TOYOTA

K SERIES ENGINE

REPAIR MANUAL

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Feb., 1981

INCLUDES

2K, 3K-C, 3K-H, 4K & 4K-C

TOYOTA MOTOR SALES CO.,LTD.

Pub. No. 36103

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FOREWORD

This repair manual has been prepared to provide information covering general service repair for the 2K, 3K-C, 3K-H, 4K & 4K-C engine equipped on the TOYOTA 1000, STARLET, COROLLA, LITEACE and BUV.

Applicable models:

KP36, 60, 61, 62 series
KE70 series
KM20 series
KF20 series

For instructions on how to use this manual, please refer to page 1—4.
Specifications contained herein are based on the January, 1981 production models. For specifications on other models, please refer to the respective Service Specification Manual.
Also for vehicles equipped with an emission control device, please refer to the Emission Control Repair Manual.

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GENERAL REPAIR INSTRUCTIONS

1. Use fender, seat and floor covers to keep the car clean and prevent damage.
2. During disassembly, keep parts in order to facilitate reassembly.
3. Before performing electrical work, disconnect the cable from the battery terminal.
4. Always replace cotter pins, gaskets and O rings with new ones.
5. When necessary, use a sealer on gaskets to prevent leaks.
6. Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.
7. Use genuine Toyota parts.
8. When replacing fuses, be sure the new fuse is the correct amperage rating. DO NOT exceed the fuse amp rating or use one of a lower rating.
9. If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels in order to ensure safety.
10. After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on the vehicle raised on a jack alone, even for a small job that can be finished quickly.
11. Use of a special service tool (SST) may be required, depending on the nature of the repair. Be sure to use SST where specified and follow the proper work procedure. A list of SST can be found at the back of this manual.

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ABBREVIATIONS USED IN TOYOTA REPAIR MANUALS

For convenience, the following abbreviations are used in Toyota repair manuals.

Abbreviation	Term	Abbreviation	Term
A/C	Air Conditioner	MP	Multipurpose
AI	Air Injection	M/T	Manual Transmission
A/T	Automatic Transmission	O/S	Oversize
BDC	Bottom Dead Center	RH	Right-hand
BTDC	Before Top Dead Center	RHD	Right-hand Drive
CO	Carbon Monoxide	SST	Special Service Tool
EGR	Exhaust Gas Recirculation	STD	Standard
EVAP	Fuel Evaporative Emission Control System	T	Tightening Torque
EX	Exhaust	TDC	Top Dead Center
HIC	Hot Idle Compensation	U/S	Undersize
IN	Intake	W/	With
LH	Left-hand	W/O	Without
LHD	Left-hand Drive		

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HOW TO USE THIS MANUAL

1. OVERVIEW ILLUSTRATION

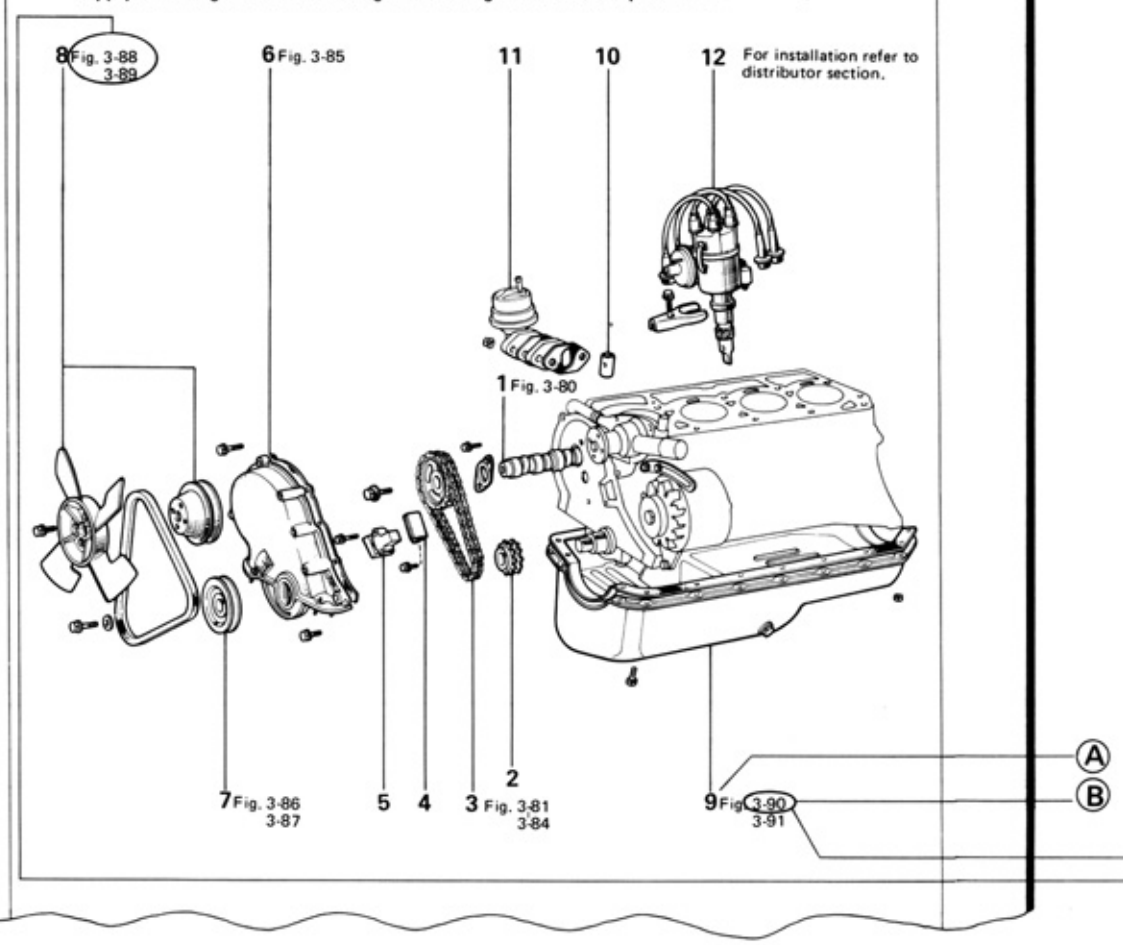
Many service operations begin with an overview illustration as a general guide.

ASSEMBLY

Assemble the parts in the numerical order shown in the figure.

Fig. 3-79

- **Thoroughly clean all parts to be assembled.**
- **Apply clean engine oil to all sliding and rotating surfaces of the parts before assembly.**



Ⓐ : The bold numbers show the order in which the work is to be done.

Ⓑ : The figure numbers refer you to more detailed instructions and specifications.

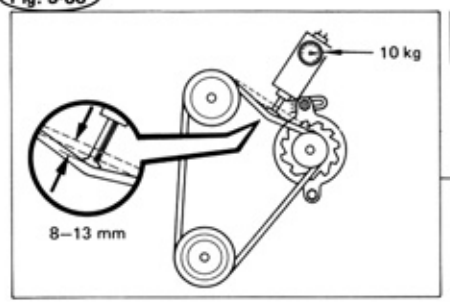
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2. ILLUSTRATED INSTRUCTIONS

All important steps in every service job are illustrated, but obvious steps are omitted to save space. Experienced technicians may only need to glance at the overview illustration and/or specifications.

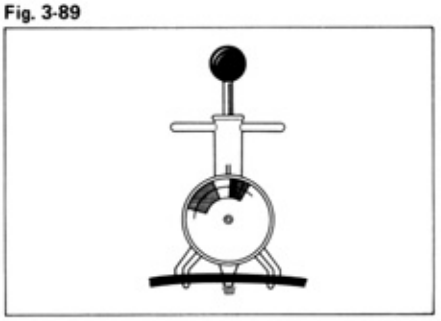
3–28 ENGINE SERVICE – Timing Chain & Camshaft

Fig. 3-88



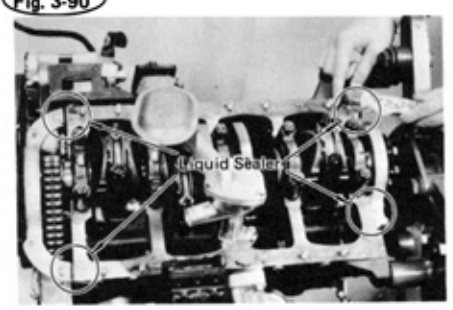
Adjust the V belt deflection.
Except USA & Canada
Drive belt deflection:
7 – 11 mm at 10 kg
(0.28 – 0.43 in.) (22 lb)

Fig. 3-89



Using a borroughs tension gauge BT-33-73F, adjust the belt deflection.
Drive belt deflection: 80 ± 20 lbs
(Used belt)

Fig. 3-90



Apply liquid sealer to the cylinder block and chain cover as shown in the figure.

Ⓒ : The pictures give basic information on what to do in each step.
Ⓓ : A symbol is often used to explain the action required.
Ⓔ : The text explains how to perform the step.
Ⓕ : Specifications, Notes and Cautions are given in bold type so you won't miss them.

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SYMBOLS

The following symbols have been adopted for simplicity and quick recognition.



REMOVE or DISASSEMBLE



INSTALL or ASSEMBLE



INSPECT



MEASURE



TIGHTEN



CLEAN



IMPORTANT

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MEMO

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ENGINE TUNE-UP

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ENGINE TUNE-UP ITEMS

	ITEM		REMARKS		
1	COOLING SYSTEM	Coolant level check	Full line		
		Quality check			
		Leakage check			
		Radiator cap valve opening pressure STD	0.75 – 1.05 kg/cm² (10.7 – 14.9 psi)		
		Limit	0.6 kg/cm²	8.5 psi	
		Coolant capacity (w/Heater)			
		2K, 3K-C & 3K-H	5.6 liters	5.9 US qt	4.9 Imp.qt
		KE70 series (Europe & Sweden)	5.8 liters	6.1 US qt	5.1 Imp.qt
		KE70 series (ex. Europe & Sweden)	6.2 liters	6.6 US qt	5.5 Imp.qt
		KM20 series (4K RHD & 4K-C)	6.7 liters	7.1 US qt	5.9 Imp.qt
		KM20 series (4K LHD)	6.9 liters	7.3 US qt	6.1 Imp.qt
		USA & Canada 4K-C	5.7 liters	6.0 US qt	5.0 Imp.qt
2	DRIVE BELT	Deflection at 10 kg (22 lb) force (except USA & Canada)			
		Fan – Alternator	7 – 11 mm	0.28 – 0.43 in.	
		Crank - A/C compressor (USA & Canada)	11 – 14 mm	0.43 – 0.55 in.	
		For borroughs belt tension			
		No. BT-33-73F New belt	125 ± 25 lbs		
		Used belt	80 ± 20 lbs		
3	AIR CLEANER	Element cleaning			
4	BATTERY	Specific gravity	1.25 – 1.27 at 20°C (68°F)		
		Electrolyte level			
5	ENGINE OIL	Oil level check	Full line		
		Oil replenishment	API service SE or better		
		Oil capacity			
		2K, 3K-C & 3K-H			
		Dry refill w/ Oil filter	3.6 liters	3.8 US qt	3.2 Imp.qt
		Drain & refill w/ Oil filter change	3.4 liters	3.6 US qt	3.0 Imp.qt
		w/o Oil filter change	2.9 liters	3.1 US qt	2.6 Imp.qt
		4K & 4K-C			
		Dry refill w/ Oil filter	3.7 liters	3.9 US qt	3.3 Imp.qt
		Drain & refill w/ Oil filter change	3.5 liters	3.7 US qt	3.1 Imp.qt
		w/o Oil filter change	3.0 liters	3.2 US qt	2.6 Imp.qt
6	SPARK PLUG	Visual check			
		Cleaning			
		Gap USA (ex. Calif.) & Canada	1.1 mm	0.043 in.	
		General, Europe & Calif.	0.8 mm	0.031 in.	

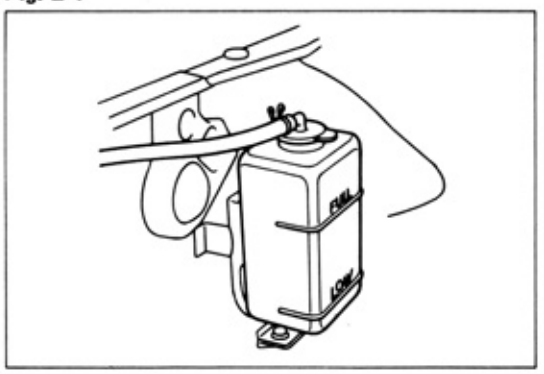
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	ITEM		REMARKS
7	HIGH TENSION CORD	Resistance	Less than 25 kΩ/cord
8	DISTRIBUTOR	Distributor cap	
		Rubbing block gap	0.45 mm 0.0177 in.
		Air gap	0.20 – 0.40 mm 0.0079 – 0.0157 in.
		Dwell angle	52° ± 6°
		Dwell angle variation	Within 3° (from idling to 2,000 rpm)
		Ignition timing	8° BTDC/idling
		Governor operation	
		Vacuum operation	
	(WARM UP ENGINE)		
9	VALVE CLEARANCE	IN	0.20 mm 0.0079 in.
		EX	0.30 mm 0.0118 in.
10	CARBURETOR	Throttle valve full open	
		Check the accelerating pump	
		Manual choke	
		Choke opener or Choke breaker	
11	IDLE SPEED	USA (ex. California) & Canada	650 rpm/cooling fan OFF
		California	700 rpm/cooling fan OFF
		2K, 3K-C, 3K-H, 4K M/T & Sweden 4K-C	750 rpm (w/cooling fan OFF)
		Australia 4K & 4K-C	800 rpm
		4K A/T	850 rpm
12	IDLE CO CONCENTRATION		
		2K (KP60 series), 3K-C, 3K-H & 4K	0.5 – 1.5% HIC system OFF
		2K (KP36 series)	0.5 – 3.5% HIC system OFF
		Sweden 4K-C	0.3 – 2.0% HIC system OFF
		Australia 4K-C	1.0% w/AI system OFF & HIC system OFF
		USA & Canada 4K-C	–
13	IDLE MIXTURE SPEED		
		USA (ex. California) & Canada	680 rpm/cooling fan OFF
		California	730 rpm/cooling fan OFF
		3K-C, 4K M/T & 4K-C	830 rpm (w/cooling fan OFF)
		Australia 4K-C	850 rpm
		4K A/T	930 rpm
14	FAST IDLE SPEED ADJUSTMENT		
		KM20 series (4K & 4K-C)	1,500 rpm
		Australia 4K	3,100 rpm
		USA & Canada	3,500 rpm
15	DASH POT	Setting speed Australia 4K	1,700 rpm
		Sweden 3K-C	2,000 rpm
		Sweden 4K-C	2,300 rpm
		Australia 4K-C & 4K (KM20 series)	2,100 rpm/AI system OFF
16	THROTTLE POSITIONER (USA & Canada)		2,000 rpm/EGR system OFF
17	COMPRESSION PRESSURE		at 250 rpm
		STD	11.0 kg/cm² 156 psi
		Limit	9.0 kg/cm² 128 psi
	Difference of pressure between cylinders		Less than 1.0 kg/cm² (14 psi)

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COOLING SYSTEM

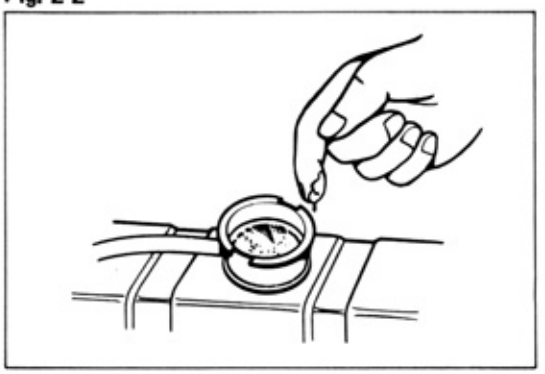
Fig. 2-1



CHECK COOLANT LEVEL

If coolant level is low, fill to FULL line of reservoir tank.

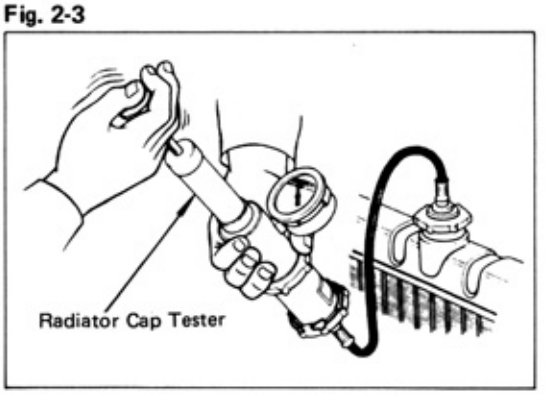
Fig. 2-2



CHECK COOLANT

Check for evidence of oil in coolant and rust or scale deposits.

Fig. 2-3

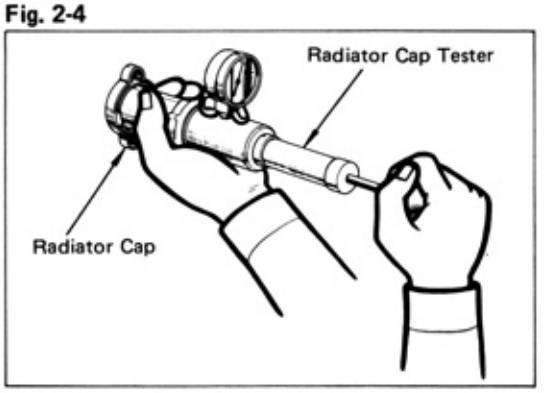


CHECK COOLING SYSTEM

Check for:

1. Damaged or deteriorated radiator and water hoses.
2. Loose hose clamps.
3. Damage or corrosion in the radiator core.
4. Leakage from the water pump, radiator core or a loose water drain cock.

Fig. 2-4



INSPECT RADIATOR CAP OPERATION

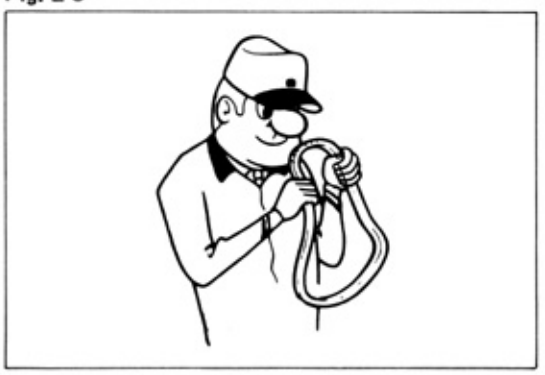
With a radiator cap tester inspect the spring tension and seating condition of the radiator cap vacuum valves. Replace the cap if the valve opens at a pressure below the specified or is otherwise defective.

Valve opening pressure:

STD	**0.75 – 1.05 kg/cm^2 (10.7 – 14.9 psi)**
Limit	**0.6 kg/cm^2 (8.5 psi)**

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Fig. 2-5



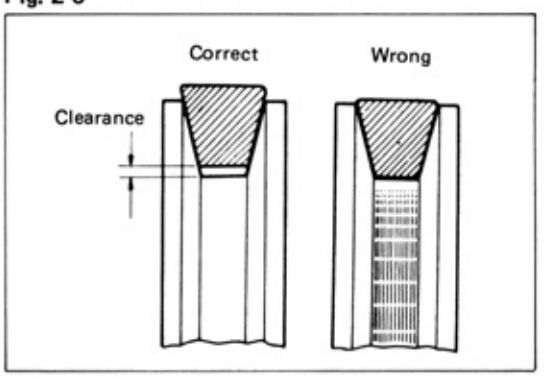
DRIVE BELT

VISUAL CHECK

Check the drive belt for:

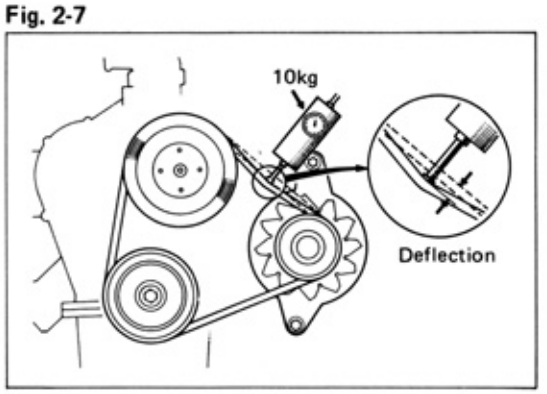
1. Cracks, deterioration, stretching or wear.
2. Adherence of oil or grease.

Fig. 2-6



3. Improper belt-to-pulley contact.

Fig. 2-7



CHECK & ADJUST BELT TENSION

Except USA & Canada

With 10 kg (22 lb) of force, press on the belts at the points indicated in the figure. The belts should deflect the amount specified.

Drive belt deflection at 10 kg (22 lb):

Fan – Alternator

7 – 11 mm

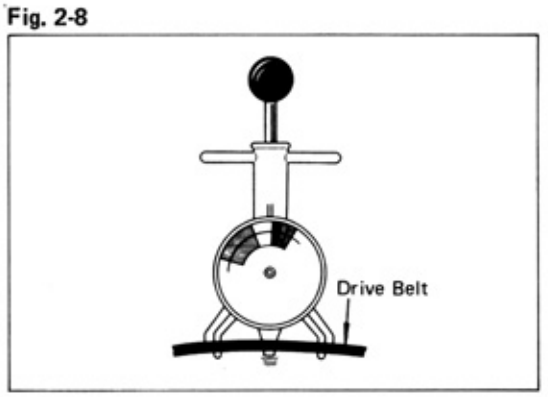
(0.28 – 0.43 in.)

Crank – A/C compressor

11 – 14 mm

(0.43 – 0.55 in.)

Fig. 2-8



USA & Canada

Using a time borroughts tension gauge BT-33-73F, adjust the following value.

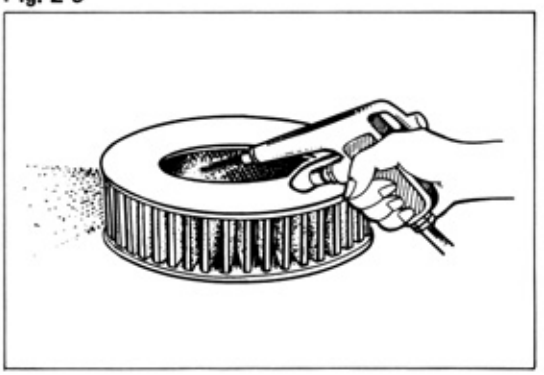
Drive belt deflection:

New belt 125 ± 25 lbs

Used belt 80 ± 20 lbs

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Fig. 2-9



AIR CLEANER

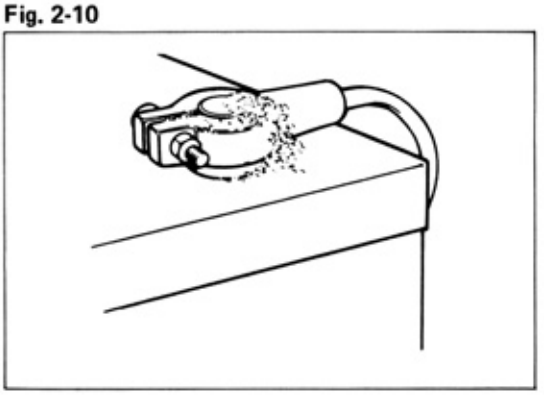
CLEAN ELEMENT

1. Remove the air cleaner element.

– Note –
Use care to prevent dirt or other foreign matter from entering into the carburetor.

2. To clean the element, blow compressed air from inside.
3. If element is torn or excessively dirty, replace it with a new one.

Fig. 2-10

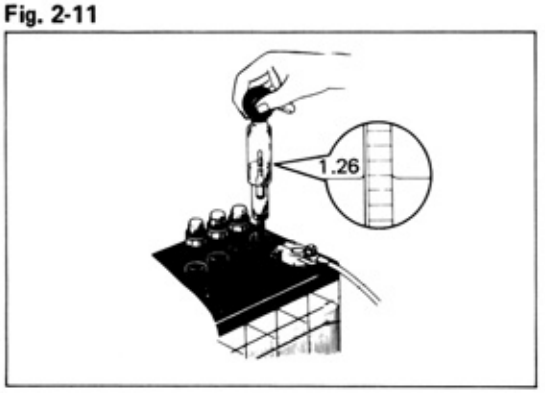


BATTERY

VISUAL CHECK

Check the battery for the following:
1. Rusted battery support.
2. Loose terminal connections.
3. Rusted or deteriorated terminals.
4. Damaged or leaking battery.

Fig. 2-11

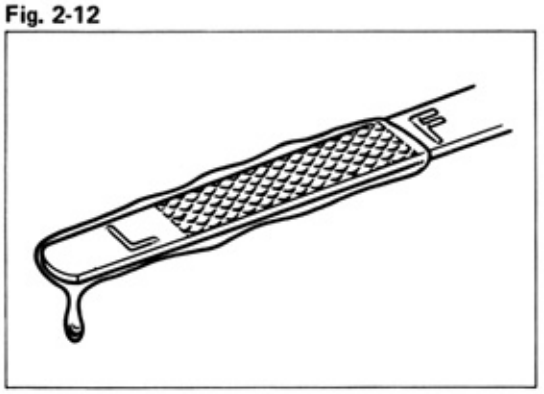


MEASURE SPECIFIC GRAVITY

1. Check the specific gravity of electrolyte with a hydrometer.
   Specific gravity:
   1.25 – 1.27 at 20°C (68°F)

2. Check the electrolyte quantity of each cell. If not at the proper level, fill with distilled water.

Fig. 2-12



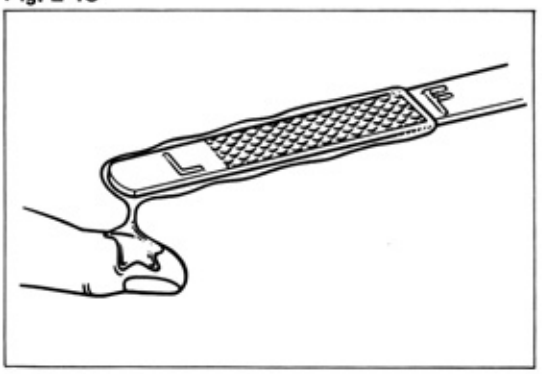
ENGINE OIL

CHECK OIL LEVEL

The oil level should be between the L and F marks. If low, check for leakage and add oil up to the F mark. Use API service SE classification oil.

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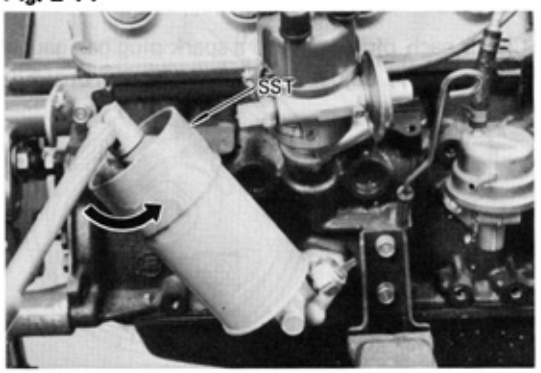
Fig. 2-13



CHECK OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

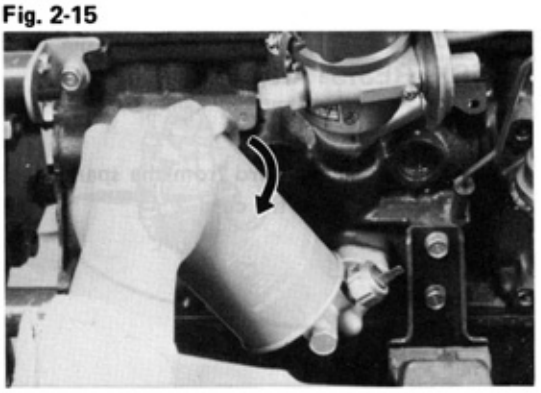
Fig. 2-14



REPLACE OIL FILTER

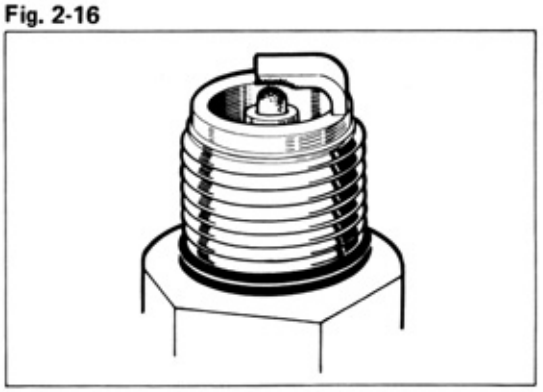
1. Remove the oil filter with SST.
   SST [09228-22020]

Fig. 2-15



2. To install, hand-tighten the oil filter firmly.
3. After starting the engine, check for oil leaks and recheck the oil level.

Fig. 2-16



SPARK PLUG

VISUAL CHECK

Check the spark plugs for the following:

1. Cracks or other damage on the threads and insulator.
2. Electrode wear.
3. Damaged or deteriorated gaskets.
4. Burnt electrode or excess carbon deposits.

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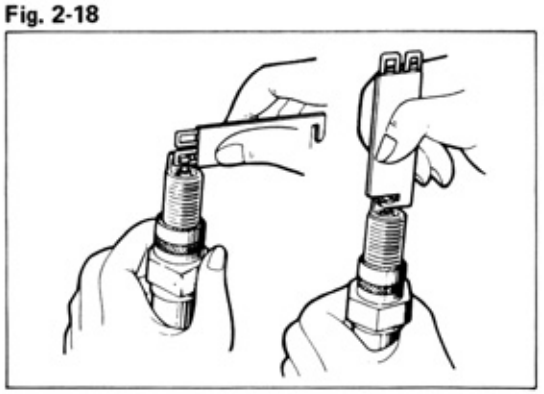
Fig. 2-17



CLEAN SPARK PLUG

1. Do not use the spark plug cleaner longer than necessary.
2. Thoroughly blow off the cleaning compound and carbon with compressed air.
3. Clean the threads and outer insulator surface.

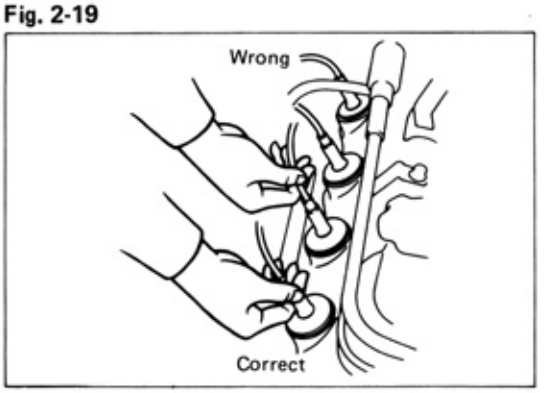
Fig. 2-18



ADJUST GAP

Check each plug gap with a spark plug gap gauge. If necessary, adjust by bending the protruding (outer) electrode.

Fig. 2-19

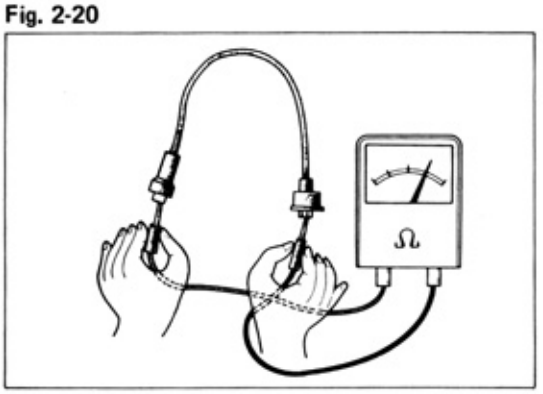


HIGH TENSION CORD

CHECK RESISTANCE

– Note –
When pulling out the cord from the spark plug, always grip the end of the cord.

Fig. 2-20



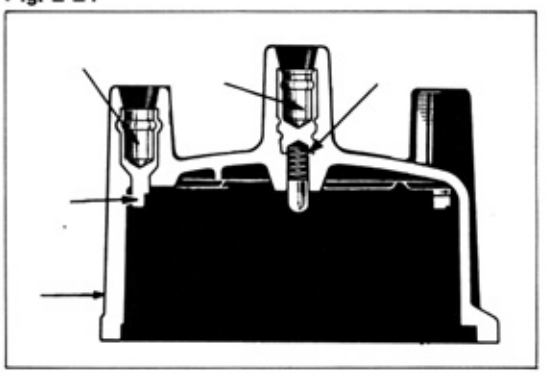
Check the cord resistance.

Resistance: Less than 25 kΩ per cord

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DISTRIBUTOR

Fig. 2-21

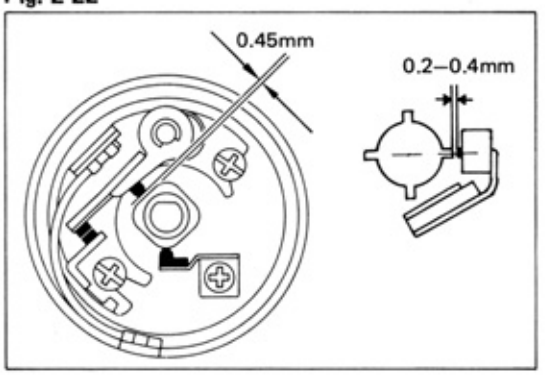


CHECK DISTRIBUTOR CAP

Check the cap and rotor.

1. Cracks, damage, corrosion, burning and dirty cord hole.
2. Burnt electrode terminal.
3. Weak center piece spring action.

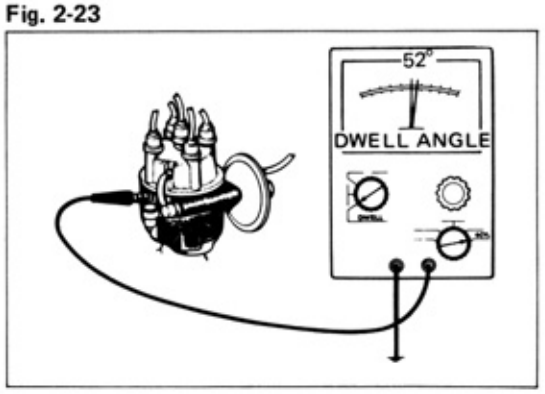
Fig. 2-22



CHECK & ADJUST POINT GAP OR AIR GAP

1. If the points are excessively burnt or pitted, replace the breaker points.
2. Adjust point gap and damping spring.
   Rubbing block gap: 0.45 mm (0.0177 in.)
3. Adjust the air gap between the rotor and pick up coil projection.
   Air gap: 0.2 – 0.4 mm (0.008 – 0.016 in.)

Fig. 2-23

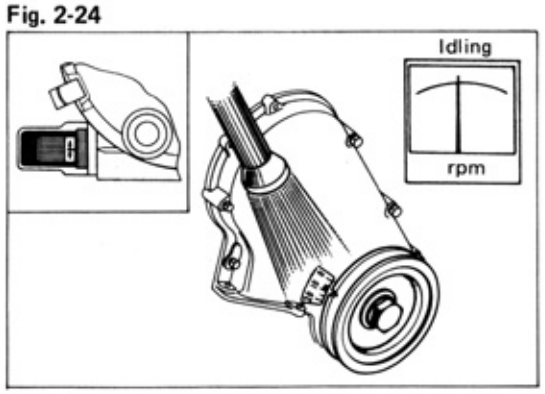


CHECK DWELL ANGLE

Check the dwell angle with a dwell angle tester.

Dwell angle: 52° ± 6°

Fig. 2-24



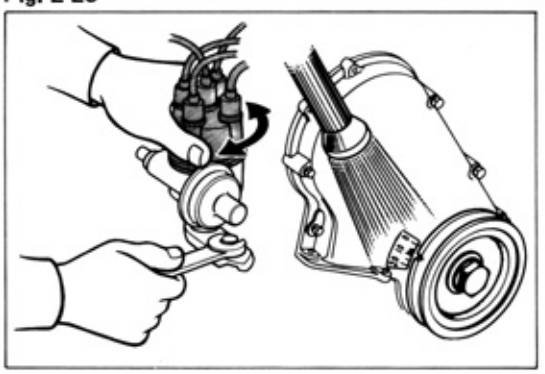
INSPECT IGNITION TIMING

Set the engine revolution at idle speed.
The octane selector must be set at standard position.

Ignition timing: 8° BTDC/idling

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Fig. 2-25



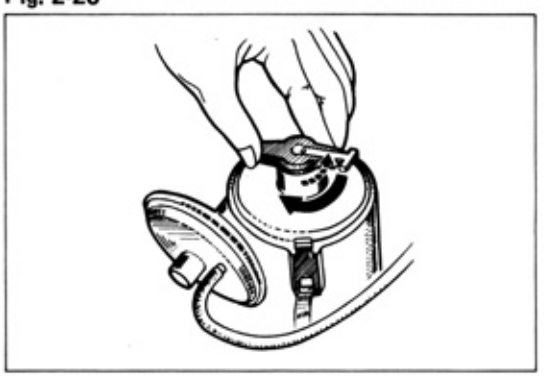
ADJUST IGNITION TIMING

Align the timing marks by turning distributor body.

Ignition timing: 8° BTDC/idling

– Caution –
Do not adjust by the octane selector.

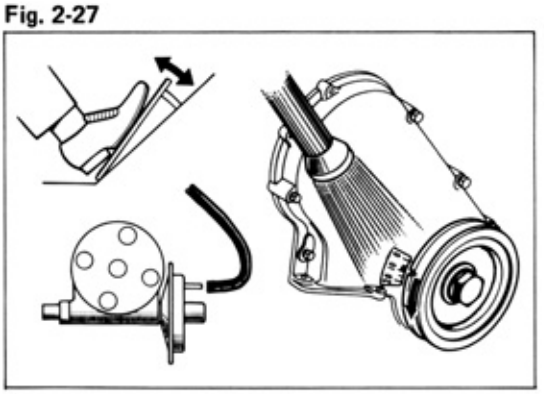
Fig. 2-26



CHECK GOVERNOR OPERATION

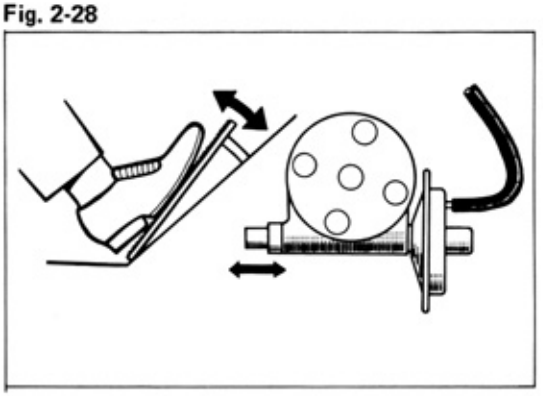
1. Rotor should return quickly when turned clockwise by hand and released.
2. Rotor should not be excessively loose.

Fig. 2-27



3. Start the engine and disconnect the vacuum hose from the distributor. The timing mark should vary in accordance with the engine speed.

Fig. 2-28

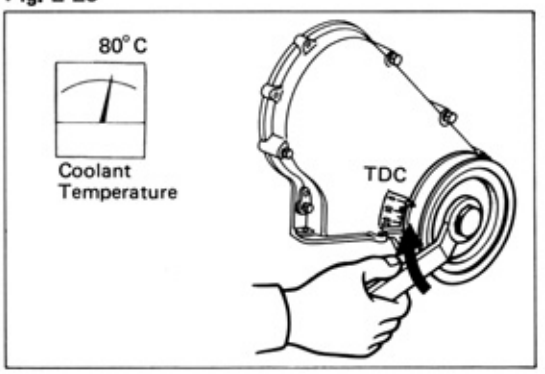


CHECK VACUUM ADVANCE OPERATION

Connect the distributor vacuum hose.
The octane selector should vary in accordance with the opening and closing of the throttle valve.

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Fig. 2-29

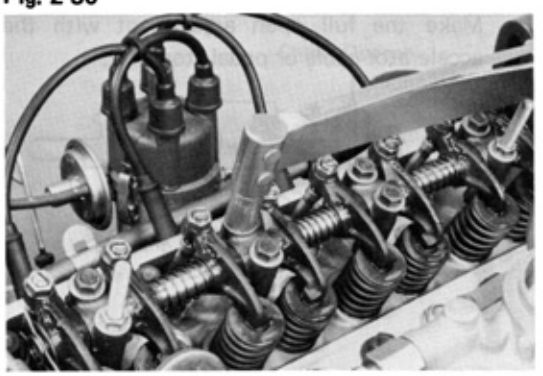


VALVE CLEARANCE

ADJUSTMENT

1. Warm up engine and turn it off.
2. Set No. 1 cylinder to TDC/compression.

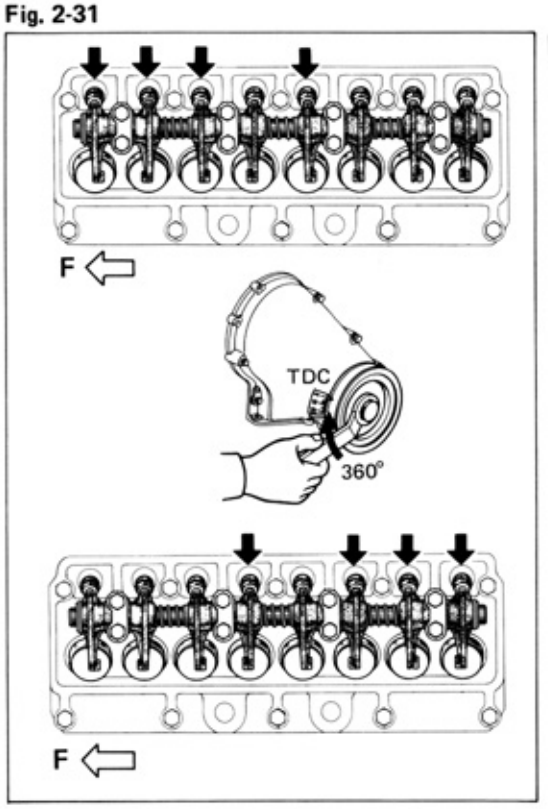
Fig. 2-30



3. Retighten the head bolts and rocker support bolts.

Tightening torque: 1.8 – 2.4 kg-m (14 – 17 ft-lb)

Fig. 2-31



4. Adjust valve clearance.
   Valve clearance is measured between valve stem and rocker arm.
   Adjust the valves indicated by arrows only.

   Valve clearance:

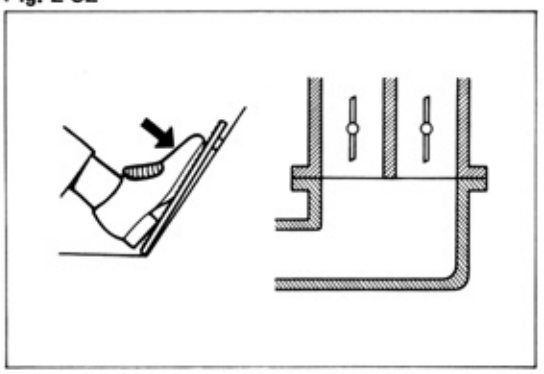
IN	**0.20 mm (0.0079 in.)**
EX	**0.30 mm (0.0118 in.)**

5. Rotate the crankshaft 360°.
6. Adjust remaining valves indicated by arrows.

– Note –
Use the SST oil tray when the adjustment is performed with engine running.
SST [09229-22010]

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Fig. 2-32



CARBURETOR

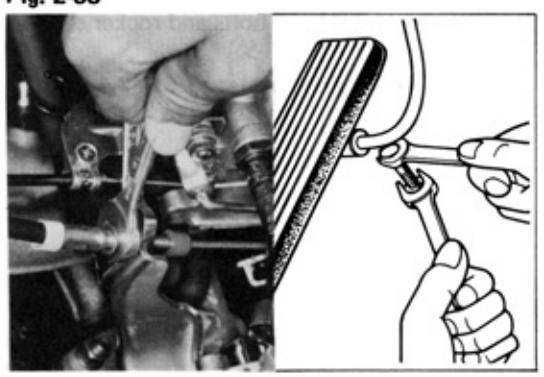
CHECK OPERATION

– Note –
For adjustment, refer to carburetor section.

Throttle Valve

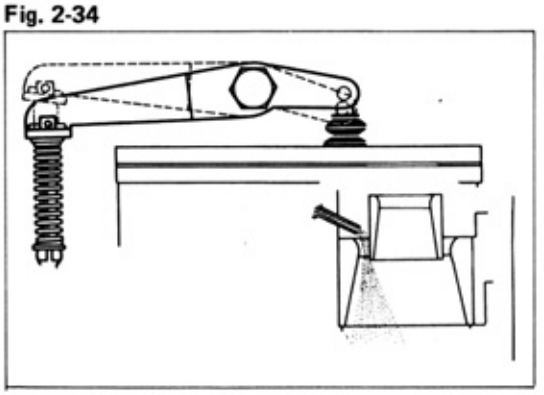
1. The throttle valve should open fully when the accelerator pedal is fully depressed.

Fig. 2-33



2. Make the full open adjustment with the accelerator cable or pedal stop bolt.

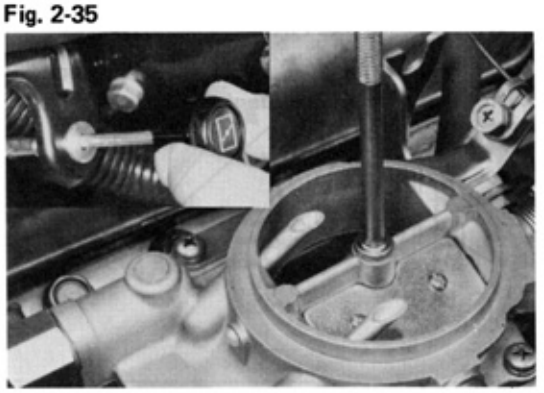
Fig. 2-34



Acceleration Pump

Gasoline should shoot out with force from the jet when the throttle valve is opened.

Fig. 2-35

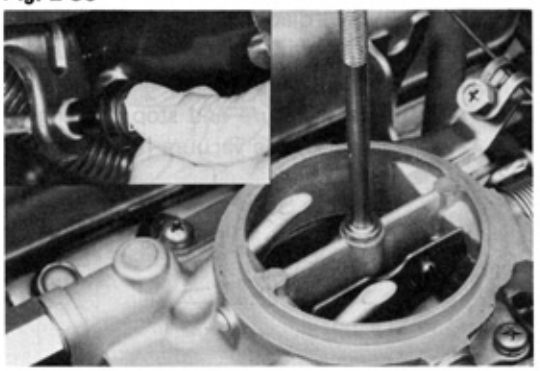


Manual Choke

1. Choke valve should be fully closed when the choke knob is pulled all the way out.

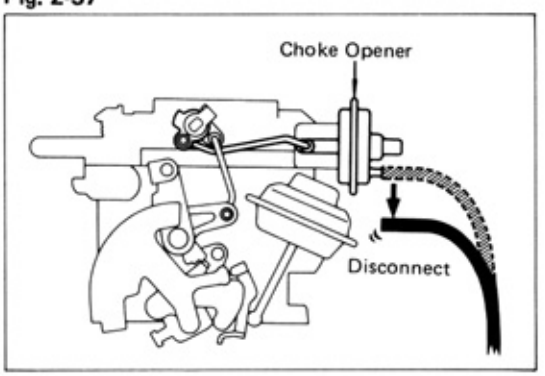
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Fig. 2-36



2. Choke valve should be fully open when the choke knob is fully returned.

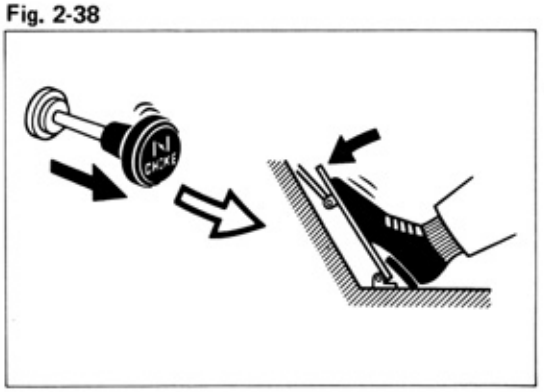
Fig. 2-37



Choke Opener (USA & Canada)

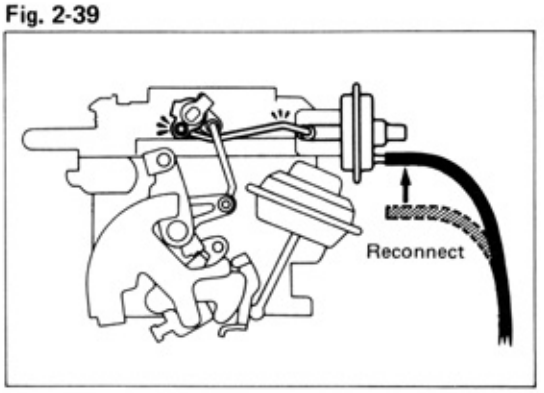
1. Check BVSV with cold engine.
   (1) The coolant temperature should be below 30°C (86°F).
   (2) Disconnect the vacuum hose from the choke opener.

Fig. 2-38



(3) Fully pull out the choke knob, depress the accelerator pedal once, and start the engine.

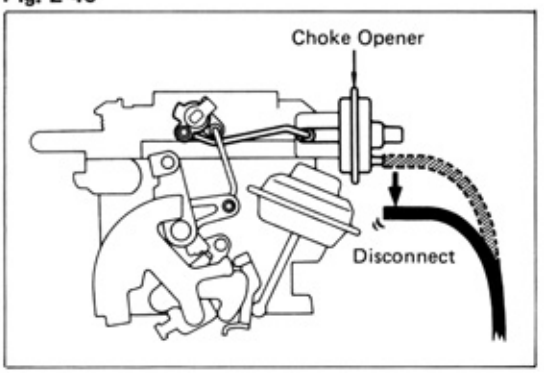
Fig. 2-39



(4) Reconnect the vacuum hose to the choke opener and check that the choke linkage does not move.

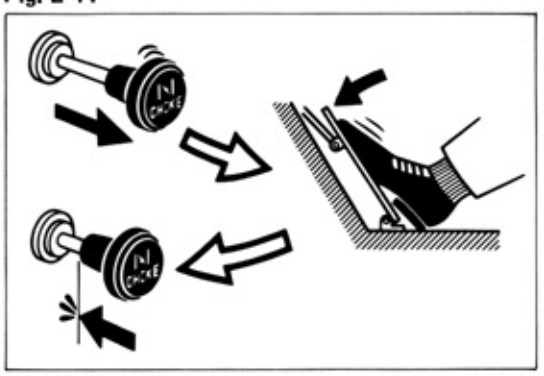
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Fig. 2-40



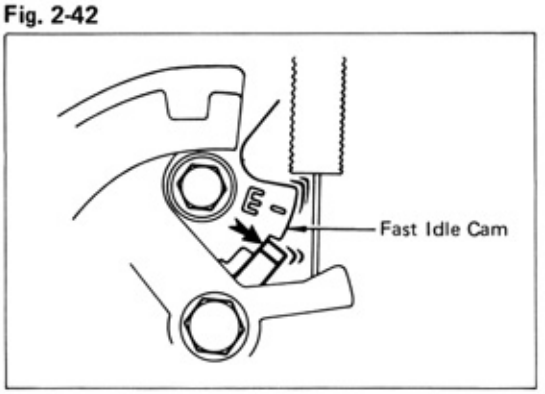
2. Check BVSV, diaphragm and linkage with hot engine.
   (1) Warm-up the engine to normal operating temperature and stop the engine.
   (2) Disconnect the vacuum hose from the choke opener.

Fig. 2-41



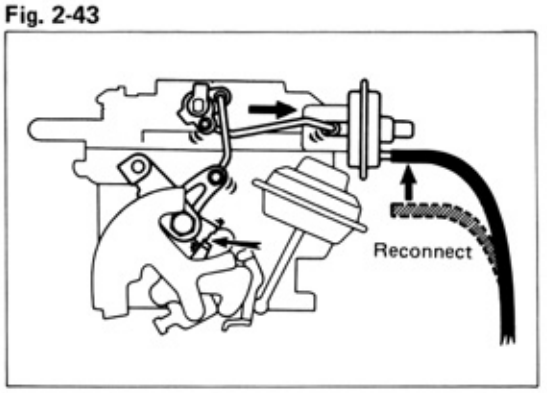
(3) Fully pull out the choke knob, depress the accelerator pedal once, and return the choke knob about half way.

Fig. 2-42



(4) Check that the fast idle cam is at the second step.
(5) Start the engine.

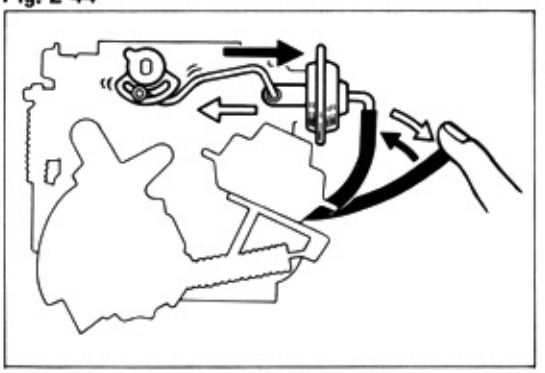
Fig. 2-43



(6) Reconnect the vacuum hose and check that the choke linkage moves, and that the fast idle cam is released to the third step.
(7) When the choke knob is pushed in all the way, check that the engine speed returns to idle.

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Fig. 2-44



Choke Breaker (4K A/T & Australia 4K-C)

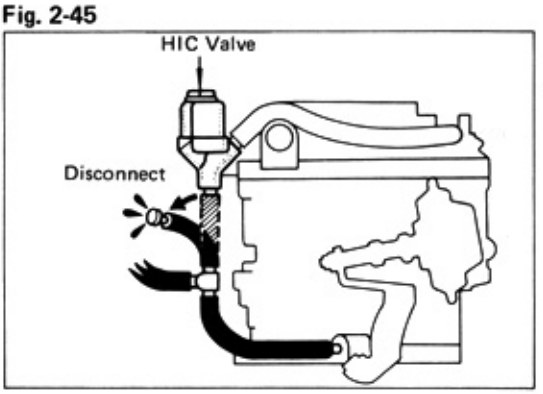
1. With the engine idling, disconnect the vacuum hose from the choke breaker. Check to see that the choke linkage has returned.
2. Reconnect the vacuum hose and check to see that the choke linkage is pulled in by the diaphragm.
   If defective, replace the diaphragm.

IDLE SPEED & IDLE MIXTURE ADJUSTMENT

2K, 3K-C, 3K-H, 4K & 4K-C

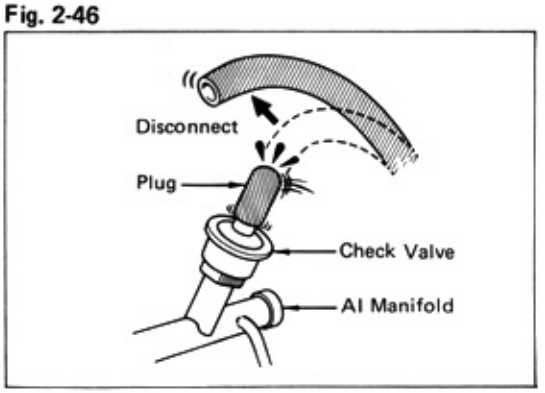
1. The adjusting and measuring conditions should be as follows:
   (1) Air cleaner installed
   (2) Normal operating coolant temperature
   (3) Choke fully open
   (4) All accessories switched off
   (5) All vacuum lines connected
   (6) Transmission in N range
   (7) Ignition timing set
   (8) Tachometer & vacuum gauge attached
   (9) Zero setting of CO meter warmed up

Fig. 2-45



2. Disconnect the HIC hose and plug the hose end.

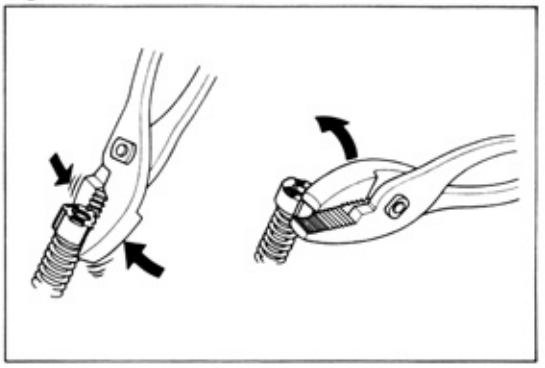
Fig. 2-46



3. Australia N.S.W & Victoria only:
   Disconnect the air injection hose from the AI check valve and plug the check valve.

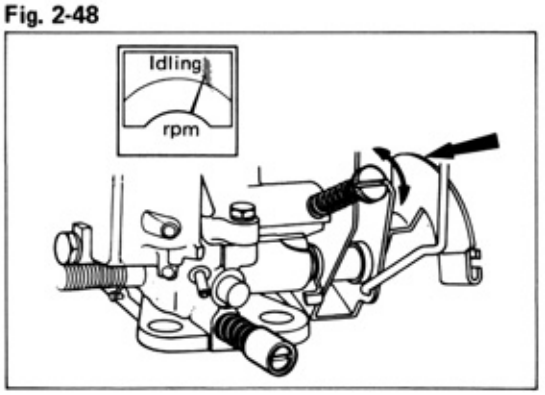
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Fig. 2-47



4. Break the idle limiter cap on the idle mixture adjusting screw if installed.

Fig. 2-48

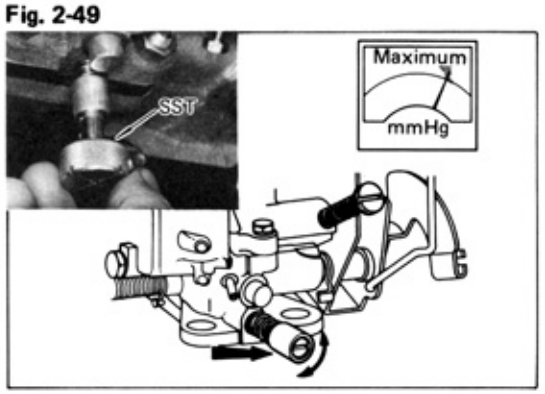


5. Set the idle speed to specified rpm by turning the idle speed adjusting screw.

Idle speed:

2K, 3K-C, 3K-H, 4K M/T &	
Sweden 4K-C	**750 rpm**
Australia 4K & 4K-C	**800 rpm**
4K A/T	**850 rpm**

Fig. 2-49



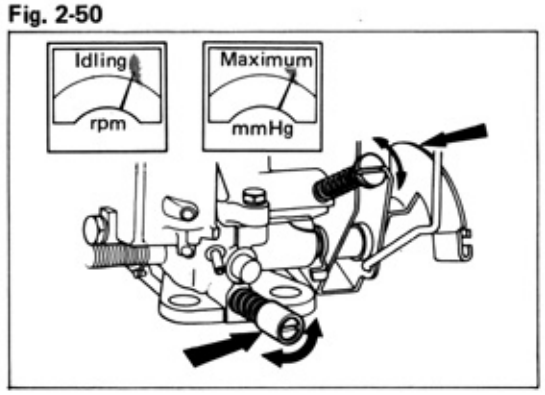
6. Set to the maximum vacuum by turning the idle mixture adjusting screw.

– Note –

It is necessary to use SST for Europe specification engine adjustment.

SST [09243-00010] or [09243-00020]

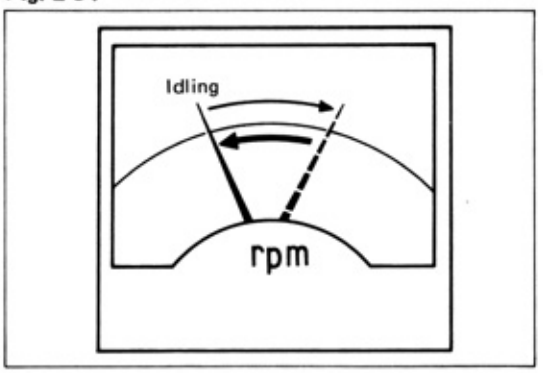
Fig. 2-50



7. Repeat adjustments 5 and 6 above until the maximum vacuum reading at the specified idle speed is obtained.

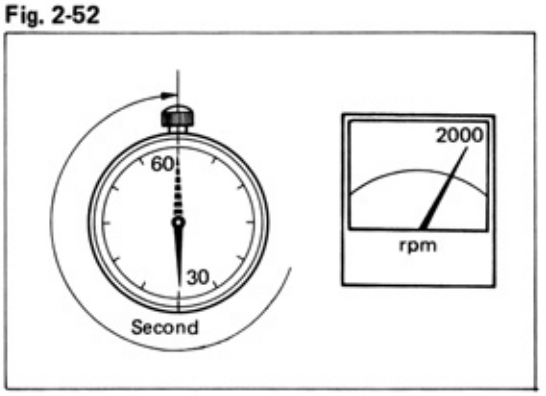
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Fig. 2-51



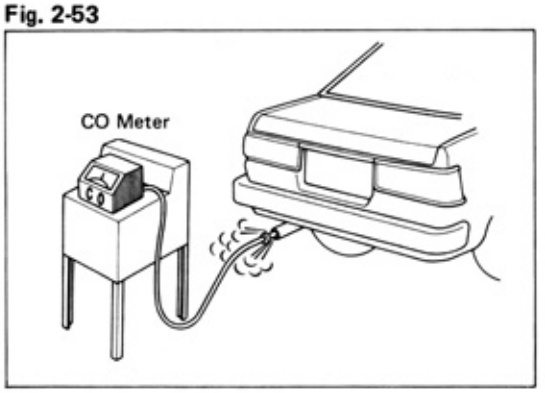
8. Race the engine momentarily with the accelerator link to verify that the engine returns to specified rpm when released.

Fig. 2-52



9. Measure the CO concentration in the exhaust gases with a CO meter.
   (1) Be sure to race the engine at about 2,000 rpm for 30 – 60 seconds.

Fig. 2-53



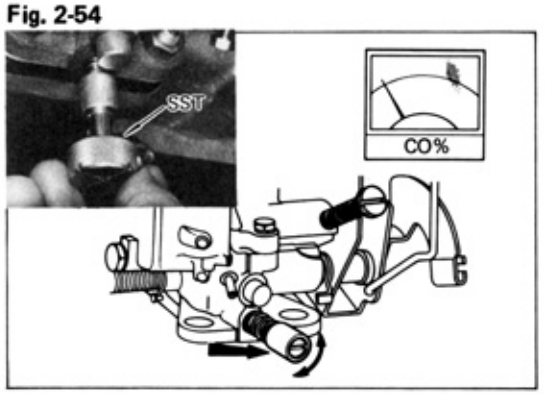
   (2) To allow the concentration to stabilize, wait at least one minute before measuring but complete the measuring within three minutes.

CO concentration

Engine model	%
2K (KP60 series), 3K-C, 3K-H & 4K	0.5 – 1.5
2K (KP36 series)	0.5 – 3.5
Australia 4K-C	1.0
Sweden 4K-C	0.3 – 2.0

   (3) If the concentration exceeds the specified value, tighten the idle mixture adjusting screw little by little until the concentration is within the specified value.

Fig. 2-54

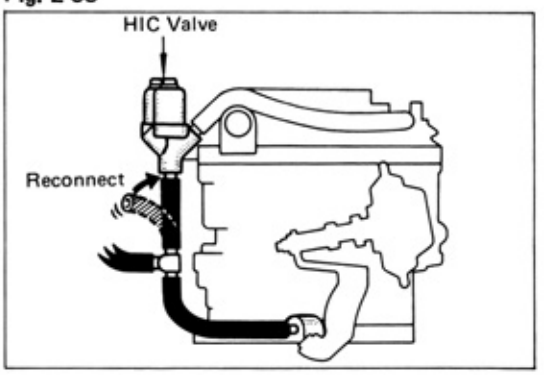


– Note –

1. **When the idle mixture adjusting screw is tightened, there will be a point where the engine speed drops rapidly. Further adjustment must not be attempted by screwing in beyond this point.**
2. **Allowable engine idle speed is ± 50 rpm of the specified speed.**

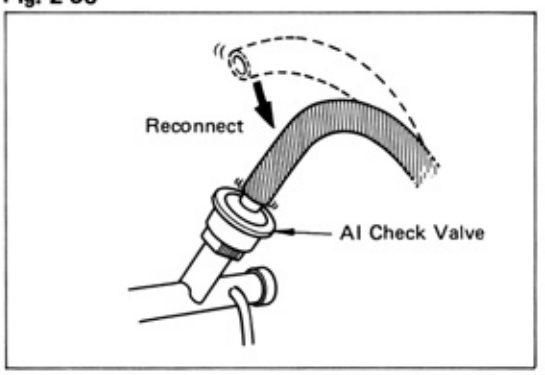
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Fig. 2-55



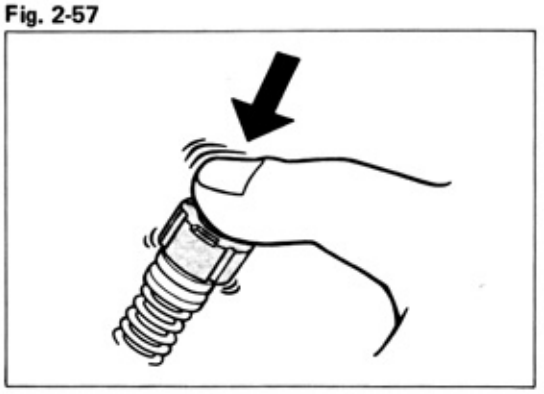
10. Reconnect the hose to the HIC valve.

Fig. 2-56



11. Australia N.S.W. & Victoria only:
Reconnect the air injection hose to the AI check valve.

Fig. 2-57



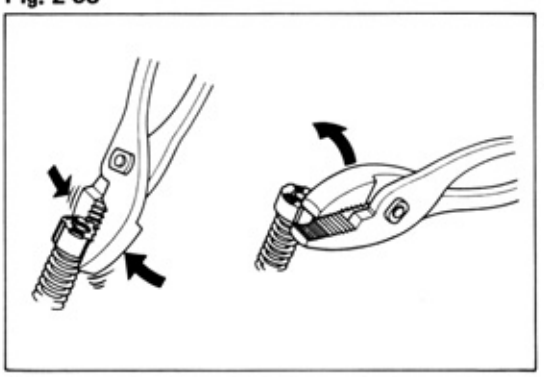
12. Install the new idle limiter cap on the idle mixture adjusting screw.

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CANADA 4K-C (LEAN DROP METHOD)

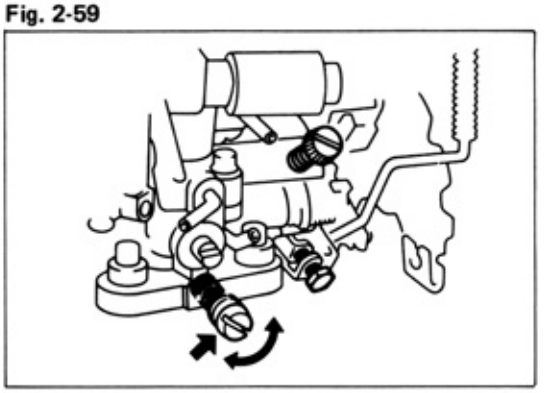
1. The adjusting and measuring conditions should be as follows:
   (1) Air cleaner installed
   (2) Normal operating coolant temperature
   (3) Choke fully open
   (4) All accessories switched off
   (5) All vacuum lines connected
   (6) Transmission in N range
   (7) Ignition timing set

Fig. 2-58



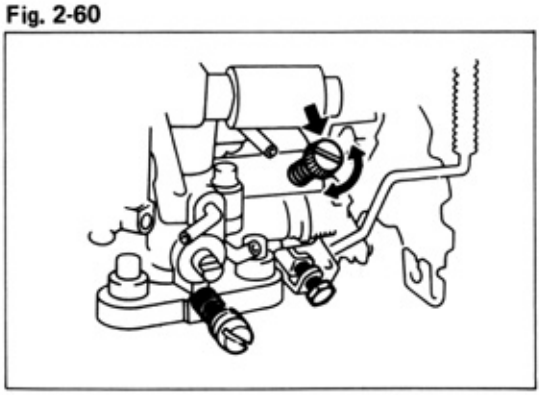
2. Break the idle limiter cap on the idle mixture adjusting screw if installed.

Fig. 2-59



3. Adjust idle speed and idle mixture.
   (1) Start the engine.
   (2) Set to the maximum speed by turning the idle mixture adjusting screw.

Fig. 2-60



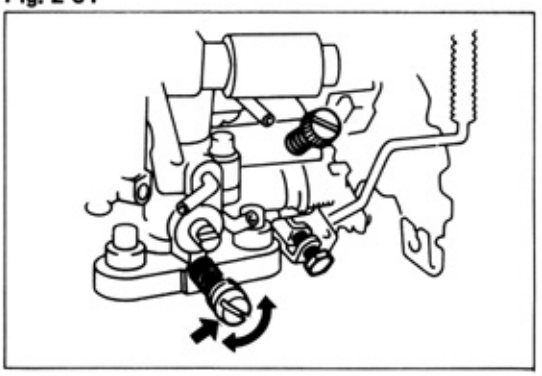
   (3) Set the idle mixture speed by turning the idle speed adjusting screw.
   Idle mixture speed: 680 rpm

– Note –
Make adjustment with the cooling fan OFF.

   (4) Before moving to the next step, continue adjustments 2 and 3 until the maximum speed will not rise any further no matter how much the idle mixture adjusting screw is adjusted.

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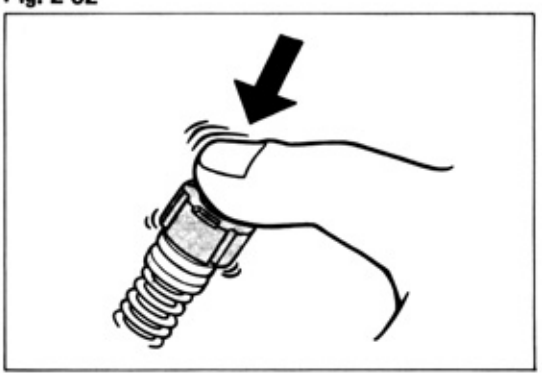
Fig. 2-61



(5) Set to the idle speed by screwing in the idle mixture adjusting screw.
Idle speed: 650 rpm

– Note –
1. **Make adjustment with the cooling fan OFF.**
2. **This is the Lean Drop Method for setting idle speed and mixture.**

Fig. 2-62

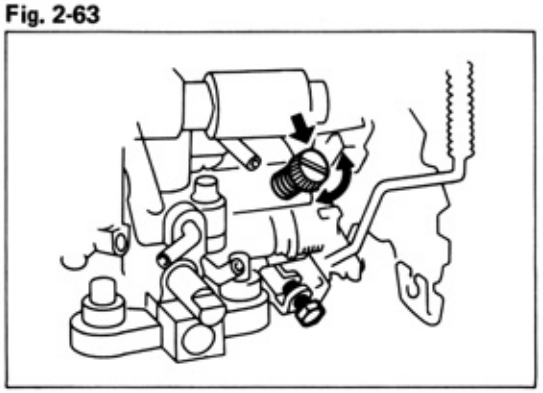


4. Install a new limiter cap on the idle mixture adjusting screw, if one was installed.

USA 4K-C (IDLE SPEED)

1. The adjusting and measuring conditions should be as follows:
   (1) Air cleaner installed
   (2) Normal operating coolant temperature
   (3) Choke fully open
   (4) All accessories switched off
   (5) All vacuum lines connected
   (6) Transmission in N range
   (7) Ignition timing set

Fig. 2-63

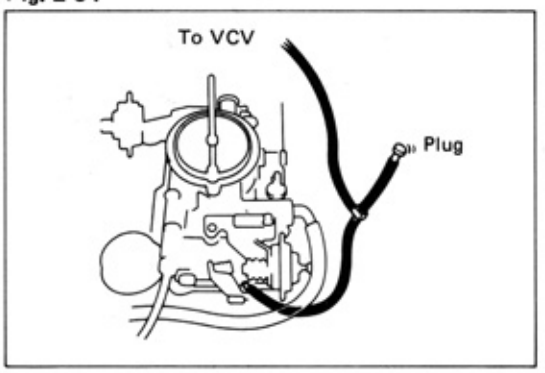


2. Adjust the idle speed by turning the idle speed adjusting screw.
   Idle speed:
   Federal 650 rpm
   California 700 rpm

– Note –
Make adjustment with the cooling fan OFF.

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Fig. 2-64

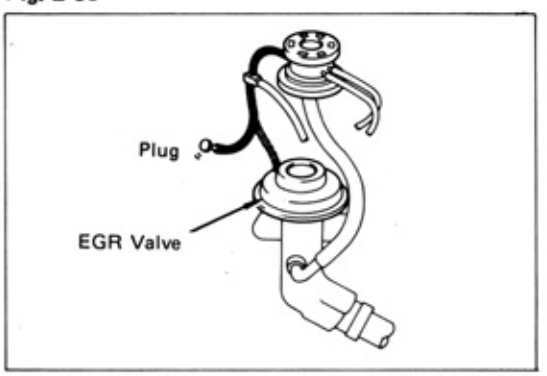


FAST IDLE SPEED

ADJUSTMENT

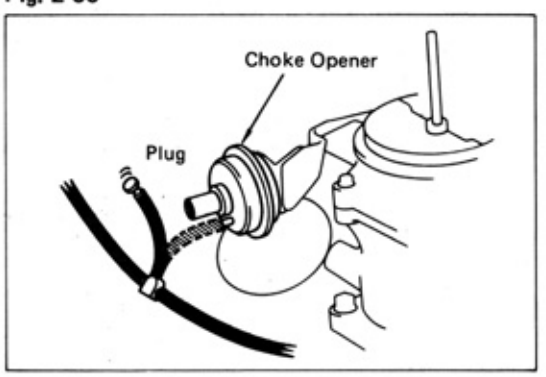
1. Remove the air cleaner and plug the hose end for the HIC system to prevent rough idling.
2. Warm up the engine and then turn it off.

Fig. 2-65



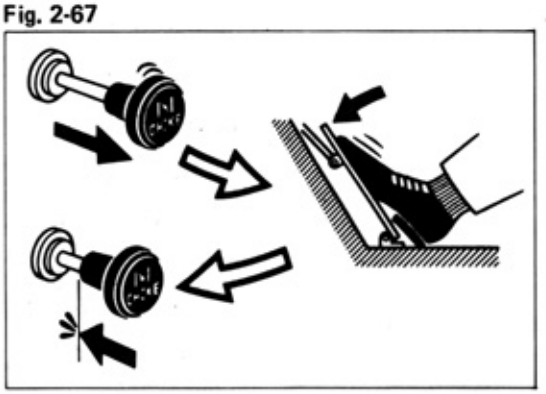
3. Disconnect the vacuum hose from the EGR valve and plug the hose end.

Fig. 2-66



4. Disconnect the vacuum hose from the choke opener and plug the hose end.

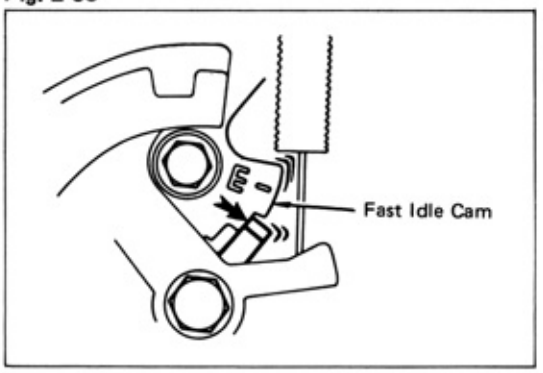
Fig. 2-67



5. Fully pull out the choke knob, depress the accelerator pedal once, and return the choke knob about half way.

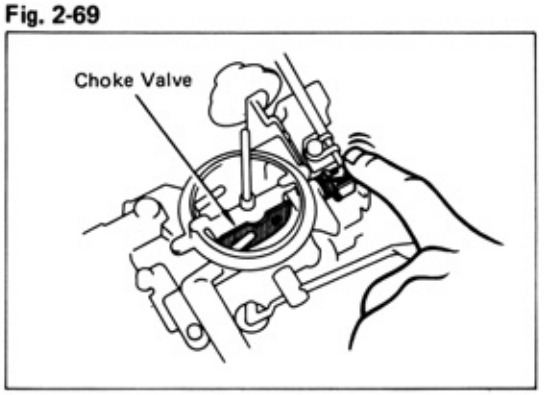
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Fig. 2-68



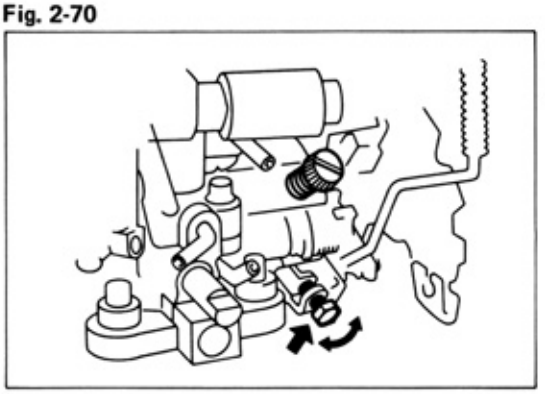
6. Check that the fast idle cam is at the second stop.

Fig. 2-69



7. Start the engine and fully open the choke valve.

Fig. 2-70



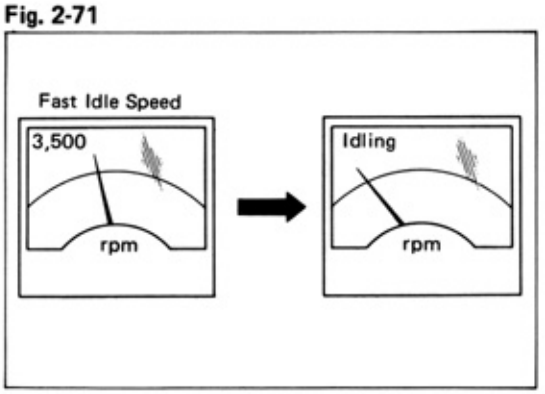
8. Adjust the fast idle speed by turning the fast idle adjusting screw.

Fast idle speed:

KM20 series (4K & 4K-C)	**1,500 rpm**
Australia 4K	**3,100 rpm**
USA & Canada	**3,500 rpm**

9. Reconnect the vacuum hoses to the proper locations.

Fig. 2-71



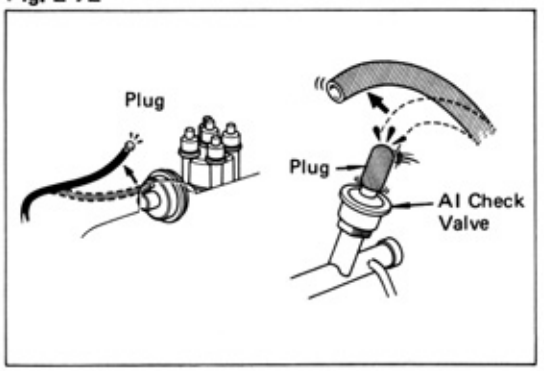
10. Make sure that the engine returns to the specified idle speed after racing the engine.

Idle speed:

USA (ex. California) & Canada	**650 rpm**
California	**700 rpm**
KM20 series (4K & 4K-C)	**800 rpm**

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Fig. 2-72

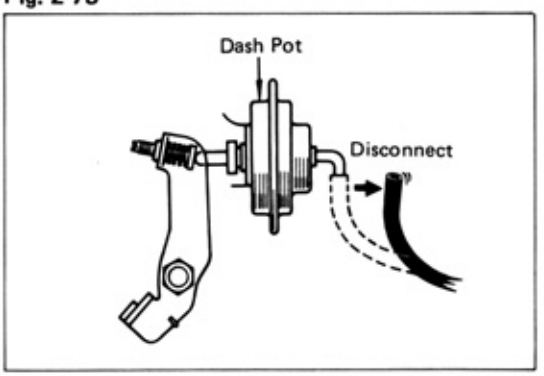


DASH POT (Australia & Sweden)

ADJUSTMENT

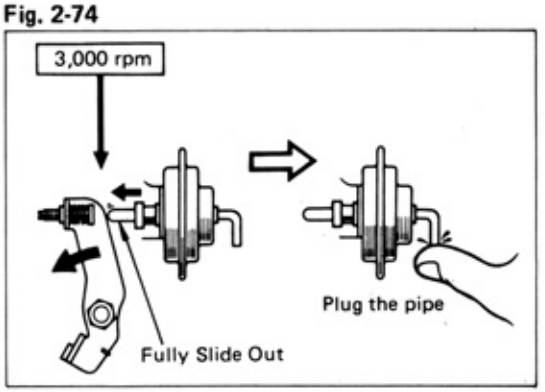
1. Warm up the engine and then turn it off.
2. Disconnect the vacuum hose from the distributor and plug the hose end.
3. Disconnect the air injection hose from the air injection check valve and plug the check valve (Australia only).

Fig. 2-73



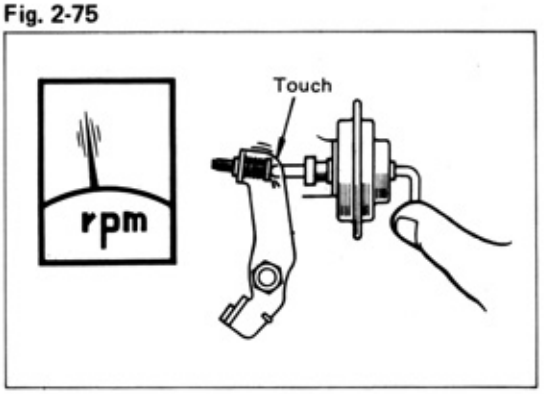
4. Disconnect the vacuum hose from the dash pot.

Fig. 2-74



5. Set the engine speed at 3,000 rpm.
6. Plug the dash pot diaphragm pipe with your finger.
7. Release the accelerator.

Fig. 2-75



8. Check the dash pot setting speed.

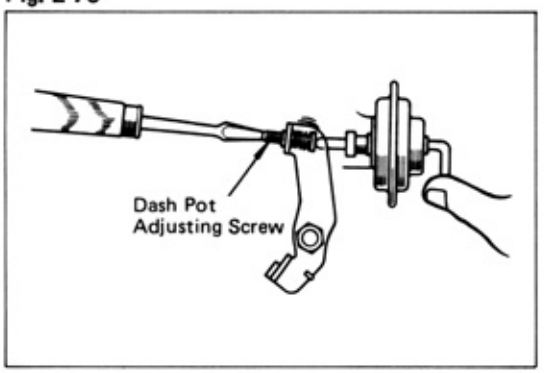
Dash pot setting speed:

Australia 4K	**1,700 rpm**
Sweden 3K-C	**2,000 rpm**
Sweden 4K-C	**2,300 rpm**
Australia 4KC & 4K (KM20 series)	**2,100 rpm**

– Note –
The diaphragm shaft should not move.

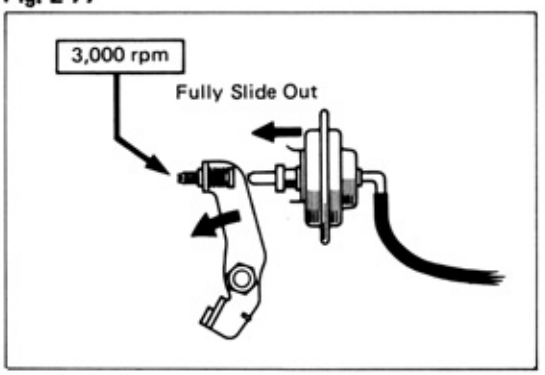
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Fig. 2-76



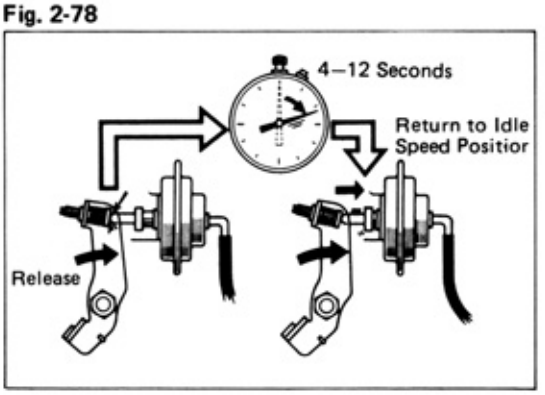
9. If not at dash pot setting speed, adjust the engine speed with the dash pot adjusting screw.

Fig. 2-77



10. Reconnect the vacuum hose to the dash pot.
11. Again set the engine speed at 3,000 rpm for about 10 seconds.
    Confirm that the diaphragm shaft fully slides out.

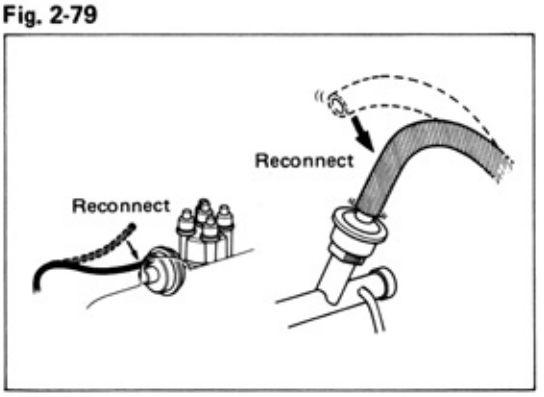
Fig. 2-78



12. Release the accelerator.
13. Check the operation time when the throttle arm returns to the idle speed position after it touches the dash pot diaphragm shaft.
    DP operation time: 4 – 12 seconds

    If the operation time is not within specification, inspect the dash pot diaphragm, jet and vacuum hose.

Fig. 2-79

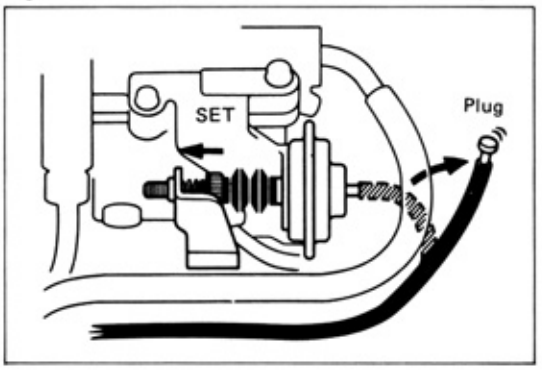


14. Reconnect the hoses to the proper locations.

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THROTTLE POSITIONER (USA & Canada)

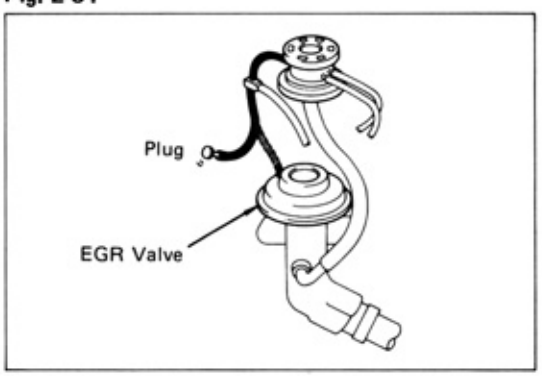
Fig. 2-80



ADJUSTMENT

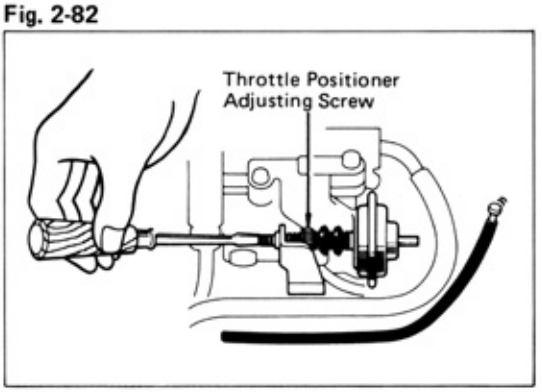
1. Warm up the engine.
2. Disconnect the vacuum hose from the throttle positioner and plug the hose end.

Fig. 2-81



3. Disconnect the vacuum hose from the EGR valve and plug the hose end.

Fig. 2-82



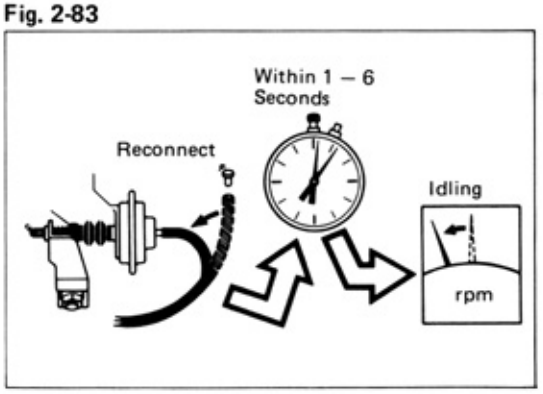
4. After the throttle positioner is set, check that the engine speed is correct.

Throttle positioner setting speed:
2,000 rpm

If not at specified speed, adjust with the throttle positioner adjusting screw.

– Note –
Make adjustment with the cooling fan OFF.

Fig. 2-83

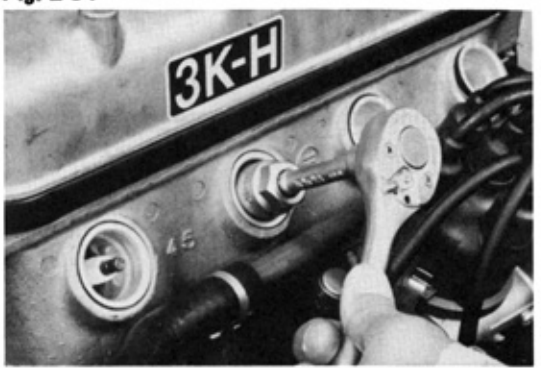


5. Reconnect the vacuum hose to the throttle positioner, check that the engine returns to idle speed within 1–6 seconds.
6. Reconnect the vacuum hose to the EGR valve.

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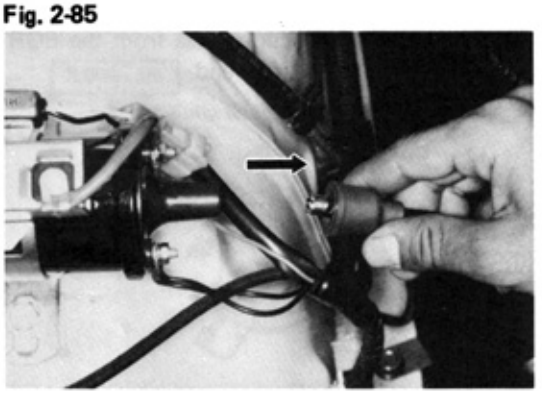
COMPRESSION PRESSURE

Fig. 2-84



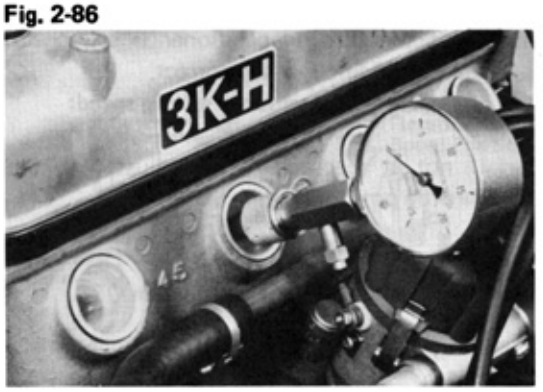
1. Warm up the engine.
2. Remove all spark plugs.

Fig. 2-85



3. Disconnect the high tension cord from the ignition coil to cut off the secondary circuit.

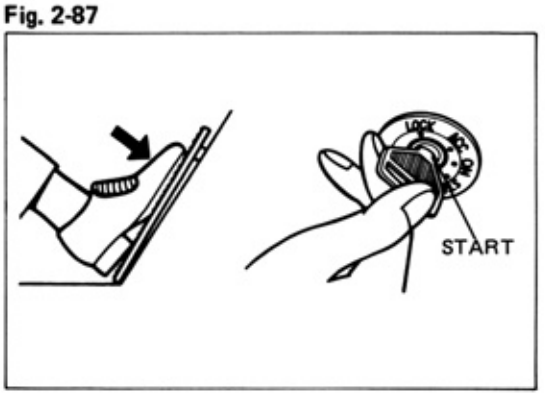
Fig. 2-86



4. Tightly insert a compression gauge into the spark plug hole.

5. Open the throttle valve fully and read the compression pressure while cranking the engine with the starter motor.

Fig. 2-87



– Note –

Keep pressure measuring time to a minimum.

Cranking speed: 250 rpm

Compression pressure:

STD	**11.0 kg/cm^2 (156 psi)**
Limit	**9.0 kg/cm^2 (128 psi)**

Difference between each cylinder:

1.0 kg/cm^2 (14 psi)

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MEMO

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ENGINE SERVICE

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TIMING CHAIN & CAMSHAFT	3-18
CYLINDER BLOCK	3-29

3

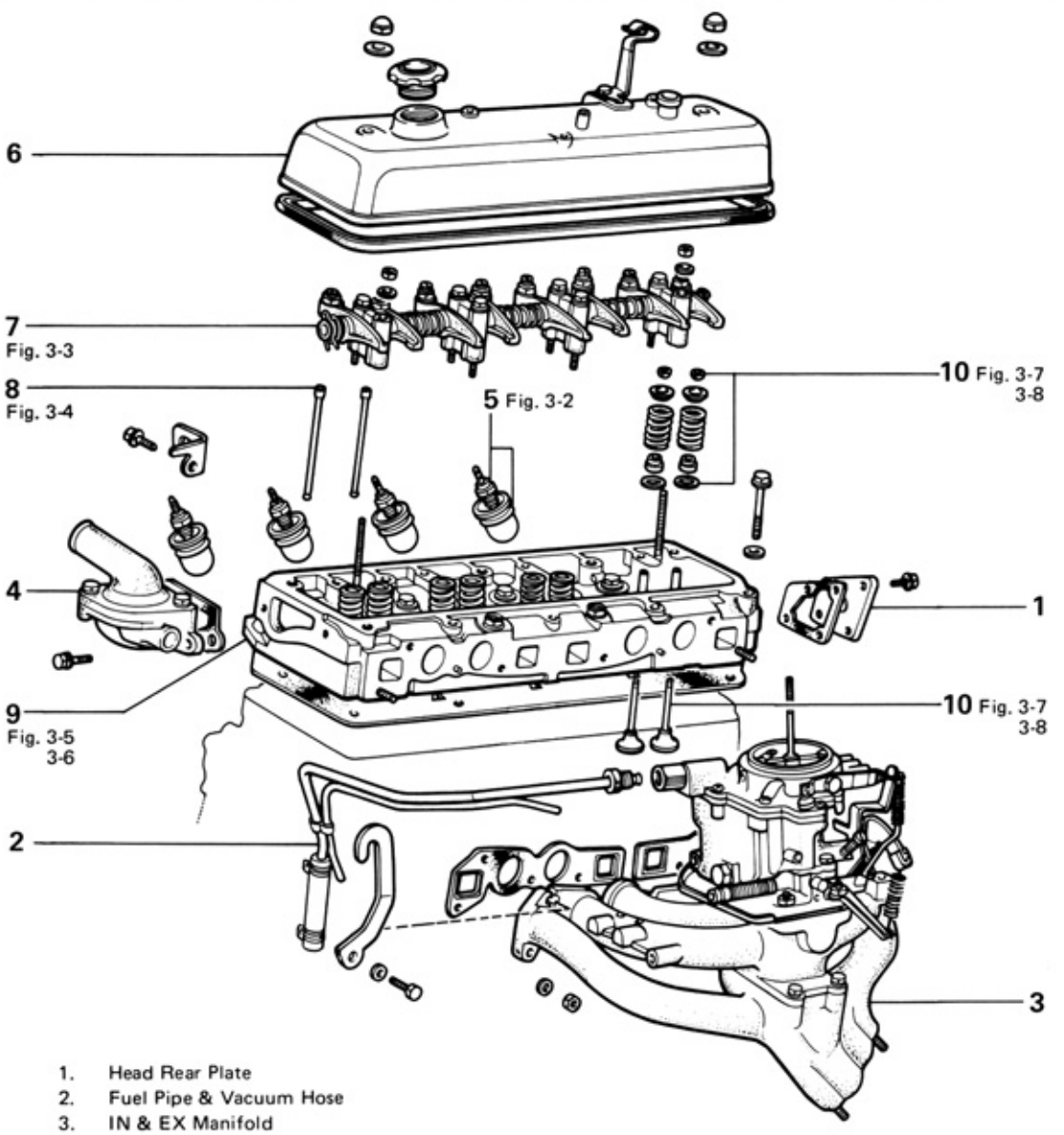
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CYLINDER HEAD

DISASSEMBLY

Disassemble the parts in the numerical order shown in the figure.

Fig. 3-1



1. Head Rear Plate
2. Fuel Pipe & Vacuum Hose
3. IN & EX Manifold
4. Water Outlet
5. Spark Plug & Tube
6. Cylinder Head Cover
7. Rocker Arm Shaft Assembly
8. Valve Push Rod
9. Cylinder Head
10. Valve, Spring & Oil Seal

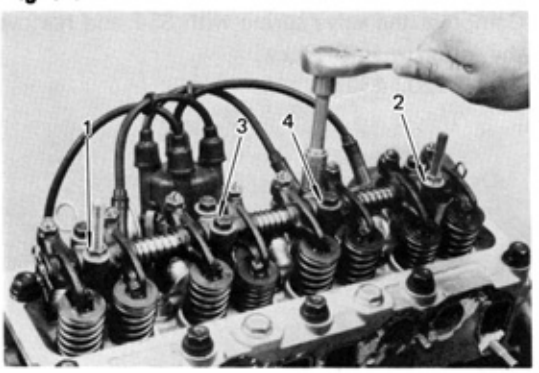
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Fig. 3-2



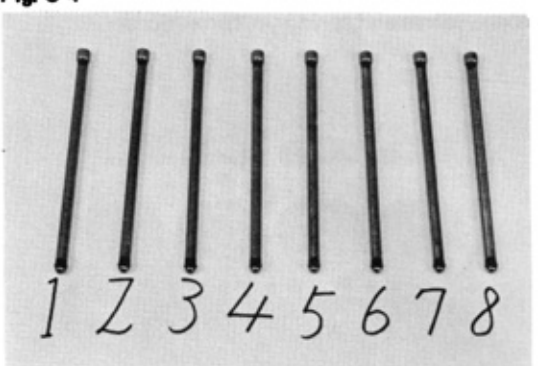
Remove the plug cords carefully by pulling on rubber boot.

Fig. 3-3



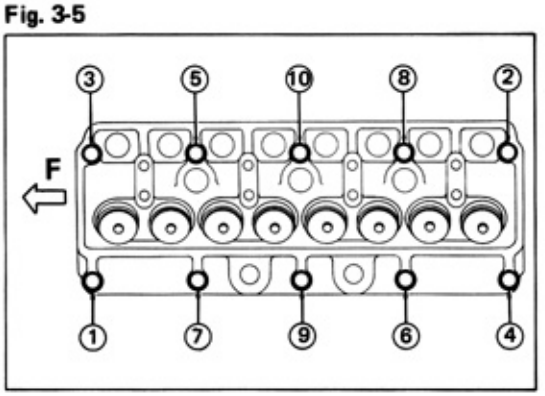
Loosen the valve rocker support bolts little by little, in three or four steps, in the specified numerical sequence.

Fig. 3-4



Keep the push rods in correct order.

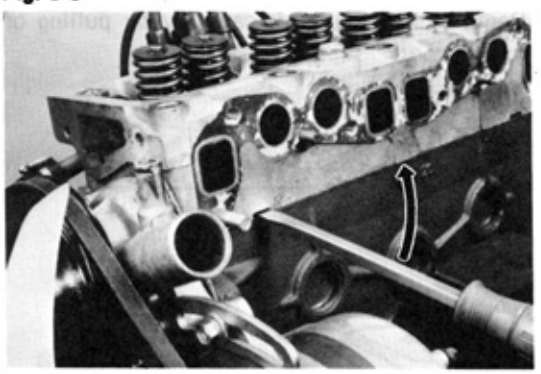
Fig. 3-5



Loosen cylinder head bolts little by little, in two or three steps, in the specified numerical sequence.

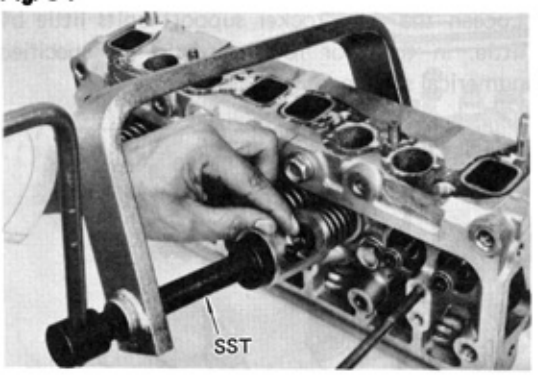
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Fig. 3-6



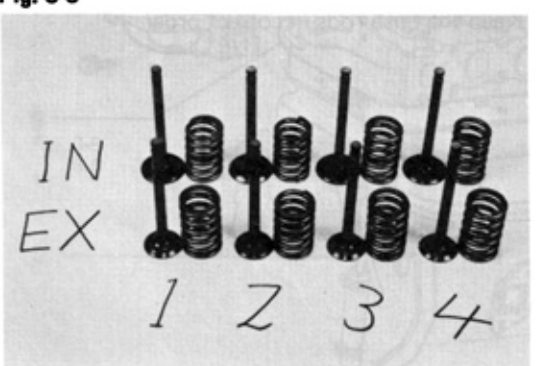
If it is difficult to lift up the cylinder head, insert a screwdriver between the head and block and pry off as shown in the figure.

Fig. 3-7



Compress the valve spring with SST and remove the spring retainer locks.
SST [09202-43012]

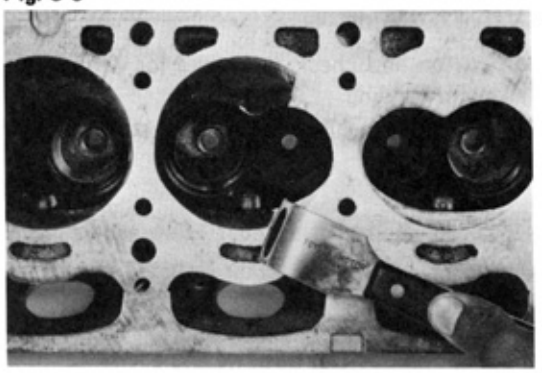
Fig. 3-8



Keep valves and springs in correct order.

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Fig. 3-9

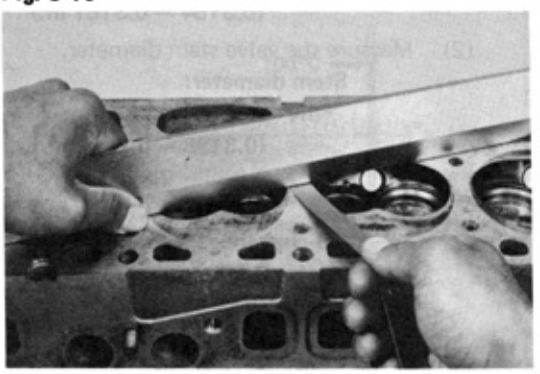


INSPECTION & REPAIR

Cylinder Head

1. Clean and check the cylinder head for cracks or scoring.

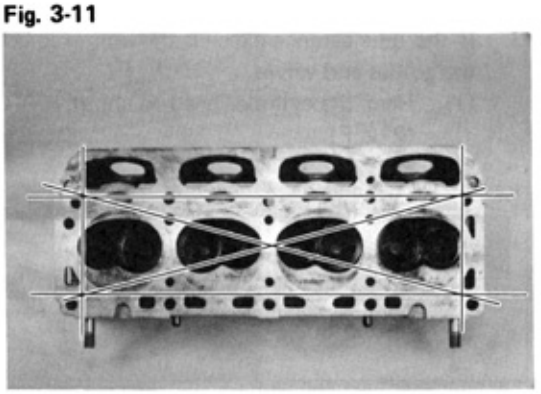
Fig. 3-10



2. Using a precision straight edge and thickness gauge, check cylinder head underside surface for warpage.

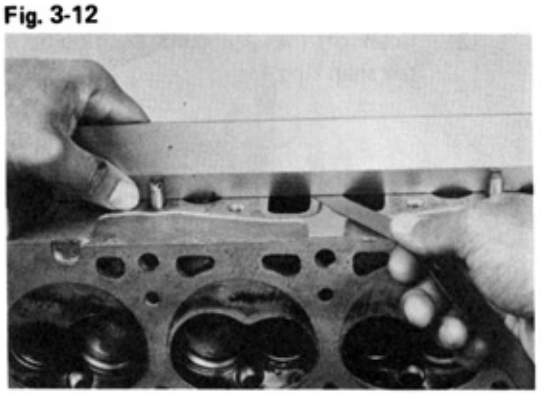
Underside surface warpage limit: 0.05 mm (0.0020 in.)

Fig. 3-11



3. Check surfaces along the indicated lines for warpage.

Fig. 3-12



4. Inspect the manifold mounting surface for warpage.

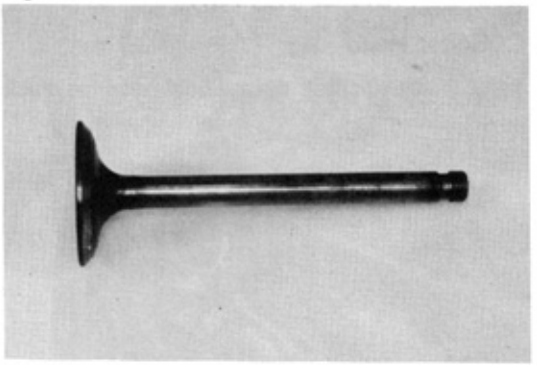
Manifold mounting surface warpage limit: 0.1 mm (0.004 in.)

5. If the warpage exceeds the limit, either machine flatten or replace the cylinder head.

Maximum reface limit: 0.3 mm (0.012 in.)

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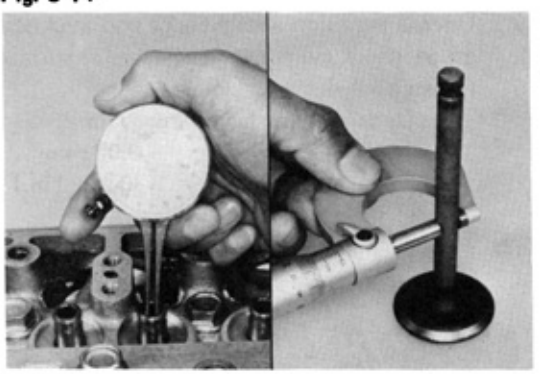
Fig. 3-13



Valve & Guide

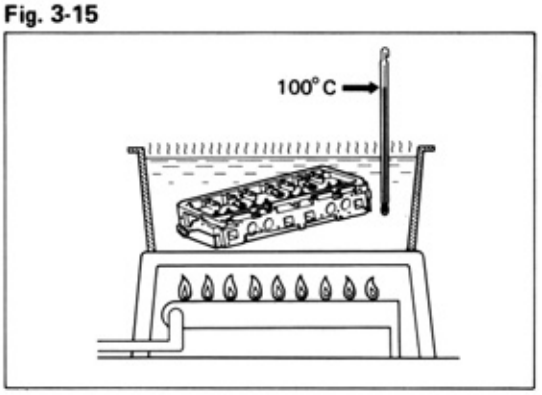
1. Clean and check the valves for wear, scores and bending.

Fig. 3-14



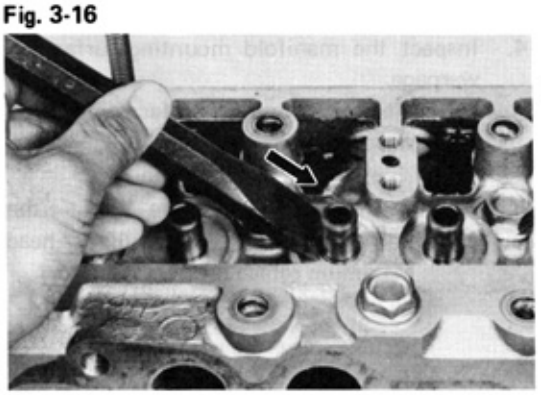
2. Measure the valve stem oil clearance.
   (1) Measure the inner diameter of the valve guide.
   Inner diameter
   (for both IN and EX):
   8.01 – 8.03 mm
   (0.3154 – 0.3161 in.)
   (2) Measure the valve stem diameter.
   Stem diameter:
   IN 7.965 – 7.980 mm
   (0.3136 – 0.3142 in.)
   EX 7.960 – 7.975 mm
   (0.3134 – 0.3140 in.)
   Oil clearance limit:
   IN 0.08 mm
   (0.0031 in.)
   EX 0.10 mm
   (0.0039 in.)

Fig. 3-15



3. If the oil clearance exceeds the limit, replace the guides and valves.
   (1) Heat the cylinder head to about 100°C (212°F).

Fig. 3-16



   (2) Break off the valve guide bushing tip at the snap ring.

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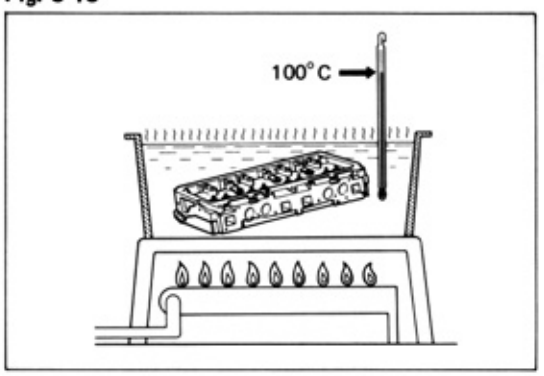
Fig. 3-17



(3) Using SST, drive out the valve guide from the top end toward the combustion chamber.
SST [09201-60011]

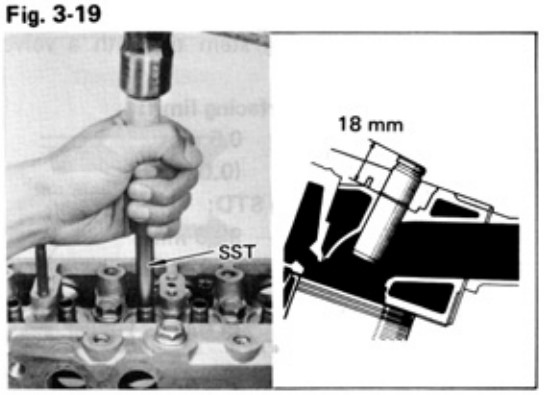
— Caution —
Before driving out the bushing, be sure the snap ring is removed.

Fig. 3-18



(4) Reheat the cylinder head to about 100°C (212°F).

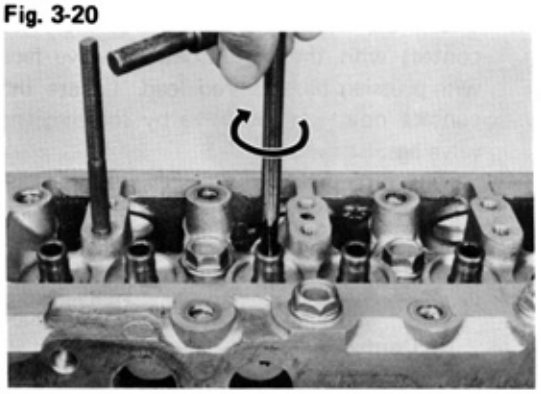
Fig. 3-19



(5) Drive in the new bushing with SST.
SST [09201-60011]
Projected length: 18 mm (0.71 in.)

— Note —
An oversize valve guide bushing of 0.05 is available to obtain proper tightness between the cylinder head and valve guide bushing.

Fig. 3-20

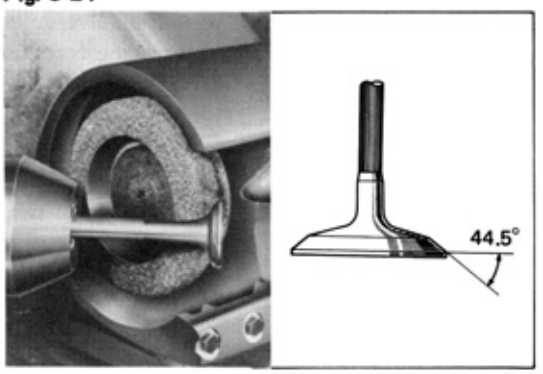


(6) Ream the valve guide with a sharp reamer to obtain the specified clearance.

Oil clearance STD:
IN 0.030 – 0.065 mm (0.0012 – 0.0026 in.)
EX 0.035 – 0.070 mm (0.0014 – 0.0028 in.)

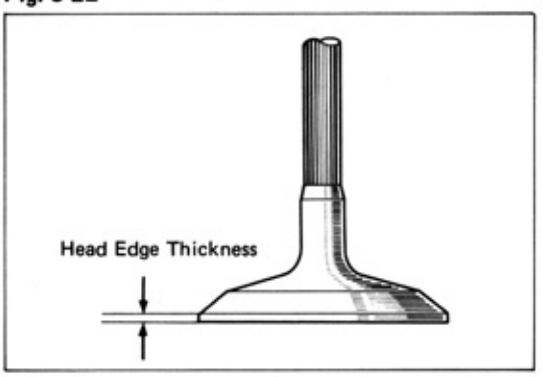
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Fig. 3-21



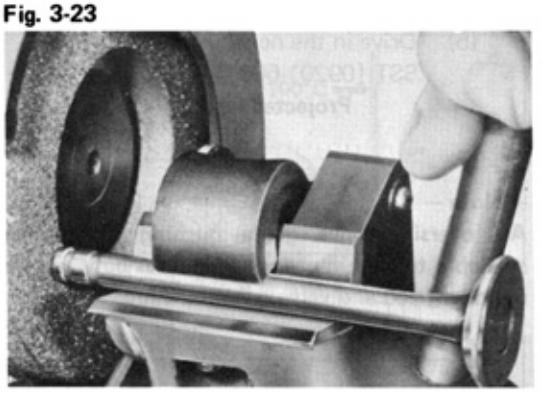
4. Reface the valve seating face with a valve refacer.
   Valve face angle: 44.5°

Fig. 3-22



5. Check the valve head edge thickness.
   Head edge thickness limit:
   IN 0.8 mm (0.031 in.)
   EX 0.9 mm (0.035 in.)

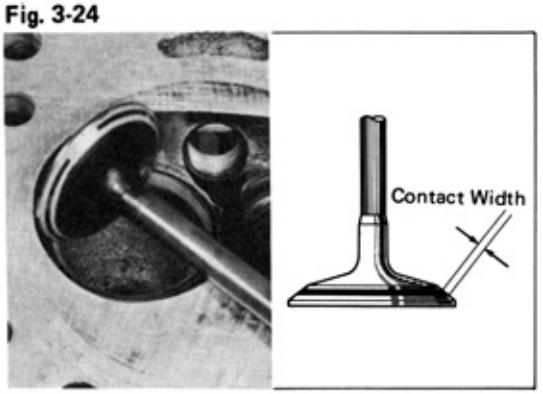
Fig. 3-23



6. Resurface the valve stem tip with a valve grinder.
   Stem tip resurfacing limit:
   0.5 mm (0.020 in.)
   Overall length STD:
   IN 99.9 mm (3.933 in.)
   EX 100.1 mm (3.941 in.)

Valve Seat

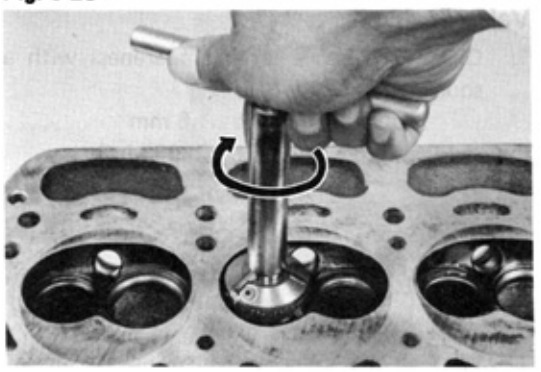
Fig. 3-24



1. Check the width and position of the valve contact with the seat. Coat the valve face with prussian blue or red lead. Locate the contact point on the valve by rotating the valve against the seat.
   Contact width:
   IN 1.1 – 1.8 mm (0.043 – 0.071 in.)
   EX 1.2 – 1.8 mm (0.047 – 0.071 in.)
   Contact position:
   Middle of valve face

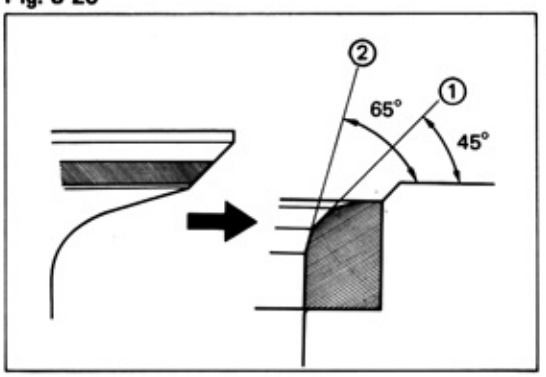
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Fig. 3-25



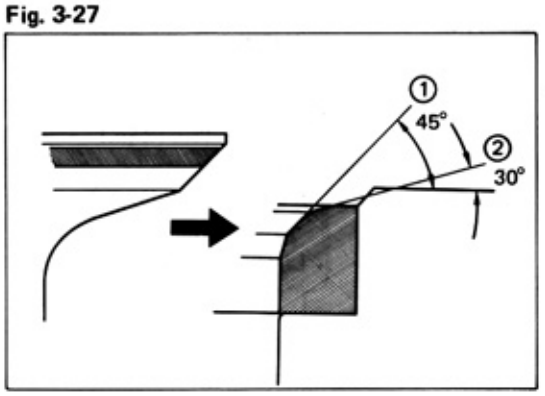
2. Resurface the valve seat with a 45° cutter to clean the seat.

Fig. 3-26



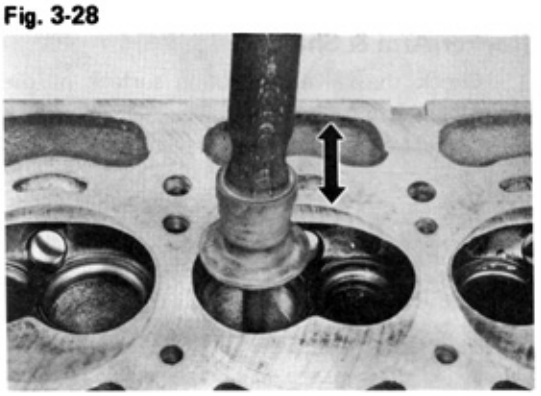
3. Correct seat position.
   (1) If the seat position is too high, use 45° and 65° cutters in the order indicated.

Fig. 3-27



   (2) If the seat position is too low, use 45° and 30° cutters in the order indicated.

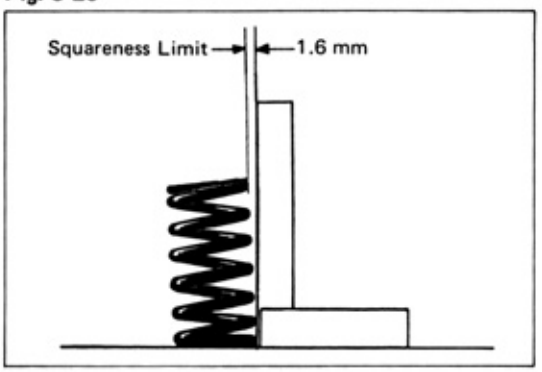
Fig. 3-28



4. After correction, the valve and valve seat should be lapped lightly with a lapping compound.

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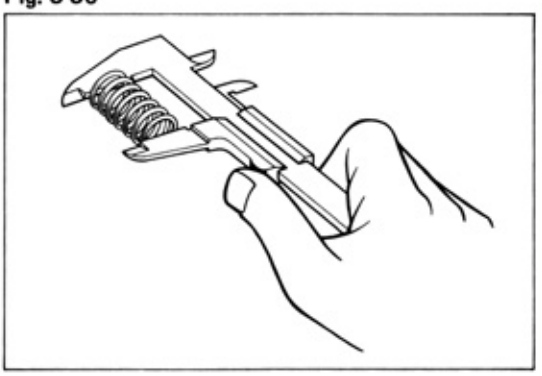
Fig. 3-29



Valve Spring

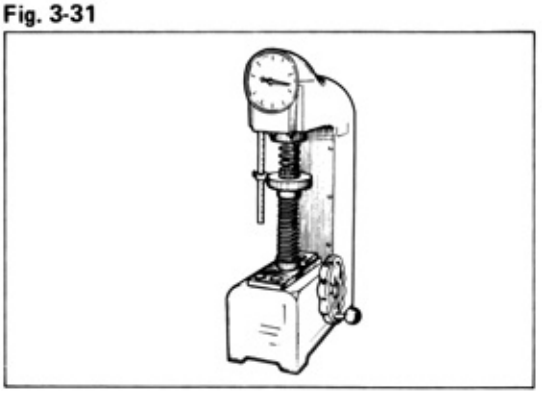
1. Check the valve spring squareness with a square.
   Squareness limit: 1.6 mm (0.063 in.)

Fig. 3-30



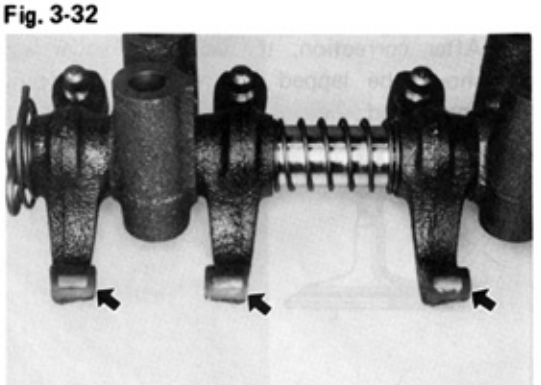
2. Measure the free length of the valve springs.
   Free length: 46.5 mm (1.831 in.)

Fig. 3-31



3. Using a spring tester, measure the spring tension at the specified installed length.
   Installed length: 38.4 mm (1.512 in.)
   Installed load:
   STD 31.8 kg (70.1 lb)
   Limit 25.0 kg (55.1 lb)

Fig. 3-32

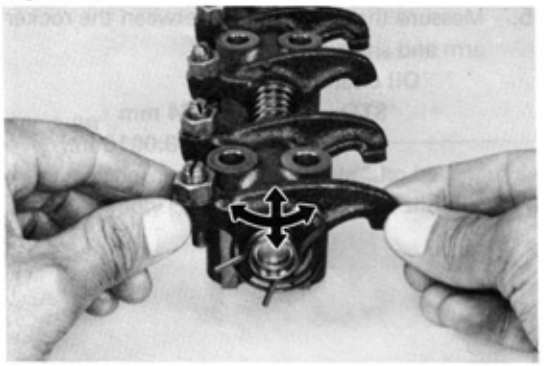


Rocker Arm & Shaft

1. Check the valve contacting surface of the rocker arm for wear.
   Correct or replace if necessary.

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Fig. 3-33

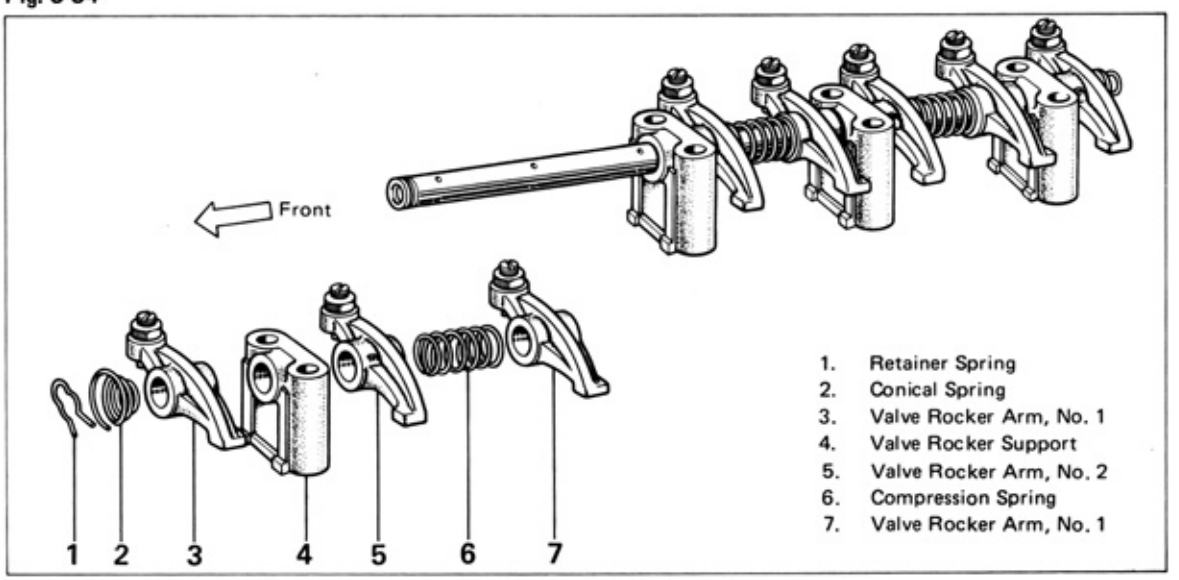


2. Check the rocker arm-to-shaft clearance by moving each rocker arm as shown in the figure. Little or no movement should be possible.
If movement is felt, disassemble and inspect.

3. Disassemble the valve rocker shaft assembly in the numerical order shown in the figure.

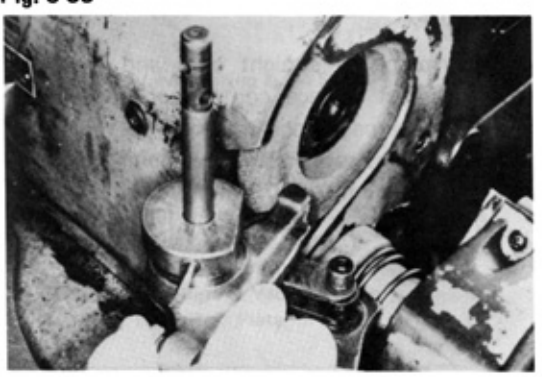
— Note —
Keep the rocker arms in correct order.

Fig. 3-34



1. Retainer Spring
2. Conical Spring
3. Valve Rocker Arm, No. 1
4. Valve Rocker Support
5. Valve Rocker Arm, No. 2
6. Compression Spring
7. Valve Rocker Arm, No. 1

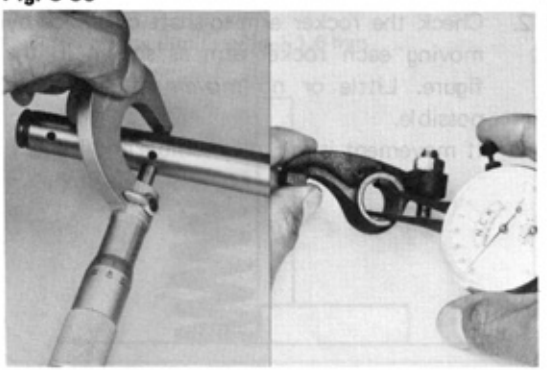
Fig. 3-35



4. If only a light ridged wear, correct the valve contacting surface of the rocker arm with a valve refacer and oil stone.

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Fig. 3-36



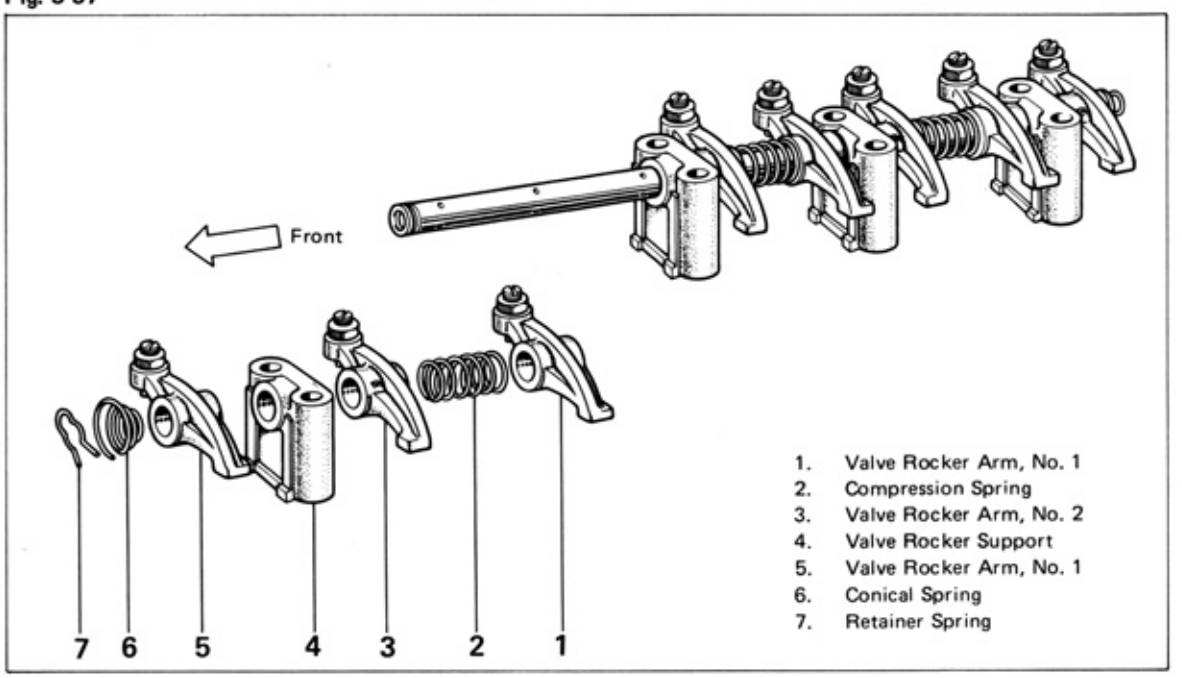
5. Measure the oil clearance between the rocker arm and shaft.

Oil clearance:

STD	**0.02 – 0.04 mm (0.0008 – 0.0016 in.)**
Limit	**0.06 mm (0.0024 in.)**

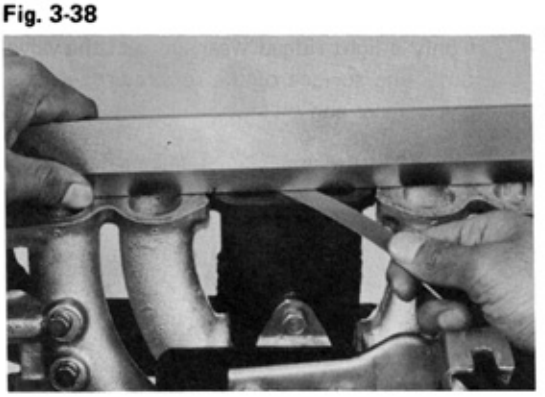
6. Assemble the valve rocker shaft assembly in the numerical order shown in the figure.

Fig. 3-37



1. Valve Rocker Arm, No. 1
2. Compression Spring
3. Valve Rocker Arm, No. 2
4. Valve Rocker Support
5. Valve Rocker Arm, No. 1
6. Conical Spring
7. Retainer Spring

Fig. 3-38



Manifold

Using a precision straight edge and thickness gauge, inspect surface contacting the cylinder head for warpage, and correct or replace if warped over the specified limit.

Warpage limit: 0.3 mm (0.012 in.)

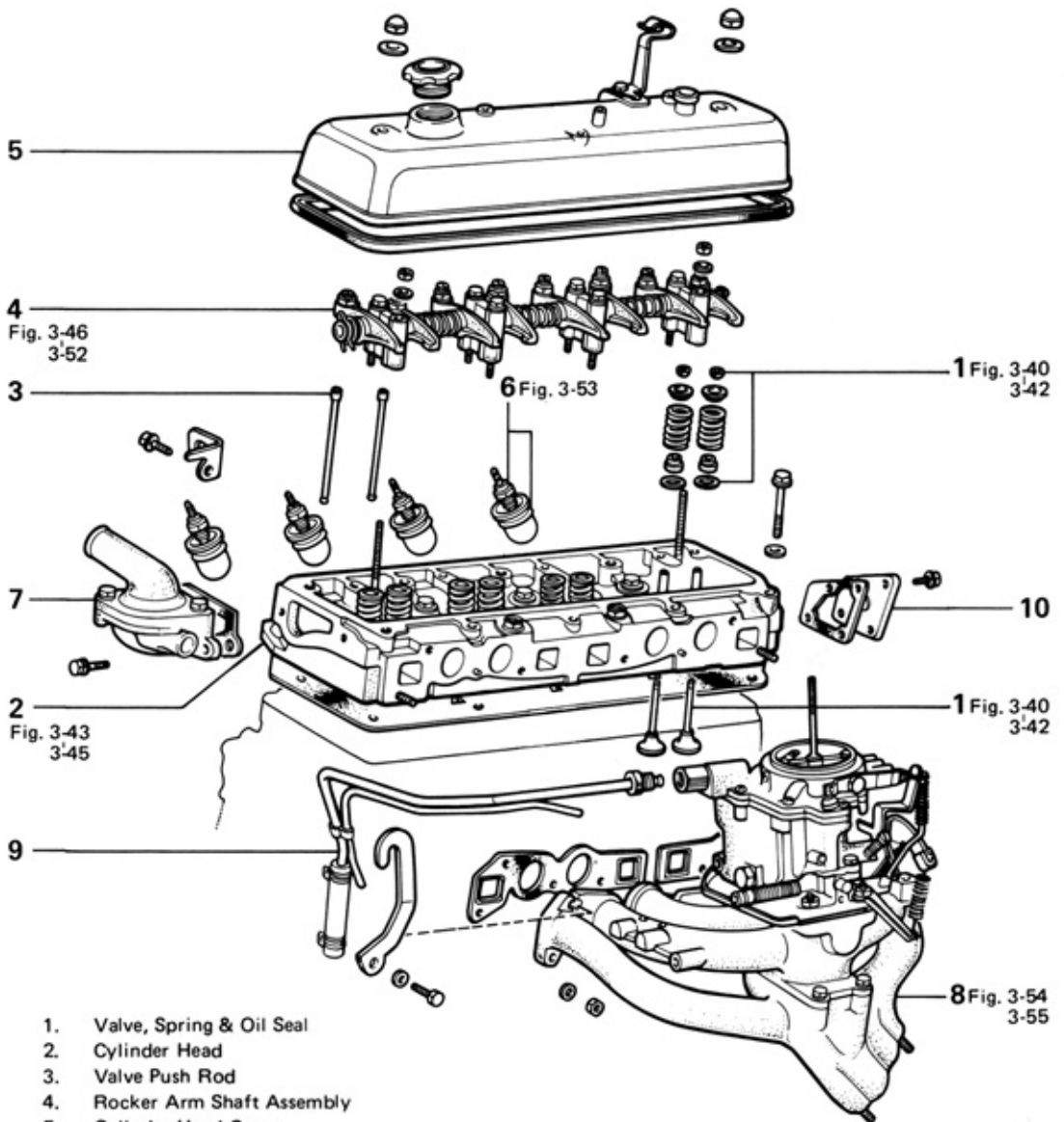
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ASSEMBLY

Assemble the parts in the numerical order shown in the figure.

Fig. 3-39

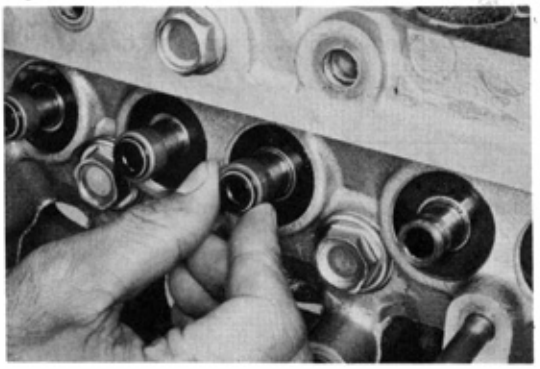
- **Thoroughly clean all parts to be assembled.**
- **Apply clean engine oil to all sliding and rotating surfaces of the parts before assembly.**



1. Valve, Spring & Oil Seal
2. Cylinder Head
3. Valve Push Rod
4. Rocker Arm Shaft Assembly
5. Cylinder Head Cover
6. Spark Plug & Tube
7. Water Outlet
8. IN & EX Manifold
9. Fuel Pipe & Vacuum Hose
10. Head Rear Plate

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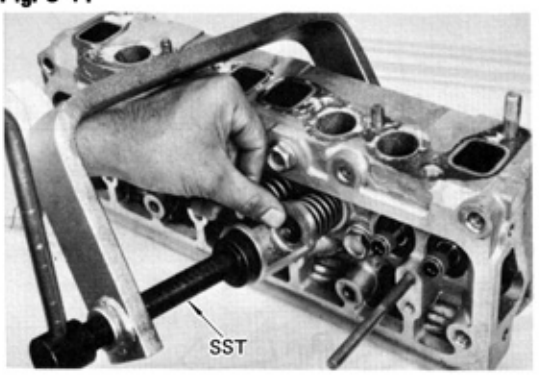
Fig. 3-40



Install the spring seat and oil seal before assembling the valve spring.

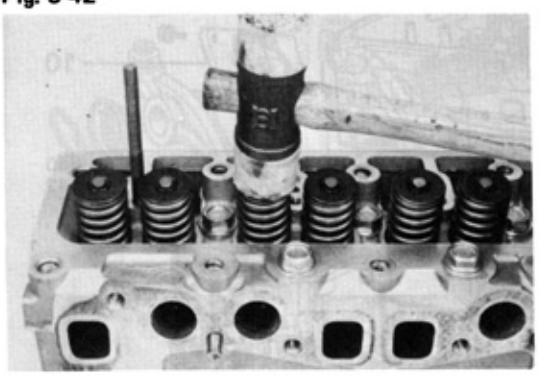
— Note —
A new oil seal should be used whenever the valve is disassembled.

Fig. 3-41



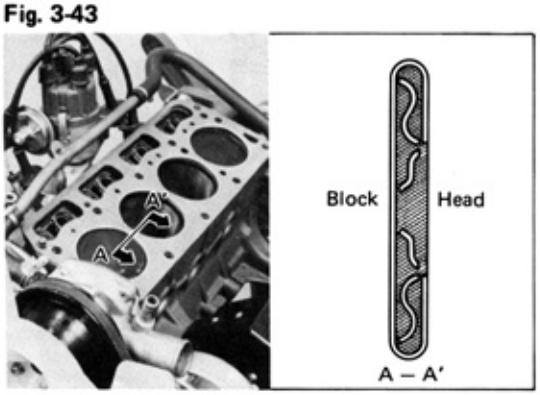
Compress the valve spring with SST and install the spring retainer locks.
SST [09202-43012]

Fig. 3-42



After installing the springs, lightly tap the stem ends to snuggle down the springs.

Fig. 3-43

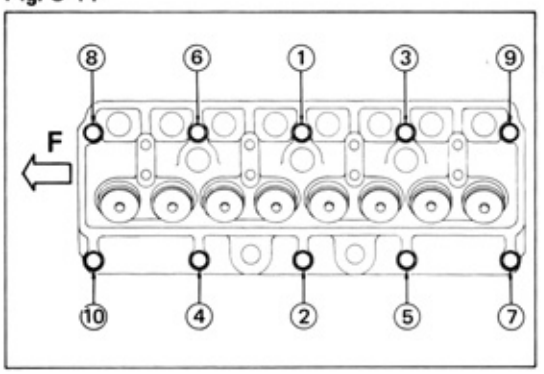


Put the cylinder head gasket on the cylinder block, aligning the bolt, water and oil holes as shown in the figure.

— Note —
Clean the cylinder block upper surface with a scraper before installing the head gasket.

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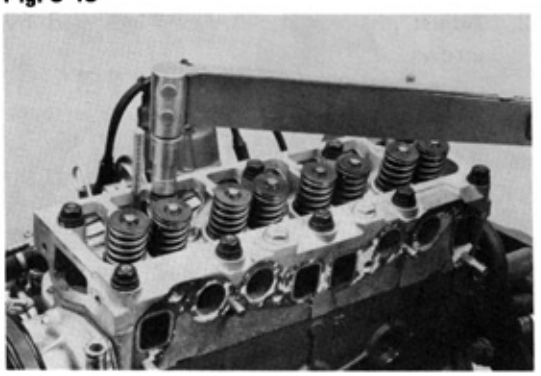
Fig. 3-44



Tighten the cylinder head bolts little by little, in two or three steps, in the specified numerical sequence.

– Note –
Apply a light coating of engine oil on the bolt threads and under the bolt head before installing.

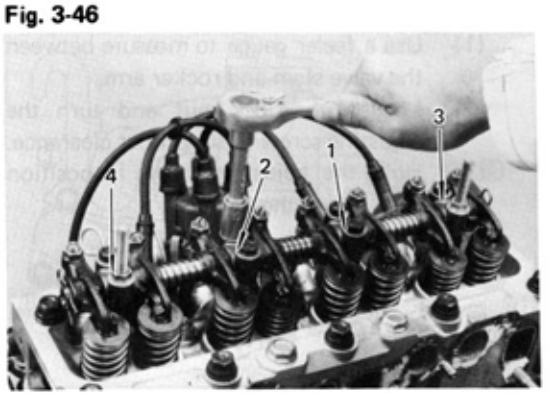
Fig. 3-45



Tighten the cylinder head bolts to specified torque.

Tightening torque: 5.4 – 6.6 kg-m (40 – 47 ft-lb)

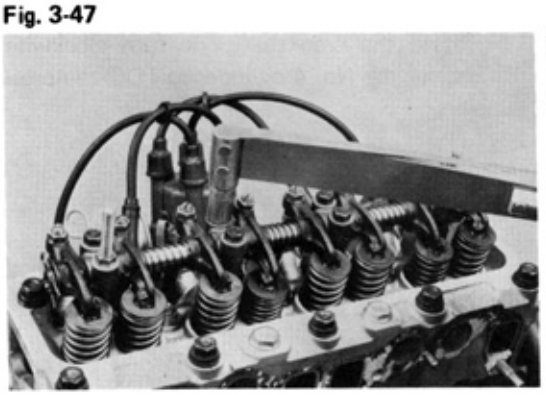
Fig. 3-46



Tighten the valve rocker support bolts little by little, in three or four steps, in the specified numerical sequence.

– Note –
Do not keep the valve push rods apart from the adjusting screws while tightening the bolts.

Fig. 3-47

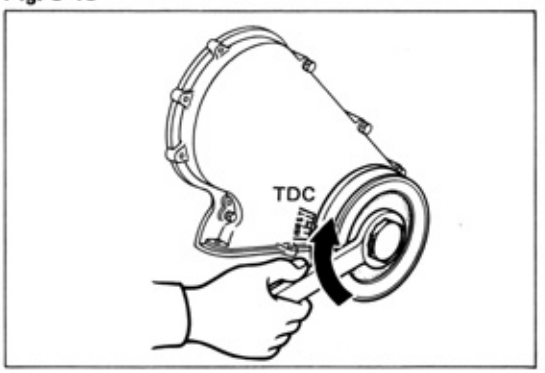


Tighten the valve rocker support bolts to specified torque.

Tightening torque: 1.8 – 2.4 kg-m (14 – 17 ft-lb)

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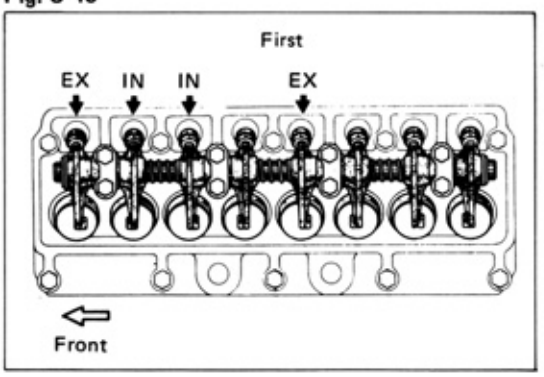
Fig. 3-48



⚠ Adjust the valve clearance.

1. Set No. 1 cylinder to TDC/compression.

Fig. 3-49

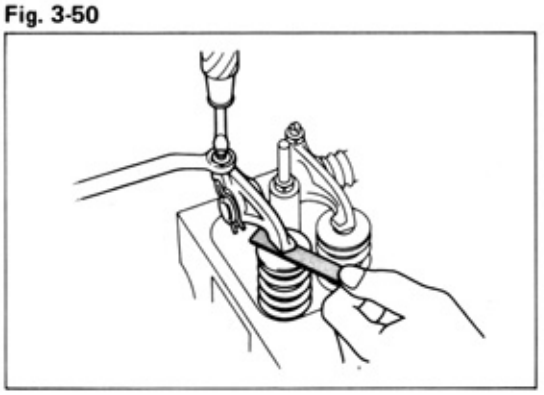


⚠ 2. Adjust the valve clearances indicated by arrows.

Valve clearance, cold:

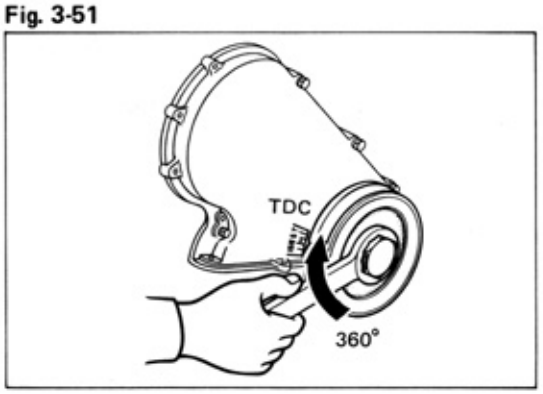
IN	**0.13 mm (0.0051 in.)**
EX	**0.23 mm (0.0091 in.)**

Fig. 3-50



(1) Use a feeler gauge to measure between the valve stem and rocker arm.
(2) Loosen the lock nut and turn the adjusting screw to set proper clearance.
(3) Hold the adjusting screw in position and tighten the lock nut.

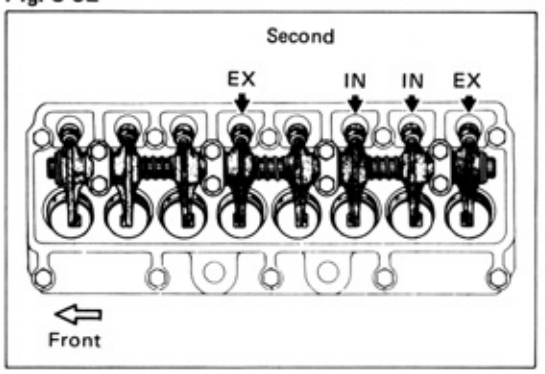
Fig. 3-51



⚠ 3. Rotate the crankshaft one turn clockwise and set the No. 4 cylinder to TDC/compression.

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Fig. 3-52

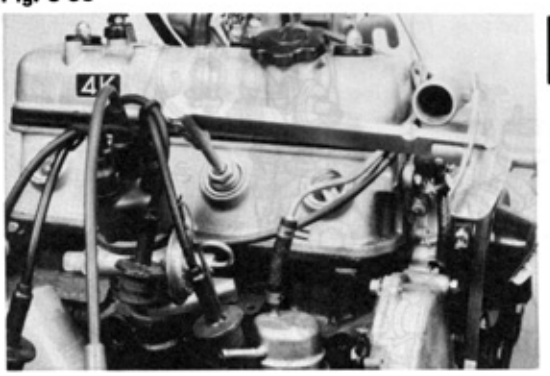


4. Adjust the remaining valves indicated by arrows.

Valve clearance, cold:

IN	**0.13 mm (0.0051 in.)**
EX	**0.23 mm (0.0091 in.)**

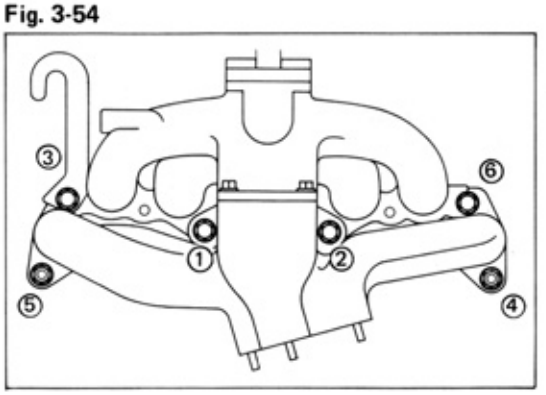
Fig. 3-53



Install the spark plug.

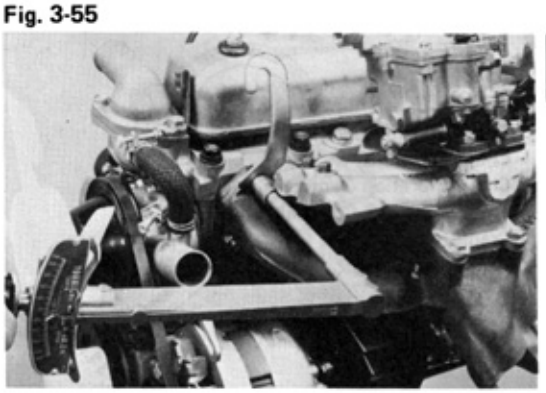
Tightening torque: 1.5 – 2.1 kg-m (11 – 15 ft-lb)

Fig. 3-54



Tighten the mounting bolts and nuts in the specified numerical sequence.

Fig. 3-55



Tightening torque: 2.0 – 3.0 kg-m (15 – 21 ft-lb)

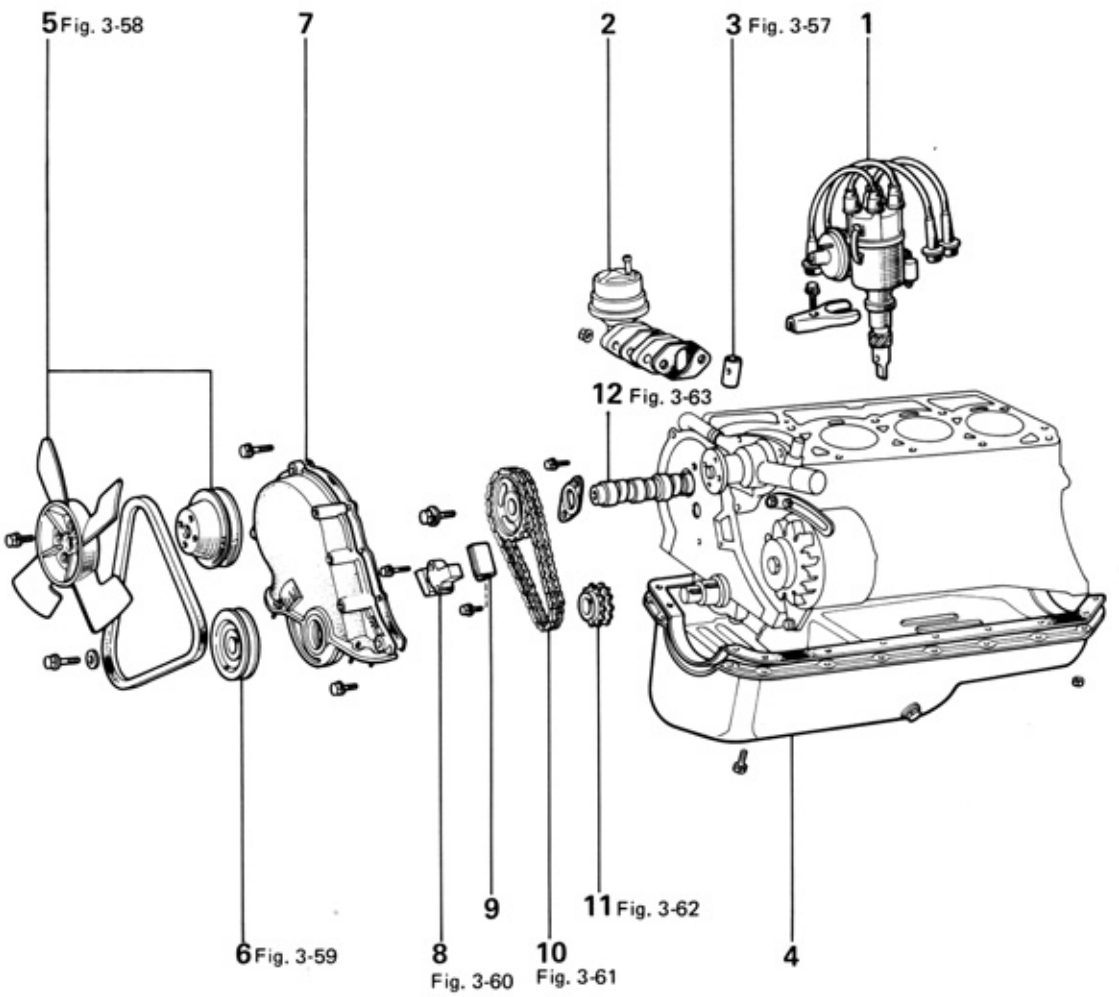
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TIMING CHAIN & CAMSHAFT

DISASSEMBLY

Disassemble the parts in the numerical order shown in the figure.

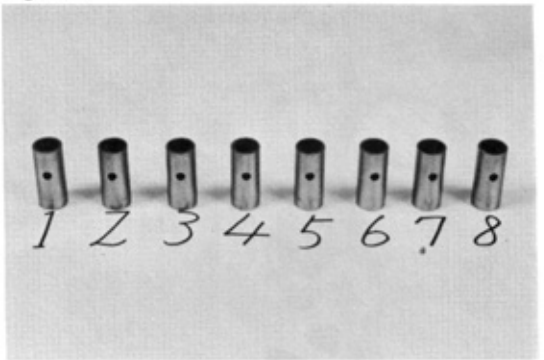
Fig. 3-56



1. Distributor
2. Fuel Pump
3. Valve Lifter
4. Oil Pan
5. V Belt & Fan Pulley
6. Crankshaft Pulley
7. Timing Chain Cover
8. Chain Tensioner
9. Chain Vibration Damper
10. Timing Chain & Camshaft Sprocket
11. Crankshaft Sprocket
12. Camshaft

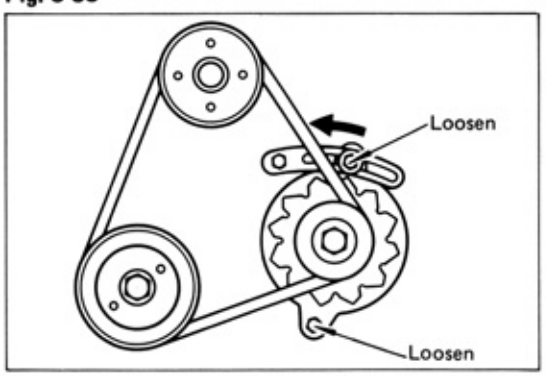
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Fig. 3-57



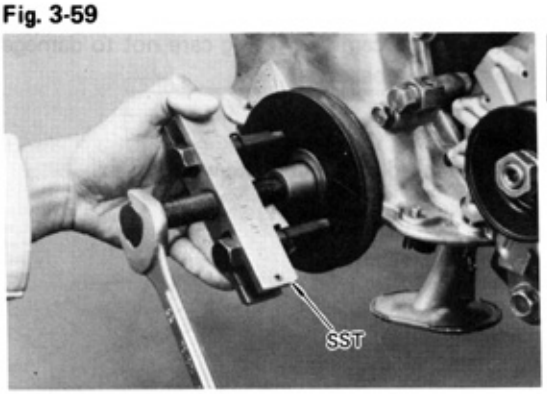
Keep the valve lifters in correct order.

Fig. 3-58



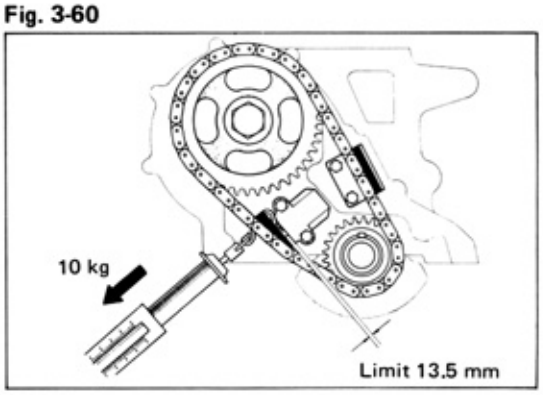
Loosen the locking bolts just enough so that the alternator can be moved, and remove the V belt.

Fig. 3-59



Remove the crankshaft pulley with SST.
SST [09213-31021]

Fig. 3-60

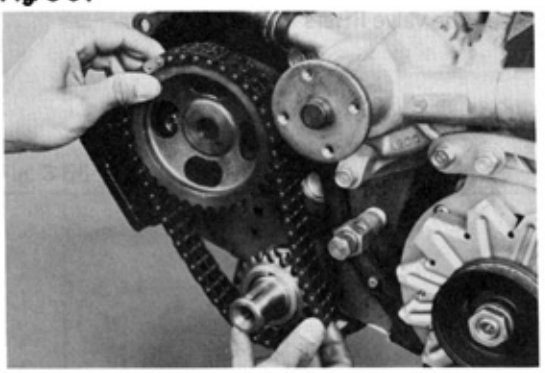


Measure the timing chain slack and, if over the limit, replace the timing chain and sprocket.

Slack limit at 10 kg (22 lb) tension:
13.5 mm
(0.531 in.)

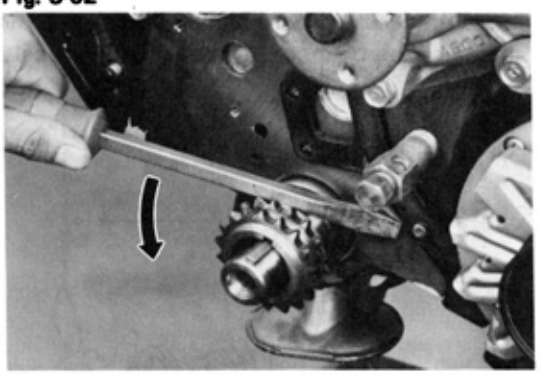
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Fig. 3-61



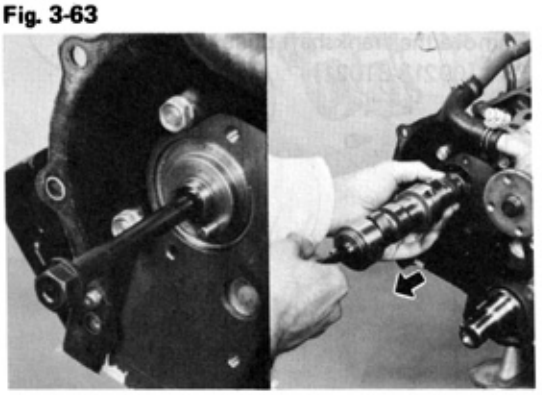
Remove the timing chain and sprocket together.

Fig. 3-62



Remove the crankshaft sprocket.

Fig. 3-63

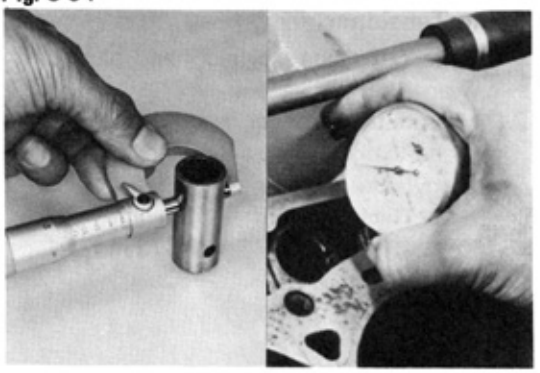


Pull out the camshaft using care not to damage the camshaft bearings.

— Note —
Use of a head bolt will make work easier.

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Fig. 3-64



INSPECTION & REPAIR

Valve Lifter

Inspect the valve lifters and lifter bores for wear or damage.

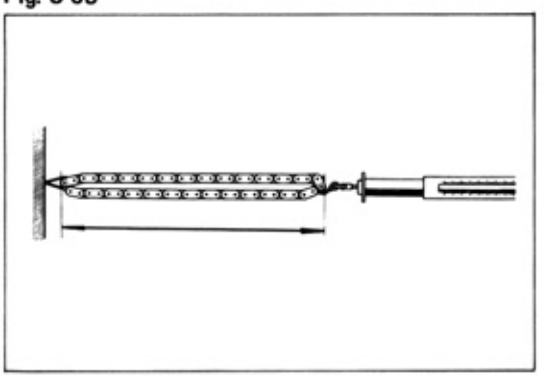
Oil clearance:

STD	**0.015 – 0.029 mm (0.0006 – 0.0011 in.)**
Limit	**0.1 mm (0.004 in.)**

– Note –

If the oil clearance exceeds the limit, it should be replaced with a lifter of O/S 0.05 to obtain proper clearance.

Fig. 3-65

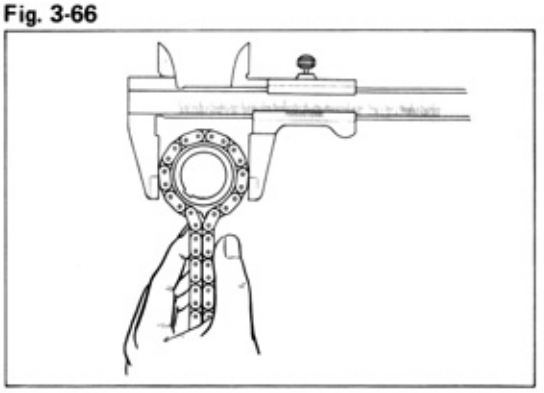


Timing Chain & Sprocket

1. Inspect the chain and sprocket for cracks, wear, or chipped teeth.
2. Measure the length of the timing chain.

Elongation limit at 5 kg (11 lb) tension: 272.7 mm (10.736 in.)

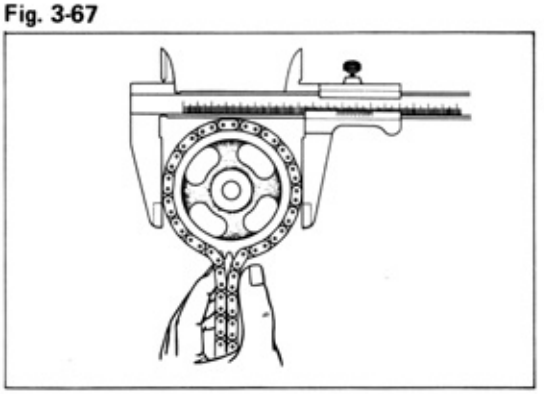
Fig. 3-66



3. Measure the crankshaft sprocket for wear as shown in the figure.

Wear limit: 59.4 mm (2.339 in.)

Fig. 3-67

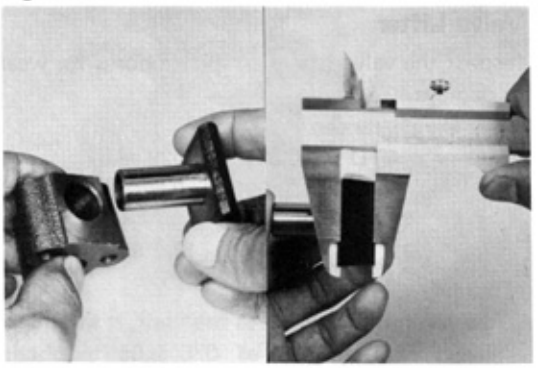


4. Measure the camshaft sprocket for wear as shown in the figure.

Wear limit: 113.8 mm (4.480 in.)

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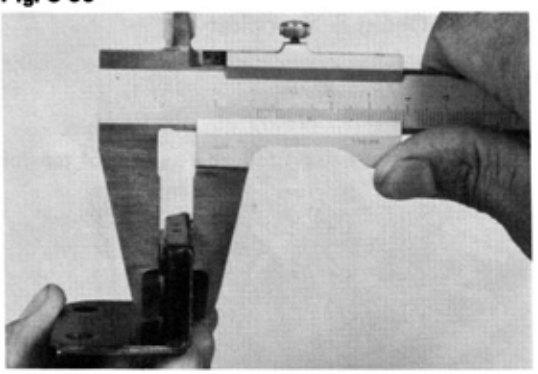
Fig. 3-68



Chain Tensioner

1. Inspect the body cylinder and plunger for wear.
2. Measure the tensioner head thickness.
   If the thickness is less than the limit, replace the cylinder and plunger as a set.
   Thickness limit: 12.0 mm (0.472 in.)

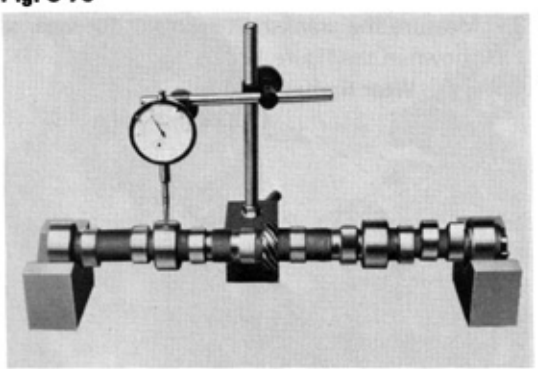
Fig. 3-69



Chain Damper

Measure the chain damper thickness.
Thickness limit: 7.0 mm (0.276 in.)

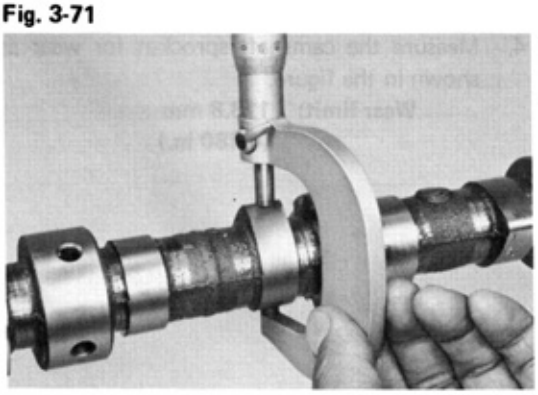
Fig. 3-70



Camshaft

1. Inspect the camshaft straightness, and for damage or wear.
2. Measure the runout as shown in the figure.
   Circle runout limit: 0.03 mm (0.0012 in.)

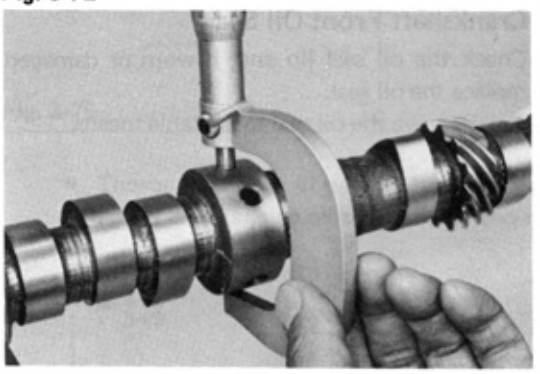
Fig. 3-71



3. Measure the cam lobe height.
   Cam height:
   IN STD 36.469 – 36.569 mm (1.4358 – 1.4397 in.)
   Limit 36.17 mm (1.4240 in.)
   EX STD 36.369 – 36.469 mm (1.4318 – 1.4358 in.)
   Limit 36.07 mm (1.4201 in.)

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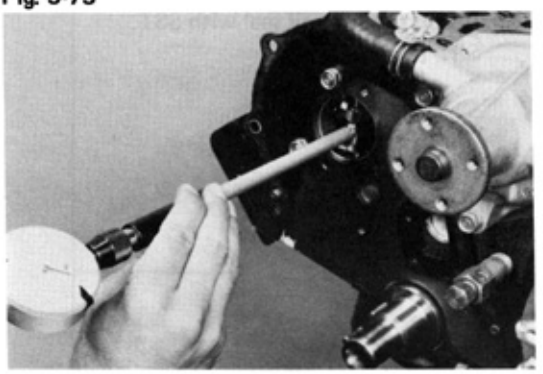
Fig. 3-72



4. Measure the journal oil clearance.
   (1) Measure the camshaft journal diameter.

Journal diameter:
STD
No. 1 43.209 – 43.225 mm (1.7011 – 1.7018 in.)
No. 2 42.954 – 42.970 mm (1.6911 – 1.6917 in.)
No. 3 42.704 – 42.720 mm (1.6813 – 1.6819 in.)
No. 4 42.459 – 42.475 mm (1.6716 – 1.6722 in.)

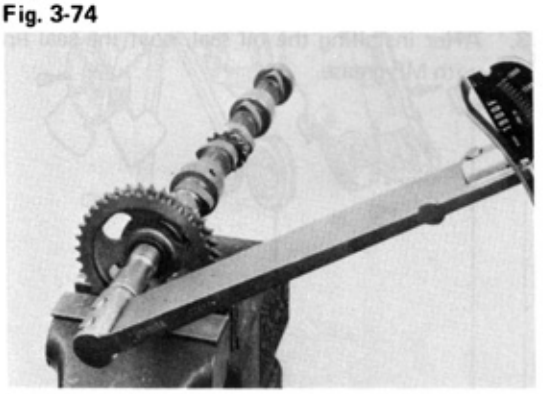
Fig. 3-73



   (2) Measure the camshaft bearing inner diameter.
   To replace the bearing, refer to the CYLINDER BLOCK section.

Oil clearance:
STD No. 1 & No. 4
0.025 – 0.066 mm (0.0010 – 0.0026 in.)
No. 2 & No. 3
0.030 – 0.071 mm (0.0012 – 0.0028 in.)
Limit 0.1 mm (0.004 in.)
U/S bearing type: 0.125, 0.250

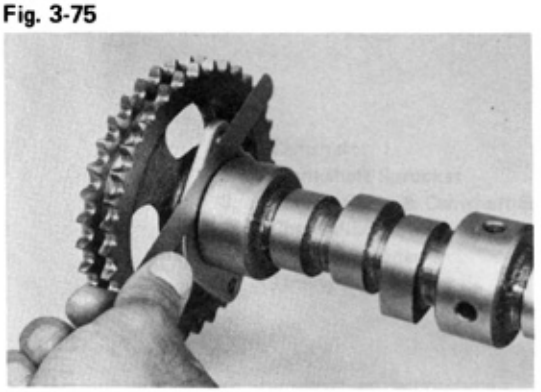
Fig. 3-74



5. Measure the camshaft thrust clearance and, if it exceeds the limit, replace the thrust plate.
   (1) Install the camshaft thrust plate and sprocket onto the camshaft and tighten to specified torque.

Tightening torque:
5.4 – 6.6 kg-m (40 – 47 ft-lb)

Fig. 3-75

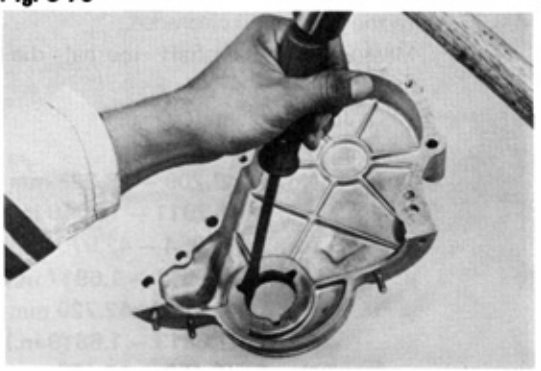


   (2) Measure the thrust clearance.

Thrust clearance:
STD 0.070 – 0.138 mm (0.0028 – 0.0054 in.)
Limit 0.3 mm (0.012 in.)

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Fig. 3-76

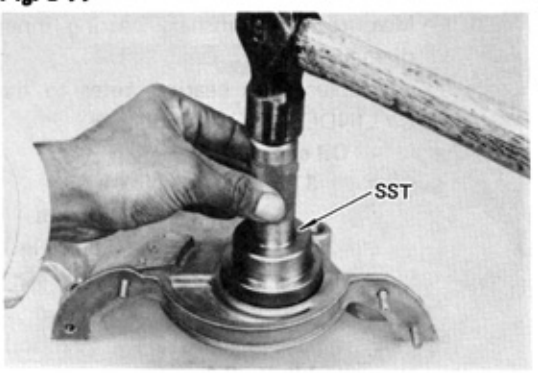


Crankshaft Front Oil Seal

Check the oil seal lip and, if worn or damaged, replace the oil seal.

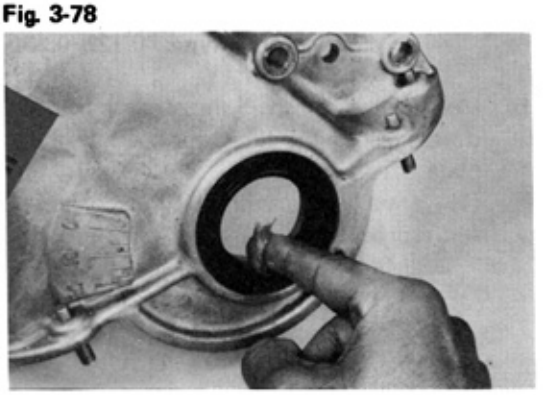
1. Remove the oil seal by suitable means.

Fig. 3-77



2. Install the new oil seal with SST.
   SST [09223-22010]

Fig. 3-78



3. After installing the oil seal, coat the seal lip with MP grease.

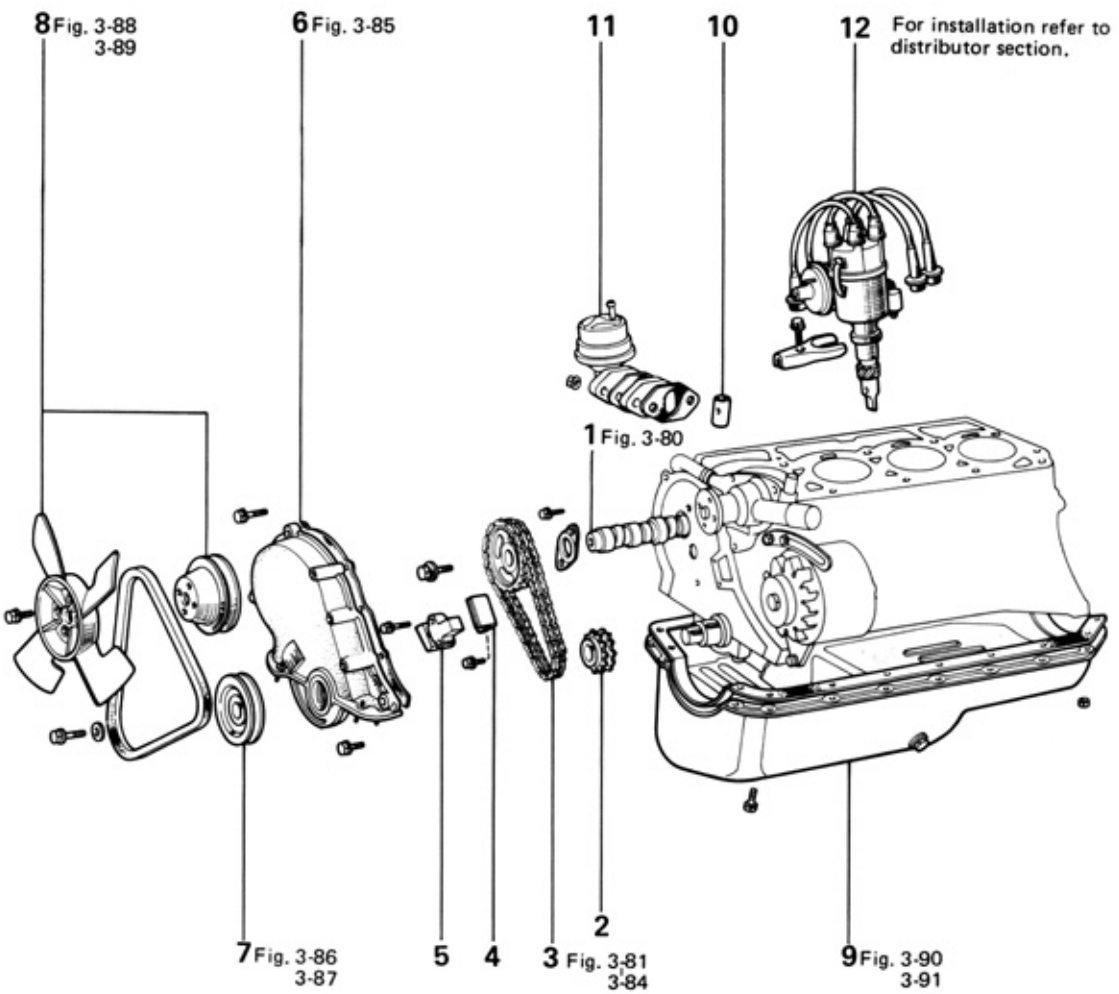
ProCarManuals.com

ASSEMBLY

Assemble the parts in the numerical order shown in the figure.

Fig. 3-79

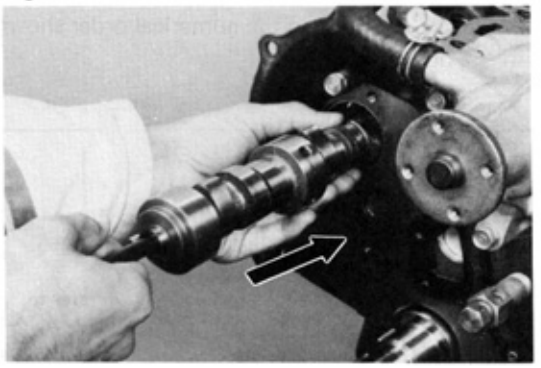
- **Thoroughly clean all parts to be assembled.**
- **Apply clean engine oil to all sliding and rotating surfaces of the parts before assembly.**



1. Camshaft
2. Crankshaft Sprocket
3. Timing Chain & Camshaft Sprocket
4. Chain Vibration Damper
5. Chain Tensioner
6. Timing Chain Cover
7. Crankshaft Pulley
8. V Belt & Fan Pulley
9. Oil Pan
10. Valve Lifter
11. Fuel Pump
12. Distributor

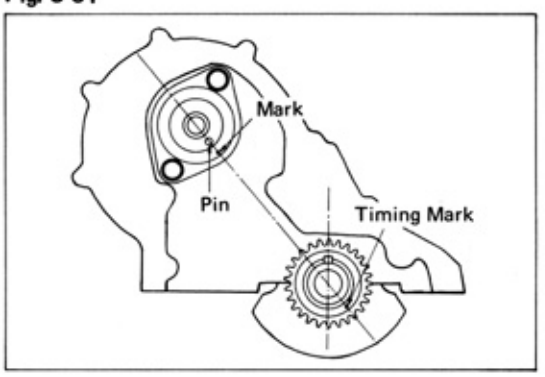
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Fig. 3-80



Install the camshaft, using care not to damage the camshaft bearings.

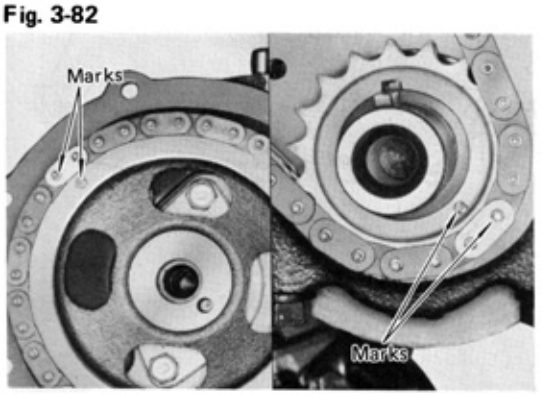
Fig. 3-81



Install the timing chain and sprocket.

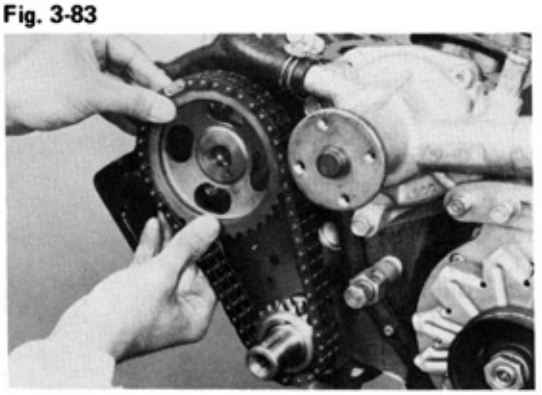
1. Set No. 1 piston to TDC.
2. Align the camshaft dowel pin with the mark on the thrust plate.

Fig. 3-82



3. Align the chain timing marks with those on the sprockets.

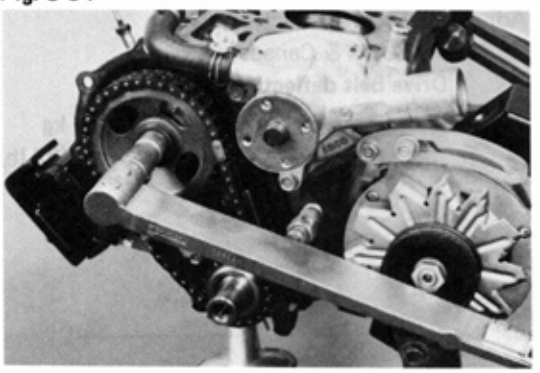
Fig. 3-83



4. Install the timing chain and sprocket together.

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Fig. 3-84



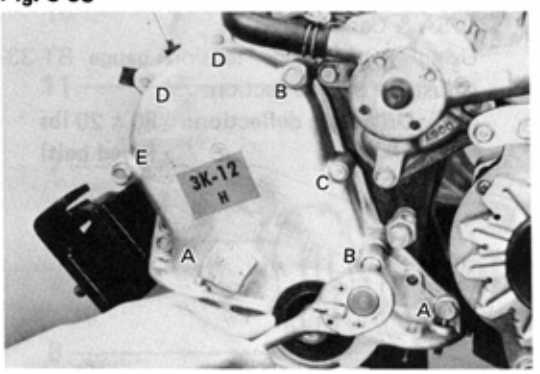
5. Tighten the set bolt.

Tightening torque: 5.4 – 6.6 kg-m (40 – 47 ft-lb)

– Note –

Apply a light coating of engine oil on the bolt threads and under the bolt head before installing.

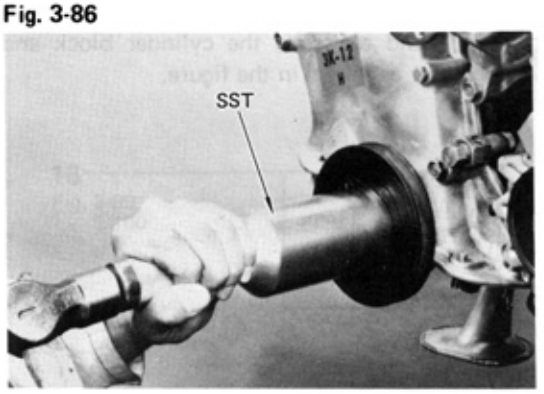
Fig. 3-85



Use the indicated bolts in the respective places.

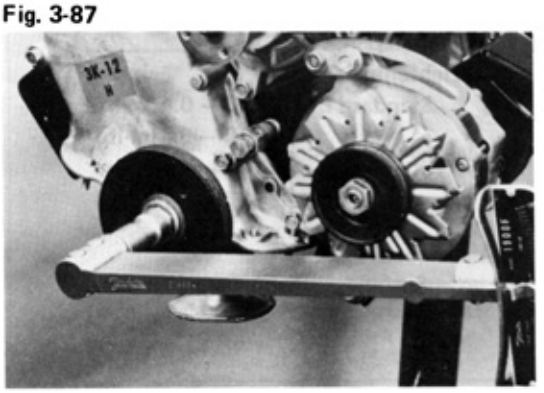
Location	Part No.
A	91611–40828
B	91651–40855
C	91651–60655
D	91651–40820
E	91651–40855

Fig. 3-86



Install the crankshaft pulley with SST.
SST [09214-60010]

Fig. 3-87



Tighten the retaining bolt.

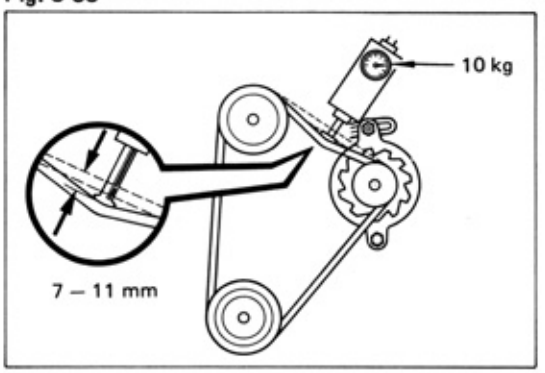
Tightening torque: 7.5 – 10.5 kg-m (55 – 75 ft-lb)

– Note –

Apply a light coat of engine oil on the bolt threads and under the bolt head before installing.

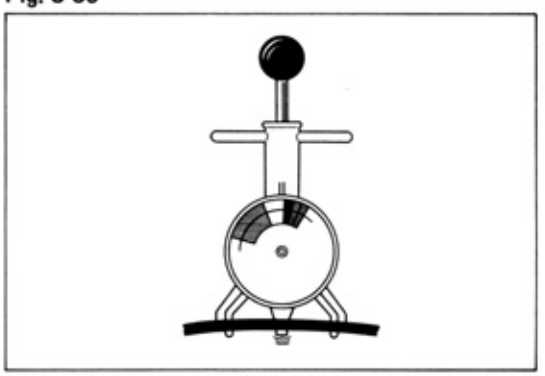
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Fig. 3-88



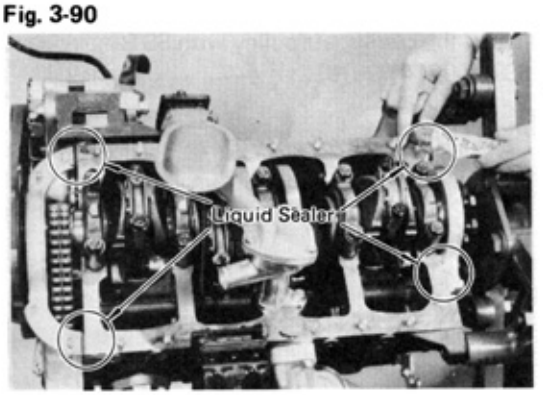
Adjust the V belt deflection.
(Except USA & Canada)
Drive belt deflection:
7 – 11 mm at 10 kg
(0.28 – 0.43 in.) (22 lb)

Fig. 3-89



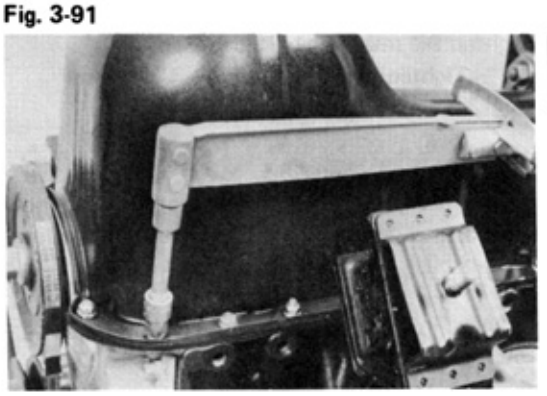
(USA & Canada)
Using a borroughs tension gauge BT-33-73 adjust the belt deflection.
Drive belt deflection: 80 ± 20 lbs
(Used belt)

Fig. 3-90



Apply liquid sealer to the cylinder block and chain cover as shown in the figure.

Fig. 3-91



Install the oil pan.
Tightening torque:
Standard bolt 0.2 – 0.4 kg-m
(18 – 34 in.-lb)
Step bolt 0.3 – 0.7 kg-m
(27 – 60 in.-lb)

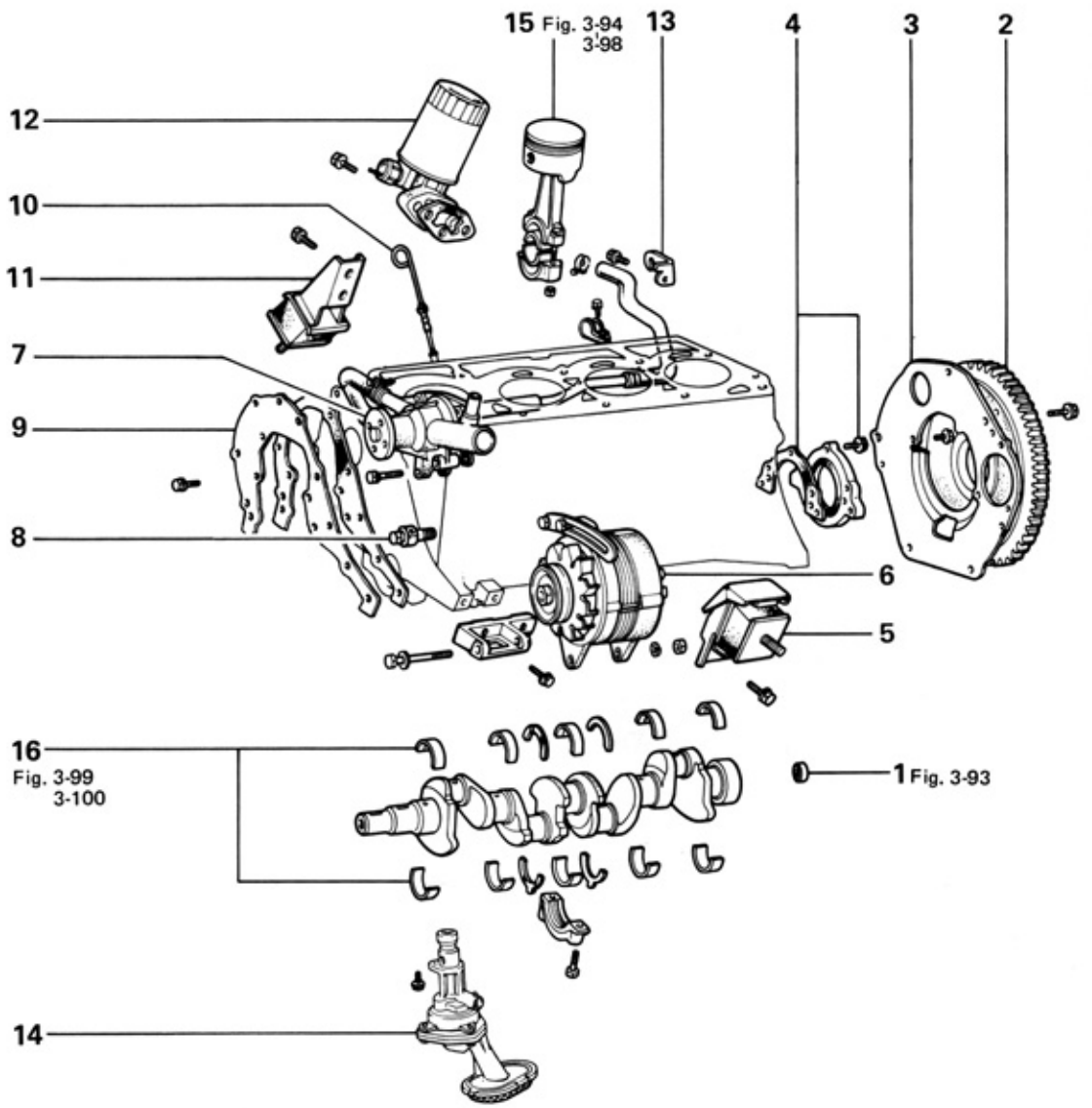
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CYLINDER BLOCK

DISASSEMBLY

Disassemble the parts in the numerical order shown in the figure.

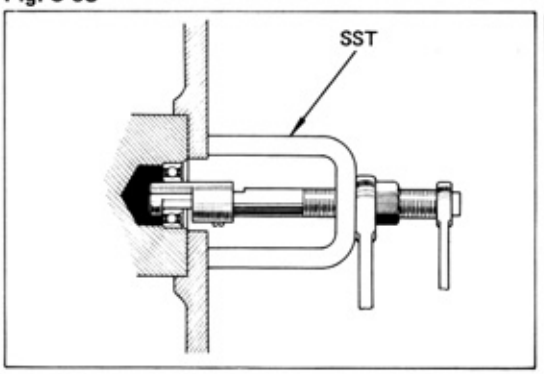
Fig. 3-92



1. Input Shaft Bearing
2. Flywheel
3. Rear End Plate
4. Rear Oil Seal
5. Engine Front Mounting, LH
6. Alternator & Bracket
7. Water Pump & Heater Hose
8. Drain Cock
9. Front End Plate
10. Oil Level Gauge
11. Engine Front Mounting, RH
12. Oil Filter
13. Engine Rear Hanger
14. Oil Pump
15. Piston & Connecting Rod
16. Crankshaft & Bearing

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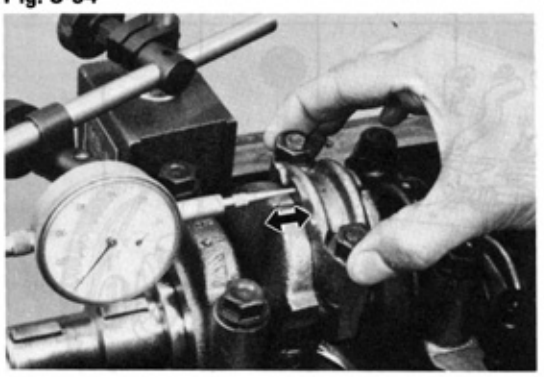
Fig. 3-93



Remove the input shaft front bearing with SST.
SST [09303-35011]

– Note –
In case the bearing is not normal, also check the transmission input shaft and rear bearing.

Fig. 3-94



Measure the connecting rod thrust clearance.
If it exceeds the limit, replace the connecting rod.

Thrust clearance:

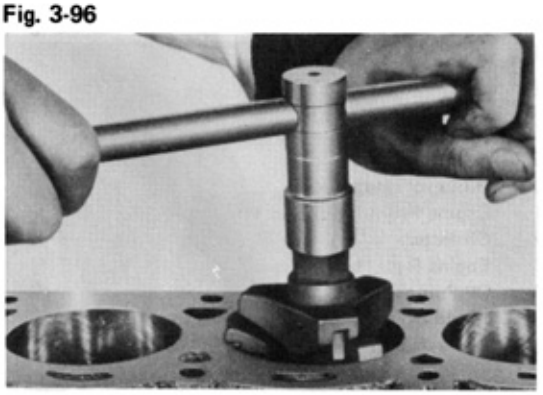
STD	**0.200 – 0.304 mm (0.0079 – 0.0120 in.)**
Limit	**0.35 mm (0.0138 in.)**

Fig. 3-95



Mark the connecting rods and caps to prevent changing their original combinations.

Fig. 3-96

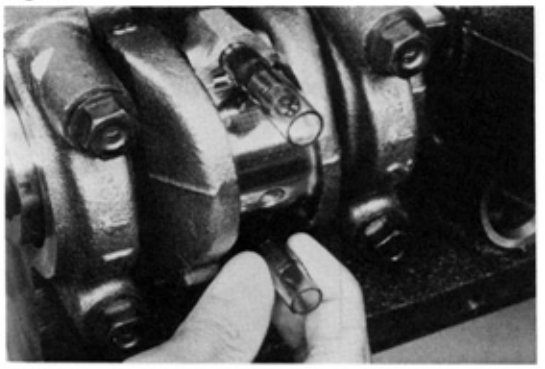


Ream the piston ring ridge at the top of the cylinder.

– Note –
If this step is not performed prior to removing the pistons, the piston ring lands will be damaged.

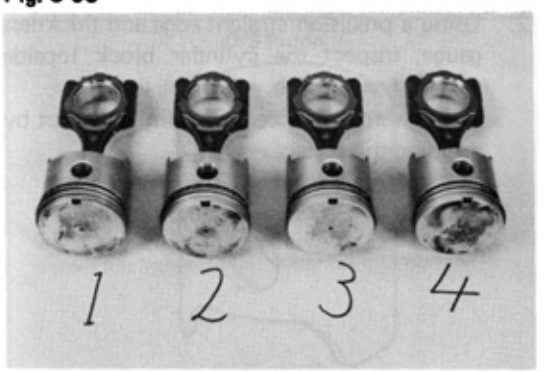
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Fig. 3-97



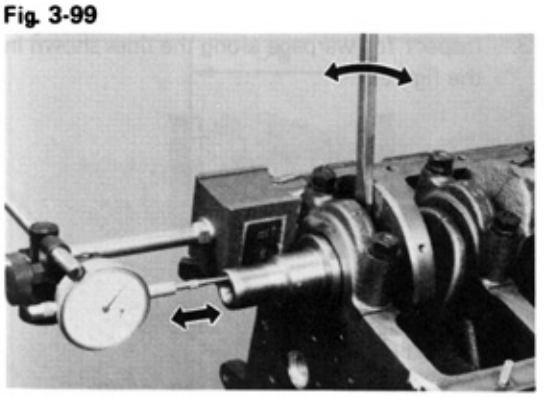
Cover the rod bolts with hoses to protect the crankshaft pins from damage.

Fig. 3-98



Keep the connecting rods and bearings in correct order.

Fig. 3-99



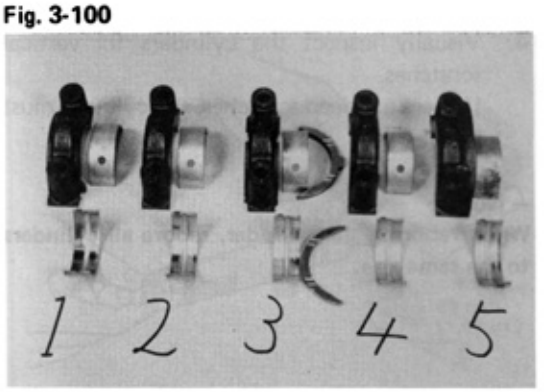
Measure the crankshaft thrust clearance.
If it exceeds the limit, replace the thrust washers as a set.

Thrust clearance:

STD	**0.040 – 0.242 mm (0.0016 – 0.0095 in.)**
Limit	**0.3 mm (0.012 in.)**

O/S thrust washer type: **0.125, 0.250**

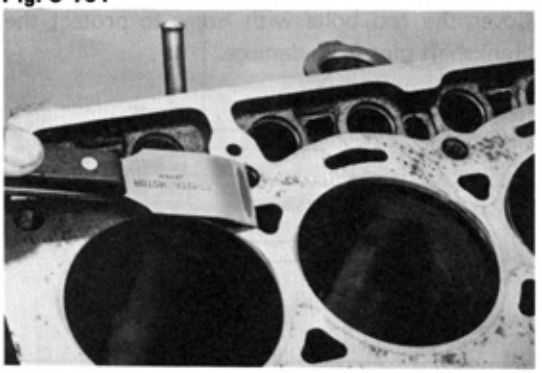
Fig. 3-100



Keep the crankshaft bearings and caps in correct order.

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Fig. 3-101

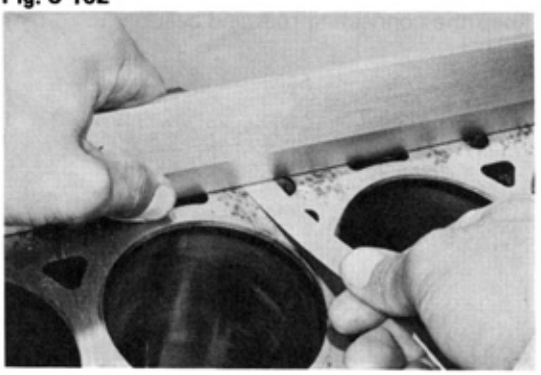


INSPECTION & REPAIR

Cylinder Block

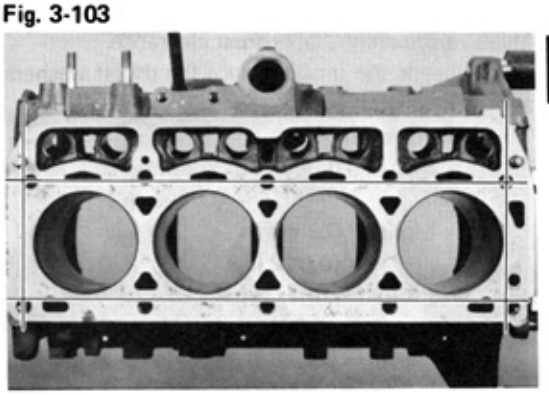
1. Clean and check the cylinder block for cracks or scores.

Fig. 3-102



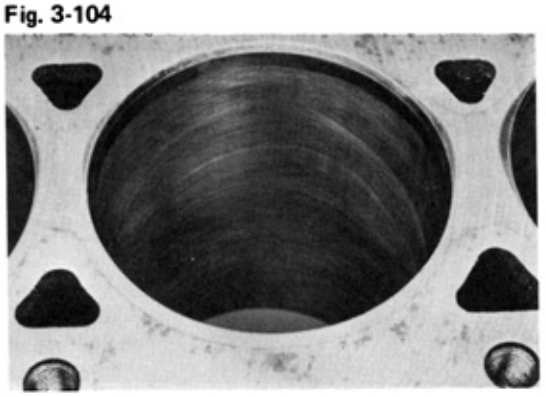
2. Using a precision straight edge and thickness gauge, inspect the cylinder block topside surface for warpage.
   If the warpage exceeds the limit, correct by grinding the surface.
   Warpage limit: 0.05 mm (0.0020 in.)

Fig. 3-103



3. Inspect for warpage along the lines shown in the figure.

Fig. 3-104

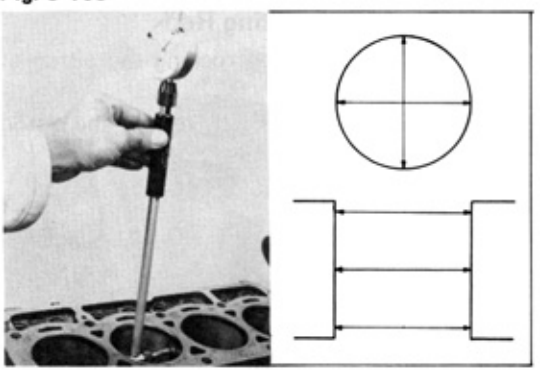


4. Visually inspect the cylinders for vertical scratches.
   If there are deep scratches, the cylinder must be rebored.

— Note —
When reboring the cylinder, rebore all cylinders to the same size.

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Fig. 3-105



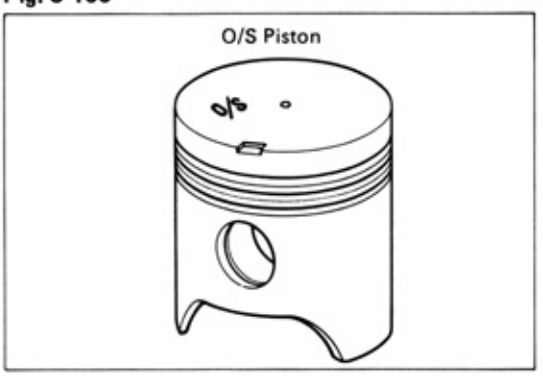
5. Measure the cylinder bores in axial and thrust directions at the top, middle and bottom as shown in the figure.
If the bore exceeds the limit, it must be rebored.

Standard bore:

2K	**72.00 – 72.05 mm (2.8346 – 2.8366 in.)**
3K,4K series	**75.00 – 75.05 mm (2.9528 – 2.9547 in.)**

Wear limit: 0.2 mm (0.008 in.)

Fig. 3-106

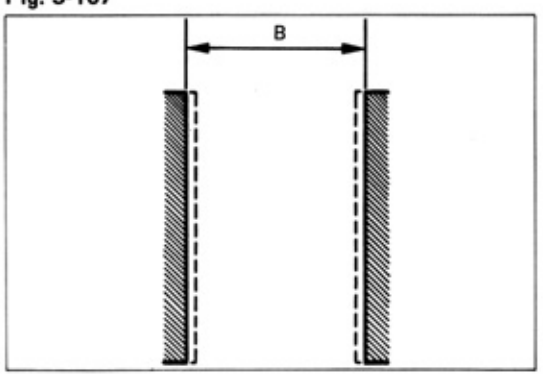


6. Use an O/S piston when the cylinders are rebored.

O/S piston diameter mm (in.)

O/S	2K	3K, 4K series
O/S 0.50	72.46 – 72.51 (2.8528 – 2.8547)	75.46 – 75.51 (2.9709 – 2.9728)
O/S 0.75	72.71 – 72.76 (2.8626 – 2.8646)	75.71 – 75.76 (2.9807 – 2.9827)
O/S 1.00	72.96 – 73.01 (2.8724 – 2.8744)	75.96 – 76.01 (2.9905 – 2.9925)

Fig. 3-107

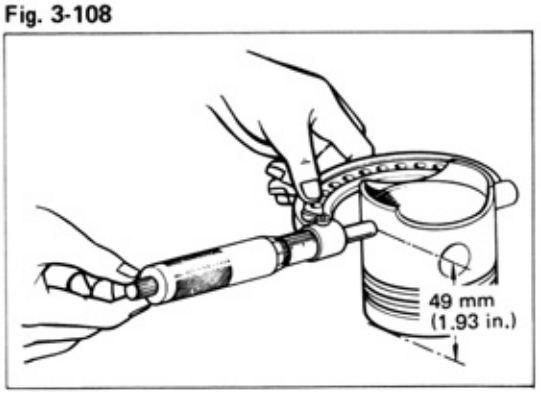


7. Use the following equation to determine the reboring finished diameter.

B = P + C – H

Where B: Reboring finished diameter
P: O/S piston diameter
C: Piston clearance 0.03 – 0.05 mm (0.0012 – 0.0020 in.)
H: Honing allowance Less than 0.02 mm (0.0008 in.)

Fig. 3-108



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Fig. 3-109



Piston Pin & Connecting Rod

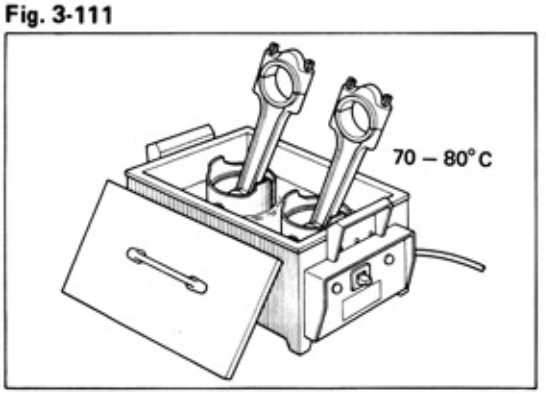
1. Check the pin fit by rocking the piston at right angle to pin.
   If any movement is felt, replace the piston and pin.

Fig. 3-110



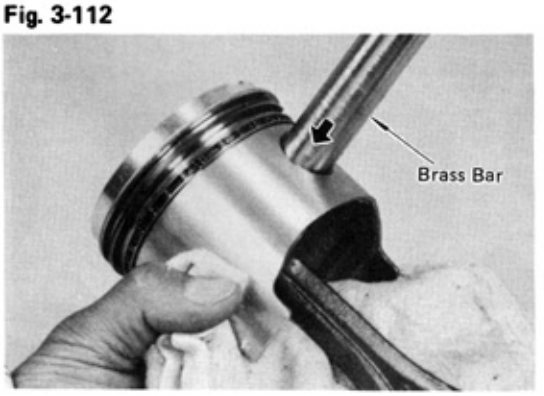
2. Remove the snap rings.

Fig. 3-111



3. Heat the piston to around 70 – 80°C (158 – 176°F) in a piston heater.

Fig. 3-112



4. Remove the piston pin from the piston.

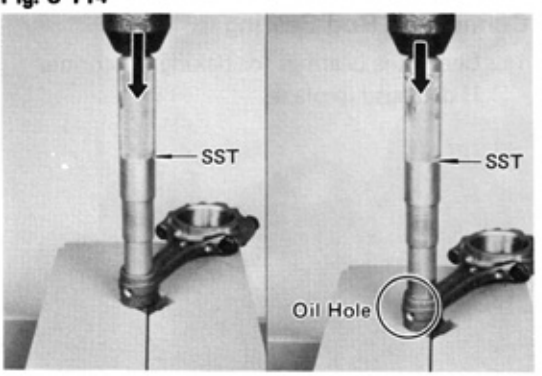
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Fig. 3-113



5. Check the fit of the piston pin.
Heat the piston to around 70 – 80°C (158 – 176°F), and coat the pin with engine oil.
It should then be possible to push the pin into the piston hole with thumb pressure.

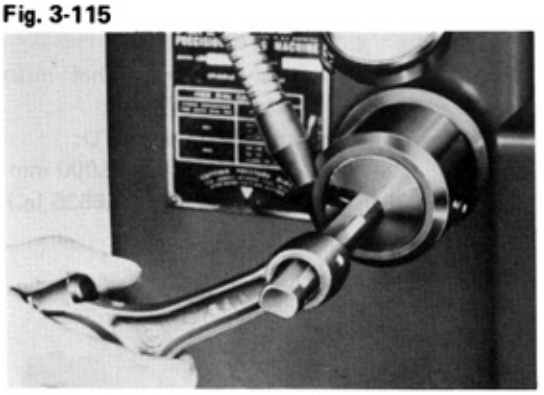
Fig. 3-114



6. If the bushing is worn or damaged, replace it wish SST.
SST [09222-30010]

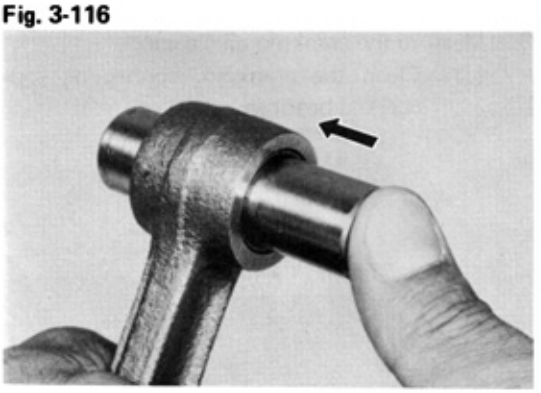
– Note –
Align the bushing oil hole with the connecting rod oil hole.

Fig. 3-115



7. After installing the bushing, re-finish the bushing bore with a pin hole grinder.

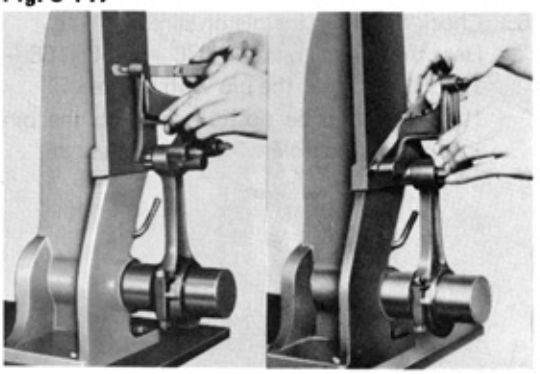
Fig. 3-116



8. The fitting between the bushing and pin should be such that the pin, when coated with engine oil, can be pushed in with the thumb at normal temperature.

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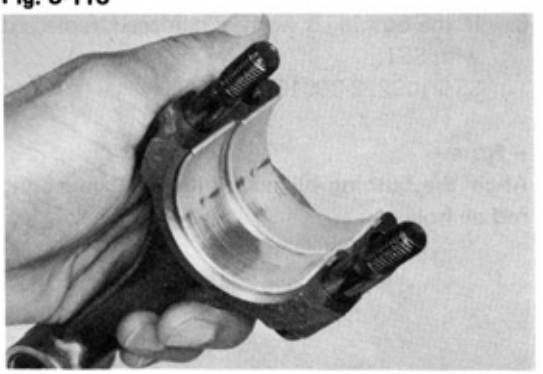
Fig. 3-117



9. Inspect for bending and twisting using a connecting rod aligner.
If over the limit, correct or replace the rod.

Bend limit: 0.05 mm per 100 mm (0.0020 in. per 3.94 in.)
Twist limit: 0.15 mm per 100 mm (0.0059 in. per 3.94 in.)

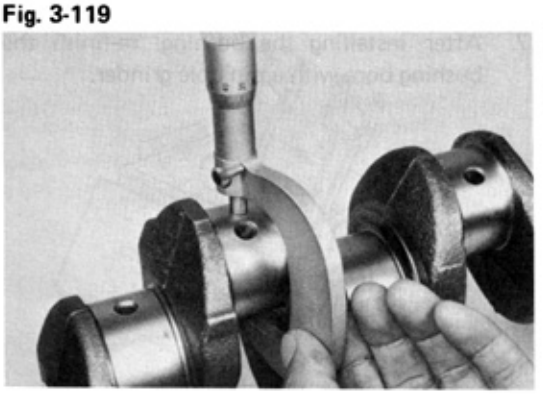
Fig. 3-118



Connecting Rod Bearing

1. Check the bearings for flaking or scoring.
If damaged, replace.

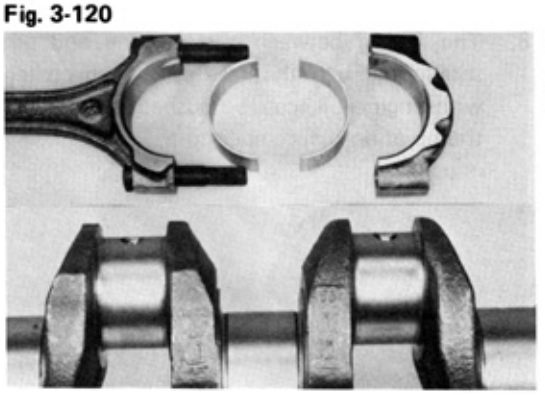
Fig. 3-119



2. Measure the crankpin diameter.
If the wear is excessive, the crankshaft must be reground or replaced.

Crankpin journal diameter STD: 41.976 – 42.000 mm (1.6526 – 1.6535 in.)
Taper & out-of-round limit: 0.01 mm (0.0004 in.)

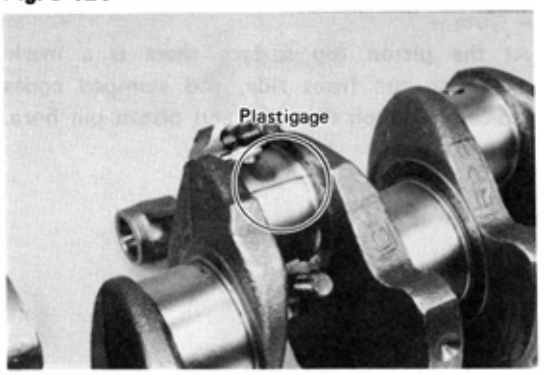
Fig. 3-120



3. Measure the crankpin oil clearance.
(1) Clean the crankpin, connecting rod, cap and bearings.

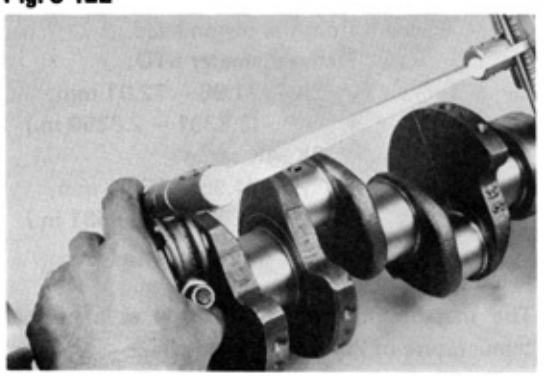
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Fig. 3-121



(2) Lay the strip of plastigage across the crankpin, but not over the oil hole.

Fig. 3-122

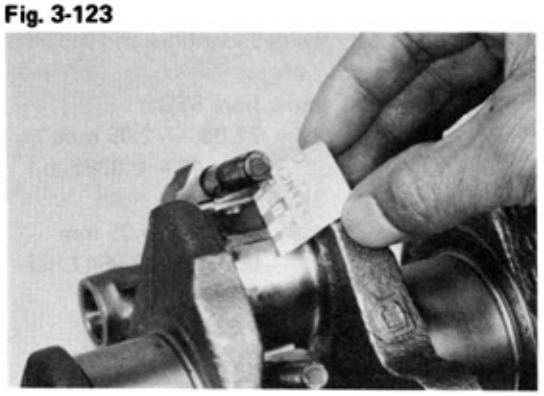


(3) Tighten the bearing cap nuts to specified torque.

Tightening torque:
4.0 – 5.2 kg-m
(29 – 37 ft-lb)

– Caution –
Do not turn the connecting rod or crankshaft.

Fig. 3-123



(4) Measure the plastigage at its widest point.
If the clearance is not within specification, replace the bearings.

Oil clearance:
STD 0.016 – 0.040 mm
(0.0006 – 0.0016 in.)
Limit 0.10 mm
(0.0039 in.)
U/S bearing type:
0.05, 0.25, 0.50, 0.75

Fig. 3-124

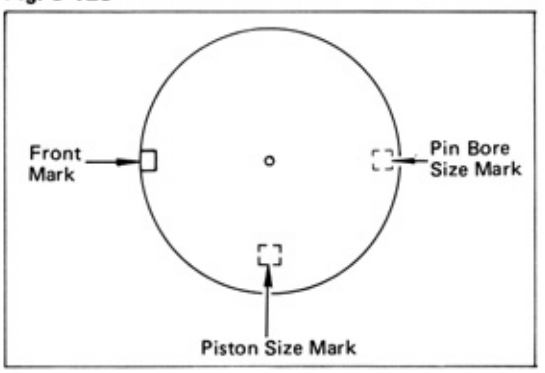


Piston

1. Check the piston for wear or damage, especially in the piston ring grooves and ring lands.

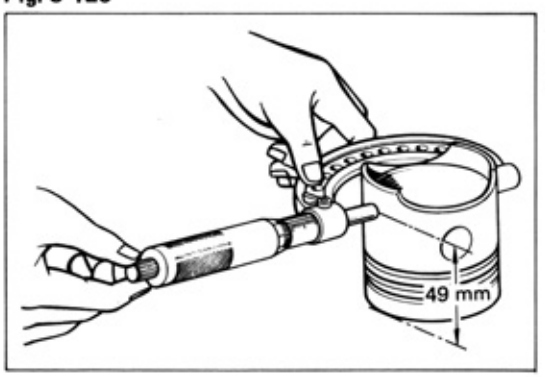
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Fig. 3-125



– Note –
At the piston top surface there is a mark indicating the front side, and stamped codes indicating piston diameter and piston pin bore.

Fig. 3-126

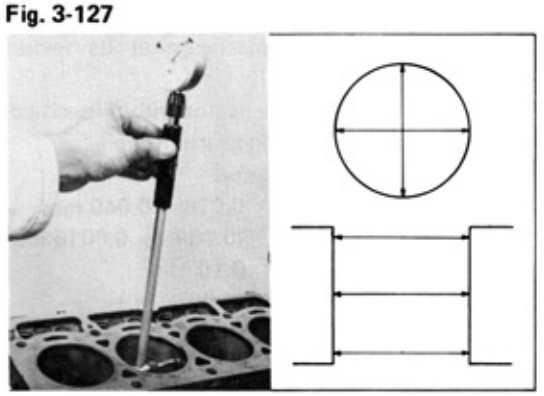


2. Check the piston clearance.
   (1) Measure the piston diameter in the thrust direction about 49 mm (1.93 in.) down from the piston head.

Piston diameter STD:
2K 71.96 – 72.01 mm
(2.8331 – 2.8350 in.)
3K, 4K series
74.96 – 75.01 mm
(2.9512 – 2.9531 in.)

– Note –
The measurement must be made at a normal temperature of 20°C (68°F).

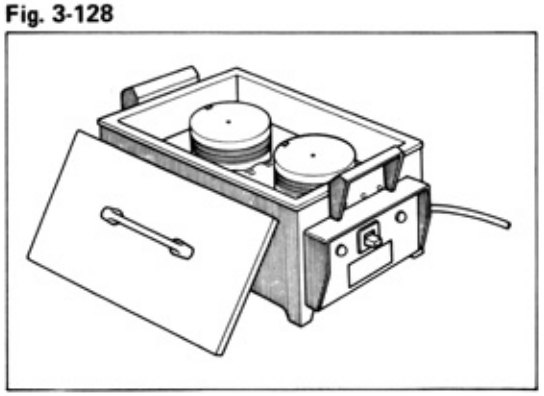
Fig. 3-127



   (2) Measure the cylinder bore and subtract the piston size.

Cylinder bore STD:
2K 72.00 – 72.05 mm
(2.8346 – 2.8366 in.)
3K, 4K series
75.00 – 75.05 mm
(2.9528 – 2.9547 in.)
Piston clearance:
0.03 – 0.05 mm
(0.0012 – 0.0020 in.)

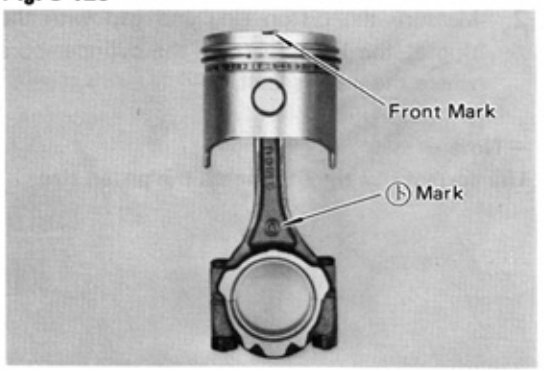
Fig. 3-128



3. Assemble the piston and connecting rod as follows.
   (1) Heat the piston to around 70 – 80°C (158 – 176°F) before installing the piston pin.

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Fig. 3-129



(2) Align the front mark of the piston head and Ⓑ mark of the connecting rod as shown in the figure.

Fig. 3-130



(3) Install the piston pin.

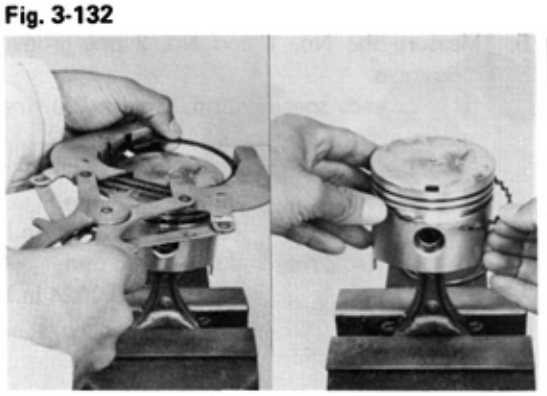
Fig. 3-131



(4) Install the snap rings on both side.

– Caution –
Make sure the snap ring completely in place.

Fig. 3-132

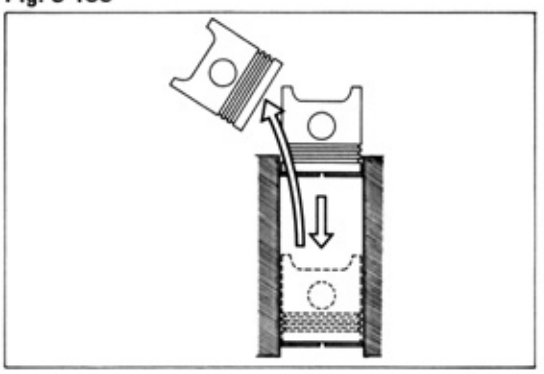


Piston Ring

1. Remove the piston rings with a piston ring expander.

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Fig. 3-133



2. Measure the piston ring end gap with the ring at the lower part of the cylinder bore where the wear is least.

— Note —
Use correct size rings to match the piston size.

Fig. 3-134



3. Measure the end gap.

End gap STD:

No. 1 ring	**0.10 – 0.28 mm (0.0039 – 0.0110 in.)**
No. 2 ring	**0.15 – 0.30 mm (0.0059 – 0.0118 in.)**
Oil ring	**0.2 – 0.9 mm (0.008 – 0.035 in.)**

Fig. 3-135



4. Clean the ring grooves with a groove cleaning tool or broken ring.

Fig. 3-136



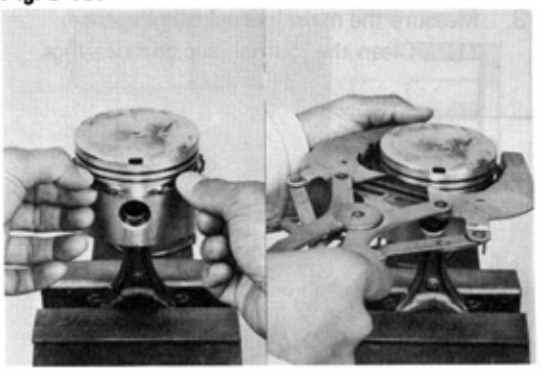
5. Measure the No. 1 and No. 2 ring groove clearances.
If it exceeds specification, replace the ring and/or piston.

Ring to groove clearance:

No. 1 ring	**0.03 – 0.07 mm (0.0012 – 0.0028 in.)**
No. 2 ring	**0.02 – 0.06 mm (0.0008 – 0.0024 in.)**

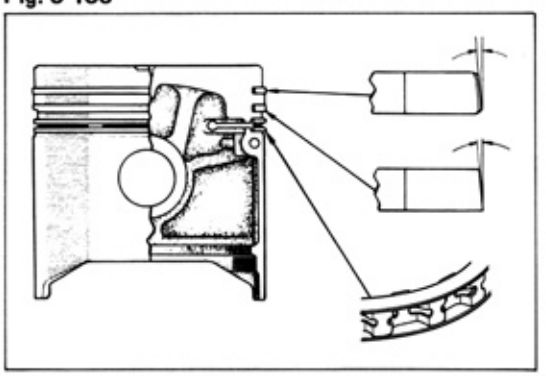
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Fig. 3-137



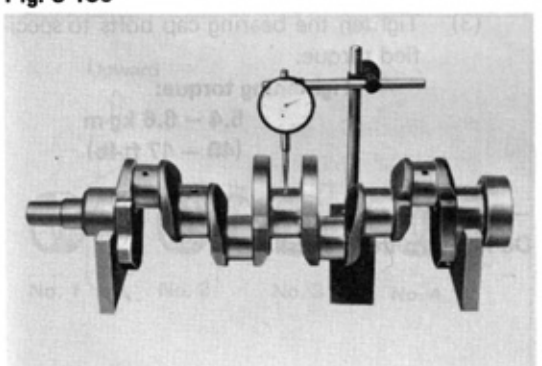
6. Install the piston rings with the piston ring expander.

Fig. 3-138



– Note –
Always install the rings with the size marks and manufacturer marks facing up.

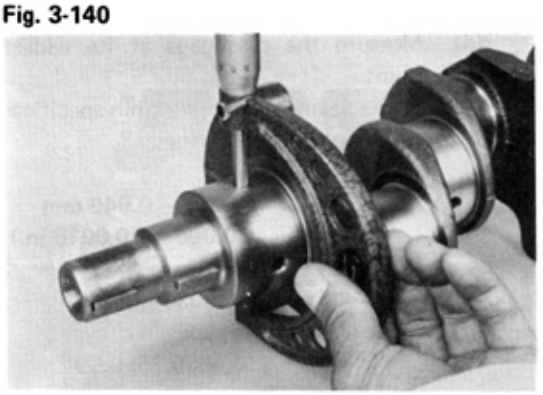
Fig. 3-139



Crankshaft & Bearing

1. Check the crankshaft for runout and, if it exceeds the limit, replace.
   Circle runout limit: 0.04 mm (0.0016 in.)

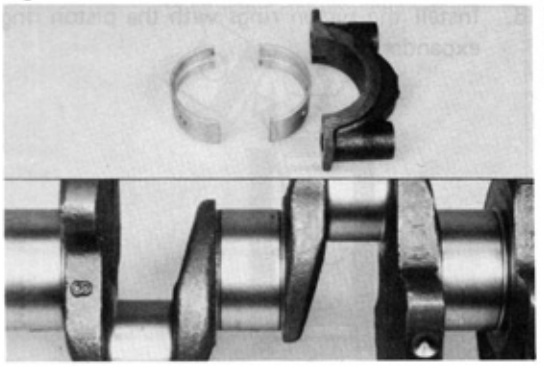
Fig. 3-140



2. Measure the crankshaft main journal.
   If the wear is excessive, the crankshaft must be reground or replaced.
   Main journal diameter STD:
   49.976 – 50.000 mm
   (1.9676 – 1.9685 in.)
   Taper & out-of-round limit:
   0.01 mm
   (0.0004 in.)

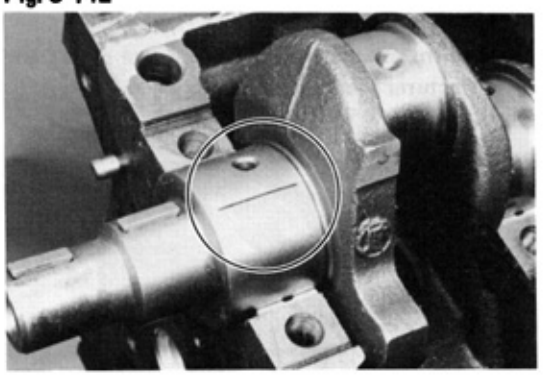
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Fig. 3-141



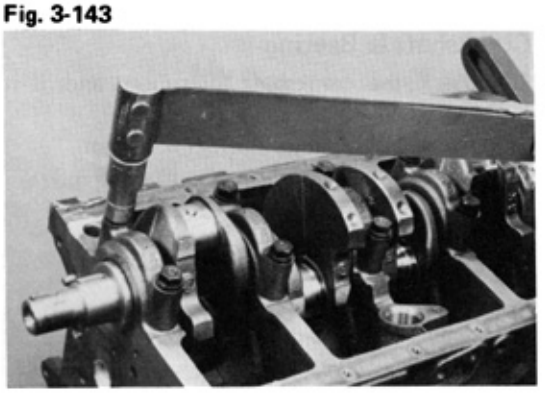
3. Measure the main journal oil clearance.
   (1) Clean the journal, cap and bearings.

Fig. 3-142



   (2) Lay a strip of plastigage across the journal, but not over the oil hole.

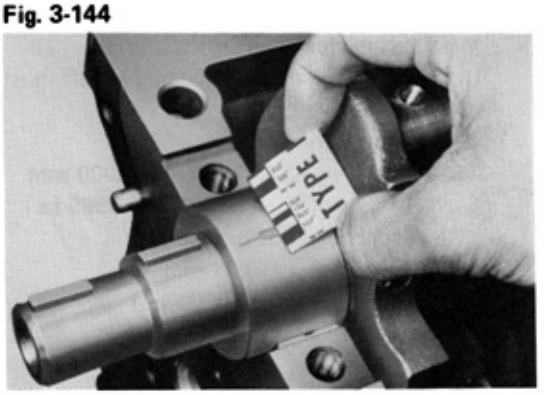
Fig. 3-143



   (3) Tighten the bearing cap bolts to specified torque.
   Tightening torque:
   5.4 – 6.6 kg-m
   (40 – 47 ft-lb)

– Caution –
Do not turn the crankshaft.

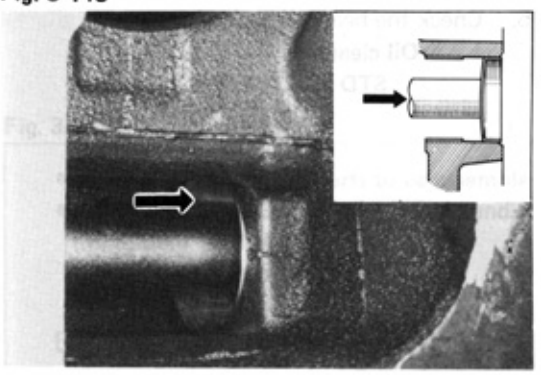
Fig. 3-144



   (4) Measure the plastigage at its widest point.
   If the clearance is not within specification, replace the bearings.
   Oil clearance:
   STD 0.016 – 0.040 mm
   (0.0006 – 0.0016 in.)
   Limit 0.10 mm
   (0.0039 in.)
   U/S bearing type:
   0.05, 0.25, 0.50

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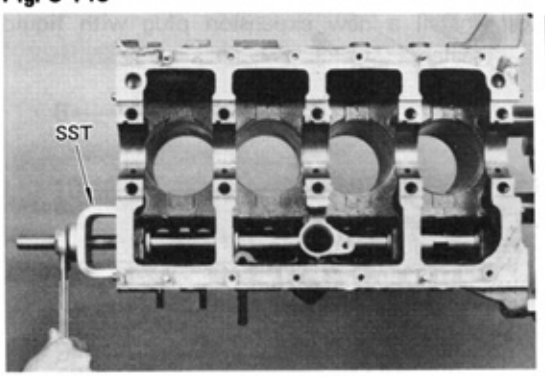
Fig. 3-145



Camshaft Bearing

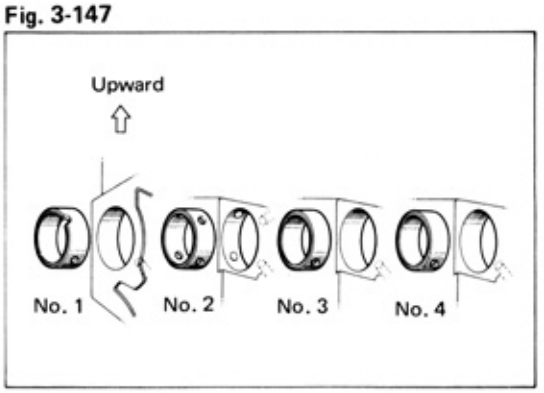
1. Remove the camshaft rear expansion plug.

Fig. 3-146



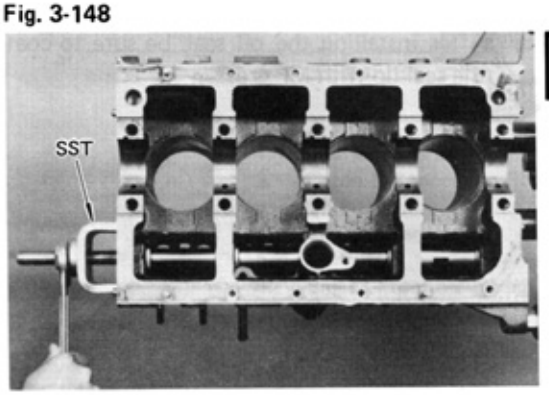
2. Remove the camshaft bearings with SST.
   SST [09215-00100]

Fig. 3-147



3. Align the bearing oil holes with the cylinder block oil holes when installing the bearings.

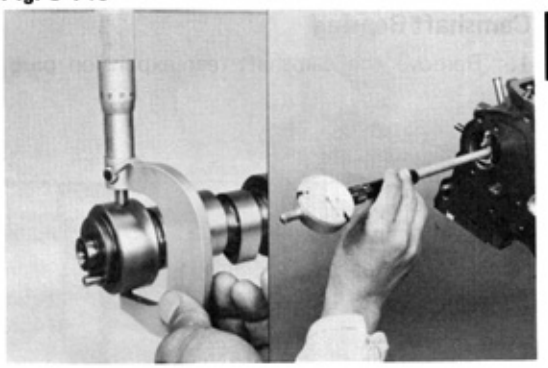
Fig. 3-148



4. Install the new bearings with SST.
   SST [09215-00100]

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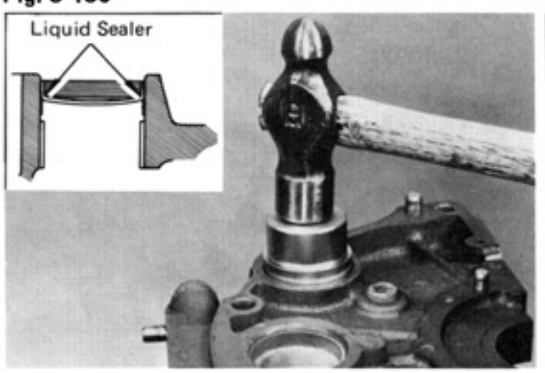
Fig. 3-149



5. Check the bearing oil clearance.

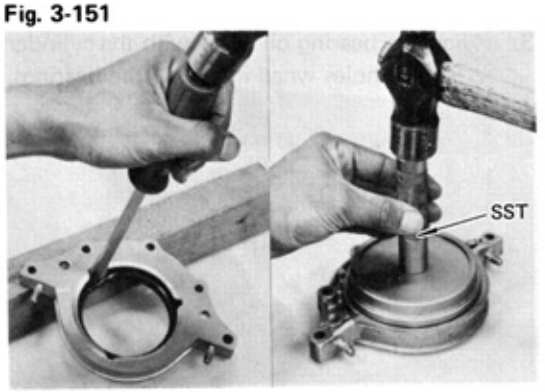
Oil clearance:
STD No. 1 & No. 4
0.025 – 0.066 mm
(0.0010 – 0.0026 in.)
No. 2 & No. 3
0.030 – 0.071 mm
(0.0012 – 0.0028 in.)
Limit 0.1 mm
(0.004 in.)
U/S bearing type: 0.125, 0.250

Fig. 3-150



6. Install a new expansion plug with liquid sealer.

Fig. 3-151

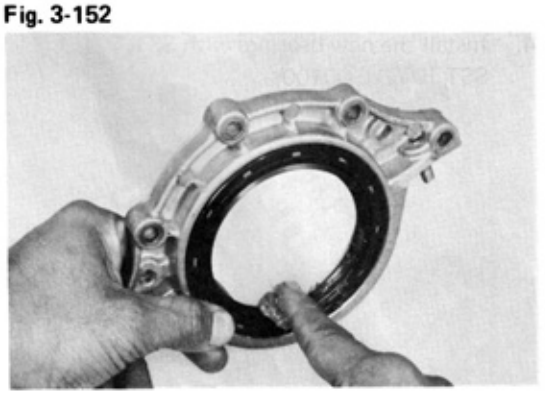


Crankshaft Rear Oil Seal

Check the oil seal lip and, if worn or damaged, replace the oil seal.

1. Remove the oil seal by a suitable means.
2. Install the new oil seal with SST.
   SST [09250-10011]

Fig. 3-152



3. After installing the oil seal, be sure to coat the seal lip with MP grease.

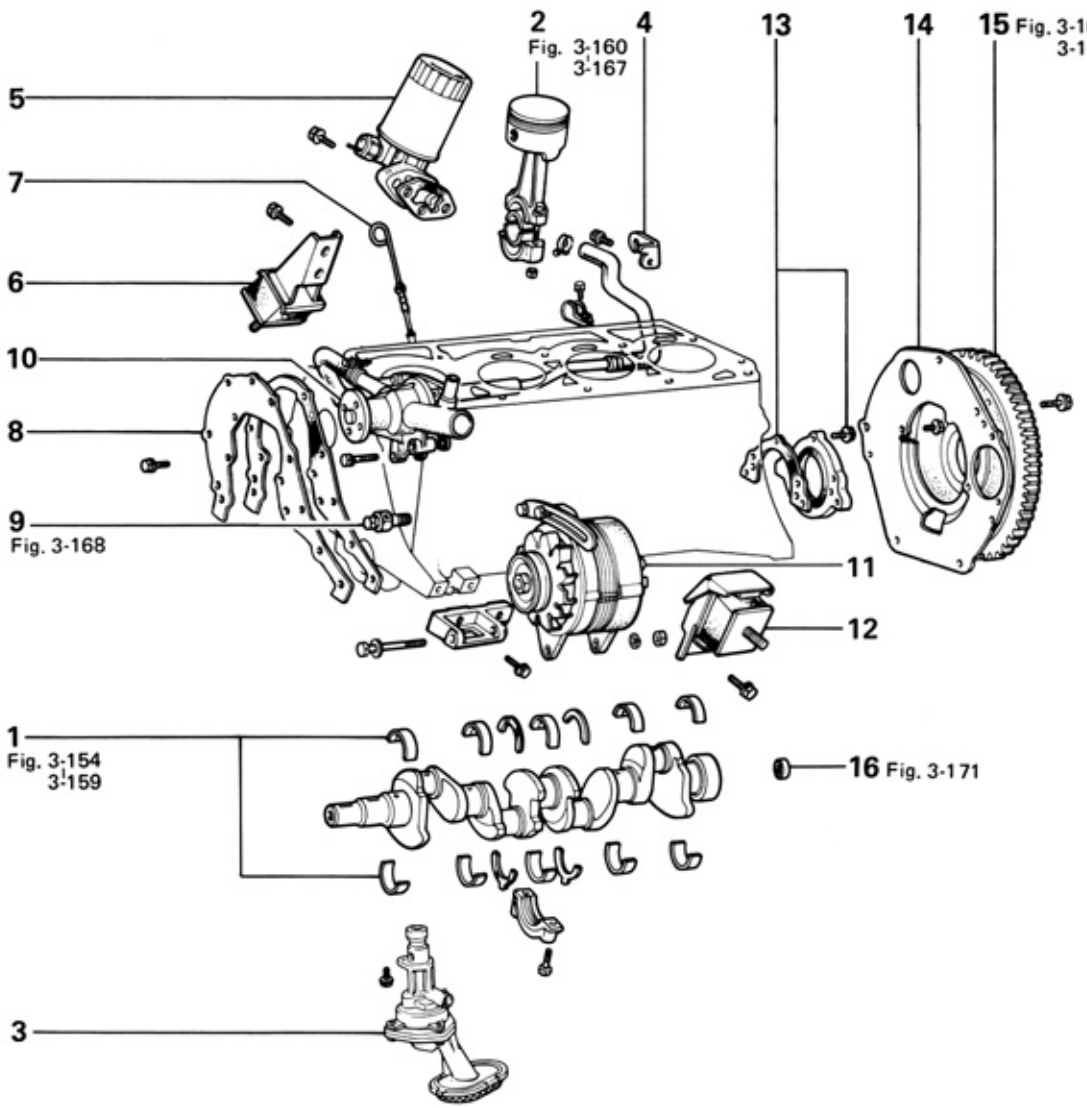
ProCarManuals.com

ASSEMBLY

Assemble the parts in the numerical order shown in the figure.

Fig. 3-153

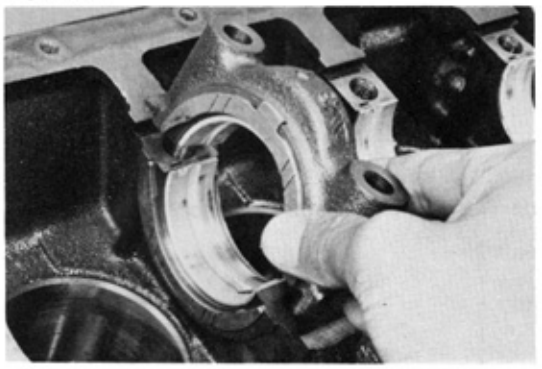
- **Thoroughly clean all parts to be assembled.**
- **Apply clean engine oil to all sliding and rotating surfaces of the parts before assembly.**



1. Crankshaft & Bearing
2. Piston & Connecting Rod
3. Oil Pump
4. Engine Rear Hanger
5. Oil Filter
6. Engine Front Mounting, RH
7. Oil Level Gauge
8. Front End Plate
9. Drain Cock
10. Water Pump & Heater Hose
11. Alternator & Bracket
12. Engine Front Mounting, LH
13. Rear Oil Seal
14. Rear End Plate
15. Flywheel
16. Input Shaft Bearing

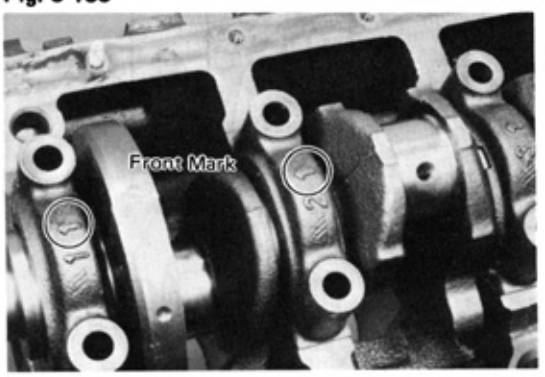
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Fig. 3-154



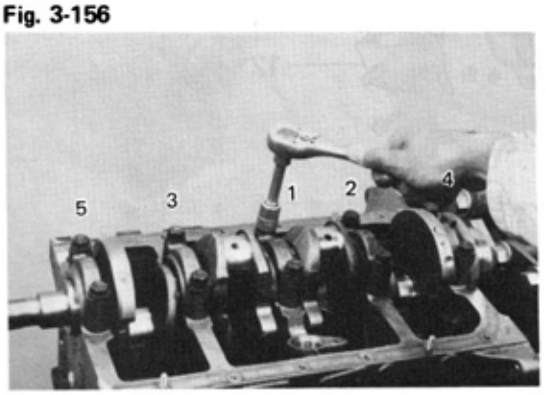
Install the thrust washers with their oil groove faces positioned toward the outside.

Fig. 3-155



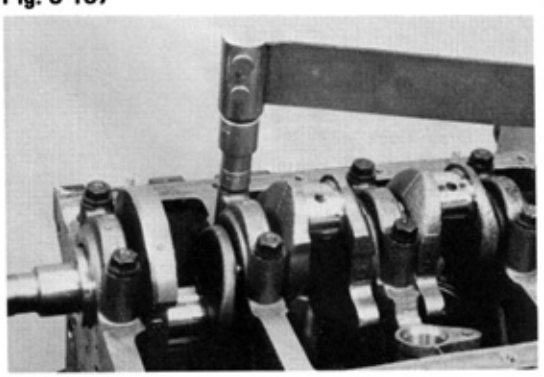
Face the arrow mark toward the front.

Fig. 3-156



Tighten the bearing cap bolts in the specified numerical sequence.

Fig. 3-157

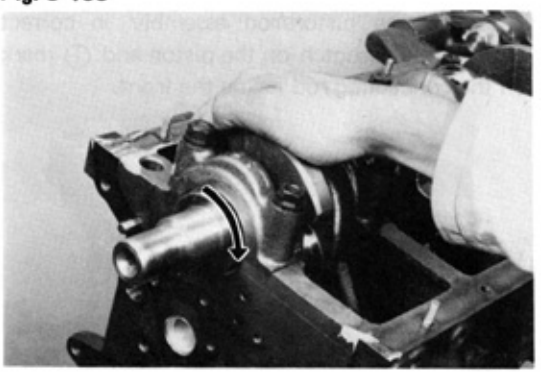


Tighten the bearing caps to specified torque.

Tightening torque: 5.4 – 6.6 kg-m (40 – 47 ft-lb)

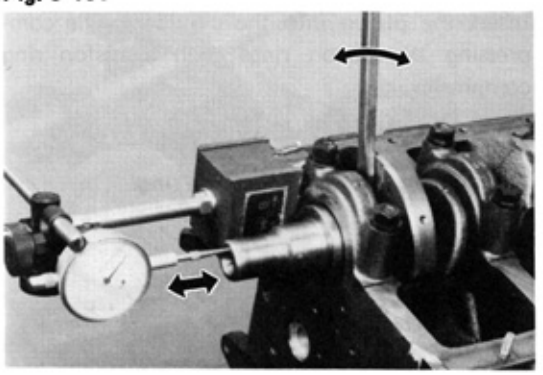
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Fig. 3-158



— Note —
Check for tightness of the crankshaft rotation after tightening each bearing cap.

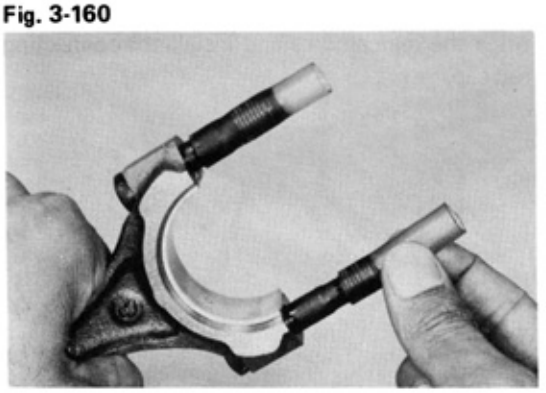
Fig. 3-159



Measure the crankshaft thrust clearance.
If it exceeds the limit, replace the thrust washers as a set.

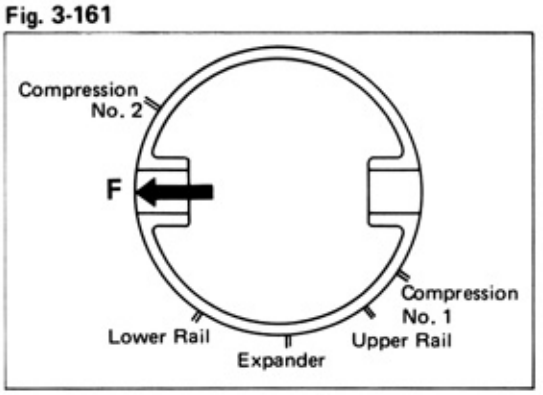
Thrust clearance:
STD 0.040 – 0.242 mm (0.0016 – 0.0095 in.)
Limit 0.3 mm (0.012 in.)
O/S thrust washer type: 0.125, 0.250

Fig. 3-160



Cover the connecting rod bolts with hoses to protect crankpins from damage.

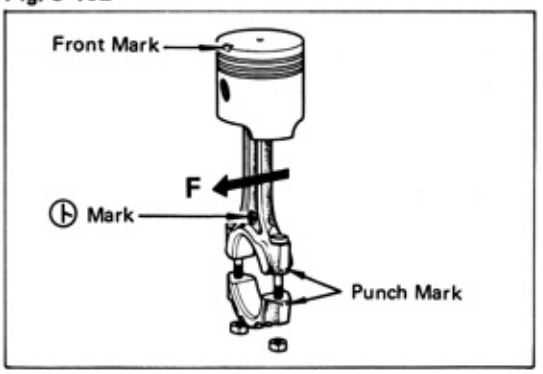
Fig. 3-161



Position the piston ring end gaps in the direction shown in the figure.

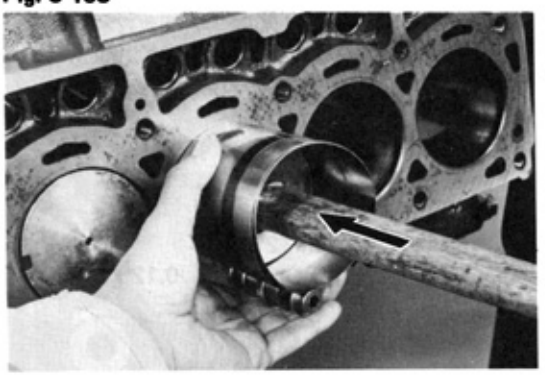
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Fig. 3-162



Assemble the piston/rod assembly in correct order with the notch on the piston and Ⓣ mark on the connecting rod facing the front.

Fig. 3-163



Insert the piston into the cylinder while compressing the piston rings with a piston ring compressor.

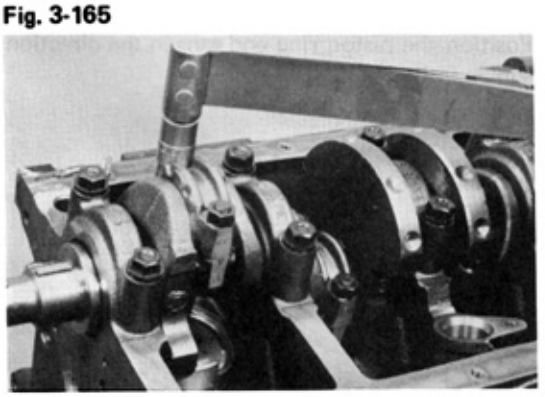
— Caution —
Use care not to break the piston ring.

Fig. 3-164



Align the matchmarks and install the connecting rod cap.

Fig. 3-165

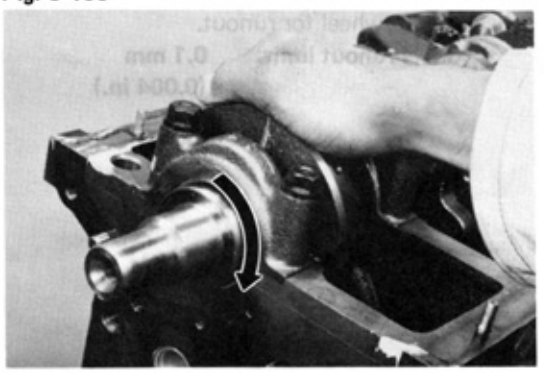


Tighten the connecting rod cap to specified torque.

Tightening torque: 4.0 – 5.2 kg-m (29 – 37 ft-lb)

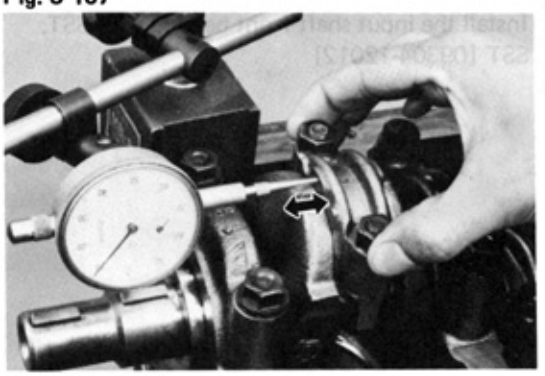
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Fig. 3-166



– Note –
Check the crankshaft rotation after tightening each bearing cap.

Fig. 3-167

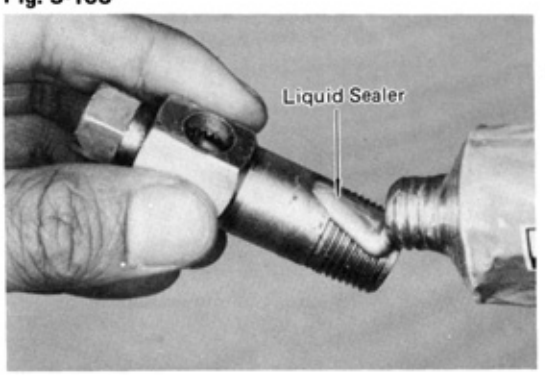


Check the connecting rod thrust clearance.

Thrust clearance:

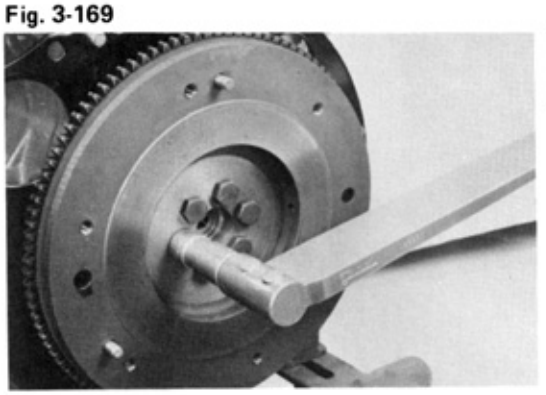
STD	**0.200 – 0.304 mm (0.0079 – 0.0120 in.)**
Limit	**0.35 mm (0.0138 in.)**

Fig. 3-168



Apply liquid sealer on the threads of the drain cock.

Fig. 3-169



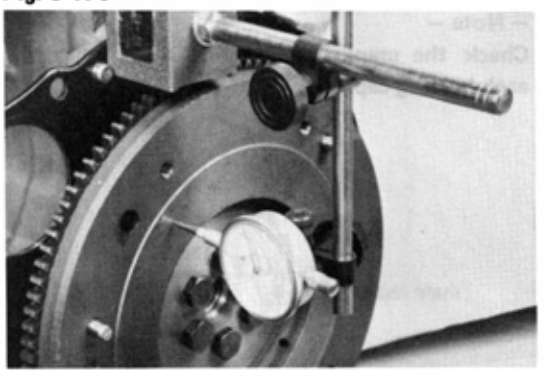
Tighten the bolts to specified torque.

Tightening torque: **5.4 – 6.6 kg-m (40 – 47 ft-lb)**

– Note –
Apply a light coating of engine oil on the bolt threads and under the head before installing.

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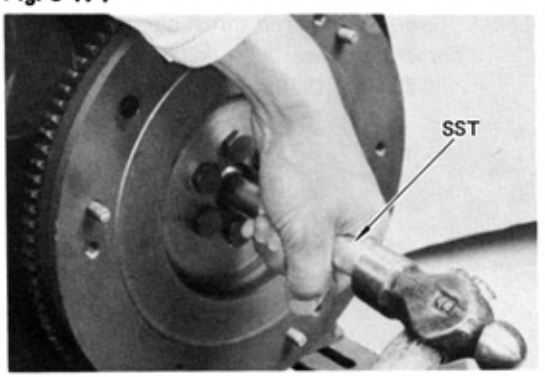
Fig. 3-170



Check the flywheel for runout.

Circle runout limit: **0.1 mm (0.004 in.)**

Fig. 3-171



Install the input shaft front bearing with SST.
SST [09304-12012]

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LUBRICATION SYSTEM

Page

LUBRICATION SYSTEM CIRCUIT 4-2

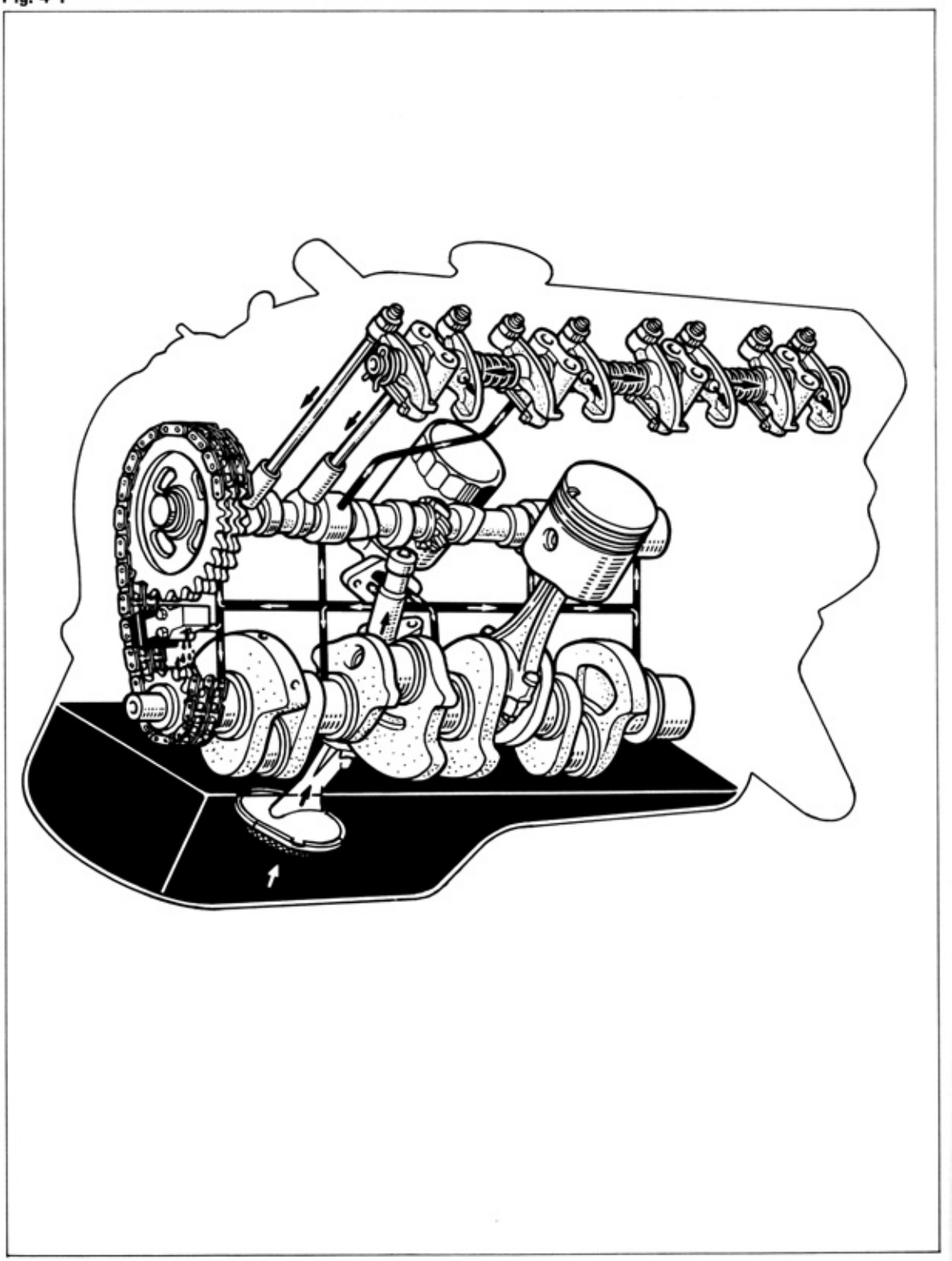
OIL PUMP 4-3

4

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LUBRICATION SYSTEM CIRCUIT

Fig. 4-1



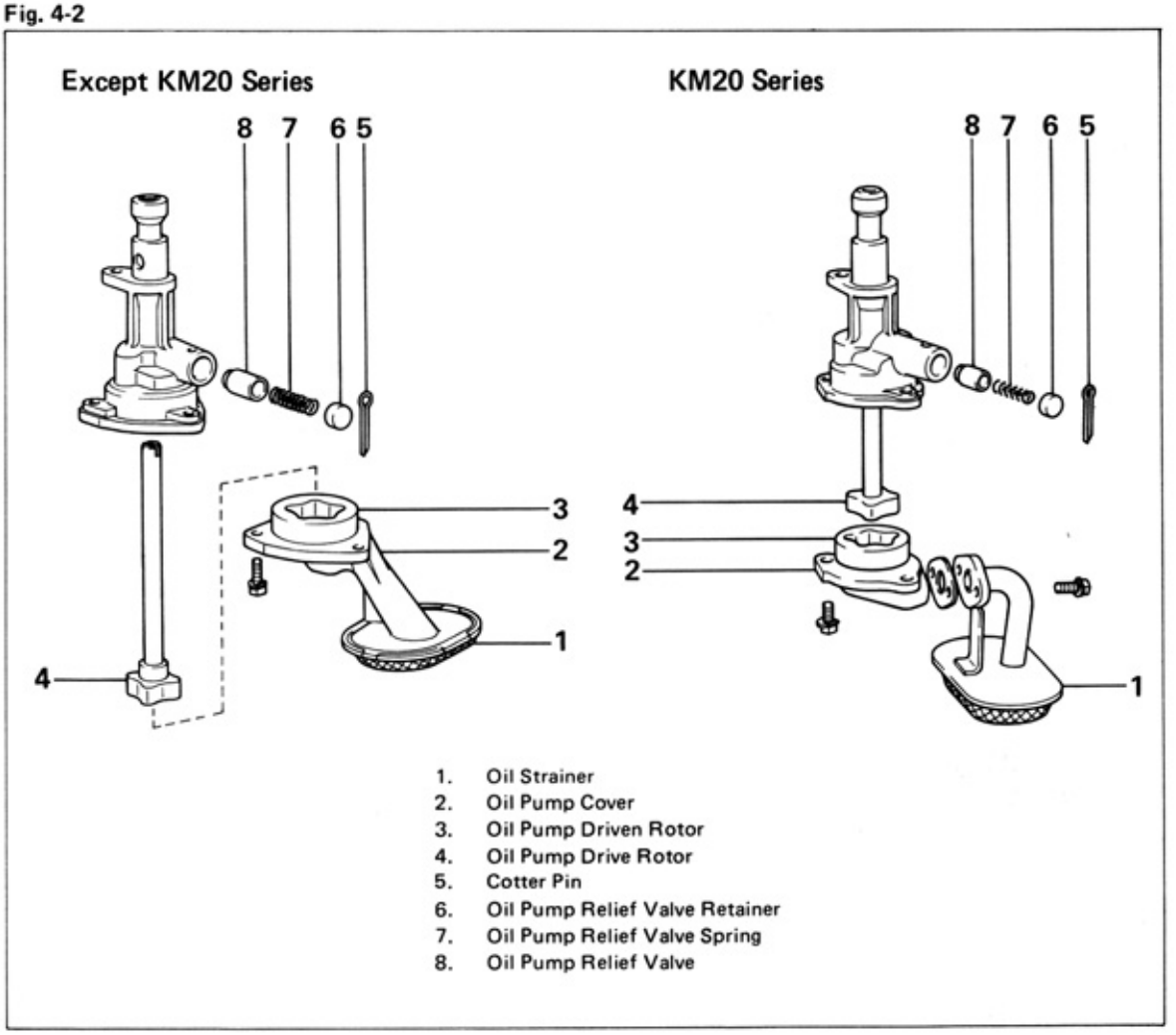
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OIL PUMP

DISASSEMBLY

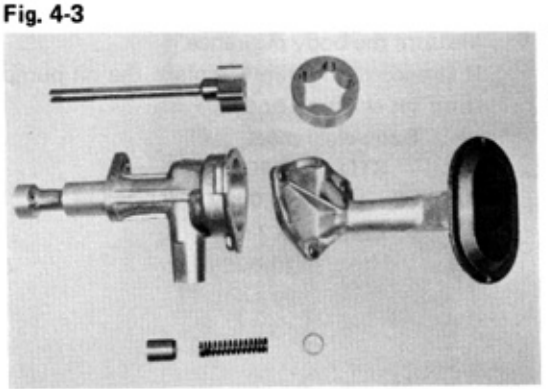
Disassemble the parts in the numerical order shown in the figure.

Fig. 4-2



1. Oil Strainer
2. Oil Pump Cover
3. Oil Pump Driven Rotor
4. Oil Pump Drive Rotor
5. Cotter Pin
6. Oil Pump Relief Valve Retainer
7. Oil Pump Relief Valve Spring
8. Oil Pump Relief Valve

Fig. 4-3

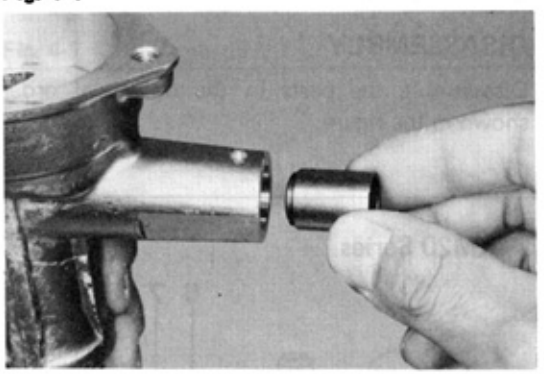


INSPECTION

1. Check the disassembled parts for wear or damage.

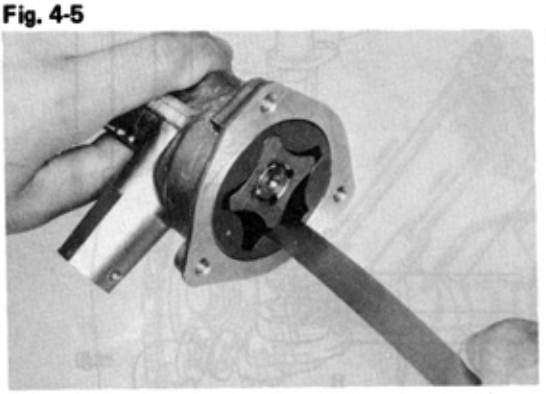
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Fig. 4-4



2. Check the relief valve for wear or scoring, and see if it slides smoothly.

Fig. 4-5

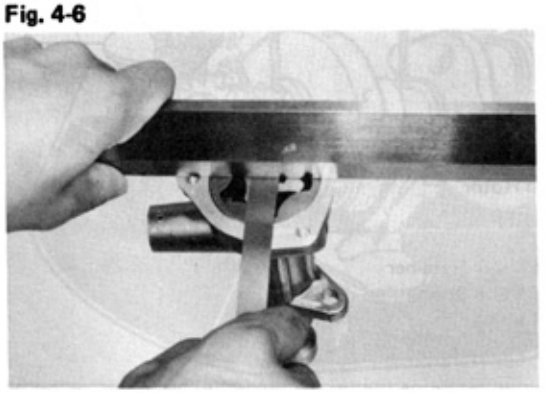


3. Measure the tip clearance.
If it exceeds the limit, replace the oil pump rotor set.

Tip clearance:

STD	**0.04 – 0.16 mm (0.0016 – 0.0063 in.)**
Limit	**0.2 mm (0.008 in.)**

Fig. 4-6

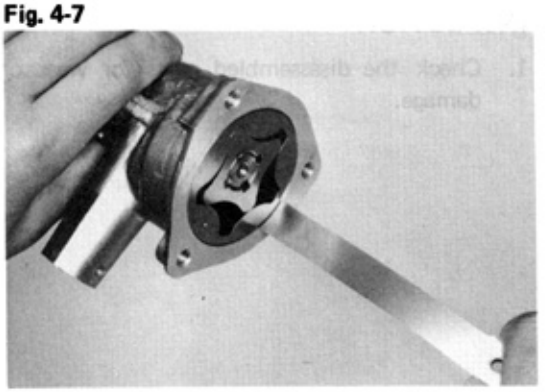


4. Measure the side clearance.
If it exceeds the limit, replace the oil pump rotor set or pump body.

Side clearance:

STD	**0.03 – 0.09 mm (0.0012 – 0.0035 in.)**
Limit	**0.15 mm (0.0059 in.)**

Fig. 4-7



5. Measure the body clearance.
If it exceeds the limit, replace the oil pump rotor set or pump body.

Body clearance:

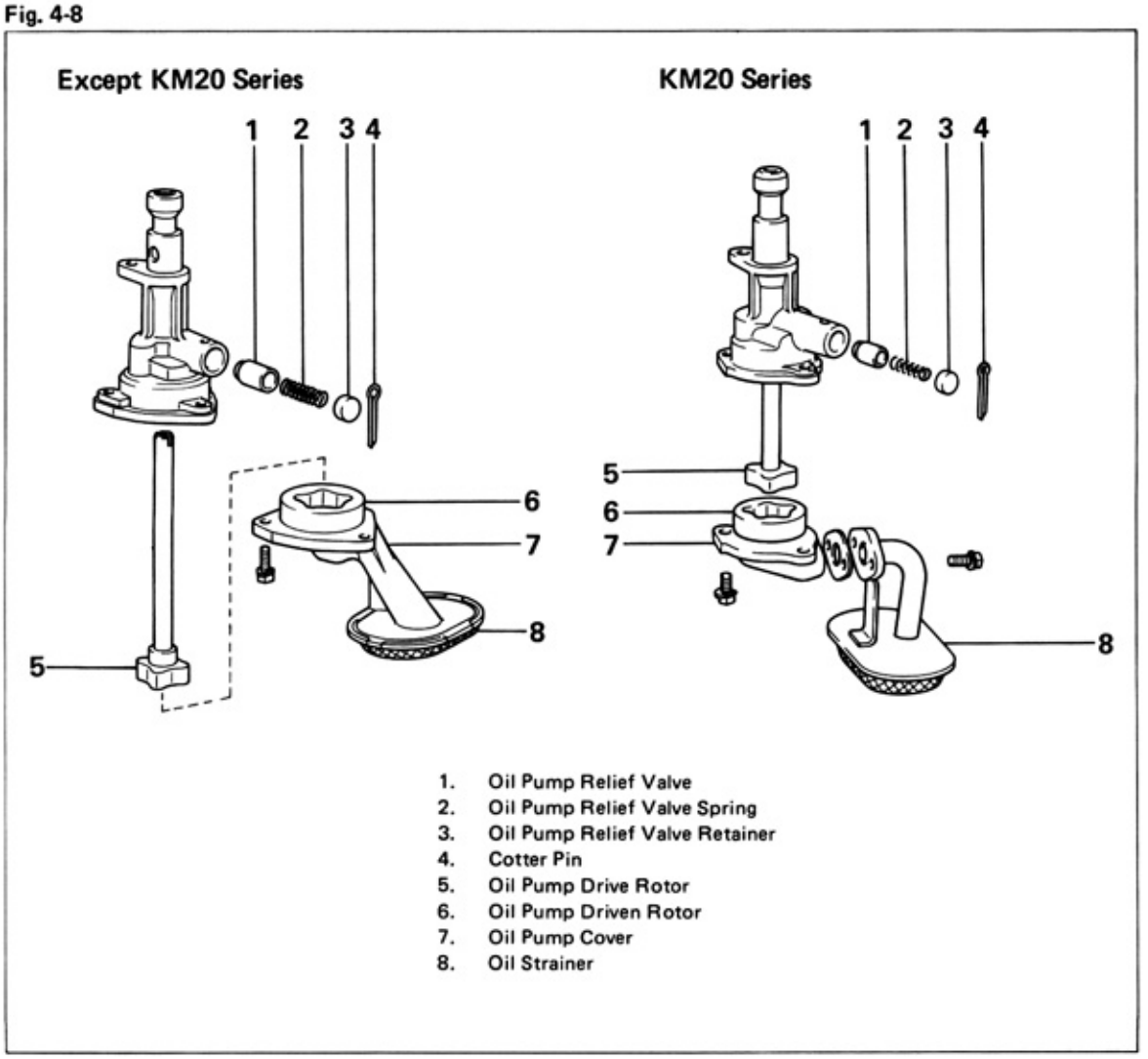
STD	**0.10 – 0.16 mm (0.0039 – 0.0063 in.)**
Limit	**0.2 mm (0.008 in.)**

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ASSEMBLY

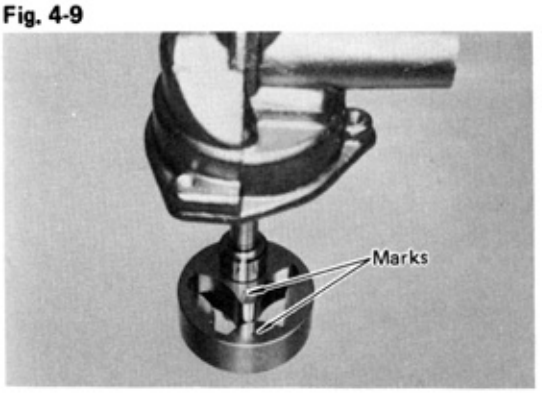
Assemble the parts in the numerical order shown in the figure.

Fig. 4-8



1. Oil Pump Relief Valve
2. Oil Pump Relief Valve Spring
3. Oil Pump Relief Valve Retainer
4. Cotter Pin
5. Oil Pump Drive Rotor
6. Oil Pump Driven Rotor
7. Oil Pump Cover
8. Oil Strainer

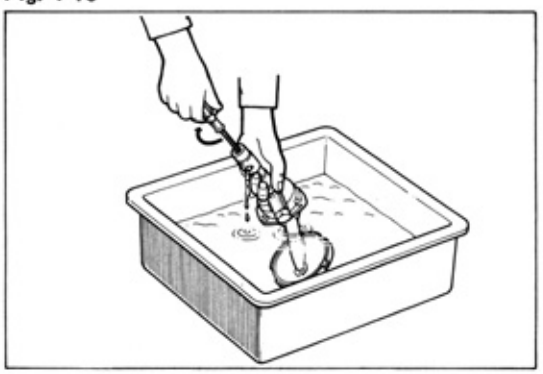
Fig. 4-9



Assemble the rotors so that the punch marks are facing the pump body (upward).

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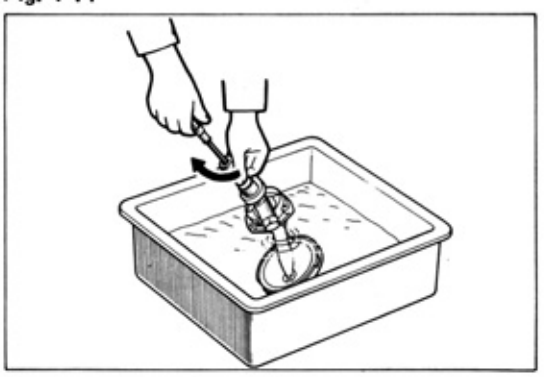
Fig. 4-10



Check the oil pump operation.

1. After assembling, immerse the pump suction end into clean engine oil, and turn the pump shaft clockwise with a screwdriver until oil comes out from the discharge hole.

Fig. 4-11



2. Close the discharge hole with your thumb, and check to see if the pump shaft rotational resistance increases when turned further.

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MEMO

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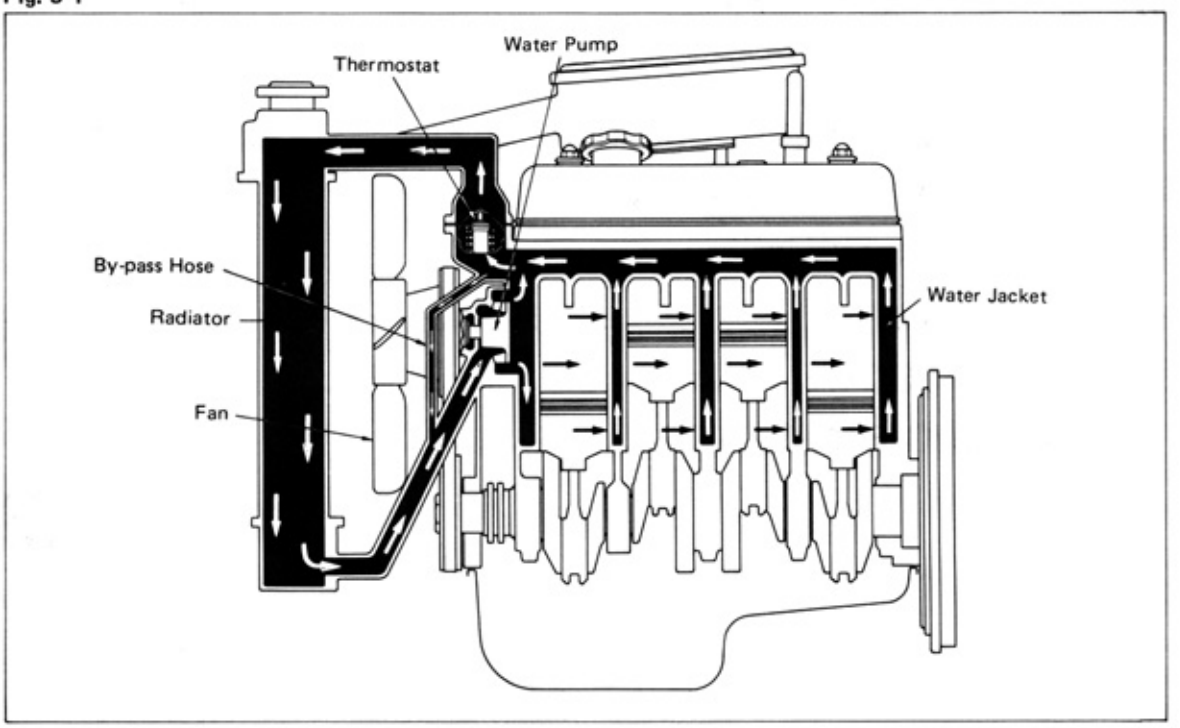
COOLING SYSTEM

	Page
COOLING SYSTEM CIRCUIT	5-2
WATER PUMP CUTAWAY VIEW	5-2
WATER PUMP	5-3
RADIATOR	5-7
THERMOSTAT	5-7
COOLING FAN MOTOR	5-8

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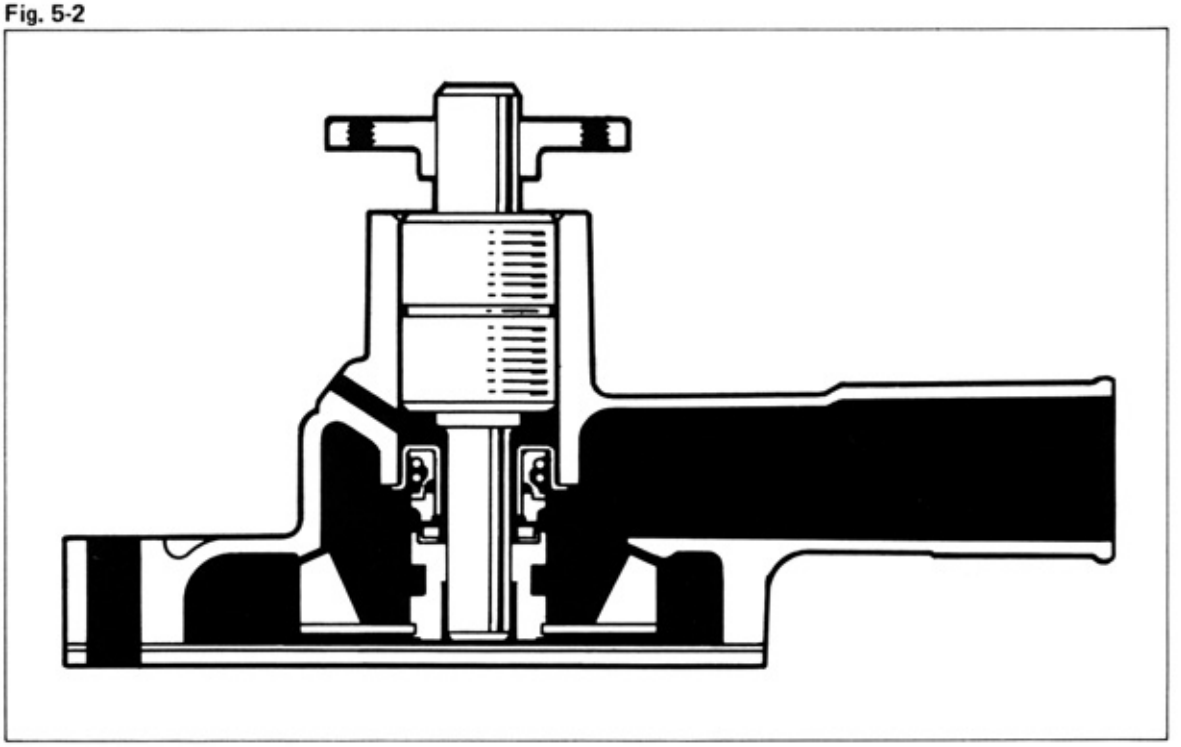
COOLING SYSTEM CIRCUIT

Fig. 5-1



WATER PUMP CUTAWAY VIEW

Fig. 5-2



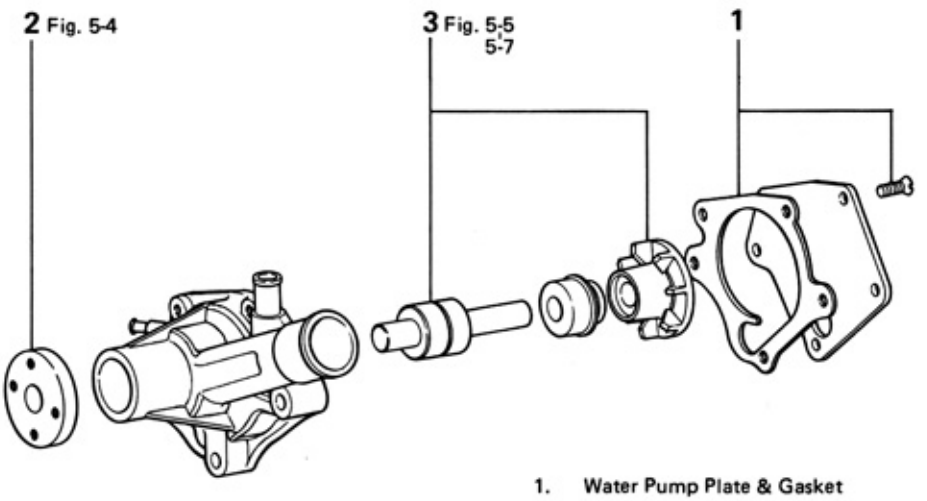
ProCarManuals.com

WATER PUMP

DISASSEMBLY

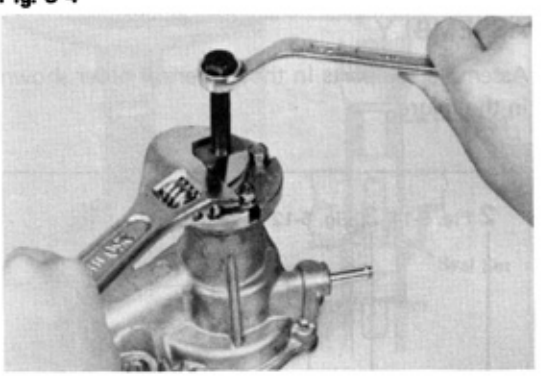
Disassemble the parts in the numerical order shown in the figure.

Fig. 5-3



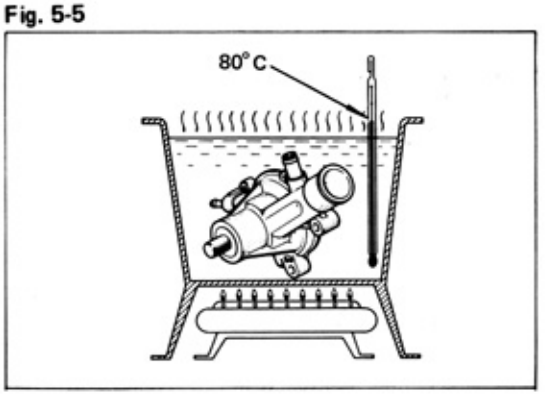
1. Water Pump Plate & Gasket
2. Water Pump Pulley Seat
3. Water Pump Bearing, Seal Set & Rotor

Fig. 5-4



Remove the pulley seat with SST.
SST [09235-20011]

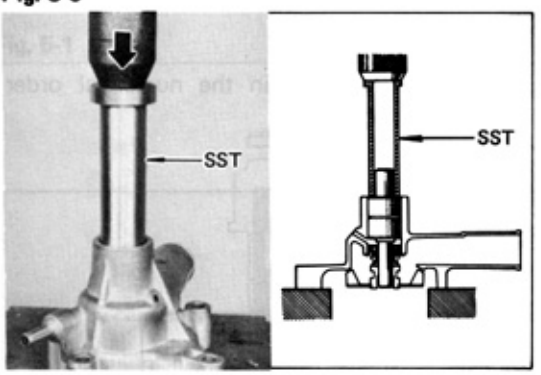
Fig. 5-5



Heat the water pump body to about 80°C (176°F).

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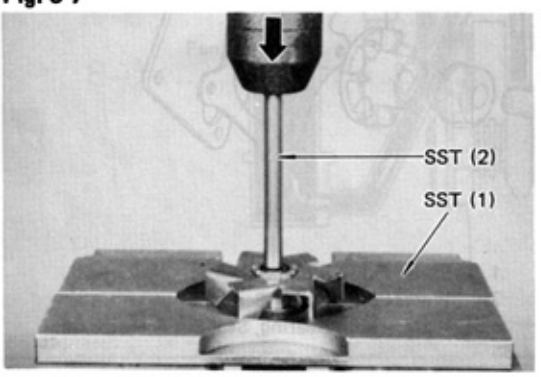
Fig. 5-6



Using SST, press out the water pump bearing together with the rotor and seal set.
SST [09238-48010]

— Note —
Always replace the seal set upon assembly.

Fig. 5-7

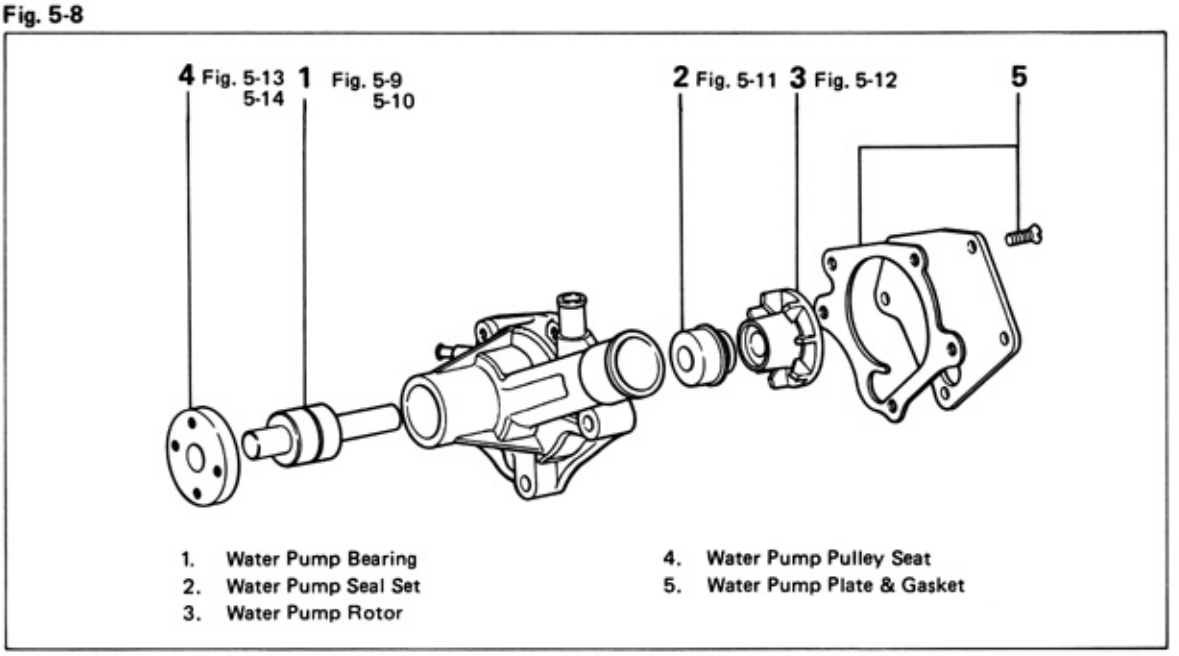


Using SST, press out the pump bearing from the rotor.
SST [09236-28011] (1)
[09236-36010] (2)

ASSEMBLY

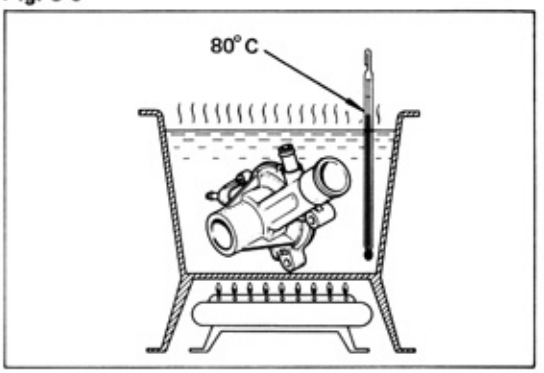
Assemble the parts in the numerical order shown in the figure.

Fig. 5-8



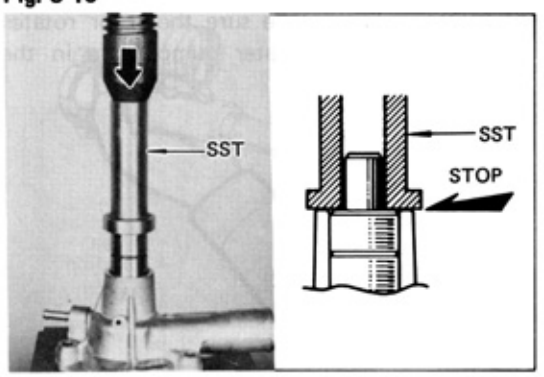
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Fig. 5-9



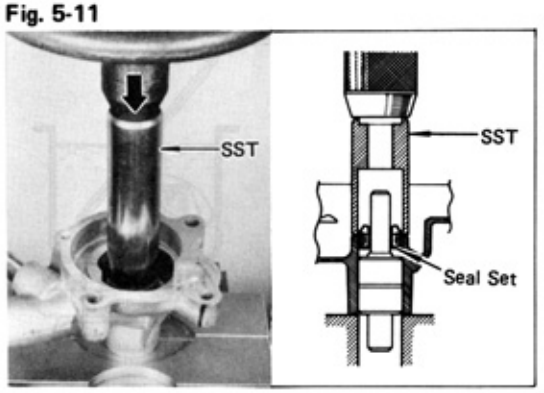
Heat the water pump body to about 80°C (176°F).

Fig. 5-10



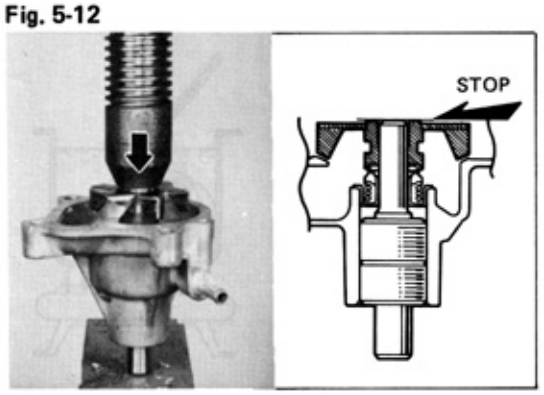
Using SST, press the water pump bearing into the pump body.
SST [09238-48010]

Fig. 5-11



Press in the new seal set with SST.
SST [09236-36010]

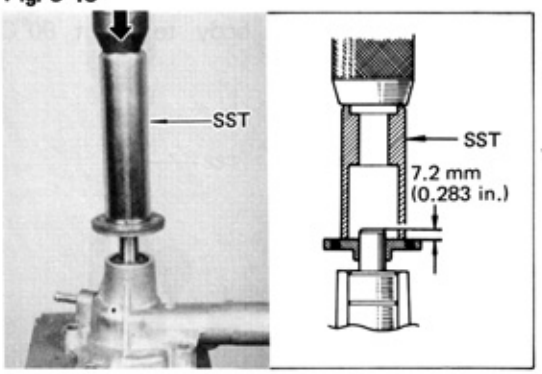
Fig. 5-12



Press in the rotor.

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Fig. 5-13



Using SST, press in the pulley seat to the specified depth.
SST [09236-36010]

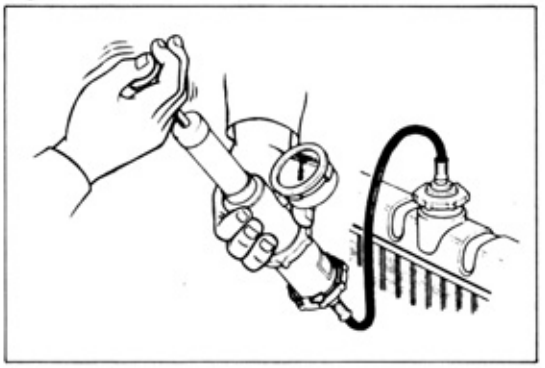
Fig. 5-14



After assembling, make sure the rotor rotates smoothly with the water pump plate in the installed condition.

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Fig. 5-15



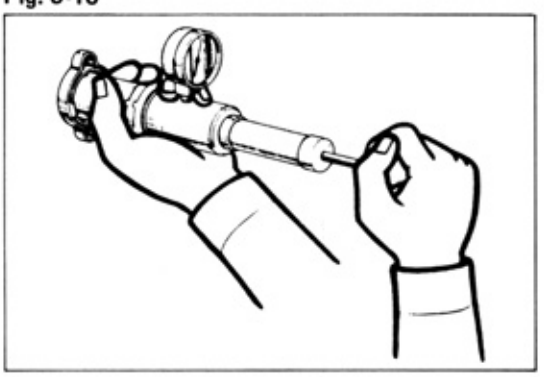
RADIATOR

INSPECTION

1. Install the radiator cap tester to the radiator, apply pressure and check for leakage in the cooling system under normal operating temperature.

   Applicable pressure: 1.2 kg/cm² (17 psi)

Fig. 5-16

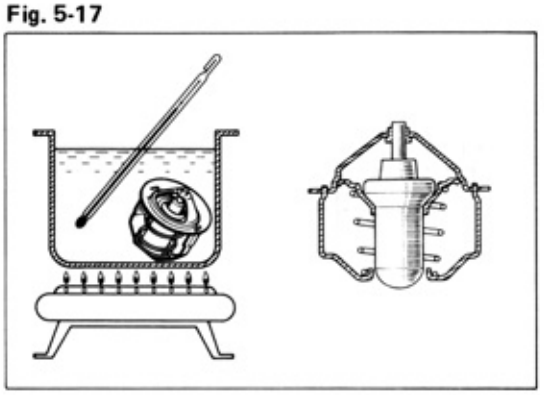


2. Check the pressure sealing and vacuum relief valve operation.

   Valve opening pressure:
   STD 0.75 – 1.05 kg/cm² (10.7 – 14.9 psi)
   Limit 0.6 kg/cm² (8.5 psi)

3. If the readings are not within acceptable limits, replace the radiator cap.

Fig. 5-17



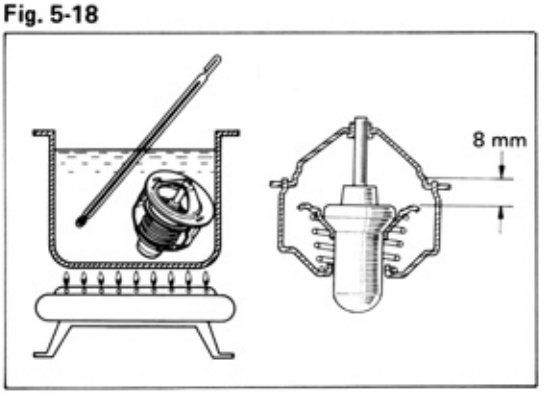
THERMOSTAT

INSPECTION

1. Immerse the thermostat in water, and check the valve opening temperature by heating the water gradually.
2. Replace the thermostat if the valve remains open at normal temperature or is not very tight when fully closed.

   Low temp. type:
   Valve starts to open at 80 – 84°C (176 – 183°F).
   Valve opens by more than 8 mm (0.31 in.) at 95°C (203°F).
   High temp. type:
   Valve starts to open at 86 – 90°C (187 – 194°F).
   Valve opens by more than 8 mm (0.31 in.) at 100°C (212°F).

Fig. 5-18

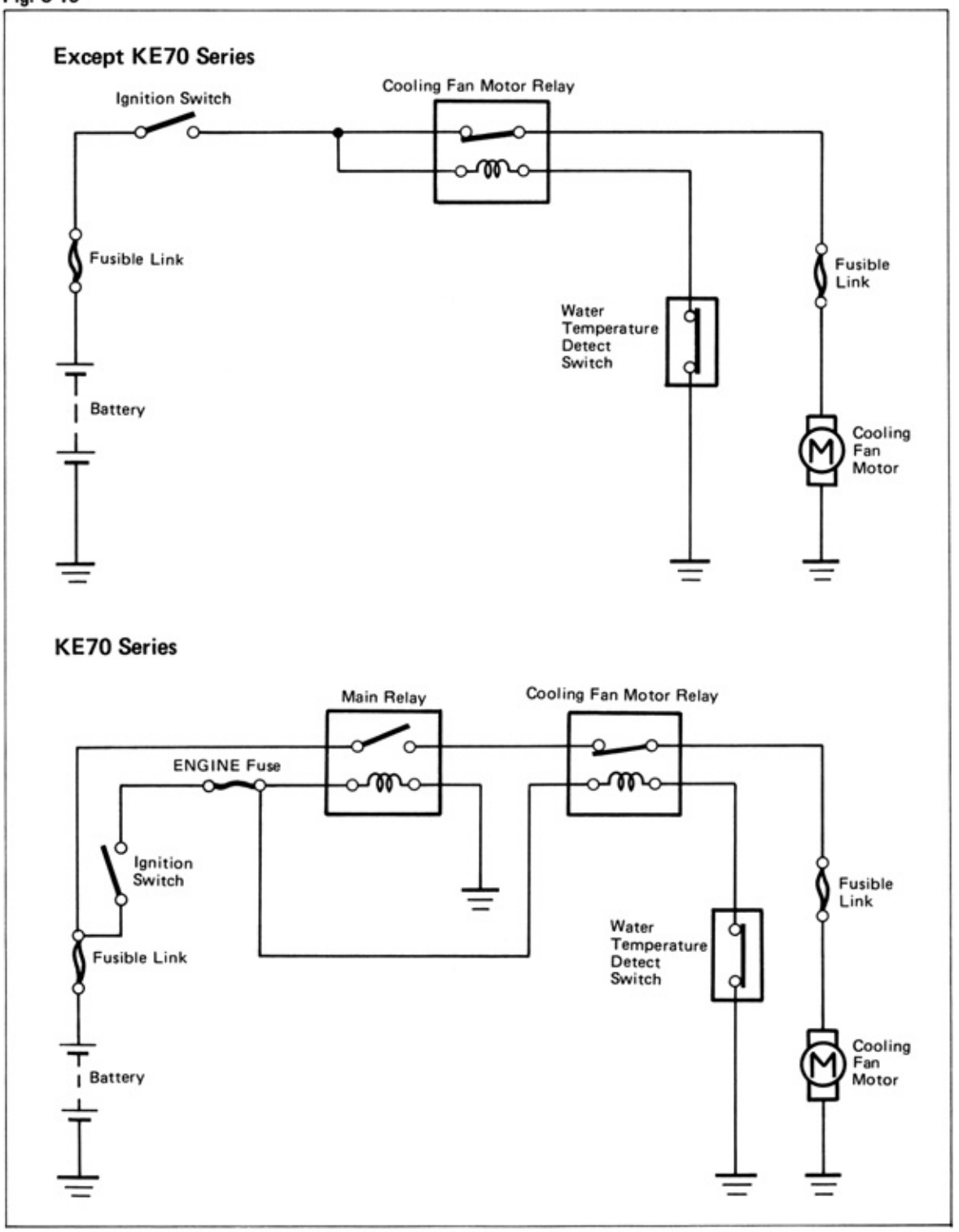


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COOLING FAN MOTOR

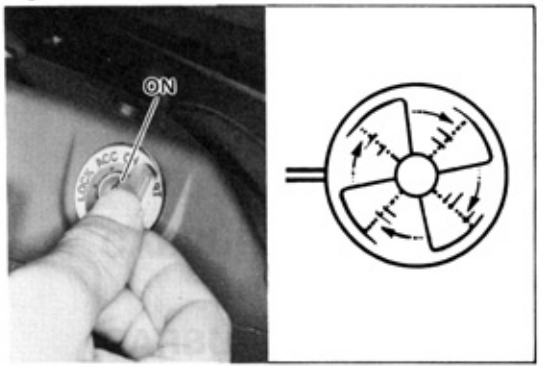
CIRCUIT DIAGRAM

Fig. 5-19



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Fig. 5-20

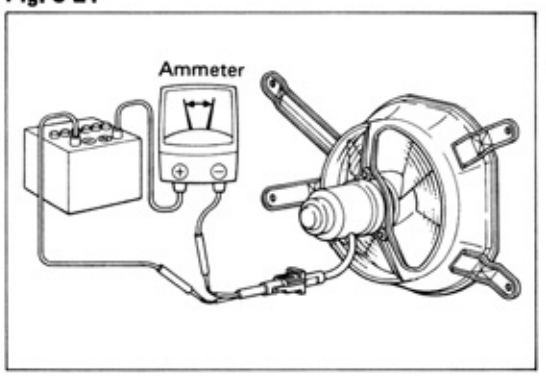


ON-VEHICLE INSPECTION

Cooling Fan Motor Relay

1. Disconnect the water temperature detect switch connector.
2. Check to see that the fan rotates when the ignition switch is turned ON.

Fig. 5-21



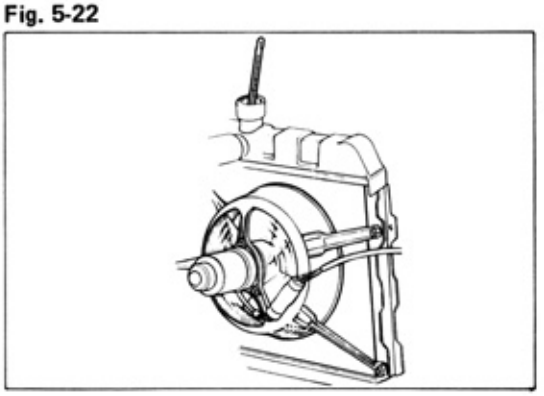
Cooling Fan Motor

Check to see that the motor rotates smoothly within the standard current flow.

Current:

STD	**2K, 3K-C, 3K-H (Europe M/T) & 4K-C (USA & Canada)**	**4.9 ± 0.5 A**
	4K (Europe) & 4K-C (Sweden)	**3.5 ± 0.4 A**
	4K (Europe A/T)	**7 ± 0.8 A**
	3K-H (w/cooler)	**9.5 ± 1 A**

Fig. 5-22



Water Temperature Detect Switch

1. Raise the coolant temperature by warming up the engine at idle.
2. Check that the fan begins turning when the coolant temperature reaches about 90°C (194°F).

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MEMO

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FUEL SYSTEM

Page

FUEL PUMP 6-2

CARBURETOR
(Except KP61 Series & KM20 Series) ... 6-4

CARBURETOR
(KP61 Series & KM20 Series) 6-24

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FUEL PUMP

COMPONENTS

Fig. 6-1

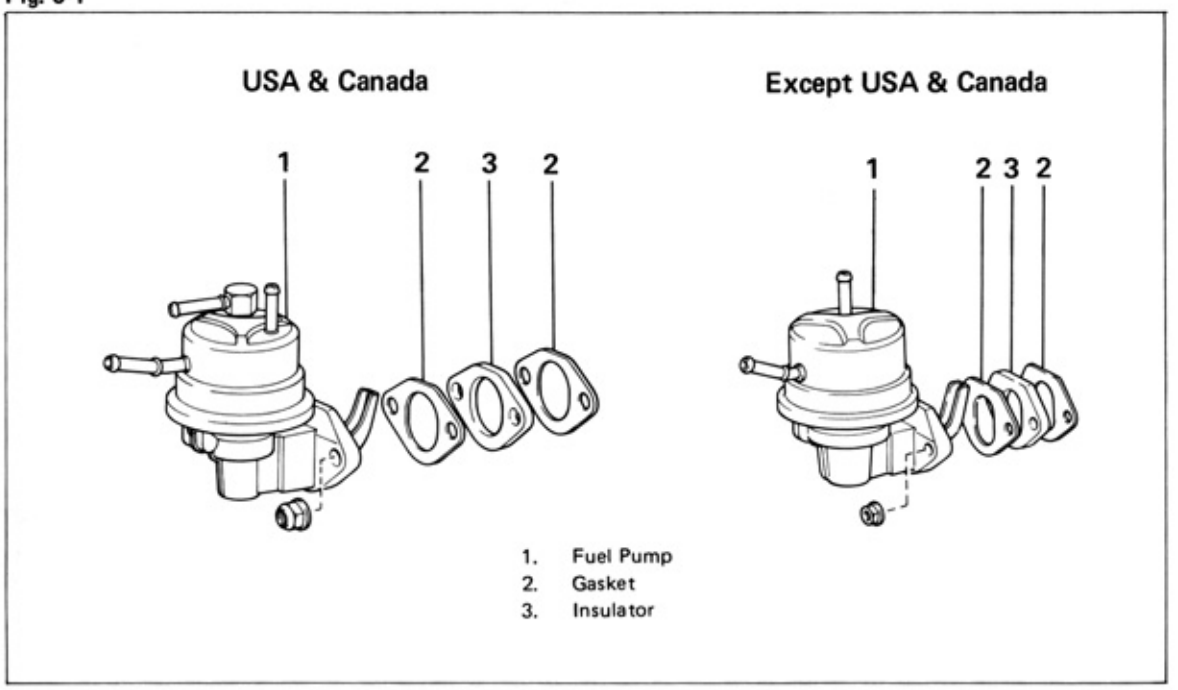
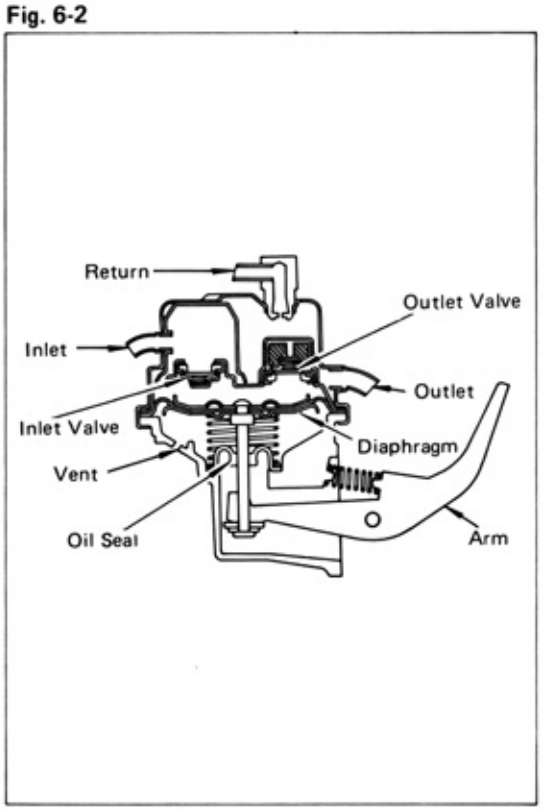


Fig. 6-2



INSPECTION (AIRTIGHT TEST)

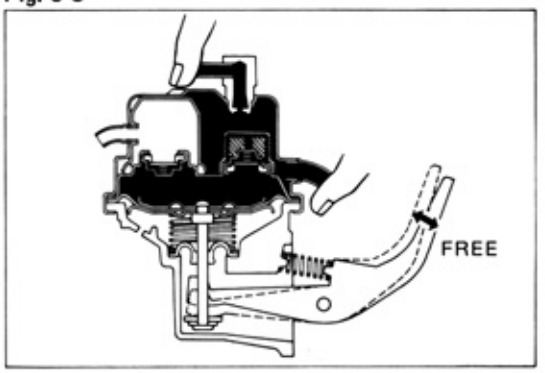
— Precaution —

Before performing the following checks on the fuel pump:

1. **Run some fuel through the pump to insure that the check valves seal tightly (a dry check valve may not seal properly).**
2. **Without blocking off any pipes, operate the pump lever and check the amount of force necessary for operation and the amount of arm play. This same amount of force should be used in the checks.**

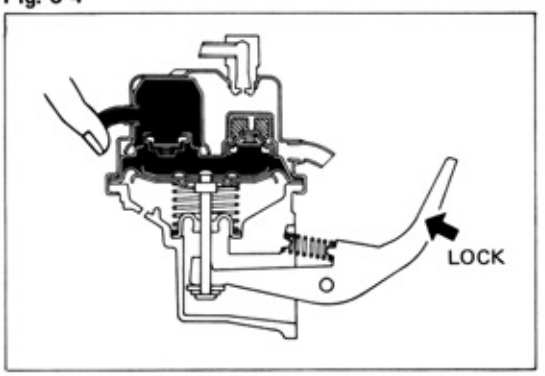
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Fig. 6-3



1. Check inlet valve
   Block off the outlet pipes with your finger and check that there is an increase in lever arm play and that the lever arm moves freely (lost motion — no reaction force).

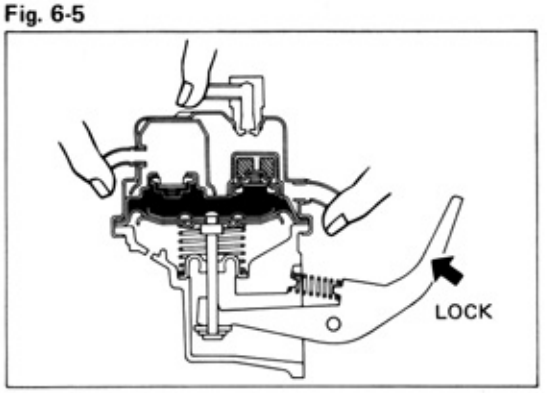
Fig. 6-4



2. Check outlet valve
   Block off the inlet pipe with your finger and check that the arm locks (does not operate with same amount of force used in the precheck above).

— Note —
Never use more force than that used in the precheck. This applies to checks 3 and 4 also).

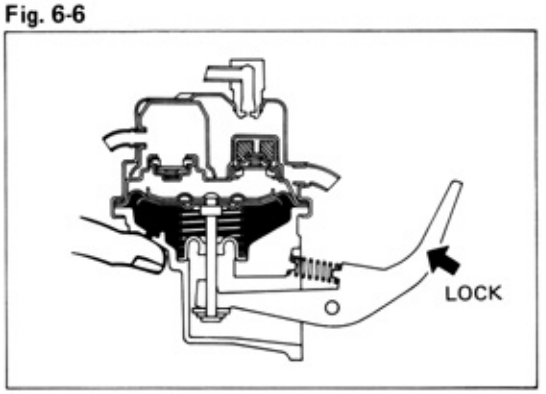
Fig. 6-5



3. Check diaphragm
   Block off the inlet and outlet pipes and check that the pump arm locks.

— Note —
If all three of these checks are not as specified, the caulking (sealing) of the body and upper casing is defective.

Fig. 6-6



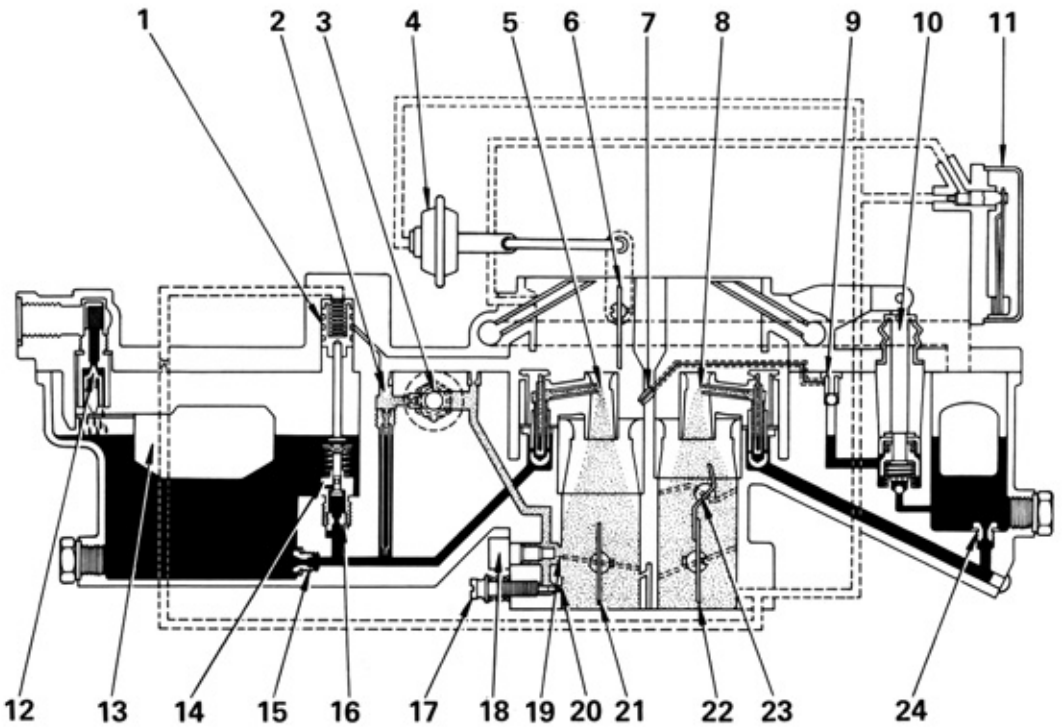
4. Check oil seal
   Block off the vent hole with your finger and check that the pump arm locks.

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CARBURETOR (Except KP61 Series & KM20 Series)

CARBURETOR CIRCUIT

Fig. 6-7



1. Power Piston
2. Slow Jet
3. Solenoid Valve
4. Choke Breaker (Europe 4K A/T)
5. Primary Main Nozzle
6. Choke Valve
7. Pump Jet
8. Secondary Main Nozzle
9. Pump Discharge Weight
10. Pump Plunger
11. Thermostat Valve
12. Needle Valve
13. Float
14. Power Valve
15. Primary Main Jet
16. Power Jet
17. Idle Mixture Adjusting Screw
18. Rivet Plug
19. Slow Port
20. Idle Port
21. Primary Throttle Valve
22. Secondary Throttle Valve
23. High Speed Valve
24. Secondary Main Jet

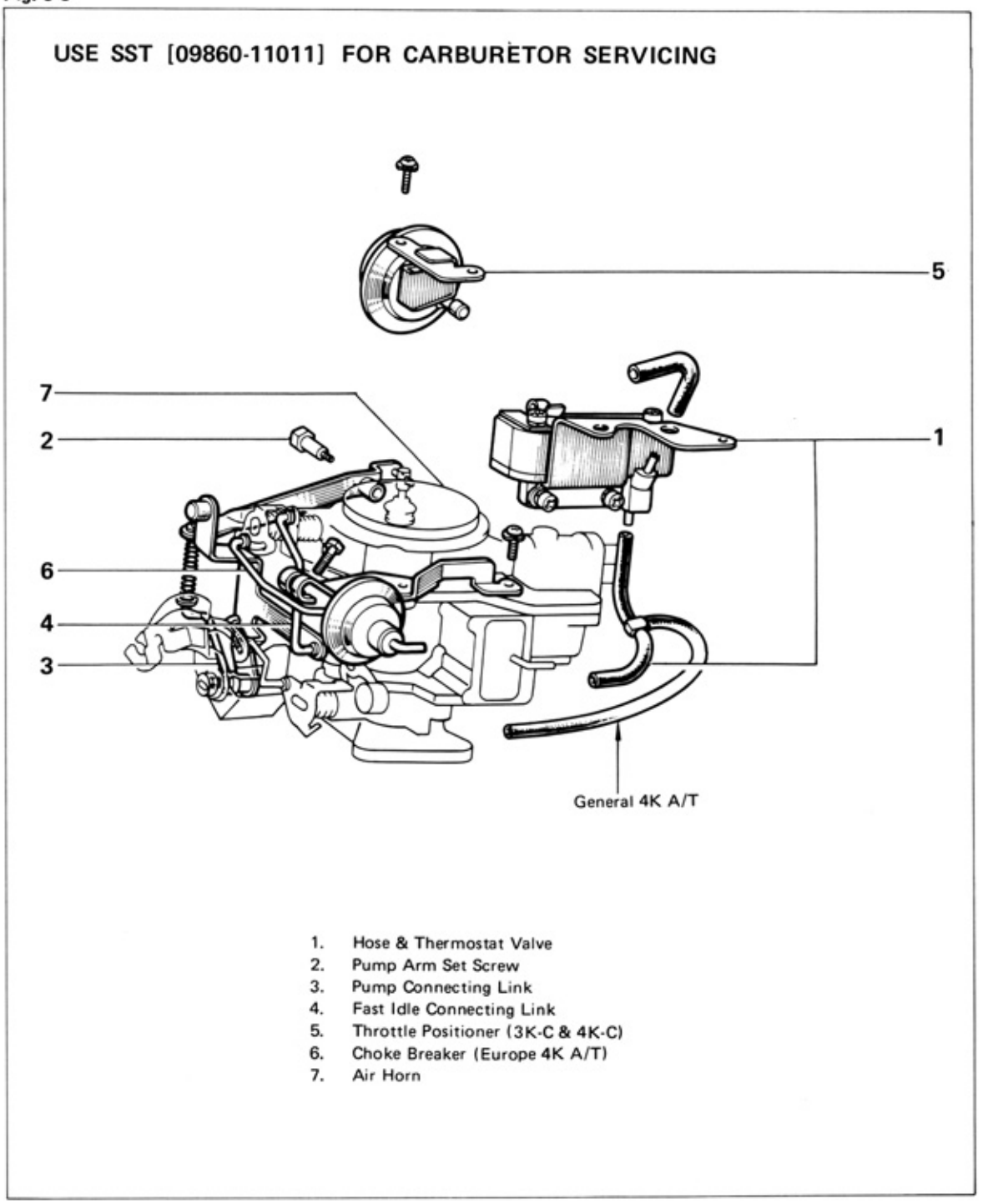
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DISASSEMBLY

Air Horn

1. Disassemble the parts in the numerical order shown in the figure.

Fig. 6-8

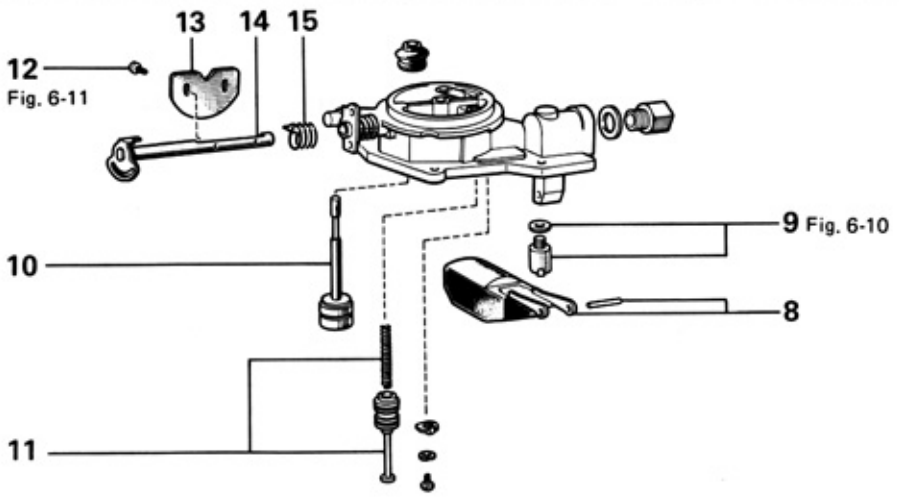


1. Hose & Thermostat Valve
2. Pump Arm Set Screw
3. Pump Connecting Link
4. Fast Idle Connecting Link
5. Throttle Positioner (3K-C & 4K-C)
6. Choke Breaker (Europe 4K A/T)
7. Air Horn

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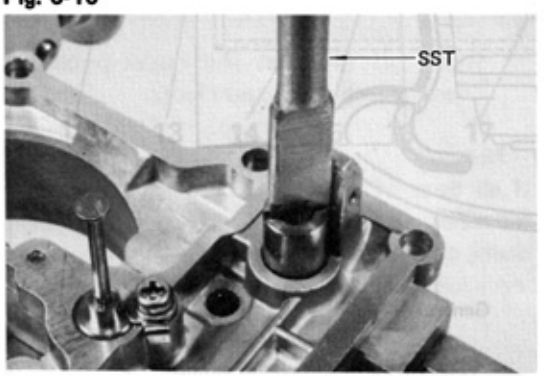
2. Disassemble the parts in the numerical order shown in the figure.

Fig. 6-9



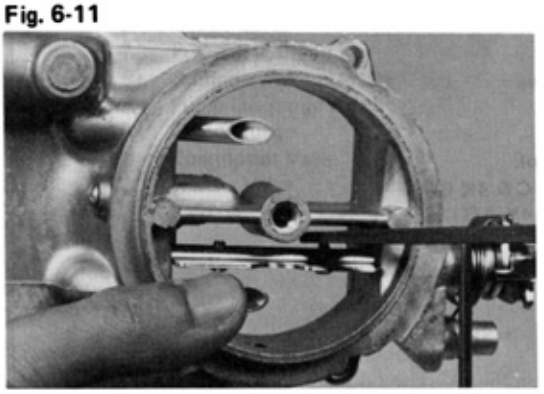
8. Float & Float Pivot Pin
9. Needle Valve Subassembly
10. Pump Plunger
11. Power Piston & Spring
12. Valve Set Screw
13. Choke Valve
14. Choke Valve Shaft
15. Choke Valve Relief Spring

Fig. 6-10



Remove the needle valve seat with SST.
SST [09860-11011]

Fig. 6-11



To remove choke valve, file off the end of the set screws.

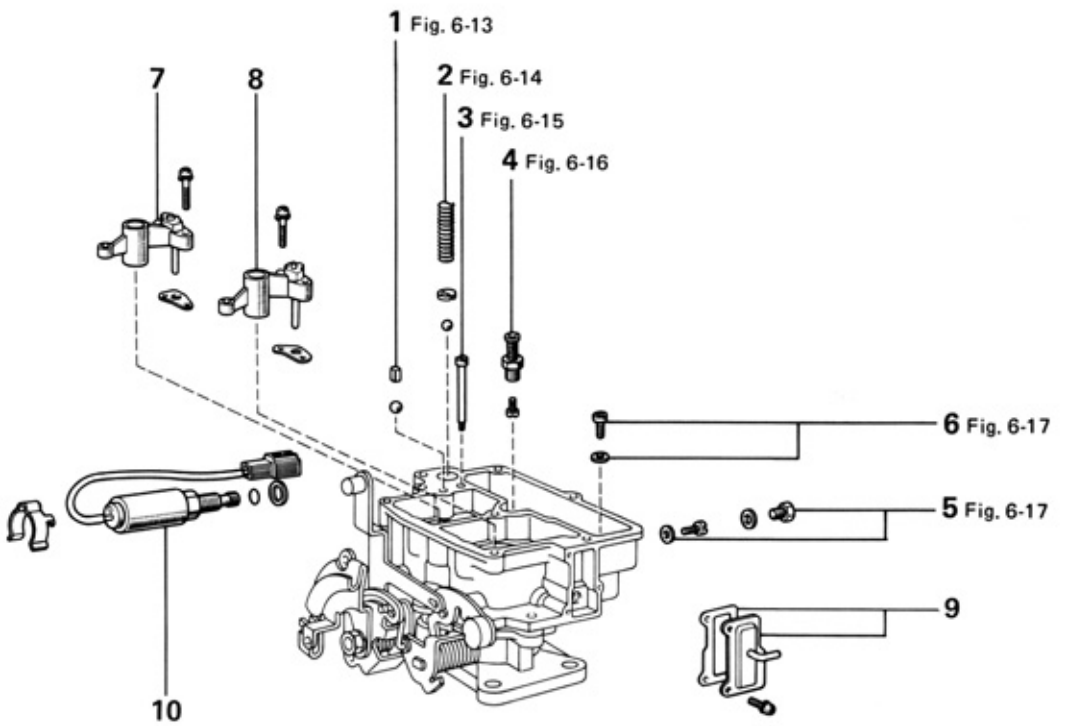
— Note —
Do this only if it is necessary to replace the choke valve or shaft.

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Body

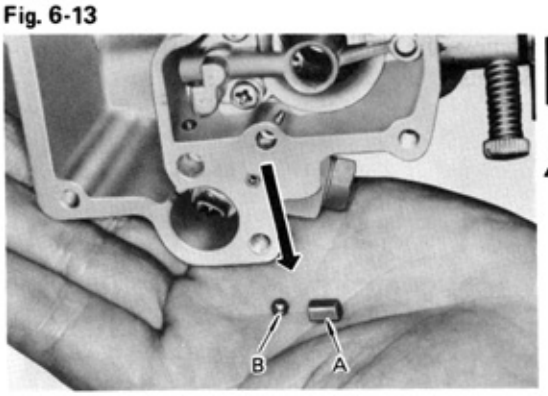
Disassemble the parts in the numerical order shown in the figure.

Fig. 6-12



1. Pump Discharge Weight & Steel Ball
2. Pump Damping Spring & Steel Ball
3. Slow Jet
4. Power Valve & Power Jet
5. Primary Main Jet
6. Secondary Main Jet
7. Primary Small Venturi
8. Secondary Small Venturi
9. Thermostatic Valve Cover (Sweden 4K-C)
10. Solenoid Valve

Fig. 6-13

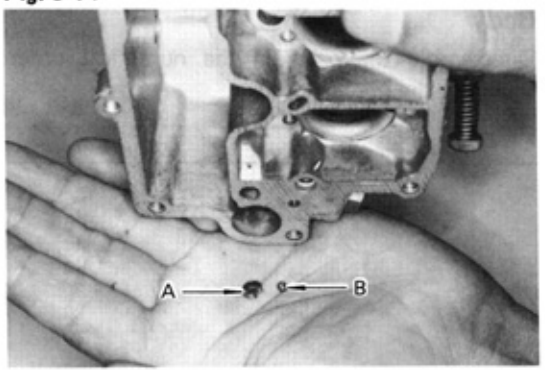


Turn the carburetor upside down, and remove the pump discharge weight A and steel ball B.

– Caution –
Use care not to lose the steel ball.

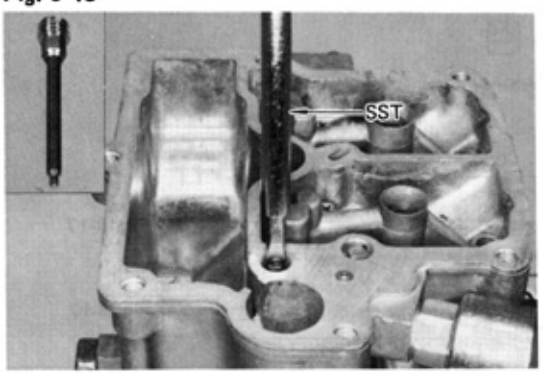
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Fig. 6-14



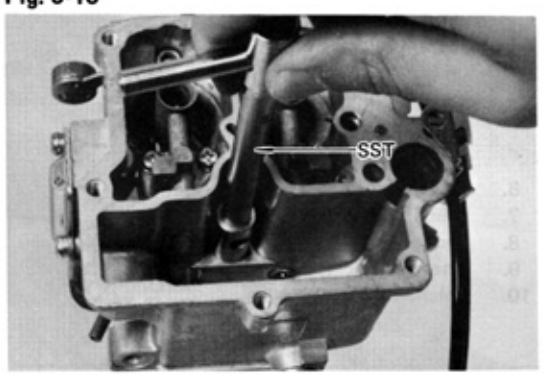
Using tweezers, take out the check ball retainer A from the bottom of pump cylinder. Turn the carburetor upside down and drop out the steel ball B.

Fig. 6-15



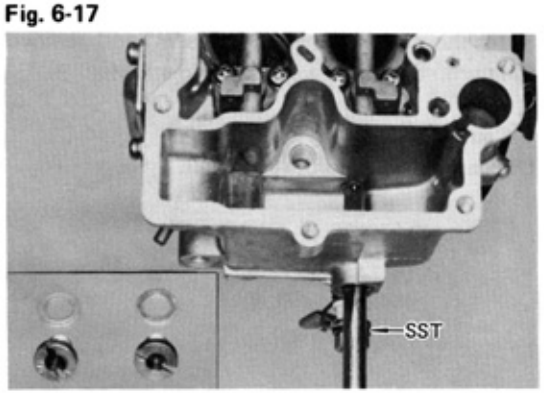
Remove the slow jet with SST.
SST [09860-11011]

Fig. 6-16



Remove the power valve with SST.
SST [09860-11011]

Fig. 6-17



Remove the primary and secondary main jets and gaskets.

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Flange

Disassemble the parts in the numerical order shown in the figure.

Fig. 6-18

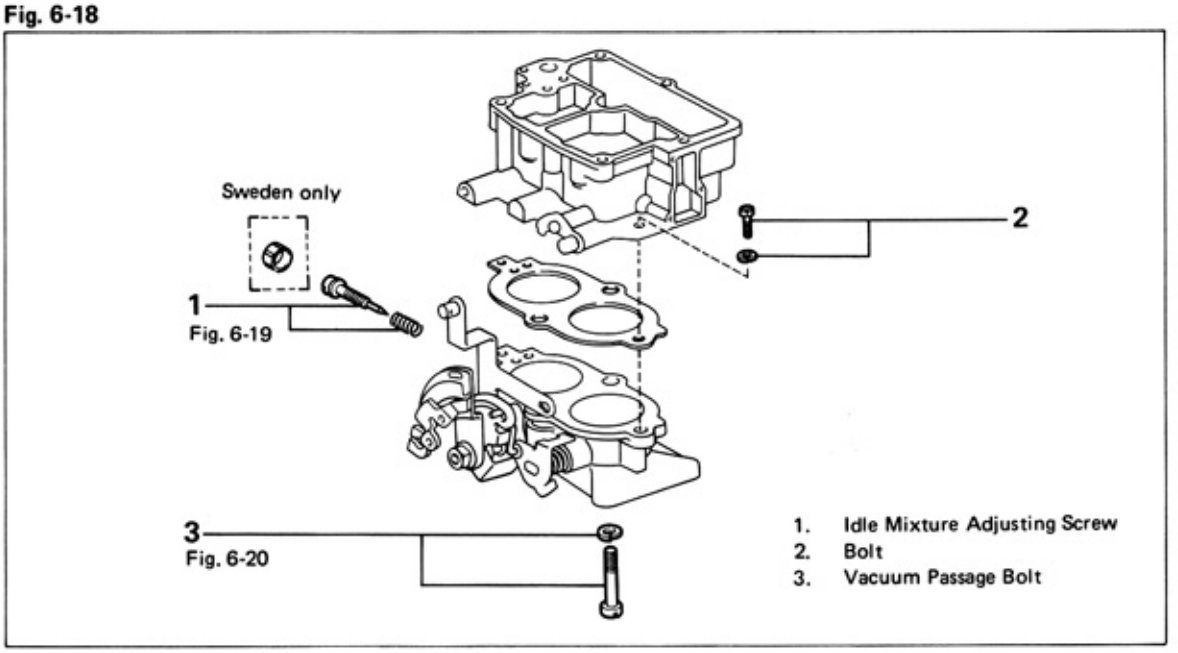
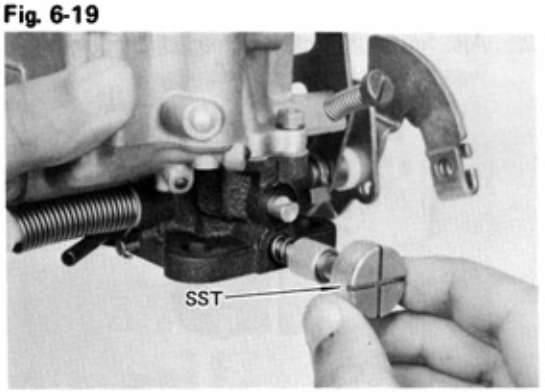
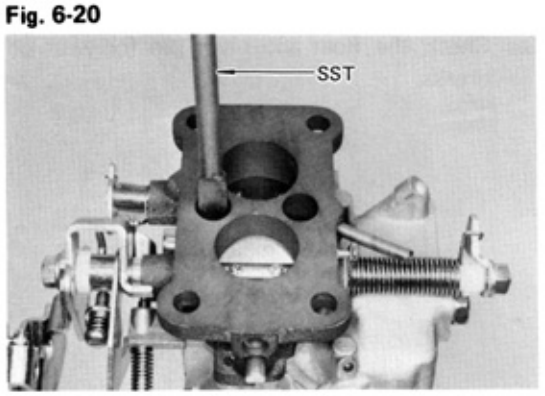


Fig. 6-19



Remove the idle mixture adjusting screw with SST (Europe) or a screwdriver (General destinations).
SST [09243-00010] or [09243-00020]

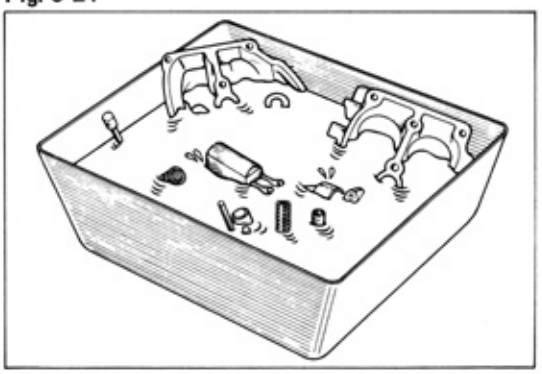
Fig. 6-20



Remove the two bolts with SST.
SST [09860-11011]

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Fig. 6-21

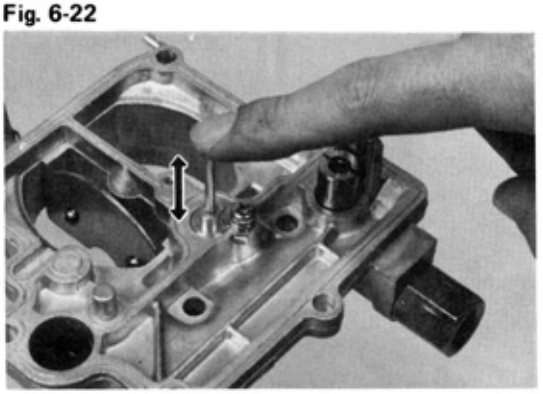


INSPECTION

– Precaution –

1. **Before inspecting the parts, wash them thoroughly in gasoline. Using compressed air, blow all dirt and other foreign matter from the jets and similar parts, and from the fuel passages and apertures in the body.**
2. **Never clean the jets or orifices with wire or a drill. This could enlarge the openings and result in excessive fuel consumption.**

Fig. 6-22

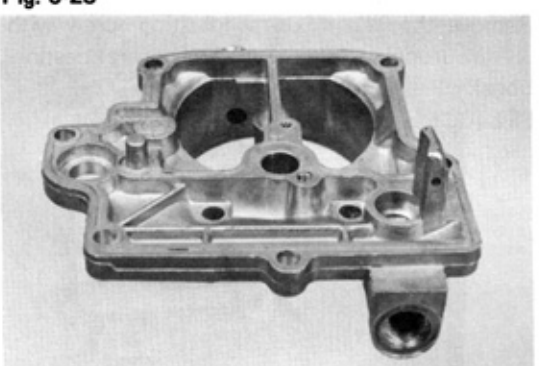


Inspect the following parts and replace any part damaged.

Air Horn Parts

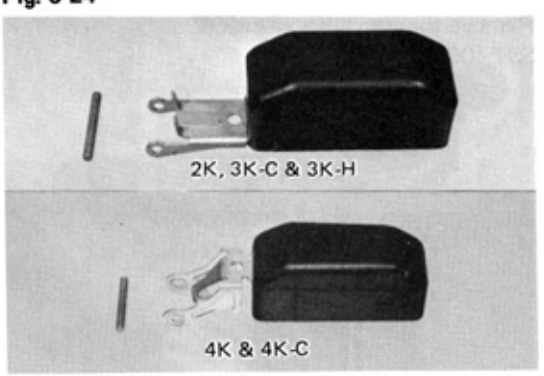
1. Make sure that the power piston moves smoothly.

Fig. 6-23



2. Air horn: Cracks, damaged threads, and wear on choke shaft bores.

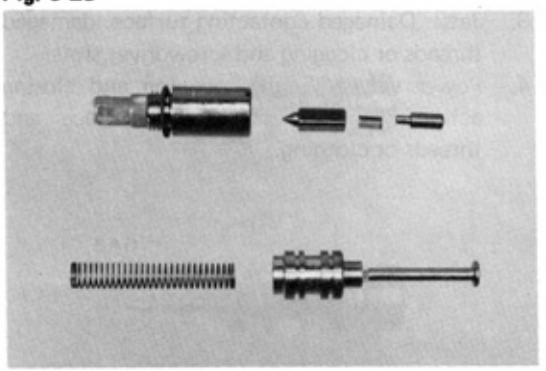
Fig. 6-24



3. Check the float and pivot pin for wear or breaks.

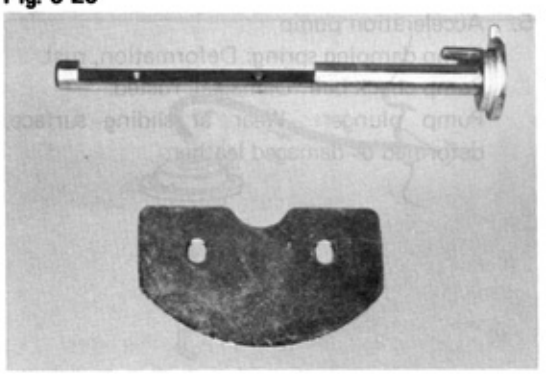
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Fig. 6-25



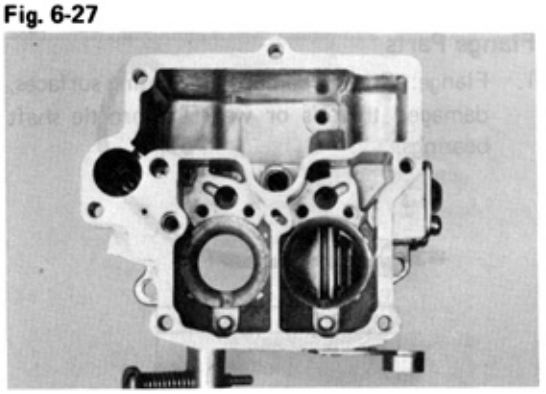
4. Strainer: Rust, breaks.
5. Needle valve surface.
6. Needle valve seat.
7. Power piston: Scratches, excessive wear. Power piston spring broken or deformed.

Fig. 6-26



8. Choke valve: Deformation. Choke shaft worn, bent, or not fitting properly in the housing.

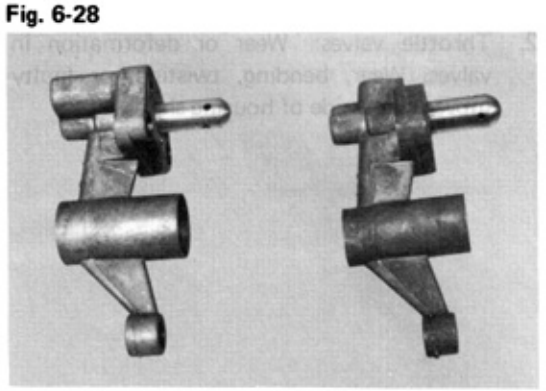
Fig. 6-27



Body Parts

1. Body: Cracks, scored mounting surfaces, damaged threads or clogging.

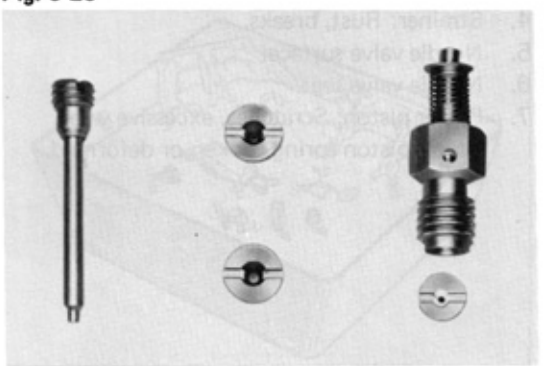
Fig. 6-28



2. Venturi: Damage of clogging.

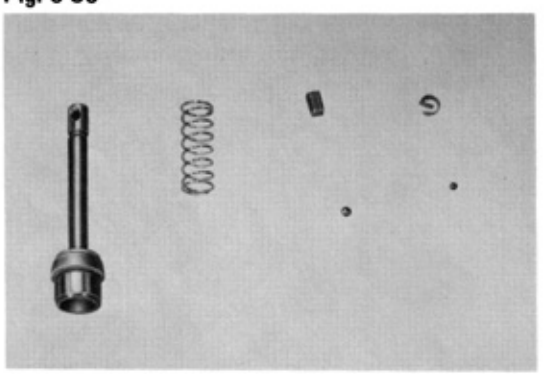
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Fig. 6-29



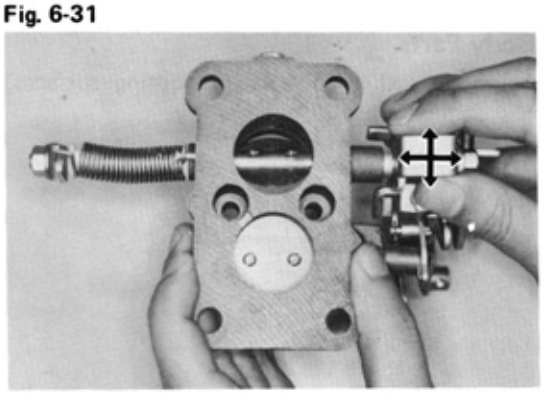
3. Jets: Damaged contacting surface, damaged threads or clogging and screwdriver slots.
4. Power valve: Faulty opening and closing action, damaged contacting surface and threads or clogging.

Fig. 6-30



5. Acceleration pump
   Pump damping spring: Deformation, rust.
   Pump check ball: Damaged, rusted.
   Pump plunger: Wear at sliding surface, deformed or damaged leather.

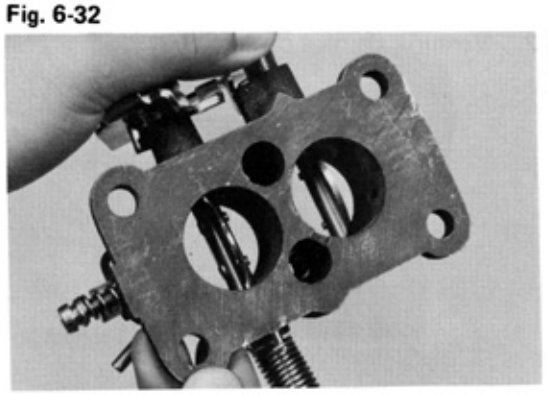
Fig. 6-31



Flange Parts

1. Flange: Cracks, damaged mounting surfaces, damaged threads or wear at throttle shaft bearings.

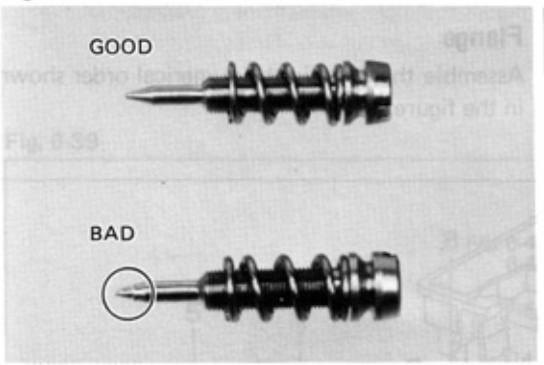
Fig. 6-32



2. Throttle valves: Wear or deformation in valves. Wear, bending, twisting, or faulty movement inside of housing shaft.

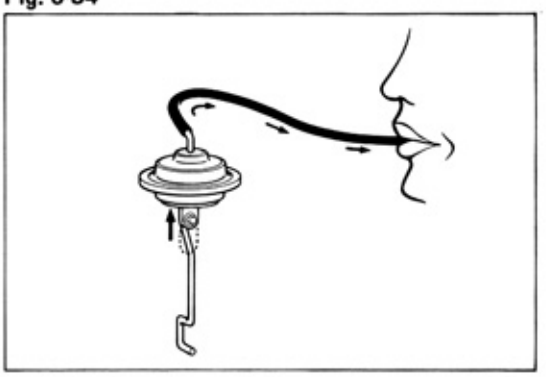
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Fig. 6-33



3. Idle mixture adjusting screw: Damage tapered tip or threads.

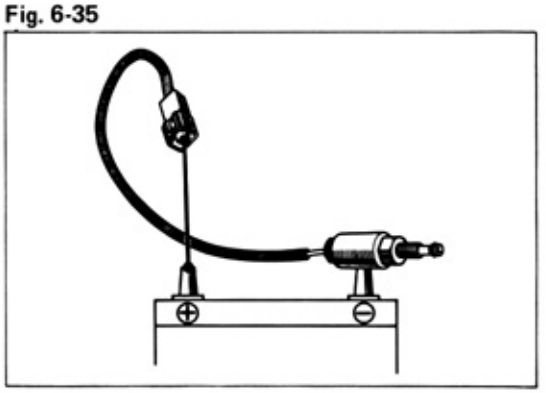
Fig. 6-34



Throttle Positioner & Choke Breaker

Connect a hose to the diaphragm and suck. The diaphragm should move. If not, replace it.

Fig. 6-35



Solenoid Valve

Check operation of solenoid valve.
Connect wiring to the battery positive terminal and ground the body. The needle valve should be pulled in.

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ASSEMBLY

Flange

Assemble the parts in the numerical order shown in the figure.

Fig. 6-36

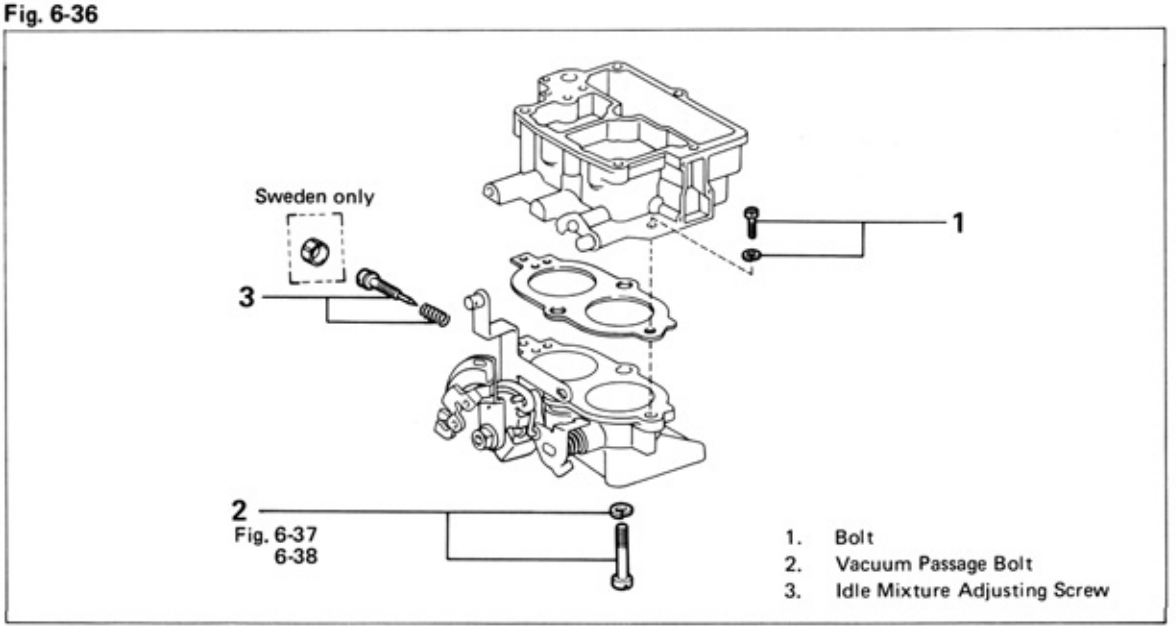
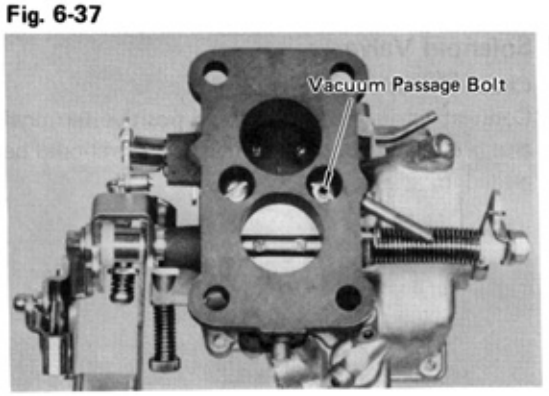


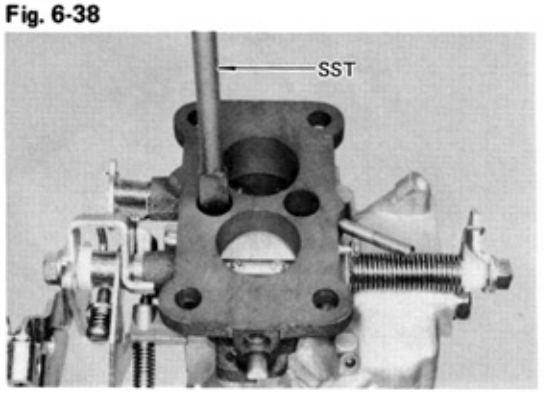
Fig. 6-37



Assemble the vacuum passage bolt in the position shown in the figure.

— Note —
Use a new gasket.

Fig. 6-38



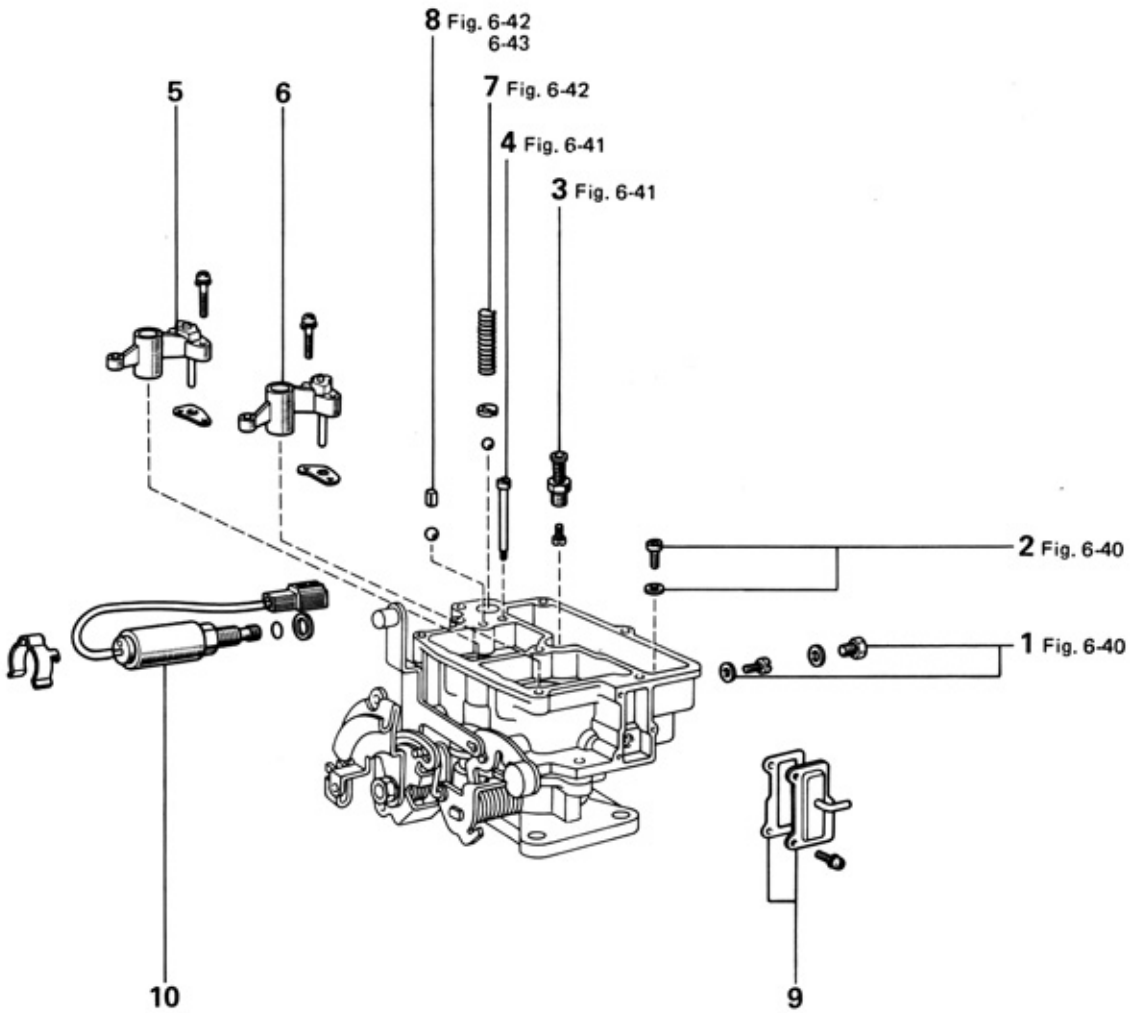
Tighten the bolts with SST.
SST [09860-11011]

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Body

Assemble the parts in the numerical order shown in the figure.

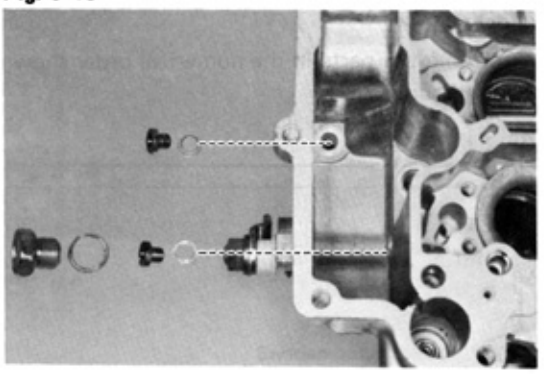
Fig. 6-39



1. Primary Main Jet
2. Secondary Main Jet
3. Power Valve & Power Jet
4. Slow Jet
5. Primary Small Venturi
6. Secondary Small Venturi
7. Pump Damping Spring & Steel Ball
8. Pump Discharge Weight & Steel Ball
9. Thermostatic Valve Cover (Sweden 4K-C)
10. Solenoid Valve

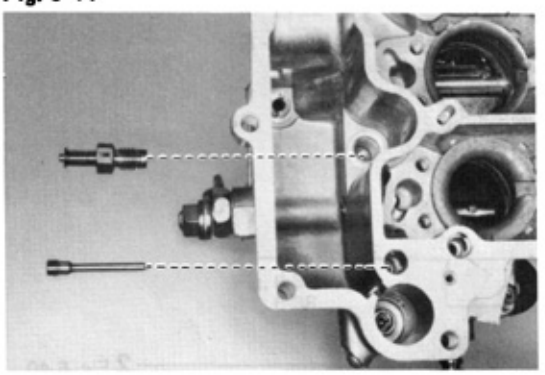
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Fig. 6-40



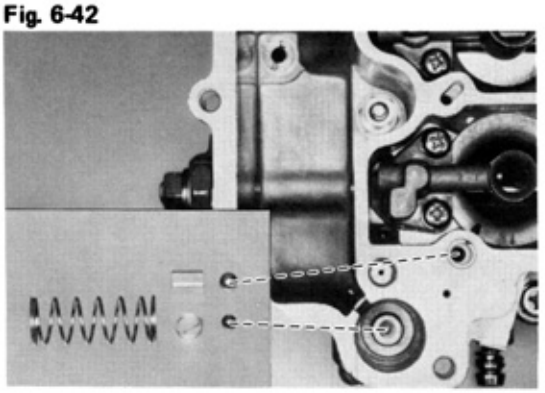
Install the main jets with new gaskets.
Primary jet —— Brass
Secondary jet — Chrome

Fig. 6-41



Install the following parts as shown in the figure.
Slow jet
Power valve

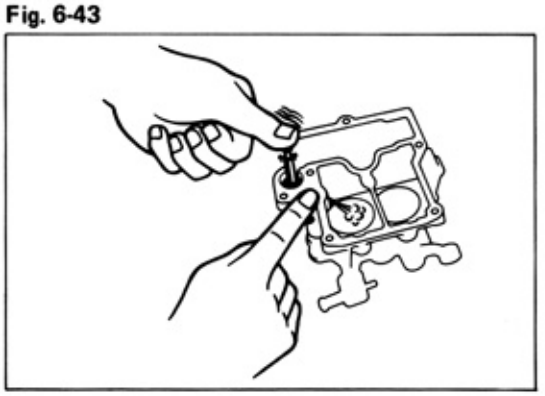
Fig. 6-42



Install the pump inlet ball, pump outlet ball and weight.

— Note —
There are two sizes of balls.
Larger ball: For pump outlet.
Smaller ball: For pump inlet.

Fig. 6-43



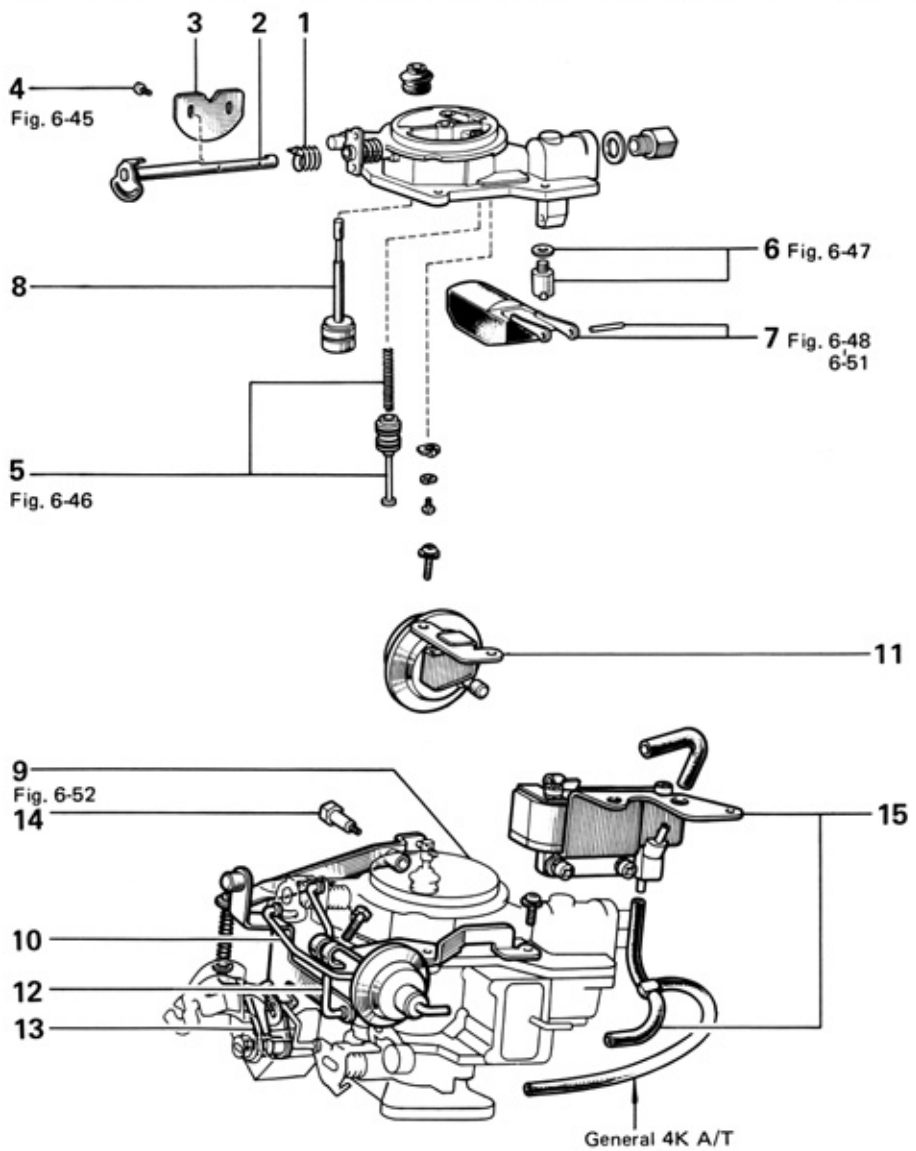
Close off the discharge weight with your finger and put a small amount of fuel into the float chamber. Push the accelerator pump and check to see that fuel spurts from the nozzle.

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Air Horn

Assemble the parts in the numerical order shown in the figure.

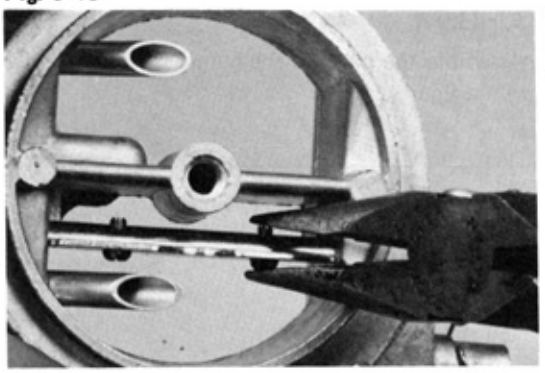
Fig. 6-44



1. Choke Valve Relief Spring
2. Choke Valve Shaft
3. Choke Valve
4. Valve Set Screw
5. Power Piston & Spring
6. Needle Valve Subassembly
7. Float & Float Pivot Pin
8. Pump Plunger
9. Air Horn
10. Choke Breaker (Europe 4K A/T)
11. Throttle Positioner (Sweden 3K-C & 4K-C)
12. Fast Idle Connecting Link
13. Pump Connecting Link
14. Pump Arm Set Screw
15. Hose & Thermostatic Valve

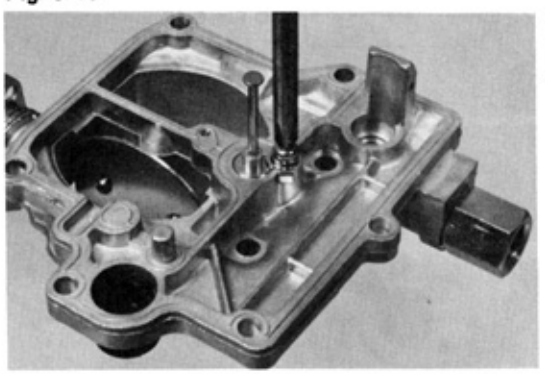
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Fig. 6-45



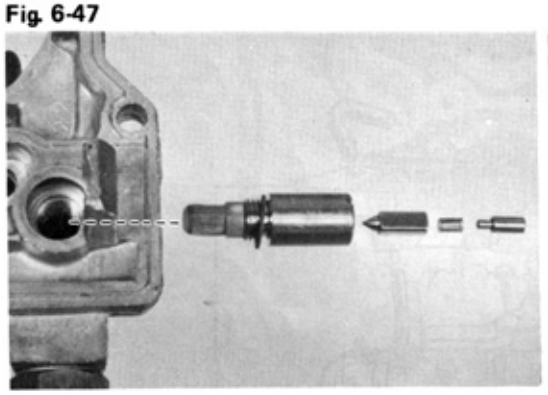
Install the choke valve, and then peen the end of screws.

Fig. 6-46



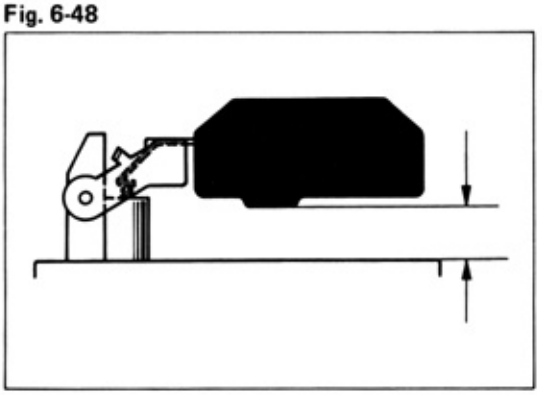
Install the power piston and spring.

Fig. 6-47



Install the valve seat, needle valve, spring and push pin in order.

Fig. 6-48



Adjust the position of the float.

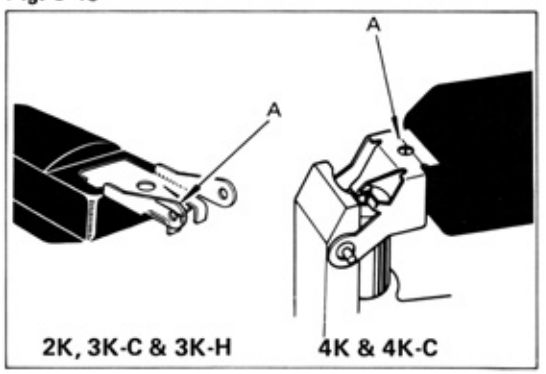
1. Allow the float to hang by its own weight.
2. Check the clearance between the float tip and air horn with SST.
   SST [09240-00014]

Raised position clearance:

2K, 3K-C & 3K-H	**6.0 mm (0.236 in.)**
4K & 4K-C	**7.5 mm (0.295 in.)**

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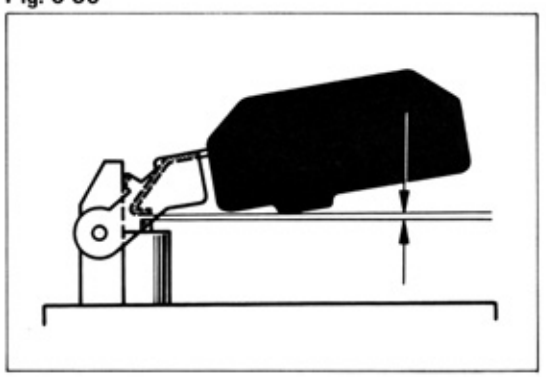
Fig. 6-49



– Note –
This measurement is always made without a gasket on the air horn.

3. Adjust the clearance by bending at point A of the float as shown in the figure.

Fig. 6-50



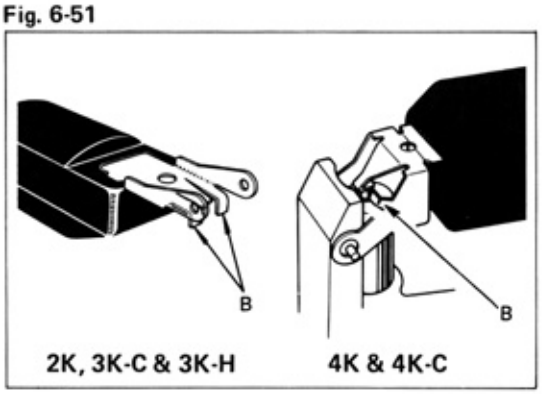
Adjust lowered position of the float.

1. Lift the float and check the clearance between the needle valve plunger and float lip with SST.
   SST [09240-00020]

Lowered position clearance:

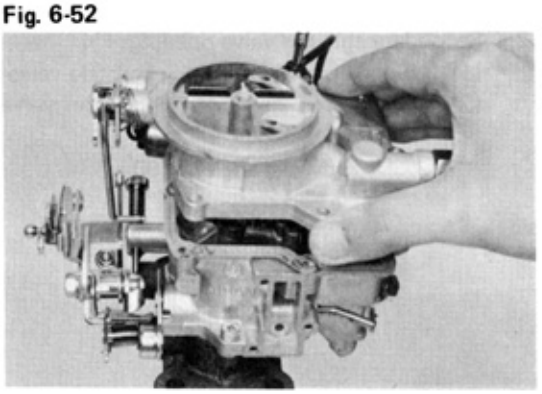
2K, 3K-C & 3K-H	**0.9 mm (0.035 in.)**
4K & 4K-C	**0.6 mm (0.024 in.)**

Fig. 6-51



2. Adjust the clearance by bending tab B of the float as shown in the figure.

Fig. 6-52



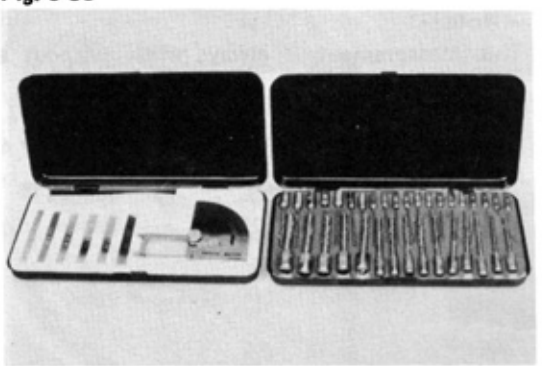
Assemble the body and air horn over a new gasket.

– Caution –

1. **Take care not to damage the pump plunger leather.**
2. **Assemble the air horn with the pump jet positioned correctly.**

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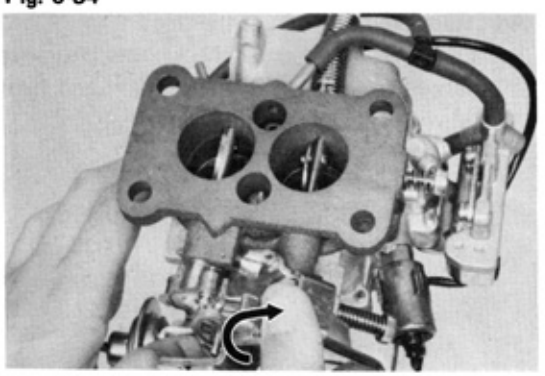
Fig. 6-53



ADJUSTMENT

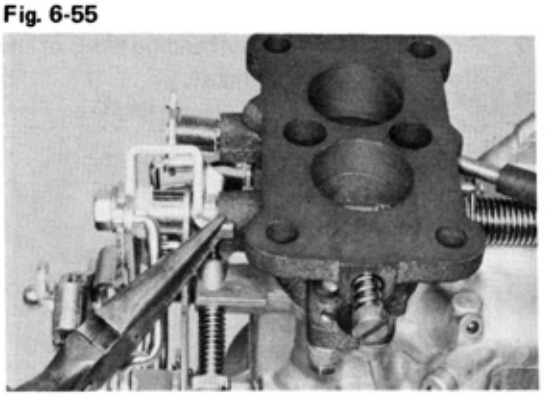
Use SST to make adjustments.
SST [09240-00014]
[09240-00020]

Fig. 6-54



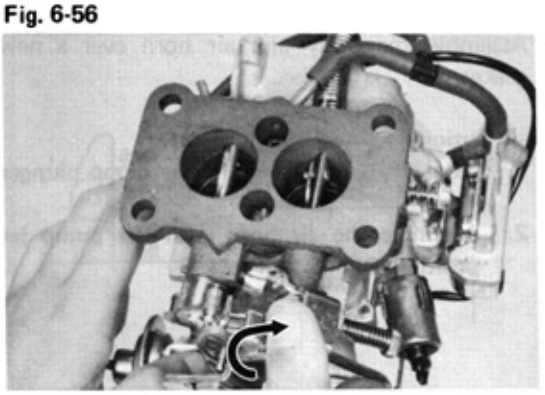
1. Primary throttle valve opening
   (1) Fully open the primary throttle valve.
   (2) Check the primary throttle valve opening angle.
   Opening angle: 90°

Fig. 6-55



(3) Adjust by bending the throttle lever stopper.

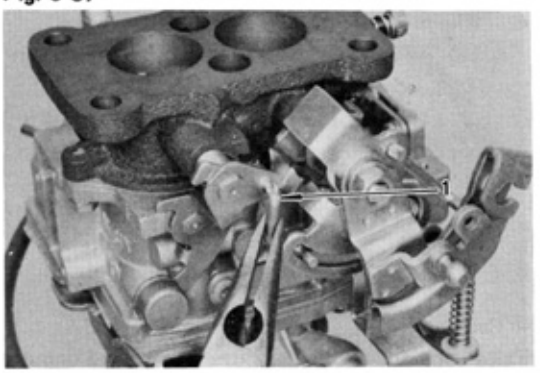
Fig. 6-56



2. Secondary throttle valve opening
   (1) Fully open the primary throttle valve.
   (2) Check the secondary throttle valve opening angle.
   Opening angle: 90°

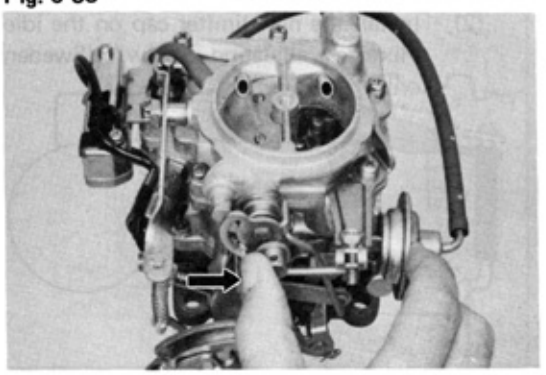
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Fig. 6-57



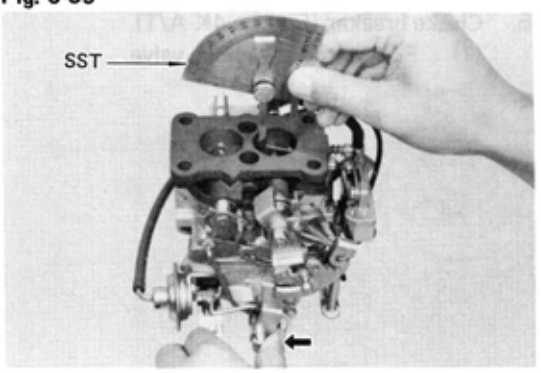
(3) Adjust by bending the throttle shaft link 1.

Fig. 6-58



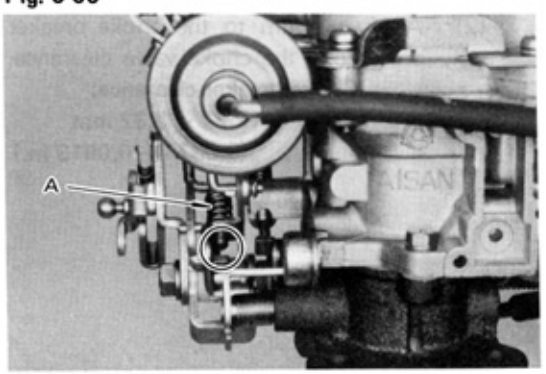
3. Fast idle
   (1) Fully close the choke valve by turning the choke shaft lever.

Fig. 6-59



(2) At this time, check the primary throttle valve opening angle with SST.
SST [09240-00014]
Fast idle angle: 26°

Fig. 6-60

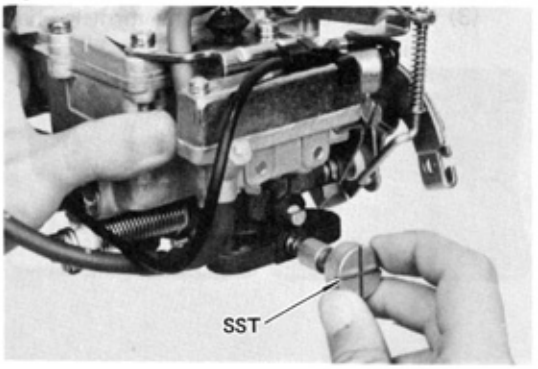


(3) Adjust by turning the fast idle adjusting screw A.

— Caution —
Be sure there is clearance remaining after adjustment.

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Fig. 6-61

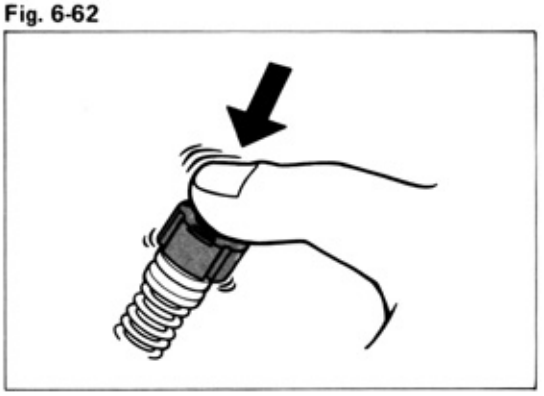


4. Idle mixture adjusting screw
   (1) Tighten the idle mixture adjusting screw to fully closed position and then unscrew it as follows with SST (Europe) or a screwdriver (General destinations).
   SST [09243-00010] or [09243-00020]

2K & 4K	**2½ turns**
3K-C & 3K-H	**3 turns**
4K-C	**1½ turns**

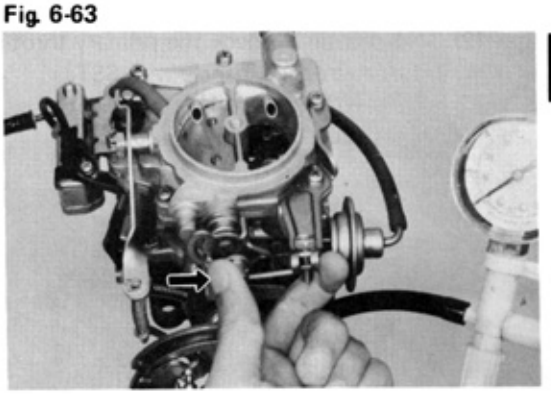
— Caution —
Take care not to screw in too tightly and damage the screw tip.

Fig. 6-62



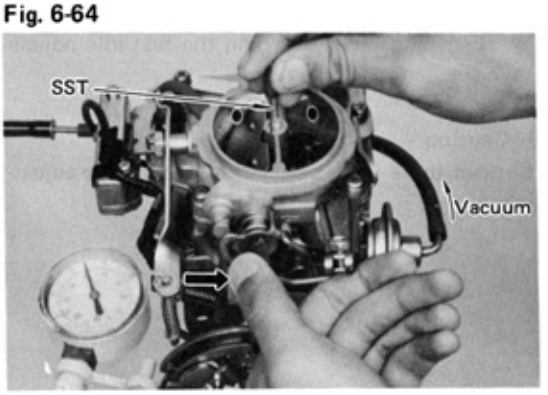
   (2) Install the new limiter cap on the idle mixture adjusting screw. (Sweden only)

Fig. 6-63



5. Choke breaker (Europe 4K A/T)
   (1) Fully close the choke valve.

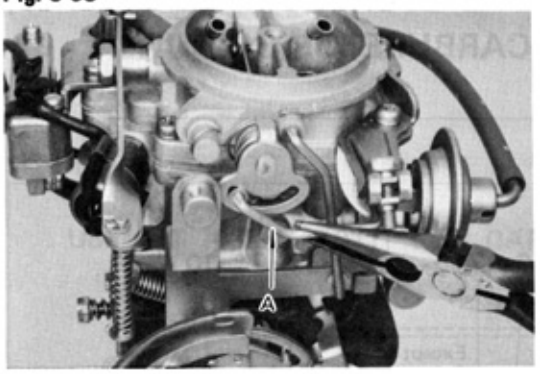
Fig. 6-64



   (2) Apply vacuum to the choke breaker and check the choke valve clearance.
   Choke breaker clearance:
   2.22 – 2.32 mm
   (0.0874 – 0.0913 in.)

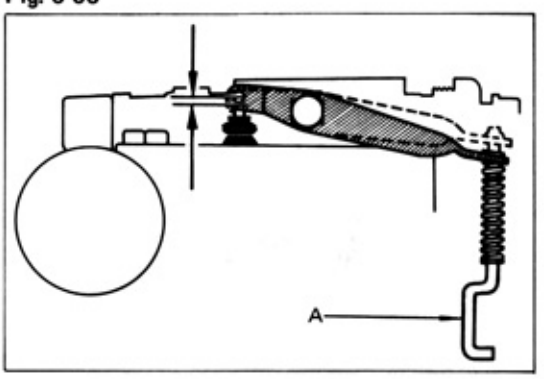
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Fig. 6-65



(3) Adjust by bending the connecting link A.

Fig. 6-66



6. Accelerating pump
Adjust the pump stroke by bending part A as shown in the figure.

Accelerating pump stroke:

2K, 4K & 4K-C	**4.85 mm (0.1909 in.)**
3K-C & 3K-H	**3.25 mm (0.1280 in.)**

– Note –

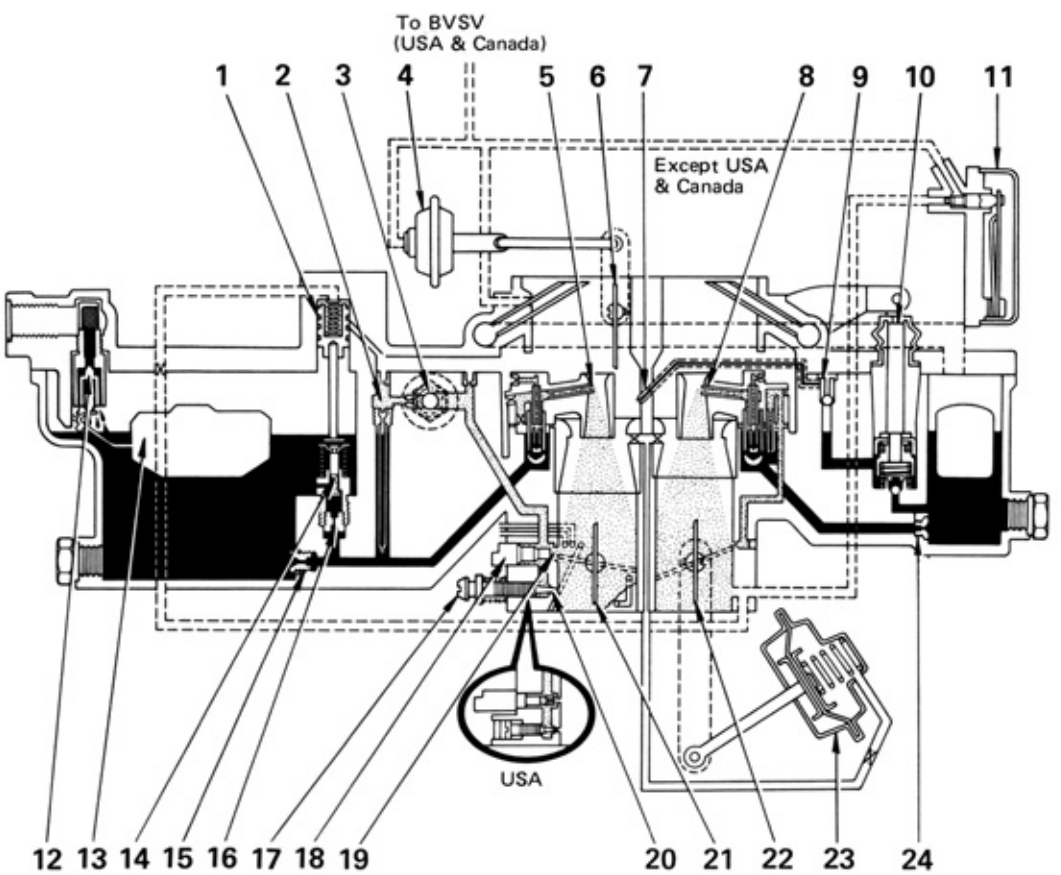
After adjustment, be sure to check the linkage to see that it operates smoothly.

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CARBURETOR (KP 61 Series & KM20 Series)

CARBURETOR CIRCUIT

Fig. 6-67



1. Power Piston
2. Slow Jet
3. Solenoid Valve
4. Choke Breaker (Australia 4K-C) or Choke Opener (USA & Canada)
5. Primary Main Nozzle
6. Choke Valve
7. Pump Jet
8. Secondary Main Nozzle
9. Pump Discharge Weight
10. Pump Plunger
11. Thermostatic Valve (Europe & Australia)
12. Needle Valve
13. Float
14. Power Valve
15. Primary Main Jet
16. Power Jet
17. Idle Mixture Adjusting Screw
18. Plug Rivet
19. Slow Port
20. Idle Port
21. Primary Throttle Valve
22. Secondary Throttle Valve
23. Secondary Throttle Valve Diaphragm
24. Secondary Main Jet

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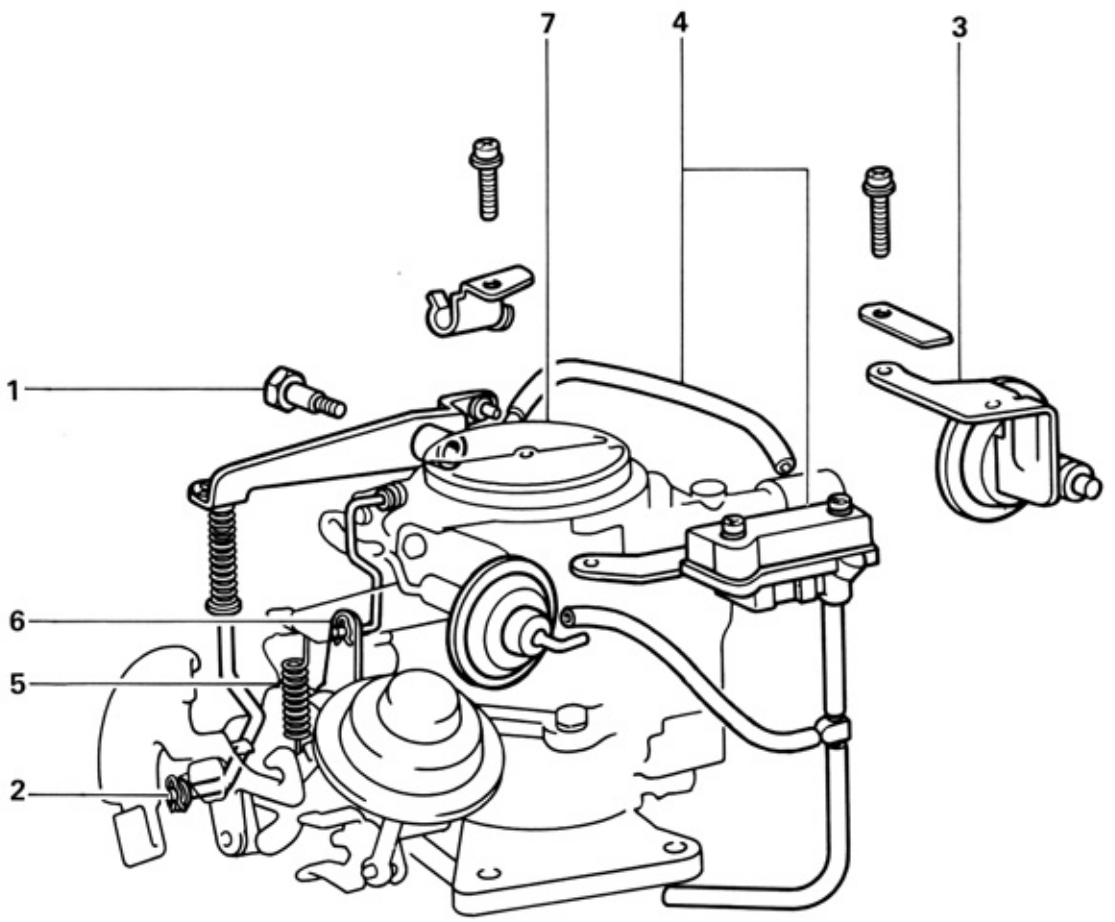
DISASSEMBLY

Air Horn

1. Disassemble the parts in the numerical order shown in the figure.

Fig. 6-68

USE SST [09860-11011] FOR CARBURETOR SERVICING

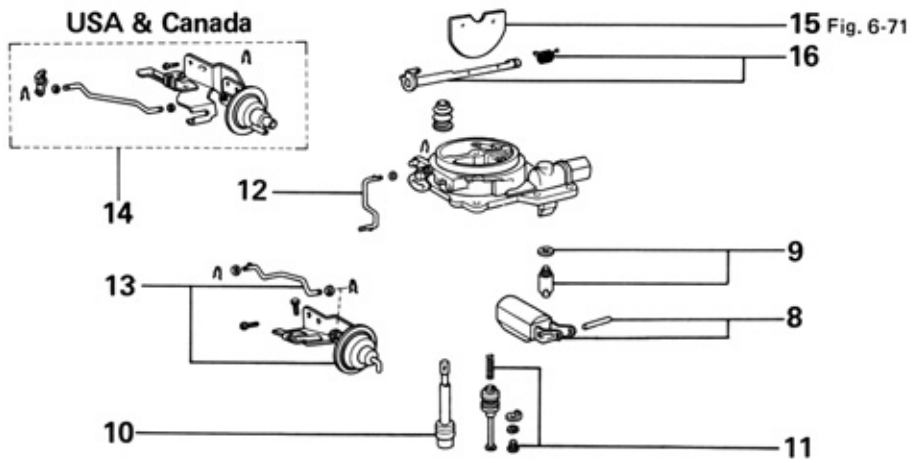


1. Pump Arm Set Screw
2. Pump Connecting Link
3. Throttle Positioner
4. Hose & Thermostatic Valve (Europe & Australia)
5. Back Spring
6. Fast Idle Cam Connecting Link
7. Air Horn

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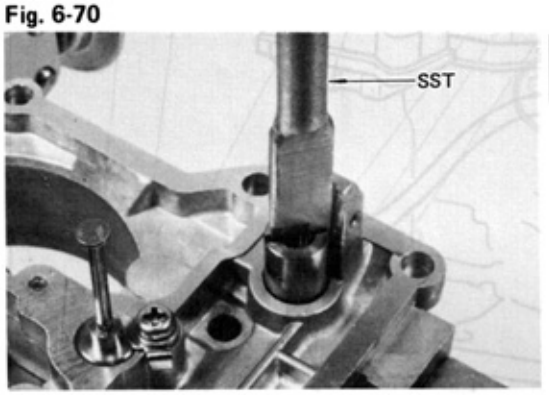
2. Disassemble the parts in the numerical order shown in the figure.

Fig. 6-69



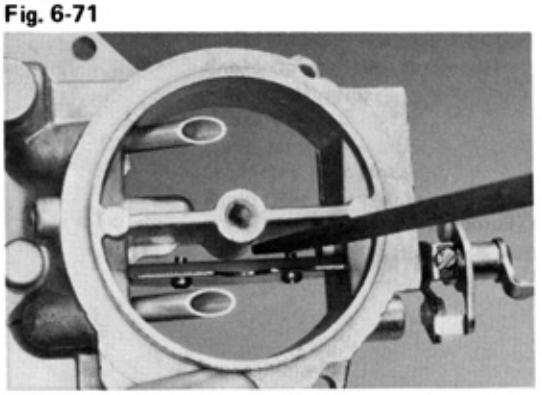
8. Float & Float Pivot Pin
9. Needle Valve Subassembly
10. Pump Plunger
11. Power Piston & Spring
12. Fast Idle Cam Connecting Link
13. Choke Breaker & Connecting Link (Australia 4K-C)
14. Choke Opener & Connecting Link (USA & Canada)
15. Choke Valve
16. Choke Valve Shaft & Spring

Fig. 6-70



Remove the needle valve seat with SST.
SST [09860-11011]

Fig. 6-71



To remove the choke valve, file off the end of the set screws.

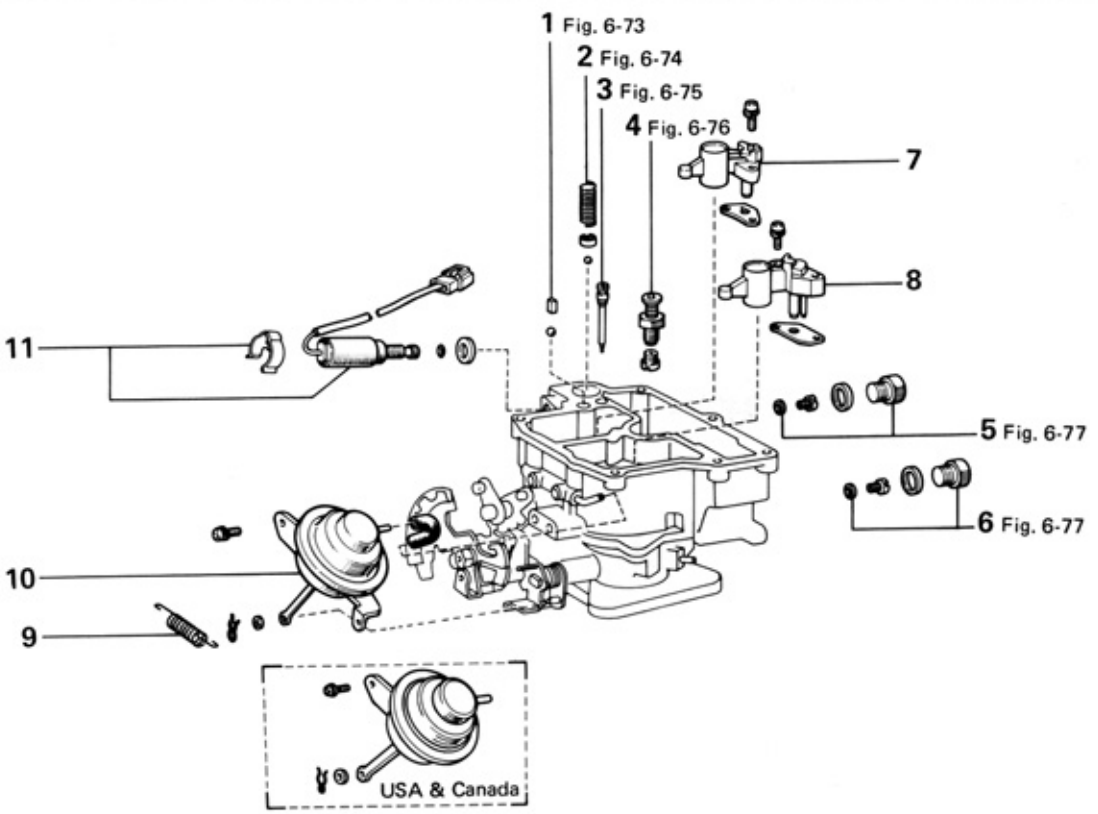
– Note –
Do this only if it is necessary to replace choke valve or shaft.

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Body

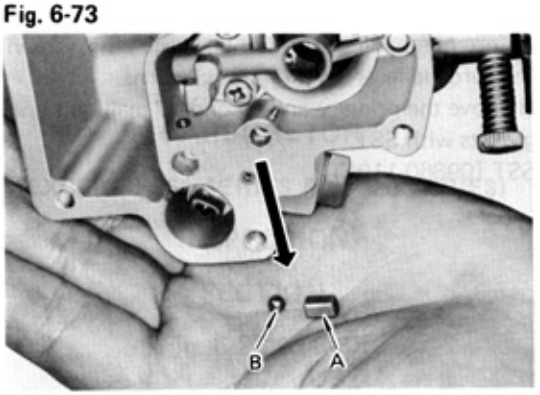
Disassemble the parts in the numerical order shown in the figure.

Fig. 6-72



1. Pump Discharge Weight & Steel Ball
2. Pump Damping Spring & Steel Ball
3. Slow Jet
4. Power Valve & Power Jet
5. Primary Main Jet
6. Secondary Main Jet
7. Primary Small Venturi
8. Secondary Small Venturi
9. Relief Spring (KM20 Series)
10. Secondary Throttle Valve Diaphragm
11. Solenoid Valve

Fig. 6-73



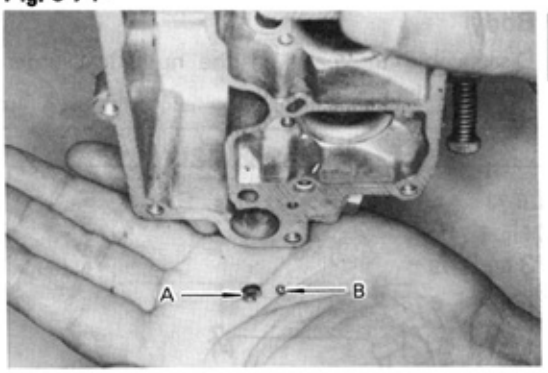
Turn the carburetor upside down, and remove the pump discharge weight A and steel ball B.

– Caution –

Use care not to lose the steel ball.

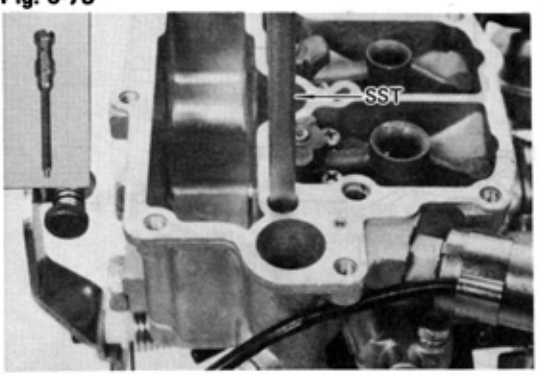
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Fig. 6-74



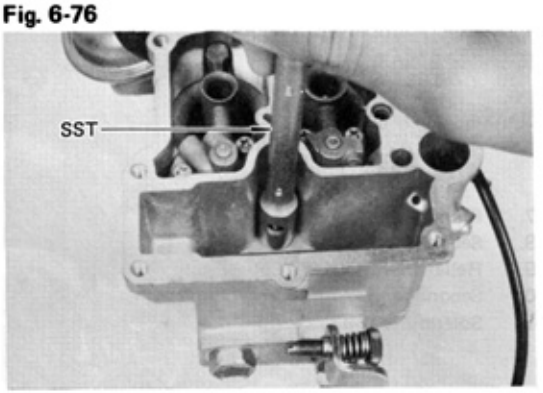
Using tweezers, take out the check ball retainer A from the bottom of pump cylinder. Turn the carburetor upside down and drop out the steel ball B.

Fig. 6-75



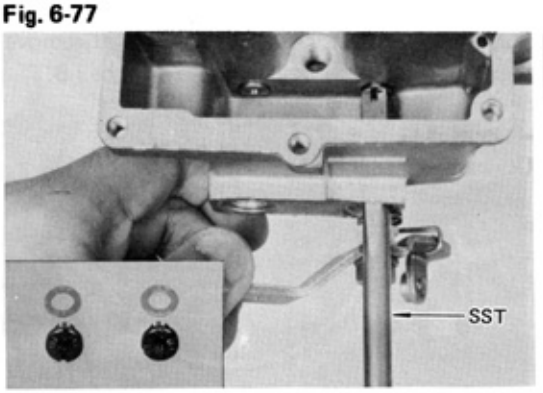
Remove the slow jet with SST.
SST [09860-11011]

Fig. 6-76



Remove the power valve with SST.
SST [09860-11011]

Fig. 6-77



Before removing the primary passage plug, loosen the throttle lever set nut about 4 turns.
Remove the primary and secondary main jets and gaskets with SST.
SST [09860-11011]

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Flange

Disassemble the parts in the numerical order shown in the figure.

Fig. 6-78

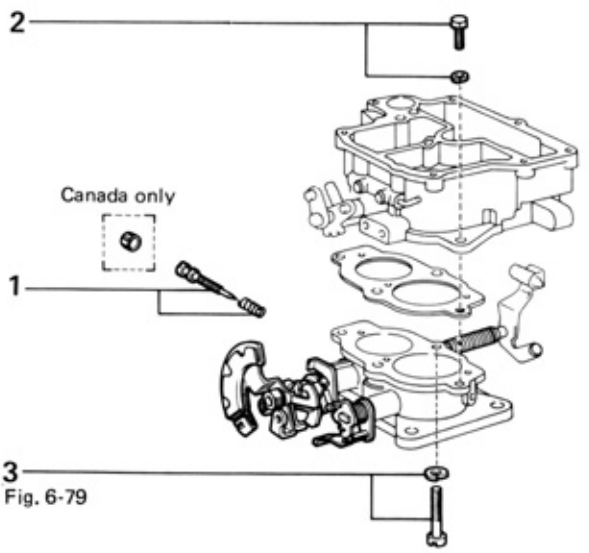
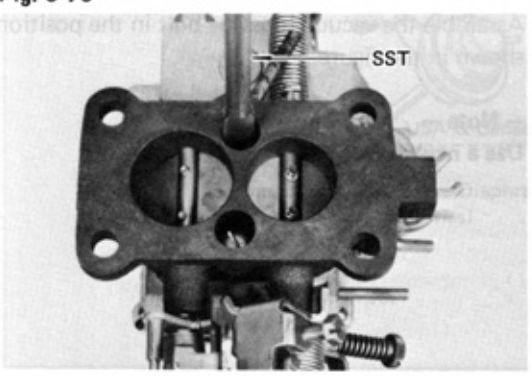


Fig. 6-79

1. Idle Mixture Adjusting Screw
2. Bolt
3. Vacuum Passage bolt

Fig. 6-79



Remove the two bolts with SST.
SST [09860-11011]

Fig. 6-80

SEE
CARBURETOR
(EXCEPT KP61 SERIES & KM20 SERIES)
INSPECTION
SECTION
Fig. 6-22 to 6-35

INSPECTION

– Precaution –

1. **Before inspecting the parts, wash them thoroughly in gasoline. Using compressed air, blow all dirt and other foreign matter from the jets and similar parts, and from the fuel passages and apertures in the body.**
2. **Never clean the jets or orifices with wire or a drill. This could enlarge the openings and result in excessive fuel consumption.**

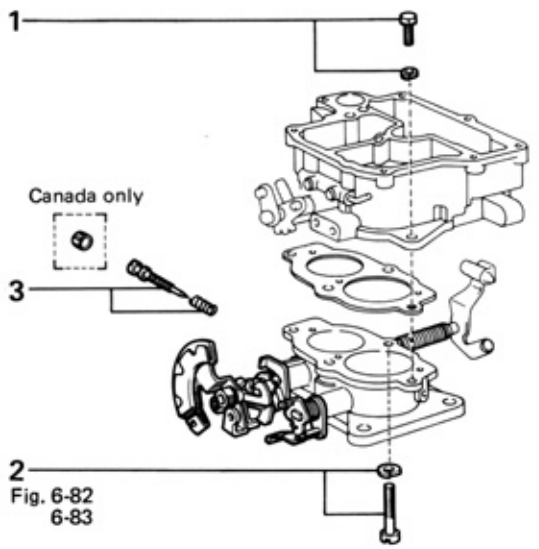
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ASSEMBLY

Flange

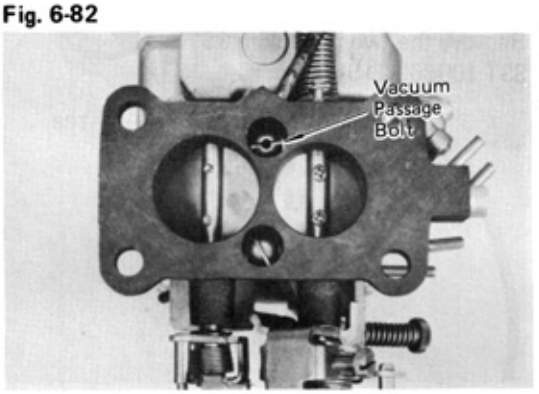
Assemble the parts in the numerical order shown in the figure.

Fig. 6-81



1. Bolt
2. Vacuum Passage Bolt
3. Idle Mixture Adjusting Screw

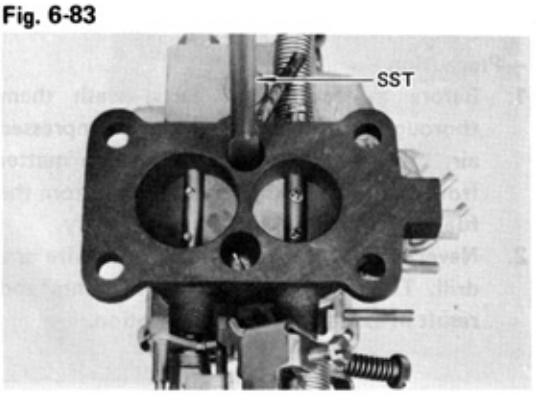
Fig. 6-82



Assemble the vacuum passage bolt in the position shown in the figure.

— Note —
Use a new gasket.

Fig. 6-83



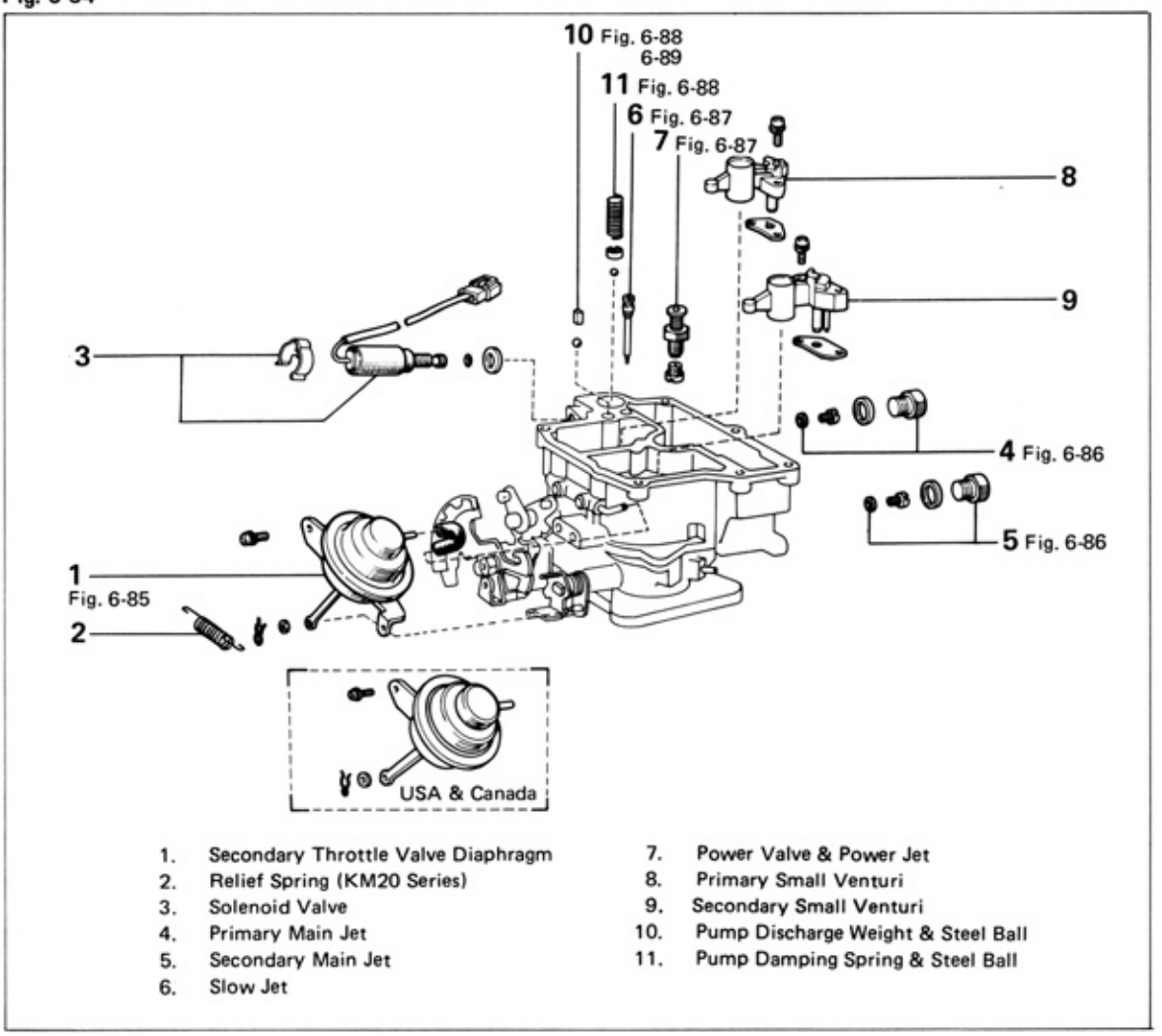
Tighten the bolts with SST.
SST [09860-11011]

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Body

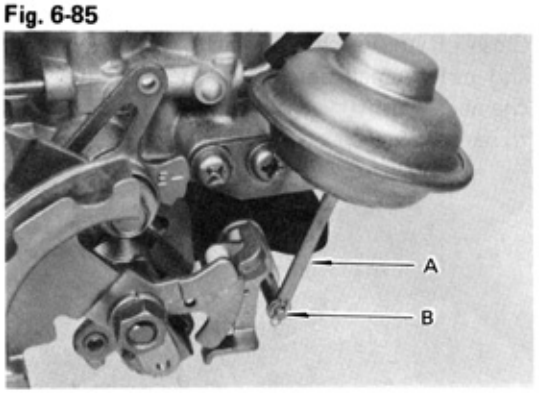
Assemble the parts in the numerical order shown in the figure.

Fig. 6-84



1. Secondary Throttle Valve Diaphragm
2. Relief Spring (KM20 Series)
3. Solenoid Valve
4. Primary Main Jet
5. Secondary Main Jet
6. Slow Jet
7. Power Valve & Power Jet
8. Primary Small Venturi
9. Secondary Small Venturi
10. Pump Discharge Weight & Steel Ball
11. Pump Damping Spring & Steel Ball

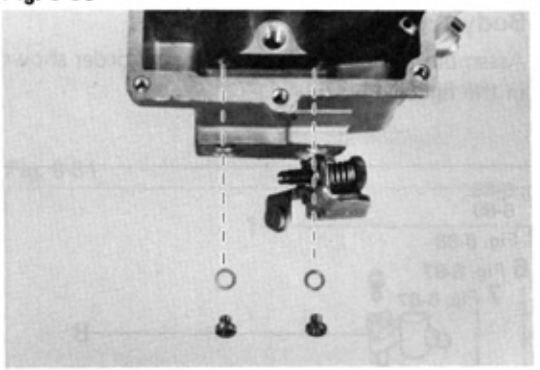
Fig. 6-85



Install the diaphragm rod A and washer onto the diaphragm lever and lock with a snap ring B.

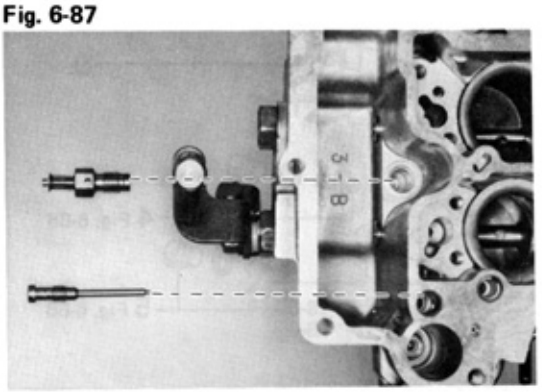
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Fig. 6-86



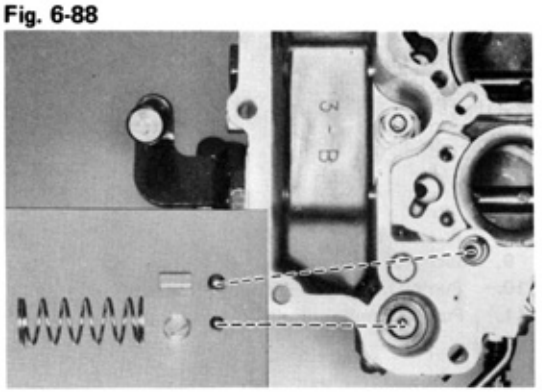
Install the main jets with new gaskets.
Primary jet —— Brass
Secondary jet — Chrome

Fig. 6-87



Install the following parts as shown in the figure.
Slow jet
Power valve

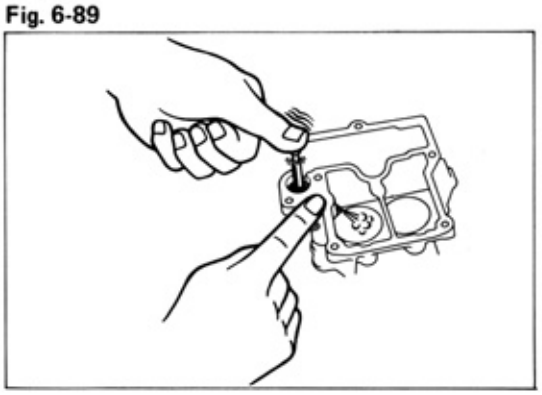
Fig. 6-88



Install the pump inlet ball, pump outlet ball and weight.

— Note —
There are two sizes of balls.
Larger ball: For pump outlet
Smaller ball: For pump inlet

Fig. 6-89



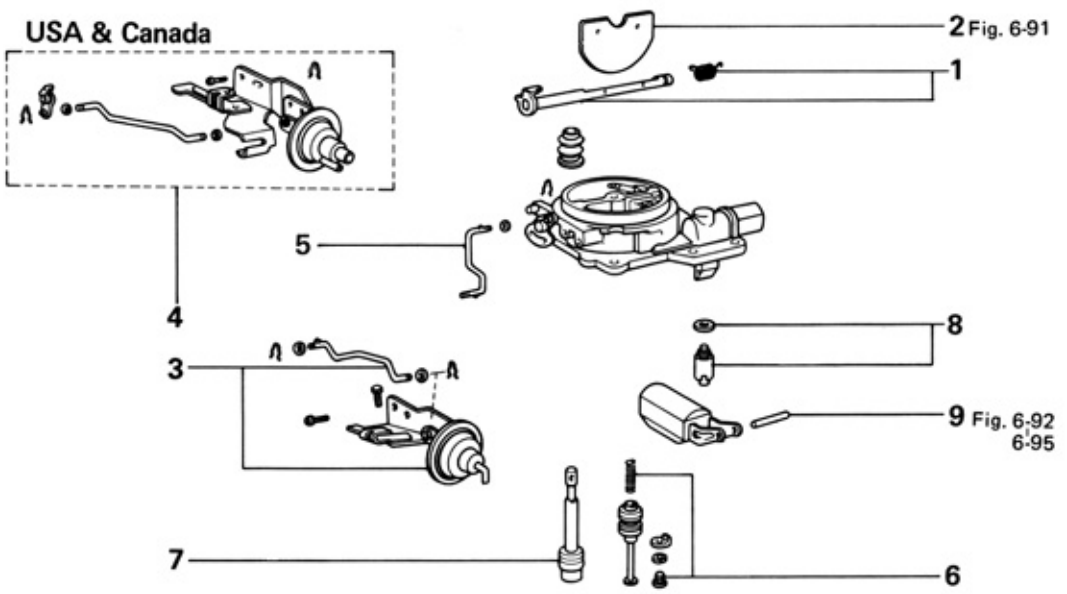
Close off the discharge weight with your finger and put a small amount of fuel into the float chamber. Push the accelerator pump and check to see that fuel spurts from the nozzle.

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Air Horn

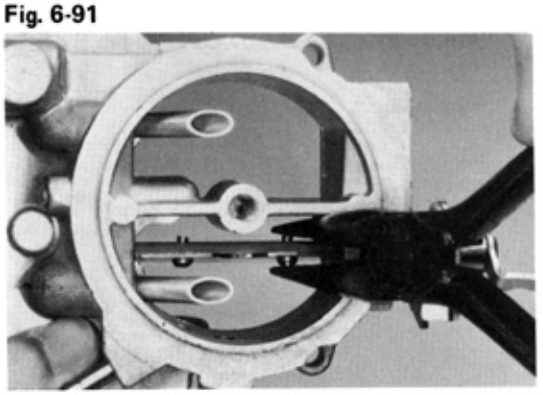
Assemble the parts in the numerical order shown in the figure.

Fig. 6-90



1. Choke Valve Shaft & Spring
2. Choke Valve
3. Choke Breaker & Connecting Link (Australia 4K-C)
4. Choke Opener & Connecting Link (USA & Canada)
5. Fast Idle Cam Connecting Link
6. Power Piston & Spring
7. Pump Plunger
8. Needle Valve Subassembly
9. Float & Float Pivot Pin

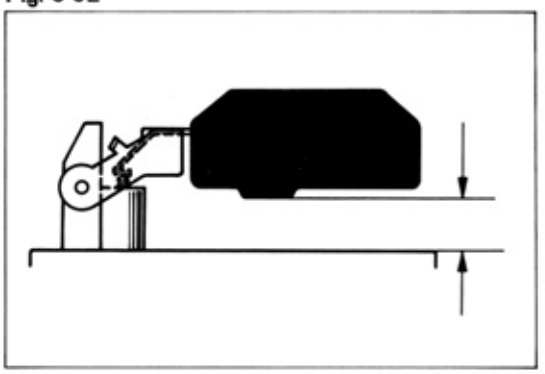
Fig. 6-91



Install the choke valve, and then peen the end of screws.

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Fig. 6-92



Adjust the raised position of the float.

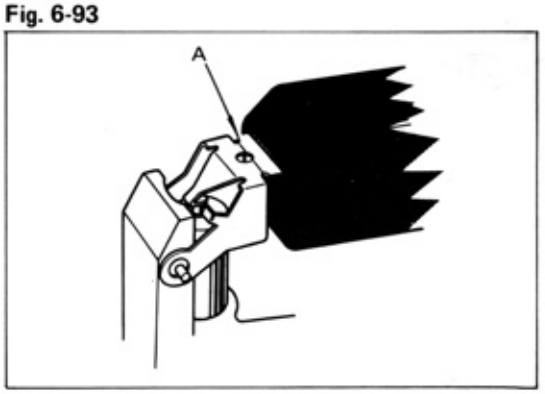
1. Allow the float to hang by its own weight.
2. Check the clearance between the float tip and air horn with SST.
   SST [09240-00014]

Raised position clearance: 7.5 mm (0.295 in.)

– Note –

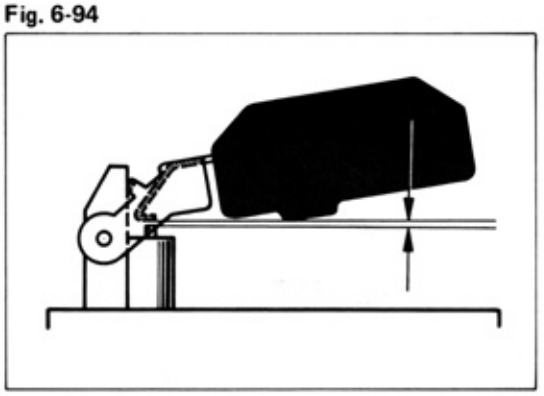
This measurement is always made without any gasket on air horn.

Fig. 6-93



3. Adjust the clearance by bending at point A of the float as shown in the figure.

Fig. 6-94

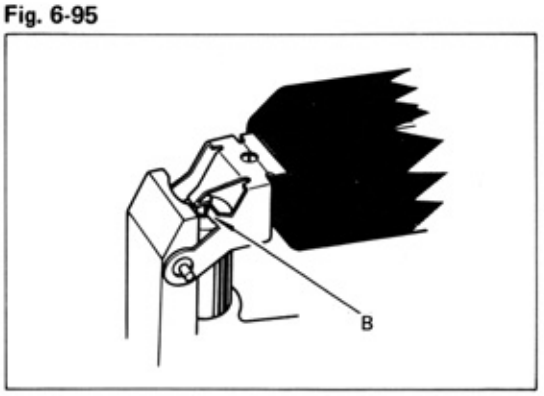


Adjust lowered position of the float.

1. Lift the float and check the clearance between the needle valve plunger and float lip with SST.
   SST [09240-00020]

Lowered position clearance: 0.9 mm (0.035 in.)

Fig. 6-95



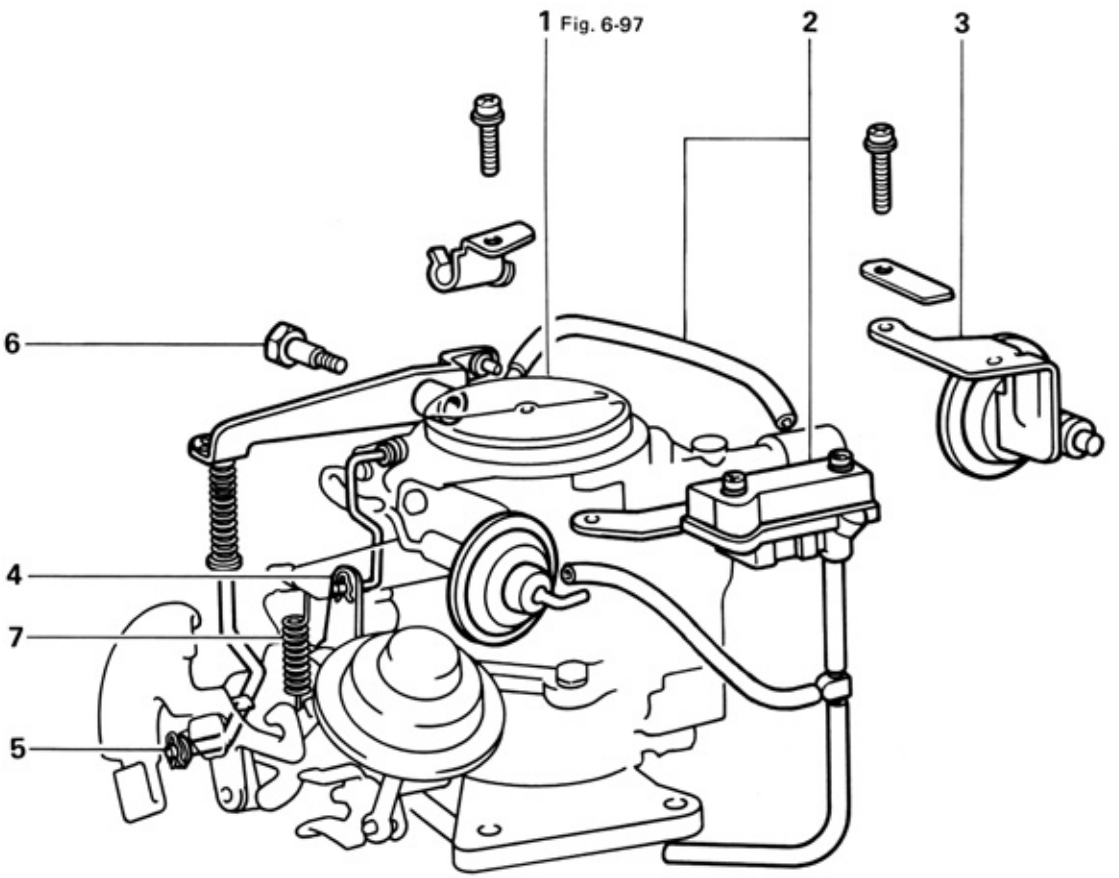
2. Adjust the clearance by bending tab B of the float as shown in the figure.

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Body & Air Horn

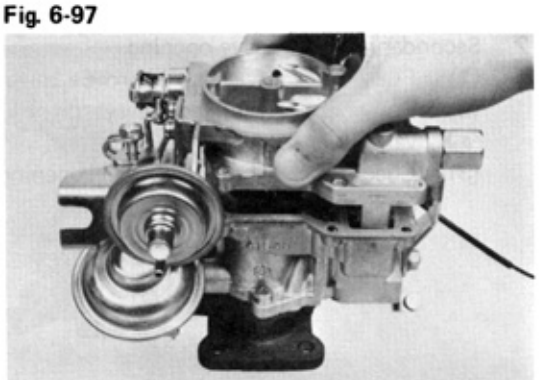
Assemble the parts in the numerical order shown in the figure.

Fig. 6-96



1. Air Horn
2. Hose & Thermostatic Valve (Europe & Australia)
3. Throttle Positioner
4. Fast Idle Cam Connecting Link
5. Pump Connecting Link
6. Pump Arm Set Screw
7. Back Spring

Fig. 6-97



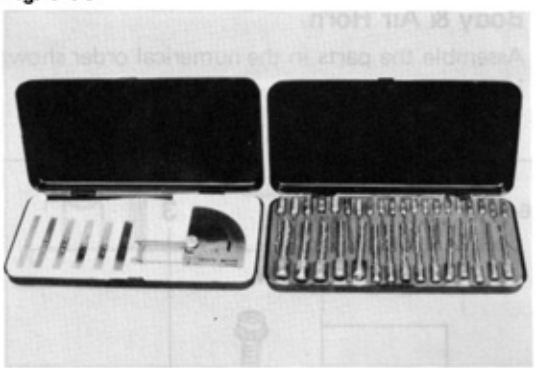
Assemble the body and air horn with a new gasket.

– Caution –

1. **Take care not to damage the pump plunger leather.**
2. **Assemble the air horn with the pump jet positioned correctly.**

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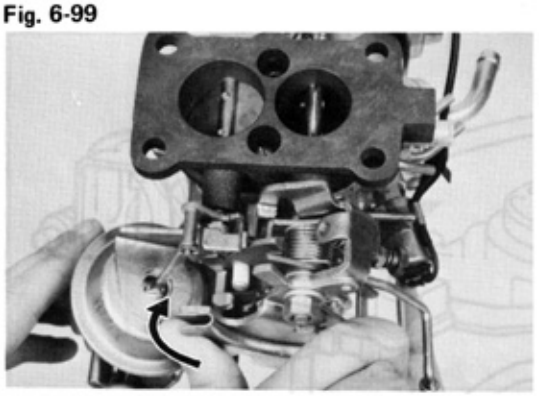
Fig. 6-98



ADJUSTMENT

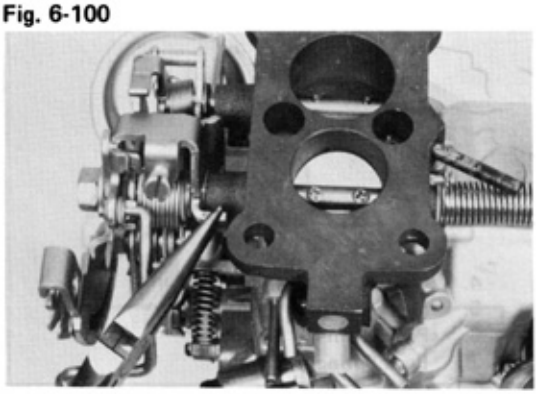
Use SST to make adjustments.
SST [09240-00014]
[09240-00020]

Fig. 6-99



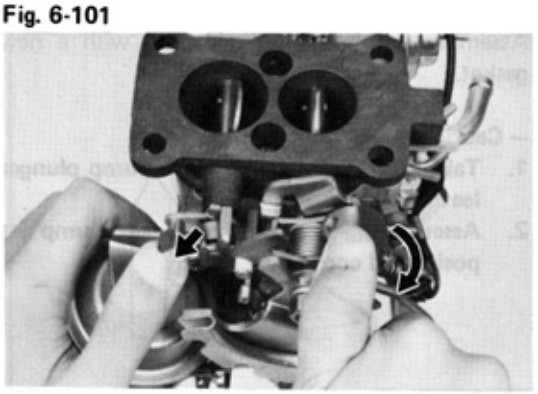
1. Primary throttle valve opening
   (1) Fully open the primary throttle valve.
   (2) Check the primary throttle valve opening angle.
   Opening angle: 90°

Fig. 6-100



(3) Adjust by bending the throttle lever stopper.

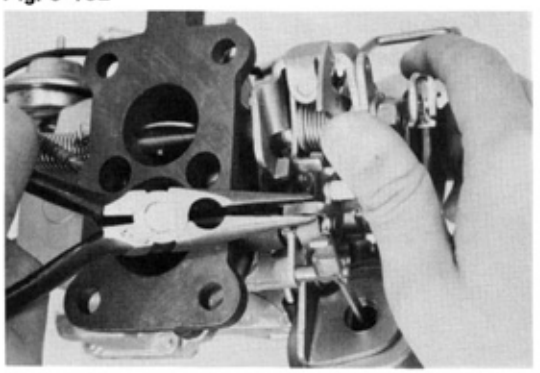
Fig. 6-101



2. Secondary throttle valve opening
   (1) Fully open the primary throttle valve.
   (2) Fully open the secondary throttle valve lever.
   (3) Check the throttle valve opening angle.
   Opening angle:
   KP61 Series 75°
   KM20 Series 90°

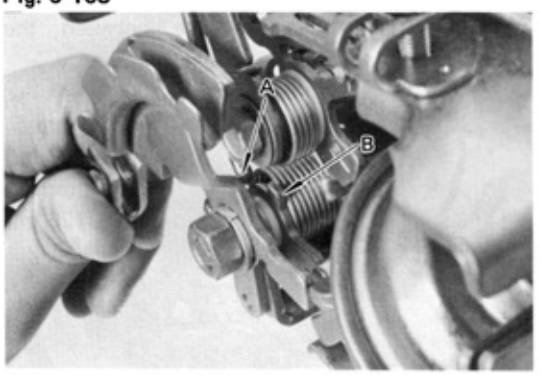
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Fig. 6-102



(4) Adjust by bending the throttle lever stopper.

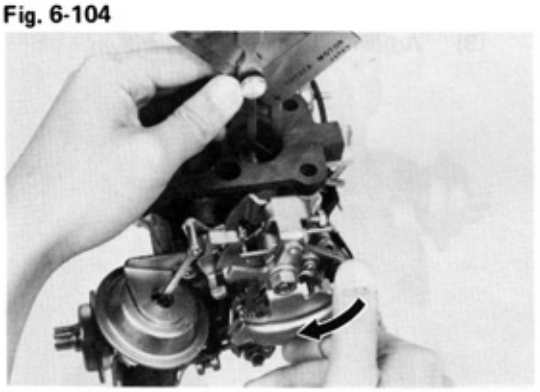
Fig. 6-103



3. Secondary touch angle

(1) Open the primary throttle valve until the throttle valve lever A touches B, as shown.

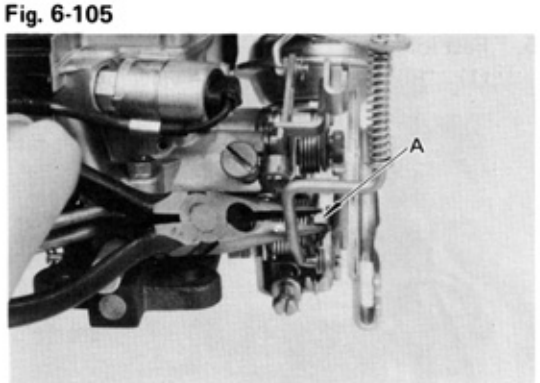
Fig. 6-104



(2) At this time, check the primary throttle valve opening angle.

Secondary touch angle: 50°

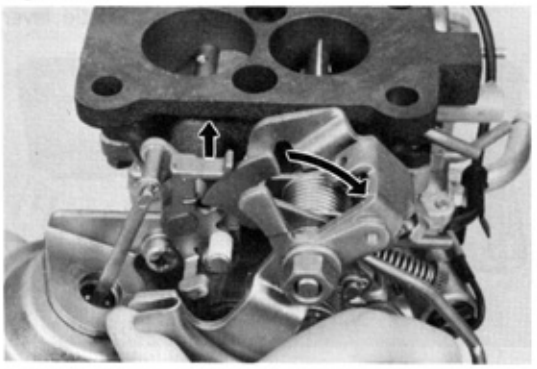
Fig. 6-105



(3) Adjust by bending A, as shown.

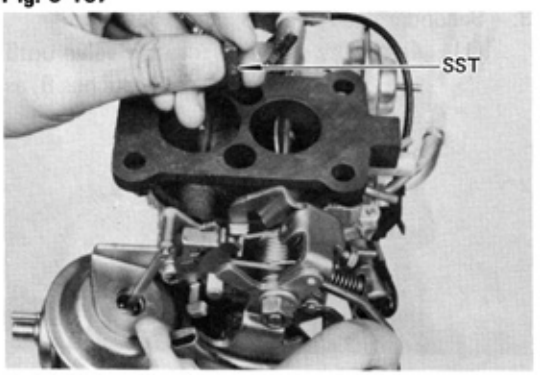
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Fig. 6-106



4. Kick-up
   (1) Open the primary throttle valve until the kick arm slightly opens the secondary throttle valve.

Fig. 6-107

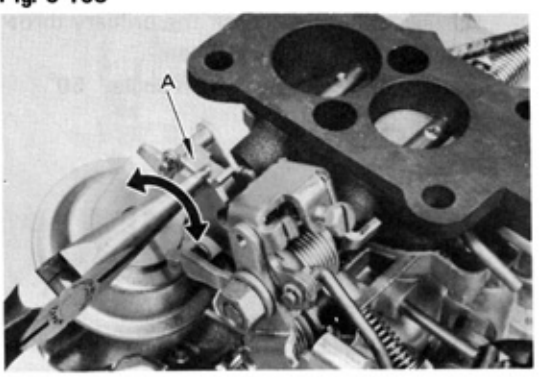


(2) Check the clearance between the secondary throttle valve and body.

Kick-up clearance :

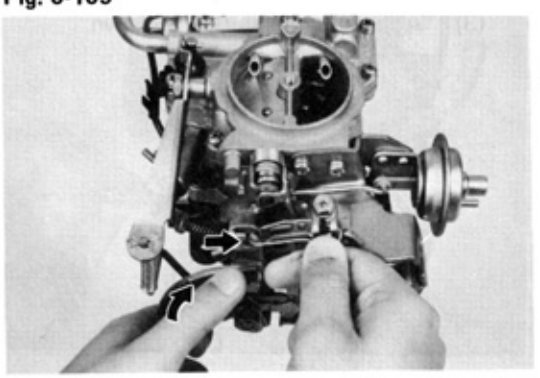
KP61 Series	**0.22 mm (0.0087 in.)**
KM20 Series	**0.32 mm (0.0126 in.)**

Fig. 6-108



(3) Adjust by bending A, as shown.

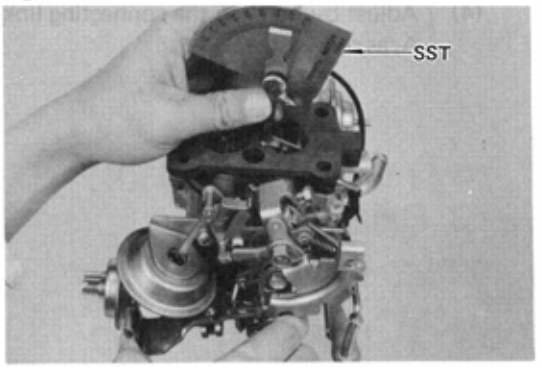
Fig. 6-109



5. Fast idle
   (1) Fully close the choke valve by turning the choke shaft lever.
   (2) Set the throttle shaft lever to the fast idle cam.

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Fig. 6-110

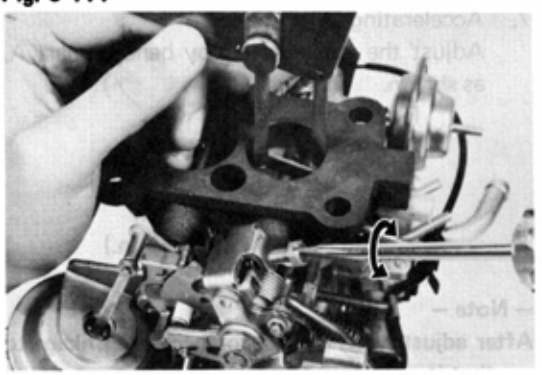


(3) At this time, check the primary throttle valve opening angle with SST.
SST [09240-00014]

Fast idle angle:

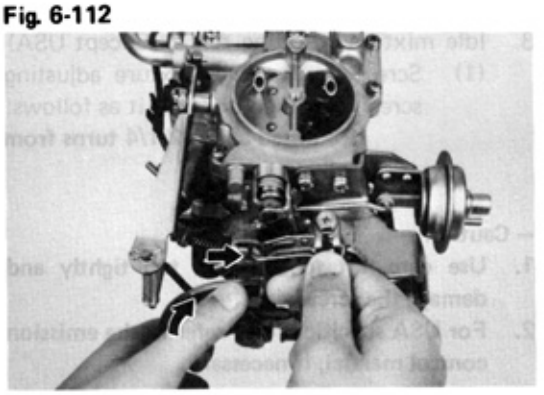
General destinations & Europe	**24°**
USA & Canada	**26°**
Australia	**25°**

Fig. 6-111



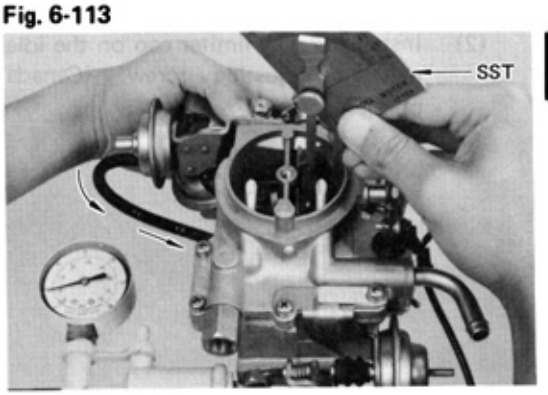
(4) Adjust by turning the fast idle adjusting screw.

Fig. 6-112



6. Choke Opener (USA & Canada) or Choke Breaker (Australia 4K-C)
(1) Fully close the choke valve.

Fig. 6-113



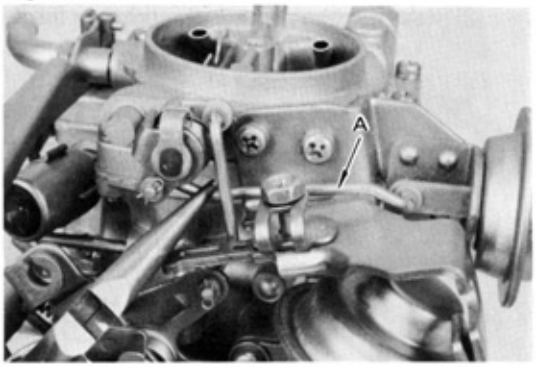
(2) Apply vacuum to the diaphragm.
(3) Check the choke valve opening angle with SST.
SST [09240-00014]

Choke valve opening angle:

Choke Breaker	**64°**
Choke Opener	**72°**

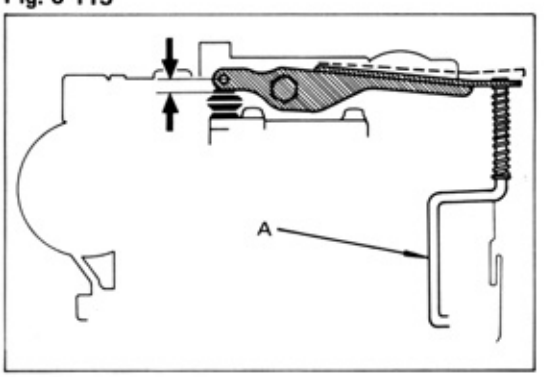
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Fig. 6-114



(4) Adjust by bending the connecting link A, as shown.

Fig. 6-115



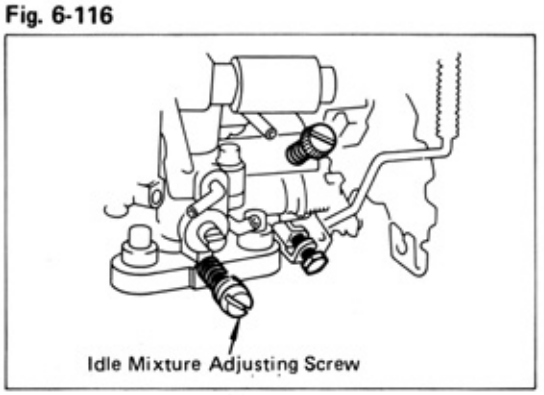
7. Accelerating pump
Adjust the pump stroke by bending part A, as shown.

Pump stroke:

KP61 Series	**3.25 mm (0.1280 in.)**
KM20 Series	**5.0 mm (0.197 in.)**

— Note —
After adjustment, be sure to check the linkage to see that it operates smoothly.

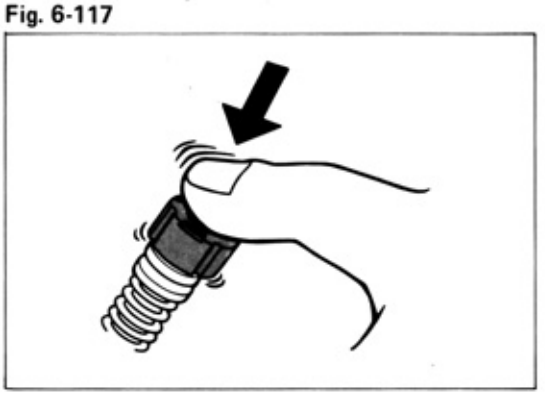
Fig. 6-116



8. Idle mixture adjusting screw (Except USA)
(1) Screw in the idle mixture adjusting screw, and then unscrew it as follows:
Returned about 2-1/4 turns from full closed.

— Caution —
1. **Use care not to screw in too tightly and damage the screw tip.**
2. **For USA specifications, refer to the emission control manual, if necessary.**

Fig. 6-117



(2) Install the new limiter cap on the idle mixture adjusting screw. (Canada only)

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STARTING SYSTEM

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REDUCTION TYPE STARTING SYSTEM CIRCUIT 7-19

PERFORMANCE TEST 7-19

REDUCTION TYPE STARTER 7-21

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CONVENTIONAL TYPE STARTING SYSTEM CIRCUIT

Fig. 7-1

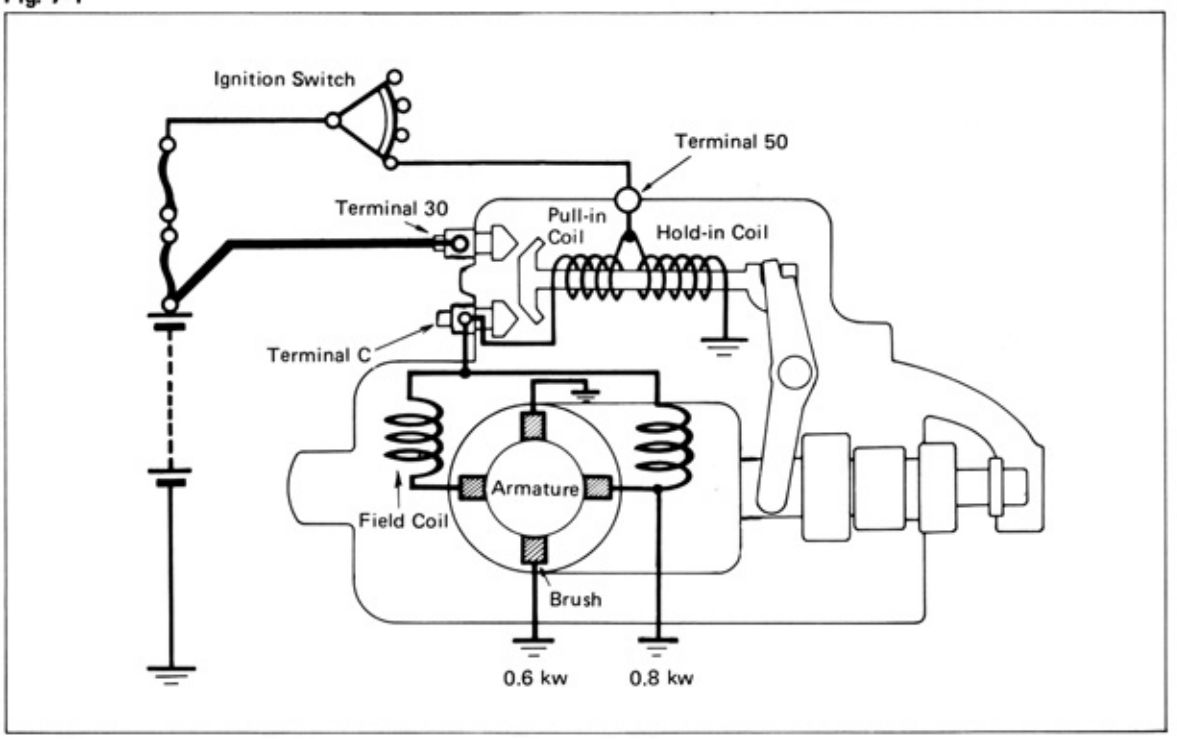
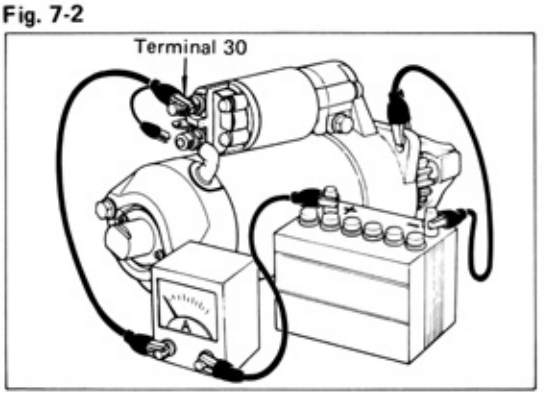


Fig. 7-2



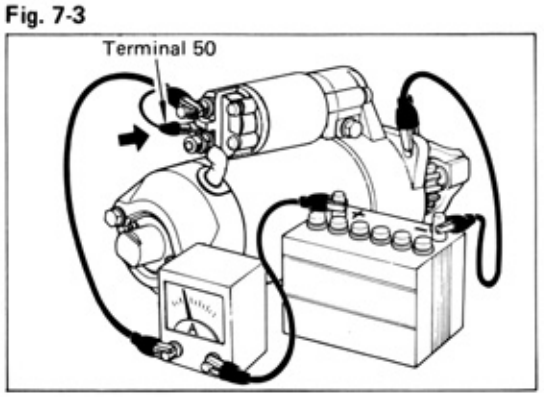
PERFORMANCE TEST

NO-LOAD PERFORMANCE TEST

Secure the starter in a vise to prevent an accident.

1. Connect the starter to a battery as is shown in the figure.
   Positive side
   Battery ⊕ ⟶ Ammeter ⊕
   Ammeter ⊖ ⟶ Terminal 30
   Negative side
   Battery ⊖ ⟶ Starter body

Fig. 7-3



2. Connect terminal 50.
   If the starter shows smooth and steady rotation with the pinion jumping out and drawing less than specified current, it is satisfactory.

   Specified current:

   0.6 kw Less than 55 A at 11V
   0.8 kw Less than 50 A at 11V

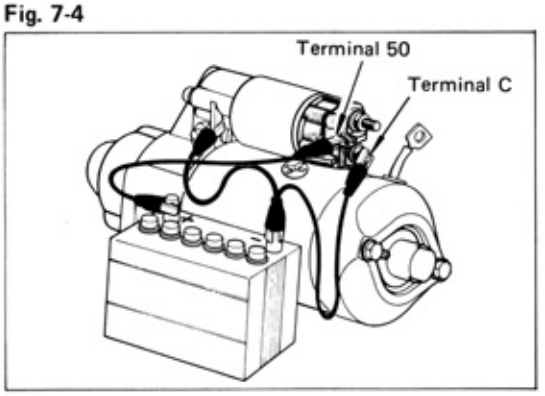
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TEST MAGNETIC SWITCH

– Caution –

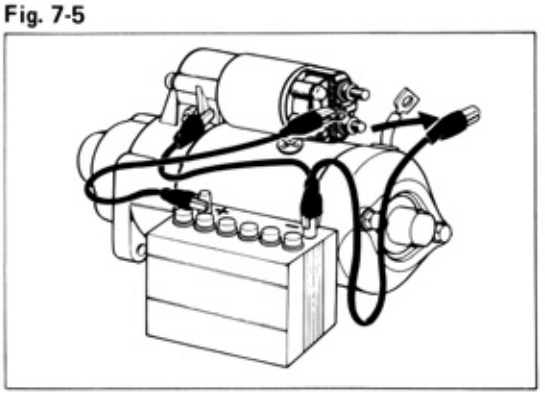
1. **Each test must be performed within 3 – 5 seconds to prevent the coil from burning out.**
2. **Disconnect the C terminal.**

Fig. 7-4



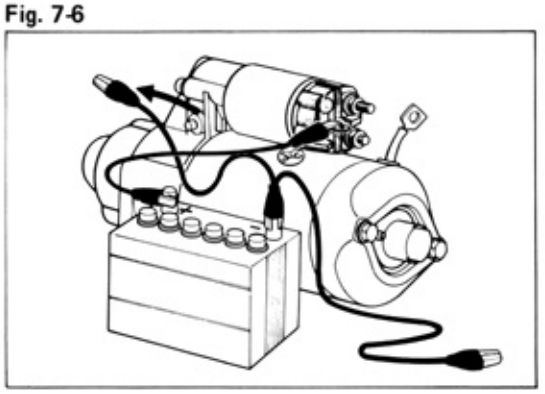
1. Pull-in test
   Connect the magnetic switch to a battery as is shown in the figure.
   Negative side
   Battery ⊖ ⟶ Starter body and terminal C
   Positive side
   Battery ⊕ ⟶ Terminal 50
   If the pinion has protruded, the pull-in coil is satisfactory.

Fig. 7-5



2. Hold-in test
   Disconnect terminal C. The pinion should remain protruded.

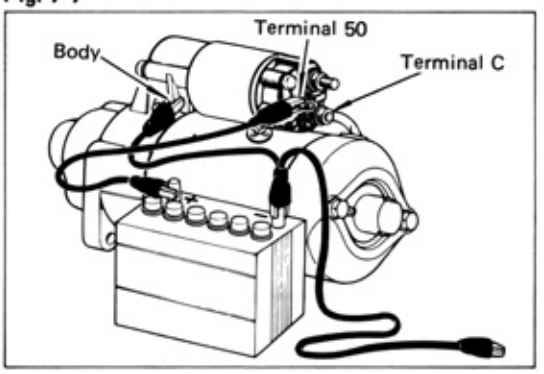
Fig. 7-6



3. Check the plunger return.
   When disconnecting the switch body, the pinion should return quickly.

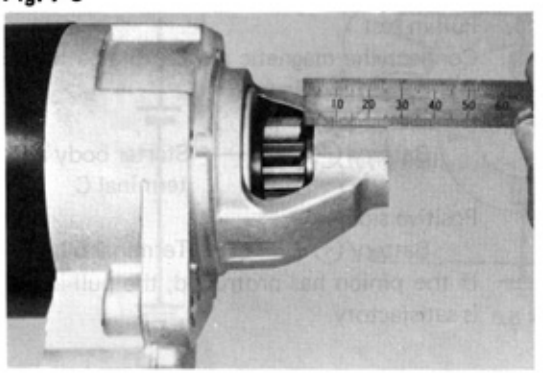
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Fig. 7-7



4. Check pinion clearance.
   (1) Connect the field coil lead to terminal C.
   (2) Connect the magnetic switch to a battery as is shown in the figure.
   Positive side
   Battery ⊕ ⟶ Terminal 50
   Battery ⊖ ⟶ Starter body

Fig. 7-8



   (3) Move the pinion to the armature side to eliminate slack, and check the clearance between the pinion end and the stop collar.
   Clearance:
   STD 0.1 – 4.0 mm (0.004 – 0.157 in.)

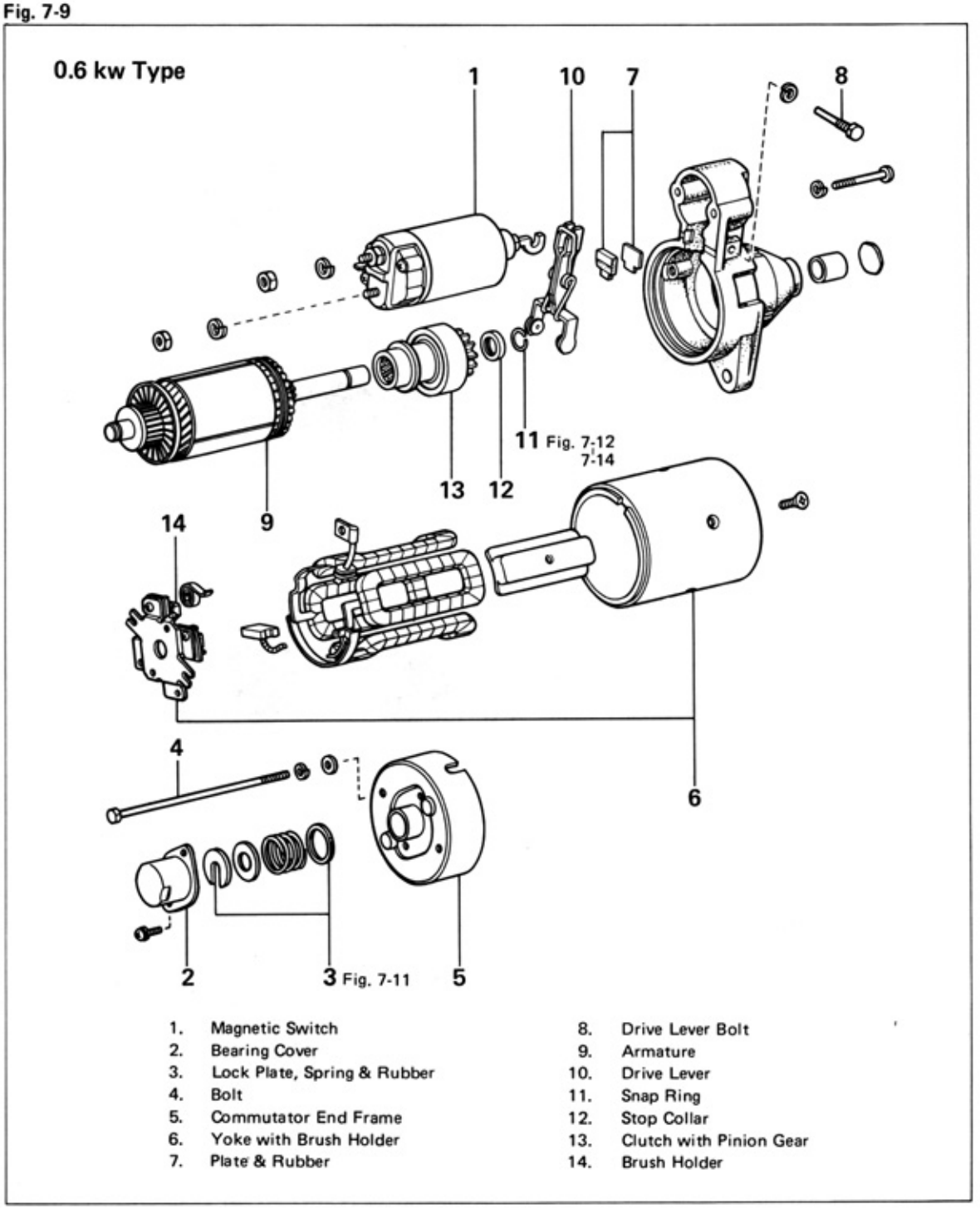
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CONVENTIONAL TYPE STARTER

DISASSEMBLY

Disassemble the parts in the numerical order shown in the figure.

Fig. 7-9



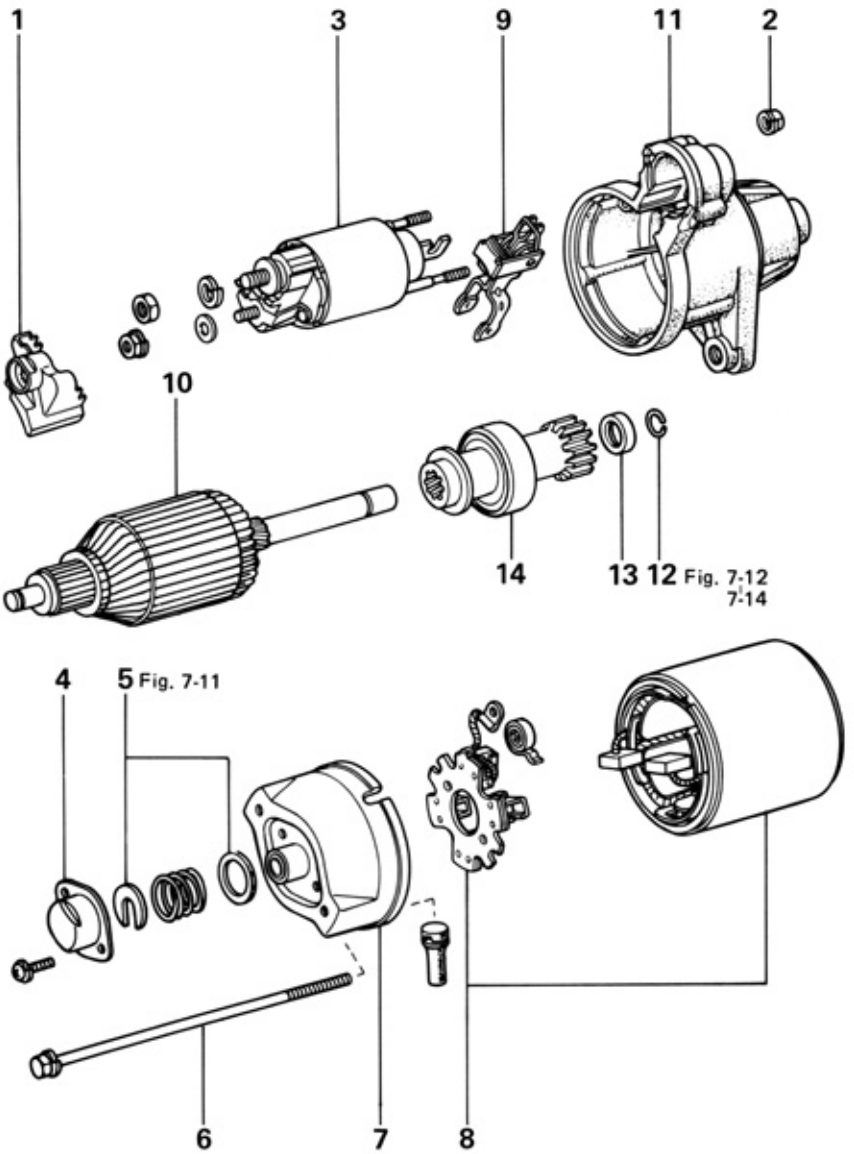
1. Magnetic Switch
2. Bearing Cover
3. Lock Plate, Spring & Rubber
4. Bolt
5. Commutator End Frame
6. Yoke with Brush Holder
7. Plate & Rubber
8. Drive Lever Bolt
9. Armature
10. Drive Lever
11. Snap Ring
12. Stop Collar
13. Clutch with Pinion Gear
14. Brush Holder

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Disassemble the parts in the numerical order shown in the figure.

Fig. 7-10

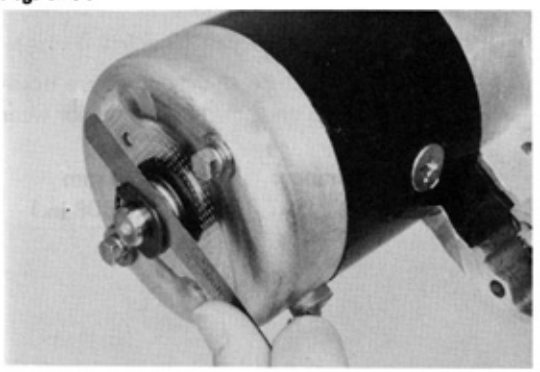
0.8 kw Type



1. Terminal Cover
2. Magnetic Switch Set Nut
3. Magnetic Switch Assembly
4. Bearing Cover
5. Lock Plate, Spring & Rubber
6. Bolt
7. Commutator End Frame
8. Yoke with Brush Holder
9. Drive Lever
10. Armature
11. Drive Housing
12. Snap Ring
13. Stop Collar
14. Clutch with Pinion Gear

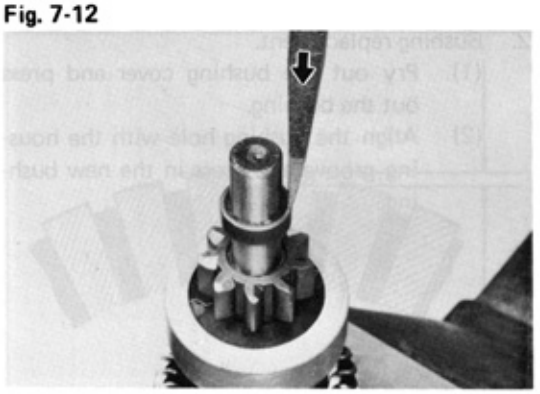
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Fig. 7-11



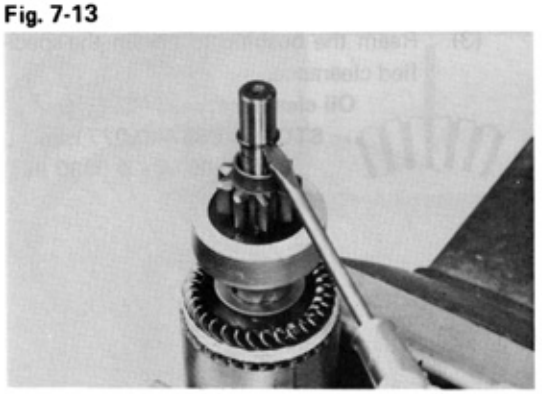
Check the armature shaft thrust clearance.
Thrust clearance limit: 1.0 mm (0.039 in.)

Fig. 7-12



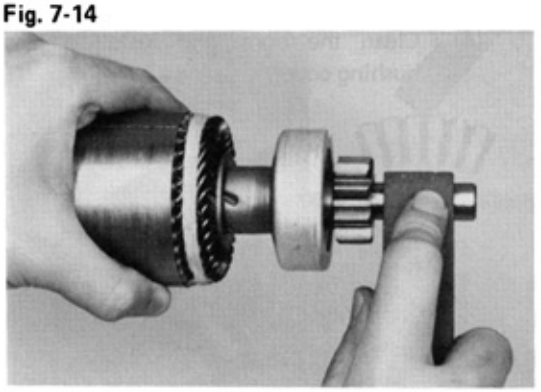
Tap in the stop collar with a screwdriver.

Fig. 7-13



Pry off the snap ring with a screwdriver.

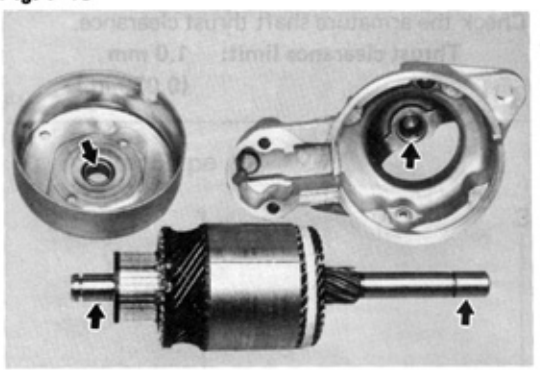
Fig. 7-14



If the pinion was difficult to pull out, smoothen shaft with an oil stone.

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Fig. 7-15



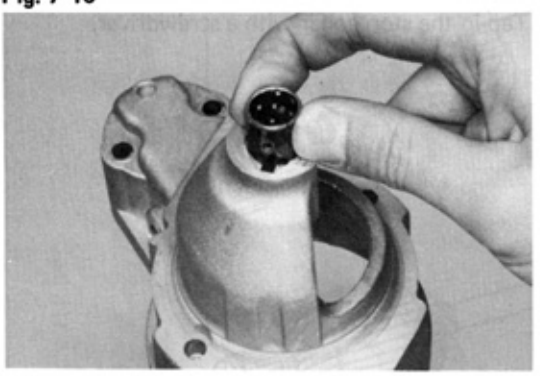
INSPECTION & REPAIR

Armature Shaft & Bearing (0.6 kw Type)

1. Inspect the armature shaft end, drive housing bushing and end frame bushing for wear or damage.

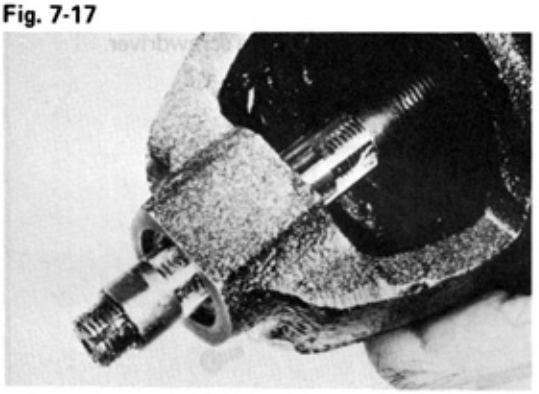
Oil clearance: Limit 0.2 mm (0.008 in.)

Fig. 7-16



2. Bushing replacement.
   (1) Pry out the bushing cover and press out the bushing.
   (2) Align the bushing hole with the housing groove and press in the new bushing.

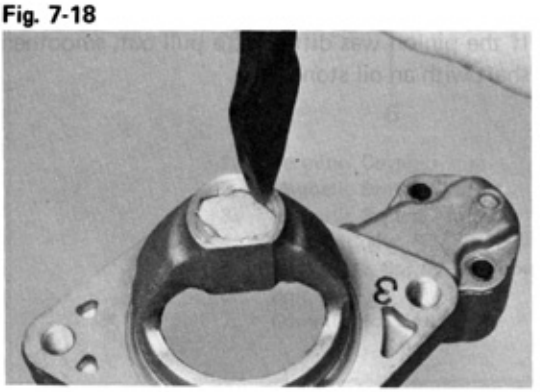
Fig. 7-17



(3) Ream the bushing to obtain the specified clearance.

Oil clearance:
STD 0.035 – 0.077 mm (0.0014 – 0.0030 in.)

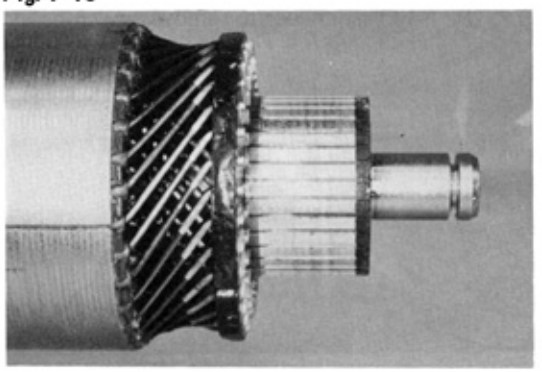
Fig. 7-18



(4) Clean the bore, and install a new bushing cover.

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Fig. 7-19

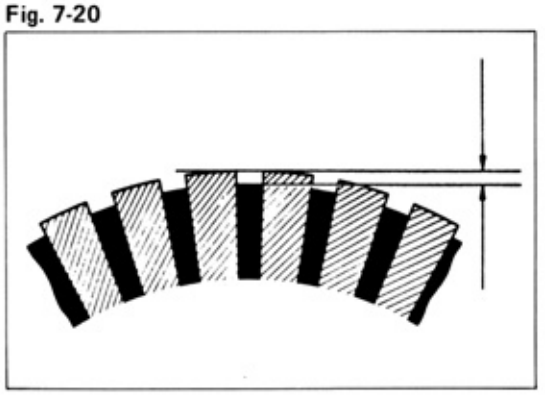


Commutator

Check for the following and repair or replace.

1. Dirty or burnt surface.
   Correct with sandpaper or a lathe if necessary.

Fig. 7-20

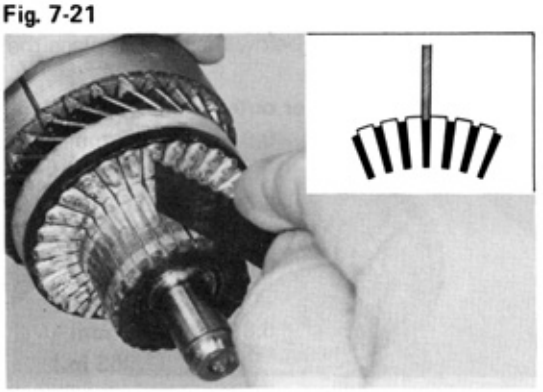


2. Depth of segment mica.

Mica depth:

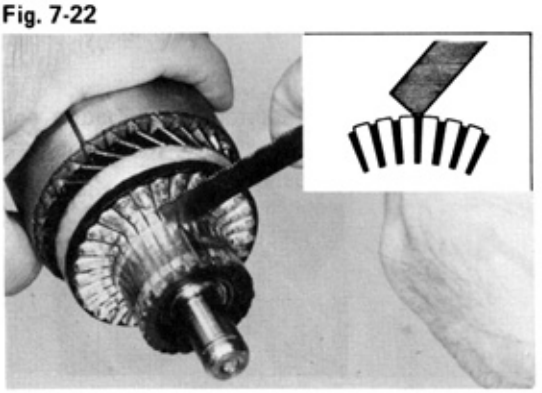
STD	**0.4 – 0.8 mm (0.016 – 0.031 in.)**
Limit	**0.2 mm (0.008 in.)**

Fig. 7-21



3. If the mica depth is below the limit, correct with a hacksaw blade.

Fig. 7-22



4. Smooth out the edge with a hacksaw blade.

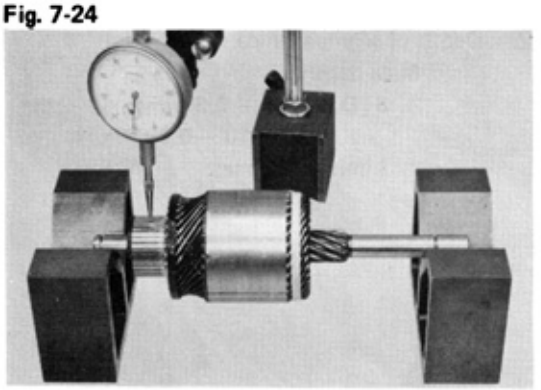
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Fig. 7-23



5. Use #400 sandpaper to remove any chips.

Fig. 7-24

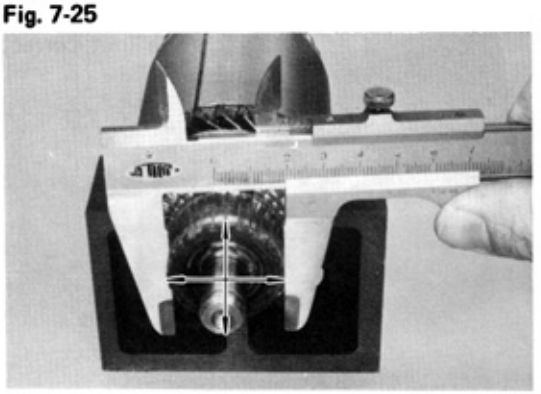


6. Runout: Correct on a lathe if it exceeds the limit.

Runout:

Limit	**0.3 mm (0.012 in.)**

Fig. 7-25

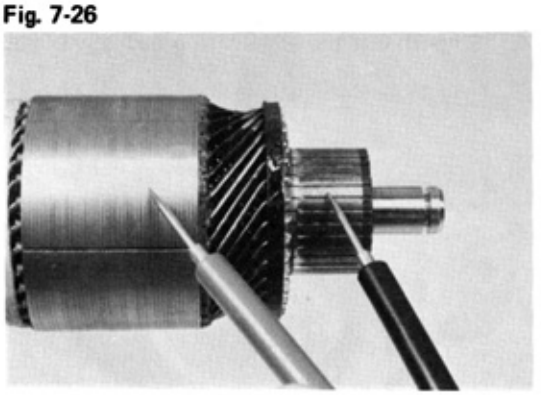


7. Surface wear: If below the limit, replace the armature.

Commutator outer diameter:

STD	**0.6 kw**	**32.7 mm (1.287 in.)**
	0.8 kw	**28.0 mm (1.102 in.)**
Limit	**0.6 kw**	**31.0 mm (1.220 in.)**
	0.8 kw	**27.0 mm (1.063 in.)**

Fig. 7-26

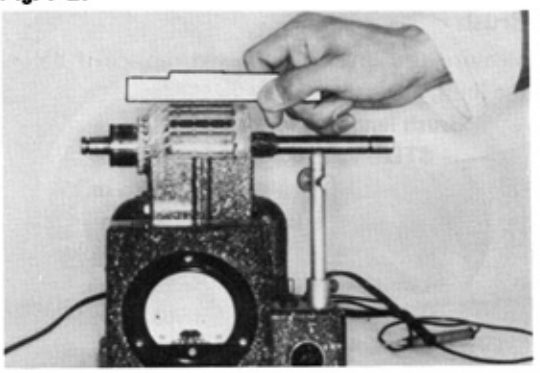


Armature Coil

1. Ground test
   Check the commutator and armature coil core. If there is continuity, the armature is grounded and must be replaced.

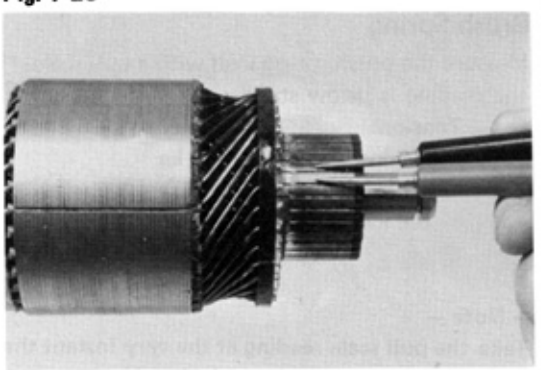
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Fig. 7-27



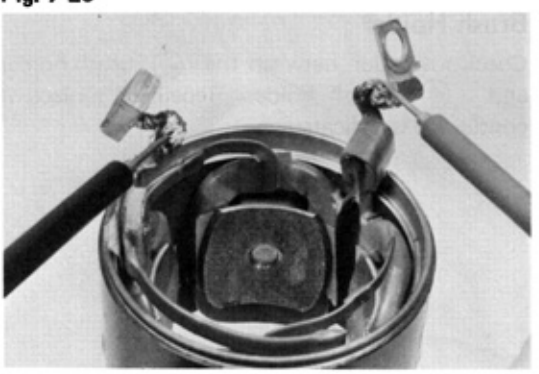
2. Short circuit test
Place the armature on an armature tester and hold a hacksaw blade against the armature core while turning the armature. If the hacksaw blade is attracted or vibrates, there is a short circuit in the armature and it must be replaced.

Fig. 7-28



3. Solder condition
Check for continuity between the commutator and armature coil.

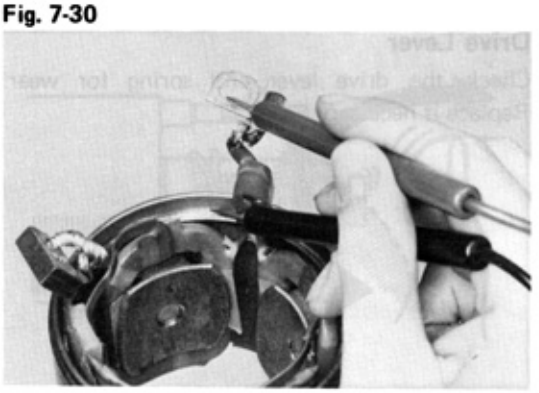
Fig. 7-29



Field Coil

1. Open circuit test
Check the field coil for continuity between the lead wire. If there is no continuity, there is an open circuit in the field coil, and it should be replaced.

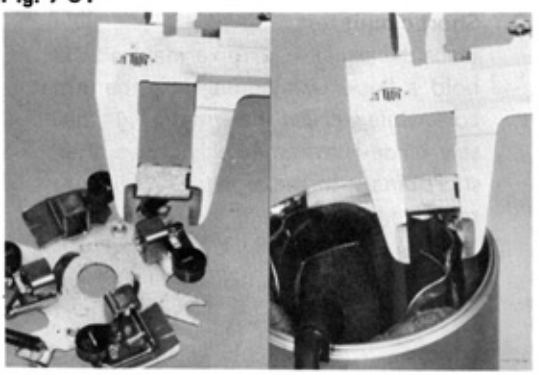
Fig. 7-30



2. Ground test
Check for continuity between the field coil end and field frame.
If there is continuity, replace the field coil.

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Fig. 7-31



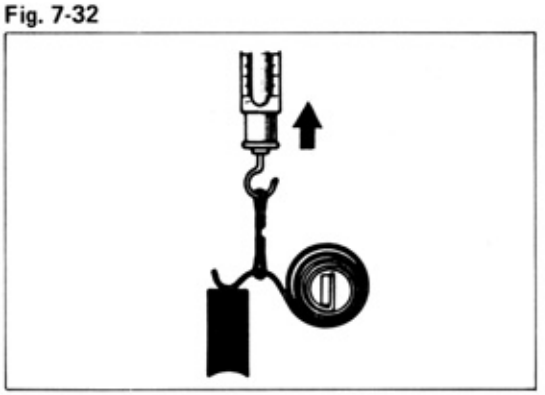
Brush

Measure the brush length and replace if below the limit.

Brush length:

STD	**0.6 kw**	**19 mm (0.75 in.)**
	0.8 kw	**16 mm (0.63 in.)**
Limit		**10 mm (0.39 in.)**

Fig. 7-32



Brush Spring

Measure the brush spring load with a pull scale. If the reading is below standard, replace the spring.

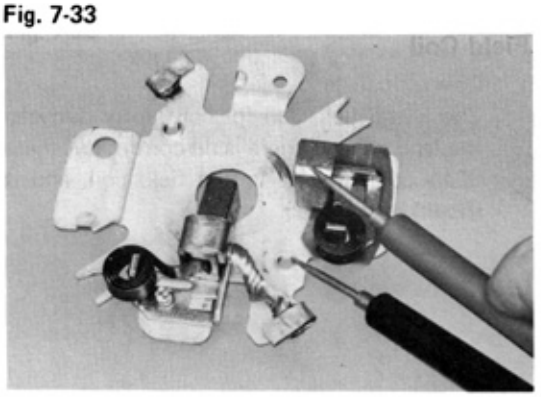
Tension:

0.6 kw	**1.05 – 1.35 kg (2.3 – 2.9 lb)**
0.8 kw	**1.02 – 1.38 kg (2.2 – 3.0 lb)**

– Note –

Take the pull scale reading at the very instant the brush spring separates from the brush.

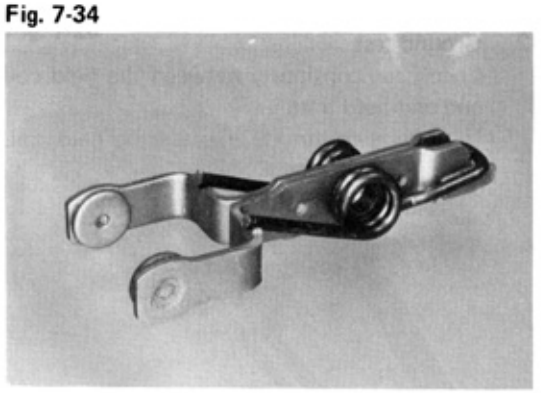
Fig. 7-33



Brush Holder

Check insulation between the ⊖ brush holder and ⊕ brush holder. Repair or replace if continuity is indicated.

Fig. 7-34

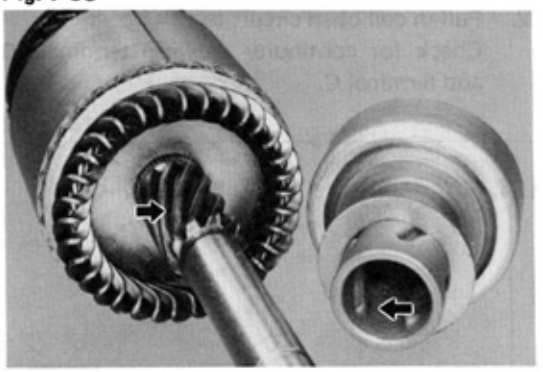


Drive Lever

Check the drive lever and spring for wear. Replace if necessary.

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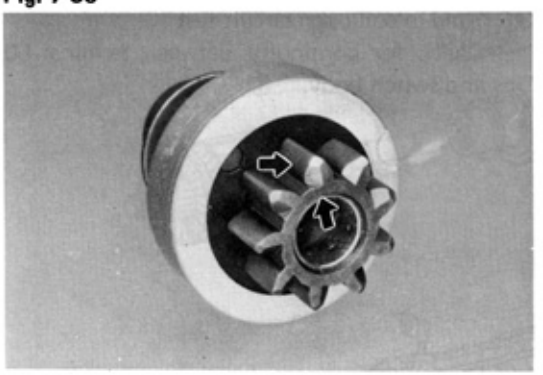
Fig. 7-35



Starter Clutch & Pinion Gear

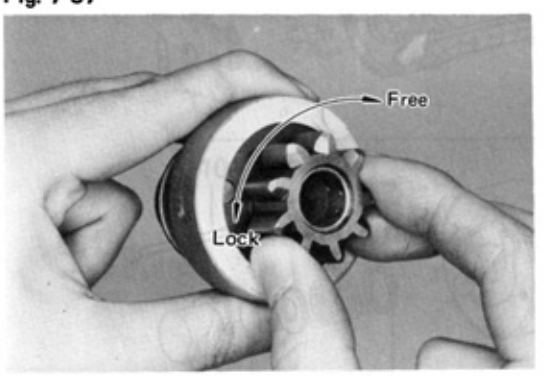
1. Check the spline teeth for wear or damage. Replace if necessary.
2. Check the pinion for smooth movement.

Fig. 7-36



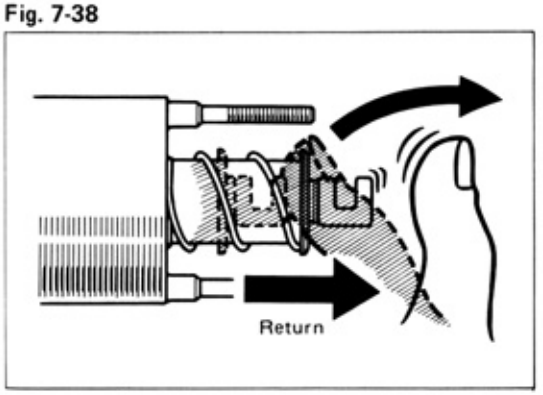
3. Check the pinion gear teeth and chamfer for wear or damage.

Fig. 7-37



4. Rotate the pinion. It should turn free in clockwise direction and lock when turned counterclockwise.

Fig. 7-38

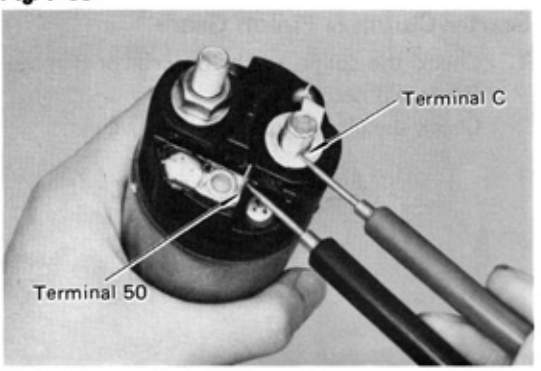


Magnetic Switch

1. Push in the plunger and release it.
   The plunger should return quickly to its original position.

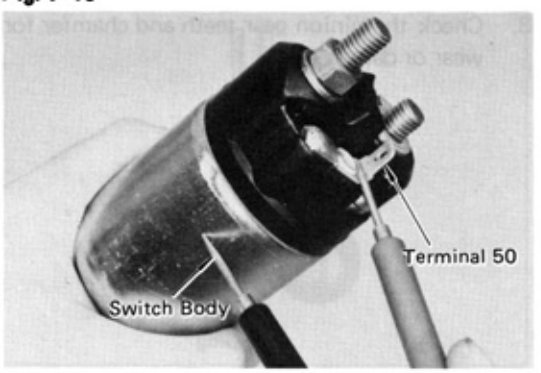
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Fig. 7-39



2. Pull-in coil open circuit test
Check for continuity between terminal 50 and terminal C.

Fig. 7-40



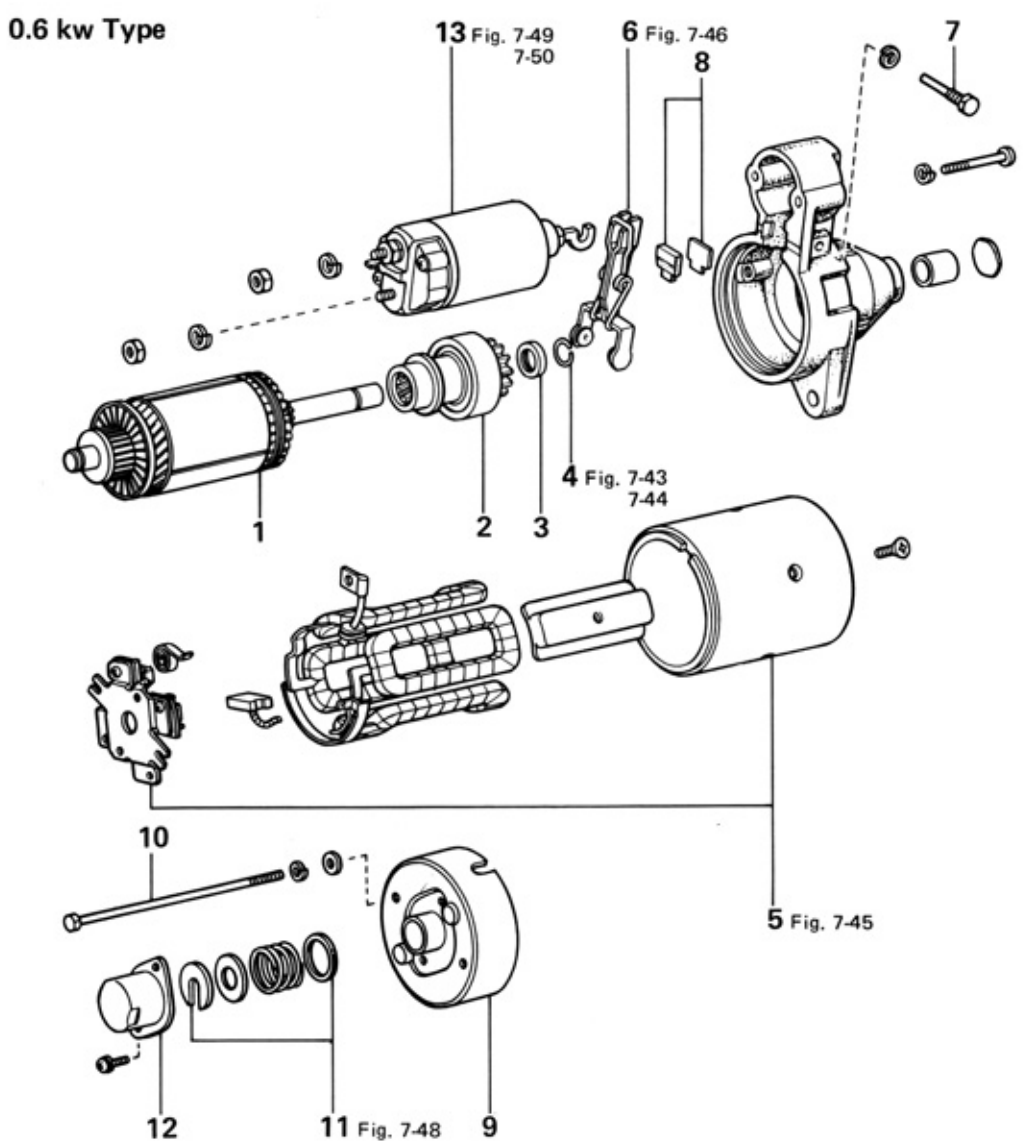
3. Hold-in coil open circuit test
Check for continuity between terminal 50 and switch body.

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ASSEMBLY

Assemble the parts in the numerical order shown in the figure.

Fig. 7-41



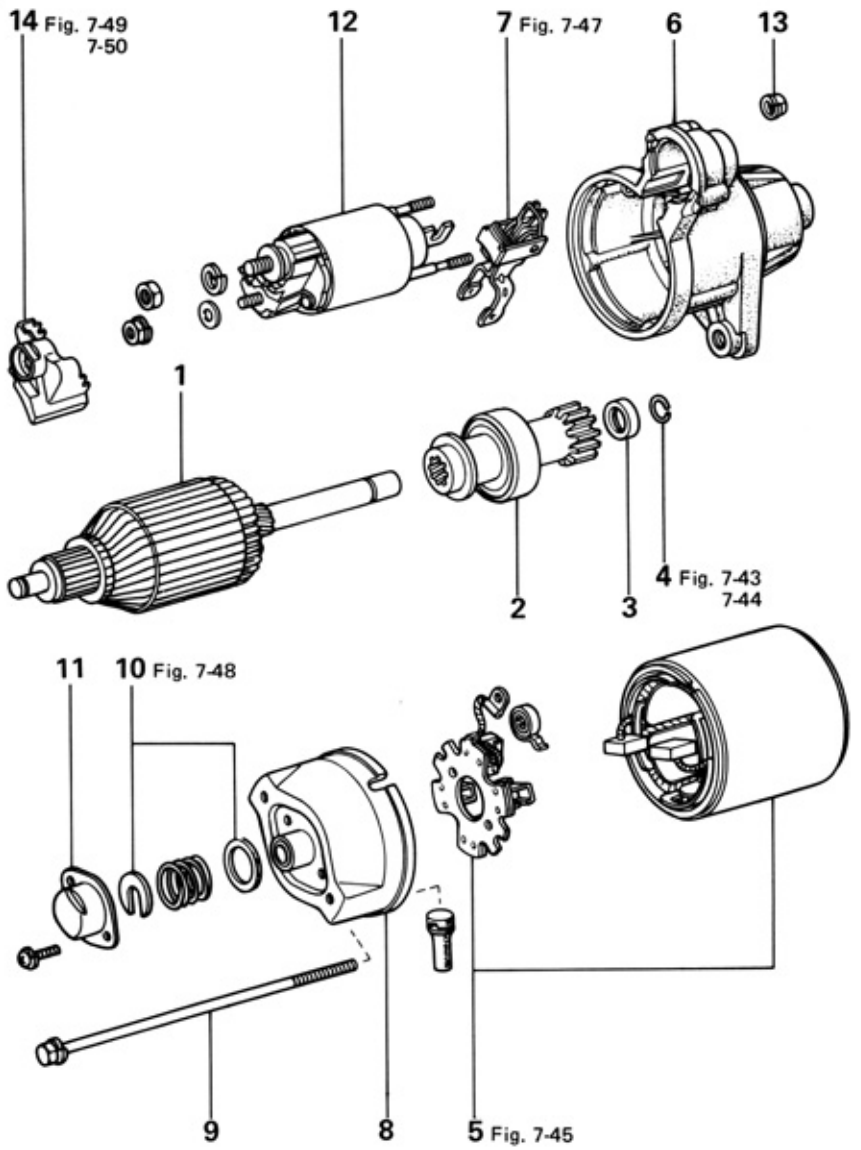
1. Armature
2. Clutch with Pinion Gear
3. Stop Collar
4. Snap Ring
5. Yoke with Brush Holder
6. Drive Lever
7. Drive Lever Bolt
8. Plate & Rubber
9. Commutator End Frame
10. Bolt
11. Lock Plate, Spring & Rubber
12. Bearing Cover
13. Magnetic Switch

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Assemble the parts in the numerical order shown in the figure.

Fig. 7-42

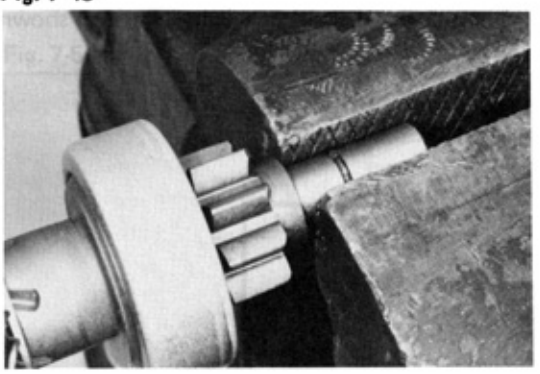
0.8 kw Type



1. Armature
2. Clutch with Pinion Gear
3. Stop Collar
4. Snap Ring
5. Yoke with Brush Holder
6. Drive Housing
7. Drive Lever
8. Commutator End Frame
9. Bolt
10. Lock Plate, Spring & Rubber
11. Bearing Cover
12. Magnetic Switch Assembly
13. Magnetic Switch Set Nut
14. Terminal Cover

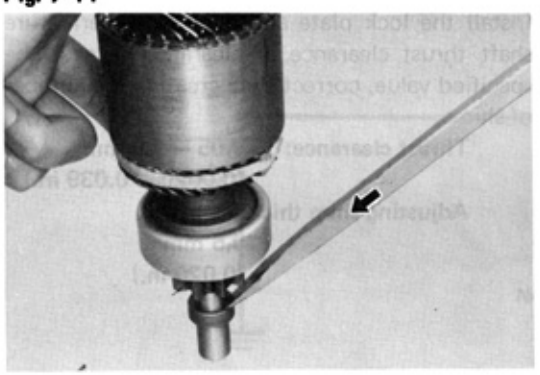
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Fig. 7-43



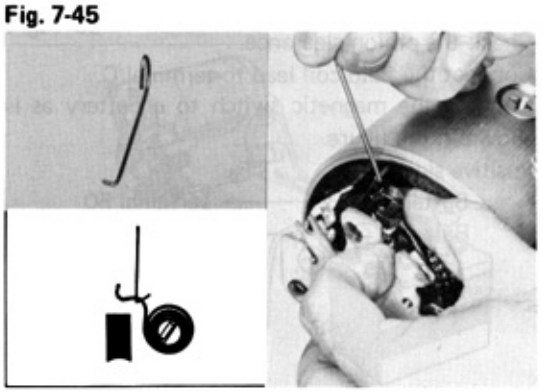
Compress the snap ring with a vise and confirm that it fits properly.

Fig. 7-44



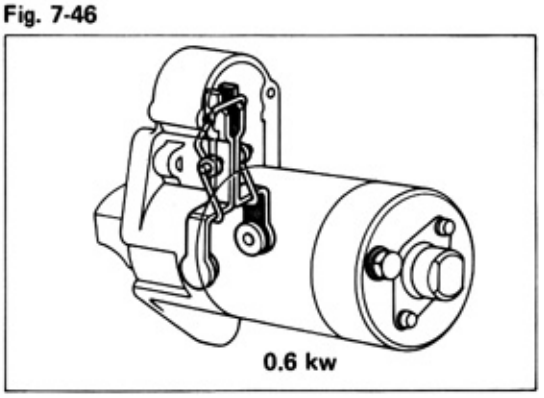
Tap the stop collar onto the snap ring.

Fig. 7-45



Assemble the brushes, being careful not to damage them.

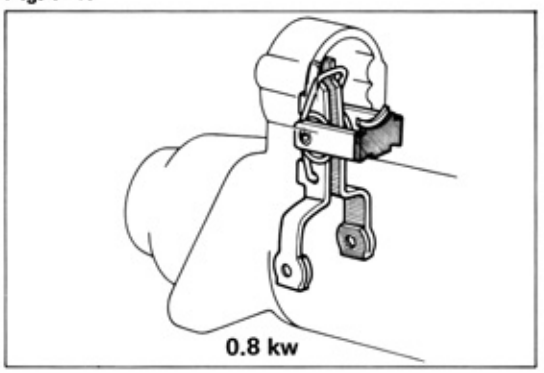
Fig. 7-46



Assemble the drive lever in the direction shown in the figure.

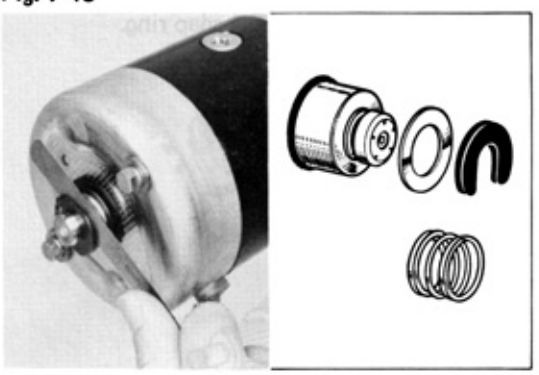
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Fig. 7-47



Assemble the drive lever in the direction shown in the figure.

Fig. 7-48

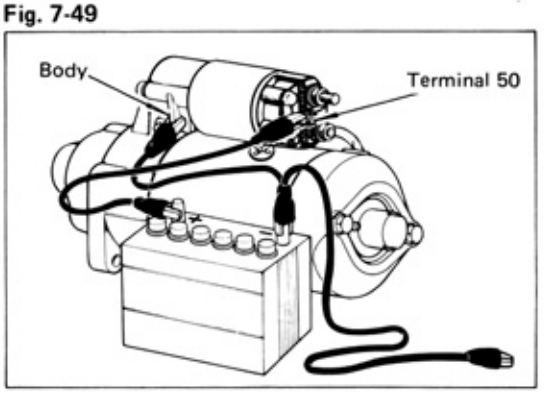


Install the lock plate and measure the armature shaft thrust clearance. If clearance exceeds the specified value, correct by increasing the number of shims.

Thrust clearance: **0.05 – 1.0 mm (0.0020 – 0.039 in.)**

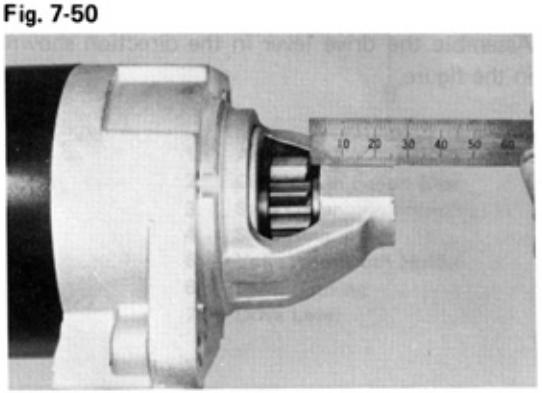
Adjusting shim thickness:
0.5 mm (0.020 in.)

Fig. 7-49



Check the pinion clearance.
Connect the field coil lead to terminal C.
Connect the magnetic switch to a battery as is shown in the figure.
Positive side
Battery ⊕ ⟶ Terminal 50
Battery ⊖ ⟶ Starter body

Fig. 7-50



Move the pinion to the armature side to eliminate the slack, and check the clearance between the pinion end and stop collar.

Clearance:
STD **0.1 – 4.0 mm (0.004 – 0.157 in.)**

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REDUCTION TYPE STARTING SYSTEM CIRCUIT

Fig. 7-51

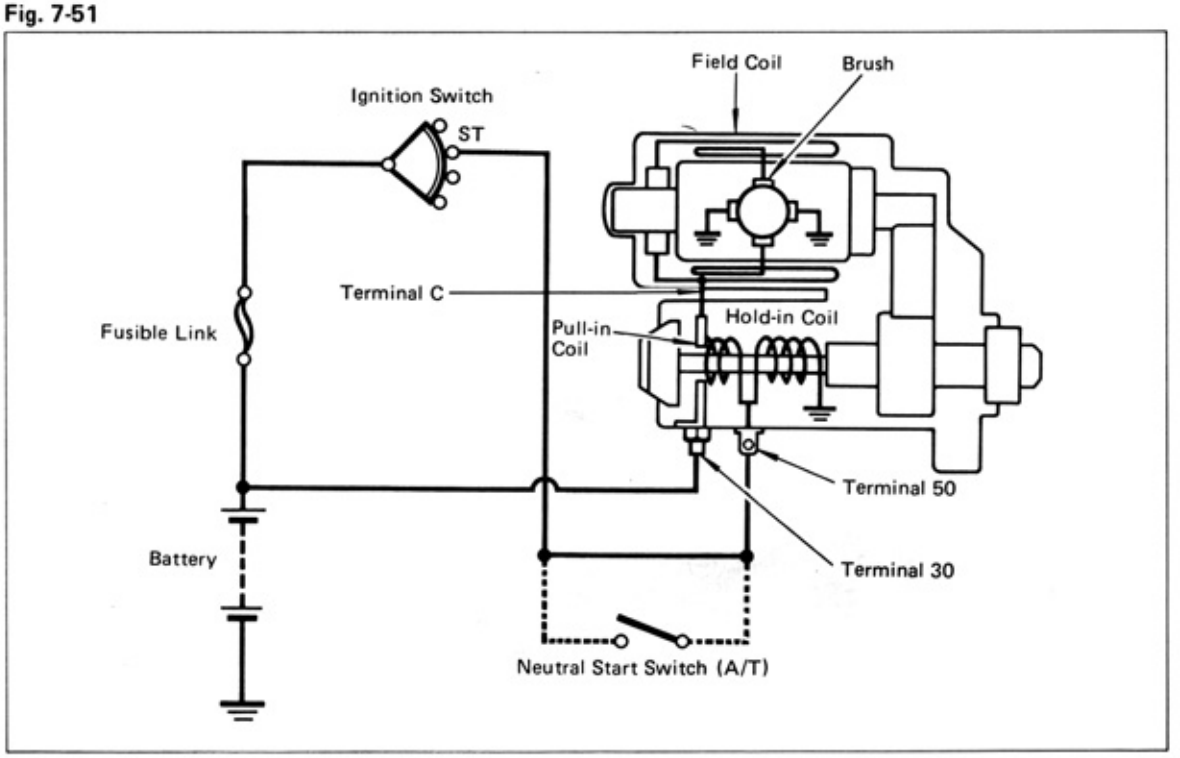
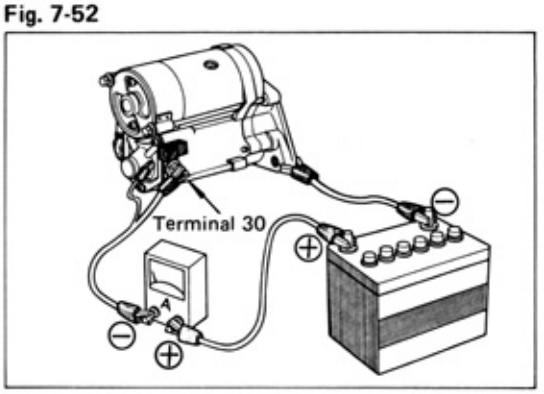


Fig. 7-52

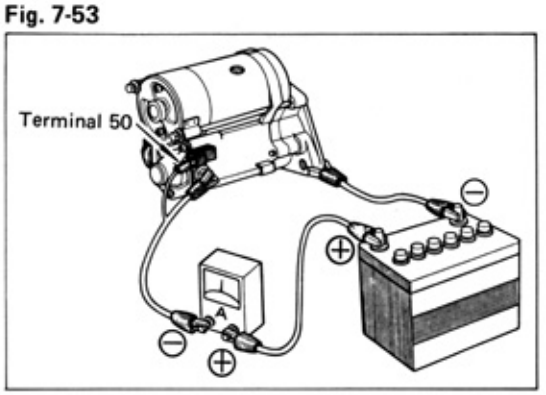


PERFORMANCE TEST

NO-LOAD PERFORMANCE TEST

1. Secure the starter in a vise to prevent an accident.
2. Connect the starter to a battery as is shown in the figure.
   Positive side
   Battery ⊕ ⟶ Ammeter ⊕
   Ammeter ⊖ ⟶ Terminal 30
   Negative side
   Battery ⊖ ⟶ Starter housing

Fig. 7-53



3. Connect the positive wire to terminal 50. If the starter shows smooth and steady rotation with the pinion jumping out and drawing less than specified current, it is satisfactory.

   Specified current: Less than 90 A at 11.5V

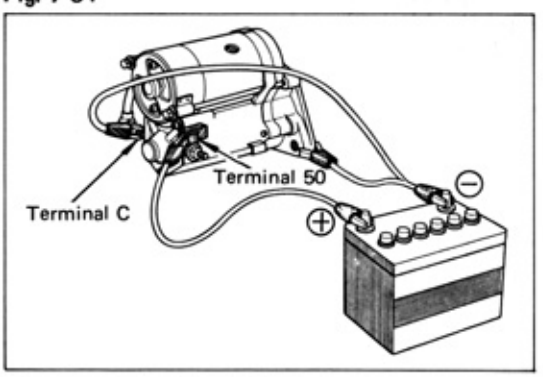
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MAGNETIC SWITCH TEST

— Caution —

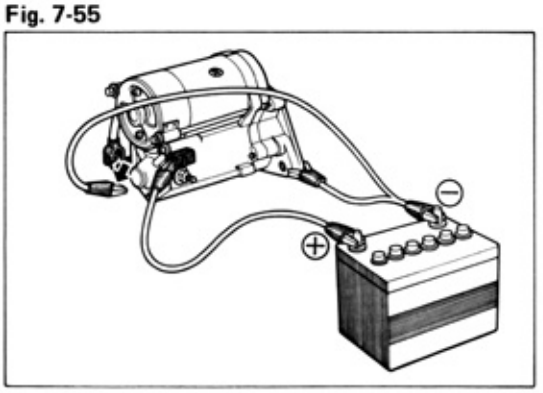
1. **Each test must be performed within 3 — 5 seconds to prevent the coil from burning out.**
2. **Disconnect terminal C.**

Fig. 7-54



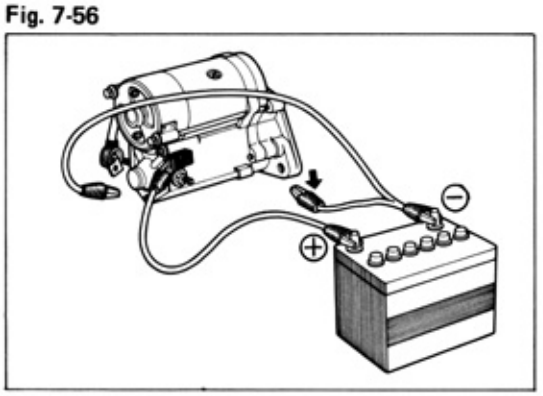
1. Pull-in coil test
   Connect the magnetic switch to a battery as is shown in the figure. The pinion should jump out.
   Negative side
   Battery ⊖ ——→ Starter housing and C terminal
   Positive side
   Battery ⊕ ——→ Terminal 50

Fig. 7-55



2. Hold-in coil test
   With the same connections as in the pull-in coil test, disconnect terminal C.
   At this time, the pinion should remain protruded.

Fig. 7-56



3. Check the pinion return.
   When disconnecting the cable from the starter housing, the protruding pinion should return quickly.

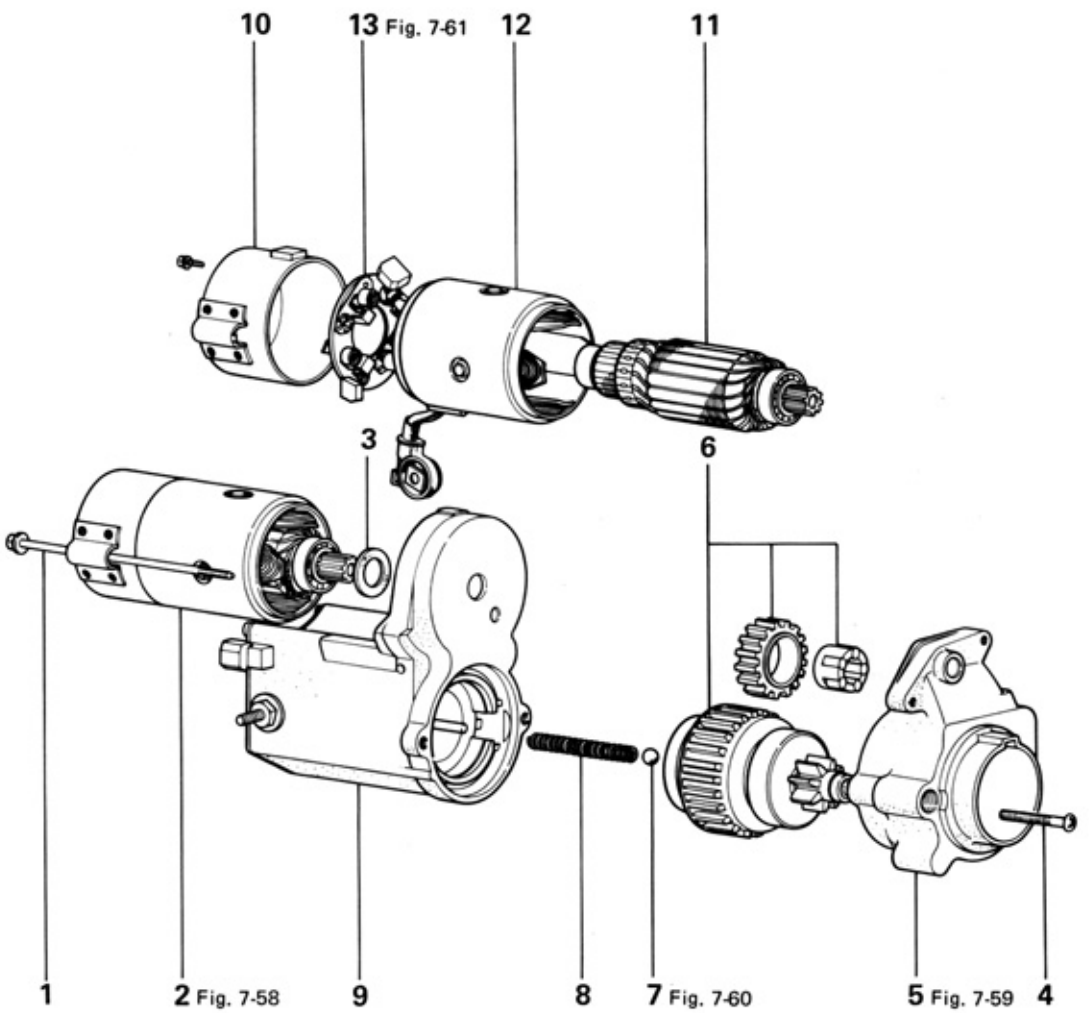
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REDUCTION TYPE STARTER

DISASSEMBLY

Disassemble the parts in the numerical order shown in the figure.

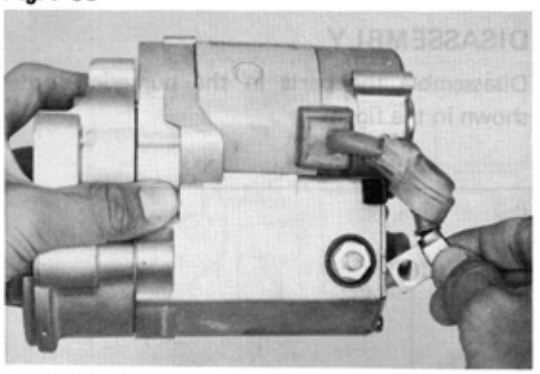
Fig. 7-57



1. Through Bolt
2. Field Frame
3. Felt Seal
4. Bolt
5. Starter Housing
6. Clutch & Idler Gear
7. Steel Ball
8. Plunger Return Spring
9. Magnetic Switch
10. End Cover
11. Armature
12. Field Frame
13. Brush Holder

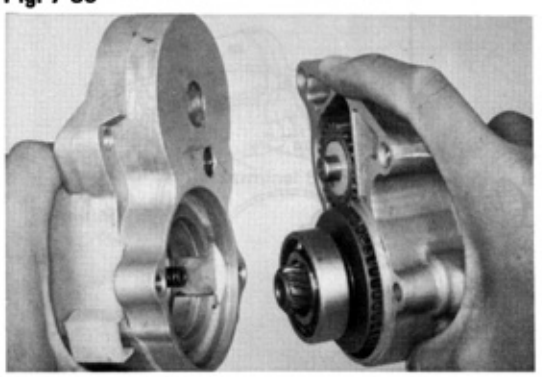
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Fig. 7-58



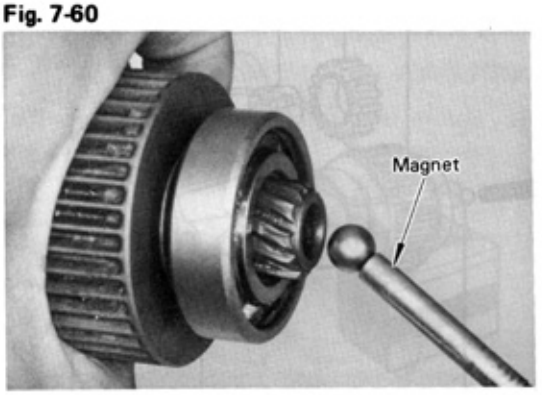
Disconnect the lead wires from the magnetic switch.

Fig. 7-59



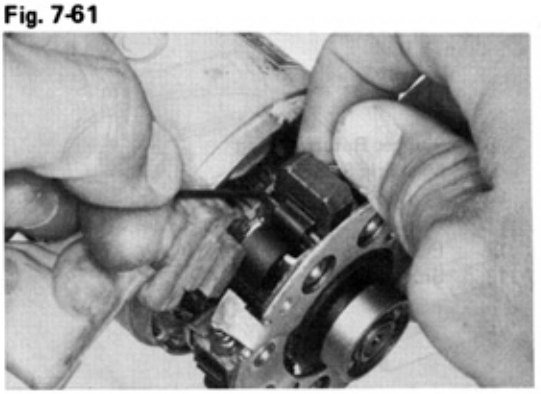
Remove the starter housing together with the idler gear and clutch.

Fig. 7-60



Using a magnet, remove the steel ball from the clutch shaft hole.

Fig. 7-61

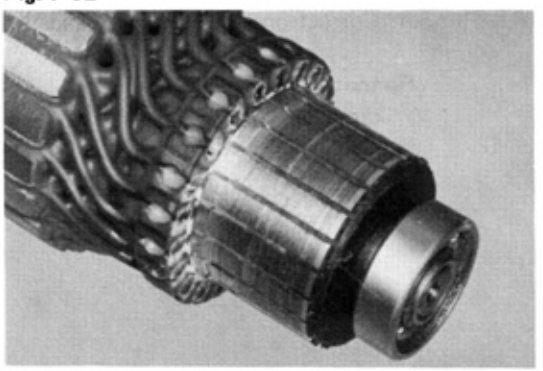


Lift up the brush spring and pull out the brush from the brush holder.

– Caution –
Use care not to damage the brush and commutator. Also avoid getting oil or grease on them.

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Fig. 7-62



INSPECTION & REPAIR

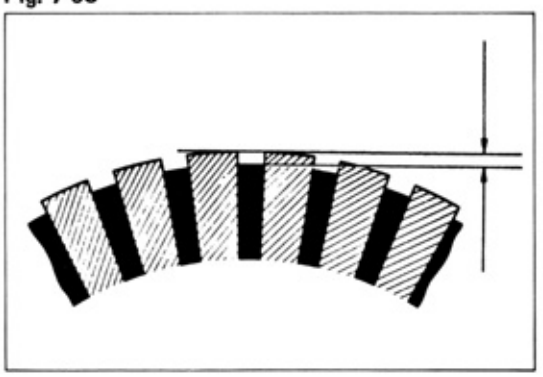
Wipe off dirt and grease from the disassembled parts.

Commutator

Check for the following items, and repair or replace as necessary.

1. Dirty or burnt surface
   Correct with sandpaper or a lathe if necessary.

Fig. 7-63

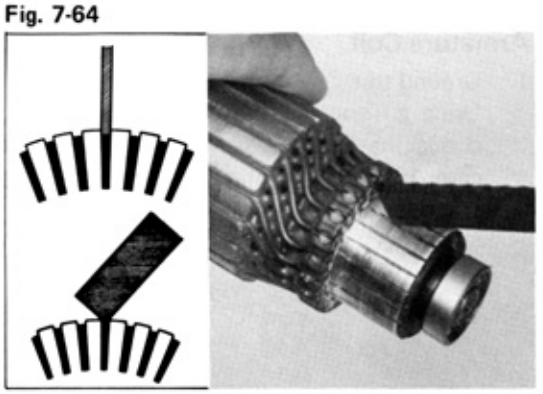


2. Depth of segment mica.

Mica depth:

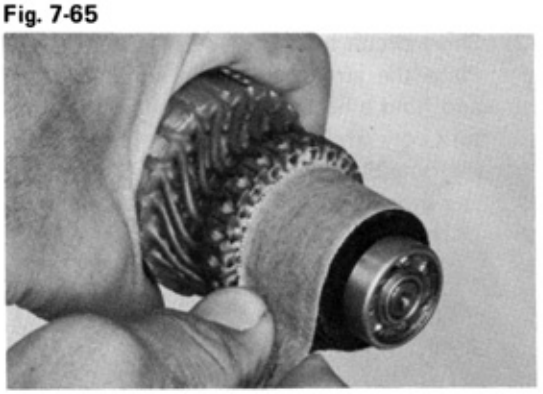
STD	**0.45 – 0.75 mm (0.0177 – 0.0295 in.)**
Limit	**0.2 mm (0.008 in.)**

Fig. 7-64



3. If the mica depth is below the limit, correct with a hacksaw blade.
4. Smooth out the edge with a backsaw blade.

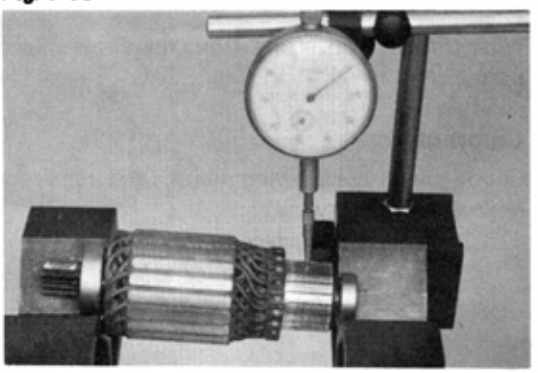
Fig. 7-65



5. Use #400 sandpaper to remove chips.

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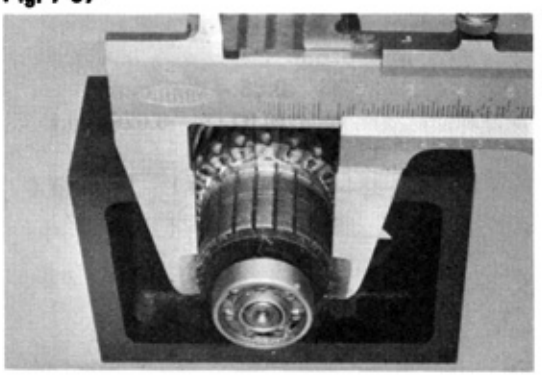
Fig. 7-66



6. Runout: Correct on a lathe if it exceeds the limit.

Runout:
Limit 0.2 mm (0.008 in.)

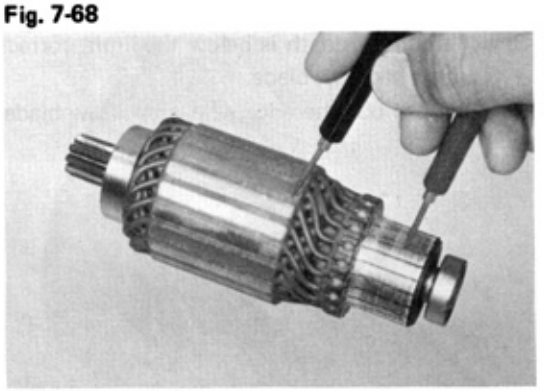
Fig. 7-67



7. Surface wear: If below the limit, replace the armature.

Diameter:
STD 30 mm (1.18 in.)
Limit 29 mm (1.14 in.)

Fig. 7-68



Armature Coil

1. Ground test
Using an armature tester or circuit tester, check the commutator and armature coil core. If there is continuity, the armature is grounded and must be replaced.

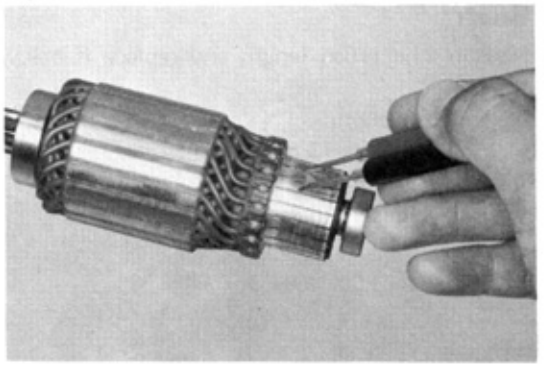
Fig. 7-69



2. Short circuit test
Place the armature on the armature tester and hold a hacksaw blade against the armature core while turning the armature. If the hacksaw blade is attracted or vibrates, there is a short circuit in the armature and it must be replaced.

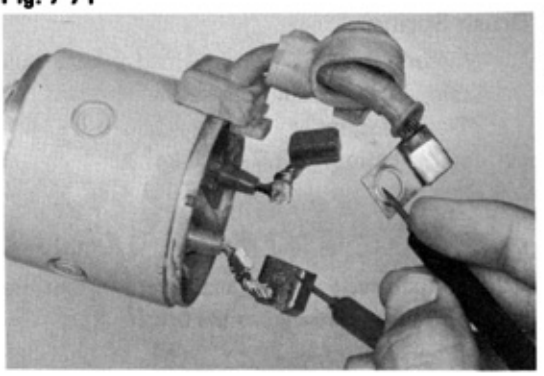
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Fig. 7-70



3. Open circuit test
Using the armature tester or a circuit tester, check for continuity between the segments. If there is no continuity at any test point, there is an open circuit and armature must be replaced.

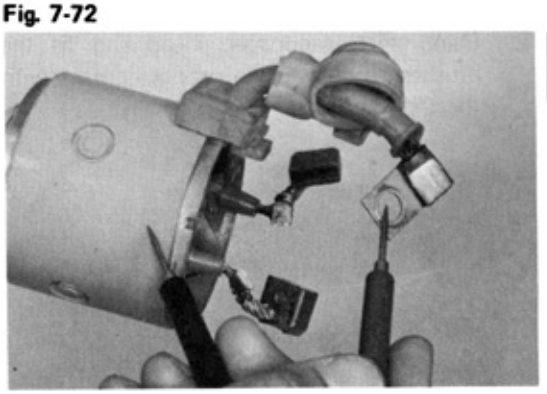
Fig. 7-71



Field Coil

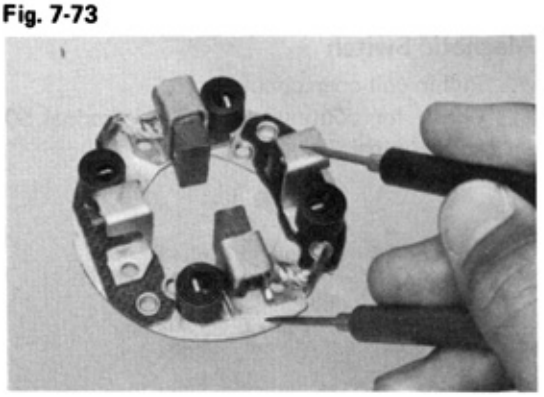
1. Open circuit test
Check for continuity between the lead wire and field coil brush lead. If there is no continuity, there is an open circuit in the field coil, and it must be replaced.

Fig. 7-72



2. Ground test
Check for continuity between the field coil end and field frame.
If there is continuity, repair or replace the field coil.

Fig. 7-73

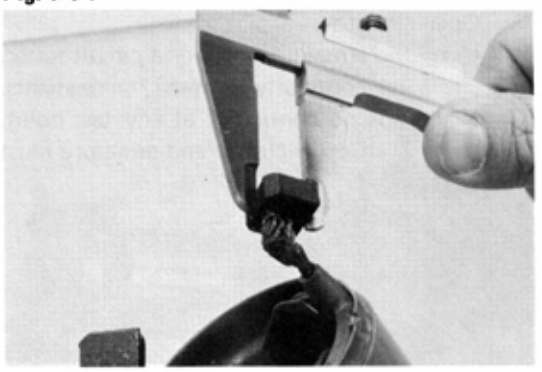


Brush Holder

Check insulation between the ⊕ and ⊖ brush holders. Repair or replace if continuity is indicated.

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Fig. 7-74



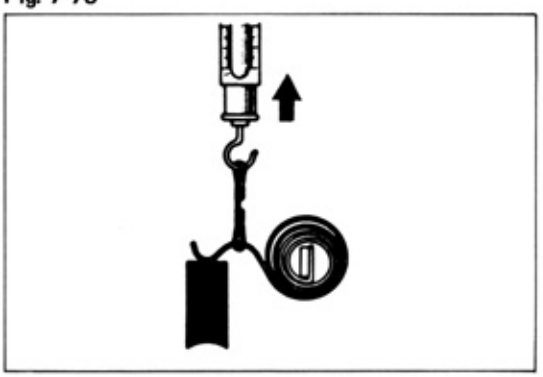
Brush

Measure the brush length and replace if below the limit.

Brush length:

STD	**13.5 mm (0.531 in.)**
Limit	**10 mm (0.39 in.)**

Fig. 7-75



Brush Spring

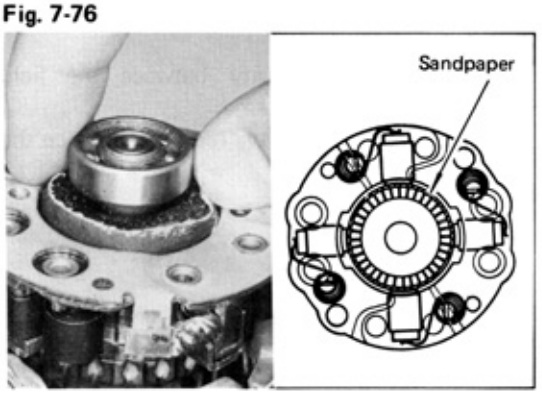
1. Measure the brush spring load with a pull scale. If the reading is below standard, replace the spring.

   Tension: 1.5 – 2.0 kg (3.3 – 4.4 lb)

– Note –

Take the pull scale reading at the very instant the brush spring separates from the brush.

Fig. 7-76



2. Using #400 sandpaper, clean and fit the brushes so they make proper contact with the commutator.

Fig. 7-77

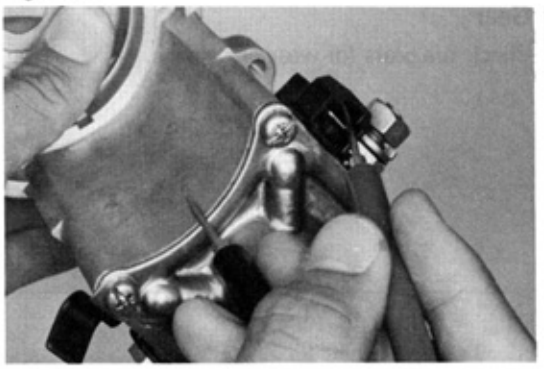


Magnetic Switch

1. Pull-in coil open circuit test
   Check for continuity between terminal 50 and terminal C.

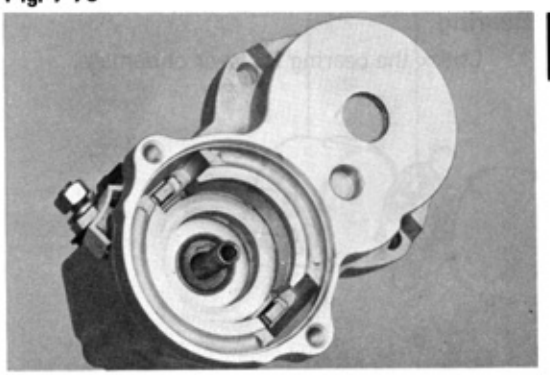
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Fig. 7-78



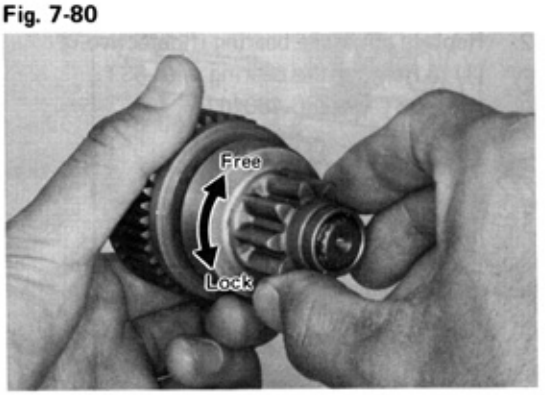
2. Hold-in coil open circuit test
Check for continuity between terminal 50 and the magnetic switch body.

Fig. 7-79



3. Check for wear or damage.

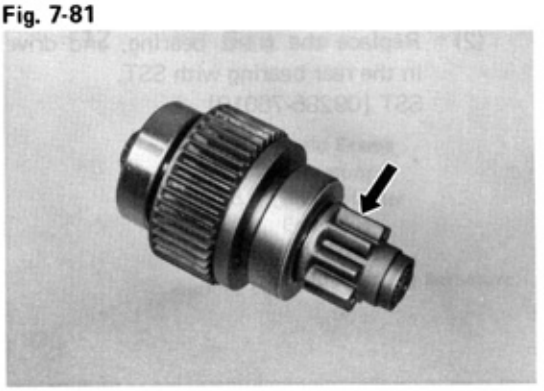
Fig. 7-80



Clutch

1. Rotate the pinion. It should turn free in clockwise direction and lock when turned counterclockwise.

Fig. 7-81



2. Check the gear teeth for wear of damage. Also inspect the flywheel ring gear for same.

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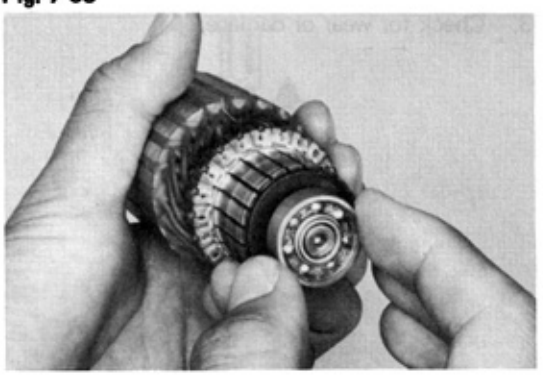
Fig. 7-82



Gear

Check the gears for wear or damage.

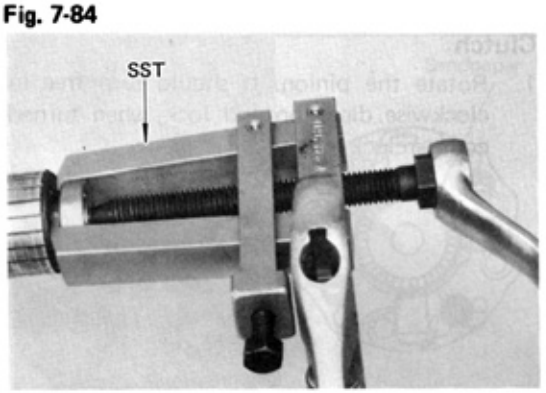
Fig. 7-83



Bearing

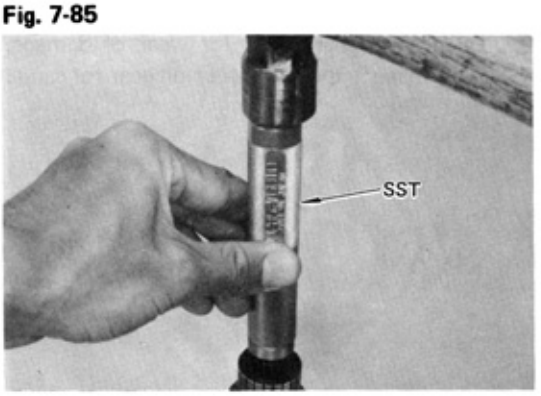
1. Check the bearing for wear or damage.

Fig. 7-84



2. Replace armature bearing if defective.
   (1) Remove the bearing with SST.
   SST [09286-46011]

Fig. 7-85



(2) Replace the front bearing, and drive in the rear bearing with SST.
SST [09285-76010]

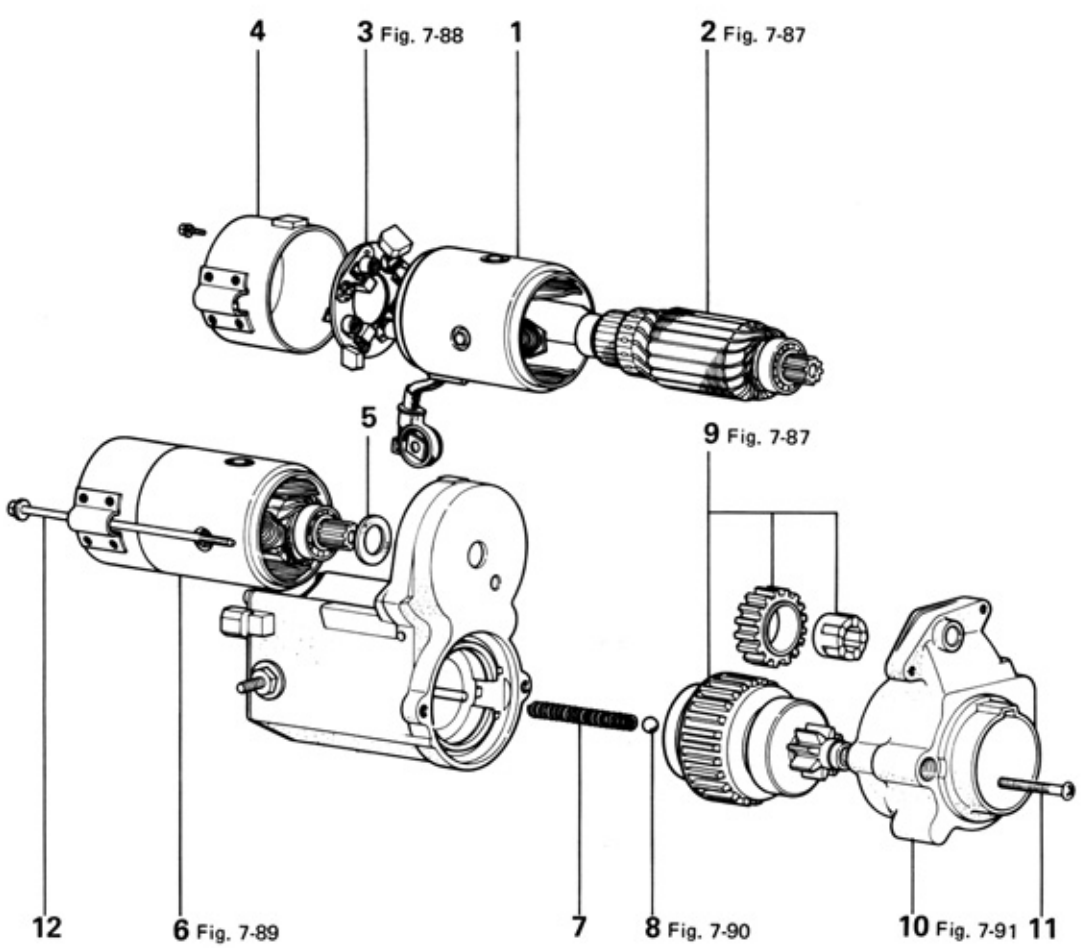
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ASSEMBLY

— Note —
When assembling, lubricate the bearings and gears with high temperature grease.

Assemble the parts in the numerical order shown in the figure.

Fig. 7-86



1. Field Frame
2. Armature
3. Brush Holder
4. End Cover
5. Felt Seal
6. Field Frame & Armature
7. Plunger Return Spring
8. Steel Ball
9. Clutch & Idler Gear
10. Starter Housing
11. Bolt
12. Through Bolt

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Use high temperature grease to lubricate bearings and gears in the places shown in the figure below.

Fig. 7-87

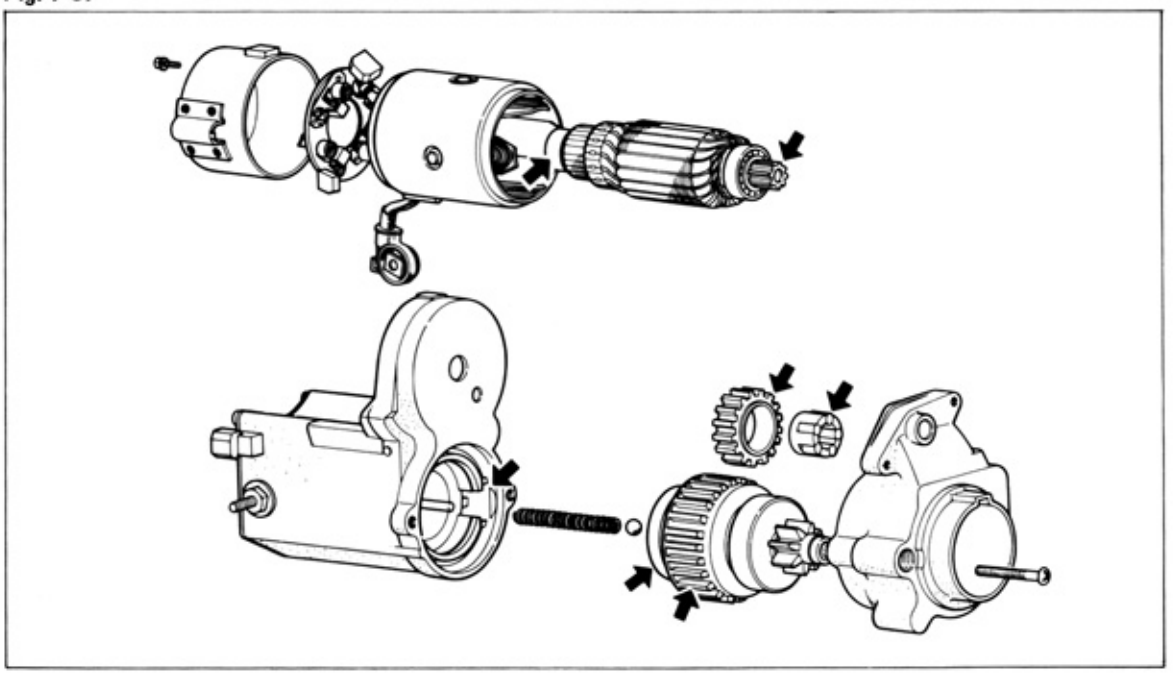
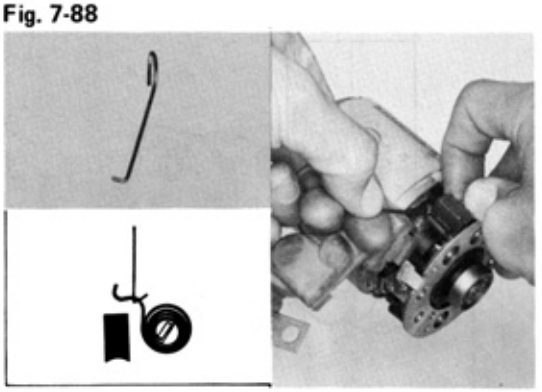


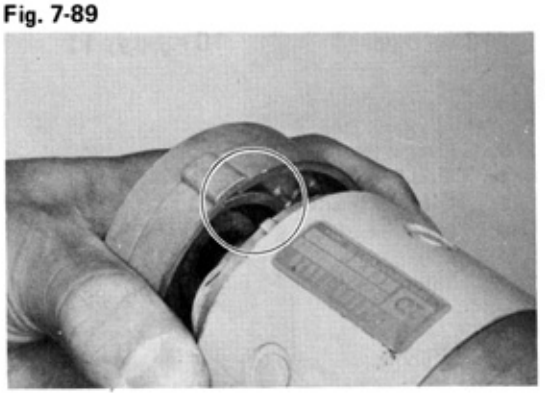
Fig. 7-88



Fir four brushes into the brush holder, using care not to damage them.

– Note –
Check to see that the ⊕ lead wires are not grounded.

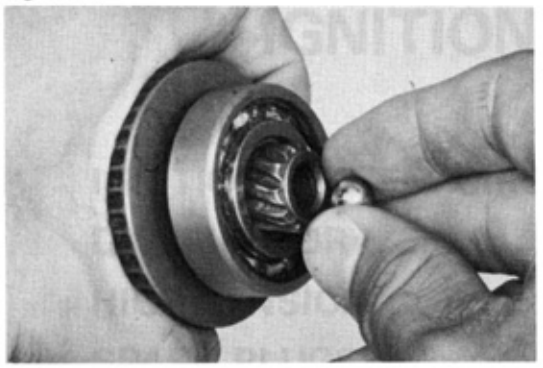
Fig. 7-89



Match the protrusion of the yoke core with the starter housing notch.

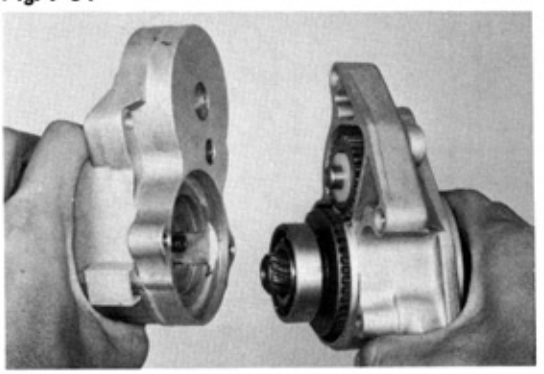
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Fig. 7-90



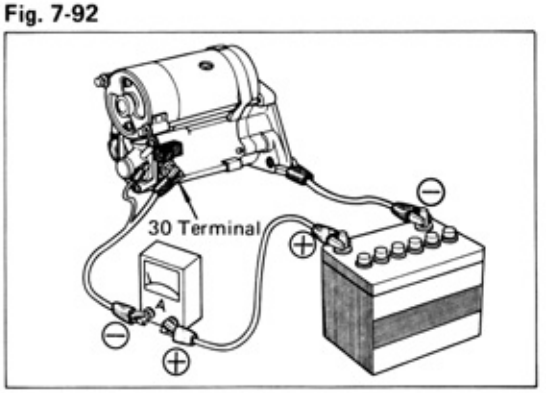
Apply grease and insert the ball into the clutch shaft hole.

Fig. 7-91



Install the idler gear roller bearing in the direction shown in the figure.

Fig. 7-92



PERFORMANCE TEST (NO-LOAD)

Connect the starter to a battery. If the starter shows smooth and steady rotation with the pinion jumping out and drawing less than specified current,it is satisfactory.

Specified current:

Less than 90 A at 11.5V

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MEMO

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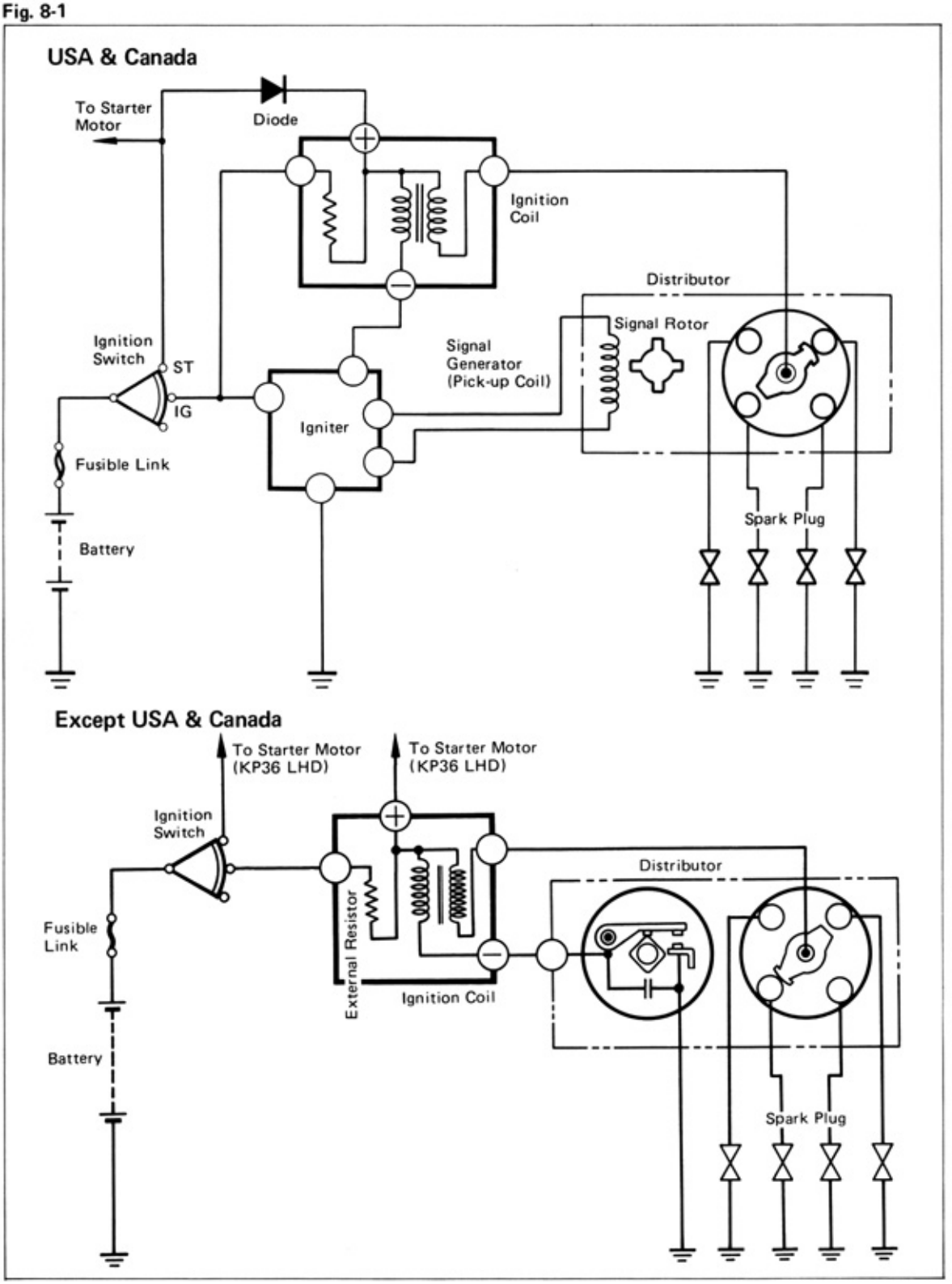
IGNITION SYSTEM

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IGNITION SYSTEM CIRCUIT	8-2
DISTRIBUTOR	8-7
HIGH TENSION CORD	8-23
SPARK PLUGS	8-24

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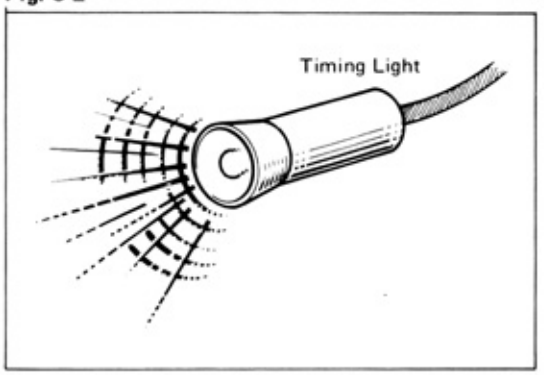
IGNITION SYSTEM CIRCUIT

Fig. 8-1



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Fig. 8-2

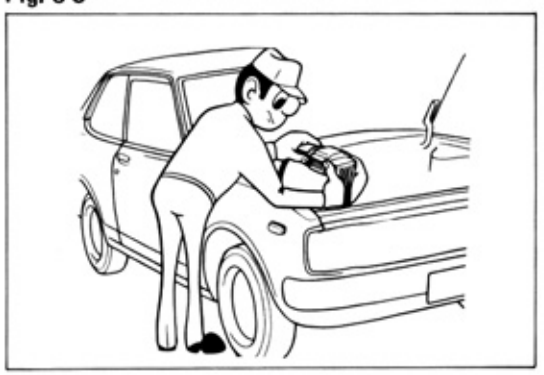


ON-VEHICLE INSPECTION

Spark Test

1. Set a timing light to the engine.
2. Crank the engine.
3. Check the spark condition with the timing light.

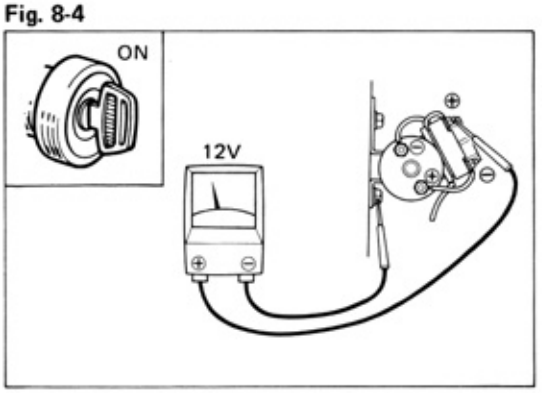
Fig. 8-3



Connector

Check the connector and wiring.

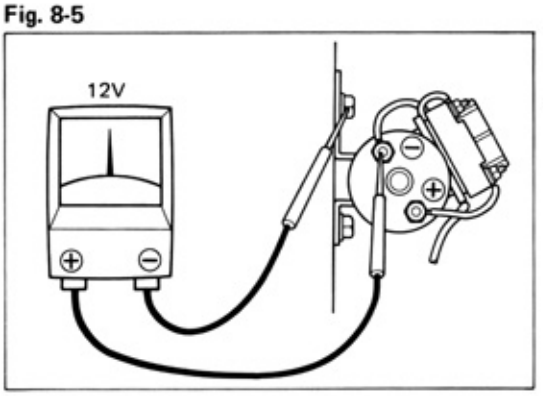
Fig. 8-4



Igniter

1. Turn on the ignition switch.
   (But do not start engine)
2. Disconnect the ignition coil cover.
3. Check the battery voltage.
   Using a voltmeter, connect the positive (+) probe to the resistor positive (+) terminal and negative (–) probe to the body ground.
   Voltage: Approx. 12V

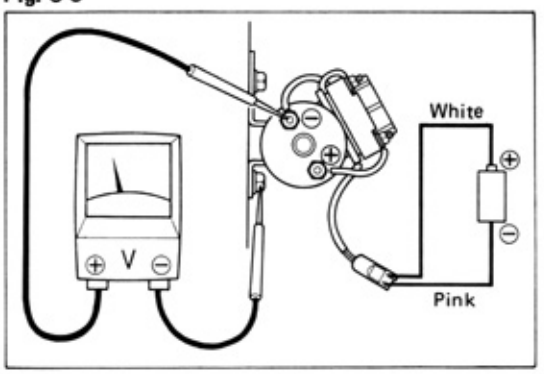
Fig. 8-5



4. Check the power transistor in igniter.
   (1) Using a voltmeter, connect the positive (+) probe to the ignition coil negative (–) terminal and negative (–) probe to the body ground (power transistor ON).
   Voltage: Less than 3V

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Fig. 8-6

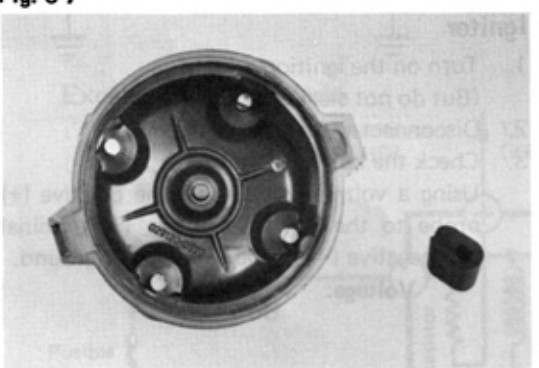


(2) Unplug wiring connector from distributor.
(3) Using a voltmeter, connect the positive (+) probe to the ignition coil negative (–) terminal and negative (–) probe to the body ground.
(4) Using a dry cell battery (1.5V), connect the positive (+) pole to the white wire terminal and negative (–) pole to the pink wire terminal (power transistor OFF).

– Caution –
To avoid destroying the power transistor in the igniter, do not apply voltage more than 5 seconds.

(5) Check the voltage reading.
Voltage: Approx. 12V

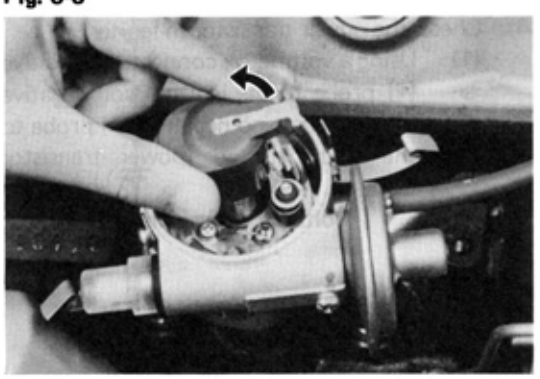
Fig. 8-7



Distributor

1. Distributor cap
Check for cracks, carbon tracks, burnt or corroded terminals, and check the center contact for wear.

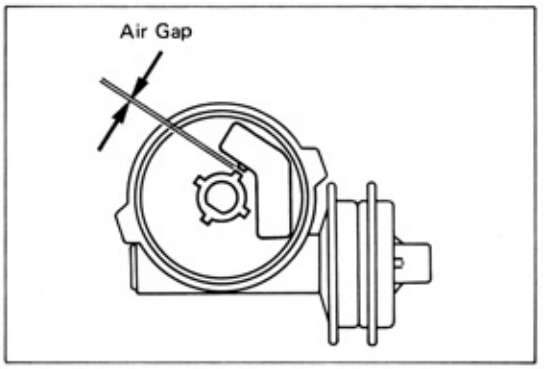
Fig. 8-8



2. Check the governor.
Turn the rotor counterclockwise and release it. The rotor should return smoothly to its original position.

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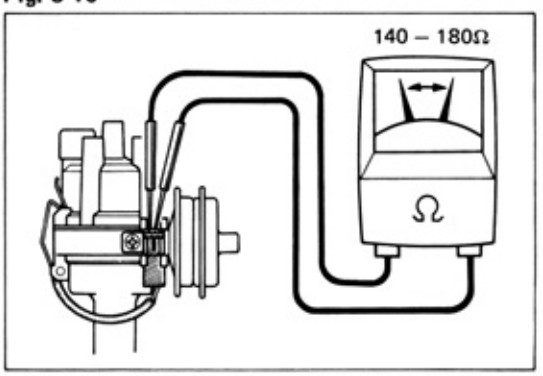
Fig. 8-9



USA & Canada

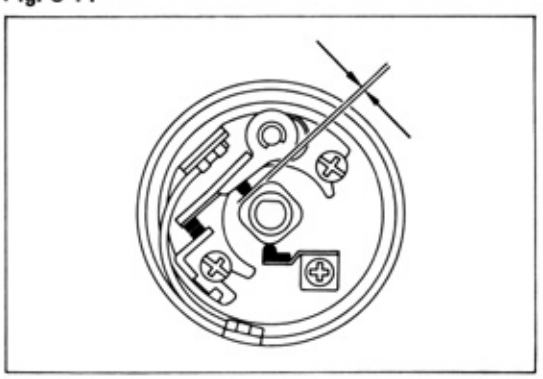
3. Check the air gap.
   Check the air gap between the timing rotor and pick up coil projection with a thickness gauge.
   Air gap: 0.2 – 0.4 mm (0.008 – 0.016 in.)

Fig. 8-10



4. Check the signal generator.
   Check the resistance of the signal generator with an ohmmeter.
   Resistance: 140 – 180 Ω

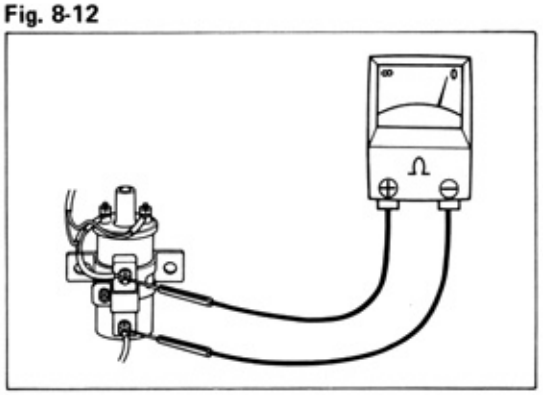
Fig. 8-11



Except USA & Canada

3. Check the rubbing block gap.
   Rubbing block gap: 0.45 mm (0.0177 in.)

Fig. 8-12



Resistor

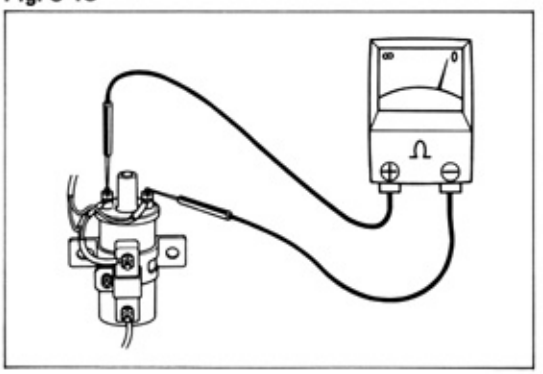
Check the resistor resistance with an ohmmeter.

Resistance:

with Igniter	**1.1 – 1.3 Ω**
without Igniter	**1.3 – 1.5 Ω**

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Fig. 8-13



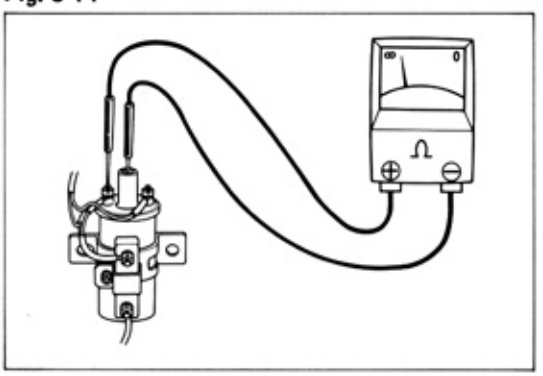
Ignition Coil

1. Check the ignition coil resistances with an ohmmeter.
   (1) Primary coil resistance: between Positive (+) and negative (–) terminals.

Resistance:

with Igniter	**1.3 – 1.7 Ω**
without Igniter	**1.2 – 1.5 Ω**

Fig. 8-14

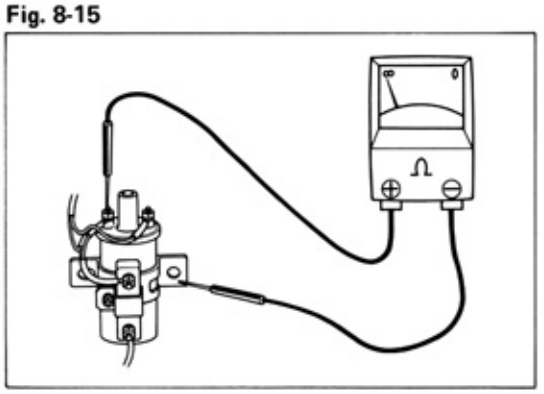


(2) Secondary coil resistance: between positive (+) terminal and high tension terminal.

Resistance:

with Igniter	**10 – 15 kΩ**
without Igniter	**8 – 12 kΩ**

Fig. 8-15



2. Check the insulation resistance between the positive (+) terminal and coil case with an ohmmeter.

Resistance: **Infinity**

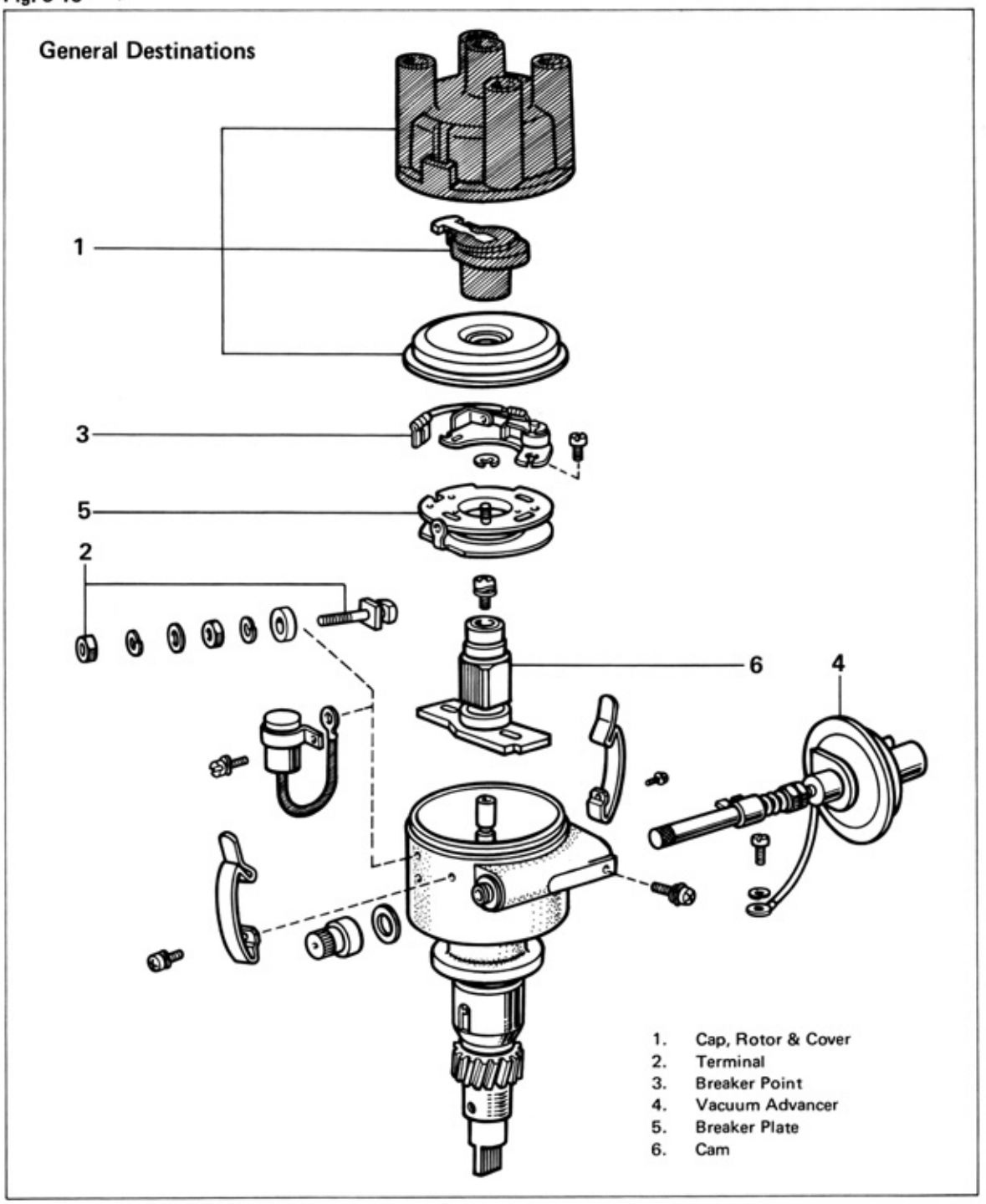
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DISTRIBUTOR

DISASSEMBLY

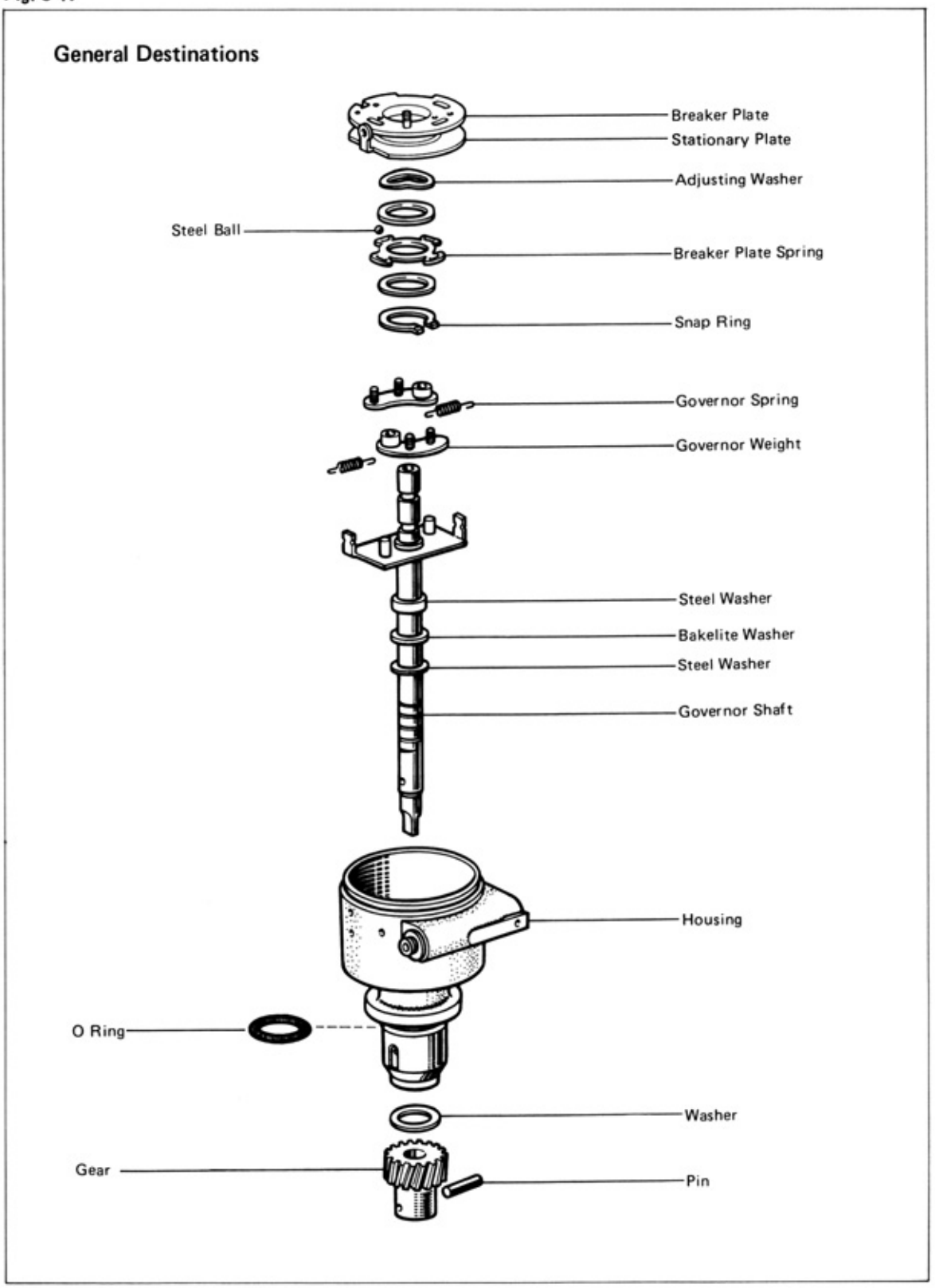
Disassemble the parts in the numerical order shown in the figure.

Fig. 8-16



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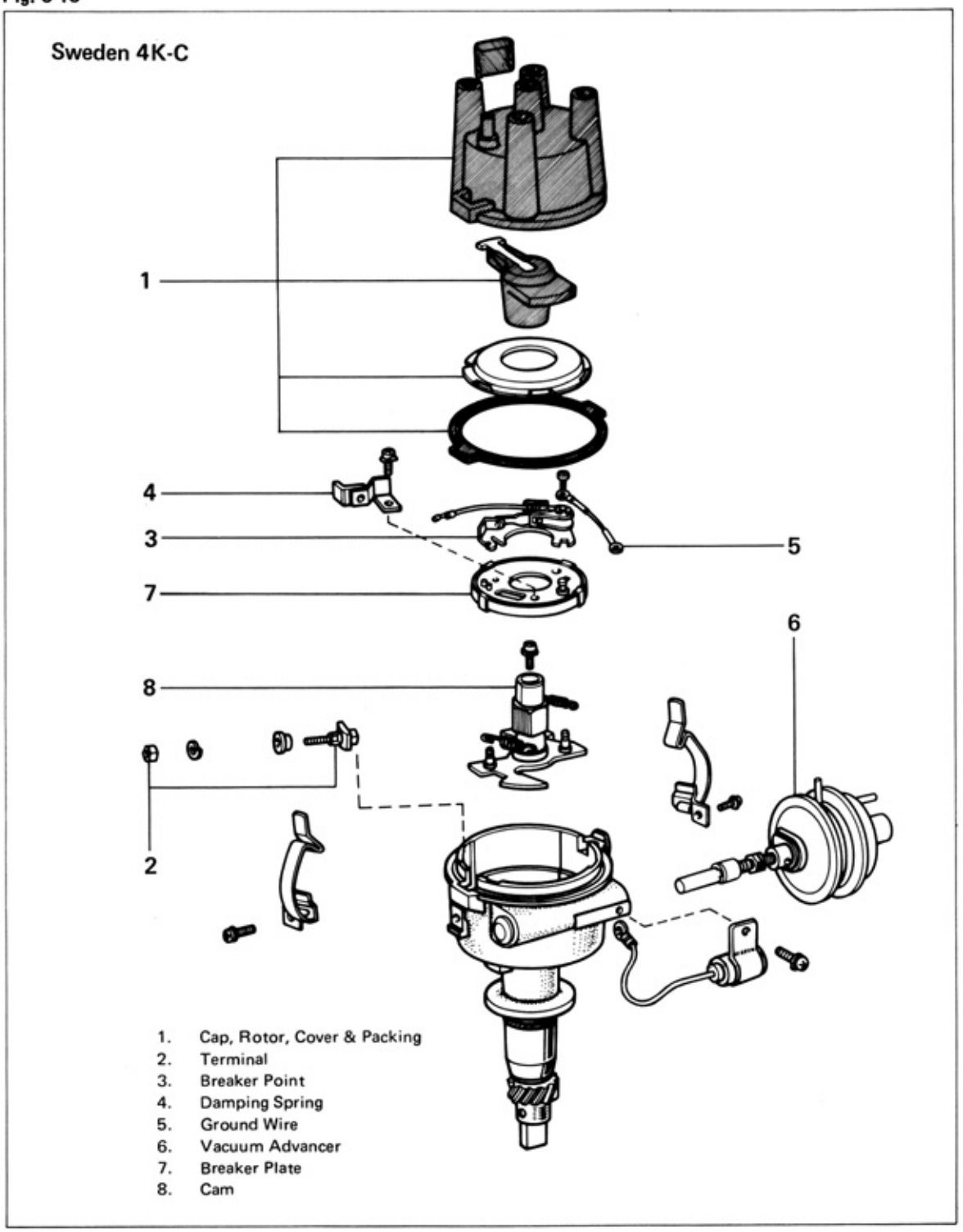
Fig. 8-17



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Disassemble the parts in the numerical order shown in the figure.

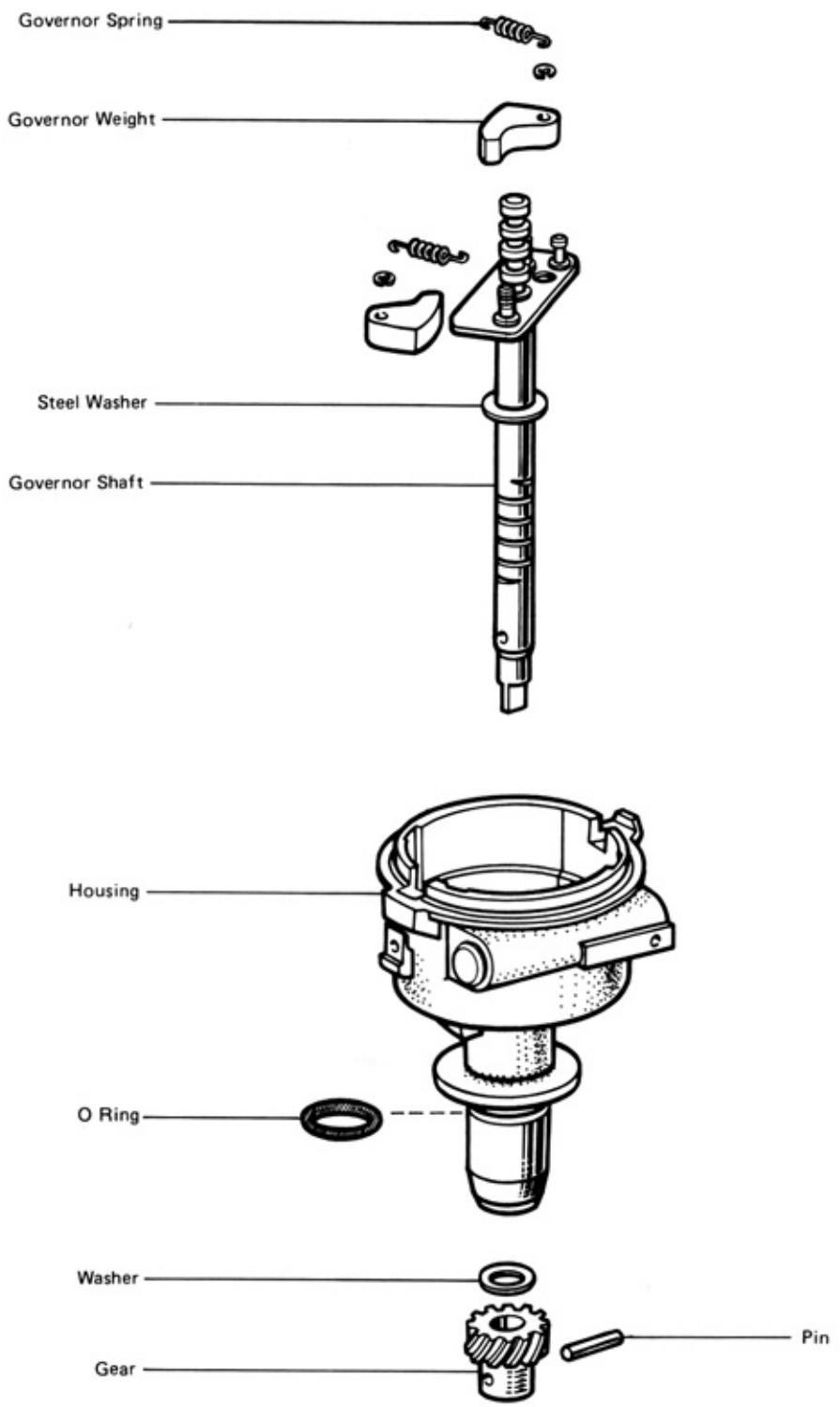
Fig. 8-18



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Fig. 8-19

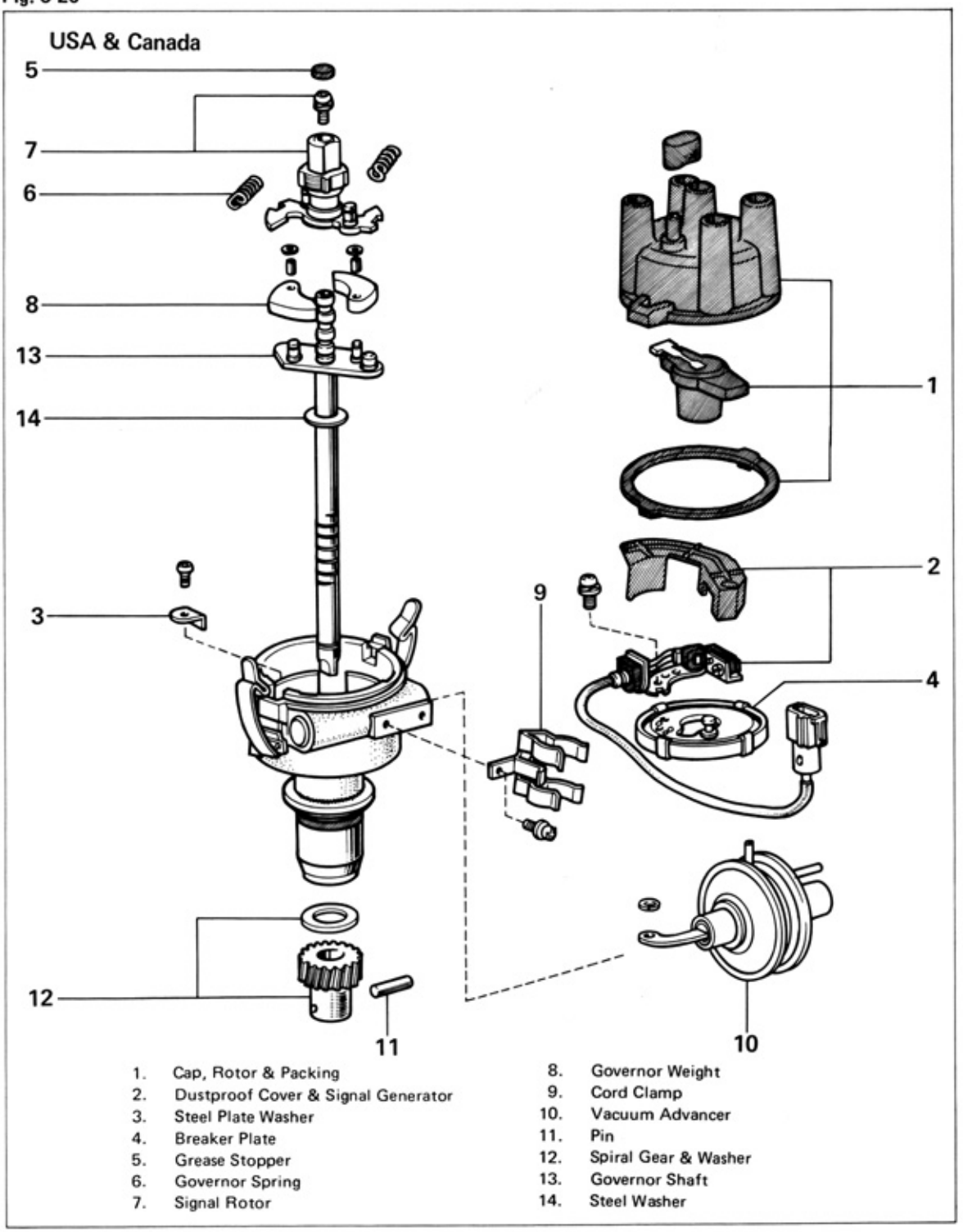
Sweden 4K-C



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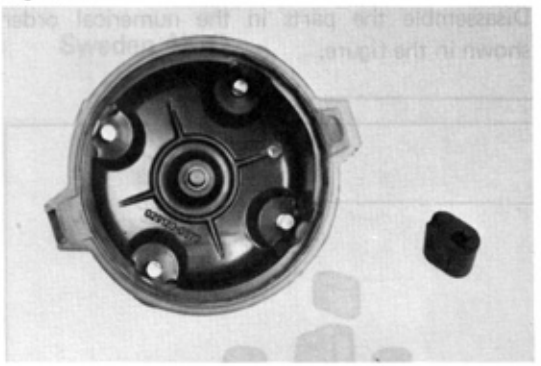
Disassemble the parts in the numerical order shown in the figure.

Fig. 8-20



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Fig. 8-21



INSPECTION & REPAIR

Cap

Inspect for cracks, carbon tracks, burnt or corroded terminals and check the center contact for wear.

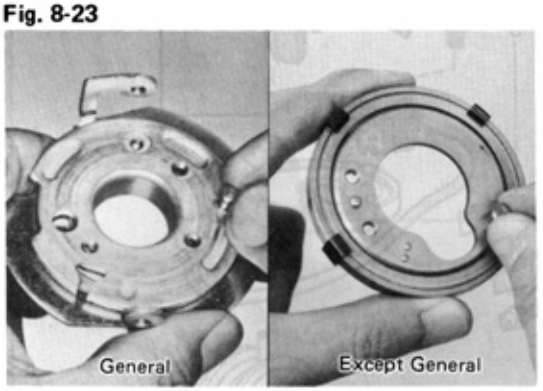
Fig. 8-22



Rotor

Inspect for cracks, carbon tracks, burnt or corroded terminals.

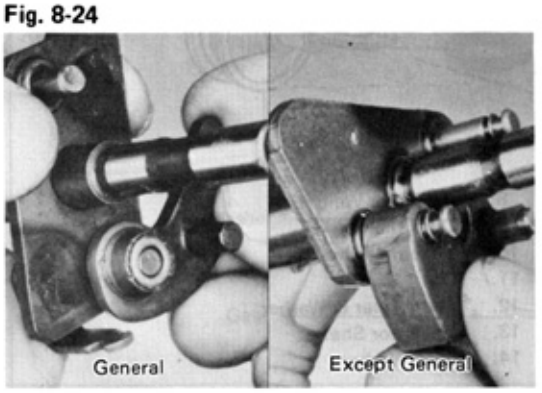
Fig. 8-23



Breaker Plate

Check the breaker plate for smooth rotation.

Fig. 8-24

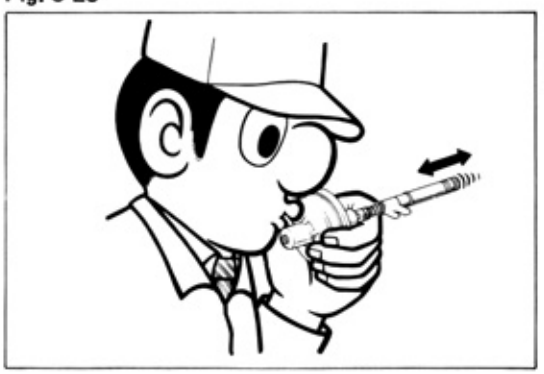


Governor Weight & Pin

Check the fitting portions of the governor weights with support pins for binding.

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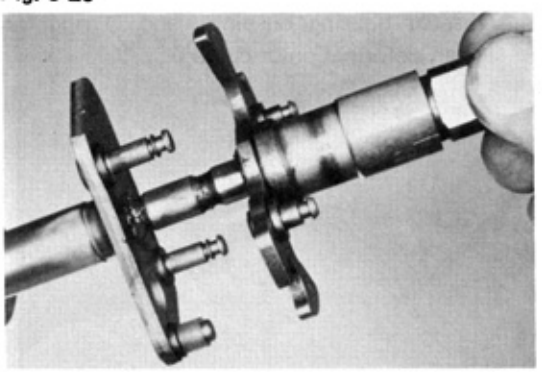
Fig. 8-25



Vacuum Advancer Diaphragm

The diaphragm should move when you inhale through the port.

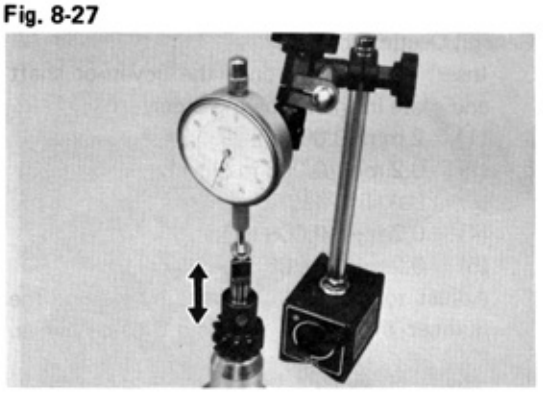
Fig. 8-26



Cam & Shaft

Inspect cam for wear, damage and fit between cam and shaft.

Fig. 8-27

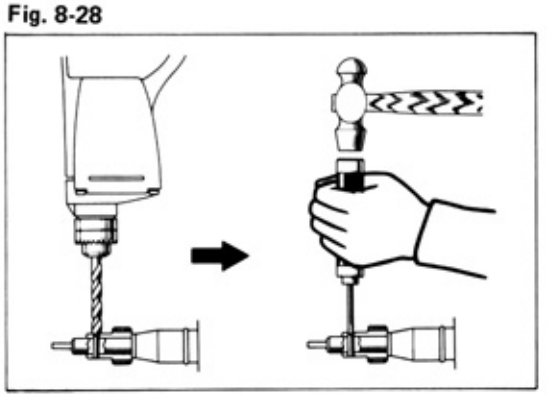


Governor Shaft & Housing

1. Check shaft thrust clearance.

Thrust clearance: 0.15 – 0.50 mm (0.006 – 0.020 in.)

Fig. 8-28



2. Remove gear and pin.
Grind off the pin end and remove the pin and gear.

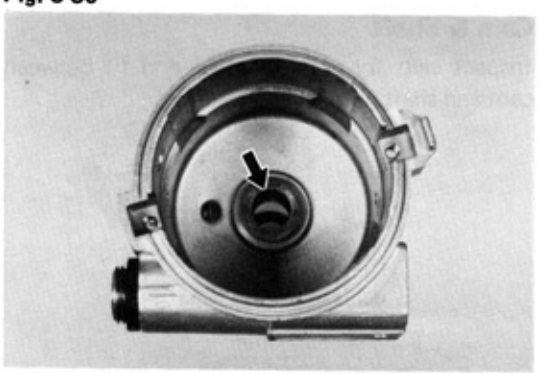
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Fig. 8-29



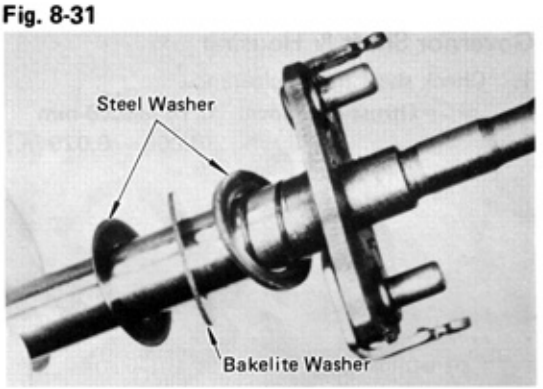
3. Inspect the governor shaft for wear or damage.

Fig. 8-30



4. Inspect housing bushings, and O ring for wear, deformation or damage.

Fig. 8-31

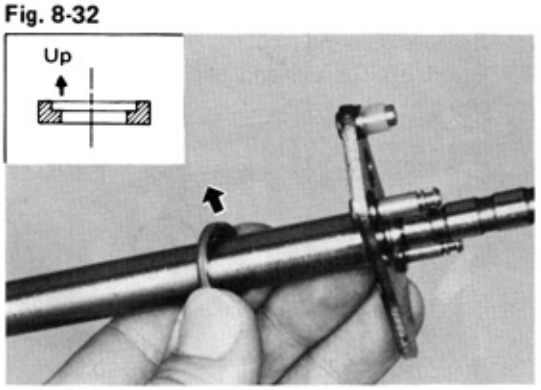


General Destinations

5. Insert the washers onto the governor shaft and plate in the following order.
   (1) 2 mm (0.08 in.)
   (2) 0.2 mm (0.008 in.)
   (3) Bakelite washer
   (4) 0.2 mm (0.008 in.)
   (5) 0.2 mm (0.008 in.)

   Adjust to standard clearance by varying the number of washers 2, 4 and 5 listed above.

Fig. 8-32



Except General Destinations

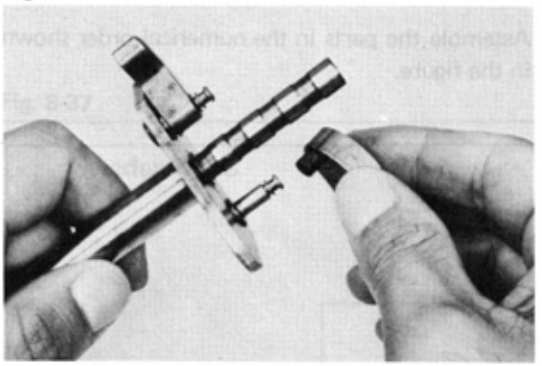
5-1 Assemble the washer as shown in the figure.

Washer (for adjustment)

Part No.	Thickness mm (in.)
90099-01385	2.5 (0.098)
90099-01386	2.7 (0.106)
90099-01387	2.9 (0.114)
90099-01412	2.3 (0.091)

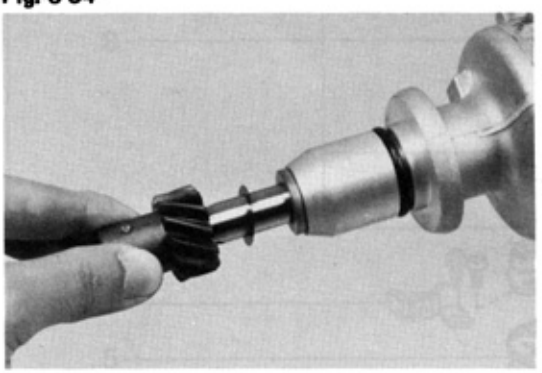
ProCarManuals.com

Fig. 8-33



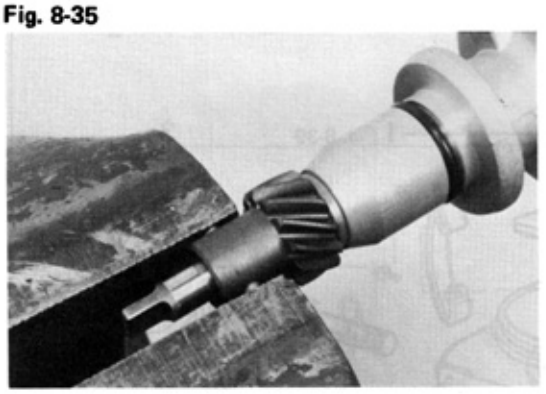
5-2 Assemble the bearing between the pin and weight.

Fig. 8-34



6. Assemble the washers and gear in order as shown in the figure and check the thrust clearance.

Fig. 8-35



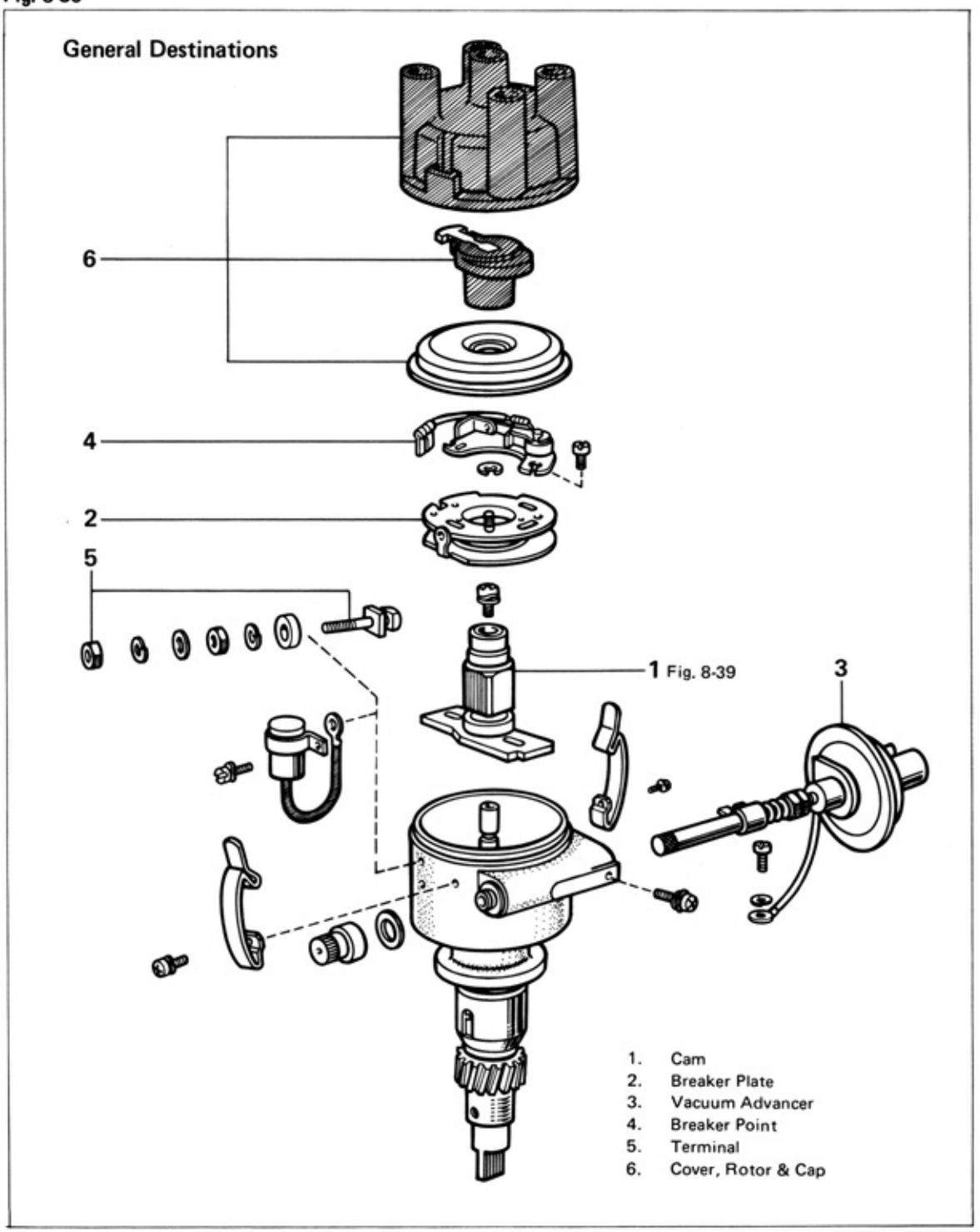
7. Peen both pin ends with a vise.

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ASSEMBLY

Assemble the parts in the numerical order shown in the figure.

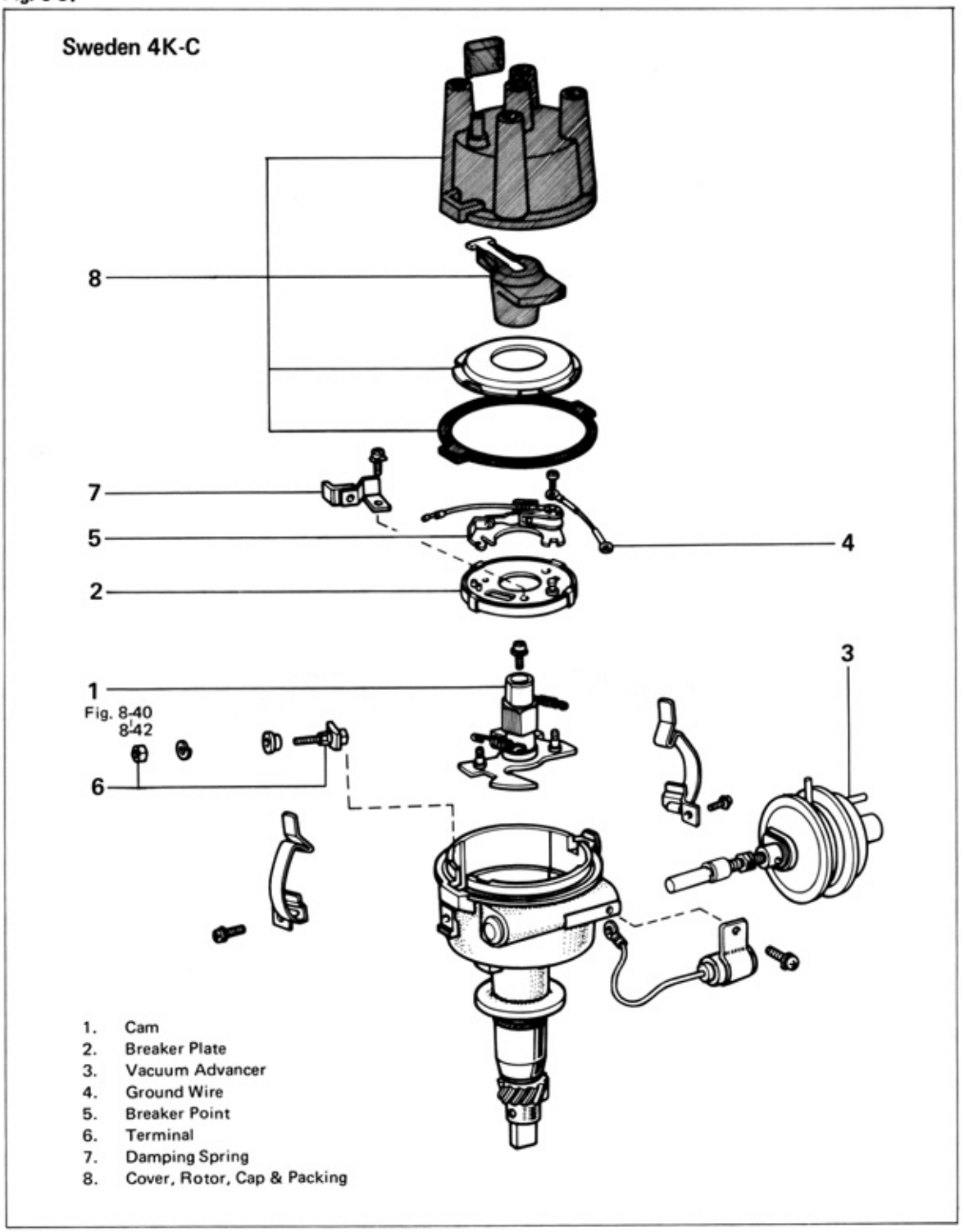
Fig. 8-36



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Assemble the parts in the numerical order shown in the figure.

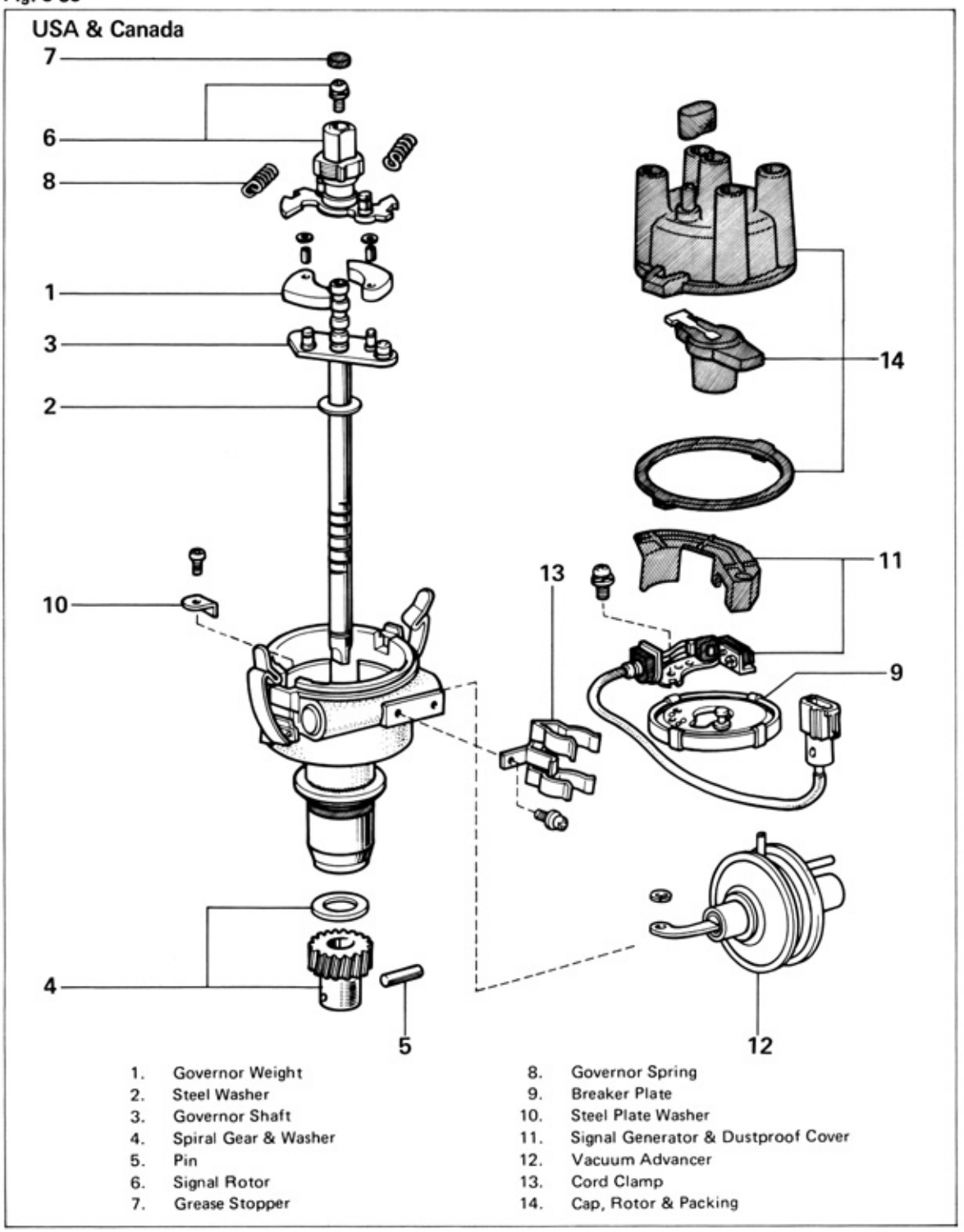
Fig. 8-37



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Assemble the parts in the numerical order shown in the figure.

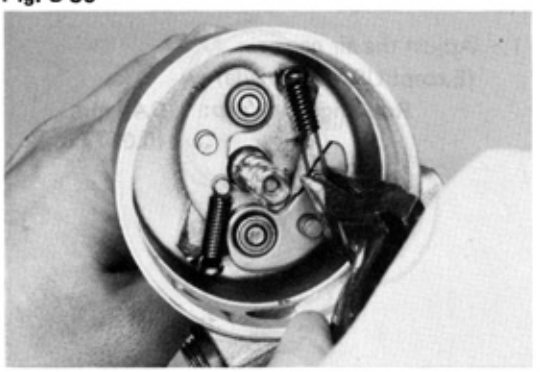
Fig. 8-38



1. Governor Weight
2. Steel Washer
3. Governor Shaft
4. Spiral Gear & Washer
5. Pin
6. Signal Rotor
7. Grease Stopper
8. Governor Spring
9. Breaker Plate
10. Steel Plate Washer
11. Signal Generator & Dustproof Cover
12. Vacuum Advancer
13. Cord Clamp
14. Cap, Rotor & Packing

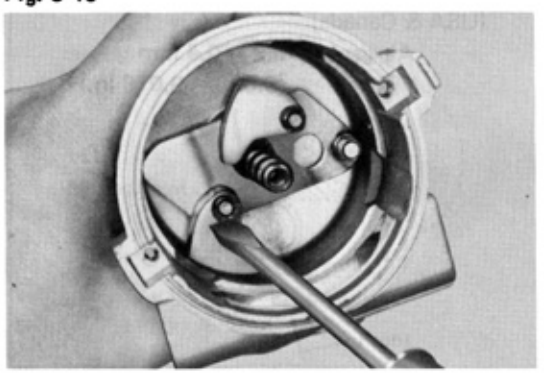
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Fig. 8-39



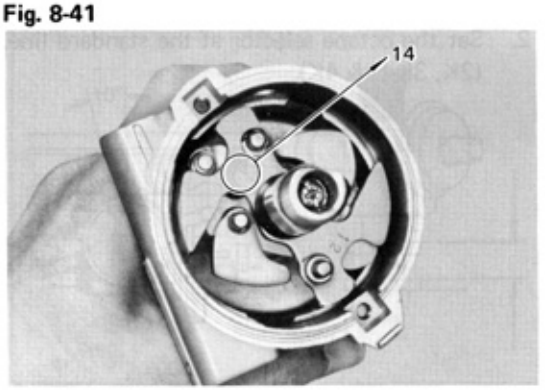
General Destinations
Install the governor springs in the direction shown in the figure.

Fig. 8-40



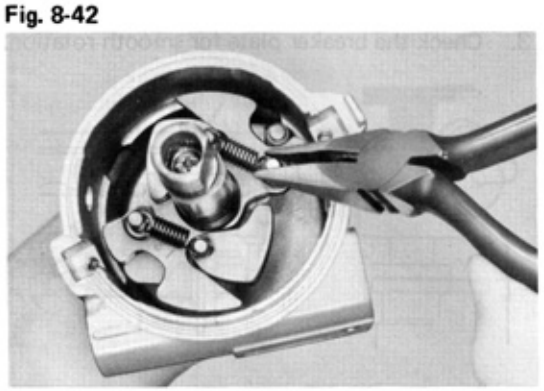
USA, Canada & Sweden
1. Insure installation of the E ring into the groove.

Fig. 8-41



2. Match the mark 14 with the stopper and install the cam.

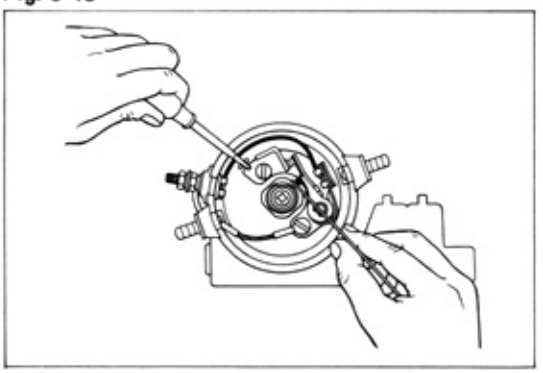
Fig. 8-42



3. Insure proper installation of the governor spring.

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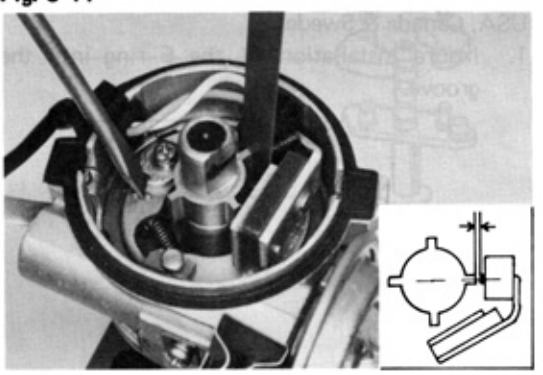
Fig. 8-43



ADJUSTMENT

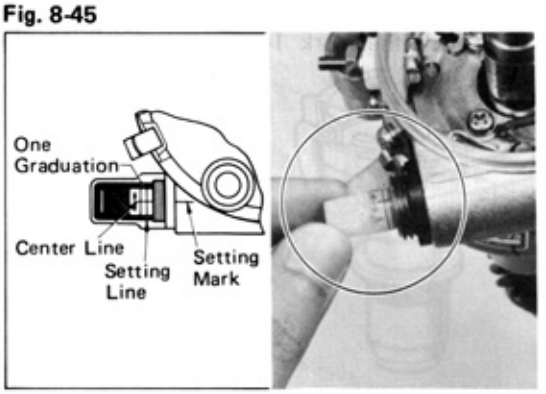
1. Adjust the air gap.
   (Except USA & Canada)
   Rubbing block gap: 0.45 mm (0.0177 in.)

Fig. 8-44



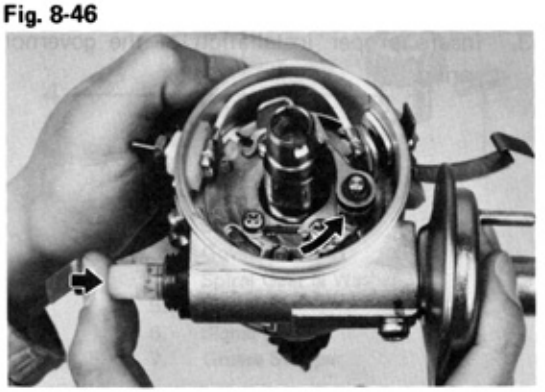
(USA & Canada)
Air gap: 0.2 – 0.4 mm (0.008 – 0.016 in.)

Fig. 8-45



2. Set the octane selector at the standard line. (2K, 3K-H & 4K)

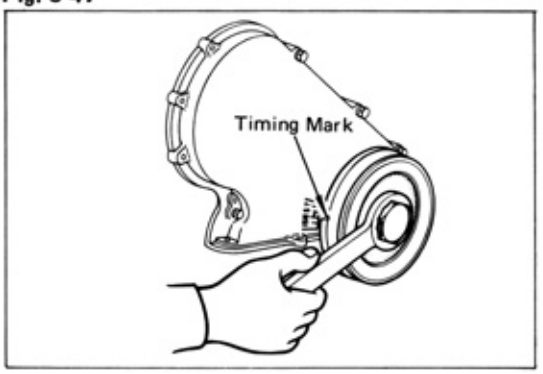
Fig. 8-46



3. Check the breaker plate for smooth rotation.

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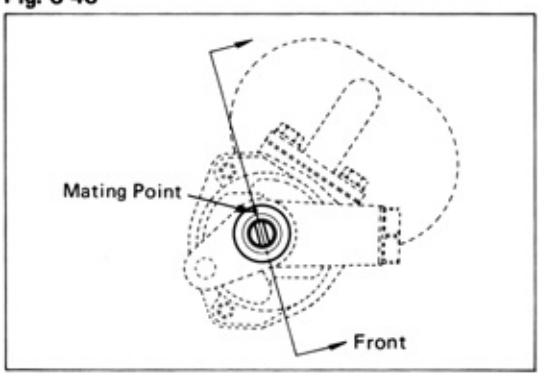
Fig. 8-47



INSTALLATION

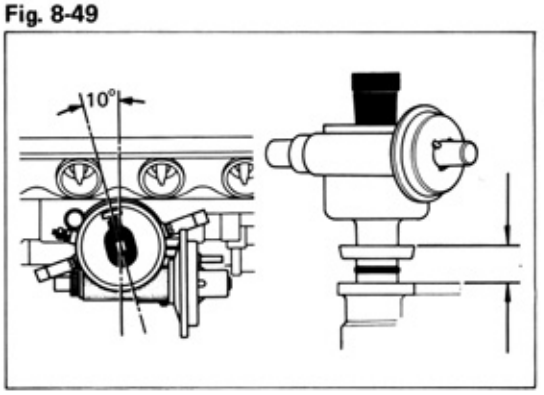
1. Set the crankshaft pulley to No. 1 cylinder ignition timing.
   Ignition timing (BTDC):
   8° at idle speed

Fig. 8-48



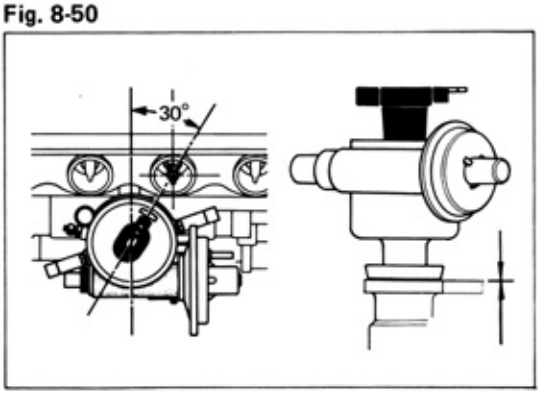
2. Align the center line of the slot at the top end of the oil pump shaft against the mark (oil hole) at the top side of the oil pump body.

Fig. 8-49



3. Position the distributor rotor toward the right side of No. 3 plug tube, and insert the distributor housing.

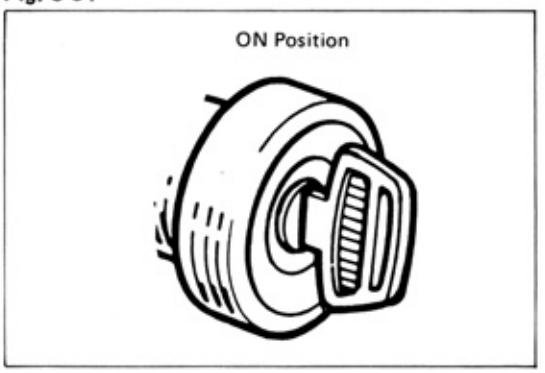
Fig. 8-50



4. When the housing is inserted, the rotor should be positioned near the center of No. 2 plug tube.

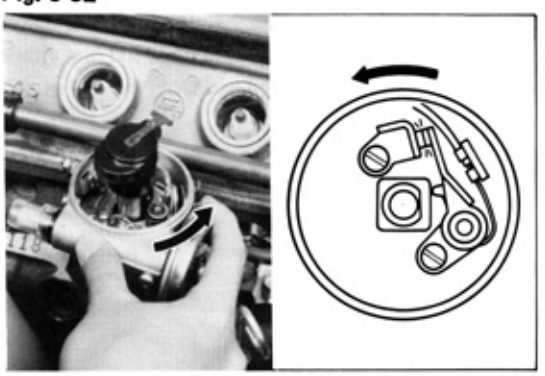
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Fig. 8-51



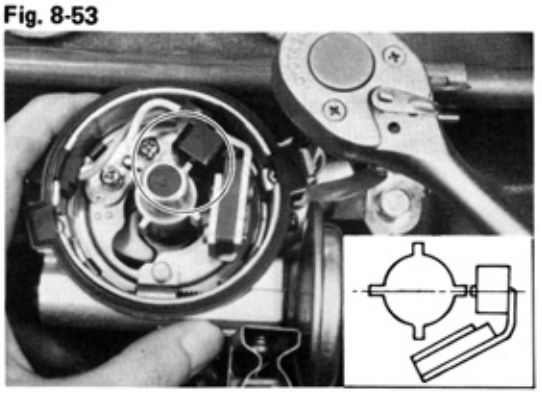
5. Turn ignition switch to the ON position. Do not turn the starter motor.

Fig. 8-52



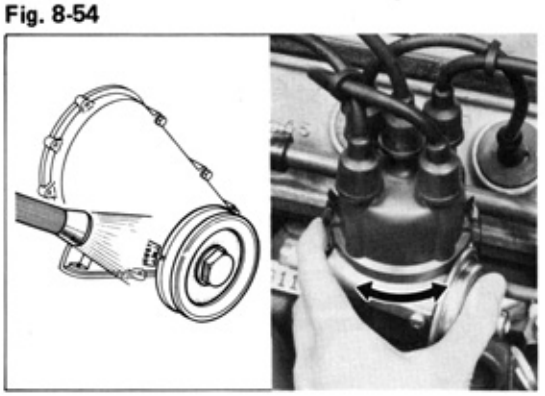
6. Rotate the distributor body counterclockwise until there is a spark between the points, and tighten the clamp bolt in that position. (Except USA & Canada)

Fig. 8-53



Adjust the housing by moving it so that the signal rotor will just begin to cut the lines of the flux, and then tighten the set bolt. (USA & Canada)

Fig. 8-54



7. Check ignition timing during idling.

Ignition timing (BTDC):
8° at idle speed

If necessary, align the timing marks by turning the distributor body.

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Fig. 8-55

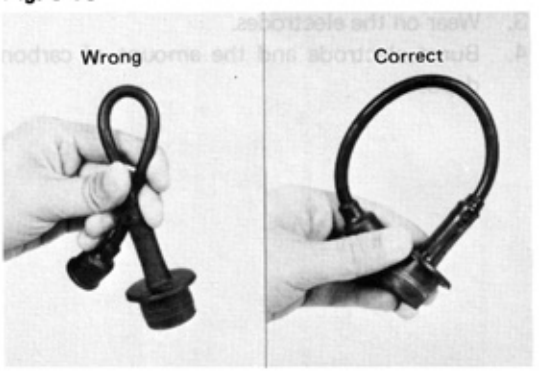


HIGH TENSION CORD

– Note –

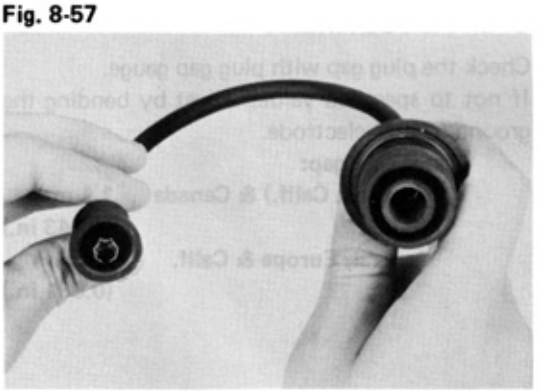
1. **Carefully remove the high tension cords by pulling on the rubber boots.**

Fig. 8-56



2. **Do not bend the cords as the conductors will break.**

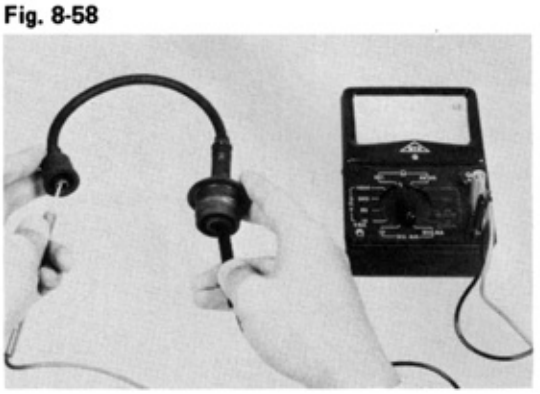
Fig. 8-57



INSPECTION

1. Check the condition of the cord terminals. If any terminal is corroded, clean it. If broken or distorted, replace the cord.

Fig. 8-58



2. Check the resistance of each cord between both ends. If the reading exceeds the limit, replace the cord.

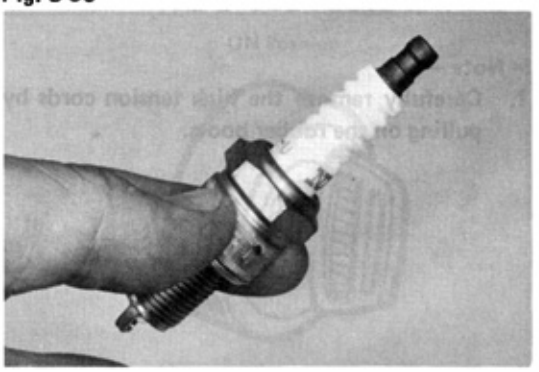
   Resistance: Less than 25 kΩ/cord

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SPARK PLUGS

INSPECTION

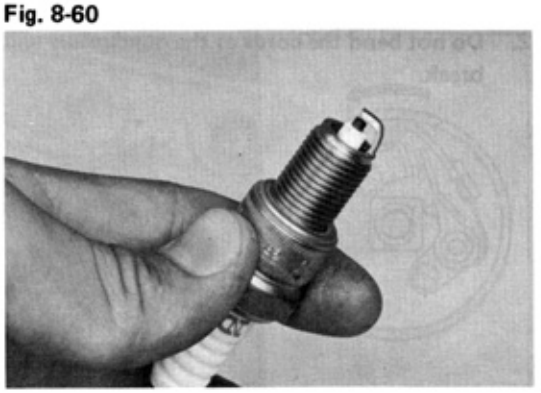
Fig. 8-59



Inspect for the following. Clean or replace the plugs if necessary.

1. Cracks or damages in the threads or insulator.
2. Damaged or deteriorated gaskets.

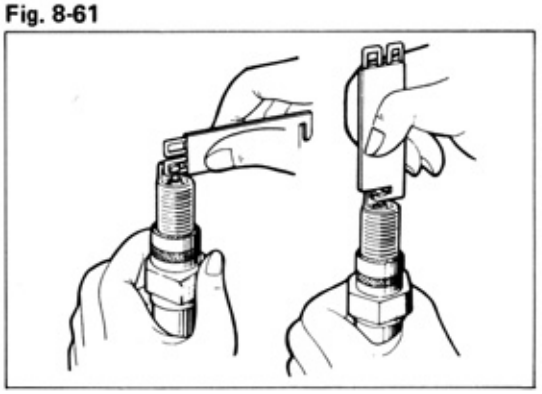
Fig. 8-60



3. Wear on the electrodes.
4. Burnt electrode and the amount of carbon deposit.

GAP ADJUSTMENT

Fig. 8-61



Check the plug gap with plug gap gauge.
If not to specified value, adjust by bending the ground (outer) electrode.

Spark plug gap:

USA (ex. Calif.) & Canada	**1.1 mm (0.043 in.)**
General, Europe & Calif.	**0.8 mm (0.031 in.)**

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MEMO

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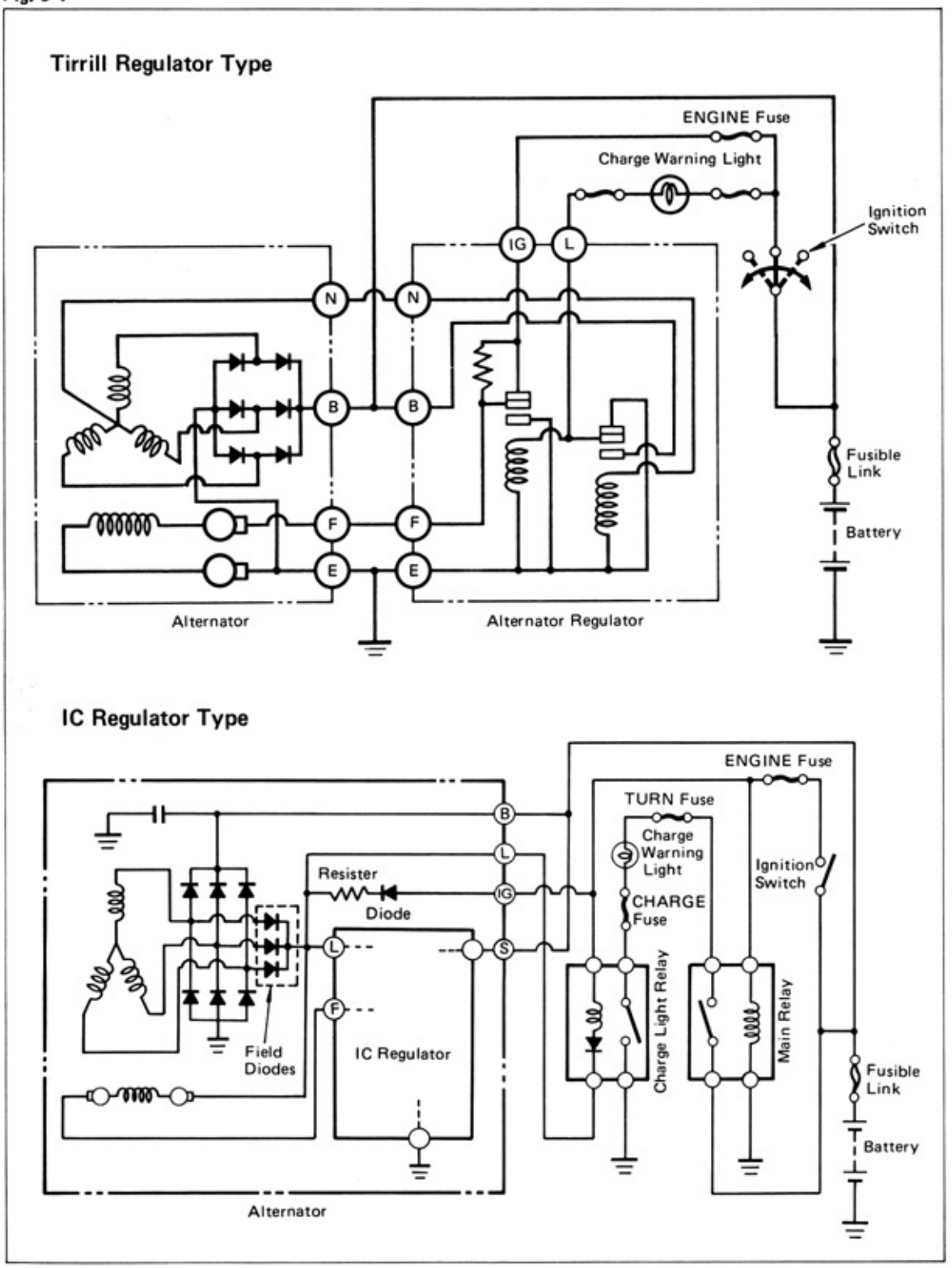
CHARGING SYSTEM

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CHARGING SYSTEM CIRCUIT	9-2
ON-VEHICLE INSPECTION	9-3
ALTERNATOR	9-7
ALTERNATOR REGULATOR	9-21

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CHARGING SYSTEM CIRCUIT

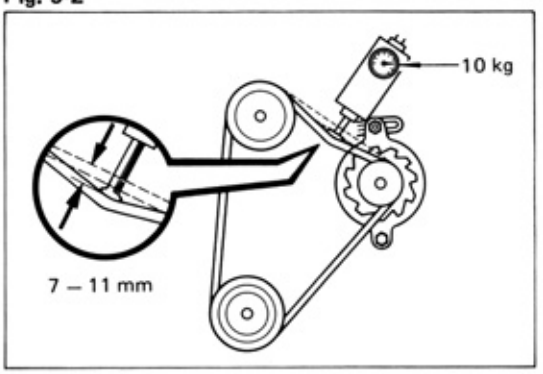
Fig. 9-1



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ON-VEHICLE INSPECTION

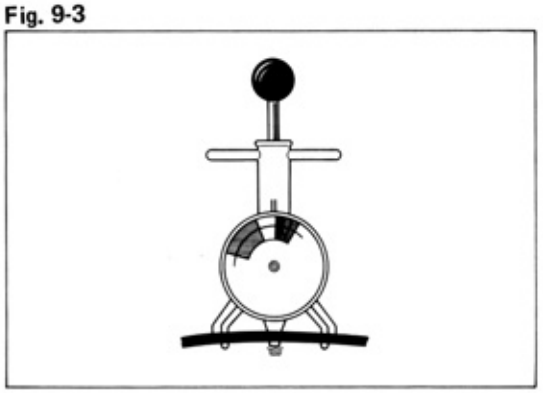
Fig. 9-2



Check the following system components:

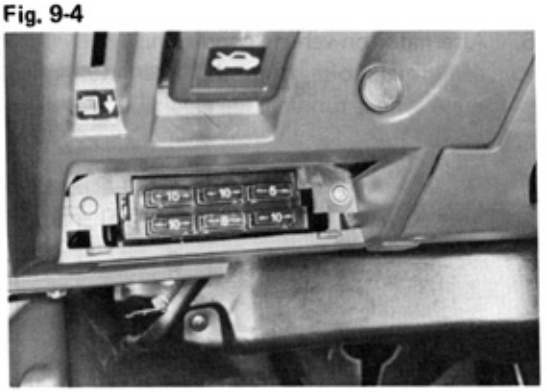
1. Drive belt deflection
   (Except USA & Canada)
   Drive belt deflection:
   7 – 11 mm at 10 kg
   (0.28 – 0.43 in.) (22 lb)

Fig. 9-3



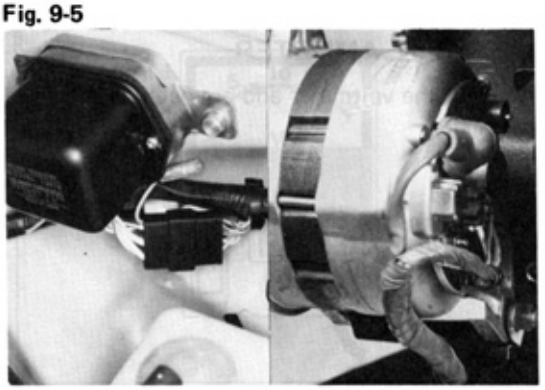
(USA & Canada)
Using a borroughs tension gauge, BT-33-73F
Driven belt deflection: 80 ± 20 lbs.

Fig. 9-4



2. Fuses

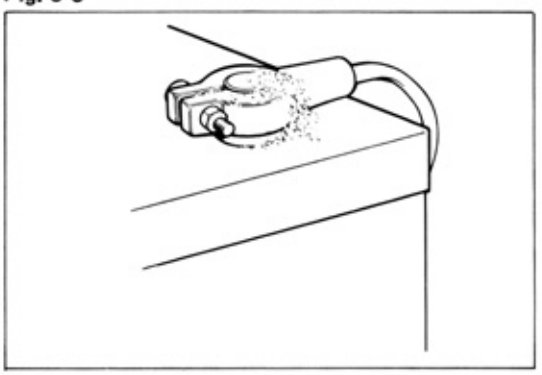
Fig. 9-5



3. Installation of the alternator and regulator wiring.

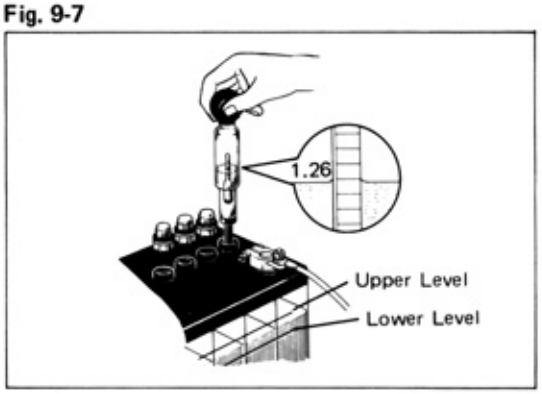
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Fig. 9-6



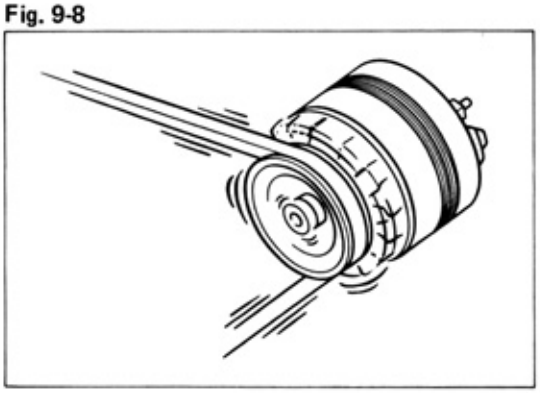
4. Battery terminal and fusible link.
   Loose
   Corrosion
   Burnt

Fig. 9-7



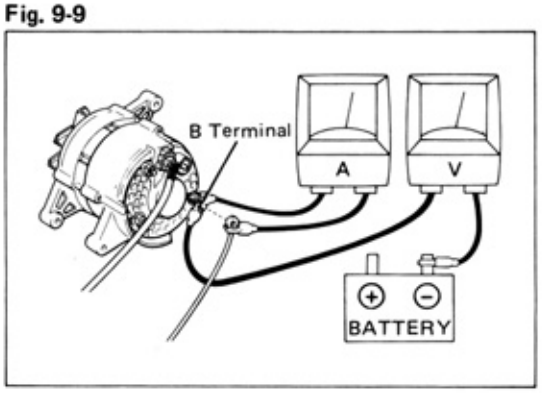
5. Specific gravity: 1.25 – 1.27 at 20°C (68°F)

Fig. 9-8



6. Alternator on-vehicle condition.
   Abnormal noise from the alternator when the engine is running.

Fig. 9-9



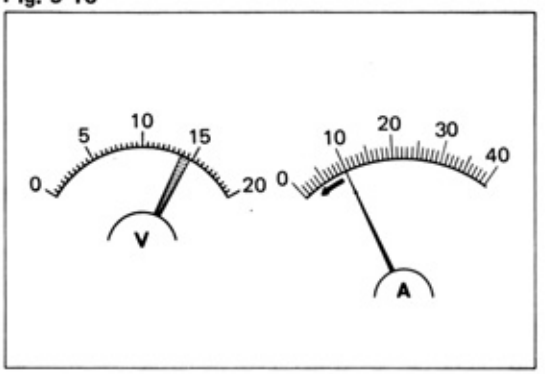
PERFORMANCE TEST USING VOLTMETER & AMMETER

Connect the voltmeter and ammeter as shown in the figure.

– Note –
Be careful not to cause a short.

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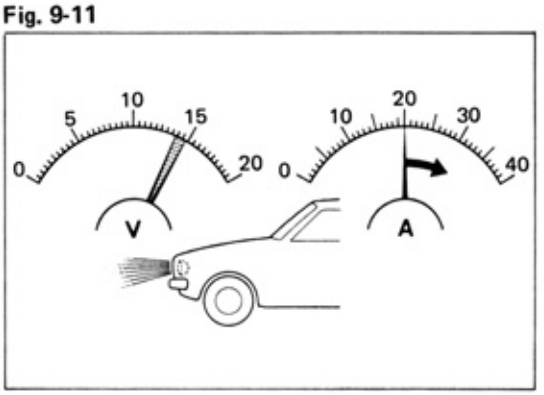
Fig. 9-10



No-load Performance Test

Regulated voltage: **13.8 – 14.8 V**
Current: **Less than 10 A**
Engine speed: **Idling to 2,000 rpm**

Fig. 9-11

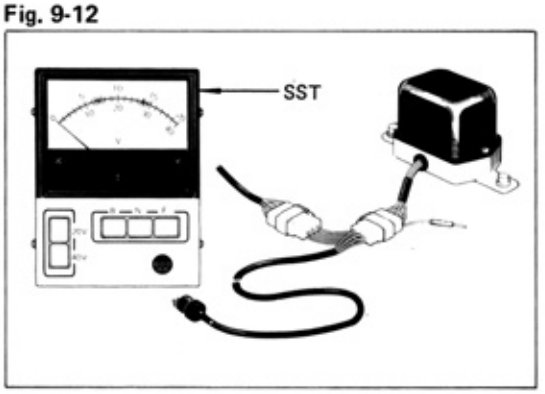


Load Performance Test

1. Run the engine at 2,000 rpm.
2. Turn on the headlights and all accessories.

Regulated voltage:
13.8 – 14.8 V
Current: **More than 20 A**

Fig. 9-12

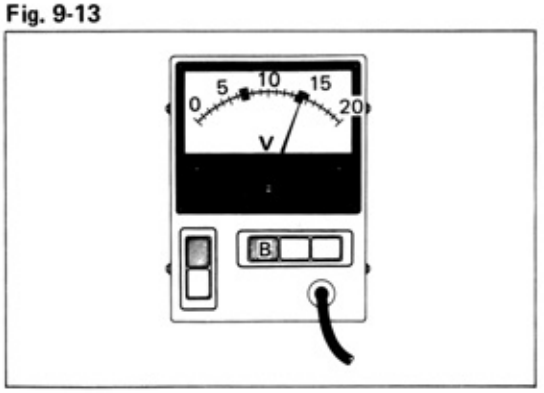


PERFORMANCE TEST BY ALTERNATOR CHECKER

Disconnect the alternator regulator connector and connect SST.
SST [09081-00011]

Push 20 V switch.

Fig. 9-13



1. Check voltage at terminal B.

Push B switch.

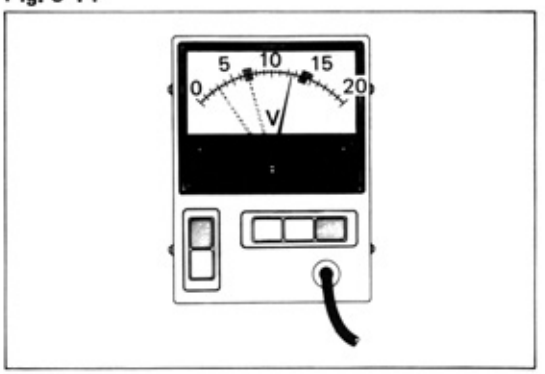
Raise engine speed from idling to 2,300 rpm.

Voltage:
STD **13.8 – 14.8 V**

If not within standard, probable cause is the alternator regulator.

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Fig. 9-14



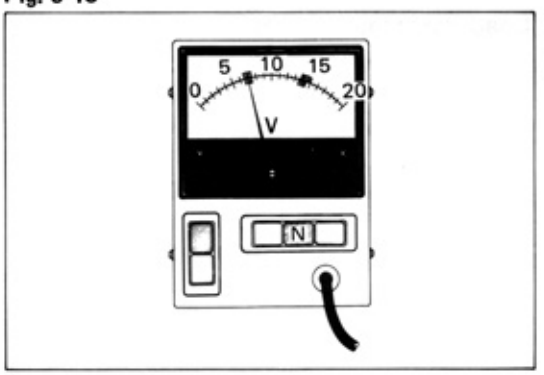
2. Check voltage at terminal F.

Push F switch.

Raise engine speed from idling to 2,000 rpm. The checker reading should gradually decrease from 12 to 3 volts.

If decrease is not registered, probable cause is alternator regulator.

Fig. 9-15



3. Check voltage at terminal N.

Push N switch.

Maintain engine speed at approximately 1,500 rpm. The pointer should be at a half of terminal B voltage.

Voltage:

STD 6.9 – 7.4 V

If the voltage is higher, the cause is the positive (+) rectifier.

If the voltage is lower, the cause is the negative (–) rectifier.

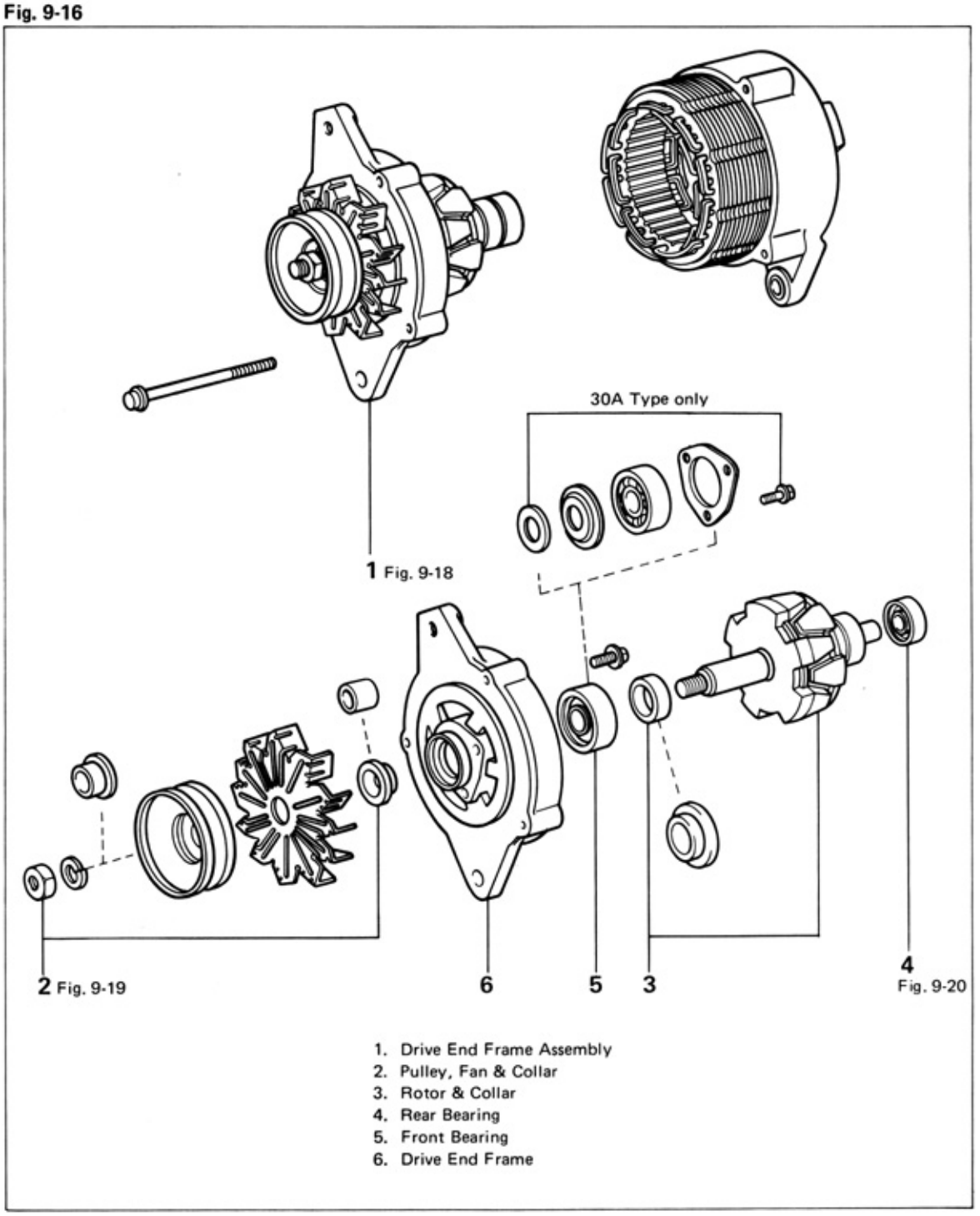
ProCarManuals.com

ALTERNATOR

DISASSEMBLY

1. Disassemble the parts in the numerical order shown in the figure.

Fig. 9-16

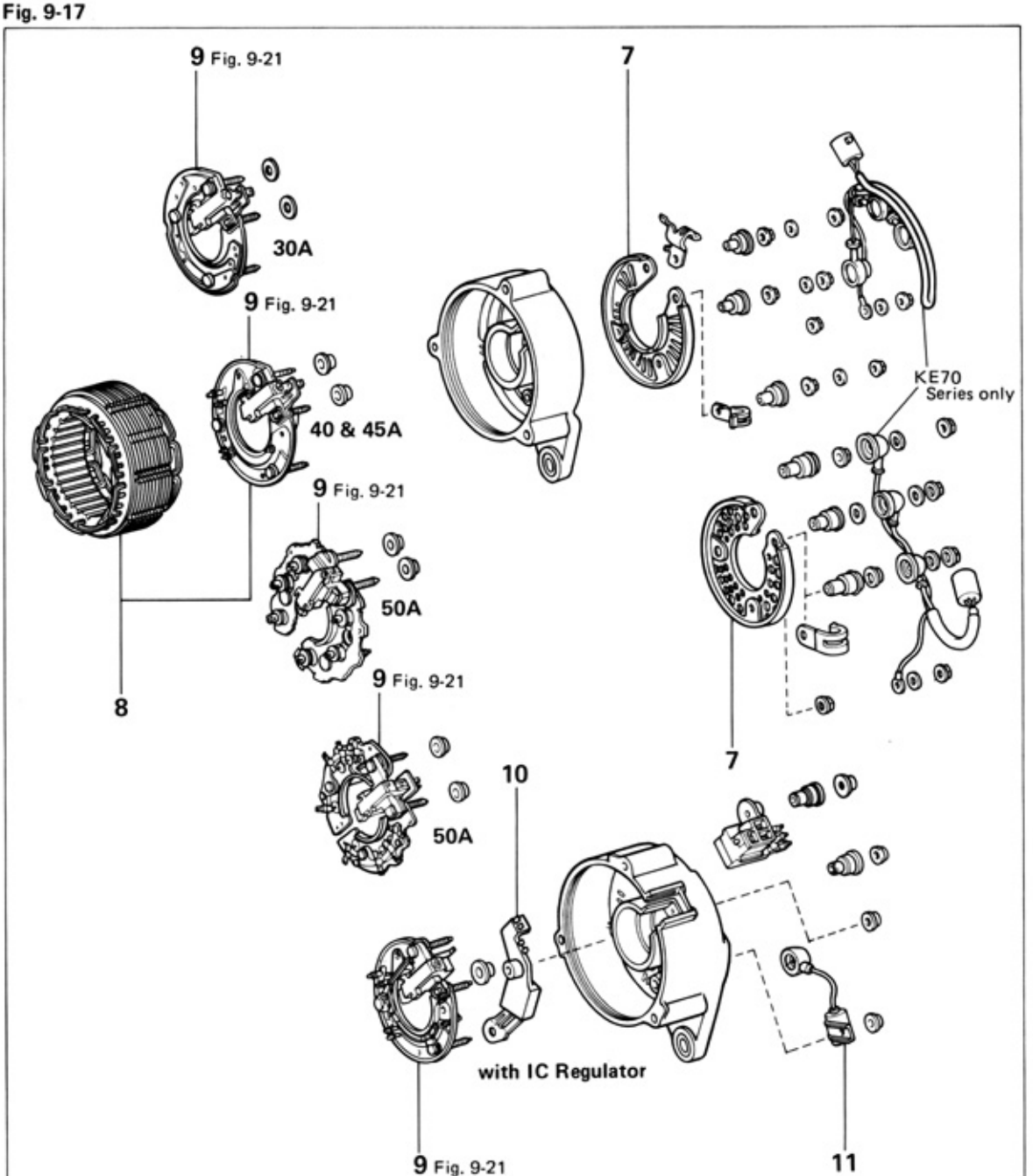


1. Drive End Frame Assembly
2. Pulley, Fan & Collar
3. Rotor & Collar
4. Rear Bearing
5. Front Bearing
6. Drive End Frame

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2. Disassemble the parts in the numerical order shown in the figure.

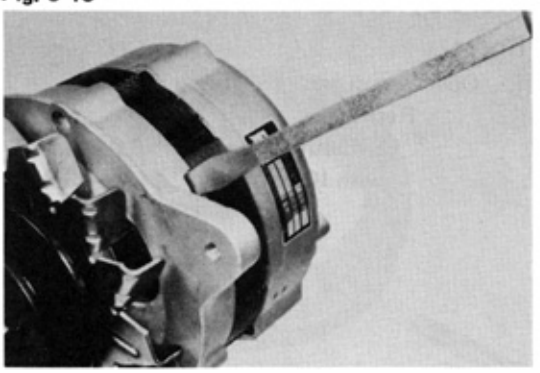
Fig. 9-17



7. Rear End Cover & Insulator
8. Startor Coil, Rectifier Holder & Insulator
9. Brush Holder & Rectifier Holder
10. IC Regulator
11. Condenser

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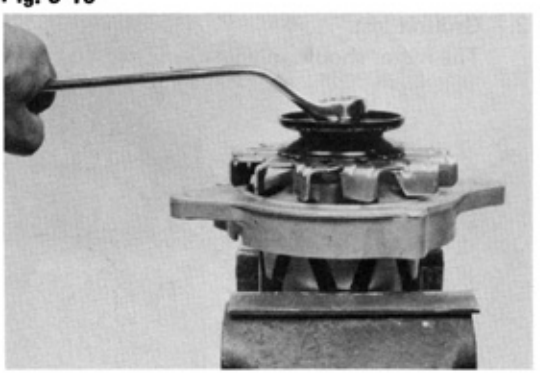
Fig. 9-18



Pry the drive end frame from the stator and tap it off.

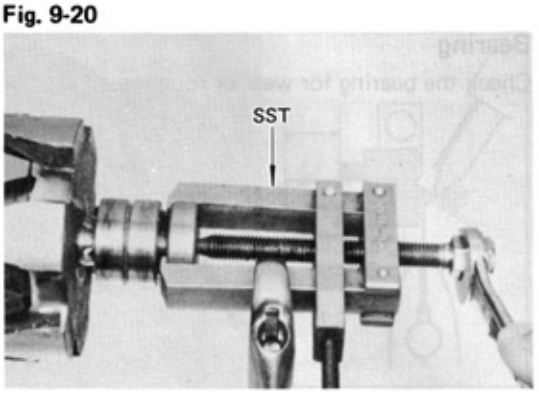
– Note –
Be carefull not to pry on the stator coil.

Fig. 9-19



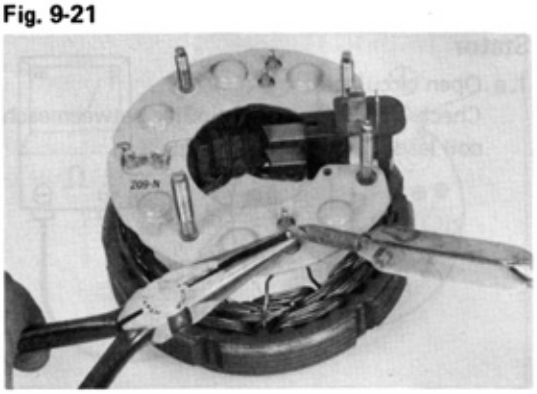
Remove the pulley nut.

Fig. 9-20



Remove the bearing with SST.
SST [09286-46011]

Fig. 9-21

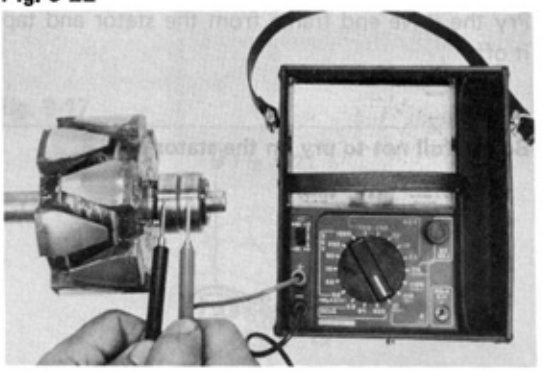


Unsolder each stator lead to the rectifier.

– Caution –
Protect the rectifier from heat.

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Fig. 9-22



INSPECTION & REPAIR

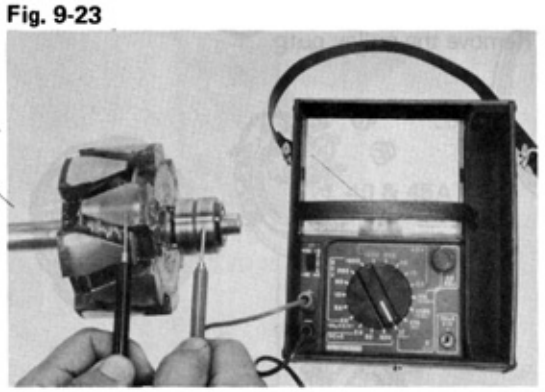
Rotor

1. Open circuit test

Resistance:

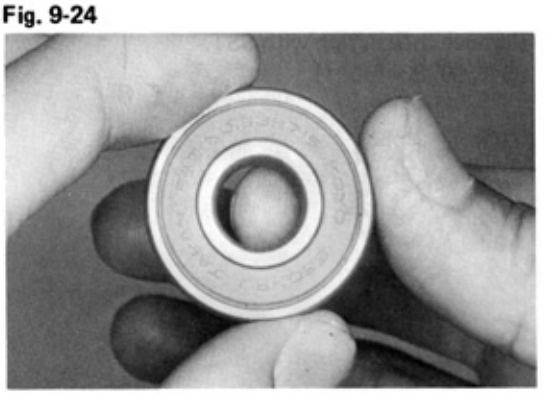
without IC regulator	**3.9 – 4.1 Ω**
with IC regulator	**2.8 – 3.0 Ω**

Fig. 9-23



2. Ground test
The meter should indicate infinity.

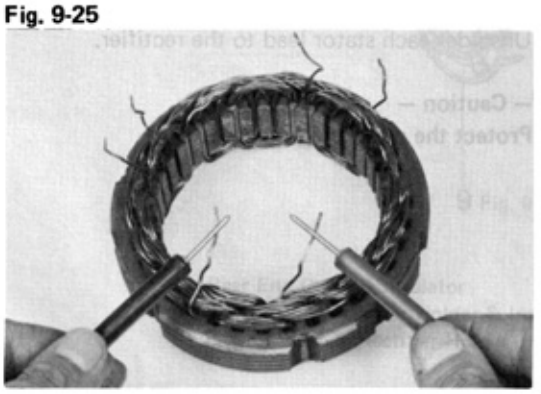
Fig. 9-24



Bearing

Check the bearing for wear or roughness.

Fig. 9-25

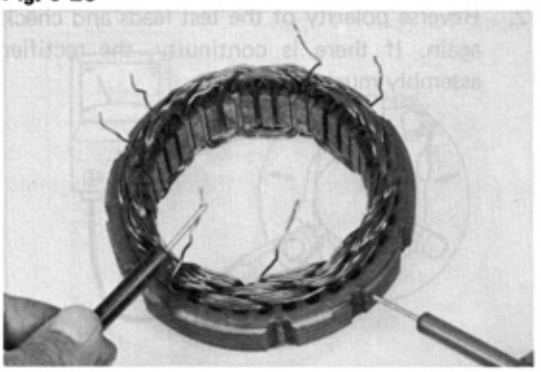


Stator

1. Open circuit test
Check that there is continuity between each coil lead.

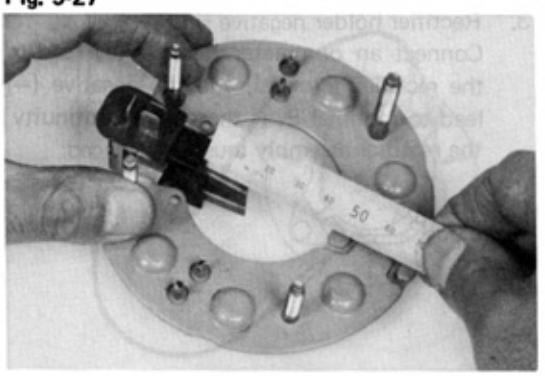
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Fig. 9-26



2. Ground test
Check that there is no continuity between each coil lead and stator core.

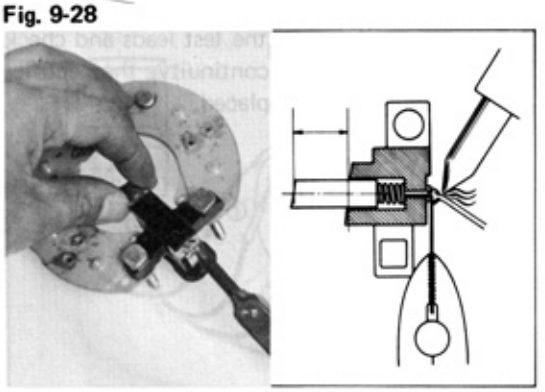
Fig. 9-27



Brush & Brush Holder

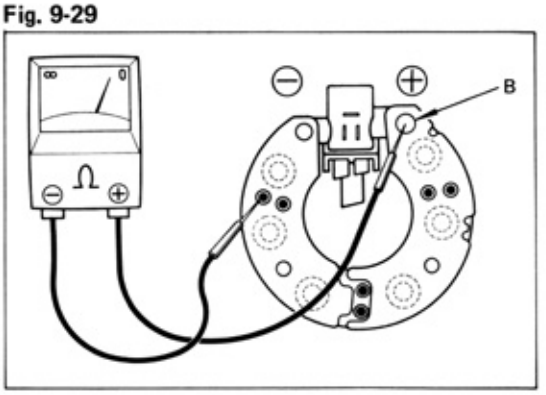
1. Measure the exposed brush length.
Exposed length:
Minimum 5.5 mm (0.217 in.)

Fig. 9-28



2. Replace the brush.
(1) Unsolder and remove the brush and the spring.
(2) Install and solder the spring and the brush.
Exposed length: 12.5 mm (0.492 in.)

Fig. 9-29

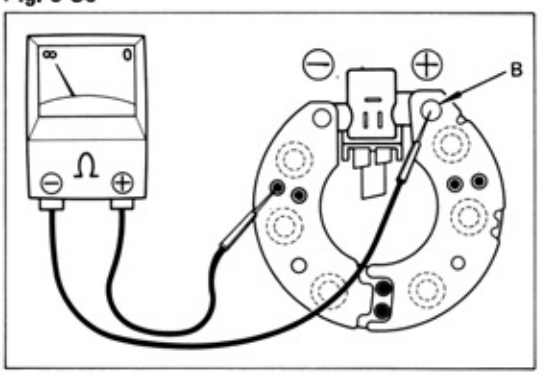


Rectifier (30, 40 & 45A Type)

1. Rectifier holder positive side
Connect an ohmmeter positive (+) lead to terminal B, and the negative (–) lead to the rectifier terminal. If there is no continuity, the rectifier assembly must be replaced.

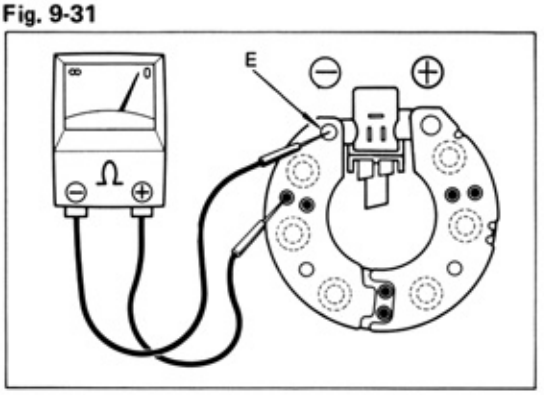
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Fig. 9-30



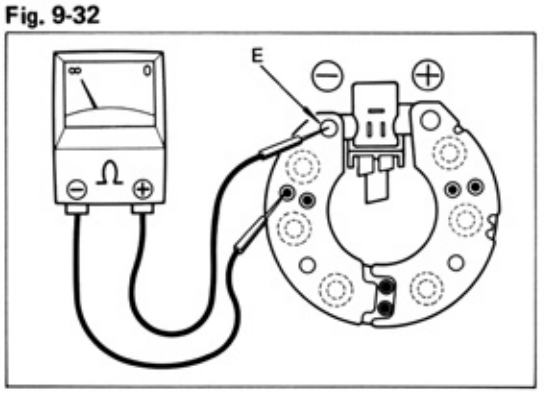
2. Reverse polarity of the test leads and check again. If there is continuity, the rectifier assembly must be replaced.

Fig. 9-31



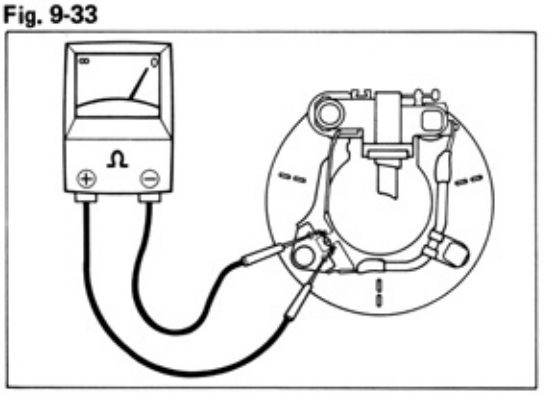
3. Rectifier holder negative side
Connect an ohmmeter positive (+) lead to the rectifier terminal, and the negative (–) lead to terminal E. If there is no continuity, the rectifier assembly must be replaced.

Fig. 9-32



4. Reverse polarity of the test leads and check again. If there is continuity, the rectifier assembly must be replaced.

Fig. 9-33

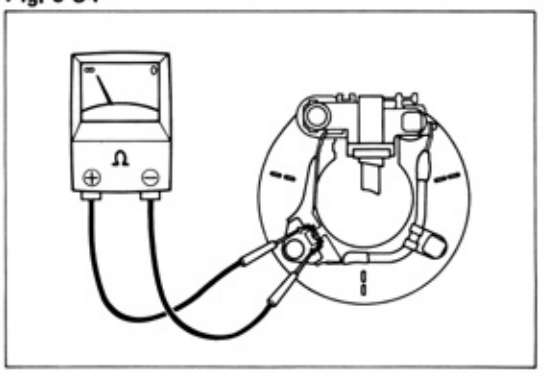


Diode (with IC Regulator)

1. Connect an ohmmeter positive (+) lead to the resistor side, and the negative (–) lead of the meter to the diode other side. If there is no continuity, the rectifier assembly must be replaced.

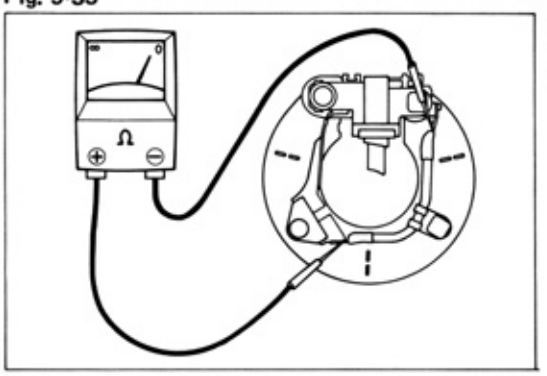
ProCarManuals.com

Fig. 9-34



2. Reverse polarity of test leads and check again. If there is continuity, the rectifier assembly must be replaced.

Fig. 9-35

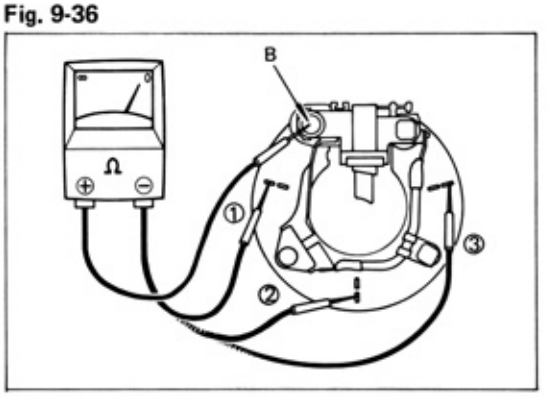


Resistor (with IC Regulator)

Check the resistor wire resistance using an ohmmeter. If there is no continuity, rectifier assembly must be replaced.

Resistance: 1.0 – 2.0 Ω

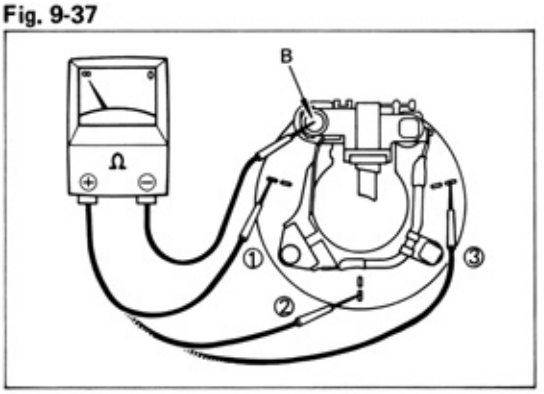
Fig. 9-36



Field Diodes (with IC Regulator)

1. Connect an ohmmeter positive (+) lead to terminal B, and the negative (–) lead of the meter to the rectifier terminal. If there is no continuity, the rectifier assembly must be replaced.

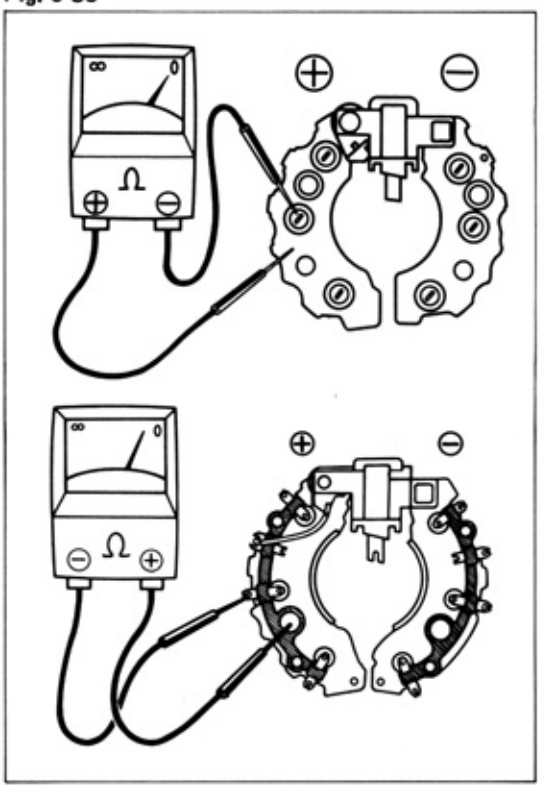
Fig. 9-37



2. Reverse polarity of test leads and check again. If there is continuity, the rectifier assembly must be replaced.

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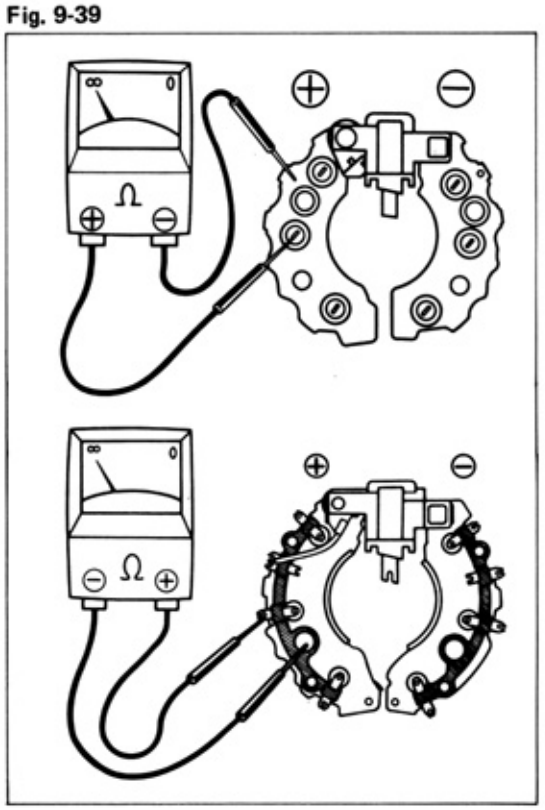
Fig. 9-38



Rectifier (50A Type)

1. Rectifier holder positive side
   Connect an ohmmeter positive (+) lead to the rectifier holder, and the negative (–) lead of the meter to the rectifier terminal. If there is no continuity, the rectifier assembly must be replaced.

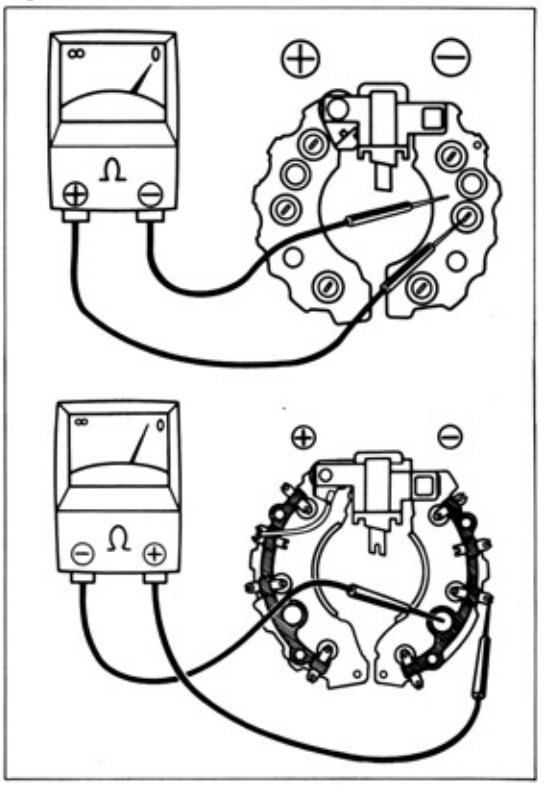
Fig. 9-39



2. Reverse polarity of test leads and check again. If there is continuity, the rectifier assembly must be replaced.

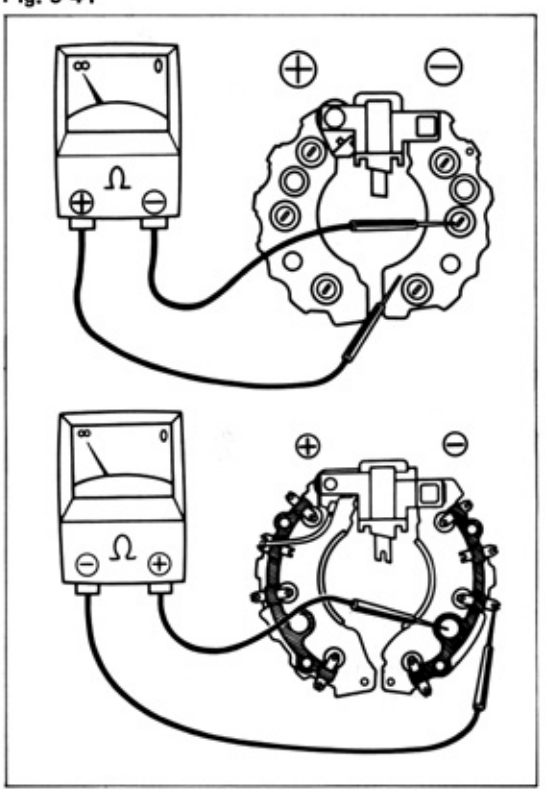
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Fig. 9-40



3. Rectifier holder negative side
Connect an ohmmeter positive (+) lead to the rectifier terminal, and the negative (–) lead of the meter to the rectifier holder. If there is no continuity, the rectifier assembly must be replaced.

Fig. 9-41



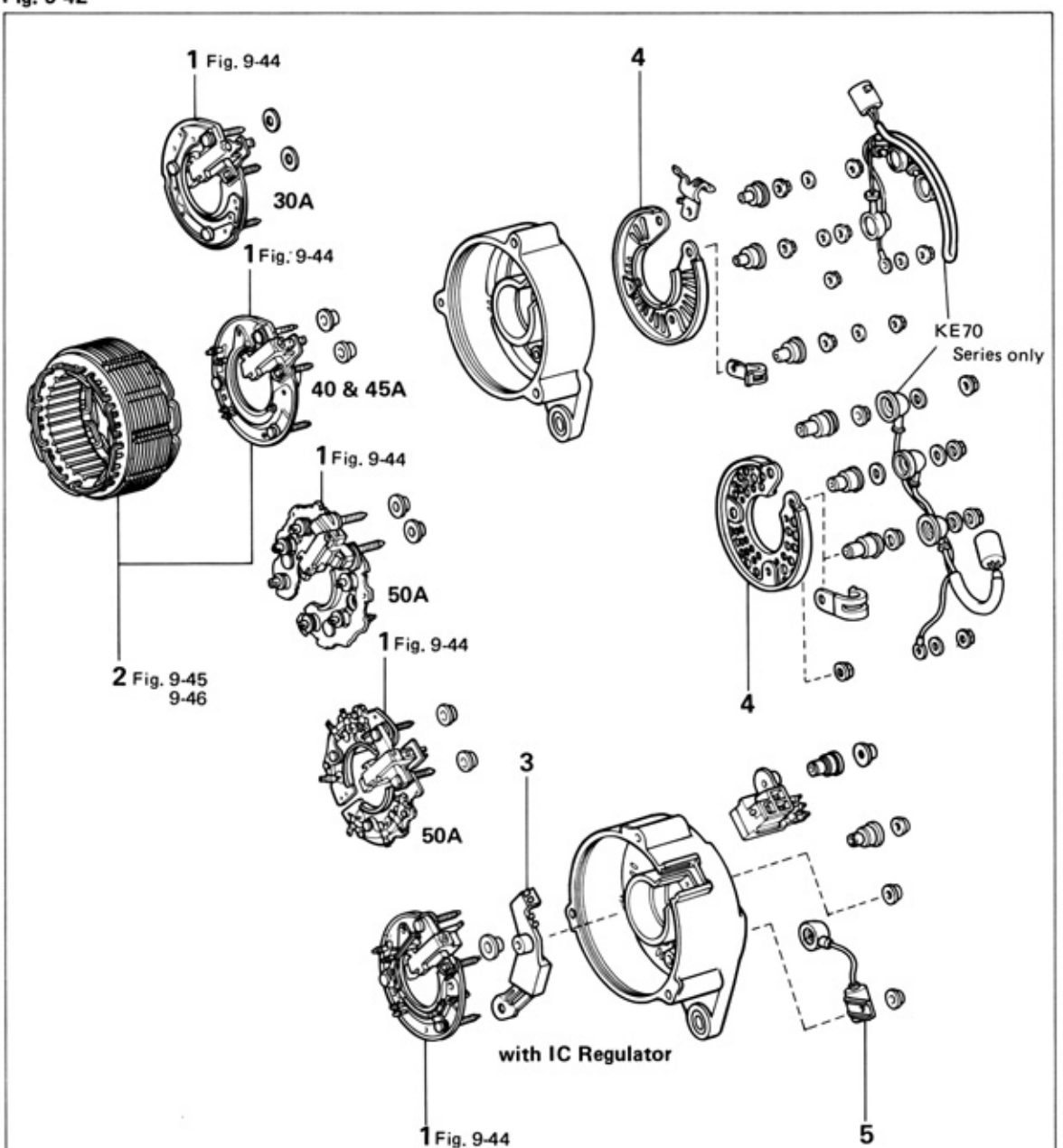
4. Reverse polarity of test leads and check again. If there is continuity, the rectifier assembly must be replaced.

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ASSEMBLY

1. Assemble the parts in the numerical order shown in the figure.

Fig. 9-42

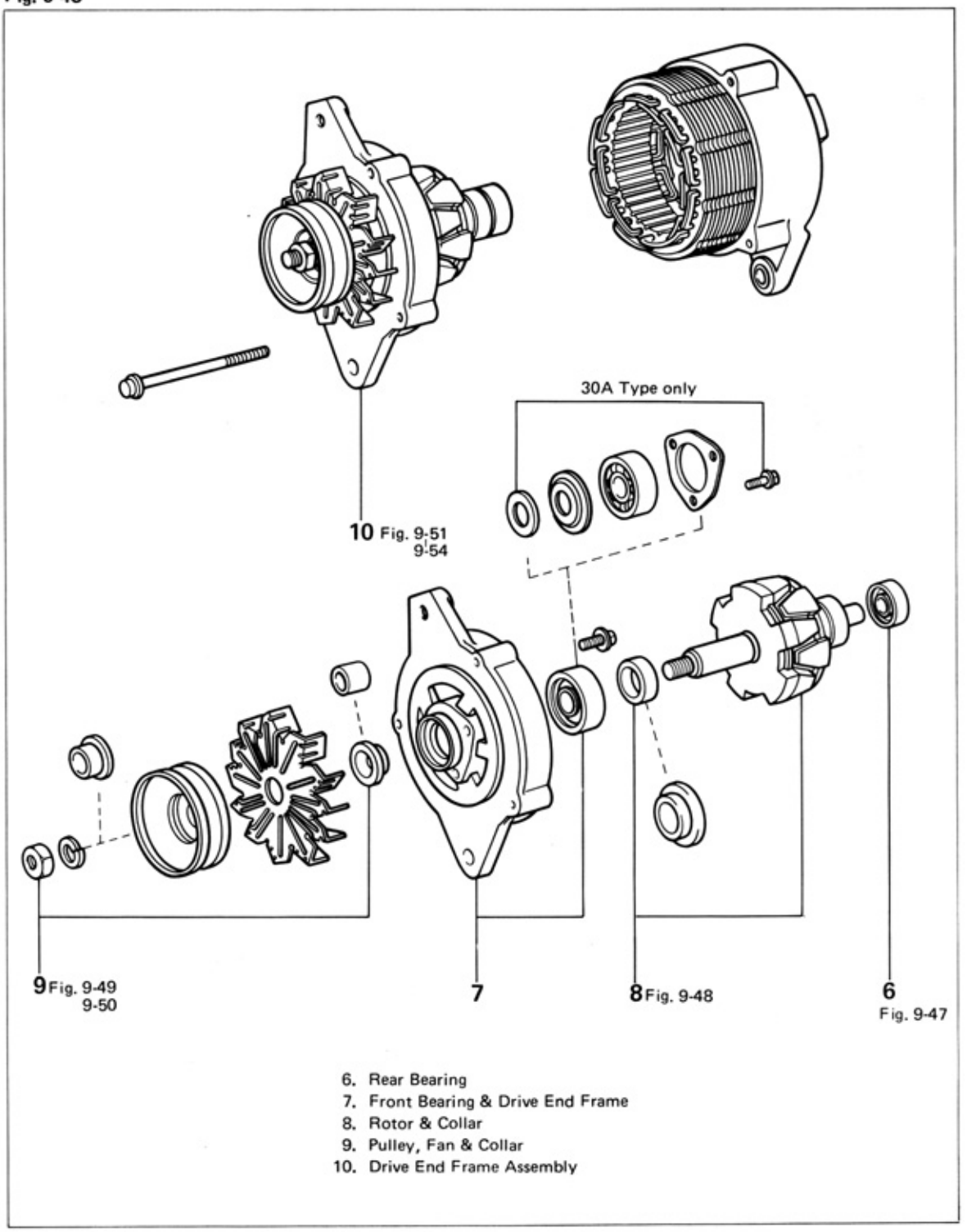


1. Brush Holder & Rectifier Holder
2. Startor Coil, Rectifier Holder & Insulator
3. IC Regulator
4. Rear End Cover & Insulator
5. Condenser

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2. Assemble the parts in the numerical order shown in the figure.

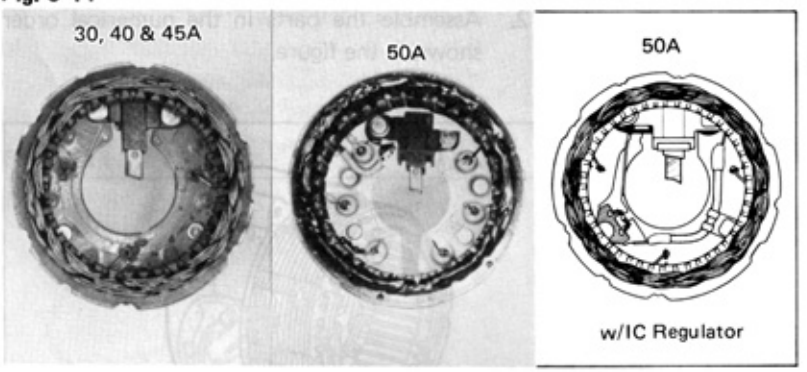
Fig. 9-43



6. Rear Bearing
7. Front Bearing & Drive End Frame
8. Rotor & Collar
9. Pulley, Fan & Collar
10. Drive End Frame Assembly

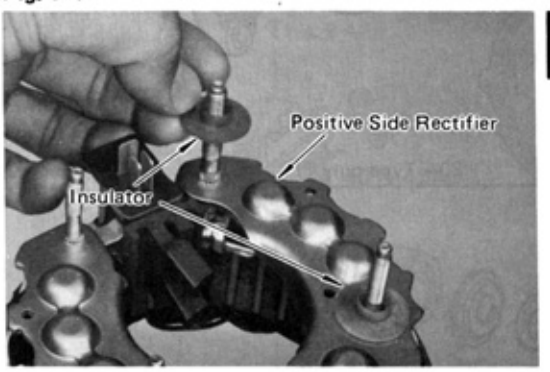
ProCarManuals.com

Fig. 9-44



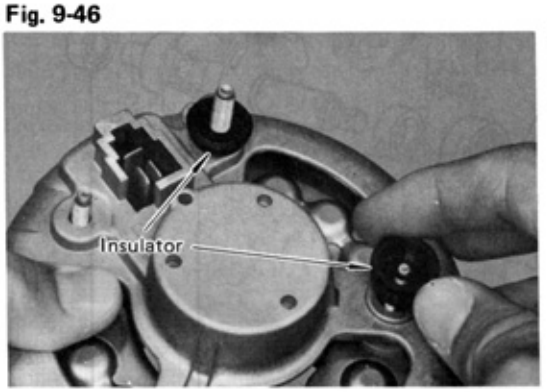
Solder each lead wire onto the rectifier or terminal as shown in the figure.

Fig. 9-45



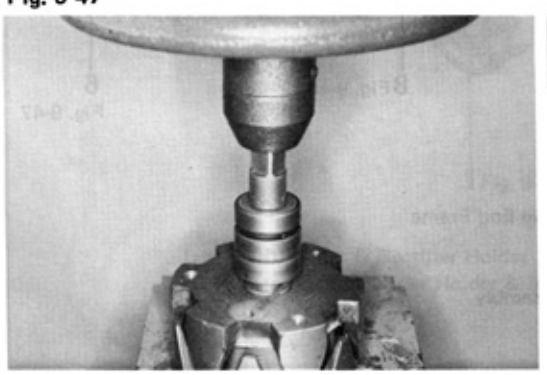
Assemble the rear end frame and rectifier holder with insulators.

Fig. 9-46



Assemble the rear end cover with the insulators.

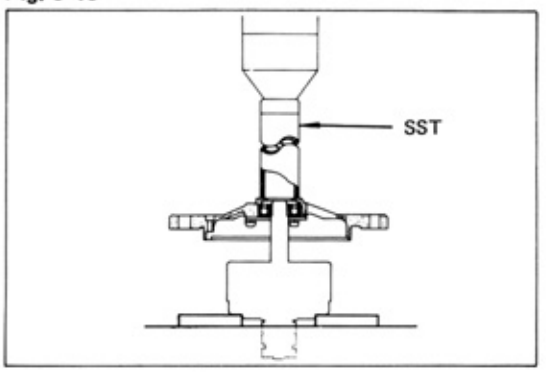
Fig. 9-47



Using a press, press the rear bearing onto the rotor shaft.

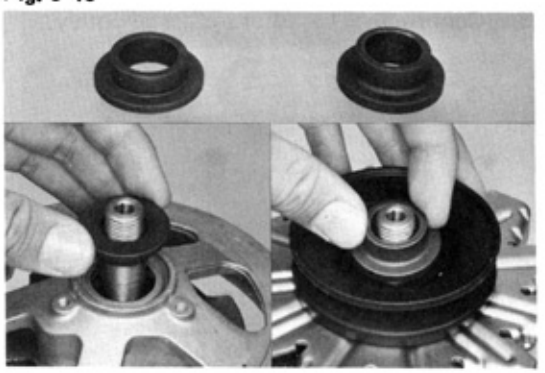
ProCarManuals.com

Fig. 9-48



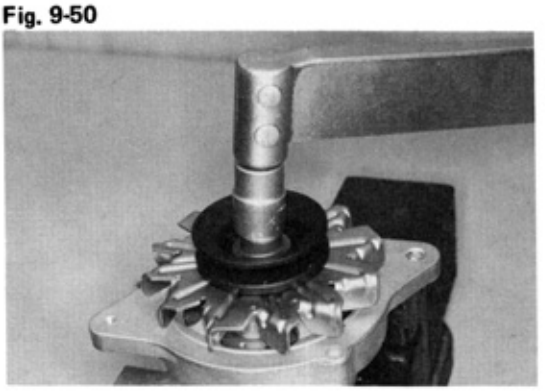
Using SST, press and drive the end frame assembly onto the rotor shaft.
SST [09612-22010]

Fig. 9-49



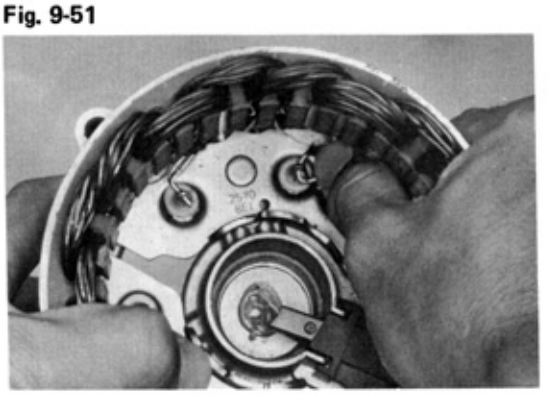
Install the collars as is shown in the figure.

Fig. 9-50



Tighten the nut to specified torque.
Tightening torque: 5.0 – 6.5 kg-m (37 – 47 ft-lb)

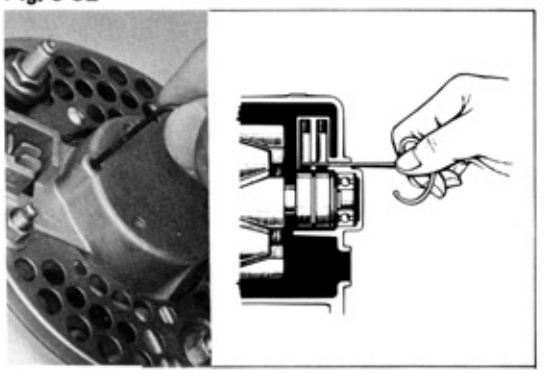
Fig. 9-51



Install the rotor shaft.
1. Bend back the rectifier lead wires away from the rotor.

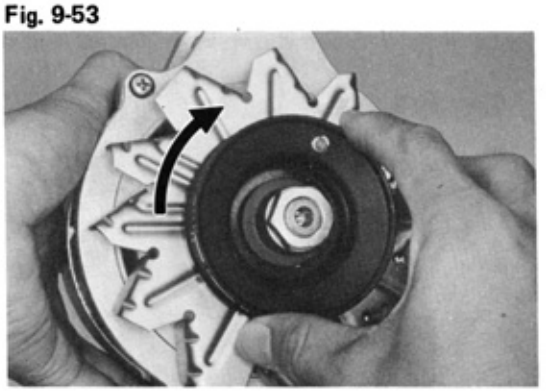
ProCarManuals.com

Fig. 9-52



2. Push in the brushes and temporarily lock them in place with a wire inserted through the access hole in the rear end frame.

Fig. 9-53



3. Confirm that the rotor rotates smoothly.

Fig. 9-54

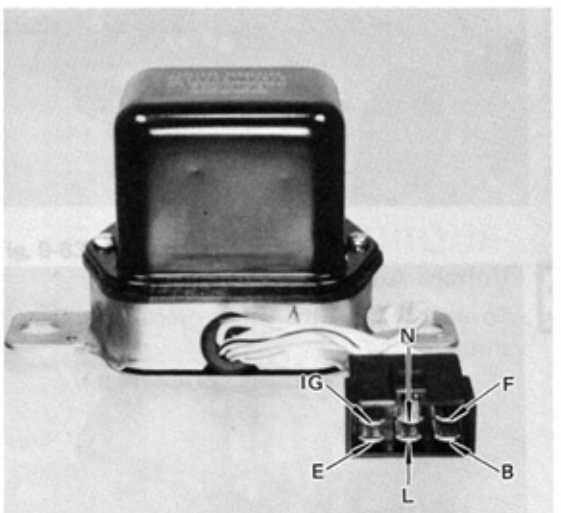


Seal the brush service hole.

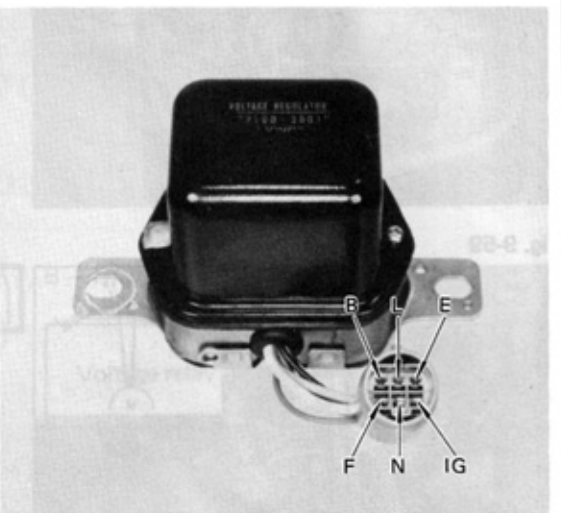
ProCarManuals.com

ALTERNATOR REGULATOR

Fig. 9-55

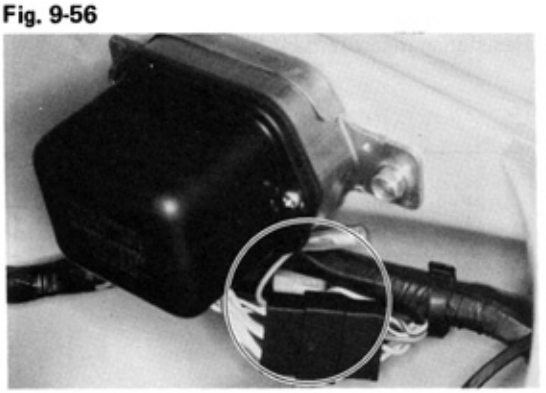


Except USA & Canada



USA & Canada

Fig. 9-56



INSPECTION & ADJUSTMENT

Check the connector fitting condition before inspecting the regulator.

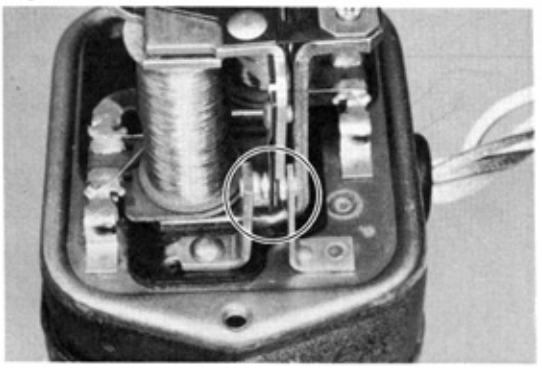
Fig. 9-57



Always be sure to have the regulator connector pulled out when inspecting and adjusting.

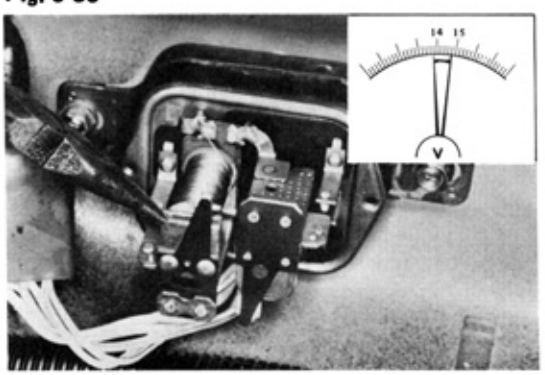
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Fig. 9-58



Check each point surface for burns or excessive damage. Replace if defective.

Fig. 9-59

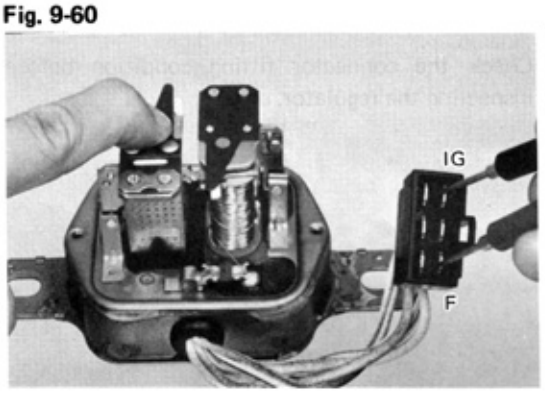


Voltage Adjustment

To adjust, bend the voltage regulator adjusting arm.

Regulated voltage: 13.8 – 14.8 V

Fig. 9-60

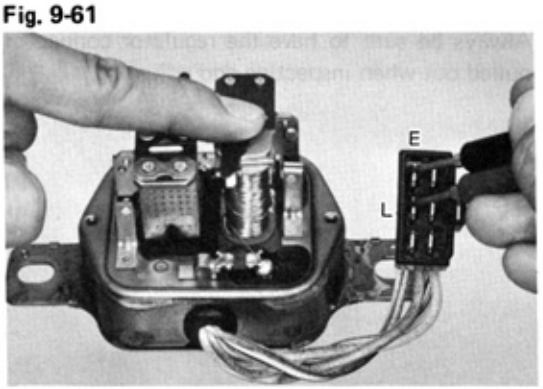


Resistance measurement between terminals.

IG – F

Voltage regulator	Open 0 Ω
	Closed approx. 11 Ω

Fig. 9-61

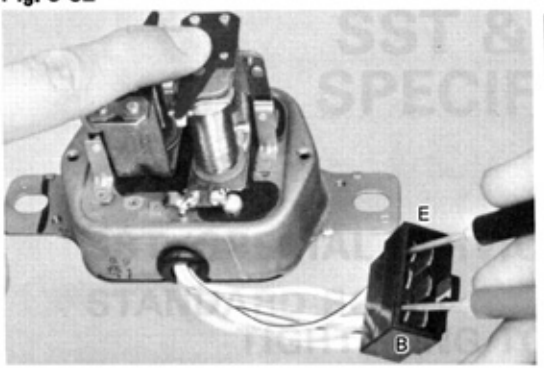


L – E

Voltage relay	Open 0 Ω
	Closed approx. 100 Ω

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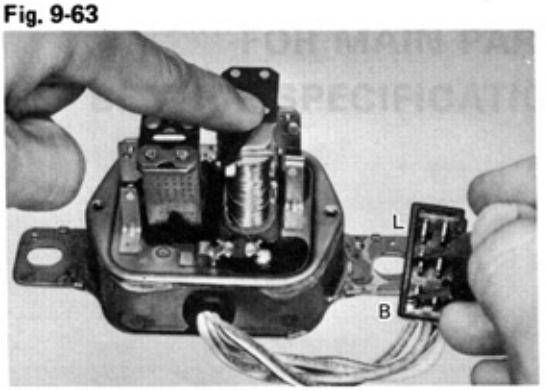
Fig. 9-62



B – E

Voltage relay	Open infinity
	Closed approx. 100 Ω

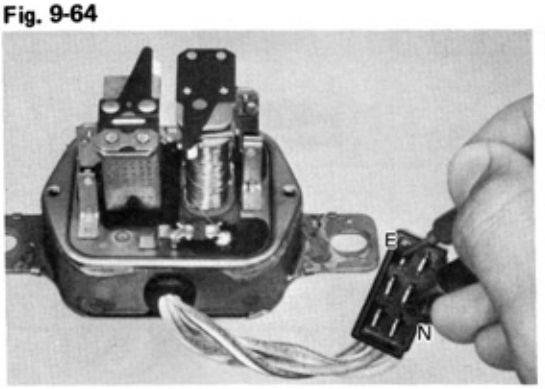
Fig. 9-63



B – L

Voltage relay	Open infinity
	Closed 0 Ω

Fig. 9-64



N – E

Approx. 23 Ω

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MEMO

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SST & SERVICE SPECIFICATIONS

Page

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TIGHTENING TORQUE FOR MAIN PARTS 10-10

SERVICE SPECIFICATIONS 10-10

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SST (SPECIAL SERVICE TOOLS)

ENGINE TUNE-UP

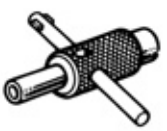
Oil Filter

Illustration	Tool No.	Tool Name
	09228-22020	Oil Filter Wrench

Valve Clearance

Illustration	Tool No.	Tool Name
	09229-22010	Engine Oil Tray

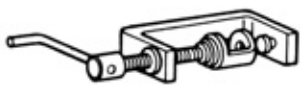
Idle Speed & Idle Mixture Adjustment

Illustration	Tool No.	Tool Name
	(09243-00010) 09243-00020	Idle Adjusting Screw Wrench

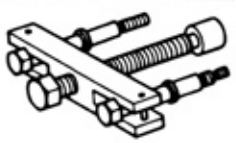
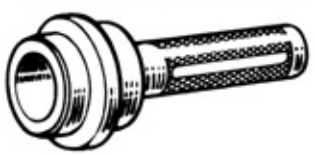
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ENGINE SERVICE

Cylinder Head

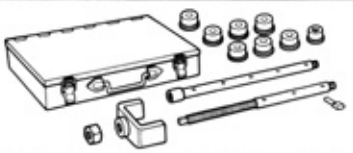
Illustration	Tool No.	Tool Name
	09201-60011	Valve Stem Guide Remover & Replacer
	09202-43012	Valve Spring Compressor

Timing Chain & Camshaft

Illustration	Tool No.	Tool Name
	09213-31021	Crankshaft Pulley Puller
	09214-60010	Crankshaft Pulley & Gear Replacer
	09223-22010	Crankshaft Front Oil Seal Replacer

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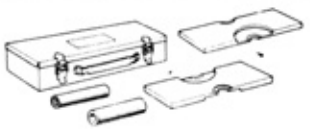
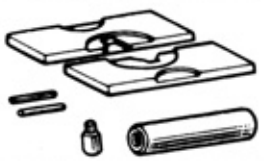
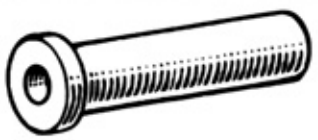
Cylinder Block

Illustration	Tool No.	Tool Name
	09215-00100	Camshaft Bearing Remover & Replacer
	09222-30010	Connecting Rod Bushing Remover & Replacer
	09250-10011	A Replacer Set
	09303-35011	Input Shaft Front Bearing Puller
	09304-12012	Input Shaft Front Bearing Replacer

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COOLING SYSTEM

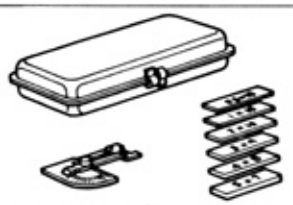
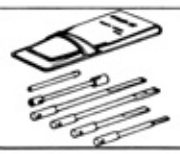
Water Pump

Illustration	Tool No.	Tool Name
	09235-20011	Water Pump Pulley Seat Puller
	09236-28011	Water Pump Overhaul Tool
	09236-36010	Water Pump Overhaul Tool
	09238-48010	Water Pump Bearing Remover & Replacer

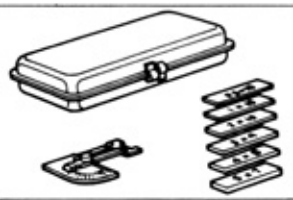
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FUEL SYSTEM

Carburetor (Except KP 61 Series & KM 20 Series)

Illustration	Tool No.	Tool Name
	09240-00014	Carburetor Adjusting Gauge Set
	09240-00020	Wire Gauge Set
	(09243-00010) 09243-00020	Idle Adjusting Screw Wrench
	09860-11011	Carburetor Driver Set

Carburetor (KP 61 Series & KM 20 Series)

Illustration	Tool No.	Tool Name
	09240-00014	Carburetor Adjusting Gauge Set
	09240-00020	Wire Gauge Set
	09860-11011	Carburetor Driver Set

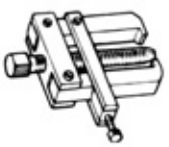
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CHARGING SYSTEM

On-Vehicle Inspection

Illustration	Tool No.	Tool Name
	09081-00011	Alternator Checker

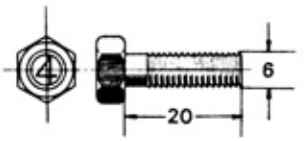
Alternator

Illustration	Tool No.	Tool Name
	09286-46011	Injection Pump Spline Shaft Puller
	09325-12010	Transmission Oil Plug

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STANDARD BOLT TIGHTENING TORQUE

9 1 1 1 1 - 4 0 6 2 0 — Part number
- Length of bolt: 20 mm
- Basic major diameter of thread: 6 mm
- Bolt head mark*



* Explanation of bolt head marks are as indicated in the following table.

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Basic diameter mm	Pitch mm	Torque limit	kg-m (ft-lb)
4T	6	1	0.4 – 0.7	(3 – 5)
	8	1.25	1.0 – 1.6	(8 – 11)
	10	1.25	1.9 – 3.1	(14 – 22)
	10	1.5	1.8 – 3.0	(14 – 21)
	12	1.25 (ISO)	3.5 – 5.5	(26 – 39)
	12	1.5	3.5 – 5.5	(26 – 39)
	12	1.75	3.0 – 5.0	(22 – 36)
	13	1.5	4.5 – 7.0	(33 – 50)
	14	1.5	5.0 – 8.0	(37 – 57)
	14	2	4.7 – 7.7	(34 – 55)
	16	1.5	7.5 – 11.0	(55 – 79)
	16	2	7.1 – 10.6	(52 – 76)
5T	6	1	0.6 – 0.9	(5 – 6)
	8	1.25	1.5 – 2.2	(11 – 15)
	10	1.25	3.0 – 4.5	(22 – 32)
	10	1.5	2.7 – 4.2	(20 – 30)
	12	1.25 (ISO)	5.0 – 8.0	(37 – 57)
	12	1.5	5.0 – 7.0	(37 – 50)
	12	1.75	4.8 – 6.8	(35 – 49)
	13	1.5	6.5 – 9.0	(48 – 65)
	14	1.5	7.5 – 11.0	(55 – 79)
	14	2	7.0 – 10.5	(51 – 75)
	16	1.5	12.0 – 17.0	(87 – 122)
	16	2	11.5 – 16.5	(84 – 119)
6T	6	1	0.6 – 0.9	(5 – 6)
	8	1.25	1.5 – 2.2	(11 – 15)
	10	1.25	3.0 – 4.5	(22 – 32)
	10	1.5	2.7 – 4.2	(20 – 30)
	12	1.25 (ISO)	5.0 – 8.0	(37 – 57)
	12	1.5	5.0 – 7.0	(37 – 50)
	12	1.75	4.8 – 6.8	(35 – 49)

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SPECIFIED TORQUE FOR STANDARD BOLTS (Cont'd)

Class	Basic diameter mm	Pitch mm	Torque limit	kg-m (ft-lb)
7T	6	1	0.8 – 1.2	(6 – 8)
	8	1.25	2.0 – 3.0	(15 – 21)
	10	1.25	4.0 – 5.5	(29 – 39)
	10	1.5	3.7 – 5.2	(27 – 37)
	12	1.25 (ISO)	7.5 – 10.5	(55 – 75)
	12	1.5	7.0 – 9.0	(51 – 65)
	12	1.75	6.0 – 8.5	(44 – 61)
	13	1.5	8.0 – 12.0	(58 – 86)
	14	1.5	10.0 – 15.0	(73 – 108)
	14	2	9.5 – 14.0	(69 – 101)
	16	1.5	15.0 – 23.0	(109 – 166)
	16	2	14.0 – 22.0	(102 – 159)

– Note –

These torque specifications are applicable only for steel (female) threads. They do not apply to other types of material or if the tightening surface is subjected to heat or vibration.

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TIGHTENING TORQUE FOR MAIN PARTS

Tightening parts	kg-m	ft-lb
Cylinder head x Cylinder block	5.4 – 6.6	40 – 47
Rocker arm support x Cylinder head	1.8 – 2.4	14 – 17
Manifold x Cylinder head	2.0 – 3.0	15 – 21
Crankshaft bearing cap x Cylinder block	5.4 – 6.6	40 – 47
Connecting rod cap x Connecting rod	4.0 – 5.2	29 – 37
Crankshaft pulley x Crankshaft	7.5 – 10.5	55 – 75
Flywheel x Crankshaft	5.4 – 6.6	40 – 47
Camshaft timing sprocket x Camshaft	5.4 – 6.6	40 – 47
Spark plug x Cylinder head	1.5 – 2.1	11 – 15
Oil pan x Cylinder block Standard bolt	0.2 – 0.4	18 – 34 in.-lb
Step bolt	0.3 – 0.7	27 – 60 in.-lb
Exhaust manifold x Exhaust pipe	3.0 – 4.5	22 – 32

SERVICE SPECIFICATIONS

ENGINE TUNE-UP

Drive belt deflection at 10 kg (22 lb)			
Fan – Alternator	7 – 11 mm		0.28 – 0.43 in.
Crank – A/C compressor	11 – 14 mm		0.43 – 0.55 in.
Battery electrolyte specific gravity at 20°C (68°F)	1.25 – 1.27		
Engine oil capacity			
2K, 3K-C & 3K-H			
Dry refill w/ Oil filter	3.6 liters	3.8 US qt	3.2 Imp. qt
Drain & refill w/ Oil filter	3.4 liters	3.6 US qt	3.0 Imp. qt
w/o Oil filter	2.9 liters	3.1 US qt	2.6 Imp. qt
4K & 4K-C			
Dry refill w/ Oil filter	3.7 liters	3.9 US qt	3.3 Imp. qt
Drain & refill w/ Oil filter	3.5 liters	3.7 US qt	3.1 Imp. qt
w/o Oil filter	3.0 liters	3.2 US qt	2.6 Imp. qt
Coolant capacity w/ Heater			
2K, 3K-C & 3K-H	5.6 liters	5.9 US qt	4.9 Imp. qt
KE70 series (Europe & Sweden)	5.8 liters	6.1 US qt	5.1 Imp. qt
KE70 series (ex. Europe & Sweden)	6.2 liters	6.6 US qt	5.5 Imp. qt
KM20 series (4K RHD & 4K-C)	6.7 liters	7.1 US qt	5.9 Imp. qt
KM20 series (4K LHD)	6.9 liters	7.3 US qt	6.1 Imp. qt
USA & Canada 4K-C	5.7 liters	6.0 US qt	5.0 Imp. qt

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ENGINE TUNE-UP (Cont'd)

Spark plug				
Gap	California & General Destinations		0.8 mm	0.031 in.
	USA (ex. California) & Canada		1.1 mm	0.043 in.
Distributor	Dwell angle		52° ± 6°	
	Rubbing block gap		0.45 mm	0.0177 in.
	Air gap		0.20 – 0.40 mm	0.0079 – 0.0157 in.
Ignition timing			8° BTDC/Idling	
Firing order			1–3–4–2	
Valve clearance		Hot IN	0.20 mm	0.0079 in.
		EX	0.30 mm	0.0118 in.
		Cold IN	0.13 mm	0.0051 in.
		EX	0.23 mm	0.0091 in.
Idle speed	USA (ex. California) & Canada		650 rpm	Cooling fan OFF
	California		700 rpm	Cooling fan OFF
	2K, 3K-C, 3K-H, 4K M/T &			
	Sweden 4K-C		750 rpm	(w/ cooling fan OFF)
	Australia 4K & 4K-C		800 rpm	
	4K A/T		850 rpm	
CO concentration				
	2K (KP60 series),			
	3K-C, 3K-H & 4K		0.5 – 1.5%	HIC system OFF/Idling
	2K (KP36 series)		0.5 – 3.5%	HIC system OFF/Idling
	Sweden 4K-C		0.3 – 2.0%	HIC system OFF/Idling
	Australia 4K-C		1.0%	HIC system OFF/Idling
	USA & Canada 4K-C		———	
Dash pot setting speed				
	Australia 4K		1,700 rpm	
	3K-C		2,000 rpm	Vacuum advance OFF
	Australia 4K-C & 4K (KM20 series)		2,100 rpm	AI system & Vacuum advance OFF
	Sweden 4K-C		2,300 rpm	
Throttle positioner (USA & Canada)			2,000 rpm	EGR system OFF
Compression pressure at 250 rpm		STD	11.0 kg/cm²	156 psi
		Limit	9.0 kg/cm²	128 psi
Difference of pressure between cylinders			Less than 1.0 kg/cm² (14 psi)	

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ENGINE

Cylinder Head

Surface warpage		Limit	0.05 mm	0.0020 in.
Maximum reface		Limit	0.2 mm	0.008 in.
Valve seat	Contact surface angle		45°	
	Contact width	IN	1.1 – 1.8 mm	0.043 – 0.071 in.
		EX	1.2 – 1.8 mm	0.047 – 0.071 in.
	Refacing angle		30°, 45°, 65°	

Valve Guide Bushing

Protrusion from cylinder head		18 mm	0.71 in.
Inner diameter		8.01 – 8.03 mm	0.3154 – 0.3161 in.
Outer diameter	STD	13.040 – 13.051 mm	0.5134 – 0.5138 in.
	O/S 0.05	13.090 – 13.101 mm	0.5154 – 0.5158 in.
Replacing temperature (Cylinder head side)		100 – 130°C	212 – 266°F

Valve

Overall length	STD	IN	99.9 mm	3.933 in.
		EX	100.1 mm	3.941 in.
	Limit	IN & EX	99.5 mm	3.917 in.
Face angle			44.5°	
Stem diameter	STD	IN	7.965 – 7.980 mm	0.3136 – 0.3142 in.
		EX	7.960 – 7.975 mm	0.3134 – 0.3140 in.
Stem oil clearance	STD	IN	0.030 – 0.065 mm	0.0012 – 0.0026 in.
		EX	0.035 – 0.070 mm	0.0014 – 0.0028 in.
	Limit	IN	0.08 mm	0.0031 in.
		EX	0.10 mm	0.0039 in.
Head edge thickness	Limit	IN	0.8 mm	0.031 in.
		EX	0.9 mm	0.035 in.

Valve Spring

Free length		46.5 mm	1.831 in.
Installed length		38.4 mm	1.512 in.
Installed load	STD	31.8 kg	70.1 lb
	Limit	25.0 kg	55.1 lb
Squareness	Limit	1.6 mm	0.063 in.

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Valve Rocker Arm & Shaft

Oil clearance	STD	0.02 – 0.04 mm	0.0008 – 0.0016 in.
	Limit	0.06 mm	0.0024 in.

Valve Lifter

Oil clearance	STD	0.015 – 0.029 mm	0.0006 – 0.0011 in.
	Limit	0.1 mm	0.004 in.
Outer diameter	STD	19.978 – 19.999 mm	0.7865 – 0.7874 in.
	O/S 0.05	20.028 – 20.049 mm	0.7885 – 0.7893 in.

Camshaft

Circle runout		Limit	0.03 mm	0.0012 in.
Thrust clearance		STD	0.070 – 0.138 mm	0.0028 – 0.0054 in.
		Limit	0.3 mm	0.012 in.
Bearing oil clearance	STD	No. 1, No. 4	0.025 – 0.066 mm	0.0010 – 0.0026 in.
		No. 2, No. 3	0.030 – 0.071 mm	0.0012 – 0.0028 in.
	Limit		0.1 mm	0.004 in.
Journal diameter				
STD	No. 1 (from front)		43.209 – 43.225 mm	1.7011 – 1.7018 in.
	No. 2		42.954 – 42.970 mm	1.6911 – 1.6917 in.
	No. 3		42.704 – 42.720 mm	1.6813 – 1.6819 in.
	No. 4		42.459 – 42.475 mm	1.6716 – 1.6722 in.
Bearing type			STD, U/S (0.125, 0.250)	
Cam height	STD	IN	36.469 – 36.569 mm	1.4358 – 1.4397 in.
		EX	36.369 – 36.469 mm	1.4318 – 1.4358 in.
	Limit	IN	36.17 mm	1.4240 in.
		EX	36.07 mm	1.4201 in.

Timing Chain Tensioner & Damper

Tensioner plunger head thickness	Limit	12.0 mm	0.472 in.
Vibration damper thickness	Limit	7.0 mm	0.276 in.

Timing Chain & Sprocket

Chain slack at 10 kg (22 lb)	Limit	13.5 mm	0.531 in.
Chain elongation	Limit	272.7 mm	10.736 in.
Crankshaft sprocket wear	Limit	59.4 mm	2.339 in.
Camshaft sprocket wear	Limit	113.8 mm	4.480 in.

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Manifold

Installing surface warpage	Limit	0.3 mm	0.012 in.

Cylinder Block

Warpage		Limit	0.05 mm	0.0020 in.
Cylinder bore	2K	STD	72.00 – 72.05 mm	2.8346 – 2.8366 in.
	3K, 4K Series	STD	75.00 – 75.05 mm	2.9528 – 2.9547 in.
Wear		Limit	0.2 mm	0.008 in.
Taper and out-of-round		Limit	Less than 0.02 mm (0.0008 in.)	
Difference of bore diameter between cylinders			Less than 0.05 mm (0.0020 in.)	
Valve lifter bore diameter		STD	20.000 – 20.021 mm	0.7874 – 0.7882 in.
		O/S 0.05	20.050 – 20.071 mm	0.7894 – 0.7902 in.

Piston & Piston Ring

Piston diameter	2K	STD	71.96 – 72.01 mm	2.8331 – 2.8350 in.
		O/S 0.50	72.46 – 72.51 mm	2.8528 – 2.8547 in.
		O/S 0.75	72.71 – 72.76 mm	2.8626 – 2.8646 in.
		O/S 1.00	72.96 – 73.01 mm	2.8724 – 2.8744 in.
	3K, 4K Series	STD	74.96 – 75.01 mm	2.9512 – 2.9531 in.
		O/S 0.50	75.46 – 75.51 mm	2.9709 – 2.9728 in.
		O/S 0.75	75.71 – 75.76 mm	2.9807 – 2.9827 in.
		O/S 1.00	75.96 – 76.01 mm	2.9905 – 2.9925 in.
Cylinder to piston clearance			0.03 – 0.05 mm	0.0012 – 0.0020 in.
Piston ring end gap	Compression ring No. 1		0.10 – 0.28 mm	0.0039 – 0.0110 in.
	Compression ring No. 2		0.15 – 0.30 mm	0.0059 – 0.0118 in.
	Oil ring		0.2 – 0.9 mm	0.008 – 0.035 in.
Piston ring to ring groove clearance				
	Compression ring No. 1		0.03 – 0.07 mm	0.0012 – 0.0028 in.
	Compression ring No. 2		0.02 – 0.06 mm	0.0008 – 0.0024 in.
Piston pin installing temperature			70 – 80°C	158 – 176°F

Connecting Rod & Bearing

Thrust clearance	STD	0.200 – 0.304 mm	0.0079 – 0.0120 in.
	Limit	0.35 mm	0.0138 in.
Bearing oil clearance	STD	0.016 – 0.040 mm	0.0006 – 0.0016 in.
	Limit	0.10 mm	0.0039 in.
Bearing type		STD, U/S (0.05, 0.25, 0.50, 0.75)	
Bushing to piston pin oil clearance	STD	0.004 – 0.008 mm	0.0002 – 0.0003 in.
	Limit	0.05 mm	0.0020 in.

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Crankshaft

Circle runout	Limit	0.04 mm	0.0016 in.
Thrust clearance	STD	0.040 – 0.242 mm	0.0016 – 0.0095 in.
	Limit	0.3 mm	0.012 in.
Taper and out-of-round	Limit	0.01 mm	0.0004 in.
Main journal oil clearance	STD	0.016 – 0.040 mm	0.0006 – 0.0016 in.
	Limit	0.10 mm	0.0039 in.
Main journal bearing type		STD, U/S (0.05, 0.25, 0.50)	
Main journal diameter	STD	49.976 – 50.000 mm	1.9676 – 1.9685 in.
U/S finished diameter	U/S 0.25	49.733 – 49.743 mm	1.9580 – 1.9584 in.
	U/S 0.50	49.483 – 49.493 mm	1.9481 – 1.9485 in.
Pin journal oil clearance	STD	0.016 – 0.040 mm	0.0006 – 0.0016 in.
	Limit	0.10 mm	0.0039 in.
Pin journal bearing type		STD, U/S (0.05, 0.25, 0.50, 0.75)	
Pin journal diameter	STD	41.976 – 42.000 mm	1.6526 – 1.6535 in.
U/S finished diameter	U/S 0.25	41.723 – 41.733 mm	1.6426 – 1.6430 in.
	U/S 0.50	41.473 – 41.483 mm	1.6328 – 1.6332 in.
	U/S 0.75	41.223 – 41.233 mm	1.6229 – 1.6233 in.
Thrust washer thickness	STD	2.43 – 2.48 mm	0.0957 – 0.0976 in.
	O/S 0.125	2.49 – 2.54 mm	0.0980 – 0.1000 in.
	O/S 0.250	2.55 – 2.60 mm	0.1004 – 0.1024 in.

Flywheel

Circle runout	Limit	0.1 mm	0.004 in.

LUBRICATING SYSTEM

Oil Pump

Tip clearance	STD	0.04 – 0.16 mm	0.0016 – 0.0063 in.
	Limit	0.2 mm	0.008 in.
Side clearance	STD	0.03 – 0.09 mm	0.0012 – 0.0035 in.
	Limit	0.15 mm	0.0059 in.
Body clearance	STD	0.10 – 0.16 mm	0.0039 – 0.0063 in.
	Limit	0.2 mm	0.008 in.

COOLING SYSTEM

Radiator

Radiator cap relief valve opening pressure			
	STD	0.75 – 1.05 kg/cm^2	10.7 – 14.9 psi
	Limit	0.6 kg/cm^2	8.5 psi

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Water Pump

Bearing installing temperature	75 – 85°C	167 – 185°F

Thermostat

	Low temp. type		High temp. type	
Valve opening temperature				
Start to open at	82°C	180°F	88°C	190°F
Fully opens at	95°C	203°F	100°C	212°F
Valve opening travel	More than 8 mm (0.31 in.)		More than 8 mm (0.31 in.)	
Identification mark	82 punch mark or Blue painting mark		88 punch mark or Red painting mark	

FUEL SYSTEM

Carburetor (Except KP 61 Series & KM 20 Series)

Acceleration pump stroke			
2K, 4K & 4K-C		4.85 mm	0.1909 in.
3K-C & 3K-H		3.25 mm	0.1280 in.
Float level			
Raised position			
2K, 3K-C & 3K-H		6.0 mm	0.236 in.
4K & 4K-C		7.5 mm	0.295 in.
Lowered position			
2K, 3K-C & 3K-H		0.9 mm	0.035 in.
4K & 4K-C		0.6 mm	0.024 in.
Throttle valve closed angle	Primary	9°	
(from horizontal plane)	Secondary	20°	
Throttle valve fully opened angle	Primary	90°	
(from horizontal plane)	Secondary	90°	
Fast idle angle at choke valve fully closed (from horizontal plane)		26°	
Choke breaker clearance (Europe 4K A/T)		2.22 – 2.32 mm	0.0874 – 0.0913 in.
Idle mixture adjusting screw preset position			
2K & 4K		Screw out 2-1/2 turns	
3K-C & 3K-H		Screw out 3 turns	
4K-C		Screw out 1-1/2 turns	

Jet diameter		2K (KP36 series)	2K (KP60 series)	3K-C & 3K-H	4K	4K-C
Main jet	Primary	0.92 mm (0.0362 in.)	0.96 mm (0.0378 in.)	1.05 mm (0.0413 in.)	1.05 mm (0.0413 in.)	1.10 mm (0.0433 in.)
	Secondary	1.62 mm (0.0638 in.)	1.59 mm (0.0626 in.)	1.41 mm (0.0555 in.)	1.68 mm (0.0661 in.)	1.53 mm (0.0602 in.)
Slow jet		0.47 mm (0.0185 in.)	0.45 mm (0.0177 in.)	0.47 mm (0.0185 in.)	0.50 mm (0.0197 in.)	0.53 mm (0.0209 in.)
Power jet		0.85 mm (0.0335 in.)	0.73 mm (0.0287 in.)	0.80 mm (0.0315 in.)	0.60 mm (0.0236 in.)	0.80 mm (0.0315 in.)

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Carburetor (KP 61 Series & KM 20 Series)

Acceleration pump stroke			
KP61 series		3.25 mm	0.1280 in.
KM20 series		5.0 mm	0.197 in.
Float level			
Raised position		7.5 mm	0.295 in.
Lowered position		0.9 mm	0.035 in.
Throttle valve closed angle	Primary	9°	
(from horizontal plane)	Secondary	20°	
Throttle valve fully opened angle	Primary	90°	
(from horizontal plane)	Secondary	75° (KP61 series)	90° (KM20 series)
Kick-up			
Secondary throttle valve to body clearance			
(Primary throttle valve fully opened)			
KP61 series		0.22 mm	0.0087 in.
KP20 series		0.32 mm	0.0126 in.
Secondary touch angle (from horizontal plane)		50°	
Fast idle angle at first cam			
(from horizontal plane)			
General destinations & Europe		24°	
USA & Canada		26°	
Australia		25°	
Choke opener angle (from horizontal plate)		72°	
Choke breaker angle (from horizontal plane)		64°	
Idle mixture adjusting screw preset position		Screw out 2-1/4 turns	

Jet diameter		4K	4K-C Australia	4K-C California	USA (ex. California) & Canada
Main jet	Primary	1.02 mm (0.0402 in.)	1.03 mm (0.0406 in.)	1.05 mm (0.0413 in.)	1.02 mm (0.0402 in.)
	Secondary	1.53 mm (0.0602 in.)	1.53 mm (0.0602 in.)	1.35 mm (0.0531 in.)	1.32 mm (0.0520 in.)
Slow jet	Primary	0.44 mm (0.0173 in.)	0.45 mm (0.0177 in.)	0.48 mm (0.0189 in.)	0.48 mm (0.0189 in.)
	Secondary	0.80 mm (0.0315 in.)	0.80 mm (0.0315 in.)	—	—
Power jet		0.50 mm (0.0197 in.)	0.50 mm (0.0197 in.)	0.47 mm (0.0185 in.)	0.47 mm (0.0185 in.)

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STARTING SYSTEM

Starter

Motor type			Conventional type	Reduction type
Rating voltage and output power			12V, 0.6 kw & 0.8 kw	12V, 1.0 kw
No-load characteristic				
Current	0.6 kw		Less than 55 A at 11 V	Less than 90 A at
	0.8 kw		Less than 50 A at 11 V	11.5 V
Revolution	0.6 kw		3,500 rpm	More than 3,000 rpm
	0.8 kw		5,000 rpm	
Armature shaft				
Outer diameter			12.43 – 12.44 mm (0.4894 – 0.4898 in.)	——
Bushing bore			12.475 – 12.505 mm (0.4911 – 0.4923 in.)	——
Bushing to shaft clearance		STD	0.035 – 0.077 mm (0.0014 – 0.0030 in.)	——
		Limit	0.2 mm 0.008 in.	——
Thrust clearance		Limit	1 mm 0.04 in.	——
Commutator				
Outer diameter	0.6 kw	STD	32.7 mm 1.287 in.	30 mm 1.18 in.
		Limit	31.0 mm 1.220 in.	29 mm 1.14 in.
	0.8 kw	STD	28 mm 1.10 in.	
		Limit	27 mm 1.06 in.	
Runout		Limit	0.3 mm 0.012 in.	0.2 mm 0.008 in.
Mica depth		STD	0.4 – 0.8 mm (0.016 – 0.031 in.)	0.45 – 0.75 mm (0.0177 – 0.0295 in.)
		Limit	0.2 mm 0.008 in.	←
Brush				
Length	0.6 kw	STD	19 mm 0.75 in.	13.5 mm 0.531 in.
		Limit	10 mm 0.39 in.	←
	0.8 kw	STD	16 mm 0.63 in.	
		Limit	10 mm 0.39 in.	
Spring tension	0.6 kw		1.05 – 1.35 kg (2.3 – 2.9 lb)	1.5 – 2.0 kg (3.3 – 4.4 lb)
	0.8 kw		1.02 – 1.38 kg (2.2 – 3.0 lb)	——
Pinion end to stop collar clearance			0.1 – 4.0 mm (0.004 – 0.157 in.)	

IGNITION SYSTEM

Distributor

Rubbing block gap	0.45 mm	0.0177 in.
Air gap	0.2 – 0.4 mm	0.008 – 0.016 in.
Dwell angle	52° ± 6°	
Governor shaft thrust clearance	0.15 – 0.50 mm	0.0059 – 0.0197 in.
Signal generator resistance	140 – 180 Ω	

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Distributor (Cont'd)

Distributor advance angle (Part No.)	Governor		Vacuum		
	Dis. rpm	Advance angle	mm Hg	in. Hg	Advance angle
(19100-24050) (19100-24120) 2K Europe, 3K-H	500 ± 100 1,750 3,000	Advance begins 12 ± 1° 14 ± 1°	110 ± 20 200 260	4.33 ± 0.78 7.87 10.24	Advance begins 6 ± 1.5° 9 ± 1.0°
(19100-24170) 3K-C	650 ± 100 1,700 3,100	Advance begins 9.5 ± 1° 13.5 ± 1°	110 ± 20 200 260 ± 10	4.33 ± 0.78 7.87 10.24 ± 0.39	Advance begins 6 ± 1.5° 9 ± 1.0°
(19100-13100) (19100-13110) 2K General & 4K	600 ± 100 1,750 2,700	Advance begins 12.0 ± 1° 14.0 ± 1°	100 ± 20 141 ± 5 180 ± 10 220 ± 5	3.94 ± 0.79 5.55 ± 0.20 7.13 ± 0.39 8.66 ± 0.20	Advance begins 3.6 ± 1.0° 6.5 ± 0.7° 9.0 ± 1.0°
(19100-13080) 4K Europe KM20 series	650 1,700 3,100	Advance begins 9.5 ± 1° 13.5 ± 1°	100 ± 15 150 210 270 ± 5	3.94 ± 0.59 5.91 8.27 10.63 ± 0.20	Advance begins 4.6 ± 1.5° 9.0 ± 1.4° 12.0 ± 1.0°
(19100-24101) 4K & 4K-C Australia	650 ± 110 1,700 3,100	Advance begins 9.5 ± 1° 13.5 ± 1°	100 ± 15 210 270 ± 5	3.94 ± 0.59 8.27 10.63 ± 0.20	Advance begins 9.0 ± 1.4° 12.0 ± 1.0°
(19100-13070) 4K-C Sweden	600 ± 120 947 1,800 3,000	Advance begins 2.8 ± 1° 11 ± 1° 14.5 ± 1°	Main 110 ± 20 170 ± 7 230 ± 5 Sub 300 ± 21 380 ± 5	 4.33 ± 0.78 6.69 ± 0.28 9.06 ± 0.20 11.81 ± 0.83 14.96 ± 0.20	 Advance begins 4.2 ± 0.9° 7.5 ± 1.0° Advance begins 5 ± 1.0°
(19100-13090) (19100-13130) 4K-C USA & Canada	500 1,800 2,800	Advance begins 11 ± 1° 13.5 ± 1°	Main 80 ± 15 200 ± 15 300 Sub 170 230	 3.15 ± 0.59 7.87 ± 0.20 11.81 6.69 9.06	 Advance begins 9.2° ± 1.0° 15° ± 1.0° Advance begins 5° ± 1.0°

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Ignition Coil

Primary coil resistance	w/o Igniter	1.2 – 1.5 Ω
	w/ Igniter	1.3 – 1.7 Ω
Secondary coil resistance	w/o Igniter	8 – 12 kΩ
	w/ Igniter	10 – 15 kΩ
External resistor resistance	w/o Igniter	1.3 – 1.5 Ω
	w/ Igniter	1.1 – 1.3 Ω
Insulation resistance	w/500 V megohm meter	More than 10MΩ

High Tension Cord

Resistance	Limit	Less than 25 kΩ/cord

Spark Plug

Type	General Distinations	ND	W16EP, W16EX-U
		NGK	BP5ES-L, BP5EA-L
	Europe & Sweden	ND	W16EPR, W16EXR-U
		NGK	BPR5ES, BPR5EA-L, BPR5EY
	Australia	ND	W16EX-U, W14EX-U
		NGK	BP5EA-L, BP5EA
	USA (ex. California) & Canada	ND	W14EXR-U11, W16EXR-U11
		NGK	BPR5EA11, BPR5EA-L11, BPR4EY11, BPR5EY11
	California	ND	W14EXR-U, W16EXR-U
		NGK	BPR5EA, BPR5EA-L, BPR4EY, BPR5EY
Gap	California & General Destinations		0.8 mm 0.031 in.
	USA (ex. California) & Canada		1.1 mm 0.043 in.

CHARGING SYSTEM

Alternator

Rating output current		w/o IC regulator	w/ IC regulator
		30 A, 40 A, 45 A, 50 A	45 A
Rotor coil resistance		3.9 – 4.1 Ω	2.8 – 3.0 Ω
Brush exposed length	STD	12.5 mm 0.492 in.	←
	Limit	5.5 mm 0.217 in.	←

Alternator Regulator

Regulating voltage	Tirrill type	13.8 – 14.8 V (w/o IC regulator)
	Built-in type	13.8 – 14.4 V (w/ IC regulator)

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