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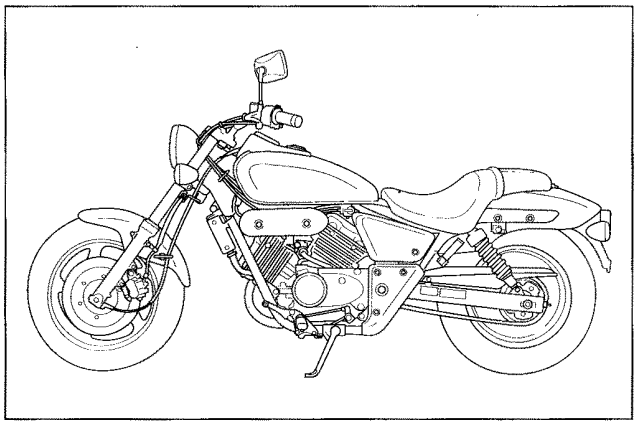
♦ Symbol Marking

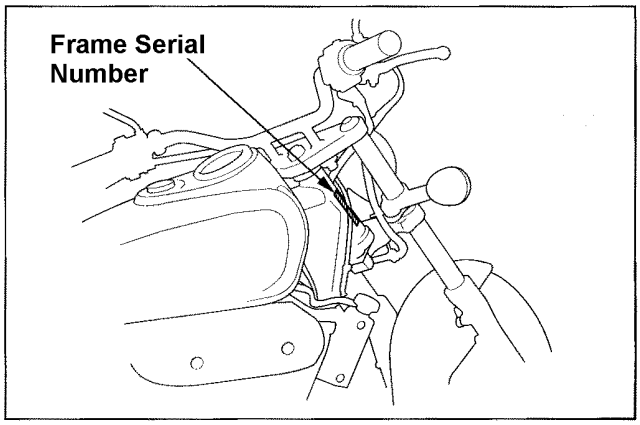
Symbol Marks

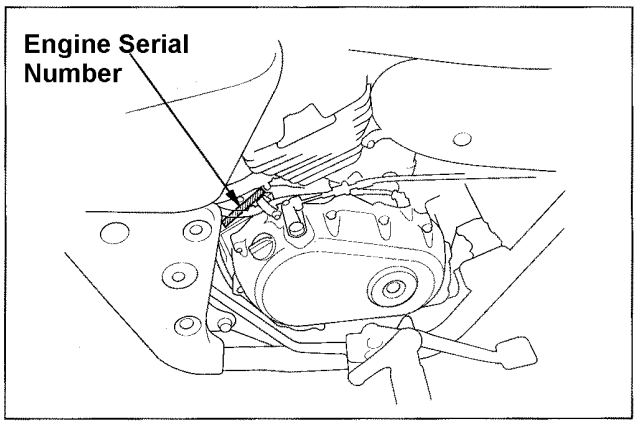
Symbol	Meaning	Symbol	Meaning
Danger	Danger: Its neglect may lead to serious injuries.	Important	Important: Its neglect may lead to injury or damaging the parts.
		General Caution	General caution: Tips of the work

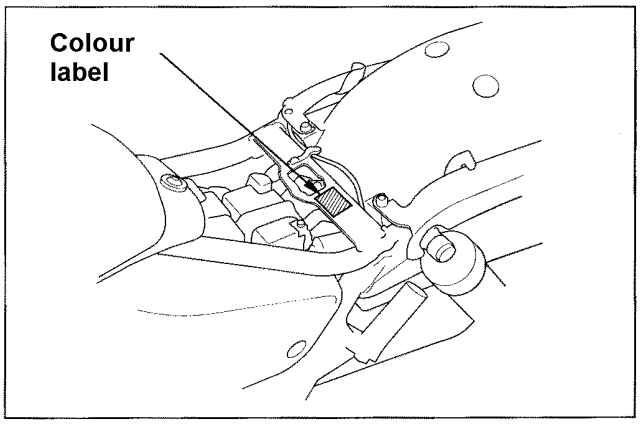
Symbol	Meaning	Symbol	Meaning
OIL	Apply oil: Unless specified, use designated or recommended oil.	SEAL	Apply sealant
MOLY OIL	Apply Molybdenum solution: The solution is a mixture of engine oil and Molybdenum grease	NEW	Replace with new parts whenever disassembled.
GREASE	Apply multi-purpose grease. (Lithium soap based NLG #2 equivalent. Example: SHELL Albania EP-2	BRAKE FLUID	Apply brake fluid. Use recommended grade (DOT4)
M	Apply Molybdenum grease (3% or more Molybdenum, NLGI#2 equivalent) Mitsubishi multi purpose M2 Dow Corning Molycoat BR – 2 PLUS	オイル	Apply recommended cushion oil.
MP	Apply Molybdenum paste. (40% or more Disulphide Molybdenum. NLGI#2 equivalent). Local paste Molycote G-n Paste (Dow Corning)	S TOOL	Use exclusive tools
S	Apply silicone grease Silicone grease G40M (ShinEtsu)	O P. TOOL	O.P. (Option) tool. Refer to parts list as these tools are considered to be parts.
LOCK	Apply screw locker. Use medium class unless specified.	⇨ 3-1	Reference pages.

Serial Numbers, Colour Label









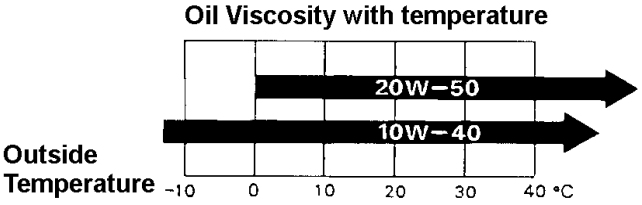
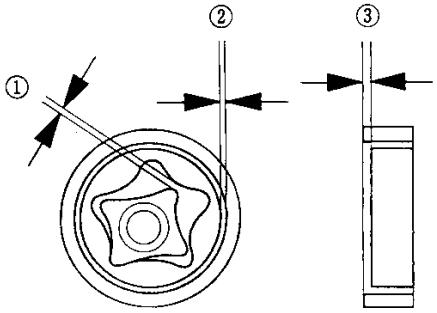
When ordering coloured parts, specify a model name and a colour code.

Item			Specification
Name			HONDA VT250/V25
Length			2,315mm
Width			845mm
Height			1,055mm
Wheel base			1,620mm
Powerplant type			MC15E
Total displacement			0.249∝
Fuel			Petrol/Unleaded
Vehicle weight	Front axle		83kg
	Rear axle		100kg
	Total		183kg
Seating Positions			2
Gross weight	Front axle		103kg
	Rear axle		190kg
	Total		293kg
Tyre	Front		120 / 80 – 17 61S
	Rear		150 / 80 – 15M/C 70S
Minimum clearance (ground)			130mm
Brake – stop distance (initial speed)			14.0m (initial 50km/h)
Minimum turning radius			3.1m
Powerplant	Starting method		Electric
	Type of the powerplant		Petrol 4 cycle/stroke
	Cylinder		V 2 abreast
	Combustion chamber		Pentroof
	Valve operation		D O H C chain driven
	Bore X stroke		60.0 x 44.1mm
	Compression ratio		11.0
	Maximum output power		27 PS / 10,000rpm
	Maximum torque		2.3kg-m / 7,500rpm
	Valve operation timing	Inlet Open	15° BTDC (1mm lifted)
		Close	20° ABDC (1mm lifted)
		Exhaust Open	30° BBDC (1mm lifted)
		Close	0° TDC (1mm lifted)
	Lubrication		Compress splash combined
	Oil pump		Trochoid
	Oil filter		Total flow filter net-paper combined
	Cooling system		Water cooled (electric fan)
	Radiator		Colgate type (closed-sealed)
	Water pump		Centrifugal pump
Fuel System	Air cleaner		Filter paper type
	Carburettor	Type	VDD2
		Gas valve dia.	32mm
		Venturi dia.	Variable (max lift 29mm)

Item			Specification
Transmission	Clutch	Type	Multiple wet plate coil spring
		Operation	Mechanical
	Initial reduction	Type	Gear
		Reduction ratio	1.821 (79/28)
	Gear shift system	Type	Full time contact
		Operation	Left foot pedal
		Gear ratio First	2.733 (41/15)
		Second	1.800 (36/20)
		Third	1.375 (33/24)
		Fourth	1.111 (30/27)
		Fifth	0.965 (28/29)
	Final reduction	Type	Chain
		Reduction ratio	2.714 (38/14)
Wheels	Caster		35°00
	Trail		159mm
Steering	Steering angle	Left	38°
		Right	38°
Brake system	Type	Front	Hydraulic disc
		Rear	Mechanical leading / trailing shoe
Shock absorbing system	Suspension	Front wheel	Telescopic type
		Rear	Swing arm type
Frame			Double cradle
Frame number			MC29 – 1000001
Engine number			MC15E – 1200001

♦ Maintenance Date

Lubrication

Item		Standard	Service Limit
Engine oil capacity	Total capacity	2.4∝	
	Oil change	1.9∝	
	Oil and filter change	2.1∝	
Recommended oil (select the proper viscosity grade which matches your operating temperature range)		Honda Genuine GP (4 cycle motorcycle) SAE10W-40 or SAE20W-50	
			
Oil pressure (at the oil pressure switch mount area)		5.0-6.0kg/cm² (5,000rpm/80°c)	
Oil pump	① tip clearance	0.15mm	0.20mm
	② body clearance	0.15 – 0.22mm	0.35mm
	③ side clearance	0.02 – 0.07mm	0.10mm
			

Cooling System

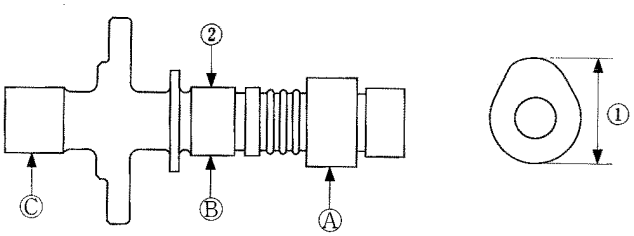
Item		Standard	Service Limit
Coolant	Total	1.1∝	
	Reserve tank capacity	0.2∝	
	Standard density	30%	
Radiator cap valve opening pressure		1.1 – 1.4kg/cm²	
Thermostat	Valve opening temp (initial)	80 - 84°c	
	Valve full-open temp.	95°c	
	Full open lifting	8mm or more	

Fuel System

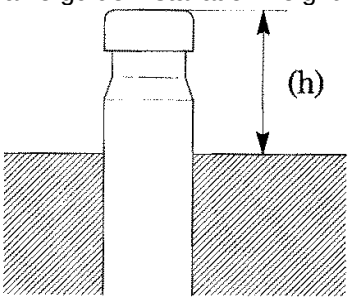
Item			Standard	Service Limit
Fuel tank capacity			11∝	
Carburettor	Setting mark		VDD2A	
	Main jet	Front	#110	
		Rear	#108	
	Slow jet		#35	
	Pilot screw opening			
	Standard		3 revs rewind	
	After idle drop		1 rev rewind	
	Float level		6.8mm	
Inter cylinder synchronised pressure difference			40mm Hg or less	
	Base carburettor		Rear cylinder carburettor	
Idling rpm			1,200 ± 100rpm	
Throttle grip free play (at the grip flange)			2 – 6mm	

Cylinder Head, Valve

Item			Standard	Service Limit
Cylinder compression			13.0 ± 2.0kg/cm² - 400rpm	
Valve clearance	IN		0.15 – 0.19mm	
	EX		0.20 – 0.24mm	
Cylinder head distortion				0.10mm
Cam shaft	① Cam height	IN	32.4612 – 32.6212mm	32.4412mm
		EX	32.3085 – 32.4685mm	32.2885mm
	② Deflection (at journal)			0.02mm



Journal external dia.	A, C	21.949 – 21.970mm	21.939mm
	B	21.861 – 21.882mm	21.851mm
Cam shaft journal oil clearance	A, C	0.030 – 0.091mm	0.111mm
	B	0.118 – 0.181mm	0.201mm
Locker arm internal diameter		10.000 – 10.015mm	10.025mm
Locker arm shaft external diameter		9.972 – 9.987mm	9.962mm
Valve stem external dia.	IN	4.975 – 4.990mm	4.97mm
	EX	4.955 – 4.970mm	4.95mm
Valve guide internal dia.	IN	5.000 – 5.012mm	5.04mm
	EX	5.000 – 5.012mm	5.04mm
Valve stem guide clearance	IN	0.010 – 0.037mm	0.07mm
	EX	0.030 – 0.057mm	0.09mm
Valve guide installation height	(h)	11.4 – 11.6mm	

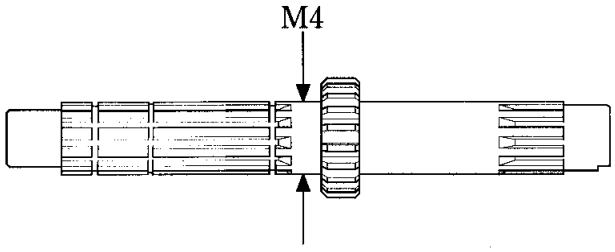
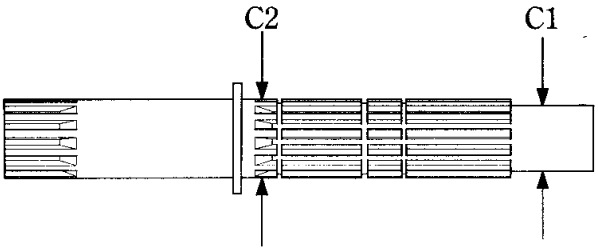


Valve seat contact width	1.0mm	
Valve spring relaxed length	36.42mm	34.72mm

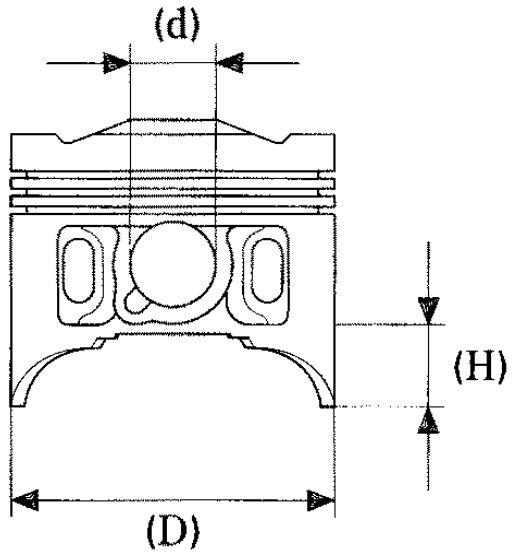
Clutch

Item		Standard	Service Limit
Clutch lever free play		10 – 20mm	
Clutch outer internal diameter		29.000 – 29.021mm	29.06mm
Clutch outer guide	External diameter	28.967 – 28.980mm	28.93mm
	Internal diameter	21.995 – 22.015mm	22.05mm
Oil pump drive sprocket internal dia		29.025 – 29.075mm	29.11mm
Clutch spring relaxed length		34.79mm	33.9mm
Clutch disc thickness	A	3.62 – 3.70mm	3.3mm
	B	2.9 – 3.0mm	2.6mm
Clutch plate distortion		-	0.30mm

Transmission

Item		Standard	Service Limit
Gear shift pattern		1 – N – 2 – 3 – 4 – 5	
Gear internal dia.	M4,M5	25.000-25.021mm	25.05mm
	C1	23.000-23.021mm	23.05mm
	C2, C3	28.000-28.021mm	28.05mm
Gear bush external dia.	M4, M5	24.959-24.980mm	24.92mm
	C1	22.959-22.980mm	22.92mm
	C2, C3	27.959-27.980mm	27.92mm
Gear bush internal dia.	M4	21.985-22.006mm	22.07mm
	C1	20.020-20.041mm	20.06mm
	C2	25.000-25.021mm	25.05mm
Gear bush clearance	M4,M5,C1,C2,C3	0.020-0.062mm	0.10mm
Main shaft external dia.	M4 bush	21.959-21.980mm	21.92mm
			
Counter shaft external dia.	C1 bush	19.987-20.000mm	19.97mm
	C2 bush	24.967-24.980mm	24.95mm
			
Bush shaft clearance	M4 bush	0.005-0.047mm	0.15mm
	C1, C2 bush	0.020-0.054mm	0.15mm
Shift fork	Catch thickness	5.93-6.00mm	5.60mm
	Internal diameter	12.000-12.021mm	12.04mm
Shift fork shaft external diameter		11.969-11.980mm	11.90mm

Cylinder, Piston

Item			Standard	Service Limit
Cylinder	Internal diameter		60.000 – 60.015mm	60.10mm
	Top surface distortion		-	0.10mm
	True-circle		-	0.05mm
	True-cylinder		-	0.05mm
Piston	External diameter (D)		59.970 – 59.990mm	59.86mm
	D-measuring point (H)		-	-
	Pin hole diameter (d)		16.002 – 16.008mm	16.028mm
				
Cylinder – Piston clearance			0.010 – 0.045mm	0.10mm
Piston pin external diameter			15.994 – 16.000mm	15.98mm
Piston – Piston pin clearance			0.002 – 0.014mm	0.048mm
Piston pin – Conrod clearance			0.016 – 0.040mm	0.10mm
Piston ring	Ring groove-ring clearance	Top	0.025 – 0.060mm	0.10mm
		Second	0.025 – 0.055mm	0.10mm
	Ring cut out	Top	0.20 – 0.35mm	0.65mm
		Second	0.20 – 0.35mm	0.50mm
		Side rail	0.20 – 0.70mm	0.85mm
	Installing – direction work	Top	R mark towards top	-
		Second	R N mark towards top	-

Crankshaft

Item		Standard	Limitation
Crankshaft type		Forged one-piece crankshaft	-
Crankshaft bearing type		Split plane bearing	-
Conrod	smaller end internal diameter	16.016 - 16.034mm	16.08mm
	bigger end side clearance	0.1 – 0.3mm	0.4mm
Crankpin oil clearance		0.028 – 0.052mm	0.07mm
Conrod bearing selection		(⇨ 11-14)	-
Main journal oil clearance		0.028 – 0.052mm	0.07mm
Main bearing selection		(⇨ 11-14)	-

Front / Rear Wheel

Item			Standard	Service Limit
Tyre groove depth		Front		1.5mm
		Rear		2.0mm
Tyre air pressure	one person (normal/high speed)	Front	2.00kg/cm²	
		Rear	2.00kg/cm²	
	two people (normal)	Front	2.00kg/cm²	
		Rear	2.00kg/cm²	
Front axle deflection				0.2mm
Wheel	rim deflection	Radial		2.0mm
		Side		2.0mm
	balance weight	Front		60g
Drive chain	free play (when using a sidestand)		25 – 35mm	
	Size / links	DID	DID520V6 / 110	
		RK	RK520SMOZ2 / 110	

Front suspension

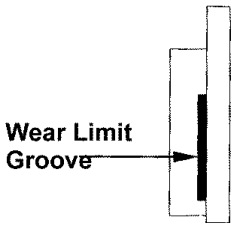
Item		Standard	Service Limit
Fork	Stroke	150mm	
	Pipe diameter	41mm	
	Spring relaxed length	329.2mm	319.3mm
	Pipe bent		0.20mm
	Oil type	Honda Ultra Cushion Oil #10	
	Oil level	150mm	
	Oil capacity	477cc	
Steering load		0.93 – 1.40kg	

Rear Suspension

Item		Standard	Service Limit
Rear suspension stroke		57.5mm	
Rear cushion	damper type	conventional type	

Brake System

Item		Standard	Service Limit
Front brake	Lever free play	10 – 20mm	
	Brake fluid type	DOT 4	
	Pad thickness		Up to the wear limit groove
	Disc thickness	4.8 – 5.2mm	4.0mm
	Disc deflection		0.1mm
	Master cylinder internal diameter	11.000 – 11.043mm	11.055mm
	Master piston external diameter	10.957 – 10.984mm	10.945mm
	Caliper cylinder internal diameter	25.400 – 25.450mm	25.460mm
	Caliper piston external diameter	25.335 – 25.368mm	25.310mm
Rear brake	Pedal free play	20 – 30mm	
	Lining thickness	5.0mm	2.0mm
	Drum internal diameter	160.0 – 160.3mm	161mm



Charging System, Alternator

Item			Standard	Service Limit
Alternator	Type		Three – phased AC	
	Output		332 W / 5,000rpm	
	Charging coil resistance (20°c)		0.1 – 1.0 Ω	
Regulator / Rectifier				
	Type		Three phased AC total regulate SCR short circuit	
	Regulated voltage		14 – 16V / 5,000rpm	
Battery	Capacity		12V – 6Ah	
	Charge current / time	Standard	0.7A / 5 – 10h	
		Rapid	3.0A / 1h	
	Leak current		0.1mm or less	
	Discharge voltage (20°c)	Full charge	13.0V or above	
		Charge req'd	12.3V or less	

Ignition System

Item			Standard	Service Limit
Ignition type			Full transistor battery ignition	
Ignition sequence			Front ⇨270° ⇨Rear ⇨ 450° ⇨ Front	
Spark plug	Standard		CR8EH – 9 (NGK) U24FER9 (NIPPON DENSO)	
	OP (High speed ops)		CR9EH – 9 (NGK) U27FER9 (NIPPON DENSO)	
	Plug gap		0.8 – 0.9mm	
Ignition timing	F mark		BTDC 10° / 1,200 ± 100rpm	
	Advance starting rpm		2,200rpm	
	Advance stop rpm		10,500rpm	
	Max. advance		35° / 10,000 ± 100rpm	
Ignition coil	Resistance			
	Primary coil		2–4 Ω	
	Secondary coil (with plug gaps)		15-21kΩ	
	Secondary coil (without plug gaps)		11-15kΩ	
	Peak voltage		100V or above	
Pulse generator	Resistance (20°c)		340 – 420 Ω	
	Peak voltage		0.7V or above	

Starting System

Item	Standard	Service Limit
Starter motor brush length	12.5 – 13.0mm	6.5mm
Starter clutch driven gear boss external diameter	42.175 – 42.200mm	42.16mm

Lamps, Instruments and Switches

Item		Standard	Service Limit
Main fuse		30A	
Sub fuse		10A x 3, 15A x 1	
Head lamp (Hi/Lo)		12V – 60 / 55W	
Stop / Tail lamp		12V – 23 / 8W	
Front turn signal / position lamp		12V – 23 / 8W x 2	
Rear turn signal lamp		12V – 23W x 2	
Turn signal pilot lamp		12V – 1.7W	
High beam pilot lamp		12V – 1.7W	
Neutral indicator		12V – 1.7W	
Instrument illumination lamps		12V – 3.4W	
Thermo – sensor resistance		130 - 180Ω / 50°c 45 - 60Ω / 80°c 10 - 20Ω / 120°c	
Fan motor switch activation temperature	OFF⇨ON ON⇨OFF	98 – 102°c 93 - 97°c	

Standard Torque Settings

Type	Torque	Type	Torque
5mm bolt, nut	0.5kg-m	5mm screw	0.4kg-m
6mm bolt, nut	1.0kg-m	6mm screw / SH flange bolt	0.9kg-m
8mm bolt, nut	2.2kg-m	6mm flange bolt, nut	1.2kg-m
10mm bolt, nut	3.5kg-m	8mm flange bolt, nut	2.7kg-m
12mm bolt, nut	5.5kg-m	10mm flange bolt, nut	4.0kg-m

Tighten with the above specified torque unless specified in the following table.

Notes:
1. Apply sealant
2. Apply screw locker
3. Stake
4. Apply engine oil to the screw and the seat
5. Apply grease
6. V – Nut
7. A lock nut (replace when removed)

Engine

Part	Number	Screw dia. (mm)	Torque (kg-m)	Notes
Lubrication:				
Oil drain bolt	1	12	3.0	
Oil filter centre bolt	1	12	1.8	
Oil pump mount bolt	3	6	1.2	
Oil pump cover bolt	3	6	1.3	
Oil pressure switch	1	-	1.2	Note 1
Oil pressure switch terminal bolt	1	4	0.23	
Oil pump driven sprocket bolt	1	6	1.5	Note 2
Cooling System:				
Water pump drain bolt	1	6	1.3	
Water pump housing cover bolt	1	6	1.3	
Fuel System:				
Boost joint	1	5	0.25	
Vacuum port plug	1	5	0.33	
Engine Mount / Dismount:				
Drive sprocket cover bolt	3	6	1.0	
Drive sprocket bolt	1	10	5.2	
Cylinder Head, Valve:				
Cylinder head cover bolt	8	6	1.0	
Spark plug	2	10	1.2	
Timing hole cap	1	45	1.8	Note 5
Cam shaft holder bolt 8mm UBS bolt	8	8	2.3	Note 4
8mm UBS bolt	4	8	3.4	Note 4
6mm UBS bolt	4	6	1.2	
6mm flange bolt	4	6	1.2	
Cylinder head bolt	4	8	3.4	Note 4
Cam sprocket bolt	4	7	1.9	Note 2
Valve adjust screw lock nut	4	5	1.0	Note 4
Locker arm shaft	4	20	5.0	Note 2
Cylinder head fin bolt	10	6	0.9	
Clutch:				
Clutch centre lock nut	1	20	8.5	Note 3,4
Gear shift linkage:				
Shift drum centre bolt	1	8	2.3	Note 2
Gear shift spindle return spring pin	1	8	2.5	

Part	Number	Diameter (mm)	Torque (kg-m)	Notes
Crankshaft, Piston and Transmission:				
Crankcase bolt 8mm UBS bolt	5	8	2.3	Note 4
8mm flange bolt	2	8	2.3	Note 4
6mm special bolt	1	6	1.2	Note 4
6mm flange bolt	10	6	1.2	Note 4
Conrod bearing cap nut	4	7	2.4	Note 4
Charging System, Alternator:				
Flywheel bolt	1	10	8.5	Note 4
Starter, Starter Clutch:				
Primary drive gear bolt	1	10	8.5	Note 4
Starter clutch bolt	3	8	2.8	Note 2
Starter motor terminal nut	1	6	1.2	
Starter motor bolt	2	5	0.5	
Lamps, Instruments and Switches:				
Neutral switch	1	10	1.2	
Others:				
6mm SH flange bolt	-	6	1.0	

Frame

Part	Number	Diameter (mm)	Torque (kg-m)	Notes
Exterior Parts, Muffler:				
Exhaust pipe joint nut	4	6	1.3	
Muffler mount bolt	1	8	2.7	
Exhaust pipe band bolt	3	8	2.0	
Muffler protector bolt	1	6	1.3	
Front exhaust pipe mount bolt	1	8	2.7	
Cooling System:				
Radiator mount bolt	2	6	1.2	
Radiator side cover bolt	4	6	1.2	
Fan motor switch	1	16	1.8	
Thermo – sensor	1	-	0.9	Note 1
Fuel System:				
Fuel cock mount bolt	1	18	2.7	
Carburettor side cover bolt	4	5	0.4	
Air cleaner stay mount bolt	2	6	0.9	
Engine Mount:				
Front engine mount nut	1	10	4.5	
Rear lower engine mount nut	1	10	4.5	
Rear upper engine mount nut	1	10	4.5	
Carburettor side cover stay bolt	2	6	0.9	
Gear shift arm bolt	1	6	1.6	
Main step holder bolt	4	8	2.7	

Torque	Number Of parts	Diameter (mm)	Torque (kg-m)	Notes
Front Wheel, Suspension and Steering:				
Front master cylinder holder bolt	2	6	1.2	
Clutch lever bracket holder bolt	2	6	1.2	
Handle mount nut	2	12	7.0	
Front axle bolt	1	14	6.0	
Front axle holder strip bolt	4	8	2.2	
Front brake disc bolt	6	8	4.3	Note 7
Front caliper mount bolt	2	8	3.1	Note 7
Front fender bolt	4	6	1.2	
Fork top bridge split bolt	2	8	2.7	
Fork bottom bridge split bolt	2	10	4.0	
Fork cap	2	37	2.3	
Fork drain bolt	2	6	0.8	
Fork socket bolt	2	8	2.0	Note 2
Brake hose clamp nut	2	6	1.2	Note 6
Steering stem nut	1	24	10.5	
Steering bearing adjust nut	1	26	3.1	Note 4
Rear Wheel, Suspension:				
Rear axle nut	1	16	9.0	Note 6
Rear brake stopper arm nut	2	8	2.2	
Final driven sprocket nut	5	10	6.5	Note 6
Rear cushion upper mount bolt	2	6	0.9	
Rear cushion lower mount bolt	2	10	3.8	
Swing arm pivot nut	1	14	9.0	Note 6
Drive chain slider screw	2	5	0.6	
Drive chain adjuster lock nut	2	8	2.2	
Brake System:				
Bleed valve	1	8	0.6	
Pad pin plug	1	10	0.25	
Pad pin	1	10	1.8	
Brake hose oil bolt	2	10	3.5	
Front brake lever pivot bolt	1	6	0.1	
Front brake lever pivot nut	1	6	0.6	
Front brake switch screw	1	4	0.12	
Front brake reservoir cap screw	2	4	0.15	
Front caliper pin bolt A	1	8	2.3	Note 2
Front caliper pin bolt	1	8	1.3	Note 2
Rear brake arm bolt	1	8	2.9	Note 7
Rear brake pedal pivot bolt	1	8	2.7	
Rear brake middle arm bolt	1	8	2.7	
Lamps, Instruments and Switches:				
Main switch mount bolt	2	6	1.0	
Side stand switch bolt	1	6	1.0	
Others:				
Side stand pivot bolt	1	10	1.0	
Side stand pivot lock nut	1	10	3.0	
Gear shift pedal pivot bolt	1	8	2.7	

Special Tools

Tool Name	Tool Number	Application
Inspection / Adjustment:		
Drive chain cutter	07HMH-MR10102	Drive chain replacement
Cam shaft lifter	07GMG-KV00100	Valve clearance adjustment/inspection
Valve adjust driver	07GMA-KT80110	Valve clearance adjustment
Valve adjust wrench 8 x 9mm	07708-0030100	
Lubrication:		
Oil pressure gauge	07506-3000000	Oil pressure measurement
Oil pressure gauge attachment	07510-4220100	
Fuel System:		
Float level gauge	07401-0010000	Float level adjustment
Cylinder Head, Valve:		
Valve spring compressor	07757-0010000	Valve cotter removal/installation
Valve compressor attachment	07959-KM30101	
Valve guide driver	07942-MA60000	Valve guide removal/installation
Valve guide reamer, 5.010mm	07984-MA60001	Valve guide cleaning/finishing
Valve seat cutter		
45° seat surface cutter 24.5mm (IN)	07780-0010100	Valve seat adjustment
45° seat surface cutter 22mm (EX)	07780-0010701	
32° plain cutter 24mm (IN)	07780-0012500	
32° plain cutter 22mm (EX)	07780-0014202	
60° internal surface cutter 22mm (IN,EX)	07780-0014202	
Cutter holder 5.0mm	07781-0010400	
Clutch:		
Lock nut wrench 17 x 27mm	07716-0020300	Clutch centre lock nut removal/installation
Clutch centre holder	07GMB-KT70101	
Front Wheel, Suspension and Steering:		
Fork seal driver	07947-KA50100	Fork guide bush, oil seal installation
Fork seal driver attachment	07947-KF00100	
Steering stem socket	07916-3710101	Steering bearing adjust nut removal/install
Steering stem driver	07946-MB00000	Steering bearing lower inner race install
Ball race remover	07953-MJ10000	Steering bearing upper outer race removal
- attachment	07953-MJ10200	
- handle	07953-MJ10200	
Bearing race remover	07946-3710500	Steering bearing lower outer race removal
Driver handle A	07749-0010000	Steering bearing outer race installation
Outer driver 42 x 47mm	07746-0010300	Steering bearing upper outer race install
Outer driver 52 x 55mm	07746-0010400	Steering bearing lower outer race install
Rear Wheel and Suspension:		
Driver shaft	07946-MJ00100	Swing arm pivot bearing removal
Bearing remover attachment	07GMD-KT70200	Swing arm left pivot bearing removal
Driver handle A	07749-0010000	Swing arm pivot bearing installation
Outer driver 28 x 30mm	07946-1870100	Swing arm left pivot bearing installation
Pilot 22mm	07746-0041000	
Outer driver 32 x 35mm	07746-0010100	Swing arm right pivot bearing installation
Pilot 15mm	07746-0040300	
Brake System:		
Snap ring pliers	07914-3230001	Master cylinder snap ring removal/install

Tool Name	Tool Number	Application
Charging System, Alternator:		
Multimeter (SANWA)	07308-0020001	Regulate / Rectifier inspection
Multimeter (KOWA)	TH – 5H	
Universal holder	07725-0030000	Flywheel removal / installation
Rotor puller	07733-0020001	
Ignition System:		
Peak voltage adapter	07HGJ-0020100	Peak voltage measurement
Starting System, Starter Clutch:		
Universal holder	07725-0030000	Primary drive gear bolt removal/installation

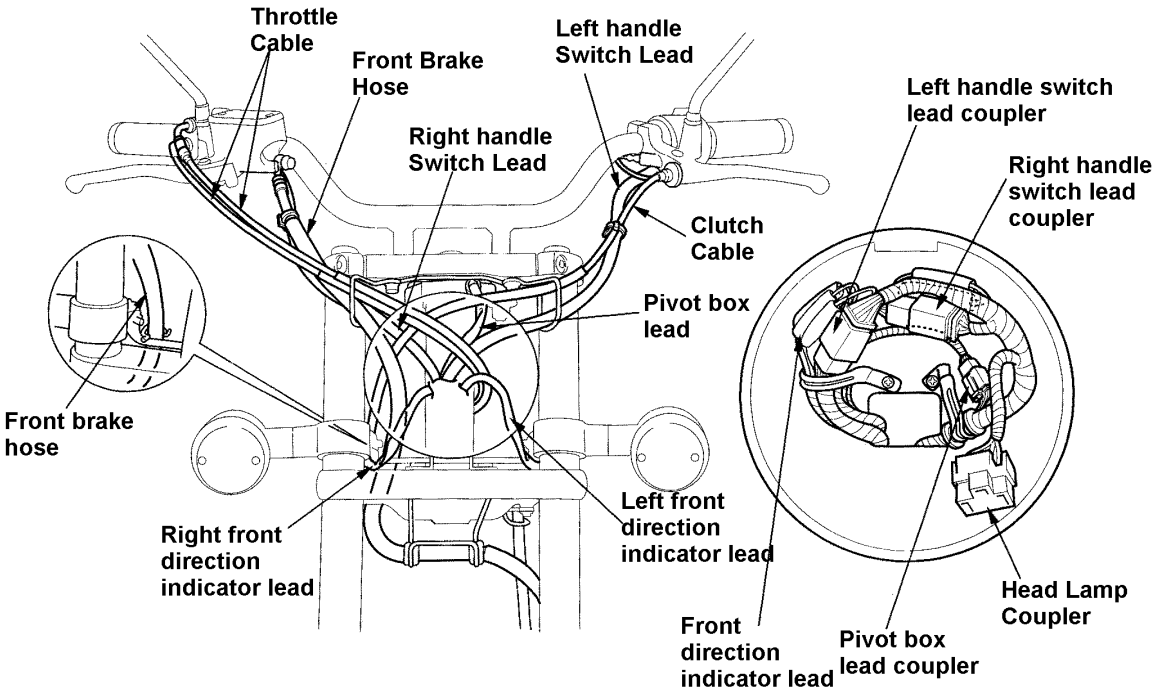
Engine

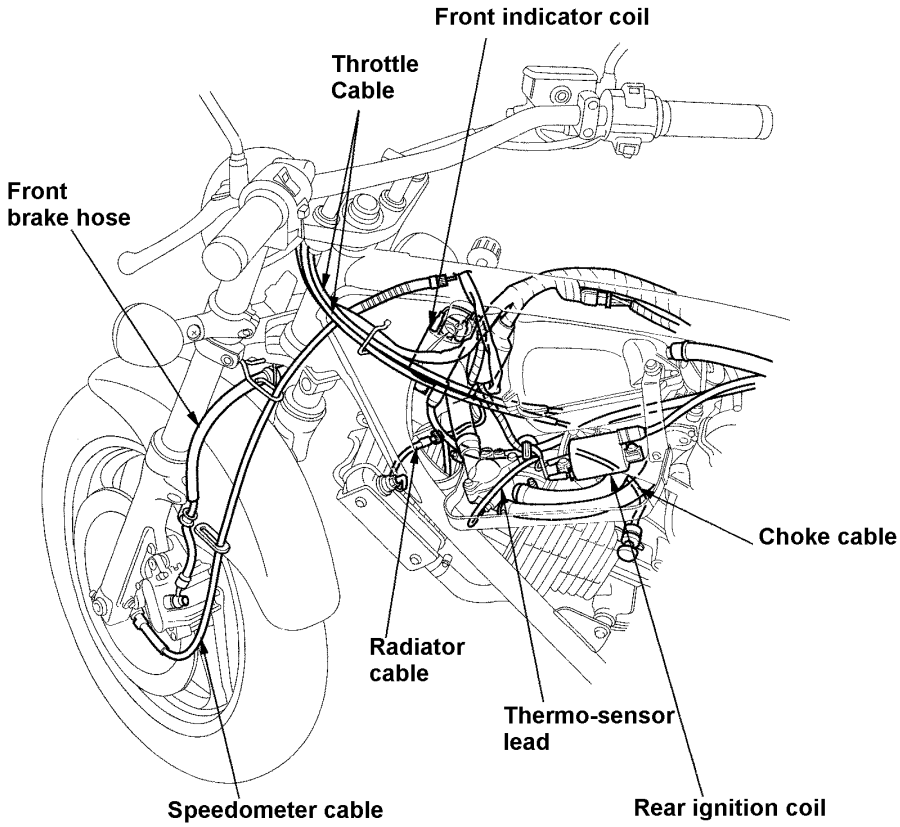
Application	Notes	Fluid Type
Crankcase 8mm UBS bolt thread, seat 8mm flange bolt thread, seat 6mm special bolt thread, seat 6mm flange bolt thread, seat Cylinder head bolt thread, seat Camshaft holder 8mm USB bolt thread, seat Piston external surface, piston pin hole Piston ring whole round Conrod bearing cap nut thread, seat Primary gear bolt thread, seat Flywheel, bolt thread, seat Valve adjust screw lock nut thread seat Clutch disc surface Clutch centre lock nut thread, seat Each bearing moving area Each O-Ring surface		Engine oil
Main bearing shaft holder / thrust surface Conrod bearing shaft holder surface Conrod small end internal diameter IN, EX valve stem (contact area with the valve guide) Locker arm contact surface, bearing Cam shaft cam surface, bearing Clutch outer contact surface M3, C4 and C5 gear (shift fork groove – all round) C1, C2, C3, M4 and M5 gear bush moving area Each gear matching area and bearings Each rotating contact surfaces		Molybdenum solution (engine oil): (Molybdenum grease) = 1:1
Crankcase contact surface ends Oil separator plate seal Breather joint Oil pressure switch thread Cylinder head half-round processed part	Do not apply to the main bearing. Do not apply to its end.	Sealant
Oil separator bolt thread Seal plate bolt thread Locker arm shaft thread Cam sprocket bolt thread Cam chain tensioner holder bolt thread Cam chain guide A, B bolts threads Oil pump driven sprocket bolt thread Shift drum bearing set plate bolt thread Shift fork shaft set plate bolt thread Shift drum centre bolt thread Starter clutch cover bolt thread Drive chain guide plate bolt thread	Coating width 6.5±1mm	Loctite
Timing hole cap thread Each oil seal lips		Multi purpose grease
Cylinder head cover gasket contact surface (cover side) Oil pan O-Ring groove	Wipe off any excess sealant	Bond (Cemedine #521)

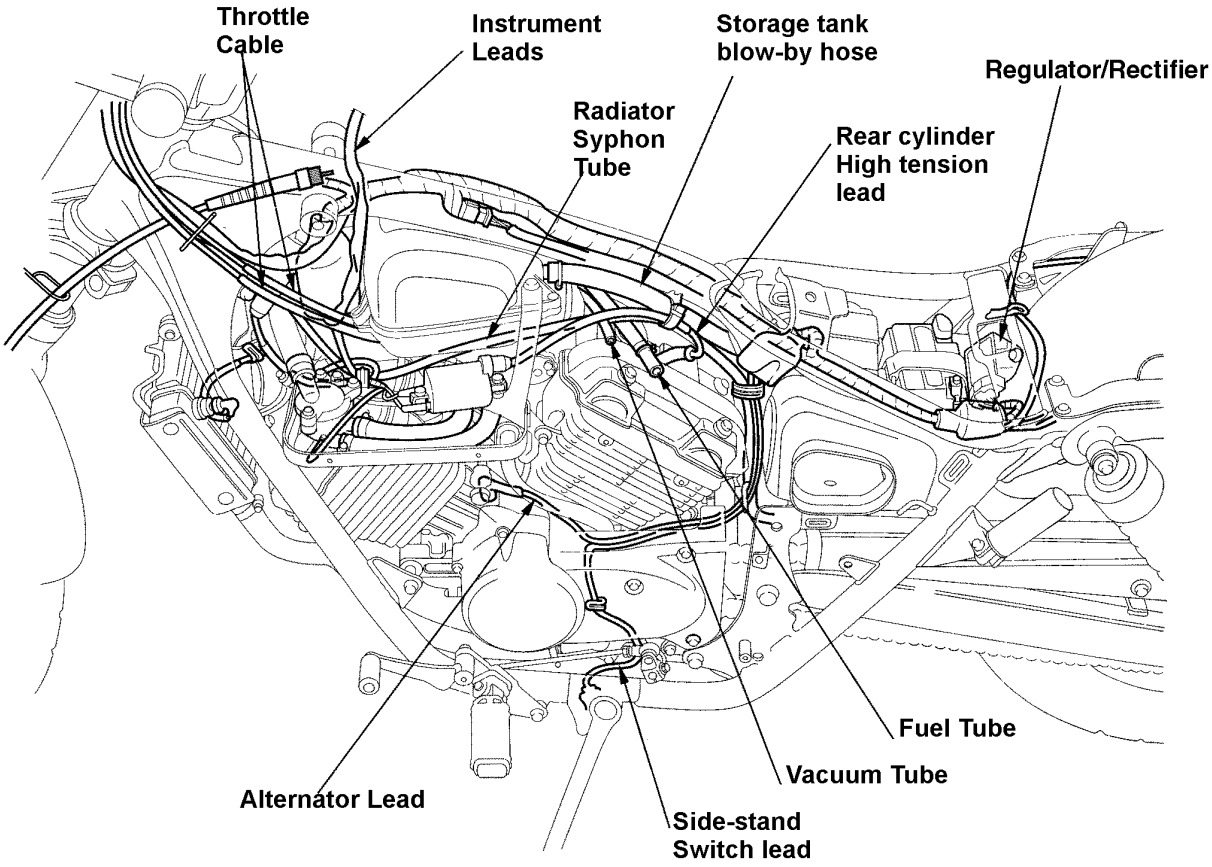
Frame

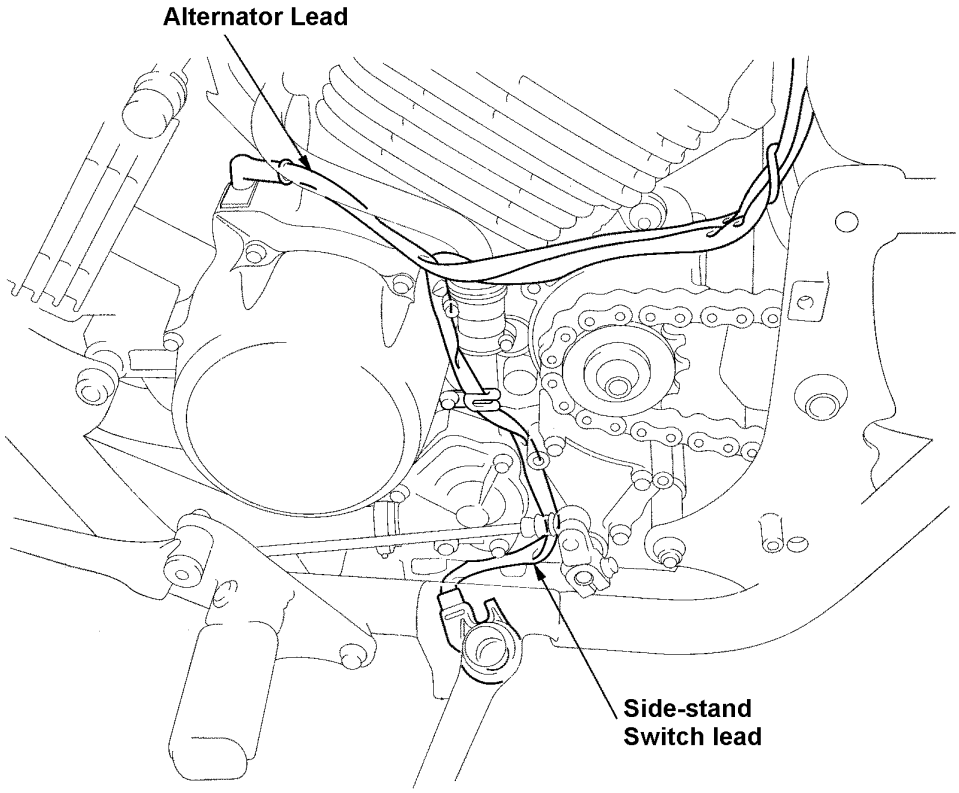
Application	Notes	Fluid Type
Rear brake spindle pivot contact surface Main step contact area Pillion step contact area Gear shift pedal pivot contact area Rear brake pedal pivot contact area Rear brake pedal rod pin contact area Clutch lever pivot bolt Rear wheel sleeve surface Rear wheel O-Ring groove, O-Ring Wheel dust seal, oil seal lip Swing arm dust seal surface Swing arm needle bearing Steering bearing Steering bearing dust seal lip Speedometer gearbox Speedometer gear / pinion Rear brake cam, shoe contact surface Rear brake anchor pin shoe contact surface		Multi purpose grease
Side stand pivot Throttle pipe winder		Molybdenum grease
Steering handle grip rubber		Honda bond A
Caliper cylinder internal surface Caliper piston external surface Caliper piston seal Master cylinder internal surface Master cylinder piston external surface Master cylinder piston cup		Brake fluid DOT 4
Brake lever pivot, piston contact area Caliper pin contact area Caliper pin boot internal surface		Silicone grease
Rear brake cam felt seal Steering bearing adjust nut thread		Engine oil
Front fork oil seal lip Front fork O-Ring external surface Front fork dust seal lip		Honda Ultra cushion oil #10
Caliper pin bolt thread Fork socket bolt thread		Loctite
Thermo-sensor thread		Sealant

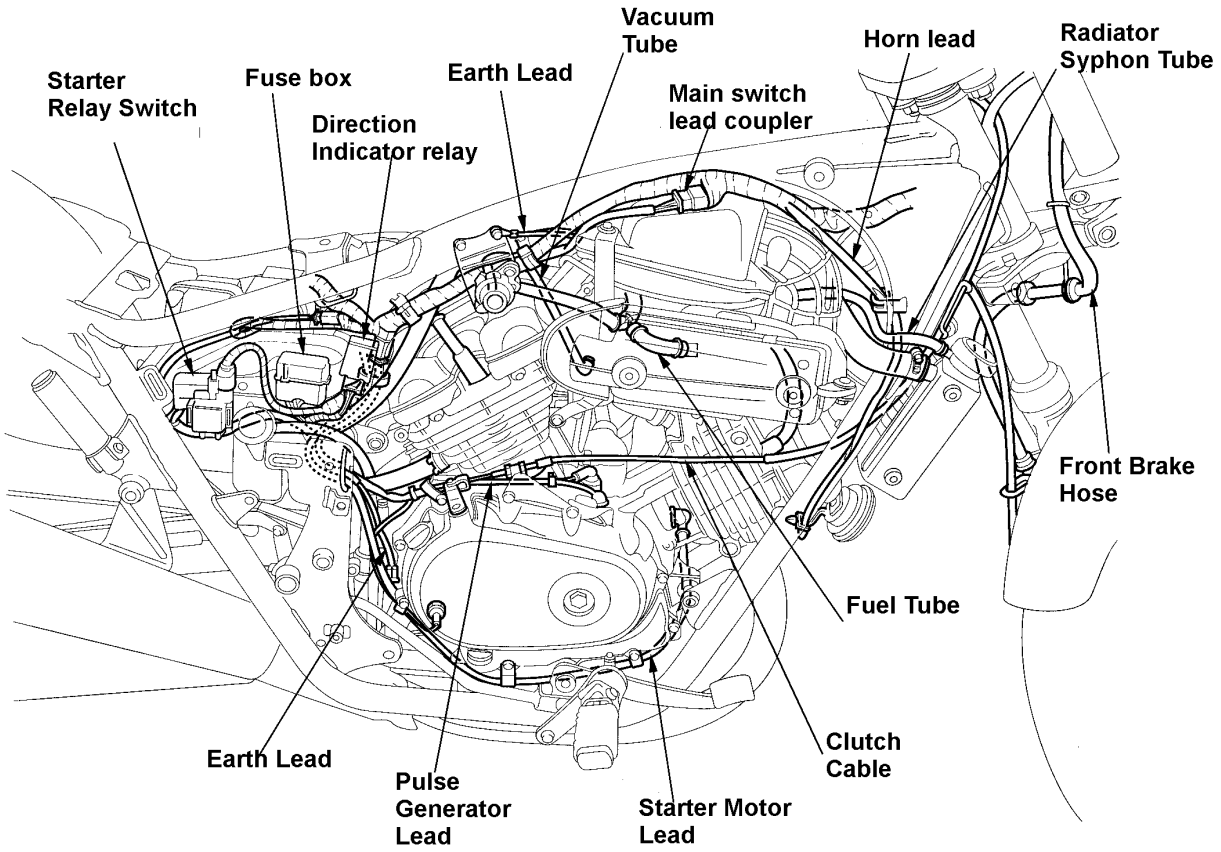
♦ **Wiring Diagram**

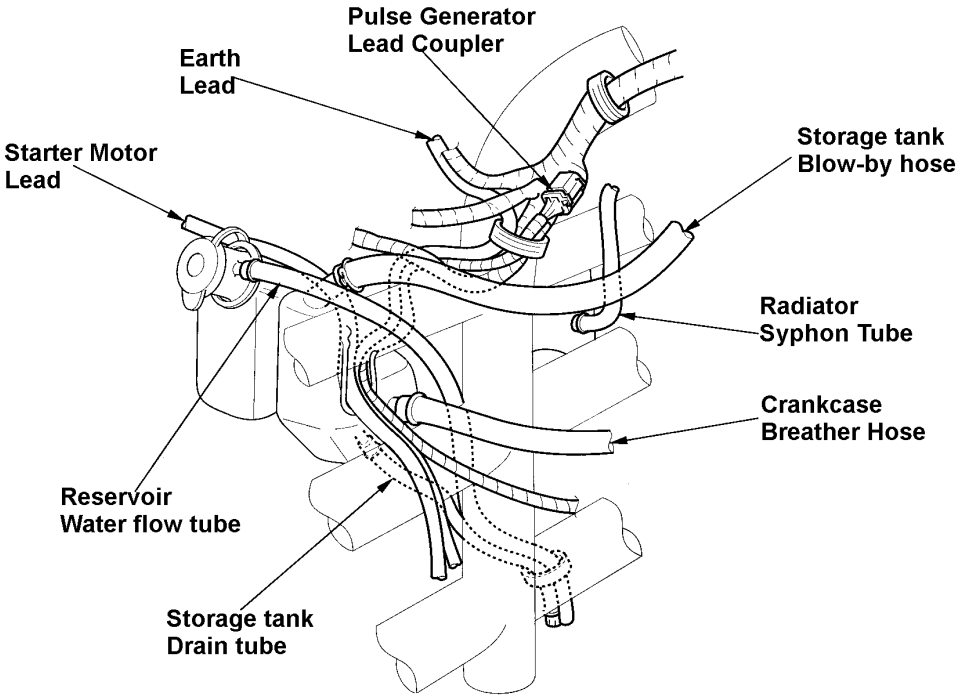


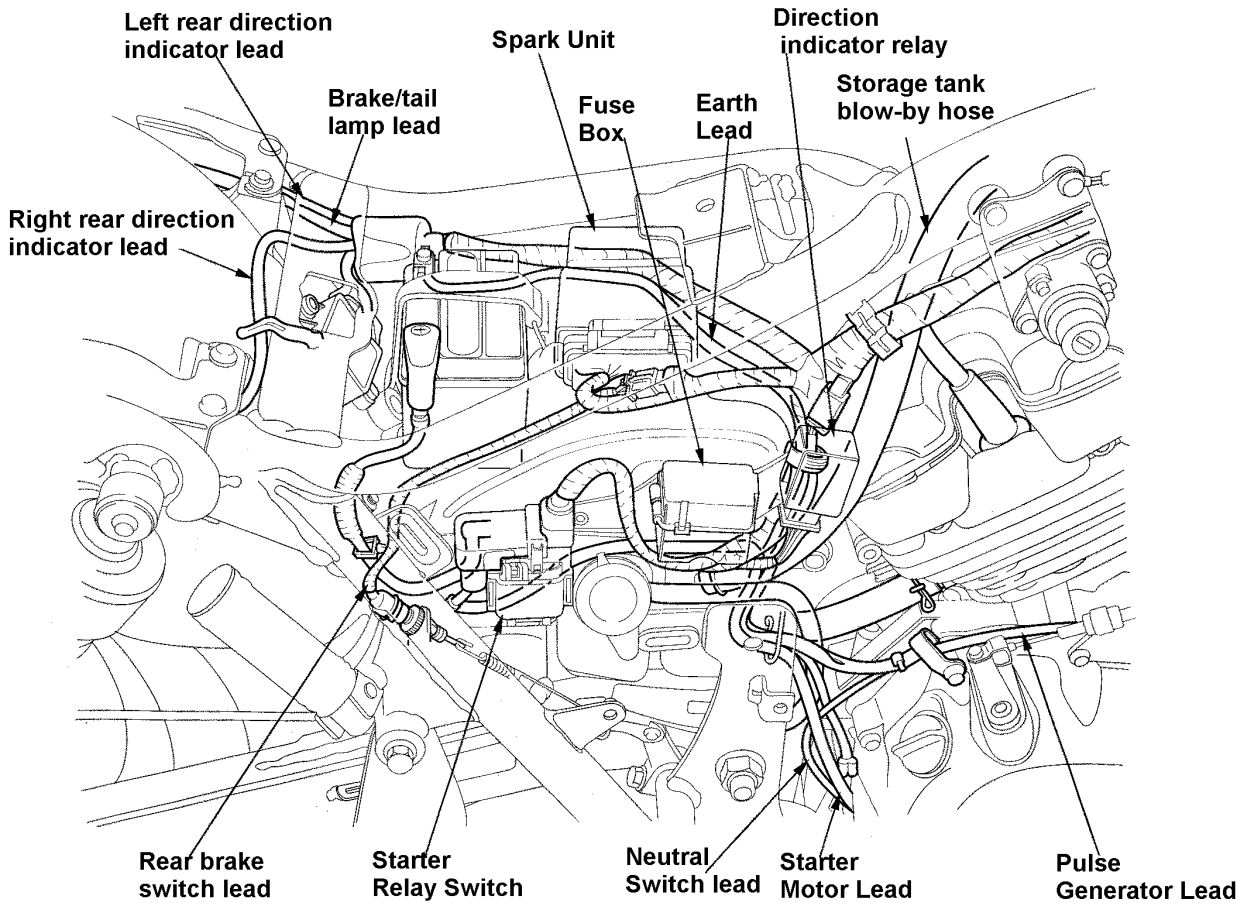


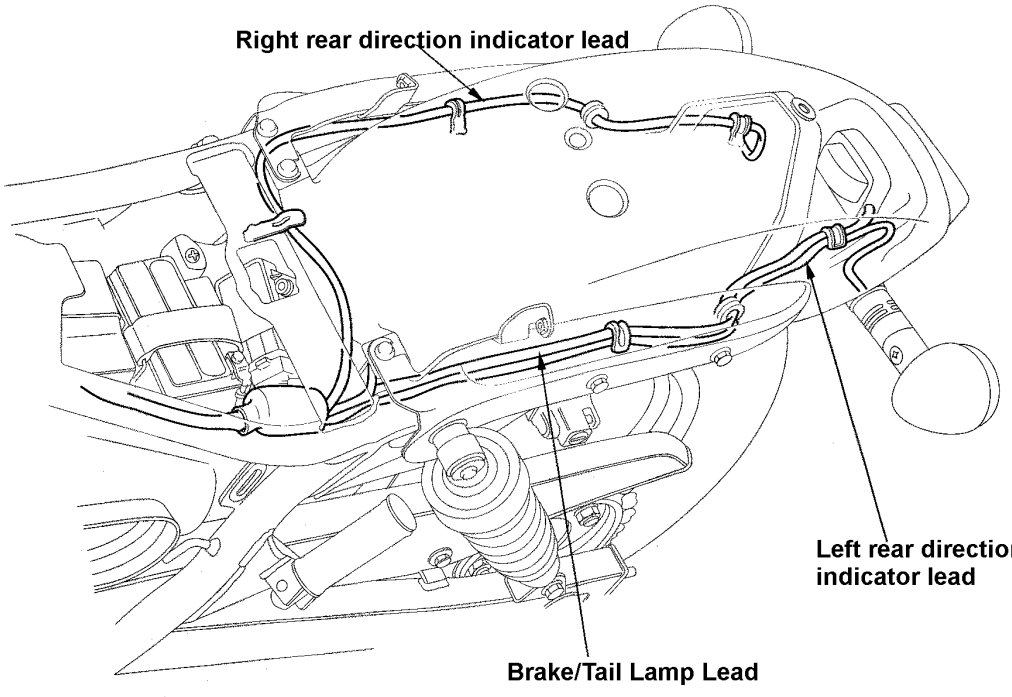

Throttle Cable
Instrument Leads
Storage tank blow-by hose
Regulator/Rectifier
Radiator Syphon Tube
Rear cylinder High tension lead
Fuel Tube
Vacuum Tube
Alternator Lead
Side-stand Switch lead


Alternator Lead
Side-stand Switch lead


Starter
Relay Switch
Fuse box
Direction
Indicator relay
Earth Lead
Vacuum
Tube
Main switch
lead coupler
Horn lead
Radiator
Syphon Tube
Front Brake
Hose
Fuel Tube
Clutch
Cable
Earth Lead
Pulse
Generator
Lead
Starter Motor
Lead


Pulse Generator
Lead Coupler
Earth
Lead
Starter Motor
Lead
Storage tank
Blow-by hose
Radiator
Syphon Tube
Crankcase
Breather Hose
Reservoir
Water flow tube
Storage tank
Drain tube


Left rear direction indicator lead
Spark Unit
Direction indicator relay
Brake/tail lamp lead
Fuse Box
Earth Lead
Storage tank blow-by hose
Right rear direction indicator lead
Rear brake switch lead
Starter Relay Switch
Neutral Switch lead
Starter Motor Lead
Pulse Generator Lead


Right rear direction indicator lead
Left rear direction indicator lead
Brake/Tail Lamp Lead

General Caution

- Petrol is highly flammable. Keep away from electrical spark as well as fire. Ventilate the working area.
- Muffler should be removed / installed when the engine is cool.

- Directions for removing / installing the exterior parts, the fuel tank and the muffler are given in this section.
- Refer to the wiring diagram for tubing / wiring.
- When removing the exterior parts, do not damage the projections or the grooves.
- Replace gaskets when removing / installing the muffler and the exhaust pipe.
- Check for exhaust leaks after installing the muffler.

Troubleshooting

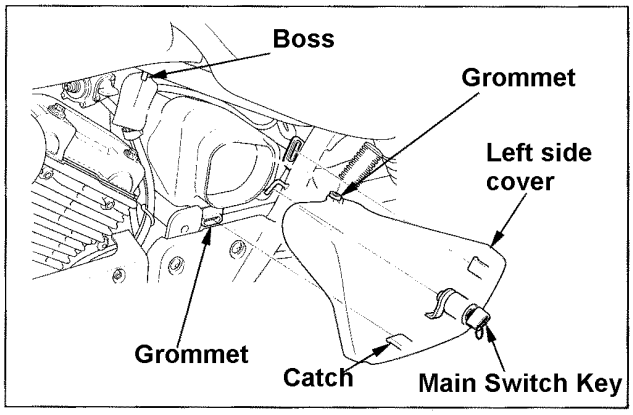
Excessive exhaust noise

- Muffler damaged
- Exhaust leak

Lack of power

- Muffler deformed
- Exhaust leak
- Muffler blocked

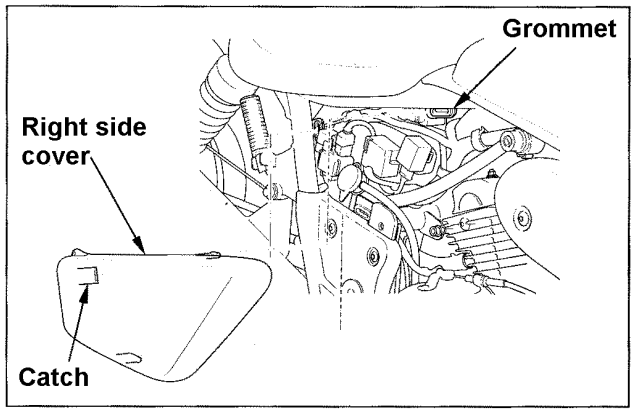
Left side cover removal / installation



Removal:
Insert the main switch key to the side cover lock cylinder and turn it right.
Pull a grommet on top of the side cover out from the frame boss. Then release the two catches from the grommets to remove the side cover.

Installation:
Insert the grommet to the frame boss. Insert the two catches to the frame grommets to install the side cover.
Turn the main switch key to the left to lock the cover.
Remove the key.

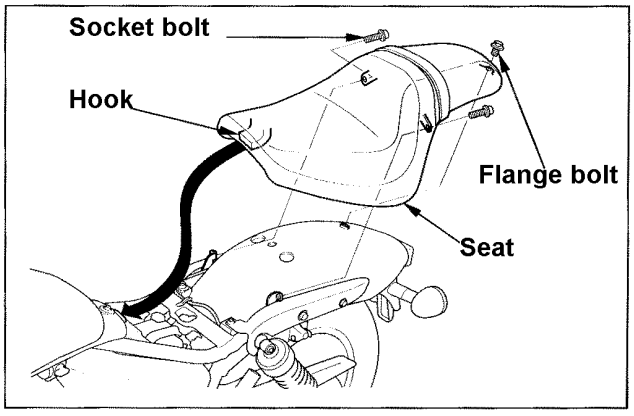
Right side cover removal / installation



Release three catches on the side cover from frame boss to remove the cover.

Reverse the procedure for its installation.

Seat removal / installation



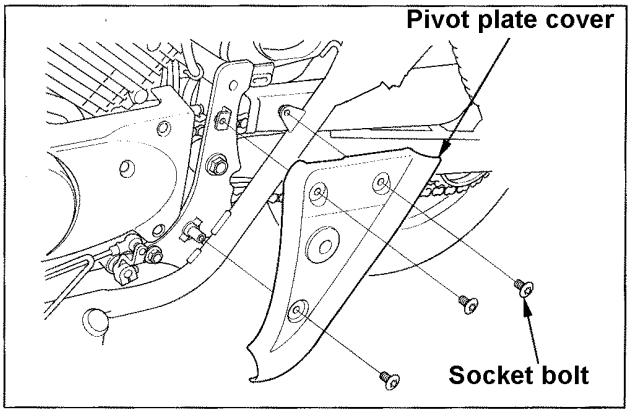
Remove two socket bolts and one flange bolt.
Release the hook in the front from the frame to remove the seat.

Reverse the procedure for its installation.

CAUTION

Firmly insert the hook to the bottom of the cross plate on the frame.

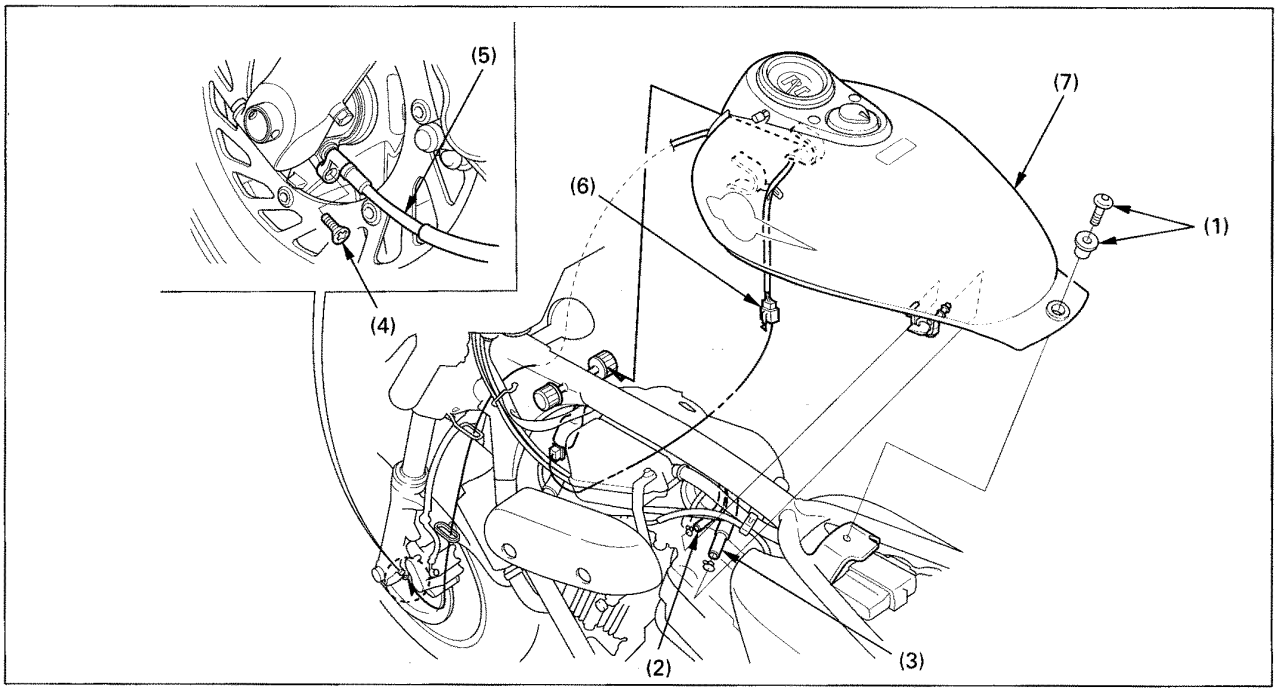
Pivot plate cover removal / installation



Remove three socket bolts to remove the pivot plate cover.

Reverse the procedure for its installation.

♦ Fuel Tank Removal / Installation



CAUTION

When removing fuel tank, remove speedometer cable set screw on the front wheel side and remove the cable together with the tank.

General Caution

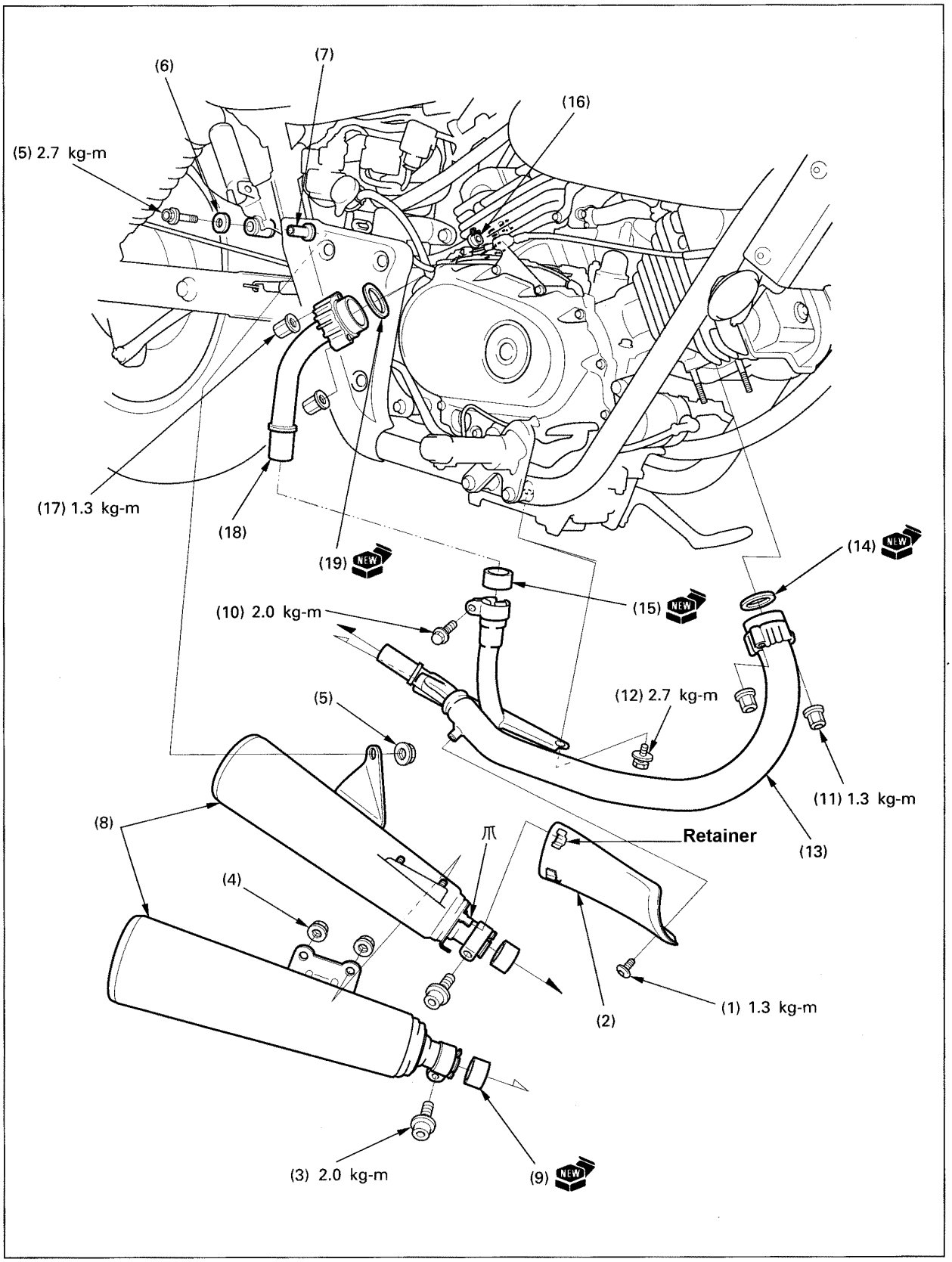
- Highly flammable.
- Wipe off spilt petrol immediately.

Relevant Works

- Seat removal / installation (2-2)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for its installation**
(1)	Mount bolt / collar	1/1	
(2)	Vacuum tube	1	
(3)	Fuel tube	1	Disconnect it after turning the fuel cock OFF.
(4)	Speedometer cable set screw	1	
(5)	Speedometer cable	1	Pass through cable clamp
(6)	Speedometer lead coupler	1	Disconnect after moving the fuel tank back.
(7)	Fuel tank	1	Set the hook to the frame mount rubber when installing.

♦ **Muffler and exhaust pipe removal/installation**



CAUTION

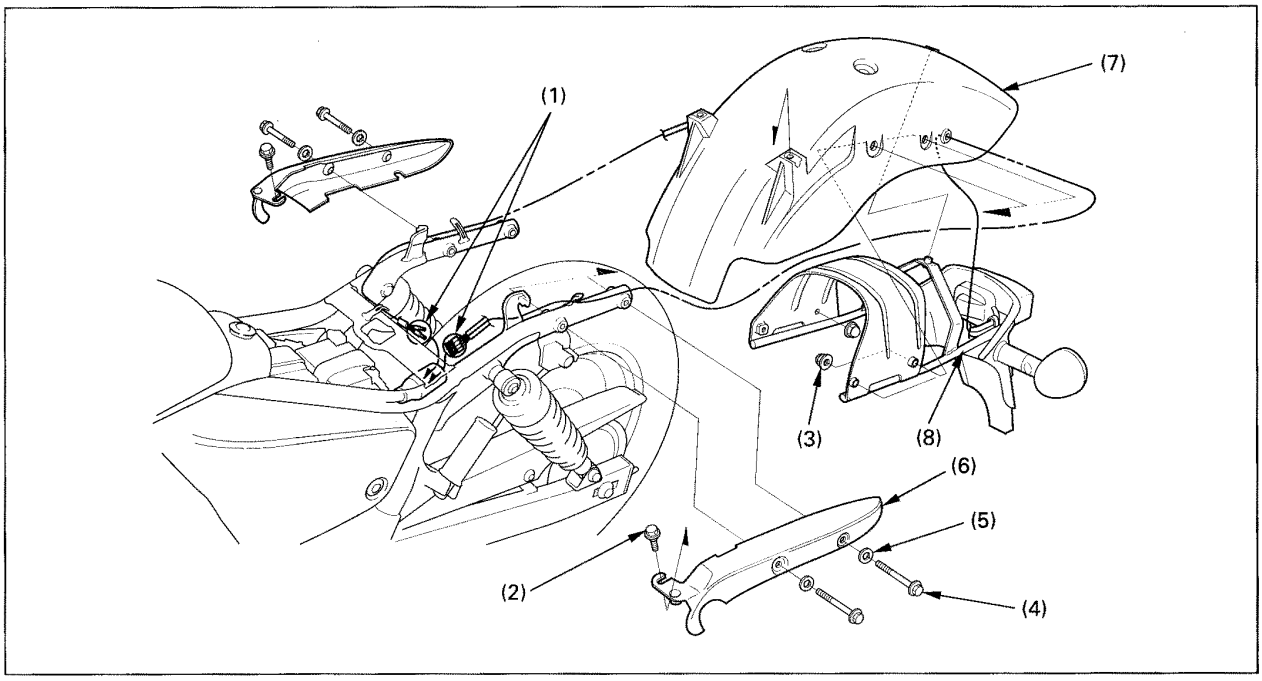
The muffler should be removed / installed when the engine is cool.

Relevant Works

- Left and Right side cover removal / installation (2-2)

Works / Parts		Qty.	Notes
	Removal		**Reverse the procedure for its installation**
(1)	Muffler protector bolt	1	
(2)	Muffler protector / grommet	1 / 2	Set the retainer to the two front muffler catches through grommet when installing.
(3)	Exhaust pipe band bolt	2	Loosen. No need to remove. Torques bolt (T40)
(4)	Rear muffler stainer bolt	2	
(5)	Muffler mount bolt / nut	1 / 1	Temporarily install and tighten the exhaust pipe band bolt first, when installing.
(6)	Washer	1	
(7)	Collar	1	
(8)	Front muffler / rear muffler	1 / 1	
(9)	Muffler seal	2	
(10)	Exhaust pipe band bolt	1	Loosen. No need to remove.
(11)	Exhaust pipe joint nut	2	
(12)	Front exhaust pipe mount bolt	1	Temporarily install and tighten the exhaust pipe joint nut and the band bolt first when installing.
(13)	Front exhaust pipe	1	
(14)	Exhaust pipe gasket	1	
(15)	Seal	1	
(16)	Crankcase breather tube	1	
(17)	Exhaust pipe joint nut	2	
(18)	Rear exhaust pipe	1	Disconnect the pipe from the joint and remove from the top
(19)	Exhaust pipe gasket	1	

♦ Rear Fender Removal/Installation



Relevant Works

- Seat removal / installation (2-2)

Works / Parts		Qty.	Notes
	Removal		**Reverse the procedure for its installation**
(1)	Direction indicator / tail lamp lead connector	7	
(2)	6mm bolt	2	Loosen
(3)	Cap nut	2	
(4)	8mm bolt	4	
(5)	Washer	4	
(6)	Rear side cover	2	
(7)	Rear fender	1	• Remove together with the rear frame. • Clamp the direction indicator / tail lamp leads correctly when installing.
(8)	Rear frame	1	

Service Information

1. Pre-operation inspection does include high speed operation inspection.
2. λ is a compulsory service schedule and μ is a manufacturers recommendation.
3. X means it does not apply.
4. O is a regular replacement of safety parts. The schedule is for general operation. If the operating environment is quite different from the standard, the schedule should be adjusted.
5. A “high speed operation” means an operation at or above 80km/h.

		Service Item	Schedule				Notes
			Pre-operation	1 month or 1000km	Every 6 months	Every 12 months	
Brake System	Hose	Brake hose replacement					O every four years
	Master/wheel cylinder, caliper	Master cylinder and wheel cylinder cups, dust seal and disc caliper rubber parts replacement.					O Bi-annual
	Brake pad	Pad wear			μ		Refer to 3 - 3
	Oil / grease	Brake fluid change					Annual
Powerplant	Main body	Air cleaner element change					Every 20,000km Inspect at each service
	Lubrication System	Engine oil change		μ			Initial one month or 1000km, then every 6000km.
		Oil filler change					Initial 13,000km, then every 12,000km
	Fuel System	Fuel hose change					O every four years
	Cooling System	Coolant change					O Bi-annual

Service Item			Schedule				Standard	Notes
			Pre-operation	1 month or 1000km	Every 6 months	Every 12 months		
Steering System	Handle	Free play, fit				λ		
		Movement				λ		
	Wheel	Turning (steering) angle				λ		
	Steering Fork	Damage			λ	λ		
		Fork spindle attachment			λ	λ		Steering stem
		Fork spindle bearing fit				λ		Steering stem
Brake System	Brake pedal	Free play and floor clearance when fully depressed			λ	λ	Freeplay pedal 20-30mm Lever (lever end) 10-20mm	
		Depressing surface and effectiveness	λ					
		Brake effectiveness		μ	λ	λ		
	Rod and cables	Fit and damage		μ		λ		
	Hose and pipe	Leak, damage and attachment		μ	λ	λ		
	Reservoir tank	Qty. level	λ		λ	λ	Qty level Front wheel: at or above MIN level	
	Master and wheel cylinder and disc caliper	Function, wear and damage				λ		
	Brake drum and brake shoe	Drum lining clearance			λ	λ		
		Shoe contact area and lining wear				λ		Indicator
		Drum wear and damage				λ	Diameter: Standard: Rear 160mm Limitation: Rear 161mm	

Service Item			Schedule: Pre-operation	Schedule: 1 month or 1000km	Schedule: Every 6 months	Schedule: Every 12 months	Standard	Notes
Brake System	Brake disc and pads	Disc pad clearance				λ		
		Pad wear				λ		Indicator
		Disc wear / damage				λ	Thickness: Standard: Front 5.0mm Limitation: Front 4.0mm	
Wheels	Wheels	Tyre pressure	λ	μ	λ	λ	Unit (kg/cm²) Front: One person Normal 2.00; One person High speed 2.00; 2 people Normal 2.00 Rear: One person Normal 2.00; One person High speed 2.00; 2 people Normal 2.00 Tyre specification: Front 120/80-17 61S; Rear 150/80-15M/C70s	Check daily
		Tyre crack, damage	λ	μ	λ	λ		Check daily
		Tyre mark depth and unusual wear	λ	μ	λ	λ	Marking depth Front: 0.8mm Rear: 0.8mm	
		Debris on tyres	λ	μ	λ	λ		
		Wheel nut and wheel bolt tightness			λ	λ	Front axle holder torque: 1.8~2.5kg-m Front axle bolt torque: 5.5~6.5kg-m Rear axle nut torque: 8.0~10.0kg-m	Axle nut and axle holder
		Rim, side line		μ		λ	Wheel rim deflection at rim end: Front Side 2.0mm or less Radial 2.0mm or less Rear Side 2.0mm or less Radial 2.0mm or less	
		Front wheel bearing fit				λ		

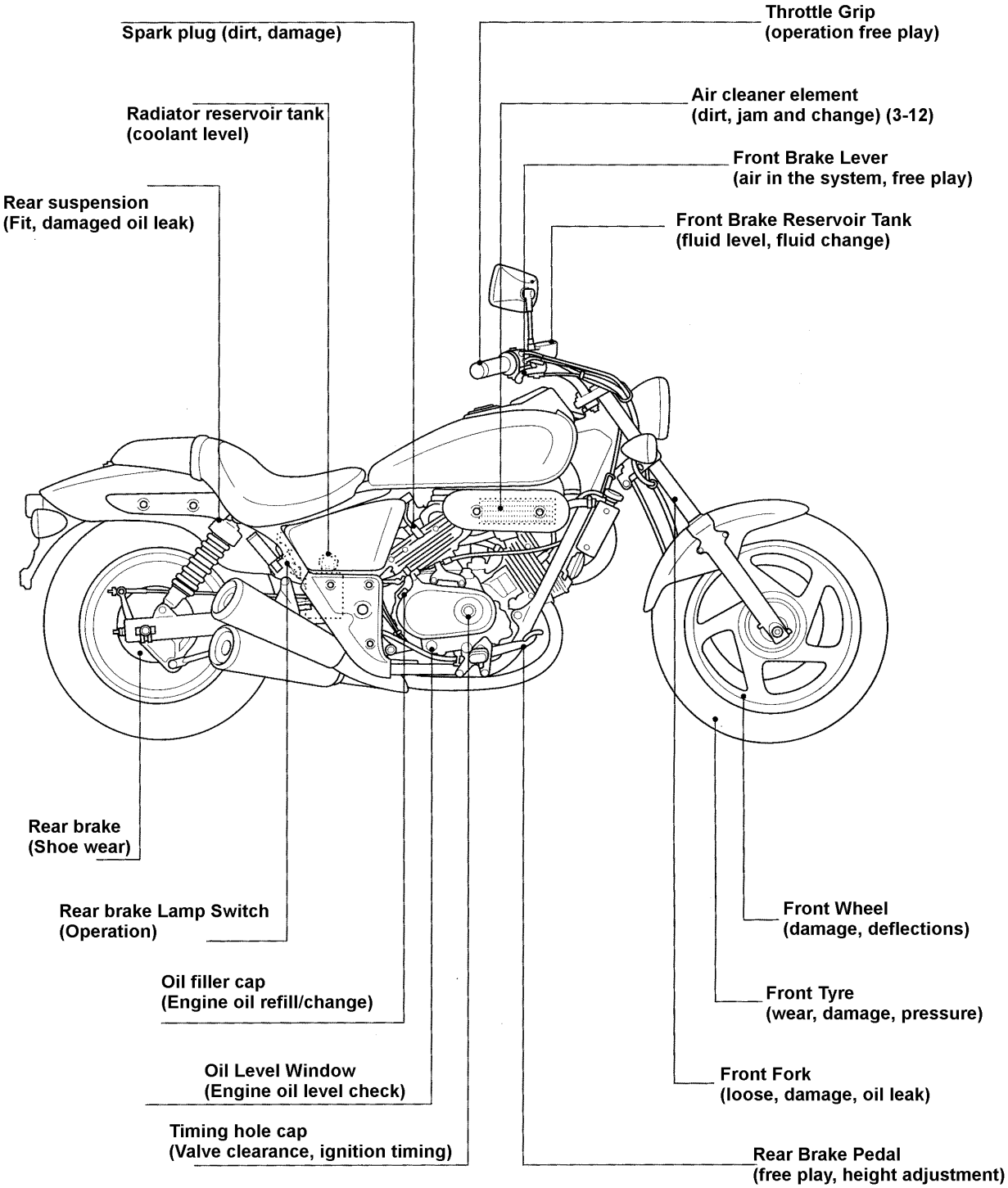
Service Item			Schedule				Standard	Notes
			Pre-operation	1 month or 1000km	Every 6 months	Every 12 months		
Wheels	Wheel	Rear wheel bearing attachment / fit				λ		
Dampers	Chassis springs	Damage				λ		Cushion spring
	Suspension arm	Joint fit and arm damage				λ		
	Shock absorber	Oil leak and damage				λ		
		Attachment				λ		
Power transmission system	Clutch	Lever free play			λ	λ	At lever end 10 ~ 20mm	
		Movement		μ	λ	λ		
	Transmission	Oil leak and oil quantity			λ	λ	Oil quantity Observation window between MIN – MAX.	
		Operation, fit				λ		
	Propeller and drive shaft	Joint fit			λ	λ		X
		Spline fit				λ		X
		Free joint fit				λ		X
	Chain and sprocket	Chain tension		μ	λ	λ	When using a side stand at the centre of front and rear sprockets, 20 ~ 25mm maximum deflection.	
		Sprocket attachment and wear				λ		

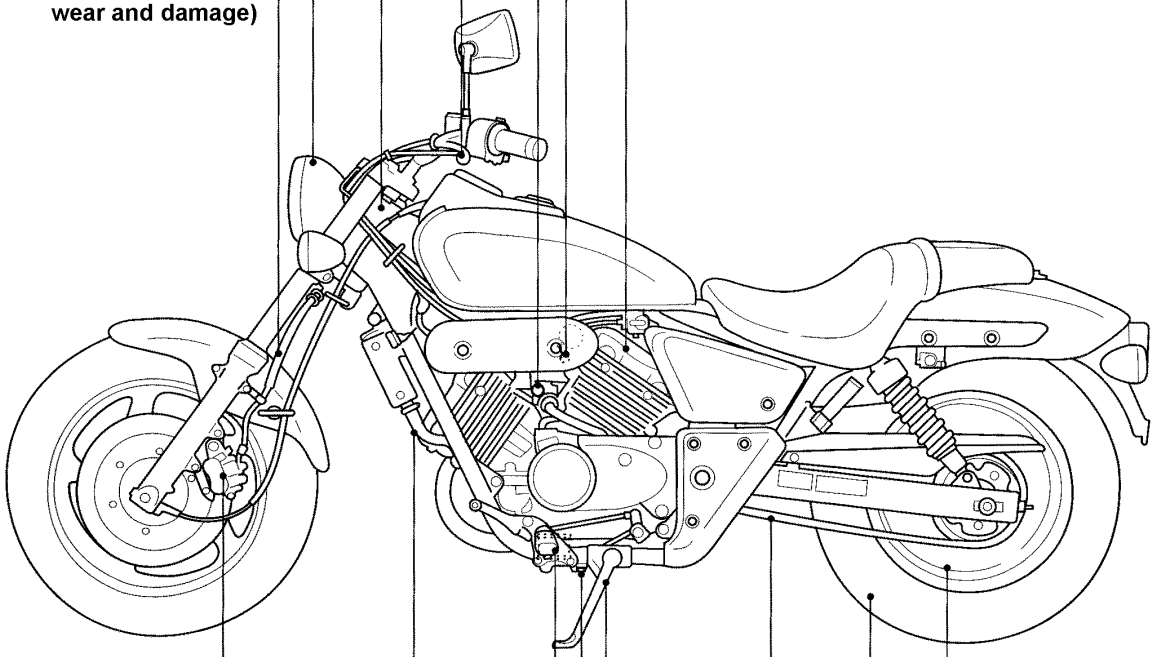
Service Item			Schedule				Standard	Notes
			Pre-operation	1 month or 1000km	Every 6 months	Every 12 months		
Electrical System	Ignition System	Spark plug condition			λ	λ	Plug gap 0.8 ~ 0.9mm	
		Ignition timing			λ	λ		Service not required (service free system)
		Pulse generator			λ	λ		Service not required (non – contact)
		Advancing system (incl. Delaying system)				λ		Service not required (electrical advancing system)
	Battery	Battery fluid level			λ	λ		Service not required (sealed module)
		Specific gravity				λ		Service not required (sealed module)
		Terminal connection				λ		
	Wiring	Connection				λ		
Powerplant	Main Body	Starting and noise			λ	λ		
		Low speed and acceleration		μ	λ	λ	Idling rpm 1,200 ± 100rpm	
		Exhaust gas			λ	λ		
		Air cleaner element			λ	λ		

Service Item			Schedule				Standard	Notes
			Pre-operation	1 month or 1000km	Every 6 months	Every 12 months		
Powerplant	Main Body	Valve Clearance		μ		λ	(cold engine) Intake: 0.15 ~ 0.19mm Exhaust: 0.20 ~ 0.24mm	
	Lubrication System	Oil dirt and quantity			λ	λ	Oil level observation window between MIN – MAX lines	
		Oil leak			λ	λ		
		Oil quantity	λ		μ			Check before each ride
		Oil Filter				λ		Inspection not required. Cartridge type.
	Fuel System	Fuel leak			λ	λ		
		Carburetor linkage system				λ		
		Throttle valve and choke valve				λ		
		Fuel filter				λ		
		Fuel quantity	λ					
	Cooling System	Coolant level	λ		λ	λ	Reservoir tank between MIN – MAX lines.	
		Coolant leak	λ			λ		
		Radiator cap function				λ	Valve opening pressure 1.1 ~ 1.4kg/cm²	
Lamps and Indicators		Operation			λ	λ		
		Flash, dirt and damage	λ					
Horn and Lock		Operation				λ		

Service Item		Schedule				Standard	Notes
		Pre-operation	1 month or 1000km	Every 6 months	Every 12 months		
Rearview Mirror	Mirror Image	λ					Rearview Mirror Inspect Daily
Reflector and registration plate holder	Dirt and Damage	λ					
Instruments	Operation				λ		
Exhaust Pipe and Muffler	Attachment and Damage				λ		
	Muffler Function				λ		
Chassis and body	Fit and Damage				λ		
Defects discovered on the previous days operation	Inspect the specific area.	λ					
Others	Chassis oil / greasing			λ	λ		

♦ Service Parts layout




Clutch Lever (free play)
Steering Head Bearing (damage)
Head Lamp (direction) (3-14)
Front Brake Hose (fluid leak, wear and damage)
Choke Knob (operation)
Throttle Stop Screw (idling r.p.m. adjustment)
Valve Clearance (inspection, adjustment) (3-13)
Front Brake Caliper (pad wear)
Radiator Hose (coolant leak, wear and damage)
Oil Filter (change)
Engine Oil Drain Bolt (engine oil change)
Rear Wheel (damage, deflection)
Rear Tyre (wear, damage and pressure)
Drive Chain (free play, greasing and adjustment)
Side Stand (operation)

Drive Chain

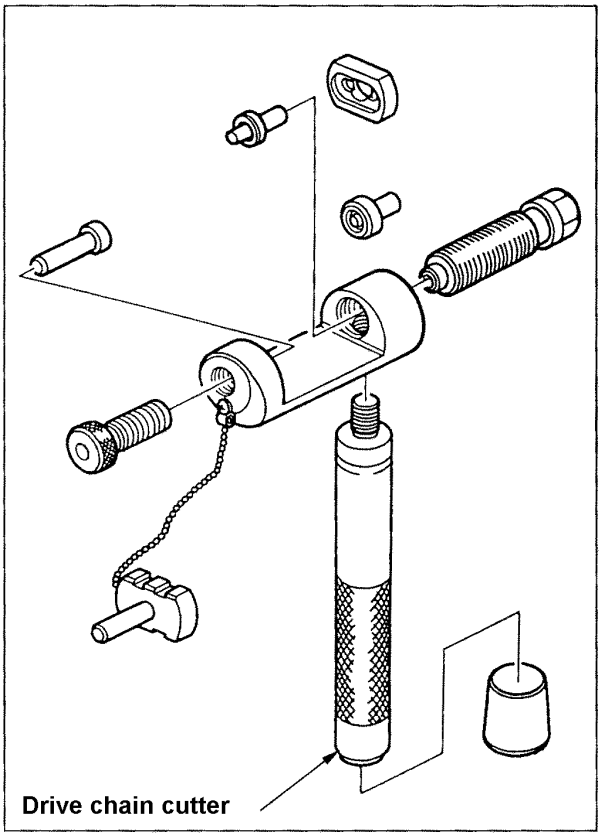
Replacement

CAUTION

- The master link joint pin is staked for the drive chain.
  Use special tool and chain
- Never use the clip-type chain.

Loosen the drive chain.
Assemble the tool.

Excl. tool	Drive chain cutter 07HMH-MR10102

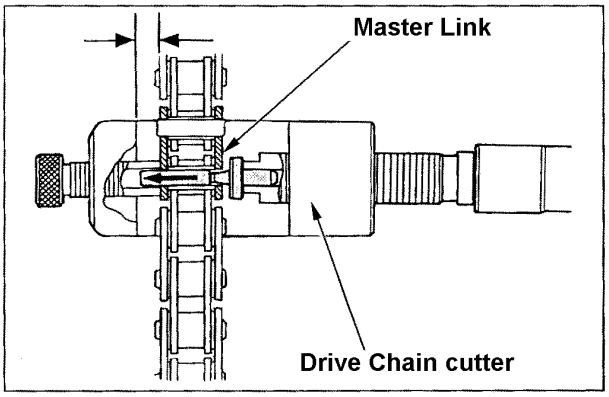


General Caution

Read the instructions before using the staking tool.

Set the tool and cut the staked part.

Excl. tool	Drive chain cutter 07HMH-MR10102

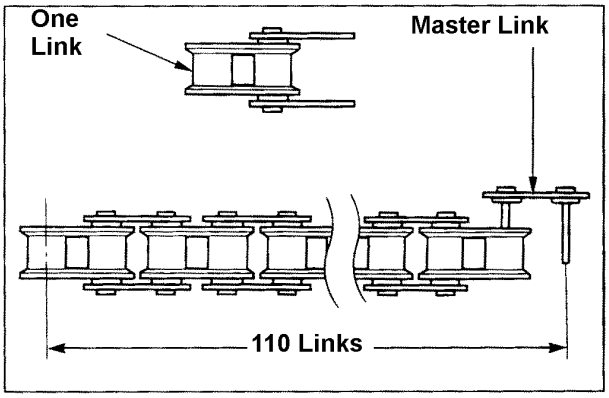


Adjust the number of the new drive chain links with a drive chain cutter.

CAUTION

Include the master link to the number of links.

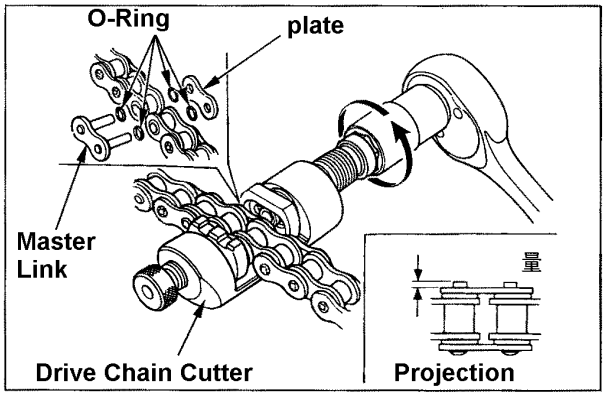
Standard links: 110 links
Replacement drive chain: DID520V6
RK520SM0Z2



CAUTION

Do not re-use the master link, the O-Rings or the link plate.

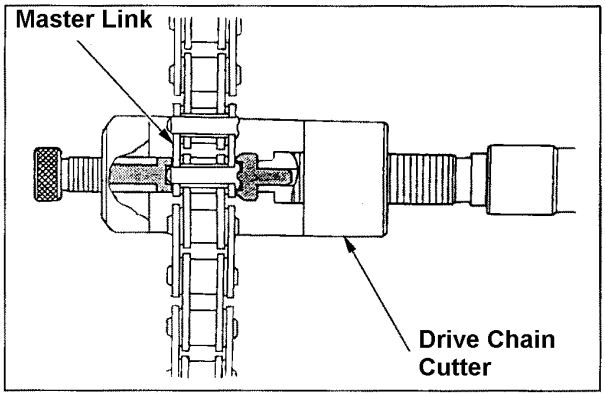
Set O-Rings to a new master link and install the master link from the inside of the chain.
Do not jam the O-Rings.



CAUTION

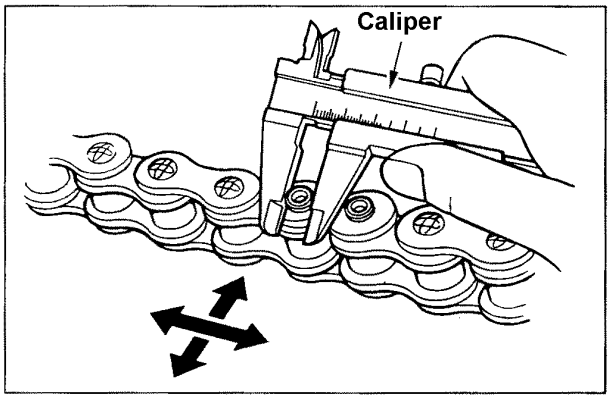
- The stamped side of the master plate should face outwards.
- Do not jam the O-Rings

Install O-Rings and a link plate by using the exclusive tool.
Check the projection length of the master link joint pins from the link plate.
Standard: DID: 1.15 ~ 1.55mm
RK: 1.2 ~ 1.4mm
Stake the joint pin ends of the master link.



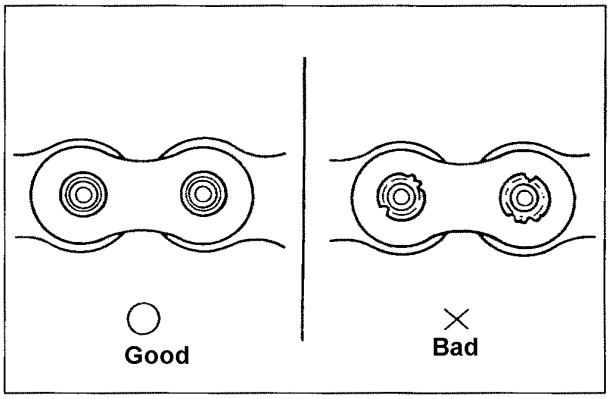
After staking, measure the staking size.

Staking size: DID: 5.4 ~ 5.6mm
RK: 5.5 ~ 5.8mm



If the size is out of the above range, redo staking by using a new master link, a link plate and O-Rings.

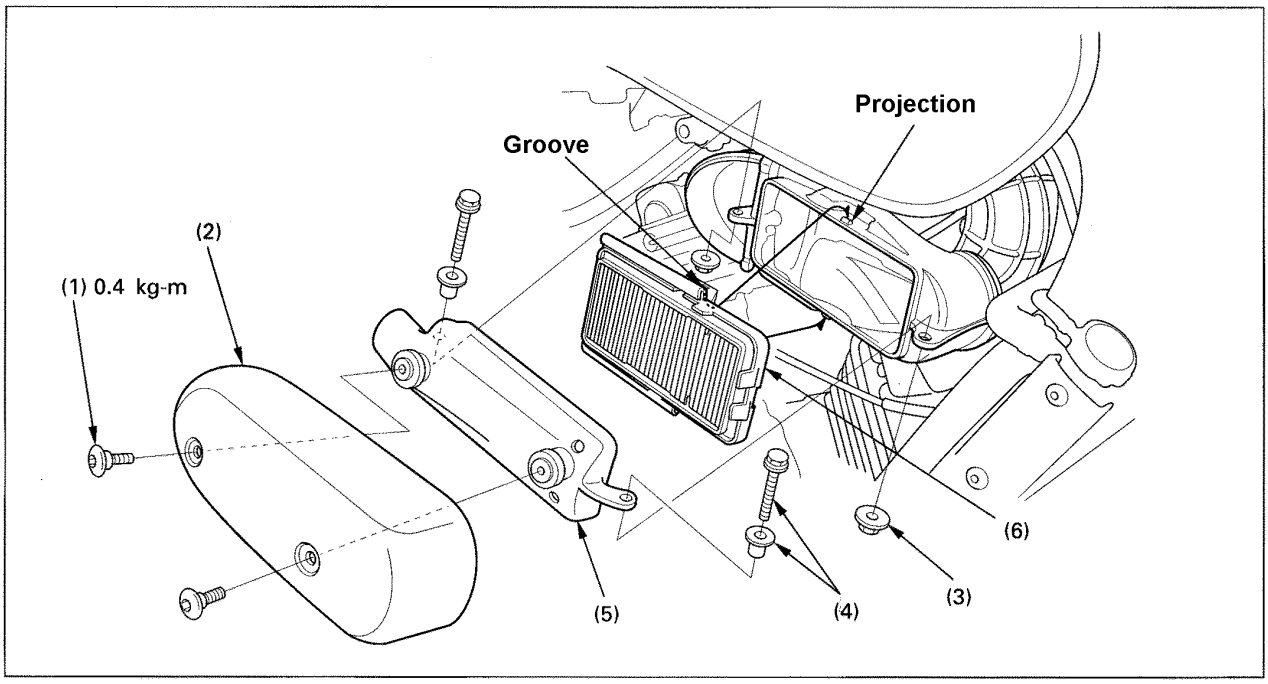
Inspect the staked area for cracks. Redo staking with a new master link, a link plate and O-Rings if there is any crack.
Note: Do not re-use old master link



CAUTION

Never use the clip-type chain joining link.

♦ Air Cleaner Element Replacement



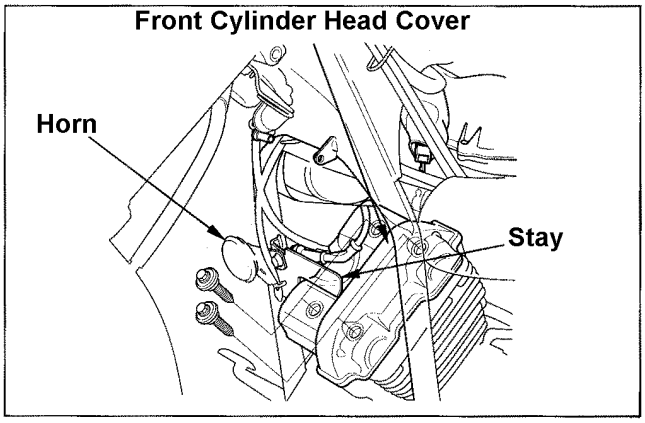
	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation**
(1)	Socket bolts	2	
(2)	Right carburettor side cover	1	
(3)	Flange nut	2	
(4)	Flange bolt / collar	2/2	
(5)	Air cleaner case cover	1	
(6)	Air cleaner element	1	Release the top and bottom grooves on the element from the projections on the case to remove.

Valve Clearance

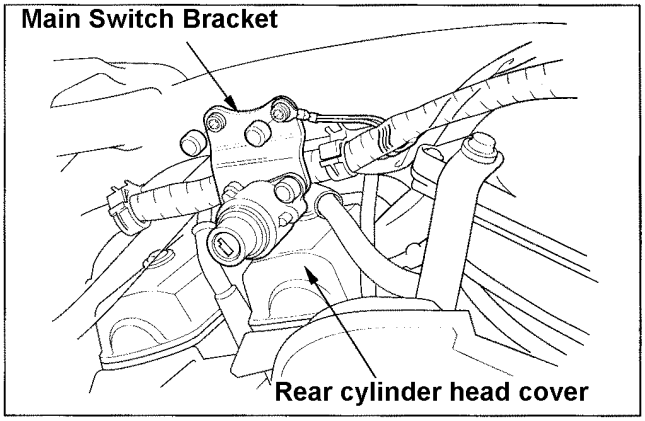
CAUTION

The valve clearance should be checked when the engine is cold (at or below 35°c).

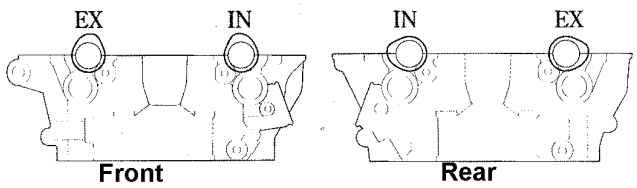
Remove the radiator (5-6).
Remove bolts to remove the horn and the radiator stay.
Remove four bolts to remove front cylinder head cover.



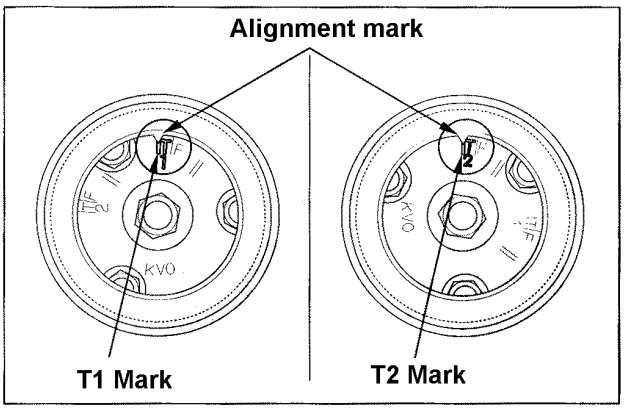
Remove fuel tank (2-3).
Remove two bolt caps.
Remove two torque bolts to disconnect the main switch bracket from the frame.
Remove four bolts to remove the rear cylinder head cover.



Remove the timing hole cap.
Rotate the crankshaft clockwise and align the crankshaft “T” marks (Rear: T1, Front: T2) with alignment marks on the right crankcase cover.
Check the cam top position of the measuring cylinder.

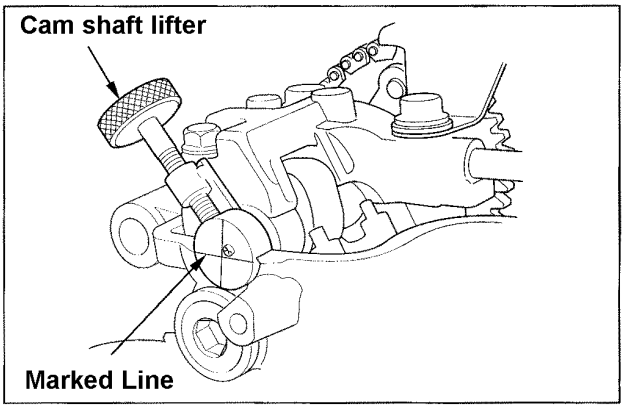


(Observing from the right of the body)



Set the cam shaft lifter to the camshaft so as to have the marked line on circular guide parallel to the cylinder head top surface.

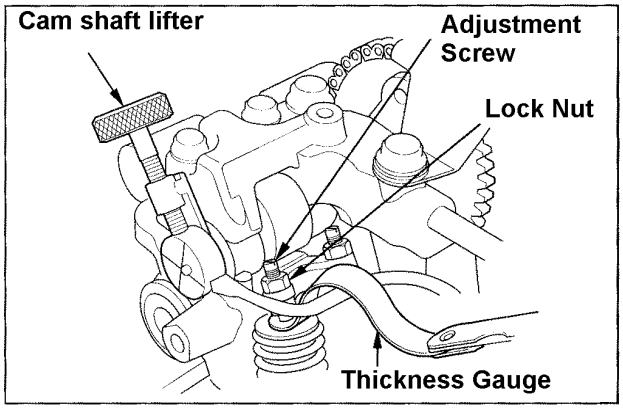
Excl. tool	Cam shaft lifter 07GMG – KV00100



Insert a thickness gauge between the adjuster screw and a valve stem to measure the valve clearance.

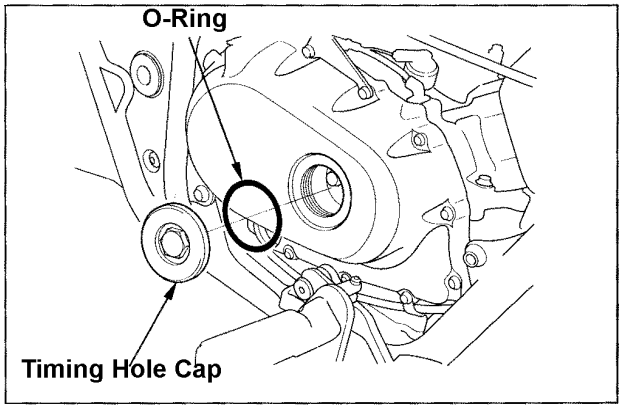
Valve clearance: IN: 0.15 ~ 0.19mm
EX: 0.20 ~ 0.24mm

Adjust the clearance by rotating the adjust screw (loosen the lock nut) while the cam shaft lifter is attached.



Apply grease to the O-Ring and the thread of the timing hole cap and install the cap.

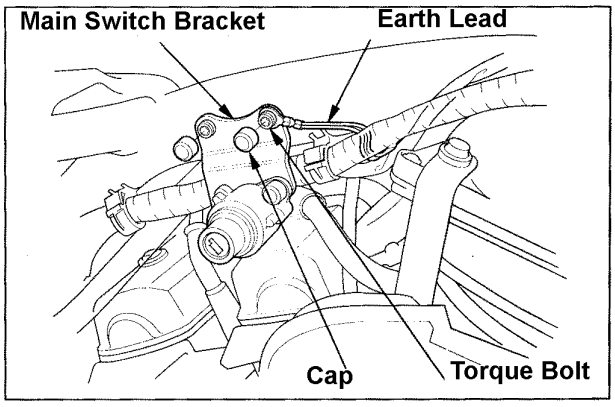
Torque: 1.8kg-m



Apply sealant to the half round part of the cylinder head and install the cylinder head cover. Tighten the cylinder head cover bolts.

Torque: 1.0kg-m

Mount the main switch bracket with two torque bolts.
Attach bolt caps.

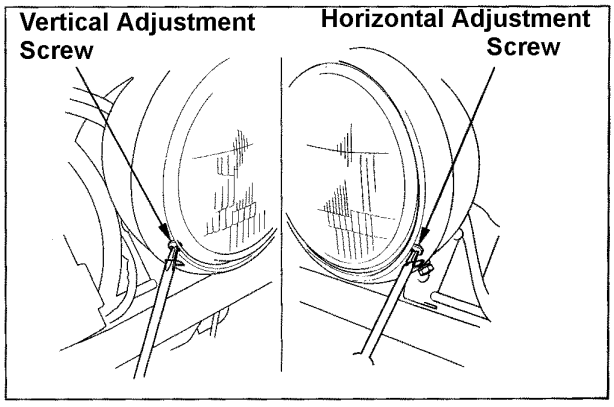


Tighten the front bolt together with the earth terminal.

Install radiator (5-6).
Install fuel tank (2-3).

Head Lamp Adjustment

Place the vehicle on a horizontally flat surface and support it vertically.
Rotate adjust screws to adjust its direction.



General Caution

- The oil pump may be serviced with the engine mounted to the frame.
- Keep the engine away from debris when removing / installing the pump.
- After the installation of the pump, check the oil pressure and inspect for oil leak.
- Refer to the main volume, Sec. 18 for the oil pressure switch inspection.

Troubleshooting

Insufficient oil quantity

- Normal oil consumption.
- Oil leak to the outside of the engine.
- Piston ring wear / improper installation.
- Valve guide / stem wear.
- Valve stem seal damage.
- Cylinder / piston wear.

Dirty Oil

- Oil / filter haven't been changed.
- Mixture with coolant (White)
  - water pump mechanical seal wear/damage.
  - Cylinder head gasket damage.
- Mixture with water (White)
  - water overflow from a storage tank.
- Piston ring wear.

Too high oil pressure

- Pressure relief valve does not open.
- Oil path, oil orifice jammed.
- Improper oil viscosity grade.

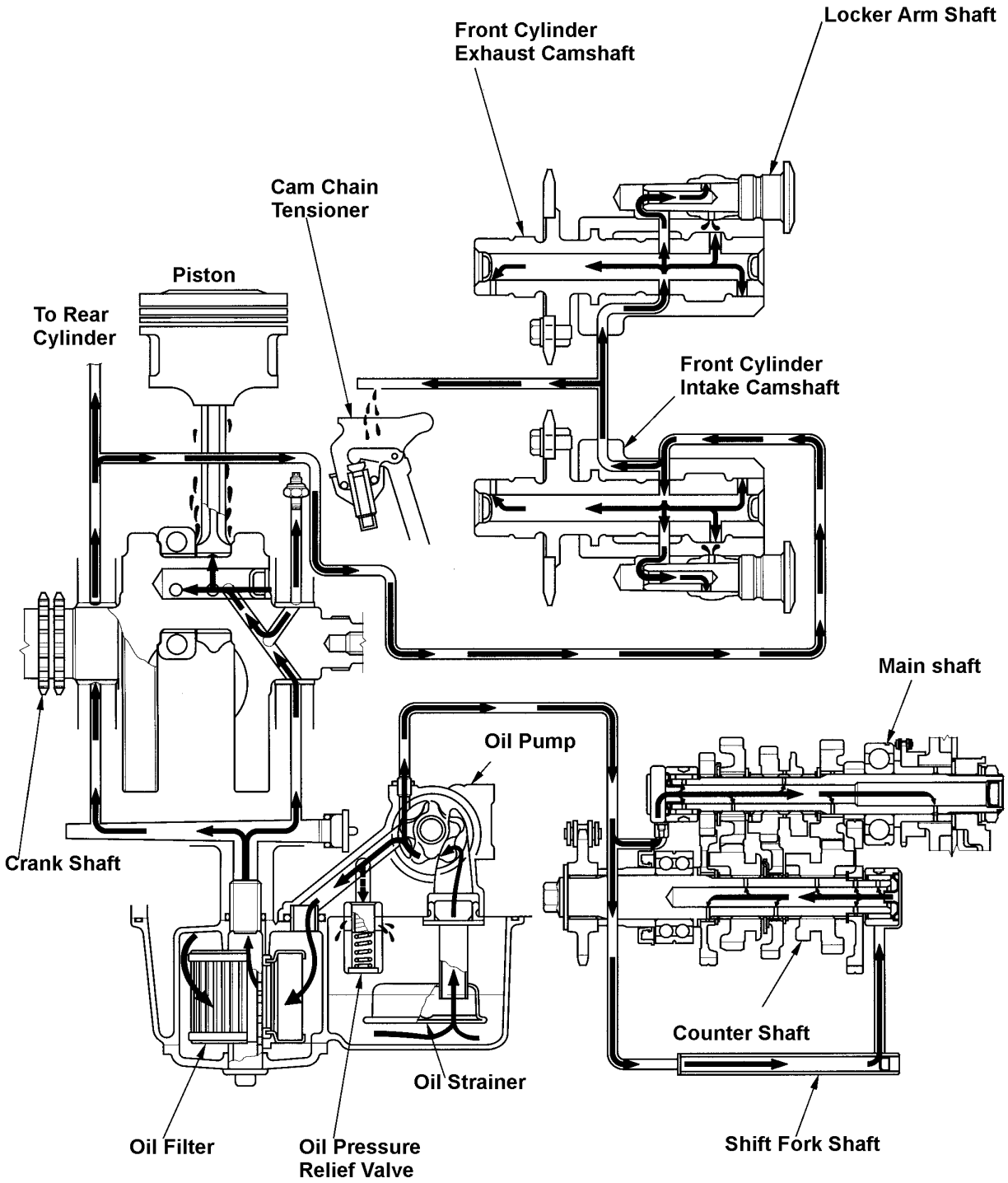
Too low oil pressure

- Pressure relief valve does not close.
- Oil strainer jammed.
- Oil filter jammed.
- Oil pump wear.
- Improper oil viscosity grade.
- Internal oil leak in the engine.
- Insufficient amount of oil.

No oil pressure

- Insufficient amount of oil.
- Oil pump drive sprocket, drive chain and a driven sprocket disconnected / damaged.
- Oil pump failure.
- Internal oil leak in the engine.

♦ **Lubrication Diagram**



Oil Filter Replacement

Remove the oil drain bolt and drain the oil.
Remove the oil filter centre bolt and remove the oil filter cover, set spring, spring seat and the oil filter.
Replace the sealing washer for the oil drain bolt with a new one.
Install and tighten the oil drain bolt.

Torque: 3.0kg-m

Remove O-Rings from the oil filter centre bolt and the filter cover.

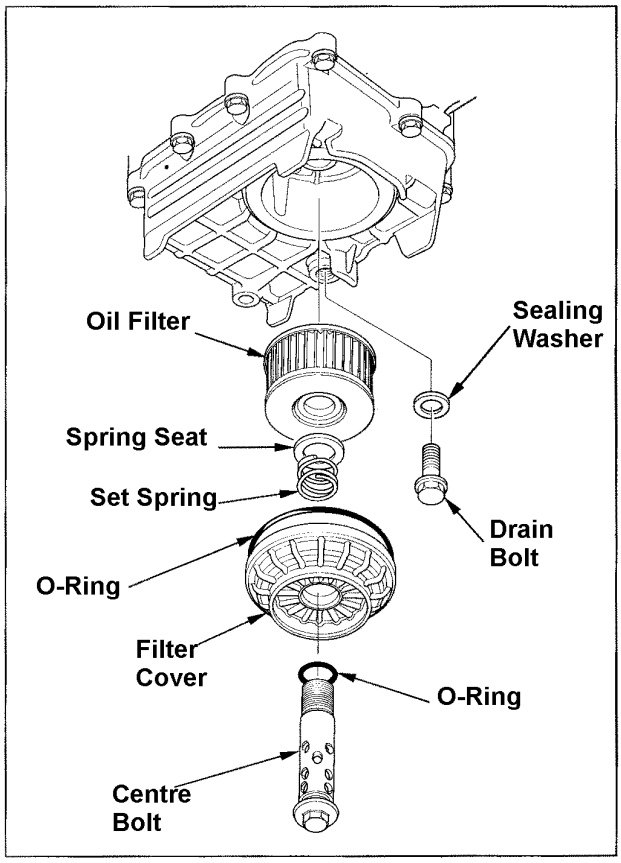
Apply engine oil to the new O-Rings and set them in the grooves on the oil filter cover and the centre bolt.

Install a new oil filter and set the spring seat, the set spring, the filter cover and the centre bolt.
Tighten the centre bolt.

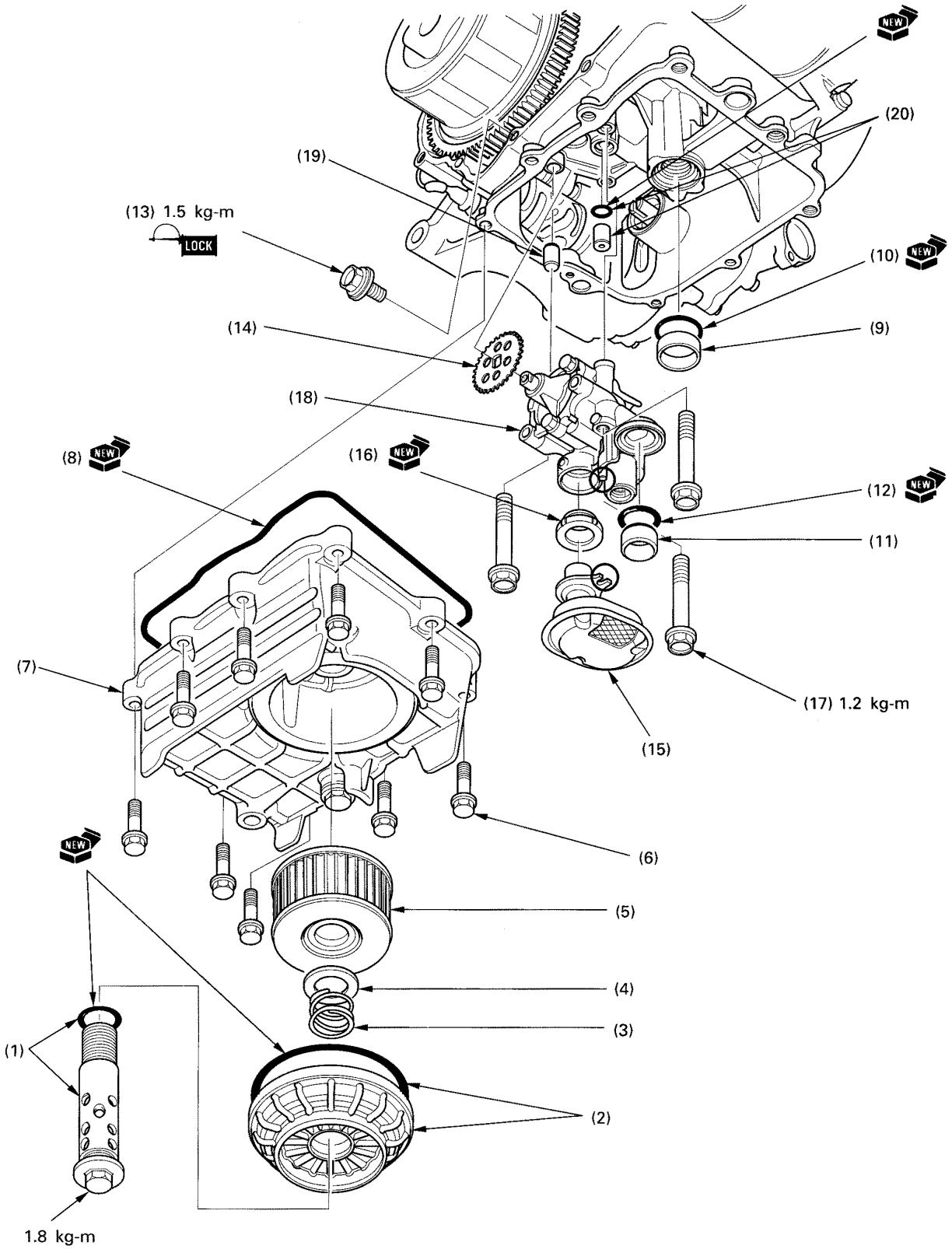
Torque: 1.8kg-m

Refill with the recommended grade oil (1-4).

Start the engine and inspect for oil leaks.



♦ **Oil Pump Removal/Installation**

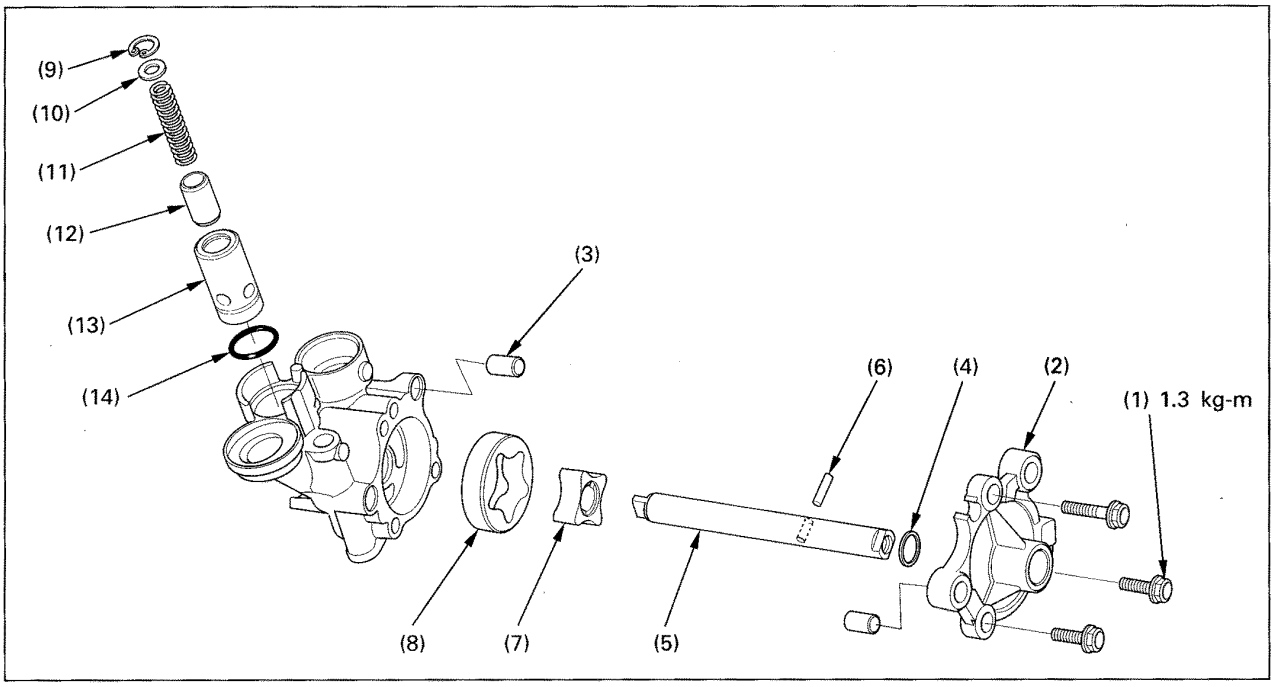


Relevant Works

- Right crankcase cover removal / installation (9-2).
- Front exhaust pipe (2-4).

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for its installation**
(1)	Oil filter centre bolt / O-Ring	1/1	
(2)	Oil filter cover / O-Ring	1/1	
(3)	Oil filter set spring	1	
(4)	Spring seat	1	
(5)	Oil filter	1	
(6)	Oil pan bolt	9	
(7)	Oil pan	1	
(8)	Oil pan O-Ring	1	
(9)	24mm oil path collar	1	
(10)	O-Ring	1	
(11)	18mm oil path collar	1	
(12)	O-Ring	1	
(13)	Oil pump driven sprocket bolt	1	
(14)	Oil pump driven sprocket	1	Face the marked line inwards when installing
(15)	Oil strainer	1	Match the cutout with the projection on the oil pump.
(16)	Oil strainer gasket	1	
(17)	Oil pump mount bolt	3	
(18)	Oil pump	1	• Match the cutout of the water pump shaft with a projection on the oil pump shaft. • Assembly / disassembly (4-6)
(19)	Knock pin	1	
(20)	Oil orifice / O-Ring	1/1	

♦ **Oil Pump Assembly/Disassembly**



Relevant Works

- Oil pump removal / installation (4-4).

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for its assembly.**
(1)	Oil pump cover bolt	3	
(2)	Oil pump cover	1	
(3)	Knock pin	2	
(4)	Thrust washer	1	
(5)	Oil pump shaft	1	• Face the screw hole end towards the cover. • Set the drive pin to the groove on the inner rotor. (both for assembly)
(6)	Drive pin	1	
(7)	Inner rotor	1	
(8)	Outer rotor	1	
	Relief valve		
(9)	Snap ring	1	
(10)	Spring seat	1	
(11)	Spring	1	
(12)	Piston	1	
(13)	Valve body	1	Do not remove unless needed.
(14)	O-Ring	1	

General Caution

CAUTION

- If the coolant is suspected to be over 100°c, do not open the radiator cap until it cools down. Wrap the cap with a cloth when opening it.
- The cooling system should be serviced when the engine is cool.
- Keep your skin, eyes and clothes away from the coolant. Do not swallow it.
  - If the coolant contacts your skin and clothes, wash with soap and rinse it.
  - If the coolant contacts your eyes, rinse with water and consult a doctor.
  - If the coolant is swallowed, induce vomiting, gargle and consult a doctor.
  - Exercise caution with coolant storage and keep it away from the reach of children.

- Do not remove radiator cap unless you have to refill/drain coolant when the cooling system is disassembled.
- Keep the coolant away from the painted surfaces. If the coolant contacts the surface, wash with water.
- After the disassembly/inspection, inspect for coolant leak by using a radiator cap tester.
- Refer to the main volume Sec. 4 for the coolant refill and air bleeding.
- Refer to the main volume Sec. 18 for the fan motor switch, thermo sensor inspection.

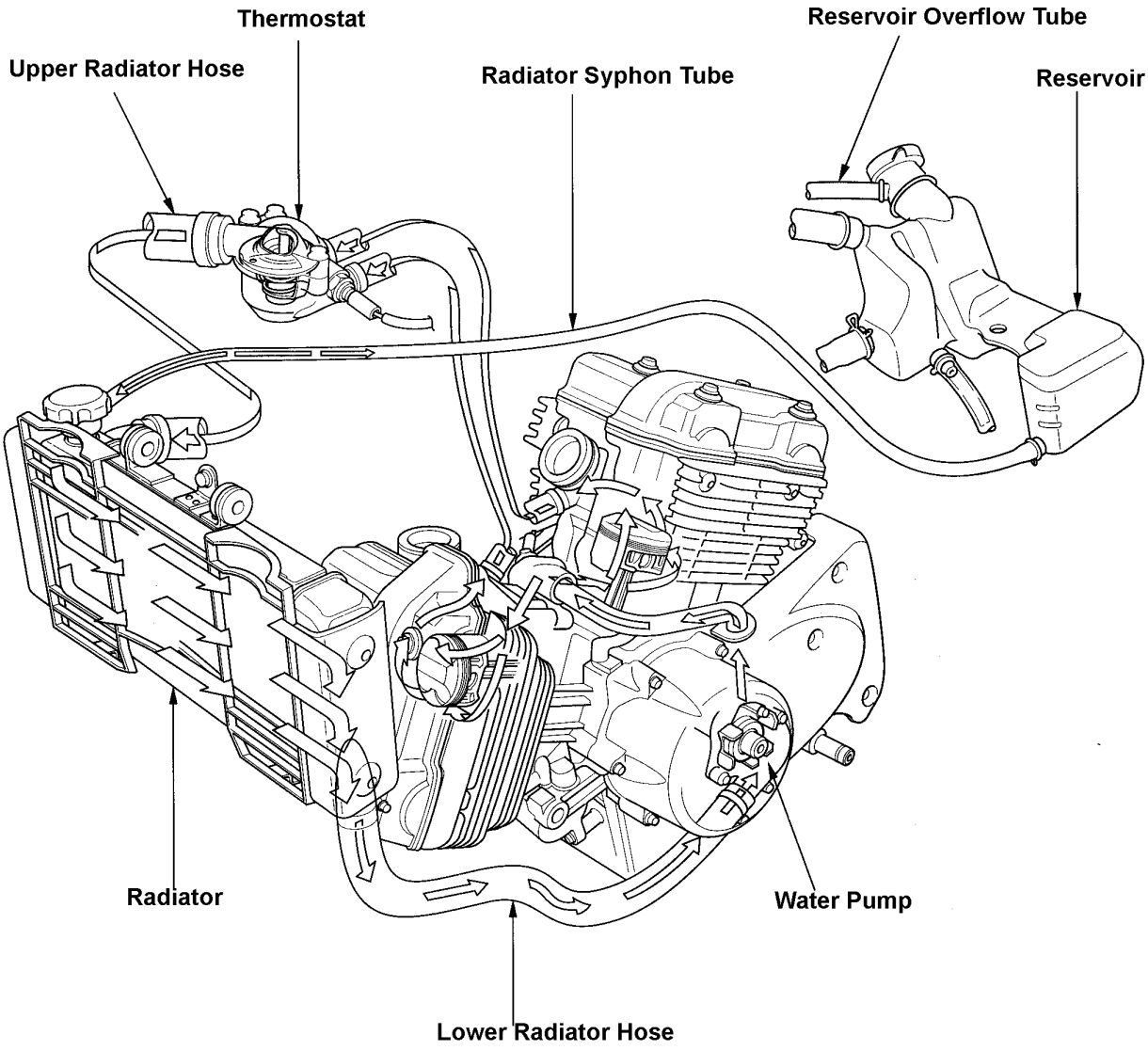
Troubleshooting

Too high water temperature
- Water temp gauge or thermo sensor failure.
- Air in the cooling system.
- Thermostat failure (does not open).
- Radiator, hose or water jacket jam.
- Fan motor failure.
- Fan motor switch failure.
- Water pump failure.
- Insufficient coolant quantity.
- Radiator blocked.

Too low water temperature
- Water temp gauge or thermo sensor failure.
- Thermostat failure.
- Fan motor switch failure.

Water leak
- Oil pump mechanical seal failure.
- O-Ring wear, loose contact.
- Radiator cap failure.
- Cylinder head gasket damaged.
- Loose hose connection.
- Hose wear / damage.

♦ **Cooling System Diagram**

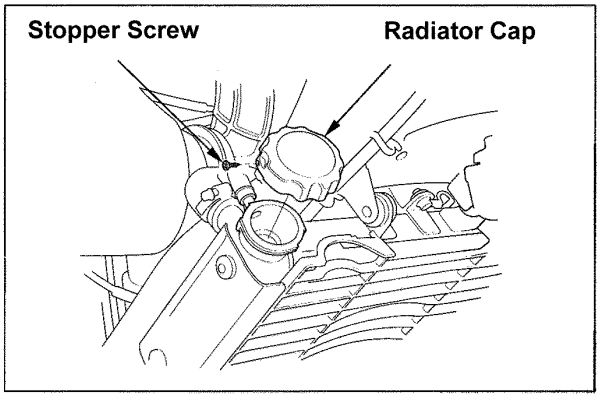


Coolant Drain

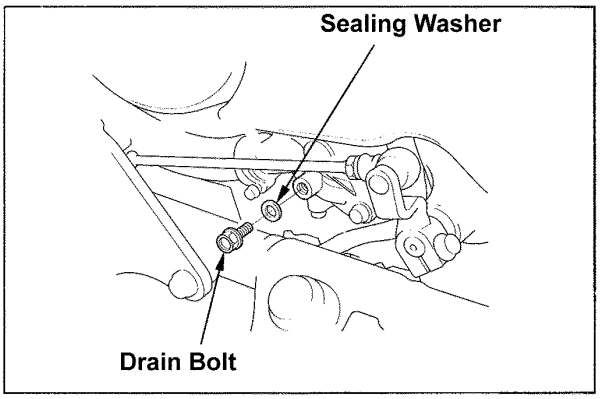
CAUTION

Do not open the radiator cap if the coolant is suspected to be above 100°c. Wait for the temperature to cool down and gently open it after wrapping the cap with a cloth.

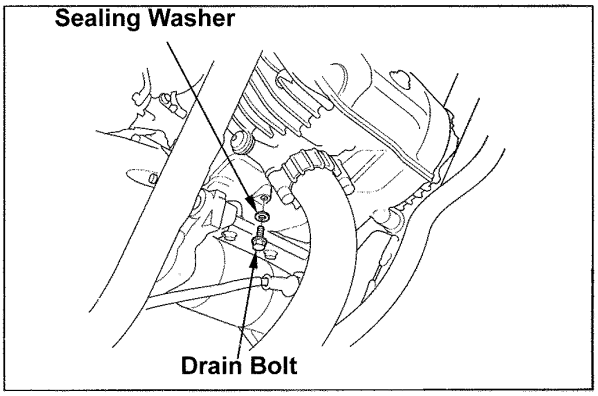
Remove the stopper screw to remove the radiator cap.



Remove the drain bolt from the water pump and drain the coolant.

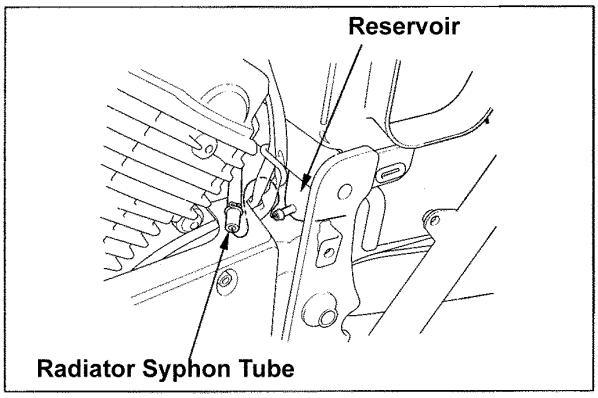


Remove the drain bolt from the front cylinder and drain the coolant.

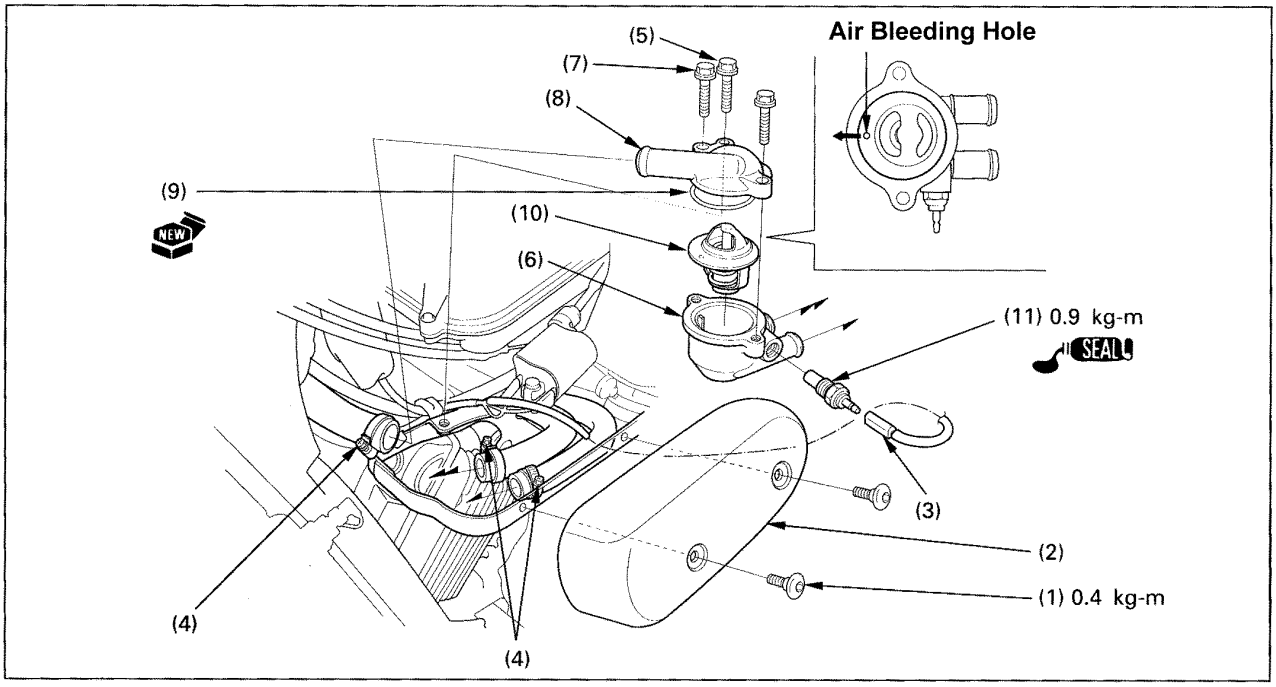


Remove the left pivot plate cover (2-2).
Disconnect the syphon tube and drain the coolant from a reservoir.
Connect the syphon tube back to the reservoir.
Install the drain bolt with a new sealing washer.

Torque: Water pump drain bolt 1.3kg-m.



♦ Thermostat Assembly / Disassembly

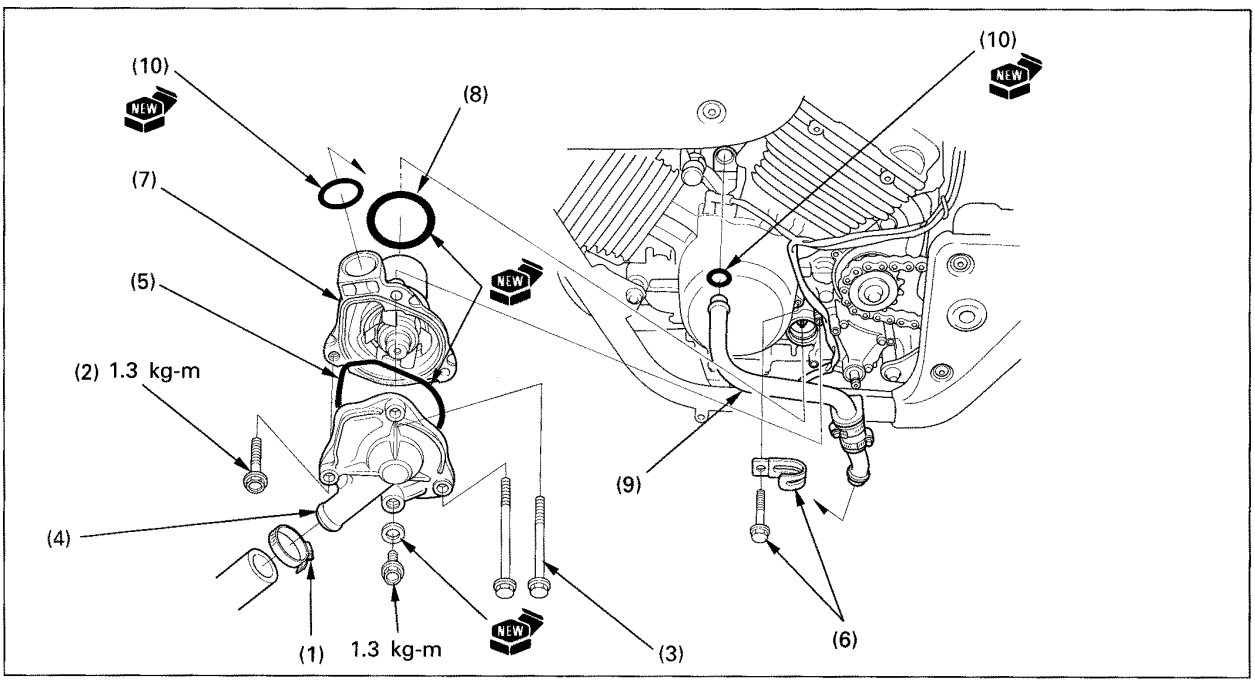


Relevant Works

- Coolant drain (5-3)
- Coolant refill / air bleeding

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for its assembly**
(1)	Socket bolt	2	
(2)	Left carburetor side cover	1	
(3)	Thermo sensor connector	1	
(4)	Hose band screw	3	Loosen
(5)	Thermostat case mount bolt	1	
(6)	Thermostat case	1	Remove from the hose
(7)	Thermostat case cover bolt	2	
(8)	Thermostat case cover	1	
(9)	O-Ring	1	
(10)	Thermostat	1	The air bleed hole should face forward when installing.
(11)	Thermo sensor	1	

♦ **Waterpump Assembly / Disassembly**

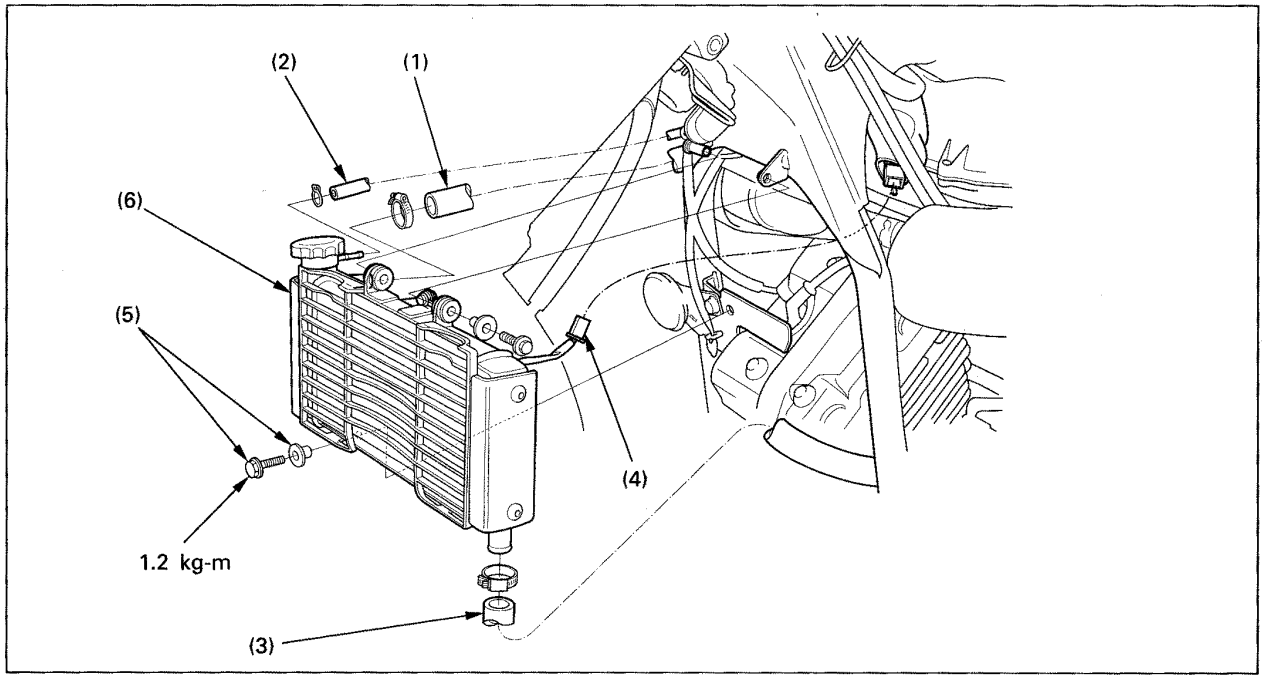


Relevant Works

- Coolant drain (5-3)
- Coolant refill / air bleeding
- Left main step holder and drive sprocket cover removal/installation (15-8)

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for its assembly**
(1)	Lower radiator hose band screw	1	Loosen
(2)	Water pump cover bolt	1	
(3)	Water pump mount bolt	2	
(4)	Water pump cover	1	Remove from the pump body and a lower radiator hose.
(5)	O-Ring	1	Remove from the pump cover.
(6)	Bolt / cable clamp	1/1	
(7)	Water pump body	1	• Remove from the engine together with the water pipe. • Match the water pump shaft cutout with the oil pump shaft projection when assembling.
(8)	O-Ring	1	Remove from pump body.
(9)	Water pipe	1	Remove from water pump.
(10)	O-Ring	2	

♦ **Radiator Removal / Installation**

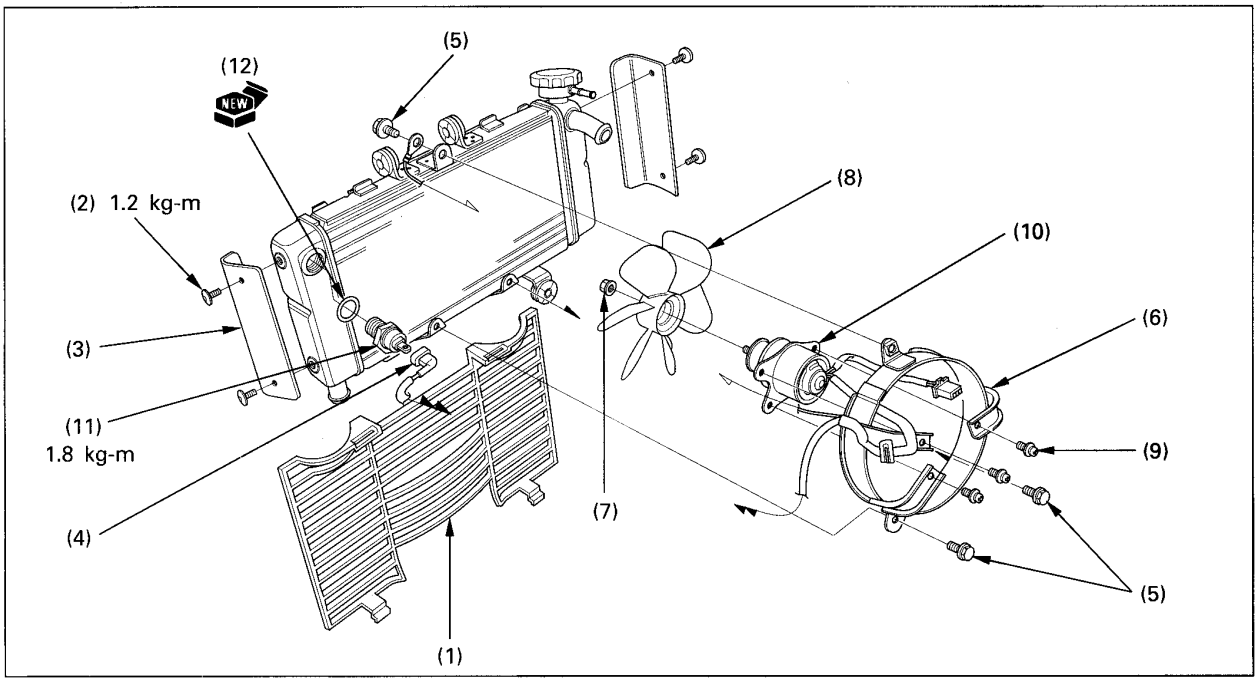


Relevant Works

- Coolant drain (5-3)
- Coolant refill / air bleeding
- Fuel tank removal/installation (2-3)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for its installation**
(1)	Upper radiator hose	1	
(2)	Radiator syphon tube	1	
(3)	Lower radiator hose	1	
(4)	Radiator lead coupler	1	
(5)	Radiator mount bolt / collar	2/2	
(6)	Radiator	1	Remove from mount boss by pushing towards the left.

♦ Radiator Assembly/Disassembly

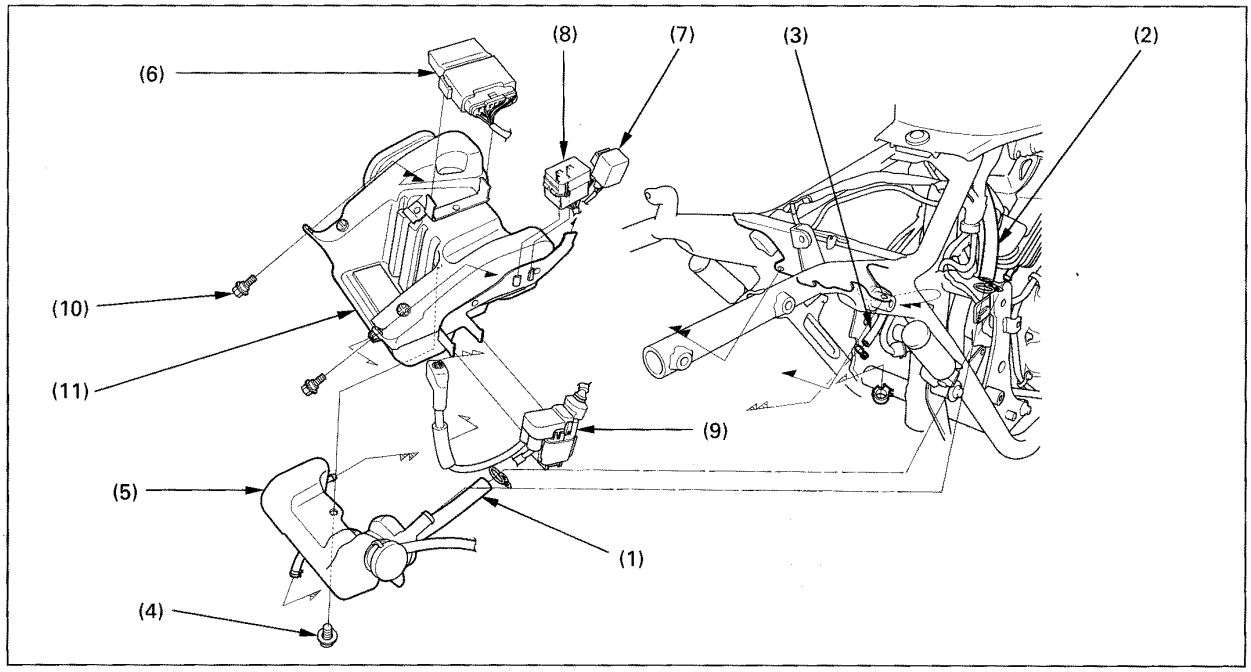


Relevant Works

- Radiator removal / installation (5-6).

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for its assembly**
(1)	Radiator grill	1	Release the top side radiator catches first, then the lower side catches.
(2)	Radiator side cover bolt	4	
(3)	Radiator side cover	2	
(4)	Fan motor switch connector	1	
(5)	Shroud mount bolt	3	Tighten the earth terminal together with the top bolt when assembling.
(6)	Shroud / fan motor Assy	1	
(7)	Nut	1	
(8)	Fan	1	Correctly align the motor shaft and the fan plain when assembling.
(9)	Screw	3	
(10)	Fan motor	1	
(11)	Fan motor switch	1	
(12)	O-Ring	1	

♦ **Reservoir and Inner box removal / installation**



Relevant Works

- Rear fender removal / installation (2-6)
- Battery removal / installation (15-4)
- Swing arm removal / installation (13-6)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
	Reservoir		
(1)	Crankcase breather hose	1	Disconnect from rear cylinder head.
(2)	Storage tank blow-by hose	1	
(3)	Radiator syphon tube	1	
(4)	Reservoir mount bolt	1	
(5)	Reservoir	1	
	Inner Box		
(6)	Spark unit	1	
(7)	Direction indicator relay	1	
(8)	Fuse box	1	
(9)	Starter relay switch	1	
(10)	Bolt	2	
(11)	Inner box	1	

General Caution

CAUTION

Petrol is highly flammable. Keep out of electrical spark as well as open fire.
Ventilate the working area, too, as evaporated petrol is also highly flammable.

- Do not overstress the cables to bend or twist. Damaged / deformed cables may cause failure.
- When assembling the component, replace the O-Ring.
- Drain the petrol in the carburetor before disassembling by loosening the float chamber drain screw. Place a collecting tray underneath.
- Cover the port with a cloth after removing a carburettor to prevent any objects to go into the engine.
- If the carburetor is to be stored for more than a month, drain petrol in the float chamber. Degraded petrol in the chamber may block the slow tubes and cause unstable idling.

Troubleshooting

Does not start
- Fuel does not reach the carburettor
  - fuel strainer blocked
  - fuel tube blocked
  - float valve stuck
  - improper float level
  - fuel tank cap breather hole blocked
  - fuel auto cock failure
- Too much fuel in cylinder
  - air cleaner blocked
  - carburettor overflow
- Intake system sucking secondary air
- Degraded petrol
- Bi-starter valve failure
- Slow system or bi-starter system blocked

The engine starts, but stops soon. Idling is unstable.
- Fuel system blocked
- Mixture too lean / too rich
- Fuel quality degraded
- Inlet taking secondary air
- Idling rpm improperly adjusted
- Fuel auto cock operation failure
- Pilot screw improperly adjusted
- Slow or bi-starter system jammed
- Float level improperly adjusted
- Fuel tank cap breather hole blocked
- Carburettor synchronisation failure
- Ignition system failure (Sec. 16)

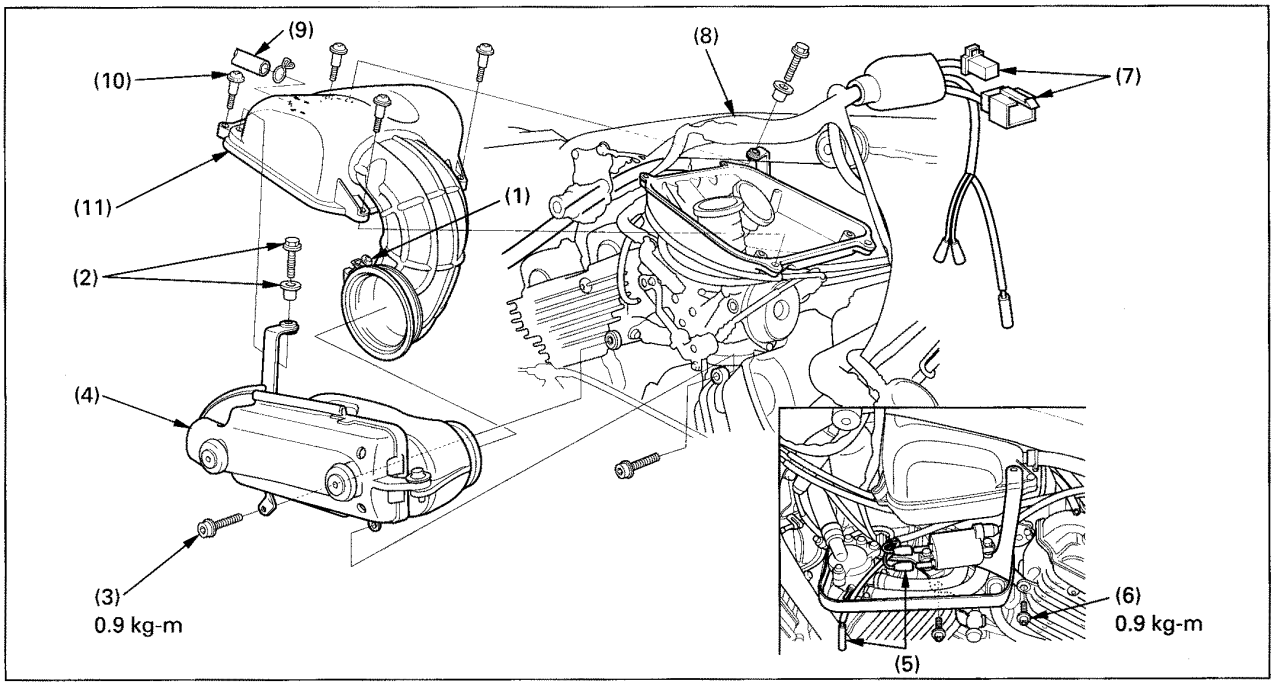
Too lean mixture
- Fuel jet clogged
- Float valve failure
- Float level too low
- Fuel system clogged
- Carburettor air vent tube clogged
- Inlet taking secondary air
- Fuel auto cock operation failure
- Vacuum piston operation failure

Too rich mixture
- Bi-starter valve is always operating
- Float valve operation failure
- Float level too high
- Air jet clogged
- Air cleaner element is dirty
- Carburettor overflow

After burn when using engine brake
- Slow system mixture too lean
- Air cut valve operation failure

Backfire, misfire on acceleration
- Mixture too lean
- Ignition system fault (Sec. 16)

♦ **Air chamber cover removal/installation**

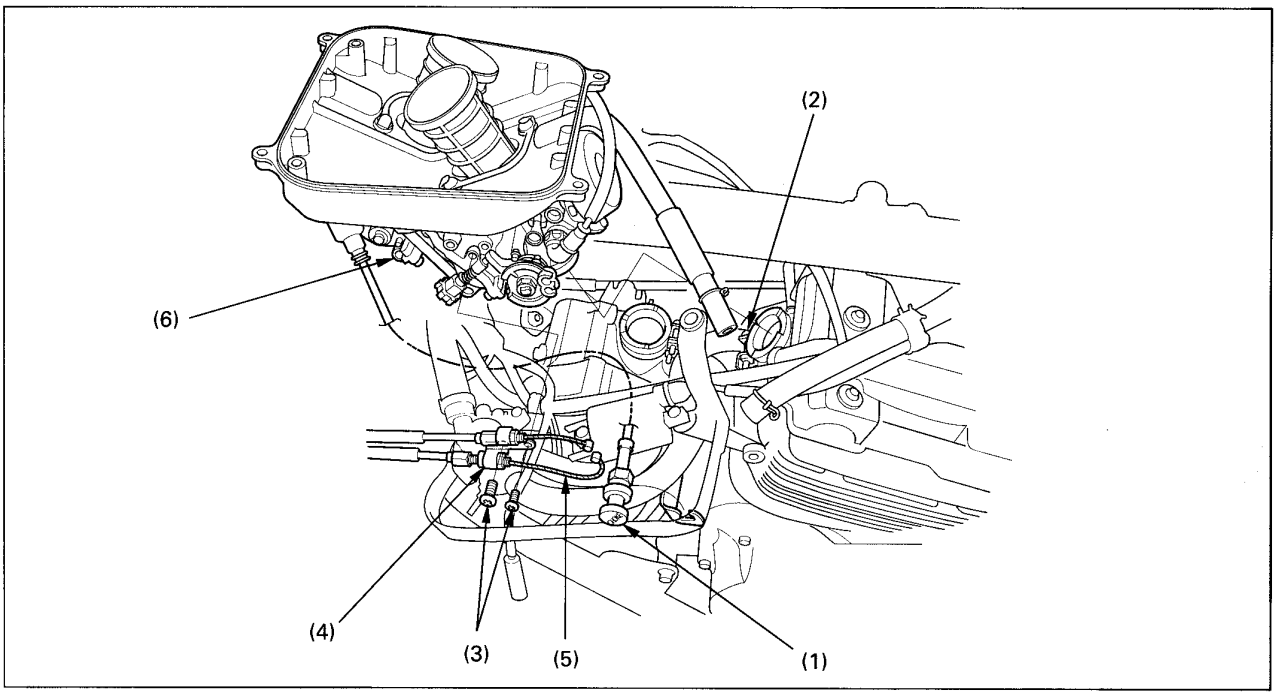


Relevant Works

- Right carburettor side cover removal/installation (3-12)
- Fuel tank removal/installation (2-3
- Left carburettor side cover removal/installation (5-4)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for its installation**
(1)	Connecting tube band screw	1	Loosen
(2)	Stay bolt / collar	2/2	
(3)	Air cleaner stay mount bolt	2	
(4)	Air cleaner case	1	Remove with the air cleaning stay
(5)	Connector	3	Disconnect ignition coils and thermal sensor
(6)	Left carburettor side cover stay bolt	2	
(7)	Coupler	2	
(8)	Main wire harness clip	1	Disconnect from frame pin and move the harness upwards.
(9)	Storage tank blow-by hose	1	
(10)	Air chamber cover screw	4	
(11)	Air chamber cover	1	• Push it up until it touches the frame. Then move it towards front and remove it to the right. • Do not damage the mating surface of air chamber.

♦ **Carburettor removal / installation**



General Caution

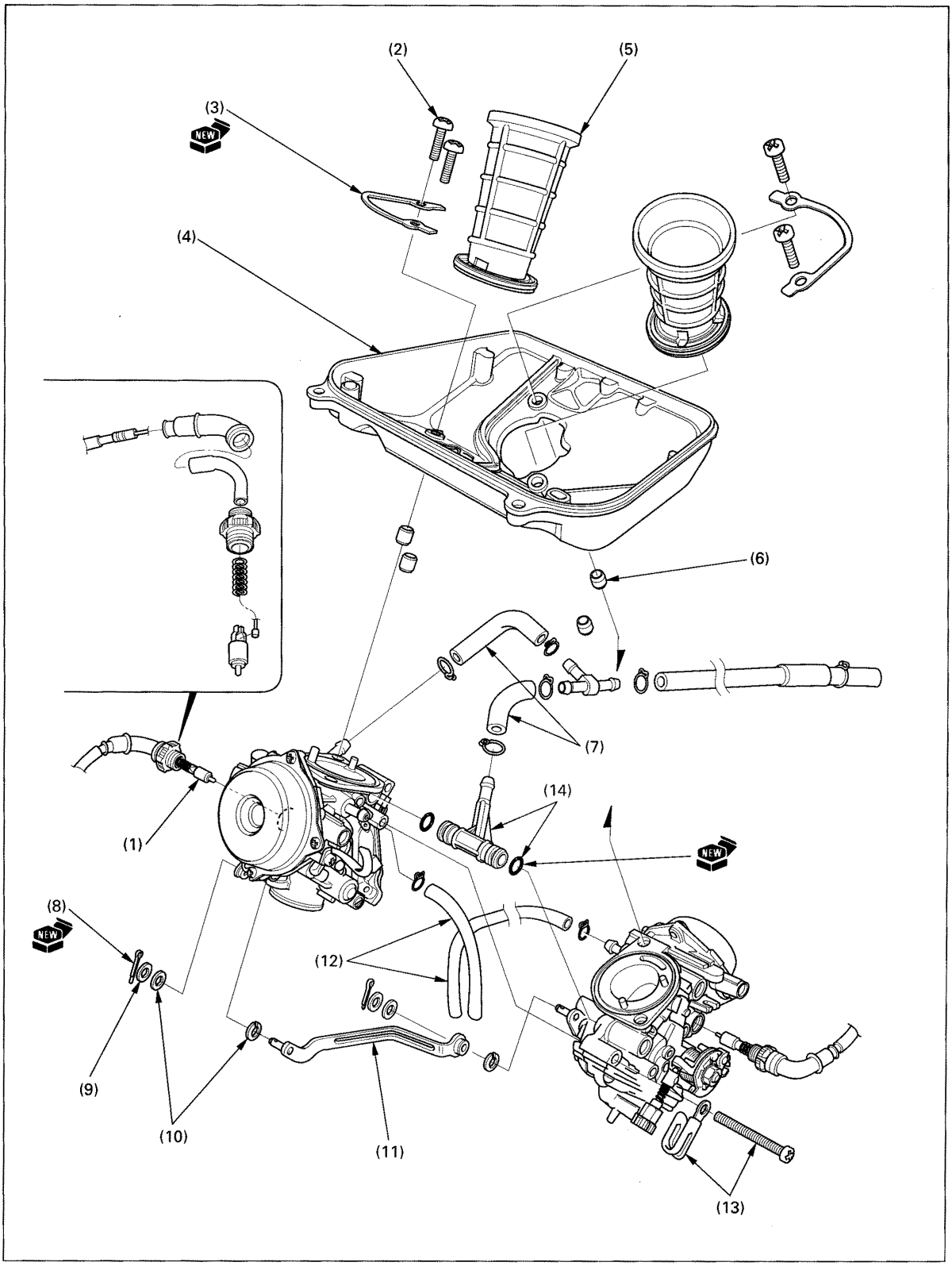
Adjust the throttle free play after installing the carburettor.

Relevant Works

- Air chamber cover removal/installation (6-2)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for its installation**
(1)	Choke knob	1	Loosen the nut and disconnect from the bracket.
(2)	Carburettor insulator band screw	2	Loosen the screws and remove the carburettor ASSY from the insulator.
(3)	Cable holder screw	2	
(4)	Throttle cable holder	1	
(5)	Throttle cable	2	Disconnect from throttle drum
(6)	Carburettor ASSY	1	• Separation (6-4) • Disassembly / assembly (6-6)

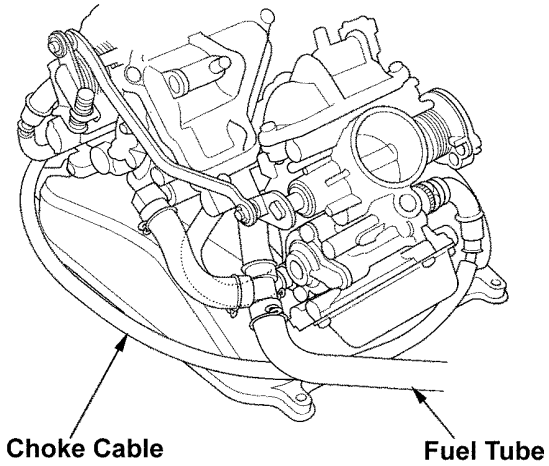
♦ **Carburettor Separation**

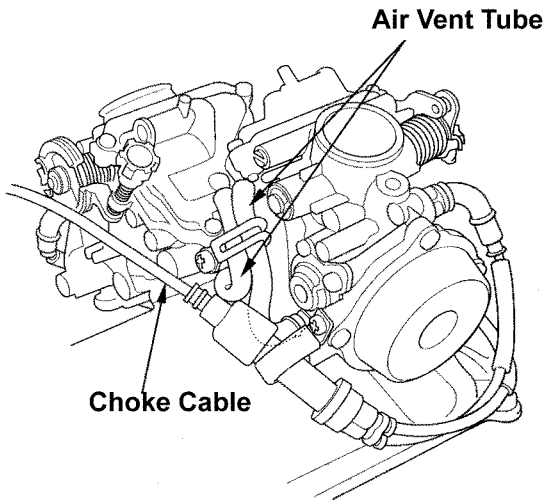


Relevant Works

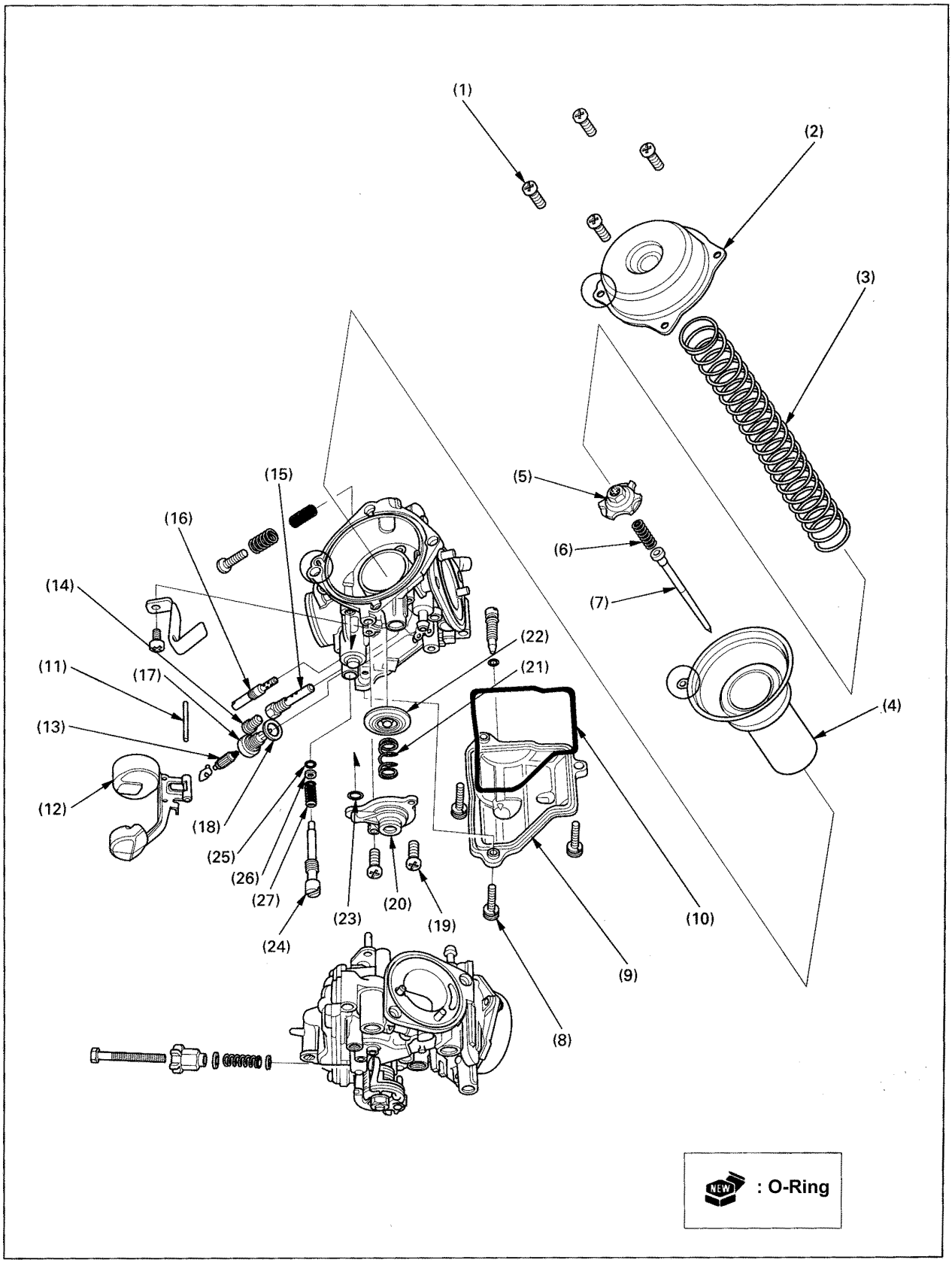
- Carburettor removal/installation (6-3)

	Works / Parts	Qty.	Notes
	Separation		**Reverse the procedure for jointing.**
(1)	Bi-starter valve / choke cable	2/1	• Loosen bi-starter valve nut to disconnect the valve from the carburettor and disconnect the cable from clamp. • When jointing, clamp the cable correctly (see the figure below).
(2)	Screw	4	Unlatch the lock plate catch.
(3)	Lock plate	2	
(4)	Air chamber	1	Remove together with the air funnel.
(5)	Air funnel	2	
(6)	Knock pin	4	
(7)	Fuel tube	2	
(8)	Cotter pin	2	
(9)	Washer	2	
(10)	Plastic washer	4	Check the direction when jointing.
(11)	Throttle link	1	
(12)	Air vent tube	2	Correctly clamp the tube (see the figure below).
(13)	Carburettor joint screw/clamp	1/1	
(14)	Fuel joint / O-Ring	1/2	





♦ **Carburettor Assembly/Disassembly**



General Caution

- The vacuum chamber, the float chamber and the jets can be serviced without removing the carburettor.
- Separate and store each part for the carburettor for re-assembly.

Relevant Works

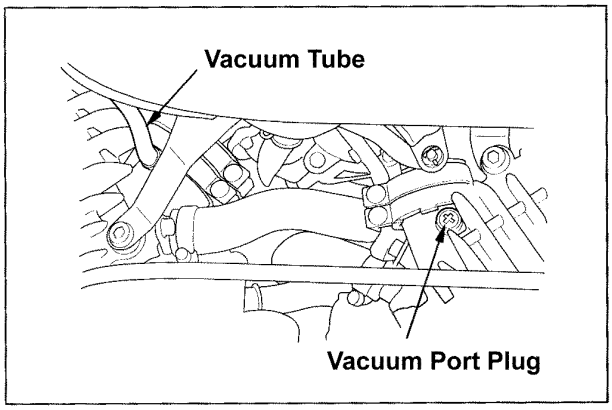
- Carburettor separation (6-4)

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for its assembly**
	Vacuum Chamber		
(1)	Screw	4	
(2)	Vacuum chamber cover	1	Do not catch the diaphragm when assembling.
(3)	Diaphragm spring	1	
(4)	Diaphragm / vacuum piston	1/1	Set the lip to the groove on the carburetor body when assembling.
(5)	Jet needle holder	1	Rotate to the left to remove it.
(6)	Spring	1	
(7)	Jet needle	1	
	Float chamber		
(8)	Screw	3	
(9)	Float chamber	1	
(10)	O-Ring	1	
(11)	Float pin	1	
(12)	Float	1	
(13)	Float valve	1	
(14)	Main jet	1	
(15)	Needle jet holder	1	
(16)	Slow jet	1	
(17)	Float valve seat	1	
(18)	Washer	1	
	Air cut valve		
(19)	Screw	2	
(20)	Diaphragm cover	1	Do not catch the diaphragm and the O-Ring when assembling.
(21)	Spring	1	
(22)	Diaphragm	1	
(23)	O-Ring	1	Set the flat side to the carburettor body when installing.
	Pilot Screw		
(24)	Pilot screw	1	
(25)	O-Ring	1	
(26)	Washer	1	
(27)	Spring	1	

Carburettor Synchronisation

General Caution

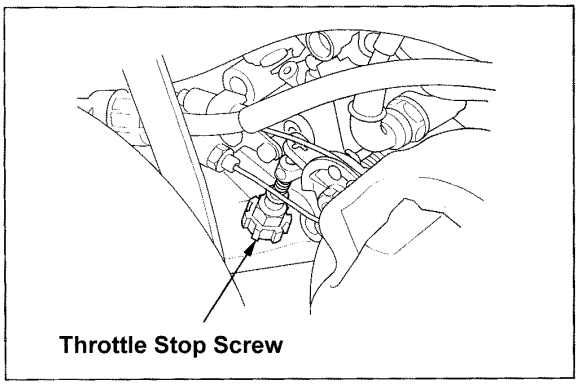
The synchronisation should be checked after warming up.
Set the gear in neutral and the bike level.



Disconnect the rear cylinder boost joint and the vacuum tube.
Apply negative pressure to the vacuum tube and seal its end.
Disconnect vacuum port plug from a front cylinder.
Install a vacuum gauge adapter to the vacuum port.
Connect the vacuum gauge hose to the adapter and the boost joint.

Start the engine and adjust idle rpm with a throttle stop screw.

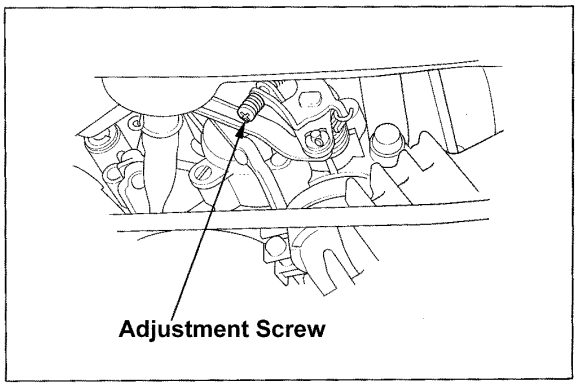
Idling rpm: 1,200 ± 100rpm



Using the intake negative pressure on the rear cylinder as a standard reference. Adjust the pressure difference with the front cylinder intake negative pressure by rotating an adjust screw.

Pressure difference: Within 40mmHg

Snap the throttle grip several times and check the pressure difference and idling rpm. Adjust as required.



Pilot Screw Adjustment

Idle drop method

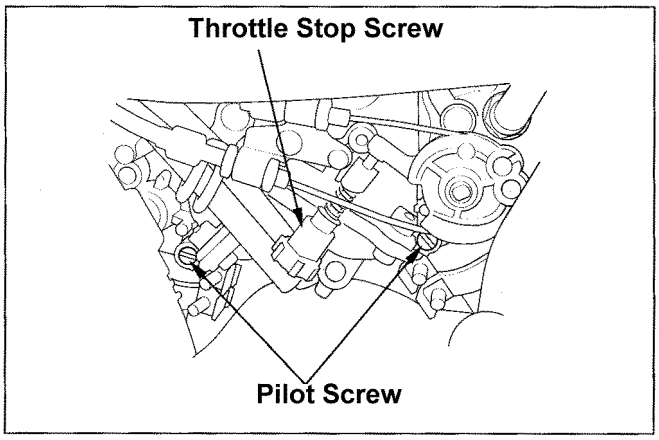
General Caution

- The pilot screw is pre-adjusted when manufactured. It does not require any adjustments unless the pilot screw or the carburettor body is replaced. Wind back to the recorded position when disassembled.
- Secure the body when servicing.
- The idling rpm varies if the cooling fan starts. Use a fan to cool down if necessary.
- Synchronise the carburettor before adjusting the pilot screw.

1) Connect a tachometer which can read 50rpm difference.

2) Tighten the pilot screws on each carburettor until it touches the end. Then wind back to standard position.

   Standard position. - 3 turns out



General Caution

- Do not overtighten the pilot screws as it may result in damaging the seat surface.

3) After warming up the engine, adjust the idling rpm with a throttle stop screw.

   Idling rpm: 1,200 ± 100rpm

4) Wind (back or forward) the rear cylinder carburettor pilot screw in ½ turn increments and find out the position where the idling rpm becomes maximum.

5) Repeat 4) for the front cylinder carburettor.

6) After snapping a few times, wind the throttle stop screw to re-set the idling rpm.

7) Gently wind forward the pilot screw for the rear cylinder carburettor until the rpm becomes 50rpm below standard idling rpm (complete the idle drop).

8) Open the pilot screw from 7) to the standard rewinding rev after the idle drop.

   Standard rewinding rev after the idle drop: 1 rev

9) Repeat 7) and 8) for the front cylinder carburettor.

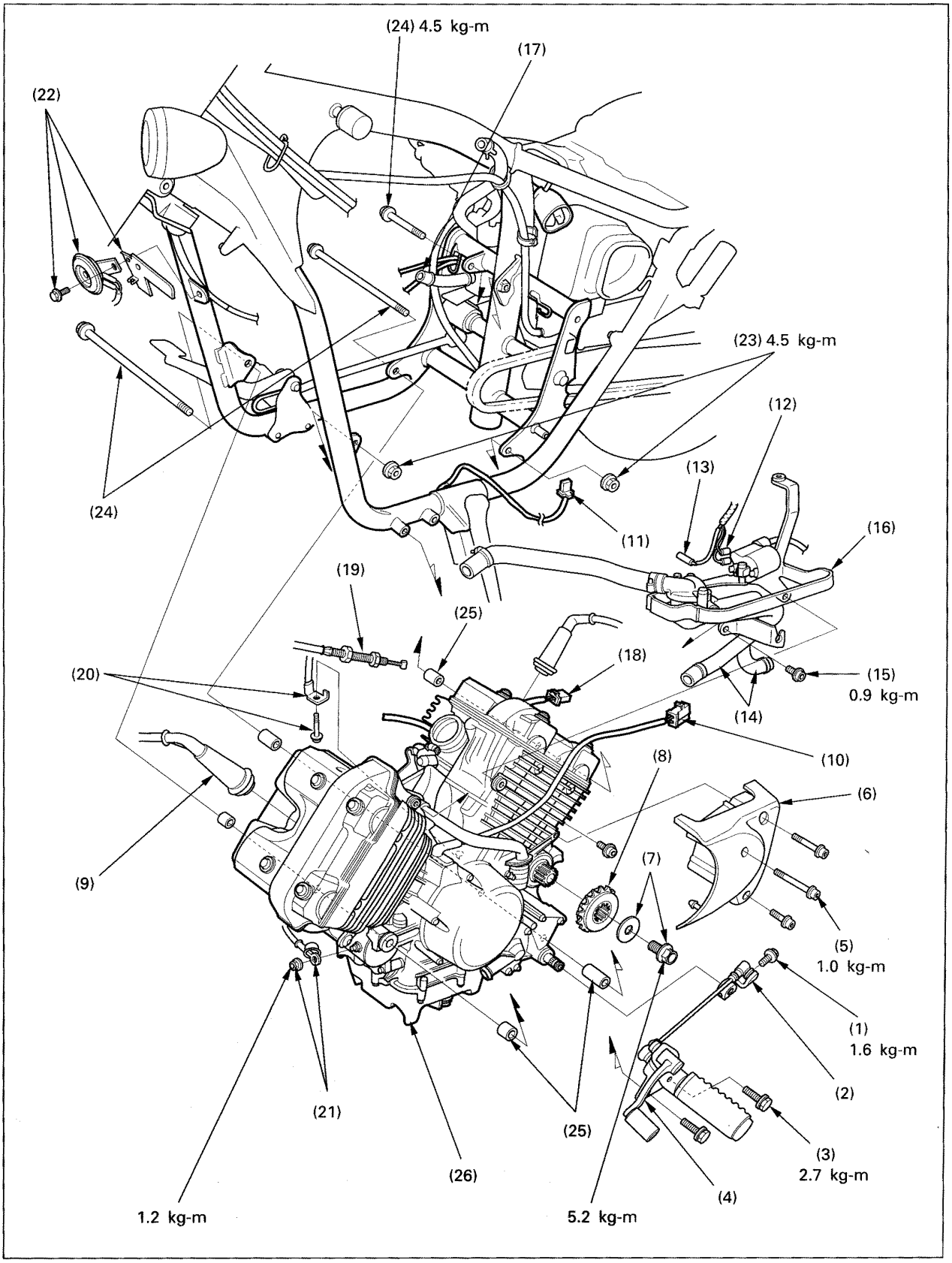
10) Adjust the idling rpm with the throttle stop screw.

If the result is faulty, redo from 4).

General Caution

- Support the bottom of the engine with floor jacks when servicing.
- Do not damage the frame, the engine body, the cables and the harness.
- The following parts should be serviced with the engine dismounted from the frame.
  - Crankcase (Sec. 11)
  - Crankshaft and Piston (Sec. 11)
  - Transmission (Sec. 11)
- The following parts can be serviced without dismounting the engine.
  - Oil Pump (Sec. 4)
  - Water Pump (Sec. 5)
  - Carburettor (Sec. 6)
  - Camshaft (Sec. 8)
  - Cylinder Head, Valve (Sec. 8)
  - Clutch (Sec. 9)
  - Gear Shift Linkage (Sec. 10)
  - Alternator (Sec. 15)
  - Pulse Generator (Sec. 16)
  - Starter Clutch (Sec. 17)
  - Starter Motor (Sec. 17)

♦ Engine Mounting/Dismounting



CAUTION

- Turn the main switch OFF and disconnect (-) lead from the battery before commencing work.
- Adjust the jacking height so as not to apply stress on the engine mount bolts.
- Inspect and adjust the following items after mounting the engine.
  - Clutch lever free play
  - Drive chain tension

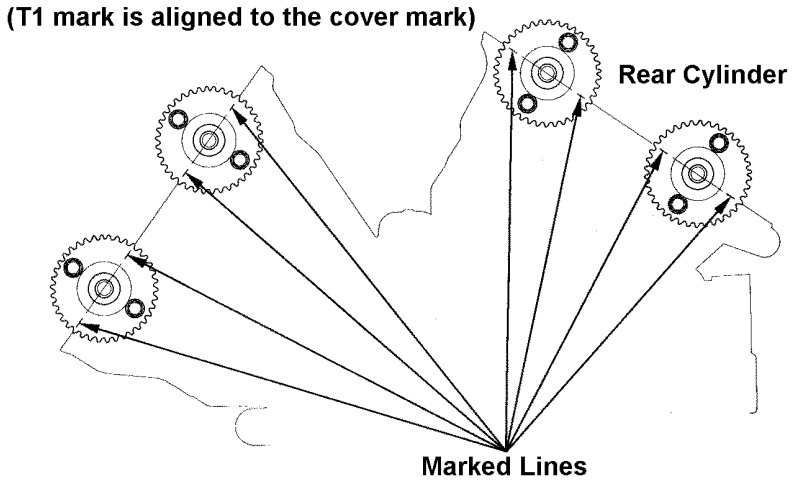
Relevant Works

- Front exhaust pipe removal / installation (2-4)
- Carburettor removal / installation (6-3)
- Radiator removal / installation (5-6)
- Right and left pivot plate cover removal / installation (2-2)

	Works / Parts	Qty.	Notes
	Dismounting		**Reverse the procedure for mounting.**
(1)	Gear shift arm bolt	1	
(2)	Gear shift arm	1	Align the punched marks on the arm and the gear shift spindle when installing.
(3)	Bolt	2	
(4)	Left main stop holder	1	Remove together with the gear shift pedal and the arm.
(5)	Socket bolt	3	
(6)	Drive sprocket cover	1	
(7)	Drive sprocket bolt / washer	1/1	
(8)	Drive sprocket	1	Loosen the drive chain before removing by loosening the rear axle nut, the lock nut and the drive chain adjust nut.
(9)	Spark plug cap	2	
(10)	Alternator lead coupler	1	Disconnect it and remove the lead from the clamp
(11)	Side stand lead coupler	1	Disconnect it and remove the lead from the clamp and the engine.
(12)	Ignition coil connector	2	
(13)	Thermo sensor connector	1	
(14)	Water hose	2	Loosen the hose band screw and disconnect from the front and the rear cylinder heads.
(15)	Socket bolt	2	
(16)	Carburettor side cover stay	1	Remove together with the ignition coil, thermostat case and the water hose.
(17)	Crankcase breather hose	1	Disconnect it from the rear cylinder head.
(18)	Pulse generator coupler	1	Disconnect it and remove the lead from the clamp
(19)	Clutch cable	1	Loosen the lock nut and the adjust nut. Then disconnect from the lifter arm to remove from the cable holder.
(20)	Bolt / Earth lead	1/1	
(21)	Nut / Starter motor lead	1/1	
(22)	Bolt / Horn / Radiator stay	1/1/1	
(23)	Engine mount nut	2	
(24)	Engine mount bolt	3	
(25)	Engine mount collar	5	When installing, be aware of the difference in each collar length: Check position of each. (Rear upper collar 32.5mm) (Left rear lower collar 41.6mm) (Front collar 19.5mm) (Right rear lower collar 38.1mm)
(26)	Engine Assy.	1	

General Caution

- Camshafts and cylinder heads can be serviced without dismounting the engine.
- Mark each removed part so that they can be re-installed to the original position.
- All disassembled parts should be cleaned and dried with compressed air before measuring them.
- The engine oil for the camshaft lubrication is supplied through the cylinder head oil path. When assembling the cylinder head, clean the oil path.
- When assembling, apply Molybdenum solution to the valve stem and locker arm contact areas, cam shaft cam surface and journals for initial lubrication.
- Align the T1 mark on the starter clutch and the alignment mark on the right crankcase cover. If the valve timing is correct, the marked lines on all cam sprockets should align with the cylinder head tops and all cam shaft ID marks (IN.F, EX.F, IN.R and EX.R) should face upwards or downwards. If all of the camshaft ID marks are facing downwards, the rear cylinder is in fully compressed position.



Troubleshooting

- Cylinder head related troubles can be identified by measuring the compression and the noise from the engine top.

Too low compression

- Valve
  - Valve clearance improperly adjusted.
  - Valve wear / burn.
  - Valve timing failure.
  - Valve spring damage.
  - Valve seat inadequate contact.

- Cylinder Head
  - Cylinder head gasket leak
  - Cylinder head distortion or crack
  - Spark plug loose attachment
- Cylinder / Piston failure (Sec. 11)

Too high compression

- Carbon on piston heads and combustion chamber

White smoke from a muffler

- Valve guide or valve stem wear
- Valve stem seal damage
- Piston, piston ring and cylinder failure (Sec. 10)

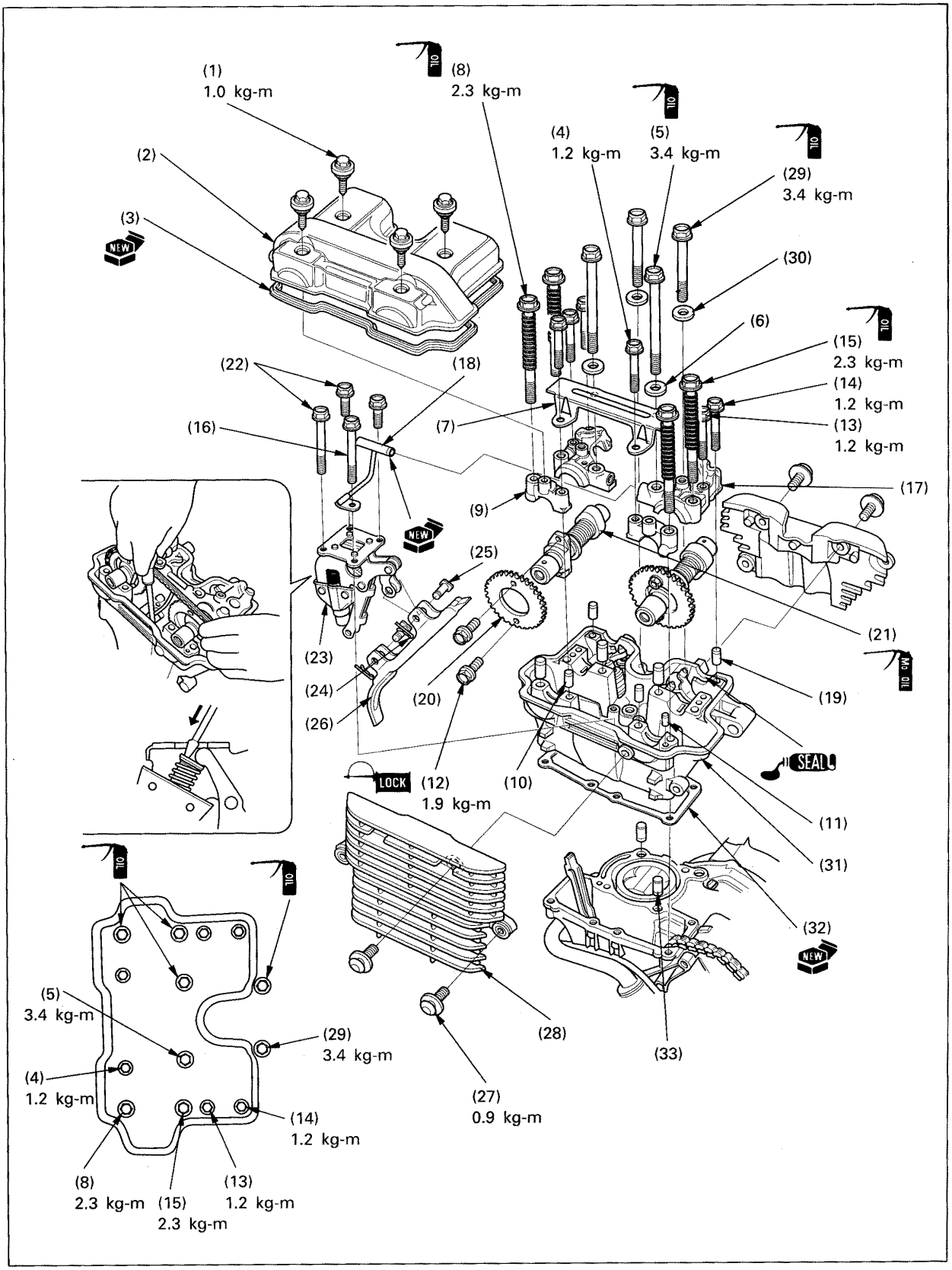
Engine Noise

- Valve clearance improper adjustment
- Valve burned
- Valve spring damage
- Camshaft damage and wear
- Cam chain tensioner, guide wear and damage
- Cam chain, sprocket wear and damage
- Piston, conrod or transmission failure (Sec. 11)

Idling Fault

- Too low compression

♦ Camshaft and Cylinder Head Removal / Installation



CAUTION

- This page describes about the rear side. Repeat the same procedure for the front one.
- Before removing the camshaft holder, remove the timing hole cap and align T mark on the starter clutch (T1 for rear, T2 for front) with the marks on right crankcase cover and check the cylinder is in fully compressed position. Then loosen the bolts equally (by dividing it to 2 ~ 3 sequences).

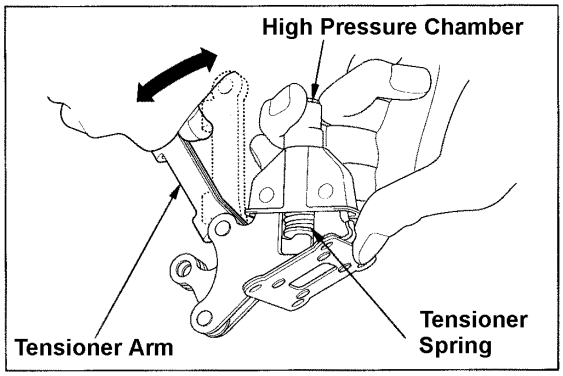
Relevant Works

- Exhaust pipe removal / installation (2-4)
- Carburettor removal / installation (6-3)
- Radiator removal / installation (5-6)
- Spark plug removal / installation
- Main switch bracket removal / installation (3-13)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
	Camshaft		
(1)	Cylinder head	4	
(2)	Cylinder head cover	1	Apply sealant to the half round part on the cylinder head when installing.
(3)	Cylinder head cover gasket	1	Apply bond to the cylinder head cover when installing. Wipe off excess bond.
(4)	6mm flange bolt	2	
(5)	8mm UBS bolt	2	
(6)	Washer	2	Do not drop it into the crankcase.
(7)	Cam chain guide	1	
(8)	8mm UBS bolt	2	
(9)	Camshaft holder C/D	1/1	
(10)	Knock pin	3	
(11)	Knock pin C	1	Do not drop them into the crankcase.
(12)	Cam sprocket bolt	4	
(13)	6mm flange bolt	2	
(14)	6mm UBS bolt	2	
(15)	8mm UBS bolt	2	
(16)	8mm flange bolt	1	
(17)	Camshaft holder A/B	1/1	Remove together with the oil path pipe.
(18)	Oil path pipe / O-Ring	1 / 2	Remove from the camshaft holder.
(19)	Knockpin	4	
(20)	Cam sprocket	2	Insert a screwdriver as shown in the figure to push the tensioner and loosen the cam chain to remove/install. Installation (8-4).
(21)	Intake / exhaust camshaft	1/1	
	Cylinder Head	3	
(22)	6mm flange bolt	1	Inspection (8-4)
(23)	Cam chain tensioner	2	
(24)	Lock pin	2	Do not drop them into the crankcase.
(25)	Tensioner arm pin	1	• Sling the cam chain to prevent it falling into the crankcase when removing the slipper.
(26)	Cam chain tensioner slipper		• Installation (8-4)
		4	
		2	
(27)	Socket bolt	2	
(28)	Cylinder head fin	2	
(29)	8mm UBS bolt	1	
(30)	Washer	1	
(31)	Cylinder head	2	
(32)	Cylinder head gasket		
(33)	Knock pin		

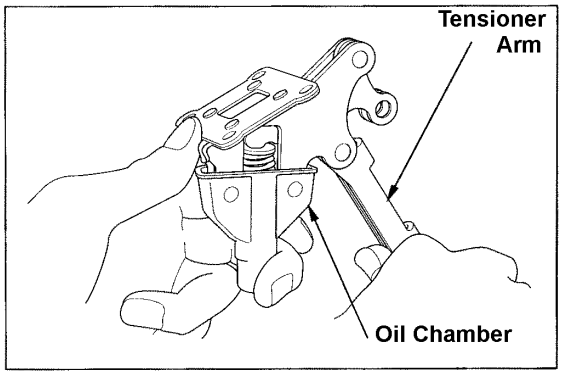
Cam Chain tensioner inspection

Turn the tensioner upside down to drain oil in the oil chamber.
Slowly move the tensioner arm to drain oil in the high pressure chamber.
Inspect the tension of the tensioner spring by moving the tensioner arm. If the tension is inadequate, replace the tensioner.



Fill the tensioner oil chamber with oil and slowly move the tensioner arm to fill the high pressure chamber with oil. Check the arm is locked when it is moved suddenly.
If the arm cannot be locked, replace the tensioner.

After the inspection, drain oil from the high pressure chamber.

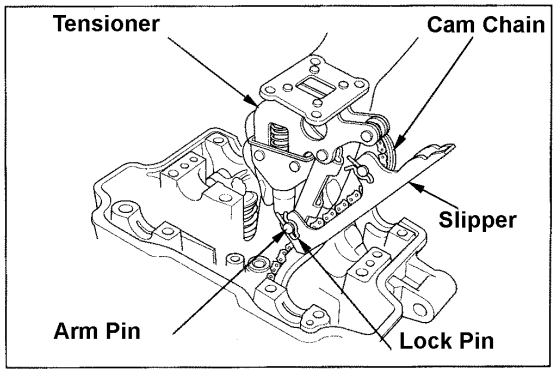


Cam Chain tensioner slipper installation

Fit the cam chain through the tensioner slipper and install the slipper to the tensioner.
Align the tensioner arm pin and the slipper flat end to install the arm pin and fix with a lock pin.

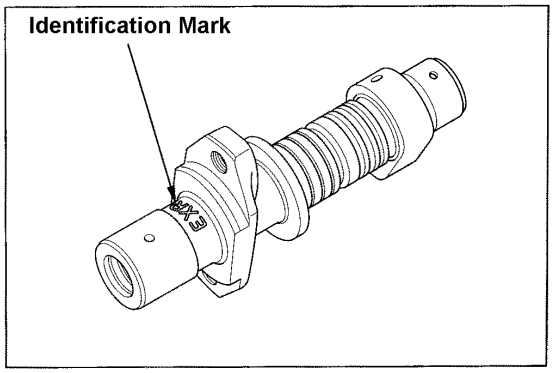
CAUTION

The front cylinder tensioner has its arm on the intake side and the rear cylinder tensioner has its arm on the exhaust side.



Camshaft installation

Check the camshaft identification.



ID marks	Installing location
IN.F	Front cylinder intake
EX.F	Front cylinder exhaust
IN.R	Rear cylinder intake
EX.R	Rear cylinder exhaust

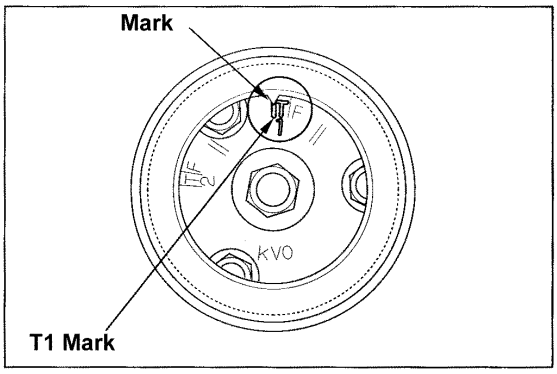
Both front and rear cylinder camshafts were removed.

CAUTION

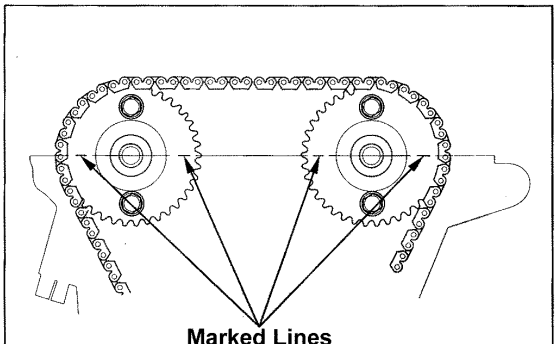
When both camshafts were removed, install the rear cylinder side first and then the front cylinder side.

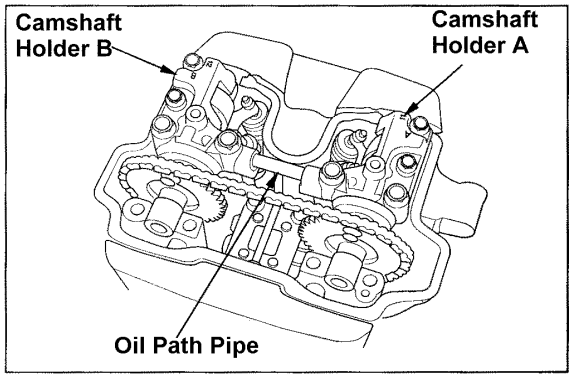
Rear Cylinder side

Rotate the crankshaft to the right and align the starter clutch T1 mark with the mark on the right crankcase cover.



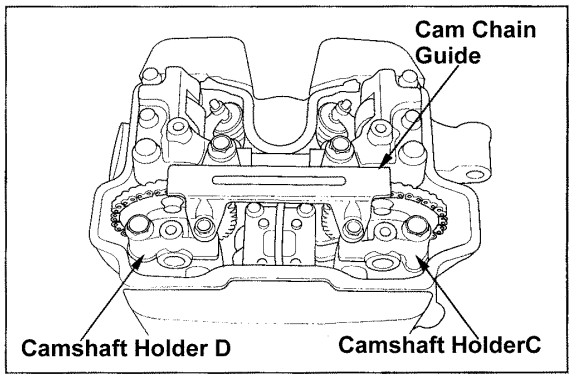
Apply Molybdenum solution to the camshaft cam surface and the bearings. Install the cam sprockets to the camshaft, facing the marked lines outwards.
Apply cam chain and set the camshafts.
Check the cam tops are facing upwards.
Set the cam chain to the cam sprocket so as to align the marked lines on the cam sprockets to the camshaft flange.
Align the bolt holes on the cam sprocket and the camshafts and install two cam sprocket bolts.
Apply clean engine oil to a new O-Ring and install it to the oil path pipe. Install the oil path pipe to the camshaft holders A and B. Install four knock pins on the camshaft holders A and B to the cylinder head.
Install the camshaft holders A and B and the oil path pipe to the cylinder head and temporarily tighten the bolts.
Rotate the crankshaft to the right for one rev and align the T1 mark on a starter clutch with the mark on the right crankcase cover to have the cylinder in fully compressed position.
Set four knock pins on camshaft holders C and D to the cylinder head.
Install the camshaft holders C and D to the cylinder head.
Remove the two 8mm temporarily installed bolts and install the cam chain guide.





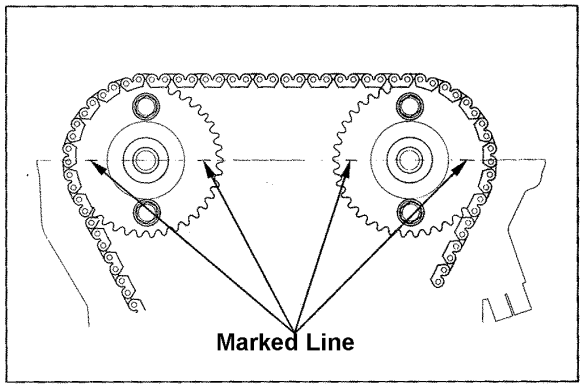
CAUTION

Check the identification marks on the cam chain guides.
F: Front R: Rear
Tighten the camshaft holder bolts in 2 ~ 3 sequences for each opposite corner.

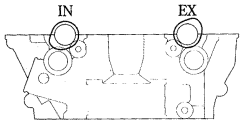


Torque:	**8mm UBS bolt (Black):**	**3.4kg-m**
	8mm UBS bolt:	**2.3kg-m**
	6mm bolt	**1.2kg-m**

Front Cylinder side

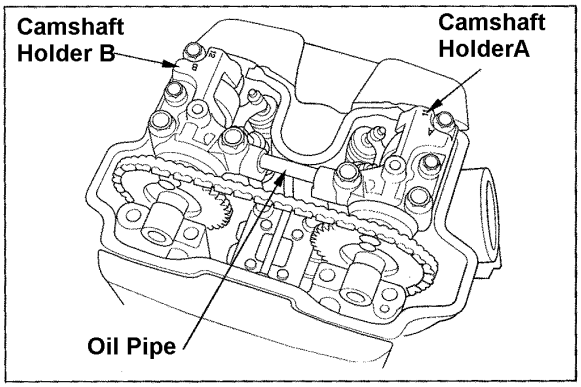


Check the T1 mark is aligned with the mark on the crankcase cover, which indicates that the rear cylinder is in fully compressed position.
Install the front cylinder camshaft and the cam sprocket in the same manner as the rear side (do not install cam sprocket bolts yet).
Rotate the crankshaft to the right for one revolution to align the T1 mark again.
Set the cam tops of the front camshaft to the direction shown as follows:

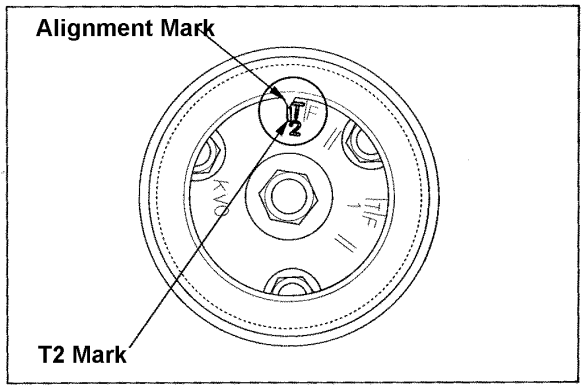


View from the right side

Align the cam sprocket and the camshaft bolt holes to install two cam sprocket bolts.
In the same manner with the rear cylinder, install the camshaft holder A and B. Then, rotate the crankshaft for one revolution to install remaining two cam sprocket bolts.
Rotate the crankshaft to the right for approx 1



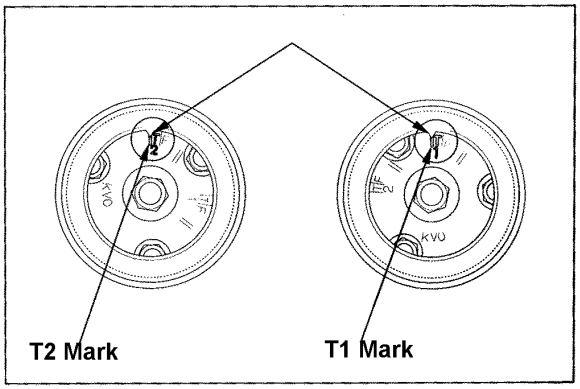
– ¼ rev (450°) to align the starter clutch T2 mark with the mark on the right crankcase cover to bring the front cylinder fully compressed.



In the same manner with the rear cylinder side, install the camshaft holders C and D, cam chain guide and tighten the bolts.

<u>Only the rear cylinder camshaft was removed:</u>

Remove the front cylinder head cover.
Rotate the crankshaft to the right and align the starter clutch T2 mark with the mark on the right crankcase cover.
Check the front cylinder is in fully compressed position (3-13).
Rotate the crankshaft to the right for ¾ revolution (270°) to align T1 mark with the mark.

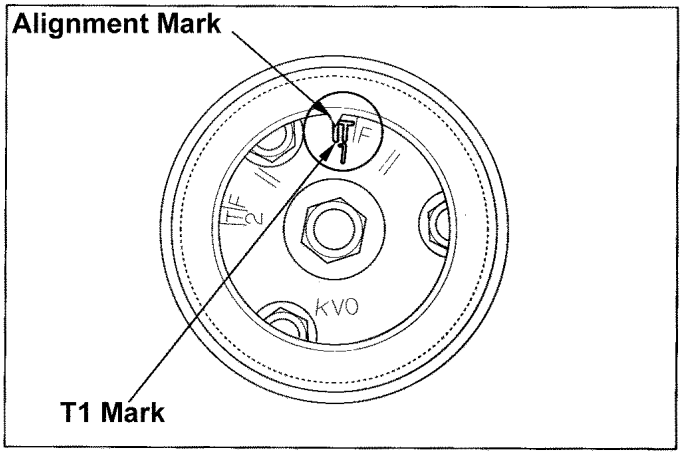


In the same manner with both cylinder camshaft removed case, install the rear cylinder camshaft, the cam sprocket and the camshaft holder.

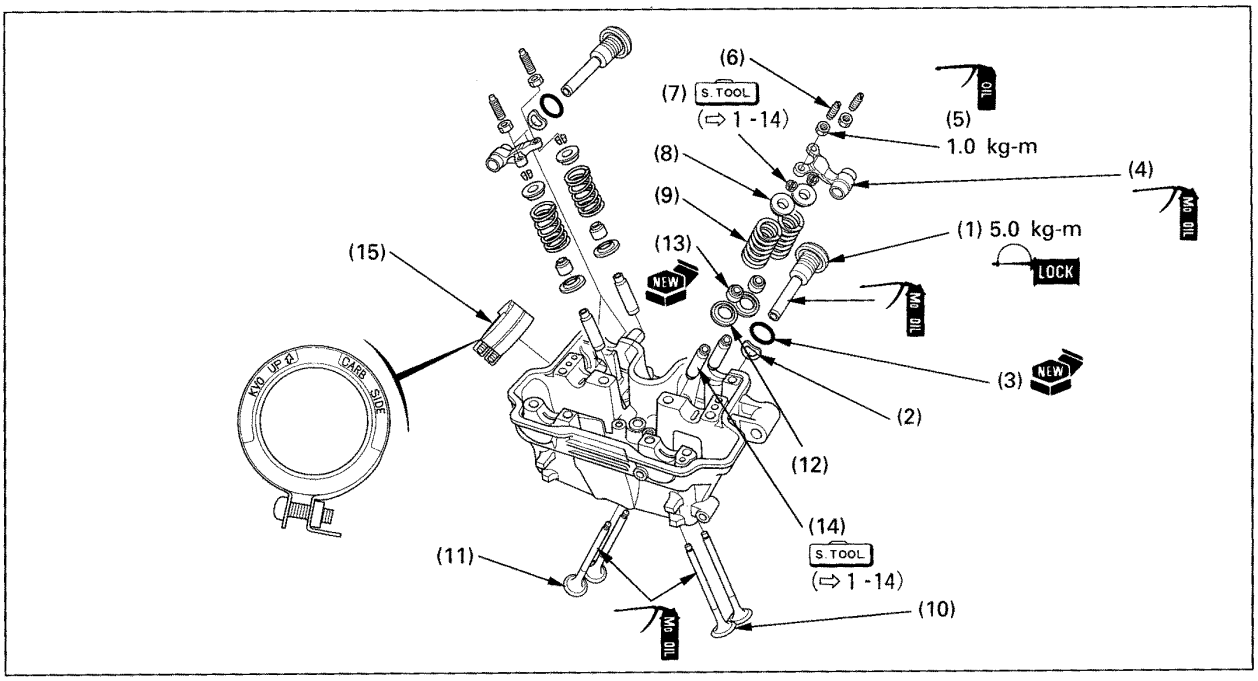
Only the front cylinder camshaft was removed:

Remove a rear cylinder head cover. Rotate the crankshaft to the right and align the starter clutch T1 mark with the mark on the right crankcase cover. Check the rear cylinder is in fully compressed position (cam top facing upwards).

In the same manner with both cylinder camshaft removed case, install the front cylinder camshaft, cam sprocket and the camshaft holder.



♦ Cylinder Head Assembly/Disassembly



CAUTION

- Sort and store each part so it can be re-installed to it's original place.
- Do not over compress the valve springs. It may deform the spring.

Relevant Works

- Cylinder head removal / installation

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for its assembly.**
(1)	Locker arm shaft	2	
(2)	Wave washer	2	
(3)	O-Ring	2	
(4)	Locker arm	2	
(5)	Lock nut	4	Do not remove unless needed.
(6)	Valve adjust screw	4	
(7)	Valve cotter	8	
(8)	Valve retainer	4	
(9)	Valve spring	4	The fine pitch end is to be installed to the cylinder head.
(10)	Intake valve	2	**CAUTION**
(11)	Exhaust valve	2	Slowly rotate it to install in order to prevent damaging the stem seal.
(12)	Spring seat	4	
(13)	Stem seal	4	
(14)	Valve guide	4	Installation height: 11.4 ~ 11.6mm
(15)	Carburettor insulator	4	Set the CARB SIDE to the carburettor side, UP mark facing upwards when installing.

General Caution

- The clutch can be serviced with the engine mounted.
- Engine oil viscosity and oil level affects the clutch operation. If the clutch is hard to release or if the vehicle is still moving forward with the clutch released, check the oil first.
- Remove any gasket stuck on the case mating surface.
- Do not damage the case mating surface when disassembling.
- Keep away from debris and dirt to prevent them going into the engine.

Troubleshooting

The majority of the clutch operation failure is improper clutch lever free play.
Before disassembling, check and adjust the free play.

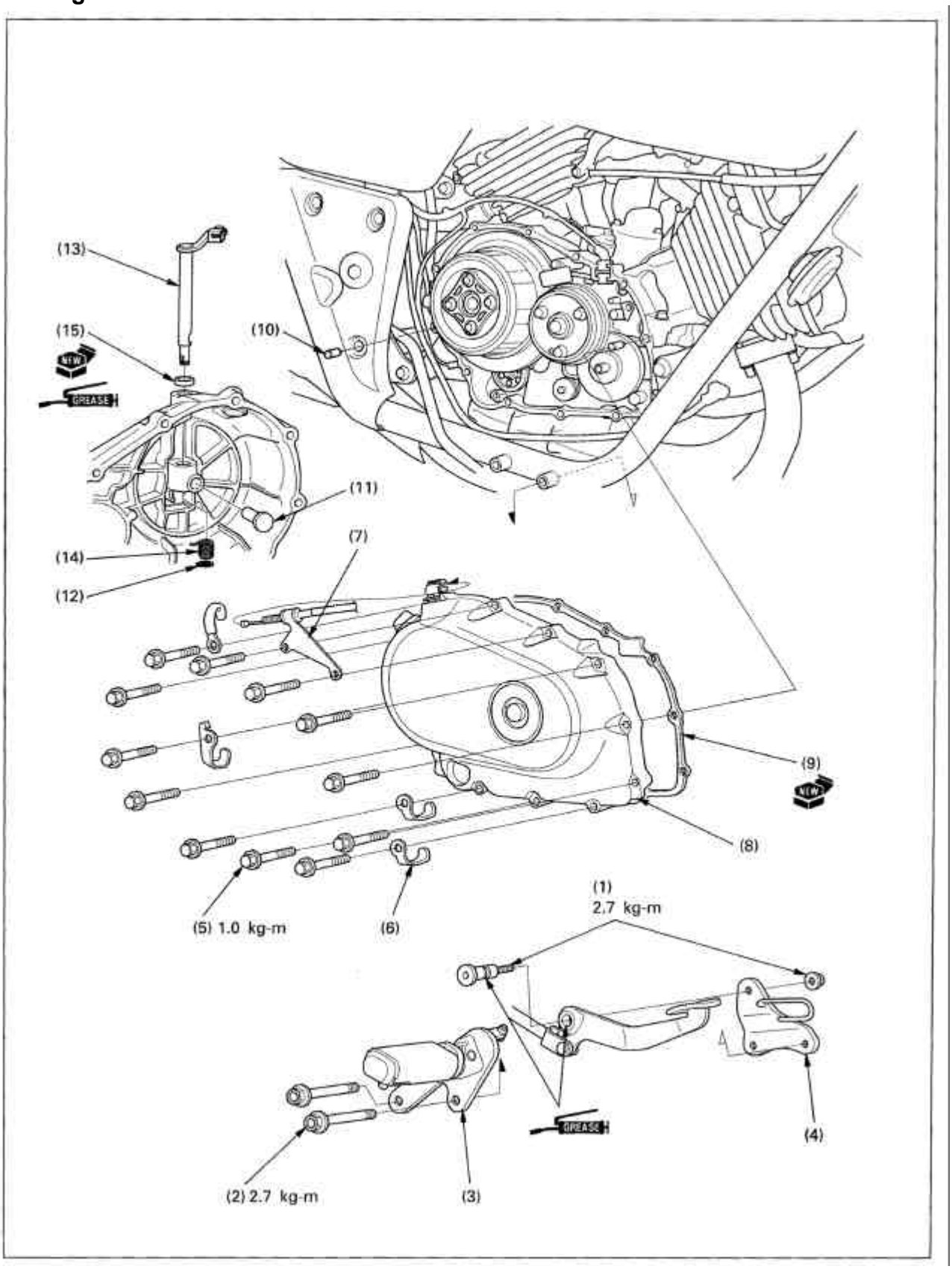
Clutch lever is heavy
- Clutch cable damaged / rust
- Clutch lifter system damaged
- Clutch lifter bearing failure
- Clutch cable not running through correct places.

Unable to release the clutch or it keeps running
- Clutch free play too large
- Clutch plate distortion, bent
- Clutch centre lock nut is loosened
- Excess amount of engine oil or too high viscosity
- Clutch lifter system damaged
- Clutch cable incorrectly routed

Clutch slips when accelerating
- Clutch lifter mechanism jammed
- Clutch free play too little
- Clutch disc wear
- Clutch spring stretched

Clutch operation is unstable
- Clutch outer groove wear

♦ **Right Crankcase Cover Removal/Installation**



CAUTION

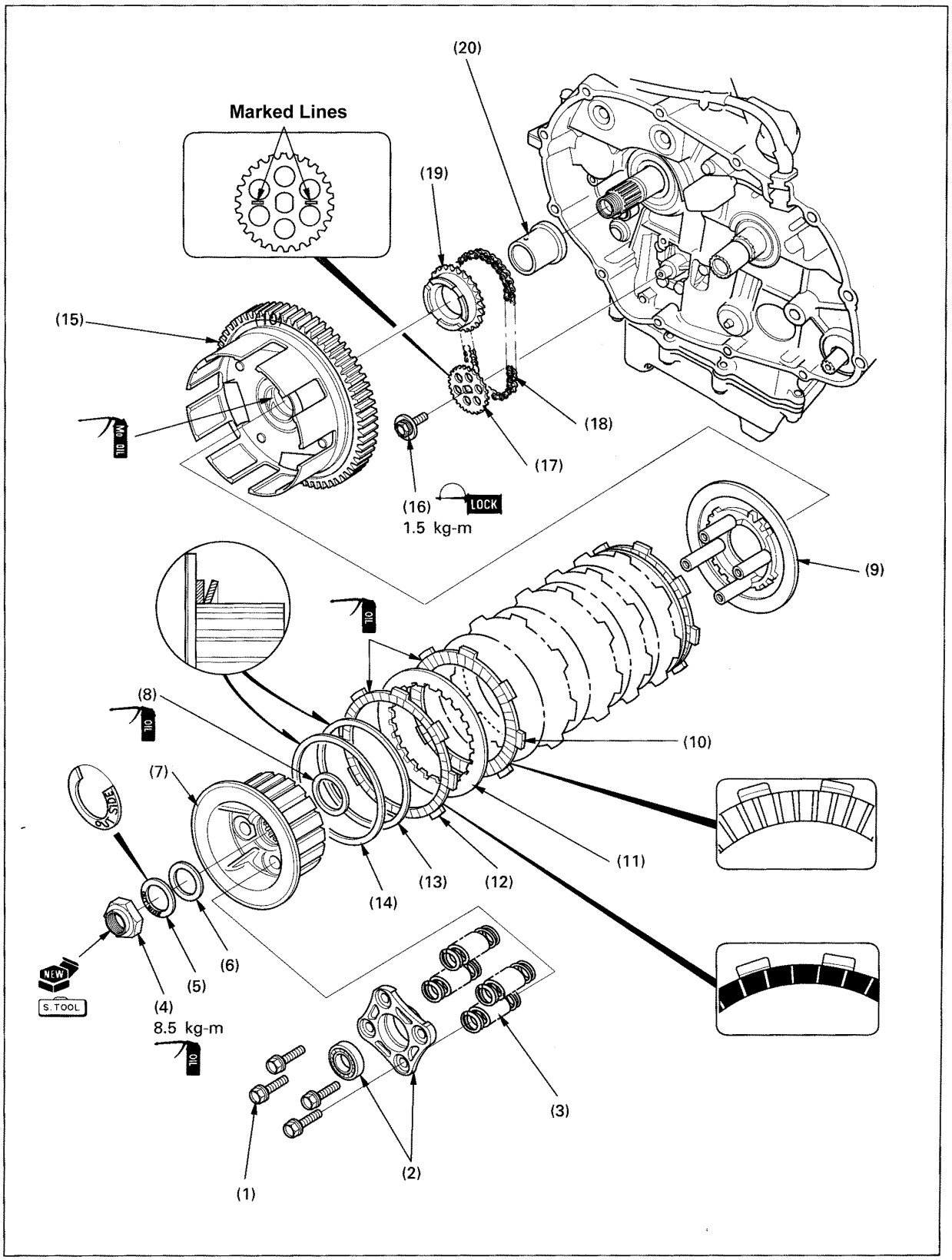
Inspect / adjust the clutch lever free play and the rear brake pedal free play after the installation.

Relevant Works

- Engine oil drain / refill

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Rear brake pedal pivot bolt/nut	1/1	Remove the pedal from the bracket.
(2)	Bolt	2	
(3)	Right main step holder	1	
(4)	Step holder bracket	1	
(5)	Right crankcase cover bolt	12	
(6)	Clamp	4	Refer to the wiring diagram (1-18) to correctly clamp the leads when installed.
(7)	Clutch cable holder	1	Disconnect the cable from the clutch arm and remove together with the cable.
(8)	Right crankcase cover	1	
(9)	Gasket	1	
(10)	Knock pin	2	
	Clutch lifter disassembly		
(11)	Lifter piece	1	Remove by rotating the clutch arm to the left.
(12)	Snap ring	1	
(13)	Clutch arm / lifter rod	1	When installing, insert the spring end to the groove on the lower part of the lifter rod.
(14)	Spring	1	
(15)	Oil seal	1	

♦ **Clutch Removal/Installation**



CAUTION

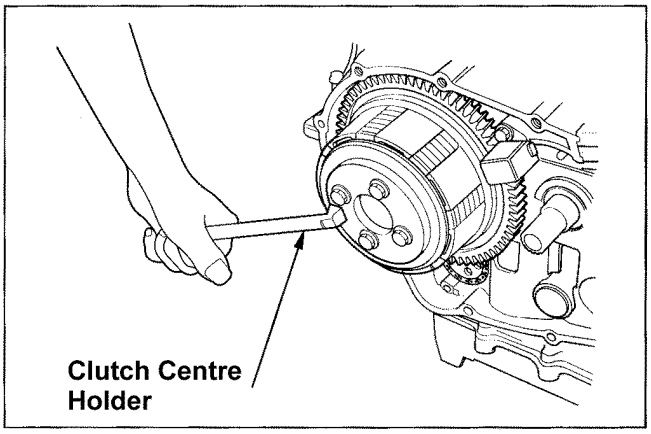
- When removing the oil pump driven sprocket bolt, loosen it before removing the clutch.
- There is no need to remove the starter clutch unless the clutch outer is to be removed.

Relevant Works

- Right crankcase cover removal/installation (9-2)
- Starter clutch removal/installation (17-6)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Clutch spring bolt	4	
(2)	Clutch lifter plate/bearing	1/1	
(3)	Clutch spring	4	
(4)	Clutch centre lock nut	1	Removal / installation (9-6)
(5)	Lock washer	1	Face the “OUTSIDE” mark outwards
(6)	Washer	1	
(7)	Clutch centre	1	Remove with ASSY from the clutch pressure plate, the clutch disc and the clutch plate.
(8)	Thrust washer	1	Install to the clutch centre guide correctly.
(9)	Clutch pressure plate	1	
(10)	Clutch disc A	6	
(11)	Clutch plate	6	
(12)	Clutch disc B	1	Internal diameter is bigger than the clutch disc A
(13)	Judder spring	1	Note the installing direction.
(14)	Spring seat	1	
(15)	Clutch outer	1	Set the oil pump drive sprocket projection to the clutch outer dent when installing.
(16)	Oil pump driven sprocket bolt	1	
(17)	Oil pump driven sprocket	1	Face the marked lines inwards.
(18)	Oil pump drive chain	1	
(19)	Oil pump drive sprocket	1	
(20)	Clutch outer guide	1	

Clutch centre lock nut removal / installation



CAUTION

When disconnecting the staked part or staking the lock nut, do not damage the main shaft.

Removal

Disconnect the staked parts on the lock nut.
Set the clutch centre holder with the clutch spring bolts.
Fix the clutch centre and remove the lock nut.

Excl. tool

Clutch centre holder 07GMB-KT70101

Installation

Apply engine oil to the new lock nut thread and the seat before installing it.
Fix the clutch centre with the clutch centre holder and tighten the lock nut.

Excl. tool

Clutch centre holder 07GMB-KT70101

Torque: 8.5kg-m

Stake the lock nut to the groove on a main shaft.

General Caution

Separate the crankcase to service the shift fork, the shift drum and the transmission (Sec. 11).

Troubleshooting

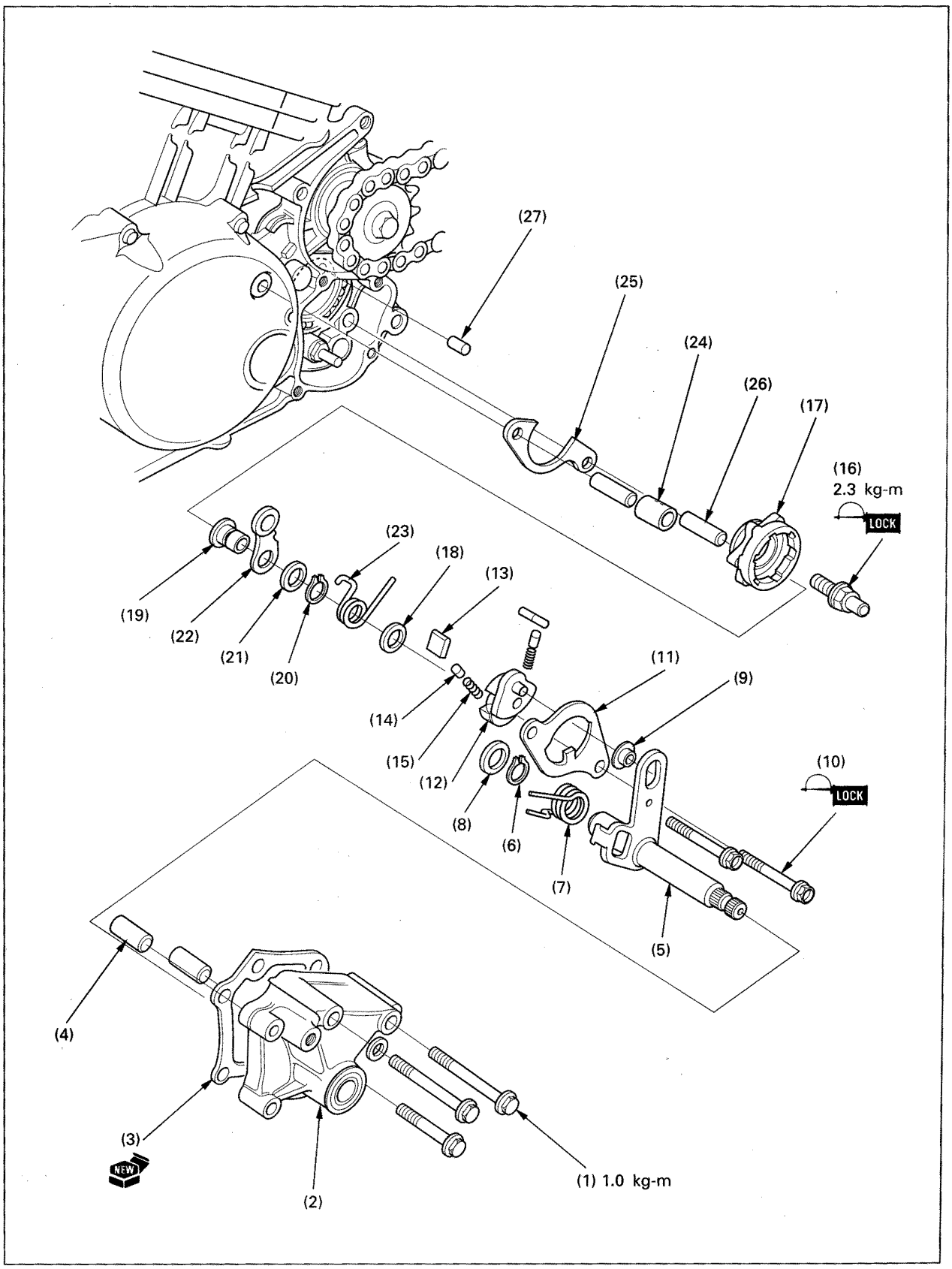
Difficult to set the gear

- Gear shift spindle bent
- Stopper arm attachment failure
- Shift fork bent
- Shift fork shaft bent
- Shift drum guide groove damage
- Shift fork guide pin damaged

The gear disengages

- Stopper arm damage
- Stopper arm spring stretched
- Shift drum centre damaged
- Gear dog part wear
- Gear shift fork groove wear
- Shift fork wear / damage
- Shift fork guide pin wear
- Shift drum guide groove wear

♦ **Gear shift linkage and shift drum removal/installation**



Relevant Works

- Water pump removal / installation (5-5)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for its installation.**
(1)	Bolt / Washer	3/1	
(2)	Shift linkage power	1	
(3)	Gasket	1	
(4)	Knockpin	2	
(5)	Gear shift spindle ASSY	1	
(6)	- snap ring	1	Do not remove unless required to do so.
(7)	- return spring	1	
(8)	Thrust washer	1	
(9)	Shifter collar	1	
(10)	Guide plate bolt	2	
(11)	Guide plate	1	Install together with the drum shifter.
(12)	Drum shifter	1	Install the spring, plunger and the ratchet pawl
(13)	Ratchet pawl	2	to the drum shifter and set the drum shifter to
(14)	Plunger	2	the guide plate.
(15)	Spring	2	
(16)	Shift drum centre bolt	1	When installing, temporarily set the guide plate and the bolt to tighten it.
(17)	Shift drum centre	1	When installing, push the stopper arm down with a screwdriver and align the drum centre hole with a shift drum pin.
(18)	Thrust washer	1	
(19)	Stopper arm ASSY	1	Remove together with the stopper arm spring.
(20)	- snap ring	1	
(21)	- washer	1	Do not remove unless required to do so.
(22)	- stopper arm	1	
(23)	Stopper arm spring	1	Remove from the stopper arm.
(24)	Guide plate spacer	1	
(25)	Shift drum bearing set plate	1	
(26)	Guide plate knockpin	2	
(27)	Shift drum pin	1	

General Caution

- The crankcase must be separated when servicing the crankshaft, piston, conrod and transmission.
- All detached parts should be sorted/stored for each cylinder. Mixing these parts between the cylinders may cause crankshaft and/or head damage as the oil clearance will vary.
- Do not damage the cylinders internal surface and the pistons external surface when cleaning, etc..
- Do not damage the crankcase mating surface.
- Do not damage the main bearing when removing/installing the crankshaft.
- Select the crankshaft bearing by using the colour code table. After replacing the bearing, check the oil clearance by using a plasticine gauge (refer to Sec. 9 in the main volume).
- Apply Molybdenum solution to the main bearing and the conrod bearing upon assembling.
- Apply sealant to the crankcase mating surface upon assembling. Wipe off all excess sealant.

Troubleshooting

Too low compression
- Piston ring wear, burn or damage
- Piston or cylinder wear
- Cylinder head, valve failure (Sec.8)

Too high compression
- Carbon on piston head and combustion chamber

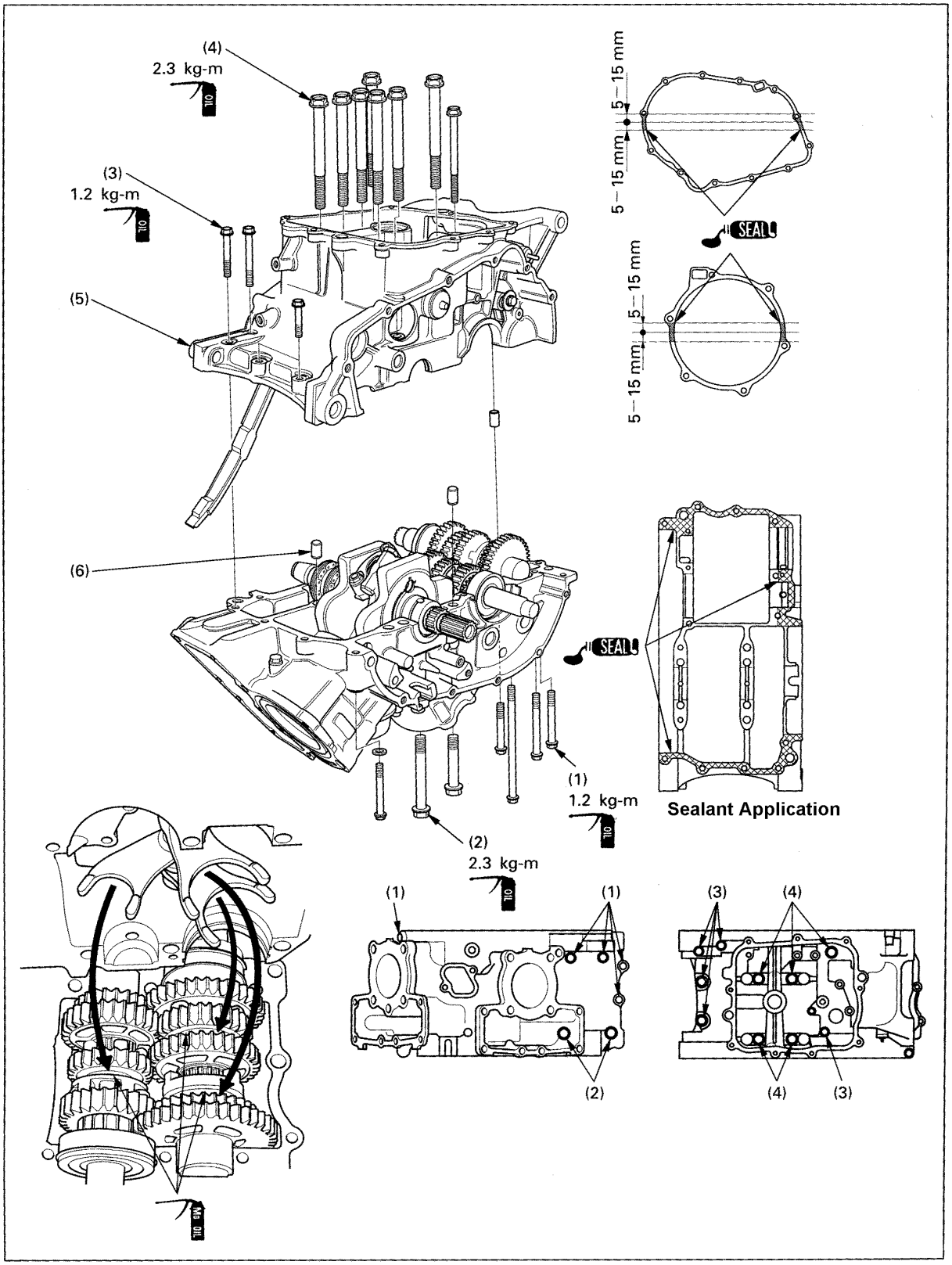
White smoke from muffler
- Cylinder, piston or piston ring wear
- Piston ring installation fault
- Piston exterior surface, cylinder internal surface damage
- Cylinder head, valve failure (Sec. 8)

Engine Noise
- Piston pin, pin hole wear
- Conrod bearing wear
- Conrod bent
- Crankshaft main bearing wear
- Transmission gear wear
- Transmission bearing wear
- Cylinder head, valve failure (Sec. 8)

Difficult to select the gear
- Gear shift spindle bent
- Stopper arm installation fault
- Shift fork bent
- Shift fork shaft bent
- Shift drum guide groove damage
- Shift fork guide pin damage

Gear disconnects
- Stopper arm damage
- Stopper arm spring stretched
- Shift drum centre damage
- Gear dock wear
- Gear shift fork groove wear
- Shift fork wear/damage
- Shift fork guide pin wear
- Shift drum guide groove wear

♦ **Crankcase Separation / Assembly**



CAUTION

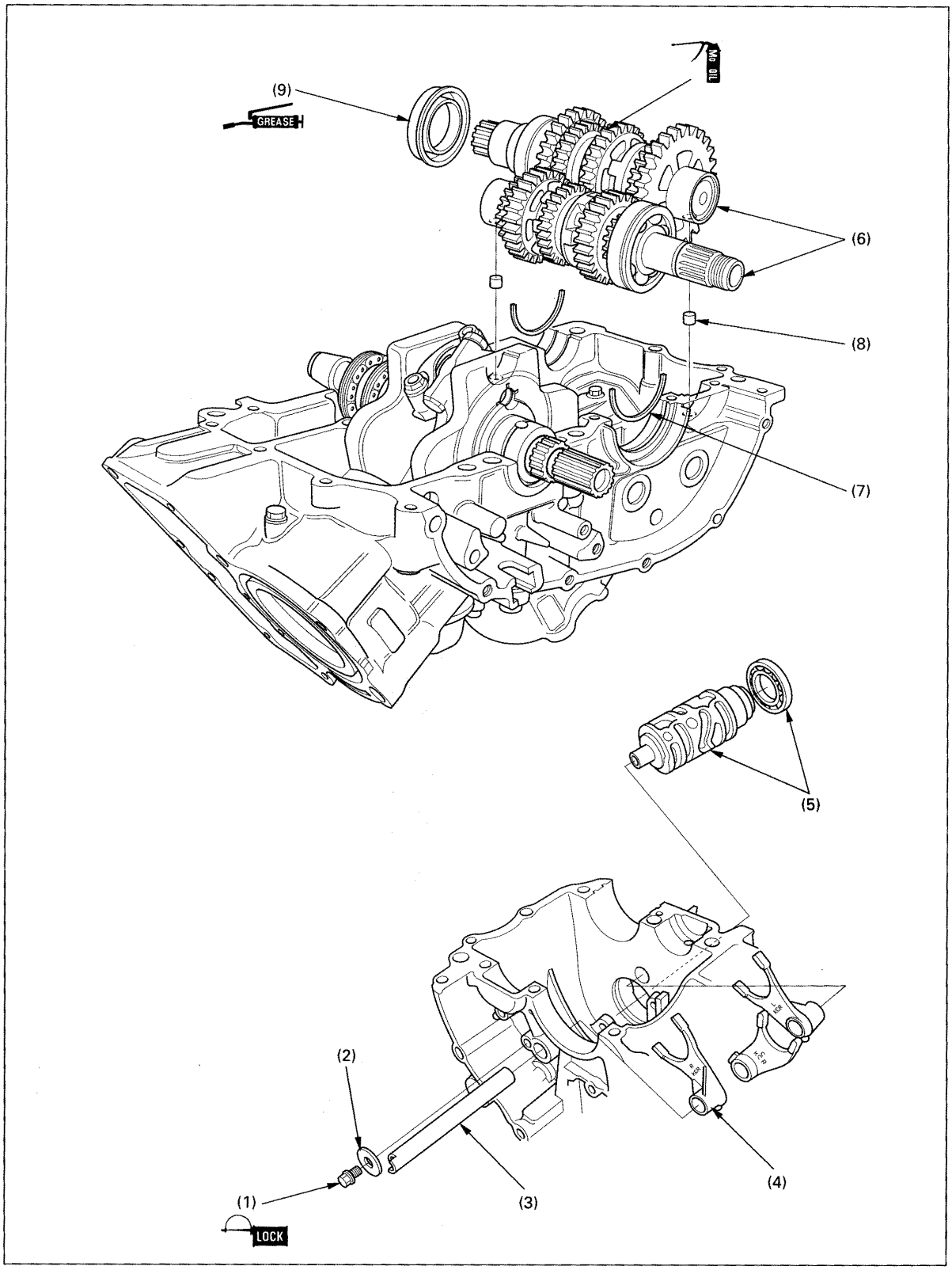
- Separate the crankcase and remove all sealant from the mating surface.
- When assembling the case, clean the mating surface and apply sealant to the hatched area

Relevant Works

- Engine mounting / dismounting (7-2)
- Clutch removal / installation (9-4)
- Gear shift linkage removal / installation (10-2)
- Starter motor removal / installation (17-4)
- Camshaft, cylinder head removal/installation (8-3)
- Pulse generator removal/installation (16-8)
- Alternator removal/installation (15-8)
- Oil pump removal/installation (4-4)

	Works / Parts	Qty.	Notes
	Separation		**Reverse the procedure for assembly.**
(1)	6mm upper crankcase bolt	5	One bolt at the front is a special bolt with a washer.
(2)	8mm upper crankcase bolt	2	
(3)	6mm lower crankcase bolt	5	One bolt is already removed with the earth cable when dismounting the engine.
(4)	8mm lower crankcase bolt	5	
(5)	Lower crankcase	1	Apply Molybdenum solution to the gear shift fork grooves and set the shift forks to the grooves.
(6)	Knock pin	3	

♦ **Transmission Removal / Installation**

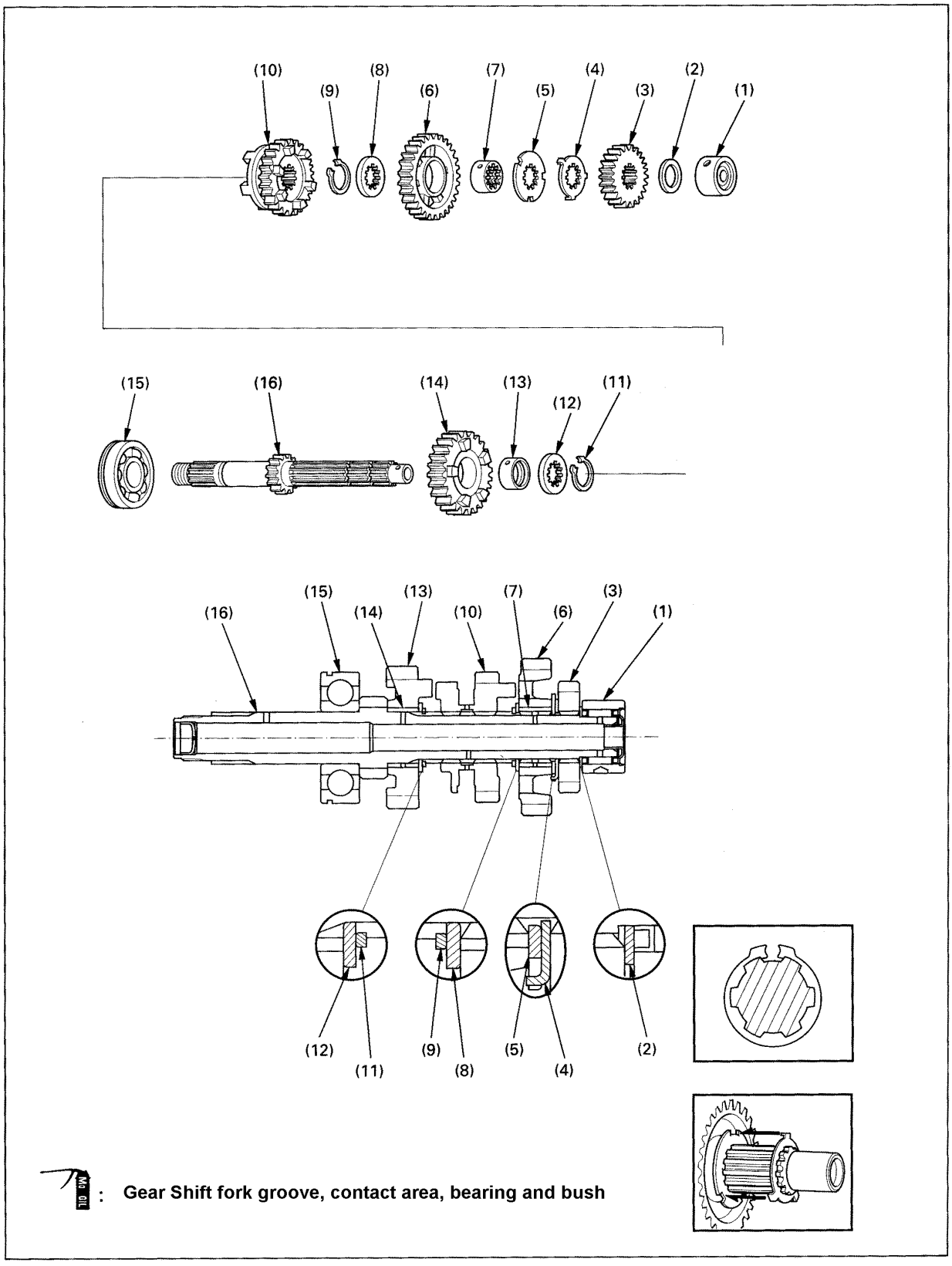


Relevant Works

- Crankcase separation / assembly (11-2)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Bolt	1	
(2)	Set plate	1	
(3)	Shift fork shaft	1	Place the cutout end to the right side.
(4)	Shift fork	3	Set the identification mark to the right and set the guide pin to the guide pin groove on the shift drum.
(5)	Shift drum/bearing	1/1	
(6)	Main shaft / Counter shaft	1/1	• Set the bearing groove to the set ring and the hole to the knockpin when installing. • Assembly / Disassembly (11-6,8)
(7)	Set ring	2	
(8)	Knockpin	2	
(9)	Counter shaft oil seal	1	

♦ Mainshaft Assembly / Disassembly



CAUTION

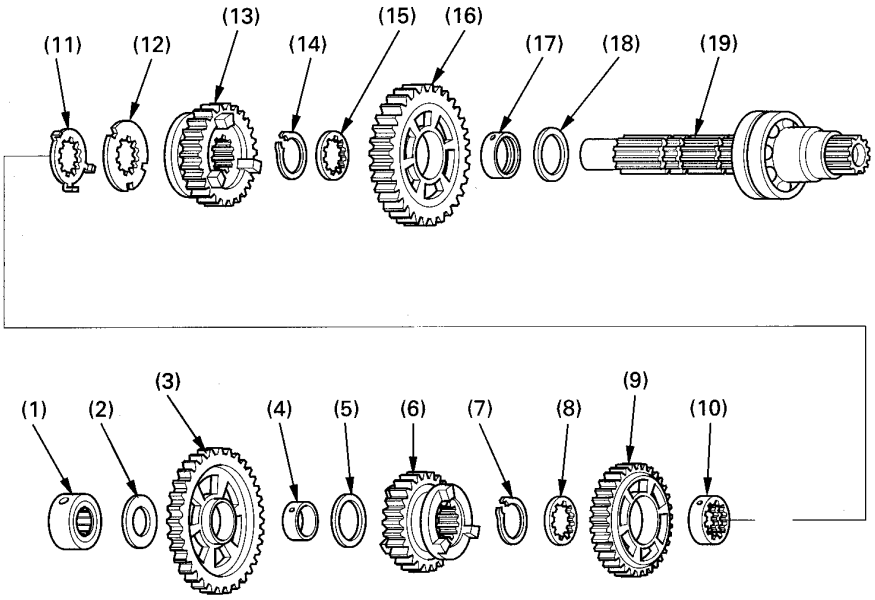
- Apply Molybdenum solution to the gear shift fork groove, gear matching area, bearing and the gear bush when assembling.
- Face the rounded surface of the washer/snap ring to the loading side.
- Do not re-use deformed snap rings.
- Set the open area of the snap rings to the grooves on the splines.

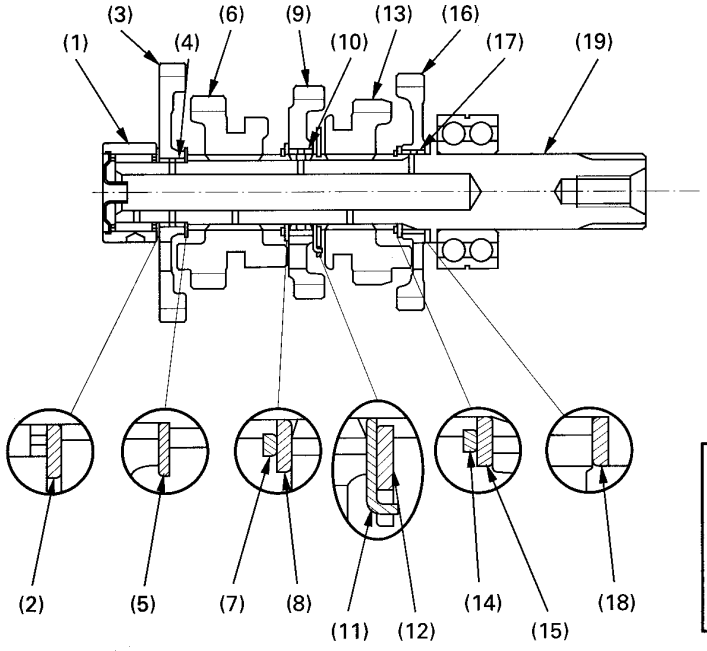
Relevant Works

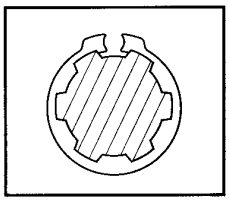
- Transmission removal/installation (11-4)

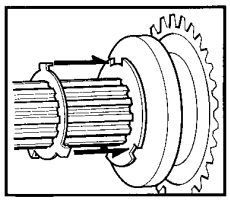
	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Needle bearing	1	
(2)	Thrust washer	1	
(3)	M2 gear (20T)	1	
(4)	Lock washer	1	Set the catch to the spline washer groove.
(5)	Spline washer	1	
(6)	M5 gear (29T)	1	
(7)	M5 gear spline bush	1	Align the bush and the shaft oil holes.
(8)	Spline washer	1	
(9)	Snap ring	1	
(10)	M3 gear (24T)	1	
(11)	Snap ring	1	
(12)	Spline washer	1	
(13)	M4 gear (27T)	1	
(14)	M4 gear bush	1	
(15)	Ballbearing (63/22)	1	
(16)	Main shaft (15T)	1	

♦ Countershaft Assembly/Disassembly









Mo Oil : Gear shift fork groove, matching area, bearings and gear bush.

CAUTION

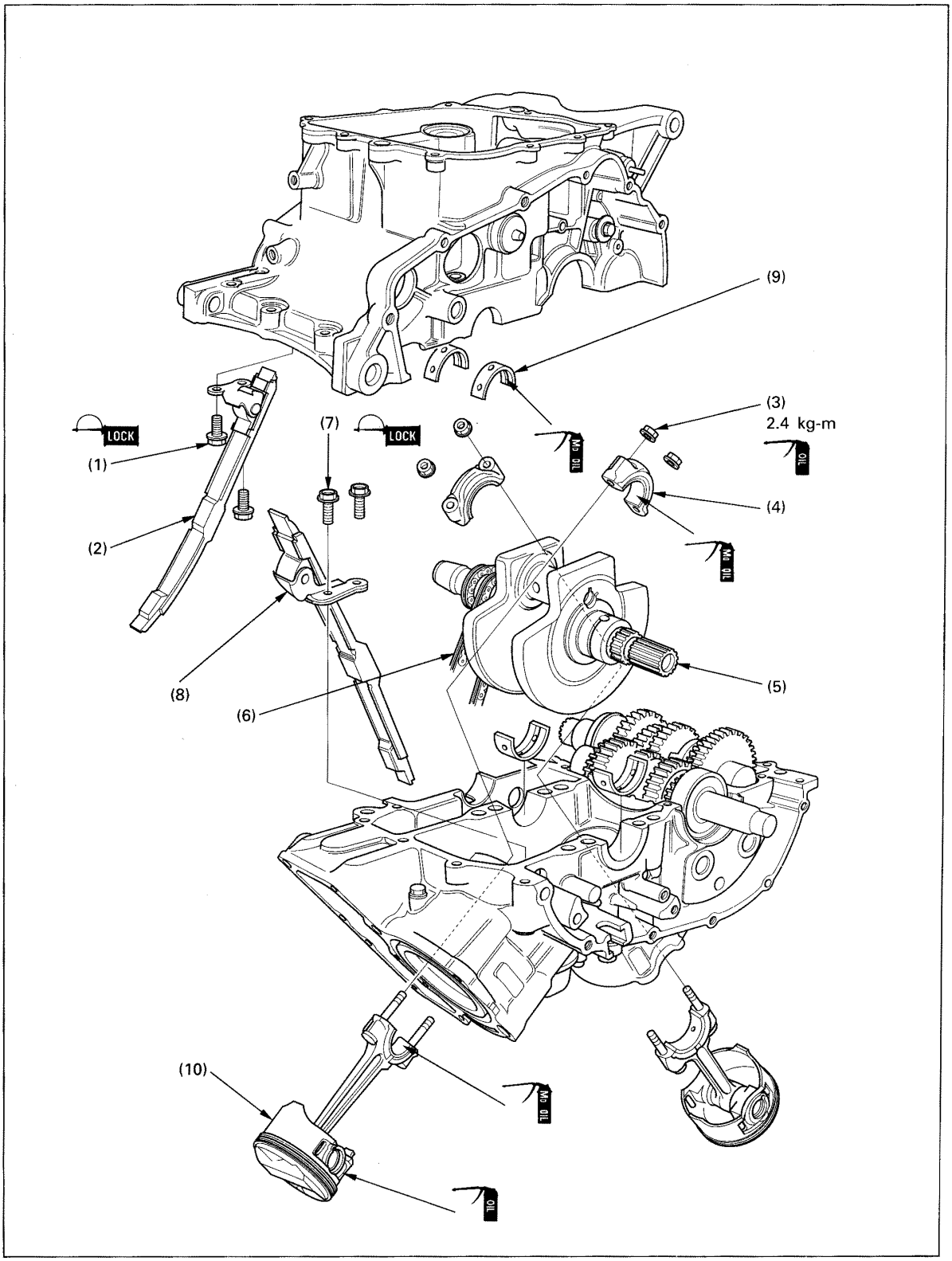
- Apply Molybdenum solution to the gear shift fork grooves, the matching area, the bearings and the gear bushes.
- The rounded side of the washers and the springs should face loading side.
- Do not re-use the deformed snap ring.
- The open area of the snap ring should be aligned with the groove on the spline.

Relevant Works

- Transmission removal/installation (11-4)

Works / Parts		Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Needle bearing	1	
(2)	Thrust washer	1	
(3)	C1 gear (41T)	1	
(4)	C1 gear bush	1	
(5)	Thrust washer	1	
(6)	C4 gear (30T)	1	
(7)	Snap ring	1	
(8)	Spline washer	1	
(9)	C3 gear (33T)	1	
(10)	C3 gear spline bush	1	Align the bush and the shaft oil holes when assembling.
(11)	Lock washer	1	Set the catch to the spline washer groove.
(12)	Spline washer	1	
(13)	C5 gear (28T)	1	
(14)	Snap ring	1	
(15)	Spline washer	1	
(16)	C2 gear (36T)	1	
(17)	C2 gear bush	1	
(18)	Thrust washer	1	
(19)	Counter shaft	1	

♦ **Crankshaft, piston and conrod removal / installation**



CAUTION

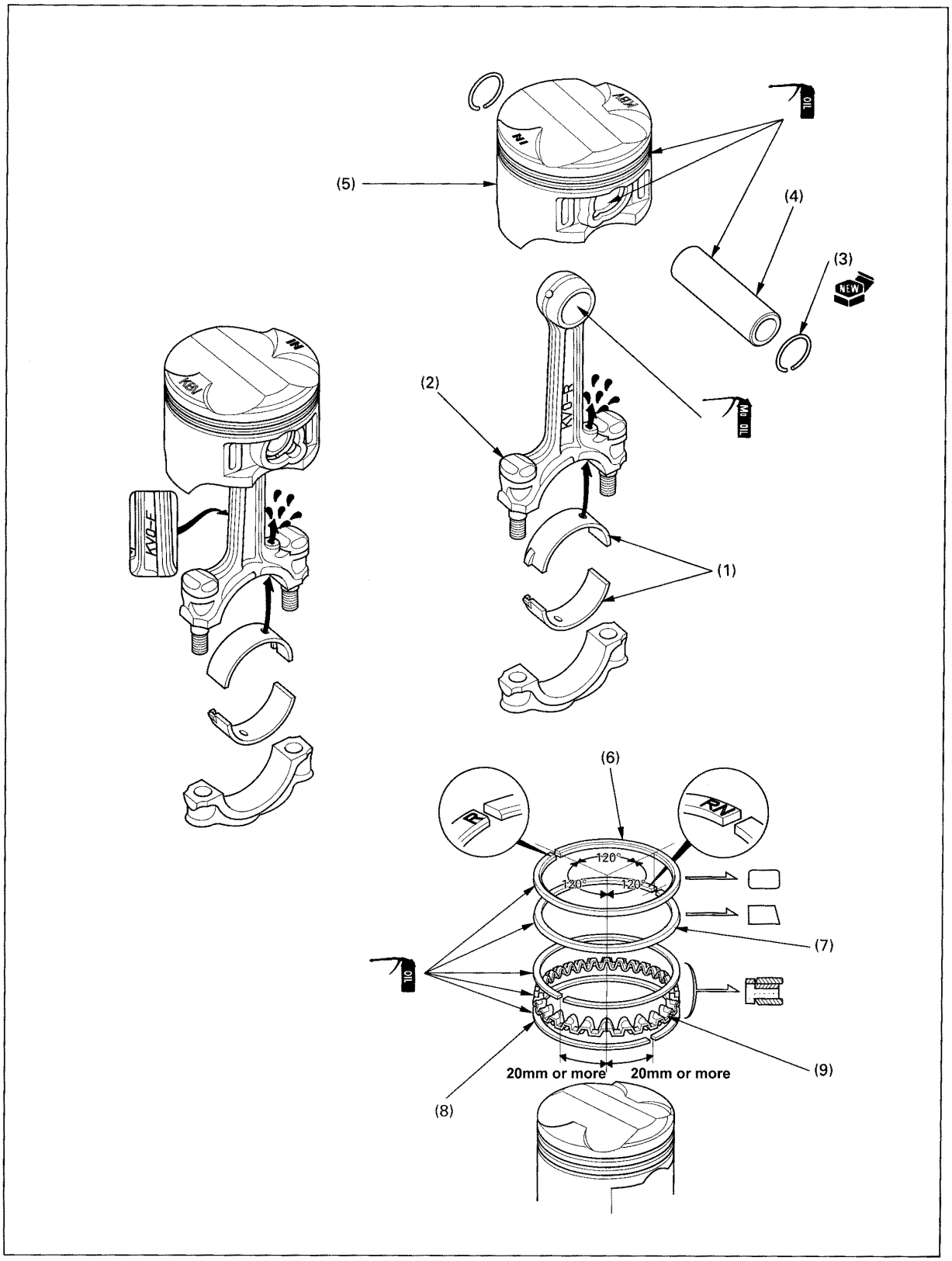
- Do not damage the main bearing when removing / installing the crankshaft.
- Sort and store all removed parts. Do not mix up parts (F&R) as clearance may vary.

Relevant Works

- Crankcase separation / assembly (11-2)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Bolt	2	
(2)	Cam chain guide B	1	
(3)	Conrod cap nut	4	
(4)	Conrod cap	2	
(5)	Crankshaft	1	• When installing, properly distribute the cam chain to both front and rear cylinder. • After installing, set the conrod to the crankpin. Do not damage the pin.
(6)	Cam chain	2	
(7)	Bolt	2	
(8)	Cam chain guide A	1	
(9)	Main bearing	4	Selection (11-14)
(10)	Piston / Conrod Assy	2	• Remove towards cylinder head side. • Assembly / disassembly (11-12). • Set the IN mark on the top of the piston to the carburetor side. By using a conventional piston ring compressor, install from the cylinder head side.

♦ **Piston and Conrod Assembly / Disassembly**



CAUTION

The direction of the conrod may be identified by the marks (F: Front, R: Rear)

Relevant Works

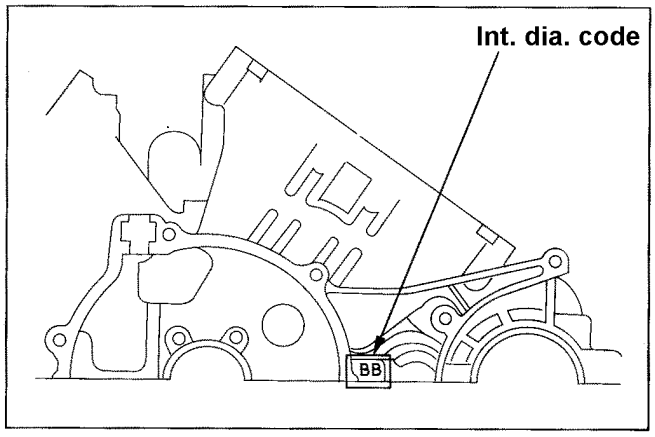
- Crankshaft, piston and conrod removal/installation (11-10)

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Conrod bearing	2	• Selection (11-14) • Align its oil hole with the one on the conrod when assembling.
(2)	Conrod bolt	2	Do not remove unless required.
(3)	Piston pin clip	2	CAUTION
(4)	Piston pin	1	
(5)	Piston	1	Set the IN mark on the front to the oil jet hole side. Set the IN mark on the rear to the opposite side of the oil jet hole.
(6)	Top ring	1	
(7)	Second ring	1	
(8)	Side rail	2	
(9)	Spacer	1	

Bearing Selection

Main Bearing

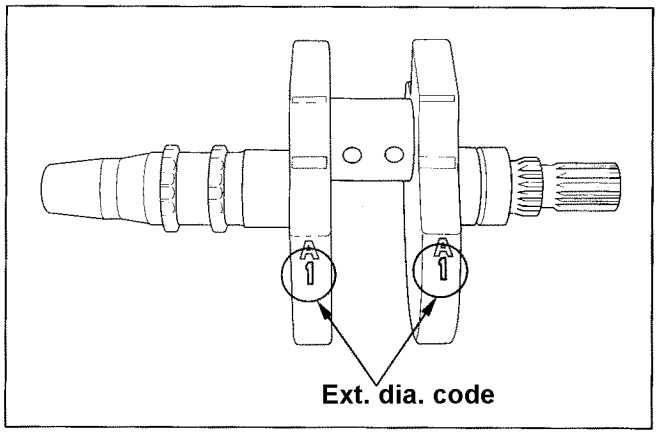
Record the main journal internal code on the crankcase.



CAUTION

- The code is marked on the left side of the upper crankcase as A or B.
- The left hand side indicates the rear cylinder and the right hand side indicates the front cylinder journal internal diameter code.

Record the crankshaft main journal external diameter code.



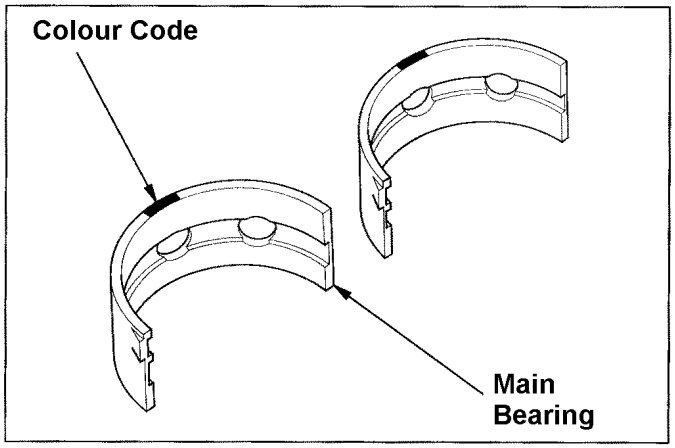
CAUTION

- The code is marked on the crankweight as 1 or 2.

From the two codes, select the replacement bearings (the bearings are colour coded).

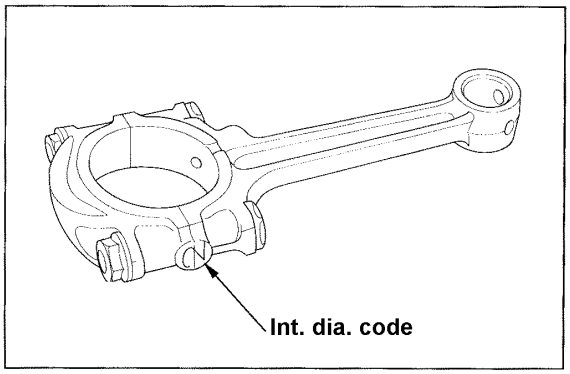
Crankcase internal diameter code / Crankshaft external diameter code		A	B
		35.000-35.008mm	35.008-35.016mm
1	32.002–32.010mm	C (Y)	B(G)
2	31.994 -32.002mm	B(G)	A(B)

Main bearing thickness:
A (B): 1.498 – 1.502mm B: Brown
B (G): 1.494 – 1.498mm G: Green
C (Y): 1.490 – 1.494mm Y: Yellow



Conrod Bearing

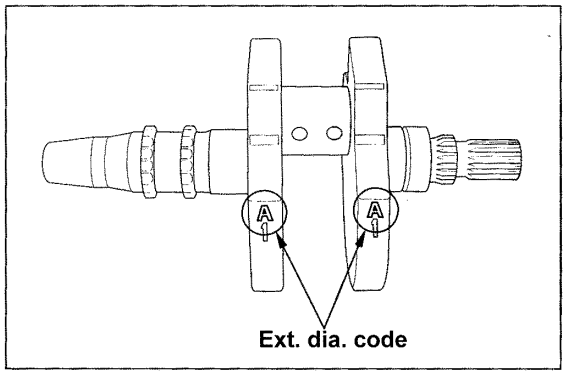
Record the conrod internal diameter code.



CAUTION

- The code is marked on the conrod as 1 or 2.

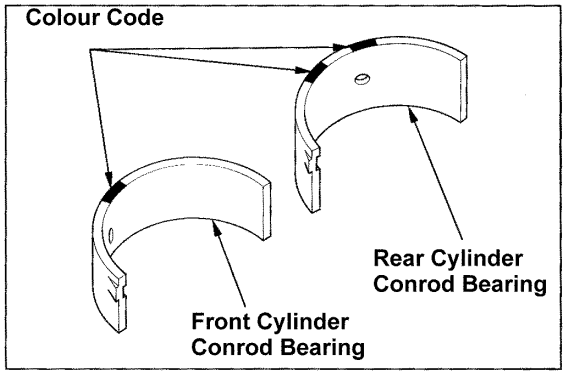
Record the crankpin external diameter on the crankshaft.



CAUTION

- The code is marked on the crankweight as A or B.

Select the replacement conrod bearings from the two codes.
(The bearings are colour coded).



CAUTION

The front cylinder conrod bearings have one colour code while the ones for the rear cylinder have two colour code markings.

Conrod internal diameter code / Crankpin external diameter code		1		2	
		36.000-36.008mm		36.008-36.016mm	
		Front	Rear	Front	Rear
A	32.992–33.000mm	C (Y)	C (Y,Y)	B(G)	B (G,G)
B	32.984-32.992mm	B(G)	B (G,G)	A(B)	A(B,B)

Conrod bearing thickness:
++
A (B) (B,B): 1.494 – 1.498mm B: Brown
B (G) (G,G): 1.490 – 1.494mm G: Green
C (Y) (Y,Y): 1.486 – 1.490mm Y: Yellow

VT250C-12. Front Wheel, Suspension and Steering

General Caution

CAUTION

Keep the brake disc and the pads away from oil/grease. If the oil/grease contact them, replace the pads and clean the brake disc.

- Firmly support the frame to lift the wheel when removing the wheel.
- Refer to Sec. 14 for the brake system service.
- Refer to Sec. 18 for the lamps, instruments and switches service.

Troubleshooting

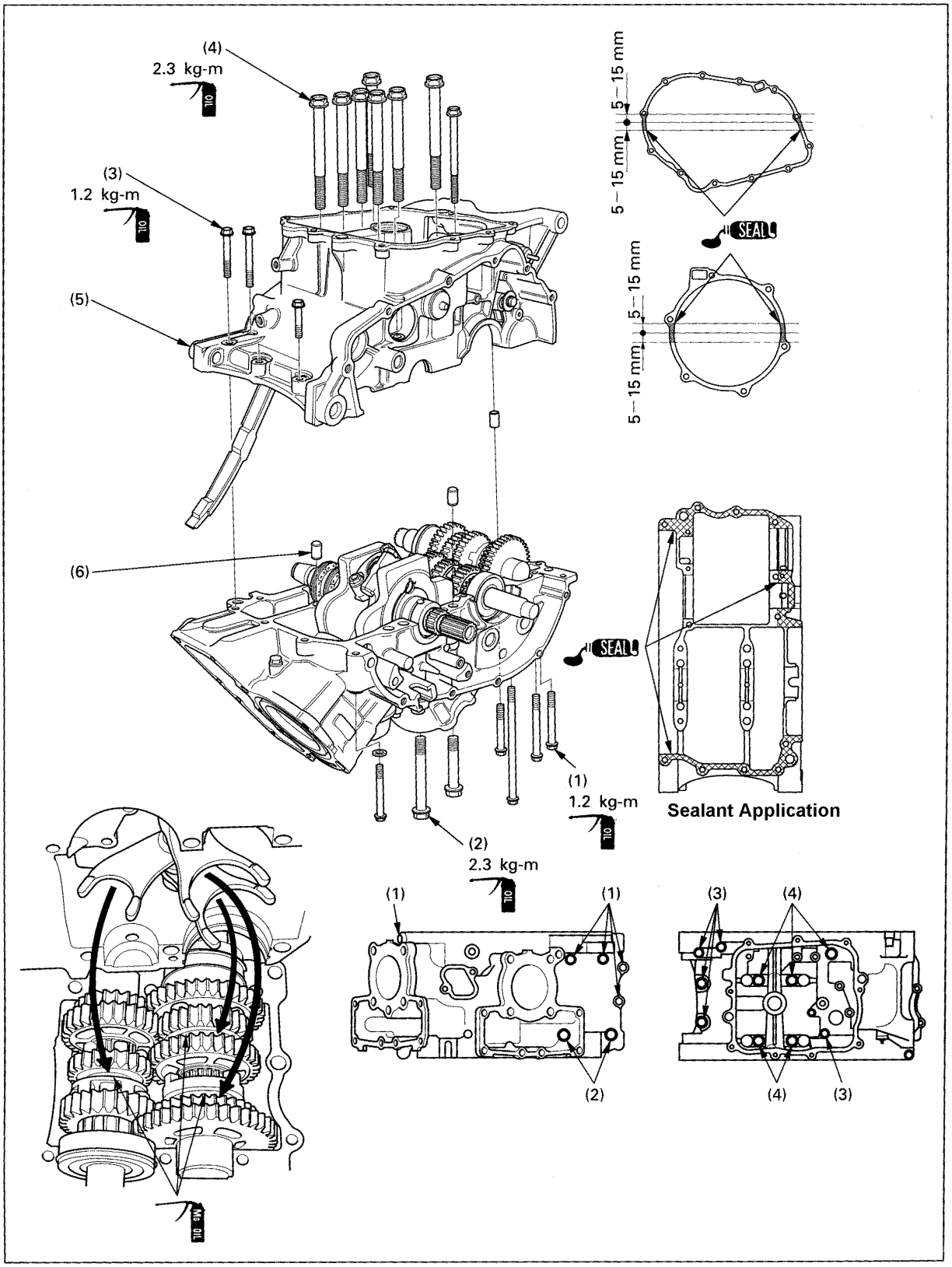
Steering too heavy
- Steering bearing adjust nut over tightened
- Steering bearing damage/wear
- Inner/outer lace damage/wear/stop
- Steering stem deformation
- Tyre pressure too low
- Tyre wear

Unstable steering
- Steering bearing damage/loose tightenings
- Unequal left/right cushions
- Front axle deformation, tyre tilted
- Frame deformed
- Tyre wear / unequal wear
- Wheel bearing loose fit
- Swing arm pivot loose fit

Front wheel deflection
- Rim deformed
- Wheel bearing failure
- Tyre fault
- Wheel unbalanced
- Axle related tightenings inadequate

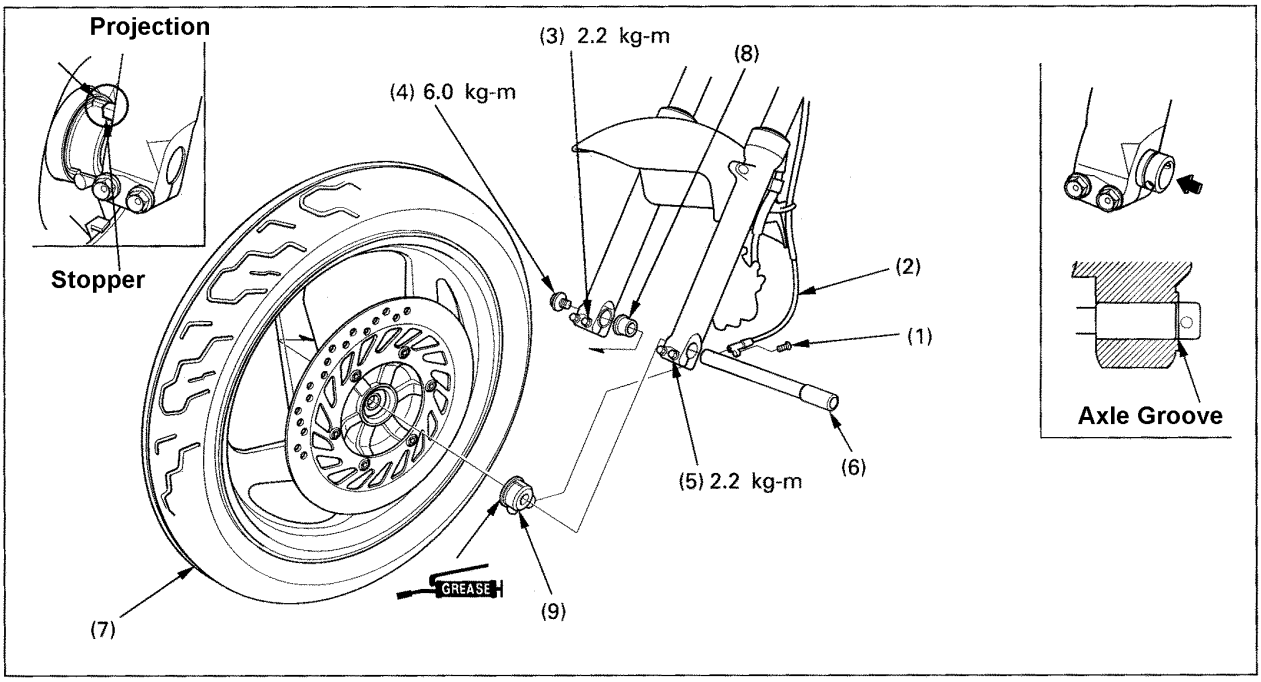
Front wheel heavy to rotate
- Wheel bearing failure
- Front axle bent
- Brake not released

♦ **Steering Handle Removal / Installation**



	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Clutch switch connector	2	
(2)	Socket bolt	2	
(3)	Clutch lever bracket holder	1	
(4)	Clutch lever bracket	1	
(5)	Screw	2	
(6)	Left handle switch	1	
(7)	Left handle grip	1	
(8)	Spacer	1	
(9)	Front brake switch connector	2	
(10)	Socket bolt	2	
(11)	Master cylinder holder	1	
(12)	Master cylinder	1	
(13)	Screw	2	
(14)	Right steering handle switch	1	
(15)	Steering handle mount nut	2	
(16)	Washer	2	
(17)	Steering handle	1	Remove from the fork top bridge.
(18)	Throttle grip	1	Pull out from the steering handle.
(19)	Throttle cable	2	Disconnect from the throttle grip flange.

♦ Front Wheel Removal/Installation



CAUTION

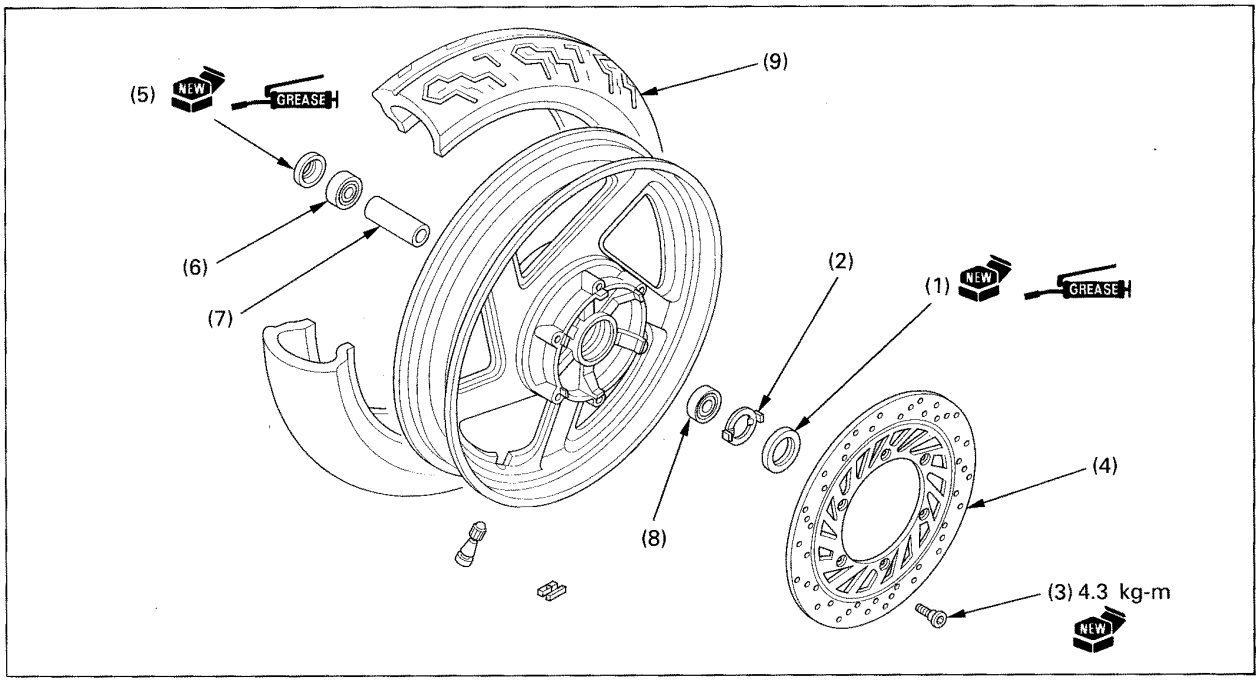
Keep the disc and pads away from oil/grease. If the oil/grease contacts the parts, replace the pads and clean the brake disc.

Relevant Works

- Support the frame and lift the front wheel.

	Works / Parts	Qty.	Notes
	Removal		
(1)	Speedometer cable set screw	1	
(2)	Speedometer cable	1	When installing, align the speedo drive projection with the fork stopper.
(3)	Right axle split bolt	2	Loosen
(4)	Axle bolt	1	
(5)	Left axle split bolt	2	• Loosen • Set the axle groove to the fork side when tightening.
(6)	Axle	1	
(7)	Front wheel ASSY.	1	CAUTION Do not operate the brake lever after removing the ASSY. Assembly / disassembly (12-5)
(8)	Side collar	1	
(9)	Speedo meter gear box (Speedo drive)	1	When installing, align the speedo drive dent with the retainer projection.

♦ Front Wheel Assembly / Disassembly



CAUTION

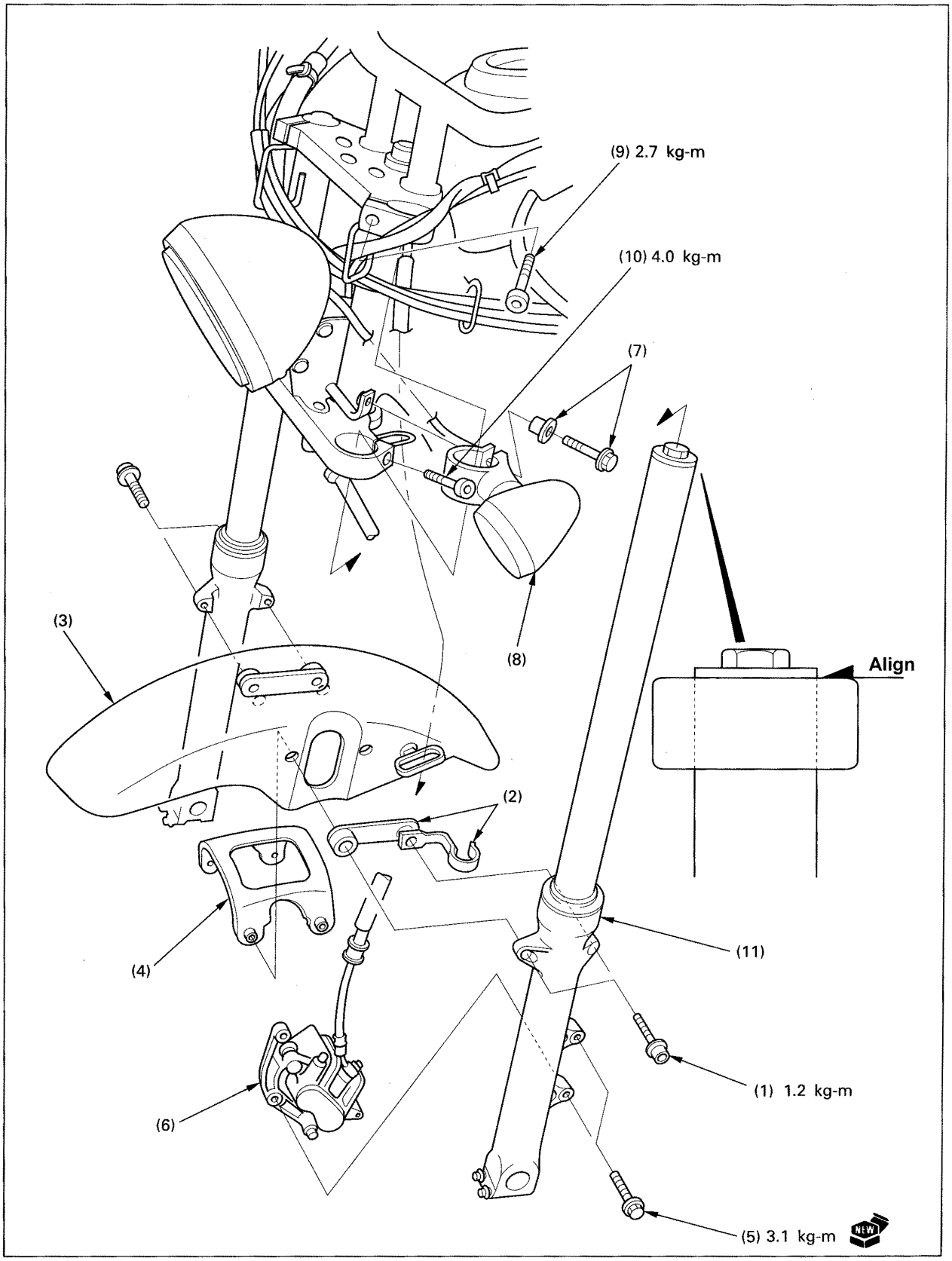
Replace both right and left wheel bearings together.

Relevant Works

- Front wheel removal / installation (12-4).

Works / Parts		Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Left dust seal	1	
(2)	Speedometer gear retainer	1	
(3)	Brake disc bolt	6	
(4)	Brake disc	1	
(5)	Right dust seal	1	
(6)	Right wheel bearing (6004 UU)	1	
(7)	Distance collar	1	
(8)	Left wheel bearing (6004 UU)	1	
(9)	Front tyre	1	Align the wheel rotating direction and the tyre rotating direction marks when assembling.

♦ **Fork Removal / Installation**



CAUTION

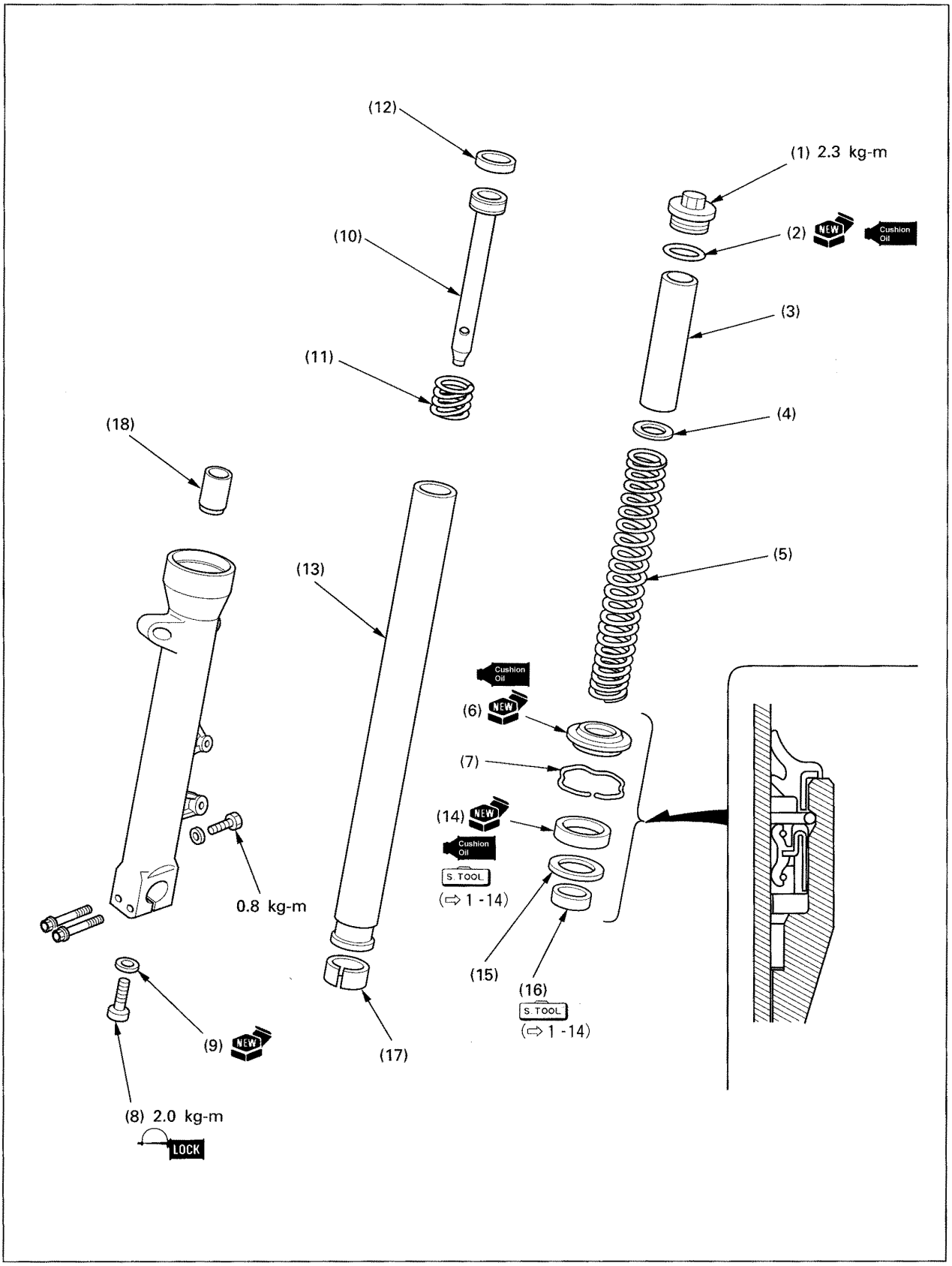
- When disassembling the fork, loosen the fork cap after loosening the top bridge split bolt.
- Refer to the wiring diagram (1-18) for hose, cable and harness installation.

Relevant Works

- Front wheel removal / installation (12-4).

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Front fender bolt	4	
(2)	Fender collar / brake hose clamp	2/1	
(3)	Front fender	1	
(4)	Front fender plate	1	
(5)	Caliper mount bolt	2	σ Caution
(6)	Front caliper	1	Do not sling the caliper with the brake hose. σ Caution Do not operate the brake lever after removing the caliper.
(7)	Direction indicator holder bolt/collar	1/1	
(8)	Front direction indicator	1	
(9)	Fork top bridge split bolt	1	Loosen
(10)	Fork bottom bridge split bolt	1	Loosen
(11)	Fork ASSY	1	• Assembly/disassembly (12-8) • Align the fork tube top and the top bridge top when installing.

♦ **Fork Assembly / Disassembly**

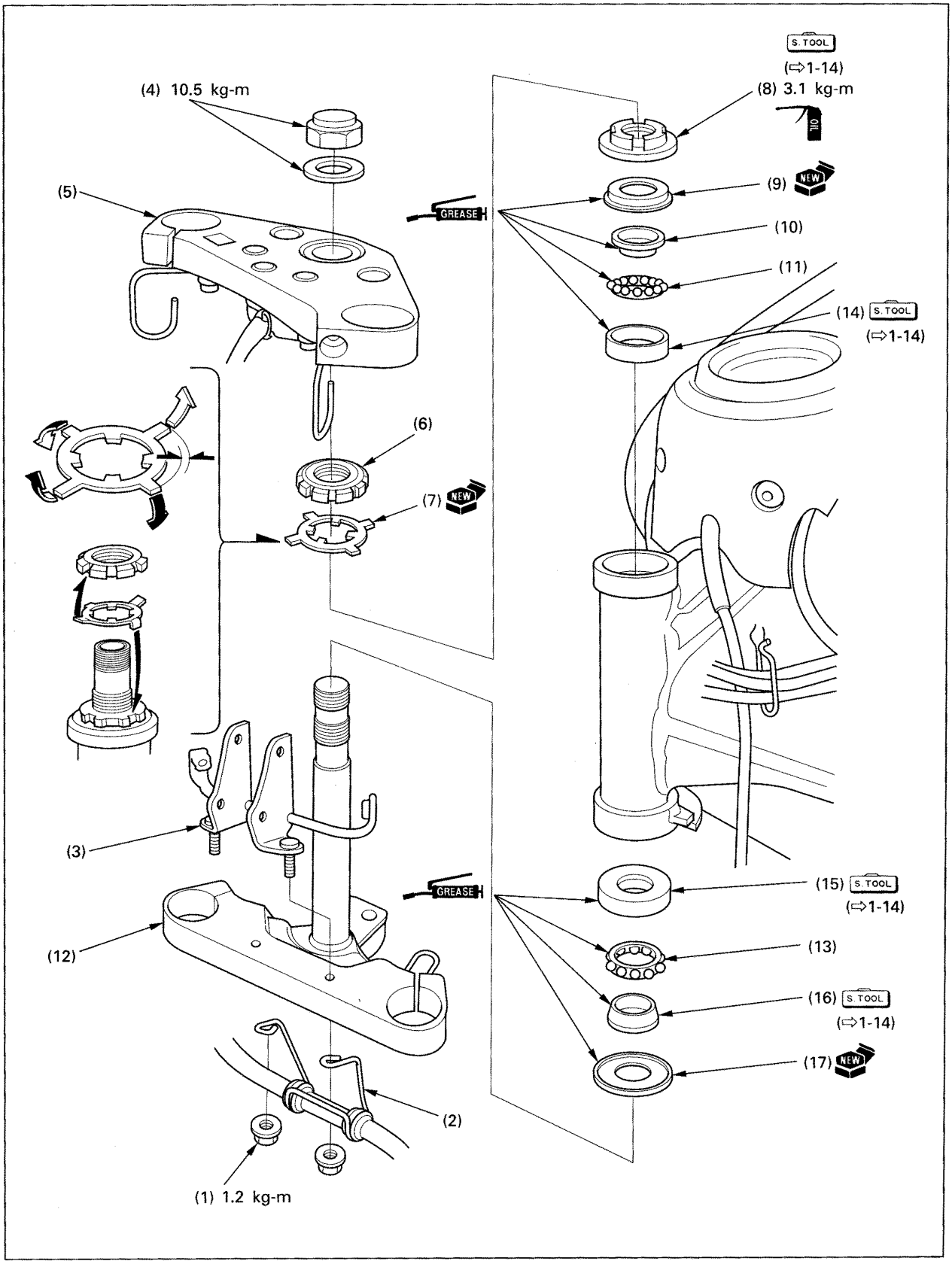


Relevant Works

- Fork removal / installation .

	Works / Parts	Qty.	Notes
	Disassembly		
(1)	Fork cap	1	
(2)	O-Ring	1	
(3)	Spacer	1	
(4)	Spring seat	1	
(5)	Fork spring	1	
(6)	Dust seal	1	CAUTION
(7)	Stopper ring	1	
(8)	Fork socket bolt	1	Do not damage the fork tube contact area. If the seat pipe rotates together, loosen the bolt by temporarily setting the fork spring, spacer and the fork cap.
(9)	Sealing washer	1	
(10)	Seat pipe	1	
(11)	Rebound spring	1	
(12)	Piston ring	1	
(13)	Fork tube	1	Do not remove from the seat pipe unless replacing it. Remove from the fork slider by pulling hard several times.
(14)	Oil seal	1	
(15)	Back up ring	1	
(16)	Guide bush	1	Remove from the fork tube.
(17)	Fork tube bush	1	
(18)	Oil lock piece	1	Do not remove from the seat pipe unless replacing it.
	Assembly		
(17)	Fork tube bush	1	Install to the fork tube.
(12)	Piston ring	1	Install to the seat pipe.
(11)	Rebound spring	1	
(10)	Seat pipe	1	Set inside the fork tube.
(18)	Oil lock piece	1	Install to the seat pipe.
(13)	Fork tube	1	Install to the fork slider.
(9)	Sealing washer	1	
(8)	Fork socket bolt	1	If the seat pipe rotates with the bolt, temporarily set the fork spring, spacer and the fork cap to tighten the bolt.
(16)	Guide bush	1	Install to the fork tube and set to the fork slider by using an exclusive tool.
(15)	Back up ring	1	
(14)	Oil seal	1	
(7)	Stopper ring	1	CAUTION
(6)	Dust seal	1	Do not damage the fork tube contact area.
(5)	Fork spring	1	
(4)	Spring seat	1	Set the fine pitch end downwards.
(3)	Spacer	1	
(2)	O-Ring	1	
(1)	Fork cap	1	

♦ **Steering Stem Removal/Installation**



CAUTION

- Replace the steering bearing and the race together.
- Remove the steering stem nut while the fork is set to the stem.

Relevant Works

- Fork removal / installation (12-6).
- Headlamp case removal / installation (18-6).

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Nut	2	
(2)	Brake hose clamp	1	
(3)	Headlamp case bracket	1	
(4)	Steering stem nut/washer	1/1	
(5)	Fork top bridge	1	
(6)	Lock nut	1	CAUTION
(7)	Lock washer	1	
(8)	Steering bearing adjust nut	1	
(9)	Upper dust seal	1	Support the stem to prevent it falling off.
(10)	Upper inner race	1	
(11)	Upper bearing	1	
(12)	Steering stem	1	
(13)	Lower bearing	1	
(14)	Upper outer race	1	
(15)	Lower outer race	1	
(16)	Lower inner race	1	
(17)	Lower dust seal	1	

General Caution

CAUTION

Keep the brake drum and the lining away from oil/grease. If the oil/grease contact them, replace the brake drum and replace the brake shoe.

- Firmly support the frame when removing/installing the rear wheel, the rear cushion and the swing arm.
- Use the genuine rear cushion mount bolts/nuts.
- Refer to Sec. 14 for the rear brake service.

Troubleshooting

Rear wheel deflection
- Wheel / rim deformation
- Wheel bearing damage
- Tyre fault
- Axle related tightenings fault
- Low tyre air pressure
- Swing arm pivot bearing failure
- Wheel unbalanced

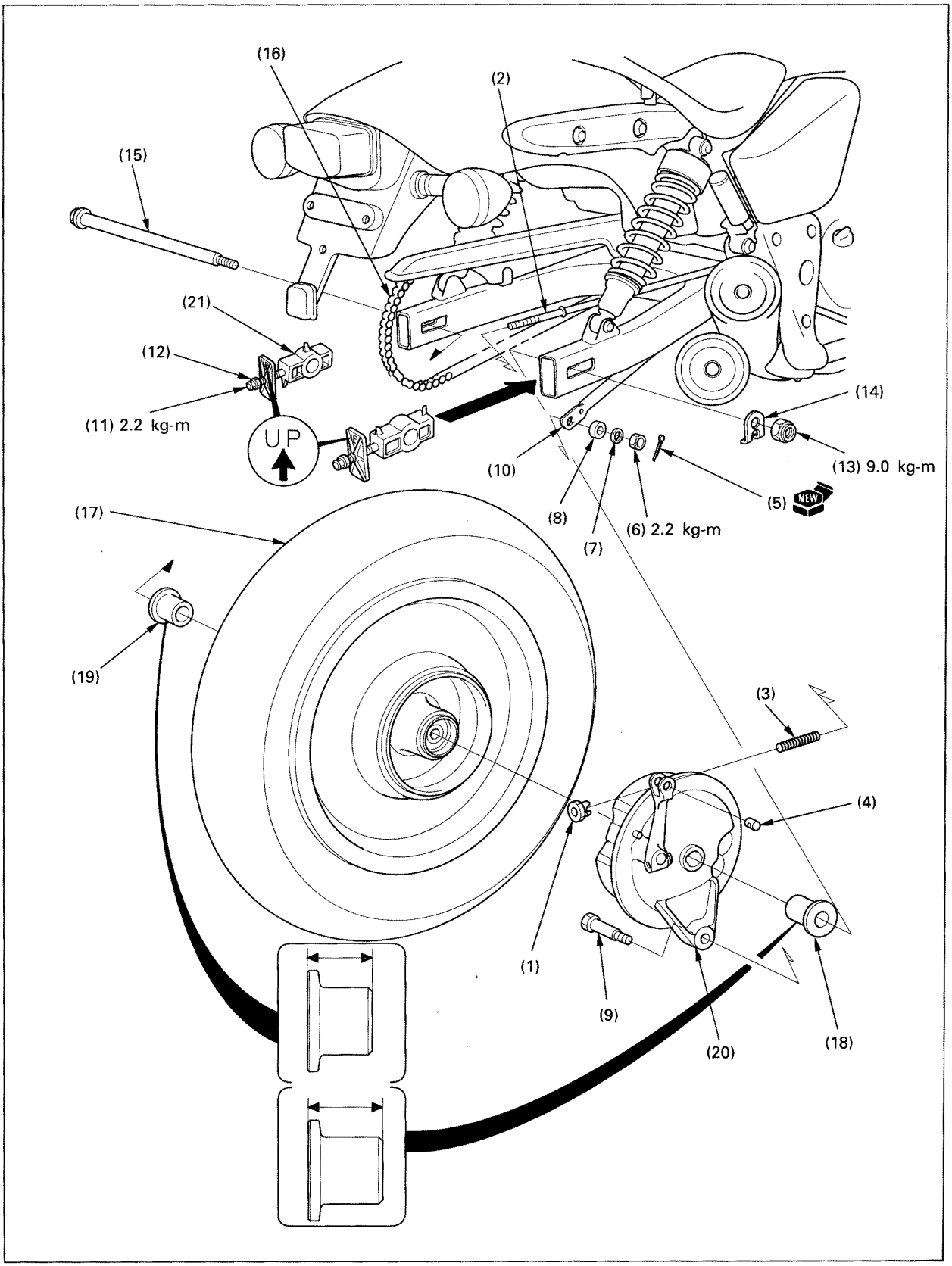
Rear wheel heavy to rotate
- Wheel bearing failure
- Rear axle deformation
- Brake not released (Sec. 14)

Rear cushion too soft
- Rear cushion spring deformed
- Rear cushion spring adjuster adjustment fault
- Rear damper failure, oil leak
- Low tyre pressure

Rear cushion too hard
- Cushion installation fault
- Damper rod deformed
- Swing arm pivot bearing failure
- Swing arm pivot bolt bent
- Rear cushion spring adjuster adjustment fault
- Too high tyre pressure

Rear cushion noise
- Cushion case touching
- Loose tightenings

♦ **Rear Wheel Removal / Installation**



CAUTION

Keep the brake drum and the lining away from oil/grease. If the oil/grease contact them, replace the brake drum and replace the brake shoe.

CAUTION

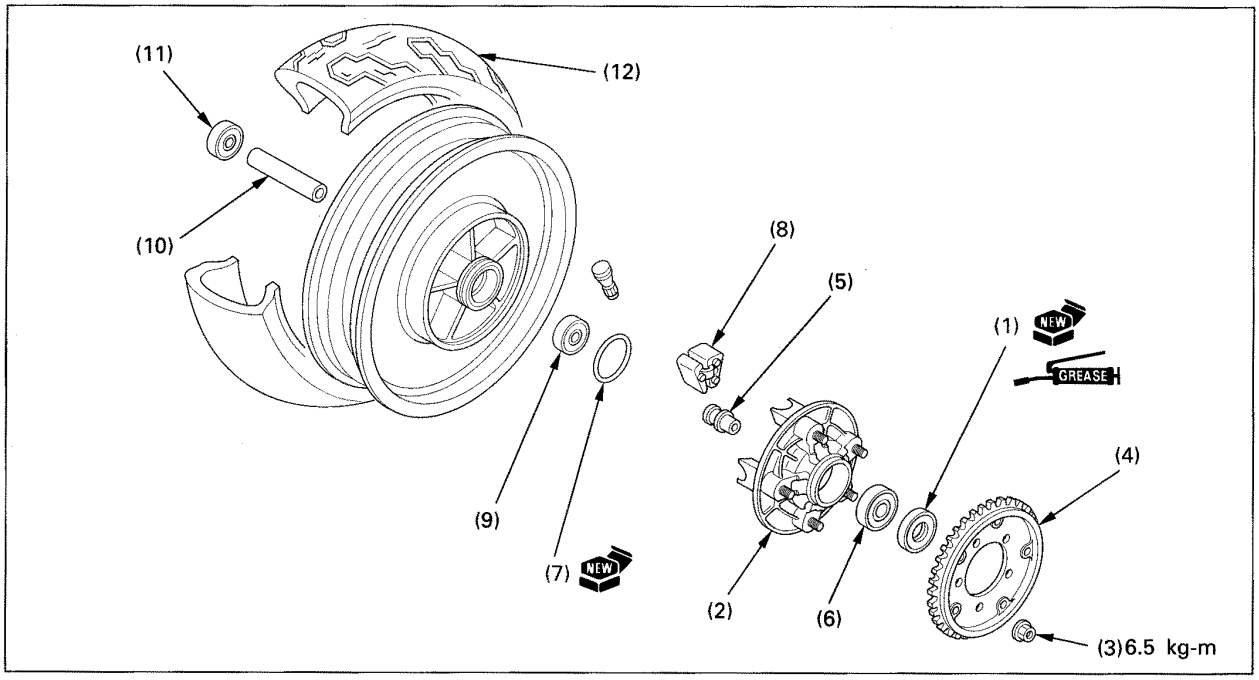
After the installation, adjust the drive chain tension and adjust the rear brake pedal free play.

Relevant Work

- Firmly support the frame to lift the rear wheel.

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Rear brake adjust nut	1	
(2)	Rear brake rod	1	
(3)	Brake rod spring	1	
(4)	Brake arm joint	1	
(5)	Cotter pin	1	
(6)	Nut	1	
(7)	Washer	1	
(8)	Cushion rubber	1	
(9)	Stopper arm bolt	1	
(10)	Stopper arm	1	
(11)	Drive chain adjuster lock nut	2	Loosen completely
(12)	Drive chain adjust nut	2	
(13)	Rear axle nut	1	Tighten it after adjusting the drive chain tension when installing.
(14)	Washer	1	
(15)	Rear axle	1	
(16)	Drive chain	1	Move the rear wheel forward to remove it from the driven sprocket.
(17)	Rear wheel	1	Assembly / disassembly (13-4)
(18)	Rear brake panel side collar	1	Length: 35mm
(19)	Rear wheel side collar	1	Length: 29mm
(20)	Rear brake panel		Assembly / disassembly (14-8)
(21)	Drive chain adjuster	2	Set the adjust scale outwards and the UP mark upwards when installing.

♦ Rear Wheel Assembly / Disassembly



CAUTION

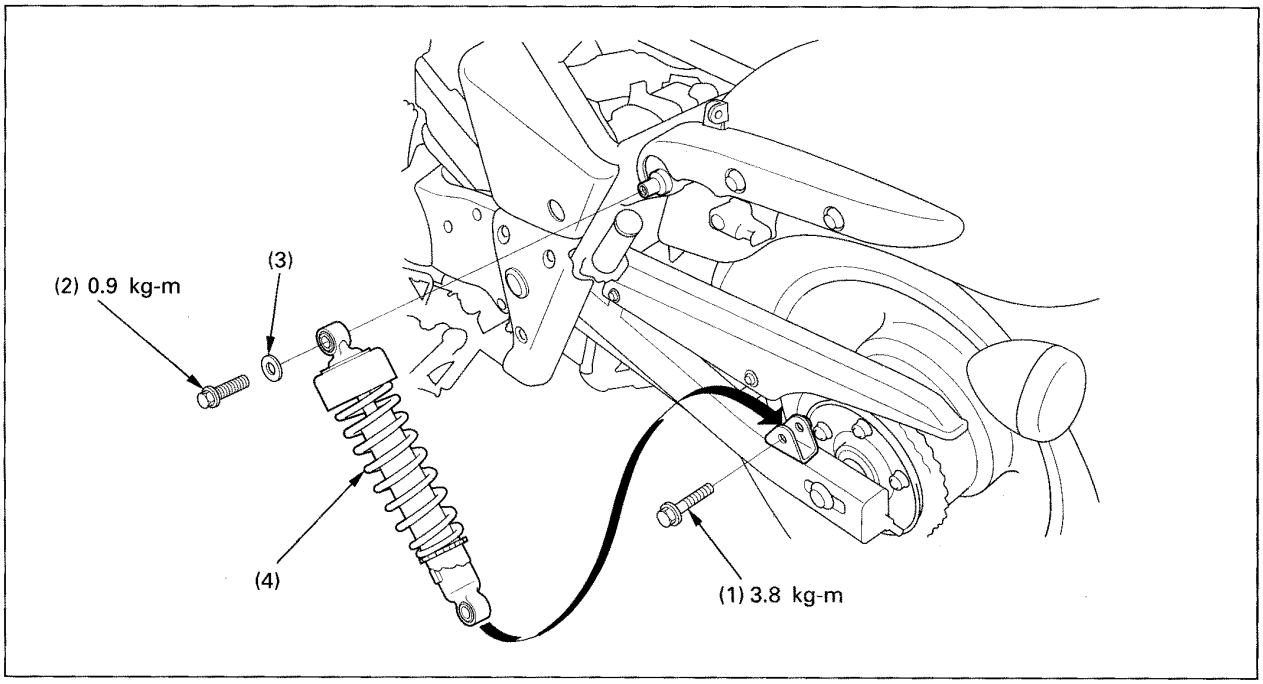
Replace both left and right wheel bearings together.

Relevant Work

- Rear wheel removal/installation (13-2).

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Left dust seal	1	
(2)	Final driven flange ASSY.	1	
(3)	- driven sprocket nut	5	Do not remove from the driven flange unless
(4)	- final driven sprocket	1	required to do so. If they are to be removed, loosen the nuts before removing the driven flange from the wheel.
(5)	- distance collar B	1	
(6)	- driven flange bearing (6204UU)	1	
(7)	O-Ring	1	
(8)	Damper rubber	5	
(9)	Left wheel bearing (6303UU)	1	
(10)	Distance collar	1	
(11)	Right wheel bearing (6303UU)	1	
(12)	Rear tyre	1	Align the wheel rotating direction mark with the tyre rotating direction mark when installing.

♦ Rear Cushion Removal / Installation



CAUTION

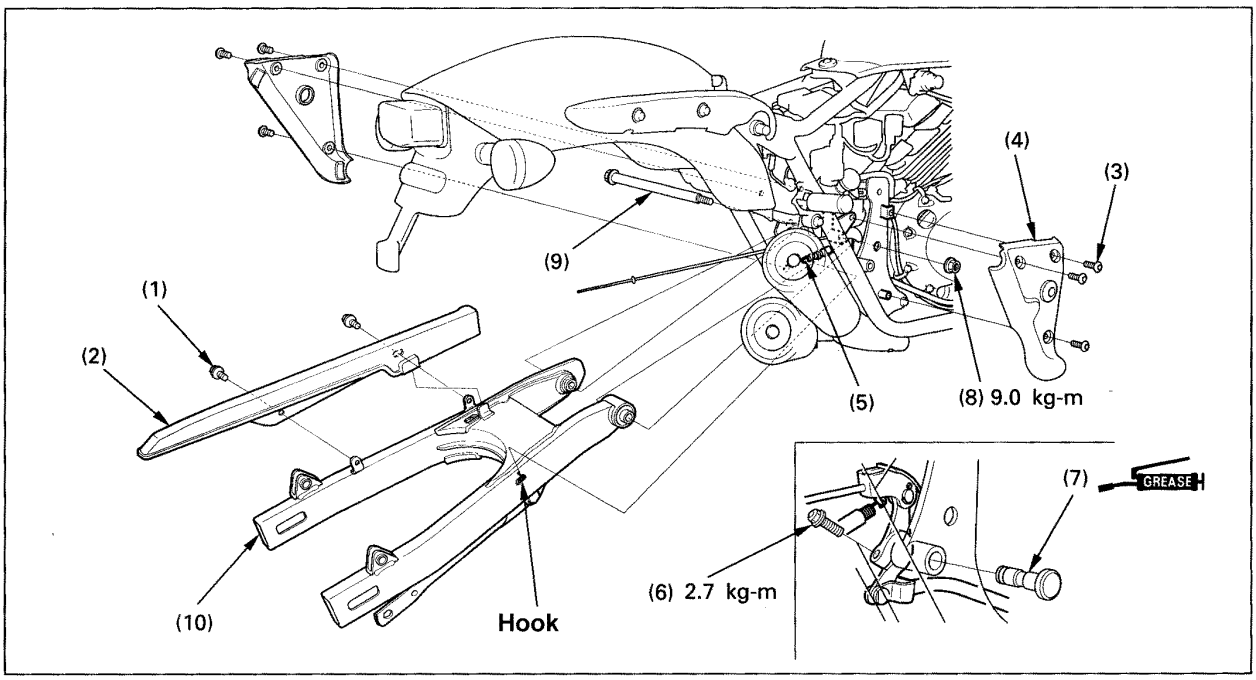
Do not disassemble the rear cushion.

Relevant Work

- Seat removal/installation (2-2)

Works / Parts		Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Lower mount bolt	1	
(2)	Upper mount bolt	1	
(3)	Washer	1	
(4)	Rear cushion	1	

♦ Swing Arm Removal / Installation

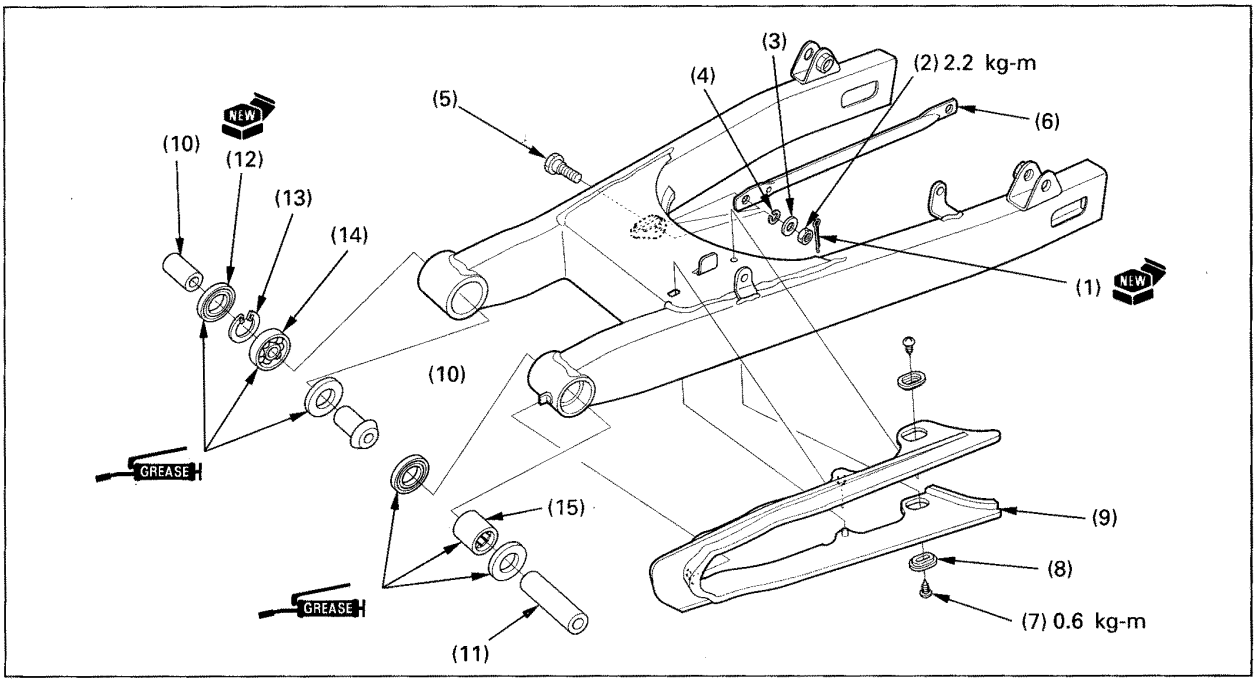


Relevant Work

- Rear wheel removal/installation (13-2)
- Rear cushion removal/installation (13-5)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Bolt	2	
(2)	Drive chain cover	1	Set the cover groove to the catch on a swing arm
(3)	Socket bolt	6	
(4)	Pivot plate cover	2	
(5)	Rear brake pedal return spring	1	Disconnect from the swing arm hook.
(6)	Rear brake middle arm split bolt	1	
(7)	Middle arm pivot shaft	1	
(8)	Swing arm pivot nut	1	
(9)	Swing arm pivot bolt	1	
(10)	Swing arm ASSY	1	Assembly / disassembly (13-7)

♦ Swing Arm Assembly / Disassembly



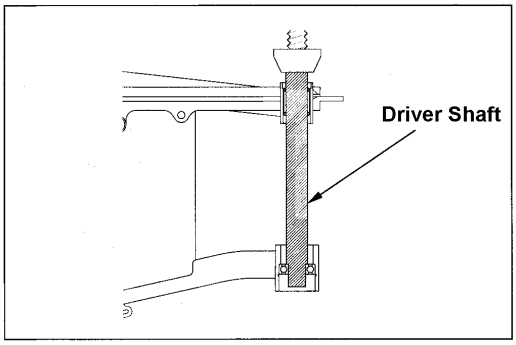
Relevant Work

- Swing arm removal / installation (13-6)

Works / Parts		Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Cotter pin	1	
(2)	Nut	1	
(3)	Washer	1	
(4)	Spring washer	1	
(5)	Stopper arm bolt	1	
(6)	Rear brake stopper arm	1	
(7)	Tapping screw	2	
(8)	Chain slider washer	2	
(9)	Chain slider	1	
(10)	Right pivot collar	2	
(11)	Left pivot collar	1	
(12)	Dust seal	4	
(13)	Snap ring	1	
(14)	Right pivot ball bearing	1	
(15)	Left pivot needle bearing	1	Replace (13-8)

Swing arm pivot bearing replacement

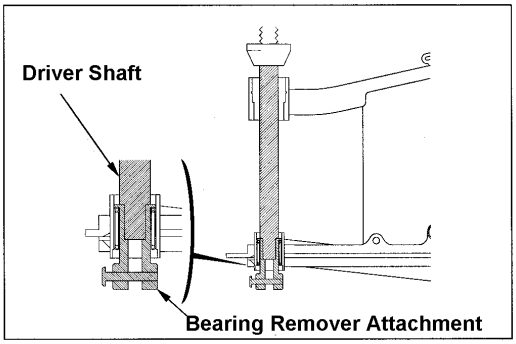
By using a hydraulic press machine, remove the ball bearing from the swing arm right pivot.



Excl. tool

Driver shaft 07946-MJ00100

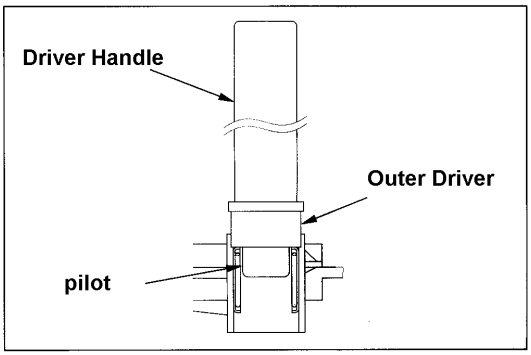
By using the press machine, remove the needle bearing from the swing arm left pivot.



Excl. tools

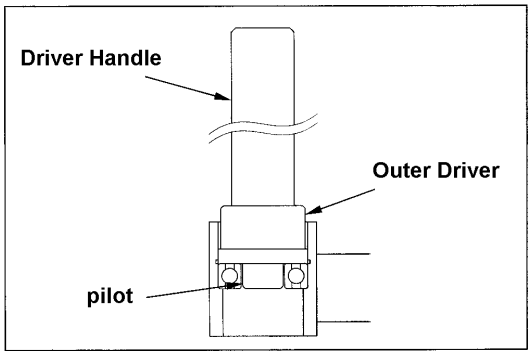
Bearing remover attachment	07GMD-KT70200
Driver shaft	07946-MJ00100

Apply grease to the new needle bearing.
Push the stamped side and insert it to the step surface in the left pivot.



Excl. tools

Driver handle A	07749-0010000
Outer driver 28 x 30mm	07946-1870100
Pilot 22mm	07746-0041000



Apply grease to the new ball bearing.
Push the stamped side and insert it to the right pivot.

Excl. tools

Driver handle A	07749-0010000
Outer driver 32 x 35mm	07746-0010100
Pilot 15mm	07746-0040300

General Caution

CAUTION

- Keep the disc and the pads from oil/grease. If the oil/grease contact them, replace the pads and clean the brake disc.
- Keep the brake drum and the lining from oil/grease. If oil/grease contact them, clean the drum and replace the brake shoe.

- Keep out of debris/water when refilling the brake fluid.
- Do not mix different brands of brake fluids.
- Do not re-use the drained brake fluid.
- Keep the painted, plastic and rubber surfaces away from the brake fluid.
- Do not re-use the sealing washers.
- Clean all removed parts with brake fluid and check the path of each with compressed air.
- If air entered the hydraulic system, bleed air from the system.

Troubleshooting

Hydraulic disc brake

Poor braking performance
- Air in the braking system
- Brake fluid degraded by moisture
- Brake pad / disc dirty
- Master cylinder piston cup wear
- Brake pad wear
- Caliper (inside) dirty
- Caliper slide not smooth/dragging
- Brake pad / disc unequal wear
- Inadequate brake fluid
- Brake fluid path jammed
- Disc distortion / deformation
- Caliper piston stuck / wear
- Disc wear
- Master cylinder (inside) dirty
- Lever deformed

Brake lever is heavy / does not return
- Brake system jammed
- Caliper piston stuck / wear
- Caliper slide not smooth
- Brake fluid path jammed
- Caliper piston seal wear
- Master cylinder piston stuck / wear
- Lever deformed

Brake does not release (drag)
- Brake pad / disc dirty
- Wheel misaligned
- Brake pad / disc unequal / stop wear
- Disc distortion / deformation
- Caliper slide not smooth/dragging
- Debris in hydraulic system
- Lever deformed

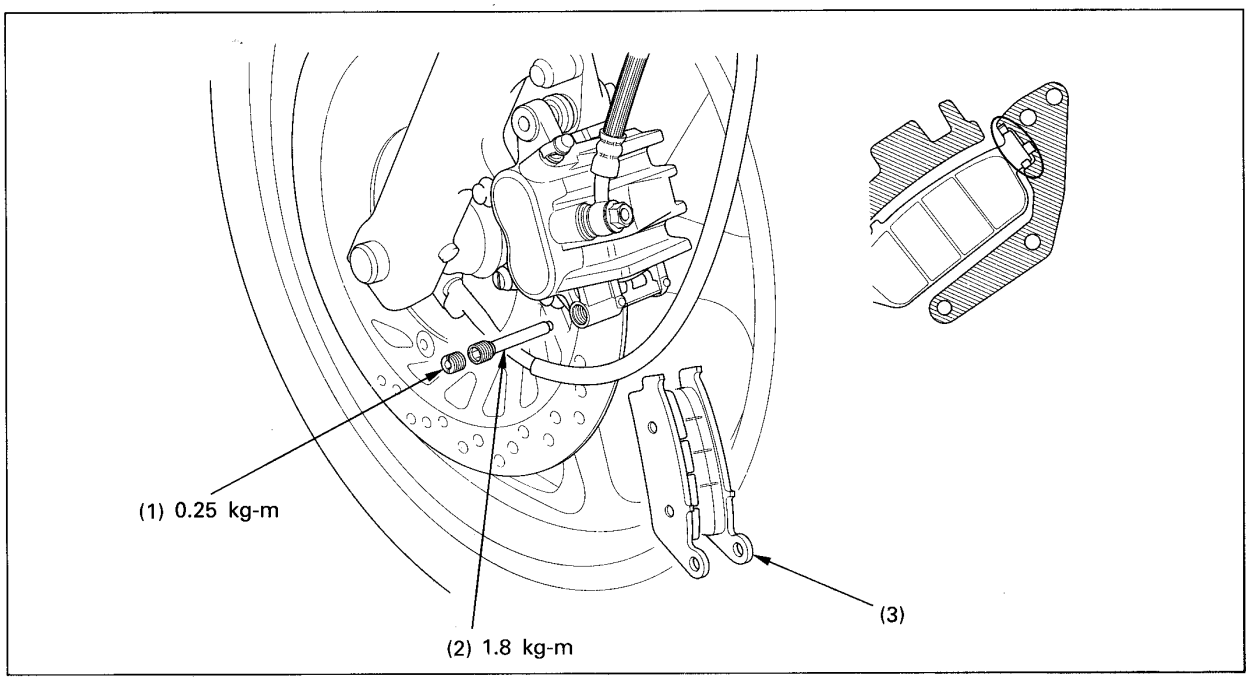
Drum Brake

Poor braking performance
- Brake linkage fault
- Brake lining wear
- Brake drum wear
- Brake cam wear
- Brake shoe attachment failure
- Brake lining unequal / step wear
- Brake lining dirt
- Brake drum dirt
- Brake shoe cam wear
- Brake arm sealation joint failure

Brake pedal does not / difficult to return
- Return spring deformed / damaged
- Brake linkage fault
- Brake drum dirt (adhesion)
- Brake lining dirt (adhesion)
- Brake cam wear / stuck
- Brake shoe installation fault
- Brake shoe cam wear / no grease
- Brake pedal pivot wear / no grease

Brake noise
- Brake lining wear
- Brake drum wear
- Brake lining unequal / step wear
- Brake lining dirt
- Brake drum dirt

♦ Front Brake Pad Replacement



CAUTION

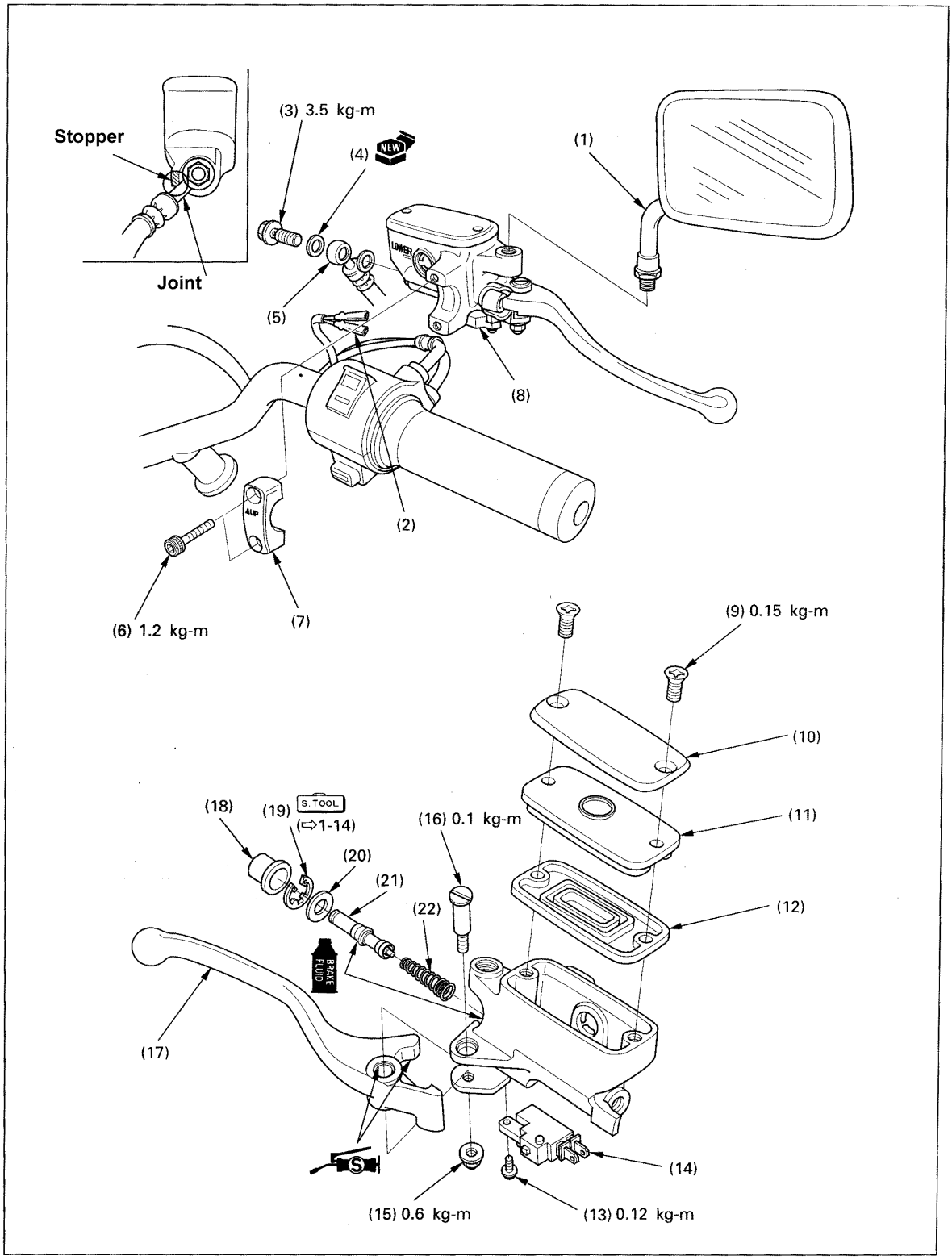
- Keep the brake disc and the pads away from oil/grease. If the oil/grease contact them, replace the pads and clean the brake disc.
- After replacing the pads, operate the lever to push the piston out.

General Caution

- Replace the two pads together as a set.
- Before removing them, push the caliper body to the disc to push the caliper piston in.
- Do not operate the brake lever while replacing the brake pads.

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Pad pin plug	1	
(2)	Pad pin	1	
(3)	Brake pad	2	Set the edge to the caliper bracket retainer when installing.

♦ Front Master Cylinder Assembly/Disassembly



CAUTION

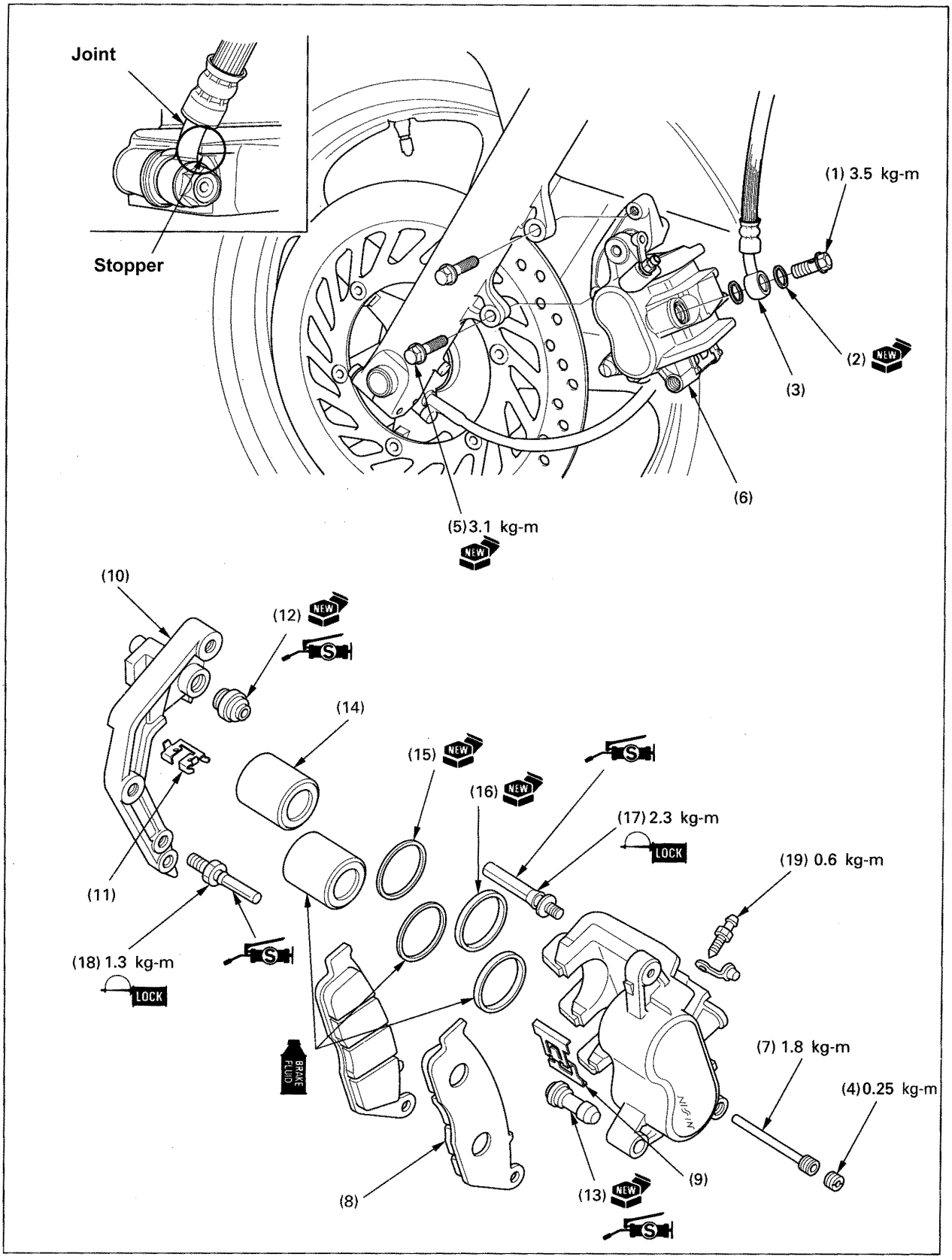
Install both master cylinder piston / piston cup and the spring together into the cylinder.

Relevant Works

- Brake fluid change / air bleed.

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Rear view mirror	1	
(2)	Front brake switch connector	2	
(3)	Brake hose oil bolt	1	Push the brake hose joint to the master cylinder stopper when tightening.
(4)	Sealing washer	2	
(5)	Brake hose	1	
(6)	Bolt	2	
(7)	Master cylinder holder	1	
(8)	Master cylinder ASSY	1	Remove from the steering handle.
(9)	Screw	2	
(10)	Reservoir cap	1	
(11)	Set plate	1	
(12)	Diaphragm	1	
(13)	Screw	1	
(14)	Front brake switch	1	Set the switch projection to the master cylinder hole when installing.
(15)	Lever pivot nut	1	
(16)	Lever pivot bolt	1	
(17)	Brake lever	1	
(18)	Boot	1	
(19)	Snap ring	1	
(20)	Washer	1	
(21)	Master piston / piston cup	1/1	
(22)	Spring	1	

♦ **Front Brake Caliper Assembly/Disassembly**



CAUTION

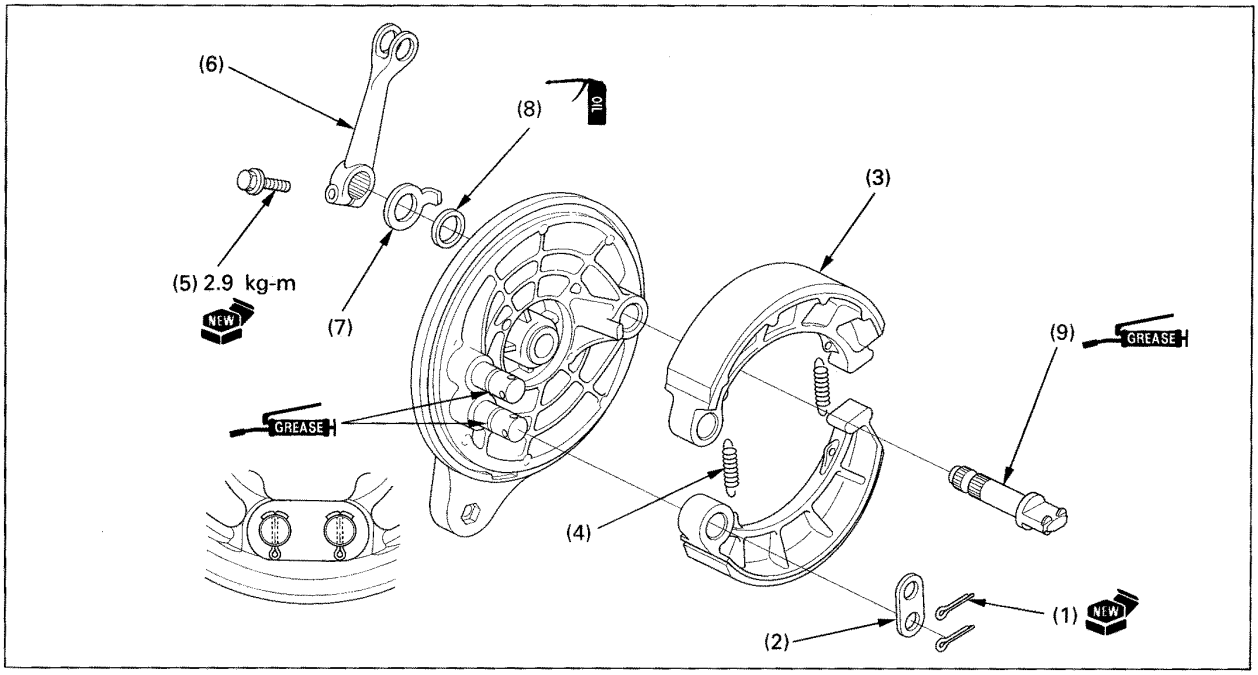
- Keep the disc and the pads away from oil/grease. If oil/grease contact them, replace the pad and clean the disc.
- After assembling the caliper, operate the lever to push the piston out.

Relevant Works

- Brake fluid change / air bleed.

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Brake hose oil bolt	1	Push the brake hose joint to the caliper stopper when tightening.
(2)	Sealing washer	2	
(3)	Brake hose	1	
(4)	Pad pin plug	1	
(5)	Caliper mount bolt	2	Loosen the pad pin before removing it.
(6)	Front caliper ASSY	1	
(7)	Pad pin	1	
(8)	Brake pad	2	
(9)	Pad spring	1	
(10)	Caliper bracket	1	
(11)	Pad retainer	1	
(12)	Pin boot	1	
(13)	Pin bush boot	1	CAUTION
(14)	Caliper piston	2	Record its position and set to the original position when installing.
(15)	Dust seal	2	CAUTION Do not damage the internal surface of the caliper.
(16)	Piston seal	2	
(17)	Caliper pin bolt A	1	Do not remove unless replacing.
(18)	Caliper pin bolt	1	
(19)	Bleed valve	1	

♦ Rear Brake Panel Assembly/Disassembly



CAUTION

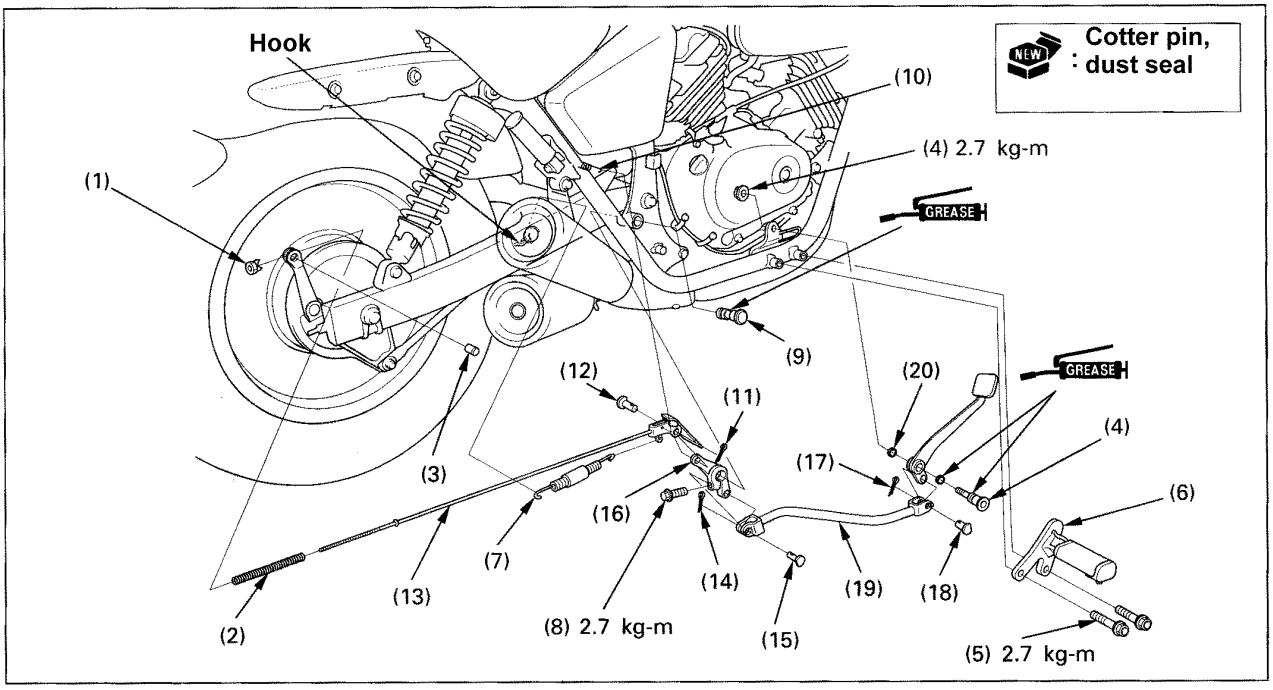
- Keep the brake lining surface away from oil/grease. If oil/grease contacts the surface, replace the brake shoe.

Relevant Works

- Rear wheel removal / installation (13-2).

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Cotter pin	2	Firmly set from the direction shown in the figure when installing.
(2)	Anchor pin washer	1	
(3)	Brake shoe	2	Remove together with the shoe spring from the anchor pin and the brake cam. Do not install the shoes upside down (leading shoe and trailing shoe).
(4)	Shoe spring	2	Set the hook to the shoe hole from the brake panel side when installing.
(5)	Brake arm bolt	1	
(6)	Brake arm	1	Align the punched marks on the brake cam and the arm when assembling.
(7)	Indicator plate	1	
(8)	Felt seal	1	
(9)	Brake cam	1	

♦ Brake Pedal Removal/Installation



Relevant Works

- Right pivot plate cover removal / installation (13-6).

	Works / Parts	Qty.	Notes
	removal		**Reverse the procedure for the installation.**
(1)	Rear brake adjust nut	1	
(2)	Brake rod spring	1	
(3)	Brake arm joint	1	
(4)	Rear brake pedal pivot bolt/nut	1/1	
(5)	Bolt	2	
(6)	Right main step holder/brake bracket	1/1	
(7)	Rear brake pedal return spring	1	Disconnect from the swing arm hook.
(8)	Rear brake middle arm split bolt	1	
(9)	Middle arm pivot shaft	1	CAUTION
(10)	Rear brake switch spring	1	• Remove from the brake rod. • Remove the brake pedal/rod ASSY from the frame
(11)	Cotter pin	1	
(12)	Joint pin	1	
(13)	Rear brake rod	1	
(14)	Cotter pin	1	
(15)	Joint pin	1	
(16)	Rear brake middle arm	1	
(17)	Cotter pin	1	
(18)	Joint pin	1	
(19)	Rear brake middle rod	1	
(20)	Dust seal	2	

General Caution

CAUTION

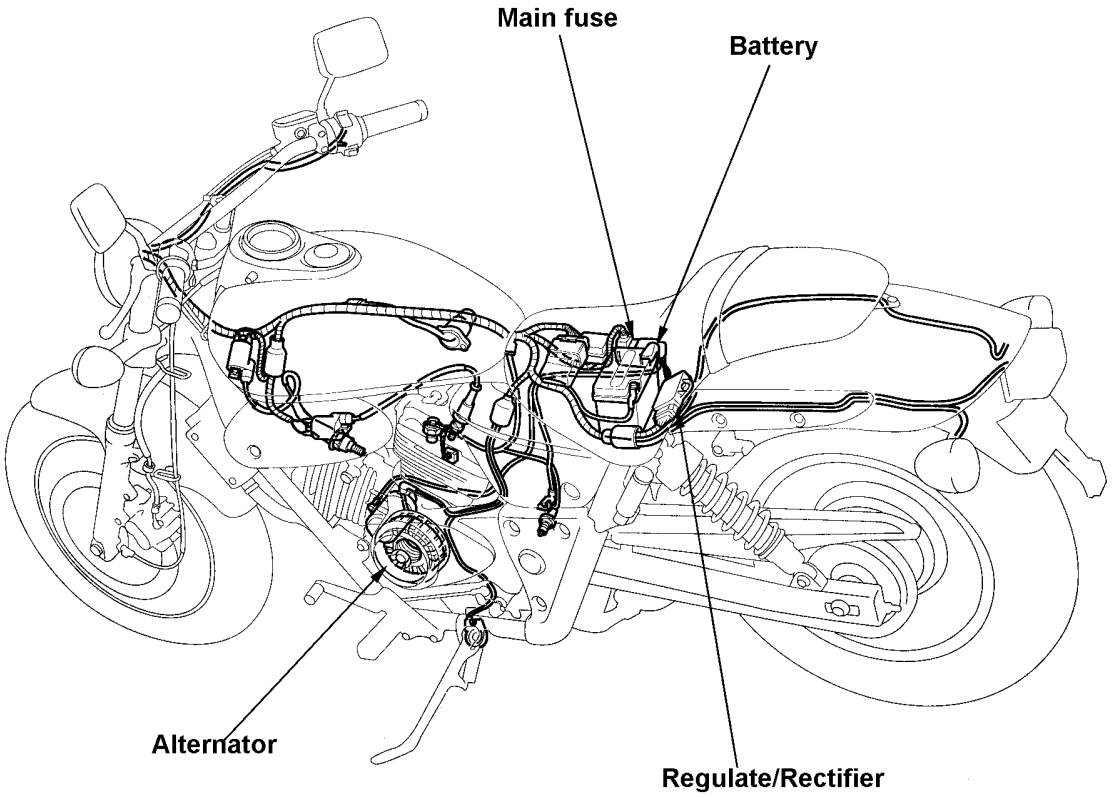
- Charging battery generates explosive gas. Keep it away from fire.
- Battery fluid (sulfuric acid) is highly toxic. Contact with clothes, skin or eyes may result in severe injury. If the fluid contacts the clothes/skin, wash out and rinse with large amount of water. If the fluid contacts the eyes, wash/rinse with water and consult the doctor. Change the affected clothes and wash the fluid off.

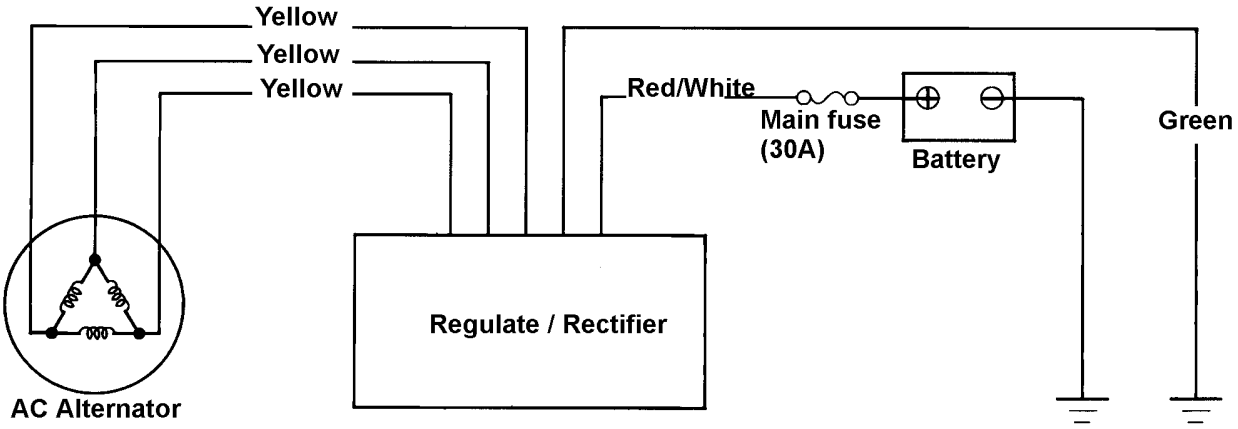
CAUTION

- This vehicle is equipped with an MF (maintenance free) battery. The MF battery has a unique charging system and therefore it is not compatible with conventional batteries.
- When charging the battery, dismount it from the frame and do not remove the fluid filler cap.
- Connection/disconnection of the terminals or the couplers while the current exists may result in over-voltage, which damages the regulate/rectifier and other electrical components. Turn the ignition switch OFF when servicing the charging system/alternator or relevant parts.

- Repetition of full charging/discharging or leaving the battery in discharged status for a long time may reduce its performance and life and may also damage it. The reduced performance (capacity) battery may easily drop its voltage and go flat.
- Some battery overcharge may appear as such because of the battery fault. If one of the cells has short circuit, the battery terminal voltage will not achieve normal voltage. In this case the regulator will not activate and excess voltage is applied to the battery which reduces the cell battery fluid.
- Because of its self discharging effect, the battery should be charged every 3 months if it was left unused.
- In the following cases the supplemental charging may be required after filling the battery fluid on a new MF battery.
  - Terminal voltage (10min after filling the fluid) < 12.4V - charge until the voltage reaches 12.8V.
  - Battery fluid temperature $\leqq$ 0°c - charge for 2 ~ 3 hours with standard charging current.
- Follow the chart on 15-3 for the charging system troubleshooting.
- Majority of the failures are to do with the coupler / connector connection. Check them before servicing the charging system.

♦ **Charging System Layout**





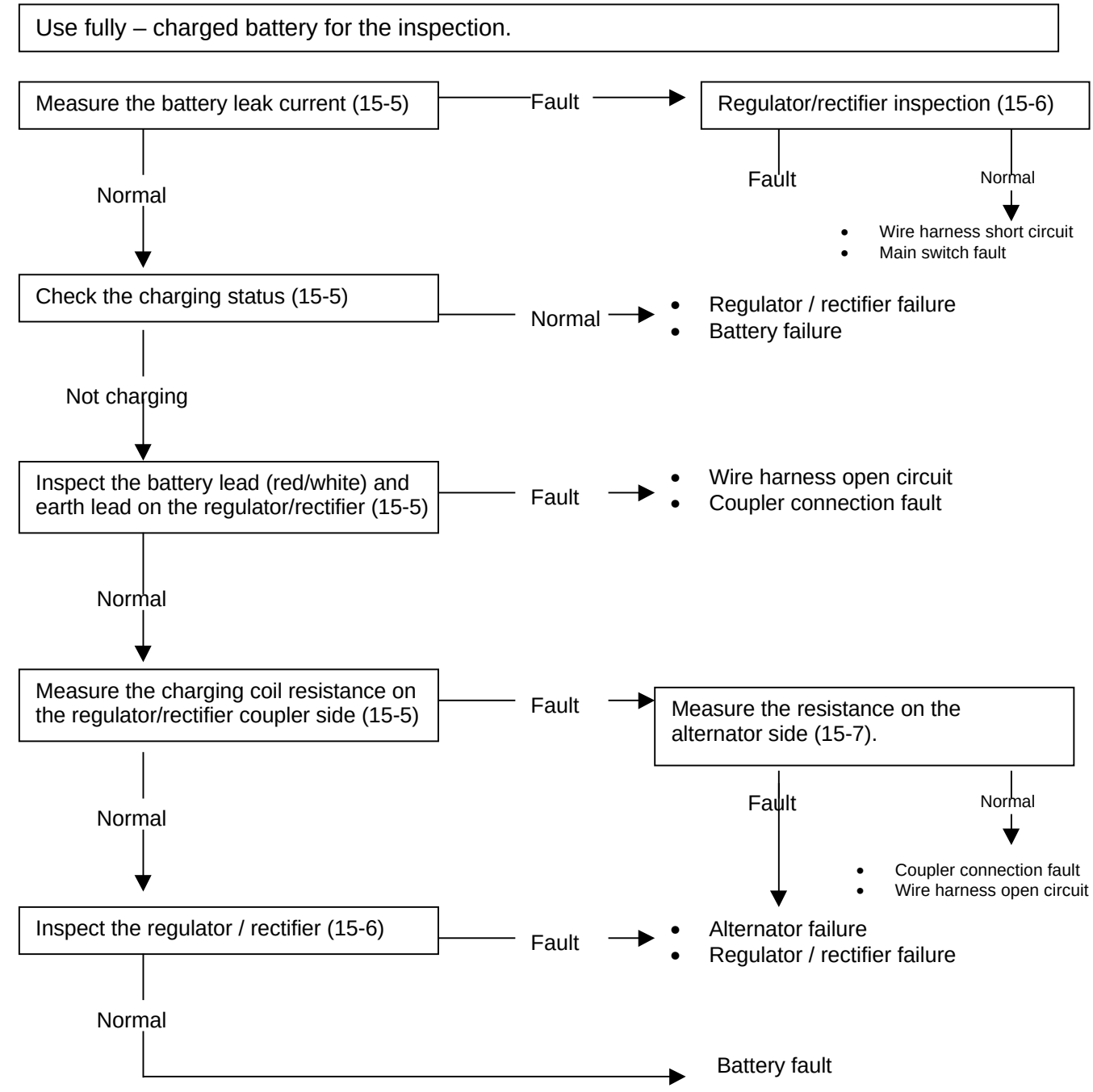
Troubleshooting

Battery Overcharge

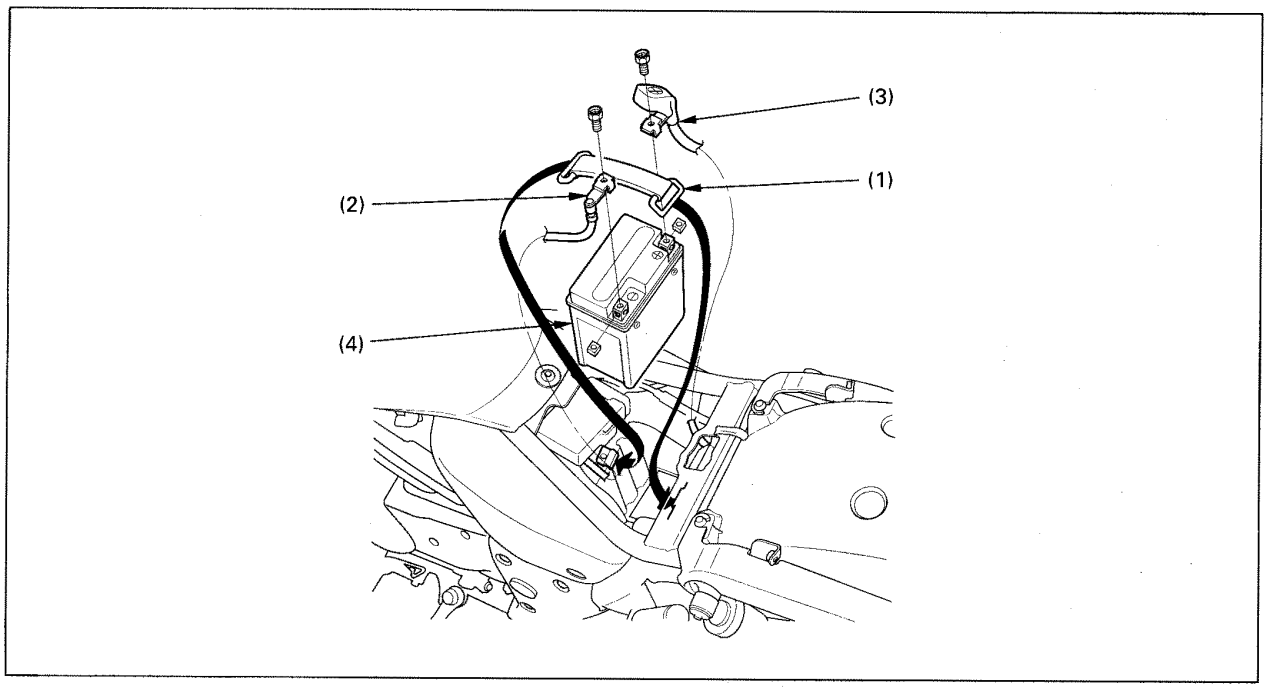
- Regulator / rectifier failure.
- Regulator / rectifier earth lead open circuit or loose connection.

Battery Undercharge / (flat battery)

CAUTION



♦ Battery Removal/Installation



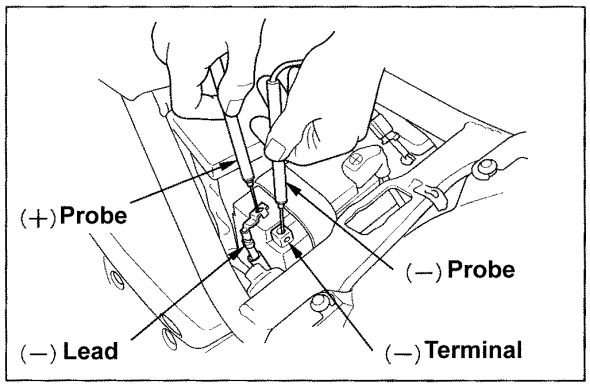
Relevant Works

- Seat removal / installation.

Works / Parts		Qty.	Notes
	Removal		**Reverse the procedure for its installation.**
(1)	Battery holder	1	
(2)	(-) lead	1	CAUTION Turn the main switch OFF. Disconnect the (-) lead first, then (+) lead.
(3)	(+) lead	1	CAUTION When installing, connect the (+) lead first, then (-) lead.
(4)	Battery	1	

Charging system inspection

Remove the seat (2-2)



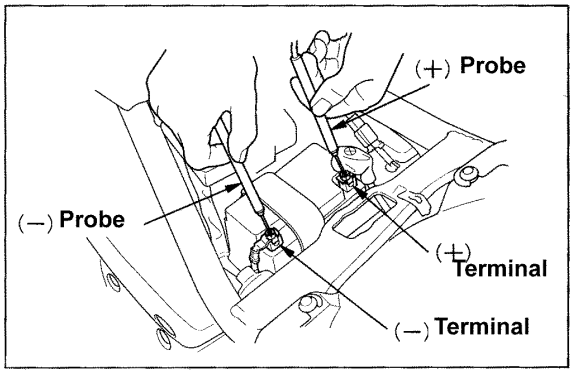
Leak test

Turn the ignition switch OFF and disconnect the (-) lead from the battery.
Connect the (+) probe of the multimeter to the (-) lead, the (-) probe to the battery (-) terminal.
Leave the ignition switch OFF and measure the leak current.

CAUTION

- Select the 1 ampre / 1A range and reduce the range as required.
- Do not turn the ignition switch ON while measuring the current.

Leak current ≦ 0.1mA

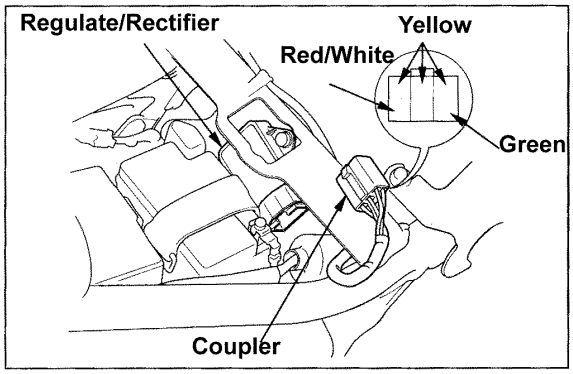


If the measured current is more than the above figure, there is a short circuit.
Disconnect the couplers/connectors one by one while measuring the current to find out the short circuit.

Charging status inspection

CAUTION

Use a battery with 13.0V (or above) terminal voltage for this inspection.



After warming up, install fully charged battery.
Connect a tachometer.
Connect a digital multimeter between the battery terminals.
Start the engine and establish the standard rpm for the regulating voltage.
Regulating voltage: 14 ~ 16V/5000rpm

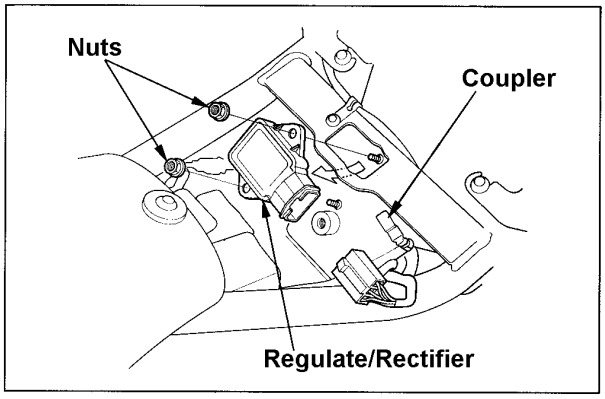
Regulate / Rectifier

Harness-side circuit inspection

Remove the seat (2-2)
Disconnect the regulator/rectifier couplers and inspect the following circuits on the main harness side.

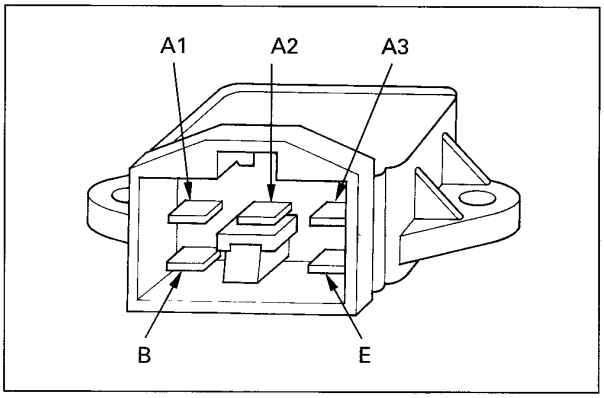
Item	Standard
Battery lead	Battery voltage between red/white (+) and body earth (-).
Ground earth	Conduction between green lead and the body earth.
Charging coil leads	0.1 ~ 1.0Ω (20°c) of resistance between yellow leads.

If the wire harness side inspections were all ok, inspect the regulator/rectifier coupler connection.
If the connections were fine, inspect the regulator/rectifier.



Regulator / Rectifier inspection
Remove the battery (15-4).
Remove two nuts to remove the regulator/rectifier.

Measure the resistance between its terminals.



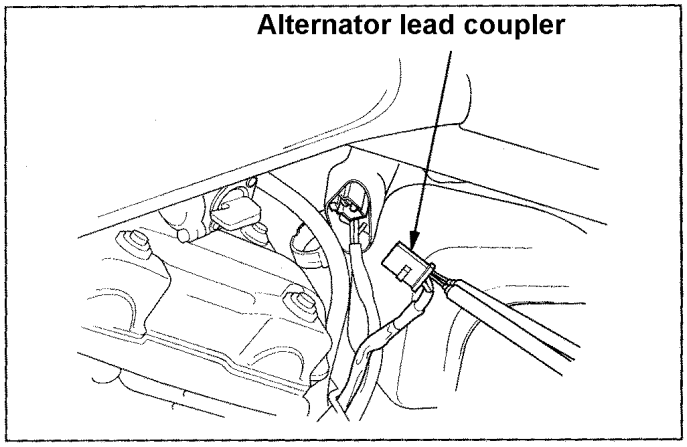
CAUTION

- Do not touch the probes while measuring.
- Use the specified multimeters only. The other products may give different readings.
  - Genuine SANWA SP-15D Analogue
  - KOWA TH-5H Analogue
- Set the following range:
  - SANWA: KΩ range
  - KOWA: Rx100Ω range
- If the readings are abnormal, change the batteries in the multimeter.

Resistance **Unit: KR_x (20^oc)**

Probe (+) / Probe (-)	B	A1	A2	A3	E
B		∞	∞	∞	∞
A1	0.5－10		∞	∞	∞
A2	0.5－10	∞		∞	∞
A3	0.5－10	∞	∞		∞
E	0.7－15	0.5－10	0.5－10	0.5－10	

If the readings are faulty, replace the regulator/rectifier.



Alternator inspection

CAUTION

The inspection can be conducted while the stator is installed to the engine.

Remove the right side cover (2-2).

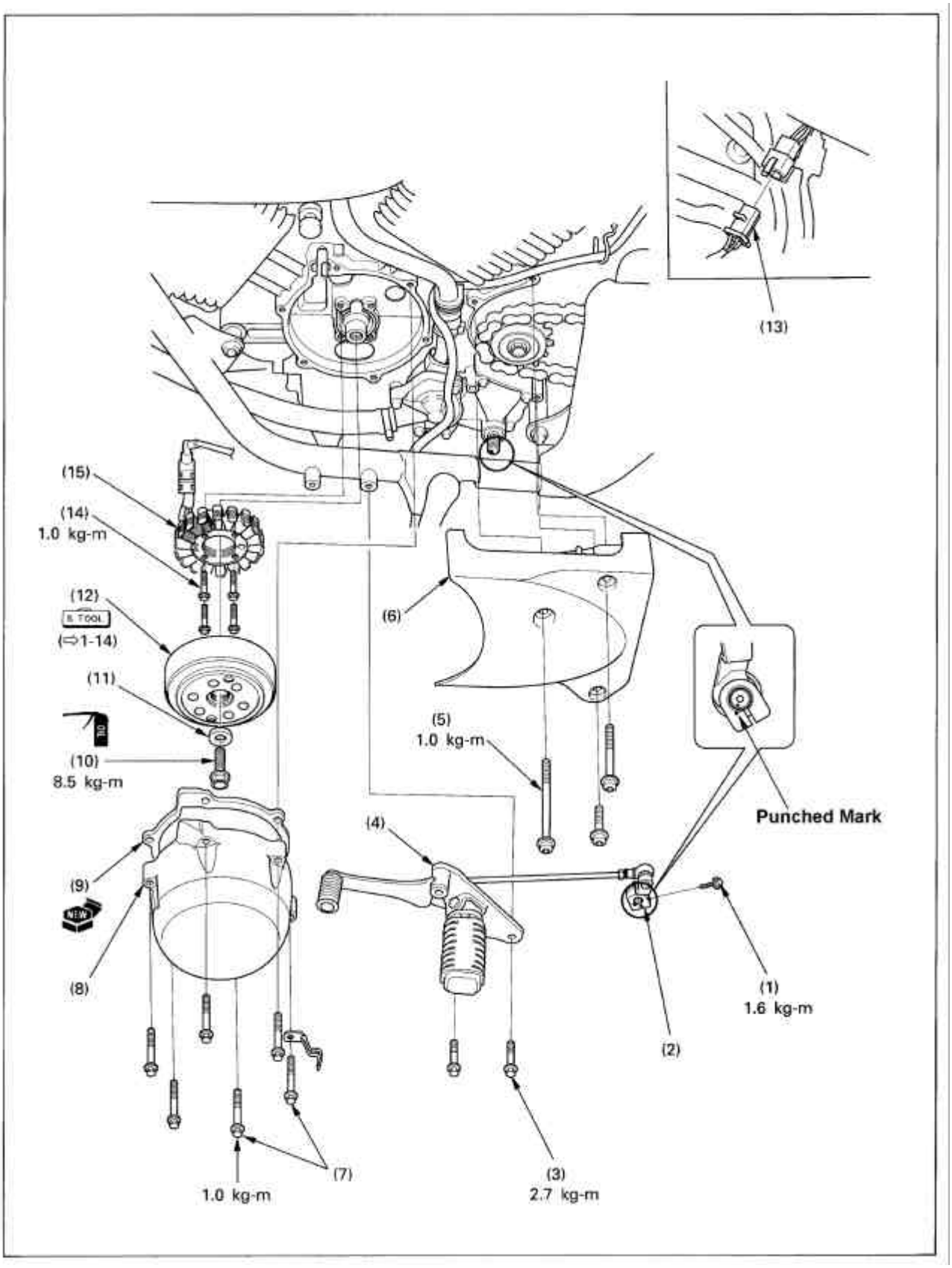
Disconnect the alternator lead coupler.
Measure the charging coil resistance at the engine side coupler terminals.

Standard: 0.1 ~ 1.0Ω (20°c)

Check there is no conduction between the engine side coupler terminals and the body earth.

If the resistance is out of the range, or if there is any conduction between the terminals and the body earth, replace the stator (15-8).

♦ **Alternator Removal/Installation**



CAUTION

- Place an oil pan underneath the engine when removing the left crankcase cover. Refill the oil after the installation.
- When installing, set the alternator leads correctly according to the wiring diagram (1-18).

Relevant Works

- Left side cover removal/installation (2-2).
- Left pivot plate cover removal/installation (2-2).

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the assembly.**
(1)	Gear shift arm bolt	1	
(2)	Gear shift arm	1	When installing, align the punched marks on the arm and the gear shift spindle.
(3)	Bolt	2	
(4)	Left main step holder	1	Remove together with the gear shift pedal and the arm.
(5)	Socket bolt	3	
(6)	Drive sprocket cover	1	
(7)	Left crankcase cover bolt/clamp	6/1	
(8)	Left crankcase cover	1	
(9)	Gasket	1	
(10)	Flywheel bolt	1	Removal / installation (15-10)
(11)	Washer	1	
(12)	Flywheel	1	
(13)	Alternator lead coupler	1	
(14)	Stator mount bolt	4	
(15)	Stator	1	Remove the grommet from the crankcase and remove together with the lead.

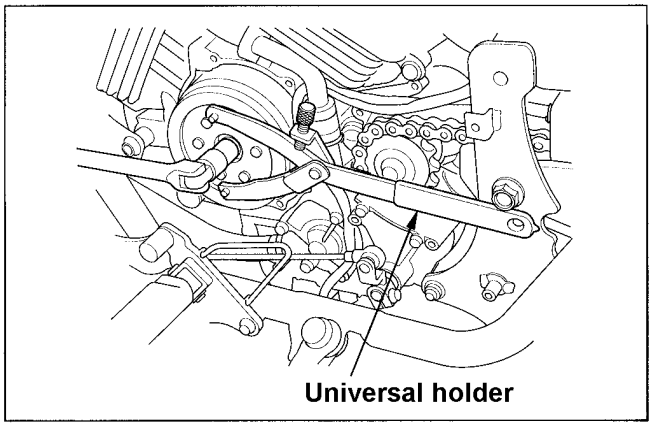
Flywheel bolt removal / installation

Removal

Set the universal holder to fix the flywheel (as shown in the figure).
Loosen and remove the flywheel bolt.

Excl. tool

Universal holder 07725-0030000

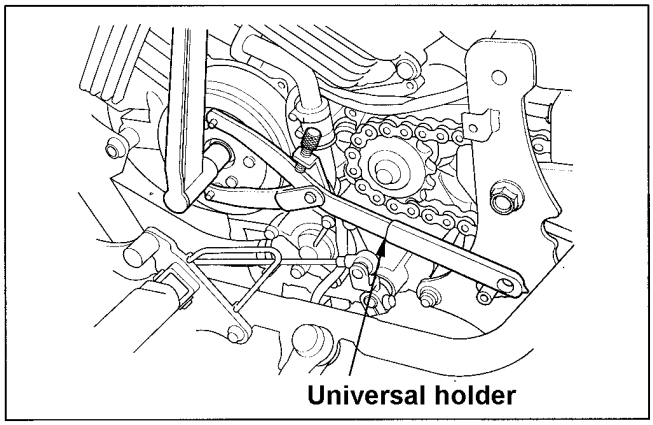


Installation

Apply clean engine oil to the flywheel bolt thread and the seat and attach it.
Set the universal holder as shown in the figure.
Tighten the flywheel bolt.

Excl. tool

Universal holder 07725-0030000

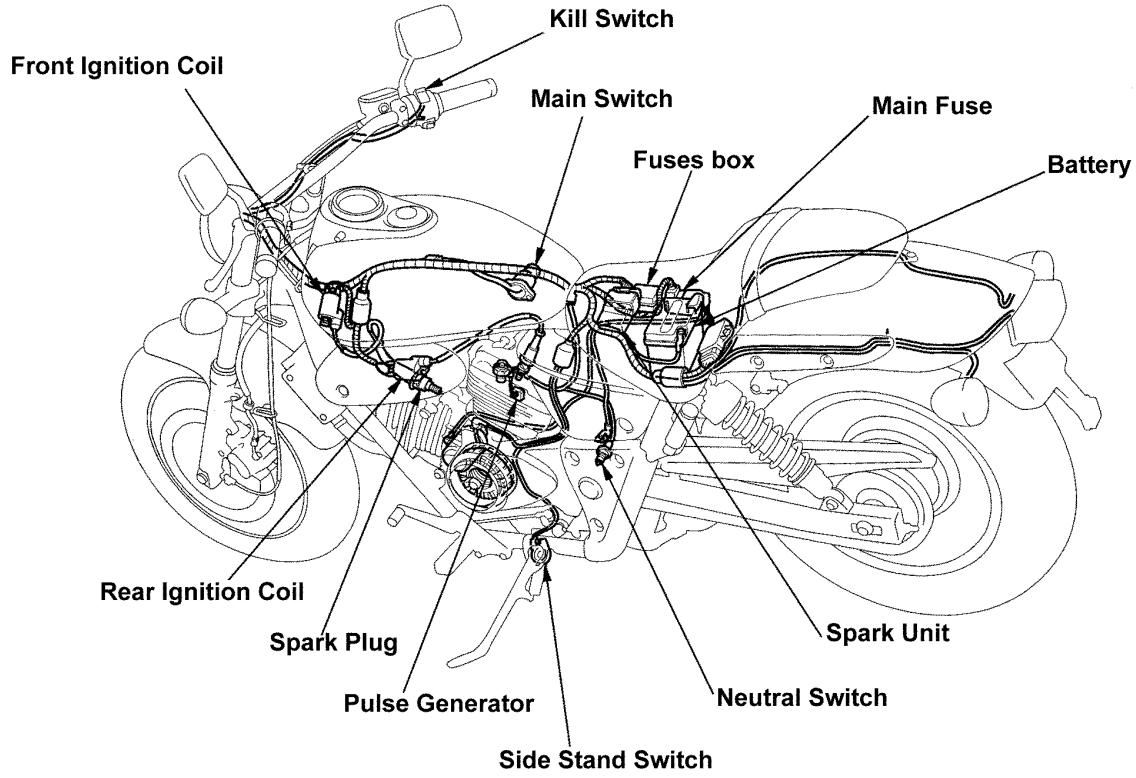


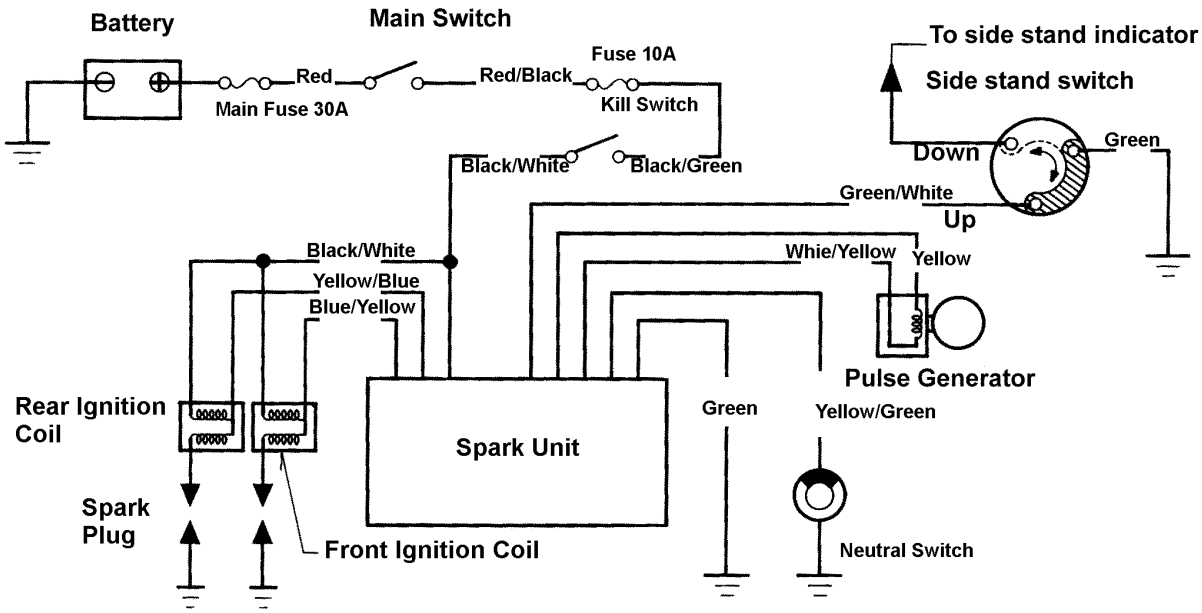
Torque: 8.5kg-m

General Caution

- Follow the chart on 16-3 for the troubleshooting.
- The ignition timing cannot be adjusted because the electrical advancing system is fixed internally in the spark unit.
- Handle the spark unit with care. Dropping it or applying shock may cause failure. Connection / disconnection of the couplers and connects while having a current may damage the circuits. Turn the main switch OFF when servicing.
- The majority of the ignition system failures are caused by the faulty connections of the couplers and the connectors. Check them before the service.
- Only use a battery in good condition. Reduced capacity batteries may not produce adequate sparks by losing its power by cranking and also by low cranking speed.
- Improper selection of the spark plugs may result in engine trouble. Use the specified spark plugs.
- Follow the tables on 19-1 for the main switch conduction test.
- Refer to Sec 18 on the main volume for the neutral switch inspection.
- This vehicle is equipped with an ignition cut off type side stand. Refer to Sec. 16 on the main volume for its detail.
- Refer to Sec 18 for removal/installation of the side stand switch.

♦ Ignition System





Troubleshooting

- Check with a new (good) spark plug before starting the troubleshooting. Also check the plug cap and high tension lead attachment and the ignition coil for signs of crack, damage or moisture contamination.
- If only one ignition coil does not produce spark, swap the ignition coils and re-test. If there is not difference, measure the ignition coil primary voltage. If the spark appears, the original coil is faulty.
- The “Initial Voltage” of the ignition coil primary voltage is the measured voltage when the kill switch is in the RUN position and the main switch is ON (while not cranking the engine).

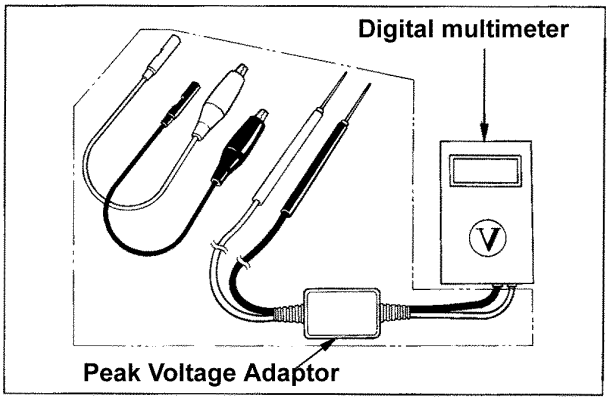
No spark from the spark plugs:

Status		Suspected cause (check from ①)
Ignition coil primary voltage	No initial voltage while the main switch is ON, the kill switch is RUN (the other electrical accessories are ok).	① Kill switch failure Black/White lead open circuit (kill switch-ignition coil) Faulty connection or open circuit of the lead on the ignition coil primary side terminal. If the initial voltage is ok when the spark unit is removed, the spark unit is faulty.
	The initial voltage is ok. However, the voltage drops 2 ~ 4V when cranking.	① Peak voltage adapter misconnection. Battery nearly flat. No voltage on spark unit (+) lead (black/white), or, spark unit coupler terminal connection fault. Spark unit earth lead (green) open circuit or faulty connection. Yellow/Blue, Blue/Yellow leads open circuit or faulty connection between the ignition coils and the spark unit. Ignition coil primary side lead short circuit. Neutral switch or side stand switch failure or relevant circuits fault (Yellow/Green, Green/White, Green leads and couplers). Pulse generator failure (measure the peak voltage). Spark unit failure (if ①~ were all ok)
	The initial voltage is ok. However, little or no peak voltage when cranking.	① Peak voltage adapter misconnected. Peak voltage adapter failure. Spark unit failure (if ① and are ok)
	The initial voltage is ok. The peak voltage is below the standard.	① Too small internal resistance in the multimeter. Too low cranking speed • The battery nearly flat. Sampling time of the multimeter (it is ok if the standard voltage is achieved after a few attempts). Spark unit failure (if all of ① ~ are ok and no sparks on the plug)
	Both initial and peak voltages are fine but no spark.	① Spark plug fault or the ignition coil secondary current leak. Ignition coil failure.
Pulse Generator	Peak voltage	① Too small internal resistance of the multimeter. Too low cranking speed • The battery nearly flat Sampling time of the multimeter (it is ok if the standard voltage is achieved after a few attempts). Pulse generator failure (if all of ① ~ are ok)
	Little or not peak voltage	① Peak voltage adapter fault Pulse generator failure

Ignition system inspection

CAUTION

- If there is no spark, check all connections and measure each peak voltage.
- Use the multimeter with the impedance of 10MR/DCV or more.



Connect the digital multimeter to the peak voltage adapter.

Excl. tool

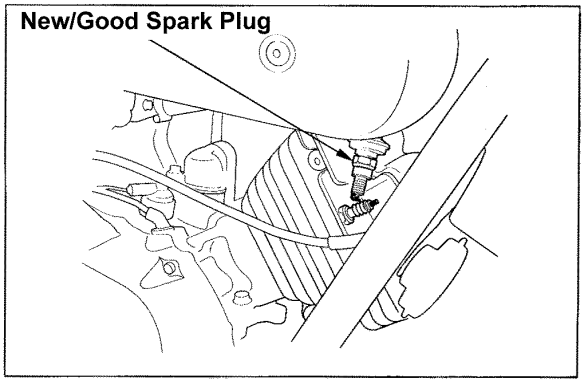
Peak voltage adapter 07HGJ-0020000
Conventional multimeter of 10MΩ/DCV or more impedance.

Ignition coil primary voltage

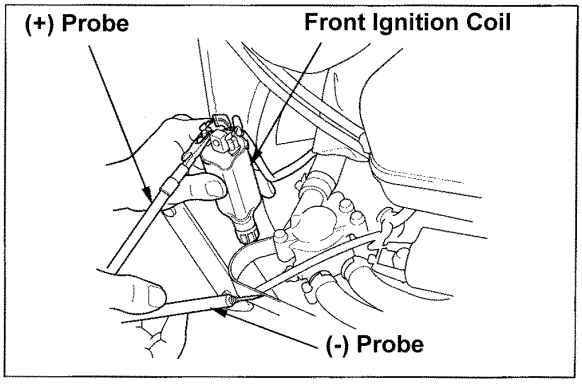
CAUTION

- Check all wirings beforehand.
- It should be inspected while cylinders give sufficient compression and the plugs and the plug caps are properly mounted.

Remove the left carburetor side cover (2-2).
Remove the front ignition coil (16-5).
If the engine ignites with normal system spark, the cranking speed is unstable.
Just like a normal spark test, leave the spark plug installed to the cylinder head, install new/good plugs to front and rear cylinder head, plug caps and earth to the engine.



Leave the primary lead connected to the ignition coil and connect the peak voltage adapter between the primary side lead and the body earth.



Connection:

Rear ignition coil: Yellow/Blue lead terminal (+) and the body earth (-).
Front ignition coil: Blue/Yellow lead terminal (+) and the body earth (-).
Turn the ignition switch ON and the kill switch to RUN.
Check the initial voltage. It should indicate almost battery voltage.
If there is inadequate/no voltage, the power circuit for the ignition coil is faulty. Refer to the troubleshooting before measuring the peak voltage.
Crank the engine with the starter motor and measure the primary side peak voltages for each ignition coil.
Peak Voltage: 100V or more

CAUTION

Do not touch the probe (metal part) while measuring. High voltage is hazardous.

CAUTION

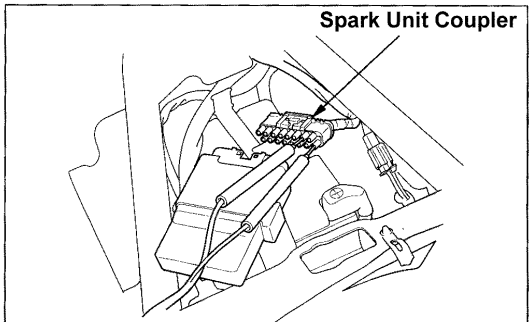
Peak voltages for each ignition coil may differ from each other but it is fine as long as the voltages are above the standard.

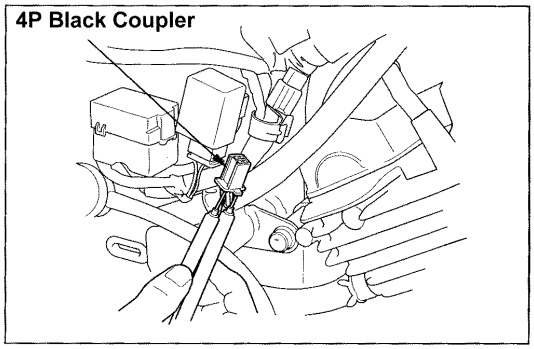
If the measured voltages are below the standard, check the coupler/wire harness connection.
If the connections are fine, the spark unit may be faulty. Conduct the troubleshooting.

Pulse Generator

CAUTION

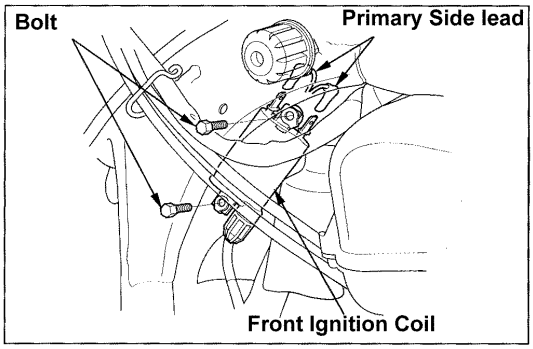
Install the spark plugs to the cylinder heads to check with actual compression existing.





Remove the seat (2-2).
Disconnect the coupler from the spark unit.
Connect the peak voltage adapter between the pulse generator or lead terminals on the wire harness end coupler (White / Yellow, Yellow).
White / Yellow – (+) and Yellow – (-).

Turn the ignition switch ON and the kill switch to RUN.
Crank the engine with the starter motor and measure the peak voltage of the pulse generator.
Peak Voltage: 0.7V or more
If the peak voltage measured at the spark unit end is below the standard, conduct the following inspection.
Remove the right side cover (2-2).
Disconnect the 4P black coupler between the pulse generator and the spark unit and connect the peak voltage adapter between the pulse generator lead terminals on the engine end coupler.
In the same manner with the spark unit end coupler, measure the peak voltage again and compare with the ones measured at the spark unit end.



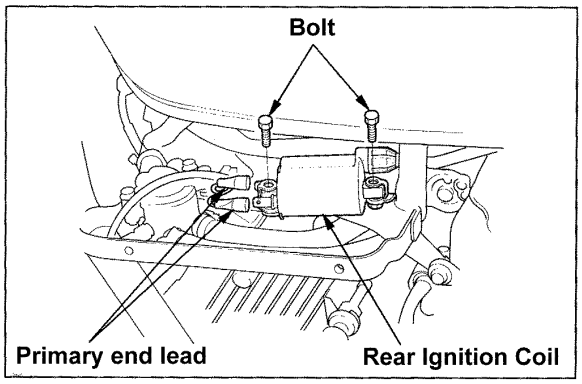
- If the spark unit end is faulty and the engine end is fine, it is caused by faulty coupler connections or wire harness open circuit.
- If both ends are faulty, refer to the troubleshooting and consider it to be the pulse generator fault.

Ignition Coil

Removal / Installation
Front ignition coil:
Remove the fuel tank (2-3)
Remove plug caps from spark plugs.
Disconnect the primary leads from the ignition coil.
Remove two mount bolts and remove the ignition coil.

Rear ignition coil

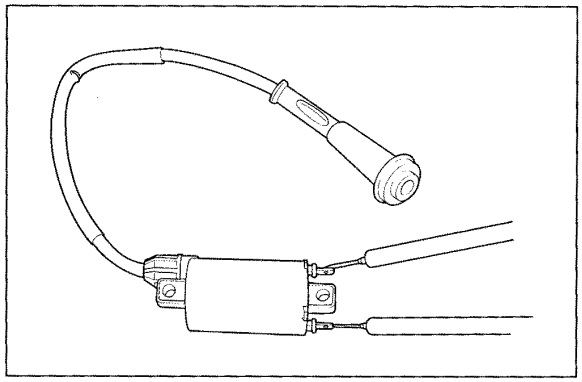
Remove the left carburetor side cover (2-2).
Remove plug caps from the spark plugs.
Disconnect the primary lead from the ignition coil.
Remove two mount bolts to remove the ignition coil.



Primary end coil inspection

Measure the primary end coil resistance between the ignition terminals.

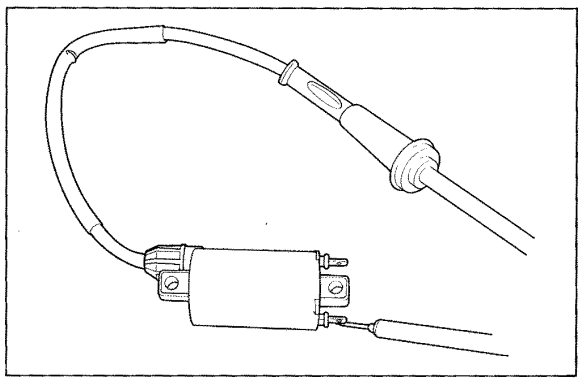
Standard: 2 ~ 4Ω (20°c)



Secondary end coil inspection

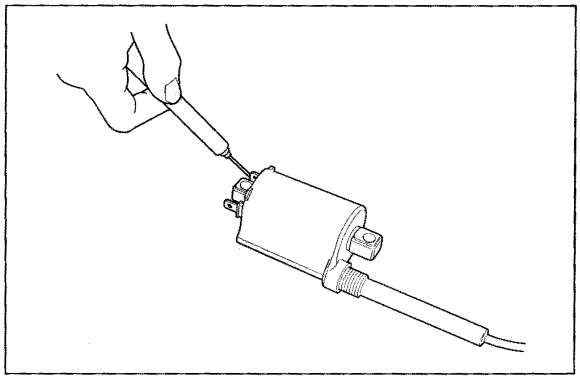
Measure the secondary end coil resistance between the spark plug cap and the primary end green terminals.

Standard: 15 ~ 21kΩ (20°c)

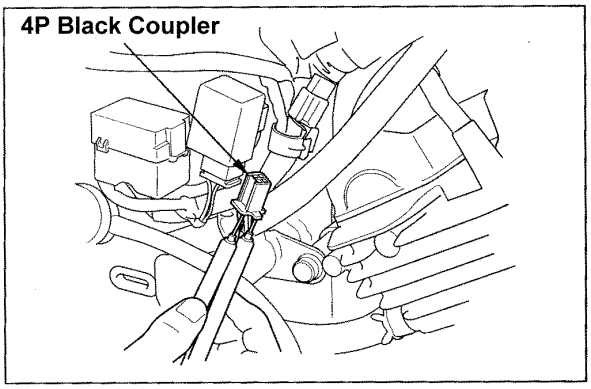


If the measured resistance was out of the above range, disconnect the high tension lead from the ignition coil and measure the secondary end coil resistance as a single module.

Standard: 11 ~ 15kΩ (20°c)



Pulse generator inspection



CAUTION

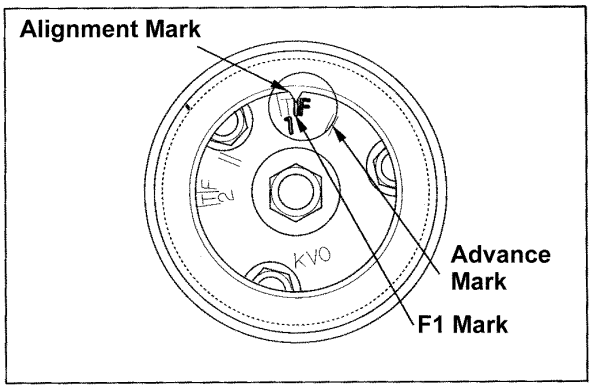
The inspection can be conducted with the pulse generator installed to the engine.

Remove the right side cover (2-2).
Disconnect the 4P black coupler.
Measure the pulse generator resistance between the White/Yellow lead and the Yellow lead terminals on the engine end coupler.

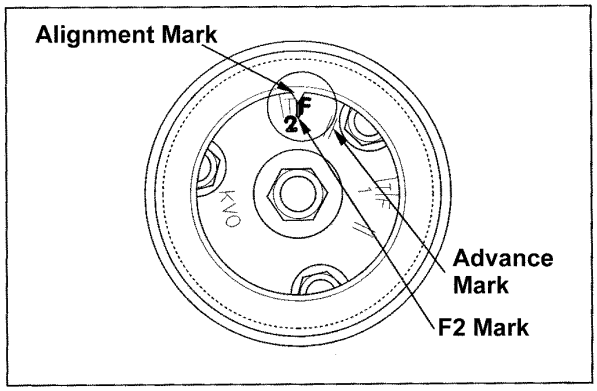
Standard: 340 ~ 420Ω (20°c)

Ignition Timing

Warm up the engine.
Shut down the engine and connect the timing lamp to the high tension lead on the rear cylinder.
Connect a tachometer.
Remove the timing hole cap.
Start the engine and set to 1,200rpm (idling).
The F1 mark on a starter clutch should align with the mark on the right crankcase cover.



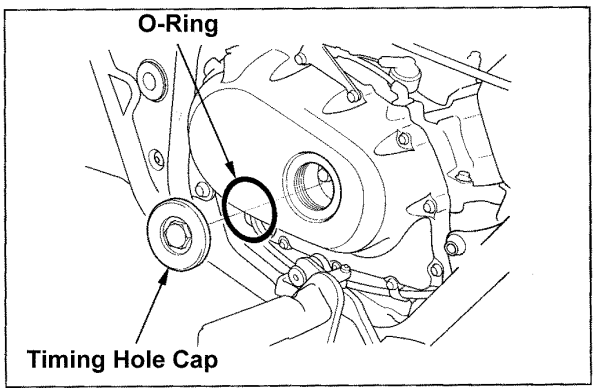
Gradually increase the engine rpm and the alignment mark on the right crankcase cover should come between the advance marks on the starter clutch at 5,000rpm.
Shut down the engine and connect the timing light to the front cylinder high tension lead.
Start the engine and set to 1,200rpm (idling).
The F2 mark on a starter clutch should align with the mark on the right crankcase cover.



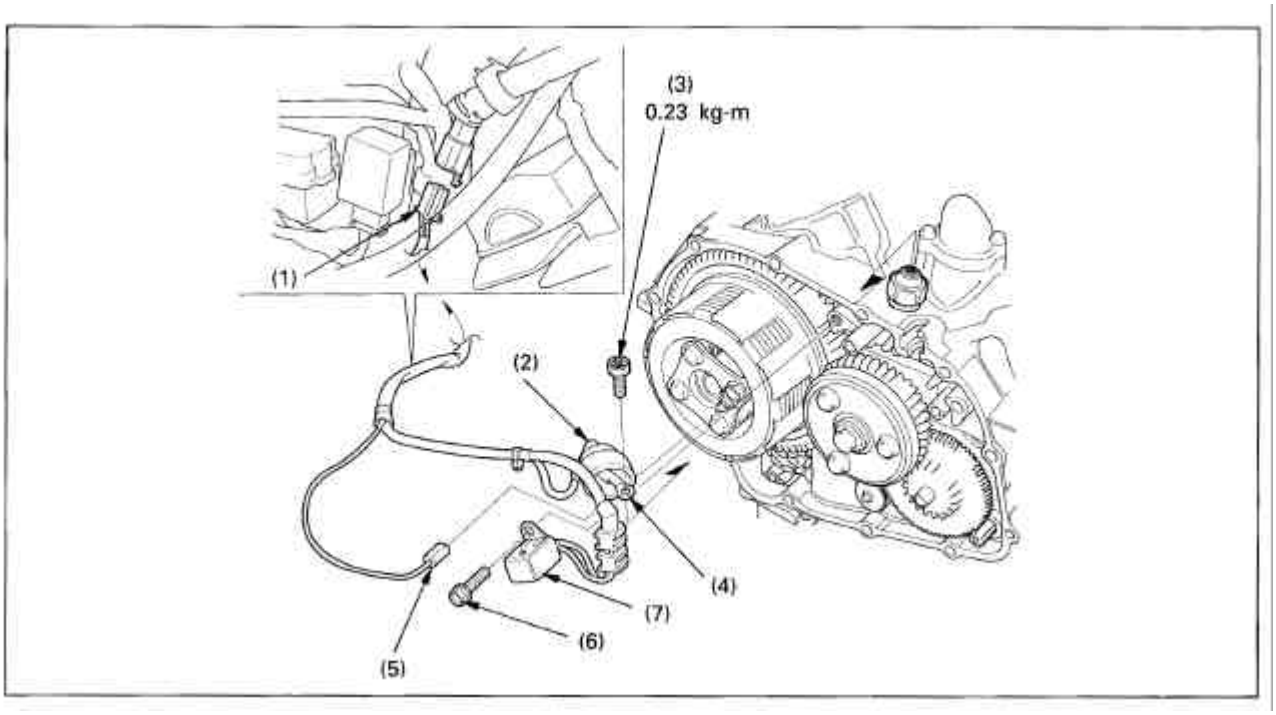
Gradually increase the engine rpm and the alignment mark on the right crankcase cover should come between the advance marks on the starter clutch at 5,000rpm.

Apply grease to the timing hole cap O-Ring and the thread and install the cap.

Torque: 1.8kg-m.



♦ Pulse Generator Removal/Installation



CAUTION

Connect the pulse generator leads, oil pressure switch leads and the neutral switch leads correctly (1-18) when installing.

Relevant Works

- Right crankcase cover removal/installation (9-2).

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	4P black coupler	1	
(2)	Dust cover	1	
(3)	Terminal screw	1	
(4)	Oil pressure switch terminal	1	
(5)	Neutral switch connector	1	
(6)	Mount bolt	1	
(7)	Pulse generator	1	• Remove the grommet from the crankcase and remove the generator together with the leads. • Align the boss with the hole on a crankcase when installing.

General Caution

CAUTION

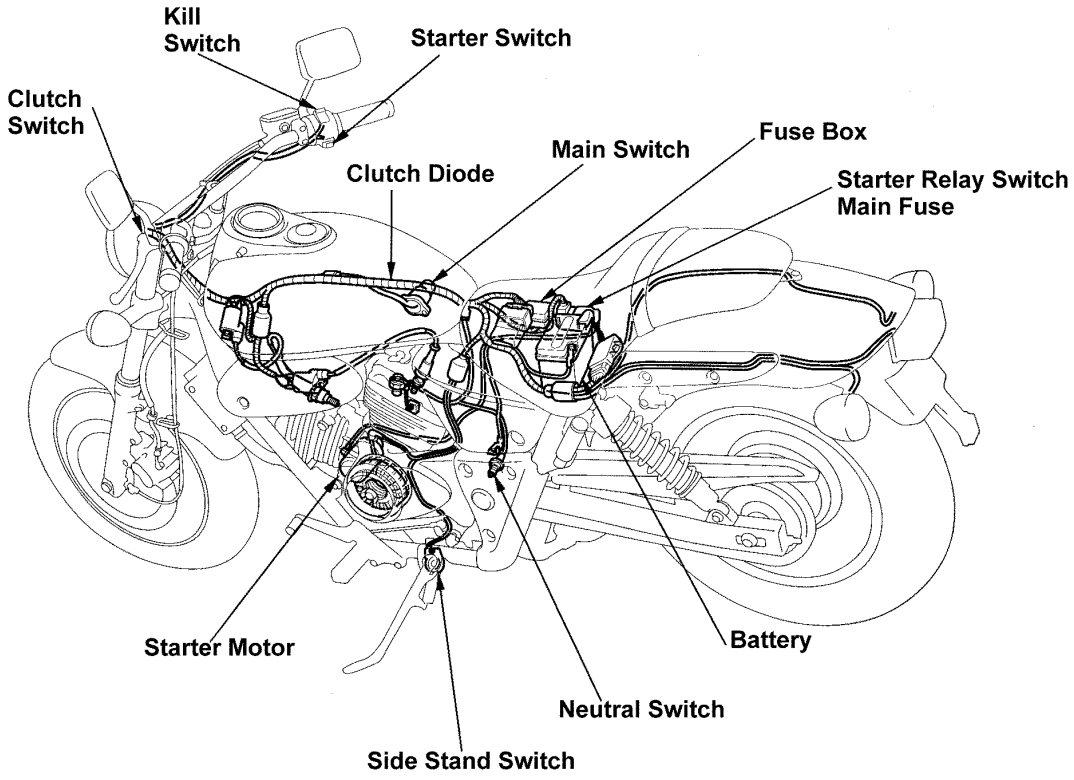
Always turn the main switch OFF when servicing the starting system.
Unexpected activation of the starter motor may cause injury.

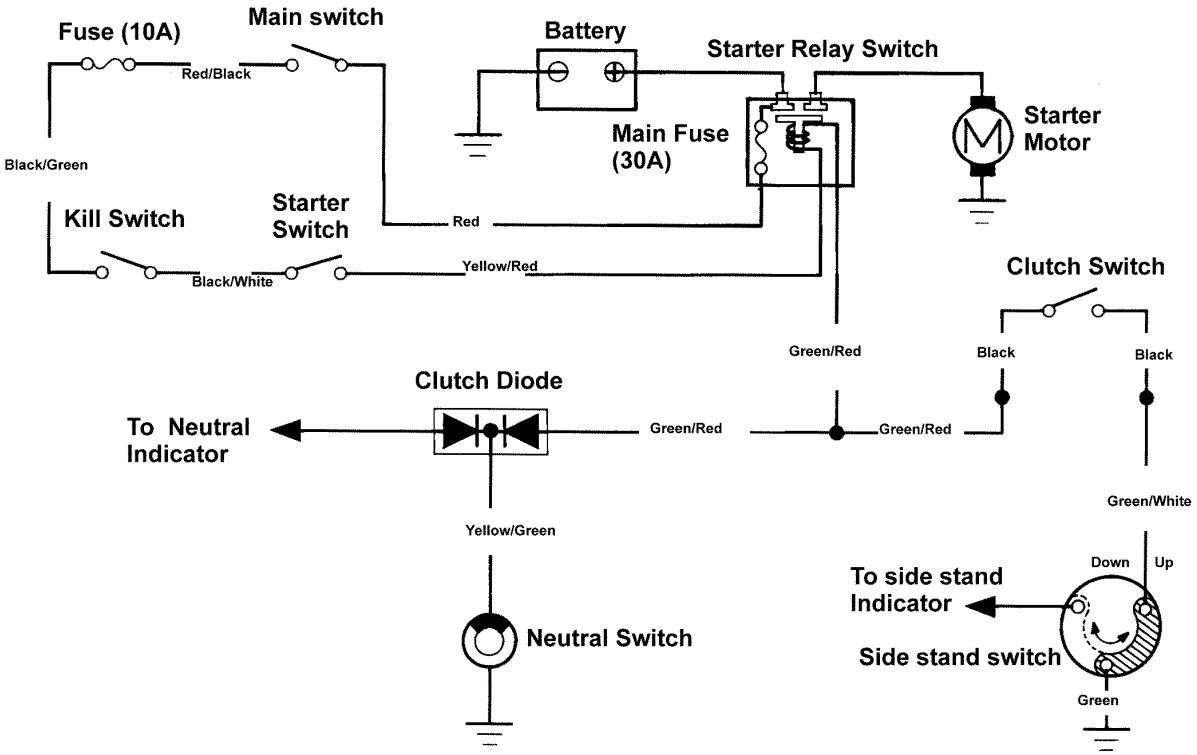
- If the battery is flat, the starter motor becomes too weak to crank. Whenever starting trouble occurs, try with well charged battery before troubleshooting.
- Excess current to the starter motor, attempting to crank, may damage the coil in the motor.
- Refer to the corresponding parts for the following parts:

• Clutch diode	Main volume	Sec 17
• Starter motor	“ “	Sec 17
• Starter relay switch	“ “	Sec 17 / Type A
• Clutch switch	“ “	Sec 18
• Neutral switch	“ “	Sec 18
• Sidestand switch	“ “	Sec 16 & 18
• Main switch	Wiring (19-1) conduction table	

- Follow the troubleshooting chart (17-3) for the starting system inspection.

♦ Starting System

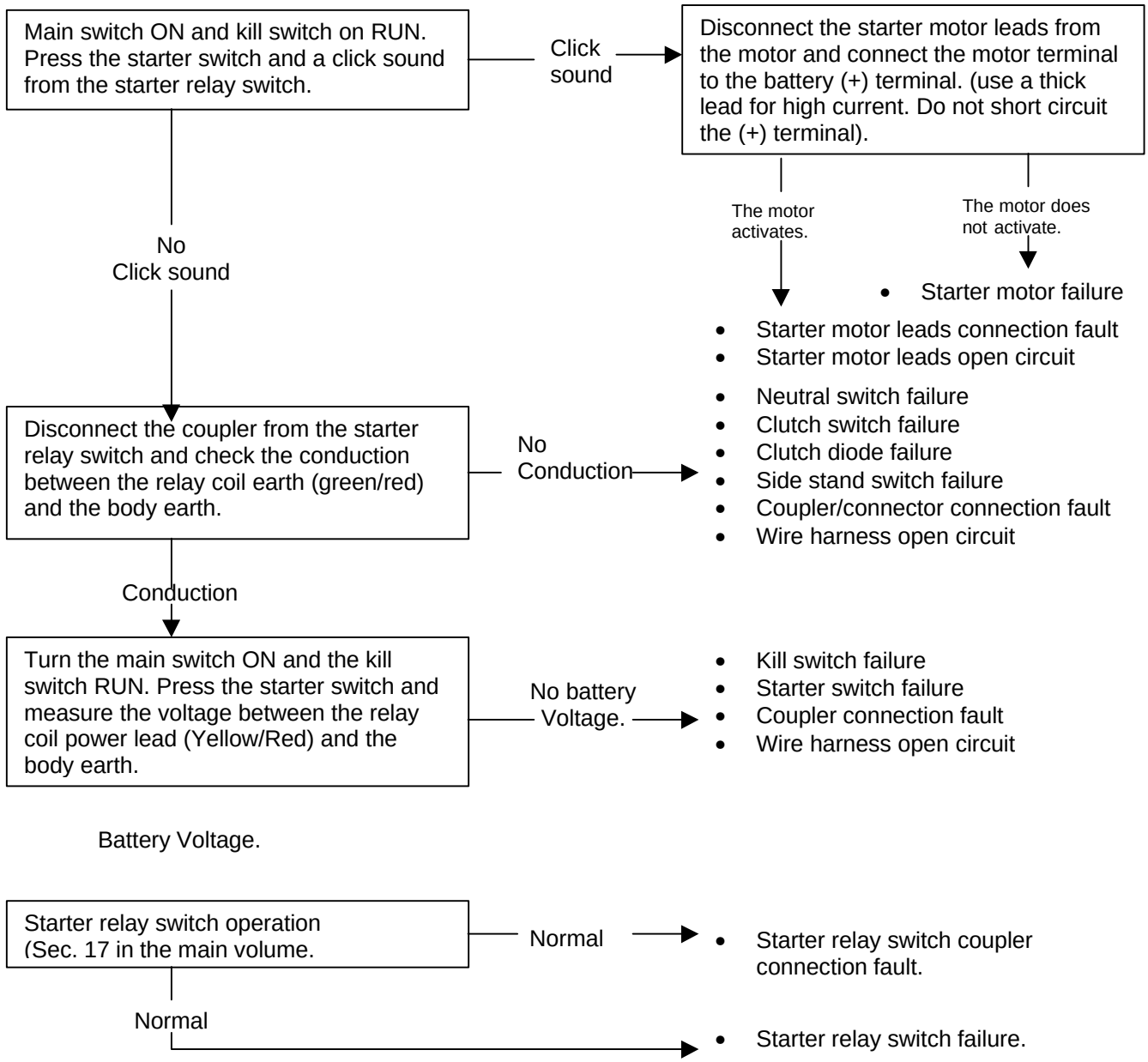




Troubleshooting

The starter motor does not activate

- Check the main (30A) and sub (10A) fuses beforehand.
- Try with a well charged battery.
- The starter motor can be activated with the main switch ON, the kill switch on RUN and with the following status:
  - Transmission in neutral
  - The sidestand is retracted and the clutch lever is held if the transmission is in the position other than neutral.



Weak starter motor torque (unable to crank)

- Battery undercharged / flat
- Battery terminals connection fault
- Starter motor terminals connection fault
- Starter motor fault
- Brush wear/damage

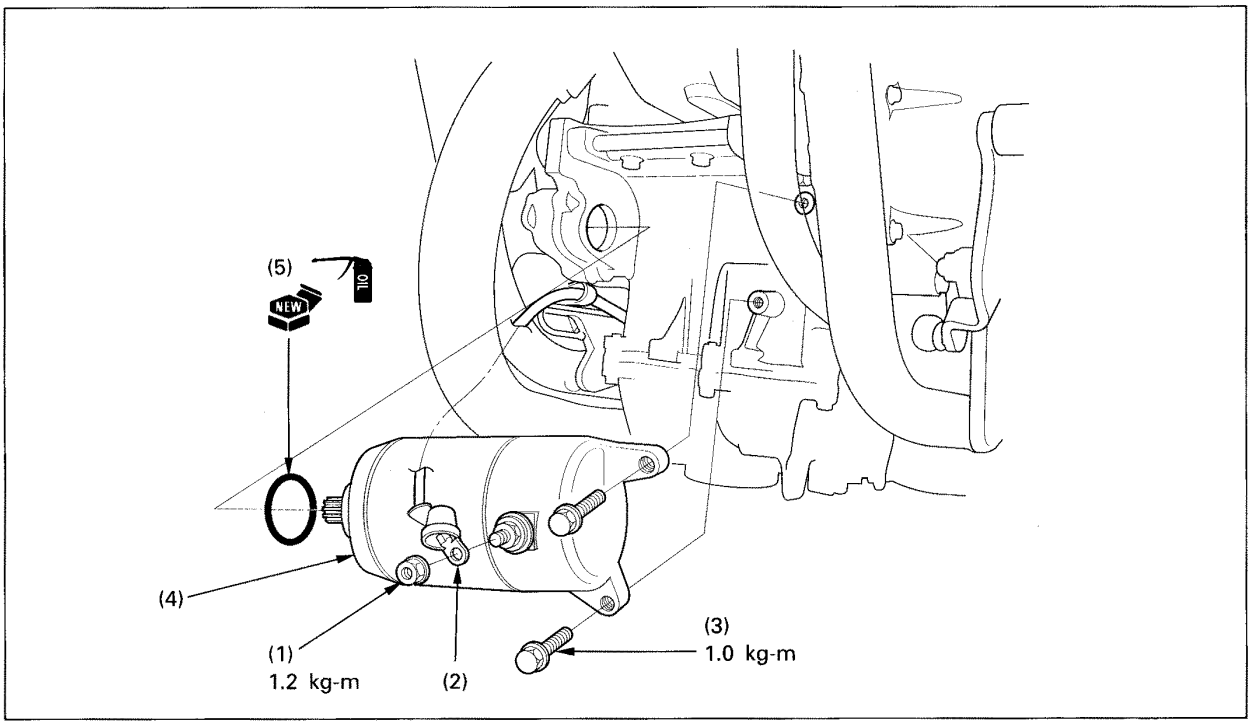
The starter motor slips

- Starter clutch slip

The starter motor is ok but does not crank

- The crankshaft does not spin due to engine failure
- Starter reduction gear fault

♦ Starter Motor removal / installation

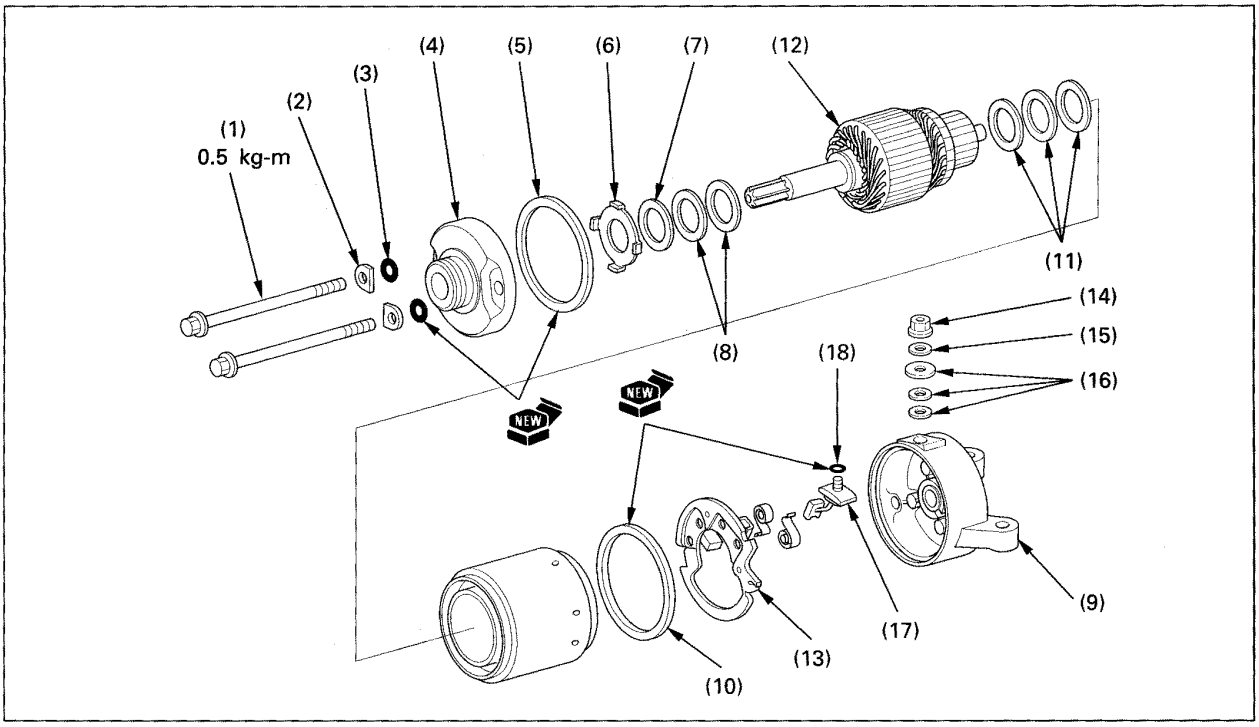


CAUTION

Turn the main switch OFF and disconnect the battery earth lead before starting any work.

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Terminal nut	1	
(2)	Starter motor lead	1	
(3)	Mount bolt	2	
(4)	Starter motor	1	
(5)	O-Ring	1	Assembly / disassembly (17-5)

♦ Starter Motor Assembly / Disassembly

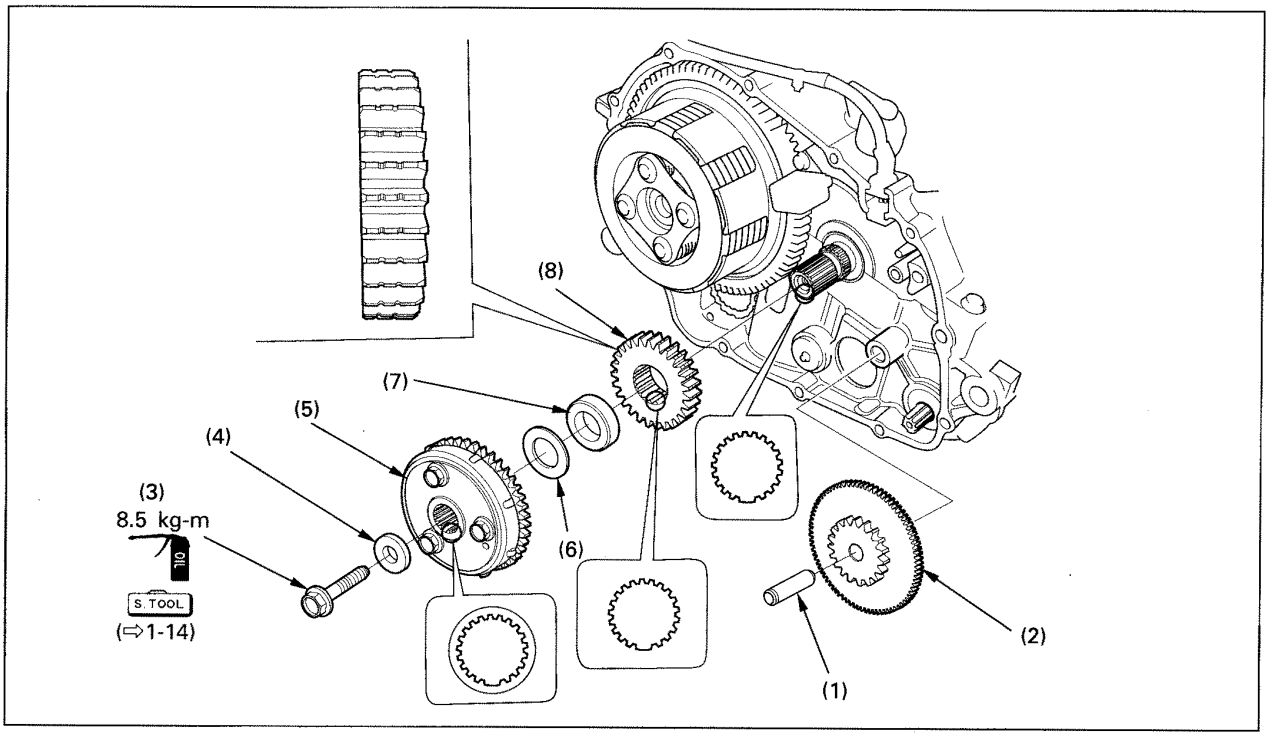


Relevant Works

- Starter motor removal / installation (17-4).

Works / Parts		Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Case bolt	2	
(2)	Washer	2	
(3)	O-Ring	2	
(4)	Front cover	1	
(5)	Seal ring	1	
(6)	Lock washer	1	Set the catch to the groove on the front cover.
(7)	Insulator washer	1	
(8)	Shim	-	Record the number (quantity) and order when disassembling.
(9)	Rear cover	1	
(10)	Seal ring	1	
(11)	Shim	-	Record the number (quantity) and order when disassembling.
(12)	Armature	1	
(13)	Brush holder	1	Remove it after removing the brush.
(14)	Nut	1	
(15)	Washer	1	
(16)	Insulator washer	3	Record the order and the size when disassembling.
(17)	Terminal brush	1	
(18)	O-Ring	1	

♦ Starter Clutch Removal/Installation

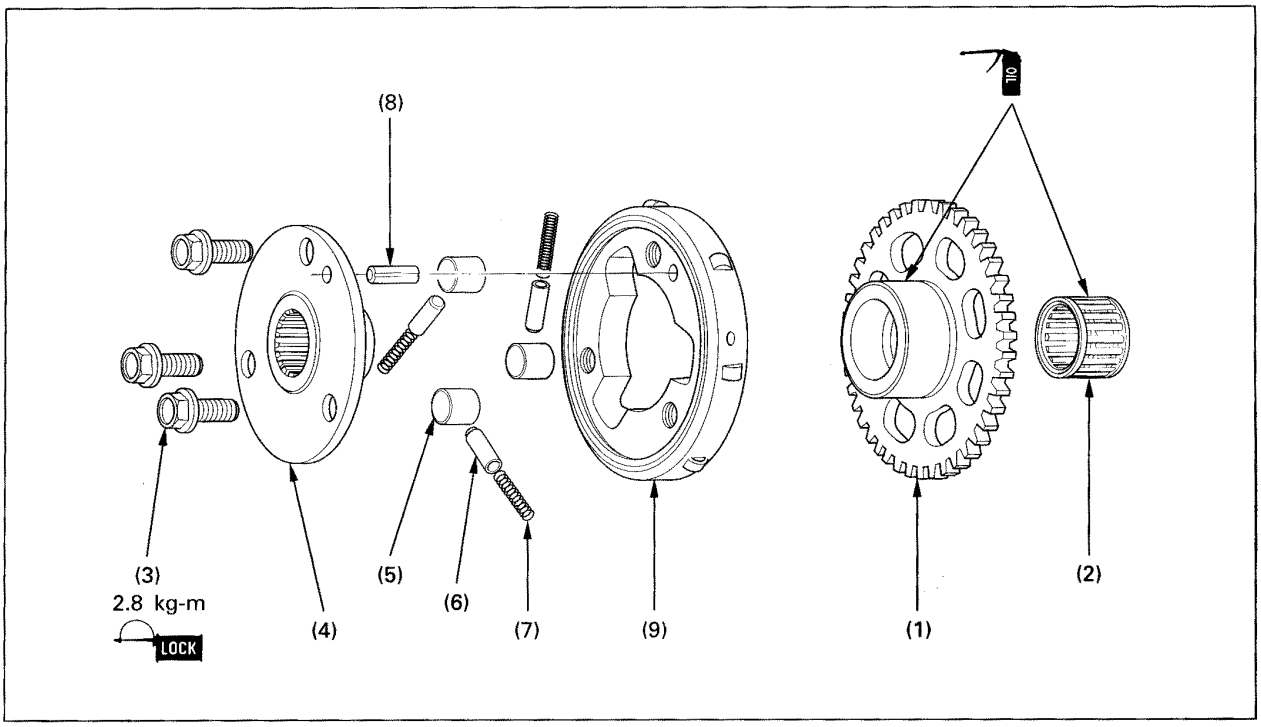


Relevant Works

- Right crankcase cover removal / installation (9-2).
- Left crankcase cover removal / installation (15-8).

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Starter reduction gear shaft	1	
(2)	Starter reduction gear	1	
(3)	Primary drive gear bolt	1	Fix the flywheel to remove the bolt (15-10).
(4)	Washer	1	
(5)	Starter clutch Assy	1	• Assembly / Disassembly (17-7) • Align the crankshaft with the wide spline when installing.
(6)	Thrust washer	1	
(7)	Spacer	1	
(8)	Primary drive gear	1	Watch out the gear direction and align the crankshaft with the wide spline when installing.

♦ Starter Clutch Assembly / Disassembly



Relevant Works

- Starter clutch removal / installation (17-6).

	Works / Parts	Qty.	Notes
	Disassembly		**Reverse the procedure for the assembly.**
(1)	Starter driven gear	1	Rotate it to the right to install when assembling.
(2)	Needle bearing	1	
(3)	Starter clutch cover bolt	3	
(4)	Starter clutch cover	1	
(5)	Roller	3	
(6)	Plunger	3	
(7)	Spring	3	
(8)	Spring pin	1	
(9)	Starter clutch body	1	

General Caution

CAUTION

The Halogen headlamp gets hot when it is illuminated. Do not touch the bulb immediately after turning it off. Wait for it to cool down.

- Do not touch the Halogen headlamp with bare hands or with dirty gloves. Oil on its surface may act as a hot spot, which cause distortion and damage on the bulb. When servicing (replacing) the bulb, follow the instructions below:
  - Do not replace it when it is turned on. Turn the main switch OFF and wait for the bulb to get cooled.
  - Wear clean gloves when replacing the bulb.
  - If oil stick on the glass surface, wipe off with a cloth using alcohol or thinner.
  - Install the dust cover after replacing the bulb.
- When checking any item using a battery, check the battery status first.
- The switch conduction test may be carried out without removing them.
- Refer to the corresponding sections for the following items:

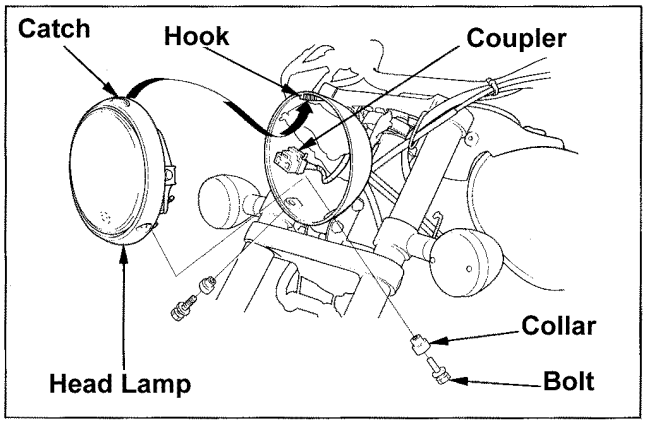
• Direction indicator relay	Main volume	(sec. 18)
• Oil pressure warning lamp	“ “	(sec. 18)
• Thermo sensor	“ “	(sec. 18)
• Steering handle switches	Wiring diagram	(19-1) tables
• Brake switch	Main volume	(sec. 18)
• Horn	“ “	(sec. 18)
• Side stand indicator	“ “	(sec. 18)

Bulb Replacement

Headlamp

CAUTION

The Halogen headlamp gets hot when it is illuminating. Do not touch immediately after turning it off. Wait for it to get cooled.

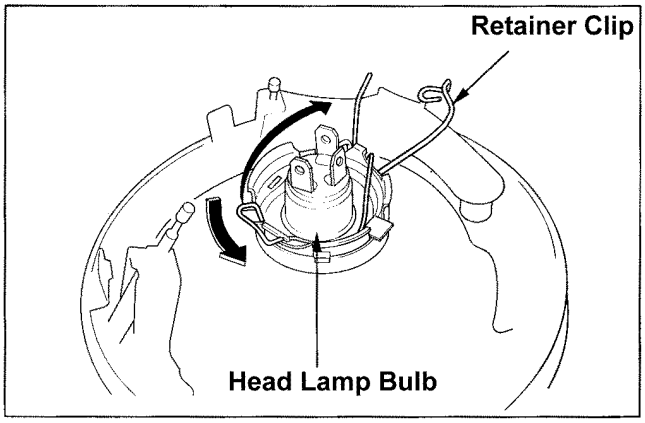


Remove two bolts and two collars to remove the headlamp from the case.

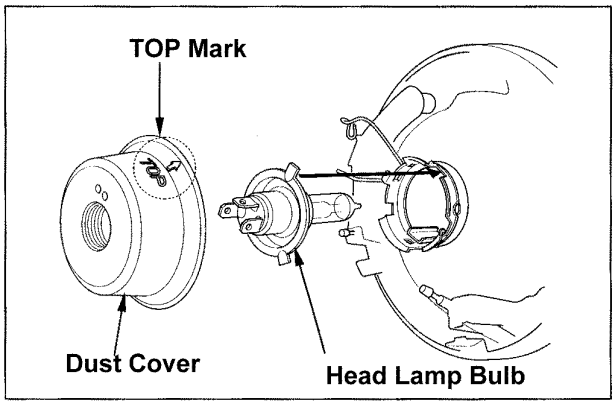
Disconnect the headlamp coupler.

Remove the dust cover.

Detach the retainer clip to remove the headlamp bulb.

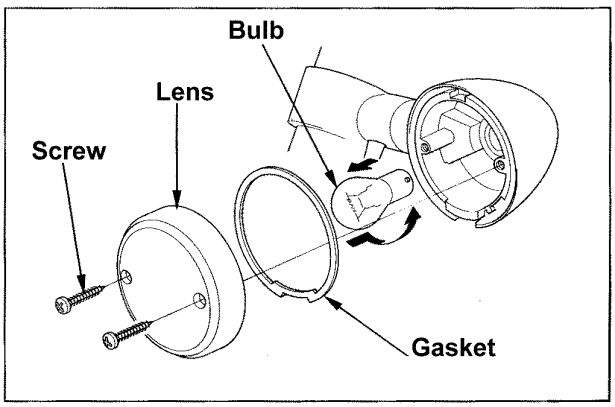


Install a new bulb and fix it with the retainer clip.
Face the TOP mark upward to install the dust cover.
Connect the headlamp coupler.
Hook the catch on the top of the headlamp to the hook on the case to install the collar.
Firmly tighten the bolts.



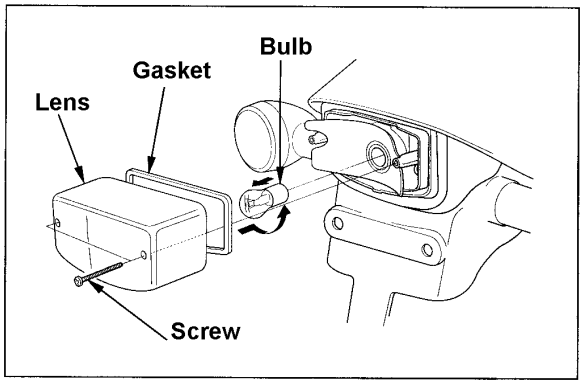
Direction Indicators

Remove two screws to remove the direction indicator lens.
Push the bulb in and rotate to the left to remove it.
Check the lens gasket is fine and correctly set.
Replace the bulb and reverse the procedure to install it.



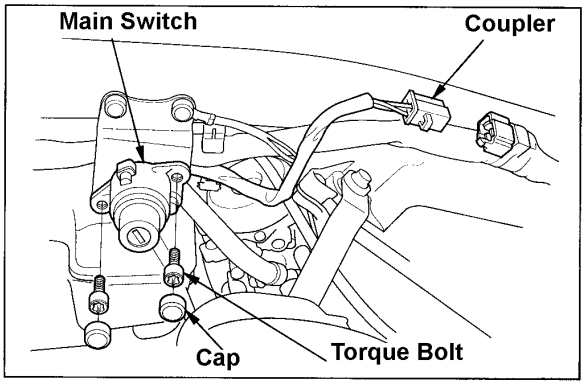
Brake / Tail lamp

Remove two screws to remove the tail lamp lens.
Push the brake/tail lamp in and rotate it to the left to remove it.
Check that the lens gasket is fine and correctly set.
Replace the bulb and reverse the procedure to install it.



Main switch removal/installation

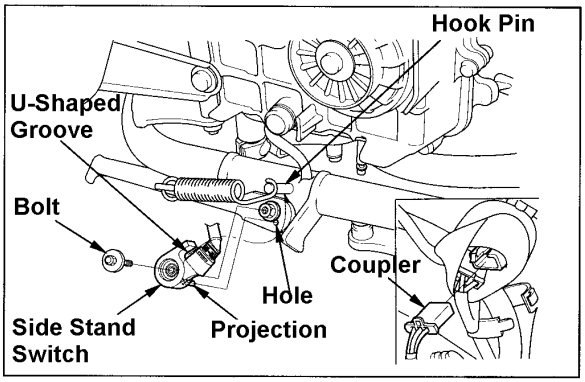
Remove the fuel tank (2-3).
Disconnect the main switch lead coupler.
Detach the harness clip for the main harness and the main switch lead.
Remove two bolt caps.
Remove two torques bolts to remove the main switch.
Reverse the procedure for it's installation.



Torque: bolts 1.0kg-m

Side stand switch removal/installation

Remove the left hand side cover (2-2).
Disconnect the side stand switch lead coupler.
Remove three socket bolts to remove the drive sprocket cover.
Support the frame to retract the side stand.
Remove the bolt to remove the side stand switch.

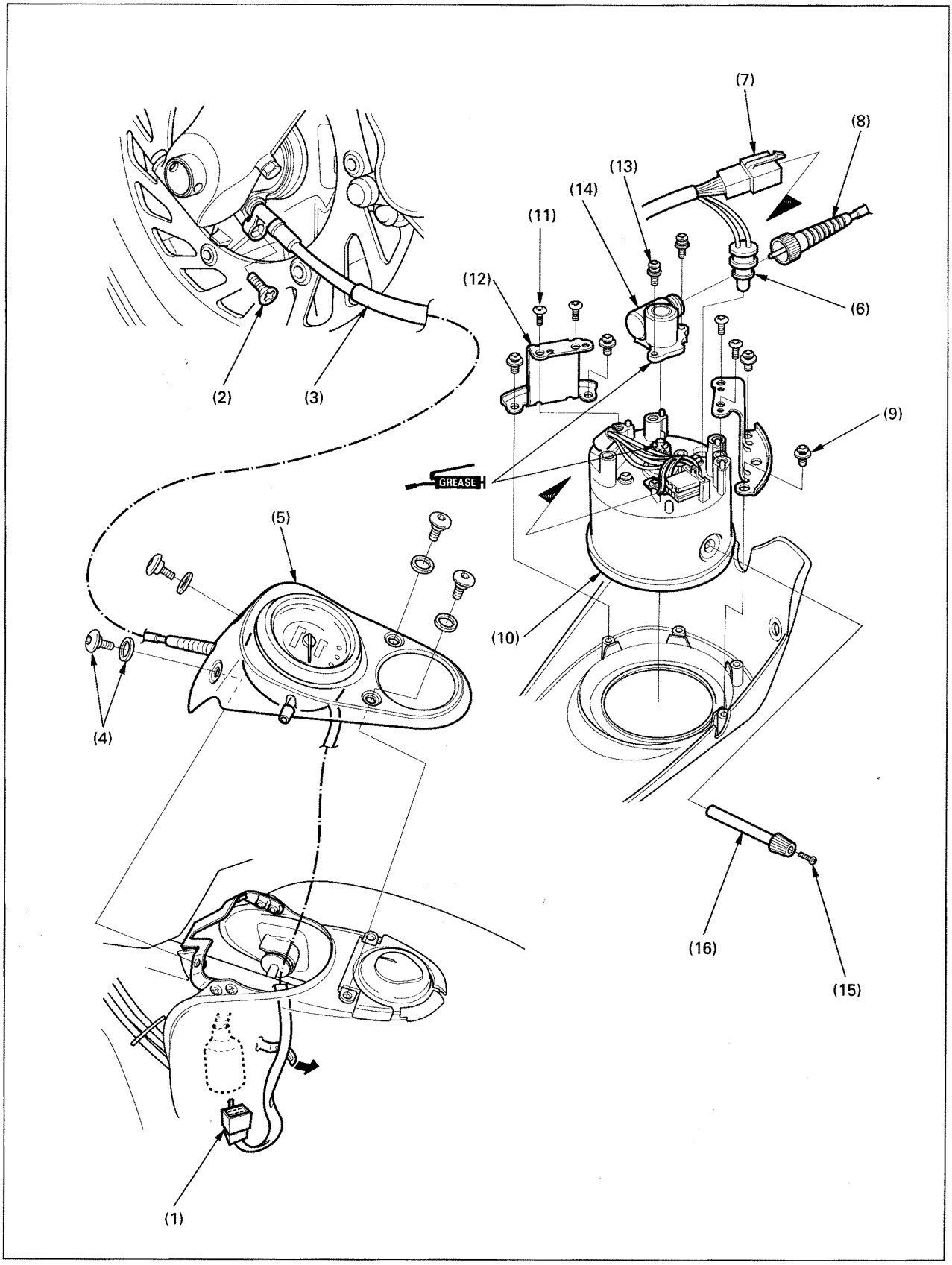


Set the side stand switch U-shaped groove to the return spring hook pin to install the switch.
Move the side stand to align the pivot hole with the switch rotor projection to install the switch.
Hold them to keep the hole and the projection aligned and tighten the bolt.

Torque: 1.0kg-m

Refer to the wiring diagram to set the side stand switch leads.
Connect the side stand switch coupler.
Install the drive sprocket cover with the three socket bolts.
Install the left side cover (2-2).

♦ **Instruments removal/installation**

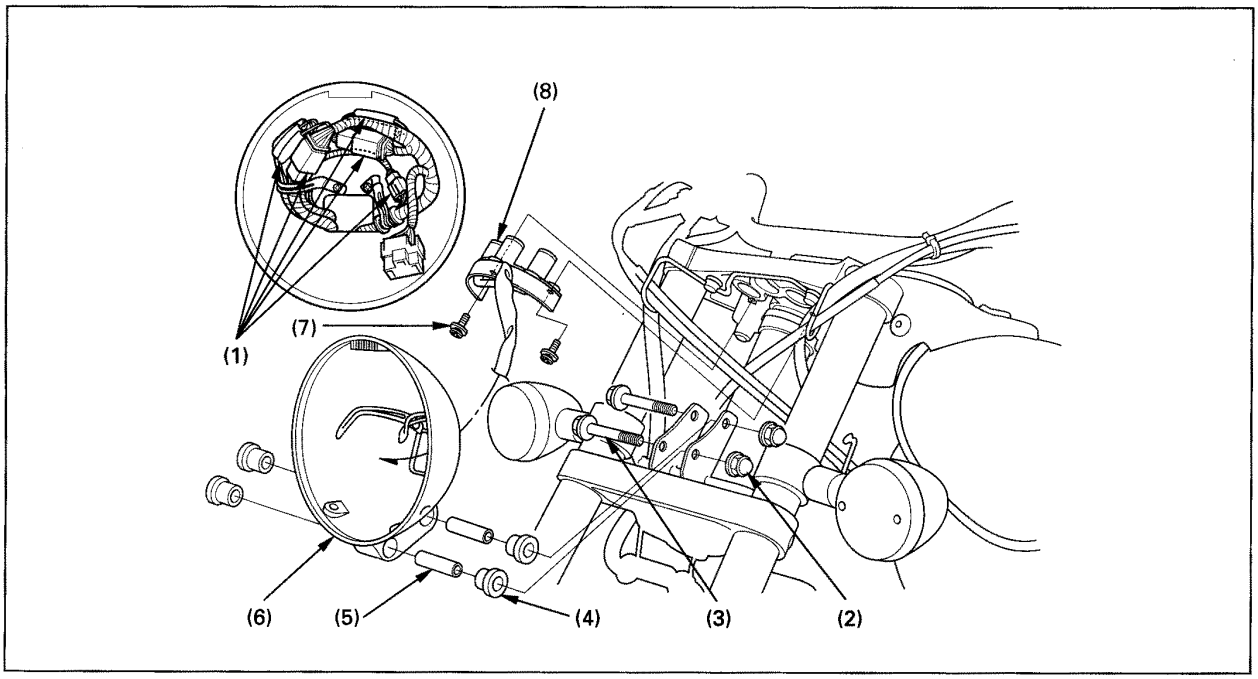


CAUTION

When removing the instruments, remove the speedometer cable together with the speedometer by removing the set screw at the front wheel end.

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Instrument leads coupler	1	
(2)	Speedometer cable set screw	1	
(3)	Speedometer cable	1	• Disconnect from the speedo drive unit. • Set the cable to clamps when installing.
(4)	Socket bolt / washer	4/4	
(5)	Instruments cover ASSY	1	Remove from the fuel tank.
(6)	Instruments illuminating lamp bulb socket	1	
(7)	Indicator lamp coupler	1	
(8)	Speedometer cable	1	Loosen the cable nut and remove from the speedometer elbow boss.
(9)	Screw	4	
(10)	Speedometer ASSY	1	
(11)	Screw	4	
(12)	Instrument bracket	2	
(13)	Screw	2	
(14)	Elbow boss	1	
(15)	Screw	1	
(16)	Trip meter reset knob	1	

♦ **Head Lamp case and pilot box removal/installation**

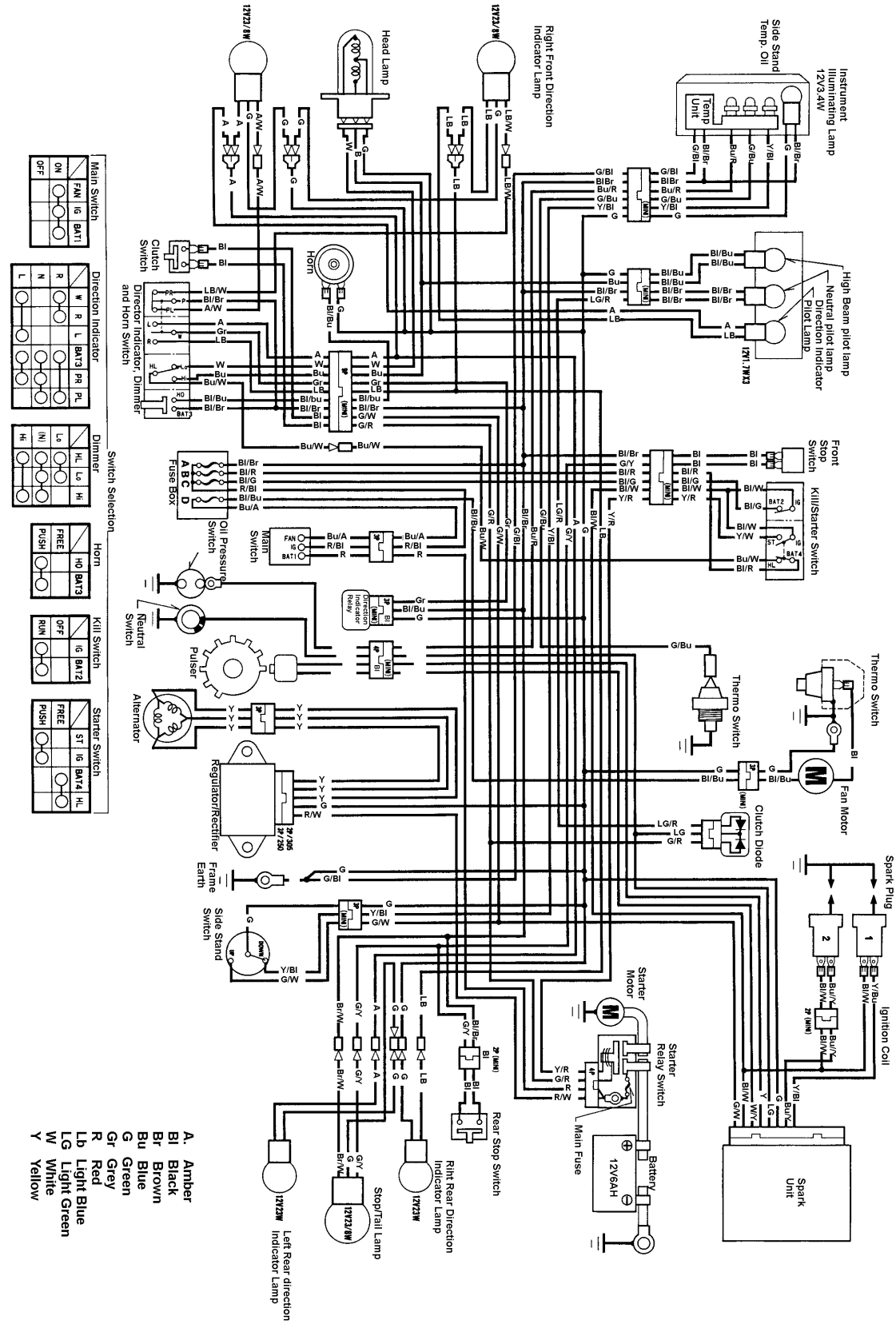


Relevant Works

- Headlamp removal/installation (18-2)

	Works / Parts	Qty.	Notes
	Removal		**Reverse the procedure for the installation.**
(1)	Connectors / couplers	9/3	• Disconnect them and detach the harness from the clamp to pull them out from the case. • Refer to the wiring (1-18) for the installation.
(2)	Cap nut	2	
(3)	Mount bolt	2	
(4)	Cushion rubber	4	
(5)	Collar	2	
(6)	Headlamp case	1	
(7)	Screw	2	
(8)	Pilot box	1	

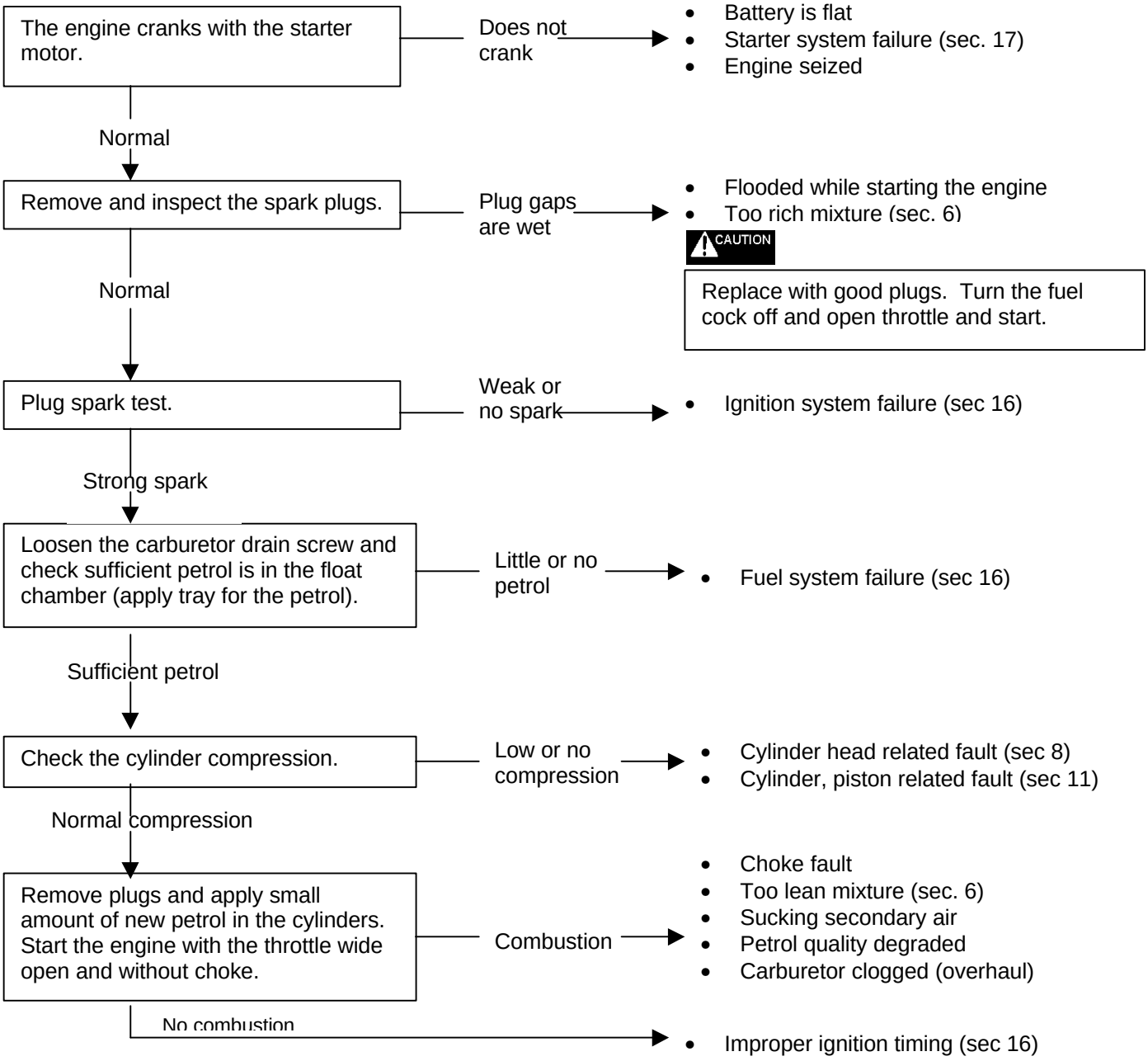
♦ Wiring Diagram



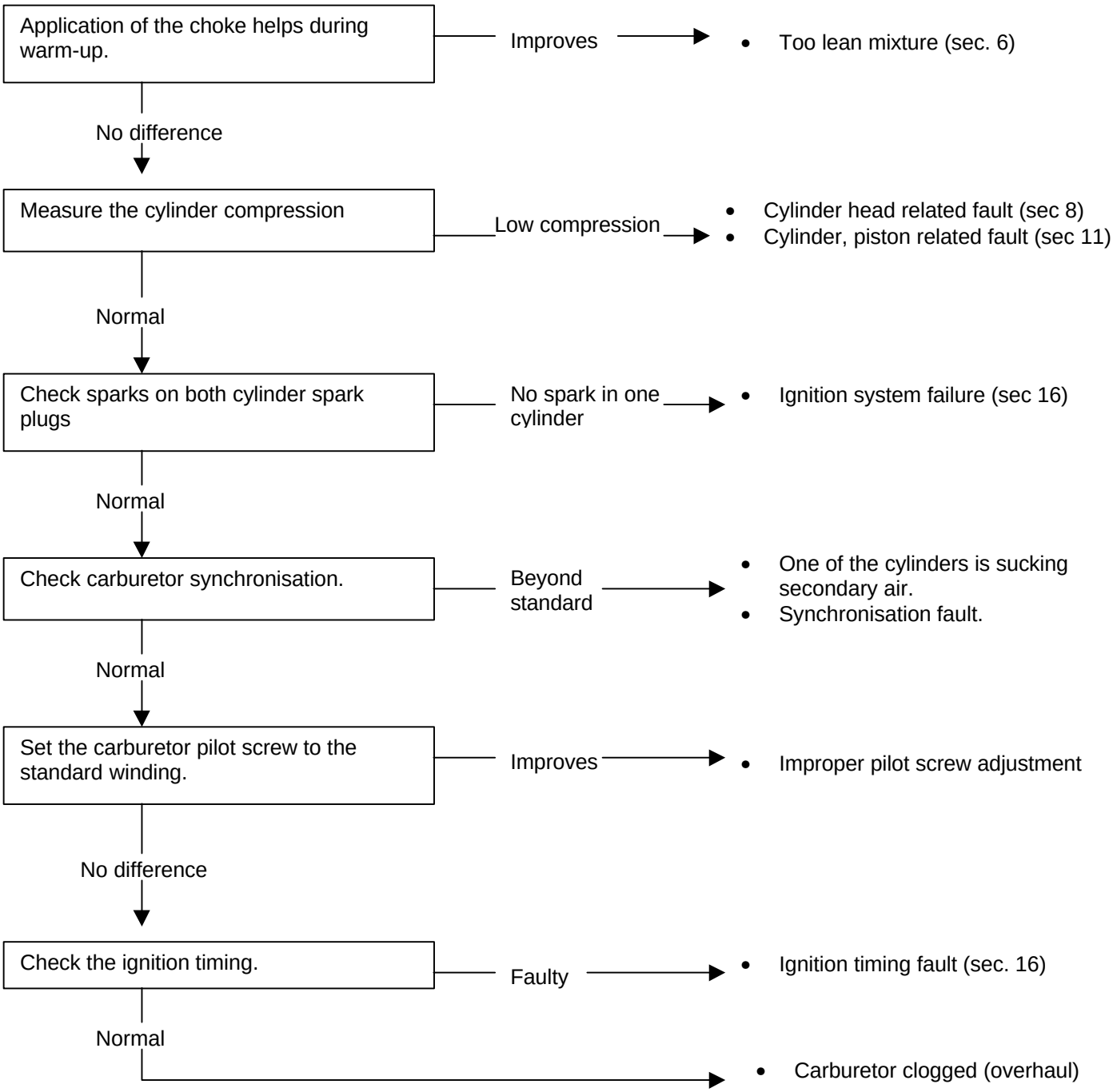
General Caution

This section describes the troubleshooting that involves the whole engine.
Refer to the corresponding sections for the troubleshooting not mentioned here.

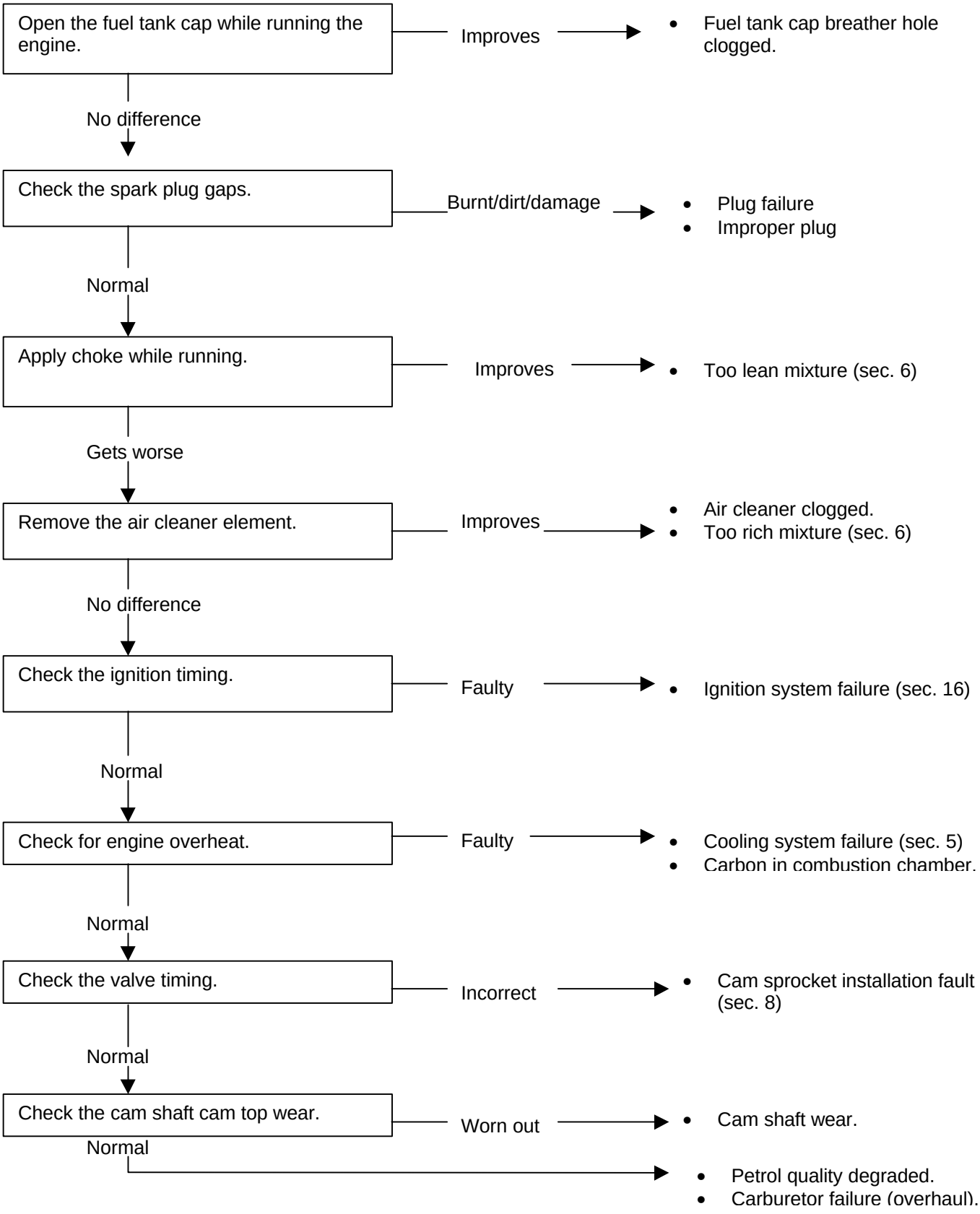
Unable or difficult to start



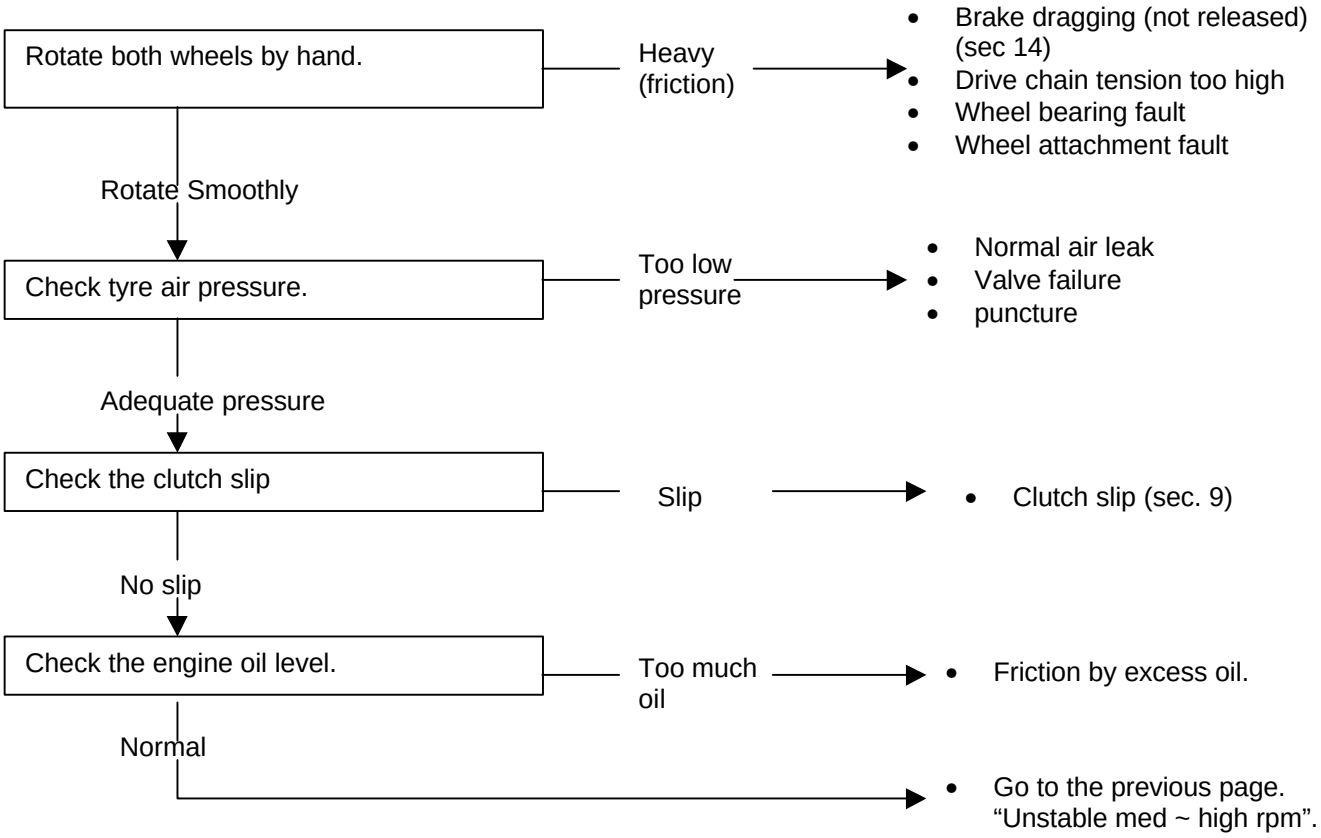
Unstable idling or low rpm



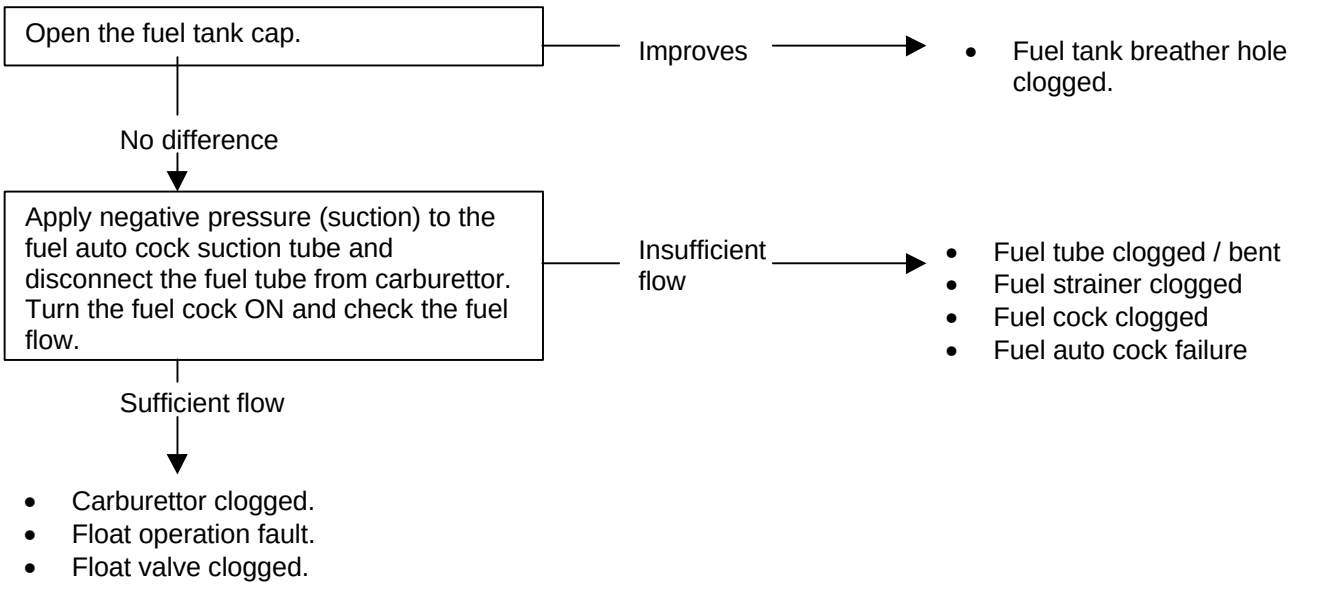
Unstable med ~ high rpm



Lack of power in high speed / insufficient speed



The engine becomes rough a few minutes after starting



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