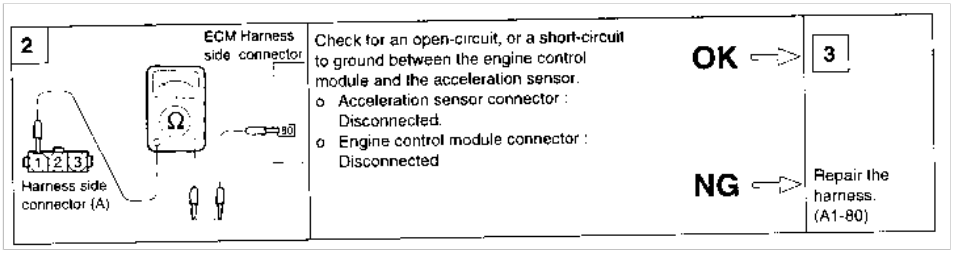
USING VOLTMETER

Check item	Check condition	Test specification
Acceleration sensor output voltage (acceleration sensor side connector No.1 or ECM harness side connector No. 80)	While idling	2.3 - 2.7V
	While driving	0.5 - 4.5v

Fuel System > MFI Control System > Accelerator Sensor > HARNESS INSPECTION PROCEDURES

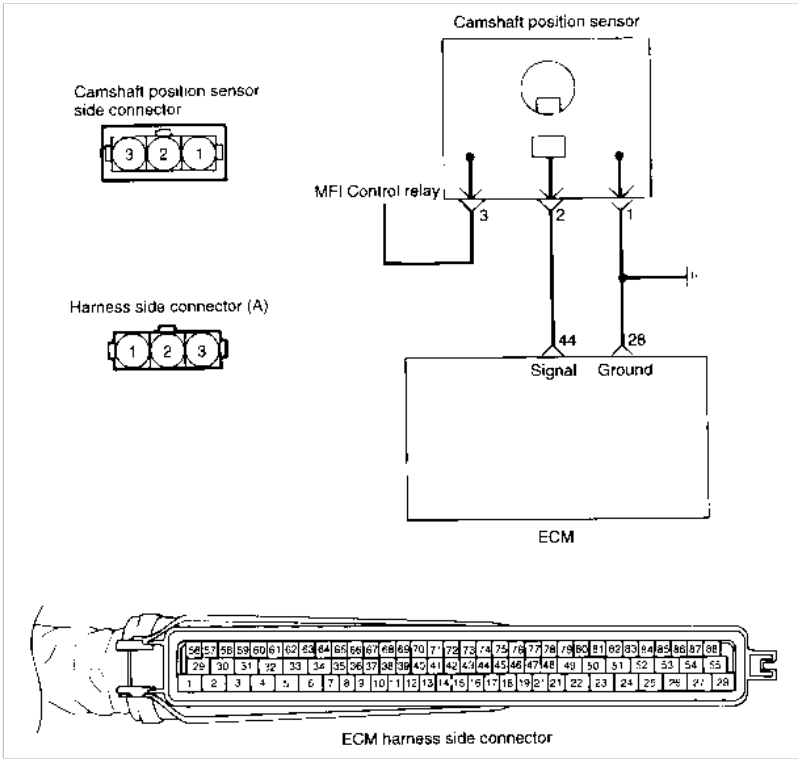
HARNESS INSPECTION PROCEDURES





Fuel System > MFI Control System > Camshaft Position Sensor > CIRCUIT DIAGRAM

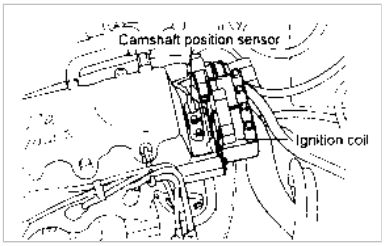
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Camshaft Position Sensor > DESCRIPTION

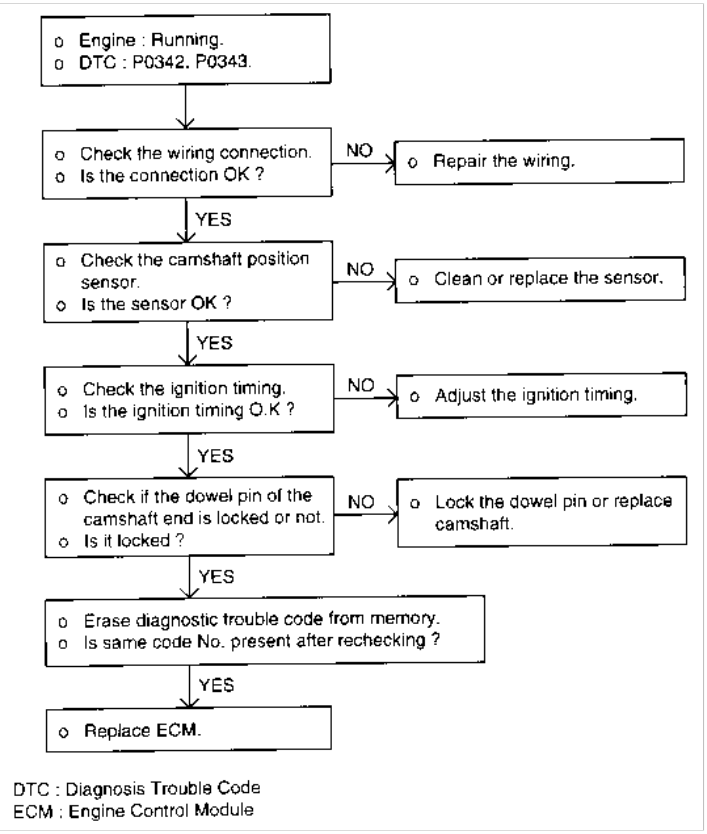
DESCRIPTION

Camshaft position sensor (CMP Sensor) senses the TDC point of No.1 cylinder in its compression stroke, whose signals are fed to ECM to be used to determine the sequence of fuel injection.



Fuel System > MFI Control System > Camshaft Position Sensor > DTC - P0342, P0343 (CMP SENSOR)

DTC - P0342, P0343 (CMP SENSOR)



TROUBLESHOOTING HINTS

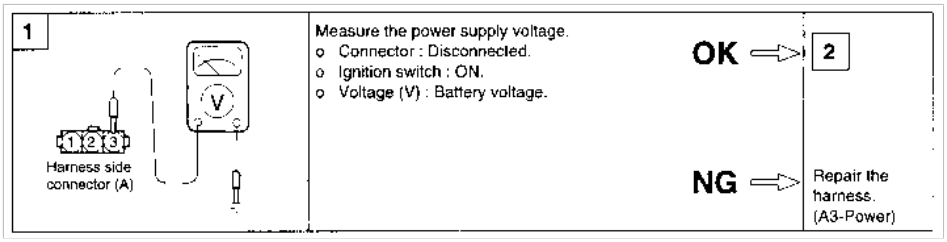
If the camshaft position sensor does not operate correctly (that is, if correct sequential injection is not made), the engine may stall or run irregularly at idle or fail to accelerate normally.

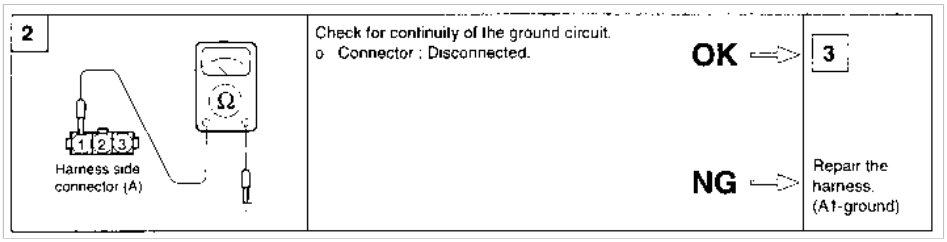
USING VOLTMETER

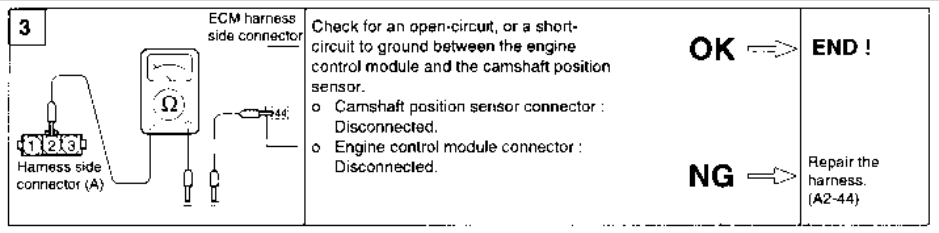
Check item	Check condition	Test specification
Camshaft position sensor output voltage (Camshaft position sensor side connector No.2 or ECM harness side connector No.44)	At idle (800 rpm)	0-5 V
	3000 rpm	0-5 v

Fuel System > MFI Control System > Camshaft Position Sensor > HARNESS INSPECTION PROCEDURES

HARNESS INSPECTION PROCEDURES

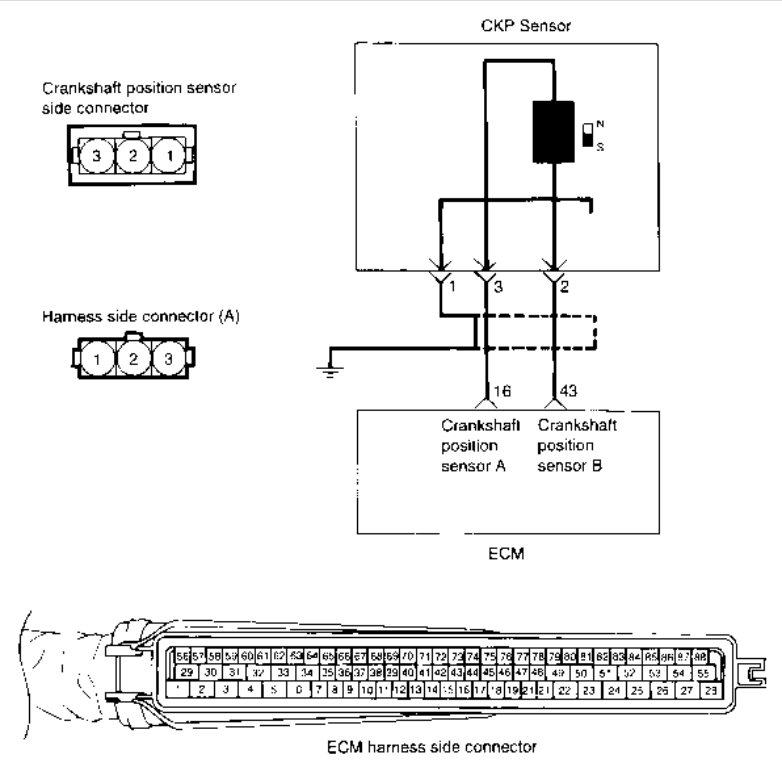






Fuel System > MFI Control System > Crankshaft Position Sensor > CIRCUIT DIAGRAM

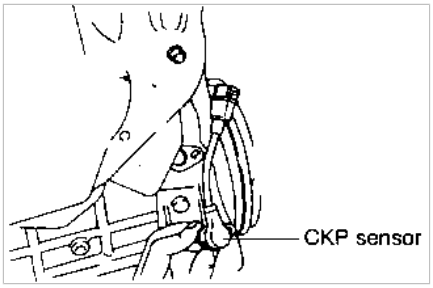
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Crankshaft Position Sensor > DESCRIPTION

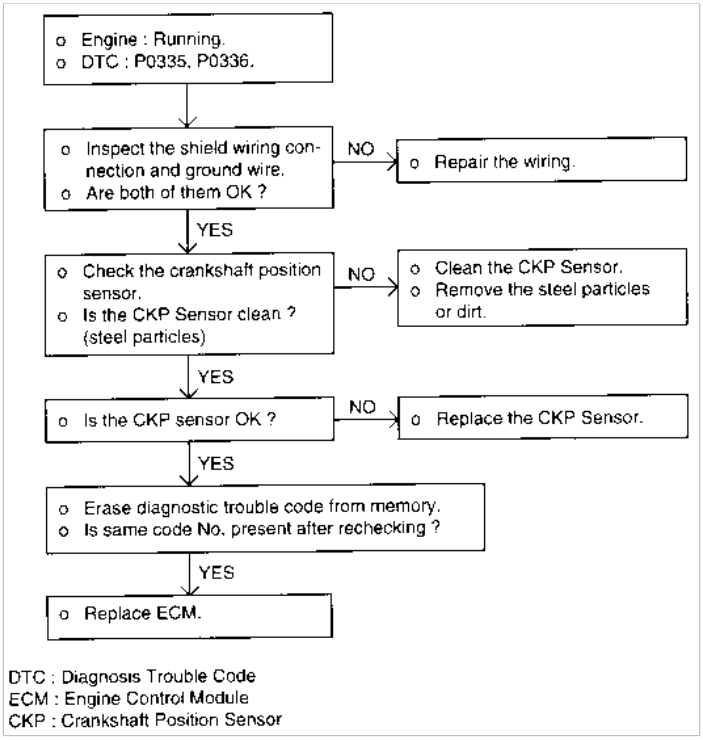
DESCRIPTION

The crankshaft position sensor which consists of a magnet and coil is installed on the flywheel. The voltage signal from this crankshaft position sensor is provided to the ECM for detecting the engine RPM and position of crankshaft.



Fuel System > MFI Control System > Crankshaft Position Sensor > DTC - P0335, P0336 (CKP SENSOR)

DTC - P0335, P0336 (CKP SENSOR)



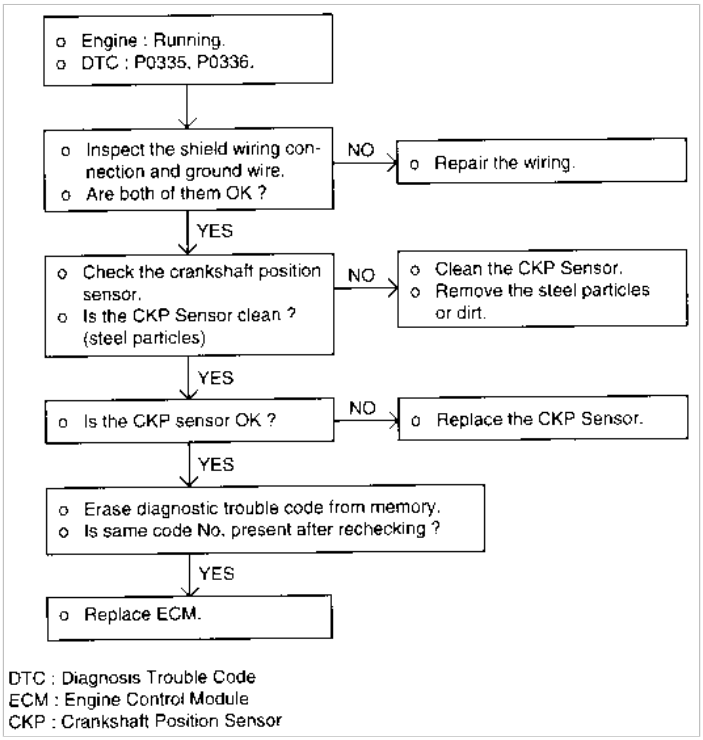
DTC : Diagnosis Trouble Code
ECM : Engine Control Module
CKP : Crankshaft Position Sensor

TROUBLESHOOTING HINTS

a. If unexpected misses are felt during driving or the engine stalls suddenly, shake the crankshaft position sensor harness. If this causes the engine to stall, check for poor contact at the sensor connector.
b. If the tachometer reads 0 rpm when the engine is cranked, check for faulty crankshaft position sensor or ignition system problems.
c. If the tachometer reads 0 rpm when the engine is cranked and it does not start, ignition coil, power TR, or an ECM defect can be considered.
d. Engine can be stalled when the crankshaft position sensor cable is close to the high voltage cable due to the electronic noise caused by the high voltage induced.

Fuel System > MFI Control System > Crankshaft Position Sensor > DTC - P0335, P0336 (CRANKSHAFT POSITION SENSOR)

DTC - P0335, P0336 (CRANKSHAFT POSITION SENSOR)



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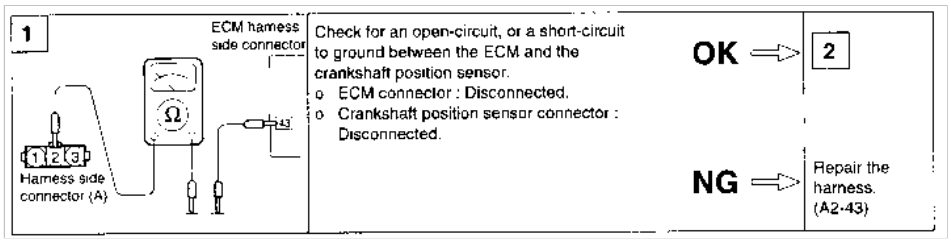
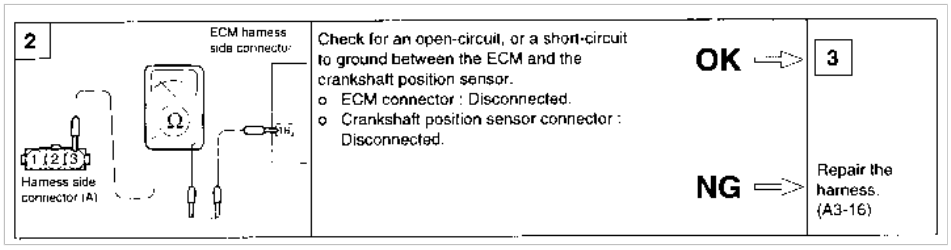
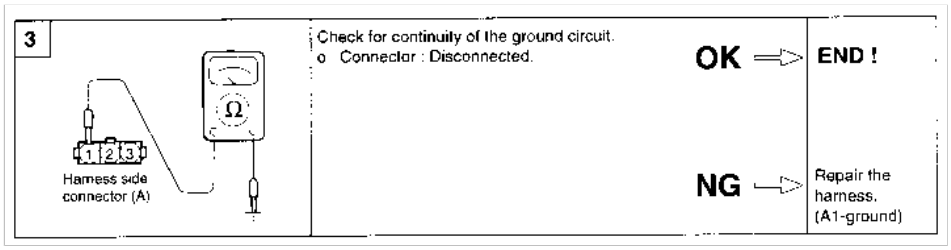
Fuel System > MFI Control System > Crankshaft Position Sensor > HARNESS INSPECTION PROCEDURE

HARNESS INSPECTION PROCEDURE

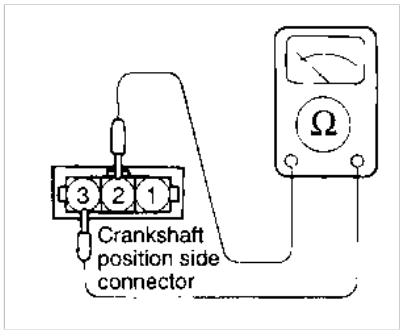






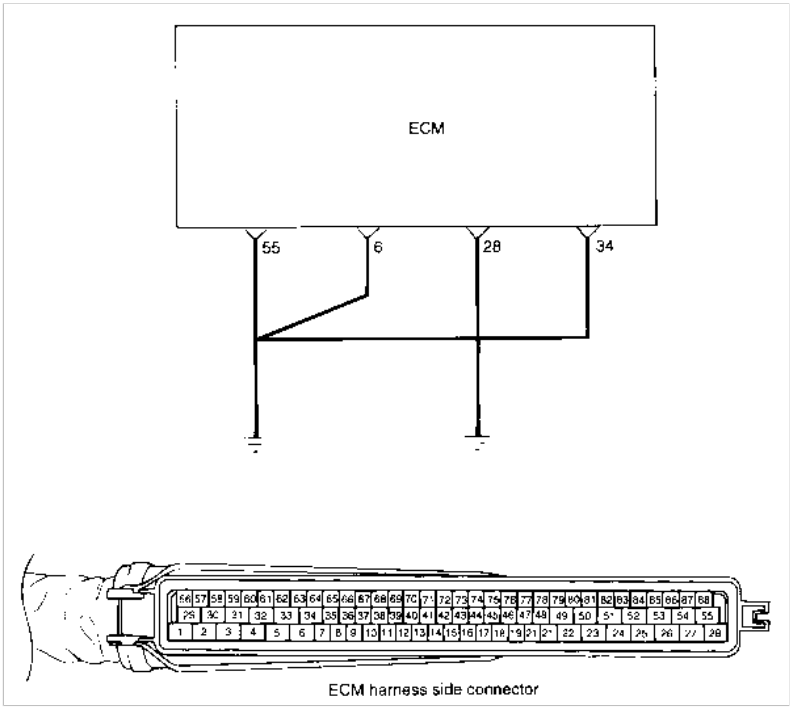
SENSOR INSPECTION

1. Disconnect the crankshaft position sensor connector.
2. Measure the resistance between terminals 2 and 3.
3. If the resistance deviates far from the standard value, replace the sensor.



Fuel System > MFI Control System > Engine Control Module (ECM) > CIRCUIT DIAGRAM

CIRCUIT DIAGRAM

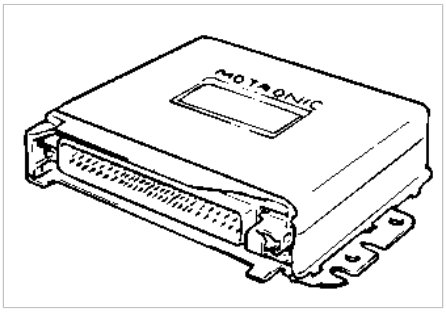


ECM harness side connector

Fuel System > MFI Control System > Engine Control Module (ECM) > DESCRIPTION

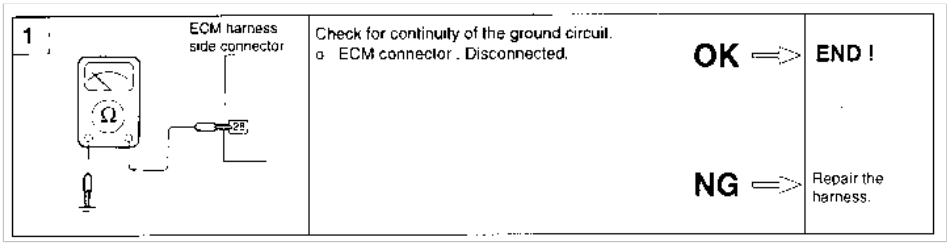
Description

Check the internal control module ROM/RAM error.



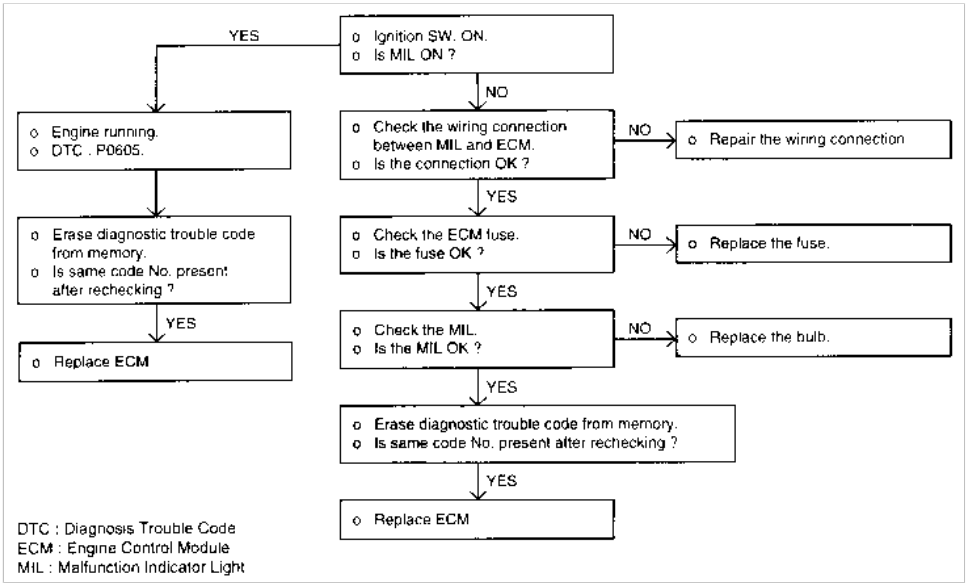
Fuel System > MFI Control System > Engine Control Module (ECM) > HARNESS INSPECTION PROCEDURE

HARNESS INSPECTION PROCEDURE



Fuel System > MFI Control System > Engine Control Module (ECM) > MIL CHECK

MIL CHECK



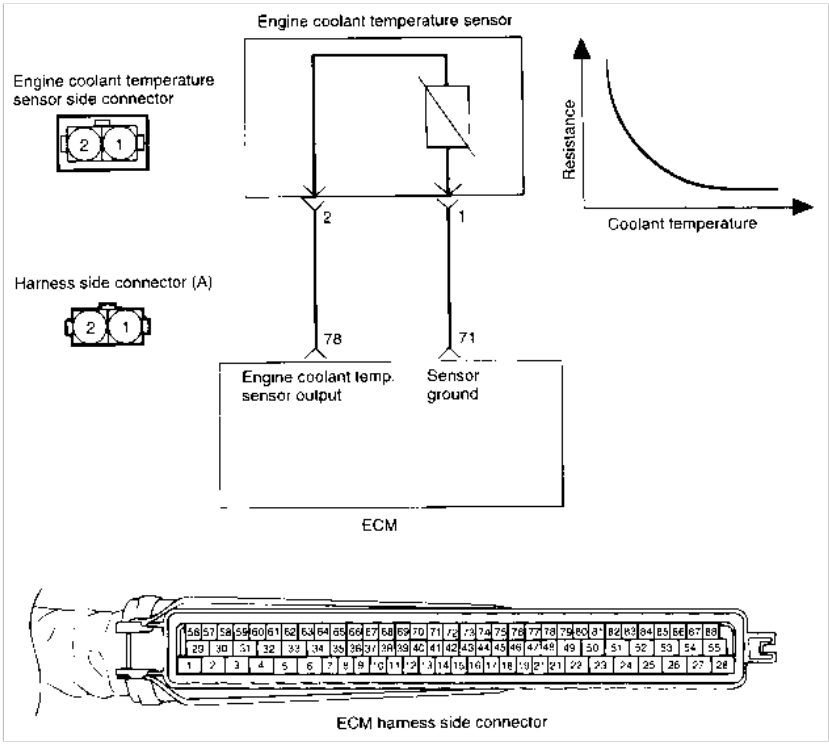
TROUBLESHOOTING HINTS

a. If the ground wire of the ECM is not connected securely to ground, the ECM will not operate correctly.

b. If we replace ECM ROM without further diagnosis, the problem may reoccur.

Fuel System > MFI Control System > Engine Coolant Temperature (ECT) Sensor > CIRCUIT DIAGRAM

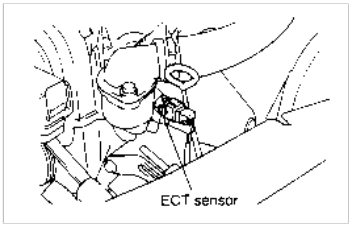
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Engine Coolant Temperature (ECT) Sensor > DESCRIPTION

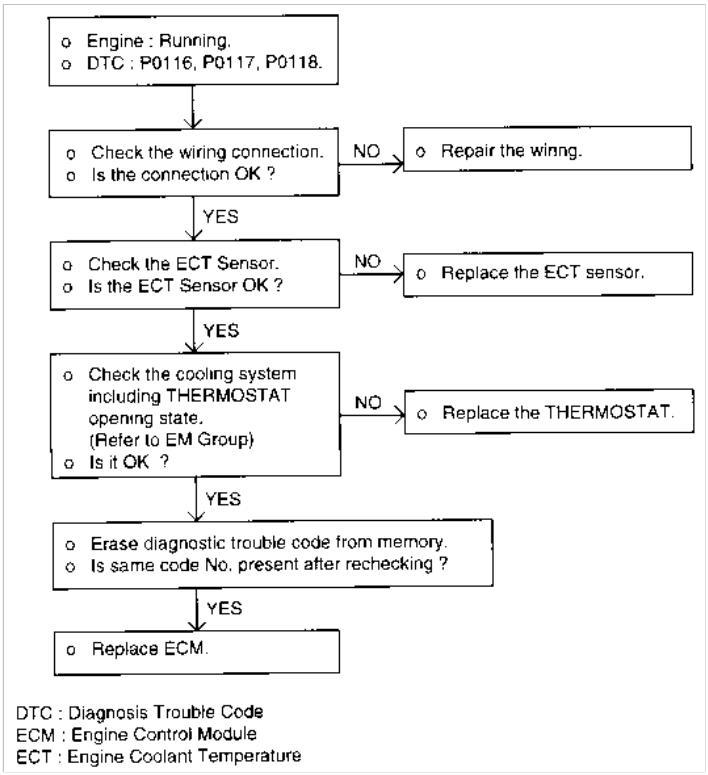
Description

The engine coolant temperature sensor is installed in the engine coolant passage of the cylinder head. It detects engine coolant temperature and emits signals to the ECM. This part employs a Thermistor which is sensitive to changes in temperature. The electric resistance of a Thermistor decreases in response to temperature rise. The ECM judges engine coolant temperature by the sensor output voltage and provides optimum fuel enrichment when the engine is cold.



Fuel System > MFI Control System > Engine Coolant Temperature (ECT) Sensor > DTC - P0116, P0117, P0118 (ECT SENSOR)

DTC - P0116, P0117, P0118 (ECT SENSOR)



TROUBLESHOOTING HINTS

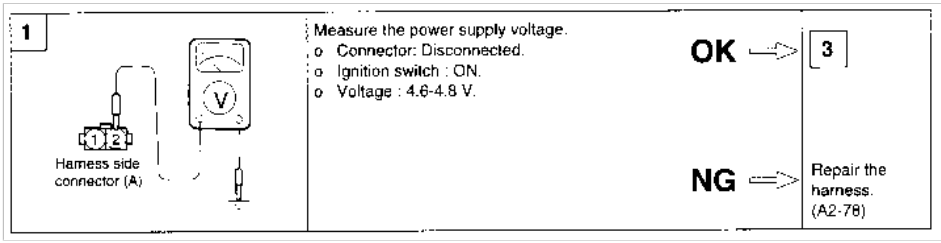
If the fast idle speed is not enough or the engine gives off dark smoke during the engine warm-up operation, it might be caused by the engine coolant temperature sensor.

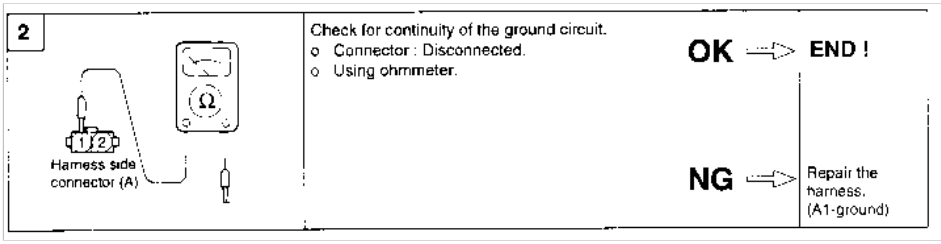
USING VOLTMETER

Check item	Coolant temperature	Test specification
Engine coolant temperature sensor output voltage (ECT Sensor side connector No.2 or ECM harness side connector No.78)	When 0°C	4.05 V
	When 20°C	3.44 V
	When 40°C	2.72 V
	When 80°C	1.25 v

Fuel System > MFI Control System > Engine Coolant Temperature (ECT) Sensor > HARNESS INSPECTION PROCEDURES

HARNESS INSPECTION PROCEDURES

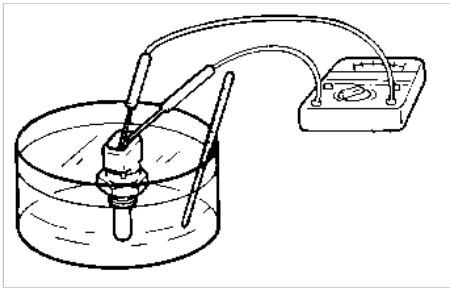




SENSOR INSPECTION

1. Remove the engine coolant temperature sensor from the intake manifold.
2. With temperature sensing portion of engine coolant temperature sensor immersed in hot water, check resistance.

Temperature °C(°F)	Resistance (kΩ)
-30 (-22)	22.22-31.78
-10 (14)	8.16-10.74
0 (32)	5.18-6.60
20 (68)	2.27-2.73
40 (104)	1.059-1.281
60 (140)	0.538-0.650
80 (176)	0.298-0.322
90 (194)	0.219-0.243



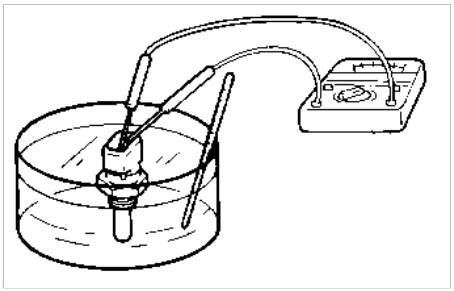
3. If the resistance deviates greatly from the standard value, replace the sensor.

Fuel System > MFI Control System > Engine Coolant Temperature (ECT) Sensor > INSPECTION

INSPECTION

Coolant Temperature Sensor

1. Heat the sensor by submerging it in hot water.
2. Check that the resistance is within the specified range.



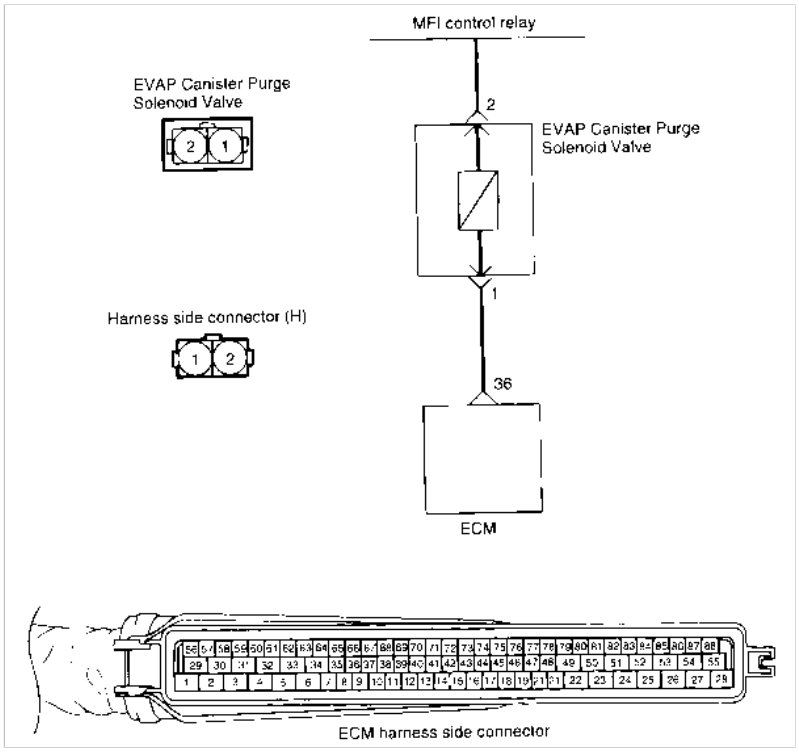
Fuel System > MFI Control System > Engine Coolant Temperature (ECT) Sensor > INSTALLATION

INSTALLATION

1. Apply sealant LOCTITE 962T or equivalent to threaded portion.
2. Install engine coolant temperature sensor and tighten it to specified torque.
3. Connect the harness connector securely.

Fuel System > MFI Control System > Evaporative [EVAP] Emission Canister Purge Solenoid Valve > CIRCUIT DIAGRAM

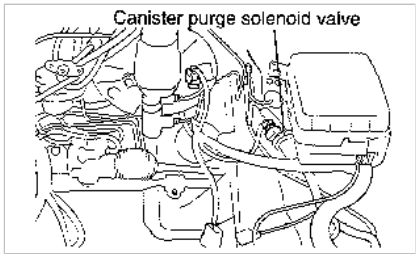
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Evaporative [EVAP] Emission Canister Purge Solenoid Valve > DESCRIPTION

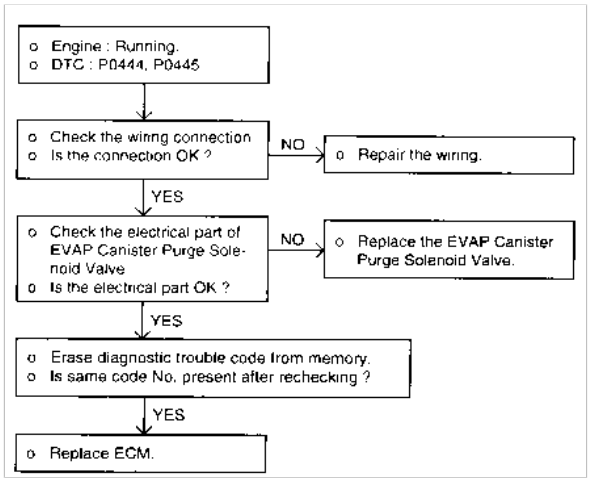
Description

The evaporative emission canister purge solenoid valve is a duty control type, which controls introduction of purge air from the evaporative emission canister.



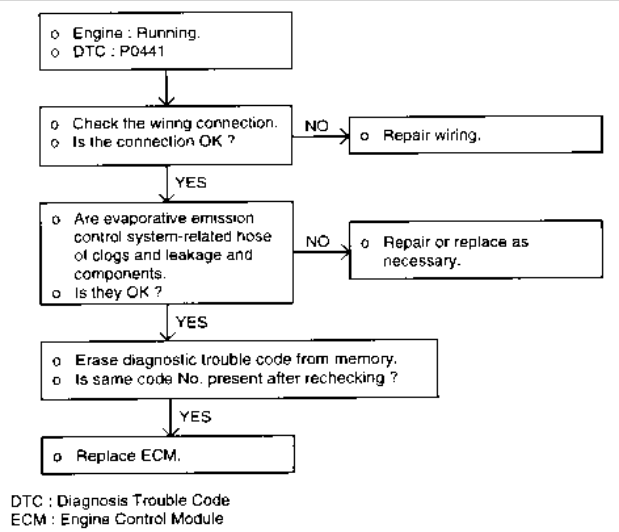
Fuel System > MFI Control System > Evaporative [EVAP] Emission Canister Purge Solenoid Valve > DTC - P0441, P0444, P0445

DTC - P0441, P0444, P0445



TROUBLESHOOTING HINTS

Open or short circuit is observed in purge solenoid valve (High) system when ignition switch is turned on.

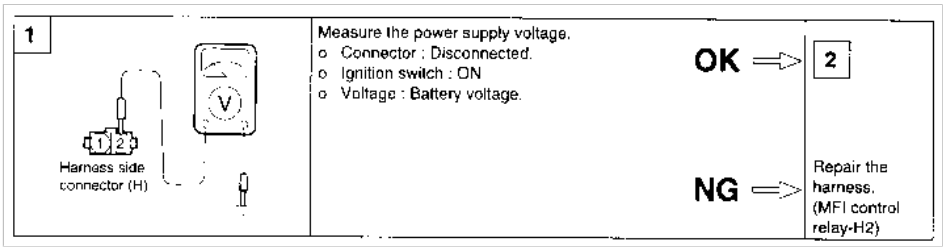


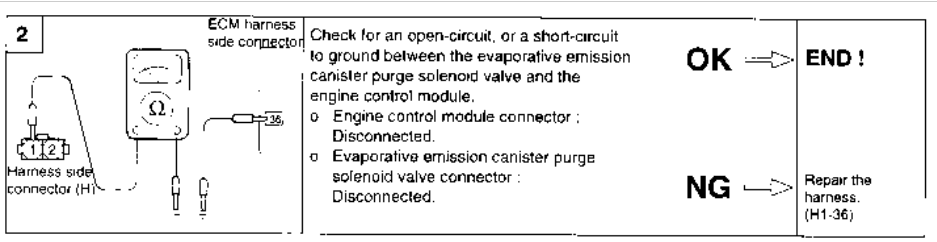
TROUBLESHOOTING HINTS

Evaporative emission control system does not function normally because of mechanical trouble.

Fuel System > MFI Control System > Evaporative [EVAP] Emission Canister Purge Solenoid Valve > HARNESS INSPECTION

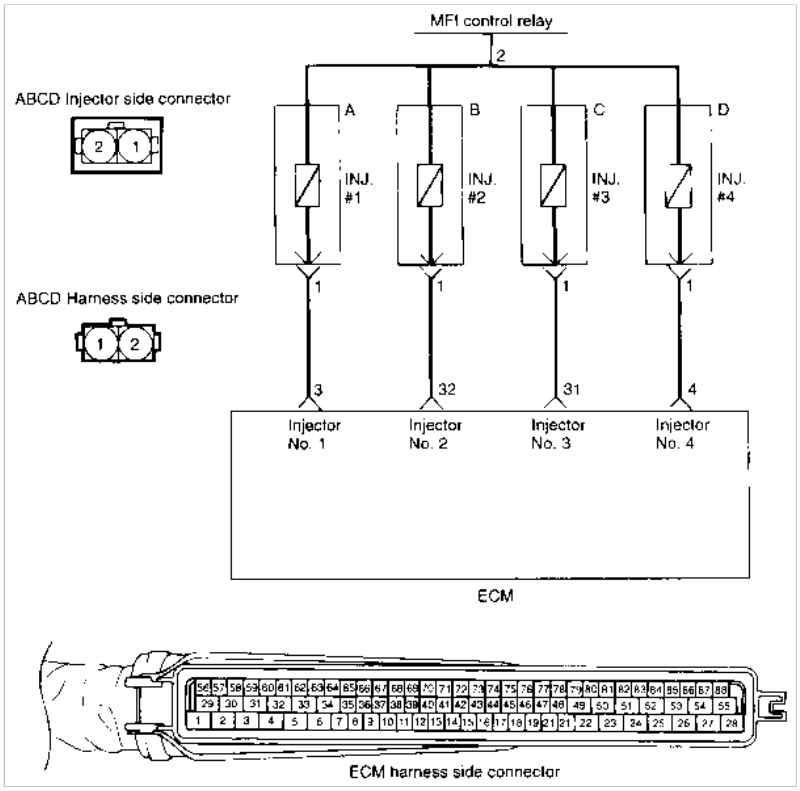
HARNESS INSPECTION





Fuel System > MFI Control System > Fuel Injector > CIRCUIT DIAGRAM

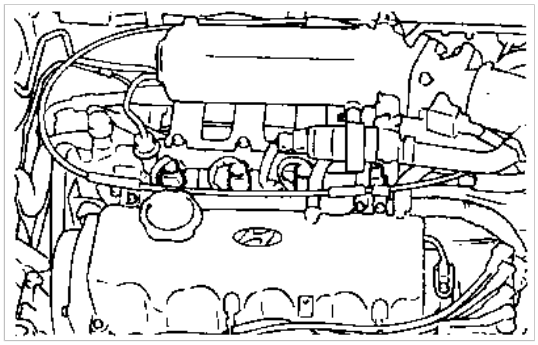
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Fuel Injector > DESCRIPTION

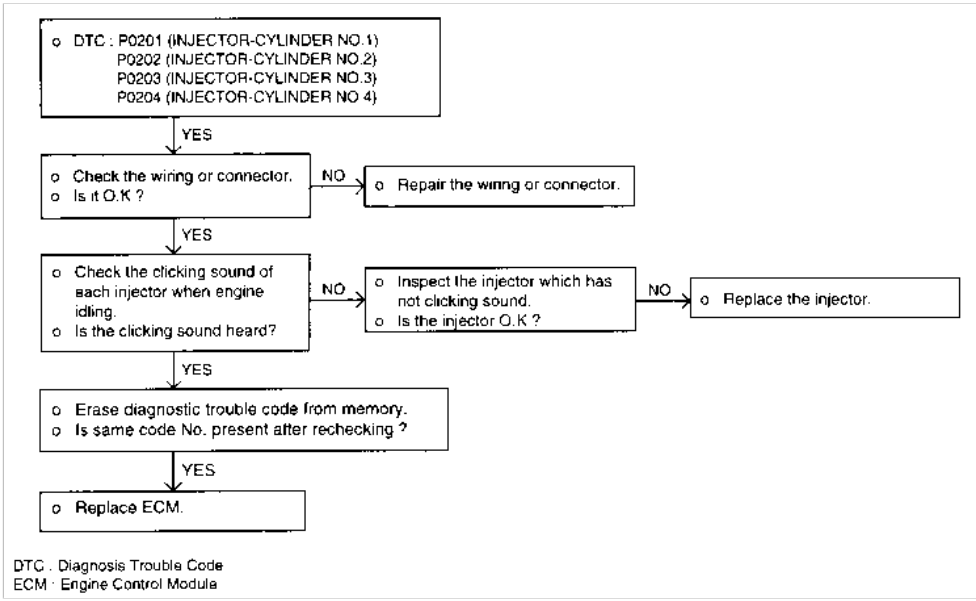
Description

The injectors inject fuel according to a signal coming from the ECM. The volume of fuel injected by the injector is determined by the time during which the solenoid valve is energized.



Fuel System > MFI Control System > Fuel Injector > DTC - P0201, P0202, P0203, P0204

DTC - P0201, P0202, P0203, P0204



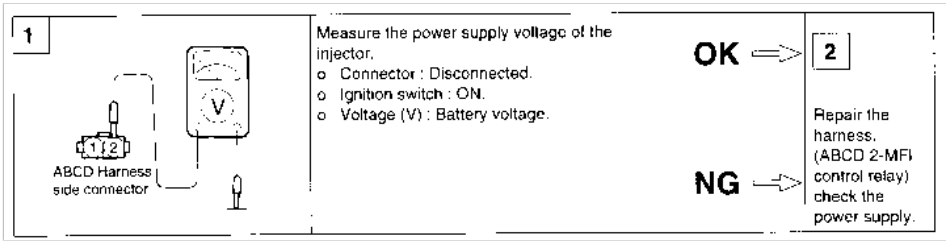
DTC : Diagnosis Trouble Code
ECM : Engine Control Module

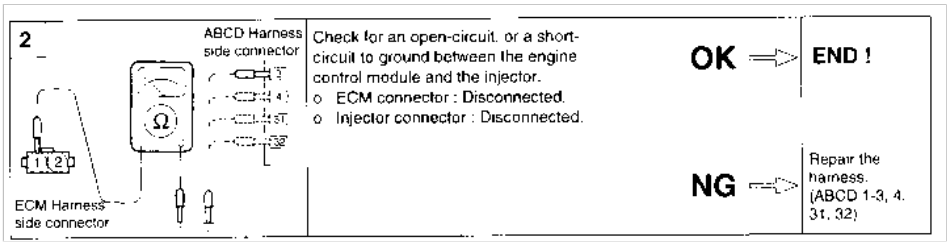
TROUBLESHOOTING HINTS

a. If the engine is hard to start when hot, check for fuel pressure and injector leaks.
b. If the injector does not operate when the engine is cranked, then check the following:
1) Faulty power supply circuit to the ECM and faulty ground circuit
2) Faulty MFI control relay
3) Faulty crankshaft position sensor and camshaft position sensor
c. If there is any cylinder whose idle state remains unchanged when the fuel injection of injectors is cut one after another during idling, check each cylinder for the following:
1) Injector and harness
2) Ignition plug and high tension cable
3) Compression pressure
d. If the injection system is OK but the injector drive time is out of specification, check for the following items.
1) Poor combustion in the cylinder. (faulty ignition plug, ignition coil, compression pressure and etc.)
e. The MIL is on or the DTC is displayed on the SCAN TOOL under the following condition.
1) When the injector itself is faulty.

Fuel System > MFI Control System > Fuel Injector > HARNESS INSPECTION PROCEDURES

HARNESS INSPECTION PROCEDURES



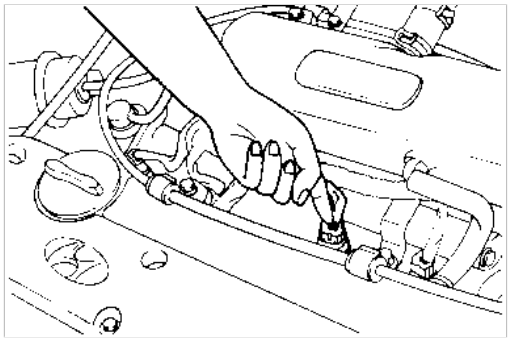


Fuel System > MFI Control System > Fuel Injector > INSPECTION

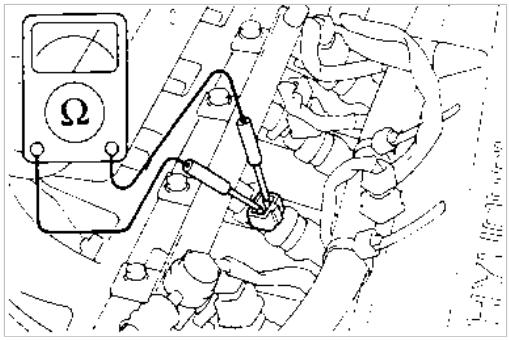
INSPECTION

1. **Operation Sound Check**

Using a stethoscope, check the injectors for a clicking sound at idle. Check that the sound is produced at shorter intervals as the engine speed increases.
Ensure that the sound from an adjacent injector is not being transmitted along the delivery pipe to an inoperative injector.



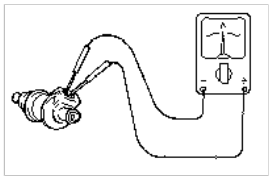
2. If a stethoscope is not available, check the injector operation with your finger. If no vibrations are felt, check the wiring connector, injector, or injection signal from ECM.
3. **Resistance Measurement Between Terminals**
   Disconnect the connector at the injector.
4. Measure the resistance between terminals.
5. If the resistance is not within specification, replace the injector.



Fuel System > MFI Control System > Fuel Injector > INSPECTION

INSPECTION

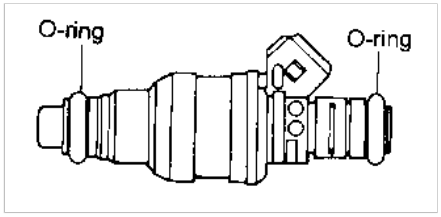
1. Measure the resistance of the injectors between the terminals using an ohmmeter.
2. If the resistance is not with in specifications, replace the injectors.



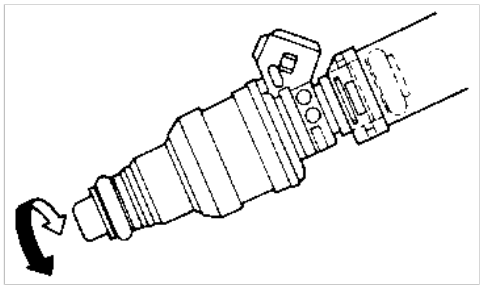
Fuel System > MFI Control System > Fuel Injector > INSTALLATION

INSTALLATION

1. Install a new grommet and O-ring to the injector.
2. Apply a coating of solvent, spindle oil gasoline to the O-ring of the injector.



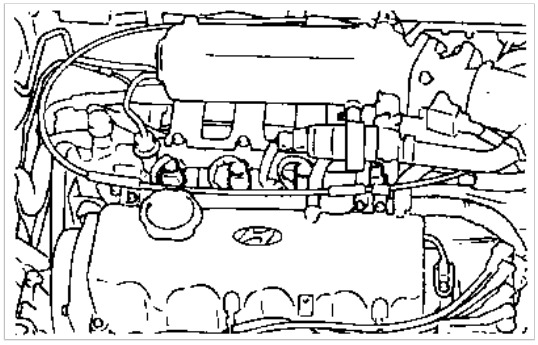
3. While turning the injector to the left and right, install it on to the delivery pipe.
4. Be sure the injector turns smoothly.
   If it does not turn smoothly, the O-ring may be jammed; remove the injector and re-insert it into the delivery pipe and re-check.



Fuel System > MFI Control System > Fuel Injector > REMOVAL

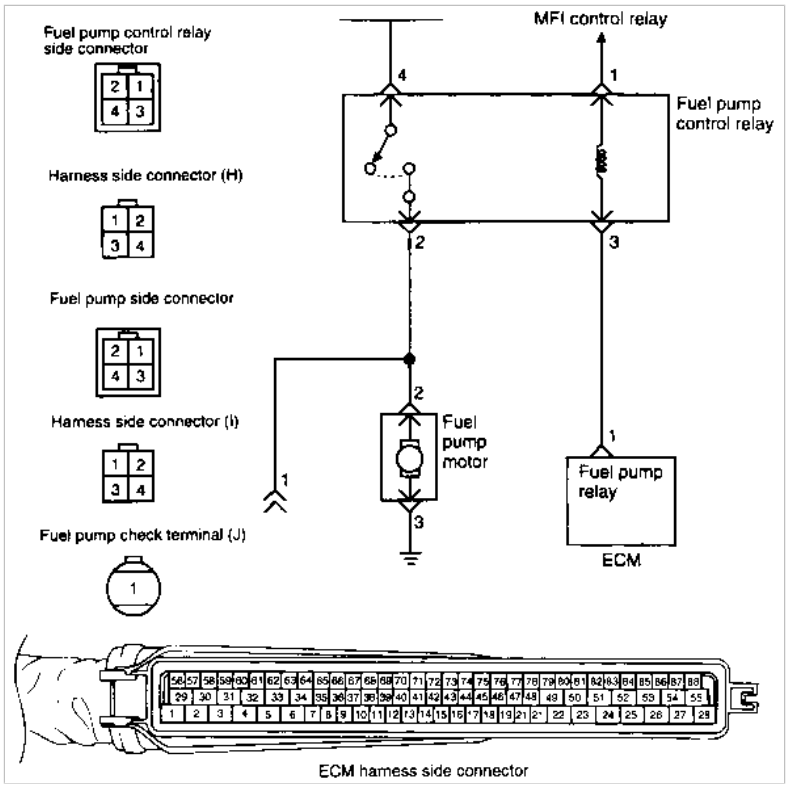
REMOVAL

1. Release residual pressure from the fuel line to prevent fuel from spilling.
   Cover the hose connection with rags to prevent splashing of fuel that could be caused by residual pressure in the fuel line.
2. Remove the delivery pipe with fuel injector and pressure regulator.
   a. Be careful not to drop any injectors when removing the delivery pipe.
   b. Be aware that fuel may flow out when removing the injector.



Fuel System > MFI Control System > Fuel Pump Inspection Connector > CIRCUIT DIAGRAM

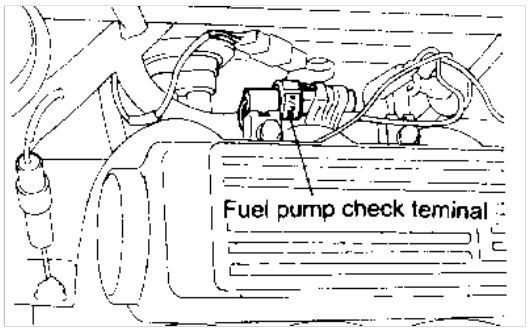
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Fuel Pump Inspection Connector > DESCRIPTION

Description

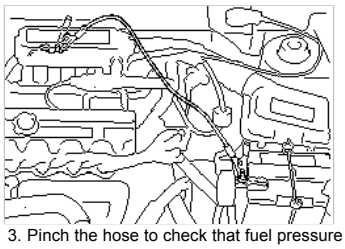
The fuel pump inspection terminal, located in the engine compartment, is used to check fuel pump operation by connecting battery voltage directly to the terminal.



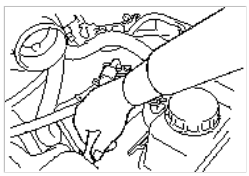
Fuel System > MFI Control System > Fuel Pump Inspection Connector > FUEL PUMP OPERATING CHECK

FUEL PUMP OPERATING CHECK

1. Turn the ignition switch OFF.
2. Apply battery voltage to the fuel pump drive connector to check that the pump operates.
   The fuel pump is an in-tank type. Its operating sound is difficult to hear without removing the fuel tank cap.

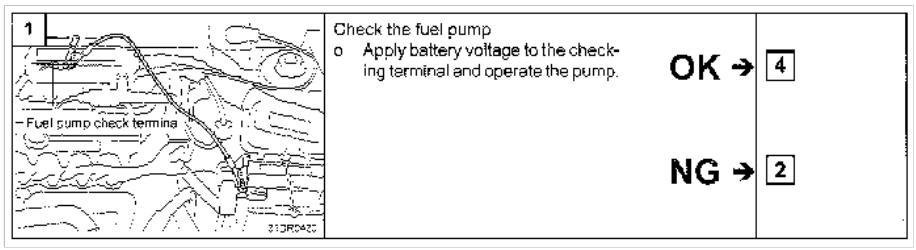


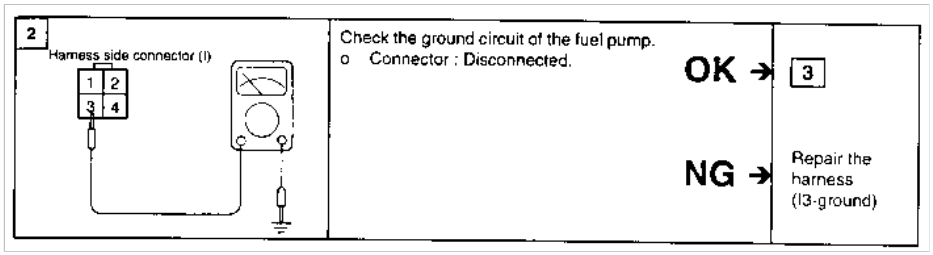
3. Pinch the hose to check that fuel pressure is felt.

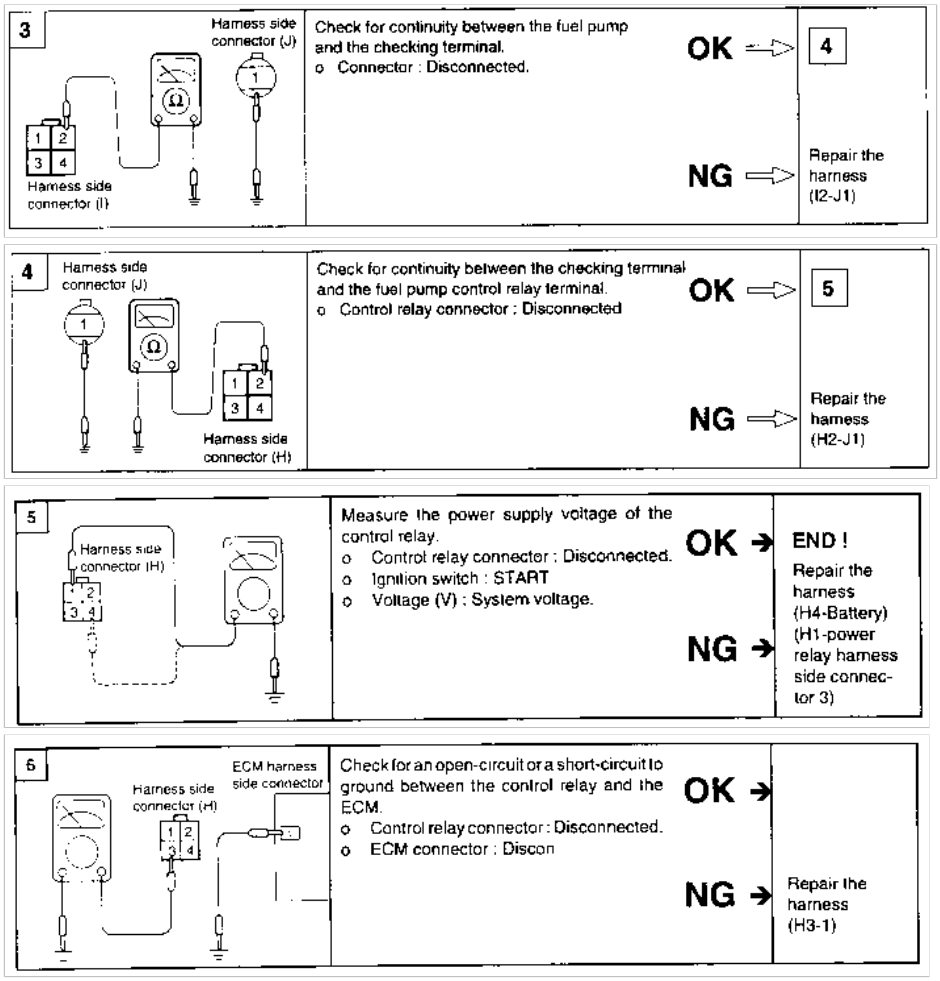


Fuel System > MFI Control System > Fuel Pump Inspection Connector > HARNESS INSPECTION PROCEDURES

HARNESS INSPECTION PROCEDURES

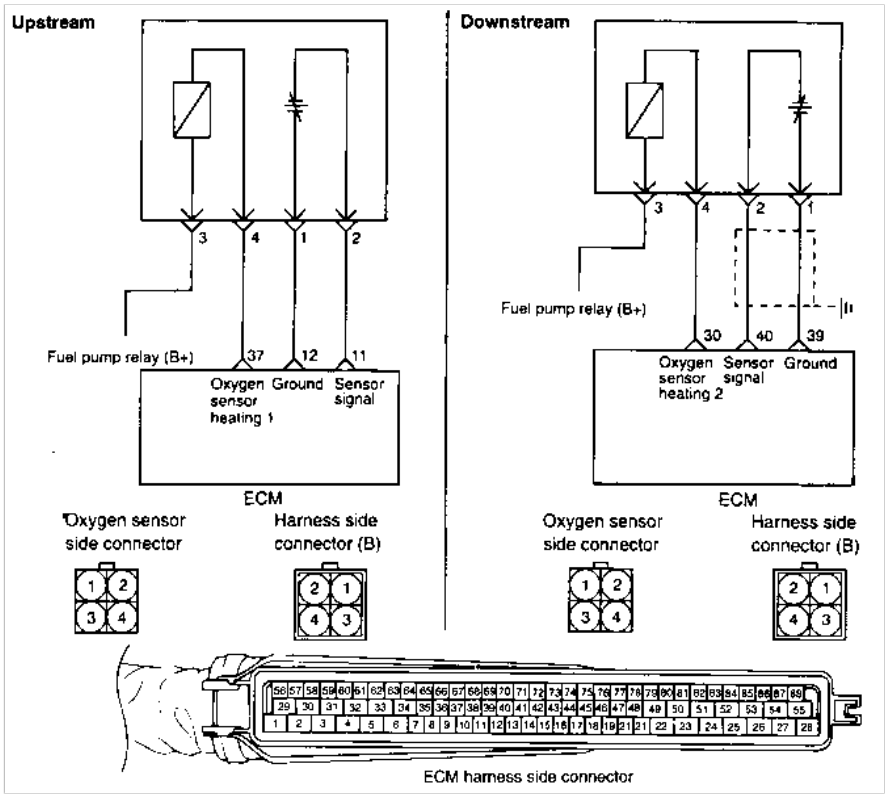






Fuel System > MFI Control System > Heated Oxygen Sensor (HO2S) > CIRCUIT DIAGRAM

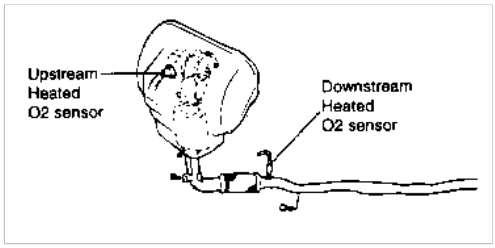
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Heated Oxygen Sensor (HO2S) > DESCRIPTION

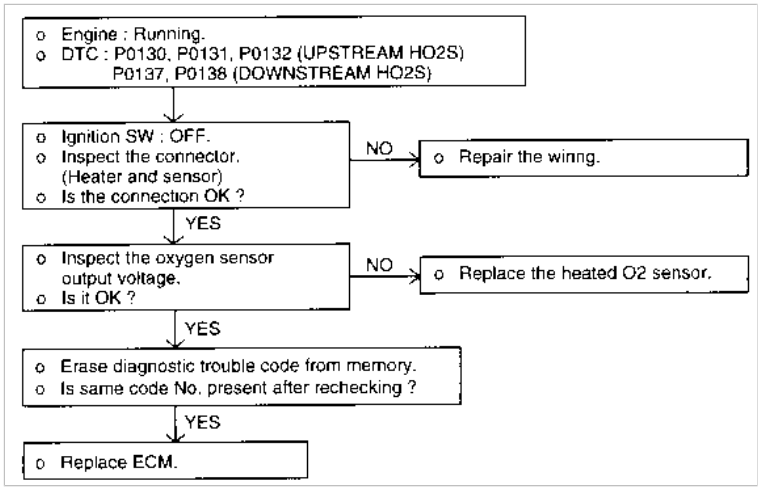
DESCRIPTION

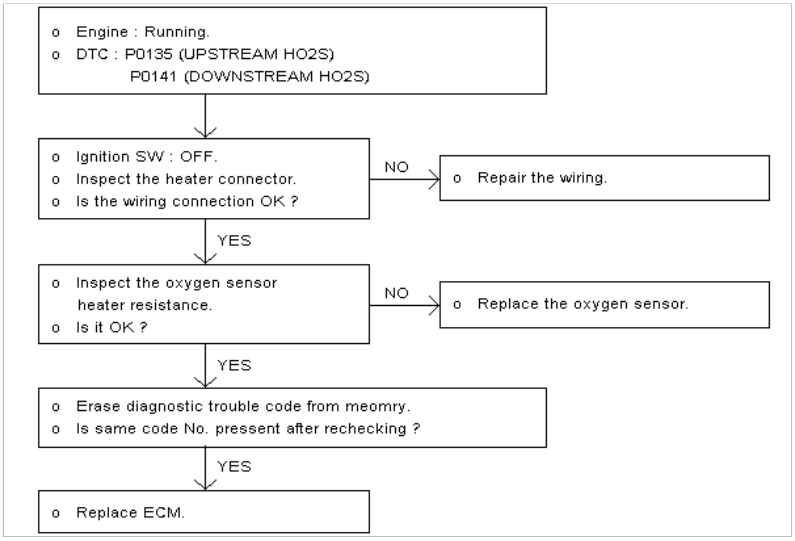
The heated oxygen senor senses the oxygen concentration in exhaust gas and converts it into a voltage which is sent to the ECM. The heated oxygen sensor outputs about 800mV when the air fuel ratio is richer than the theoretical ratio and outputs about 100mV when the ratio is leaner (higher oxygen concentration in exhaust gas.) The ECM controls the fuel injection ratio based on this signal so that the air fuel ratio is maintained at the theoretical ratio. The oxygen sensor has a heater element which ensures the sensor performance during all driving conditions.

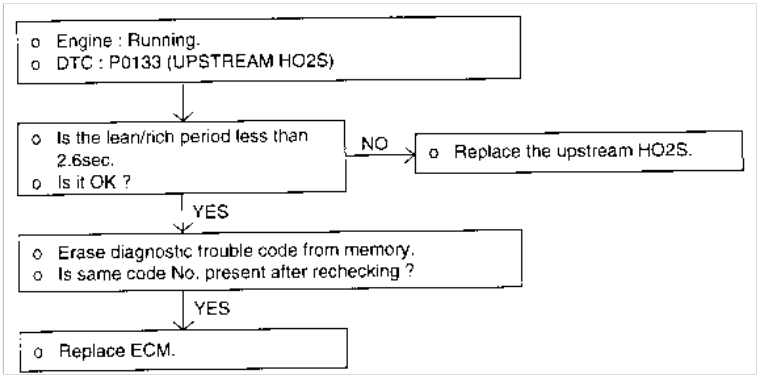


Fuel System > MFI Control System > Heated Oxygen Sensor (HO2S) > DTC - P0130, P0131, P0132, P0137, P0138

DTC - P0130, P0131, P0132, P0137, P0138

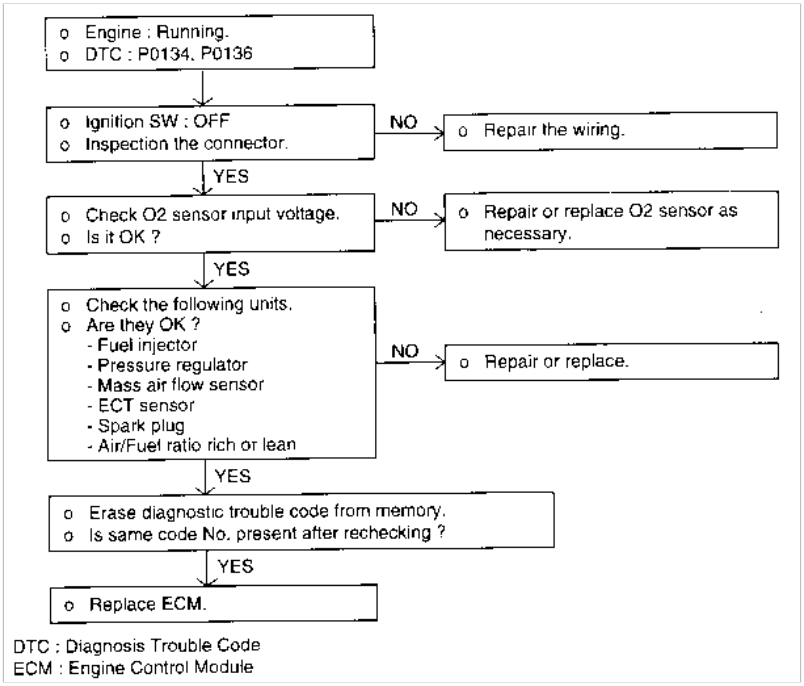






TROUBLESHOOTING HINTS

When the lean/rich period is above 2.6 seconds in a fully warmed-up engine is 2,000-3,000 rpm and engine is above middle load.



TROUBLESHOOTING HINTS

a. If the heated oxygen sensor is defective, abnormally high emission may occur.

b. If the heated oxygen sensor check has been normal, but the sensor output voltage is out of specification, check for the following items related to air fuel ratio control system.

1) Faulty injector.

2) Air leaks in the intake manifold.

3) Faulty mass air flow sensor, EVAP valve and engine coolant temperature sensor.

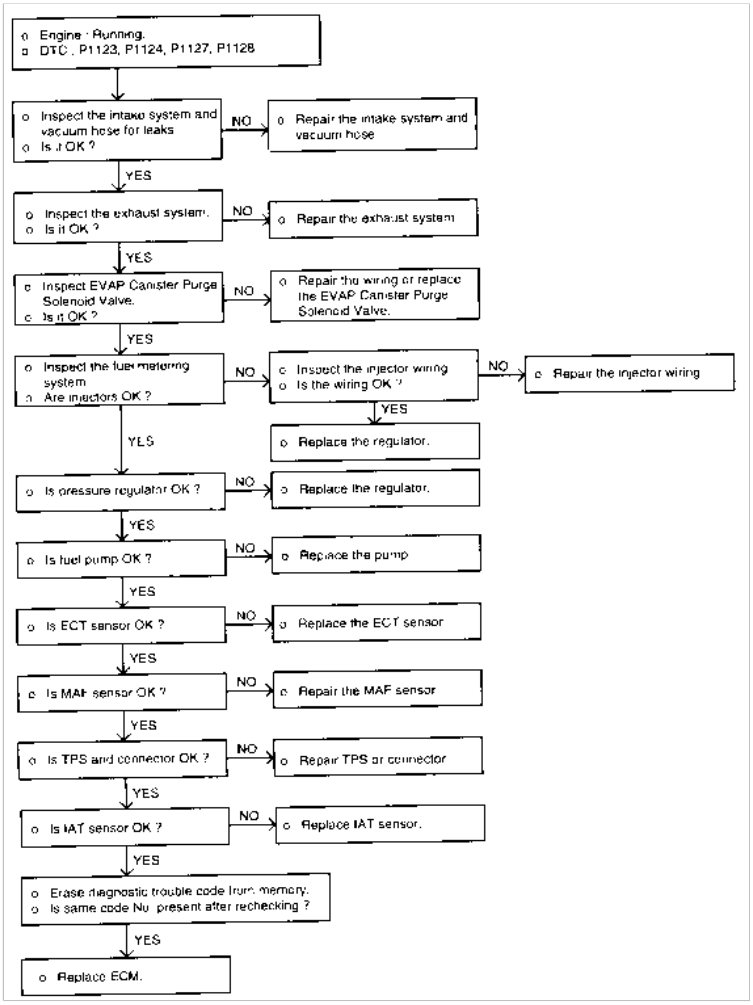
4) Wiring connection problem.
c. When O2 sensor output voltage is maintained as following for above 50 sec.
1) Upstream: 0.4V - 0.6V
2) Downstream: 0.4V - 0.5V

Check item	Check condition	Engine condition	Test specifi-cation
Heated oxygen sensor output voltage. (Heated oxygen sensor side connector No. 2 or ECM harness side connector)	Warm-up.	When decelerating suddenly from 4,000 rpm.	'A' 200 mV or lower.
		When engine is suddenly raced.	'B' 600-1,000 mV.
Heater resistance	Cooling (22°C)	Key OFF	2.1±0.4Ω

If you release the accelerator pedal suddenly while the engine is running at about 4000 rpm, the fuel supply will be stopped for a while.
When you suddenly press the accelerator pedal, the voltage will reach 'B' range. Then, when you let the engine idle again, the voltage will fluctuates between 'A' and 'B' range. In this case, the O2 sensor can be determined as good.

Fuel System > MFI Control System > Heated Oxygen Sensor (HO2S) > DTC - P0130, P0131, P0132, P0137, P0138 (AIR-FUEL CONTROL)

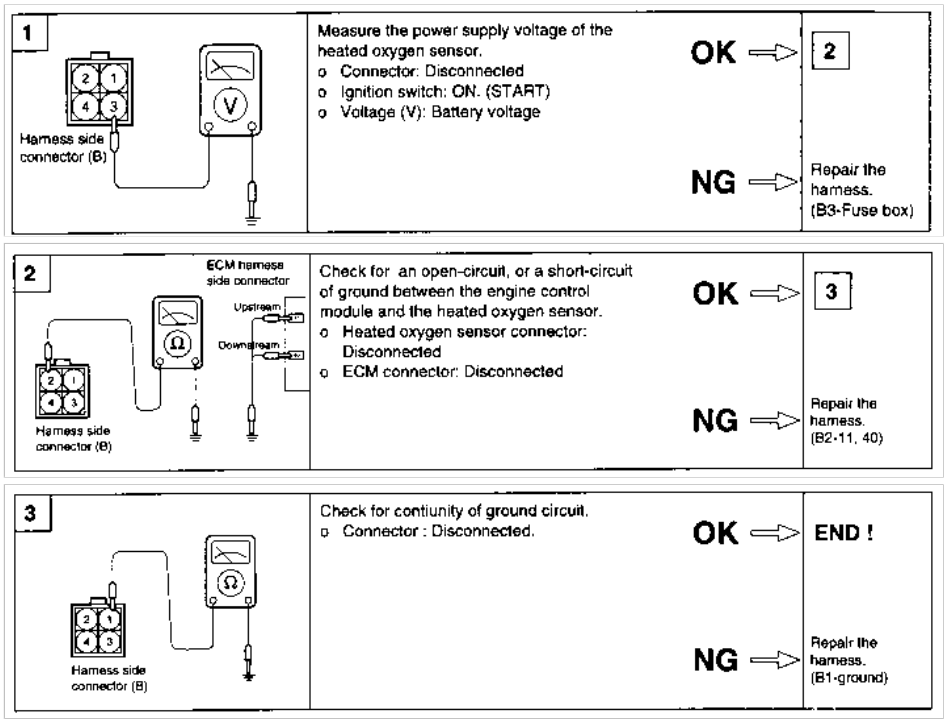
DTC - P0130, P0131, P0132, P0137, P0138 (AIR-FUEL CONTROL)



TROUBLESHOOTING HINTS
Air/Fuel ratio stays rich or lean longer than specified period because of system malfunction.

Fuel System > MFI Control System > Heated Oxygen Sensor (HO2S) > HARNESS INSPECTION PROCEDURE

HARNESS INSPECTION PROCEDURE



SENSOR INSPECTION

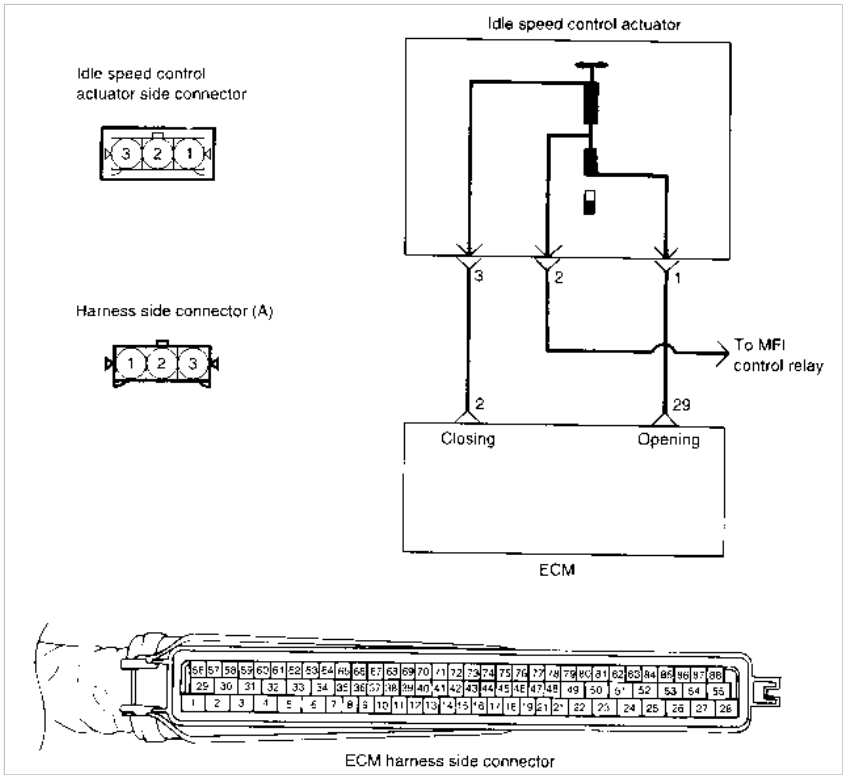
a. Before checking, warm up the engine until the engine coolant temperature reaches 80 to 95°C (176 to 205°F).

b. Use an accurate digital voltmeter.

Replace the oxygen sensor if there is a malfunction.

Fuel System > MFI Control System > Idle Speed Control Actuator > CIRCUIT DIAGRAM

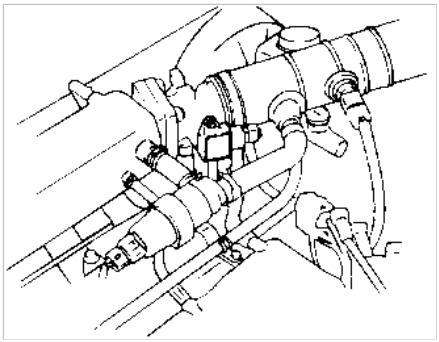
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Idle Speed Control Actuator > DESCRIPTION

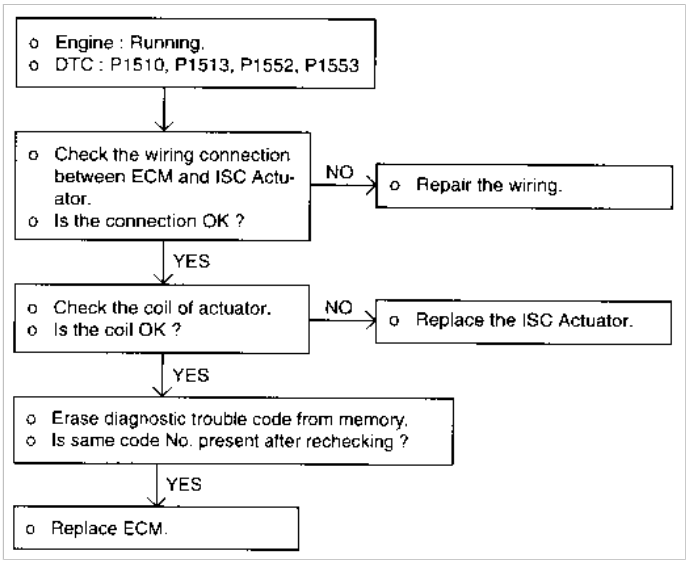
DESCRIPTION

The idle speed control actuator is the double coils type and has two coils. The two coils are driven by separate driver stages in the ECM. Depending on the pulse duty factor, the equilibrium of the magnetic forces of the two coils will result in different angles of the motor. In parallel to the throttle valve, a bypass hose line is arranged where the idle speed actuator is inserted in.



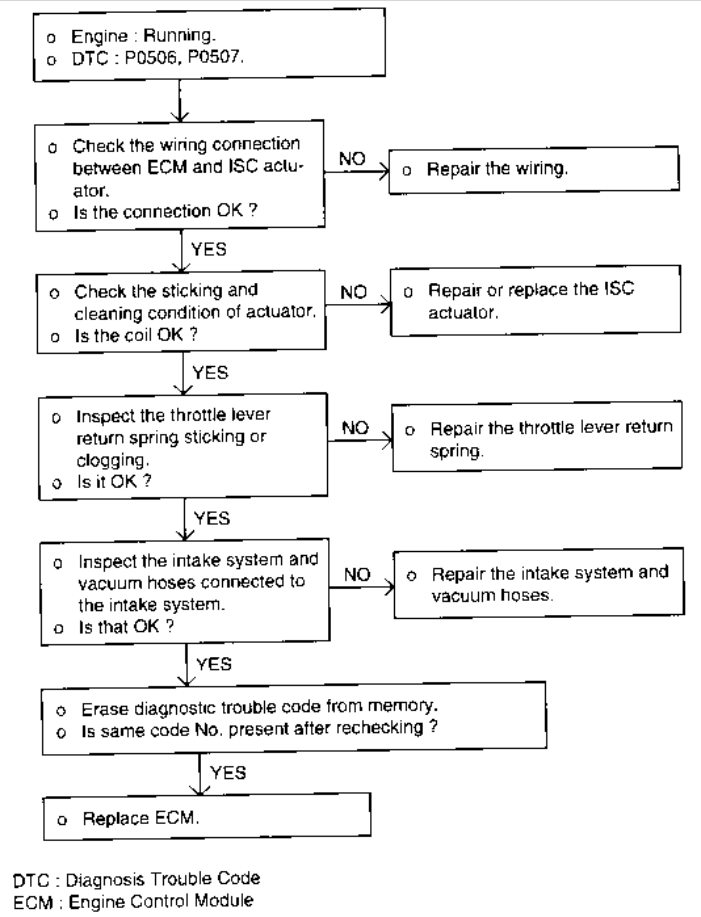
Fuel System > MFI Control System > Idle Speed Control Actuator > DTC - P1510, P1513, P1552, P1553

DTC - P1510, P1513, P1552, P1553



TROUBLESHOOTING HINTS

Open or short circuit is observed in idle air control system when ignition switch is turned on.

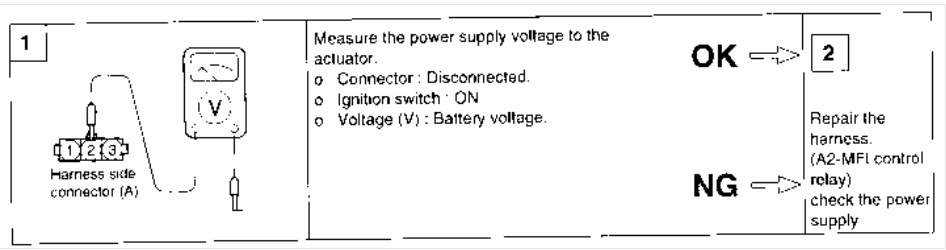


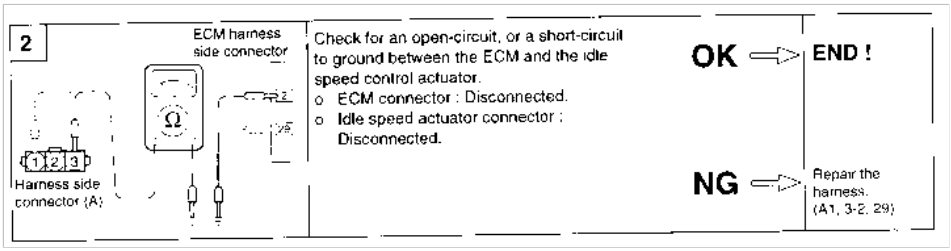
TROUBLESHOOTING HINTS

Mechanical problems are observed in idle air control system.

Fuel System > MFI Control System > Idle Speed Control Actuator > HARNESS INSPECTION PROCEDURE

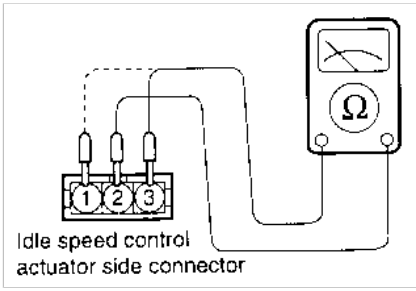
HARNESS INSPECTION PROCEDURE





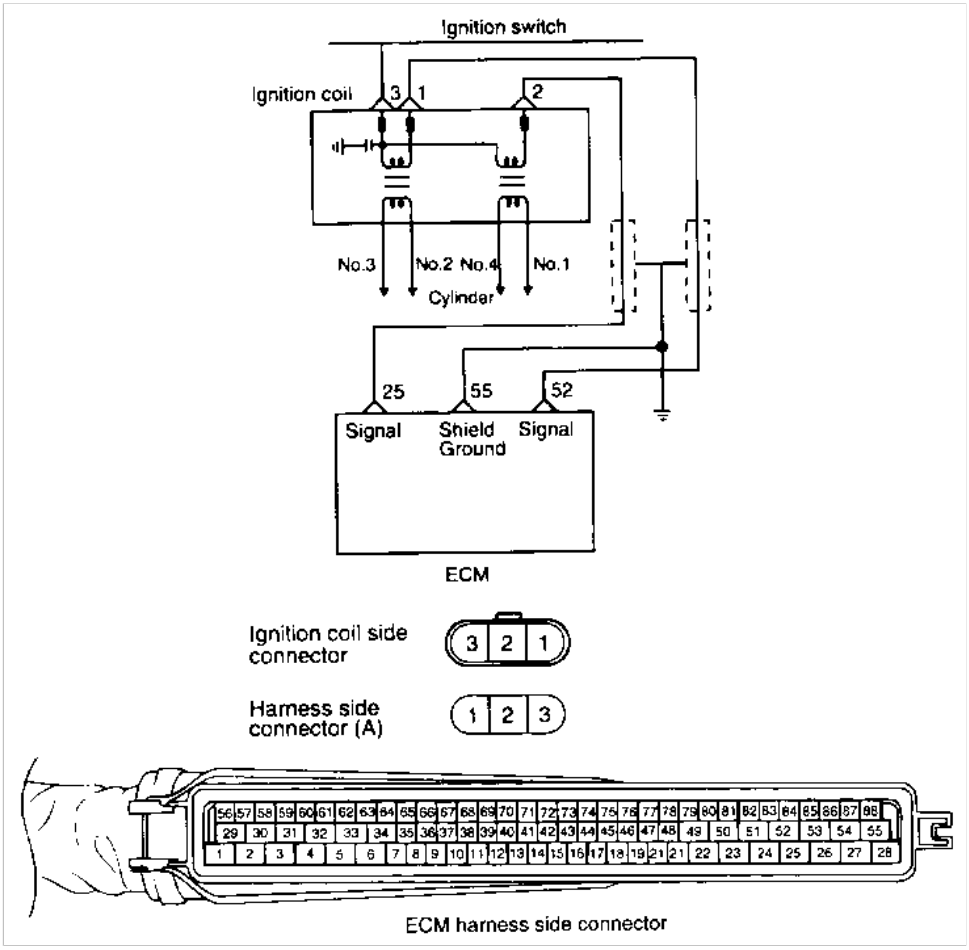
ACTUATOR INSPECTION

1. Disconnect the connector at the idle speed control actuator.
2. Measure the resistance between terminals.
3. Connect the connector at the idle speed control actuator.



Fuel System > MFI Control System > Ignition Coil (SOHC) > CIRCUIT DIAGRAM

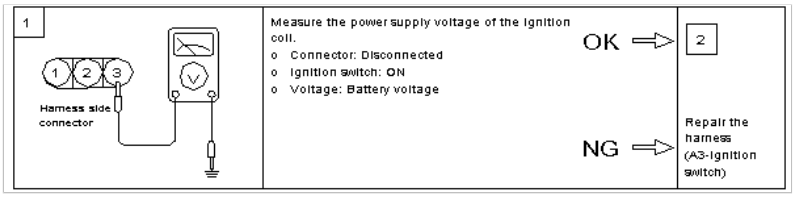
CIRCUIT DIAGRAM

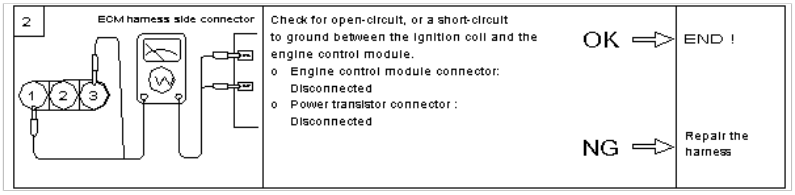


Fuel System > MFI Control System > Ignition Coil (SOHC) > HARNESS INSPECTION PROCEDURE

HARNESS INSPECTION PROCEDURE

HARNESS INSPECTION PROCEDURE (SOHC)

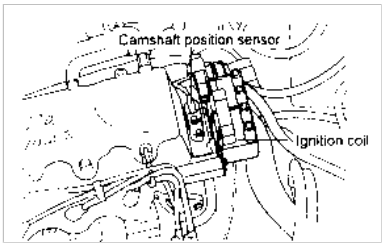




Fuel System > MFI Control System > Ignition Coil (SOHC) > IGNITION COIL

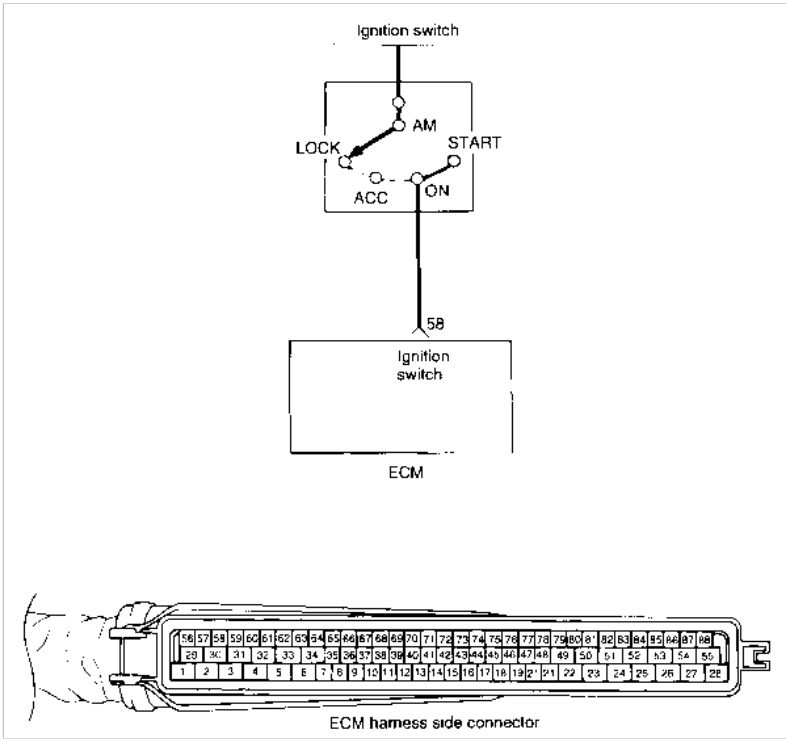
IGNITION COIL

When the ignition power transistor is turned ON by the signal from the ECM, It send the signal to the ignition coil, then primary current is shut off and a high voltage is induced in the secondary coil.



Fuel System > MFI Control System > Ignition Switch-ST [M/T] > CIRCUIT DIAGRAM

CIRCUIT DIAGRAM



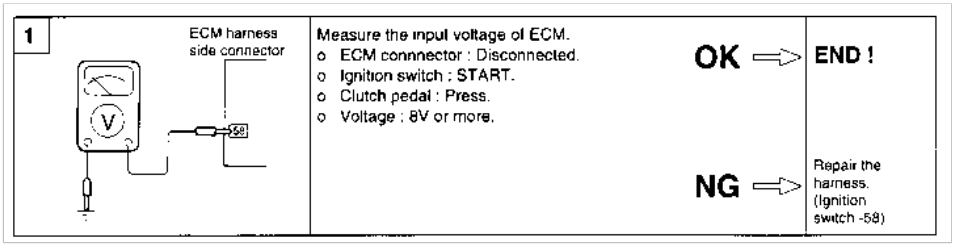
Fuel System > MFI Control System > Ignition Switch-ST [M/T] > DESCRIPTION

Description

The ignition switch-ST inputs a high signal to the ECM while the engine is cranking. The ECM provides fuel injection control, etc. at engine start-up based on this signal.

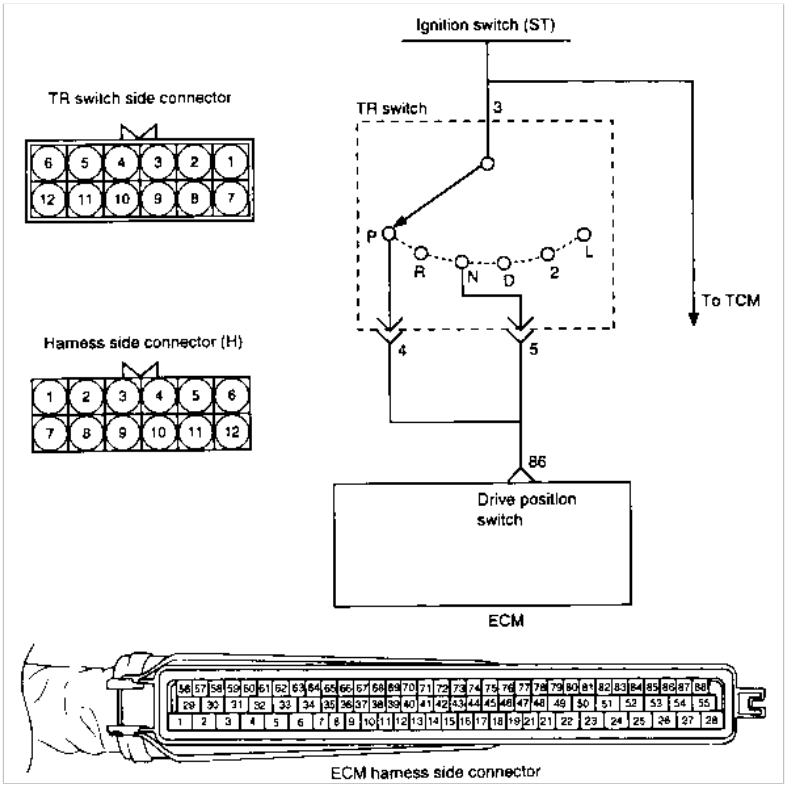
Fuel System > MFI Control System > Ignition Switch-ST [M/T] > HARNESS INSPECTION

HARNESS INSPECTION



Fuel System > MFI Control System > Ignition Switch-ST and Transaxle Range Switch [A/T] > CIRCUIT DIAGRAM

CIRCUIT DIAGRAM

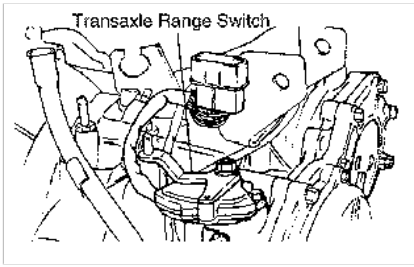


Fuel System > MFI Control System > Ignition Switch-ST and Transaxle Range Switch [A/T] > DESCRIPTION

Description

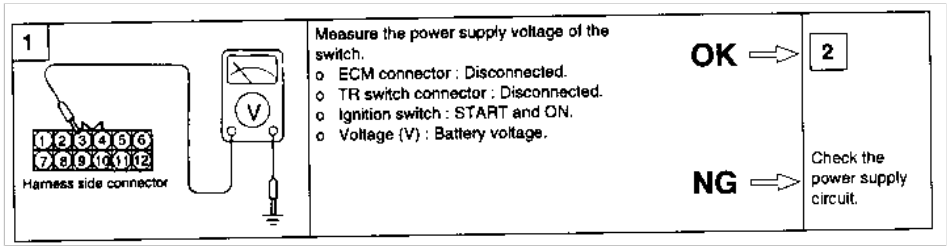
When the ignition switch is set to the ST position, the battery voltage is applied through the ignition switch and inhibitor switch to the ECM. If the selector lever is not in the P or N position, the battery voltage will not reach to the ECM.

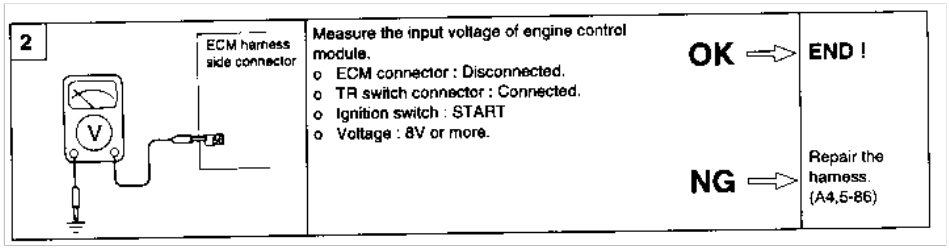
Based on this signal, the ECM determines the automatic transaxle load and drives the idle speed control actuator to maintain optimum idle speed.



Fuel System > MFI Control System > Ignition Switch-ST and Transaxle Range Switch [A/T] > HARNESS INSPECTION

HARNESS INSPECTION





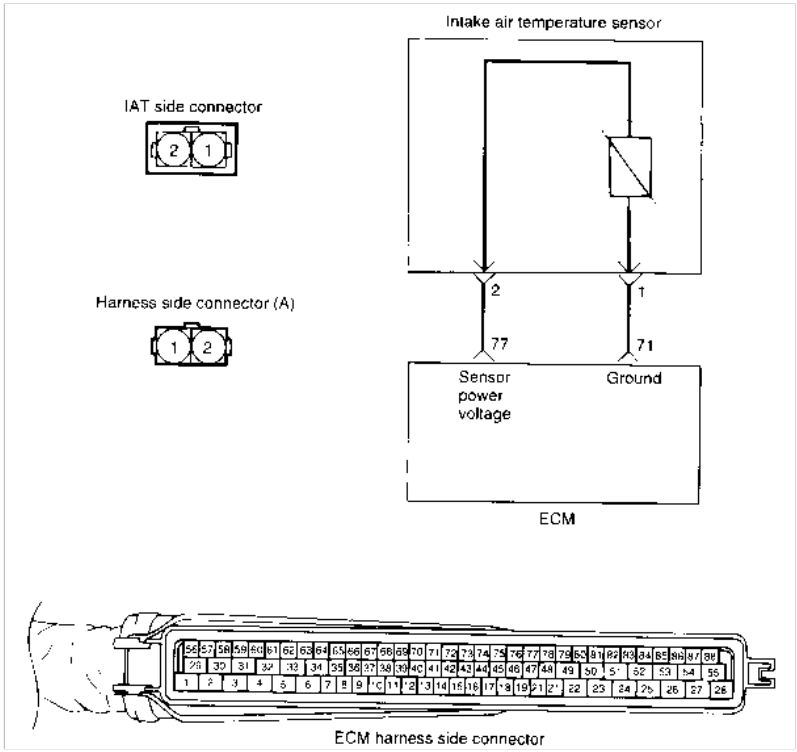
Fuel System > MFI Control System > Ignition Switch-ST and Transaxle Range Switch [A/T] > TROUBLESHOOTING HINTS

TROUBLESHOOTING HINTS

If the park/neutral position switch harness check is normal but the park/neutral position switch output is abnormal, check for the control cable adjustment.

Fuel System > MFI Control System > Intake Air Temperature (IAT) Sensor > CIRCUIT DIAGRAM

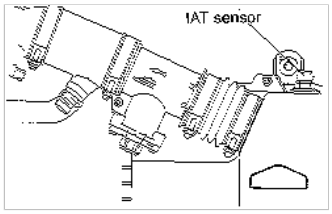
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Intake Air Temperature (IAT) Sensor > DESCRIPTION

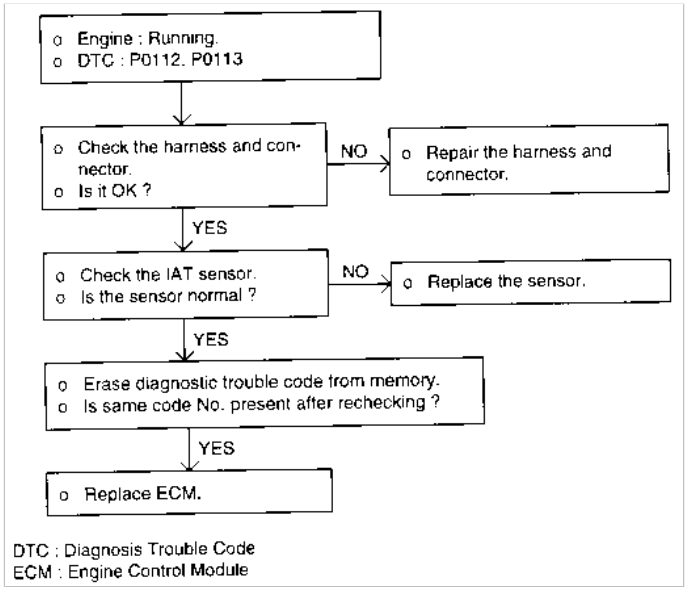
Description

The intake air temperature sensor (IAT Sensor), located on the air cleaner, is a resistor-based sensor for detecting the intake air temperature. According to the intake air temperature information from the sensor, the ECM provides necessary fuel injection amount control.



Fuel System > MFI Control System > Intake Air Temperature (IAT) Sensor > DTC - P0112, P0113 (IAT SENSOR)

DTC - P0112, P0113 (IAT SENSOR)

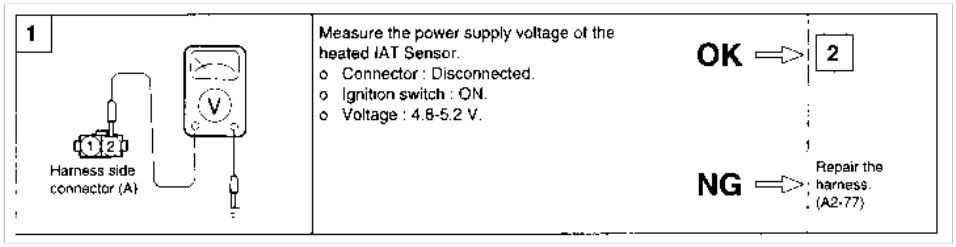


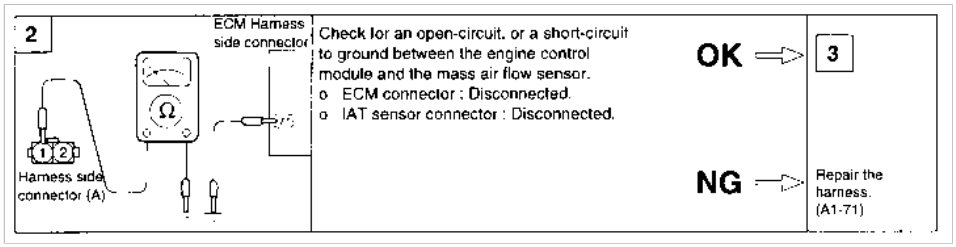
TROUBLESHOOTING HINTS

Input from intake air temperature sensor is below 0.1V or above 4.8V when engine is in full warm-up condition.

Fuel System > MFI Control System > Intake Air Temperature (IAT) Sensor > HARNESS INSPECTION PROCEDURE

HARNESS INSPECTION PROCEDURE





SENSOR INSPECTION

1. Using the voltmeter, measure the sensor voltage.
2. Measure the voltage between the IAT sensor terminal 1 and 2.

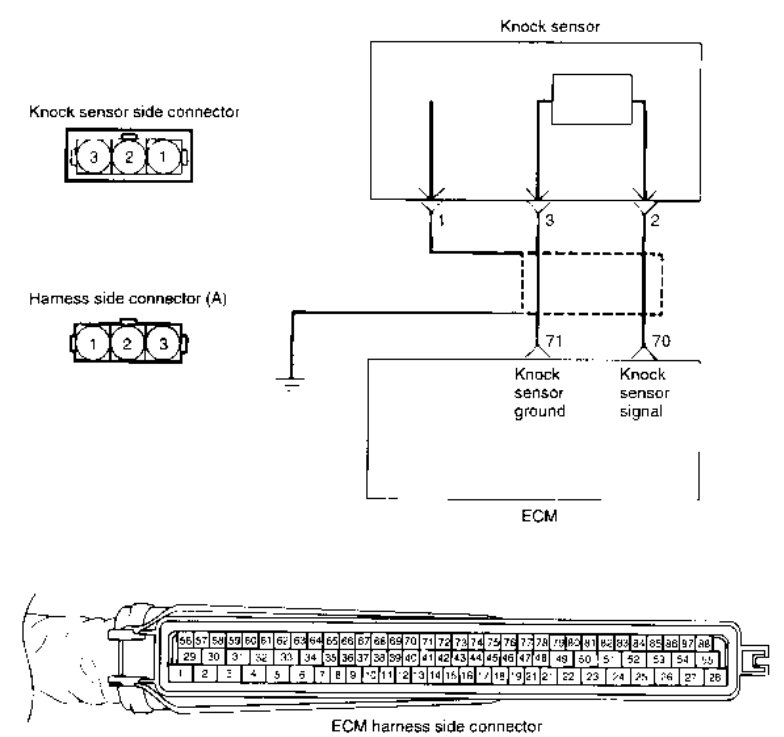
	Temperature °C (°F)	Output voltage (V)
IG. SW. ON	0 (32)	3.3-3.7 V
	20 (68)	2.4-2.8 V
	40 (104)	1.6-2.0 V

	80 (176)	0.5-0.9 V

3. If the voltage deviates from the standard value, replace the intake air temperature sensor assembly.

Fuel System > MFI Control System > Knock Sensor (KS) > CIRCUIT DIAGRAM

CIRCUIT DIAGRAM

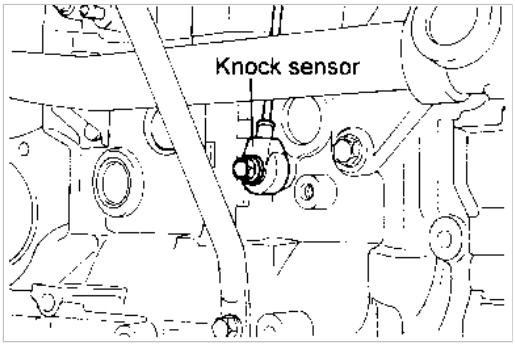


Fuel System > MFI Control System > Knock Sensor (KS) > DESCRIPTION

Description

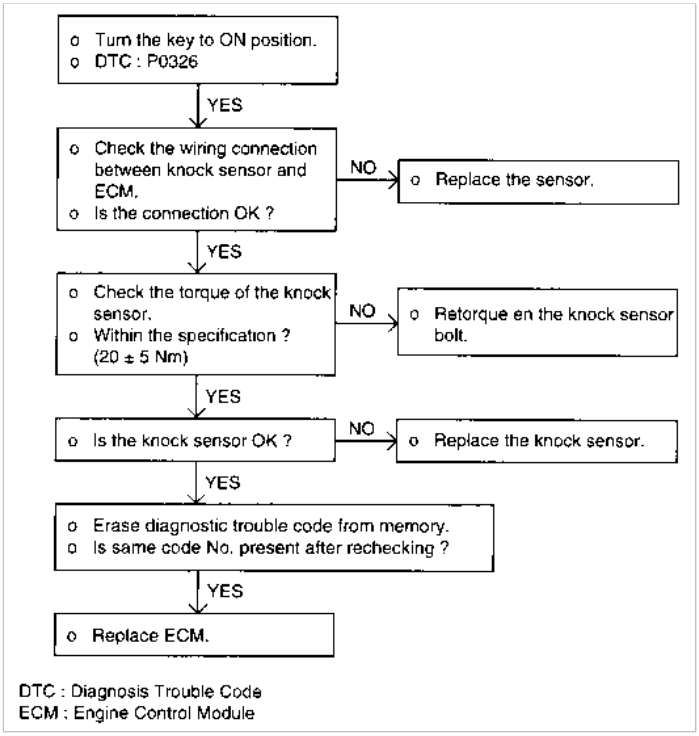
The knock sensor is attached to the cylinder block and senses engine knocking conditions.

A knocking vibration from the cylinder block is applied as pressure to the piezoelectric element. This vibrational pressure is then converted into a voltage signal which is delivered as output. If engine knocking occurs, ignition timing is retarded to suppress it.



Fuel System > MFI Control System > Knock Sensor (KS) > DTC - P0326

DTC - P0326

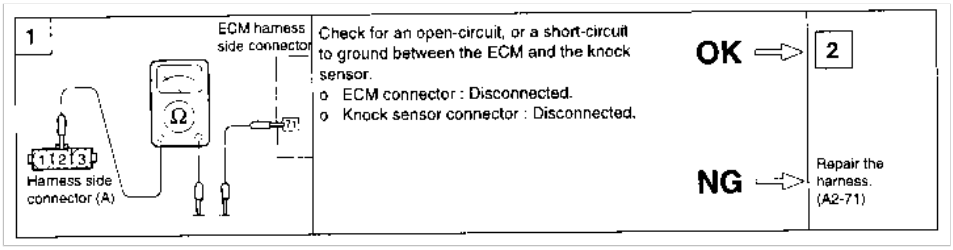


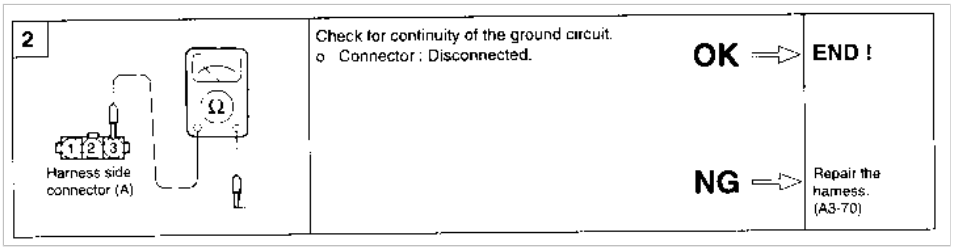
TROUBLESHOOTING HINTS

When knock sensor signal is abnormally low.

Fuel System > MFI Control System > Knock Sensor (KS) > HARNESS INSPECTION PROCEDURE

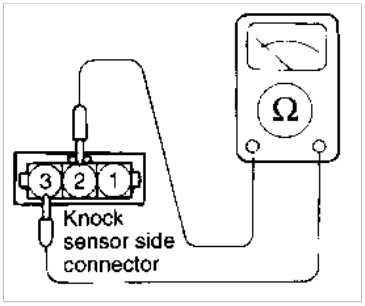
HARNESS INSPECTION PROCEDURE





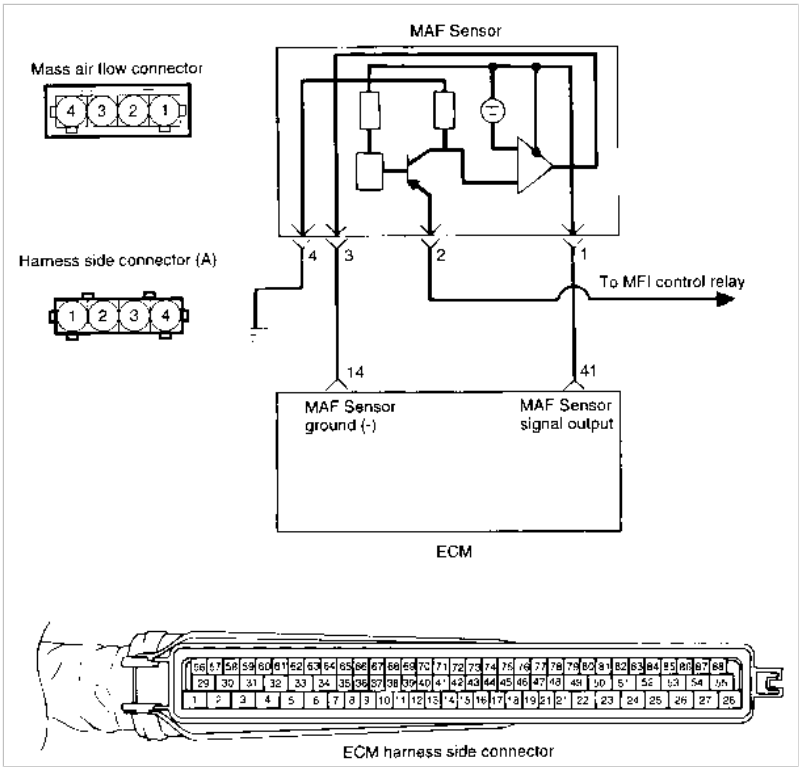
SENSOR INSPECTION

1. Disconnect the knock sensor connector.
2. Measure resistance between terminals 2 and 3.
3. If the resistance is continual, replace the knock sensor.
4. Measure the capacitance between terminals 2 and 3.



Fuel System > MFI Control System > Mass Air Flow (MAF) Sensor > CIRCUIT DIAGRAM

CIRCUIT DIAGRAM

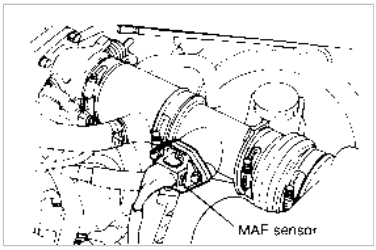


Fuel System > MFI Control System > Mass Air Flow (MAF) Sensor > DESCRIPTION

Description

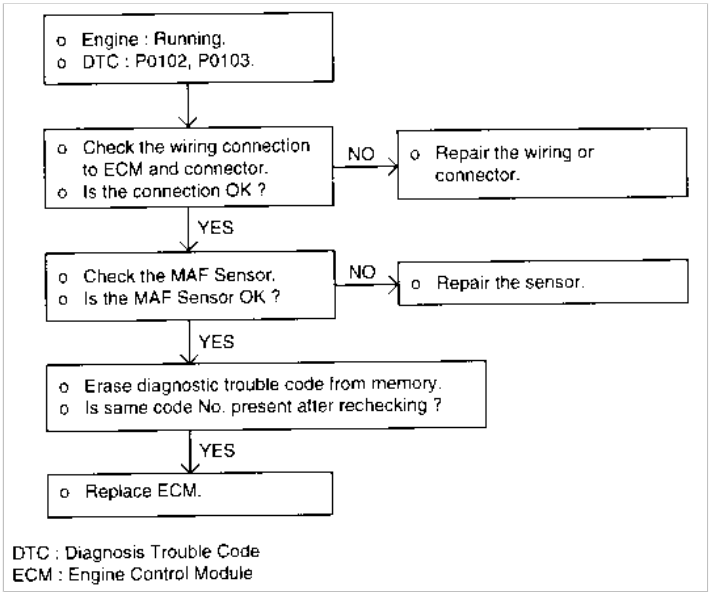
This hot film type air flow sensor is composed of a hot film sensor, housing, metering duct (hybrid, sensor element).

Mass air flow rate is measured by detection of heat transfer from a hot film probe because the change of the mass air flow rate causes change in the amount of heat being transferred from the hot film probe surface to the air flow. The air flow sensor generates a pulse so it repeatedly opens and closes between the 5V voltage supplied from the engine control module. This results in the change of the temperature of the hot film probe and in the change of resistance.



Fuel System > MFI Control System > Mass Air Flow (MAF) Sensor > DTC - P0102, P0103 (MAF SENSOR)

DTC - P0102, P0103 (MAF SENSOR)



TROUBLESHOOTING HINTS

a. If the engine stalls occasionally, start the engine and shake the MAF sensor harness. If the engine stalls, check for poor contact of the MAF sensor connector.
b. If the MAF sensor output voltage is other than 0 when the ignition switch is turned on (do not start the engine). Check for faulty MAF sensor or ECM.
c. If the engine can be idle even if the MAF sensor output voltage is out of specification, check for the following conditions:
1) Disturbed air flow in the MAF sensor, disconnected air duct, and clogged air cleaner filter.
2) Poor combustion in the cylinder, faulty ignition plug, ignition coil, injector, and incorrect comparison.
d. Though no MAF sensor malfunction occurs, check the mounting direction of MAF sensor.

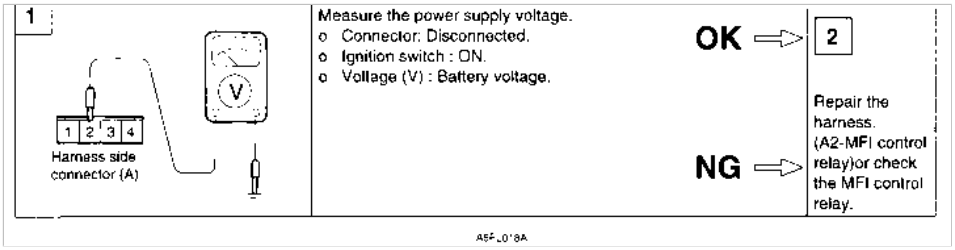
USING VOLTMETER

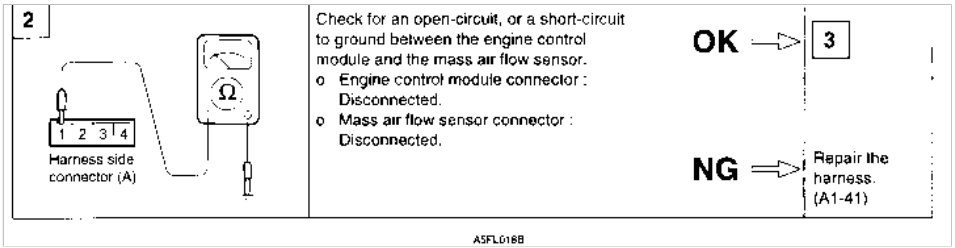
Check item	Engine state	Test specification
Mass air flow sensor output voltage (MAF sensor side connector No. 1 or ECM harness side connector No. 41)	Idle (800 rpm)	0.7 - 1.1 V
	3000 rpm	1.3 - 2.0 V

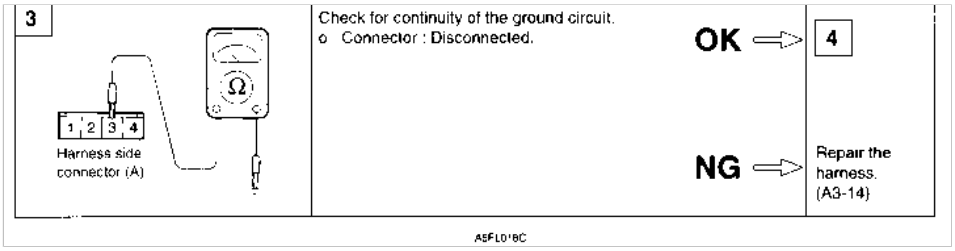
a. When the vehicle is new (within initial operation of about 500 km [300 miles]), the mass air flow sensor air quantity may be about 10% higher.
b. Use an accurate digital voltmeter.
c. Before checking, warm up the engine until the engine coolant temperature reaches 80 to 90°C (176 to 198°f).

Fuel System > MFI Control System > Mass Air Flow (MAF) Sensor > HARNESS INSPECTION PROCEDURES

HARNESS INSPECTION PROCEDURES

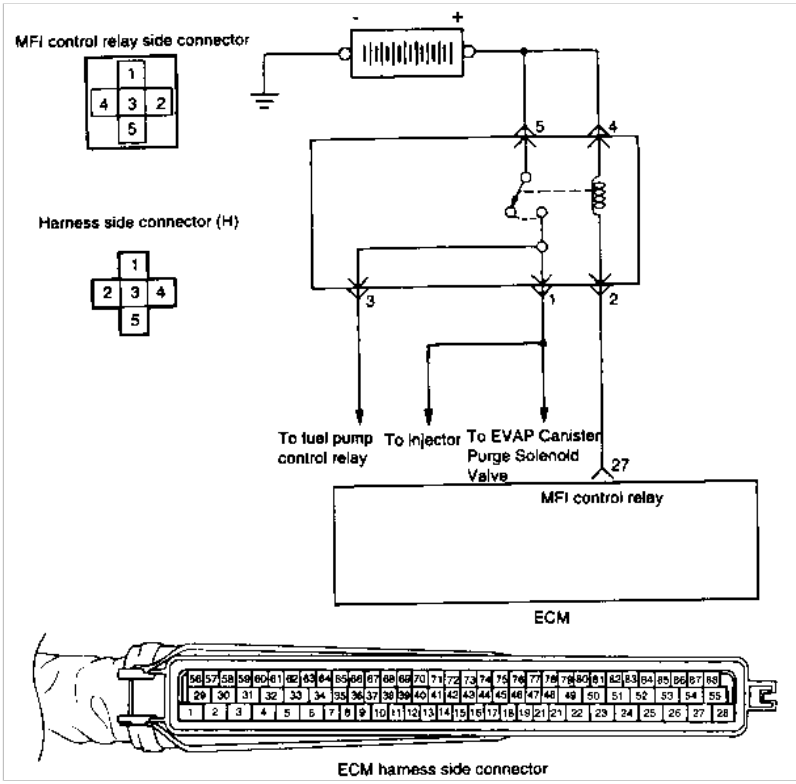






Fuel System > MFI Control System > MFI Control Relay > CIRCUIT DIAGRAM

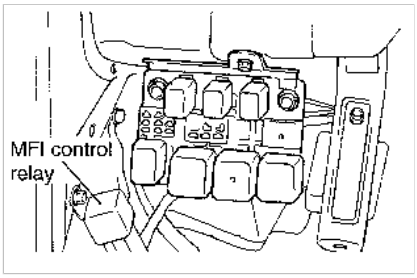
CIRCUIT DIAGRAM



Fuel System > MFI Control System > MFI Control Relay > DESCRIPTION

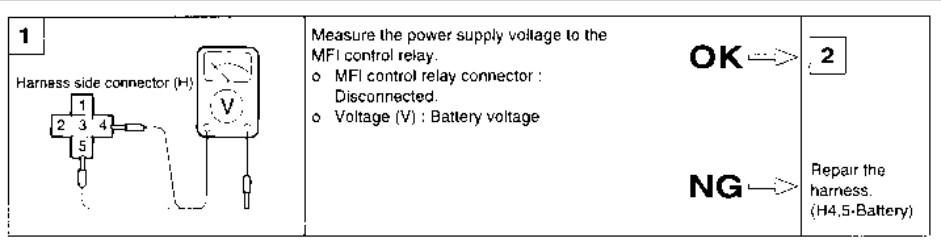
Description

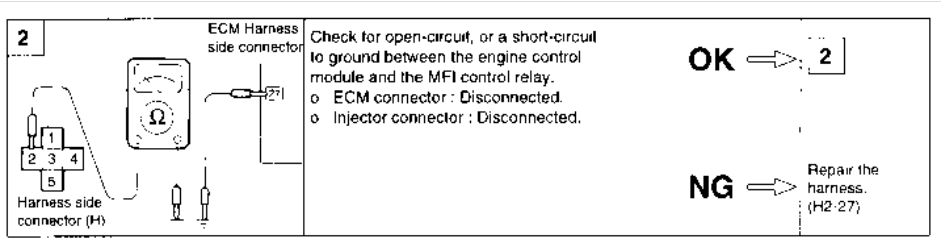
When the ignition switch is on, battery power is supplied to the ECM, the injector, the mass air flow sensor, etc. While the ignition switch is turned on, current flows from the ignition switch through the current relay coil to ground.



Fuel System > MFI Control System > MFI Control Relay > HARNESS INSPECTION PROCEDURE

HARNESS INSPECTION PROCEDURE

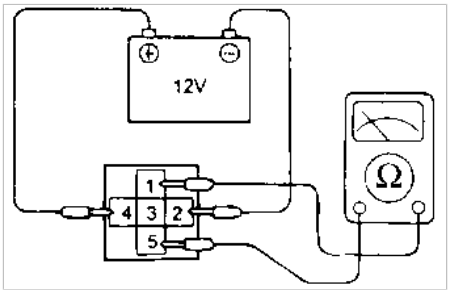




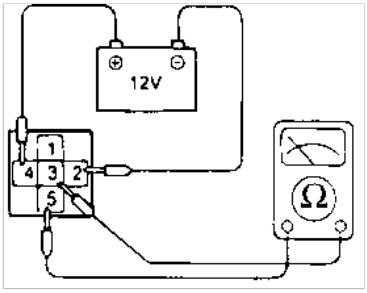
MFI CONTROL RELAY INSPECTION

1. Check continuity of relay contacts between terminals 4 (+) and 2 (-).

Relay coil (between terminal 5 and 1)	Continuity
When de-energized	No (infinite Ω)
When energized	Yes (0 Ω)
Relay coil (between terminal 5 and 3)	Continuity
When de-energized	No. (infinite Ω)
When energized	Yes (0 Ω)

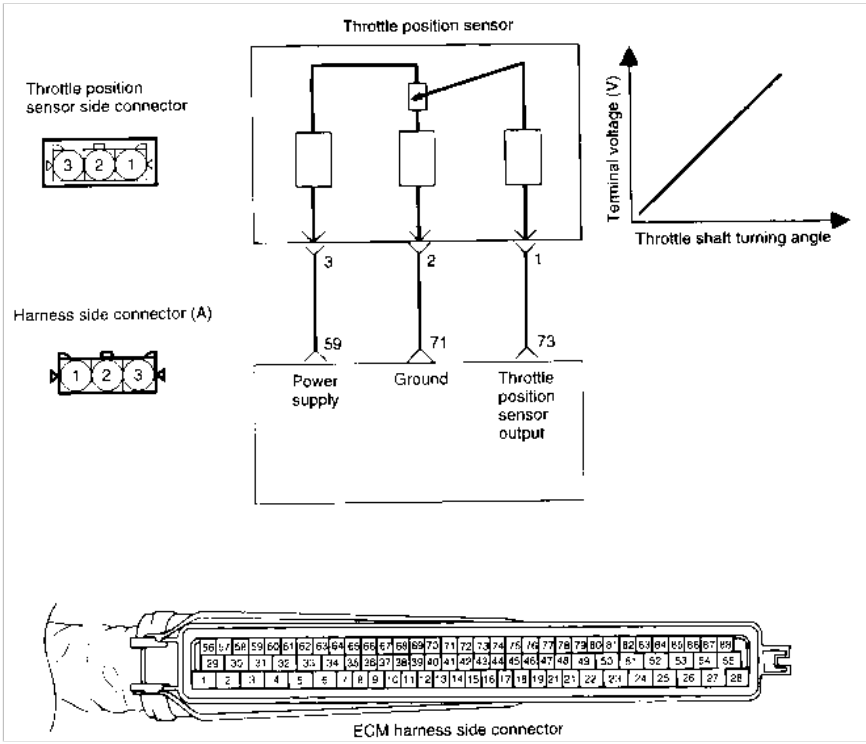


2. If fault, replace the MFI control relay.



Fuel System > MFI Control System > Throttle Position (TP) Sensor > CIRCUIT DIAGRAM

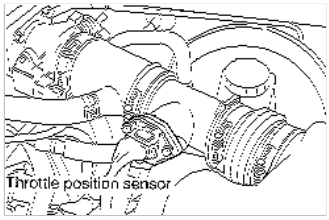
CIRCUIT DIAGRAM



Fuel System > MFI Control System > Throttle Position (TP) Sensor > DESCRIPTION

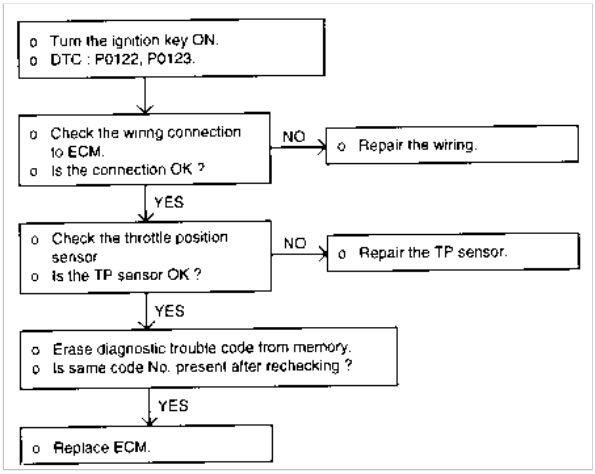
DESCRIPTION

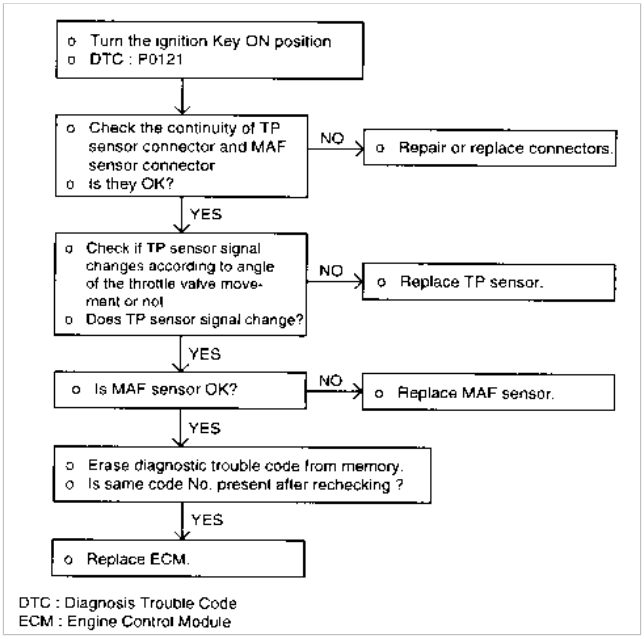
The TP Sensor is a rotating type variable resistor that rotates with the throttle shaft to sensor the throttle valve angle. As the throttle shaft rotates, the throttle angle of the TP Sensor changes and the ECM detects the throttle valve opening based on the change of the throttle angle.



Fuel System > MFI Control System > Throttle Position (TP) Sensor > DTC - P0122, P0123 (TP SENSOR)

DTC - P0122, P0123 (TP SENSOR)





TROUBLESHOOTING HINTS

Input voltage from throttle position sensor is below 0.1V or above 4.7V when ignition switch is turned on.

TROUBLESHOOTING HINTS

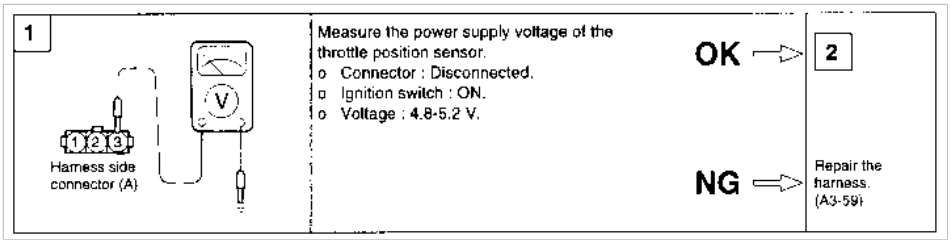
a. The TPS signal is important in the control of the automatic transaxle. Shift shock and other troubles will occur if the sensor is faulty.
b. If the idle condition or accelerating is abnormal, check the TPS connector. (When the TPS connector is not connected properly, the current data can show that the idle state is off, though the accelerator pedal is released. And it results in improper idle or accelerating.)
c. Input voltage from throttle position sensor is below 0.1V or above 4.7V when ignition is turned on.

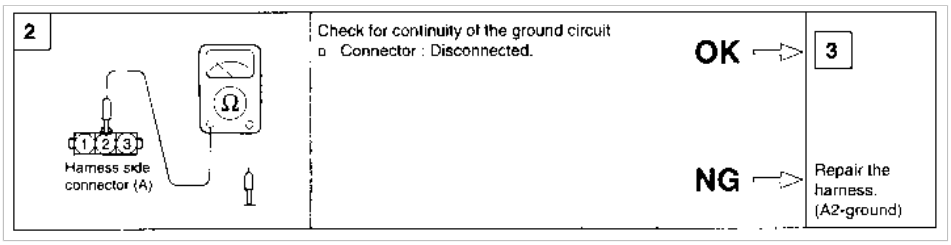
USING VOLTMETER

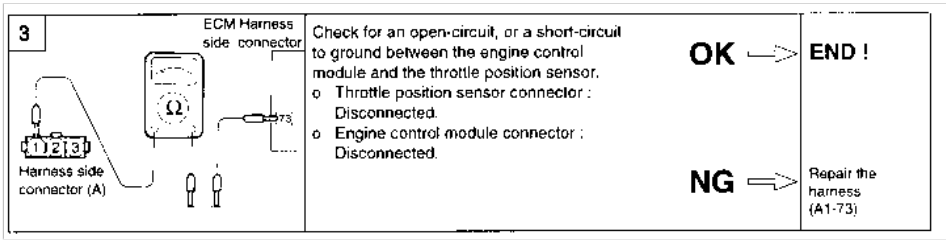
Check item	Check condition	Test specification
Throttle position sensor output voltage (TP sensor side connector No.1 or ECM harness side connector No.73)	At idle (800 rpm)	0.1-0.875 V
	Wide open throttle	4.25-4.8 v

Fuel System > MFI Control System > Throttle Position (TP) Sensor > HARNESS INSPECTION PROCEDURES

HARNESS INSPECTION PROCEDURES

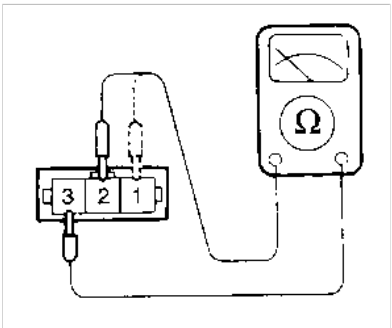






SENSOR INSPECTION

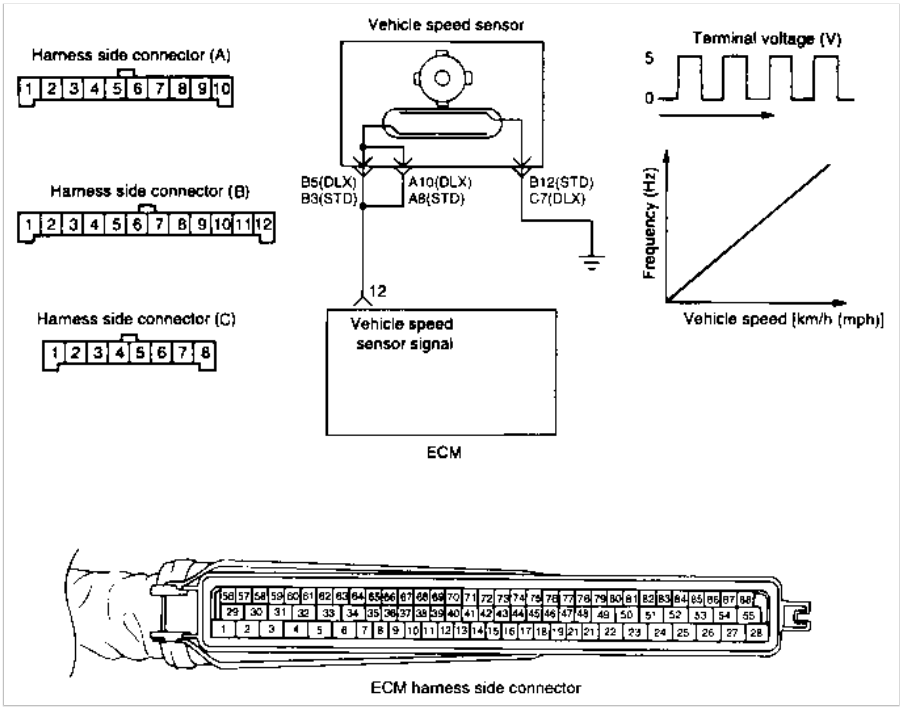
1. Disconnect the throttle position sensor connector.
2. Measure resistance between terminal 2 (sensor ground) and terminal 3 (sensor power).
3. Connect an ohmmeter between terminal 3 (sensor ground) and terminal 1 (sensor output).



4. Operate the throttle valve slowly from the idle position to the full open position and check that the resistance changes smoothly in proportion to the throttle valve opening angle.
5. If the resistance is out of specification, or fails to change smoothly, replace the throttle position sensor.

Fuel System > MFI Control System > Vehicle Speed Sensor (VSS) > CIRCUIT DIAGRAM

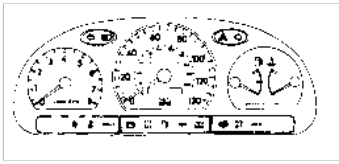
Circuit Diagram



Fuel System > MFI Control System > Vehicle Speed Sensor (VSS) > DESCRIPTION

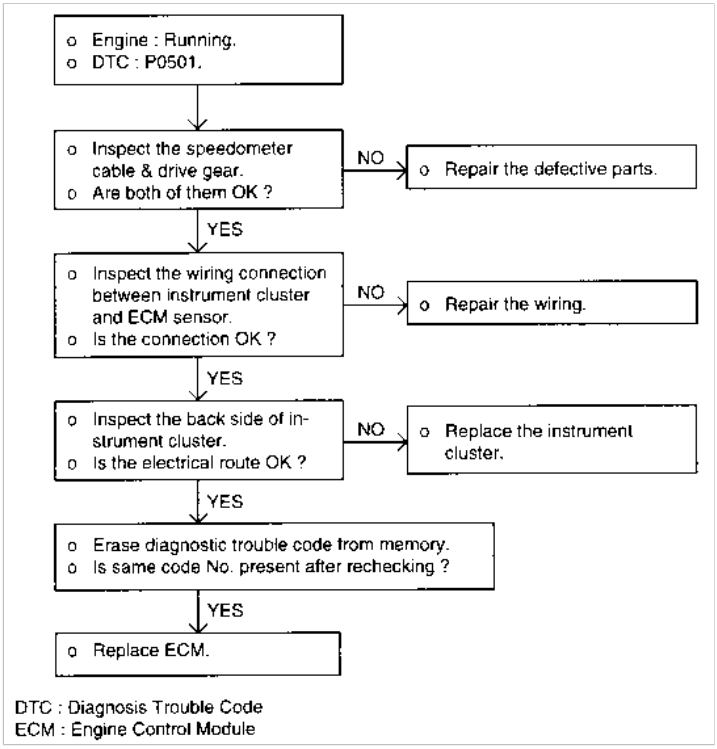
Description

The vehicle speed senor is a reed switch. The vehicle speed sensor is built into the speedometer and coverts the transaxle gear revolutions into pulse signals, which are sent to ECM.



Fuel System > MFI Control System > Vehicle Speed Sensor (VSS) > DTC - P0501

DTC - P0501

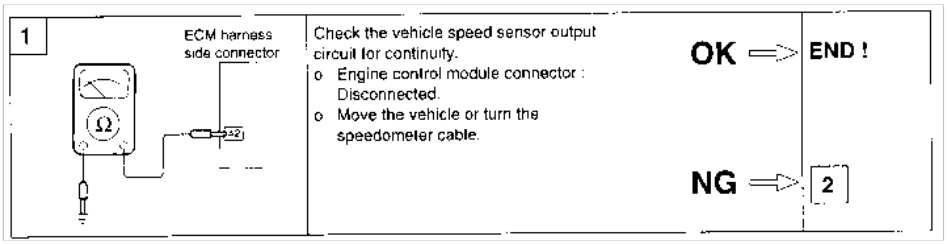


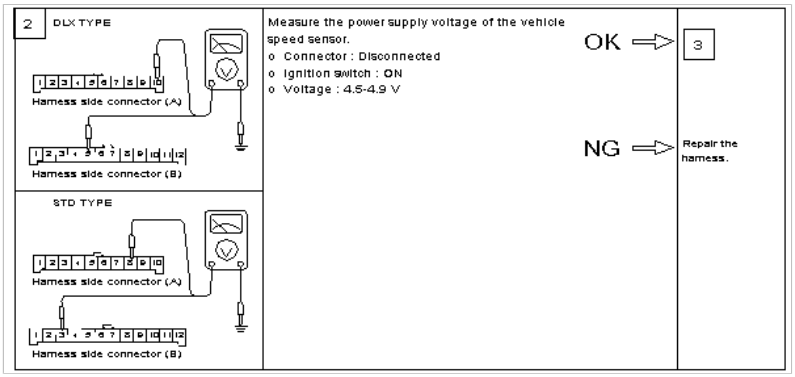
TROUBLESHOOTING HINTS

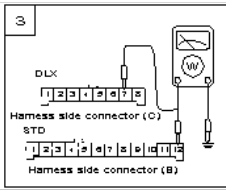
If there is an open or short circuit in the vehicle speed sensor signal circuit, the engine may stall when the vehicle is decelerated to a stop.

Fuel System > MFI Control System > Vehicle Speed Sensor (VSS) > HARNESS INSPECTION PROCEDURES

HARNESS INSPECTION PROCEDURES





3 	Check for continuity of the ground circuit. o Connector : Disconnected.	OK ⇒ NG ⇒	END ! Repair the harness (B12, C7-ground)

ACCENT(X3) > 1998 > G 1.5 SOHC > Heating, Ventilation & Air Conditioning

Heating, Ventilation & Air Conditioning > Air Conditioning System > ADDING OIL FOR REPLACEMENT COMPONENT PARTS

ADDING OIL FOR REPLACEMENT COMPONENT PARTS

When replacing the system's component parts, be sure to add the following amount of oil to the parts being replaced.

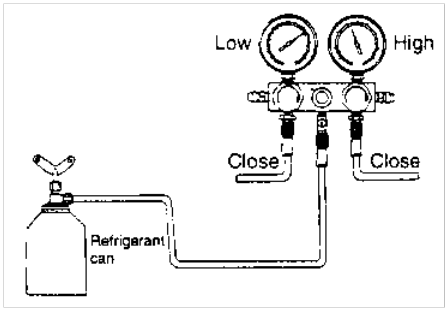
Component parts to be replaced	Amount of oil cc (US fl oz)
Evaporator core	40 (1.28)
Condenser	25 (0.8)
Receiver-drier	40 (1.28)
Compressor	30 (0.96)
Tube, hose	15 (0.48)

Heating, Ventilation & Air Conditioning > Air Conditioning System > CHARGING REFRIGERANT SYSTEM

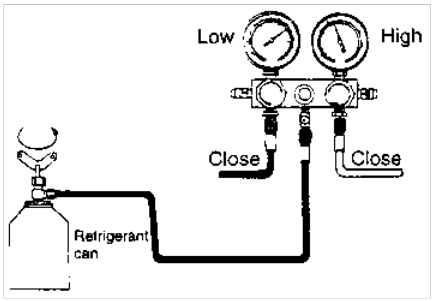
CHARGING REFRIGERANT SYSTEM

This step is to charge the system through the low pressure side with refrigerant in a vapor state. When the refrigerant container is placed right side up, refrigerant will enter the system as a vapor.

1. Attach an Air Conditioning Service Station as shown in the figure.



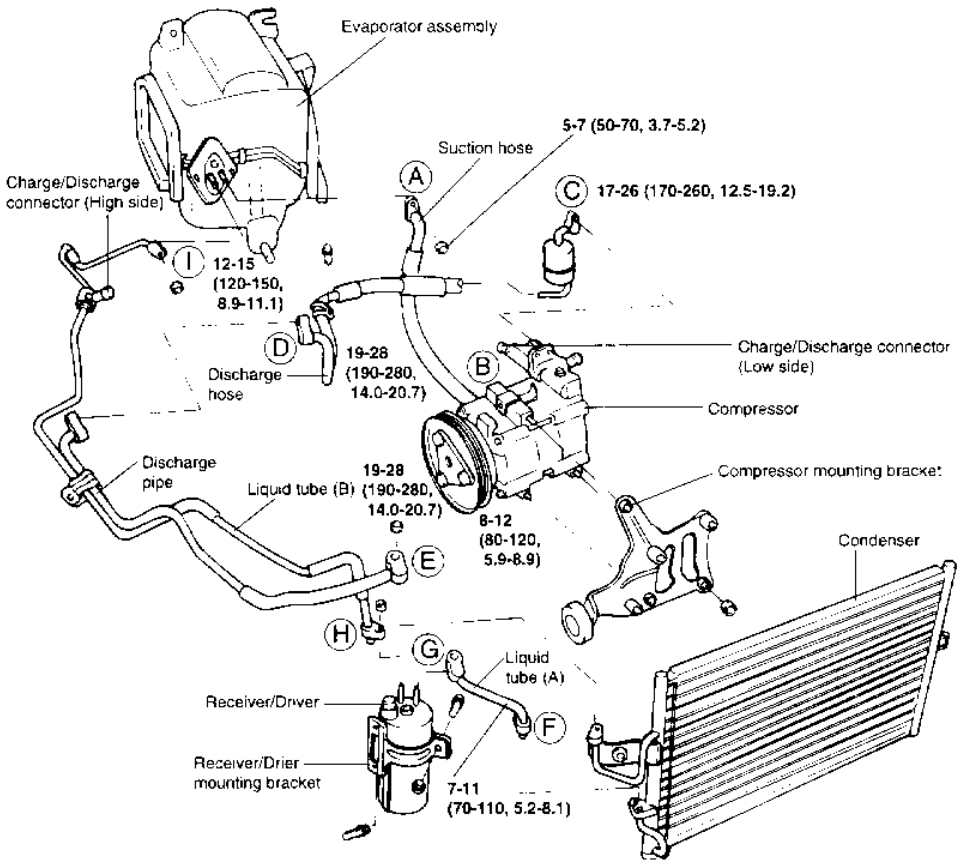
2. Open the low pressure valve. Adjust the valve so that the low pressure gauge does not read over.



3. Put the refrigerant in a pan of warm water on heat plate (maximum temperature 40°C [104°F]) to keep vapor pressure in the container slightly higher than vapor pressure in the system.
4. Run the engine at fast idle, and operate the air conditioner.
   Be sure to keep the container upright to prevent liquid refrigerant from being charged into the system through the suction side, resulting in possible damage to the compressor.
5. Charge the system to the specified amount. Then, close the low pressure valve.

Heating, Ventilation & Air Conditioning > Air Conditioning System > COMPONENTS

Components



CONNECTIONS — **TORQUE : Nm (kg.cm, lb.ft)**

Symbol	Description	Symbol	Description
A	Evaporator to suction hose	F	Condenser to liquid tube (A)
B	Suction hose to compressor	G	Liquid tube (A) to receiver/drier
C	Compressor to discharge hose	H	Receiver/Drier to liquid tube (B)
D	Discharge hose to discharge pipe	I	Liquid tube (B) to evaporator
E	Discharge pipe to condenser		

Heating, Ventilation & Air Conditioning > Air Conditioning System > COMPRESSOR OIL LEVEL CHECK

COMPRESSOR OIL LEVEL CHECK

The oil used to lubricate the compressor circulates in the system while the compressor is operating. Whenever replacing any component of the system, or when a large amount of gas leakage occurs, add oil to maintain the original total amount of oil.

Heating, Ventilation & Air Conditioning > Air Conditioning System > DISCHARGING THE REFRIGERANT SYSTEM

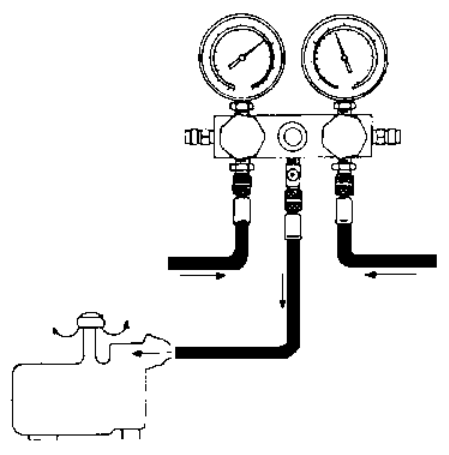
DISCHARGING THE REFRIGERANT SYSTEM

Federal regulations require that the discharging of R-134a refrigerant be performed by a licensed technician using only an approved recovery and/or recycling system. Do not discharge R-134a refrigerant into the atmosphere. When discharging the refrigerant system, always follow the recovery or recycling system equipment manufacturer's instructions.

Heating, Ventilation & Air Conditioning > Air Conditioning System > EVACUATING REFRIGERANT SYSTEM

EVACUATING REFRIGERANT SYSTEM

1. When an A/C System has been opened to the atmosphere, such as during installation or repair, it must be evacuated using a vacuum pump. (If the system has been open for several days, the receiver/dryer should be replaced.)
2. Start the pump, then open both gauge valves. Turn the pump on for about 15 minutes. Close the valves and stop the pump. The low gauge should indicate above 700 mm Hg (27 in-Hg) and remain steady with the valves closed.
   If low pressure does not reach more than 700 mmHg (27 in-Hg) in 15 minutes, there is probably a leak in the system. Check for leaks, and repair (see Leak Test).
3. If there are no leaks, open the valves and continue pumping for at least another 15 minutes, then close both valves and stop the pump.



Heating, Ventilation & Air Conditioning > Air Conditioning System > HANDLING INSTRUCTIONS

HANDLING INSTRUCTIONS

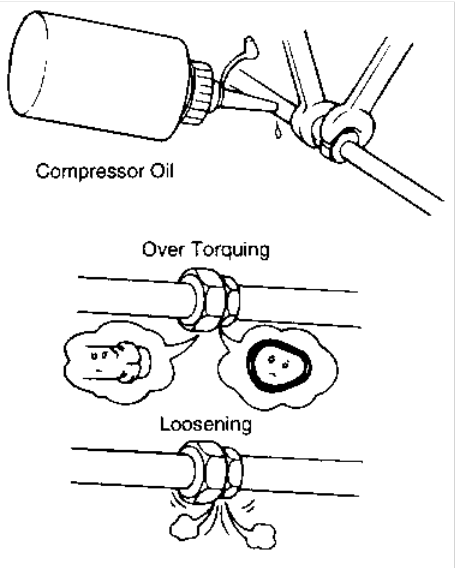
WHEN HANDLING REFRIGERANT

1. The R-134a liquid refrigerant is highly volatile. A drop on the skin of your hand could result in localized frostbite. When handling the refrigerant, be sure to wear gloves.
2. If the refrigerant splashes into your eyes, wash them with clean water immediately. It is standard practice to wear goggles or glasses to protect your eyes, and gloves to protect your hands.

3. The R-134a container is highly pressurized. Never leave it in a hot place. Check that the storage temperature is below 52°C (126°F).
4. A halide leak detector is often used to check the system for refrigerant leakage. Bear in mind that R-134a, upon coming into contact with flame (this detector burns propane to produce a small flame), produces phosgene, a toxic gas.
5. Use only recommended lubricant for R-134a A/C system and components. If lubricant other than recommended one is used, system failure may occur.
6. The PAG lubricant absorbs moisture from the atmosphere at a rapid rate; therefore the following precautions must be observed:
   a. When removing refrigerant components from a vehicle, immediately cap the components to prevent moisture from entering the A/C system.
   b. When installing refrigerant components in a vehicle, do not remove the cap until just before connecting the components.
   c. Complete the connection of all refrigerant tubes and hoses without delay to prevent moisture from entering the A/C system.
   d. Use the recommended lubricant from a sealed container only.
7. If accidental system discharge occurs, ventilate the work area before resuming service.

WHEN REPLACING PARTS ON A/C SYSTEM

1. Never open or loosen a connection before discharging the system.
2. Seal the open fittings with a cap or plug immediately in disconnected parts to prevent intrusion of moisture or dust.

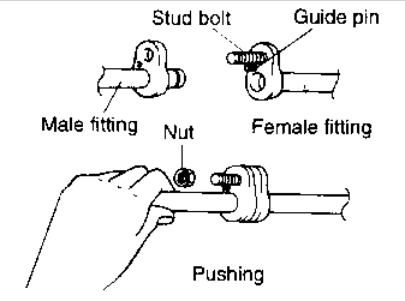


3. Do not remove the sealing caps from a replacement component until it is ready to be installed.
4. Before connecting an open fitting, always install a new sealing ring. Coat the fitting and seal with refrigerant oil before making the connection.

WHEN INSTALLING CONNECTING PARTS

FLANGE WITH GUIDE PIN TYPE

1. Check the new O-ring for damage or something missed (use only specified one) and lubricate using compressor oil.
2. Hand-tighten the nut by pushing the pipe to one side.
3. Tighten the nut to specified torque.



HANDLING TUBING AND FITTINGS

The internal parts of the refrigeration system will remain in a state of chemical stability as long as pure-moisture free refrigerant and refrigerant oil are used. Abnormal amounts of dirt, moisture or air can upset he chemical stability and cause troubles or serious damage.

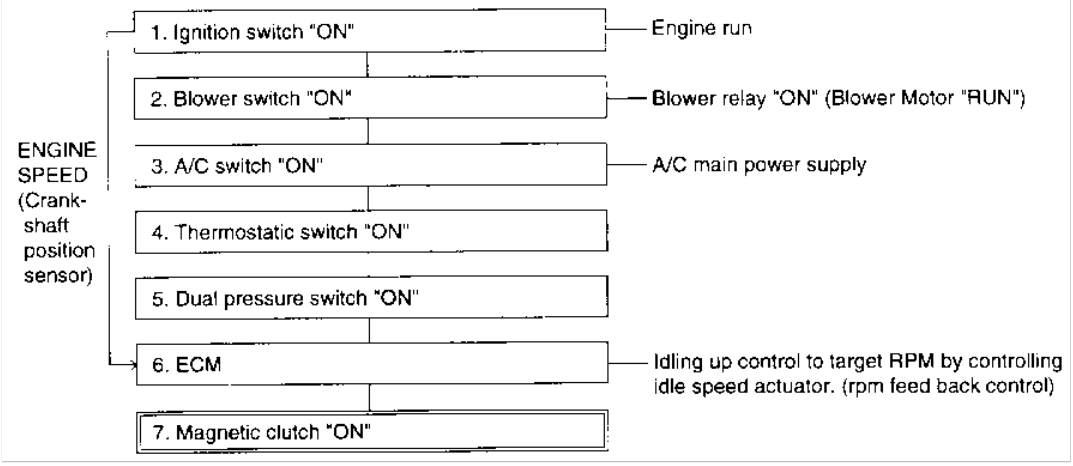
THE FOLLOWING PRECAUTIONS MUST BE OBSERVED

1. When it is necessary to open the refrigeration system, have everything you will need to service the system ready so the system will not be left open any longer than necessary.
2. Cap or plug all lines and fittings as soon as they are opened to prevent the entrance of dirt and moisture.
3. All lines and components in parts stock should be capped or sealed until they are ready to be used.
4. Never attempt to rebind formed lines to fit. Use the correct line for the installation you are servicing.
5. All tools, including the refrigerant dispensing manifold, the gauge set manifold and test hoses should be kept clean and dry.

Heating, Ventilation & Air Conditioning > Air Conditioning System > HOW THE MAGNETIC CLUTCH IS ENERGIZED

HOW THE MAGNETIC CLUTCH IS ENERGIZED

The general process for how the magnetic clutch is energized is shown below (MFI only).

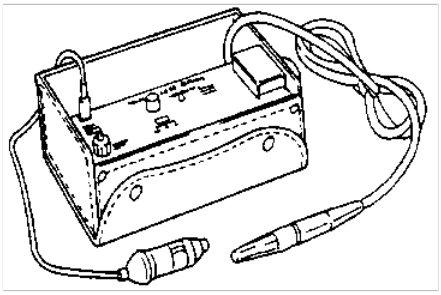


Heating, Ventilation & Air Conditioning > Air Conditioning System > LEAK TEST

LEAK TEST

ELECTRONIC LEAK DETECTOR

The leak detector is a delicate device that detects small amounts of halogen.



In order to use the device properly, read the manuals supplied by the manufacturer to perform the specified maintenance and inspections.

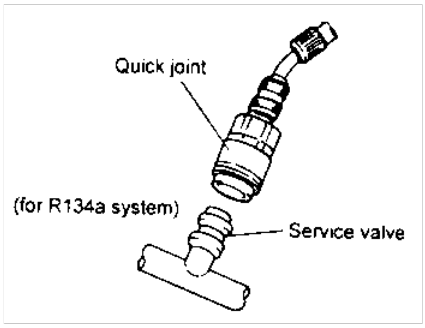
If a gas leak is detected, proceed as follows:

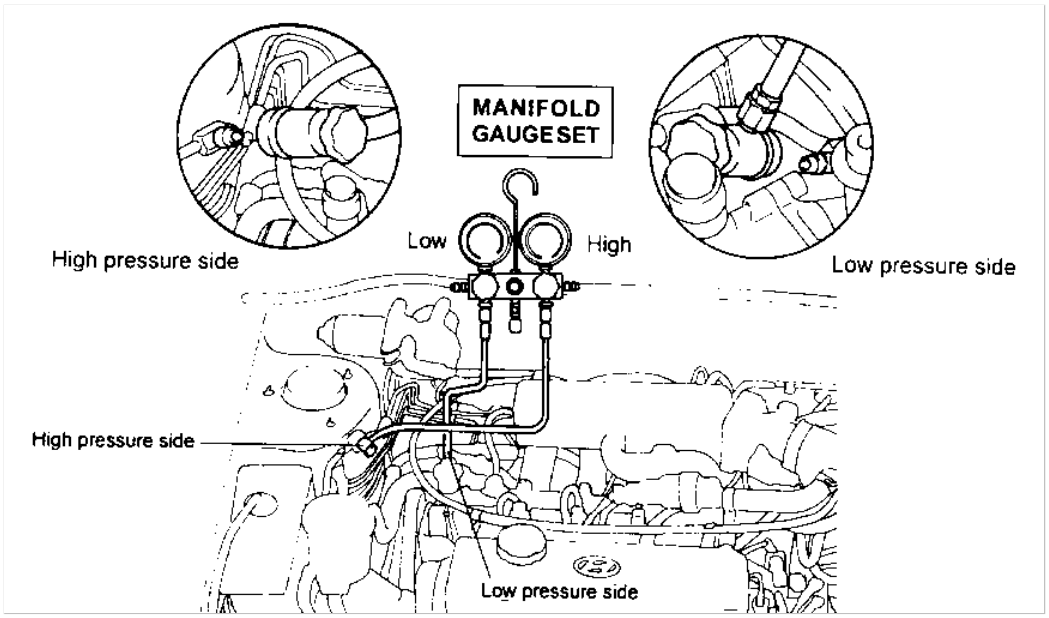
1. Check the torque on the connection fitting and, if necessary, tighten to the proper torque. Check for leakage with the leak detector.
2. If leakage continues even after the fitting has been retightened, discharge the refrigerant from the system, disconnect the fittings, and check the seat for damage. Replace fitting, even if the damage is slight.
3. Check compressor oil and add oil if required.
4. Charge the system and recheck for leaks. If no leaks are found, evacuate and charge the system.

Heating, Ventilation & Air Conditioning > Air Conditioning System > MANIFOLD GAUGE SET INSTALLATION

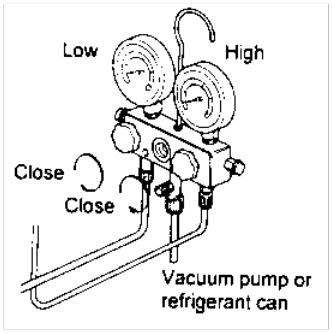
MANIFOLD GAUGE SET INSTALLATION

The R-134a system employs new high and low service charge ports with "quick connect" adapters. Each adapter is a female fitting with threads on the inside to protect the system from contaminants. This type of change port is also expected to reduce refrigerant leakage.





1. Close both hand valves of manifold gauge set.
2. Install charging hoses of gauge set to service ports. Connect the low pressure hose to the low pressure service port in the suction pipe, and the high pressure hose to the high pressure service port in the discharge hose.
3. Tighten the hose nuts by hand.

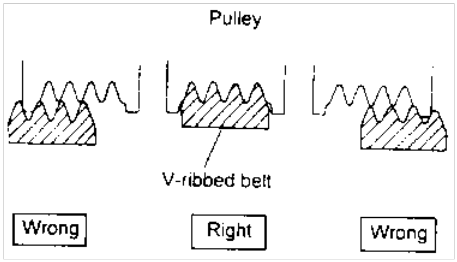


Heating, Ventilation & Air Conditioning > Air Conditioning System > ON-VEHICLE INSPECTION

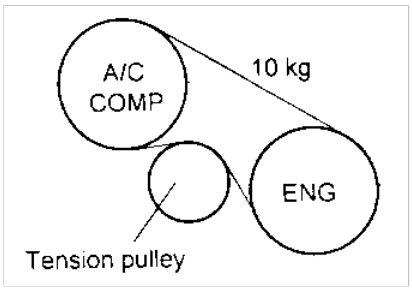
ON-VEHICLE INSPECTION

1. Check condenser fins for blockage or damage. If the fins are clogged, clean them with pressurized water.
   Be careful not to damage the fins.

2. Make sure that drive belt is installed correctly. Check that the drive belt fits properly in the ribbed grooves.



3. Check drive belt tension. If the proper tensions are not maintained, belt slippage will greatly reduce air conditioning performance and drive belt life. To avoid such adverse effects, the following service procedure should be followed:



(1) Any belt that has operated for a minimum of one half-hour is considered to be a "used" belt. Adjust air conditioning drive belt at the time of new-car preparation.

(2) Check drive belt tension at regular service intervals and adjust as needed.

CONDITION	LENGTH (mm)
After Driving	8
Used Belt	6-7
New Belt	5-5.5

4. Start the engine.
5. Turn ON the A/C switch. Check that the A/C operates at each position of the blower switch.
6. Check magnetic clutch operation.
7. Check idle RPM increases. When the magnetic clutch engages, idle RPM should be increased (refer to engine section).
8. Check that condenser fan motor rotates.

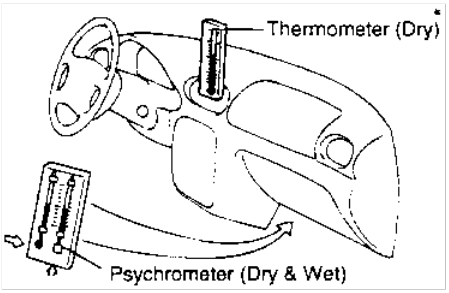
A/C SWITCH	CONDENSER FAN MOTOR
ON	ON
OFF	OFF

9. If no cooling or insufficient cooling, inspect for leakage. Using a gas leak detector, inspect each component of the refrigeration system.

Heating, Ventilation & Air Conditioning > Air Conditioning System > PERFORMANCE TEST

PERFORMANCE TEST

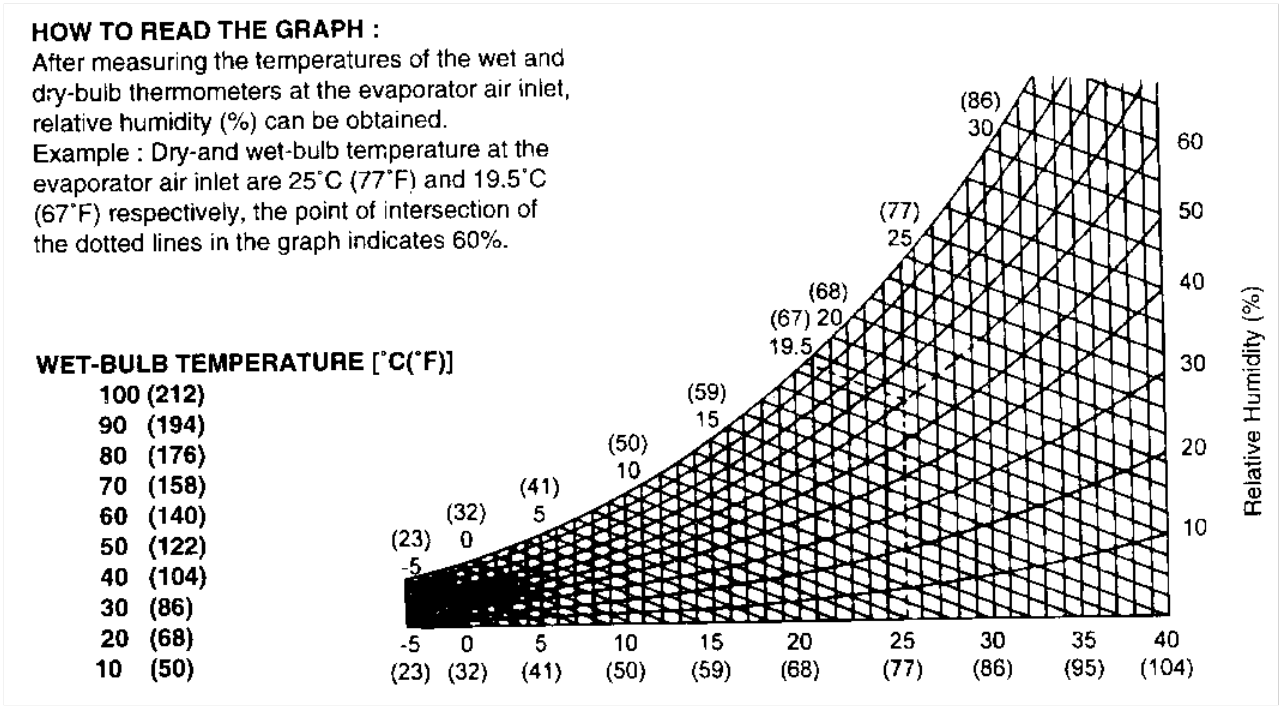
1. Install the manifold gauge set.
2. Run the engine at 2,000 rpm and set the controls for maximum cooling and high blower speed.
3. Keep all windows and doors open.
4. Place a dry-bulb thermometer in the cool air outlet.
5. Place a psychrometer close to the inlet of the cooling unit.
6. Check that the reading on the high pressure gauge is 1,373-1,575 kPa (14-16 kg/cm2, 199-228 psi).
   If the reading is too high, pour water on the condenser.
   If the reading is too low, cover the front of the condenser.
7. Check that the reading on the dry-bulb thermometer at the air inlet at 25-35°C (77-95°F).



8. Calculate the relative humidity from the psychrometric graph by comparing the wet-and dry-bulb reading of the psychrometer at the air inlet.

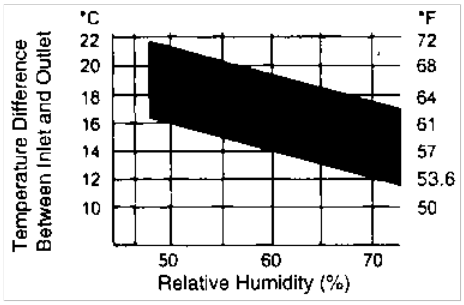
HOW TO READ THE GRAPH :

After measuring the temperatures of the wet and dry-bulb thermometers at the evaporator air inlet, relative humidity (%) can be obtained.
Example : Dry-and wet-bulb temperature at the evaporator air inlet are 25˚C (77˚F) and 19.5˚C (67˚F) respectively, the point of intersection of the dotted lines in the graph indicates 60%.



9. Measure the dry-bulb temperature at the cool air outlet, and calculate the difference between the inlet dry-bulb and outlet dry-bulb temperatures.

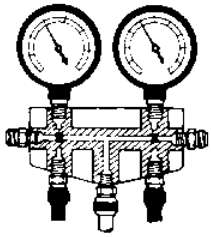
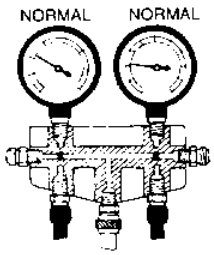
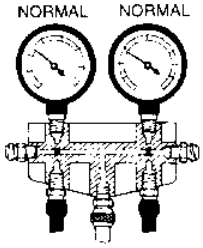
10. Check that the intersection of the relative humidity and temperature difference is between the Block hard line. If the intersection is within the block hard line, cooling performance is satisfactory.



Heating, Ventilation & Air Conditioning > Air Conditioning System > PERFORMANCE TEST DIAGNOSIS

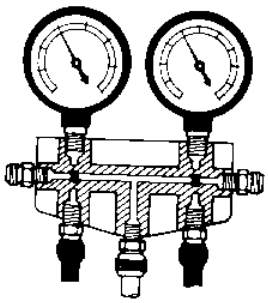
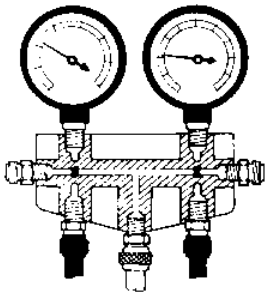
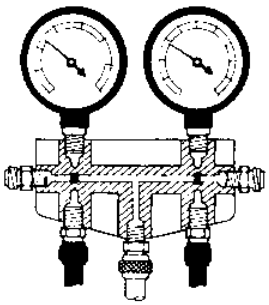
PERFORMANCE TEST DIAGNOSIS

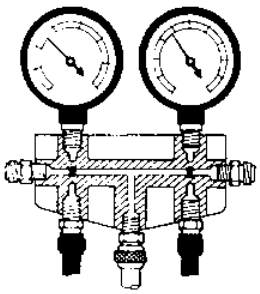
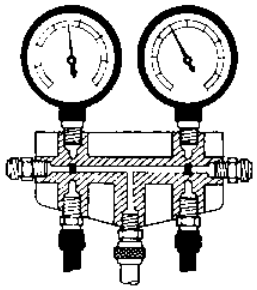
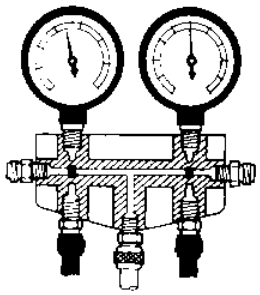
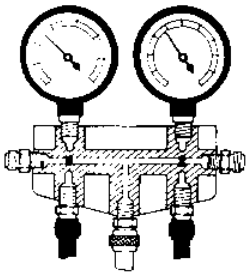
The test gauge indicators shown are to be used as typical examples of common problems which you may need to diagnose.

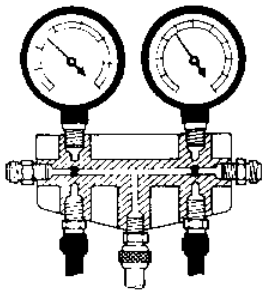
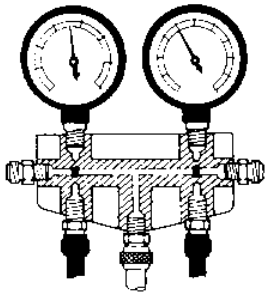
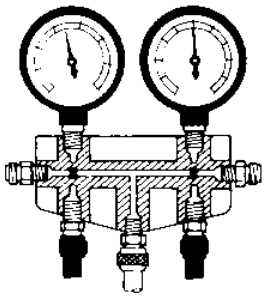
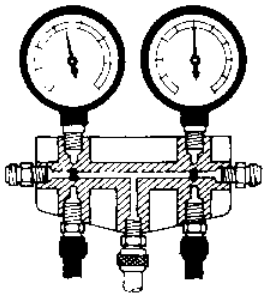
GAUGE READINGS	OTHER SYMPTOMS	DIAGNOSIS	CORRECTION
1 A5HA021A LOW SIDE HIGH SIDE NORMAL NORMAL 	• Discharge air: slightly cool. • Thermostatic switch (with thermistor): Low side gauge doesn't fluctuate with "ON" and "OFF"	Some air and moisture in system.	1. Check leak. 2. Discharge refrigerant from system. 3. Repair leaks as located. 4. Replace receiver-drier. The drier is probably saturated with moisture. 5. Evacuat the system for at least 30 minutes. 6. Charge system with refrigerant. 7. Operate system and check performance.
2 A5HA021B LOW SIDE HIGH SIDE NORMAL NORMAL 	• Discharge air: Becomes warm as low side cycles into vacuum. • Discharge air: Becomes warm all the time during hot part of day.	Excessive moisture in system	1. Discharge refrigerant 2. Replace receiver-drier 3. Evacuate system with a vacuum pump. 4. Recharge system to proper capacity. 5. Operate system and check performance.
3 A5HA021C LOW SIDE HIGH SIDE NORMAL NORMAL 	• Compressor: Cycles on and off too fast. • Low side gauge: Not enough range shown on low side gauge.	Defective thermostatic switch	1. Stop engine and turn air conditioning "OFF" 2. Replace thermostatic switch when installing new thermostatic switch. Make sure that the tube of thermostatic switch is installed in the same position and to the same depth in evaporator core as old switch tube. 3. Operate system and check performance.

PERFORMANCE TEST DIAGNOSIS

The test gauge indicators shown in the following chapter are to be used as typical examples of common problems which you may need to diagnose.

GAUGE READINGS	OTHER SYMPTOMS	DIANOSIS	CORRECTION
1 A5HA021A Low side NORMAL High side NORMAL 	• Discharge air: slightly cool. • Thermostatic switch (with thermistor): Low side gauge doesn't fluctuate with switch "ON" and "OFF" cycle.	Some air and moisture in system.	1. Leak test system. 2. Discharge refrigerant from system. 3. Repair leaks as located. 4. Replace receiver-drier. The drier is probably saturated with moisture. 5. Evacuat the system for at least 30 minutes. 6. Charge system with refrigerant. 7. Operate system and check performance.
2 A5HA021B Low side NORMAL High side NORMAL 	• Discharge air: Becomes warm as low side cycles into vacuum. • Discharge air: Becomes warm all the time during hot part of day.	Excessive moisture in system	1. Discharge refrigerant 2. Replace receiver-drier 3. Evacuate system with a vacuum pump. 4. Recharge system to proper capacity. 5. Operate system and check performance.
3 A5HA021C Low side NORMAL High side NORMAL 	• Compressor: Cycles on and off too fast. • Low side gauge: Not enough range shown on low side gauge.	Defective thermostatic switch	1. Stop engine and turn air conditioning "OFF" 2. Replace thermostatic switch when installing new thermostatic switch. Make sure that thermister tube is installed in the same position and to the same depth in evaporator core as old switch tube. 3. Operate system and check performance.

GAUGE READINGS	OTHER SYMPTOMS	DIANOSIS	CORRECTION
A5HA021D 4 Low side: NORMAL to HIGH; High side: NORMAL 	• Compressor: low side pressure builds too high before compressor turns on (cycle "ON" point too high)	Faulty thermostatic switch	1. Stop engine and turn air conditioning "OFF" 2. Repair or replace thermostatic switch with thermistor (make sure that all wiring is positioned so that no short circuiting can occurred.) 3. Operate system and check performance.
A5HA021E 5 Low side: LOW; High side: LOW 	• Discharge air: Slightly cool.	System slightly low on refrigerant	1. Check leaks. 2. Discharge refrigerant. 3. Repair leaks. 4. Check compressor oil level. 5. Evacuate system using a vacuum pump. 6. Charge system with refrigerant. 7. Operate system and check performance.
A5HA021F 6 Low side: LOW; High side: LOW 	• Discharge air: Warm	• System very low on refrigerant • Possible leak in system.	1. Check leaks. 2. Leak test compressor seal area very carefully. 3. Discharge refrigerant. 4. Check compressor oil level. 5. Evaporate system using a vacuum pump. 6. Charge system with refrigerant. 7. Operate system and check performance.
A5HA021G 7 Low side: LOW; High side: LOW 	• Discharge air: Slightly cool. • Expansion valve: Sweating or frost build up.	• Expansion valve stuck closed. • Screen plugged. • Sensing bulb malfunction.	1. Discharge system. 2. Disconnect inlet line at expansion valve and remove and inspect screen. 3. Clean and replace screen and reconnect inlet line. 4. Evacuate system using a vacuum pump. 5. Charge system with refrigerant.

GAUGE READINGS	OTHER SYMPTOMS	DIANOSIS	CORRECTION
A5HA021H 8 Low side LOW High side LOW 	• Discharge air: slightly cool. • High side pipe: Cool and also shows sweating or frost.	Restriction in high side of system	1. Discharge system. 2. Remove and replace receiver-drier, liquid pipes or other defective components. 3. Evacuate system using a vacuum pump. 4. Charge system with refrigerant. 5. Operate system and check performance.
A5HA021I 9 Low side HIGH High side LOW 	• Compressor :Noisy	Compressor malfunction	1. Isolate compressor. 2. Remove compressor cylinder head and inspect compressor. 3. Check compressor oil level. 4. Replace receiver-drier 5. Operate system and check performance.
A5HA021J 10 Low side HIGH High side HIGH 	• Discharge air: Warm. High side pipe : Very hot	Malfunctioning condenser overcharge.	1. Check for loose or worn fan belt. 2. Inspect condenser for clogged air passage. 3. Inspect condenser mounting for proper radiator clearance. 4. Check for refrigerant overcharge. 5. Operate system and check performance.
A5HA021K 11 Low side HIGH High side HIGH 	• Discharge air: Slightly cool.	Large amount of air and moisture	1. Discharge refrigerant from system. 2. Replace receiver-drier which may be saturated with moisture. 3. Evacuate system using vacuum pump. 4. Charge system with refrigerant. 5. Operate system and check performance.

Heating, Ventilation & Air Conditioning > Air Conditioning System > REFRIGERANT LEVEL CHECK

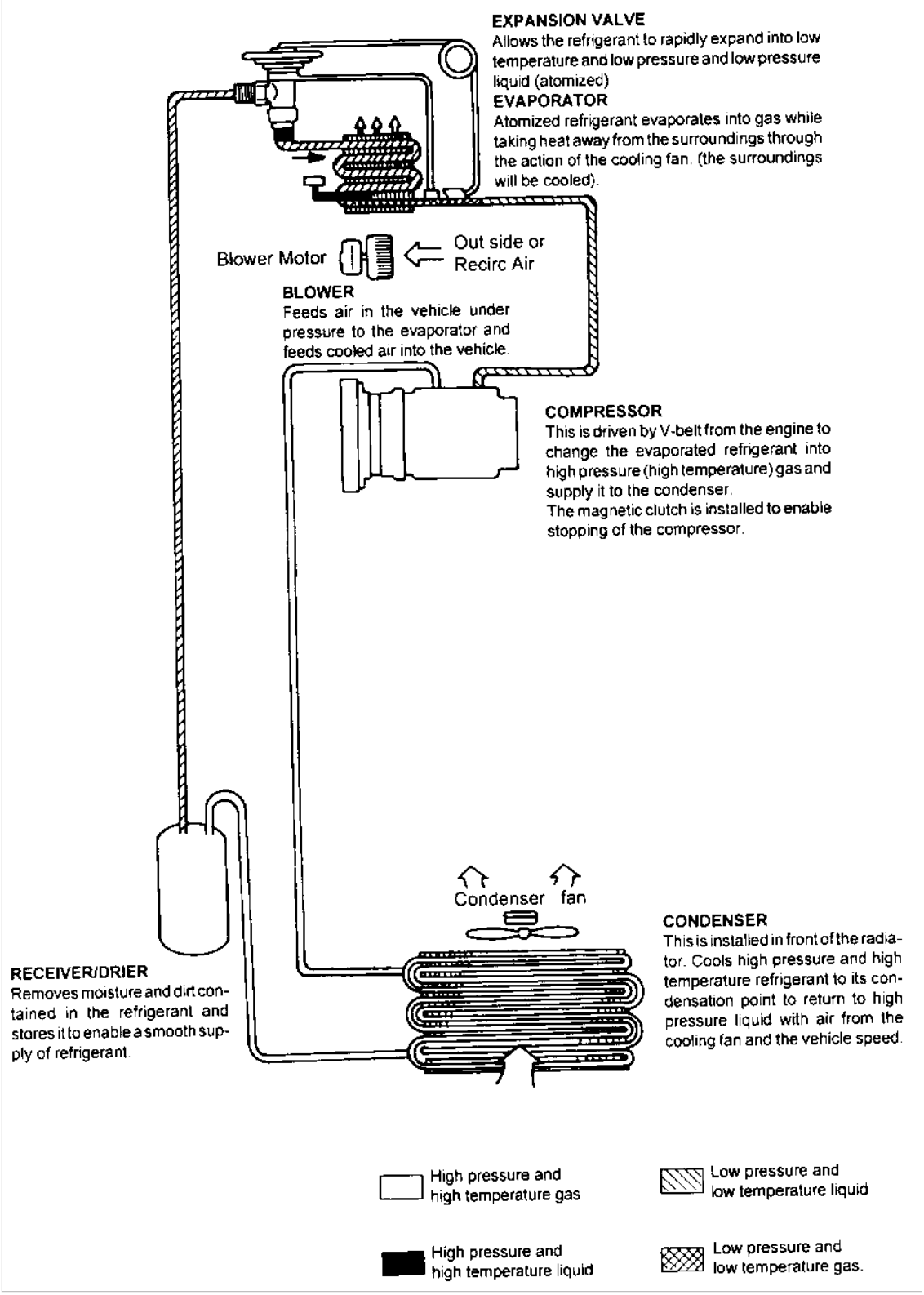
REFRIGERANT LEVEL CHECK

a. Start the engine and hold engine speed at 1,500 rpm.
b. Set A/C switch to "ON" position.
c. Set temperature lever to maximum cold position.
d. Set blower to maximum speed.
e. After the lapse of about five minutes, check whether the amount of refrigerant is proper or insufficient according to the following table.

Check item	Almost no refrigerant	Insuf-ficient refrigerant	Suitable refrigerant	Too much refrigerant
Temperature of high pressure and low pressure lines	Almost no difference between high pressure and low pressure side temperature	High pressure side is warm and low pressure side is fairly cold	High pressure side is hot and low pressure side is cold	High pressure side is abnormally hot
Repair	Stop compressor and conduct an overall check	Check for gas leakage, repair as required, replenish and charge system	|	Discharge refrigerant from service valve of low pressure side

Heating, Ventilation & Air Conditioning > Air Conditioning System > REFRIGERATION CYCLE

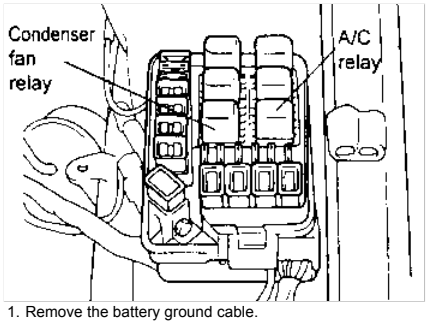
REFRIGERATION CYCLE



Heating, Ventilation & Air Conditioning > Air Conditioning System > SYSTEM RELAYS

SYSTEM RELAYS

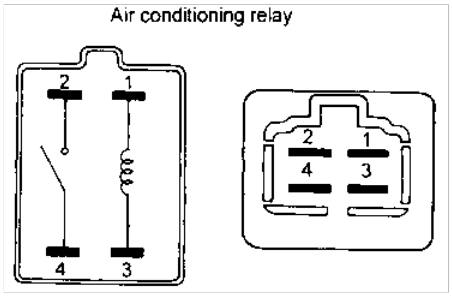
AIR CONDITIONING RELAY AND CONDENSER FAN RELAY



1. Remove the battery ground cable.
2. Remove the cover of relay box located in engine compartment.
3. Remove the relays from relay box.
4. Check for continuity or voltage between the terminals.

AIR CONDITIONING RELAY- check for continuity

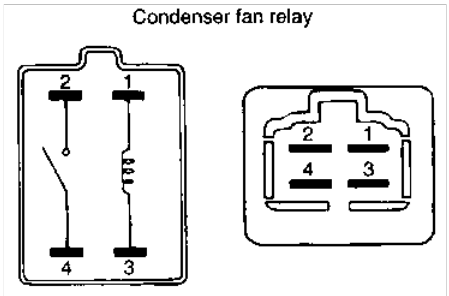
Terminal / Condition	1	2	3	4
Constant	○		○	
Apply battery voltage to terminal 1 and 3		○		○



If continuity is not as specified, replace the relay.

CONDENSER FAN- check for voltage

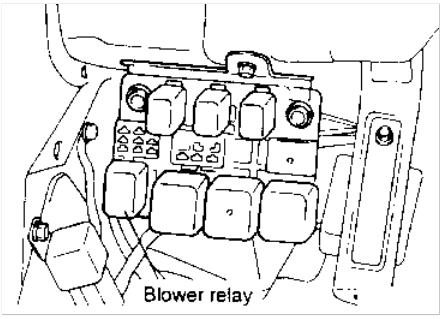
Terminal / Condition	1	2	3	4
Constant	○		○	
Apply battery voltage to terminal 1 and 3		○		○



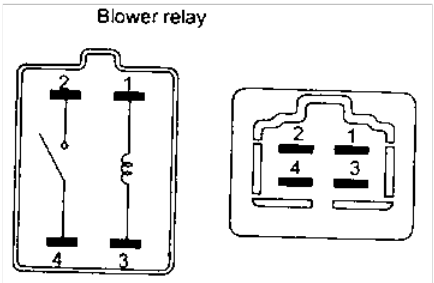
If continuity is not as specified, replace the relay.

BLOWER FAN RELAY

1. Remove the battery ground cable.
2. Remove the rheostat switch with coin box from the crash pad.
3. Remove the relay and check for continuity between the terminal.



Terminal / Condition	1	2	3	4
Constant				
Apply battery voltage to terminal 1 and 3				

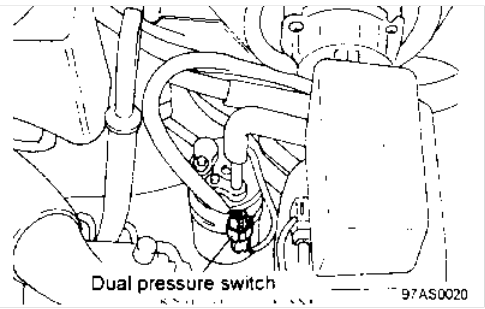


If continuity is not as specified, replace the relay.

Heating, Ventilation & Air Conditioning > Air Conditioning System > A/C Dual Pressure Switch > DUAL PRESSURE SWITCH

DUAL PRESSURE SWITCH

The dual pressure switch is a combination of the low pressure switch (for checking the quantity of refrigerant) and the high pressure switch (for prevention of overheating). It is installed in the receiver, and, when the pressure becomes approximately 200kPa (29 psi) or lower, the compressor stops, thus preventing the compressor from being damaged by heat. When the pressure reaches 3,214 kPa (470 psi) or higher, the compressor stops, thus preventing overheating. There is generally no necessity for inspection; if, however, an unusual condition, such as non-operation of the compressor is encountered, check by following the procedures below.



Refrigerant	R134a
Pressure setting (kg/cm^2G)	ON / OFF 20 22 25 26 32 (Low pressure side) (High pressure side)

Heating, Ventilation & Air Conditioning > Air Conditioning System > A/C Dual Pressure Switch > INSTALLATION

INSTALLATION

1. Installation is reverse of removal.
2. Evacuate, charge and test refrigeration system.

Heating, Ventilation & Air Conditioning > Air Conditioning System > A/C Dual Pressure Switch > ON-VEHICLE INSPECTION

ON-VEHICLE INSPECTION

1. Disconnect connector of the dual pressure switch.
2. Install the manifold gauge set.
3. Observe the gauge reading.
4. Check the continuity between the two terminals of the dual pressure switch shown in the figure. If defective, replace the dual pressure switch.

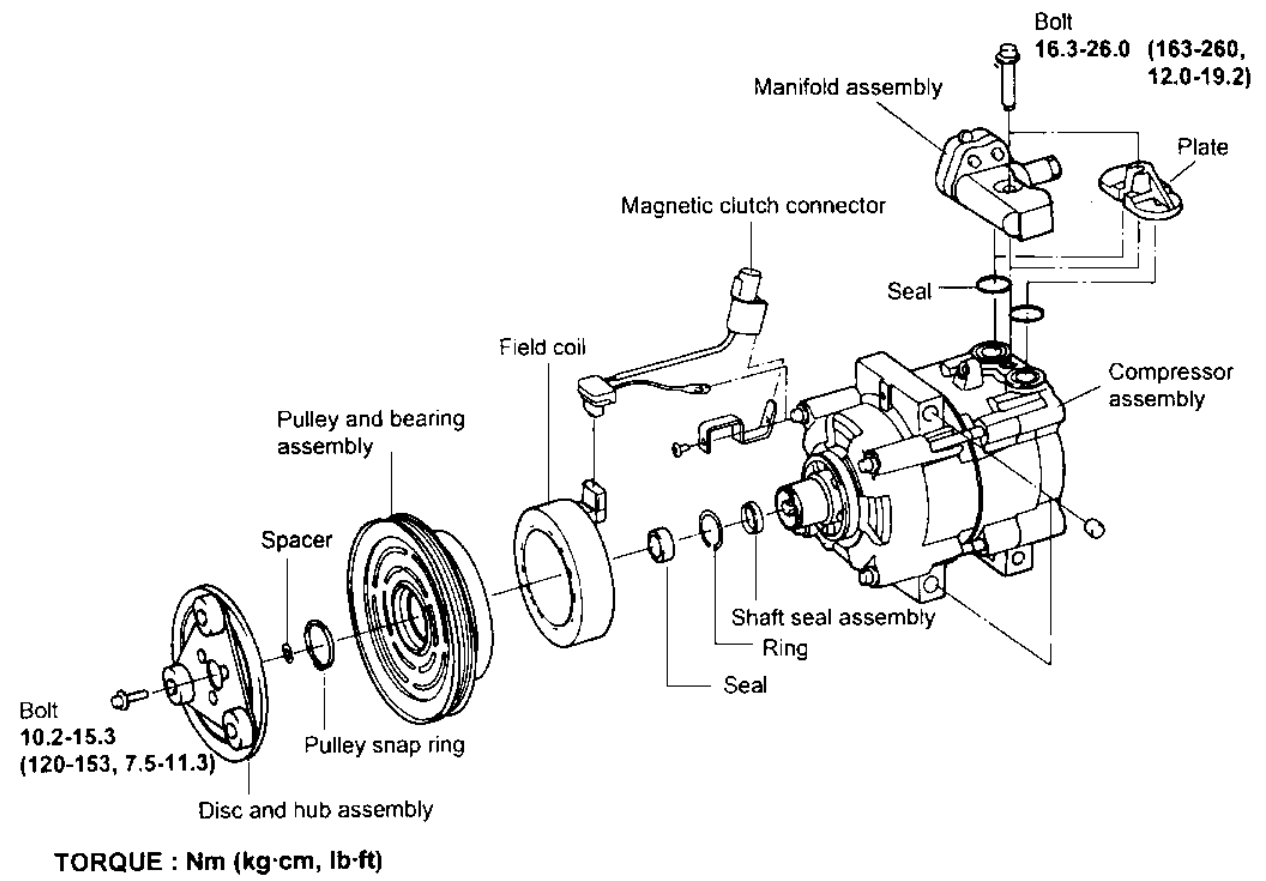
Heating, Ventilation & Air Conditioning > Air Conditioning System > A/C Dual Pressure Switch > REMOVAL

REMOVAL

1. Discharge the air conditioning system.
2. Disconnect connector from the dual pressure switch.
3. Remove the dual pressure switch using the wrench.
   a. Cap the open fitting immediately to keep moisture out of the system.
   b. Be careful not to twist tubes.

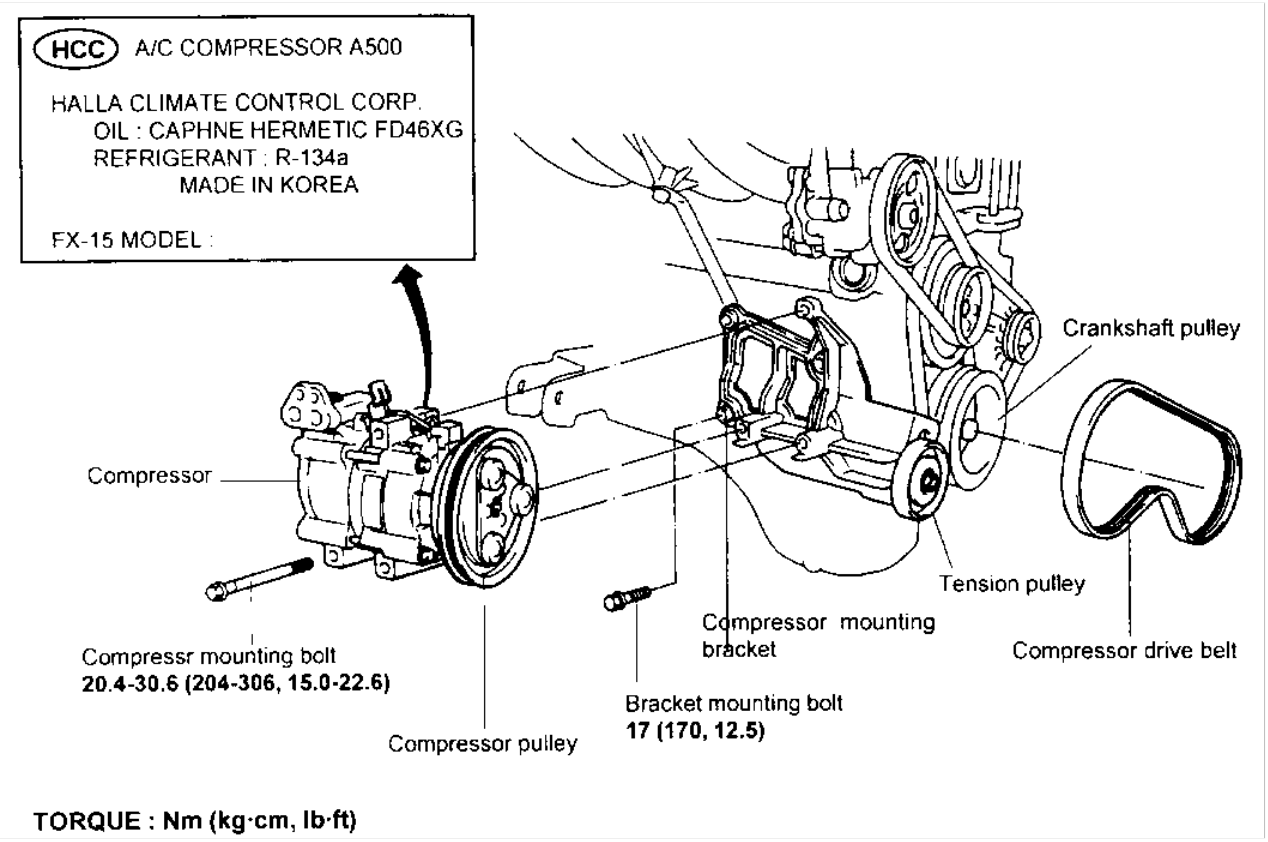
Heating, Ventilation & Air Conditioning > Air Conditioning System > Air Conditioning Compressor > COMPONENTS

Components



Heating, Ventilation & Air Conditioning > Air Conditioning System > Air Conditioning Compressor > COMPONENTS

Components



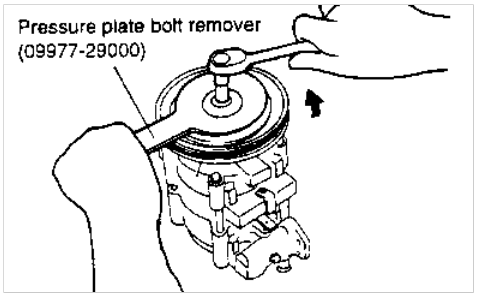
Heating, Ventilation & Air Conditioning > Air Conditioning System > Air Conditioning Compressor > DISASSEMBLY AND REASSEMBLY

DISASSEMBLY AND REASSEMBLY

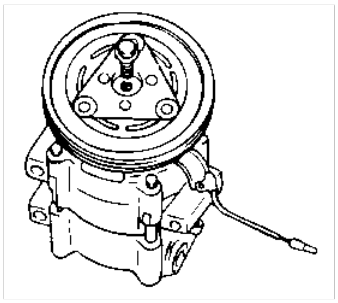
CLUTCH HUB AND PULLEY

DISASSEMBLY

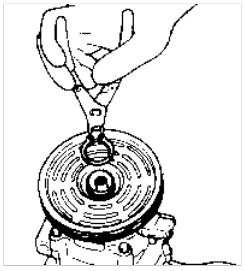
1. Remove the clutch hub retaining bolt with the aid of a spanner wrench.



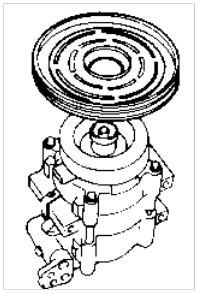
2. Pull the clutch hub and shims from the compressor shaft. If the hub cannot be pulled from the compress shaft, screw an 8mm bolt into the shaft hole of the clutch hub to force the hub from the shaft.



3. Remove the pulley retaining snap ring.

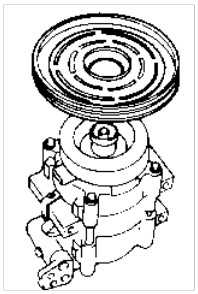


4. Pull the pulley bearing assembly from the compressor.

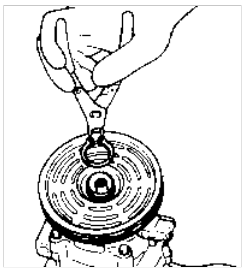


REASSEMBLY

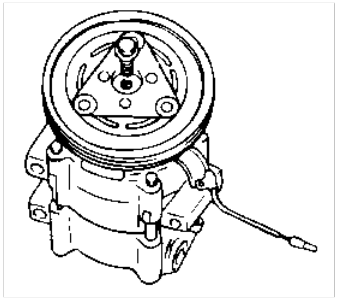
1. Clean the pulley bearing surface of the compressor head to remove any dirt or corrosion.
2. Install the pulley and bearing assembly on the compressor. The bearing is a slip fit on the compressor head and, if properly aligned, should slip on the compressor head.



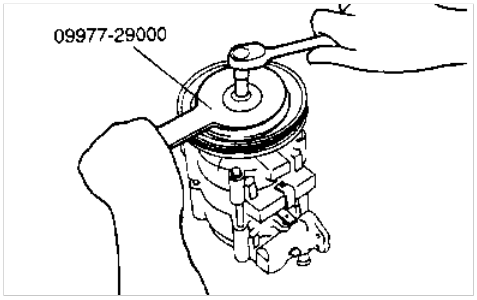
3. Install the pulley retaining snap ring with the bevel side of the snap ring out.



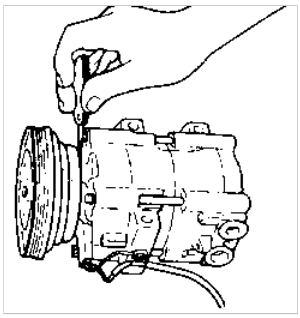
4. Place one nominal thickness spacer shim inside the hub spline opening and slide the hub on the end of the compressor shaft.



5. Thread a new hub retaining bolt into the end of the compressor shaft. Tighten the hub retaining bolt.
   Do not use air tools.



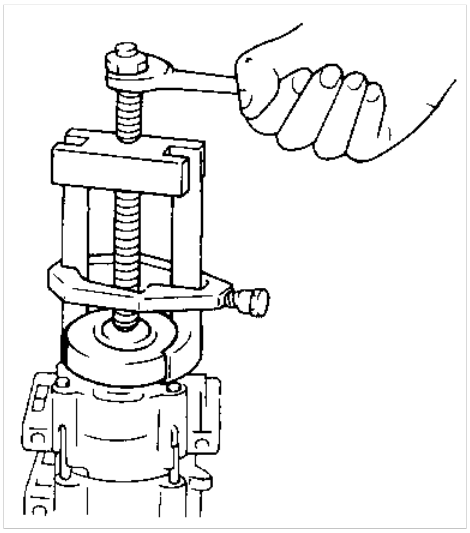
6. Check the clutch air gap between the clutch hub and the pulley mating surfaces with a feeler gauge. The air gap should be as follows:
   Check at three locations equally spaced around the pulley.
7. If the clutch air gap is not within the dimensions specified above, repeat steps 4 through 6 with shims of various thicknesses until the air gap is between the specified limits.



CLUTCH FIELD COIL

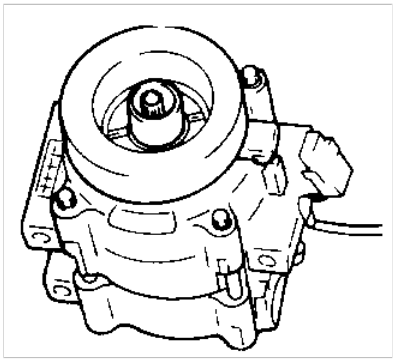
DISASSEMBLY

1. Remove the clutch hub and pulley following the procedure given.
2. Install shaft protector tool on the nose opening of the compressor.
3. Install the puller on the compressor as shown in the illustration.
   Place the tip of the puller forcing screw on the center dimple of the shaft protector and the jaws of the puller around the back side of the field coil.
4. Tighten the forcing screw with a wrench to pull the coil loose from the compressor front head.
   Do not use air tools.



REASSEMBLY

1. Clean the coil press diameter of the front head to remove any dirt or corrosion.
2. With the compressor in a vertical position (nose up), place the coil in position on the front head of the compressor. Assure that the clutch coil electrical connector is positioned correctly.
3. Place the coil pressing tool in position over the compressor nose and the inner radius of the field coil.
4. Position an eight (8) inch, two jaw puller to the compressor and pressing tool as shown in the illustration. The jaws of the puller should be firmly engaged with the rear side of the compressor front mounts and the forcing screw should be piloted on the center of the pressing tool.



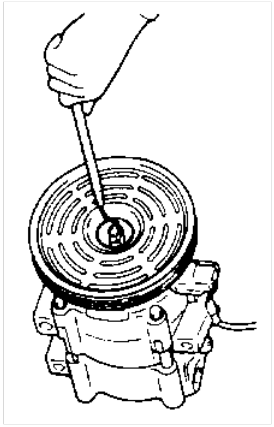
5. Tighten the forcing screw with a wrench by hand until the coil is pressed completely onto the compressor front head. Check to assure that the field coil bottoms against the front head at all points around the coil outer diameter.
6. Install the clutch pulley and hub on the compressor as outlined.

SHAFT SEAL

The refrigerant system must be discharged and the compressor must be removed from the vehicle prior to replacing the compressor shaft seal.

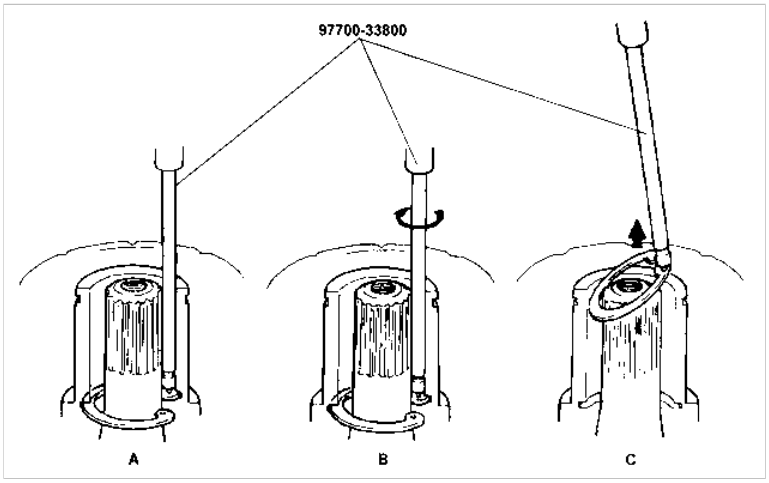
DISASSEMBLY

1. Remove the clutch hub from the compressor.
2. Remove the shaft seal felt from the nose of the compressor with a pick type tool.

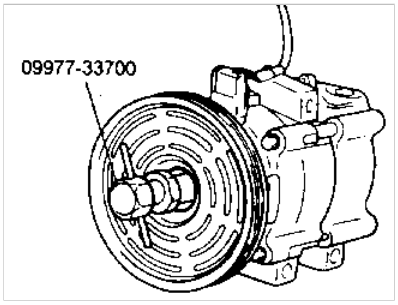


3. Blow any debris from inside the compressor nose with low pressure compressed air. Then, clean the inside and outside nose area of the compressor with a lint-free cloth to remove any oil and dirt.
4. Remove the shaft seal retaining snap ring from inside the compressor nose with Snap Ring Remover as follows.
   a. Insert tip of Snap Ring Remover into one of the snap ring eyes (View A).
   b. Rotate the Snap Ring Remover to position the tool tip and snap ring eye closest to the compressor shaft (View B).
   c. Pull the Snap Ring Remover tool up quickly while keeping the tool shaft against the side of the nose opening to remove the snap ring (View C).

Removing FX15 Shaft Seal Retaining Snap Ring

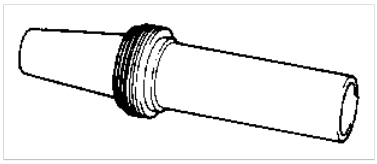


5. Position the Shaft Seal Remove Tool (09977-33700) over the compressor shaft and push the tool into the nose of the compressor and down against the shaft seal. Engage the end of the tool with the internal diameter of the shaft seal. While holding the hex part of the tool, turn the tool handle clockwise to expand the tool tip inside the seal inner radius. Then, pull the shaft seal from the compressor with the tool.

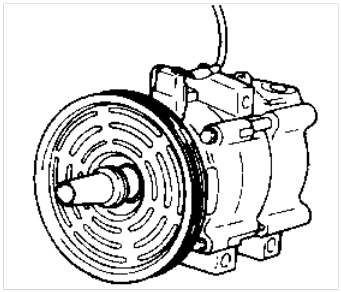


REASSEMBLY

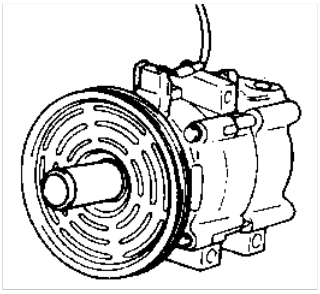
1. Obtain a new shaft seal kit. Carefully remove the contents from the package and locate the plastic shaft seal protector. Inspect the protector for any burrs or other damage. Do not use the protector if it is damaged. Obtain another shaft seal kit and use the protector from it.
2. Using a clean lint-free cloth, clean the shaft and the seal pocket inside the compressor nose.
3. Dip the shaft seal protector and seal in clean refrigerant oil and position the seal on the protector with the lip of the seal pointing toward the large end of the protector.



4. Place the seal protector with shaft seal over the end of the compressor shaft.



5. Place the shaft seal installer tool over the end of the shaft seal protector. Then, slowly push the shaft seal down the protector until it is seated in the compressor.
6. Remove the seal installer and seat protector from the compressor.
7. Place a new seal retaining snap ring into the compressor nose opening and seat the snap ring into the groove with the remover tool.
8. Leak test the shaft seal installation after rotating the shaft about 10 revolutions with the clutch hub.
9. Install new felt into the compressor nose.
10. Install the clutch hub on the compressor as outlined in this section.



Heating, Ventilation & Air Conditioning > Air Conditioning System > Air Conditioning Compressor > ON-VEHICLE INSPECTION

ON-VEHICLE INSPECTION

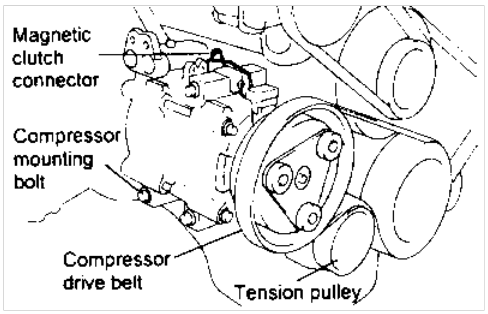
1. Install manifold gauge set.
2. Check compressor drive belt tension.
3. Run engine at approx. 1,500 rpm.
4. Check compressor for following:
   a. Low pressure gauge reading is not lower and high pressure gauge reading is not higher than abnormal.
   b. Metallic sound.
   c. Leakage from shaft seal. If any of the above is not satisfactory, repair the compressor.
5. Check magnetic clutch.
   a. Lift-up the vehicle.
   b. Inspect the pressure plate and the rotor for signs of oil.
   c. Check the clutch bearings for noise and leaking grease.
   d. Using an ohmmeter, measure the resistance of the stator coil between the clutch lead wire and ground.
      If resistance value is not as specified, replace the coil.
   e. Connect the positive(+) lead from the battery to terminal. Check that the magnetic clutch is energized. If magnetic clutch is not energized, replace the coil.

Do not short the positive(+) lead wire on the vehicle by applying battery voltage.

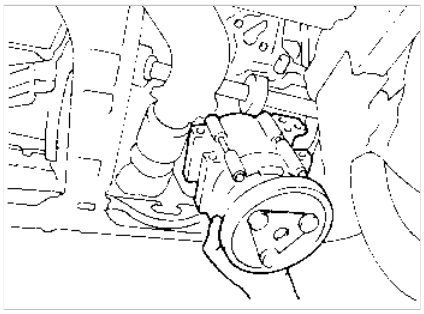
Heating, Ventilation & Air Conditioning > Air Conditioning System > Air Conditioning Compressor > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

1. Discharge refrigerant from the refrigerant system.
2. Disconnect the magnetic clutch connector.
3. Lift up the car.
4. Loosen the tension pulley and then remove the compressor drive belt.
5. Remove the front muffler mounting bolts, if necessary.
6. Remove the discharge hose and suction hose.
7. Remove the compressor mounting bolts.

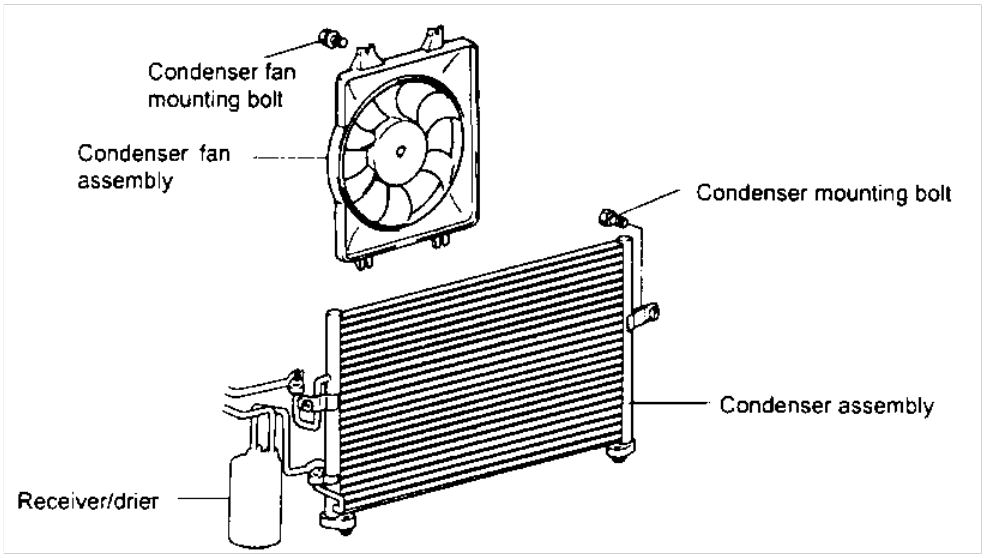


8. Remove the compressor.
9. Installation is the reverse order of removal.



Heating, Ventilation & Air Conditioning > Air Conditioning System > Condenser > COMPONENTS

Components



Heating, Ventilation & Air Conditioning > Air Conditioning System > Condenser > INSTALLATION

INSTALLATION

1. Installation is reverse of removal.
2. If the condenser is replaced with a new unit, add 25cc of compressor oil to the compressor.
3. Evacuate, charge and test refrigeration system.

Heating, Ventilation & Air Conditioning > Air Conditioning System > Condenser > ON-VEHICLE INSPECTION

ON-VEHICLE INSPECTION

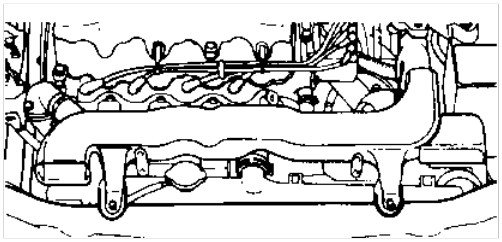
1. Check the condenser fins for blockage or damage. If fins are clogged, clean them with compressed air. If the fins are bent, straighten them with a screwdriver or a pair of pliers. Be careful not to damage the fins.
2. Check the condenser fittings for leakage. Repair or replace if necessary.

Heating, Ventilation & Air Conditioning > Air Conditioning System > Condenser > REMOVAL

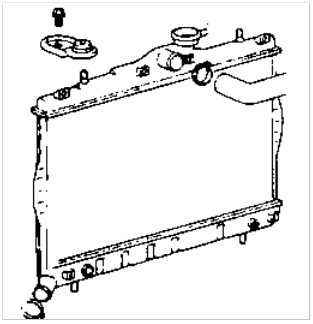
REMOVAL

For vehicles not equipped with anti-lock brake system, steps 1, 5, 6 and 8 are not necessary. That is, the condenser can be removed without removing the radiator and fan assembly.

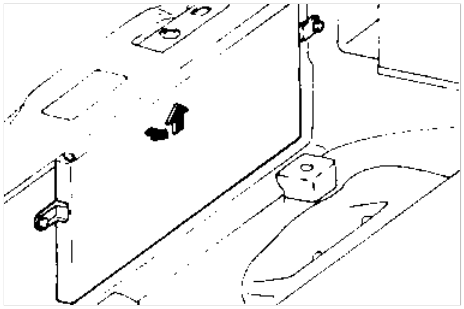
1. Discharge refrigerant from the refrigeration system.
2. Discharge engine coolant from the radiator.
3. Remove the two bolts holding the radiator upper mounting clamps and the air intake duct.
4. Remove two of the radiator mounting clips and the air intake duct.



5. Disconnect the coolant inlet and the outlet hoses from the radiator.
6. Disconnect oil cooler hoses from the transaxle (A/T only).
7. Disconnect the radiator fan and the condenser fan connectors.
8. Remove the radiator and fan assembly.
9. Disconnect the discharge pipe and the liquid tube (A) from the condenser.
   a. Cap the open fittings immediately to keep moisture from entering the system.
   b. Be careful not to damage the discharge tube and the liquid tube (A).
   c. Be careful not to damage the condenser fins.
10. Remove two condenser mounting bolts.

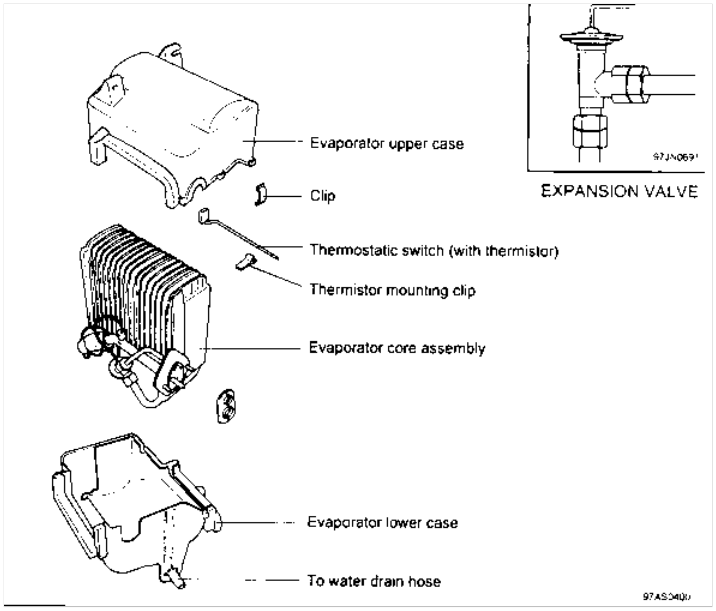


11. Remove the condenser assembly.



Heating, Ventilation & Air Conditioning > Air Conditioning System > Evaporator > COMPONENTS

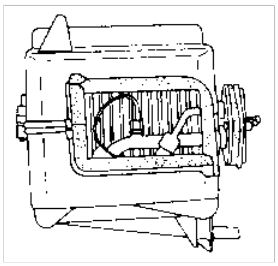
Components



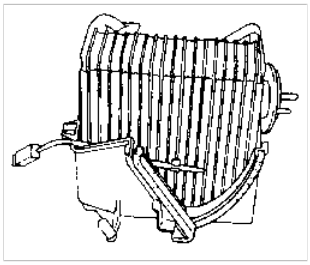
Heating, Ventilation & Air Conditioning > Air Conditioning System > Evaporator > DISASSEMBLY

DISASSEMBLY

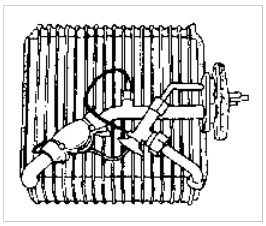
1. Remove 7 clips, holding the upper case to the lower case.
2. Remove the upper case.
   Be careful not to break the thermostatic switch wiring.
3. Remove the thermostatic switch with thermistor and its mounting clip from the evaporator unit.



4. Remove the evaporator unit from the lower case.



5. Disconnect the capillary tube from the outlet fitting of the evaporator.
6. Disconnect liquid tube and suction tube from the inlet and outlet fittings of the expansion valve.
7. Remove the packing and heat sensing tube from suction tube of evaporator.
8. Remove the expansion valve.



Heating, Ventilation & Air Conditioning > Air Conditioning System > Evaporator > INSPECTION

INSPECTION

1. Check the evaporator fins for blockage. If the fins are clogged, clean them with compressed air.

Never use water to clean the evaporator.

2. Check fittings for cracks or scratches.

Heating, Ventilation & Air Conditioning > Air Conditioning System > Evaporator > ON-VEHICLE INSPECTION

ON-VEHICLE INSPECTION

1. Check quantity of refrigerant gas during refrigeration cycle.
2. Install manifold gauge set.
3. Run the engine at 2,000 rpm at least 5 minutes.
4. Read the manifold gauge and check the gas leakage from the evaporator by using gas leak detector.
   a. If the expansion valve is clogged, low pressure reading will drop to 0 kg/cm2, otherwise it is ok.
   b. If the expansion valve is clogged or gas leaks from the evaporator, then repair or replace as necessary.

Heating, Ventilation & Air Conditioning > Air Conditioning System > Evaporator > REASSEMBLY

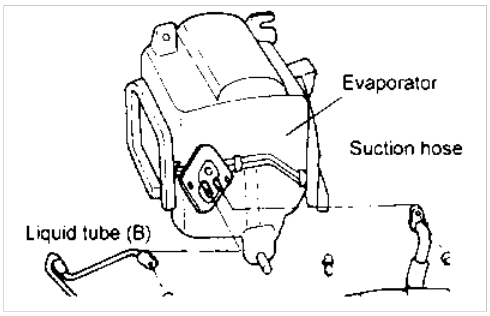
REASSEMBLY

1. Connect the expansion valve to the inlet fitting of the evaporator. Torque the nut.
   Be sure that the O-ring is positioned on the tube fitting.
2. Install the holder to the suction tube with heat sensitizing tube.
3. Connect the liquid tube to the inlet fitting of the expansion valve. Torque the nut.
4. Install lower unit case to the evaporator.
5. Install thermistor to the evaporator.
6. Install upper unit case.
7. Install one screw for the pipe clamp.
8. Install seven clips, holding the upper case to the lower case.

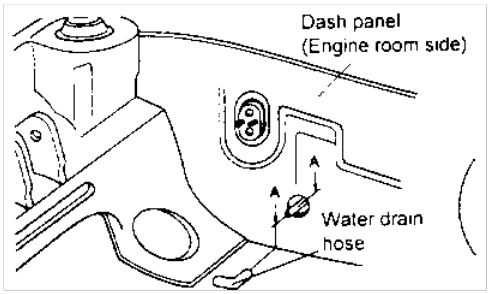
Heating, Ventilation & Air Conditioning > Air Conditioning System > Evaporator > REMOVAL

REMOVAL

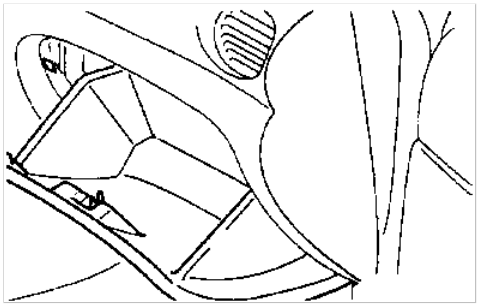
1. Disconnect the battery negative terminal.
2. Discharge the refrigerant.
3. Disconnect the liquid tube "B" and suction hose from the evaporator.
   Cap the open fittings immediately to keep moisture and dirt out of the system.



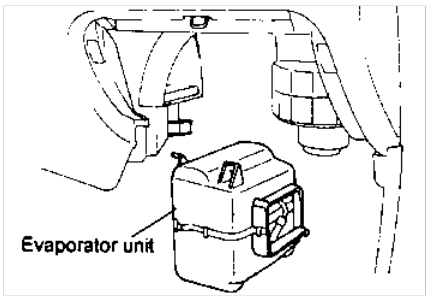
4. Remove the water drain hose from the evaporator.
5. Remove the grommet cover from the dash panel (2 screws).



6. Remove three of the glove box assembly bolts.



7. Disconnect the thermostatic switch connector.
8. Remove three of the evaporator mounting bolts (or nuts).
9. Remove the evaporator unit.



INSTALLATION

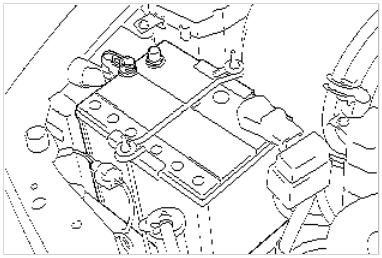
1. Installation is reverse order of removal.
2. If the evaporator unit is replaced with a new unit, add 40cc of compressor oil to the compressor.
3. Evacuate, charge and test refrigeration system

Heating, Ventilation & Air Conditioning > Air Conditioning System > Front Passenger Air Bag > REMOVAL

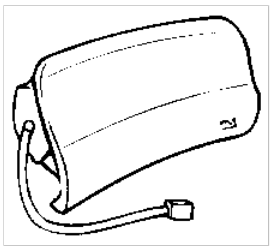
REMOVAL

a. Never attempt to disassemble or repair the air bag module or clock spring.
b. Do not drop the air bag module or allow contact with water, grease or oil. Replace it if a dent, crack, deformation or rust are detected.
c. The air bag module should be stored on a flat surface and placed so that the pad surface is facing upward. Do not place anything on top of it.
d. Do not expose the air bag module to temperature over 93°C (200°F)
e. An undeployed air bag module should only be disposed in accordance with the procedures.
f. Never attempt to measure the circuit resistance of the air bag module (squib) even if you are using the specified tester. If the circuit resistance is measured with a tester, accidental air bag deployment will result in serious personal injury.
g. Whenever the PAB is deployed it should be replaced with a new one assembled with an extension wire. Because the squib is melt down if the PAB is deployed making the extension wire useless.

1. Disconnect the battery negative (-) terminal cable.
   Wait at least 30 seconds.

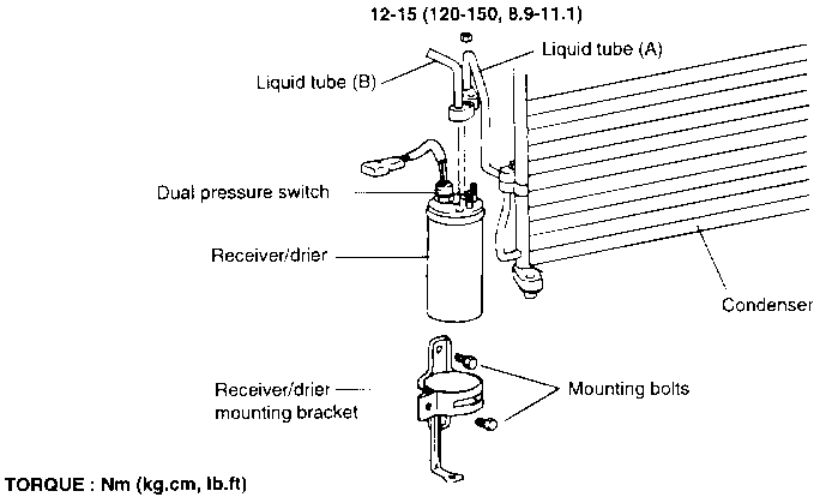


2. Remove the glove box.
3. Disconnect the PAB module connector.
4. Remove the crash pad assy and then the PAB module.



Heating, Ventilation & Air Conditioning > Air Conditioning System > Receiver/Drier > COMPONENTS

Components



Heating, Ventilation & Air Conditioning > Air Conditioning System > Receiver/Drier > INSTALLATION

INSTALLATION

1. Install the receiver-drier in the bracket.
   Do not remove the blind plugs until ready for connection.
2. Connect the two liquid line pipes to the receiver-drier at specified torque.
3. If the receiver-drier is replaced with a new unit, add 40cc of compressor oil to the compressor.
4. Evacuate, charge and test refrigeration system.

Heating, Ventilation & Air Conditioning > Air Conditioning System > Receiver/Drier > ON-VEHICLE INSPECTION

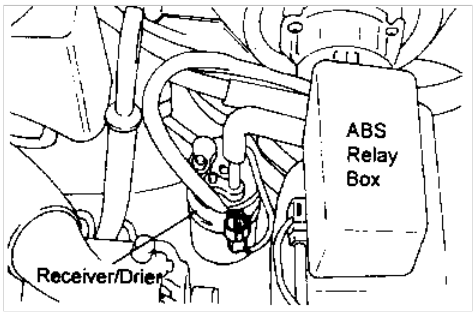
ON-VEHICLE INSPECTION

1. Check the sight glass, fusible plug and the fittings for leakage, using a leak detector.
2. Check the receiver-drier for clogging.
   a. Run the engine at fast idle with the air conditioning ON.
   b. Check both the inlet and outlet temperature. If difference in temperatures between the inlet and outlet is large, replace the receiver-drier.

Heating, Ventilation & Air Conditioning > Air Conditioning System > Receiver/Drier > REMOVAL

REMOVAL

1. Discharge the air conditioning system.
2. Disconnect the two liquid line pipes from the receiver-drier.
3. Remove the receiver-drier from the bracket.
   Plug all open fittings immediately to keep moisture out of the system.

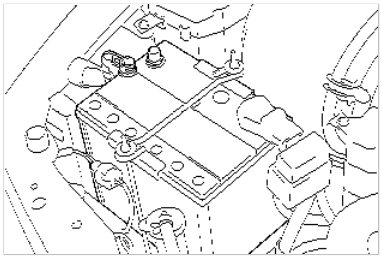


Heating, Ventilation & Air Conditioning > Air Conditioning System > Refrigerant Line > REMOVAL

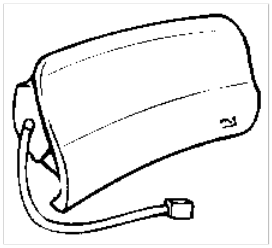
REMOVAL

a. Never attempt to disassemble or repair the air bag module or clock spring.
b. Do not drop the air bag module or allow contact with water, grease or oil. Replace it if a dent, crack, deformation or rust are detected.
c. The air bag module should be stored on a flat surface and placed so that the pad surface is facing upward. Do not place anything on top of it.
d. Do not expose the air bag module to temperature over 93°C (200°F)
e. An undeployed air bag module should only be disposed in accordance with the procedures.
f. Never attempt to measure the circuit resistance of the air bag module (squib) even if you are using the specified tester. If the circuit resistance is measured with a tester, accidental air bag deployment will result in serious personal injury.
g. Whenever the PAB is deployed it should be replaced with a new one assembled with an extension wire. Because the squib is melt down if the PAB is deployed making the extension wire useless.

1. Disconnect the battery negative (-) terminal cable.
   Wait at least 30 seconds.



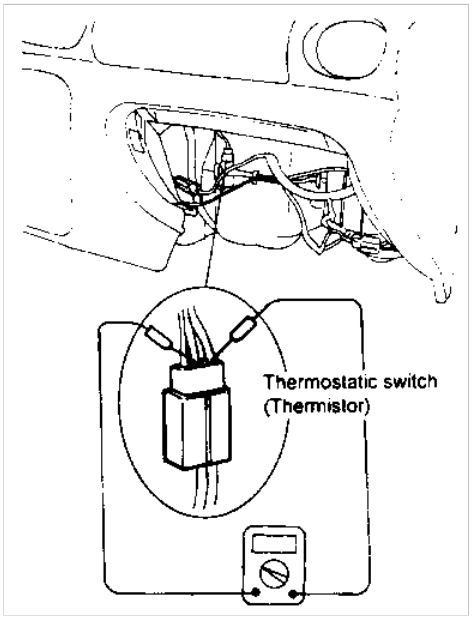
2. Remove the glove box.
3. Disconnect the PAB module connector.
4. Remove the crash pad assy and then the PAB module.



Heating, Ventilation & Air Conditioning > Air Conditioning System > Thermostatic Switch > ON-VEHICLE INSPECTION

ON-VEHICLE INSPECTION

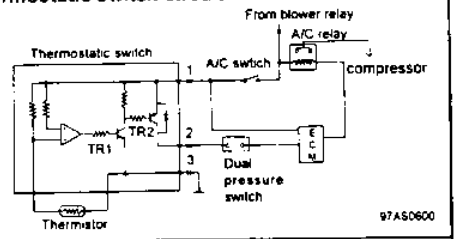
1. Remove the glove box assembly.
2. Turn the blower and A/C switches ON.
3. Start the engine.
4. With the thermostatic switch connector in coupled state, install a voltmeter between terminals 2 and 3 (-) and check whether there is a change in voltage between terminals according to the temperature of the evaporator surface.



***Thermostatic switch operating characteristics**

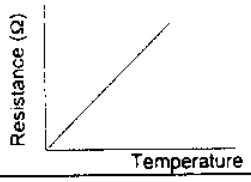
Operating temp	Thermo switch operation	Terminal voltage (2 and 3)	Remarks
1.5±1.0°C (34.7±1.8°F)	OFF	0 V	Compressor clutch should be disengaged
4 3±1.0°C (39.7±1.8°F)	ON	12 V	Compressor clutch should be engaged

*** Thermostatic switch circuit**



Thermistor

* Type : PTC (Positive Thermal Coefficient)



Operation

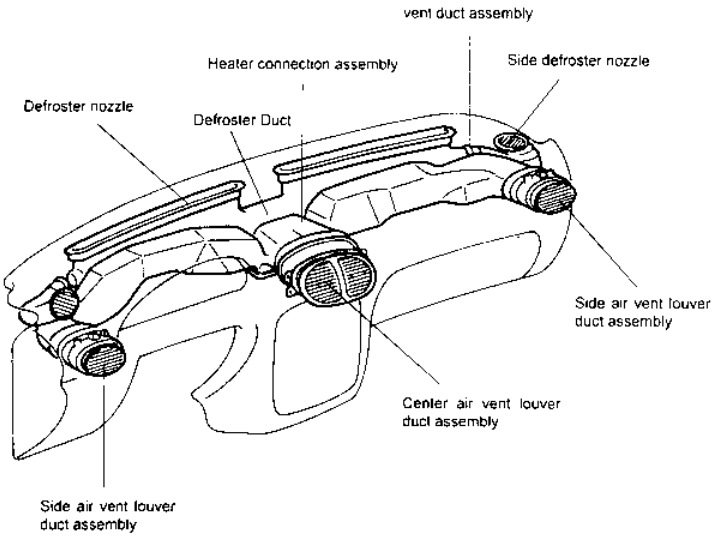
1. When the resistance (the temperature of the evaporator) in the thermistor increases :
   →TR1"ON"→TR2"ON"→Thermostatic switch"ON".
2. When the resistance (the temperature of the evaporator) in the thermistor decreases :
   →TR1"OFF"→TR2"OFF"→Thermostatic switch "OFF"

This check should be carried out on the back probes of the thermostatic switch when it is in coupled state.

5. If above condition is not satisfied, remove the evaporator unit and replace the thermostatic switch.

Heating, Ventilation & Air Conditioning > Blower Controls > Vents/Air Distribution > COMPONENTS

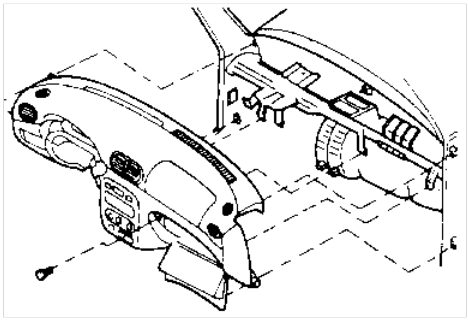
COMPONENTS



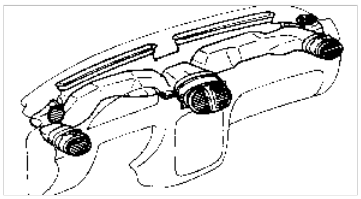
Heating, Ventilation & Air Conditioning > Blower Controls > Vents/Air Distribution > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

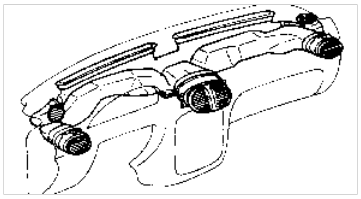
1. Remove the front and rear console assemblies.
2. Remove the glove box and crash pad assemblies.



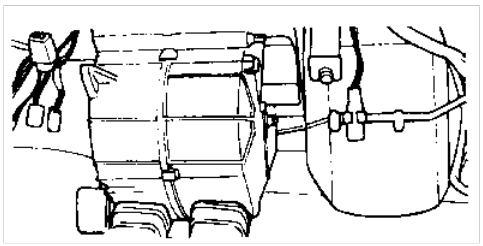
3. Detach the defroster nozzle assembly, and then the defroster hose and the side defroster nozzle.



4. Remove the heater connection assembly.
5. Remove the side air vent hose assembly (LH/RH).



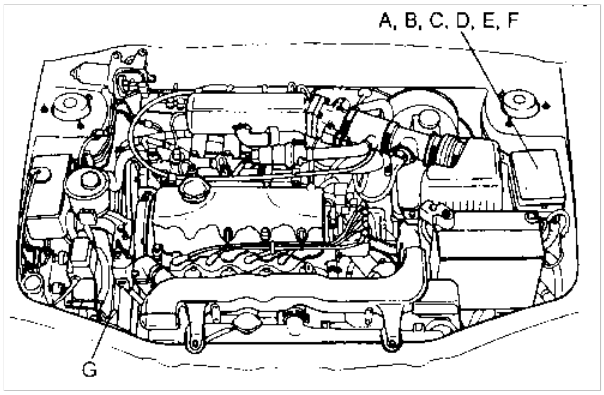
6. Installation is the reverse order of removal procedures.



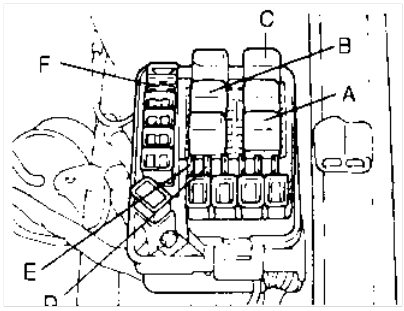
Heating, Ventilation & Air Conditioning > General > LOCATION OF COMPONENTS

LOCATION OF COMPONENTS

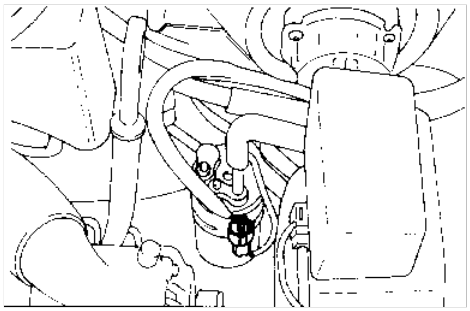
IN THE ENGINE ROOM



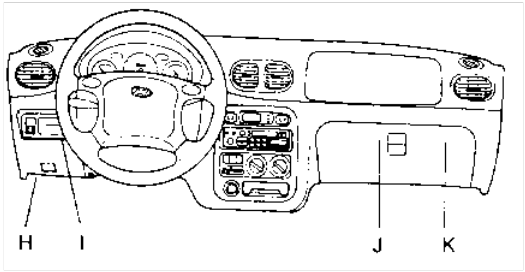
A. A/C relay, B. Condenser fan relay, C. Radiator fan relay, D. Blower fuse, E. A/C fuse, F. Condenser fuse



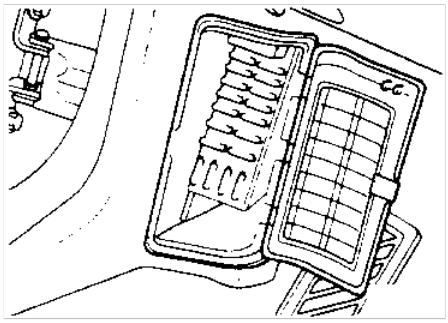
G. Dual pressure switch



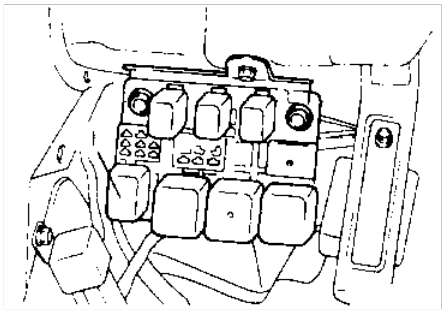
ON THE CRASH PAD



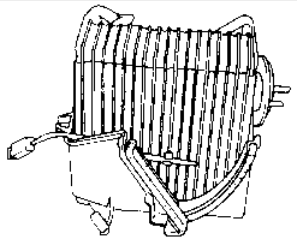
H. Fuses in dash fuse box



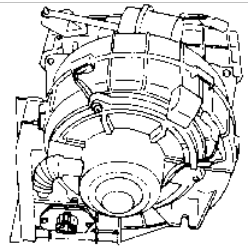
I. Blower relay



J. Thermostatic switch (with thermistor)



K. Blower resistor



Heating, Ventilation & Air Conditioning > General > SPECIAL TOOLS

SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
09977-34000Pressure plate bolt remover		Removal and installation of pressure plate
09977-33700Shaft seal remover and installer		Removal and installation of the shaft seal
09977-33800Snap ring remover		Removal of snap ring
09455-34000Bearing and gear puller		Removal of field coil

Heating, Ventilation & Air Conditioning > General > SPECIFICATIONS

SPECIFICATIONS

Heater unit

Type	Three-way-flow full-air-mix system
Heating capacity	4,500 ± 428 kcal/h

Heater control assembly

Rotary type (Vacuum Control System)

Manual lever type (Lever Control System)

Air conditioning

Cooling capacity	4,100 ± 410 kcal/h

Compressor

Model	FX-15 (Swash plate type)
Refrigerant unit lubricant, cc (cu. in.)	PAG oil FD46XG or Equivalent 170-190cc (10.4-11.6)
Bore x stroke	29.0 x 23.3 mm
Displacement	154 cc/rev
Operating voltage	DC 12.8 ± 0.2 V

Magnetic clutch

Voltage, power consumption	DC 12.8 ± 0.2 V
Breakaway torque	Min. 40 Nm(400 kg.cm, 29.50 lb.in)
Coil resistance(12.8V at 20°C)	3.23 ± 0.08Ω

Dual Pressure switch

High pressure switch	OFF 32 ± 2 kg/cm2(3,138 kPa, 455 psi)
	ON 26 ± 2 kg/cm2(2,550 kPa, 370 psi)
Low pressure switch	OFF 2.0 ± 0.2 kg/cm2(200 kPa, 28 psi)
	ON 2.25 ± 0.2 kg/cm2(220 kPa, 32 psi)

Freezer prevention

Electrical type (Thermistor)

OFF : 1.5 ± 1°C (34.7 ± 1.8°F)

ON : 4.3 ± 1°C (39.7 ± 1.8°F)

Pressure relief valve (color: NATURAL)

Working pressure	35.0-42.2 kg/cm2(498-600 psi)
Resealed pressure	28.1 kg/cm2 (400 psi)

Refrigerant and quantity

R-134a Approx. 670-680g (1.48-1.50 lbs) Max.

SERVICE STANDARDS

Amount of deflection of V belt

New Belt	5-5.5 mm (0.20-0.21 in.)
Used belt	6-7 mm (0.23-0.28 in.)
After driving	8 mm (0.31 in.)

Compressor clutch clearance (air gap)

0.4-0.6 mm (0.0157-0.0236 in.)

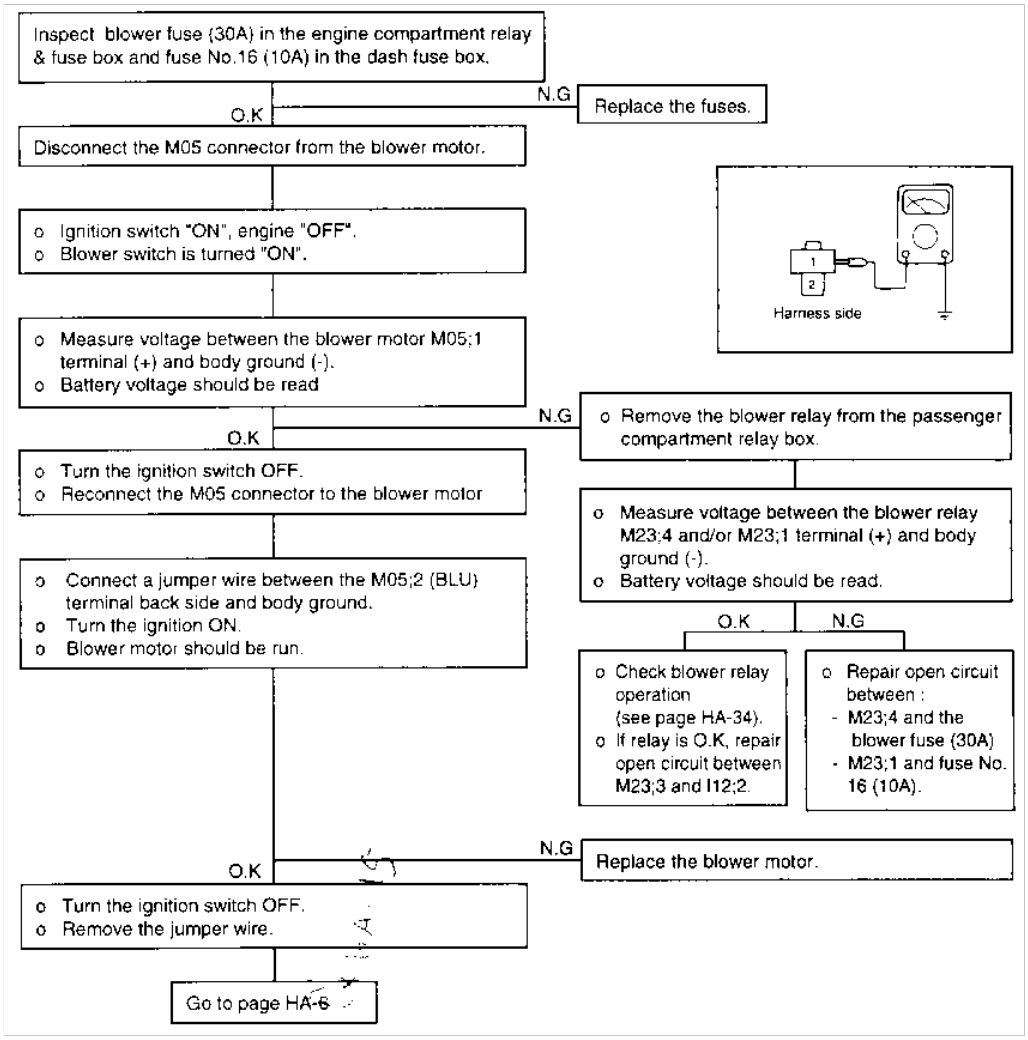
V belt size

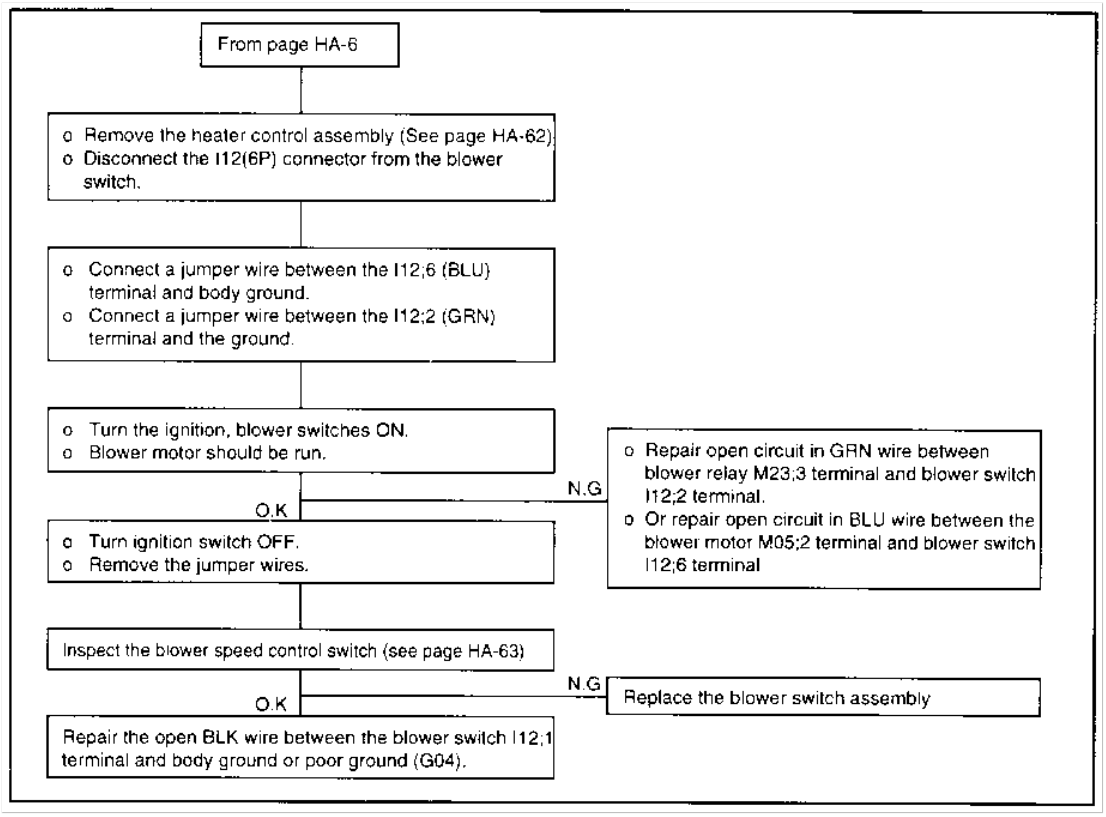
Type	4PK875
Length	875 ± 5.0 mm (34.4 ± 0.2 in.)

Heating, Ventilation & Air Conditioning > General > TROUBLESHOOTING (BLOWER MOTOR DOES NOT RUN)

TROUBLESHOOTING (Blower Motor Does Not Run)

For detailed schematic diagram, refer to the ETM section.

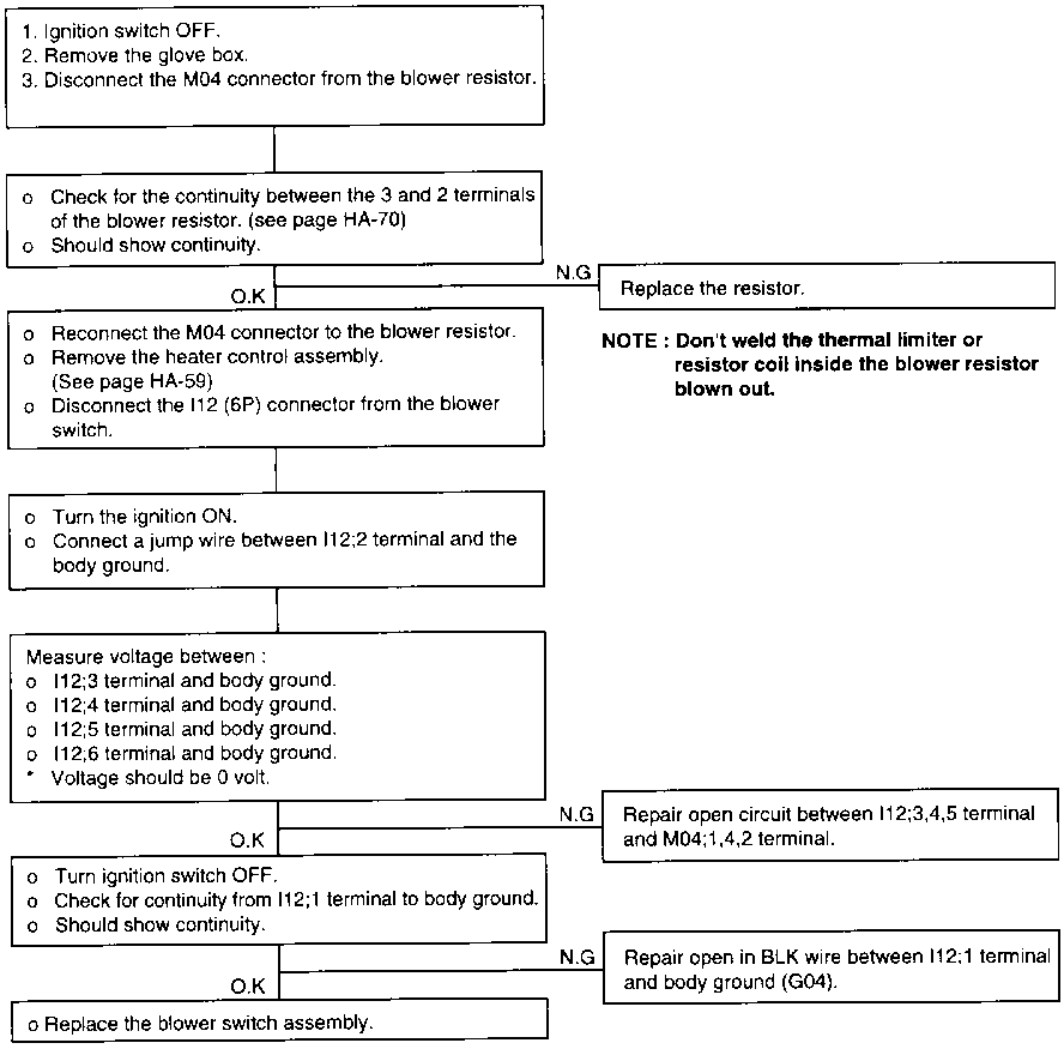




Heating, Ventilation & Air Conditioning > General > TROUBLESHOOTING (BLOWER MOTOR RUNNING SPEED DOES NOT CHANGE)

TROUBLESHOOTING (Blower Motor Running Speed Does Not Change)

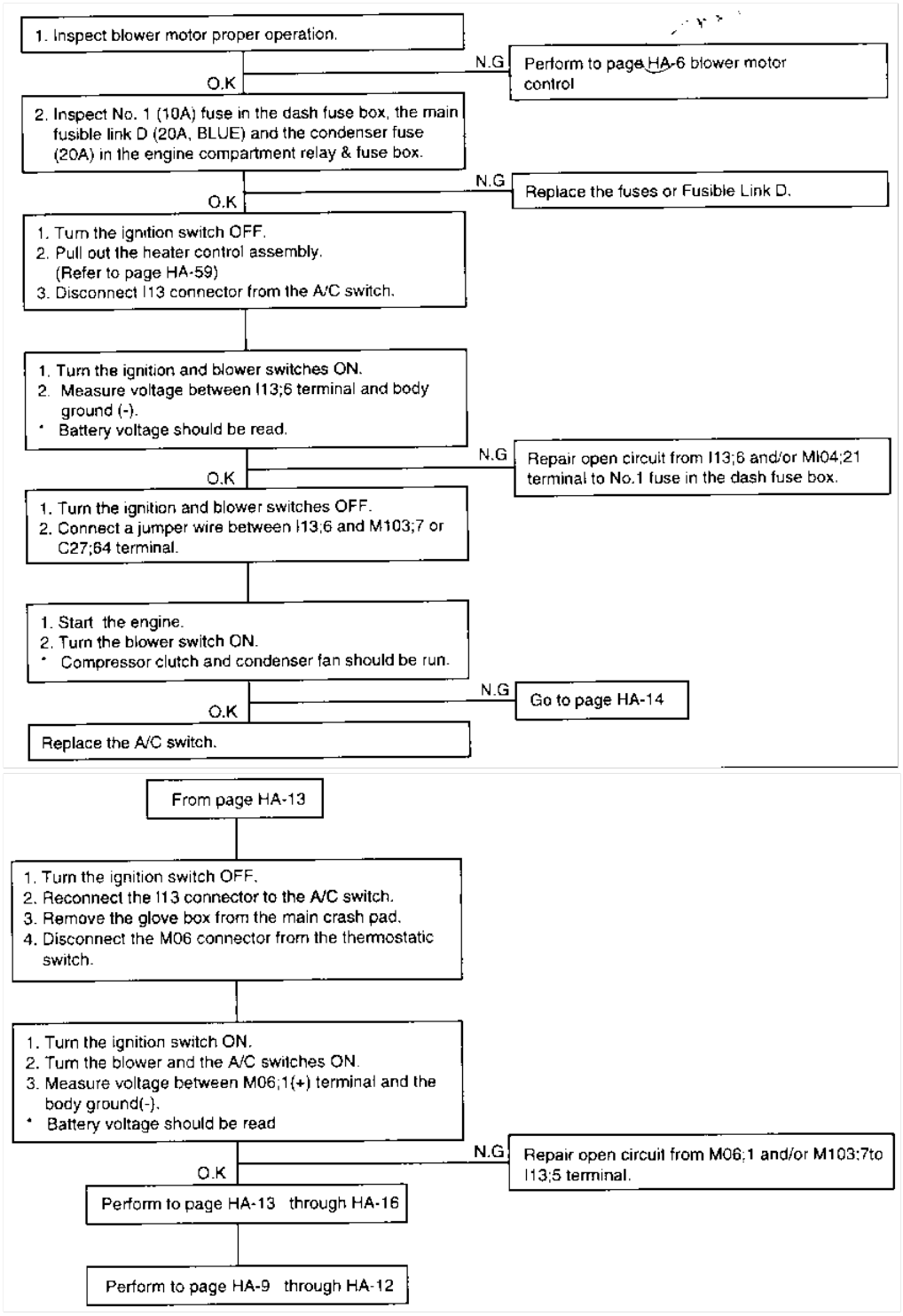
For detailed schematic diagram, refer to the ETM section.



Heating, Ventilation & Air Conditioning > General > TROUBLESHOOTING (COMPRESSOR AND CONDENSER FAN DO NOT RUN)

TROUBLESHOOTING (COMPRESSOR AND CONDENSER FAN DO NOT RUN)

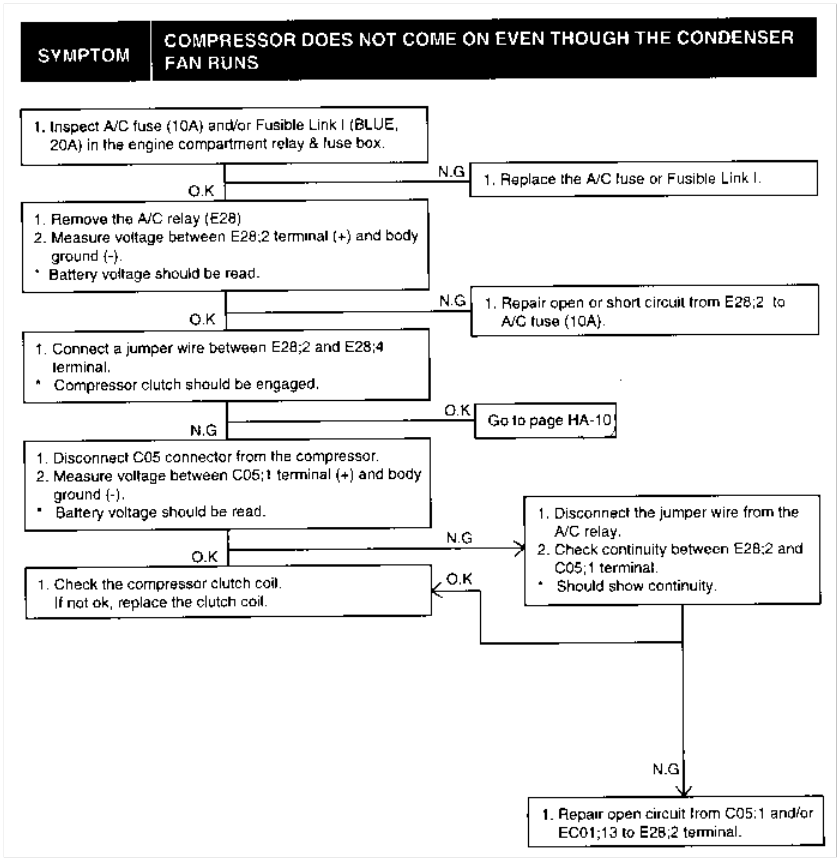
For detailed schematic diagram, refer to the ETM section.

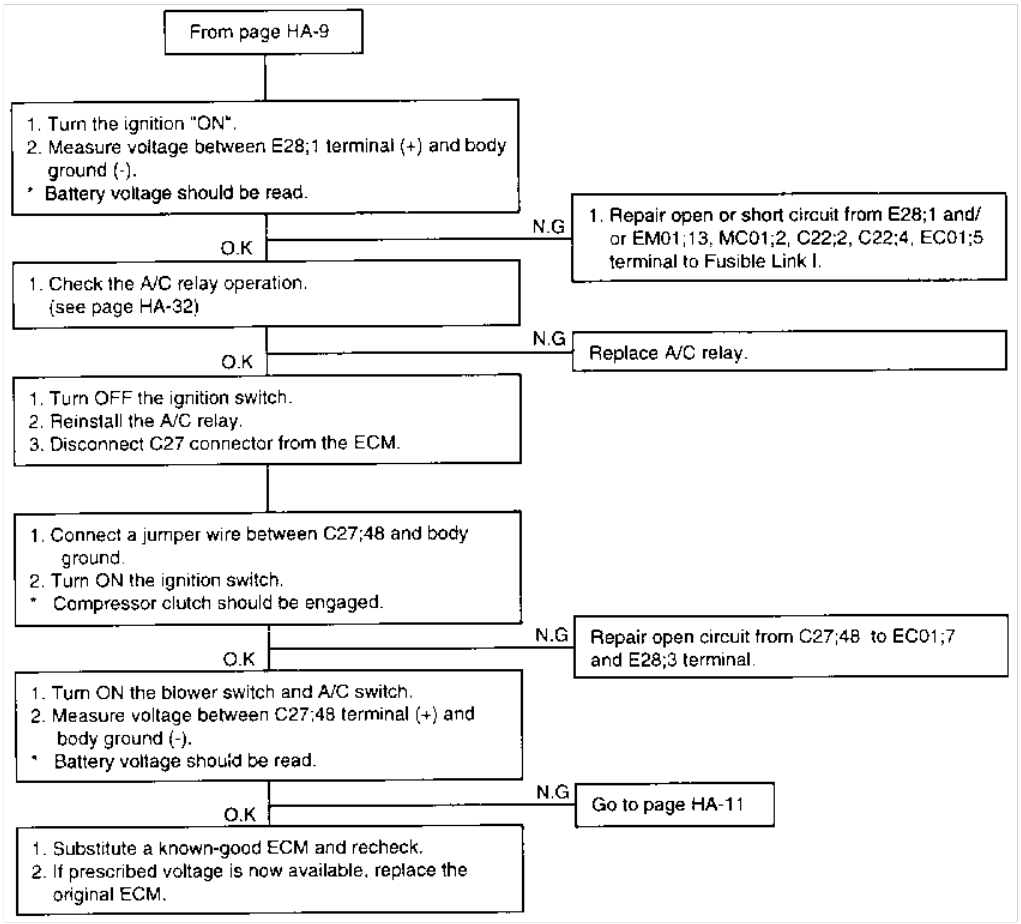


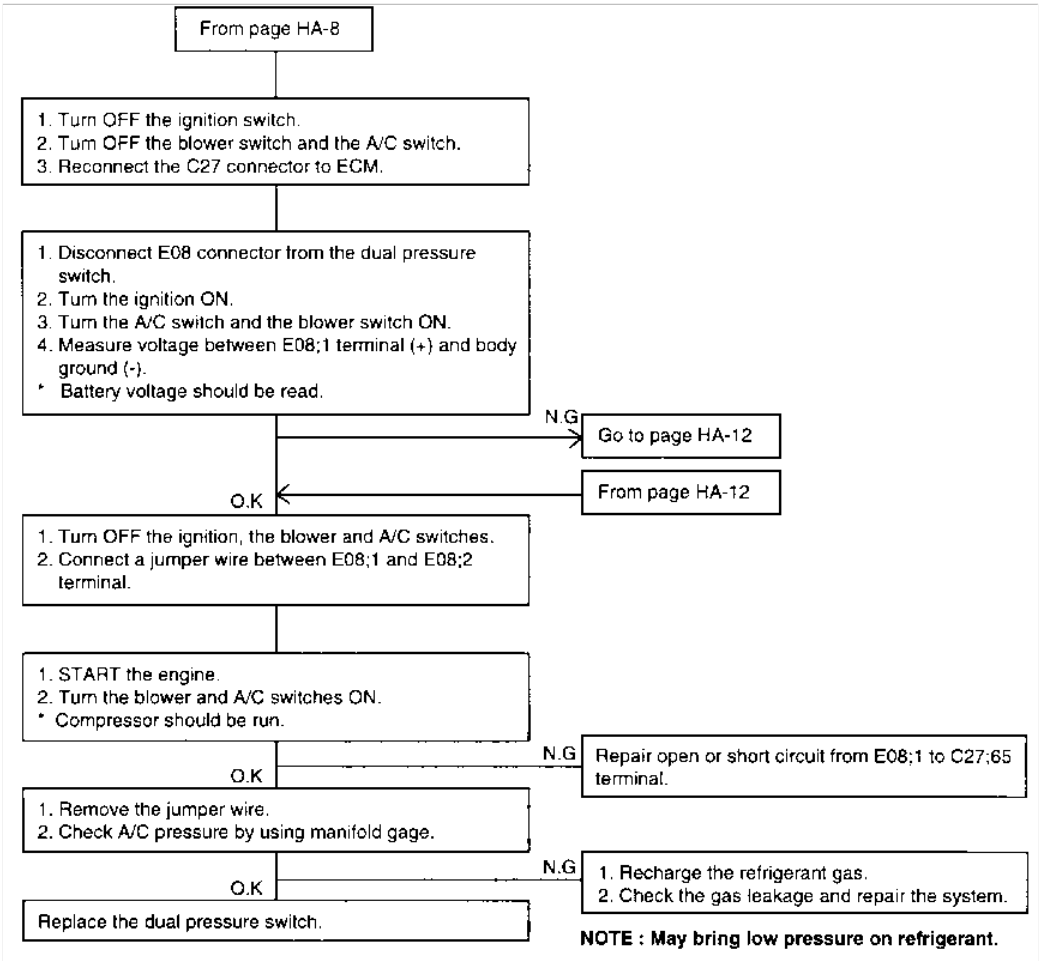
Heating, Ventilation & Air Conditioning > General > TROUBLESHOOTING (COMPRESSOR DOES NOT RUN)

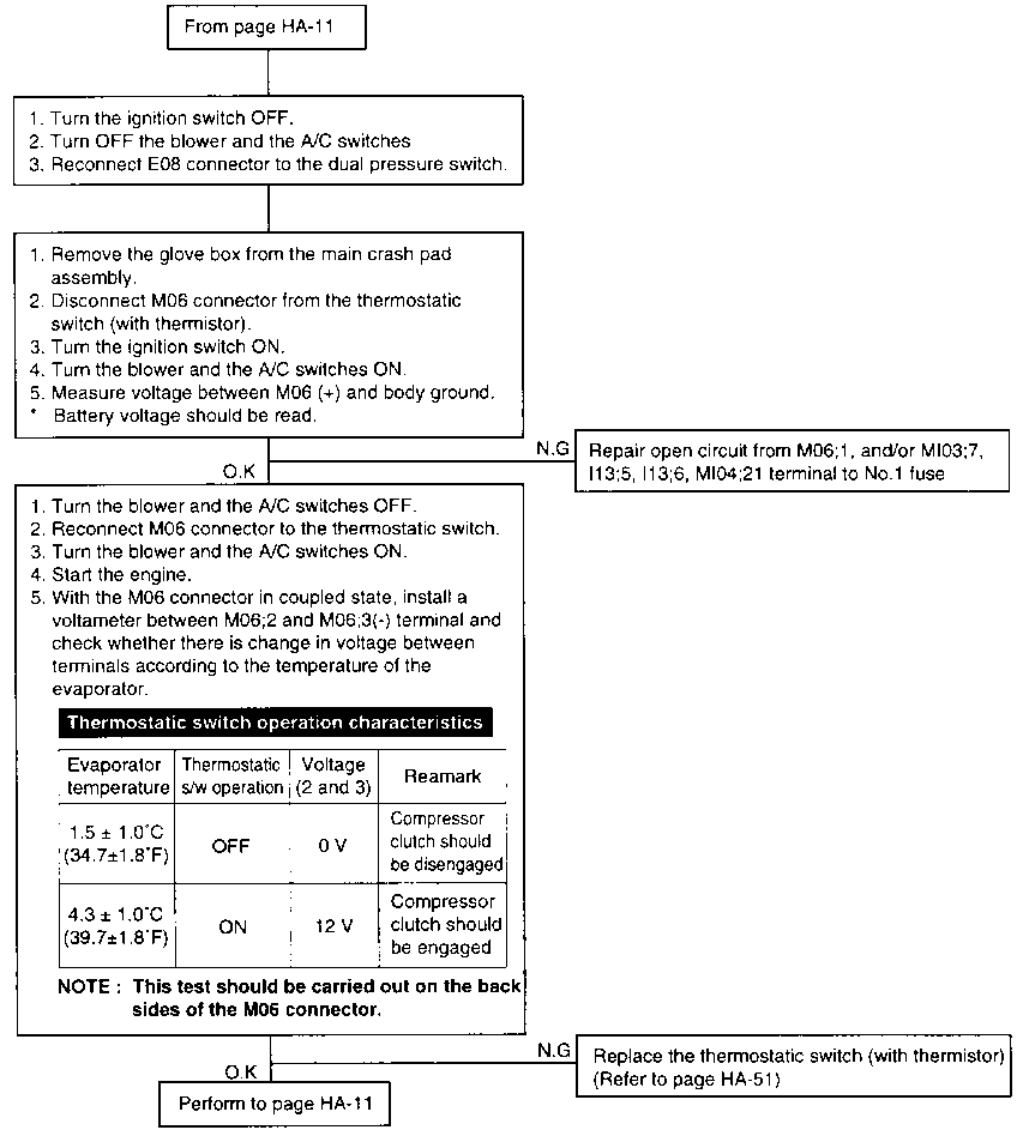
TROUBLESHOOTING (COMPRESSOR DOES NOT RUN)

For detailed schematic diagram, refer to the ETM section.


SYMPTOM
COMPRESSOR DOES NOT COME ON EVEN THOUGH THE CONDENSER FAN RUNS
1. Inspect A/C fuse (10A) and/or Fusible Link I (BLUE, 20A) in the engine compartment relay & fuse box.
N.G
1. Replace the A/C fuse or Fusible Link I.
O.K
1. Remove the A/C relay (E28)
2. Measure voltage between E28;2 terminal (+) and body ground (-).
* Battery voltage should be read.
N.G
1. Repair open or short circuit from E28;2 to A/C fuse (10A).
O.K
1. Connect a jumper wire between E28;2 and E28;4 terminal.
* Compressor clutch should be engaged.
O.K
Go to page HA-10
N.G
1. Disconnect C05 connector from the compressor.
2. Measure voltage between C05;1 terminal (+) and body ground (-).
* Battery voltage should be read.
N.G
1. Disconnect the jumper wire from the A/C relay.
2. Check continuity between E28;2 and C05;1 terminal.
* Should show continuity.
O.K
1. Check the compressor clutch coil. If not ok, replace the clutch coil.
O.K
N.G
1. Repair open circuit from C05;1 and/or EC01;13 to E28;2 terminal.


From page HA-9
1. Turn the ignition "ON".
2. Measure voltage between E28;1 terminal (+) and body ground (-).
* Battery voltage should be read.
N.G
1. Repair open or short circuit from E28;1 and/or EM01;13, MC01;2, C22;2, C22;4, EC01;5 terminal to Fusible Link I.
O.K
1. Check the A/C relay operation. (see page HA-32)
N.G
Replace A/C relay.
O.K
1. Turn OFF the ignition switch.
2. Reinstall the A/C relay.
3. Disconnect C27 connector from the ECM.
1. Connect a jumper wire between C27;48 and body ground.
2. Turn ON the ignition switch.
* Compressor clutch should be engaged.
N.G
Repair open circuit from C27;48 to EC01;7 and E28;3 terminal.
O.K
1. Turn ON the blower switch and A/C switch.
2. Measure voltage between C27;48 terminal (+) and body ground (-).
* Battery voltage should be read.
N.G
Go to page HA-11
O.K
1. Substitute a known-good ECM and recheck.
2. If prescribed voltage is now available, replace the original ECM.


From page HA-8
1. Turn OFF the ignition switch.
2. Turn OFF the blower switch and the A/C switch.
3. Reconnect the C27 connector to ECM.
1. Disconnect E08 connector from the dual pressure switch.
2. Turn the ignition ON.
3. Turn the A/C switch and the blower switch ON.
4. Measure voltage between E08;1 terminal (+) and body ground (-).
* Battery voltage should be read.
N.G
Go to page HA-12
From page HA-12
O.K
1. Turn OFF the ignition, the blower and A/C switches.
2. Connect a jumper wire between E08;1 and E08;2 terminal.
1. START the engine.
2. Turn the blower and A/C switches ON.
* Compressor should be run.
N.G
Repair open or short circuit from E08;1 to C27;65 terminal.
O.K
1. Remove the jumper wire.
2. Check A/C pressure by using manifold gage.
N.G
1. Recharge the refrigerant gas.
2. Check the gas leakage and repair the system.
O.K
Replace the dual pressure switch.
NOTE : May bring low pressure on refrigerant.



Heating, Ventilation & Air Conditioning > General > TROUBLESHOOTING (GENERAL GUIDE)

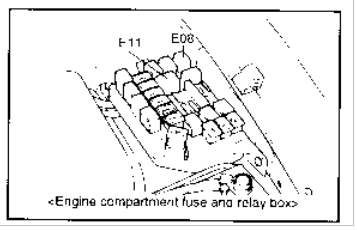
TROUBLESHOOTING (General Guide)

SYMPTOM CHART

SYMPTOM		REMEDY
No hot air flow	Blower motor does not run at all	Perform the flow chart (page HA-15)
	Blower motor runs	Check for following : • Clogged heater duct • Clogged blower outlet • Clogged heated core or hose • Faulty air mix door • Air mix cable adjustment
Hot air flow is low	Blower speed does not change	Perfrom flow chart (page HA-17)
	Blower runs properly	Check following : • Clogged heater duct • Clogged blower outlet • Incorrect door position
Compressor does not come on even though the condenser fan runs.		Perform the procedures in the flow chart. (page HA-7)
Compressor and condenser fan do not run.		Perform the procedures in the flow chart. (page HA-11)
Only condenser fan does not run.		Perform the procedures in the flow chart. (page HA-13)
Idle-up not OK.		See the fuel and emission section.

QUICK TROUBLESHOOTING HINTS

1. Check the fusible link K (30A) and fuse No. 16 (10A) for blower control system.
2. Check that blower relay (E11) is properly mounted in the engine compartment relay box.
3. Check fuse No. 1 (10A) in the dash fuse box and A/C fuse (10A) in the engine compartment relay & fuse box for A/C control system.
4. Check that A/C relay (E08) is properly mounted in engine compartment relay & fuse box.



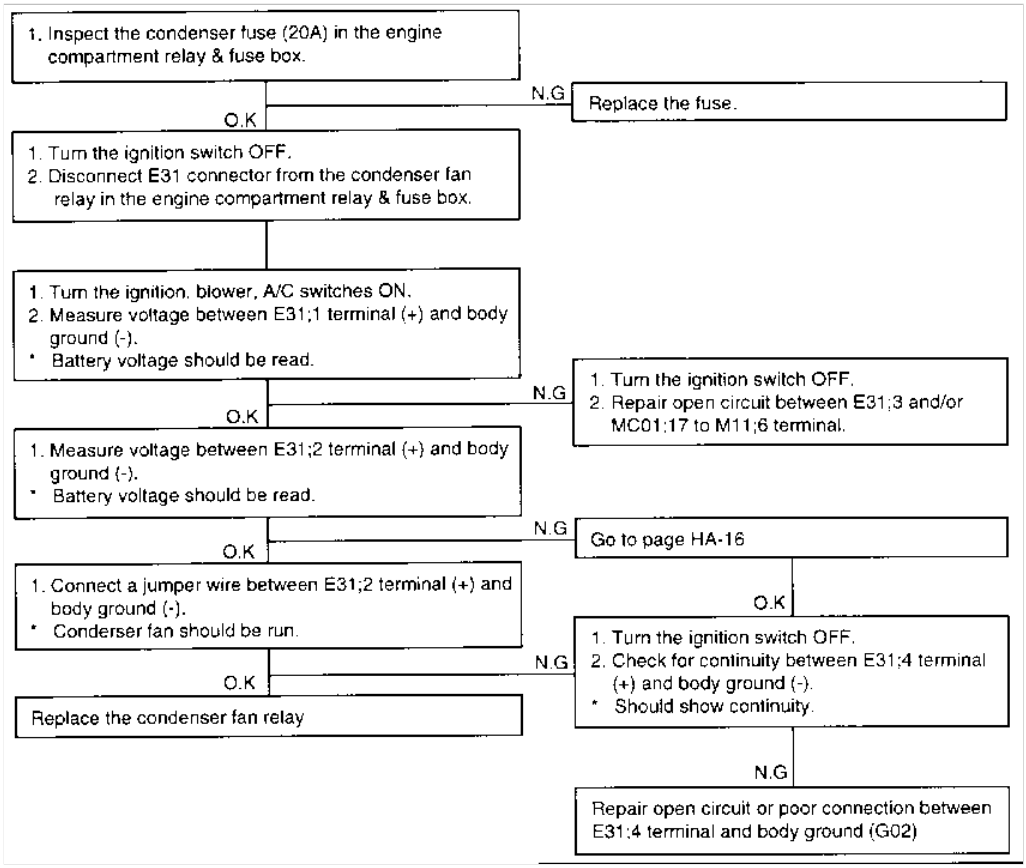
<Engine compartment fuse and relay box>

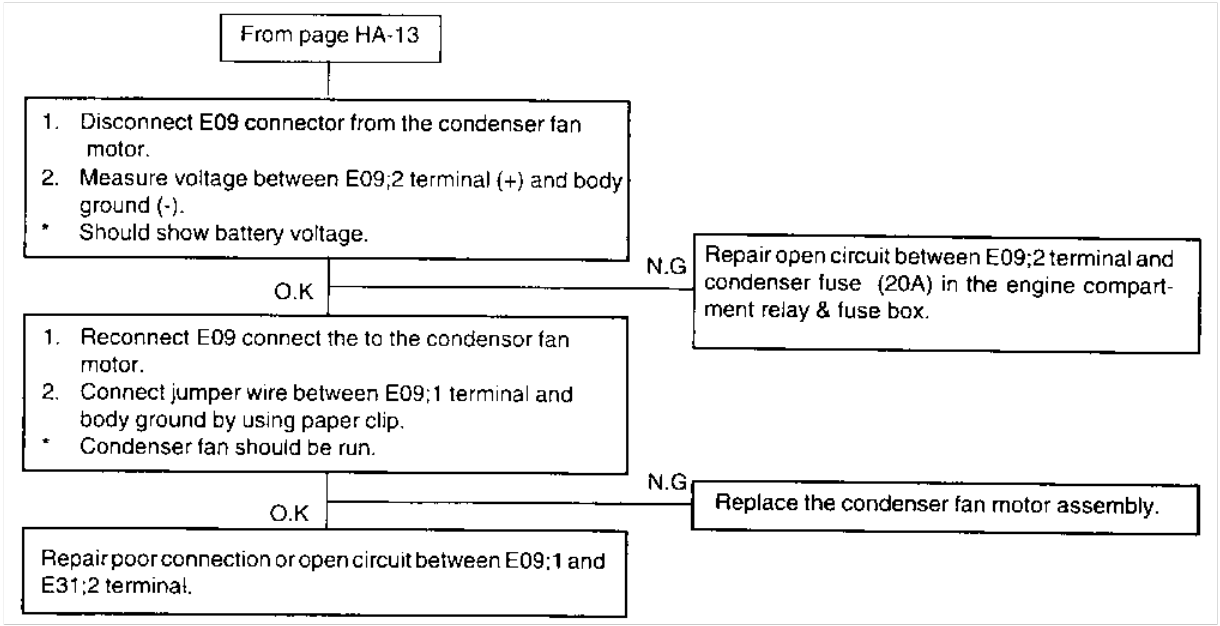
QUICK TROUBLESHOOTING HINTS

a. Check the blower fuse (30A) and fuse No. 16 (10A) for blower control system.
b. Check that blower relay (M23) is mounted in passenger compartment relay box.
c. Check fuse No. 1 (10A) in the dash fuse box and Fusible Link I (BLUE, 20A) in the engine compartment relay & fuse box for A/C control system.
d. Check that A/C relay (E28) is mounted in engine compartment relay & fuse box.
e. Check that A/C system is properly charged.
f. Check condenser fuse (20A) for condenser fan control and the main fusible link D (BLUE, 20A) for radiator fan control, mounted in the engine compartment relay & fuse box.

Heating, Ventilation & Air Conditioning > General > TROUBLESHOOTING (ONLY CONDENSER FAN DOES NOT RUN)

TROUBLESHOOTING (Only Condenser Fan Does Not Run)





Heating, Ventilation & Air Conditioning > Heater > Air Mix Cable > AIR MIX CABLE ADJUSTMENT

AIR MIX CABLE ADJUSTMENT

After installation of the heater control assembly, adjust the air mix cable.

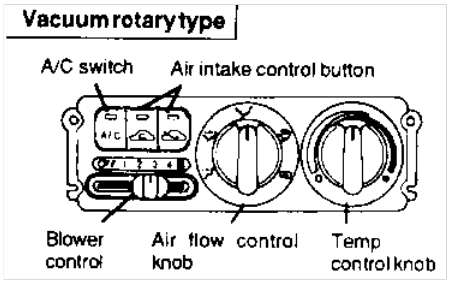
1. Slide the temperature control lever to HOT.
2. Turn the air mix door shaft arm to the left and connect the end of the cable to the arm.
3. Gently slide the cable outer housing back from the end enough to take up any slack in the cable, but not enough to make the temperature control lever move. Then, snap the cable housing into the clamp.

Heating, Ventilation & Air Conditioning > Heater > Heater > DESCRIPTION

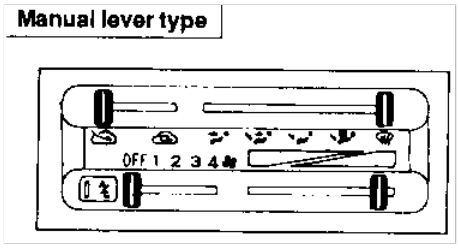
DESCRIPTION

The heater assembly is a blend air system. It consists of a heater assembly, blower assembly and duct, which is connected between the heater case and blower case. The heater case contains the heater core and the temperature blend door. The blower assembly containing the outside/recirculating air door, the blower motor and the lower wheel are connected directly to an opening in the upper cowl.

The outside air is drawn into the system from the cowl through the blower inlet into the blower housing forced through and/or round the heater core, mixed and then discharged through outlets in the discharge air duct to the floor area or through the defroster outlets, depending the type of climate control desired.

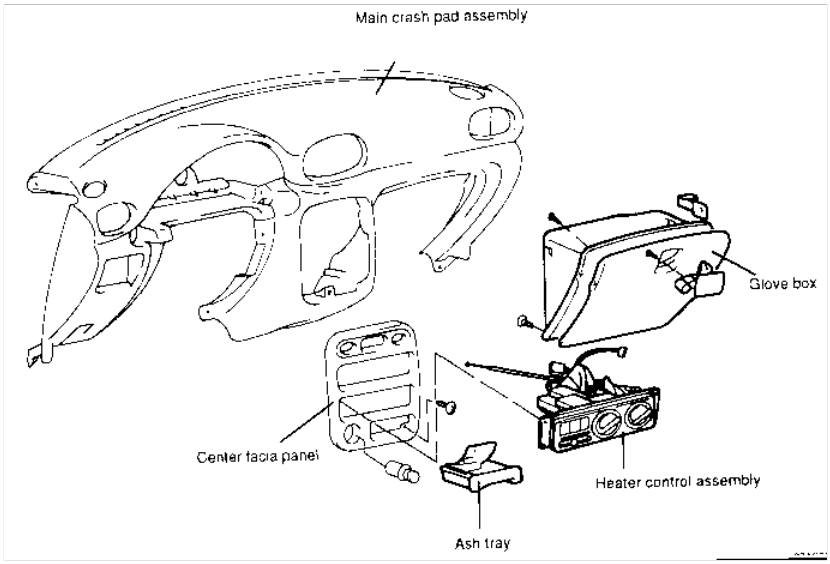


The system airflow is controlled by two kinds of control assembles: the vacuum rotary and the manual lever type.



Heating, Ventilation & Air Conditioning > Heater > Heater Control Assembly > COMPONENTS

Components

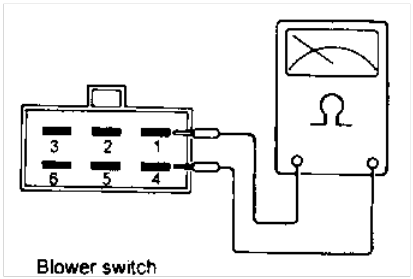


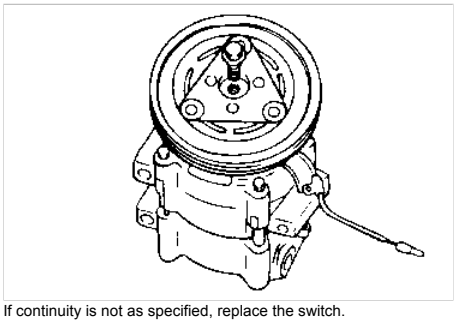
Heating, Ventilation & Air Conditioning > Heater > Heater Control Assembly > INSPECTION

INSPECTION

BLOWER SWITCH

1. Check for continuity between terminals as shown below.

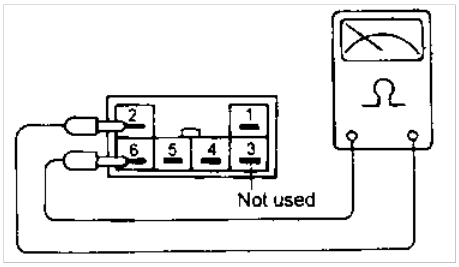


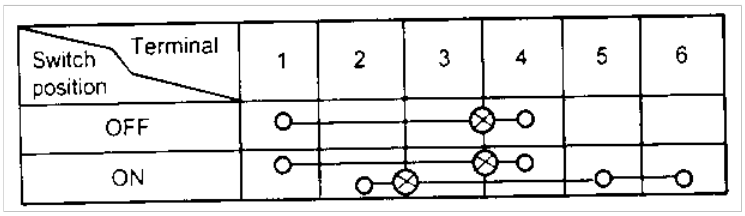


If continuity is not as specified, replace the switch.

AIR CONDITIONING SWITCH

1. Check for continuity between terminals as shown below.





If continuity is not as specified, replace the switch.

MODE CONTROL SWITCH

1. Connect the vacuum tester to black color hose of the vacuum connector.
2. Connect the vacuum hoses to mode control switch.
3. Clog the vacuum port for fresh/recirc control switch.
4. Check for vacuum hiss from the mode switch and vacuum hoses, and inspect for air flow between each hoses when the mode switch is at each of the positions as shown below.

Hose color	Panel	Panel/Floor	Floor	Floor/Defros-ter	Defros-ter
Black	V	V	V	V	V
Blue	-	V	V	V	-
Red	-	V	V	-	-
Yellow	V	V	-	-	-
White	-	-	-	-	-

"V": make air flow with black hose.
If air flow is not as specified, replace the mode switch.

FRESH/RECIRC BUTTON

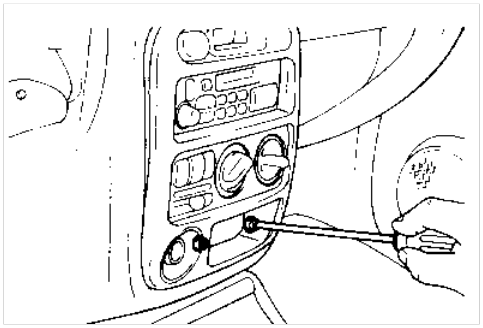
1. Connect the vacuum tester to black color hose for the fresh/recirc control switch.
2. Check for vacuum hiss and air flow as shown below.

Hose color	Button switch position: Fresh	Button switch position: Recirc
Black	V	V
White	-	v

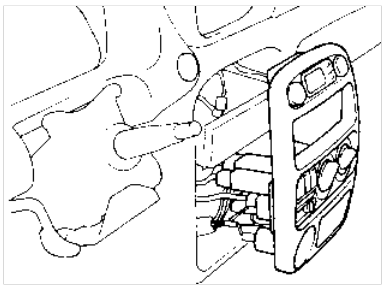
Heating, Ventilation & Air Conditioning > Heater > Heater Control Assembly > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

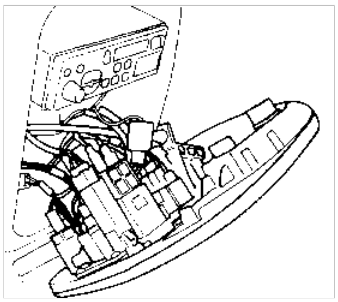
1. Disconnect the battery ground cable.
2. Pull out the ashtray and remove two screws.



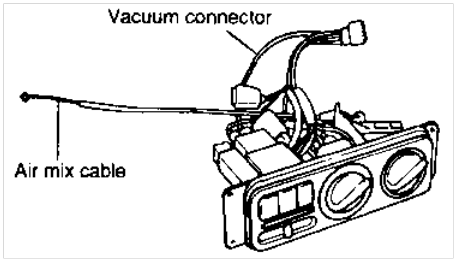
3. Disconnect the air mix control cable on the heater unit.
4. Using a flat tip screwdriver, pry loose 2 clips, pull out the center facia panel and then disconnect connectors.



5. Remove four mounting bolts of the heater control assembly from behind the center facia panel and then remove the center facia panel.

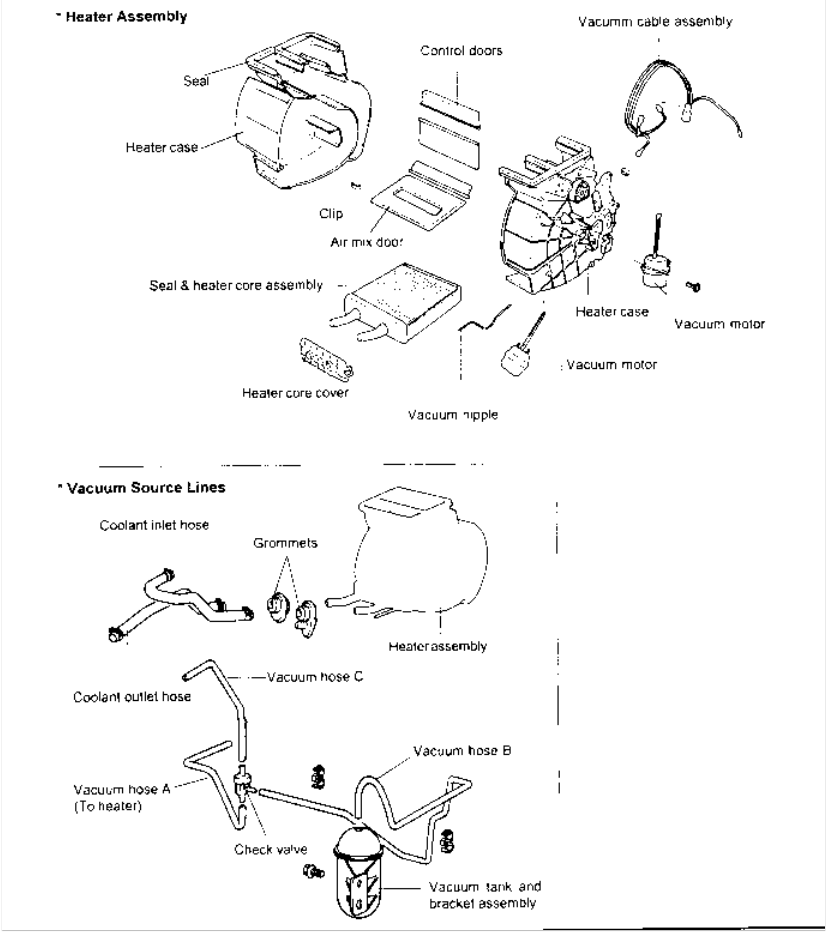


6. Disconnect connectors from the heater control assembly.
7. Disconnect the vacuum connector.
8. Remove the heater control assembly.
9. Installation is the reverse order of removal.



Heating, Ventilation & Air Conditioning > Heater > Heater Unit > COMPONENTS

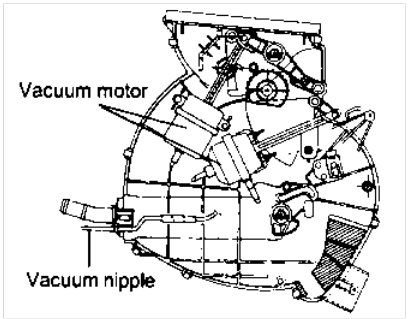
Components



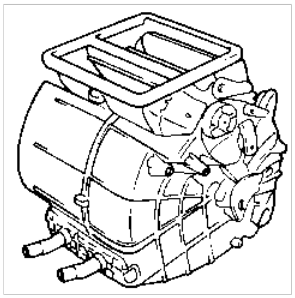
Heating, Ventilation & Air Conditioning > Heater > Heater Unit > DISASSEMBLY AND REASSEMBLY

DISASSEMBLY AND REASSEMBLY

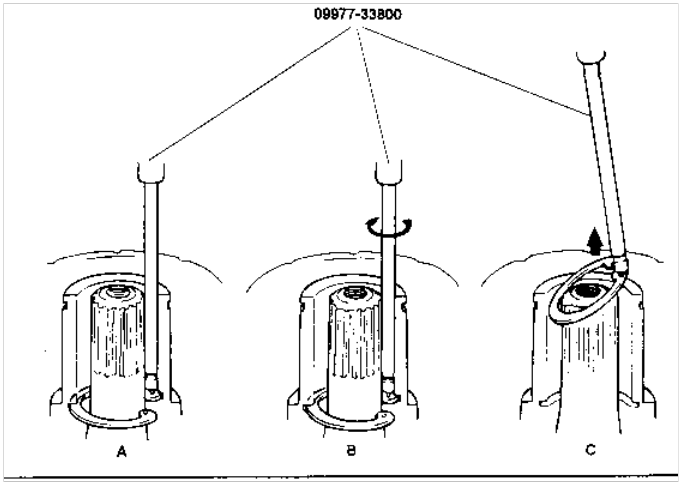
1. Disconnect the vacuum hose from the vacuum nipple.



2. Remove 2 mounting bolts from each of the vacuum motors.
3. Remove the vacuum hose mounting bracket and bolt.
4. Remove the vacuum motor and vacuum hose assembly.
5. Disconnect the connection at both sides of the heater core cover and remove the cover and the vacuum nipple.
6. Pull out the heater core.



7. Remove eight (8) clips which is holding both cases around the heater unit.
8. Disassemble the heater unit.
9. Unlatch the control door latches with a sharp-tip driver from the outside of the case and remove control doors from the case.



10. Reassembly is the reverse order of disassembly.

Heating, Ventilation & Air Conditioning > Heater > Heater Unit > INSPECTION

INSPECTION

HEATER CORE

1. Install a special tool to the heater core inlet. Plug the heater core outlet.
2. Place the heater core in water, then apply 200kPa (29psi) pressure.
3. Hold for two minutes while checking for leakage from the heater core. If there is leakage, repair or replace the heater core.

VACUUM MOTOR

1. Connect vacuum tester to each of the vacuum connectors and apply 510mmHg pressure.
2. Check vacuum hiss from the vacuum motor diaphragm. Also check that the shaft returns smoothly to its initial position.
3. If not okay, replace the vacuum motor.
   Never manually operate any vacuum motor or vacuum motor controlled door. This may cause internal damage to the motor diaphragm.

Heating, Ventilation & Air Conditioning > Heater > Heater Unit > INSTALLATION

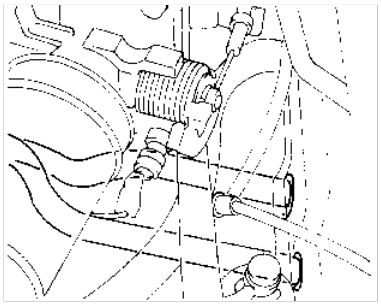
INSTALLATION

1. Installation is the reverse of removal procedures.
2. After installation of the heater unit, check that the air mix lever slides smoothly the full stroke right to left. If not okay, readjust the air mix cable.

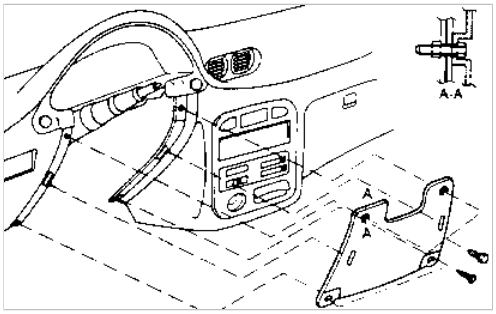
Heating, Ventilation & Air Conditioning > Heater > Heater Unit > REMOVAL

REMOVAL

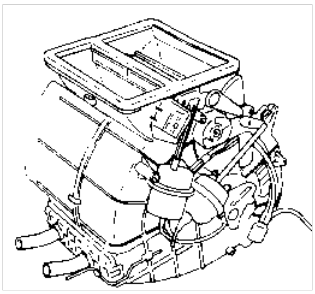
1. Disconnect the negative terminal from the battery.
2. Drain coolant from the radiator.
3. Remove the coolant inlet and outlet hoses with the vacuum hose from the heater unit.
4. Discharge refrigerant from the refrigeration system.
5. Remove the suction and liquid lines from the evaporator.



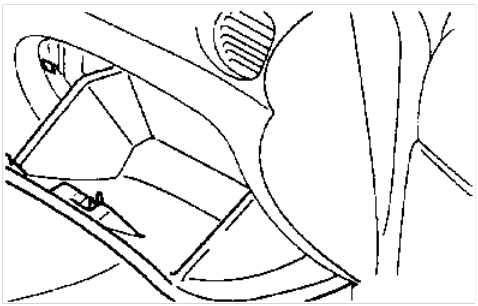
6. Remove the steering wheel and the multifunction switch assembly.



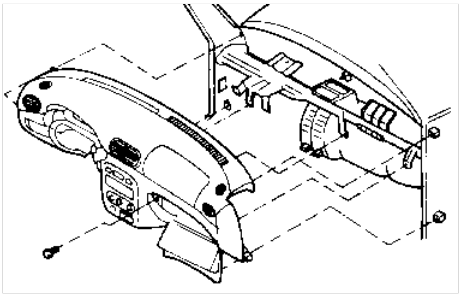
7. Remove the front and the rear console assemblies.
8. Remove the lower crash pad (LH).
9. Remove the center facia panel and disconnect connectors and vacuum connector from the heater control assembly.
10. Remove the heater control assembly and the audio.



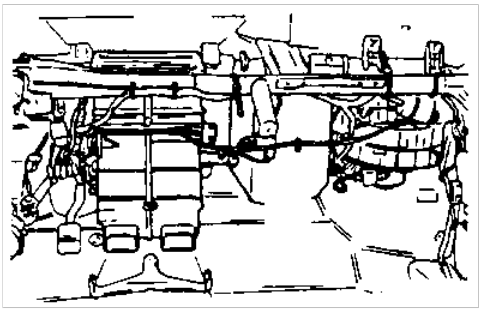
11. Remove the glove box.
12. Remove 4 mounting bolts from the passenger airbag mounting bracket (if equipped).



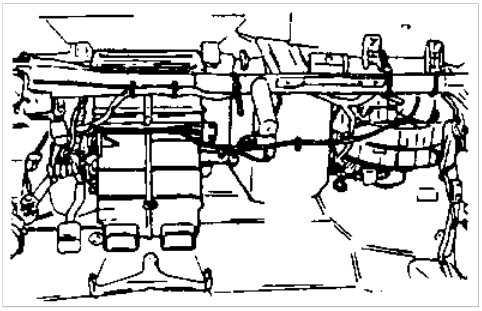
13. Remove the main crash pad assembly.
14. Disconnect cables from the heater unit and the thermostatic switch connector from the evaporator unit.
15. Disconnect other remnant connectors (if they exist).
16. Remove the main crash pad assembly.



17. Remove 3 evaporator mounting bolts (or nuts).

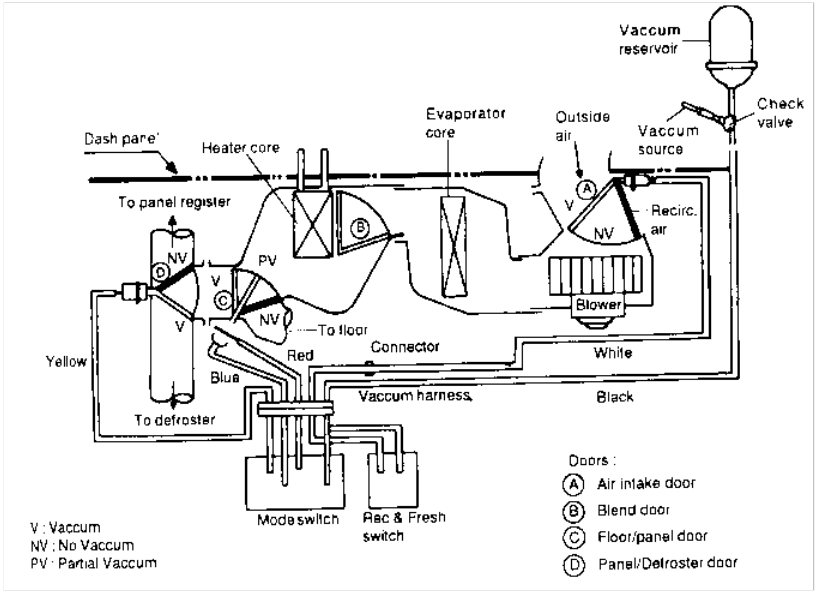


18. Remove the evaporator unit.
19. Remove 3 mounting bolts from the heater unit.
20. Remove the heater unit.



Heating, Ventilation & Air Conditioning > Heater > Vents/Air Distribution > VACUUM SYSTEM

VACUUM SYSTEM



MODE CONTROL SWITCHING

CONNECTION (Vacuum Hose Color)	FUNCTION	MODE SWITCH BUTTON					FRESH/ REC-BUTTON	
		PANEL	PANEL FLOOR (BI-LEVEL)	FLOOR	FLOOR DEF	DEF.	RECIRC.	FRESH
BLACK	SOURCE	V	V	V	V	V	V	V
BLUE	FLOOR (PARTIAL)	A	V	V	V	A	-	-
RED	FLOOR (FULL)	A	A	V	A	A	-	-
YELLOW	PANEL	V	V	A	A	A	-	-
WHITE	RECIRC	*	*	*	*		V	A

V=Vacuum A=Atmosphere
*=Controlled by "RECIRC" or "FRESH" button.

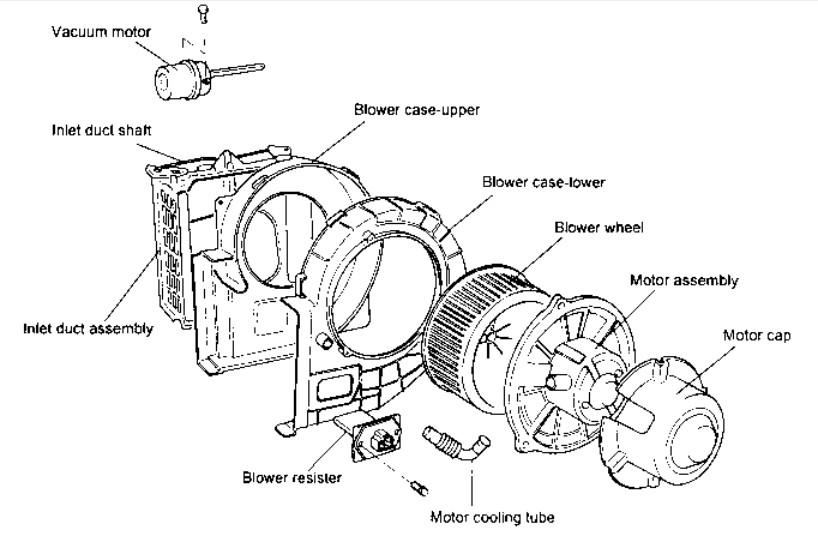
SYMPTOM AND PROBABLE CAUSE IN AIR FLOW MODE CONTROL SYSTEM

Symptom	Probable cause
On "FLOOR" position. All air through defroster or DEF/FLOOR.	a. Blue and/or red vacuum hose pinched or disconnected at vacuum motor. b. Black source hose pinched or disconnected at the connector. c. Engine compartment vacuum source hose pinched or disconnected at the vacuum manifold. d. Defective vacuum motor.
On "DEF/FLOOR" position. All air through defroster.	a. Blue hose pinched or disconnected at vacuum motor. b. Black source hose pinched or disconnected at the connector. c. Engine compartment vacuum source hose pinched or disconnected at the vacuum manifold.

	d. Defective vacuum motor
On "PANEL VENTS" position. All air through defroster.	a. Yellow vacuum hose pinched or disconnected at vacuum motor. b. Black source hose pinched or disconnected at the connector. c. Engine compartment vacuum source hose pinched or disconnected at the vacuum manifold. d. Detective vacuum motor.
On "PANEL/FLOOR" position. All air through defroster or panel.	a. Yellow vacuum hose pinched or disconnected at vacuum motor. b. Blue hose pinched or disconnected at vacuum motor. c. Black source hose pinched or disconnected at the connector. d. Engine compartment vacuum source hose pinched or disconnected at the vacuum manifold. e. Defective vacuum motor.
On "DEF" position. (No vacuum) On "RECIRC" position. All air through fresh.	a. White vacuum hose disconnected at the connector or recirc duct vacuum motor. b. Black source hose pinched or disconnected at the connector. c. Engine compartment vacuum source hose pinched or disconnected at the vacuum manifold. d. Defective vacuum motor
Engine poor idle.	a. Engine compartment vacuum source hose disconnected.

Heating, Ventilation & Air Conditioning > Vacuum System > Blower Motor > COMPONENTS

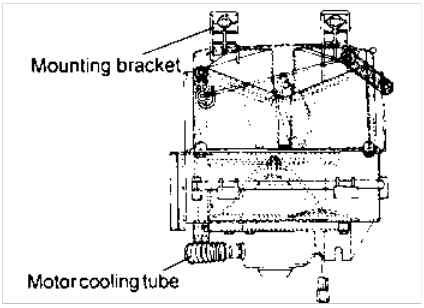
Components



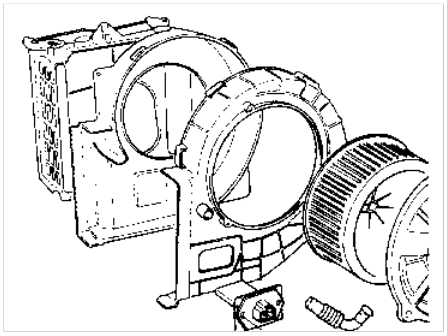
Heating, Ventilation & Air Conditioning > Vacuum System > Blower Motor > DISASSEMBLY AND REASSEMBLY

DISASSEMBLY AND REASSEMBLY

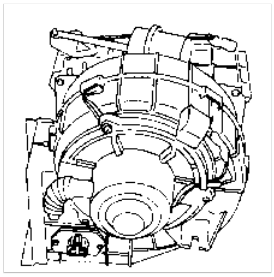
1. Disconnect the motor cooling tube.



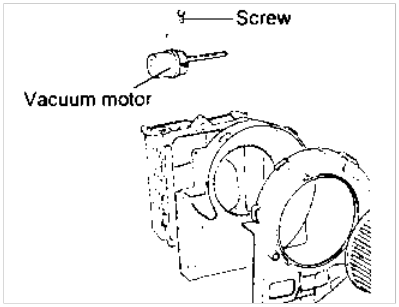
2. Remove the three screws and the blower motor assembly.
3. Remove three screws and loosen a connection holding the inlet duct assembly and the blower upper case.



4. Remove the inlet duct assembly.
5. Loosen six connections holding the blower upper and the lower case by using a flat tip screwdriver.



6. Remove two screws and the blower resistor.
7. Remove the screws holding the vacuum motor to the inlet duct.

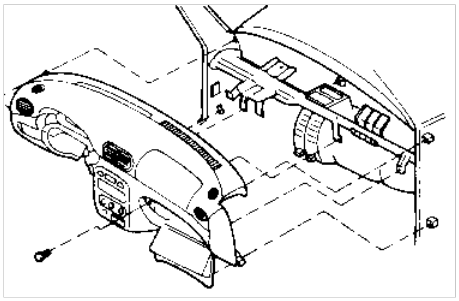


8. Remove the vacuum motor assembly.
9. Reassembly is the reverse order of disassembly.

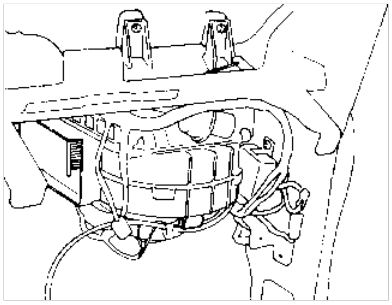
Heating, Ventilation & Air Conditioning > Vacuum System > Blower Motor > REMOVAL AND INSTALLATION

REMOVAL AND INSTALLATION

1. Remove the main crash pad assembly.



2. Disconnect the resistor and blower motor connector.
3. Remove 3 nuts (or bolts) from the blower unit mounting bracket.
4. Pull out the blower unit and then disconnect the fresh/recirculation vacuum connector from the vacuum motor.



5. Installation is the reverse order of removal.

ACCENT(X3) > 1998 > G 1.5 SOHC > Restraints

Restraints > General > CUSTOMER CAUTIONS

CUSTOMER CAUTIONS

Failure to carry out service operations in the correct sequence could cause the airbag system to unexpectedly deploy during servicing, possibly leading to a serious injury.

Further, if a mistake is made in servicing the airbag system, it is possible that the airbag may fail to operate when required.

Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully.

1. Be sure to proceed to airbag-related service after approx. 30 seconds or longer from the time the ignition switch is turned to the LOCK position and the negative (-) terminal cable is disconnected from the battery. The airbag system is equipped with a back-up power source to assure the deployment of airbag when the battery cable is disconnected by an accident. The back-up power is available for approximately 150ms.
2. When the negative (-) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by the audio memory system. When the work is finished, reset the audio system and adjust the clock.
3. Malfunction symptoms of the airbag system are difficult to confirm, so the diagnostic codes become the most important source of information when troubleshooting.
4. When troubleshooting the airbag system, always inspect the diagnostic codes before disconnecting the battery.
5. Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.
6. Never attempt to disassemble and repair the airbag modules (DAB, PAB), clock spring and wiring in order to reuse them.
7. If any component of SRS has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
8. After work on the airbag system is completed, perform the SRS SRI check.
   The airbag indicator lamp can be interrupted by other circuit fault in some cases. Therefore if the airbag indicator lamp goes on, be sure to erase the DTC codes using Scan tool just after repairing or replacing the troubled parts including fuse.
9. Especially in case of welding the body, never fail to disconnect the battery negative (-) terminal.

Restraints > General > DESCRIPTION

DESCRIPTION

The supplemental restraint system (SRS AIR BAG) is designed to supplement the seat belt to help reduce the risk or severity of injury to the driver and passenger by activating and deploying the driver and passenger side air bag in certain frontal collisions.

The SRS (Air Bag) consists of: a driver's side air bag module located in the center of the steering wheel, which contains the folded cushion and an inflator unit; a passenger's side air bag module, located in the passenger side crash pad contains the folded cushion assembled with inflator unit; SRSCM located on the floor under the heater core which monitors the system; an accelerometer which senses the vehicle deceleration; a spring interconnection (clock spring), located within the steering column; system wiring and wiring connector; and a knee bolster, located under the steering column.

The impact sensing function of the SRSCM is carried out by electronic accelerometer that continuously measures the vehicle's acceleration and delivers a corresponding signal through amplifying and filtering circuitry to the microprocessor.

Deployment of the air-bag is designed to occur in frontal or near-frontal impacts of moderate or severe force.

Only authorized service personnel should do work on or around the SRS components. Those service personnel should read this manual carefully before doing any such work. Extreme care must be used when servicing the SRS to avoid injury to the service personnel (by inadvertent deployment of the air bag) or the driver (rendering the SRS inoperative).

Restraints > General > ELECTRICAL SYSTEM

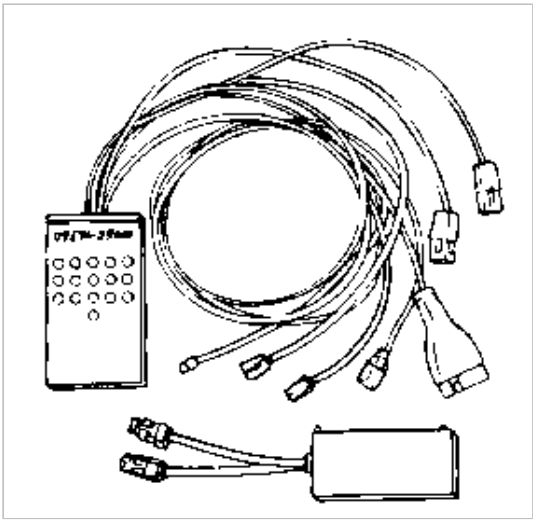
ELECTRICAL SYSTEM

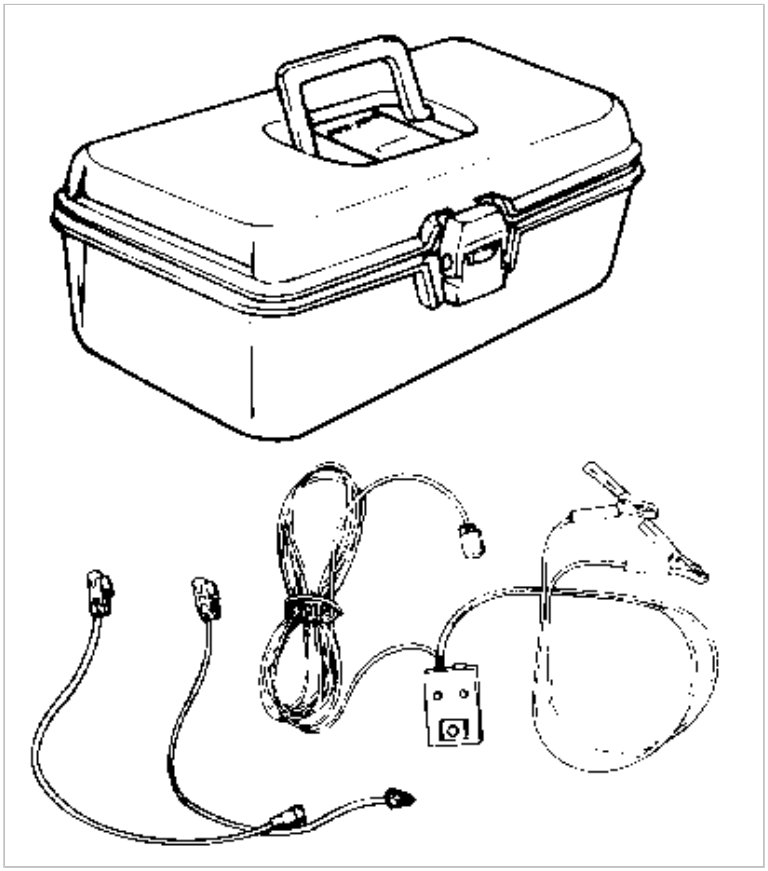
The SRS airbag system has sophisticated electrical and electronic components, therefore the airbag operating components should be handled very carefully.

1. SRSCM (Supplement Restraint System Control Module)
   SRSCM determines to deploy the airbag module by sensing the frontal impact sensed by the sensor built in SRSCM.
   a. Arming sensor/safing sensor: The arming/sating sensor built in the airbag firing circuit has the function of arming the airbag circuit under all required deployment condition and maintaining the airbag firing circuits unarmed under normal driving conditions.
      The safing sensor is a dual-contact electromechanical switch which closes if it experiences a deceleration exceeding a specified threshold.
   b. Back-up power: The SRSCM reserves the energy supply to provide deployment energy for a short second when the vehicle voltage is low or if lost in a vehicle frontal crash.
   c. Malfunction detection: The SRSCM continuously monitors the current SRS operation status while the ignition key is turned on and detects the malfunction of the system. The malfunction can be displayed in the form of diagnostic trouble code using Scan tool.
   d. MIL (Malfunction Indication Lamp) notification: If any fault is detected, the SRSCM sends signal to the indicator lamp on the cluster to warn the vehicle driver.
      The MIL indicator is the key to driver notification of SRS faults. Verify lamp and SRSCM operation by flashing 6 times when the ignition switch is first turned on.
   e. Malfunction recording: Once a fault occurred in the system SRSCM records the fault in the memory in the form of DTC and the DTC is erased only by Scan tool.
   f. Data link connector: The SRSCM memory stored data are linked through this connector located at the underneath of driver side crash pad to the external output device such as Scan tool.
   g. After firing the airbags once, the SRSCM cannot be used again and must be replaced.

Restraints > General > SPECIAL SERVICE TOOLS

SPECIAL SERVICE TOOLS

Tool	Name and Description
	Airbag wiring harness checker (0957A-29000) a. Harness inspection b. SRSCM inspection with dummy terminals
	Deployment tool (0957a-34100) a. Deployment of undeployed Air-bag module b. SRS DEPLOYMENT ADAPTER HARNESS (0957a-34200)

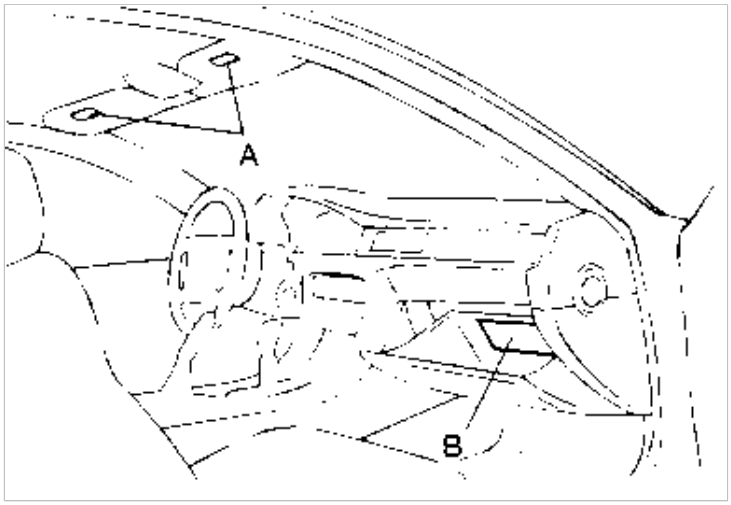


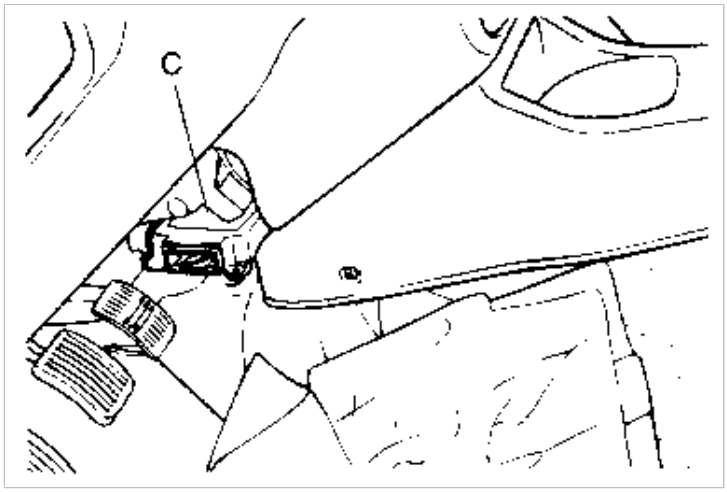
Restraints > General > WARNING/CAUTION LABELS

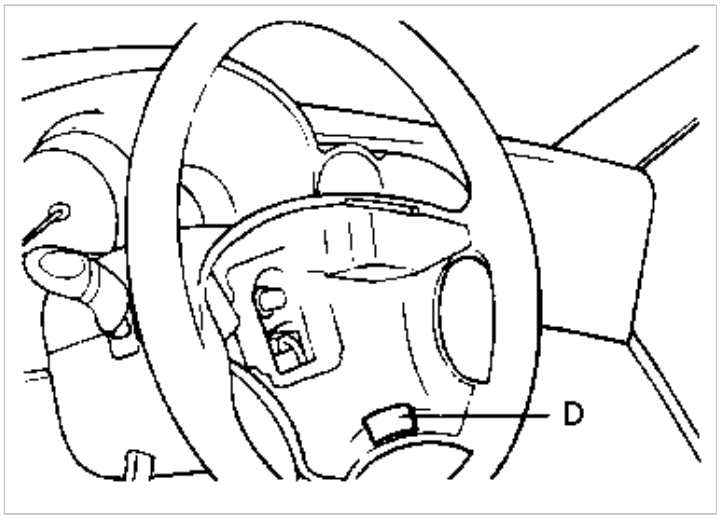
WARNING/CAUTION LABELS

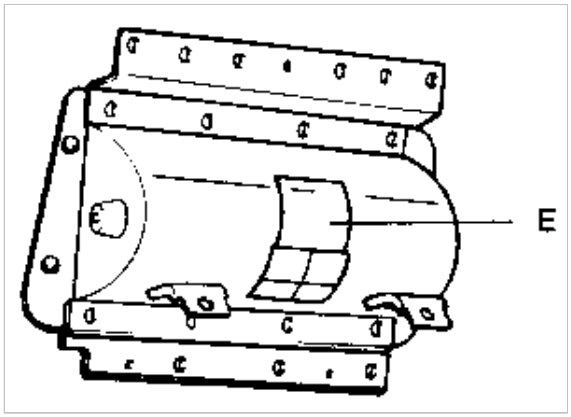
A number of caution labels relating to the SRS are found in the vehicle, as shown in the following illustration. Follow label instructions when servicing SRS.

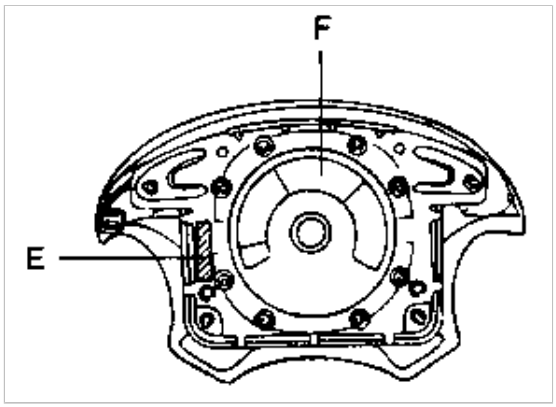
If labels are dirty of damaged, replace them with new ones.

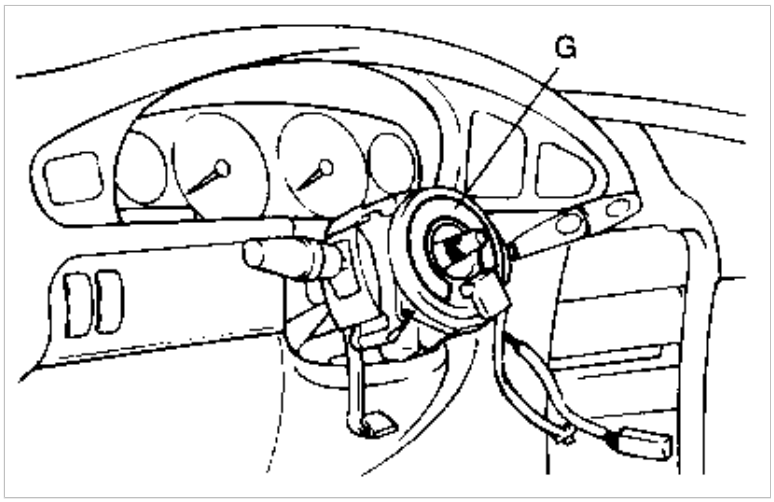


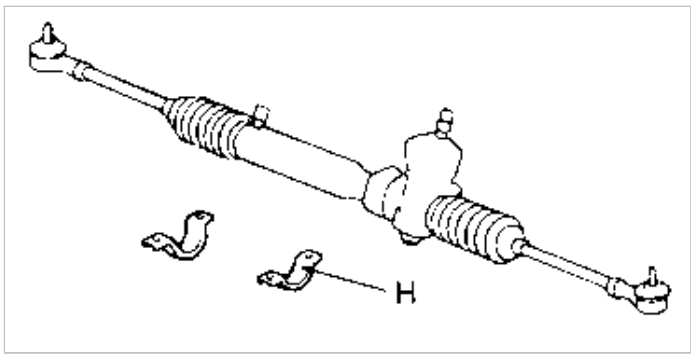

C


D


E







A. DAB + PAB	B. DAB + PAB
CAUTION TO AVOID SERIOUS INJURY : For maximum safety protection in all types of crashes, you must always wear your safety belt. Do not install rearward-facing child seats in any front passenger seat position. Do not sit or lean unnecessarily close to the airbag. Do not place any objects over the airbag or between the airbag and yourself. See the owner's manual for further information and explanation.	Airbag system is normal if "SRS" lamp, in cluster, flashes approximately 6 times and then goes out after ignition key is turned on. However, if any of the following conditions occur, the system must be serviced. a. "SRS" lamp does not light when key is turned on. a. "SRS" lamp flashes or stays lit continuously. a. The airbag has inflated. THE AIRBAG SYSTEM must be inspected by authorized dealer Ten Years after vehicle manufacture date shown on certification label located on left front door-latch post or door frame. Failure to follow above instruction can result in injury to you or other occupants and children in the vehicle. See "SRS" section in Owner's Manual for more information about airbag.

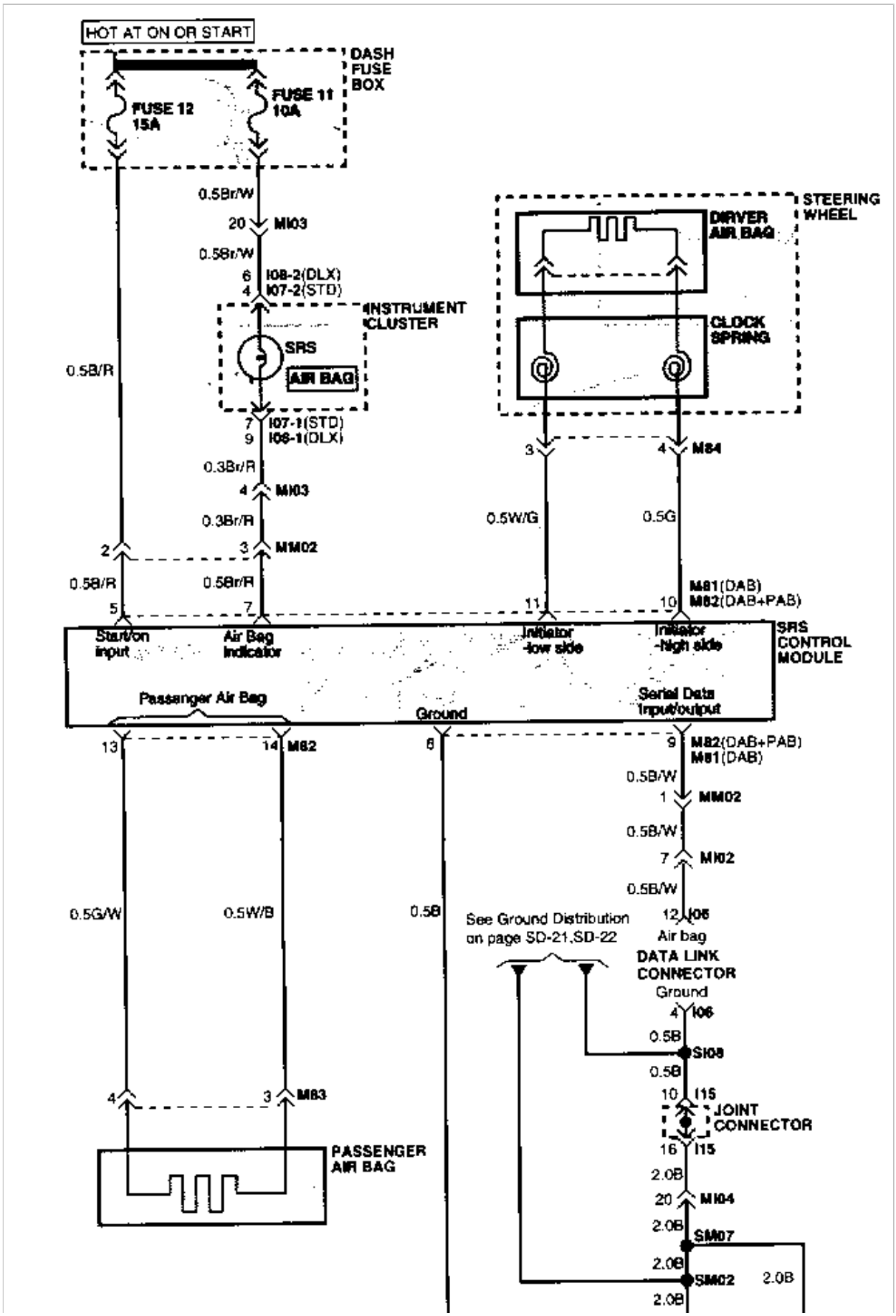
C. CAUTION : AIRBAG ESPS UNIT	D. CAUTION : SRS
Detach connector before unmounting. Assemble strictly according to manual instructions.	Before replacing steering wheel, read service manual, center front wheels and align SRS clock spring neutral marks. Failure to do so may render SRS system inoperative, risking serious driver injury.

E. ATTENTION :	F.
To help avoid personal injury due to unwanted inflation do not service or dispose of this unit without following instructions in the service manual. This unit is to be installed and/or dismantled by trained personnel only.	Contents are poisonous and extremely flammable. Do not probe with electrical devices or otherwise tamper with in any way. Service to this unit is to be performed by authorized personnel only.

G. CAUTION : SRS clock spring	H. CAUTION : SRS
This is not a repairable part. Do not disassemble or tamper. If defective, remove and replace entire unit per service manual instructions. To re-center rotate in direction of arrow until tight. Then rotate in opposite direction approximately 2 3/4 turns and align. Failure to follow instructions may render SRS system inoperative, risking serious driver injury.	Before removal of steering gearbox, read service manual, center front wheels and remove ignition key. Failure to do so may damage SRS clock spring and render SRS system inoperative, risking serious driver injury.

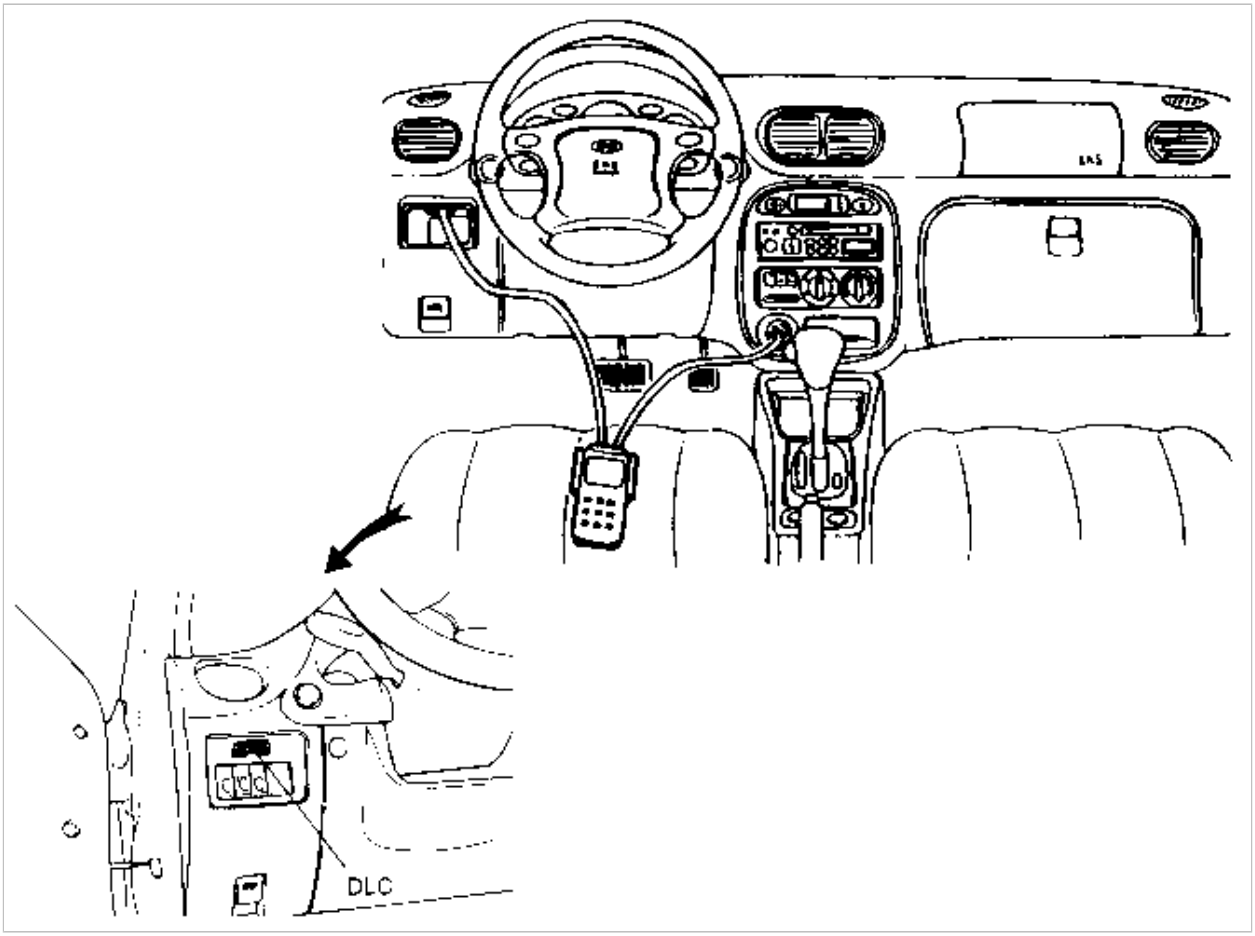
Restraints > SRS Air Bag System > AIR BAG SYSTEM (SRS) SCHEMATIC

AIR BAG SYSTEM (SRS) SCHEMATIC


HOT AT ON OR START
DASH FUSE BOX
FUSE 12 15A
FUSE 11 10A
0.5Br/W
20 MI03
0.5Br/W
6 I08-2(DLX)
4 I07-2(STD)
INSTRUMENT CLUSTER
SRS
AIR BAG
0.5B/R
7 I07-1(STD)
9 I08-1(DLX)
0.3Br/R
4 MI03
0.3Br/R
3 MM02
2
0.5B/R
0.5Br/R
5
7
STEERING WHEEL
DRIVER AIR BAG
CLOCK SPRING
3
4 M84
0.5W/G
0.5G
11
10 M81(DAB) M82(DAB+PAB)
Start/on input
Air Bag Indicator
Initiator -low side
Initiator -high side
SRS CONTROL MODULE
Passenger Air Bag
Ground
Serial Data Input/output
13
14 M82
6
9 M82(DAB+PAB) M81(DAB)
0.5B/W
1 MM02
0.5B/W
7 MI02
0.5B/W
0.5G/W
0.5W/B
0.5B
12 I06
Air bag
See Ground Distribution on page SD-21,SD-22
DATA LINK CONNECTOR
Ground
4 I06
0.5B
SI08
0.5B
10 I15
JOINT CONNECTOR
16 I15
2.0B
20 MI04
2.0B
SM07
2.0B
SM02
2.0B
2.0B
4
3 M83
PASSENGER AIR BAG

Restraints > SRS Air Bag System > DIAGNOSIS WITH HI-SCAN

DIAGNOSIS WITH HI-SCAN



CHECK PROCEDURES

1. Connect the Scan tool DLC to the vehicle data link connector located at underneath the dash panel.
2. Turn the ignition key to "ON" position and turn on Scan tool.
3. Perform the SRS diagnosis according to the vehicle model configuration.
4. If a fault code is assured, then replace the component. Never attempt to repair the component.
5. If the Scan tool finds that a component of the system is faulty, there is a possibility that the fault is not in the components but in SRS wiring or connector.
   To eliminate the possibility, refer to the following check procedure using SRS harness checker (No.: 0957a-29000)

Restraints > SRS Air Bag System > DTC - B1111, B1112

DTC - B1111, B1112

DTC CODE	DISPLAY ON SCAN TOOL	CONDITION
B1111	Battery voltage - High	a. Ignition switch "ON" or start release b. Input battery voltage > 16.0 - 19.2V Ignition switch "ON" or start release input battery voltage > 16.0 - 19.2V
B1112	Battery voltage - Low	a. Ignition switch' "ON" or start release b. Input battery voltage < 7.2 - 9.0V

Check items

a. Connector, harness
b. Fuse
c. Charging system (Battery, alternator)
d. SRSCM malfunction

Check procedures

The ABSCM measures the voltage at the ignition input to detect an operating voltage out of the normal operating range.

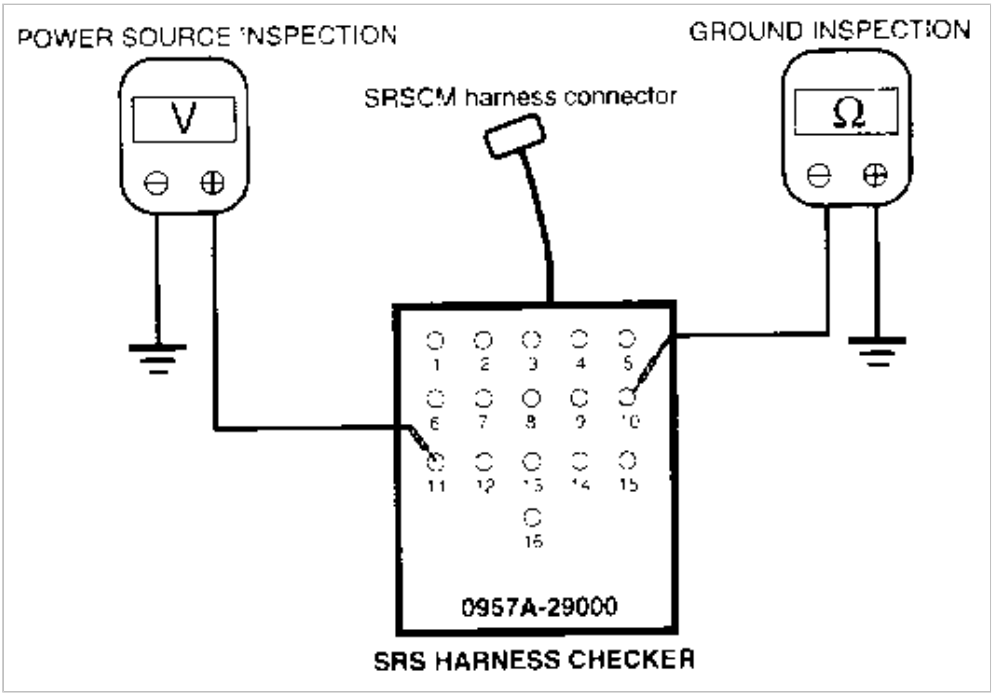
When the ignition voltage supplying fuse (No. 12) is blown out, the Scan tool cannot communicate with the SRSCM even though SRS SRI illuminates continuously.

Power source

1. Turn ignition switch to lock, and disconnect. the negative (-) terminal cable from battery and wait at least 30 seconds.
2. Disconnect SRSCM connector, DAB and PAB inflators.
3. Connect SRS harness checker to SRSCM harness side connector and connect battery negative (-) terminal.
4. Turn ignition switch to ON position.
5. Measure the voltage between checker terminal 11 and body ground.
   LIMIT: 6.0 - 16.5V

Ground connection

1. Turn ignition switch to LOCK position.
2. Check continuity between checker terminal No. 10 and body ground.
   LIMIT: Continuity



Restraints > SRS Air Bag System > DTC - B1346, B1347

DTC - B1346, B1347

DTC CODE	DISPLAY ON SCAN TOOL	CONDITION
B1346	DAB resistance - High	a. Ignition switch "ON" or start release

		b. DAB module malfunction > 3.6 - 6.7 OHM
B1347	DAB resistance - Low	a. Ignition switch "ON" or start release b. DAB module malfunction > 0.6 - 1.9 OHM

CHECK ITEMS

a. Short circuit in DAB harness
b. DAB module malfunction
c. Clock spring malfunction
d. SRS control module malfunction

CHECK PROCEDURES

The SRSCM shall measure the resistance of the DAB to detect a resistance which lies outside the allowed range. Do not attempt to measure the resistance of DAB squib.

Before inspection,

1. Disconnect the battery negative (-) terminal cable and wait at least 30 seconds.
2. Remove the DAB connector and PAB connector.
   When storing airbag module, keep the surface facing upward.

CHECK INFLATOR CIRCUIT

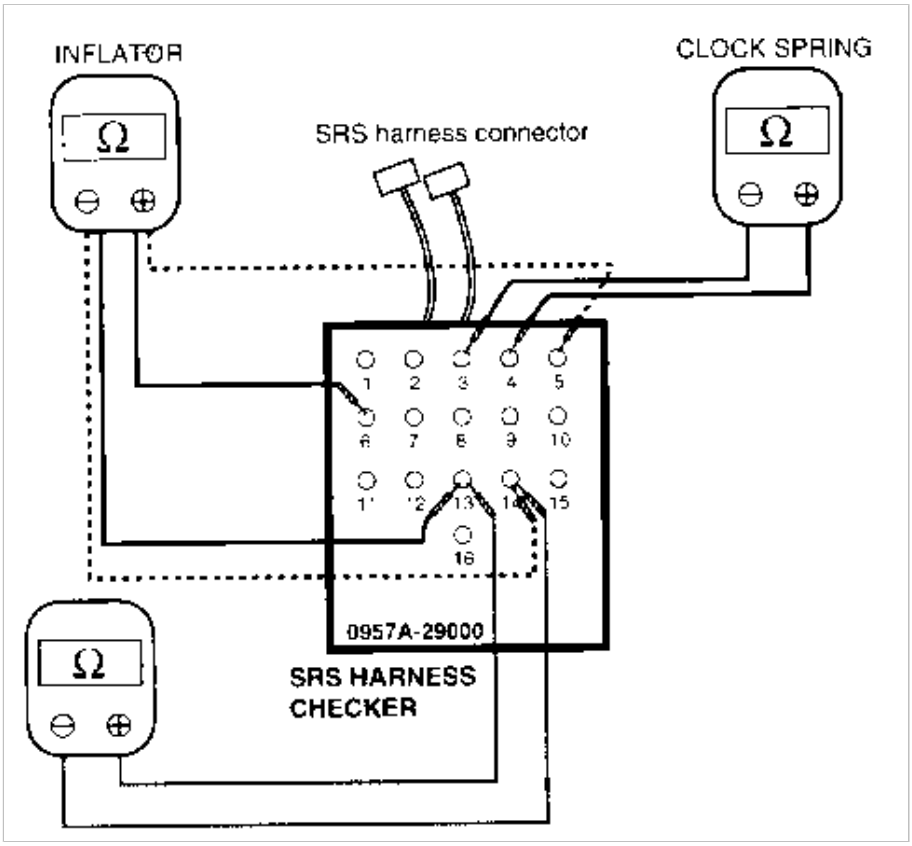
1. Turn ignition switch to lock, and disconnect the negative (-) terminal cable from battery and wait at least 30 seconds.
2. Disconnect SRSCM connector. (Refer to BD section for removal of center console box.)
3. Connect the SRS harness checker to DAB harness side connector & SRSCM harness side connector.
4. Check the terminal of checker and the limit is as following.

Terminals	B1346	B1347
6 to 13	Continuity	-
5 to 14	Continuity	-
13 to 14	-	Non-continuity

CHECK CLOCK SPRING

1. Remove the clock spring connector.
2. Connect the SRS harness checker to clock spring side connector and DAB dummy terminal.
3. Check continuity between checker terminal 3 and 4.
   LIMIT
   B1346: Continuity
   B1347: Non-continuity

CHECK PROCEDURE



Restraints > SRS Air Bag System > DTC - B1348, B1349

DTC - B1348, B1349

DTC CODE	DISPLAY ON SCAN TOOL	CONDITION
B1348	DAB - short to ground	a. Ignition switch "ON" or start release b. Resistance between DAB module circuit harness and battery ground < 4 - 20 KOHM
B1349	DAB - short to battery	a. Ignition switch "ON" or start release b. Resistance between DAB module circuit harness and battery ground < 6 - 20 KOHM

CHECK ITEMS

a. Short circuit in DAB harness
b. DAB module malfunction
c. Clock spring malfunction
d. SRS control module malfunction

CHECK PROCEDURES

The SRS circuit consists of SRSCM, spiral cable, driver side airbag and passenger side airbag.

Before inspection,

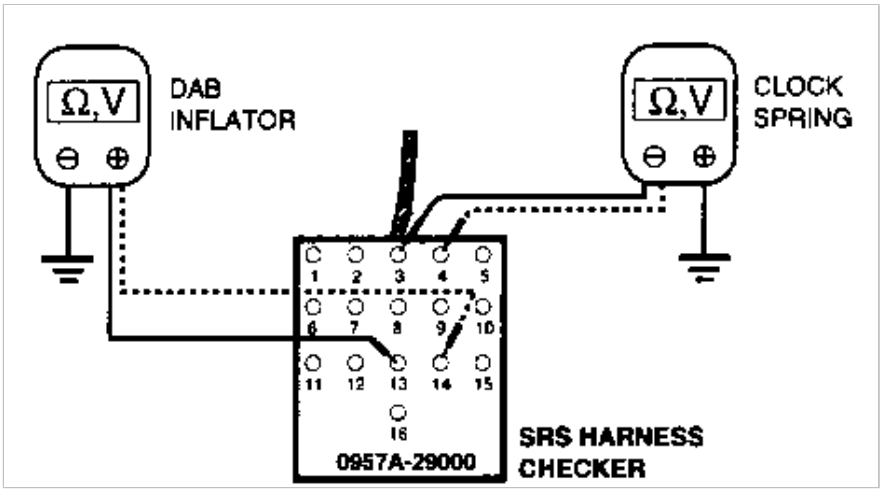
1. Disconnect battery negative (-) terminal and wait at least 30 seconds.
2. Remove the DAB and PAB connectors.
   Keep the surface of airbag module facing upward.

DAB INFLATOR CIRCUIT

1. Disconnect SRSCM harness connector and DAB and PAB.
2. Connect SRS harness checker to the SRSCM harness connector and inflator connectors.
3. Check continuity or voltage between terminals 13, 14 to body ground respectively.
   LIMIT
   B1348: Non-continuity
   B1349: 0V

CLOCK SPRING

1. Disconnect DAB and clock spring connector and SRSCM connector.
2. Connect SRS harness checker to the SRS harness checker to clock spring connector.
3. Connect battery and ignition "ON" and check continuity or voltage between terminals 3, 4 to body ground respectively.
   LIMIT
   B1348: Non-continuity
   B1349: 0V



Restraints > SRS Air Bag System > DTC - B1352, B1353

DTC - B1352, B1353

DTC CODE	DISPLAY ON SCAN TOOL	CONDITION
B1352	PAB resistance - High	a. Ignition switch "ON" or start release b. PAB module circuit resistance > 2.8 - 5.4 OHM
B1353	PAB resistance - Low	a. Ignition switch "ON" or start release b. PAB module circuit resistance > 0.4 - 1.6 OHM

CHECK ITEMS

a. Open circuit in passenger airbag harness
b. PAB module malfunction
c. SRS control module malfunction

CHECK PROCEDURES

The SRSCM shall measure the resistance of the PAB to detect a resistance which lies outside the allowed range. Never attempt to measure the resistance of PAB.

Before inspection,

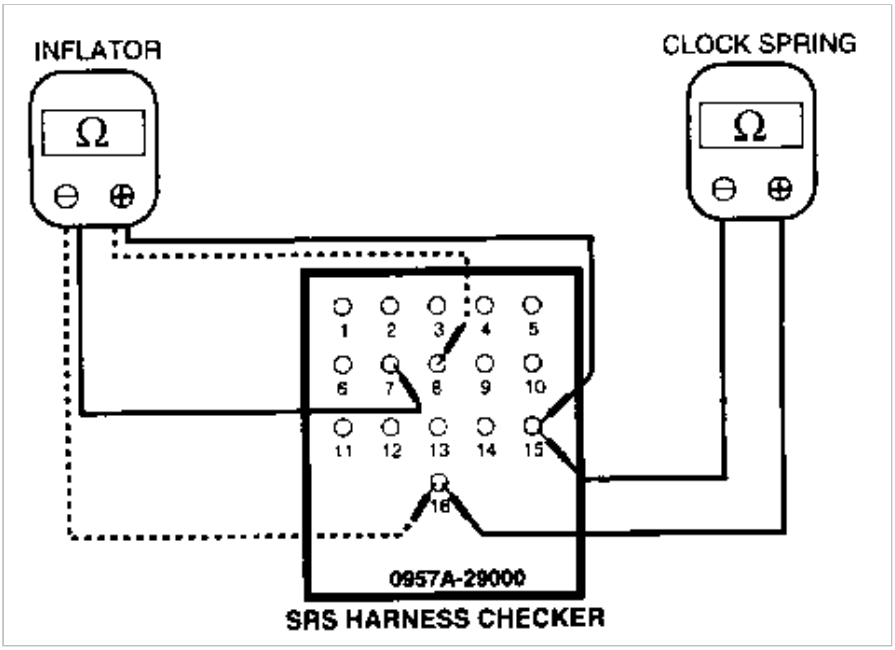
1. Disconnect the battery negative (-) terminal cable and wait at least 30 seconds to prevent unexpected deployment of airbag.

2. Remove the DAB and PAB connectors.
   Keep the surface of airbag module facing upward.

INFLATOR CIRCUIT (PAB)

1. Disconnect SRSCM connector, DAB and PAB.
2. Connect the SRS harness checker to the inflator connector and SRSCM harness side connector.
3. Check the continuity between the terminals of checker, and the LIMIT as follows:

Terminals	B1352	B1353
7 to 15	Continuity	-
8 to 16	Continuity	-
15 to 16	-	Non-continuity



Restraints > SRS Air Bag System > DTC - B1354, B1355

DTC - B1354, B1355

DTC CODE	DISPLAY ON SCAN TOOL	CONDITION
B1354	PAB - short to ground	a. Ignition switch "ON" or start release b. Resistance between PAB module circuit harness and battery ground < 4 -20 KOHM
B1355	PAB - short to battery	a. Ignition switch "ON" or start release b. Resistance between PAB module circuit harness and battery (+12) < 6 -20 KOHM

CHECK ITEMS

a. Short circuit in PAB harness
b. PAB module malfunction
c. SRS control module malfunction

CHECK PROCEDURES

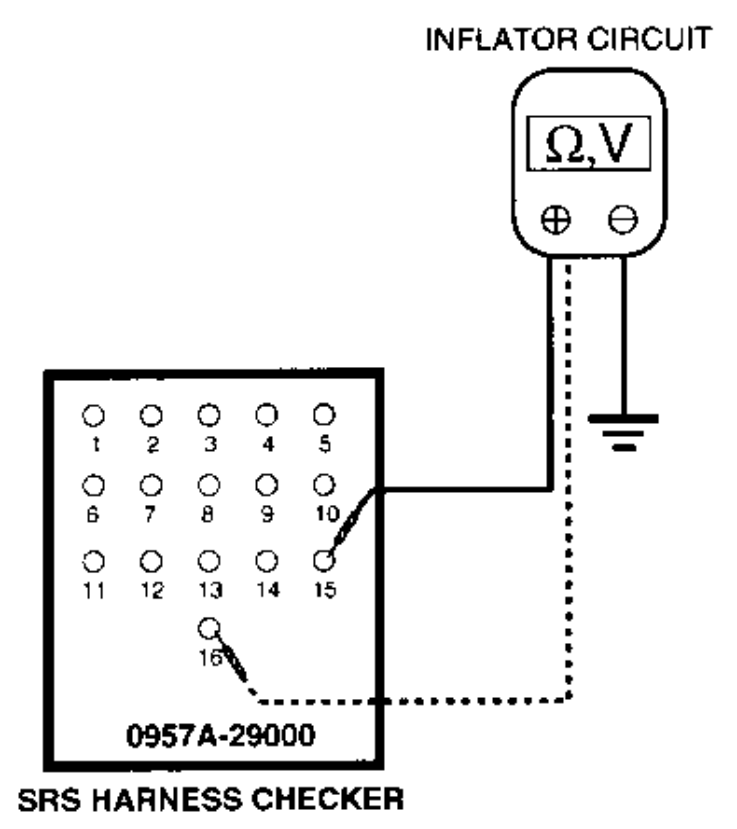
The SRS circuit consists of SRSCM, spiral cable, driver side airbag and passenger side airbag.

Before inspection,

1. Disconnect battery negative (-) terminal cable and wait at least 30 seconds to prevent action of back up power.
2. Remove the DAB and PAB connectors.
   Keep the surface of airbag module facing upward.

CHECK INFLATOR CIRCUIT

1. Disconnect SRSCM harness connector and DAB and PAB.
2. Connect SRS harness checker to the SRSCM harness connector and inflator connectors.
3. Check continuity or voltage between terminals 15, 16 of checker to body ground respectively.
   LIMIT
   B1354: Non-continuity
   B1355: 0V



Restraints > SRS Air Bag System > DTC - B1372, B1661, B1650

DTC - B1372, B1661, B1650

DTC CODE	DISPLAY ON SCAN TOOL	CONDITION
B1372	SRSCM firing circuit DAB - PAB	a. Ignition switch "ON" or start release b. SRSCM internal malfunction
B1661	SRSCM parameter	a. Ignition switch "ON" start release b. SRSCM internal parameter configuration missing or incorrect
B1650	SRSCM crash recorded	a. Ignition switch "ON" or start release b. SRSCM crash recorded

DESCRIPTION

SRSCM MALFUNCTION

The SRSCM shall also cyclically monitor the following:

1. Functional readiness of the firing circuit activation transistors (driver and passenger side)
2. Adequacy of deployment energy reserves (driver and passenger - side)
3. Safing sensor integrity: detection of faulty closure (longer than 4 seconds)
4. Plausibility of accelerometer signal
5. Operation of SRSCM components (A/D-converter, etc.)

The timely completion of all tests is monitored by a separate hardware watchdog. During normal operation, the watchdog is triggered periodically by the SRSCM; if the SRSCM fails to trigger the watchdog, the watchdog will reset the SRSCM and activate the SRI (Service Reminder Indicator).

The SRSCM must be replaced once the fault codes mentioned above are confirmed.

Restraints > SRS Air Bag System > DTC - B2500

DTC - B2500

DTC CODE	DISPLAY ON SCAN TOOL	CONDITION
B2500	SRS SERVICE REMINDER INDICATOR	a. Ignition switch "ON" or start release b. SRS service reminder indicator circuit voltage < 3.5 - 5.5V when the service reminder indicator is commanded by the SRSCM to turn off c. SRS service reminder indicator circuit voltage > 3.0 - 5.5V when the service reminder indicator is commanded by the SRSCM to turn on

CHECK ITEMS

a. Connector and harness
b. SRS service reminder indicator
c. SRSCM malfunction

CHECK PROCEDURES

When the airbag system is normal, the SRI flashes for approx. 6 seconds after the ignition switch is turned ON, and then turns off automatically.

If there is a malfunction in the airbag system, the SRI lights up to inform the driver of the abnormality.

The SRSCM shall measure the voltage at the airbag SRI (Malfunction Indicator Lamp) output pin, both when the lamp is on and when the lamp is off, to detect whether the commanded state matches the actual state.

AIRBAG FUSE

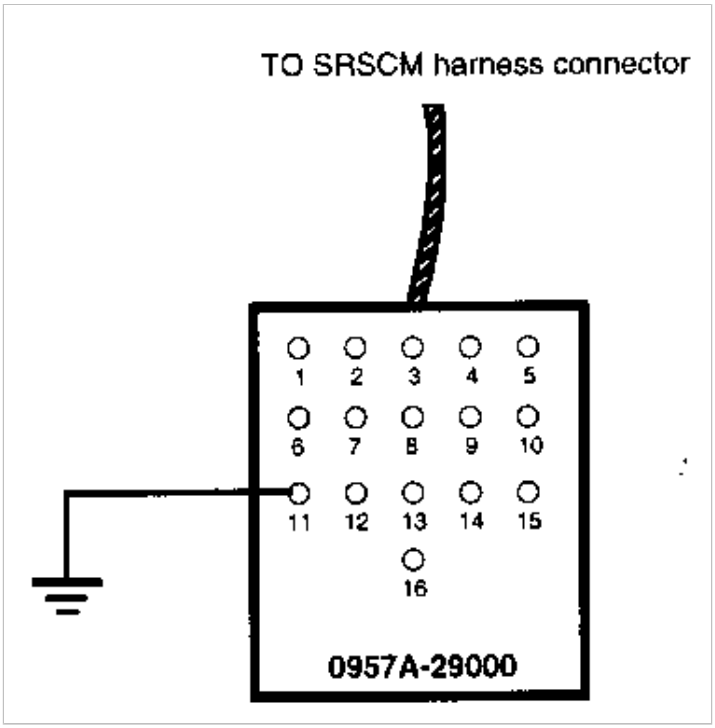
1. Remove the FUSE No. 11 and 12 from dash fuse box
2. Inspect the state of FUSE
3. Replace if necessary

SRS SRI CIRCUIT

1. Disconnect the battery negative (-) terminal and wait 30 seconds.
2. Remove the SRSCM connector, DAB and PAB connectors.
3. Connect the SRS harness checker to SRSCM harness side connector.
4. Ground the SRS harness checker terminal 11.
5. Turn ignition switch to "ON" position.

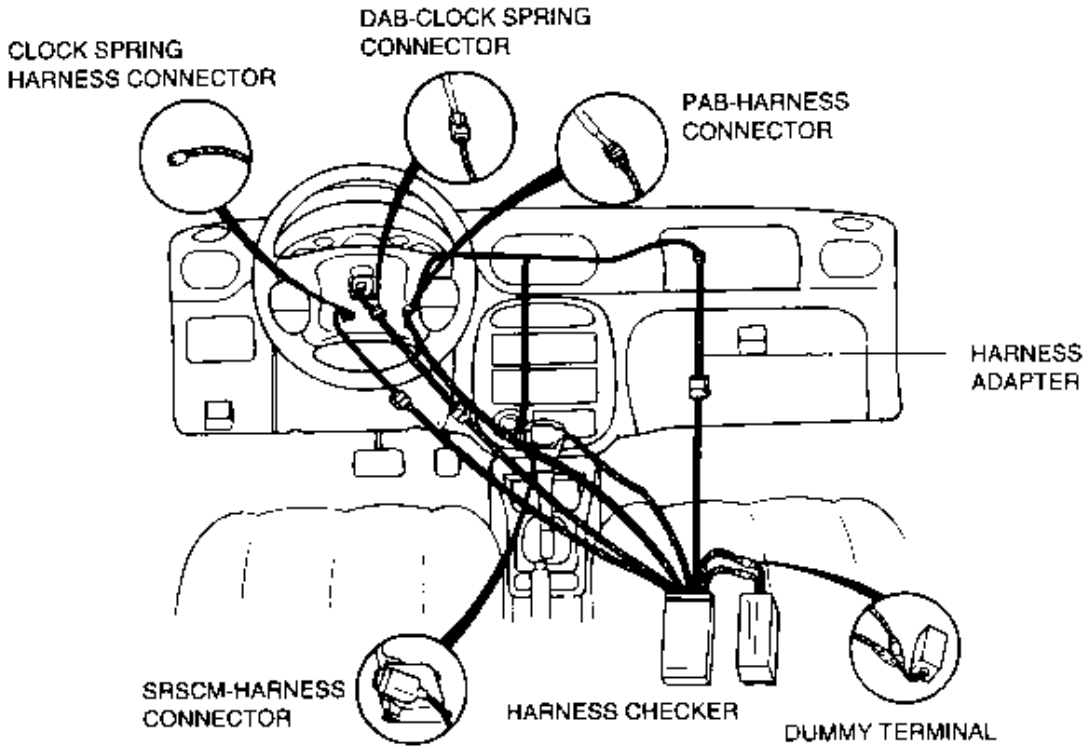
LIMIT
SRS SRI ON

If no fault is found in wiring or connector, replace the SRSCM.



Restraints > SRS Air Bag System > TROUBLESHOOTING USING HARNESS CHECKER (0957A-29000)

TROUBLESHOOTING USING HARNESS CHECKER (0957A-29000)



SRS HARNESS CHECKER INSTALLATION LAYOUT

The SRS harness checker (0957A-29000) is available for troubleshooting of airbag system. If a fault code is confirmed by using Scan tool, it is recommended that you check whether there is a abnormal condition in the connector or wiring around the Scan tool indicated components.

To prevent unnecessary component change, make sure where the fault exists.

Connect the harness checker as illustrated above.

It is not necessary to check all connectors of the checker.

Choose the necessary connector referring to the troubled area of the system.

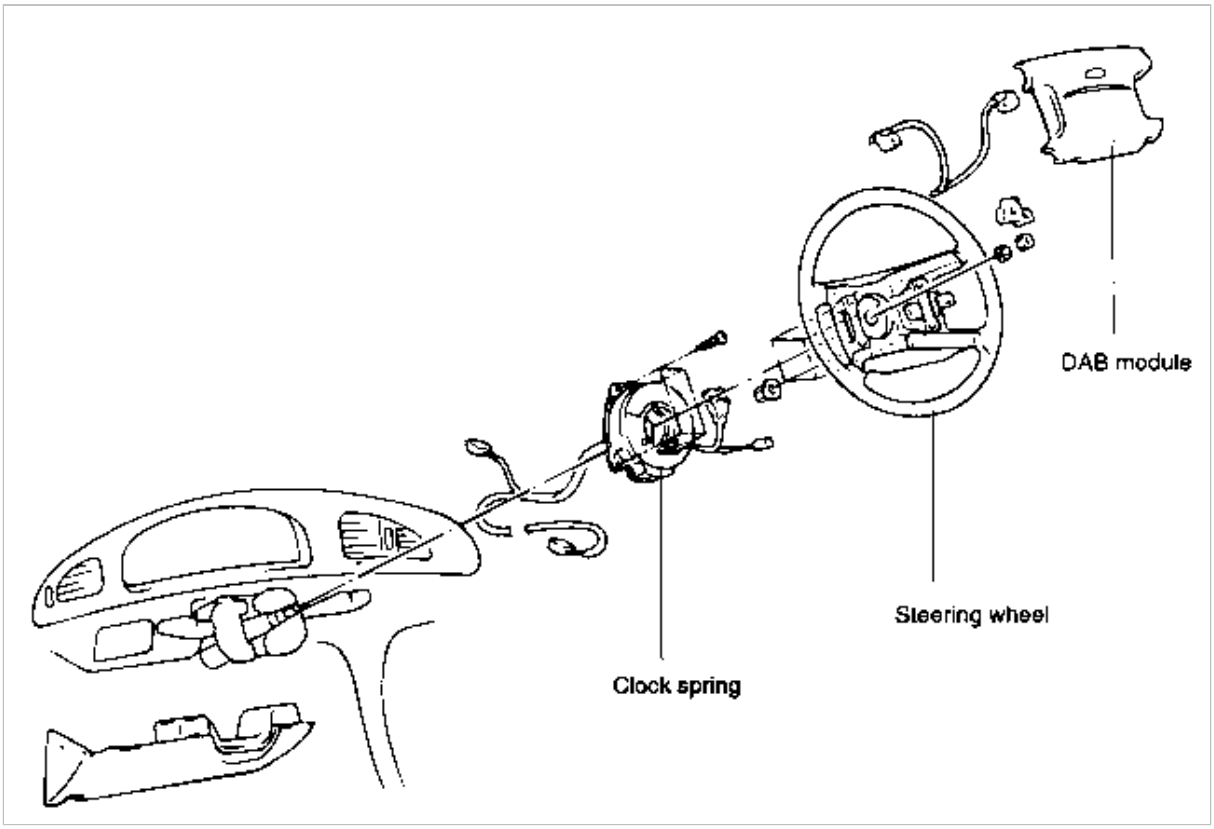
Dummy terminal can be used to simulate the airbag system while removing the both DAB and PAB. If the Scan tool displays that the trouble is in DAB and PAB itself, it is necessary to confirm the trouble.

To verify the source of trouble with Scan tool, first remove the DAB or PAB module connector as necessary and connect the dummy terminal to harness checker.

Then re-check the trouble code with the Scan tool . If the fault is in the airbag modulator there should be no trouble codes on Scan tool screen. Otherwise, the trouble may be with other components such as the connector or wiring.

Restraints > SRS Air Bag System > Air Bag Module > COMPONENTS

COMPONENTS



Restraints > SRS Air Bag System > Air Bag Module > INFLATOR MODULE DISPOSAL

INFLATOR MODULE DISPOSAL

FIELD DEPLOYMENT PROCEDURES

When handling the deployed airbag take care so that the by-product dust does not enter the eye. Always wear gloves to avoid direct contact with the by-product material.

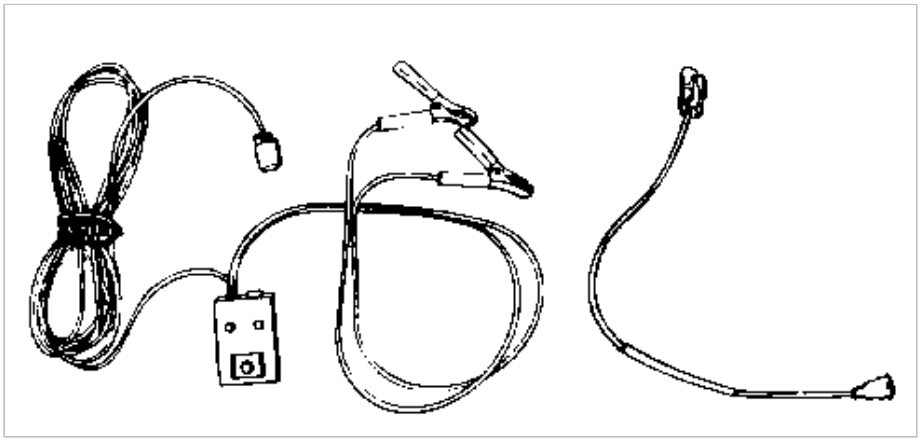
Restraints > SRS Air Bag System > Air Bag Module > INFLATOR MODULE DISPOSAL PROCEDURES

INFLATOR MODULE DISPOSAL PROCEDURES

Before either disposing of a vehicle equipped with an air bag, or prior to disposing of the air bag module, be sure to first follow the procedures described below to deploy the air bag.

AIR BAG REMOTE DEPLOYMENT DEVICES

Tool, Number, Name	Use
	Deployment inside the vehicle (when vehicle will no longer be driven)

	
Deployment tool (0957A-34100)SRS DEPLOYMENT ADAPTER HARNESS (0957A-34200)	

DISPOSAL PLAN

When the problem occurs, take disposal steps as follows.

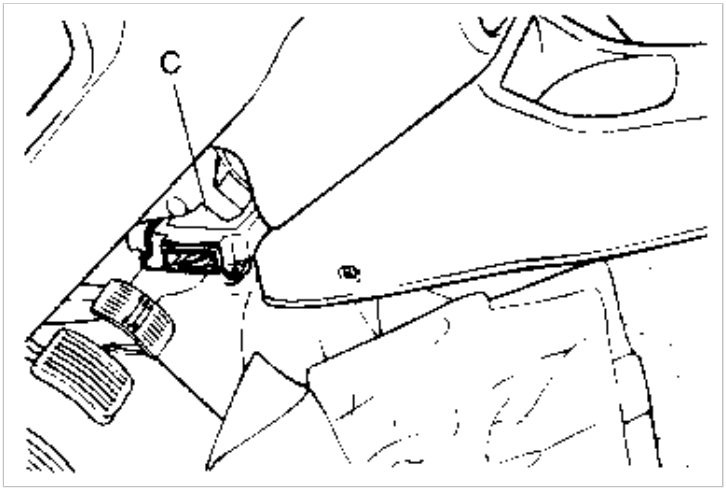
CASE	DISPOSAL PLAN
Abnormal problems in air bag module	Return to HMC dealer
Car scrapping (DAB, PAB)	Deploy the air bag module in the scrapper yard with SST
Crash (Deployed)	Service station disposes the Air-bag module

UNDEPLOYED AIR BAG MODULE DISPOSAL

a. If the vehicle is to be scrapped, junked, or otherwise disposed of, deploy the air bag inside the vehicle.
b. Since there is a loud noise when the air bag is deployed, avoid residential areas whenever possible. If anyone is nearby, give warning of the impending noise.
c. Since a large amount of smoke is produced when the air bag is deployed, select a well-ventilated site. Moreover, never attempt the test near a fire or smoke sensor.

DEPLOYMENT INSIDE THE VEHICLE

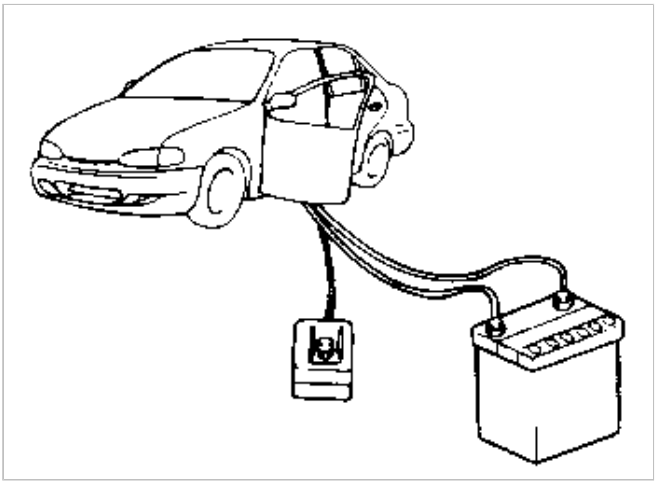
WHEN VEHICLE WILL NO LONGER BE DRIVEN



1. Open all windows and doors of the vehicle.
   Move the vehicle to an isolated spot.
2. Disconnect the negative (-) and positive (+) battery cables from the battery terminals, and then remove the battery from the

vehicle.
Wait at least 30 seconds after disconnecting the battery cable before doing any further work.

3. Remove the driver side floor carpet.
4. Remove Air-bag SRSCM connector.
5. Connect disposal tool to the air bag checker R-terminal.
6. Connect SRS air bag adapter harness battery (+) and (-) when the SRS harness checker is still disconnected, to prevent sudden unexpected deployment of the air bag.
   Connect the SRS harness checker to SRSCM harness side connector.
7. At location as far away from the vehicle as possible, press the push button (removed from the vehicle) to deploy the air bag.



   a. Before deploying the air bag in this manner, first check to be sure that there is no one in or near the vehicle. Wear safety glasses.
   b. The inflator will be quite hot immediately following the deployment, so wait at least 30 minutes to allow it to cool before attempting to handle it. Although not poisonous, do not inhale gas from air bag deployment. See Deployed Air Bag Module Disposal Procedures for post-deployment handling instructions.
   c. If the air bag fails to deploy when the procedures above are followed, do not go near the module.

DEPLOYED AIR BAG MODULE DISPOSAL PROCEDURES

After deployment, the air bag module should be disposed of in the same manner as any other scrap parts, except that the following points should be carefully noted during disposal.

1. The inflator will be quite hot immediately following deployment, so wait at least 30 minutes to allow it to cool before attempting to handle it.
2. Do not put water or oil on the air bag after deployment.
3. There may be, adhered to the deployed air bag module, material that could irritate the eyes and or skin, so wear gloves and safety glasses when handling a deployed air bag module. IF, DESPITE THESE PRECAUTIONS, THE MATERIAL DOES

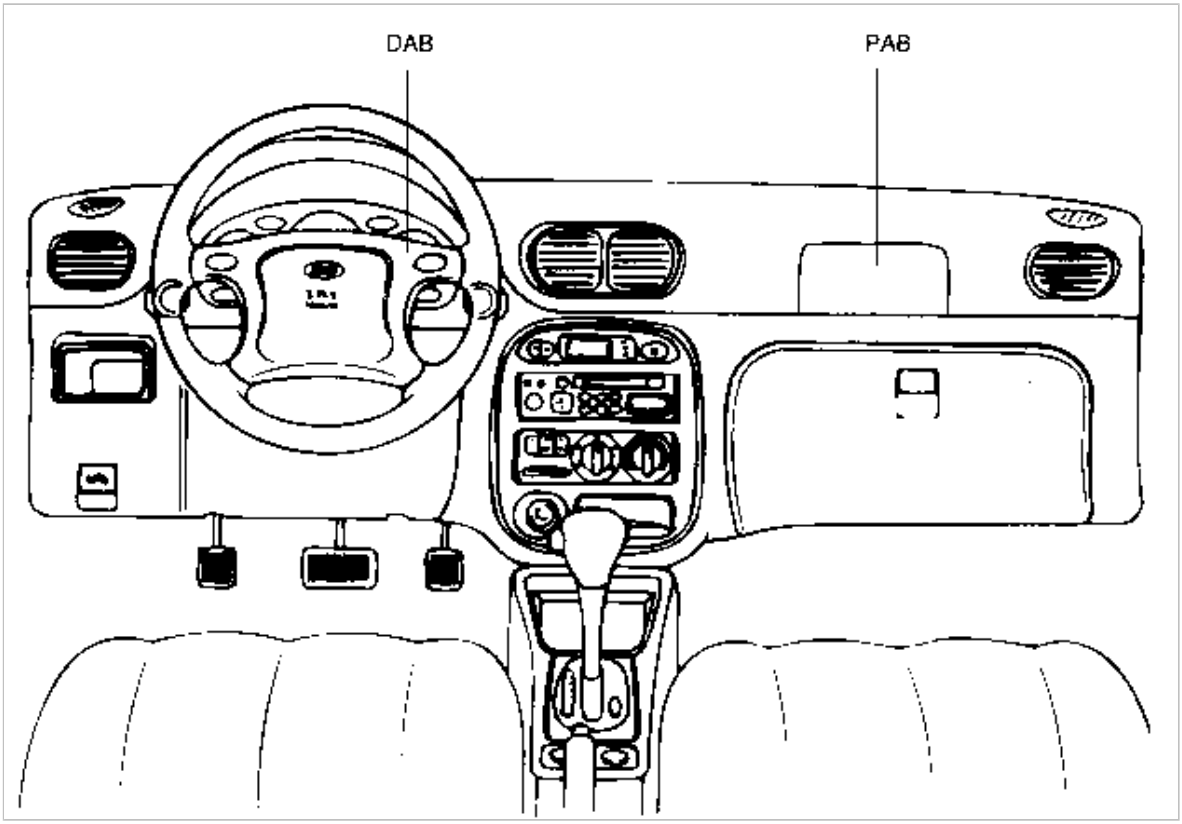
GET INTO THE EYES OR ON THE SKIN, IMMEDIATELY RINSE THE AFFECTED AREA WITH A LARGE AMOUNT OF CLEAN WATER. IF ANY IRRITATION DEVELOPS, SEEK MEDICAL ATTENTION.

4. Tightly seal the air bag module in a strong vinyl bag for disposal.
5. Be sure to always wash your hands after completing this operation

Restraints > SRS Air Bag System > Air Bag Module > INFLATOR MODULES (DAB, PAB)

INFLATOR MODULES (DAB, PAB)

Both DAB (Driver airbag) and PAB (Passenger airbag) module are comprised of inflator and cushion. The initiator (a gas generator igniting device) is assembled in the inflator. When the vehicle is in a frontal crash of sufficient force to close the sensor of SRSCM, current is developed through the deployment loop. Current passing through the initiator ignites the material in the DAB and PAB module simultaneously and inflates the airbag.



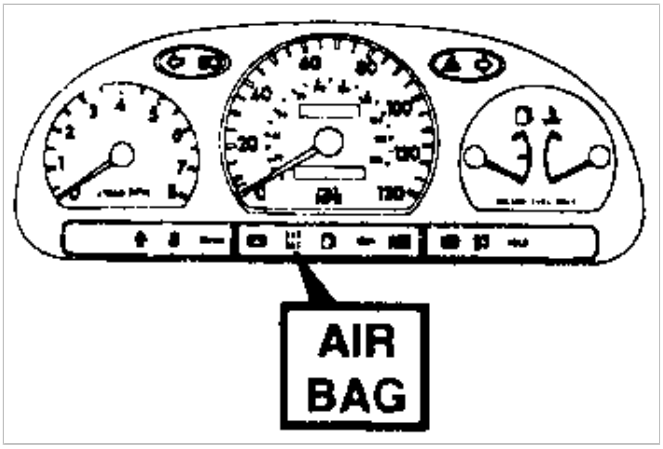
1. When removing the air-bag module or handling a new airbag module, it should be placed with the pad top sur face facing up. In this case, the twin-lock type connector lock lever should be in the lock state and care should be taken to place it so the connector will not be damaged. Do not store a steering wheel pad on top of another one. (Storing the pad with its metallic surface up may lead to a serious accident if the airbag should inflate for some reason.)
2. Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)
3. Store the air-bag module where the ambient temperature remains below 93°C (290°F), without high humidity and away from electrical noise.
4. When using electric welding, disconnect the airbag connectors under the steering column near the MULTI-FUNCTION SWITCH connector before starting work.

SRS HARNESS

The SRS harness is wrapped in yellow tube so that is easy to differentiate from among other system harnesses. The shorting bar is included inside the wiring connectors of both DAB and PAB inflator side. The shorting bar shorts the current flow DAB and PAB module circuit when the connectors are disconnected. The circuits to the inflator module are shorted in this way to help prevent unwanted deployment of the airbag when serving the airbag module.

SRSCM INDEPENDENT LAMP ACTIVATION

The SRS malfunction indicator lamp (MIL) is located on the cluster giving information of SRS operating conditions by the control signals from SRSCM.



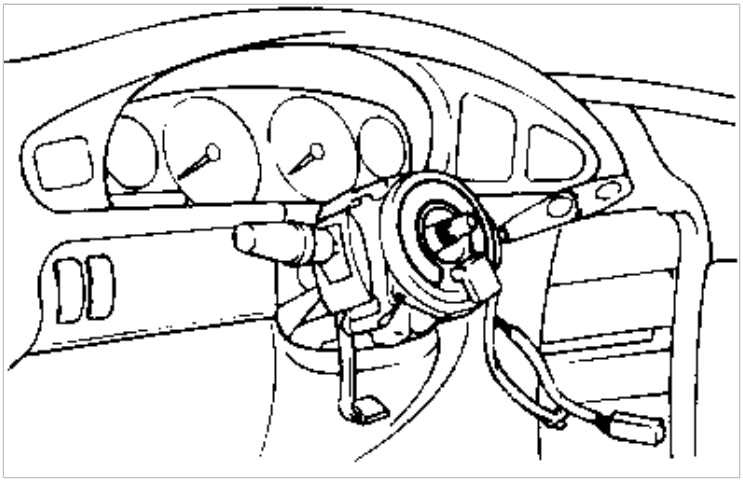
There are certain fault conditions in which the SRSCM (SRS Control Module) cannot function and thus cannot control the operation of the lamp. In these cases, the lamp is directly activated by appropriate circuitry that operates independently of the SRSCM, as follows:

1. Loss of ignition voltage supply to the SRSCM: lamp turned on continuously.
2. Loss of internal operating voltage: lamp turned on continuously.
3. SRSCM not connected: lamp turned on through shorting bar in wiring harness connector.

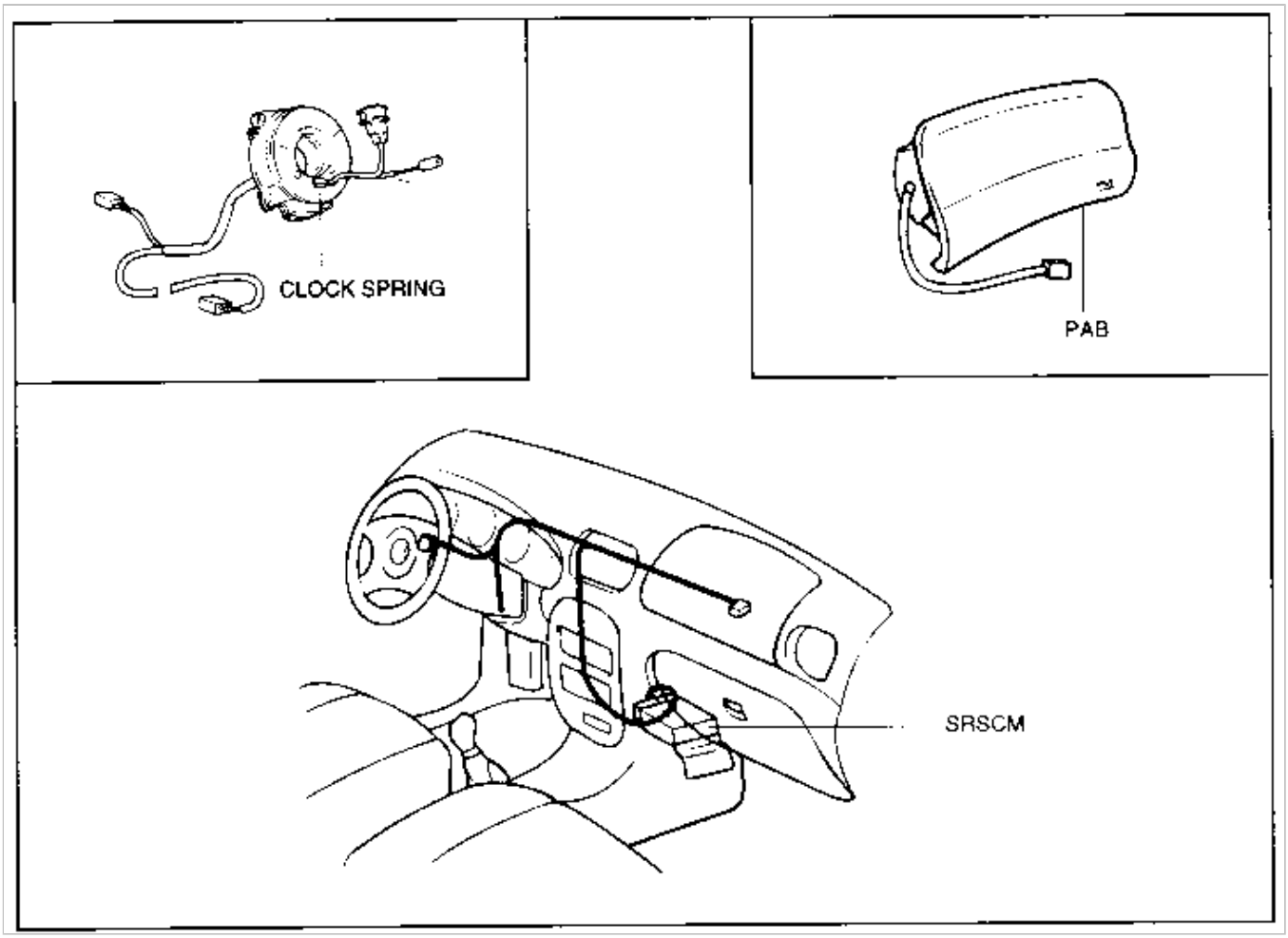
CLOCK SPRING

The clock spring (coil spring) consists of two current carrying coils. It is attached between the steering column and the steering wheel. It allows rotation of the steering wheel while maintaining continuous contact of the deployment loop through the inflator module.

The steering wheel must be fitted correctly to the steering column with the clock spring at the neutral position, otherwise cable disconnection and other troubles may result.

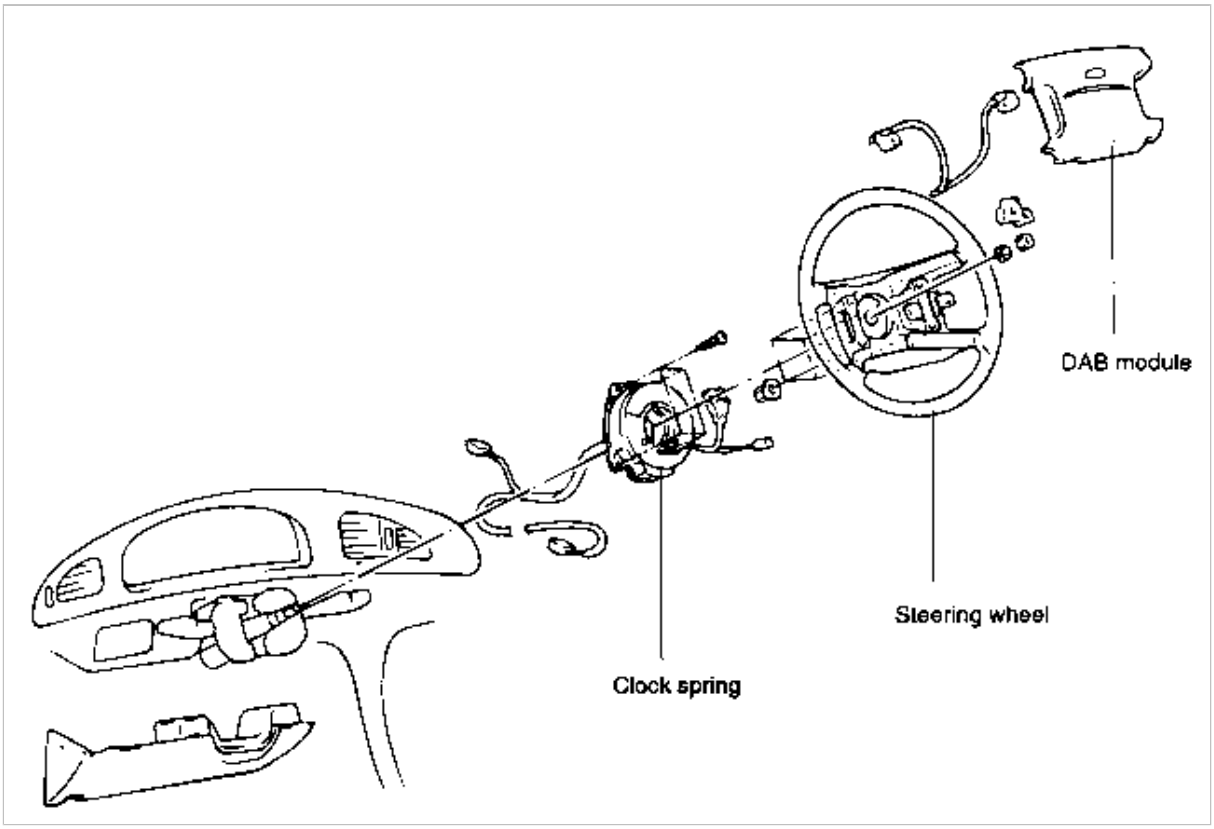


SYSTEM COMPONENT AND LAYOUT



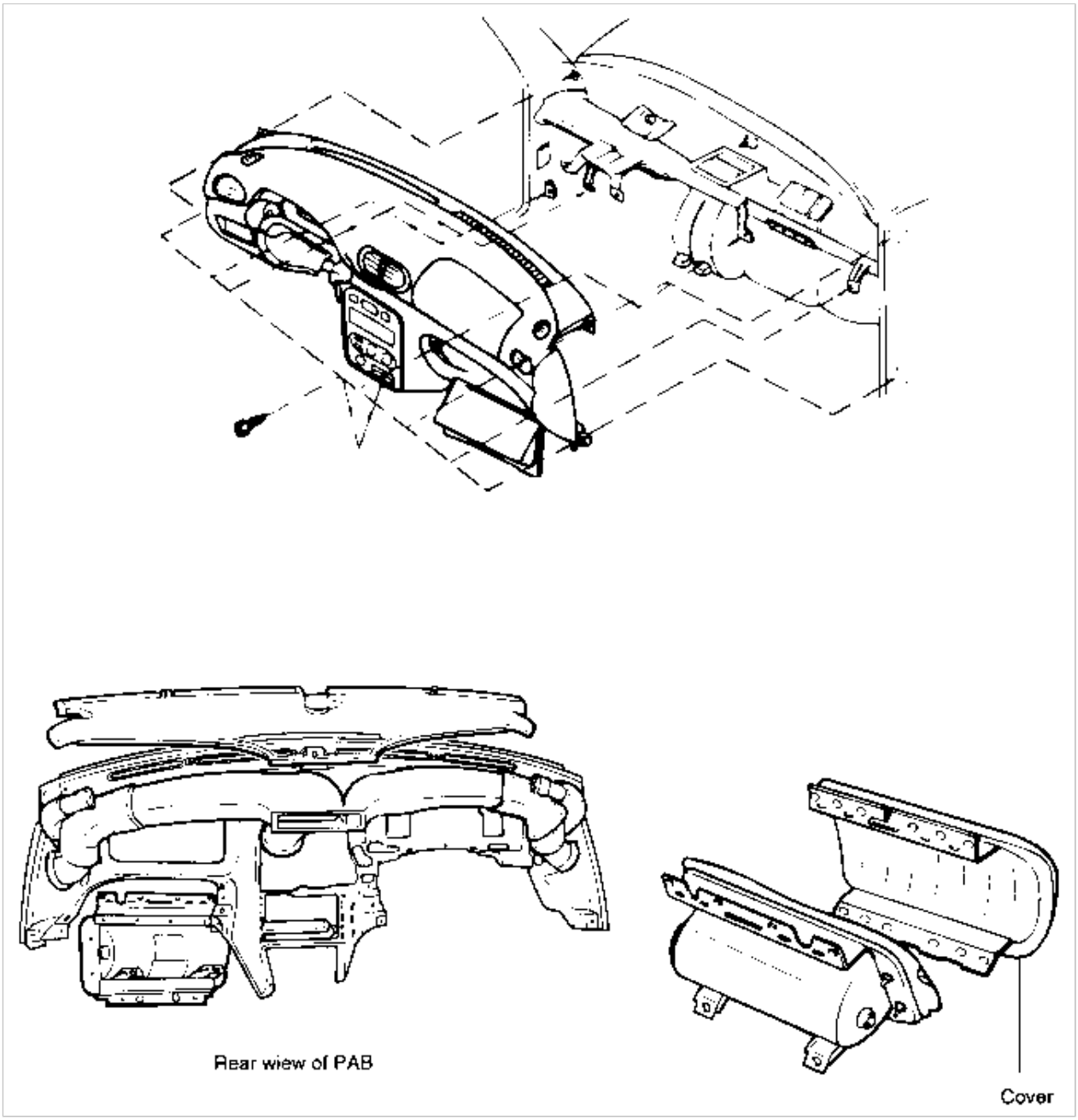
Restraints > SRS Air Bag System > Clock Spring > COMPONENTS

COMPONENTS



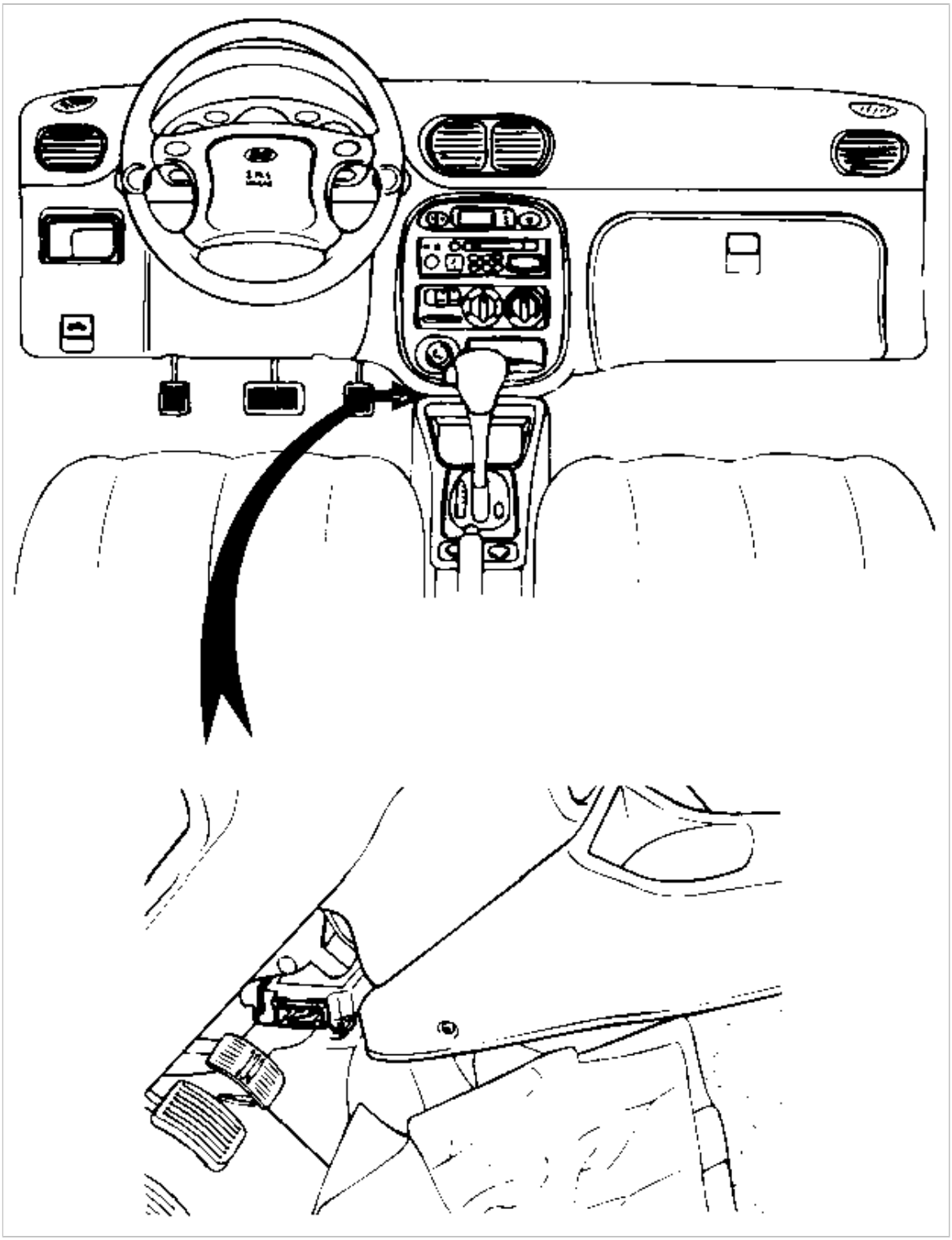
Restraints > SRS Air Bag System > Front Passenger Air Bag > REASSEMBLY

REASSEMBLY



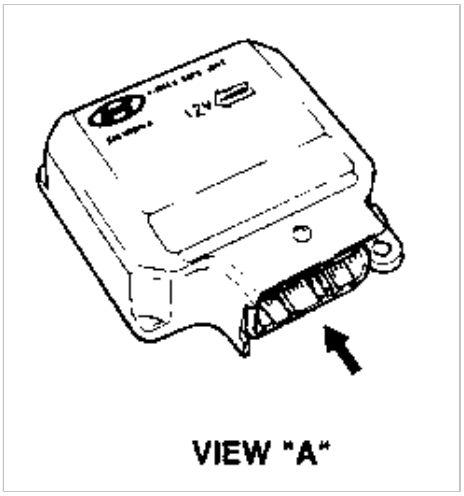
Restraints > SRS Air Bag System > Supplemental Restraint System Control Module > COMPONENTS

COMPONENTS



Restraints > SRS Air Bag System > Supplemental Restraint System Control Module > SRSCM CONNECTOR

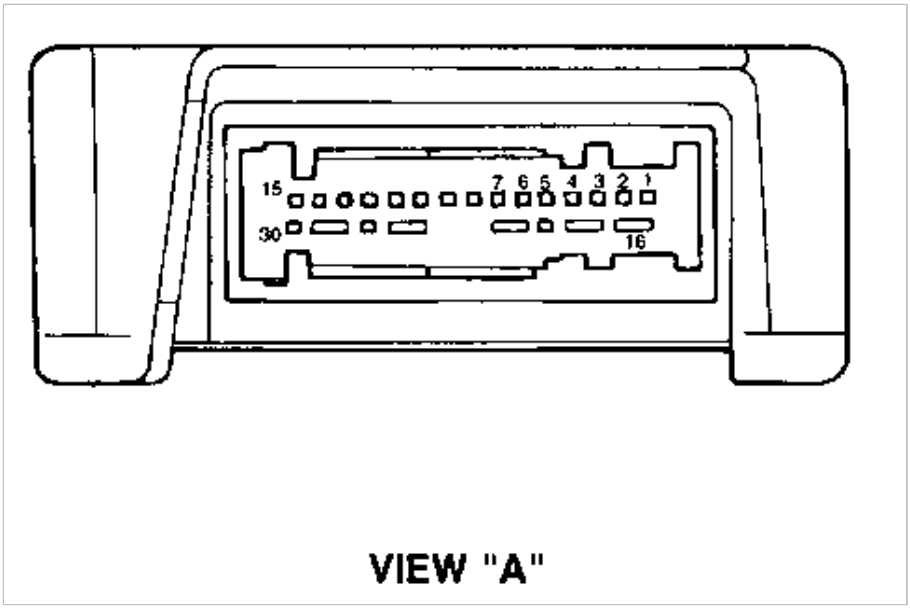
SRSCM CONNECTOR



VIEW "A"

Install the SRSCM with the arrow mark on the SRSCM facing toward the front of the vehicle.

VIEW "A"



VIEW "A"

PIN DESCRIPTION

Connector pin layout	
Pin 1	Not used
Pin 2	Not used
Pin 3	Not used
Pin 4	Not used
Pin 5	Ignition voltage
Pin 6	Ground
Pin 7	SRS warning lamp
Pin 8	Not used
Pin 9	Serial data input/output
Pin 10	Driver inflator, high side
Pin 11	Driver inflator, low side

Pin 12	Not used
Pin 13	Passenger inflator, high side
Pin 14	Passenger inflator, low side
Pin 15	Not used

PIN DESCRIPTION

Shorting bar removal tab	|
Pin 16, 17	Not used
Pin 18, 19	Not used
Pin 21, 22	SRS SRI
Pin 25, 26	Driver inflator
Pin 28, 29	Passenger inflator

ACCENT(X3) > 1998 > G 1.5 SOHC > Steering System

Steering System > General > LUBRICANTS

LUBRICANTS

Item	Recommended lubricant	Quantity
Horn contact ring of steering wheel	LONG TIME PD2(OPTIMOL, GERMAN)	As required
Bearing of steering shaft	ALVANIA #2 OR #3(KEUK DONG SHELL, KOREA)	As required
Ball joint of tie rod end	VALIANT R-2(SHOSEK I, JAPAN)	As required
Steering gear housing	ONE-LUBER RP(KYODOYUSHI, JAPAN)	As required
Inner ball joint of gear box	LONG TIME PD2(OPTIMOL, GERMAN)	As required
Contact area of gear box bellows & tie rod	SILICON GREASE(SPEC NO. : MS511-41)	As required
Power steering fluid	ATF DEXRON II TYPE	0.9 liter (0.95 qts.)

Steering System > General > SERVICE STANDARD

SERVICE STANDARD

Manual Steering

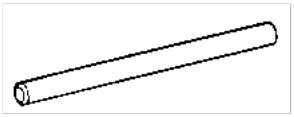
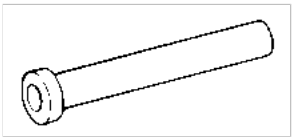
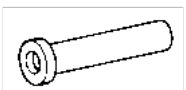
Steering wheel free play	0-30 mm (0-1.1 in.)
Steering angle (Inner wheel)	38°52'
Steering angle (Outer wheel)	33°07'
Tie rod end ball joint starting torque	0.5-2.5 Nm(5-25 kg.cm 4-22 lb.in.)
Total pinion preload(±180° or less from neutral)	0.4-1.1 Nm(4-11 kg.cm, 3.5-9.5 lb.in.)
Total pinion preload(±180° or more from neutral)	0.3-1.6 Nm(3-16 kg.cm, 2.6-14 lb.ft)
Tie rod swing resistance	2.5 Nm(20-50 kg.cm, 1.4-3.6 lb.ft)

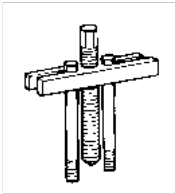
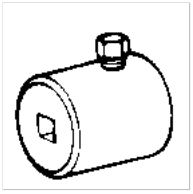
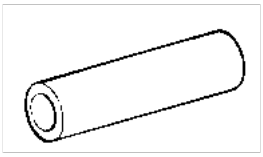
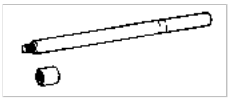
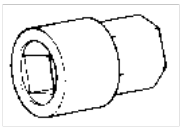
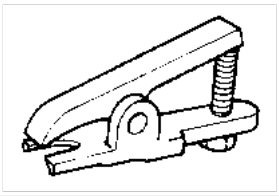
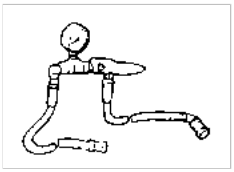
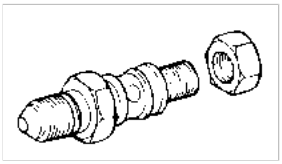
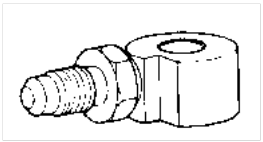
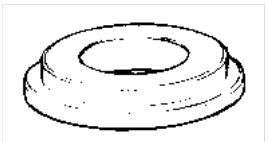
Power Steering

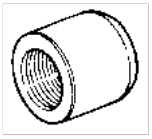
Steering wheel free play	0-30 mm (0-1.1 in.)
Steering angle (Inner wheel)	38°52'
Steering angle (Outer wheel)	33°07'
Stationary steering effort	39.23 N (4 kg, 8.8 lbs)or less
Belt deflection [under 98N (10 kg, 22 lb) force]	7-10 mm
Oil pump relief pressure	5.9 MPa (60 kg/cm2, 853 psi)
Total pinion preload	0.6-1.3 Nm(6-13 kg.cm, 5.2-11.3 lb.in.)
Tie rod swing resistance	2-5 Nm(20-50 kg.cm, 1.4-3.6 lb.ft)

Steering System > General > SPECIAL TOOLS

SPECIAL TOOLS

Tool (Number and name)	Illustration	Use
09517-21400Drift		Removal of pinion gear bearing.
09222-21100Valve stem oil seal installer		Installation of the pinion gear bearing.
09432-21600Bearing installer		Installation of oil pump oil seal.
09434-14200Counter shaft bearing installer		Installation of the valve housing oil seal.

09561-11002 (J-1859-03)Steering wheel puller		Removal of the steering wheel.
09565-11100Pre-load socket		Measurement of pinion gear pre-load and the rod ball joint pre-load.
409565-21000Pinion bearing remover and installer		Removal & installation of pinion gear bearing and oil seal valve body housing.
09555-21000Bar		Removal & installation of the oil seal from gear housing.
09565-21100Yoke plug torque wrench socket		Removal, installation and adjustment of steering gear yoke plug.
09568-34000Ball joint		Separation of the tie rod end ball joint.
09572-21000Oil pressure gauge		Measurement of the oil pressure.(use with 09572-22000, 09572-22100)
09572-22000Oil pressure gauge adapter		Measurement of the pressure.(use with 09572-21000, 09572-22100)
09573-22100Oil pressure gauge adapter		Measurement of the oil pressure.(use with 09572-21000, 09572-22000)
09573-21000Oil seal installer gauge		Installation of the back-up washer and oil seal.(use with 09573-21100, 09573-21200, 09517-11000, 09555-21000)
09573-21100Oil seal installer		Installation of the back-up washer and oil seal.(use with 09573-21000, 09573-21200, 09555-21000)

		
09573-21200Oil seal guide		a. Removal of gear box oil seal and back washer.(Use with 09555-21000) b. Installation of gear box oil seal and back washer.(Use with 09555-21000, 09573-21000)

Steering System > General > SPECIFICATIONS

SPECIFICATIONS

Manual Steering

Shaft and joint type	Collapsible, cross joints (two joints used)
Steering gear type	Rack and pinion
Rack stroke	134 mm (lock to lock : 3.76 turns)

Power Steering

Shaft and joint type	Collapsible, cross joints, tilt column with pop-up
Steering gear type	Rack and pinion
Rack stroke	134 mm
Oil pump type	Vane type
Oil pump displacement	9.6 cm/rev. (0.59 in/rev.)
Oil pump pressure switch operating pressure	1.5-2.0 MPa (15-20 kg/cm, 213-284 psi)

Steering System > General > TIGHTENING TORQUE

TIGHTENING TORQUE

Item	Nm	kg.cm	lb.ft
Steering wheel lock nut	35-45	350-450	26-33
Steering column and shaft assembly mounting bracket	13-18	130-180	10-13
Steering shaft and joint	15-20	150-200	11-15
Pinion gear and joint	15-20	150-200	11-15
Dust cover mounting bolt	4-6	40-60	3-4.4
Gear box mounting bolt	60-80	600-800	44-59
Tie rod end lock nut	50-55	500-550	37-41
Tie rod end ball joint slotted nut	15-34	150-340	11-25
Rack yoke plug nut	50-70	500-700	37-52
Tie rod to rack	80-100	800-1000	59-74

Power Steering Only

Item	Nm	kg.cm	lb.ft
Valve body housing to rack housing assembly	**20-30**	**200-300**	**15-22**
Pressure and return tube mounting clip	8-12	80-120	6-9
Pressure and return tube to gear box	12-18	120-180	9-13
Pinion and return valve assembly to self-locking nut	20-30	200-300	15-22
End plug	50-70	500-700	37-52
Oil pump mounting bracket bolt	20-27	200-270	15-20
Oil pump adjust bolt	25-33	250-330	18-24
Pressure hose mounting bolt(to oil pump)	55-60	550-600	41-44
Oil reservoir mounting bolt	8-12	80-120	6-9
Suction hose mounting clamp(to oil pump suction connector)	3-5	30-50	2.2-3.6
Oil cooler tube mounting bolt	8-12	80-120	6-9

Steering System > General > TROUBLESHOOTING (MANUAL STEERING)

TROUBLESHOOTING (MANUAL STEERING)

Symptom	Probable cause	Remedy
Excessive play of steering wheel	Loose rack support cover	Retighten
	Loose steering gear mounting bolts	Retighten
	Loose or worn tie-rod end	Retighten or replace as necessary
Steering wheel operation is hard	Excessive turning resistance of tie-rod ball joint	Replace
	Excessively tightened rack support cover	Adjust
	Rough turning of inner tie-rod and/or ball joint	Lubricate or replace ball joint
	Distorted rack	Replace
	Worn steering shaft joint and/or body grommet	Replace
	Damaged pinion bearing	Replace
Steering wheel does not return properly	Excessive turning resistance of tie-rod ball joint	Replace
	Excessively tightened rack support cover	Adjust
	Rough turning of inner tie-rod and/or ball joint	Replace
	Worn steering shaft joint and/or body grommet	Correct or replace
	Distorted rack	Replace
	Damaged pinion bearing	Replace

Steering System > General > TROUBLESHOOTING (POWER STEERING)

TROUBLESHOOTING (POWER STEERING)

Symptom	Probable cause	Remedy
Excessive play of steering wheel	Loose rack support cover	Retighten
	Loose steering gear mounting bolts	Retighten
	Loose or worn tie-rod end	Retighten or replace as necessary
Steering wheel operation is heavy (Insufficient power assist)	V-belt slippage	Check
	Damaged V-Belt	Replace
	Low fluid level	Replenish
	Air in the fluid	Bleed air
	Twisted or damaged hoses	Correct the routing or replace
	Insufficient oil pump pressure	Repair or replace the oil pump
	Sticky flow control valve	Replace
	Excessive internal oil pump leakage	Replace damaged parts
	Excessive oil leaks from rack and pinion in gear box	Replace damaged parts
	Distorted or damaged gear box or valve body seal ring	Replace
The steering wheel does not return properly	Excessive turning resistance of tie-rod end	Replace
	Excessively tightened rack support cover	Adjust
	Rough turning or inner tie-rod and/or ball joint	Replace
	Loose mounting of gear box to gear box mounting bracket	Retighten
	Worn steering shaft joint and/or body grommet	Correct or replace
	Distorted rack	Replace
	Damaged pinion bearing	Replace
	Twisted or damaged hoses	Reroute or replace
	Damaged oil pressure control valve	Replace
	Damaged oil pump input shaft bearing	Replace

Symptom	Probable cause
Noise	Hissing Noise in Steering Gear There is some noise in all power steering systems. One of the most common is a hissing sound when the steering wheel is turned and the car is not moving. This noise will be most evident when turning the wheel while the brakes are applied. There is no relationship between this noise and steering performance. Do not replace the valve unless the "hissing" noise is extremely objectionable. A replaced valve will also have a slight noise, and is not always a cure for the condition.

Symptom	Probable cause	Remedy

Rattling or chucking noise in rack and pinion	Interference with hoses from vehicle body	Reroute
	Loose gear box bracket	Retighten
	Loose tie-rod end and/or ball joint	Retighten
	Worn tie-rod end and/or ball joint	Replace
Noise in the oil pump	Low fluid level	Replenish
	Air in the fluid	Bleed air
	Loose pump mounting bolts	Retighten

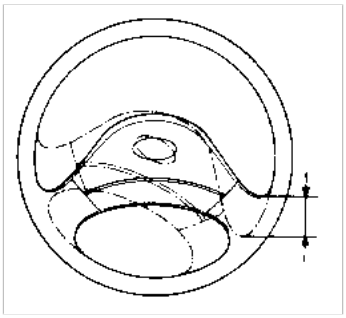
A slight "grinding noise" may be heard immediately after the engine is started in extremely cold weather conditions (below-20°C) : This is due to power steering fluid characteristics in extreme cold conditions and is not a malfunction.

Steering System > Manual Steering System > SERVICE ADJUSTMENT PROCEDURE

SERVICE ADJUSTMENT PROCEDURE

CHECKING STEERING WHEEL FREE PLAY

1. Start the engine and with the steering wheel in the straight ahead position, apply a force of 5 N (1.1 lb) while turning the steering wheel.
2. Measure the play at the circumference of the steering wheel.

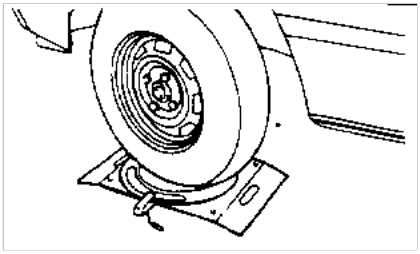


3. If the play exceeds the standard value, inspect the contact of the steering shaft and tie rod ends.

CHECKING STEERING ANGLE

1. Place the front wheel on a turning radius gauge and measure the steering angle.

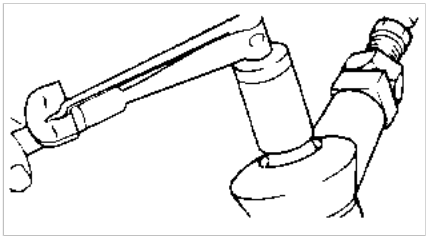
Steering angle	Standard value
Inner wheel	38°52'
Outer wheel	33°07'



2. If the measured value is not within the standard value, adjust the linkage.

CHECKING TIE ROD END BALL JOINT STARTING TORQUE

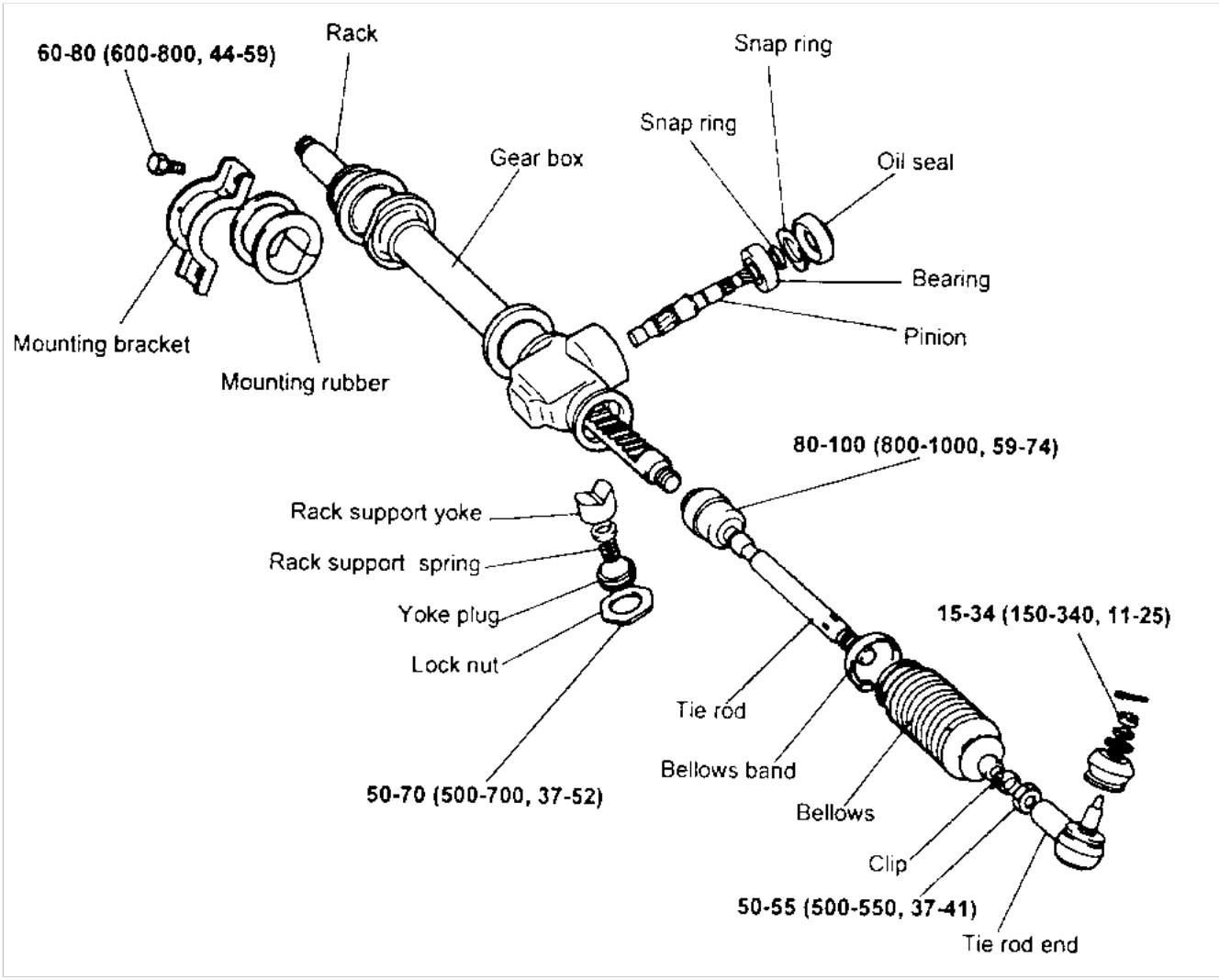
1. Mount two nuts on the ball joint, and then measure the starting torque.



2. If the starting torque exceeds the standard value, replace the tie rod end.
   Even if the starting torque is below limit of the standard value, the ball joint may be reused unless it has drag and excessive play.

Steering System > Manual Steering System > Manual Steering Gear Box > COMPONENTS

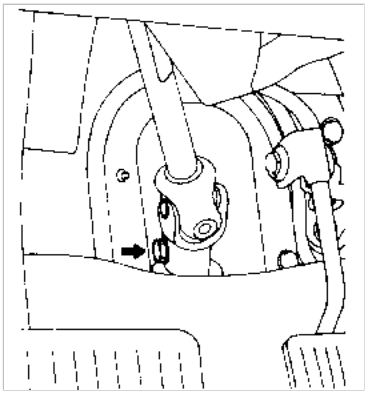
COMPONENTS



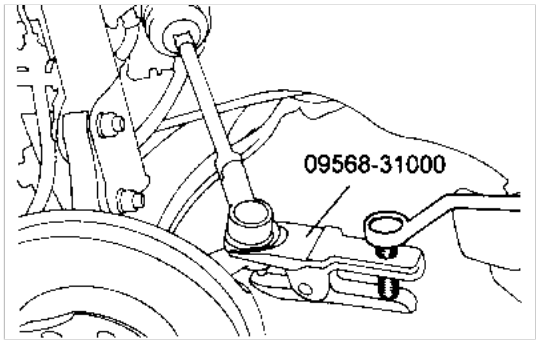
Steering System > Manual Steering System > Manual Steering Gear Box > DISASSEMBLY

DISASSEMBLY

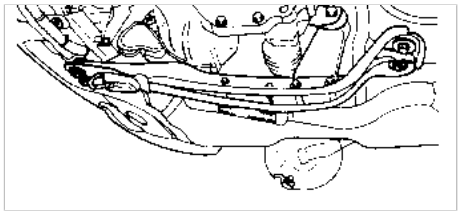
1. Remove the wheel and tire assembly.
2. Remove the coupling bolt.



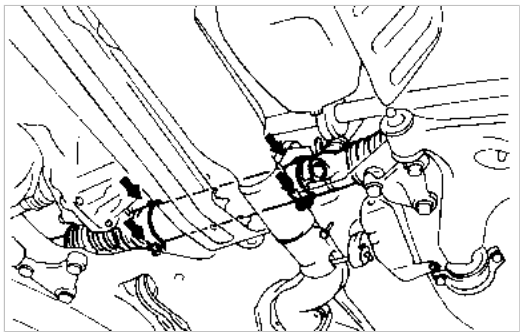
3. Remove the tie rods from the knuckle arms, using the Special Tool (09568-31000).



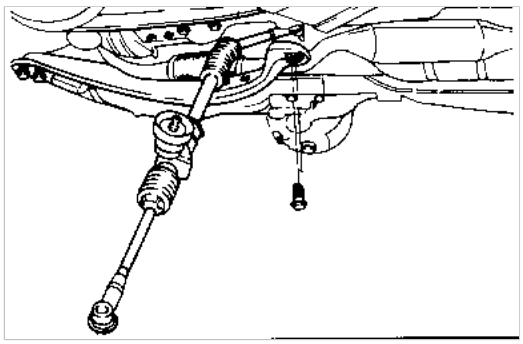
4. Remove the rear roll stopper bracket assembly and then remove the rear mounting bolts (2EA) and loosen half way the front mounting bolts (2EA) of the center member assembly.



5. Remove the steering gear box mounting clamp.

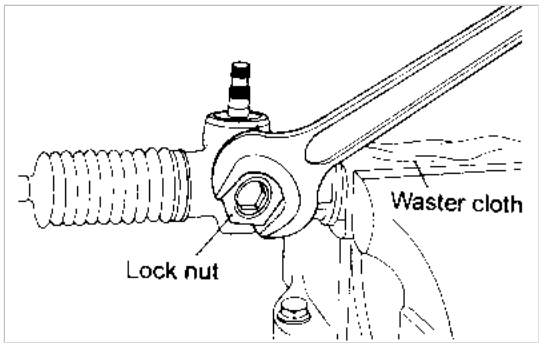


6. Move the steering gear and linkage assembly toward the right side of the vehicle and then pull it out from the left side of the center member assembly.

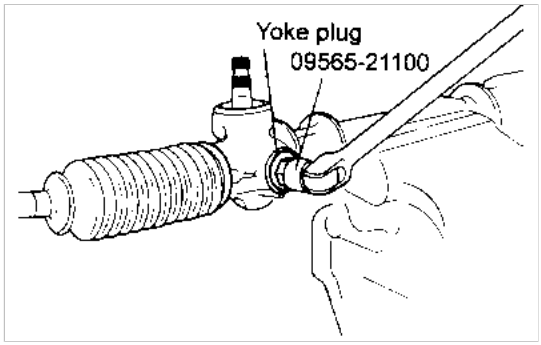


Before disassembly, measure the rack starting force and pinion starting torque in the neutral (straight ahead) position for reference at reassembly.

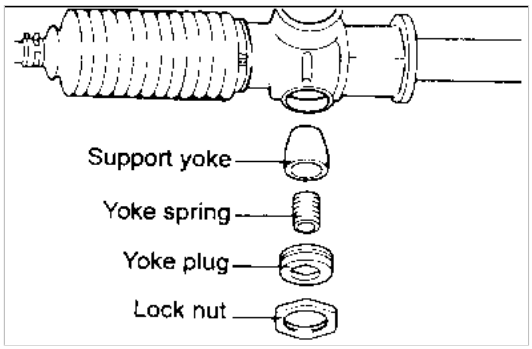
7. Clean the rack and pinion assembly and mount it in a soft-jawed vise.
   When mounting the rack in the vise, wrap a cloth around the rack and be careful not to damage the rack when tightening the vise.
8. Remove the tie rod assembly.
9. Remove the lock nut from the yoke plug.



10. Using Special Tool (09565-21100), remove the yoke plug.

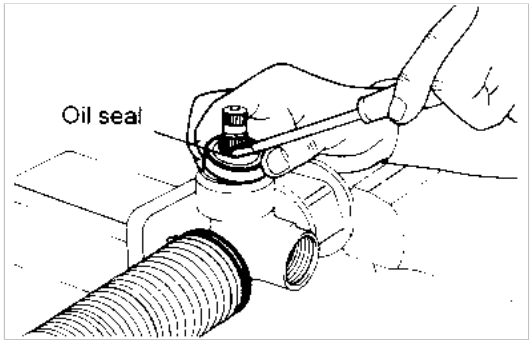


11. Remove the yoke spring, cushion rubber and support yoke from the gear box.

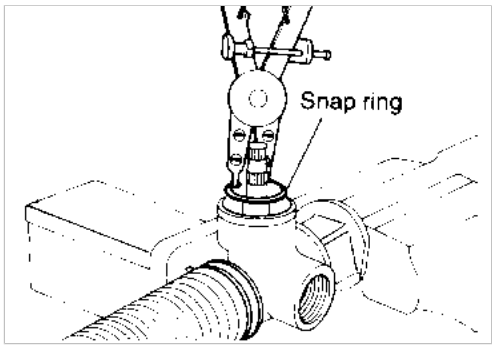


12. Remove the dust cap.

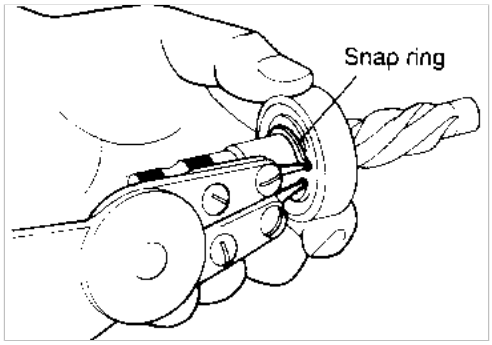
13. Remove the oil seal from the gear box.



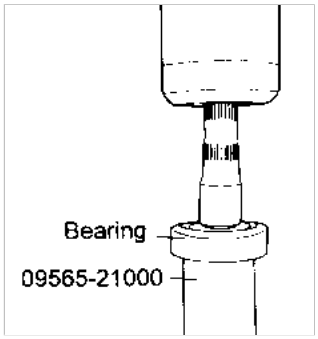
14. Remove the snap ring from the gear box. Remove the pinion together with the bearing.



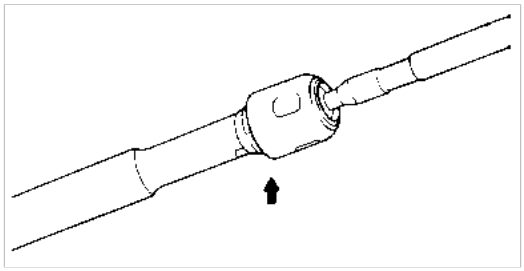
15. Remove the bearing retainer snap ring from the pinion.



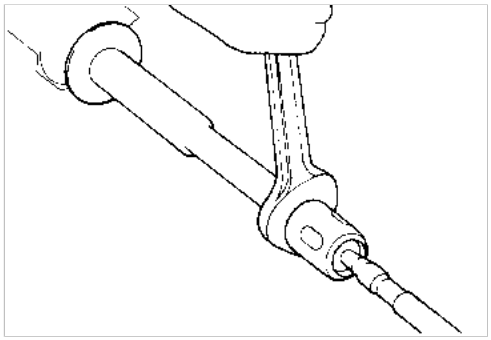
16. Using Special Tool (09565-21000), remove the bearing from the pinion.



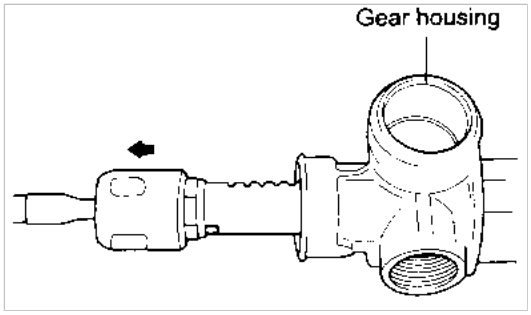
17. Remove the bellows.
18. Using a chisel, unstake the right side rack end nut.



19. Move the rack all the way towards the rack housing and hold the toothed portion of the rack in a soft-jawed vise. Loosen the tie rod end and remove the tie rod assembly from the rack.

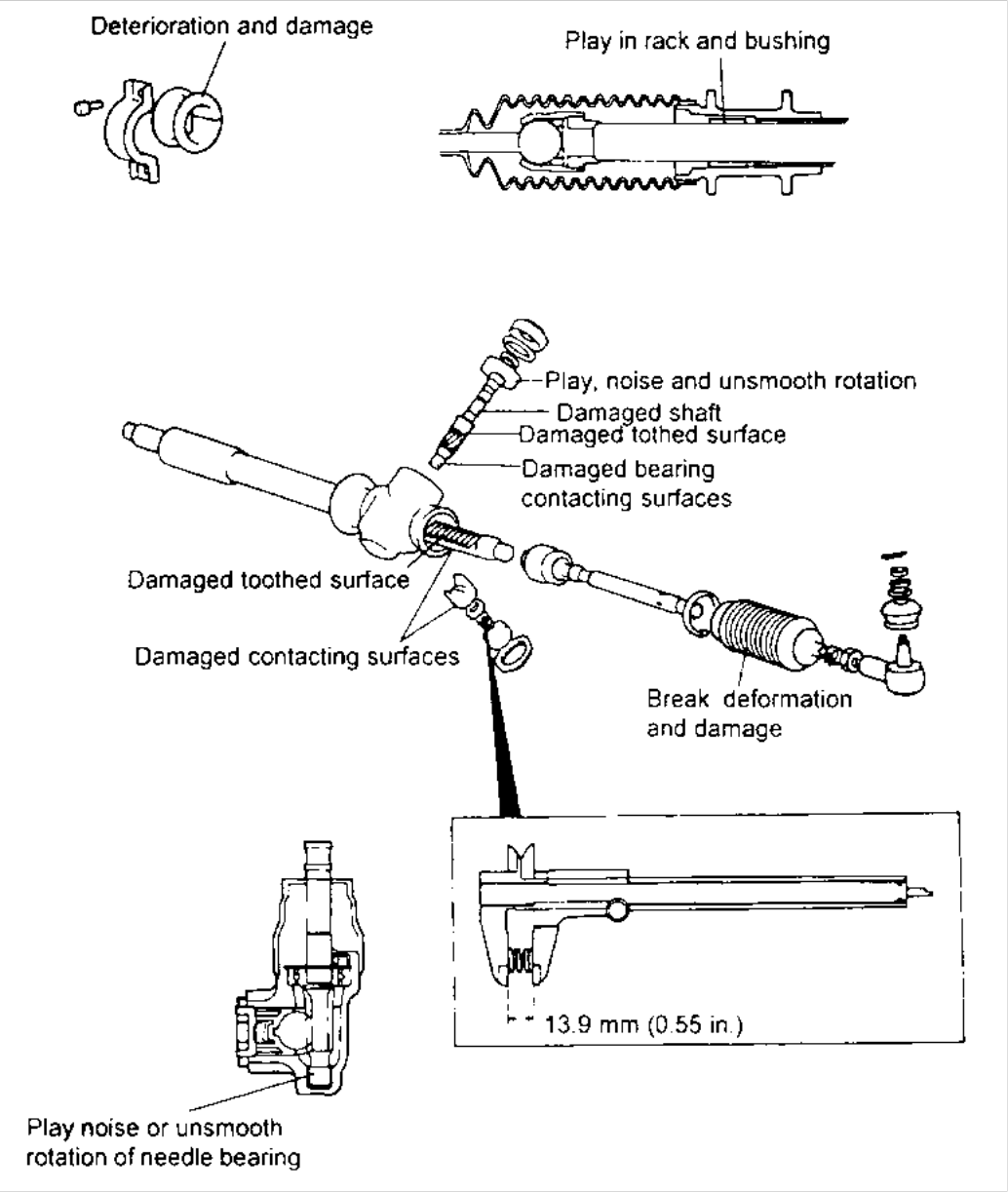


20. Remove the rack from the gear housing.
    To keep from damaging the bushing with the rack teeth, remove the rack from the left side.



Steering System > Manual Steering System > Manual Steering Gear Box > INSPECTION

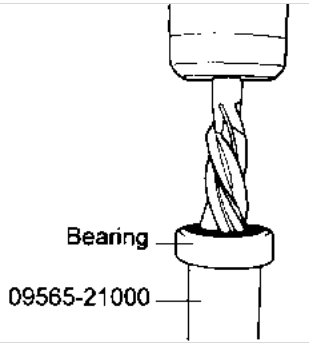
INSPECTION



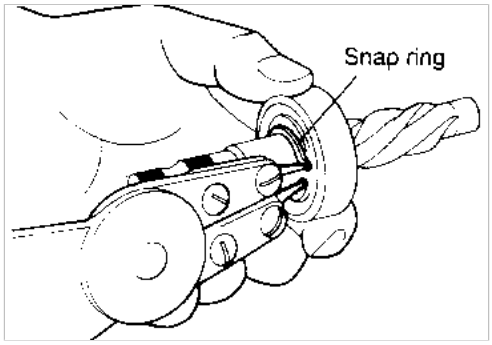
Steering System > Manual Steering System > Manual Steering Gear Box > REASSEMBLY

REASSEMBLY

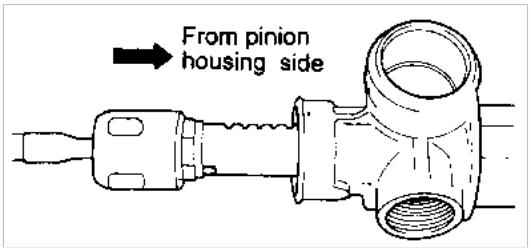
1. Prior to reassembly, clean all gear box components in a suitable solvent.
2. Press fit the bearing to the pinion with Special Tool (09565-21000).



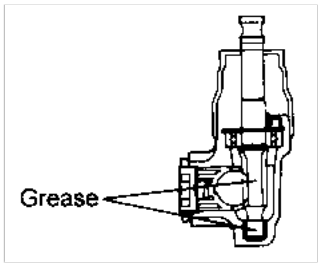
3. Install the snap ring on the pinion.



4. Apply grease to the rack, pinion, bushing, needle roller bearing and other moving surfaces.
   Do not seal the air passage in the housing bushing with grease.
5. After inserting the rack into the gear housing, install the pinion gear in mesh with the rack.



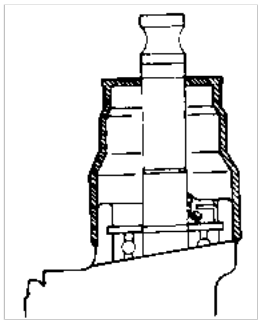
   a. Make sure that the rack is inserted into the gear housing from the left side.
   b. Wipe away excessive grease.



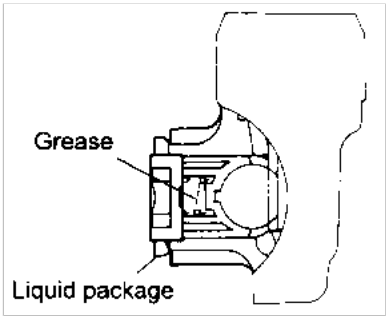
6. Select and install the appropriate type of snap ring to minimize the play in the axial direction on the pinion.

Thickness mm (in.)	Identification color
1.590 (0.063)	Blue
1.665 (0.066)	White
1.740 (0.069)	Yellow

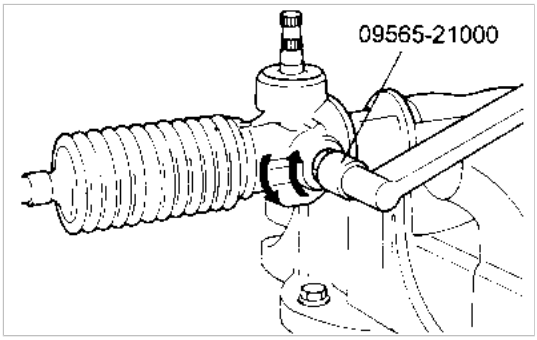
7. Apply grease to the lip of the oil seal before installing the oil seal in the gear box.
   Be sure to use a new oil seal.



8. Install the support yoke, cushion rubber, spring and yoke plug to the pinion gear box.
   Apply grease to the cupped portion of the support yoke.

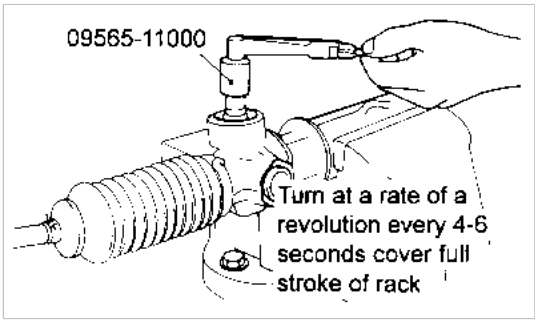


9. Adjust the yoke plug, with Special Tool (09565-21000). Tighten the yoke plug to 11 Nm (112 kg.cm, 8 lb.ft) and then back off 30°-60°. Secure the yoke plug with the lock nut.
   a. Adjust the yoke plug with the rack in the neutral position.
   b. Apply a sealer between the lock nut and the housing.

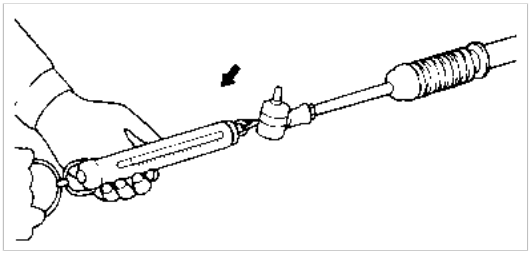


10. Install the tie rod end and bellows. Use and stake a new locking plate at each end.
11. The combined preload of the pinion (with bellows and grease) should be measured by turning the pinion at a rate of one revolution every 4-6 seconds with Special Tool (09565-11100). The rack starting force should also be measured.
    The pinion preload should be measured over the full stroke of the rack.

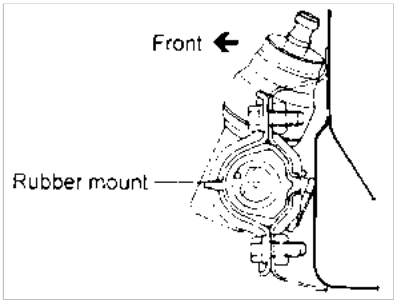
Total pinion preload	
±180° or less from neutral	0.4-1.1 Nm (4-11 kg.cm, 3.5-9.5 lb.in)
±180° or more from neutral	0.3-1.6 Nm (3-16 kg.cm, 2.4-14 lb.in)



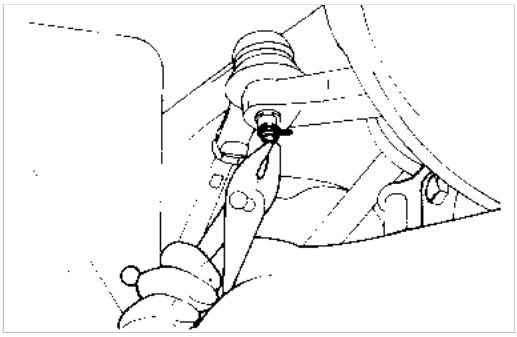
12. If the measured values are out of specification, replace the cushion rubber and yoke spring and readjust in accordance with step 9.



13. Install the rubber mount on the gear box as shown.

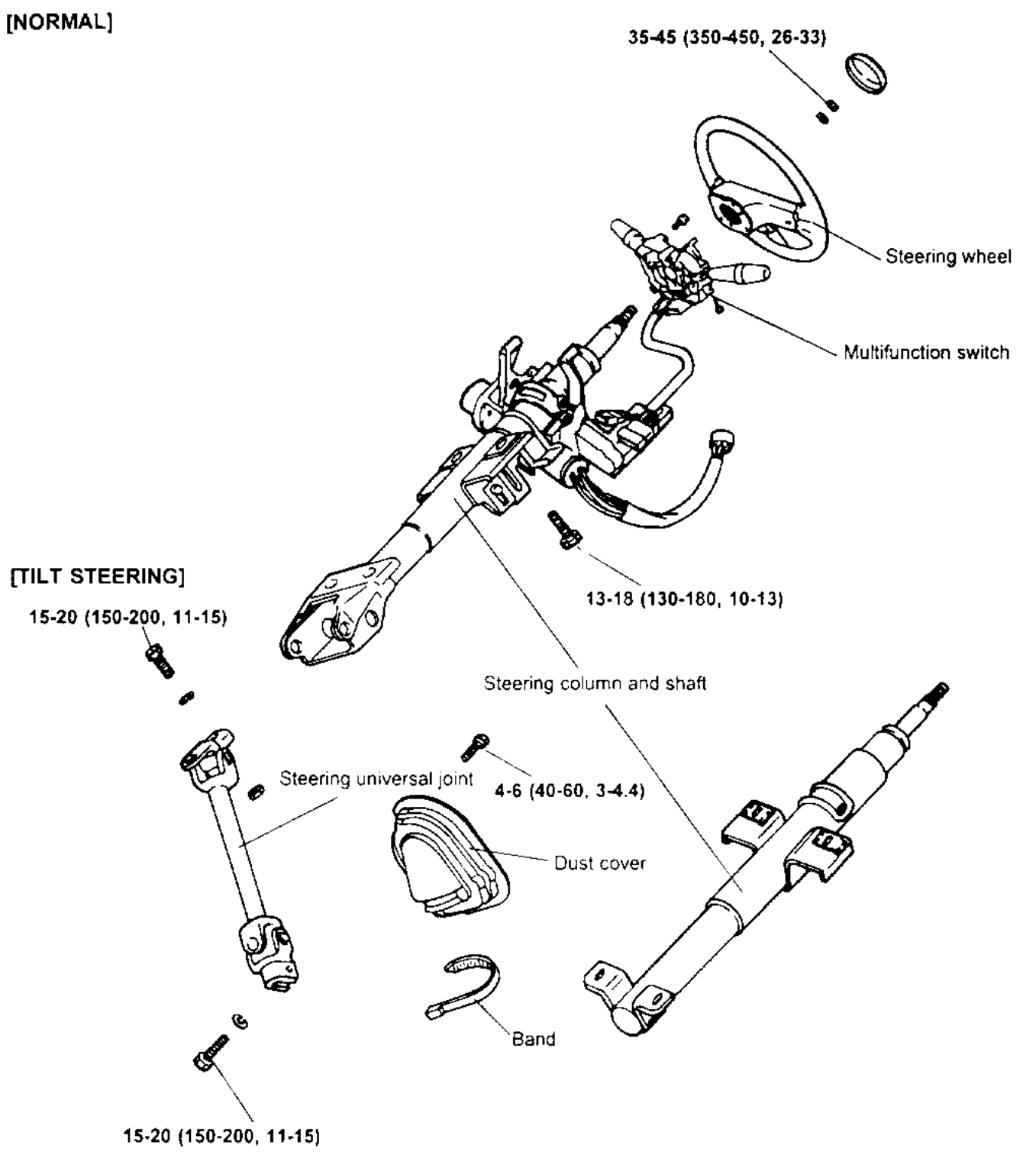


14. Install the pinion in the coupling and install the rack and pinion assembly to the crossmember.
    Make sure that the rack and pinion assembly is not tilted or twisted when installed. Care must be taken not to apply excessive torque, as it distorts the rack and pinion assembly and affects the steering effort.
15. Tighten the coupling bolt.
16. Install the tie rods on the knuckle.
    Align the slot of the nut with the split pin hole of the stud and tighten the nut to specifications.
17. Adjust the wheel alignment.
18. After confirming that the bellows are not twisted, install the clip on the end of the bellows.



Steering System > Manual Steering System > Steering Column/Shaft > COMPONENTS

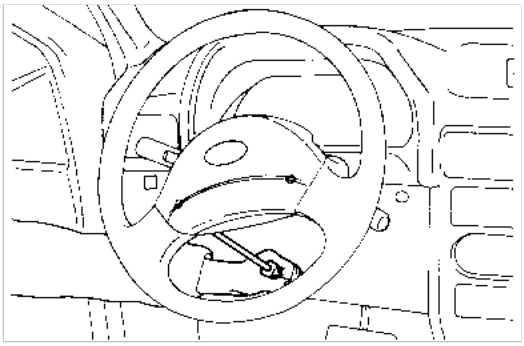
COMPONENTS



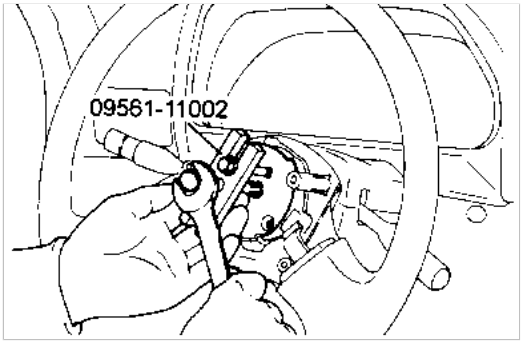
Steering System > Manual Steering System > Steering Column/Shaft > DISASSEMBLY

DISASSEMBLY

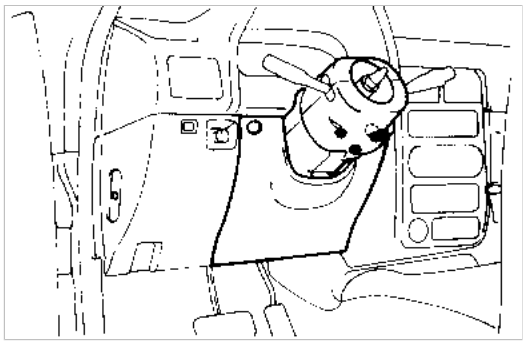
1. Remove the horn cover assembly.
2. Remove the upper and lower horn plate, and disconnect the horn button connector.



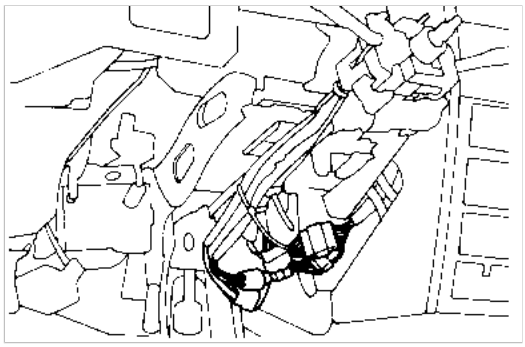
3. Remove the steering wheel lock nut.
4. After making alignment marks on the steering shaft and wheel, remove the steering wheel, using the Special Tool (09561-11002).
   Do not hammer on the steering wheel to remove it: doing so may damage the steering column.



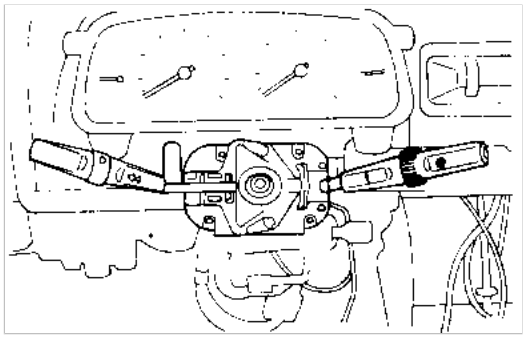
5. Remove the lower crash pad, and disconnect the rheostat connector.
6. Remove the column shroud.



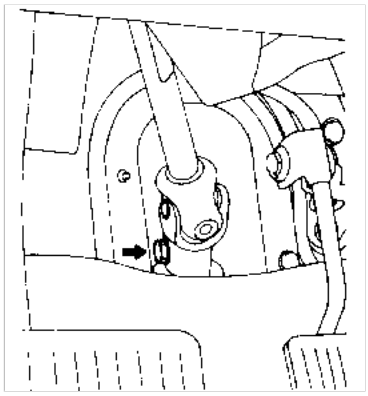
7. Disconnect the connectors.



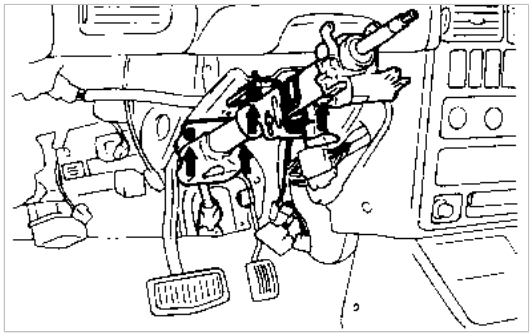
8. Remove the multifunction switch.



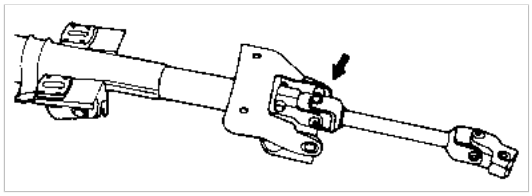
9. Remove the bolt coupling the universal joint and pinion.



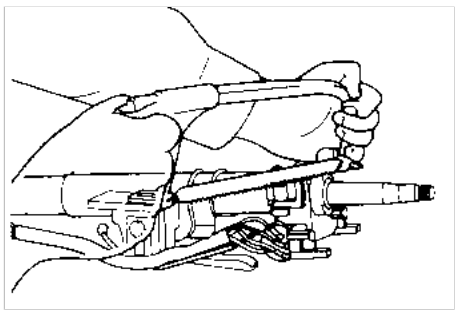
10. After removing the bolts used to secure the column bracket to the frame, remove the steering column and shaft assembly.



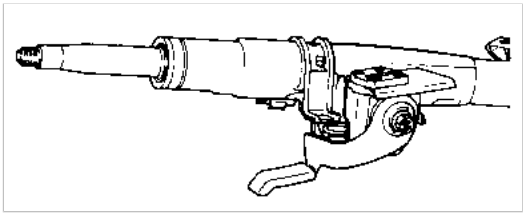
11. Loosen the column shaft to universal joint bolt, and remove the universal joint.



12. If it is necessary to remove the steering lock, cut a slot in the mounting screw heads and bracket with a hack saw. Loosen the screws with a flat-blade screwdriver to remove the steering wheel lock.
When the steering wheel lock is reinstalled, the steering wheel lock assembly and screws should be replaced with new parts.



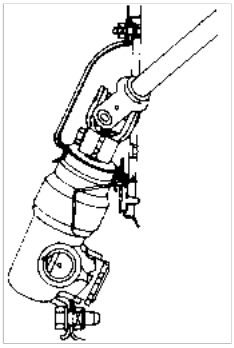
13. If necessary, remove the tilt steering lever and mounting bracket. (Tilt steering only)
Do not disassemble the steering column and shaft.



Steering System > Manual Steering System > Steering Column/Shaft > INSPECTION

INSPECTION

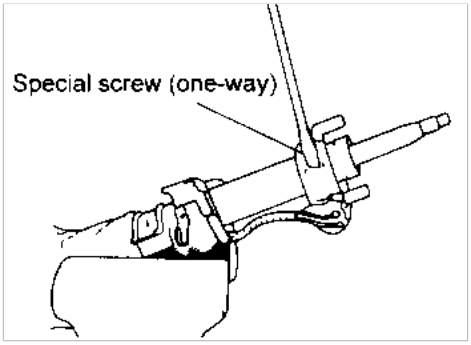
1. Check the steering column and shaft for damage and distortion.
2. Check the joints for play, damage or rough movement.
3. Check the tilt bracket and spring for cracks and damage.
4. Check that the steering lock mechanism operates properly.
5. Check the dust cover for cracks or damage.
   If necessary, replace.



Steering System > Manual Steering System > Steering Column/Shaft > REASSEMBLY

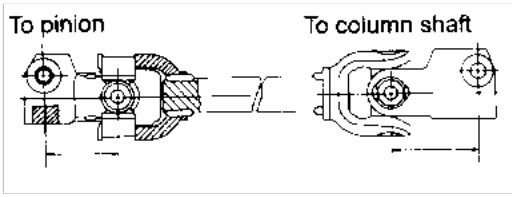
REASSEMBLY

1. Assembly is the reverse of the disassembly procedure.
2. Align the steering lock with the column boss and insert the ignition key to verify the steering lock operation before tightening the lock to specifications.
   Use the special one way screws to install the lock.



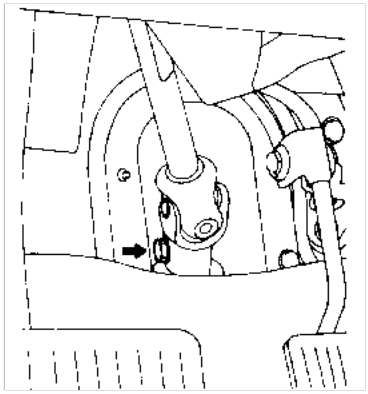
[NORMAL]

1. Install the universal joint to the column shaft.
   Make sure that the joint is installed in the correct direction as illustrated. In securing, be sure that the bolt is installed correctly to the gear box pinion groove and that the end of the bolt is protruded on the opposite side of the universal joint yoke.



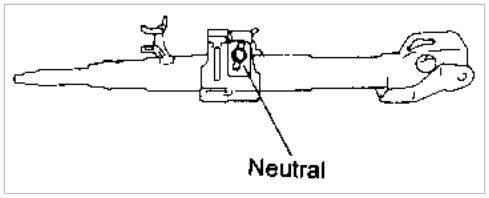
2. Align the universal joint to the pinion together with the column shaft and tighten it temporarily.
3. Mount the steering column shaft to the mounting frame.
   When installing, be careful not to distort the steering column.
4. Tighten the bolt coupling to the universal joint with gear box pinion.

5. Install the multifunction switch and connect the connectors.
6. Install the column shroud.
7. Install the lower crash pad.
8. Install the steering wheel.
   When the steering wheel is installed, make sure that the alignment marks are in alignment and that the steering wheel is in the straight ahead position.

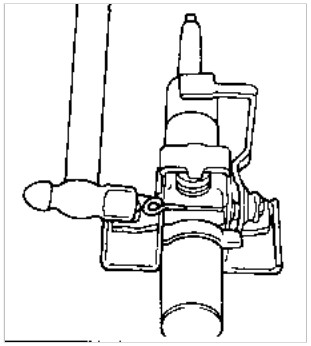


[TILT STEERING: Canada only]

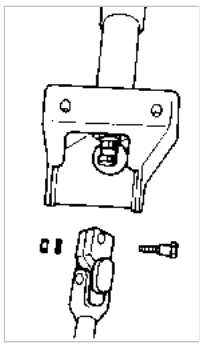
1. Install the universal joint to the gear box.
   In case of the tilt steering column, please observe the following. Failure to observe these instructions could be a cause of the deformation of the tilt bracket which may result in heavy tilt lever operation and inoperative pop-up.



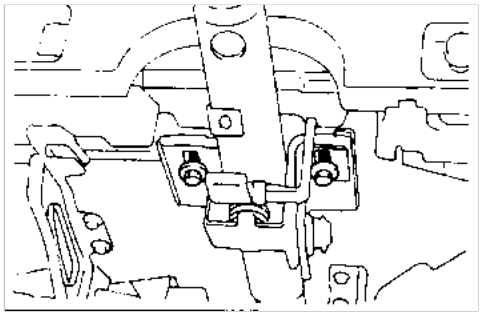
2. Before installation, make sure if a pin hole exists on the distance bracket.
   (1) If it does, lock the tilt around a neutral position and install a pin stopper (P/NO.: 56357-24100) to the hole. And then, unlock the tilt lever.
   (2) If not, lock the tilt around a neutral position.



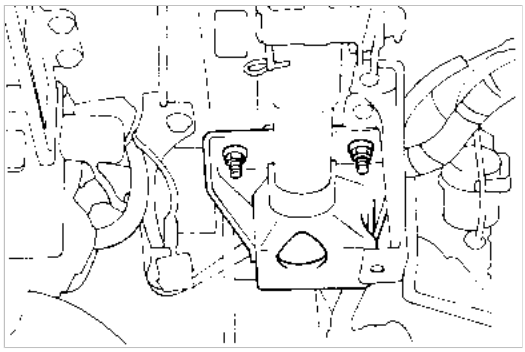
3. Install the bolt coupling to the column shaft with the U-joint.



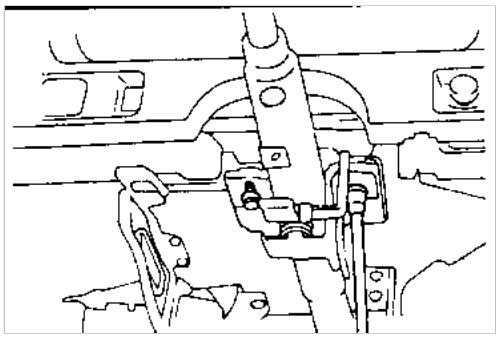
4. Install two mounting bolts temporarily.



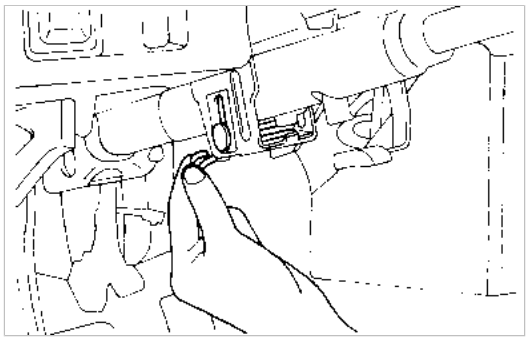
5. Install two mounting nuts.



6. Tighten the two mounting bolts completely.

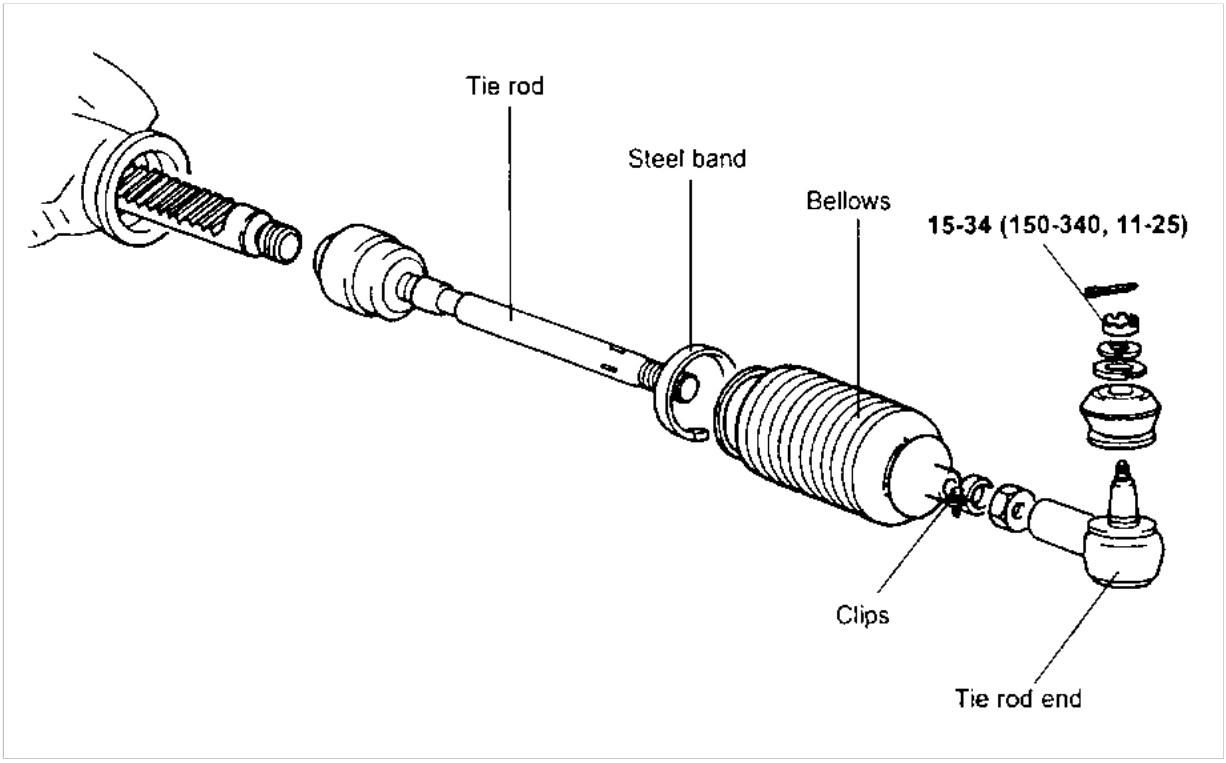


7. If the pin stopper is installed, pull it off in a low tilt position.



Steering System > Manual Steering System > Tie Rod > COMPONENTS

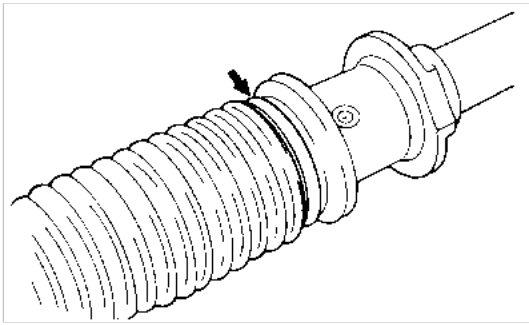
COMPONENTS



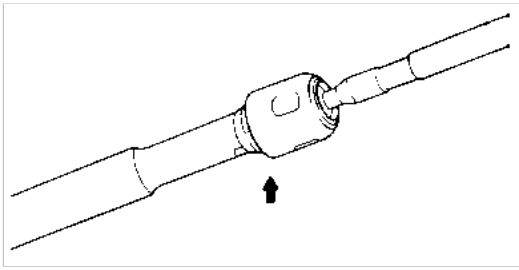
Steering System > Manual Steering System > Tie Rod > DISASSEMBLY

DISASSEMBLY

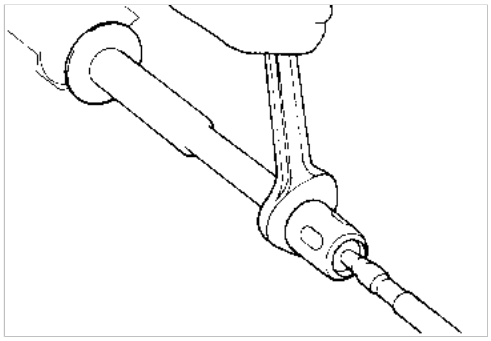
1. Mount the rack and pinion assembly in a vise.
   When mounting the rack in the vise, wrap a cloth around the rack and be careful not to damage the rack when tightening the vise.
2. Cut the bellows mounting band and remove the bellows.



3. Unstake the tie rods with a chisel.
   If the rack is to be removed, remove the left side tie rod end joint from the knuckle.



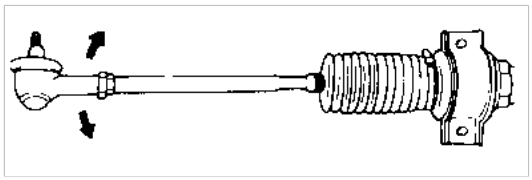
4. After moving the rack fully to the right, mount the rack in a soft jawed vise, and remove the left tie rod.
5. Remove the right tie rod by the same procedures described in steps (3) and (4).



Steering System > Manual Steering System > Tie Rod > INSPECTION

INSPECTION

1. Damaged or distorted tie rods and ends.
2. Damaged or distorted bellows and dust cover.
3. Tie rod oscillating torque.
4. Tie rod ball joint operation and axial play.

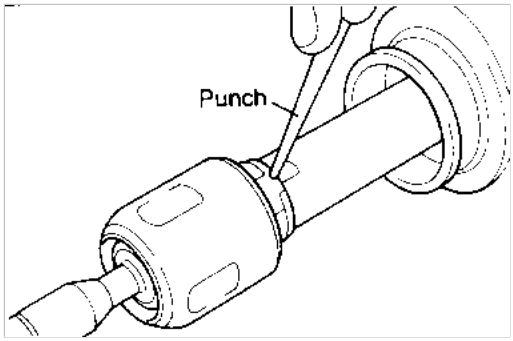


Steering System > Manual Steering System > Tie Rod > REASSEMBLY

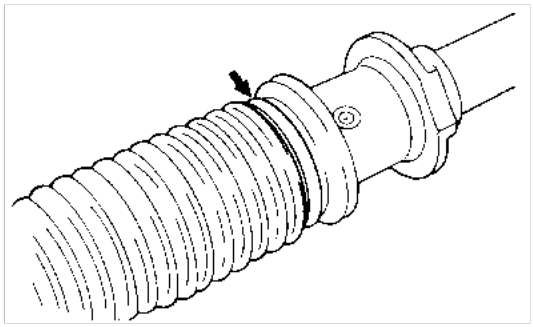
REASSEMBLY

Install the rack and pinion, and tie rods as an assembly to the vehicle.

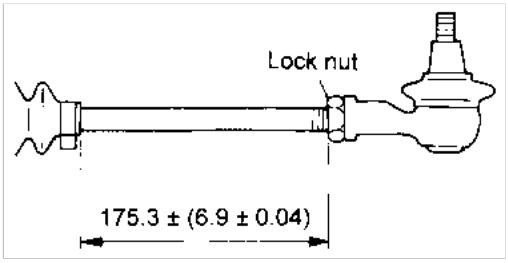
1. After installing the tie rods to the rack to the specified torque, secure by staking the rack keyway.



2. After installing the bellows on the gear housing, secure with a mounting band.
   The bellows mounting band should be installed after adjustment of toe-in.



3. Measure the rack stroke.
   The full stroke of the rack determines the maximum steering angle.
4. Adjust the length of the tie rods and tighten the lock nut.



Steering System > Manual Steering System > Tie Rod > REMOVAL

REMOVAL

Remove the rack and pinion and tie rods from the vehicle as an assembly.

Steering System > Mechanical Power Steering System > AIR BLEEDING

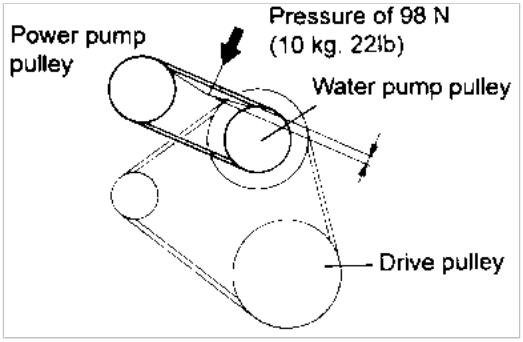
AIR BLEEDING

1. Disconnect the high tension cable and then, while operating the starting motor intermittently (for 15-20 seconds), turn the steering wheel all the way to the left and to the right five or six times.
   a. During air bleeding, replenish the fluid supply so that the level never falls below the lower position of the filter.
   b. If air bleeding is done while the vehicle is idling, the air will be broken up and absorbed into the fluid. Be sure to do the bleeding only while cranking.
2. Connect the high tension cable, and start the engine (idling).
3. Turn the steering wheel to the left and the right until there are no air bubbles in the oil reservoir.
   Do not hold the steering wheel turned all the way to either side for more than ten seconds.
4. Confirm that the fluid is not milky, and that the level is up to the position specified on the level gauge.
5. Confirm that there is little change in the surface of the fluid when the steering wheel is turned left and right.
   a. If the surface of the fluid changes considerably, air bleeding should be done again.
   b. If the fluid level rises suddenly when the engine is stopped, it indicates that there is still air in the system.
   c. If there is air in the system, a jingling noise may be heard from the pump and the control valve may also produce unusual noises. Air in the system will shorten the useful life of the pump and other parts.

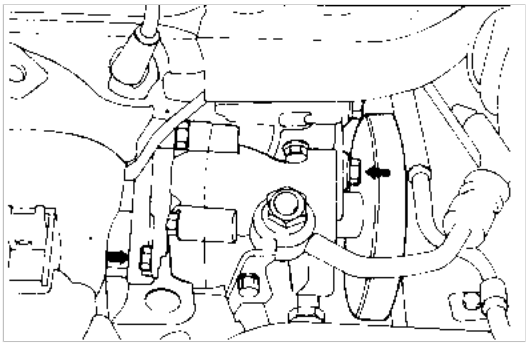
Steering System > Mechanical Power Steering System > CHECKING POWER STEERING BELT TENSION

CHECKING POWER STEERING BELT TENSION

1. Depress the V-belt by applying a pressure of 98N (10kg, 22lb) at the specified point, and measure the deflection to confirm that it is within the standard value.



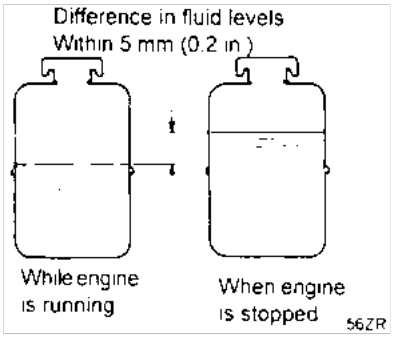
2. To adjust the belt tension, loosen the oil pump mounting bolts, move the oil pump, and then retighten the bolts.
   Be sure to run the engine momentarily prior to rechecking the belt deflection.



Steering System > Mechanical Power Steering System > CHECKING POWER STEERING FLUID LEVEL

CHECKING POWER STEERING FLUID LEVEL

1. Position the vehicle on a level surface.
2. Start the engine. With the vehicle kept stationary, turn the steering wheel several times continuously to raise the fluid temperature from 50-60°C (122-140°F).
3. With the engine at idle, turn the steering wheel fully clockwise and counterclockwise several times.
4. Make sure there is no foaming or cloudiness in the reservoir fluid.
5. Stop the engine to check for a difference in fluid level between a stationary and a running engine.
   a. If the fluid level varies 5 mm (0.2 in.) or more, bleed the system again.



   b. If the fluid level suddenly rises after stopping the engine, insufficient bleeding is indicated.
   c. Incomplete bleeding will produce a chattering sound in the pump and a noise in the flow control valve, decreasing durability of the pump.

Steering System > Mechanical Power Steering System > REPLACING POWER STEERING FLUID

REPLACING POWER STEERING FLUID

1. Jack up the front wheels and support with rigid racks.
2. Disconnect the return hose from the oil reservoir and plug the oil reservoir.
3. Connect a vinyl hose to the disconnected return hose, and drain the oil into a container.
4. Disconnect the high-tension cable at the ignition coil side. While operating the starter motor intermittently, turn the steering wheel all the way to the left and then to the right several times to drain the fluid.
5. Securely connect the return hoses, and fill the oil reservoir with the specified fluid.
6. Bleed the system.

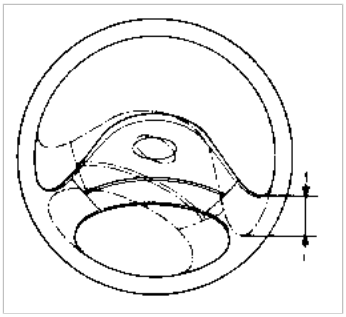
Automatic transmission fluid DEXRON II type

Steering System > Mechanical Power Steering System > SERVICE ADJUSTMENT PROCEDURE

SERVICE ADJUSTMENT PROCEDURE

CHECKING STEERING WHEEL FREE PLAY

1. Start the engine and with the steering wheel in the straight ahead position, apply a force of 5 N (1.1 lb) while turning the steering wheel.
2. Measure the play at the circumference of the steering wheel.

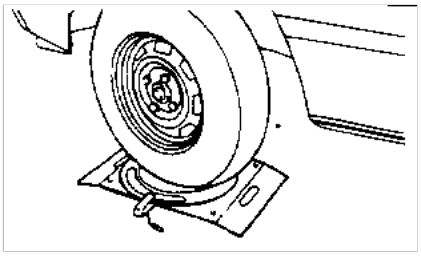


3. If the play exceeds the standard value, inspect the contact of the steering shaft and tie rod ends.

CHECKING STEERING ANGLE

1. Place the front wheel on a turning radius gauge and measure the steering angle.

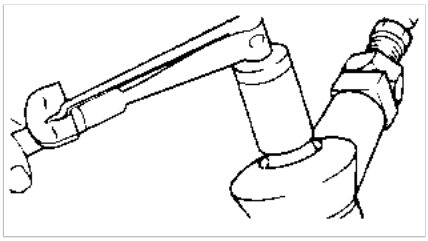
Steering angle	Standard value
Inner wheel	38°52'
Outer wheel	33°07'



2. If the measured value is not within the standard value, adjust the linkage.

CHECKING TIE ROD END BALL JOINT STARTING TORQUE

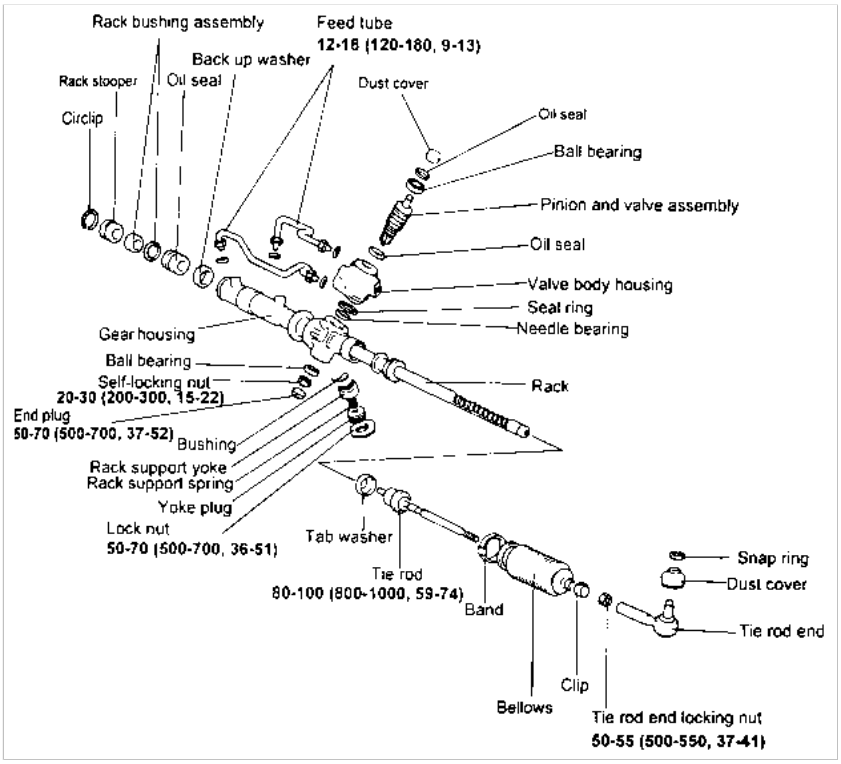
1. Mount two nuts on the ball joint, and then measure the starting torque.



2. If the starting torque exceeds the standard value, replace the tie rod end.
   Even if the starting torque is below limit of the standard value, the ball joint may be reused unless it has drag and excessive play.

Steering System > Mechanical Power Steering System > Power Steering Gear Box > COMPONENTS

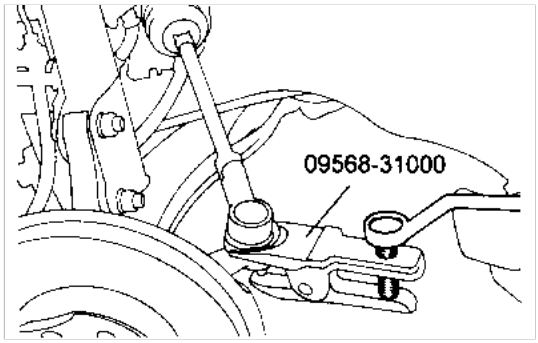
COMPONENTS



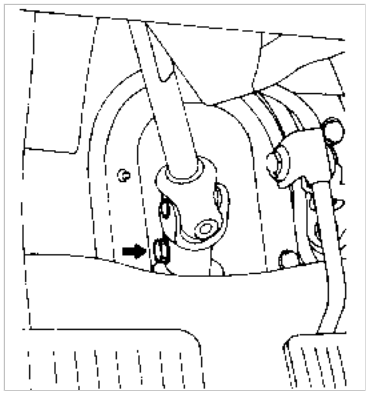
Steering System > Mechanical Power Steering System > Power Steering Gear Box > DISASSEMBLY

DISASSEMBLY

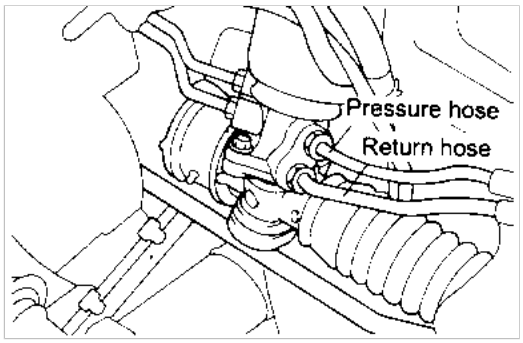
1. Using special tool, disconnect the tie rod end from the knuckle.



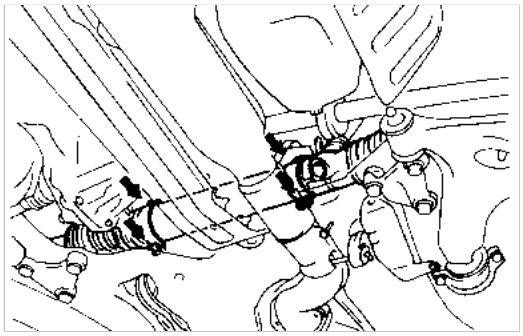
2. Disconnect the coupling bolt of universal joint assembly from the gear box.



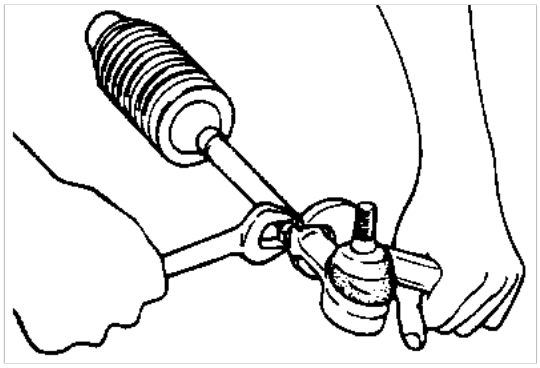
3. Drain the fluid.
4. Disconnect the pressure and return hoses from the gear box.
5. Remove the band from the steering joint cover.



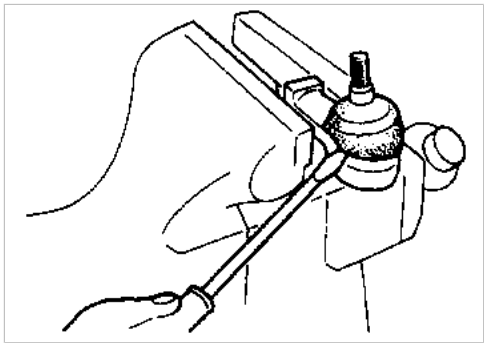
6. Remove the gear box mounting bolts.
7. Remove the center member.
8. Remove the stabilizer bar.
9. Pull the gear box out toward the side of the vehicle.
   When the gear box is to be removed, pull it out carefully and slowly so as not to cause damage to the boots.



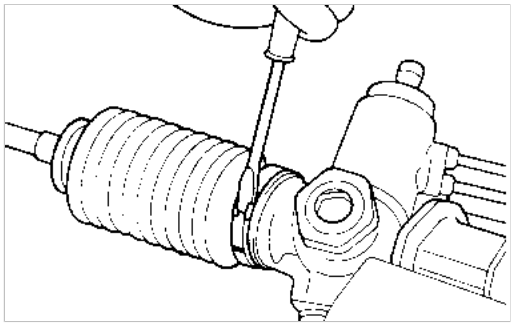
10. Remove the tie rod end from the tie rod.



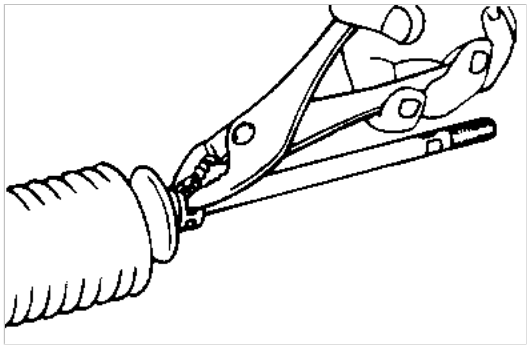
11. Remove the dust cover from the ball joint.



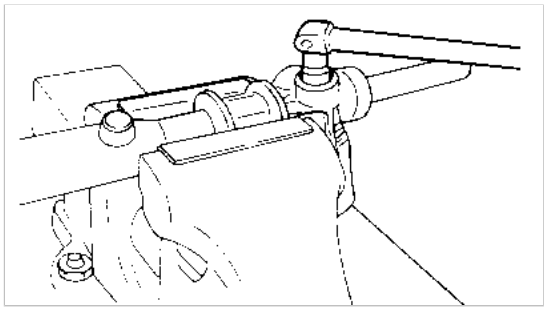
12. Remove the bellows band.



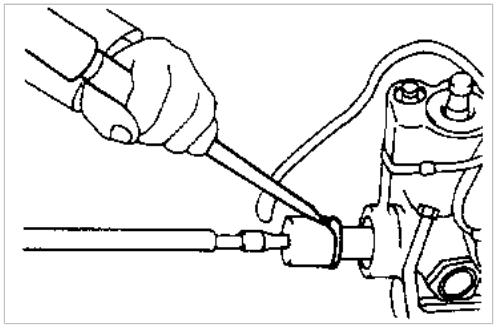
13. Remove the bellows clip.
14. Pull the bellows out toward the tie rod.
    Check for rust on the rack when the bellows are replaced.
15. Remove the feed tube from the gear housing.



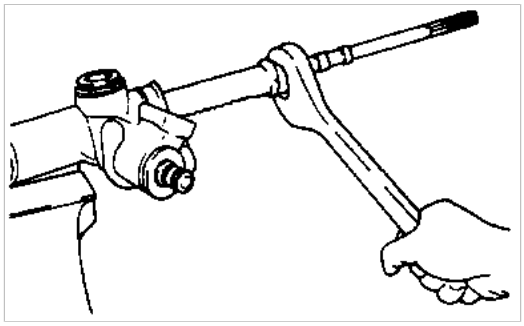
16. While moving the rack slowly, drain the fluid from the gear housing.
17. Remove the end plug.
18. With the pinion turned clockwise until the rack is locked, remove the self-locking nut.



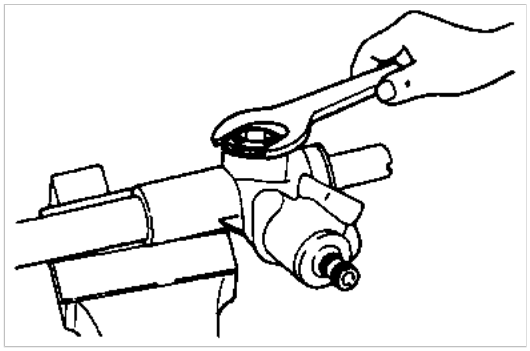
19. Unstake the tab washer between the tie rod and rack with a chisel.



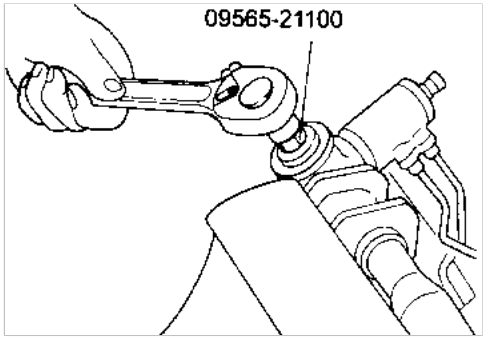
20. Remove the tie rod from the rack.
    Remove the tie rod from the rack, taking care not to twist the rack.



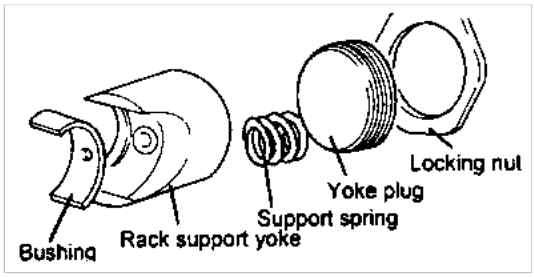
21. Remove the yoke plug locking nut.



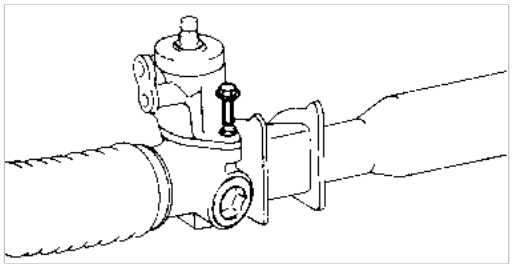
22. Using Special Tool (09565-21100), remove the yoke plug.



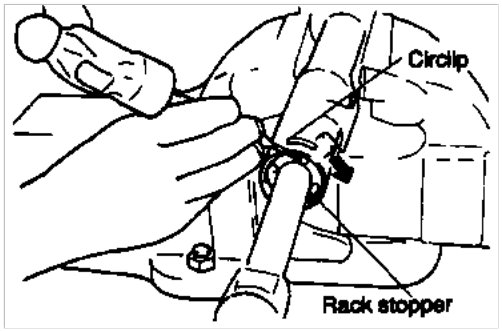
23. Remove the rack support spring, yoke and bushing from the gear box.



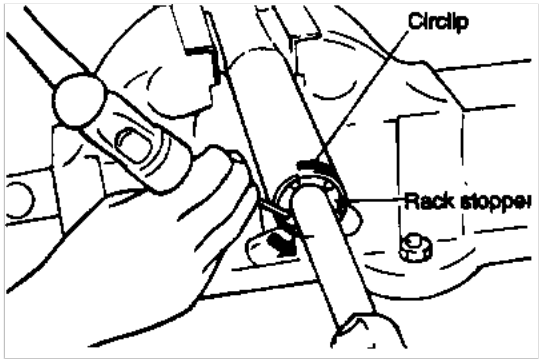
24. Remove the valve body housing by loosening the two bolts.



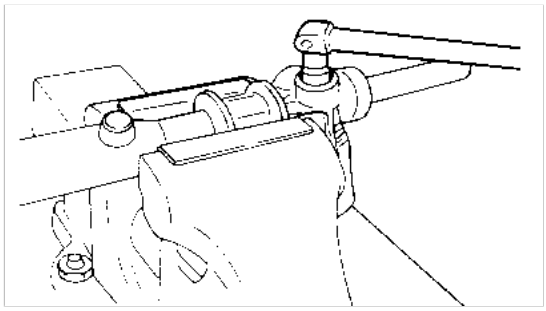
25. Turn the rack stopper clockwise until the end of the circlip comes out of the slot in the gear housing.



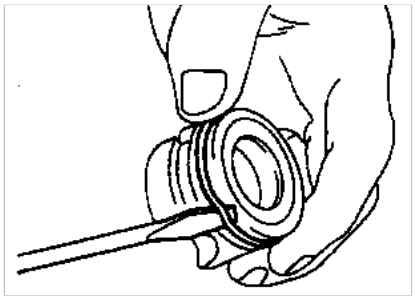
26. When the end of the circlip comes out from the notched hole of the housing rack cylinder, turn the rack stopper counter clockwise and remove the circlip.



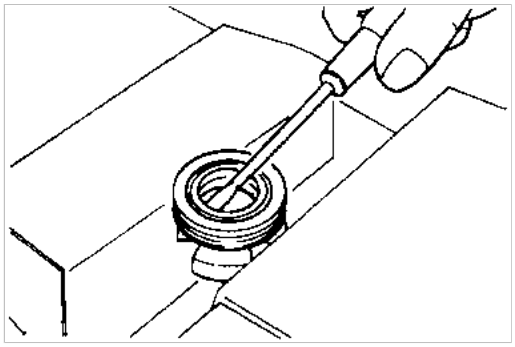
27. Remove the rack stopper, rack bushing and rack from the gear housing by moving them toward the pinion side.
When the rack has been removed, be sure to replace the housing side oil seal.



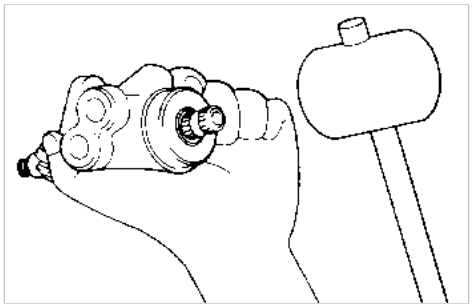
28. Remove the O-ring from the rack bushing.



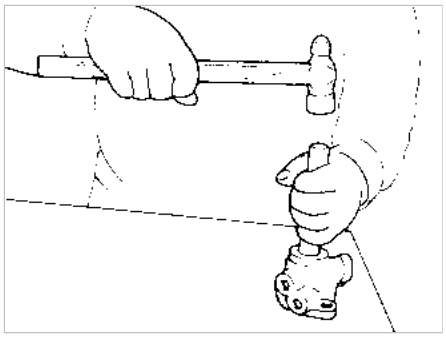
29. Remove the oil seal from the rack bushing.



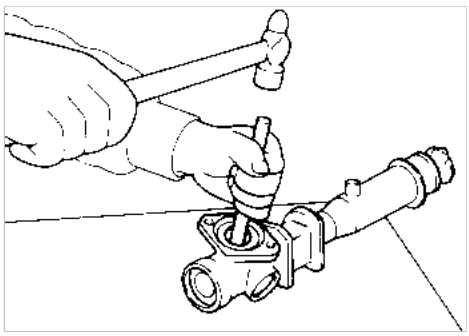
30. Remove the valve body from valve body housing with a soft hammer.



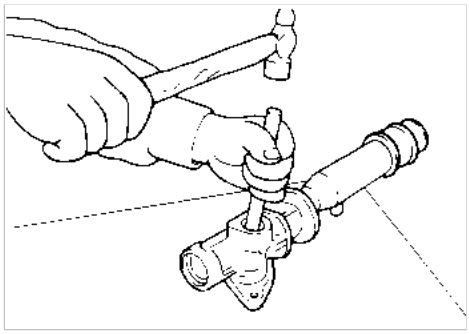
31. Use the special tool (09565-21000) to remove the oil seal and ball bearing from the valve body housing.



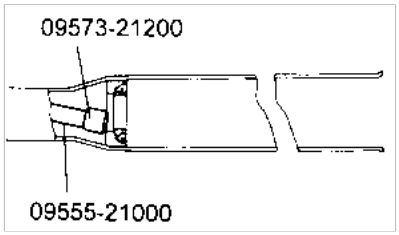
32. Use the special tool (09517-21400) to remove the ball bearing from the gear housing.
Be careful not to damage the pinion valve cylinder inside of the gear housing.



33. Use the special tool (09517-21400) to remove the needle bearing from the gear housing.



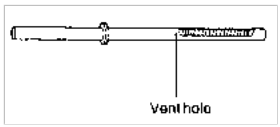
34. Use the special tools (09573-21200, 09555-21000) to remove the back washer and oil seal from the gear housing.
Be careful not to damage the rack cylinder inside of the gear housing.



Steering System > Mechanical Power Steering System > Power Steering Gear Box > INSPECTION

INSPECTION

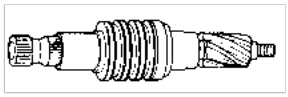
1. Rack
   (1) Rack tooth face damage or wear
   (2) Oil seal contact surface damage
   (3) Bending or twisting
   (4) Oil seal ring damage or wear
   (5) Oil seal damage or wear



2. Pinion valve
   (1) Pinion gear tooth face damage or wear
   (2) Oil seal contact surface damage
   (3) Seal ring damage or wear
   (4) Oil seal damage or wear

3. Bearing
   (1) Seizure or abnormal noise during bearing rotation
   (2) Excessive play
   (3) Missing needle bearing rollers

4. Others
   (1) Damage of the gear housing cylinder bore
   (2) Boot damage, cracking or aging

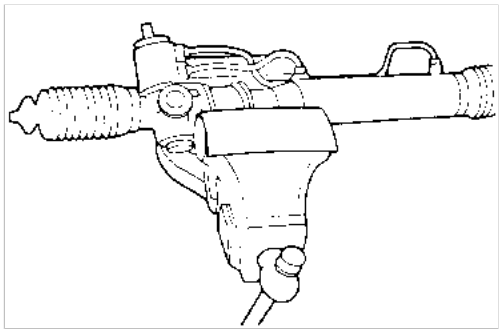


Steering System > Mechanical Power Steering System > Power Steering Gear Box > INSPECTION AND ADJUSTMENT PRIOR TO DISASSEMBLY

INSPECTION AND ADJUSTMENT PRIOR TO DISASSEMBLY

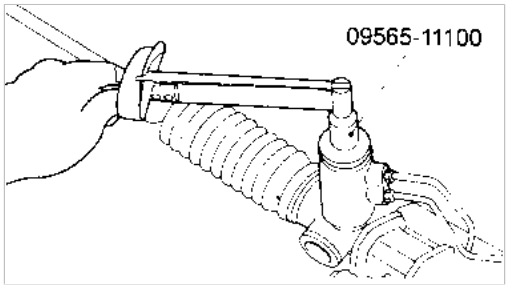
Mount the gear box in a soft jawed vise.

Do not tighten the vise on the gear housing. Use the mounting section of the rack to secure it in the vise.



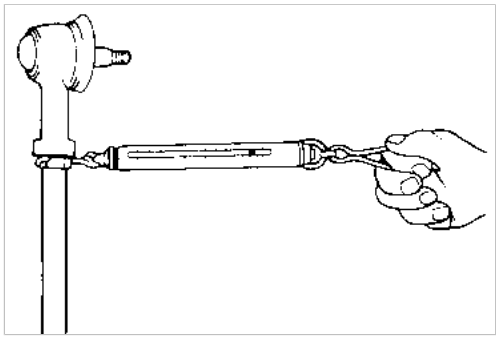
TOTAL PINION PRELOAD

1. Rotate the pinion gear for approximately 4 to 6 seconds for one rotation to confirm the total pinion preload.
   Measure the pinion preload through the entire stroke of the rack.
2. If the measured value is out of specifications, first adjust the yoke plug, then re-check the total pinion preload.
3. If the yoke plug adjustment does not obtain the total pinion preload, check or replace the yoke plug components.



TIE ROD SWING RESISTANCE

1. Give 10 hard swings to the tie rod.
2. Measure the tie rod swing resistance with a spring scale.
3. If the measured value exceeds the standard value, replace the tie rod assembly.
   Even if the measured value is below the standard value, a tie rod that swings smoothly without excessive play may be used. If the measured value is below 4.3 N (0.9 lb)[100 Ncm (8.7 lb.in.)], replace the tie rod.



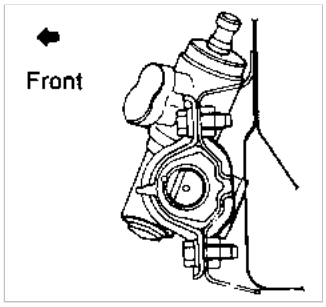
BELLOWS INSPECTION

1. Inspect the bellows for damage or deterioration.
2. Make sure the bellows are secured in the correct position.
3. If the bellows are defective, replace them.

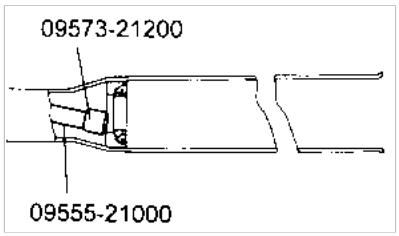
Steering System > Mechanical Power Steering System > Power Steering Gear Box > REASSEMBLY

REASSEMBLY

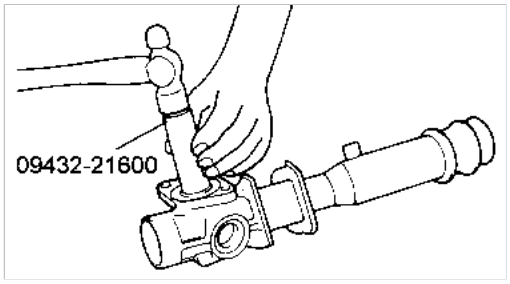
a. Install with the projection on the mounting rubber of the gear housing aligned with the holes in the clamp and gear housing bracket.
b. Apply adhesive to the cylinder side mounting rubbers so that its slitted part will not open.
c. Check that there are no oil leaks.
d. Confirm the steering wheel rotates smoothly.
e. Adjust the toe-in.
f. Install all parts with reference to the torque specification.



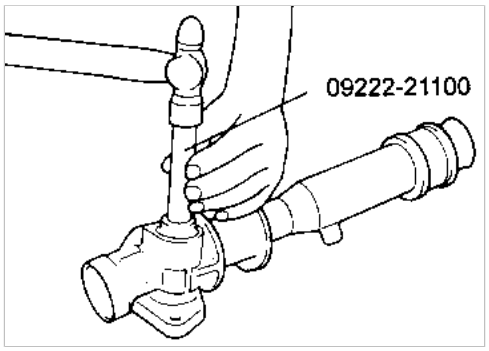
1. Apply the specified oil to the entire surface of the rack oil seal.
2. Install backup washer and oil seal to the specified position in the gear housing.



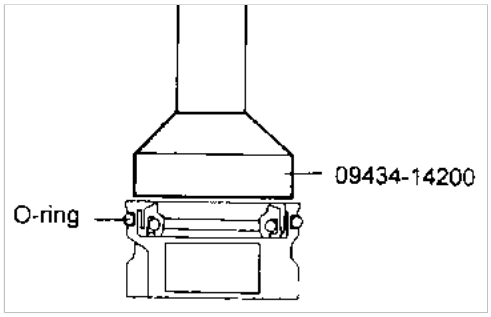
3. Apply the specified grease to the entire surface of the needle bearing.
4. Set the scribed side of the needle bearing in the Special Tool (09432-21600) and install it into the gear housing (until the special tool contacts the gear housing).
   Note the direction of the needle bearing.



5. Apply the specified grease to the ball bearing and install using the special tool (09222-21100).
   Always use a new bearing.

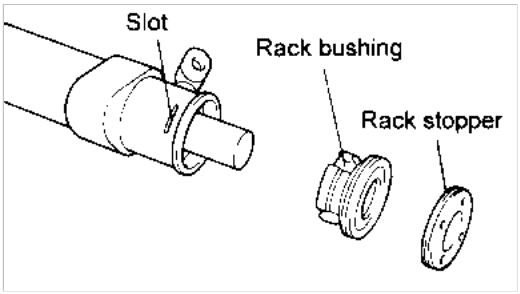


6. Apply the specified oil to the entire surface of the rack bushing oil seal.
7. Install the oil seal in the rack bushing.
8. Apply the specified oil to the entire surface of the O-ring and install it in the rack bushing.

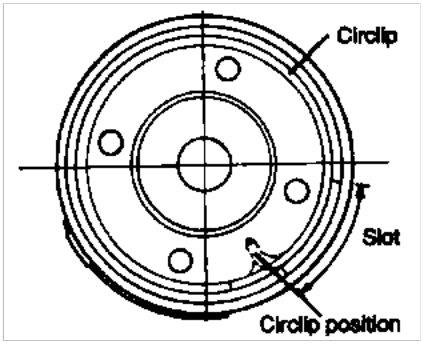


9. Apply the specified grease to the rack teeth and wrap with vinyl tape.
   Do not plug the vent hole in the rack with grease.

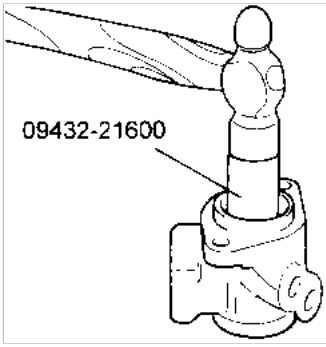
10. Insert the rack into the gear housing.
    Install the rack bushing and rack stopper.



11. Push in the rack stopper until the circlip groove of the rack stopper is aligned with the notched hole of the rack housing. Install the circlip while turning the rack stopper.
    The circlip should not be visible through the notched hole of the rack housing.

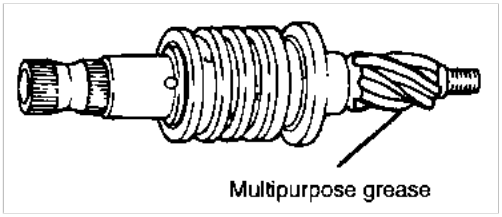


12. Using Special Tool (09432-21600), install the oil seal and the ball bearing in the valve body.

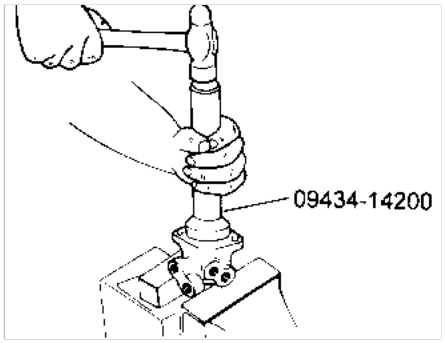


13. Apply the specified oil and grease to the pinion valve assembly and install in the gear housing assembly.

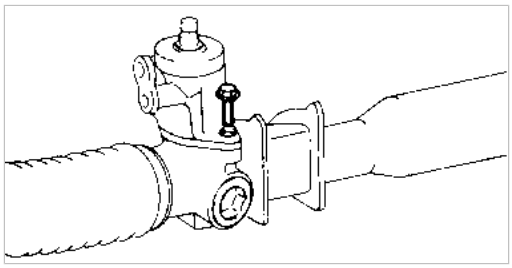
Recommended fluid	Automatic transaxle fluid DEXRON II type
Recommended grease	Multipurpose grease SAE J310, NLGI No.2



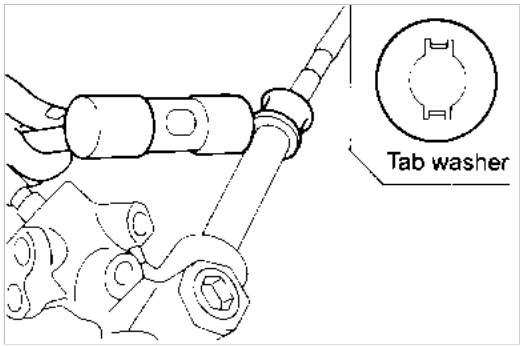
14. Apply the specified oil and then use the Special Tool (09434-14200) to install the seal in the valve body housing.



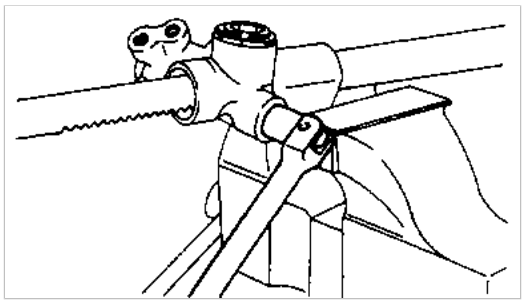
15. Install the valve body assembly with the seal ring to the gear box.



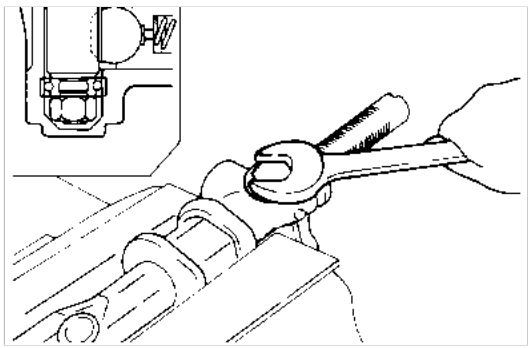
16. Install the tab washer and the tie rod and stake the tab washer end at two points over the tie rod.
    a. Align the tab washer pawls with the rack grooves.
    b. Always use a new tab washer.



17. With the pinion turned all the way clockwise, tighten the self-locking nut.
    Always use a nut.

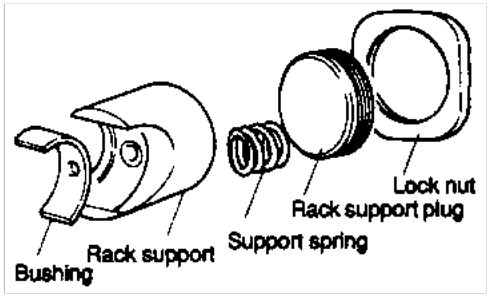


18. Apply semi-drying sealant to the threaded section of the end plug and tighten to the specified torque.

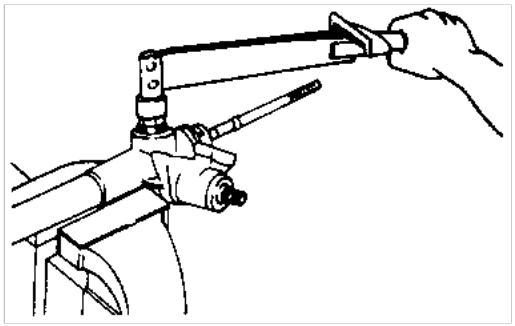


19. Stake the end plug at two points on its circumference with a punch.

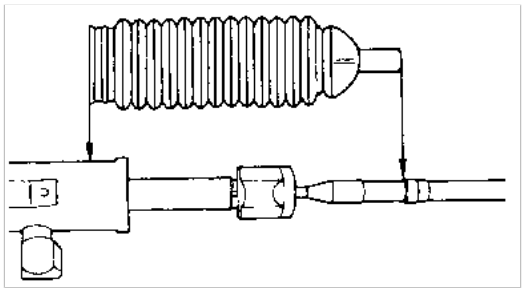
20. Install the bushing, rack support, rack support spring and rack support cover in the order shown. Apply semi-drying sealant to the threaded section of the rack support cover before installation.



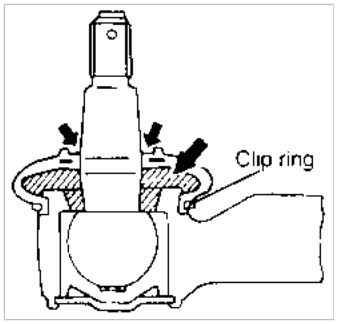
21. With the rack placed in the center position, attach the rack support cover to the gear housing. Tighten the rack support cover within the range of 20-25 Nm (200-250, Kg.cm, 14.5-18 lb.ft), using the Special Tool (09565-21100). Loosen the rack support cover approximately 10°, and tighten the locking nut the specified torque.



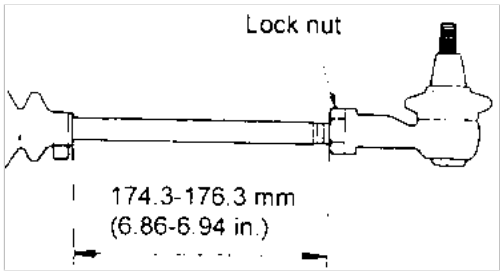
22. Tighten the feed tube to the specified torque and install the mounting rubber using adhesive.
23. Apply the specified grease to the bellows mounting position (fitting groove) of the tie rod.
24. Install the attaching band to the bellows.
    When the bellows are installed, a new band must be used.



25. Install the bellows in position, taking care not to twist it.
26. Fill the dust cover inner side and lip with the specified multipurpose grease, and place the dust cover in position with the clip ring attached in the groove of the tie rod end.

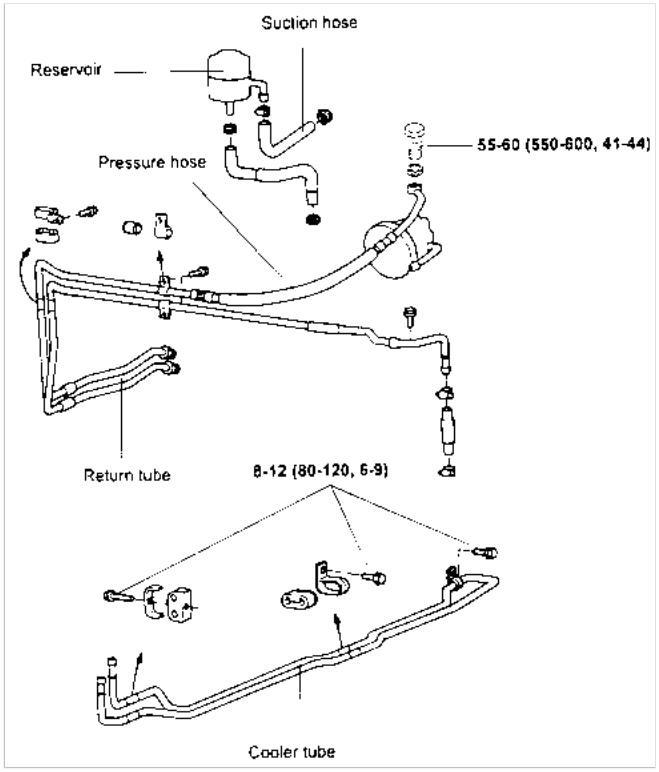


27. Install the tie rods so that the length of the left and right tie rods are equal.
28. Confirm the pinion preload.



Steering System > Mechanical Power Steering System > Power Steering Hoses > COMPONENTS

COMPONENTS



Steering System > Mechanical Power Steering System > Power Steering Hoses > DISASSEMBLY

DISASSEMBLY

Return tube

1. Drain the fluid.
2. Disconnect the return hose from the oil reservoir.
3. Remove the clip which secures the return tube to the vehicle body.
4. Disconnect the return tube from the gear box.

Steering System > Mechanical Power Steering System > Power Steering Hoses > INSPECTION

INSPECTION

a. Inspect the hoses for damage or deterioration.
b. Confirm that there is no interference between the hose and any other parts.

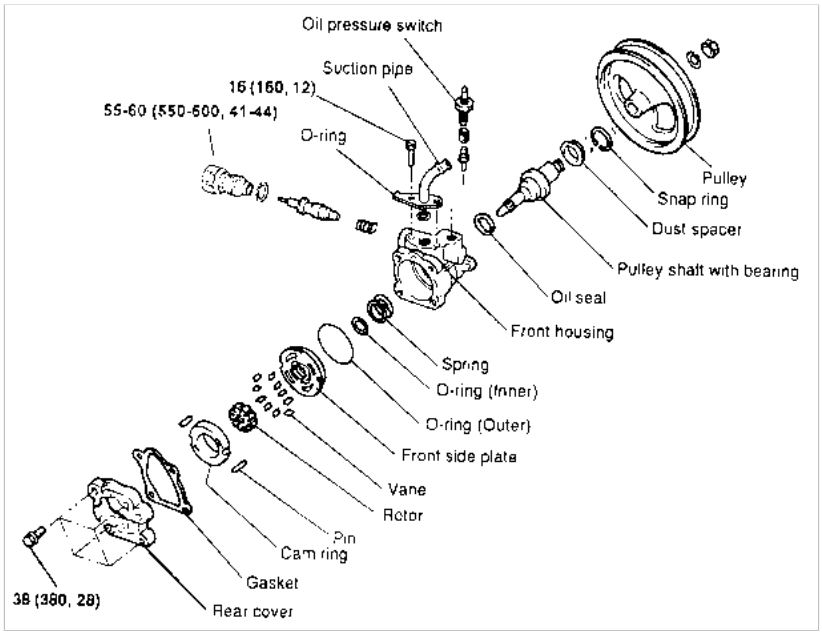
Steering System > Mechanical Power Steering System > Power Steering Hoses > INSTALLATION

INSTALLATION

Install all parts to the torque specifications.

Steering System > Mechanical Power Steering System > Power Steering Oil Pump > COMPONENTS

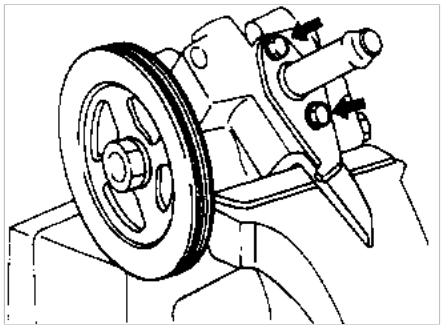
COMPONENTS



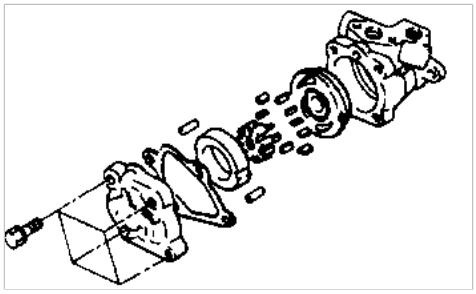
Steering System > Mechanical Power Steering System > Power Steering Oil Pump > DISASSEMBLY

DISASSEMBLY

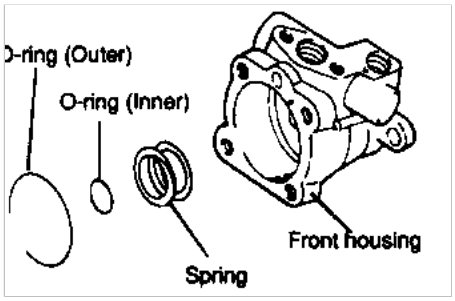
1. Remove the suction pipe and the O-ring from the oil pump.



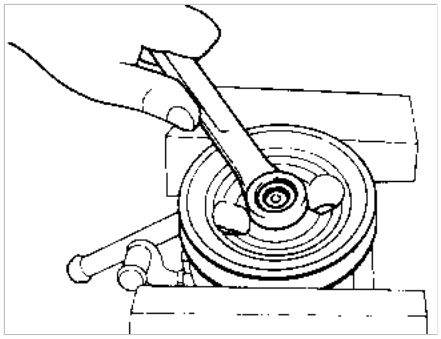
2. Remove the rear cover with the gasket and pins.
3. Remove the cam ring.
4. Remove the rotor and vanes.
5. Remove the front side plate.



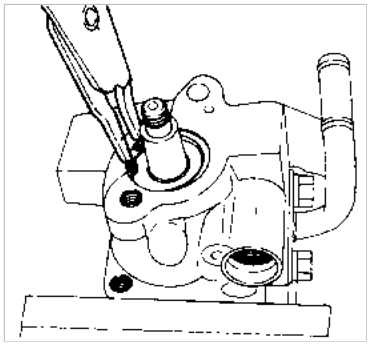
6. Remove the inner and outer O-ring.
7. Remove the spring.
   When assembling, use a new gasket and O-ring.



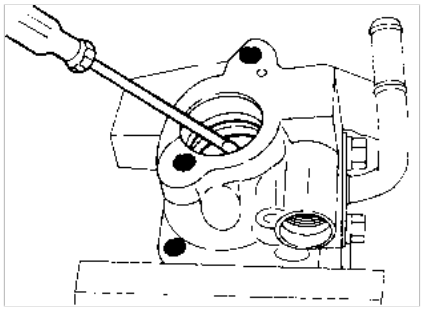
8. Remove the pulley nut with the spring washer.
9. Pull off the pulley and the woodruff key.



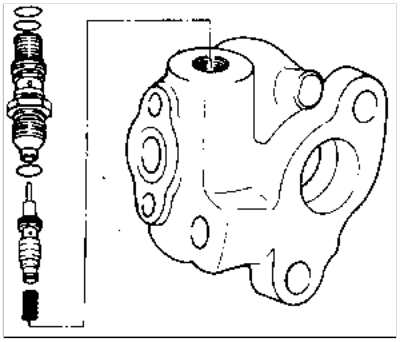
10. Remove the snap ring using snap ring pliers.
11. Drive out the pulley shaft with the bearing. If necessary, use plastic hammer.



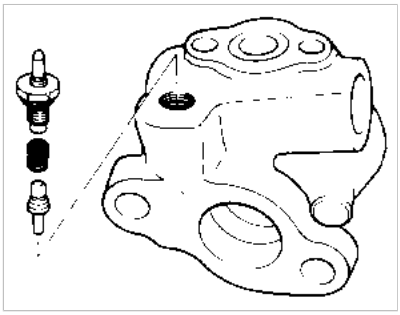
12. Remove the oil seal from the oil pump body.
    When assembling, use a new oil seal.



13. Remove the guide bracket and nut.
14. Remove the connector from the oil pump body, and take out the flow control valve and the flow control spring.
15. Remove the O-ring from the connector.
    Do not disassemble the flow control valve.



16. Remove the oil pump switch.
17. Take out the spring and the spool.
18. Remove the O-ring from the oil pump switch.



Steering System > Mechanical Power Steering System > Power Steering Oil Pump > INSPECTION

INSPECTION

a. Clean all disassembled parts with a suitable cleaning solvent.
b. If any inside parts of the oil pump have been damaged, replace the pump as an assembly.
c. If the pulley is cracked or deformed, replace it.
d. If oil leaks around the pulley shaft oil seal, replace the oil seal.
e. If the serrations of the pulley or pulley shaft are deformed or worn, replace them.

Steering System > Mechanical Power Steering System > Power Steering Oil Pump > INSTALLATION

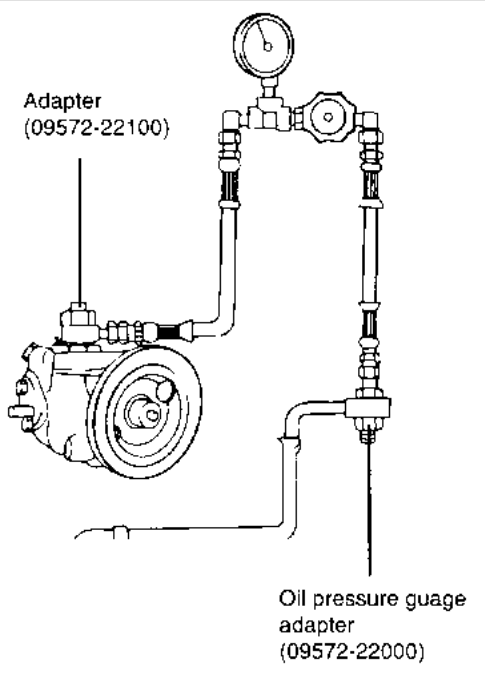
INSTALLATION

1. Install the oil pump to the oil pump bracket.
2. Install the suction hose.
3. Install the ribbed V-belt and adjust the belt tension.
4. Connect the pressure hose to the oil pump, and the suction hose to the oil reservoir.
   Install the hoses so they are not twisted and they do not come in contact with any other parts.
5. Replenish the fluid.
6. Bleed the system.
7. Check the oil pump pressure.
8. Install parts to the torque specifications.

Steering System > Mechanical Power Steering System > Power Steering Oil Pump > OIL PUMP PRESSURE TEST (OIL PUMP RELIEF PRESSURE)

OIL PUMP PRESSURE TEST (OIL PUMP RELIEF PRESSURE)

1. Disconnect the pressure hose from the oil pump. Connect the special tool between the oil pump and pressure hose as illustrated.

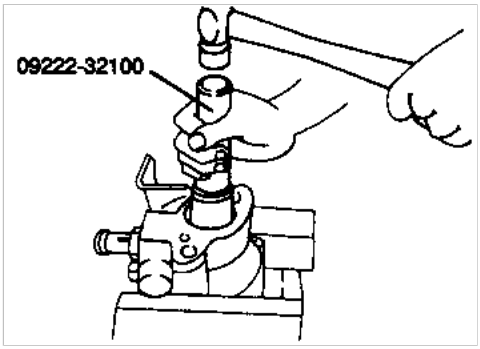


2. Bleed the air, and then start the engine and turn the steering wheel several times so that the fluid temperature rises to approximately 50°C (122°F).
3. Increase the engine speed to 1,000 rpm.
4. Close the shut-valve of the special tool and measure the fluid pressure to confirm that it is within the standard value range.
   Do not keep the shut-off valve on the pressure gauge closed for more than ten seconds.
5. Remove the special tools, and tighten the pressure hose to the specified torque.
6. Bleed the system.

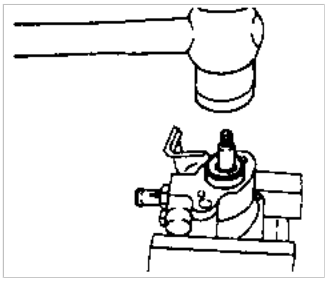
Steering System > Mechanical Power Steering System > Power Steering Oil Pump > REASSEMBLY

REASSEMBLY

1. Install the oil pump switch.
2. Install the flow control valve spring, valve and connector in the pump body.
   Apply a thin coat of ATF DEXRON II type to all the replaced parts including the oil seal and O-ring.

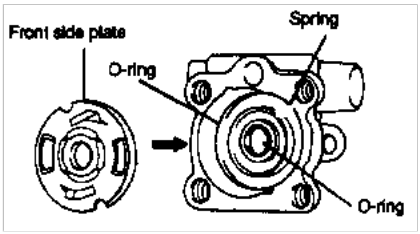


3. Install the guide bracket and nut.
4. Using special tool (09222-32100), install the oil seal into the pump body.
5. Gently insert the shaft assembly and install the snap ring.
6. Install the pump pulley with woodruff key in place.

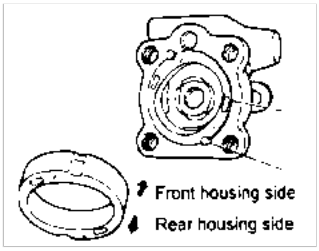


7. Install the spring and the inner and outer O-rings.

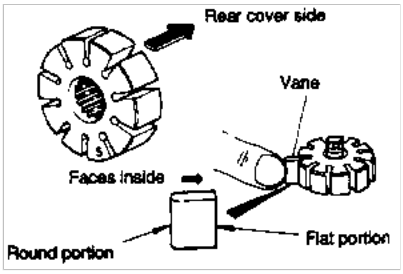
8. Install the front side plate.



9. Insert the pins into the pin grooves of the front housing, then install the cam ring, paying attention to its direction.



10. Install the rotor with its punch marked side facing towards the front side plate.
11. Install the vane plates with the round end facing outward.
12. Install the gasket and rear cover.
13. Tighten the suction connector.

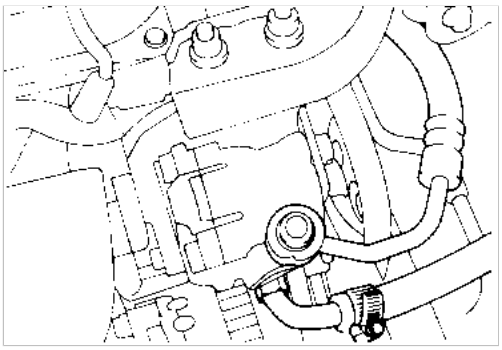


Steering System > Mechanical Power Steering System > Power Steering Oil Pump > REMOVAL

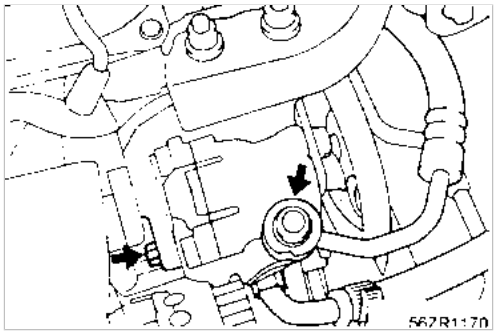
REMOVAL

Be sure to cover the generator with a protector when servicing the oil pump.

1. Remove the pressure hose from the oil pump.
2. Disconnect the suction hose from the suction connector and drain the fluid into a container.



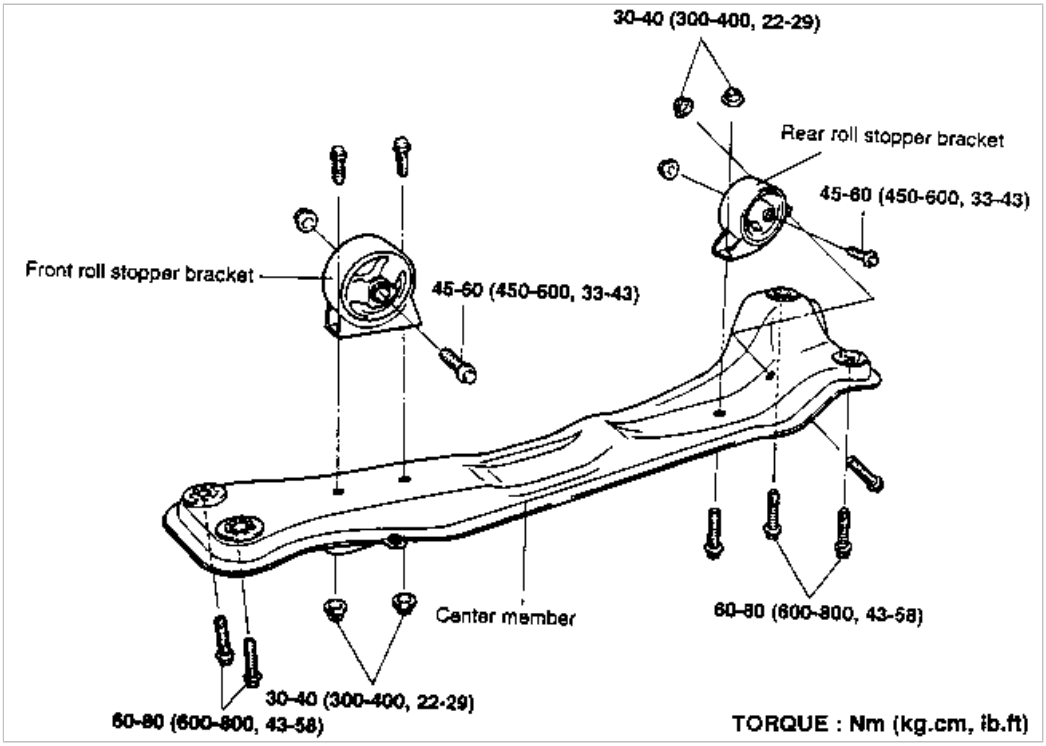
3. Loosen the oil pump mounting bolts to remove the V-belt.
4. Remove the oil pump bracket mounting bolts and disconnect the pressure switch connector.
5. Remove the oil pump.


562B1170

ACCENT(X3) > 1998 > G 1.5 SOHC > Suspension System

Suspension System > Front Suspension System > Cross Member > COMPONENTS

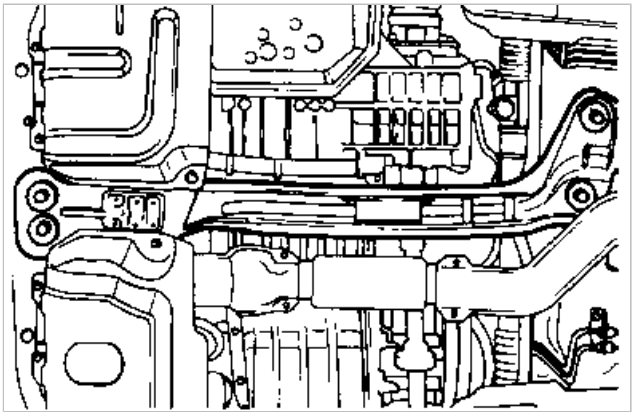
COMPONENTS



Suspension System > Front Suspension System > Cross Member > DISASSEMBLY

DISASSEMBLY

1. Raise the vehicle and position the jack stands.
2. Detach the front and rear roll stopper brackets from the engine mounting bracket.
3. Remove the center member assembly.



Suspension System > Front Suspension System > Cross Member > INSPECTION

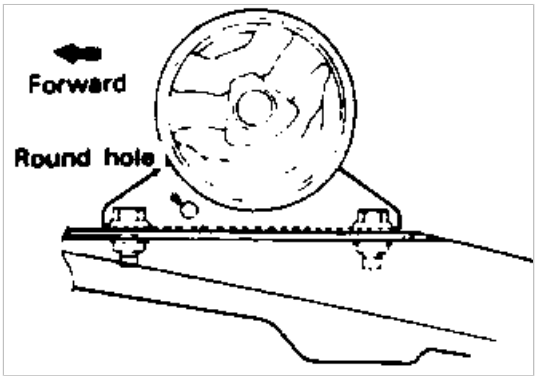
INSPECTION

1. Check each insulator and bushing for cracks or deterioration.
2. Check each bracket for distortion or damage.

Suspension System > Front Suspension System > Cross Member > REASSEMBLY

REASSEMBLY

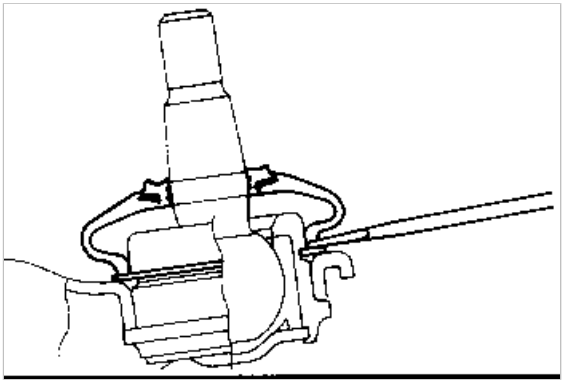
1. Install the front roll stopper bracket so that its round hole faces forward.
2. Fit the rear roll stopper bracket to the center member and install the center member assembly.
3. Temporarily tighten the front roll stopper bracket bolt. After the total weight of the engine has been placed on the vehicle body, securely tighten the nut.



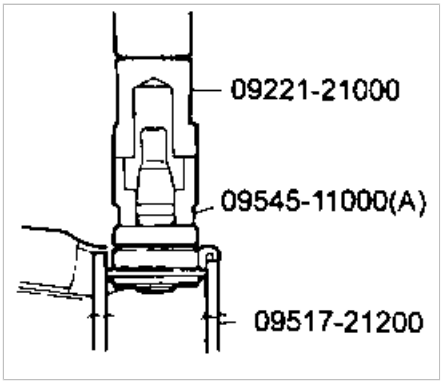
Suspension System > Front Suspension System > Lower Arm > BALL JOINT AND DUST COVER REPLACEMENT

BALL JOINT AND DUST COVER REPLACEMENT

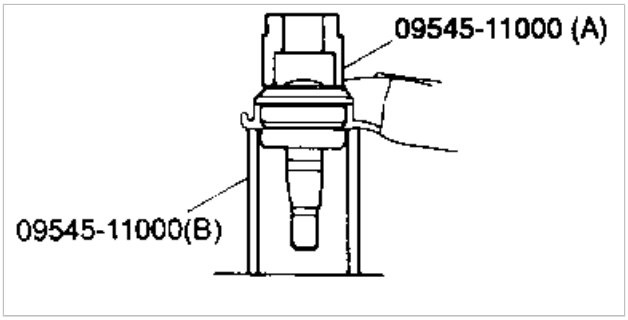
1. Using a screwdriver, remove the dust cover from the lower arm ball joint.
2. Remove the snap ring.



3. Using the special tools, remove the ball joint from the lower arm assembly.

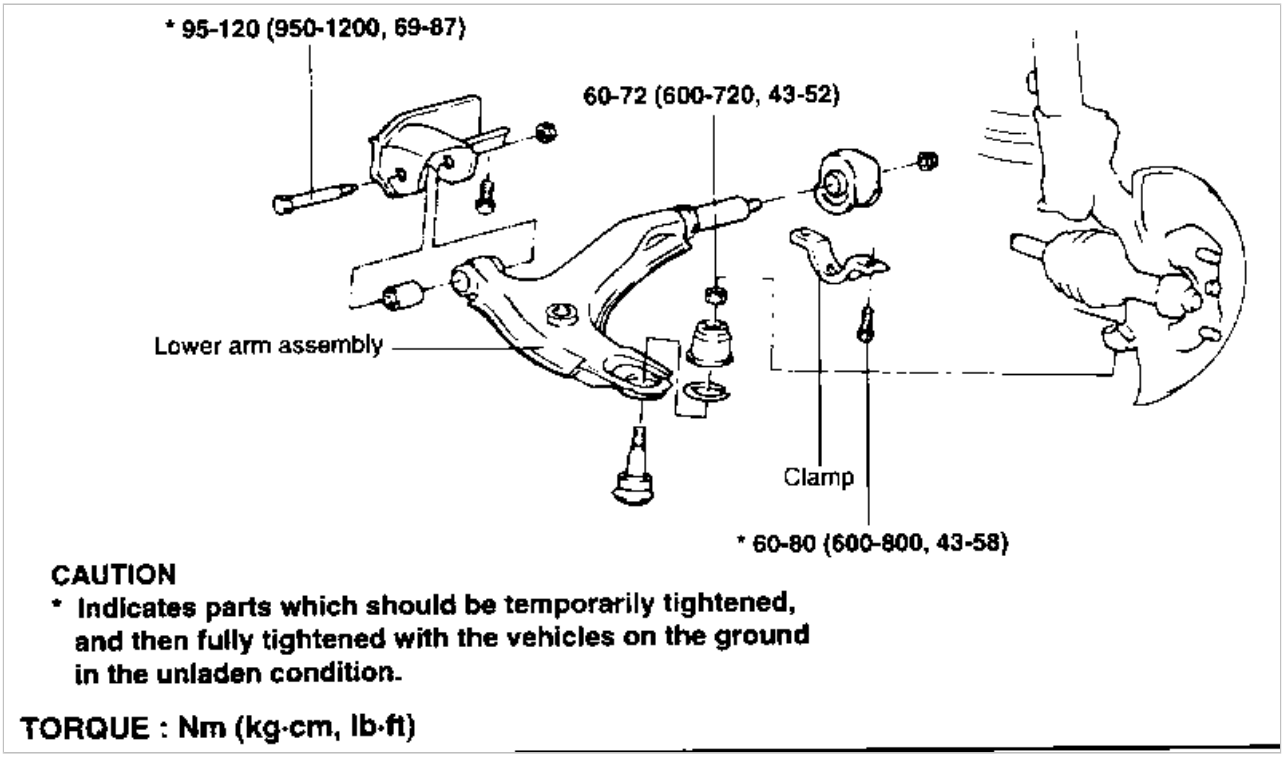


4. Press fit the ball joint into the lower arm assembly.



Suspension System > Front Suspension System > Lower Arm > COMPONENTS

COMPONENTS



CAUTION
*** Indicates parts which should be temporarily tightened, and then fully tightened with the vehicles on the ground in the unladen condition.**

TORQUE : Nm (kg·cm, lb·ft)

Suspension System > Front Suspension System > Lower Arm > INSPECTION

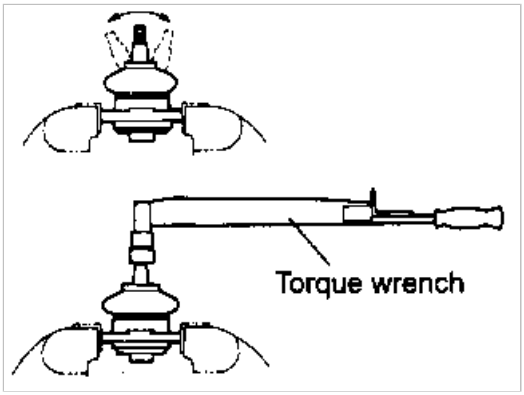
INSPECTION

1. Check the lower arm for bend or breakage.
2. Check the clamp for deterioration or damage.
3. Check the ball joint dust cover for cracks.
4. Check all bolts for condition and straightness.

Suspension System > Front Suspension System > Lower Arm > INSPECTION OF BALL JOINTS

INSPECTION OF BALL JOINTS

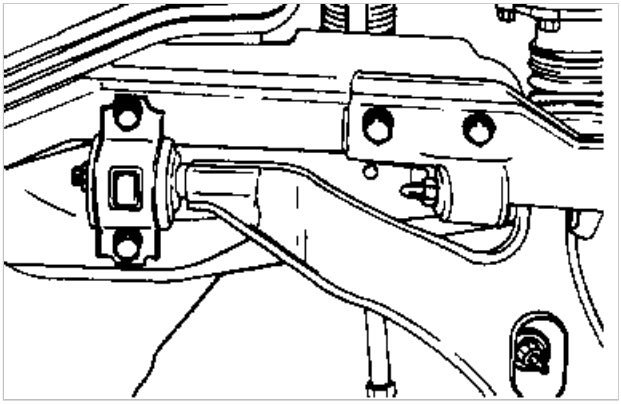
1. Remove the ball joint assembly from the lower arm.
2. Inspect the ball joints for rotation condition.
   (1) As shown in the figure, flip the ball joint stud back and forth 5 times.
   Using a torque gauge, measure rotation starting torque.



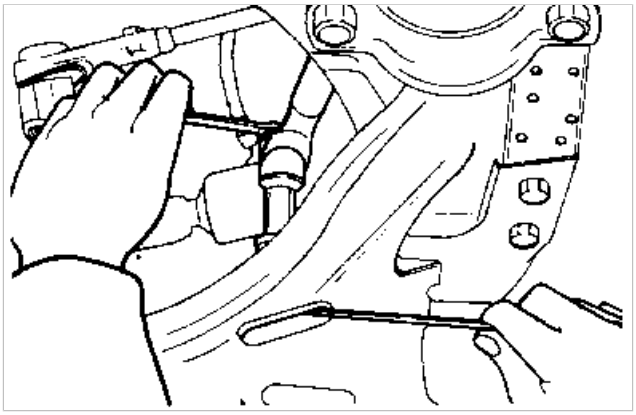
Suspension System > Front Suspension System > Lower Arm > INSTALLATION

INSTALLATION

1. Install the lower arm mounting bolt and nut.



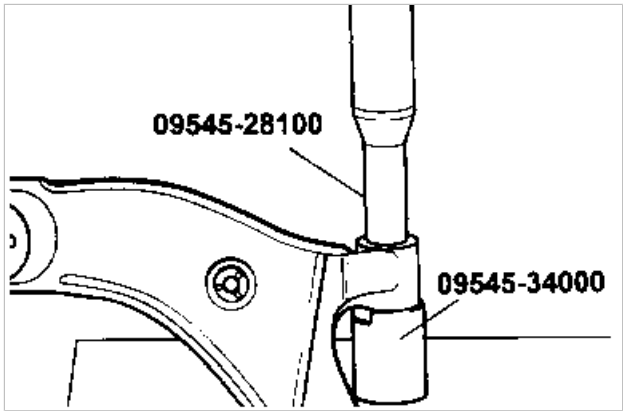
2. Tighten the stabilizer link with a spanner wrench (14 mm or 9/16 in) then install the self-locking nut.



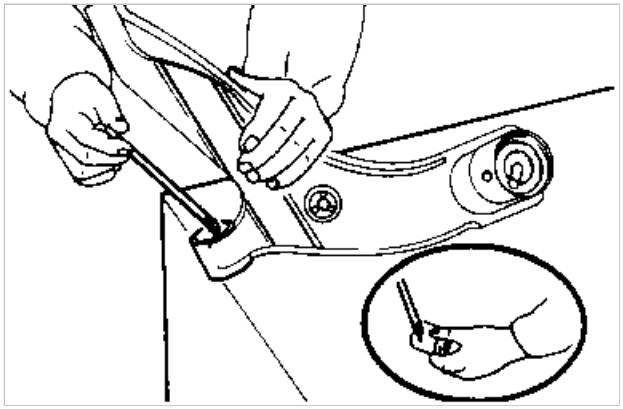
Suspension System > Front Suspension System > Lower Arm > LOWER ARM BUSHING (A) REPLACEMENT

LOWER ARM BUSHING (A) REPLACEMENT

1. Install the special tools (09545-34000, 09545-28100) on the lower arm.
2. Press out the bushing.

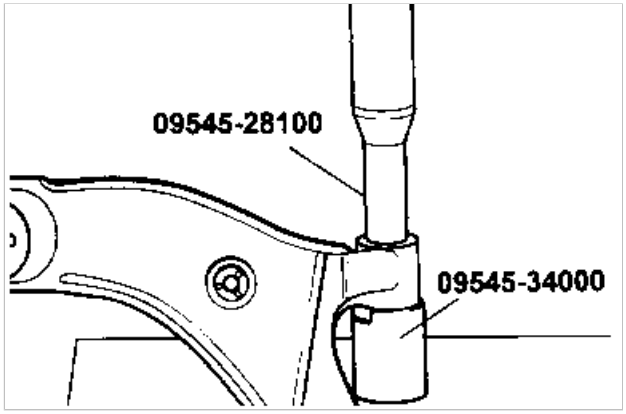


3. Apply soap solution to the following portions.
   (1) Outer surface of the new bushing.
   (2) Inner surface of the lower arm bushing mount.
   (3) Inner surface of the special tools.



4. Install the special tools and new bushing onto the lower arm.
5. Press fit the bushing into the lower arm bushing mount.
6. Center the bushing by the following procedure, if necessary.
   (1) Reset the special tools and lower arm.
   (2) Center the bushing.

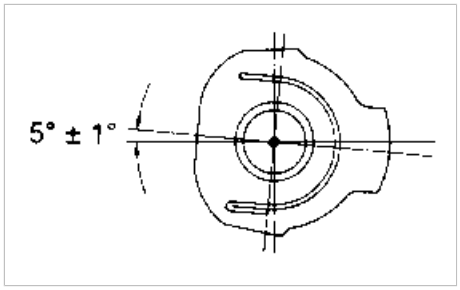
   After centering the bushing, wipe off the soap solution.



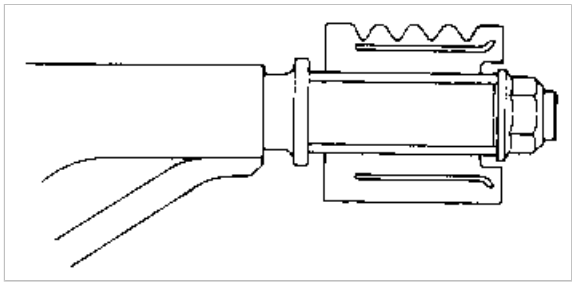
Suspension System > Front Suspension System > Lower Arm > LOWER ARM BUSHING (B) REPLACEMENT

LOWER ARM BUSHING (B) REPLACEMENT

1. After positioning the lower arm bushing (B) at the angle indicated in the illustration, install the self-locking nut.



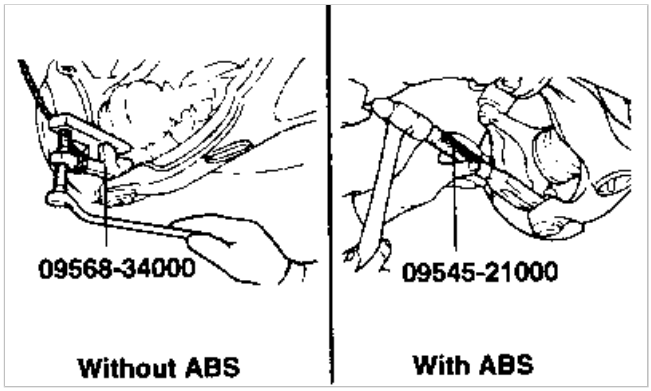
2. Press fit the lower arm mounting shaft and tighten the shaft mounting nut.



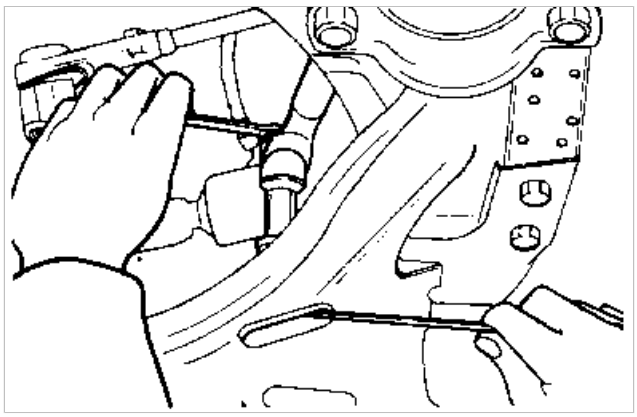
Suspension System > Front Suspension System > Lower Arm > REMOVAL

REMOVAL

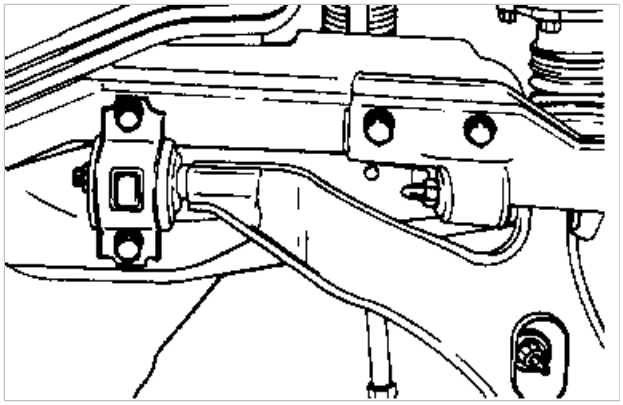
1. Using special tool, disconnect the lower arm ball joint from the knuckle.
   Be sure to tie a cord to the special tool and to a nearby part.



2. Remove the stabilizer link mounting self-locking nut, and detach the stabilizer bar from the lower arm.

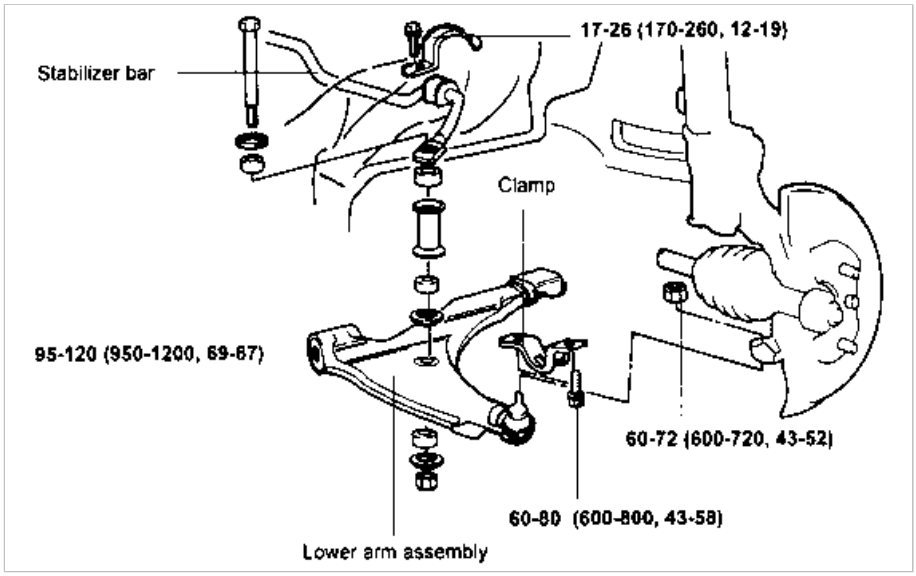


3. Remove the lower arm mounting nut and bolt.



Suspension System > Front Suspension System > Stabilizer Bar > COMPONENTS

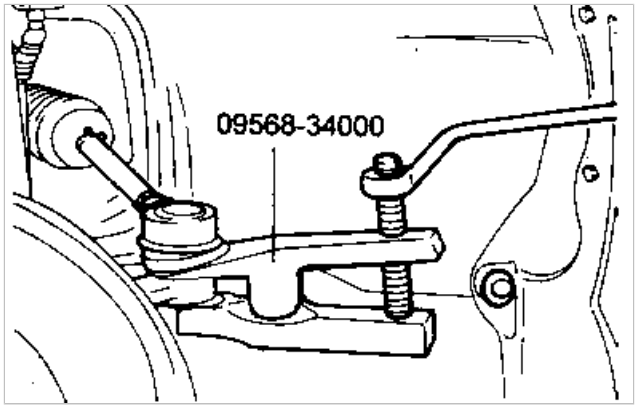
COMPONENTS



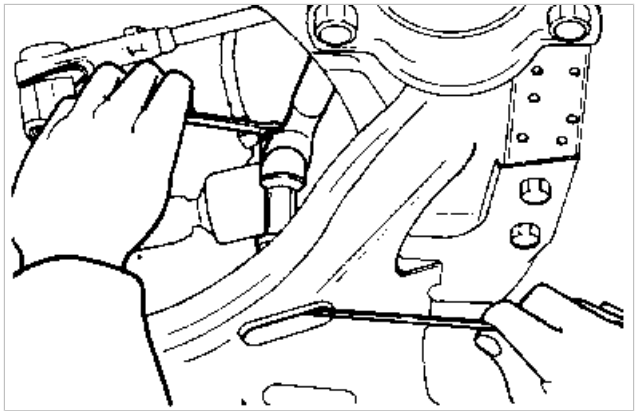
Suspension System > Front Suspension System > Stabilizer Bar > DISASSEMBLY

DISASSEMBLY

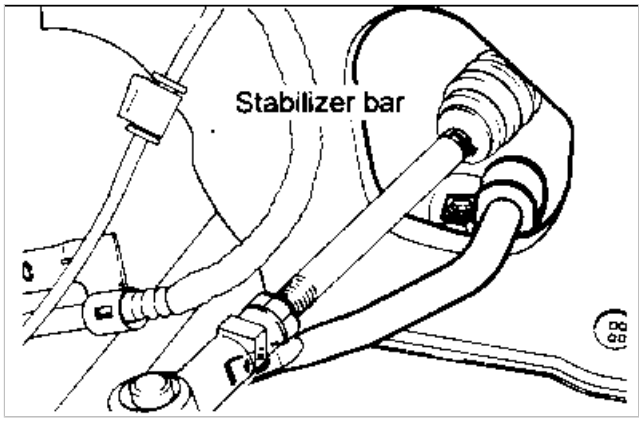
1. Disconnect the tie rod end ball joint from the knuckle using special tool.
   Be sure to tie a cord to the special tool and to a nearby part.



2. Remove the stabilizer link self-locking nut with a spanner wrench (14 mm or 9/16 in).



3. Remove the stabilizer bar through the access opening.
4. Detach the upper bracket then remove the bushing.



Suspension System > Front Suspension System > Stabilizer Bar > INSPECTION

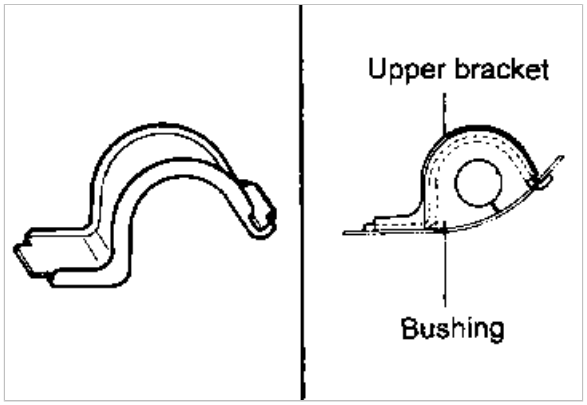
INSPECTION

1. Check the stabilizer bar for deterioration and damage.
2. Check all bolts for condition and straightness.

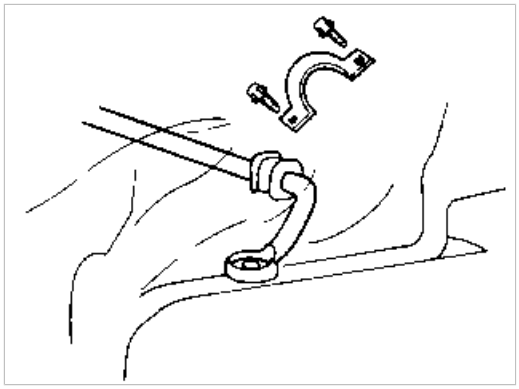
Suspension System > Front Suspension System > Stabilizer Bar > REASSEMBLY

REASSEMBLY

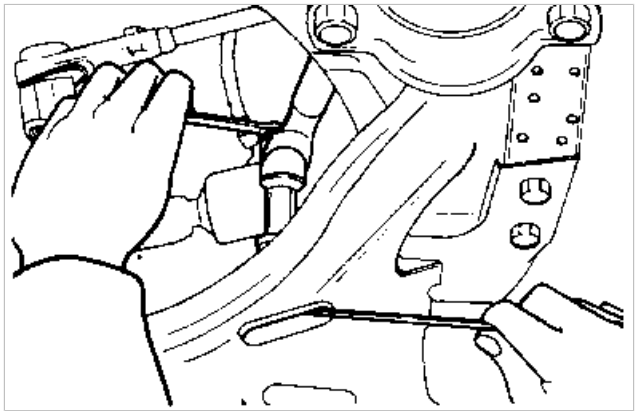
1. Install the bushing onto the stabilizer bar.
2. Align the upper bracket with the bushing. Make sure the projections are secured in the space of the bracket.



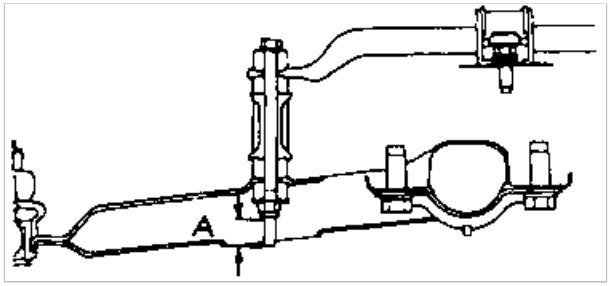
3. Using the access opening, temporarily tighten the bushing fixtures then position the opposite bushing.



4. Secure the stabilizer link with a spanner wrench (14 mm or 9/16 in.) then install the self-locking nut.

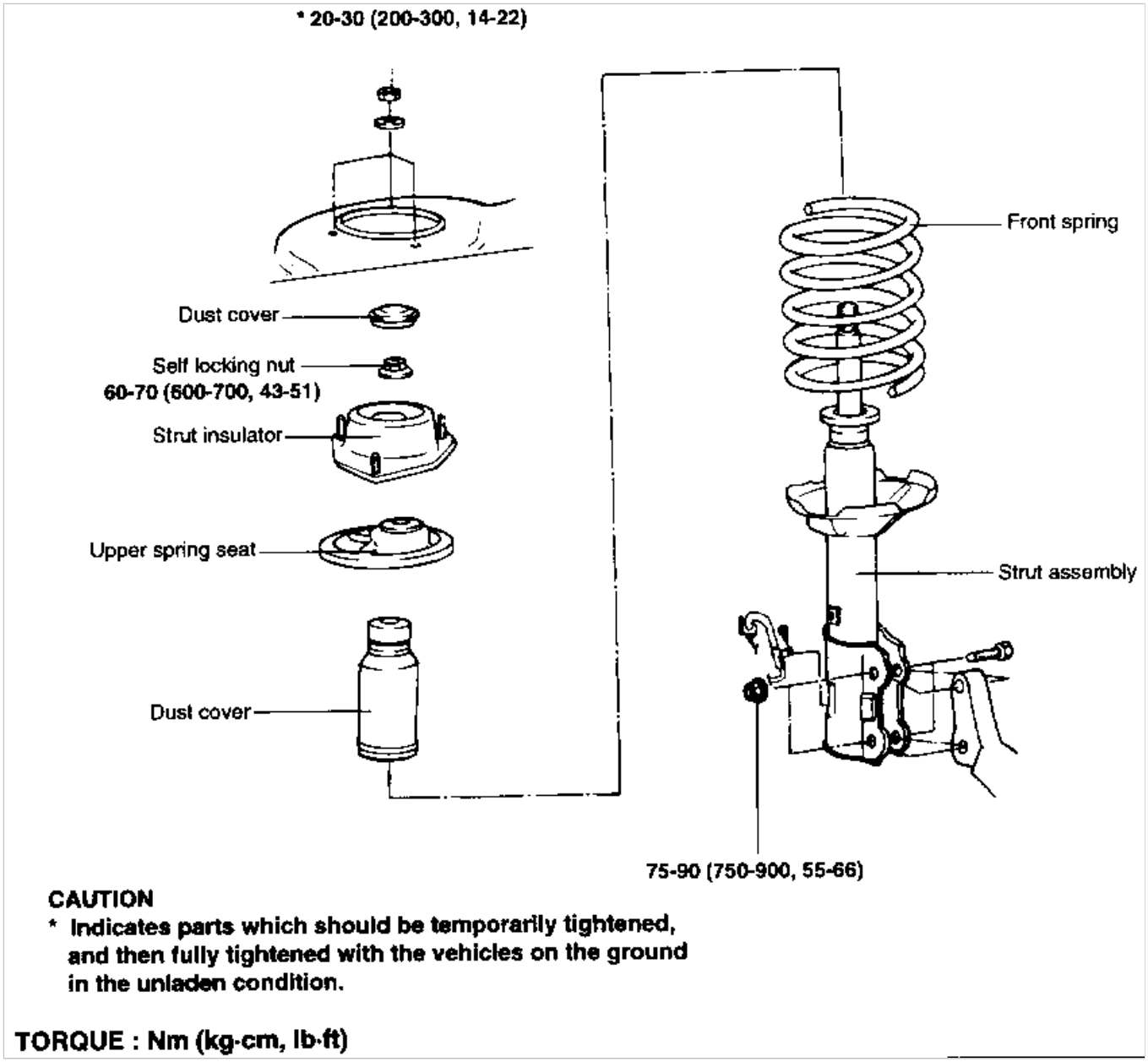


5. Tighten the self-locking nut on the stabilizer link to the specified distance.
6. Connect the tie rod end ball joint to the knuckle.



Suspension System > Front Suspension System > Strut Assembly > COMPONENTS

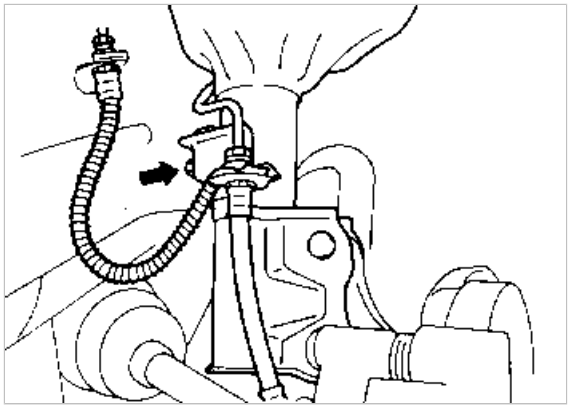
COMPONENTS



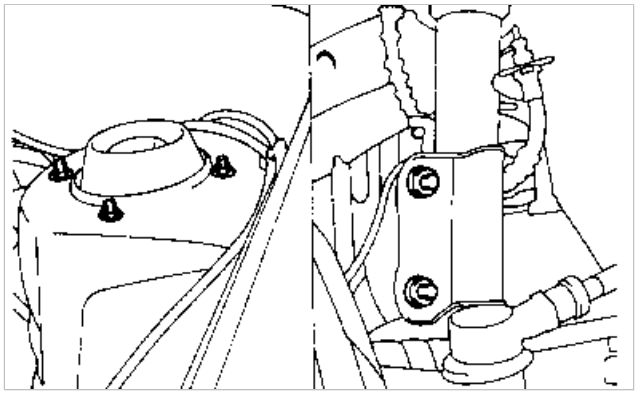
Suspension System > Front Suspension System > Strut Assembly > DISASSEMBLY

DISASSEMBLY

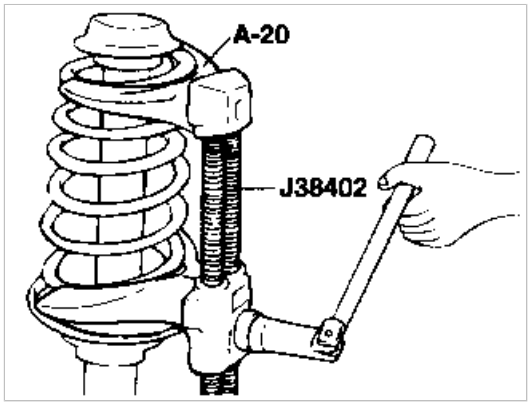
1. Raise the front of the vehicle and mount it on a jack stand.
2. Remove the wheel and tire.
3. Detach the brake hose and tube bracket from the strut assembly.
   Do not pry or force the components.



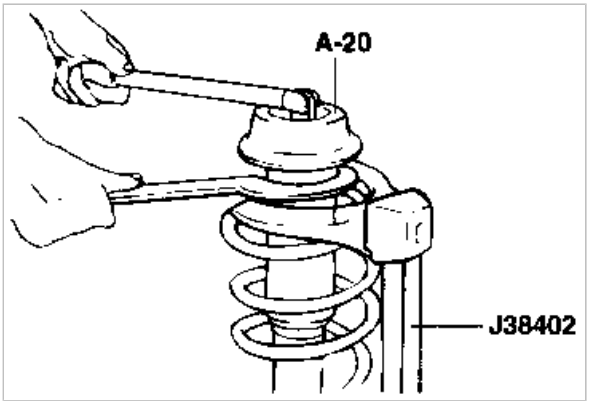
4. Remove the strut assembly from the knuckle and wheel house.



5. Using special tool, spring compressor, compress the coil spring.



6. Holding the upper spring seat with special tool, special spanner, loosen the nut at the top end of the shock absorber and remove the insulator.

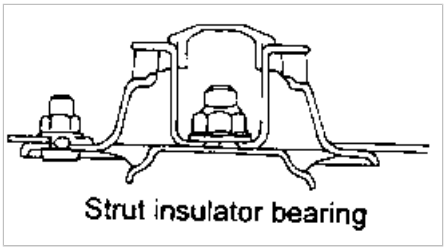


7. Remove the spring seat, spring and rubber bumper.

Suspension System > Front Suspension System > Strut Assembly > INSPECTION

INSPECTION

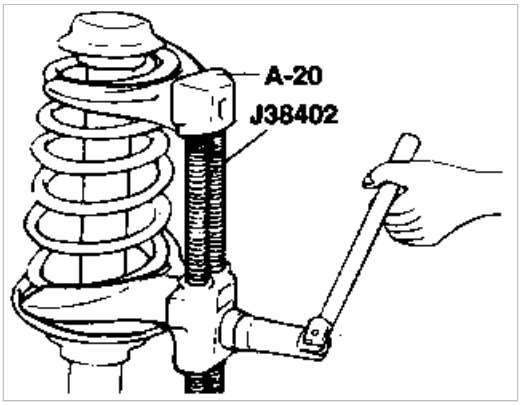
1. Check the bearing for wear.
2. Check the rubber parts for cracks and wear.
3. Check the coil spring for sagging and weakness.



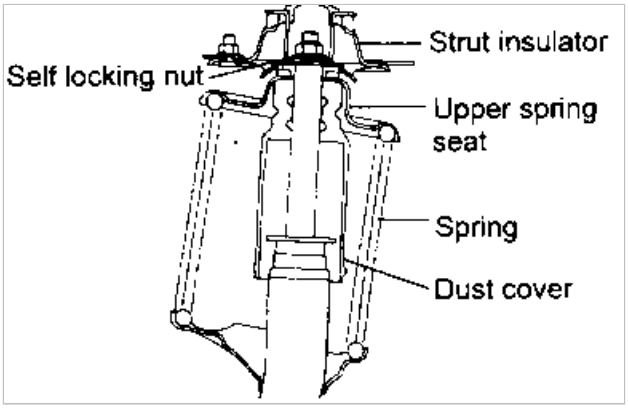
Suspension System > Front Suspension System > Strut Assembly > REASSEMBLY

REASSEMBLY

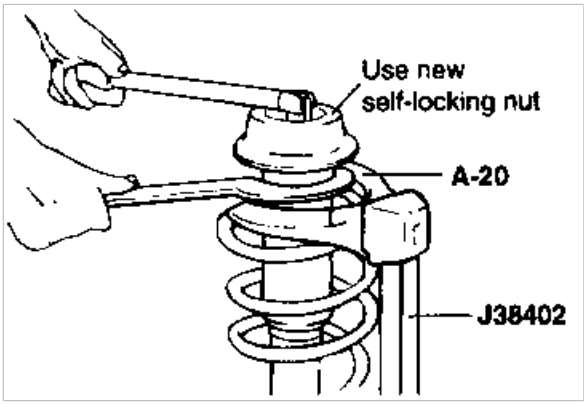
1. Install special tool on the coil spring and compress the spring. After spring is fully compressed, install it on the strut subassembly.



2. Install the rubber bumper, upper rubber seat, upper seat assy, insulator and washer in order.
   Align the D-shaped hole in the spring seat upper assembly with the indentation on the piston rod.
3. After having correctly seated the upper and lower ends of the coil spring in the upper and lower spring seat grooves, loosen special tool.



4. Using special tool, hold the upper spring seat and tighten the self-locking nut to specified torque.



5. Pack grease in the strut upper bearing and install the cap.
   Make sure that no grease is on the insulator rubber.

a. When installing the strut, the mating surface must be clean, and refer to the following tightening torque.

b. Be sure to bleed the brake system when installing the brake hose.

Suspension System > General > LUBRICANTS

LUBRICANTS

Items	Recommended lubricant	Quantity
Front wheel bearing	SAE J310a Multi-purpose grease NLGI-2 orequivalent	As required
In ball joint oflower arm	Valiant R-2 grease orPOLY LUB GLY 801 K	As required
In insulator bearingof strut	SAE J310a, Chassis grease NLGI No.0 orequivalent	As required
Inside surface and lip of ball joint dust cover	Sunlight MB-2	As required
Wheel bearing, oil seal lip, inside surface of the hub and hub cap	SAE J310a Multi-purpose grease NLGI-2 orequivalent	As required

Suspension System > General > SERVICE STANDARD

SERVICE STANDARD

Standard value

Toe in	Front	3 mm in - 3 mm out (0.12 in. in -0.12 in. out)
	Rear	1-5 mm(0.04-0.20 in.)
Camber	Front	0°±30'
	Rear	-41±30'

Caster: 2°±30'

King pin inclination angle: 12°8' ± 30'

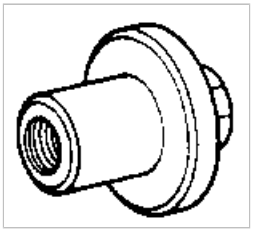
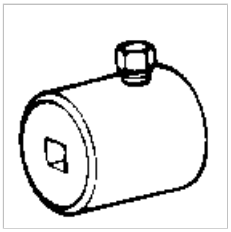
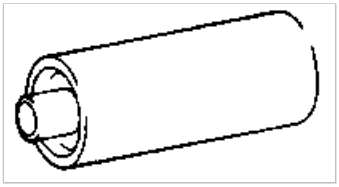
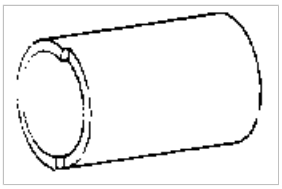
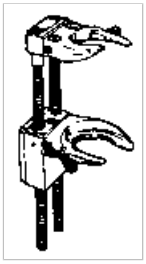
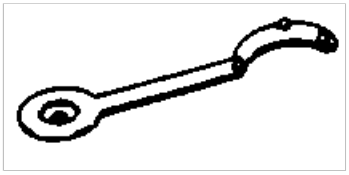
King pin offset: 5.94 mm (0.23 in.)

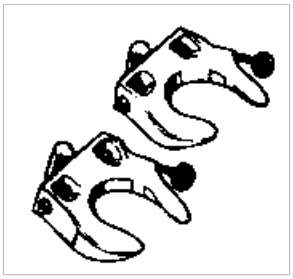
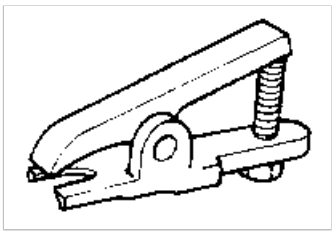
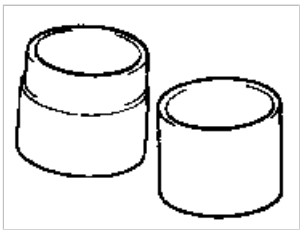
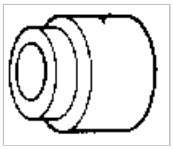
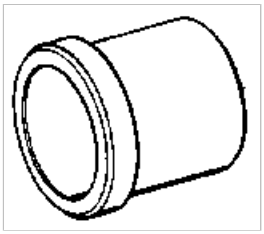
Wheel runout	[Steel wheel]	[Aluminum wheel]
Radial mm (in.)	0.6 (0.023): Average of LH & RH	0.3 (0.012)
Axial mm (in.)	1.0 (0.039)	0.3 (0.012)
Side slip mm (in.)	2-9 (0.08-0.35)	

Suspension System > General > SPECIAL TOOLS

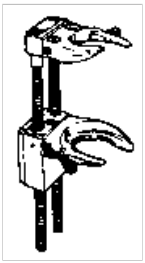
SPECIAL TOOLS

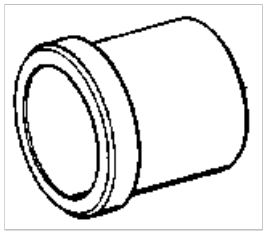
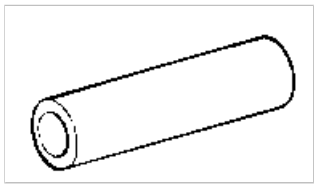
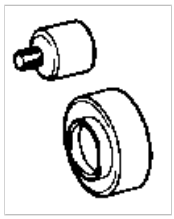
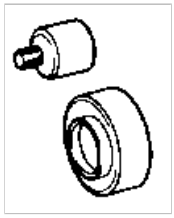
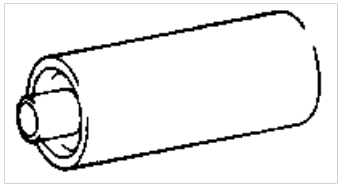
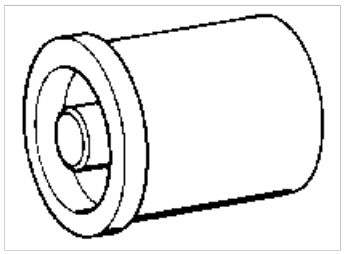
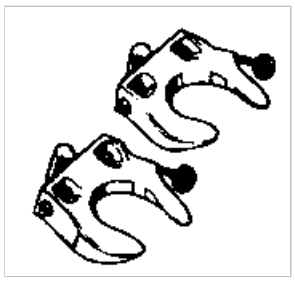
FRONT SUSPENSION

Tool (Number and Name)	Illustration	Use
09529-21000Wheel alignment gauge attachment		Front wheel alignment for aluminum type wheel.
09565-11100Pre-load socket		Measurement of the front lower arm ball joint starting torquer (use with torque wrench)
09545-21000Ball joint remover		Removal of the front lower arm ball joint (with ABS)
09545-28100Lower arm bushing arbor		Removal of the front lower arm bushing(use with 09545-34000)
09545-34000Lower arm bushing remover and installer, base		Removal & installation of the front lower arm bushing.(use with 09545-28100)
09546-11000(J38402)Strut spring compressor		Compression of the front coil spring (use with A-20).
09546-21000Special spanner		Removal & installation of the front coil spring.Removal & installation of the shock absorber oil seal.
A-20Strut compressor adapter		Compression of front coil spring (use with J38402)

		
09568-34000Ball joint remover		Separation of the tie rod end ball joint and lower arm ball joint
09545-11000(A, B)Ball joint remover		Installation of the lower arm ball joint
09517-21200Ball joint remover		Removal of the lower arm ball joint.(use with 09221-21000, 09545-11000A)
09221-21000Ball joint remover		Removal of the lower arm ball joint.(use with 09517-21200, 09545-11000A)

REAR SUSPENSION

Tool (Number and Name)	Illustration	Use
J38402Strut spring compressor		Compression of the rear coil spring (use with A-20)
09521-21000Bushing remover and installer		Removal and installation of rear suspension arm bushing(use with 09545-28100, 09546-21100)

		
09432-22000Bushing remover		Removal of rear trailing arm bushing(use with 09545-21100)
09456-21100Bushing installer		Installation of rear suspension arm bushing andrear axle carrier bushing (use with 09221-21000)
09545-21100Bushing remover and installer		Removal and installation of rear trailing arm andrear axle carrier bushing (use with 09432-22000, 09552-31000)
09545-28100Bushing remover		Removal of rear suspension arm bushing andrear axle carrier bushing (use with 09221-21000)
09552-31000Bushing installer		Installation of rear trailing arm bushing andrear axle carrier bushing (use with 09546-21100)
A-20 and A-40Strut compressor adapter		Compression of the rear coil spring (use with j38402)

Suspension System > General > SPECIFICATIONS

SPECIFICATIONS

Front suspension system

MacPherson strut with coil spring

Coil spring free height and identification color

Model	Free height mm (in.)	Identification color
L+A/C+S/R+ABS L/GL+GS+S/R L+A/C+P/S+S/R L/GL/GS+ABS L+A/C+P/S+ABS L/GL/GS+A/C+P/S L+A/T L/GL/GS+A/C+S/R L+A/T+S/R L/GL/GS+A/C+ABS L+A/T+ABS L/GL/GS+P/S+S/R L+A/T+P/S L/GL/GS+P/S+ABS L/GL/GS L/GL/GS+S/R+ABS L/GL/GS+A/C L/GL/GS+P/S+S/R+ABS L/GL/GS+P/S	133 (5.2)	PINK-1
GL/GS+A/C+P/S+S/R L+A/T+ABS+S/R GL/GS+A/C+P/S+ABS L+A/T+P/S+S/R GL/GS+A/C+S/R+ABS L+A/T+P/S+ABS L/GL/GS+A/C+P/S+S/R+ABS L+A/T+P/S+S/R+ABS GL/GS+A/T L+A/T+A/C ALL	133 (5.2)	PINK-1 BLUE-1

a. L, GS(L): Trim level
b. A/T: With automatic transaxle
c. P/S: With power steering
d. A/C: With air conditioning
e. S/R: With sun roof
f. ABS: With anti-lock braking system

Shock absorber

Type	Hydraulic cylindrical double-acting type
Maximum length	470 mm (18.5 in.)
Compressed length	319 mm (12.6 in.)
Stroke	151 mm (5.9 in.)

Stabilizer bar

Length (center to center)	980 mm (38.6 in.)
O.D.	17.3 mm (0.7 in.)

Wheel and Tire

Tire size	P155/80 R 13
	P175/65 R 14
	P175/70 R 13
Temporary tire	T105/70 D 14
Tire inflation pressure kPa (psi)	205 (30)

Temporary tire	414 (60)
Wheel size	4.5J X 13, 5J X 13(Steel wheel)
	5J X 13, 5J X 14(Aluminum wheel)

Rear suspension system

Dual Link

Coil spring

Wire dia. x O.D. (lower) x O.D (upper) X free height mm (in.)	11.8 X 150 X 95 X 340 (0.41 x 4.35 x 12.83)
Identification color	White

Shock absorber

Type	Hydraulic, cylindrical, double acting type
Max. length	562 mm (22.12 in.)
Min. length	361 mm (14.21 in.)
Stroke	201 mm (7.91 in.)

Suspension System > General > TIGHTENING TORQUE

TIGHTENING TORQUE

Front Suspension

Front suspension	Nm	kg.cm	lb.ft
Strut upper installation nut	20-30	200-300	14-22
Strut assembly to knuckle	75-90	750-900	55-66
Strut mounting self locking nut	60-70	600-700	43-51
Lower arm ball joint to knuckle	60-72	600-720	43-52
Lower arm mounting bracket to the lower arm	95-120	950-1200	69-87
Lower arm/lower arm bracket mounting bolt	60-80	600-800	43-58
Stabilizer bar lower/upper bracket mounting bolt	17-26	170-260	12-19
Tie rod end ball joint to knuckle	15-34	150-340	11-25

Rear Suspension

Rear suspension	Nm	kg.cm	lb.ft
Wheel bearing nut	180-220	1800-2200	130-159
Rear strut upper mounting nut	20-30	200-300	14-22
Rear strut to carrier	75-90	750-900	55-66
Stabilizer link mounting bolt	17-26	170-260	12-19
Trailing arm to carrier	100-120	1000-1200	72-87
Trailing arm complete to floor	40-50	400-500	29-36
Suspension arm to carrier	100-120	1000-1200	72-87
Suspension arm (A) to floor	100-120	1000-1200	72-87
Suspension arm (B) to floor	80-100	800-1000	58-72

Suspension System > General > TROUBLESHOOTING

TROUBLESHOOTING

FRONT SUSPENSION

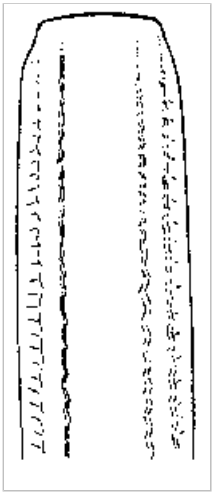
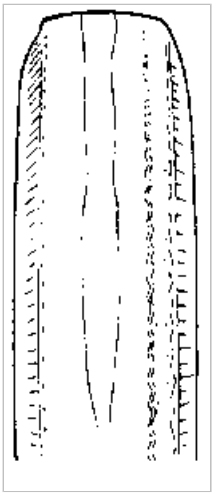
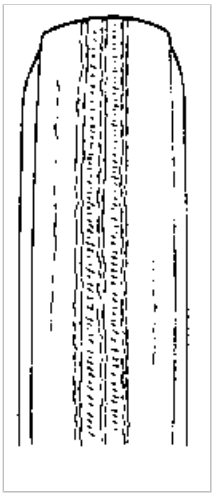
Symptom	Probable cause	Remedy
Hard steering	Improper front wheel alignment	Correct
	Excessive turning resistance of lower arm ball joint	Replace
	Flat tire	Adjust
	No power assist	Repair and replace
Poor return of steering wheel to center	Improper front wheel alignment	Correct
Poor riding	Improper front wheel alignment	Correct
	Malfunctioning shock absorber	Repair or replace
	Broken or worn stabilizer	Replace
	Broken or worn coil spring	Replace
	Worn lower arm bushing	Replace the lower arm assembly
Abnormal tire wear	Improper front wheel alignment	Correct
	Malfunctioning shock absorber	Replace
Wandering	Improper front wheel alignment	Correct
	Poor turning resistance of lower arm ball joint	Repair
	Loose or worn lower arm bushing	Retighten or replace
Vehicle pulls to one side	Improper front wheel alignment	Correct
	Excessive turning resistance of lower arm ball joint	Replace
	Broken or worn coil spring	Replace
	Bent lower arm	Repair
Steering wheel shimmy	Improper front wheel alignment	Correct
	Poor turning resistance of lower arm ball joint	Replace
	Broken or worn stabilizer	Replace
	Worn lower arm bushing	Replace
	Malfunctioning shock absorber	Replace
	Broken or worn coil spring	Replace
Bottoming	Broken or worn coil spring	Replace
	Malfunctioning shock absorber	Replace

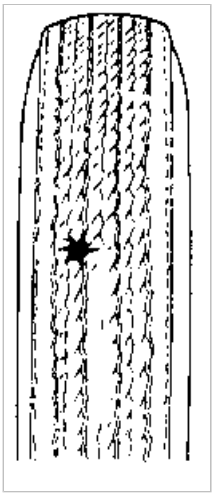
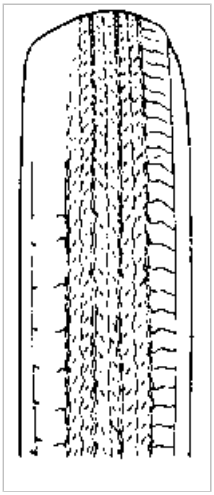
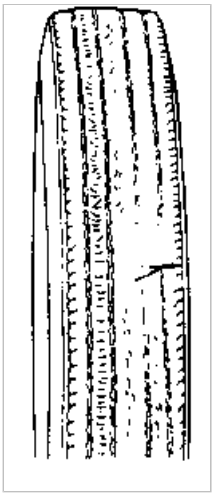
REAR SUSPENSION

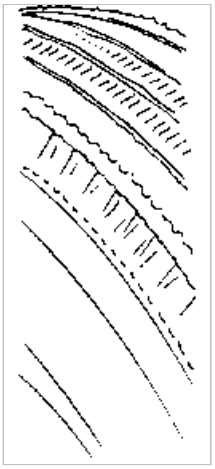
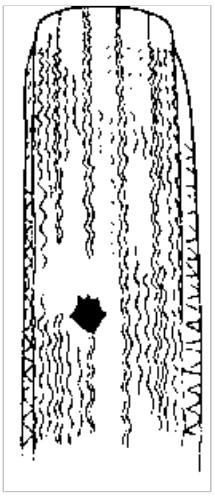
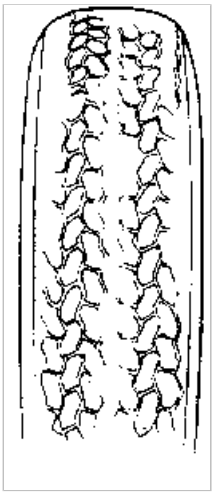
Symptom	Probable cause	Remedy
Abnormal sound	Loose installation parts	Retighten
	Damaged or worn wheel bearings	Replace
	Faulty shock absorber	Replace damaged parts
	Defective tire	Replace
Poor ride control	Excessive tire pressure	Adjust pressure
	Faulty strut assembly	Replace
	Loose wheel nuts	Tighten to specified torque
	Sagging or broken coil spring	Replace
	Defective tire	Replace
	Worn bushing	Replace
Vehicle body tilts to one side	Deformation of torsional axle and arm assembly	Replace
	Worn bushings	Replace
	Sagging or broken coil spring	Replace

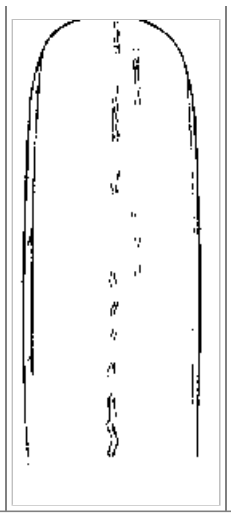
WHEEL AND TIRE DIAGNOSIS

CENTER OF TREAD WORN		

		a. Over-inflation
CENTER OF TREAD WORN		a. Center-tread down to fabric due to excessive over-inflation
BOTH SIDES OF TREAD WORN		a. Under-inflation b. Bulge at the shoulder c. Wear rapidly
CHUNKING OF TIRE		a. When a patch of tread has loosened, it can be torn off the tire by centrifugal force at high speed

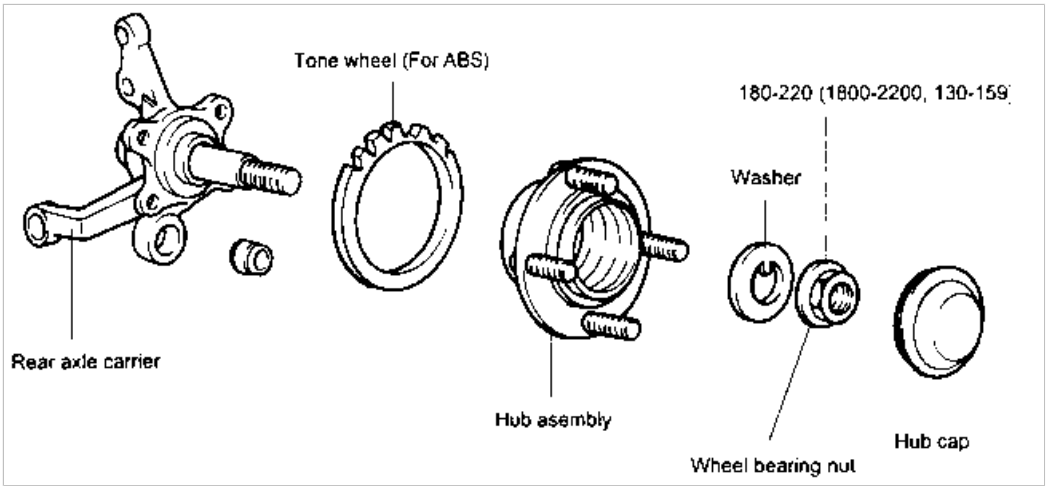
		
ONE SIDE OF TIRE WORN		a. Incorrect camber angle
FLAT SPOT		a. Caused by heavy braking which makes the wheels lock and scrubs the tires along the road surface
FEATHERING		a. Excessive TOE-IN, TOE-OUT

		
BAD PLUGGING		a. Using more than one plug distorts the tread, resulting in carcass failure
UNEVEN TIRE WEAR		a. Bad wheel balance, fault in suspension, steering gear of bearing
TOTALLY UNSAFE TIRE		a. Tread worn below the limit



Suspension System > Rear Suspension System > Rear Axle/Hub > COMPONENTS

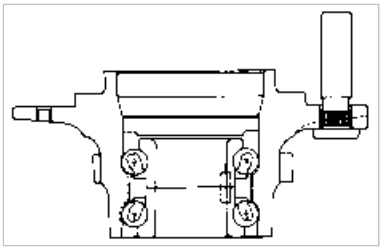
COMPONENTS



Suspension System > Rear Suspension System > Rear Axle/Hub > DISASSEMBLY

DISASSEMBLY

1. Jack up the rear of the vehicle and support it on jack stands.
2. Remove the wheel and tire.
3. Remove the brake drum.
4. Remove the rear hub assembly.
   The rear hub unit bearing should not be dismantled.



Suspension System > Rear Suspension System > Rear Axle/Hub > INSPECTION

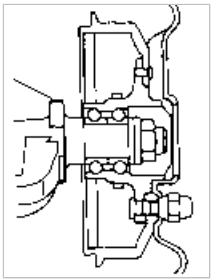
INSPECTION

1. Check the oil seal for crack or damage.
2. Check the rear hub unit bearing for wear or damage.
3. Check the rear rotor for chipped teeth.

Suspension System > Rear Suspension System > Rear Axle/Hub > REASSEMBLY

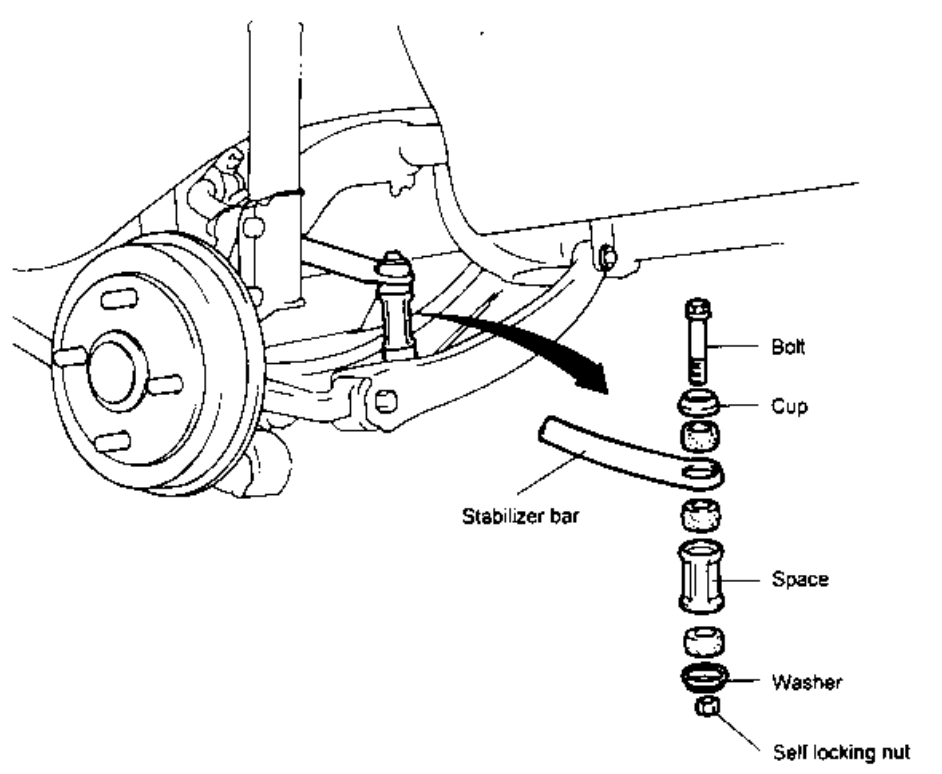
REASSEMBLY

1. After tightening the wheel bearing nut, crimp the nut to meet the concave portion of the spindle.
2. Install the hub cap.



Suspension System > Rear Suspension System > Rear Stabilizer Bar > COMPONENTS

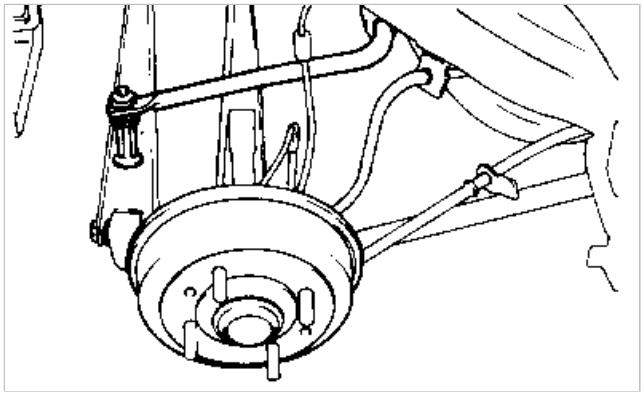
COMPONENTS



Suspension System > Rear Suspension System > Rear Stabilizer Bar > DISASSEMBLY

DISASSEMBLY

1. Remove the stabilizer link self-locking nut.
2. Remove the stabilizer brackets and bush.
3. Remove the stabilizer bar.



Suspension System > Rear Suspension System > Rear Stabilizer Bar > INSPECTION

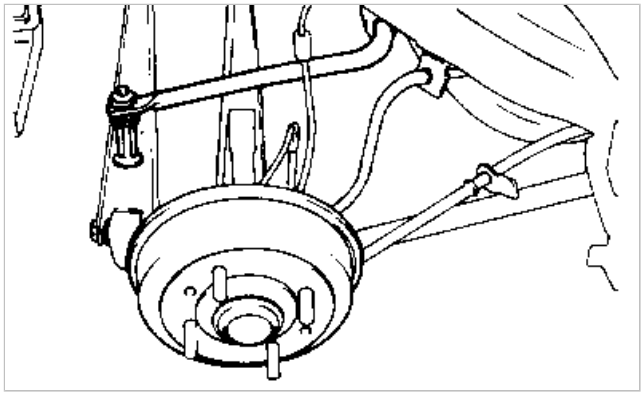
INSPECTION

1. Check the stabilizer bar for deterioration or damage.
2. Check all bolts for condition and straightness.

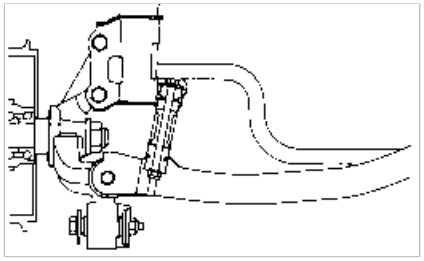
Suspension System > Rear Suspension System > Rear Stabilizer Bar > REASSEMBLY

REASSEMBLY

1. Install the bushing onto the stabilizer bar.
2. Tighten the bushing mounting bracket.
3. Secure the stabilizer bar link with spanner wrench then install the self-locking nut.

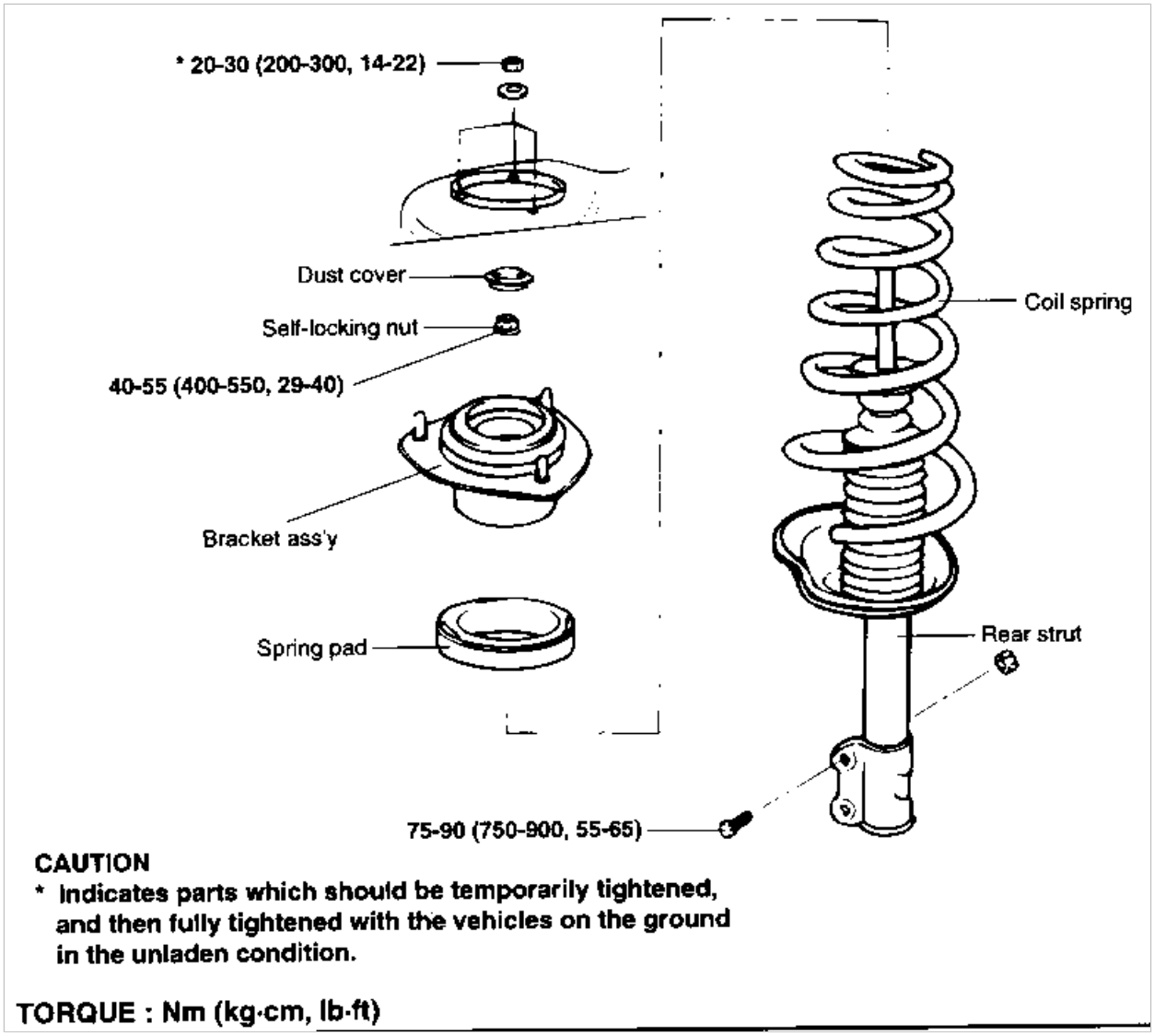


4. Tighten the self-locking nut on the stabilizer link to the specified distance.



Suspension System > Rear Suspension System > Rear Strut > COMPONENTS

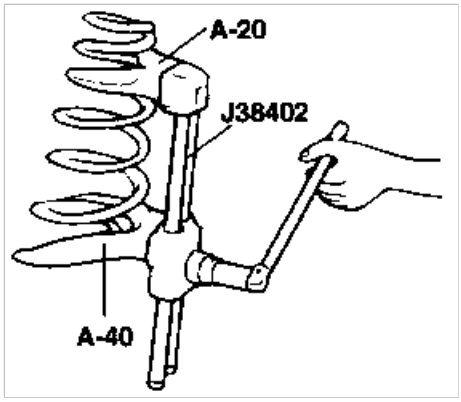
COMPONENTS



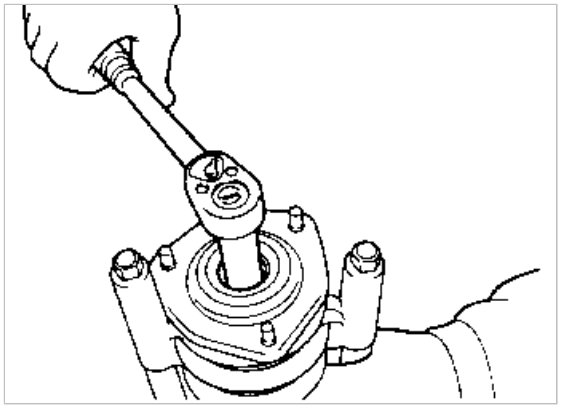
Suspension System > Rear Suspension System > Rear Strut > DISASSEMBLY

DISASSEMBLY

1. Before removing the piston rod tightening nut, compress the coil spring using the special tool.
   Do not use an air tool to tighten the bolt of the special tool.



2. While holding the piston rod, remove the piston rod tightening nut.



Suspension System > Rear Suspension System > Rear Strut > INSPECTION

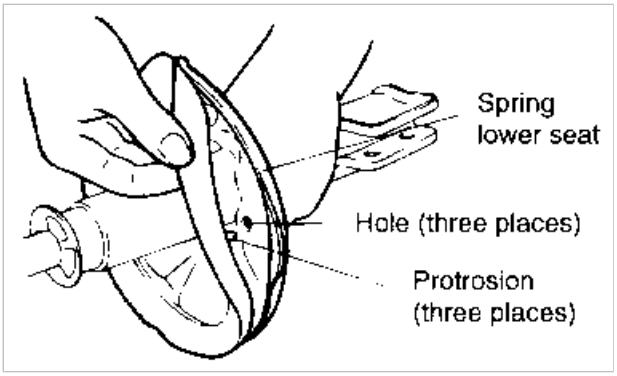
INSPECTION

1. Check the rubber parts for damage.
2. Check the coil springs for damage or deterioration.

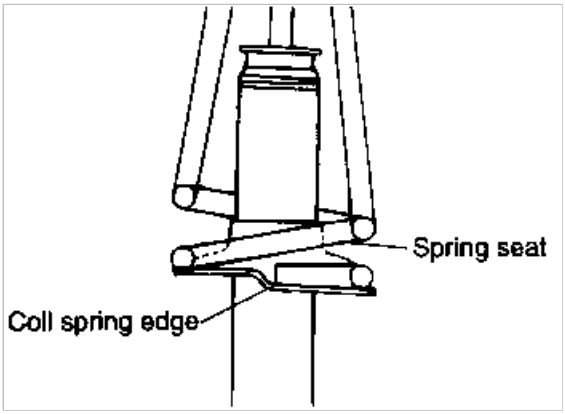
Suspension System > Rear Suspension System > Rear Strut > REASSEMBLY

REASSEMBLY

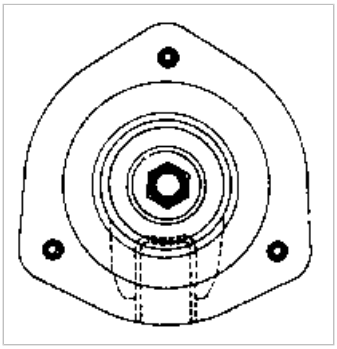
1. Install the lower spring pads so that the protrusions fit to the holes in the spring lower seat.



2. Compress the coil spring using the special tool and insert in the rear strut.
3. Align the edge of the coil spring to the position of the rear strut spring seat as shown.
   When replacing a coil spring, be sure to use a spring having the appropriate identification mark.

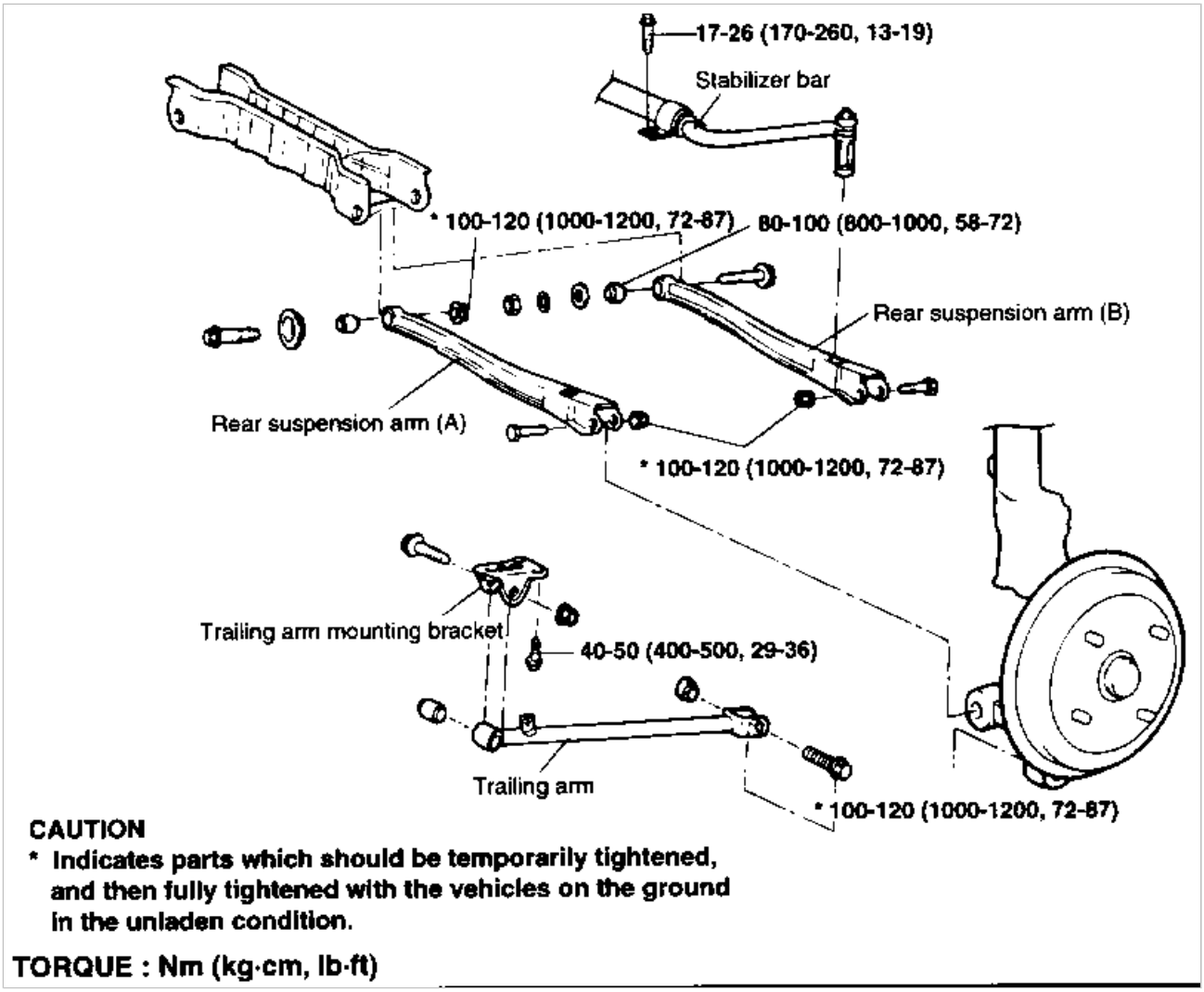


4. With the position of the bracket assembly as shown in the illustration, tighten the tightening nut according to the specified torque.



Suspension System > Rear Suspension System > Rear Suspension Arm > COMPONENTS

COMPONENTS



CAUTION
*** Indicates parts which should be temporarily tightened, and then fully tightened with the vehicles on the ground in the unladen condition.**

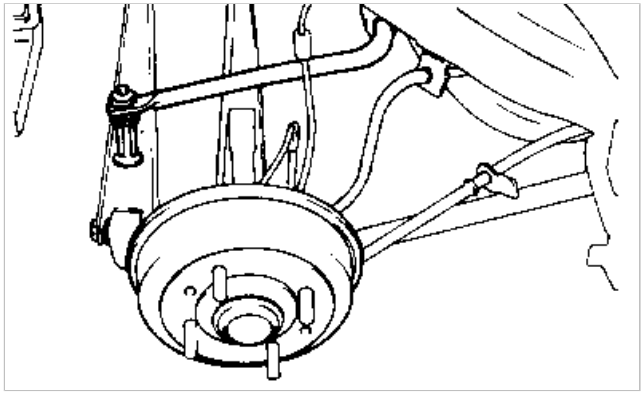
TORQUE : Nm (kg·cm, lb·ft)

Suspension System > Rear Suspension System > Rear Suspension Arm > DISASSEMBLY

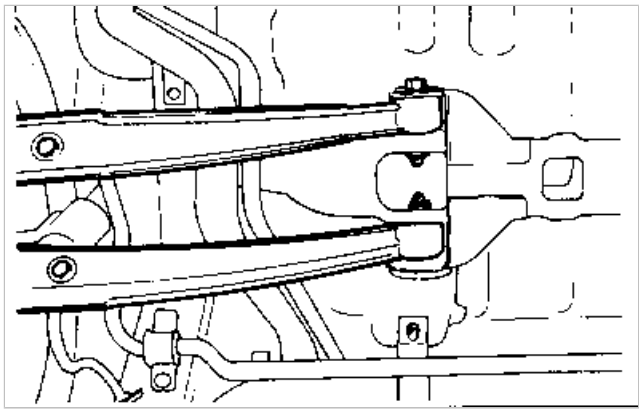
DISASSEMBLY

1. Remove the strut upper mounting nuts.
2. Remove the brake caliper assembly.
3. Remove the brake disc.
4. Remove the brake hose clamp bolt.

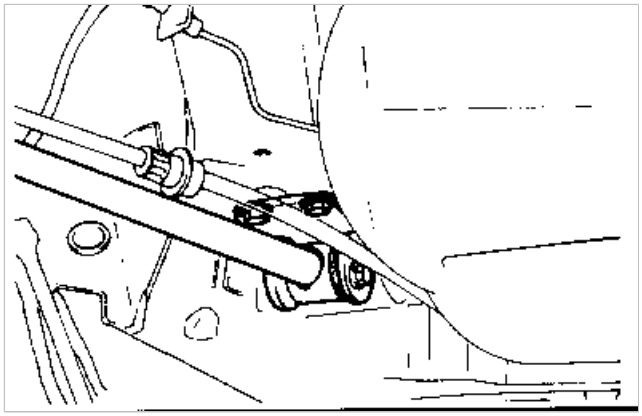
5. Remove the parking brake cable end.
6. Remove the stabilizer bar.



7. Remove the rear suspension.



8. Remove the trailing arm.
9. Remove the rear suspension assembly.



Suspension System > Rear Suspension System > Rear Suspension Arm > INSPECTION

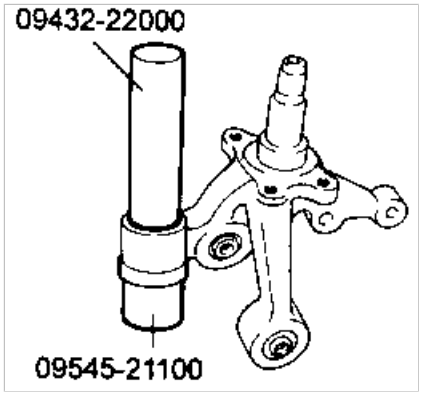
INSPECTION

Check the rear suspension for cracks or other damage.

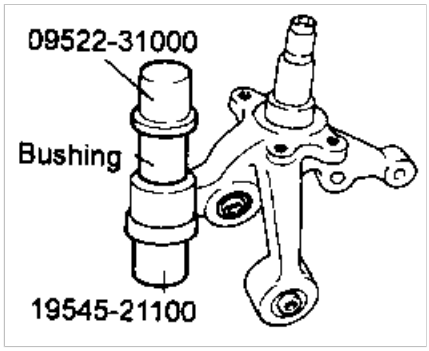
Suspension System > Rear Suspension System > Rear Suspension Arm > REAR AXLE CARRIER BUSH REPLACEMENT

REAR AXLE CARRIER BUSH REPLACEMENT

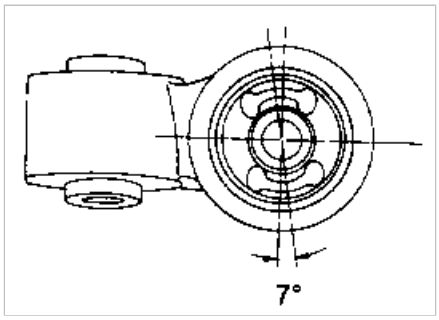
1. Install special tools (09432-22000, 09545-21100) on the rear axle carrier trailing arm bushing.
2. Press out the bushing.



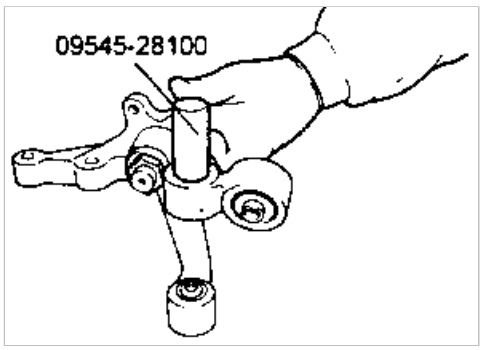
3. Apply soap solution to the new bushing and trailing arm bushing mount.
4. Install special tools (09545-21100, 09442-31000) and new bushing onto the rear axle carrier.



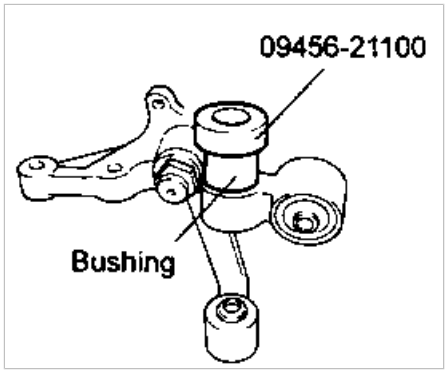
5. When press fitting, press in the direction of the arrow into the position as shown in the illustration.
6. Press fit the bushing into the bushing mount.



7. Install the special tool (09545-28100) on the rear axle carrier suspension arm bushing.
8. Press out the bushing.



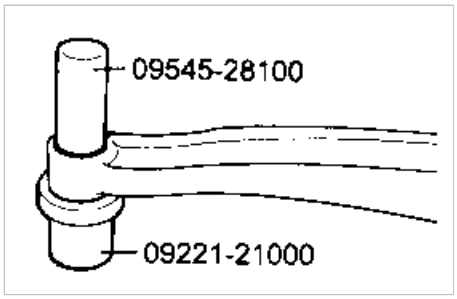
9. Apply soap solution to the new bushing and suspension arm bushing mount.
10. Install the special tool (09456-21100) and new bushing onto the rear axle carrier.
11. Press fit the bushing into the suspension arm bushing mount.



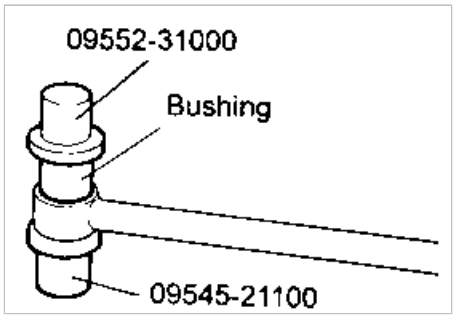
Suspension System > Rear Suspension System > Rear Suspension Arm > REAR SUSPENSION ARM BUSH REPLACEMENT

REAR SUSPENSION ARM BUSH REPLACEMENT

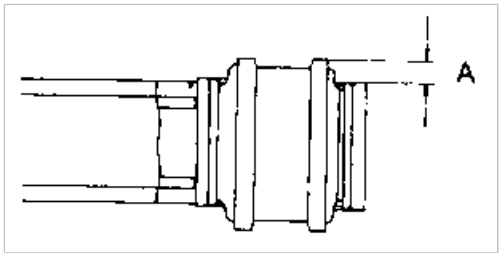
1. Install special tools (09221-21000, 09545-28100) on the rear suspension arm.
2. Press out the bushing.



3. Apply soap solution to the new bushing and rear suspension arm bushing mount.
4. Install special tools and new bushing onto the rear suspension arm.



5. Press until the inner pipe projection is at the standard value.



Suspension System > Rear Suspension System > Rear Suspension Arm > REASSEMBLY

REASSEMBLY

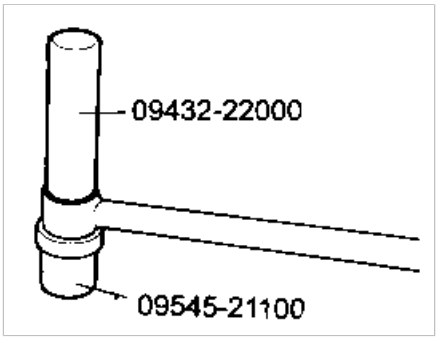
Reassembly is the reverse of the disassembly procedure.

Suspension System > Rear Suspension System > Rear Suspension Arm > TRAILING ARM BUSHING

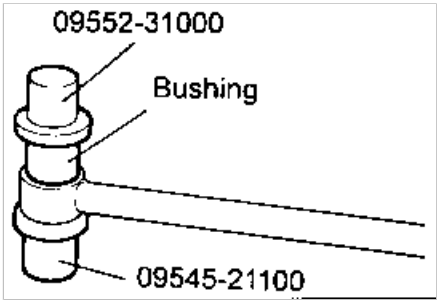
REPLACEMENT

TRAILING ARM BUSHING REPLACEMENT

1. Install the special tools (09432-22000, 09545-21100) on the trailing arm.
2. Press out the bushing.



3. Apply soap solution to the new bushing and trailing arm bushing mount.
4. Install special tools (09545-21100, 09552-31000) and new bushing on to the trailing arm.
5. Press fit the bushing into the trailing arm bushing mount.



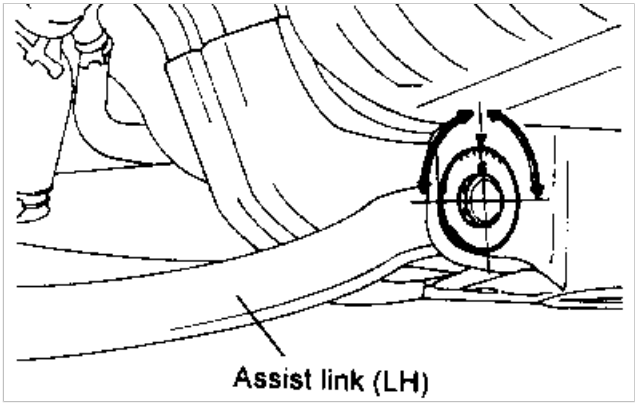
Suspension System > Tires/Wheels > Tire > SERVICE ADJUSTMENT PROCEDURES

SERVICE ADJUSTMENT PROCEDURES

REAR WHEEL ALIGNMENT INSPECTION

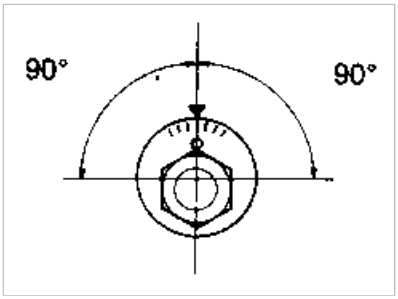
TOE-IN

The rear suspension (B) mounting bolt should be turned an equal amount on both sides when adjusting.



The scale has gradations of approximately 2.4 mm (0.09 in.) (single side toe angle equivalent to 14')

a. The eccentric bolt should be adjusted within a 90° range left and right from the centre position.



Suspension System > Tires/Wheels > Tire > SERVICE ADJUSTMENT PROCEDURES

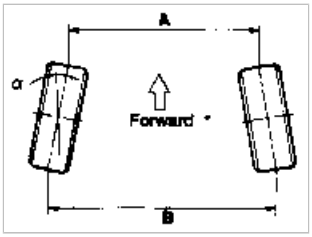
SERVICE ADJUSTMENT PROCEDURES

FRONT WHEEL ALIGNMENT

When using a wheel alignment tester to inspect front wheel alignment, always position the car on a level surface and the front wheels in the straight ahead position. Prior to inspection, make sure that the front suspension and steering system are in normal operating condition and that wheels and tires are free of deflection and tires are inflated to specification.

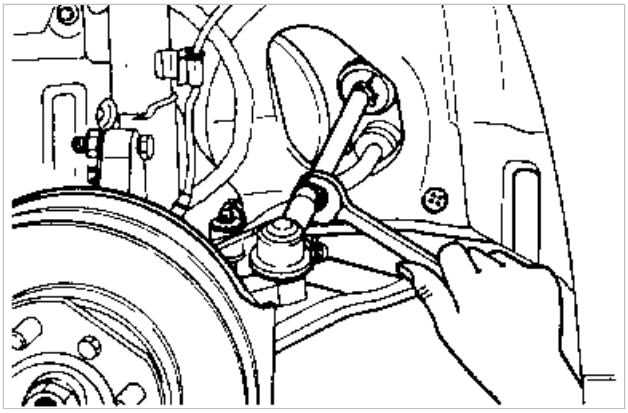
TOE-IN

Toe-in (B-A or angle) is adjusted by turning the tie rod turn-buckles. Toe in on the left front wheel can be reduced by turning the tie rod toward the rear of the car. Toe change is achieved by turning the tie for the right and left wheels simultaneously the same amount as follows:



Description	Changes in toe mm (in.)/deg.
No. of turns of tie rod (same amount for right and left): 1/2	Approx. 5.5 (0.217)/32.5'
No. of turns of tie rod (same amount for right and left): 1	Approx. 11 (0.433)/1°5'

a. Toe-in adjustment by turning the right and left tie rods the same amount.
b. When adjusting toe-in, loosen the outer bellows clip to prevent twisting the bellows.
c. After the adjustment, firmly tighten the tie rod end lock nuts and reinstall the bellows clip.

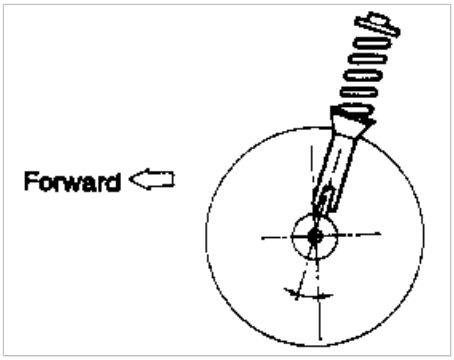


CAMBER

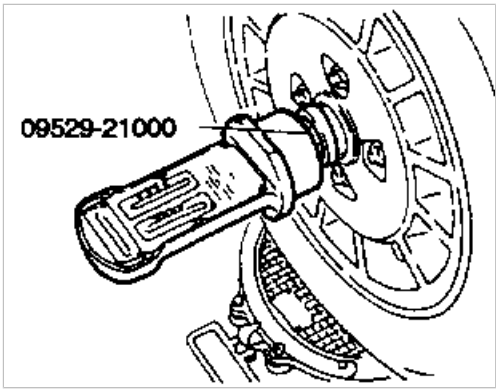
The steering knuckle, which is integral with the strut assembly, is pre-adjusted to the specified camber at the factory and requires no adjustment.

CASTER

Caster is pre-set at the factory and cannot be adjusted. If caster is not within standard value, replace the bent or damaged parts.



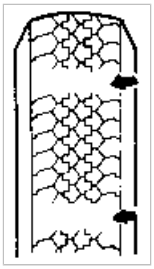
a. The front suspension assembly must be free of worn, loose or damaged parts prior to measuring front wheel alignment.
b. Measure wheel alignment by using the special tool.
c. Camber and caster are pre-set at the factory and cannot be adjusted.
d. If camber and caster are not within specifications, replace bent or damaged parts.



Suspension System > Tires/Wheels > Tire > TIRE WEAR

TIRE WEAR

1. Measure the tread depth of tires.
2. If the remaining tread depth is less than the limit, replace the tire.
   When the tread depth of the tires is reduced to 1.6 mm (0.06 in.) or less, the wear indicators will appear.



Suspension System > Tires/Wheels > Wheel > WHEEL

WHEEL

INSTRUCTIONS FOR ALUMINUM TYPE WHEELS

a. Aluminum wheels need special attention. If salt or chemicals have adhered to the wheels, they need to be rinsed off as soon as possible. After cleaning the wheels, apply a coating of wax to prevent corrosion.
b. When cleaning the vehicle with steam, do not direct steam onto the aluminum wheels.
1) Clean the hub surface.
2) After finger tightening the wheel nuts, tighten them to specifications.
3) Do not use an impact wrench or push on the wrench with your foot to tighten the wheel nuts.
4) Do not apply oil to the threaded portions.

TIRE CHAINS AND SNOW TIRES

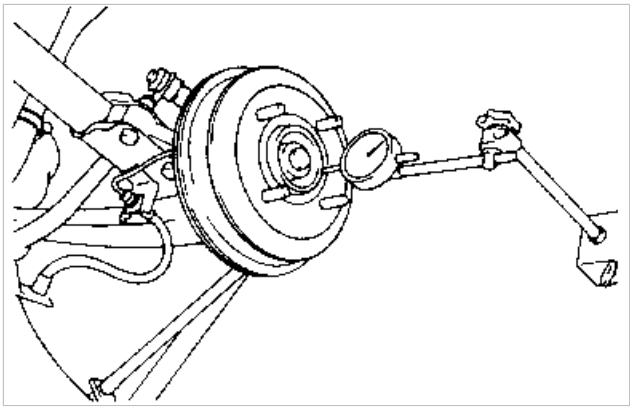
a. Use tire chains only on the front wheels. Do not use tire chains on rear wheels.

b. When using snow tires, use them on all four wheels for maneuverability and safety.

Suspension System > Tires/Wheels > Wheel > WHEEL BEARING END PLAY INSPECTION

WHEEL BEARING END PLAY INSPECTION

1. Inspect the play of the bearings while the vehicle is jacked up and resting on floor jack.
2. If there is any play, remove the hub cap and then release the parking brake.
3. Remove the caliper assembly and the brake disc.
4. Check the bearing's end play.
   Place a dial gauge against the hub surface, then move the hub in the axial direction and check whether or not there is end play.

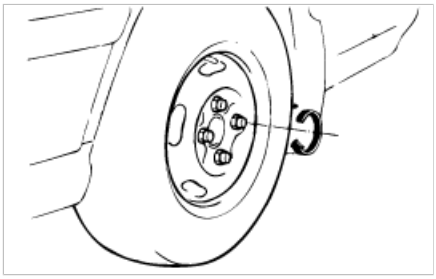


5. If the end play exceeds the limit, the rear wheel bearing nut should be tightened to the specified torque and check the end play again.
6. Replace the rear hub bearing unit if an adjustment cannot be made to within the limit.

Suspension System > Tires/Wheels > Wheel > WHEEL NUT TIGHTENING

WHEEL NUT TIGHTENING

1. Tightening torque.
   When using impact-wrench, tightening torque should be checked using a hand torque wrench.
2. Tightening order: go around the wheel tightening every other nut until they are all tight. Double-check each nut for tightness.

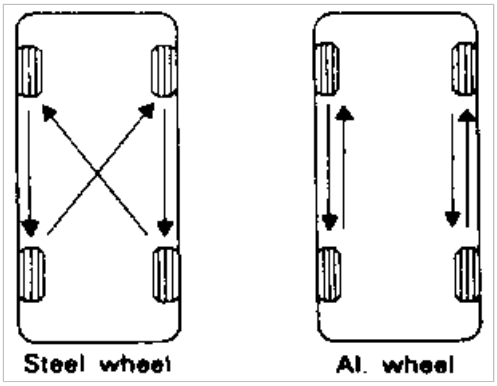


Suspension System > Tires/Wheels > Wheel > WHEEL ROTATION

WHEEL ROTATION

Rotate the tires in the patterns illustrated.

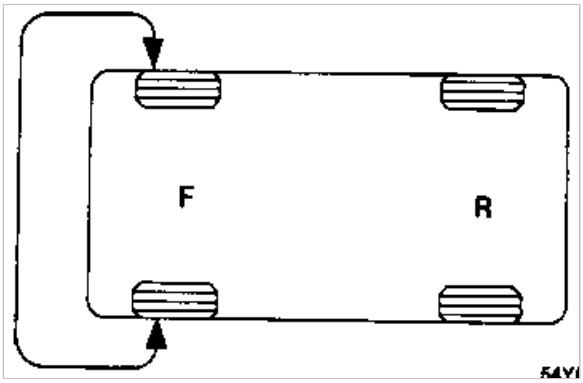
The temporary spare tire should not be used in the wheel rotation.



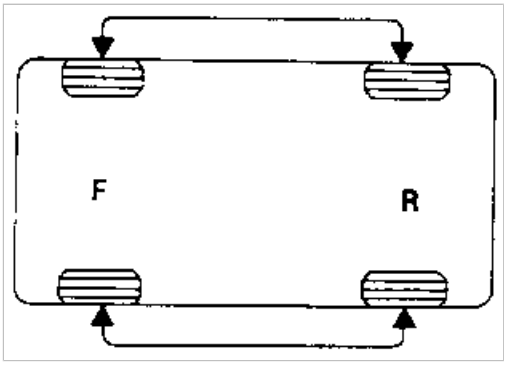
Checking for pull and wander

If the steering pulls to one side, use the following wheel rotation procedure.

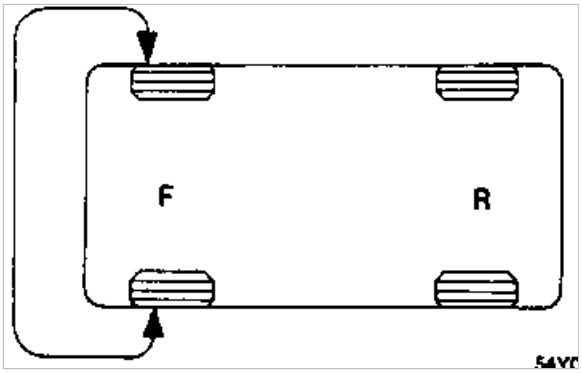
1. Switch the front right and front left tires, and perform the road test in order to confirm vehicle stability.



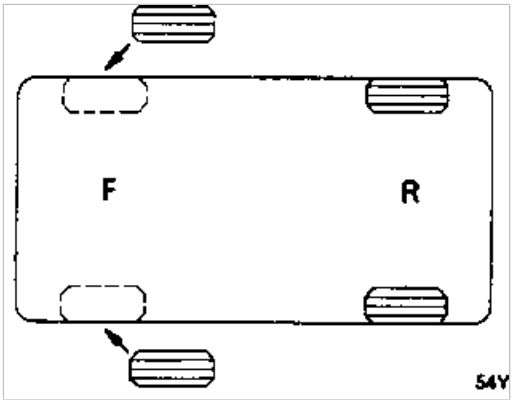
2. If the steering pulls to opposite side, switch the front and rear tires, and again perform the road test.



3. If the steering continues to pull to one side, switch the front right and left tires again, and again perform the road test.



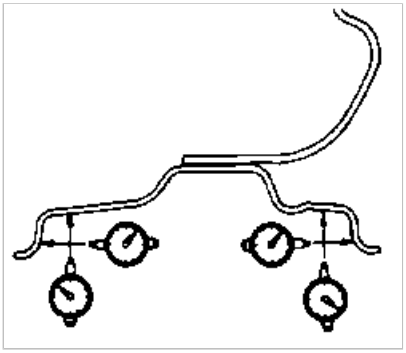
4. If the steering continues to pull to the opposite side, replace the front wheels with new ones.



Suspension System > Tires/Wheels > Wheel > WHEEL RUNOUT

WHEEL RUNOUT

1. Jack up the vehicle and support it with floor stands.
2. Measure wheel runout with a dial indicator as illustrated.

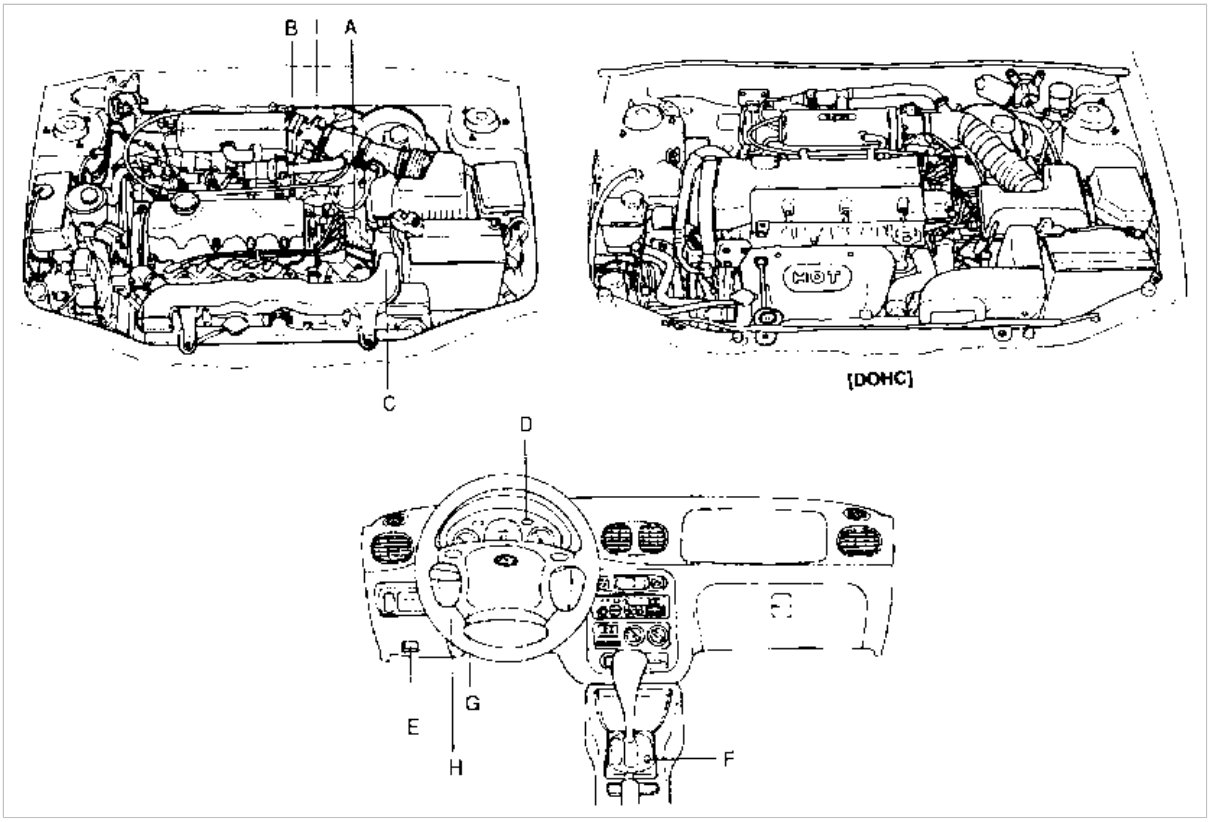


3. Replace the wheel if wheel runout exceeds the limit.

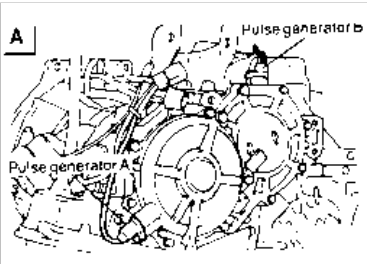
ACCENT(X3) > 1998 > G 1.5 SOHC > Transaxle/Transmission

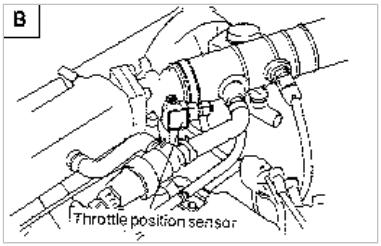
Transaxle/Transmission > Automatic Transaxle Control System > E.L.C 4-SPEED AUTOMATIC TRANSAXLE CONTROL COMPONENTS

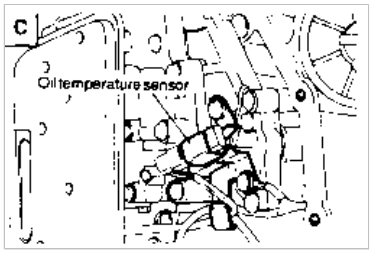
E.L.C 4-SPEED AUTOMATIC TRANSAXLE CONTROL COMPONENTS

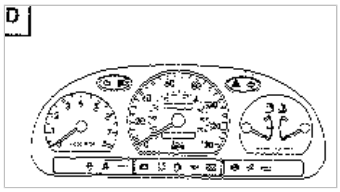


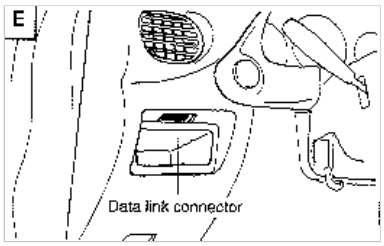
Name	Symbol	Name	Symbol
Pulse generator A, B	A	Normal (NORM)/Economy (ECO) switch	F
M.F.I. throttle position sensor	B	4 A/T control module	G
Oil temperature sensor	C	M.F.I control module	H
Vehicle-speed sensor	D	Idle switch	I
Data link connector	E		

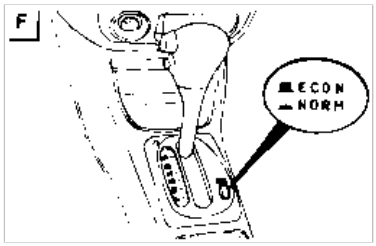


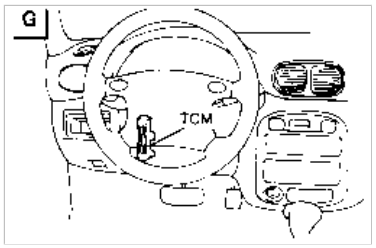


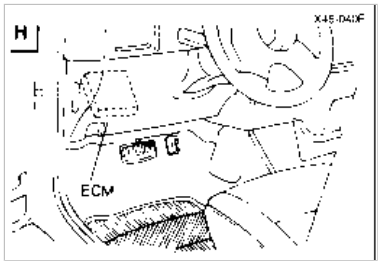


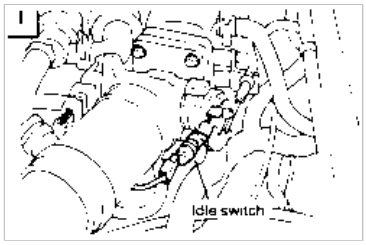












Transaxle/Transmission > Automatic Transaxle System > IDLE SWITCH CHECK AND ADJUSTMENT

IDLE SWITCH CHECK AND ADJUSTMENT

After warming up the engine, make sure that the idle switch is on with the accelerator pedal in the free state.

Check to see that the idle switch is on or off by checking the voltage between the wire at the idle switch connector and the ground wire.

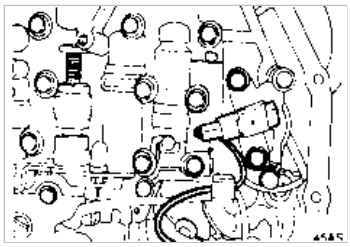
a. When the idle switch is ON: 0V

b. When the idle switch is OFF: 12v

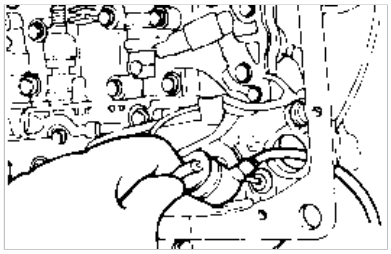
Transaxle/Transmission > Automatic Transaxle System > LINE PRESSURE ADJUSTMENT

LINE PRESSURE ADJUSTMENT

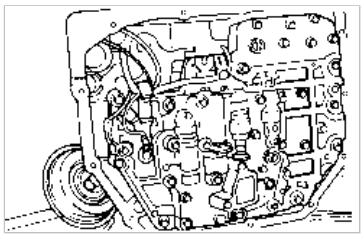
1. Drain the automatic transaxle fluid.
2. Remove the oil pan.
3. Remove the oil filter.
4. Remove the oil temperature sensor.



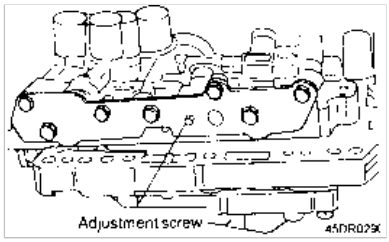
5. Press the tab of the solenoid valve harness grommet and push in.



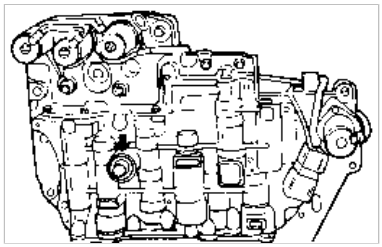
6. Remove the valve body assembly. The manual valve can come out, so be careful not to drop it.



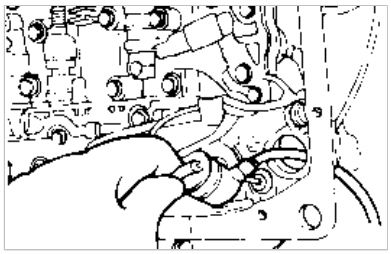
7. Turn the adjustment screw of the regulator valve and adjust so that the line pressure (kickdown brake pressure) reaches the standard value.
   When the adjustment screw is turned clockwise, the line pressure becomes higher; when it is turned counterclockwise, it becomes lower.



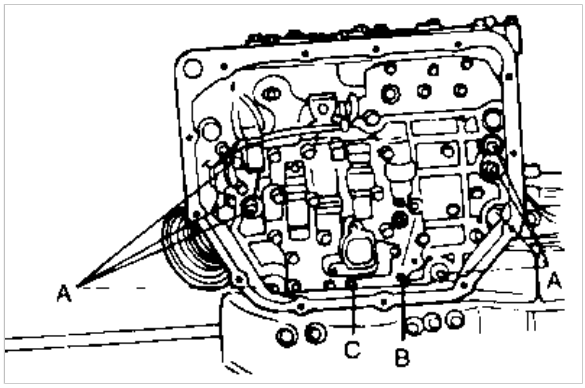
8. Check to be sure that the O-ring is installed on the upper surface of the valve body at the place shown in the figure.
9. Replace the O-ring of the solenoid valve connector with a new one.



10. Install the valve body assembly to the case and then insert the solenoid valve connector into the case. Be sure, at this time, that the notched part of the connector faces as shown in the figure.
    Also be careful that the lead wiring isn't caught.



11. Tighten the ten (10) valve body assembly mounting bolts to 10-12 Nm (100-120 kg.cm, 7-9 lb.ft).
    a. A: 25 mm (0.709 in.) long
    b. B: 35 mm (0.984 in.) long
    c. C: 40 mm (1.575 in.) long
12. Install the oil filter.
13. Install a new oil pan gasket with the oil pan.
14. Pour in the specified amount of automatic transaxle fluid.
15. Make the oil pressure test. Readjust if necessary.



Transaxle/Transmission > Automatic Transaxle System > LUBRICANTS

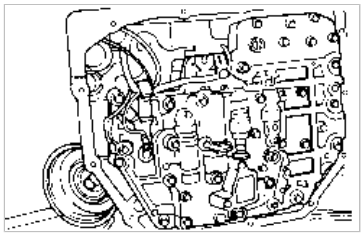
LUBRICANTS

Items	Specified lubricant	Quantity
Transaxle fluid lit. (U.S. qts., Imp. qts.)	GENUINE HYUNDAI ATF SP-11, DIAMOND ATF SP-II OR AUTRAN MMSP-II.	6.5 (6.8,5.7)
Drive shaft oil seal lip	Automatic transaxle fluid	As required
Sliding part of bushing	Chassis grease SAE J310, NLGI No. 0	As required
Selector lever sliding portion	Multipurpose grease SAE J310, NLGI No. 2	As required

Transaxle/Transmission > Automatic Transaxle System > REDUCING PRESSURE ADJUSTMENT

REDUCING PRESSURE ADJUSTMENT

1. Remove parts up to the oil filter in the same way as for line pressure adjustment. The valve body need not be removed.
2. Turn the lower valve body adjustment screw and adjust it so that the reducing pressure is the standard value. When the adjustment screw is turned clockwise, the reducing pressure becomes higher; when it is turned counterclockwise, it becomes lower.
   When adjusting the reducing pressure, aim for the center value (425 kPa, 60 psi) of the standard value allowance.
3. Install the oil filter and oil pan in the same way as for adjustment of the line pressure.
4. Make the oil pressure test. Readjust if necessary.
   This adjustment should be made at an oil temperature of 80-90°C (176-194°F).
   If the adjustment is made at a temperature that is too high, the line pressure will drop during idling. If this happens, it may not be possible to make the correct adjustment.

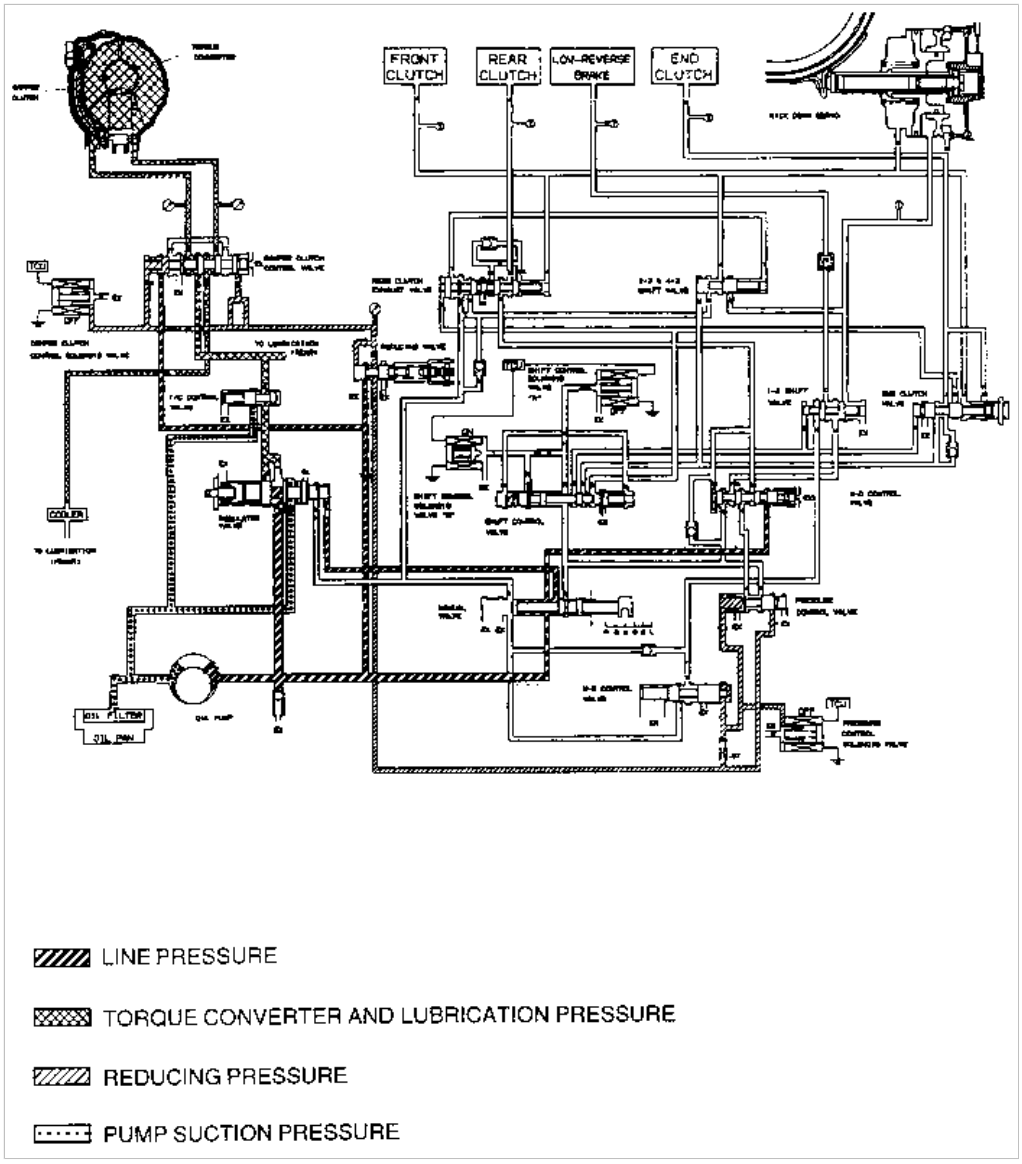


Transaxle/Transmission > Automatic Transaxle System > SCHEMATIC DIAGRAMS

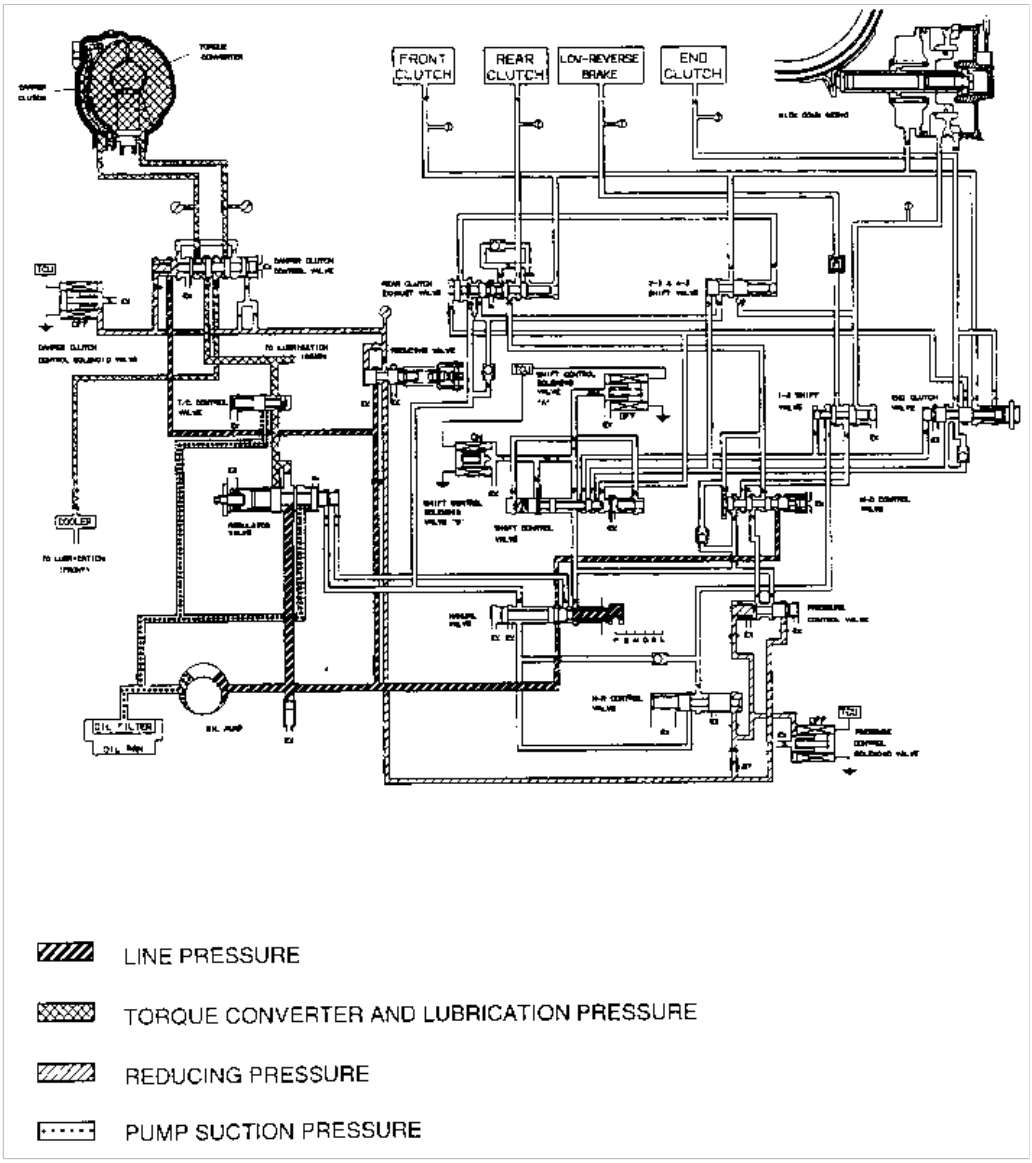
SCHEMATIC DIAGRAMS

Automatic Transaxle System Schematics

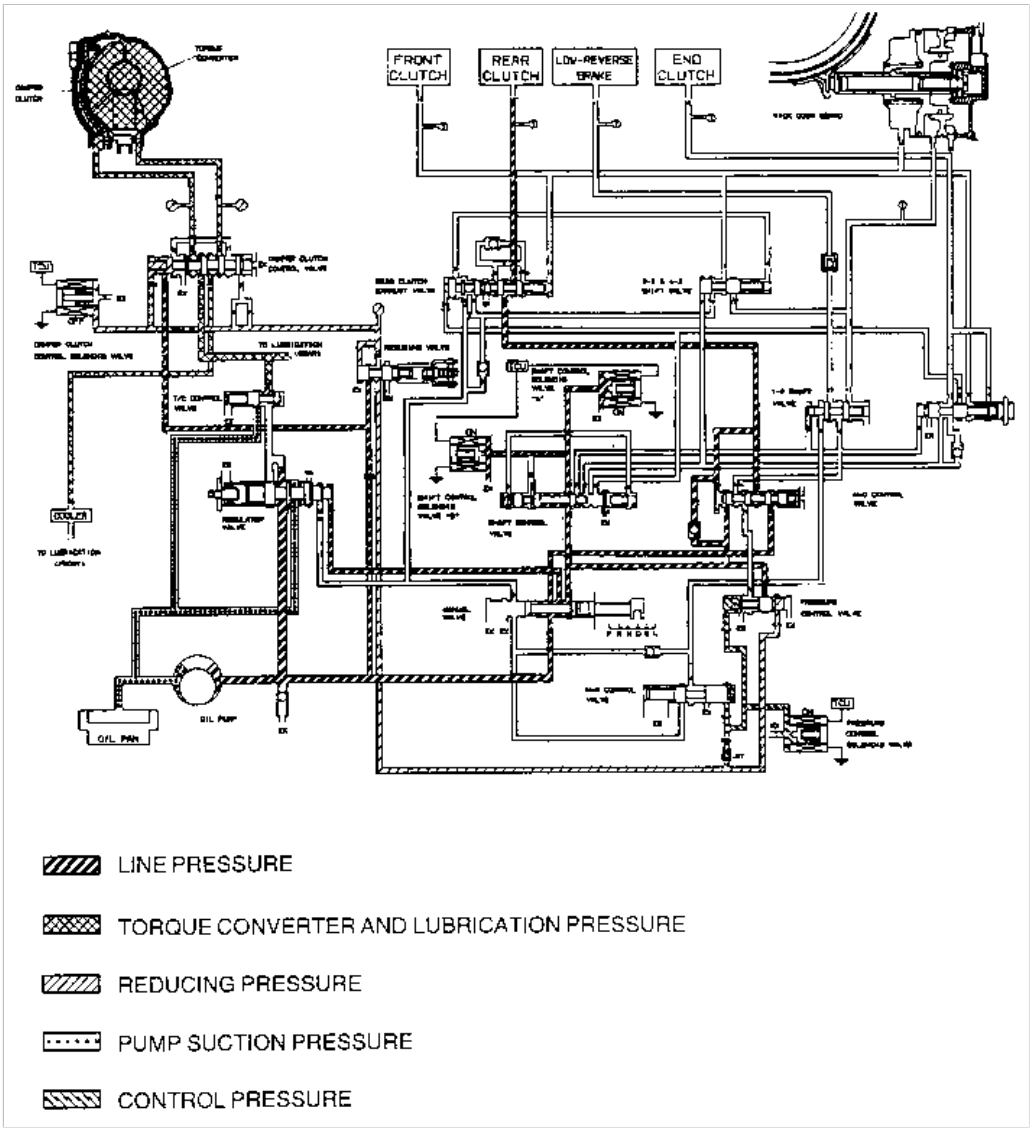
NEUTRAL



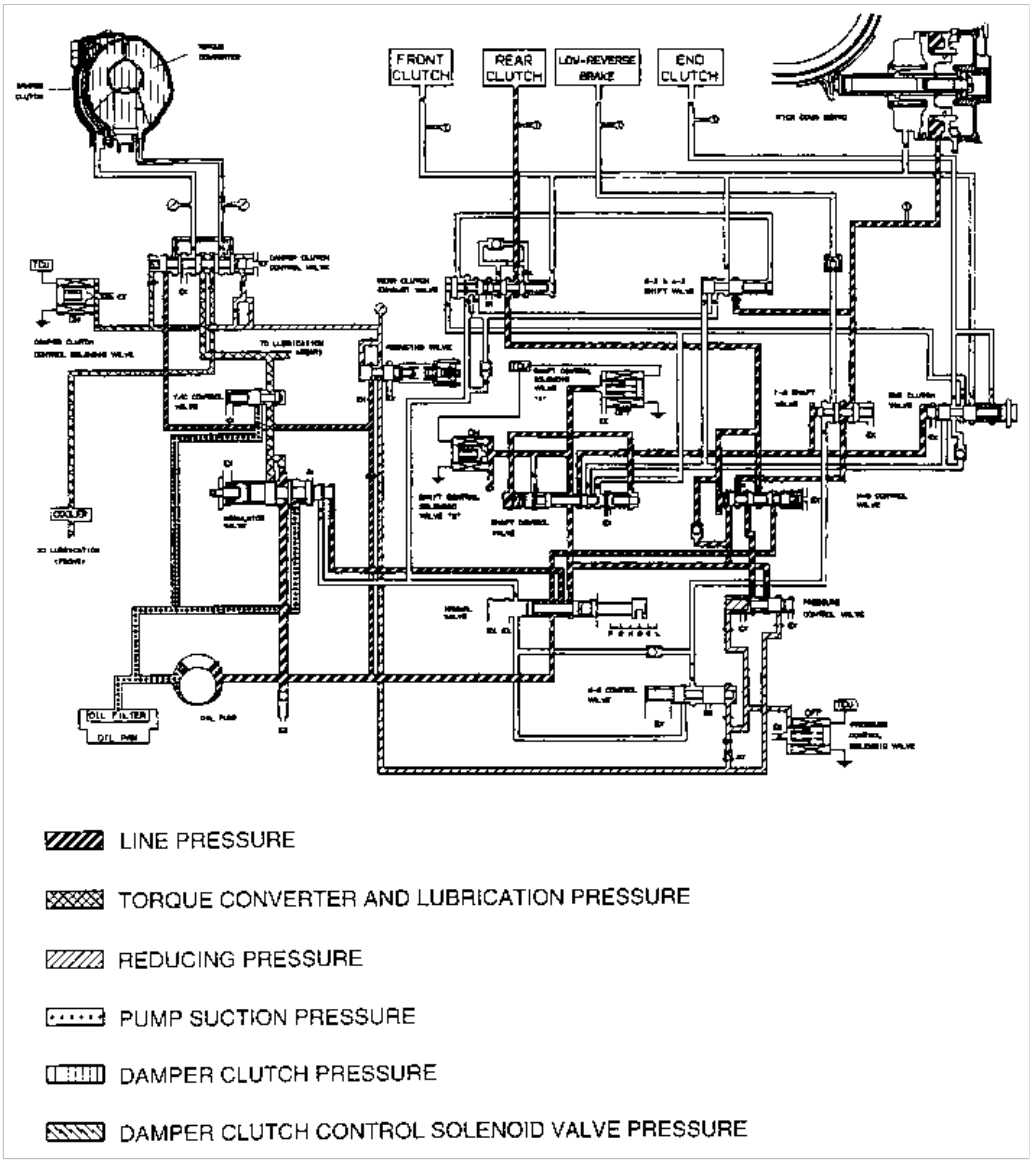
PARKING


FRONT CLUTCH
REAR CLUTCH
LOW-REVERSE BRAKE
END CLUTCH
TCU
COOLER
LINE PRESSURE
TORQUE CONVERTER AND LUBRICATION PRESSURE
REDUCING PRESSURE
PUMP SUCTION PRESSURE

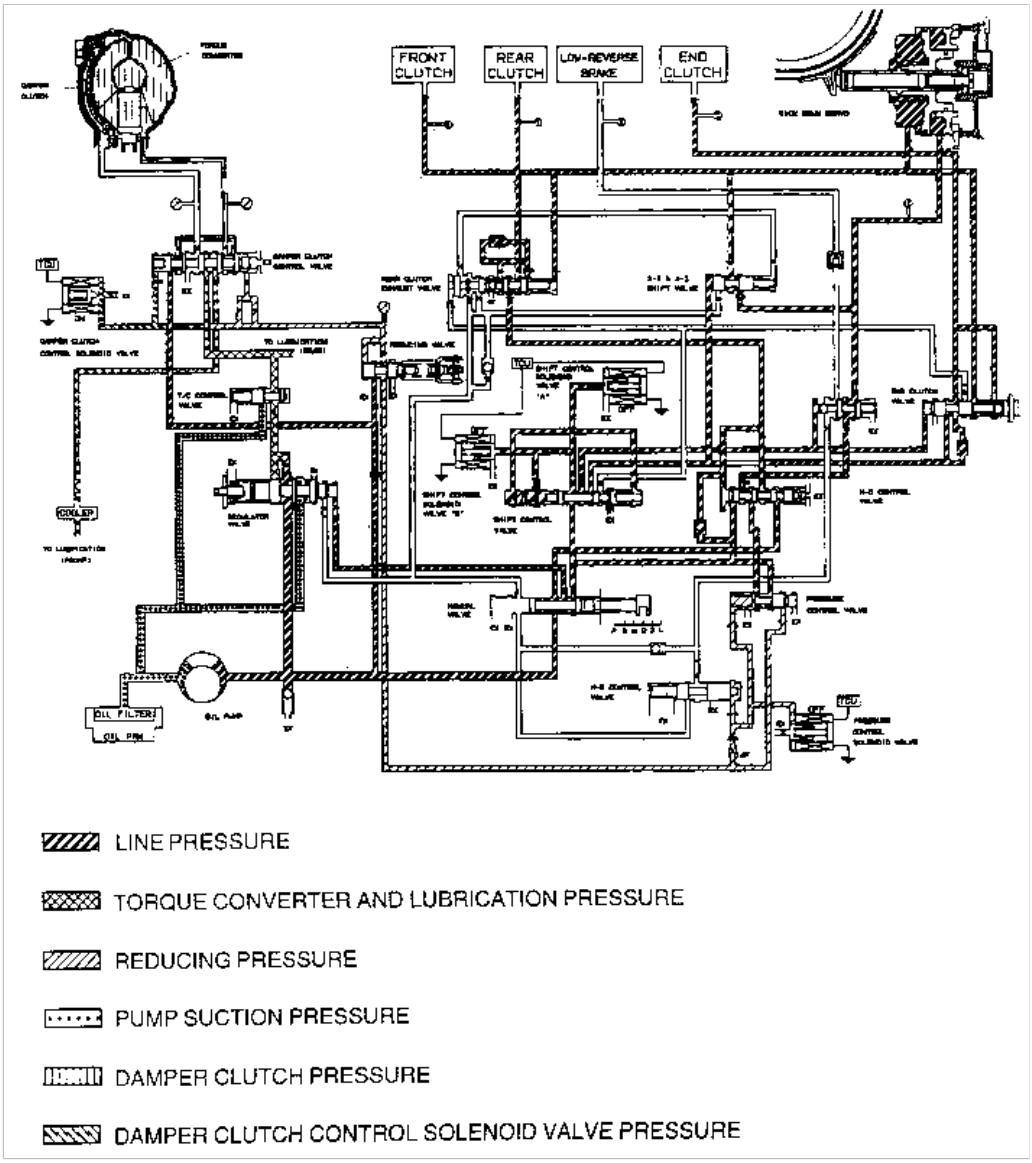
DRIVE (FIRST)



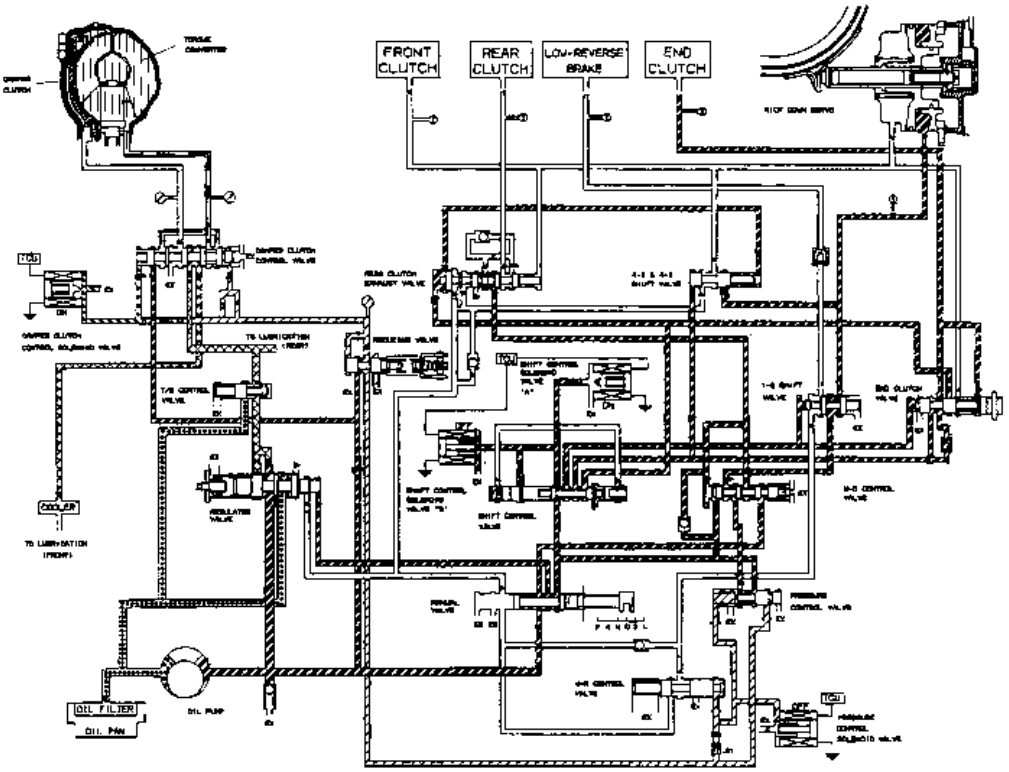
DRIVE (SECOND)


FRONT CLUTCH
REAR CLUTCH
LOW-REVERSE BRAKE
END CLUTCH
COOLER
OIL FILTER
OIL PAN
LINE PRESSURE
TORQUE CONVERTER AND LUBRICATION PRESSURE
REDUCING PRESSURE
PUMP SUCTION PRESSURE
DAMPER CLUTCH PRESSURE
DAMPER CLUTCH CONTROL SOLENOID VALVE PRESSURE

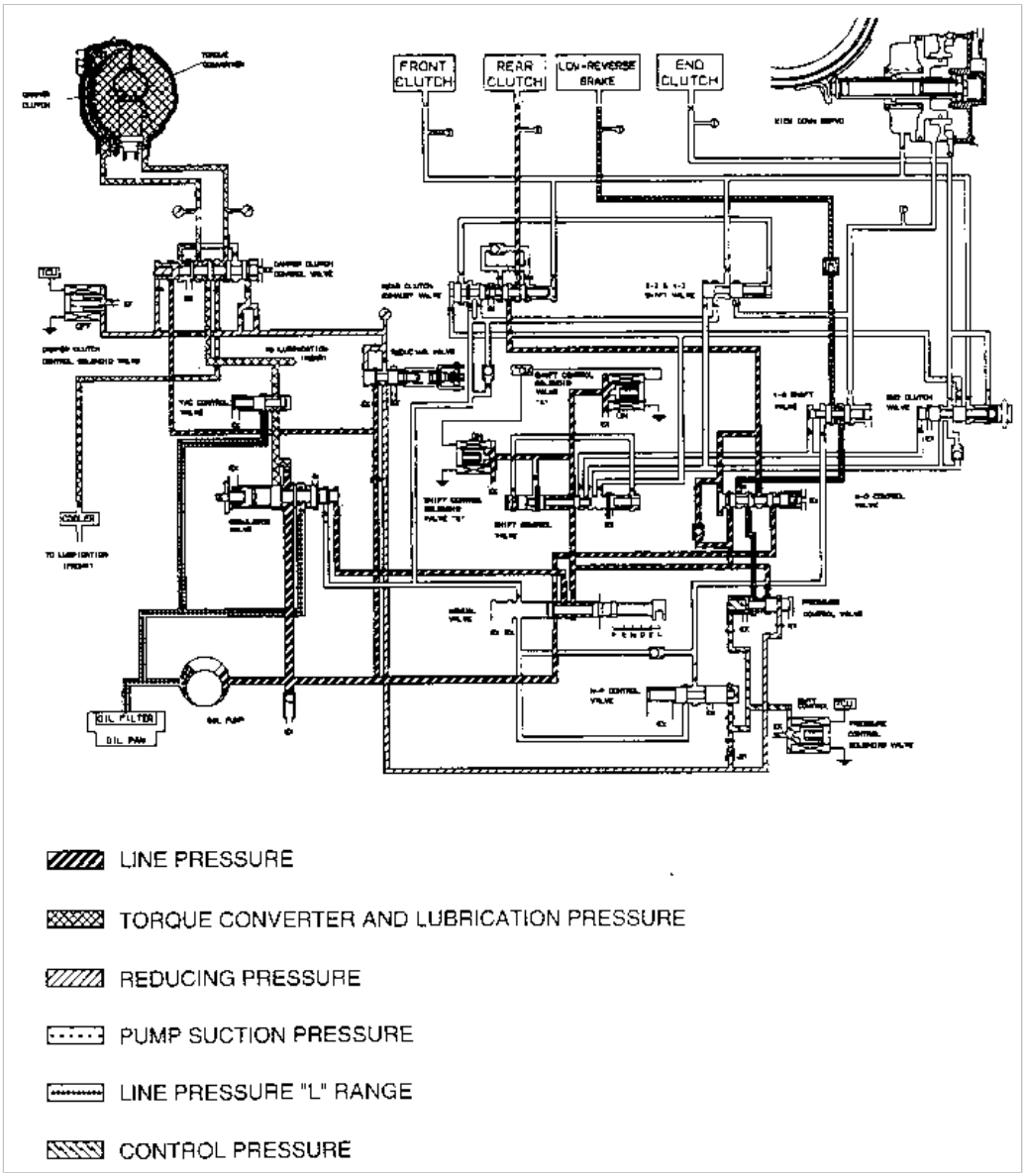
DRIVE (THIRD)



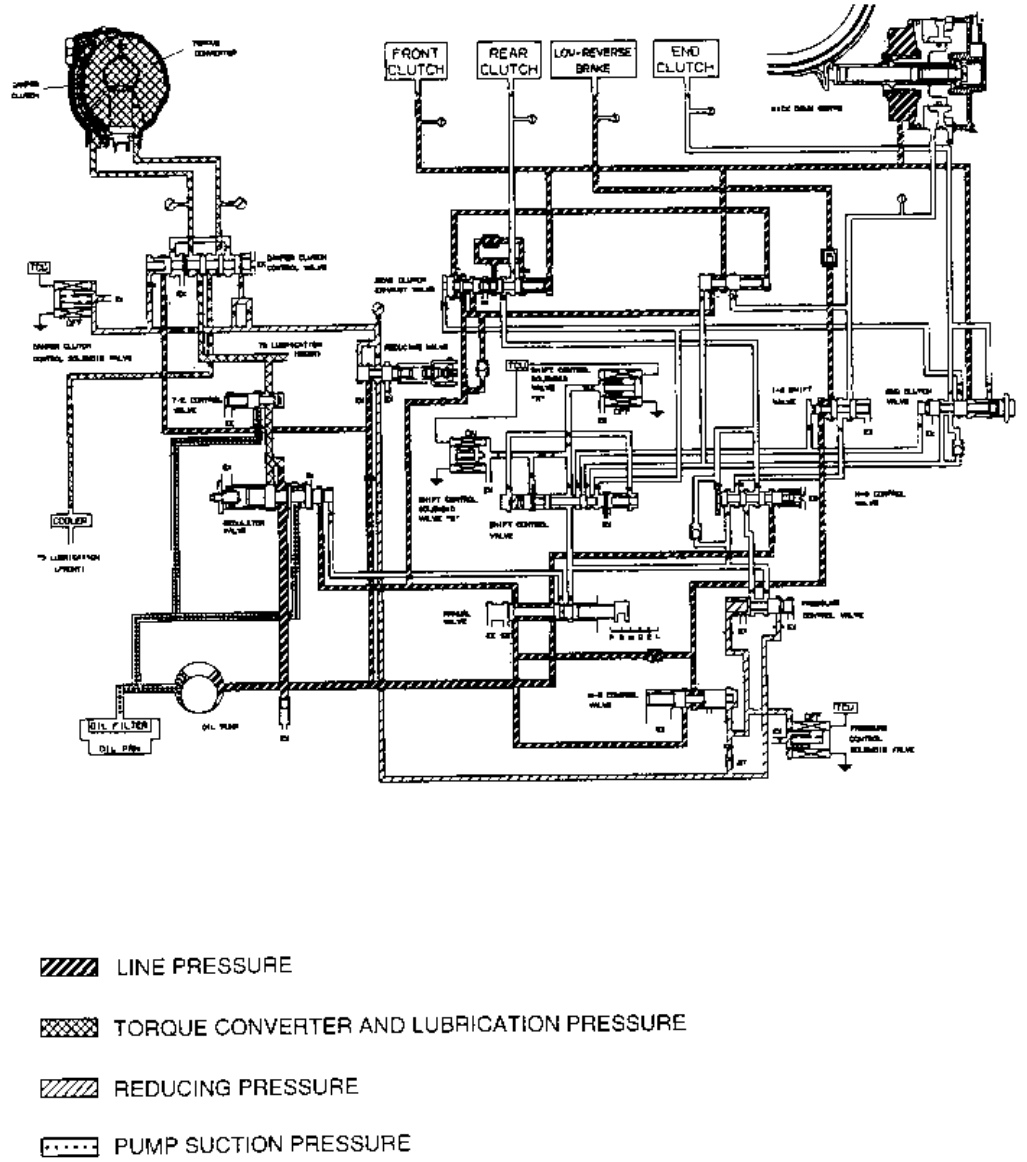
DRIVE (FOURTH)


FRONT CLUTCH
REAR CLUTCH
LOW-REVERSE BRAKE
END CLUTCH
TCU
COOLER
OIL FILTER
OIL PAN
OIL PUMP
LINE PRESSURE
TORQUE CONVERTER AND LUBRICATION PRESSURE
REDUCING PRESSURE
PUMP SUCTION PRESSURE
DAMPER CLUTCH PRESSURE
DAMPER CLUTCH CONTROL SOLENOID VALVE PRESSURE

LOCK UP


FRONT CLUTCH
REAR CLUTCH
LOW-REVERSE BRAKE
END CLUTCH
KICK DOWN SERVO
TCU
COOLER
OIL FILTER
OIL PAN
LINE PRESSURE
TORQUE CONVERTER AND LUBRICATION PRESSURE
REDUCING PRESSURE
PUMP SUCTION PRESSURE
LINE PRESSURE "L" RANGE
CONTROL PRESSURE

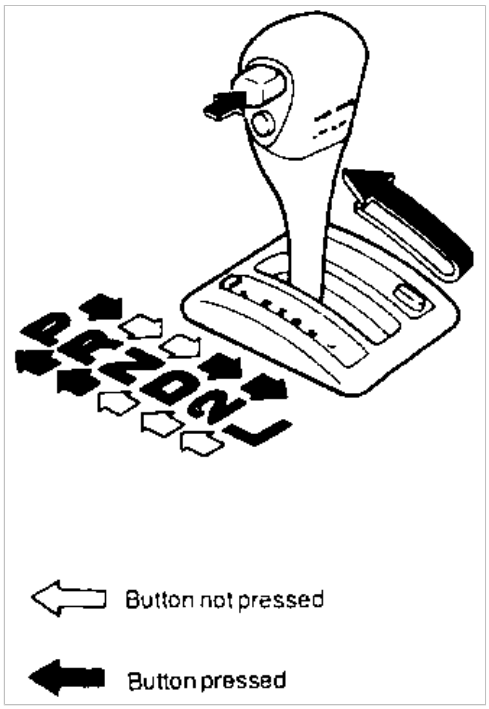
REVERSE



Transaxle/Transmission > Automatic Transaxle System > SELECTOR LEVER OPERATION CHECK

SELECTOR LEVER OPERATION CHECK

1. Shift the selector lever to each range and check to see that the lever moves smoothly and is controlled. Check to see that the position indicator is correct.
2. Check to be sure that the selector lever can be shifted to each position (by button operation as shown in the illustration).
3. Start the engine. Check to see if the vehicle moves forward when the selector lever is shifted from "N" to "D," and moves backward when shifted to "R."
4. When the shift lever malfunctions, adjust the control cable and the selector lever sleeve. Check for worn shift lever assembly sliding parts.



Transaxle/Transmission > Automatic Transaxle System > SERVICE SPECIFICATIONS

SERVICE SPECIFICATIONS

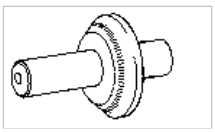
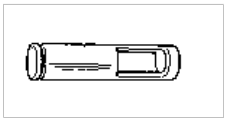
Input shaft end play	0.3L-1.0L mm(0.012-0.039 in)
Transfer shaft end play (Without pre-load)	0.01L-0.06L mm(0.0004-0.0024 in)
Oil pump gear side clearance	0.02-0.048 mm(0.0008-0.0019 in)
Front clutch snap ring clearance	0.4-0.6 mm (0.016-0.024 in)
Rear clutch snap ring clearance	0.3-0.5 mm (0.012-0.020 in)
End clutch snap ring clearance	0.4-0.65 mm (0.16-0.026 in)
Low reverse brake end play	0.675-0.987 mm(0.026-0.039 in)
Differential case end play	0-0.15L mm (0-0.006 in)
Differential side gear and pinion backlash	0.025L-0.150L mm (0.0010-0.0059 in)
Transfer drive gear end play	0-0.06L mm (0-0.0024 in)

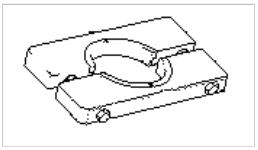
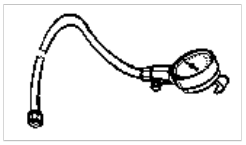
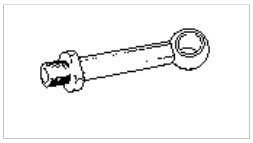
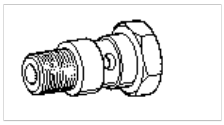
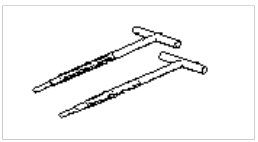
T : Indicates minus (-) direction of end play (Preload)

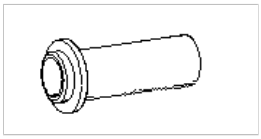
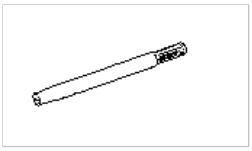
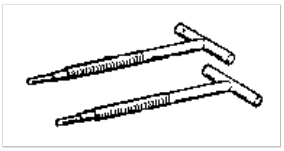
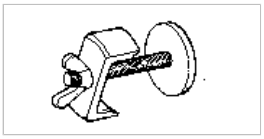
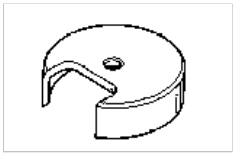
L : Indicates plus (+) direction of end play (Normal End play)

Transaxle/Transmission > Automatic Transaxle System > SPECIAL TOOLS

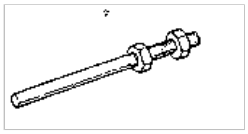
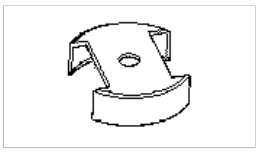
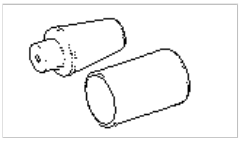
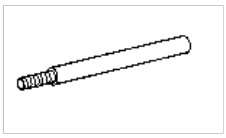
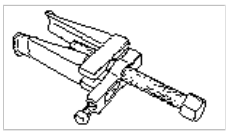
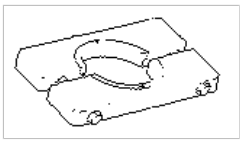
SPECIAL TOOLS

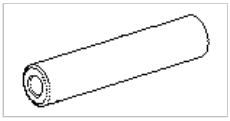
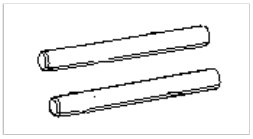
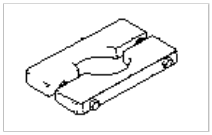
Tool (Number and name)	Illustration	Use
09431-21200 Oil seal installer		Installation of differential oil seal.
09432-33800 Bearing and gear installer		Installation of the transfer shaft bearing and transfer driven gear.
09452-21000 Removing plate		Removal of transfer shaft taper roller bearing and differential ball bearing.

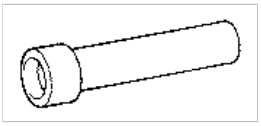
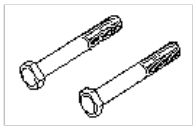
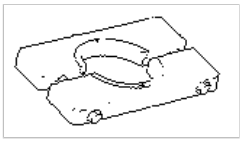
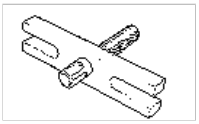
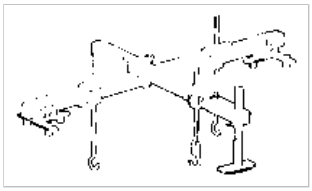
		
09452-21500 Oil pressure gauge		Measurement of the oil pressure (use with 09452-21001, 09452-21002)
09452-21001 Oil pressure gauge adapter		Measurement of the oil pressure (use with 09452-21500, 09452-21002)
09452-21002 Oil pressure gauge adapter		Measurement of the oil pressure (use with 09452-21500 and 09452-21001)
09452-21100 Oil pump remover		Removal of the oil pump

Tool (Number and name)	Illustration	Use
09452-21200 Bearing and oil seal installer		Installation of oil pump oil seal and transfer drive gear bearing.
09452-21301 Oil pump band		Assembling the oil pump
09452-214001 Guide pin		Installation of the oil pump
09452-22000 Differential bearing retainer remover		Removal of the differential bearing retainer
09453-21000 Spring compressor		Removal and installation of the snap ring and return spring of the clutch
09453-21100 Spring compressor		Removal and installation of the rear clutch (use with 09453-21000)
09453-21310		Removal and installation of the center support

Center support remover and installer		

Tool (Number and Name)	Illustration	Use
09453-21400 Dial gauge support		Measurement of the input shaft, low and reverse brake and transfer shaft end play. (Use with dial gauge)
09453-24000 Spring compressor		Installation of snap ring and front clutch
09453-33000 Snap ring installer		Installation of end clutch snap ring
09453-33100 Dial gauge extension		Measurement of the low and reverse brake end play (use with dial gauge)
09455-21100 Bearing installer		Installation of differential ball bearing
09455-32200 Bearing outer race remover		Removal of the transfer driven gear bearing outer race
09455-33000 Removing plate		Removal of the transfer driven gear taper roller bearing

Tool (Number and name)	Illustration	Use
09455-33200 Bearing installer		Installation of transfer driven gear taper roller bearing
09456-21000 Guide pin		Assembly of the valve body
09457-22000 Removing plate		Removal of the transfer drive gear rear bearing
09457-22100		Installation of the transfer shaft bearing outer race

Transfer shaft bearing outer race installer		
09457-22200 Transfer driven gear remover		Removal of the transfer driven gear (use with 09526-11001)
09457-34000 Removing plate		Removal of the transfer drive gear front bearing
09526-11001 Transfer driven gear remover		Removal of the transfer driven gear (use with 09457-22200)
09400-29000 Engine support fixture		Removal and installation of transaxle assembly

Transaxle/Transmission > Automatic Transaxle System > SPECIFICATIONS

SPECIFICATIONS

Type	Automatic four speed with torque converter and internal differential-A4AF2

Torque converter

Type	With damper clutch
Engine stall speed	2,500 ± 200 rpm
Stall torque ratio	1.9

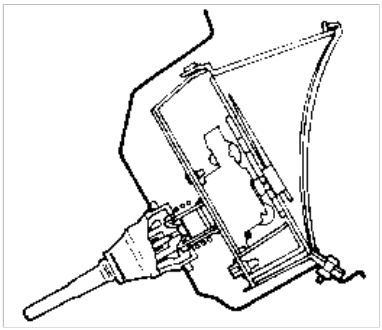
Transaxle

Type	Electronically controlled 4-speed full-automatic	|
Gear ratio	First	2.846
	Second	1.581
	Third	1.000
	Fourth	0.685
	Reverse	2.176
	Final gear ratio	3.656
Speedometer gear ratio	Drive 36/Driven 32	|

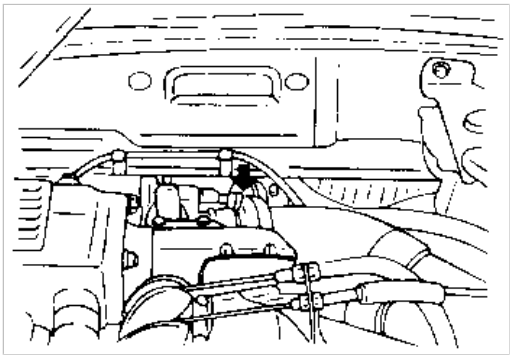
Transaxle/Transmission > Automatic Transaxle System > SPEEDOMETER CABLE REPLACEMENT

SPEEDOMETER CABLE REPLACEMENT

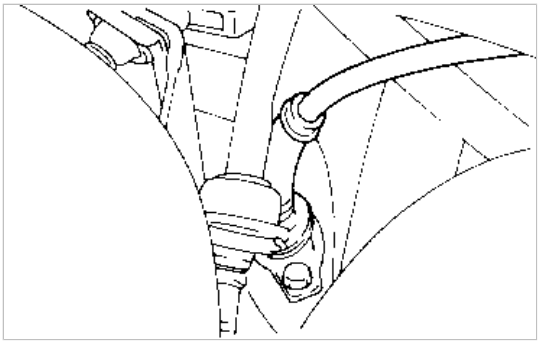
1. Correctly insert the adapter into the instrument panel, and fasten the new speedometer cable.



2. Install the grommet as shown in the illustration so that the cable attachment part and the projection part are horizontal.
   The cable arrangement should be made so that the radius of the cable bends isor more.



3. At the transaxle end of the speedometer cable, the key joint should be inserted into the transaxle, and the nut should be securely tightened.
   If the cable is not correctly and securely connected, it may cause an incorrect reading on the speedometer, or abnormal noise. Be sure to connect it correctly.



Transaxle/Transmission > Automatic Transaxle System > TIGHTENING TORQUE

TIGHTENING TORQUE

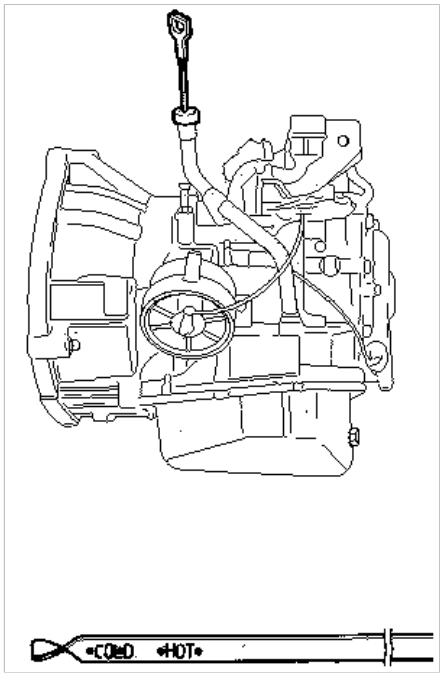
Items	Nm	Kg.cm	lb.ft
Oil pan bolts	10-12	100-120	7-9
Selector lever assembly mounting bolts	12-15	120-150	9-11
Starter motor mounting bolt	27-34	270-340	20-24
Oil cooler hose connector	15-22	150-220	11-16
Hose bracket	3-5	30-50	2-4
Cover to selector knob	2.0 or more	20 or more	1.4 or more
Selector knob to lever assembly	2.0 or more	20 or more	1.4 or more
Bell housing cover to engine	8-10	80-100	6-7
Transaxle side mounting bracket (M12)	60-80	600-800	43-58
Transaxle front mounting bracket (M12)	60-80	600-800	43-58
Transaxle rear mounting bracket (M10)	43-55	430-550	31-46
Transaxle rear mounting bracket (M12)	60-80	600-800	43-58
Torque converter to drive plate	46-53	460-530	33-38
Control cable to body	5-7	50-70	4-5

Indicator panel	1.5 or more	15 or more	1.1 or more
Lever assembly to bracket assembly	14-22	140-220	10-14
Drain plug	35-45	350-450	25-32
Pressure check plug	8-10	80-100	6-7
Pulse generator mounting bolt	10-12	100-120	7-9
Bearing retainer screw (Rear cover)	17-22	170-220	12-16
Transfer shaft lock nut	200-230	2000-2300	145-166
One-way clutch outer race bolt	35-45	350-450	25-32
Differential drive gear bolt	130-140	1300-1400	94-101
Differential bearing retainer	43-55	430-550	31-40
Differential bearing cap	60-80	600-800	43-58
Differential cover [10 mm (0.40 in) diameter bolt]	43-55	430-550	31-46
Differential cover [8 mm (0.31 in) diameter bolt]	20-27	200-270	14-20
Manual control lever lock nut	17-21	170-210	12-15
Manual control shaft set screw	8-10	80-100	6-7
Transaxle range switch attaching bolt	10-12	100-120	7-9
Sprag rod support bolt	20-27	200-270	15-19
Pump housing-to-reaction shaft support bolt	10-12	100-120	7-9
Oil pump assembly mounting bolt	19-23	190-230	13-16
Valve body end cover	4-6	40-60	3-4
Valve bolt assembly mounting bolt	10-12	100-120	7-9
Oil filter bolt	5-7	50-70	4-5
Speedometer sleeve locking plate bolt	3-5	30-50	2-4
End clutch cover	6-8	60-80	5-6
Kickdown lock nut	15-22	150-220	11-16
Rear cover	19-23	190-230	14-16

Transaxle/Transmission > Automatic Transaxle System > TRANSAXLE FLUID LEVEL INSPECTION

TRANSAXLE FLUID LEVEL INSPECTION

1. Drive the vehicle until the fluid reaches normal operating temperature (80-90°C [176-194°F]).
2. Place the vehicle on a level floor.
3. Move the selector lever sequentially to every position. This will fill the torque converter and hydraulic system with fluid. Then, place the lever in "N" (Neutral) position.
4. Before removing the dipstick, wipe all contaminate from around the dipstick. Then take out the dipstick and check the condition of the fluid.
   The transaxle should be overhauled under the following conditions:
   a. If there is a "burning" odor.
   b. If the fluid color has become noticeably blacker.
   c. If there is a noticeably excessive amount of metal particles in the fluid.



5. Check to see if the fluid level is in the "HOT" range on dipstick. If fluid level is low, add automatic transaxle fluid until the level reaches the "HOT" range.
   Transaxle fluid: GENUINE HYUNDAI ATF SP-II, DIAMOND ATF SP-II OR AUTRAN MMSP-II
   Low fluid level can cause a variety of abnormal conditions because it allows the pump to take in air along with fluid. Air trapped in the hydraulic system forms bubbles, which causes erratic pressure, which in turn causes delayed shifting, slipping clutch and brakes, etc.
   Improper filling can also make fluid level too high. When the transaxle has too much fluid, gears churn up foam and cause the same conditions which occur with a low fluid level condition, resulting in accelerated deterioration of automatic transaxle fluid.
   In either case, air bubbles can cause overheating and fluid oxidation, which can interfere with normal valve, clutch, and servo operation. Foaming can also result in fluid escaping from the transaxle vent where it may be mistaken for a leak.
   Along with fluid level, it is important to check to the condition of the fluid. When fluid smells burned, and is contaminated with metal particles or friction material particles, a complete transaxle overhaul is needed.
6. Be sure to examine the fluid on the dipstick closely. If there is any doubt about its conditions, drain out a sample for a closer check. After fluid has been checked seat the dipstick fully to seal out water and dirt.

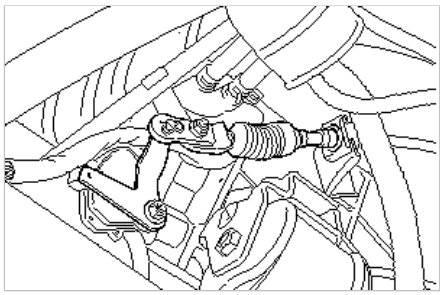
TRANSAXLE FLUID REPLACEMENT

Refer to Lubrication and maintenance.

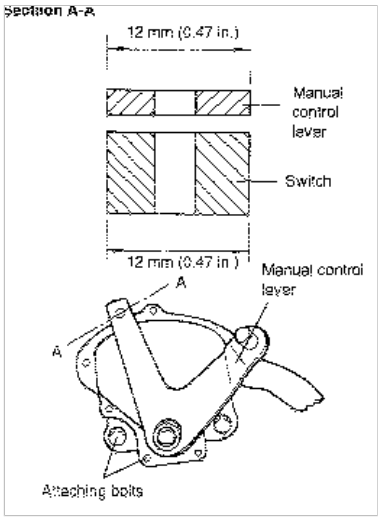
Transaxle/Transmission > Automatic Transaxle System > TRANSAXLE RANGE SWITCH ADJUSTMENT

TRANSAXLE RANGE SWITCH ADJUSTMENT

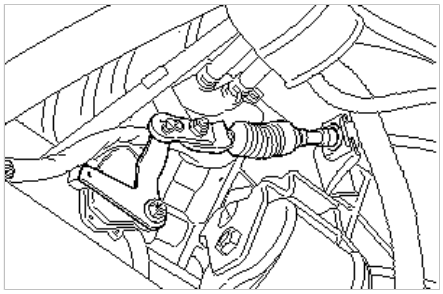
1. Place the selector lever in the "N" (Neutral) position.
2. Loosen the manual control lever lock nut to separate the cable and lever.



3. Place the manual control lever in the "N" (Neutral) position.
4. Turn the transaxle range switch body until the 12 mm (.47 in.) wide end of the manual control lever aligns with the switch body flange [12 mm (0.472 in.) wide portion].
5. Tighten the attaching bolts (2 pcs.) to the specified torque.
   When setting up the switch body, be careful not to drop the O-ring from the switch body. Tighten the attaching bolts carefully.



6. Make sure that the selector lever is in the "N" (Neutral) position.
7. Adjust the flange nut so that there is no slack in the control cable and make sure that the selector lever operates smoothly.
8. Run the vehicle and confirm that the transaxle is set in each range when the selector lever is shifted to each position.



Transaxle/Transmission > Automatic Transaxle System > TROUBLESHOOTING (CHECKING PROCEDURE - SELF DIAGNOSIS)

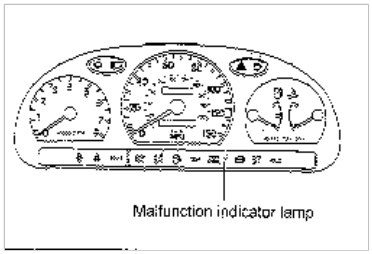
TROUBLESHOOTING (CHECKING PROCEDURE - SELF DIAGNOSIS)

a. As many as ten diagnostic trouble codes, in the sequence of occurrence, can be stored in the Random Access Memory (RAM) incorporated within the control module.
b. The same diagnostic trouble code can be stored just one time.
c. If the number of stored diagnostic trouble codes or diagnostic trouble patterns exceeds ten, already stored diagnostic trouble codes will be erased, in sequence beginning with the oldest.
d. Do not disconnect the battery until all diagnostic trouble codes or diagnostic trouble patterns have been read out, because all stored diagnostic trouble codes or diagnostic trouble patterns will be canceled when the battery is disconnected.
e. If the auto transaxle fluid temperature reaches 50°C or above 200 times from the initial memory, the fault code will be erased.
f. If the fail-safe system is activated and the transaxle is locked in third gear, the diagnostic trouble code in the Fail-Safe Code Description will be stored in the RAM. Three of these fault codes can be stored.
g. The cancelation will occur if, with the transaxle locked in 3rd gear, the ignition key is turned to the OFF position, but the diagnostic trouble code is stored in the RAM.

Malfunction Indicator Lamp (MIL)

An on-board diagnostic lamp comes on the notify the driver that there is a problem with the vehicle. However, when an irregular state returns to normal, the malfunction indicator lamp will go out automatically after 3 driving cycles that have no same fault. Immediately after the ignition switch is turned on, the malfunction indicator light is lit continuously to indicate that the malfunction indicator lamp operates normally.

The following items will be indicated by the MIL:



a. Fluid temperature sensor
b. Pulse generator A (PG-A)

c. Pulse generator B (PG-B)
d. Shift control solenoid valve A (SCSV-A)
e. Shift control solenoid valve B (SCSV-B)
f. Pressure control solenoid valve (PCSV)
g. Damper clutch control solenoid valve (DCCSV)
h. Shift stage synchronize
i. Ignition pulse
j. Throttle position sensor
k. Transaxle range switch

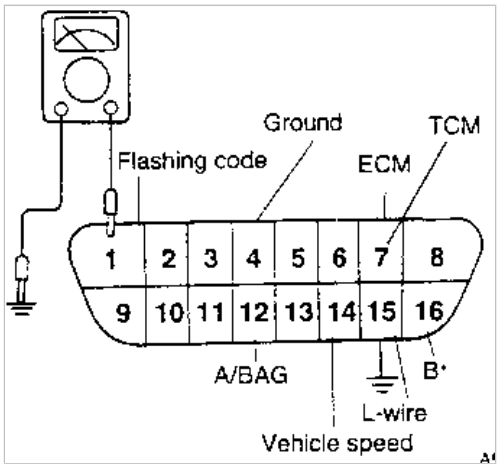
Inspection Procedure

Using Scan Tool

1. Turn OFF the ignition switch.
2. Connect the scan tool to the data link connector on the coil box.
3. Turn ON the ignition switch.
4. Use the scan tool to check the diagnostic trouble code.
5. Repair the faulty part from the diagnosis chart.
6. Erase the diagnostic trouble code.
7. Disconnect the scan tool.

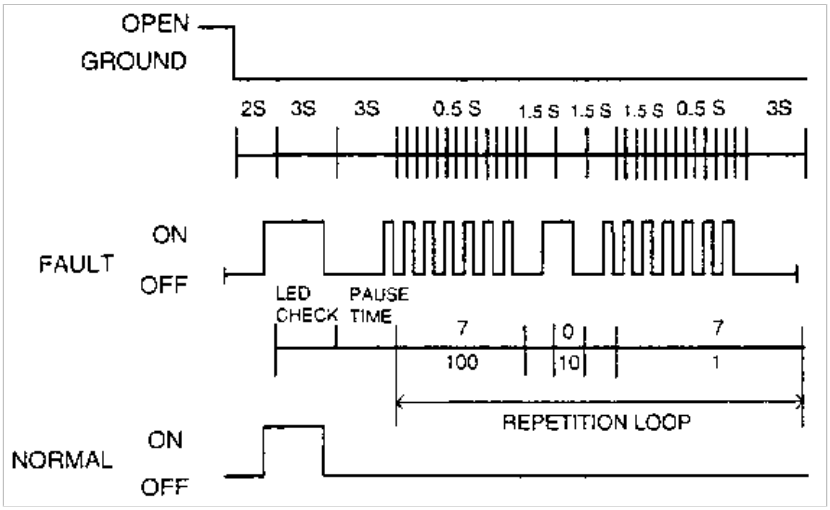
Using Voltmeter

1. Ignition switch ON (Do not start)
2. Connect the voltmeter to the data link connector (No. 1 pin)
3. Ground the L-wire (No. 15) in the data link connector.
4. Output pattern shows on the voltmeter.
5. Read the output diagnostic trouble codes. Then follow the remedy procedures according to the DIAGNOSTIC TROUBLE CODE DESCRIPTION" below.
6. Erase the diagnostic trouble code.

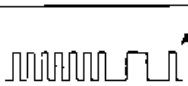


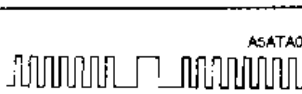
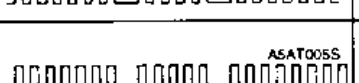
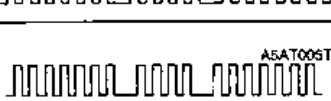
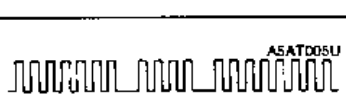
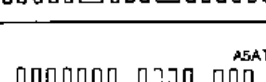
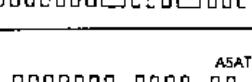
Reading Method

EX : 0707 (Transaxle range switch)



Diagnostic Trouble Code Description

Code	Diagnostic trouble code (for voltmeter)	Cause	Remedy
P1702	 A5AT005E	Shorted throttle position sensor circuit	• Check the throttle position sensor connector • Check the throttle position sensor itself • Check the idle switch • Check the throttle position sensor wiring harness • Check the wiring between ECM and throttle position sensor
P1701	 A5AT005F	Open throttle position sensor circuit	
P1704	 A5AT005H	Throttle position sensor malfunction Improperly adjusted throttle position sensor	
P0712	 A5AT005I	Open fluid temperature sensor circuit	• Fluid temperature sensor connector inspection • Fluid temperature sensor inspection • Fluid temperature sensor wiring harness inspection
P0713	 A5AT005J	Shorted fluid temperature sensor circuit	
P1709	 A5AT005K	Open kickdown servo switch circuit Shorted kickdown servo switch circuit	• Check the kickdown servo switch connector • Check the kickdown servo switch • Check the kickdown servo switch wiring harness
P0727	 A5AT005L	Open ignition pulse pickup cable circuit	• Check the ignition pulse signal line • Check the wiring between ECM and ignition system
P1714	 A5AT005M	Short-circuited or improperly adjusted idle switch	• Check the idle switch connector • Check the idle switch itself • Adjust the idle switch • Check the idle switch wiring harness

Code	Diagnostic trouble code (for voltmeter)	Cause	Remedy
P0717	 A5AT006N	Open- circuited pulse generator A	• Check the pulse generator A and pulse generator B • Check the vehicle speed reed switch (for chattering) • Check the pulse generator A and B wiring harness
P0722	 A5AT005O	Open-circuited pulse generator B	
P0707	 A5AT005Z	No input signal	• Check the transaxle range switch • Check the transaxle range wiring harness • Check the manual control cable
P0708	 A5ATA05A	More than two input signals.	
P0752	 A5AT005P	Open shift control solenoid valve A circuit	• Check the solenoid valve connector • Check the shift control solenoid valve A • Check the shift control solenoid valve A wiring harness
P0753	 A5AT005Q	Shorted shift control solenoid valve A circuit	
P0757	 A5AT006R	Open shift control solenoid valve B circuit	• Check the shift control solenoid valve connector • Check the shift control solenoid valve B wiring harness • Check the shift control solenoid valve B
P0758	 A5AT005S	Shorted shift control solenoid valve B circuit	
P0747	 A5AT006T	Open pressure control solenoid valve circuit	• Check the pressure control solenoid valve • Check the pressure control solenoid valve wiring harness
P0748	 A5AT005U	Shorted pressure control solenoid valve circuit	
P0743	 A5AT005V	Open circuit in damper clutch control solenoid valve Short circuit in damper clutch control solenoid valve Defect in the damper clutch system	• Inspection of solenoid valve connector • Individual inspection of damper clutch control solenoid valve • Check the damper clutch control solenoid valve wiring harness • Check the TCM • Inspection of damper clutch hydraulic system
P0742	 A5AT005W		
P0740	 A5AT005X		
P1744	 A5AT005Y		

Code	Diagnostic trouble code (for voltmeter)	Cause	Remedy
P0731	 A5ATA05B	Shifting to first gear does not match the engine speed	• Check the pulse generator A and pulse generator B connector • Check the pulse generator A and pulse generator B • Check the one way clutch or rear clutch • Check the pulse generator wiring harness
P0732	 A5ATA05C	Shifting to second gear does not match the engine speed	
P0733	 A5ATA05D	Shifting to third gear does not match the engine speed	• Check the rear clutch or control system • Check the pulse generator A and pulse generator B connector • Check the pulse generator A and pulse generator B • Check the front clutch slippage or control system • Check the pulse generator wiring harness • Check the rear clutch slippage or control system
P0734	 A5ATA05E	Shifting to fourth gear does not match the engine speed	• Check the pulse generator A and B connector • Check the pulse generator A and B • Kickdown brake slippage • Check the end clutch or control system • Check the pulse generator wiring harness
-		Normal	

Fail-safe Item

Output code		Description	Fail-safe	Note (relation to diagnostic trouble code)
Code No.	Output pattern (for voltmeter)			
P0717	 A5AT005N	Open-circuited pulse generator A	Locked in third (D) or second (2,L)	When code No. 0717 is generated fourth time
P0722	 A5AT005O	Open-circuited pulse generator B	Locked in third (D) or second (2,L)	When code No.0722 is generated fourth time
P0752	 A5AT005D	Open-circuited or shorted shift control solenoid valve A	Lock in third	When code No. 0752 or 0753 is generated fourth time
P0753	 A5AT005Q			
P0757	 A5AT005R	Open-circuited or shorted shift control solenoid valve B	Lock in third gear	When code No. 0757 or 0758 is generated fourth time
P0758	 A5AT005S			
P0747	 A5AT005T	Open-circuited or shorted pressure control solenoid valve	Locked in third (D) or second (2,L)	When code No. 0747 or 0748 is generated fourth time
P0748	 A5AT005U			
P0731	 A5ATA05B	Gear shifting does not match the engine speed	Locked in third (D) or second (2,L)	When either code No. 0731, 0732, 0733 or 0734 is generated fourth time.
P0732	 A5ATA05C			
P0733	 A5AT005D			
P0734	 A5ATA05E			

CHECKING THE CONTROL SYSTEM (WHEN A SCAN TOOL IS USED)

Diagnosis items	Checking procedures		Checking items (Remedy)
	Check conditions	Normal value	
Throttle position sensor (TP Sensor) • Service data	Accelerator pedal slowly	10-11%	• TP Sensor or circuit harness if no change occurs • TP Sensor or accelerator pedal cable if gradual change is not noted
	Press accelerator pedal slowly	Varies with accelerator opening	
	Accelerator pedal pressed to floor	95-100%	
Fluid temperature sensor • Service data	Cold engine (before starting)	Equivalent to outside air temperature	• Fluid temperature sensor or circuit harness
	While warming up engine	Gradual increase	
	After warming up engine	80-110°C	
Kickdown servo switch • Service data	L range : Idling	ON	• Kickdown servo maladjusted • Kickdown servo switch or circuit harness • Kickdown servo
	D range : First or third gear	ON	
	D range : Second or fourth gear	OFF	
Engine speed • Service data	N range : Idling	650-900 rpm	• Ignition system • Ignition signal pick-up circuit harness
	N range : 2,500 rpm (tachometer reading)	2,400-2,600 rpm	
Closed throttle position switch • Service data	Accelerator pedal fully released	ON	• Closed throttle position switch or circuit harness • Closed throttle position switch in correctly adjusted
	Accelerator pedal pressed very slightly	OFF	
Air conditioning relay signals • Service data	D range : air conditioning idle UP	ON	• Air conditioning power relay ON signal detection circuit harness
	D range : air conditioning idle OFF	OFF	
Shift position • Service data	D range : idling	CREEP	• TCM • Closed throttle position switch system • Transaxle range switch system • TP sensor system
	L range : idling	First	
	2 range : second gear	Second	
	D range : overdrive-OFF : third gear	Third	
	D range : overdrive-ON : fourth gear	Frouth	

Diagnosis items	Checking procedures		Checking items (Remedy)
	Check conditions	Normal value	
Pulse generator A • Service data	D range : driving at 50 km/h (31 mph) in third gear	1,600-2,000 rpm	• Pulse generator A or circuit harness • Pulse generator A shielded wire • Incoming noise from outdside
	D range : driving at 50 km/h (31 mph) in fourth gear	1,100-1,400 rpm	
Pulse generator B • Service data	D range : driving at 50 km/h (31 mph) in third gear	1,600-2,000 rpm	• Pulse generator B or circuit harness • Pulse generator B shield wire • Incoming noise from outside
	D range : driving at 50 km/h (31 mph) in fourth gear	1,600-2,000 rpm	
Overdrive switch • Service data	Overdrive switch is turned ON	OD-ON	• Overdrive switch or circuit harness
	Overdrive switch is turned OFF	OD-OFF	
Shift pattern switch • Service data	Selection of the normal pattern (including during E pattern control when fluid temperature is low)	PWR	• Shift patten switch or circuit harness
	Selection of the Economy pattern	Economy	
Transaxle range switch • Service data	Shift selector lever to P range	P	• Transaxle range switch maladjusted • Transaxle range switch or circuit harness • Manual control cable • If selector lever is inoperative, check shift lock mechanism
	Shift selector lever to R range	R	
	Shift selector lever to N range	N	
	Shift selector lever to D range	D	
	Shift selector lever to 2 range	2	
	Shift selector lever to L range	L	
Vehicle speed sensor • Service data	Keep vehicle stopped	0 km/h	• Vehicle speed sensor if high speed signal is delivered while vehicle is stopping • In other cases, vehicle speed sensor or circuit harness
	Driving at 30 km/h (19 mph)	30 km/h (19mph)	
	Driving at 50 km/h (31 mph)	50 km/h (31mph)	
PCSV duty • Service data	D range : idling	80-90%	• When accelerator pedal is slightly pressed while idling in D range, duty should become 95-100% when vehicle is moving. • TCM • TP sensor system • Closed throttle position switch system
	D range : first gear	95-100%	
	D range : during shift	Varies with condition	

Diagnosis items	Checking procedures		Checking items (Remedy)
	Check conditions	Normal value	
DCCSV slip speed • Service data	D range : third gear 1,500 rpm (tachometer reading)	200-300 rpm	• Damper clutch • Ignition signal wire or pulse generator B system • Inappropriate transaxle fluid pressure • DCCSV
	D range : third gear 3,500 rpm (tachometer reading)	0 rpm	
DCCSV duty • Service data	D range : third gear 1,500 rpm (tachometer reading)	0%	• TCM • TP sensor system • Pulse generator B system • Damper clutch control solenoid valve
	D range : third gear 3,500 rpm (tachometer reading)	Varies with load	

Transaxle/Transmission > Automatic Transaxle System > TROUBLESHOOTING (CONVERTER STALL TEST)

TROUBLESHOOTING (CONVERTER STALL TEST)

The stall test consists of determining maximum engine speed obtained at full throttle in "D" and "R." This test checks torque converter stator overrunning clutch operation, and holding ability of transaxle clutches and low-reverse brake.

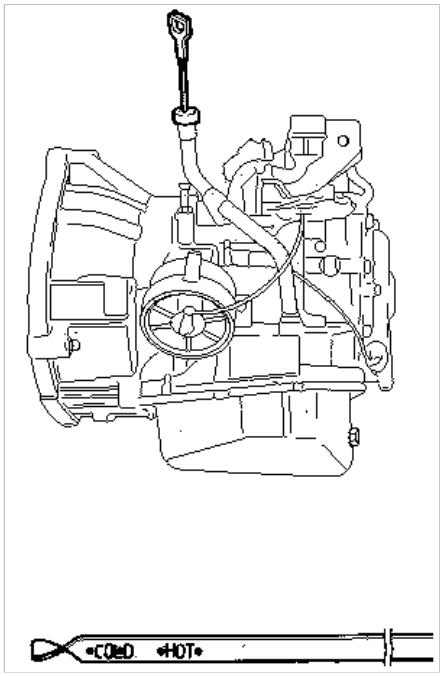
During this test, make sure that no one stands in front of or behind vehicle.

1. Check transaxle fluid level. Fluid should be at normal operating temperature [80-90° (176-194°F)]. Engine coolant should also be at normal operating temperature [80-90°C (176-194°F)].
2. Apply chocks to both rear wheels.
3. Attach an engine tachometer.
4. Apply the parking and service brakes fully.
5. Start the engine.
6. With the selector lever in the "D" position, depress the accelerator pedal fully to read maximum engine rpm. Do not hold the throttle wide open any longer than is necessary to obtain maximum engine rpm reading--never longer than is necessary to obtain maximum engine rpm reading--and never longer than 5 seconds at a time. If more than one stall test is required, operate the engine at approximately 1,000 rpm in neutral for 2 minutes to cool the transaxle fluid between tests.
7. **Stall Speed : 2,300-2,700 rpm**
   Place the selector lever in the "R" position and perform the stall test as previously described.
8. **Stall Speed Above Specification in "D"**
   If stall speed is higher than specification, rear clutch or overrunning clutch of transaxle is slipping. In this case, perform hydraulic test to locate cause of slippage.
9. **Stall Speed Above Specification in "R"**
   If the speed is higher than specification, the front clutch of the transaxle or low-reverse brake is slipping. In this case, perform the hydraulic test to locate the cause of slippage.
10. **Stall Speed Below Specification in "D" and "R"**
    If the stall speed is lower than specification, insufficient engine output or a faulty torque converter is suspected. Check for engine misfiring, improper ignition timing, or valve clearance etc. If these are good, the torque converter is faulty.

Transaxle/Transmission > Automatic Transaxle System > TROUBLESHOOTING (DIAGNOSIS AND TESTING FLUID LEVEL)

TROUBLESHOOTING (DIAGNOSIS AND TESTING FLUID LEVEL)

1. Park the vehicle on a level surface.
2. Before removing the dipstick, wipe all dirt from the area around the dipstick.
3. With the selector lever in "P" (Park) and the parking brake applied, start the engine.
4. The engine should be running at idle speed and the fluid should be at normal operating temperature [80-90°C (176-194°F)].
5. Move the selector lever to every position to fill the torque converter and hydraulic circuit with fluid, then place the lever in the "N" (Neutral) position. This operation checks that fluid level check is accurate.
6. Check if the fluid level is in the "HOT" range shown on the dipstick. If the fluid is low, add automatic transaxle fluid until the level reaches the "HOT" range.



Low fluid level can cause a variety of conditions because it allows the pump to take in air along with the fluid. Air trapped in the hydraulic circuit forms bubbles which will aerate the fluid, causing pressures to be erratic. Improper filling can also cause the fluid level to be too high. When the transaxle has too much fluid, the gears churn up foam and cause the same conditions which occur with a low fluid level, resulting in accelerated deterioration of automatic transaxle fluid. In either case, air bubbles can cause overheating, fluid oxidation, and varnishing, which can interfere with normal valve, clutch, and servo operation. Foaming can also result in fluid escaping from the transaxle vent where it may be mistaken for a leak. Along with fluid level, it is important to check the condition of the fluid. When fluid smells burned, and is contaminated with metal bushing or friction material particles, a complete transaxle overhaul is needed. Be sure to examine the fluid on the dipstick closely. If there is any doubt about its condition, drain out a sample to verify. After the fluid has been checked, seat dipstick fully to seal out water and dirt.

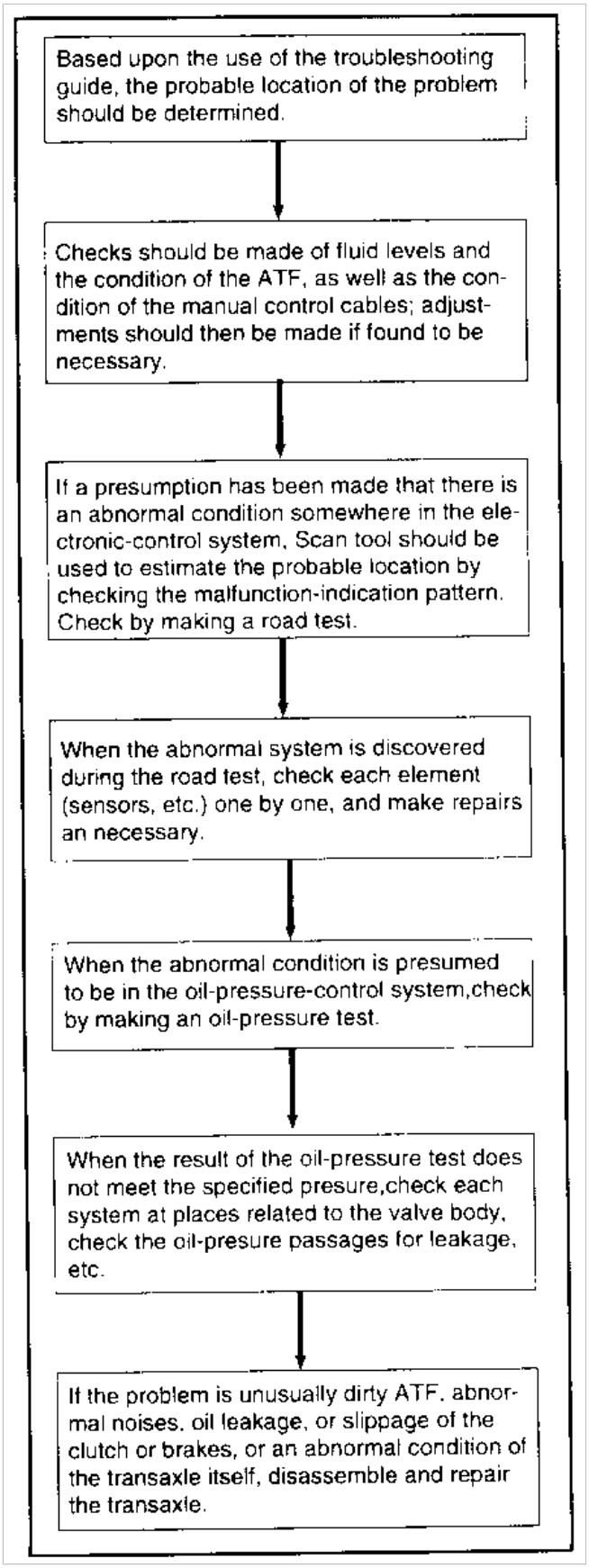
Transaxle/Transmission > Automatic Transaxle System > TROUBLESHOOTING (DIAGNOSTIC TROUBLESHOOTING FLOW)

TROUBLESHOOTING (DIAGNOSTIC TROUBLESHOOTING FLOW)

Malfunctions of the auto transaxle can lead to other problems, such as those described below:

a. Improper maintenance and/or adjustments
b. Electronic control malfunctions
c. Mechanical malfunctions
d. Hydraulic control
e. Engine performance malfunctions, etc

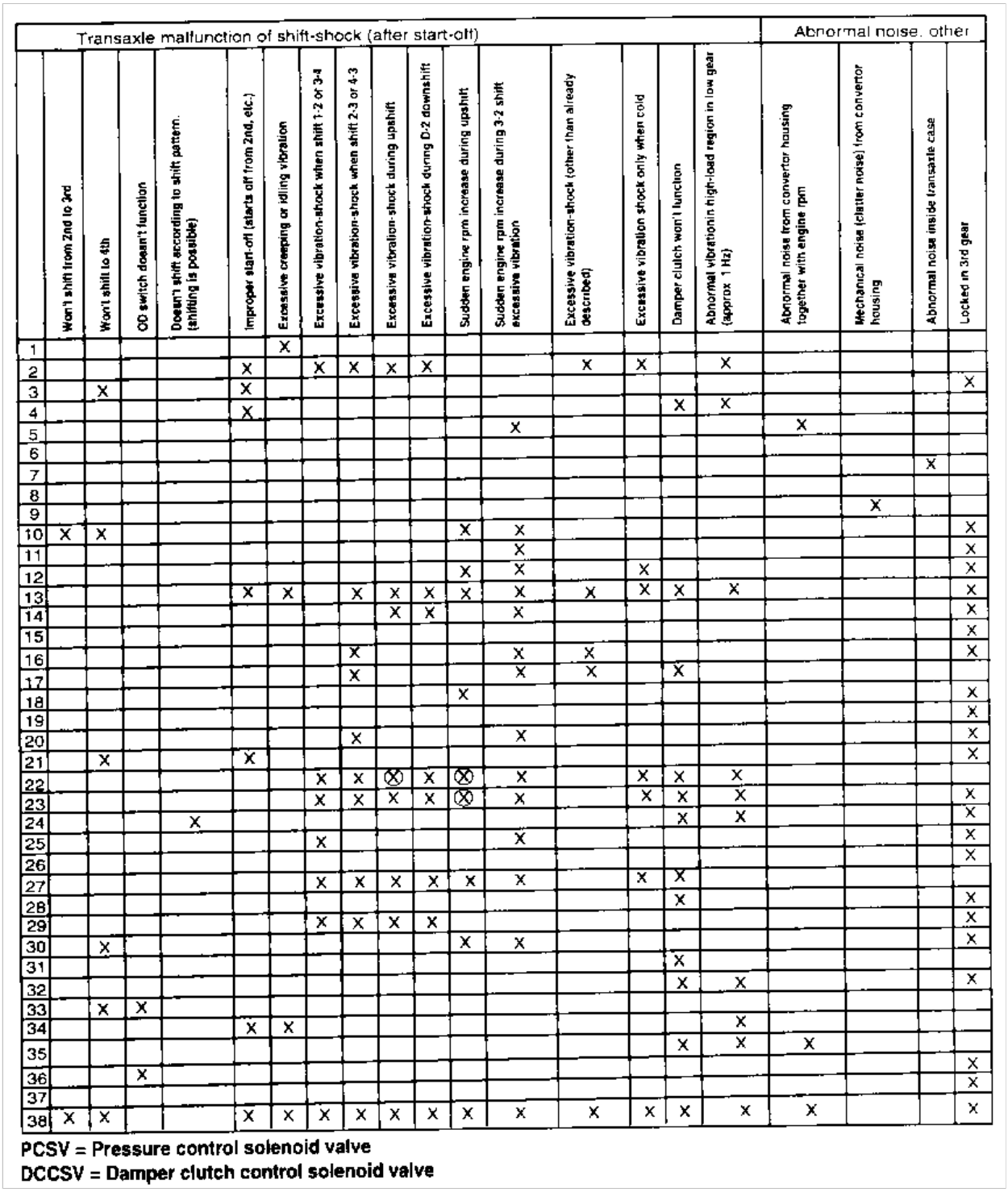
In order to properly troubleshoot the source of these malfunctions it is first essential to methodically question the owner concerning the problem. The driver should also be asked whether or not the problem has occurred more than once. Troubleshooting tests should be conducted as described below.



TROUBLESHOOTING GUIDE

	Problem / Presumed cause	Driving impossible or abnormal (before start-off)												
		Starter motor won't function	Forward/backward movement impossible	Forward movement impossible	Backward movement impossible	Engine stalls when N-D or R	Clutch slips at D (stall rpm too high)	Clutch slips at R (stall rpm too high)	Stall rpm too low	Vehicle moves in P or N	Engine starts, or vehicle moves, between NR or ND	Parking doesn't hold	Abnormal vibration-shock when shifted to D-2-L-R
1	Abnormal idle rpm					x							
2	Poor performance					x			x				
3	Improper adjustment of manual linkage	x	x	x	x		x	x		x	x	x	x
4	Malfunction of torque converter (including damper clutch)		x	x	x				x				
5	Operation malfunction of oil pump		x	x	x		x	x					
6	Malfunction of one-way clutch			x			x						
7	Damaged or worn gear or other rotating part, or improper adjustment of the preload												
8	Malfunction of parking mechanism									x		x	
9	Cracked drive plate, or loose bolt		x										
10	Worn inside diameter of front clutch retainer				x			x					
11	Low fluid level		x	x	x		x	x					
12	Line pressure too low (seal damaged, leakage, looseness, etc.)		x	x	x		x	x					
13	Malfunction of valve body (sticking valve, working cavity, adjustment, etc.)		x	x	x	x	x	x		x	x		x
14	Malfunction of front clutch or piston				x			x					x
15	Malfunction of rear clutch or piston			x			x						x
16	Malfunction of kickdown band or piston												
17	Improper adjustment of kickdown servo												
18	Malfunction of low-reverse brake or piston		x		x			x					x
19	O-ring of low-reverse brake circuit between valve body and case not installed				x			x					
20	Malfunction of end clutch or piston (check ball hole, other)												
21	Malfunction of transaxle range switch, damaged or disconnected wiring, or improper adjustment	x								x	x		x
22	Malfunction of TPS, or improper adjustment									x	x	x	
23	Pulse generator (A) damaged or disconnected wiring, or short-circuit												
24	Pulse generator (B) damaged or disconnected wiring, or short-circuit				x								
25	Malfunction of kickdown servo switch												
26	SCSV-A or B damaged or disconnected wiring, or short-circuit or sticking (valve open)												
27	Malfunction of ignition signal system												
28	Incorrectly grounded ground strap												
29	PCSV damaged or disconnected wiring, or short-circuit												x
30	PCSV damaged or disconnected wiring (valve open)		(x)	(x)	(x)		x	x					x
31	DCCSV damaged or disconnected wiring (valve closed)												
32	DCCSV short-circuit or sticking (valve closed)					(x)							
33	Malfunction of OD switch												
34	Malfunction of idle switch, or improper adjustment												x
35	Malfunctionof oil-temperature sensor												
36	Malfunction of reed switch												
37	Poor contact of ignition switch												
38	Malfunction of transaxle control module												x

NOTE : (X) indicates items of high priority during inspection.
Abbrviations : TPS = Throttle Position Sensor, SCSV = Shift Control Solenoid Valve.



	Transaxle malfunction of shift-shock (after start-off)																Abnormal noise, other			
	Won't shift from 2nd to 3rd	Won't shift to 4th	OD switch doesn't function	Doesn't shift according to shift pattern. (shifting is possible)	Improper start-off (starts off from 2nd, etc.)	Excessive creeping or idling vibration	Excessive vibration-shock when shift 1-2 or 3-4	Excessive vibration-shock when shift 2-3 or 4-3	Excessive vibration-shock during upshift	Excessive vibration-shock during D-2 downshift	Sudden engine rpm increase during upshift	Sudden engine rpm increase during 3-2 shift excessive vibration	Excessive vibration-shock (other than already described)	Excessive vibration shock only when cold	Damper clutch won't function	Abnormal vibrationin high-load region in low gear (approx. 1 Hz)	Abnormal noise from convertor housing together with engine rpm	Mechanical noise (clatter noise) from convertor housing	Abnormal noise inside transaxle case	Locked in 3rd gear
1						X														
2					X		X	X	X	X			X	X		X				X
3		X			X										X	X				
4					X							X					X			
5																			X	
6																				
7																			X	
8																		X		
9																				
10	X	X									X	X								X
11												X								X
12											X	X		X						X
13					X	X		X	X	X	X	X	X	X	X	X				X
14									X	X		X								X
15																				X
16								X				X	X							X
17								X				X	X		X					
18											X									X
19																				X
20								X				X								X
21		X			X															X
22							X	X	⊗	X	⊗	X		X	X	X				
23							X	X	X	X	⊗	X		X	X	X				X
24				X											X	X				X
25							X					X								X
26																				X
27							X	X	X	X	X	X		X	X					
28															X					X
29							X	X	X	X										X
30		X									X	X								X
31															X					
32															X	X				X
33		X	X																	
34					X	X										X				
35															X	X	X			
36			X																	X
37																				X
38	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X			X

PCSV = Pressure control solenoid valve
DCCSV = Damper clutch control solenoid valve

Transaxle/Transmission > Automatic Transaxle System > TROUBLESHOOTING (ELEMENT IN USE AT EACH POSITION OF SELECTOR LEVER)

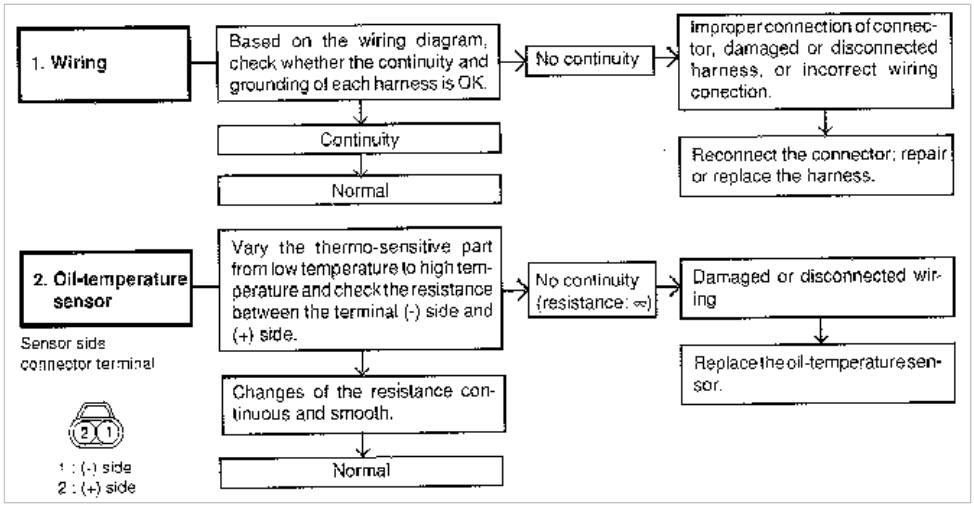
TROUBLESHOOTING (ELEMENT IN USE AT EACH POSITION OF SELECTOR LEVER)

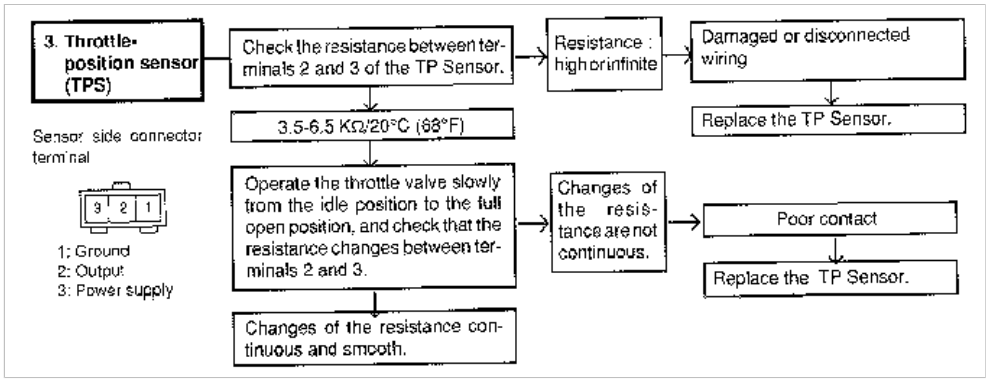
Select lever position	Overdrive control switch	Shifting gear	Gear ratio	Engine start	Parking Mechanism	Clutch				Brake	
						C1	C2	C3	OWC	B1	B2
P	-	Neutral	-	Possible	O						
R	-	Reverse	2.176	-		O					O
N	-	Neutral	-	Possible							
D	ON	1st	2.846				O		O		
		2nd	1.581				O			O	
		3rd	1.000			O	O	O			
		O.D.	0.685					O		O	
D	OFF	1st	2.846				O		O		
		2nd	1.581					O			
		3rd	1.000			O	O	O			
2	-	1st	2.846				O		O		
		2nd	1.581				O			O	
L	-	1st	2.846				O				O

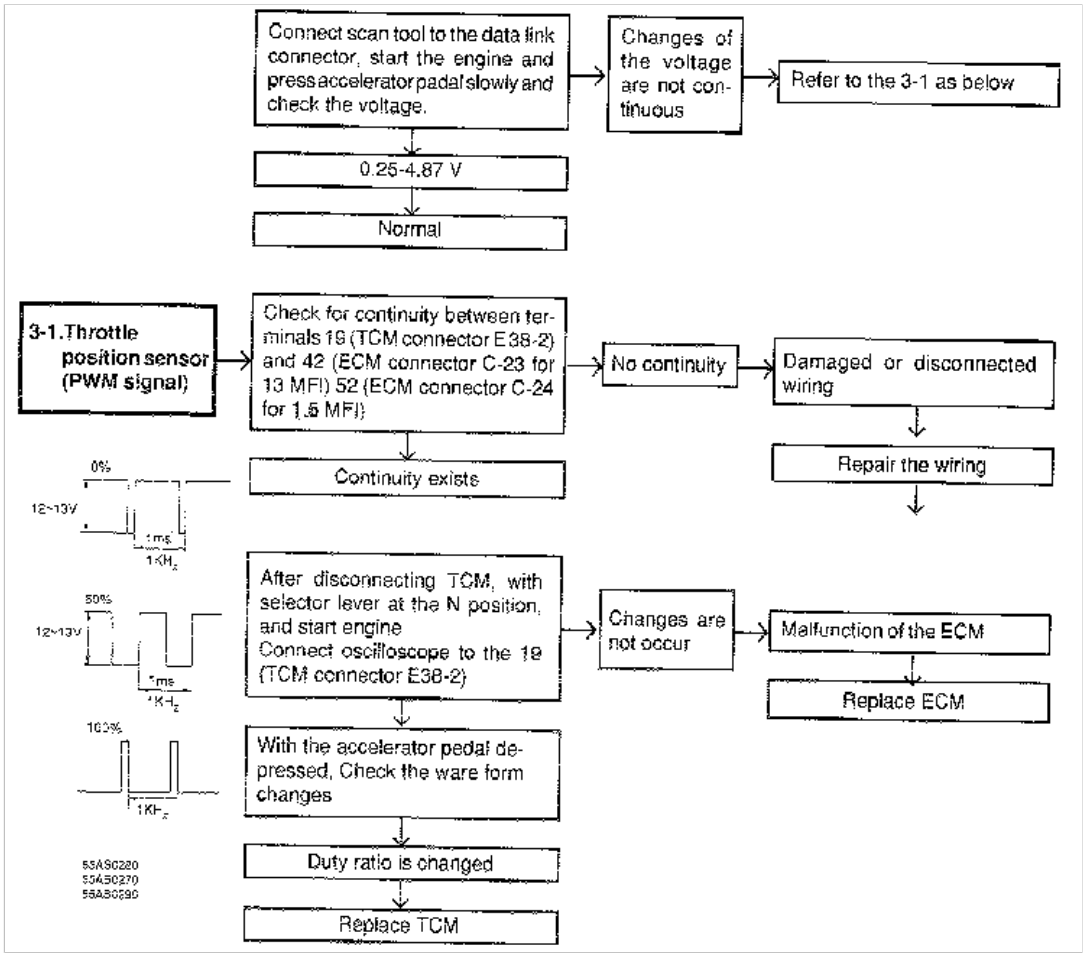
a. C1: Front clutch
b. C2: Rear clutch
c. C3: End clutch
d. OWC: One way clutch
e. B1: Kickdown brake
f. B2: Low & reverse brake

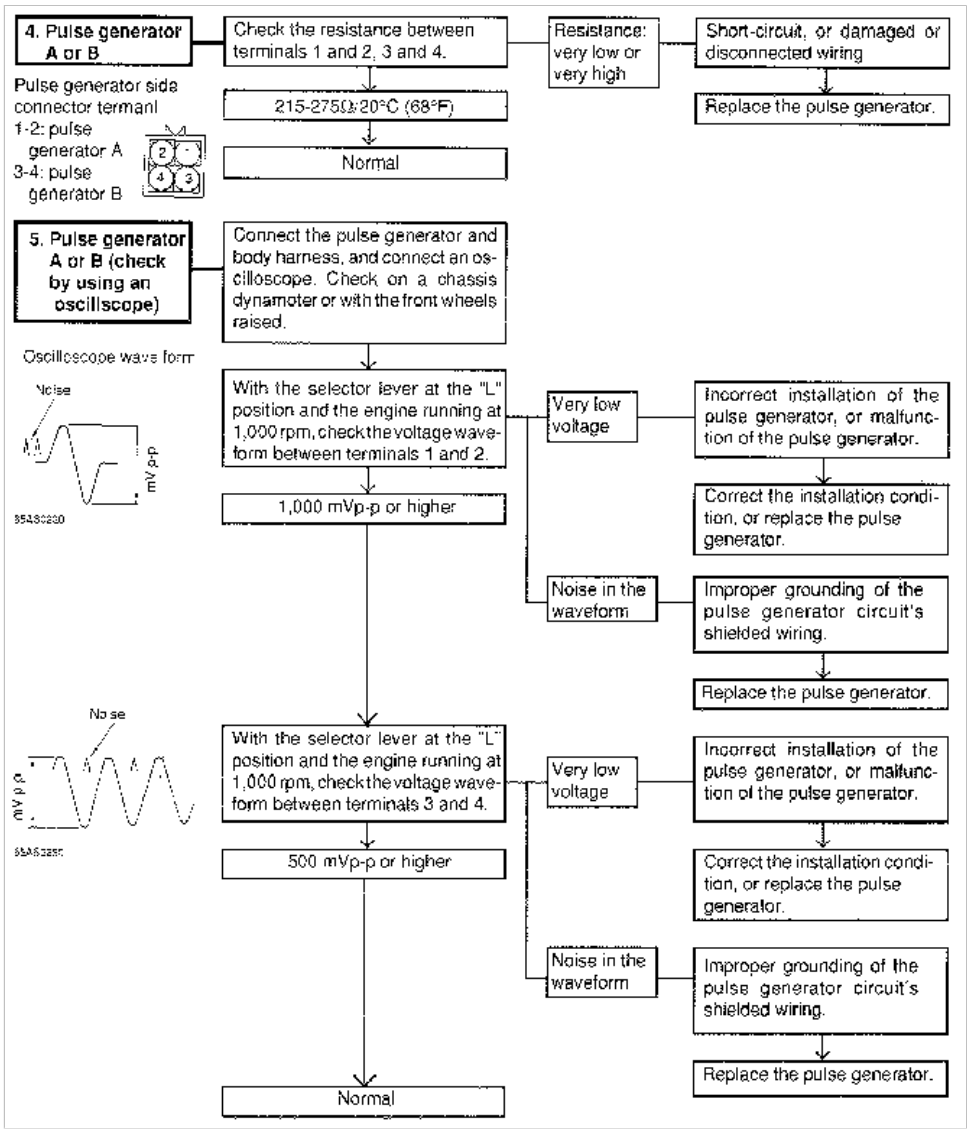
Transaxle/Transmission > Automatic Transaxle System > TROUBLESHOOTING (INSPECTION OF ELECTRONIC CONTROL SYSTEM COMPONENTS)

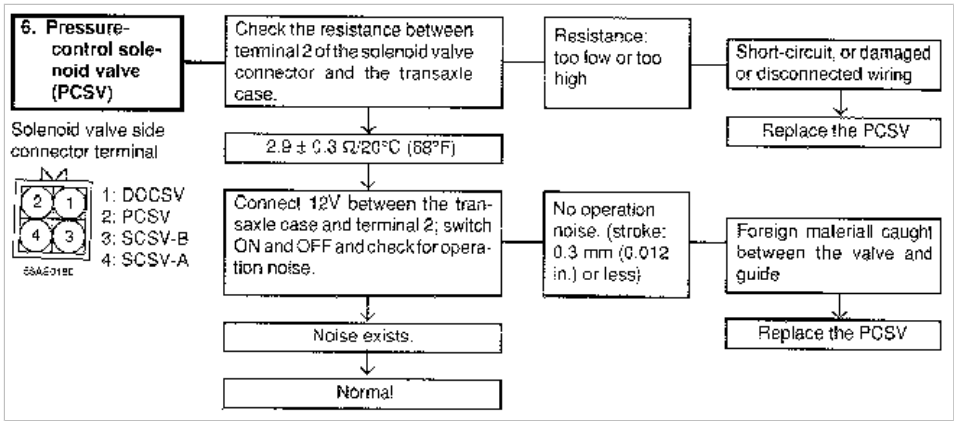
TROUBLESHOOTING (INSPECTION OF ELECTRONIC CONTROL SYSTEM COMPONENTS)

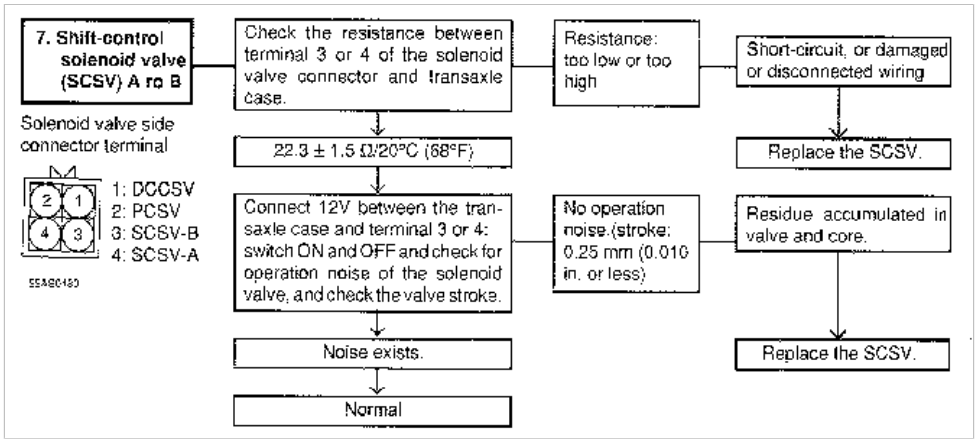


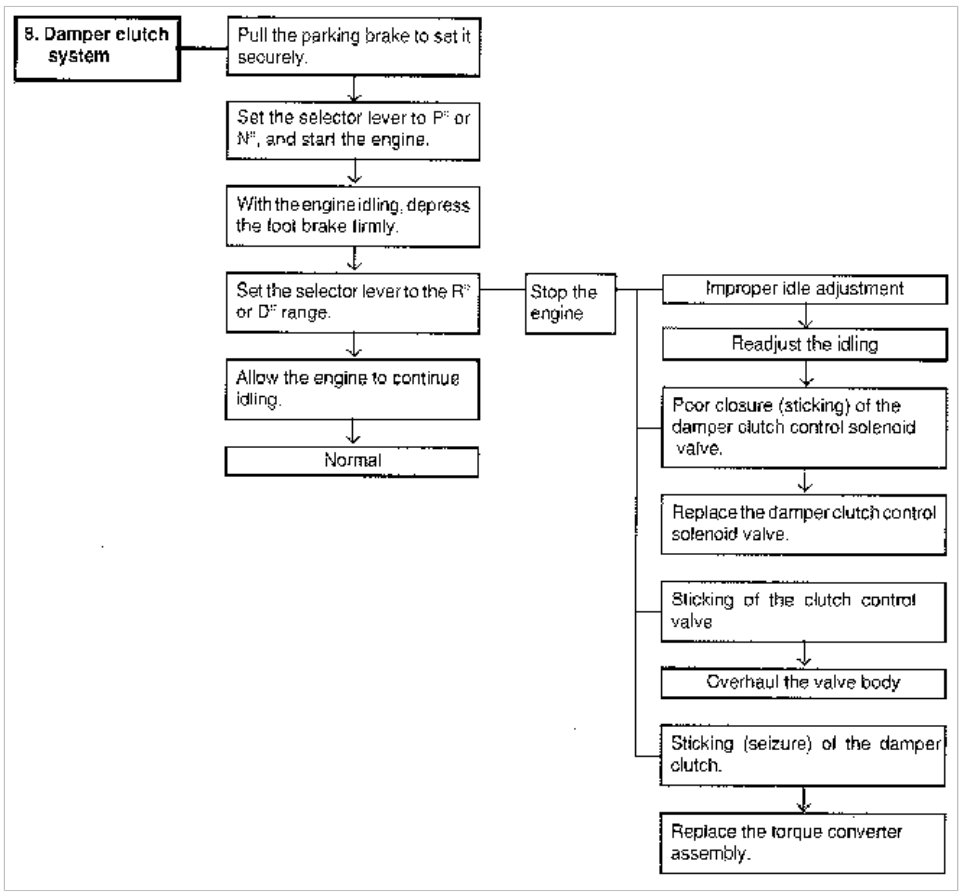

3. Throttle position sensor (TPS)
Check the resistance between terminals 2 and 3 of the TP Sensor.
Resistance : high or infinite
Damaged or disconnected wiring
Replace the TP Sensor.
3.5-6.5 KΩ/20°C (68°F)
Sensor side connector terminal
3 2 1
1: Ground
2: Output
3: Power supply
Operate the throttle valve slowly from the idle position to the full open position, and check that the resistance changes between terminals 2 and 3.
Changes of the resistance are not continuous.
Poor contact
Replace the TP Sensor.
Changes of the resistance continuous and smooth.

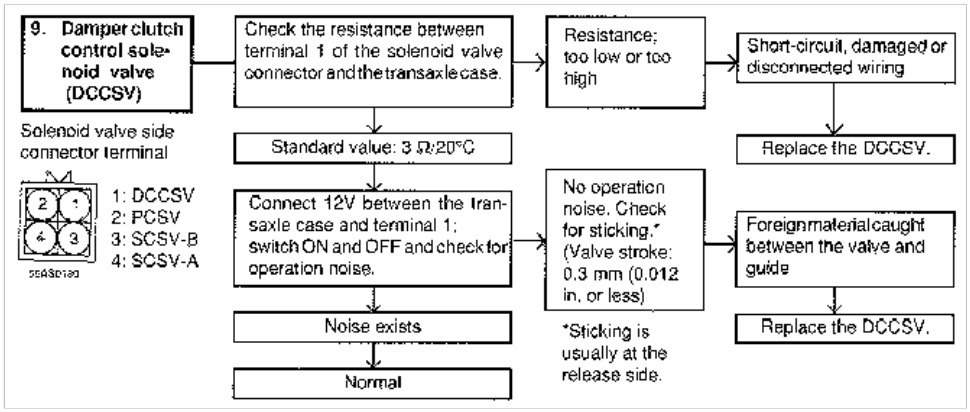

Connect scan tool to the data link connector, start the engine and press accelerator padal slowly and check the voltage.
Changes of the voltage are not continuous
Refer to the 3-1 as below
0.25-4.87 V
Normal
3-1. Throttle position sensor (PWM signal)
Check for continuity between terminals 19 (TCM connector E38-2) and 42 (ECM connector C-23 for 13 MFI) 52 (ECM connector C-24 for 1.5 MFI)
No continuity
Damaged or disconnected wiring
Repair the wiring
Continuity exists
0%
12~13V
1ms
1KHz
50%
12~13V
1ms
1KHz
100%
1KHz
55AS0220
55AS0270
55AS0290
After disconnecting TCM, with selector lever at the N position, and start engine
Connect oscilloscope to the 19 (TCM connector E38-2)
Changes are not occur
Malfunction of the ECM
Replace ECM
With the accelerator pedal depressed, Check the ware form changes
Duty ratio is changed
Replace TCM

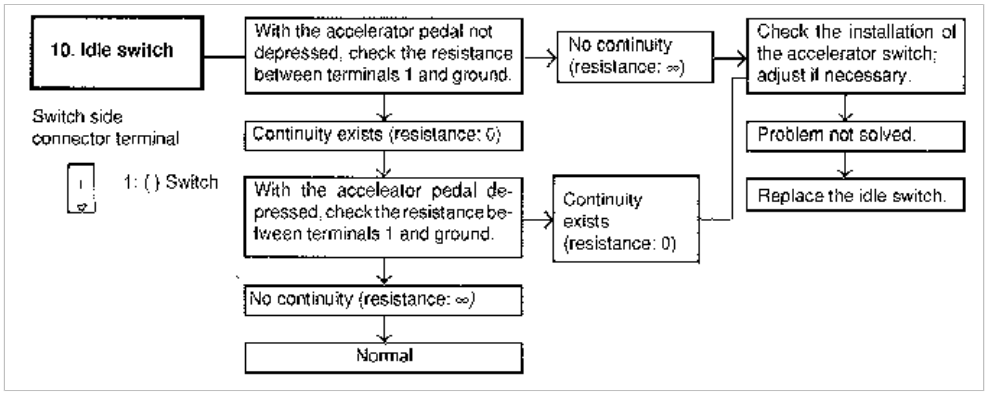

4. Pulse generator A or B
Check the resistance between terminals 1 and 2, 3 and 4.
Resistance: very low or very high
Short-circuit, or damaged or disconnected wiring
Replace the pulse generator.
215-275Ω/20°C (68°F)
Normal
Pulse generator side connector termanl
1-2: pulse generator A
3-4: pulse generator B
5. Pulse generator A or B (check by using an oscillscope)
Connect the pulse generator and body harness, and connect an oscilloscope. Check on a chassis dynamoter or with the front wheels raised.
Oscillosecope wave form
Noise
mV p-p
With the selector lever at the "L" position and the engine running at 1,000 rpm, check the voltage waveform between terminals 1 and 2.
Very low voltage
Incorrect installation of the pulse generator, or malfunction of the pulse generator.
Correct the installation condition, or replace the pulse generator.
1,000 mVp-p or higher
Noise in the waveform
Improper grounding of the pulse generator circuit's shielded wiring.
Replace the pulse generator.
Noise
mV p-p
With the selector lever at the "L" position and the engine running at 1,000 rpm, check the voltage waveform between terminals 3 and 4.
Very low voltage
Incorrect installation of the pulse generator, or malfunction of the pulse generator.
Correct the installation condition, or replace the pulse generator.
500 mVp-p or higher
Noise in the waveform
Improper grounding of the pulse generator circuit's shielded wiring.
Replace the pulse generator.
Normal

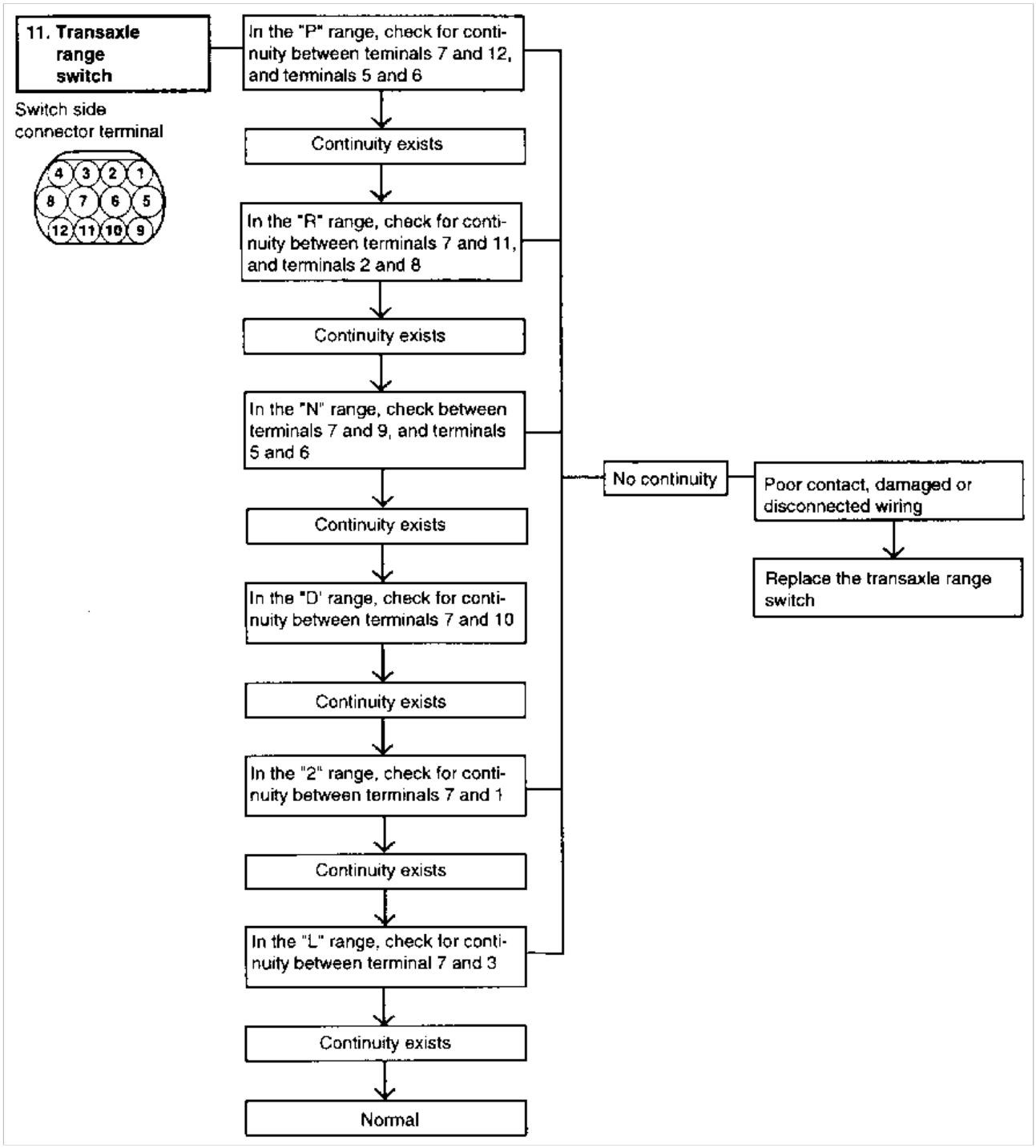

6. Pressure-control solenoid valve (PCSV)
Check the resistance between terminal 2 of the solenoid valve connector and the transaxle case.
Resistance: too low or too high
Short-circuit, or damaged or disconnected wiring
Replace the PCSV
2.9 ± 0.3 Ω/20°C (68°F)
Solenoid valve side connector terminal
1: DCCSV
2: PCSV
3: SCSV-B
4: SCSV-A
Connect 12V between the transaxle case and terminal 2; switch ON and OFF and check for operation noise.
No operation noise. (stroke: 0.3 mm (0.012 in.) or less)
Foreign materiall caught between the valve and guide
Replace the PCSV
Noise exists.
Normal

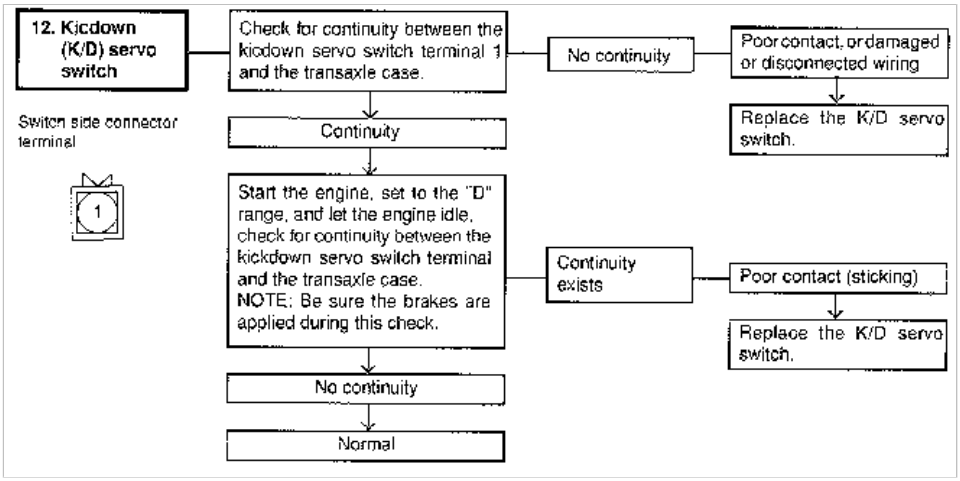

7. Shift-control solenoid valve (SCSV) A ro B
Solenoid valve side connector terminal
1: DCCSV
2: PCSV
3: SCSV-B
4: SCSV-A
Check the resistance between terminal 3 or 4 of the solenoid valve connector and transaxle case.
Resistance: too low or too high
Short-circuit, or damaged or disconnected wiring
Replace the SCSV.
22.3 ± 1.5 Ω/20°C (68°F)
Connect 12V between the transaxle case and terminal 3 or 4: switch ON and OFF and check for operation noise of the solenoid valve, and check the valve stroke.
No operation noise.(stroke: 0.25 mm (0.010 in. or less)
Residue accumulated in valve and core.
Replace the SCSV.
Noise exists.
Normal

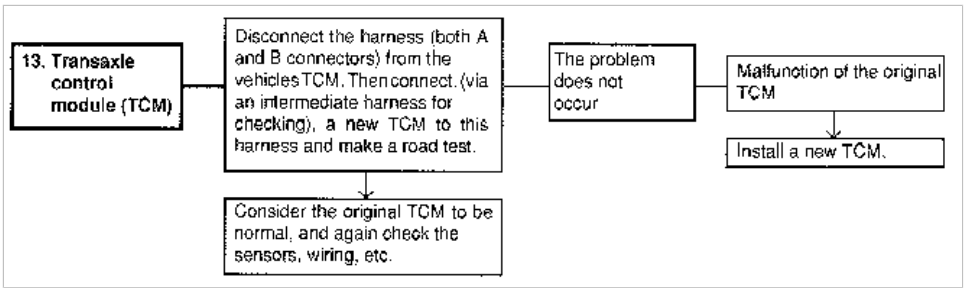

8. Damper clutch system
Pull the parking brake to set it securely.
Set the selector lever to P or N, and start the engine.
With the engine idling, depress the foot brake firmly.
Set the selector lever to the R or D range.
Stop the engine
Improper idle adjustment
Readjust the idling
Allow the engine to continue idling.
Normal
Poor closure (sticking) of the damper clutch control solenoid valve.
Replace the damper clutch control solenoid valve.
Sticking of the clutch control valve
Overhaul the valve body
Sticking (seizure) of the damper clutch.
Replace the torque converter assembly.


9. Damper clutch control solenoid valve (DCCSV)
Solenoid valve side connector terminal
1: DCCSV
2: PCSV
3: SCSV-B
4: SCSV-A
Check the resistance between terminal 1 of the solenoid valve connector and the transaxle case.
Resistance; too low or too high
Short-circuit, damaged or disconnected wiring
Replace the DCCSV.
Standard value: 3 Ω/20°C
Connect 12V between the transaxle case and terminal 1; switch ON and OFF and check for operation noise.
No operation noise. Check for sticking.* (Valve stroke: 0.3 mm (0.012 in. or less)
Foreign material caught between the valve and guide
Replace the DCCSV.
Noise exists
Normal
*Sticking is usually at the release side.


10. Idle switch
With the accelerator pedal not depressed, check the resistance between terminals 1 and ground.
No continuity (resistance: ∞)
Check the installation of the accelerator switch; adjust if necessary.
Switch side connector terminal
1: ( ) Switch
Continuity exists (resistance: 0)
Problem not solved.
With the acceleator pedal depressed, check the resistance between terminals 1 and ground.
Continuity exists (resistance: 0)
Replace the idle switch.
No continuity (resistance: ∞)
Normal


11. Transaxle range switch
Switch side connector terminal
4 3 2 1
8 7 6 5
12 11 10 9
In the "P" range, check for continuity between terminals 7 and 12, and terminals 5 and 6
Continuity exists
In the "R" range, check for continuity between terminals 7 and 11, and terminals 2 and 8
Continuity exists
In the "N" range, check between terminals 7 and 9, and terminals 5 and 6
Continuity exists
In the "D' range, check for continuity between terminals 7 and 10
Continuity exists
In the "2" range, check for continuity between terminals 7 and 1
Continuity exists
In the "L" range, check for continuity between terminal 7 and 3
Continuity exists
Normal
No continuity
Poor contact, damaged or disconnected wiring
Replace the transaxle range switch





Transaxle/Transmission > Automatic Transaxle System > TROUBLESHOOTING (MANUAL CONTROL CABLE)

TROUBLESHOOTING (MANUAL CONTROL CABLE)

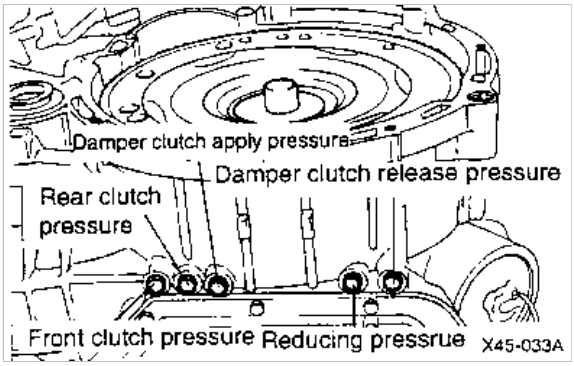
Proper manual control linkage adjustment can be determined by checking whether transaxle range switch is performing well.

1. Apply parking and service brakes securely.
2. Place the selector lever in "R" range.
3. Set the ignition key to "ST" position.
4. Slowly move the selector lever upward until it clicks as it fits in the notch of the "P" range. If the starter motor operates when the lever makes a click, "P" position is correct.
5. Then, slowly move the selector lever to the "N" range as described in step 4. If starter motor operates when the selector lever fits in "N," the position is correct.
6. Also check to be sure that the vehicle doesn't begin to move and the lever doesn't stop between P-R-N-D-2-L.
7. The manual-control cable is properly adjusted if, as described above, the starter motor starts at both the "P" range and the "N" range.

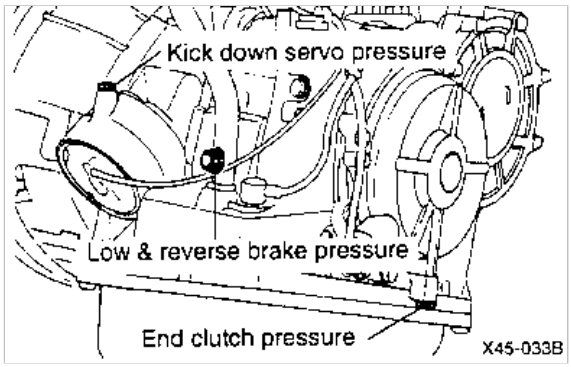
Transaxle/Transmission > Automatic Transaxle System > TROUBLESHOOTING (OIL PRESSURE TESTS)

TROUBLESHOOTING (OIL PRESSURE TESTS)

1. Completely warm up the transaxle.
2. Raise the front of the vehicle so that the front wheels can be rotated.
3. Connect an engine tachometer and place it in a position where it's easy to see.
4. Attach the special oil-pressure gauge (09452-21500) and the adapter (09452-21002) to each oil-pressure outlet port.
   When the reverse pressure is to be tested, use the 3,000 kpa (400 psi) type of gauge.



5. Measure the oil pressure under various conditions. Check to be sure that the measured results are within the standard value range shown in the "Standard oil pressure table" below. If the oil pressure is not within the specified range, check and repair as described in "Preliminary Steps if Oil Pressure Is Not Normal" below.



Standard Oil Pressure Table

No.	Conditions				Standard oil pressure KPa (psi)							
	Selector lever position	(Reference) vehicle speed km/h (mph)	Engine speed rpm	Shift position	1 Reducing pressure	2 Kickdown brake pressure	3 Front clutch pressure	4 End clutch pressure	5 Low-reverse brake pressure	6 Torque-converter pressure	7 Damper clutch release pressure	8 Rear clutch pressure
1	N	0(0)	Idling	Neutral	380-460 (55-67)	–	–	–	..	*	*	–
2	D	0(0)	Approx.	2nd gear	380-460 (55-67)	90-295 (13-43)	–			*	*	*
3	D (SW-ON)	110 (68)	2,500 Approx	4th gear	380-460 (55-67)	840-900 (122-131)	–	840-900 (122-131)	–	490-785 (71-114)	-	840-900 (122-131)
4	D (SW-OFF)	75 (47)	2,500 Approx	3rd gear	380-460 (55-67)	840-900 (122-131)	820-900 (119-131)	840-900 (122-131)		490-785 (71-114)	-	840-900 (122-131)
5	2	50 (31)	2,500 Approx.	2nd gear	380-460 (55-67)	840-900 (122-131)	–	–	–	490-785 (71-114)	-	840-900 (122-131)
6	L	0 (0)	1,000 Approx.	1st gear	380-460 (55-67)	–	–	–	500-630 (73-91)	*	410-500 (59-73)	840-900 (122-131)
7	R	35 (22)	2,500 Approx.	Reverse	380-670 (55-67)	-	1750-2050 (254-297)	–	1750-2050 (254-297)	270-340 (39-49)	420-500 (61-73)	-
		0 (0)	1,000				450 (65) or more		450 (65) or more	*	*	

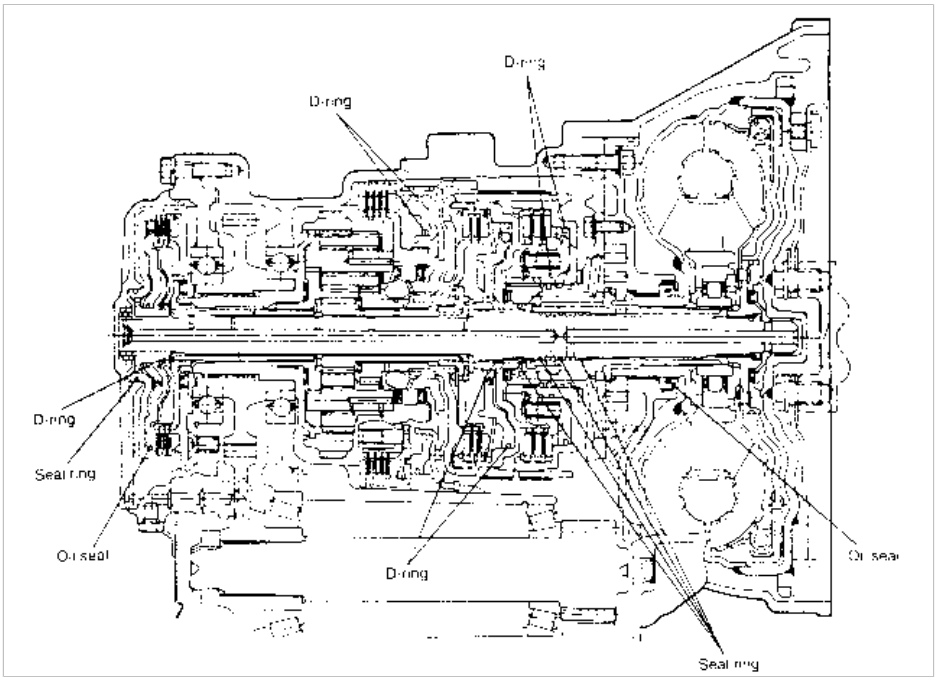
NOTE:
- must be 19.6 kPa (2.8 psi) or less.
SW-ON : Switch ON the overdrive control switch.
SW-OFF : Switch OFF the overdrive control switch.
* : Hydraulic pressure is generated, but not the standard value.

Preliminary steps if oil pressure is not normal

	Trouble symptom	Probable cause	Remedy
1	*Line pressures are all low (or high). **NOTE** ***"Line pressure" refers to oil pressures 2,3,4,5,6,7 and 8 in the "Standard oil pressure table" on the previous page.**	1. Clogging on oil filter 2. Improper adjustment of oil pressure (line pressure) regulator valve 3. Sticking of regulator valve 4. Looseness of valve body tightening part 5. Improper oil pump discharge pressure	1. Visually inspect the oil filter; replace the oil filter if it is restricted. 2. Measure line pressure 2 (kickdown brake pressure); if the pressure is not the standard value, readjust the line pressure, or if necessary, replace the valve body assembly. 3. Check the operation of the regulator valve; repair if necessary, or replace the valve body assembly. 4. Tighten the valve body tightening bolt and installation bolt. 5. Check the side clearance of the oil pump gear; replace the oil pump assembly if necessary.
2	Improper reducing pressure	1. Improper line pressure 2. Clogging of the filter (L-shaped type) of the reducing-pressure circuit 3. Improper adjustment of the reducing pressure 4. Improper adjustment of the reducing pressure 5. Sticking of the reducing valve 6. Looseness of valve body tightening part	1. Check the 2 kickdown brake pressure (line pressure); if the line pressure is not the standard value, check as described in item 1 above. 2. Disassemble the valve body assembly and check the filter; replace the filter if it is restricted. 3. Measure the 1 reducing pressure; if it is not the standard value, readjust, or replace the valve body assembly. 4. Check the operation of the reducing valve; if necessary, repair it, or replace the valve body assembly. 5. Tighten the valve body tightening bolt and installation bolt.

	Trouble symptom	Probable cause	Remedy
3	Improper kickdown brake pressure	1. Malfunction of the D-ring or seal ring or the sleeve or kickdown servo piston. 2. Looseness of valve body tightening part. 3. Functional malfunction of the valve body assembly.	1. Disassemble the kickdown servo and check whether the seal ring or D-ring is damaged. If it is cut or has scratches, replace the seal ring or D-ring. 2. Tighten the valve body tightening bolt and installation bolt. 3. Replace the valve body assembly.
4	Improper front clutch pressure	1. Malfunction of the D-ring of the sleeve or kickdown servo piston. 2. Looseness of valve body tightening part 3. Malfunction of the valve body assembly. 4. Wear of the front clutch piston or retainer, or malfunction of the D-ring. (Refer to the figure on the next page.) 5. Oil pump gasket or seal ring (2) damaged.	1. Disassemble the kickdown servo and check whether the seal ring is damaged. If it is cut or has scratches, replace the seal ring or D-ring. 2. Tighten the valve body tightening bolt and installation bolt. 3. Replace the valve body assembly. 4. Disassemble the transaxle itself and check whether or not there is wear of the front clutch piston and retainer inner circumference, or damage of the D-ring. If there is any wear or damage, replace the piston, retainer, D-ring and or seal ring.
5	Improper end clutch pressure	1. Malfunction of a D-ring , seal ring of the end clutch or O-ring of the pipe (Refer to the following figure) 2. Looseness of valve body tightening part. 3. Malfunction of the valve body assembly	1. Disassemble the end clutch and check the seal ring, D-ring of the pisition, seal ring of the retainer, etc.; replace if there are cuts, scars, scratcher or damage. 2. Tighten the valve body tightening bolt and installation bolt. 3. Replace the valve body assembly.

	Trouble symptom	Probable cause	Remedy
6	Improper low-reverse brake pressure	1. O-ring between valve body and transaxle damaged or missing 2. Looseness of valve body tightening part 3. Malfunction of the valve body assembly 4. Malfunction of the O-ring of the low-reverse brake piston or the O-ring of the retainer (Refer to the following figure.)	1. Remove the valve body assembly and check to be sure that the O-ring at the upper surface of the upper valve body is not missing or damaged; install or replace the O-ring if necessary. 2. Tighten the valve body tightening bolt and installation bolt. 3. Replace the valve body assembly. 4. Disassemble the transaxle itself and check the O-ring for damage; replace if there are cuts, scars, scratches or damage.
7	Improper torque converter pressure	1. Sticking of the damper clutch control solenoid valve (DCCSV) or the damper clutch control valve. 2. Clogging or leaking of the oil cooler and/or lines. 3. Damaged seal ring of the input shaft (Refer to the following the figure) 4. Malfunction of the torque converter.	1. Check the operation of the damper clutch system and the DCCSV. 2. Repair or replace, as necessary, the cooler and/or lines. 3. Disassemble the transaxle itself and check for damage of the seal ring; replace the seal ring if there is damage. 4. Replace the torque converter.
8	Improper rear clutch pressure	1. Malfunction of the D-ring or seal ring of the rear clutch. 2. Looseness of valve body tightening part. 3. Functional malfunction of the valve body assembly	1. Disassemble the end clutch and check the seal ting, D-ring of the piston, seal ring of the retainer, etc.; replace if there are cut, scars, scratches or damage. 2. Tighten the value body tightening bolt and installation bolt. 3. Replace the valve body assembly.
9	Improper damper clutch release pressure	Same as the probable cause of torque converter pressure	Same as the remedy of torque converter pressure



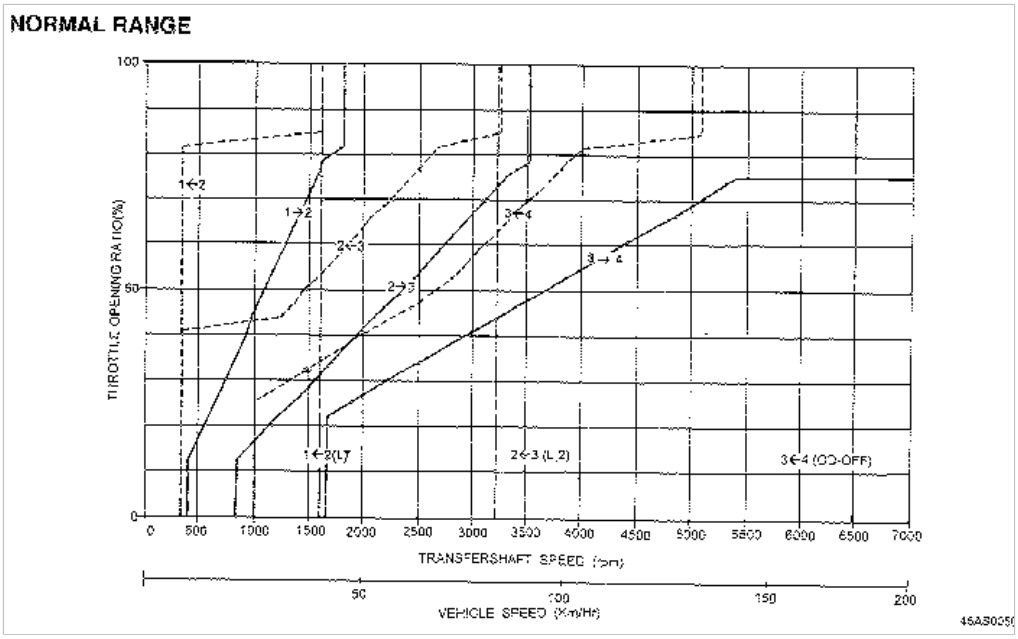
Transaxle/Transmission > Automatic Transaxle System > TROUBLESHOOTING (SHIFT PATTERNS)

TROUBLESHOOTING (SHIFT PATTERNS)

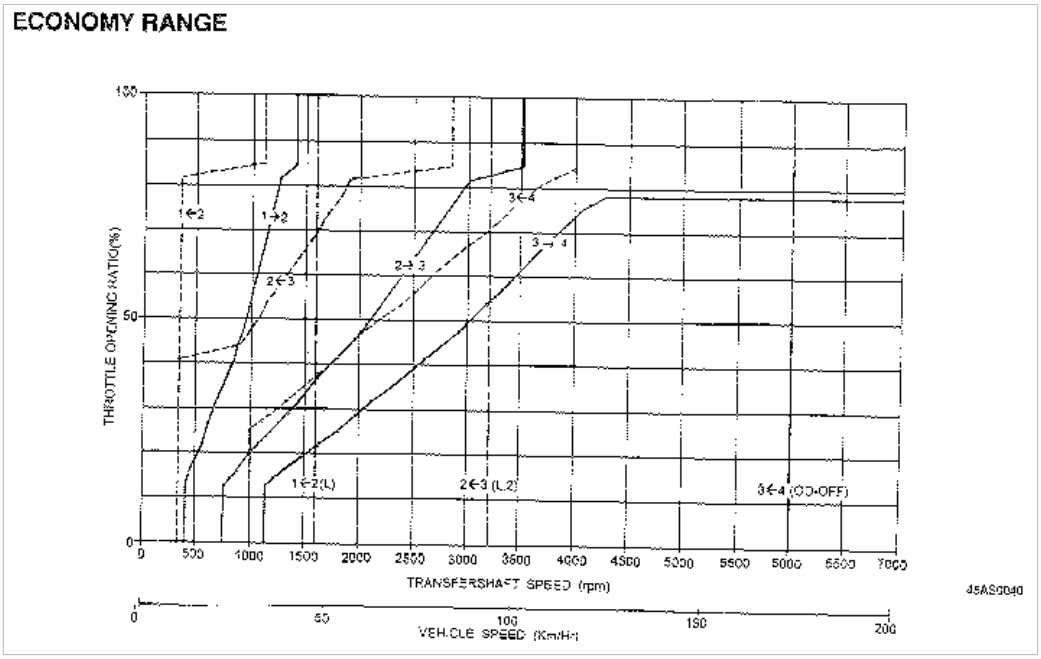
a. Two shift patterns are pre-stored in the control module of this transaxle.
b. One is the Normal pattern (for more powerful performance), and the other is the Economy pattern (for improved fuel consumption and quieter operation).
c. The driver can select and switch to the desired pattern by using the normal/economy select switch on the center console.
d. The solid lines shown in these shift patterns indicate up-shifts; the broken lines indicate down-shifts.
e. There is a difference between the shift points for up-shifts and down-shifts so that up-shifts and down-shifts will not occur frequently when driving at a speed near the shift point.
f. When the vehicle is stopped, there is a shift to second gear to obtain a suitable "creeping." Then, when the accelerator pedal is depressed, the vehicle starts in first gear.

SHIFT PATTERN [FOR 1.5L MFI]

NORMAL RANGE

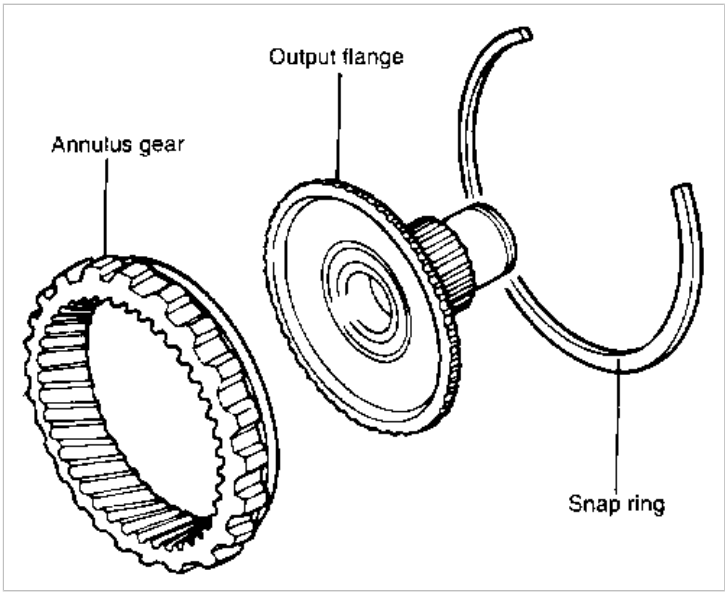


ECONOMY RANGE



Transaxle/Transmission > Automatic Transaxle System > Annulus Gear And Output Flange > COMPONENTS

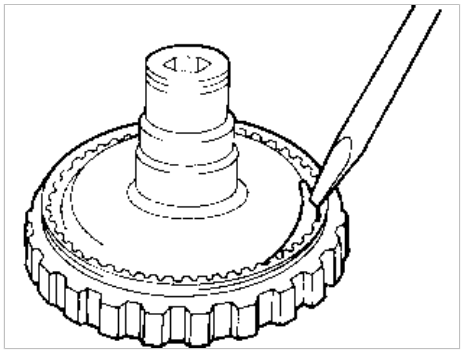
Components



Transaxle/Transmission > Automatic Transaxle System > Annulus Gear And Output Flange > DISASSEMBLY

DISASSEMBLY

Remove the snap ring from the rear of the output flange.

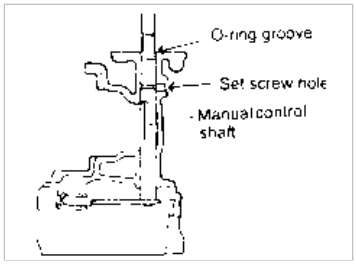


Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > ASSEMBLY

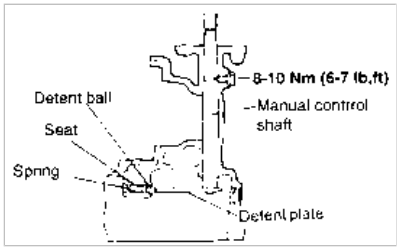
ASSEMBLY

Do not reuse gaskets, oil seals and rubber parts. Replace them with new ones at every reassembly. The O-ring of the oil level dipstick need not be replaced.
Do not use grease other than petrolatum or industrial vaseline. Apply automatic transaxle fluid to friction elements, rotating parts, and sliding parts before installation. Refer to page 104 concerning automatic transaxle fluid. New clutch discs should be immersed in automatic transaxle fluid for a minimum of two hours before installation.
Do not apply sealer or adhesive to gaskets. When bushings must be replaced, replace their complete assembly.
Do not use shop towels during disassembly and reassembly operation. The oil in the cooler should also be replaced.

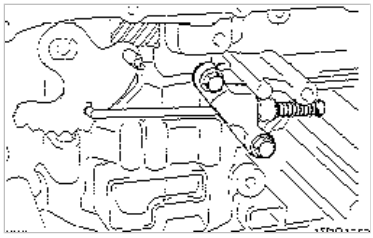
1. Insert manual control shaft into the transaxle case and push it toward the manual control lever. At this time, do not install the larger one of the two O-rings on the manual control shaft.
   If installed before inserting the shaft, the O-ring will interfere with shaft set screw hole.



2. After installing the new O-ring on manual control shaft, draw shaft back into case. Install the set screw and gasket. Install the detent end steel ball, seat and spring at the same time.

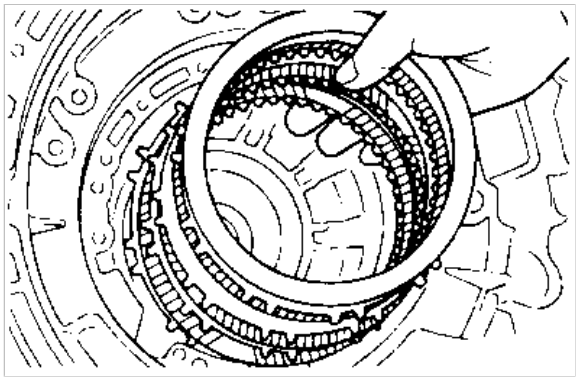


3. Install the parking sprag rod to the detent plate (manual control shaft). Install the sprag rod support and tighten the two bolts.

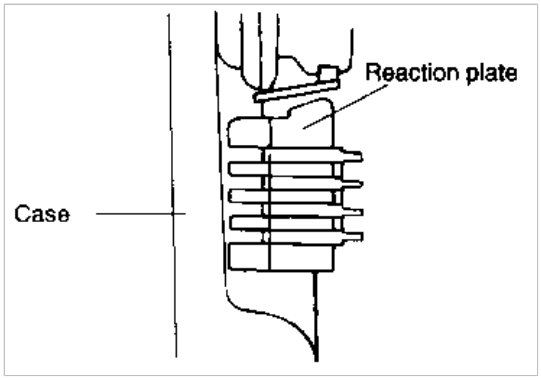


Before assembly of the transaxle, measure the end play of the low-reverse brake, and select a pressure plate to be used so that the end play will be the standard value. Install the brake reaction plate, brake plate and brake disc to the transaxle case.

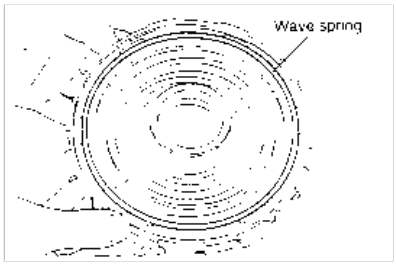
4. Install the brake reaction plate, brake plate and brake disc to the transaxle case.
   If new brake discs are used, be sure to immerse them in ATF for a minimum of two hours.



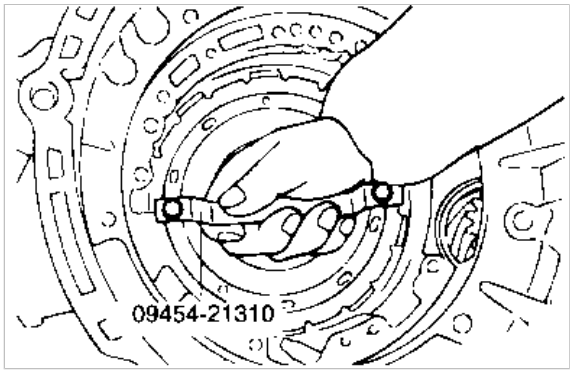
5. Install the appropriate pressure plate and then install the return spring.
   Be sure that the return spring is installed so that it faces in the correct direction.



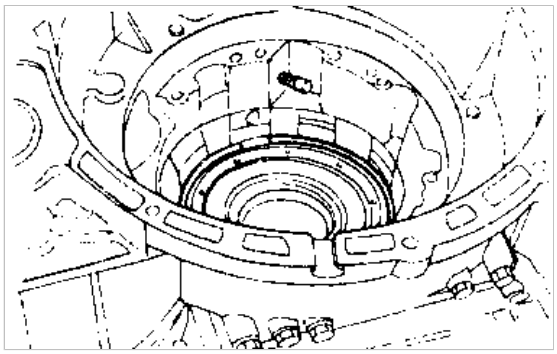
6. Apply a coating of petroleum jelly to the wave spring and attach it to the center support.



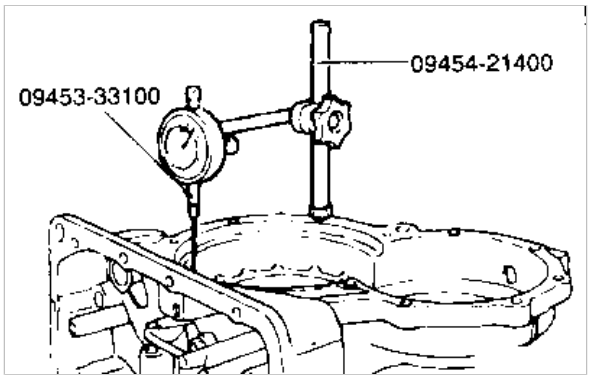
7. Install the special tool (09453-21310) to the center support.



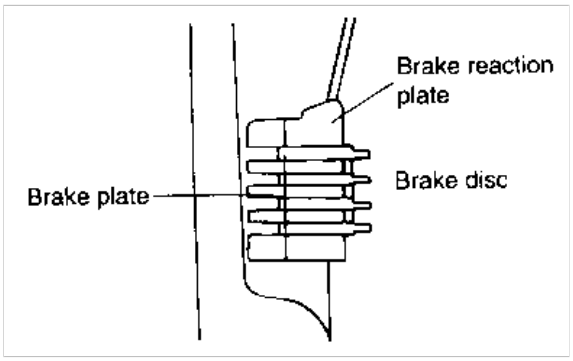
8. Install the snap ring.



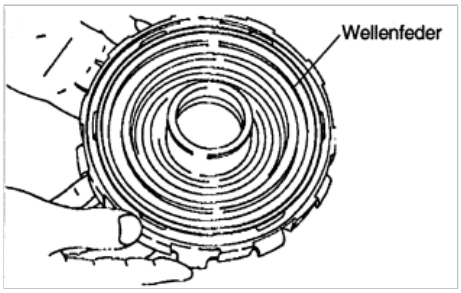
9. Install the special tools (09454-21400, 09453-33100) and a dial gauge at the rear side of the transaxle case.
   Install the dial gauge so that it contacts the brake reaction plate at a right angle from the transfer idler shaft hole.



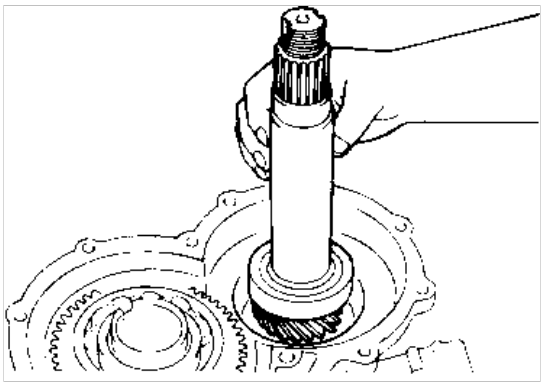
10. Using a manual pump, pump air (5 kg/cm2) in from the position shown in the illustration. Read the dial indicator gauge, and select the pressure plate that will provide the standard value.



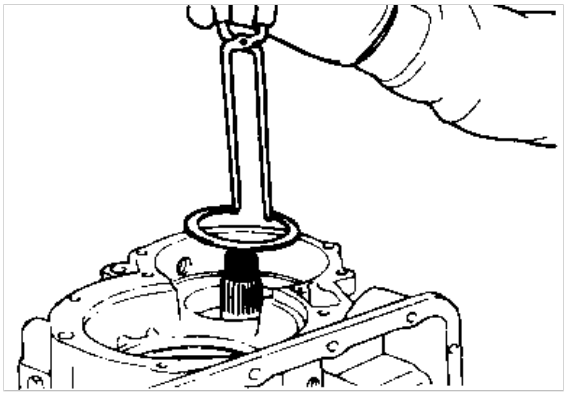
11. After selecting pressure plate, remove center support, brake plate rake disc, brake reaction plate and pressure plate.



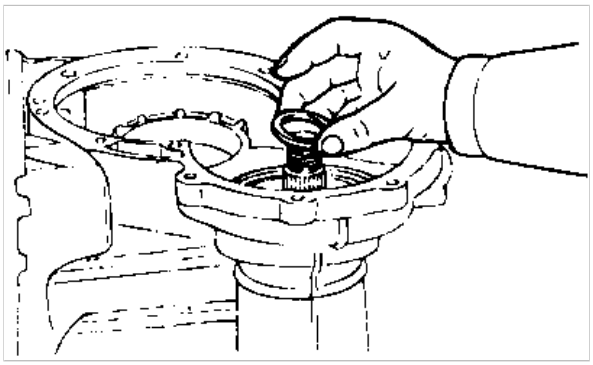
12. Install the transfer shaft, and press-fit the bearing outer race to the transaxle case.



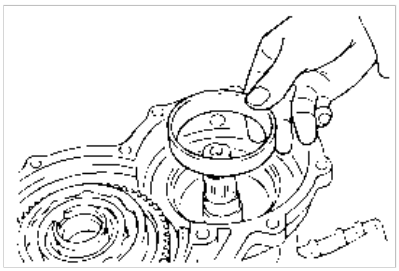
13. Install the transfer shaft snap ring.



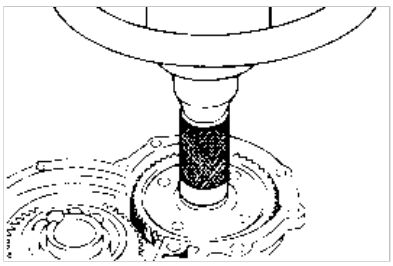
14. Insert the spacer on the transfer shaft.



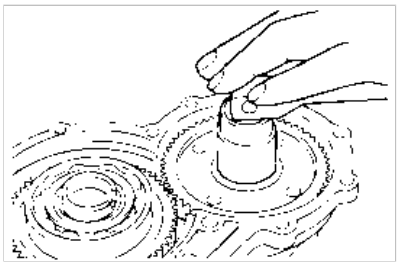
15. Install the bearing cage on the case.



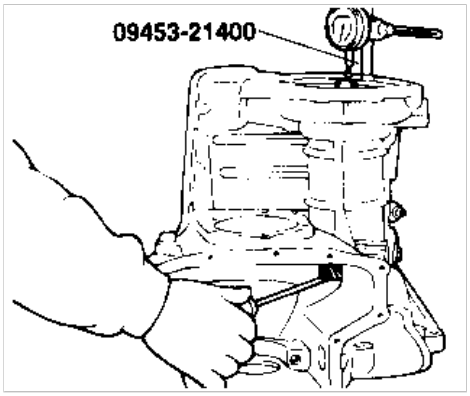
16. Press-fit the transfer driven gear to the transfer shaft.



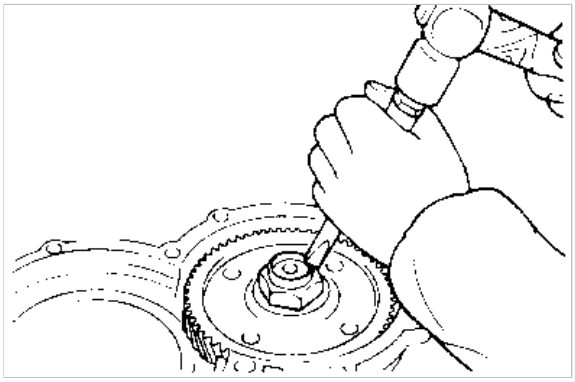
17. Tighten the lock nut to the specified torque.



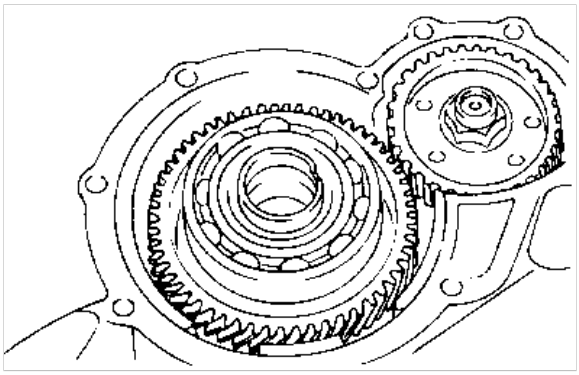
18. After installing the dial gauge, measure the end play of the transfer shaft, then select the spacer(s) needed to obtain the standard value, and refit.



19. Using a punch, lock the lock nut to prevent rotation.



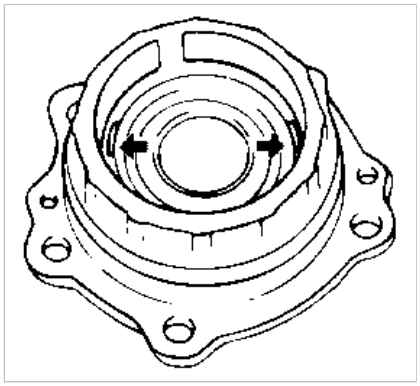
20. Install the transfer drive gear assembly.



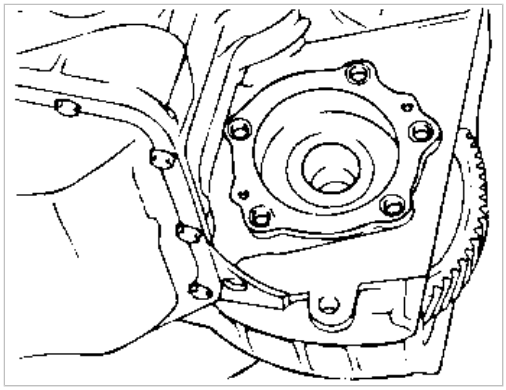
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > ASSEMBLY (CONTINUED)

ASSEMBLY (continued)

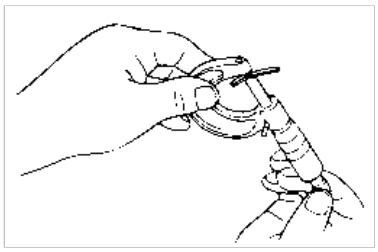
1. Place two pieces of solder, roughly 10 mm (0.4 in) long and 3 mm (0.12 in) in diameter, at the position shown on the differential bearing retainer outer race.



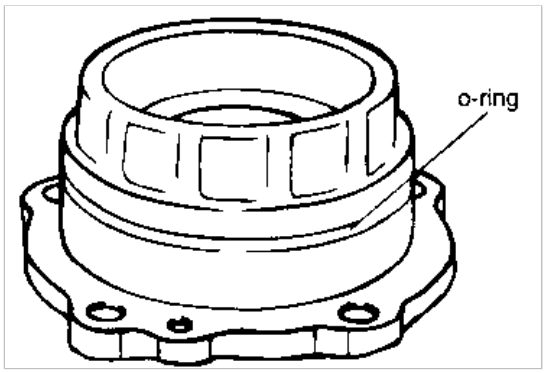
2. Install the differential bearing retainer and tighten the bolt to specified torque.



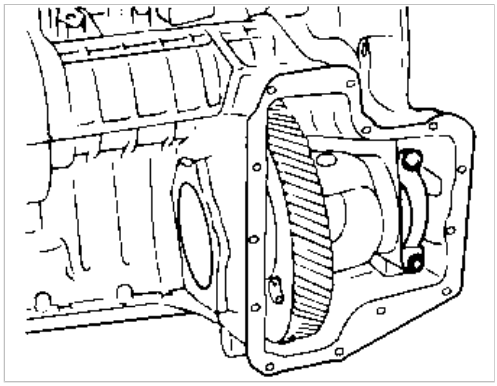
3. Remove the differential bearing retainer.
4. Remover the crushed solder from the outer race of the differential bearing.
5. Select and install a spacer so that the preload of the differential bearing will be the standard value.



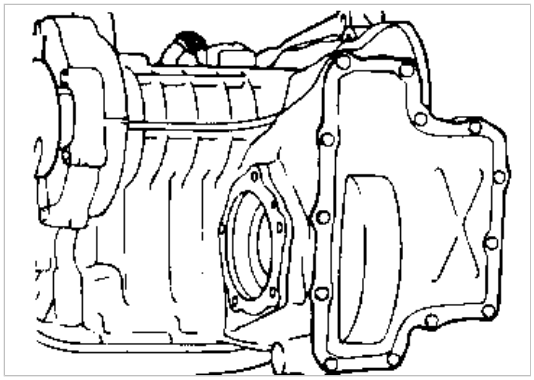
6. Apply the ATF to the newly installed O-ring and install the differential bearing retainer.



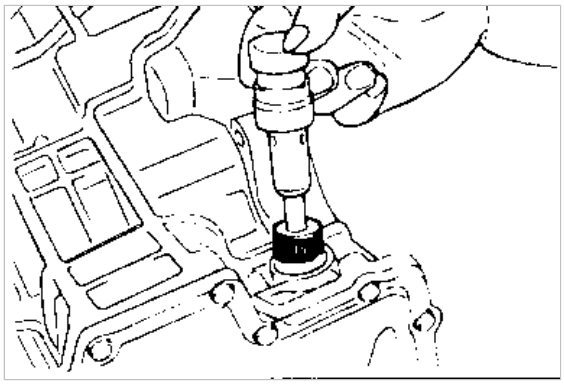
7. Install the differential bearing cap.



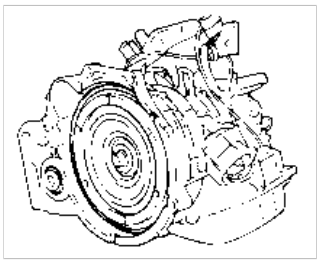
8. Install the differential cover with new gasket.



9. Install the speedometer sleeve.



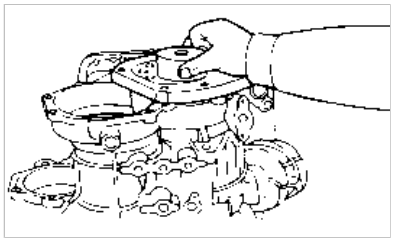
10. After applying automatic transaxle fluid to the outside surface of the oil pump side cylindrical portion of the torque converter, install the torque converter carefully so as not to damage the seal lip. Make certain that the torque converter is in mesh with oil pump driver gear.
11. Measure the distance between the ring gear end and the converter housing end. The torque converter has been properly installed when measurement is approximately 12 mm (0.47 in.).



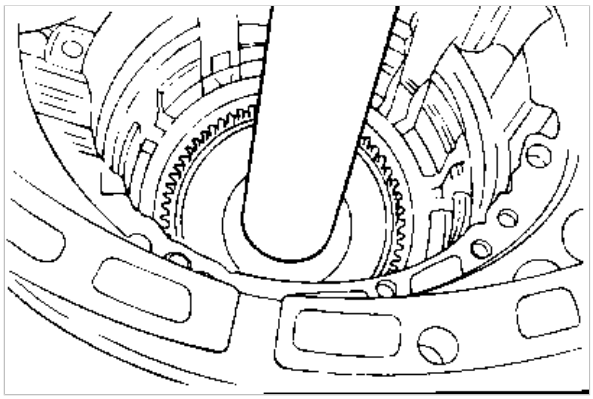
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > ASSEMBLY (CONTINUED)

ASSEMBLY (continued)

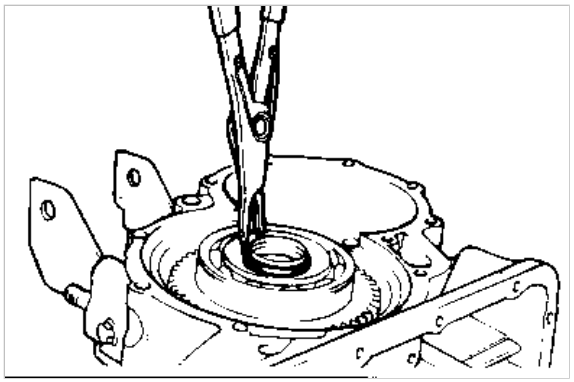
1. Install the special tool at the rear side of the transaxle case.



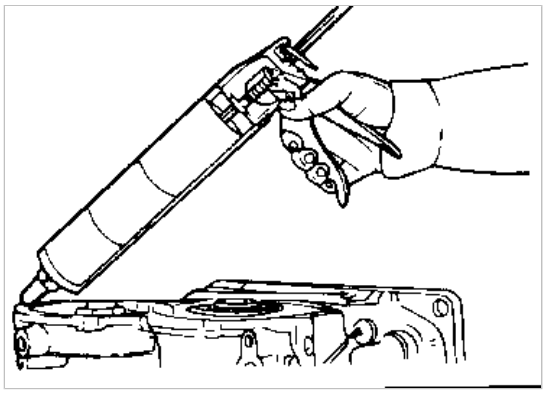
2. Using the special tool, insert an assembly of the annulars gear into the transfer drive gear.



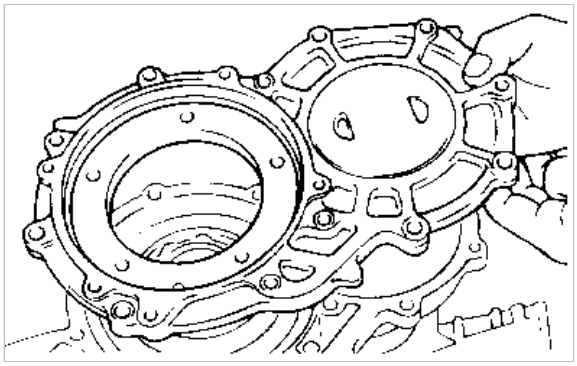
3. Install the stopper plate and snap ring.



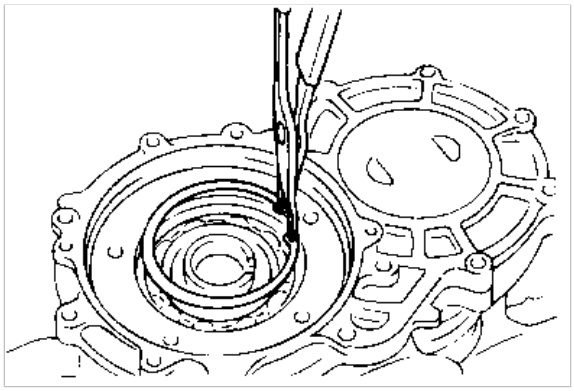
4. Apply specified sealant to the rear cover.



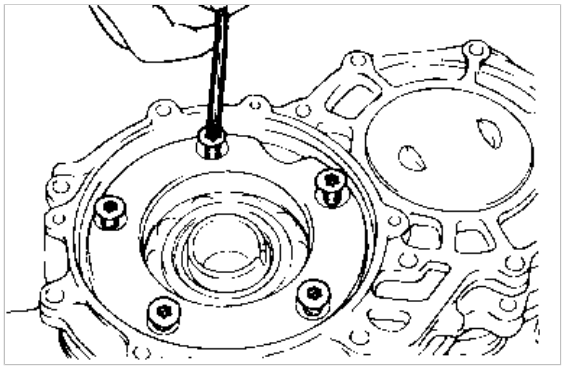
5. Install the rear cover assembly.

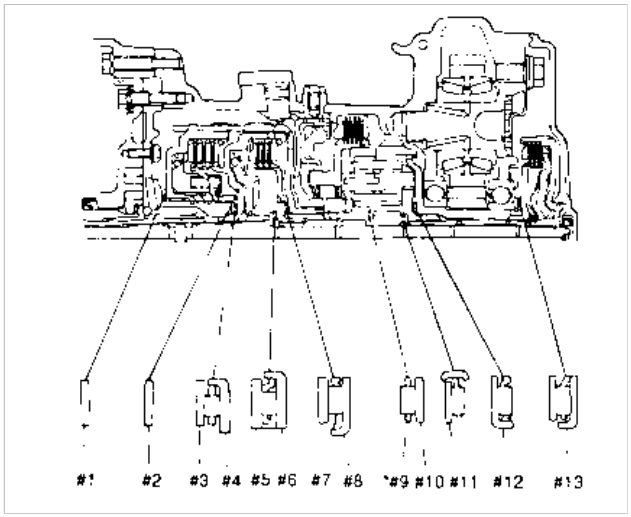


6. Install snap ring.



7. Install the bearing retainer. Tighten the screws to the specified torque. Apply awidth of sealant (3M Stud Locking No. 1303). Sealant should not stick out of screw head.

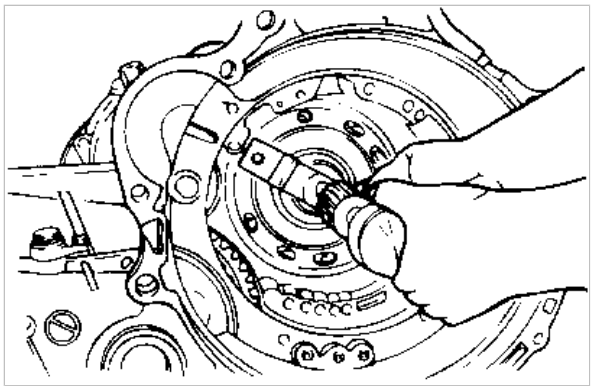




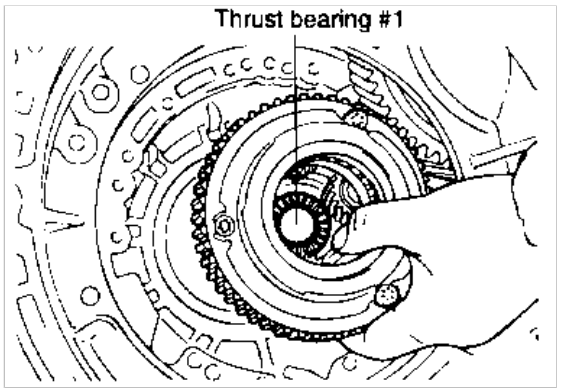
Identification of thrust bearings, thrust races and thrust washers.

Outer diameter	Inner diameter	Thickness	Code No.	Outer diameter	Inner diameter	Thickness	Code No.
70 (2.756)	55.7 (2.193)	1.4 (0.055)	#1	48.1 (1.906)	34.4 (1.354)	-	#4
70 (2.756)	55.7 (2.193)	1.8 (0.071)		40 (1.575)	21 (0.827)	2.4 (0.094)	#5
70 (2.756)	55.7 (2.193)	2.2 (0.087)		42.6 (1.677)	28 (1.102)	-	#6
70 (2.756)	55.7 (2.193)	2.6 (0.102)		54 (2.126)	38.7 (1.524)	1.6 (0.063)	#7
70 (2.756)	55.7 (2.193)	1.8 (0.071)	#2	52 (2.047)	36.4 (1.433)	-	#8
48.9 (1.925)	37 (1.457)	1.0 (0.039)	#3	41 (1.614)	28 (1.102)	-	#9
48.9 (1.925)	37 (1.457)	1.2 (0.047)		39 (1.535)	28 (1.102)	1.2 (0.047)	#10
48.9 (1.925)	37 (1.457)	1.4 (0.055)		38 (1.496)	22.2 (0.874)	-	#11
48.9 (1.925)	37 (1.457)	1.6 (0.063)		52 (2.047)	36.4 (1.433)	-	#12
48.9 (1.925)	37 (1.457)	1.8 (0.071)		58 (2.283)	44 (1.732)	-	#13
48.9 (1.925)	37 (1.457)	2.0 (0.079)					
48.9 (1.925)	37 (1.457)	2.2 (0.087)					
48.9 (1.925)	37 (1.457)	2.4 (0.094)					

8. Apply a coating of petroleum jelly to thrust bearing #12 and attach to the planetary carrier.

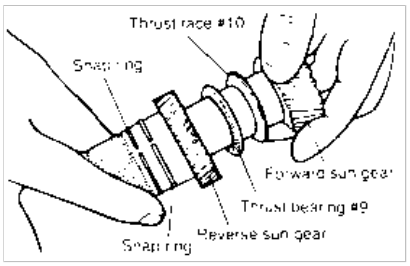


9. Install the planetary carrier to the case.

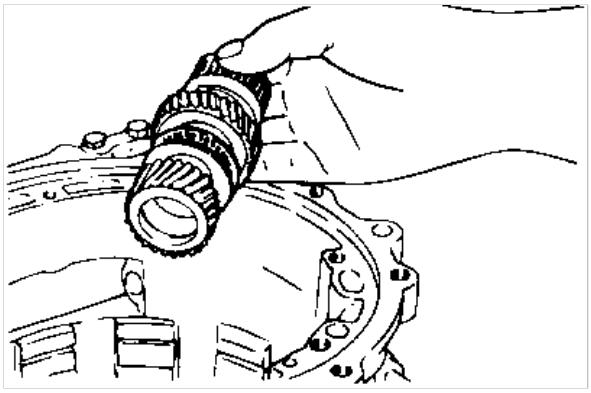


10. Assemble the reverse sun gear and the forward sun gear in the following order:
    (1) Attach the seal ring and the snap ring to the reverse sun gear. When attaching, squeeze the seal ring as shown in the figure.
    (2) Attach thrust race #9 to the forward sun gear.
    (3) Attach thrust race #10 to the forward sun gear.

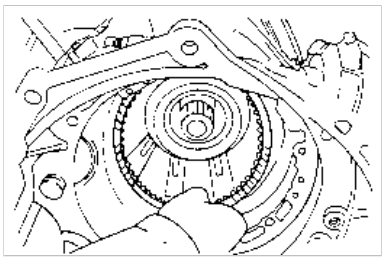
    (4) Assemble the reverse sun gear, and then the forward sun gear.



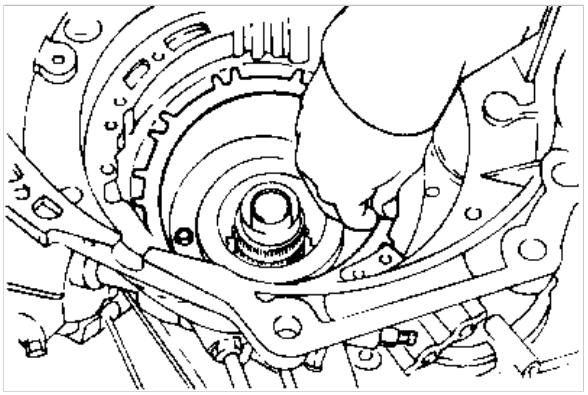
11. Install both of the previously assembled sun gears inside the planetary carrier.



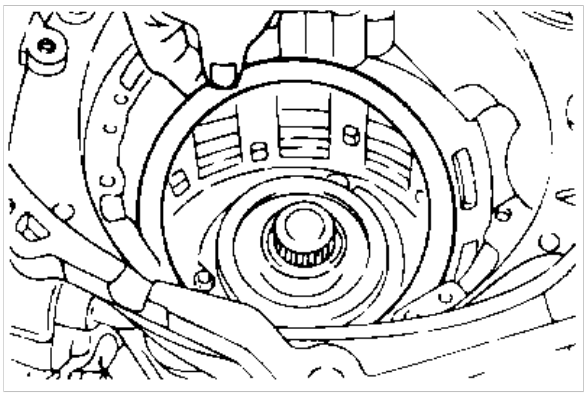
12. Install the brake disc and brake plate.



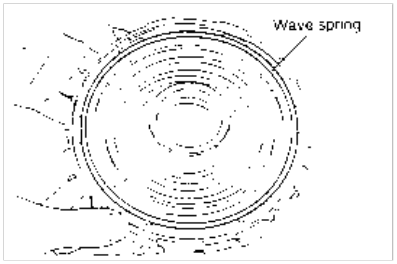
13. Install the selected brake pressure plate.



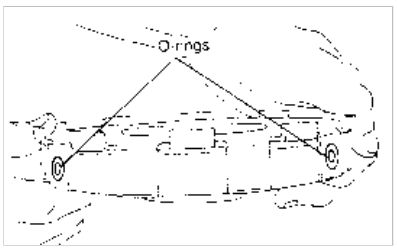
14. Install the return spring.



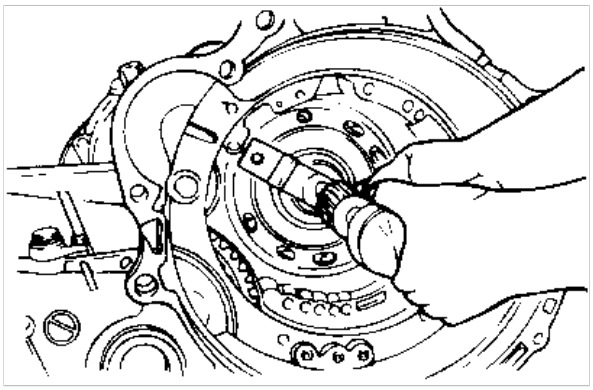
15. Apply a coating of petroleum jelly to the wave spring and attach it to the center support.



16. Install the two new O-rings to the center support.

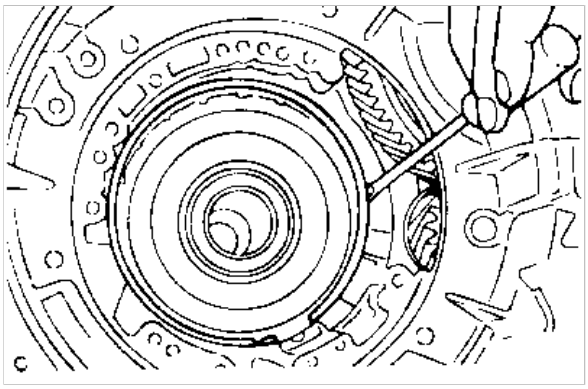


17. After applying a coating of ATF to the O-rings, install the special tool (09453-21310) to the center support, and install into the case.

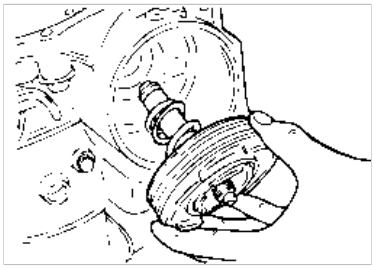


Be sure that the wave spring is not out of position.

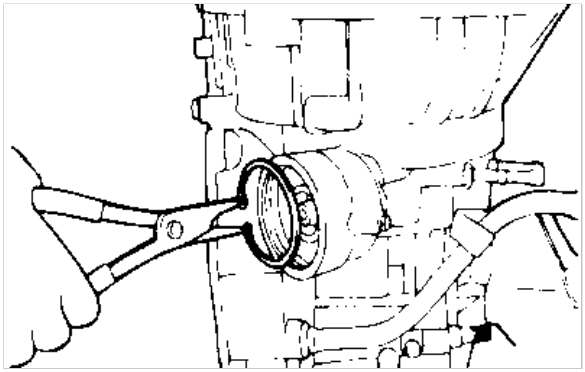
18. Install the snap ring.



19. Assemble a new seal ring (large diameter) and D-ring (small audiometer) to the kickdown servo piston, and install a new O-ring in the groove around the sleeve; then assemble the kickdown servo spring, piston and sleeve in the transaxle case.



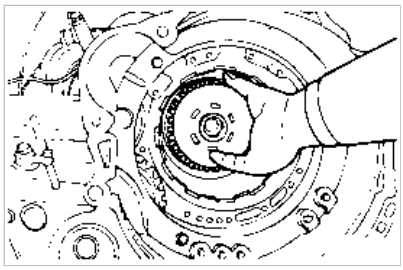
20. Press the kickdown servo and sleeve, and install the snap ring.



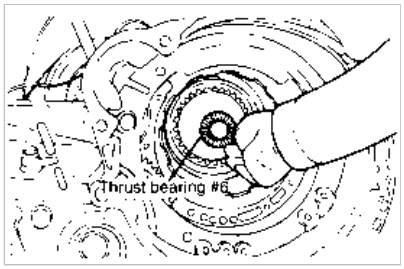
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > ASSEMBLY (CONTINUED)

ASSEMBLY (continued)

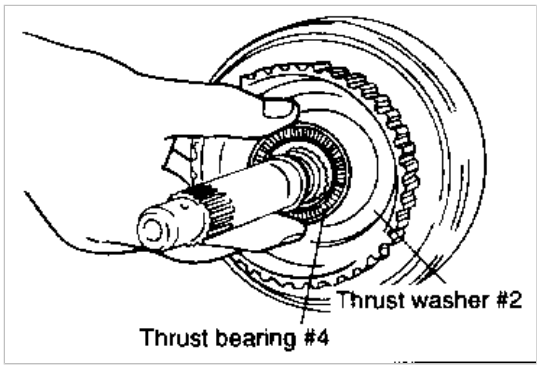
1. Install the clutch hub to the sun gear spline.



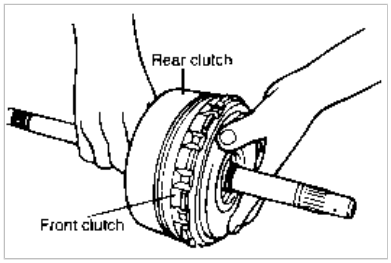
2. Attach thrust bearing #6 onto the hub using petroleum jelly.



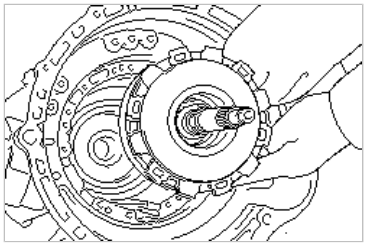
3. Apply a coating of petroleum jelly to thrust washer #2 and thrust bearing #4. Attach to the rear clutch assembly.



4. Combine the rear clutch and the front clutch assemblies.



5. Install the entire clutch assembly.



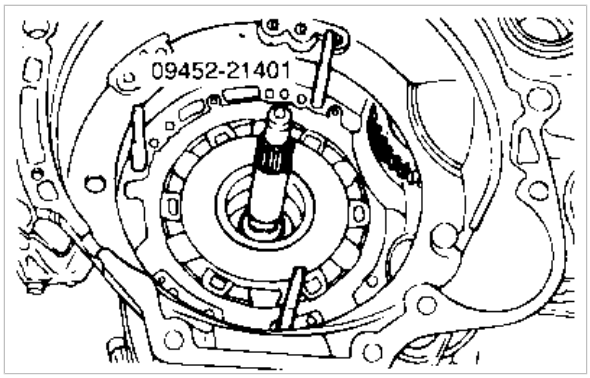
6. If end play which was measured and recorded at disassembly is not within standard value, adjust to specification by selecting thrust race #3.
When the thrust race is replaced with that of a different thickness, also replace thrust washer #1 located between the oil pump and front clutch. Use a washer of proper corresponding thickness corresponding to thrust race. Find correct pair of thrust races (metal) and thrust washers (fiber) from following table.

Thrust washer #3 (metal)	Thrust race #1 (fiber)
Thickness mm (in.)	Thickness mm (in.)
1.4 (0.055)	1.0 (0.039)
1.4 (0.055)	1.2 (0.047)
1.8 (0.071)	1.4 (0.055)
1.8 (0.071)	1.6 (0.063)
2.2 (0.87)	1.8 (0.071)
2.2 (0.87)	2.0 (0.079)
2.6 (0.102)	2.2 (0.087)
2.6 (0.102)	2.4 (0.095)

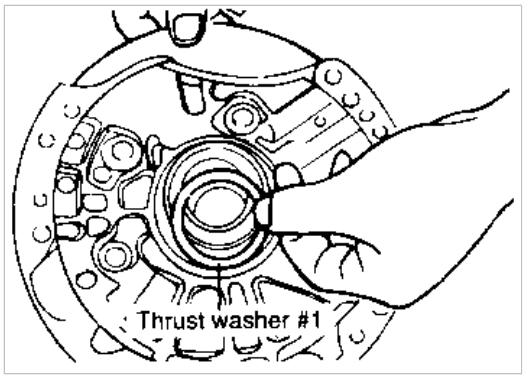
Example: When a different thickness thick thrust race is selected, a corresponding thrust washer must be paired with it.

7. Attach the reused thrust washer #1, or the one selected in step 49 to the front clutch by using petroleum jelly.

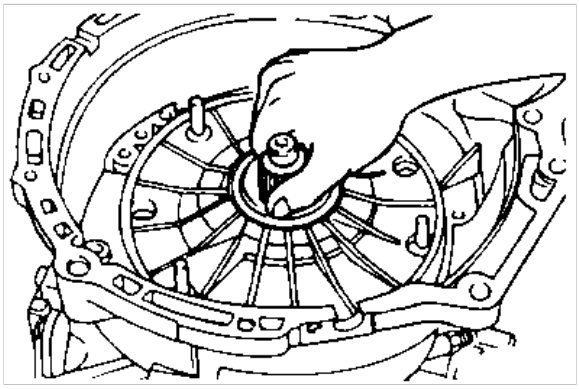
8. Install the special tool (09452-21401) to the case.



9. Attach the reused thrust race #3 or the one selected in step 50 to the oil pump by using petroleum jelly.



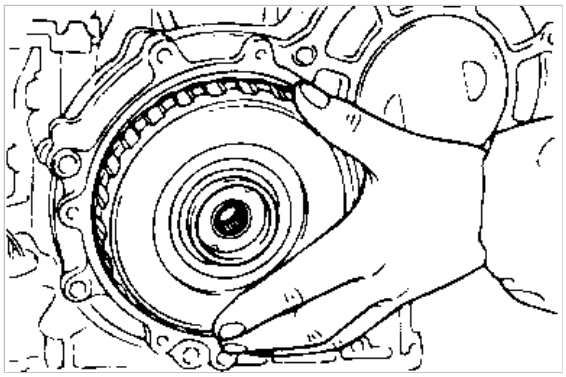
10. Install a new oil pump gasket and the oil pump assembly.



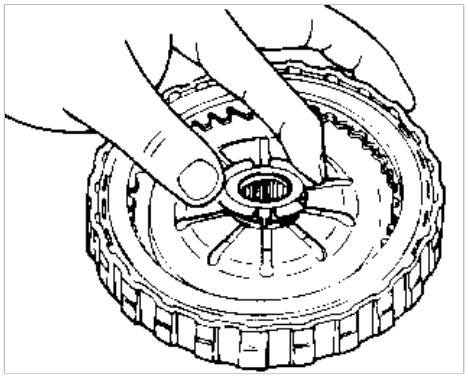
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > ASSEMBLY (CONTINUED)

ASSEMBLY (continued)

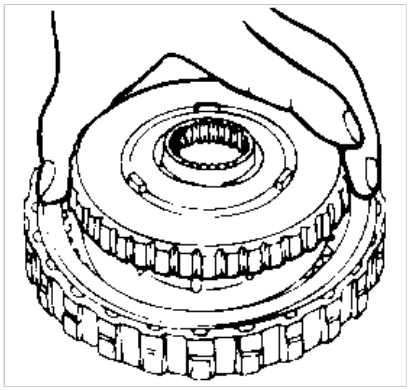
1. Install the end clutch shaft. Be sure to install the longer spline toward the front as shown.



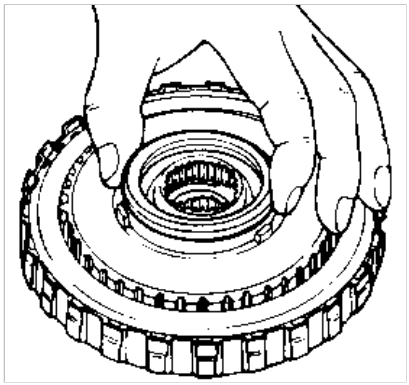
2. Fit the thrust washer toward the return spring at the end clutch side.



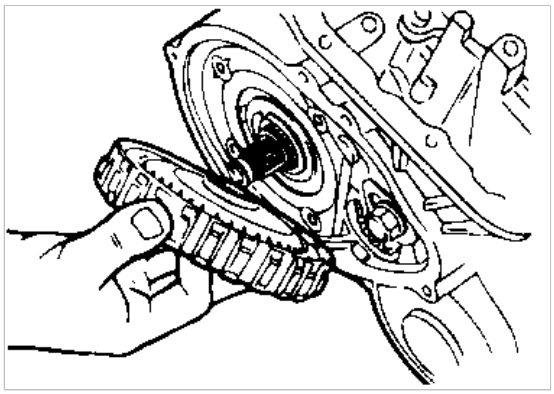
3. Install the end clutch hub to end clutch.



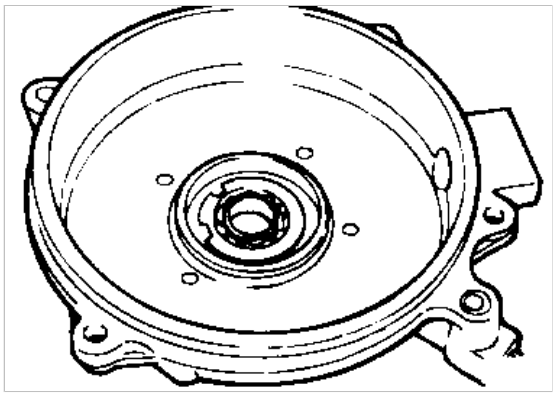
4. Attach, using petroleum, thrust bearing #13 to the end clutch hub.



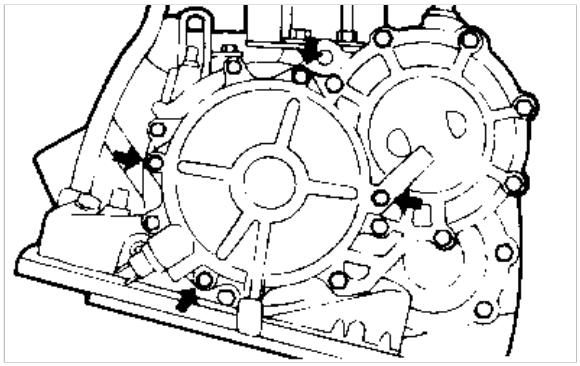
5. Install the end clutch assembly.



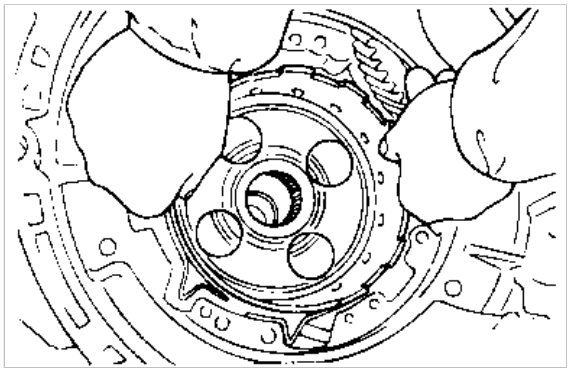
6. Attach a new O-ring and D-ring to the end clutch cover.
   Install so that the D-ring is not twisted. Apply a sufficient amount of automatic transaxle fluid to the bearing.



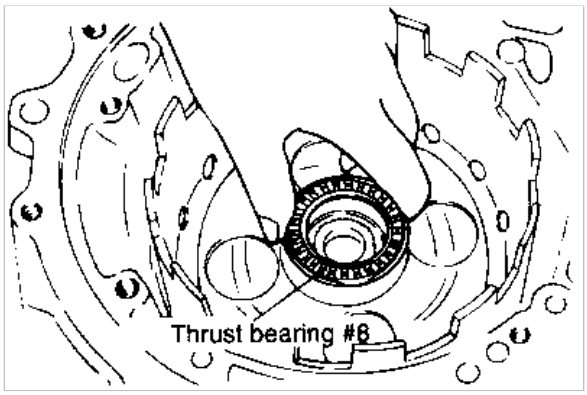
7. Attach the end cover and fasten it with four bolts.
   When installing the end cover, be sure the screw hole is correctly aligned. If the end cover is turned (after it is installed) in order to align with the screw hole, the O-ring and/or the D-ring may be twisted as result.



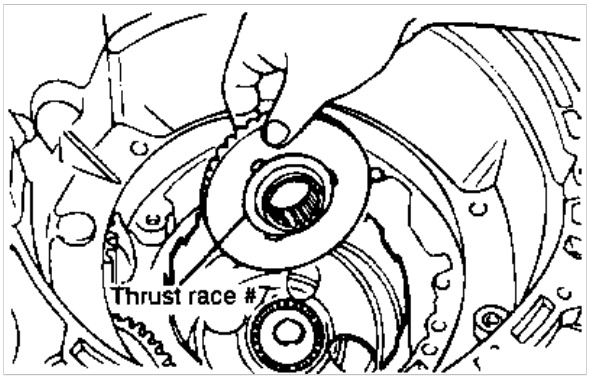
8. Install kickdown drum with its splines in mesh with the sun gear. Place the kickdown band on the kickdown drum and tighten the kickdown servo adjusting screw to keep the band in position.
   Refer to the KICKDOWN SERVO ADJUSTMENT.



9. Apply a coating of petroleum jelly to thrust bearing #8, and then attach to the kickdown drum.



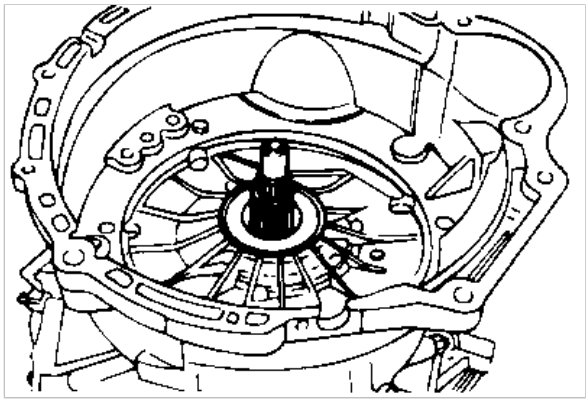
10. Apply a coating of petroleum jelly to thrust race #7, and then attach to the rear clutch hub.



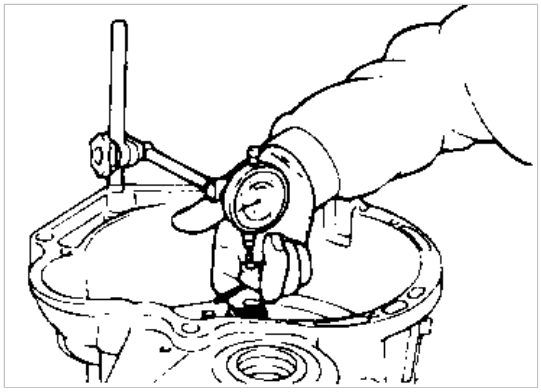
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > ASSEMBLY (CONTINUED)

ASSEMBLY (continued)

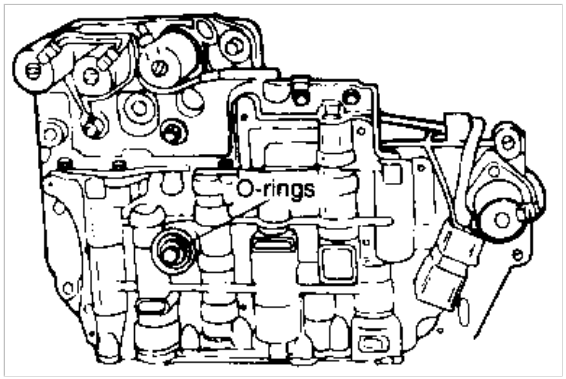
1. Install a new O-ring in the groove of the oil pump housing and lightly apply automatic transaxle fluid to the outside surface of the O-ring.
2. Install the oil pump assembly by tightening the six bolts evenly. When installing this oil pump assembly, be careful that the thrust washer remains in place.



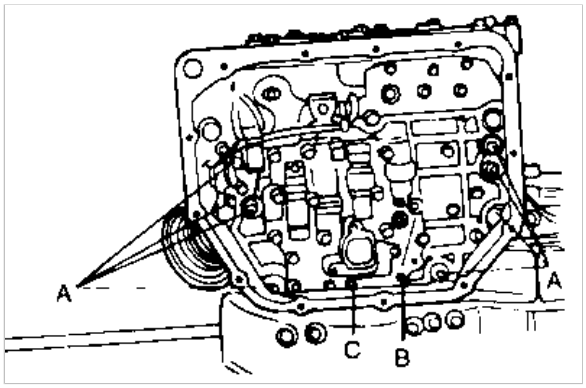
3. Check the input shaft end play. Readjust if necessary (see step 50).



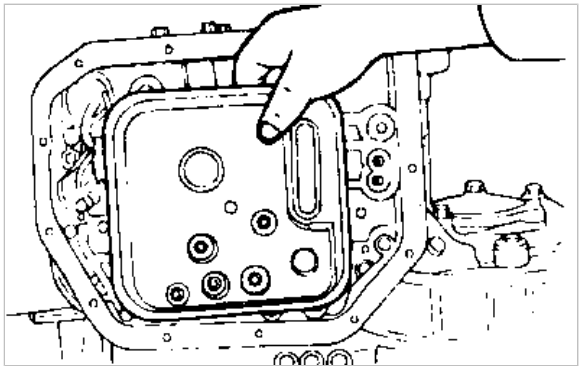
4. Install the O-ring at the center of the top of the valve body assembly (brake oil pressure passage). Install the valve body assembly to the case, fitting the detent end plate (manual control shaft) pin in the slot of the manual valve.



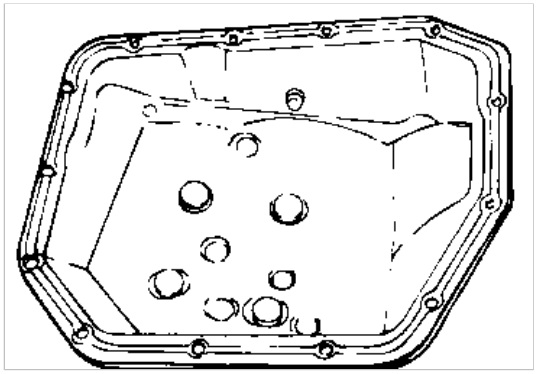
5. Replace the O-ring of the solenoid valve connector with a new one.
6. Tighten the valve body assembly mounting bolts to 10-12 Nm (100-120 kg cm, 7-9 lb ft.)
   (1) A:long
   (2) B:long
   (3) C:long



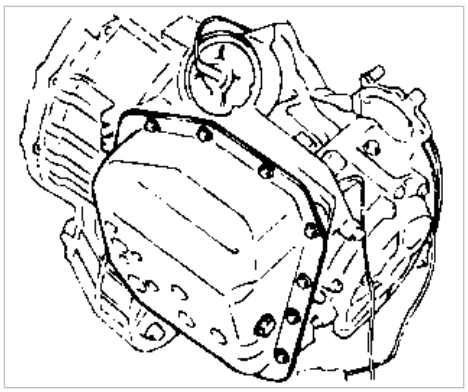
7. Install the oil filter. Tighten the four oil filter mounting bolts to 5-7 Nm (50-70 kg cm, 4-5 lb ft).



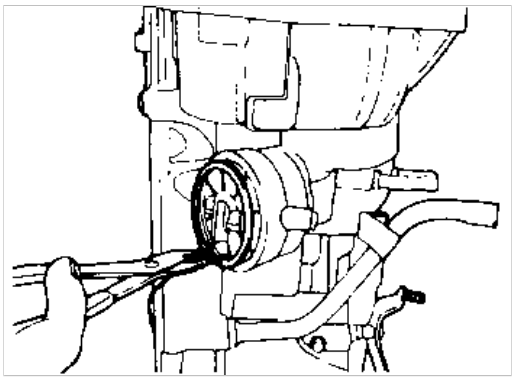
8. Install five magnets into the five depressions provided in the oil pan.



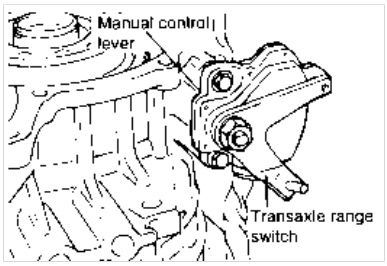
9. Install a new oil pan gasket and oil pan. Tighten 12 bolts to 10-12 Nm (100-120 kg cm, 7-9 lb ft).



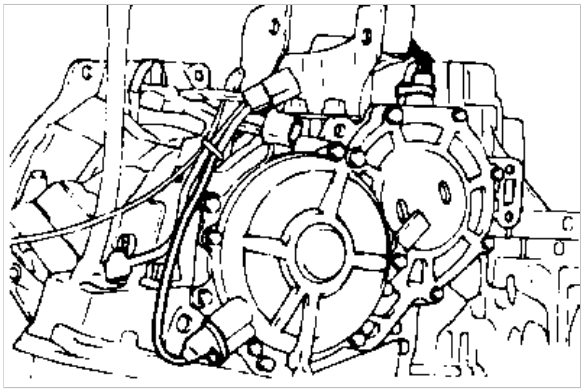
10. Install a new D-ring to the kickdown servo switch. Press into the case and secure using the proper snap ring.



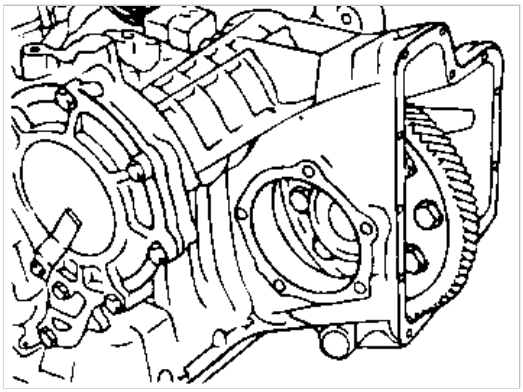
11. Install the transaxle range switch and manual lever. Adjust the transaxle range switch.



12. Install the pulse generator A and B.

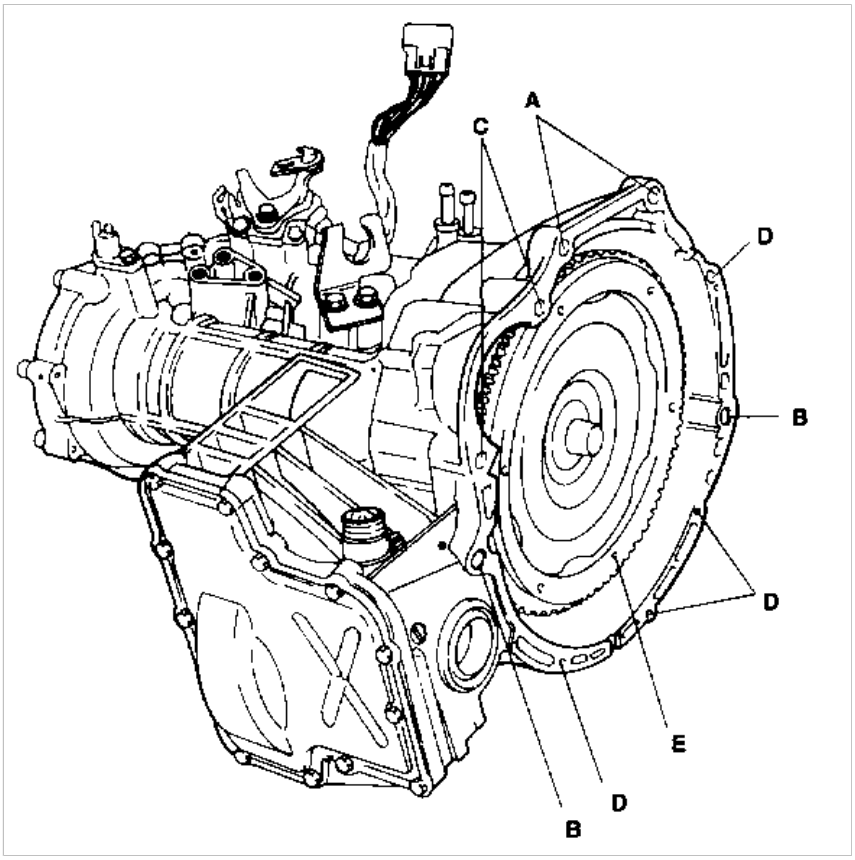


13. Install the differential assembly.



Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > COMPONENTS

COMPONENTS

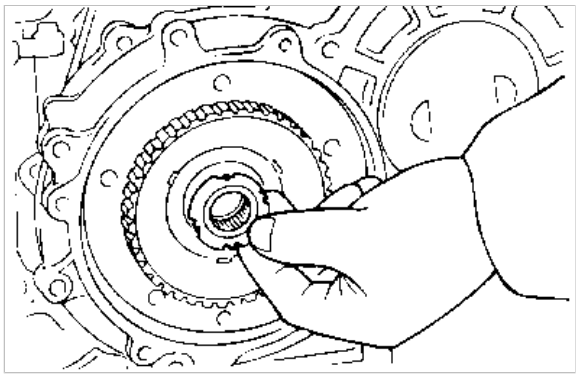


	Nm	Kgcm	lbft	O.D x Length mm (in.)	Bolt identifica-tion
A	60-80	600-800	43-58	12 x 40 (1.6)	A X B
B	43-55	430-550	31-40	10 x 70 (2.7)	
C	27-34	270-340	20-25	10 x 55 (2.2)	
D	8-10	80-100	6-7	6 x 10 (0.4)	
E	46-53	460-530	33-38	10 x 60 (0.5)	

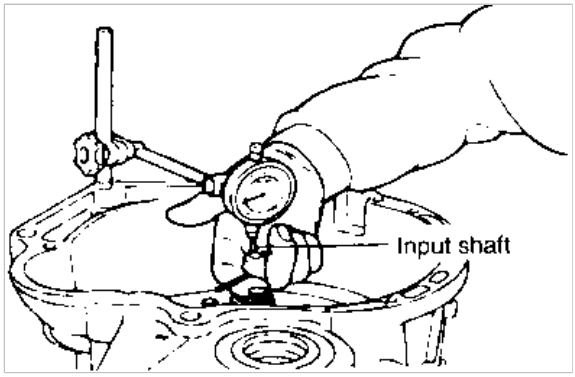
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > DISASSEMBLY

DISASSEMBLY

Because the automatic transaxle is composed of component parts of an especially high degree of precision, these parts should be very carefully handled during disassembly and assembly so as not to scar or scratch them.
A rubber mat should be placed on the workbench, and it should always be kept clean.
During disassembly, cloth gloves or rags should not be used.
If such items must be used, use articles made of nylon, or use paper towels.
All disassembled parts must be thoroughly cleaned. Metal parts may be cleaned with ordinary detergents, but must be thoroughly air dried.
Clean the clutch disc, resin thrust plate and rubber parts by using ATF (automatic transaxle fluid), being very careful that dust, dirt, etc. do not adhere.
If the transaxle main unit is damaged, also disassemble and clean the cooler system as well.
1. Clean away any sand, mud, etc. adhered around the transaxle.



2. Place the transaxle assembly on the workbench with the oil pan down.
3. Remove the torque converter.



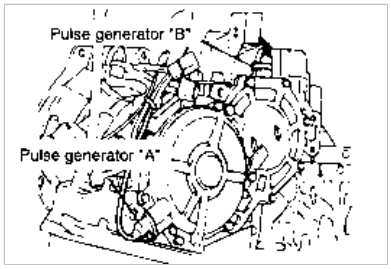
4. Measuring input shaft end play before disassembly will usually indicate when a thrust washer change is required (except when major parts are replaced).

Thrust wishers are located between the reaction shaft support and rear clutch reaction, and between the reaction shaft support and front clutch retainer.

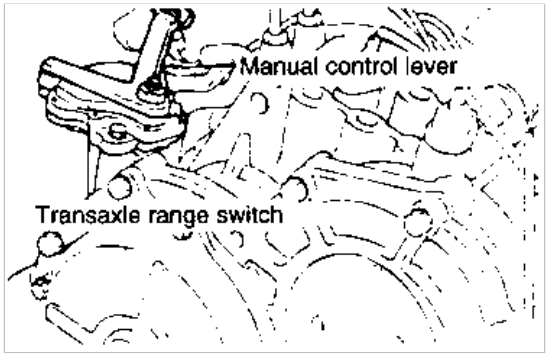
Mount a dial indicator to the converter housing with the dial indicator support.

Make sure that the indicator plunger is seated against the end of the input shaft.

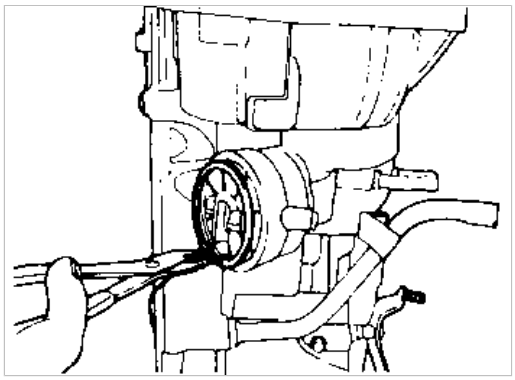
When checking end play, pull out or push in the input shaft with pliers. Be careful not to scratch the input shaft. Record indicator reading for reference when reassembling the transaxle.



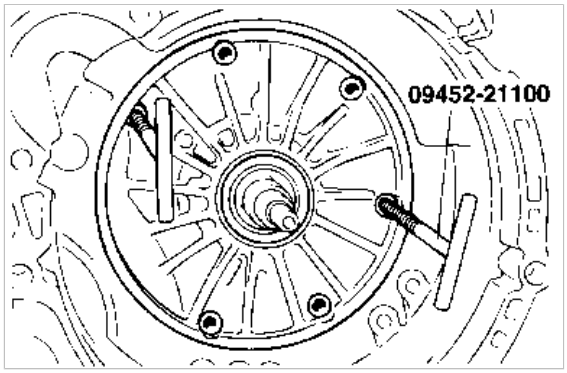
5. Remove the pulse generators "A" and "B".
6. Remove manual control lever, then remove the transaxle range switch.



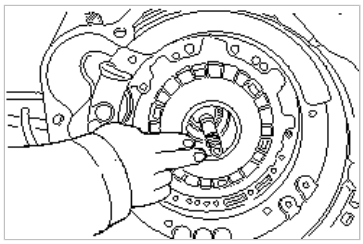
7. Remove the snap ring and kickdown servo switch.



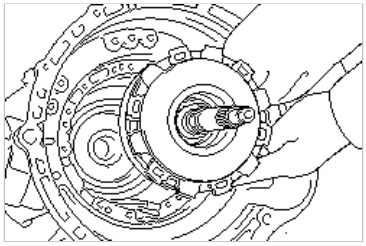
8. Remove 6 bolts, attach the special tools (09452-21100) and remove oil pump assembly.
   When removing the oil pump assembly, be sure to follow to prevent the damage to the transaxle case.
   a. Turn the knob of both special service tools simultaneously and uniformly not to be inclined to "B" side.
   b. While turning the special service tool, tap on the "A" side of the oil pump lightly with rubber or plastic hammer if necessary.



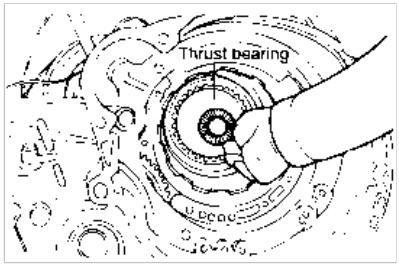
9. Remove the fiber thrust washer.



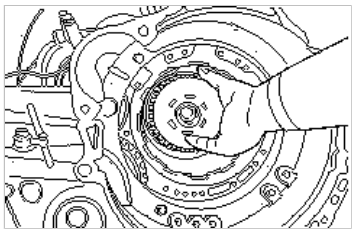
10. Pull up the input shaft, and remove the front clutch assembly and the rear clutch assembly together.



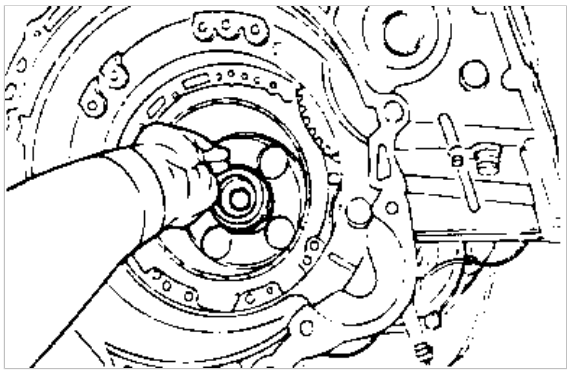
11. Remove the thrust bearing.



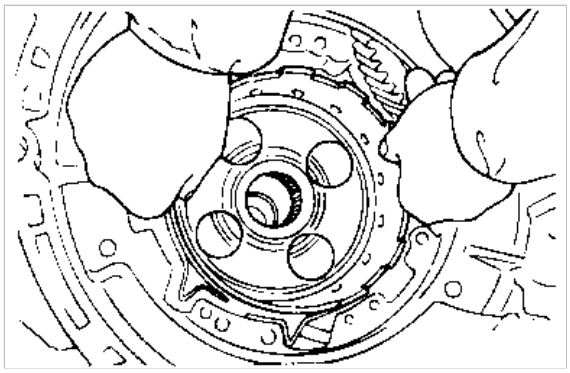
12. Remove the clutch rub.



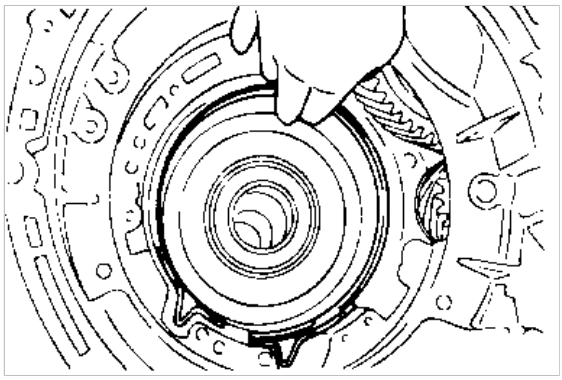
13. Remove the thrust race and bearing.



14. Remove the kickdown drum.



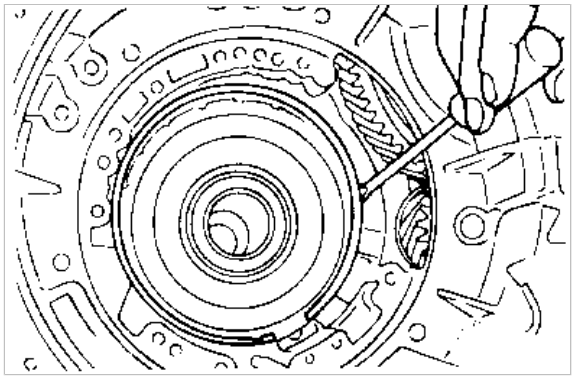
15. Remove the kickdown band.



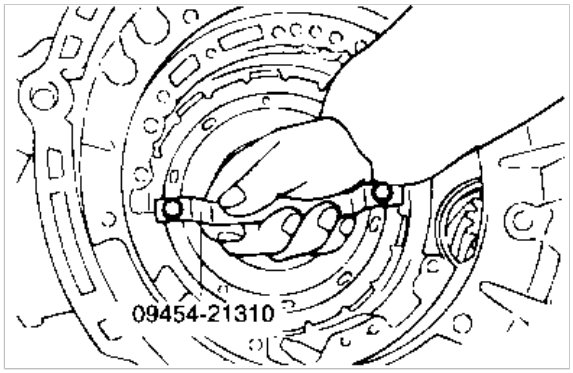
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > DISASSEMBLY (CONTINUED)

DISASSEMBLY (continued)

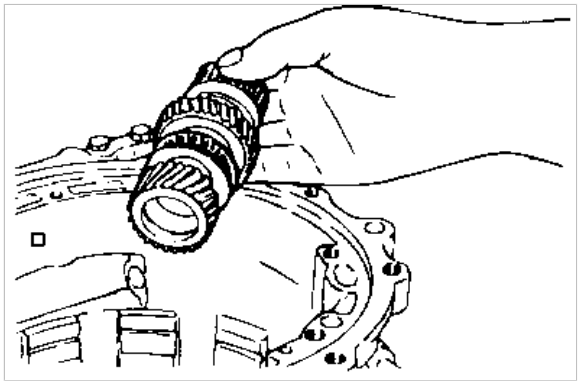
1. Remove the snap ring.



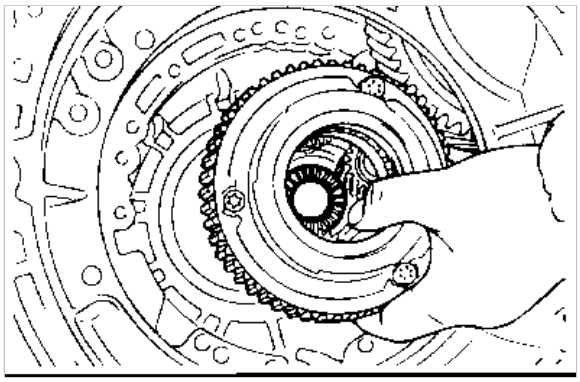
2. After the special tool (09453-21310) on the center support.
   Holding the handle of the tool, pull the center support straight upward.



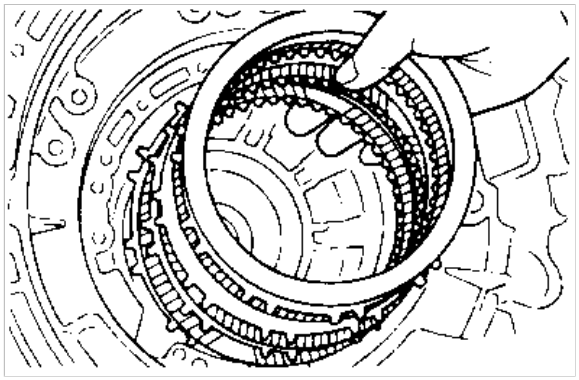
3. Remove the reverse sun gear and the forward sun gear together.



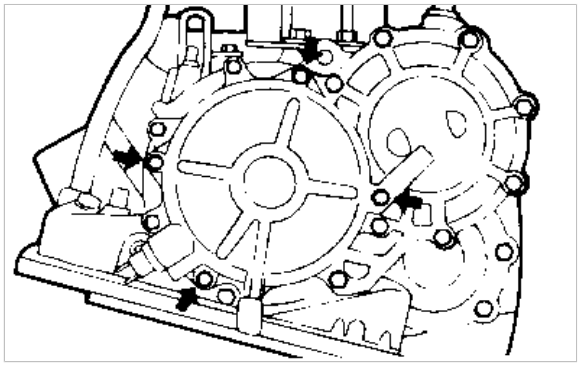
4. Remove the planet carrier assembly and thrust bearing.



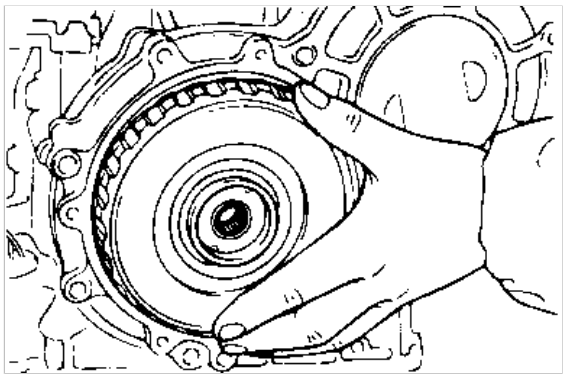
5. Remove the wave spring, return spring, reaction plate, brake disc, and brake plate.



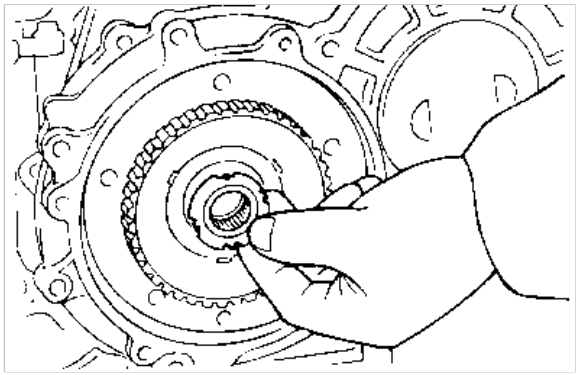
6. Remove the end clutch cover mounting bolts, the cover holder, and the end clutch cover.



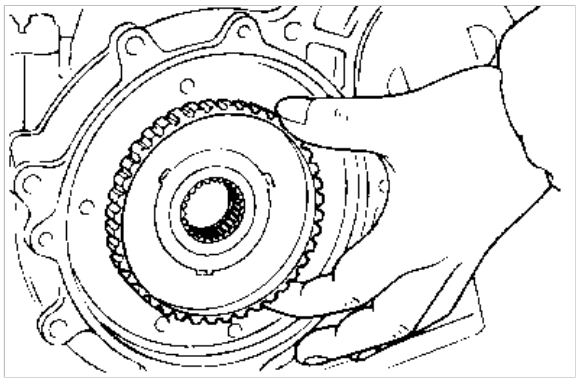
7. Remove the end clutch assembly.



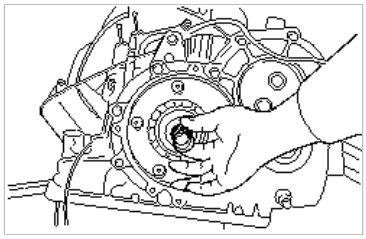
8. Remove the thrust plate.



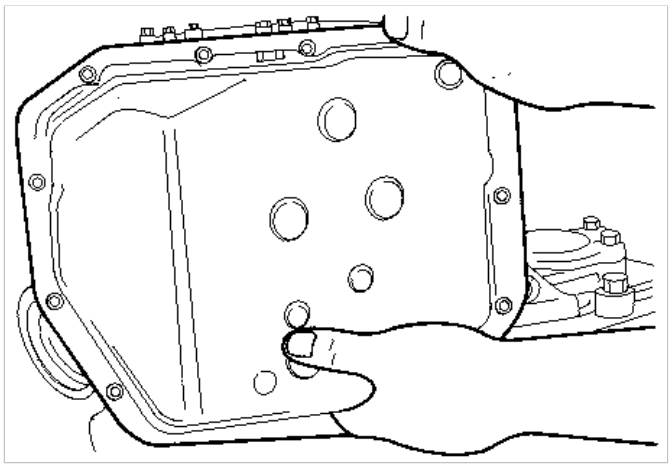
9. Remove the end clutch hub and thrust bearing.



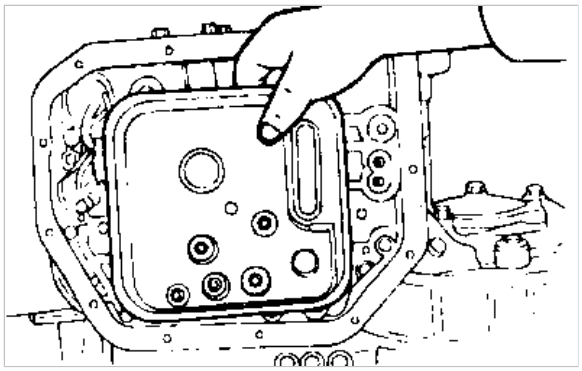
10. Pull out the end clutch shaft.



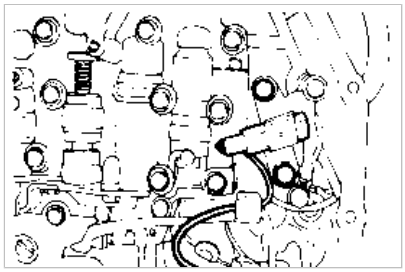
11. Remove the oil pan and gasket.



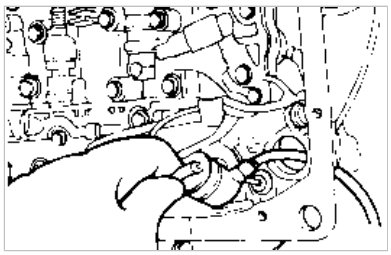
12. Remove the oil filter from the valve body.



13. Remove the oil temperature sensor installation bolt; then, after removal from the bracket, pull out from the connector.



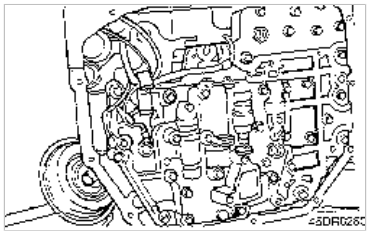
14. Press the tab of the solenoid valve harness grommet and push in.



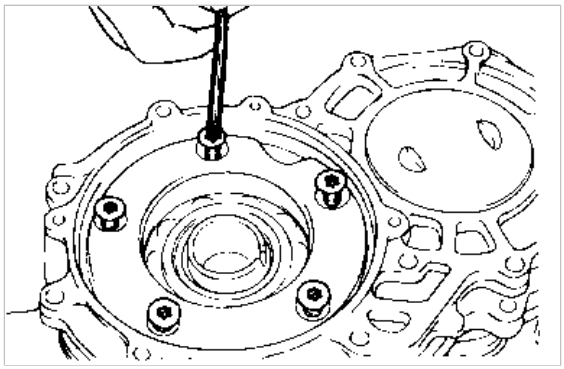
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > DISASSEMBLY (CONTINUED)

DISASSEMBLY (continued)

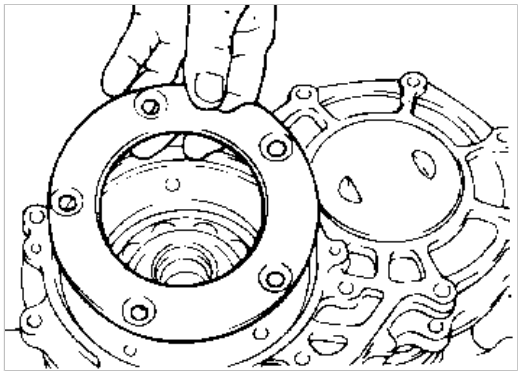
1. Remove the 10 valve body bolts. Remove the valve body.



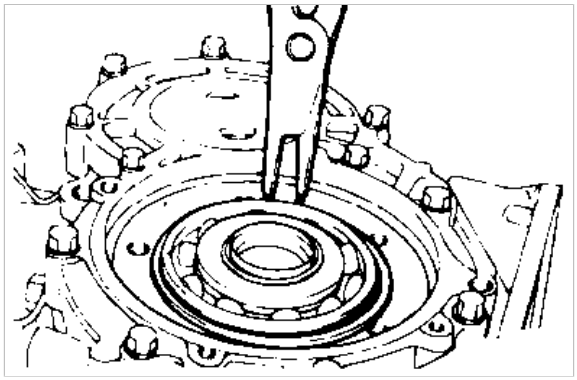
2. Using an impact driver, loosen the bolt.
   If an impact driver is not available, use a punch or something similar.



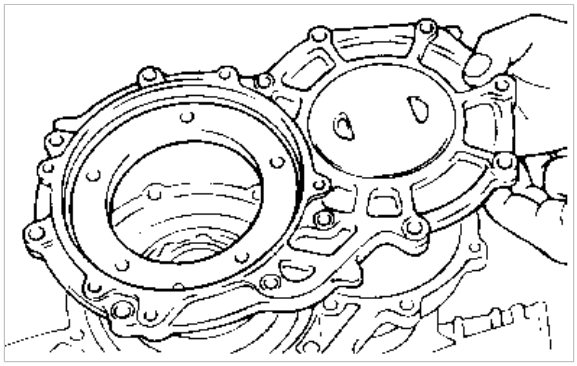
3. Remove the bearing retainer.



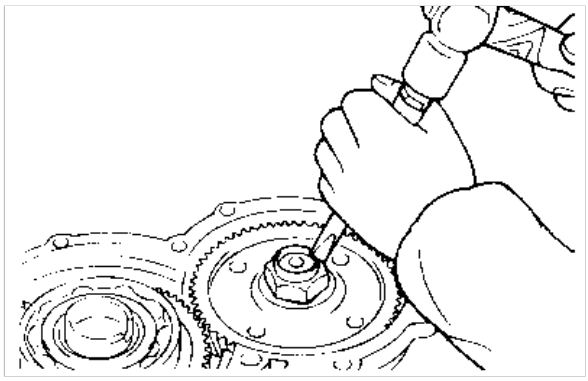
4. Remove the snap ring from the bearing.



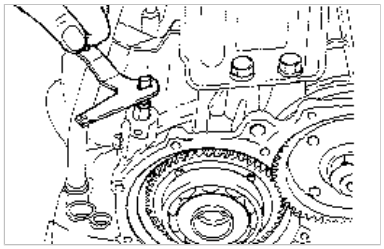
5. Loosen the rear cover mounting bolt and remove the rear cover.



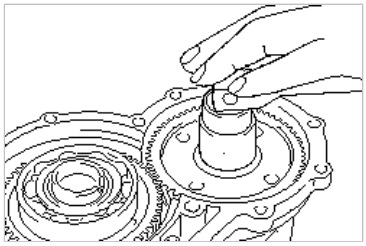
6. Unstake the transfer shaft lock nut stopper.



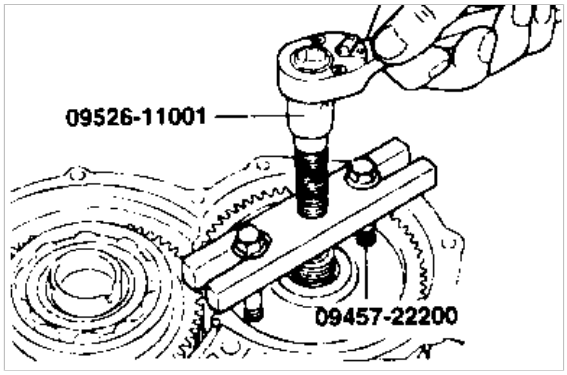
7. Place lever in "P" position.



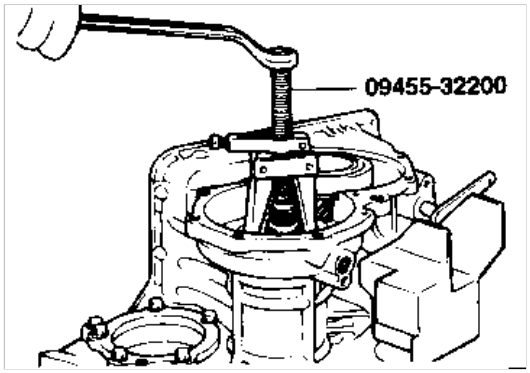
8. Remove the locking nut.



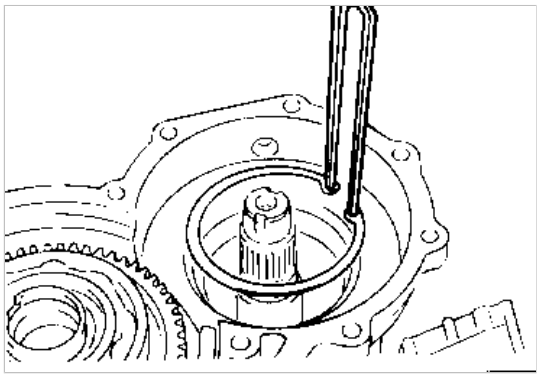
9. Using the special tool, remove the transfer driven gear.



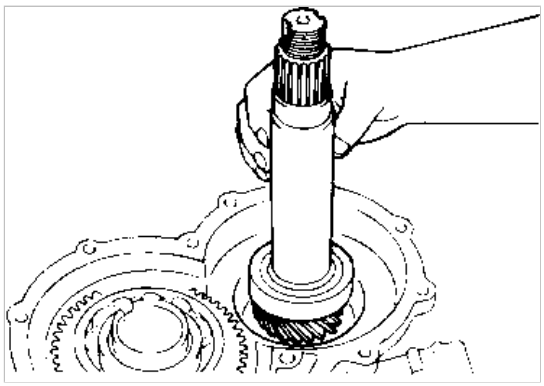
10. Remove the taper roller bearing outer race.



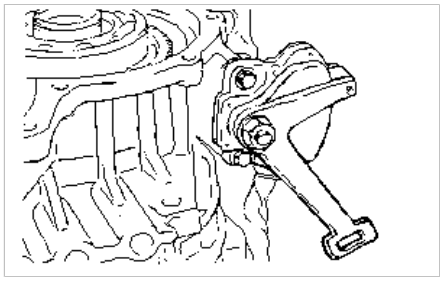
11. Remove the snap ring.



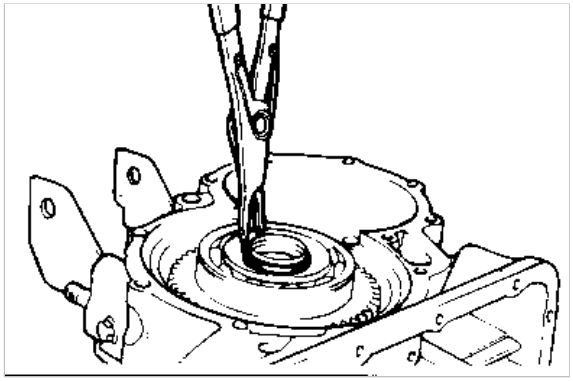
12. Remove the transfer shaft and taper roller bearing.



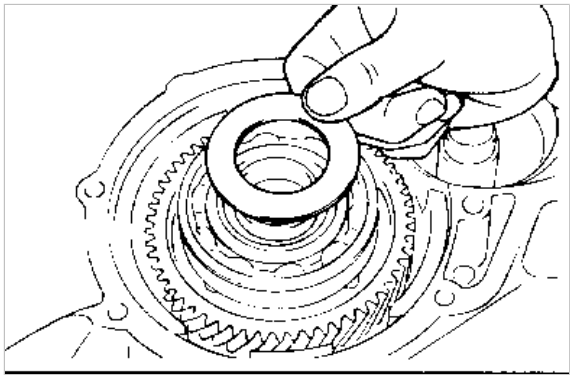
13. Move the manual control lever from the "P" position to "N" position.



14. Remove the snap ring from the output flange assembly.

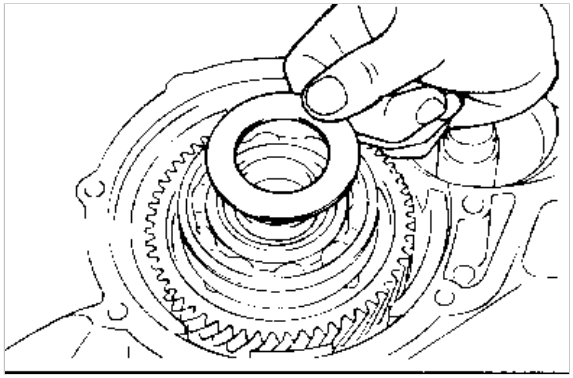


15. Remove the stopper plate.

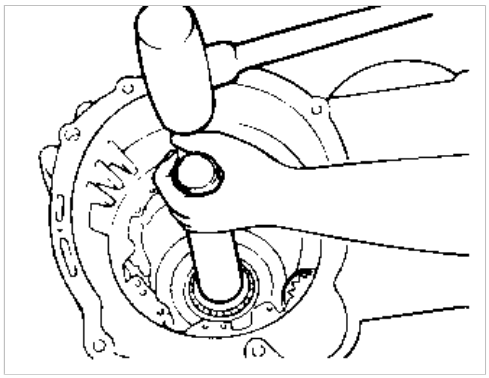


Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > DISASSEMBLY (CONTINUED)

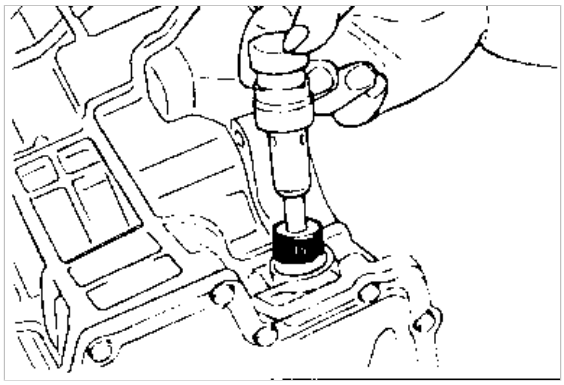
DISASSEMBLY (continued)



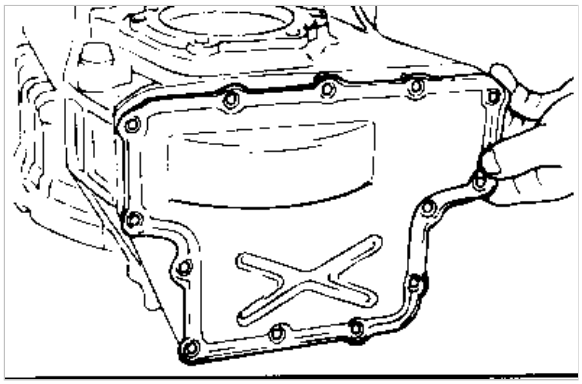
1. Using the special tool pressure, remove the output flange and drive gear.



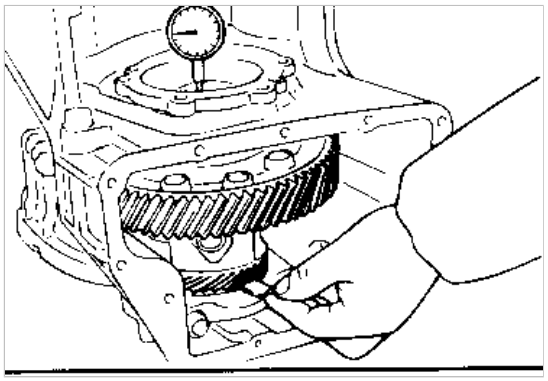
2. Remove the speedometer sleeve.



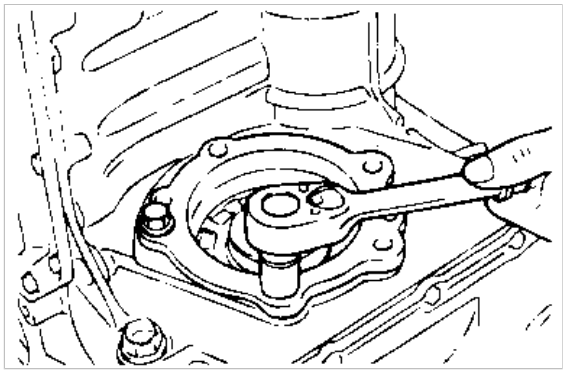
3. Remove the differential cover and the gasket.



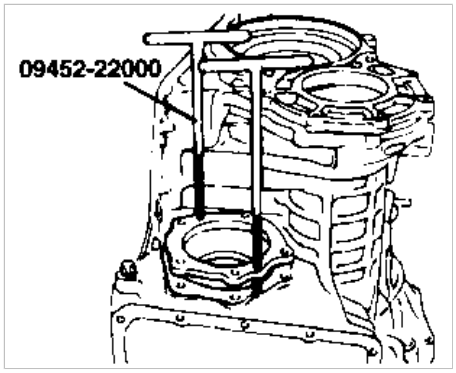
4. Before removal of the differential gear, measure the end play of the differential gear with a dial gauge.



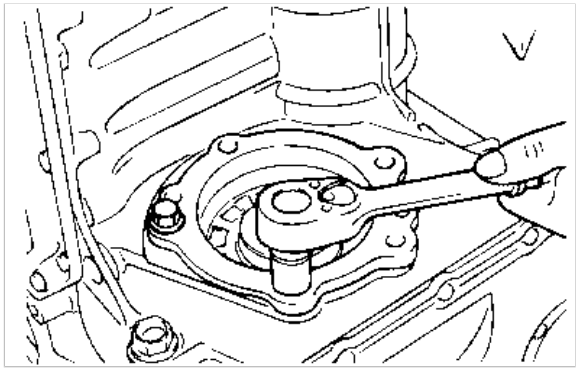
5. Remove the 5 differential bearing retainer mounting bolts.



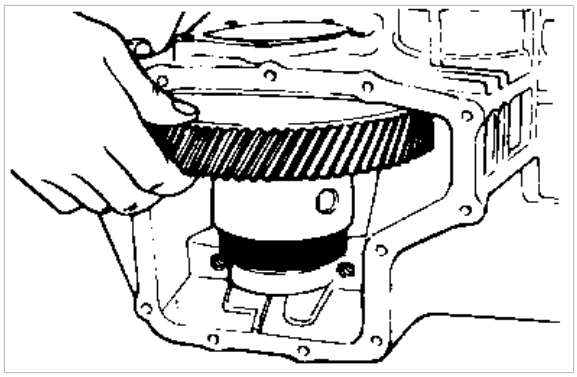
6. Using the special tool, remove the differential bearing retainer.



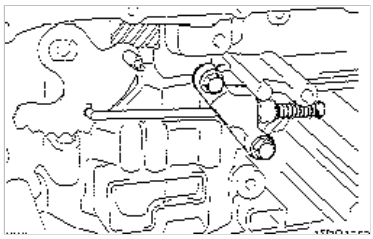
7. Loosen the mounting bolts and remove the bearing cap.



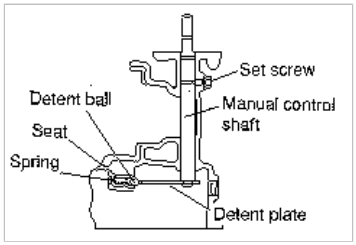
8. Remove the differential assembly.



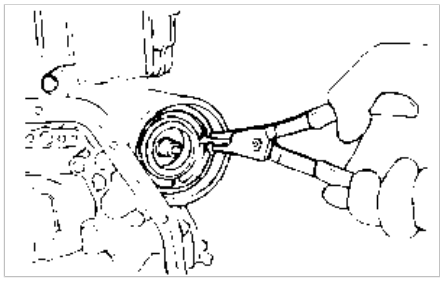
9. Remove two bolts and the parking sprag rod.



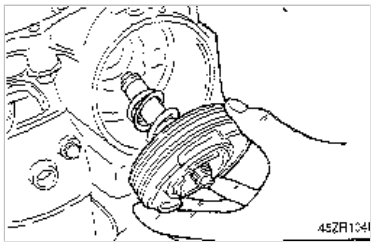
10. Remove the set screw and the manual control shaft assembly.
    Remove the steel ball, the seat and the spring together.



11. Remove the kickdown servo snap ring.



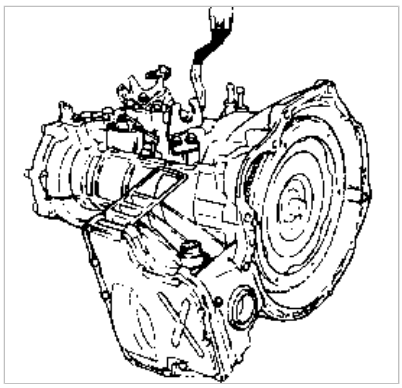
12. Remove the kickdown piston assembly.



Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > INSTALLATION

INSTALLATION

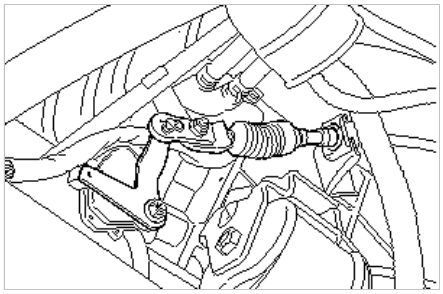
1. Attach the torque converter on the transaxle side and mount the transaxle assembly onto the engine.
   Since the oil seal on the transaxle side may be damaged if the torque converter is first mounted on the engine, make sure that the torque converter is first assembled to the transaxle.



2. Install the transaxle control cable and adjust as follows:
   (1) Move the shift lever and the transaxle range switch to the "N" position, and install the control cable.
   (2) When connecting the control cable to the transaxle mounting bracket, install the clip until it contacts the control cable.

(3) Remove any free-play in the control cable by adjusting the nut, then check that the selector lever moves smoothly.

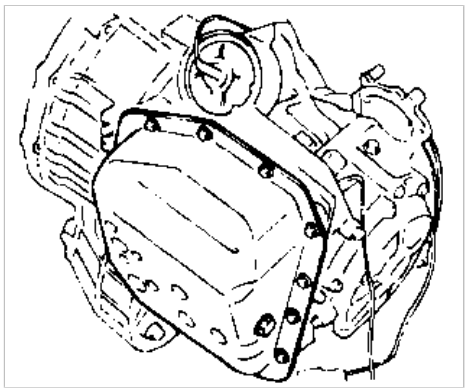
(4) Check that the control cable has been adjusted correctly.



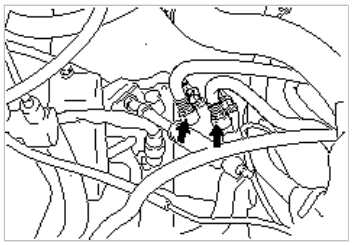
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle > REMOVAL

REMOVAL

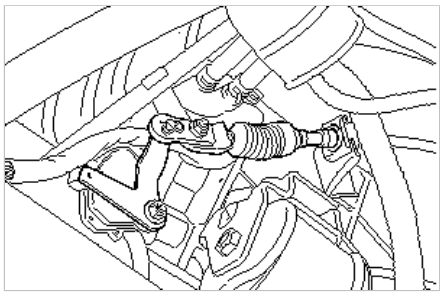
1. Remove the drain plug and drain out the transaxle fluid.
2. Disconnect and remove the air cleaner assembly.



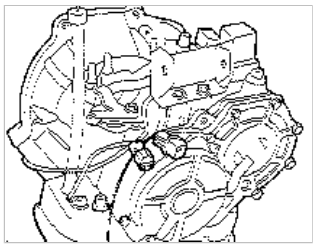
3. Loosen the mounting clamps and disconnect the return and supply hose.
   To prevent the entry of dust and foreign matter, plug the disconnected hoses and the transaxle fitting part.



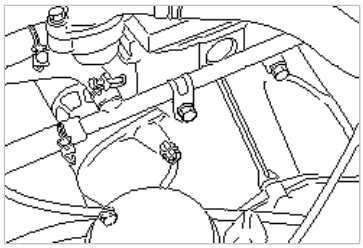
4. Remove the control cable.
5. Remove the speedometer cable.



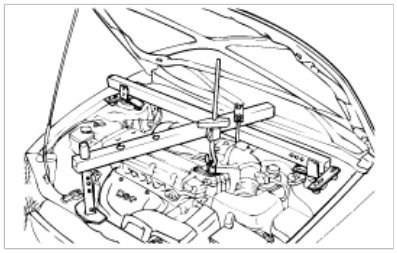
6. Separate the pulse generator connector, transaxle range switch connector, kickdown servo switch connector, solenoid valve connector and the oil temperature sensor connector.



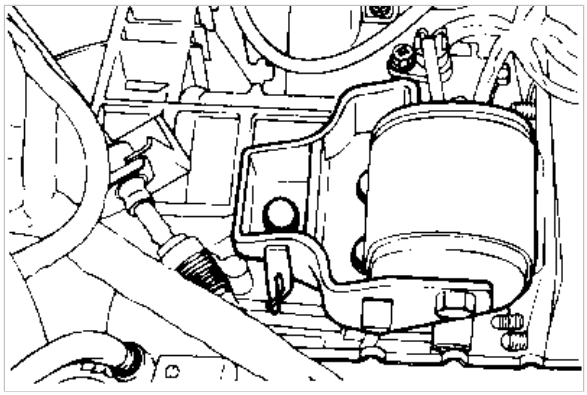
7. Remove the transaxle-to-engine bolt from the upper portion of the transaxle.



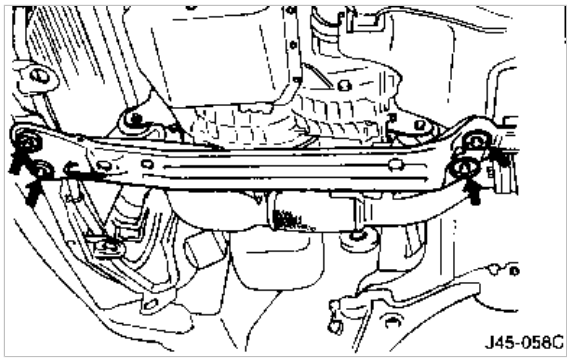
8. Attach an engine support fixture to the engine hooks, and keep just enough so that there is no pressure on the insulators.



9. Remove the transaxle mounting bracket.

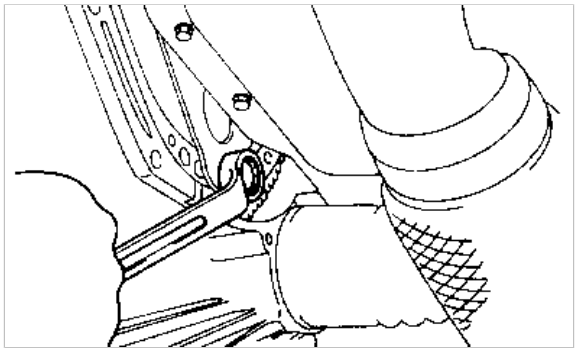


10. While supporting the lower part of the transaxle by using a jack, remove the center member mounting bolts.
    Support a wide area of the transaxle so that an excessive amount of pressure is not applied to the oil pan.

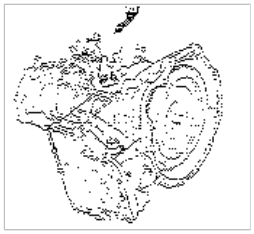


11. Remove center member and roll stopper mounting bolts.
12. Remove the bell housing cover.
13. Remove the six special bolts connecting the converter to the drive plate.
    To remove the special bolts of the torque converter, turn the engine crankshaft with a box wrench to bring one of the bolts to the position appropriate for removal.
    After removing the bolt, turn the crankshaft in the same manner as above and remove all remaining bolts one after another.

Bring the transaxle shift lever into the "N" (Neutral) position.

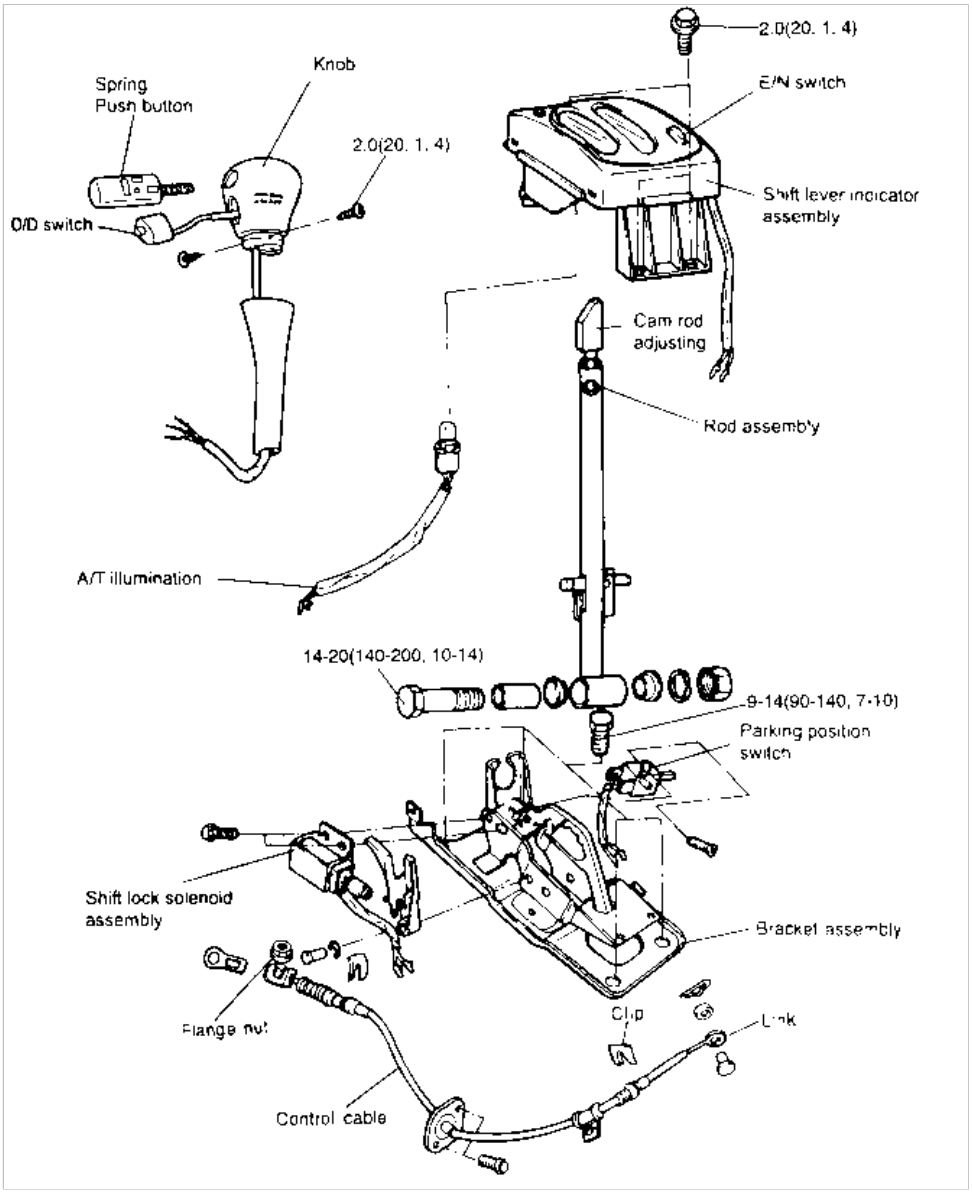


14. Remove the lower arm ball joint. (Refer to DRIVE SHAFT GROUP.)
15. Remove the remaining engine connecting bolts while at the same time supporting the transaxle with a floor jack.
16. Remove the transaxle assembly.



Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle Shift Control > COMPONENTS

Components



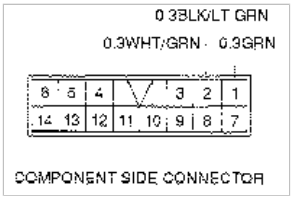
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle Shift Control > INSPECTION

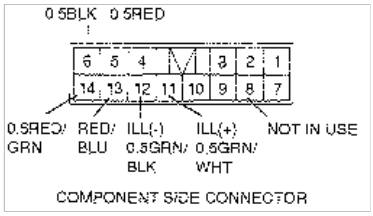
INSPECTION

1. Check the control cable for function and for damage.
2. Check the bushing for wear or damage.
3. Check the spring for damage or deterioration.
4. Check the overdrive switch for continuity.

: Continuity

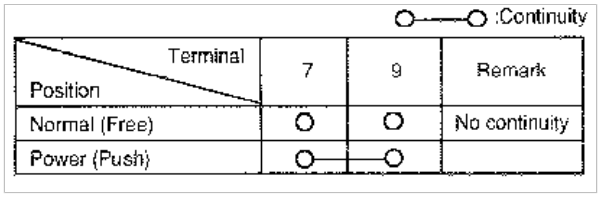
Terminal / Switch position	1	2	3
Overdrive activation	○	○	
Overdrive non-activation	○		○

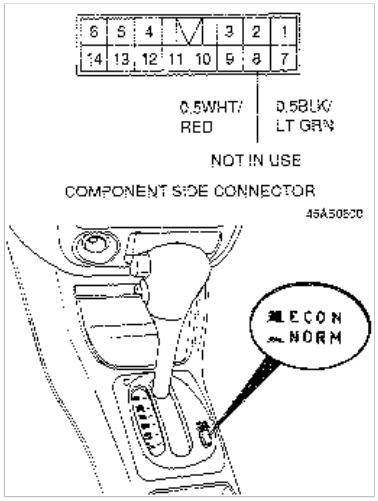




Color code	Color of wire	Color code	Color of wire
BLK	Black	RED	Red
BLU	Blue	YEL	Yellow
WHT	White	GRN	Green
LT GRN	Light Green	|	|

5. Check continuity between indicator light terminal 11 and 12.
   a. [LIMIT] : Continuity
6. Check continuity between parking position switch terminal 5 and 6 in free load.
   a. [LIMIT] : Continuity
7. Check continuity between parking position switch terminal 5 and 6 while pressing the switch.
   a. [LIMIT] : No continuity
8. Check the movement of shift control solenoid according to the battery voltage.
   a. [LIMIT] : When applied: ON
   b. When not applied: OFF
9. Check the E/N switch for continuity.

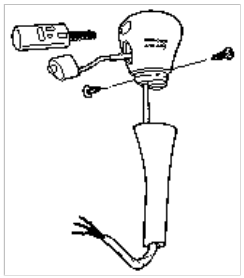




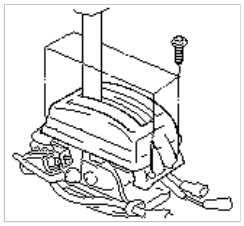
Transaxle/Transmission > Automatic Transaxle System > Automatic Transaxle Shift Control > REMOVAL

REMOVAL

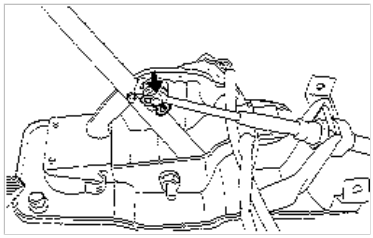
1. Remove the console box assembly. (Refer to Body Group.)
2. Remove the knob installation screws.
3. Disconnect the overdrive switch connector, remove the 3 connector pins from connector with small driver, and then remove selector knob assembly.



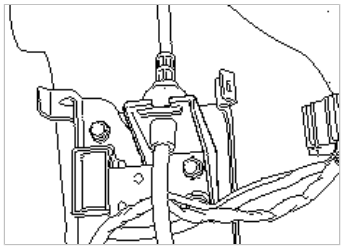
4. Disconnect the position indicator light connector and E/N switch connector.
5. Remove the shift lever indicator assembly.



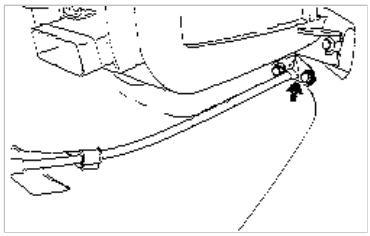
6. Remove self lock pin from the link.



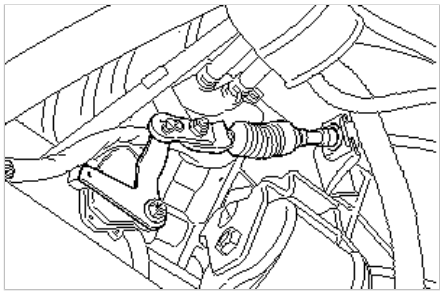
7. Remove the clip from the shift lever side.



8. Remove the bolt-washer assembly located on dash panel.



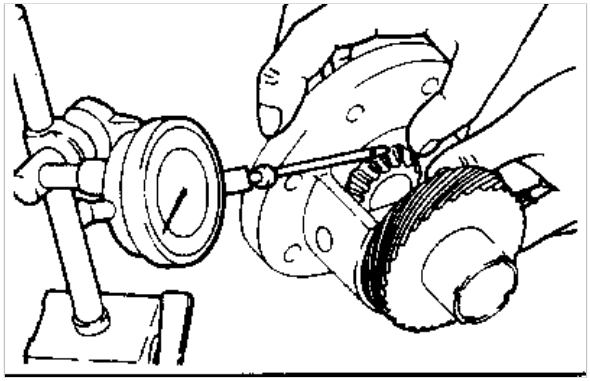
9. Remove the clip from the transaxle side.
10. Remove the transaxle control cable assembly.



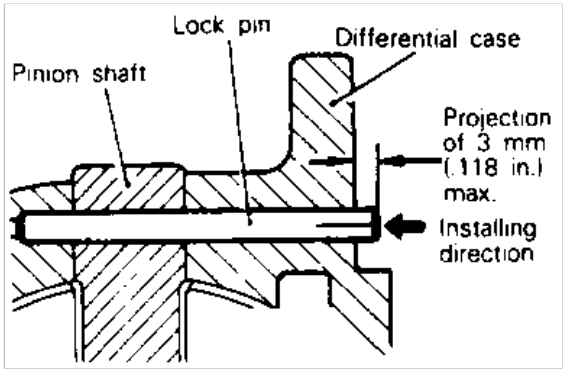
Transaxle/Transmission > Automatic Transaxle System > Differential (A/T) > ASSEMBLY

ASSEMBLY

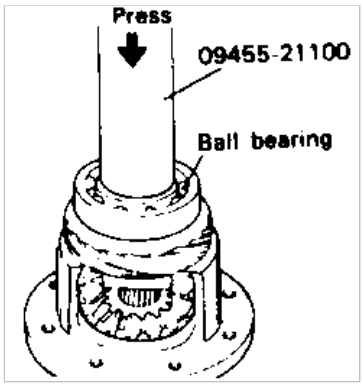
1. With the spacers installed on the back of the differential side gears, install the gears into the differential case. If reusing parts, install them in the original positions noted during disassembly. If reusing parts, install them in the original positions noted during disassembly. If using new differential side gears, install medium thickness spacers 1.0 mm (0.039in.).
2. Install washers on the back of the pinion gears. Install gears into the differential case, then insert the pinion shaft.
3. Measure the backlash between the side gear and the pinion gear.
   Backlash should be 0.025L - 0.150L mm (0.010-0.059 in.) and the right and left hand gear pairs should have equal backlash. If the backlash is out of specification, disassemble and reassemble using different spacers that give the correct backlash.



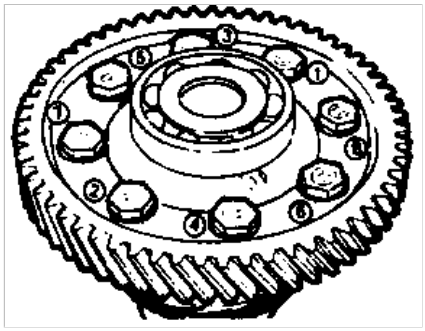
4. Install the pinion shaft lock pin in the direction specified in the illustration. After installation, check that the projection is less than 3 mm (.118 in.).
   The lock pin must not be reused.



5. Press the bearings onto both ends of the differential case. Press on the inner race when installing the bearings. Do not apply load to outer race.
6. Install the differential drive gear onto the case.

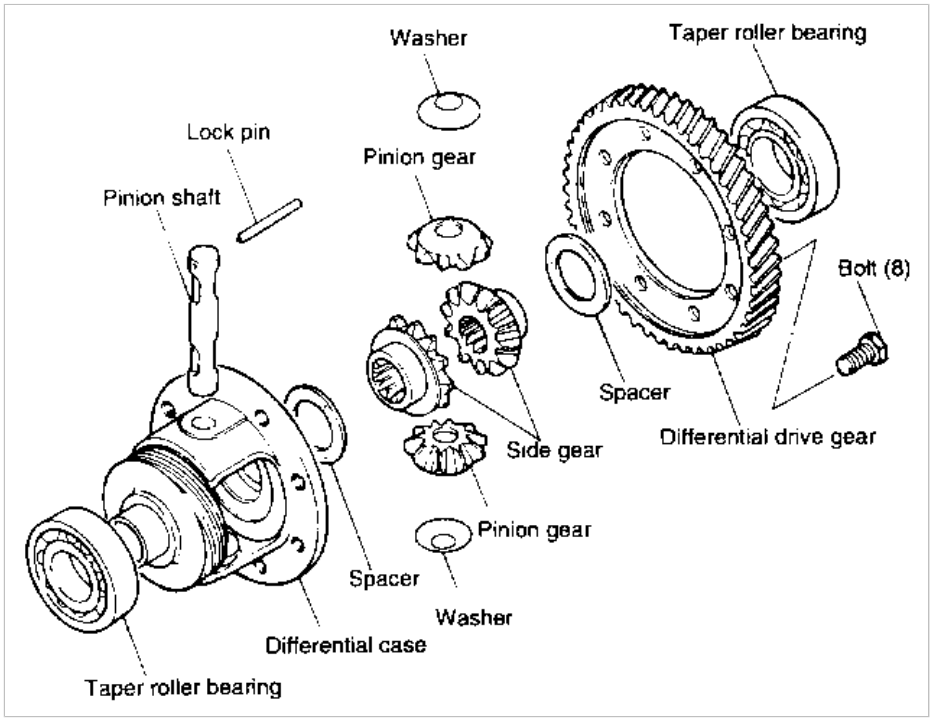


7. Apply ATF to the bolts and tighten the bolts to the specified torque in the sequence shown in the illustration.



Transaxle/Transmission > Automatic Transaxle System > Differential (A/T) > COMPONENTS

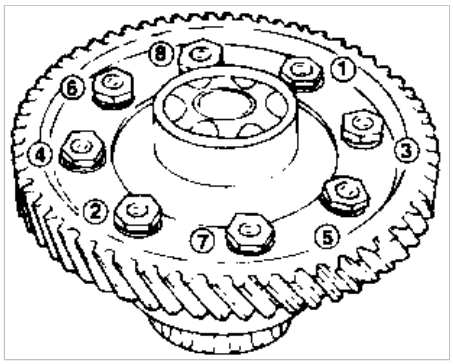
COMPONENTS



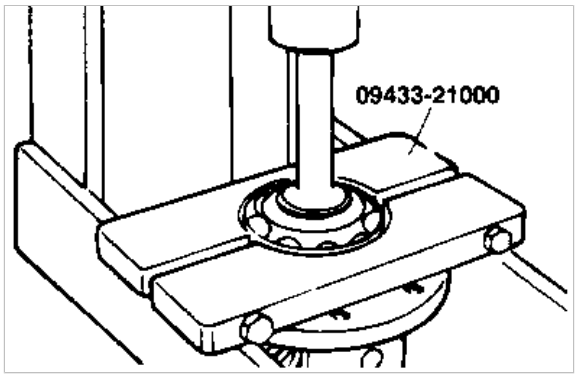
Transaxle/Transmission > Automatic Transaxle System > Differential (A/T) > DISASSEMBLY

DISASSEMBLY

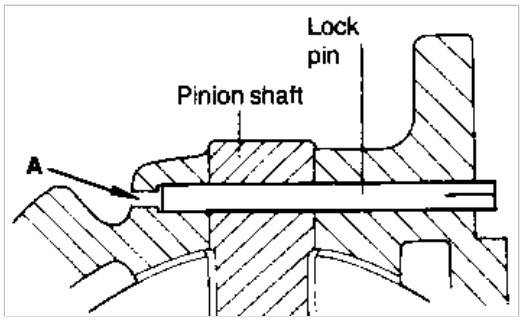
1. Remove the drive gear retaining bolts and drive gear from the differential case.



2. Remove the ball bearing with the special tool (09433-21000).



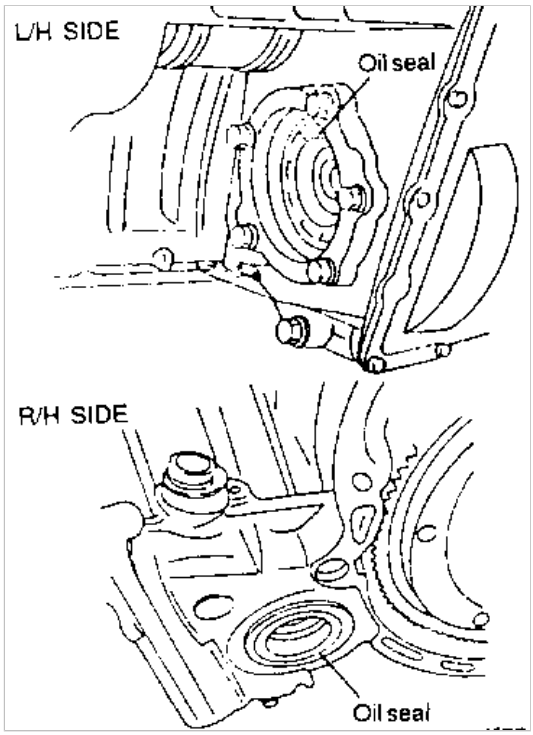
3. Drive out the lock pin with a punch inserted in hole "A."
4. Remove the pinion shaft, pinion gears and washers.
5. Remove the side gears and spacers.
   Do not mix the gears and spacers between the left and right sides.



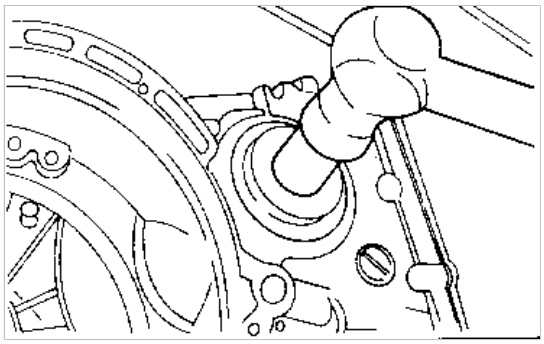
Transaxle/Transmission > Automatic Transaxle System > Drive Shaft > DRIVE SHAFT OIL SEALS REPLACEMENT

DRIVE SHAFT OIL SEALS REPLACEMENT

1. Disconnect the drive shaft from the transaxle.
   (Refer to DRIVE SHAFT AND FRONT AXLE.)
2. Using a flat-tip (-) screwdriver, remove the oil seal.



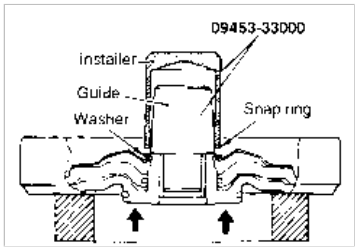
3. Using the special tool (09431-21200), tap the drive shaft oil seal into the transaxle.
4. Apply a coating of the automatic transaxle fluid to the lip of the oil seal.



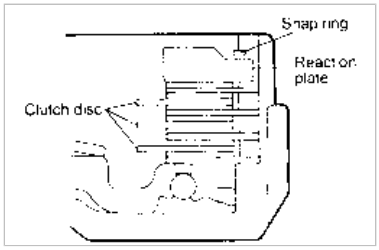
Transaxle/Transmission > Automatic Transaxle System > End Clutch > ASSEMBLY

ASSEMBLY

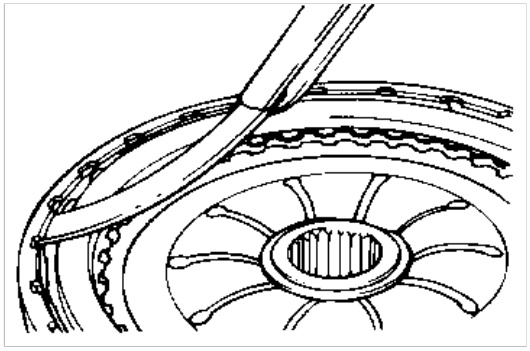
1. Install the D-section rings and oil seal in the piston inner and outer grooves.
2. After applying a coating of automatic transaxle fluid to the D-section rings outer circumference, manually press the piston into the end clutch retainer.
3. Install the return spring and washer.
4. After fitting a new snap ring into the guide of the special tool (09453-33000), install the retainer. Push the snap ring as far down on the guide as possible. Attach the installer and press until the snap ring enters the groove. Do not press more than necessary. The places indicated by arrows in the illustration (center projections) are not to be supported.



5. Install the clutch plate, clutch disc and reaction plate to the end clutch retainer.
   If the reaction plate, clutch plate and clutch disc are reused, install them in the same order in which they were disassembled. Apply a coating of automatic transaxle fluid.
   When a new clutch disc is used, soak it in automatic transaxle fluid for 2 hours before using it.

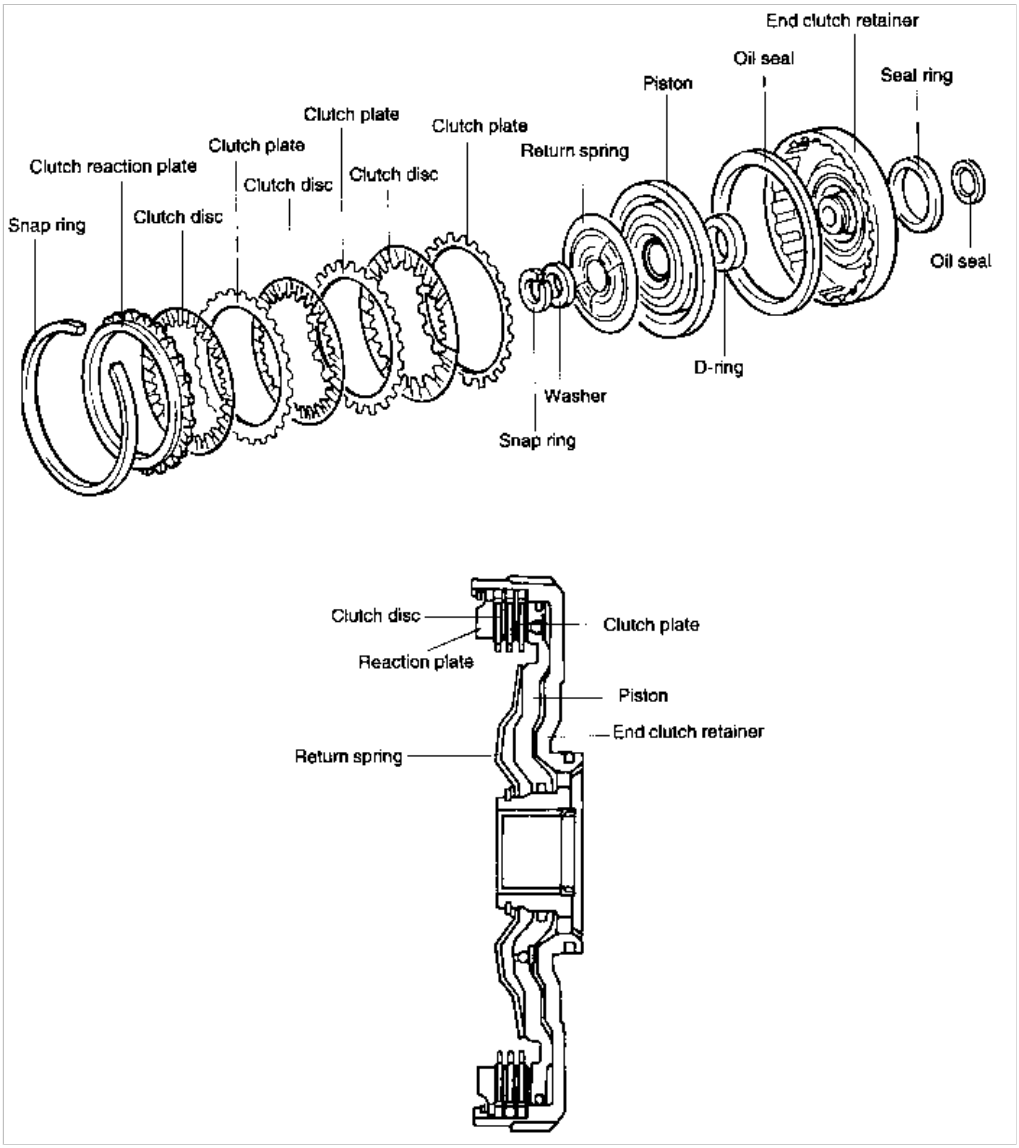


6. Install the snap ring. Check that the clearance between the snap ring and the clutch reaction plate is 0.4-0.65 mm (0.016- 0.026 in.).
   To check the clearance, hold the circumference of the clutch reaction plate down with 50N (11 lb.) force. If clearance is out of specifications, adjust the clearance by selecting the proper snap ring.



Transaxle/Transmission > Automatic Transaxle System > End Clutch > COMPONENTS

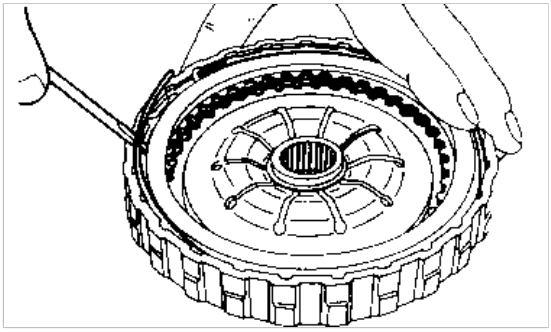
Components



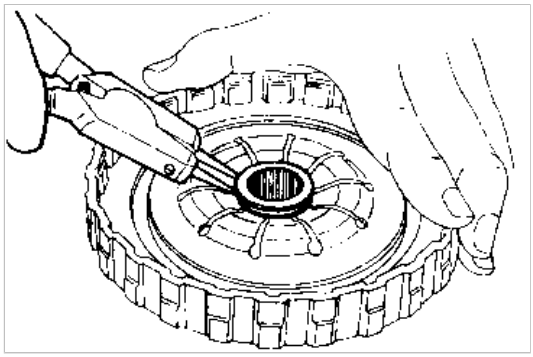
Transaxle/Transmission > Automatic Transaxle System > End Clutch > DISASSEMBLY

DISASSEMBLY

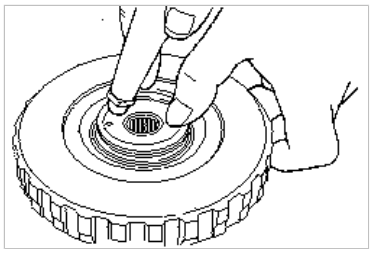
1. Remove the snap ring, clutch reaction plate, clutch disc, and the clutch plate. If the disc and plate are reused, note the installation order and direction when they are disassembled.



2. Remove the snap ring with snap-ring pliers, and then remove the washer and return spring.



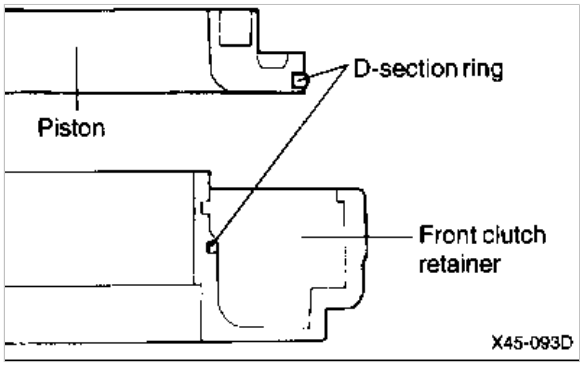
3. Remove the piston. If it is difficult to remove, face the piston side downward, and, with the retainer on a base, blow air in through the oil passage on the rear surface.
4. Remove the seal ring from the retainer.
5. Remove the two D-section rings and oil seal from the piston.



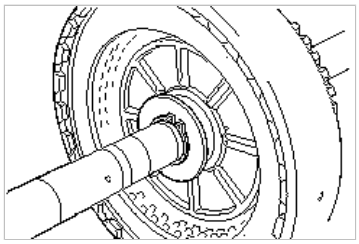
Transaxle/Transmission > Automatic Transaxle System > Front Clutch > ASSEMBLY

ASSEMBLY

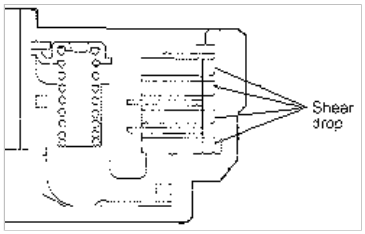
1. Install the D-section ring in the groove on the outside surface of the piston with its round side out. Install another D-section ring to the front clutch retainer.
2. Apply automatic transaxle fluid to the outside surface of the D-section rings. Then push the piston into front clutch retainer by hand.



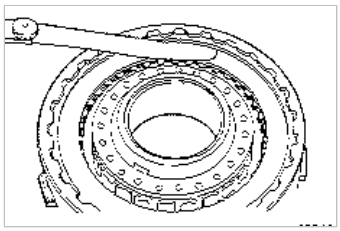
3. Install the return spring and spring retainer.
4. Compress the return spring with the special tool (09453-24000) and install the snap ring.



5. Install the three clutch reaction plates and two clutch discs. Prior to installation, apply automatic transaxle fluid to them.
   a. When new clutch discs are used, they should be immersed in automatic transaxle fluid a minimum of two hours prior to installation.

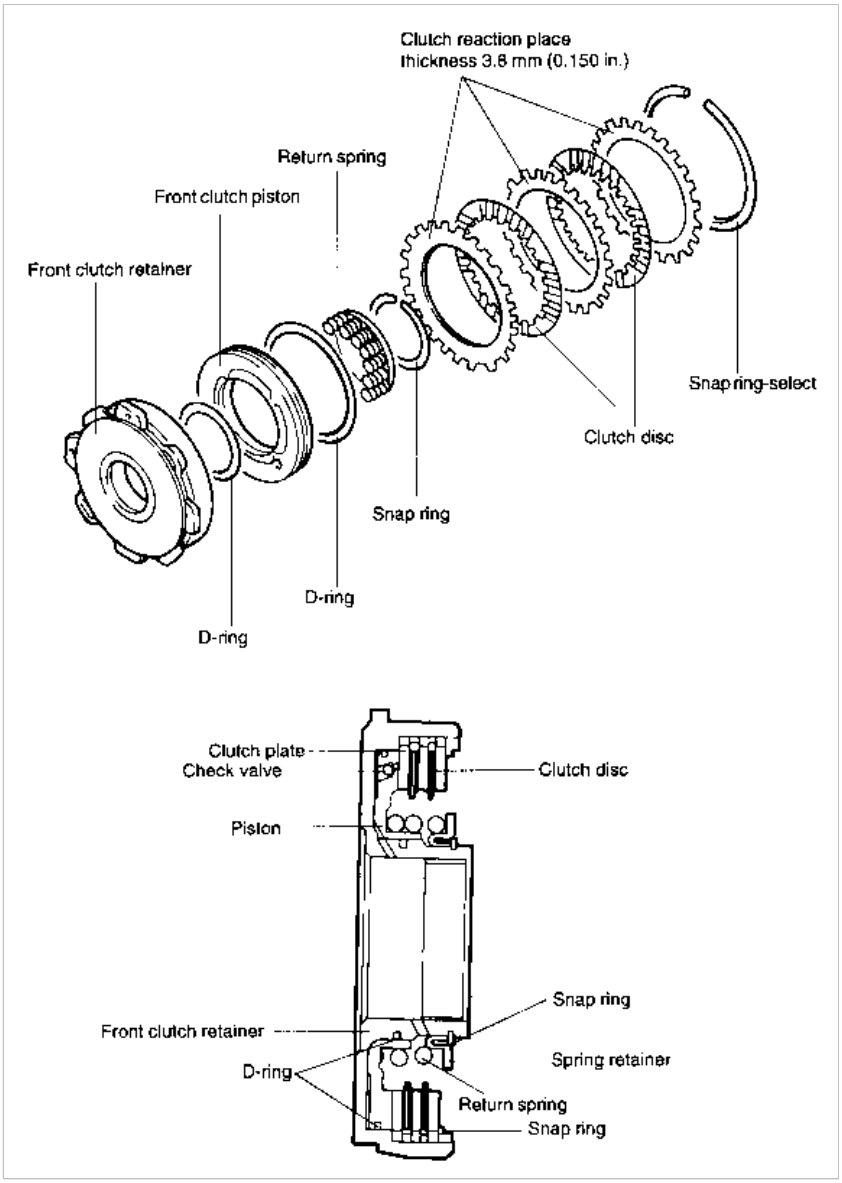


6. After installing the snap ring, check to see if there is a 0.4-0.6 mm (0.0157-0.0236 in.) clearance between the snap ring and the clutch reaction plate.
7. To check clearance, hold the entire circumference of the clutch reaction plate down with 50N (11 lb.) force. If clearance is out of specification, adjust the clearance by selecting the proper snap ring.



Transaxle/Transmission > Automatic Transaxle System > Front Clutch > COMPONENTS

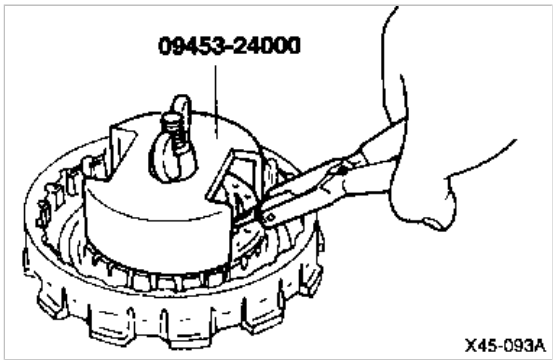
Components



Transaxle/Transmission > Automatic Transaxle System > Front Clutch > DISASSEMBLY

DISASSEMBLY

1. Remove snap ring from clutch retainer.
2. Take out three clutch reaction plates and two clutch discs. If the clutch reaction plates and the clutch discs are to be reused, be sure not to change the installation order or direction.
3. With return spring compressed with special tool (09453-21000, 09453-24000), Spring Compressor, remove snap ring, then spring retainer and return spring.



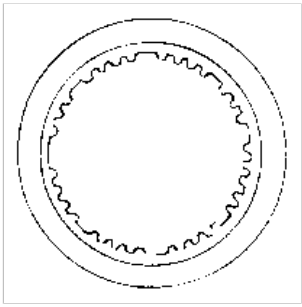
4. Remove piston from retainer.

5. Remove the D-section rings from the inner and outer circumferences of the piston.

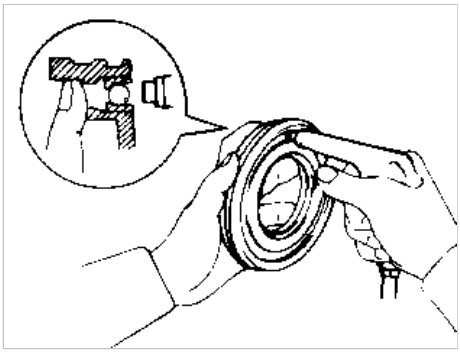
Transaxle/Transmission > Automatic Transaxle System > Front Clutch > INSPECTION

INSPECTION

1. Check to see if the sliding surface of the disc and plate are worn or burnt; if necessary, replace them.
   If the lining of the disc is peeling off or discolored, replace all discs.



2. Check that the check ball is free by shaking the piston.



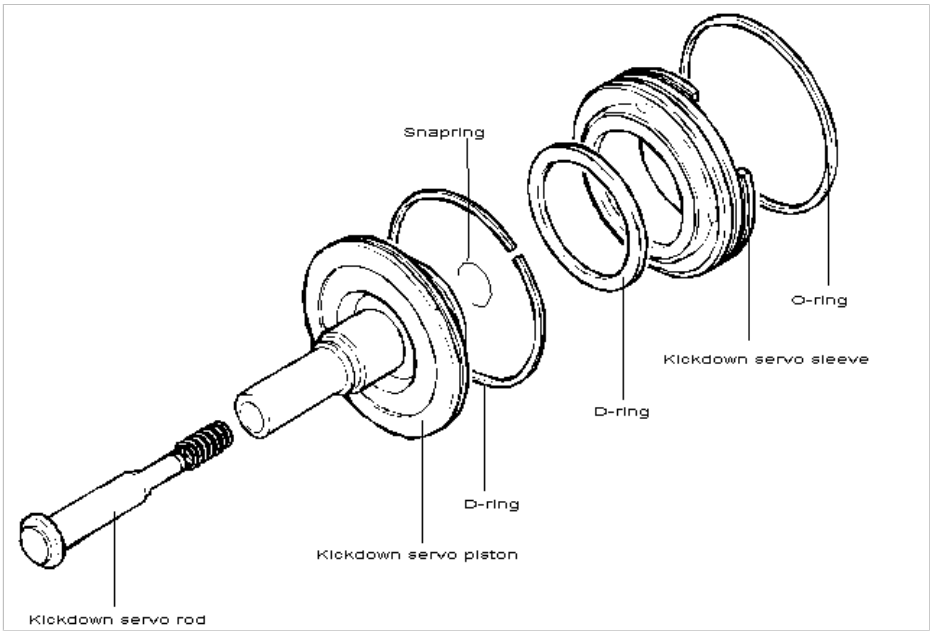
Transaxle/Transmission > Automatic Transaxle System > Kick Down Servo > ASSEMBLY

ASSEMBLY

1. Install the rod and nut to the kickdown servo piston.
2. Install two new D-rings (one large and one small) around the circumference of the piston, and then apply a coating of ATF to the D-rings.
3. Install the kickdown servo piston in the sleeve.
4. Install a new O-ring around the circumference of the sleeve, and apply a coating of ATF to the o-ring.

Transaxle/Transmission > Automatic Transaxle System > Kick Down Servo > COMPONENTS

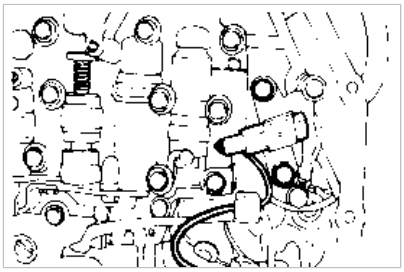
COMPONENTS



Transaxle/Transmission > Automatic Transaxle System > Kick Down Servo > KICKDOWN SERVO ADJUSTMENT

KICKDOWN SERVO ADJUSTMENT

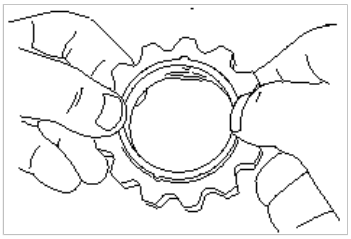
1. Completely remove all dirt and other contaminating materials adhered around the kickdown adjust screw.
2. Loosen the lock nut.
3. Loosen and tighten the adjust screw two times by torque of 5 Nm (3.6 lb.ft).
4. Tighten adjust screw by torque of 5 Nm and then, loosen the adjust screw 3 to 3-1/3 turns.
5. Tighten the lock nut to the specified torque.
   Before assembling, apply sealant (DC780) to center portion of the adjust screw.



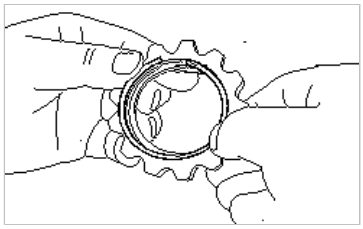
Transaxle/Transmission > Automatic Transaxle System > Oil Pump (A/T) > ASSEMBLY

ASSEMBLY

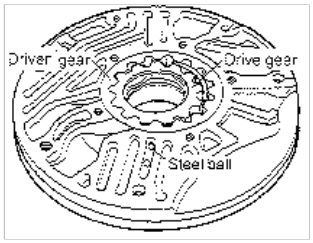
1. Install the oil seal to the oil pump drive gear.



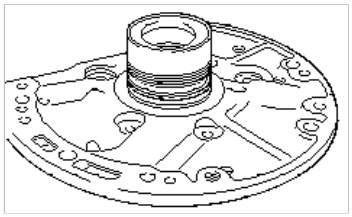
2. Install the snap ring.



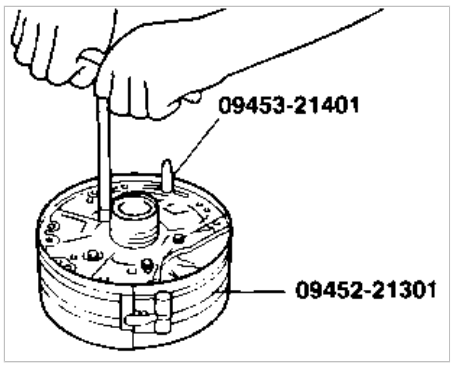
3. After immersing the drive and driven gears in automatic transaxle fluid, install them into pump housing. When reusing gears, install with mating marks properly aligned.
4. Fit a new O-ring into the groove at the inner circumference of the drive gear.
5. Install the steel ball in the hole as shown in the illustration.



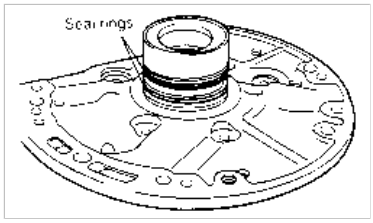
6. Install the two seal rings, coated with automatic transaxle fluid, to the reaction shaft support.



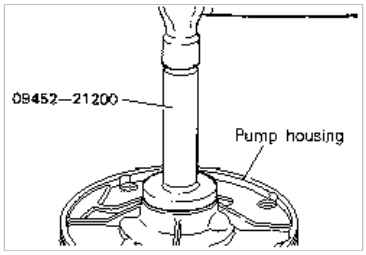
7. Make sure that oil pump gear turns freely.
8. Install a new O-ring in the groove provided in the circumference of the pump housing and apply petroleum jelly to the circumference of the O-ring.
9. Loosely install the reaction shaft support on the pump housing.
   Tighten the five bolts finger tight.
10. With the reaction shaft support properly positioned on the pump housing, using special tools (09452-21401, 09452-21301) tighten the five bolts to 10-12 M, (100-120 kg. cm, 7-9 lb.ft).



11. Pry off the pump housing oil seal using a screwdriver.

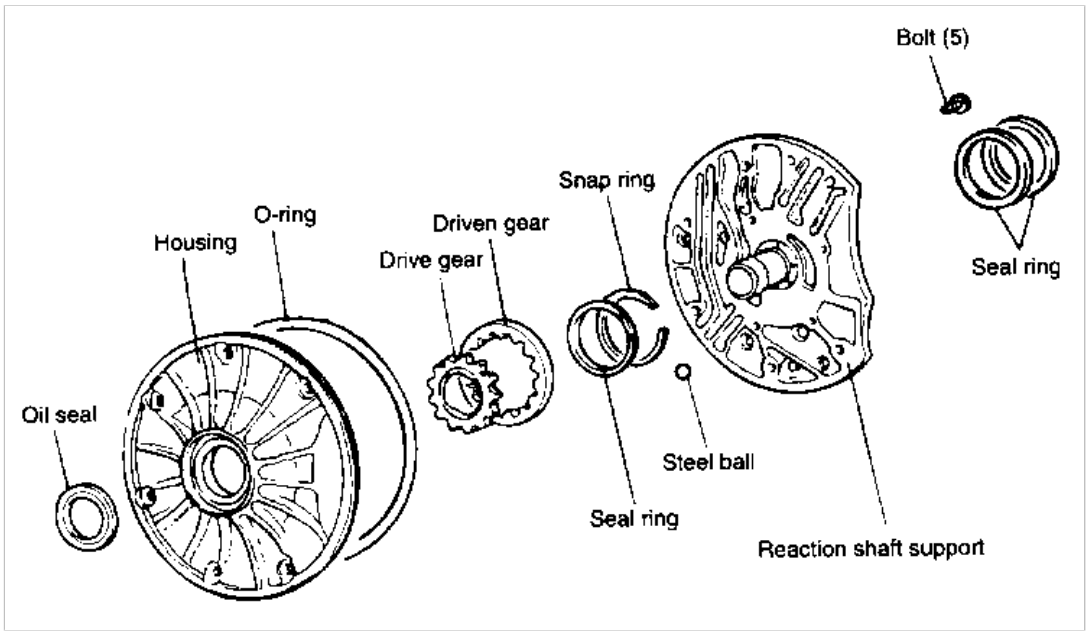


12. Using the special tool (09452-21200), install the oil seal to the pump housing. Apply a thin coat of automatic transaxle fluid to the lip of the oil seal before installation.



Transaxle/Transmission > Automatic Transaxle System > Oil Pump (A/T) > COMPONENTS

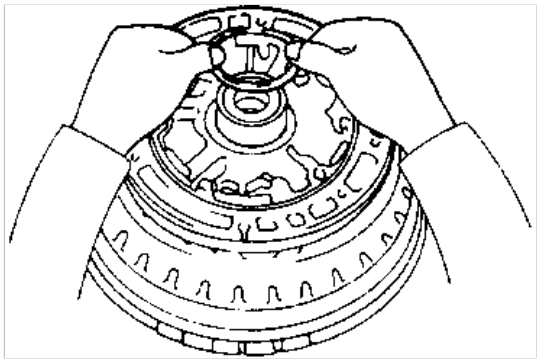
Components



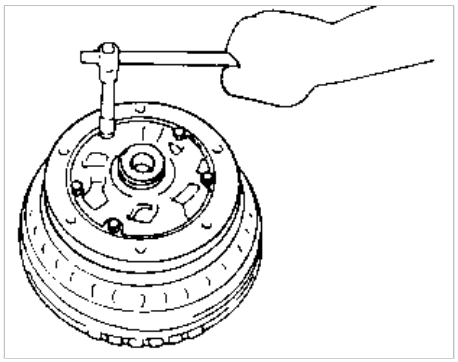
Transaxle/Transmission > Automatic Transaxle System > Oil Pump (A/T) > DISASSEMBLY

DISASSEMBLY

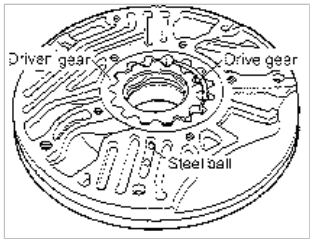
1. Place the oil pump body on the torque converter.
2. Remove the two seal rings and O-ring.



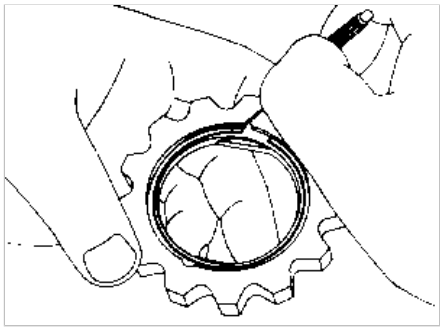
3. Remove five bolts and remove reaction shaft support from housing.
4. Remove the oil pump body from the torque converter.



5. Make reassembly alignment marks on drive and driven gear.
6. Remove oil pump drive and driven gears from pump housing.
7. Remove the steel ball from housing.



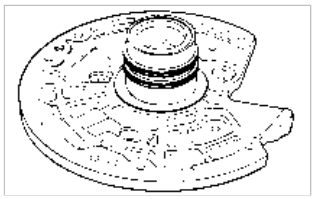
8. Remove the snap ring and the oil seal from the oil pump drive gear.



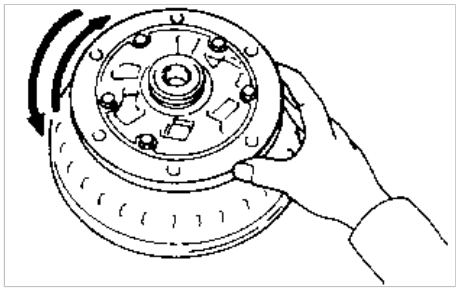
Transaxle/Transmission > Automatic Transaxle System > Oil Pump (A/T) > INSPECTION

INSPECTION

1. Measure the side clearance of the oil pump gear. If the clearance exceeds the standard value, or if an inspection of the surface area (of the oil pump housing) that contacts the oil pump gear reveals indications of interference, replace the entire oil pump assembly.



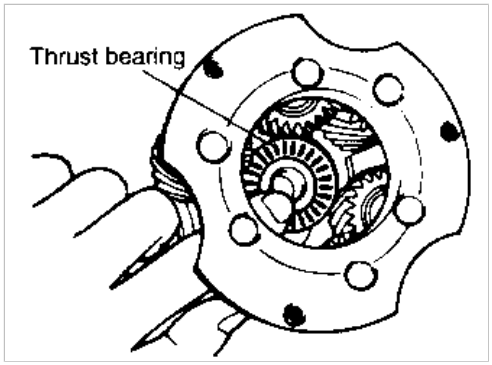
2. Check the surface of the reaction shaft support that contacts oil pump gear. If there are indications of interference, replace the entire oil pump assembly.
3. Check the oil pump drive rotation.



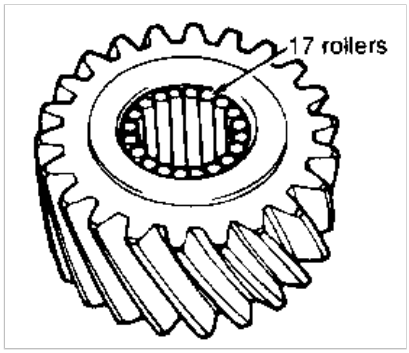
Transaxle/Transmission > Automatic Transaxle System > Planetary Gear Set > ASSEMBLY

ASSEMBLY

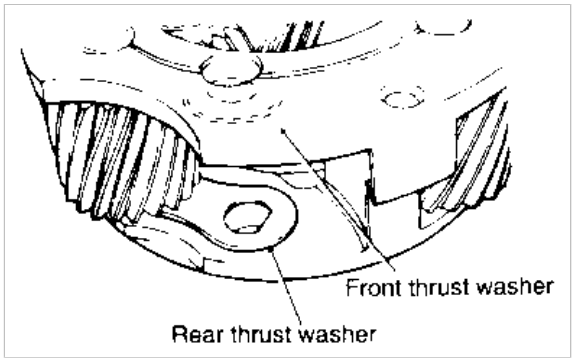
1. Install the thrust bearing in the carrier. Be sure that it fits correctly in the carrier.



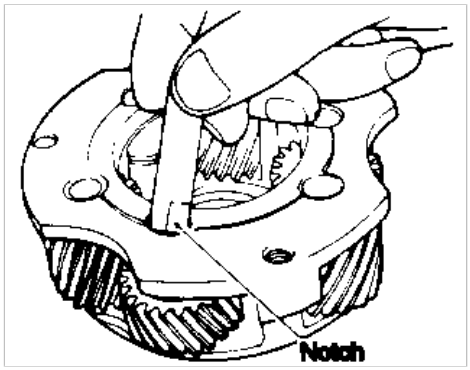
2. Apply a generous amount of petroleum jelly to the inside of the short pinion to hole the 17 rollers bearing in place.



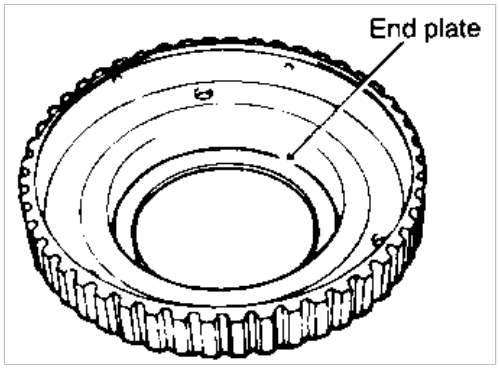
3. Line up holes in the rear thrust washer and front thrust washer with shaft of carrier.
4. Install short pinion, spacer bushing and two front thrust washers and align the holes. Use care not to allow rollers to move out of position.



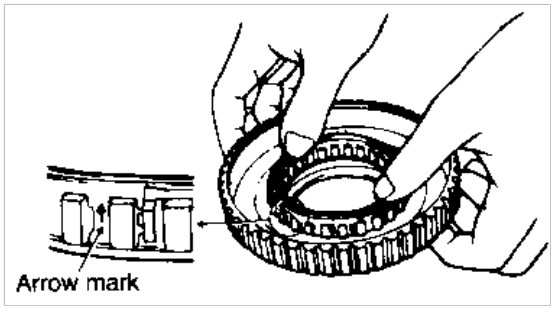
5. Insert the pinion shaft. Be sure that flattened end of the pinion shaft fits properly into the hole in the rear thrust plate when pinion shaft is inserted.



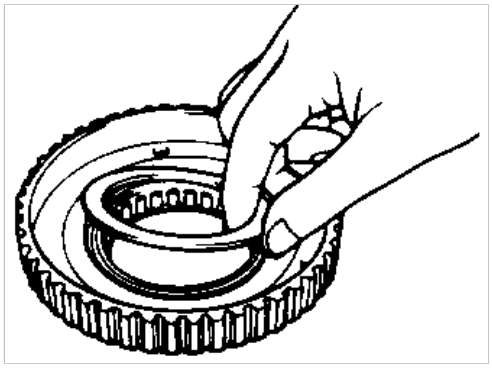
6. Install end plate in the outer race.



7. Press the overrunning clutch into outer race. Be sure that the arrow on the outside circumference of the cage is pointing upward as shown in the illustration when the overrunning clutch is installed.

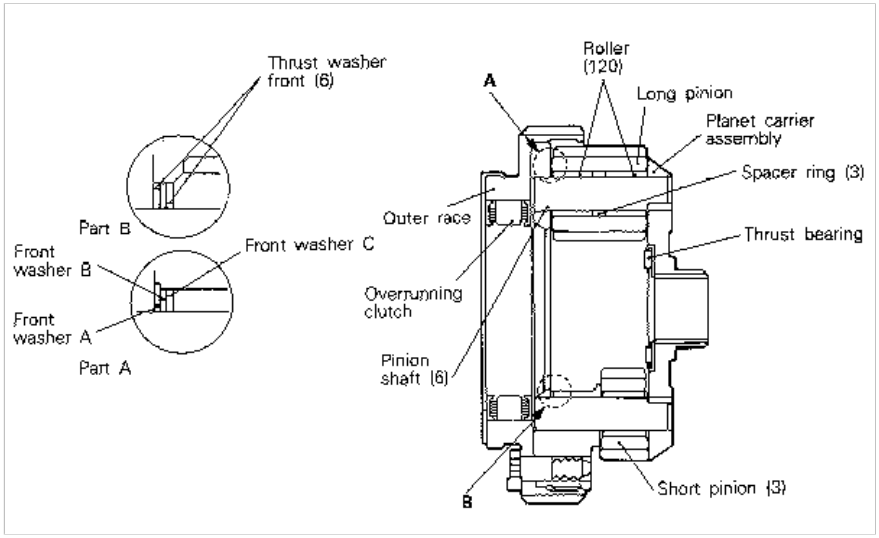


8. Apply petroleum jelly to the overrunning clutch end plate to retain it inside the overrunning clutch. Install the end plate in the clutch.



Transaxle/Transmission > Automatic Transaxle System > Planetary Gear Set > COMPONENTS

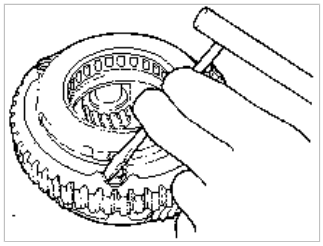
COMPONENTS



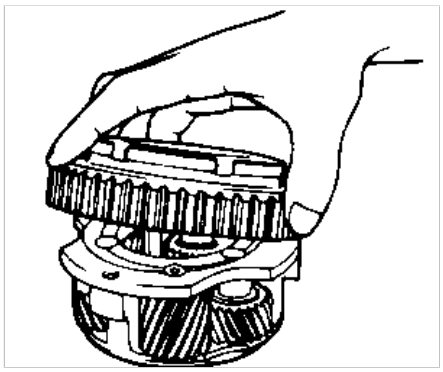
Transaxle/Transmission > Automatic Transaxle System > Planetary Gear Set > DISASSEMBLY

DISASSEMBLY

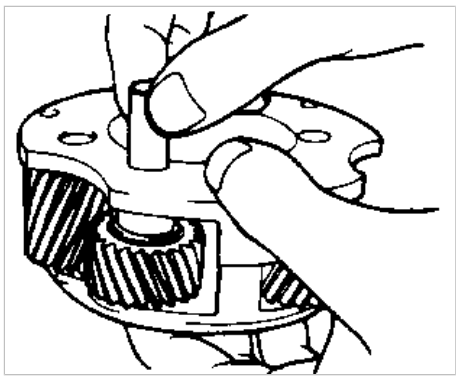
1. Remove three bolts.



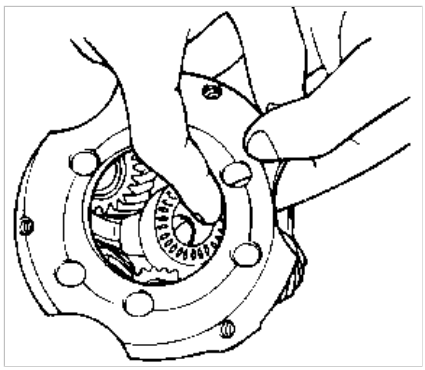
2. Remove the overrunning clutch outer race assembly. Remove the overrunning clutch end plate.



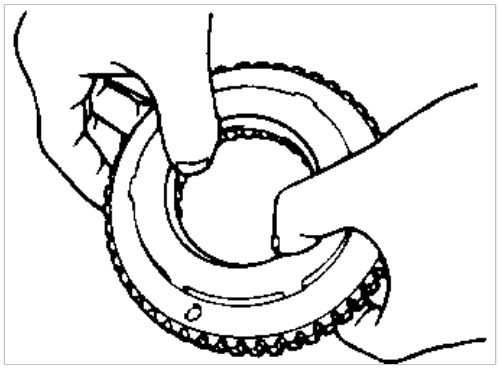
3. Remove the shaft of only one short pinion.
4. Remove the spacer bushing and two front thrust washers.
5. Remove the pinion. Do not drop the 17 roller bearing in the pinion.



6. Remove the thrust bearing.



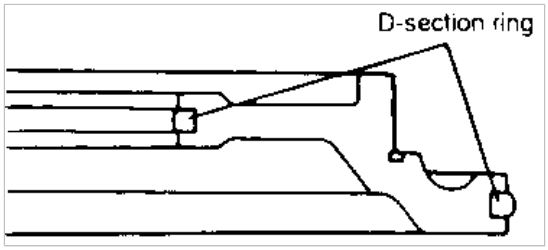
7. Push the overrunning clutch out of the outer race by hand.



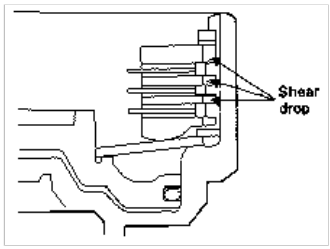
Transaxle/Transmission > Automatic Transaxle System > Rear Clutch > ASSEMBLY

ASSEMBLY

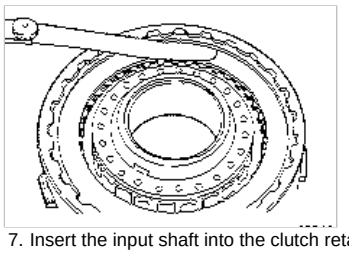
1. Install the D-section rings in the grooves in the outside and inside surfaces of the piston.



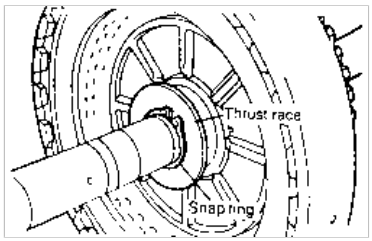
2. After applying automatic transaxle fluid to the outside surface of the D-section rings, push the piston into the rear clutch retainer by hand.
3. Install the return spring on the piston.
4. Compress the return spring with the snap ring by pushing down with a screwdriver and setting the snap ring in its groove.
5. Install clutch pressure plate, two clutch discs, clutch plate and clutch reaction plate into the rear clutch retainer. When the reaction plate, clutch plate and clutch disc are removed, reinstall them by reversing the order of disassembly. Prior to installing, apply automatic transaxle fluid to the plates and discs.
   When new clutch discs are used, immerse them in automatic transaxle fluid for a minimum of two hours prior to installation.



6. Install the snap ring. Check to see that the clearance between the snap ring and clutch reaction plate is 0.3-0.5 mm (0.0118-0.0197 in.). To check clearance, hold the entire circumference of the clutch reaction plate down with 50N (11 lbs) force. If clearance is out of specification, adjust by selecting the proper snap ring. Snap rings are the same as those used for the front clutch.



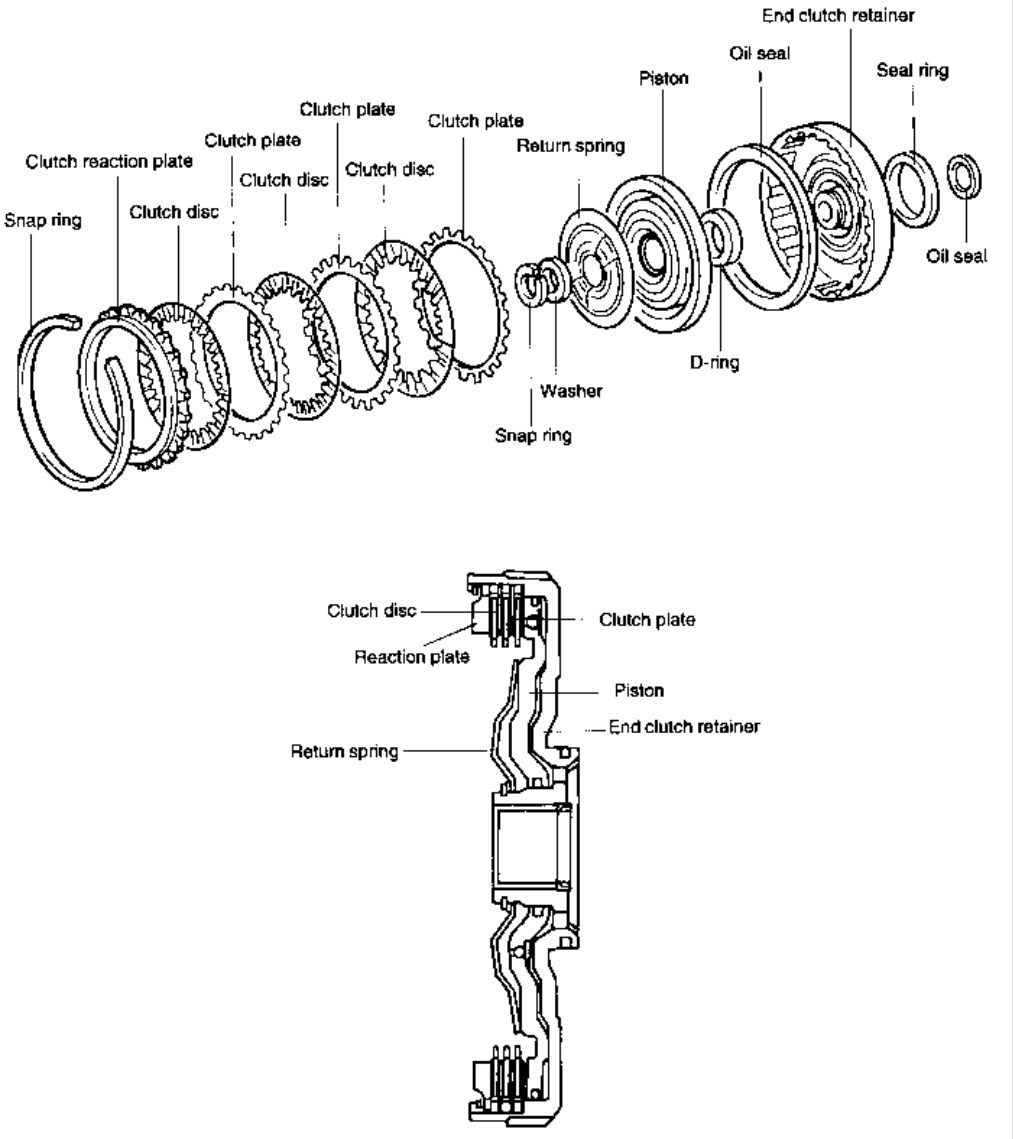
7. Insert the input shaft into the clutch retainer.
8. Install the thrust race and snap ring.



9. Install the three seal rings to the grooves in the input shaft.

Transaxle/Transmission > Automatic Transaxle System > Rear Clutch > COMPONENTS

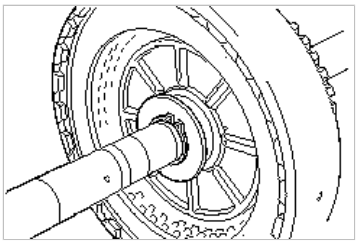
Components



Transaxle/Transmission > Automatic Transaxle System > Rear Clutch > DISASSEMBLY

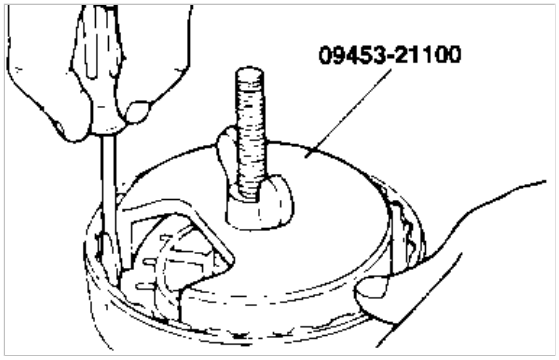
DISASSEMBLY

1. Remove the snap ring and thrust race.
2. Remove the input shaft from the rear clutch retainer.
3. Remove the snap ring from the clutch retainer.
4. Remove the clutch reaction plate, three clutch plates, two clutch discs and clutch pressure plate from the retainer.



5. Compress the return spring by using the spring compressor.

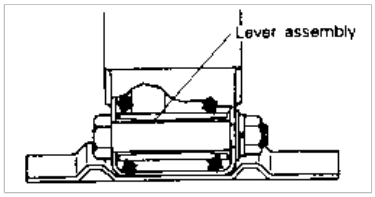
6. Using a screwdriver, remove the wave spring.
7. Remove the return spring and piston.
8. Remove the two D-section rings from piston.



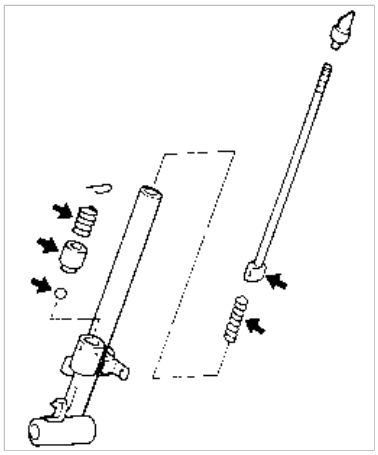
Transaxle/Transmission > Automatic Transaxle System > Shift Lever Assembly > ASSEMBLY

ASSEMBLY

1. Apply a coating of grease to the sliding part of the bushing.



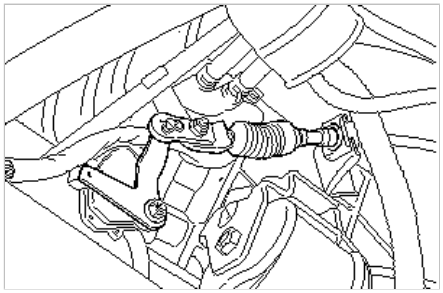
2. Apply the specified grease at the places shown in the figure.



Transaxle/Transmission > Automatic Transaxle System > Shift Lever Assembly > CONTROL CABLE ADJUSTMENT

CONTROL CABLE ADJUSTMENT

1. Eliminate slack from the control cable with the adjusting flange nut and check that the select lever operates smoothly.
2. Driving the car, check that the transaxle is set in the proper range when the select lever is shifted to each position.



Transaxle/Transmission > Automatic Transaxle System > Shift Lever Assembly > INSPECTION

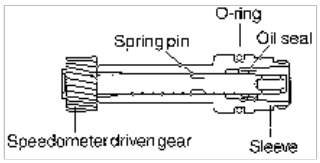
INSPECTION

1. Check the detent place for wear.
2. Check the bushing for wear or damage.
3. Check the spring for damage or deterioration.
4. Check the pin at the end of the rod assembly for wear.

Transaxle/Transmission > Automatic Transaxle System > Speedometer > ASSEMBLY

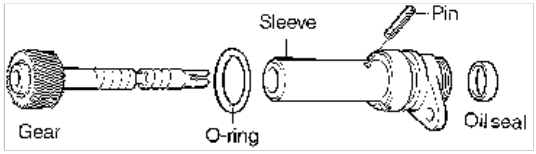
ASSEMBLY

1. Install a new oil seal to the shaft part of the gear, and apply ATF to the oil seal.
2. Insert the gear into the sleeve, and align the pin hole and the groove of the gear's shaft.
3. Tap a new spring pin into the sleeve.
4. Install a new O-ring into the outer groove of the sleeve, and apply a coating of ATF to the outer circumference of the O-ring.



Transaxle/Transmission > Automatic Transaxle System > Speedometer > COMPONENTS

Components



Transaxle/Transmission > Automatic Transaxle System > Speedometer Driven Gear Assembly > DISASSEMBLY

DISASSEMBLY

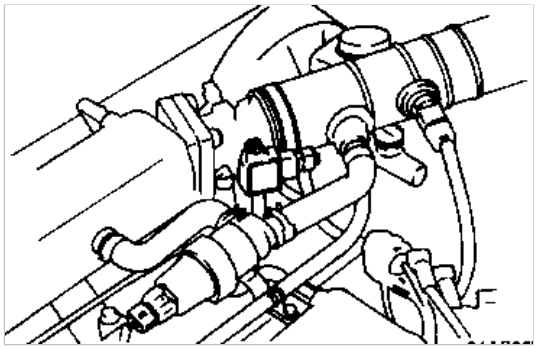
Drive the spring pin out, and disassemble the gear and sleeve.

Do not reuse the O-rings and spring pin.

Transaxle/Transmission > Automatic Transaxle System > Throttle Position (TP) Sensor > ADJUSTMENT

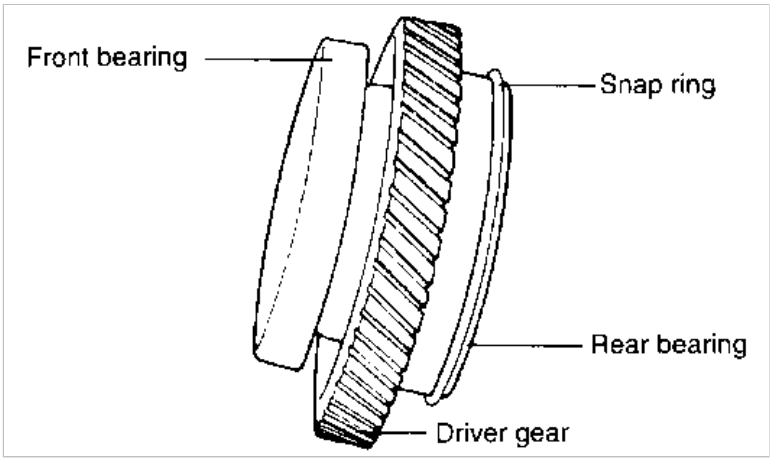
ADJUSTMENT

Refer to FUEL SYSTEM.



Transaxle/Transmission > Automatic Transaxle System > Transfer Drive Gear > COMPONENTS

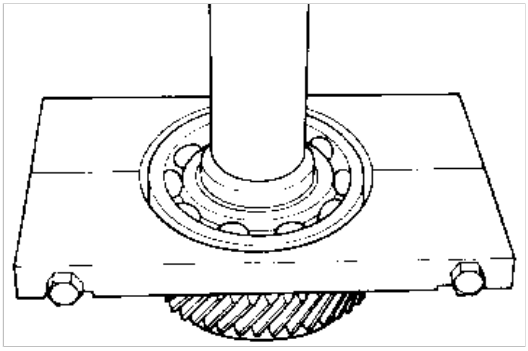
COMPONENTS



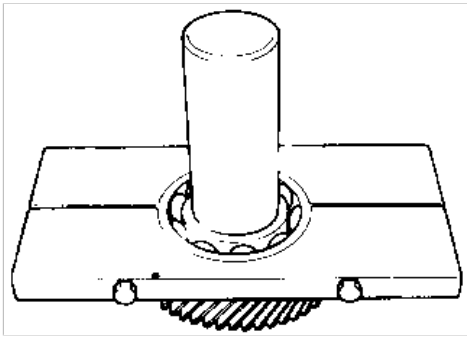
Transaxle/Transmission > Automatic Transaxle System > Transfer Drive Gear > DISASSEMBLY

DISASSEMBLY

1. Using special tool (09457-34000), pull off the front bearing from transfer drive gear.



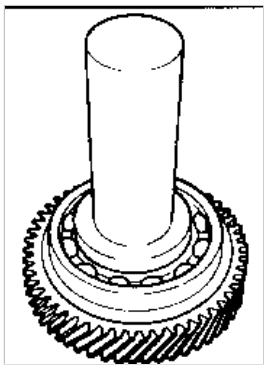
2. Using special tool (09457-22000), pull off the rear bearing from transfer drive gear.



Transaxle/Transmission > Automatic Transaxle System > Transfer Drive Gear > REASSEMBLY

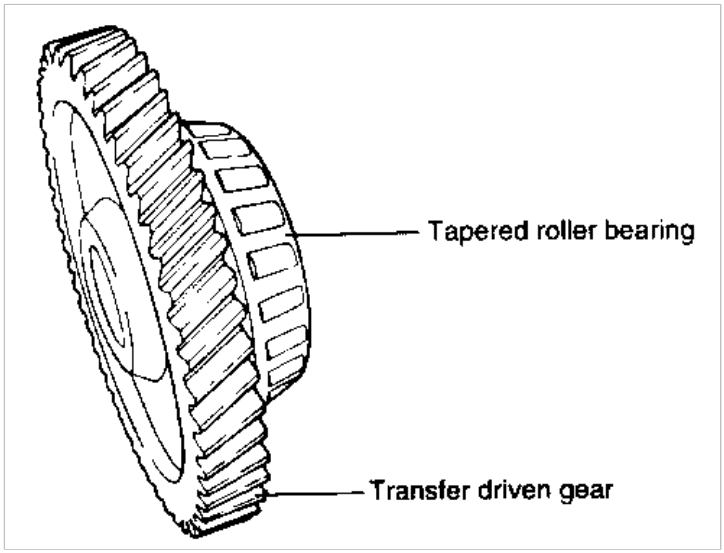
REASSEMBLY

Using special tool (09452-21200), press the front bearing and the rear bearing onto the transfer drive gear.



Transaxle/Transmission > Automatic Transaxle System > Transfer Driven Gear > COMPONENTS

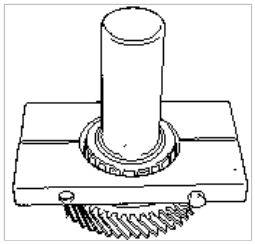
COMPONENTS



Transaxle/Transmission > Automatic Transaxle System > Transfer Driven Gear > DISASSEMBLY

DISASSEMBLY

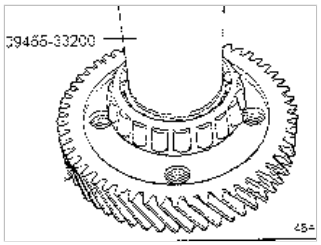
Using special tool (09455-33000), pull off tapered roller bearing from the transfer driven gear.



Transaxle/Transmission > Automatic Transaxle System > Transfer Driven Gear > REASSEMBLY

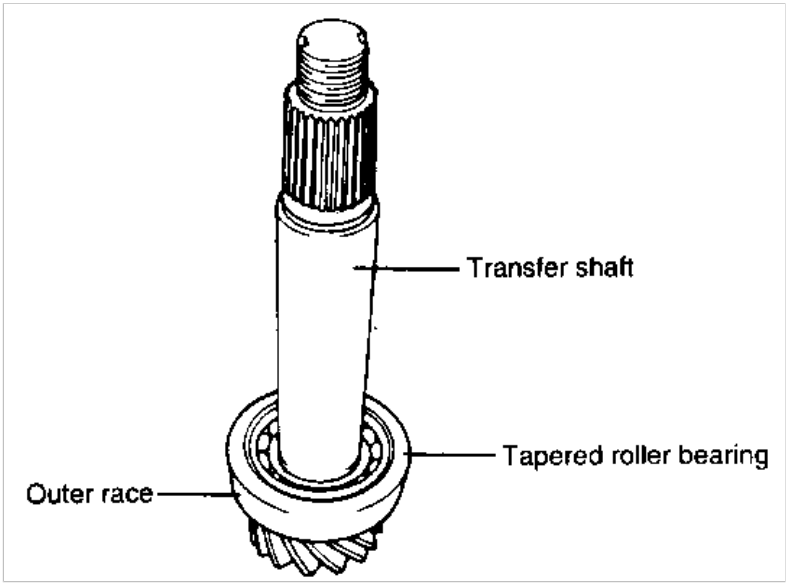
REASSEMBLY

Using special tool (09455-33200), press tapered roller bearing onto the transfer drive gear.



Transaxle/Transmission > Automatic Transaxle System > Transfer Shaft > COMPONENTS

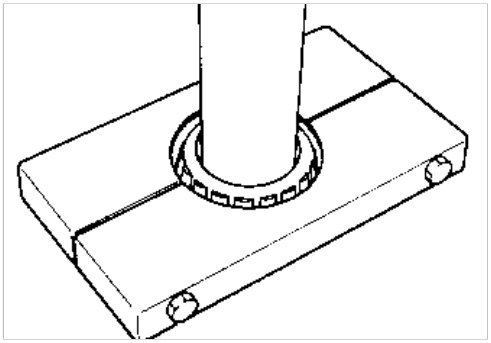
COMPONENTS



Transaxle/Transmission > Automatic Transaxle System > Transfer Shaft > DISASSEMBLY

DISASSEMBLY

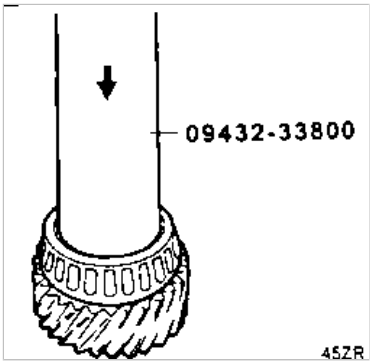
Using special tool (09433-21000), remove the bearing from the transfer shaft.



Transaxle/Transmission > Automatic Transaxle System > Transfer Shaft > REASSEMBLY

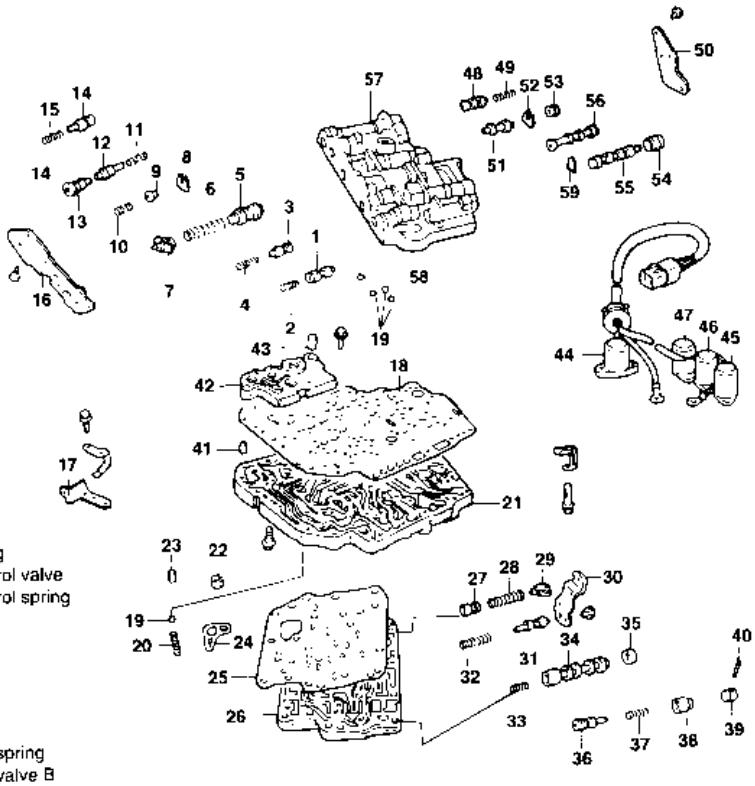
REASSEMBLY

Press the bearing inner race on to the transfer shaft.



Transaxle/Transmission > Automatic Transaxle System > Valve Body > COMPONENTS

COMPONENTS

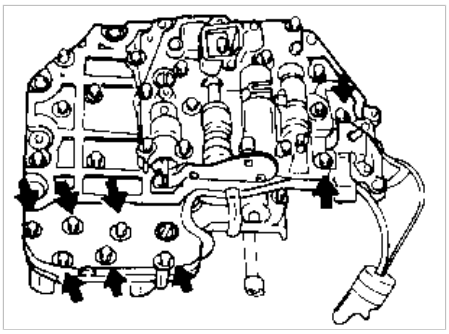


1. Pressure control valve
2. Pressure control spring
3. Torque converter control valve
4. Torque converter control spring
5. Regulator valve
6. Regulator valve
7. Adjusting screw
8. Stopper plate
9. Shift control plate
10. Shift control spring
11. Rear clutch exhaust spring
12. Rear clutch exhaust valve B
13. Rear clutch exhaust valve A
14. 2nd-3rd/4th-3rd shift valve
15. 2nd-3rd/4th-3rd shift spring
16. Front end cover
17. Valve stopper
18. Upper separating plate
19. Steel ball
20. Relief spring
21. Intermediate plate
22. Nut
23. Jet
24. Oil filter
25. Lower separating plate
26. Lower valve body
27. Reducing valve
28. Reducing spring
29. Adjusting screw
30. End cover
31. N-R control/accumulator valve
32. N-R control/accumulator spring
33. Damper clutch control spring
34. Damper clutch control valve
35. Damper clutch control sleeve
36. End clutch valve
37. End clutch spring
38. End clutch plug
39. Stopper
40. Pin
41. Down bushing
42. Block
43. Pipe
44. Pressure control solenoid valve (PCSV)
45. Shift control solenoid valve B (SCSV-B)
46. Shift control solenoid valve A (SCSV-A)
47. Damper clutch control solenoid valve (DCCSV)
48. 1-2 shift valve
49. 1-2 shift spring
50. Rear end cover
51. Shift control valve
52. Stopper plate
53. Shift control valve
54. N-D control plug B
55. N-D control valve
56. Manual valve
57. Upper valve body
58. Teflon ball
59. N-D plate

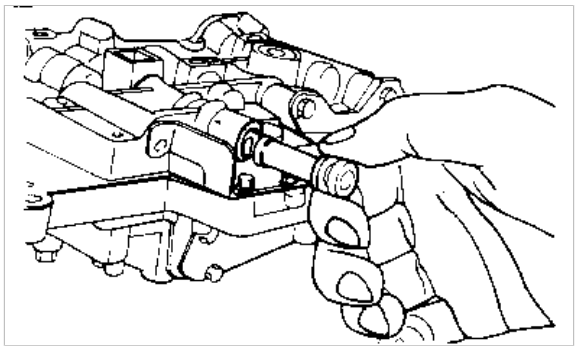
Transaxle/Transmission > Automatic Transaxle System > Valve Body > DISASSEMBLY

DISASSEMBLY

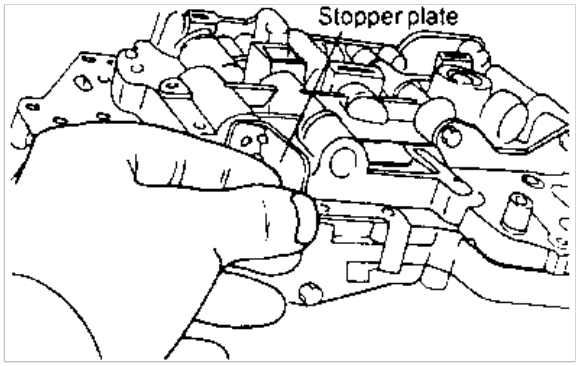
1. Remove the 4 solenoid valves and the oil temperature sensor bracket.



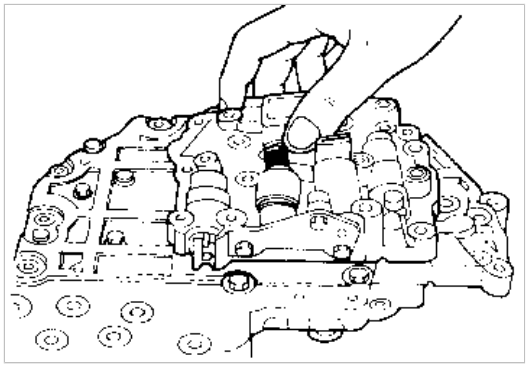
2. Remove the manual valve.



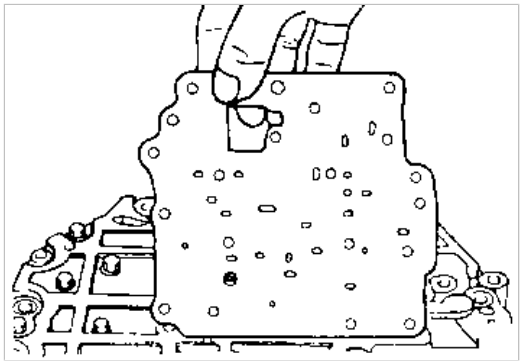
3. Remove the valve stopper and clamp.



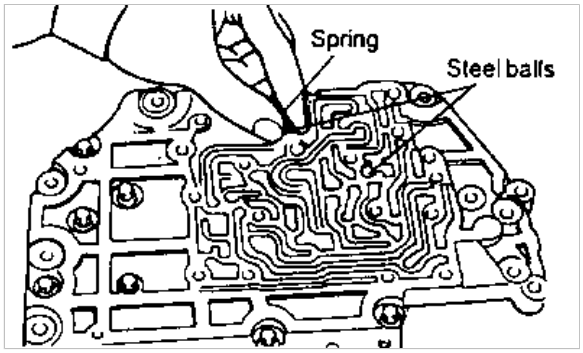
4. Remove the bolts (15), and then remove the lower valve body.



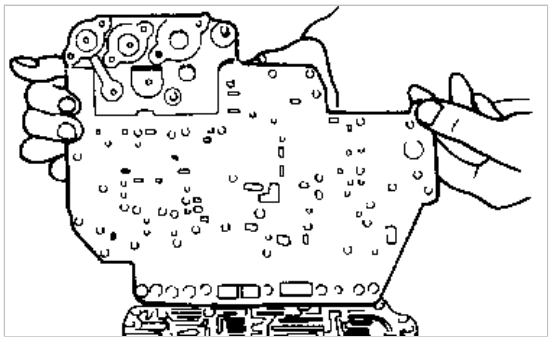
5. Remove the separating plate.



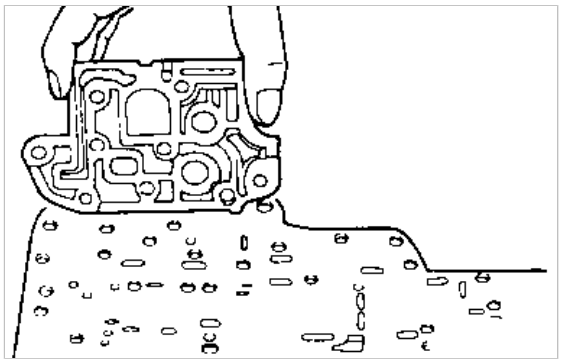
6. Remove the relief spring, two steel balls and oil filter from the intermediate plate.



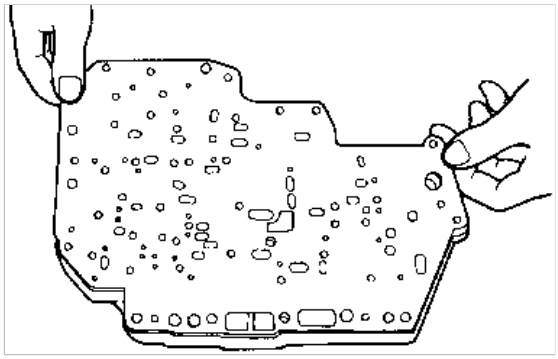
7. Remove the bolts (7), and then remove the intermediate plate and upper separation plate.



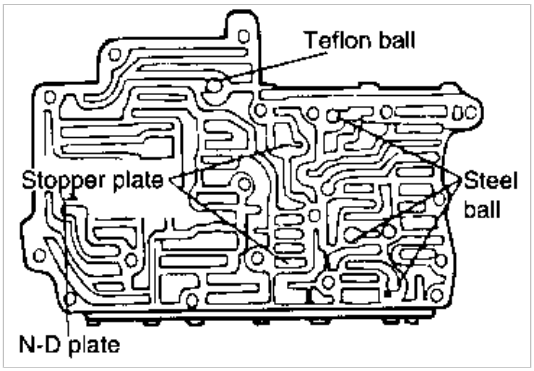
8. Remove the block.



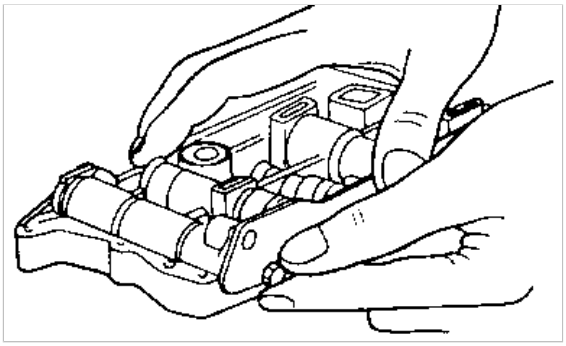
9. Remove the upper separating plate.



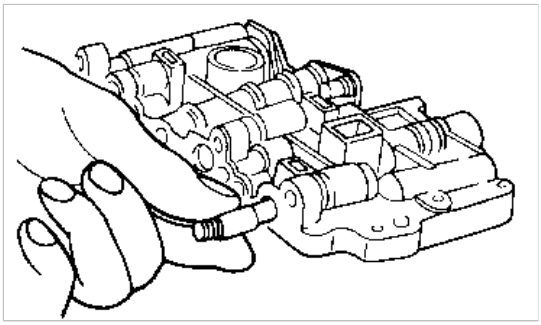
10. Remove, from the upper valve body, the three steel balls, the teflon ball, two stopper plates and N-D plate.



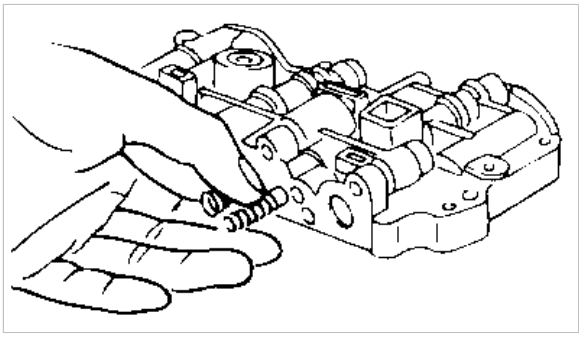
11. Remove, from the upper valve body, the seven bolts; then remove the front end cover and the adjustment screw.
When removing the bolts, be sure to firmly press the front end cover (as shown in the illustration) so as to prevent the spring from causing the adjustment screw to pop out.



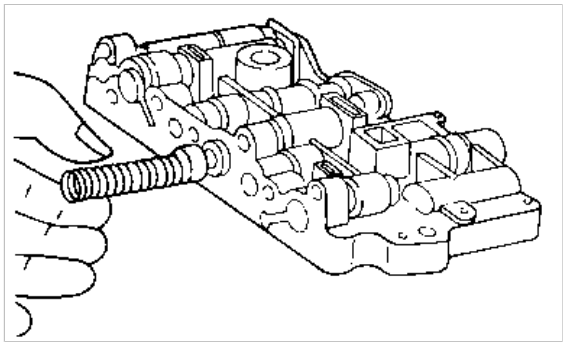
12. Remove the pressure control spring and the pressure control valve.



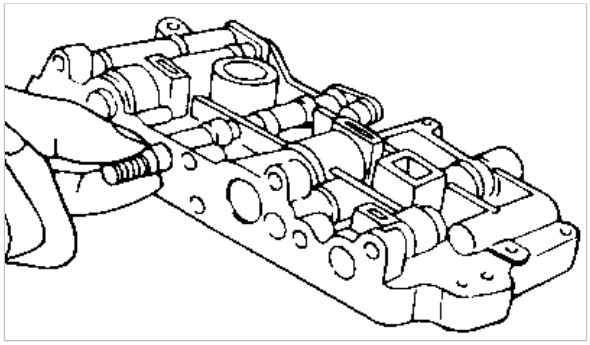
13. Remove the torque converter control spring and the torque converter control valve.



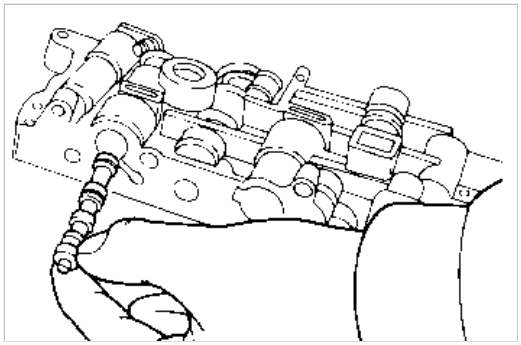
14. Remove the regulator spring and the regulator valve.



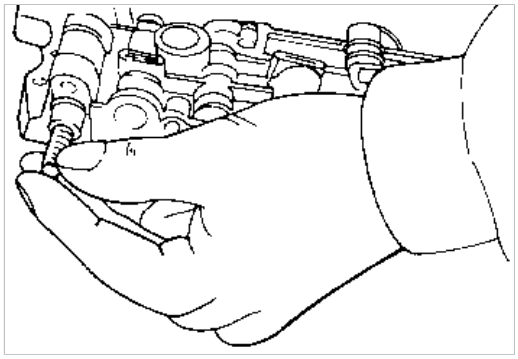
15. Remove the shift-control spring and shift-control plug A.



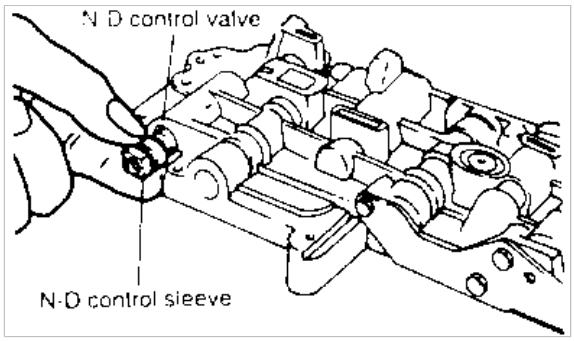
16. Remove rear clutch exhaust valves A and B as well as the rear clutch exhaust spring.



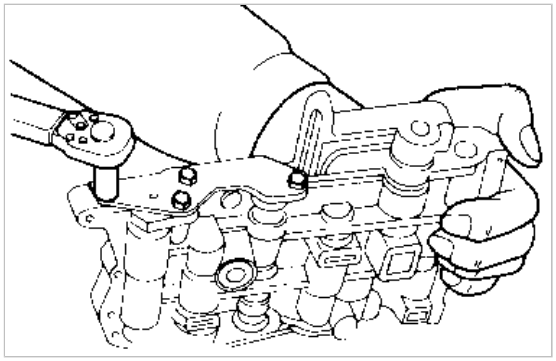
17. Remove the 2-3/4-3 shift spring and the shift valve.



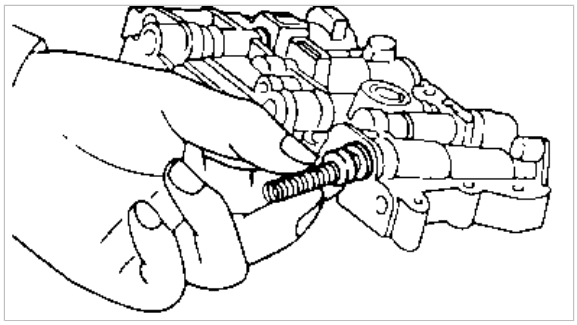
18. Remove, from the rear side of the upper valve body, the N-D control sleeve and the N-D control valve.



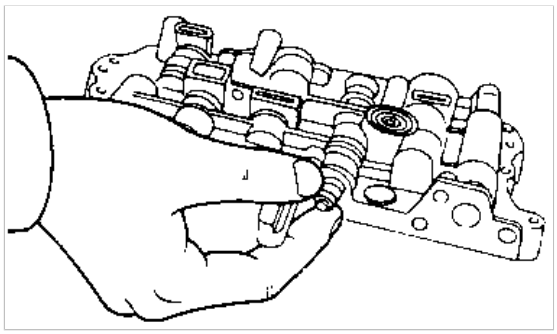
19. Remove the four bolts, and then remove the rear end cover.



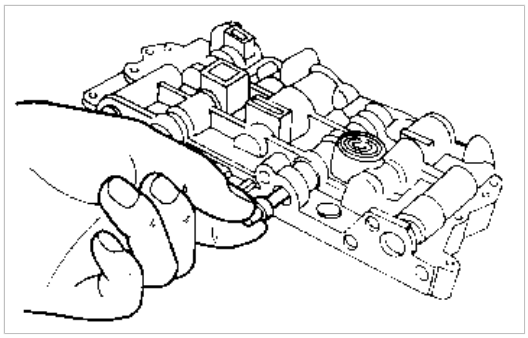
20. Remove the 1-2 shift spring and the 1-2 shift valve.



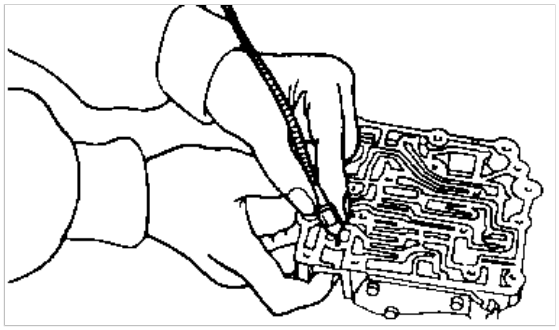
21. Remove shift-control plug B.



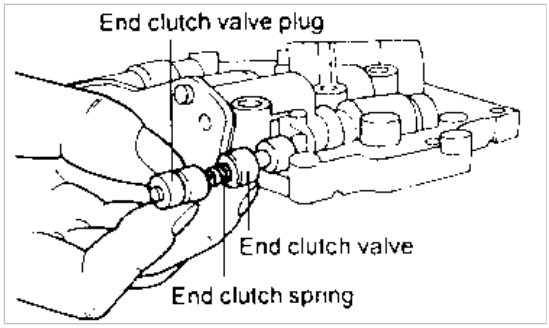
22. Remove the shift-control valve.



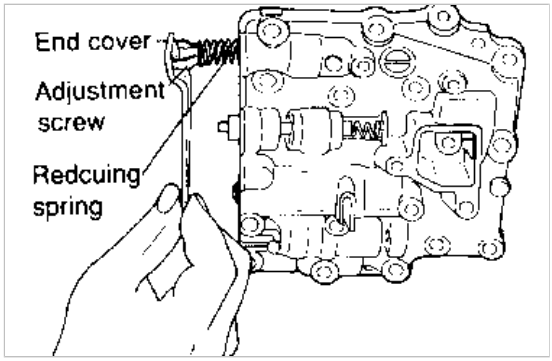
23. Using a magnet, extract the pin from the lower valve body, and then remove the stopper.



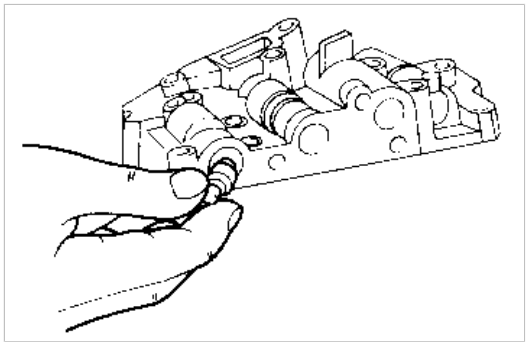
24. Remove the end clutch valve plug, end clutch spring, and end clutch valve.



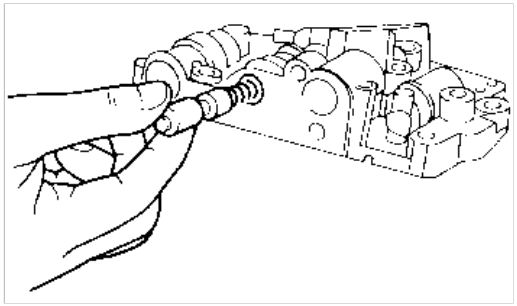
25. Remove the three bolts from the lower valve body, and then remove the end cover, adjustment screw, and reducing spring.



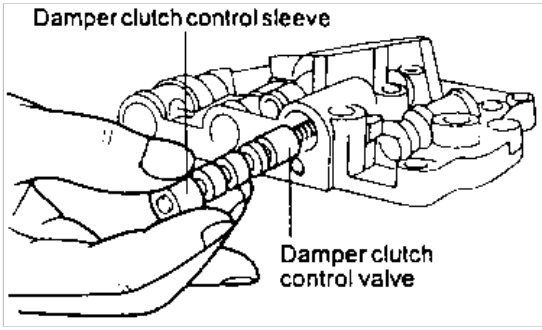
26. Remove the reducing valve.



27. Remove the N-R control/accumulator valve and the N-R control/accumulator spring.



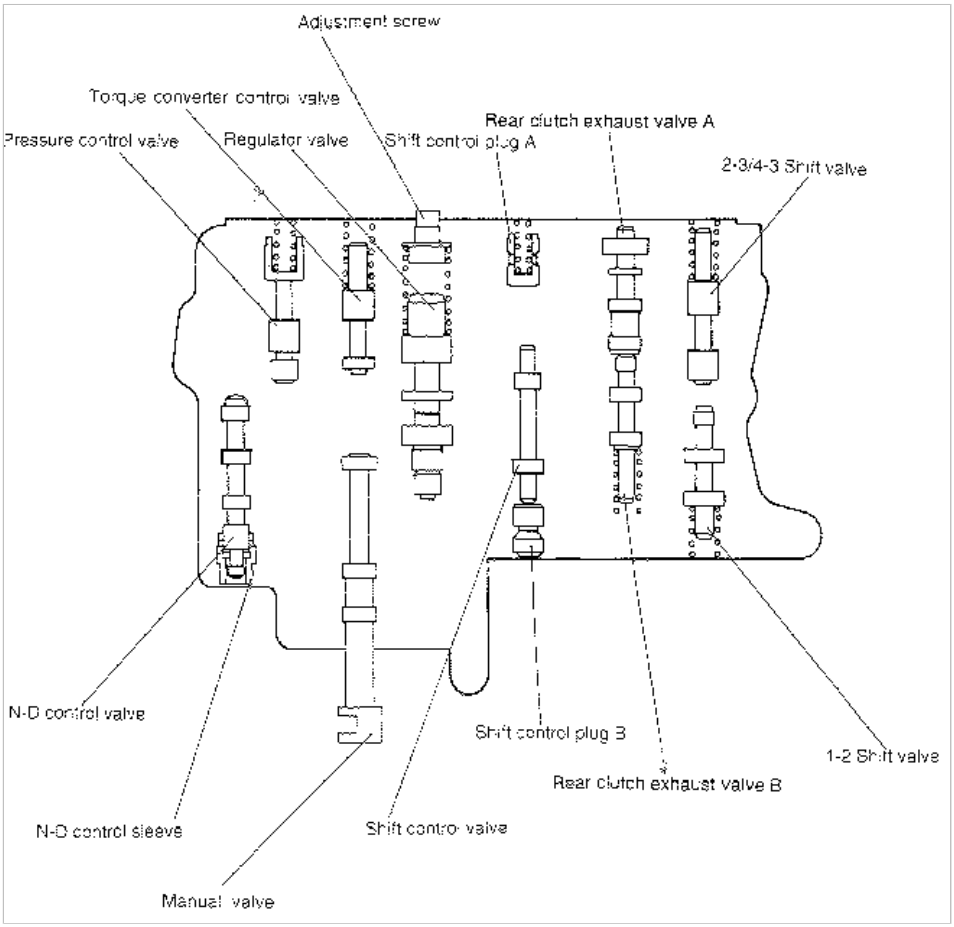
28. Remove the damper clutch control sleeve, damper clutch control valve, and the damper clutch control spring.



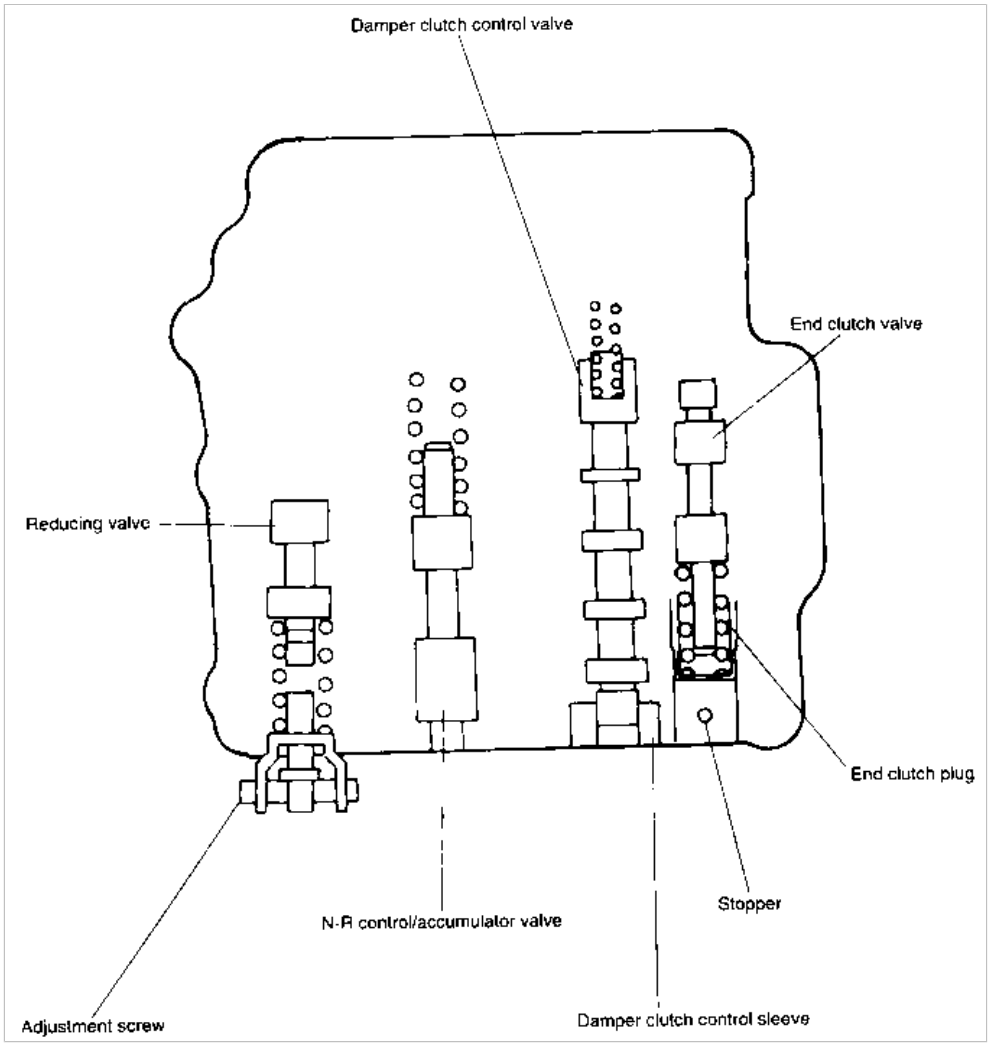
Transaxle/Transmission > Automatic Transaxle System > Valve Body > REASSEMBLY

REASSEMBLY

Upper Valve Body



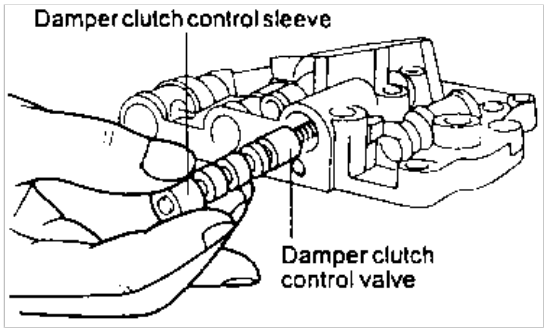
Lower Valve Body



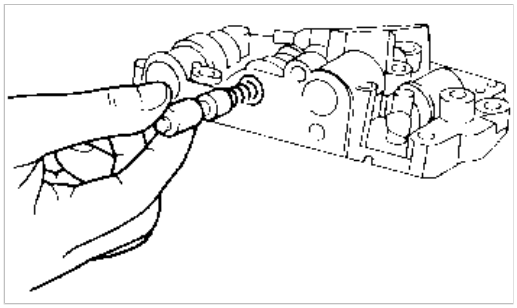
Transaxle/Transmission > Automatic Transaxle System > Valve Body > REASSEMBLY (CONTINUED)

REASSEMBLY (continued)

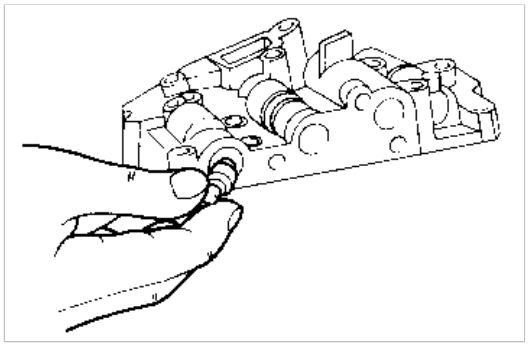
1. Install in the lower valve body, the damper clutch control spring, damper clutch control valve, and the damper clutch control sleeve.



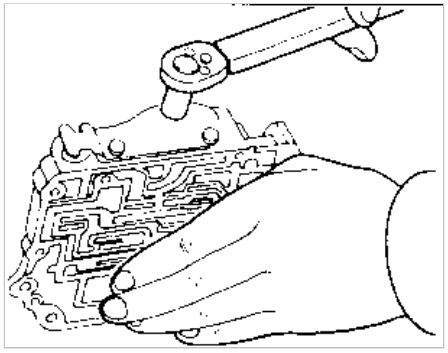
2. Install the N-R control/accumulator spring and the N-R control/accumulator valve.



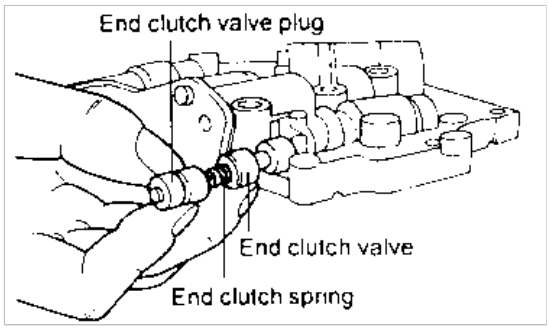
3. Install the reducing valve.



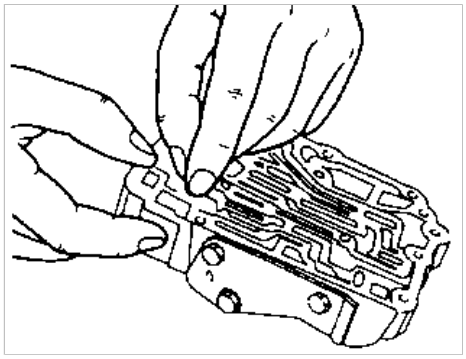
4. Install the reducing spring, adjustment screw, and end cover. Tighten the bolts to the specified torque.



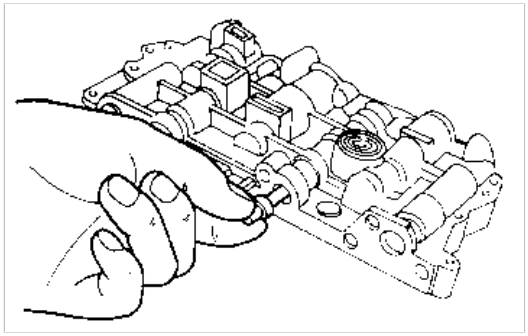
5. Install the end clutch valve, end clutch spring, and end clutch plug.



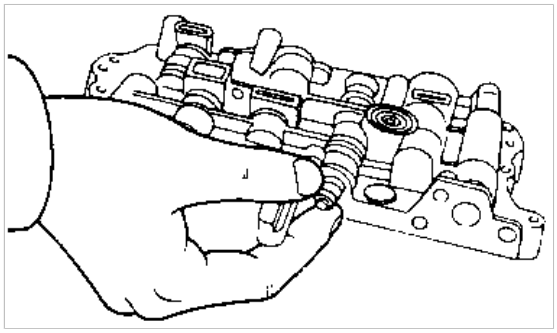
6. Install the stopper and secure it with the pin.



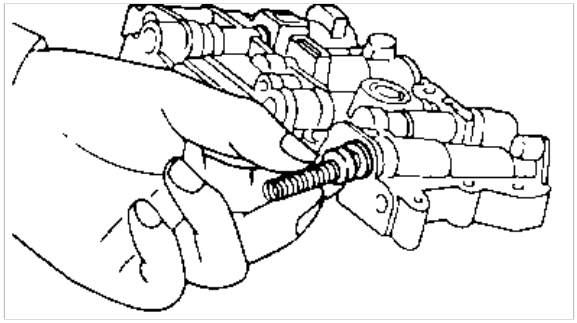
7. Install the shift-control valve to the upper valve body.



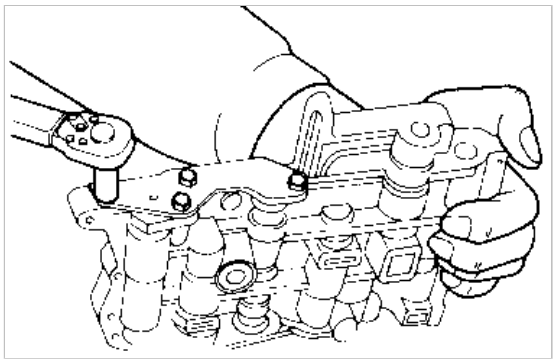
8. Install the shift-control plug B.



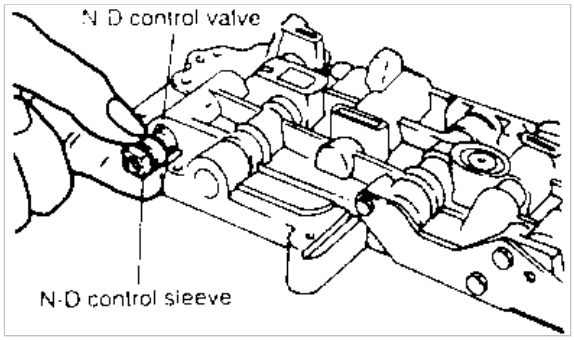
9. Install the 1-2 shift valve 1-2 shift spring.



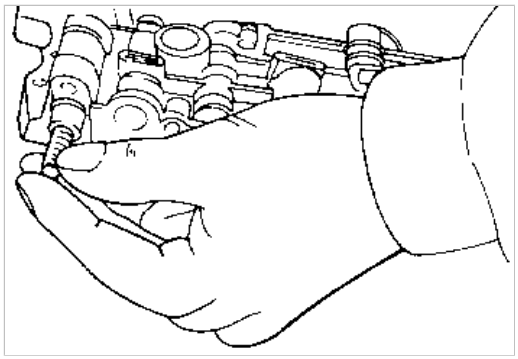
10. Install the rear end cover.



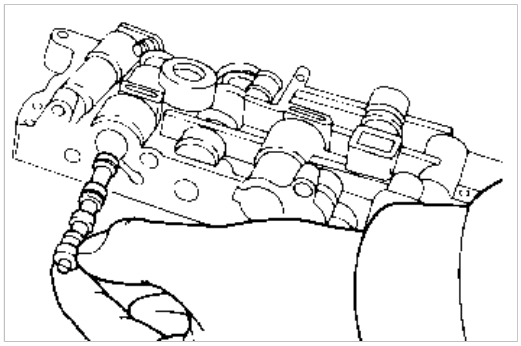
11. Install the N-D control valve and the N-D control sleeve.



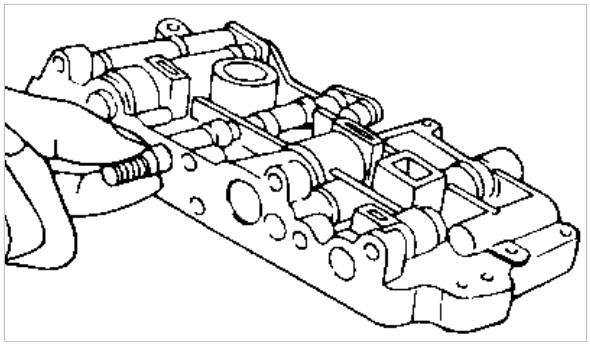
12. Install the 2-3/4-3 shift valve and the 2-3/4-3 shift spring.



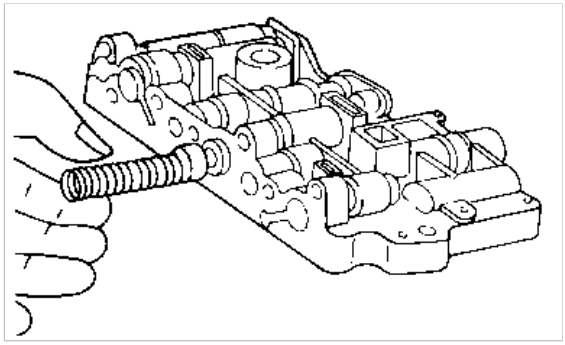
13. Install the rear clutch exhaust spring and rear clutch exhaust valves A and B.



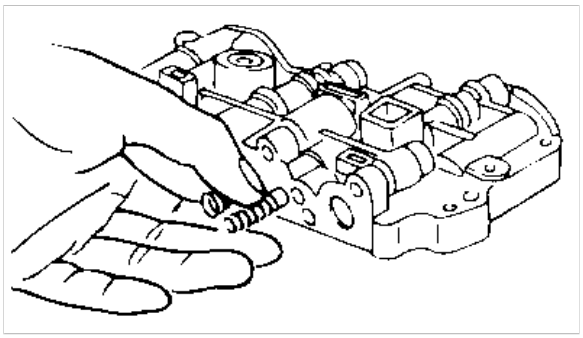
14. Install shift-control plug A and shift control spring.



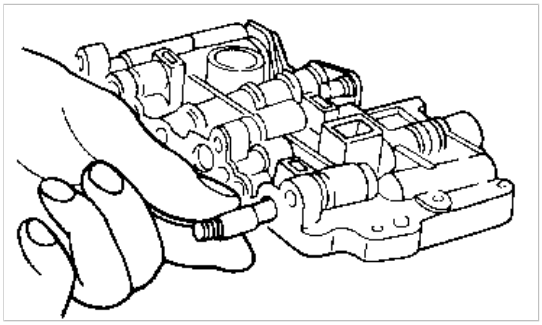
15. Install the regulator valve and regulator spring.



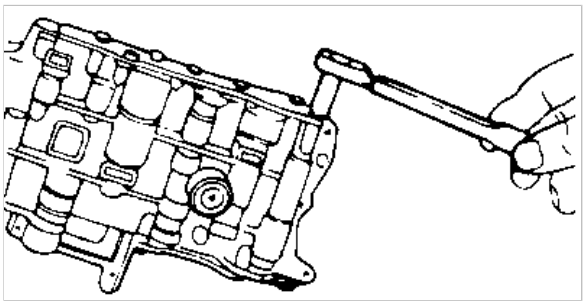
16. Install the torque converter control valve and torque converter control spring.



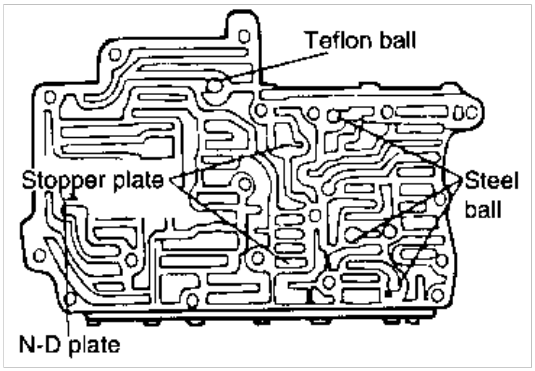
17. Install the pressure control valve and pressure control spring.



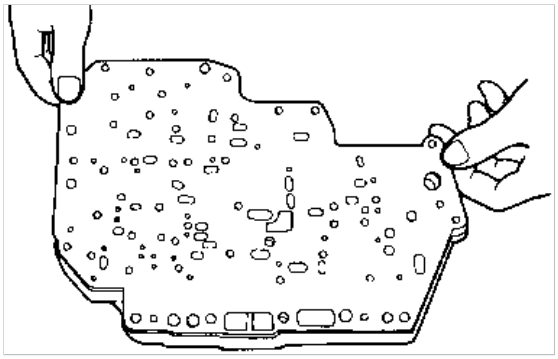
18. Install the adjustment screw and front end cover. Tighten the bolts to the specified torque.



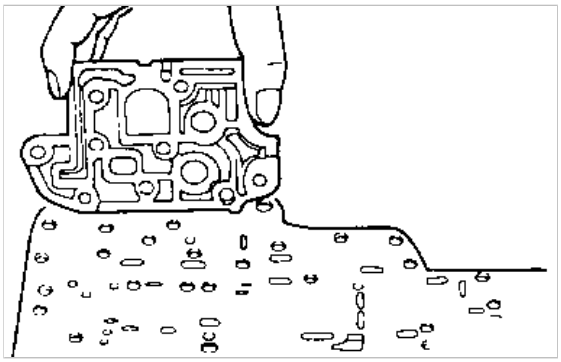
19. Install in the upper valve body, the three steel balls, the teflon ball, two stopper plate and N-D plate.



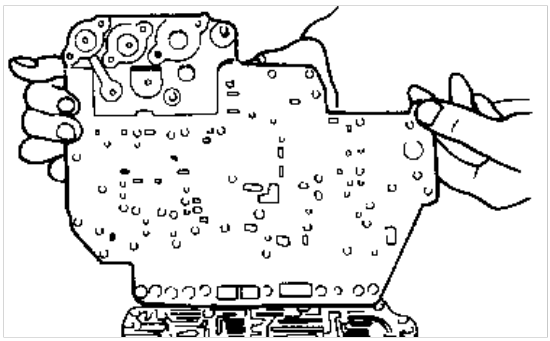
20. Install the upper separating plate.



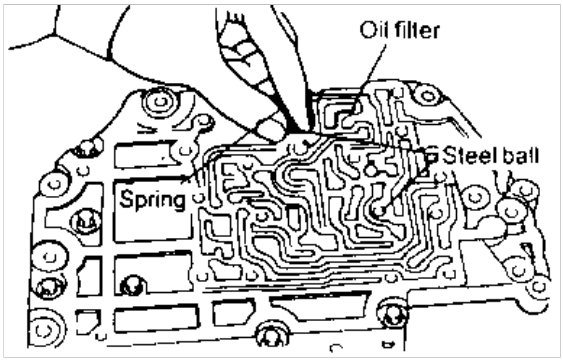
21. Install the block.



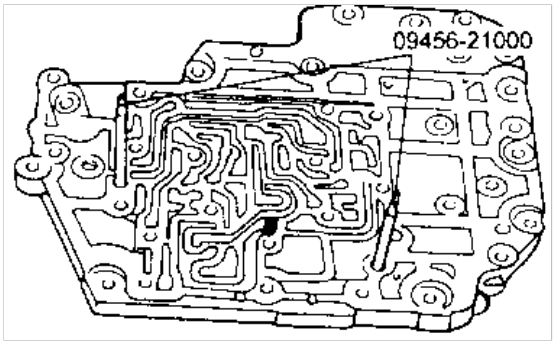
22. Install the special tool (09456-21000). Then, securing the upper separating plate and the intermediate plate with the eight installation bolts, remove the special tool.



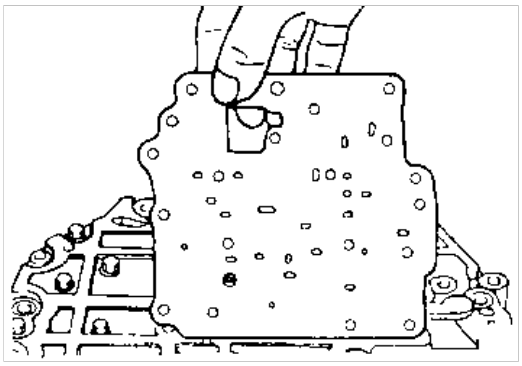
23. Install to the intermediate plate, the oil filter, the two steel balls, and the spring.



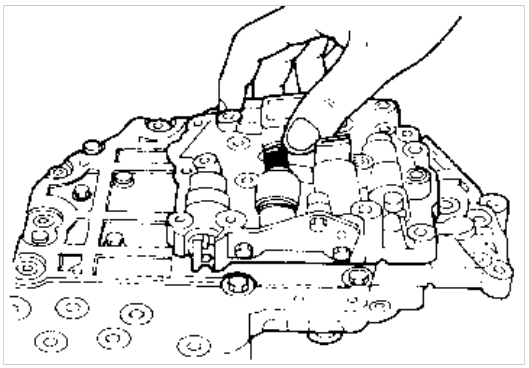
24. Install the special tool (09456-21000) to the intermediate plate.



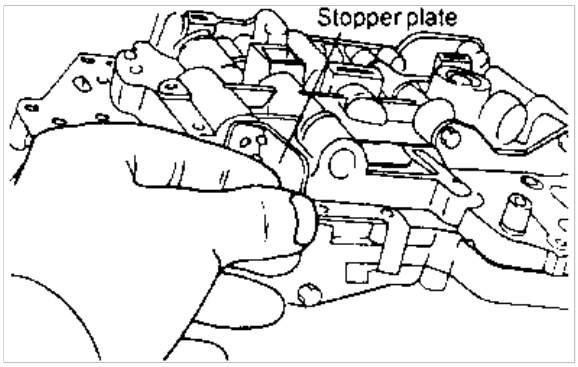
25. Install the separating plate.



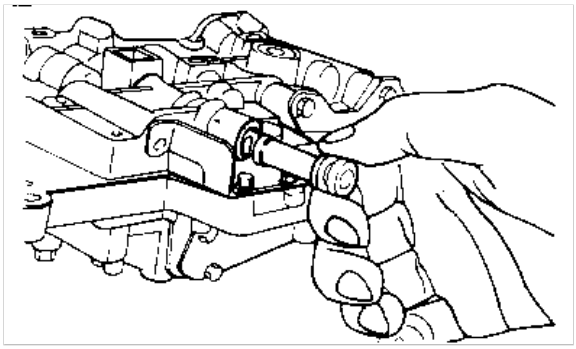
26. After securing the lower valve body using the 15 installation bolts, remove the special tool.



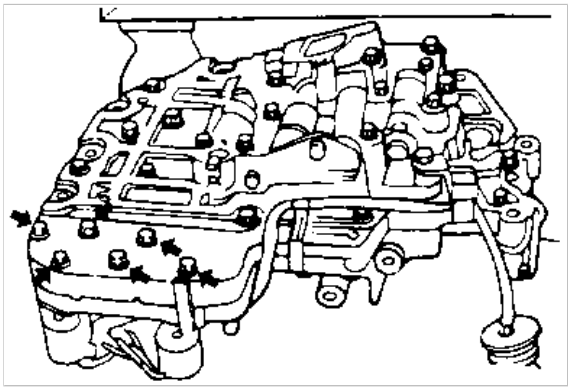
27. Install the valve stopper plate and clamp.



28. Install the manual valve.



29. Secure the six solenoid installation bolts.



Transaxle/Transmission > Manual Transaxle System > LUBRICANTS AND GREASE

LUBRICANTS AND GREASE

Item	Recommended lubricant	Quantity
Transaxle gear oil lit (U.S. Imp. qts)	Hypoid gear oil, SAE 75W/85W, API-GL4	2.15 (2.27, 1.89)
Transaxle input shaft spline	MOLYWHITE TA No. 2	As required
Transaxle oil seal lip	RETINAX AM, MOLYTEX GREASE EP2	As required

Transaxle/Transmission > Manual Transaxle System > SEALANTS AND ADHESIVES

SEALANTS AND ADHESIVES

	Recommended sealants and adhesives	Quantity
Transaxle case and clutch housing alignment surface	THREE BOND 1216	As required
Transaxle case and rear cover alignment surface	THREE BOND 1216	As required
Bearing retain bolt (flush bolt only)	THREE BOND 1303	As required

Transaxle/Transmission > Manual Transaxle System > SERVICE ADJUSTMENT PROCEDURES

SERVICE ADJUSTMENT PROCEDURES

TRANSAXLE GEAR OIL LEVEL INSPECTION

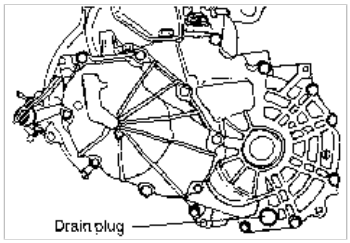
Inspect component for evidence of leakage. Check the gear oil level by removing the filler plug. If the oil is contaminated, it is necessary to replace it with new oil.

1. Remove oil filter plug and check level with finger.
2. Oil level must be up to fill hole. If it is below hole, add oil until it runs out, then reinstall plug.
3. Replace transaxle gear oil if it is noticeably dirty and not of a suitable viscosity.

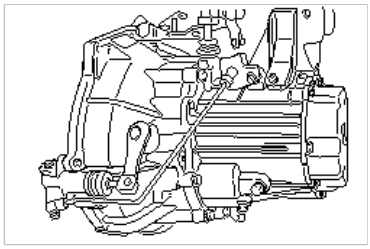
REPLACEMENT OF TRANSAXLE GEAR OIL

Use HP Gear Oil SAE 75W/85W (API-GL-4)

1. With the vehicle parked on a level surface, remove the drain plug and drain the transaxle oil.
2. Replace the gasket with a new one and install the drain plug.

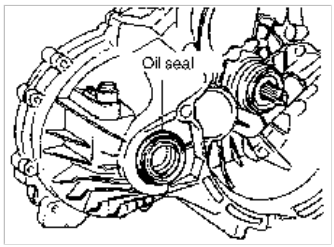


3. Add new oil the through the filler plug, filling to a level 5-9 mm (0.2-0.4 in.) below the plug opening.

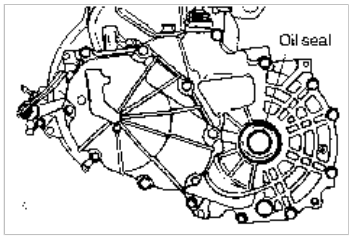


DRIVE SHAFT OIL SEAL REPLACEMENT

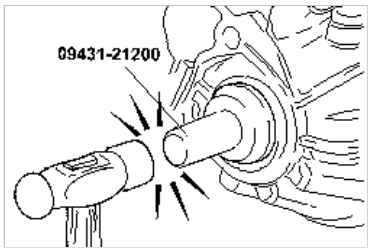
1. Disconnect the drive shaft from the transaxle.



2. Using a flat-tip screwdriver, remove the oil seal.

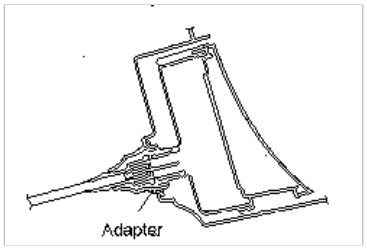


3. Using the special tool (09431-21200), tap the drive shaft oil seal into the transaxle.
4. Apply a coating of gear oil to the lip of the oil seal.

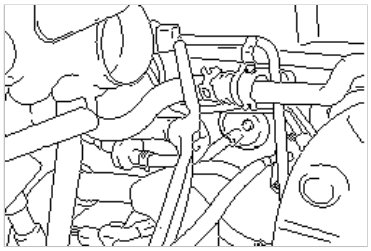


SPEEDOMETER CABLE REPLACEMENT

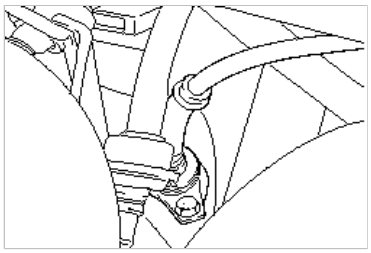
1. Correctly insert the adapter into the instrument panel, and fasten the new speedometer cable.



2. Install the grommet so the cable attachment part and the projecting part are horizontal, as shown in the illustration.
   The cable should be installed so that the radius of the cable bend is 150 mm (5.9 in.) or more.



3. At the transaxle, the cable should be inserted into the transaxle, and the nut should be securely tightened.
   If the cable is not correctly and securely connected, it may cause the speedometer to read incorrectly or it may produce abnormal noise.



Transaxle/Transmission > Manual Transaxle System > SERVICE STANDARD

SERVICE STANDARD

Standard value	mm (in.)
Input shaft front bearing end play	0.01T-0.12L (0.0004T-0.0047L)
Input shaft rear bearing end play	0.01T-0.09L (0.0004T-0.0035L)
Output shaft rear bearing end play	0.05T-0.10T (0.0002T-0.004T)
Differential rear bearing end play	0.05L-0.17L (0.002L-0.0067L)
Gear backlash in differential	0.025L-0.15L (0.0009L-0.0059L)

T: Indicates - (minus) direction of endplay (Preload)

L: Indicates + (plus) direction of endplay (Normal endplay)

Transaxle/Transmission > Manual Transaxle System > SNAP RING FOR ADJUSTMENT AND SPACER

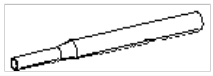
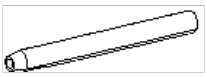
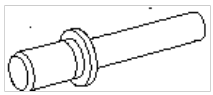
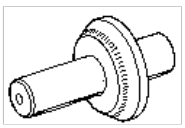
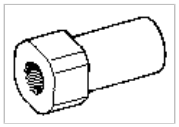
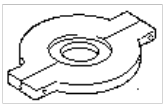
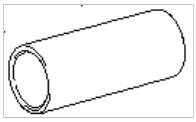
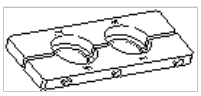
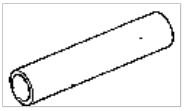
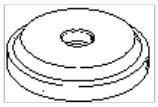
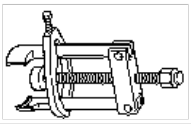
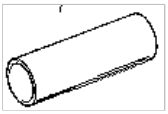
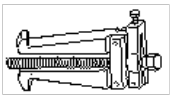
SNAP RING FOR ADJUSTMENT AND SPACER

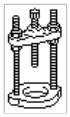
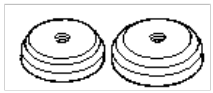
Part name	Thickness mm (in.)	Identification symbol

Snap ring (For adjustment of input shaft front bearing end play)	2.24 (0.0882)	24
	2.31 (0.0909)	31
	2.38 (0.0937)	38
Snap ring (For adjustment of input shaft rear bearing end play)	1.80 (0.0709)	80
	1.87 (0.0736)	87
	1.94 (0.0764)	94
	2.01 (0.0791)	01
	2.08 (0.0819)	08
	2.15 (0.0846)	25
Spacer (For adjustment of output shaft bearing end play)	1.43 (0.0563)	43
	1.46 (0.0575)	46
	1.49 (0.0587)	49
	1.52 (0.0598)	52
	1.55 (0.0610)	55
	1.58 (0.0622)	58
	1.61 (0.0634)	61
	1.64 (0.0646)	64
	1.67 (0.0657)	67
	1.70 (0.0669)	70
	1.73 (0.0681)	73
	1.76 (0.0693)	76
	1.79 (0.0705)	79
	1.82 (0.0717)	82
	1.85 (0.0728)	85
	1.88 (0.0740)	88
	1.91 (0.0752)	91
	1.94 (0.0764)	94
	1.97 (0.0776)	97
	2.00 (0.0787)	00
	2.03 (0.0799)	03
	2.06 (0.0811)	06
	2.09 (0.0823)	09
	2.12 (0.0835)	12
Spacer (For adjustment of differential case end play)	0.56 (0.0220)	56
	0.65 (0.0256)	65
	0.74 (0.0291)	74
	0.83 (0.0327)	82
	0.92 (0.0362)	92
	1.01 (0.0398)	01
	1.10 (0.0433)	10
	1.19 (0.0469)	19
	1.28 (0.0504)	28
	1.37 (0.0539)	37
Spacer (For adjustment of differential pinion backlash)	0.75-0.82 (0.0295-0.0323)	-
	0.83-0.92 (0.0327-0.0362)	-
	0.92-1.00 (0.0366-0.0394)	-
	1.01-1.08 (0.398-0.0425)	-
	1.09-1.16 (0.429-0.457)	-

Transaxle/Transmission > Manual Transaxle System > SPECIAL TOOLS

SPECIAL TOOLS

Tool (Number and Name)	Illustration	Use
09414-11000 Lock pin extractor		Drive out the spring pin of the shift fork
09414-11100 Lock pin installer		Driving in the spring pin on the shift fork
09431-21000 Front oil seal installer		Installation of the input shaft front oil seal
09431-21200 Oil seal installer		Installation of differential oil seal
09432-21101 Input shaft holder		Holding the input shaft when loosening input shaft nut
09432-21400 Taper bearing puller		Removal of input shaft front bearing
09432-22000 Bearing installer		Installation of output shaft's gear and sleeve
09432-22100 Bearing outer race installer		Installation of input and output shaft bearing outer race (Use with 09500-11000)
09432-33200 Bearing removing plate		Removal of input shaft's gear and bearing sleeve
09432-33300 Bearing installer		Installation of input shaft bearing
09432-33400 Bearing race installer		Installation of input shaft bearing outer race (Use with 09500-21000)
09495-33000 Bearing and gear puller		Removal of ball bearing and gear
09455-21100 Bearing installer		a. Installation of gear sleeve and bearing b. Installation of differential bearing
09455-32200 Oil seal puller		Removal of output shaft bearing outer race
09532-11000 Differential bearing installer		Removal of differential bearing (Use with 09532-11100, 09532-11301)

		
09532-11500 Pinion bearing outer race installer		Installation of output shaft and differential shaft bearing outer race (Use with 09500-11000)

Transaxle/Transmission > Manual Transaxle System > SPECIFICATIONS

SPECIFICATIONS

MODEL: M5AF3

TYPE: Hydraulic Type

Gear Ratio

First	3.462
Second	2.053
Third	1.370
Fourth	1.031
Fifth	0.838
Reverse	3.250
Final	3.842
Speedometer gear ratio (driven/drive)	32/36

Transaxle/Transmission > Manual Transaxle System > TIGHTENING TORQUE

TIGHTENING TORQUE

Item	Nm	kg.cm	lb.ft
Shift cable and select cable to body	12-15	120-150	9-11
Shift lever assembly to body	12-15	120-150	9-11
Shift lever to lever (A)	19-28	190-280	13-20
Lever (A) to bracket assembly	19-28	190-280	13-20
Clutch release cylinder mounting bolts	15-22	150-220	11-16
Clutch line to transaxle assembly	13-17	130-170	9-12
Shift cable and select cable to transaxle	15-22	150-220	11-16
Start motor mounting bolts	27-34	270-340	20-25
Transaxle mount bracket to transaxle	60-80	600-800	43-58
Transaxle mount bracket to body	90-110	900-1100	65-80
Bell housing cover mounting bolts	8-10	80-100	6-7
Transaxle mounting bolts	43-55	430-550	32-39
Rear cover bolt	15-22	150-220	11-15
Backup light switch	30-35	300-350	22-25
Poppet spring plug	30-42	300-420	22-30
Speedometer sleeve bolt	3-5	30-50	2-4
Input shaft lock nut	140-160	1400-1600	102-115
Intermediate gear shaft bolt	140-160	1400-1600	102-115
Reverse idler gear shaft bolt	43-55	430-550	32-39
Transaxle case tightening bolt	35-42	350-420	26-30
Stopper bracket bolt	15-22	150-220	11-15
Restrict ball assembly	30-35	300-350	22-25
Reverse shift lever assembly attaching bolt	15-22	150-220	11-15
Bearing retainer bolt	15-22	150-220	11-15
Differential drive gear bolt	130-140	1300-1400	94-101

Interlock plate bolt	20-27	200-270	15-19

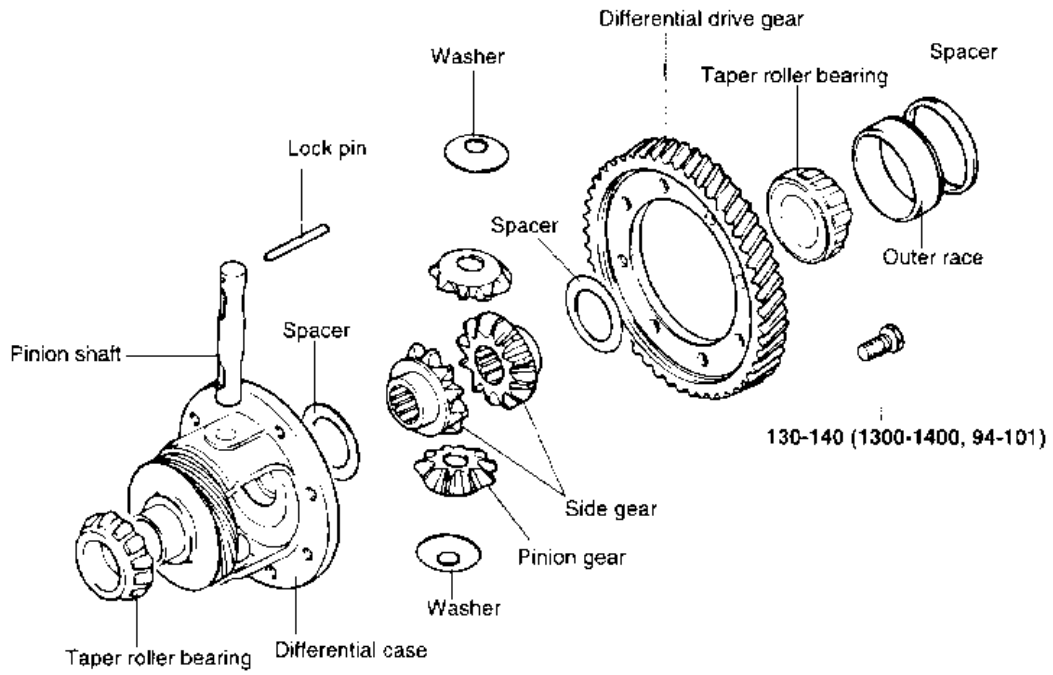
Transaxle/Transmission > Manual Transaxle System > TROUBLESHOOTING

TROUBLESHOOTING

Symptom	Probable cause	Remedy
Vibration, noise	Loose or damaged transaxle and engine mounts	Tighten or replace mounts
	Inadequate shaft end play	Correct end play
	Worn or damaged gears	Replace gears
	Worn or damaged bearings	Replace bearings
	Use of inferior grade of gear oil	Replace with specified gear oil
	Low oil level	Replenish
	Inadequate engine idle speed	Adjust idle speed
Oil leakage	Broken or damaged oil seal or O-ring	Replace oil seal or O-ring
Hard shift	Faulty control cable	Replace control cable
	Poor contact or wear of synchronizer ring and gear cone	Correct or replace
	Weakened synchronizer spring	Replace synchronizer ring
	Use of inferior grade of gear oil	Replace with specified gear oil
Jumps out of gear	Worn gear shift fork or broken poppet spring	Replace shift fork or poppet spring
	Excessive clearance of synchronizer hub to sleeve spline	Replace synchronizer hub and sleeve
	Worn or damaged gears and/or bearings	Replace gears and/or bearings

Transaxle/Transmission > Manual Transaxle System > Differential (M/T) > COMPONENTS

Components

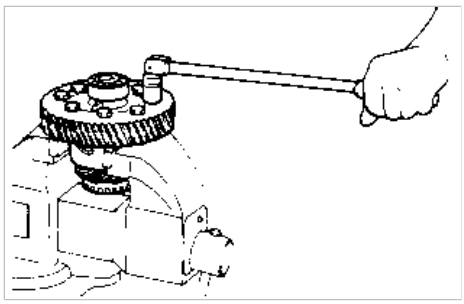


TORQUE: Nm (kg.cm, lb.ft)

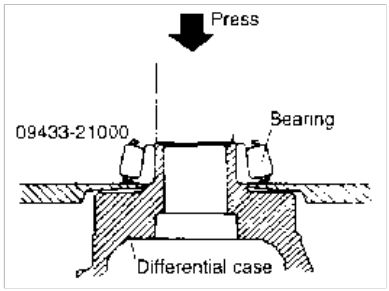
Transaxle/Transmission > Manual Transaxle System > Differential (M/T) > DISASSEMBLY

DISASSEMBLY

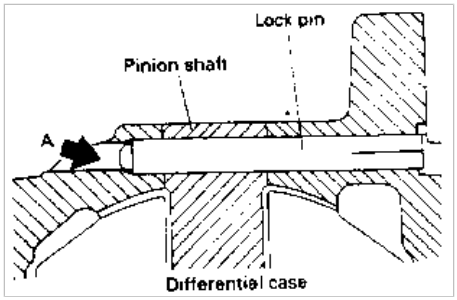
1. Clamp the differential case in a vise.
2. Remove the differential drive gear retaining bolts and remove the differential drive gear from the case.



3. Remove the taper roller bearing using the special tool (09433-21000).
   Do not reuse the bearing removed from the shaft.



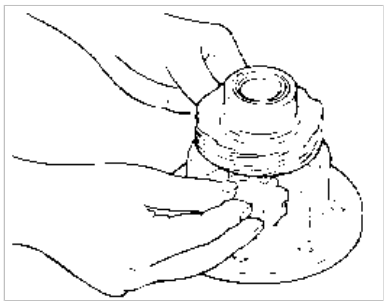
4. Drive out the lock pin from hole A using a punch.
5. Drive out the pinion shaft.
6. Remove the pinion gears, washers, side gear and spaces.



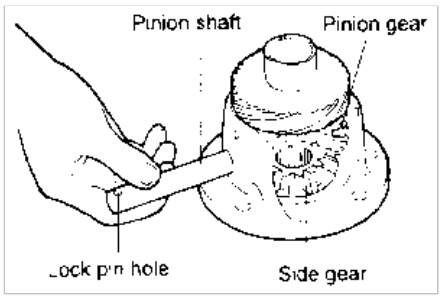
Transaxle/Transmission > Manual Transaxle System > Differential (M/T) > REASSEMBLY

REASSEMBLY

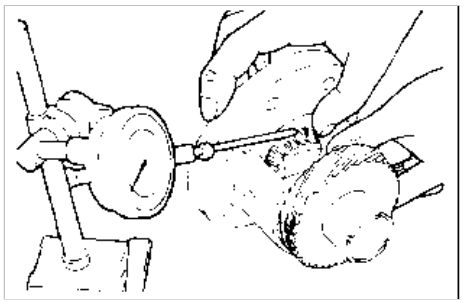
1. Install the spacer on the back of the side gear and then install the gear in the differential case.
   a. When installing a new side gear, use a spacer of medium thickness [0.83-0.92 mm (0.033-0.036 in.)]
   b. Do not reuse the lock pin.
   c. The lock pin head must be sunk below the flange surface of the differential case.



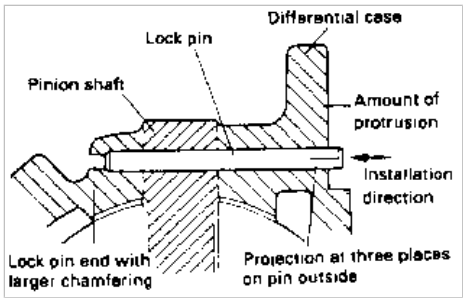
2. Set the washer on the back of each pinion and insert the two pinions to specified position while engaging them with the side gears by turning them.
3. Insert the pinion shaft.



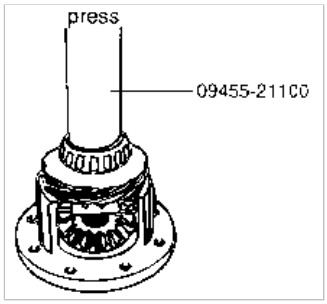
4. Measure the backlash between the side gears and pinions.



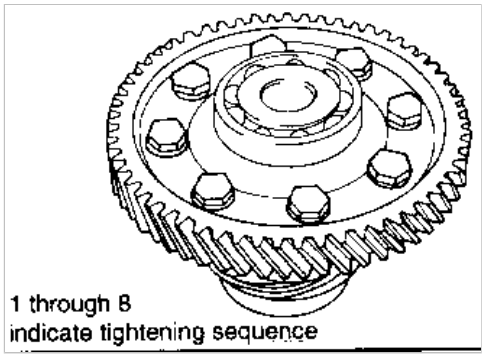
5. If the backlash is out of specification, disassemble and install the correct spacer, reassemble and remeasure.
   Adjust the backlash of both side gears to the same specification.
6. Align the pinion shaft lock pin hole with the case lock pin hole and insert the lock pin.
   a. Do not reuse the lock pin.
   b. The lock pin head must not protrude more than 3 mm (0.118 in.).



7. Install the tapered roller bearings on both sides of the differential case using the special tool (09455-21100).
   When press-fitting the bearing, press on the inner race only.

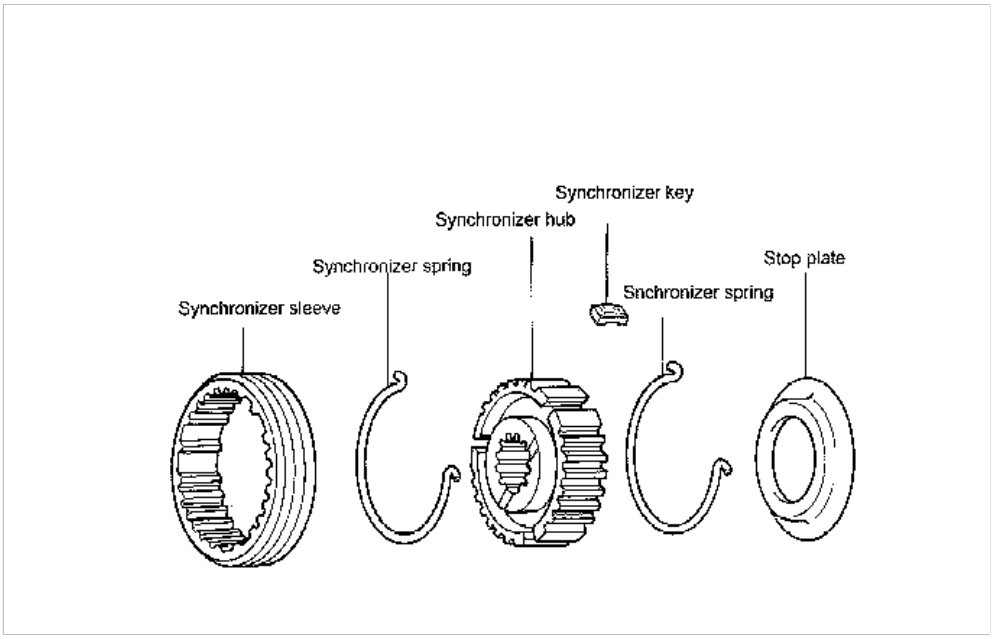


8. Apply specified sealant to the entire threads of the bolts. Tighten to specifications using the sequence shown in the illustration. Specified sealant: BM stud locking No. 2471.
   If a bolt is reused, remove the old sealant from the threads.



Transaxle/Transmission > Manual Transaxle System > Fifth Speed Synchronizer > COMPONENTS

Components

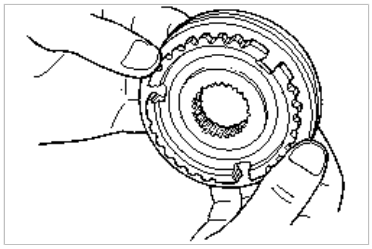


Transaxle/Transmission > Manual Transaxle System > Fifth Speed Synchronizer > INSPECTION

INSPECTION

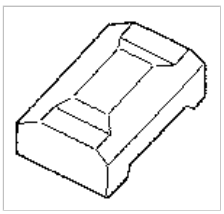
SYNCHRONIZER SLEEVE AND HUB

1. Install the synchronizer sleeve on the hub and check that they slide smoothly.
2. Check that the sleeve is free from damage.
3. Check for wear of the hub front end (surface in contact with the fifth speed gear).
   Replace the synchronizer hub and sleeve as a set.



SYNCHRONIZER KEY AND SPRING

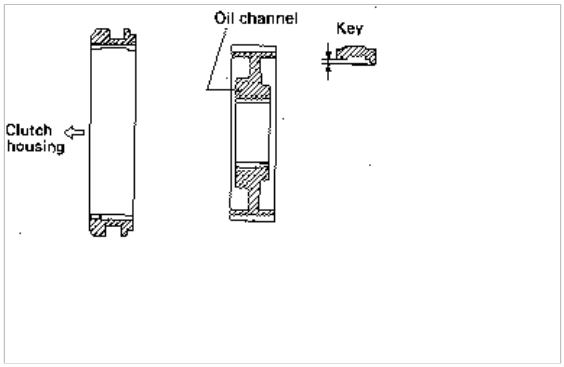
1. Check for wear of the synchronizer key center protrusion.
2. Check the spring for weakness, deformation and breakage.



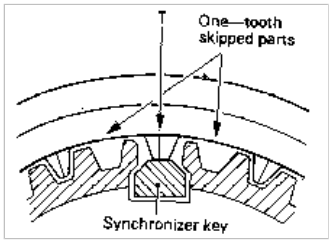
Transaxle/Transmission > Manual Transaxle System > Fifth Speed Synchronizer > REASSEMBLY

REASSEMBLY

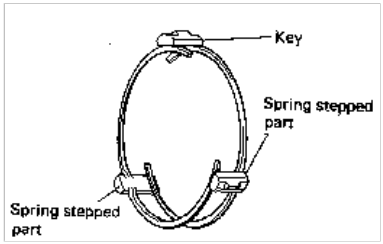
1. Assemble the synchronizer hub, sleeve and key, noting their direction.



2. The synchronizer sleeve has teeth at six portions. Assemble the hub to the sleeve so that the center tooth between the two missing teeth will touch the synchronizer key.

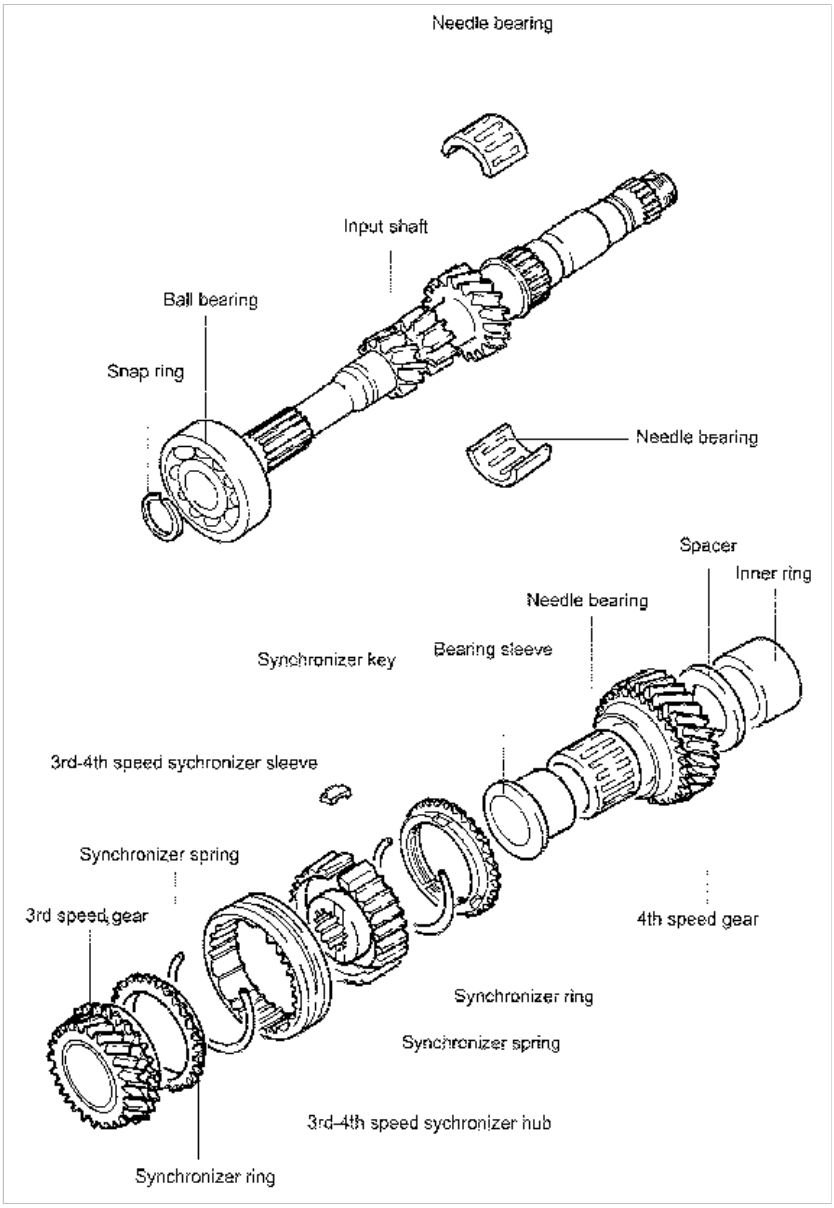


3. Install the synchronizer spring so that its protrusion may be engaged in the groove of the synchronizer key.
When installing the synchronizer springs, make sure that the front and rear ones are not faced in same direction.



Transaxle/Transmission > Manual Transaxle System > Input Shaft > COMPONENTS

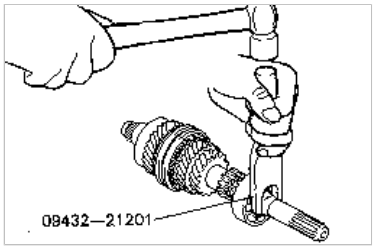
Components



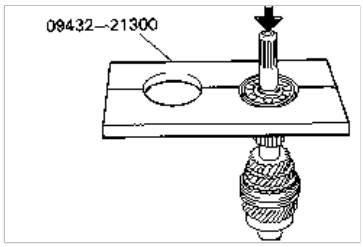
Transaxle/Transmission > Manual Transaxle System > Input Shaft > DISASSEMBLY

DISASSEMBLY

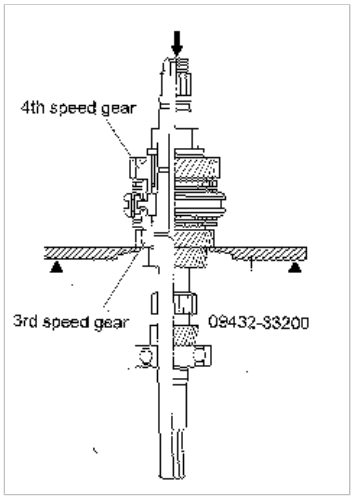
1. Remove the snap ring using the special tool (09432-21201).



2. Remove the front bearing using the special tool (09432-21300).



3. Remove the inner ring, spacer, 4th gear, needle bearing, bearing sleeve, synchronizer rings, 3rd and 4th gear synchronizer hub and sleeve and 3rd gear all together using the special tool (09432-33200).

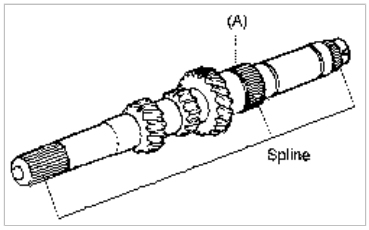


Transaxle/Transmission > Manual Transaxle System > Input Shaft > INSPECTION

INSPECTION

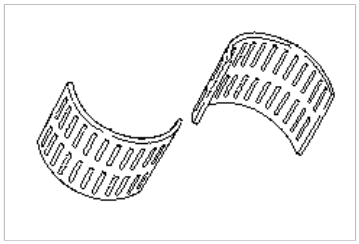
INPUT SHAFT

1. Check the outer surface of the input shaft where the needle bearing is mounted for damage or abnormal wear (portion [A]).
2. Check the splines for damage or wear.



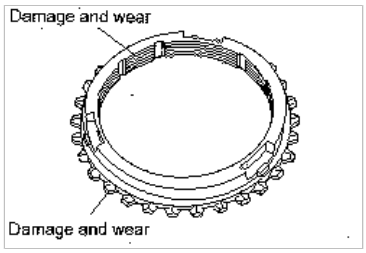
NEEDLE BEARING

1. Install the needle bearing on the shaft with the bearing sleeve and gear. Check that it rotates smoothly without abnormal noise or play.
2. Check the needle bearing cage for distortion.

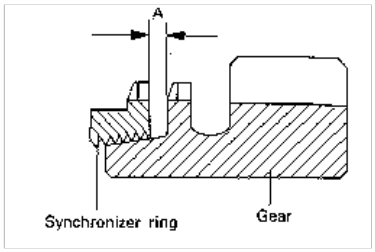


SYNCHRONIZER RING

1. Check the clutch gear teeth for damage.
2. Check the internal surface for damage, wear or broken grooves.

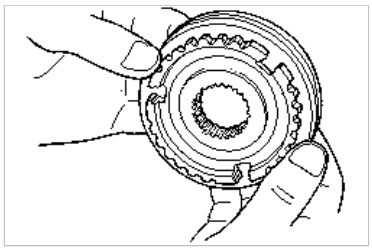


3. Push the synchronizer ring toward the clutch gear and check clearance "A." Replace if it is not within specifications.



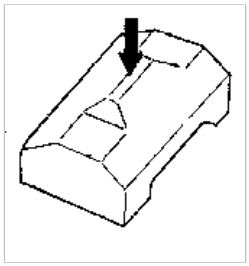
SYNCHRONIZER SLEEVE AND HUB

1. Install the synchronizer sleeve on the hub and check that it slides smoothly.
2. Check that the sleeve is free from damage.
3. Check for wear of the hub end surfaces (in contact with each gear).
   Replace the synchronizer hub and sleeve as a set.



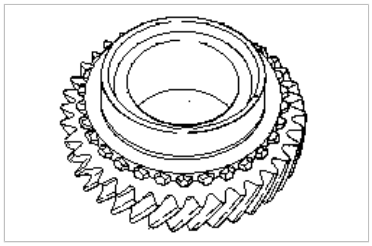
SYNCHRONIZER KEY AND SPRING

1. Check for wear of the synchronizer key center protrusion.
2. Check the spring for weakness, distortion or damage.



GEARS

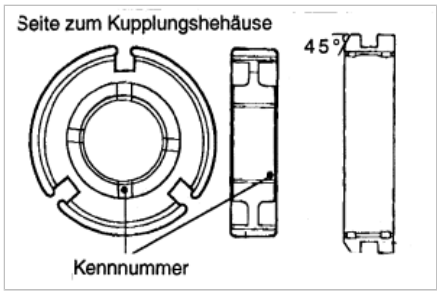
1. Check the bevel gear clutch gear teeth for damage or wear.
2. Check the gear cone for rough surfaces, damage or wear.
3. Check the gear bore for damage or wear.



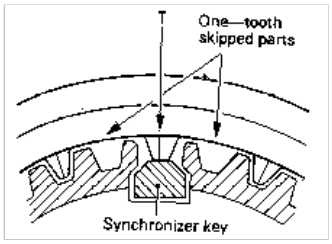
Transaxle/Transmission > Manual Transaxle System > Input Shaft > REASSEMBLY

Reassembly

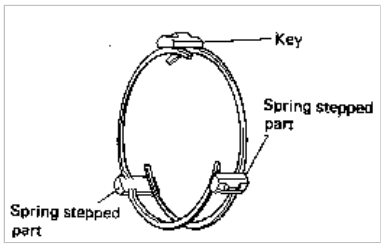
1. Install the synchronizer hub and sleeve so that they are positioned as shown in the figure.



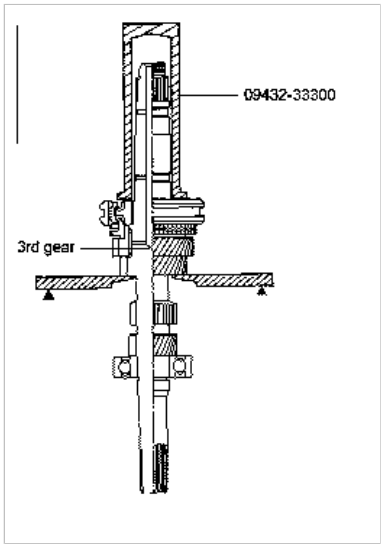
2. The synchronizer sleeve has teeth missing at six places. Assemble the hub to the sleeve so that the center tooth between the two missing teeth will touch synchronizer key.



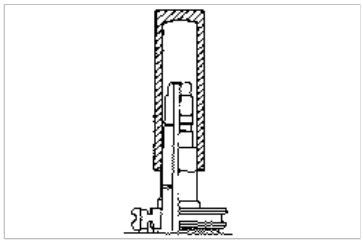
3. Install the synchronizer spring so that the stepped portions will rest on the synchronizer keys.
When installing the synchronizer springs, make sure they are not facing the same direction.



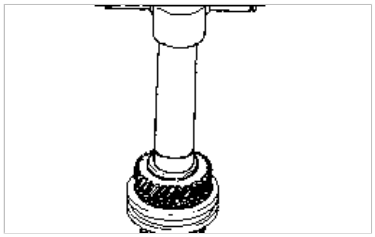
4. Install the 3rd-4th gear synchronizer assembly on the input shaft using the special tool (09432-33300).
   a. When installing the synchronizer assembly, make sure that the three synchronizer keys are seated correctly in their respective grooves of the synchronizer ring.
   b. After installing the synchronizer assembly, check that 3rd gear rotates smoothly.



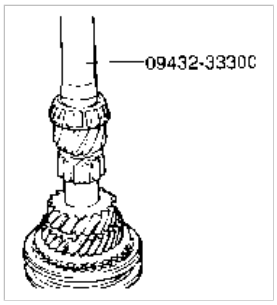
5. Install the bearing sleeve using the special tool (09432-33300).



6. Install the needle bearing and 4th gear on the input shaft.
7. Install the space and sleeve on the input shaft.

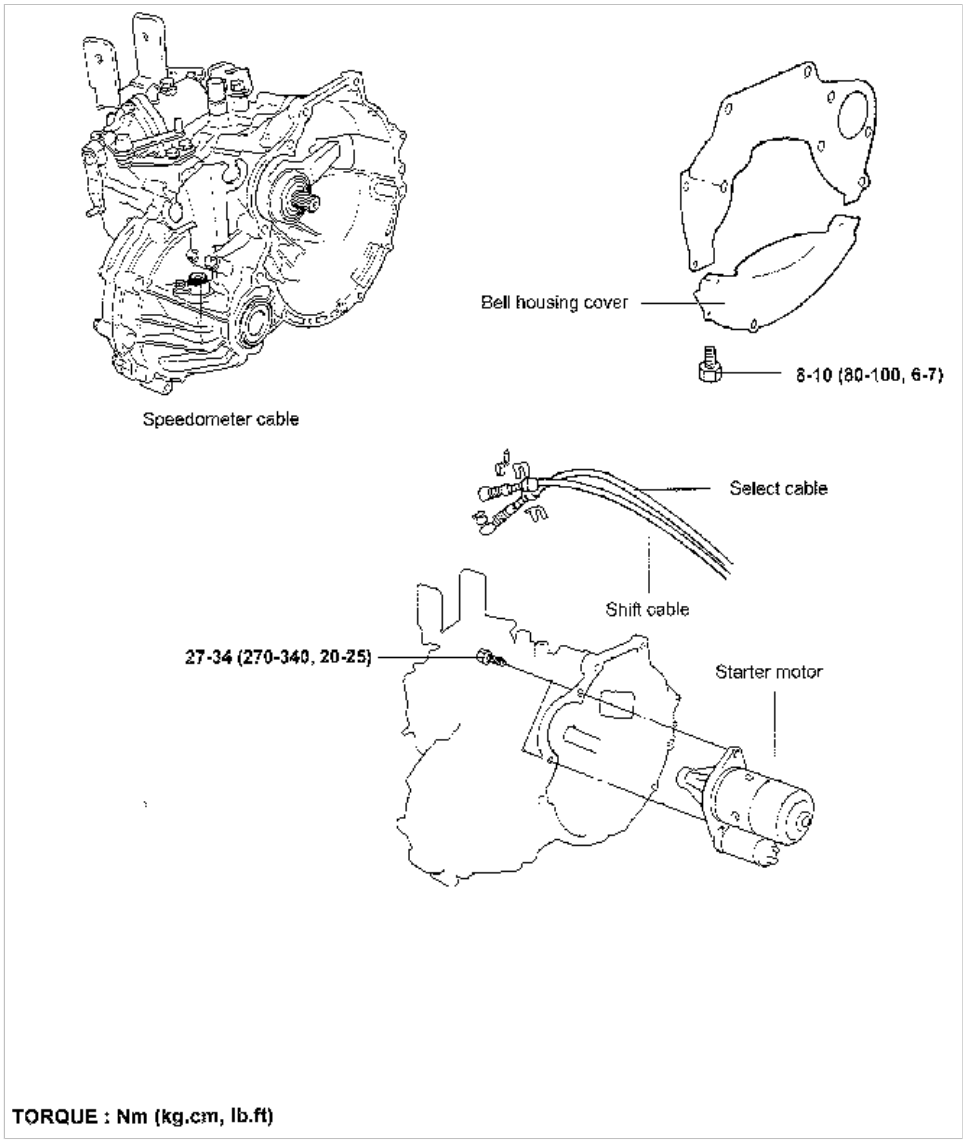


8. Install the ball bearing using the special tool (09432-33300).
   Install the snap ring.



Transaxle/Transmission > Manual Transaxle System > Manual Transaxle > COMPONENTS

Components



Transaxle/Transmission > Manual Transaxle System > Manual Transaxle > INSTALLATION

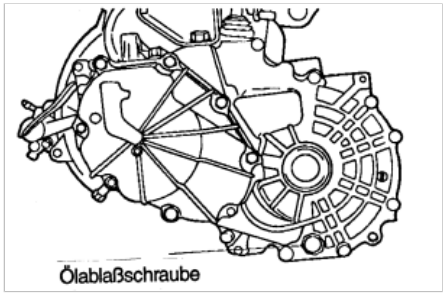
INSTALLATION

Installation is the reverse of removal.

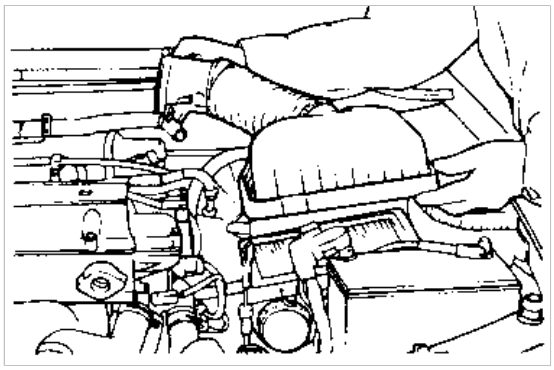
Transaxle/Transmission > Manual Transaxle System > Manual Transaxle > REMOVAL

REMOVAL

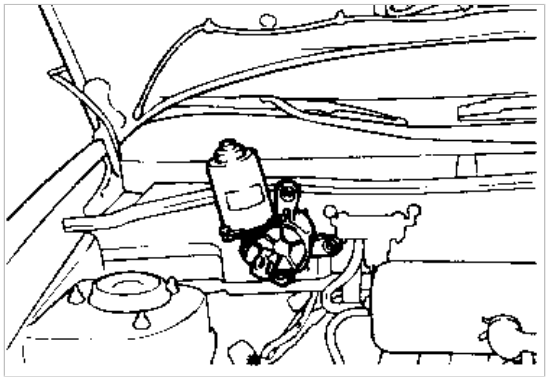
1. Remove the drain plug and drain the transaxle gear oil.
2. Remove the clutch release cylinder. (Refer to the CLUTCH SECTION.)



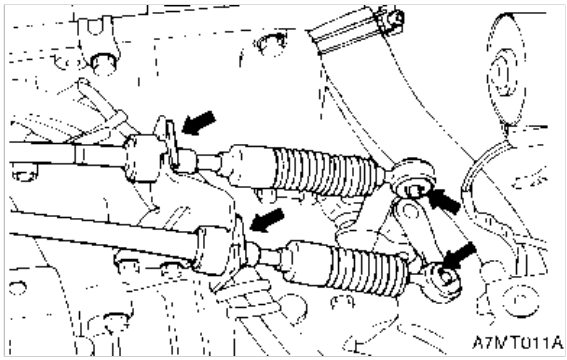
3. Remove the air cleaner assembly.



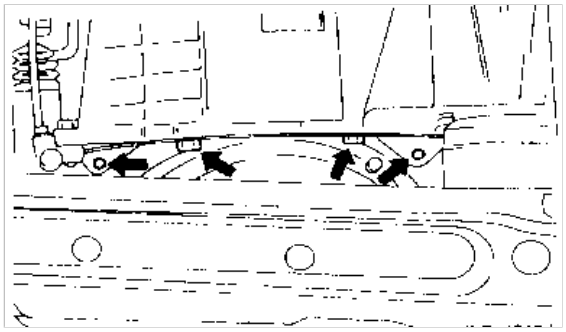
4. Remove the wiper motor mounting bolt (3EA).
   Do not remove the wiper motor, but push up the wiper motor to upper side of the vehicle.



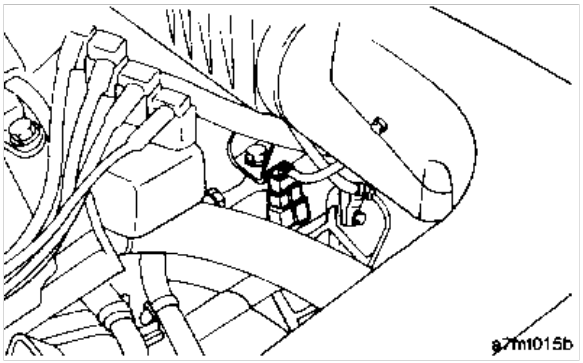
5. Remove the select cable and shift cable. (Refer to MANUAL TRANSAXLE CONTROL SECTION.)
6. Remove the splash shield.
7. Disconnect the tie rod end, the lower arm ball joint and drive shaft. (Refer to DRIVE SHAFT AND FRONT AXLE SECTION.)



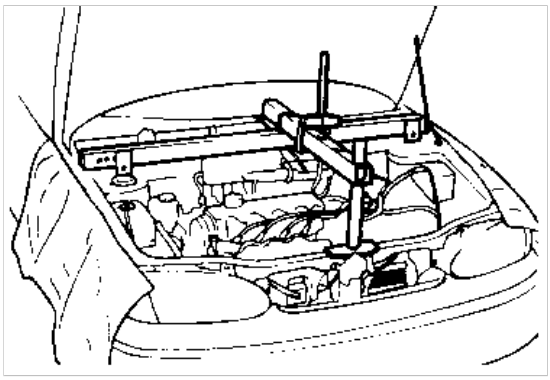
8. Remove the bell housing cover.



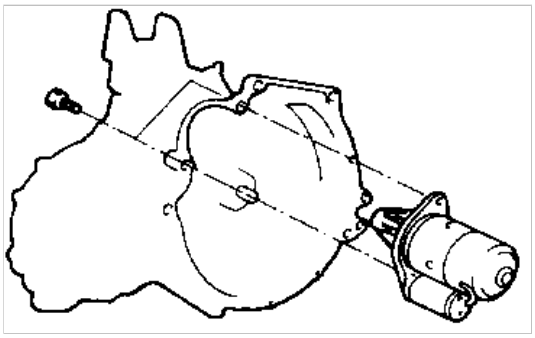
9. Disconnect the backup light switch connector.
10. Remove the speedometer cable.
11. Disconnect the clutch cable or clutch tube.



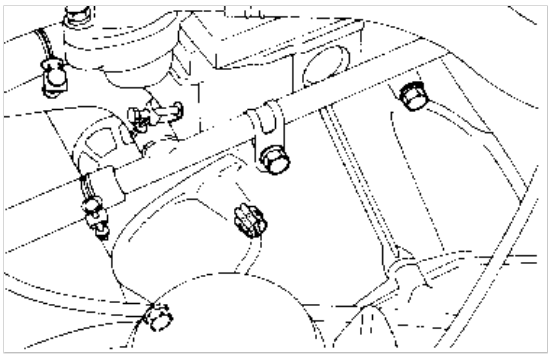
12. Attach an engine support fixture (09400-29000) to the engine hooks, and keep just enough so that there is no pressure on the insulators.



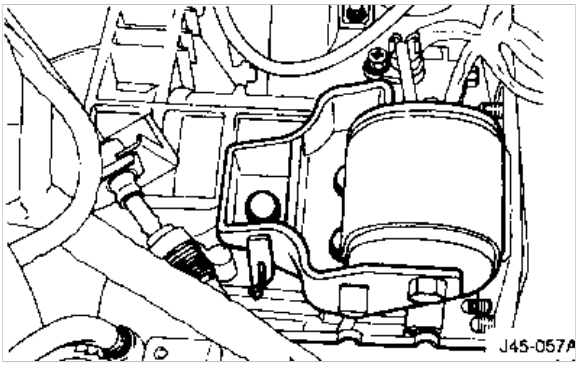
13. Remove the starter motor mounting bolts (2EA).



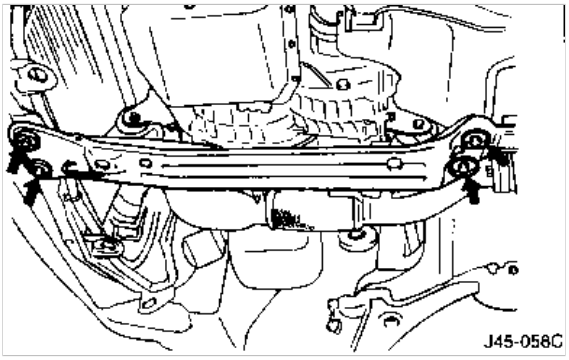
14. Remove the transaxle-to-engine bolts from the upper portion of the transaxle.



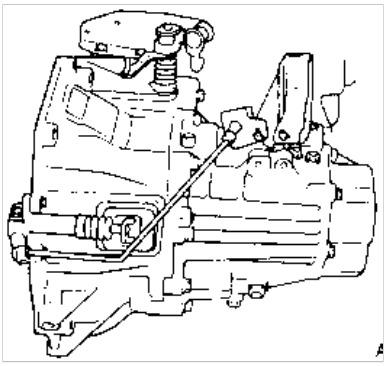
15. Remove the transaxle mounting bracket.



16. Remove the transaxle assembly lower mounting bolts with the transaxle assembly support with a jack.
17. Remove center member and roll stopper mounting bolts.

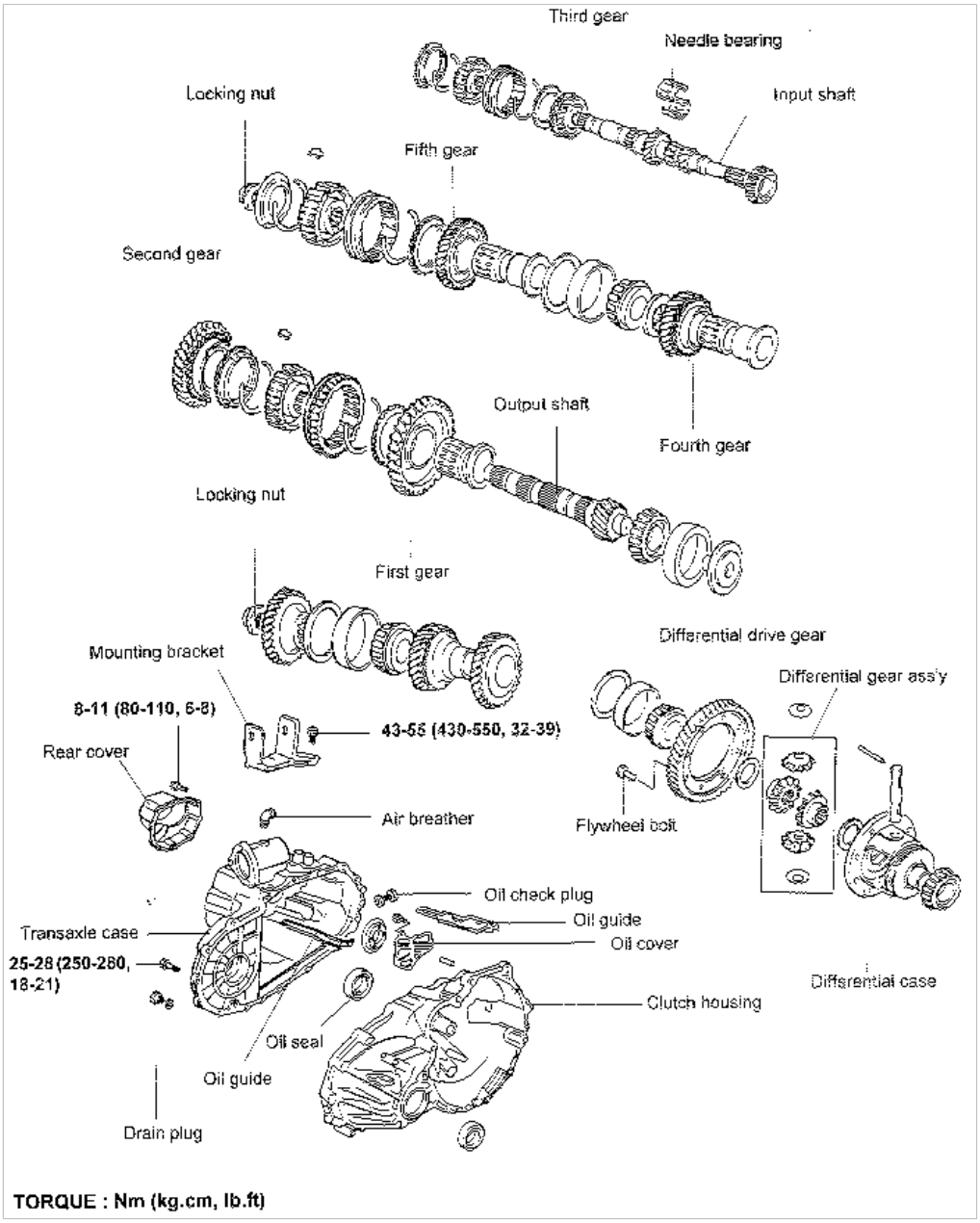


18. Remove the transaxle assembly.
    When supporting the transaxle assembly, make sure that the lifting force is applied to a wide area, not to a small localized area.



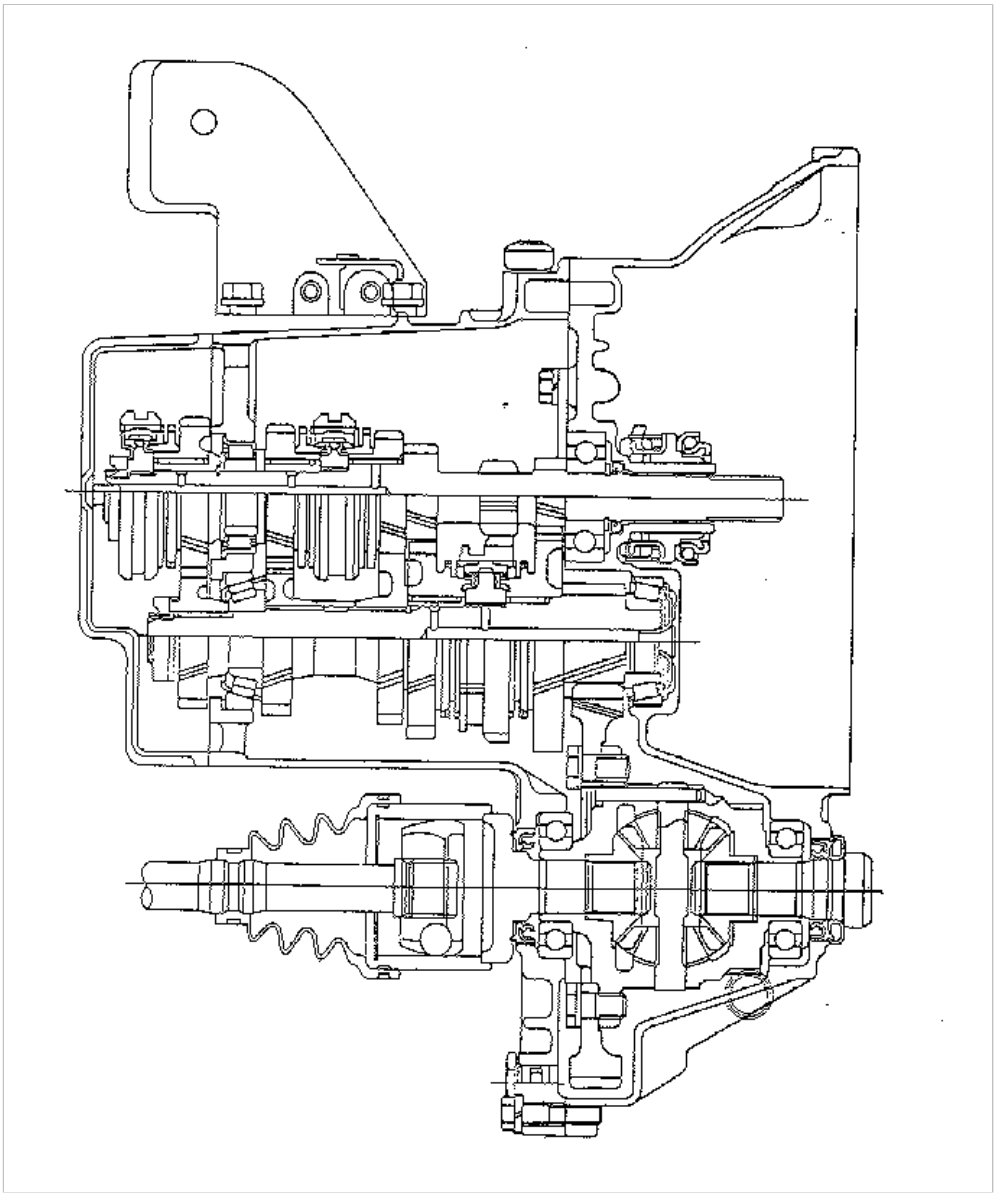
Transaxle/Transmission > Manual Transaxle System > Manual Transaxle Assembly > COMPONENTS

Components



Transaxle/Transmission > Manual Transaxle System > Manual Transaxle Assembly > DIAGRAM

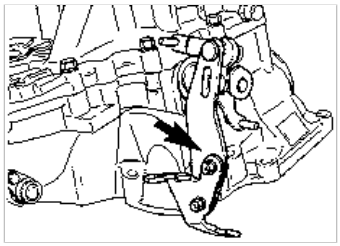
DIAGRAM



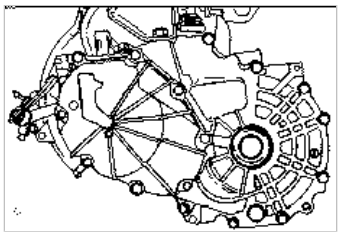
Transaxle/Transmission > Manual Transaxle System > Manual Transaxle Assembly > DISASSEMBLY

DISASSEMBLY

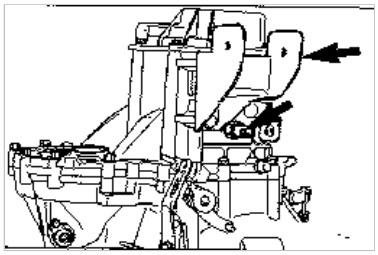
1. Remove the shift and control cable bracket.



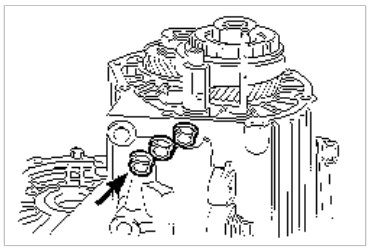
2. Remove the rear cover bolt and rear cover.



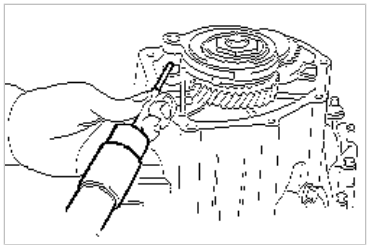
3. Remove the back up light switch, gasket and mounting bracket.



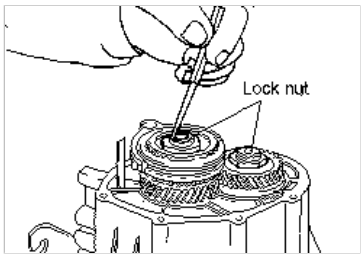
4. Remove the seal bolts, poppet spring and mounting bracket.
   Be careful not to lose the springs or balls.



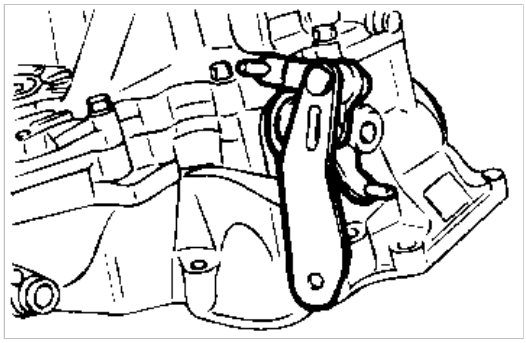
5. Remove the spring pin using the special tool (09414-11000).



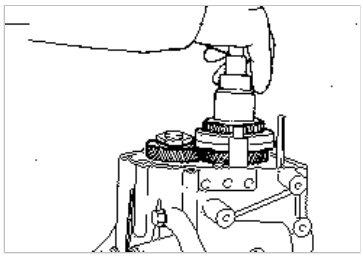
6. Remove the lock nuts of input shaft and output shaft.



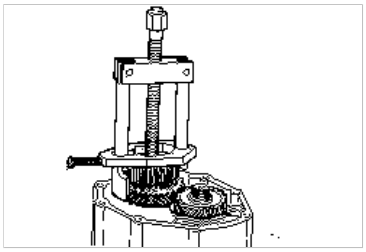
7. Shift the transaxle into first speed using the control lever and select lever.



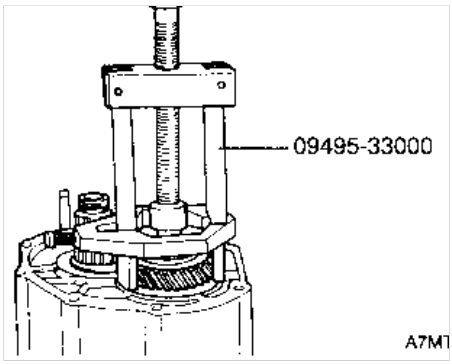
8. Shift the fifth speed synchronizer to fifth speed gear, then loosen and remove the lock nuts.



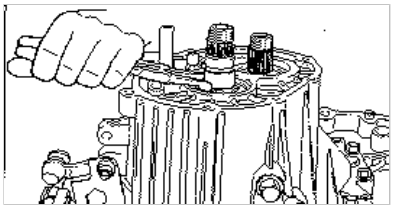
9. Remove the fifth speed synchronizer sleeve and shift fork.
10. Remove the fifth synchronizer hub and ring with fifth speed gear and needle bearing using the special tool (09455-21000).



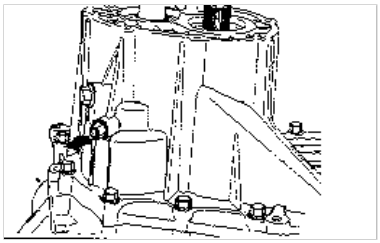
11. Remove the fifth speed gear on the output shaft using the special tool (09495-33000).



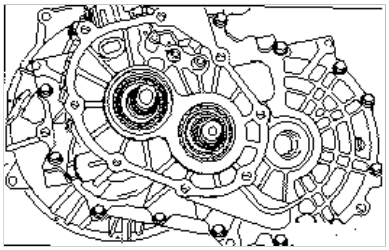
12. Remove the fifth gear sleeve and then remove the snap ring.



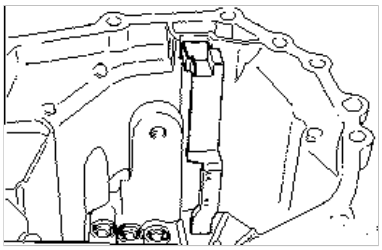
13. Remove the reverse gear shaft bolt.



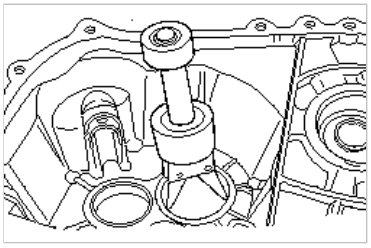
14. Remove the transaxle case fixing bolts in the clutch housing and then remove the transaxle case.



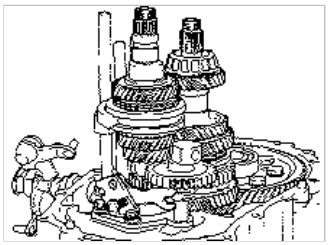
15. Remove the oil guides.



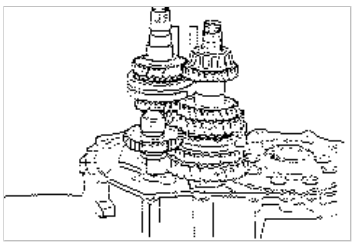
16. Remove the output shaft bearing outer race and spacer using special tool (09455-23000).



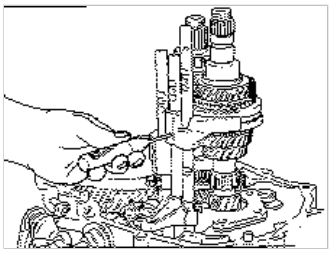
17. Remove the reverse shift lever.



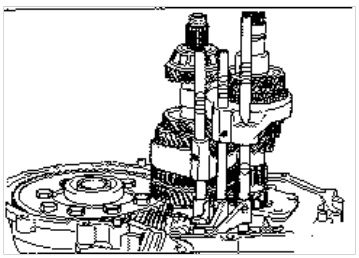
18. Remove the reverse gear shift and the reverse gear.



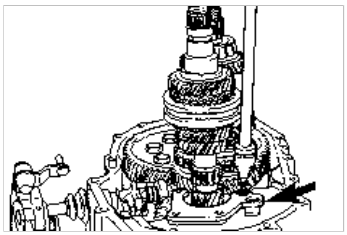
19. Remove the spring pins using the special tool (09414-11000).



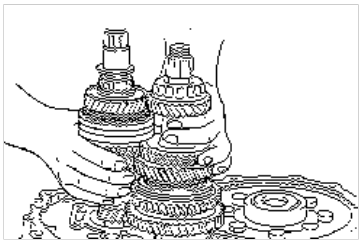
20. Detach the shift rail and fork assembly.



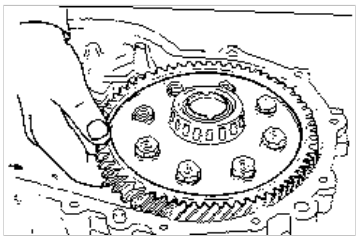
21. Remove the bearing retainer.



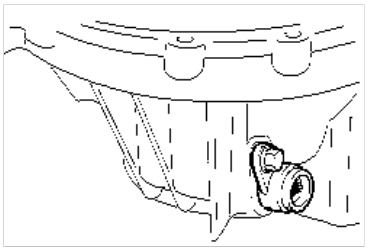
22. Remove the input shaft assembly and output shaft assembly at the same time.



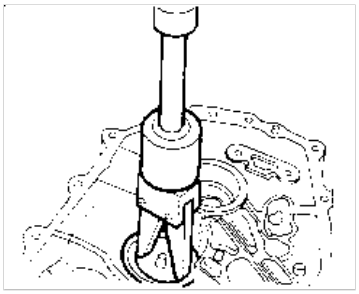
23. Remove the differential gear assembly.



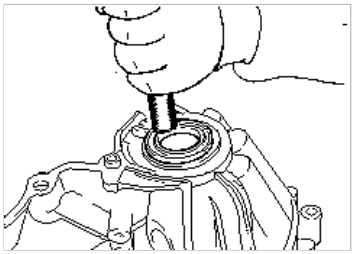
24. Remove the speedometer driven gear assembly.



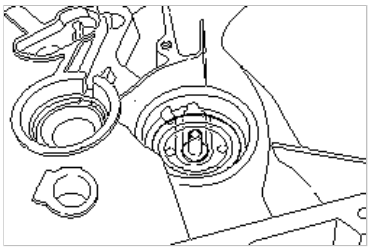
25. Remove the output shaft bearing outer race using the special tool (09455-32200).



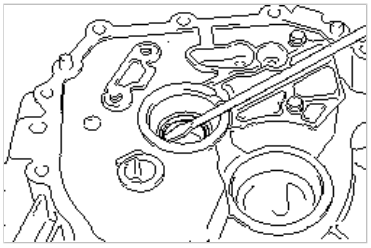
26. Remove the drive shaft oil seal using the special tool.



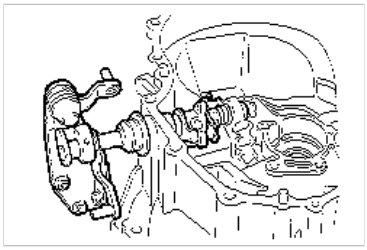
27. Remove the output shaft oil guide.



28. Remove the input shaft oil seal.



29. Remove the control shaft assembly.

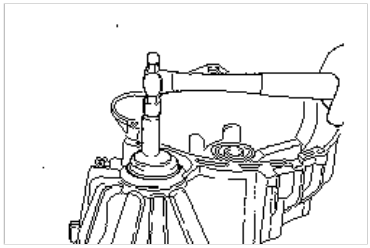


Transaxle/Transmission > Manual Transaxle System > Manual Transaxle Assembly > REASSEMBLY

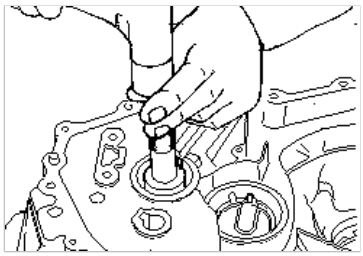
REASSEMBLY

Assembly procedure is the reverse of removal procedure.

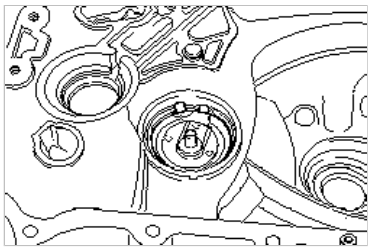
1. Install the drive shaft oil using special tool (09431-21000).
   Insert the oil seal straightly.



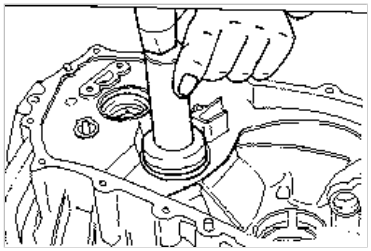
2. Install the input shaft front oil seal using the special tool (09431-21000).
   Do not reuse the oil seal.



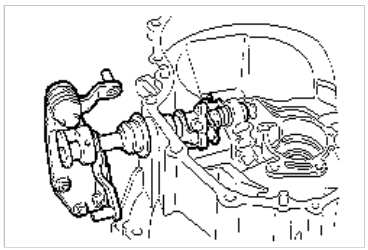
3. Install the output shaft oil guide in the direction illustrated.



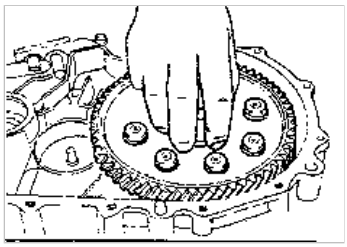
4. Install the output shaft bearing outer race using the special tool (09532-11500).



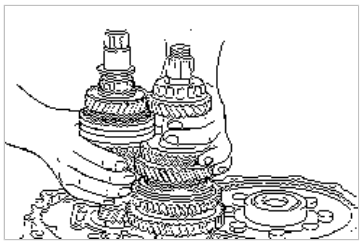
5. Install the control shaft assembly.



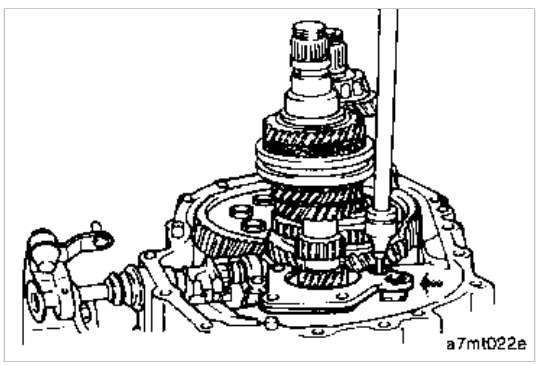
6. Install the differential gear assembly.



7. Install the input shaft assembly and output shaft assembly at the same time.



8. Remove the bearing retainer.
   Apply a THREEBOND 1303 on the hex-bolts.

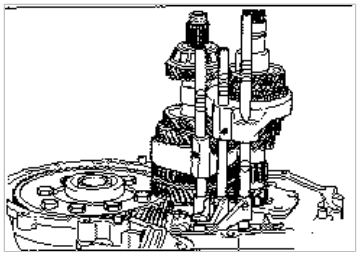


9. Reassembly of the shift rail assemblies.

(1) Place the first and second speed synchronizer sleeve to neutral position.

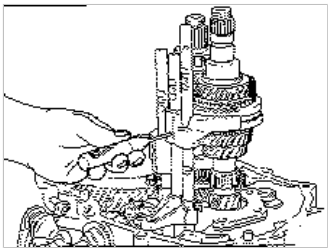
(2) Place the third and fourth speed synchronizer sleeve to neutral position.

(3) Install the shift rail and fork assemblies.

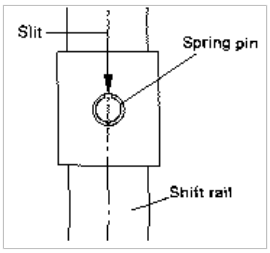


10. Reassembly of spring pin.

(1) Install the spring pins using the special tool (09414-11100) or pin punch.

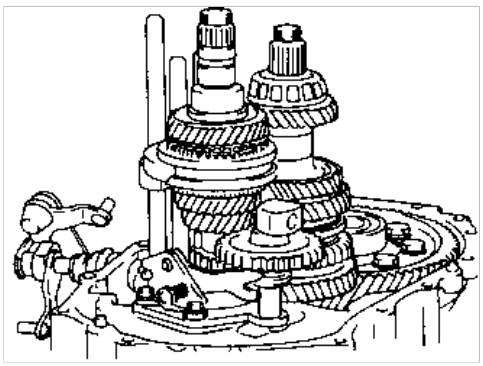


(2) When installing, make sure that the slit of the spring pin is aligned with center line of the shift rail. Do not reuse the spring pin.

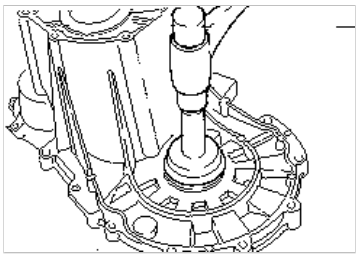


11. Install the reverse gear in the direction illustrated.

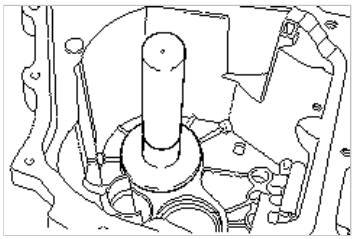
12. Install the reverse shift lever.



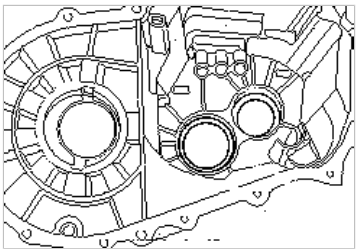
13. Install the drive shaft oil seal in the transaxle case using the special tool (09431-21200). Do not reuse the oil seal.



14. Install the output shaft bearing outer race and spacer using the special tools (09500-11000, 09432-22100).



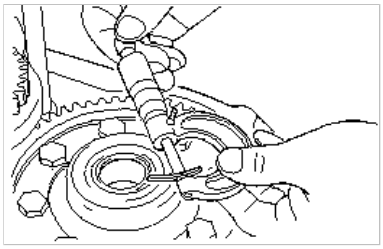
15. Installation of spacer.
    (1) Place two pieces of rosin-core solder with 3 mm in diameter on the bearing outer race as illustrated.



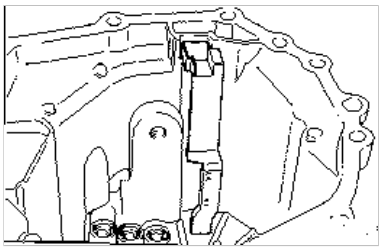
    (2) Install the transaxle case temporarily and tighten the bolts to the specified torque, then remove the transaxle case.
    (3) Detach the crushed solders.
    (4) Measure the thickness of the crushed solder.
    Select and install the proper spacers which complete following specification.
    Standard value (End play)

Item	Measurement - mm (in.)
Input shaft front bearing	0.01T-0.12L (0.0004T-0.0047L)
Input shaft rear bearing	0.01T-0.09L (0.0004T-0.0035L)
Output shaft rear bearing	0.01T-0.15T (0.0004T-0.0059T)
Differential rear bearing	0.05T-0.17T (0.0019T-0.0067T)
Gear backlash in differential	0.025-0.15 (0.0009-0.0059)

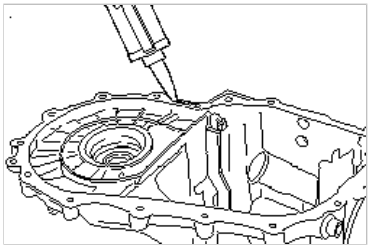
    T: indicates tightening of - (minus) direction of endplay (Preload)
    L: indicates loosening of + (plus) direction of endplay (Normal endplay)
    For proper spacer, refer to relevant parts catalog.



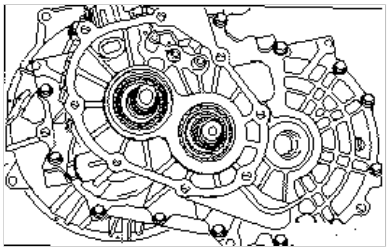
16. Install the oil guide in the transaxle case.



17. Apply the specified sealant to the clutch housing side of the transaxle case.



18. Install the transaxle case onto the clutch housing assembly and tighten the bolts.

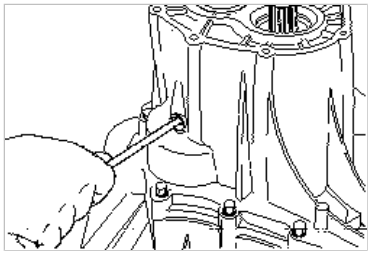


19. Center the shaft with screw driver.

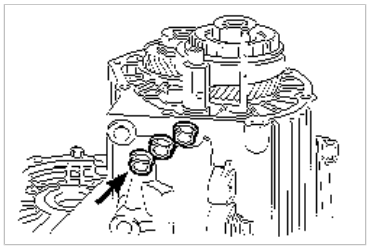
Transaxle/Transmission > Manual Transaxle System > Manual Transaxle Assembly > REASSEMBLY (CONTINUED)

REASSEMBLY (continued)

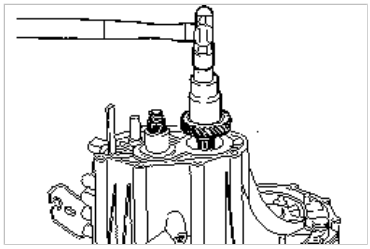
1. Tighten the reverse gear shaft bolt to the specified torque.



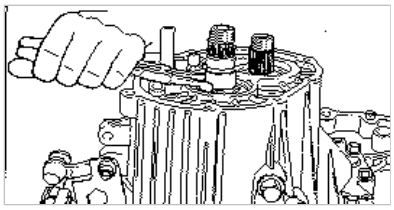
2. Install poppet balls, poppet springs, and seal bolts.



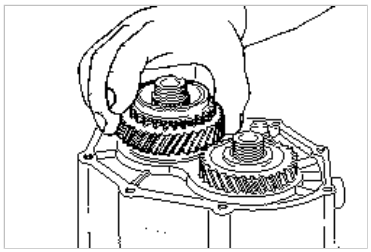
3. Install the output shaft gear using the special tool (09432-33300).



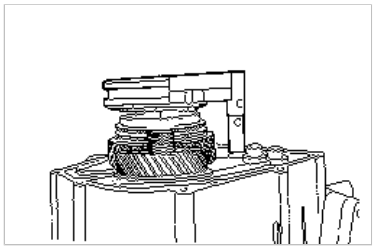
4. Install the rear bearing and spacer onto the input shaft and then insert the snap ring. Install the 5th speed gear sleeve.



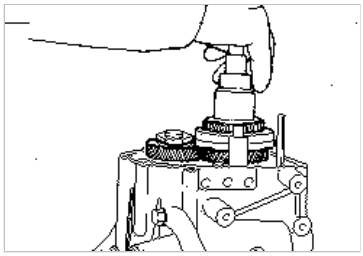
5. Install the 5th speed gear, needle roller bearing, synchronizer ring and synchronizer hub.



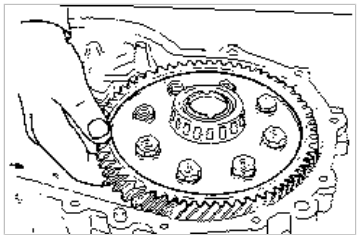
6. Install the fifth speed gear shift fork and the synchronizer sleeve at the same time.



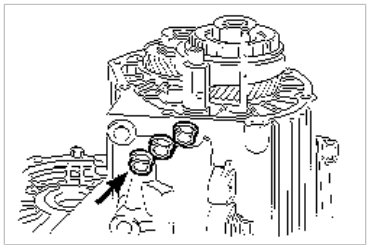
7. Installation of locking nut.
   (1) Shift transaxle into first speed with the control lever and select lever.
   (2) Engage the fifth speed sleeve to the fifth speed gear.
   (3) Tighten the lock nut to the specified torque.
   Do not reuse the lock nut.



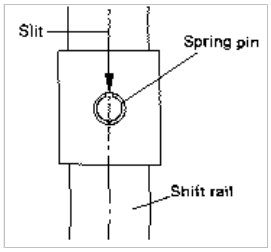
   (4) Stake the locking nut.



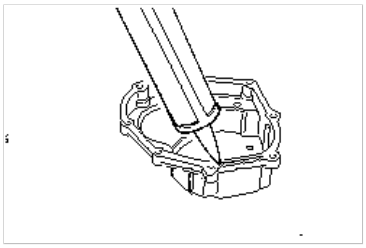
8. Install the spring pin using the specified tool (09414-11100) or pin punch.
   Do not reuse the spring pin.



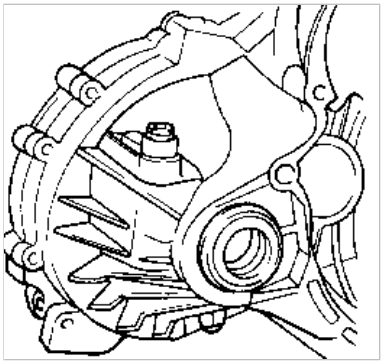
9. When installing, make sure that the slit of the spring pin is aligned with the center line of the shift rail.



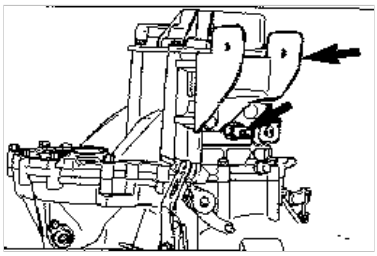
10. Apply the specified sealant to the rear cover and install the rear cover.



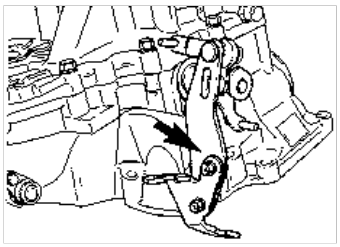
11. Install the speedometer driven gear assembly.



12. Install the back up light switch.
13. Install the mounting bracket.

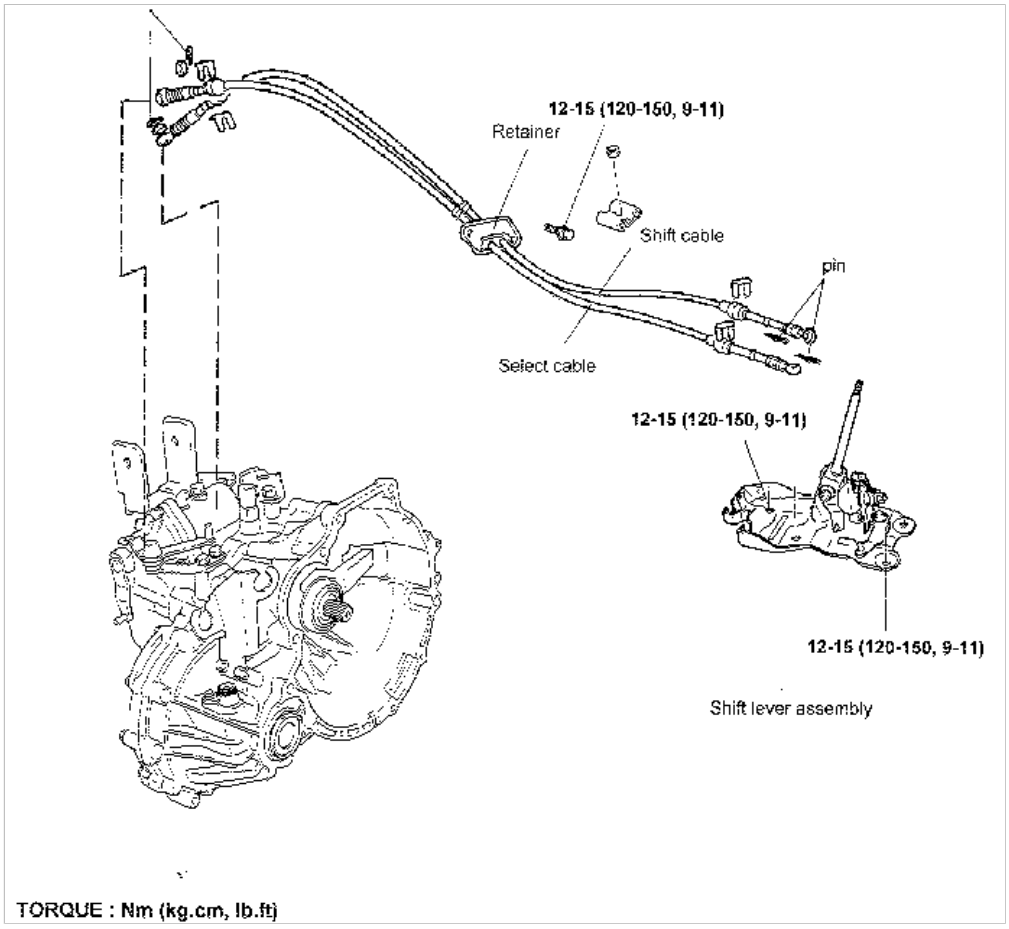


14. Install the select lever assembly.



Transaxle/Transmission > Manual Transaxle System > Manual Transaxle Shift Control > COMPONENTS

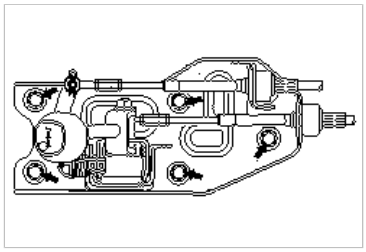
Components



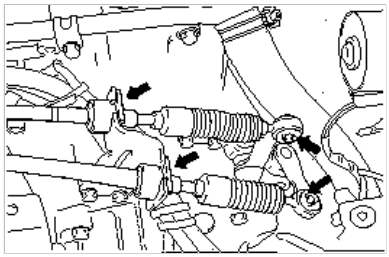
Transaxle/Transmission > Manual Transaxle System > Manual Transaxle Shift Control > DISASSEMBLY

DISASSEMBLY

1. Remove the console assembly. (Refer to CONSOLE.)
2. Remove the cotter pins and clips (shift lever side).
3. Remove the shift lever assembly.



4. Remove the retainer and bolts.
5. Remove the cotter pins and clips (Transaxle side).
6. Remove the shift cable and select cable.



Transaxle/Transmission > Manual Transaxle System > Manual Transaxle Shift Control > INSPECTION

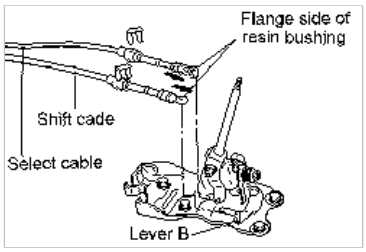
INSPECTION

1. Check the select cable for proper operation and damage.
2. Check the shift cable for proper operation and damage.
3. Check the boot for damage.
4. Check each bushing for wear, abrasion, sticking, restricted movement or damage.
5. Check for a weak or damaged spring.

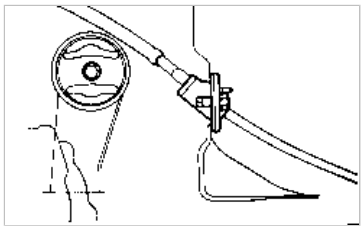
Transaxle/Transmission > Manual Transaxle System > Manual Transaxle Shift Control > REASSEMBLY

REASSEMBLY

1. Install the shift lever assembly.

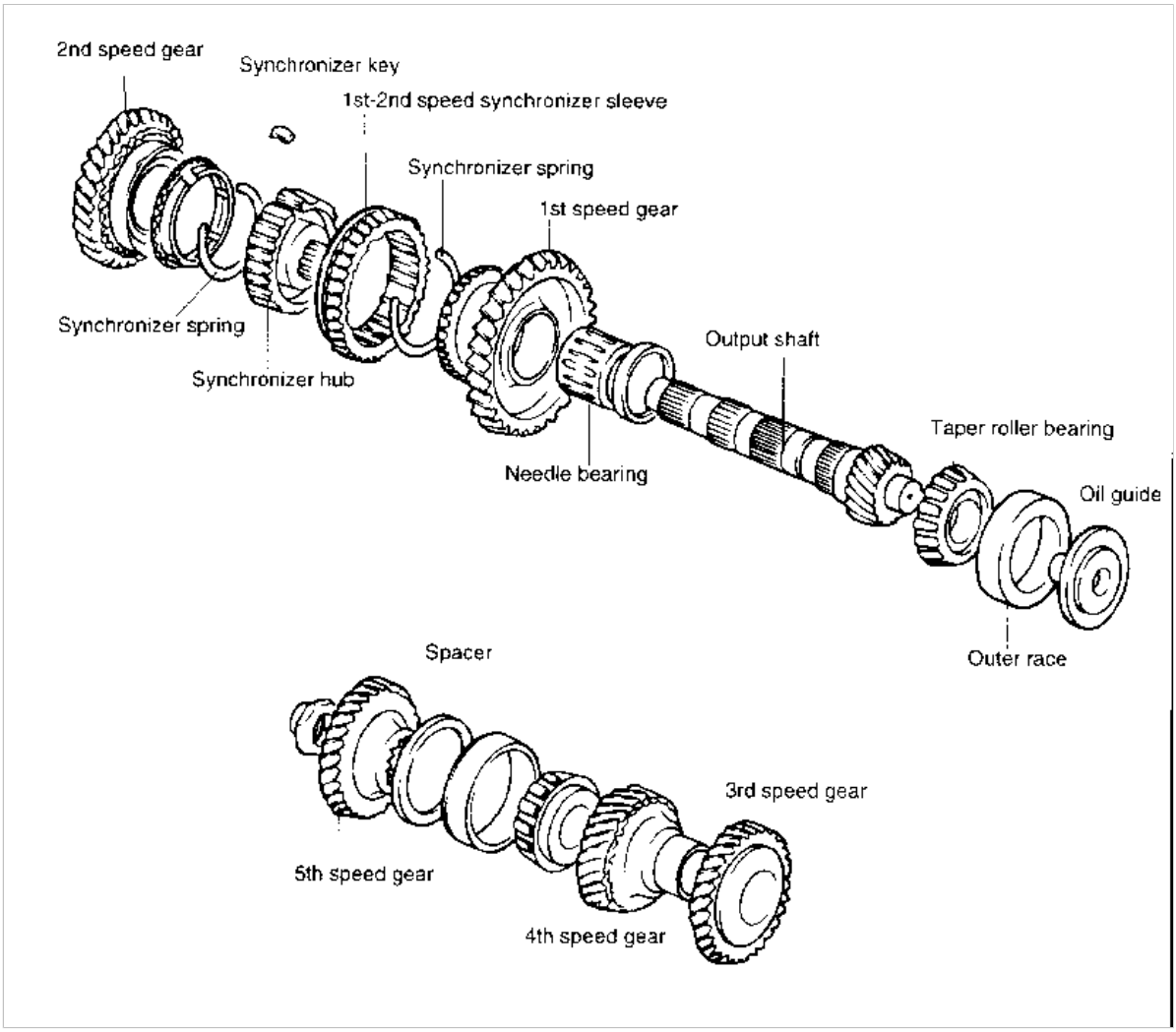


2. Installation of shift lever and select cable.
   (1) Move the transaxle select lever and shift lever to the neutral position.
   (2) When connecting the select cable to lever (B), adjust the select cable's length so that lever (B) is at the neutral position.
   (3) The flange side of the resin bushing at the select cable end should be at the lever (B) end surface.
   (4) The flange side of the resin bushing at the shift cable end should be at the shift lever's cotter pin hole.
   (5) After connecting the shift cable, check that the dimensions (A) and (B) shown in the illustration are equal.
   (6) Move the shift lever to each position and verify that the shifting is smooth.
3. Install the retainer and bolts.



Transaxle/Transmission > Manual Transaxle System > Output Shaft > COMPONENTS

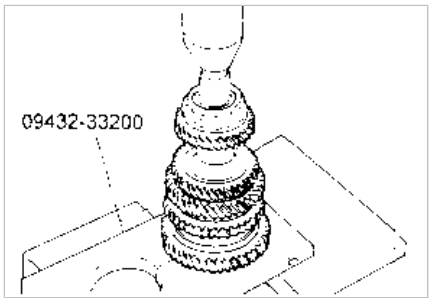
Components



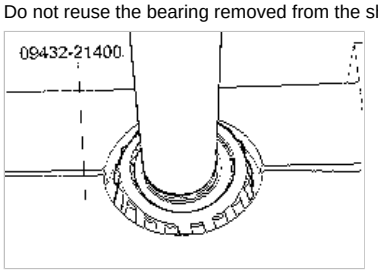
Transaxle/Transmission > Manual Transaxle System > Output Shaft > DISASSEMBLY

DISASSEMBLY

1. Remove the taper roller bearing, fourth output gear, spacer, third output gear, second speed gear assembly with second gear sleeve and needle roller bearing, first speed gear assembly with needle roller bearing and spacer and steel ball, using the special tool (09432-33200).



2. Remove the rear taper roller bearing using the special tool (09432-21400).
   Do not reuse the bearing removed from the shaft.

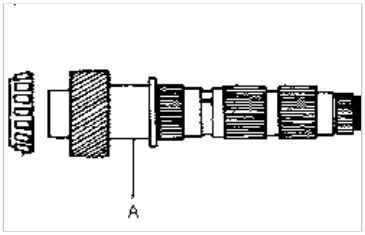


Transaxle/Transmission > Manual Transaxle System > Output Shaft > INSPECTION

INSPECTION

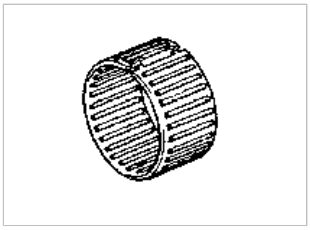
OUTPUT SHAFT

1. Check the outer surface of the output shaft where the needle bearing is mounted for damage or abnormal wear (portion [A]).
2. Check the splines for damage or wear.



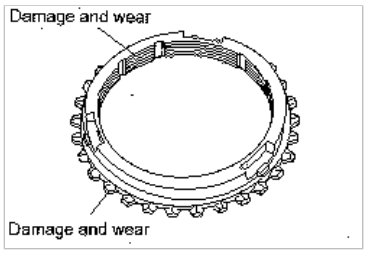
NEEDLE BEARING

1. Install the needle bearing on the shaft with the bearing sleeve and gear. Check that it rotates smoothly without abnormal noise or play.
2. Check the needle bearing cage for distortion.

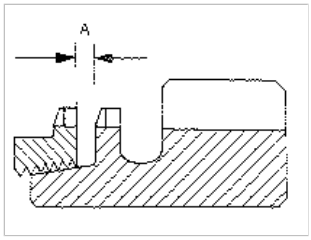


SYNCHRONIZER RING

1. Check the clutch gear teeth for damage.
2. Check internal surface for damage, wear or broken grooves.

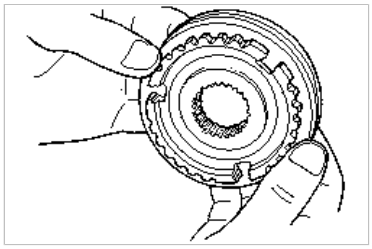


3. Push the synchronizer ring toward the clutch gear and check clearance "A." Replace if it is not within specifications.



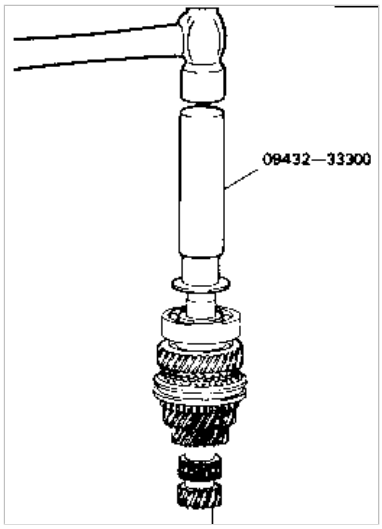
SYNCHRONIZER SLEEVE AND HUB

1. Install the synchronizer sleeve on the hub and check that it slides smoothly.
2. Check that the sleeve is free from damage.
3. Check for wear of the hub end surfaces (in contact with each gear).
   Replace the synchronizer hub and sleeve as a set.



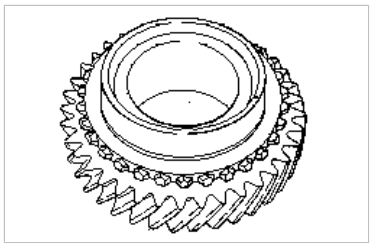
SYNCHRONIZER KEY AND SPRING

1. Check for wear of the synchronizer key center protrusion.
2. Check the spring for weakness, distortion or damage.



GEARS

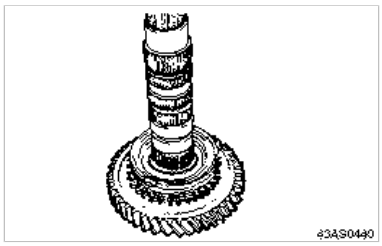
1. Check the helical gear and clutch gear teeth for damage or wear.
2. Check the gear cone for rough surfaces, damage or wear.
3. Check the gear bore for damage or wear.



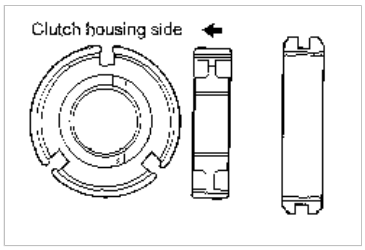
Transaxle/Transmission > Manual Transaxle System > Output Shaft > REASSEMBLY

REASSEMBLY

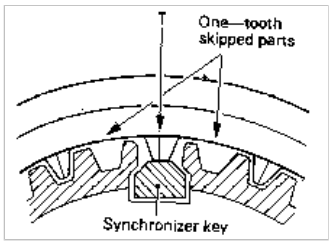
1. Install the first speed gear assembly with needle bearing.



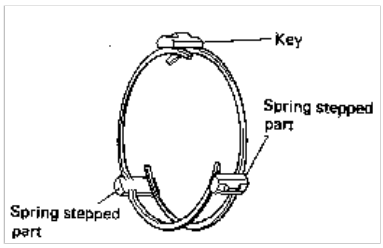
2. Combine the first-second gear synchronizer hub and sleeve.



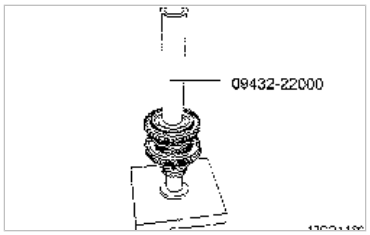
3. The synchronizer sleeve has teeth missing at six places.
   Assemble the hub to the sleeve so that the center tooth between the two missing teeth will touch the synchronizer key.



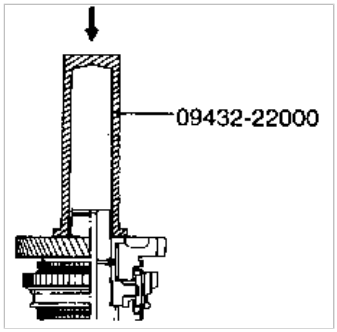
4. Install the synchronizer spring so that its protrusion may be engaged in the groove of the synchronizer keys.
   When installing the synchronizer springs, make sure they are not facing the same direction.



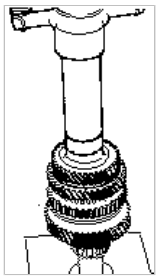
5. Install the first-second speed gear synchronizer assembly over the output shaft using the special tool (09432-22000).
   a. When installing the synchronizer assembly, make sure that the three synchronizer keys are seated correctly in their respective groove on the synchronizer ring.
   b. After installation of the synchronizer assembly, check that first gear rotates smoothly.



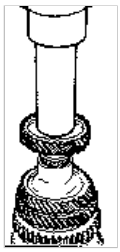
6. Install the second speed gear with needle roller bearing and bearing sleeve using the special tool (09432-22000).



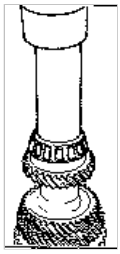
7. Install the third speed gear and spacer.



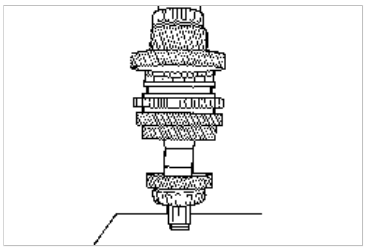
8. Install the fourth speed gear.



9. Install the bearing using the special tool (09432-22000).
   Do not reuse the bearing removed from the shaft.

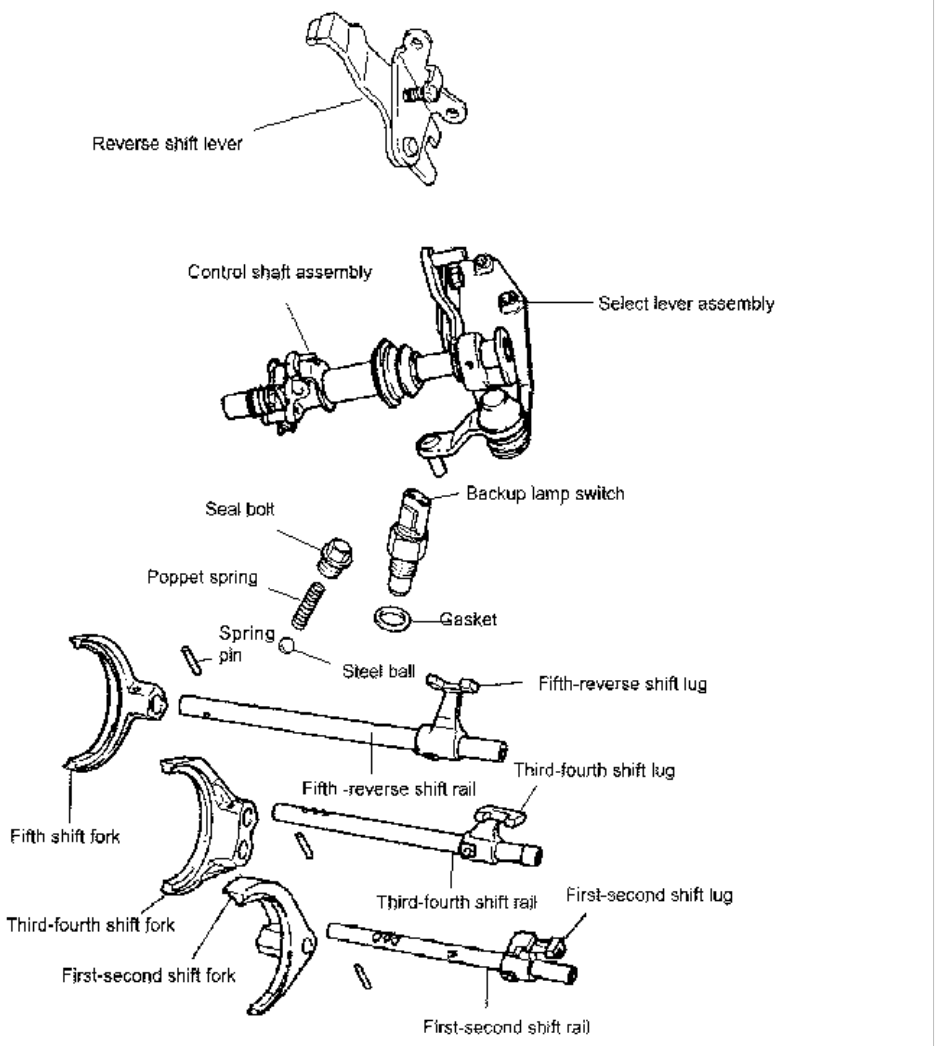


10. Install the rear side taper roller bearing using the special tool (09432-22000).



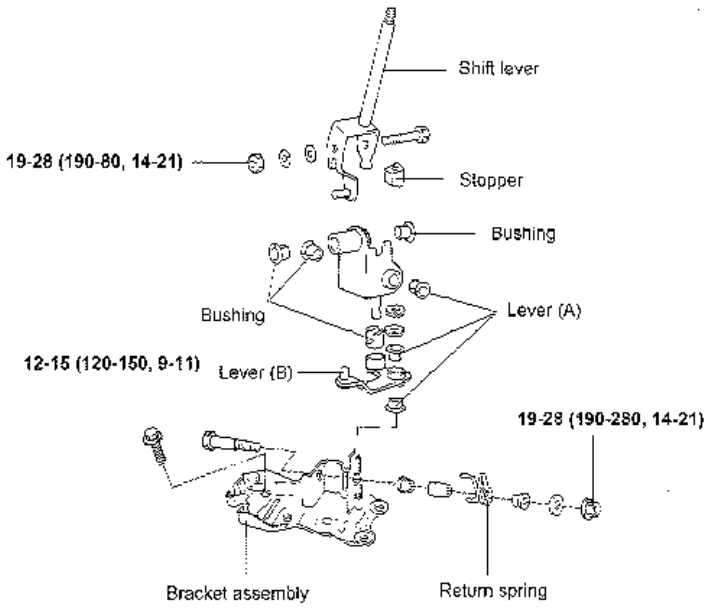
Transaxle/Transmission > Manual Transaxle System > Shift Fork > COMPONENTS

Components



Transaxle/Transmission > Manual Transaxle System > Shift Lever Assembly > COMPONENTS

Components



TORQUE : Nm (kg.cm, lb.ft)

Transaxle/Transmission > Manual Transaxle System > Shift Lever Assembly > INSPECTION

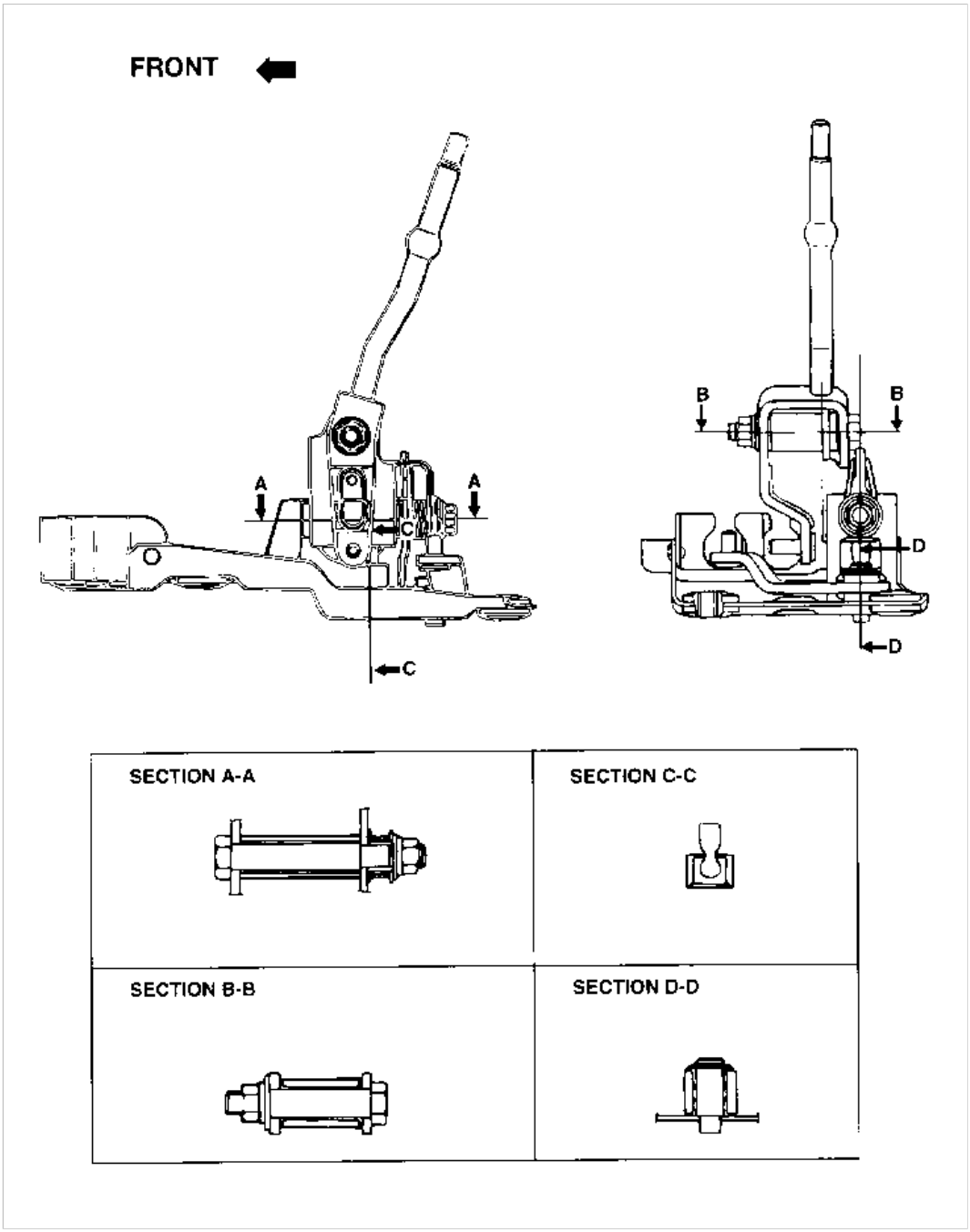
INSPECTION

1. Check the bushing for wear or damage.
2. Check the return spring for damage or deterioration.

Transaxle/Transmission > Manual Transaxle System > Shift Lever Assembly > REASSEMBLY

REASSEMBLY

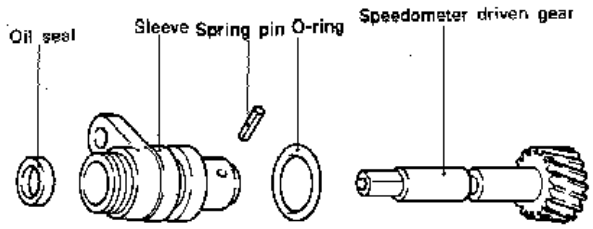
1. Apply multi-purpose grease to the sliding part of the bushings.
2. Assembly is reverse of the disassembly.



Transaxle/Transmission > Manual Transaxle System > Speedometer Driver Gear Assembly > COMPONENTS

COMPONENTS

COMPONENTS



Transaxle/Transmission > Manual Transaxle System > Speedometer Driver Gear Assembly > REASSEMBLY

REASSEMBLY

1. Apply gear oil sparingly to the speedometer driven gear shaft and insert the shaft.

Carefully insert the speedometer driven gear into the clutch housing. Do not disassemble the speedometer driven gear shaft.