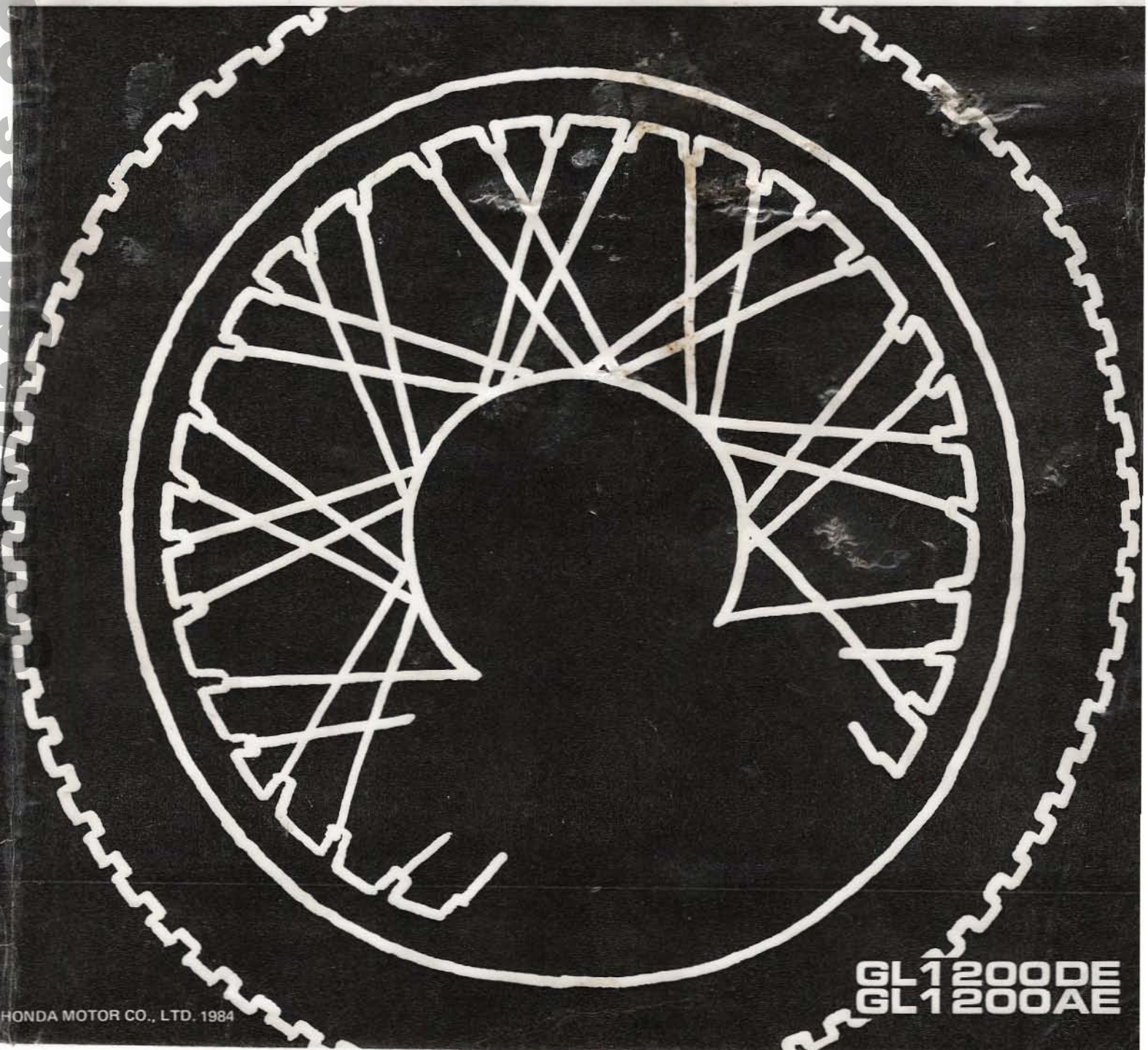
HONDA

SHOP MANUAL

GOLD WING GL1200D GL1200A



GL1200DE
GL1200AE

62 MG900

HOW TO USE THIS MANUAL

This shop manual describes the technical features and servicing procedures for the GOLD WING (GL-1200D) and GOLD WING ASPENCADE (GL1200A).

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition.

Throughout the manual, the following abbreviations are used to identify individual types.

CODE	AREA (TYPE)
ED	Europe
E	U.K.
F	France
G	Germany
U	Australia
SA	South Africa
ND	Northern Europe
SW	Switzerland
SD	Sweden

Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 20 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on page 1 of that section.

Most sections start with an assembly or system illustration, service information and troubleshooting for the section. The subsequent pages give detailed procedures.

If you are not familiar with this motorcycle, read the TECHNICAL FEATURES in Section 21.

If you don't know the source of the trouble, go to section 22, TROUBLESHOOTING.

HONDA MOTOR CO., LTD.
SERVICE PUBLICATIONS OFFICE

CONTENTS

1. GENERAL INFORMATION

GENERAL SAFETY

WARNING

If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas.

WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.

WARNING

The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. In case of contact flush thoroughly with water and call a doctor if electrolyte gets in your eyes.

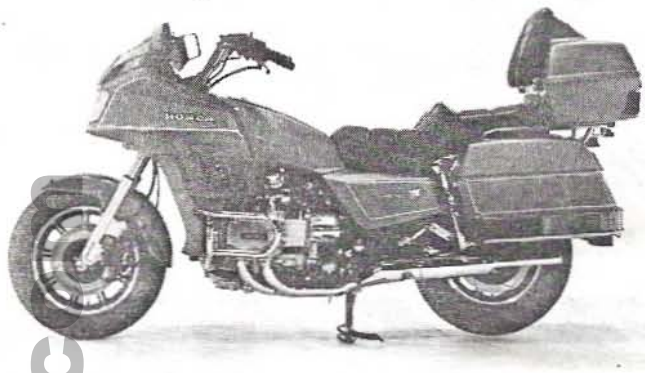
WARNING

The battery generates hydrogen gas which can be highly explosive. Do not smoke or allow flames or sparks near the battery, especially while charging it.

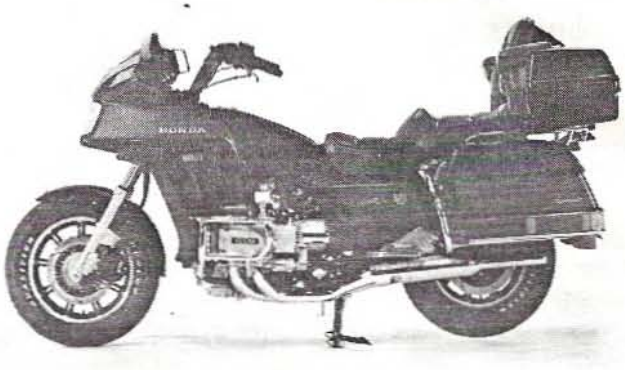
SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalent. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Use only metric tools when servicing this motorcycle. Metric bolts, nuts, and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.
4. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
5. When tightening bolts or nuts, begin with larger-diameter or inner bolts first and tighten to the specified torque diagonally in 2–3 steps, unless a particular sequence is specified.
6. Clean parts in high flash point cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Refer to Cable & Harness Routing (pages 1-21 through 1-27) when routing cables, hoses or electrical wires.

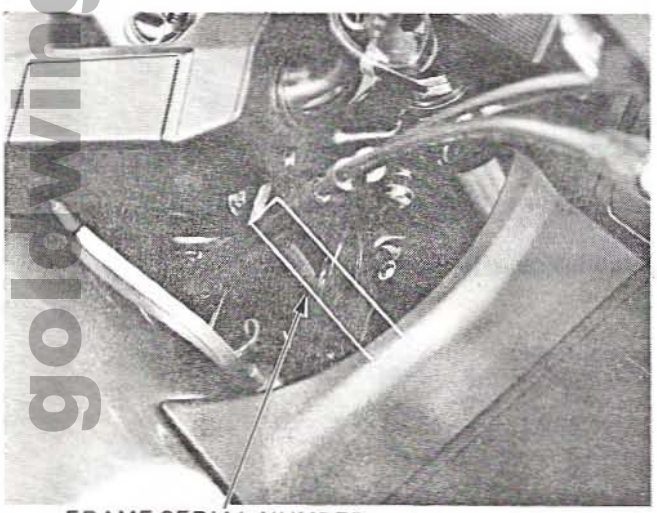
MODEL IDENTIFICATION



GOLD WING (GL1200D)

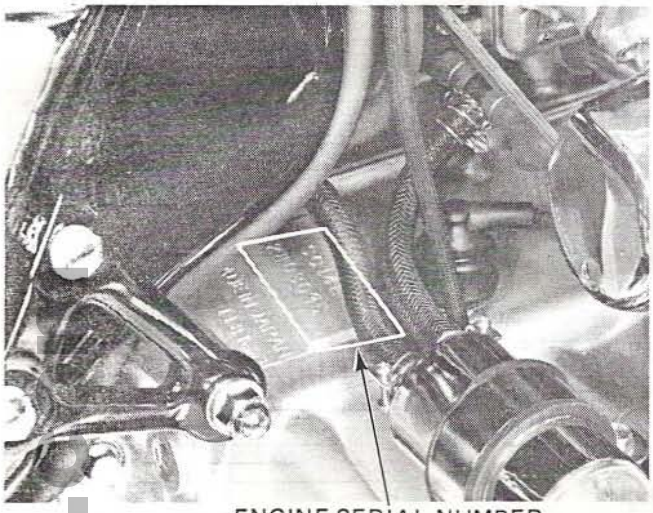


GOLD WING ASPENCADE (GL1200A)



FRAME SERIAL NUMBER

The frame serial number is stamped on the right side of the steering head.

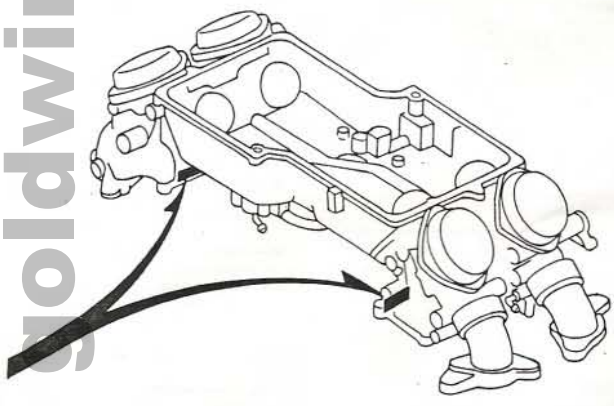


ENGINE SERIAL NUMBER

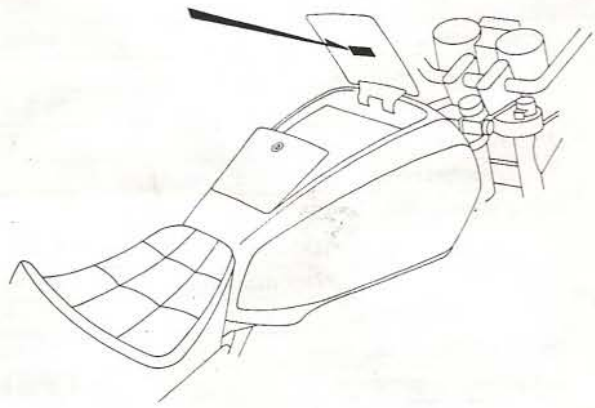
The engine serial number is stamped on the top right side of the engine case.

FINAL DRIVE SERIAL NUMBER

The final drive serial number is on the final drive case near the pinion flange as shown.



The carburetor identification numbers are stamped on the each carburetor bodies.



The color label is attached to the location shown. When ordering a color-coded part, always specify its designated color.

SPECIFICATIONS

	ITEM			GOLD WING (GL1200D)	GOLD WING ASPENCADE (GL1200A)
Dimensions	Overall length			2,505 mm (98.6 in)	←
	Overall width			970 mm (38.2 in)	←
	Overall height			1,510 mm (59.4 in)	←
	Wheelbase			1,610 mm (63.4 in)	←
	Seat height			780 mm (30.7 in)	←
	Ground clearance			140 mm (5.5 in)	←
	Dry weight			318 kg (701 lbs)	328 kg (723 lbs)
	Curb weight			342 kg (754 lbs)	353 kg (778 lbs)
Frame	Frame type			Double cradle	←
	Front suspension	Travel		Telescopic, 140 mm (5.5 in)	←
		Air pressure		0–40 kPa (0–0.4 kg/cm², 0–6 psi)	←
	Rear suspension	Travel		Swing arm, 105 mm (4.1 in)	←
		Air pressure		200–400 kPa (2.0–4.0 kg/cm², 28–56 psi)	←
	Front tire	Size		130/90-16 67H	←
		Air pressure		225 kPa (2.25 kg/cm², 32 psi)	←
	Rear tire	Size		150/90-15 74H	←
		Air pressure		225 kPa (2.25 kg/cm², 32 psi)	←
	Front brake and lining swept area			Double disc brake, 952 cm² (148 sq. in)	←
	Rear brake and lining swept area			Disc brake, 516 cm² (80 sq. in)	←
	Fuel capacity			22 lit. (5.8 US gal, 4.8 Imp gal)	←
	Caster angle			30°	←
	Trail length			118 mm (4.6 in)	←
	Front fork oil capacity			345 cm³ (11.7 US oz, 12.1 Imp oz) After disassembly	←
Engine	Engine type			Water cooled, 4 stroke O.H.C.	←
	Cylinder arrangement			Flat four	←
	Bore and stroke			75.5 x 66.0 mm (2.97 x 2.59 in)	←
	Displacement			1,181 cm³ (72.1 cu-in)	←
	Compression ratio			9.0 : 1	←
	Valve train			Belt driven over head camshaft	←
	Oil capacity	At disassembly		4.0 lit. (4.2 US qt, 3.5 Imp qt)	←
		After draining		3.2 lit. (3.4 US qt, 2.8 Imp qt)	←
	Lubrication system			Forced and wet sump	←
	Cooling system capacity			2.7 lit. (2.9 US qt, 2.4 Imp qt)	←
	Cylinder compression			1,300 kPa (13.0 kg/cm², 185 psi)	←
	Engine weight			109 kg (240 lbs)	←
	Camshaft	Intake valve	Opens	10° BTDC (At 1 mm lift)	←
			Closes	40° ABDC (At 1 mm lift)	←
		Exhaust valve	Opens	40° BBDC (At 1 mm lift)	←
			Closes	10° ATDC (At 1 mm lift)	←
	Valve clearance	Intake/Exhaust		Hydraulic valve adjuster system	←
	Idle speed			950 min⁻¹ (rpm)	←

	ITEM		GOLDWING (GL1200D)	GOLDWING ASPENCADE (GL1200A)
Carburetion	Carburetor type, venturi bore		VD, 30 mm (1.2 in)	←
	Throttle valve bore		32 mm (1.3 in)	←
	Carburetor identification No.		VD63A	←
	Pilot screw opening		3-1/2	←
	Float level		7.5 mm (0.30 in)	←
Drive Train	Clutch type		Wet, multi-plate	←
	Transmission		5-speed, constant mesh	←
	Primary reduction ratio		1.708 (41/24)	←
	Secondary reduction ratio		0.897 (35/39)	←
	Gear ratio	1st 2nd 3rd 4th 5th	2.643 (37/14) 1.666 (40/24) 1.250 (35/28) 1.000 (32/32) 0.829 (29/35)	←
	Final reduction ratio		2.833 (34/12)	←
	Gearshift pattern		Left foot operated return system 1–N–2–3–4–5	←
	Final gear oil capacity		170 cm^3 (5.7 US oz, 6.0 Imp oz) (After rebuild)	←
Electrical	Ignition		Battery, Ignition (Full transistor)	←
	Ignition timing "F" mark		10° BTDC	←
	Full advance		45° BTDC	←
	Starting system		Starting motor	←
	Alternator		A.C. generator, 360W/5,000 min^{-1} (rpm)	←
	Battery capacity		12V–20A	←
	Spark plug — Standard	NGK	DPR8EA-9	←
		ND	X24EPR-U9	←
	Spark plug — For cold climate (Below 5°C, 41°F)	NGK	DPR7EA-9	←
		ND	X22EPR-U9	←
	Spark plug — For extended high speed riding	NGK	DPR9EA-9	←
		ND	X27EPR-U9	←
	Spark plug gap		0.8–0.9 mm (0.031–0.035 in)	←
	Firing order		1–3–2–4	←
	Fuse		7.5A, 10A, 15A and 30A (main fuse)	7.5A, 10A, 15A, 20A and 30A (main fuse)
Lights	Headlight		12V–60/55W H4 bulb	←
	Brake/tail light		12V–21/5W	12V–21/5W 12V–27/7W <U>
	Turn signal light		12V–21W 12V–23W <SA>	12V–21W 12V–23W <U>
	Position light		12V–4W	←
	Tacho/speedometer light		12V–3.4W	12V–3W
	Neutral indicator light		12V–3.4W	12V–3W
	Turn signal indicator light		12V–3.4W	12V–3W
	High beam indicator light		12V–3.4W	12V–3W
	Licence light		12V–5W <Except G> 12V–8W <SA>	12V–5W 12V–8W <U>

Item	Q'ty	Thread dia. (mm)	Torque			Remarks
			N·m	kg-m	ft-lb	
Air hose connector	2	8	8–12	0.8–1.2	6–9	
Air pressure sensor	1	–	8–12	0.8–1.2	6–9	
Front axle nut	1	12	55–65	5.5–6.5	40–47	
Front axle holder nut	4	8	20–30	2.0–3.0	14–22	
Front brake disc bolt	5	8	27–33	2.7–3.3	20–24	
Front brake caliper bracket mount bolt (upper)	2	10	30–40	3.0–4.0	22–29	
(lower)	2	8	20–25	2.0–2.5	14–18	
Brake caliper pivot bolt	3	12	25–30	2.5–3.0	18–22	
Brake caliper bolt	3	8	20–25	2.0–2.5	14–18	
Brake hose oil bolt	4	10	25–35	2.5–3.5	18–25	
Brake metal line joint nut	6	10	16–18	1.6–1.8	12–13	
Front brake master cylinder holder bolt	2	6	10–14	1.0–1.4	7–10	
Rear brake disc nut	5	8	27–33	2.7–3.3	20–24	
Rear brake master cylinder bolt	2	8	24–29	2.4–2.9	17–21	
Rear brake rod joint lock nut	1	8	15–20	1.5–2.0	11–14	
Rear axle nut	1	18	85–105	8.5–10.5	61–76	
Rear shock absorber mount nut (upper)	2	10	30–40	3.0–4.0	22–29	
Rear shock absorber mount bolt (right)	1	8	20–25	2.0–2.5	14–18	
(left)	1	18	65–75	6.5–7.5	47–54	
Rear axle pinch bolt	1	8	24–29	2.4–2.9	17–21	
Swing arm pivot bolt (right)	1	30	80–120	8.0–12.0	58–87	
(left)	1	30	18–20	1.8–2.0	13–14	
Swing arm pivot lock nut	1	30	80–120	8.0–12.0	58–87	
Final drive gear case nut	4	8	24–30	2.4–3.0	17–22	
Final drive gear case filler cap	1	30	10–14	1.0–1.4	7–10	
Final drive gear case drain plug	1	6	10–14	1.0–1.4	7–10	
Final drive gear case cover bolt (8 mm)	6	8	23–28	2.3–2.8	17–20	
(10 mm)	2	10	45–50	4.5–5.0	33–36	
Final drive pinion joint nut	1	16	100–120	10.0–12.0	72–87	
Engine mount bolt/nut (12 mm)	3	12	55–65	5.5–6.5	40–47	
(10 mm)	3	10	30–40	3.0–4.0	22–29	
(8 mm)	6	8	18–25	1.8–2.5	13–18	
Sub frame cap nut	3	10	30–40	3.0–4.0	22–29	
Footpeg bolt/nut	2	12	55–65	5.5–6.5	40–47	GL1200D only
Passenger footpeg bolt	2	10	35–45	3.5–4.5	25–33	
Exhaust pipe joint nut	4	8	15–20	1.5–2.0	11–14	
Muffler mount bolt	2	10	35–45	3.5–4.5	25–33	
Muffler joint bolt	4	8	20–24	2.0–2.4	14–17	
Center stand pivot pinch bolt	2	8	15–20	1.5–2.0	11–14	
Side stand pivot lock nut	1	10	20–24	2.0–2.4	14–17	
Rear brake pedal bolt	1	8	18–25	1.8–2.5	13–18	
Gearshift pedal	1	6	8–12	0.8–1.2	6–9	
Rear fender mounting bolt	2	8	12–16	1.2–1.6	9–12	
Seat mounting bolt	2	8	18–25	1.8–2.5	13–18	
Starter motor cable terminal nut	1	6	4–8	0.4–0.8	3–8	

orque specifications listed above are for important fastners. Other should be tightened to standard torque values listed below

TANDARD TORQUE VALUES

Item	Torque Values N·m (kg-m, ft-lb)	Item	Torque Values N·m (kg-m, ft-lb)
5 mm bolt and nut	4–6 (0.4–0.6, 3–4)	5 mm screw	3–5 (0.3–0.5, 2–4)
6 mm bolt and nut	8–12 (0.8–1.2, 6–9)	6 mm screw and 6 mm flange bolt with 8 mm head	7–11 (0.7–1.1, 5–8)
8 mm bolt and nut	18–25 (1.8–2.5, 13–18)	6 mm flange bolt and nut	10–14 (1.0–1.4, 7–10)
10 mm bolt and nut	30–40 (3.0–4.0, 22–29)	8 mm flange bolt and nut	24–30 (2.4–3.0, 17–22)
12 mm bolt and nut	50–60 (5.0–6.0, 36–43)	10 mm flange bolt and nut	35–45 (3.5–4.5, 25–33)

TOOLS

SPECIAL

* Newly designed tool

DESCRIPTION	TOOL NUMBER	ALTERNATE TOOL	REF. SECTION
Fuel unit wrench	07920–SB20000		19
*Shim selection gauge	07974–MG90000		7
Timing pully holder	07925–3710200		7
Valve guide reamer	07984–5510000		7
Hydraulic tappet bleeder	07973–MJ00000	or 07973–ME90000	7
Clutch center holder	07923–4610001	or modified 07923–4610000	8
Oil seal driver attachment	07965–MA10200		8
Snap ring pliers	07914–3230001		8, 13, 15
Lock nut wrench, 17 x 27 mm	07907–MC70000	07907–4150000	9
Rotor holder	07925–3710000		9
Damper spring compressor	07964–3710000		9, 10
Bearing puller	07931–4630000		10
Bearing remover set, 20 mm	07936–3710001	Handle 07936–3710100	10
		Remover, 20 mm 07936–3710600	10
		Weight 07741–0020101	10
Driver	07949–3710001		10
Puller attachment	07946–4690200		10
*Piston pin dis/assembly tool set or	07973–MG90000	NOTE: See page 11-3	11
*Piston pin dis/assembly tool kit	07973–MG90100	Use with 07973–6570002	11
*Pilot driver	07973–MG90200		11
*Pilot collar	07973–MG90300		11
*Piston base	07973–MG90400		11
*Piston pin guide	07973–MG90500		11
*Piston base	07958–MG90000		10
*Piston slider	07955–MG90000		10
Engine case assembly guide	07973–3710000		10
Steering stem socket	07916–3710100		12
Ball race remover	07953–4250002		12
Bearing race remover	07946–3710500		12
Steering stem driver	07946–MB00000		12
Attachment	07949–3710701	07946–3710700	12
Fork seal driver attachment	07947–KF00100		13
Fork seal driver	07947–KA50100		13
Hex wrench, 6 mm	07917–3230000	or equivalent, tool commercially available	13
Fork seal driver	07947–3710101		13
Pivol lock nut wrench	07908–4690001		13
Socket bit, 10 mm	07917–3710000		13
Bearing remover	07936–8890101		13
*Final joint holder attachment	07924–9690100		14
Final joint holder	07924–ME40000		14
Retainer wrench	07910–ME80000		14
Bearing race insert attachment	07931–4630300		14
Bearing puller attachment	07934–MG70200		14
Dis/assembly tool base	07965–3710300		14
Shaft puller	07931–ME40000		14
Timing inspection plug	07999–3710001		17

COMMON

DESCRIPTION	TOOL NUMBER	ALTERNATE TOOL	REF. SECTION
Oil pressure gauge	07510–3000000		2
Oil pressure gauge attachment	07510–4220100		2
Vacuum gauge set	07404–0030000	Gauge 07404–0030100	3
		Adaptor (A) 07510–3000100	3
		Adaptor (B) 07510–3000200	3
Float level gauge	07410–0010000		4
Valve spring compressor	07757–0010000		7
Valve guide remover, 6.6 mm	07742–0010200		7
Lock nut wrench, 26 x 30 mm	07716–0020303		8, 12
Trox driver bit (T40)	07703–0010100	or equivalent tool	9
Attachment, 35 mm I.D.	07746–0030400		9
Driver	07746–0030100		9, 10, 14
Attachment, 52 x 55 mm	07746–0010400		9, 10, 12, 14
Pilot, 25 mm	07746–0040600		9
Attachment, 32 x 35 mm	07746–0010100		9, 10, 14
Pilot, 15 mm	07746–0040300		9, 12
Attachment, 25 mm I.D.	07746–0030200		10
Attachment, 20 mm I.D.	07746–0020400		10
Driver	07746–0020100		10
Attachment, 42 x 47 mm	07746–0010300		10, 12, 14
Pilot, 17 mm	07746–0040400		10
Pilot, 20 mm	07746–0040500		10, 12, 14
Attachment, 37 x 40 mm	07746–0010200		13
Attachment, 30 mm I.D.	07746–0030300		14
Driver	07749–0010000		9, 10, 12, 13, 14
Bearing remover collet, 15 mm	07746–0050400		12
Bearing remover collet, 20 mm	07746–0050600		12
Bearing remover expander	07746–0050100		12
Bearing puller	07631–0010000		14

VALVE SEAT CUTTERS

DESCRIPTION	TOOL NUMBER	REMARKS	REF. SECTION
32° cutter	07780–0012400	Intake	7
32° cutter	07780–0012300	Exhaust	7
45° cutter	07780–0010500	Intake	7
45° cutter	07780–0010400	Exhaust	7
60° cutter	07780–0014100	Intake and Exhaust	7
Cutter holder, 6.6 mm	07781–0010201		7

SERVICE DATA

ENGINE

Unit: mm (in)

	ITEM			STANDARD	SERVICE LIMIT
	Engine weight (including carburetors)			109 kg (240 lbs)	–
	Engine oil capacity	After disassembly		4.0ℓ (4.2 US qt, 3.5 Imp qt)	–
		After oil drain and filter change		3.2ℓ (3.4 US qt, 2.8 Imp qt)	–
	Radiator coolant capacity	After disassembly		2.15ℓ (2.3 US qt, 1.9 Imp qt)	–
		After draining (including reserve tank)		2.7ℓ (2.9 US qt, 2.4 Imp qt)	–
		Reserve tank		0.55ℓ (0.6 US qt, 0.5 Imp qt)	–
CYLINDER HEAD	Cylinder head warpage			–	0.10 (0.004)
	Valve stem O.D.		IN	6.580–6.590 (0.2591–0.2594)	6.54 (0.257)
			EX	6.550–6.560 (0.2579–0.2583)	6.54 (0.257)
	Valve guide I.D.		IN, EX	6.600–6.615 (0.2598–0.2604)	6.64 (0.261)
	Valve stem to guide clearance		IN	0.010–0.035 (0.0004–0.0014)	0.08 (0.003)
			EX	0.040–0.065 (0.0016–0.0026)	0.10 (0.004)
	Valve head diameter		IN	36.00 (1.417)	–
			EX	32.00 (1.260)	–
	Valve seat width			1.4 (0.06)	–
	Valve spring free length		Inner	40.20 (1.583)	39.0 (1.54)
			Outer	43.75 (1.722)	42.5 (1.67)
	Valve spring installed force/length		Inner	28.8 ± 2.0 kg/26 mm (63.5 ± 4.4 lbs/1.0 in)	–
			Outer	51.5 ± 3.6 kg/28 mm (113.5 ± 7.9 lbs/1.1 in)	–
	Rocker arm I.D.		IN, EX	14.000–14.018 (0.5512–0.5519)	14.05 (0.553)
	Rocker arm shaft O.D.		IN, EX	13.973–13.984 (0.5501–0.5506)	13.84 (0.545)
	Assist spring free length			17.5 (0.69)	16.0 (0.63)
	Hydraulic tappet adjuster compression stroke with kerosene			0–0.30 (0–0.012)	0.3 (0.012) max.
	Camshaft	Cam lobe height	IN	35.8 (1.41)	35.6 (1.40)
			EX	35.8 (1.41)	35.6 (1.40)
		Journal O.D.	Center	24.934–24.950 (0.9817–0.9823)	24.91 (0.981)
			Both ends	26.954–26.970 (1.0612–1.0618)	26.91 (1.059)
		Journal I.D.	Center	25.000–25.021 (0.9843–0.9851)	25.05 (0.986)
			Both ends	27.000–27.021 (1.0630–1.0638)	27.05 (1.065)
		Journal oil clearance	Center	0.050–0.087 (0.0020–0.0034)	0.14 (0.006)
			Both ends	0.030–0.067 (0.0012–0.0026)	0.14 (0.006)
		Valve timing (at 1 mm lift) IN	Open	10° BTDC	–
			Close	40° ABDC	–
		Valve timing (at 1 mm lift) EX	Open	40° BBDC	–
			Close	10° ATDC	–
CYLINDER, PISTON	Cylinder compression pressure			1,100–1,500 kPa (11–15 kg/cm², 156–213 psi)	1,000 kPa (10 kg/cm², 142 psi)
	Cylinder	I.D.		75.500–75.515 (2.9724–2.9730)	75.60 (2.976)
		Out-of-round		–	0.15 (0.006)
		Taper		–	0.05 (0.002)
		Top warpage		–	0.10 (0.004)
	Piston	O.D. (at skirt)		75.470–75.490 (2.9713–2.9720)	75.35 (2.967)
		Piston-to-cylinder clearance		0.010–0.045 (0.0004–0.0018)	0.15 (0.006)
	Piston ring	End gap	Top and second	0.10–0.30 (0.004–0.012)	0.6 (0.02)
			Oil ring side rail	0.20–0.90 (0.008–0.035)	1.1 (0.04)
		Ring-to-ring land clearance		0.015–0.045 (0.0006–0.0018)	0.12 (0.005)
	Piston pin	O.D.		18.994–19.000 (0.7478–0.7480)	18.98 (0.747)
		Piston hole I.D.		19.010–19.016 (0.7484–0.7487)	19.03 (0.749)
		Pin-to-piston clearance		0.010–0.022 (0.0004–0.0009)	0.05 (0.002)
		Pin-to-rod interference		0.015–0.039 (0.0006–0.0015)	–

	ITEM			STANDARD	SERVICE LIMIT
CRANKSHAFT, CONNECTING ROD	Main journal bearing oil clearance			0.020–0.044 (0.0008–0.0017)	0.08 (0.003)
	Crankpin bearing oil clearance			0.020–0.044 (0.0008–0.0017)	0.08 (0.003)
	Crankshaft runout (at center journal)			–	0.05 (0.002)
	Connecting rod side clearance			0.15–0.30 (0.006–0.012)	0.40 (0.016)
	Crank pin and main journal		Taper	–	0.004 (0.0002)
			Out-of-round	–	0.008 (0.0003)
CLUTCH	Slave cylinder	Cylinder I.D.		33.600–33.662 (1.3228–1.3253)	33.68 (1.326)
		Piston O.D.		33.550–33.575 (1.3209–1.3218)	33.52 (1.320)
	Clutch	Plate warpage		–	0.30 (0.012)
		Disc thickness		3.45–3.55 (0.136–0.140)	3.2 (0.13)
		Clutch spring free height		5.80 (0.228)	5.5 (0.22)
OIL PUMP	Main oil pump	Tip clearance		0.15 (0.006)	0.35 (0.014)
		Pump body clearance		0.15–0.21 (0.006–0.008)	0.41 (0.016)
		Pump end clearance		0.02–0.07 (0.001–0.003)	0.12 (0.005)
	Scavenge pump	Tip clearance		0.15 (0.006)	0.35 (0.014)
		Pump body clearance		0.15–0.21 (0.006–0.008)	0.41 (0.016)
		Pump end clearance		0.02–0.10 (0.001–0.004)	0.12 (0.005)
	Pressure relief valve	Relief pressure		500–580 (5.0–5.8 kg/cm², 71–82 psi)	–
		Relief valve spring free length		72.8 (2.87)	67.0 (2.64)
	Oil pressure	Cold (At 35°C/95°F)	Idle speed	450 kPa (4.5 kg/cm², 64 psi)	–
			5,000 min⁻¹ (rpm)	530 kPa (5.3 kg/cm², 75 psi)	–
		Hot (At 80°C/176°F)	Idle speed	100 kPa (1.0 kg/cm², 14 psi)	–
			5,000 min⁻¹ (rpm)	520 kPa (5.2 kg/cm², 74 psi)	–
GEARSHIFT	Shift fork shaft O.D.			12.966–12.984 (0.5105–0.5112)	12.90 (0.508)
	Shift fork I.D.		L, C	13.000–13.018 (0.5118–0.5125)	13.04 (0.513)
			R	13.000–13.027 (0.5118–0.5129)	13.05 (0.514)
	Shift drum	Minor diameter		11.966–11.984 (0.4711–0.4718)	11.95 (0.470)
		Groove width		7.05–7.15 (0.278–0.281)	–
	Shift fork claw thickness			6.4–6.5 (0.25–0.26)	6.1 (0.24)
TRANSMISSION	Gear I.D.		C1	31.000–31.025 (1.2205–1.2215)	31.05 (1.222)
			C2, C3	31.000–31.033 (1.2205–1.2218)	31.06 (1.223)
			M4	25.020–25.041 (0.9850–0.9859)	25.06 (0.987)
			M5	28.020–28.041 (1.1031–1.1040)	28.06 (1.105)
	Gear busing O.D.		C1, C2, C3	30.950–30.975 (1.2185–1.2195)	30.90 (1.217)
			M5	27.959–27.980 (1.1007–1.1016)	27.90 (1.098)
	Gear-to-bushing clearance		C1	0.025–0.075 (0.0010–0.0030)	0.15 (0.006)
			C2, C3	0.025–0.083 (0.0010–0.0033)	0.16 (0.006)
			M5	0.040–0.082 (0.0016–0.0032)	0.16 (0.006)
	Gear-to-shaft clearance		M4	0.040–0.082 (0.0016–0.0032)	0.15 (0.006)
	Mainshaft bearing assembled length			177.4 (6.99)	–
	Output shaft spring	Installed length		84.5 (3.33)	–
		Free length		110.9 (4.37)	100 (3.9)
	Alternator shaft drive gear back lash (At rotor)			0.05 (0.002)	–
COOLING	Radiator cap relief pressure			75–105 kPa (0.75–105 kg/cm², 11–15 psi)	–
	Thermostat	Beings to open temperature		80–84°C (176–183°F)	–
		Fully opened temperature		93–97°C (199–206°F)	–
		Valve lift (heated to 97°C/5 minutes)		8.0 (0.32)	7.0 (0.28)

CARBURETOR

Unit: mm (in)

Carburetor type	VD type
Throttle valve bore	32 (1.26)
Venturi bore	30 (1.18)
Idle speed	950 ± 100 min^{-1} (rpm)
Float level	7.5 (0.30)
Pilot screw	3-1/2 turns out
Main jet	#108
Slow jet	#35
Carburetor identification number	VD63A
Fast idle speed (after normal operating temperature)	2,000 ± 500 min^{-1} (rpm)
Starter valve stroke	6–7 (0.2–0.3)
Throttle valve free play	2–6 (0.1–0.2)
Fuel pump flow capacity	Minimum of 500 cm^3 (16.9 US oz, 17.6 Imp oz)/minute
Carburetor vacuum difference	Within 40 mm (1.6 in) Hg

FRAME

Unit: mm (in)

	ITEM			STANDARD	SERVICE LIMIT
SUSPENSION	Front suspension air pressure			0–40 kPa (0–0.4 kg/cm^2, 0–6 psi)	–
	Rear suspension air pressure			200–400 kPa (2.0–4.0 kg/cm^2, 28–57 psi)	–
	Front fork spring free length		Spring A	162.9 (6.41)	162.6 (6.40)
			Spring B	407.6 (16.05)	406.8 (16.02)
	Front fork oil capacity		After disassembly	345 cm^3 (11.67 US oz, 12.11 Imp oz)	–
			After draining	323 cm^3 (10.92 US oz, 11.34 Imp oz)	–
	Front fork oil			ATF	–
	Fork tube runout			–	0.20 (0.008)
	Rear shock absorber refill capacity			259.5 cm^3 (8.78 US oz, 9.11 Imp oz)	–
	Rear shock absorber oil			ATF	–
BRAKES	Front brake master cylinder	Cylinder I.D.	G type	15.870–15.913 (0.6248–0.6265)	15.925 (0.6270)
			Except G type	12.700–12.743 (0.5000–0.5017)	12.755 (0.5022)
		Piston O.D.	G type	15.827–15.854 (0.6231–0.6242)	15.815 (0.6226)
			Except G type	12.684–12.657 (0.4994–0.4983)	12.645 (0.4978)
	Front brake caliper	Right caliper cylinder I.D.	G type	32.030–32.080 (1.2610–1.2630)	32.090 (1.2634)
			Except G type	25.400–25.490 (1.0000–1.0035)	25.460 (1.0024)
		Left caliper cylinder I.D.		32.030–32.080 (1.2610–1.2630)	32.090 (1.2634)
		Right caliper piston O.D.	G type	31.948–31.998 (1.2578–1.2598)	31.940 (1.2575)
			Except G type	25.318–25.368 (0.9968–0.9987)	25.310 (0.9965)
		Left caliper piston O.D.		31.948–31.998 (1.2578–1.2598)	31.940 (1.2575)
	Front brake disc	Thickness	GL1200D	4.5–5.2 (0.18–0.20)	4.0 (0.16)
			GL1200A	9.9–10.1 (0.39–0.40)	9.0 (0.35)
		Runout		–	0.3 (0.01)
	Front brake pad thickness			5.4–5.6 (0.21–0.22)	–
	Rear brake master cylinder	Cylinder I.D.	G type	14.000–14.043 (0.5512–0.5529)	14.055 (0.5533)
			Except G type	15.870–15.913 (0.6248–0.6265)	15.925 (0.6270)
		Piston O.D.	G type	13.957–13.984 (0.5495–0.5506)	13.940 (0.5488)
			Except G type	15.827–15.854 (0.6231–0.6242)	15.815 (0.6226)

Unit: mm (in)

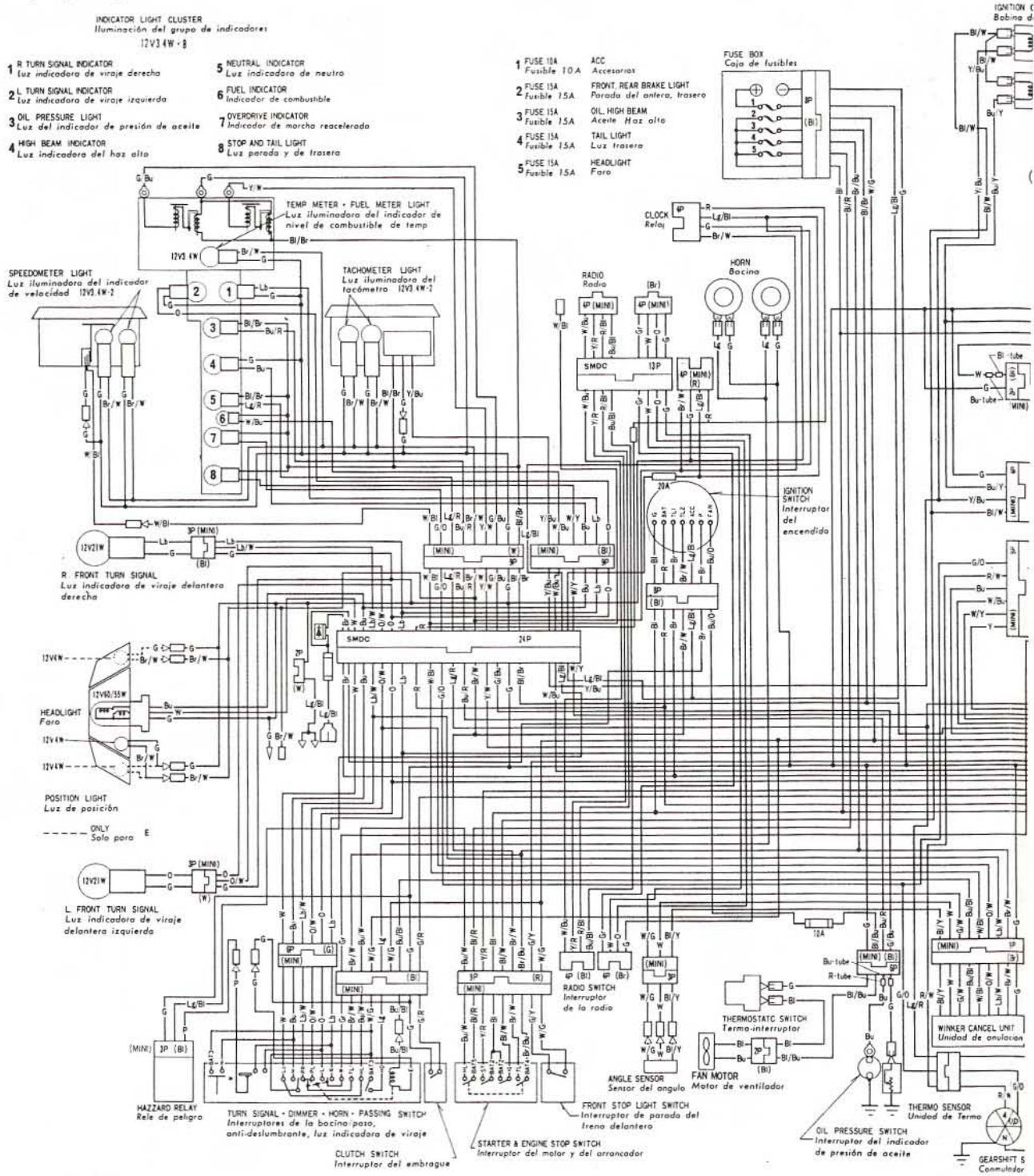
	ITEM			STANDARD	SERVICE LIMIT
BRAKES	Rear brake caliper	Cylinder I.D.		32.030–32.080 (1.2610–1.2630)	32.090 (1.2634)
		Piston O.D.		31.948–31.998 (1.2578–1.2598)	31.940 (1.2575)
	Rear brake disc	Thickness		6.9–7.1 (0.27–0.28)	6.0 (0.24)
		Runout		–	0.3 (0.01)
	Rear brake pad thickness			6.4–6.6 (0.25–0.26)	–
	Brake fluid			DOT 4	–
WHEELS	Wheel axle runout			–	0.20 (0.008)
	Wheel rim runout		Axial	–	2.0 (0.08)
			Radial	–	2.0 (0.08)
	Tire tread depth		Front	–	1.5 (0.06)
			Rear	–	2.0 (0.08)
CLUTCH	Clutch master cylinder		Cylinder I.D.	15.870–15.913 (0.6248–0.6265)	15.93 (0.627)
			Piston O.D.	15.827–15.854 (0.6231–0.6242)	15.82 (0.623)
FINAL DRIVE	Final gear oil	Recommended oil		Hypoid gear oil SAE 80, API GL-5	–
		Capacity	After disassembly	170 cm³ (5.7 US oz, 6.0 Imp oz)	–
			After draining	130 cm³ (4.4 US oz, 4.6 Imp oz)	–
	Final gear backlash			0.08–0.18 (0.003–0.007)	0.30 (0.012)
		Difference at 3 points		–	0.10 (0.004)
	Final gear assembly preload			0.2–0.4 N·m (2.0–4.0 kg-cm, 1.7–3.5 in-lbs)	–
	Ring gear-to-caes stopper clearance			0.3–0.6 (0.01–0.02)	–

ELECTRICAL

IGNITION	Firing order			1–3–2–4	–
	Ignition timing	Full advance	Ignition timing "F" mark	10° BTDC	–
			Without vacuum advance	32° BTDC	–
			With vacuum advance	45° BTDC	–
	Spark plug	Standard	NGK	DPR8EA-9	–
			ND	X24EPR-U9	–
		For cold climate (Below 5°C/41°F)	NGK	DPR7EA-9	–
			ND	X22EPR-U9	–
		For extended high speed riding	NGK	DPR9EA-9	–
			ND	X27EPR-U9	–
		Spark plug gap		0.8–0.9 mm (0.031–0.035 in)	–
	Pulse generator air gap			0.40–0.10 mm (0.016–0.043 in)	–
	Ignition coil resistance	Primary coil		2.4–3.0Ω	–
		Secondary coil	With spark plug cap	20.1–27.9 KΩ	–
			Without spark plug cap	12.6–15.4 KΩ	–
	Pulse generator coil resistance (At 20°C, 68°F)			1.1–1.3 KΩ	–
	Vacuum advance	Advance start vacuum		36–44 mmHg (1.4–1.7 in Hg)	–
		Advance stop vacuum		63–77 mmHg (2.5–3.0 in Hg)	–
	Electrical advance	Advance start		1,500–1,750 min⁻¹ (rpm)	–
		Advance stop		2,800–3,200 min⁻¹ (rpm)	–

CHARGING	Battery capacity			12V–20A	–
	Battery specific gravity/voltage (At 20°C, 68°F)	Full charged		1.280/12–13V	–
		Normal reading		1.260/11–12V	–
		Need charging		1.200/below 12V	–
	Battery charing rate			2A max.	–
	Alternator			14V, 0.36 KW/5,000 min^{-1} (rpm)	–
	Regulator/rectifier	Type		Transisterized	–
		Regulated voltage		14–15V	–
		Charging start		1,000–1,200 min^{-1} (rpm)	–
ELECTRICAL	Starter motor	Brush length		12–13 mm (0.47–0.51 in)	7.5 m (0.30 in)
		Brush spring tension		560–680 g (19.8–24.0 oz)	440 g (15.5 oz)
	Oil pressure switch continuity pressure			0.2–0.4 kg/cm^2 (2.8–5.7 psi)	–
	Fan motor switch	No continuity temperature		93–97°C (119–207°F)	–
		Continuity temperature		98–102°C (208–216°F)	–
	Coolant temperature sensor resistance		At 60°C (140°F)	104 Ω	–
			At 85°C (185°F)	44 Ω	–
			At 110°C (230°F)	20 Ω	–
			At 120°C (248°F)	16 Ω	–
	Fuel gauge level sensor resistance		E	101–110 Ω	–
			1/2	43–52 Ω	–
			F	0–10 Ω	–
	Self-cancelling turn signal angle sensor resistance			10–19 KΩ	–

GL1200D E, F, ED, SW



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	FAN	P	TLI	TL2
LOCK							
OFF							
ACC	○		○				
ON	○	○	○	○		○	○
P	○		○		○		
COLOR	R	Bl	Lg/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
*				
P	○	○		
H	○		○	○
COLOR	Br/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti-deslumbrante

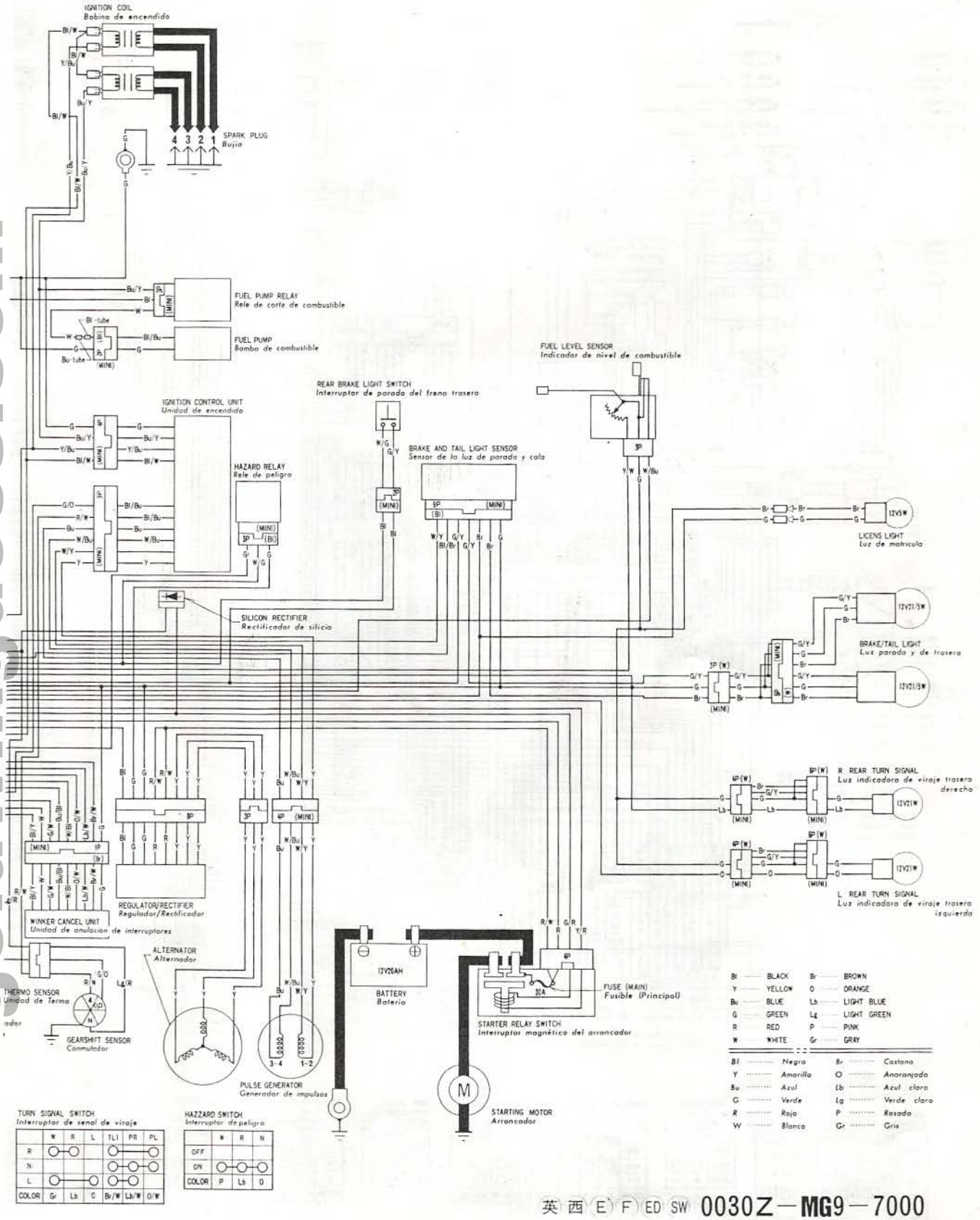
	HL	Lo	Hi
Lo		○	
N	○	○	○
Hi	○		○
COLOR	Bu/W	W	Bu

PASSING SWITCH
Interruptor de la luz de paso

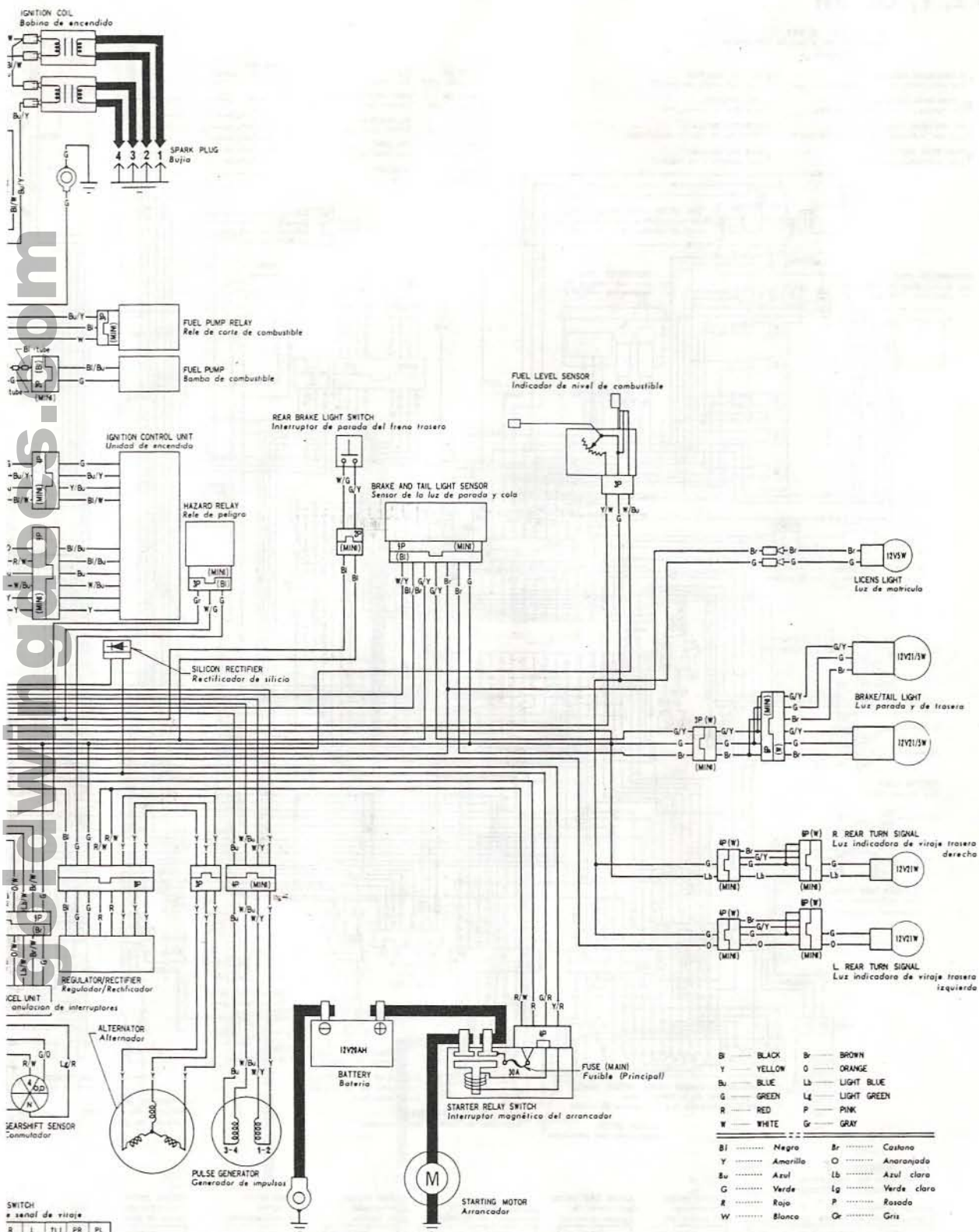
	BAT3	Ho
FREE		
PUSH	○	○
COLOR	W/G	Bu

TURN SIGNAL SWITCH
Interruptor de senal d

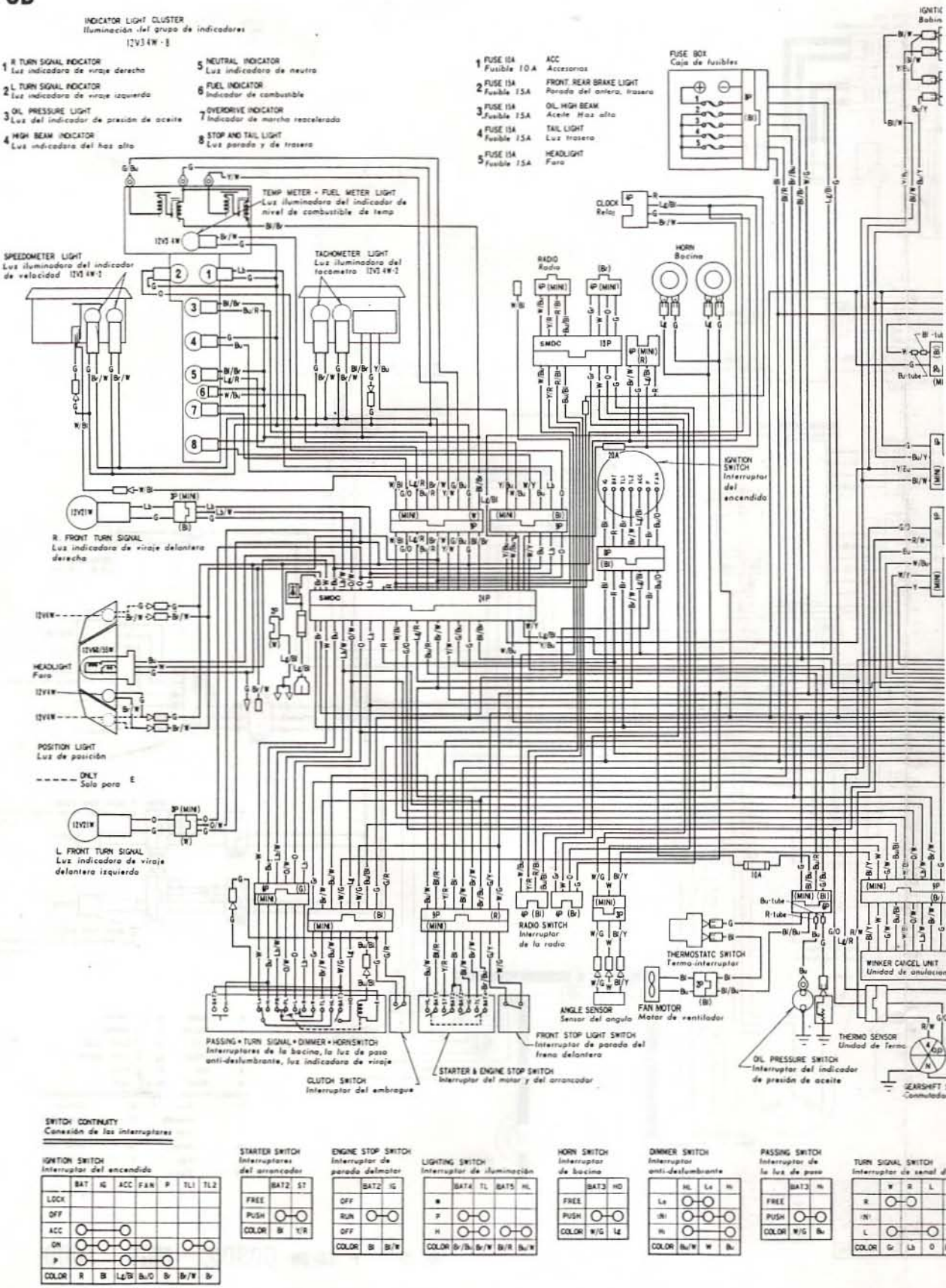
	W	R	L
R			
N			
L	○		○
COLOR	Gr	Lb	C



英 西 E F ED SW 0030Z—MG9—7000


IGNITION COIL
Bobina de encendido
SPARK PLUG
Bujia
FUEL PUMP RELAY
Rele de corte de combustible
FUEL PUMP
Bomba de combustible
FUEL LEVEL SENSOR
Indicador de nivel de combustible
REAR BRAKE LIGHT SWITCH
Interruptor de parada del freno trasero
IGNITION CONTROL UNIT
Unidad de encendido
BRAKE AND TAIL LIGHT SENSOR
Sensor de la luz de parada y cola
HAZARD RELAY
Rele de peligro
LICENS LIGHT
Luz de matricula
SILICON RECTIFIER
Rectificador de silicio
BRAKE/TAIL LIGHT
Luz parada y de trasera
R REAR TURN SIGNAL
Luz indicadora de viraje trasera derecha
L REAR TURN SIGNAL
Luz indicadora de viraje trasera izquierda
REGULATOR/RECTIFIER
Regulador/Rectificador
ALTERNATOR
Alternador
BATTERY
Bateria
FUSE (MAIN)
Fusible (Principal)
STARTER RELAY SWITCH
Interruptor magnético del arrancador
PULSE GENERATOR
Generador de impulsos
STARTING MOTOR
Arrancador
Bl — BLACK
Y — YELLOW
Bu — BLUE
G — GREEN
R — RED
W — WHITE
Br — BROWN
O — ORANGE
Lb — LIGHT BLUE
Lg — LIGHT GREEN
P — PINK
Gr — GRAY
Bl ····· Negro
Y ····· Amarillo
Bu ····· Azul
G ····· Verde
R ····· Rojo
W ····· Blanco
Br ····· Castano
O ····· Anaranjado
Lb ····· Azul claro
Lg ····· Verde claro
P ····· Rosado
Gr ····· Gris

GL1200D SD



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	FAN	P	TL1	TL2
LOCK							
OFF							
ACC	○		○				
ON	○	○	○	○		○	○
P	○		○		○		
COLOR	R	B	Lg/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
●				
P	○	○		
H	○	○	○	○
COLOR	Br/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti-deslumbrante

	HL	Lo	Hi
Lo	○		○
(N)	○	○	○
Hi		○	○
COLOR	Bu/W	W	Bu

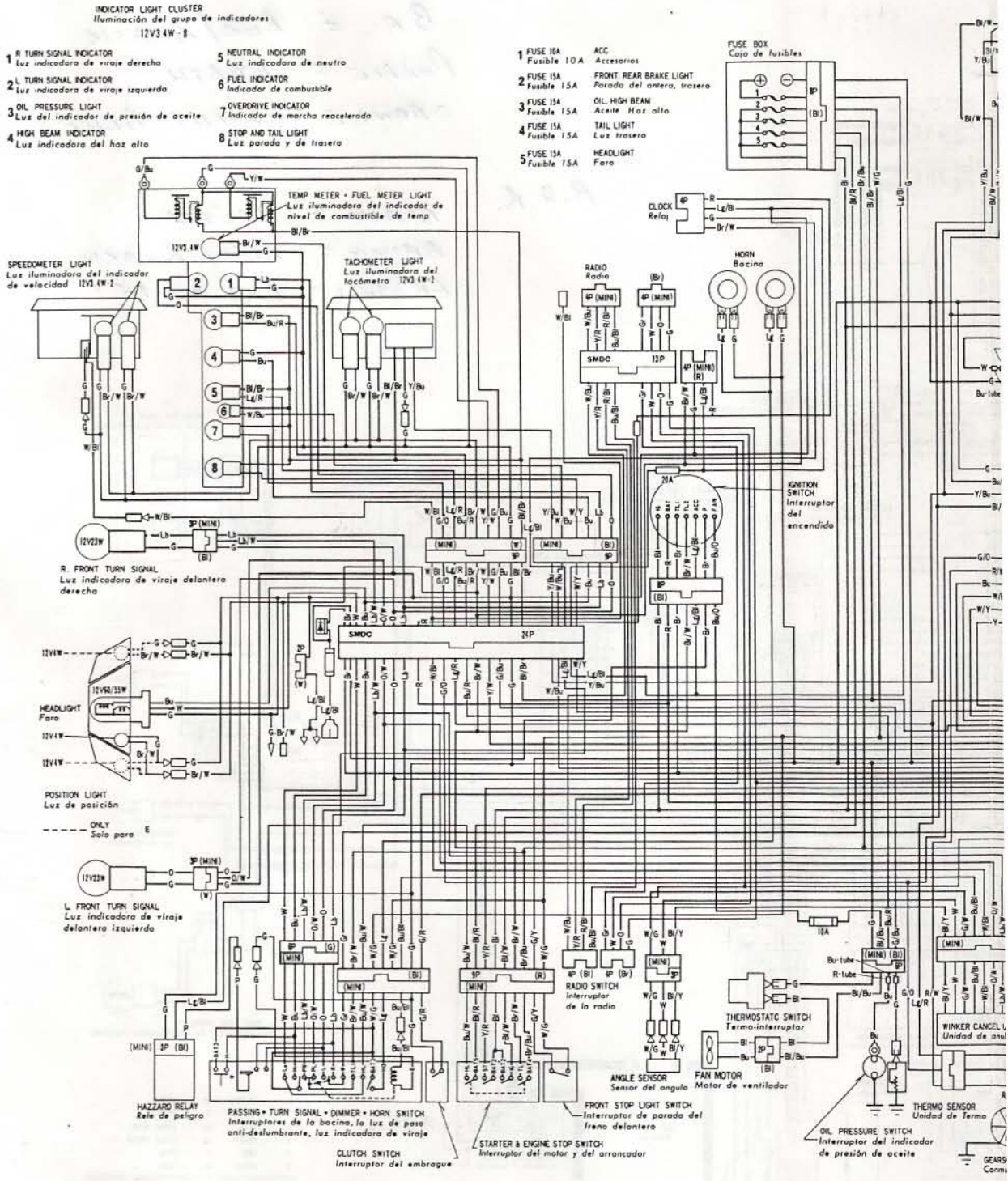
PASSING SWITCH
Interruptor de la luz de paso

	BAT3	Hi
FREE		
PUSH	○	○
COLOR	W/G	Bu

TURN SIGNAL SWITCH
Interruptor de senal

	W	R	L
R	○		
(N)			
L			○
COLOR	Gr	Lg	O

GL1200D SA



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	FAN	P	TL1	TL2
LOCK							
OFF							
ACC	○		○				
ON	○	○	○	○		○	○
P	○		○		○		
COLOR	R	Bl	Lg/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF	○	○
RUN		
OFF	○	○
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
•				
P	○	○		
H	○		○	○
COLOR	Br/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti-deslumbrante

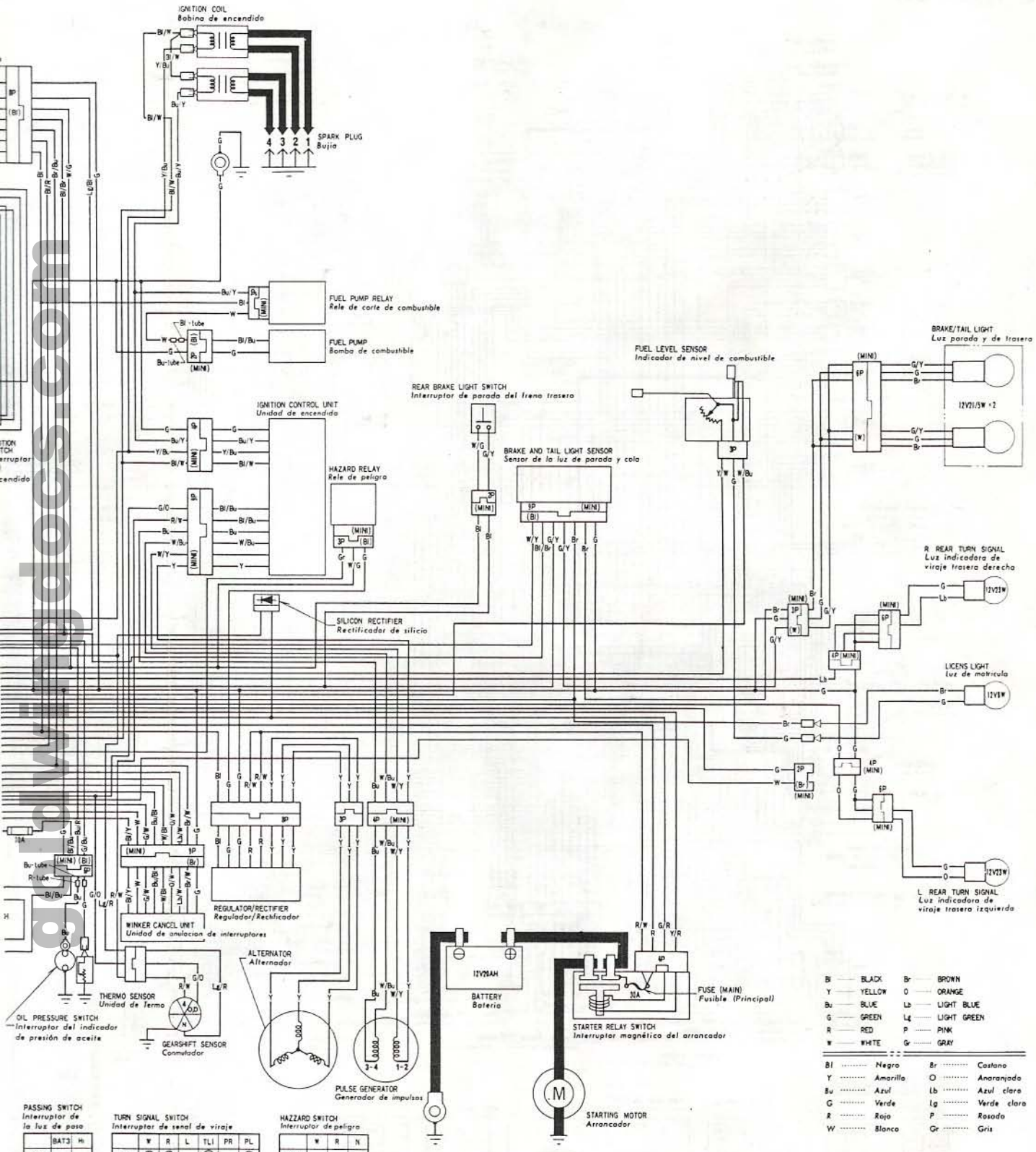
	HL	Lo	Hi
Lo	○	○	
IN	○	○	
Hi	○		○
COLOR	Bu/W	W	Bu

PASSING SWITCH
Interruptor de la luz de paso

	BAT3	Hi
FREE		
PUSH	○	○
COLOR	W/G	Bu

TURN SIGNAL SWITC
Interruptor de sen

	W	R
R		○
IN		
L	○	
COLOR	Gr	Lg



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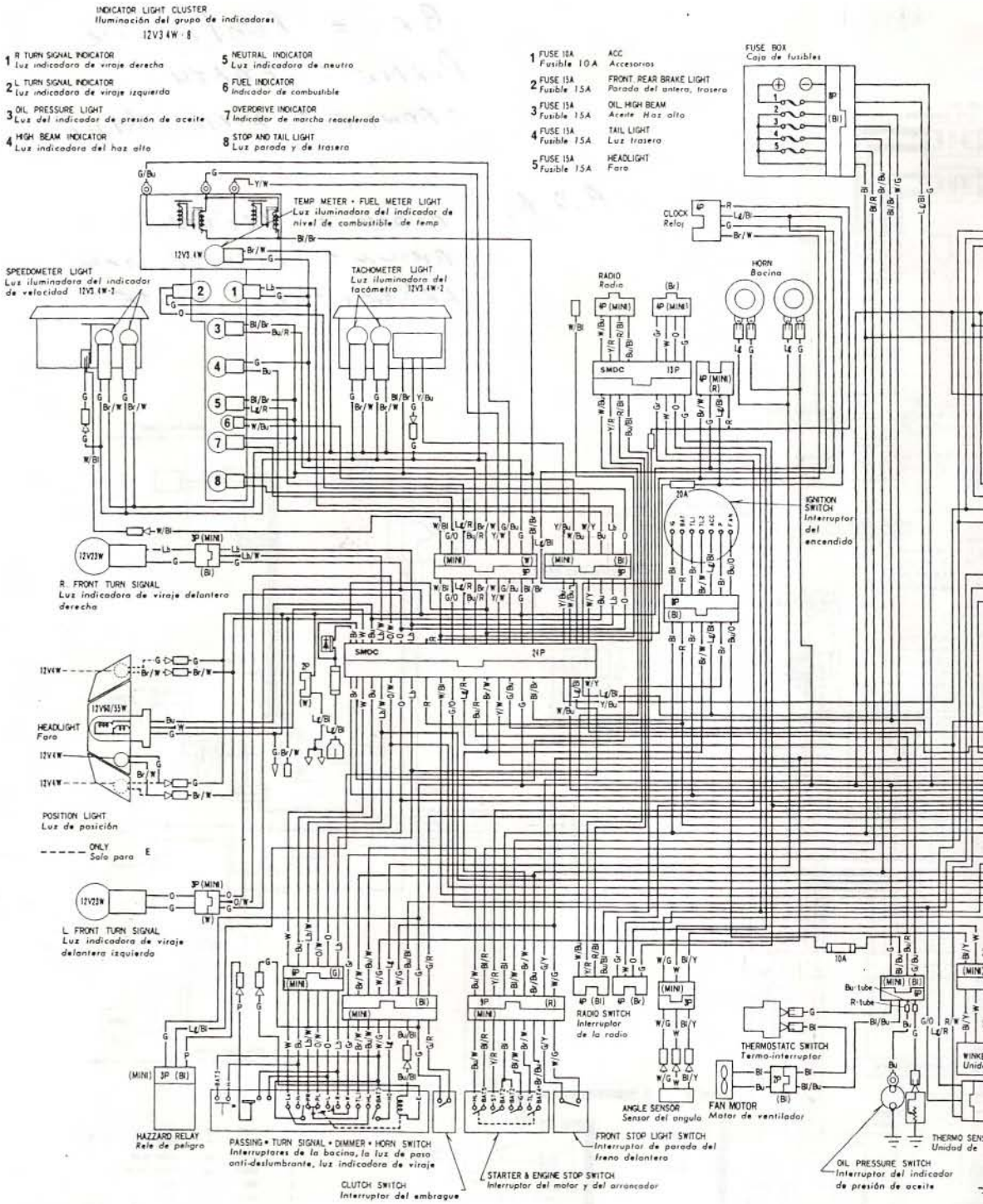
GL1200D SA



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	FAN	P	TL1	TL2
LOCK							
OFF							
ACC	○		○				
ON	○		○	○		○	○
P	○		○		○		
COLOR	R	Bl	Lg/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
●				
P	○			
H	○		○	
COLOR	Br/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti-deslumbrante

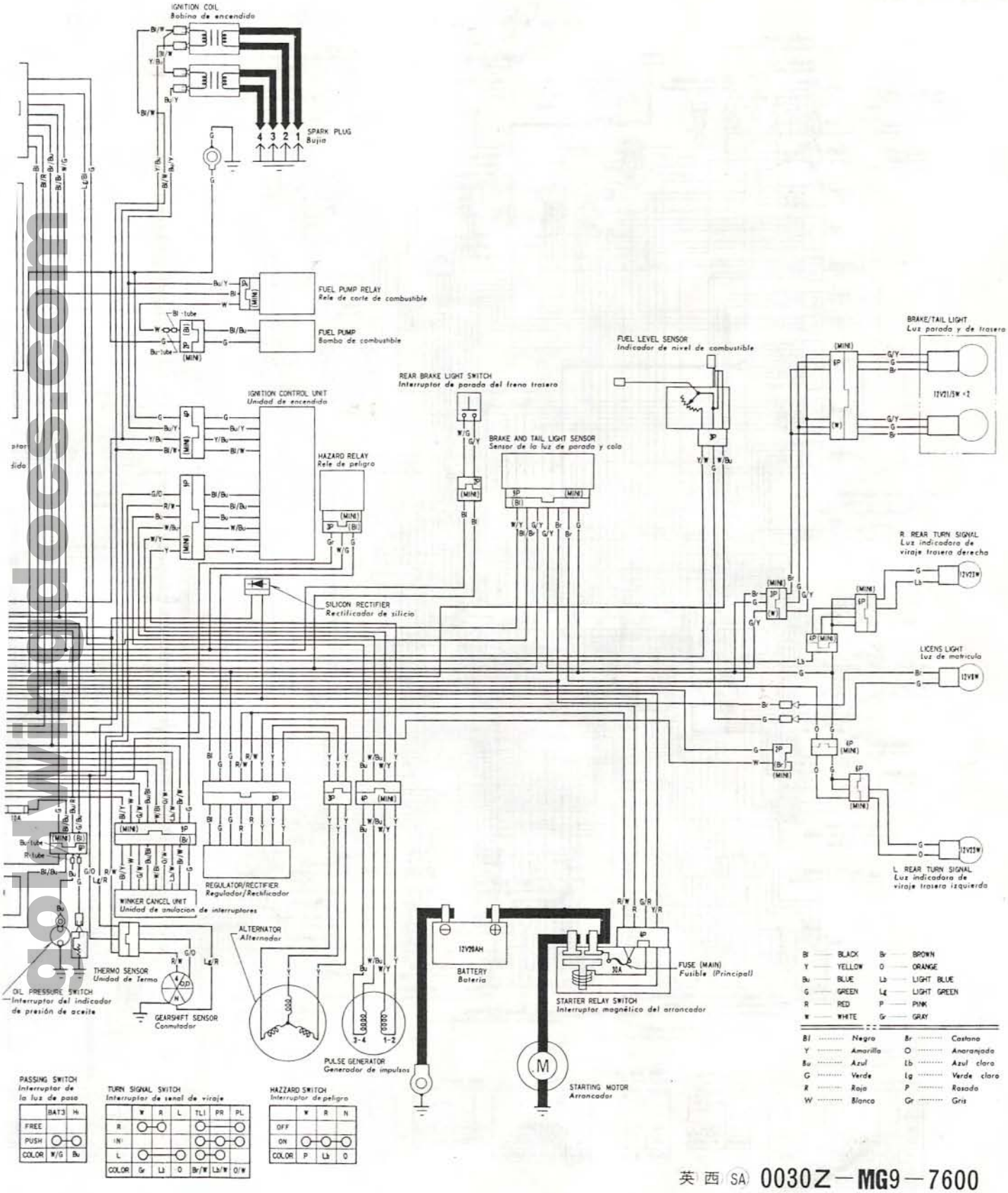
	HL	Lo	Hi
Lo	○	○	
N	○	○	○
Hi		○	○
COLOR	Bu/W	W	Bu

PASSING SWITCH
Interruptor de la luz de paso

	BAT3	Hi
FREE		
PUSH	○	○
COLOR	W/G	Bu

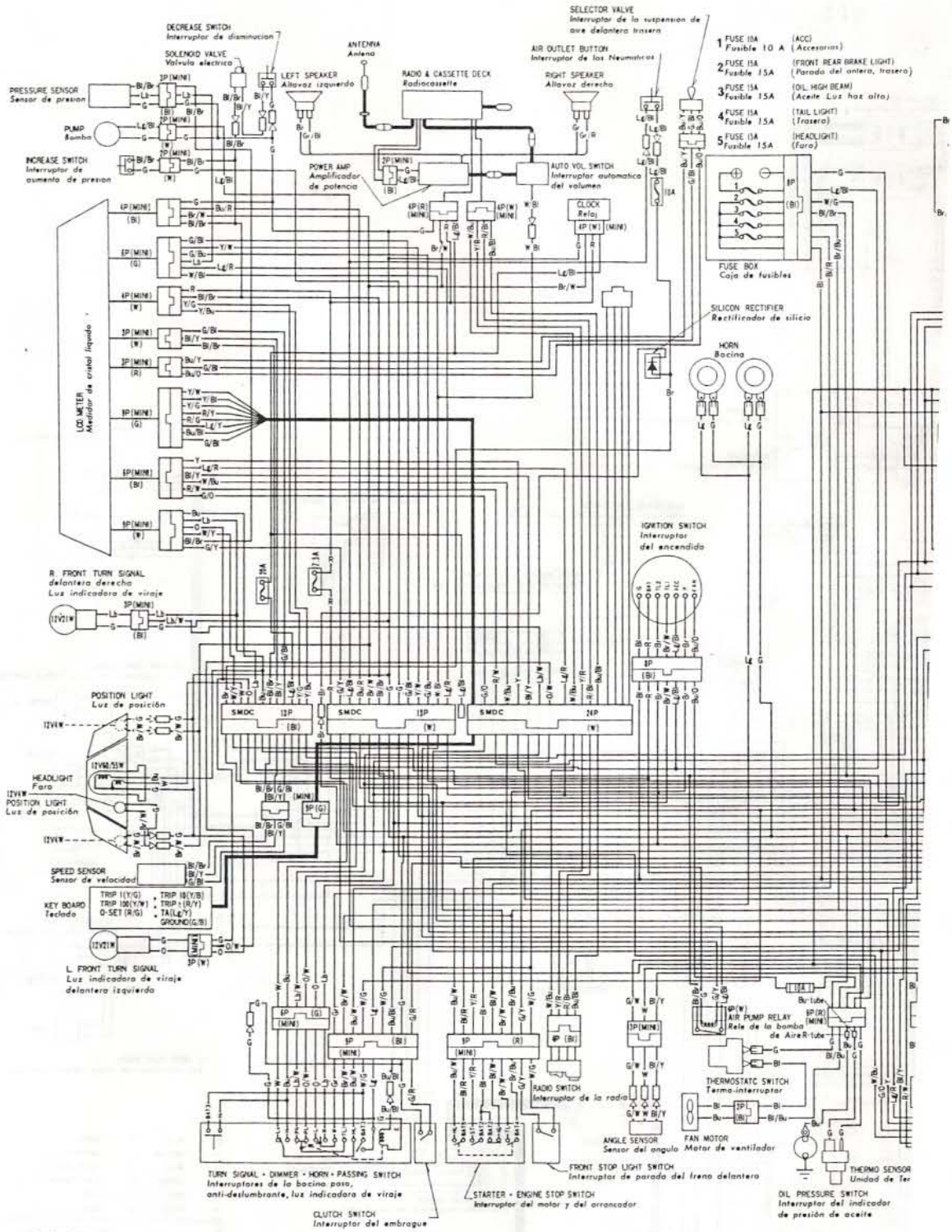
TURN SI
Interrup

R
N
L
COLOR



英 西 SA 0030Z—MG9—7600

GL1200A SD



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	FAN	P	TL1	TL2
LOCK							
OFF							
ACC	○		○				
ON	○	○	○	○		○	○
P	○		○		○		
COLOR	R	Bl	L g/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
*				
P	○	○		
H	○	○	○	○
COLOR	Br/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

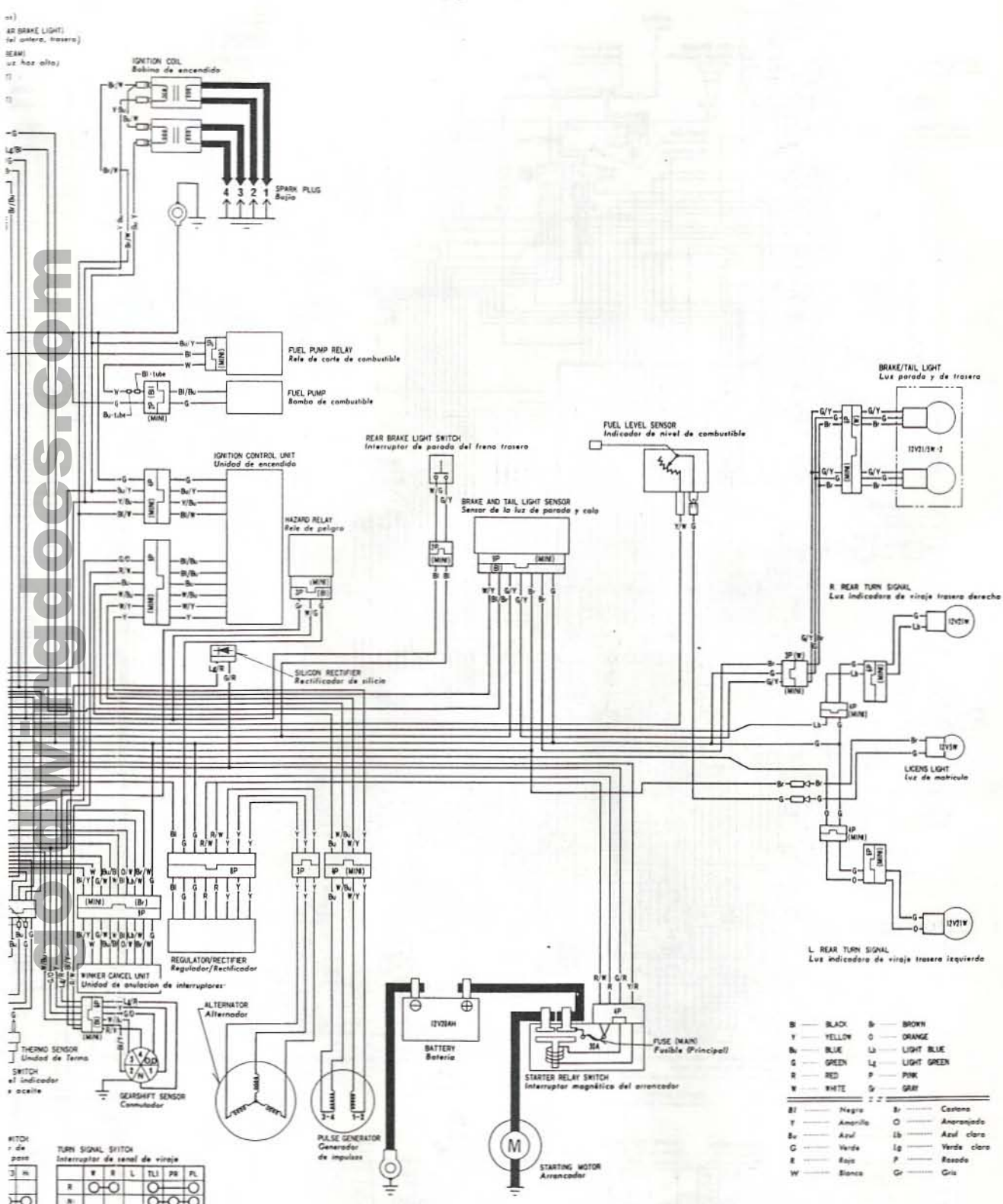
	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti-deslumbrante

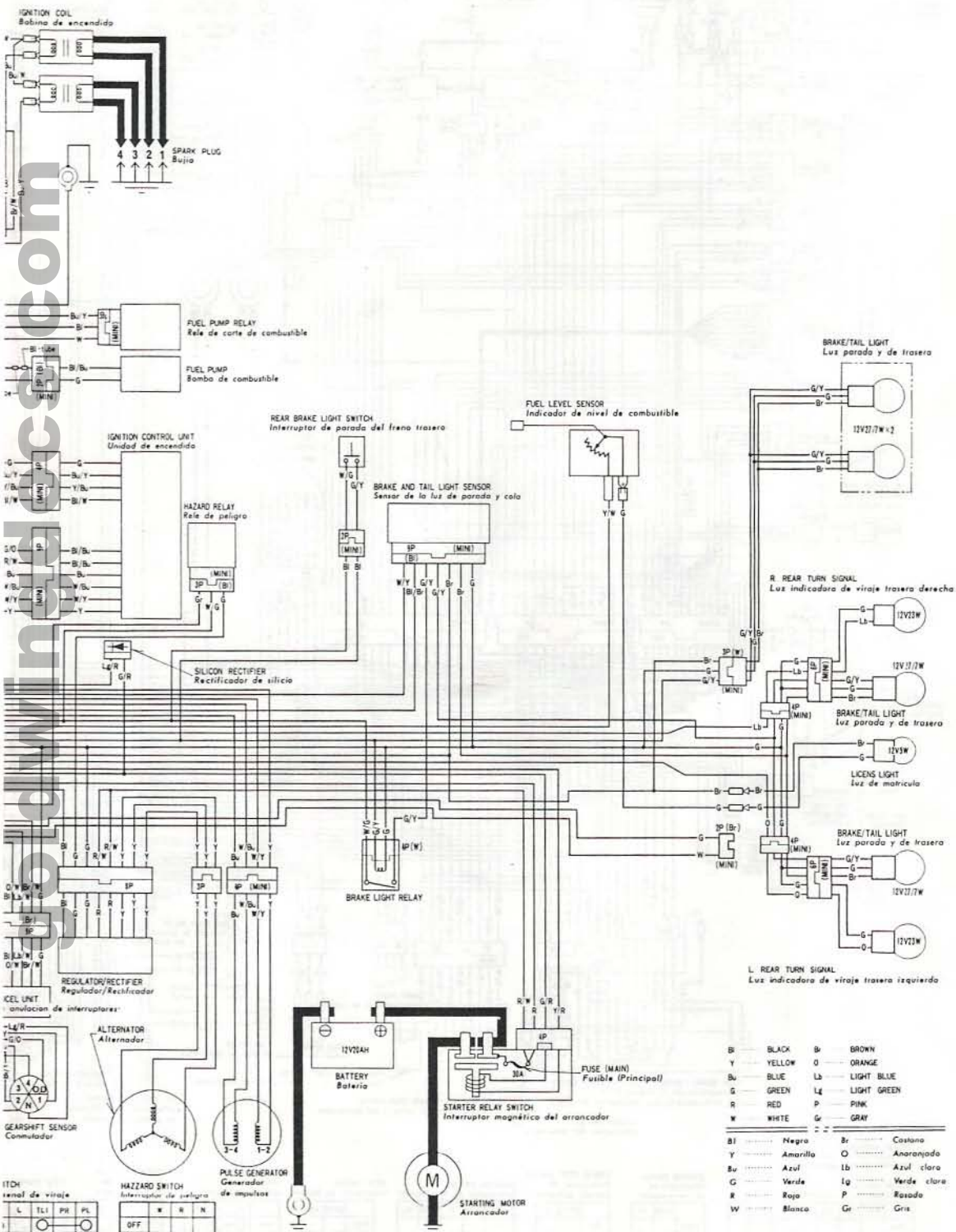
	HL	Lo	Hi
Lo	○	○	
N	○		○
L	○		○
COLOR	Bu/W	W	Bu

PASSING SWITCH
Interruptor de la luz de paso

	BAT3	Hi
FREE		
PUSH	○	○
COLOR	W/G	Bu



英 西 SD 0030Z－MG9－9700


IGNITION COIL
Bobina de encendido
SPARK PLUG
Bujía
FUEL PUMP RELAY
Relé de corte de combustible
FUEL PUMP
Bomba de combustible
IGNITION CONTROL UNIT
Unidad de encendido
HAZARD RELAY
Relé de peligro
REAR BRAKE LIGHT SWITCH
Interruptor de parada del freno trasero
BRAKE AND TAIL LIGHT SENSOR
Sensor de la luz de parada y cola
FUEL LEVEL SENSOR
Indicador de nivel de combustible
BRAKE/TAIL LIGHT
Luz parada y de trasera
12V27/7W×2
R REAR TURN SIGNAL
Luz indicadora de viraje trasera derecha
12V23W
12V27/7W
BRAKE/TAIL LIGHT
Luz parada y de trasera
12V5W
LICENS LIGHT
Luz de matrícula
BRAKE/TAIL LIGHT
Luz parada y de trasera
12V27/7W
12V23W
L REAR TURN SIGNAL
Luz indicadora de viraje trasera izquierda
SILICON RECTIFIER
Rectificador de silicio
BRAKE LIGHT RELAY
REGULATOR/RECTIFIER
Regulador/Rechicador
ALTERNATOR
Alternador
GEARSHIFT SENSOR
Conmutador
HAZZARD SWITCH
Interruptor de peligro
PULSE GENERATOR
Generador de impulsos
BATTERY
Batería
12V20AH
FUSE (MAIN)
Fusible (Principal)
30A
STARTER RELAY SWITCH
Interruptor magnético del arrancador
STARTING MOTOR
Arrancador
OFF
ON
COLOR
Br BROWN
Y YELLOW
O ORANGE
Bu BLUE
Lb LIGHT BLUE
G GREEN
Lg LIGHT GREEN
R RED
P PINK
W WHITE
Gr GRAY
Bl Negro
Y Amarillo
Bu Azul
G Verde
R Roja
W Blanco
Br Castaño
O Anaranjado
Lb Azul claro
Lg Verde claro
P Rosado
Gr Gris

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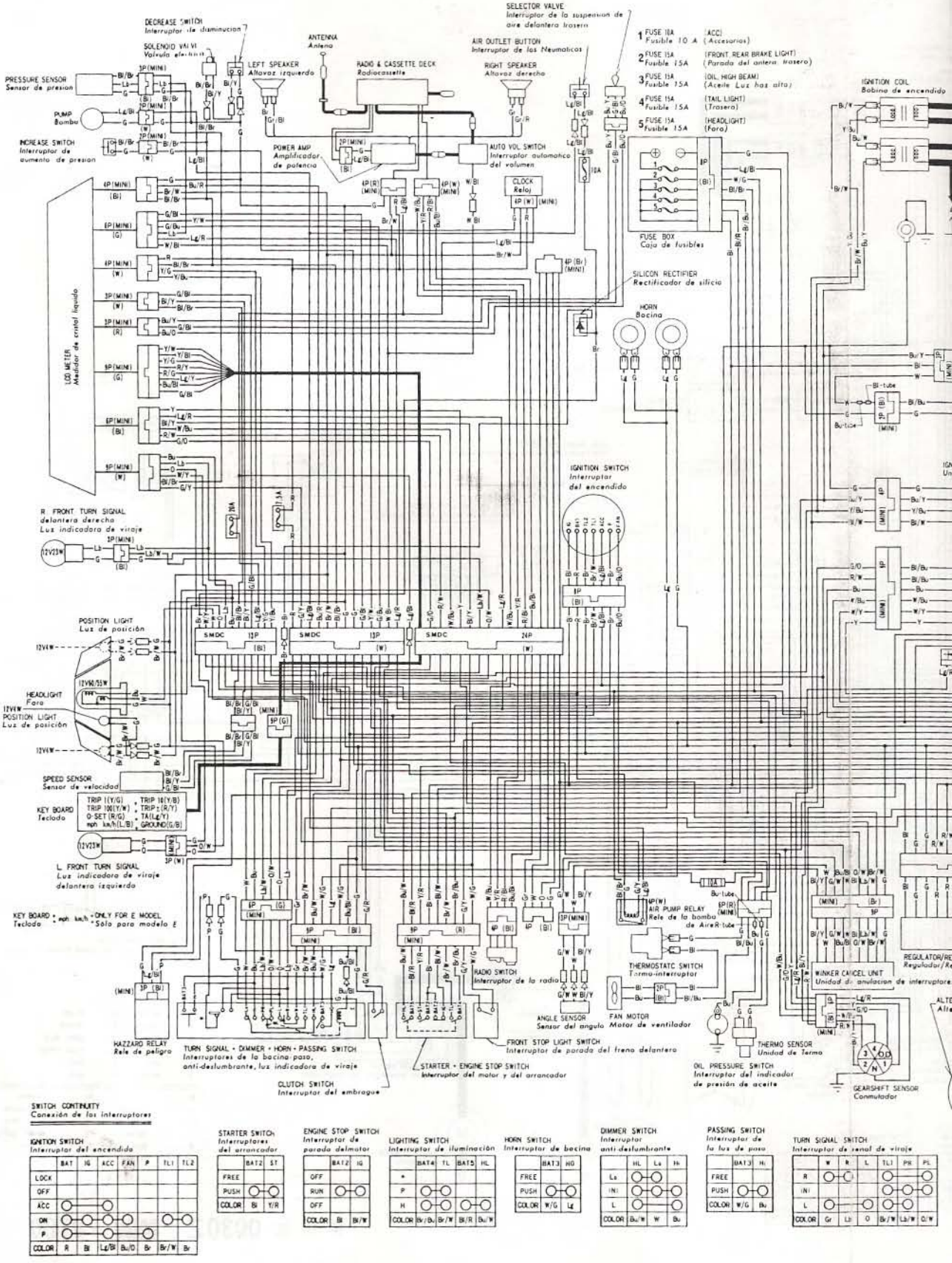


SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	FAN	P	TL1	TL2
LOCK							
OFF							
ACC	○	○	○				
ON	○	○	○	○		○	○
P	○				○		
COLOR	R	Bl	Lg/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
*				
P	○	○		
H	○	○	○	○
COLOR	Br/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti-deslumbrante

	HL	Lo	Hi
Lo			
(N)	○	○	○
L	○	○	○
COLOR	Bu/W	W	Bu

PASSING SWITCH
Interruptor de la luz de paso

	BAT3	HI
FREE		
PUSH	○	○
COLOR	W/G	Bu

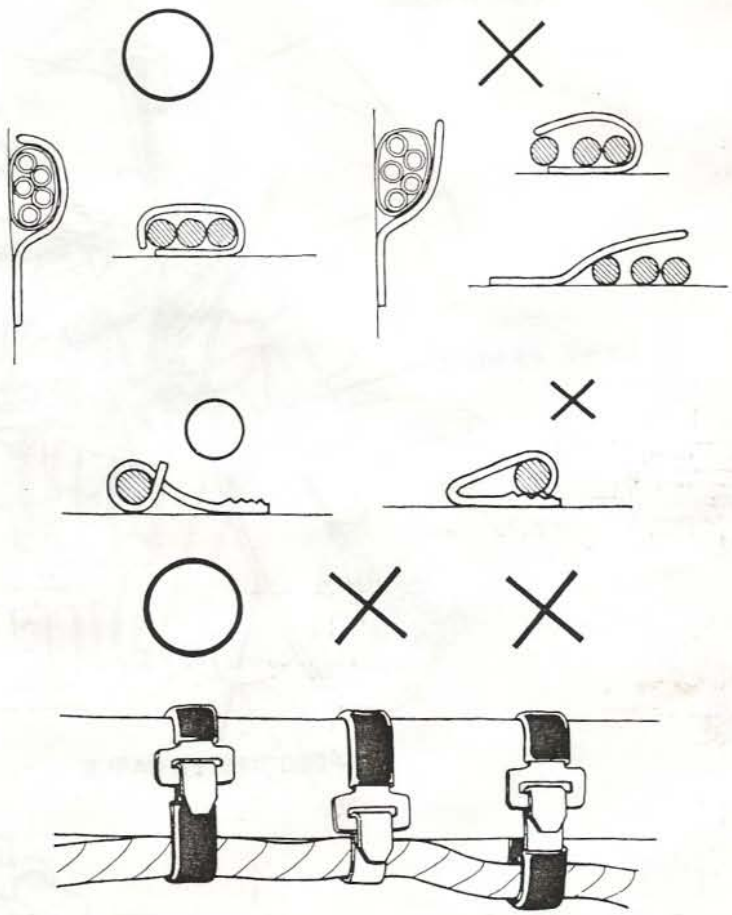
TURN SIGNAL SWITCH
Interruptor de senal de viraje

	W	R	L	TL1	PR	PL
R	○	○				
(N)					○	○
L		○	○		○	○
COLOR	Gr	Lg	O	Br/W	Lg/W	O/W

CABLE & HARNESS ROUTING

Note the following when routing cables and wire harnesses.

- A loose wire, harness or cable can be a safety harzard. After clamping, check each wire to be sure it is secure.
- Do not squeeze wires against the weld or end of its clamp when a weld-on clamp is used.
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so they are not pulled taut or have excessive slack.
- Protect wires and harnesses with electrical tape or tubes if they contact a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use wires or harnesses with a broken insulator. Repair by wrapping them with a protective tape or replace them.
- Route wire harnesses so they avoid sharp edges or corners and avoid the projected ends of bolts and screws.
- Keep wire harnesses away from the exhaust pipes and other hot parts.
- Be sure grommets are seated in their grooves properly.
- After clamping, check each harness to be certain that it is not interfering with any moving or sliding parts.
- Wire harnesses routed along the handlebars should not be pulled taut, have excessive slack, be pinched, or interfere with adjacent or surrounding parts in all steering positions.
- After routing, check that the wire harnesses are not twisted or kinked.



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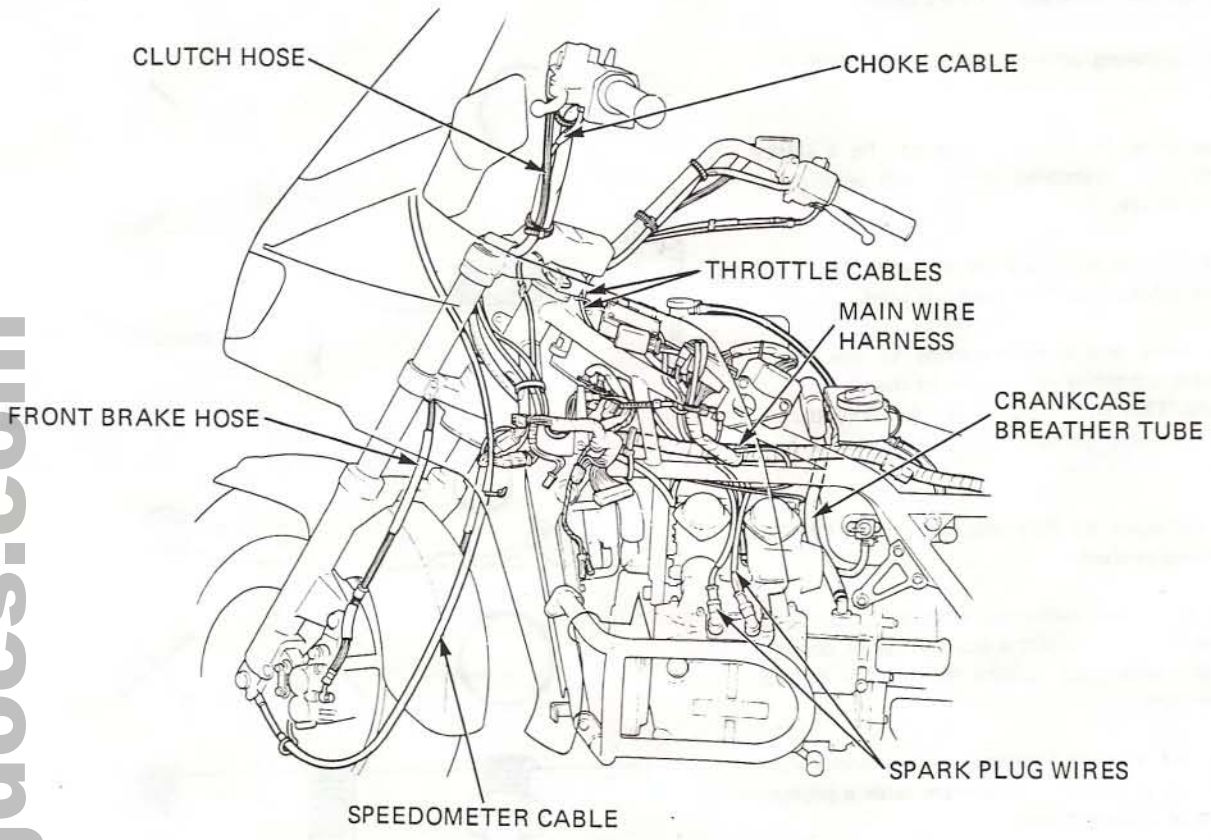

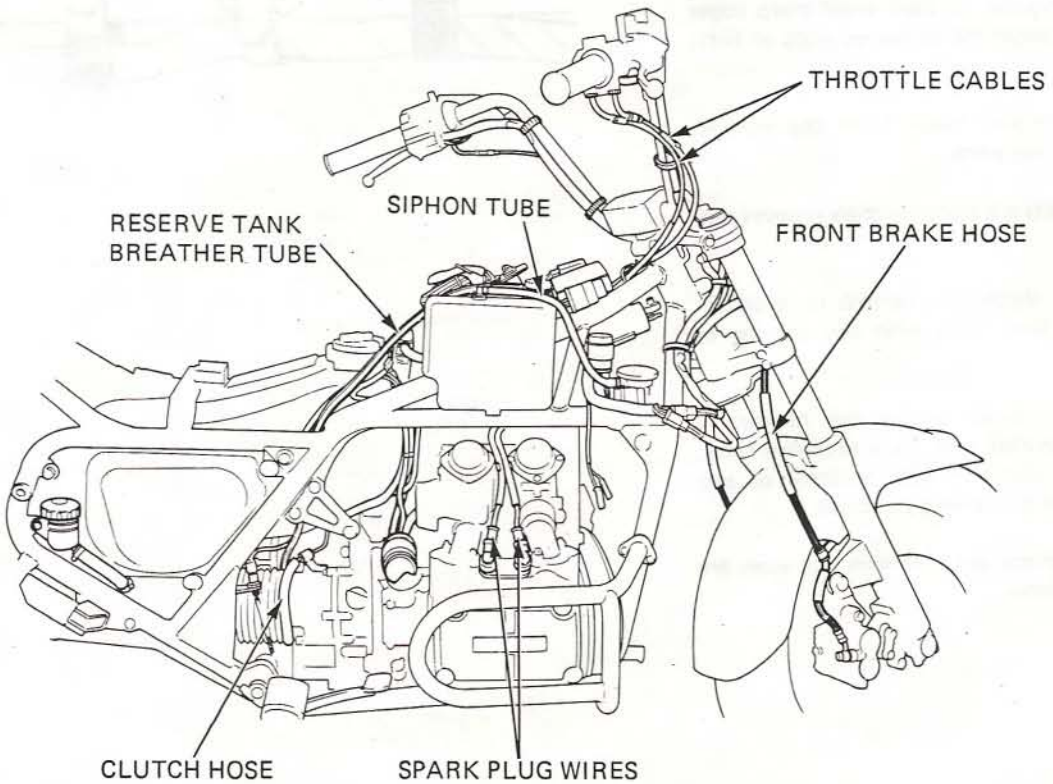

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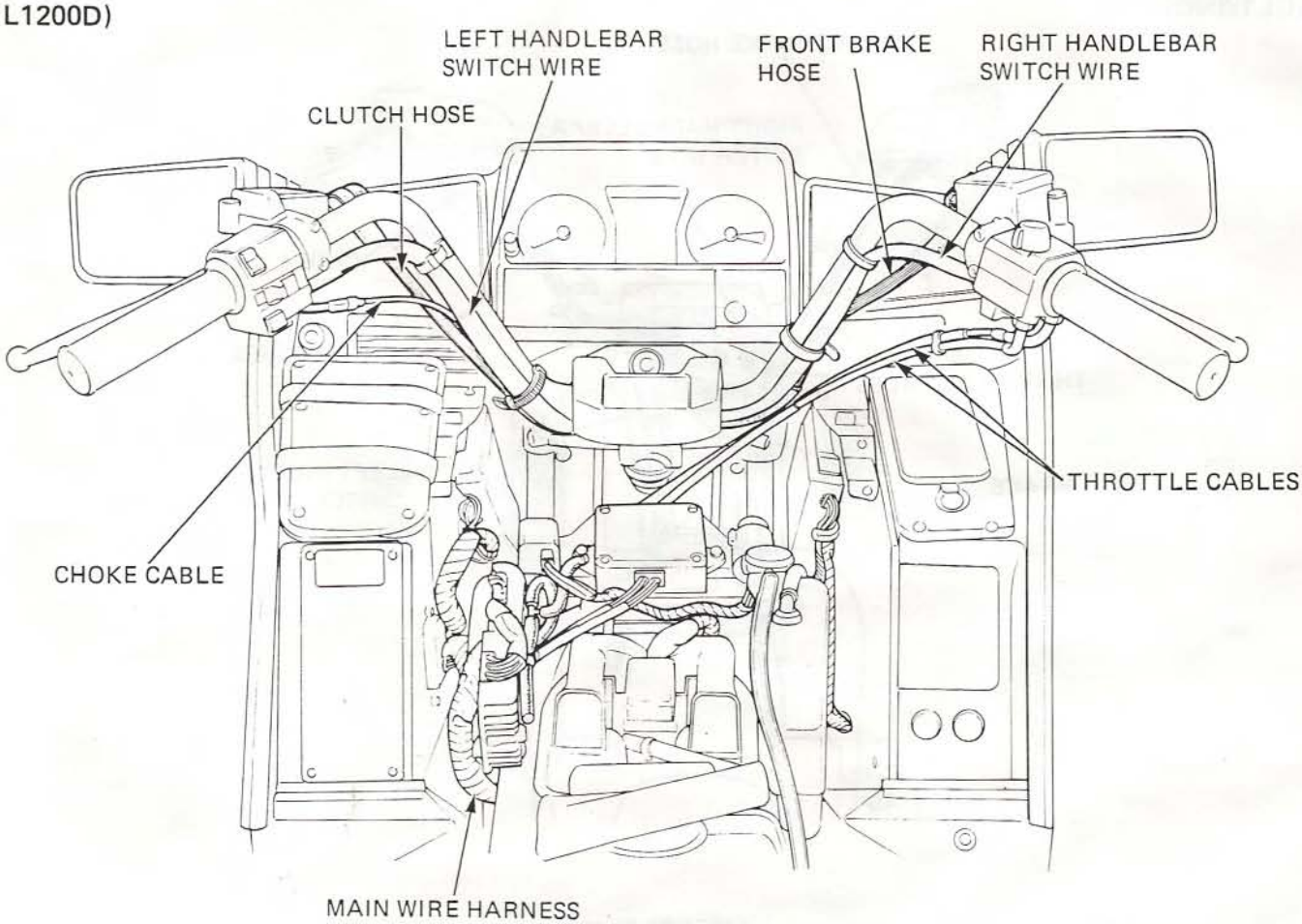

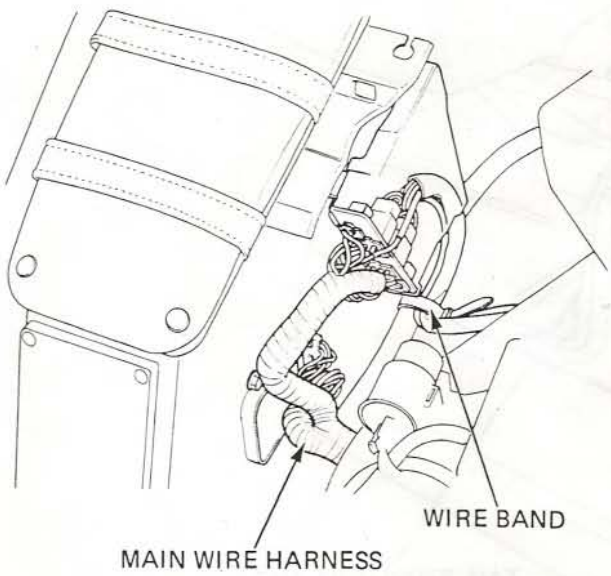

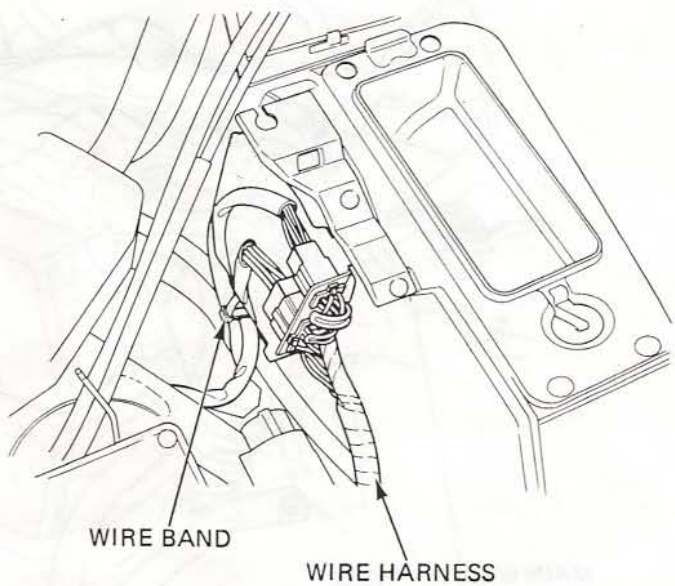

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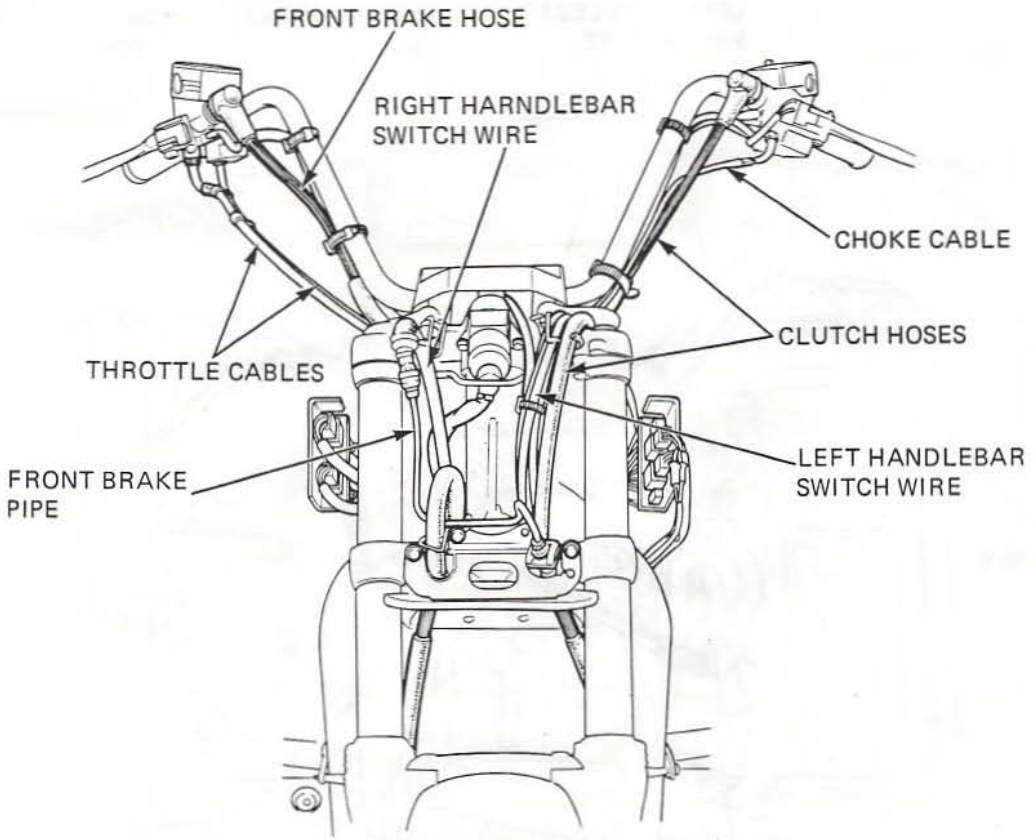
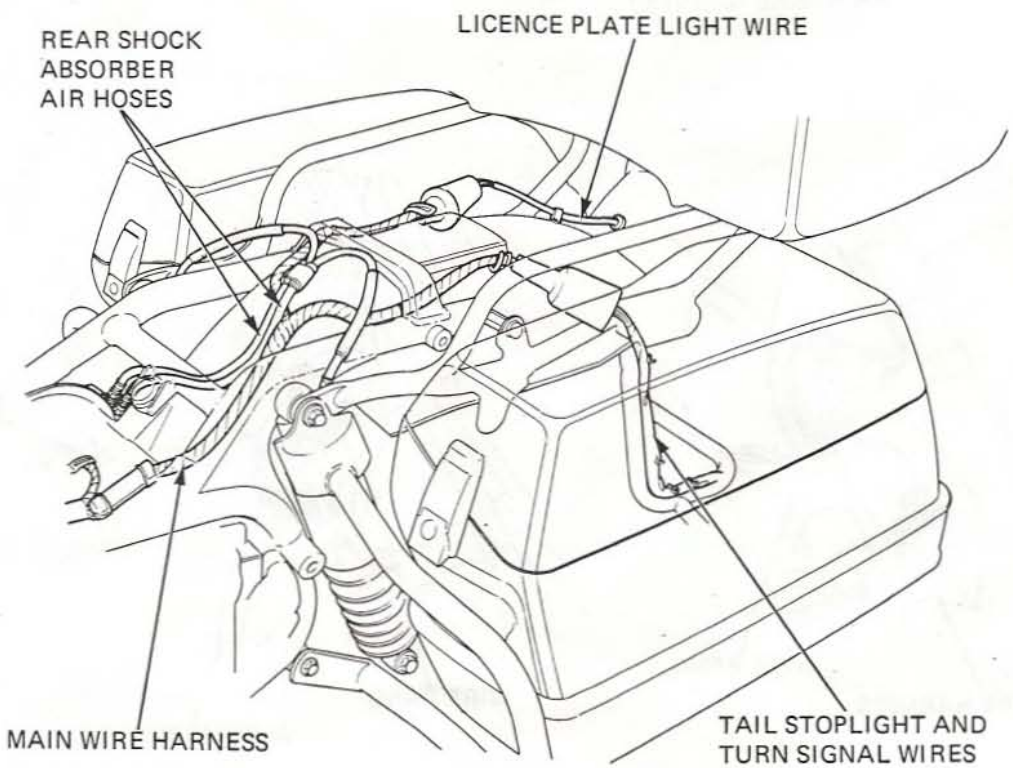
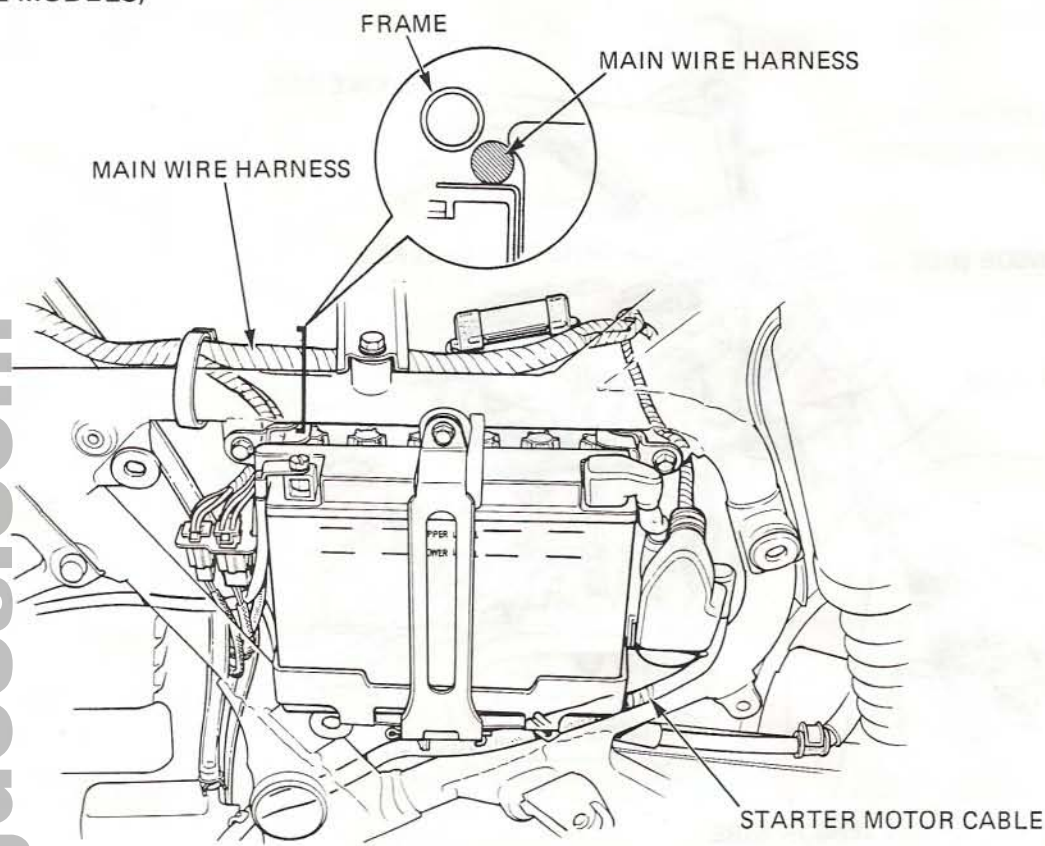
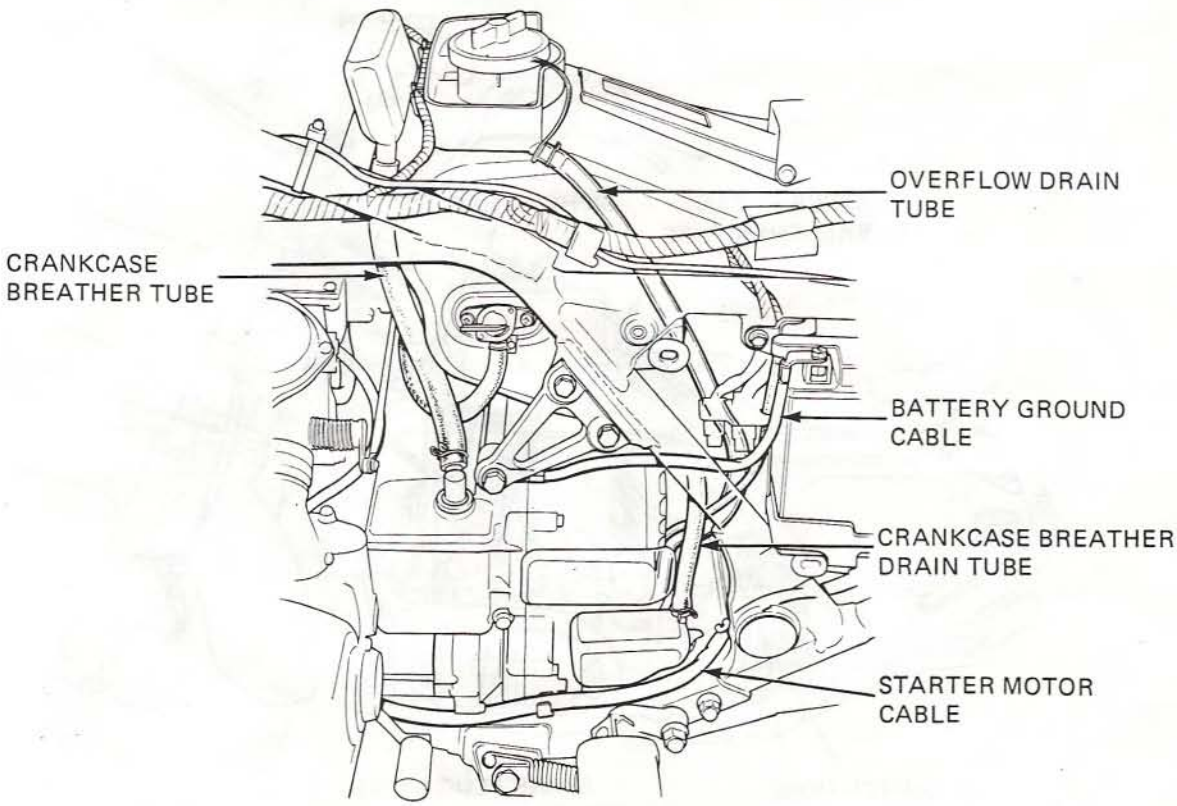




(ALL MODELS)





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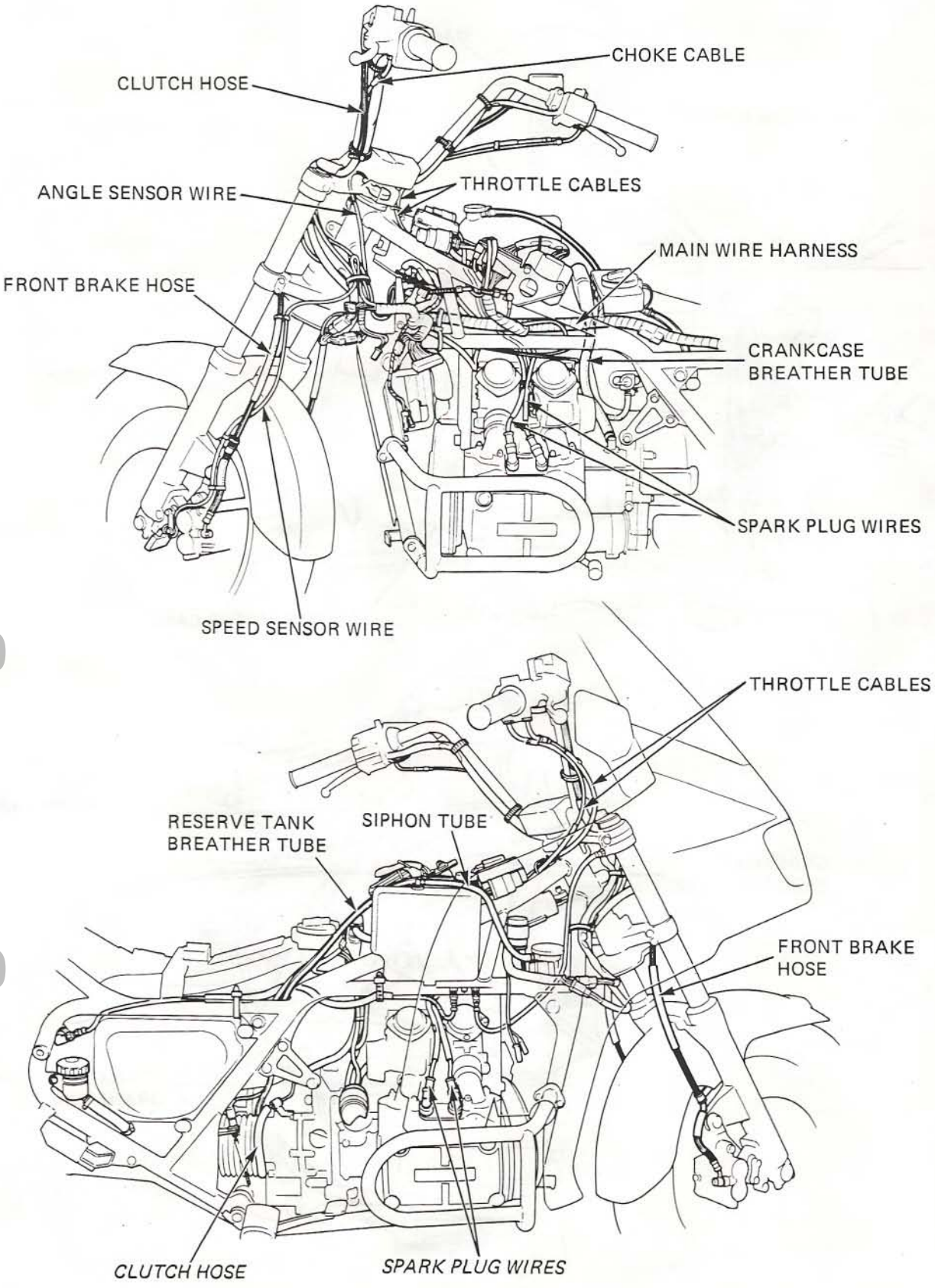

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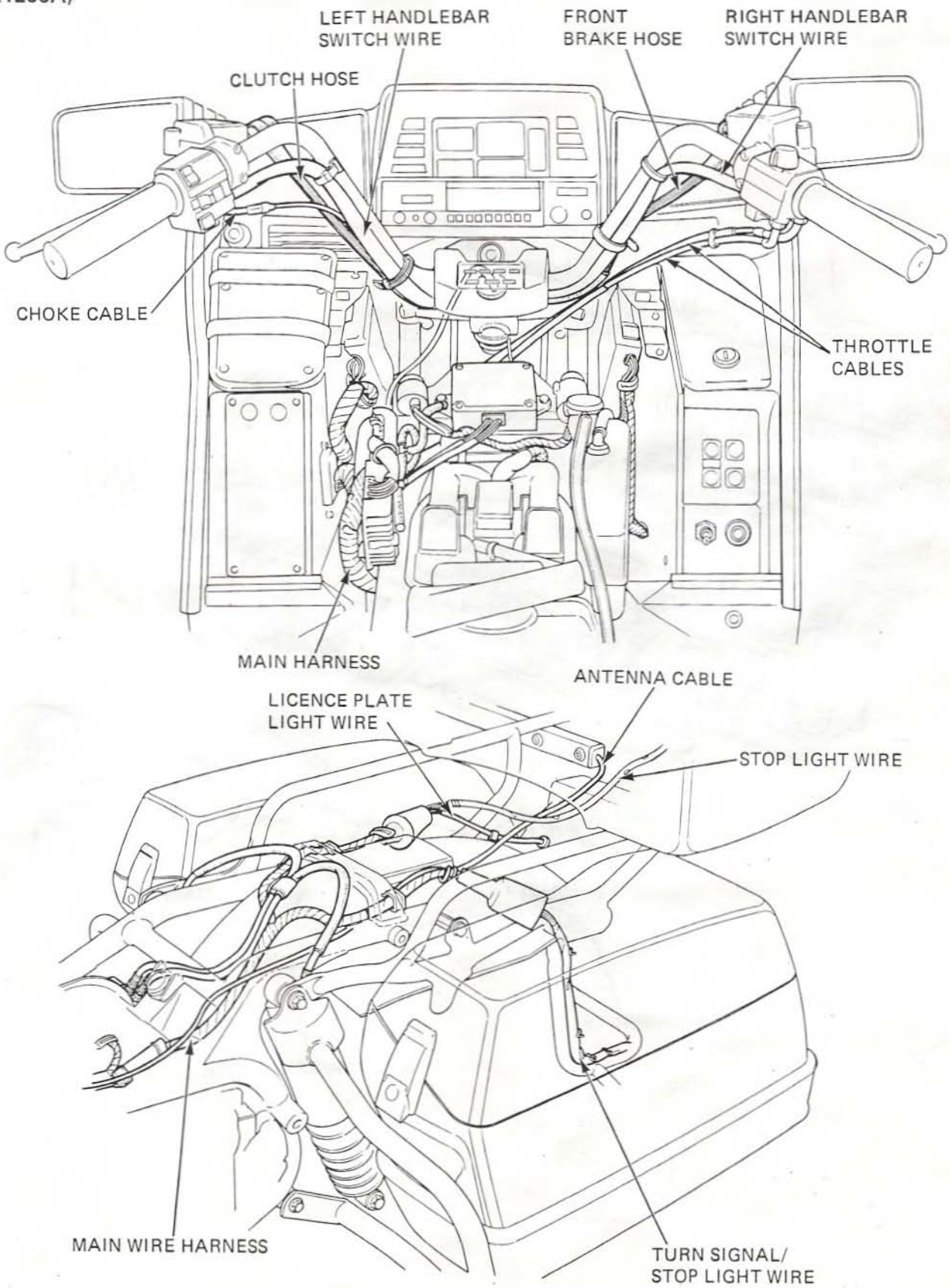
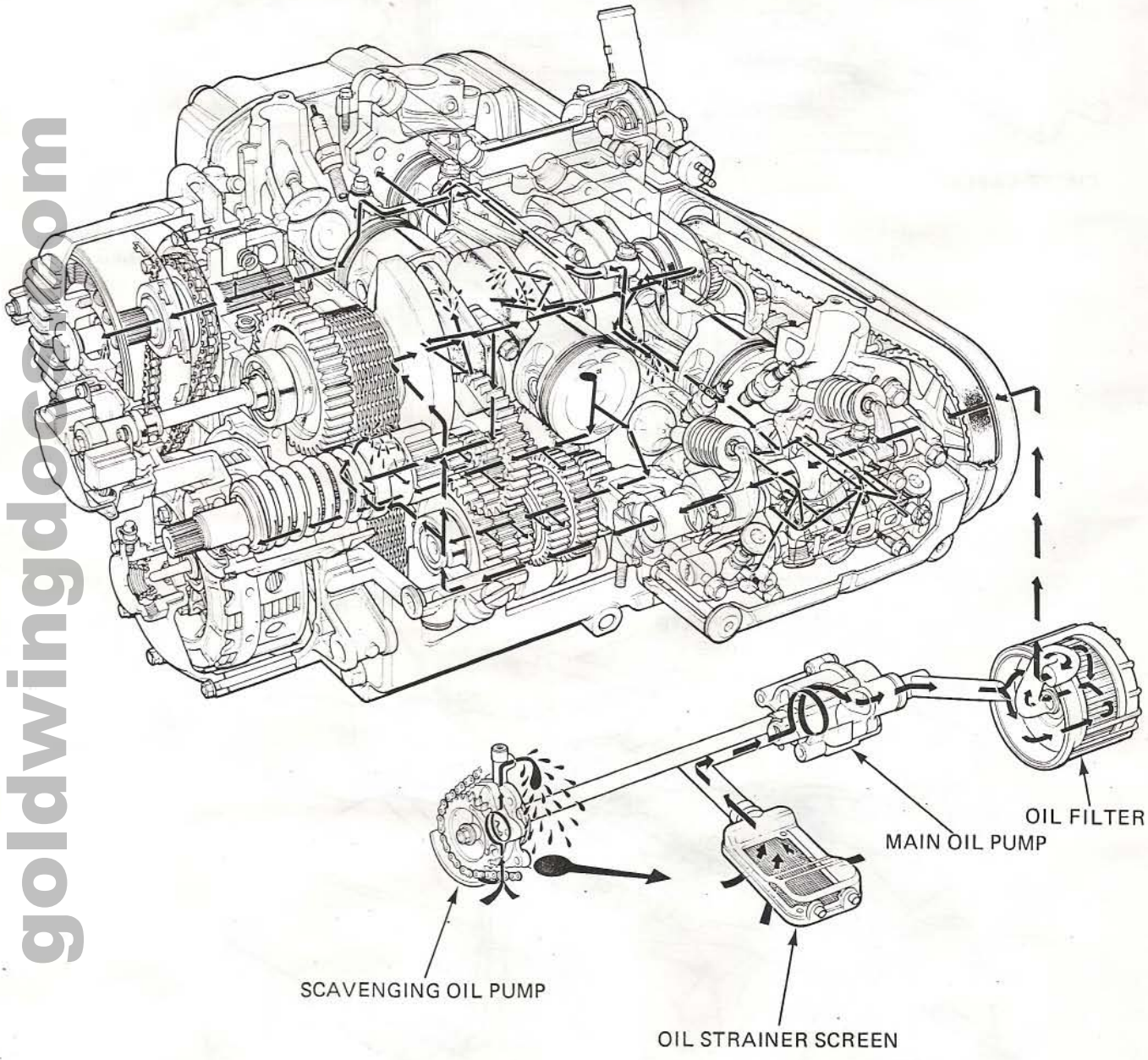


LUBRICATION DIAGRAM



2. LUBRICATION

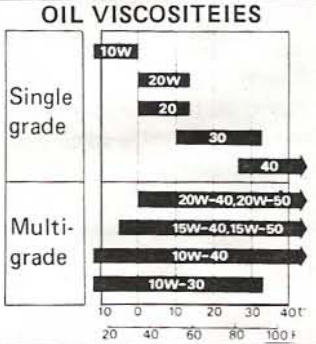
SERVICE INFORMATION

GENERAL

- The lubrication system uses two oil pumps; main and scavenging. The main pump sucks up oil from the crankcase and delivers it under pressure to the bearings and other important parts of the engine. It is equipped with a pressure relief valve. The scavenging pump draws oil from the rear cover and sends it to the primary drive chain to lubricate and cool it.
- The main pump can be serviced without removing the engine from the frame. To service the scavenging pump, it is necessary to remove the engine from the frame.

SPECIFICATIONS

Unit : mm (in)

ITEM			STANDARD	SERVICE LIMIT
Engine oil capacity	After disassembly		4.0 liters (4.2 US qt, 3.5 Imp qt)	—
	After draining		3.2 liters (3.4 US qt, 2.8 Imp qt)	—
Recommended engine oil			HONDA 4-stroke oil or equivalent. API service classification SE or SF. The viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range. OIL VISCOSITEIES 	
Oil pressure (At 80°C/176°F)	At Idle speed		100 kPa (1.0 kg/cm², 14 psi)	—
	At 5,000 min⁻¹ (rpm)		520 kPa (5.2 kg/cm², 74 psi)	—
Oil pump	Tip clearance	Main pump	0.15 (0.006)	0.35 (0.014)
		Scavenge pump	0.15 (0.006)	0.35 (0.014)
	Body clearance	Main pump	0.15–0.21 (0.006–0.008)	0.41 (0.016)
		Scavenge pump	0.15–0.21 (0.006–0.008)	0.41 (0.016)
	End clearance	Main pump	0.02–0.07 (0.001–0.003)	0.12 (0.005)
		Scaverge pump	0.02–0.10 (0.001–0.004)	0.12 (0.005)
Relief valve spring free length			72.8 (2.87)	67.0 (2.64)

TORQUE VALUES

Oil pump mounting bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Oil pressure switch	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

TOOLS

Common

Oil pressure gauge	07510–3000000
Oil pressure gauge attachment	07510–4220100

TROUBLESHOOTING

Oil level too low
- Oil level not replenished frequently enough
- External oil leaks
- Oil-up
  - Worn piston rings
  - Improperly installed piston rings
  - Worn cylinder
- Oil-down
  - Worn stem seal
  - Worn valve guide

Oil level too high
- Pressure relief valve stuck closed
- Clogged oil filter, gallery, or metering orifice
- Incorrect oil being used

Low oil pressure
- Oil level low
- Plugged oil filter or screen
- Pressure relief valve stuck open
- Oil pump faulty
- Internal oil leakage
- Incorrect oil being used

Oil contamination
- Oil or filter not changed often enough
- Worn piston rings

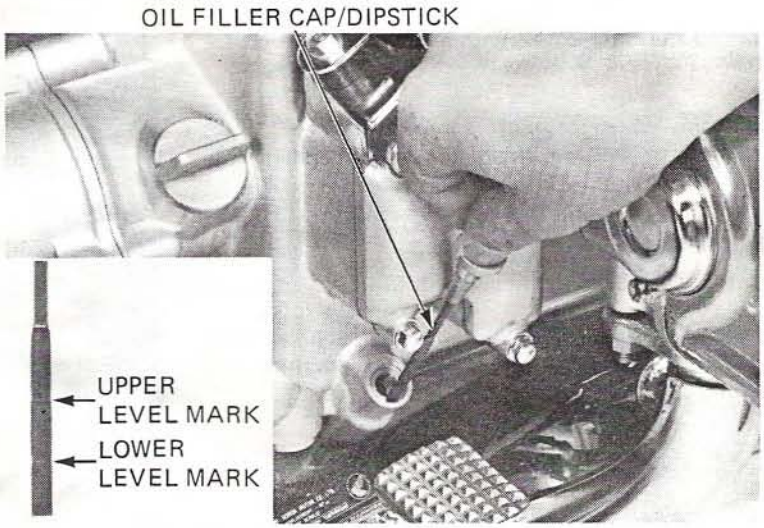
Oil emulsification
- Entry of radiator coolant
  - Blown cylinder head gasket
  - Leaky core plug
  - Leaky coolant passage
- Entry of water

No oil pressure
- Oil level too low; no oil
- Broken oil pump drive chain
- Broken oil pump drive shaft
- Internal leaks
- Faulty oil pump

ENGINE OIL LEVEL

Start the engine and let it idle for a 2–3 minutes. Stop the engine and put the motorcycle on its center stand on level ground.

Remove the oil filler cap/dipstick, wipe it clean, and insert the dipstick without screwing it in. The oil level should be between the upper and lower level marks on the dipstick. If required add the recommended oil up to the upper level mark. Reinstall the oil filler cap/dipstick and check there are no oil leaks.



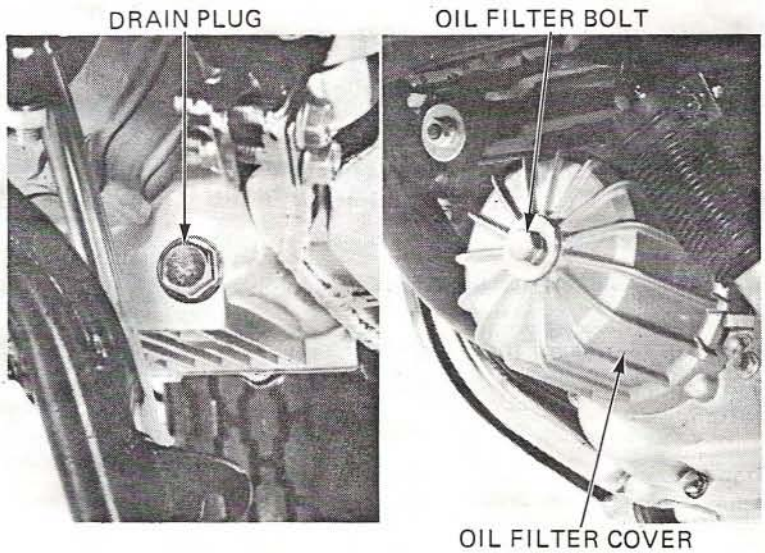
ENGINE OIL & FILTER CHANGE

NOTE:

> Change engine oil with the engine warm and the motorcycle on its center stand to assure complete and rapid draining.

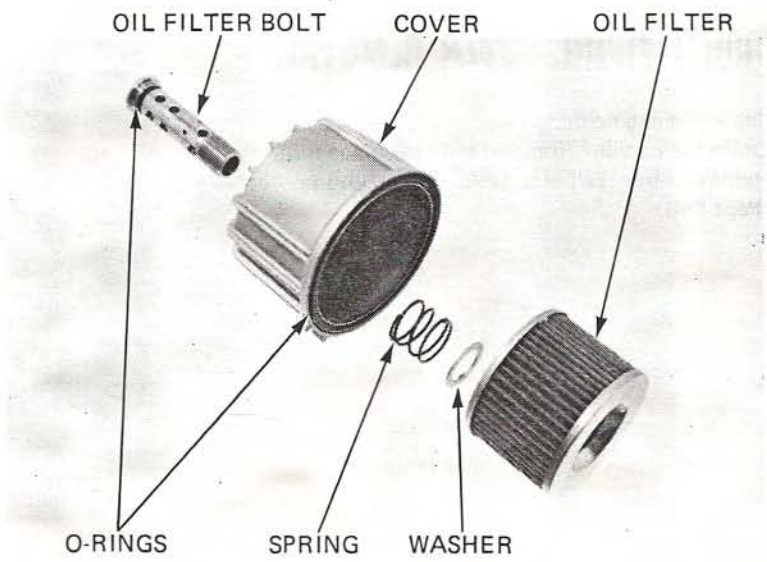
Stop the engine.

Remove the oil filler cap, drain plug, oil filter bolt, and oil filter cover.



After draining the oil completely, check that the drain plug sealing washer is in good condition and install the plug.

Replace the oil filter. Check that the oil filter bolt and cover O-rings are in good condition.



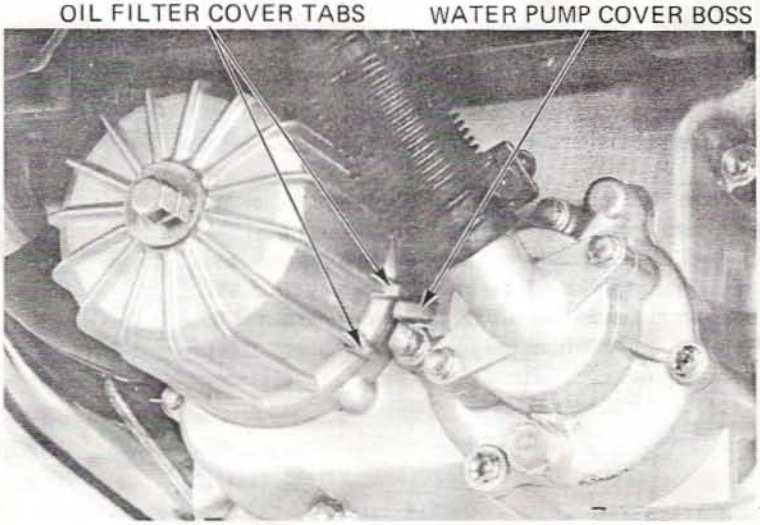
Install the filter cover, with aligning the boss on the water pump cover between the two cover tabs.

Fill the crankcase with approximately 3.2 liters (3.4 US qt, 2.8 Imp qt) of the recommended grade oil and install the oil filler cap.

Recommended Oil:
Honda 4-Stroke Oil or Equivalent
API Service Classification—SE or SF

The viscosities shown in the chart may be used when the average temperature is within the indicated range. (See page 2-1).

OIL FILTER COVER TABS WATER PUMP COVER BOSS



OIL PRESSURE INSPECTION

Warm the engine up to normal operating temperature.
Stop the engine and remove the oil pressure switch.
Connect an oil pressure gauge to the pressure switch hole using attachment.

OIL PRESSURE GAUGE
07510—3000000 or COMMERCIALLY AVAILABLE

ATTACHMENT 07510—4220100

Start the engine and check the oil pressure.

OIL PRESSURE:
100 kPa (1.0 kg/cm^2, 14 psi) at idle speed
520 kPa (5.2 kg/cm^2, 74 psi) at 5,000 min^{-1} (rpm)

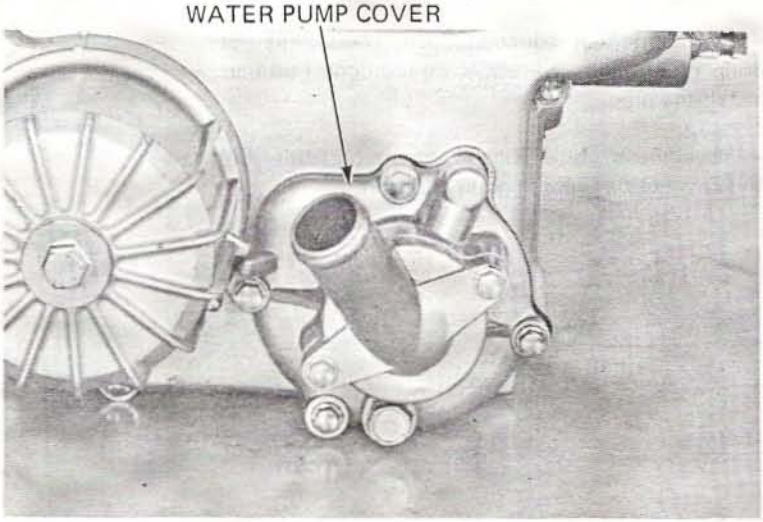
Stop the engine.
Apply sealant to the pressure switch threads and install.

TORQUE: 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

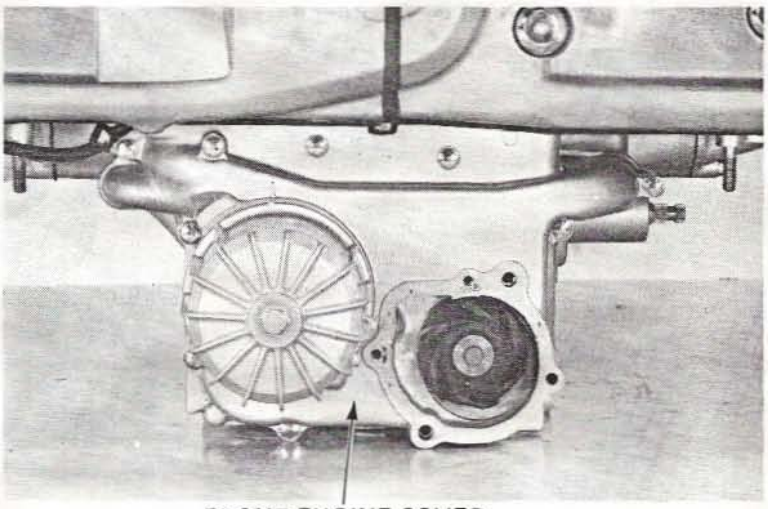
FRONT ENGINE COVER REMOVAL

Drain the engine oil.
Drain the coolant from the radiator (Page 6-3).
Remove the radiator and water pump cover (Page 6-4).

WATER PUMP COVER

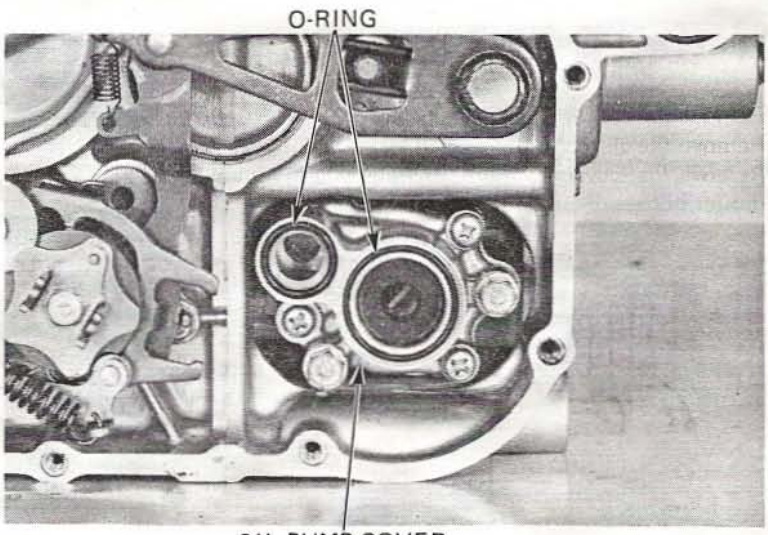


Unscrew the cover bolts and remove the front engine cover.

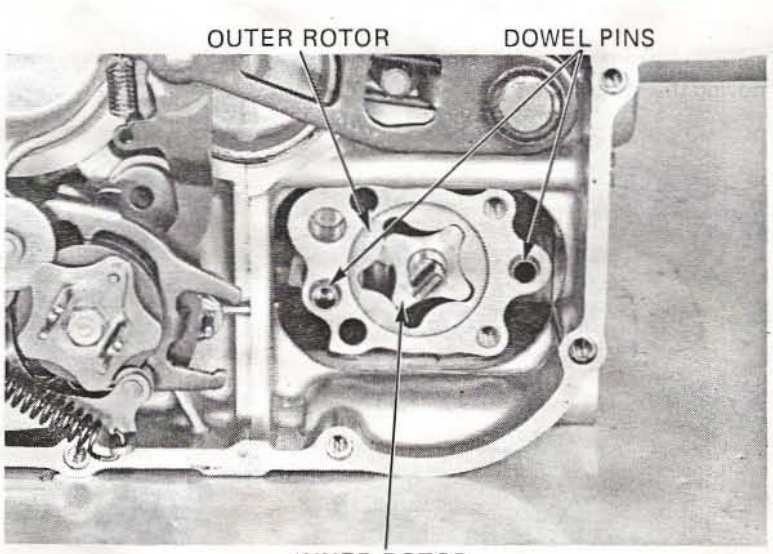


MAIN OIL PUMP REMOVAL

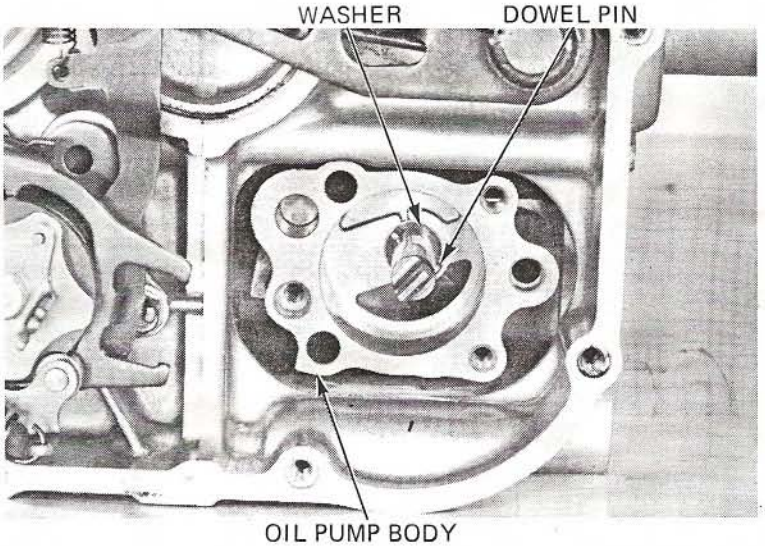
Remove the O-rings and collars from the pump cover.
Remove the pump cover from the oil pump by removing the three screws and two bolts.



Remove the inner and outer rotors from the pump body.
Remove the dowel pins from the pump body.

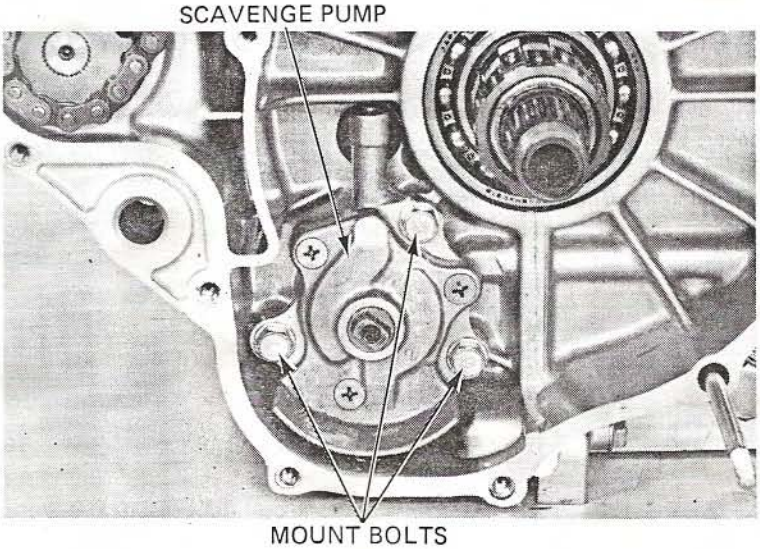


Remove the dowel pin and washer from the pump drive shaft.
Remove the pump body.

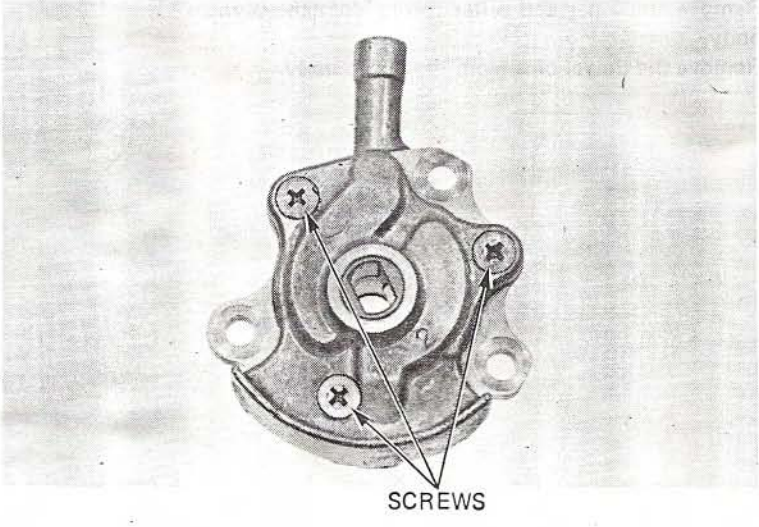


SCAVENGING PUMP REMOVAL

Remove the rear engine cover.
Remove the clutch outer (Page 8-12).
Remove the scavenging pump by removing the three mount bolts.



Remove the pump cover from the pump by removing the three screws.



OIL PUMP INSPECTION

NOTE:

> The main and scavenging pumps are quite identical in construction and can be serviced in the same manner.

TIP CLEARANCE

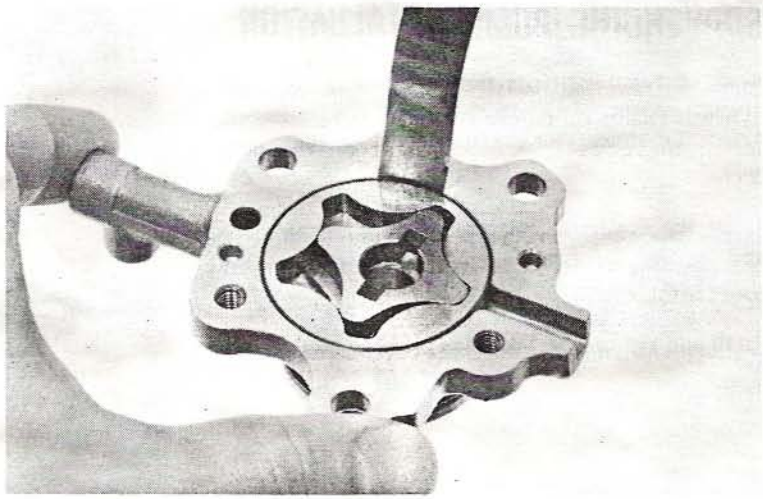
Measure the rotor tip clearance.

SERVICE LIMIT:
MAIN/SCAVENGE: 0.35 mm (0.014 in)

BODY CLEARANCE

Measure the pump body clearance.

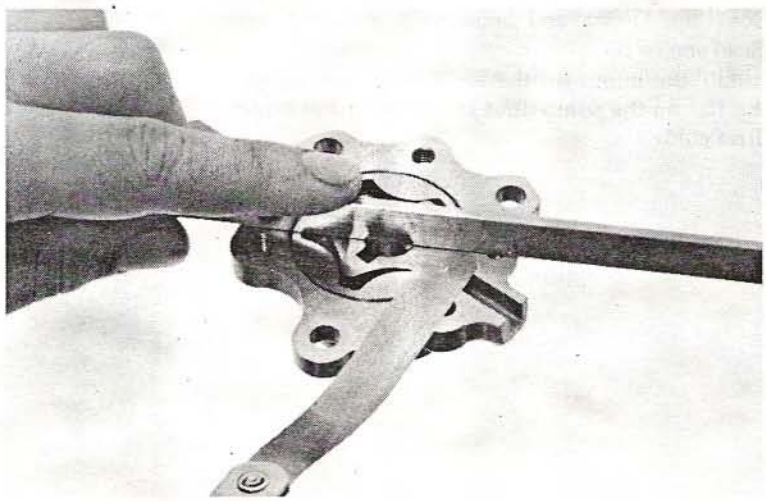
SERVICE LIMIT:
MAIN/SCAVENGE: 0.41 mm (0.016 in)



END CLEARANCE

Measure the end clearance using a straight edge and feeler gauge as shown.

SERVICE LIMIT:
MAIN/SCAVENGE: 0.12 mm (0.005 in)



RELIEF VALVE INSPECTION

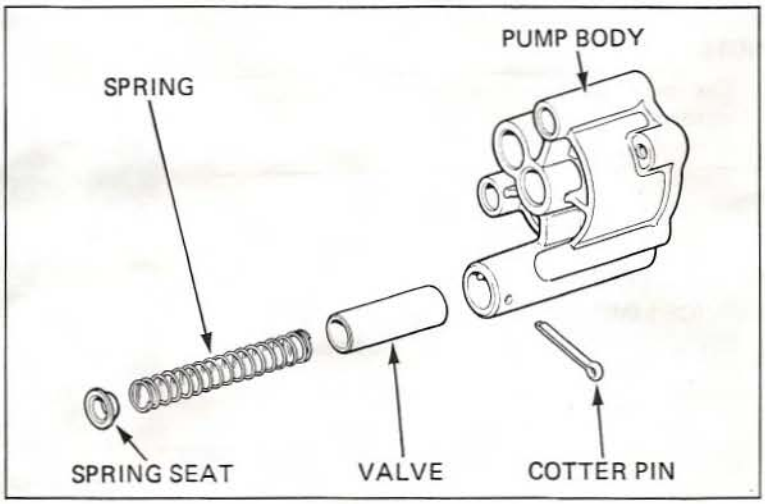
Remove the cotter pin, spring seat, spring and valve.

Check the relief valve for freedom of movement in the pump body.
Measure the free length of the valve spring.

SERVICE LIMIT: 67.0 mm (2.64 in)

NOTE:

- Replace the cotter pin with a new one whenever disassembled.
- Check operation of the relief valve after assembly.

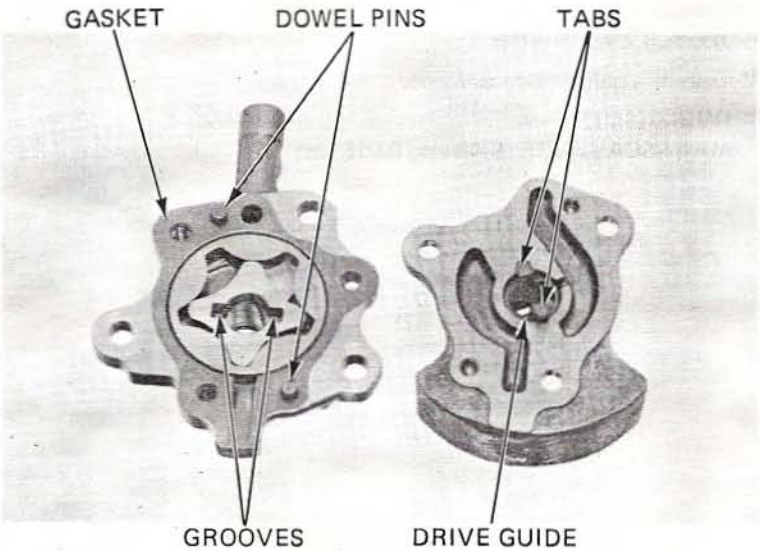


SCAVENGING PUMP INSTALLATION

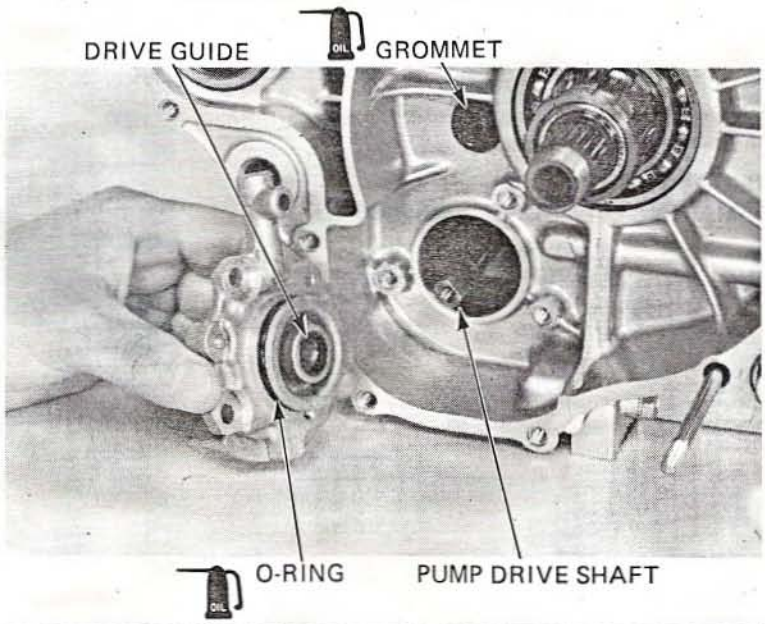
Clean all removed parts thoroughly and dip them in clean engine oil before they can be reassembled.
Install the dowel pins and gasket on the pump body.

Install the cover on the pump body aligning the tabs on the drive guide with the grooves in the inner rotor.

Install and tighten the the three cover screws.

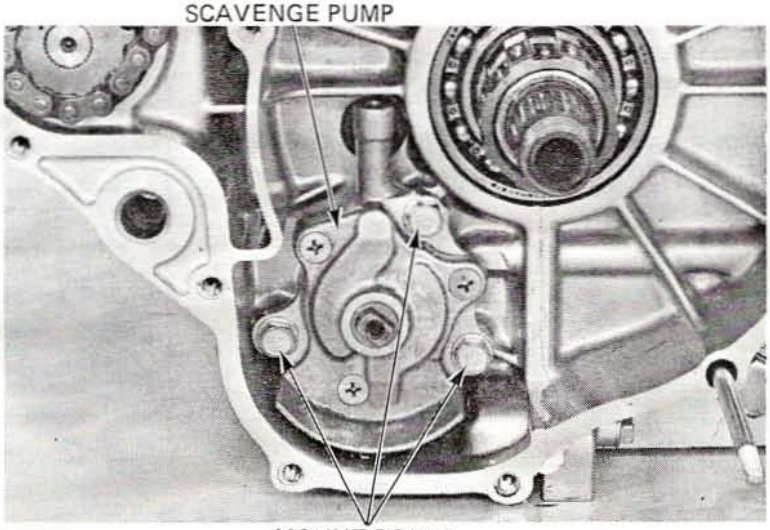


Coat the O-ring and engine case grommet with clean engine oil.
Install the pump on the engine case with aligning the flat on the pump drive shaft with the flat on the drive guide.



Install and tighten the three mount bolts.

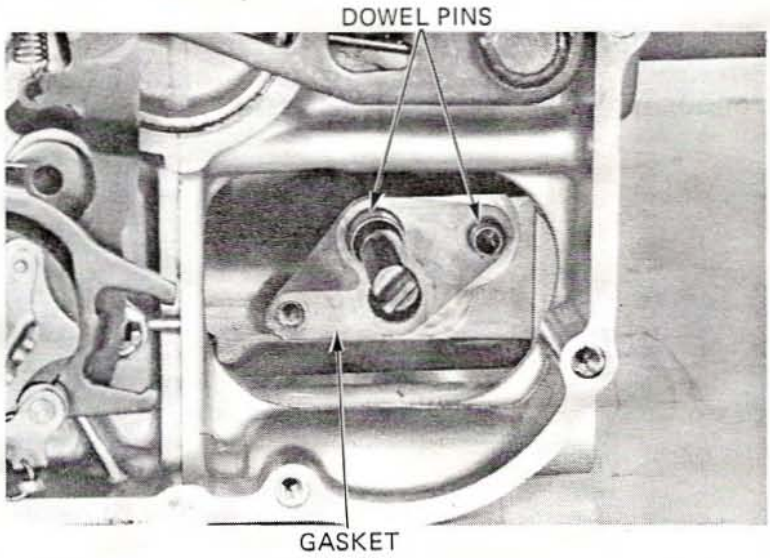
TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)



MAIN PUMP INSTALLATION

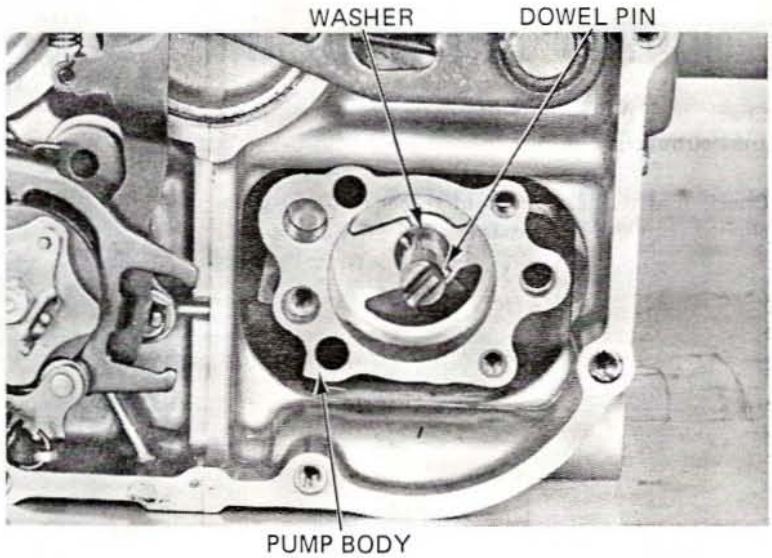
Clean and dip all removed parts in clean engine oil before they can be reassembled.

Install the dowel pins and gasket on the engine case.



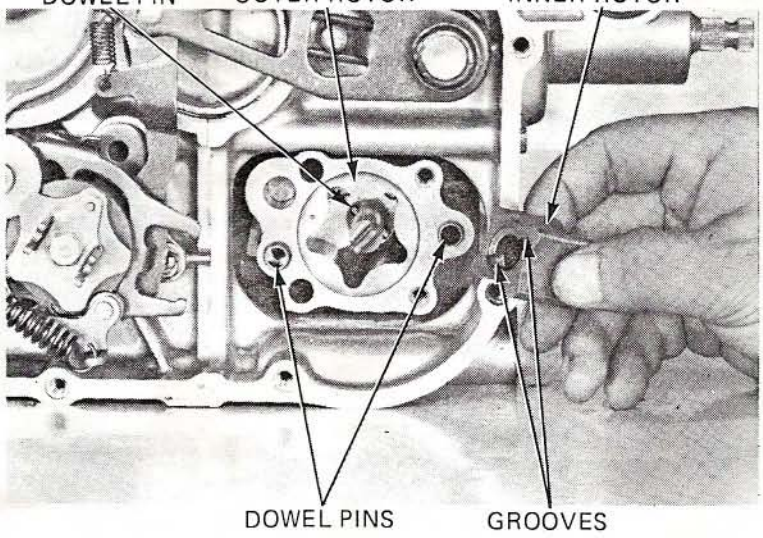
Install the pump body on the engine case.

Insert the washer and dowel pin onto the pump drive shaft.



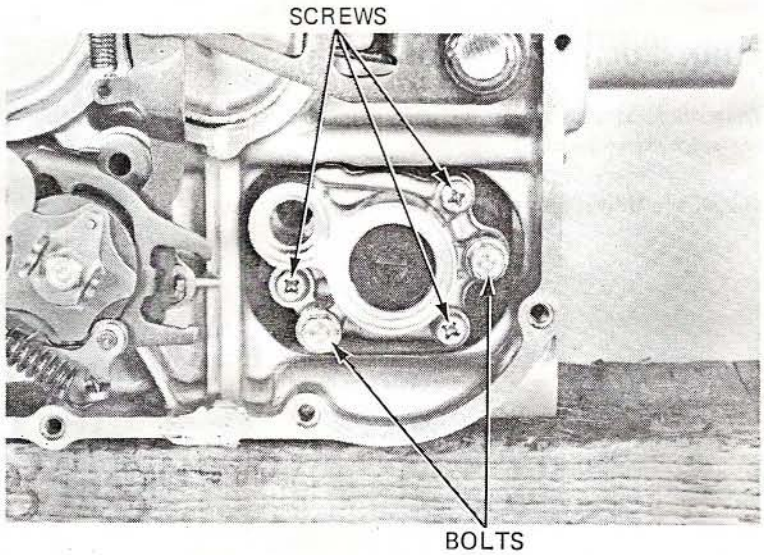
Install the dowel pins on the pump body.
Install the outer rotor into the body with the punch mark facing the outside.

Align the grooves in the inner rotor with the dowel pin, and insert the inner rotor into the outer rotor.



Install the oil pump cover and tighten the cover screws and bolts.

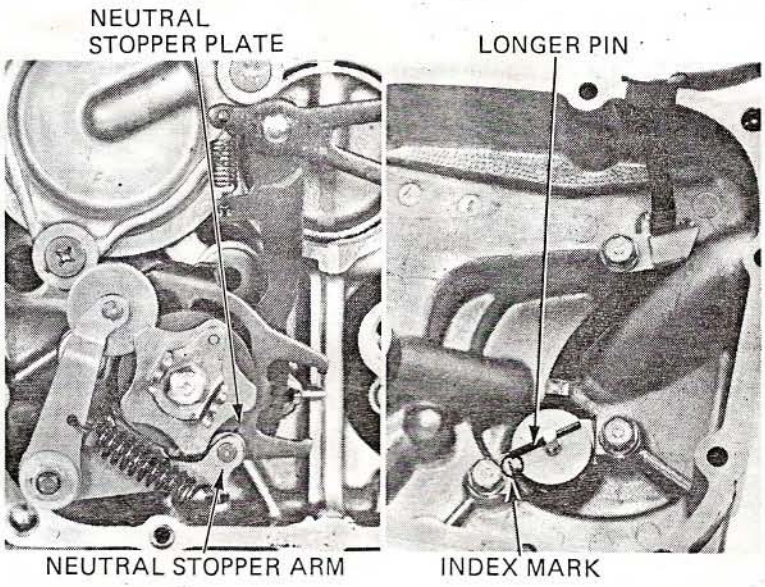
TORQUE: 10–12 N·m (1.0–1.2 kg-m, 7–10 ft-lb)



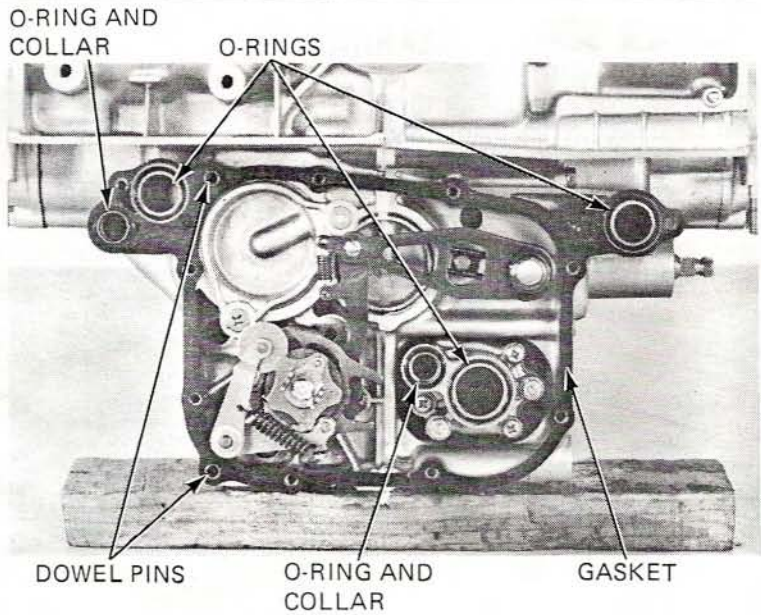
FRONT ENGINE COVER INSTALLATION

Check that the neutral stopper arm is aligned with the neutral cut-out in the stopper plate properly.

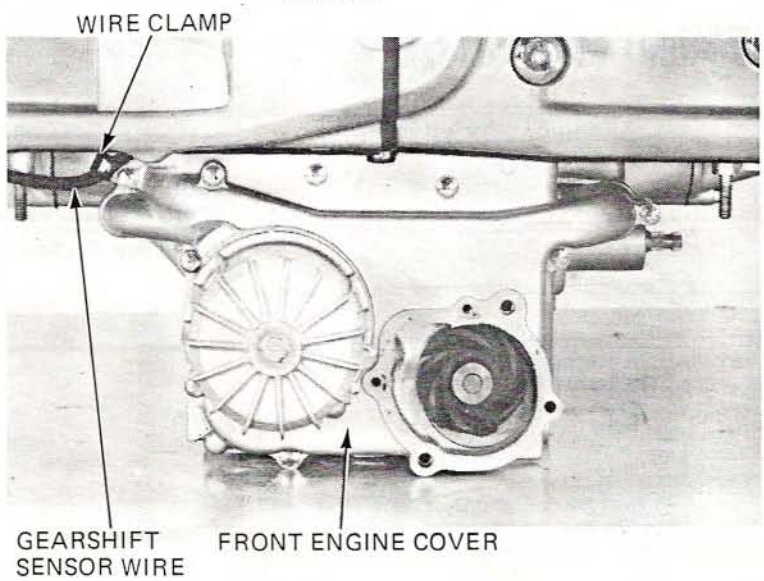
Check that the longer pin of the gearshift sensor is aligned with the index mark on the sensor body.



Install new O-rings and collars.
Install the dowel pins and a new gasket on the engine case.



Install the front engine cover and tighten the cover bolts in a crisscross pattern in 2–3 steps.

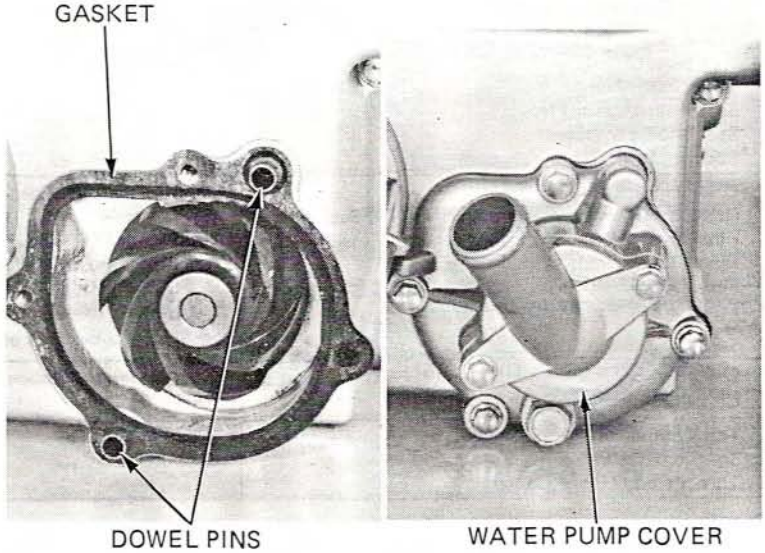


Install the dowel pins and a new gasket on the engine cover.
Install the radiator and water pump cover and tighten the cover bolts.

TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

Fill the engine with the recommended oil up to the proper level (Page 2-3).

Fill the system with coolant and bleed air from the radiator (Page 6-3).

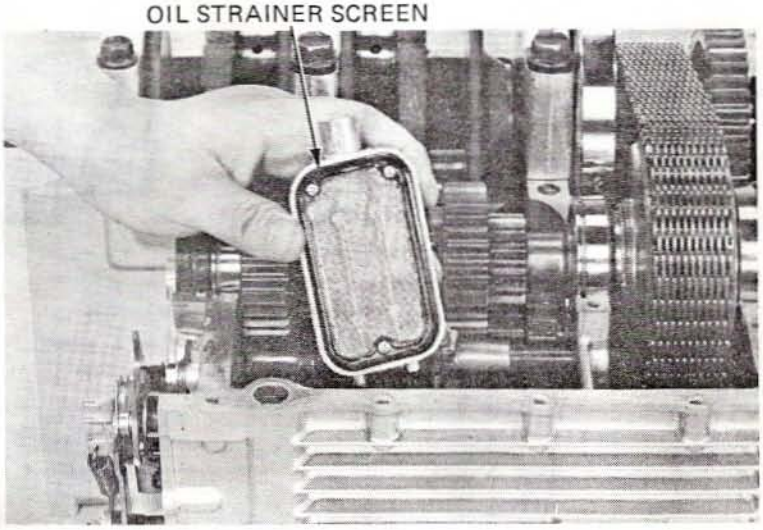


STRAINER SCREEN CLEANING

Separate the engine cases (Page 10-9).
Clean the strainer screen thoroughly.
Remove accumulated sediments from the engine cases.

Install the strainer screen and assemble the engine cases (Page 10-24).

OIL STRAINER SCREEN



LUBRICATION POINTS

LUBRICATION POINT	LUBRICANT	REMARKS
Engine	HONDA 4-STROKE OIL or AN EQUIVALENT API Service Classification: SE or SF	3.2ℓ (3.4 US qt, 2.8 Imp qt) After draining
Final Drive Gear	Hypoid Gear Oil, SAE 80, API GL-5	130 cm³ (4.4 US oz, 4.6 Imp oz) After draining
Front Fork	ATF (Automatic Transmission Fluid)	323 cm³ (10.9 US oz, 11.4 Imp oz) After draining
Steering Head Bearings Steering Head Bearing Dust Seal Suspension Air Hose Joint O-rings Brake Lever Pivot Clutch Lever Pivot Speedometer Gearbox Swing Arm Pivot Bearings and Dust Seals Final Driven Flange Bolts (Threads) Front and Rear Wheel Bearings Rear Wheel Bearing Dust Seal Lips Throttle Grip Sliding Surface Center Stand Pivot Side Stand Pivot Brake Pedal Pivot Seat Adjust Lever Pivot Seat Sliding Surfaces Footpeg Pivot	Multipurpose Grease	
Drive Shaft, Universal Joint Drive Shaft Pinion Joint Splines and Oil Seal Final Driven Flange Splines Final Driven Shaft Oil Seal Lip Pinion Retainer O-ring Front Wheel Bearing Dust Seal Lips	Molybdenum Disulfide Grease • MOLYKOTE® BR2-PLUS manufactured by Dow Corning, U.S.A. • MULTIPURPOSE M-2 manufactured by Mitsubishi Oil, Japan • Other lubricants of equivalent quality	
Brake Caliper Pivot Bolts Sliding Surface Brake Caliper Slide Collars	Hi-Temperature Silicone Grease	
Top Compartment Cover Pivot Speedometer Cable Throttle and Choke Cables	Light Weight Oil	

3. MAINTENANCE

SERVICE INFORMATION

WARNING

- *Support the motorcycle on the center stand on a level surface before starting any work.*
- *When the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas.*

SPECIFICATIONS

Frame

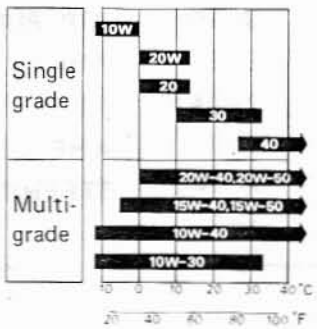
Throttle grip free play		: 2–6 mm (1/8–1/4 in)
Final gear oil		: Hypoid gear oil SAE 80, API GL-5 130 cm^3 (4.4 US oz, 4.6 Imp oz) after draining
Brake fluid		: DOT 4 Brake fluid
Clutch fluid		: DOT 4 Brake fluid
Front fork air pressure		: 0–40 kPa (0–0.4 kg/cm^2, 0–6 psi)
Rear suspension air pressure		: 200–400 kPa (2.0–4.0 kg/cm^2, 28–57 psi)
Tire pressure	Front	: 225 kPa (2.25 kg/cm^2, 32 psi)
	Rear	: 225 kPa (2.25 kg/cm^2, 32 psi) Driver only 280 kPa (2.8 kg/cm^2, 40 psi) Driver and one passenger
Tire tread depth	Front	: 1.5 mm (1/16 in)
	Rear	: 2.0 mm (3/32 in)

Engine

Choke valve stroke	: 6–7 mm (0.2–0.3 in)
Recommended spark plugs	
Standard	: DPR 8EA-9 (NGK) or X24EPR-U9 (ND)
For cold climate (Below 5°C, 41°F)	: DPR 7EA-9 (NGK) or X22EPR-U9 (ND)
Extended high speed riding	: DPR 9EA-9 (NGK) or X27EPR-U9 (ND)
Spark plug gap	: 0.8–0.9 mm (0.031–0.035 in)
Idle speed	: 950 ± 100 min^{-1} (rpm)
Engine oil Recommended oil	: HONDA 4-stroke oil or equivalent API Service classification SE or SF

The viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range.

OIL VISCOSITIES



Engle oil capacity	: 3.2ℓ (3.4 US qt, 2.8 Imp qt) After draining 4.0ℓ (4.2 US qt, 3.5 Imp qt) After disassembly
Carburetor vacuum difference	: Within 40 mm (1.6 in) Hg

TOOLS

Vacuum gauge	: 07404–0030100 or equivalent gauge commercially available
Vacuum gauge adaptor (A)	: 07510–3000100
Vacuum gauge adaptor (B)	: 07510–3000200

TROUBLESHOOTING

Engine will not crank
- Battery or charging system faulty
- Starter or starter system faulty
- Engine seized
- Switches or accessory faulty

Engine cranks but will not start
- Out of fuel or incorrect fuel
- Engine stop switch off
- Ignition system faulty
- Fuel filter clogged
- Fuel cap vent clogged

Engine cranks but will not start-cold weather
- Battery weak due to low temperature
- Incorrect choke cable adjustment
- Ice in fuel lines, carburetors, fuel tank, or fuel filter
- Incorrect engone oil
- Water pump iced (incorrect antifreeze ratio)

Engine cranks but will not start-engine hot
- Fuel flow stopped by boiling (vapor lock) in lines, carburetor, or fuel pump
- Incorrect starting procedure

Run-on (continues to run with ignition off)
- Excessive carbon build-up in engine
- Intake pipe leak
- Old or incorrect fuel

Lack of power or high speed performance
- Alternator voltage low or battery low
- Ignition system faulty
- Intake pipe leaks
- Not enough fuel
- Valve springs weak or broken
- Cylinder head gasket blown

Misfires at idle
- Dirty air cleaner
- Spark plugs gapped incorrectly
- Spark plug caps faulty
- Ignition cables deteriorated
- Carburetor problems (choke, clogged jets, high float level, etc.)

Mid-range performance poor
- Incorrect spark plug heat range
- Faulty spark plugs
- Ignition system faulty
- Low engine compression
- Low fuel pump pressure
- Improperly adjusted throttle linkage

Backfires, explosions in muffler
- Ignition system faulty
- Retarded ignition timing
- Valve timing faulty
- Lean mixture (often due to dirt or water in fuel, or intake air leak)
- Slow air cut-off valve faulty
- Leaky or sticking intake valve or weak or broken intake valve spring
- Faulty hydraulic tappet
- Weak or broken exhaust valve spring(s)
- Burnt exhaust valve(s)

Pre-ignition (mixture ignites before spark plug fires)
- Hot spot in combustion chamber (carbon particle)
- Overheated valve (sticking in guide)
- Overheated engine

MAINTENANCE SCHEDULE

Perform the PRE-RIDE INSPECTION in the Owner's Manual at each scheduled maintenance period.

I: INSPECT AND CLEAN, ADJUST, LUBRICATE, OR REPLACE IF NECESSARY.
C: CLEAN, R: REPLACE, L: LUBRICATE

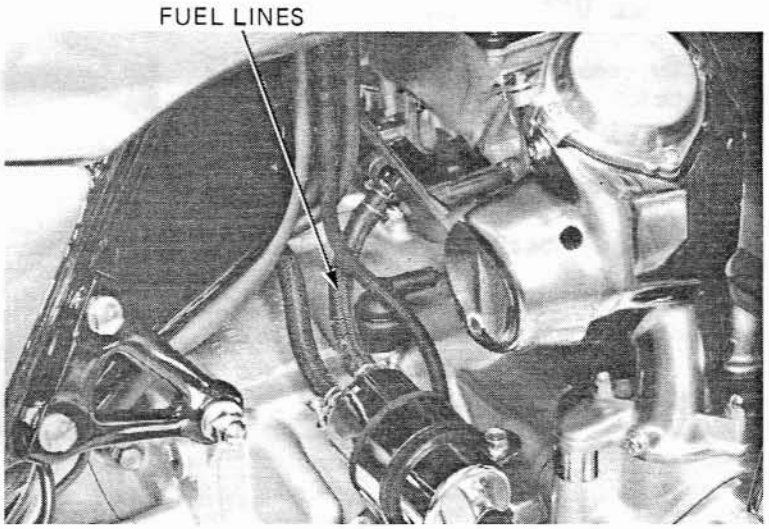
	ITEM \ FREQUENCY	WHICHEVER COMES FIRST → / EVERY ↓	ODOMETER READING (NOTE 3) 1,000 km (600 mi)	6,400 km (4,000 mi)	12,800 km (8,000 mi)	19,200 km (12,000 mi)	25,600 km (16,000 mi)	32,000 km (20,000 mi)	38,400 km (24,000 mi)	Refer to page
*	FUEL LINES				I		I		I	3-5
*	FUEL FILTER								R	3-5
*	THROTTLE OPERATION		I		I		I		I	3-6
*	CARBURETOR CHOKE				I		I		I	3-6
	AIR CLEANER	NOTE 1			R		R		R	3-7
	CRANKCASE BREATHER	NOTE 2		C	C	C	C	C	C	3-8
	SPARK PLUGS			I	R	I	R	I	R	3-9
	ENGINE OIL	YEAR: R	R		R		R		R	2-3
	ENGINE OIL FILTER	YEAR: R	R		R		R		R	2-3
*	CARBURETOR SYNCHRONIZATION		I		I		I		I	3-9
*	CARBURETOR IDLE SPEED		I	I	I	I	I	I	I	3-10
	RADIATOR COOLANT				I		I		*R	3-11
*	RADIATOR CORE				I		I		I	3-11
*	COOLING SYSTEM HOSES & CONNECTIONS		I		I		I		I	3-12
**	DRIVE SHAFT JOINT						L			3-12
	FINAL DRIVE OIL				I		I		R	3-12
	BATTERY	MONTH: I	I	I	I	I	I	I	I	3-13
	BRAKE FLUID	MONTH: I 2 YEARS:* R	I	I	I	*R	I	I	*R	3-14
	BRAKE PAD WEAR			I	I	I	I	I	I	3-14
	BRAKE SYSTEM		I		I		I		I	3-15
*	BRAKE LIGHT SWITCH		I		I		I		I	3-16
*	HEADLIGHT AIM		I		I		I		I	3-16
	CLUTCH FLUID	MONTH: I 2 YEARS:* R	I	I	I	*R	I	I	*R	3-17
	CLUTCH SYSTEM		I		I		I		I	3-17
	SIDE STAND				I		I		I	3-18
*	SUSPENSION		I		I		I		I	3-18
*	AIR PUMP ELEMENT	NOTE 4				C			C	3-20
*	AIR DRIER	NOTE 4	I		I		I		I	3-20
*	NUTS, BOLTS, FASTENERS		I		I		I		I	3-21
**	WHEELS		I		I		I		I	3-22
**	STEERING HEAD BEARINGS		I		I		I		I	3-22

* SHOULD BE SERVICED BY AN AUTHORIZED HONDA DEALER, UNLESS THE OWNER HAS PROPER TOOLS AND SERVICE DATA AND IS MECHANICALLY QUALIFIED.
** IN THE INTEREST OF SAFETY, WE RECOMMEND THESE ITEMS BE SERVICED ONLY BY AN AUTHORIZED HONDA DEALER.

NOTES: 1. SERVICE MORE FREQUENTLY WHEN RIDING IN DUSTY AREAS.
2. SERVICE MORE FREQUENTLY WHEN RIDING IN RAIN OR AT FULL THROTTLE.
3. FOR HIGHER ODOMETER READING, REPEAT AT THE FREQUENCY INTERVAL ESTABLISHED HERE.
4. GOLD WING ASPENCADE (GL1200A) MODEL ONLY.

FUEL LINES

Check the fuel lines for deterioration, damage, or leakage.
Replace if necessary after turning the fuel valve OFF. Tighten hose clamps as required.



FUEL FILTER

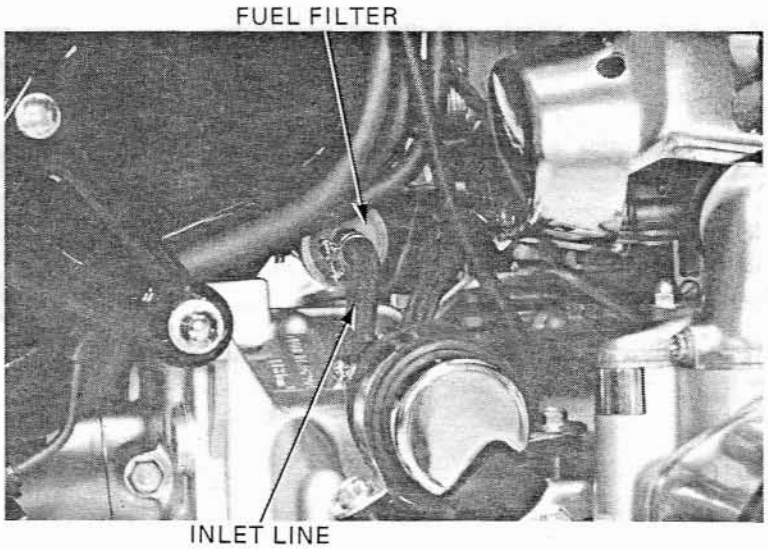
Turn the fuel valve and ignition switch OFF.

Loosen the hose clamp and pull the fuel pump inlet line off the fuel pump.

Remove the nut holding the fuel filter bracket to the fuel tank.
Pull the inlet line and filter out the left side.

WARNING

Gasoline is flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.



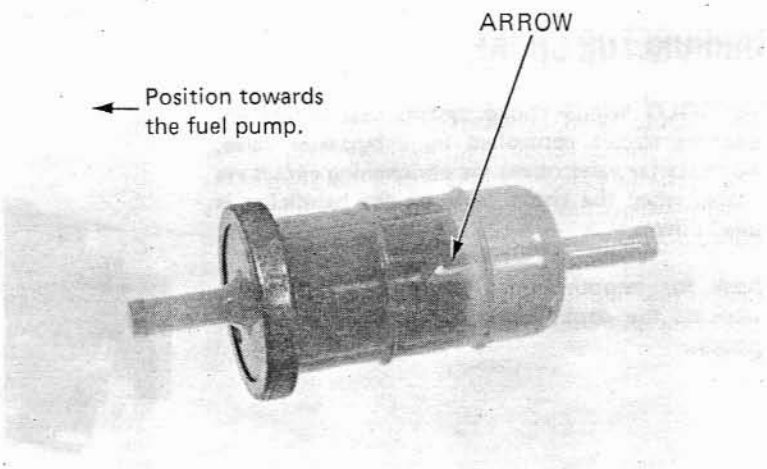
Remove the fuel filter bracket and loosen the hose clamps at each end of the filter.

Pull the fuel lines off the filter and install a new filter with the arrow on the body pointing toward the fuel pump.

Install the fuel filter bracket on the filter and tighten securely.

Route the fuel line under the fuel tank and connect it to the fuel pump.

Position the filter bracket on the gas tank and install the nut, then tighten the hose clamp at the fuel pump.



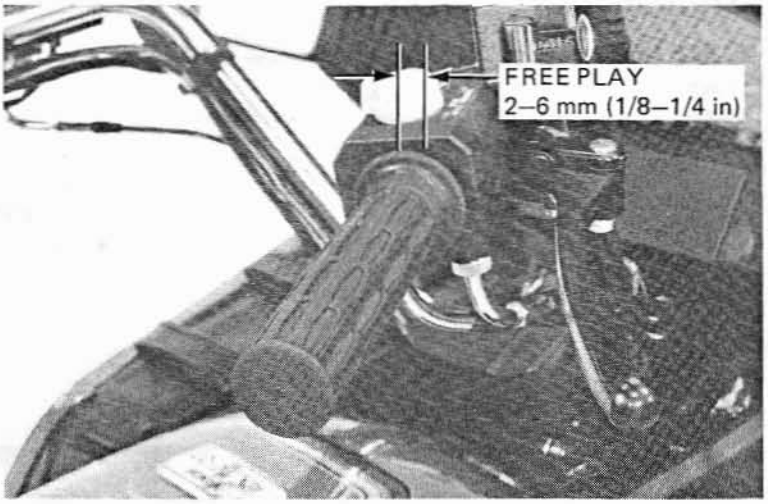
THROTTLE OPERATION

Check for smooth throttle grip full opening and automatic full closing in all steering positions.

Make sure there is no deterioration, damage, or kinking in the throttle cables. Replace any damaged parts.
Lubricate the throttle cables, if throttle operation is not smooth.

Measure throttle grip free play at the throttle grip flange.

FREE PLAY: 2–6 mm (1/8–1/4 in)

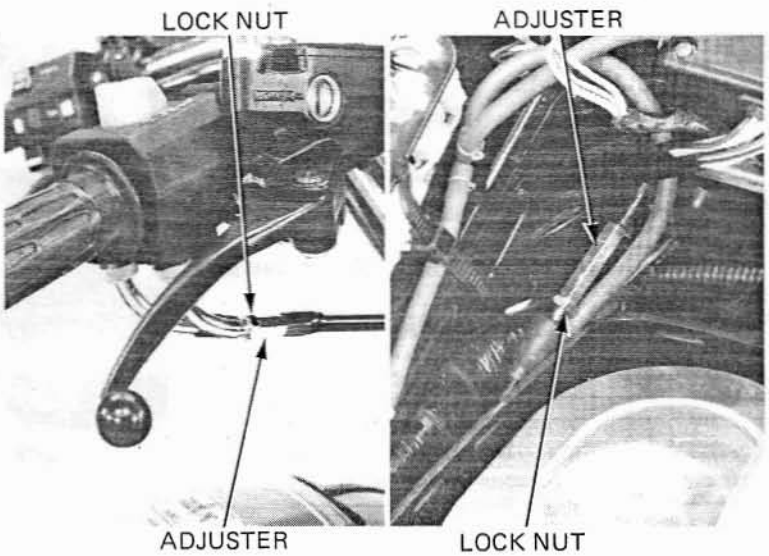


Make minor adjustments with the adjuster at the throttle grip.

Make major throttle grip free play adjustments with the middle cable adjuster after removing the air cleaner cover.

To make adjustments with either adjuster, loosen the lock nut, turn the adjuster as required, and tighten the lock nut.

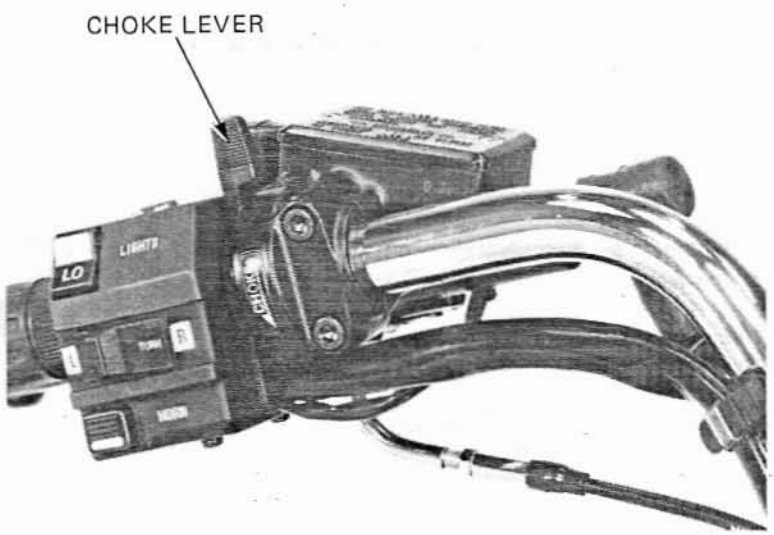
Recheck throttle operation and install all removed parts.



CARBURETOR CHOKE

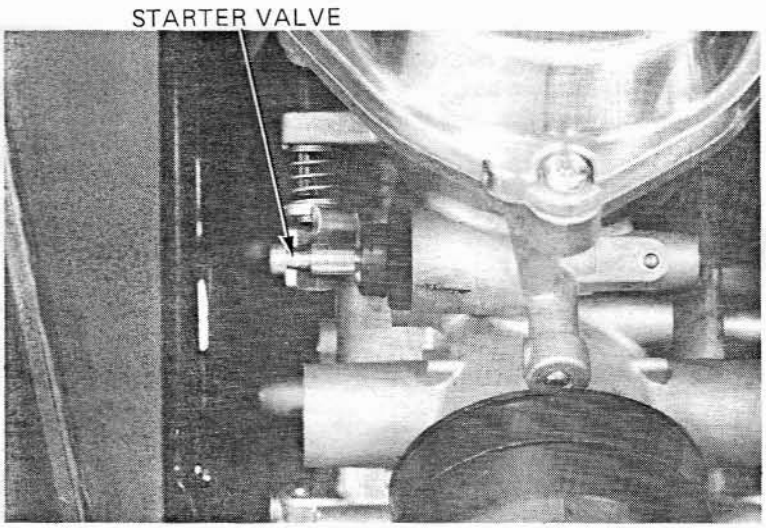
The GOLD WING choke system uses a fuel enrichening circuit controlled by a bystarter valve. The bystarter valve opens the enrichening circuit via a cable when the choke lever on the handlebar is pulled down.

Check for smooth upper choke lever operation. Lubricate the choke cable if the operation is not smooth.

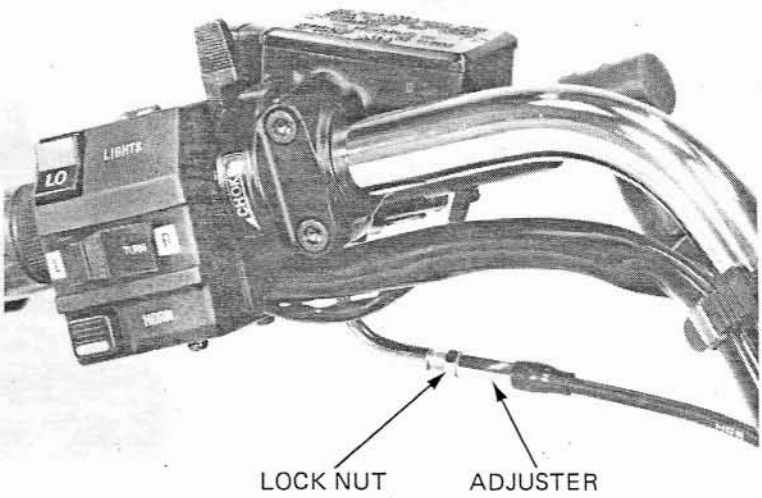


Remove the carburetor protector covers.
Push the choke lever on the handlebar all the way back to fully open position and measure the starter valve stroke at the each carburetor between the fully closed and fully open positions.

VALVE STROKE: 6–7 mm (0.2–0.3 in)

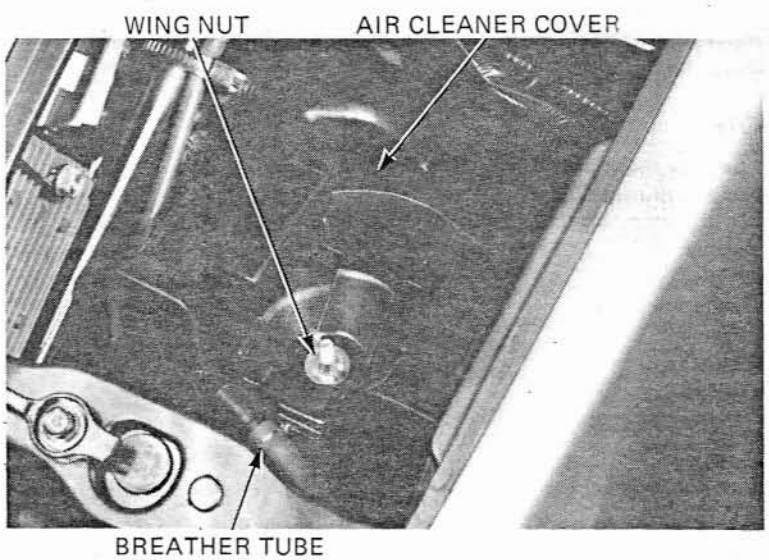


To adjust, loosen the lock nut and turn the adjuster as required. Tighten the lock nut.



AIR CLEANER

Open the top compartment cover and lift out the tool tray.
Remove the fuse box from the holder. Disconnect the breather tube from the air cleaner case.
Remove the wing nut and air cleaner cover. Pull out the air cleaner element and discard it.



Install a new air cleaner element. Install the air cleaner cover and wing nut. Connect the breather tube and install the fuse box.
Install the tool tray and close the top compartment cover.

AIR CLEANER

CRANKCASE BREATHER

Loosen the drain tube lower clamp. Remove the storage tank mounting bolt and remove the storage tank.

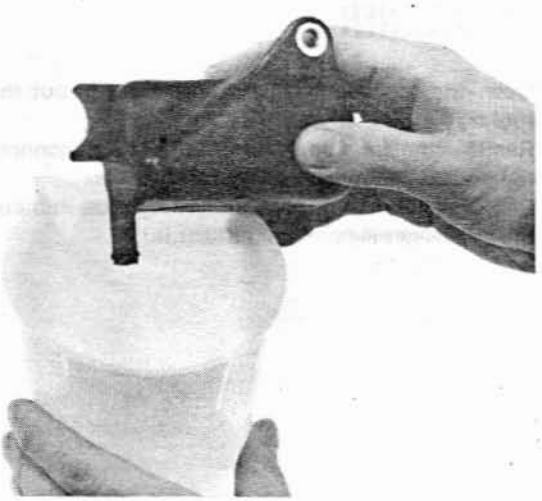
STRORAGE TANK

MOUNTING BOLT

Empty any deposits from the tank and reinstall the storage tank.

NOTE:

> Service more frequently when riding in rain, or at full throttle.



SPARK PLUGS

Remove the plug cap cover.
Disconnect the spark plug caps and clean any dirt from around the spark plug bases.

Remove the spark plugs.

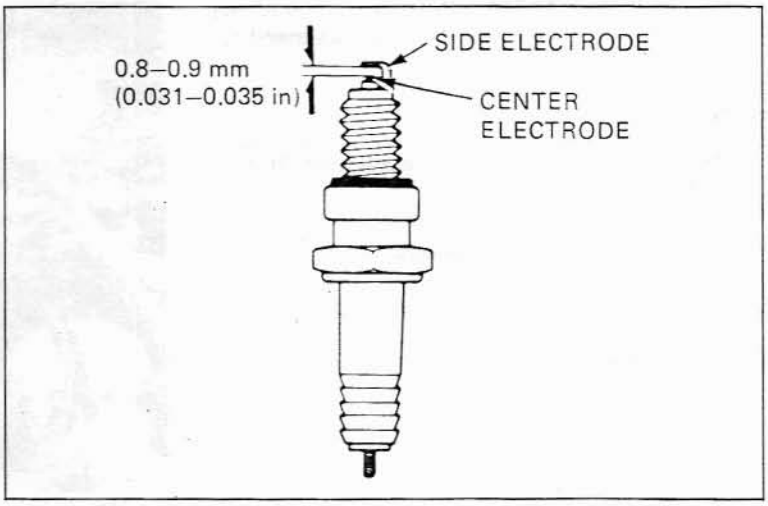
RECOMMENDED SPARK PLUGS:

	NGK	ND
Standard	DPR8EA-9	X24EPR-U9
For cold climiate (Below 5°C, 41°F)	DPR7EA-9	X22EPR-U9
For extended high speed riding	DPR9EA-9	X27EPR-U9

PLUG CAP COVER

Visually inspect the spark plug electrodes for wear. The center electrode should have square edges and the side electrode should have a constant thickness. Discard the spark plug if there is apparent wear or if the insulator is cracked or chipped. If the spark plug deposits can be removed by sandblasting, the spark plug can be reused. Measure the spark plug gaps using a wire-type feeler gauge.

SPARK PLUG GAP:
0.8–0.9 mm (0.031–0.035 in)



Adjust by bending the side electrode carefully. With the plug washer attached, thread each spark plug in by hand to prevent crossthreading. Continue tightening by hand until the spark plug bottoms. Then, tighten the spark plugs another 1/2 turn with a spark plug wrench to compress the plug washer.
Connect the spark plug caps.
Install the spark plug cap cover.

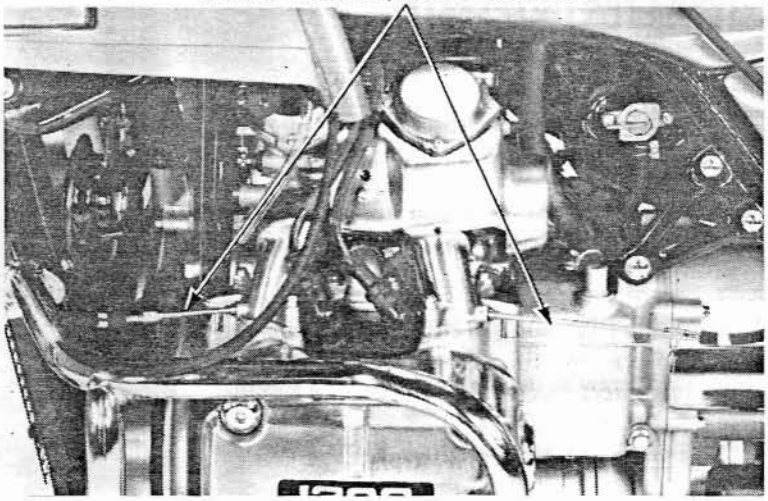
CARBURETOR SYNCHRONIZATION

NOTE:

> Perform this maintenance with the engine at normal operating temperature, transmission in neutral, and motorcycle on its center stand.

Remove the plugs from the carburetor intake pipes and install the vacuum gauge adaptors. Connect the vacuum gauges.

VACUUM GAUGE ADAPTORS
07510–3000100, 07510–3000200

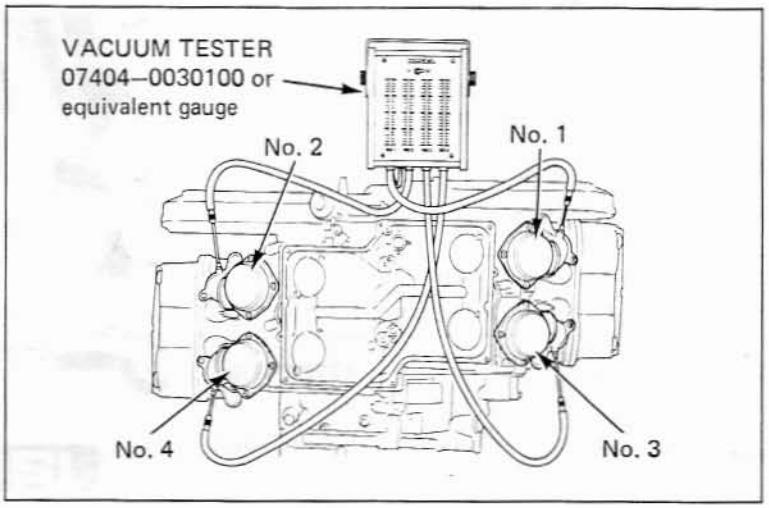


Remove the right and left fairing lower covers and inner covers. (section 20).

Start the engine and adjust the idle speed with the throttle stop screw.

IDLE SPEED: 950 ± 100 min^{-1} (rpm)

Check that the difference in vacuum readings is 40 mm (1.6 in) Hg or less.



If adjustment is necessary turn the adjusting screws until the vacuum gauge readings are within specification.

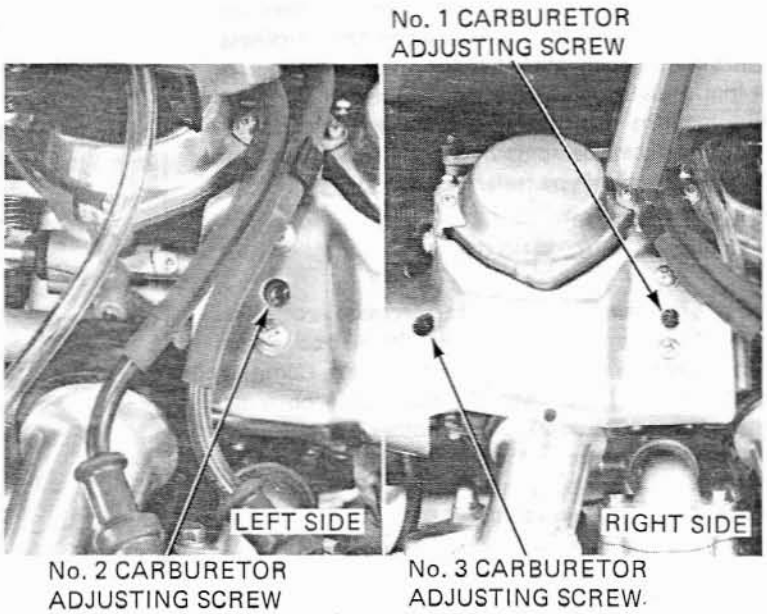
NOTE:

> The No.4 carburetor cannot be adjusted. It is the base.

Start the engine and rev it up several times.

Recheck the synchronization and idle speed.

Install the removed parts.



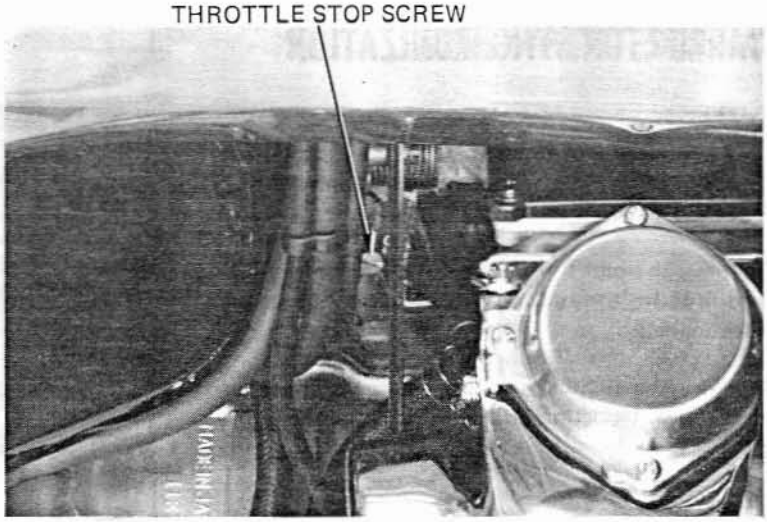
CARBURETOR IDLE SPEED

NOTE:

> - Inspect and adjust idle speed after all other engine adjustments are within specifications.
> - The engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine, shift to NEUTRAL, and place the motorcycle on its center stand. Turn the throttle stop screw as required to obtain the specified idle speed.

IDLE SPEED: 950 ± 100 min^{-1} (rpm)



RADIATOR COOLANT

Support the motorcycle on its centerstand on level ground.

Open the top compartment cover and remove the tool tray.

Check the coolant level of the reserve tank with the engine running at normal operating temperature. The level should be between the "UPPER" and "LOWER" level lines.

If necessary, remove the reserve tank cap and fill to the "UPPER" level line with a 50/50 mixture of distilled water and anti-freeze.

CAUTION:

When adding coolant to the reserve tank, move the fuse box out of the way.

WARNING

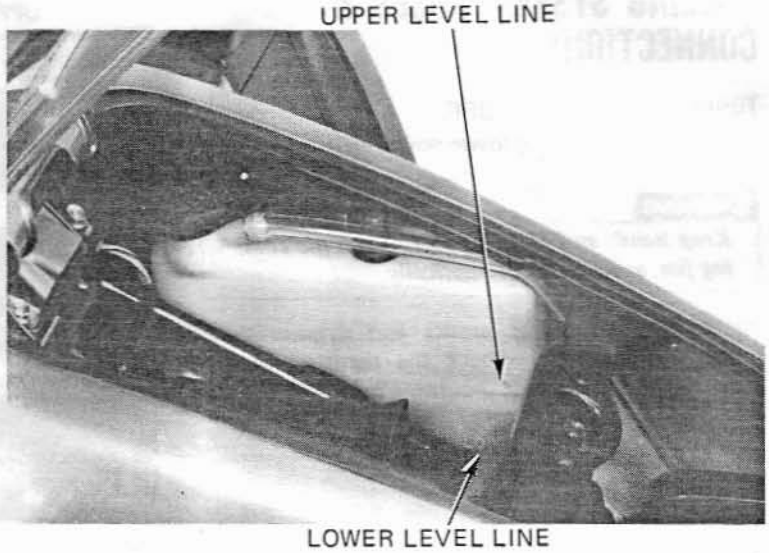
Avoid scalding; never remove the radiator cap when the engine is hot. The coolant is under pressure.

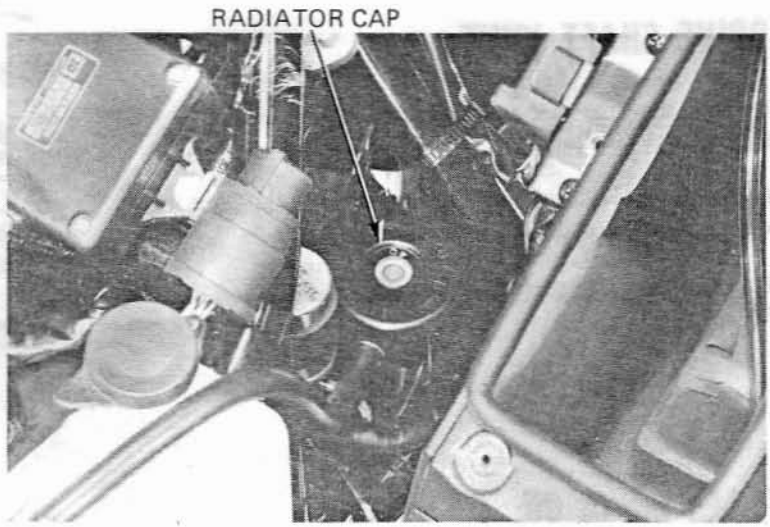
If the reserve tank is empty remove the top compartment and radiator cap.

Run the engine for 2–3 minutes to allow air to escape.

Fill the radiator with coolant and install the cap. Fill the reserve tank to the "UPPER" level line and install the cap.

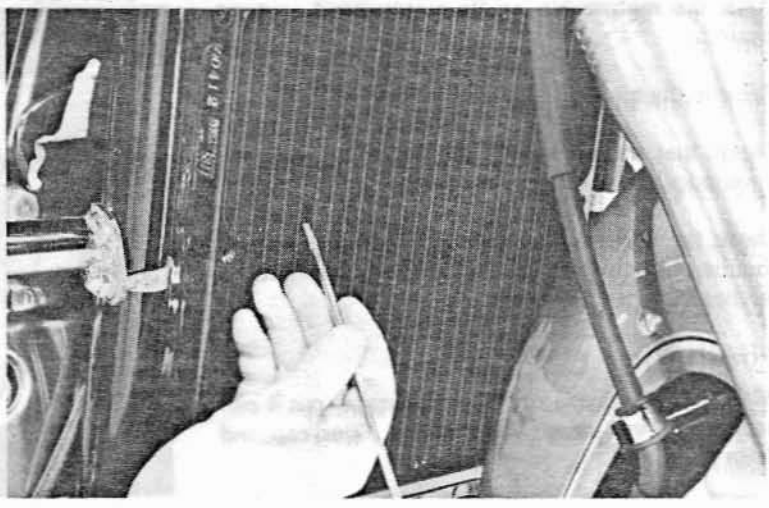
Install the top compartment.





RADIATOR CORE

Remove the radiator screen.
Check the air passages for clogging or damage.
Straighten bent fins or collapsed core tubes.
Remove insects, mud or any obstructions with compressed air or low water pressure.
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.



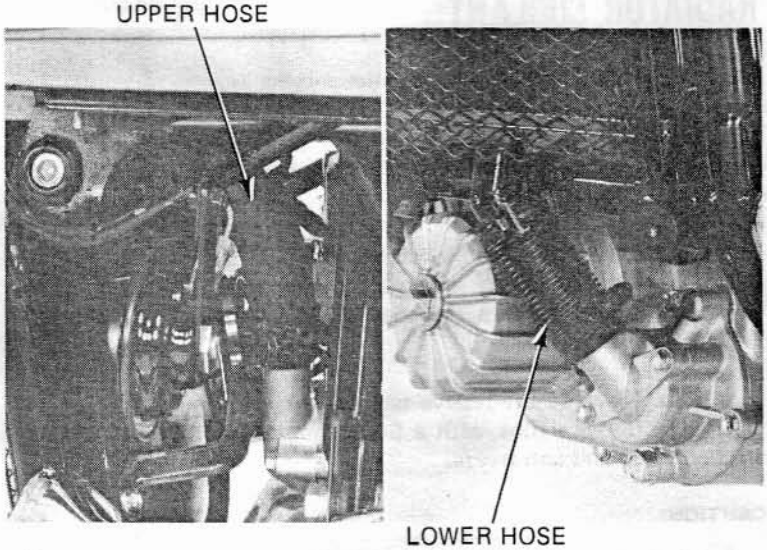
COOLING SYSTEM HOSES & CONNECTIONS

Turn the ignition switch OFF.
Remove the left fairing lower cover.

WARNING

Keep hands and clothing away from the cooling fan, as it starts automatically.

Inspect the hoses for cracks and deterioration. Replace, if necessary. Check the tightness of the hose clamps and radiator mounting nuts.

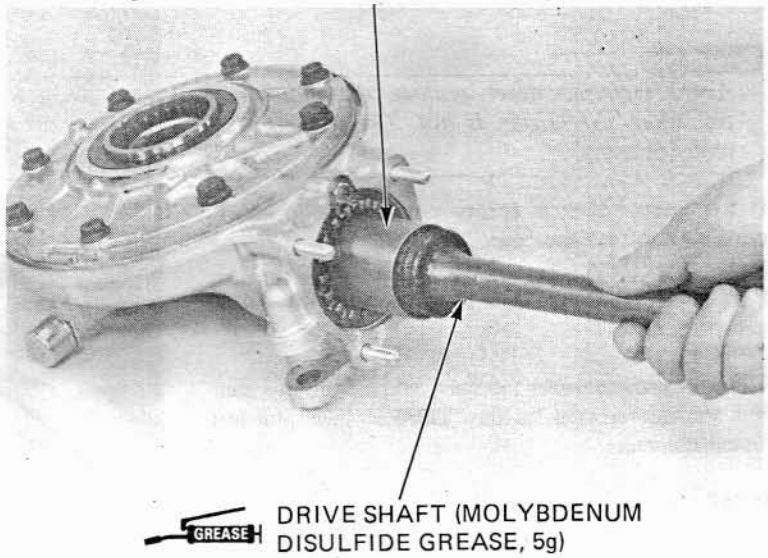


DRIVE SHAFT JOINT

Remove the final gear case and drive shaft from the pinion joint (Section 14).

Lubricate the drive shaft and pinion joint splines with molybdenum disulfide grease.

Reinstall the drive shaft and final gear case (Section 14).



FINAL DRIVE OIL

INSPECTION

Place the motorcycle on its center stand on level ground.

Remove the oil filler cap.

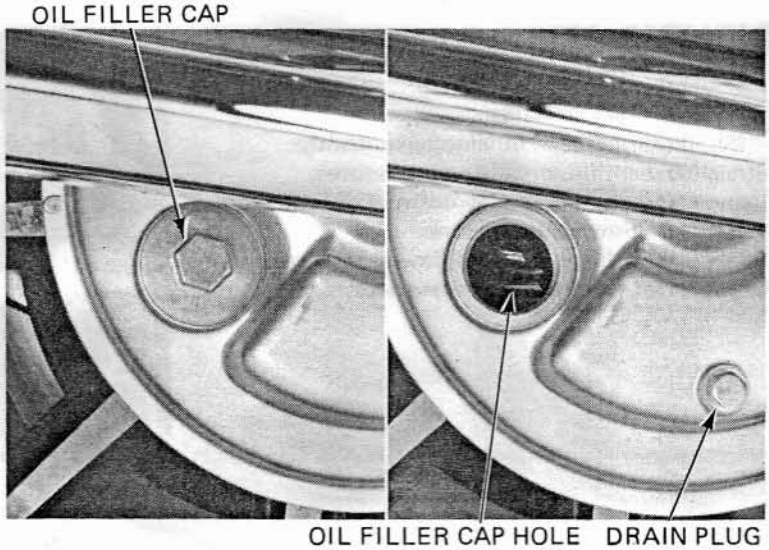
Check that the oil level is slightly lower than the lower edge of the oil filler cap hole.

Check for leaks, if the level is low. Pour fresh recommended oil through the oil filler hole until it reaches the lower edge.

DRAINING

With the motorcycle on its center stand, put a pan under the final drive. Remove the filler cap and drain plug.

Rotate the wheel by hand to drain any residual oil.

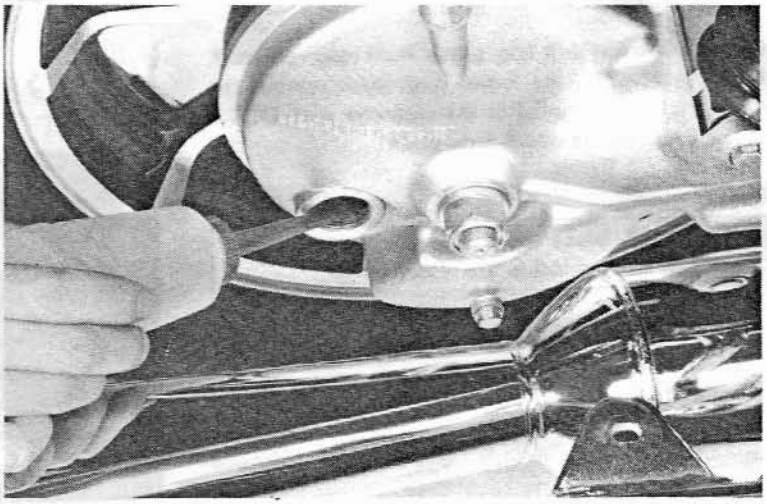


Make sure the sealing washer is in good condition and install the drain plug.

TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

Fill the gear case with the recommended gear oil. Allow 2–3 minutes for the oil to flow around the gear teeth and bearings and check the level. Install the filler cap.

OIL CAPACITY: 130 cm^3 (4.4 US oz, 4.6 Imp oz)
RECOMMENDED OIL:
Hypoid gear oil SAE 80, API GL-5



UPPER LEVEL MARK

BATTERY

Place the motorcycle on its center stand on level ground.

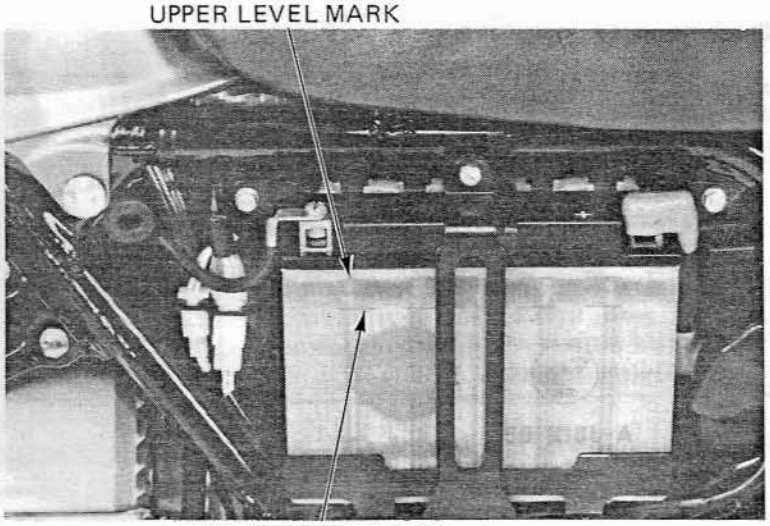
Remove the left side cover.

Inspect the battery fluid level for each cell.

When the fluid level nears the lower level, refill with distilled water to the upper level.

NOTE:

> Add only distilled water. Tap water will shorten the service life of the battery.



LOWER LEVEL MARK

Replace the battery if sulfation forms or sediments accumulate on the bottom.

Make sure the battery breather tube is routed as shown by illustration on the battery caution label.

NOTE:

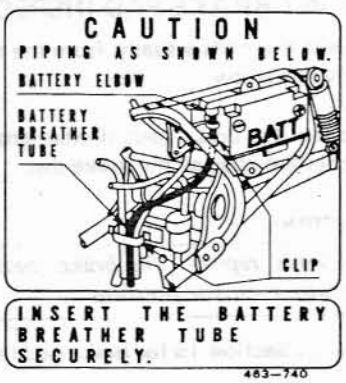
> Apply a thin coat of grease to the battery terminals when installing the battery.

WARNING

> *The battery electrolyte contains sulfuric acid. Protect your eyes, skin, and clothing. If electrolyte gets in your eyes; flush them thoroughly with water and get prompt medical attention.*

BREATHER TUBE

BATTERY CAUTION LABEL

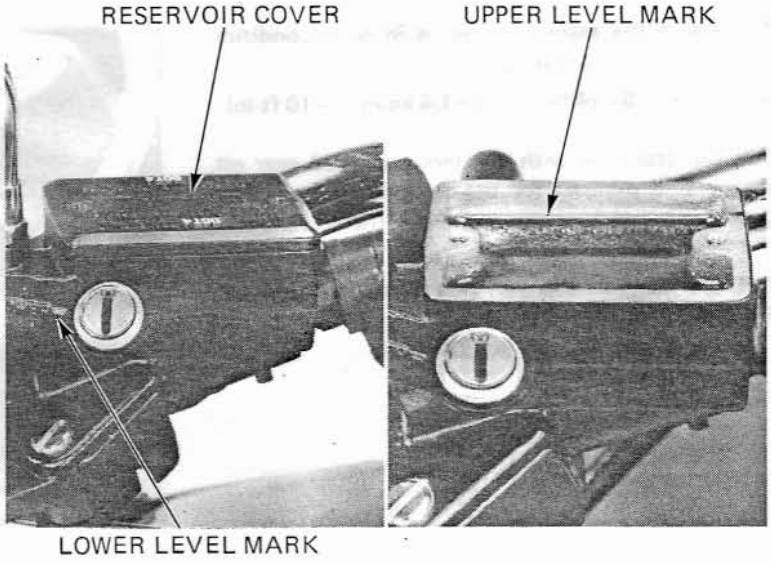


BRAKE FLUID

Check the front and rear brake fluid reservoir level. If the level nears the lower level mark remove the cover and diaphragm. Fill the reservoir with DOT 4 Brake Fluid to the upper level mark.

NOTE:

> The front brake fluid reservoir upper level mark is located inside the reservoir.

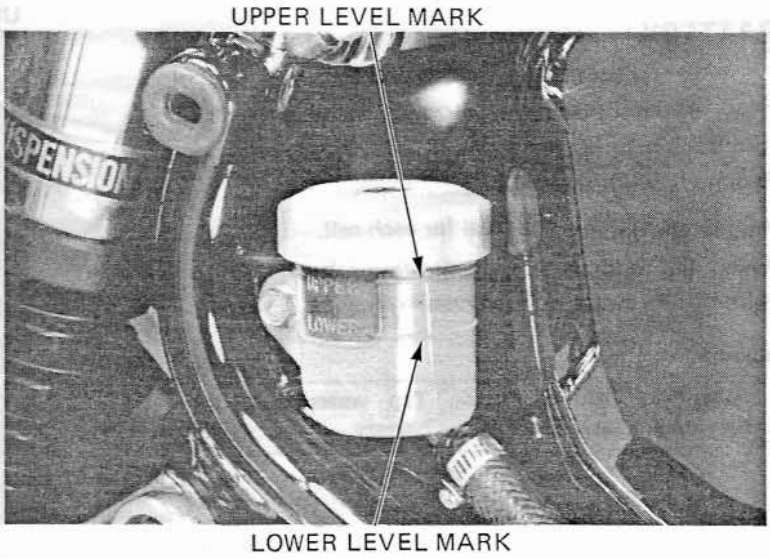


Check the entire system for leaks, if the level is low.

CAUTION:

> - *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
> - *Do not mix different types of fluid, as they are not compartible with each other.*
> - *Avoid spilling fluid on painted surfaces and wind screen. Place a rag over the painted surfaces and wind screen whenever the system is serviced.*

Refer to section 15 for brake bleeding procedures.



BRAKE PAD WEAR

FRONT BRAKE PAD INSPECTION

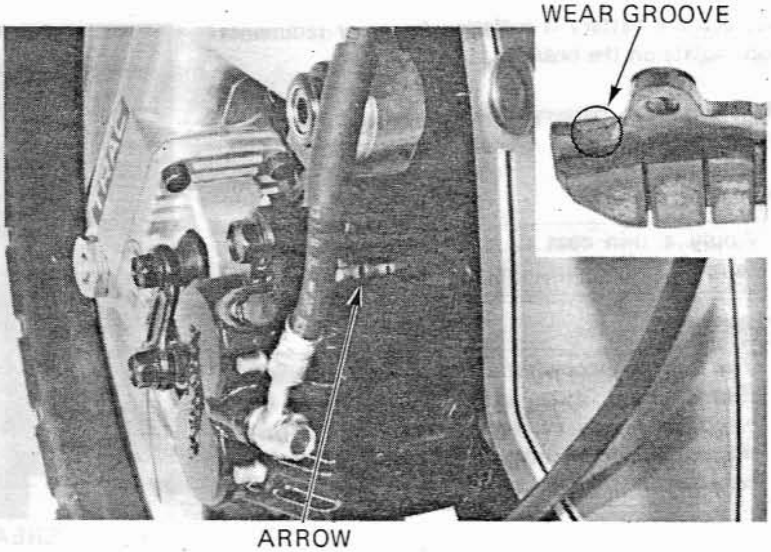
Inspect the pads visually from the direction indicated by the arrow.

Replace the brake pads if wear groove on the pads reaches the edge of the brake disc.

CAUTION:

> *Always replace the brake pads in pairs to assure even disc pressure.*

Refer to Section 15 for brake pad replacement.



REAR BRAKE PAD INSPECTION

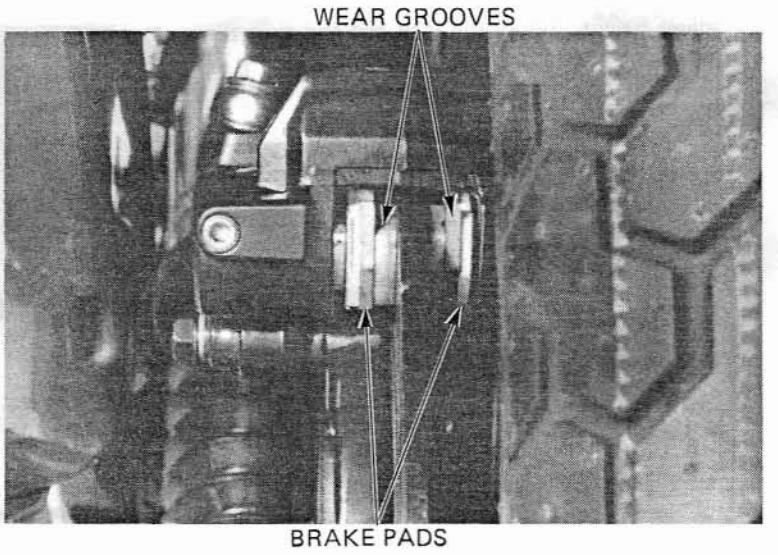
Remove the left saddlebag.

Inspect the pads visually from the back of the caliper.

Replace the brake pads if wear groove on the pads reaches the edge of the brake disc.

CAUTION:

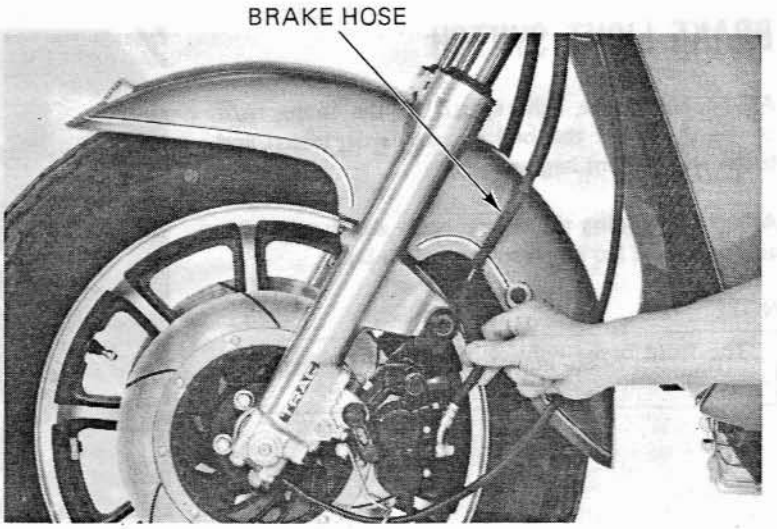
Always replace the brake bads as a set to assure even disc pressure.



BRAKE SYSTEM

Inspect the brake hoses, metal lines and fittings for deterioration, cranks and signs of leakage. Tighten any loose fittings.

Replace hoses metal lines and fittings as required.

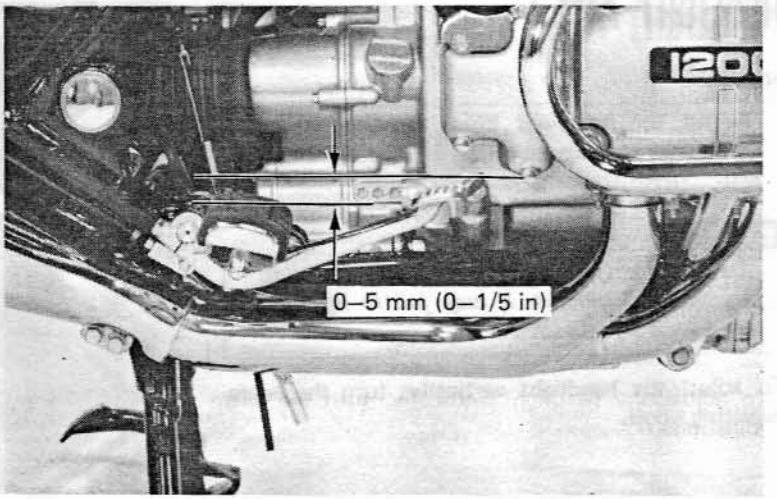


BRAKE PEDAL HEIGHT

Adjust brake pedal height so the pedal is 0–5 mm (0–1/5 in) above the upper surface of the footpeg.

CAUTION:

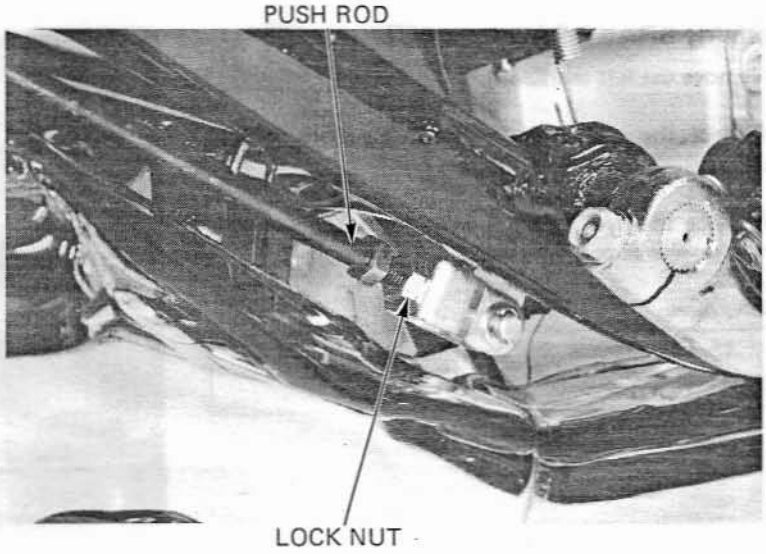
Incorrect brake pedal height can cause brake drag.



To adjust height, loosen the lock nut and turn the master cylinder push rod. Tighten the lock nut.

NOTE:

> Adjust the brake light switch (below) after adjusting pedal height.



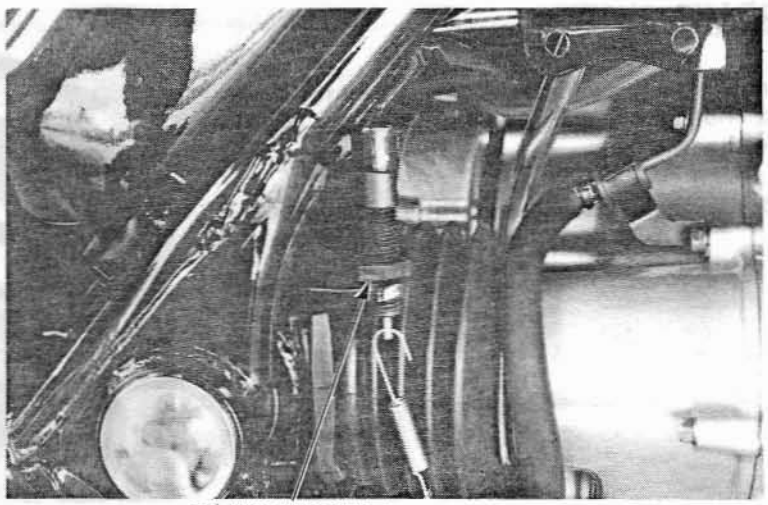
BRAKE LIGHT SWITCH

Adjust the brake light switch so the brake light comes on when the brake pedal is depressed and brake engagement begins.

Adjust by holding the switch body and turning the adjusting nut. Do not turn the switch body.

NOTE:

> The front brake light switch does not require adjustment.



HEDLIGHT AIM

NOTE:

> Adjsut the headlight beam as specified by local laws and regulations.

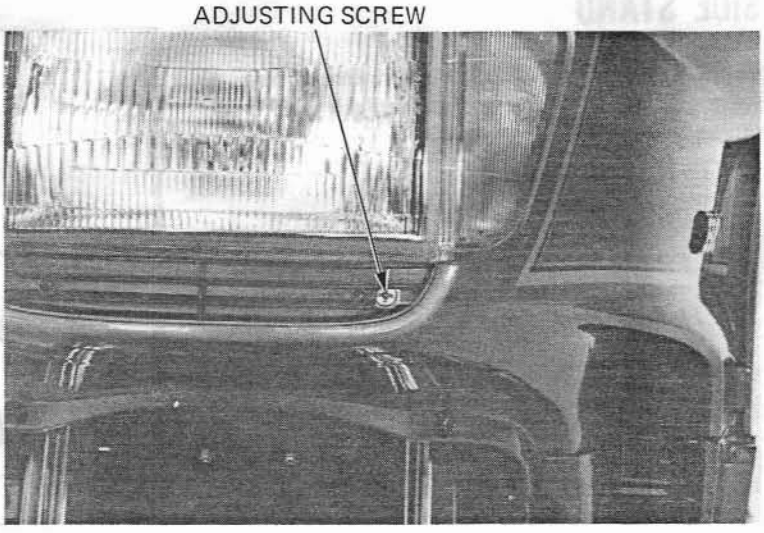
WARNING

> *An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.*

To adjust the headlight vertically, turn the beam adjusting knob.

To adjust the headlight horizontally, turn the adjusting screw.

Make sure all lights function properly.

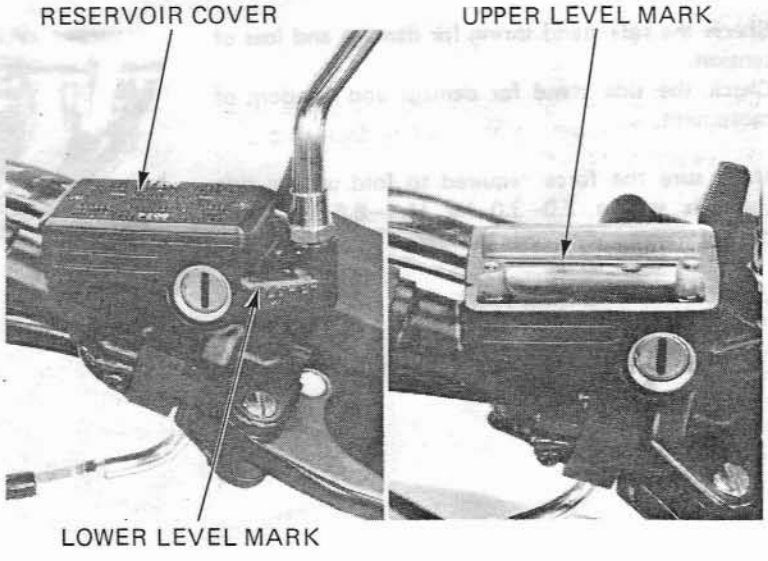


CLUTCH FLUID

Check the clutch fluid level.
If the level is below the lower level mark, check the clutch system for leaks.
Remove the reservoir cap screws and cap.
Fill the reservoir with DOT 4 BRAKE FLUID to the upper level mark.

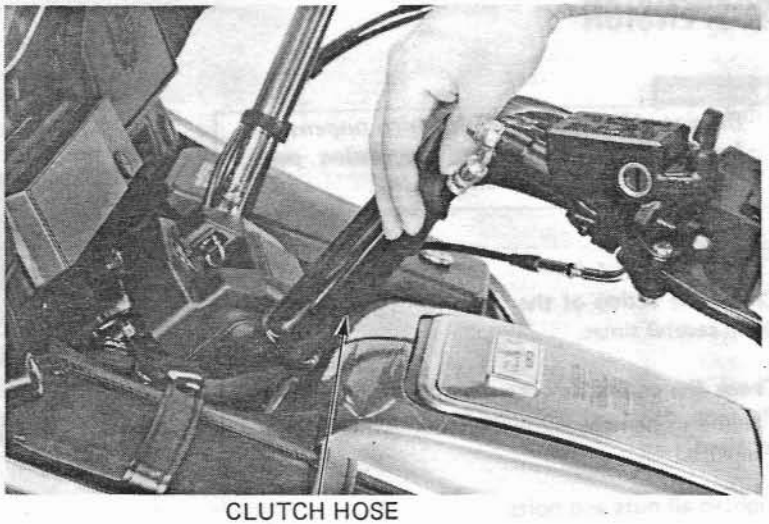
CAUTION:

- *Do not remove the cover until the handlebar has been turned so that the reservoir is level.*
- *Do not mix different types of fluid, as they are not compartible with each other.*
- *Avoid spilling fluid on painted surfaces and wind screen. Place a rag over the painted surfaces and wind screen whenever the system is serviced.*



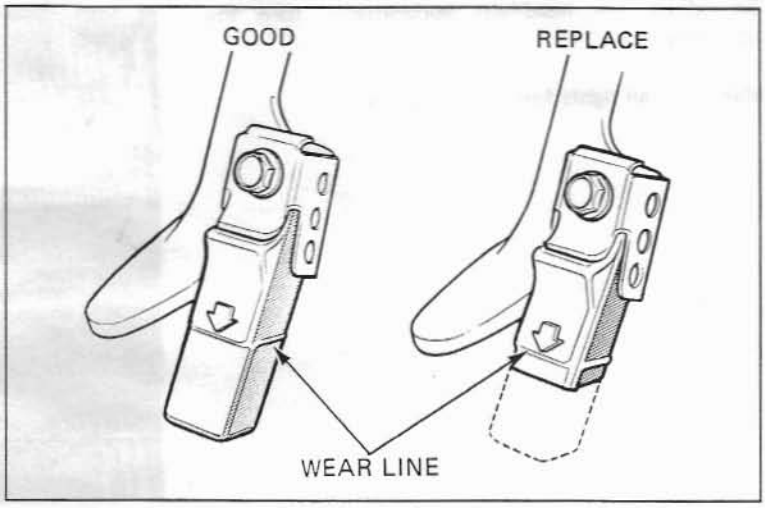
CLUTCH SYSTEM

Inspect the clutch hose, metal line and fittings for deterioration, cracks and signs of leakage. Tighten any loose fittings.
Replace hoses, metal line and fittings as required.



SIDE STAND

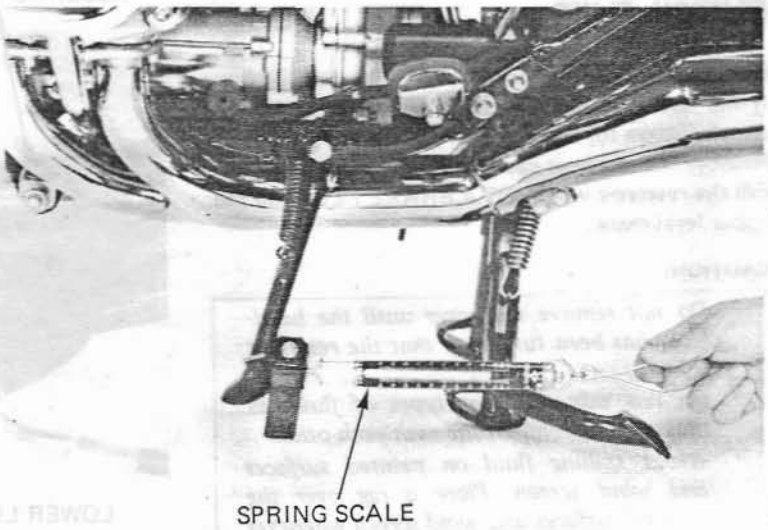
Check the rubber pad for deterioration or wear. If wear extends to the wear line, replace with a pad marked "Over 260 lbs Only".



Check the side stand spring for damage and loss of tension.
Check the side stand for damage and freedom of movement.

Make sure the force required to fold up the side stand is within 2.0–3.0 kg (4.4–6.6 lb) when pulling with a spring scale as shown.

Lubricate the side stand pivot.



SUSPENSION

WARNING

Do not ride a vehicle with faulty suspension. Loose, worn or damaged suspension parts impair vehicle stability and control.

FRONT

Check the action of the front forks by compressing them several times.

Check the entire fork assembly for leaks or damage. Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

Check the front fork air pressure when the forks are cold.

Place the motorcycle on its center stand.

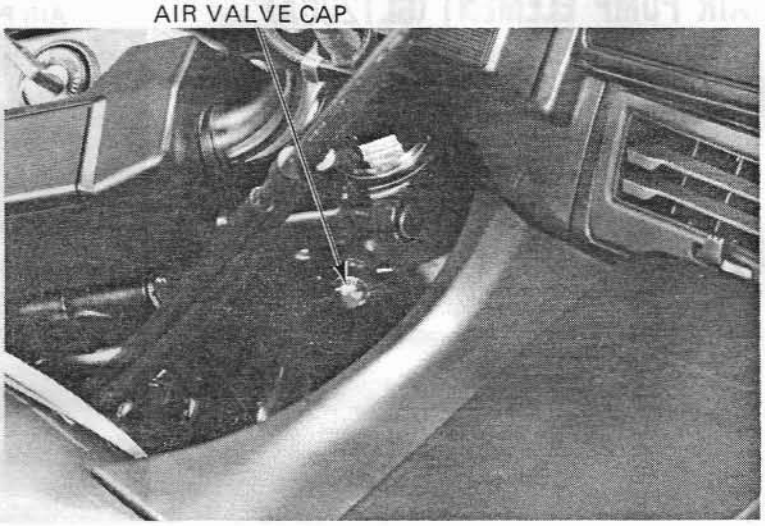
Remove each air valve cap and measure the air pressure.
Inspect the air pressure by the on-board air pressure gauge in the instrument panel (GL1200A).

AIR PRESSURE:
0–40 kPa (0–0.4 kg/cm², 0–6 psi)

NOTE:

> Some pressure will be lost when checking pressure (except GL1200A). Determine the amount of loss and compensate accordingly.

AIR VALVE CAP



REAR

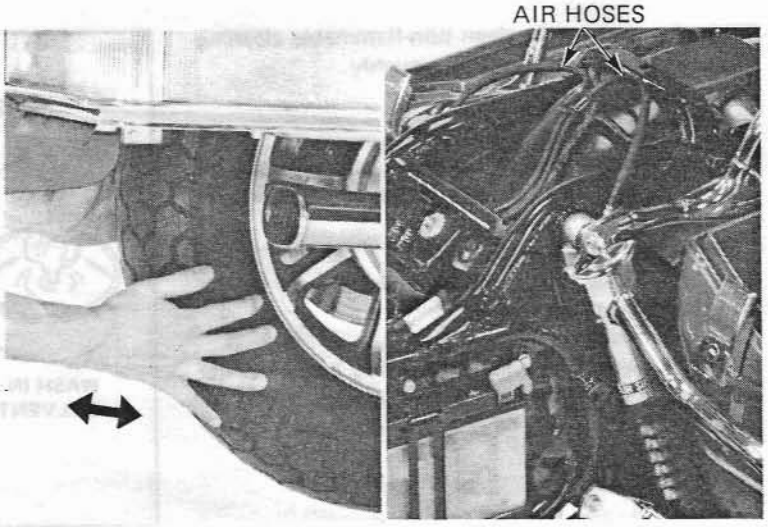
Place the motorcycle on its center stand.
Check the swing arm for damage.
Move the rear wheel sideways with force to see if the swing arm bearings are worn. Replace the bearings if there is any looseness.
Check the shock abosrbers for leak or damage.

Inspect the air hoses for deterioration and cracks.

Replace parts as required.

Tighten all nuts and bolts.

AIR HOSES



Remove the air valve cap and inspect the air pressure.

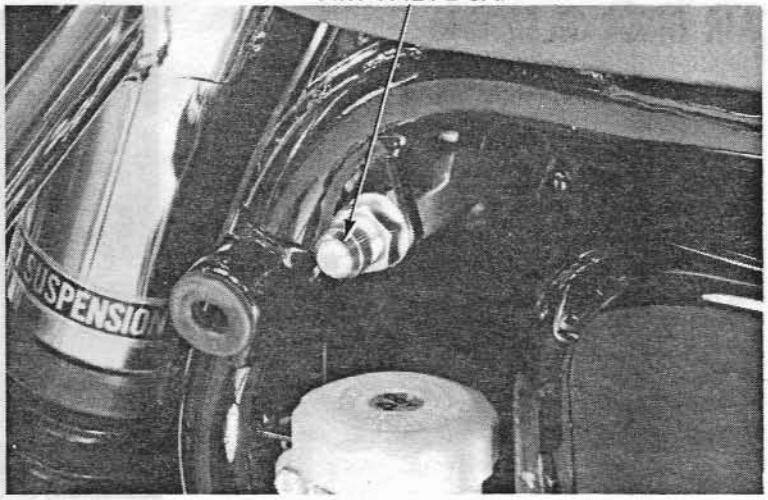
Inspect the air pressure by the on-board air pressure gauge in the instrument panel (GL1200A).

AIR PRESSURE:
200–400 kPa (2.0–4.0 kg/cm², 28–57 psi)

NOTE:

> Some pressure will be lost when checking pressure (except GL1200A). Determine the amount of loss and compensate accordingly.

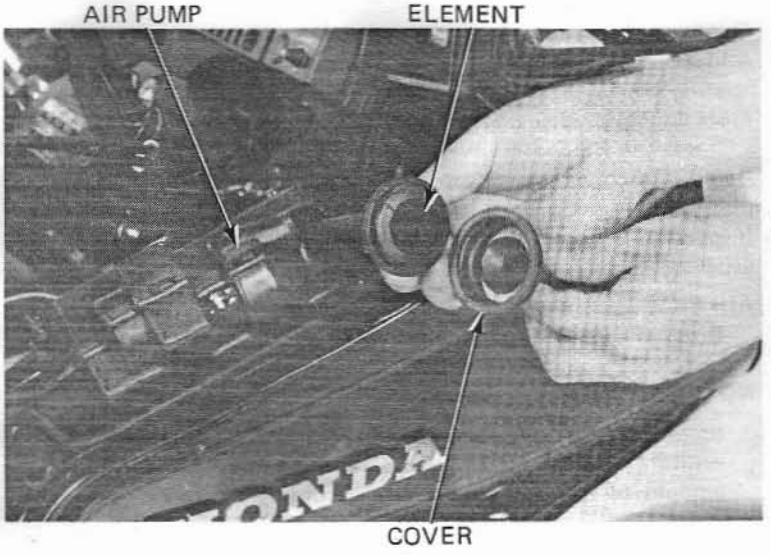
AIR VALVE CAP



AIR PUMP ELEMENT (GL1200A)

Remove the right fairing pocket cover and remove the air pump filter.

Separate the filter housing and remove the element.



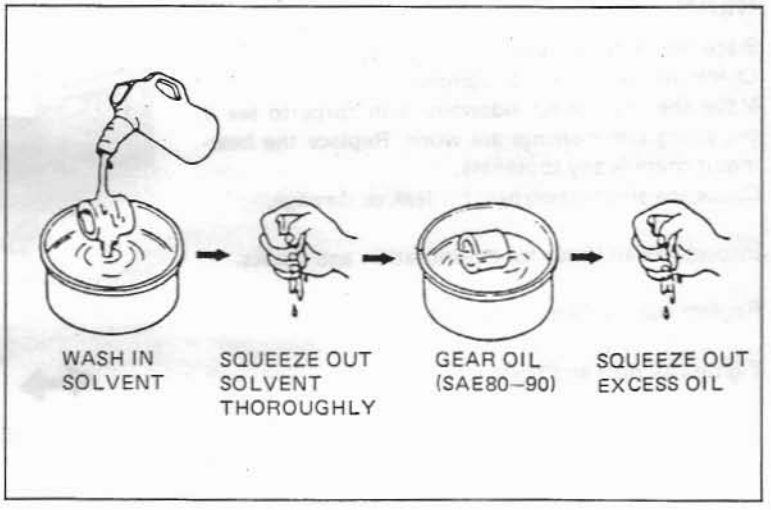
Wash the element in clean non-flammable cleaning solvent and allow it to dry thoroughly.

WARNING

Never use gasoline or low flash point solvents for cleaning the element. A fire or explosion could result.

Soak the element in clean gear oil (SAE 80 or 90) and squeeze out the excess.

Reinstall the element in the housing and push the cap onto the housing until it snaps closed.

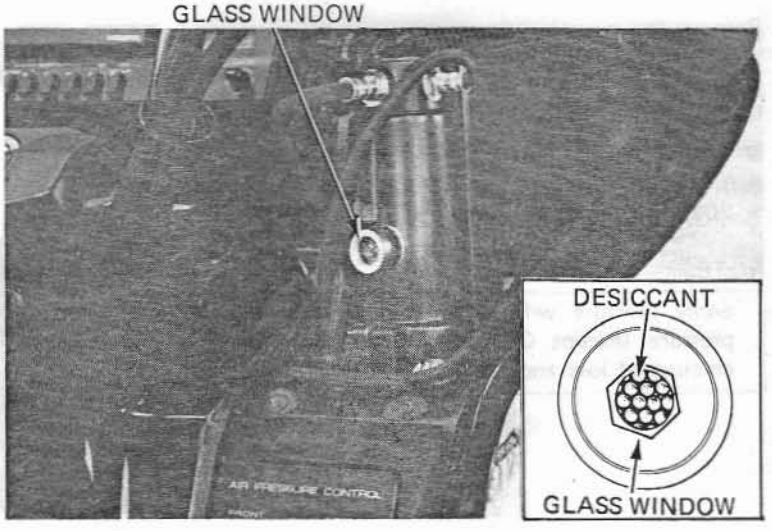


AIR DRIER (GL1200A)

Remove the right fairing pocket and pull off the drier cover.

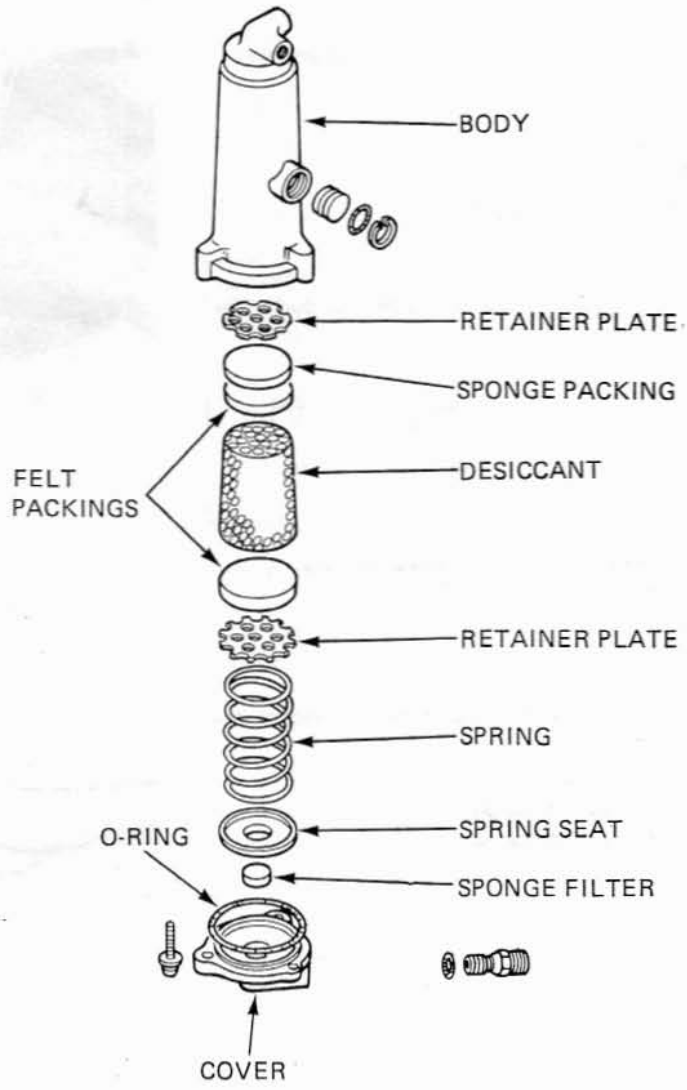
Inspect the desiccant color in the glass window. The desiccant should be blue.

If the desiccant is colorless, disconnect the air hoses and remove the air drier.



Remove the three screws and remove the drier cover.
Remove the spring and spring seat.
Remove the retainer plate and felt packing.
Discard the desiccant.
Remove the felt and sponge packings and retainer plate.
Clean the inside of the drier body with clean cloth.

Install the retainer plate, sponge packing and felt packing.
Pack the new desiccant and install the felt packing.
Install the retainer plate, and spring seat.
Clean and dry the sponge filter.
Install the sponge filter into the drier cover.
Install the drier cover and tighten the screws securely.
Install the drier and right fairing pocket.



NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to their correct torque values (Page 1-6) at the intervals shown in the Maintenance Schedule (Page 3-4).
Check all cotter pins, safety clips, hose clamps and cable stays.

WHEELS

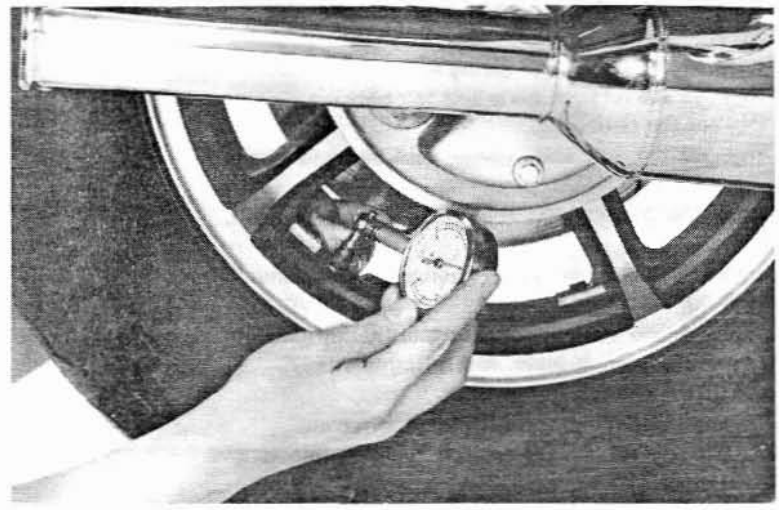
NOTE:

> Tire pressure should be checked when tires are COLD.

Check the tires for cuts, imbedded nails, or other sharp objects.

RECOMMENDED TIRES AND PRESSURES:

		Front	Rear
Tire size		130/90-16 67H	150/90-15 74H
Cold tire pressure kPa (kg/cm², psi)	Driver only	225 (2.25, 32)	225 (2.25, 32)
	Driver and one passenger	225 (2.25, 32)	280 (2.8, 40)
Tire brand	MICHELIN	A48	M48
	DUNLOP	F11	K627

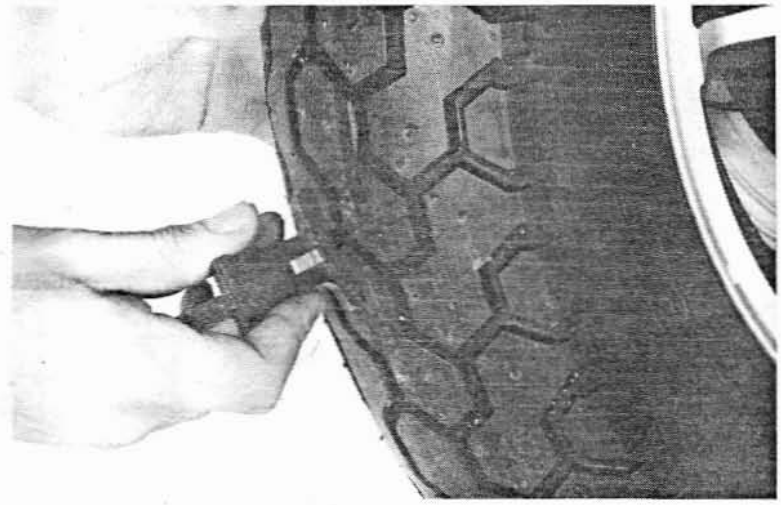


Check the front and rear wheels for rim runout (Section 12).

Measure the tread depth at the center of the tires.

Replace the tires if the tread depth reaches the following limits:

Minimum tread depth:
Front: 1.5 mm (1/16 in)
Rear: 2.0 mm (3/32 in)



STEERING HEAD BEARINGS

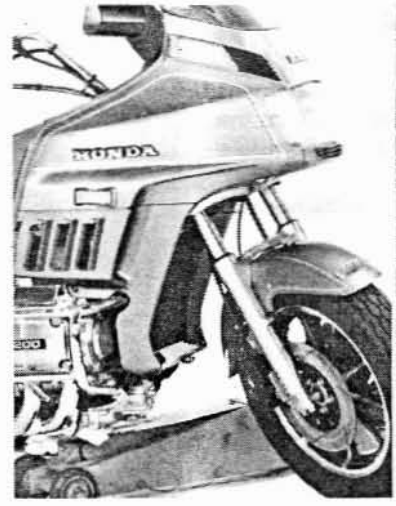
Raise the front wheel off the ground using a jack under the engine.

While holding the fork sliders, check that the front wheel turns freely and smoothly from full left to full right. Push and pull on the sliders and check that there is no free play or looseness.

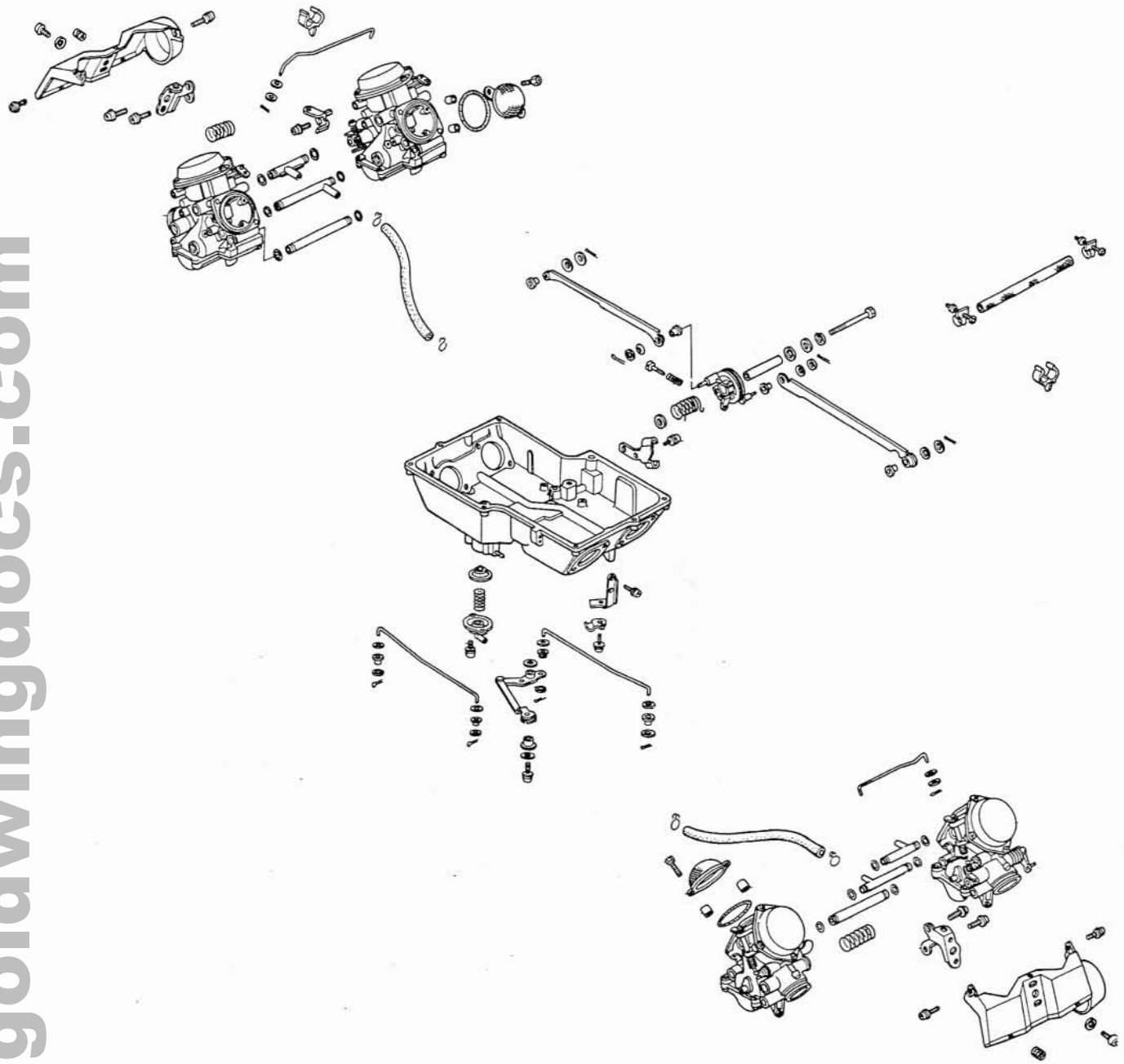
If the steering head bearings do not pass these tests, inspect them for damage and proper adjustment.

NOTE:

> Check that the control cables are routed correctly and do not interfere with steering.



MEMO



4. FUEL SYSTEM

SERVICE INFORMATION

GENERAL

WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Do not smoke or allow flames or sparks in the work area.

- Refer to Section 3 for throttle/choke cable adjustment.
- The vacuum chambers can be removed without removing the carburetor assembly.
- The float chambers have drain plugs. Drain gasoline from the chambers before removing the carburetors.
- The float chambers can be removed without separate each carburetors.
- The carburetors can be removed and disassembled without disturbing the synchronization adjusting screws.
- Always replace used O-rings and cotter pins with new ones.

SPECIFICATIONS

Carburetor type	VD type
Throttle valve bore	32 mm (1.26 in)
Venturi bore	30 mm (1.18 in)
Idle speed	950 ± 100 min^{-1} (rpm)
Float level	7.5 mm (0.30 in)
Main jet	#108
Slow jet	#35
Carburetor identification number	VD63A
Fuel pump flow capacity	500 cm^3 (16.9 US oz, 17.6 Imp oz)
Fast idle speed	1,500–2,500 min^{-1} (rpm) at normal operating temperature

TORQUE VALUES

Carburetor intake manifold band screw	4–6 N·m (0.4–0.6 kg-m, 3–4 ft-lb)
Fuel pump mount bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Carburetor set bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Throttle linkage center bolt	4–6 N·m (0.4–0.6 kg-m, 3–4 ft-lb)

TOOL

Float level gauge	07410–0010000

TROUBLESHOOTING

Engine cranks but own't start
- No fuel in tank
- No fuel to carburetor
- Engine flooded with fuel
- No spark at plug (ignition system faulty)
- Air cleaner clogged
- Intake air leak
- Improper choke operation
- Improper throttle operation
- Incorrect choke cable free play
- Fuel tank vent blocked

After buring during deceleration
- Ignition system faulty
- Faulty slow air cutoff valve
- Lean mixture

Misfiring during acceleration
- Ignition malfunction
- Lean mixture

Backfiring
- Ignition malfunction
- Carburetor malfunction
- Lean mixture

Lean mixture
- Clogged fuel jets
- Piston stuck closed
- Faulty float valve
- Float level too low
- Fuel tank cap vent blocked
- Fuel strainer screen clogged
- Restricted fuel line
- Intake air leak
- Restricted or faulty fuel pump

Engine idles roughly, stalls, or runs poorly
- Air cleaner clogged
- Ignition malfunction
- Carburetors not synchronized
- Fuel contaminated
- Intake air leak.
- Idle speed incorrect
- Rich mixture
- Lean mixture
- Low cylinder compression
- Incorrect pilot screw adjustment
- Slow air cutoff valve faulty
- Starter valve stack open

Poor performance (driveability) and poor fuel economy
- Fuel system clogged
- Air cleaner clogged
- Ignition malfunction

Incorrect fast idle speed
- Incorrect choke cable free play
- Starter valve stack or damaged
- Starter air line clogged
- Starter valve not synchronized

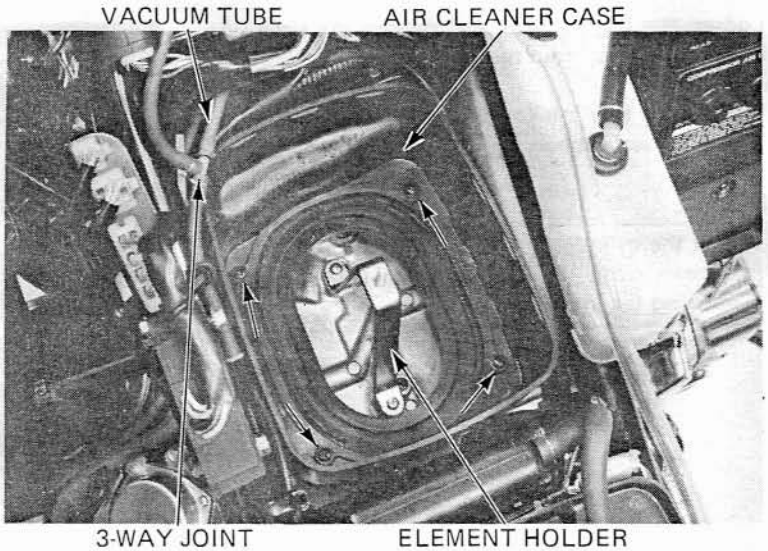
Rich mixture
- Clogged air jets
- Faulty float valve
- Float level too high
- Starter valve stack open or damaged
- Dirty air cleaner
- Needle and seat faulty or worn

CARBURETOR REMOVAL

Remove the fairing lower covers, inner covers and top compartment.
Remove the air cleaner element.

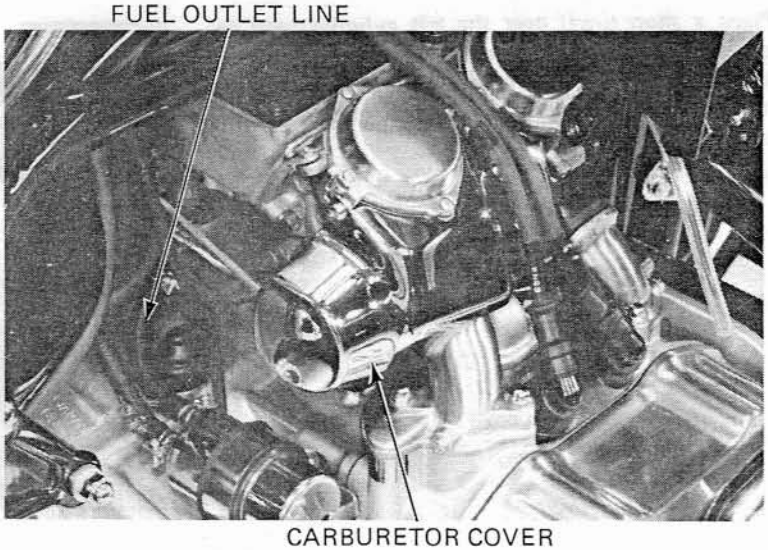
Remove the air cleaner case by removing four screws.

Remove the element holder from the air chamber.
Disconnect the vacuum tube from the 3-way joint.



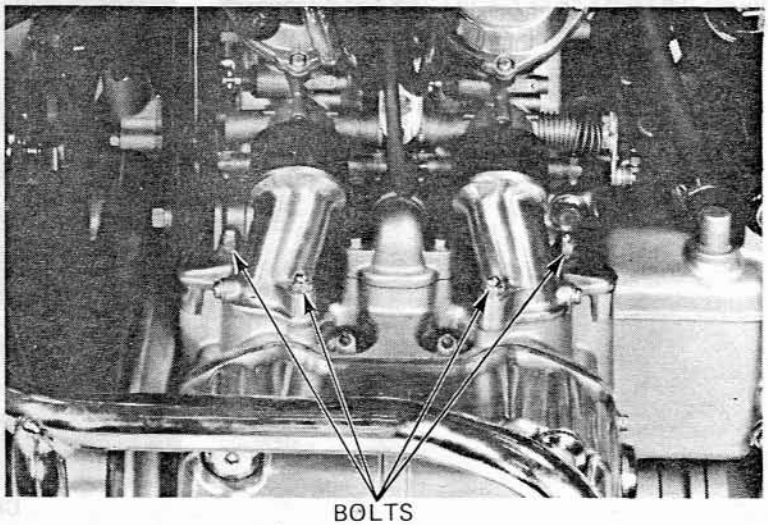
Remove the right and left carburetor covers.

Disconnect the fuel pump outlet line from the fuel pump.



Disconnect the spark plug caps from the spark plugs and wire clamps.

Remove the eight intake pipe-to-head bolts.

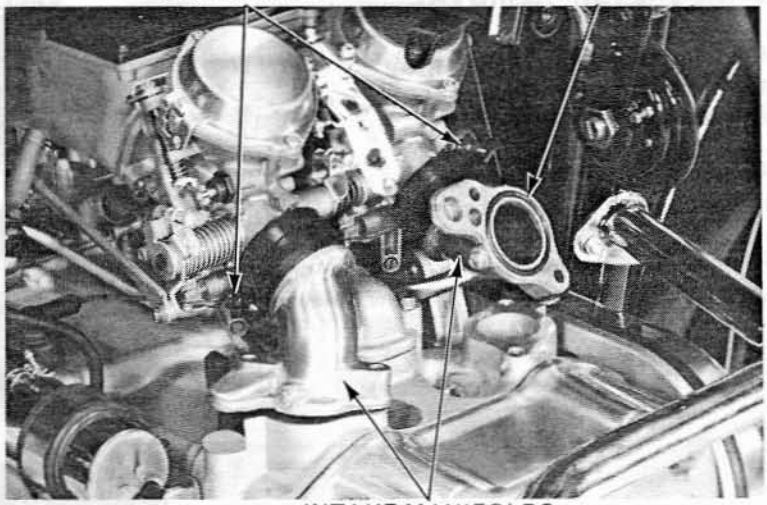


Loosen the band screws and remove the right side intake manifolds from the carburetors.

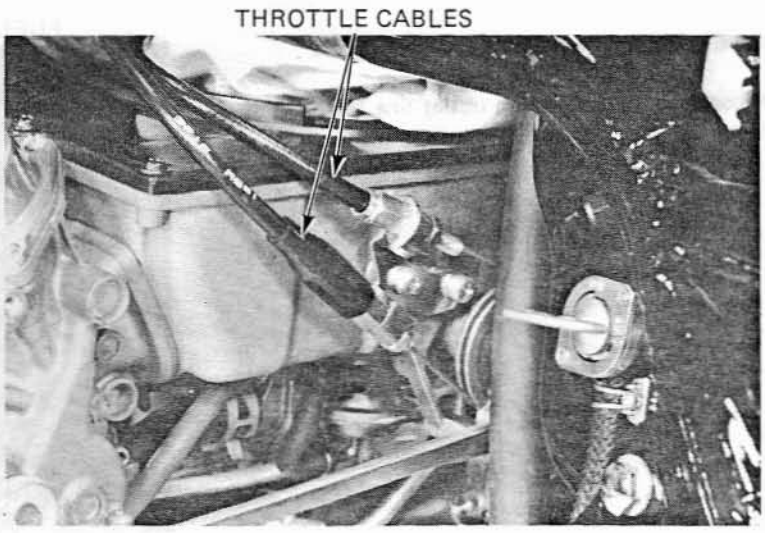
Remove the four intake manifold seal rubbers.
Check the seal rubbers for damage or deteriorations.

NOTE:

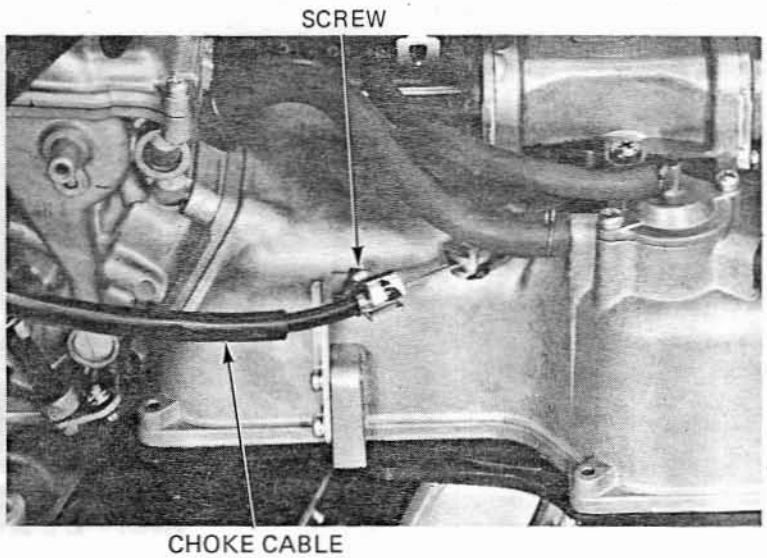
> Seal the cylinder head inlet ports with tape or a clean cloth the keep dirt and debris from entering the intake ports.



Place a shop towel over the left cylinder head to prevent the cylinder head cover from damage.
Move the carburetors and air chamber as an assembly to the left side and disconnect the throttle cables.



Loosen the choke cable clamp screw and disconnect the choke cable from the choke linkage.

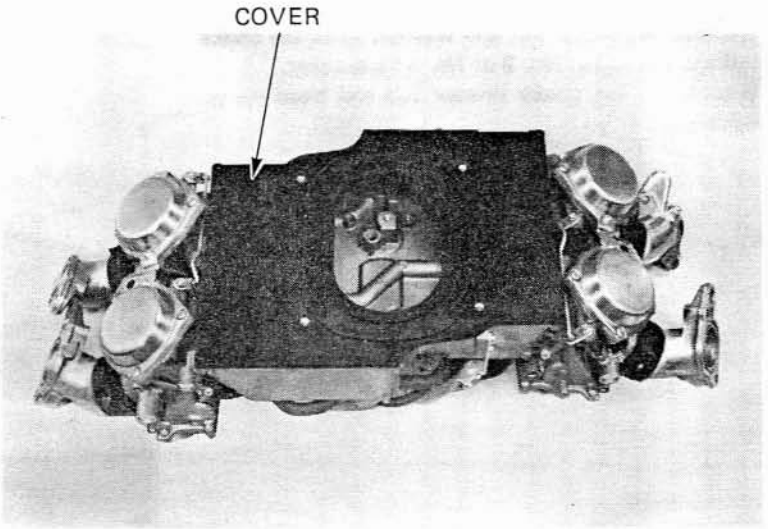


Remove the cover from the air chamber.

Loosen the hose clamps and remove the intake pipes and rubber couplers from the carburetors.

CAUTION:

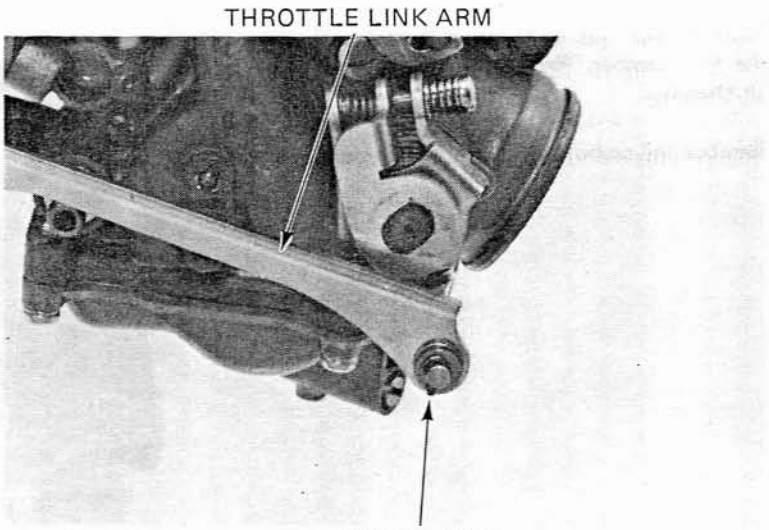
Do not try to remove the rubber couplers from the intake pipes. They are bonded in place for precise alignment.



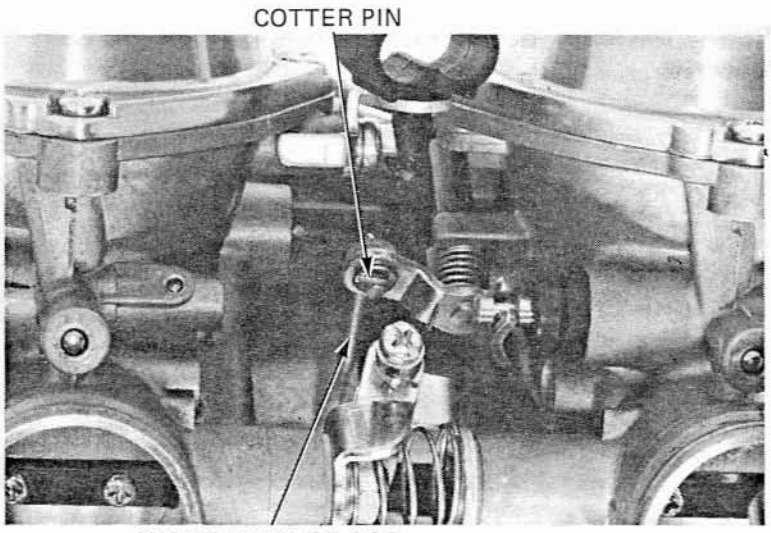
CARBURETOR SEPARATION

Remove the cotter pin, washers and plastic collar from the linkage at No. 3 or No. 4 carburetor.

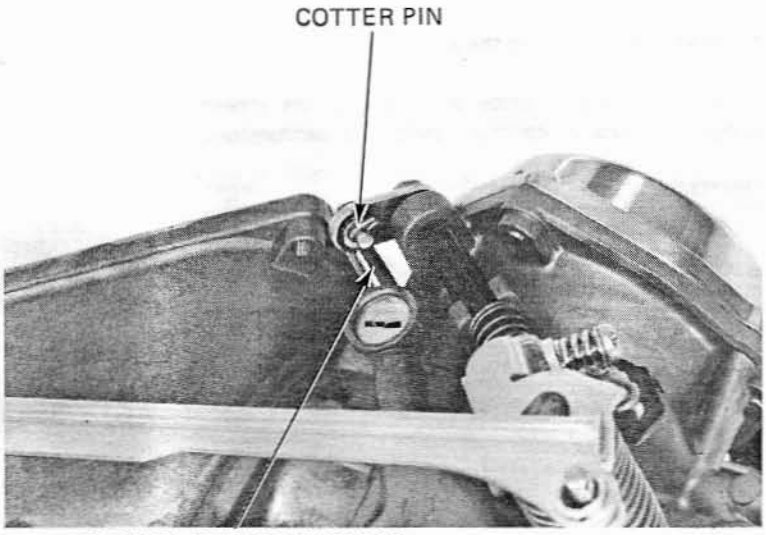
Disconnect the throttle link arm from the carburetor.



Remove the cotter pin, washers and plastic washers from the choke linkage rod at No. 1 or No.4 carburetor starter valve arm.
Disconnect the choke linkage rod from the starter valve arm.



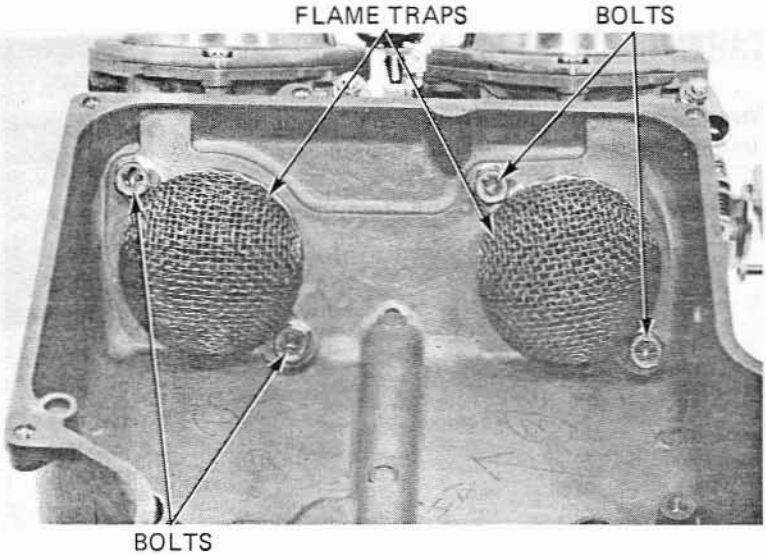
Remove the cotter pin and washers from the choke linkage sub rod at No. 2 or No. 3 carburetor. Disconnect the choke linkage sub rod from starter valve arm.



CHOKE LINKAGE SUB ROD

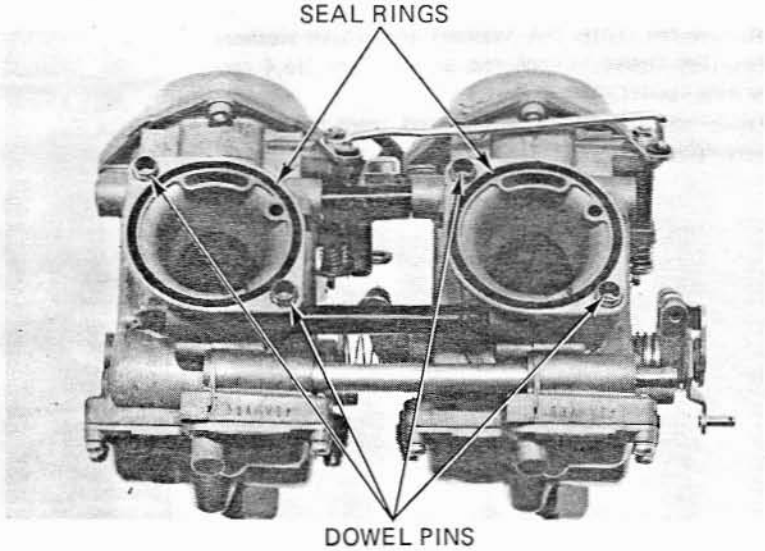
Remove the four bolts securing each carburetor to the air chamber. Remove the flame traps from the air chamber.

Remove the carburetors from the air chamber.



BOLTS

Remove the seal rings and dowel pins from each carburetor.



DOWEL PINS

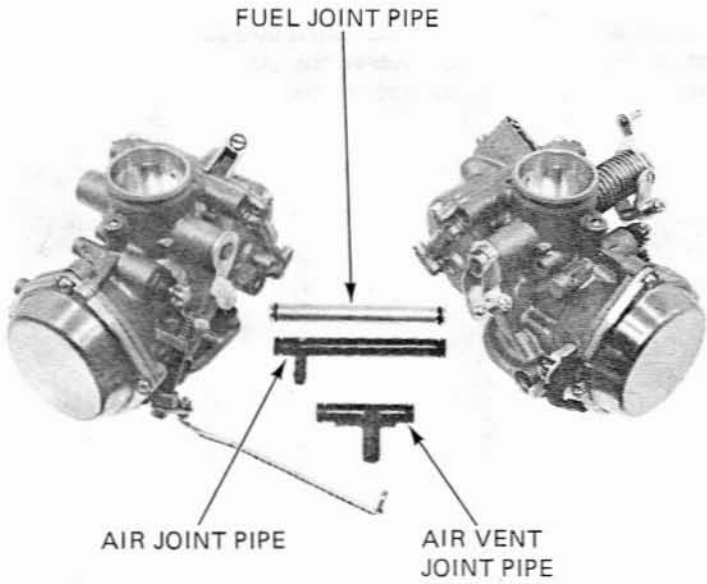
Carefully separate the individual carburetors.

CAUTION:

The carburetor bores must stay parallel during separation. If the carburetors are twisted, the fuel or air joint pipes may be bent resulting in fuel or air leakage.

NOTE:

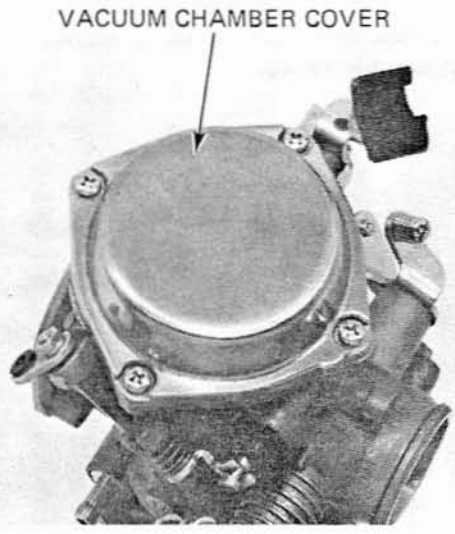
Do not loosen the carburetor synchronization adjusting screw.



CARBURETOR DISASSEMBLY

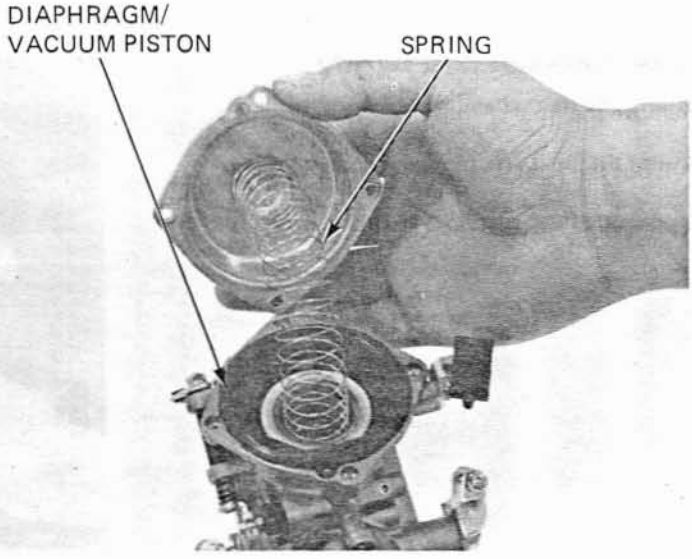
VACUUM CHAMBER REMOVAL

Remove the four vacuum chamber cover screws and cover.

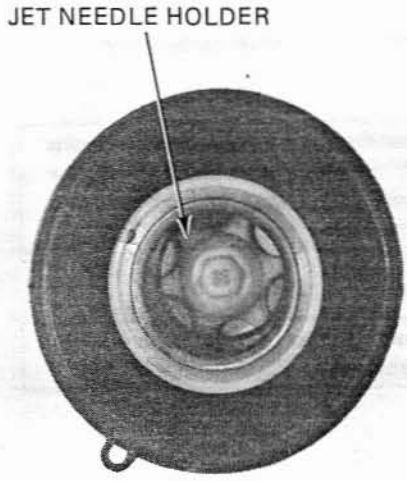


Remove the compression spring, diaphragm and vacuum piston.

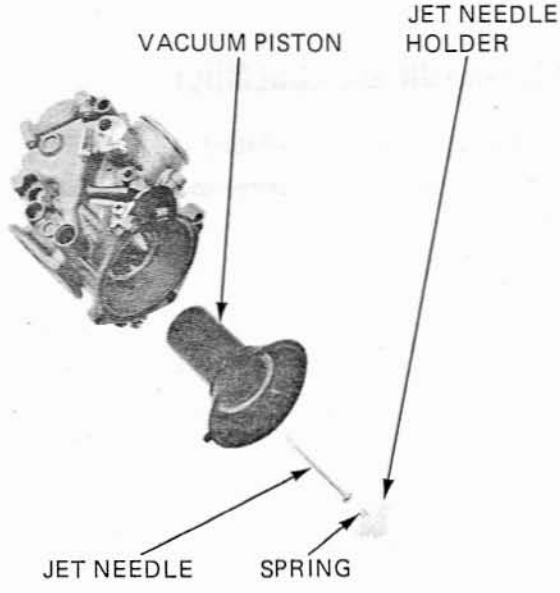
Inspect the vacuum piston for wear, nicks, scratches or other damage. Check the diaphragm for deterioration and tears. Make sure the piston moves up and down freely in the carburetor.



Push the jet needle holder in and turn it 60 degrees with an screwdriver. Then remove the jet needle holder, spring and jet needle from the piston.



Inspect the jet needle for excessive wear at the tip and for bending, or other damage.

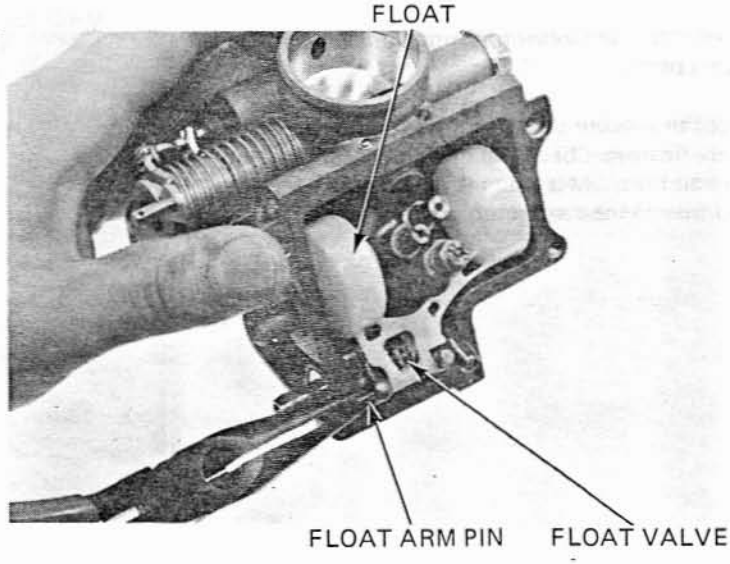


FLOAT CHAMBER REMOVAL

Remove the float chamber body.

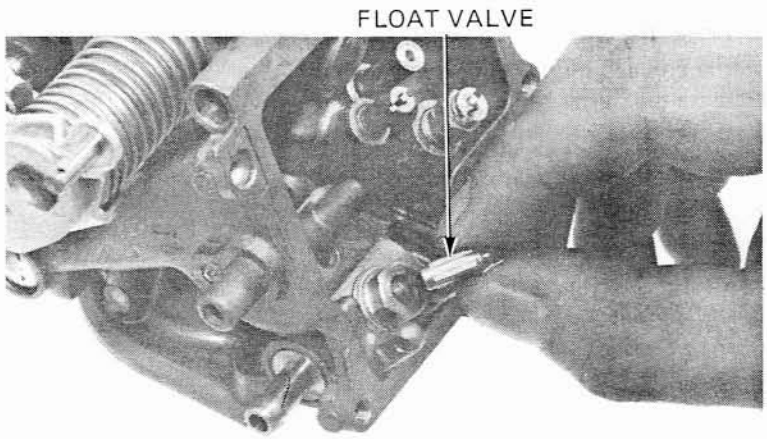
Pull out the float arm pin with a pair of pliers.

Remove the float and float valve.



Inspect the float valve for grooves and nicks.

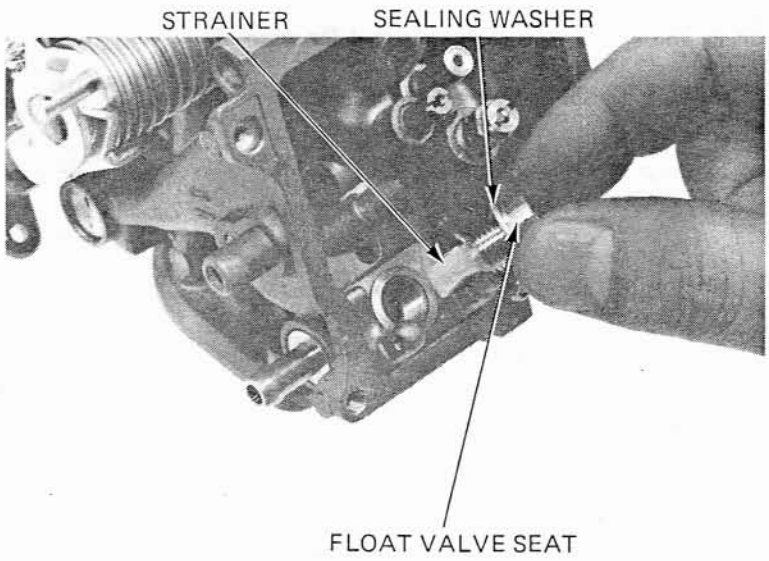
Inspect the operation of the float valve.



Remove the float valve seat from the carburetor body.

Clean the strainer with clean solvent.

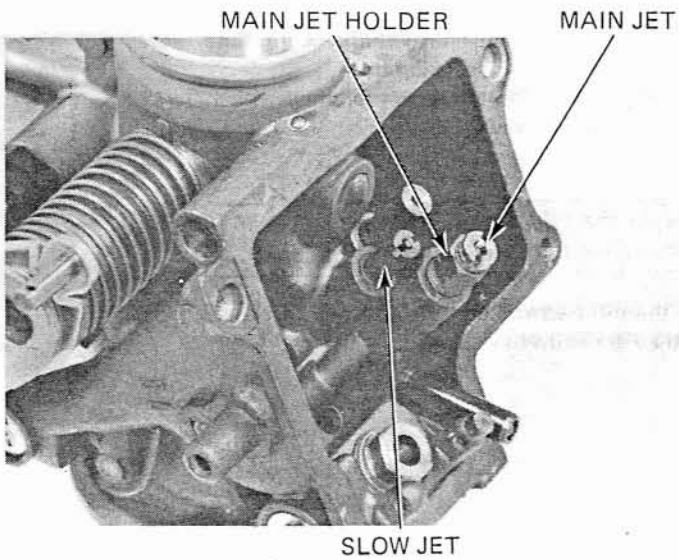
Make sure the sealing washer is in good condition.



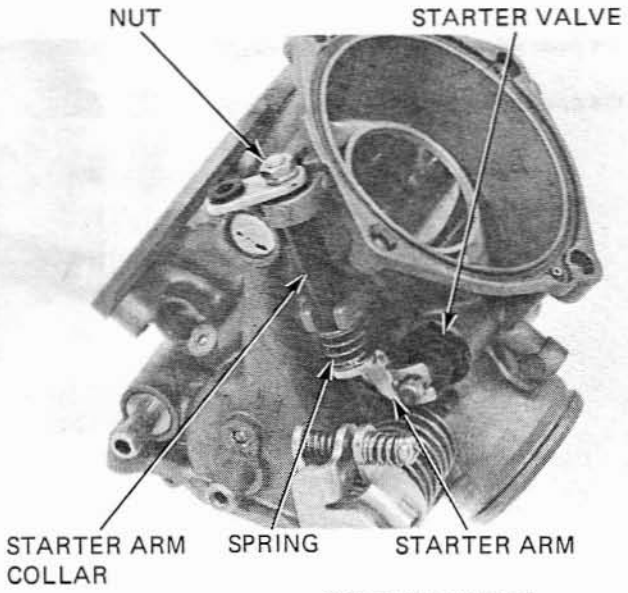
Remove the main jet, main jet holder and slow jet from the carburetor body.

CAUTION:

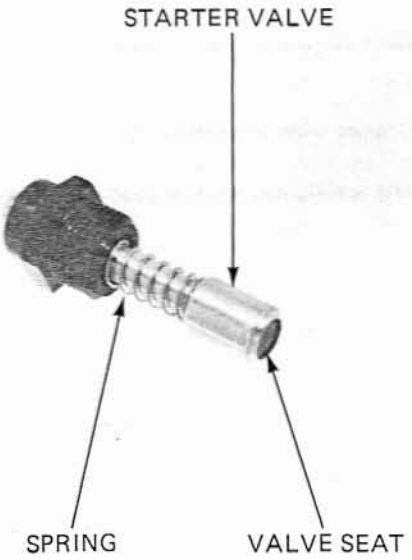
Do not try to remove the needle jet from the carburetor body. The needle jet is pressed in the carburetor body.



Remove the starter arm collar and remove the starter arm and spring by removing the nut.
Remove the starter valve.



Check the starter valve and valve seat for wear or damage.
Check the valve spring for weak or damage.

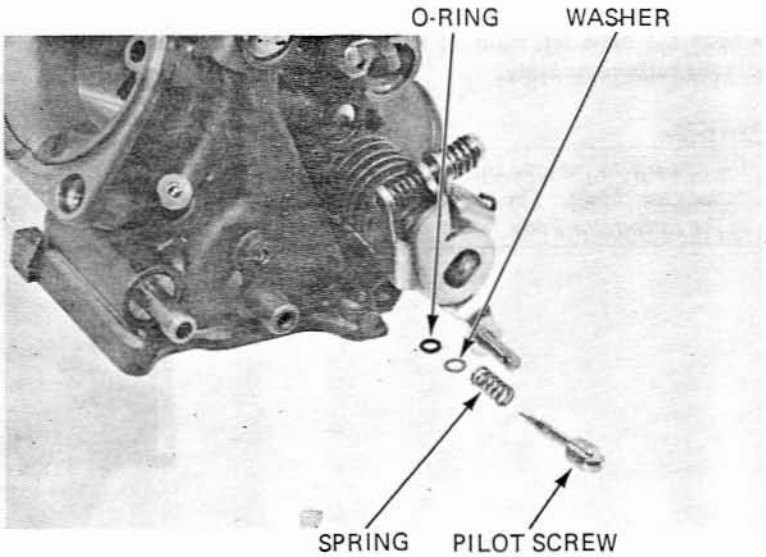


Turn each pilot screw in and carefully count the number of turns before is seats lightly.
Make a note of this to use as a reference when reinstalling the pilot screws.

CAUTION:

Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.

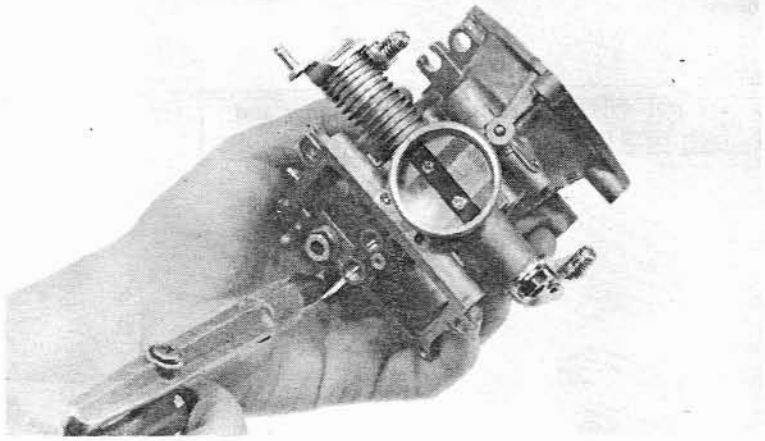
Remove the pilot screws and inspect them. Replace them if they are worn or damaged.



Use compressed air to clean all the carburetor jets and passages.

CAUTION:

Never use wire or drill bits to clean carburetor jets. The jets will become enlarged or scratched disturbing the correct mixture ratio.



THROTTLE LINKAGE

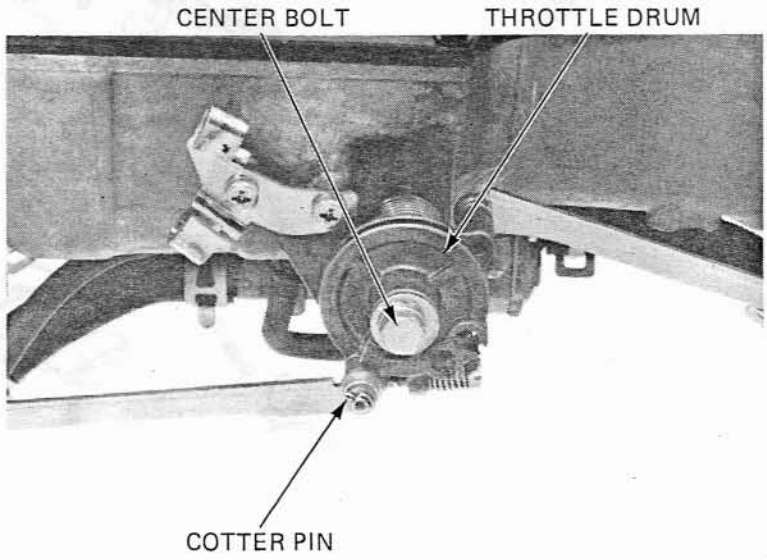
REMOVAL

Remove the cotter pin and washer from the throttle drum, and remove the throttle linkage from the throttle drum.

Remove the throttle linkage by removing linkage center bolt.
Remove the linkage as an assembly from the air chamber.

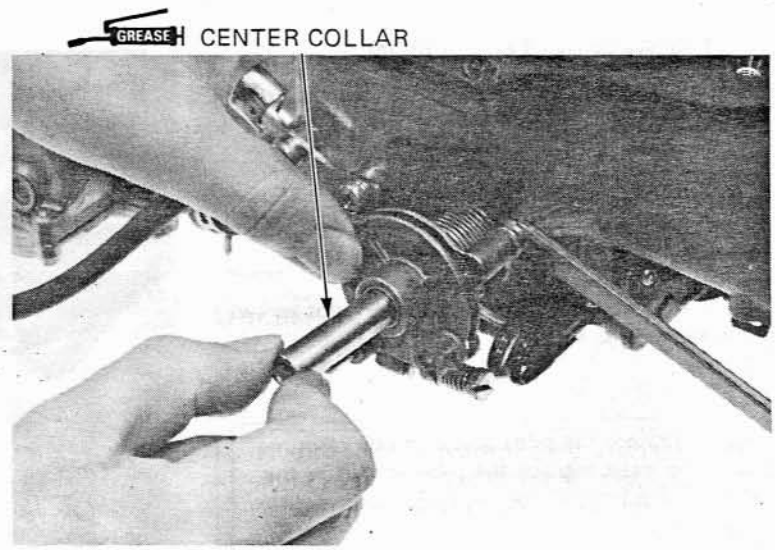
CAUTION:

The main throttle return spring will unwind when the linkage is removed. Note its position for proper reassembly.



INSTALLATION

Apply grease to the center collar.
Install the linkage in reverse order of removal.

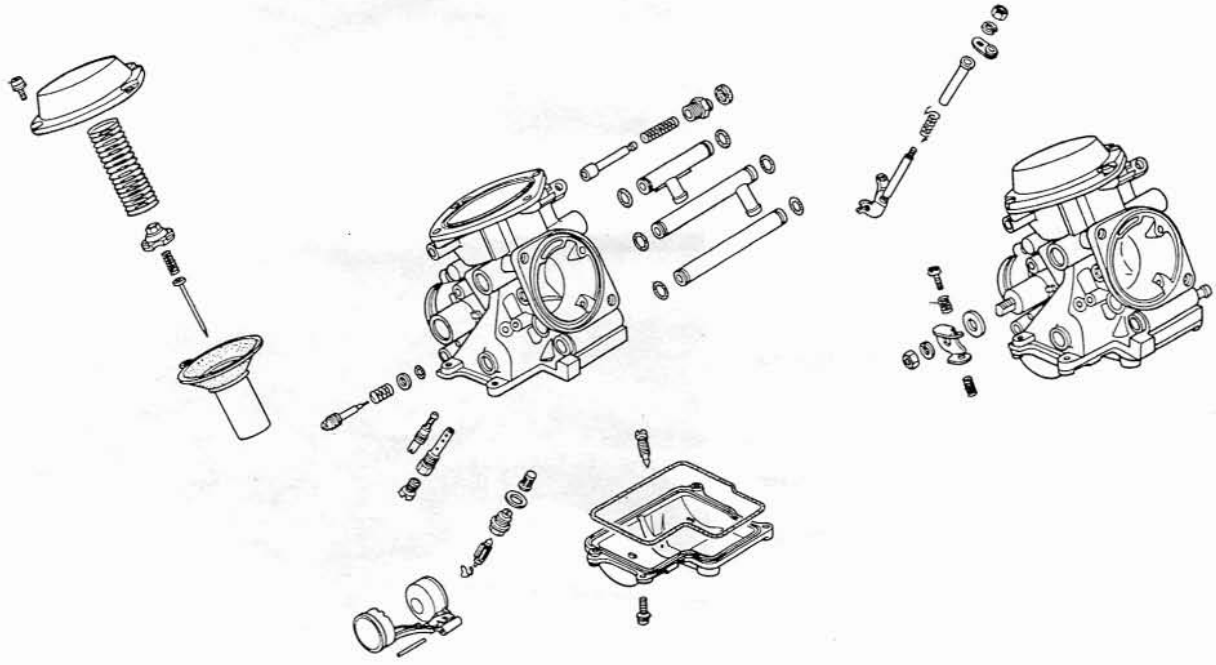


CARBURETOR ASSEMBLY

The reassembly sequence is essentially the reverse of disassembly.

NOTE:

> Do not overtighten the main jet holder and float valve seat.



PILOT SCREW INSTALLATION

Install the pilot screws and return them to their original position as noted during removal.

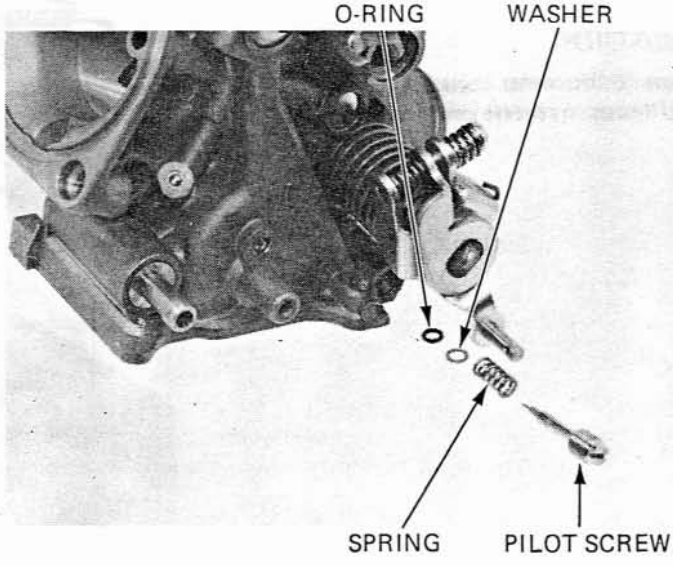
CAUTION:

> *Damage to the pilot screw seat occurs if the pilot screw is tightened against the seat.*

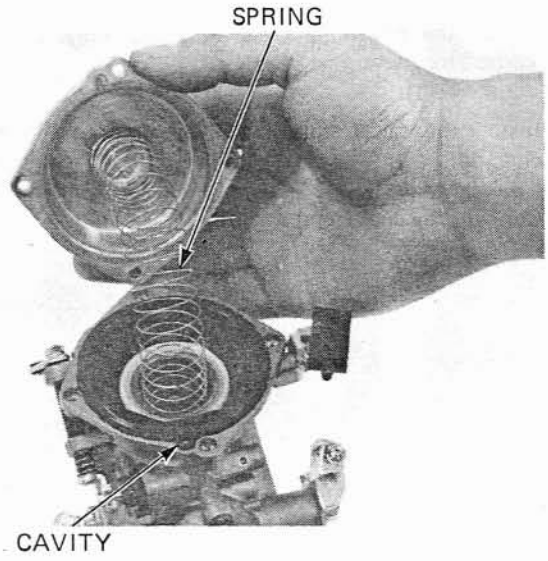
Perform pilot screw adjustment if new pilot screws are installed (page 4-16).

NOTE:

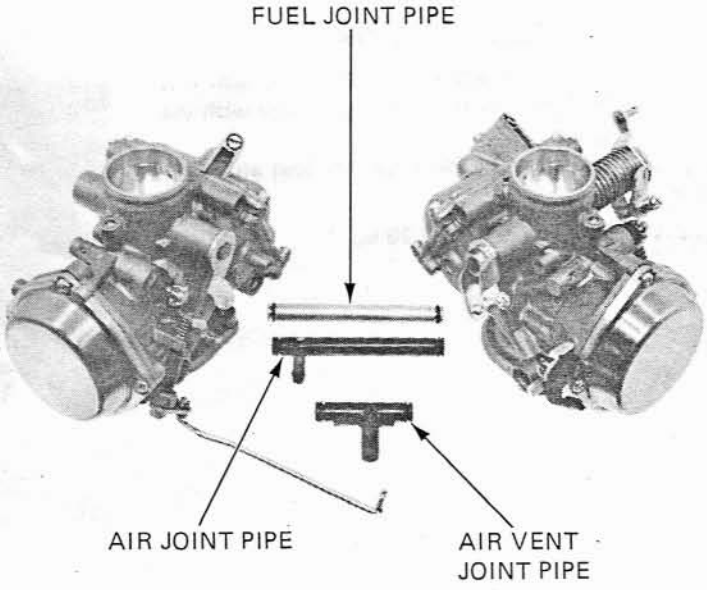
> If you replace the pilot screw in one carburetor, you must replace the pilot screws in the other carburetors for proper pilot screw adjustment.



Install the chamber cover so that its cavity aligns with the hole in the diaphragm.

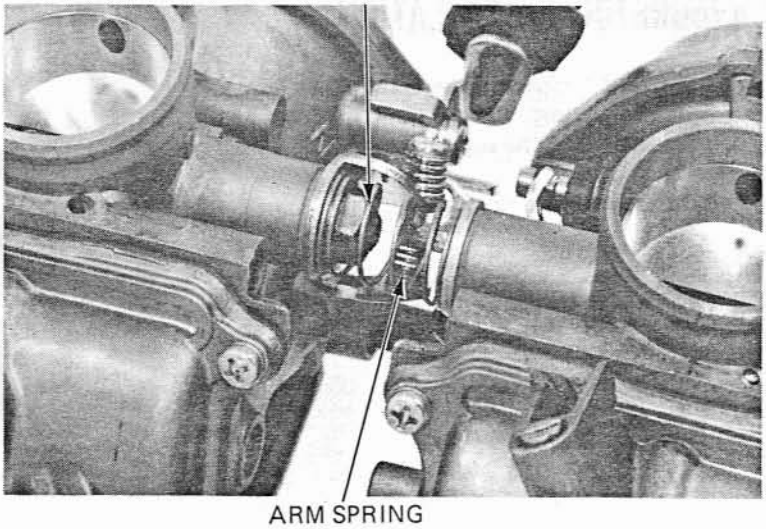


Lubricate new joint pipe O-rings with oil and assemble the carburetor pairs (No. 1, 3 and 2, 4).



Insert the throttle arm of No. 1 or No. 2 carburetor between synchronization adjusting screw and arm spring.
Install the thrust spring between throttle arm pivot of each carburetors.

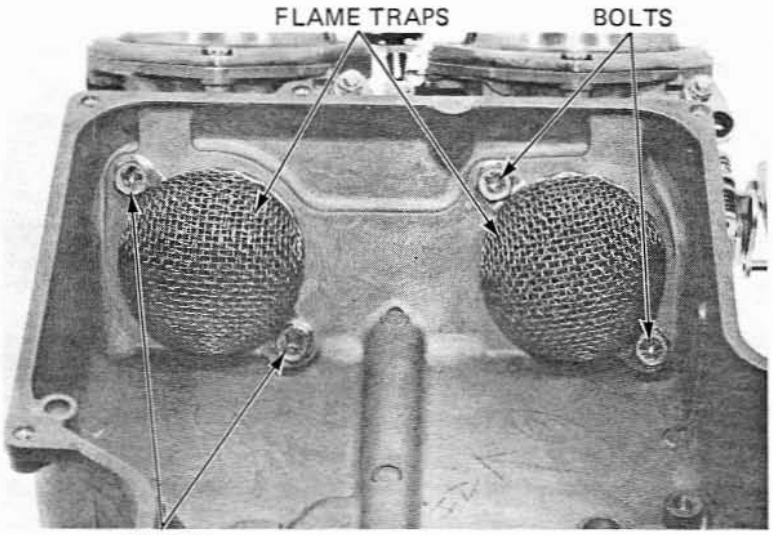
Make sure the fuel joint and air joint pipes are securely installed.



Install the dowel pins and new seal rings to the carburetor mating surfaces.

Install the carburetors and flame trap to the air chamber.

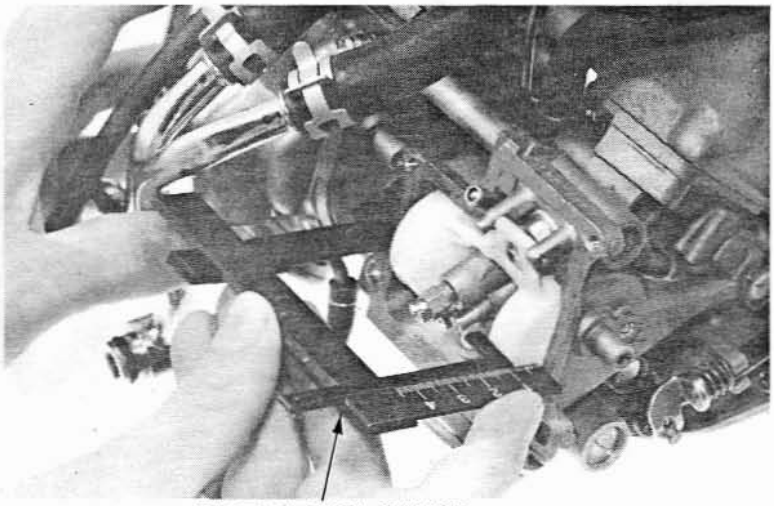
Connect the choke and throttle linkage.



FLOAT LEVEL INSPECTION

With the float valve seated and the float arm just touching the valve, measure the float valve with the float level gauge.
Adjust if necessary by bending the float arm carefully.

FLOAT LEVEL: 7.5 mm (0.30 in)



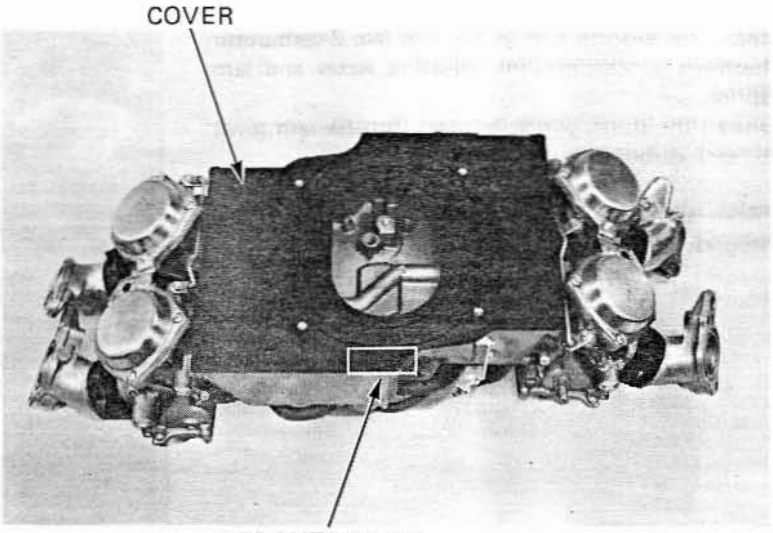
CARBURETOR INSTALLATION

Install the intake pipes on the carburetors but do not tighten the hose clamps until the complete system is installed on the engine.

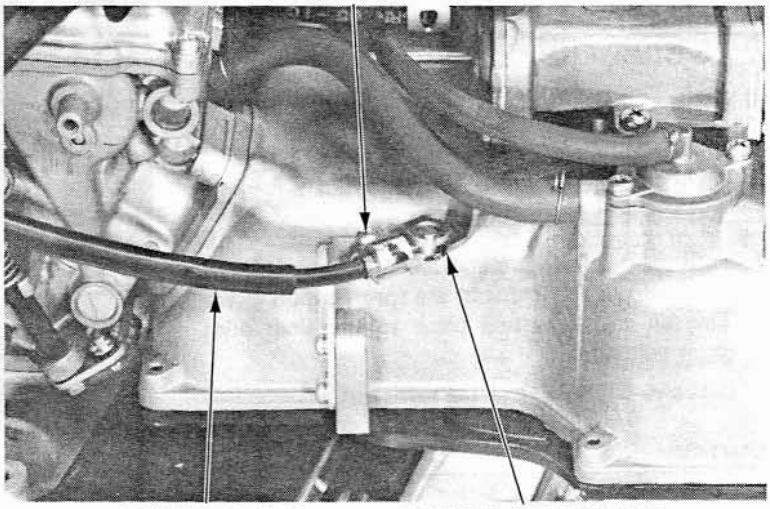
Install the cover on the air chamber.

NOTE:

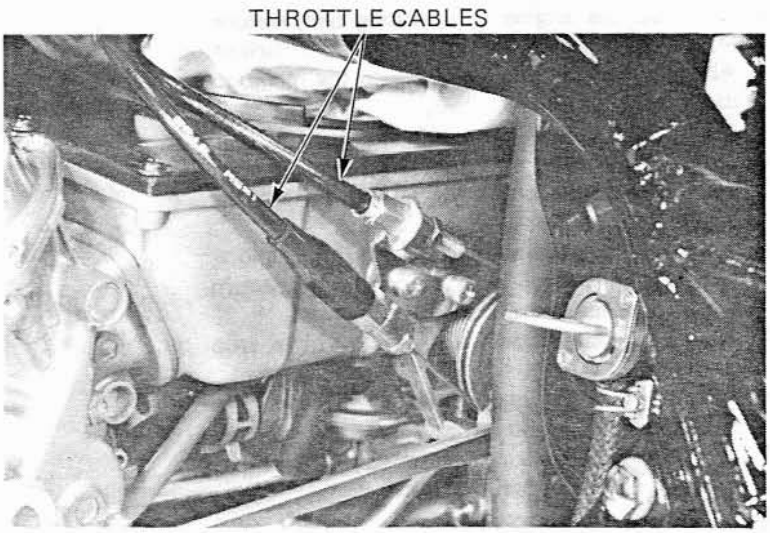
> Install the cover with "FRONT" mark facing forward.



Connect the choke cable to the choke linkage. Align the end of the cable outer with edge of the cable holder.
Tighten cable holder screw securely.
Make sure that the choke linkage end does not contact to the cable outer when the choke lever is turned to fully open position.



Install the carburetor/air chamber system on the engine from the left side. Reconnect the throttle cables while the linkage is accessible before final positioning is made.



Complete the installation of the carburetor/air chamber system in the reverse order of removal.

Check and adjust the carburetors after installation.
- Carburetor synchronization.
- Choke operation.
- Throttle operation.
- Cable, tube and harness routing.

PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE

NOTE:

> Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

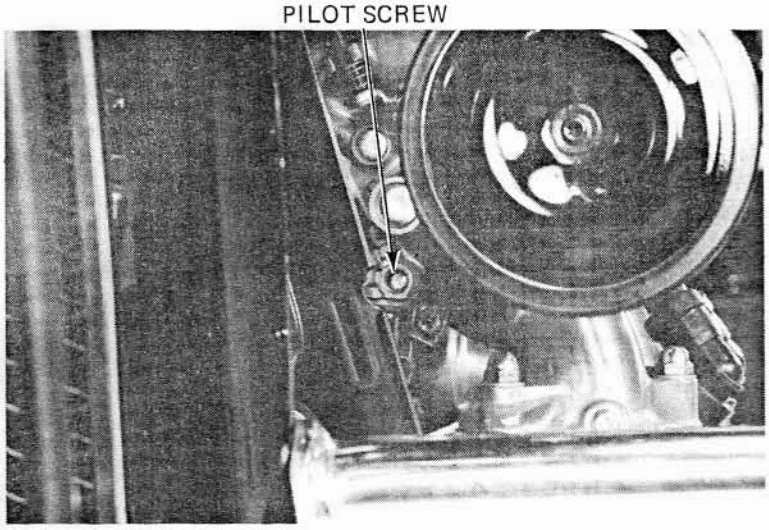
1. Turn each pilot screw clockwise until it seats lightly and back it out to the specification given. This an initial setting prior to the final pilot screw adjustment.

   INITIAL OPENING: 3-1/2 turns out

CAUTION:

> *Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

2. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.
3. Attach a tachometer according to the manufacturer's instructions.
4. Adjust the idle speed with the throttle stop screw.
5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out by a continual 1/2 turn until engine speed drops by 50 rpm or less.
7. Adjust the idle speed with the throttle stop screw.
8. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 rpm.
9. Turn the No. 1 carburetor pilot screw 1 turn out from the position obtained in step 8.
10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the No. 2, No. 3 and No. 4 carburetor pilot screws.

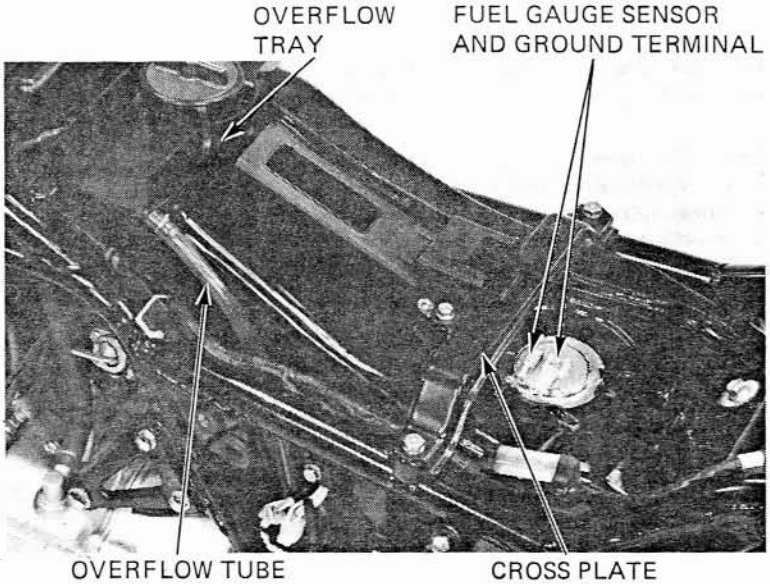


FUEL TANK

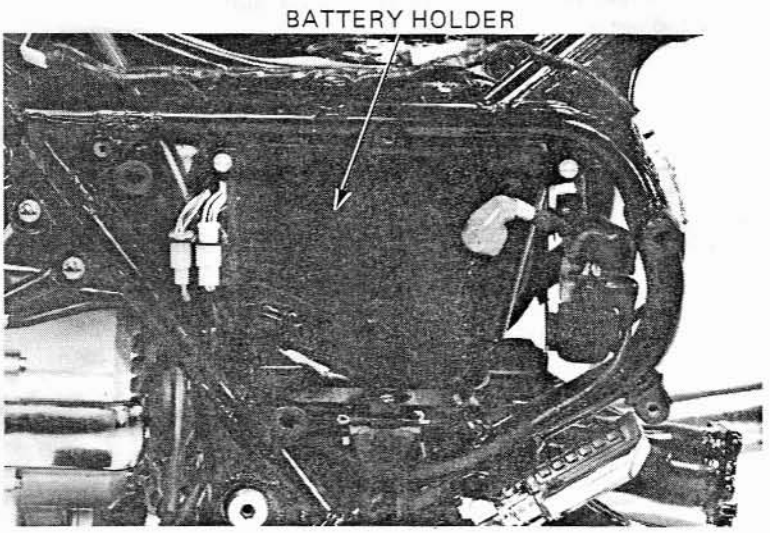
REMOVAL

Remove the seat and top compartment (section 20).
Remove the rear fender and rear shock absorbers. (page 13-13).
Remove the rear wheel (page 12-9).

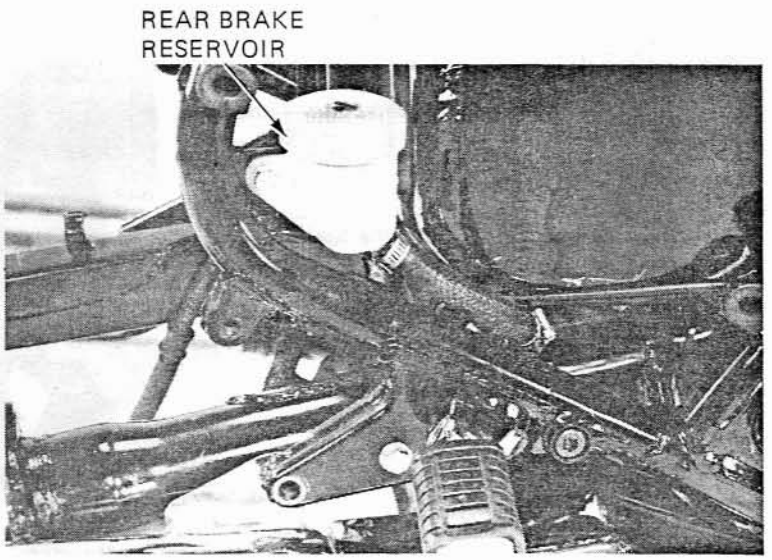
Disconnect the overflow tube from the overflow tray.
Remove the cross plate from the frame.
Disconnect the fuel gauge sensor and ground terminals from the sensor.



Remove the battery and battery holder from the frame.



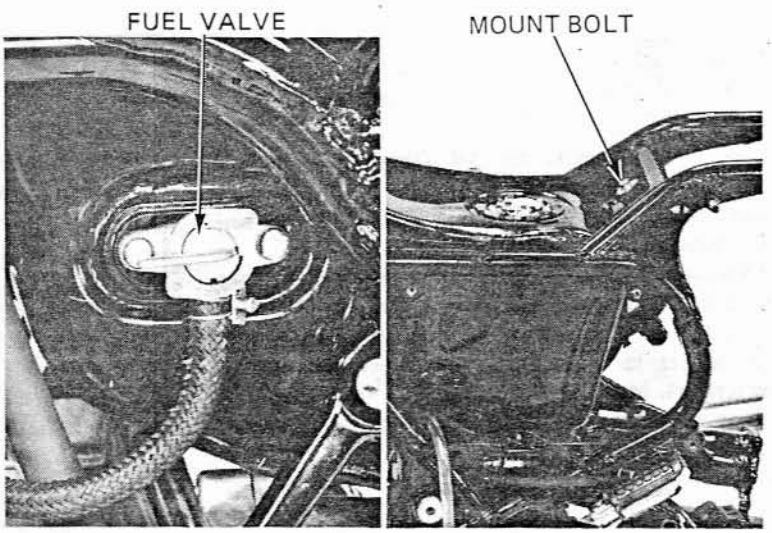
Remove the rear brake reservoir from the frame.



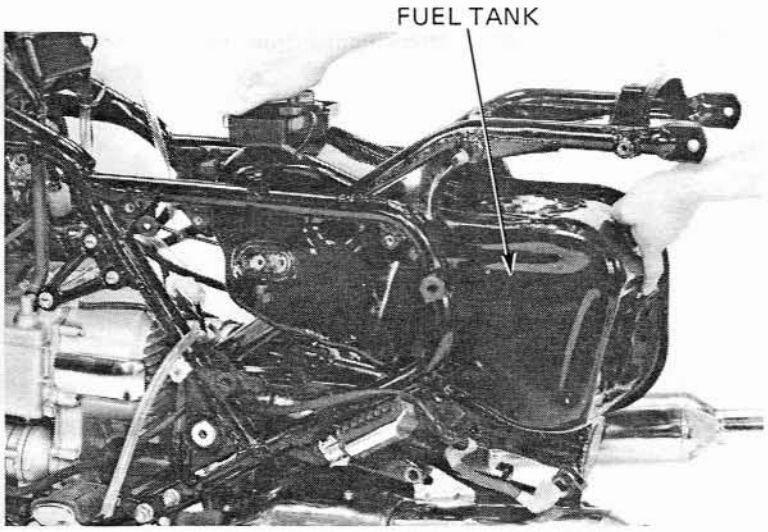
Remove the bolt holding the fuel filter bracket to the fuel tank.

Turn the fuel valve off and remove fuel valve from the fuel tank.

Remove the fuel tank mount bolt.



Move the fuel tank toward the rear of the motorcycle and out of the frame.

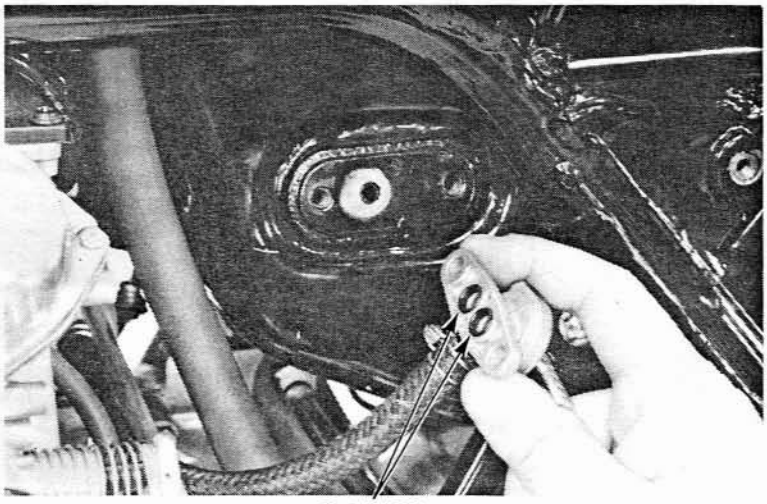


INSTALLATION

To reinstall the fuel tank, reverse the removal procedure.

NOTE:

- Install the new O-rings into the fuel valve.
- Make sure the cable and harness routing after installation.



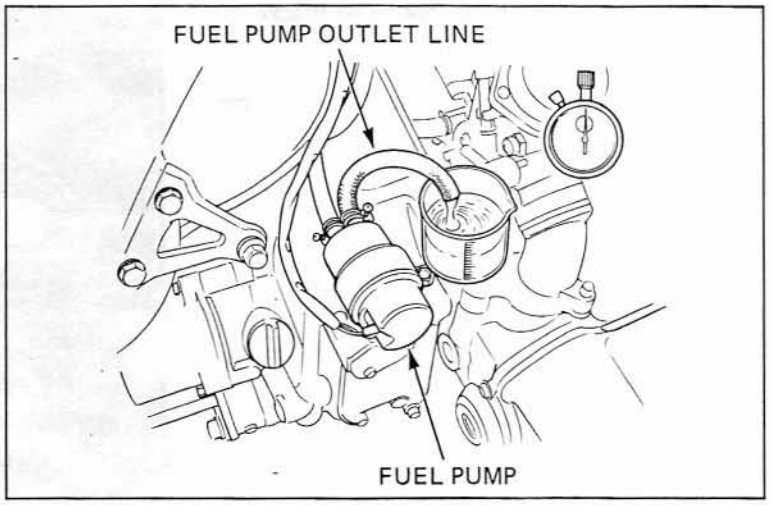
FUEL PUMP

WARNING

Do not allow flames or sparks near gasoline.

Turn the ignition switch off. Disconnect the fuel pump relay from the coupler.
Short the white and black wire terminals at the fuel pump relay coupler with a jamper wire.
Disconnect the fuel pump out let line at the 3-way joint and hold a graduated beaker under the tube.
Turn the ignition switch on and let fuel flow into the beaker for 5 seconds, then turn the ignition switch off. Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minite.

FUEL PUMP FLOW CAPACITY:
500 cm^3 (16.9 US oz, 17.6 Imp oz)/minute minimum

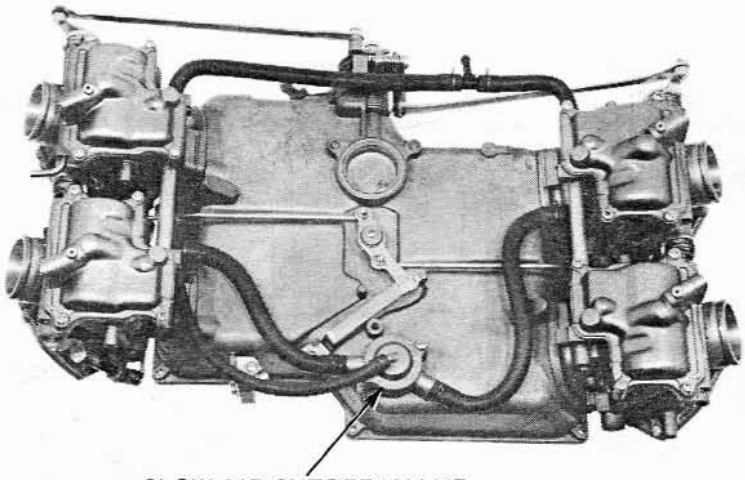


SLOW AIR CUTOFF VALVE

INSPECTION

Remove the carburetor assembly (page 4-3).
Disconnect the air outlet tubes from the air joint pipes.

Disconnect the vacuum tube from the slow air cutoff valve.

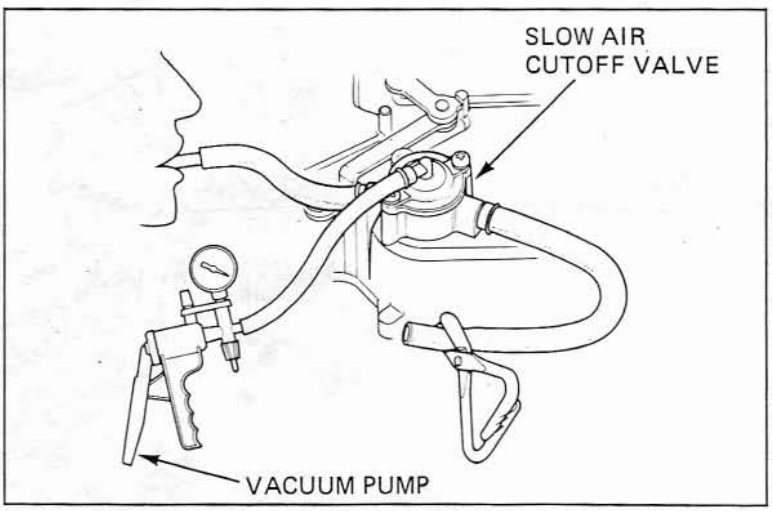


Connect the vacuum gauge to the valve.
Pinch the end of the air outlet tube and exhale air into the other end to check that air flows through the outlet tube into the air chamber.

With the specified amount of vacuum applied to the diaphragm, check that no air flows through the outlet tube.

SPECIFIED VACUUM:
420–480 mm (16.5–18.9 in) Hg

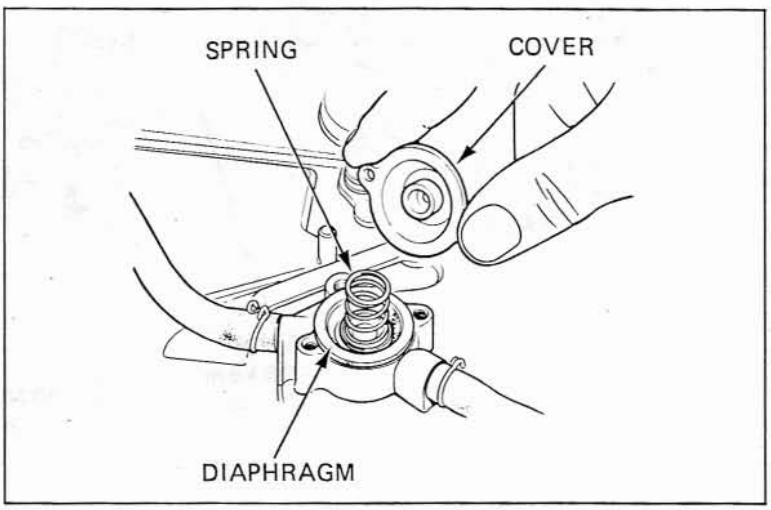
Apply the same procedures to the remaining outlet tube.

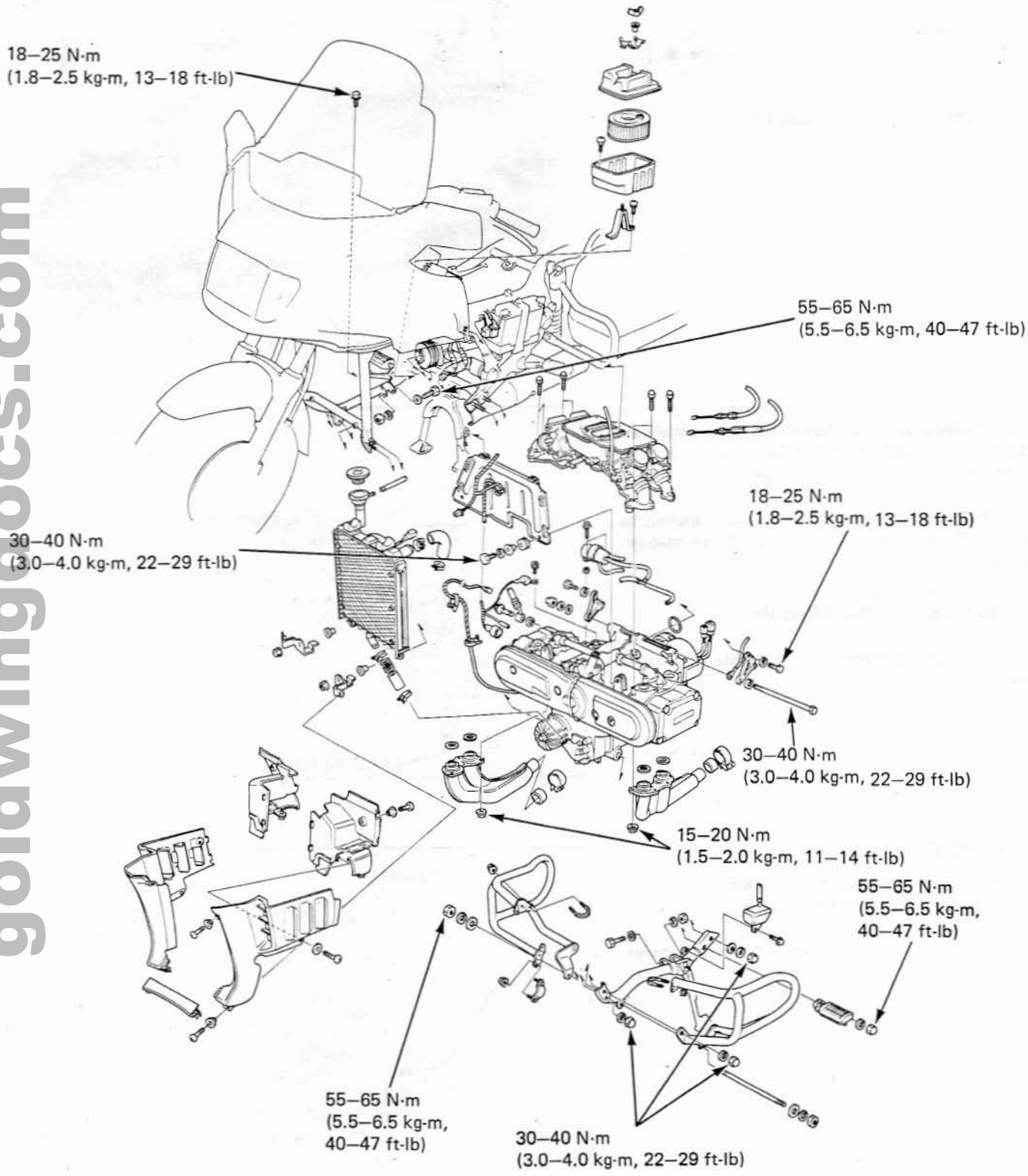


REPLACEMENT

Remove the cover, spring and diaphragm.
Use compressed air to clean air passage.

Install the slow air cutoff valve in the reverse order of removal.





SERVICE INFORMATION

GENERAL

- Parts requiring engine removal for servicing:
  - Crankshaft and pistons
  - Connecting rods
  - Clutch outer and scavenge oil pump
  - Alternator and alternator drive shaft
  - Gearshift spindle
  - Transmission
  - Starting motor and starting clutch
- Remove and install the engine with a hydraulic jack to support its weight.
- Drain the engine oil before removing the engine if the front or rear cover is to be removed.
- For cooling system removal and installation, see Section 6, Cooling System.
- The lower left frame tube (sub-frame) is removable to facilitate engine removal.

SPECIFICATIONS

Engine oil capacity	4.0ℓ (4.2 US qt, 3.5 Imp qt) after disassembly
Engine oil recommendation	See page 2-1.
Coolant capacity (Radiator and engine)	2.15ℓ (2.27 US qt, 1.90 Imp qt) after disassembly
Engine weight	109 kg (240 lbs)

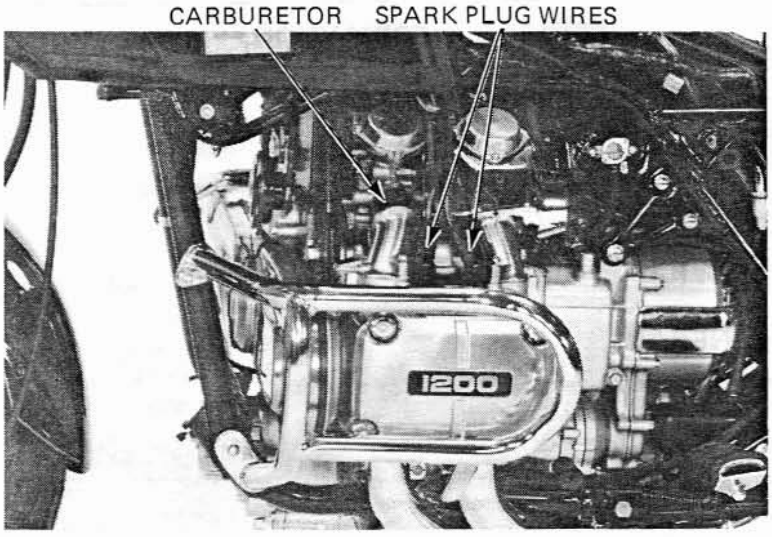
TORQUE VALUES

Engine mount bolt/nut (12 mm)	55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
(10 mm)	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
(8 mm)	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
Sub-frame cap nut	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Left footpge cap nut	55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
Exhaust pipe joint nut	15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb)
Muffler joint bolt	20–24 N·m (2.0–2.4 kg-m, 14–17 ft-lb)
Coolant drain plug	35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)
Engine oil drain plug	35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)

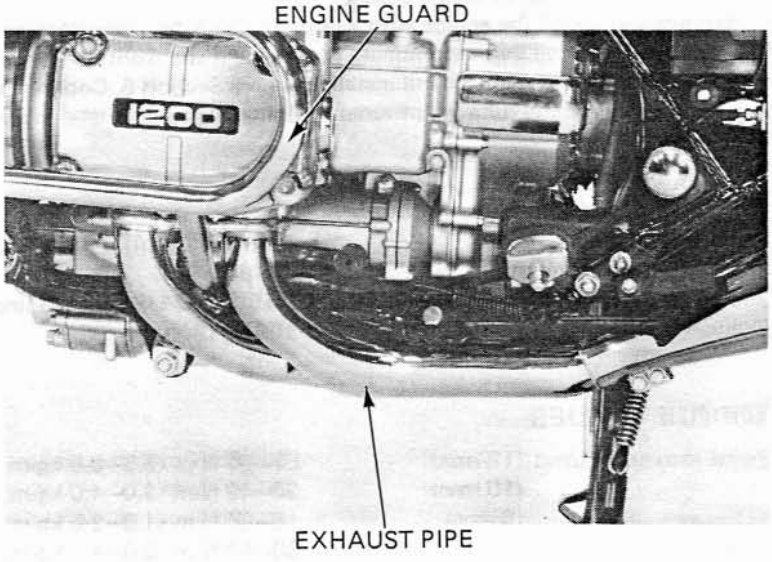
ENGINE REMOVAL

Disconnect the battery ground cable from the battery.

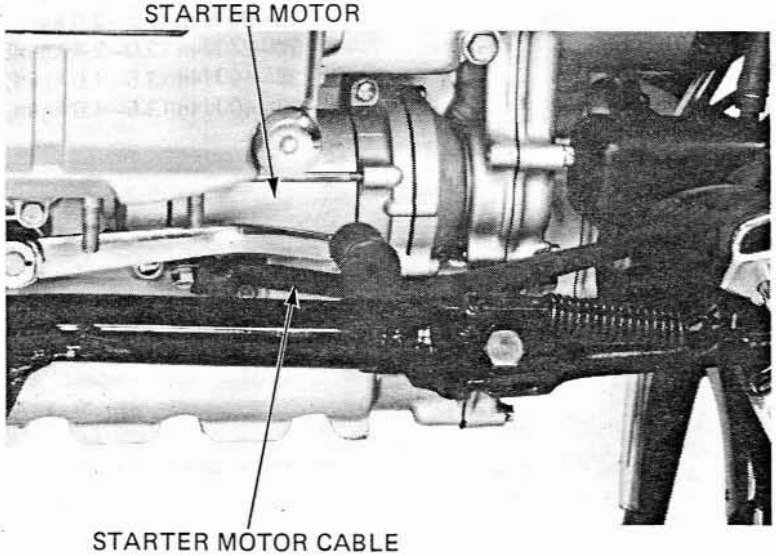
Remove the radiator (section 6).
Disconnect the spark plug wires from the spark plugs.
Remove the carburetor (section 4).



Remove the exhaust pipes and engine guards.

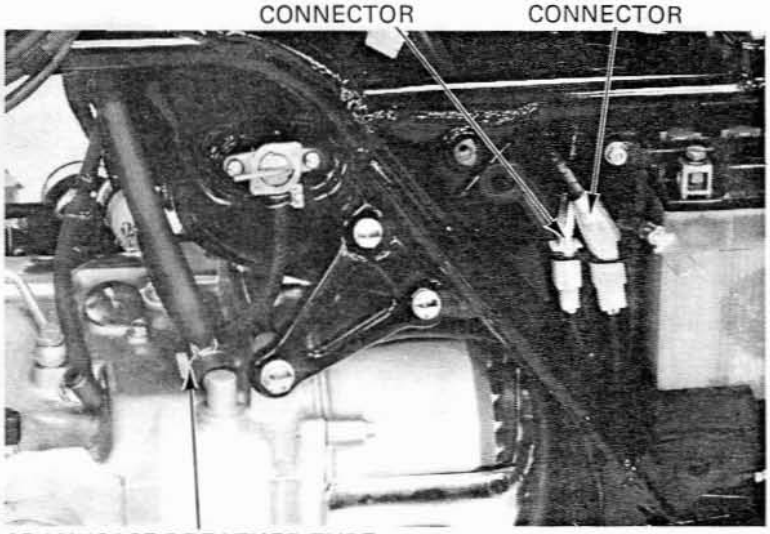


Disconnect the starter motor cable from the starter motor.

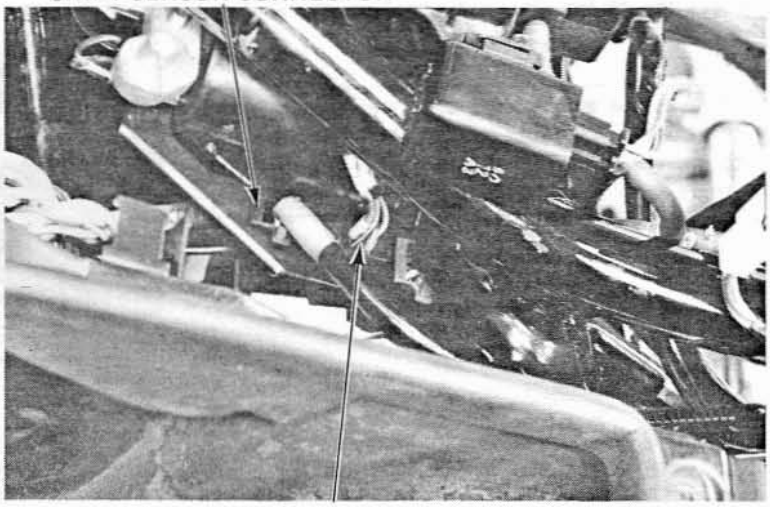


Remove the crankcase breather storage tank.

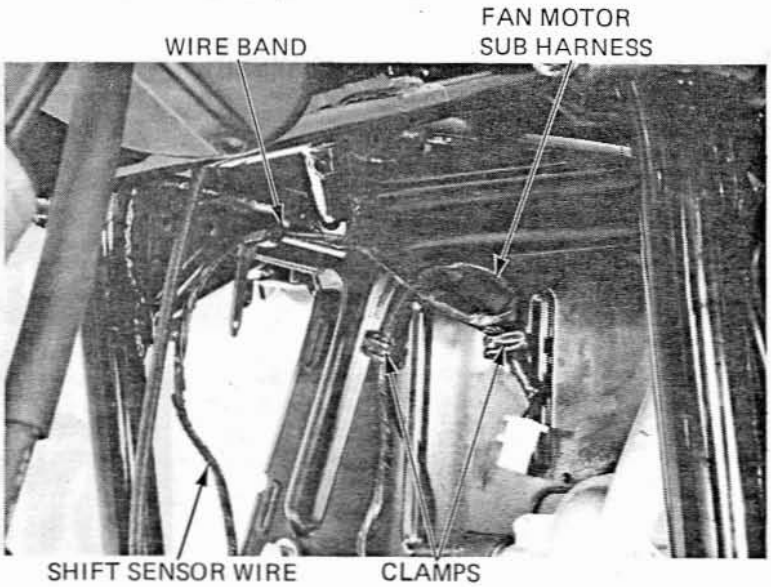
Disconnect the alternator and pulse generator connectors.



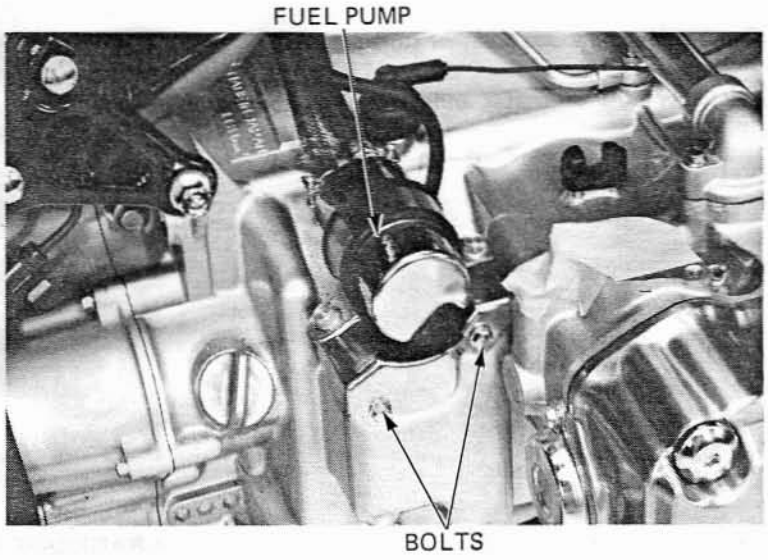
Disconnect the shift sensor and fan motor/sensor connectors.



Release the shift sensor wire and fan motor sub harness from the wire band and clamp.



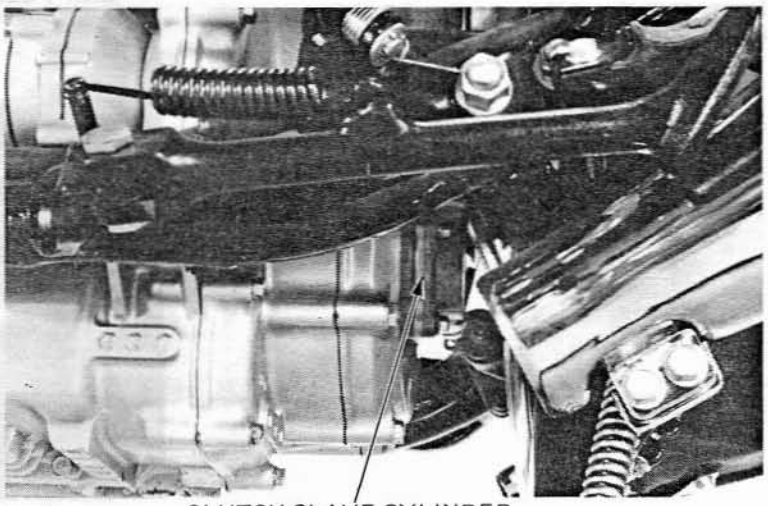
Remove the fuel pump from the engine by removing the two bolts.



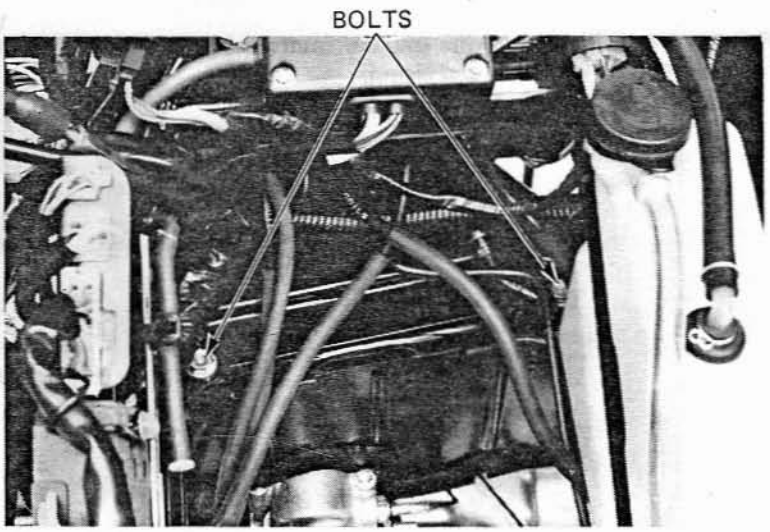
Remove the clutch slave cylinder from the engine.

NOTE:

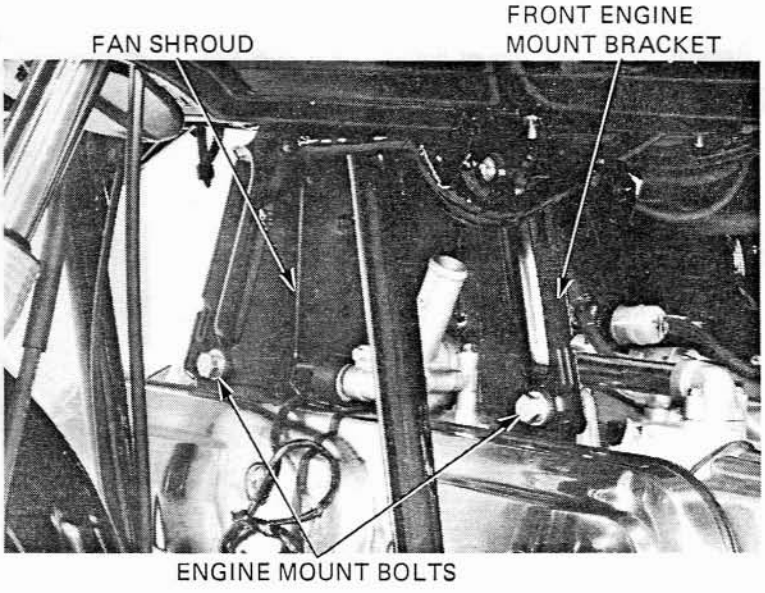
> Squeeze the clutch lever once and keep it in this position by tying it to the handlebar grip to prevent the slave cylinder piston from over stroke caused by fluid gravity.



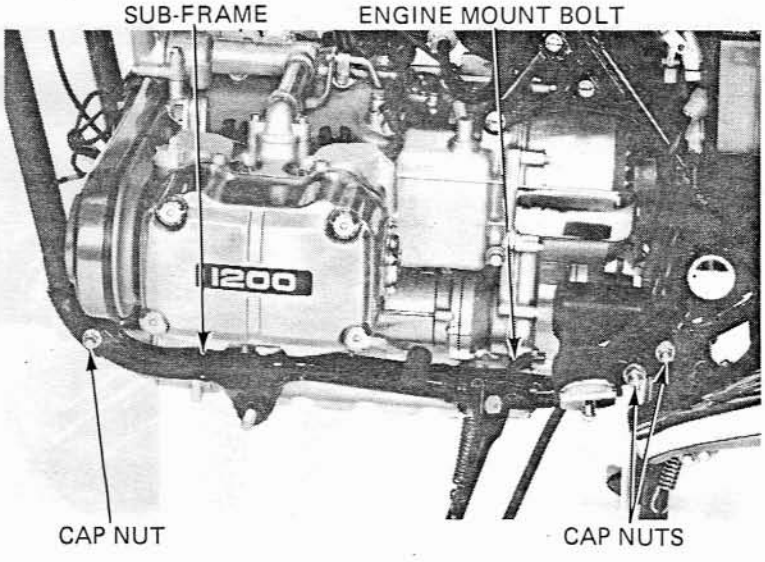
Remove the two front engine mount bracket bolts.



Remove the two engine mount bolts.
Remove the fan shroud and front engine mount bracket.



Remove the sub-frame by removing the engine mount bolt and cap nuts.

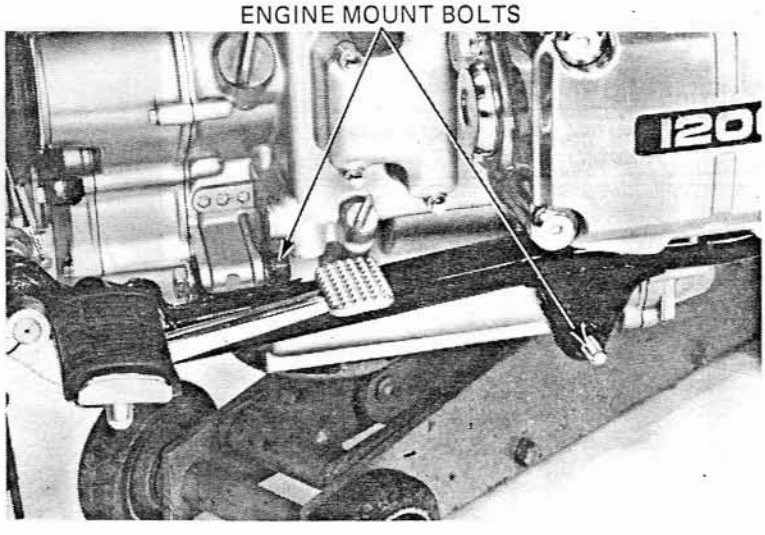


Place a floor jack or other adjustable support under the engine.

NOTE:

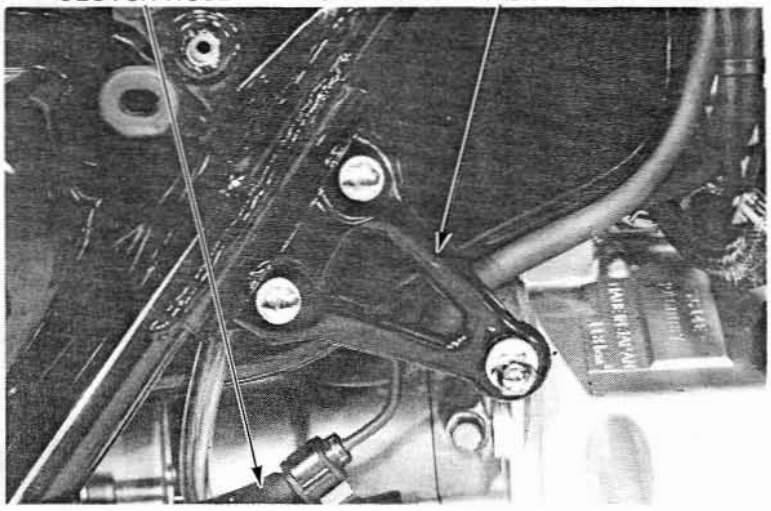
> The jack height must be continuously adjusted so that mounting bolts can be removed, and so stress is relieved from other bolts until they are removed.

Remove the engine mount bolts.

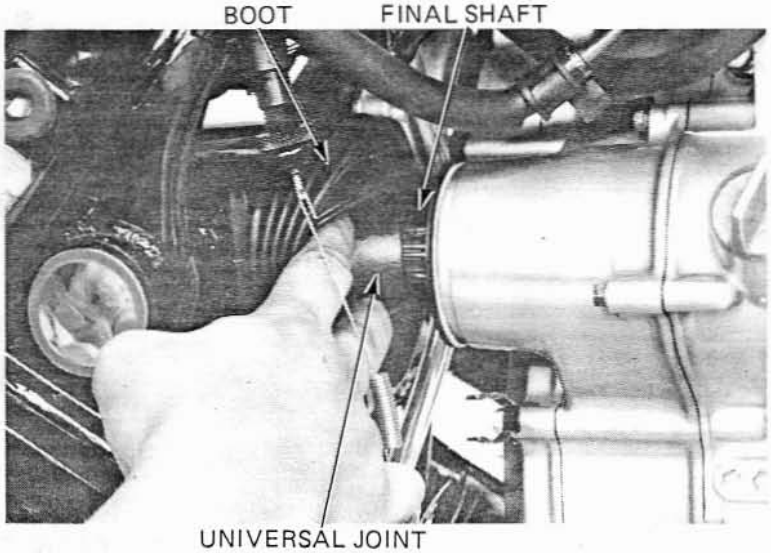


Remove the engine mount bracket from each side.

Release the clutch hose from the hose clamp.



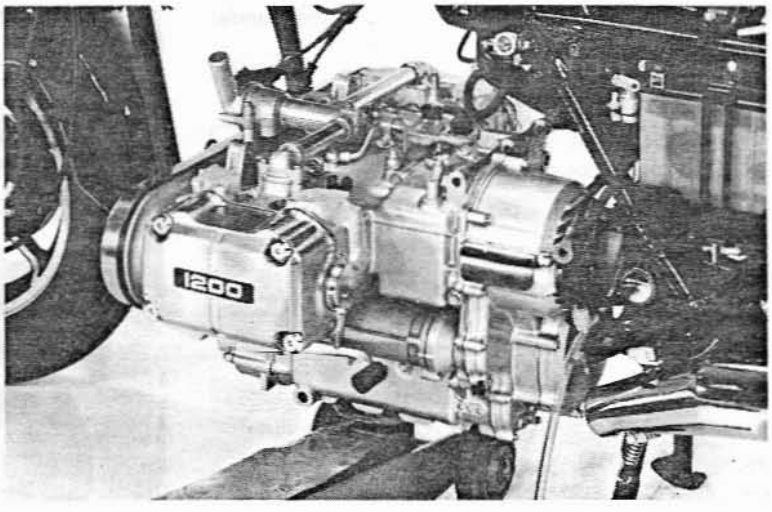
Adjust the jack and move the engine forward or frame rearward to disengage the output shaft from the universal joint.



Move the engine out of the frame.

CAUTION:

Be careful not to damage the brake lines during removal.

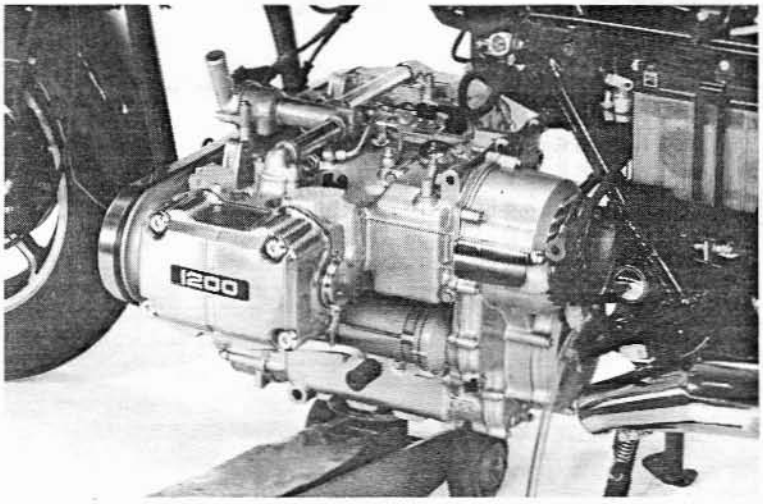


ENGINE INSTALLATION

The installation sequence is essentially the reverse order of removal.

Lubricate the final shaft splines with molybdenum disulfide grease before installation.

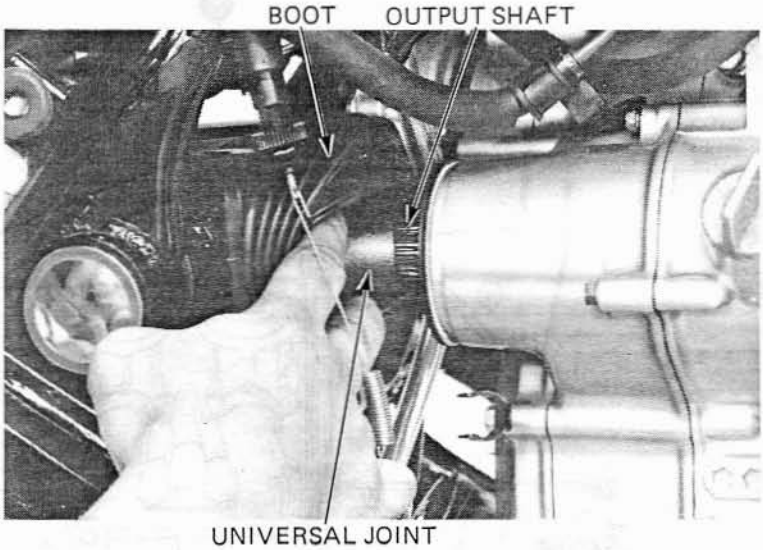
Carefully manuever the engine into the frame while working to align and engage the output shaft and the universal joint.



CAUTION:

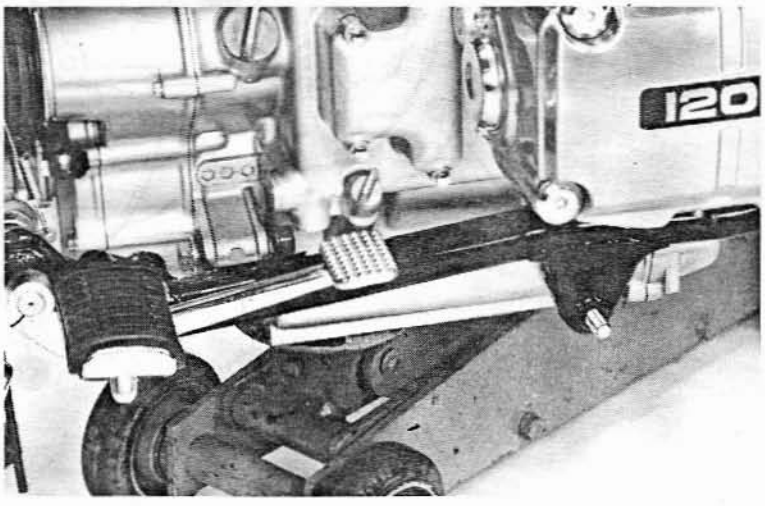
Be careful not to damage the brake lines during installation.

Slide the output shaft into the universal joint by moving the engine backward.



CAUTION:

Carefully align mounting points with the jack to prevent damage to mounting bolt threads, wire harness and cables.

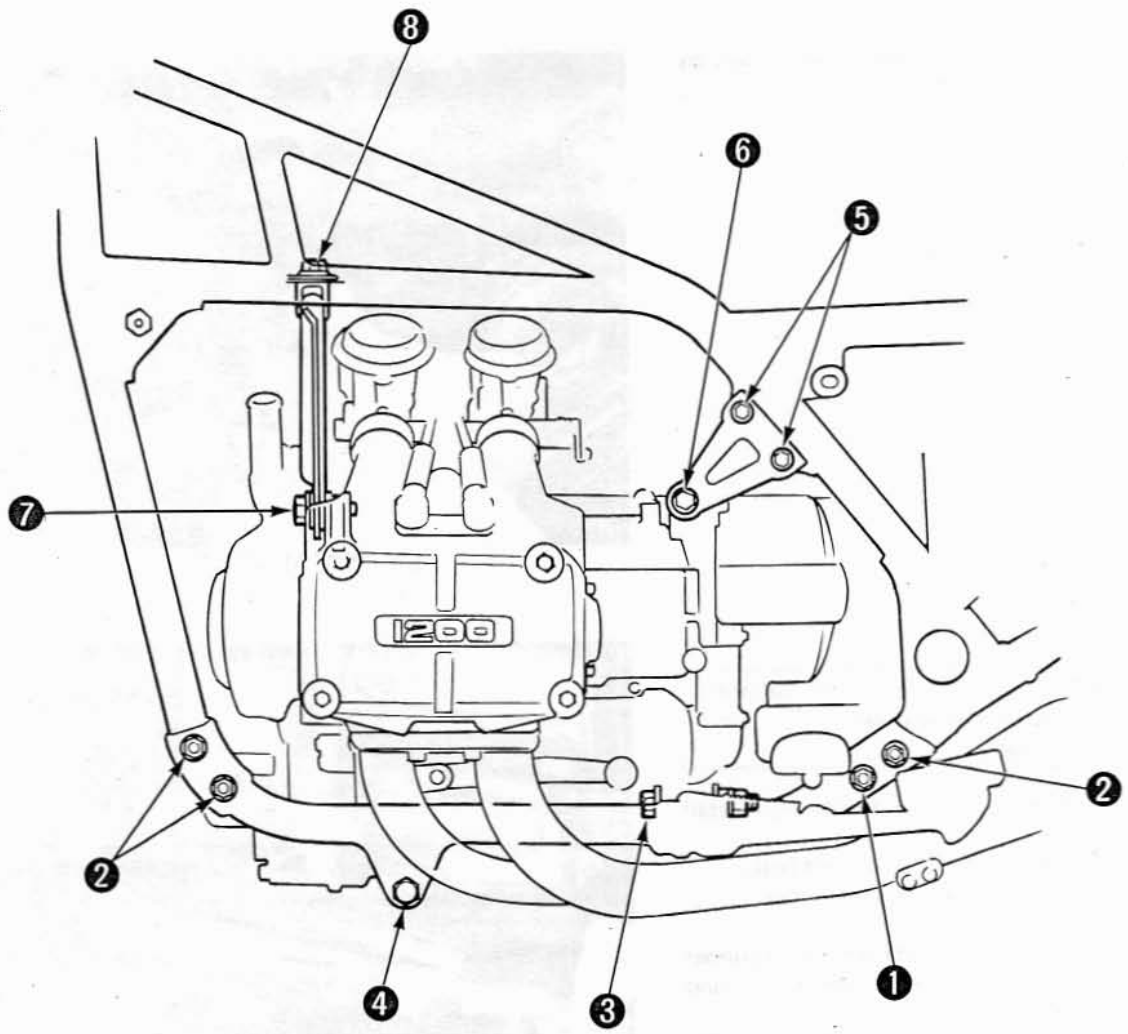


Hand tighten mounting bolts and nuts (and install parts noted) in this order.

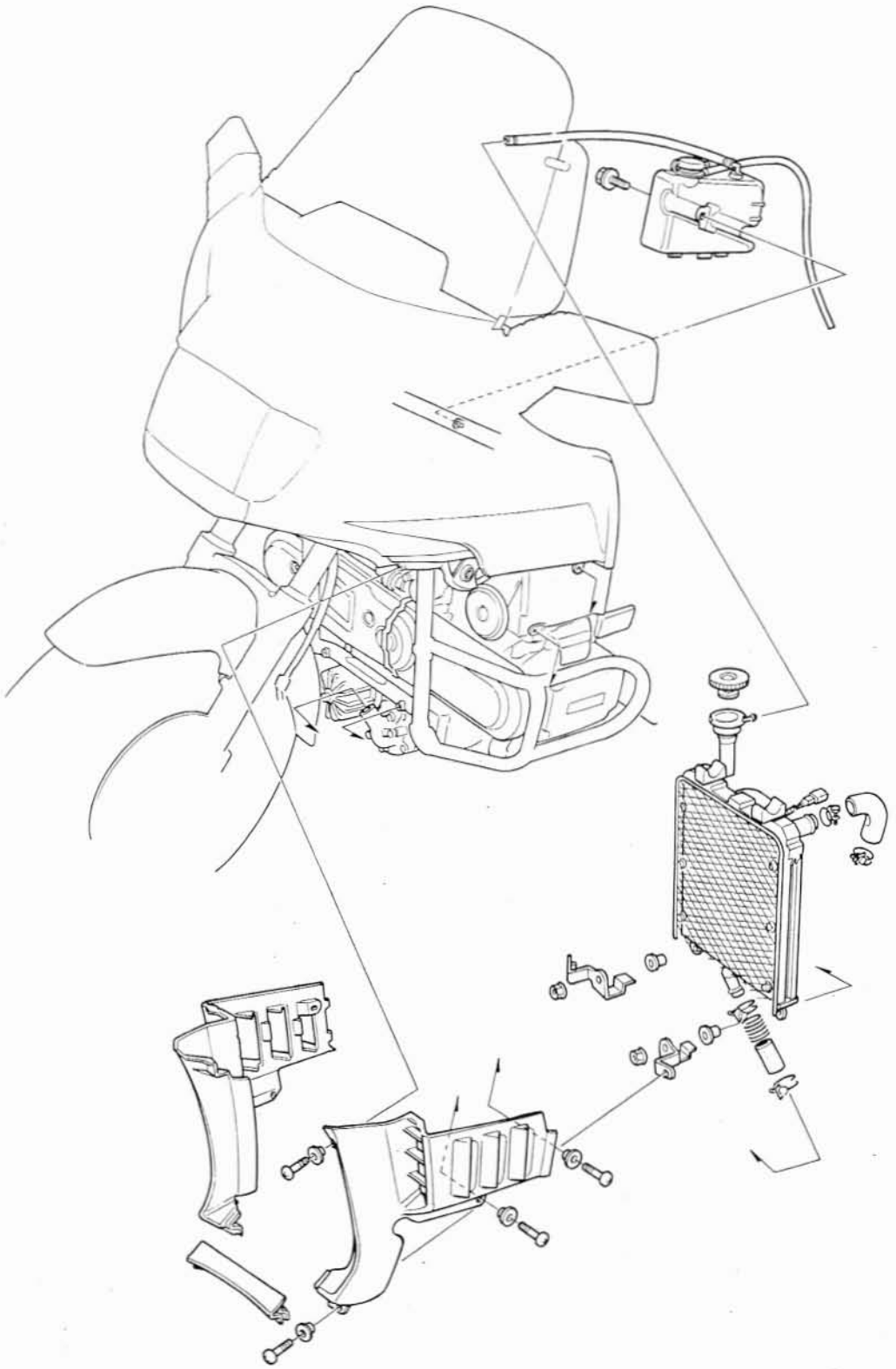
1. The left and then the right rear mount bolts.
2. The sub-frame, footpeg and sub-frame bolts.
3. The forward mount bolt.
4. The right and left side mount brackets and upper engine mount bolts, including the battery ground with the left side mount.
5. The upper and lower front mount bracket bolts.

Remove the jack and torque the mounting bolts in the sequence shown:

1. 55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb) Left side only
2. 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb) Left side only
3. 55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
4. 55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
5. 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
6. 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
7. 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
8. 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)



MEMO



6. COOLING SYSTEM

SERVICE INFORMATION

GENERAL

- Use new gaskets and O-rings when reinstalling or replacing cooling system parts.
- Use only distilled water and ethylene glycol in the cooling system. A 50-50 mixture is recommended for maximum corrosion protection. Do not use alchol-based anti-freeze.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- Do not remove the radiator cap when the engine is hot. The coolant is under pressure and severe scalding could result. The engine must be cool before servicing the cooling system.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.

SPECIFICATIONS

Radiator cap relief pressure	75–105 kPa (0.75–1.05 kg/cm^2, 10.7–14.9 psi)
Freezing point (Hydrometer test):	55% Distilled water + 45% ethylene glycol: –32°C (–26°F) 50% Distilled water + 50% ethylene glycol: –37°C (–35°F) 45% Distilled water + 55% ethylene glycol: –44.5°C (–48°F)
Coolant capacity: After disassembly Reserve tank After draining (included reserve tank)	 2.15 liters (2.3 US qt, 1.9 Imp qt) 0.55 liters (0.6 US qt, 0.5 Imp qt) 2.7 liters (2.9 US qt, 2.4 Imp qt)
Thermostat	Begins to open: 80° to 84°C (176° to 183°F) Fully open: 93° to 97°C (199° to 206°F) Valve lift: Minimum of 8 mm at 95°C (0.315 in at 203°F)
Boiling point (with 50–50 mixture):	Upressurized: 107.7°C (226°F) Cap on, pressurized: 125.6°C (258°F)

TORQUE VALUES

Coolant drain plug	35–40 N·m (3.5–4.0 kg-m, 25–29 ft-lb)
Coolant temperature sensor	21–25 N·m (2.1–2.5 kg-m, 15–18 ft-lb)
Thermostatic fan motor switch	24–32 N·m (2.4–3.2 kg-m, 17–23 ft-lb)

TROUBLESHOOTING

Engine temperature too high

- Faulty temperature gauge or gauge sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses, or water jacket
- Fan blades bent
- Faulty fan motor
- Faulty fan motor
- Radiator cap not holding pressure
- Fan not working:
  - Faulty thermostatic switch
  - Faulty fan motor
- Water pump not rotating
- Water pump impellers damaged
- Incorrect coolant-water ratio

Engine temperature too low

- Faulty temperature gauge or gauge sensor
- Thermostat stuck open

Coolant leaks

- Faulty pump seal
- Deteriorated O-rings
- Radiator hose damaged
- Loose or overtightened hose clamps

INSPECTION

COOLANT

Test the coolant mixture with an anti-freeze tester. For minimum corrosion protection, a 50–50% solution of ethylene glycol and distilled water is recommended.

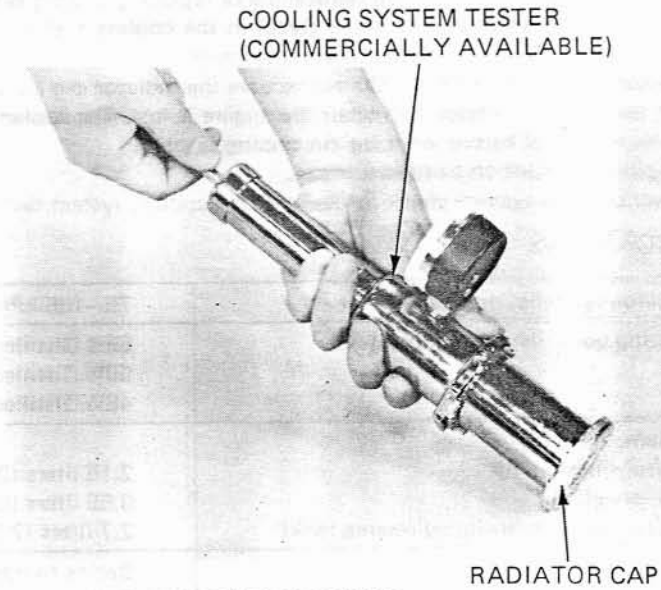
RADIATOR CAP

Pressure test the radiator cap. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold specified pressure for at least six seconds.

NOTE:

> Before installing the cap on the tester, moisten the sealing surfaces.

RADIATOR CAP RELIEF PRESSURE:
75–105 kPa (0.75–1.05 kg/cm², 10.7–14.9 psi)



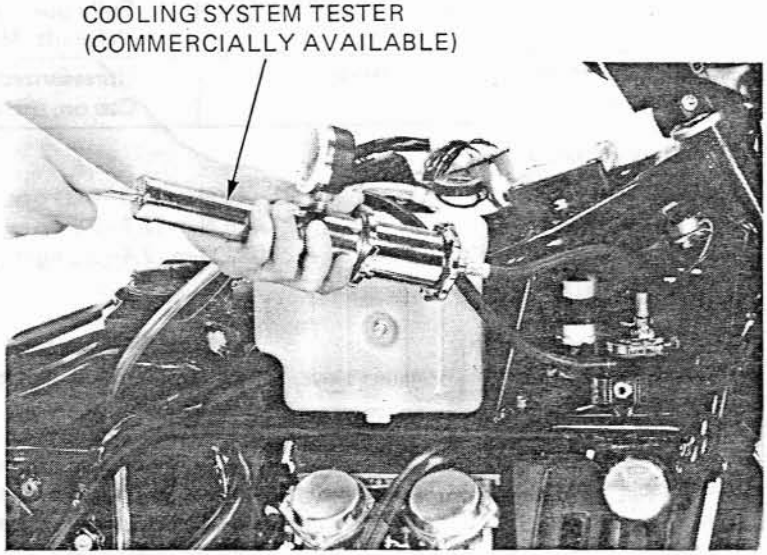
RADIATOR LEAKAGE TEST

Pressurize the radiator, engine and hoses, and check for leaks.

CAUTION:

> *Excessive pressure can damage the radiator. Do not exceed 105 kPa (1.05 kg/cm², 14.9 psi).*

Repair or replace components if the system will not hold the specified pressure for at least six seconds.

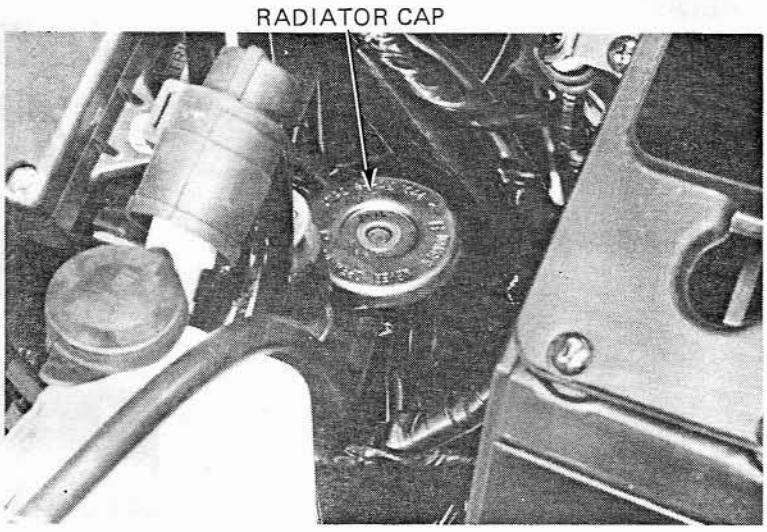


COOLANT REPLACEMENT

WARNING

The engine must be cool before servicing the cooling system, or severe scalding may result.

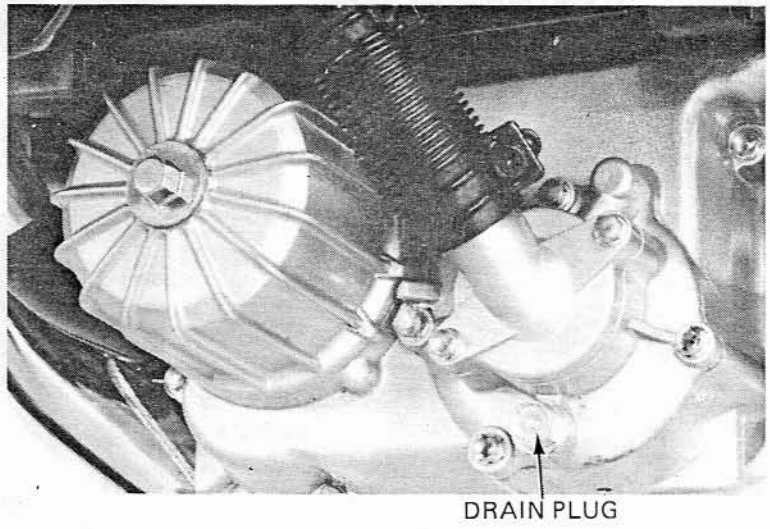
Remove the seat and top compertment.
Remove the radiator cap.



Remove the drain plug, and drain the coolant.

Replace the drain plug.

TORQUE: 35–45 N·m (3.5–4.5 kg-m, 25–29 ft-lb)



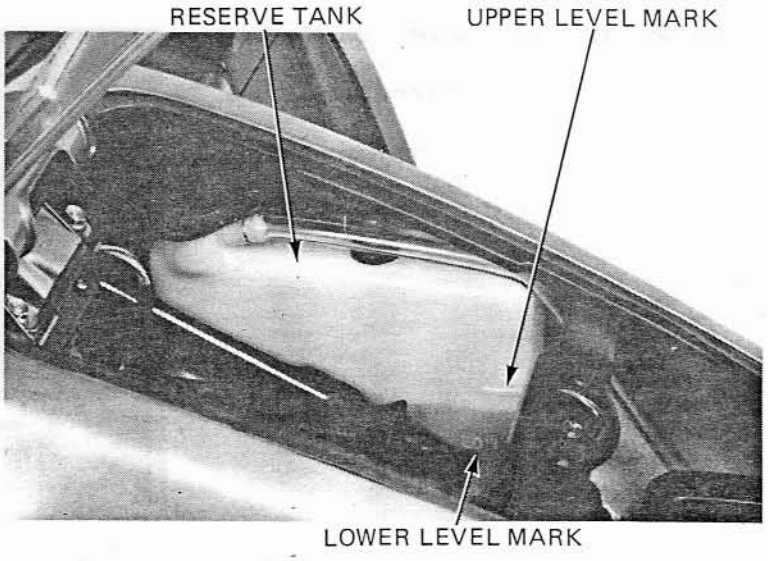
Fill the system with a 50–50 mixture of distilled water and ethylene glycol.

Start the engine with the radiator cap off and run until there are no air bubbles in the coolant and the coolant level stabilizes.

Stop the engine and add coolant up to the proper level, if necessary.

Reinstall the radiator cap.

Check the level of coolant in the reserve tank and fill to the correct level if the level is low, after the engine has cooled.

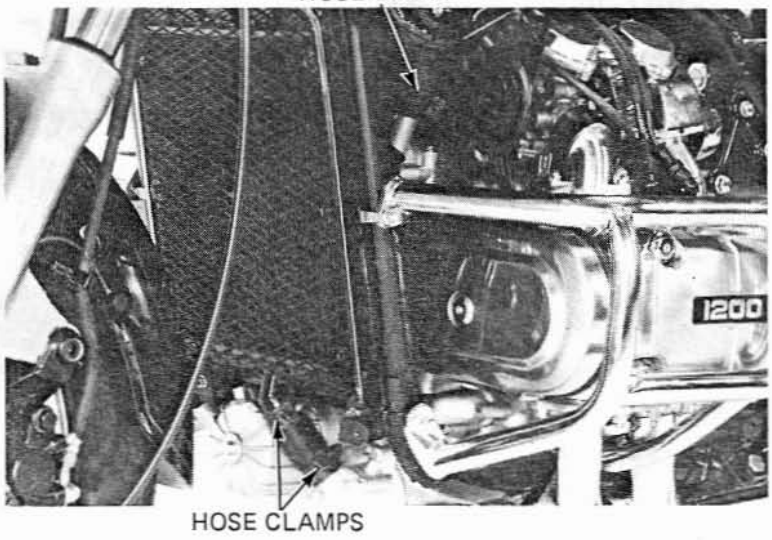


RADIATOR

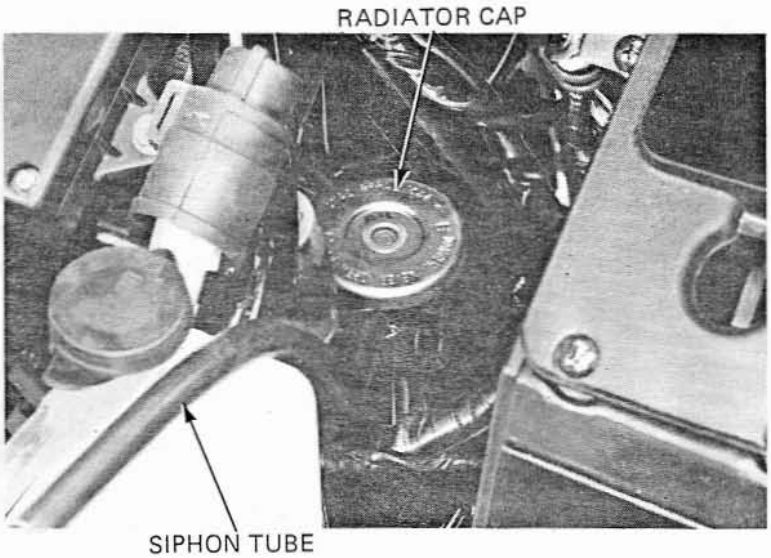
REMOVAL

Remove the seat and top compartment.
Remove the fairing lower covers.
Drain the coolant from the engine.

Loosen the upper and lower hose clamps.

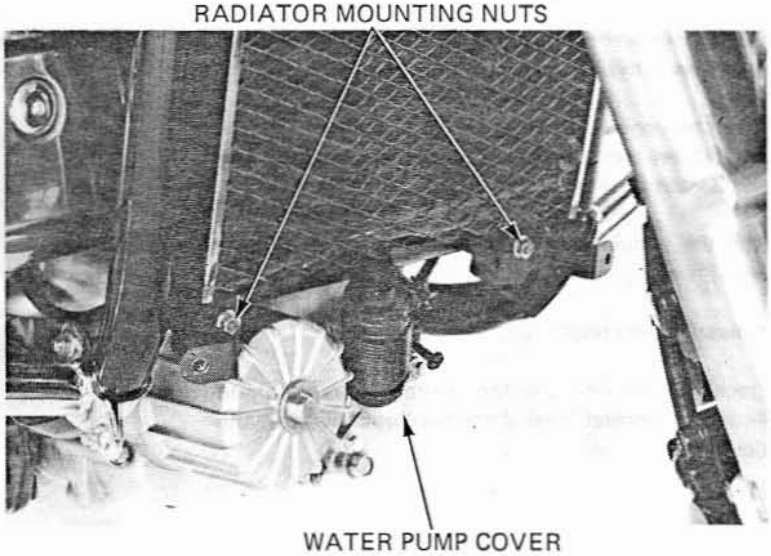


Remove the radiator cap from the radiator.
Disconnect the siphon tube from the radiator.



Remove the water pump cover from the front engine cover.
Remove the water pump cover from the lower hose.

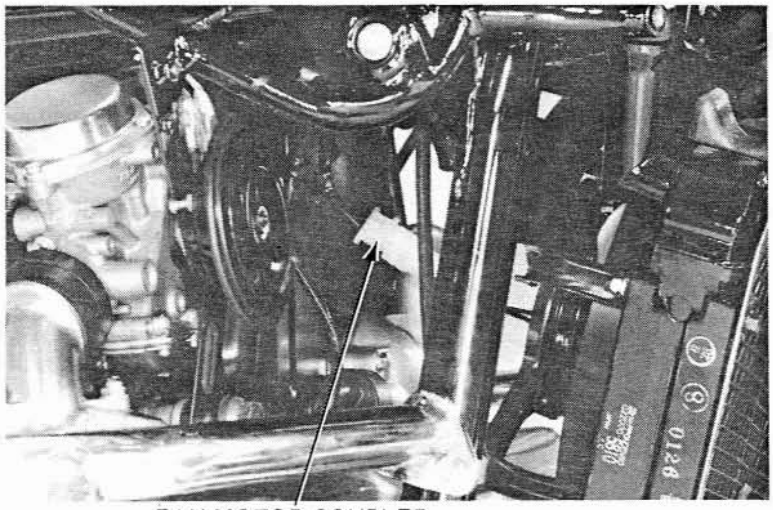
Remove the two radiator mounting nuts and fairing brackets.



Disconnect the upper hose from the thermostat housing and pull the radiator out.
Disconnect the fan motor coupler and remove the radiator.

CAUTION:

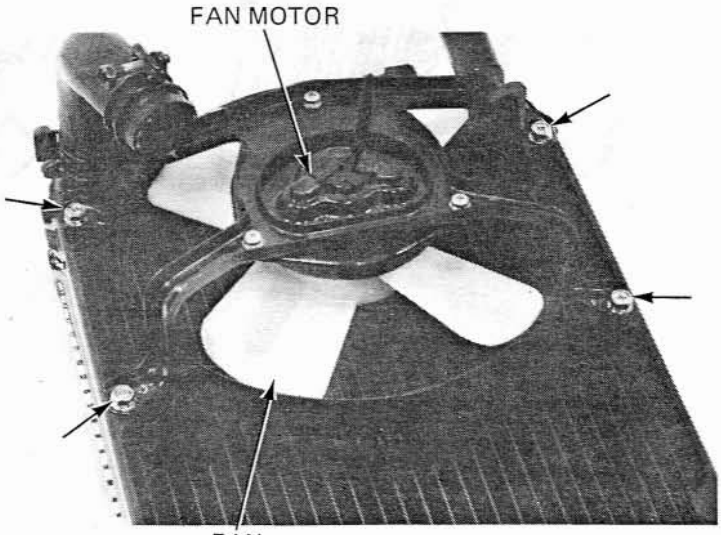
Be careful not to damage the radiator fins by radiator mounting stud.



FAN MOTOR COUPLER

DISASSEMBLY

Remove the four fan motor mount bracket bolts and the fan and motor.



FAN MOTOR

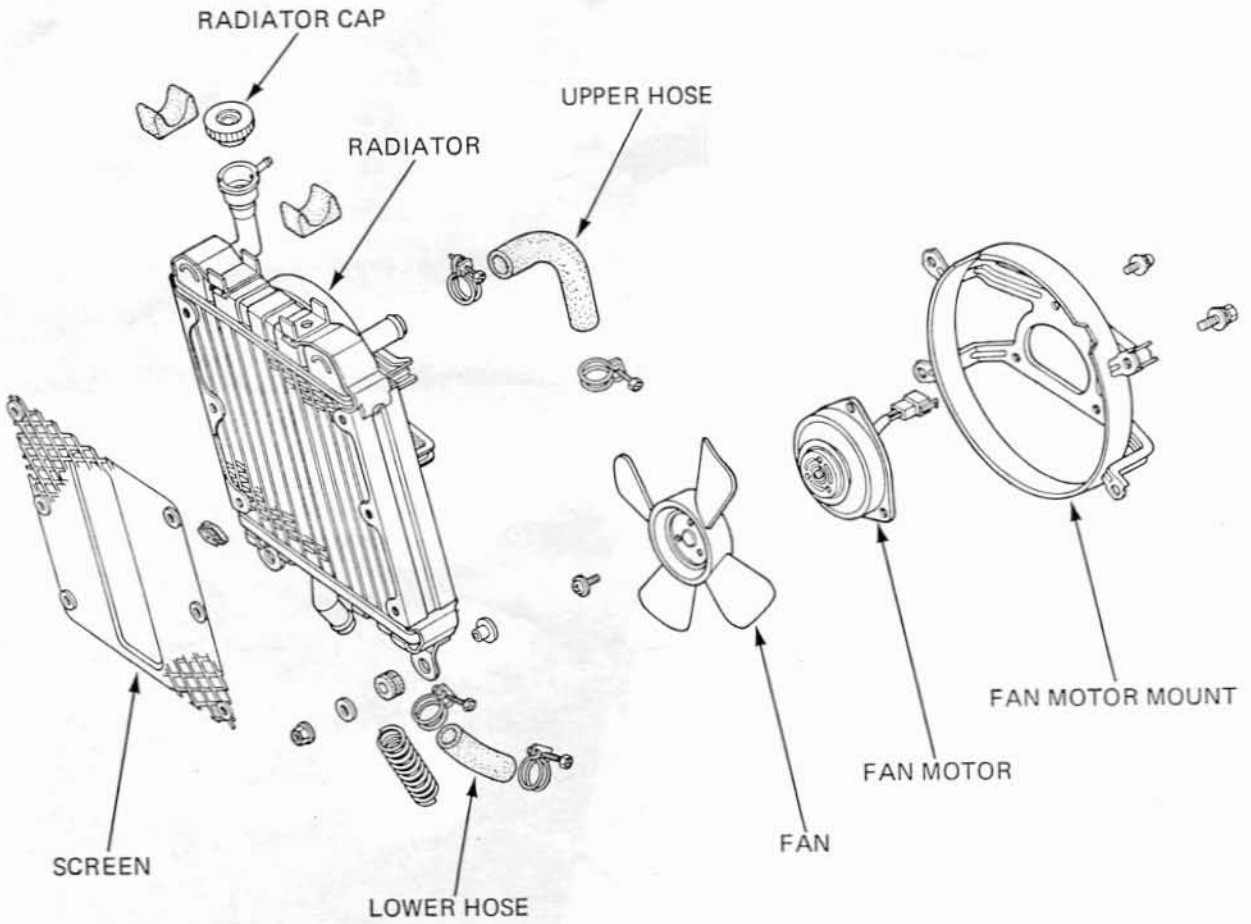
FAN

FAN MOTOR INSPECTION

Disassemble the fan motor from the fan. Use a 12V battery to energize the motor and check its operation. The motor should run freely.

ASSEMBLY

Assemble the radiator in the reverse order of disassembly.



INSTALLATION

The installation sequence is essentially the reverse order of removal.

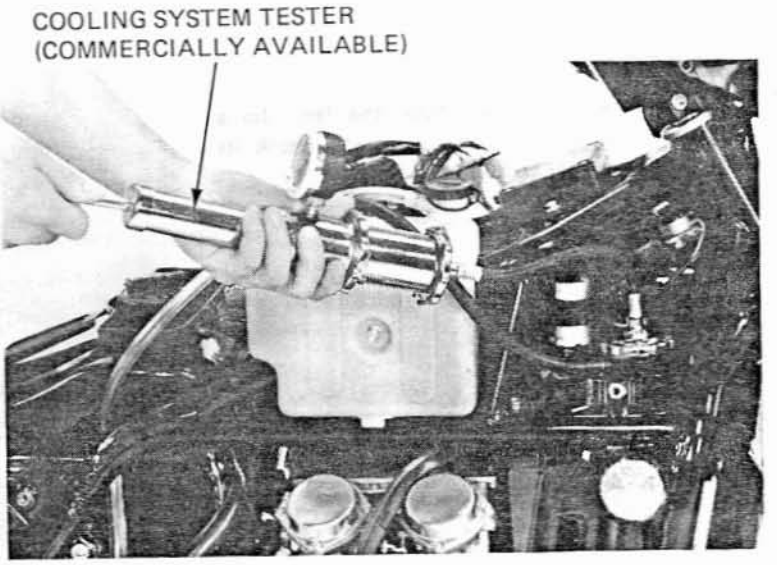
NOTE:

> Replace the water pump cover gasket with new one.

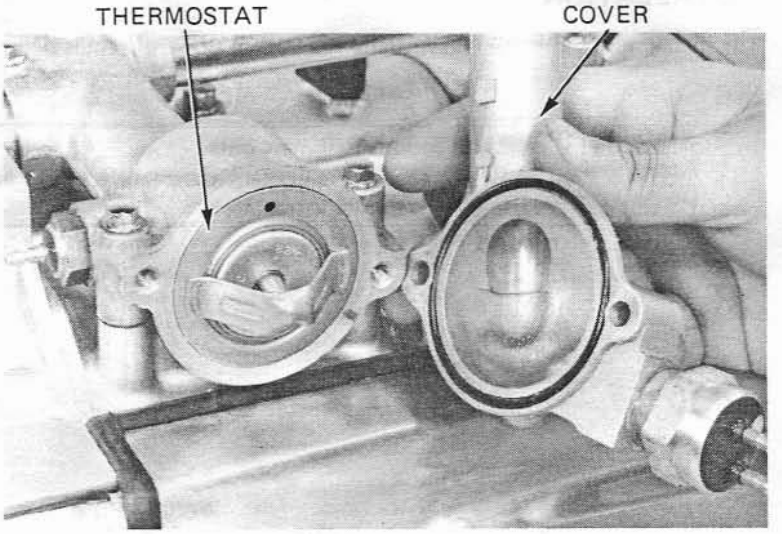
Check the radiator for leaks after installation (page 6-2).

Fill the system with coolant and bleed air from the radiator (page 6-3).

Install the removed parts.



THERMOSTAT AND WATER PIPES

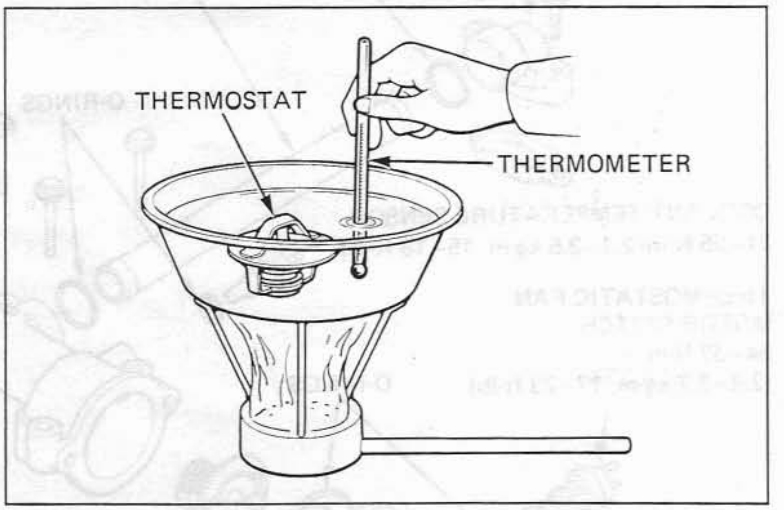


THERMOSTAT REMOVAL

Remove the radiator (page 6-4).
Remove the thermostat cover.
Remove the thermostat from the housing.

INSPECTION

Visually inspect the thermostat for damage.
Suspend the thermostat in hot water to check its operation.
Do not let the thermostat or thermometer touch the pan or false readings will result.



Technical Data:

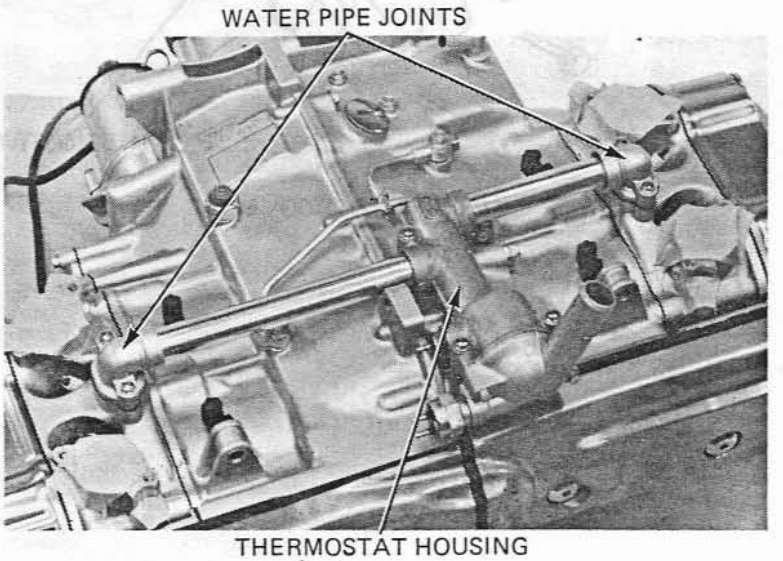
Starts to open	80° to 84°C (176° to 183°F)
Full open	93° to 97°C (199° to 206°F)
Valve lift	8 mm (0.31 in) minimum

NOTE:

- Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.
- Valve lift must be checked by applying heat for five minutes.

WATER PIPE DISASSEMBLY

Remove the radiator and carburetor.
Remove the water pipe joints from the cylinder heads.
Remove the thermostat housing from the engine.

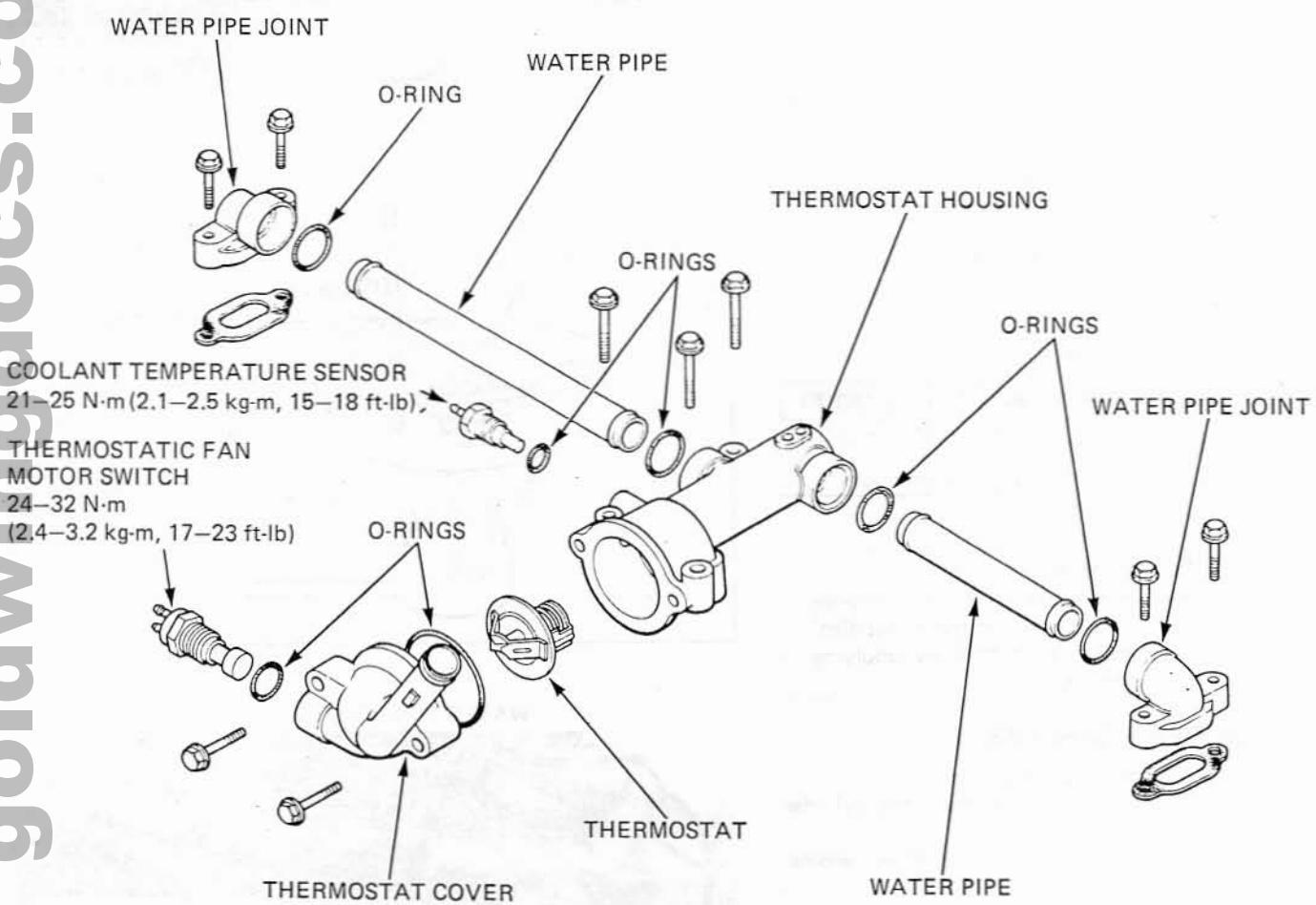


INSTALLATION

The installation sequence is essentially the reverse order of removal.

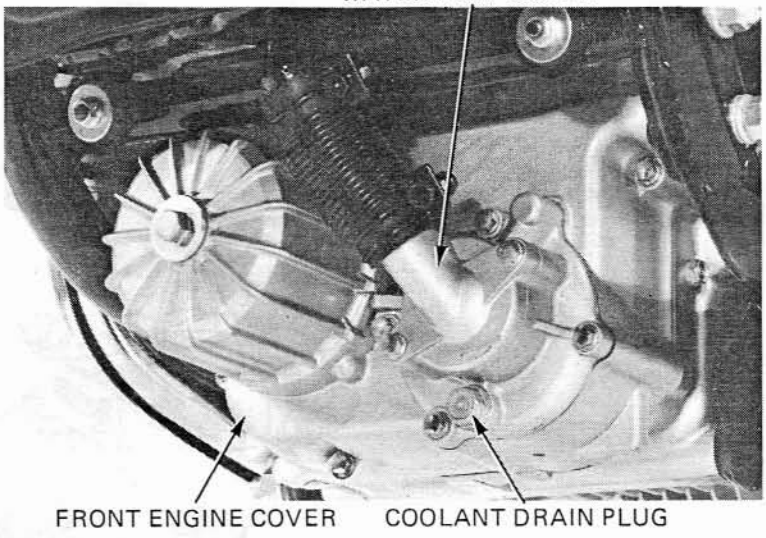
NOTE:

- Replace all O-rings and gaskets with new ones.
- Apply sealant to the thread of the coolant tempeature sensor and thermostatic fan motor switch before installation.
- Do not damage the O-rings during installation.



WATER PUMP

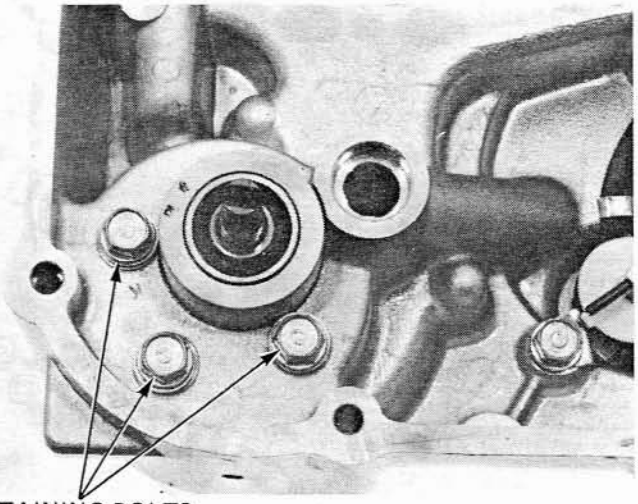
Drain the oil and coolant and remove the radiator and water pump cover.
Remove the front engine cover (page 2-4).



Remove the three water pump retaining bolts and water pump.

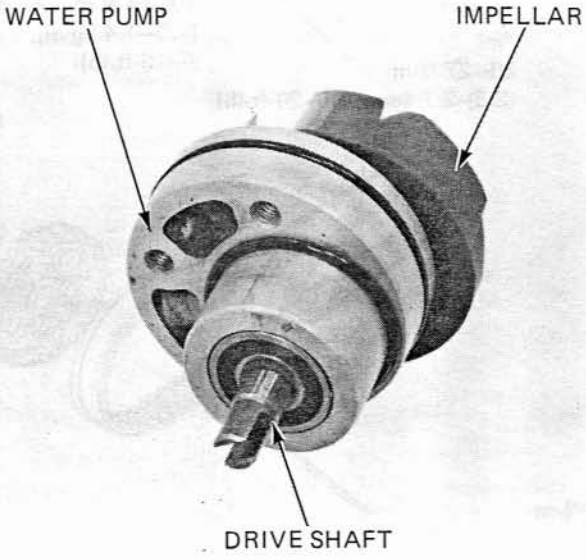
NOTE:

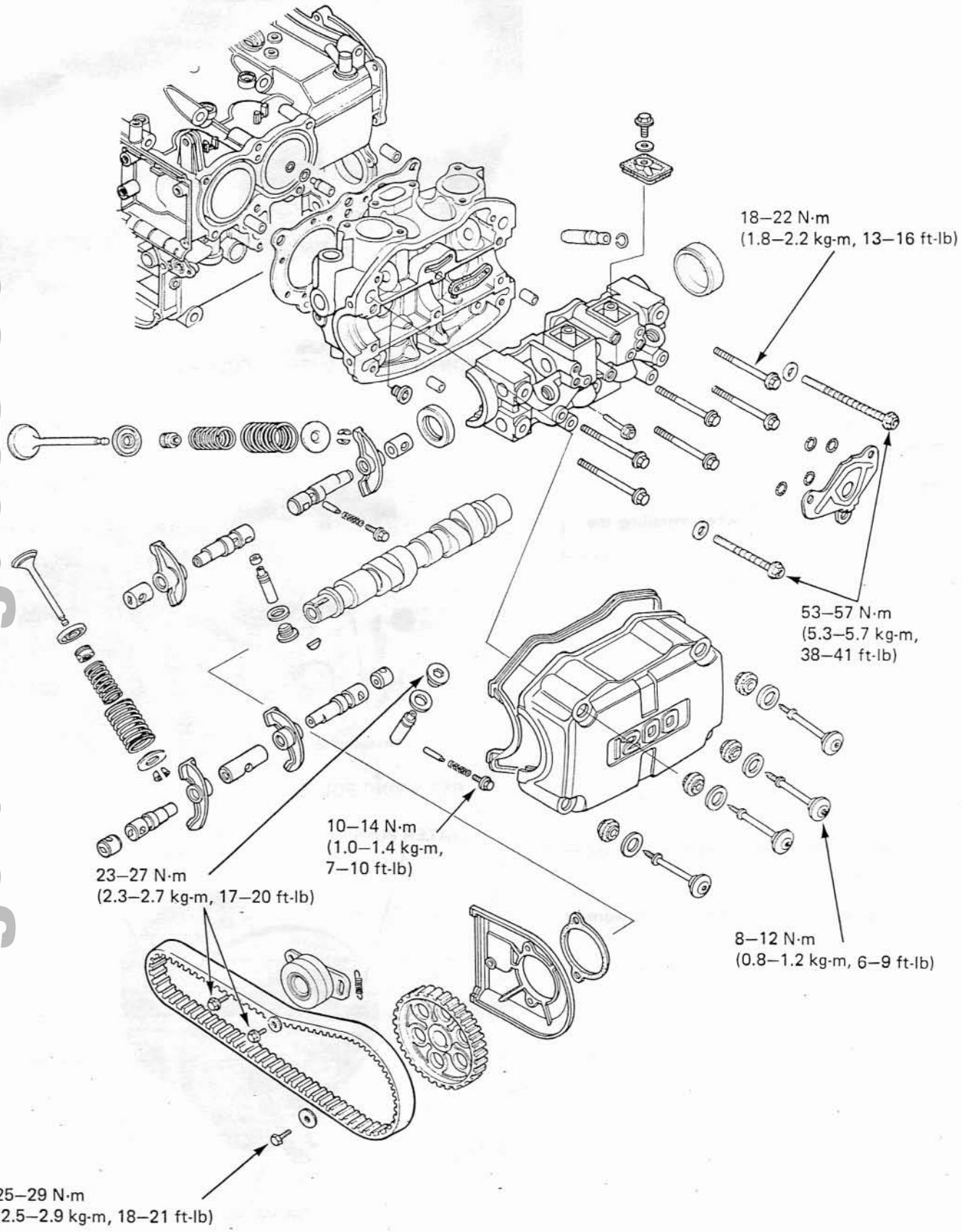
> Use new sealing washers when installing the water pump.



Inspect the pump for worn bearings, loose shaft, or damaged impeller.

Do not try to repair the water pump. If it is worn or damaged, replace it.





7. CYLINDER HEAD/VALVE

SERVICE INFORMATION

GENERAL

- Inspect and adjust timing belt tension while the engine is cold.
- Cylinder head maintenance and inspection can be done with the engine in the frame.
- Camshaft lubricating oil is fed to each cylinder head through an oil control orifice located in the engine case. Be sure these orifices are not clogged and that the O-rings and dowel pins are in place before installing the cylinder heads.
- Care should be taken to prevent the camshaft drive belts from becoming contaminated with oil, which will cause the rubber to swell and affect the camshaft timing. Do not twist the belts, or bend to a radius of less than 25 mm, to avoid possible fracture of the fiberglass material.
- When the camshaft holders are removed, be sure to fill the de-foaming chambers with clean engine oil during reassembly, which otherwise would allow air to enter the hydraulic tappet adjusters.
- Air in the hydraulic tappet adjuster causes excessive tappet noises. Remove the adjuster and bleed air if there is air in any adjuster.
- Use a sounding rod or a stethoscope to diagnose the trouble, if the top-end is noisy.
- Adjust the hydraulic adjsuter holder with shim, if any of the following parts is replaced:
  - Cylinder head/camshaft holder
  - Camshaft
  - Valve/valve seat (refacing)
  - Rocker arm/rocker arm shaft

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			1,100–1,500 kPa (11–15 kg/cm², 156–213 psi)	1,000 kPa (10 kg/cm², 142 psi)
Valve, Valve guide	Stem O.D.	IN	6.580–6.590 (0.2591–0.2594)	6.54 (0.257)
		EX	6.550–6.560 (0.2579–0.2583)	6.54 (0.257)
	Guide I.D.	(IN, EX)	6.600–6.615 (0.2598–0.2604)	6.64 (0.261)
	Valve stem to guide clearance	IN	0.010–0.035 (0.0004–0.0014)	0.08 (0.003)
		EX	0.040–0.065 (0.0016–0.0026)	0.10 (0.004)
	Seat width		1.4 (0.06)	–
Valve spring	Free length	INNER	40.20 (1.583)	39.0 (1.54)
		OUTER	43.75 (1.722)	42.5 (1.67)
	Preload/Length	INNER	26.8–30.8 kg/26 mm (59.08–67.90 lbs/1.0 in)	–
		OUTER	47.9–55.1 kg/28 mm (105.60–121.47 lbs/1.1 in)	–
Valve rocker arm I.D.			14.000–14.018 (0.5512–0.5519)	14.05 (0.553)
Rocker arm shaft O.D.			13.937–13.984 (0.5501–0.5506)	13.84 (0.545)
Assist spring free length			17.5 (0.69)	16.0 (0.63)
Hydraulic tappet adjuster compression stroke with kelosene			0–0.30 (0–0.012)	0.30 (0.012)

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Camshaft	Cam lobe height	IN	35.8 (1.41)	35.6 (1.40)
		EX	35.8 (1.41)	35.6 (1.40)
	Runout (at center journal)		—	0.10 (0.004)
	Journal O.D.	Center	24.934–24.950 (0.9817–0.9823)	24.91 (0.981)
		Both ends	26.954–24.970 (1.0612–0.9831)	26.91 (1.059)
	Holder journal I.D.	Center	25.000–25.021 (0.9843–0.9851)	25.05 (0.986)
		Both ends	27.000–27.021 (1.0630–1.0638)	27.05 (1.065)
	Journal oil clearance	Center	0.050–0.087 (0.0020–0.0034)	0.14 (0.006)
		Both ends	0.030–0.067 (0.0012–0.0026)	0.14 (0.006)
Cylinder head warpage			—	0.10 (0.004)

TORQUE VALUES

Cylinder head bolt (10 mm bolt)	53–57 N·m (5.3–5.7 kg-m, 38–41 ft-lb)
Timing belt dreven pully bolt	25–29 N·m (2.5–2.9 kg-m, 18–21 ft-lb)
Hydraulic tappet adjuster stopper plug	23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)
Camshaft holder bolt	18–22 N·m (1.8–2.2 kg-m, 13–16 ft-lb)
Rocker arm assist bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Heat shield bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Timing belt cover bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Cylinder head cover bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Timing belt tensioner bolt	24–28 N·m (2.4–2.8 kg-m, 17–20 ft-lb)

TOOLS

Special

Timing pully holder	07925–3710200
Hydraulic tappet breeder	07973–MJ00000 or 07973–ME90000
Valve guide reamer, 6.6 mm	07984–5510000
Shim selection gauge	07974–MG90000

Common

Valve spring compressor	07757–0010000
Valve guide remover, 6.6 mm	07742–0010200

TROUBLESHOOTING

Engine top-end problems can be diagnosed by a compression test, or by tracing noises with a sounding rod or stethoscope.

Low compression or uneven compression

- Valves
  - Sticking hydraulic tappet adjuster
  - Incorrect hydraulic adjuster shim
  - Incorrect valve clearance
  - Burned or bent valves
  - Incorrect valve timing
  - Sticking valve
  - Broken valve spring
- Cylinder Head
  - Leaking or damaged head gasket
  - Warped or cracked cylinder head
- Camshaft
  - Worn or damaged timing belt
  - Loose pulley or drive key
  - Worn or damaged belt tensioner pulley
- Engine lower end problems (See section 11)

Compression too high

- Excessive carbon build-up on piston head or combustion chamber

Excessive noise

- Hydraulic Tappet Adjuster
  - Air in hydraulic tappet adjuster or improper installation
  - Worn or sticking adjuster
  - Clogged cylinder head oil holes or orifices
  - Broken or weak assist spring
  - Sticking or damaged assist shaft
  - Use of improper shim
- Worn valve stem
- Sticking valve or broken valve spring
- Damaged rocker arm or camshaft
- Loose or damaged camshaft drive belt
- Loose or damaged drive belt tensioners or drive pulleys.

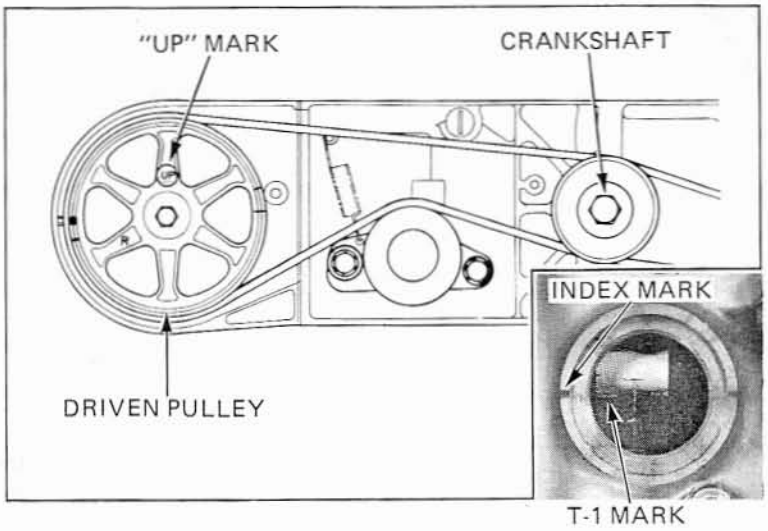
Contaminated engine oil or coolant

- Leaking or blown head gasket
- Leaking core plugs
- Damaged or warped cylinder head

TIMING BELT REMOVAL

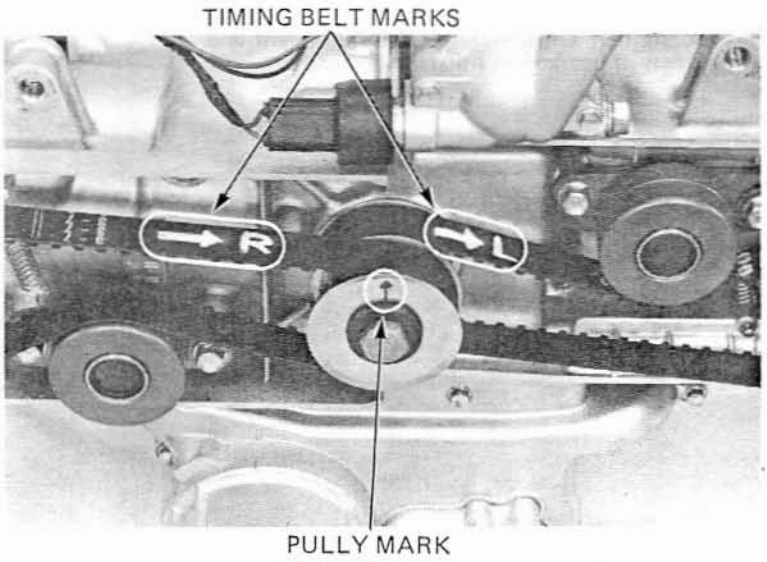
Remove the radiator (page 6-4).
Remove the timing belt covers.

Remove the timing mark hole cap.
Turn the crankshaft clockwise until the T-1 mark on the flywheel lines up with the index mark on the engine case. The "UP" marks on the driven pullys should be facing up as shown.



Identify each belt as left or right and also mark its direction of rotation.

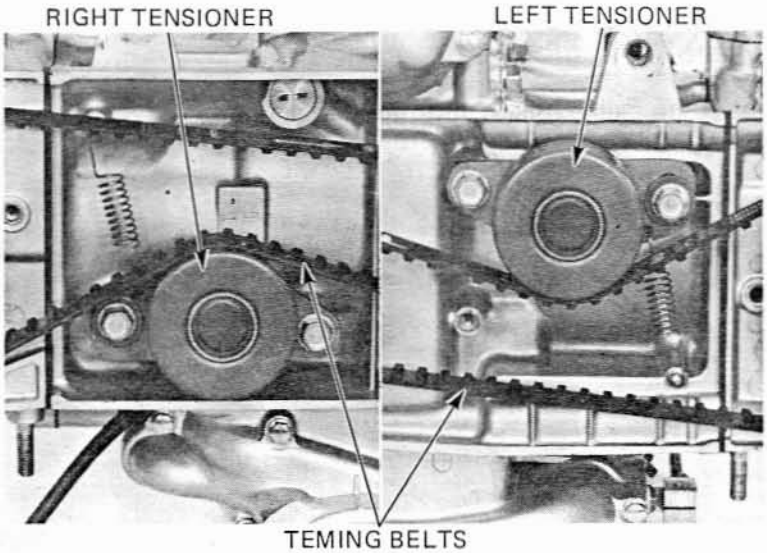
Mark the crankshaft pulley with tape or felt-tip pen to indicate T.D.C. No. 1 cylinder.



Loosen the tensioner bolts, then slip off the right and left belts, in that order.

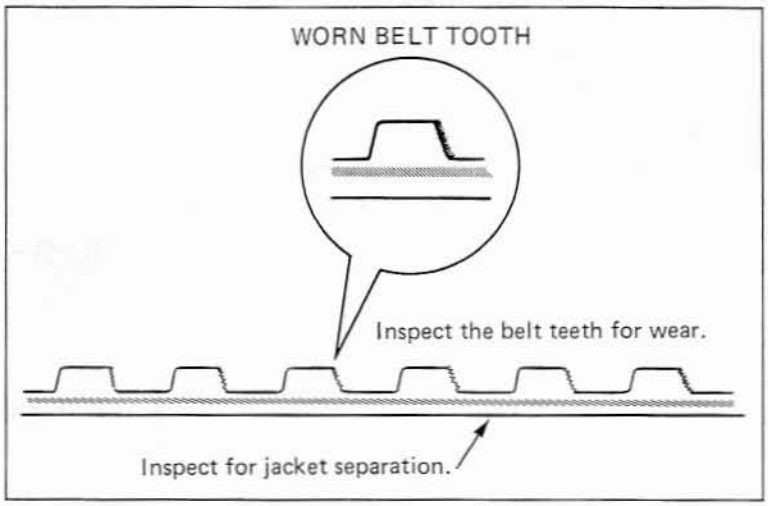
CAUTION:

- *To prevent belt damage, do not use sharp tools, such as a screwdriver, to pry off belts.*
- *Do not turn the camshaft after the timing belts have been removed, since it is possible to bend the valves.*

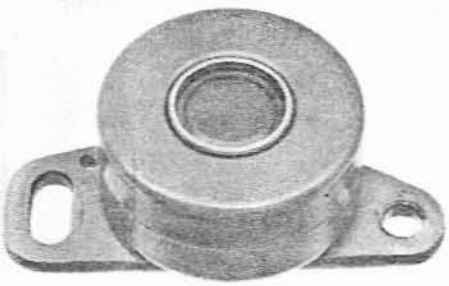


BELT INSPECTION

Check the belts for sweling caused by oil contamination.
Replace belts if material is cracked, teeth are worn, or swelling is evident.

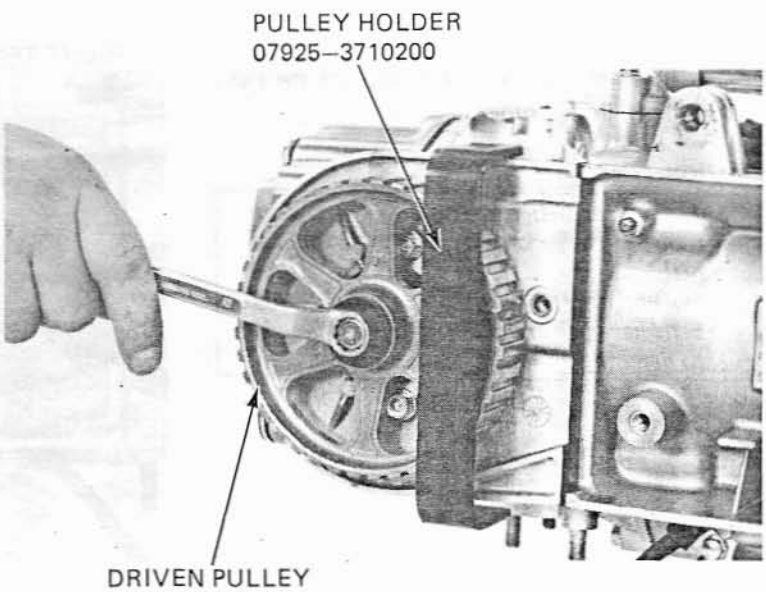


Inspect the belt tensioners for free movement and smoothness of bearings in rollers.

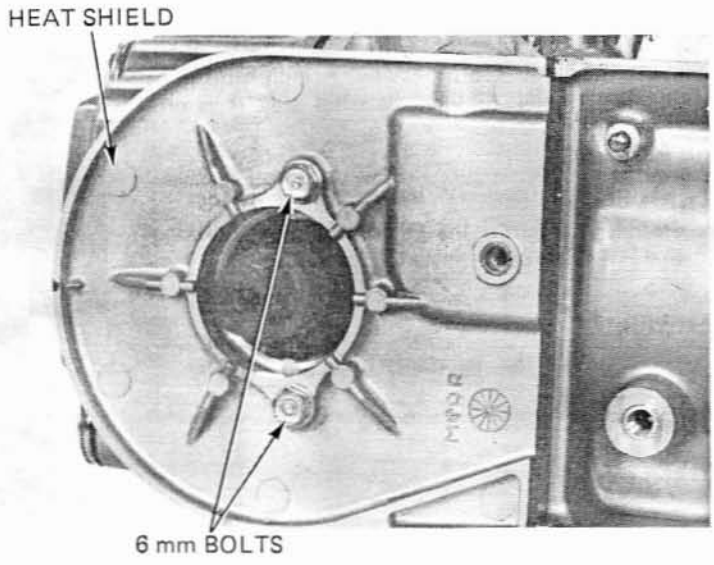


CAMSHAFT REMOVAL

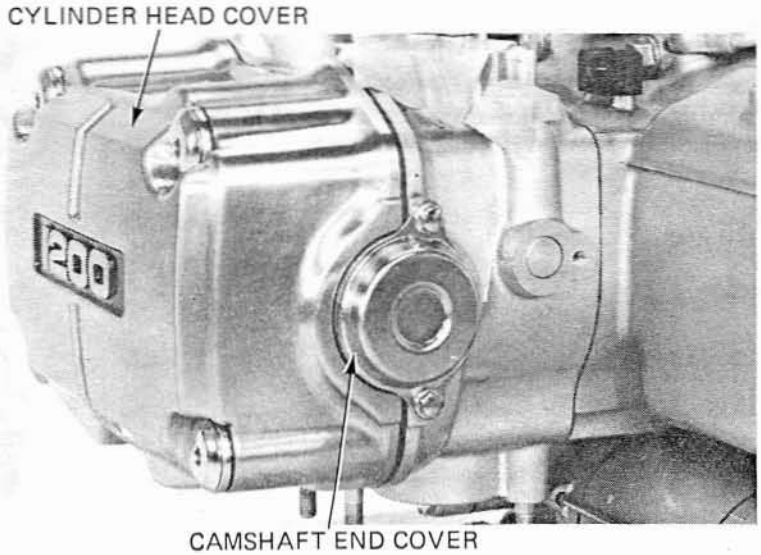
Install the Pulley Holder, then unscrew the cam pulley bolt and remove the driven pulley.



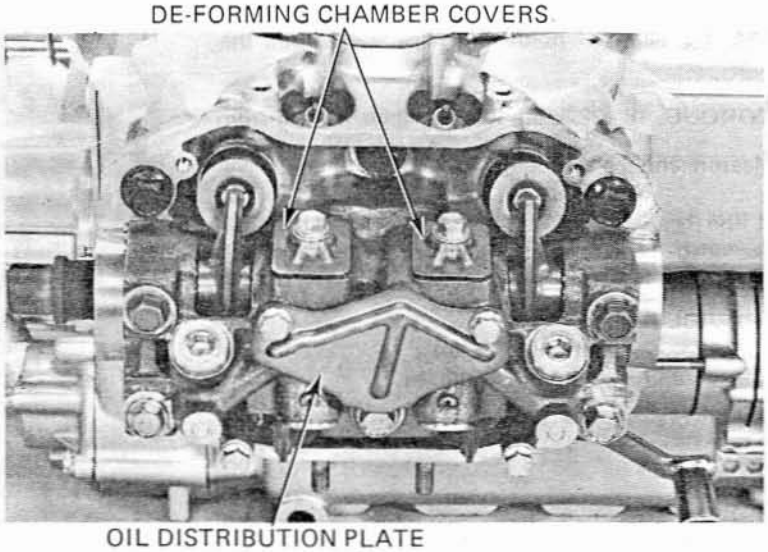
Remove the cylinder head heat shields and the gaskets.



Remove the camshaft end covers from the rear of the cylinder heads.
Remove the cylinder head covers.



Remove the de-foaming chamber covers, oil distribution plates and O-rings from the rocker arm holders.



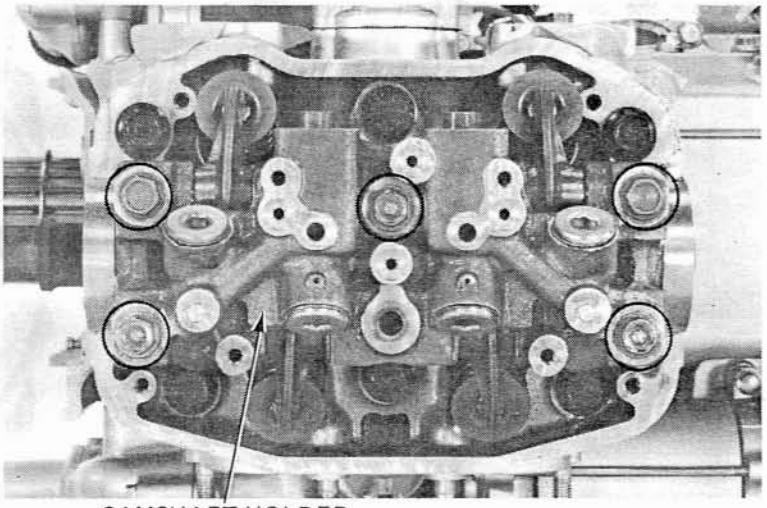
Remove the five rocker arm holder bolts, then remove the rocker arm assembly and camshaft. Mark each holder to identify what side it is on.

NOTE:

To prevent cocking the camshaft holder assembly, unscrew the camshaft holder bolts in a crisscross pattern, two turns at a time.

CAUTION:

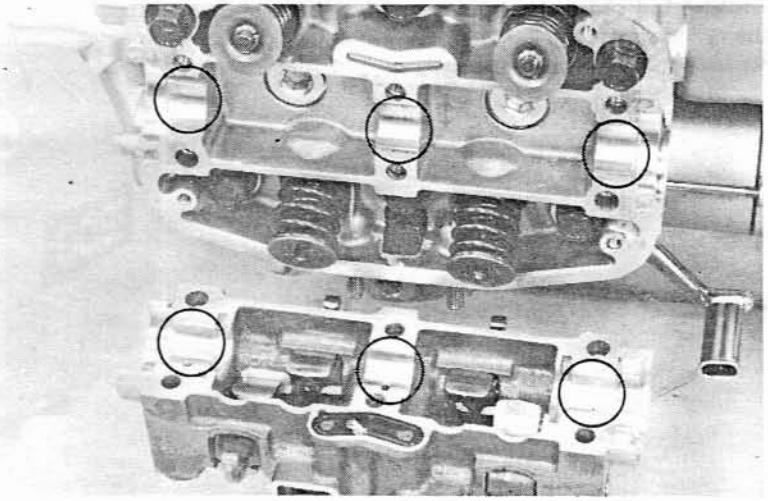
Do not let the camshaft fall out of the cylinder head.



CAMSHAFT HOLDER

CAMSHAFT INSPECTION

Inspect the cam bearing surfaces for scoring, scratching, or damage caused by insufficient lubrication. Check that the oil passages are clear.



Bolt the camshaft holder in place and torque the bolts.

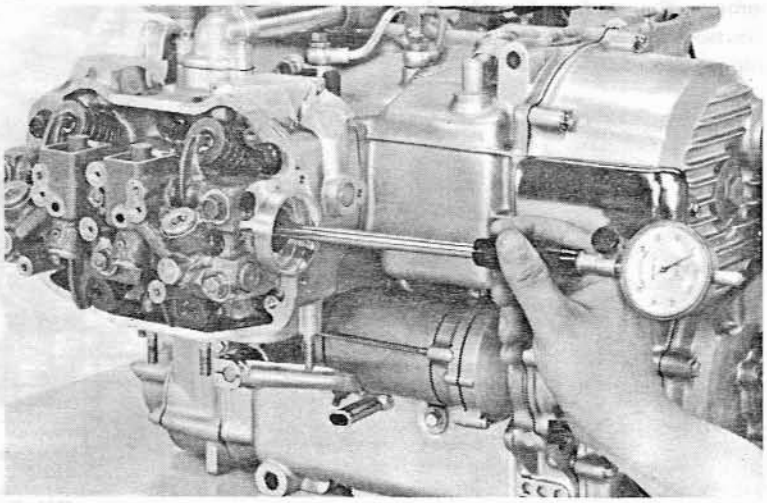
TORQUE: 18–22 N·m (1.8–2.2 kg-m, 13–16 ft-lb)

Measure and record the I.D. of each bearing.

If the bearing is worn so that the service limit is exceeded, replace the cylinder head and camshaft holders as a set.

SERVICE LIMITS:

Center: 25.05 mm (0.986 in)
Both ends: 27.05 mm (1.065 in)



Measure and record the O.D. of each camshaft bearing journal.
Replace the camshaft with a new one if the service limit is exceeded.

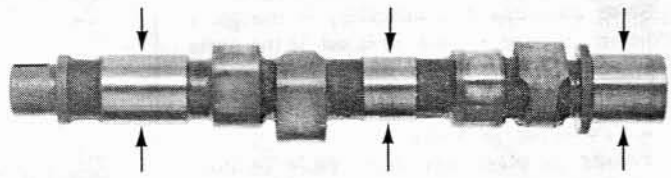
SERVICE LIMITS:
Center: 24.91 mm (0.981 in)
Both ends: 26.91 mm (1.059 in)

Determine the end and center bearing clearance.

SERVICE LIMIT: 0.14 mm (0.006 in)

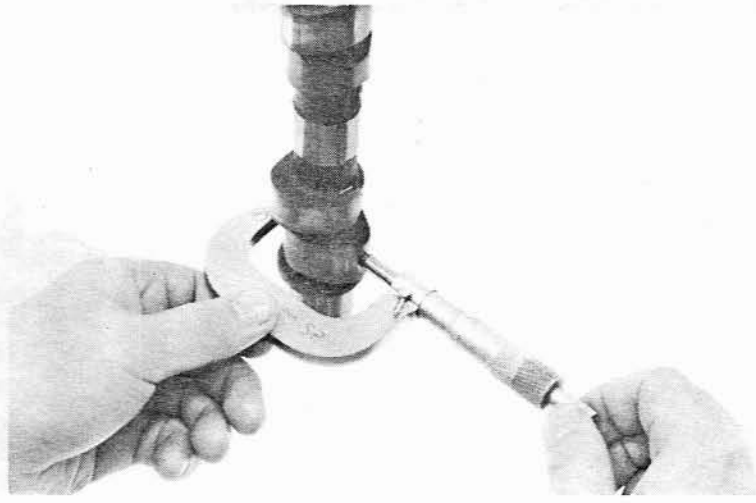
NOTE:

- The difference between the O.D. of a camshaft journal and the I.D. of its cam bearing (the holder and cylinder head) is the clearance.
- The clearance may also be checked using plastigauge.



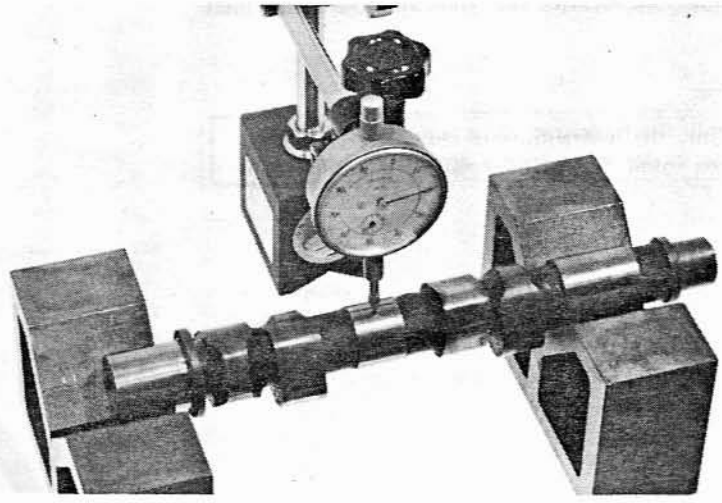
Check each cam lobe's height with a micrometer. Replace the cam if the height is less than the service limit.

SERVICE LIMITS:
IN: 35.6 mm (1.40 in)
EX: 35.6 mm (1.40 in)



Set each camshaft on a stand or Vee blocks.
Set a dial indicator on the center bearing journal. Rotate the camshaft two revolutions and read the runout.

SERVICE LIMIT: 0.10 mm (0.004 in)

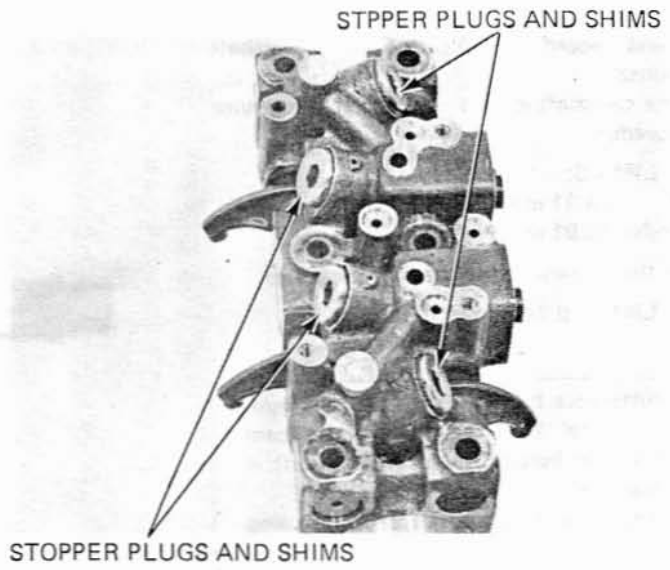


CAMSHAFT HOLDER DISASSEMBLY

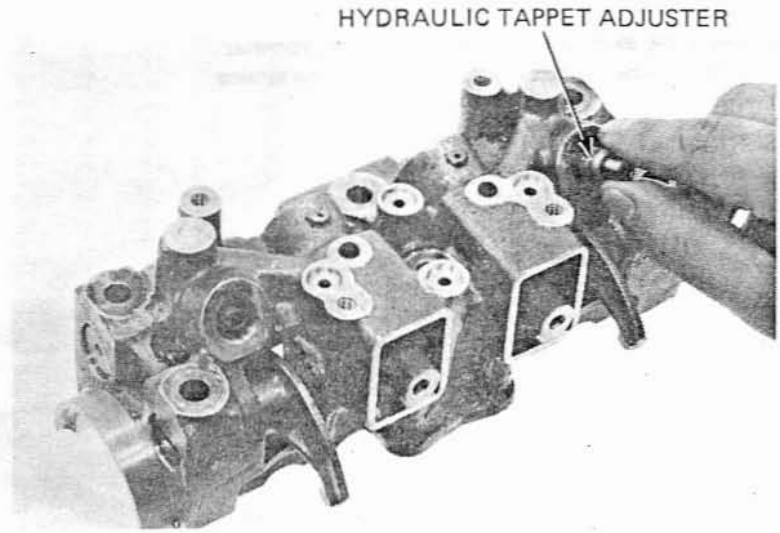
Remove the stopper plugs and shims from the camshaft holder (on some stopper plugs, the shims are not used).

NOTE:

- Shim adjustment is necessary if the parts listed on page 7-1 are replaced. If the parts are reused, mark the shims with felt-tip pen so that they can be placed back to their original locations.
- Failure to place the shims back to their original locations can cause tappet noises or sticking valve.
- Mark the camshaft holder components during disassembly so they can be installed in their original positions upon reassembly.



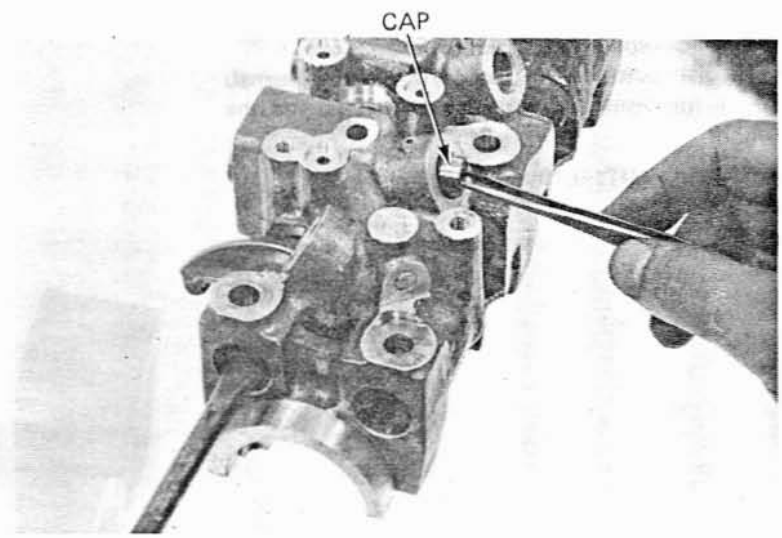
Remove the tappet adjuster from the camshaft holder.



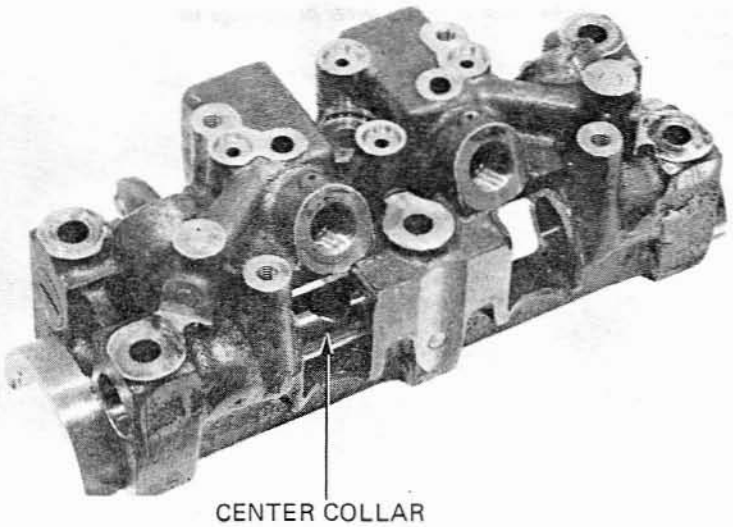
Remove the adjuster cap from the hole on the inlet side.

NOTE:

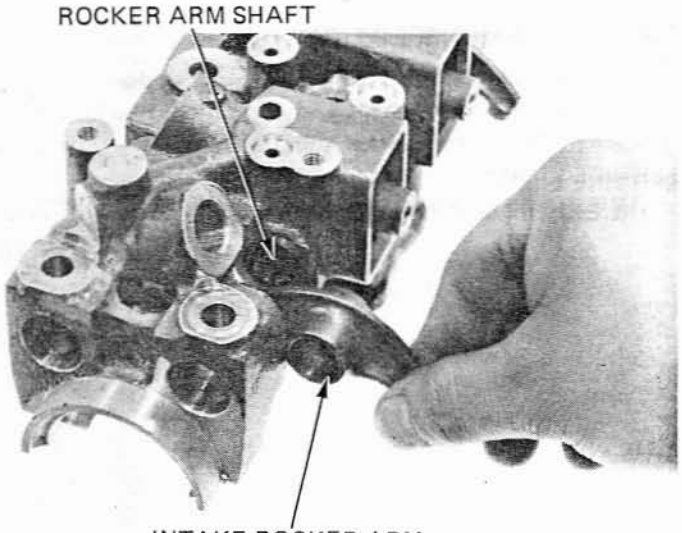
Only the hydraulic valve adjusters controlling the intake valve rocker arm shafts have caps.



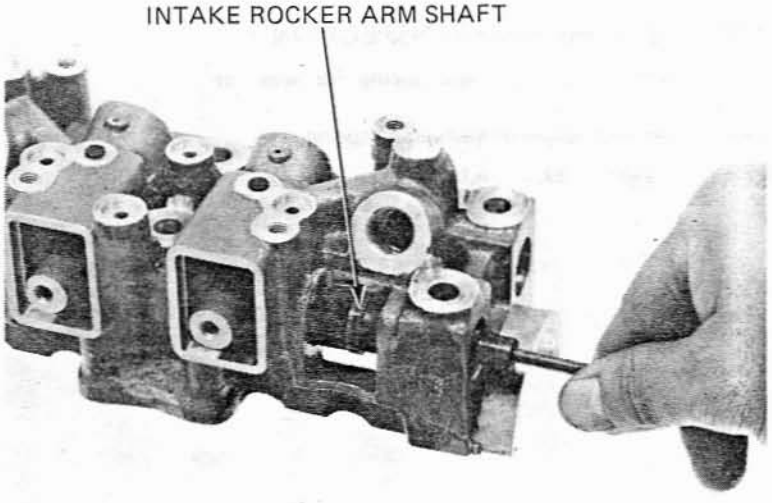
Remove the shaft collars from the exhaust side.
Remove the rocker arm shaft, and remove the exhaust rocker arms.
Remove the center collar from between the right and left rocker arms.



Remove the shaft collars from the inlet side.
Remove the intake rocker arms by pressing the rocker arm shaft in.



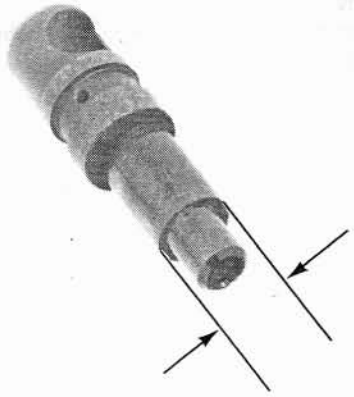
Remove the intake rocker arm shaft by screwing in a 5 mm forcing bolt.



ROCKER ARM SHAFT INSPECTION

Inspect each rocker arm shaft for wear or damage to the sliding surfaces.
Measure the O.D. of each rocker arm shaft.

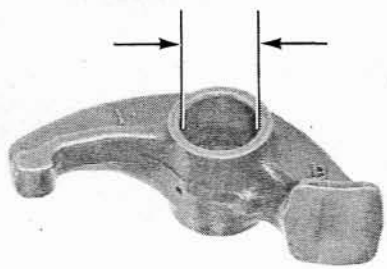
SERVICE LIMIT:
(IN/EX): 13.84 mm (0.545 in)



ROCKER ARM INSPECTION

Inspect the rocker arms for wear or damage to the slipper and stem contacting faces.
Measure the I.D. of each rocker arm.

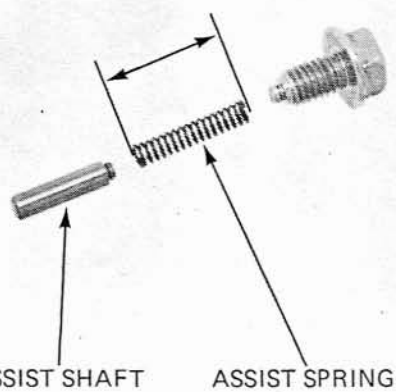
SERVICE LIMIT:
(IN/EX): 14.05 mm (0.553 in)



ASSIST SPRING/SHAFT INSPECTION

Inspect each assist shaft and spring for wear or damage.
Measure the free length of each assist spring.

SERVICE LIMIT: 16.0 mm (0.63 in)



HYDRAULIC TAPPET ADJUSTER INSPECTION

Inspect the hydraulic tappet adjuster for wear or damage or for a clogged oil hole.

Measure the compression stroke of each hydraulic tappet adjuster as follows:
Attach the Hydraulic Tappet Bleeder to the hydraulic tappet and compress and extend the adjuster slowly in a jar filled with kerosene.

NOTE:

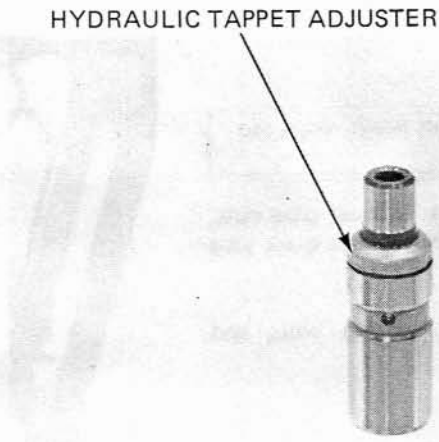
> Hold the adjuster upright while compressing and extending the adjuster.

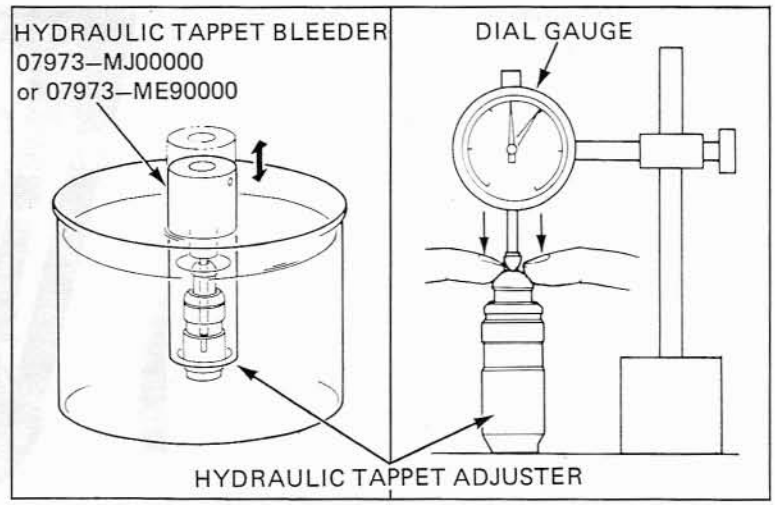
Continue operating the adjuster until there are no air bubbles from the adjuster and it does not make no further action.
Remove the adjuster and try to compress quickly the adjuster by hand. Measure the compression stroke with the dial gauge on the flat place.

COMPRESSION STROKE: 0–0.3 mm (0–0.012 in)

NOTE:

> Keep the adjuster below the surface of kerosene while priming the adjuster.





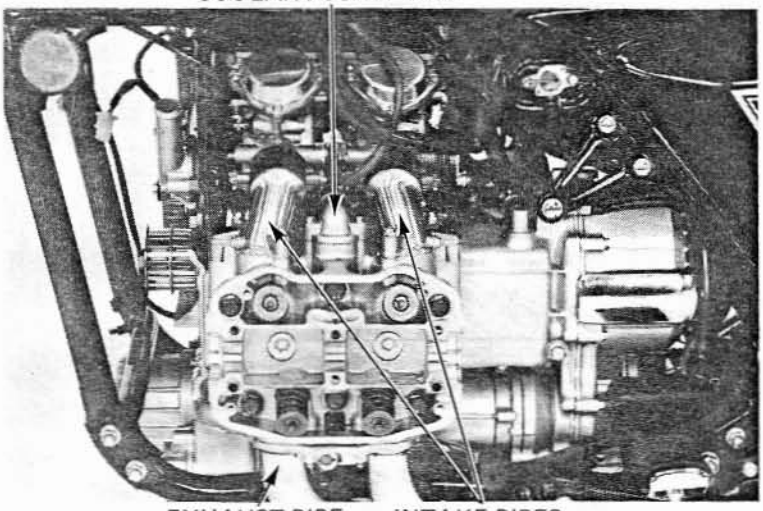
CYLINDER HEAD REMOVAL

CAUTION:

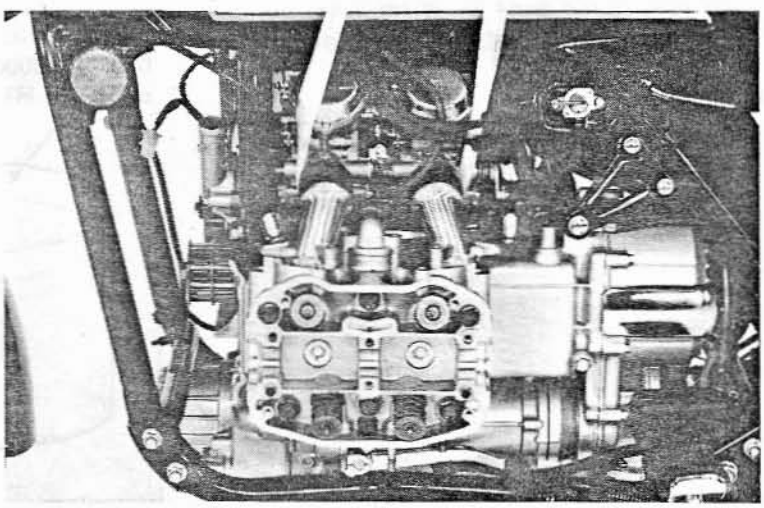
Before removing the cylinder heads, drain the coolant (page 6-3).

Remove the intake pipe bolts, exhaust pipe nuts, and coolant joint pipe bolts. Disconnect spark plug wires and remove spark plugs.

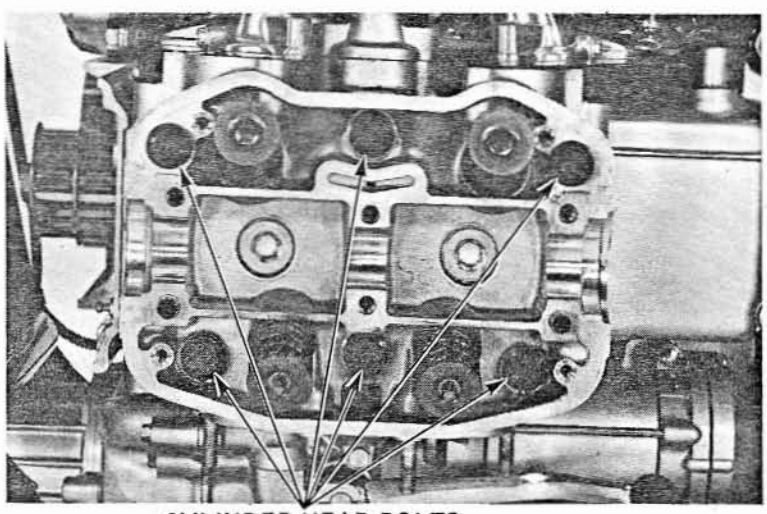
Remove the muffler rear mounting bolts and remove the exhaust system.



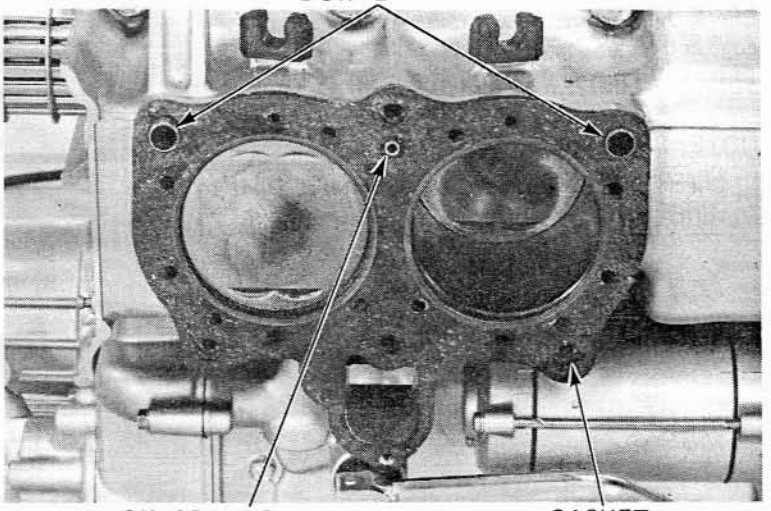
Support the intake pipes with bungee cords.



Remove the cylinder head bolts, then remove the cylinder head.



Remove the head gasket, dowel pins, oil orifice and O-ring.



CYLINDER HEAD DISASSEMBLY

Using a valve spring compressor, compress the springs and remove the keepers. Remove retainers, springs, and valves.

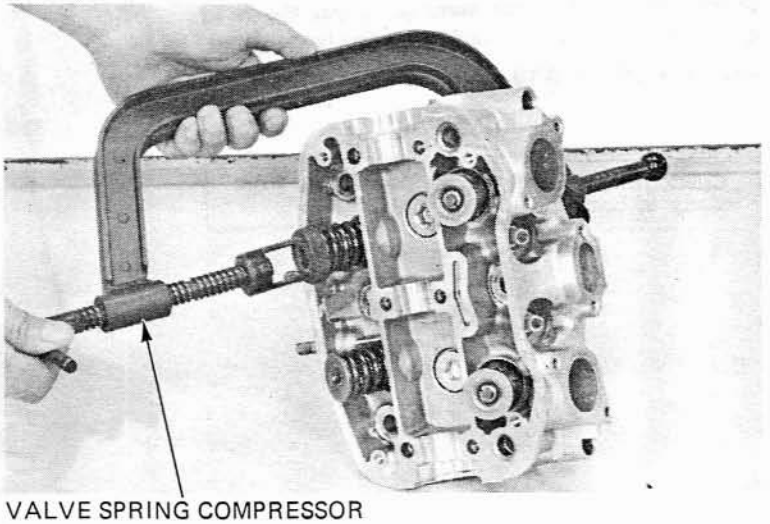
NOTE:

> Keep valves and related parts in order.

Clean gasket material from the cylinder head.

NOTE:

> Gaskets will come off easier if soaked in solvent or sprayed with gasket remover.

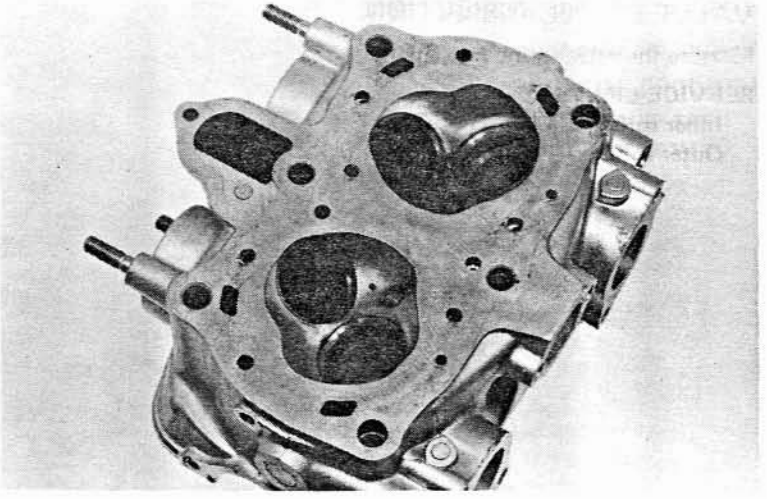


CYLINDER HEAD INSPECTION

Clean carbon deposits from the combustion chamber and exhaust ports, then check the spark plug holes and valve areas for cracks.

NOTE:

> Do not damage the valve seats.

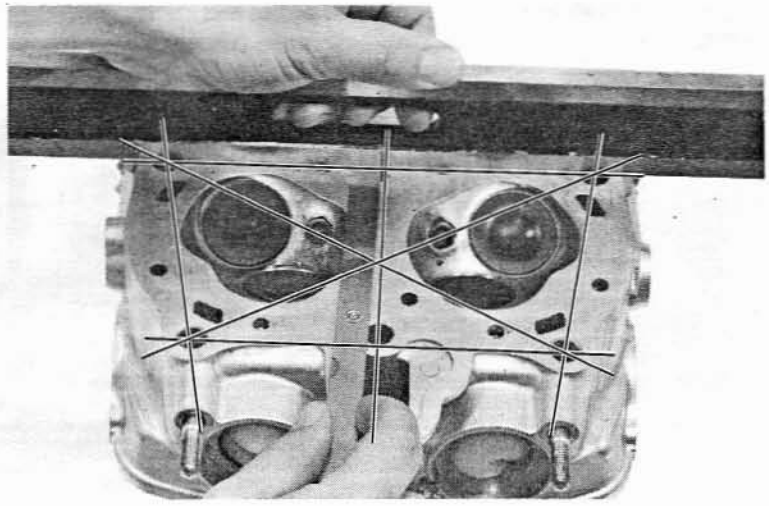


Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)

NOTE:

> Check for warpage in an X-pattern; from corner to corner.

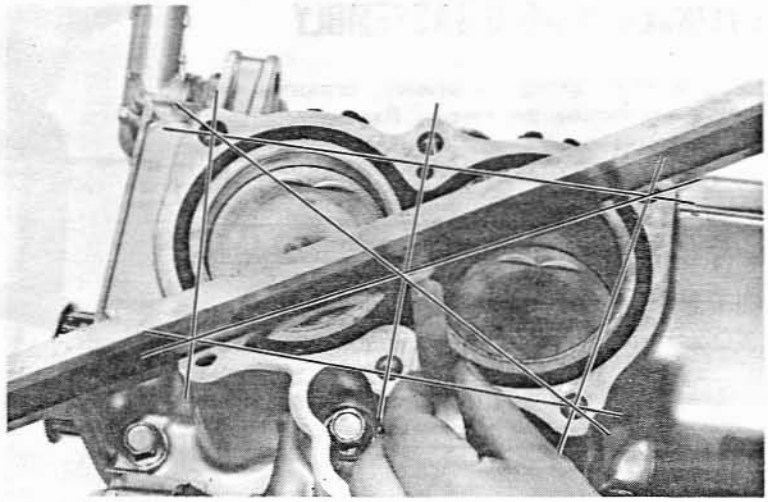


Check the cylinders for warpage across the head mating surface with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)

NOTE:

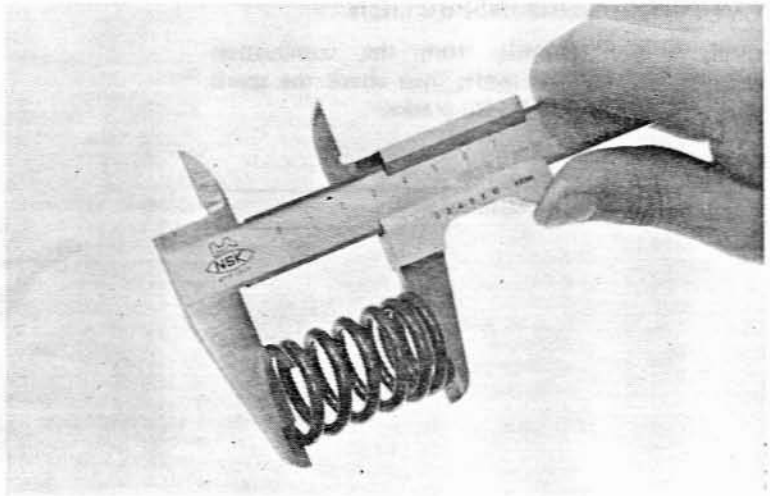
> Check for warpage in an X-pattern; from corner to corner.



VALVE SPRING INSPECTION

Measure the valve spring free length.

SERVICE LIMITS:
Inner spring: 39.0 mm (1.54 in)
Outer spring: 42.5 mm (1.67 in)



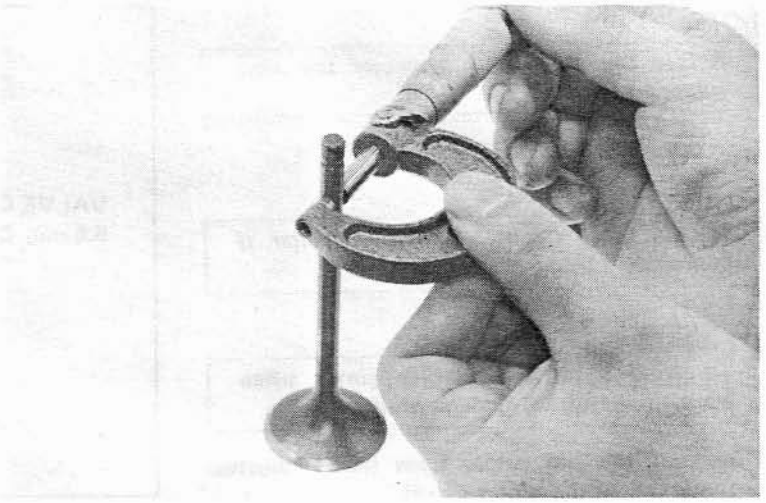
VALVE, VALVE GUIDE INSPECTION

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Inspect each valve for bending, scratches or abnormal stem wear.

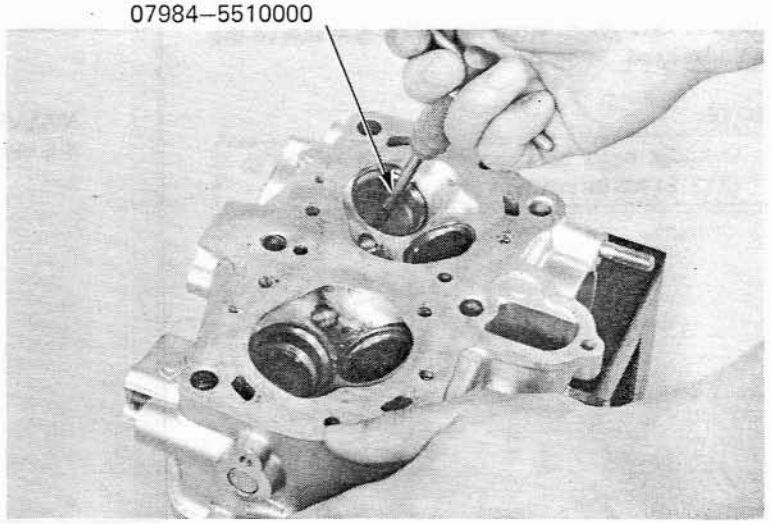
Measure and record the O.D. of each valve stem.

SERVICE LIMIT:
IN/EX: 6.54 mm (0.257 in)



VALVE GUIDE REAMER, 6.6 mm
07984–5510000

Run the proper reamer through the guides to remove carbon deposits.



Measure and record the I.D. of each valve guide.

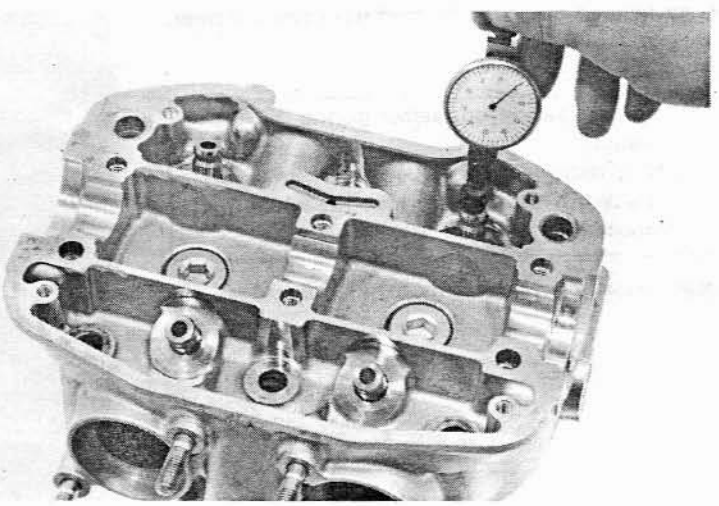
SERVICE LIMIT: 6.64 mm (0.261 in)

Calculate the valve stem-to-guide clearance.

SERVICE LIMITS:
Intake: 0.08 mm (0.003 in)
Exhaust: 0.10 mm (0.004 in)

If the stem-to-guide clearance exceeds the service limits, determine if a new guide would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.

If clearance is still over the service limit, replace the valves.



VALVE GUIDE REPLACEMENT

NOTE:

> Reface the valve seats whenever the valve guides are replaced.

Heat the cylinder head to 100°C (212°F).

CAUTION:

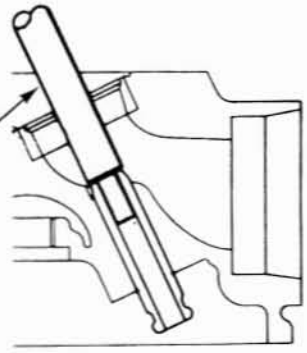
> *Do not use a torch to heat the cylinder, it may cause warping.*

WARNING

> ***To avoid burns, wear heavy gloves when handling the heated cylinder head.***

Drive out the old guides from the combustion chamber side of the cylinder head.

VALVE GUIDE REMOVER, 6.6 mm 07742–0010200

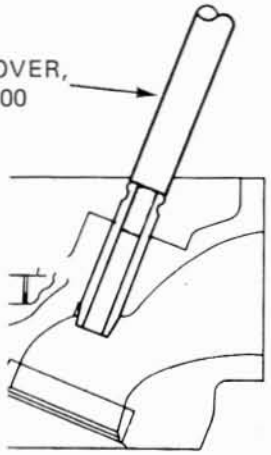


Drive in new guides from the rocker arm side of the cylinder head.

NOTE:

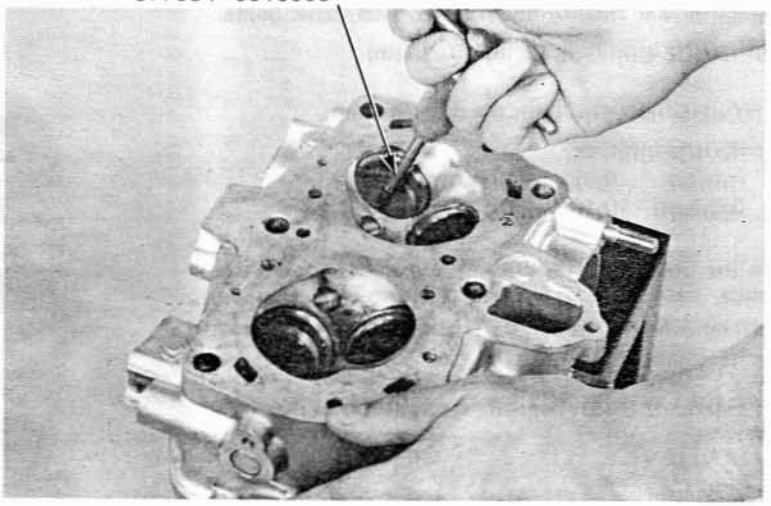
> Cylinder head heat should still be at 100°C (212°F) for installation of the new guides.

VALVE GUIDE REMOVER, 6.6 mm 07742–0010200



Ream the new guides to finished size using a reamer.

VALVE GUIDE REAMER, 6.6 mm 077984–5510000



NOTE:

> - Use cutting oil on reamer during this procedure.
> - It is important that the reamer aways be rotated in the cutting direction when it is inserted or removed.

Clean all cutting residue out of the valve guides.

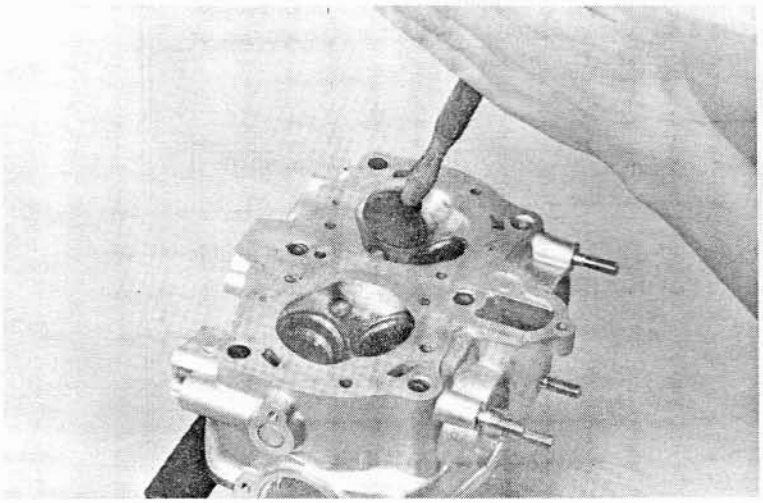
VALVE SEAT INSPECTION/REFACING

NOTE:

> Shim adjust the hydraulic tappet adjuster whenever the valve seats are refaced. (page 7-29).

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

Apply a light coating of Prussian Blue to each valve face. Lap each valve and seat using a rubber hose or other hand-lapping tool.

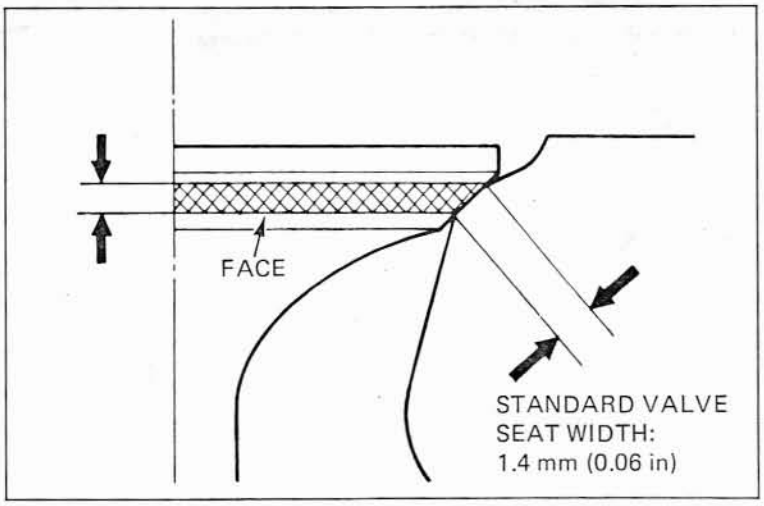


Remove the valve and inspect the face.

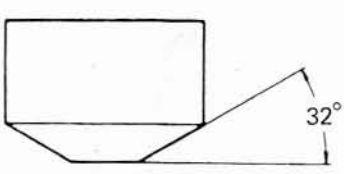
CAUTION:

> *The valves cannot be ground. If the valve face is rough, worn unevenly, or contacts the seat improperly the valve must be replaced.*

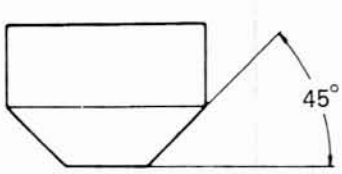
If the seat is too wide, too rough, or has low spots, the seat must be ground.



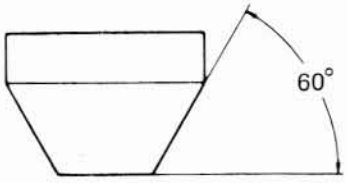
VALVE SEAT CUTTERS



TOOL NO.
IN: 07780–0012400
EX: 07780–0012300



IN: 07780–0010500
EX: 07780–0010400



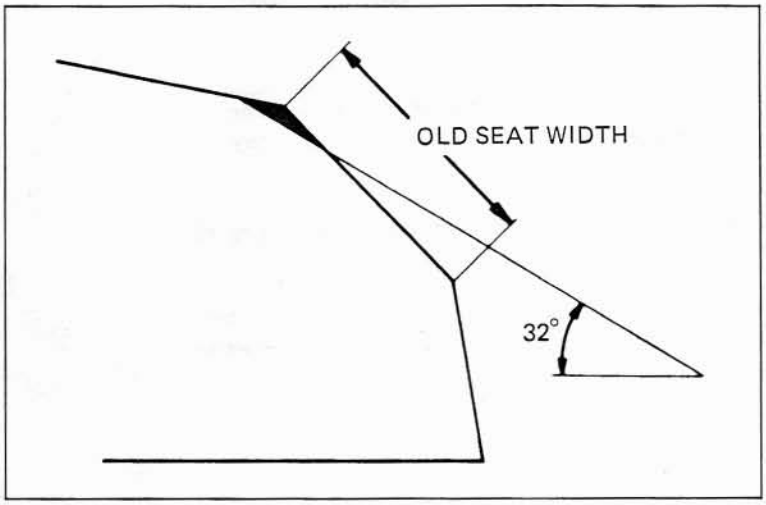
IN/EX: 07780–0014100

Follow the refacer manufacturer's instructions. Use a 45 degree cutter to remove any roughness or irregularities from the seat.

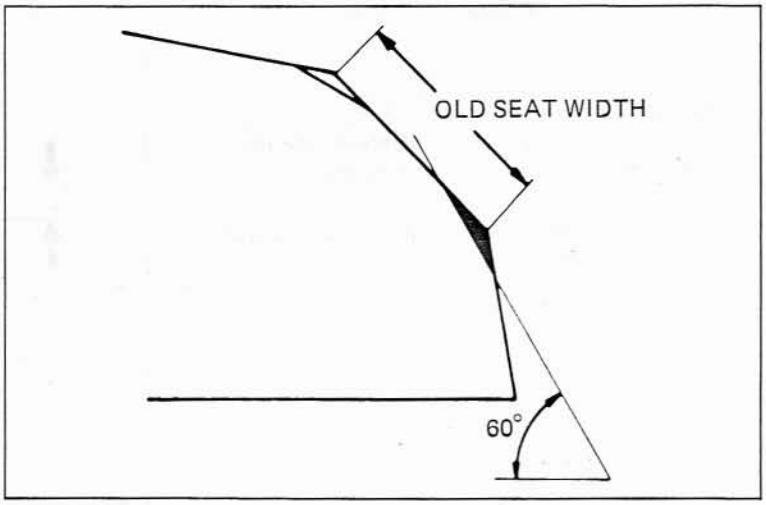
NOTE:

> Reface the seat with a 45 degree cutter when the valve guide is replaced.

Use a 32 degree cutter remove 1/4 of the existing valve seat material.

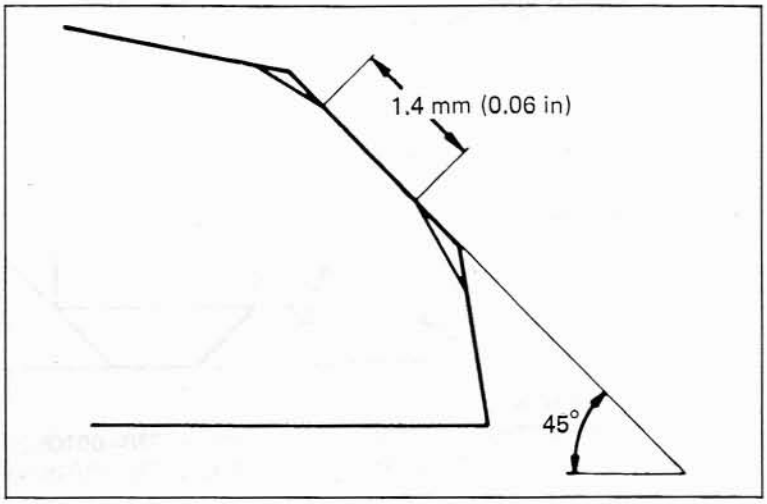


Use a 60 degree cutter to remove the bottom 1/4 of the old seat. Remove the cutter and inspect the area you have just removed.



Install a 45 degree finish cutter and cut the seat to the proper width.

VALVE SEAT WIDTH: 1.4 mm (0.06 in)



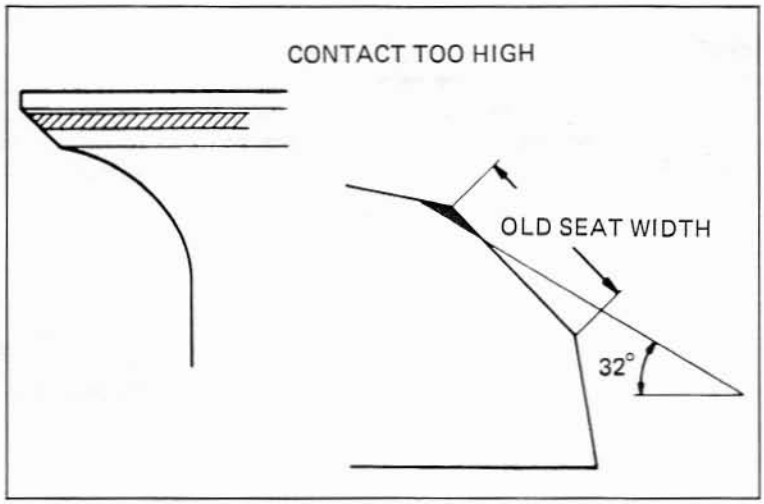
Apply a thin coating of Prussian Blue to the valve seat.

Press the valve through the valve guide and onto the seat to make a clear pattern.

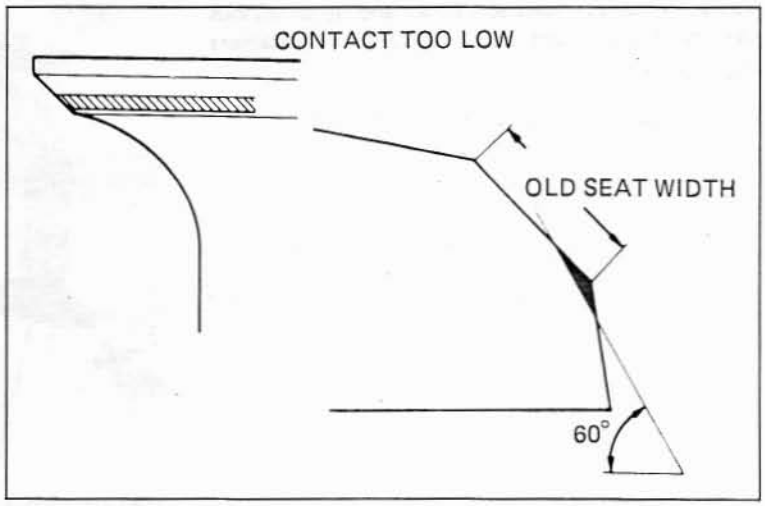
NOTE:

> The location of the valve seat in relation to the valve face is very important for good sealing.

If the contact area is too high on the valve, the seat must be lowered uwing a 32 degree flat cutter.



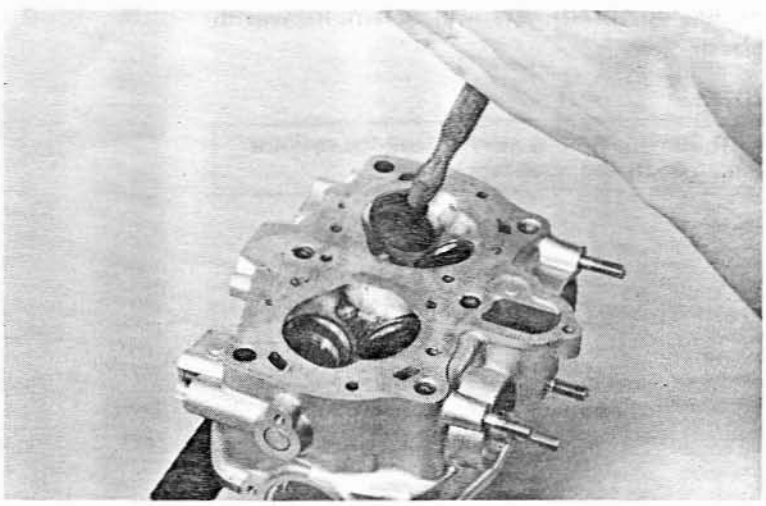
If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter.



Refinish the seat to specifications, using a 45 degree finish cutter.

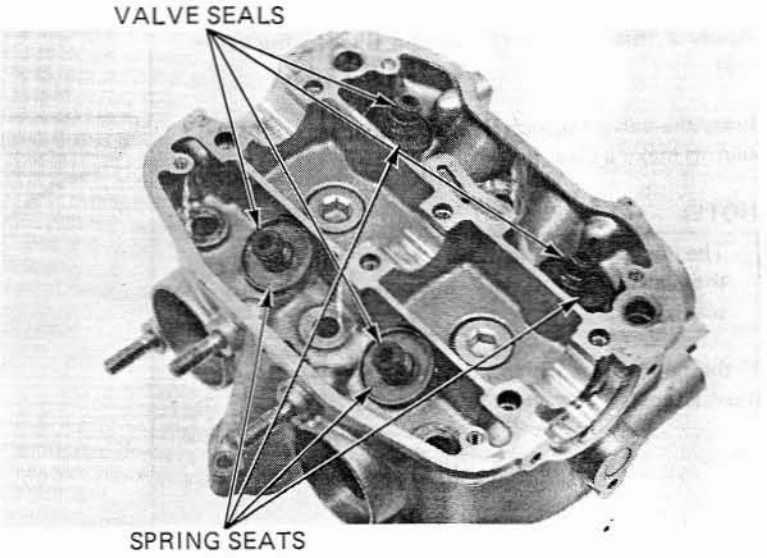
After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.

After lapping, wash all residual compound off the cylinder head and valve.



CYLINDER HEAD ASSEMBLY

Install the spring seats.
Install a new valve stem seal on each valve guide.
Lubricate each valve stem with a solution of one part molybdenum disulfide grease and two part engine oil.

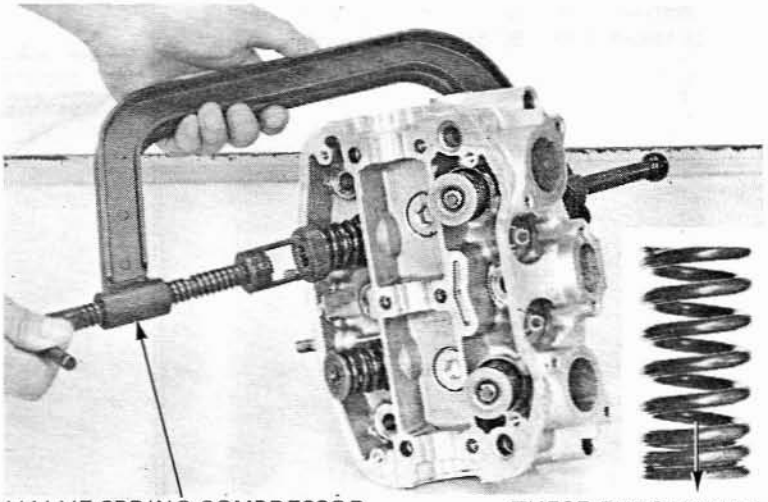


Install the valves, then slip inner and outer springs over valve stems and install valve spring retainers and keepers.

The spring tightly wound coils should face in toward the cylinder head.

CAUTION:

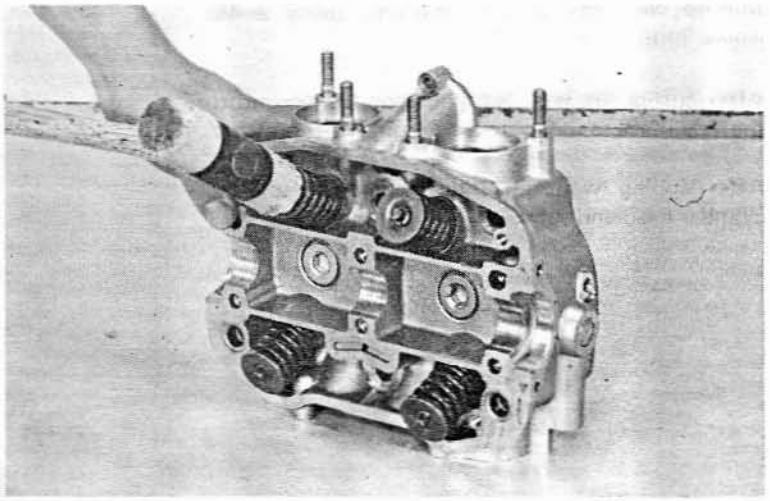
To prevent loss of tension, do not compress the valve spring more than necessary.



Tap the top of each valve with a plastic hammer to seat the keepers.

NOTE:

To prevent bending valves, stand the cylinder head on its end when tapping them.

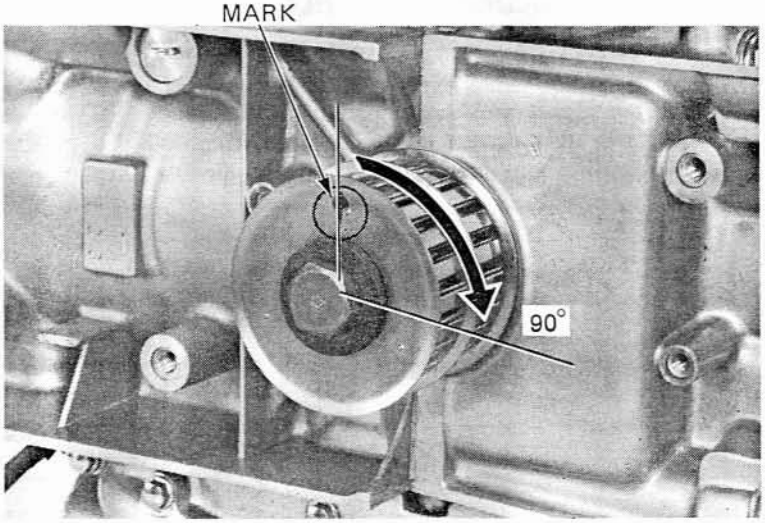


Check that the timing mark is on No. 1 cylinder TDC (page 7-3).

Mark the crankshaft pulley (page 7-3), then rotate the crankshaft 90° clockwise.

NOTE:

> This will reduce the possibility of bending the valves when assembling the engine.



Clean the head gasket residue from the engine block and check that all oil and water passages are clear.

Install a new O-ring on the oil control orifice, then install the orifice in the cylinder.

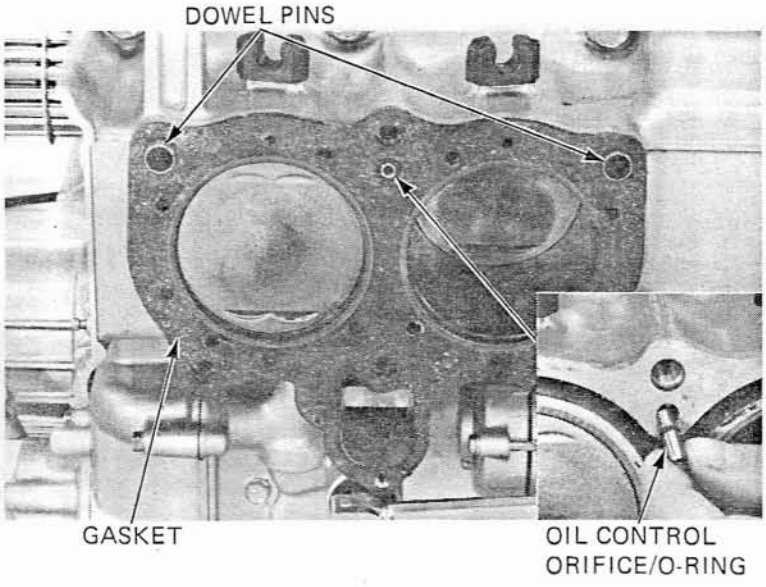
NOTE:

> Install the orifice with the small diameter end towards the inside.

Install the dowel pins and a new head gasket.

NOTE:

> The head gasket is graphite-coated and does not require any sealant.



Install the cylinder head and the head bolts.

NOTE:

> Coat the head bolt threads and the underside of the bolt heads with molybdenum disulfide grease.

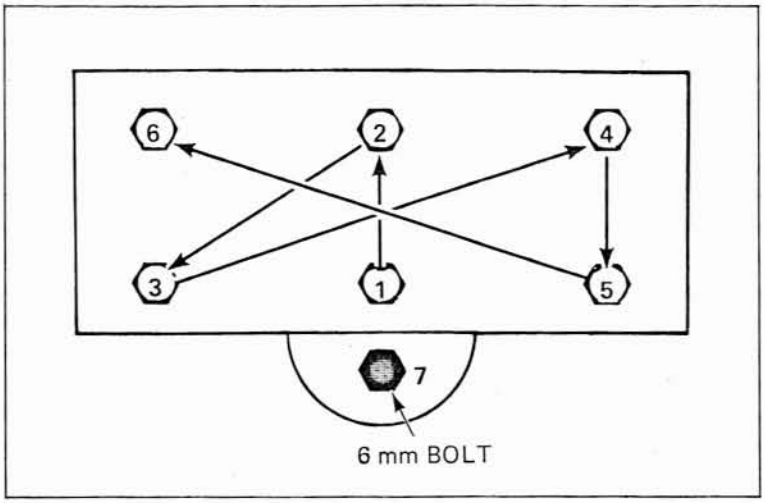
Torque the six 10 mm bolts first, then torque the single 6 mm bolt.

TORQUE:

10 mm bolt: 53–57 N·m
(5.3–5.7 kg-m, 38–41 ft-lb)
6 mm bolt: 8–12 N·m
(0.8–1.2 kg-m, 6–7 ft-lb)

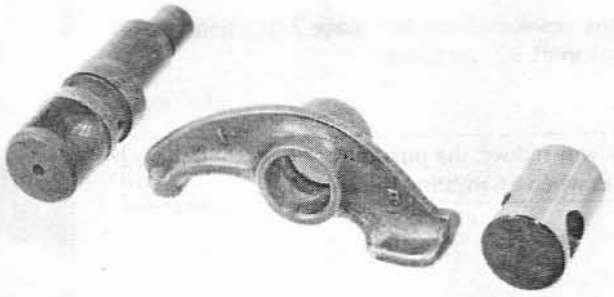
NOTE:

> Tighten the 10 mm bolts in 2–3 steps in a crisscross pattern.



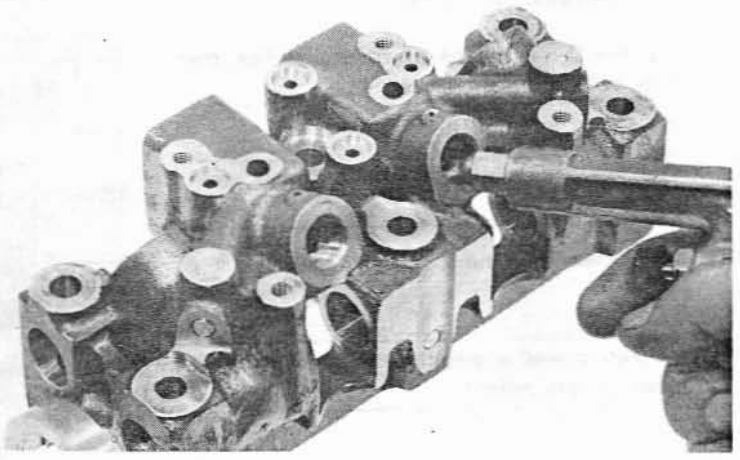
CAMSHAFT HOLDER ASSEMBLY /INSTALLATION

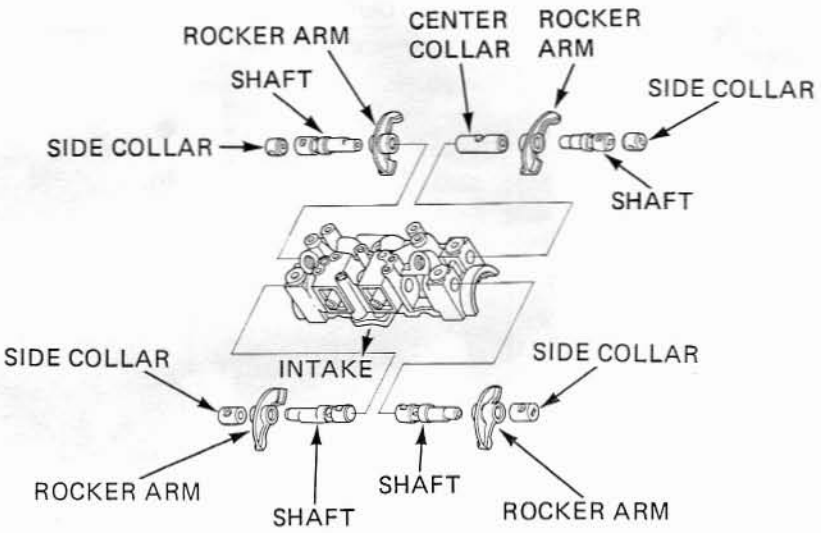
Assemble the rocker arm shafts, rocker arms and shaft collars in their correct locations by referring to the identification marks made during disassembly.



Clean the camshaft holder thoroughly and blow open all holes and passages with a compressed air.

Coat the all sliding surfaces with molybdenum disulfide grease.

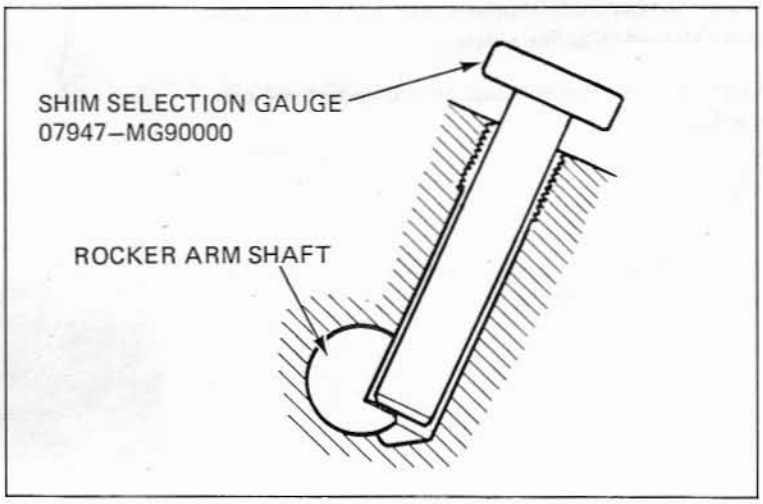




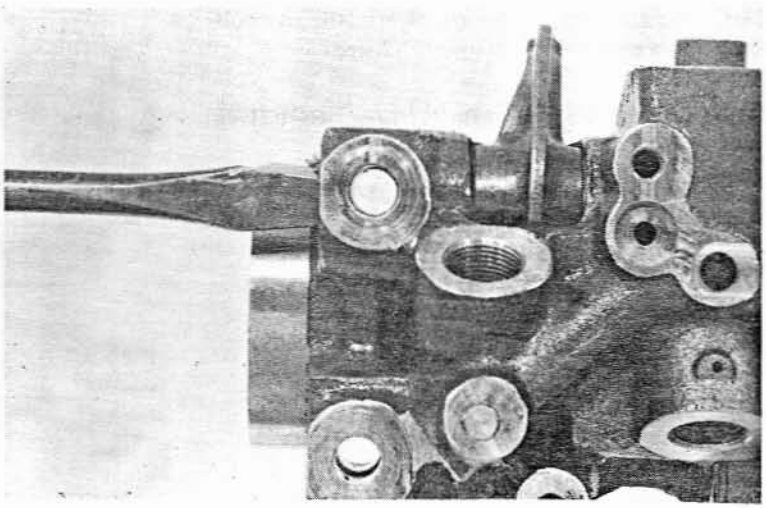
Install the rocker arms, rocker arm shafts, and collars in the camshaft holder.

NOTE:

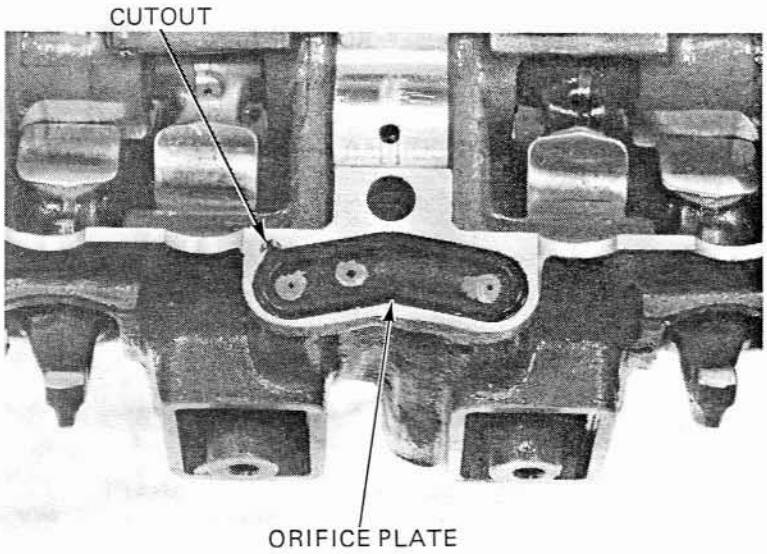
Align the cutout in the rocker arm shaft with the tappet adjuster mount opening.



Install the center and side collars with the cutouts aligned with the bolt holes in the camshaft holder.



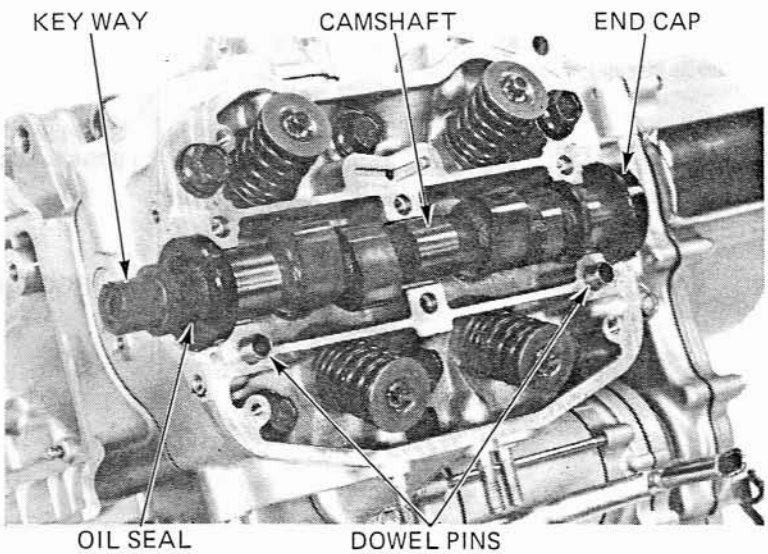
Install the orifice plate aligning the lug on the plate with the cutout in the camshaft holder.



Coat the camshaft journals and cam lobes with molybdenum disulfide grease.

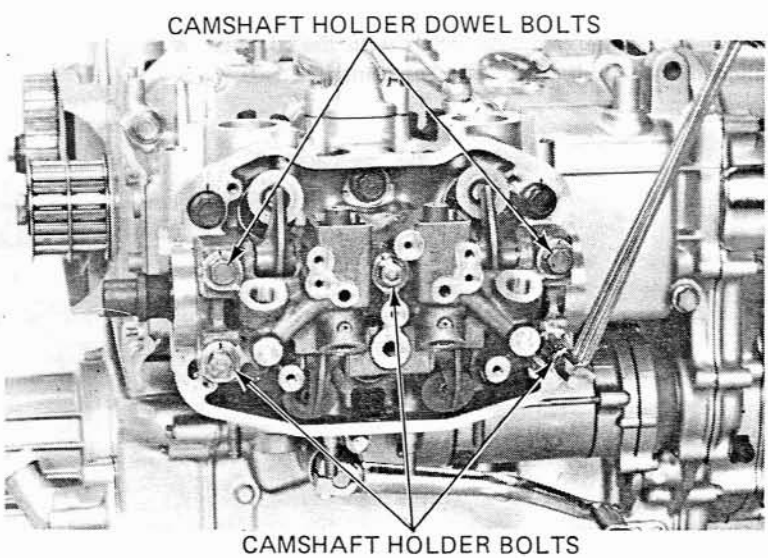
Install the oil seal and cap on the end of the camshaft.
Coat the outer peripheries of the oil seal and end cap with sealant, and install the camshaft in the cylinder head.

Aling the keyway in the camshaft with the upper mating surface of the cylinder head.

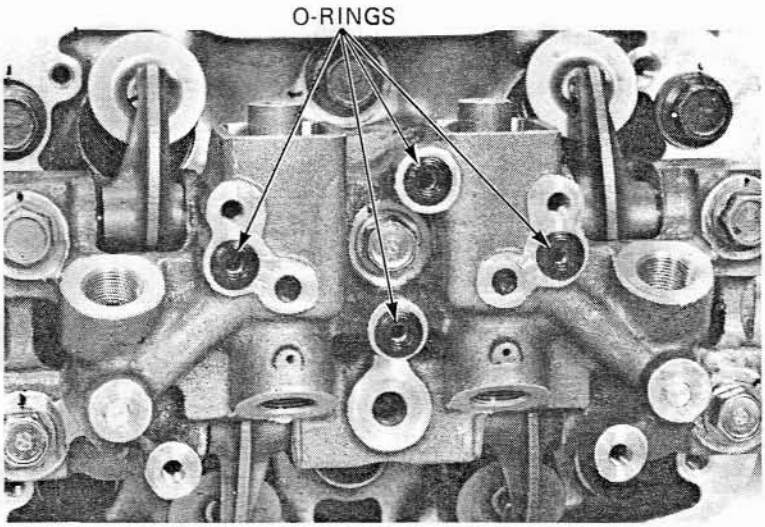


Install the camshaft holder and tighten the five bolts shown in a crisscross pattern in 2–3 steps.

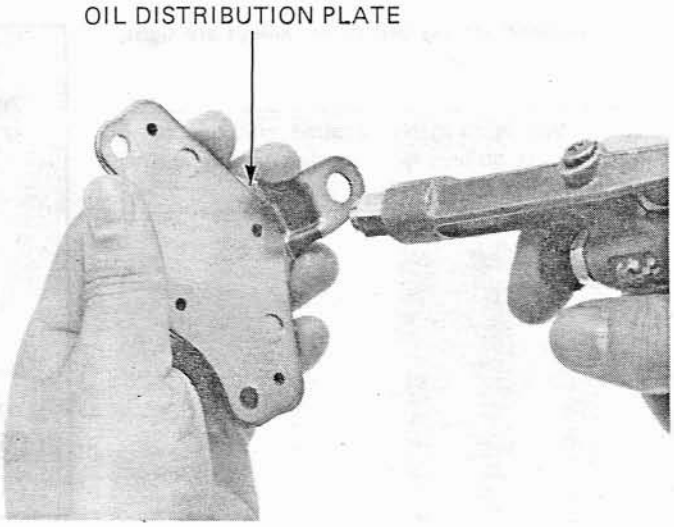
TORQUE: 18–22 N·m (1.8–2.2 kg-m, 13–16 ft-lb)



Install new O-rings in the oil passages.



Blow open the oil holes in the oil distribution plate with compressed air.

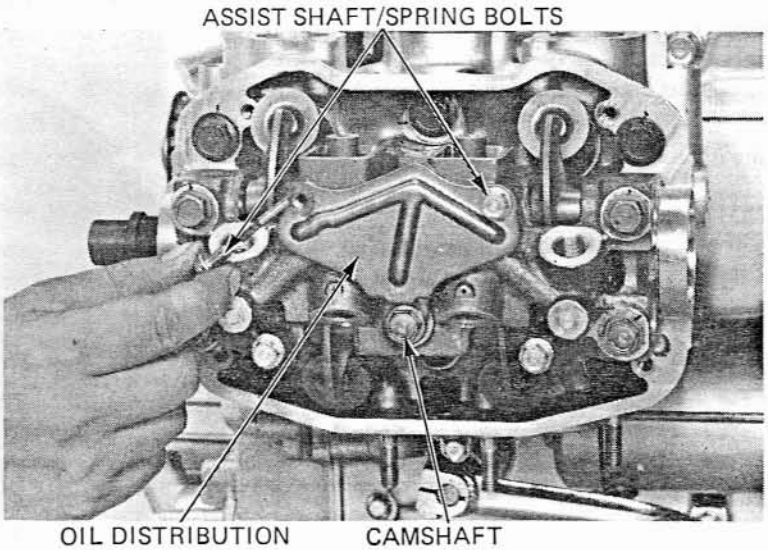


Install the oil distribution plate and tighten the camshaft holder 8 mm bolt and assist shaft/spring bolts.

TORQUE:

Camshaft holder bolt:
18–22 N·m (1.8–2.2 kg-m, 13–16 ft-lb)

Assist shaft/spring bolt:
8–12 N·m (0.8–1.2 kg-m, 6–7 ft-lb)

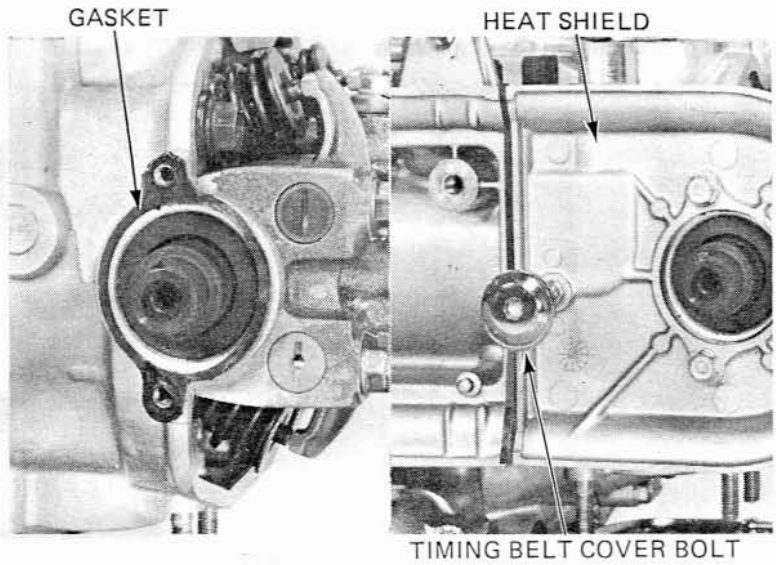


Place the new gasket on the cylinder head.

Check that the neutral switch wire is routed correctly, then install both heat shields.

NOTE:

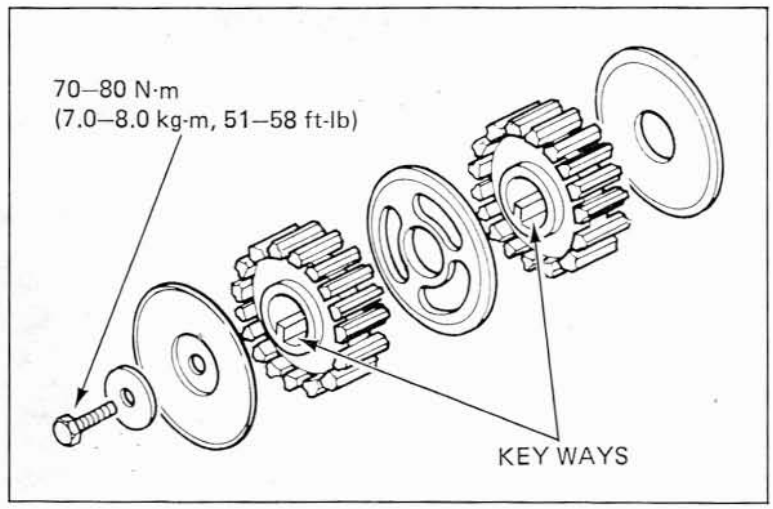
To ensure proper alignment, run a cover bolt into the heat shield hole before torque the two shield bolts.



Check that both timing belt drive pulleys are tight.

NOTE:

If the bolt is properly torqued and one or both of the pulleys is loose, disassemble and inspect pulley keyways for wear.



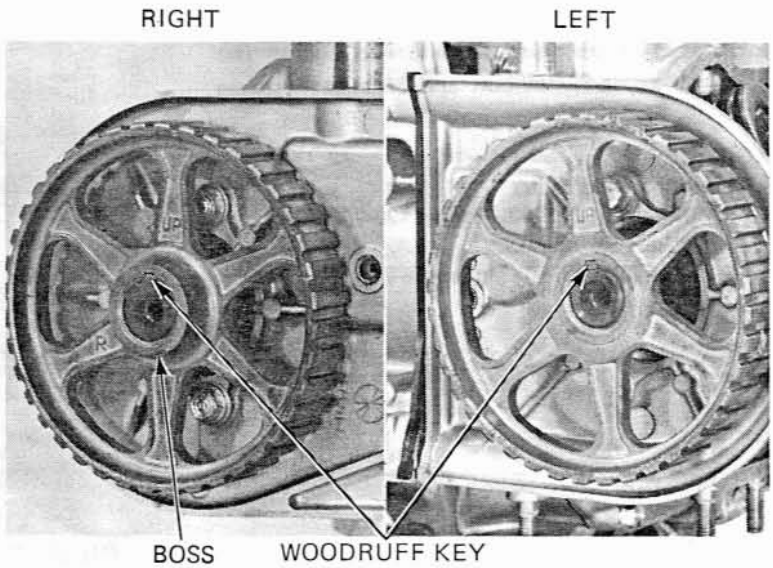
Install the woodruff key in the keyway in the camshaft.
Install the driven pulley on the camshaft with the key in the camshaft aligned with the keyway in the driven pulley.

NOTE:

The right pulley should be installed so that its boss is facing outward, and the left pulley with its boss facing inward.

CAUTION:

Do not turn the camshaft while timing belts are removed; you may damage the valves and piston domes.

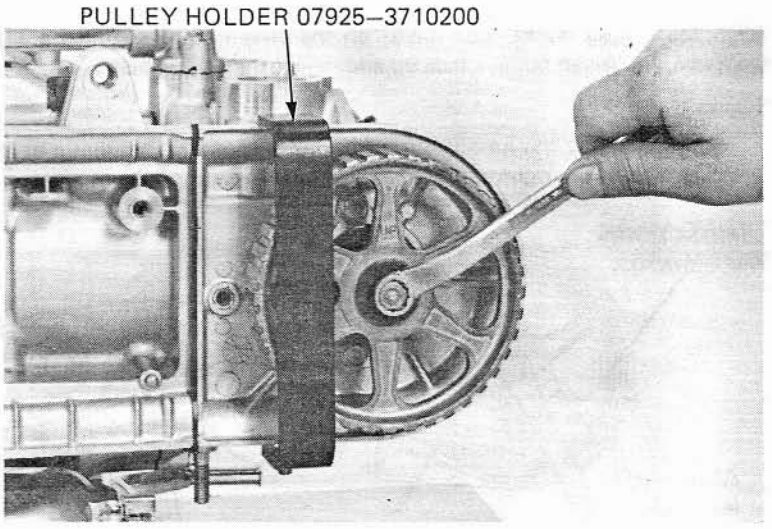


Hold the pulley with the Pulley Holder and tighten the bolt.

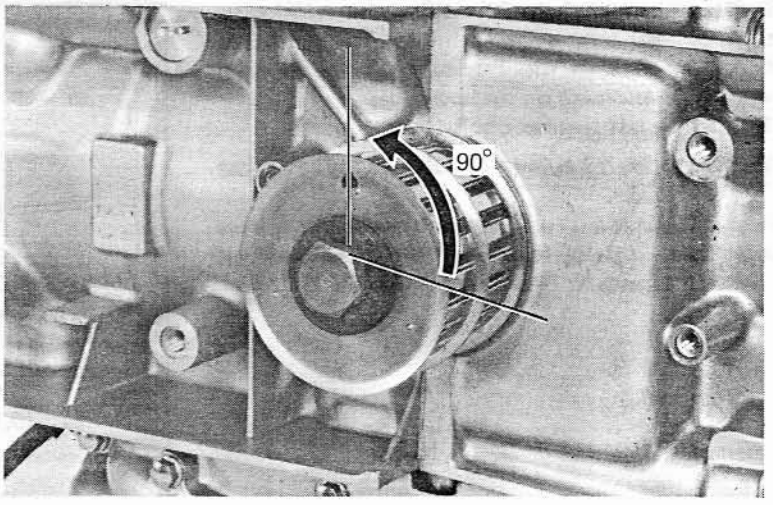
TORQUE: 25–29 N·m (2.5–2.9 kg-m, 18–21 ft-lb)

Perform the following procedures before install the timing belt, if the hydraulic tappet adjuster shim selection is not necessary (see page 7-29).

- Hydraulic tapper adjuster air bleeding (page 7-30).
- Hydraulic tappet adjuster installation (page 7-30).
- Shim and stopper plug installation (page 7-30).



Turn the crankshaft 90° counterclockwise to bring the marking on the drive pulley to the original position. The "T-1" marking on the flywheel should be aligned with the index mark on the engine case.



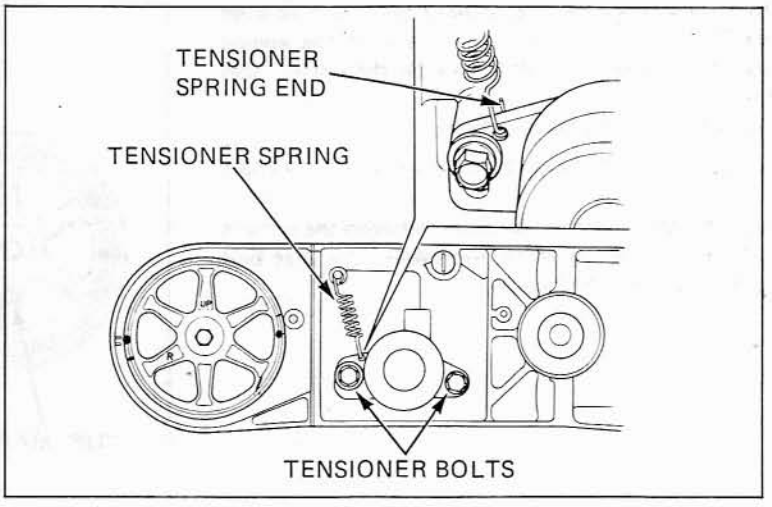
Install the right and left timing belt tensioners on the engine case, and tighten the bolt just enough to allow smooth movement of the tensioner.

NOTE:

To protect the timing belts, install the tensioner springs with the ends facing towards the engine case as shown.

CAUTION:

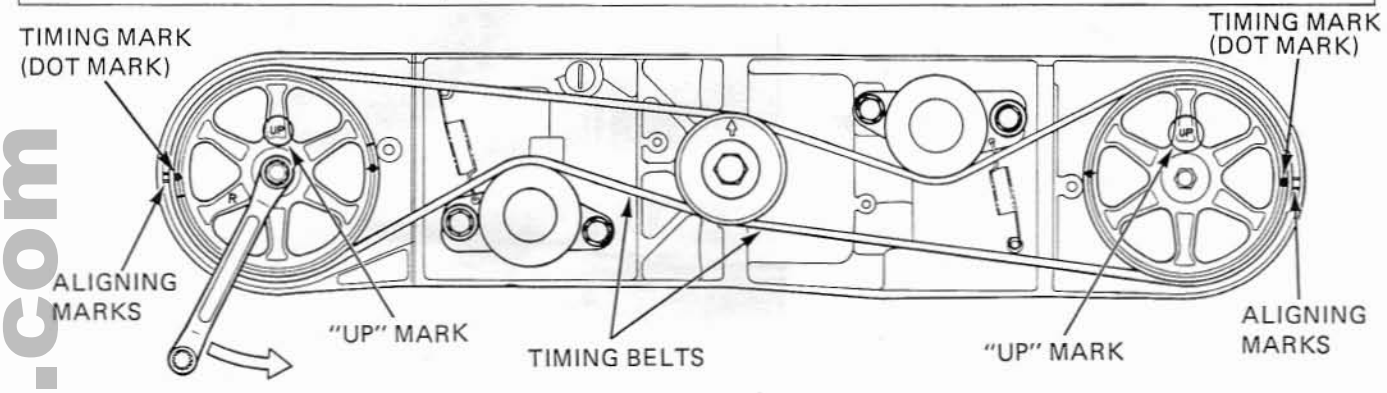
Do not lubricate the belt tensioner since oil will damage the timing belts. To protect the sealed tensioner bearings, do not use solvents or other cleaning agents inside the front timing cover.



Align the timing marks (dot mark) on the driven pulleys with the aligning marks on the heat shield, making sure the "UP" marks on the driven pulleys face up and install the timing belts.

NOTE:

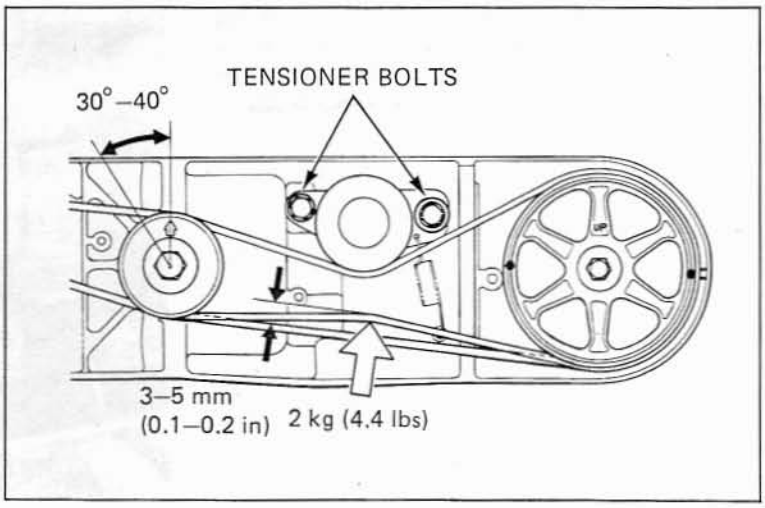
> The right pulley marks will slip off if you release your hand due to reaction caused by the No. 3 cylinder cams lifting the valves. Install the right belt while keeping alignment of the marks.



Rotate the crankshaft 30°–40° counterclockwise, then 30°–40° clockwise to bring it to the original position and align the T·1 mark on the flywheel with the index mark on the engine case.
Tighten the left tensioner bolts.

TORQUE: 24–28 N·m (2.4–2.8 kg-m, 17–20 ft-lb)

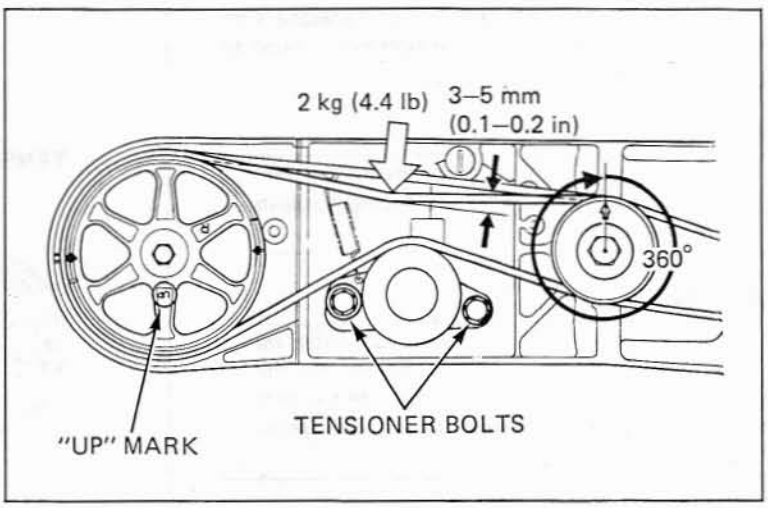
Push the belt lower run midway between the pulleys with 2 kg (4.4 lb) force and make sure that belt slack is 3–5 mm (0.1–0.2 in).



Rotate the crankshaft clockwise 360° and re-align the T·1 mark with the index mark on the engine case. Make sure the "UP" mark on the pulley faces down.
Tighten the right tensioner bolts.

TORQUE: 24–28 N·m (2.4–2.8 kg-m, 17–20 ft-lb)

Push the belt lower run midway between the pulleys with 2 kg (4.4 lb) force and make sure that belt slack is 3–5 mm (0.1–0.2 in).



HYDRAULIC TAPPET ADJUSTER SHIM SELECTION

Adjust with shims the hydraulic tappet adjusters when any of the following parts is replaced:

- Cylinder head/camshaft holder
- Camshaft
- Valve/valve seat (refaced)
- Rocker arm/rocker arm shaft

If none of the above parts are replaced, reinstall the original shims in their correct positions.
Install the assist shaft/spring bolt.
With the "T-1" mark on the flywheel aligned with the index mark on the crankcase, and the No.1 cylinder in Top Dead Center on its compression stroke, determine the number of thims to be used for the valves shown below:
No.1 cylinder: IN, EX No.3 cylinder: EX
No.4 cylinder: IN

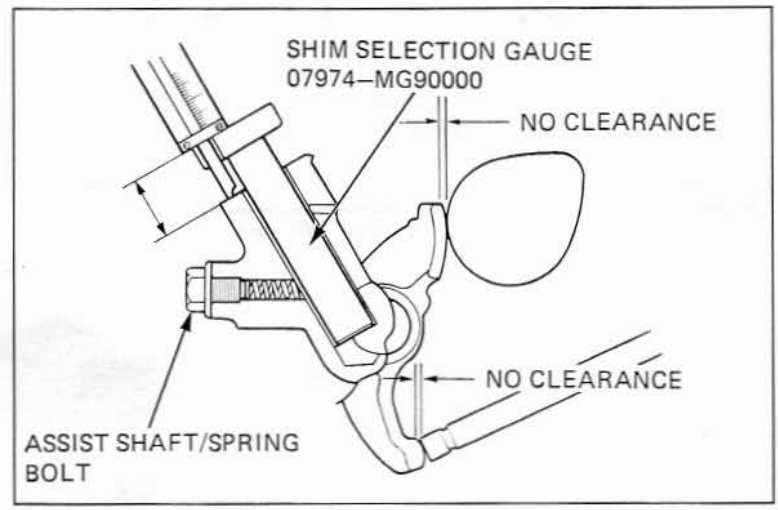
Measure the distance between the top end of the Shim Selection Gauge and shim surface of the cam holder by inserting the gauge into the tappet adjuster mount hole.

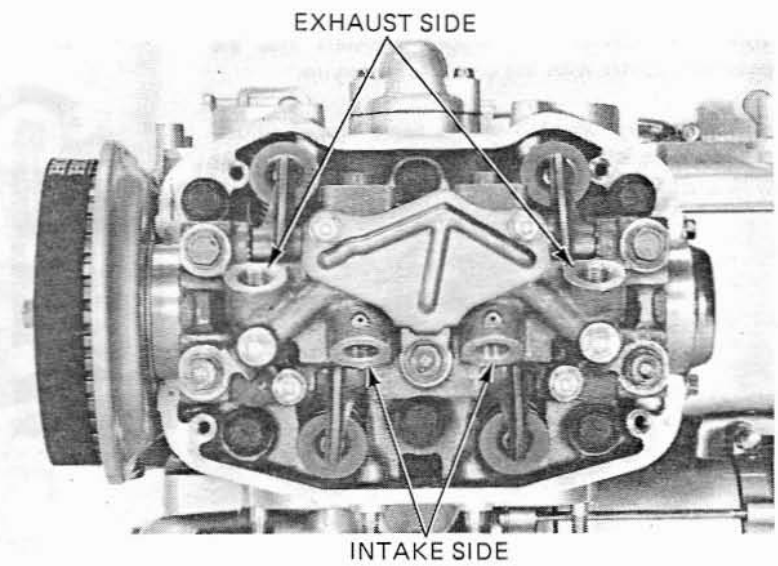
NOTE:

- Check that there is no clearance between the rocker arm and cam lobe, and rocker arm and valve stem.
- To prevent the incorrect shim selection by valve lifting, make sure that the side movement of the rocker arm during measurement.

INTAKE	EXHAUST	NUMBER OF SHIMS
8.5–9.5 mm (0.33–0.37 in)	10.5–11.5 mm (0.41–0.45 in)	0
9.5–10.5 mm (0.37–0.41 in)	11.5–12.5 mm (0.45–0.49 in)	1
10.5–11.5 mm (0.41–0.45 in)	12.5–13.5 mm (0.49–0.53 in)	2

Turn the crankshaft one complete turn (360°) clockwise and align the "T-1" mark on the flywheel with the index mark on the crankcase.
Determine the number of shims to be used for the valves shown below:
No.2 cylinder: IN, EX No.4 cylinder: EX
No.3 cylinder: IN



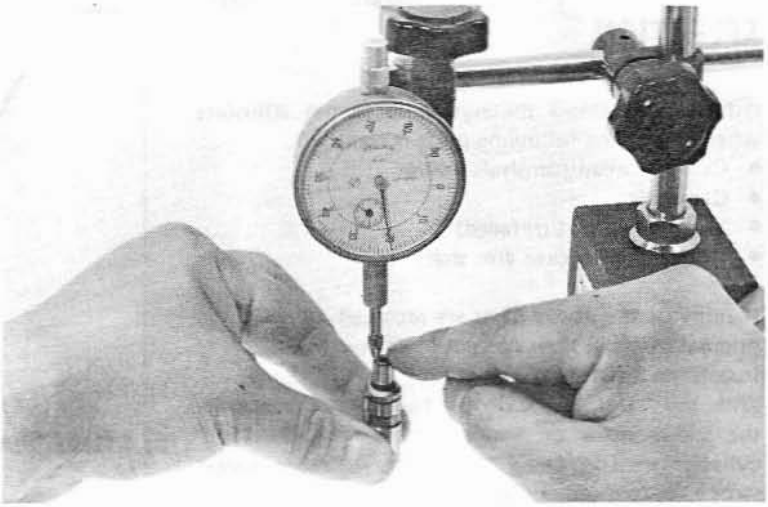


Inspect each hydraulic tappet adjuster for presence of air by compressing it with fingers.

Bleed air from the adjuster if it is compressed by more than 0.30 mm (0.012 in) (Page 7-11).

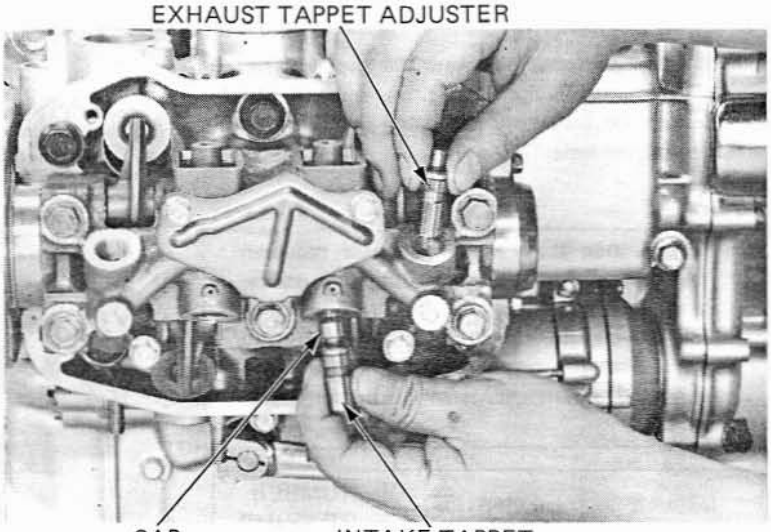
CAUTION:

To prevent entry of air, do not tilt the adjusters once they are filled with oil or kerosene.



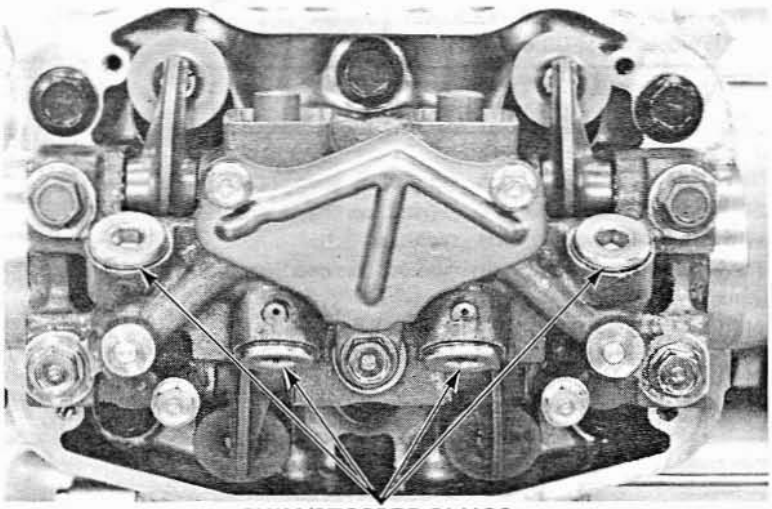
Slide the exhaust valve tappet adjusters into the camshaft holder with the oil holes facing up.

Install the cap on each intake valve tappet adjuster, and slide it into position in the camshaft holder with the cap facing up.



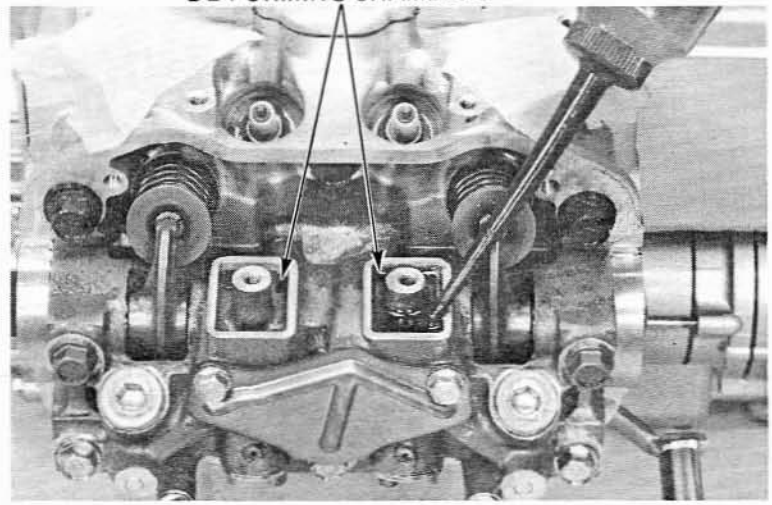
Install the shims and stopper plugs.

TORQUE: 23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)



Fill the de-foaming chambers with clean engine oil. Install the chamber cover.

DE-FORMING CHAMBERS

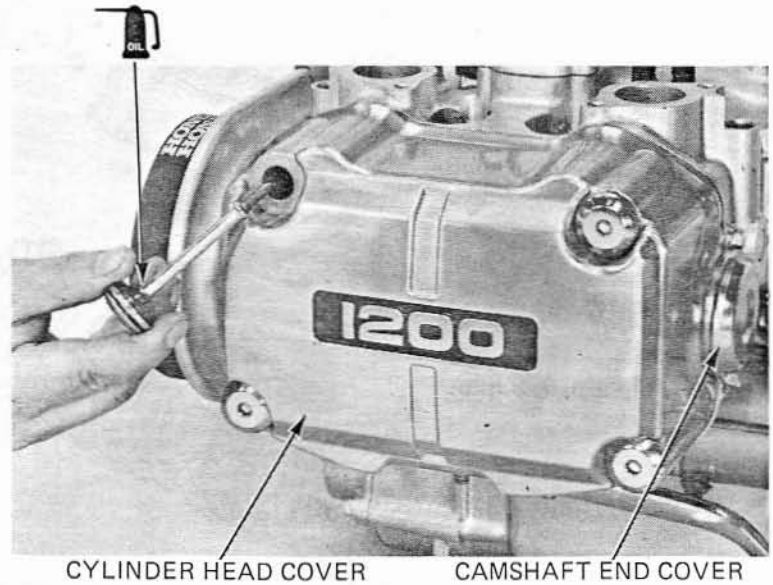


Apply sealant to the mating surfaces of the cylinder head cover and sealing cover.

Apply sealant to the outer peripheries of the oil seal and end cap on the ends of the camshaft.
Install the cylinder head cover.
Coat the rubber areas of the cover bols with oil and torque the bolts.

TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

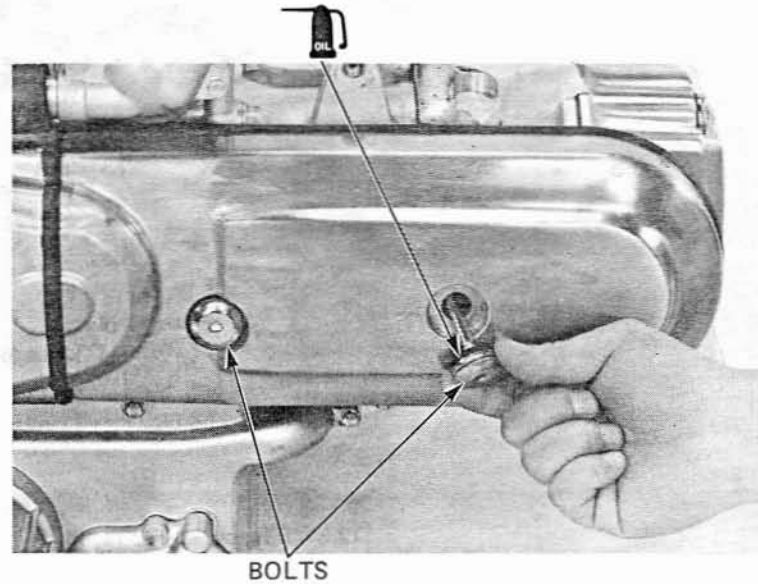
Install the camshaft end cover.



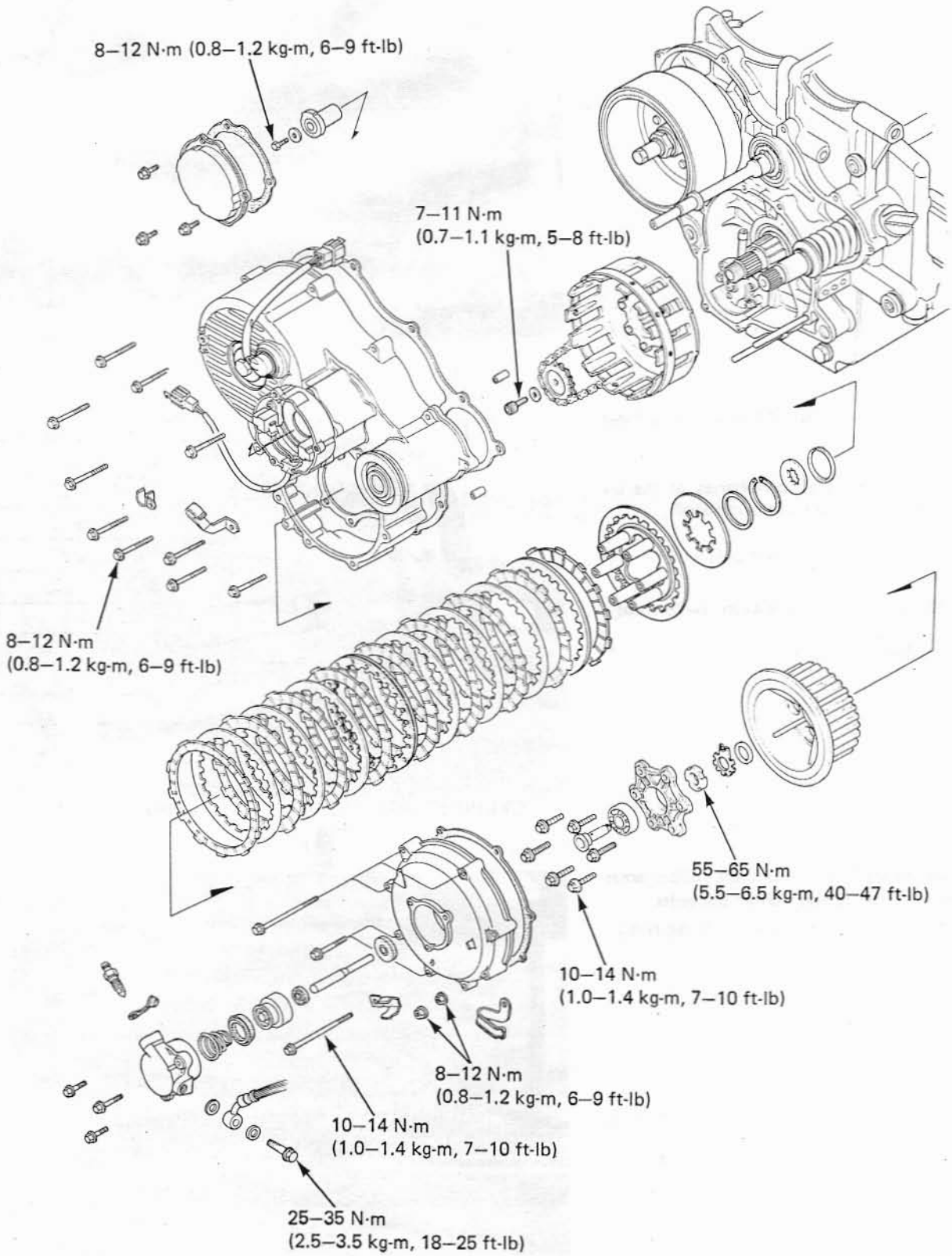
CYLINDER HEAD COVER CAMSHAFT END COVER

Install the timing belt cover. Coat the rubber areas of the cover bolts will oil and tighten the bolts.

TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)



BOLTS



8. CLUTCH

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the clutch hydraulic system, clutch and starter clutch.
- DOT 4 brake fluid is used for the hydraulic clutch and is referred to as clutch fluid in the section. Do not use other types of fluid as they are not compatible.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch master cylinder	Cylinder I.D.	15.870–15.913 (0.6248–0.6265)	15.93 (0.627)
	Piston O.D.	15.827–15.854 (0.6231–0.6242)	15.82 (0.623)
Clutch slave cylinder	Cylinder I.D.	33.600–33.662 (1.3228–1.3253)	33.68 (1.326)
	Piston O.D.	33.550–33.575 (1.3209–1.3218)	33.52 (1.320)
Clutch	Spring free height	5.80 (0.228)	5.5 (0.22)
	Disc thickness	3.45–3.55 (0.136–0.140)	3.2 (0.13)
	Plate warpage	–	0.3 (0.012)
Clutch fluid		DOT 4	–

TORQUE VALUES

Clutch center lock nut	55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
Clutch hose bolt	25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)
Clutch master cylinder socket bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Oil pump driven sprocket bolt	7–11 N·m (0.7–1.1 kg-m, 5–8 ft-lb)
Clutch lifter plate bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

TOOLS

Special

Snap ring pliers	07914–3230001
Clutch center holder	07923–4610001 or modified 07923–4610000
Oil seal driver attachment	07965–MA10200

Common

Lock nut wrench,26 x 30 mm	07716–0020303

TROUBLESHOOTING

Clutch lever soft or spongy
- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking

Clutch lever too hard
- Sticking piston(s)
- Clogged hydraulic system

Clutch slips
- Hydraulic system sticking
- Discs worn
- Springs weak

Clutch will not disengage
- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking
- Hydraulic system sticking
- Plates warped

Motorcycle creeps with clutch disengaged
- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking
- Hydraulic system sticking
- Plates warped

Excessive lever pressure
- Hydraulic system sticking
- Lifter mechanism damaged

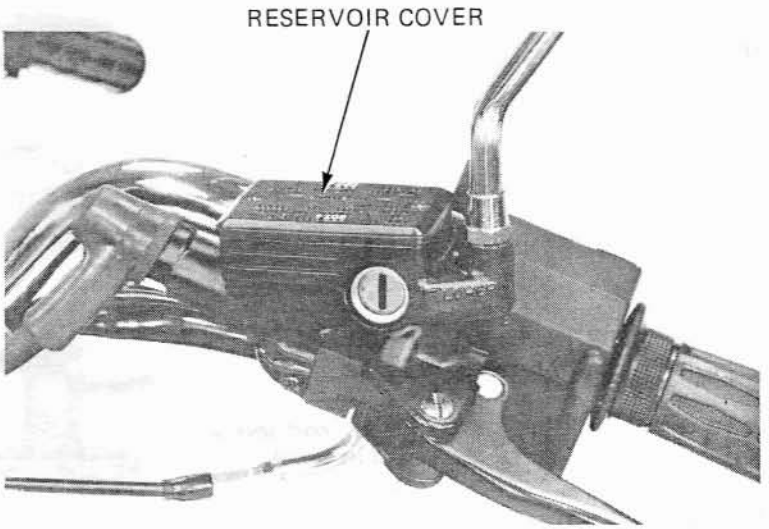
Clutch operation feels rough
- Outer drum slots rough
- Sticking piston(s)

CLUTCH FLUID REPLACEMENT/ AIR BLEEDING

Check the fluid level with the fluid reservoir parallel to the ground.

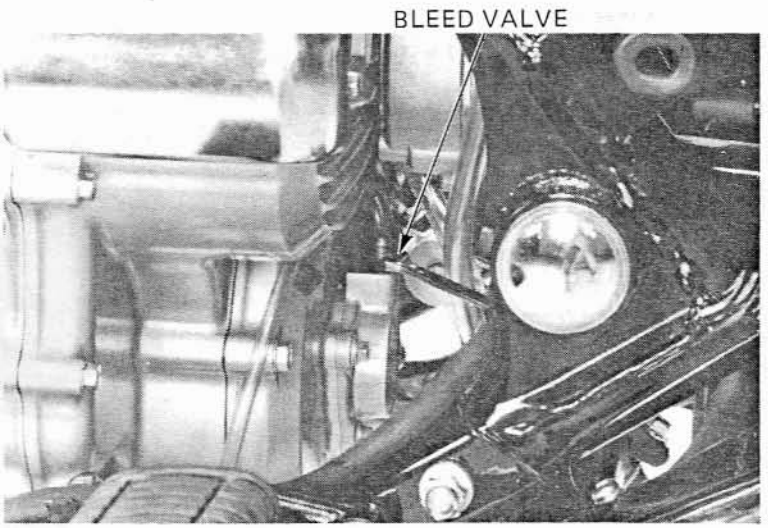
CAUTION:

- *Install the diaphragm on the reservoir when operating the clutch lever. Failure to do so Avoid spilling fluid on painted surfaces and wind screen. Place a rag over the painted surfaces and wind screen whenever the system is serviced.*



CLUTCH FLUID DRAINING

Connect a bleed hose to the bleed valve.
Loosen the slave cylinder bleed valve and pump the clutch lever.
Stop operating the lever when no fluid flows out of the bleed valve.

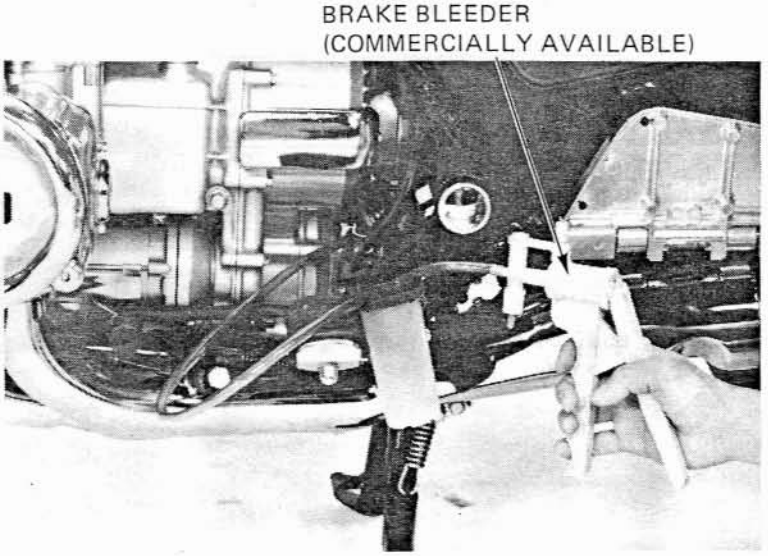


CLUTCH FLUID FILLING

NOTE:

Do not mix different types of fluid since they may not be compatible.

Connect the Brake Bleeder to the bleed valve. Pump the brake bleeder and loosen the bleed valve. Add fluid when the fluid level in the master cylinder reservoir is low.
Repeat above procedures until air bubbles do not appear in the bleed hose.



NOTE:

If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

If a Brake Bleeder not available, fill the system as follows:
Close the bleed valve, fill the reservoir, and install the diaphragm.
Pump up the system pressure with the lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt. Then bleed the system.

AIR BLEEDING

NOTE:

> Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.

1) Squeeze the clutch lever, open the bleed valve 1/2 turn then close the valve.

NOTE:

> Do not release the clutch lever until the bleed valve has been closed again.

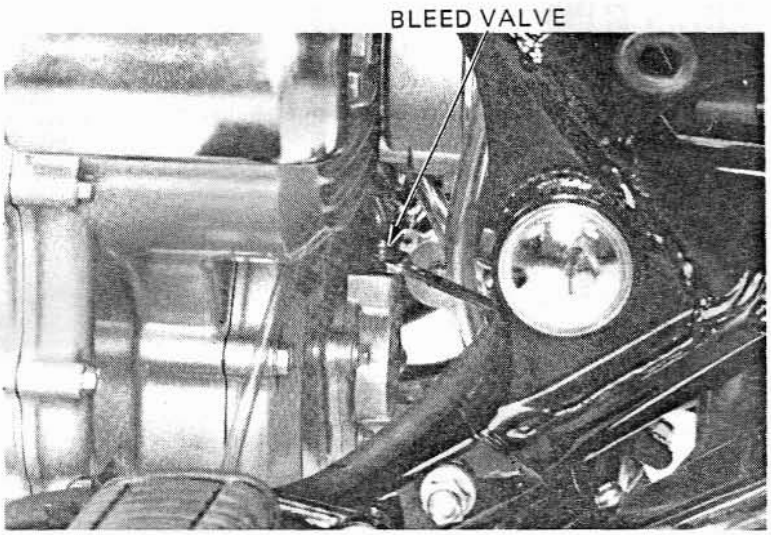
2) Release the clutch lever slowly and wait several seconds after it reaches the end of its travel.

Repeat the above steps until bubbles cease to appear in the fluid at the end of the hose.

Tighten the bleed valve.

TORQUE: 4–7 N·m (0.4–0.7 kg-m, 35–61 in-lb)

Fill the fluid reservoir to the upper level.



CLUTCH MASTER CYLINDER

DISASSEMBLY

Drain clutch fluid from the hydraulic system.
Remove the rear view mirror and clutch lever.
Disconnect the clutch switch wires and remove the clutch hose.

CAUTION:

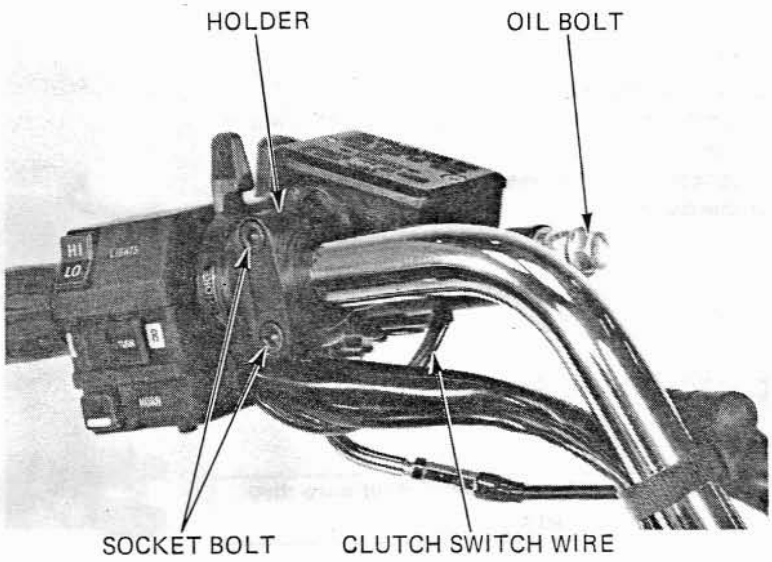
> *Avoid spilling clutch fluid on painted surfaces and wind screen. Place a rag over the painted surfaces and wind screen whenver the clutch system is serviced.*

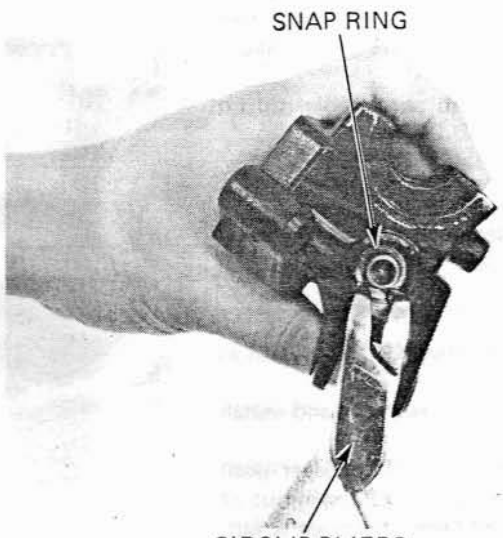
NOTE:

> When removing the oil bolt, cover the end of the hose to prevent contamination and secure the hose.

Remove the master cylinder.

Remove the push rod boot and snap ring from the master cylinder body.

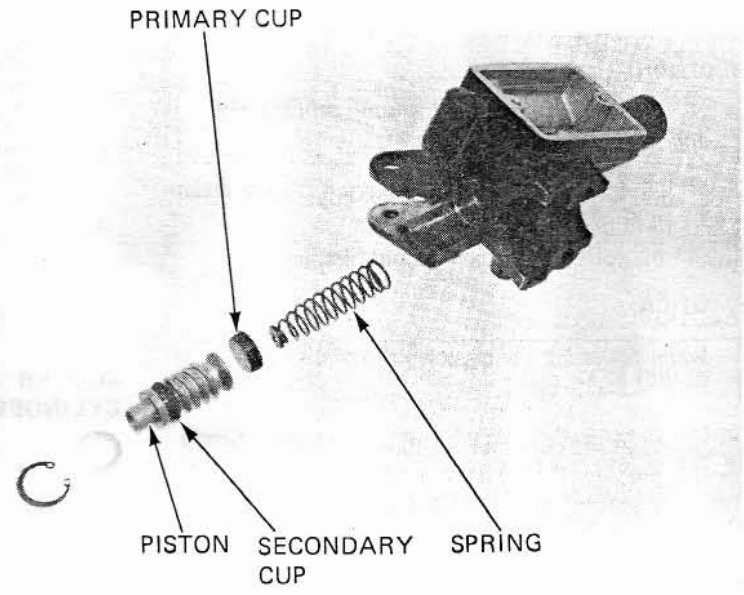




Remove the piston out of the master cylinder.

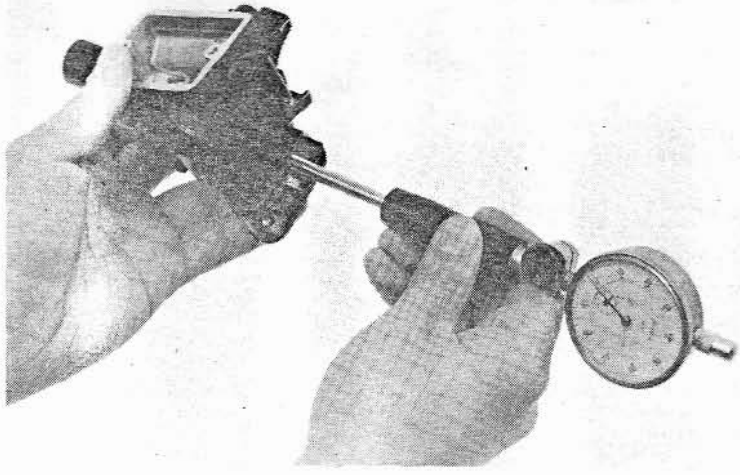
Remove the following:
– piston and secondary cup.
– primary cup and spring.
– clutch switch, if necessary.

Check the primary and secondary cups for damage or deterioration.



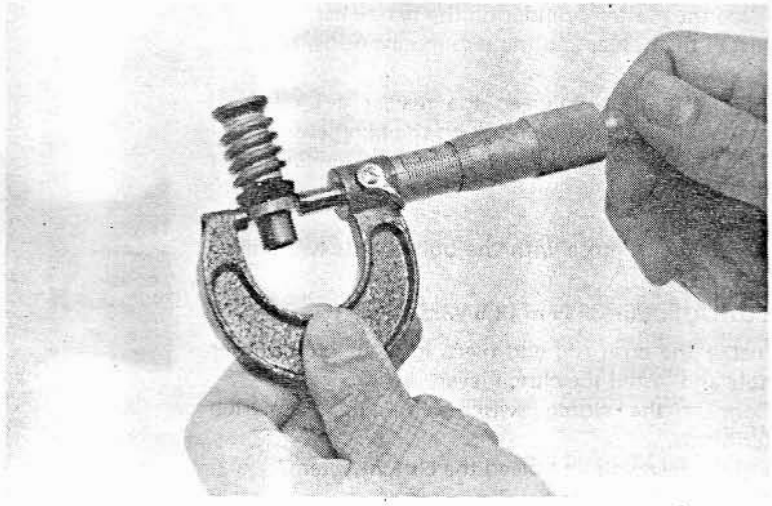
MASTER CYLINDER I.D. INSPECTION

Check the master cylinder for scores, scratches or nicks.
Measure the master cylinder I.D.
SERVICE LIMIT: 15.93 mm (0.627 in)



MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.
SERVICE LIMIT: 15.82 mm (0.623 in)



ASSEMBLY

CAUTION:

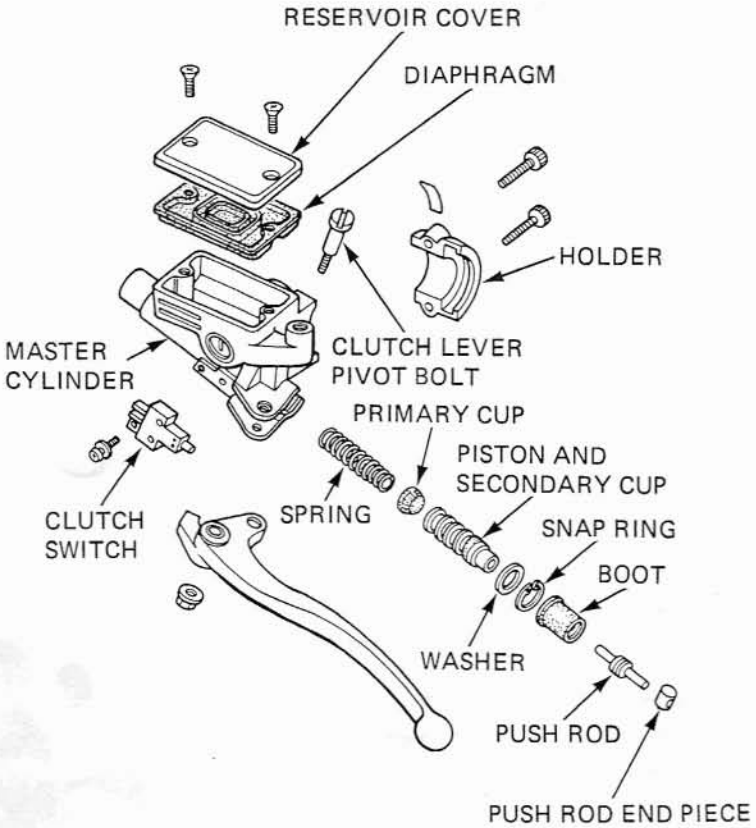
Handle the master piston, spring, primary cup and secondary cup as a set.

Coat the primary and secondary cups with clean brake fluid before assembly.
Install the spring, primary cup and piston.

CAUTION:

When installing the cups, do not allow the lips to turn inside out.

Install the snap ring making sure it is seated firmly in the groove. Then install the boot and push rod.
Install the clutch switch, if it was removed.



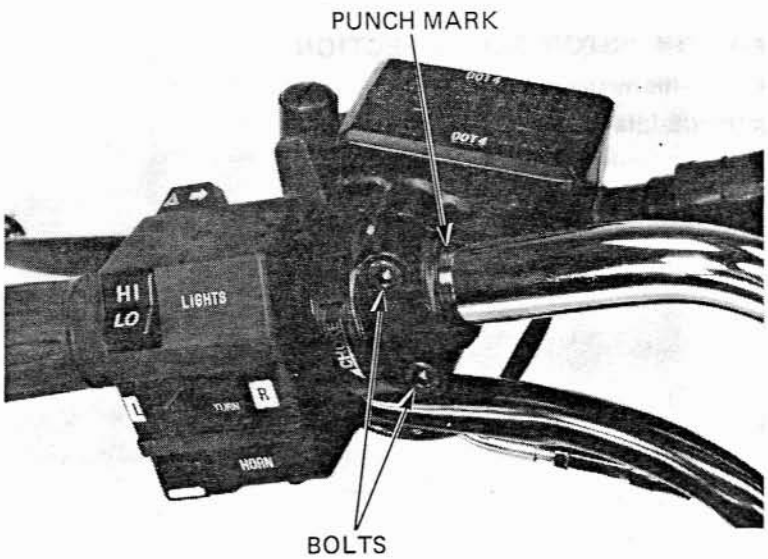
Place the master cylinder on the handlebar.
Install the holder and the two mounting bolts.

Align the split between the master cylinder and holder with the punch mark on the handlebar.
Tighten the upper bolt first, then tighten the lower bolt.

Install the oil hose with the bolt and its two sealing washers.

TORQUE: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

Install the push rod end piece into the clutch lever hole and install the clutch lever.
Connect the clutch switch wires to the switch terminals.
Fill the reservoir and bleed the clutch system.



CLUTCH SLAVE CYLINDER

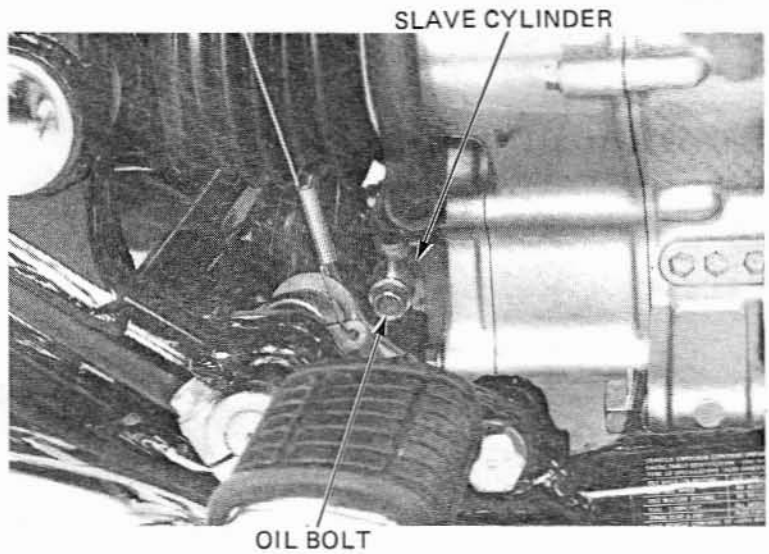
DISASSEMBLY

Place a container under the slave cylinder, remove the oil bolt and disconnect the clutch hose.

CAUTION:

Avoid spilling clutch fluid on painted surfaces.

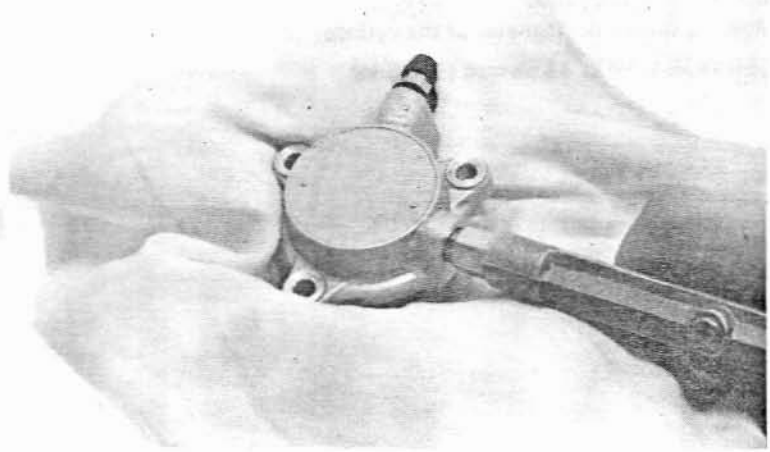
Remove the slave cylinder.



Remove the piston from the cylinder.

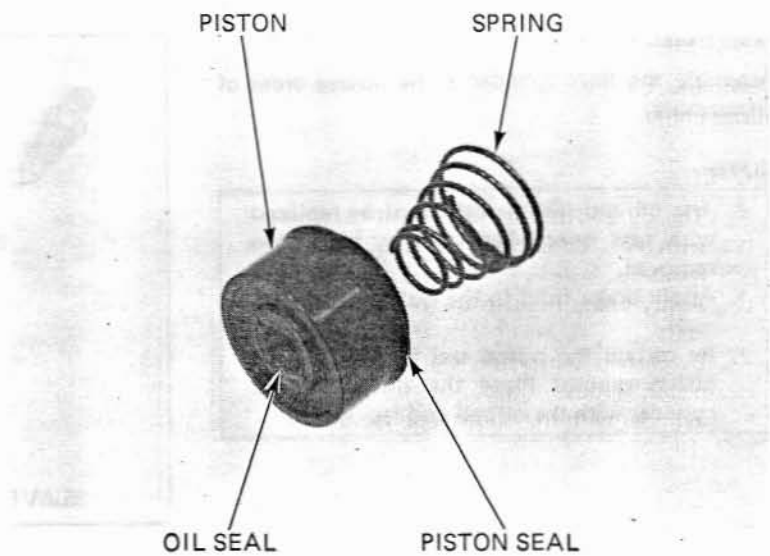
If piston removal is hard, place a shop towel over the piston to cushion the piston when it is expelled, and position the cylinder with the piston down.

Apply compressed air to the fluid inlet to remove the piston. Use the air in short spurts.



Remove the spring from the slave cylinder.

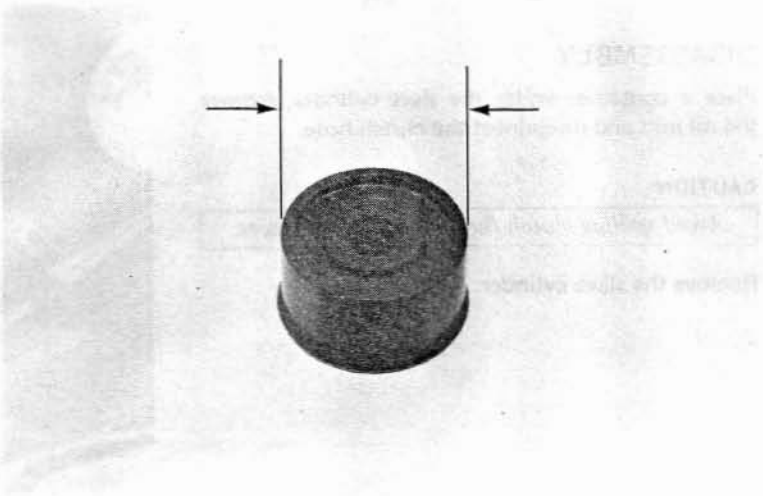
Remove the oil and piston seals.
Clean the piston groove with clutch fluid.
Check the piston spring for weakness or damage.



PISTON O.D. INSPECTION

Check the piston for scoring or scratches.
Measure the outside diameter of the piston with a micrometer.

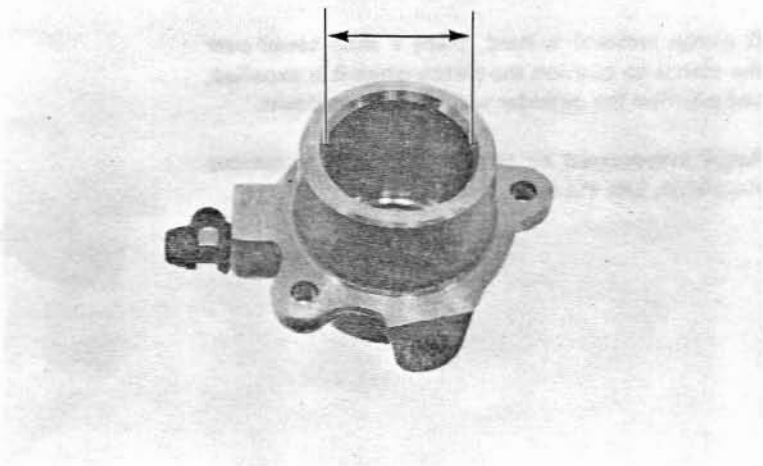
SERVICE LIMIT: 33.52 mm (1.320 in)



CYLINDER I.D. INSPECTION

Check the slave cylinder for scoring or scratches.
Measure the inside diameter of the cylinder bore.

SERVICE LIMIT: 33.68 mm (1.326 in)

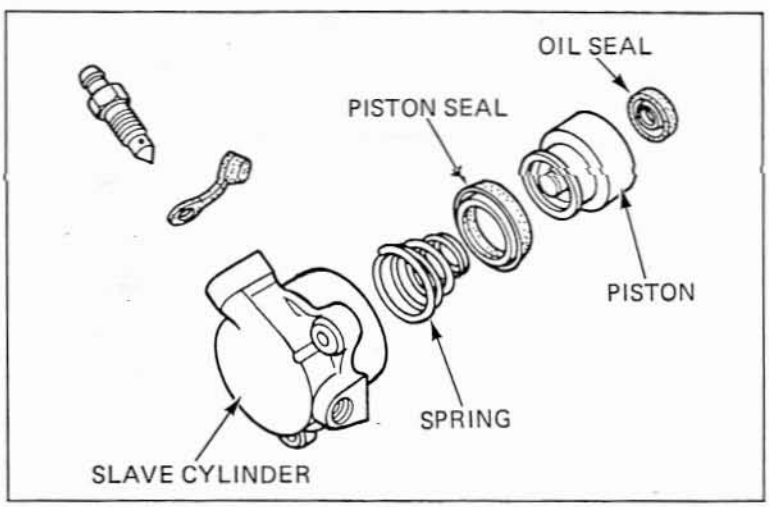


ASSEMBLY

Assembly the slave cylinder in the reverse order of disassembly.

NOTE:

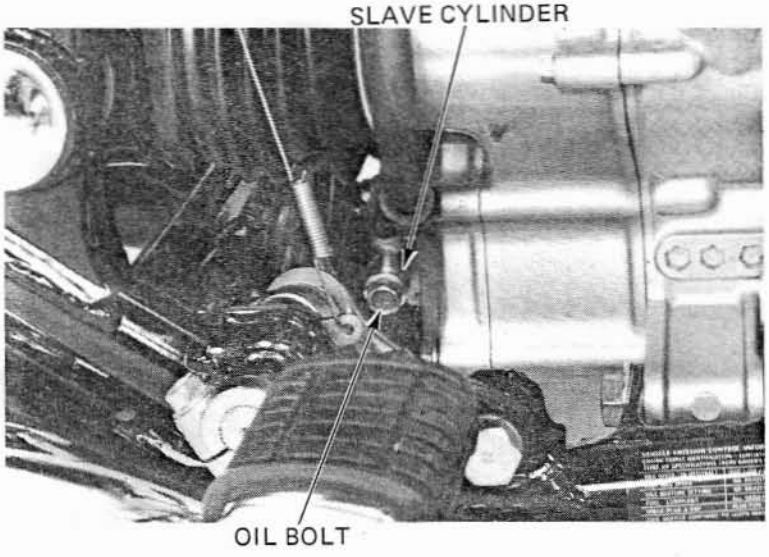
- The oil and piston seals must be replaced with new ones whenever they have been removed.
- Apply brake fluid to the piston and piston seal.
- Be certain the piston seal is seated in the piston groove. Place the piston in the cylinder with the oil seal end facing out.



Install the slave cylinder.
Connect the clutch hose with the oil bolt and the two sealing washers.

TORQUE: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

Fill the clutch fluid reservoir and bleed the clutch system.



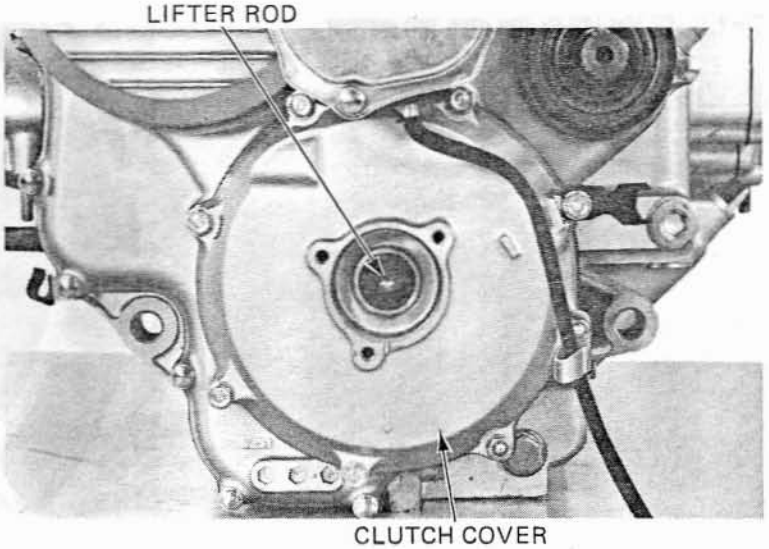
CLUTCH DISASSEMBLY

Remove the slave cylinder from the clutch cover, and remove the lifter rod.

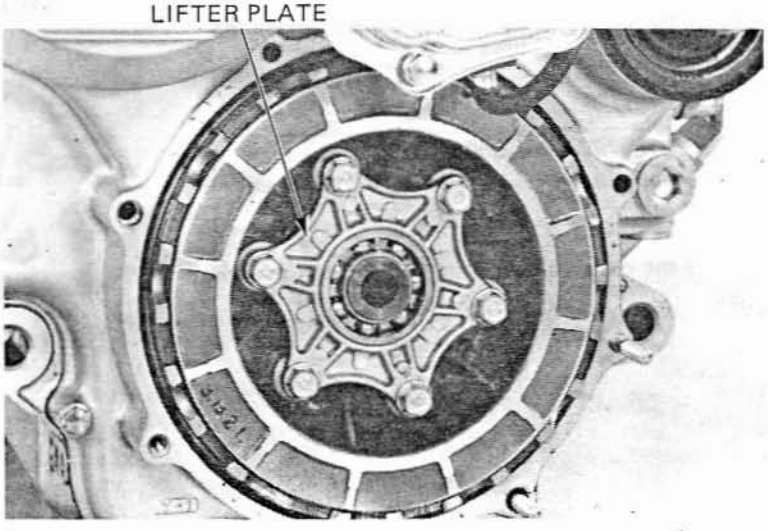
NOTE:

> Squeeze the clutch lever once and keep it in this position by tying it to the handlebar grip to prevent the slave cylinder piston from over stroke caused by fluid gravity.

Remove the clutch cover.
Remove the gasket and dowel pins.



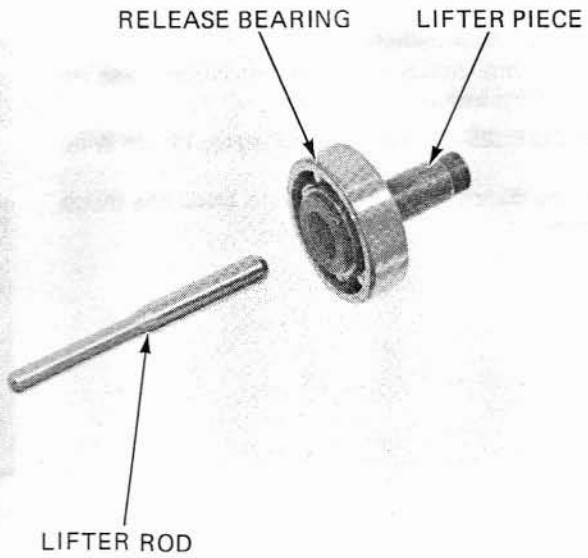
Remove the lifter plate by removing the six bolts.



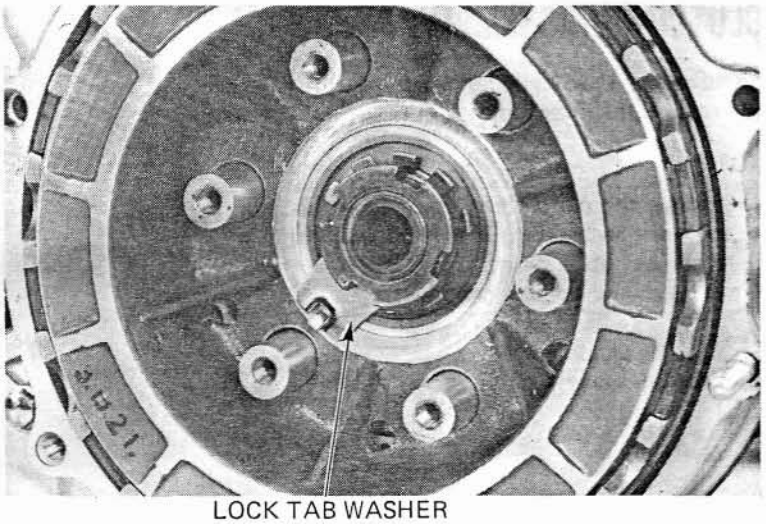
Check the release bearing for excessive play.

Check the lifter piece for wear or damage.

Inspect the lifter rod for wear, damage or bending.



Straighten the tab of the lock tab washer.



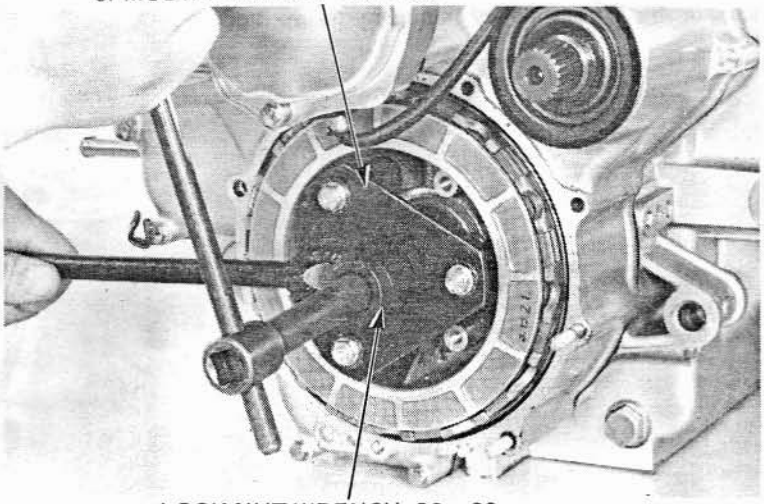
CLUTCH CENTER HOLDER 07923–4610001
or MODIFIED 07923–4610000

Remove the clutch center lock nut, then remove the lock washers.

NOTE:

> If use the 07923–4610000, enlage center hole to 39 mm to provide clearance for the lock nut wrench.

Remove the clutch center assembly from the clutch outer.



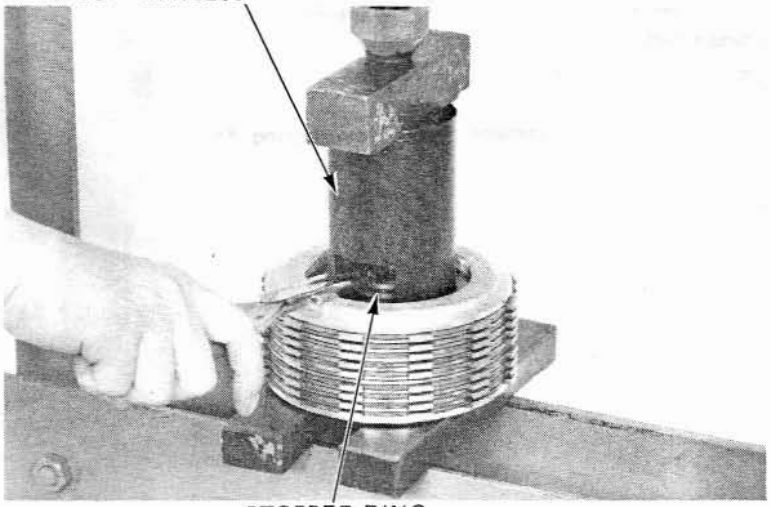
Compress the diaphragm spring in a press just enough to remove the stopper ring; remove the stopper ring.

CAUTION:

To prevent a loss of tension, do not compress the diaphragm spring more than necessary to remove the stopper ring.

Remove the clutch plates, clutch damper plate, discs and pressure plate from the clutch center.

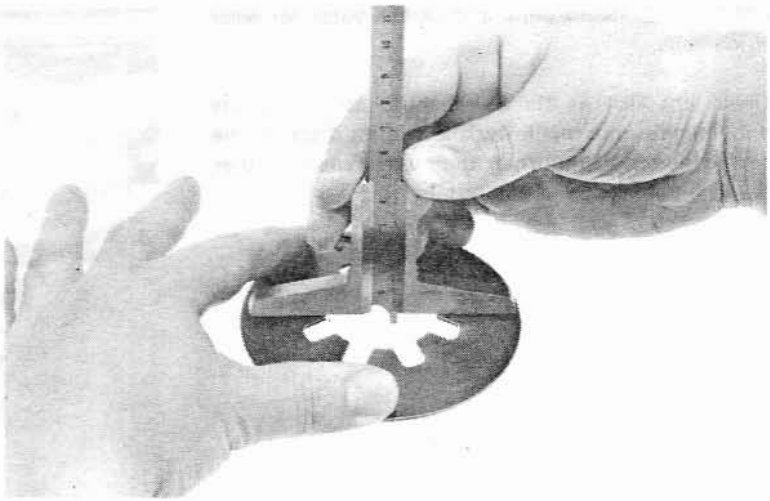
OIL SEAL DRIVER ATTACHMENT
07965–MA10200



STOPPER RING

Measure the height of the clutch spring.

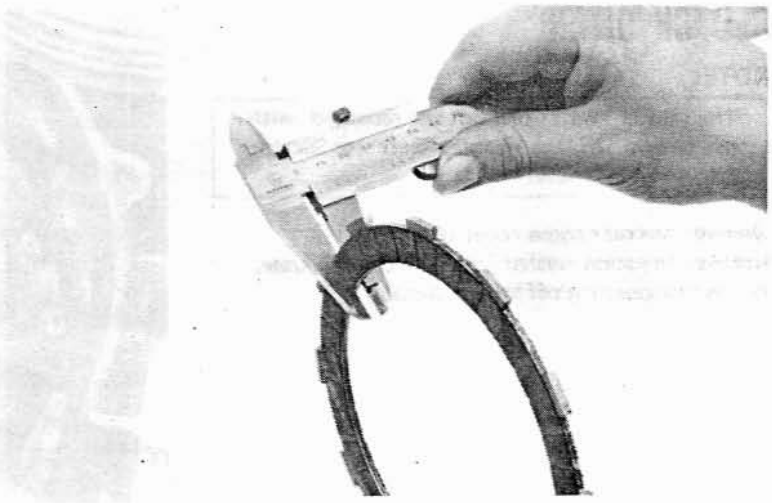
SERVICE LIMIT: 5.5 mm (0.22 in)



Measure each clutch disc thickness.

SERVICE LIMIT: 3.2 mm (0.13 in)

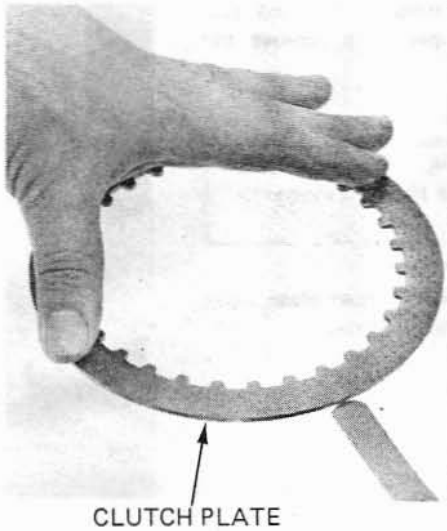
Replace any discs that are damaged, discolored, or thinner than the service limit.

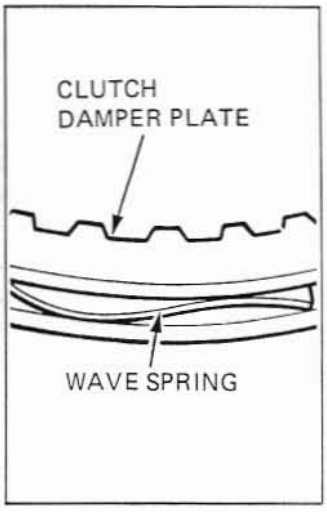


Check for clutch plate warpage on a surface plate, using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)

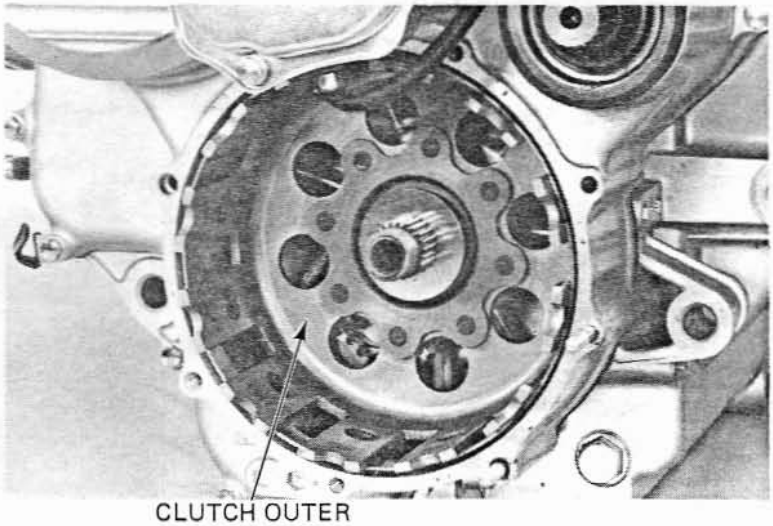
Check the clutch damper plate wave spring for damage.





Check the pressure plate and clutch outer for wear or damage.

Check the slots in the clutch outer for nicks, cuts and indentations made by the friction discs. If the surfaces are not smooth or there is evidence of other damage, replace the clutch outer.

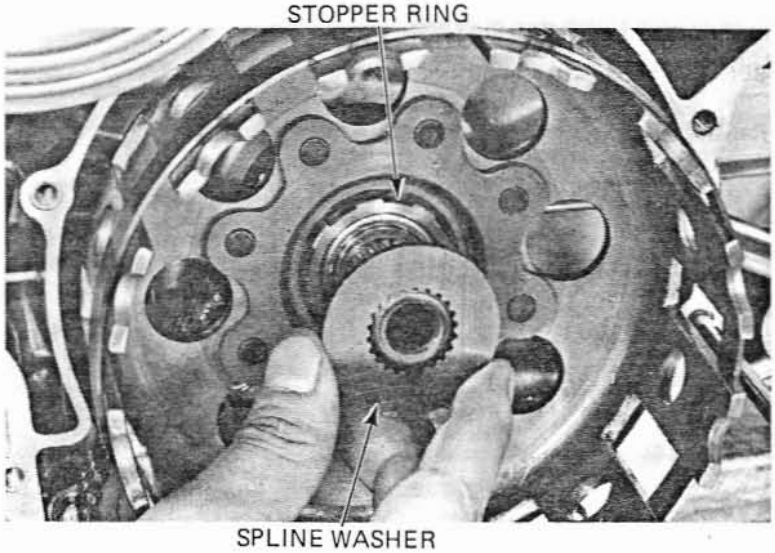


CLUTCH OUTER

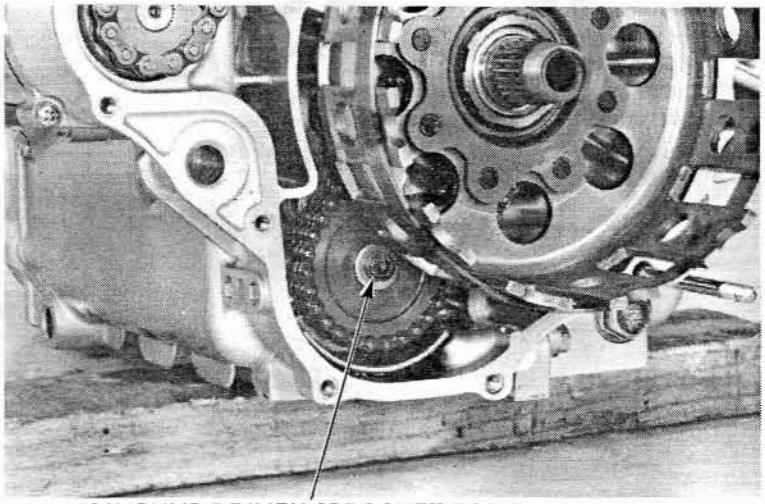
NOTE:

> The clutch outer cannot be removed with the engine in the frame. Refer to Section 5 for engine removal.

Remove the rear engine cover (Page 9-3).
Remove the spline washer from the clutch outer.
Pry the stopper ring off the mainshaft.



Remove the oil pump driven sprocket bolt.
Remove the clutch outer and oil pump drive chain/sprocket as a unit.

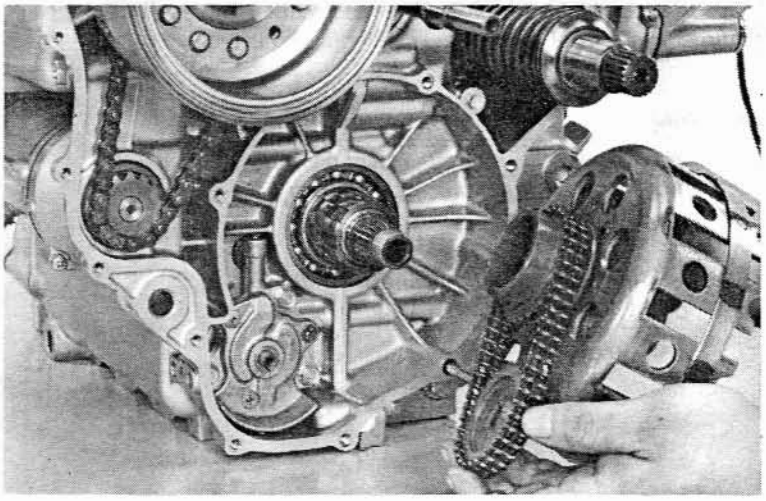


OIL PUMP DRIVEN SPROCKET BOLT

Install the clutch outer in the reverse order of removal.

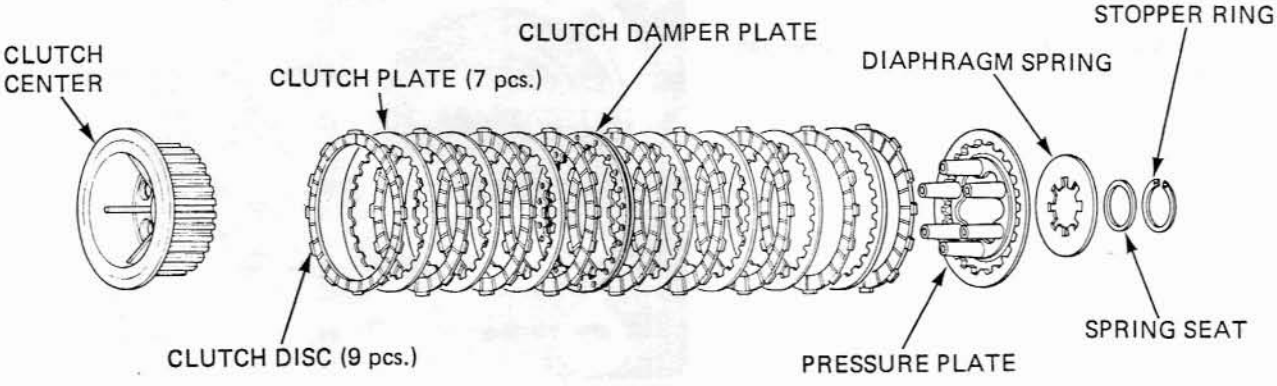
NOTE:

- Install the snap ring with the sharp end facing towards the outside.
- Tighten the oil pump driven sprocket bolt to 7–11 N·m (0.7–1.1 kg-m, 5–8 ft-lb) torque.



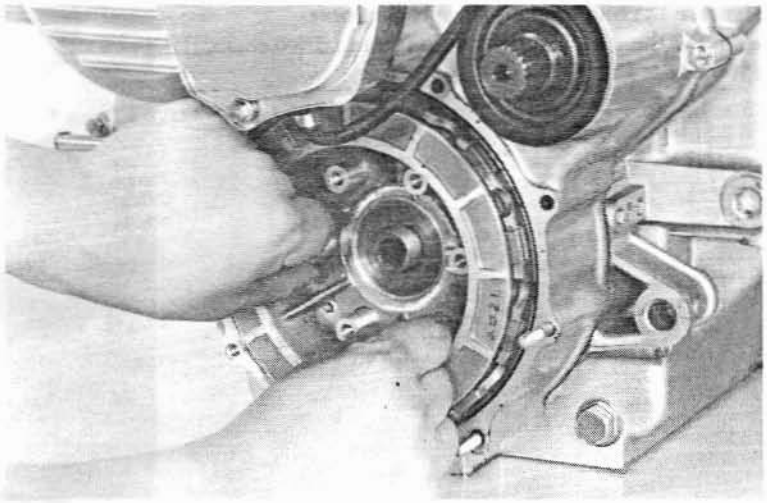
CLUTCH ASSEMBLY

Coat the discs and plates with clean engine oil.
Install the clutch center, plates, discs and pressure plate as shown.



Slide the clutch center assembly into the clutch outer to align the discs and plates.

Remove the clutch center assembly from the clutch outer without disturbing the alignment.

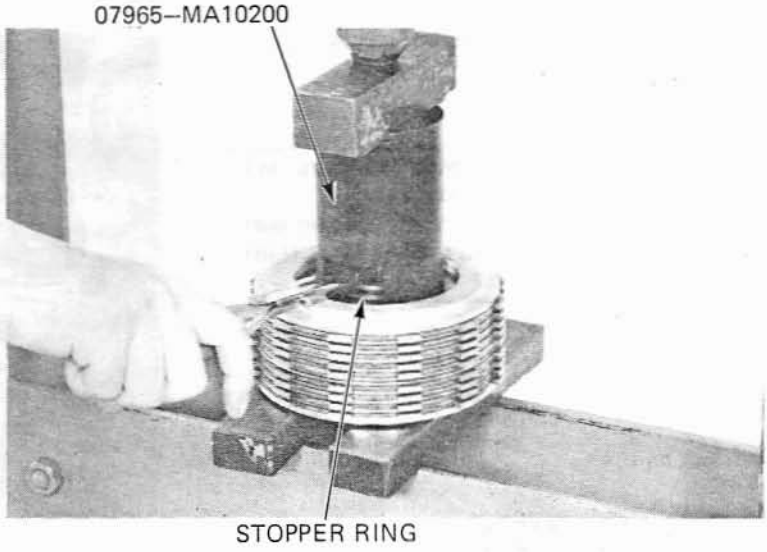


Place the diaphragm spring on the clutch center and compress the spring in a press just enough to install the stopper ring.

CAUTION:

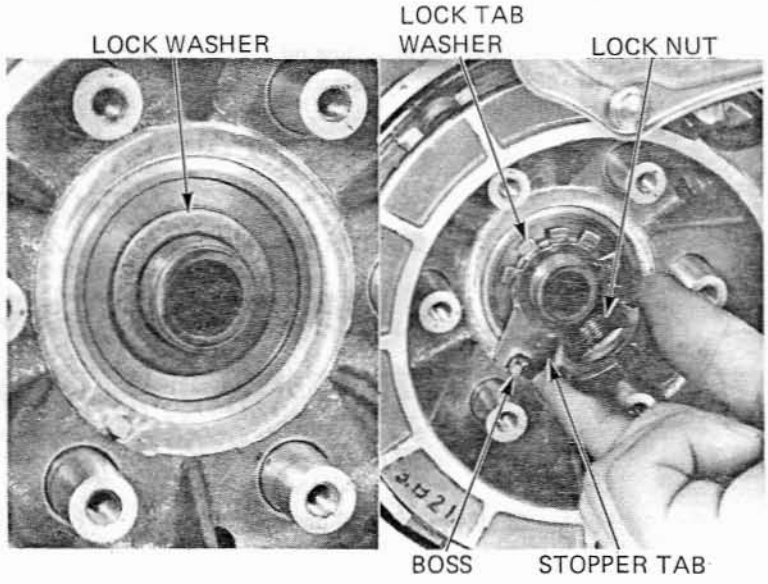
To prevent a loss of tension, do not compress the diaphragm spring more than necessary to install the stopper ring.

Seat the stopper ring in the ring groove in the clutch center boss with the sharp end facing up.



Install the clutch center assembly in the clutch outer.
Install the lock washer with the marking "OUTSIDE" facing out.

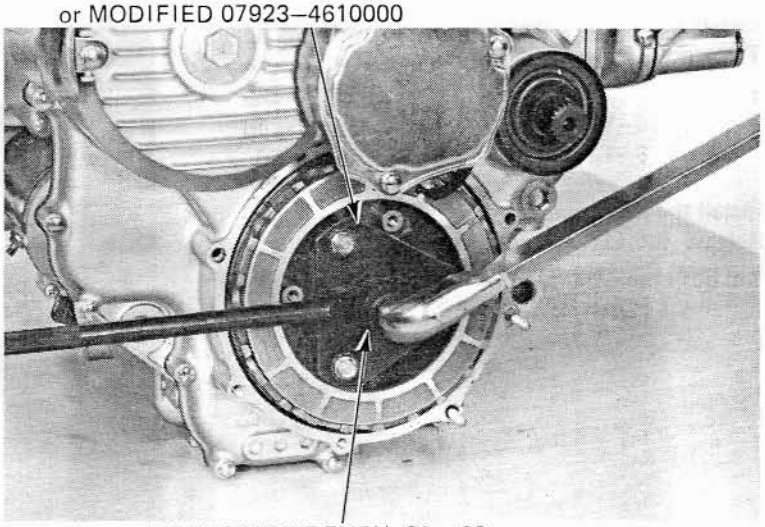
Install the lock tab washer with the stopper tab aligned with the boss of the clutch center.
Install the center lock nut with the taper end facing towards the inside.



Tighten the lock nut.

TORQUE: 55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)

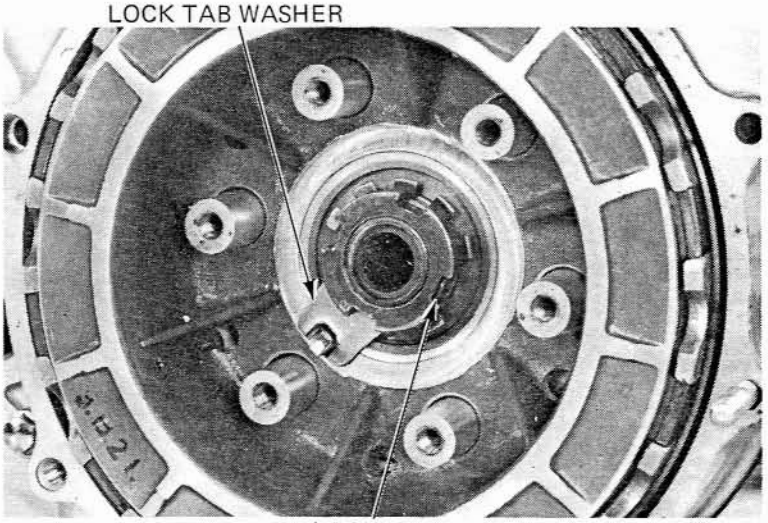
CLUTCH CENTER HOLDER 07923–4610001
or MODIFIED 07923–4610000



LOCK NUT WRENCH, 26 x 30 mm
07716–0020303

Bend the tab of the lock tab washer up into the groove in the lock nut.

LOCK TAB WASHER



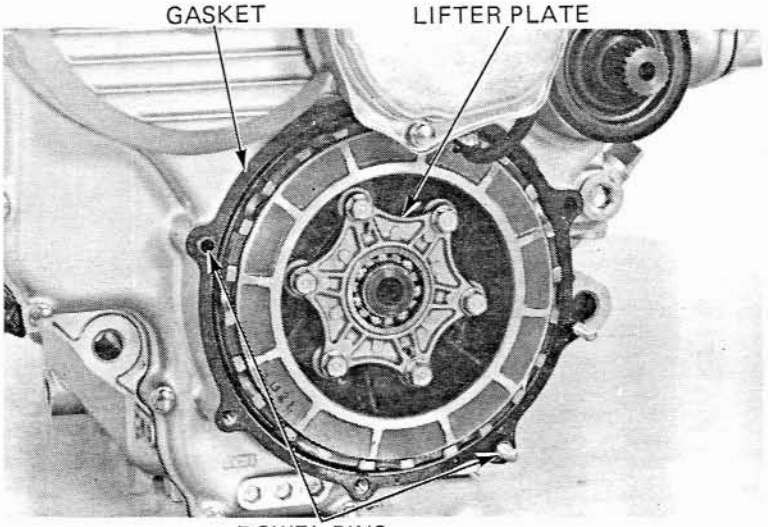
LOCK TAB

Install the liter plate and tighten the six bolts in a criss-cross pattern in 2–3 steps.

TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

Install the dowel pins and a new gasket.

GASKET LIFTER PLATE

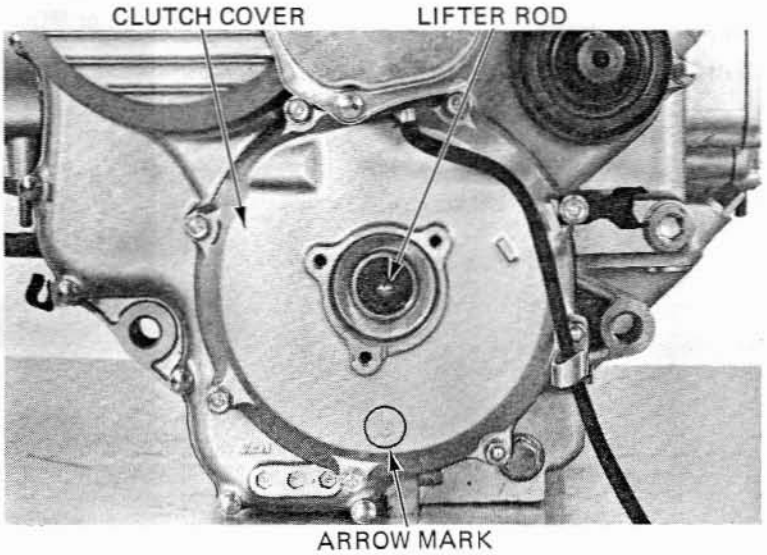


DOWEL PINS

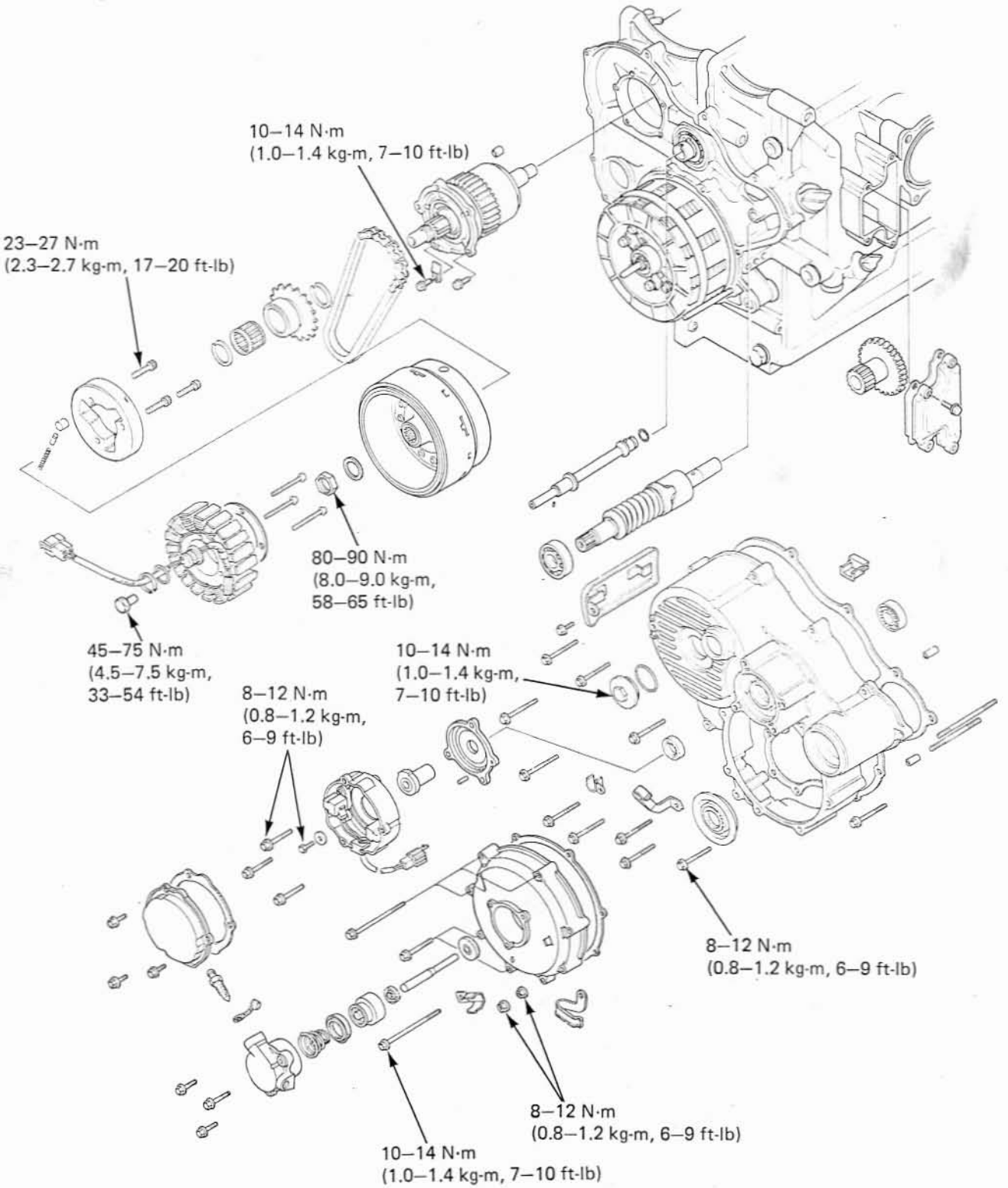
Install the clutch cover with the arrow facing down.
Tighten the cover bolts and nuts.

TORQUE:
Bolt: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Nut: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

Install the lifter rod.
Release the clutch lever from the handlebar grip and push the slave cylinder piston in all the way.
Install the clutch slave cylinder.



MEMO



9. ALTERNATOR/STARTER CLUTCH/ REAR ENGINE COVER

SERVICE INFORMATION

GENERAL

- All maintenance services and repaires described in this section must be performed with the engine removed off the frame.
- It is necessary to adjust the drive gear backlash whenever the alternator drive shaft is removed. Improper backlash can cause abnormal engine noise and requires removal of the engine to adjust.

9

SPECIFICATION

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Pulse generator rotor air gap	0.40–1.10 (0.016–0.043)	–
Alternator drive shaft backlash (At alternator rotor)	0.05 (0.002)	–

TORQUE VALUES

Alternator rotor lock nut	80–90 N·m (8.0–9.0 kg-m, 58–65 ft-lb)
Alternator drive shaft holder bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Starter clutch outer torx bolt	23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)
Alternator cover hole cap	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Alternator drive shaft bolt (10 mm)	45–75 N·m (4.5–7.5 kg-m, 33–54 ft-lb)
Stator mount screw	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Pulse generator rotor bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Pulse generator case bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

TOOLS

Special

Lock nut wrench, 17 x 27 mm	07907–MC70000 or 07907–4150000
Rotor holder	07925–3710000
Damper spring compressor	07964–3710000

Common

Attachment, 52 x 55 mm	07746–0010400
Attachment, 32 x 35 mm	07746–0010100
Pilot, 25 mm	07746–0040600
Pilot, 15 mm	07746–0040300
Driver	07749–0010000
Torx driver bit (T40)	07703–0010100 or equivalent tool
Attachment, 35 mm I.D.	07746–0030400
Driver	07746–0030100

TROUBLESHOOTING

Abnormal engine noise (gear noise)
- Improper alternator drive gear backlash
- Worn or damaged alternator drive gear

Abnormal engine noise at low speed
- Weak alternator drive shaft diaphragm spring
- Alternator drive shaft friction case binding

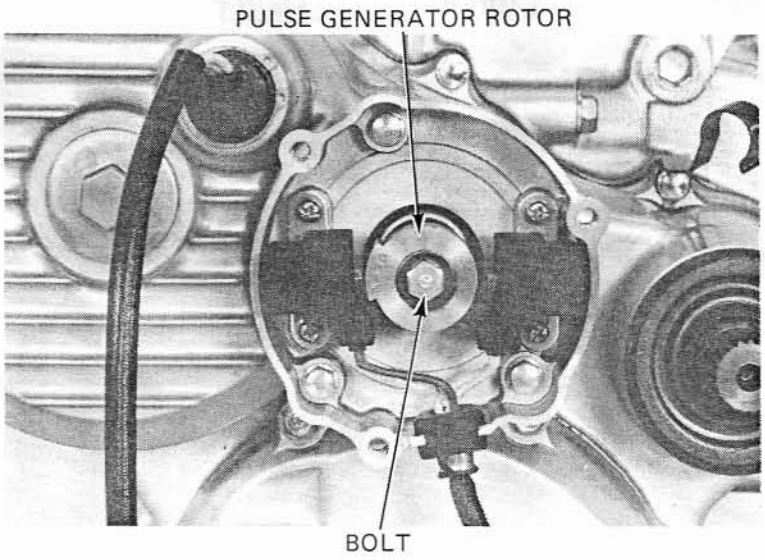
Starter rotates, but engine won't start
- Faulty starter clutch
- Broken starter drive chain

REAR ENGINE COVER REMOVAL

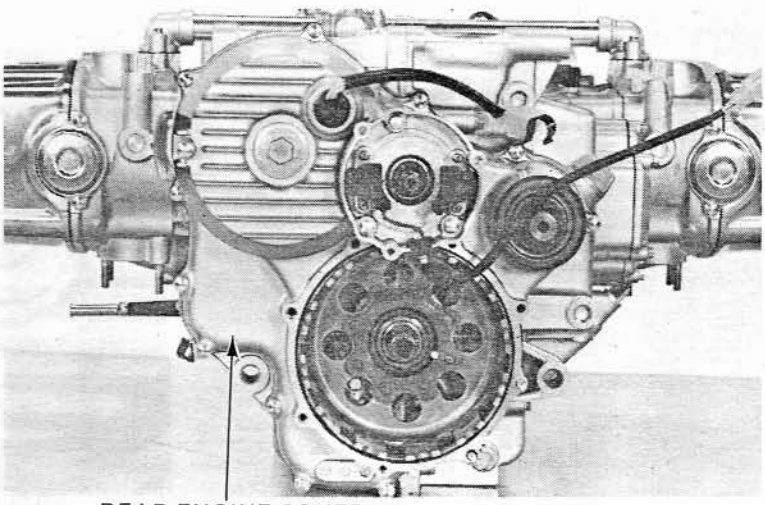
Remove the pulse generator cover.
Remove the bolt and the pulse generator rotor.
Remove the clutch cover.

NOTE:

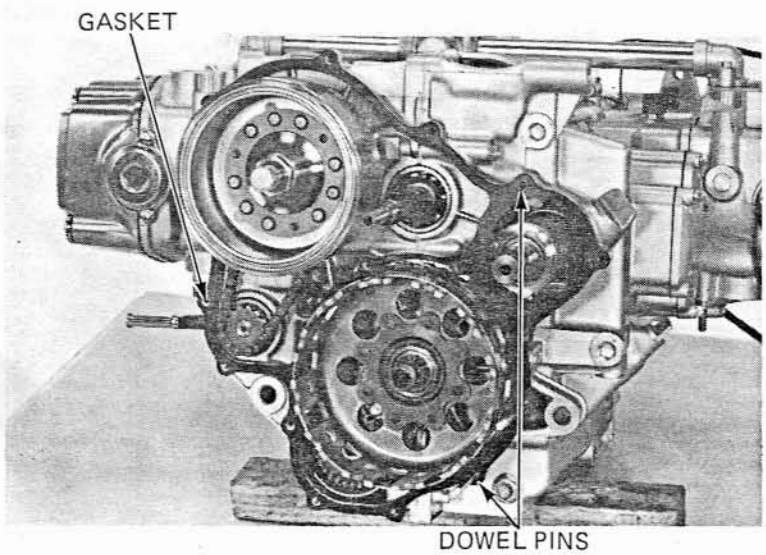
> The rear engine cover can be removed without removing the clutch discs and plates.



Remove the bolts and rear engine cover.

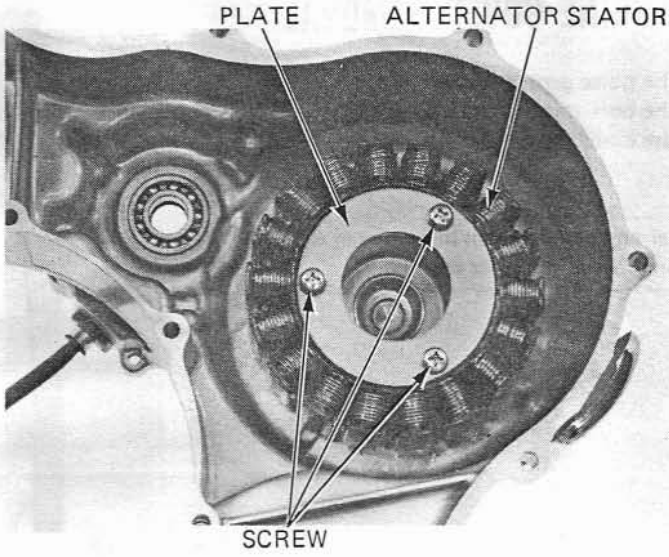


Remove the gasket and dowel pins.



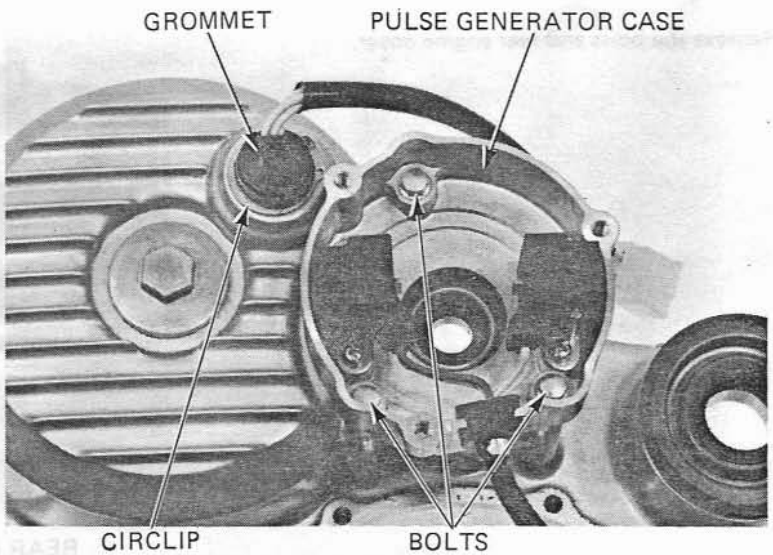
REAR ENGINE COVER DISASSEMBLY

Unscrew the three screws attaching the stator and remove the plate.

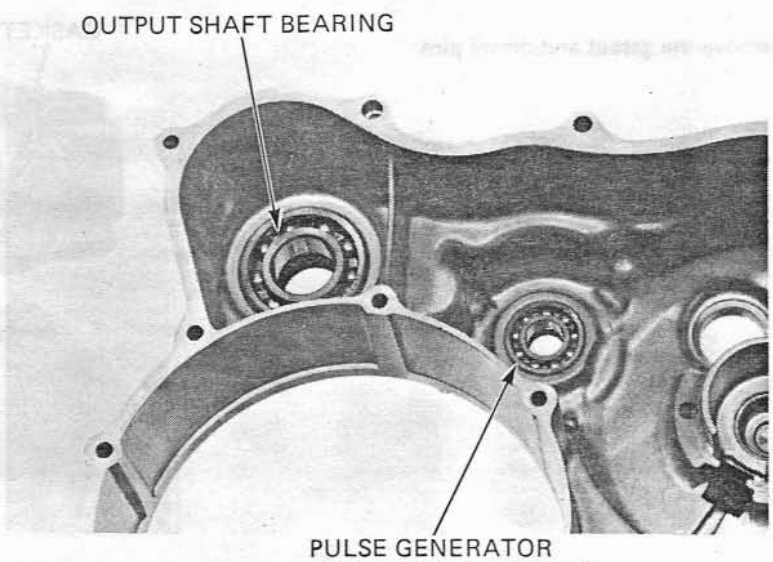


Pry off the circlip securing the alternator wire, and remove the stator.

Remove the three bolts and then remove the pulse generator case and spacer.



Inspect the oil seals and bearings for the output shaft and pulse generator drive shaft.
Remove the oil seals and bearings from the case and replace with new ones if necessary.

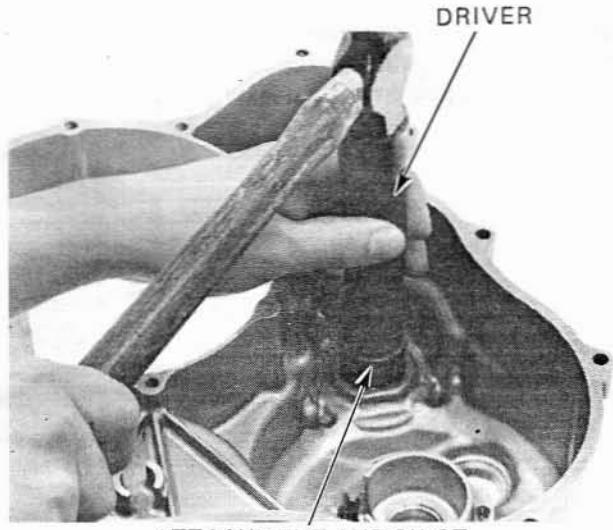


REAR ENGINE COVER ASSEMBLY

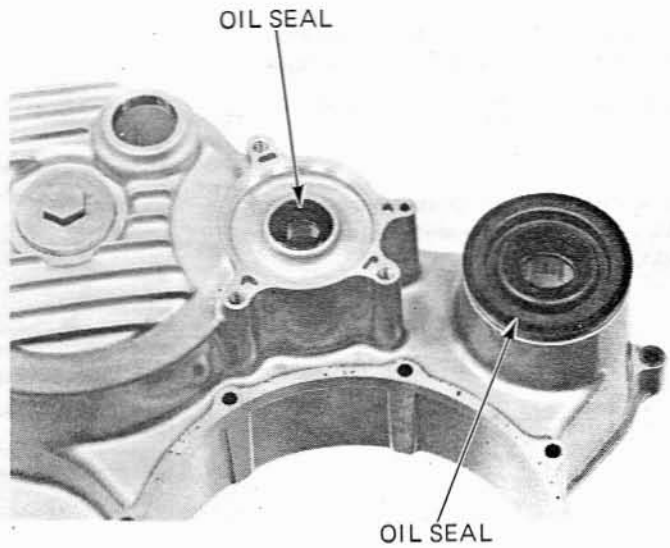
Drive output shaft and pulse generator drive shaft bearings into the case.

Output shaft bearing:
- Driver 07749–0010000
- Attachment, 52 x 55 mm 07746–0010400
- Pilot, 25 mm 07746–0040600

Pulse generator drive shaft bearing:
- Driver 07749–0010000
- Attachment, 32 x 35 mm 07746–0010100
- Pilot, 15 mm 07746–0040300



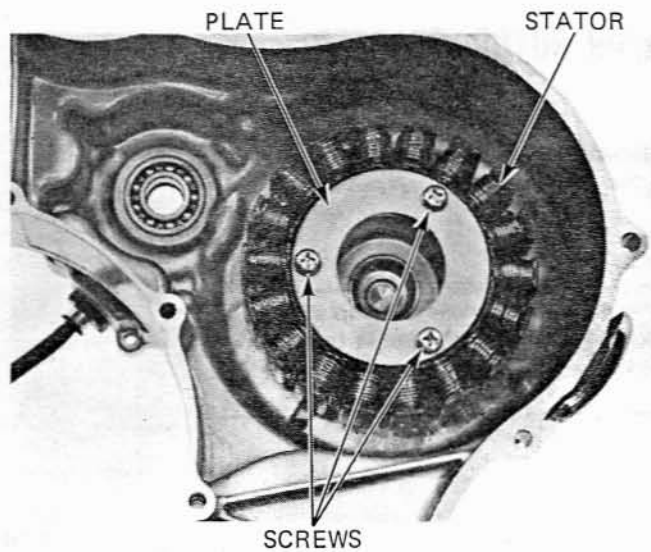
Drive in new oil seals.



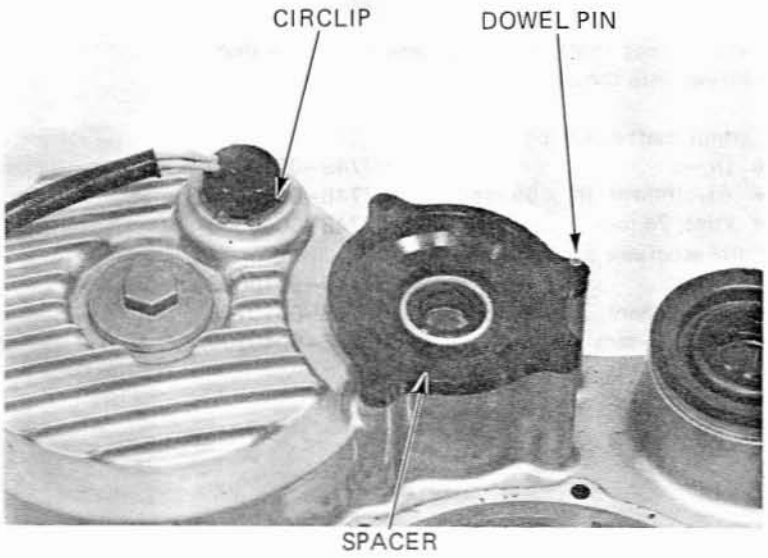
Route the stator wires through the hole in the rear engine case; install the grommet so that the groove is seated over the edge of the hole in the engine case.

Coat the stator mount screw threads with locking agent and tighten the stator and plate with them.

TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)



Seat the circlip in the groove of the grommet with the round edge facing towards the engine case.
Install the spacer and dowel pins on the case mating face.

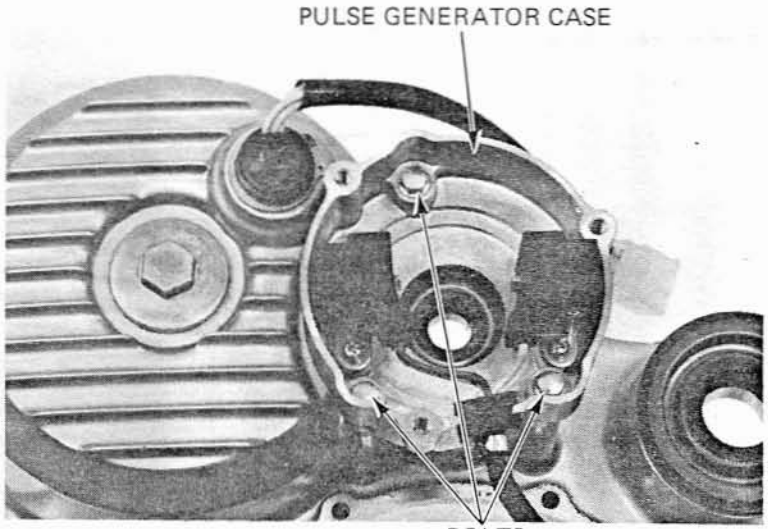


Place the pulse generator case onto the spacer.
Install and tighten the pulse generator case bolts.

TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

NOTE:

> Do not torque the bolts in excess of 12 N·m (1.2 kg-m, 9 ft-lb) to prevent the case from distortion.

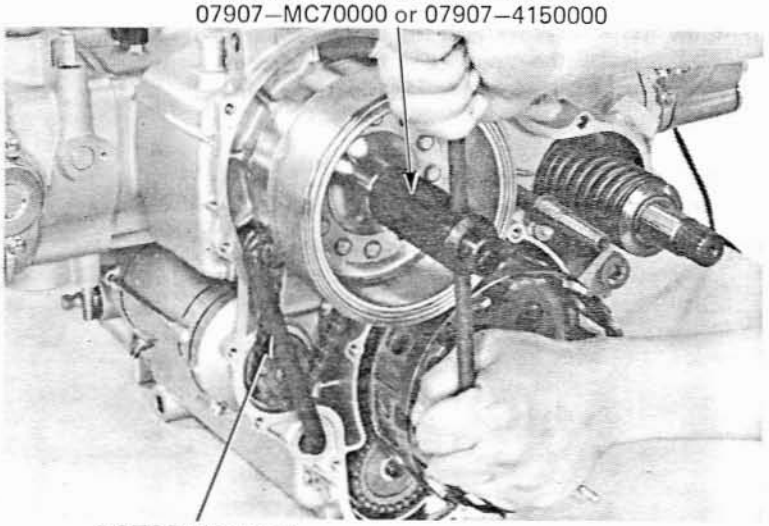


ALTERNATOR ROTOR/STARTER CLUTCH

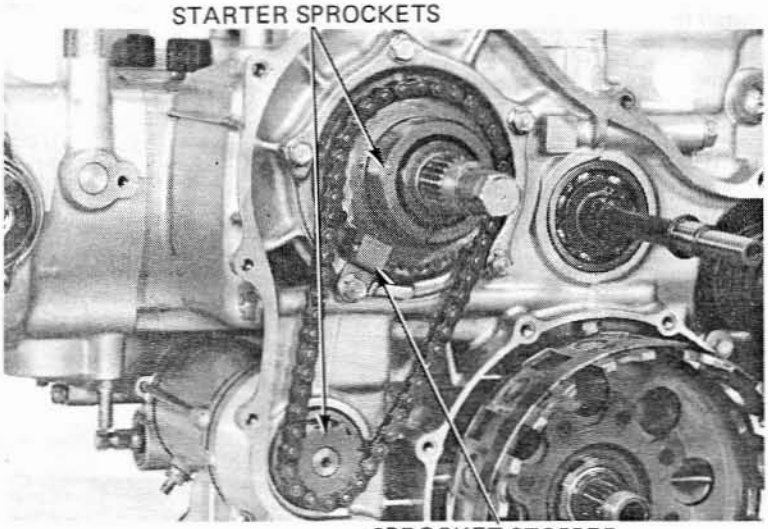
Hold the alternator rotor with the Rotor Holder, and remove the rotor lock nut, plain washer, and rotor.

NOTE:

> It is not necessary to remove the bolt at the end of the shaft. This bolt is used to turn the crankshaft when the engine is installed in the frame.

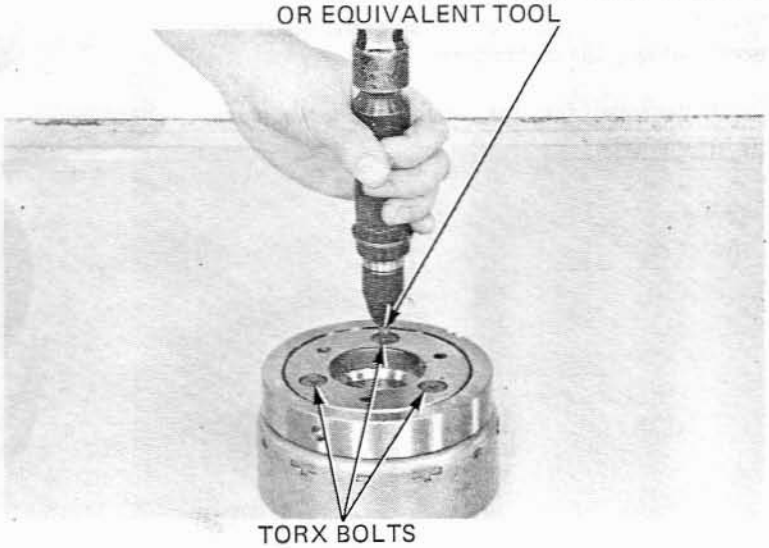


Remove the sprocket stopper and remove the starter drive and driven sprockets and drive chain.



Remove the starter clutch rollers, springs and plungers from the starter clutch outer.

Unscrew the three Torx Bolts and remove the starter clutch outer.

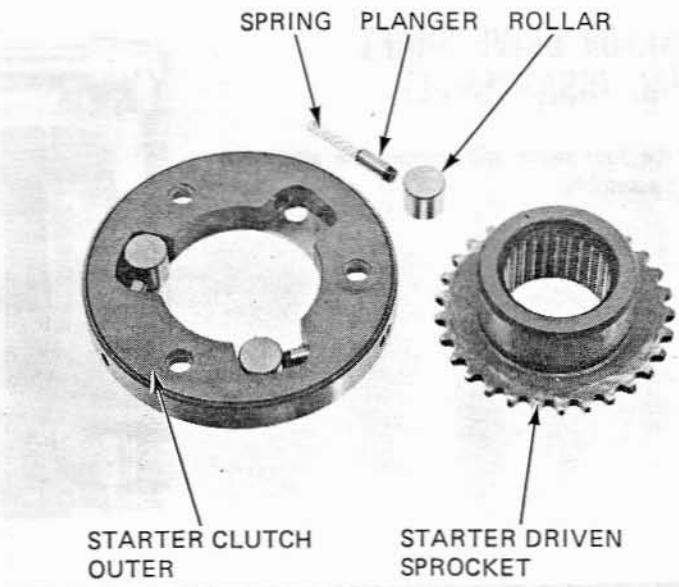


Check the rollers for freedom of movement in the clutch outer.
Check the rollers for wear or damage.

Check the clutch outer for wear of damage to the roller contacting surfaces.
Check the plungers for wear; springs for loss of tension.

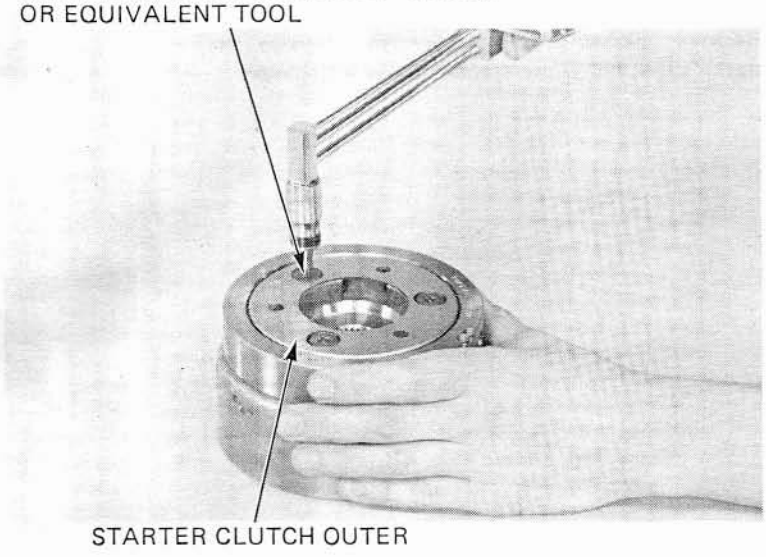
Check the starter driven sprocket needle bearing for wear or damage.
If necessary, remove the bearing by removing the circlip.

Check the starter driven sprocket for wear or damage to the roller contacting surface.



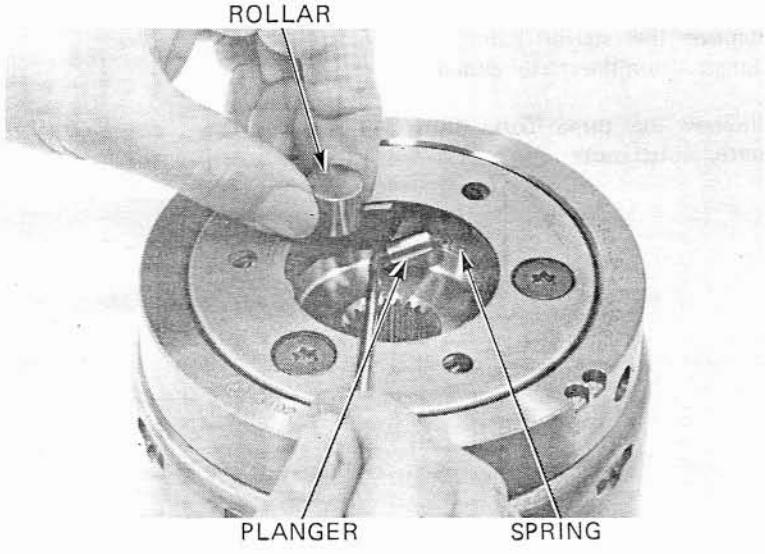
Install the clutch outer on the rotor.
Apply locking agent to the threads and undersides of the Torx Bolts, Install and tighten the Torx bolts.

TORQUE: 23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)



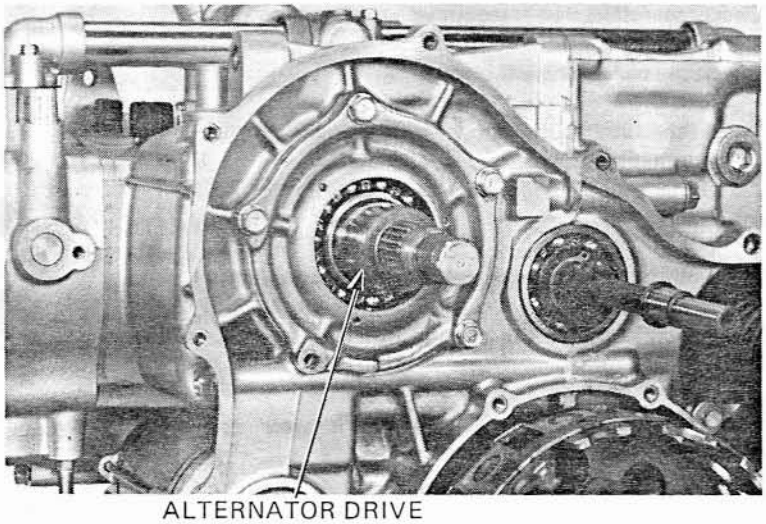
Assemble the springs with the plungers; insert the assemblies into the clutch outer.

Install the rollers into the clutch outer while pressing the plungers.



ALTERNATOR DRIVE SHAFT REMOVAL/DISASSEMBLY

Unscrew the four bolts and remove the alternator drive shaft assembly.

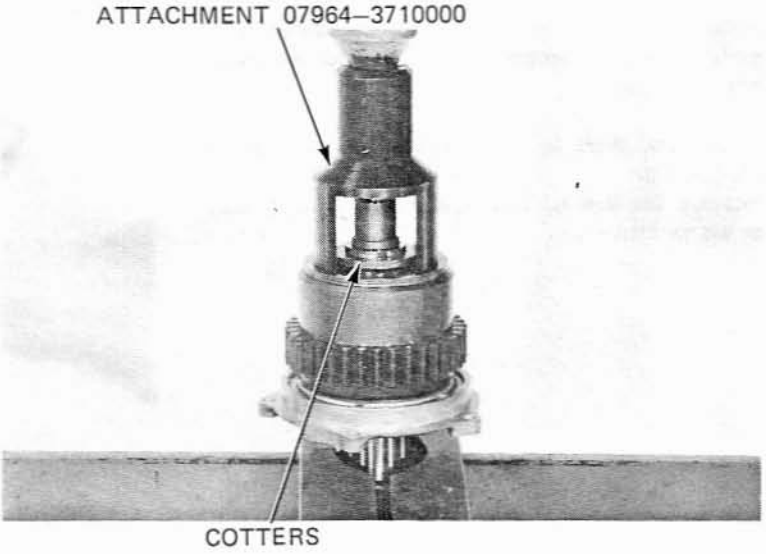


Compress the diaphragm springs with a press just enough to remove the cotters.

CAUTION:

Support the alternator drive shaft assembly at the shaft. Never support the bearing holder.

Remove the cotters, spring seat and three diaphragm springs.

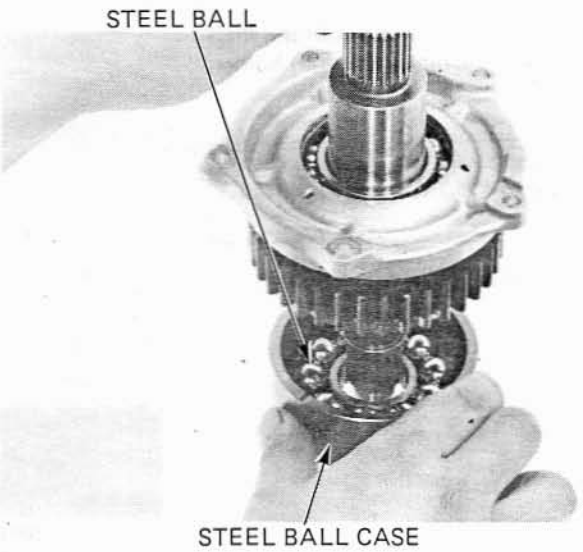


Remove the stell ball case and 10 steel balls.

NOTE:

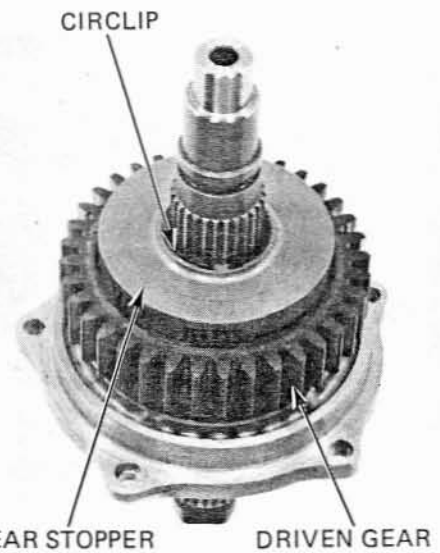
Do not let the steel balls fall out of the ball case during removal.

Inspect the steel balls and inside of the steel ball case for evidences of excessive or abnormal wear.



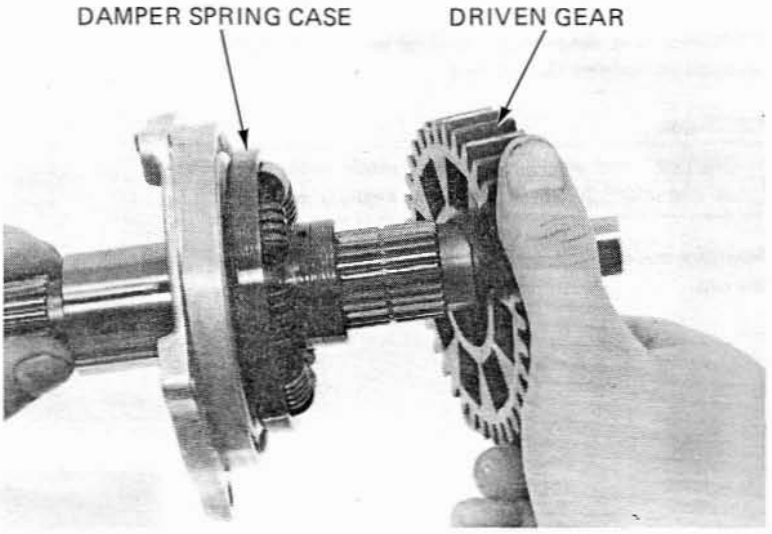
Pry off the circlip and remove the gear stopper and driven gear.

Inspect the gear stopper for excessive or abnormal wear on the boss and ball contacting surfaces.



Inspect the I.D. of the driven gear and sliding surface of the damper spring case for excessive wear or damage.

Rotate the shaft by hand and check for play in the bearing.
Replace the bearing with a new one if it is noisy or has excessive play.

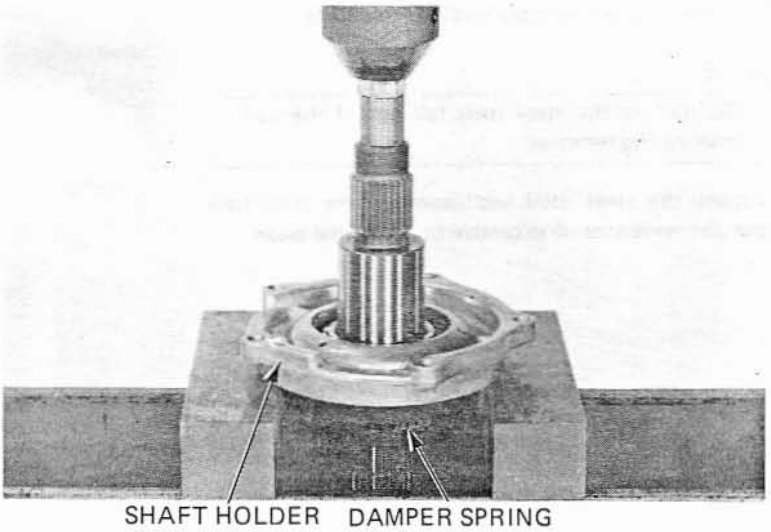


Press the shaft with a hydraulic press until the shaft and damper spring case are clear of the shaft holder.

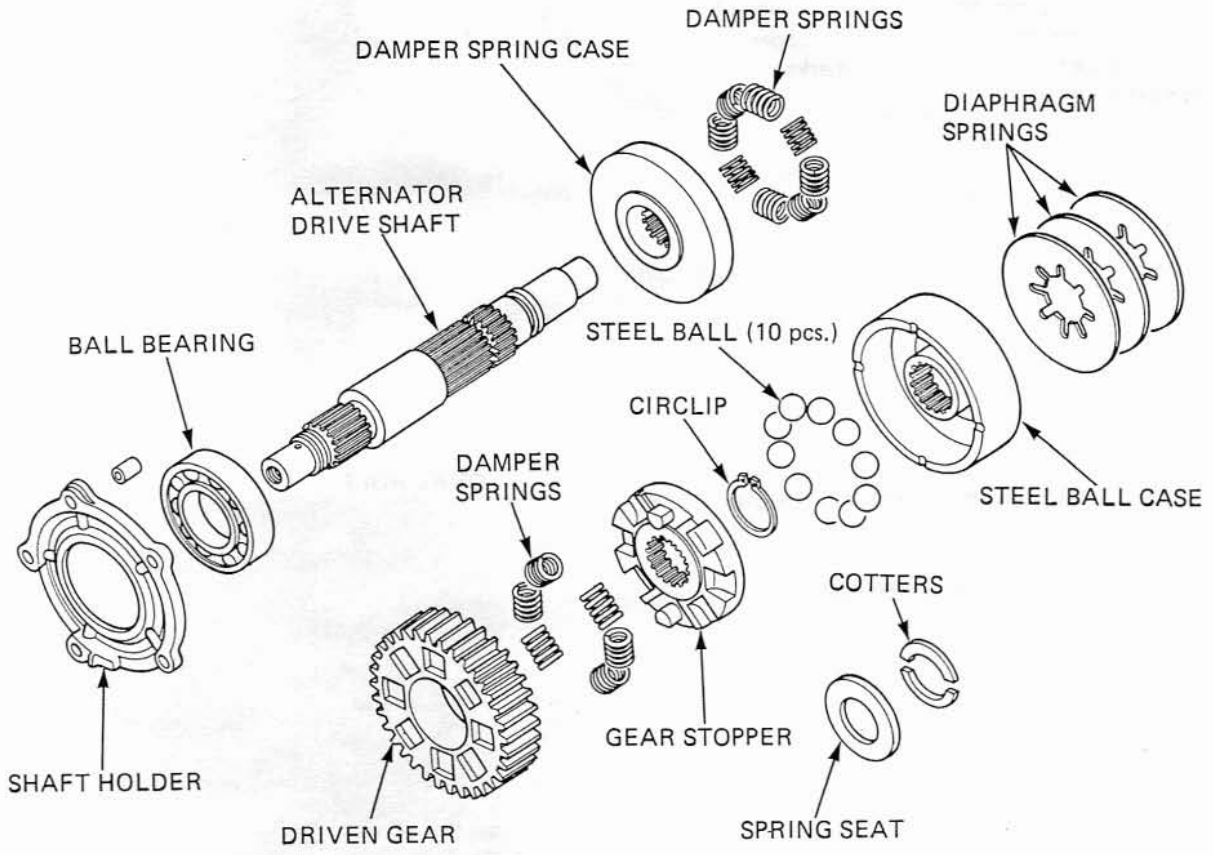
NOTE:

> The shaft ball bearing must be replaced with a new one whenver the shaft is removed from the case.

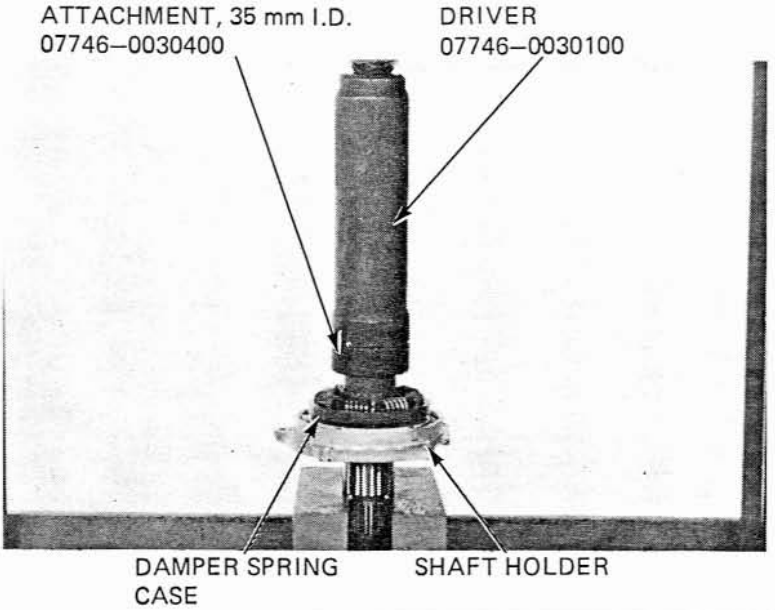
Replace the bearing with a new one.



ASSEMBLY:



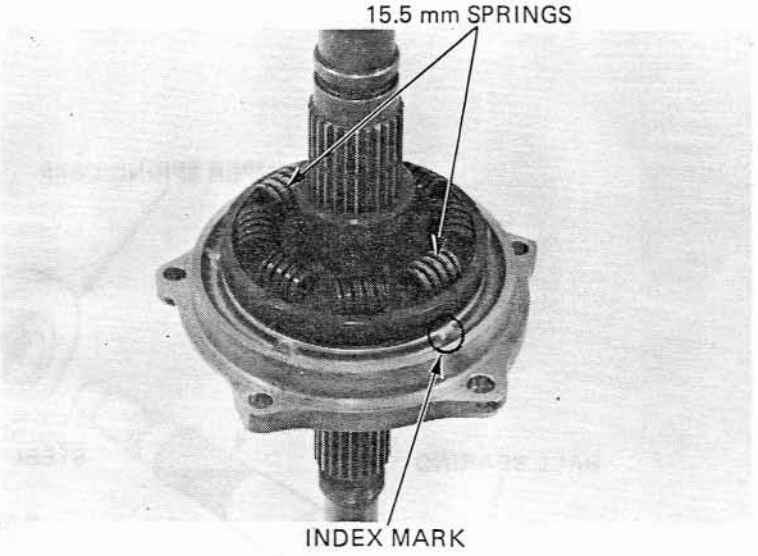
While holding the shaft with a stand, press the damper spring case onto the shaft.



Install the damper springs in the spring case.

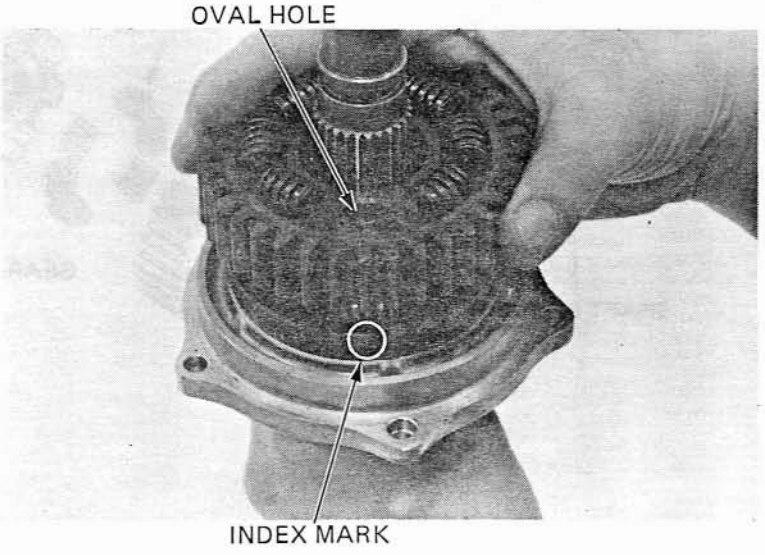
NOTE:

> There are two 15.5 mm springs (yellow paint) and six 15.1 mm springs. Install the longer springs in the slots next to the index marks on the damper spring case.

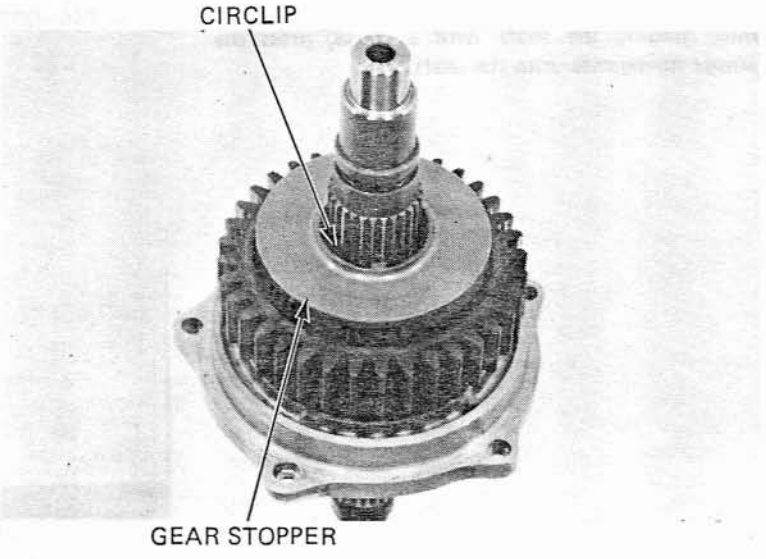


Install the driven gear with the oval hole in the gear aligned with the index mark on the spring caes.

Install the damper springs in the driven gear.



Install the gear stopper and circlip.



Install the 10 steel balls into the steel ball case and then install the case onto the shaft.

Place the three diaphragm springs and spring seat on the steel ball case and then compress the springs with a hydraulic press.

CAUTION:

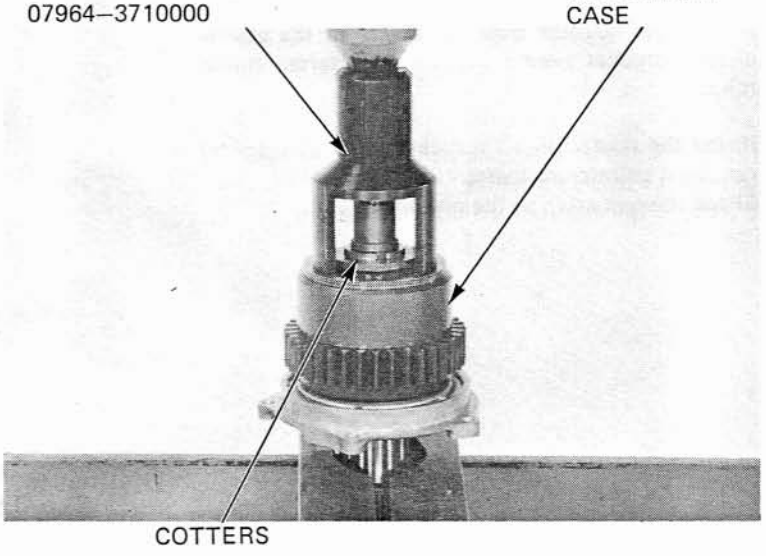
Support the alternator drive shaft assembly at the shaft. Never support the bearing holder.

NOTE:

Center the attachment to seat the spring cotters.

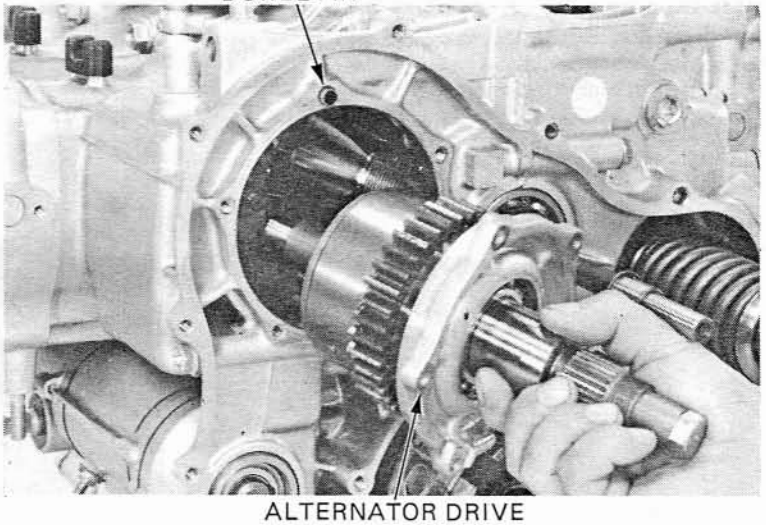
Seat the spring cotters in the groove of the shaft with the round ends facing towards the driven gear.

Remove the assembly from the press and check that the spring cotters are seated in the shaft groove firmly.



ALTERNATOR DRIVE SHAFT INSTALLATION

Slide the dowel pin into the hole of the engine case; install the alternator drive shaft assembly in the engine case.



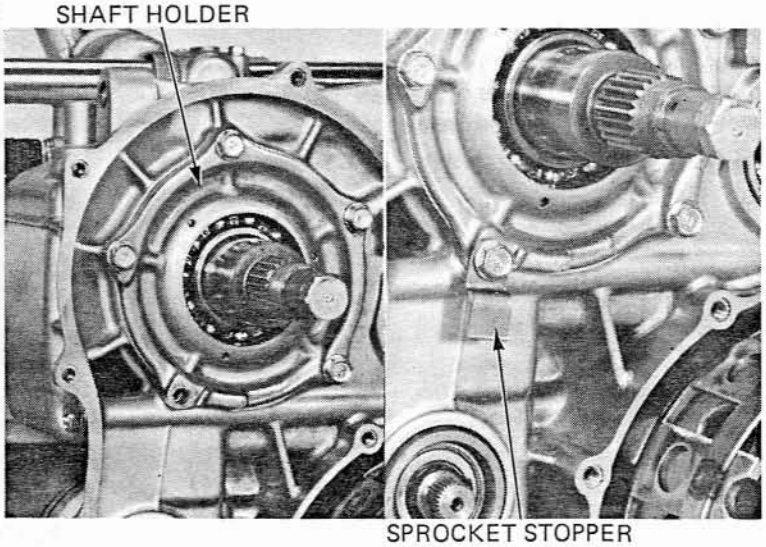
Install the four shaft holder bolts and tightening them to the temporary torque.

TEMPORARY TORQUE:
1 N·m (0.1 kg-m, 0.7 ft-lb)

NOTE:

Do not overtighten the bolts. The bolts should allow movement of the shaft holder when the shaft is tapped lightly.

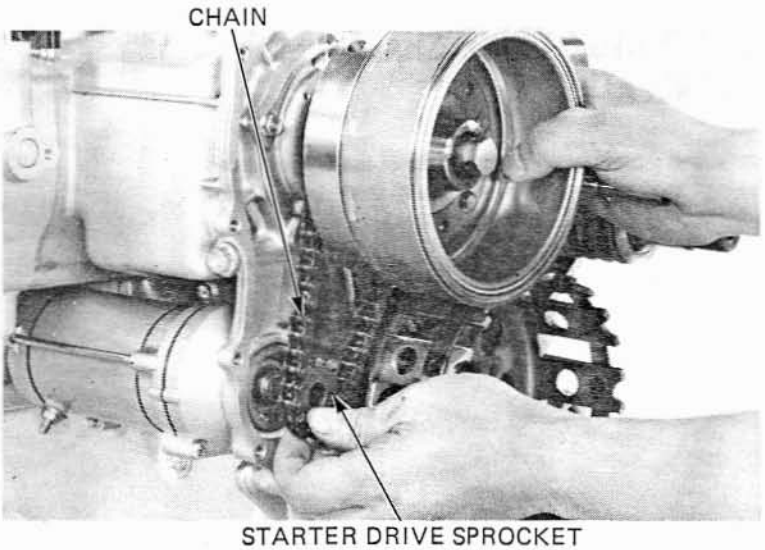
Install the sprocket stopper and tighten the bolt finger tight.



Apply molybdenum disulfide grease to the starter driven sprocket needle bearing and starter clutch rollers.

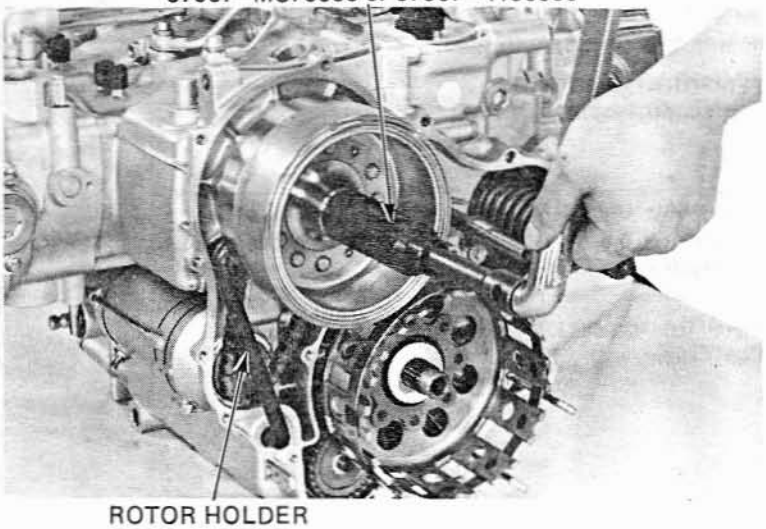
Install the starter driven sprocket onto the rotor by turning it counterclockwise.
Check the operation of the one-way clutch.

Place the drive chain on the starter drive and driven sprockets and install the sprocket and rotor onto the shafts.



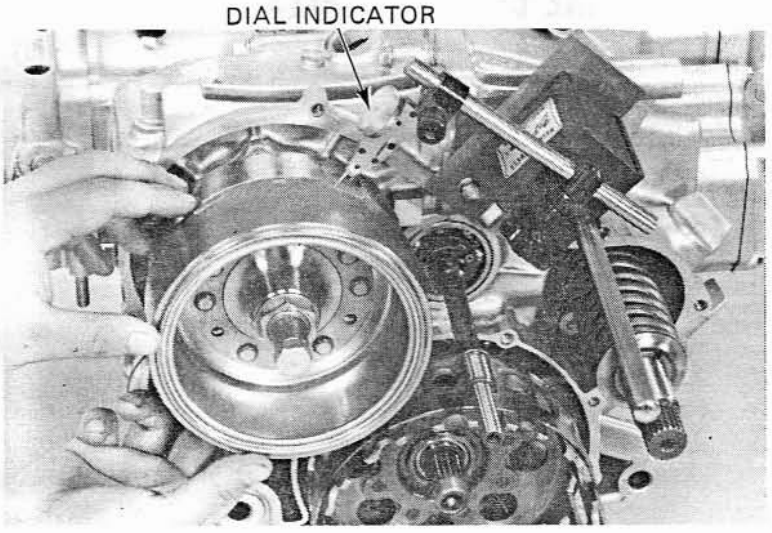
Install the plain washer on the shaft.
Apply locking agent to the shaft threads. Apply engine oil to the under side of the lock nut. Tighten the lock nut to the specified torque.

TORQUE: 80–90 N·m (8.0–9.0 kg-m, 58–65 ft-lb)



Measure the alternator drive gear backlash with a dial indicator as shown.

STANDARD BACKLASH: 0.05 mm (0.002 in)



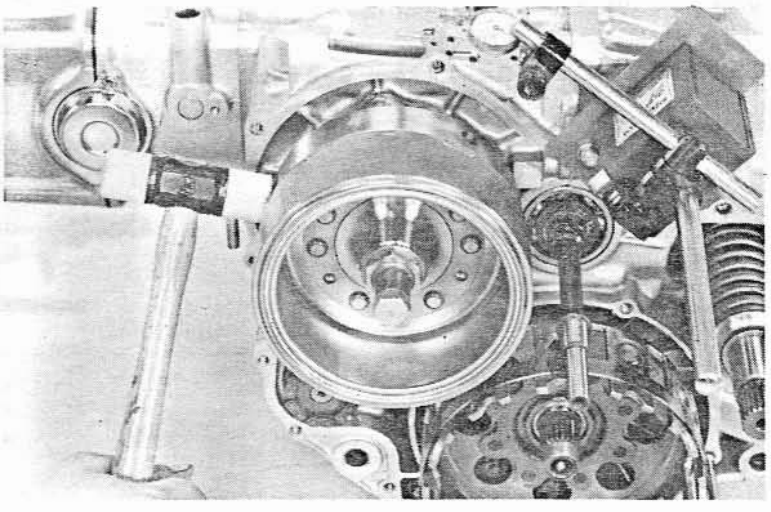
Adjust the backlash, if necessary, by tapping the rotor lightly with a plastic hammer until the backlash is 0.05 mm (0.002 in).

Measure the backlash with the alternator rotor in three different positions, 120° apart.

All measurements of the backlash should be within 0.010–0.100 mm (0.004–0.040 in).

NOTE:

> The alternator drive gear will be noisy if the backlash is zero.



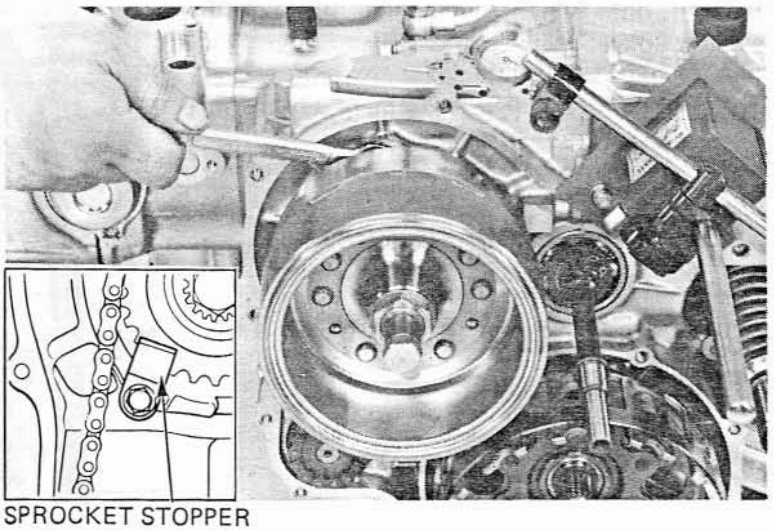
Tighten the holder bolts to the specified torque.

TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

NOTE:

> Rotate the sprocket stopper into place on the driven sprocket and tighten the bolt.

Recheck the backlash at any point after tightening the holder bolts.

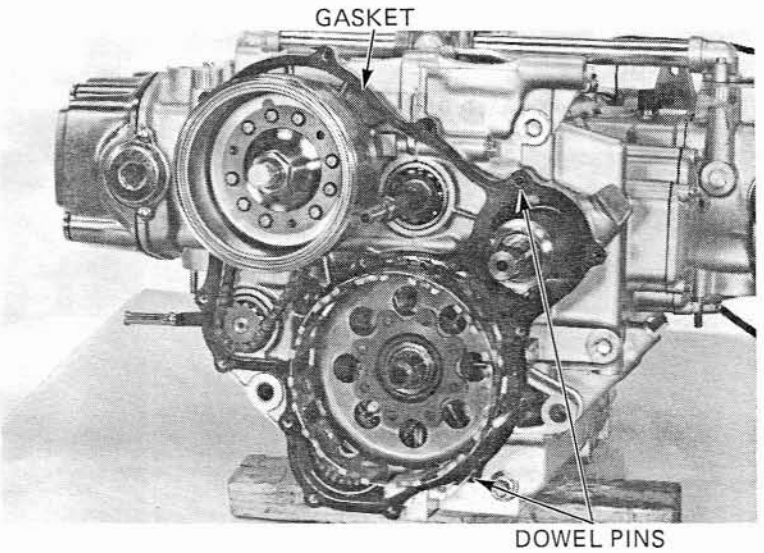


REAR ENGINE COVER INSTALLATION

Check that there are no bolts, nuts and other foreign matters inside the rotor.
Install the dowel pins and a new gasket.

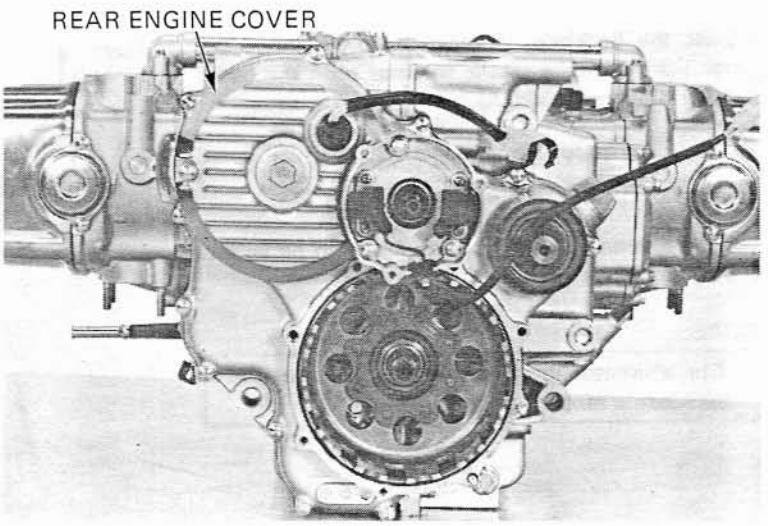
NOTE:

> Apply sealant to the right and left engine case mating surface areas of the gasket surface.



Install the rear engine cover and tighten the bolts in a crisscross pattern in 2–3 steps.

TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)



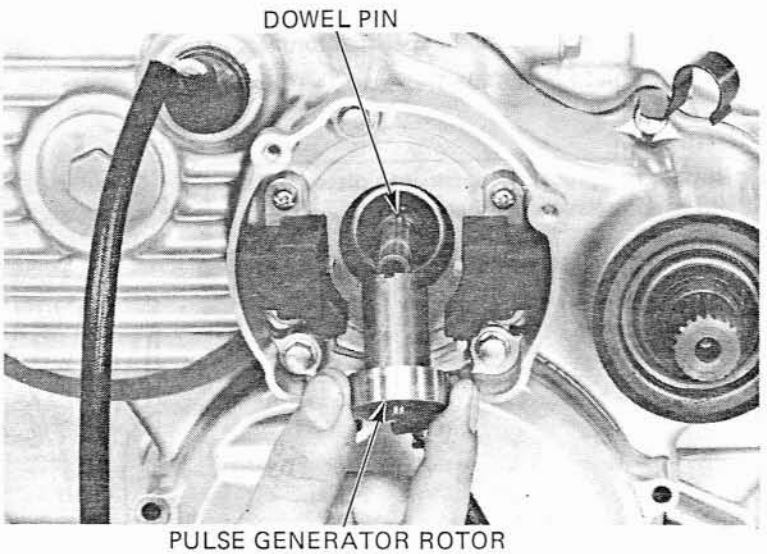
Install the rotor with the cutout in the rotor aligned with the dowel pin on the rotor shaft.
Install and tighten the rotor bolt.

TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

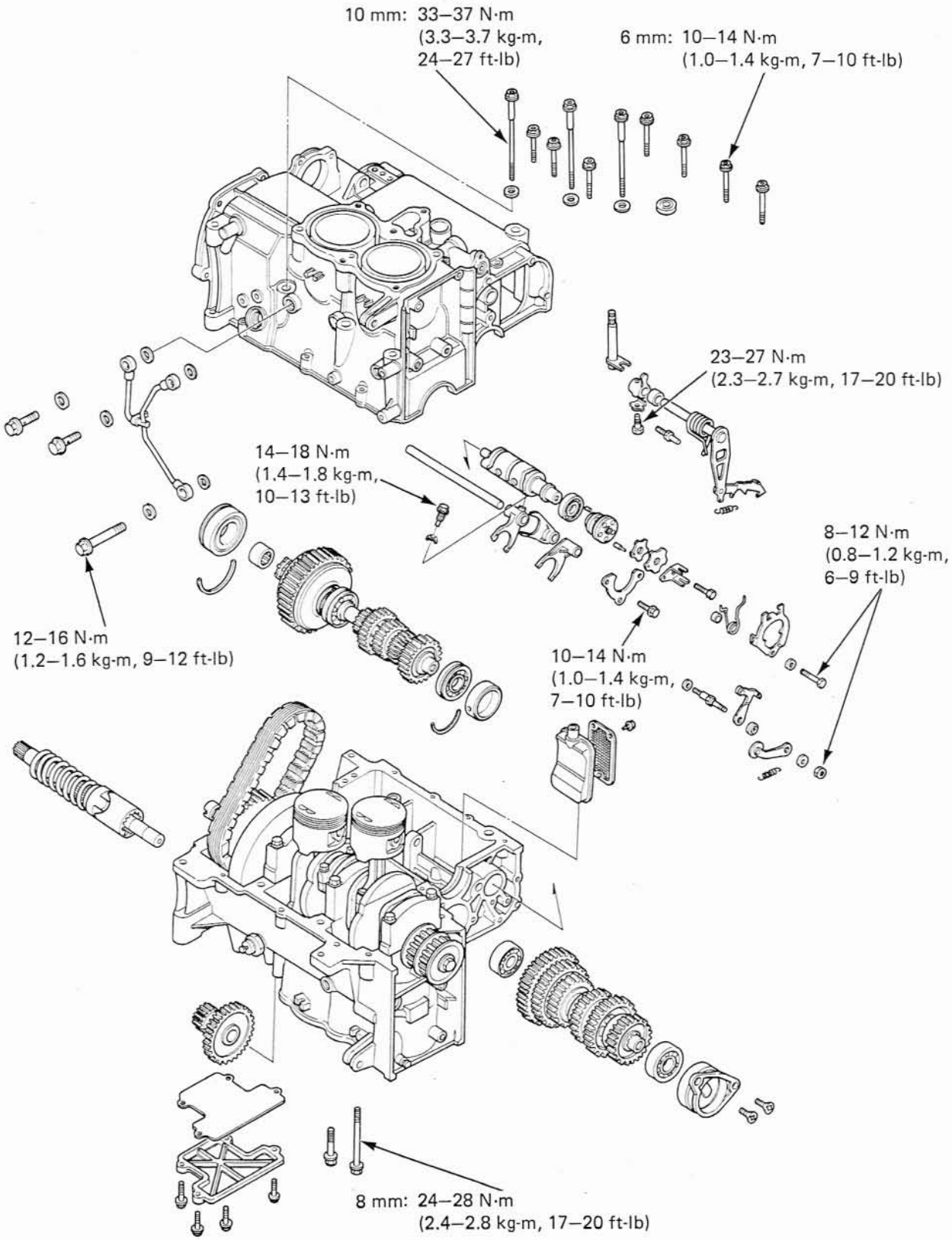
Inspect the air gap between the pulse generator rotor and pickup.

AIR GAP: 0.40–1.10 mm (0.016–0.043 in)

Install the pulse generator cover.
Install the clutch assembly and clutch cover. (page 8-13).



MEMO



SERVICE INFORMATION

GENERAL

- The gearshift linkage can be serviced with the engine in the frame except the shift spindle and shift arms.
- To inspect the output shaft, it is necessary to remove the engine and rear engine cover.
- The crankcases must be separated to inspect the transmission gears.
- Avoid damaging the pistons with the transmission gears or engine case when separating the crankcase halves because they will fall as the cases are pulled off them.
- Prior to assembling the crankcase halves, apply a sealant to their mating surfaces. Wipe off excess sealant thoroughly.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Transmission gear I.D.	C1	31.000–31.025 (1.2205–1.2215)	31.05 (1.222)
	C2	31.000–31.033 (1.2205–1.2218)	31.06 (1.223)
	C3	31.000–31.033 (1.2205–1.2218)	31.06 (1.223)
	M4	25.020–25.041 (0.9850–0.9859)	25.06 (0.987)
	M5	28.020–28.041 (1.1031–1.1040)	28.06 (1.105)
Transmission gear bushing O.D.	C1	30.950–30.975 (1.2185–1.2195)	30.90 (1.217)
	C2	30.950–30.975 (1.2185–1.2195)	30.90 (1.217)
	C3	30.950–30.975 (1.2185–1.2195)	30.90 (1.217)
	M5	27.959–27.980 (1.1007–1.1016)	27.90 (1.098)
Gear to bushing clearance	C1	0.025–0.075 (0.0001–0.0030)	0.15 (0.006)
	C2	0.025–0.083 (0.0001–0.0033)	0.16 (0.006)
	C3	0.025–0.083 (0.0001–0.0033)	0.16 (0.006)
	M5	0.040–0.082 (0.0016–0.0032)	0.16 (0.006)
Shift fork I.D.	L	13.000–13.018 (0.5118–0.5125)	13.04 (0.513)
	C	13.000–13.018 (0.5118–0.5125)	13.04 (0.513)
	R	13.000–13.027 (0.5118–0.5129)	13.05 (0.514)
Shift drum	Minor diameter	11.966–11.984 (0.4711–0.4718)	11.95 (0.470)
	Groove width	7.05–7.15 (0.278–0.281)	–
Output shaft spring	Installed length	84.5 (3.33)	–
	Free length	110.9 (4.37)	100 (3.9)
Shift fork craw thickness		6.4–6.5 (0.25–0.26)	6.1 (0.24)
Shift fork shaft O.D.		12.966–12.984 (0.5105–0.5112)	12.90 (0.508)

TORQUE VALUES

Engine case bolt (6 mm)	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
(8 mm)	24–28 N·m (2.4–2.8 kg-m, 17–20 ft-lb)
(10 mm)	33–37 N·m (3.3–3.7 kg-m, 24–27 ft-lb)
Oil pipe bolt	12–16 N·m (1.2–1.6 kg-m, 9–12 ft-lb)
Gear shift arm lock bolt	23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)
Shift fork lock bolt	14–18 N·m (1.4–1.8 kg-m, 10–13 ft-lb)
Shift drum set plate bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Positive stopper pivot bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Stopper arm set nut	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Primary chain guide bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

TOOLS

Special

Damper spring compressor attachment	07964–3710000		
Bearing puller	07931–4630000		
Bearing remover set, 20 mm	07936–3710001	Remover, 20 mm	07936–3710600
		Handle	07936–3710100
		Weight	07741–0010201
Driver	07949–3710001		
Puller attachment	07946–4690200		
Piston slider	07955–MG90000		
Piston base	07958–MG90000		
Engine case assembly guide	07973–3710000		

Common

Attachment, 52 x 55 mm	07746–0010400
Attachment, 42 x 47 mm	07746–0010300
Attachment, 32 x 35 mm	07746–0010100
Pilot, 20 mm	07746–0040500
Pilot, 17 mm	07746–0040400
Driver	07749–0010000
Driver	07746–0030100
Driver	07746–0020100
Attachment, 20 mm I.D.	07746–0020400
Attachment, 25 mm I.D.	07746–0030200

TROUBLESHOOTING

Hard to shift into gear
- Improper clutch adjustment
  - Too much free play
- Shift forks bent
- Shift shaft bent
- Shift claw bent
- Shift spindle bolt loose
- Shift drum stopper bent
- Shift drum cam grooves damaged

Transmission jumps out of gear
- Gear dogs worn
- Shift shaft bent.
- Shift drum stopper broken
- Shift forks bent

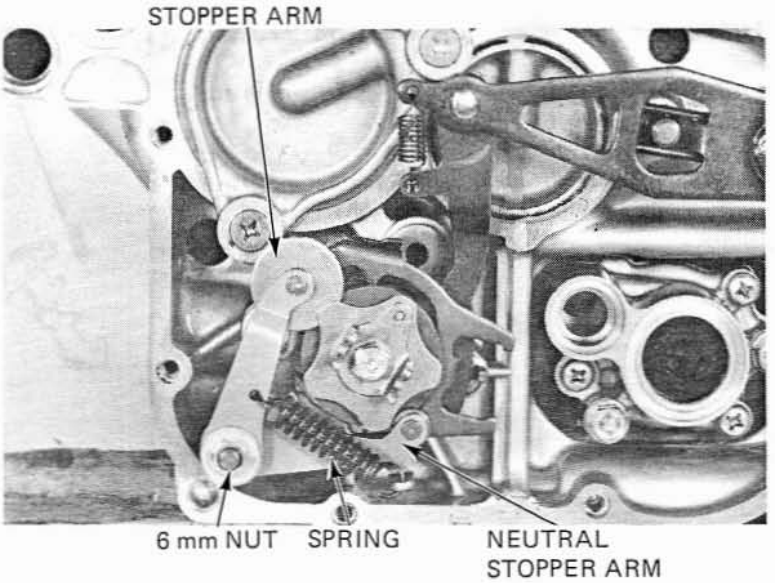
GEARSHIFT LINKAGE DISASSEMBLY

SHIFT DRUM LINKAGE

Remove the front engine cover (Page 2-4).

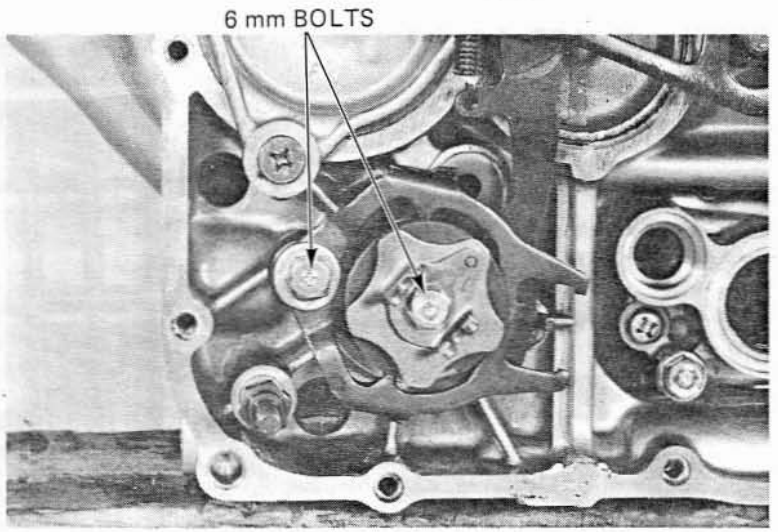
Unscrew the 6 mm nut and remove the stopper arm, neutral stopper arm and spring.

Inspect the spring for loss of tension.
Check the stopper arm for excessive or abnormal wear or damage.



Remove the two 6 mm bolts and disassemble the shift drum stopper.

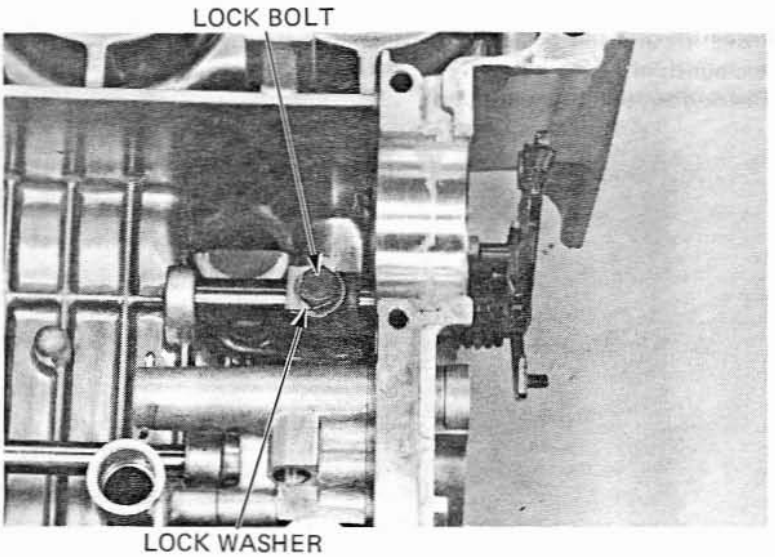
Inspect the stopper plate for excessive or abnormal wear or damage.



SHIFT ARM/SPINDLE

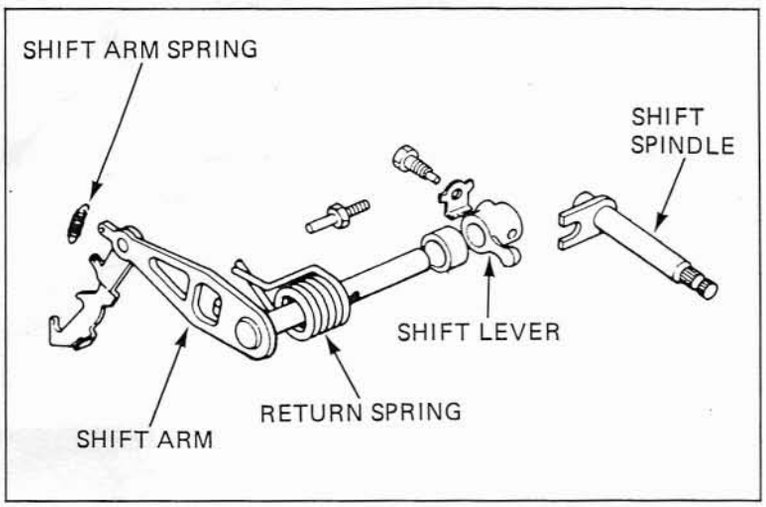
Separate the engine cases (Page 10-9).
Remove the gearshift pedal.

Straighten the tab of the lock washer and remove the shift arm and spindle from the left engine case by removing the lock bolt.



Inspect the shift spindle and shift arm for wear, damage or bending.
Inspect the shift arm spring and return spring for weakness or signs of damage.

Replace the shift arm or spindle if there is excessive shift lever movement before the shaft starts to rotate.



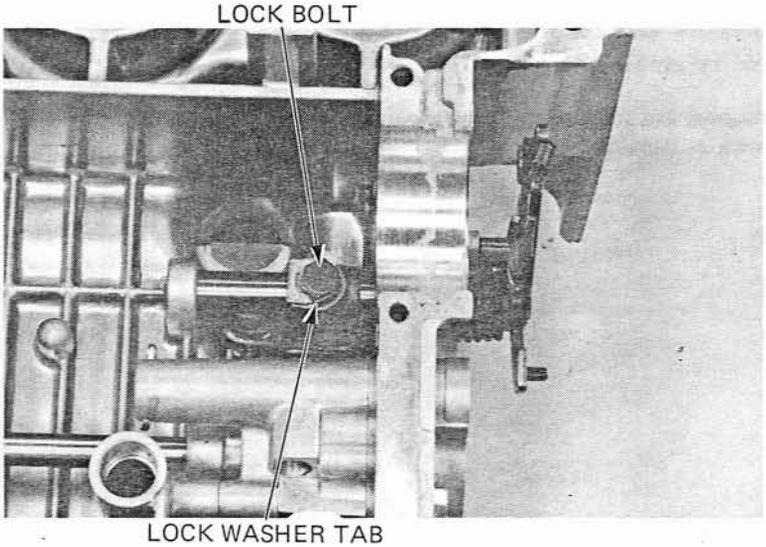
SHIFT LINKAGE ASSEMBLY

SHIFT ARM/SPINDLE

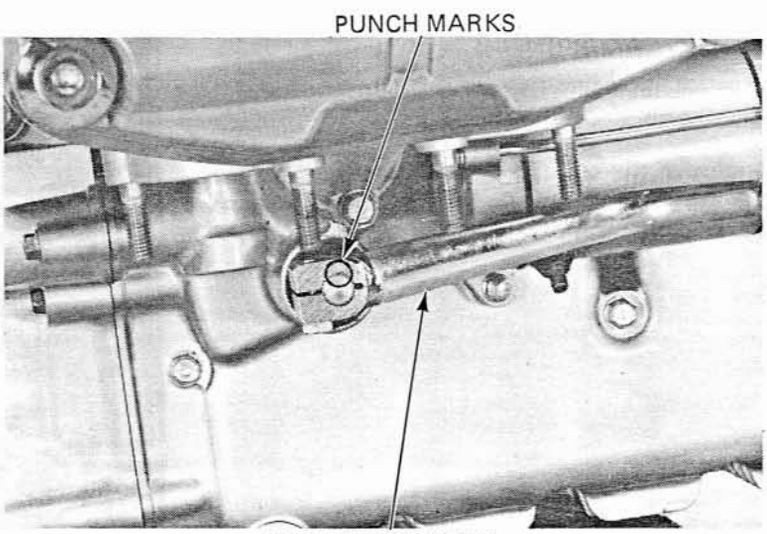
Reinstall the shift spindle and shift arm in the reverse order of removal. Tighten the lock bolt to specified torque.

TORQUE: 23–27 N·m (2.3–2.7 kg-m, 17–20 ft-lb)

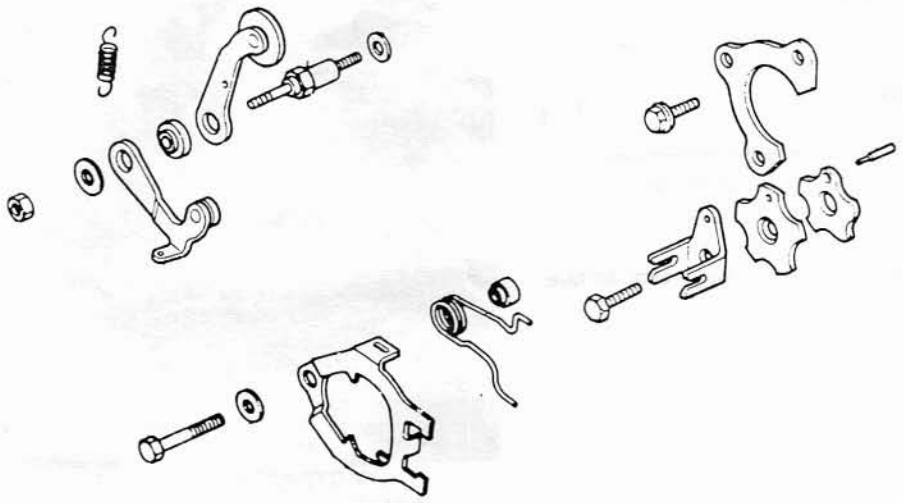
Bend the tab of the lock washer up against the side of the lock bolt.



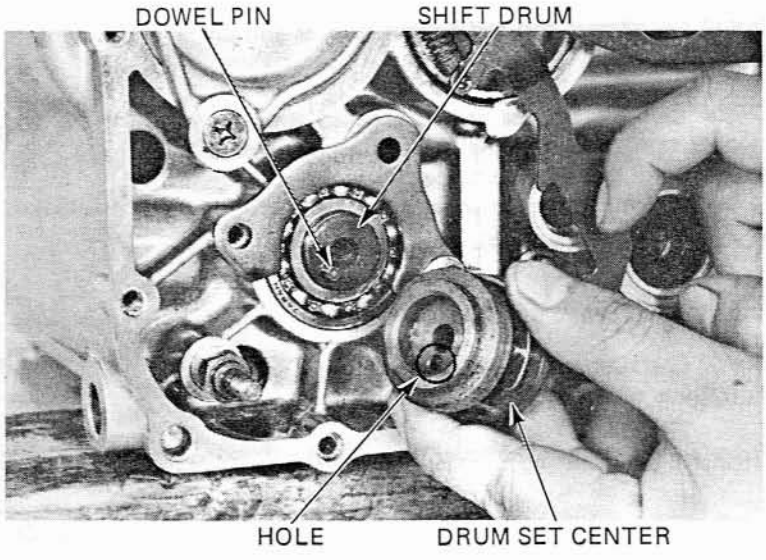
Install the gearshift pedal on the pedal shaft aligning the punch marks.
Check operation of the shift arm.



SHIFT DRUM LINKAGE



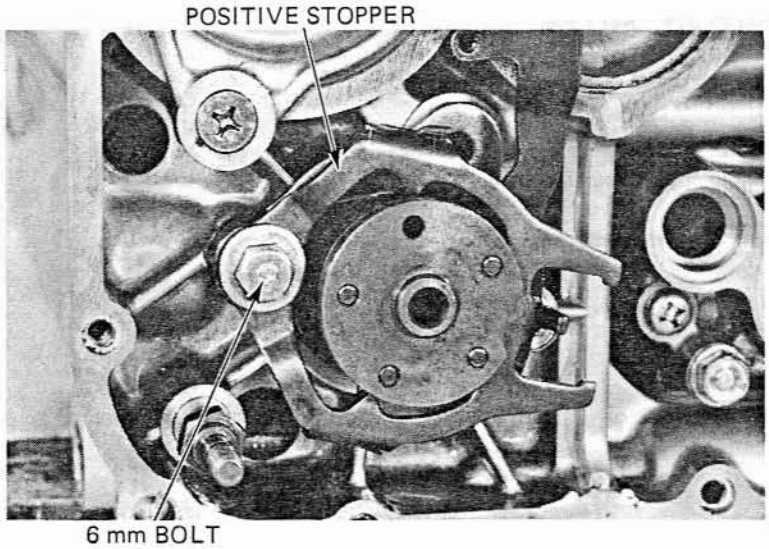
Install the dowel pin in the shift drum.
Insert the drum set center in the shift drum aligning the dowel pin with the dowel hole in the set center.



Install the positive stopper, spring and collar and tighten the 6 mm bolt.

TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

Check operation of the positive stopper.



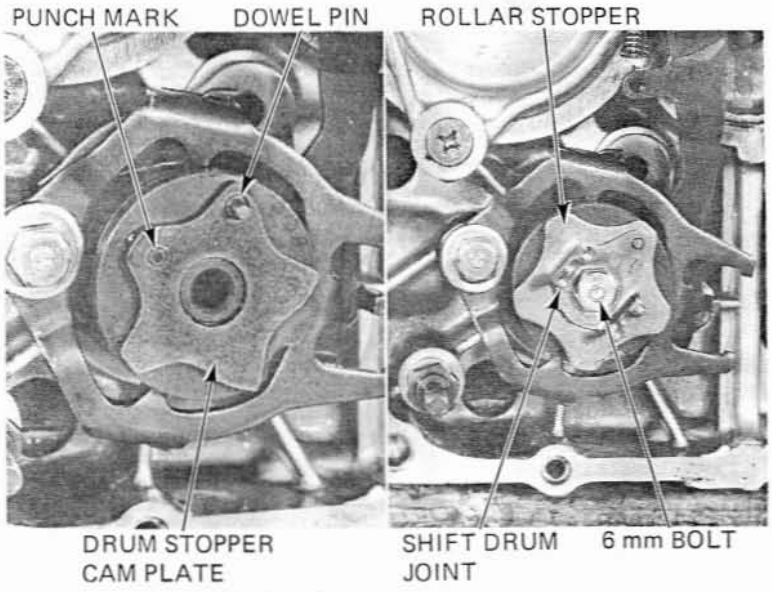
Install the shift drum stopper cam plate and dowel pin on the drum set center.

NOTE:

> The punch mark on the cam plate should face the outside.

Install the roller stopper and shift drum joint aligning the dowel holes with the dowel pin.

Apply locking agent to the threads and torque the 6 mm bolt.



Install the stopper arm and neutral stopper arm on their pivot bolt.

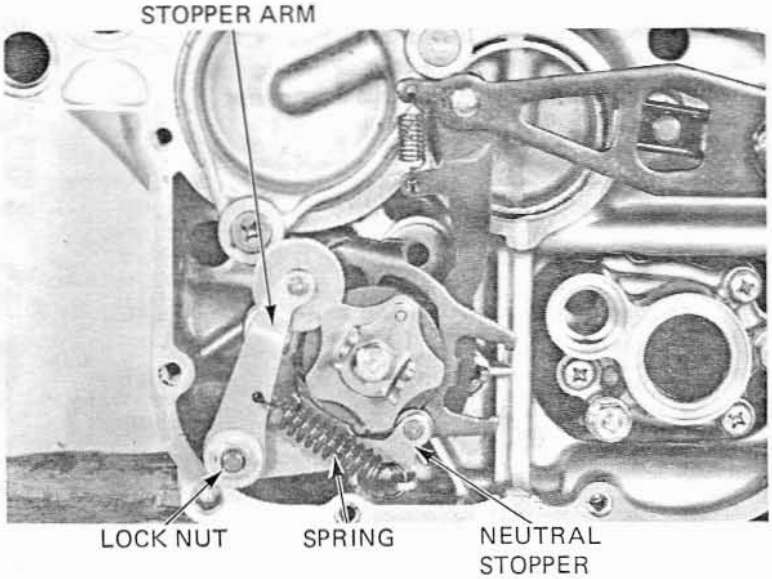
Check that the stopper arm is engaged with the stopper cam plate, and the neutral stopper arm is engaged with the drum set center.
Install the 6 mm nut and tighten.

TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

Install the spring.

Check operation of the gearshift linkage; set the shift drum in neutral.

Reinstall the front engine cover (Page 2-10).

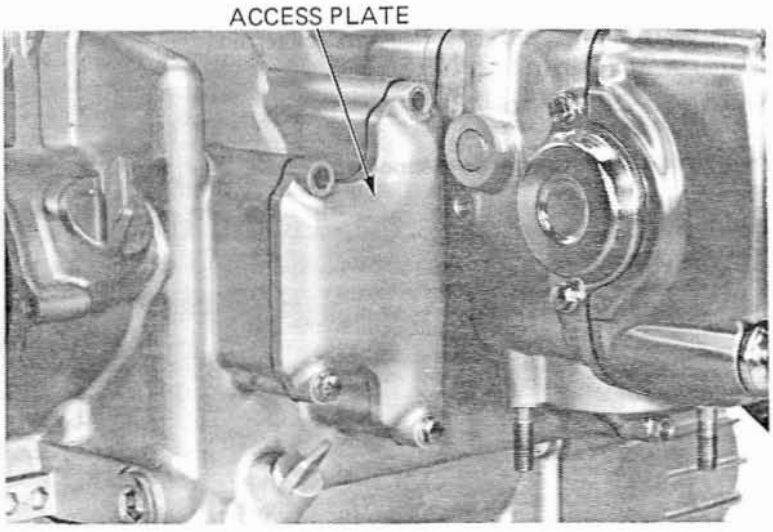


OUTPUT SHAFT

REMOVAL

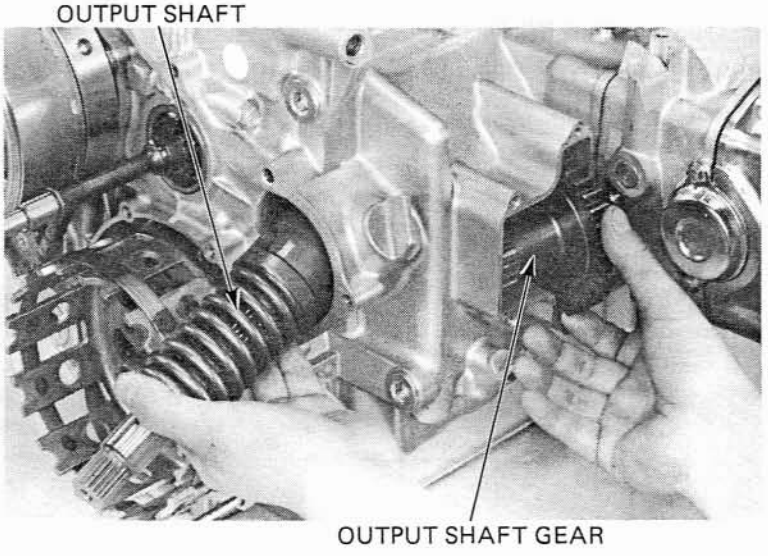
Remove the engine from the frame; remove the rear engine cover (Page 9-3).

Remove the access plate.



Hold the output shaft gear and pull the shaft out of the case.

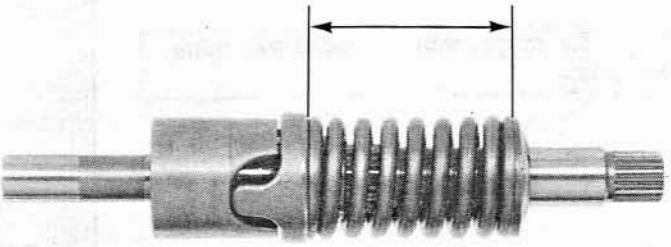
Remove the gear through the access hole.



Measure the assembled length of the spring.

ASSEMBLED LENGTH: 84.5 mm (3.33 in)

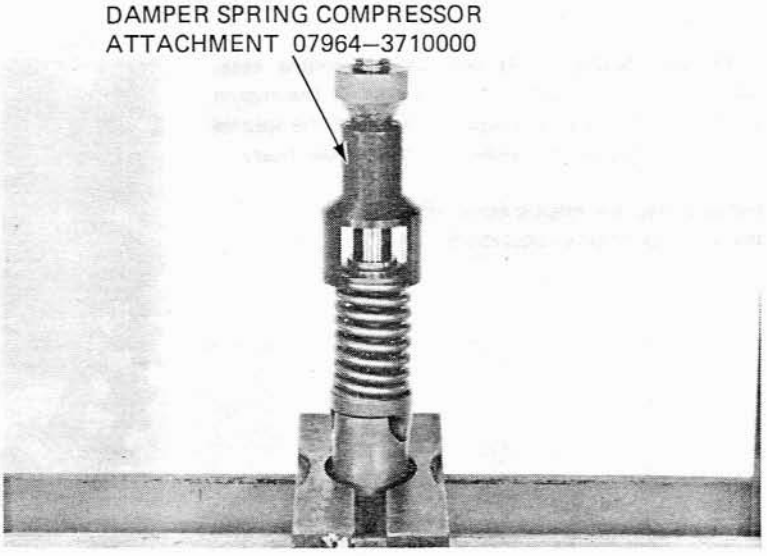
Inspect the damper lifter for abnormal wear, especially if the assembled spring length is longer than specified. Check the shaft splines for damage.



To disassemble the output shaft, compress the spring enough to remove the cotters.

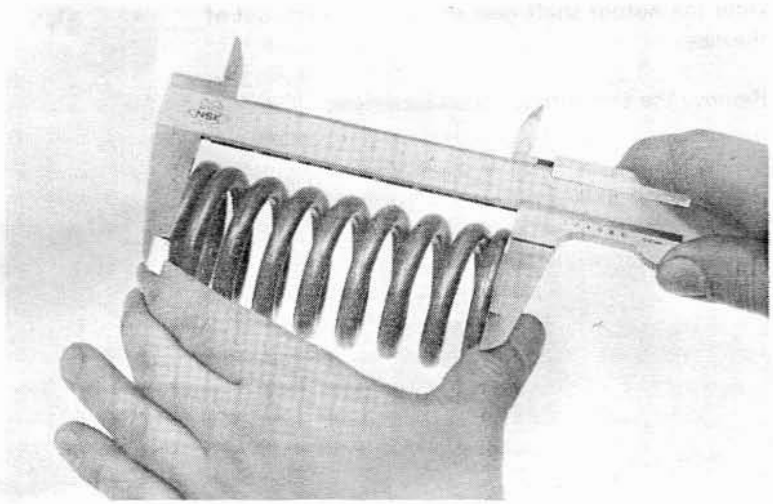
NOTE:

> The spring compressor attachment can be used without a hydraulic press.



Measure the spring free length.

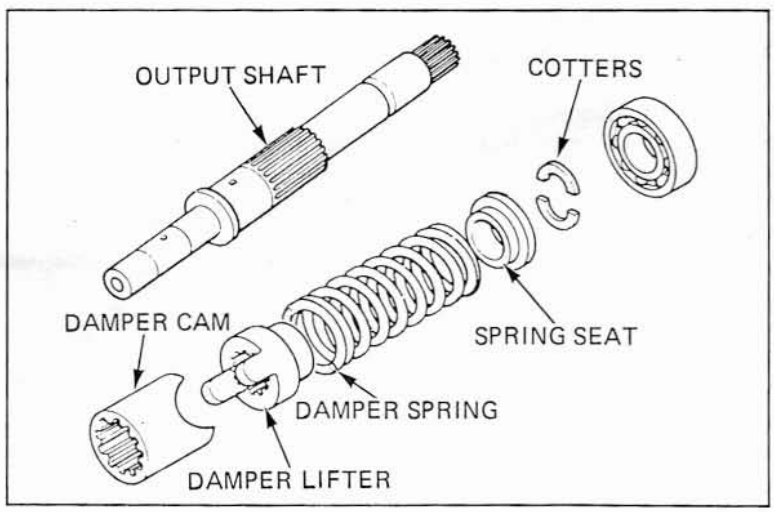
SERVICE LIMIT: 100 mm (3.9 in)



Reassemble the shaft.

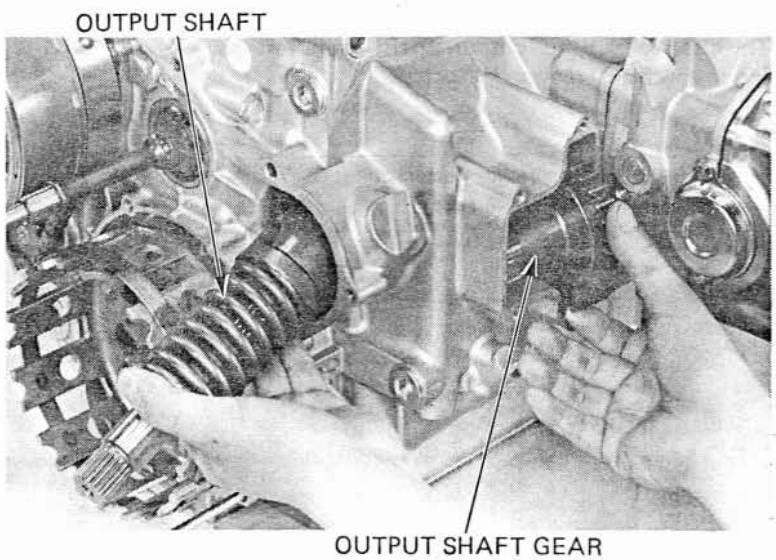
NOTE:

> Install the cotters with the round end facing the spring.



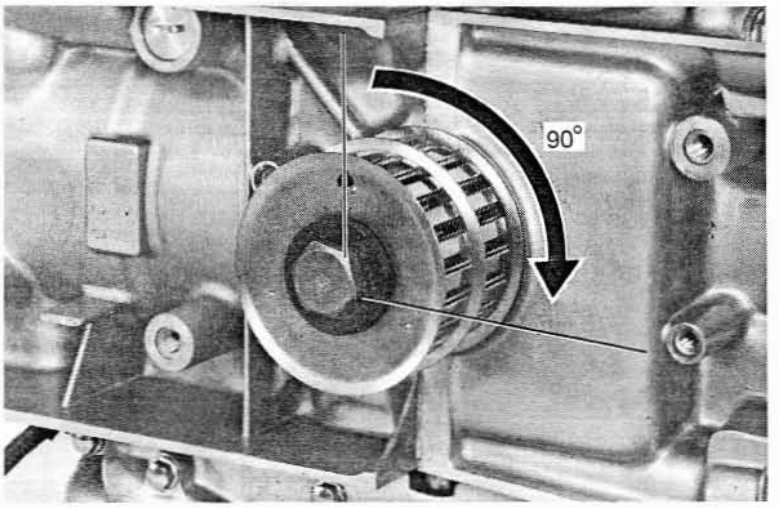
Install the output shaft gear in the engine case. Install the output shaft from the rear of the engine and push it through the gear. Make sure the splines on the gear engage the splines in the damper liter.

Reinstall the rear engine cover (Page 9-16).
Reinstall the engine (Section 5).



ENGINE CASE SEPARATION

Remove the engine from the frame (Section 5).
Turn the crankshaft clockwise to bring the No. 1 piston at TDC on the compression stroke.
Remove the timing belt (Page 7-3).
Turn the crankshaft 90° further from the above position.

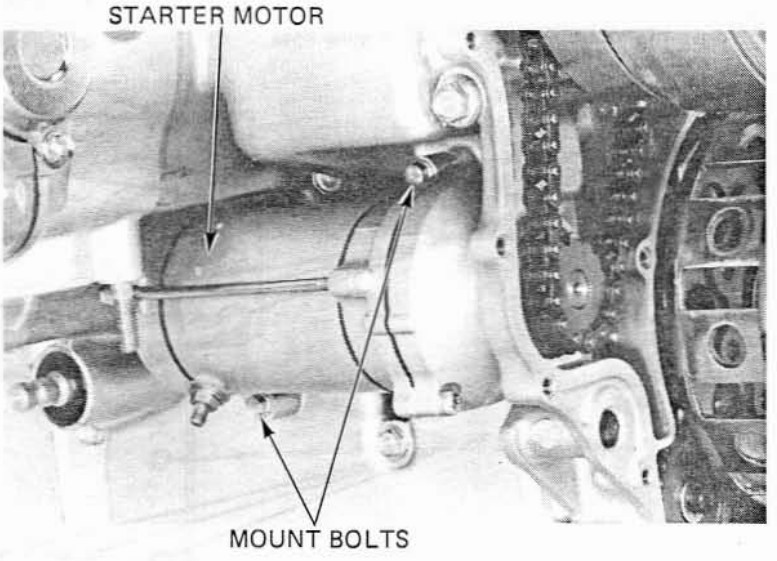


Remove the starter motor.
Remove the following parts:

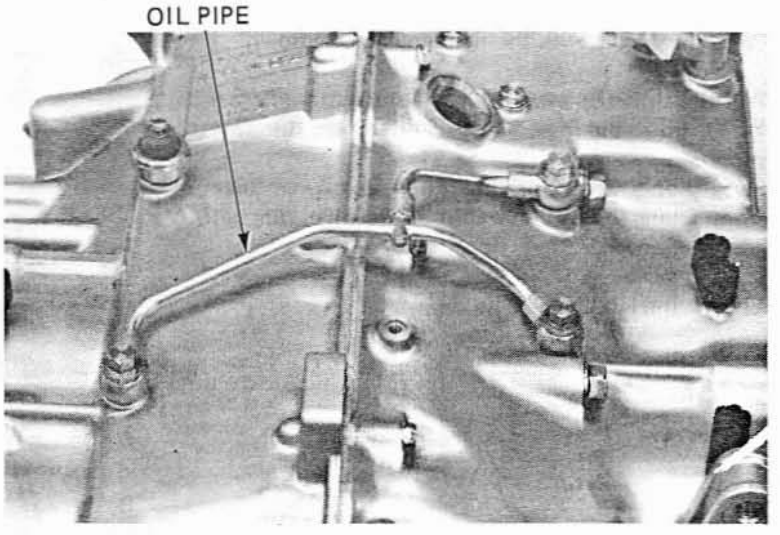
- Right and left cylinder heads.
- Thermostat housing.
- Front engine cover.
- Clutch outer.
- Output shaft.
- Pulse generator drive shaft.

NOTE:

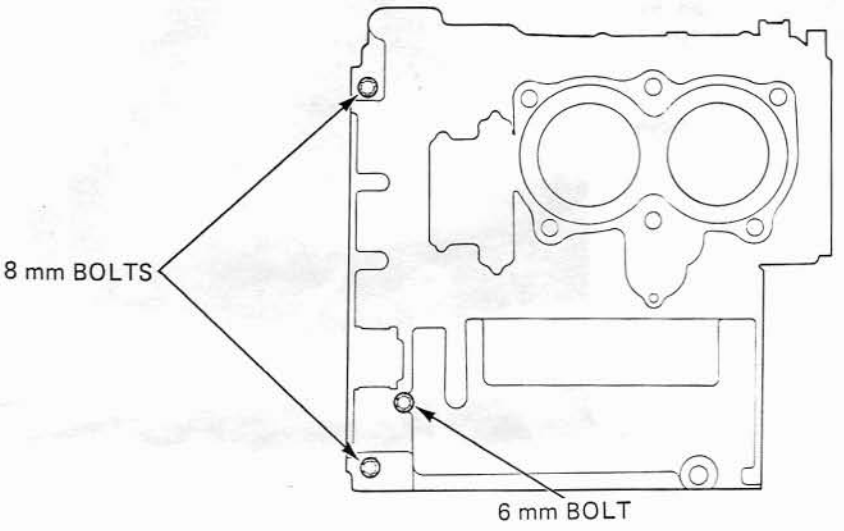
> The engine case halves can be separated without removing the alternator drive shaft.



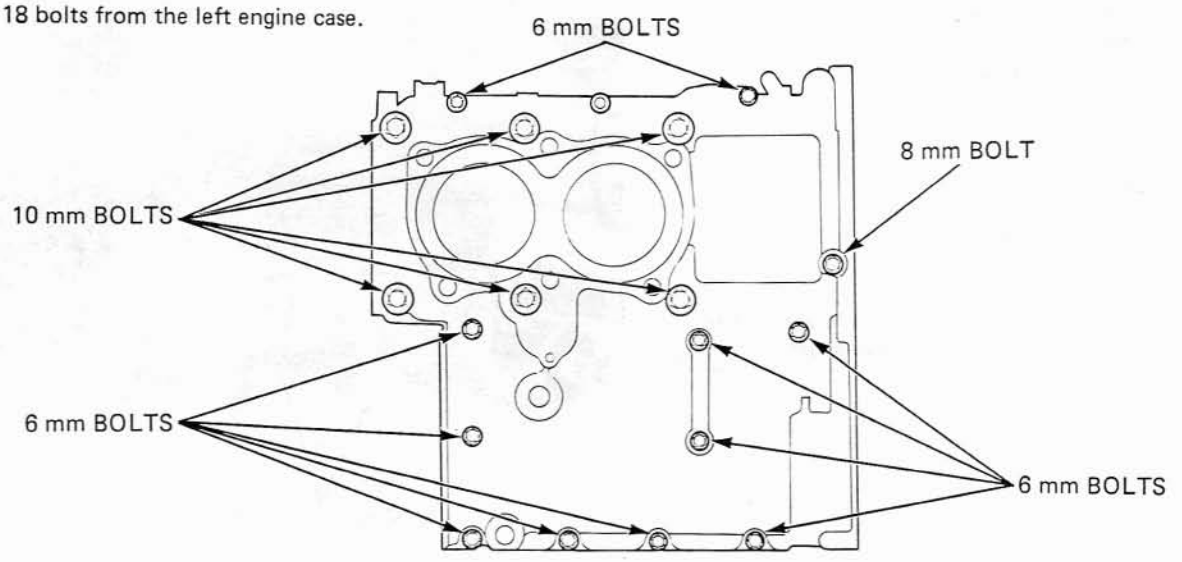
Remove the oil pipe from the engine cases.



Remove the three bolts from the right engine case.



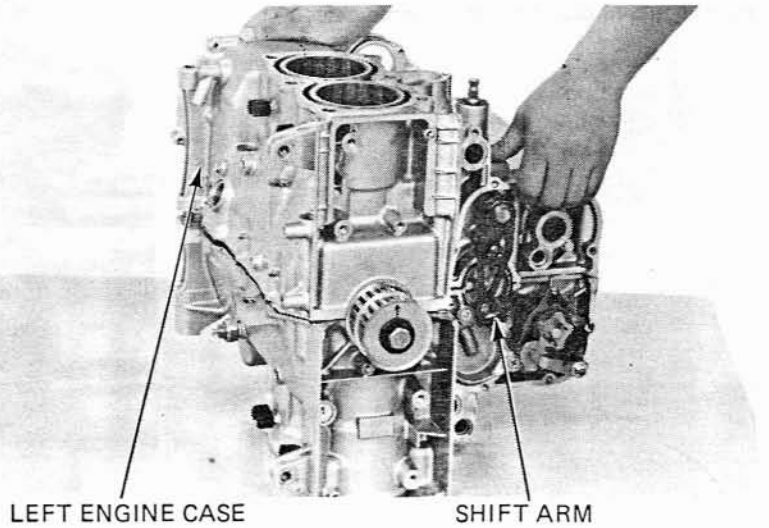
Remove the 18 bolts from the left engine case.



Place the engine with the right engine case down.

Pull the shift arm away from the shift drum. Partially separate the case halves and install the case supports.
Place shop towels under the pistons to prevent them from falling onto the transmission when the left case is removed.

Lift off the left engine case.

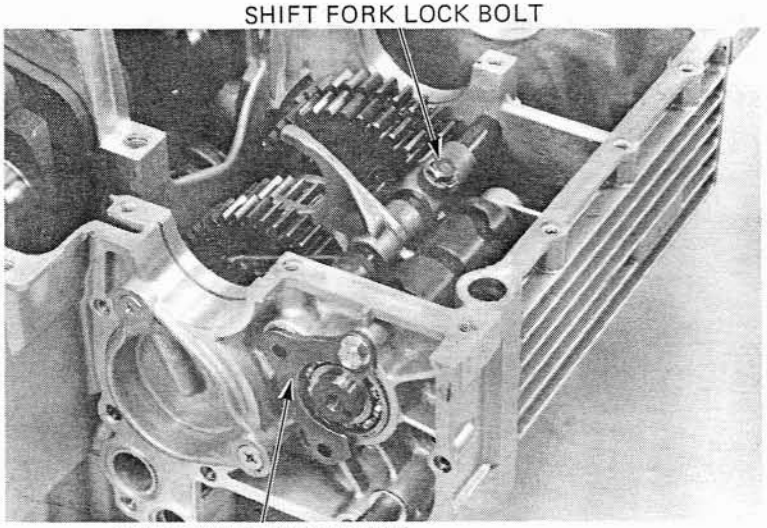


SHIFT FORK/SHIFT DRUM

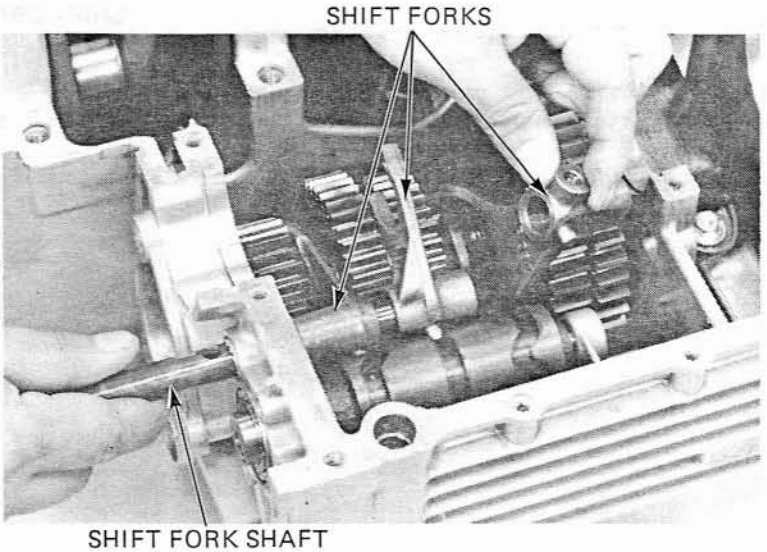
REMOVAL

Separate the engine case halves.
Remove the shift linkage (Page 10-3).
Remove the mainshaft (Page 10-12).
Remove the shift drum set plate.

Remove the shift fork lock bolt and lock washer.



Pull the shift fork shaft out of the engine case while taking out the shift forks.
Remove the shift drum.



INSPECTION

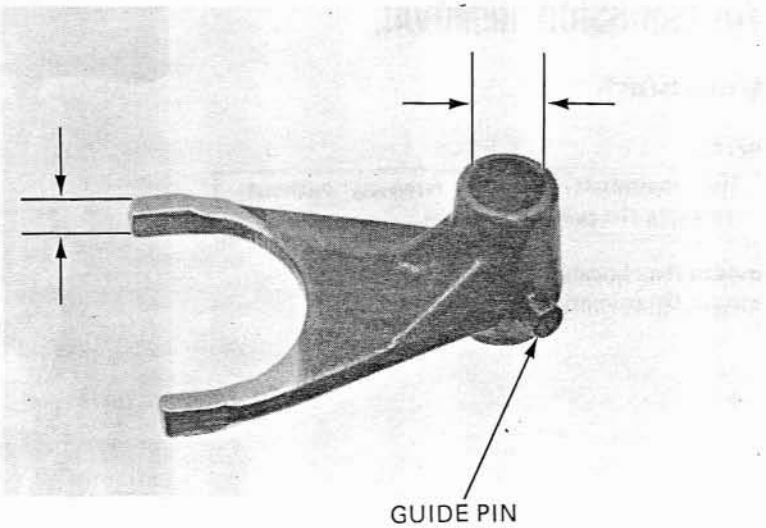
Inspect the shift fork guide pins for wear or damage.

Measure the shift fork claw thickness.

SERVICE LIMIT: 6.1 mm (0.24 in)

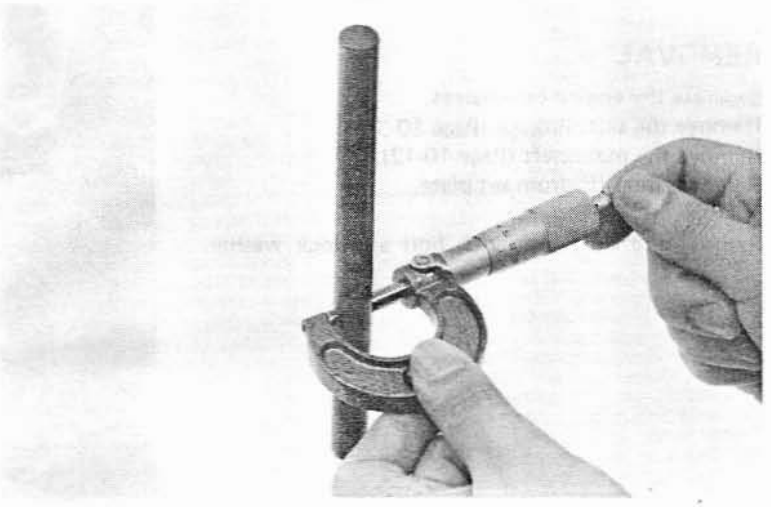
Measure the shift fork I.D.

SERVICE LIMITS:
"L" and "C" forks: 13.04 mm (0.513 in)
"R" fork: 13.05 mm (0.514 in)



Measure the shift fork shaft O.D. at shift fork surfaces.

SERVICE LIMIT: 12.90 mm (0.508 in)

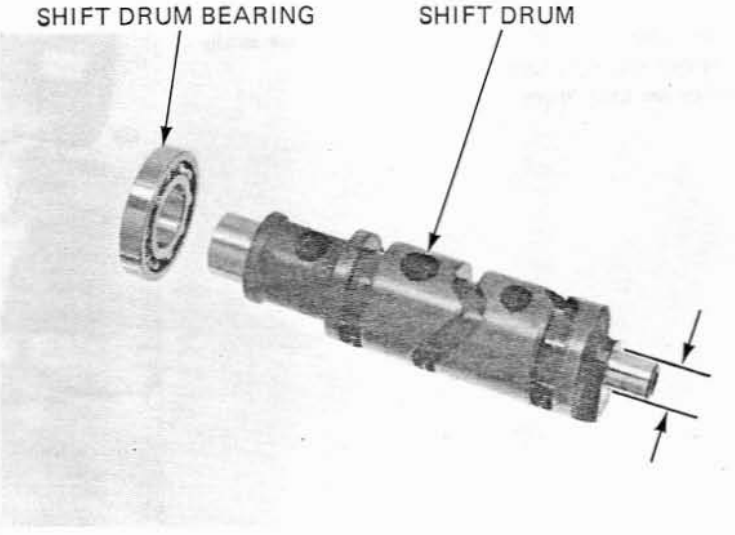


Inspect the shift drum bearing for smooth rotation.

Inspect the shift drum grooves. They should be smooth and free of chips and burrs.

Measure the shift drum O.D. at the end.

SERVICE LIMIT: 11.95 mm (0.470 in)



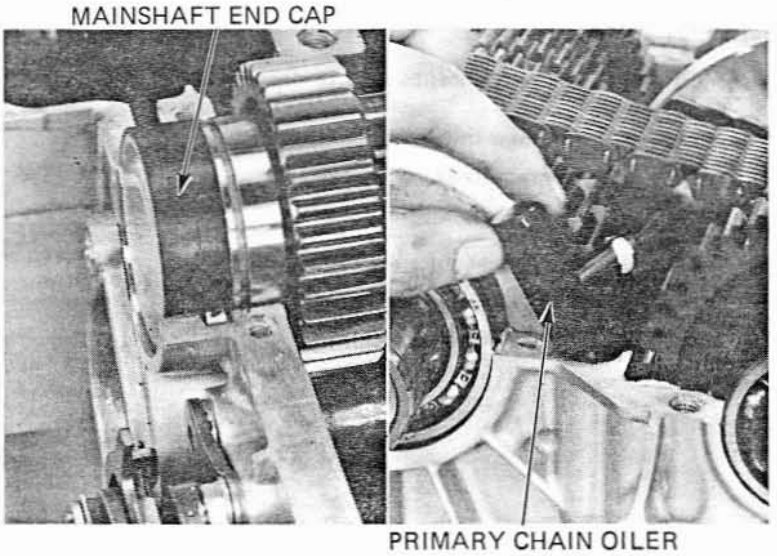
TRANSMISSION REMOVAL

MAINSHAFT

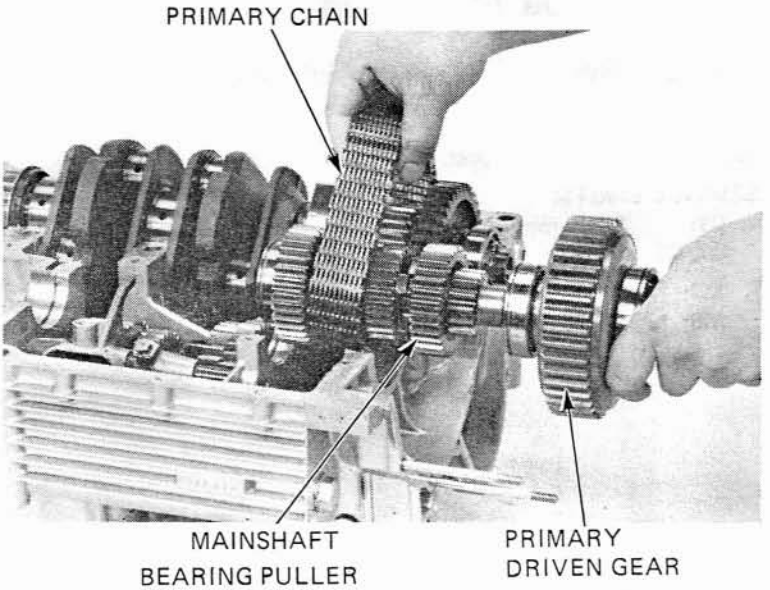
NOTE:

> The mainshaft can be removed without removing the gearshift linkage.

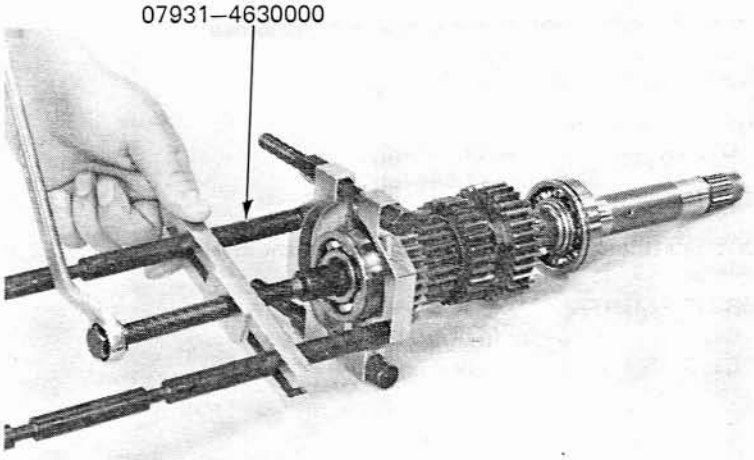
Remove the mainshaft end cap.
Remove the primary chain oiler.



Hold the primary chain and remove the mainshaft and primary driven gear out of the case.
Remove the primary driven gear from the mainshaft.



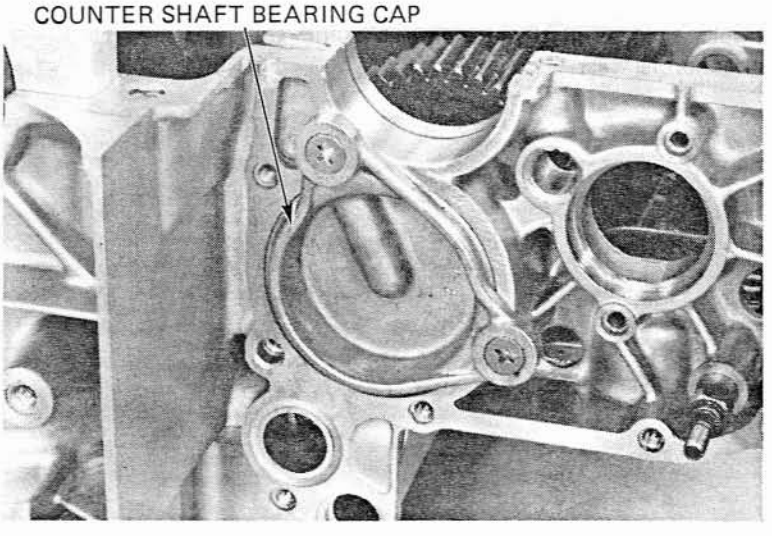
Pull the ball bearing out of the mainshaft and disassemble the mainshaft.



COUNTERSHAFT

Remove the shift drum, shift fork shaft and shift forks (Page 10-11).

Remove the two screws and countershaft bearing cap.
Lift the shaft and gears out of the case.



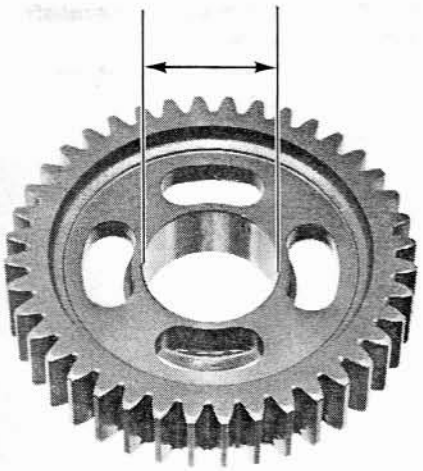
TRANSMISSION INSPECTION

Check gear dogs, dog holes and teeth for excessive or abnormal wear, or insufficient lubrication.

Measure the I.D. of each gear.

SERVICE LIMITS:

C1:	31.05 mm (1.222 in)
C2, C3:	31.06 mm (1.223 in)
M4:	25.06 mm (0.987 in)
M5:	28.06 mm (1.105 in)



Check the gear bushings for excessive or abnormal wear, or insufficient lubication.
Measure the O.D. of the gear bushings.

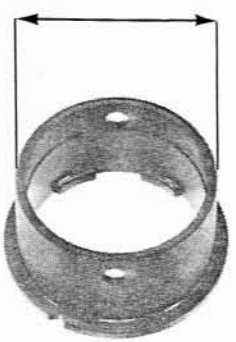
SERVICE LIMITS:

C1, C2, C3:	30.90 mm (1.217 in)
M5:	27.90 mm (1.098 in)

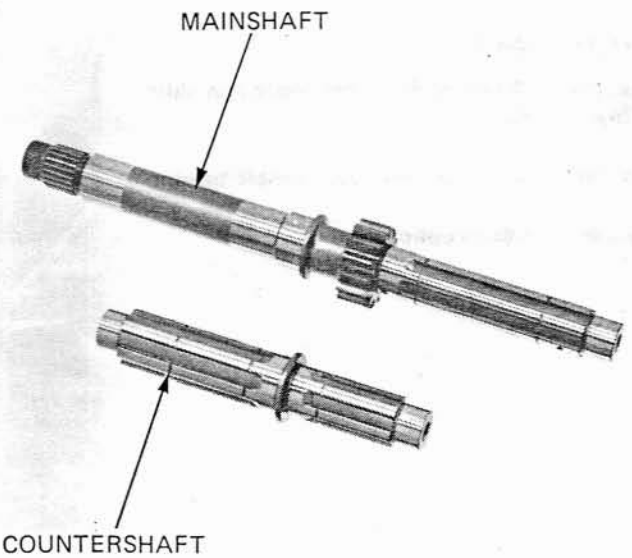
Calculate the clearance between the gear and gear bushing.

SERVICE LIMITS:

C1:	0.15 mm (0.006 in)
C2, C3, M5:	0.16 mm (0.006 in)

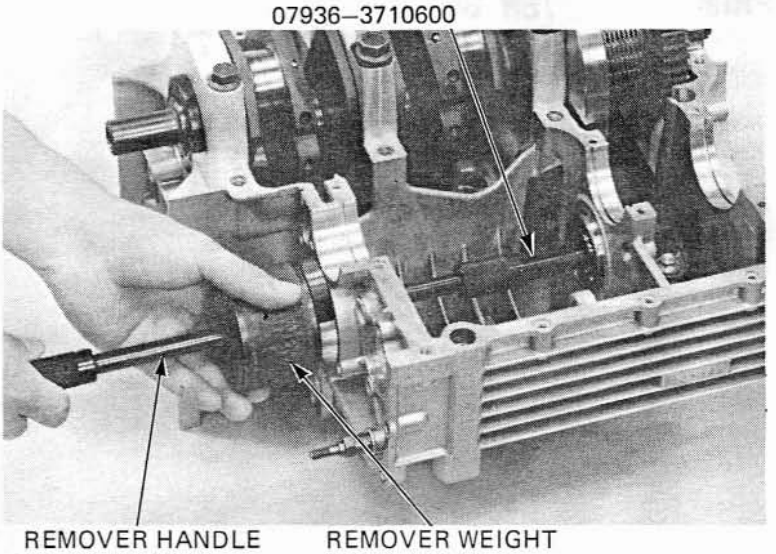


Inspect the mainshaft and countershaft for excessive or abnormal wear.

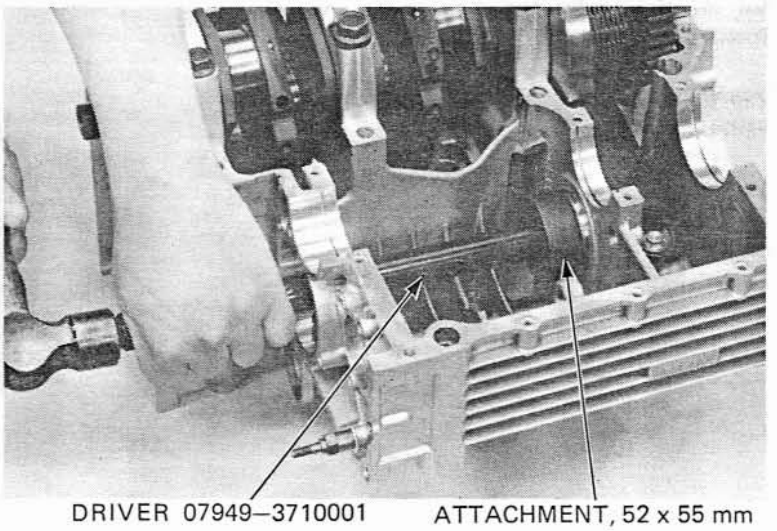


Inspect the countershaft bearing. Replace the gearing if it is noisy or has excessive play.

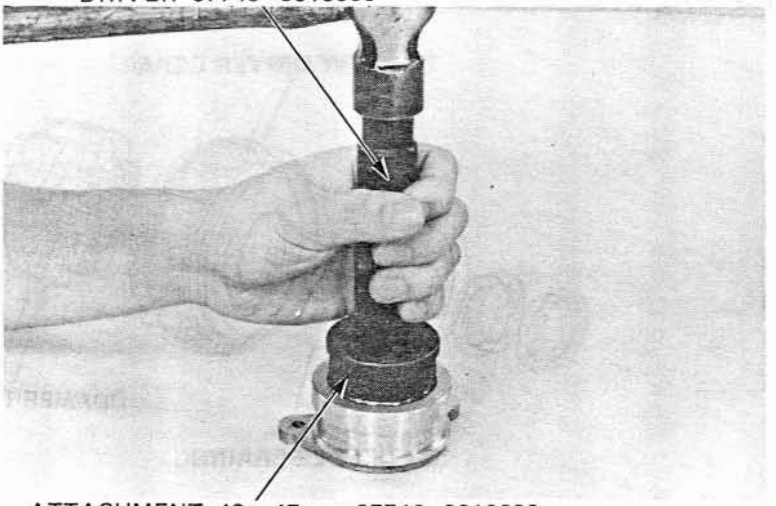
Remove the bearing out of the engine case.



Drive a new bearing into the engine case.



Drive the bearing into a new bearing cap.

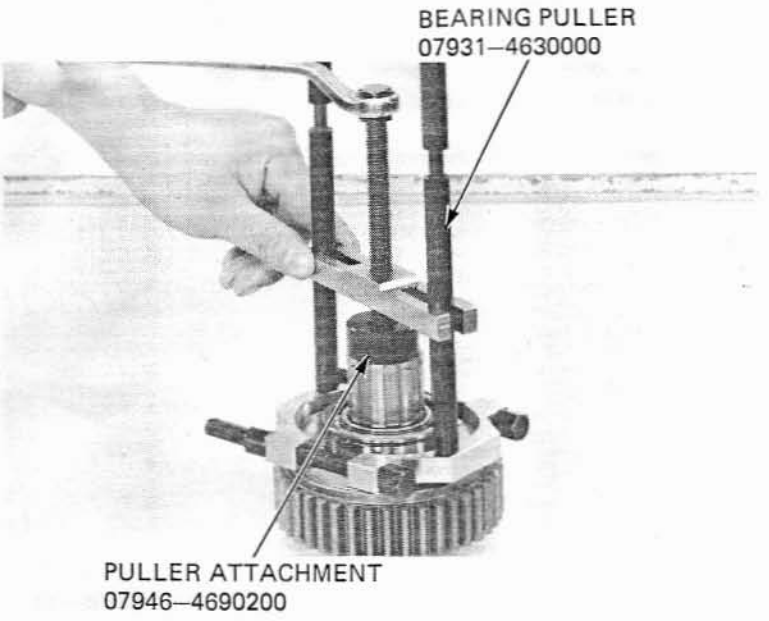


PRIMARY DRIVEN GEAR

DISASSEMBLY

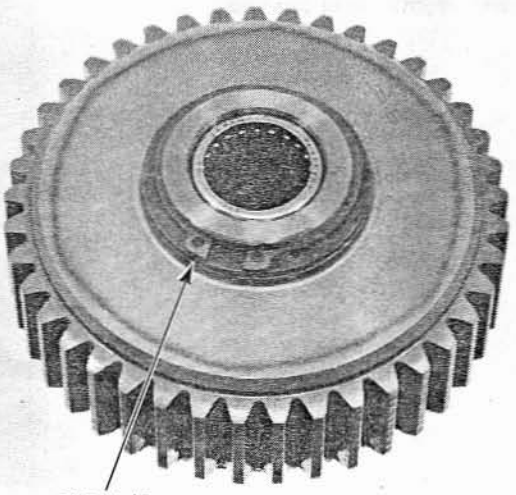
Inspect the ball bearing. Replace the bearing with a new one if it is noisy or has excessive play.

Inspect the shaft needle bearings for excessive or abnormal wear, and replace with new ones if necessary.

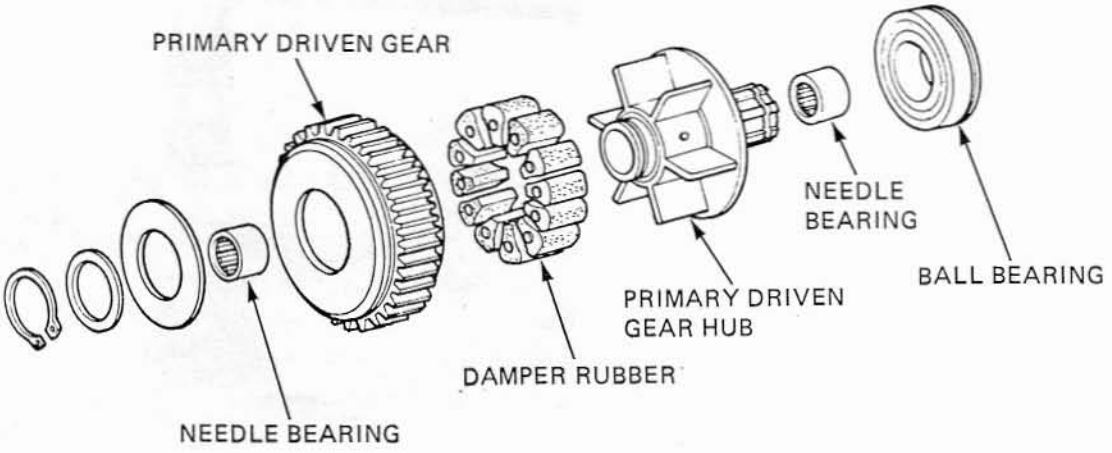


Pry off the circlip and disassemble the primary driven gear.

Check the damper rubbers for evidences of deterioration or other faults.



ASSEMBLY

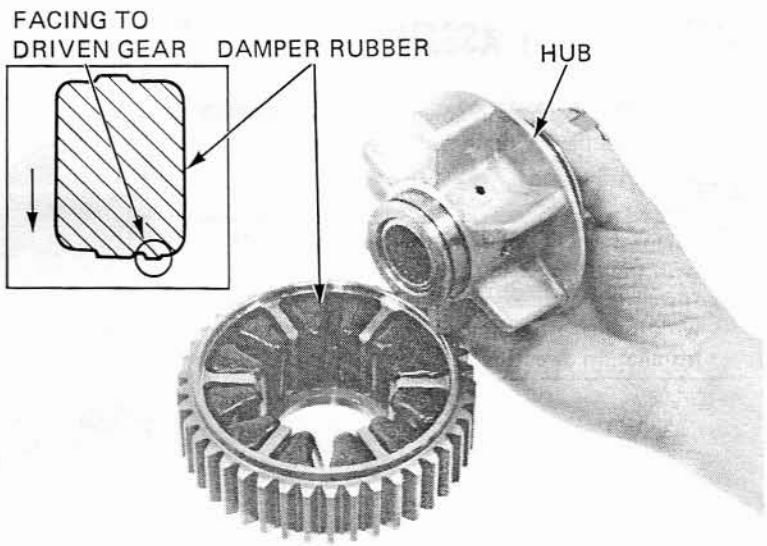


Coat the damper rubbers with clean engine oil, and slide them into the driven gear.

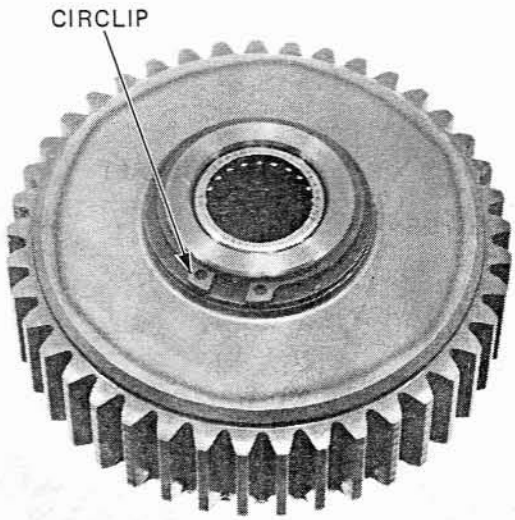
NOTE:

> Install the damper rubber with the raised end facing the inside.

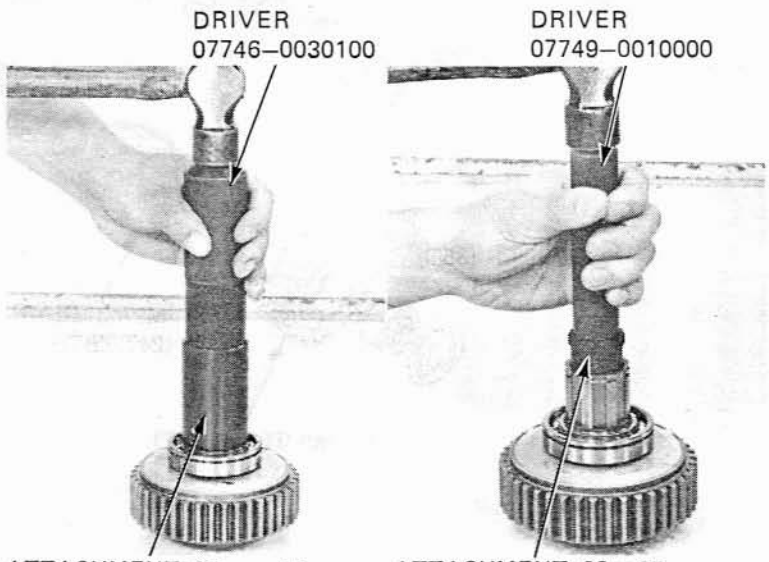
Install the hub onto the driven gear.



Seat the circlip in the groove of the gear hub with the sharp edge facing towards the outside.



Install new ball and needle bearings into the hub if they were removed.

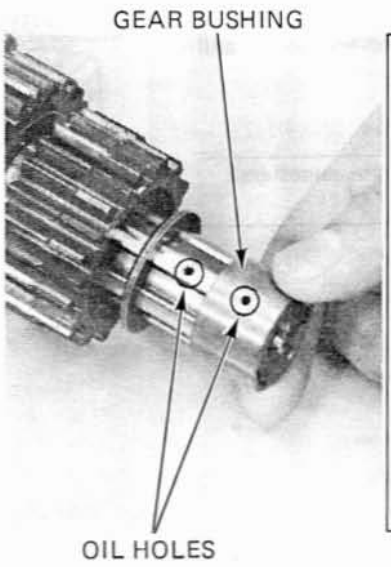


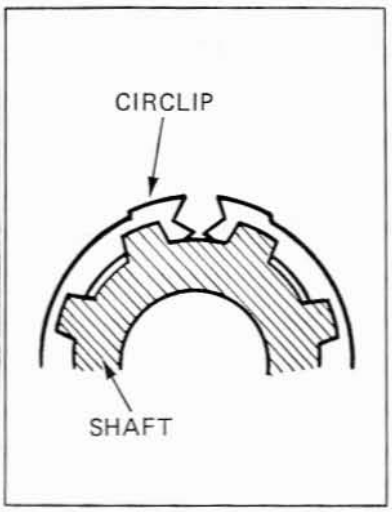
TRANSMISSION ASSEMBLY

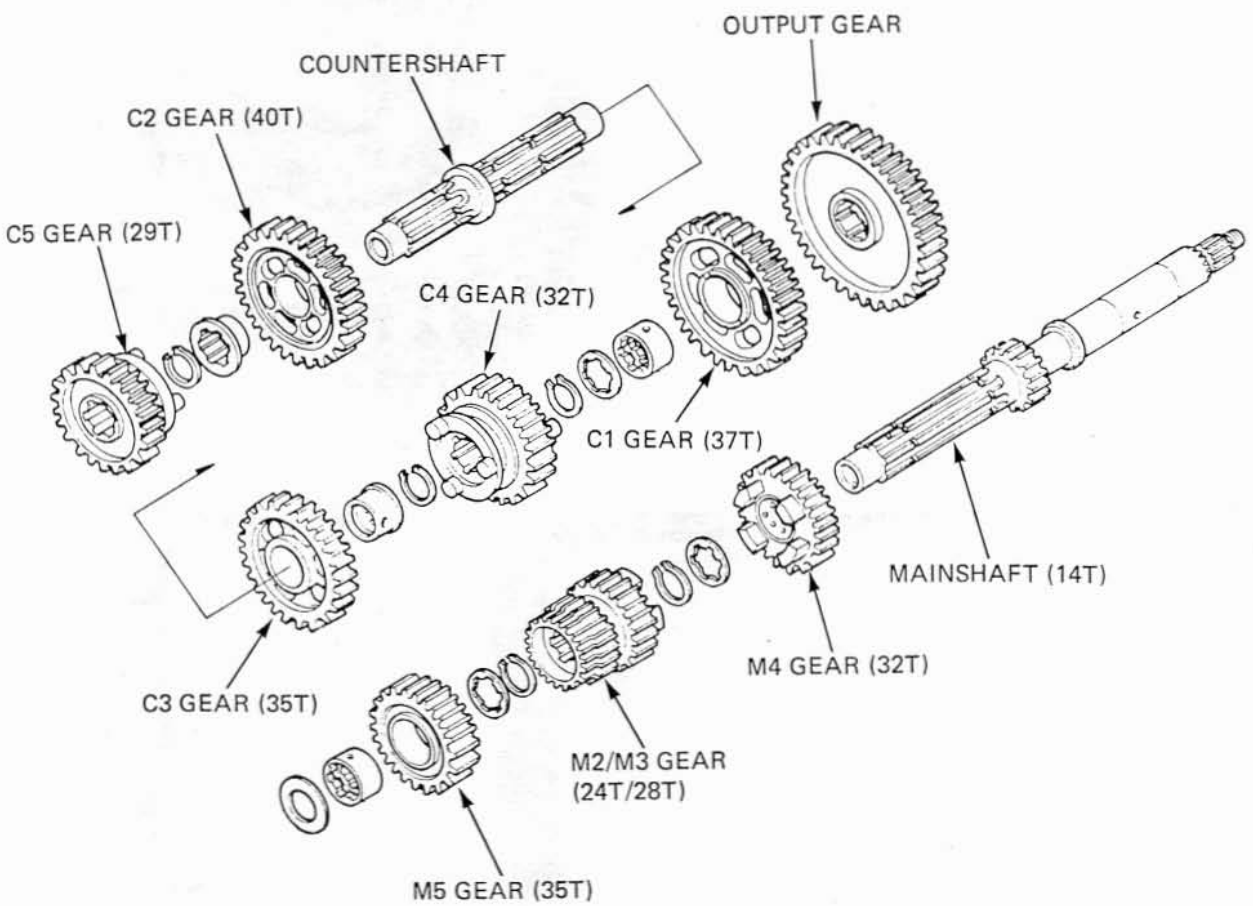
Clean all removed parts in solvent and dip them in clean engine oil before they can be reassembled.

NOTE:

- Align the oil holes in the gear bushings with the oil holes in the shafts.
- Install the circlips with the end gap aligned with the shaft spline as shown. Note the installation direction.





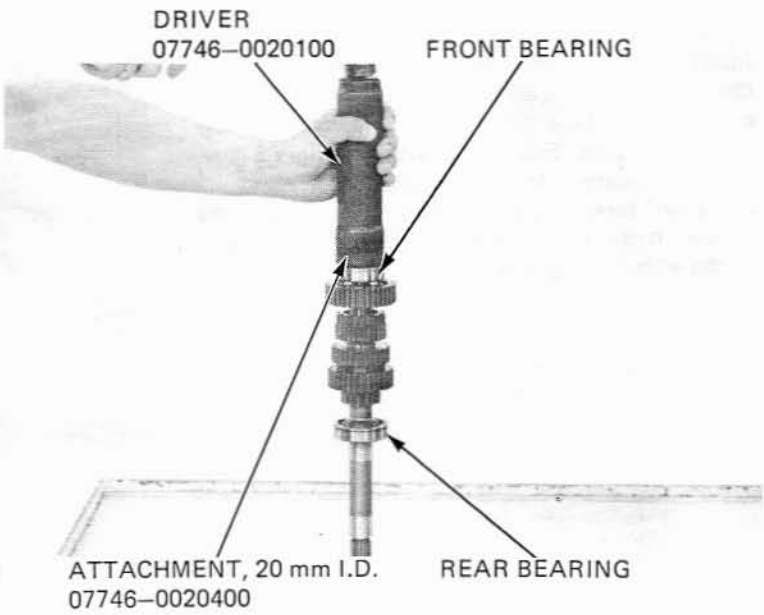


Drive a new bearing onto the mainshaft using driver and attachment as follows:
Front bearing:

- Driver 07746–0020100
- Attachment, 20 mm I.D. 07746–0020400

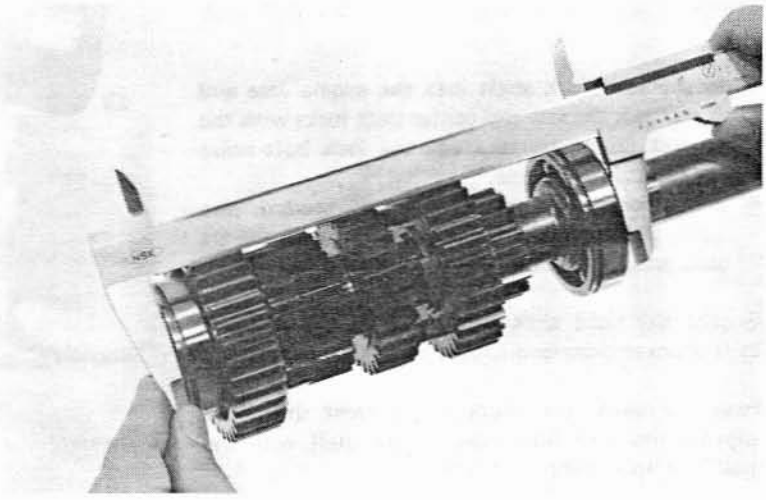
Rear bearing:

- Driver 07746–0030100
- Attachment, 25 mm I.D. 07746–0030200



After reassembling the mainshaft, measure the assembled length to ensure proper alignment with the case bearing set rings.

ASSEMBLY LENGTH: 177.4 mm (6.98 in)

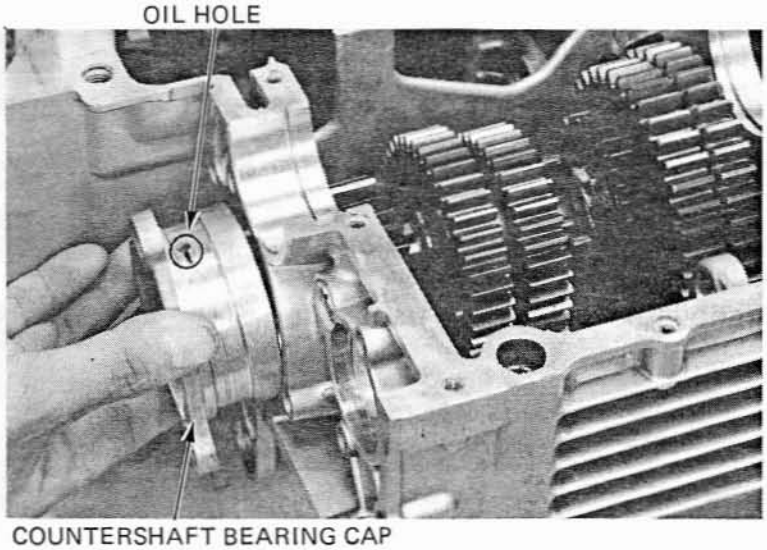


TRANSMISSION INSTALLATION

COUNTERSHAFT

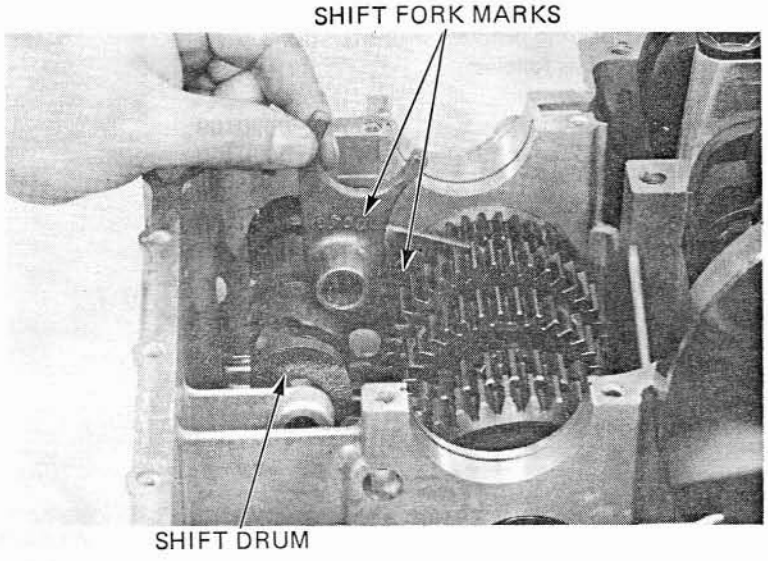
Install the countershaft and gears in the engine case. Be sure the oil passage in the bearing cap is clean and push it into position by hand.
Tighten the screws securely.

TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)



Install the shift drum in the engine case.
Check the markings on the shift forks:

- Left fork: Face the mark "L" towards the rear of the engine. Engage the claw with the C5 gear, and the guide with the shift drum groove.
- Center fork: Face the mark "C" towards the rear of the engine with the guide engaged with the shift drum groove.



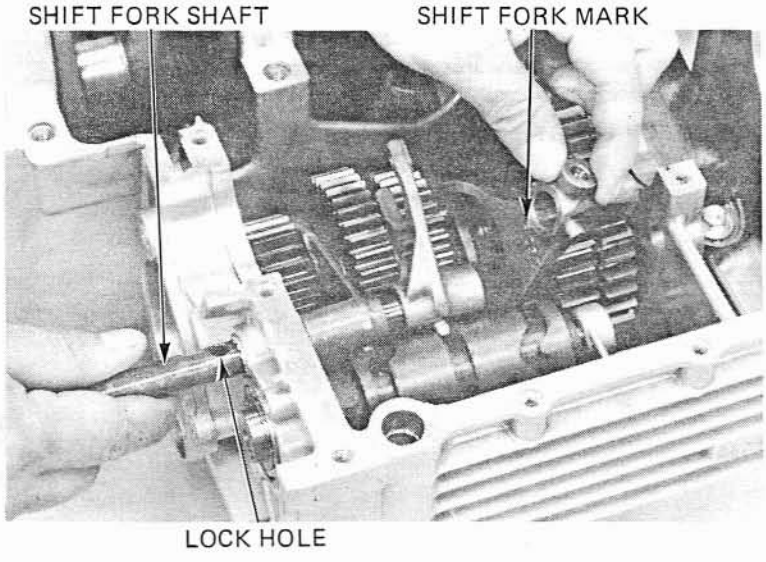
Liberally apply clean engine oil to the shift fork shaft.

Slide the shift fork shaft into the engine case and push through the left and center shift forks with the short end (as measured from the lock bolt hole) facing towards the inside.

- Right fork: Face the mark "R" towards the front of the engine. Engage the claw with the C4 gear, and the guide with the shift drum groove.

Engage the right shift fork with the C4 gear and shift drum as described above.

Push the shift fork through the right shift fork aligning the lock bolt hole in the shaft with the lock bolt hole in the shift fork.



Install the lock washer and lock bolt on the right sifht fork and tighten.

TORQUE: 14–18 N·m (1.4–1.8 kg-m, 10–13 ft-lb)

Bend the tab of the lock washer up against the lock bolt.

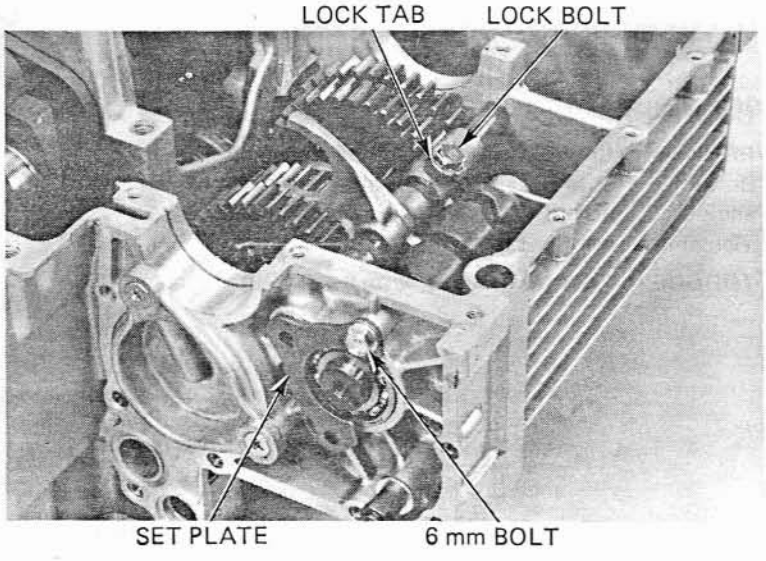
Install the shift drum set plate on the end of the shift fork shaft and tighten the bolt.

TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

NOTE:

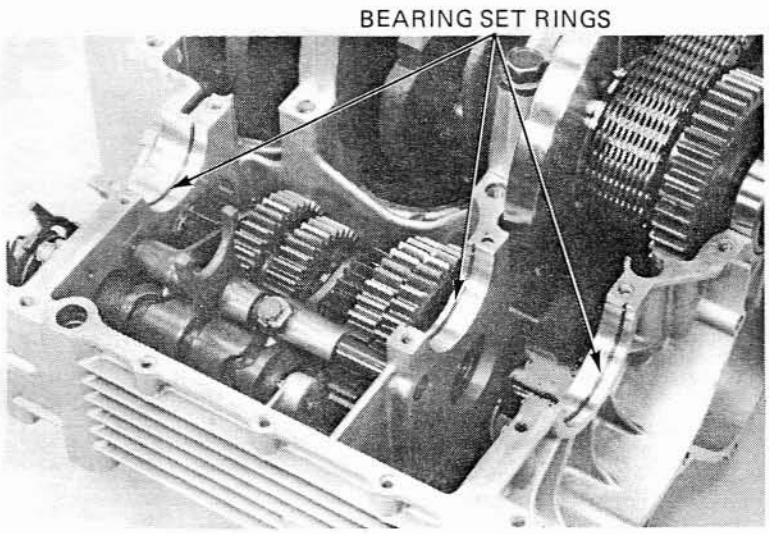
> Insert a 6 mm bolt in one of the bolt holes in the set plate to align the bolt holes.

Reassemble the shift drum linkage (Page 10-5).



MAINSHAFT

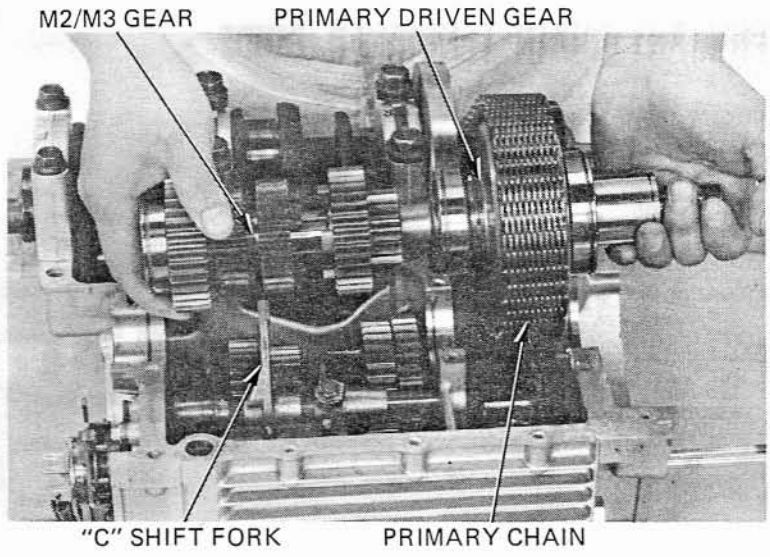
Install the bearing set rings in the grooves of the right engine case.



Install the primary driven gear onto the mainshaft.

Place the primary chain on the primary driven gear by passing the mainshaft through the chain.

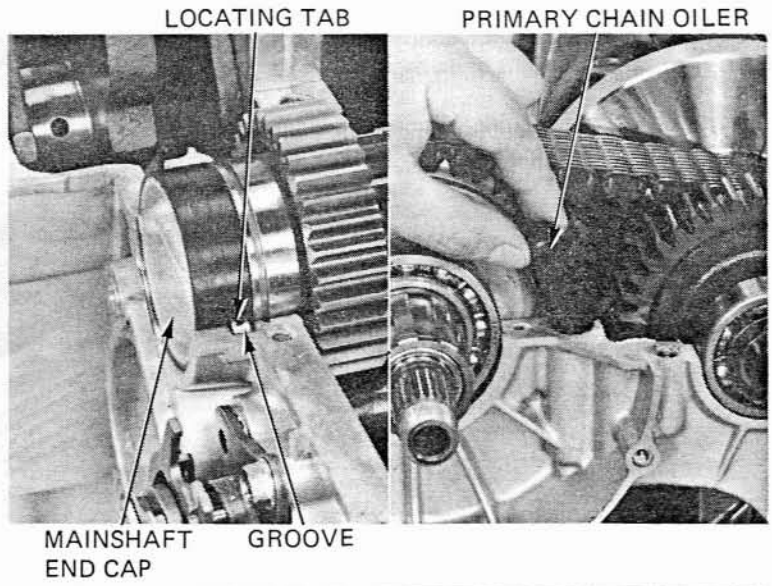
Engage the center shaft fork guide with the shift drum groove with the claw engaged with the M2/M3 gear; install the mainshaft in the right engine case.



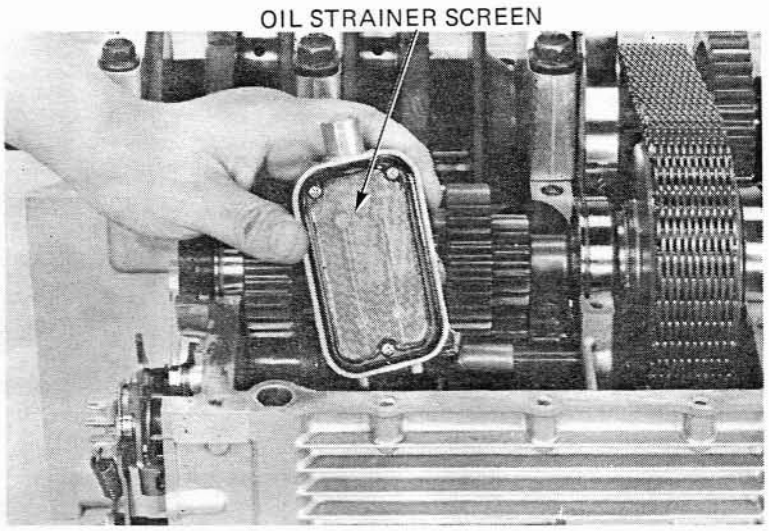
Align the locating tab of the mainshaft end cap with the case groove, and reinstall the end cap.

Check that the bearing set rings are seated in the bearing grooves securely.

Install the primary chain oiler.



Clean and reinstall the oil stariner screen in its original place.



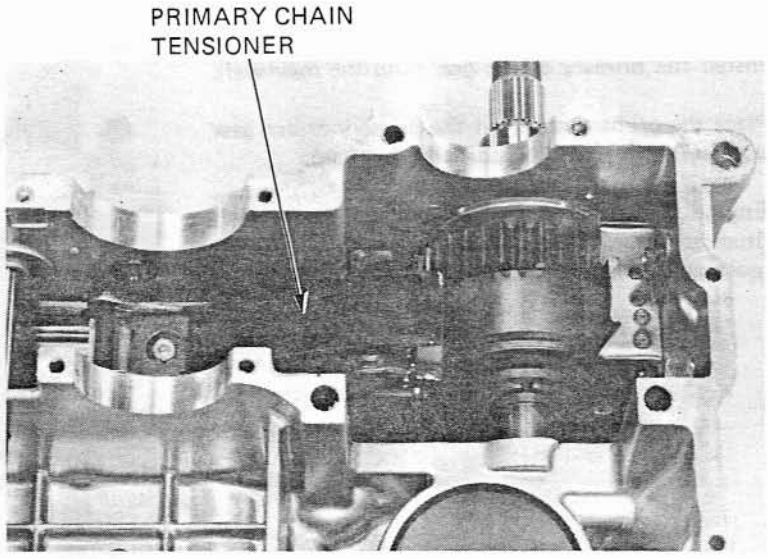
PRIMARY CHAIN TENSIONER/GUIDE

Inspect the primary tensioner slipper for abnormal or excessive wear.
Check operation of the tensioner and replace if the spring is weak or broken.

To remove the tensioner, back off the two tensioner mounting bolts.

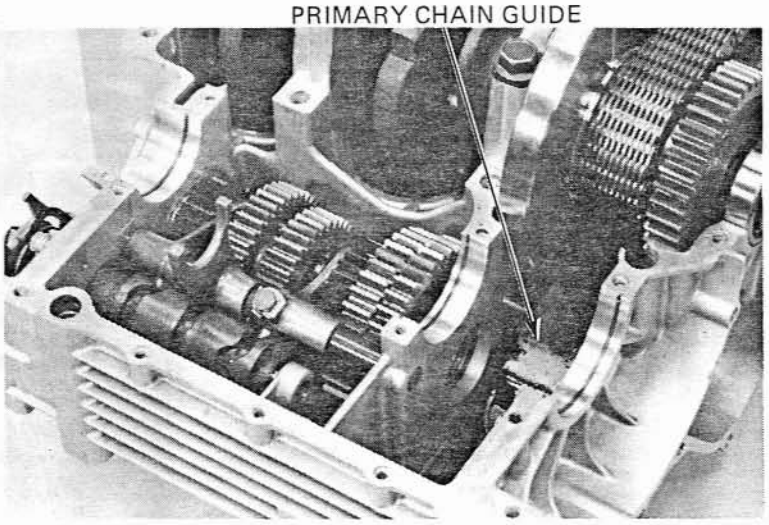
NOTE:

> Do not remove the alternator drive shaft assembly.



Inspect the chain guide for abnormal or excessive wear. Also check for signs of damage.

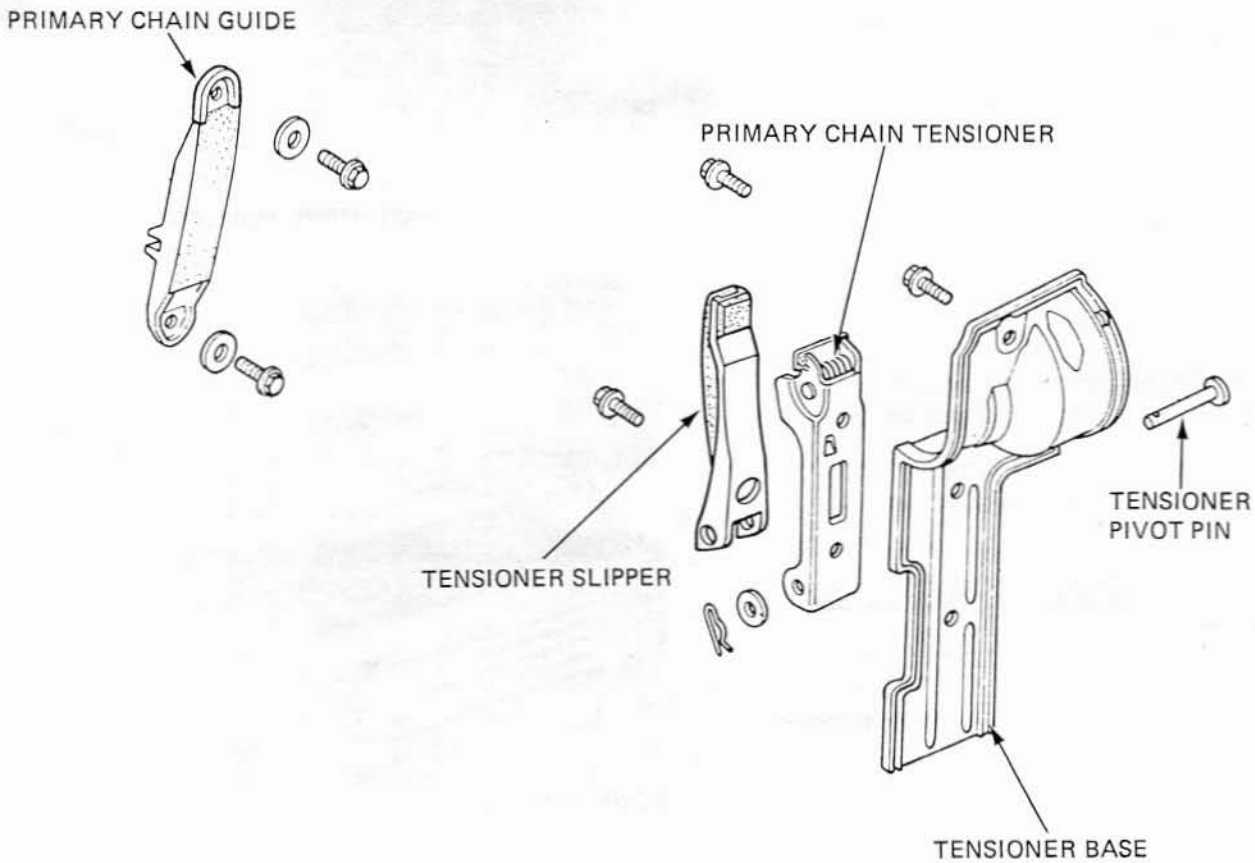
To remove the chain guide, remove the crankshaft and two 6 mm mounting bolts.



The assembly sequence is essentially the reverse order of disassembly.

NOTE:

- Note the tensioner pivot pin direction.
- Engage the guide groove with the case abutment.



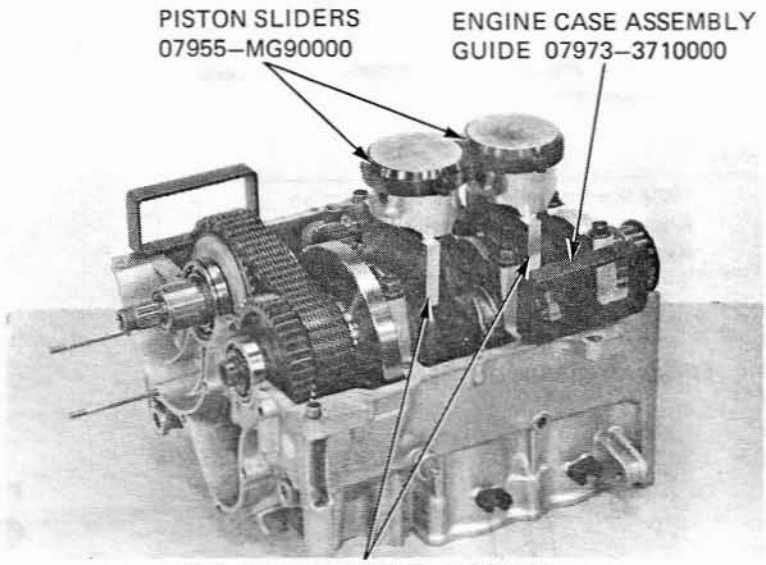
ENGINE CASE ASSEMBLY

Make sure that the piston ring end gaps are staggered as shown in Page 11-15.

Compress the piston ring with the piston sliders.

Align the tops of the No. 2 and 4 pistons and install the Piston Bases between the pistons and crank webs.

Place the Engine Case Assembly Guides on the engine case as shown.



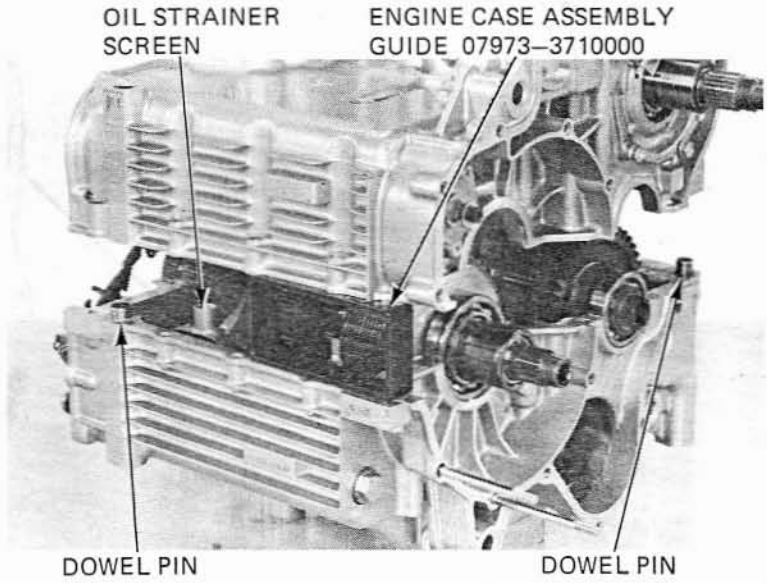
Coat the cylinders, pistons, and piston rings/grooves with oil. Lower the case until it rests on the guides.

Remove the piston bases and guides.
Apply sealant to the case mating surfaces.

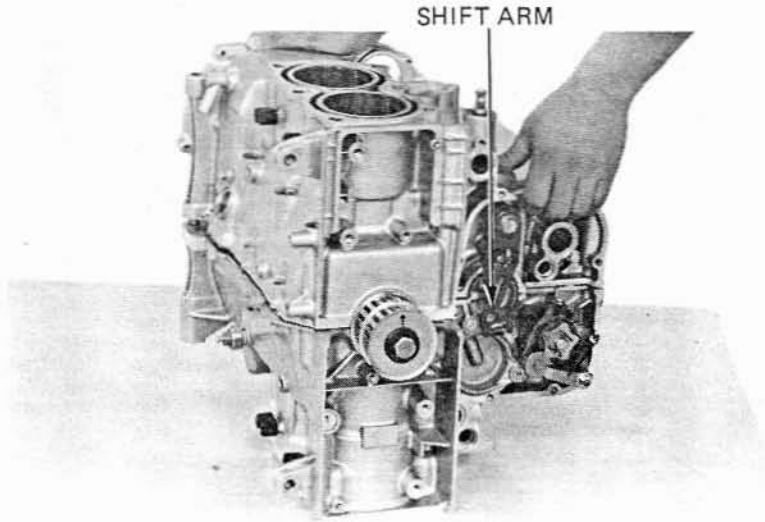
NOTE:

> Be sure to apply sealant to where the cases are mated.

Install the dowel pins.
Make sure that the oil strainer screen is in its correct position.



Engage the shift arm with the shift drum and seat the cases.



Coat all case 10 mm bolts (threads and under heads) with molybdenum disulfide grease.

Tighten the 10 mm case bolts.

TORQUE: 33–37 N·m (3.3–3.7 kg-m, 24–27 ft-lb)

Tighten the 8 mm case bolts.

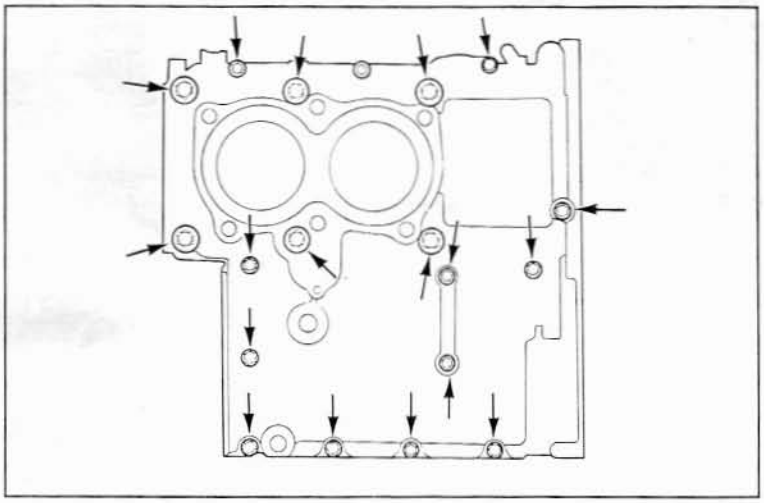
TORQUE: 24–28 N·m (2.4–2.8 kg-m, 17–20 ft-lb)

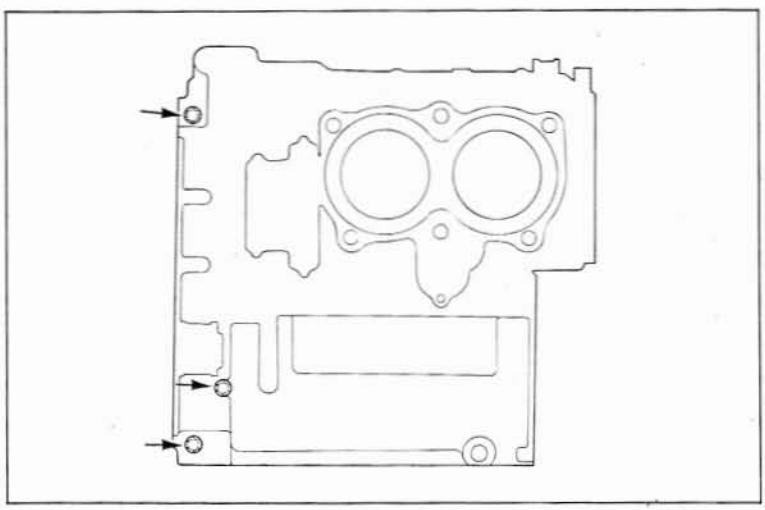
Tighten the 6 mm case bolts.

TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

NOTE:

- Tighten all case bolts in a crisscross pattern in 2–3 steps.
- Begin with larger-diameter bolts first.





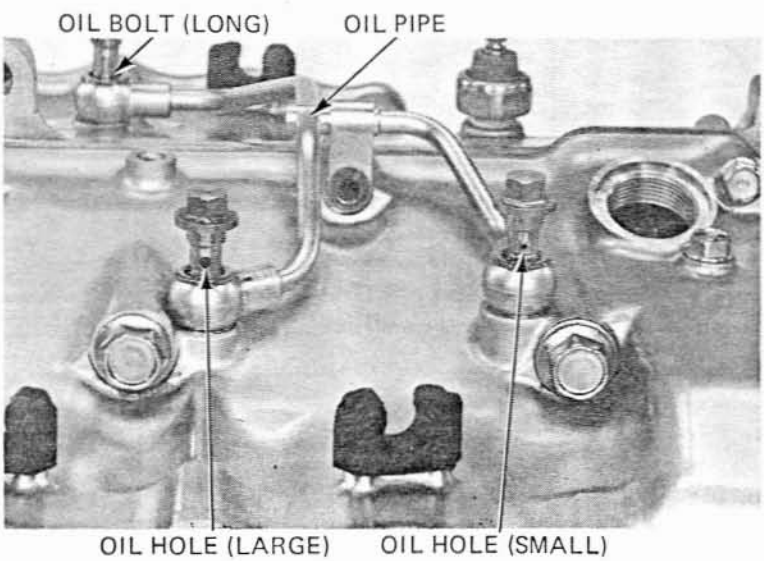
Install the oil pipes and tighten the three oil pipe bolts with the sealing washers.

NOTE:

Install the longer bolt on the right engine case. Use the bolt with a larger hole on the front of the left engine case, and the bolt with small hole on the rear.

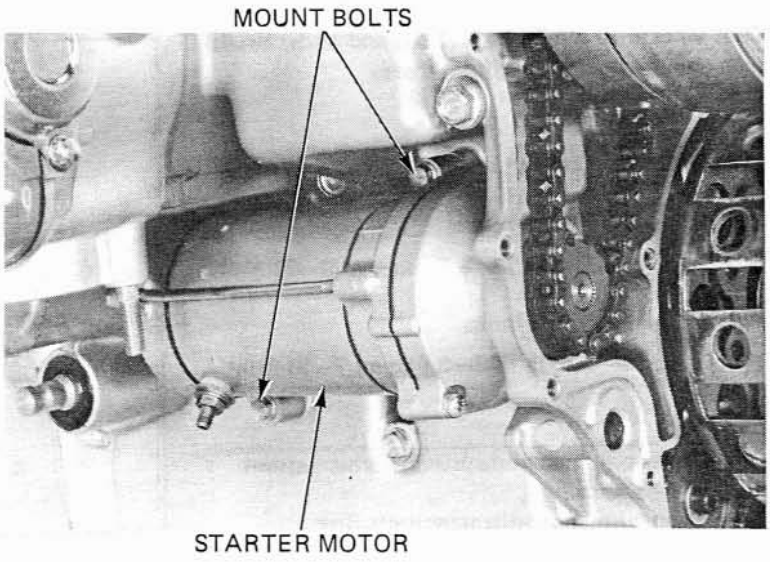
Torque the oil bolts.

TORQUE: 12–16 N·m (1.2–1.6 kg-m, 9–12 ft-lb)

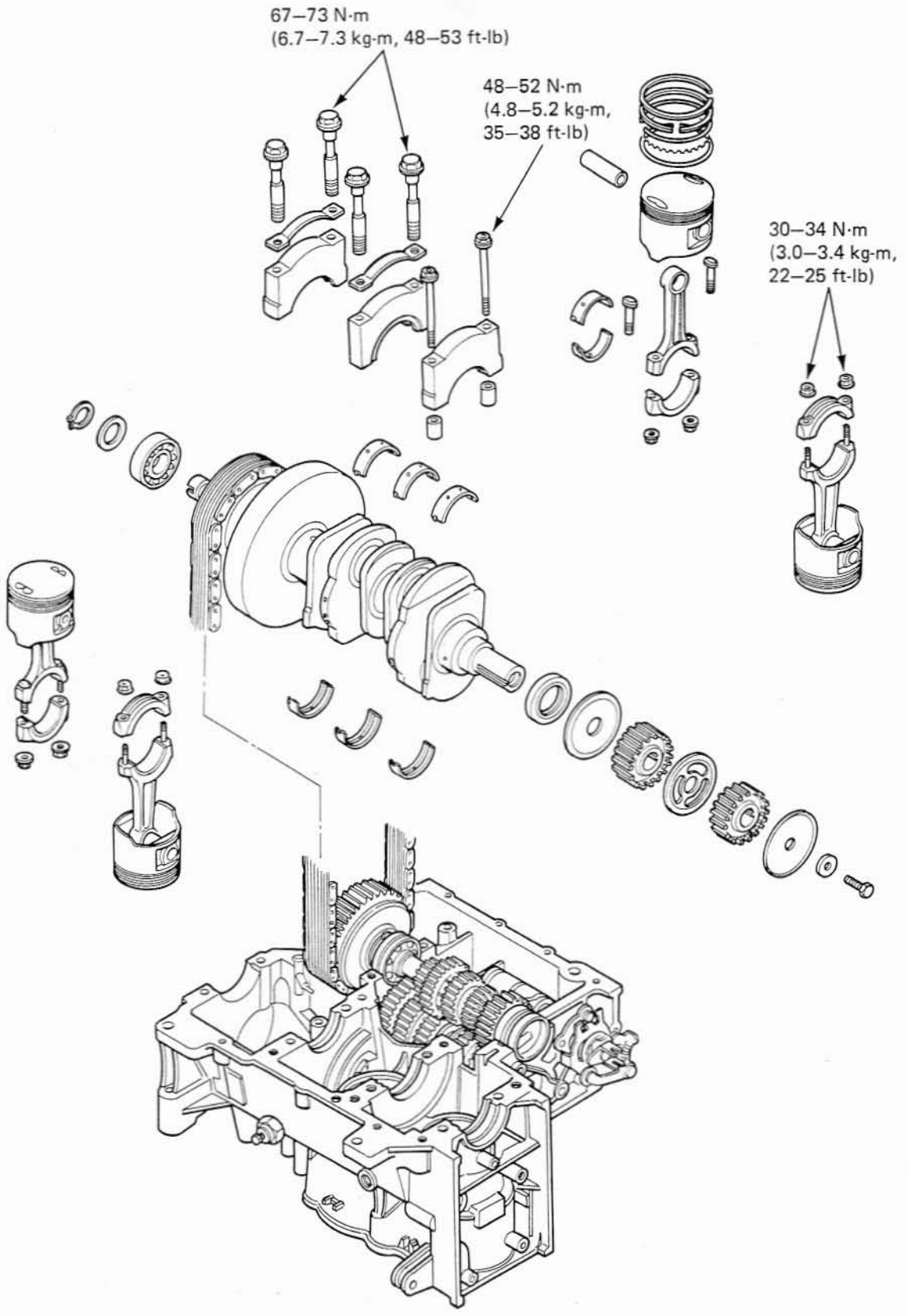


Reinstall the following parts:

- Starter motor
- Pulse generator drive shaft
- Output shaft
- Clutch outer
- Front engine cover
- Thermostat housing
- Right and left cylinder heads/timing belts.



MEMO



11. CRANKSHAFT/PISTON

SERVICE INFORMATION

GENERAL

- To separate the engine cases, refer to Section 10. TRANSMISSION/SHIFT LINKAGE.
- To remove the crankshaft and pistons, it is necessary to remove the engine and separate the engine case halves. For engine removal, see Section 5.
- If you will not be removing the right side pistons (cylinder No. 1 and 3), it is not necessary to remove the right cylinder head. Certain steps are required to prevent valve damage when separating the engine cases without first removing the right cylinder head.
- Whenever the case is disassembled, remove all gasket material from oil passages and water jeackets.
- Do not reused old piston pins.
- The piston pins are a tight pressure fit to the rod small ends. To remove and install the piston pins, it is necessary to use a special tool.

11

SPECIFICATION

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression pressure			1,100–1,500 kPa (11–15 kg/cm², 156–213 psi)	1,000 kPa (10 kg/cm², 142 psi)
Cylinder	Cylinder I.D.		75.500–75.515 (2.9724–2.9730)	75.60 (2.976)
	Out-of-round		–	0.15 (0.006)
	Taper		–	0.05 (0.002)
Piston	Piston O.D. (at skirt)		75.470–75.490 (2.9713–2.9720)	75.35 (2.967)
	Piston pin hole I.D.		19.010–19.016 (0.7484–0.7487)	19.03 (0.760)
	Piston to cylinder crearance		0.010–0.045 (0.0004–0.0018)	0.15 (0.006)
Piston pin	Pin O.D. (at sliding surfaces)		18.994–19.000 (0.7478–0.7480)	18.98 (0.747)
	Pin-to-piston crearance		0.010–0.022 (0.0004–0.0009)	0.05 (0.002)
	Pin-to-rod interference		0.015–0.039 (0.0006–0.0015)	–
Piston ring	End gap	Top and second	0.10–0.30 (0.004–0.012)	0.60 (0.024)
		Oil ring side rail	0.20–0.90 (0.008–0.035)	1.10 (0.043)
	Ring-to-ring land clearance		0.015–0.045 (0.0006–0.0018)	0.12 (0.005)
Crankshaft, connecting rod	Runout (at center journal)		–	0.05 (0.002)
	Rod side crearance		0.15–0.30 (0.006–0.012)	0.40 (0.016)
	Crankpin bearing oil crearance		0.020–0.044 (0.0008–0.0017)	0.08 (0.003)
	Main bearing oil crearance		0.020–0.044 (0.0008–0.0017)	0.08 (0.003)
	Main and crank pin journal	Taper	–	0.004 (0.0002)
		Out-of-round	–	0.008 (0.0003)

TORQUE VALUES

Crankshaft main bearing cap bolt	(front cap)	48–52 N·m (4.8–5.2 kg-m, 35–38 ft-lb)
	(center and rear cap)	67–73 N·m (6.7–7.3 kg-m, 48–53 ft-lb)
Connecting rod cap nut		30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)

TOOLS

Piston pin dis/assembly tool set	07973–MG90000

TROUBLESHOOTING

Excessive Noise
- Crankshaft
  - Worn main bearing
  - Worn rod bearing
- Piston and Connection Rod
  - Worn piston or cylinder
  - Worn piston pin or pin hole
  - Worn rod small end

Low Compression or Uneven Compression
- Worn cylinder or piston ring

High Compression
- Excessive carbon build-ups on piston head or in combustion chambers

Excessive Smoke
- Worn cylinder, piston or piston rings
- Improperly installed piston rings
- Damaged piston or cylinder

Overheating
- Excessive carbon build-up on piston head
- Blocked or restricted flow of coolant
- Sticking thermostat

Knocking or Abnormal Noise
- Worn pistons and cylinders
- Excessive carbon build-up on piston head

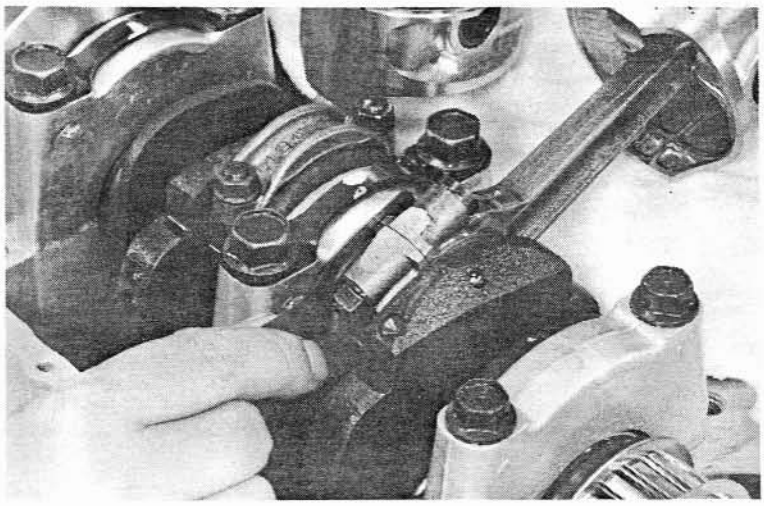
PISTON/CONNECTING ROD REMOVAL

SIDE CLEARANCE INSPECTION

Separate the engine case (Page 10-9).
Check connecting rod side clearance.

SERVICE LIMIT: 0.40 mm (0.016 in)

If clearance exceeds the service limit, replace the rod.
Recheck and if still out of limit, replace the crankshaft.
Inspect the crankshaft for rough spots or damage.

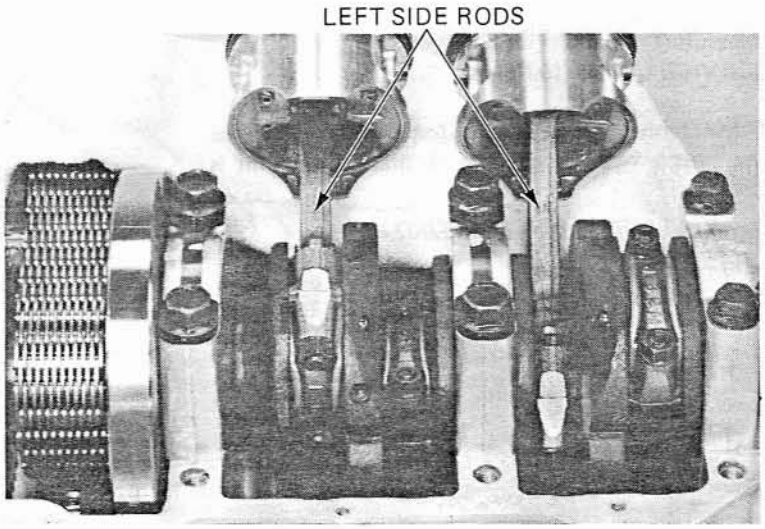


Remove the left side rods and pistons. Mark them to indicate the correct cylinder (No. 2 and 4) and position on the crankpins.
Remove the right side rods and pistons. Mark them to indicate the correct cylinder (No. 1 and 3) and position on the crankpins.

CAUTION:

On engines with high mileage, inspect the cylinders for a ridge just above the highest point of ring travel. Any ridge must be removed with an automotive type ridge reamer before removing the right side pistons to allow the pistons and rings to pass through the cylinder.

Inspect the piston sliding surfaces for abnormal wear or damage.



Remove the piston pin using the piston pin dis/assembly tool set.

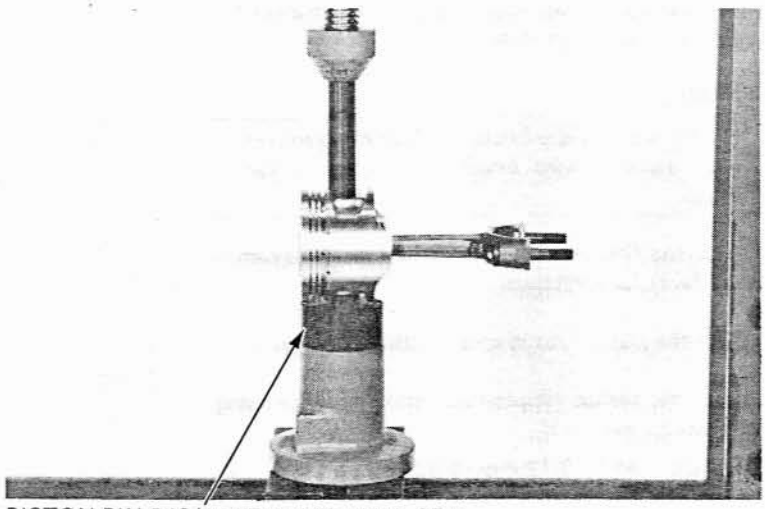
CAUTION:

- *Failure to align the piston correctly could result in piston damage.*
- *Do not reuse the piston pin whenever disassembled.*

NOTE:

If you have the Piston Pin Dis/Assembly Tool Set (07973–6570002) for GL1000 and GL1100, replace its parts with a Piston Pin Dis/Assembly Tool Kit (07973–MG90100) for GL1200.
The Piston Pin Dis/Assembly Tool Kit consists of the following parts.

– Pilot driver	07973–MG90200
– Pilot collar	07973–MG90300
– Piston base	07973–MG90400
– Piston pin guide	07973–MG90500

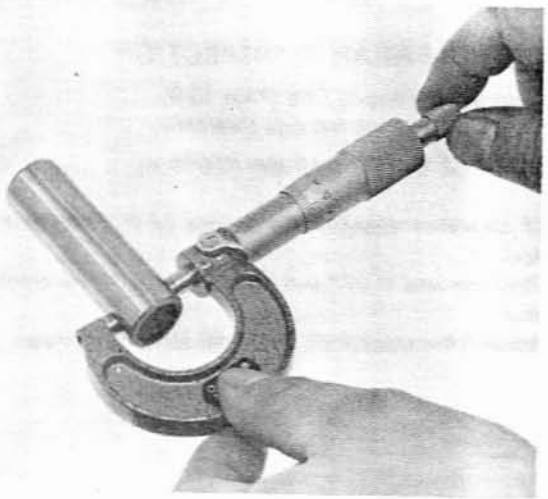


PISTON PIN DIS/ASSEMBLY TOOL SET
07973–MG90000

PISTON/RING/ROD INSPECTION

Measure the O.D. of a new piston pin at both ends.

SERVICE LIMIT: 18.98 mm (0.747 in)



Measure the piston pin hole I.D.

SERVICE LIMIT: 19.03 mm (0.760 in)

Calculate the piston pin-to-piston clearance. Replace the piston with a new one if the service limit is exceeded.

SERVICE LIMIT: 0.05 mm (0.002 in)

Clean the piston top and ring grooves. Inspect for evidence of pitting or detrioration.

CAUTION:

Do not use a whire brush to clean ring grooves and lands; a wire brush can damage these areas.

Inspect the ring lands for abnormal wear and piston thrust faces for scratches.

Inspect the pistons for cracks or other damage.

Inspect the piston ring-to-ring land clearance using new piston rings.

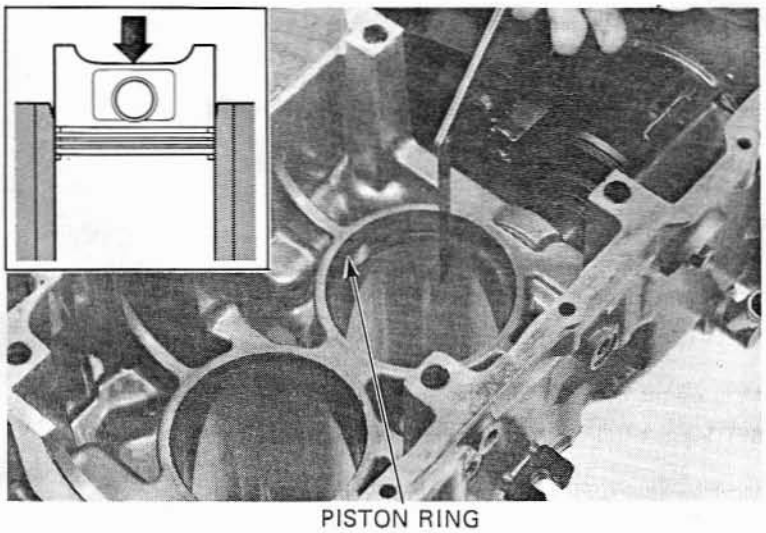
SERVICE LIMIT: 0.12 mm (0.005 in)

Using a piston, push the ring into the cylinder squarely and measure the end gap.

SERVICE LIMITS:

Top/second:	**0.60 mm (0.024 in)**
Oil:	**1.10 mm (0.043 in)**

If the gap exceeds the service limit, measure the cylinder I.D.
Replace the piston ring if the cylinder I.D. is within specification.



Measure the piston O.D. at a point 10 mm (0.4 in) from the bottom, and 90° to the piston pin bore.

SERVICE LIMIT: 75.35 mm (2.967 in)

CYLINDER INSPECTION

Inspect the cylinder walls for scratches and wear.

Measure the cylinder I.D. at three levels in X and Y axis. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 75.60 mm (2.976 in)

Measure each piston O.D. at three levels in X axis. Calculate the piston-to-cylinder clearance. Take the maximum reading to determine the clearance.

SERVICE LIMIT: 0.15 mm (0.006 in)

Measure the cylinder for taper in X and Y axis.

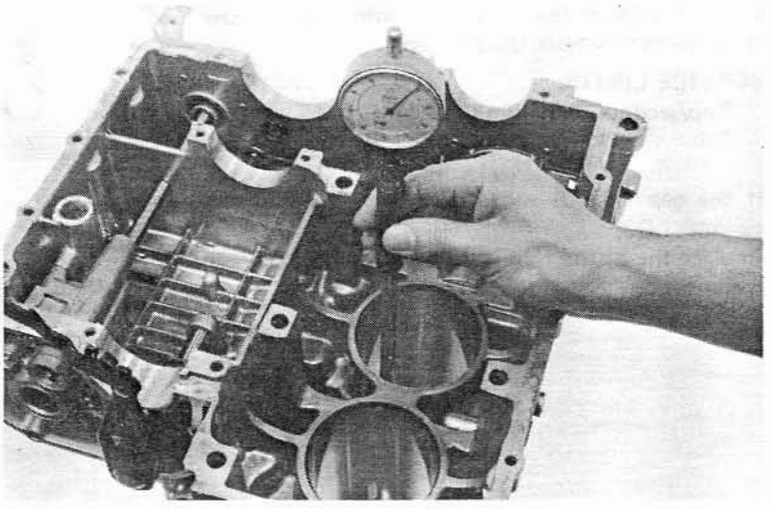
SERVICE LIMIT: 0.05 mm (0.002 in)

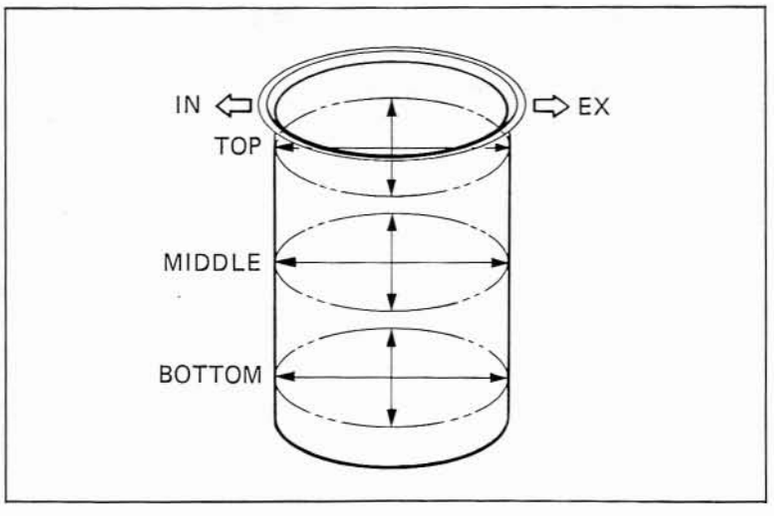
Measure the cylinder for out of round at three levels in X and Y axis. Take the maximum reading to determine the out of round.

SERVICE LIMIT: 0.15 mm (0.006 in)

The cylinder must be rebored and oversize piston fitted if the service limits are exceeded.
The following oversize pistons are available:
0.25 mm (0.001 in), 0.50 mm (0.020 in), 0.75 mm (0.030 in), 1.00 mm (0.039 in)

The cylinder must be rebored so that the clearance to an oversize piston is 0.010–0.045 mm (0.0004–0.0018 in).





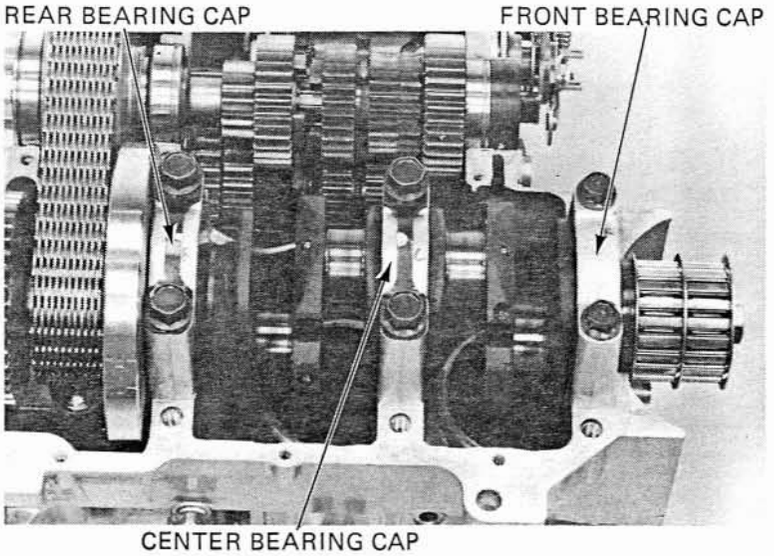
CRANKSHAFT REMOVAL

Remove the mainshaft from the engine case (Page 10-12).

Remove the three crankshaft main bearing caps and lift the crankshaft from the case with the primary chain.

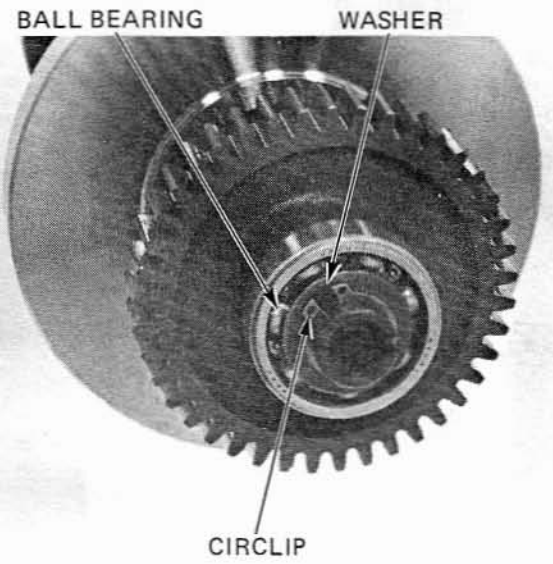
NOTE:

> Before removing, mark the main bearing caps so they can be placed back to their original locations from which they were removed.



Pry off the circlip and remove the ball bearing and washer from the crankshaft.

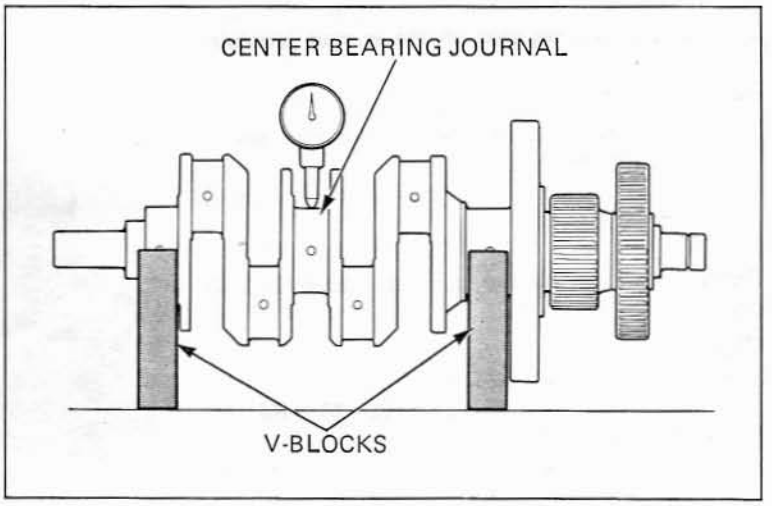
Check the ball bearing by spinning by hand. Replace the bearing with a new one if it is noisy or has excessive play.



CRANKSHAFT INSPECTION

Set the crankshaft on a stand or Vee blocks.
Set a dial indicator on the center main bearing journal. Rotate the crankshaft two revolutions and read the runout.

SERVICE LIMIT: 0.05 mm (0.002 in)



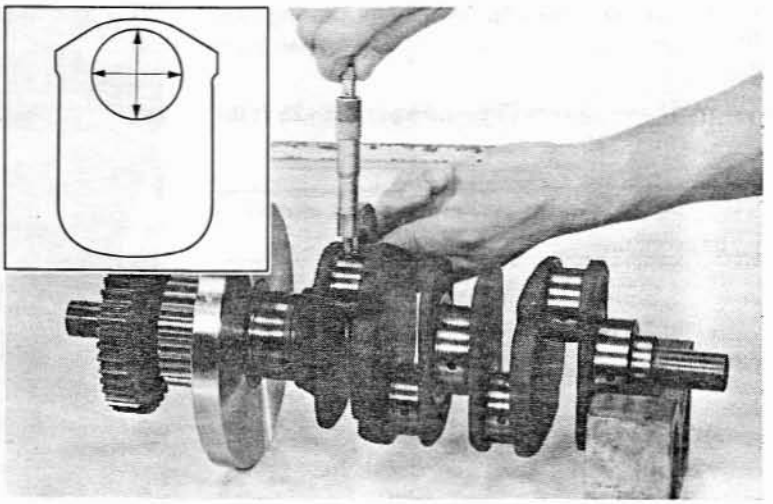
Measure the crankshaft main bearing journals and crankpins with a micrometer for out-of-round and taper.

SERVICE LIMITS:

Taper:	**0.004 mm (0.0002 in)**
Out-of-Round:	**0.008 mm (0.0003 in)**

NOTE:

> The crankshaft cannot be repaired. Replace if the journals or crankpins are burnt, cracked, or out of tolerance; or if the runout is beyoung limits.



CRANKSHAFT BEARING

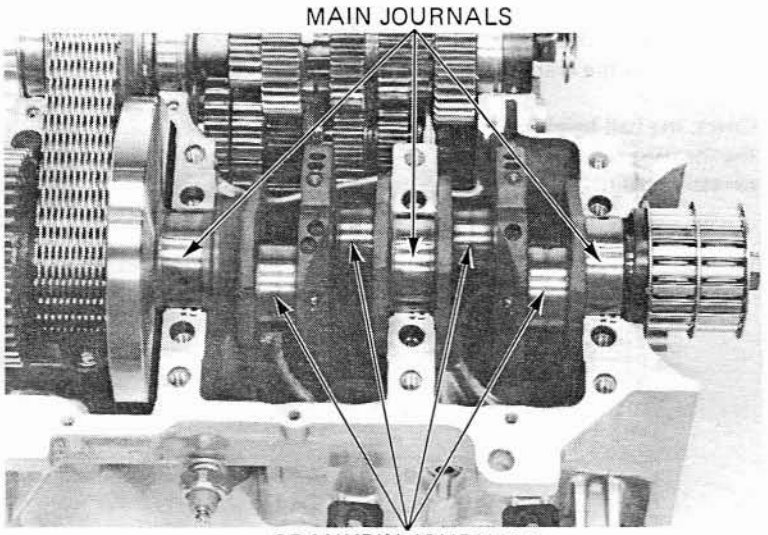
Inspect the main and crankpin bearing inserts for damage or separation.

OIL CLEARANCE INSPECTION

Put a piece of plastigauge on each crankpin or main journals.

NOTE:

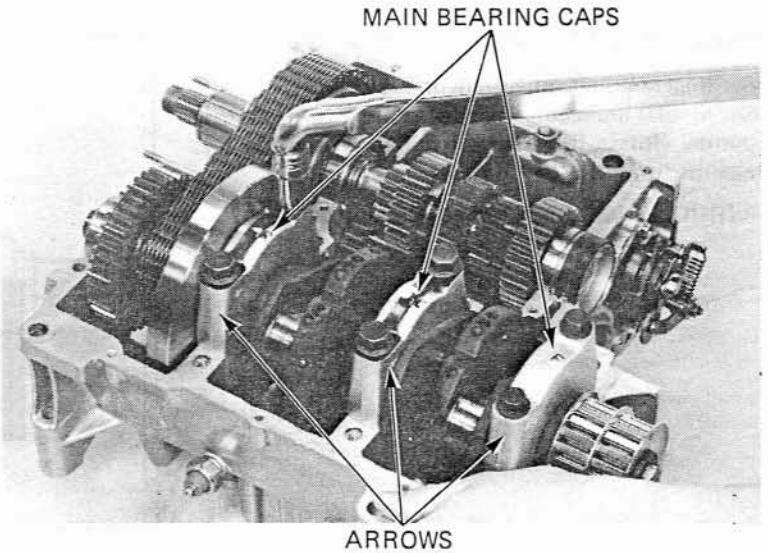
Do not place the plastigauge over oil holes.



On the main journal bearings, install the main bearings and bearing caps on the correct journals.

NOTE:

- The arrows on the caps should face towards the case top.
- Do not rotate the crankshaft during inspection.



Tighten the cap bolts in a crisscross pattern in 2–3 steps.

TORQUES:

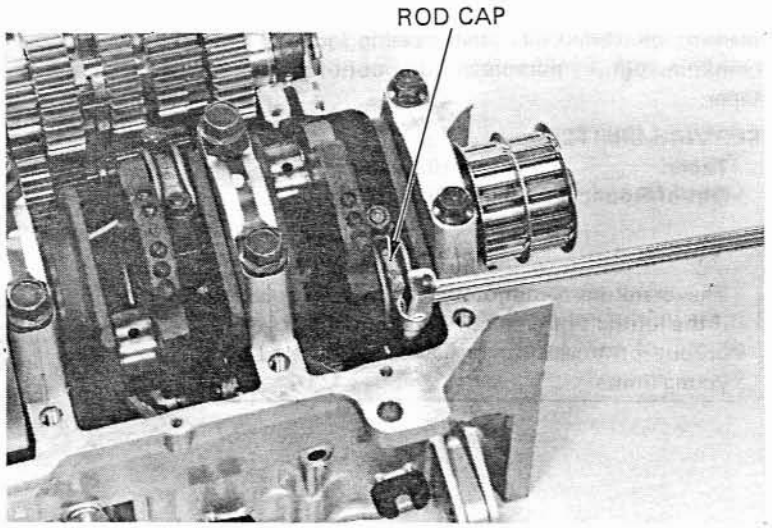
Front cap bolt:	48–52 N·m (4.8–5.2 kg-m, 35–38 ft-lb)
Center and rear cap bolts:	67–73 N·m (6.7–7.3 kg-m, 48–53 ft-lb)

On the crankpin bearings, install the bearing caps and rods on the correct crankpins, and tighten them evenly.

TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–25 ft-lb)

NOTE:

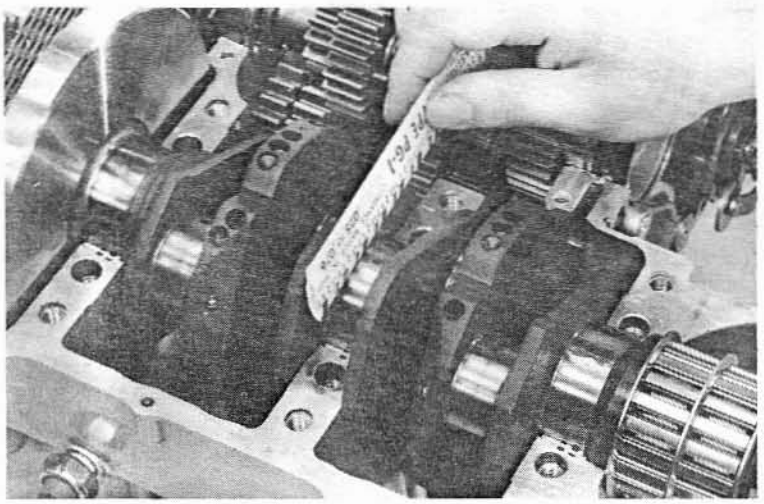
Do not rotate the connecting rod during inspection.



Remove the caps and measure the compressed plastigauge on each crankpin or journal.

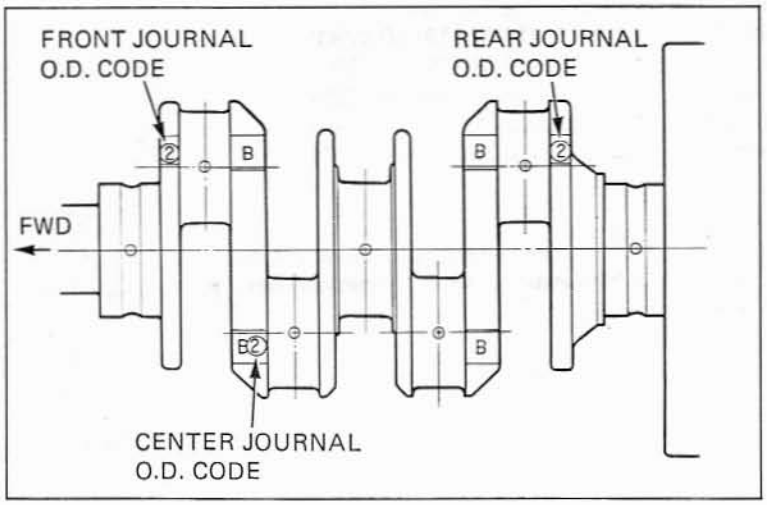
If the bearing clearance is beyond the service limit, select the correct replacement bearings.

SERVICE LIMITS:
Main bearing: 0.08 mm (0.003 in)
Crank pin bearing: 0.08 mm (0.003 in)



MAIN BEARING SELECTION

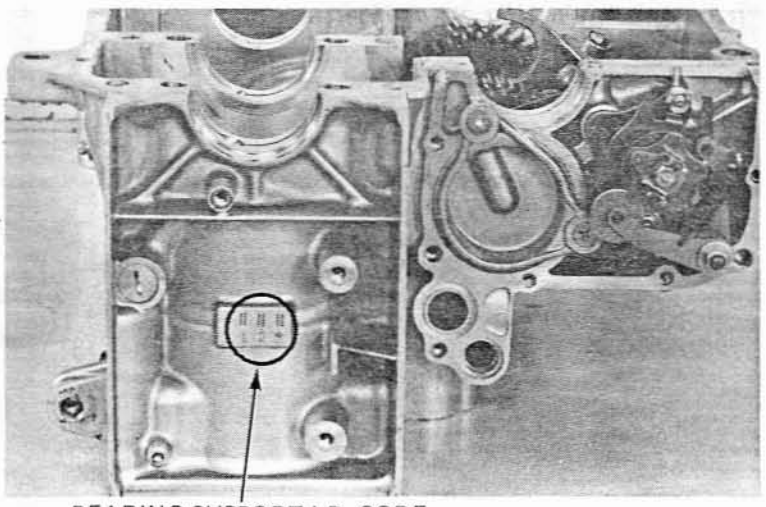
Record the corresponding crankshaft main journal O.D. code number. Codes may be 1, 2 or 3.



Record the engine crankcase bearing support I.D. codes from the pad on the right side engine case. Codes may be I, II, or III.

NOTE:

> The letters 1, 2 and 3 stand for FRONT, CENTER and REAR respectively.



Cross reference the bearing support and main journal codes to determine the correct replacement bearing color.

Main Bearing Selection Table

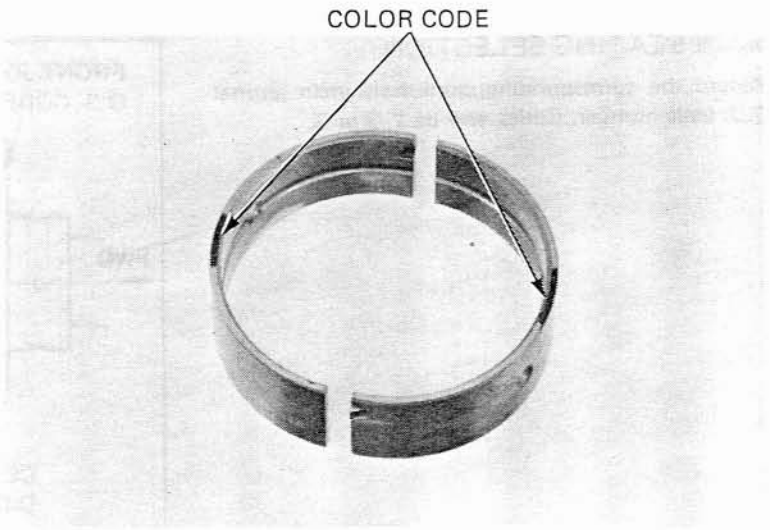
Crankcase Bearing Support I.D. Codes	III	Brown	Black	Blue
	II	Green	Brown	Black
	I	Yellow	Green	Brown
		1	2	3
		Crankshaft Main Journal O.D. Codes		

Bearing Insert Thickness, mm (in):

Blue	2.010–2.014 (0.0791–0.0793)
Black	2.006–2.010 (0.0790–0.0791)
Brown	2.002–2.006 (0.0788–0.0790)
Green	1.998–2.002 (0.0787–0.0788)
Yellow	1.994–1.998 (0.0785–0.0787)

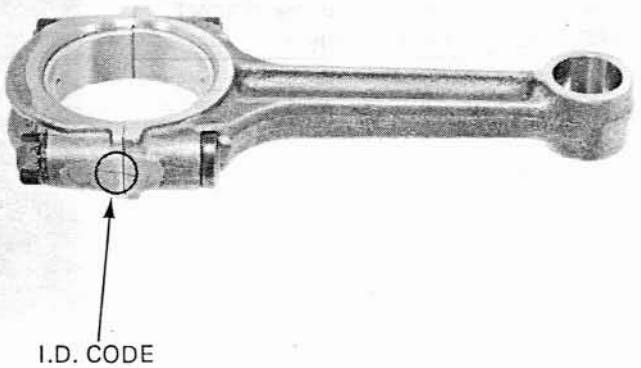
CAUTION:

After selecting new bearings, reckeck clearance with plastigage. Incorrect clearance can cause major engine damage.

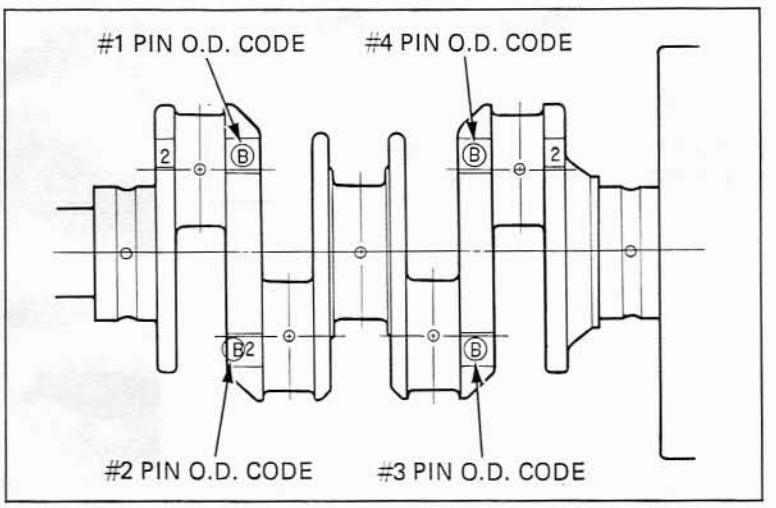


CRANKPIN BEARING SELECTION

Record each connecting rod I.D. code number. Codes may be 1, 2, or 3.



Record the corresponding crankpin O.D. code letter. Codes may be A, B, or C.



Cross reference the connecting rod I.D. and crankpin O.D. codes to determine the correct replacement bearing color.

Rod Bearing Selection Table

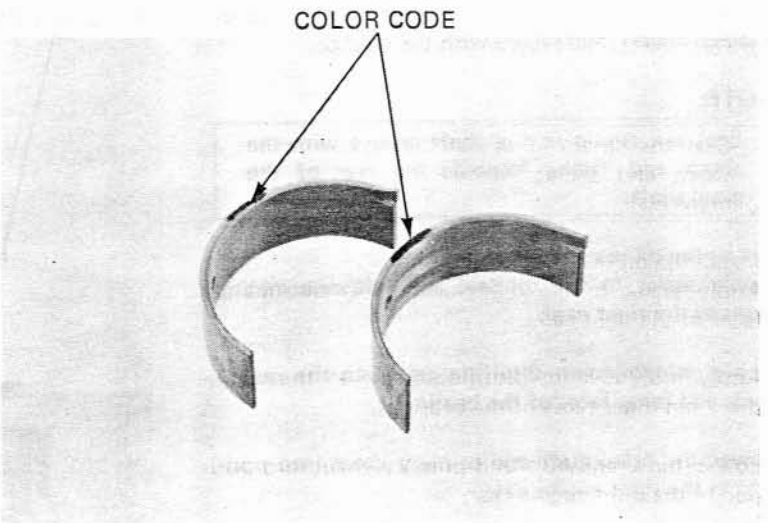
Connecting Rod I.D. Codes				
	3	Brown	Black	Blue
	2	Green	Brown	Black
	1	Yellow	Green	Brown
		A	B	C
		Crankpin O.D. Codes		

Bearing Insert Thickness, mm (in):

Blue	1.507–1.511 (0.0593–0.0595)
Black	1.503–1.507 (0.0592–0.0593)
Brown	1.499–1.503 (0.0590–0.0592)
Green	1.495–1.499 (0.0589–0.0590)
Yellow	1.491–1.495 (0.0587–0.0589)

CAUTION:

After selecting new bearings, recheck clearance with plastigage. Incorrect clearance can cause major engine damage.

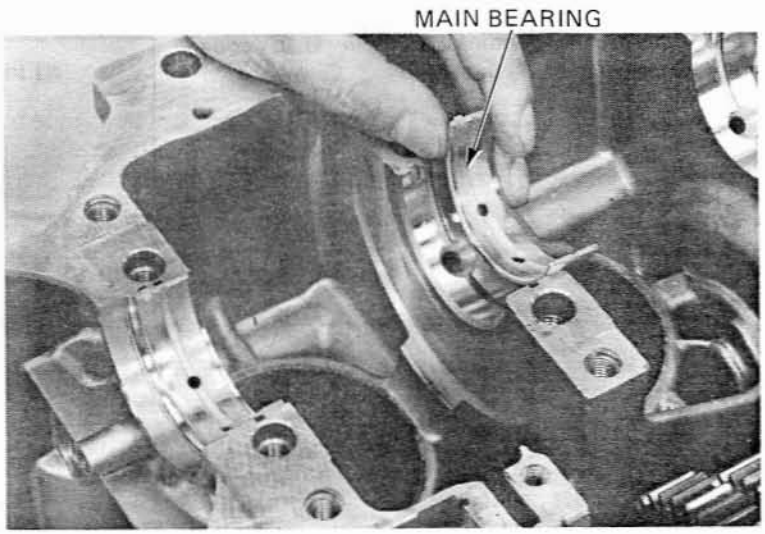


BEARING INSTALLATION

Install the main bearings into the right engine case and bearing caps.

CAUTION:

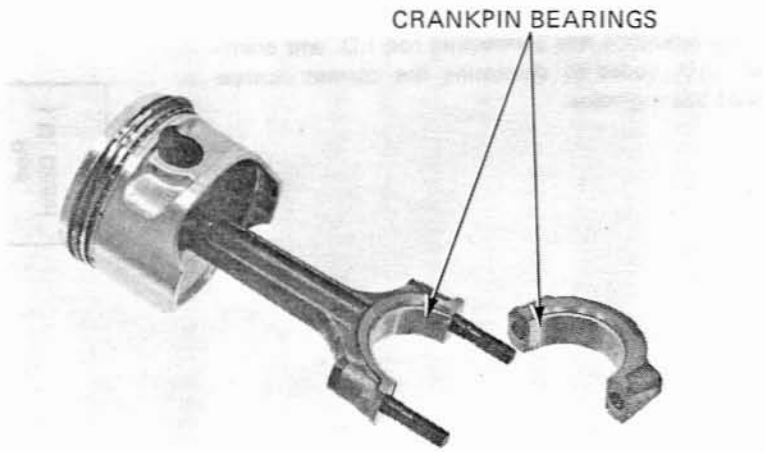
The bearing tabs should be aligned with the groovers in the case and caps.



Install the crankpin bearings in the connecting rods and bearing caps.

CAUTION:

The bearing tabs should be aligned with the grooves in the rods and caps.



CRANKSHAFT INSTALLATION

Install the ball bearing and washer on the end of the crankshaft, and secure with the circlip.

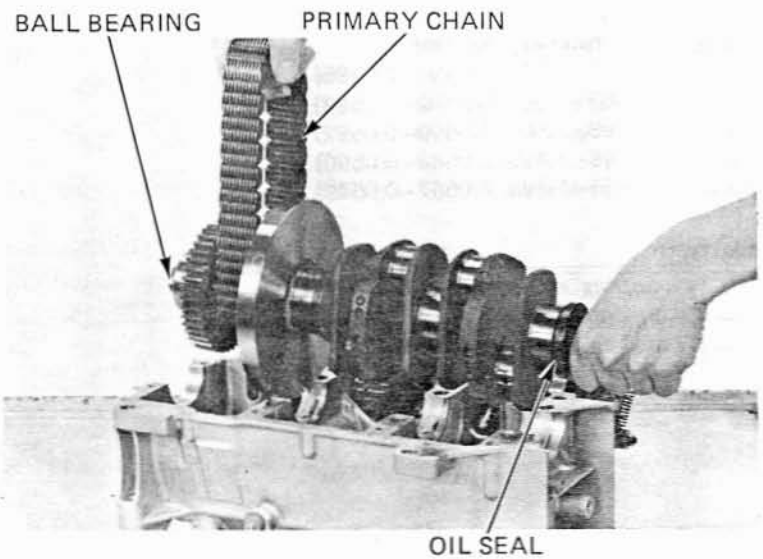
NOTE:

Seat the circlip in the shaft groove with the sharp end facing towards the rear of the crankshaft.

Install the oil seal on the crankshaft.
Apply sealer to the oil seal and left case mating faces of the right case.

Apply molybdenum disulfide grease to the crankshaft and inner faces of the bearings.

Lower the crankshaft and primary chain into position in the right engine case.



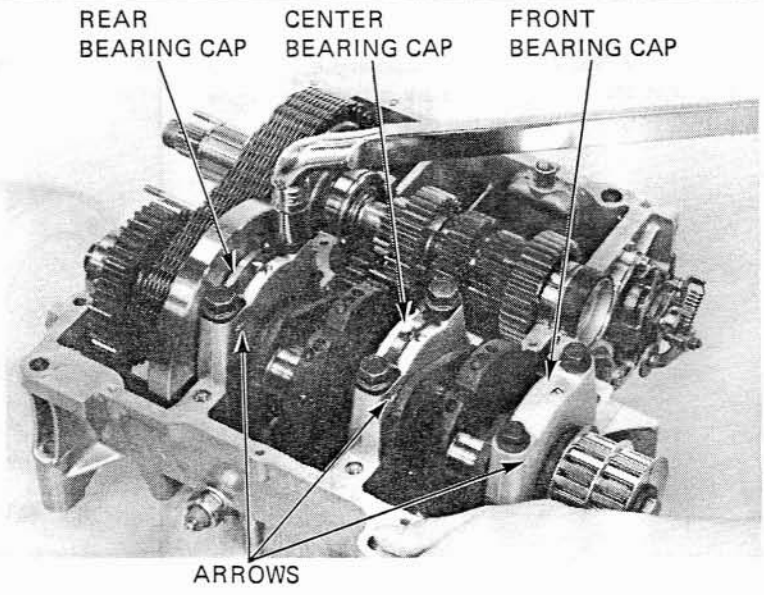
Install the main bearing caps and bearing halves in their correct locations; the arrow on the bearing cap should point to the top of the engine.

CAUTION:

> *The bearing caps must be installed in their correct locations or the bearing clearance may not be correct causing engine damage.*

Apply molybdenum disulfied grease to the thread and seating surfaces of the bearing cap bolts.
Tighten the bolts in a crisscross pattern in 2–3 steps.

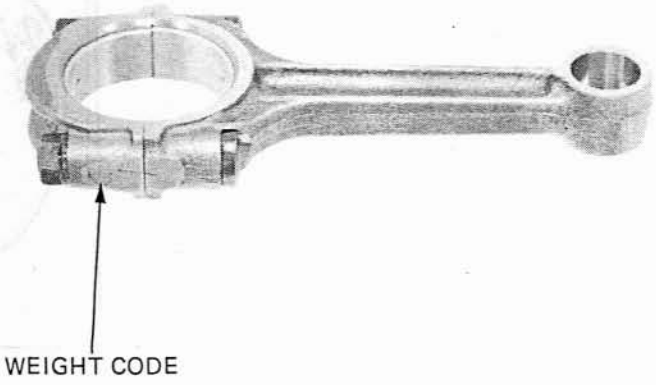
Front cap bolt:
48–52 N·m (4.8–5.2 kg-m, 35–38 ft-lb)
Center and rear cap bolt:
67–73 N·m (6.7–7.3 kg-m, 48–53 ft-lb)



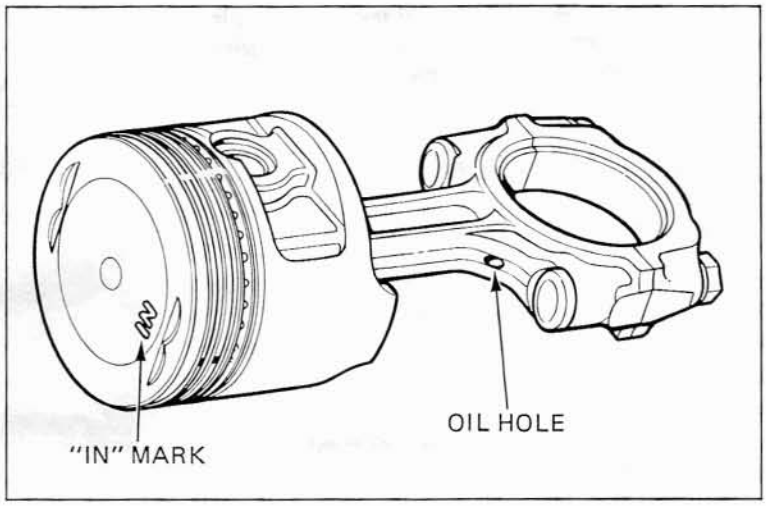
PISTON AND ROD INSTALLATION

When replacing a connecting rod, be sure to select a new rod according to the table shown below.

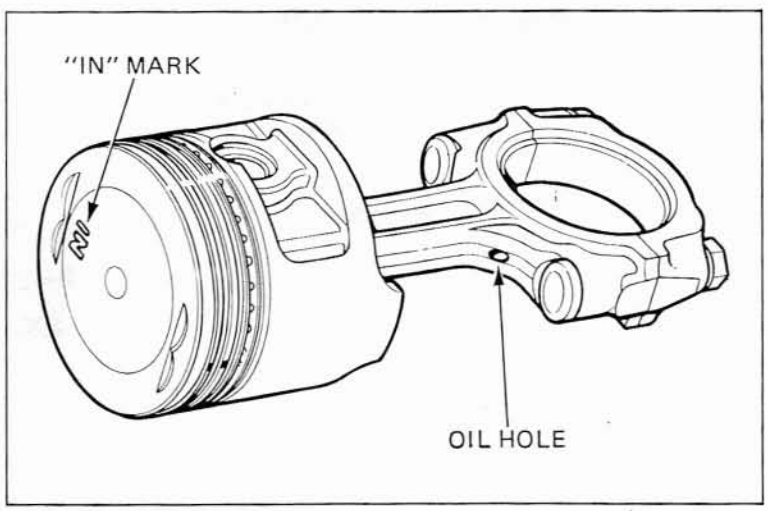
Weight codes on rod to be replaced	Weight codes on new rods
A	B
B	B
C	B
D	E
E	E
F	E



Assemble the No. 2 or No. 4 piston and connecting rod so that the intake "IN" mark is facing the same direction as the oil hole in the rod.



Assemble the No. 1 or No. 3 piston and connecting rod so that the intake "IN" mark is facing the opposite direction as the oil hole in the rod.

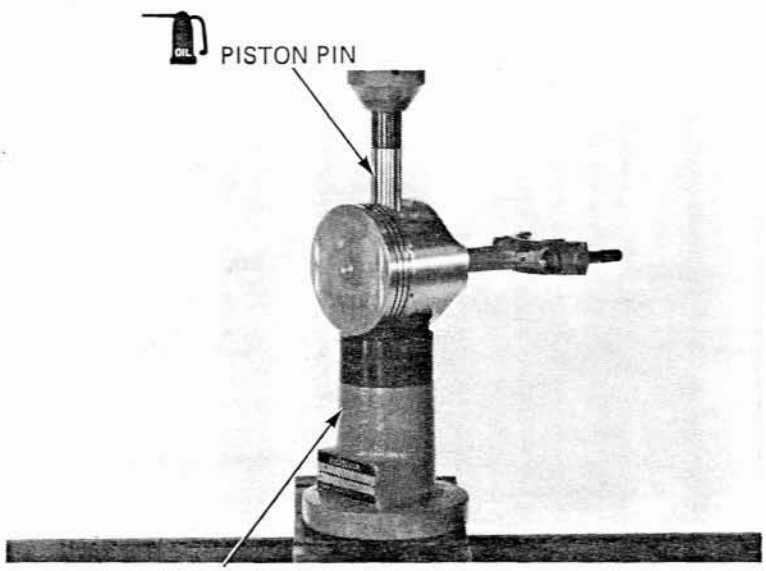


Coat the piston pin with clean engine oil.
Press the new piston pin in to the connecting rod.

CAUTION:

Failue to align the piston correctly could result in piston damage.

Check that the pin is installed properly.



PISTON PIN DIS/ASSEMBLY TOOL SET
07973–MG90000

Before installing pistons, apply a coat of oil to ring grooves, cylinder bores, and rod bearings.

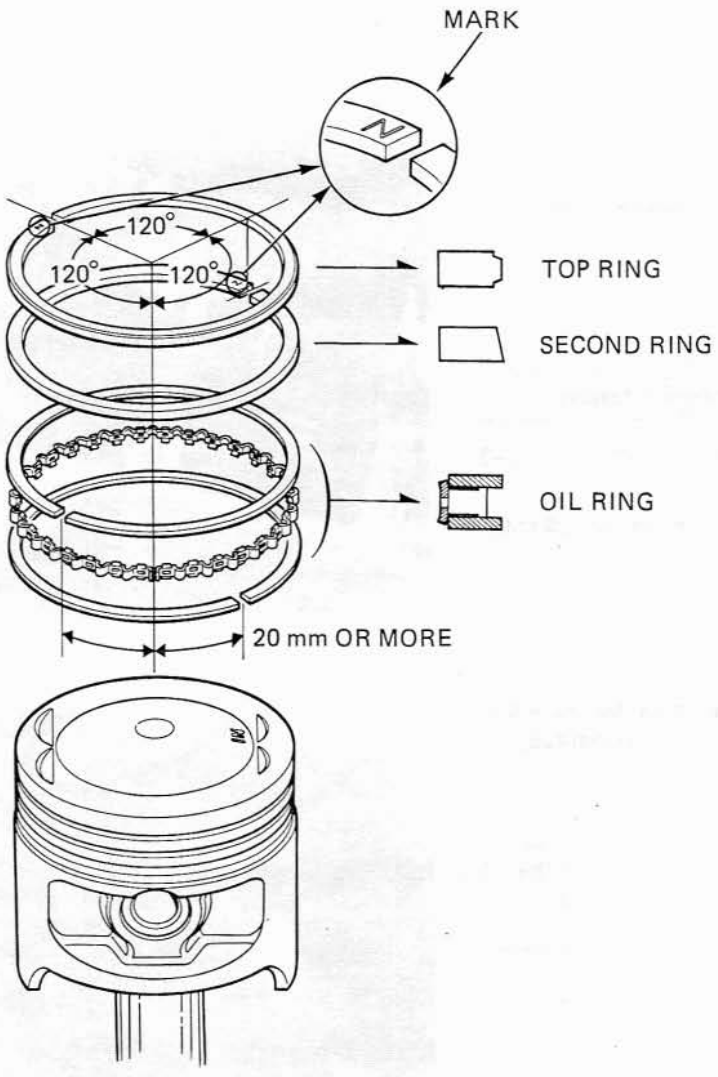
Carefully install the piston rings onto the piston.

NOTE:

> All rings should be installed with the markings toward the top of the piston. After installation they should be free to rotate in the piston ring grooves.

Stagger the piston ring end gaps 120° apart.

Stagger the oil ring and side rail end gaps as shown.

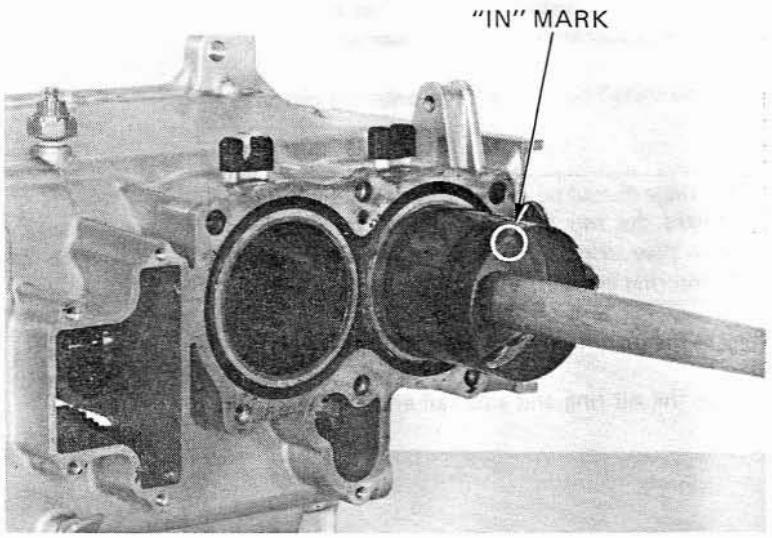


Apply molybdenum disulfide grease to the crankpin bearings.

Install the right side rod assemblies into cylinders No.1 and 3 in their original positions as marked before removal.

NOTE:

- To prevent damaging crankshaft, slip short sections of rubber hose over the rod bolts before installation.
- Install the pistons so that the "IN" mark on the piston top is towards the top of the engine.



Apply molybdenum disulfide grease to the rod cap bearings.

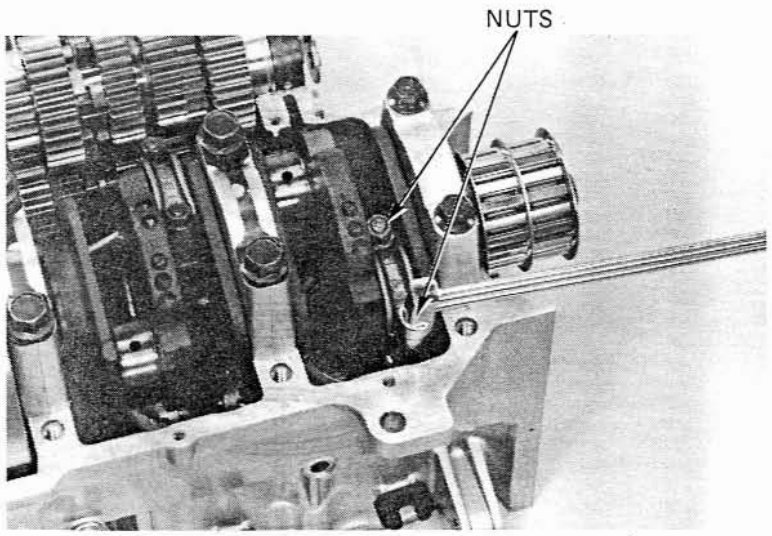
Install the No. 1 and No. 3 rod bearing caps on the correct crankpins.

CAUTION:

The bearing caps must be installed in their correct locations or the bearing oil crearance may not be correct causing engine damage.

Tighten the nuts in a crisscross pattern in 2–3 steps.

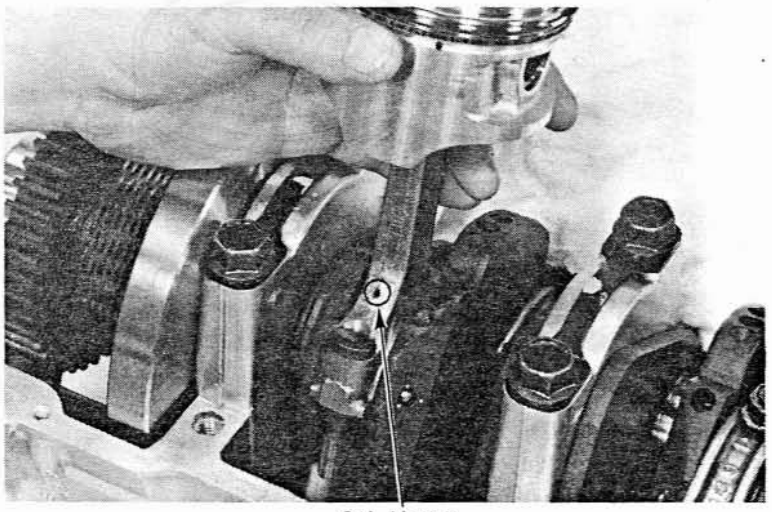
TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)



Install the left side rod assemblies for cylinders No. 2 and 4 in their original positions as marked.

NOTE:

Install the piston and connecting rod assemblies so that the intake "IN" marks on the pistons and oil holes in the rods are facing the top of the engine.



Apply molybdenum disulfide grease to the rod cap bearings.

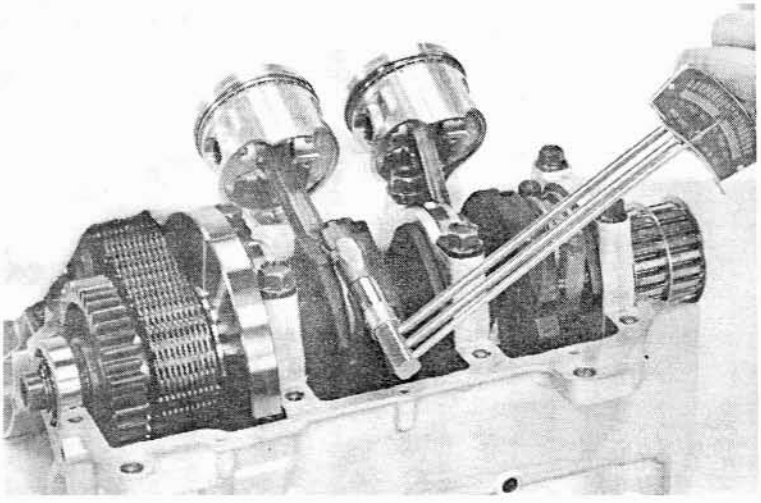
Install the caps on the correct crankpins by making reference to the mark on the side of the rod.

Tighten the cap nuts in a crisscross pattern in 2–3 steps.

TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)

Install the mainshaft in the right engine case (Page 10-21).

Assemble the engine case (Page 10-24).



CYLINDER COMPRESSION

Warm up the engine.
Stop the engine, then disconnect the spark plug caps and remove the spark plugs.
Insert the compression gauge.
Open the throttle all the way and crank the engine with the starter motor.

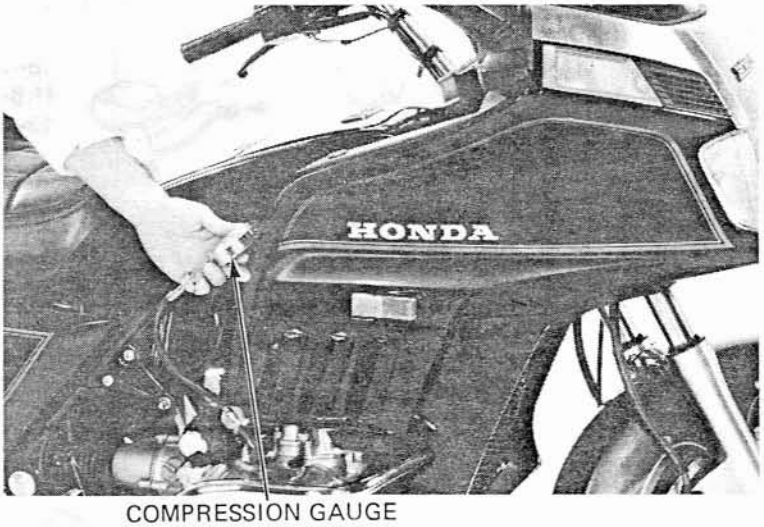
NOTE:

> Crank the engine until the gauge reading stops rising. The maximum reading is usually reached within 4-7 seconds.

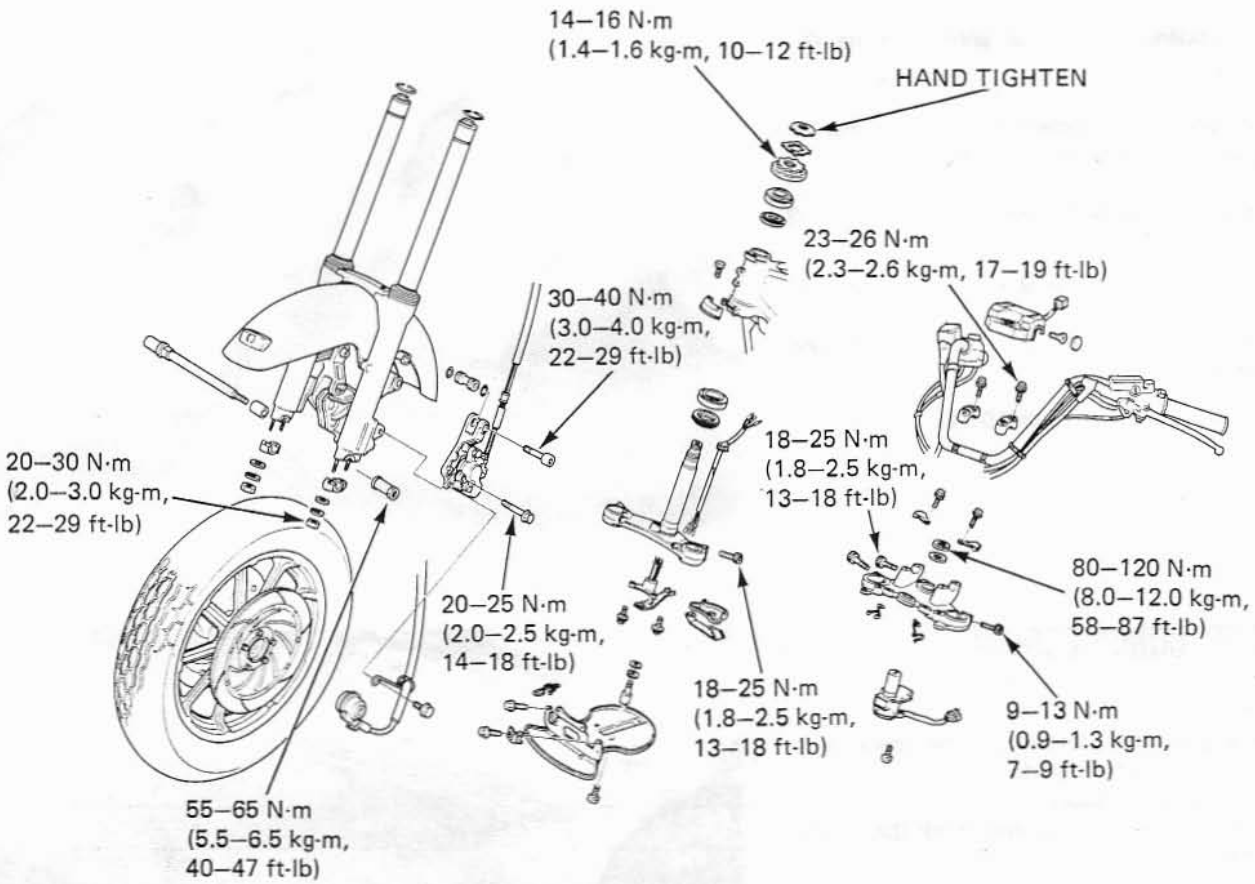
COMPRESSION PRESSURE:
1,100–1,500 kPa (11–15 kg/cm², 156–213 psi)

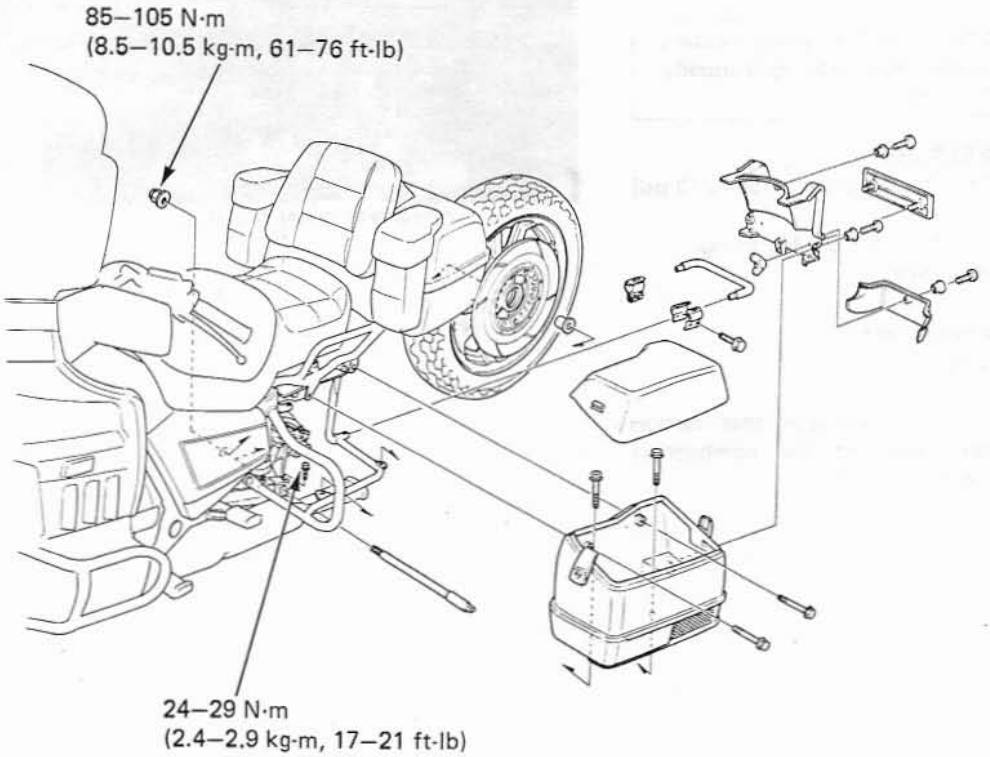
If compression is low, check for the following:
- Improper valve clearance
- Leaky valves
- Leaking cylinder head gasket
- Worn piston/ring/cylinder

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown.



COMPRESSION GAUGE





12. WHEEL/STEERING

SERVICE INFORMATION

GENERAL

- A jack or other support is required to support the motorcycle.
- Wheel bearings must not be re-used after they have been removed; Always use new bearings.
- Tubeless tire removal, repair and remounting procedures are covered in the Tubeless Tire Manual.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Axle runout		–	0.2 (0.01)
Wheel rim runout	Radial	–	2.0 (0.08)
	Axial	–	2.0 (0.08)

TORQUE VALUES

Front axle nut	55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)
Front axle holder nut	20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)
Front brake caliper bracket bolt (upper)	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
(lower)	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Front brake caliper bolt	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Brake disc bolt/nut	27–33 N·m (2.7–3.3 kg-m, 20–24 ft-lb)
Rear axle nut	85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)
Rear axle pinch bolt	24–29 N·m (2.4–2.9 kg-m, 17–21 ft-lb)
Shock absorber lower mount bolt (right)	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Shock absorber lower mount bolt (left)	65–75 N·m (6.5–7.5 kg-m, 47–54 ft-lb)
Handlebar holder bolt	23–26 N·m (2.3–2.6 kg-m, 17–19 ft-lb)
Steering stem nut	80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb)
Top bridge pinch bolt	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
Steering stem adjustment nut	14–16 N·m (1.4–1.6 kg-m, 10–12 ft-lb)
Fork air equalizer set screw	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Fork equalizer air valve	4–7 N·m (0.4–0.7 kg-m, 3–5 ft-lb)
Front fork pinch bolt (upper)	9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb)
(lower)	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)

TOOLS

Special

Steering stem socket	07916–3710100
Ball race remover	07953–4250002
Bearing race remover	07946–3710500
Steering stem driver	07946–MB00000
Attachment	07946–3710701 or 07946–3710700

Common

Attachment, 42 x 47 mm	07746–0010300
Pilot, 15 mm	07746–0040300
Driver	07749–0010000
Bearing remover corret, 15 mm	07746–0050400
Bearing remover expander	07746–0050100
Bearing remover corret, 20 mm	07746–0050600
Attachment, 52 x 55 mm	07746–0010400
Pilot, 20 mm	07746–0040500
Lock nut wrench, 26 x 30 mm	07716–0020203

TROUBLE SHOOTING

Hard steering
- Steering adjustment nut too tight
- Faulty steering stem bearings
- Damaged steering stem bearings
- Insufficient tire pressure

Steers to one side or does not track straight
- Bent forks
- Bent frame
- Forks installed incorrectly
- Axle installed incorrectly
- Bent swing arm
- Wheel installed incorrectly

Front wheel wobbling or vibration
- Loose axle (front or rear)
- Loose wheel bearings
- Loose steering stem nut or bearings
- Loose lock nut(s) os swing arm pivot bolt
- Unbalanced tire and wheel
- Bent wheel
- Excessive lateral wheel runout
- Bent forks
- Bent swing arm
- Bent or cracked frame
- Loose engine mounts

FRONT WHEEL

REMOVAL

Put the motorcycle on its center stand.

Raise the front wheel off the ground by placing a block or safety stand under the engine.

GL1200D:
Disconnect the speedometer cable from the speedometer gear box.
GL1200A:
Remove the speed sensor from the speedometer gear box.

Remove the right and left caliper assemblies by removing the caliper bracket mount bolts.

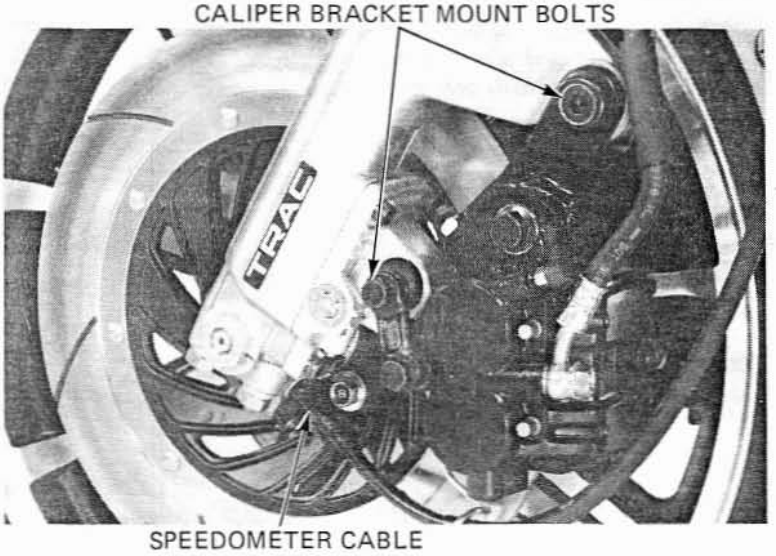
CAUTION:

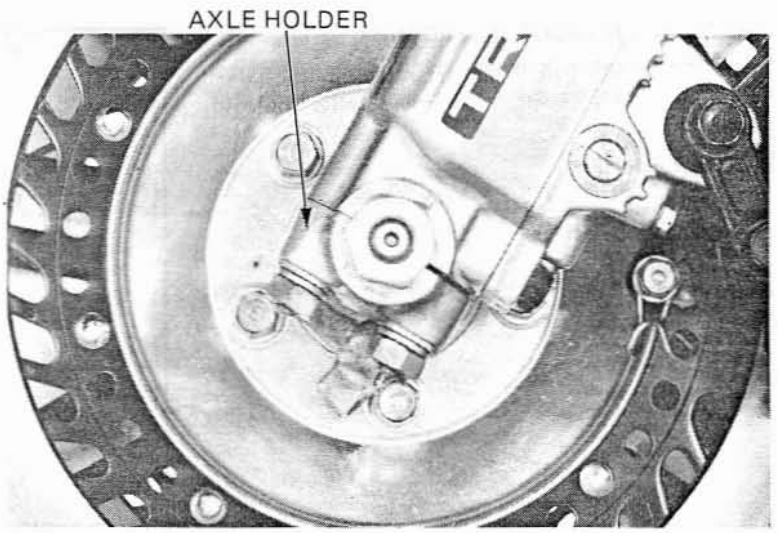
Support the caliper assembly so that it does not hang from the brake hose. Do not twist the brake hose.

Remove the axle holders and the front wheel.

NOTE:

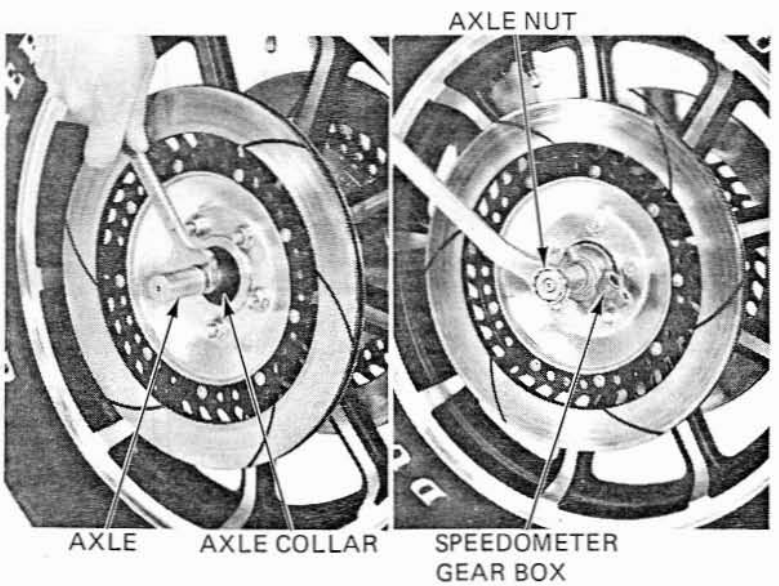
Do not depress the brake lever or pedal when the wheel is off the motorcycle or it will be difficult to refit the disc between the brake pads.





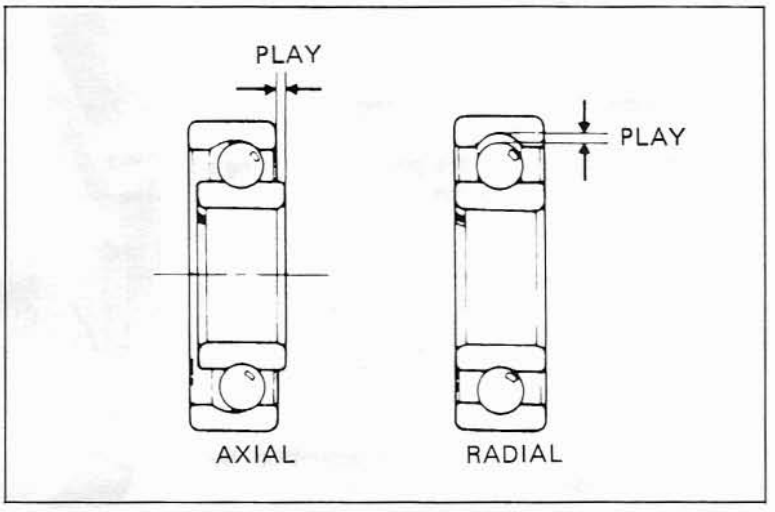
DISASSEMBLY

Remove the axle nut, speedometer gear box, axle and collar.



WHEEL BEARING INSPECTION

Check the wheel bearing play by placing the wheel in a truing stand and spinning the wheel by hand. Replace the bearings with new ones if they are noisy or have excessive play.



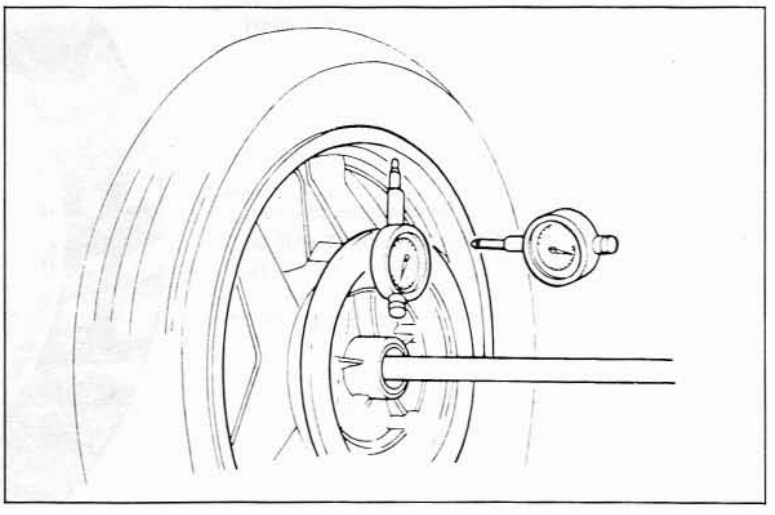
WHEEL RIM RUNOUT INSPECTION

Place the wheel in a truing stand. Spin the wheel slowly and measure the runout with a dial indicator gauge.

SERVICE LIMITS:

RADIAL RUNOUT: 2.0 mm (0.08 in)
AXIAL RUNOUT: 2.0 mm (0.08 in)

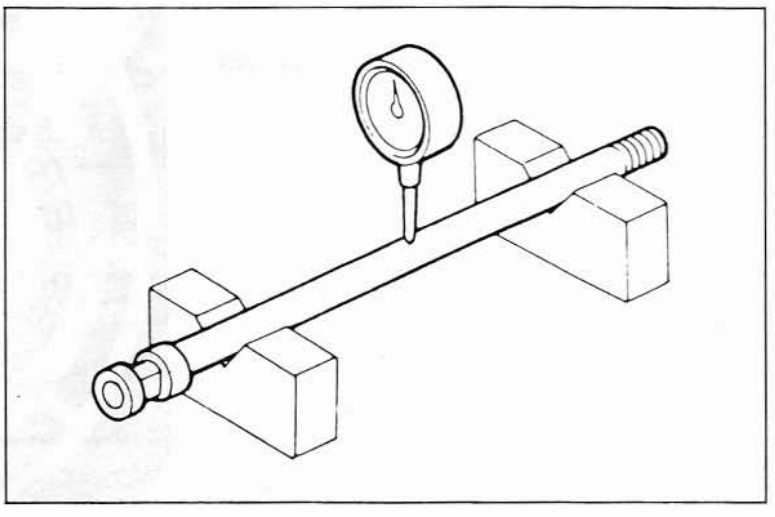
Replace the wheel if the runouts are exceeded the service limits.



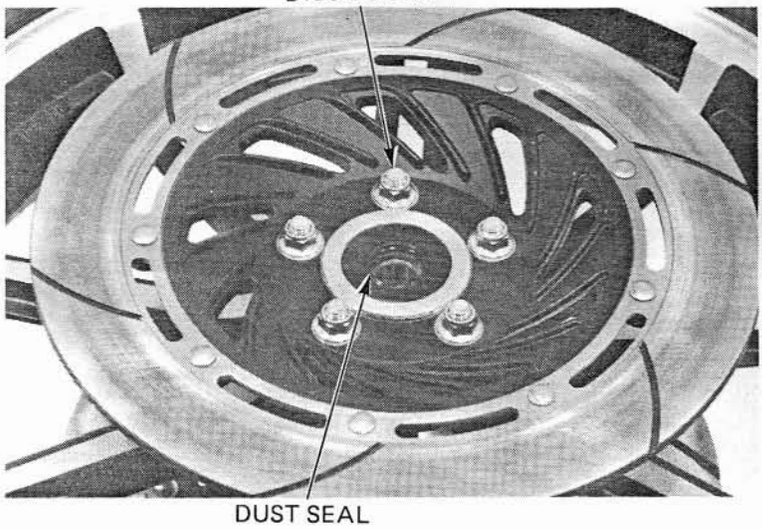
AXLE INSPECTION

Set the axle in V blocks and measure the runout. The actual runout is 1/2 of the toral indicator reading.

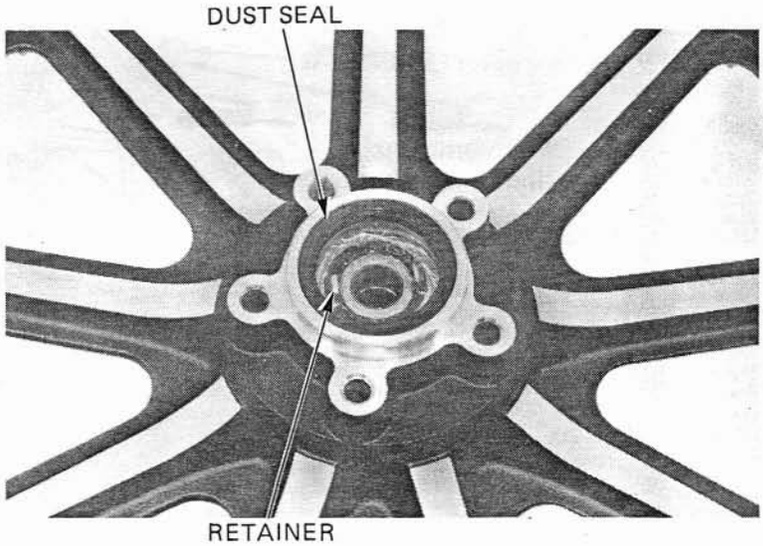
SERVICE LIMIT: 0.2 mm (0.01 in)



Remove the disc bolts, discs and dust seals.



Remove the dust seal and speedometer gear retainer.

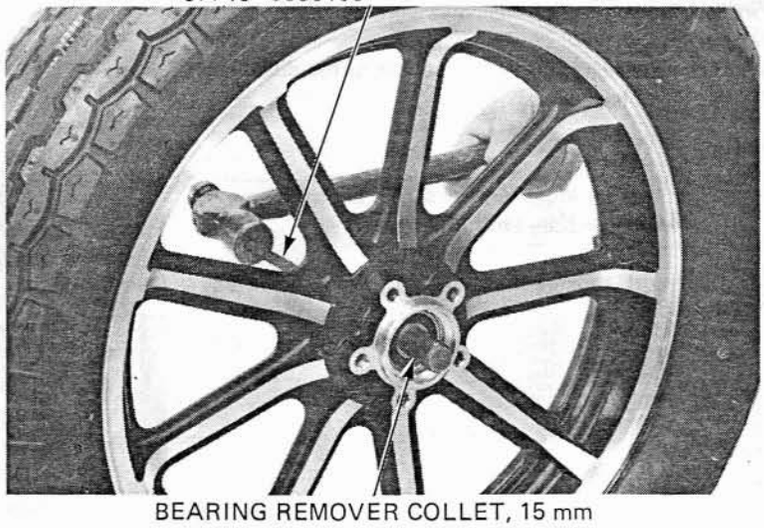


Remove the bearings and the distance collar from the hub.

NOTE:

> If the bearings are removed, replace them with new bearings during assembly.

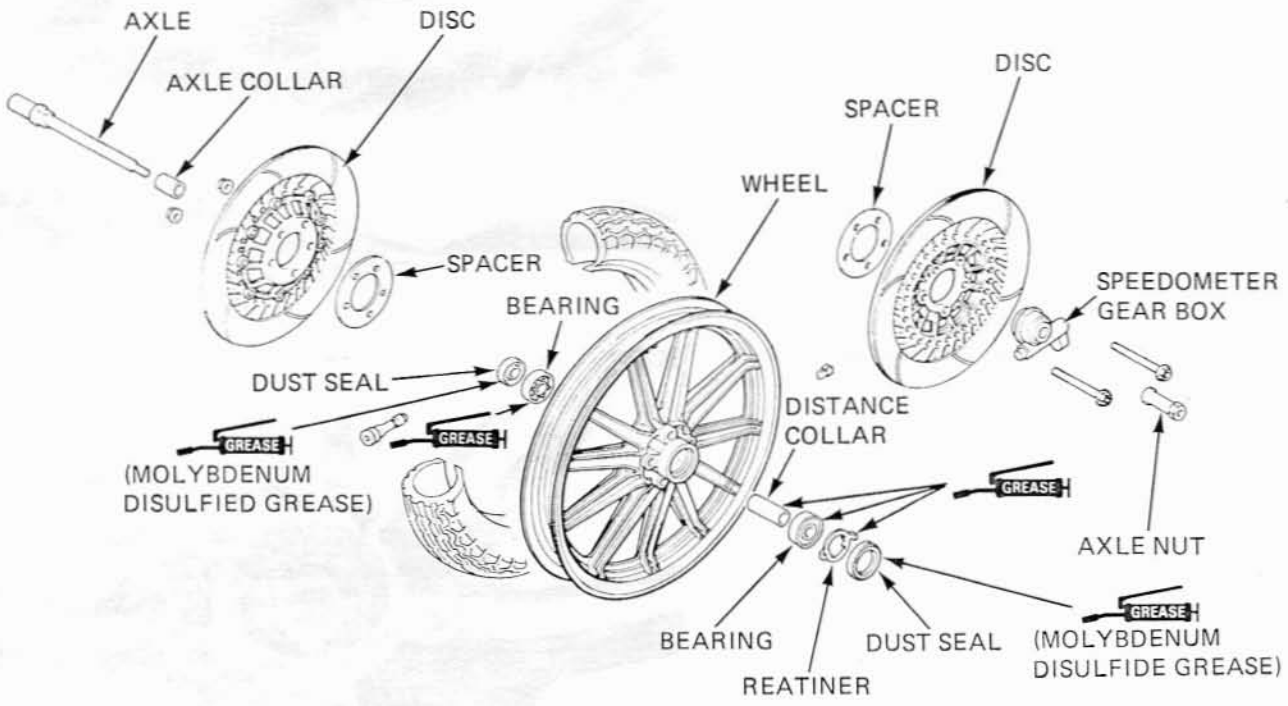
BEARING REMOVER EXPANDER
07746–0050100



ASSEMBLY

WARNING

Do not get grease on the brake disc or braking power will be eliminated.

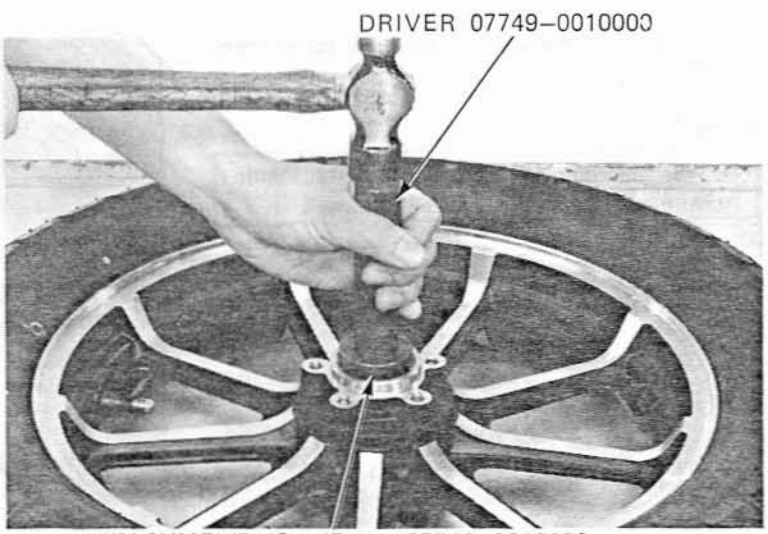


Pack the bearing cavities with grease if new ones are being installed.
Drive in the right bearing first and press the distance collar into place.

NOTE:

Install the bearings with the sealed ends facing out. Make sure they are fully seated.

Install the distance collar and then drive in the left bearing.



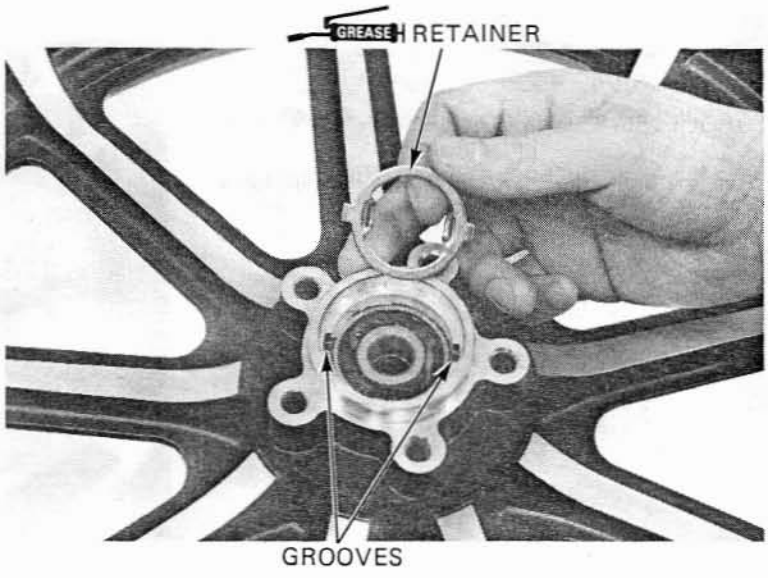
ATTACHMENT, 42 x 47 mm 07746–0010300
AND PILOT, 15 mm 07746–0040300

Lubricate the retainer with grease.
Install the speedometer gear retainer into the wheel hub.

NOTE:

> Align the tabs on the retainer with groove in the hub.

Install the dust seal into the hub.



Coat the dust seal lip with molybdenum disulfide grease.

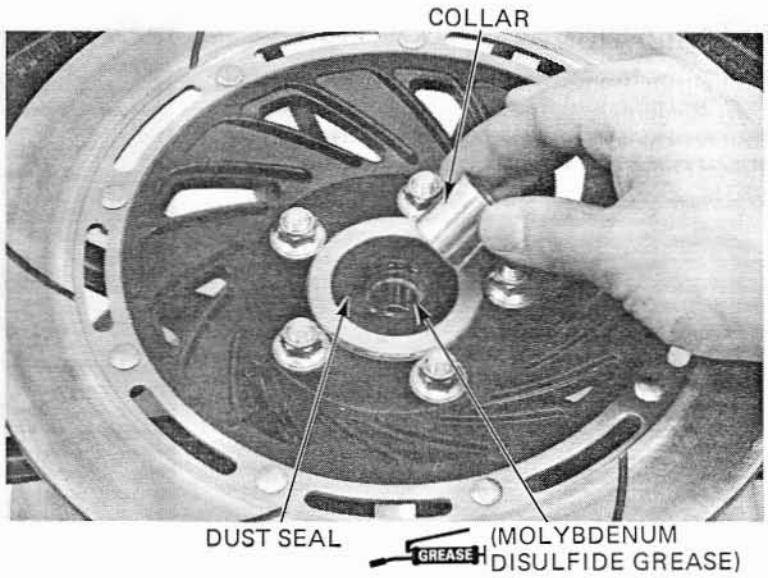
Install the dust seal and collar into the hub.

CAUTION:

> *Remove all the grease from around the outside of the dust seal.*

Install the discs, disc bolts and nuts.

TORQUE: 27–33 N·m (2.7–3.3 kg-m, 20–24 ft-lb)

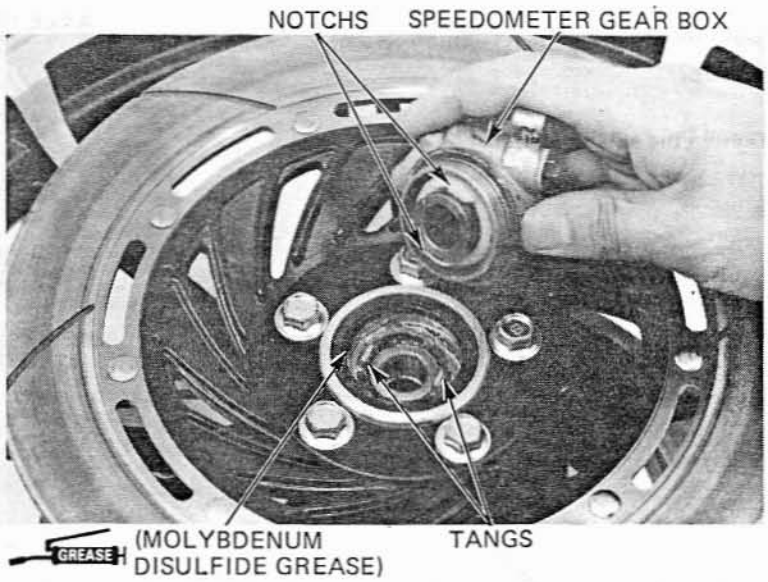


Coat the dust seal lip with molybdenum disulfide grease.

Lubricate the speedometer gear with grease.
Install the speedometer gear box in the wheel hub, aligning the gear box notches with the tangs in the retainer.

CAUTION:

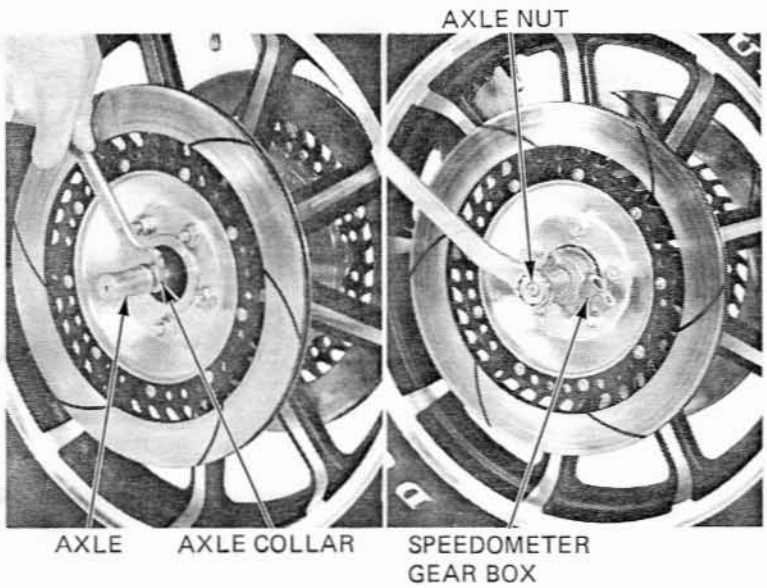
> *Remove all the grease around the outside of the oil seal.*



Install the axle from the axle collar side.
Install the axle nut and tighten the axle nut.

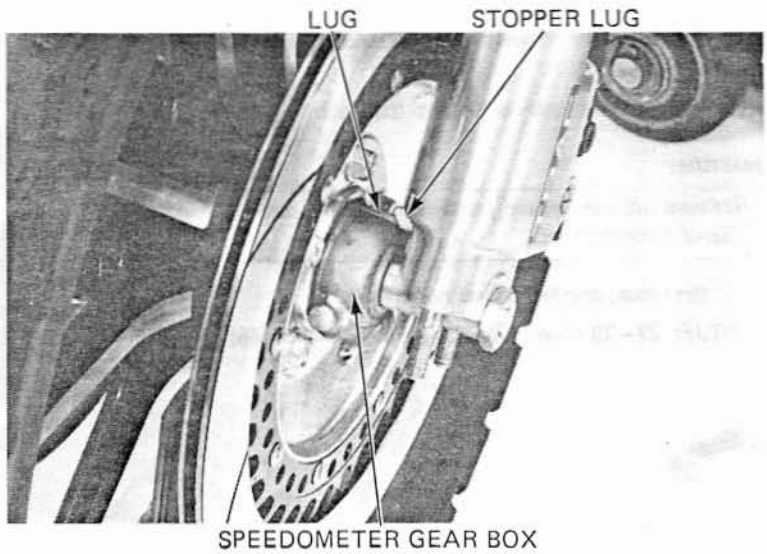
TORQUE: 55–65 N·m (5.5–6.5 kg-m, 40–47 ft-lb)

Clean the brake discs with a high quality degreasing agent.



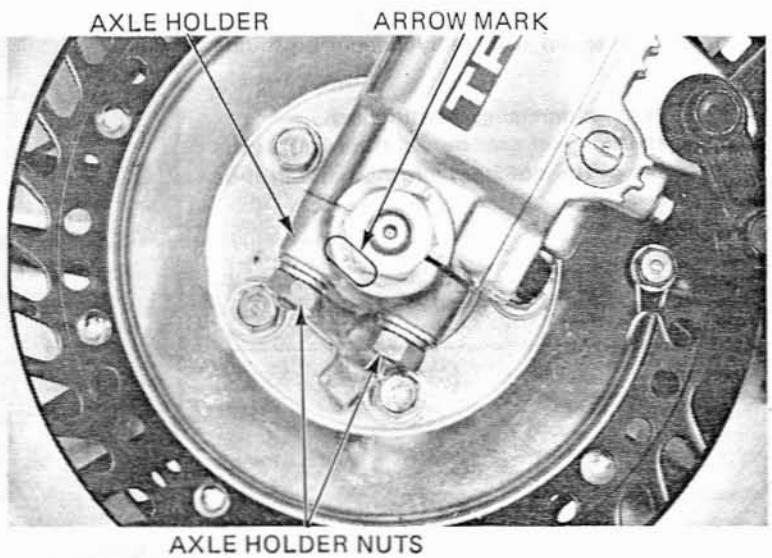
INSTALLATION

Position the front wheel between the fork legs and lower the forks onto the axle.
Position the speedometer gear box so that lug on the gear box is against rear of the stopper lug on left fork leg.



Install the axle holders with arrow mark facing forward.

Tighten the axle holder nuts loosely.



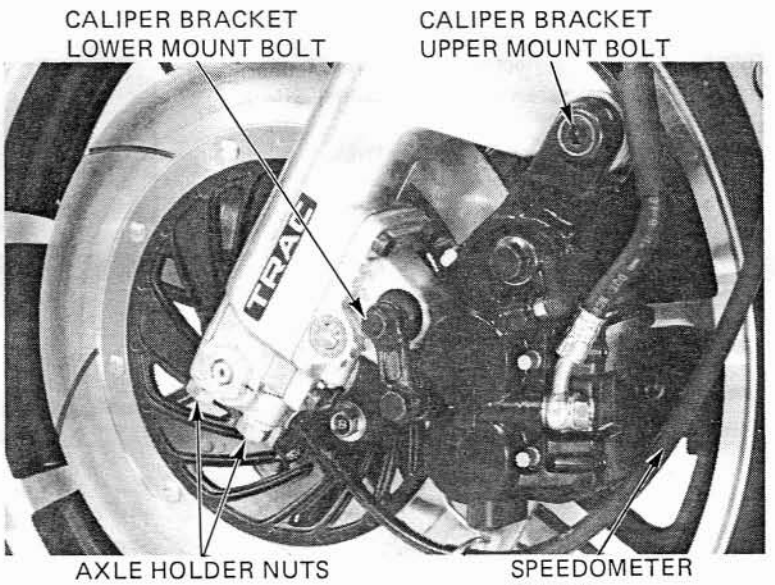
Install the right and left caliper assemblies on the fork legs.
Tighten the caliper bracket mount bolts.

TORQUE:
Upper bolt: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Lower bolt: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

Tighten the axle holder forward nuts to the specified torque first, then tighten the rear nuts to the same torque.

TORQUE: 20–30 N·m (2.0–3.0 kg-m, 22–29 ft-lb)

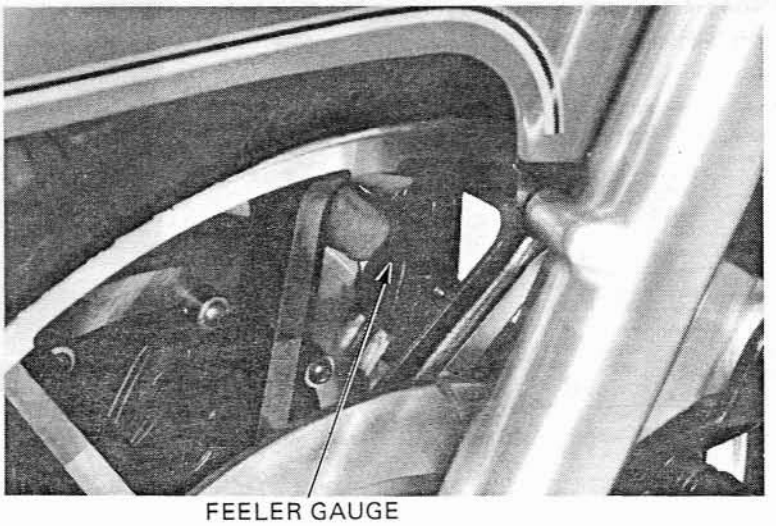
Connect the speedometer cable or speed sensor to the speedometer gear box.



Measure the clearance between each surface of the right brake disc and the right brake caliper bracket with a 0.70 mm (0.028 in) feeler gauge.
If the feeler gauge cannot be inserted easily, loosen the right axle holder nuts and move the right fork out until the gauge can be inserted.
Then retighten the right axle holder nuts.

CAUTION:

After installing the wheel, apply the brakes several times and recheck the caliper clearance on both sides. Failure to provide clearance will damage the brake discs and affect braking efficiency.

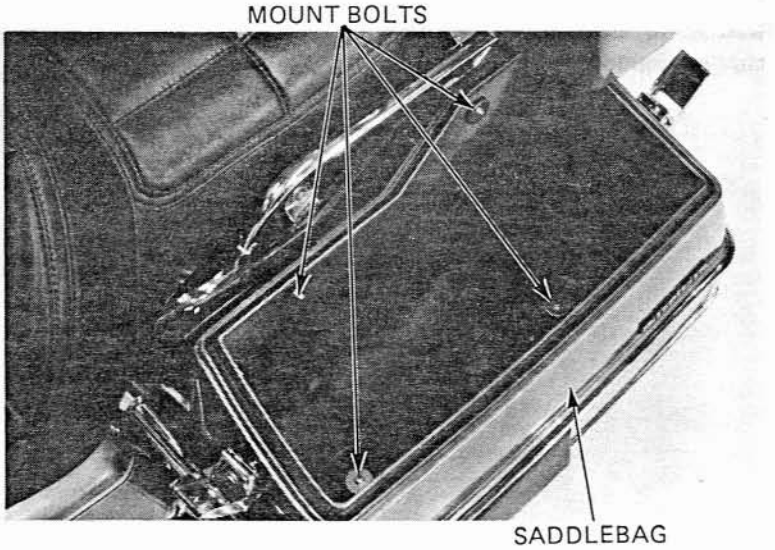


REAR WHEEL

REMOVAL

Put the motorcycle on its center stand.

Remove the four left saddlebag mount bolt and two nuts.



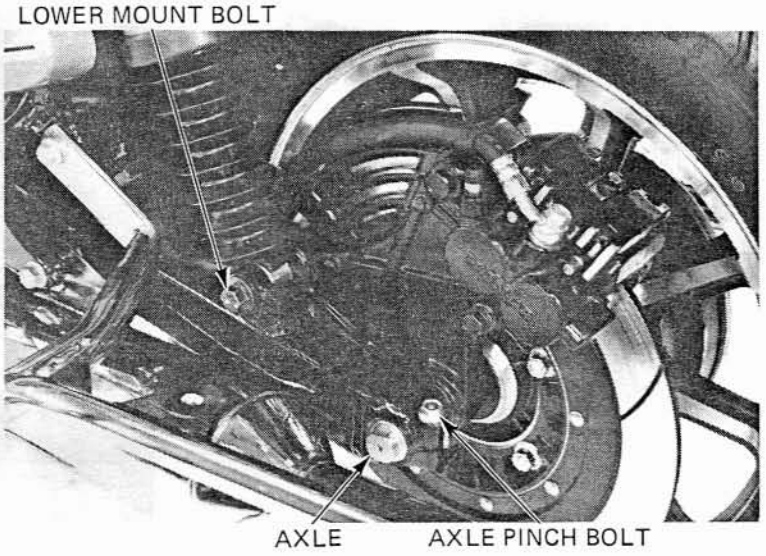
Remove the left shock absorber lower mount bolt.
Remove the axle pinch bolt.

Raise the rear wheel with a block large enough that the axle clears the muffler.

Remove the axle and move the caliper assembly outward to allow removal of the rear wheel.
Remove the rear wheel.

NOTE:

> Do not depress the brake pedal while the wheel is off the motorcycle or it will be difficult to refit the brake caliper.



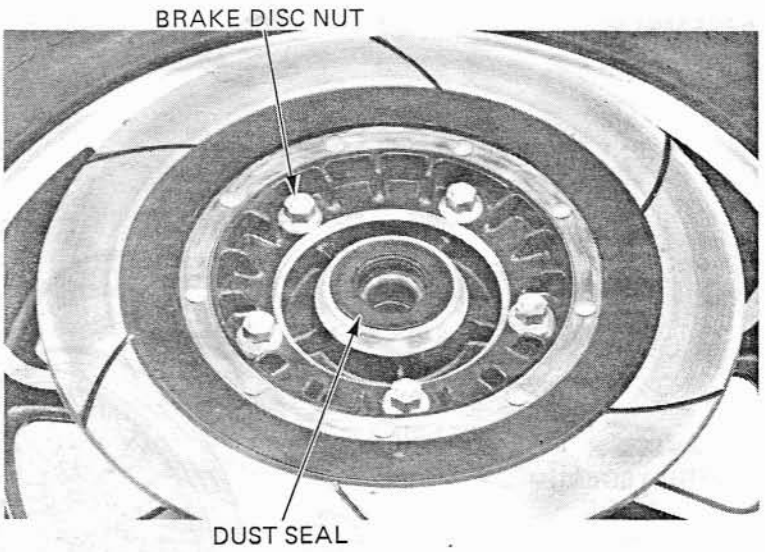
INSPECTION

Inspect the wheel as described in front wheel section.

- Axle inspection (Page 12-4).
- Wheel bearing inspection (Page 12-4).
- Wheel rim runout inspection (Page 12-4).

DISASSEMBLY

Remove the brake disc and dust seal from the wheel hub.



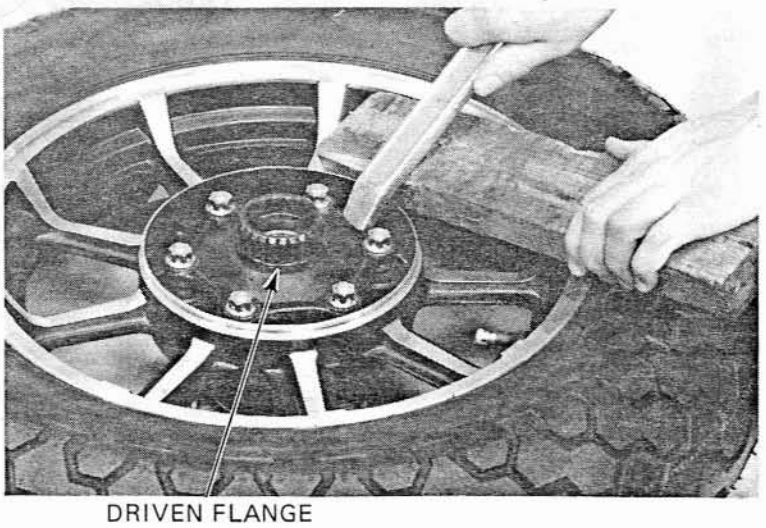
Remove the driven flange from the wheel hub.

CAUTION:

> *Be careful not to damage the wheel hub.*

NOTE:

> The pins and nuts cannot be removed.



Remove the bearings and distance collar from the rear wheel hub.

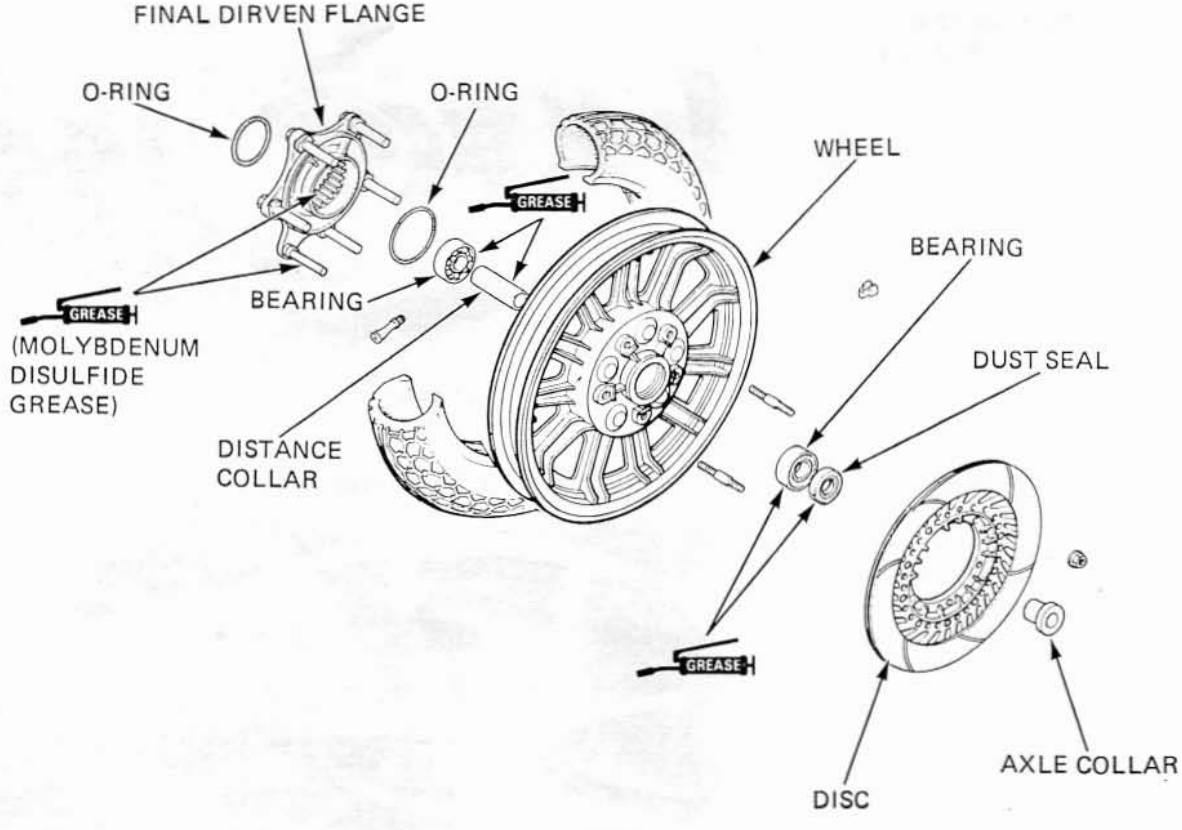
NOTE:

> If the bearings are removed, replace them with new bearings during assembly.

BEARING REMOVER EXPANDER
07746–0050100

BEARING REMOVER COLLET, 20 mm
07746–0050600

ASSEMBLY

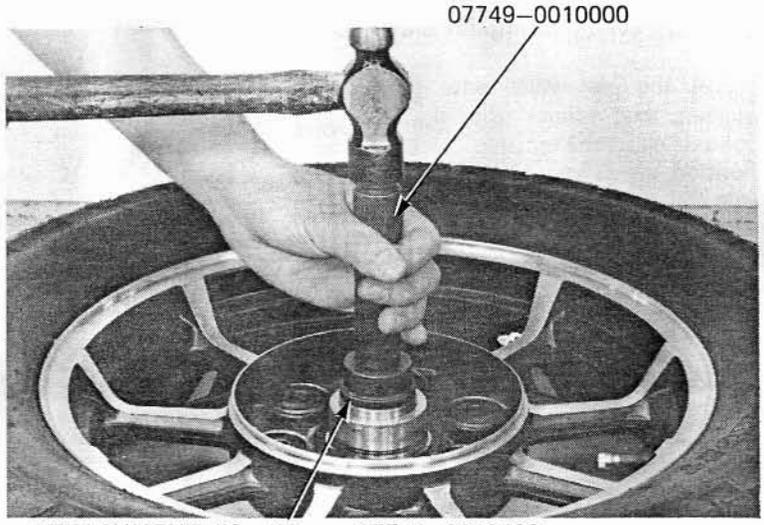


Pack new bearing cavities with grease and drive in the left bearing with a bearing driver.

NOTE:

> Drive the bearings in squarely with the sealed ends facing out. Make sure they are fully seated.

Install the distance collar and then drive in the right bearing.

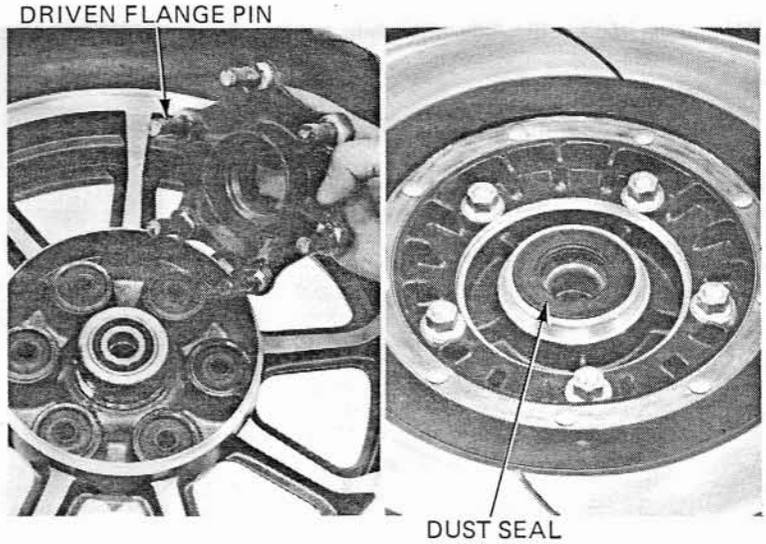


Lubricate the driven flange pin with molybdenum disulfide grease.
Install the driven flange to the wheel hub.

Lubricate the dust seal lip with grease and install the dust seal to the wheel hub.

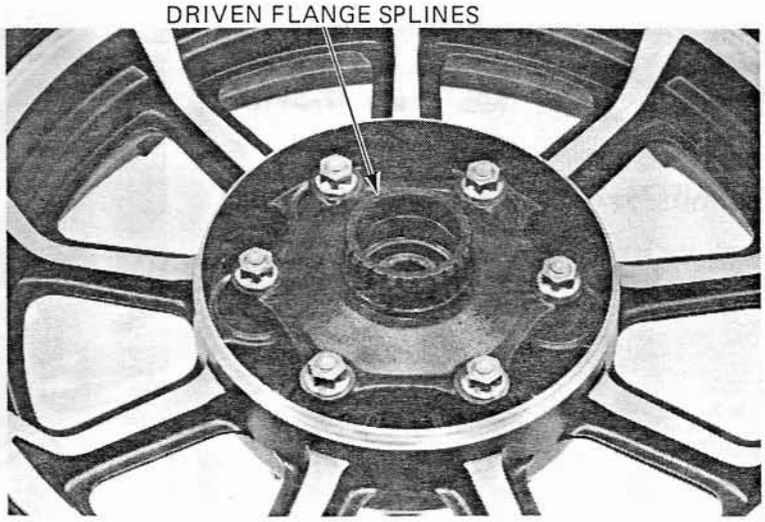
Install the brake disc and tighten the bolts.

TORQUE: 27–33 N·m (2.7–3.3 kg-m, 20–24 ft-lb)



REAR WHEEL INSTALLATION

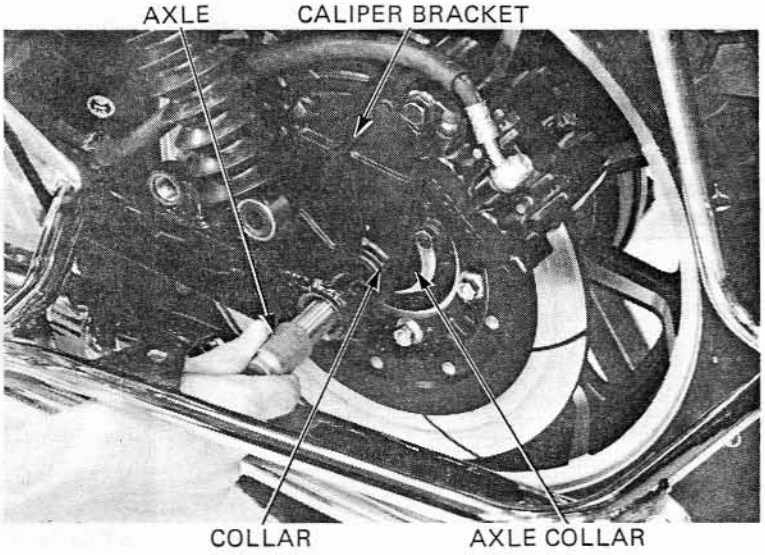
Apply molybdenum disulfide grease to the driven flange splines.



Install the axle collar into the dust seal.

Install the rear wheel onto the final gear case, aligning their splines. Rise the rear wheel so that the axle clears the muffler.
Position the caliper brackt and collar between the axle collar and swing arm as shown.

Insert the rear axle through the swing arm, washer, caliper bracket, collar and rear wheel.

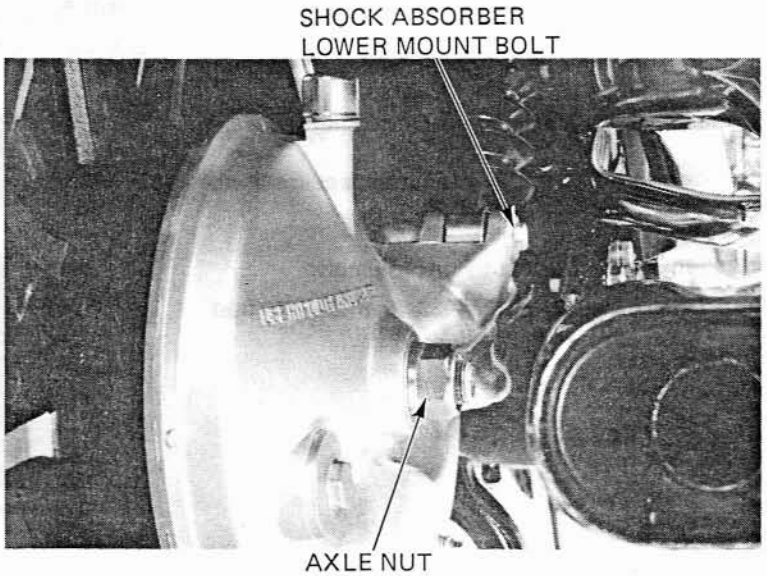


Install and tighten the axle nut while holding the left axle end.

TORQUE:
85–105 N·m (8.5–10.5 kg-m, 61–76 ft-lb)

Install and tighten the right shock absorber lower mount bolt.

TORQUE: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)



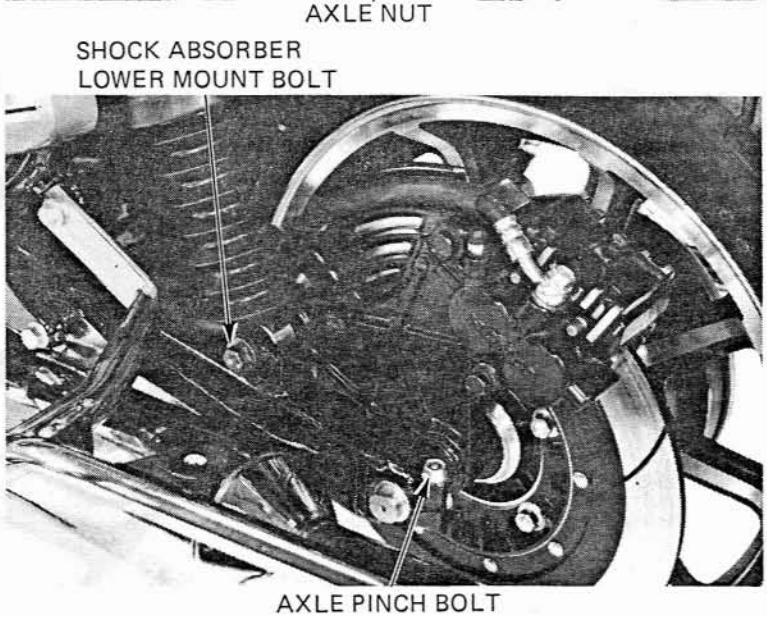
Install and tighten left shock absorber lower mount bolt.

TORQUE: 65–75 N·m (6.5–7.5 kg-m, 47–54 ft-lb)

Tighten the axle pinch bolt.

TORQUE: 24–29 N·m (2.4–2.9 kg-m, 17–21 ft-lb)

Install the rear bumber, rear fender, left saddlebag and reflex reflector in the reverse order or removal.



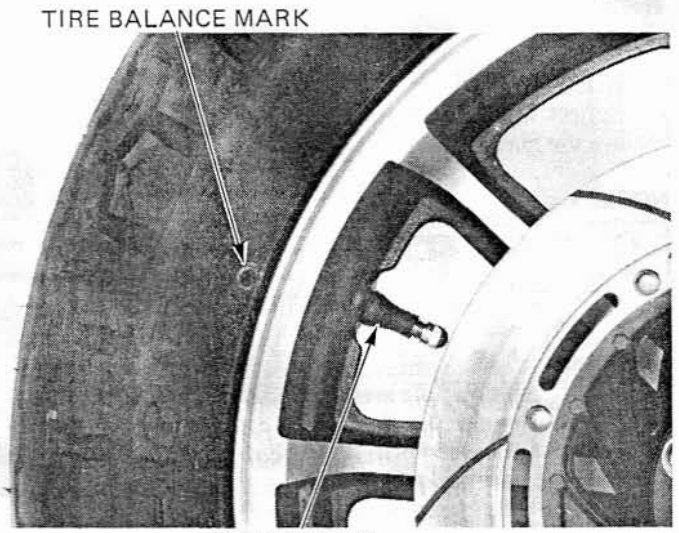
WHEEL BALANCING

CAUTION:

Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the rim.

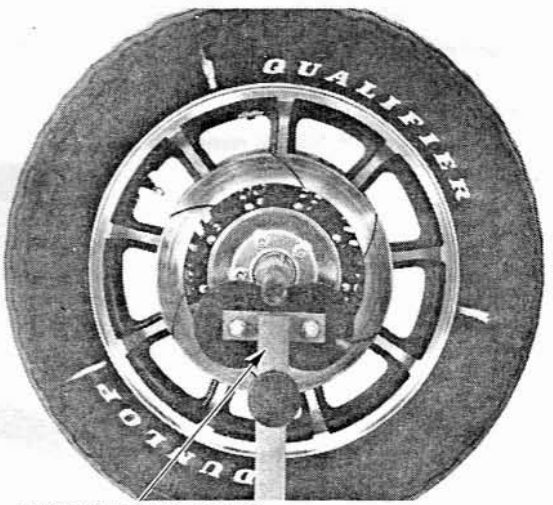
NOTE:

For optimum balance, the tire balance mark (a paint dot on the sidewall) must be located next to the valve stem. Remount the tire if necessary.

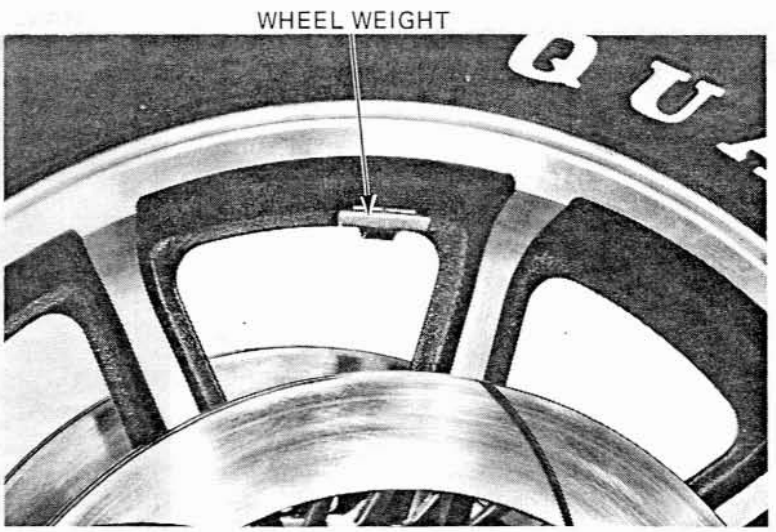


Mount the wheel, tire and brake disc assembly in an inspection stand. (If a stand is not available, mount the wheel on its axle and clamp the axle in a vise.)

Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk. Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.



To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it's spun. Do not add more than 60 grams.



HANDLEBARS

REMOVAL

Disconnect the front brake light switch wires and remove the master cylinder.

NOTE:

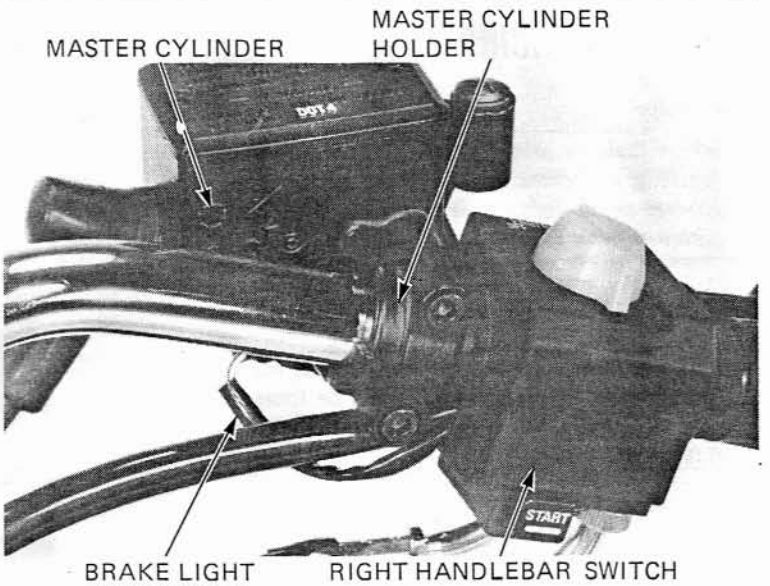
> Do not loosen the brake hose unless necessary.

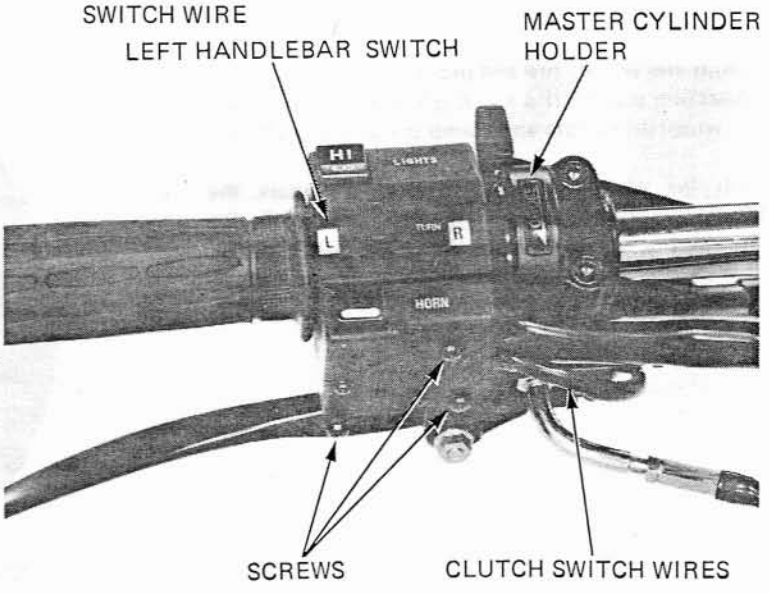
WARNING

- *After removing the master cylinder, keep it level. Do not tilt the master cylinder, or turn it upside down to prevent air from entering the brake hose.*
- *Do not hang the master cylinder by the brake hose.*

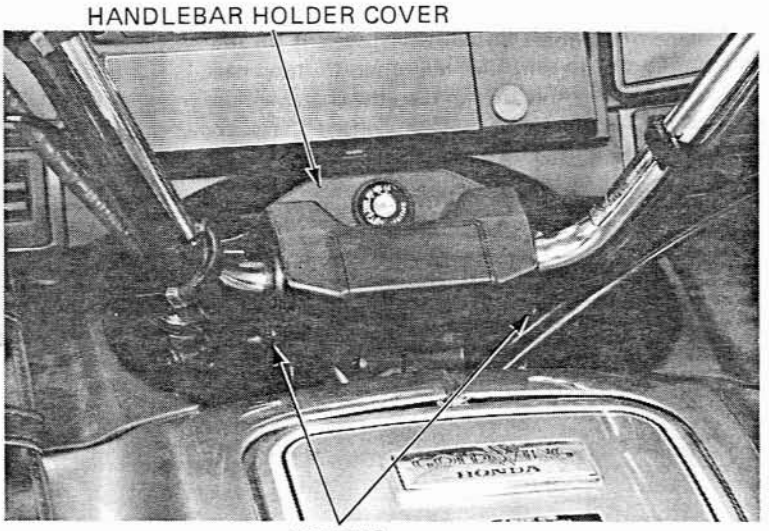
Remove the right handlebar switch attaching screws.

Remove the clutch master cylinder holder.
Disconnect the choke cable from the choke lever.
Disconnect the clutch switch wires.
Remove the left handlebar switch by removing the three screws.





Remove the handlebar holder cover.
Remove the wire band from the handlebar.



Remove the handlebar holder by removing the four socket bolt.
Slide the throttle grip off the handlebar.

INSTALLATION

Apply Honda Boud A to the inside surfase of the grips and to the clean surface of the left handlebar and throttle pipe. Wait 3-5 minutes and install the grips. Rotate the grips for even application of the adhesive.

NOTE:

> Allow the adhesive to dry for an hour before using.

When installing a new handlebar, apply grease to the right handlebar end, then slip on the throttle grip. Check that the throttle cables are not twisted.

Position the handlebar on the lower holders with the serrations aligned with the holders and the punch marks aligned with the tops of the holders.

Position the handlebar's upper holders on the handlebar with the punch marks on the holders forward. Apply oil to the thread of the socket bolts. Loosely install the four socket bolts.

Tighten the forward bolts to the specified torque first, then tighten the rear bolts to the same torque.

TORQUE: 23–26 N·m (2.3–2.6 kg-m, 17–19 ft-lb)

Install the handlebar holder cover.

Position the master cylinder on the handlebar. Loosely install the holder with the "UP" mark facing upward using the two bolts.

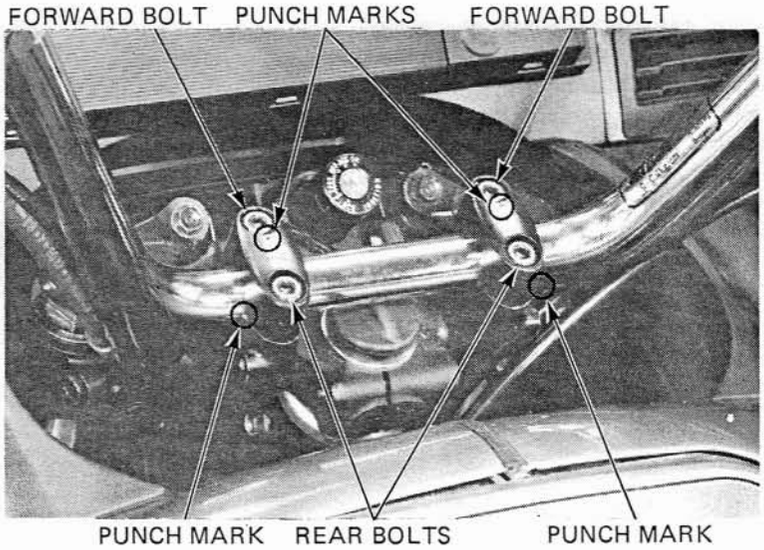
Align the lug on the holder with the punch mark on the handlebar.

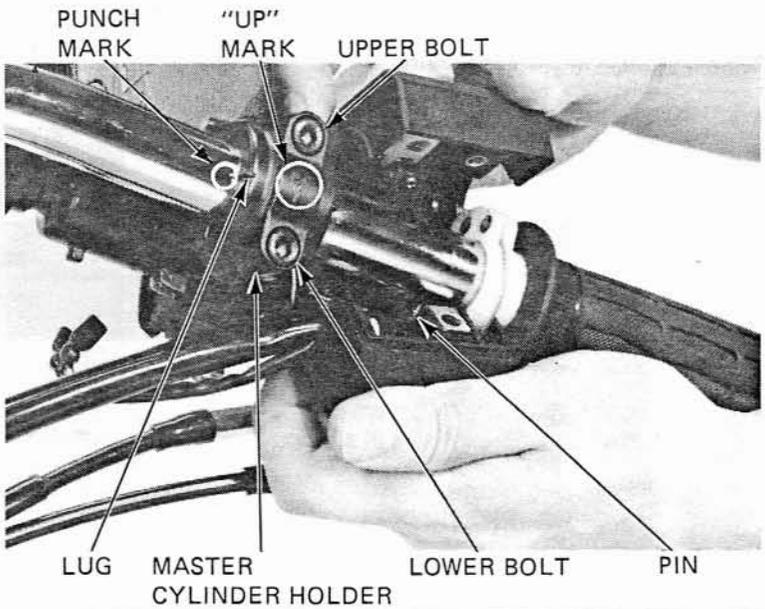
Tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

Insert the pin on the bottom half of switch assembly into the hole in the handlebar. Tighten the forward screws first, then tighten the rear screws to the same torque.

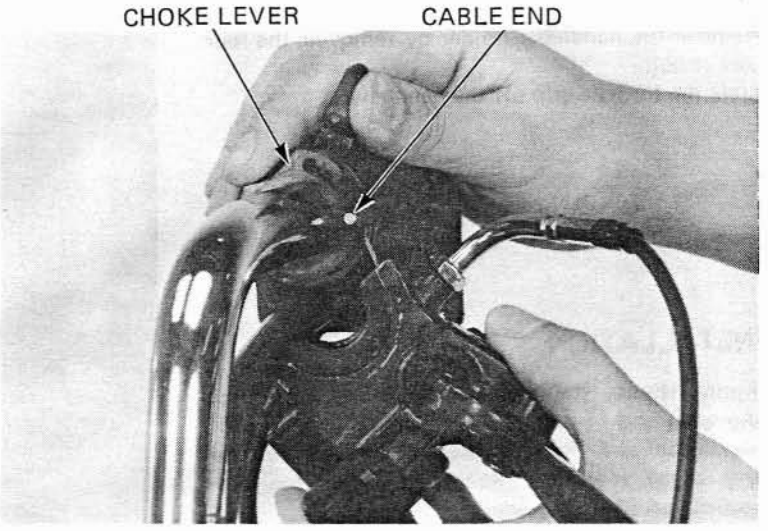
Connect the brake light switch wires.



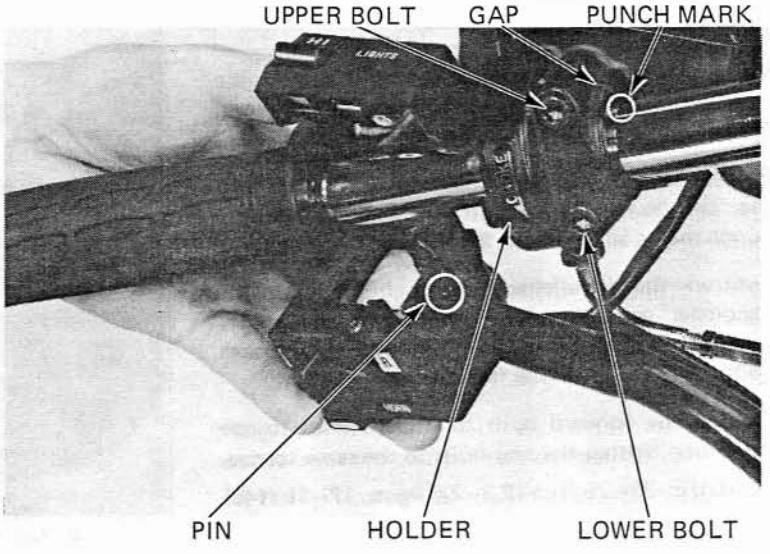


Apply contact cement to the left handlebar grip and push it into place.
Apply grease to the choke lever sliding surfaces.
Insert the choke cable end into hole of the choke lever.

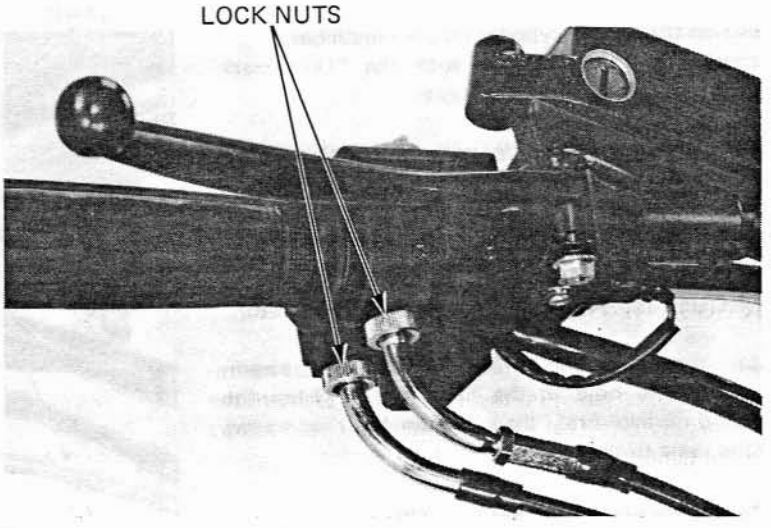
Loosely install the clutch master cylinder holder and bolts.



Align the gap between the holder and master cylinder with the punch mark on the handlebar.
Tighten the upper bolt first, then the lower bolt.
Insert the pin on the bottom half of switch assembly into the hole in the handlebar.
Tighten the forward screws first, then tighten the rear screw.
Connect the clutch switch wires.



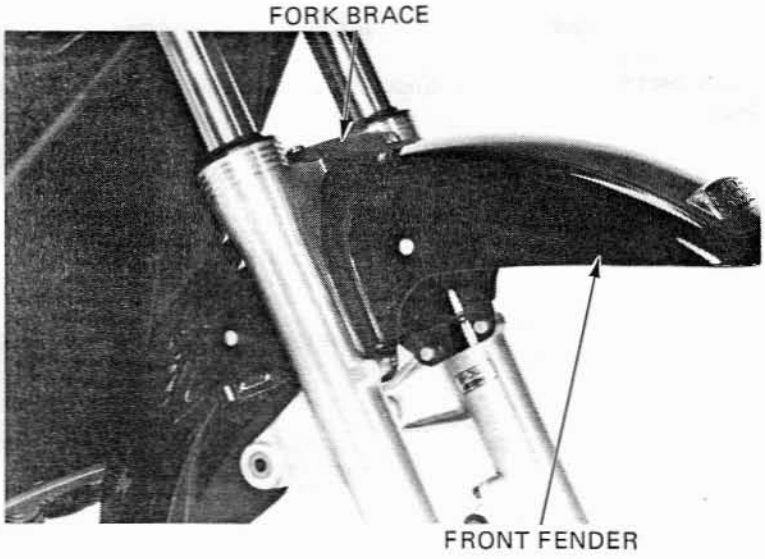
Tighten the throttle cable lock nuts.



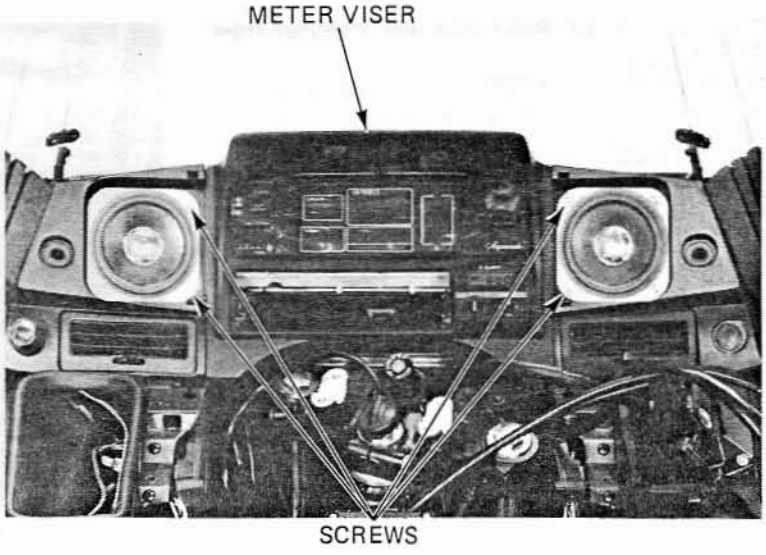
STEERING STEM

REMOVAL

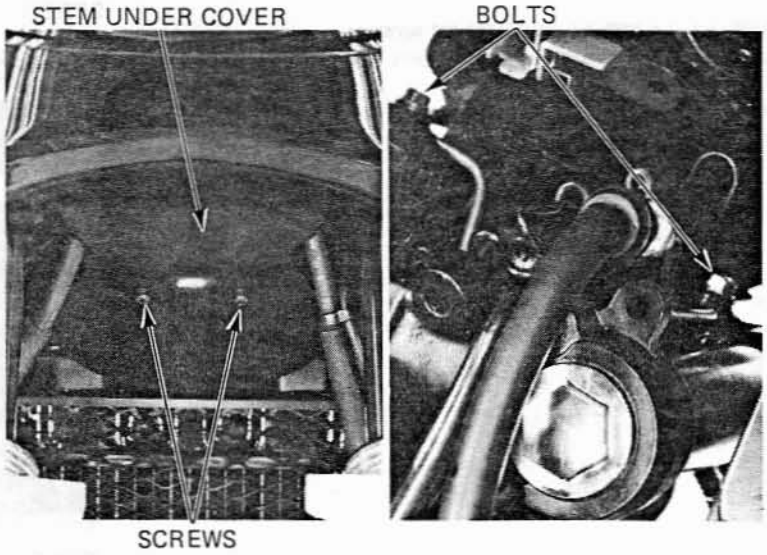
Remove the front wheel (Page 12-3).
Remove the handlebar from the top bridge.
Remove the front fender and fork brace.



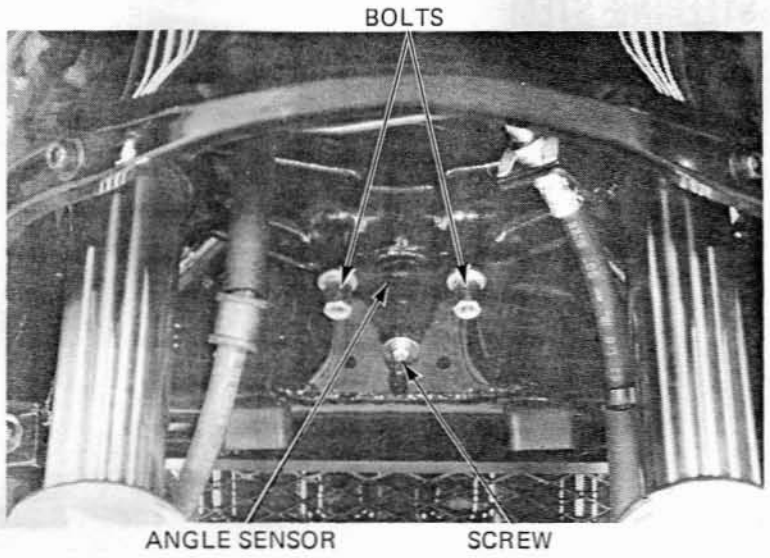
Remove the meter viser by removing speaker (GL1200A) or attaching screws.



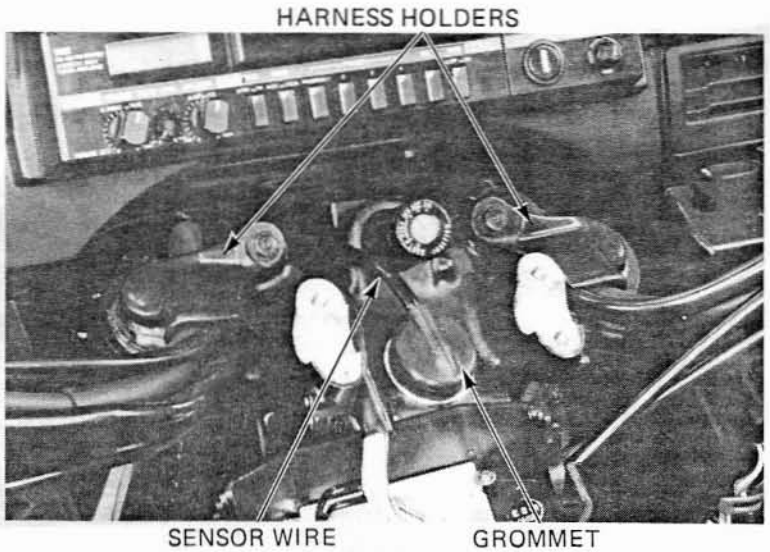
Remove the stem under cover by removing the two screws and bolts.



Remove the screw and two bolts, and pull out the angle sensor.
Disconnect the couplers and remove the sensor from the wire.

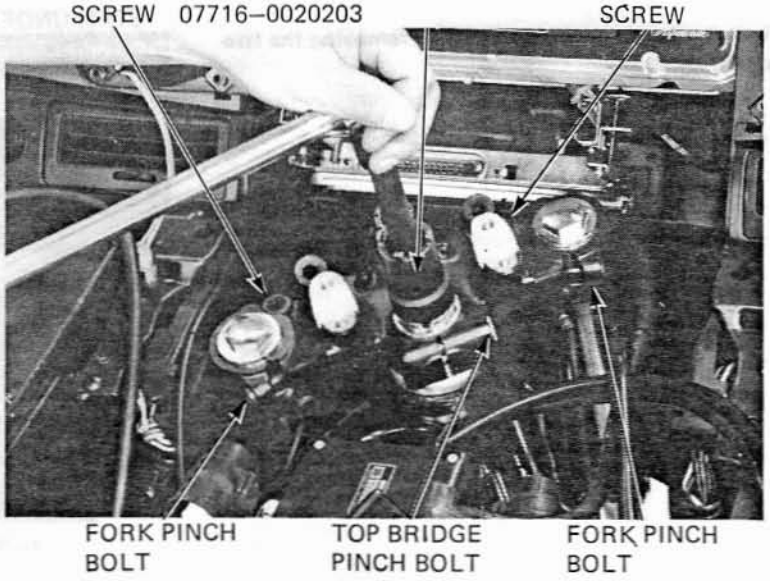


Remove the angle sensor wire and grommet from the stem nut.
Remove the harness holders from the top bridge.

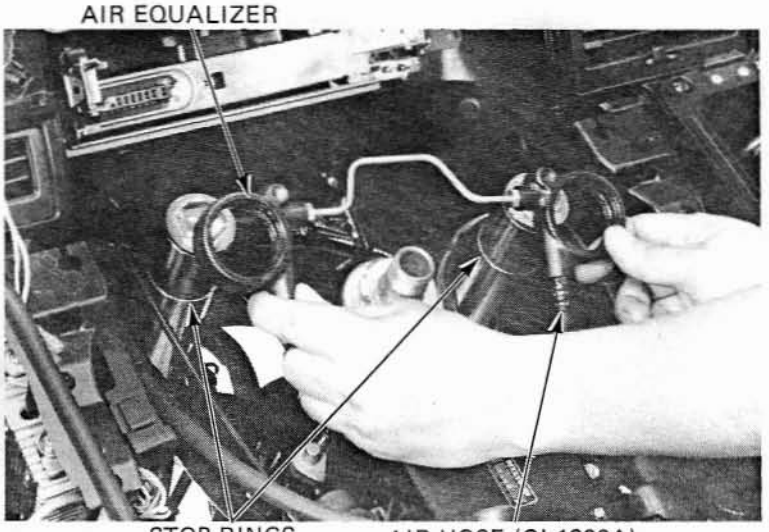


LOCK NUT WRENCH, 26 x 30 mm
07716–0020203

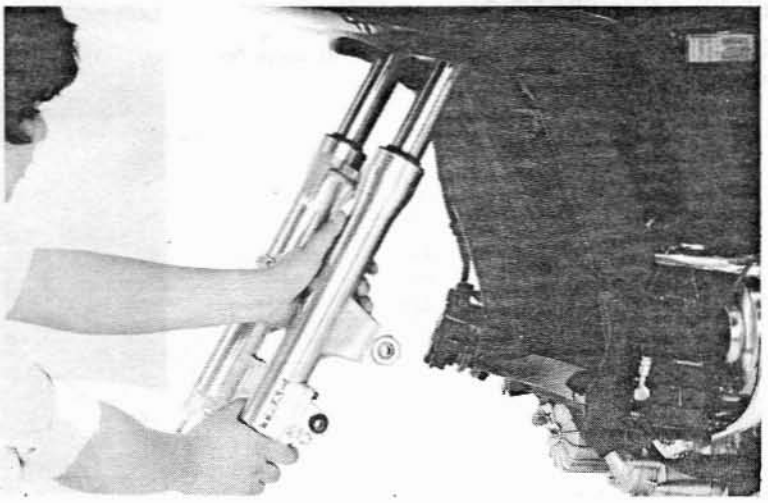
Remove the two air equalizer set screws.
Loosen the fork upper pinch bolts and top bridge pinch bolt.
Remove the stem nut and washer.
Remove the top bridge.



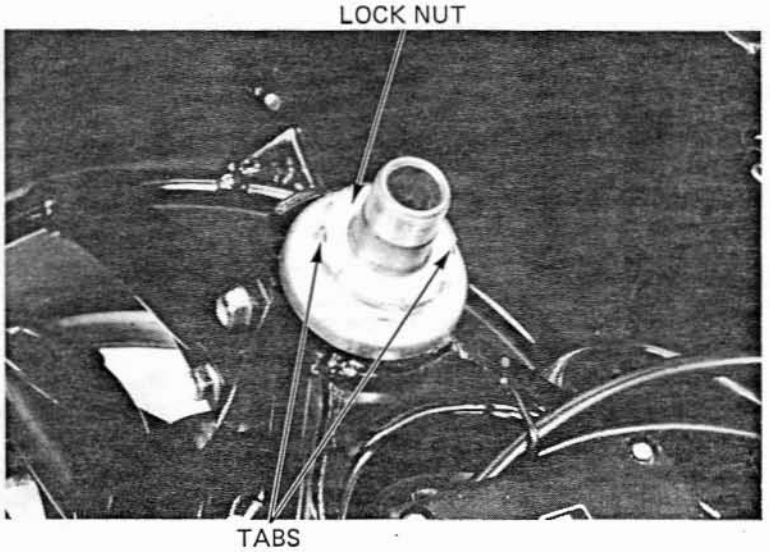
Disconnect the air hose from the air equalizer (GL1200A).
Remove the air equalizer and stop rings from the fork tubes.



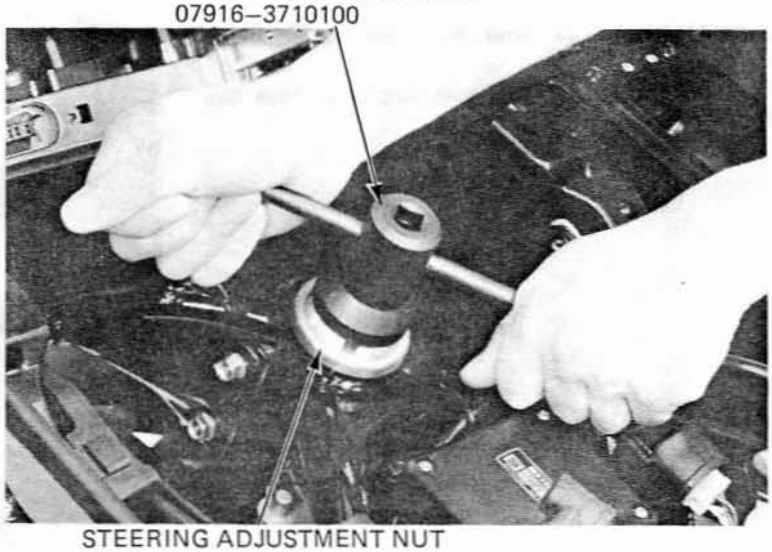
Loosen the fork lower pinch bolts and remove the front forks.



Straighten the tab of the lock washer and remove the lock nut.

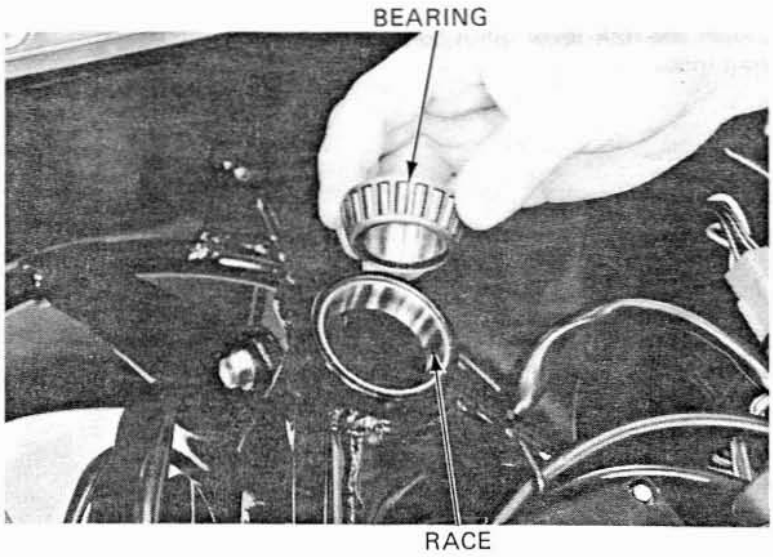


Holder the steering stem to prevent it from falling. Remove the steering adjustment nut and steering stem.



BEARING INSPECTION

Check the upper and lower bearings and races for wear or damage and replace if necessary.



BOTTOM BEARING REPLACEMENT

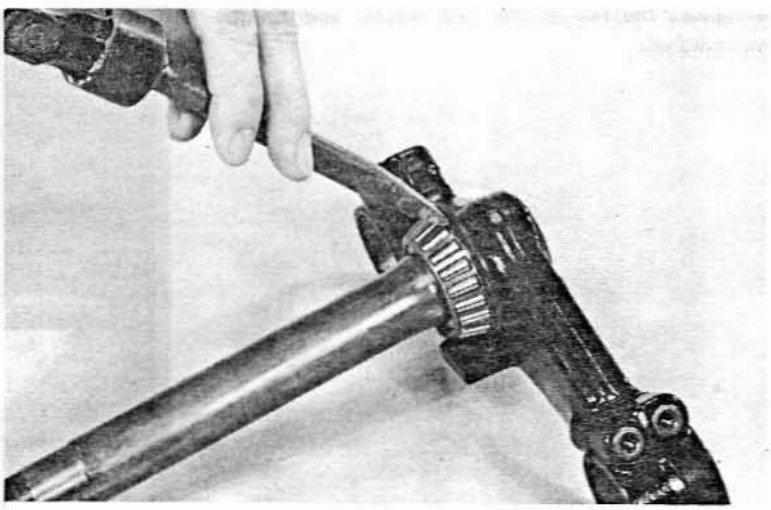
NOTE:

> Always replace the bearing and race as a set.

Remove the bottom bearing with a hammer and a drift.

NOTE:

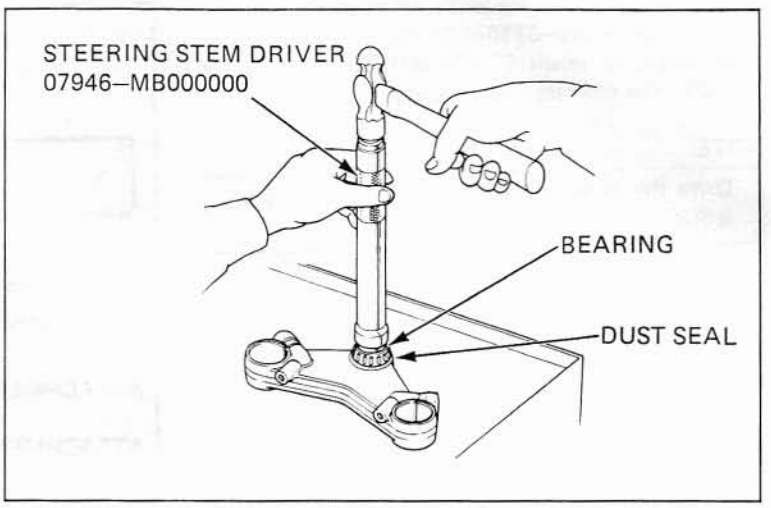
> - Install the adjustment nut on the top end of the steering stem to prevent damage to the threads.
> - The bearing and dust seal will be damaged during removal and will require replacement.



Install a new dust seal and drive a new bearing into place.

NOTE:

> Replace the dust seal and bearing whenever they are removed from the steering stem.

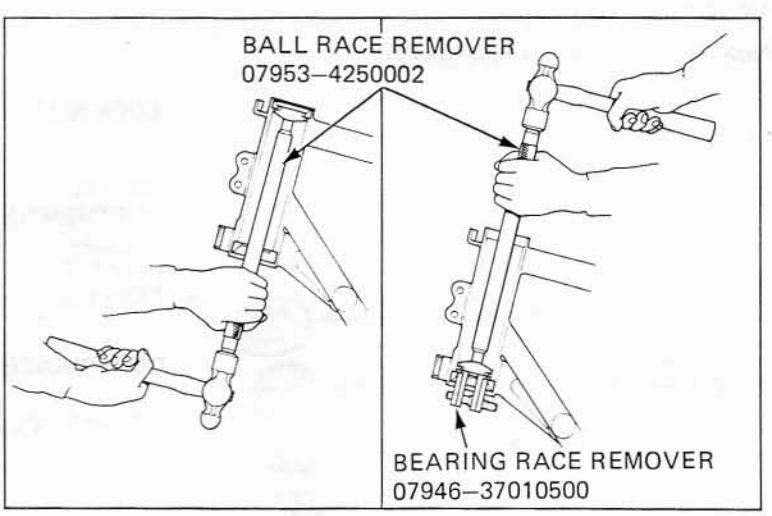


BEARING RACE REPLACEMENT

Inspect the top and bottom races and replace if worn or damaged.
Drive out the top race and then the bottom race.

NOTE:

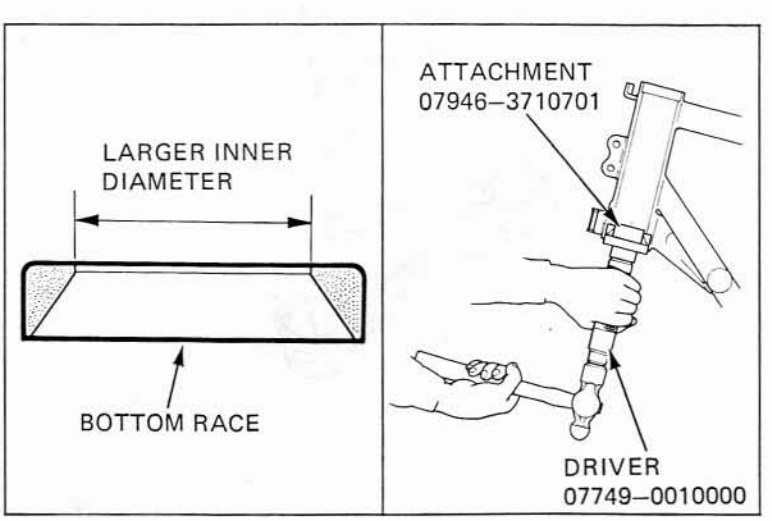
> Always remove the top race before driving out the bottom race.



Install a new bottom race.

NOTE:

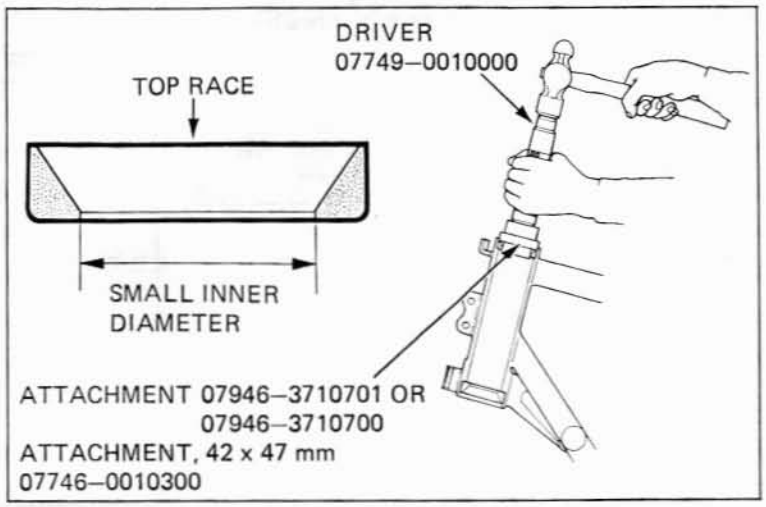
> - The bottom race has a larger I.D. than the top race. Be sure to install the races in their proper places.
> - Drive the races in squarely until they seat fully.



Install a new top race with attachment 07946–3710701 or 07946–3710700 first.
Then use attachment 07746–0010300 or old race to install the top race until it seats.

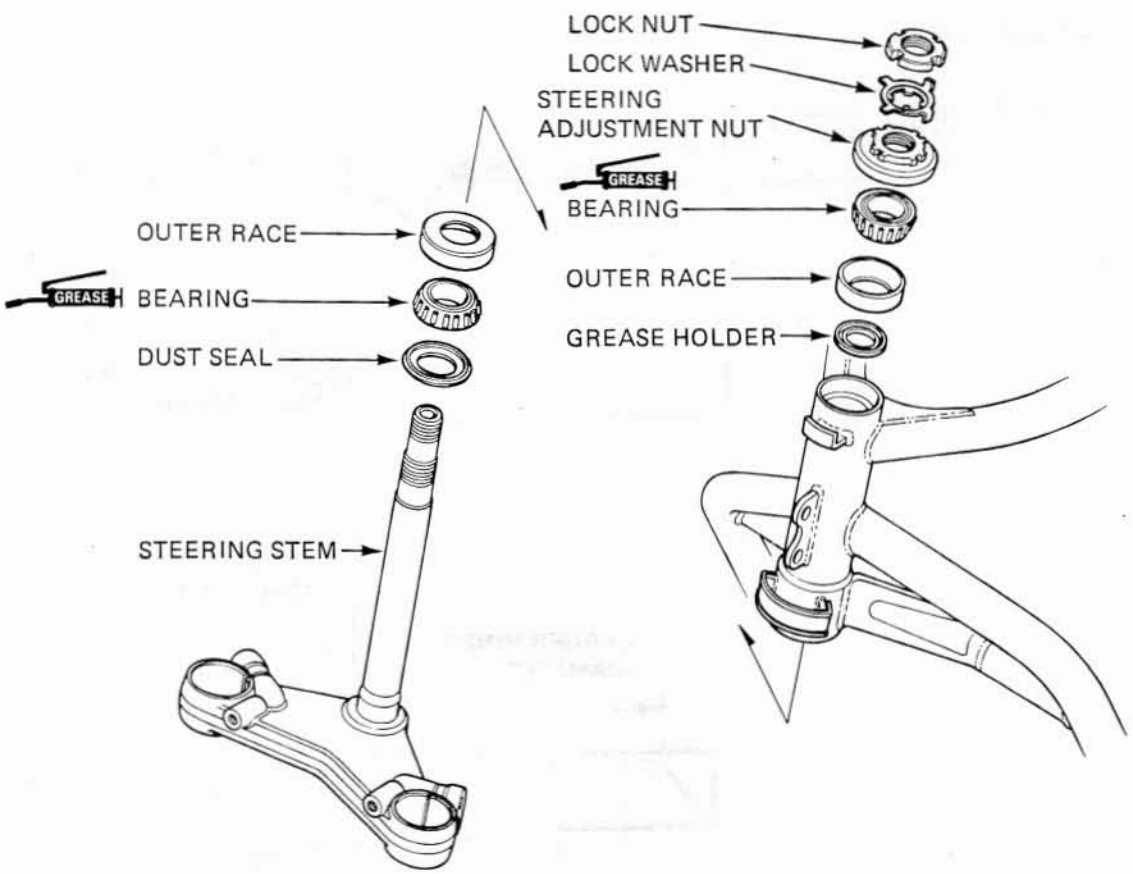
NOTE:

> Drive the races in squarely until they are fully seated.



INSTALLATION

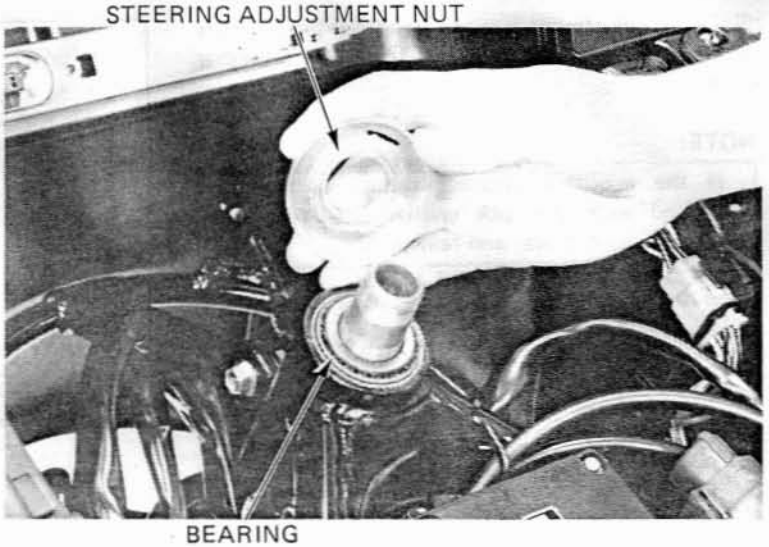
Pack all bearing cavities with grease.



Insert the steering stem into the steeing head.

Install the grease holder and bearing onto the stem pipe.

Install the steering adjustment nut.



Tighten the steering adjustment nut to the specified torque.

TORQUE: 14–16 N·m (1.4–1.6 kg-m, 10–12 ft-lb)

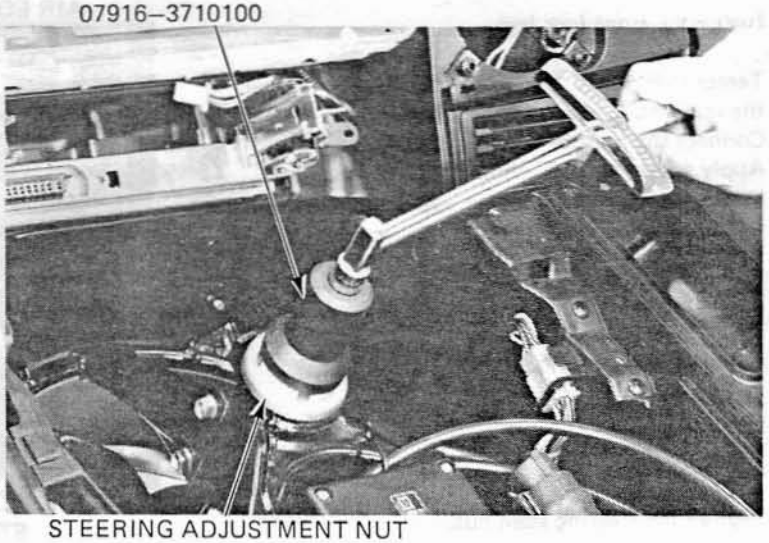
Turn the steering stem lock-to-lock five times to seat the bearings. Repeat the bearing tightening and steering stem turning sequence twice more.

NOTE:

> After each tightening and turning sequence, you should be able to turn nut slightly before reaching the specified torque.

WARNING

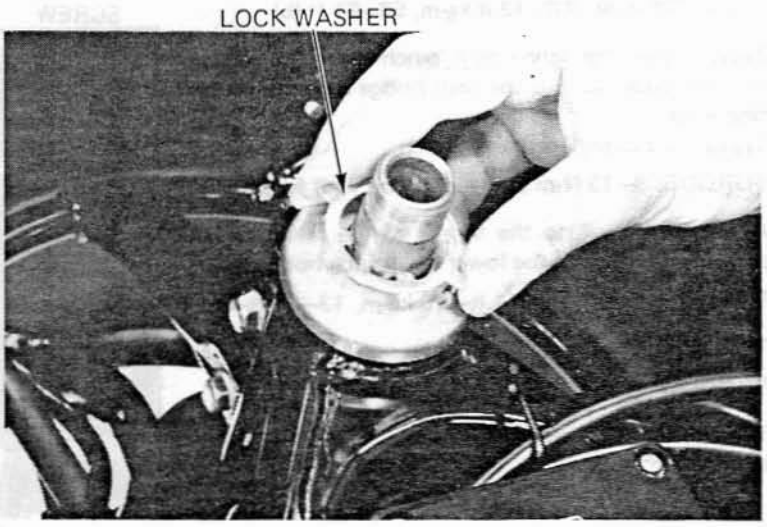
> *If the bearing adjustment nut is too loose, handlebar oscillation may be experienced. If too tight, cornering instability and excessive noise during braking will be experienced.*



Install a new bearing adjustment nut lock washer aligning the tabs with the nut grooves.

NOTE:

> Always replace a used lock washer with a new one.

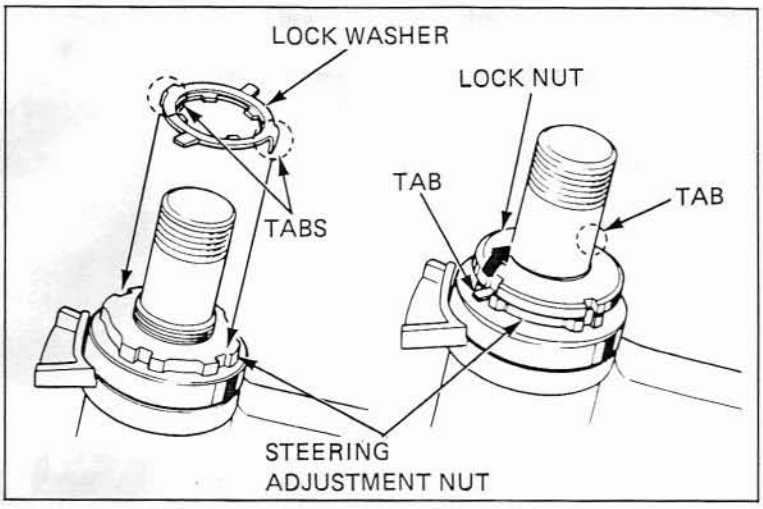


Hold the adjustment nut and hand tighten the lock nut only to align its grooves with the lock washer tabs.

NOTE:

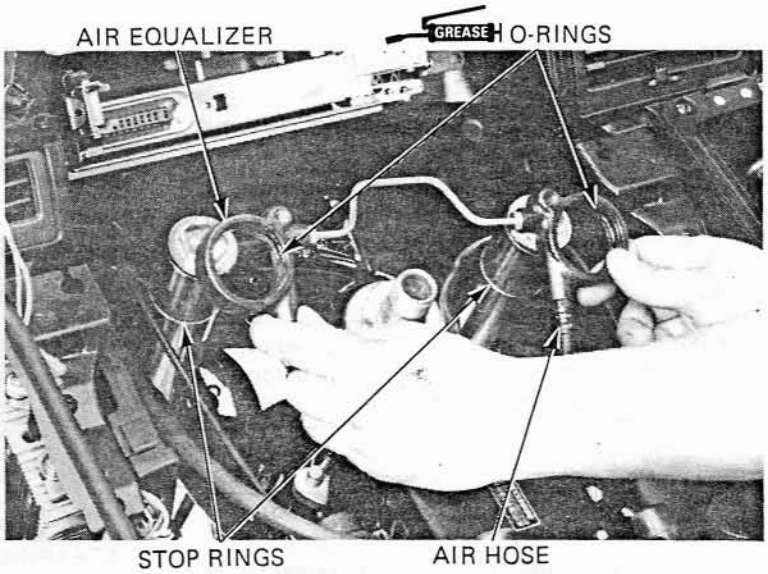
> If the lock nut grooves cannot be easily aligned with the lock washer tabs, remove the nut, turn it over and reinstall it.

Bend the other two lock washer tabs up into the lock nut grooves.



Install the front fork legs.

Temporarily hold the front fork legs by tightening the lower fork pinch bolts.
Connect the air tube to the air equalizer.
Apply grease to the O-rings in the air equalizer.
Install the stop rings and air equalizer tube onto the fork tubes.



Tighten the steering stem nut.

TORQUE:
80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb)

Then, loosen the lower fork pinch bolts and place the fork tube up into the fork bridge until the stop ring seats.
Tighten the upper fork pinch bolts.

TORQUE: 9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb)

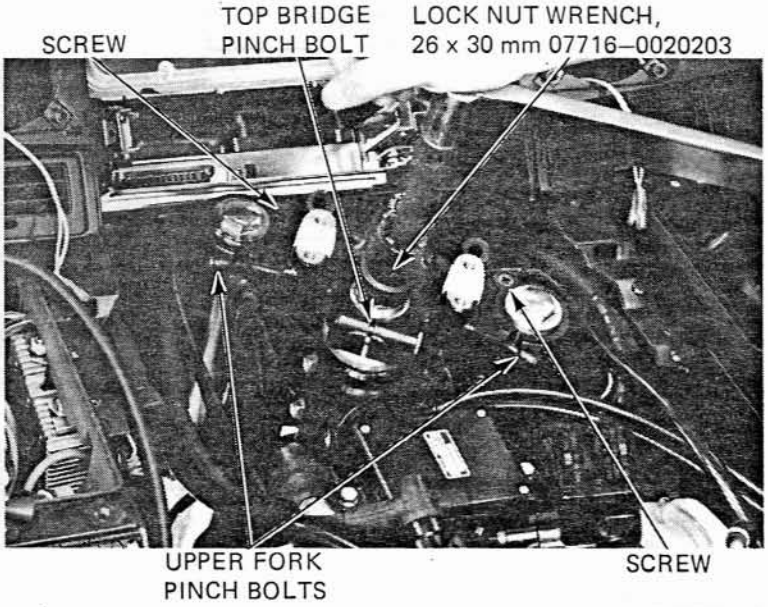
Apply engine oil to the thread of the lower fork pinch bolts. Tighten the lower fork pinch bolt.

TORQUE: 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)

Tighten the top bridge pinch bolt.

TORQUE: 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)

Tighten the air equalizer set screws and air hose joint.



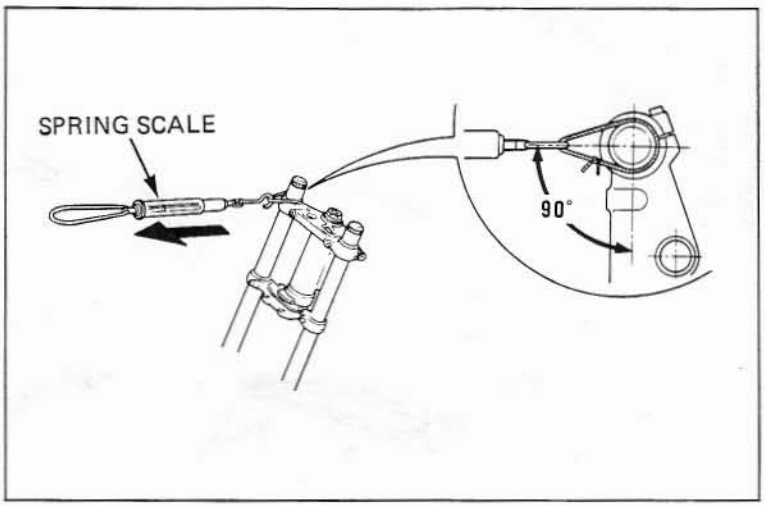
Install the front wheel (Page 12-8).

Place a stand under the engine and raise the front wheel off the ground.
Position the steering stem to the straight ahead position.
Hook a spring scale to the fork tube and measure the steering head bearing preload.

NOTE:

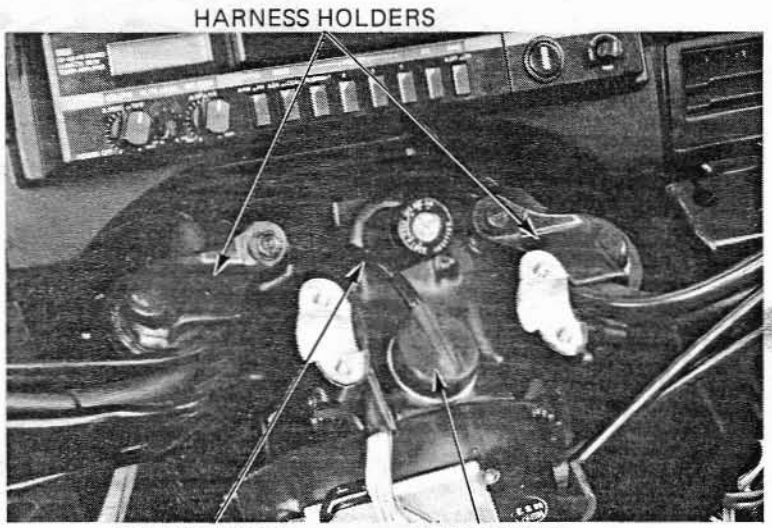
> Make sure that there is no cable and wire harness interference.

The preload should be within 2.0–2.5 kg (4.4–5.5 lb) for right and left turns.
If the readings do not fall within the limits, lower the front wheel on the ground and adjust the bearing adjustment nut.



Install the harness holder on the top bridge.
Install the angle sensor and grommet into the stem pipe.

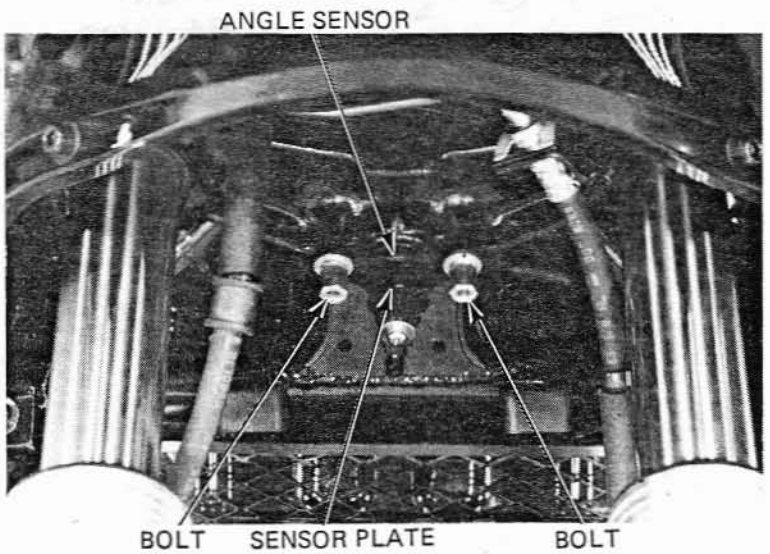
Connect the angle sensor to the sensor wire at bottom of steering stem.

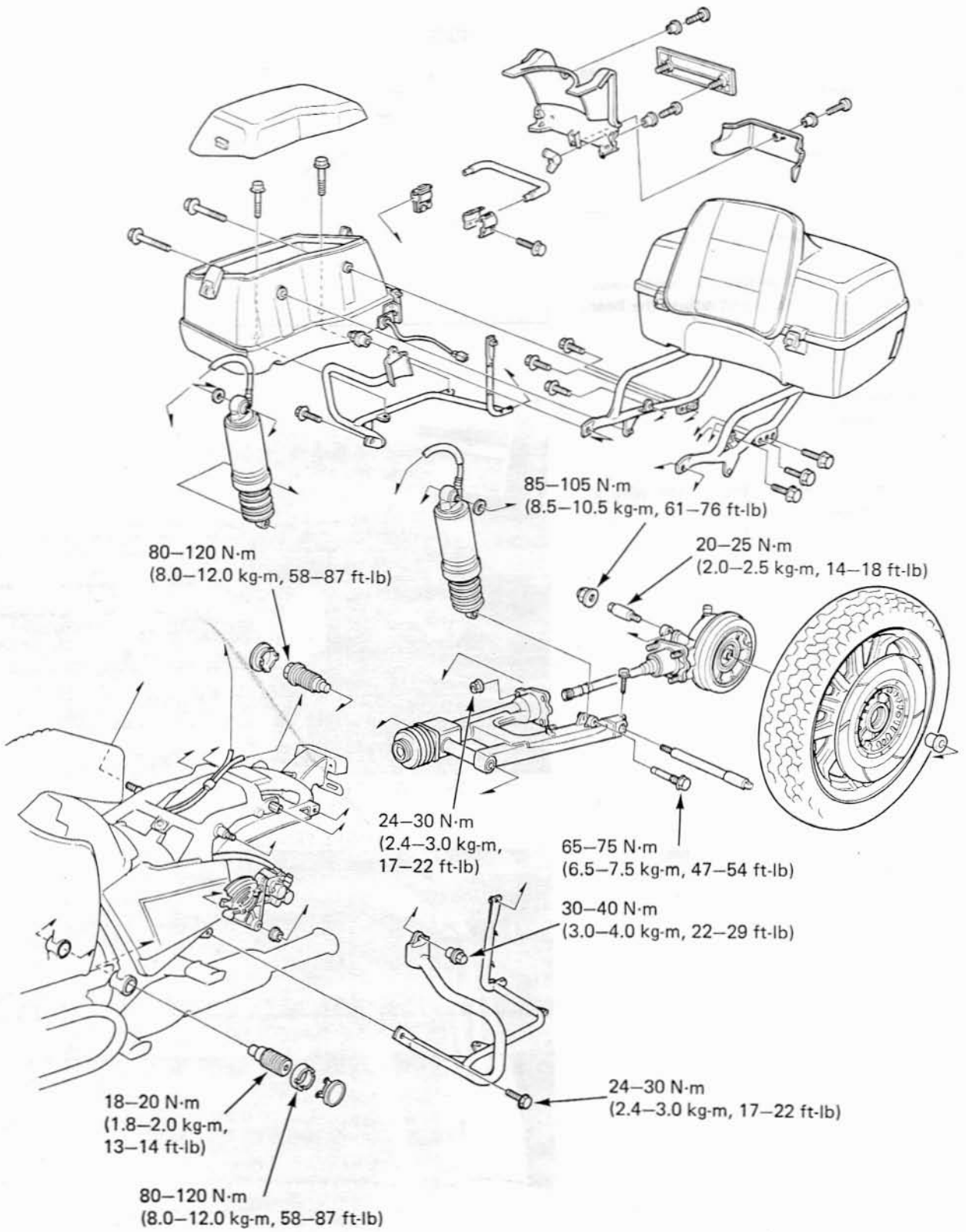


Install the angle sensor to the steering stem.
Install the sensor cover and two bolt.
Install the sensor plate.

Install the stem under cover.

Install the handlebar (Page 12-17).





13. SUSPENSION

SERVICE INFORMATION

GENERAL

- If the motorcycle has been involved in an accident, the frame should be inspected very carefully at the steering head and at the engine mounts, as these are the areas that are most likely to suffer damage.
- Apply clean ATF to the O-rings when install the air hoses.
- Always replace a bent forks; straightening them will weaken the material.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Front fork air pressure		0–40 kPa (0 –0.4 kg/cm^2, 0–6 psi)	–
Rear shock absorber air pressure		200–400 kPa (2.0–4.0 kg/cm^2, 28–57 psi)	–
Front fork spring free length	Spring A	162.9 (6.41)	162.6 (6.40)
	Spring B	407.6 (16.05)	406.8 (16.02)
Front fork oil capacity	After disassembly	345 cm^3 (11.67 US oz, 12.11 Imp oz)	–
	After draining	323 cm^3 (10.92 US oz, 11.34 Imp oz)	–
Front fork oil		ATF	–
Front fork tube runout		–	0.20 (0.008)
Rear shock absorber refill capacity		259.5 cm^3 (8.77 US oz, 9.11 Imp oz)	–
Rear shock absorber oil		ATF	–

TORQUE VALUES

Front fork pinch bolt (upper)	9–13 N·m (0.9–1.3 kg-m, 7–9 ft-lb)
(lower)	18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
Front fork bottom socket bolt	15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)
Front fork cap bolt	15–30 N·m (1.5–3.0 kg-m, 11–22 ft-lb)
Air valve	4–7 N·m (0.4–0.7 kg-m, 3–5 ft-lb)
Air hose joint (8 mm)	4–7 N·m (0.4–0.7 kg-m, 3–5 ft-lb)
(10 mm)	15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb)
Air hose connector	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Air pressure sensor	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Rear shock absorber upper mount nut	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
Rear shock absorber lower mount bolt (right)	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
(left)	65–75 N·m (6.5–7.5 kg-m, 47–54 ft-lb)
Final drive gear case nut	24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)
Swing arm pivot bolt (right)	80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb)
(left)	18–20 N·m (1.8–2.0 kg-m, 13–14 ft-lb)
Swing arm pivot lock nut	80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb)

TOOLS

Special

Seal driver attachment	07947–KF00100
Seal driver	07947–KA50100
Snap ring priers	07914–3230001
Hollow set wrench, 6 mm	07917–3230000 or equivalent tool commercially available
Fork seal driver	07947–3710101
Pivot lock nut wrench	07908–4690001
Socket bit, 10 mm	07917–3710000
Bearing remover	07936–8890101

Common

Attachment, 37 x 40 mm	07746–0010200
Driver	07749–0010000

TROUBLESHOOTING

Wobble or vibration
- Distorted rim
- Loose wheel bearing
- Faulty tire
- Loose axle
- Loose swing arm pivot bolt

Soft suspension
- Weak spring
- Insufficient air pressure
- Weak rear damper
- Insufficient fluid weight

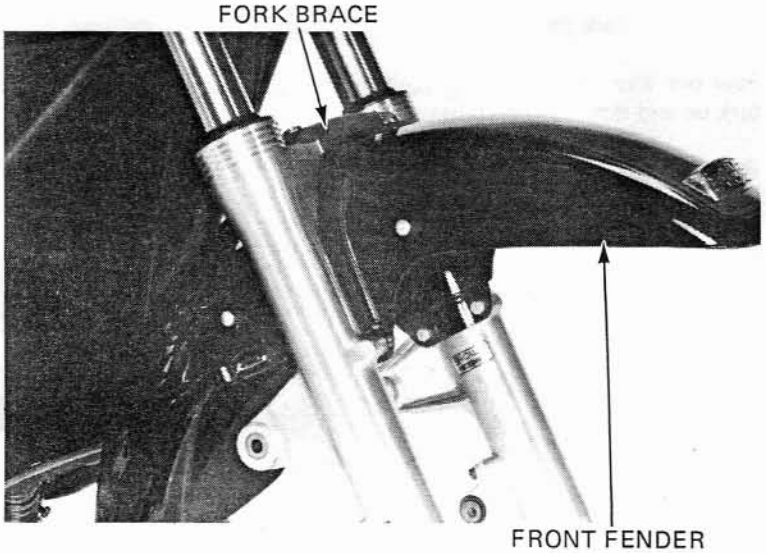
Hard suspension
- Incorrect fluid weight
- Too much air pressure
- Clogged fork hydraulic passage
- Bent fork tubes
- Slider binding
- Clogged anti-dive orifice

Suspension noise
- Shock case binding
- Loose fasteners
- Insufficient fluid weight

FRONT FORK

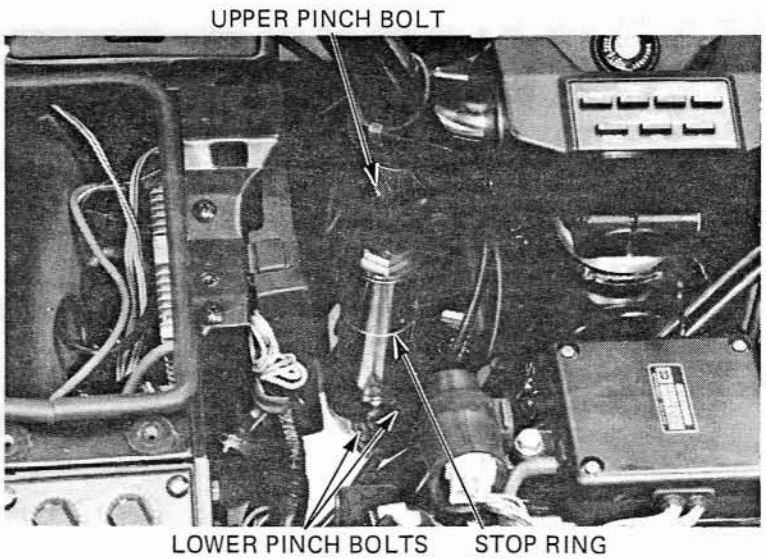
REMOVAL

Remove the front wheel (Page 12-3).
Remove the top compartement.
Remove the front fender and fork brace.



Loosen the fork pinch bolts.

Remove the stop rings from the front fork tubes and remove the front forks.



DISASSEMBLY

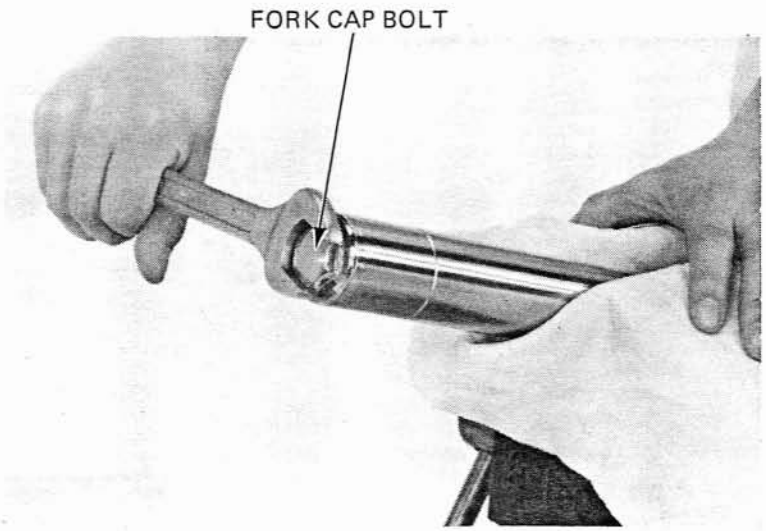
Hold the fork tube in a vise with sofr jaws and remove the fork cap bolt.

CAUTION:

Do not damage or bend the sliding surface.

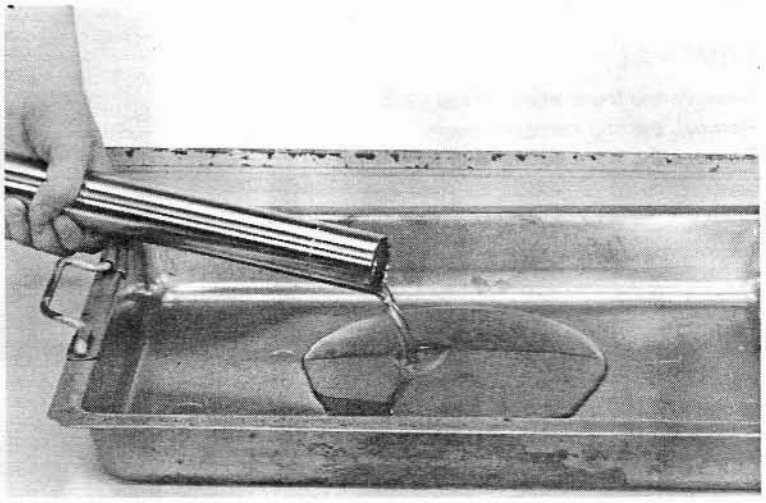
WARNING

Use care when loosening the bolt or the spring will pop out.



Remove the fork springs.

Pour out any remaining fork fluid by pumping the fork up and down several times.



Hold the fork slider in a vise with soft jaws and remove the hex bolt.

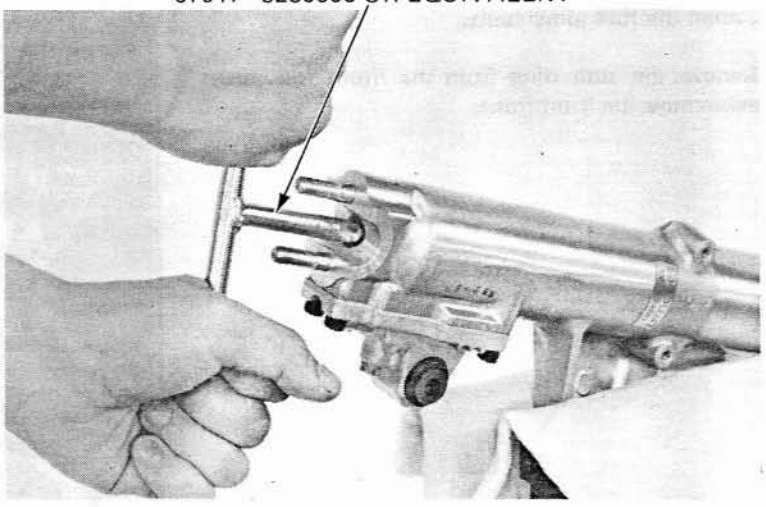
CAUTION:

Excessive vise pressure can damage the fork slider.

NOTE:

Temporarily install the spring and fork bolt if difficulty is encountered in removing the hex bolt.

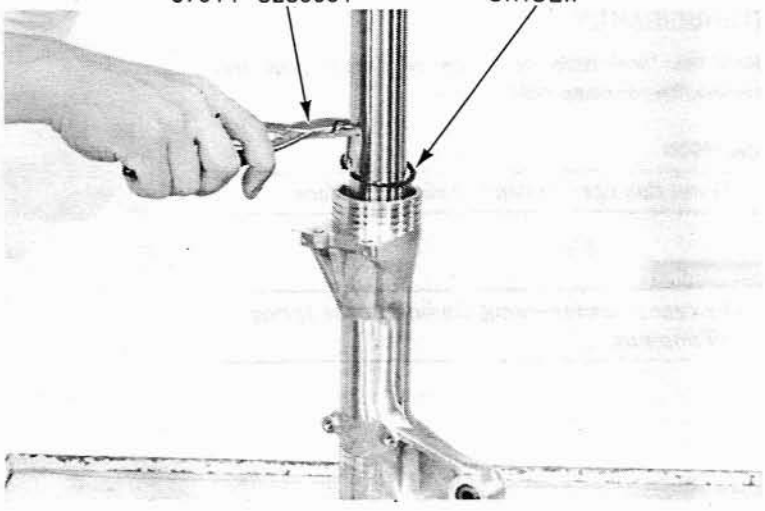
HOLLOW SET WRENCH, 6 mm
07917–3230000 OR EQUIVALENT



Remove the dust seal, foam seal, plastic washer and circlip.

SNAP RING PLIERS
07914–3230001

CIRCLIP

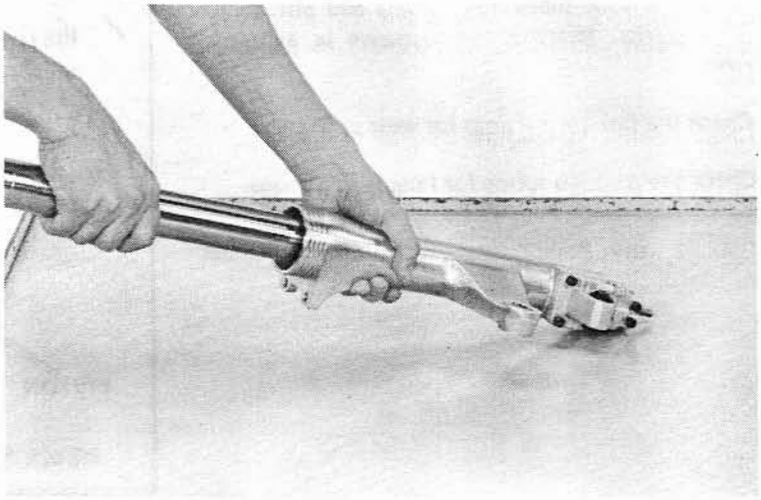


Remove the fork tube from the slider by pumping it in and out several times.

NOTE:

> The slider bushing causes resistance and the fork tube bushing must force it out.

Remove the oil lock piece from the slider.

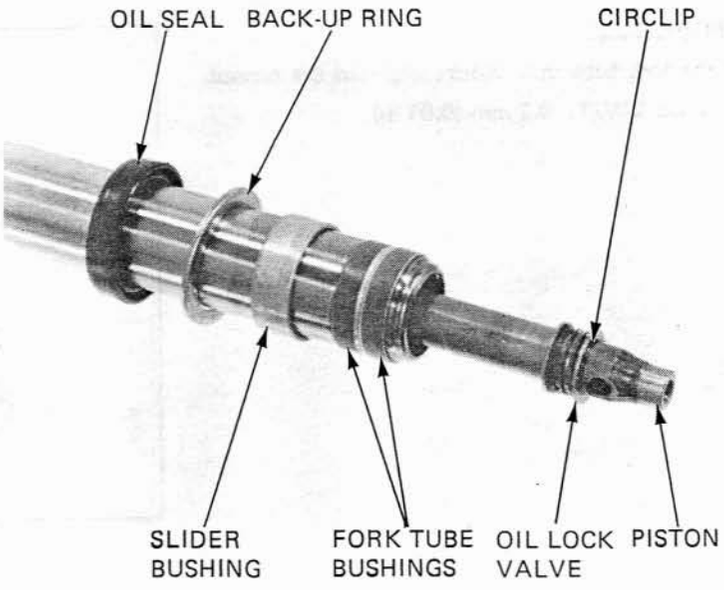


Remove the oil seal, back-up ring and slider bushing from the fork tube.

NOTE:

> Do not remove the fork tube bushings unless they are necessary to replace them with new ones.

Remove the circlip, oil lock valve, spring and spring seat from the piston. Remove the piston and rebound spring from the fork tube.
Remove the oil lock piece from the slider.



INSPECTION

- FRONT FORK SPRING FREE LENGTH

Measure the fork spring free length.

SERVICE LIMITS:

Spring A: 162.6 mm (6.40 in)
Spring B: 406.8 mm (16.02 in)

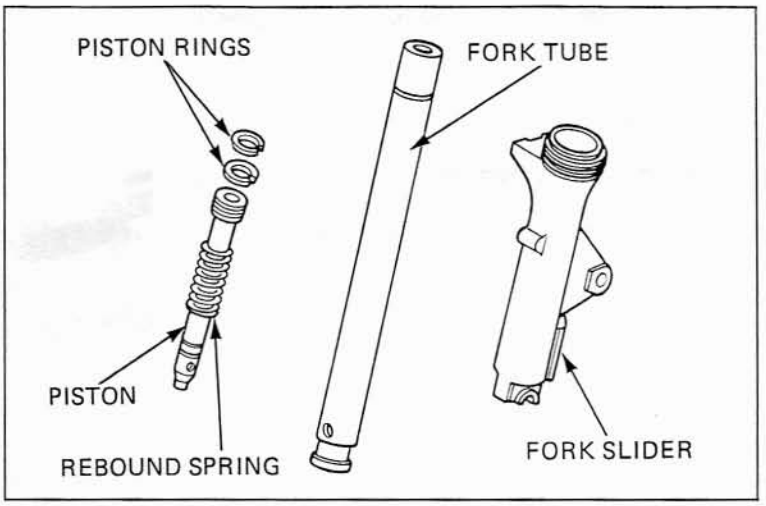
• FORK TUBE/FORK SLIDER/PISTON

Check the fork tubes, fork sliders and pistons for score marks, scratches, or excessive or abnormal wear.

Check the fork piston rings for wear or damage.

Check the rebound spring for fatigue or damage.

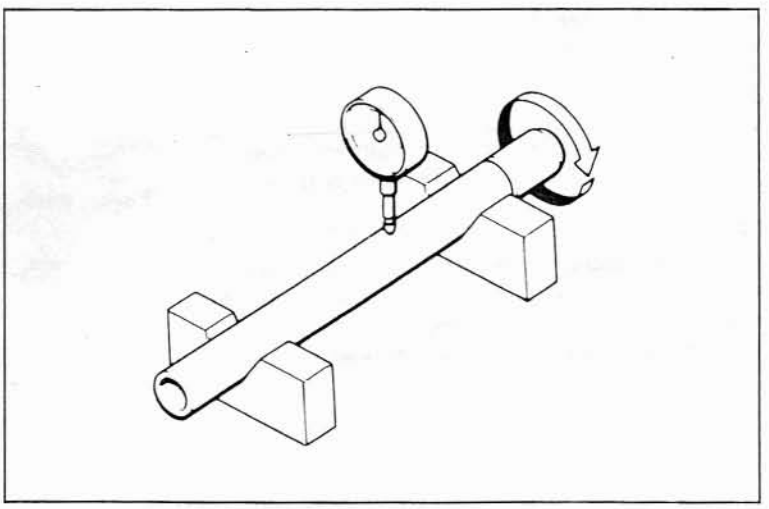
Replace any components which are worn or damaged.



• FORK TUBE

Set the fork tube in V blocks and read the runout.

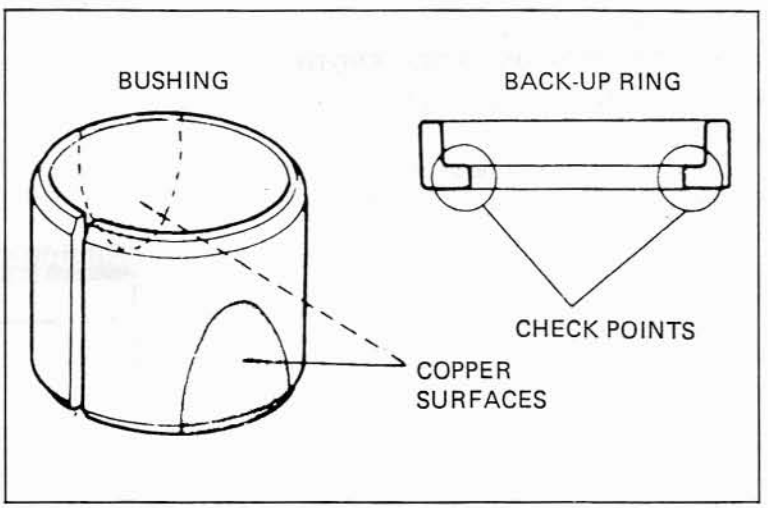
SERVICE LIMIT: 0.2 mm (0.01 in)



• BUSHING/BACK-UP RING

Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the check points shown.



ANTI-DIVE CASE

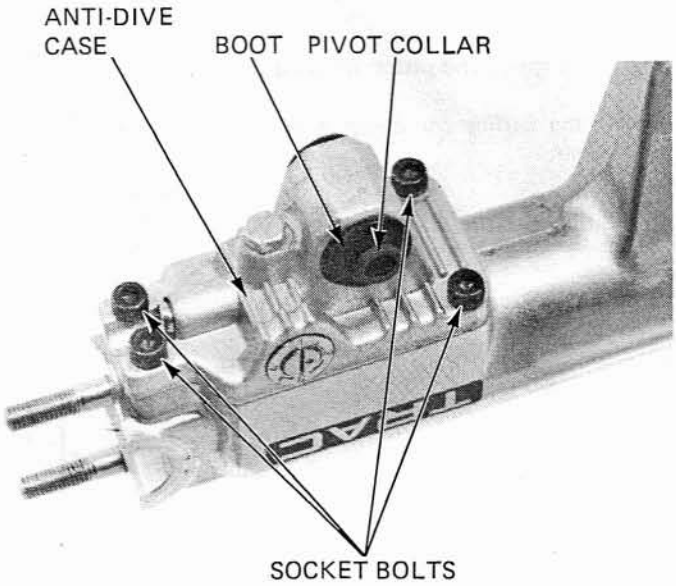
- REMOVAL

Remove the four socket bolts and remove the anti-dive case.

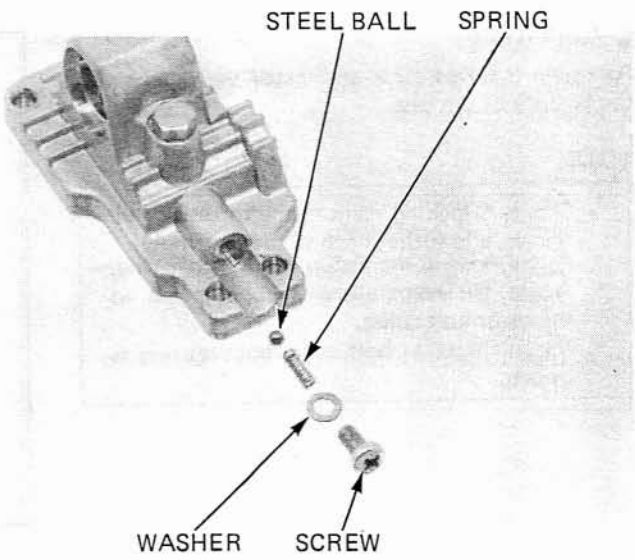
NOTE:

- Drain the oil before servicing the anti-dive system.
- Place the steel ball and spring in a parts rack so they are not lost.

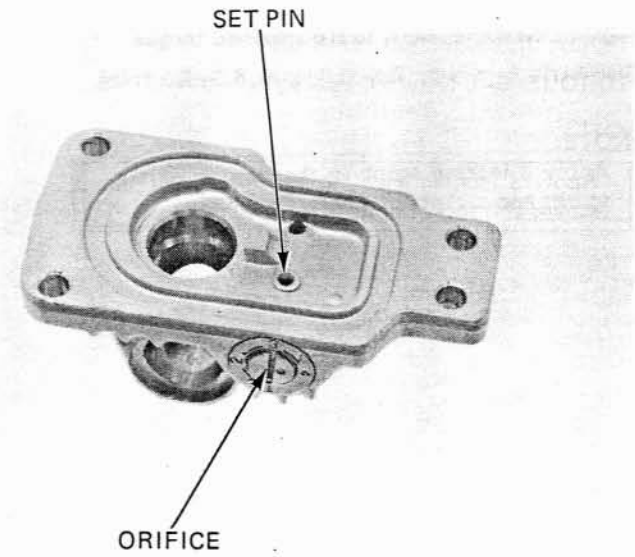
Remove the boot set ring and remove the boots and pivot collar.



Remove the screw, washer, spring and steel ball from the anti-dive case.



Remove the orifice by removing the set pin.

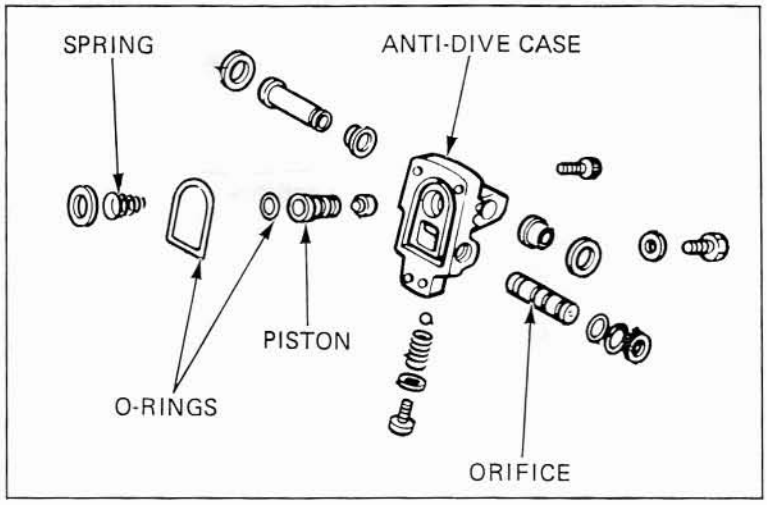


• INSPECTION

Check the spring and piston for wear or damage.

Check the orifice for clogging by applying compressed air.

Check the operation of the orifice.

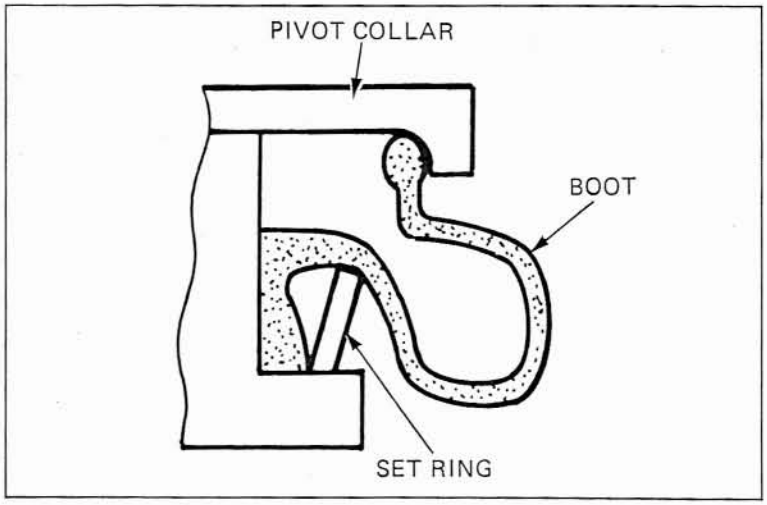


• ASSEMBLY

Assemble removed parts and install the assembly in the bottom of the case.

NOTE:

- Apply a locking agent to the threads of the screws and socket bolts before assembly.
- Apply ATF to the piston and piston O-ring.
- Apply Hi-Temperature silicone grease to the pivot bolt collar.
- Install the pivot bolt collar boot set ring as shown.

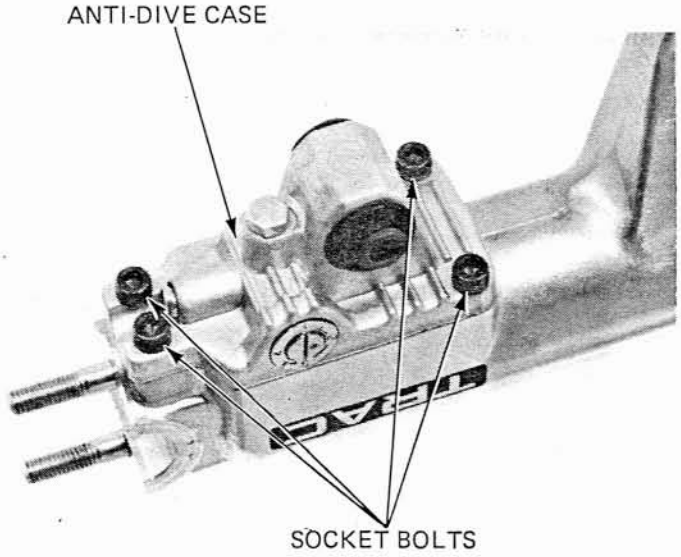


Tighten the socket bolts to the specified torque.

TORQUE: 6–9 N·m (0.6–0.9 kg-m, 4.3–6.5 ft-lb)

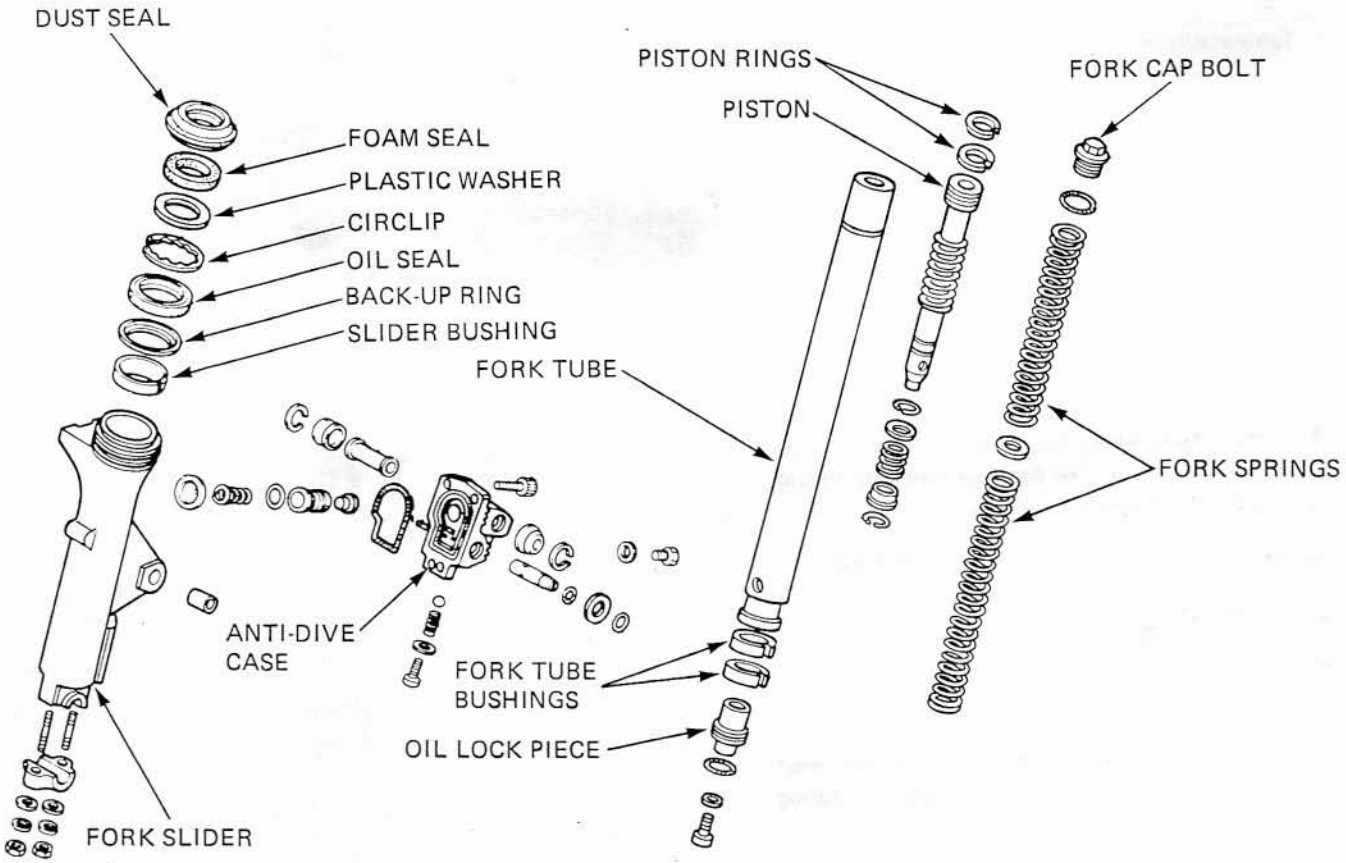
NOTE:

Apply a locking agent to the threads of the screws and socket bolts before assembly.

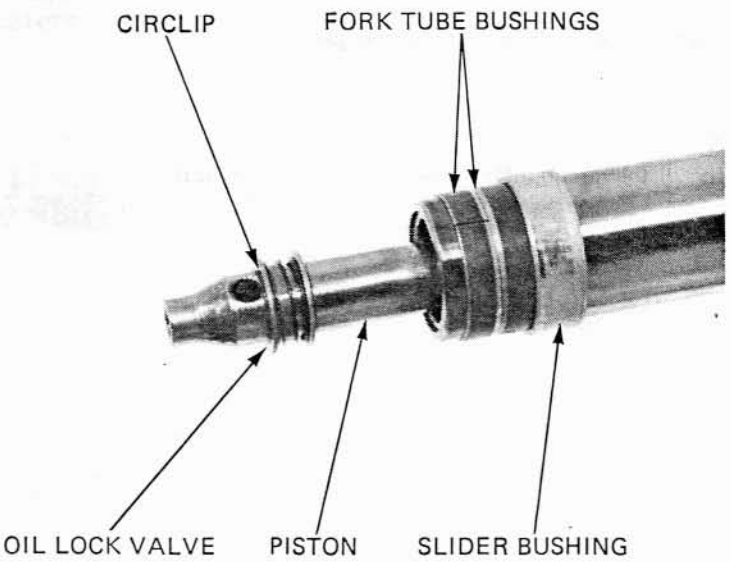


ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



Install a new bushing on the fork tube if necessary. Place the rebound spring and piston into the fork tube. Install the spring seat, spring and oil lock valve onto the piston and secure them with the circlip. Place the oil lock piece on the end of the piston and insert the fork tube into the slider.



Place the fork slider in a vise with soft jaws.

Apply a locking agent to the socket bolt and thread it into the piston. Tighten the socket bolt.

NOTE:

> Temporarily install the fork springs and fork cap bolt to tighten the socket bolt.

TORQUE: 15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)

HOLLOW SET WRENCH, 6 mm
07917–3230000 OR EQUIVALENT

Place the slider bushing over the fork tube and rest it on the slider. Put the back-up ring and an old bushing or equivalent tool on top.

Drive the bushing into place with the seal driver.

Remove the old bushing.

Check the groove and top edge of the fork tube for burrs or scratches.

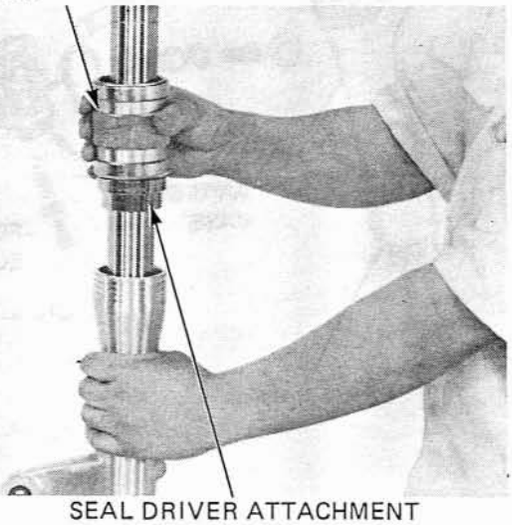
Wrap the fork tube groove and top edge with vinyl tape to prevent damage to the oil seal lip, during installation.

Install the back-up ring.

Coat a new oil seal with ATF and install it with the seal mark facing up.

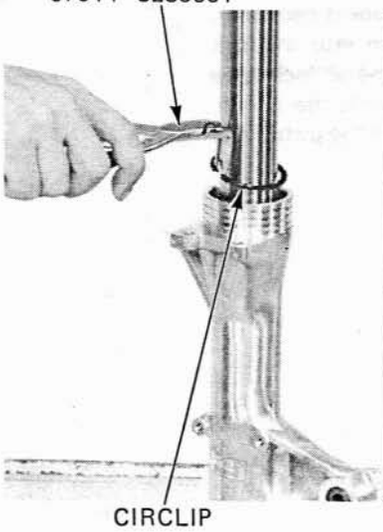
Drive the oil seal in with the seal driver.

FORK SEAL DRIVER ATTACHMENT
07947–KA50100



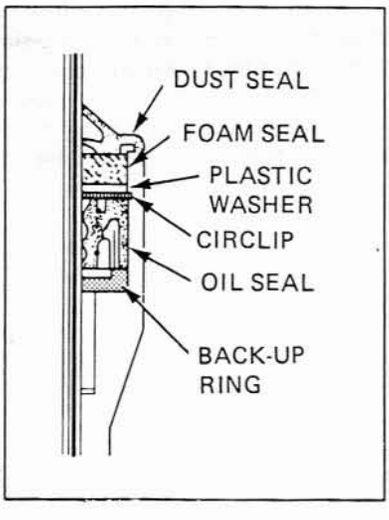
SEAL DRIVER ATTACHMENT
07947–KF00100

SNAP RING PLIERS
07914–3230001



Install the circlip, plastic washer, foam seal and dust cover.

CIRCLIP

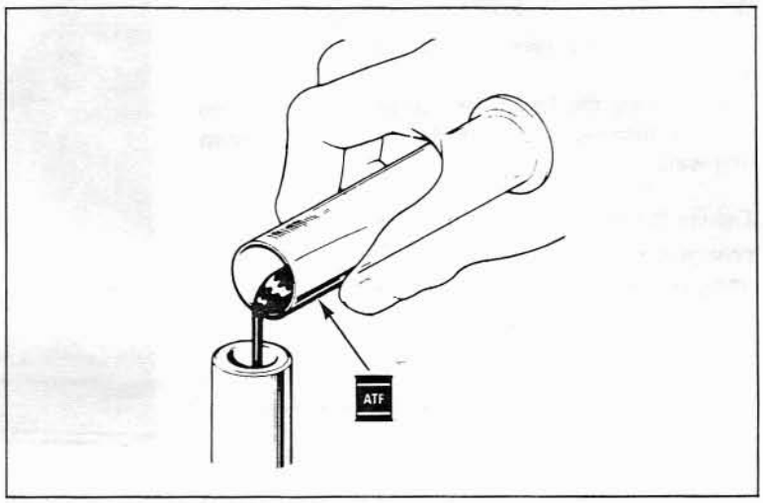


Pour the specified amount of ATF into the fork tube.

CAPACITY: 345 cm³ (11.67 US oz, 12.11 Imp oz)

NOTE:

Be sure the oil level is the same in both fork tubes.



Wipe all oil from the fork springs and install the lower spring into the fork tube with the small diameter end must face toward the bottom.

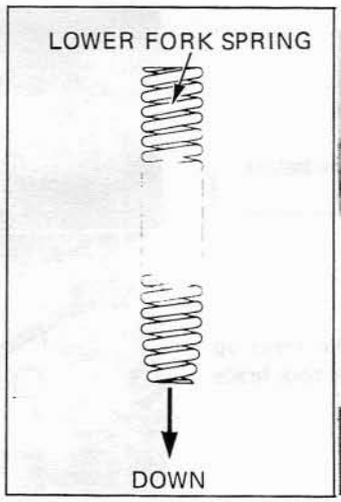
Install the spring seat and upper spring with narrow coils toward the bottom.

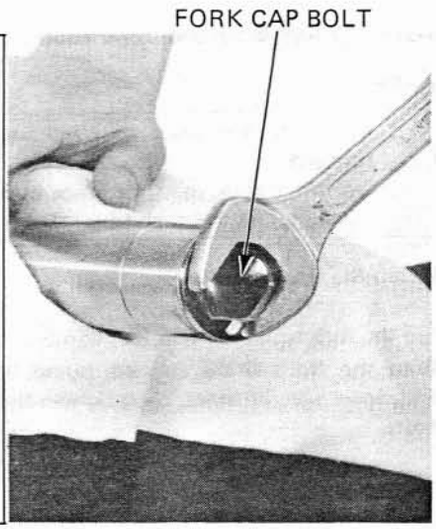
Install and torque the fork cap bolt.

TORQUE: 15–30 N·m (1.5–3.0 kg-m, 11–22 ft-lb)

CAUTION:

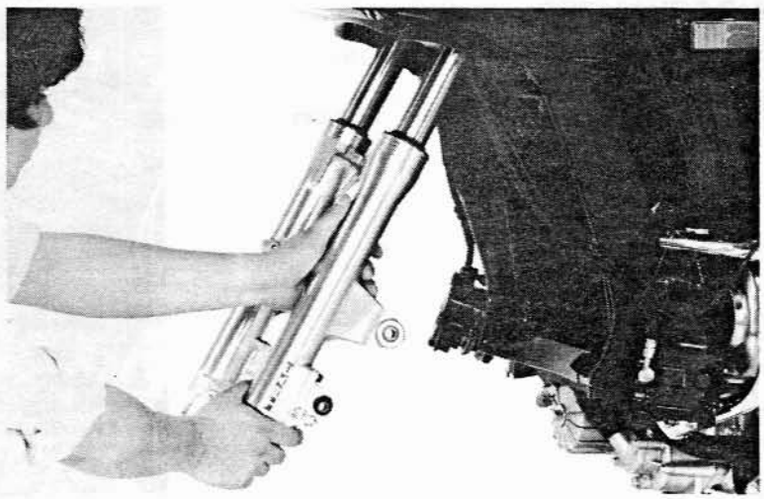
Be careful not to cross-thread the fork cap bolts.





INSTALLATION

Place the fork tubes into the steering stem.
Tighten the lower pinch bolt loosely.



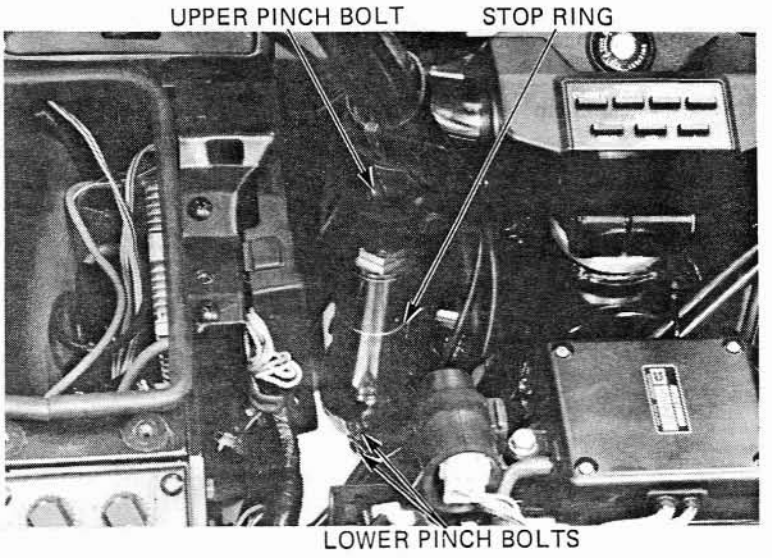
Apply grease to the O-rings in the fork air equalizer.

Install the stop ring on the fork tube groove securely.

Then, loosen the lower fork pinch bolts and place the fork tube up into the fork bridge until the stop ring seats.

Tighten the fork tube pinch bolts.

TORQUE VALUES:
UPPER: 9–13 N·m (0.8–1.3 kg-m, 7–9 ft-lb)
LOWER: 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)



Install the fork brace and front fender.

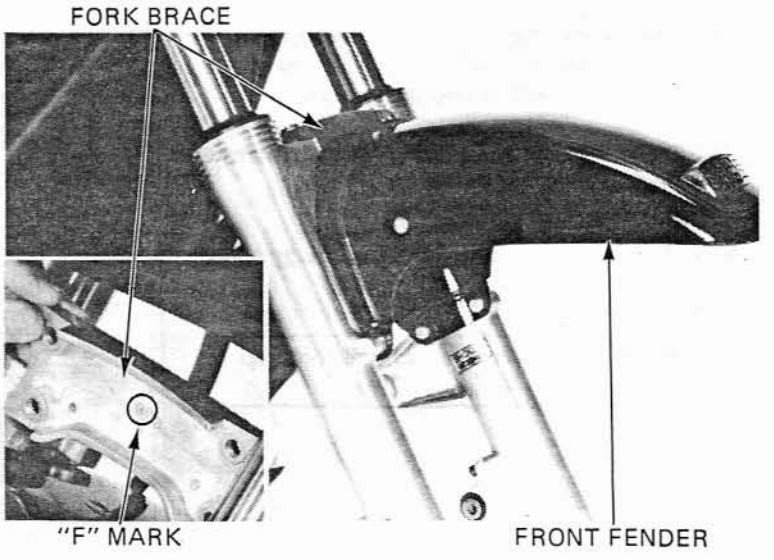
NOTE:

- Install the fork brace with "F" mark facing forward.
- Do not torque the fork brace bolts before installing the front wheel.

Install the front wheel (Page 12-8).

Fill the fork tubes with air (Section 3).

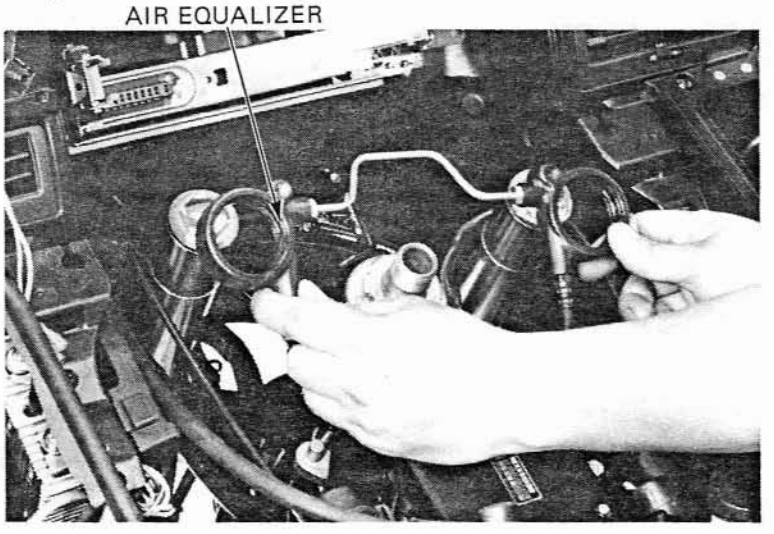
With the front brake applied, pump the forks up and down several times, then tighten the fork brace bolts.



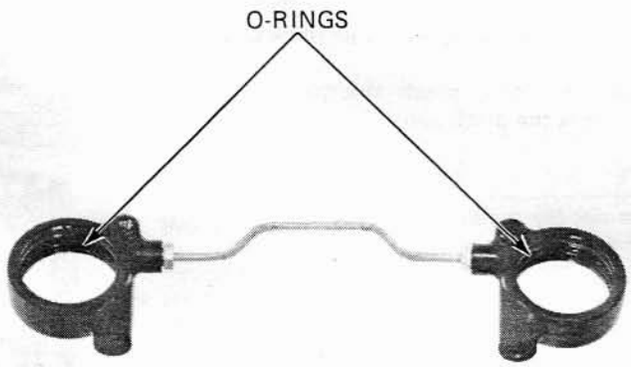
AIR EQUALIZER

Remove the fork top bridge (Page 12-19).

Remove the air equalizer from the fork tubes.

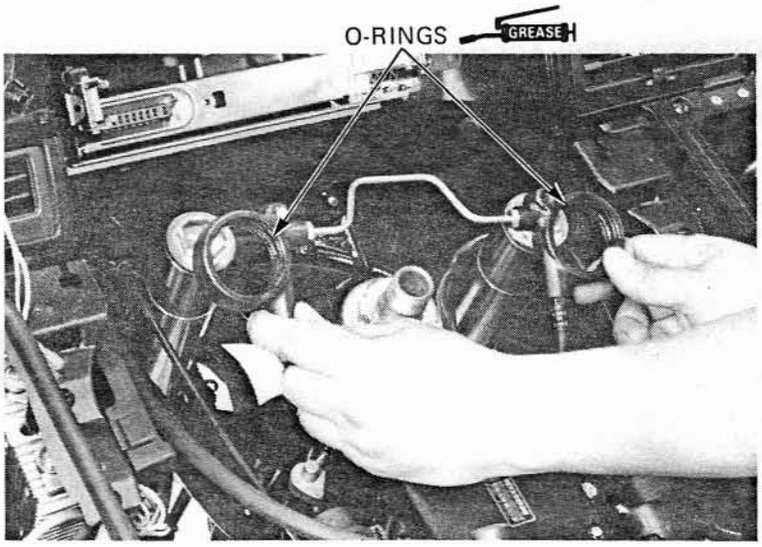


Inspect the O-rings for damage or deterioration.
Replace the O-rings if necessary.



Apply grease to the O-rings and install the equalizer onto the fork tubes.

Install the fork bridge onto the forks (Page 12-26).
Check for air leakage after assembly.



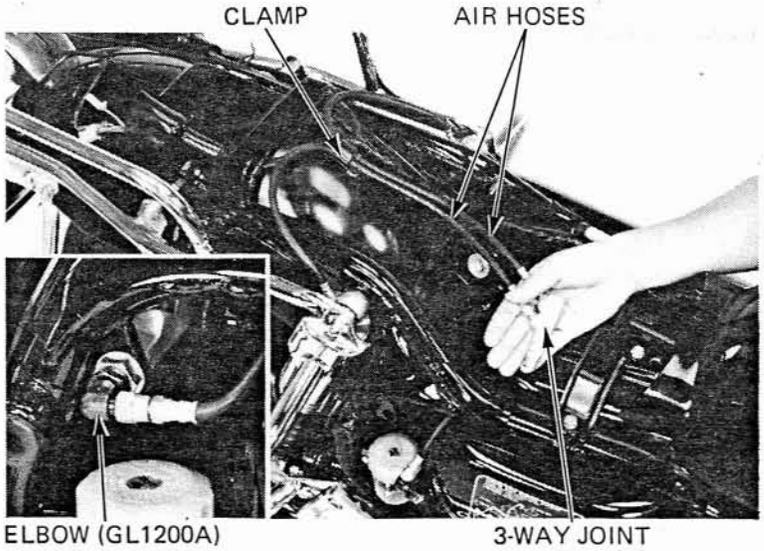
REAR SHOCK ABSORBER

REMOVAL

Place the motorcycle on its center stand.

Remove the side cover and seat.
Remove the travel trunk and saddlebags.

Disconnect the air hose and elbow from the 3-way joint (GL1200A).
Remove the 3-way joint from the frame.
Remove the air hoses from the hose clamp.

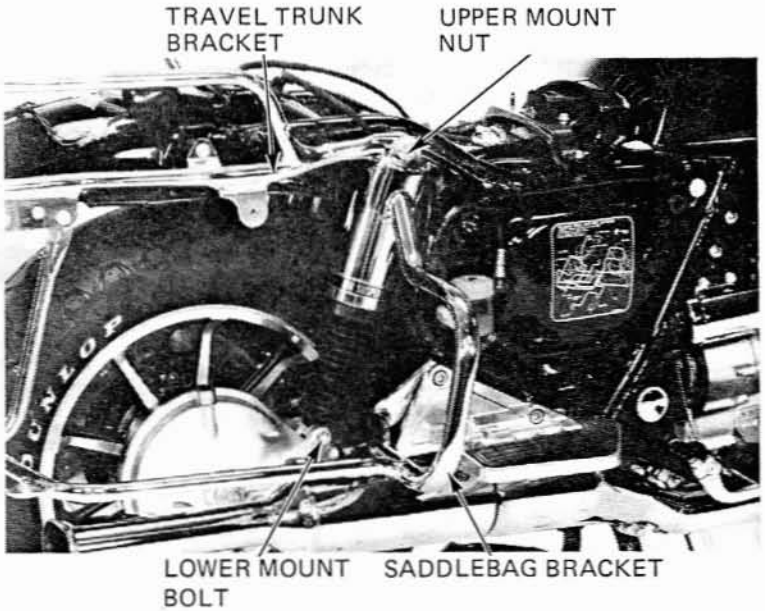


Remove the saddlebag and travel trunk brackets.

Remove the lower shock absorber mounting bolt and remove the shock absorber.

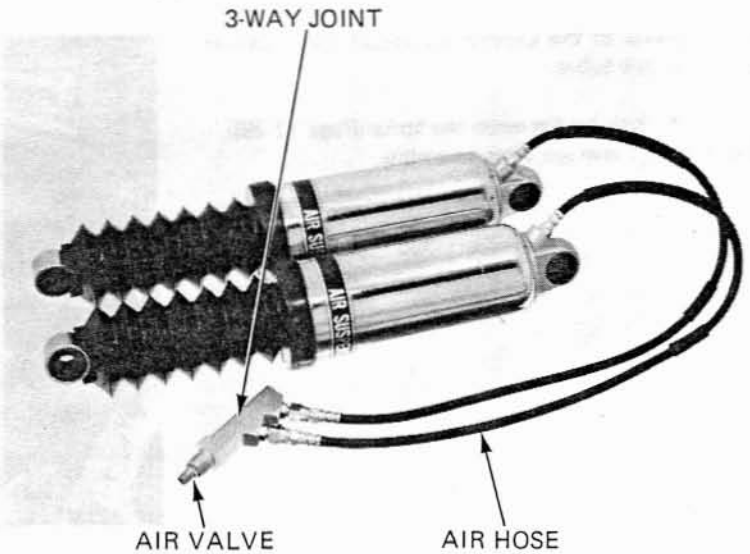
NOTE:

> Do not lay the shock absorber over on its side or the fluid will run out the air hose.

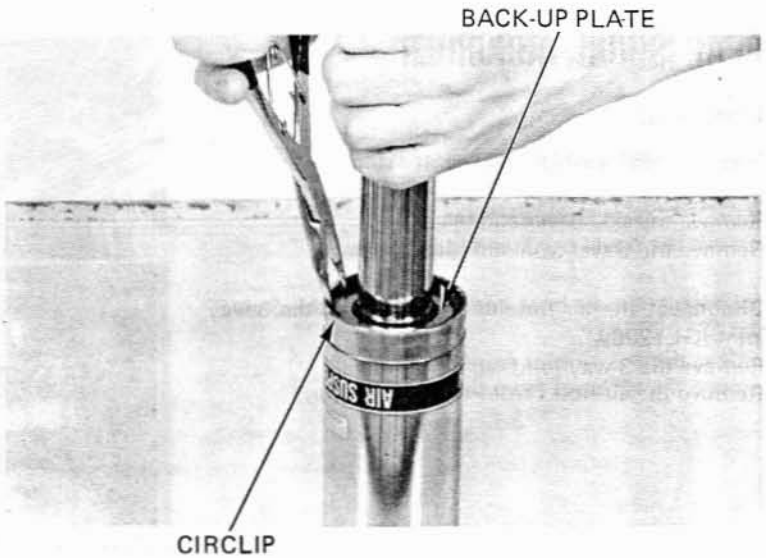


OIL SEAL REPLACEMENT

Disconnect the air hose from the 3-way joint.
Remove the air valve from the 3-way joint (GL-1200D).
Remove the outlet air valve from the air outlet hose on right side of fairing (GL1200A).
Remove the boot.



Remove the circlip and back-up plate.

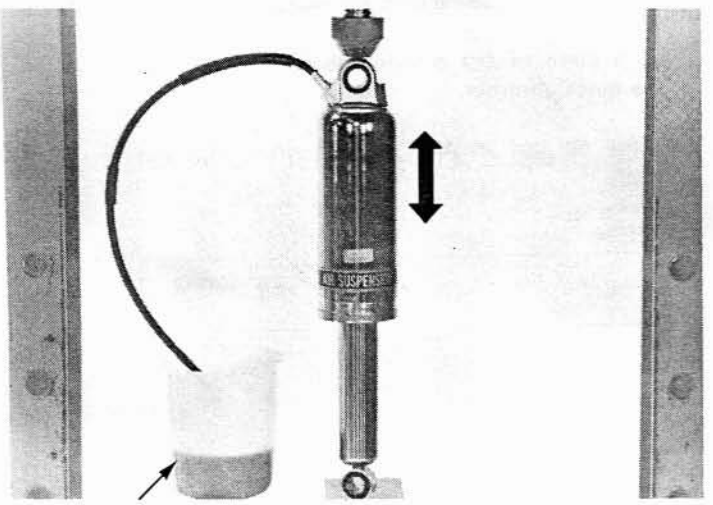


Place about 300–500 cm^3 (10.1–16.9 US oz, 10.5 –17.6 Imp oz) of damper oil (ATF or equivalent) in a clean container.
Place the shock absorber in a hydraulic press.

Place the air hose in the oil and pump the shock absorber serveral times until the damper is filled with the oil.

NOTE:

> Do not over-press the shock. This shock absorber's stroke is 80 mm (3.2 in).



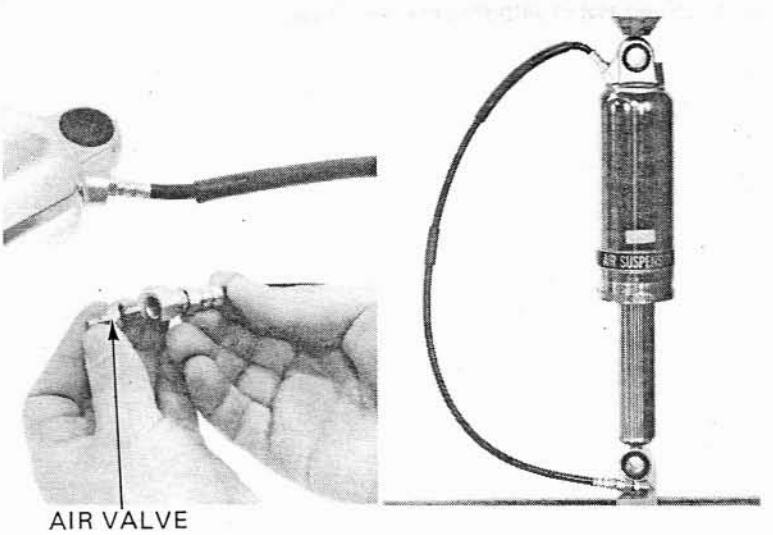
DAMPER OIL (ATF OR EQUIVALENT)

Let the shock stand for 5 minutes to allow air to escape.
Install the air valve in the air hose.

Wrap a shop towel around the shock absorber.

Press the oil seal out by compressing the chock absorber.

Leave the shock absorber for another 10 minutes to let any remaining ATF drain out.
Remove the shop towel from the shock absorber.
Do not tilt the shock absorber or ATF will flow out of the damper case.

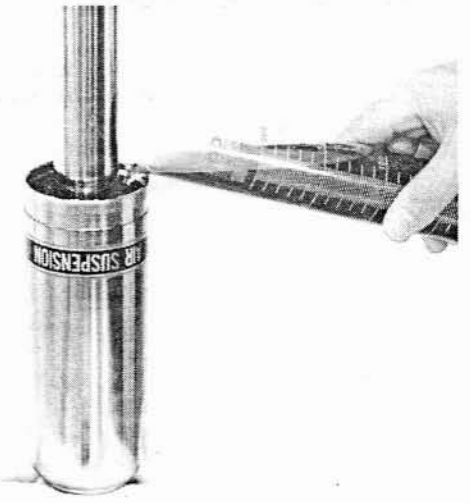


AIR VALVE

Turn the shock absorber upside down quickly after the ATF has drained from the outer case.

Fill the damper case with the specified amount of ATF.

SPECIFIED AMOUNT:
259.5 cm^3 (8.77 US oz, 9.11 Imp oz)



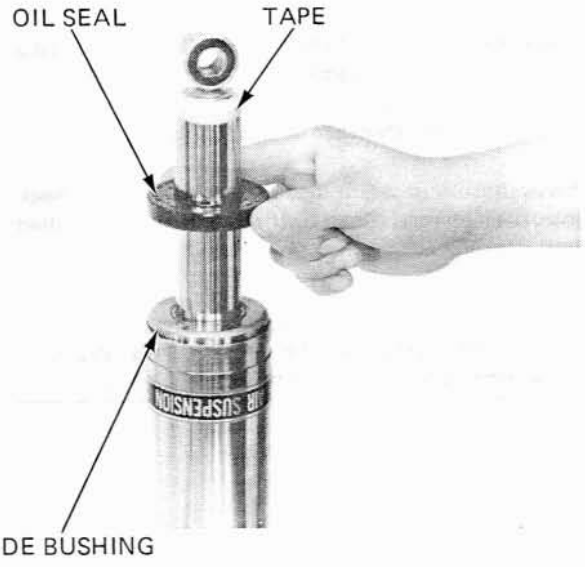
Install the guide bushing into the damper case.

Wrap a piece of tap around the edge at the end of the shock absorber.

Dip the oil seal in ATF and install it onto the damper.

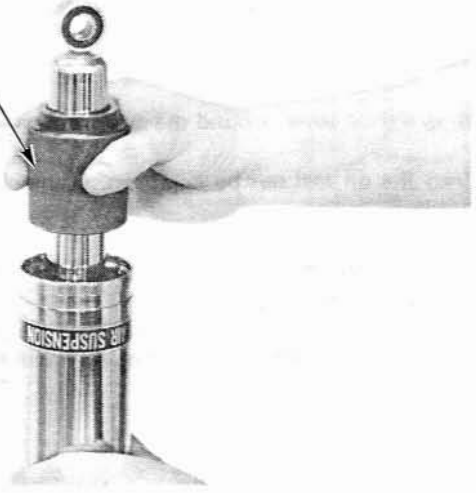
CAUTION:

Be careful not to damage the oil seal during installation.



Drive the oil seal in with the fork seal driver.

FORK SEAL DRIVER
07947–3710101

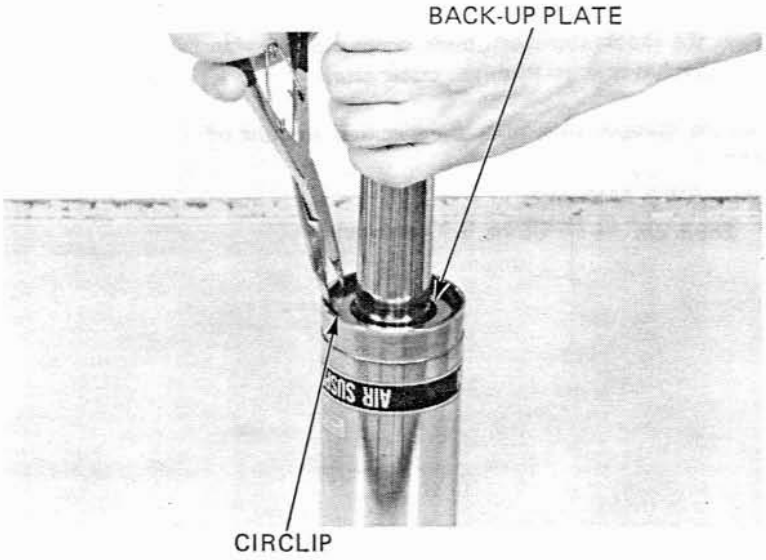


Install the back-up plate and circlip.

CAUTION:

Be sure the circlip is seated in the groove all the way around.

Remove the air valve from the air hose.
Install the boot.

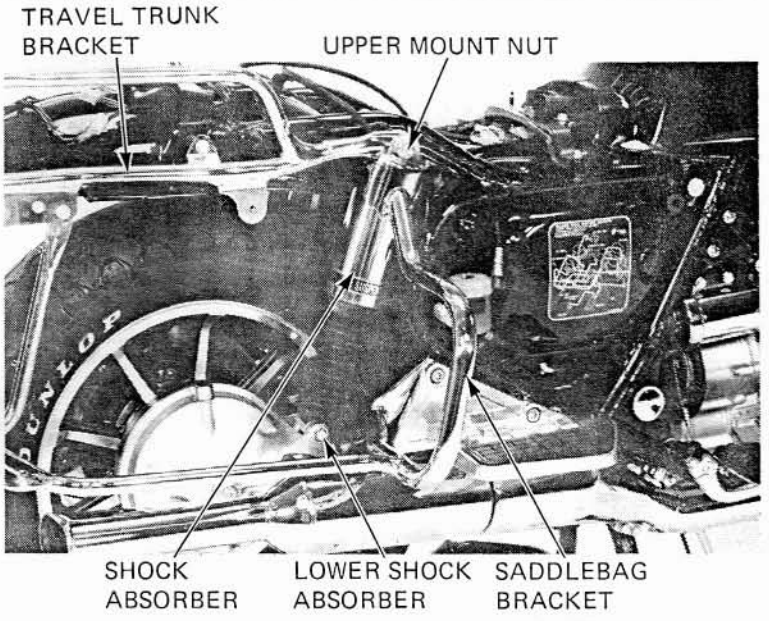


Push the shock absorber onto the mounting stud at the top and install the mounting bolts at the bottom.

Position the travel trunk and saddlebag brackets or handrail on the motorcycle.

Install the cap nuts on the mounting studs. Tighten the nuts/bolts to the specified torque.

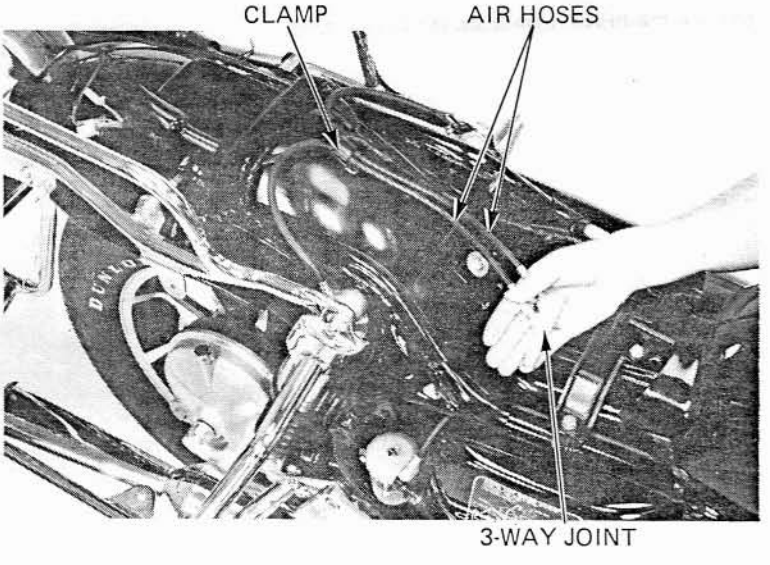
TORQUE:
- **Upper mount bolt:**
  30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
- **Right lower mount bolt:**
  20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
- **Left lower mount bolt:**
  65–75 N·m (6.5–7.5 kg-m, 47–54 ft-lb)



Connect the air hose to the 3-way joint.

TORQUE: 15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb)

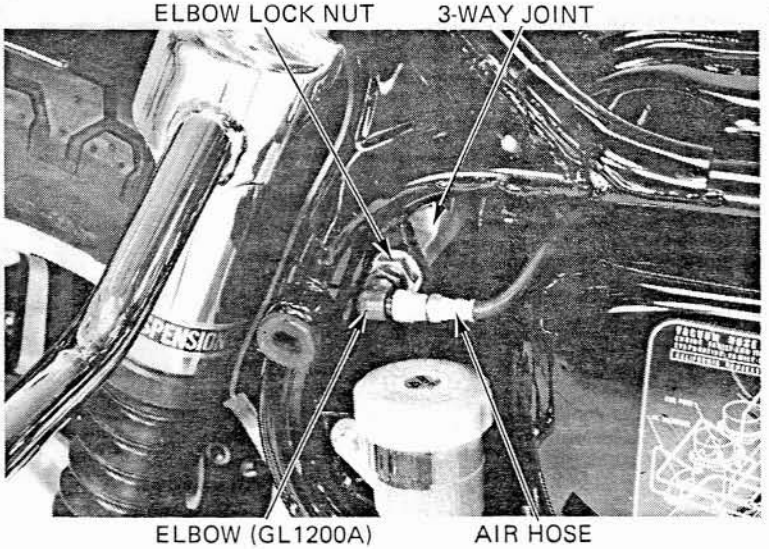
Route the air hoses through the clamp on the rear fender.



Install the 3-way joint into the frame.

Loosely install the elbow to the 3-way joint and tighten elbow lock nut (GL1200A).
Connect the air hose to the elbow.

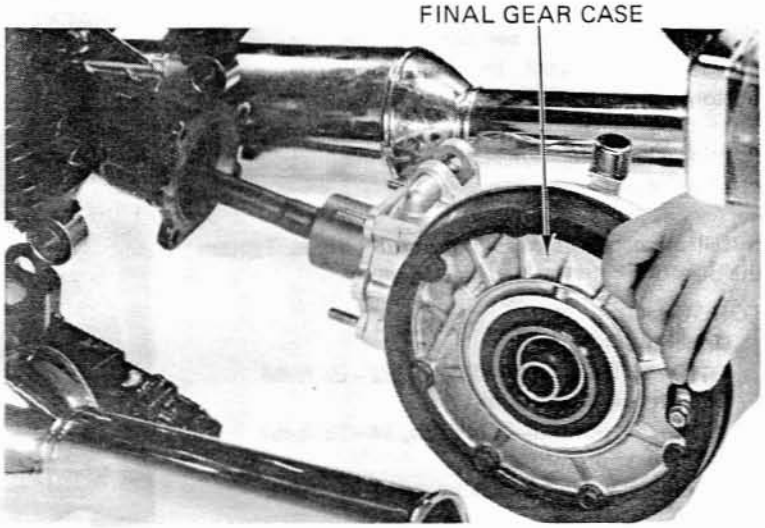
TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)



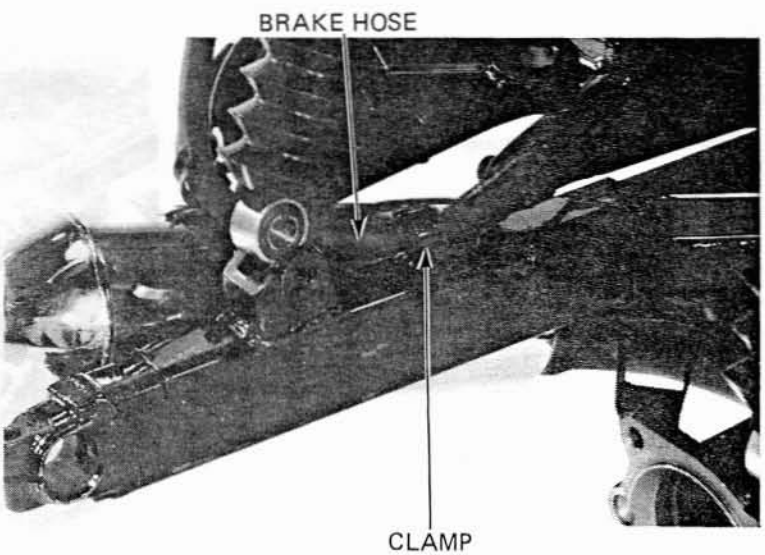
SWING ARM

REMOVAL

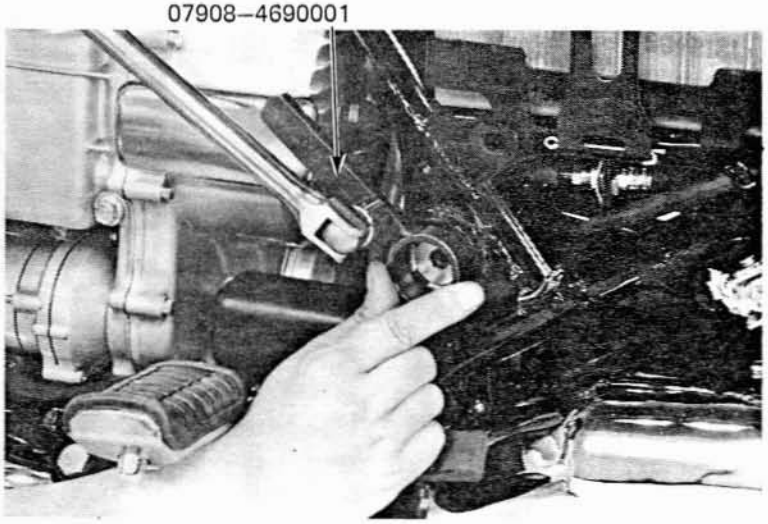
Remove the rear wheel (Page 12-9).
Remove the final gear case (Page 14-3).



Remove the brake hose from the hose clamp.

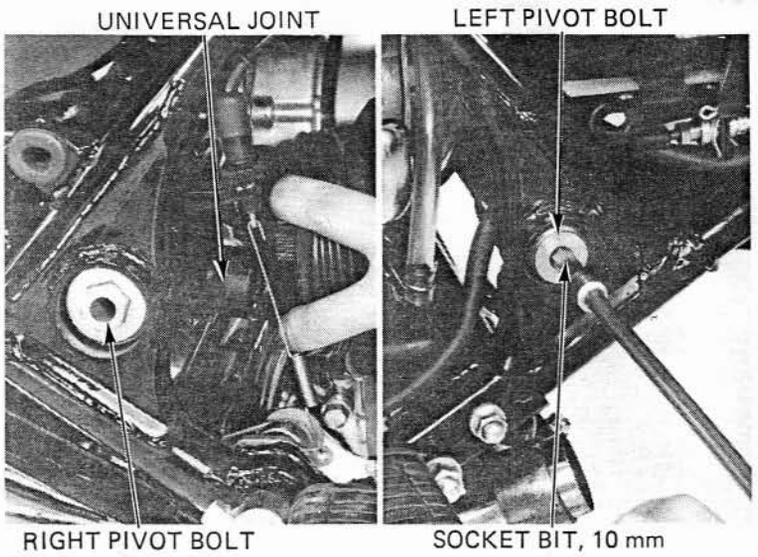


Remove the swing arm pivot lock nut.
Remove the exhaust muffler.



Disconnect the universal joint from the final shaft. Refer to page 14-4 for universal joint inspection. Remove the right and left pivot bolts.

Remove the swing arm.



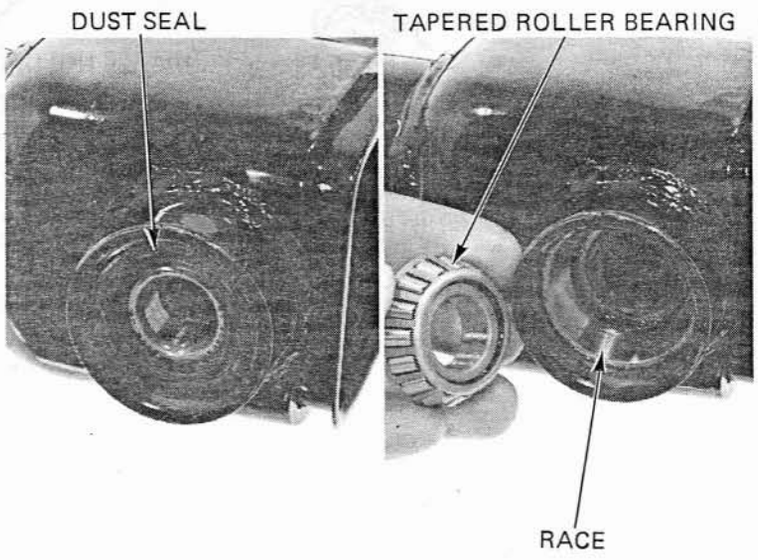
PIVOT BEARING REPLACEMENT

Remove the dust seal.

Inspect the tapered roller bearings and races for damage or wear.

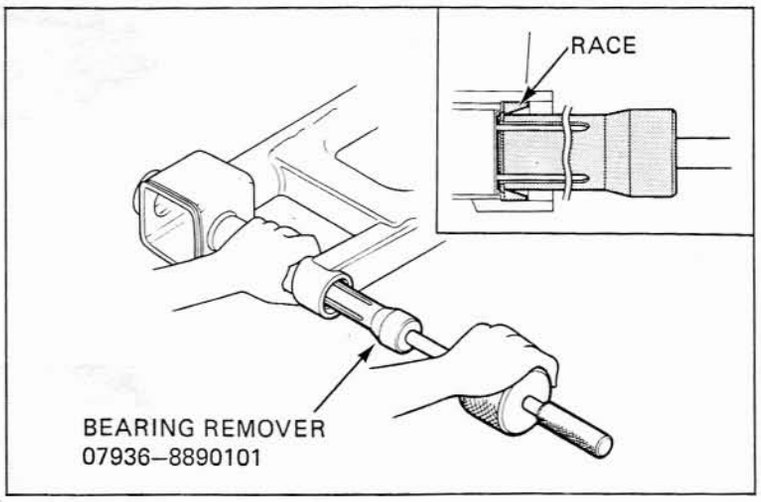
NOTE:

Always replace pivot bearings in pairs.

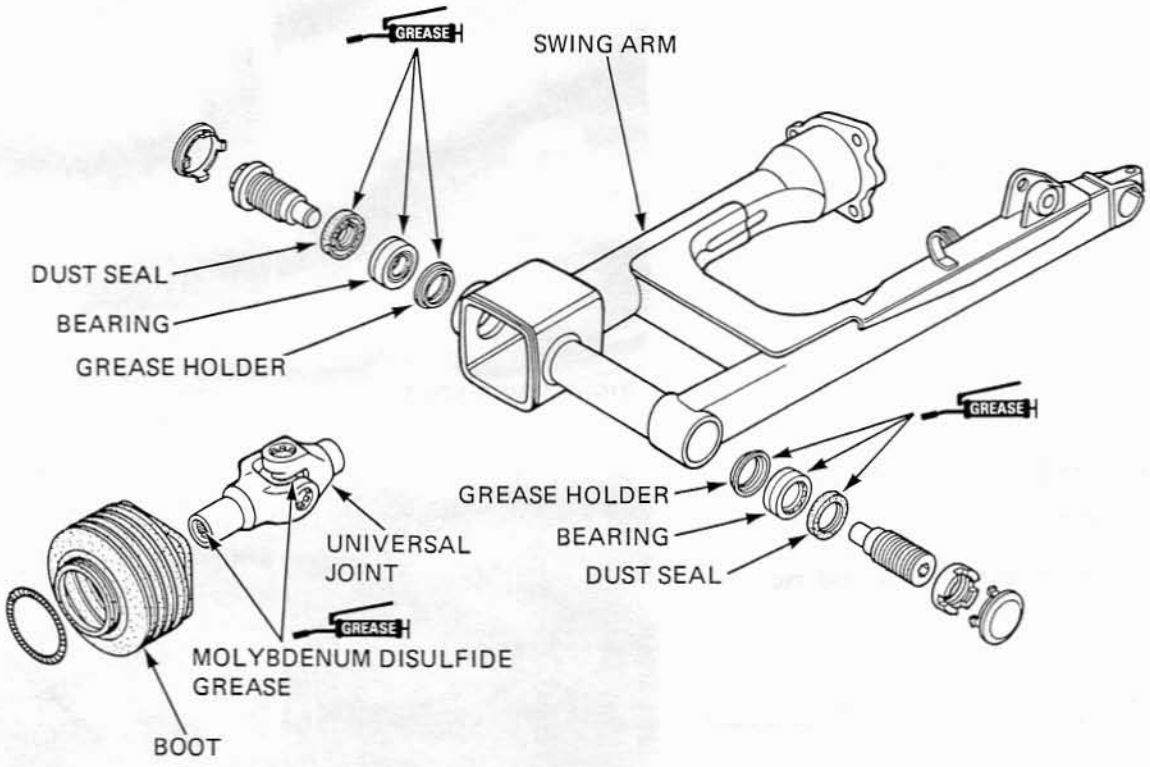


Remove the outer races with the bearing remover.

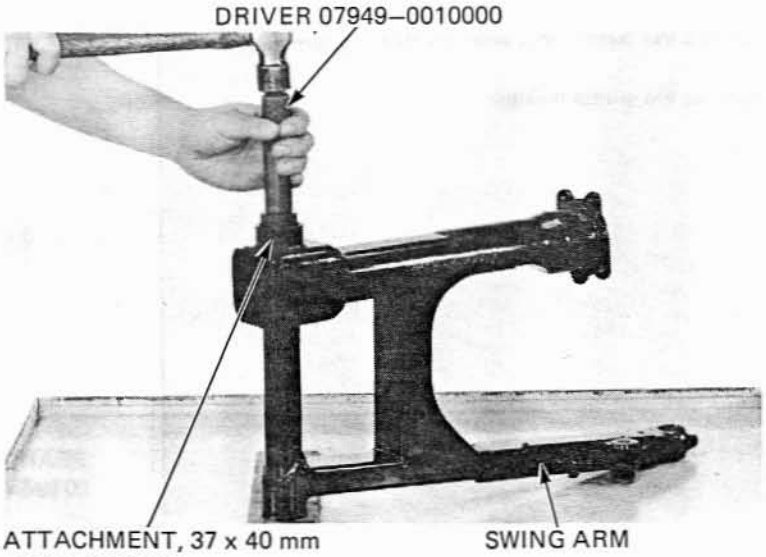
Remove the grease holder.



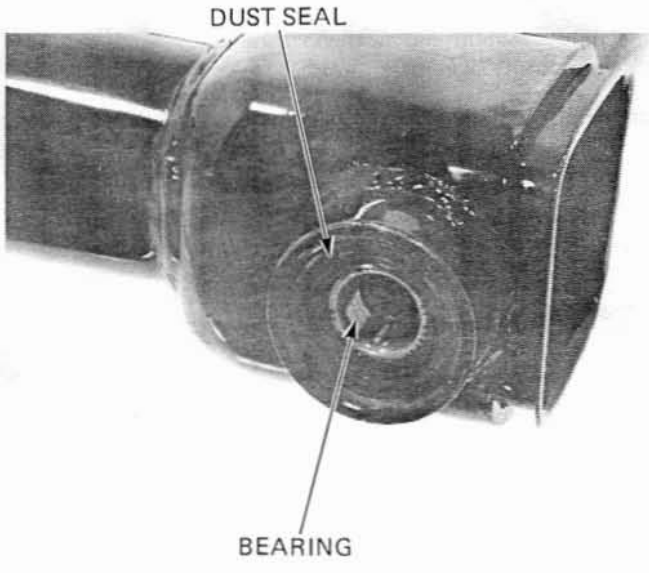
SWING ARM ASSEMBLY



Install the grease holder.
Drive the new bearing races squarely into the swing arm.

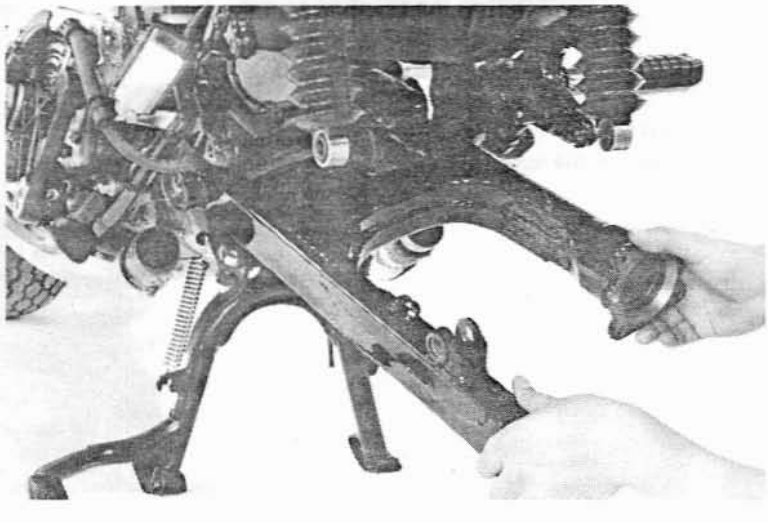


Install the bearings and dust seal into the swing arm.



SWING ARM INSTALLATION

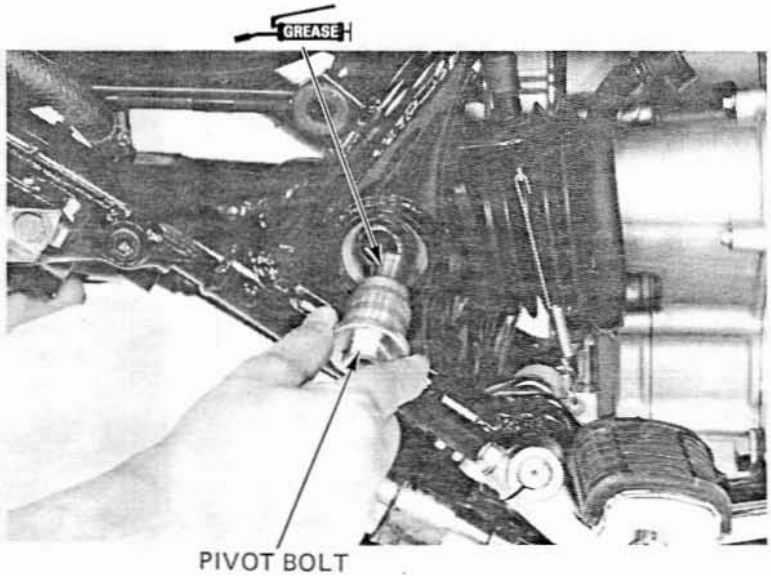
Install the universal joint into the swing arm.
Install the swing arm.



Apply grease to the tip of the right and left pivot bolts and loosely install them.

NOTE:

> Make sure that the end of the pivot bolts are inserted into the bearing inner races.



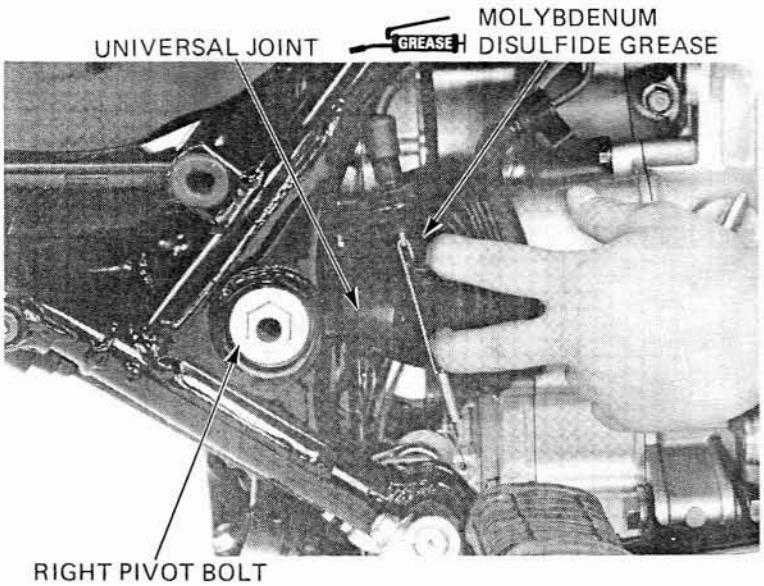
Lubricate the universal joint and final shaft splines with molybdenum disulfide grease.

Insert the universal joint into the final shaft.

Tighten the right pivot bolt to the specified torque.

TORQUE:
80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb)

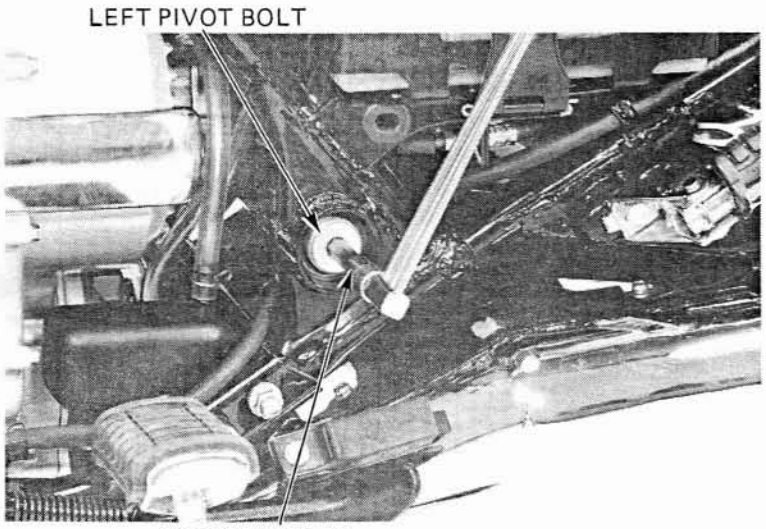
Install the exhaust muffler.



Tighten the left pivot bolt to the specified torque.

TORQUE: 18–20 N·m (1.8–2.0 kg-m, 13–14 ft-lb)

Move the swing arm up and down several times to seat the bearings with the pivot bolt then retighten the pivot bolt to the specified torque.

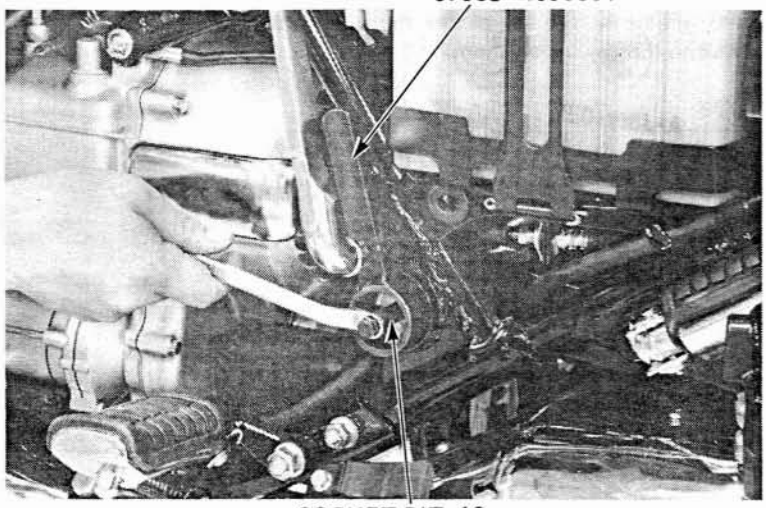


Install the pivot lock nut on the pivot bolt.
Hold the pivot bolt and tighten the pivot lock nut to a torque wrench reading of 75–105 N·m (7.5–10.5 kg-m, 54–76 ft-lb).

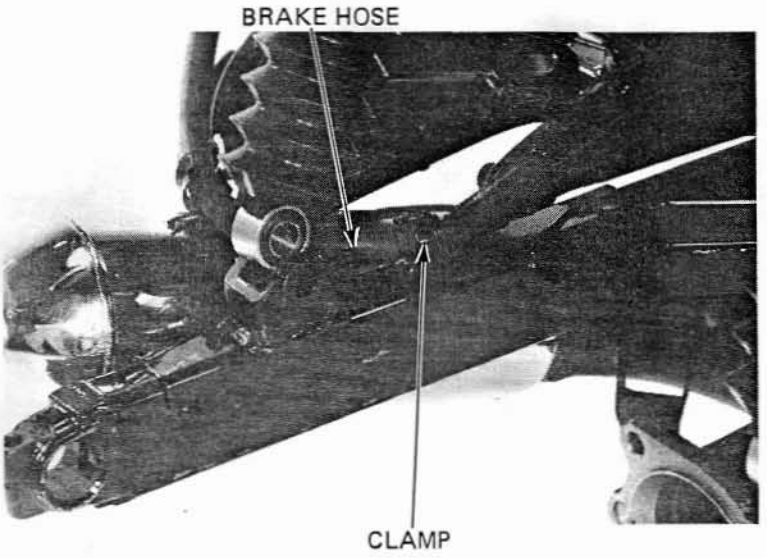
NOTE:

> Because the lock nut wrench increases the torque wrench's leverage, the torque actually applied to the lock nut is the specified torque value: 80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb).

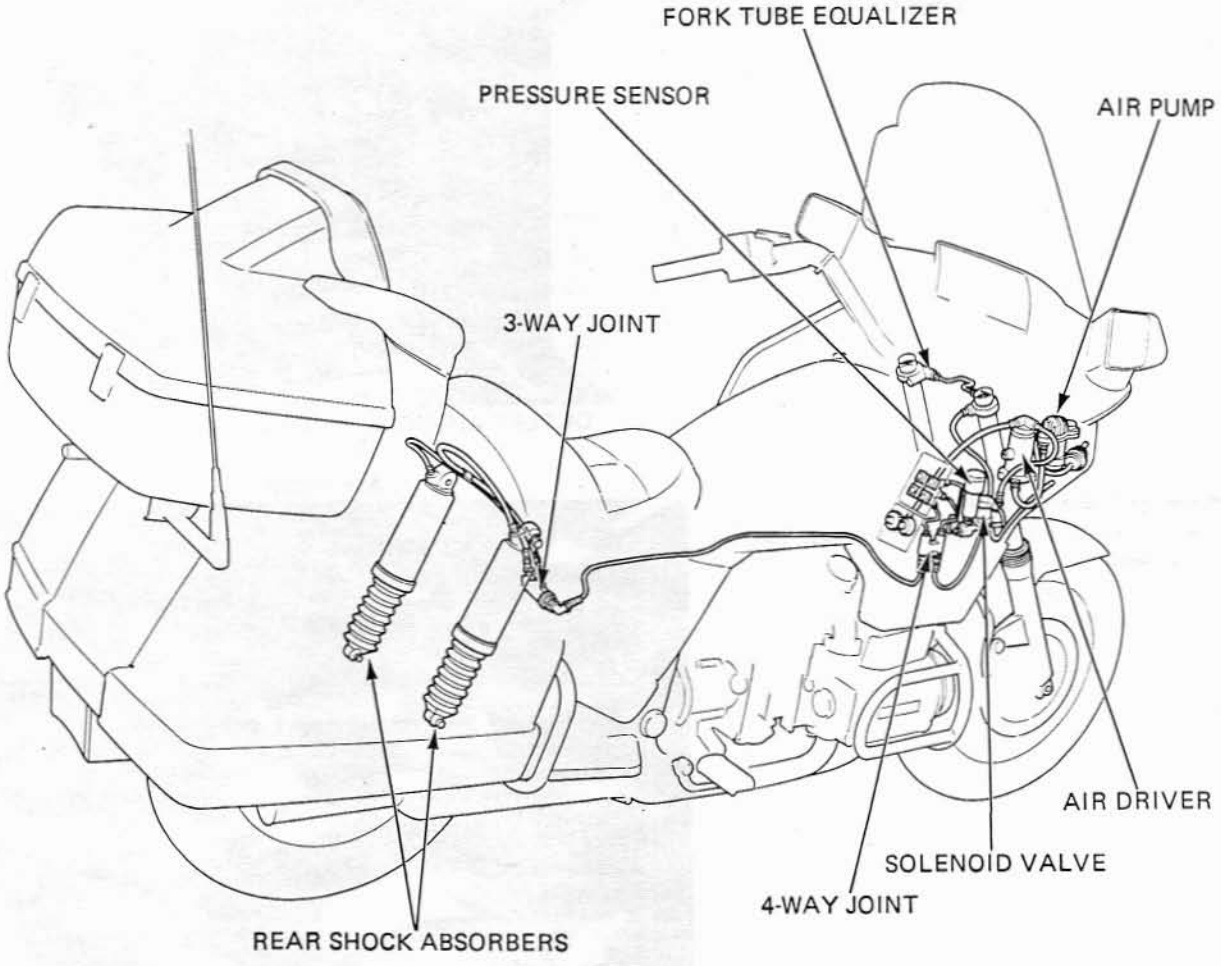
Install the pivot caps.



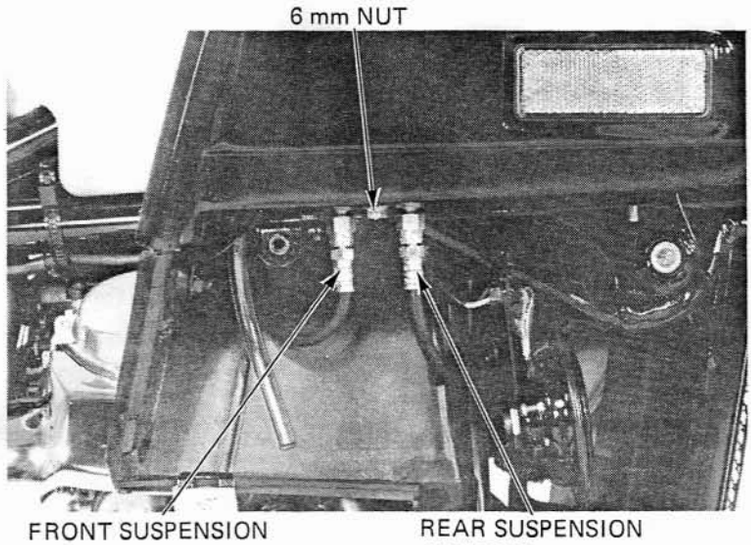
Secure the brake hose to the hose clamp.
Install the final drive gear case (Page 14-17).
Install the rear wheel (Page 12-13).



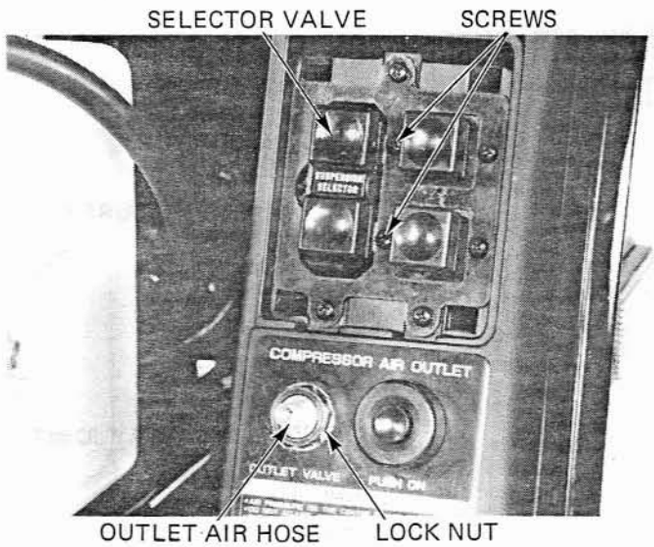
ON-BOARD AIR SUSPENSION SYSTEM (GL1200A)



Remove the right fairing lower cover.
Disconnect the front and rear suspension air hoses from the fairing.
Remove the 6 mm nut.

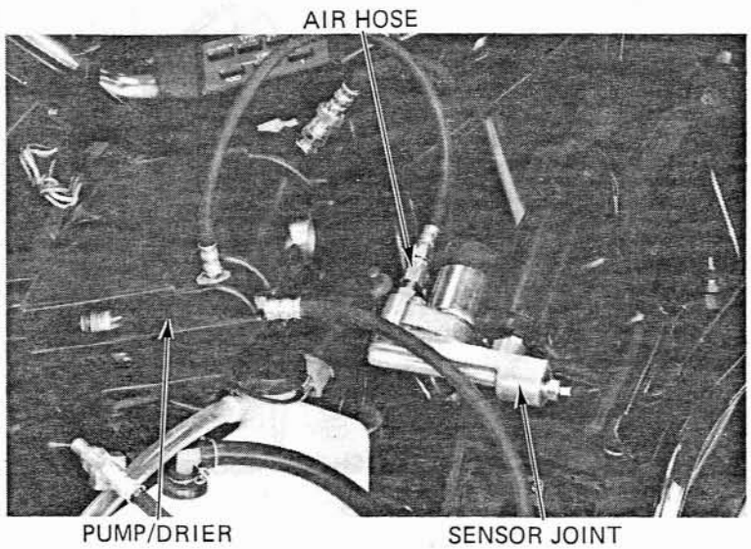


Remove the switch panel.
Remove the outlet air hose by removing the lock nut.
Remove the selector valve by removing two screws.



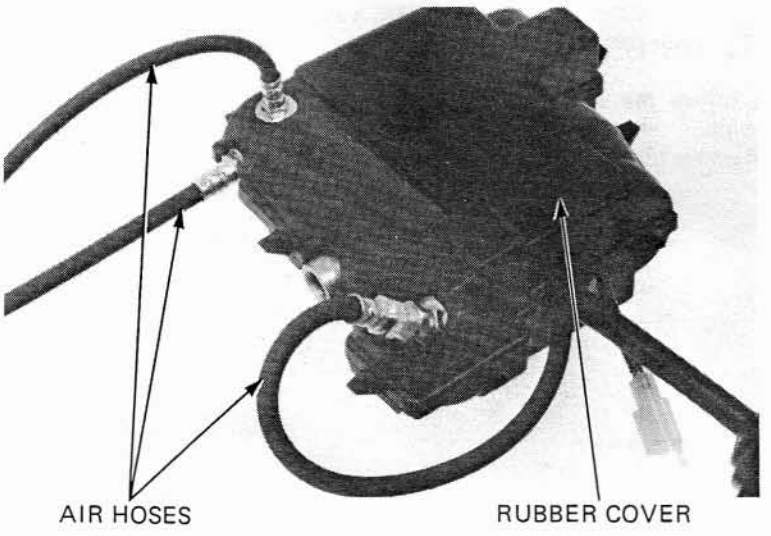
Remove the right fairing pocket.
Pull the air pump/drier assembly and sensor joint out from the fairing.

Disconnect the air hose from the sensor joint.



AIR DRIVER DISASSEMBLY

Disconnect the air hoses from the drier.
Remove the rubber cover.

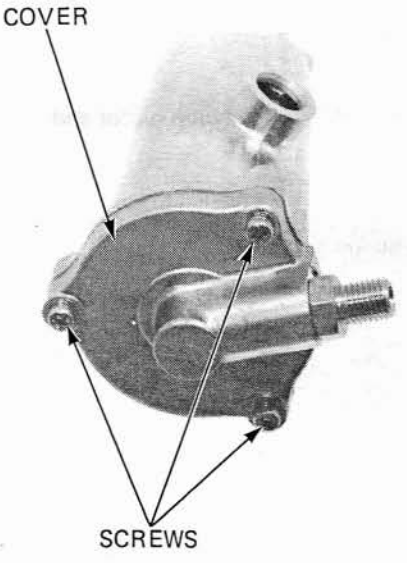


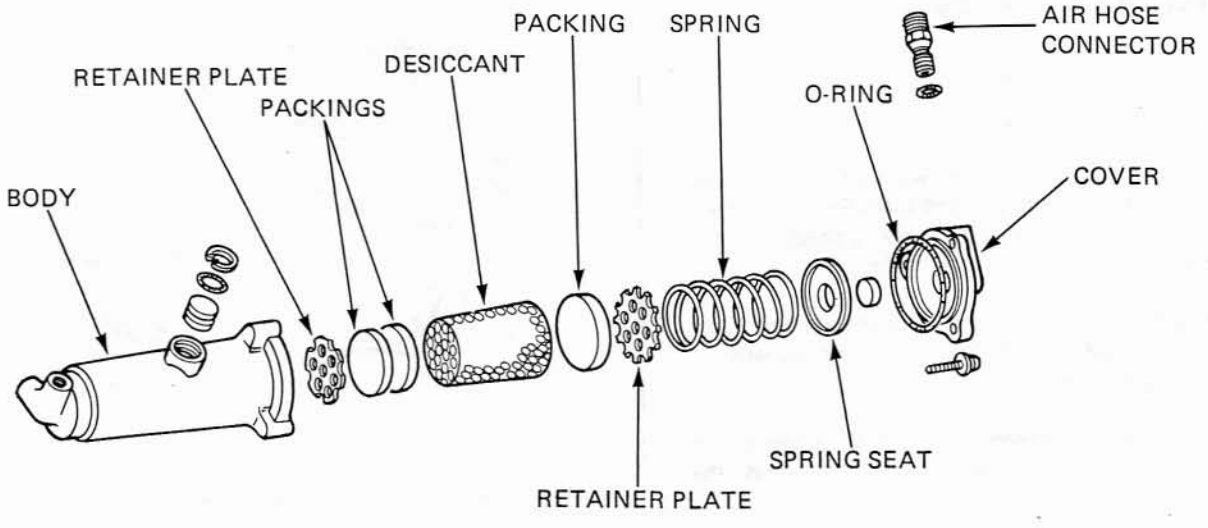
Remove the screws, then disassemble the drier as shown, if necessary.

Check the color of the desiccant. It should be blue. If not, bake the desiccant until it is blue, or replace, if necessary.

Check the packings for dirt or moisture and replace, if necessary.

Clean the inside of the body and the cover openings with compressed air.

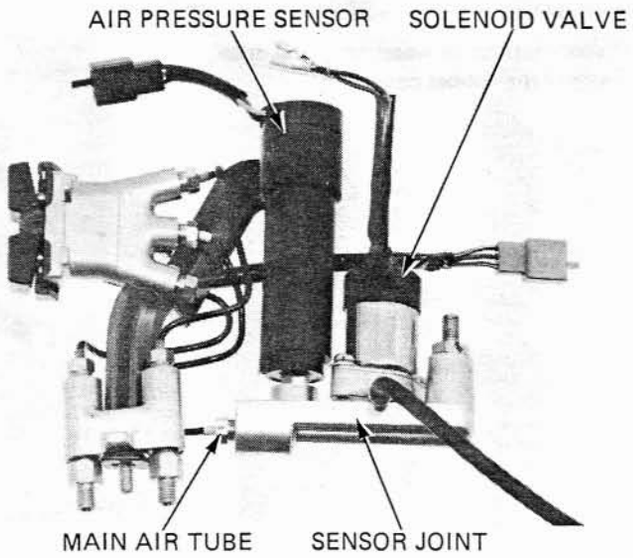




CONTROL SYSTEM DISASSEMBLY

Disconnect the main air tube with yellow band at the sensor joint.

Remove the air pressure sensor from the sensor joint.
Remove the solenoid valve from the sensor joint.



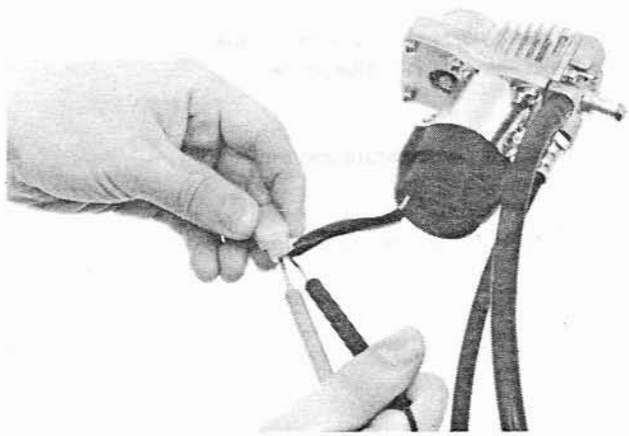
INSPECTION

- AIR PUMP

Use a 12V battery to energize the pump motor and check its operation.

NOTE:

Do not disassemble the air pump.



- AIR PRESSURE SENSOR

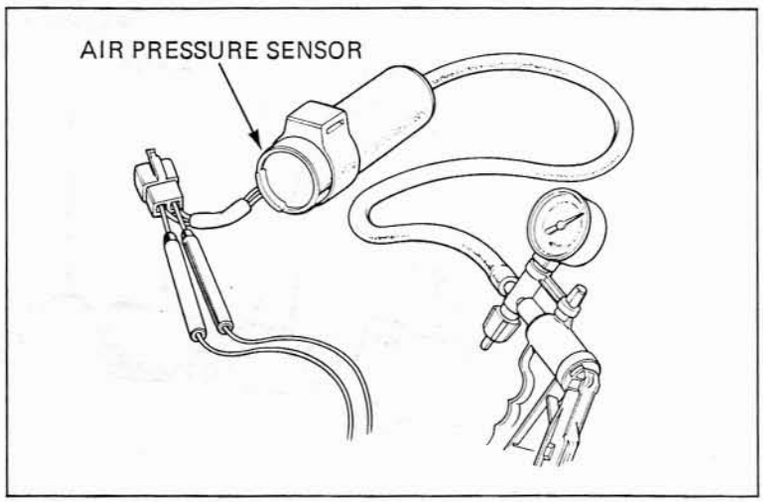
Measure the resistance between the sensor coupler Black/Brown and Green terminals.

SPECIFIED RESISTANCE: 0.7–1.3 kΩ

Measure the resistances between the Black/Brown and Light Blue terminals, and Light Blue and Green terminals, of the sensor, by applying pressures from 0 to 4 kg/cm^2 (0–57 psi) gradually.

The resistance between the Black/Brown and Light Blue terminals should increase proportionally as the pressure is increased.

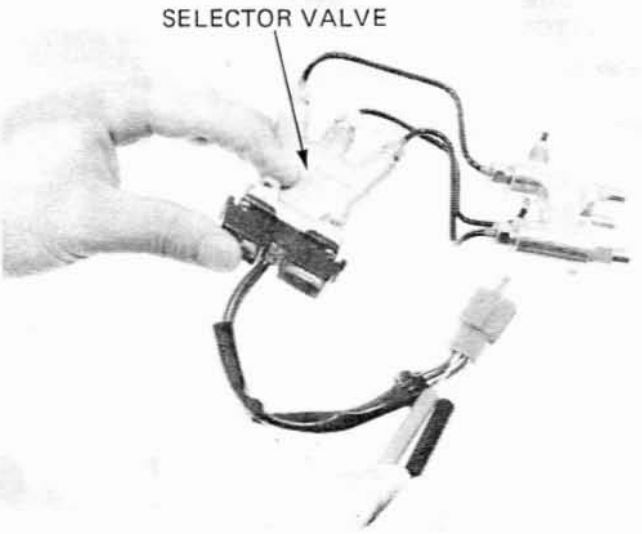
The resistance between the Light Blue and Green terminals should decrease proportionally as the pressure is increased.



• SELECTOR VALVE

There should be continuity between the Green/Black and Blue/Yellow terminals when the selector is pressed on FRONT.

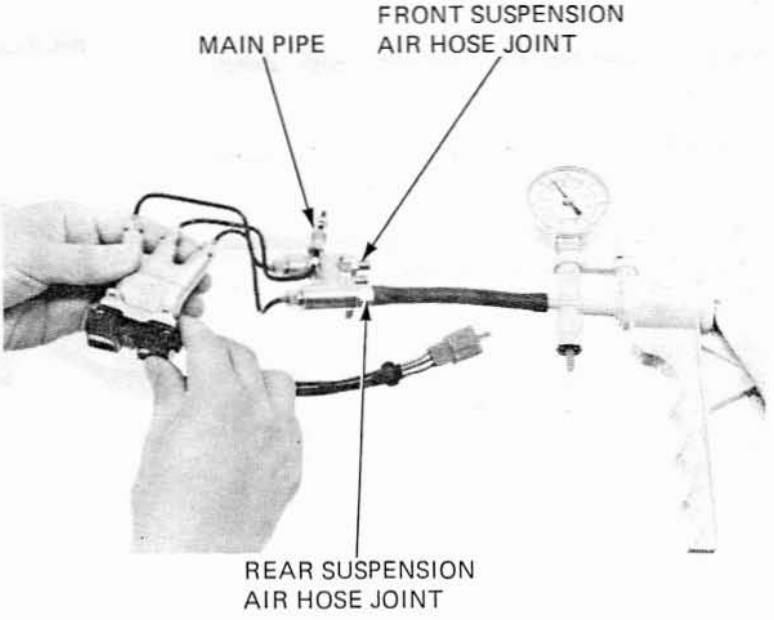
Check that there exists continuity between the Green/Black and Blue/Pink terminals when the selector is pressed on REAR.



Check the 4-way joint for leakage by applying vacuum to the rear suspension air hose joint.

There should be no vacuum when the selector is pressed on REAR. The rear suspension air hose joint should be open to the main pipe (yellow band).

Apply the same procedures to the front suspension air hose joint.



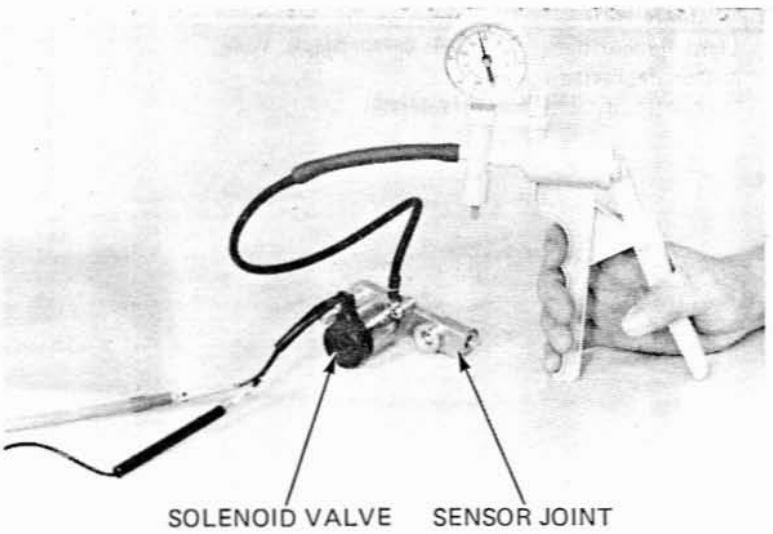
• SOLENOID VALVE

Check the valve for leakage by applying vacuum to the discharge tube of the sensor joint.

The valve is normal if there is no vacuum in the discharge tube when a 12V is applied to the valve terminals.

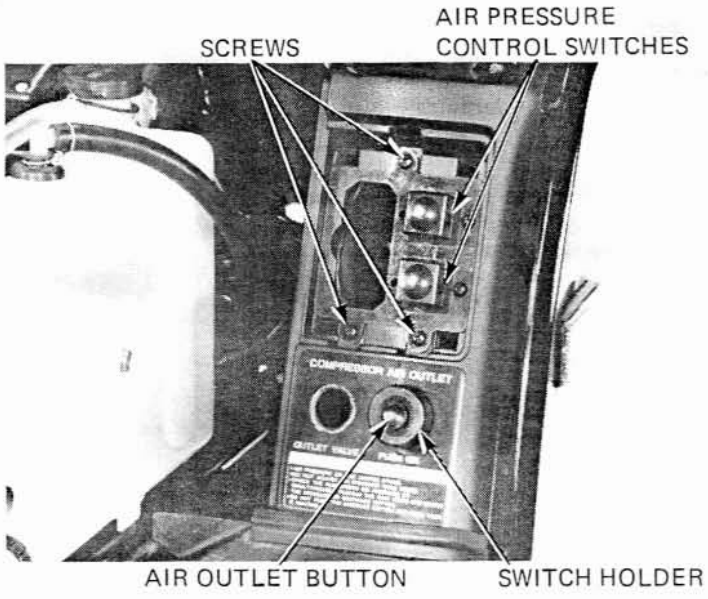
If vacuum takes time to disappear, clean the sensor passage.

Replace the solenoid valve with a new one if it won't function.

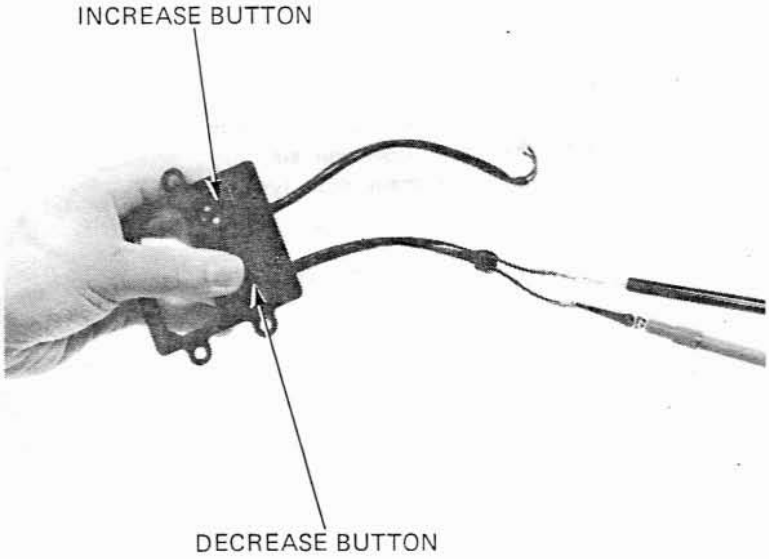


- AIR PRESSURE CONTROL SWITCH/AIR OUTLET BUTTON

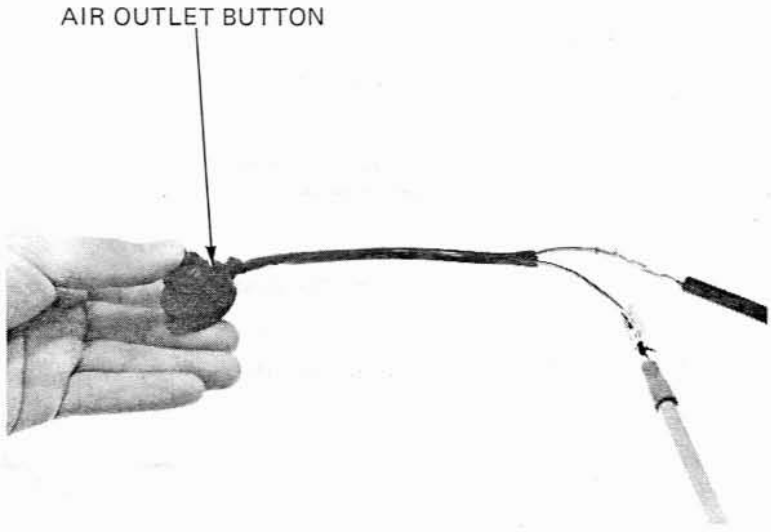
Remove the air pressure control switches by removing screws.
Remove the switch holder and the air outlet button.



Check the switches for continuity with switch depressed.
Increase button:
Black/Brown to Green with button depressed
No continuity with button released.
Decrease button:
Black/Yellow to Green with button depressed
No continuity with button released.

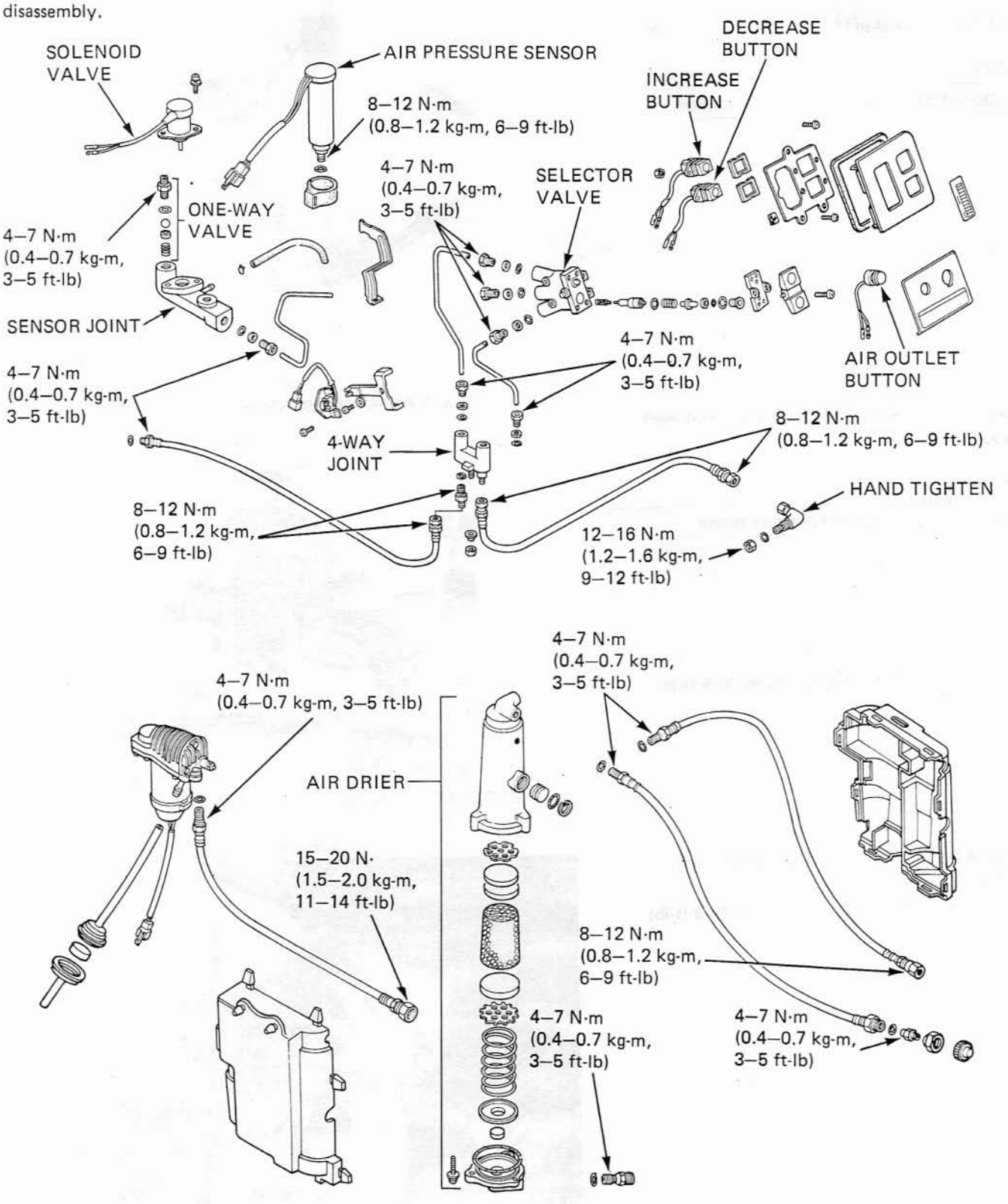


Air outlet button:
Light green/Black to Light green/Black with button depressed.
No continuity with button released.



INSTALLATION

The assembly sequence is essentially the reverse of disassembly.

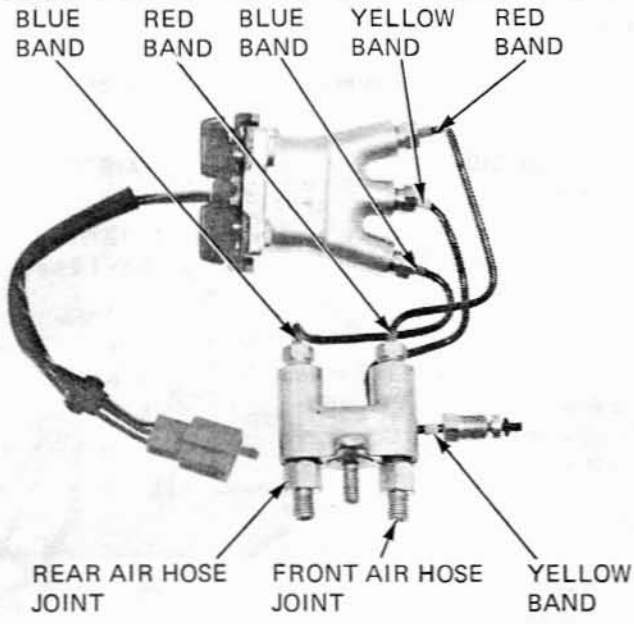


Connect the selector valve and 4-way joint with air tubes.

TORQUE: 4–7 N·m (0.4–0.7 kg-m, 3–5 ft-lb)

NOTE:

Do not bend the plastic tubes excessively.



Install the air pressure sensor on the sensor joint.

TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

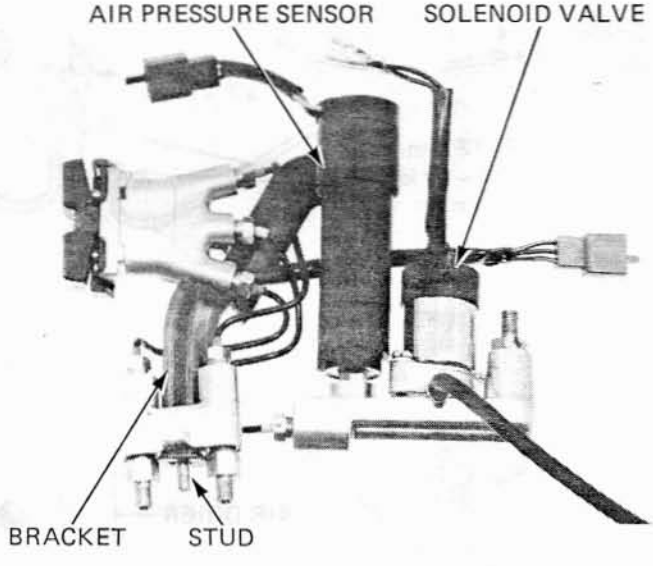
NOTE:

Do not overtighten the pressure sensor.

Install the solenoid valve on the sensor joint. Position the lower hole of the sensor bracket over the 4-way valve stud.

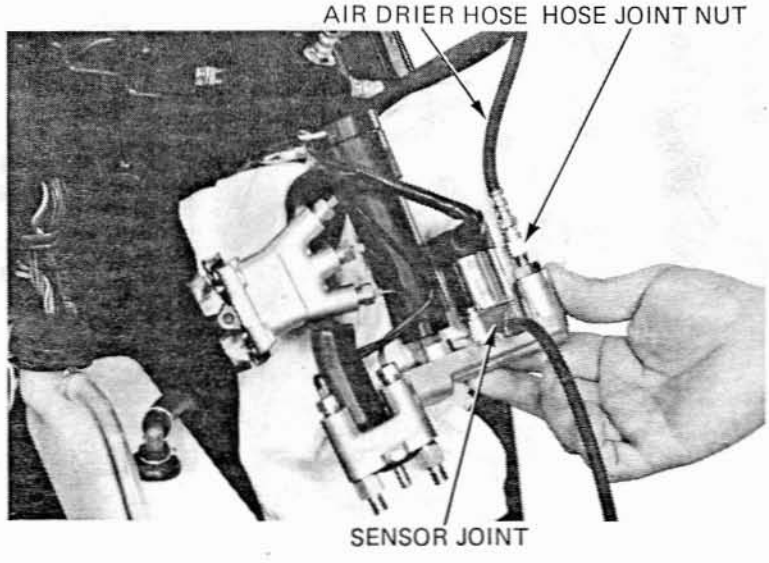
Connect the main air tube to the sensor joint.

TORQUE: 4–7 N·m (0.4–0.7 kg-m, 3–5 ft-lb)

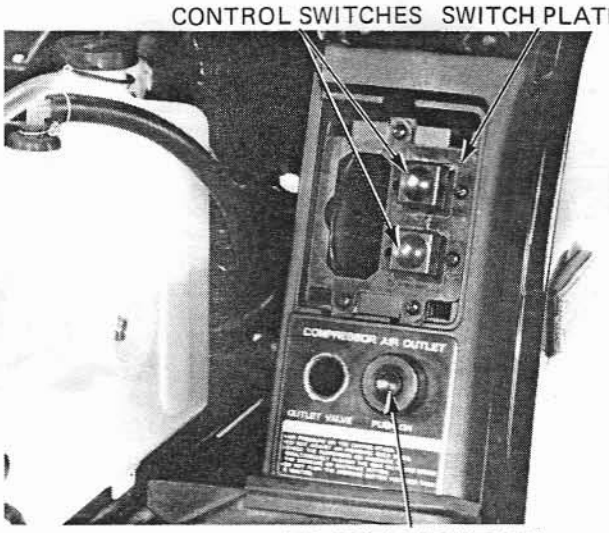


Connect the air drier hose to the sensor joint. Tighten the hose joint nut.

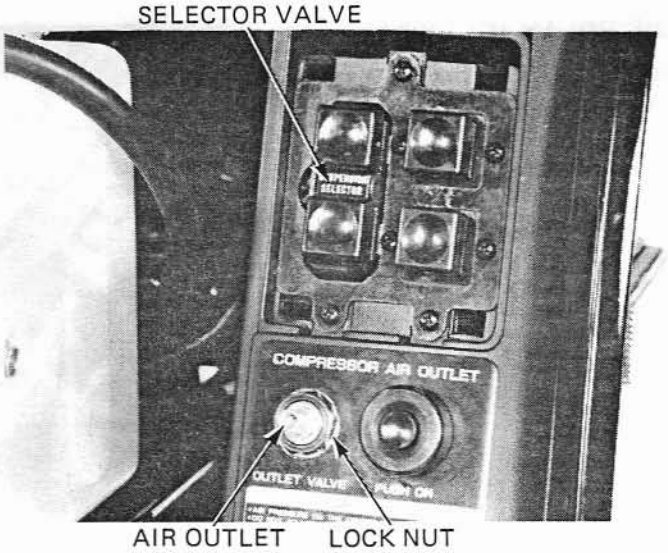
TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)



Install the air outlet button.
Install the control switches and switch plate.
Connect the switch wires to the wire harness.

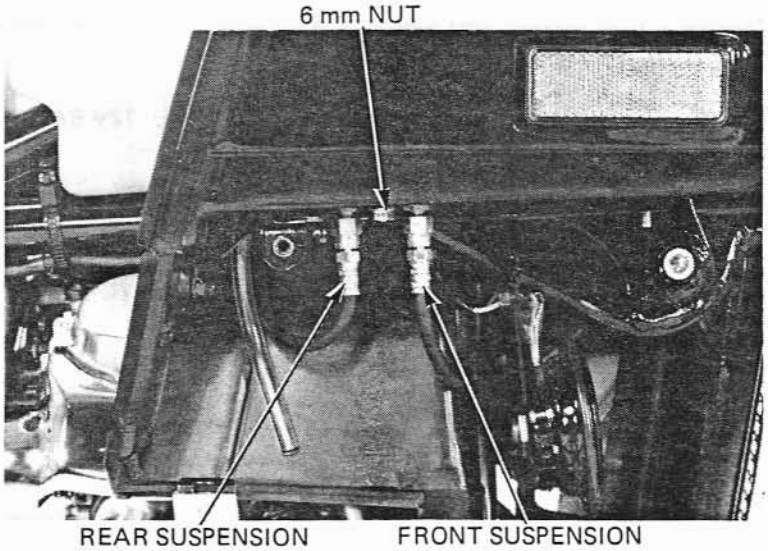


Install the air outlet hose and selector valve.
Connect the selector valve wires to the wire harness.
Install the switch panel onto the control switches.



Install the 6 mm nut onto the stud of the 4-way joint. Tighten the nut securely.
Connect the front and rear suspension air hoses to the 4-way joint.
Tighten the hose joint nuts.

TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)



Connect the sensor wire, solenoid valve wire and air pump wire to the wire harness.
Install the air pump/drier into the fairing.

CAUTION:

Be careful not to block the air hoses by bending or twisting the hoses during installation.

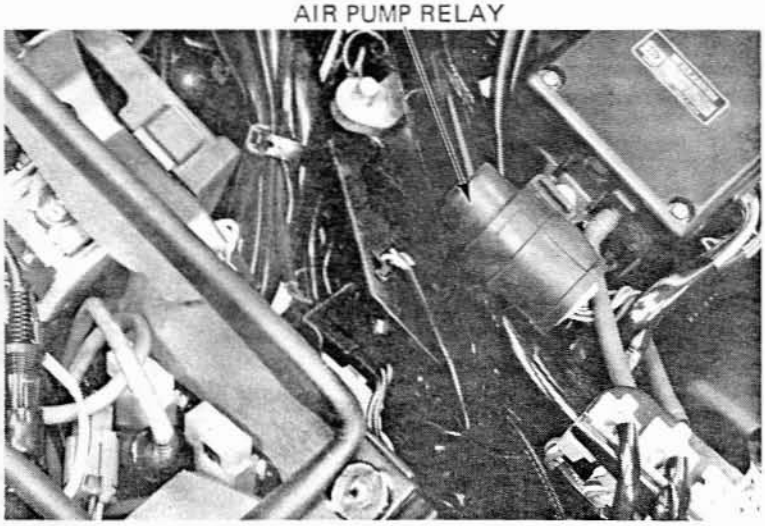
Check the operation and air leakage after installation.
Install the right fairing pocket.

AIR PUMP/DRIER

AIR PUMP RELAY (GL1200A)

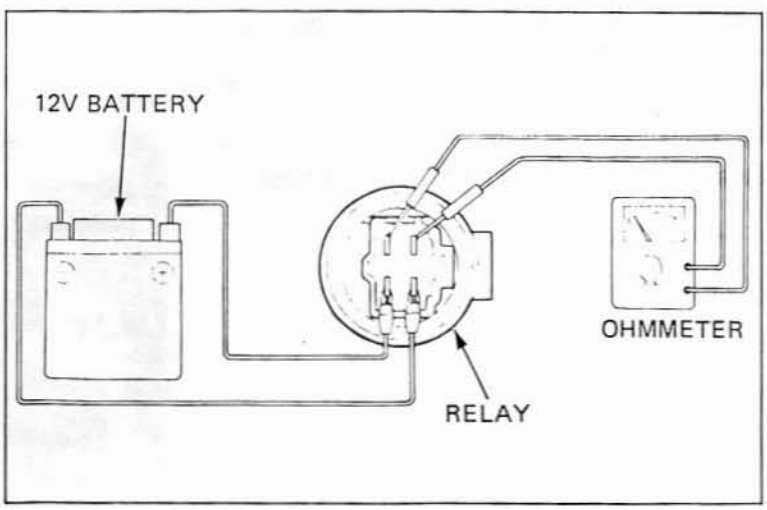
Remove the air pump relay from the relay bracket.
Disconnect the relay from the coupler.

AIR PUMP RELAY

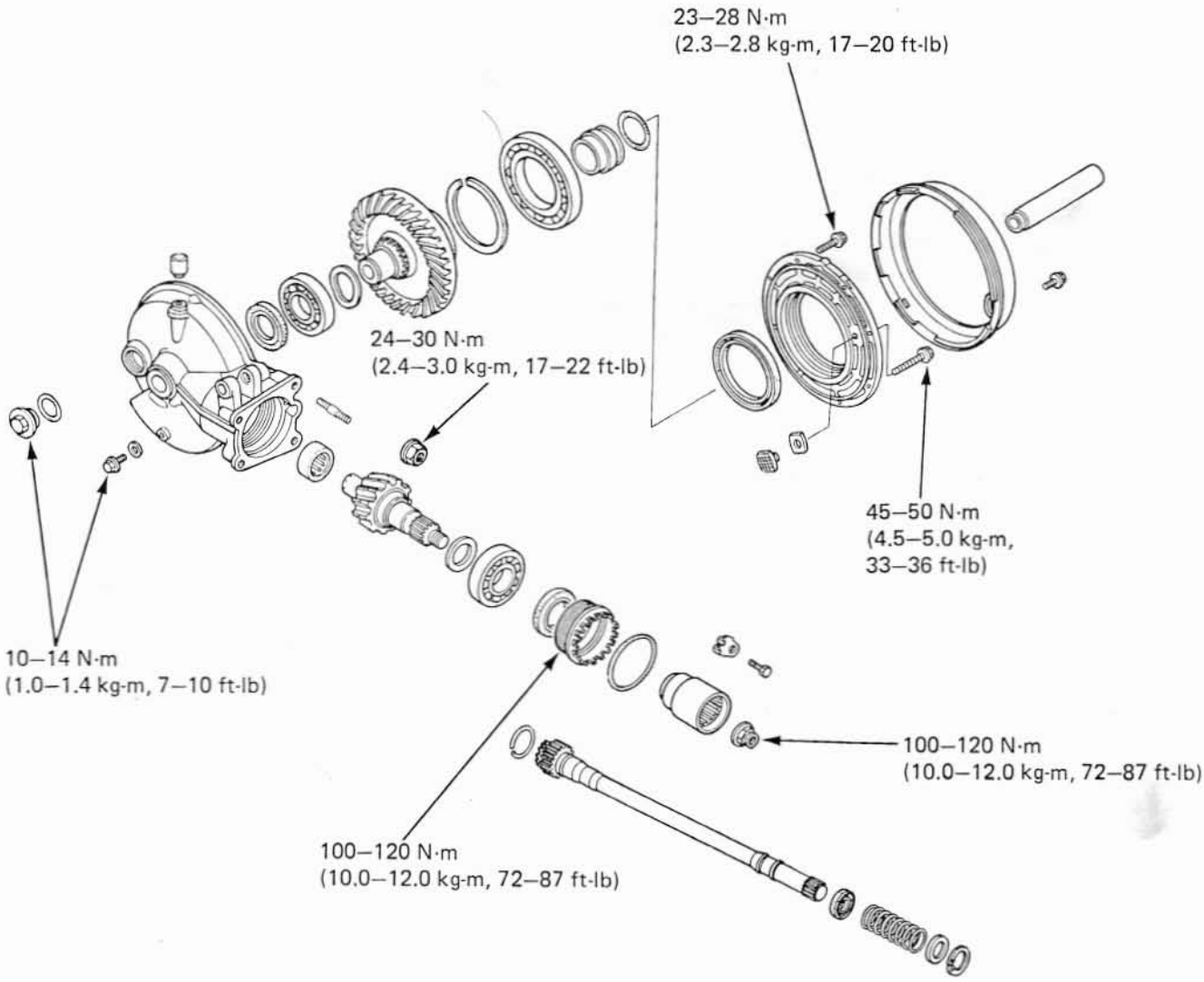


Connect a fully charged 12V battery and an ohmmeter to the relay terminals as shown.

The relay is normal if there is continuity when voltage is applied.



MEMO



14. FINAL DRIVE

SERVICE INFORMATION

GENERAL

- The final drive gear assembly must be removed together with the drive shaft.
- Replace all oil seals and O-rings whenver the final drive gear assembly is disassembled.
- Check tooth contact pattern and gear backlash when the bearing, gear set and/or gear case has been replaced.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Final gear oil	Capacity	170 cm^3 (5.7 US oz, 6.0 Imp oz)	–
	Recommended oil	Hypoid gear oil, SAE 80 API GL-5	–
Gear backlash		0.08–0.18 (0.003–0.007)	0.30 (0.012)
Gear assembly preload		0.2–0.4 N·m (2–4 kg-cm, 1.7–3.5 in-lb)	–

TORQUE VALUES

Pinion bearing retainer	100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)
Pinion joint nut	100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)
Gear case cover bolt 10 mm	45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)
8 mm	23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)
Final drive gear case attaching nut	24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)
Final drive gear case filler cap	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Final drive gear case drain plug	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

TOOLS

Special

Pinion joint holder attachment	07924–9690100
Pinion joint holder	07924–ME40000
Retainer wrench	07910–ME80000
Bearing race insert attachment	07931–4630300
Bearing puller attachment	07934–MG70200
Dis/assembly tool base	07965–3710300
Shaft puller	07931–ME40000

Common

Driver	07746–0030100
Attachment, 30 mm I.D.	07746–0030300
Attachment, 32 x 35 mm	07746–0010100
Pilot, 20 mm	07746–0040500
Attachment, 52 x 55 mm	07746–0010400
Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Bearing puller	07631–0010000

TROUBLESHOOTING

Excessive noise

- Worn or scored ring gear shaft and driven flange
- Scored driven flange and wheel hub
- Worn or scroed drive pinion and splines
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gear

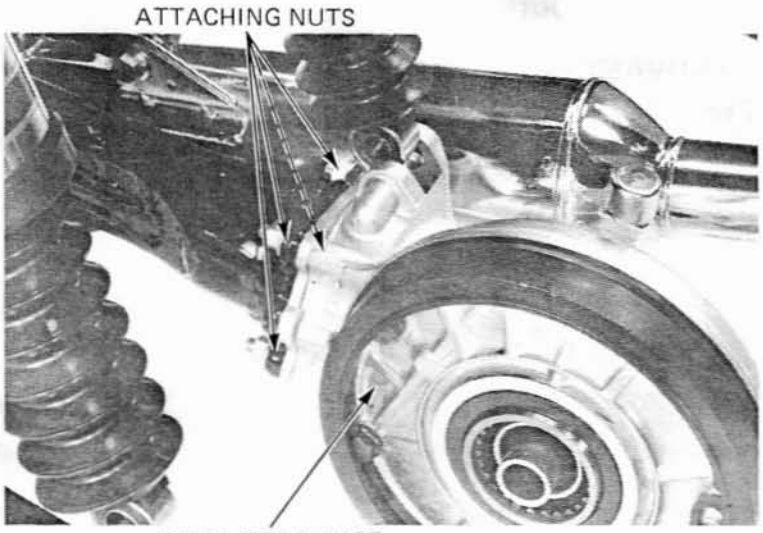
Oil leak

- Clogged breather
- Oil level too high
- Seals damaged

FINAL DRIVE REMOVAL

Place the motorcycle on its center stand. Drain the final gear oil (page 2-15) and remove the rear wheel (page 12-9).

Remove the final gear case attaching nuts and remove the gear case from the swing arm.

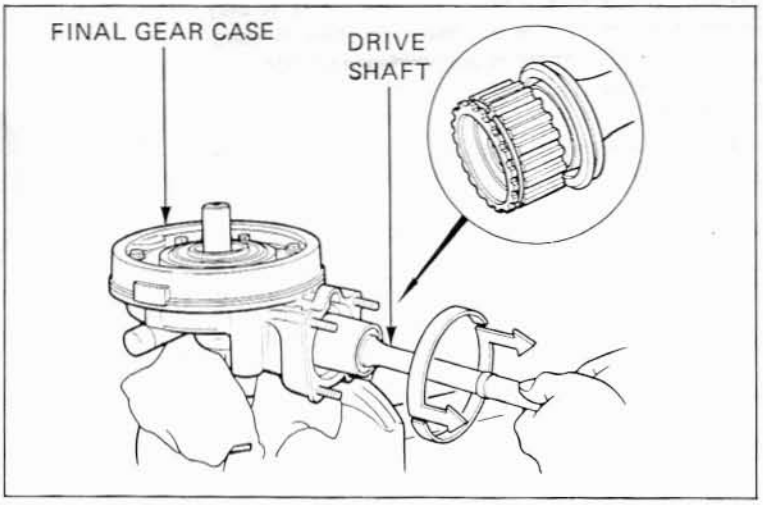


DRIVE SHAFT

REMOVAL

Insert the axle through the gear case and secure the case in a vise with soft jaws or shop rags by clamping the axle. Place the shock mount between the jaws for stability.

Separate the drive shaft from the gear case by gently revolving the shaft in a circular motion while tugging slightly.



DISASSEMBLY

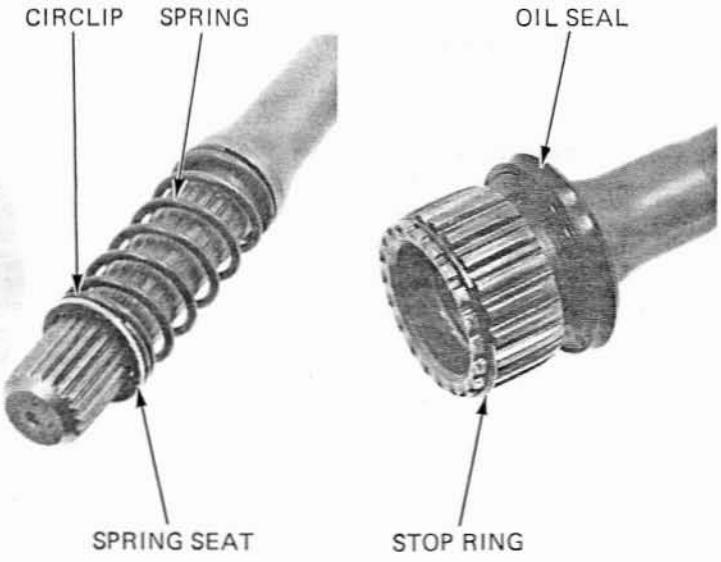
Remove the circlip, spring seat and spring from the drive shaft.

Remove the oil seal and stop ring from the drive shaft.

NOTE:

> Replace the oil seal with a new one if it is removed.

Inspect the drive shaft splines for wear or damage.



ASSEMBLY

Place a new oil seal over the drive shaft.

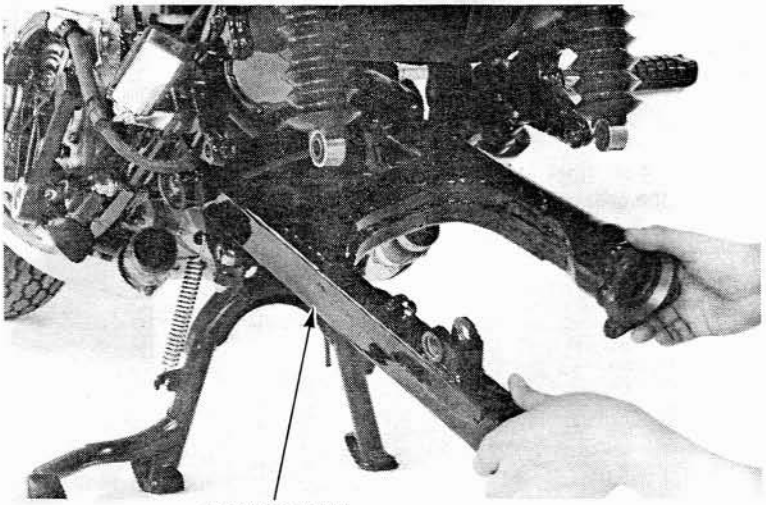
Install the damper spring, spring seat, circlip and a new stop ring.

UNIVERSAL JOINT

REMOVAL/INSTALLATION

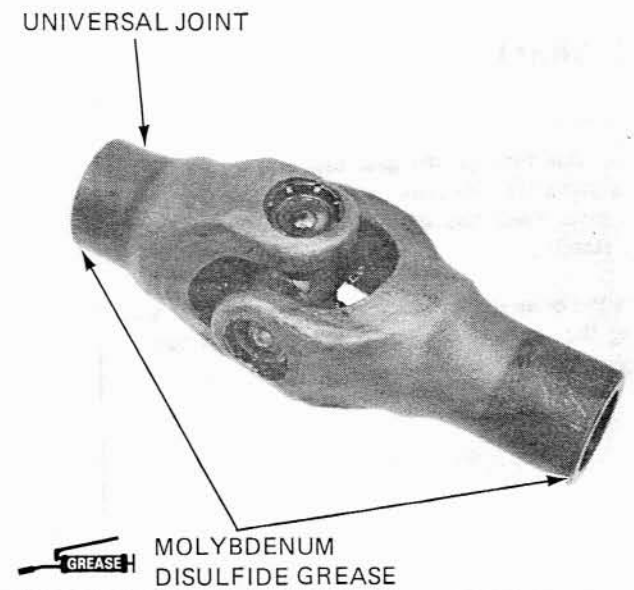
Remove the swing arm (Page 13-18).

Remove the universal joint from the swing arm.



Inspect the universal joint. There should be no play in the bearings. Rotate the shaft and joint in opposite directions. If there is any evidence of side play, the universal joint must be replaced.

Lubricate the splines with molybdenum disulfide grease.

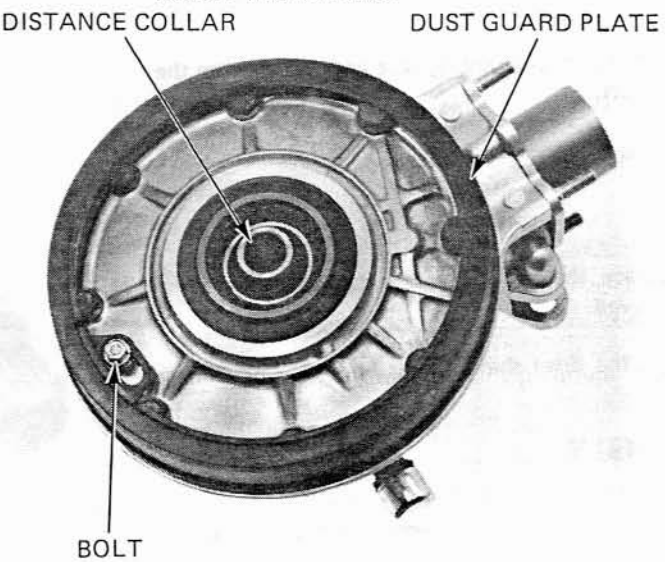


FINAL DRIVE GEAR

RING GEAR REMOVAL

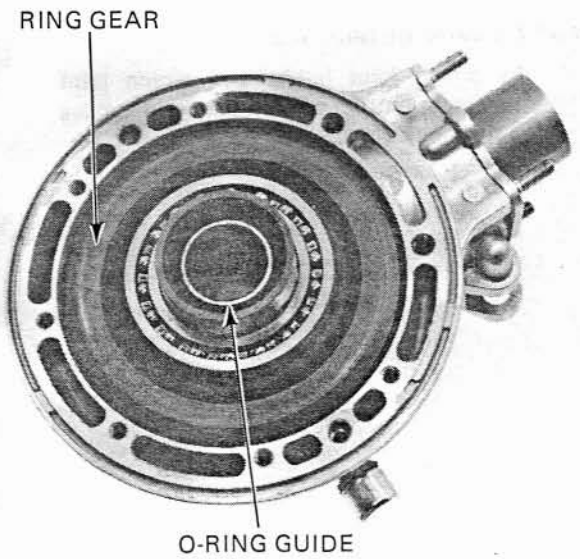
Remove the distance collar.

Remove the dust guard plate bolt and the dust guard plate by turning it clockwise.



Remove the eight case cover bolts and cover. If the ring gear stays in the cover, press the ring gear out of the cover.

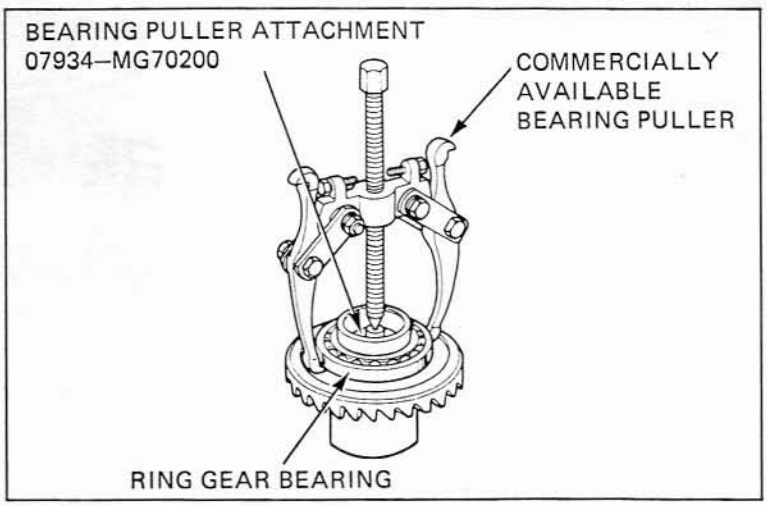
Remove the ring gear from the final drive case.



RING GEAR BEARING REMOVAL

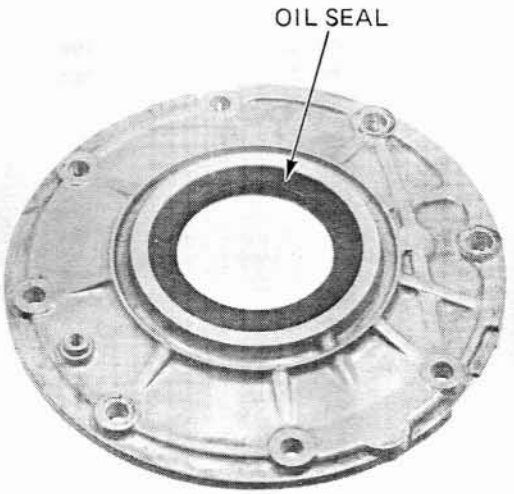
Remove the O-ring guide by tapping it from the opposite side.

Remove the ring gear bearing and gear adjusting spacer.



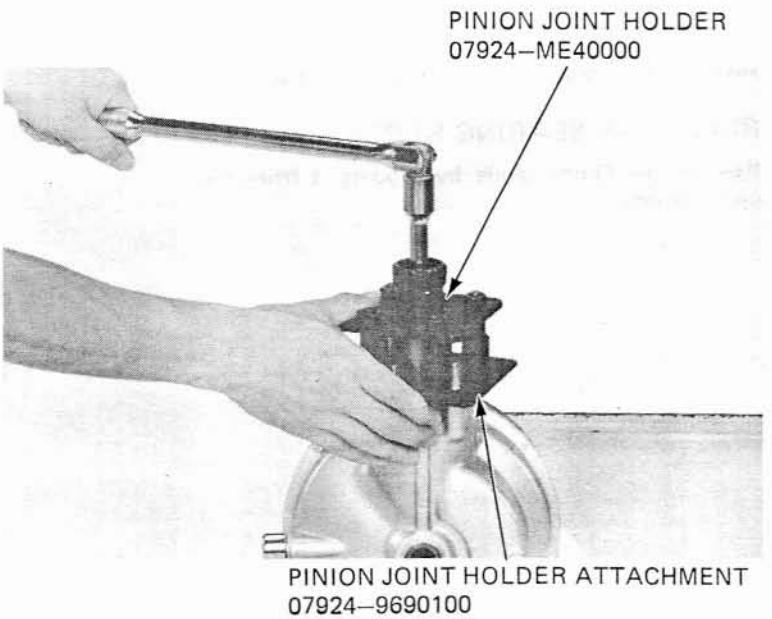
CASE COVER OIL SEAL REPLACEMENT

Remove the oil seal from the case cover and press in a new oil seal.

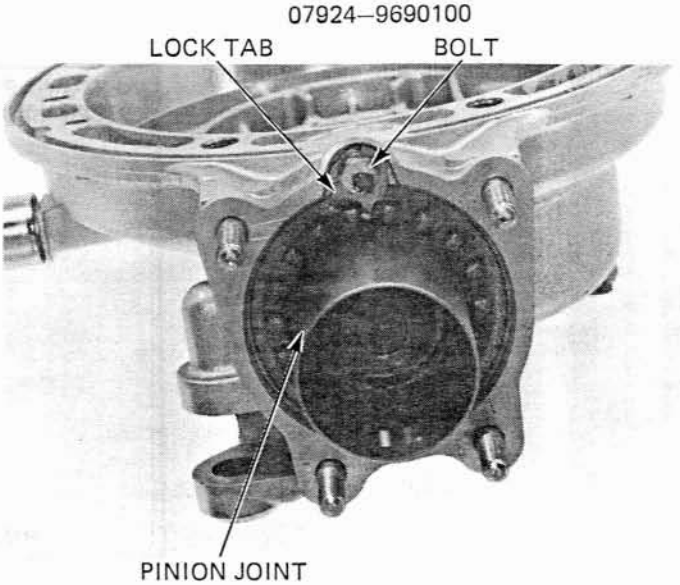


PINION GEAR REMOVAL

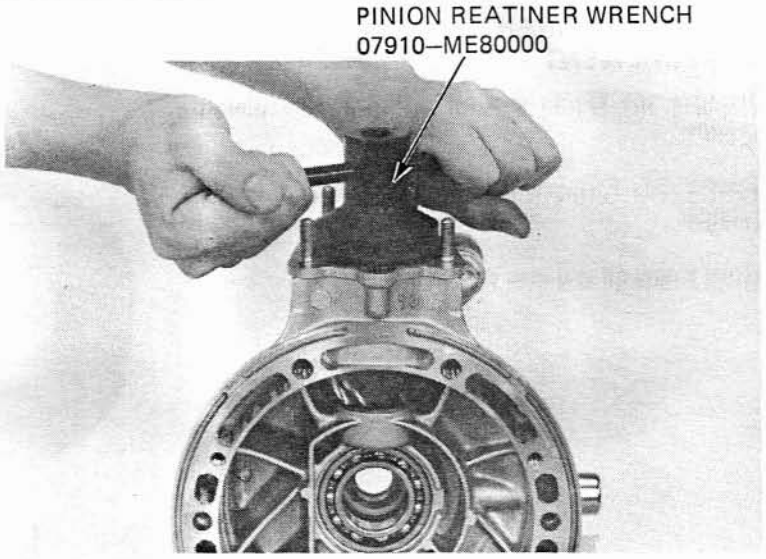
Install the pinion joint holder and pinion joint holder attachment onto the pinion joint and remove the pinion shaft nut. Remove the tools.



Remove the pinion joint.
Remove the retainer lock tab.



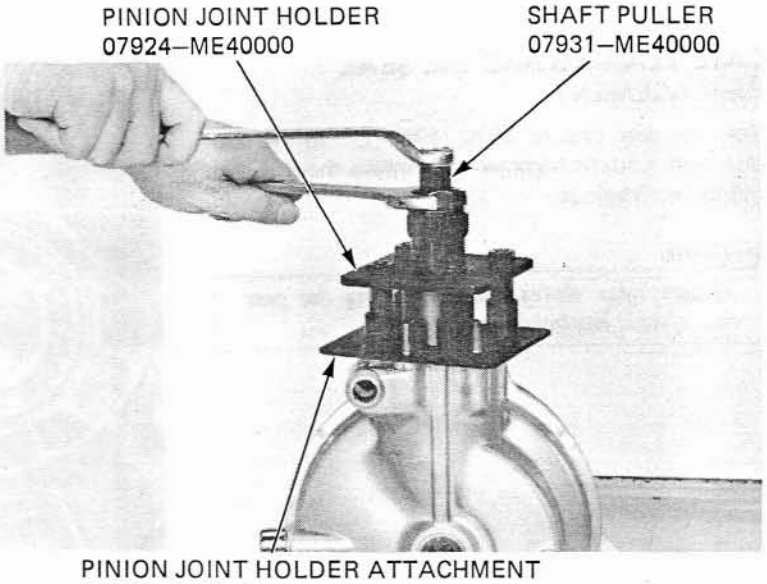
Remove the pinion retainer with the pinion retainer wrench.



Pull the pinion assembly off with the pinion puller.

CAUTION:

The ring gear must be removed when remving the pinion assembly.

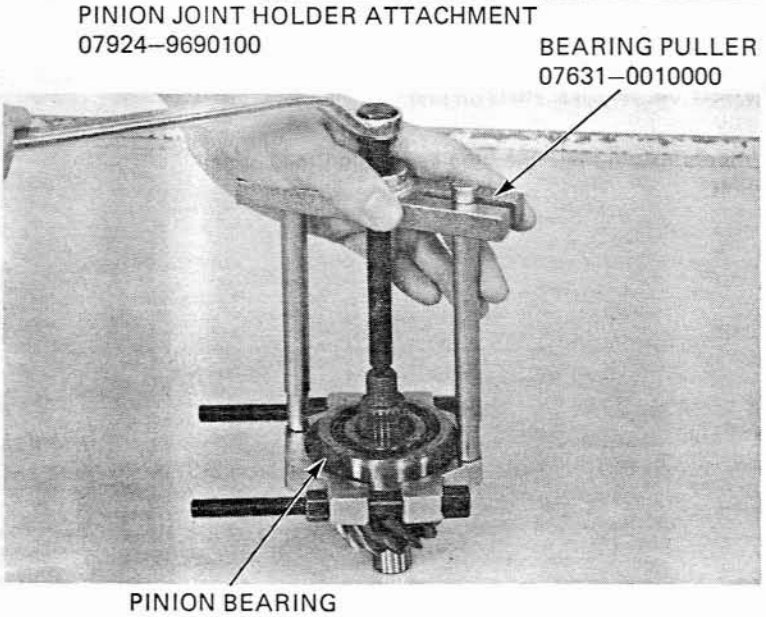


PINION BEARING REMOVAL

Pull the bearing outer and inner races off the shaft with the bearing puller.

Pull the other inner race off with the same tool.

Remove the pinion adjustment spacer.

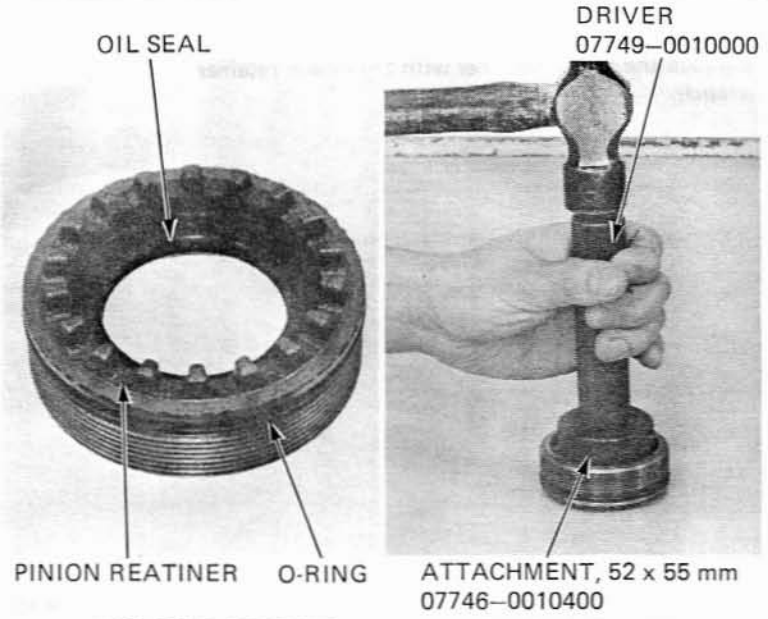


PINION RETAINER OIL SEAL REPLACEMENT

Remove the O-ring and oil seal from the pinion retainer.

Coat a new O-ring with oil and install it onto the retainer.

Drive a new oil seal into the retainer.

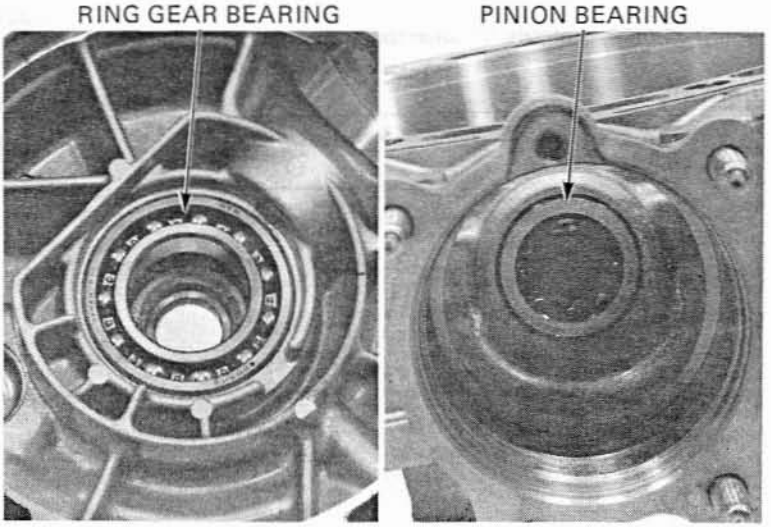


CASE BEARING AND OIL SEAL REPLACEMENT

Heat the gear case to 80°C (176°F). Tap the gear case with a plastic hammer and remove the ring gear and pinion bearings.

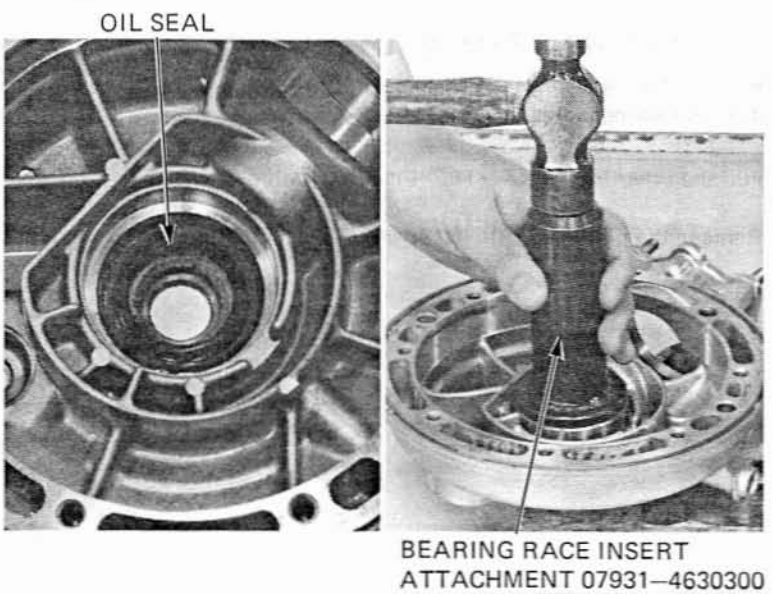
CAUTION:

Always wear gloves when handling the gear case after it has been heated.

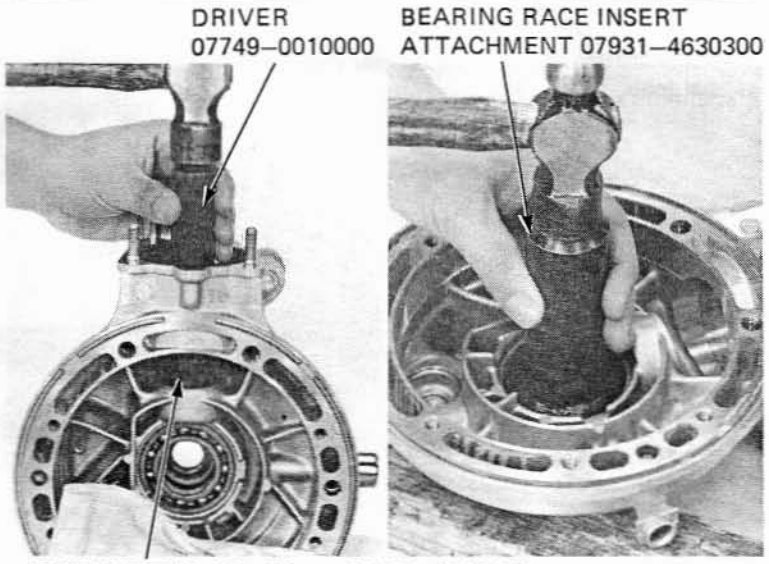


Remove the ring gear shaft oil seal.

Drive a new oil seal into the case, using the special tools.

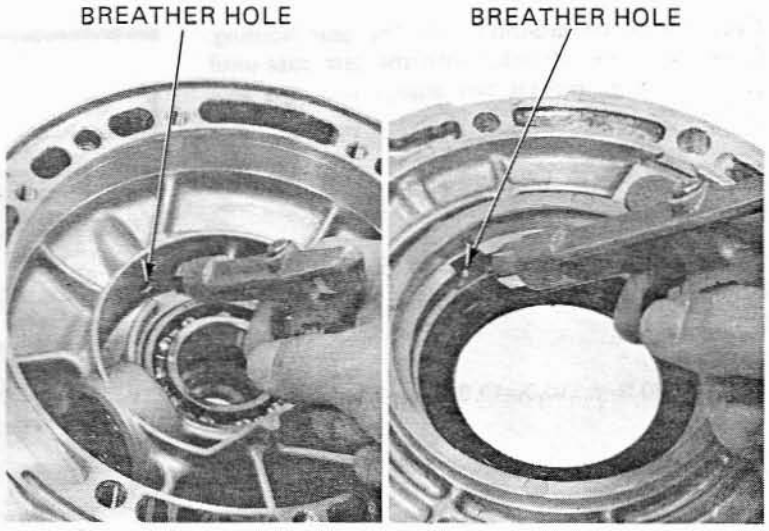


Drive new pinion and ring gear bearings into the case.



BREATHER HOLE CLEANING

Remove the breather hole cap and blow through the breather hole with compressed air.

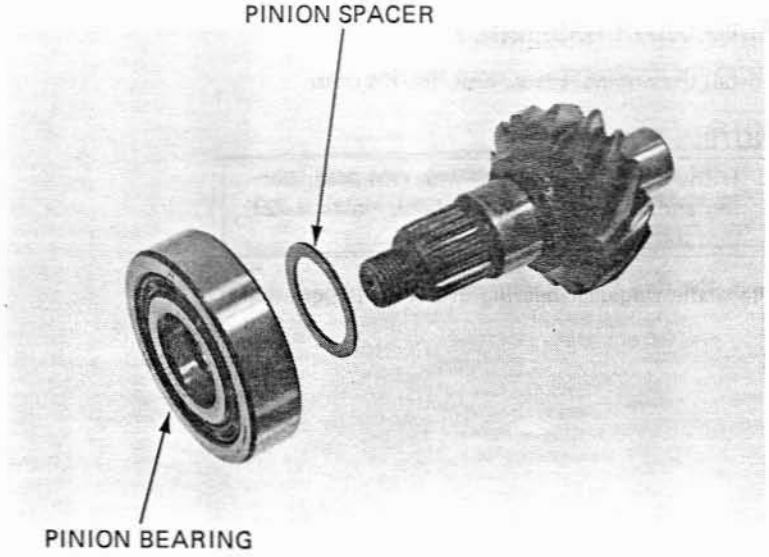


PINION GEAR ASSEMBLY

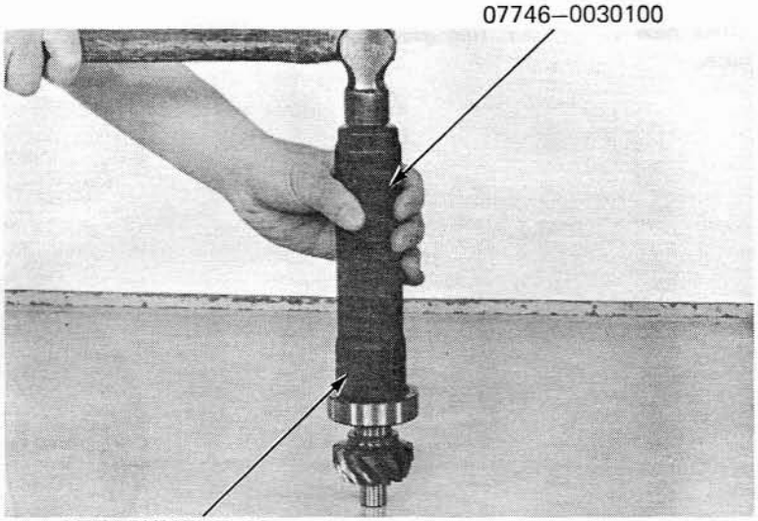
Install the original pinion gear spacer.

NOTE:

> When the gear set, pinion bearing and/or gear case has been replaced, use a 1.5 mm (0.06 in) thick spacer.



Press the bearing onto the pinion gear shaft with the special tools shown.

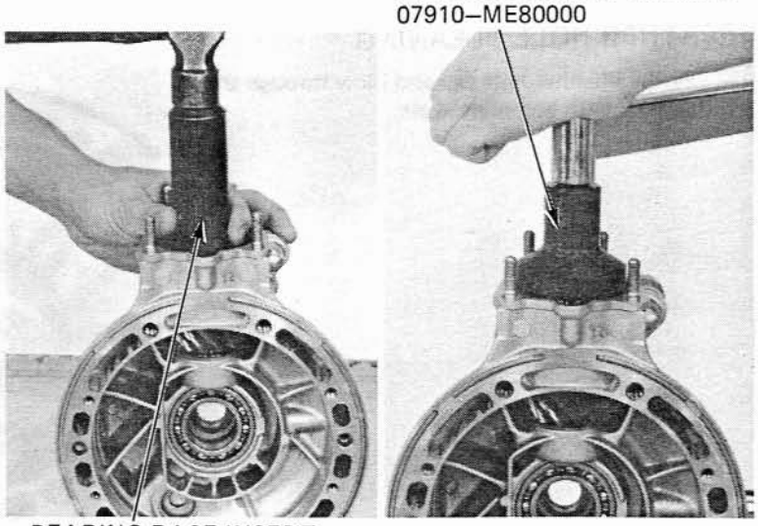


Place the pinion assembly into the gear housing. Drive the pinion assembly into the gear case until pinion retainer threads can engage with the case threads.

Apply gear oil to the O-ring and threads on the pinion retainer.

Screw in the pinion retainer to press the pinion bearing into place, then tighten it to the specified torque.

TORQUE:
100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)



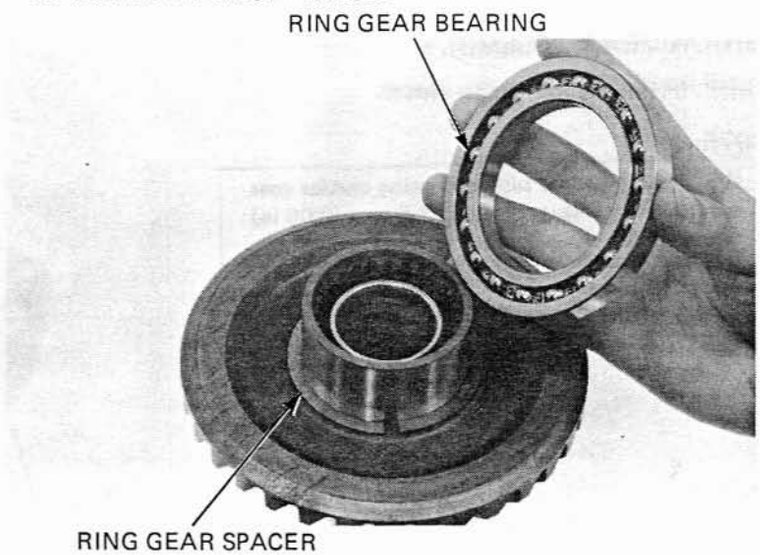
RING GEAR ASSEMBLY

Install the original spacer onto the ring gear.

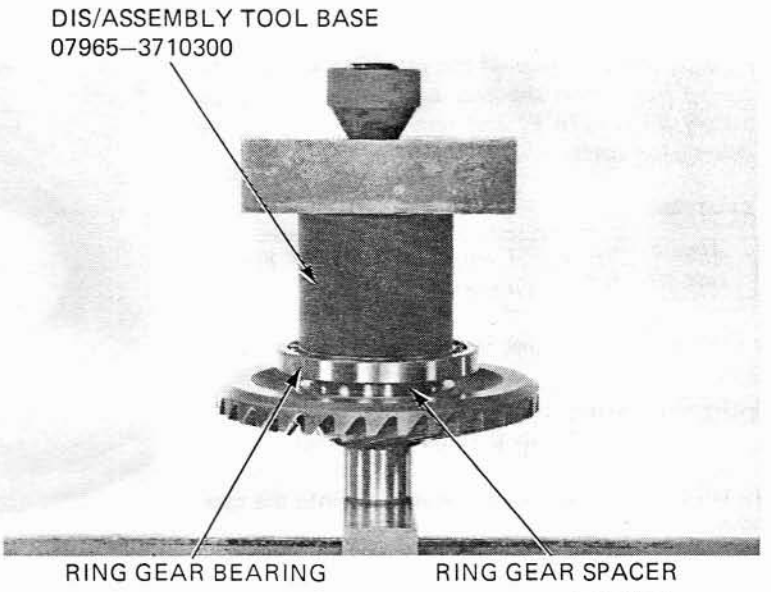
NOTE:

> If the gear set, pinion bearing, ring gear bearing and/or gear case is replaced, install a 2.0 mm thick spacer.

Place the ring gear bearing over the ring gear shaft.

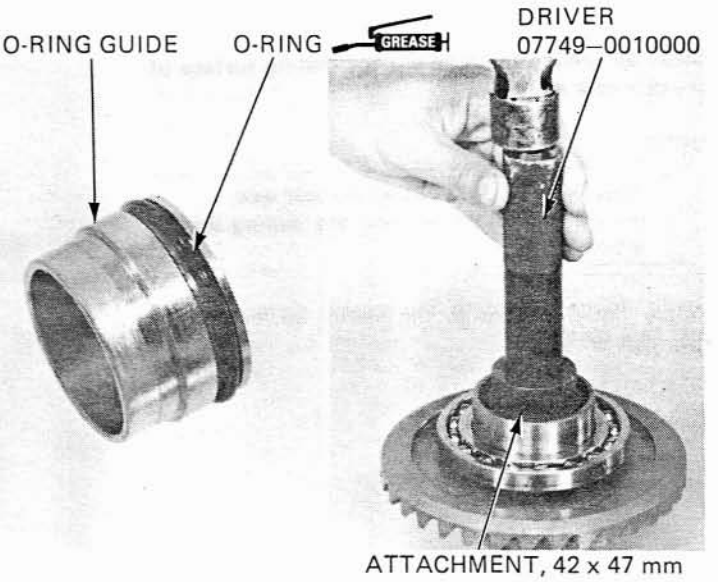


Place a new ring gear bearing on the ring gear shaft. Press the new bearing onto the shaft with hydraulic press.



Install a new O-ring onto the O-ring guide.

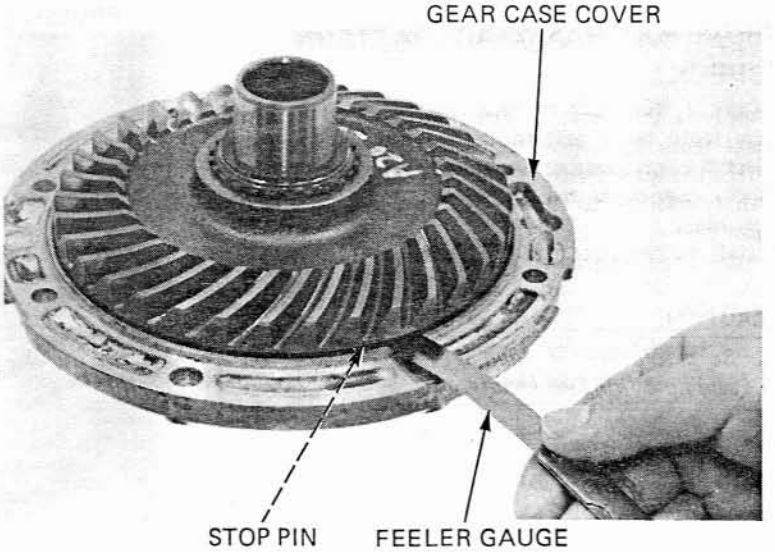
Apply grease to the O-ring and drive the O-ring guide onto the ring gear shaft.



Install the ring gear into the gear case cover.

Measure the clearance between the ring gear and the ring gear stop pin with a feeler gauge.

CLEARANCE: 0.30–0.60 mm (0.012–0.024 in)



Remove the ring gear. If the clearance exceeds the service limit, heat the gear case cover to approximately 80°C (176°F) and remove the stop pin by tapping the cover.

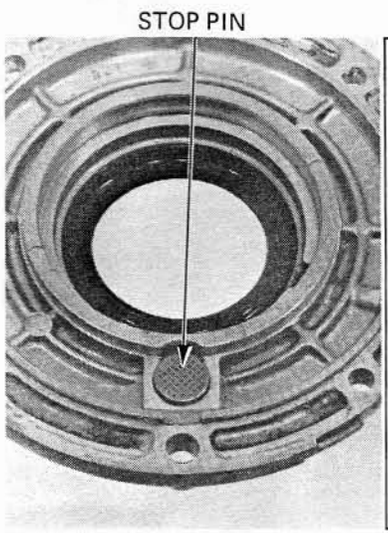
CAUTION:

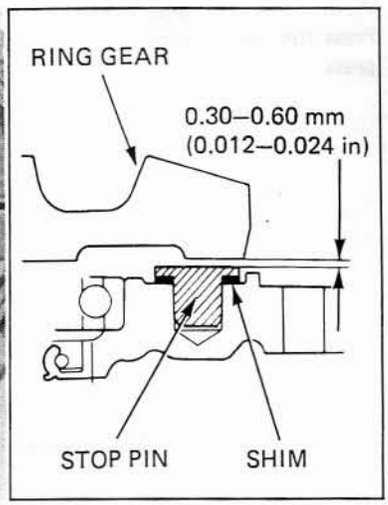
Always wear gloves when handling the gear case after it has been heated.

Install a stop pin shim to obtain the correct clearance.

SHIM THICKNESS: A: 0.10 mm (0.004 in)
B: 0.15 mm (0.006 in)

Install the shim and drive the stop pin into the case cover.



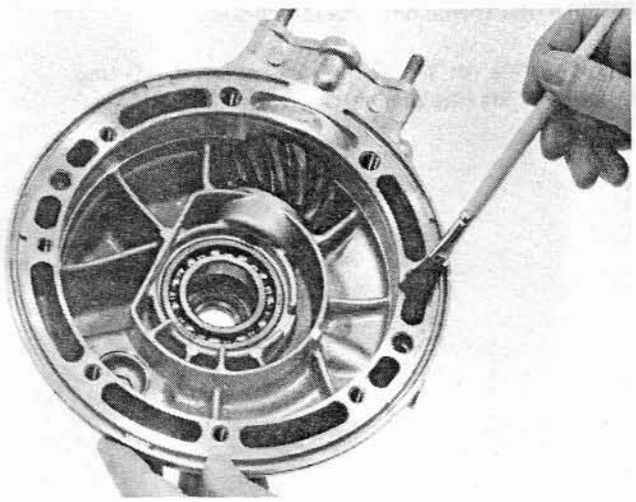


Clean all sealing material off the mating surface of the gear case and cover.

NOTE:

- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.

Apply liquid sealant to the mating surface of the gear case cover.

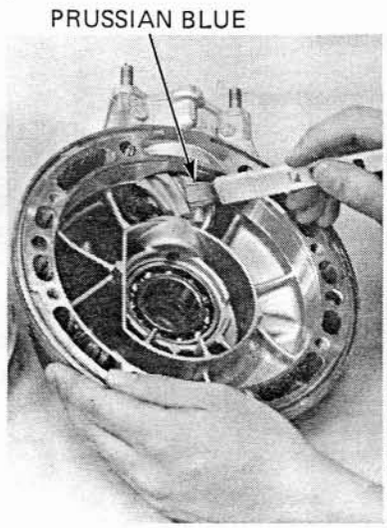


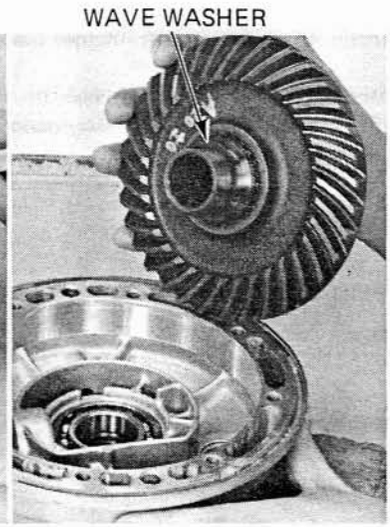
GEAR TOOTH CONTACT PATTERN CHECK

Apply a thin coat of Prussian Blue to the pinion gear teeth for a gear tooth contact pattern check.
Place the wave washer onto the ring gear.
Apply gear oil to the lip of the oil seal in the final gear case.
Install the ring gear into the gear case.

CAUTION:

Be careful not to damage the gear case oil seal lip by ring gear shaft.

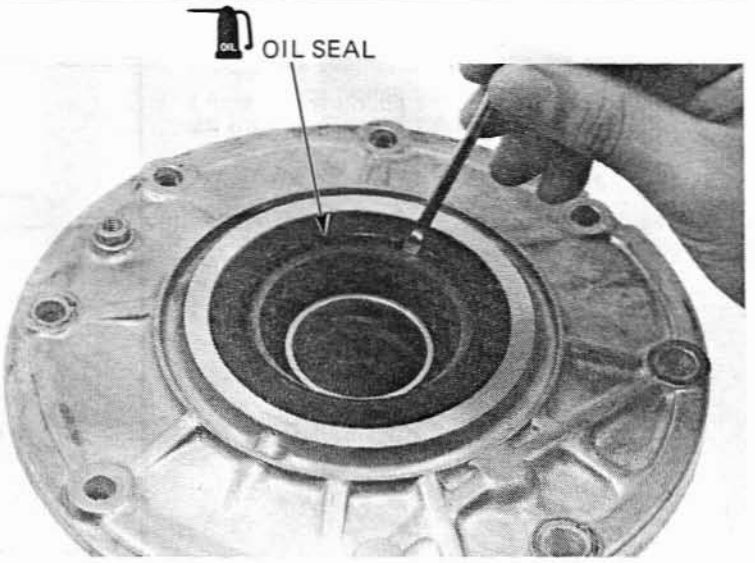




Apply gear oil to the lip of the oil seal on the gear case cover.
Install the gear case cover onto the ring gear.

CAUTION:

Be careful not to damage the oil seal lip during installation.

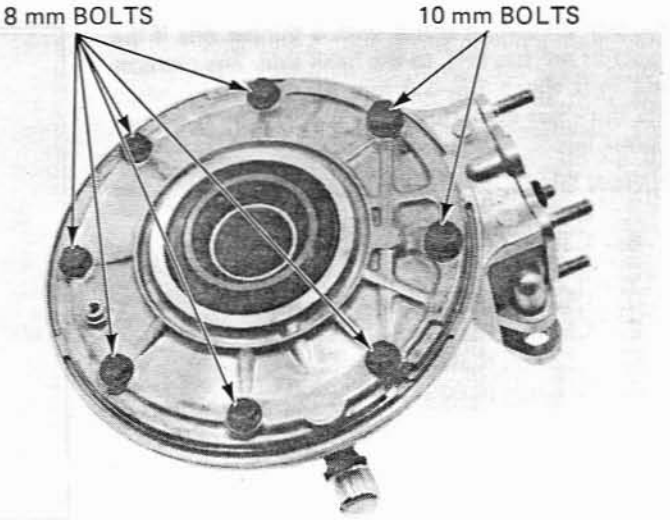


Tighten all the cover bolts in 2–3 steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps.

TORQUE: 23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)

Then tighten the 10 mm bolts.

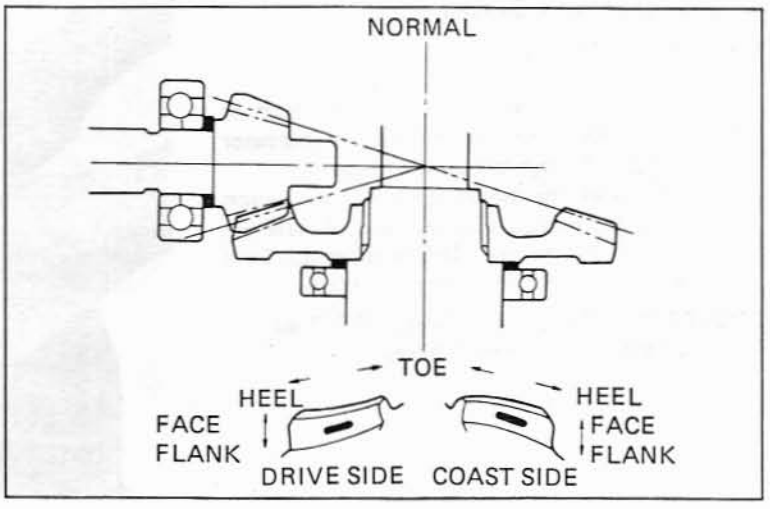
TORQUE: 45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)



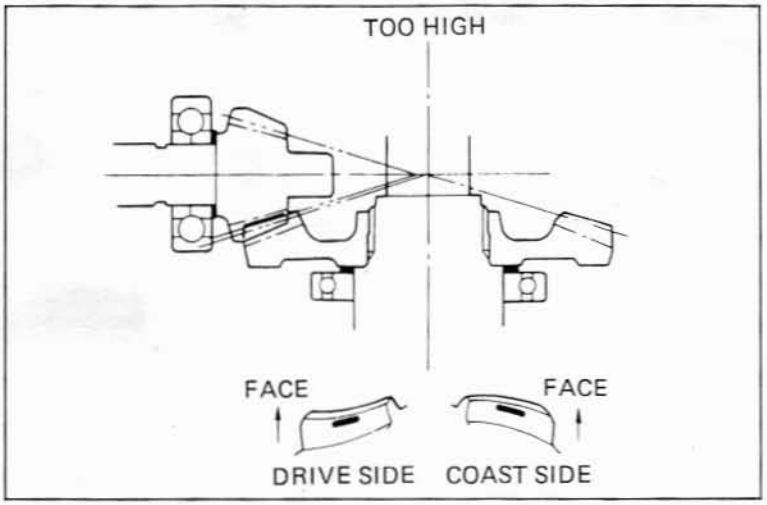
Remove the oil filler cap from the final gear case.

Rotate the ring gear several times in both directions of rotation. Check the gear tooth contact pattern through the oil filler hole. The pattern is indicated by the Prussian Blue applied to the pinion before assembly.

Contact is normal if the Prussian Blue is transferred to the approximate center of each tooth and slightly to the flank side.



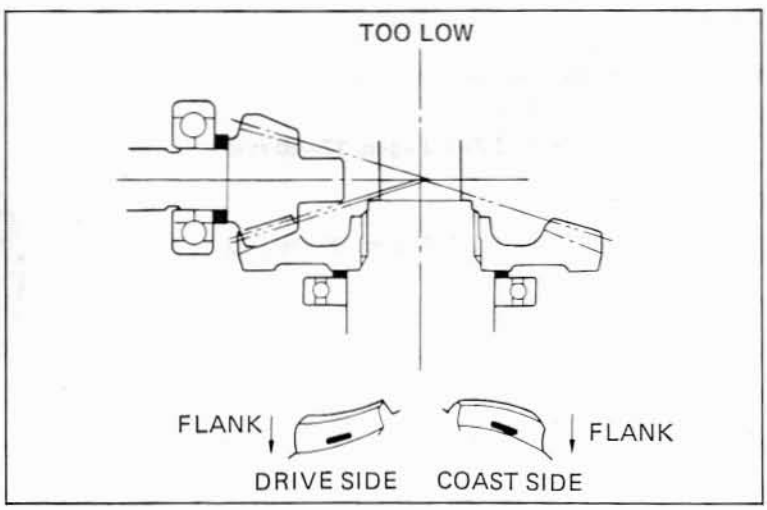
If the patterns are not correct, remove and replace the pinion spacer. Replace the pinion spacer with a thicker one if the contacts are too high, toward the face.



Replace the pinion spacer with a thinner one if the contacts are too low, to the flank side. The patterns will shift about 1.5–2.0 mm (0.06–0.08 in) when the thickness of the spacer is changed by 0.10 mm (0.004 in).

PINION SPACER:

- **A: 1.32 mm (0.0520 in)**
- **B: 1.38 mm (0.0543 in)**
- **C: 1.44 mm (0.0567 in)**
- **D: 1.50 mm (0.0591 in) Standard**
- **E: 1.56 mm (0.0614 in)**
- **F: 1.62 mm (0.0638 in)**
- **G: 1.68 mm (0.0661 in)**



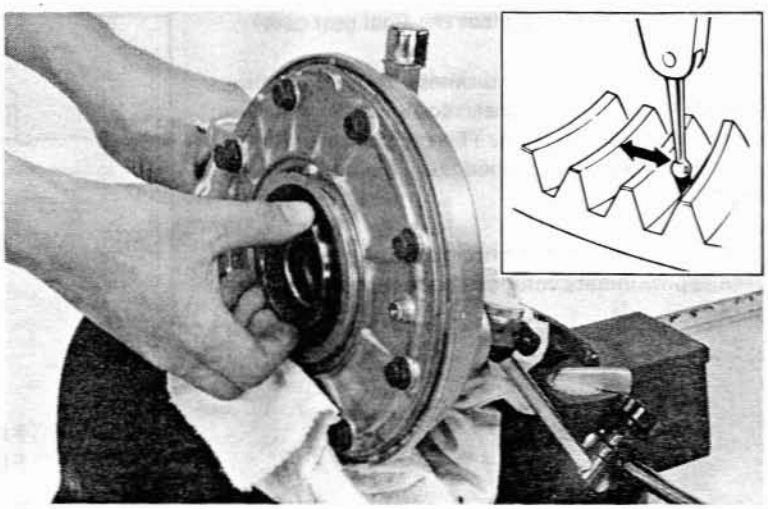
BACKLASH INSPECTION

Remove the oil filler cap.

Set the final gear assembly into a jig or stand to hold it steady. Set a horizontal type dial indicator on the ring gear, through the oil filler hole.

Temporarily install the pinion joint onto the pinion gear and hold the pinion joint by hand. Rotate the ring gear by hand until gear slack is taken up. Turn the ring gear back and forth to read backlash.

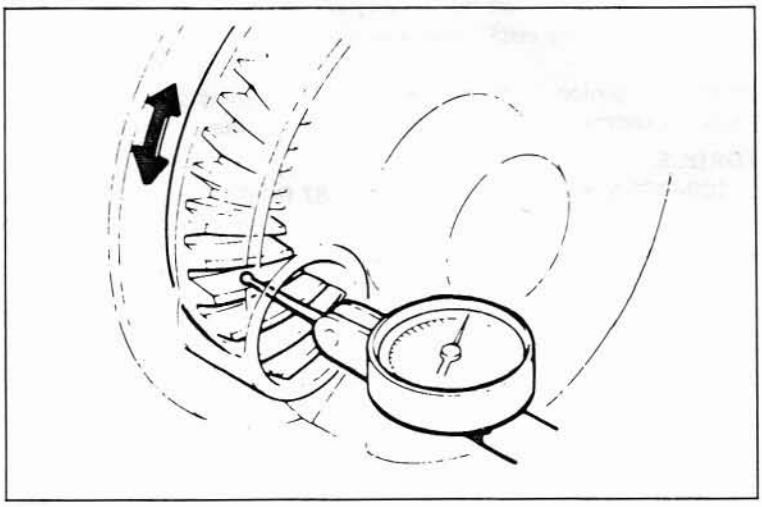
STANDARD: 0.08–0.18 mm (0.003–0.007 in)
SERVICE LIMIT: 0.30 mm (0.02 in)



Remove the dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more.

Compare the difference of the three measurements.

SERVICE LIMIT: 0.10 mm (0.004 in)



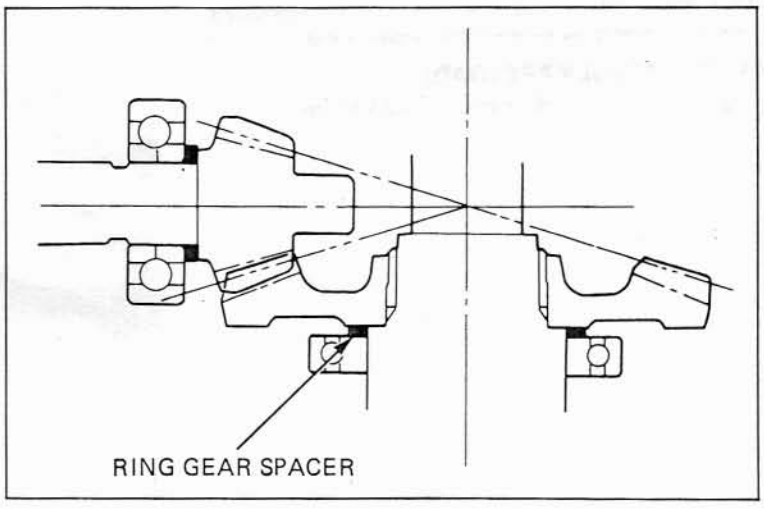
If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.

If backlash is too small, replace the ring gear spacer with a thinner one.

Backlash is changed by about 0.06–0.07 mm (0.002–0.003 in) when thickness of the spacer is changed by 0.10 mm (0.004 in).

RING GEAR SPACER:

- **A: 1.82 mm (0.072 in)**
- **B: 1.88 mm (0.074 in)**
- **C: 1.94 mm (0.076 in)**
- **D: 2.00 mm (0.079 in) Standard**
- **E: 2.06 mm (0.081 in)**
- **F: 2.12 mm (0.084 in)**
- **G: 2.18 mm (0.086 in)**
- **H: 2.24 mm (0.088 in)**
- **I: 2.30 mm (0.091 in)**



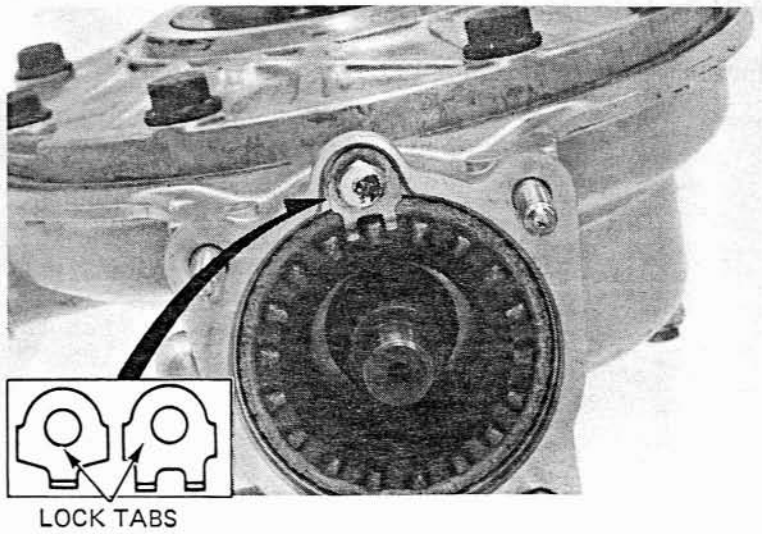
Remove the pinion joint from the pinion gear.

PINION JOINT INSTALLATION

Install the appropriate pinion retainer bolt lock tab.

NOTE:

There are two types of lock tabs as shown.



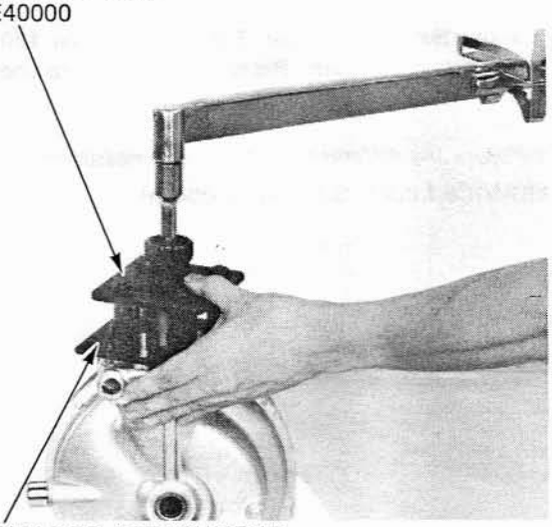
Apply gear oil to the oil seal lip contact surface of the pinion joint and install the pinion joint.

Install the pinion joint holder and pinion joint holder attachment. Tighten the pinion joint nut.

TORQUE:
100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)

Remove the tools.

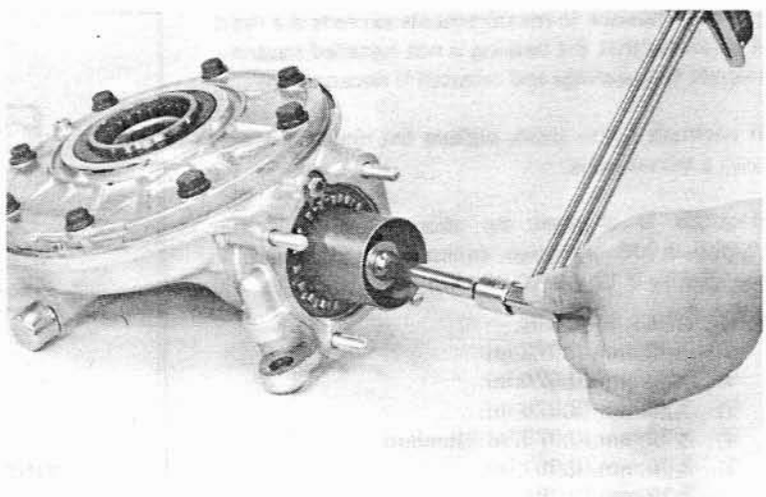
PINION JOINT HOLDER
07924–ME40000



PINION JONT HOLDER ATTACHMENT
07924–9690100

Make sure that the gear assembly rotates smoothly without binding by turning the pinion joint.

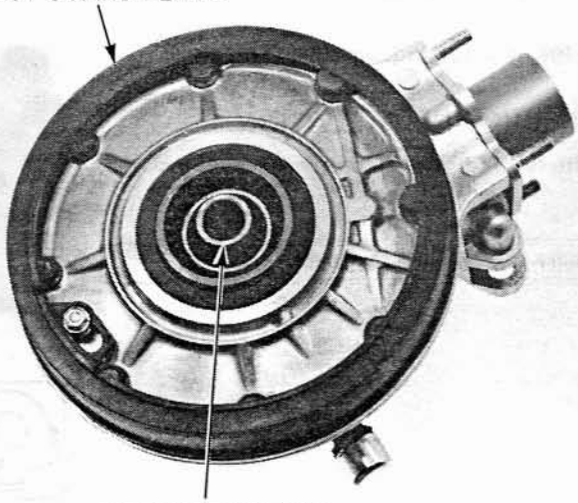
GEAR ASSEMBLY PRELOAD:
0.2–0.4 N·m (2–4 kg-cm, 1.7–3.5 in-lb)



Install the dust guard plate and torque the bolt.

Install the distance collar.

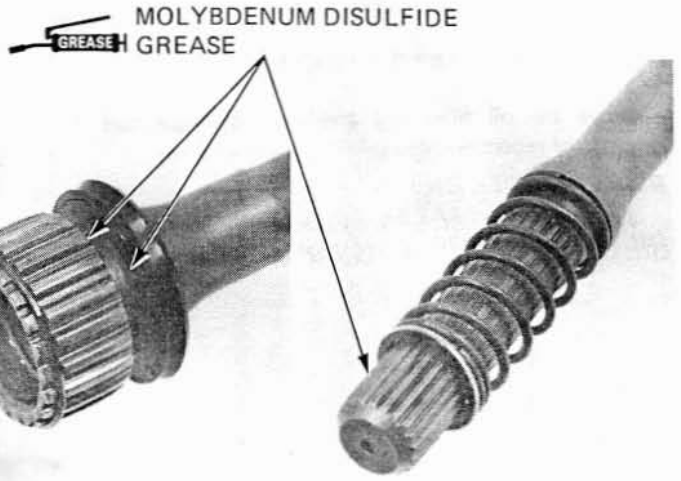
DUST GUARD PLATE



DISTANCE COLLAR

FINAL DRIVE INSTALLATION

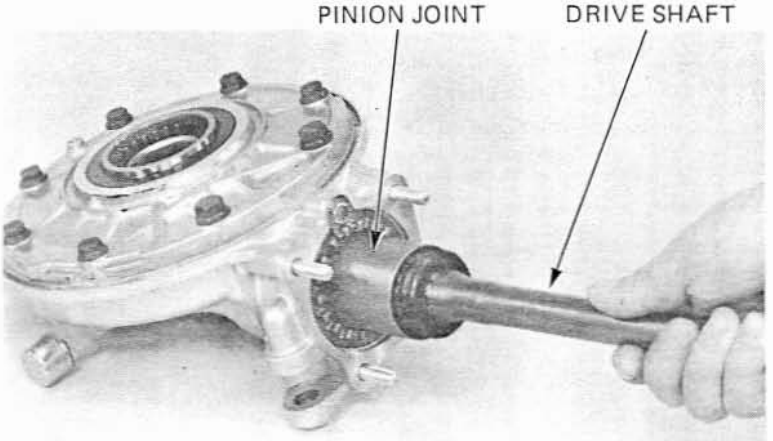
Lubricate the splines of the drive shaft and oil seal with molybdenum disulfide grease.



Insert the drive shaft into the pinion joint until the stop ring seats in the pinion joint spline grooves.

NOTE:

- Make sure that the stop ring is seated properly by pulling on the drive shaft lightly.
- Be careful not to damage the drive shaft oil seal.



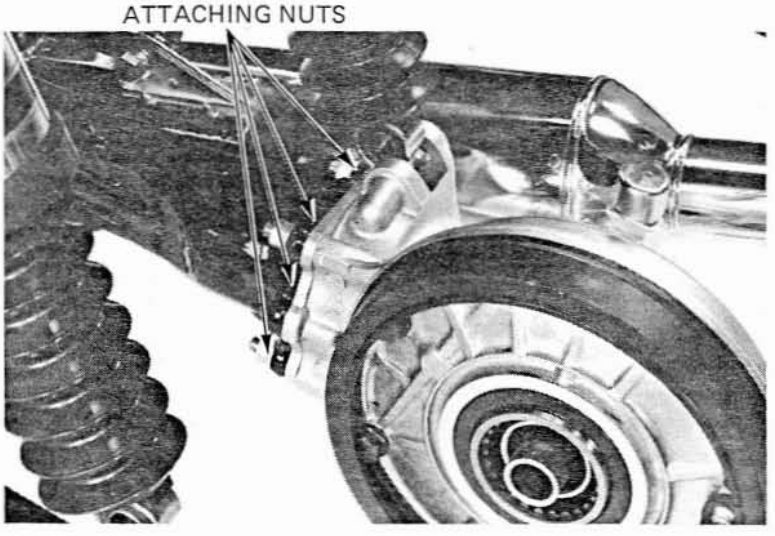
Attach the gear case onto the swing arm loosely.

NOTE:

To ease axle installation, do not tighten the gear case nuts until after the axle is installed.

Install the rear wheel and tighten bolts and nut (page 12-13).
Then, tighten the final gear case nuts.

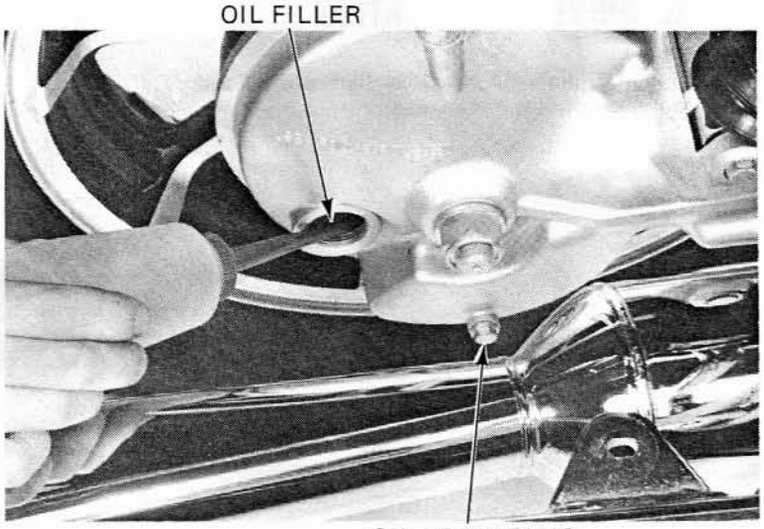
TORQUE: 24–30 N·m (2.4–3.0 kg-m, 17–22 ft-lb)



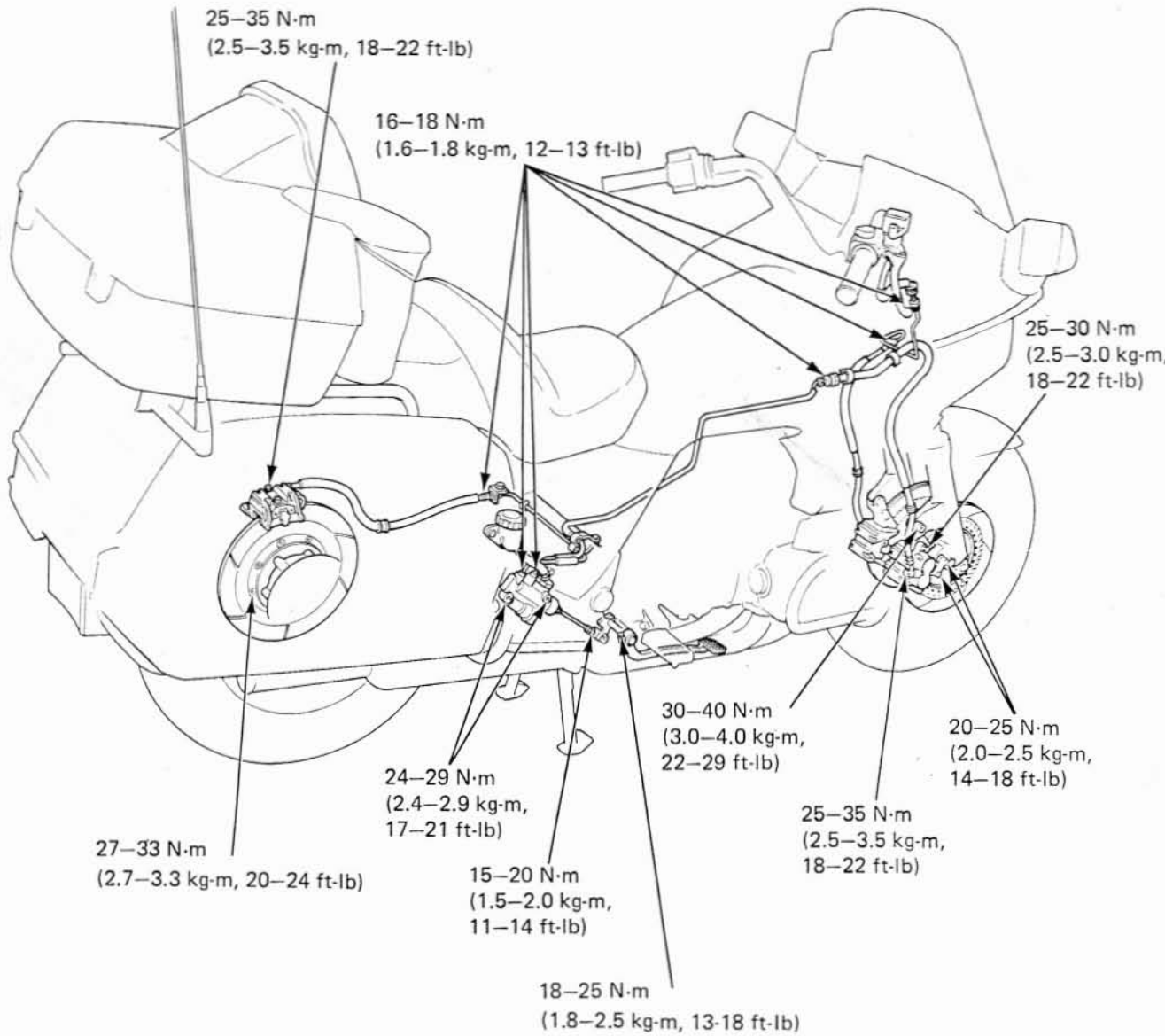
Make sure that the case drain bolt is tightened.

Remove the oil filler cap and pour the specified amount of recommended oil.

RECOMMENDED OIL:
Hypoid gear oil SAE 80, API GL-5
OIL CAPACITY: 170 cm³ (5.7 US oz, 6.0 Imp oz)



MEMO



15. HYDRAULIC BRAKES

SERVICE INFORMATION

GENERAL

CAUTION:

- *Spilled brake fluid will severely damage instrument less, wind screen and painted surfaces. Be very careful whenever your remove the reservoir cap: Make sure the front reservoir is horizontal first.*
- *Never allow contaminants (dirt, water, etc.) to get into the hydraulic brake system.*

- The GOLD WING is equipped with a unified brake system which provides simultaneous braking action of the right front and rear disc brakes through application of the foot operated brake pedal. The hand operated brake lever activates the left front disc brake which is independent of the unified system (Except G type).
- The front brake can be removed without disconnecting the hydraulic system. Once the hydraulic systems have been opened, or if the brakes feel spongy, the system must be bled.
- Do not allow foreign material to enter the system when filling the reservoir.
- Always the fresh DOT 4 brake fluid from a sealed container when servicing the system.
- Always check brake operation before riding the motorcycle.
- Replace the sealing washers whenever the brake hose bolt is removed.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Front brake master cylinder	Cylinder I.D.	G type	15.870–15.913 (0.6248–0.6265)	15.925 (0.6270)
		Except G type	12.700–12.743 (0.5000–0.5017)	12.755 (0.5022)
	Piston O.D.	G type	15.827–15.854 (0.6231–0.6242)	15.815 (0.6226)
		Except G type	12.684–12.657 (0.4994–0.4983)	12.645 (0.4978)
Front brake caliper	Right caliper cylinder I.D.	G type	32.030–32.080 (1.2610–1.2630)	32.090 (1.2634)
		Except G type	25.400–25.490 (1.0000–1.0035)	25.460 (1.0024)
	Left caliper cylinder I.D.		32.030–32.080 (1.2610–1.2630)	32.090 (1.2634)
	Right caliper piston O.D.	G type	31.948–31.998 (1.2578–1.2598)	31.940 (1.2575)
		Except G type	25.318–25.368 (0.9968–0.9987)	25.310 (0.9965)
	Left caliper piston O.D.		31.948–31.998 (1.2578–1.2598)	31.940 (1.2575)
Front brake disc	Thickness	GL1200D	4.5–5.2 (0.18–0.20)	4.0 (0.16)
		GL1200A	9.9–10.1 (0.39–0.40)	9.0 (0.35)
	Runout		–	0.3 (0.01)
Front brake pad thickness			5.4–5.6 (0.21–0.22)	–
Rear brake master cylinder	Cylinder I.D.	G type	14.000–14.043 (0.5512–0.5529)	14.055 (0.5533)
		Except G type	15.870–15.913 (0.6248–0.6265)	15.925 (0.6270)
	Piston O.D.	G type	13.957–13.984 (0.5495–0.5506)	13.940 (0.5488)
		Except G type	15.827–15.854 (0.6231–0.6242)	15.815 (0.6226)
Rear brake caliper	Cylinder I.D.		32.030–32.080 (1.2610–1.2630)	32.090 (1.2634)
	Piston O.D.		31.948–31.998 (1.2578–1.2598)	31.940 (1.2575)
Rear brake disc	Thickness		6.9–7.1 (0.27–0.28)	6.0 (0.24)
	Runout		–	0.3 (0.01)
Rear brake pad thickness			6.4–6.6 (0.25–0.26)	–

TORQUE VALUES

Brake hose oil bolt		25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)
Brake metal line joint nut		16–18 N·m (1.6–1.8 kg-m, 12–13 ft-lb)
Front brake caliper bracket mount bolt	(upper)	30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
	(lower)	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Brake caliper pivot bolt		25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
Brake caliper bolt		20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Brake disc bolt/nut		27–33 N·m (2.7–3.3 kg-m, 20–24 ft-lb)
Front brake master cylinder holder bolt		10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Rear brake master cylinder bolt		24–29 N·m (2.4–2.9 kg-m, 17–21 ft-lb)
Rear brake rod joint lock nut		15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb)
Rear brake pedal bolt		18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)

TOOL

Special

Snap ring pliers	07914–3230001

TROUBLESHOOTING

Brake lever soft or spongy
- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking

Brake lever too hard
- Sticking piston(s)
- Clogged hydraulic system
- Pads glazed or worn excessively

Brakes drag
- Clogged hydraulic system
- Hydraulic system sticking
- Sticking piston(s)
- Incorrect rear brake pedal adjustment
- Caliper side slide pin sticking
- Caliper installed incorrectly
- Disc or wheel misaligned

Brake grab or pull to one side
- Pads contaminated
- Disc or wheel misaligned

Brake chatter or squeal
- Pads contaminated
- Excessive disc runout
- Caliper installed incorrectly
- Disc or wheel misaligned

Rear wheel locked at eary stage
- Pressure control valve faulty

BRAKE FLUID REPLACEMENT/ AIR BLEEDING

BRAKE FLUID DRAINING

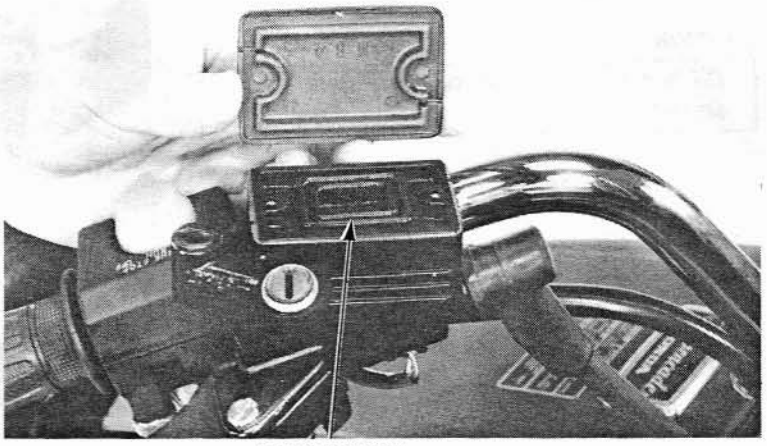
WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.

CAUTION:

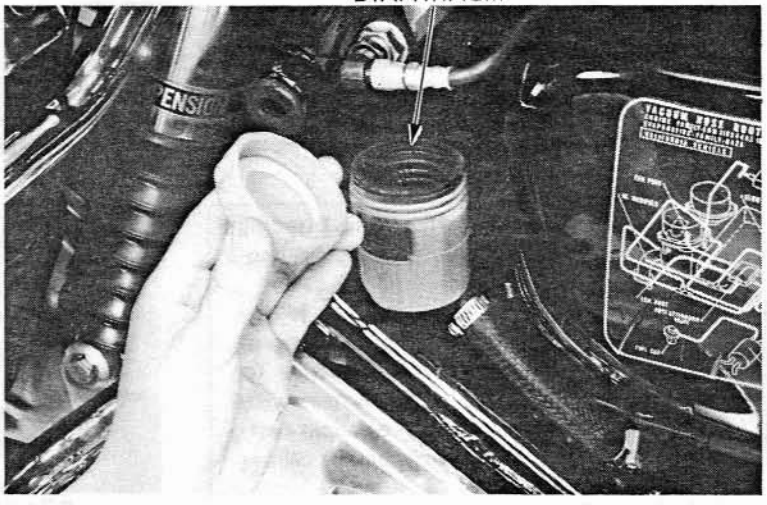
- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling fluid on painted surfaces and wind screen. Place a rag over the painted surfaces and wind screen whenever the system is serviced.*

Remove the reservoir cover and diaphragm with the fluid reservoir parallel to the ground.



DIAPHRAGM

DIAPHRAGM

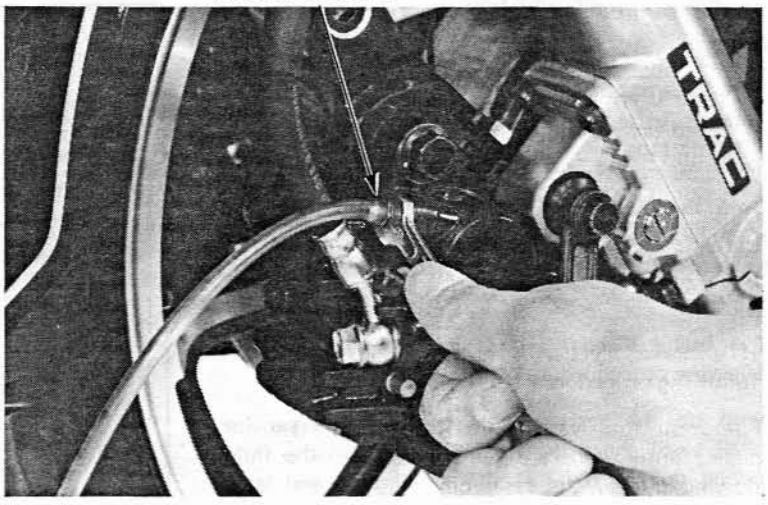


Connect a bleed hose to the bleed valve.

Loosen the caliper bleed valve and pump the brake lever (or pedal). Stop pumping the lever (or pedal) when no more fluid flows out of the bleed valve.

Close the bleed valve.

BLEED VALVE



BRAKE FLUID FILLING

Fill the reservoir with **DOT 4** brake fluid from a sealed container.

CAUTION:

Do not mix different types of fluid. They are not compatible.

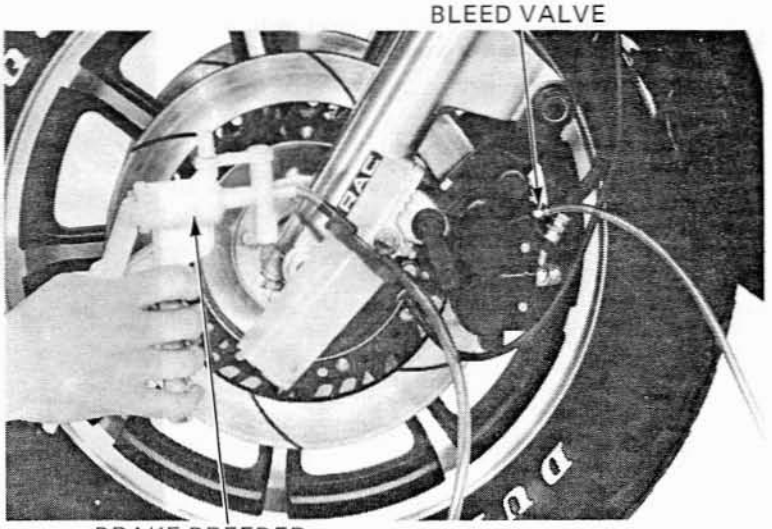
Connect the commercially available brake bleeder to the bleed valve.

Pump the brake bleeder and loosen the bleed valve.
Add fluid when the fluid level in the master cylinder reservoir is low.

NOTE:

- Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.
- GL1200 uses a unified brake system. To fill the foot operated brake system with brake fluid, fill the rear brake caliper first, then fill the right front brake caliper (Except G type).

BLEED VALVE



BRAKE BREEDER
(COMMERCIALLY AVAILABLE)

Repeat the above procedures until air bubbles do not appear in the plastic hose.

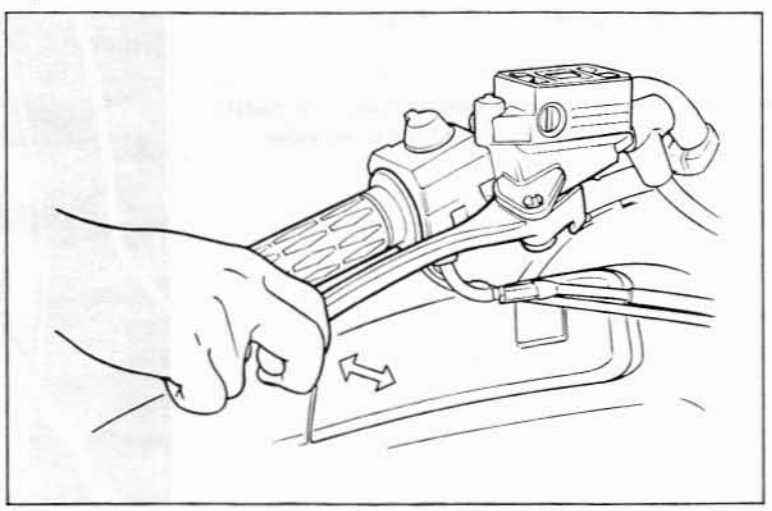
NOTE:

If air is entering the bleeder from around the bleed valve threads. Seal the threads with teflon tape.

Close the bleed valve and operate the brake lever or pedal. If it feels spongy, bleed the system by performing the AIR BLEEDING procedure (Page 15-5).

If a brake bleeder is not avaiable, perform the following procedure:

Pump up the system presure with the lever (or pedal) until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt.



AIR BLEEDING

1) Squeeze the brake lever (or pedal), open the bleed valve 1/2 turn and then close the valve.

NOTE:

- Do not release the brake lever (or pedal) until the bleed valve has been closed.
- Bleed the rear brake caliper line first, then bleed the right front brake caliper line when bleed the foot operated brake system (Except G type).

2) Release the brake lever (or pedal) slowly and wait several seconds after it reaches the end of its travel.

Reeat steps 1 and 2 until bubbles cease to appear in the fluid at the end of the hose.

Tighten the bleed valve.

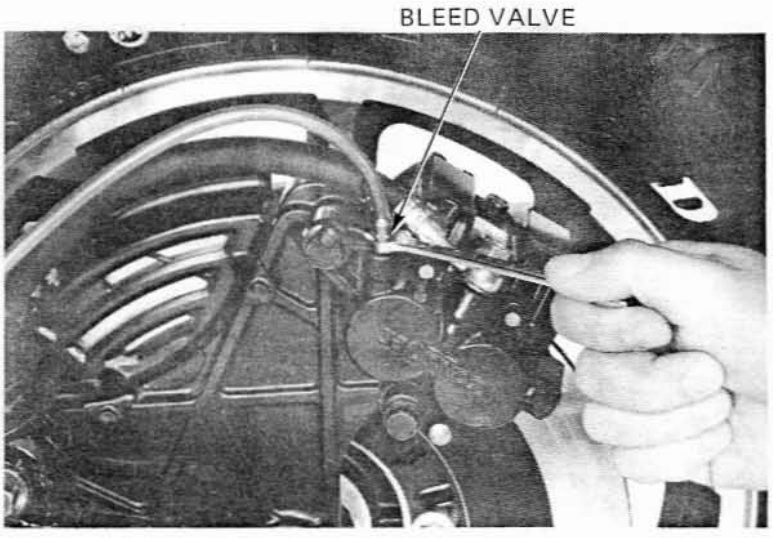
TORQUE: 4–7 N·m (40–70 kg-cm, 35–61 in-lb)

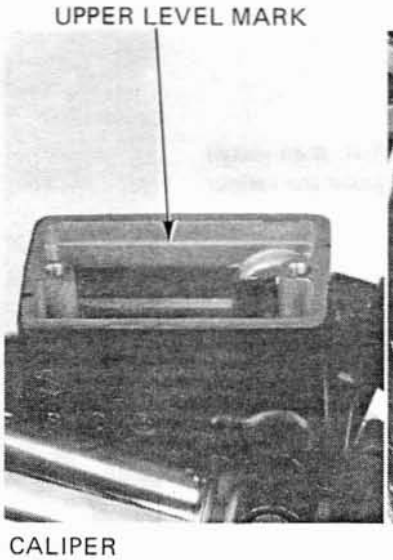
Fill the fluid reservoir to the upper level mark.

Reinstall the diaphragm and master cylinder cover.

WARNING

A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean a contaminated disc with a high quality brake degreasing agent.





BRAKE PAD/DISC

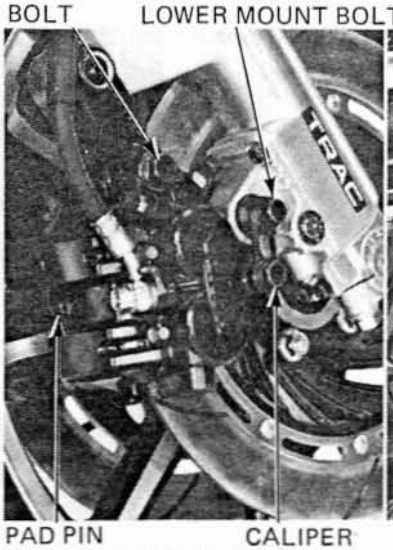
PAD REPLACEMENT

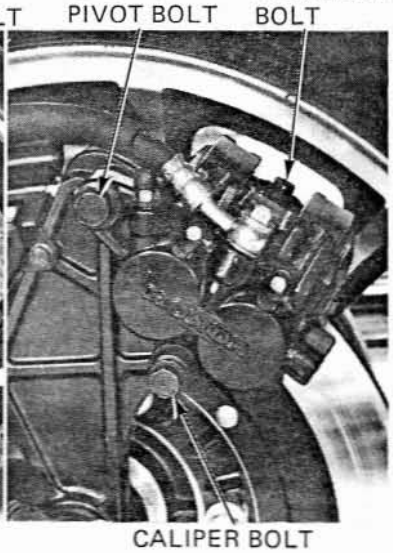
Remove the left saddlebag before rear brake caliper removal.

NOTE:

Always replace the brake pads in pairs to assure even disc pressure.

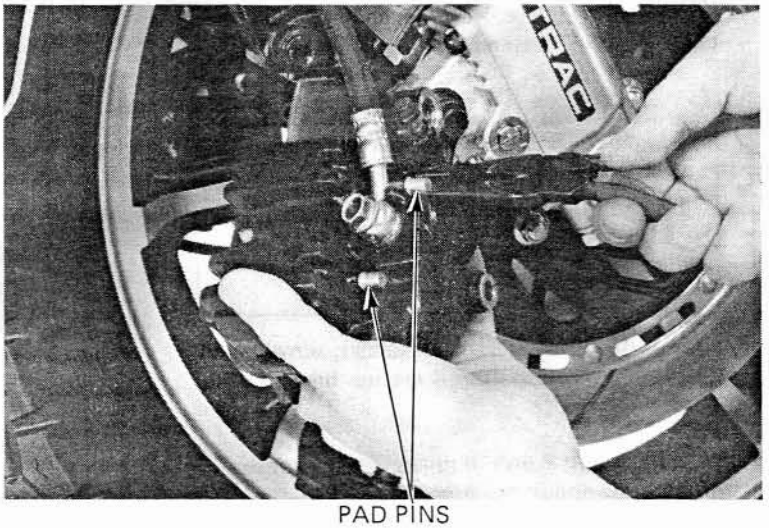
Remove the caliper pivot and caliper bolts. Loosen the front caliper bracket lower mount bolt.
Loosen the pad pin retainer bolt. Remove the caliper from the bracket.





Remove the pad pin retainer and pull the pad pins out of the caliper.

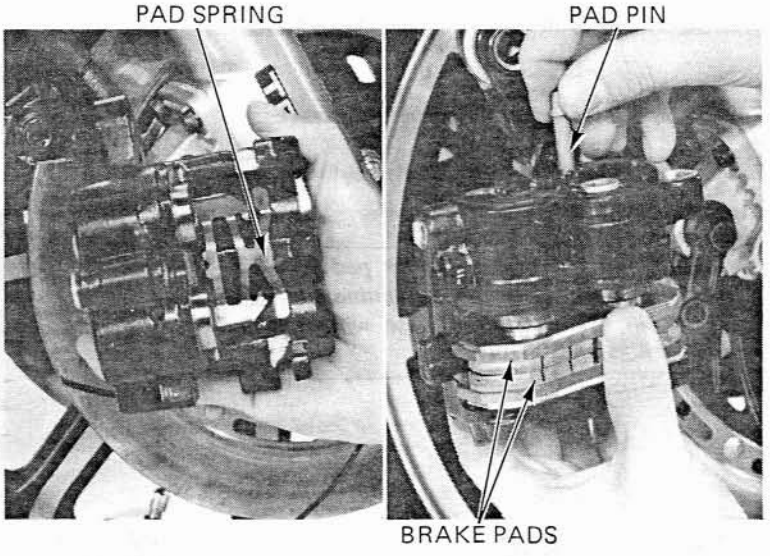
Remove the brake pads.



Position the pad spring in the caliper as shown.

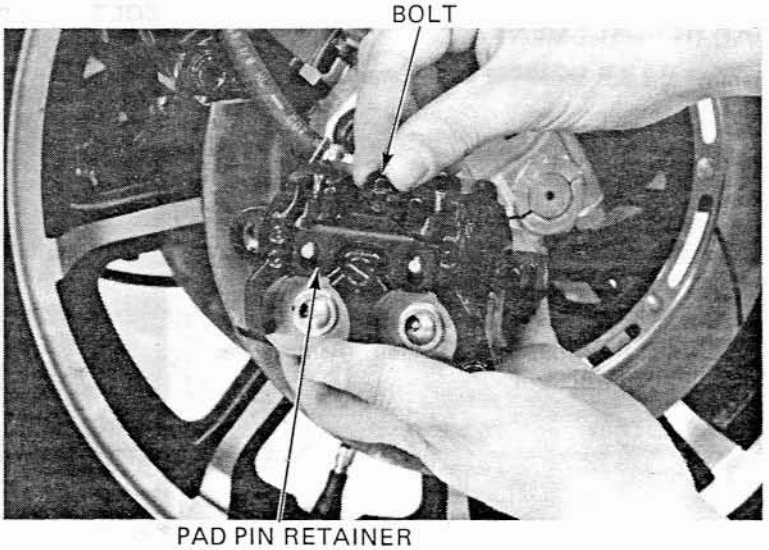
Install the new pads in the caliper.

Install the pad pins, one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.



Place the pad pin retainer over the pad pins. Push the retainer down to secure the pins.

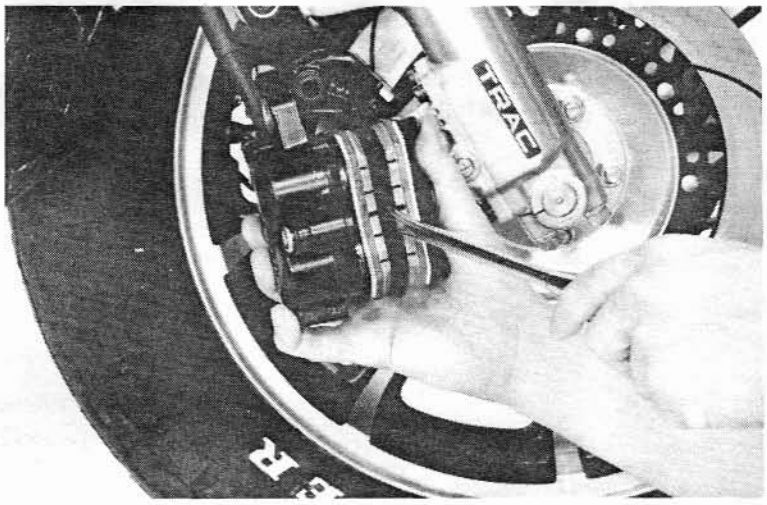
Install the pad pin retainer bolt.



Push the pistons all the way in to allow installation of new brake pads.

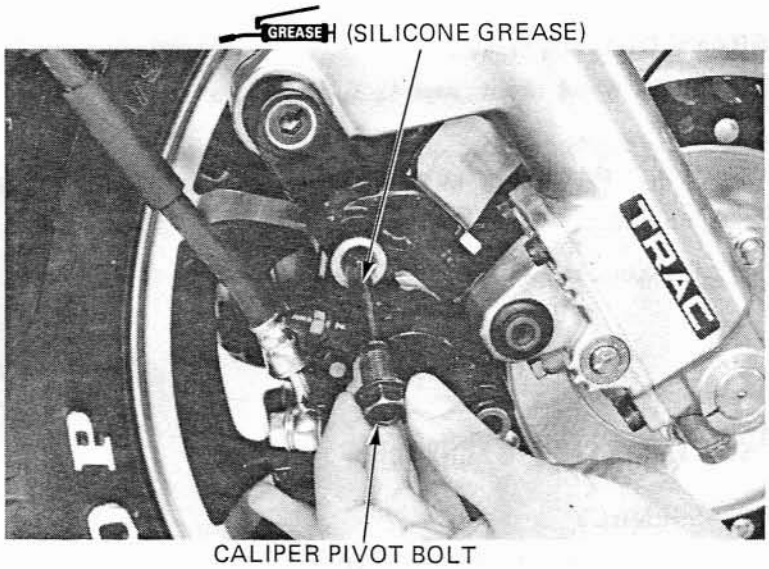
NOTE:

> Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.



Install the caliper on the caliper bracket so the brake disc is positioned between the pads, making sure not to damage the pads.

Apply Hi-Temperature silicone grease to the caliper pivot bolt and insert the pivot bolt into the pivot bolt hole.

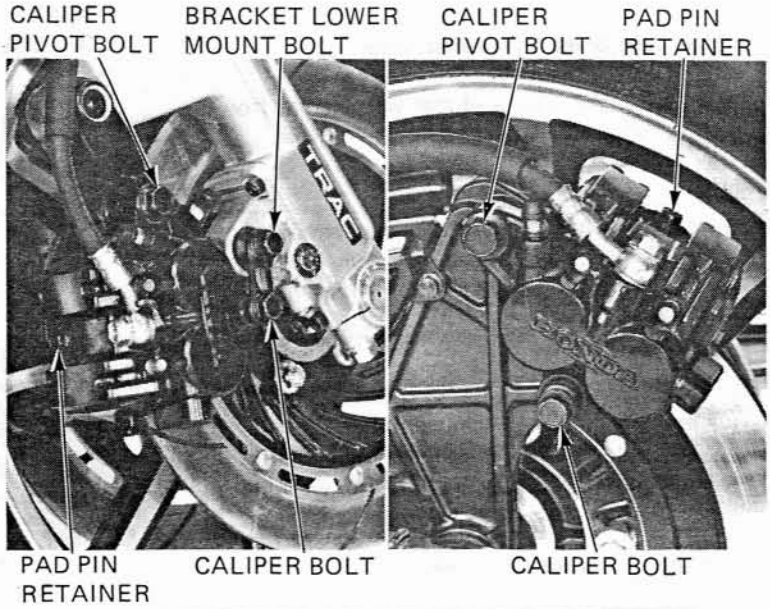


Install the caliper bolt and tighten the caliper pivot and caliper bolts to specified torque.

TORQUE:

Caliper pivot bolt:
25–30 N·m (2.5–3.0 kg-m, 18–22 ft-lb)
Caliper bolt and bracket lower mount bolt:
20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

Tighten the pad pin retainer bolt securely.

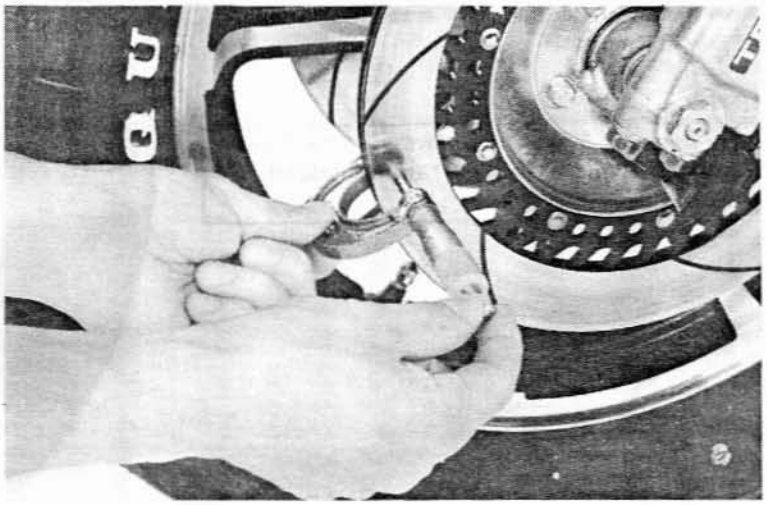


BRAKE DISC THICKNESS

Measure the thickness of each brake discs.

SERVICE LIMIT:

Front brake (GL1200D): 4.0 mm (0.16 in)
Front brake (GL1200A): 9.0 mm (0.35 in)
Rear brake: 6.0 mm (0.24 in)

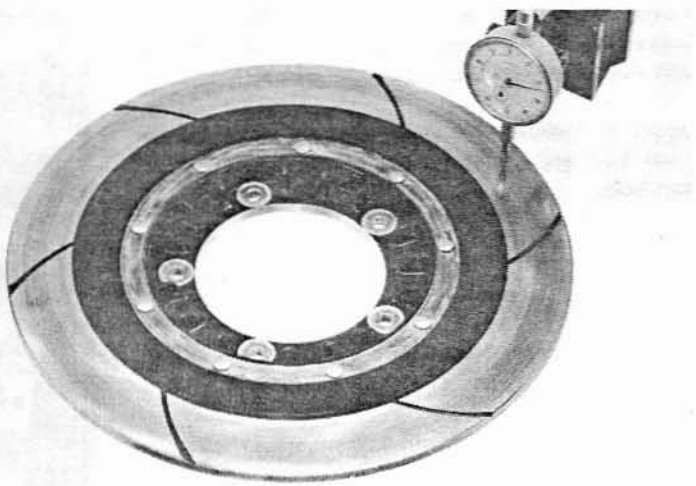


BRAKE DISC WARPAGE

Remove the wheel (front, page 12-3), (rear, page 12-9).
Remove the disc from the wheel.
Measure the brake disc warpage on a surface plate.

SERVICE LIMIT: 0.3 mm (0.01 in)

Reinstall the disc and wheel.



FRONT MASTER CYLINDER

DISASSEMBLY

Drain brake fluid from the hydraulic system.

Disconnect the brake light switch wires.

Remove the brake lever and rear view mirror from the master cylinder. Disconnect the brake hose.

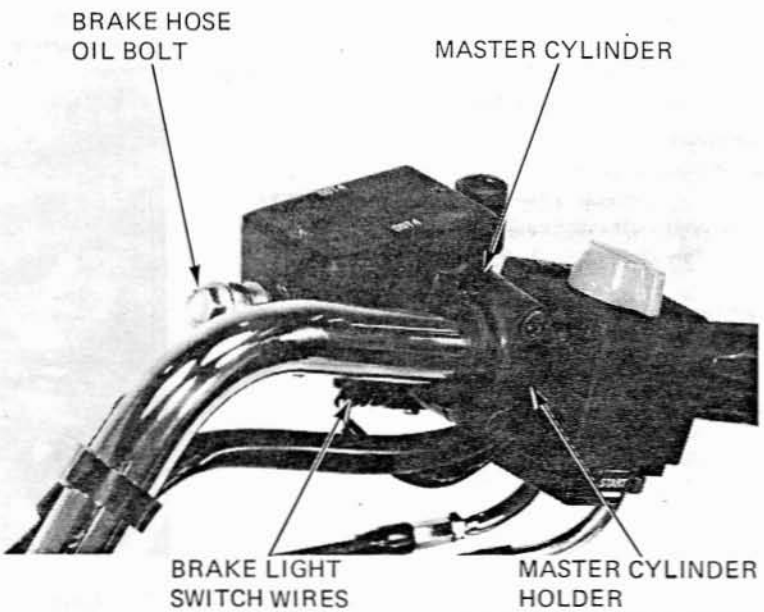
CAUTION:

Avoid spilling brake fluid on painted surfaces or wind screen. Place a rag over the painted surfaces and wind screen whenever the brake system is serviced.

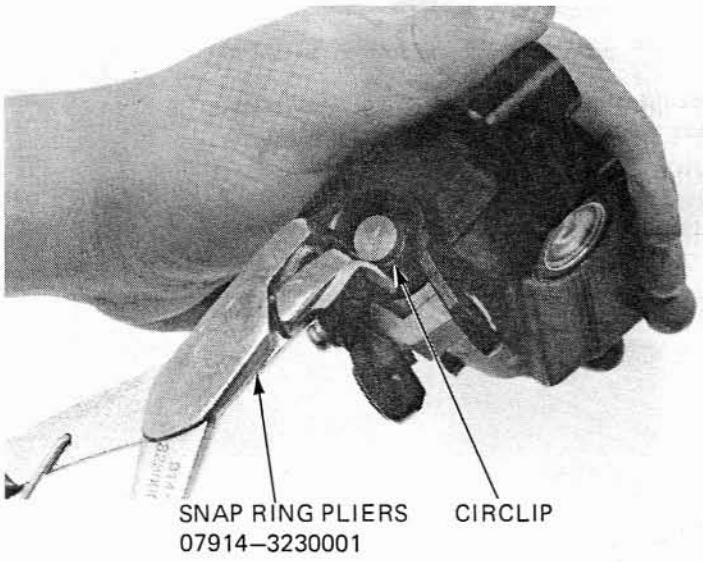
NOTE:

When removing the oil hose bolt, cover the end of the hose to prevent contamination. Secure the hose to prevent fluid from leaking out.

Remove the master cylinder.



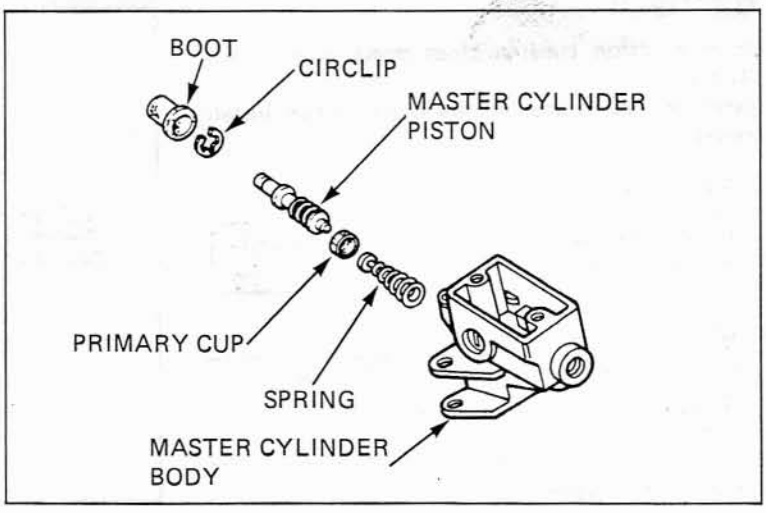
Remove the piston boot and circlip from the master cylinder body.



Remove the master cylinder piston and spring.

Remove the brake light switch from the master cylinder body, if necessary.

Clean the inside of the master cylinder and reservoir with brake fluid.



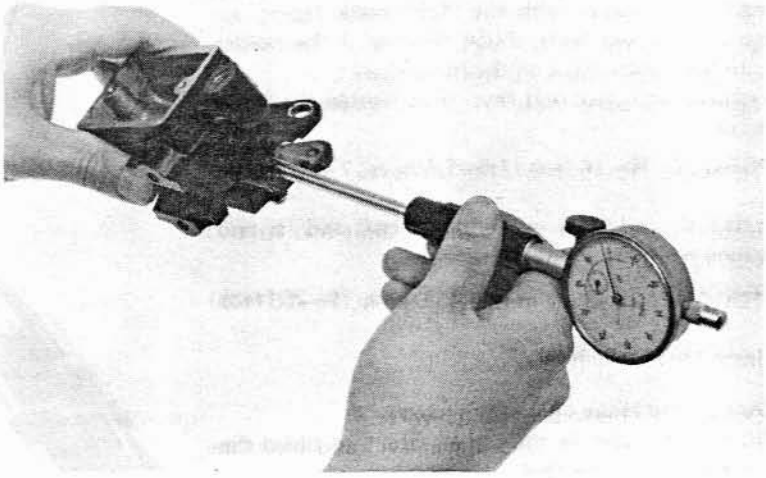
INSPECTION

- MASTER CYLINDER

Check for scores, scratches, nicks or other damage.
Measure the master piston bore I.D.

SERVICE LIMITS:

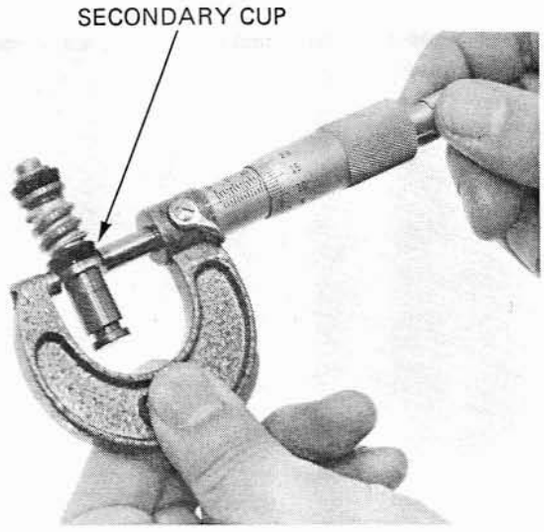
Except G type: 12.755 mm (0.5022 in)
G type: 15.925 mm (0.6270 in)



• MASTER CYLINDER PISTON

Inspect the piston for scores, scratches, nicks or other faults.
Inspect the piston cups for damage or deterioration.
Measure the master cylinder piston O.D. as shown.

SERVICE LIMITS:
Except G type: 12.645 mm (0.4978 in)
G type: 15.815 mm (0.6226 in)



ASSEMBLY

Dip the piston cups in clean brake fluid before assembly.
Install the spring and primary cup together. Install the master cylinder piston.

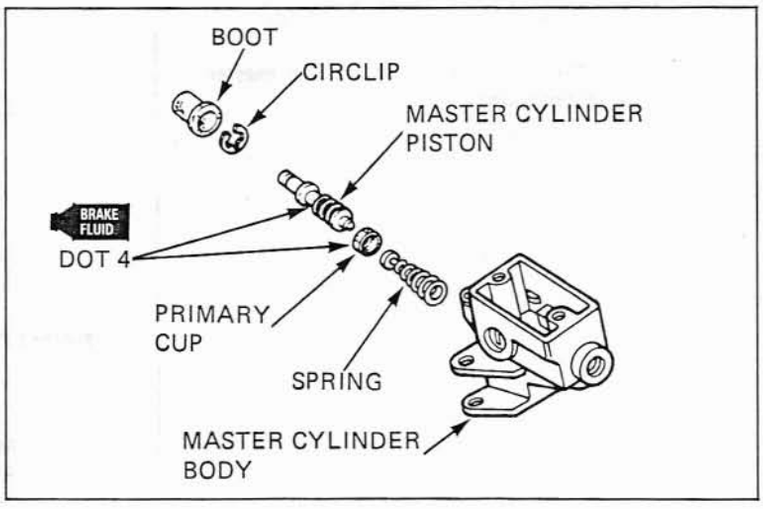
NOTE:

> Handle the master cylinder piston, cups and spring as a set.

CAUTION:

> *When installing the cups, do not allow the lips to turn inside out. Be certain the circlip is seated firmly in the groove.*

Install the circlip and boot.



Place the master cylinder on the handlebar. Loosely install the holder with the "UP" mark facing upward using two bolts. Align the lug of the holder with the punch mark on the handlebar.
Tighten the upper bolt first, then tighten the lower bolt.

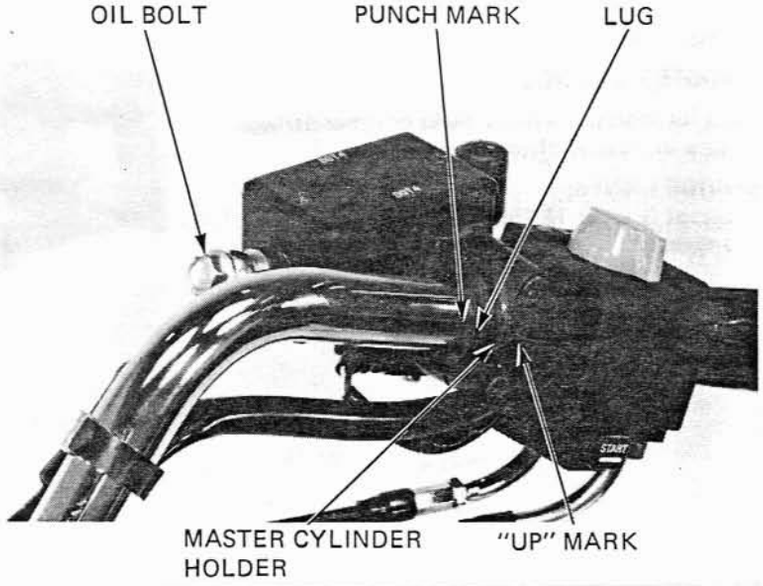
TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

Install the oil hose with the oil bolt and its two sealing washers.

TORQUE: 25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)

Install the brake lever.

Connect the brake light switch wires.
Fill the reservoir to the upper level and bleed the brake system (page 15-4).

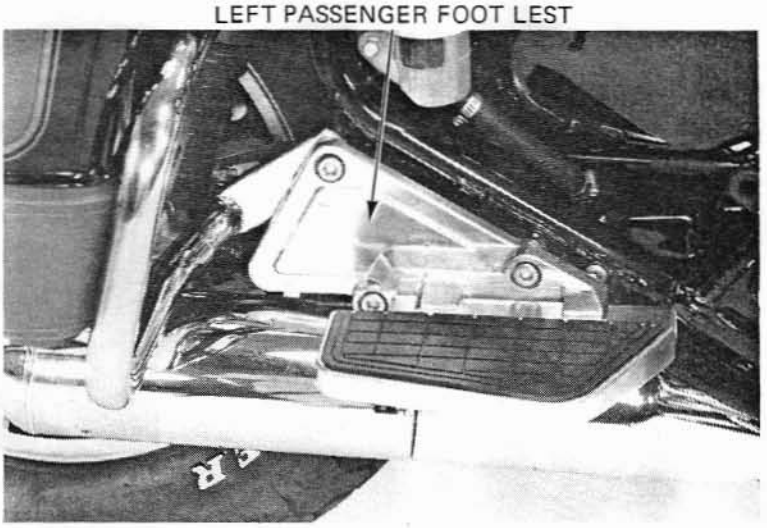


REAR MASTER CYLINDER

REMOVAL

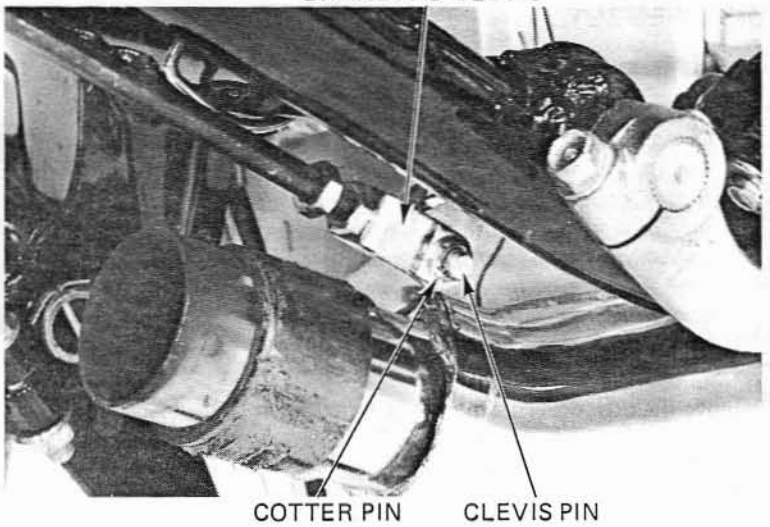
Remove the left passenger foot lest (GL1200A).
Remove the swing arm (page 13-18).

LEFT PASSENGER FOOT LEST



Drain the brake fluid from the brake line. (Page 15-3).
Remove the cotter pin and clevis pin. Disconnect the brake rod clevis from the brake arm.

BRAKE PAD CLEVIS

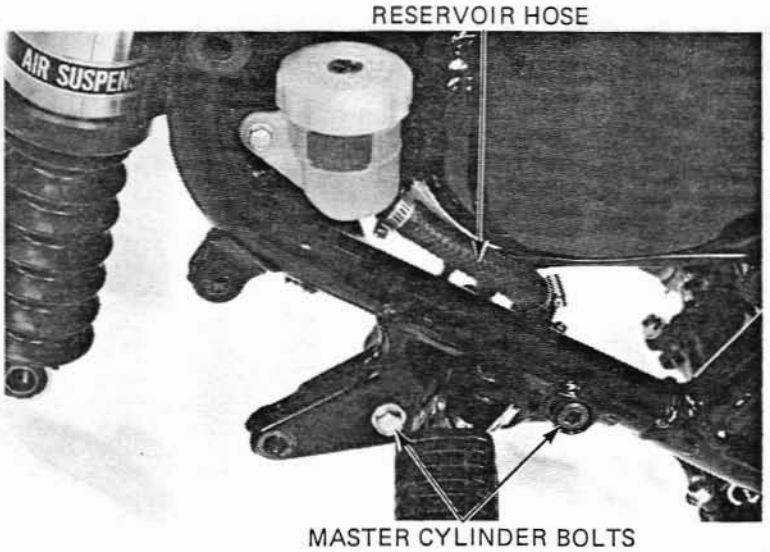


COTTER PIN CLEVIS PIN

Place a drip pan under the brake line.
Disconnect the reservoir hose from the reservoir.

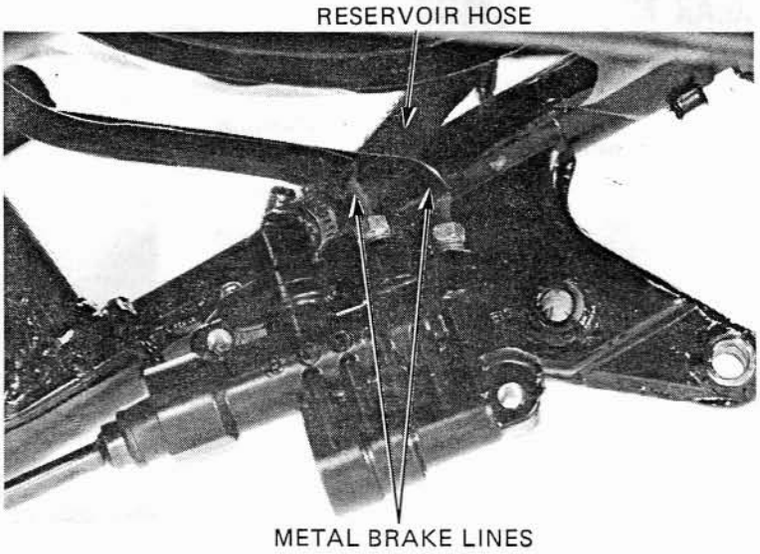
Remove the two master cylinder bolts.

RESERVOIR HOSE



MASTER CYLINDER BOLTS

Disconnect the metal brake lines from the master cylinder.
Disconnect the reservoir hose from the master cylinder.
Remove the master cylinder.

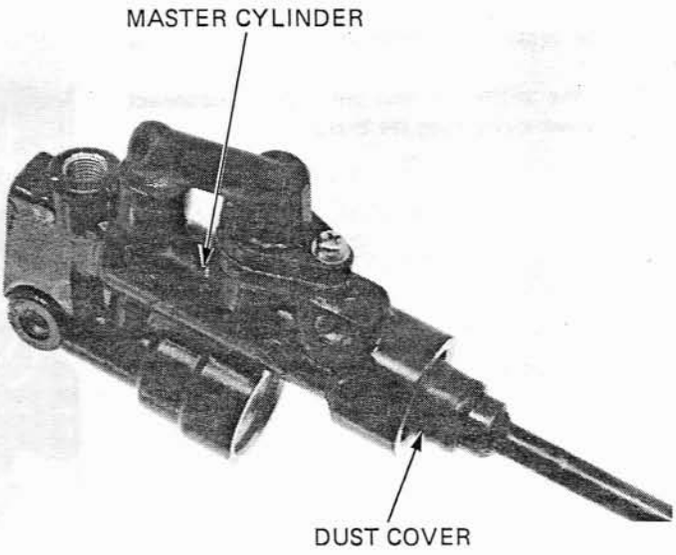


DISASSEMBLY

CAUTION:

- *A pressure control valve is incorporated in the rear brake master cylinder. When filling the master cylinder, use extreme care to keep foreign matter from entering the inside as it will affect the performance of the control valve (except G type).*
- *The pressure control valve cannot be disassembled. Do not attempt to disassemble the pressure control valve (except G type).*

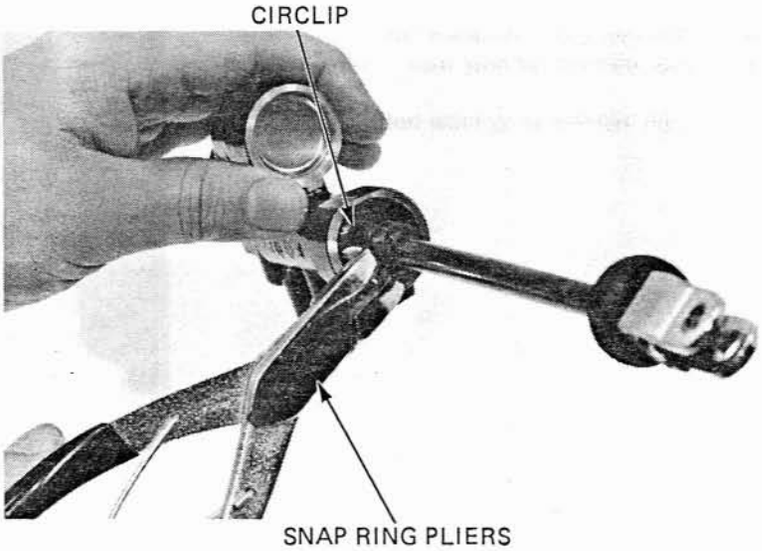
Remove the dust cover from the master cylinder.



Remove the circlip and pull the rod out of the master cylinder body.

CAUTION:

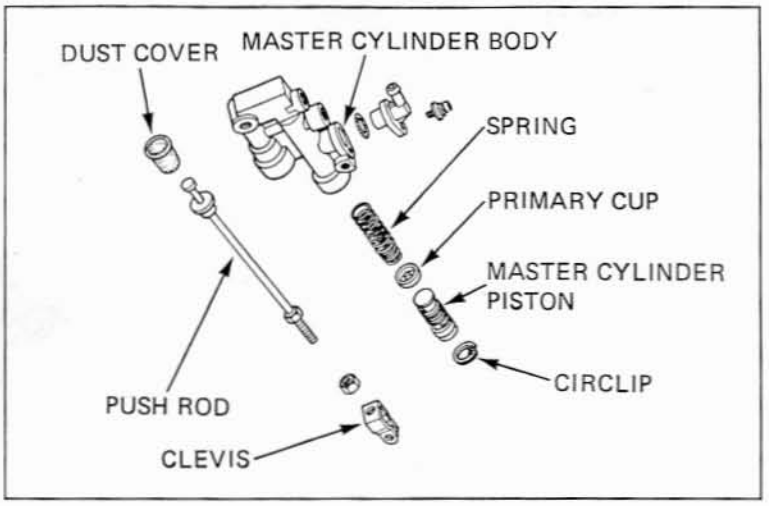
Beware that the piston rod will pop out when removing the circlip.



Remove the master cylinder piston, primary cup and spring.

It may be necessary to apply a small amount of air pressure to the fluid outlet to remove the master piston and primary cup.

Clean all parts with clean brake fluid.



INSPECTION

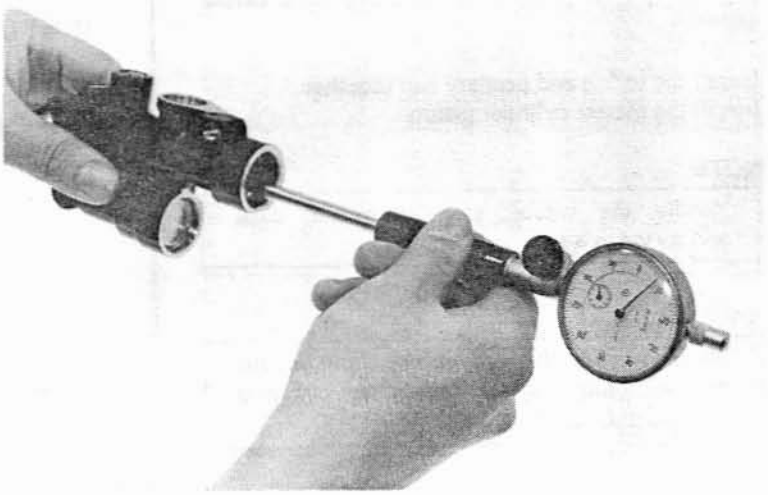
- MASTER CYLINDER

Check the master cylinder bore for scores, scratches or nicks.

Measure the inside diameter of the master cylinder bore.

SERVICE LIMITS:

Except G type:	**15.925 mm (0.6270 in)**
G type:	**14.055 mm (0.5533 in)**



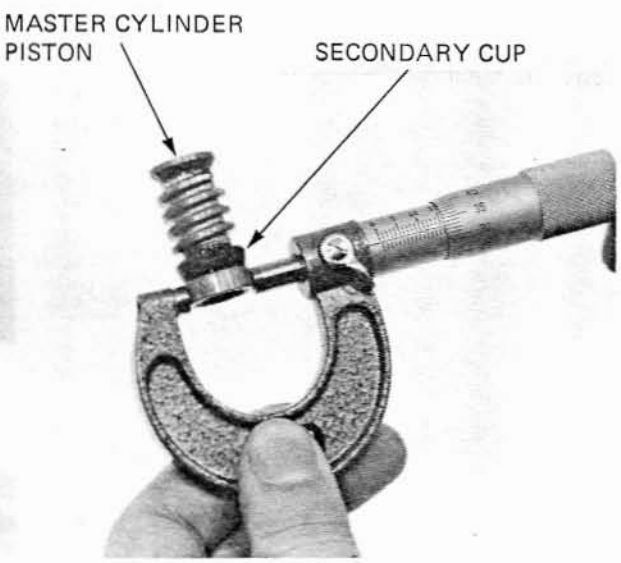
- MASTER CYLINDER PISTON

Inspect the piston for scores, scratches or other faults.
Check the primary and secondary cups for damage or deterioration.

Measure the master piston O.D. as shown.

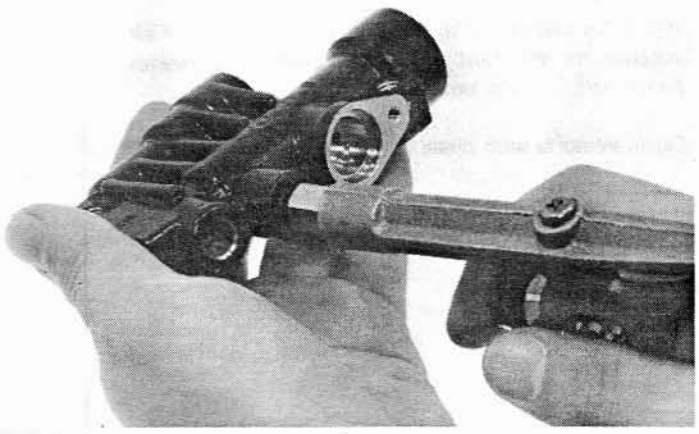
SERVICE LIMITS:

Except G type:	**15.815 mm (0.6226 in)**
G type:	**13.940 mm (0.5488 in)**



ASSEMBLY

Clean the master cylinder with compressed air.



Dip the piston cups in clean brake fluid before assembly.

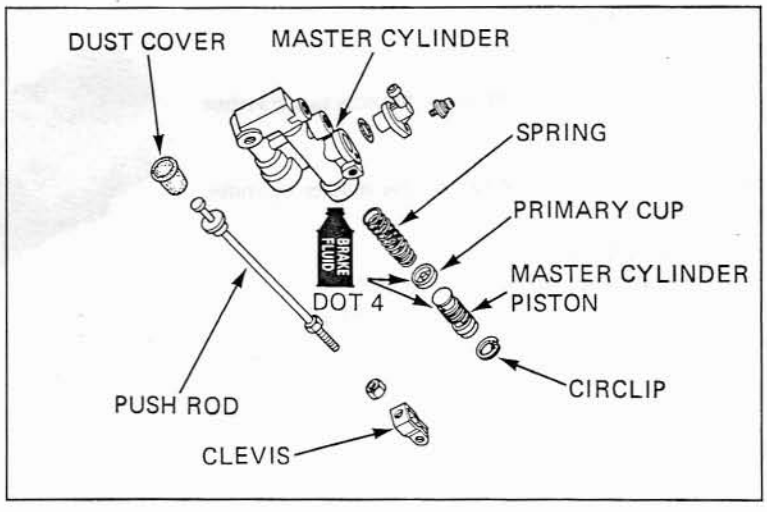
Install the spring and primary cup together.
Install the master cylinder piston.

NOTE:

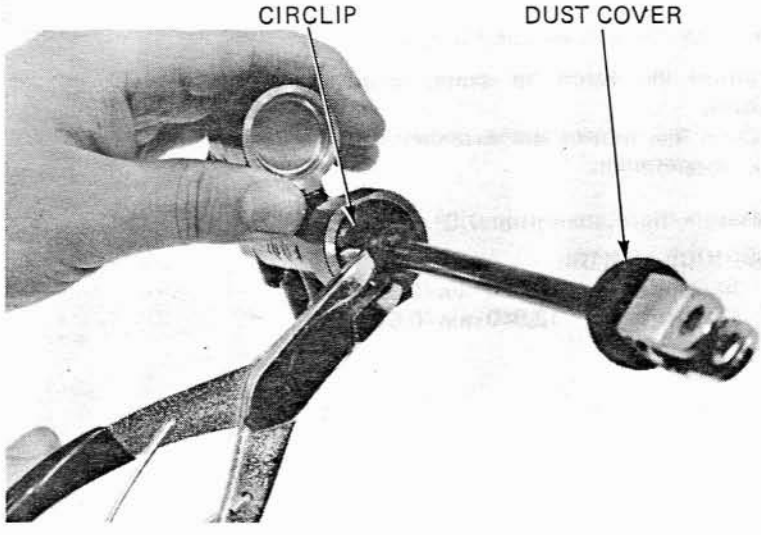
> Handle the master cylinder piston, cups and spring as a set.

CAUTION:

> *When installing the cups, do not allow the lips to turn inside out. Be certain the circlip is seated firmly in the groove.*

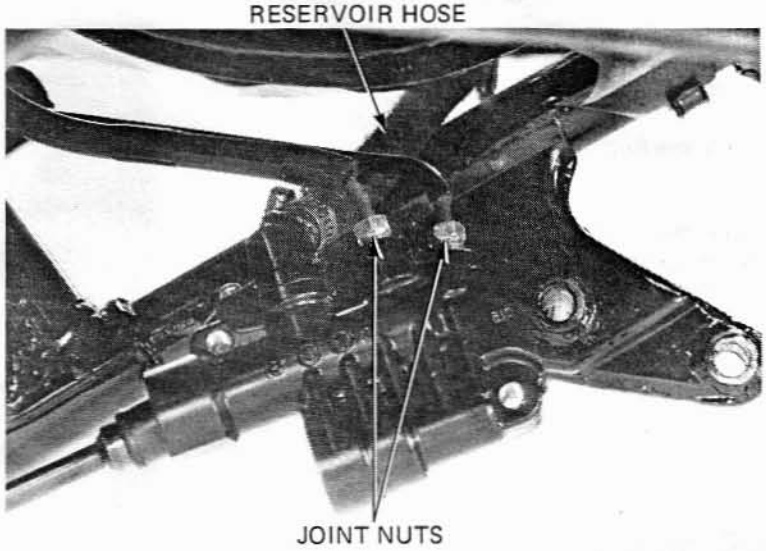


Install the circlip and dust cover.



Connect the reservoir hose and tighten the hose band securely.
Connect the metal brake line to the master cylinder. Tighten the joint nut to specified torque.

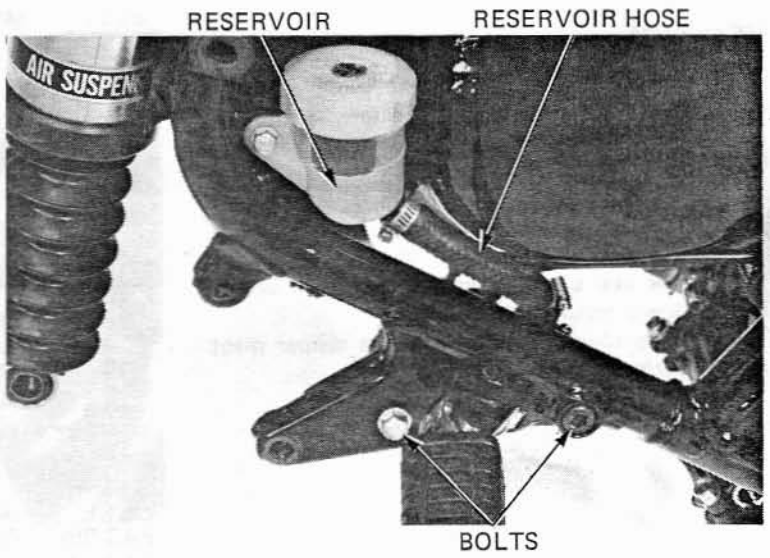
TORQUE: 16–18 N·m (1.6–1.8 kg-m, 12–18 f-lb)



Install the master cylinder and tighten the bolts.

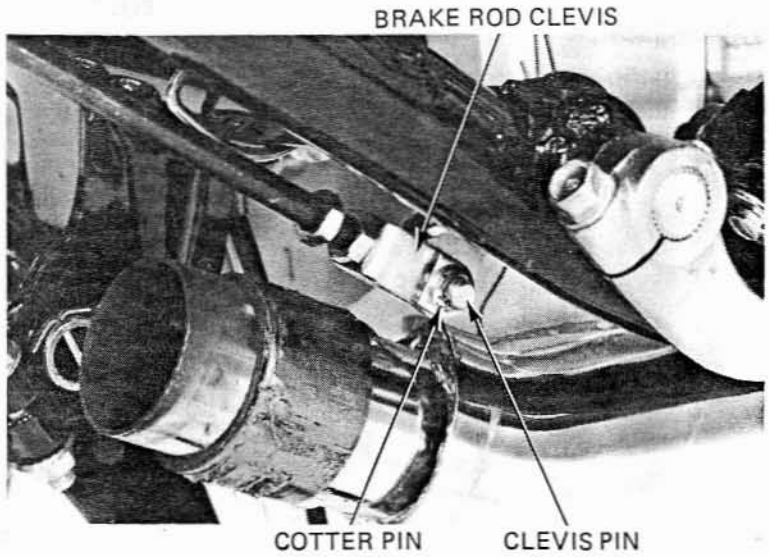
TORQUE: 24–29 N·m (2.4–2.9 kg-m, 17–21 ft-lb)

Connect the reservoir hose to the reservoir and tighten the hose band securely.



Connect the brake rod clevis to the brake arm with the clevis pin and a new cotter pin.
Adjust the brake pedal height (Page 2-18).
Tighten the lock nut.

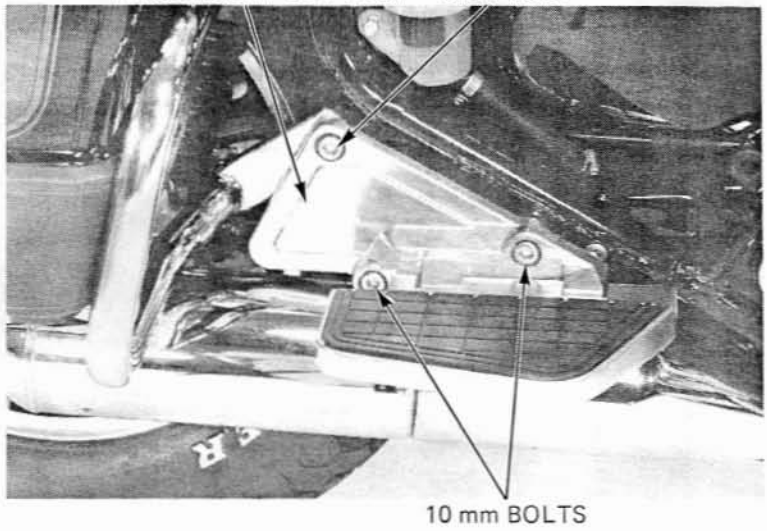
TORQUE: 15–20 N·m (1.5–2.0 kg-m, 11–14 ft-lb)



Install the passenger foot rest and righten the bolts (GL1200A).

TORQUE:
10 mm Bolt: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)
8 mm Bolt: 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)

Install the swing arm (Page 13-21).
Fill the brake hydraulic system with recommended brake fluid (Page 15-4).



BRAKE CALIPERS

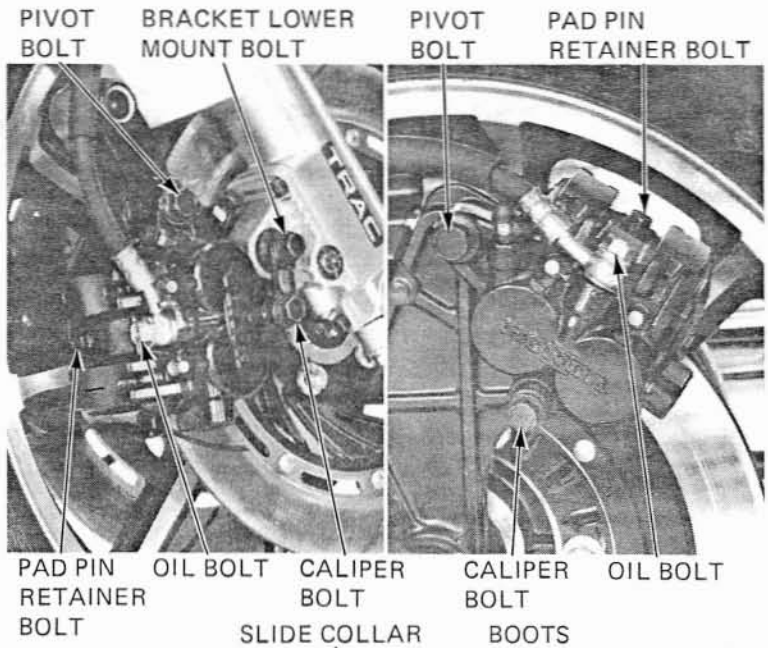
REMOVAL

Place a clean container under the caliper and disconnect the brake hose from the caliper.

CAUTION:

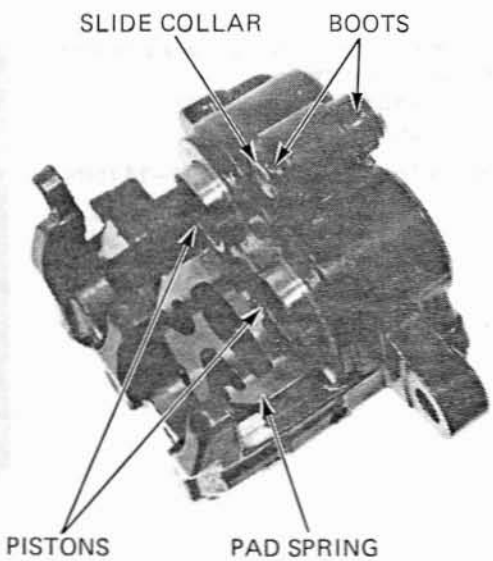
Avoid spilling brake fluid on painted surfaces and wind screen.

Loosen the pad pin retainer bolt and front caliper bracket lower mount bolt.
Remove the caliper by removing the caliper pivot and caliper bolts.



DISASSEMBLY

Remove the brake pads and pad spring.
Remove the caliper slide collar and boots.
Remove the caliper pistons.



If necessary, apply compressed air to the caliper fluid inlet to get the piston out. Place a shop rag under the caliper to cushion the piston when it is expelled. Use the air in short spurts.

CAUTION:

Do not bring the nozzle too close to the inlet.

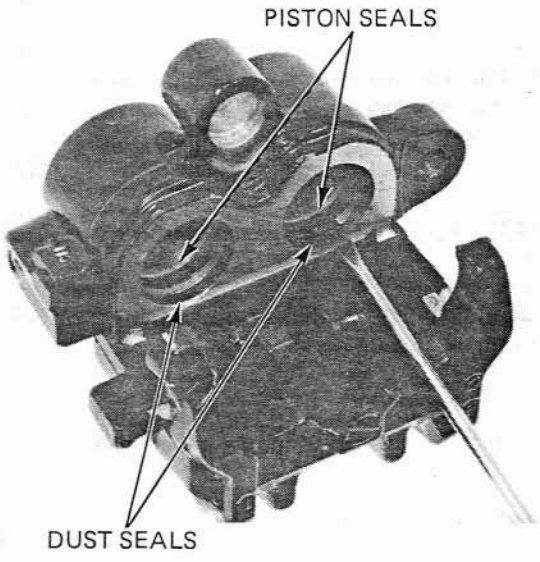
Examine the pistons and cylinders for scoring, scratches or other damage and replace if necessary.

Push the piston and dust seals in, lift them out and discard them.

Clean the piston and dust seal grooves with brake fluid.

CAUTION:

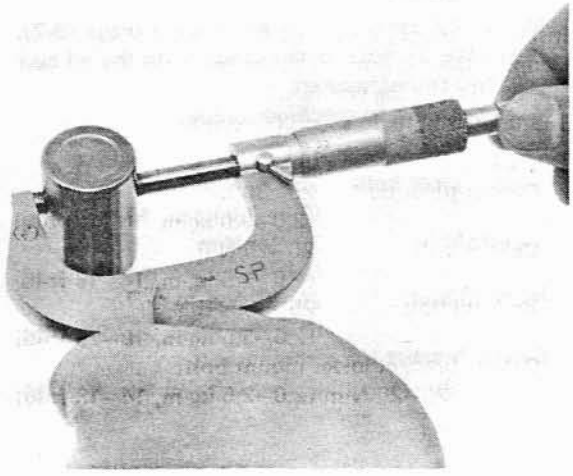
Be careful not to damage the piston sliding surfaces when removing the seals.



PISTON INSPECTION

Check the pistons for scoring, scratches or other faults. Measure the piston diameter with a micrometer.

SERVICE LIMITS: 31.940 mm (1.2575 in)
Right front caliper (except G type): 25.310 mm (0.9965 in)



CYLINDER INSPECTION

Check the caliper cylinder bore for scoring, scratches or other faults. Measure the caliper cylinder bore.

SERVICE LIMITS: 32.090 mm (1.2634 in)
Right front caliper (except G type):
25.460 mm (1.0024 in)

ASSEMBLY

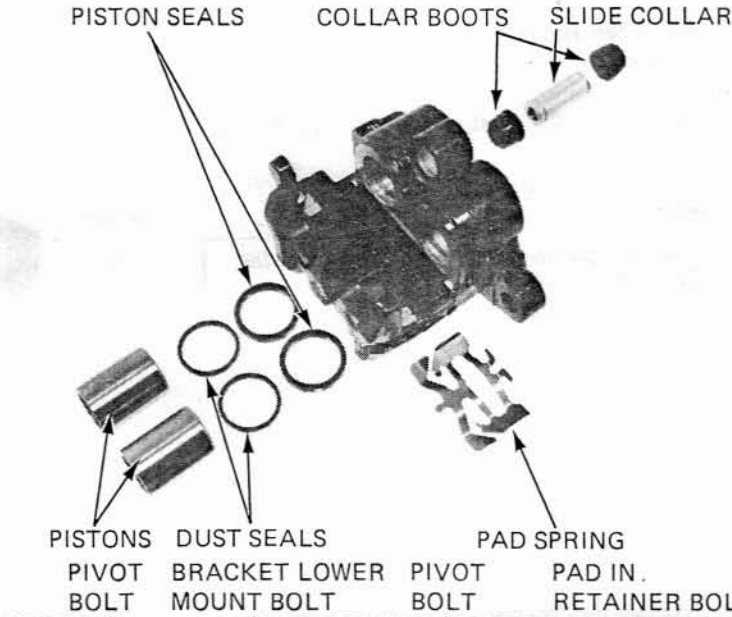
The piston and dust seals must be replaced with new ones whenver they are removed. Coat the seals with silicone grease or brake fluid before assembly.

Install the pistons with the dished ends toward the pads.

Coat the outer side of the slide collar with Hi-Temperature silicone grease.

Install the collar boots and collar making sure that the boots are seated in the collar and caliper grooves properly.

Install the pad spring and pads.

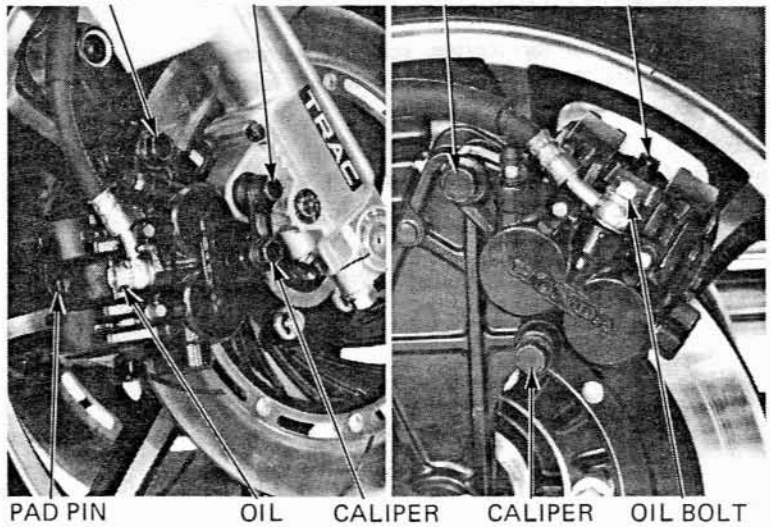


INSTALLATION

Install the caliper on the caliper bracket (Page 15-7). Connect the oil hose to the caliper with the oil bolt and its two sealing washers.
Tighten the bolts to specified torque.

TORQUE:

Caliper pivot bolt:	**25–30 N·m (2.0–3.0 kg-m, 18–22 ft-lb)**
Caliper bolt:	**20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)**
Hose oil bolt:	**25–35 N·m (2.5–3.5 kg-m, 18–25 ft-lb)**
Caliper bracket lower mount bolt:	**20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)**

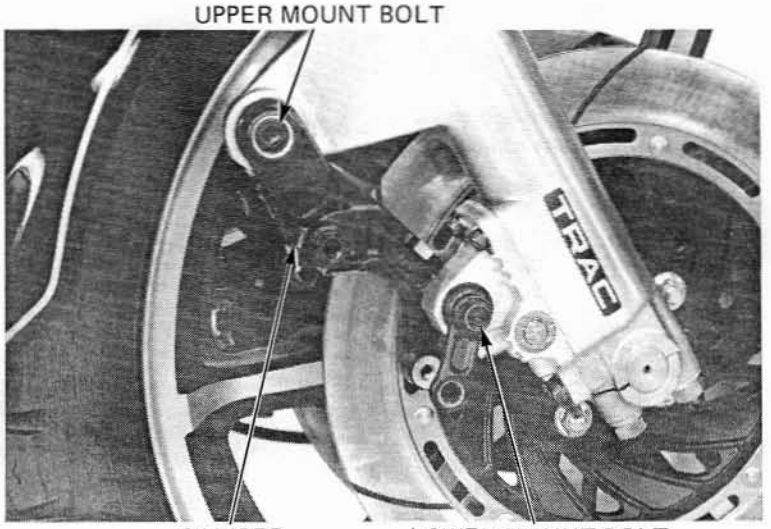


FRONT CALIPER BRACKET REMOVAL

Remove the caliper without disconnecting the brake hose (Page 15-5).

Remove the caliper bracket by removing upper and lower mount bolts.

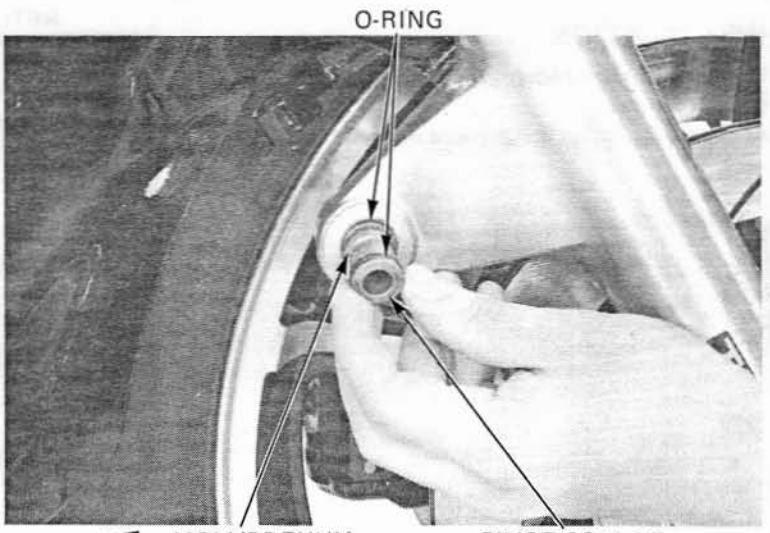
Inspect the condition of the caliper pivot bolt boot.



INSTALLATION

Inspect the O-rings for damage or deterioration.

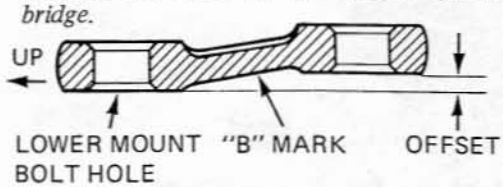
Coat the outer side of the caliper bracket pivot collar with molybdenum disulfide grease.



Install the caliper bracket onto the fork leg.

CAUTION:

Note the caliper bracket bridge installation direction. Face the mark "B" toward the inside and install the lower mount bolt through the hole of the caliper bracket bridge.

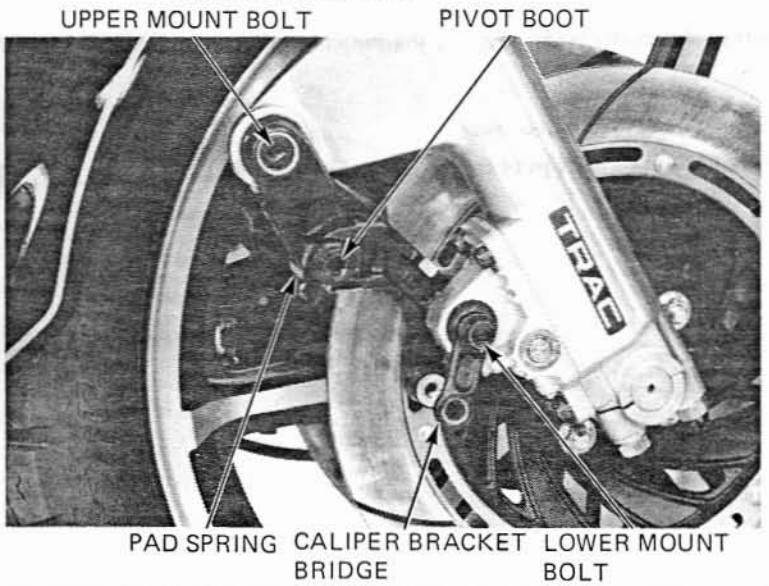


Install the pivot boot and pad spring.

Loosely install the upper and lower mount bolt, then torque the upper mount bolt.

TORQUE: 30–40 N·m (3.0–4.0 kg-m, 22–29 ft-lb)

Install the caliper assembly onto the caliper bracket (Page 15-7).

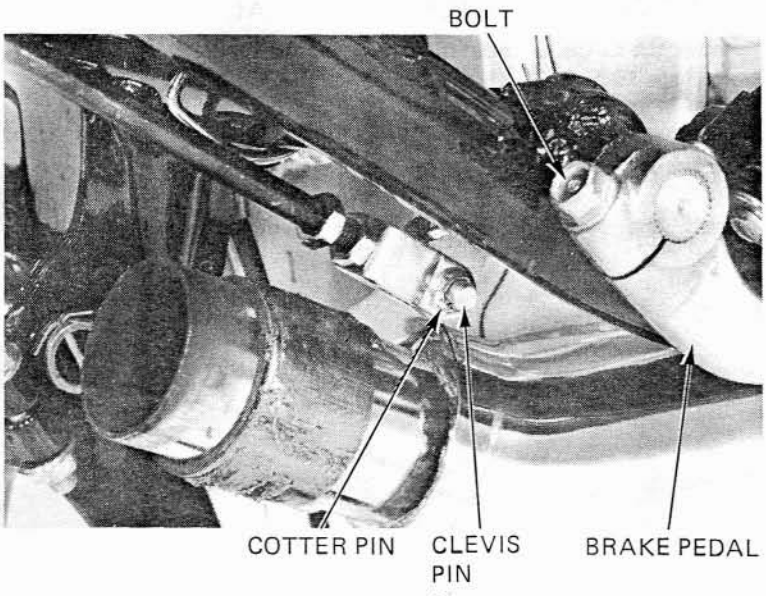


BRAKE PEDAL

REMOVAL

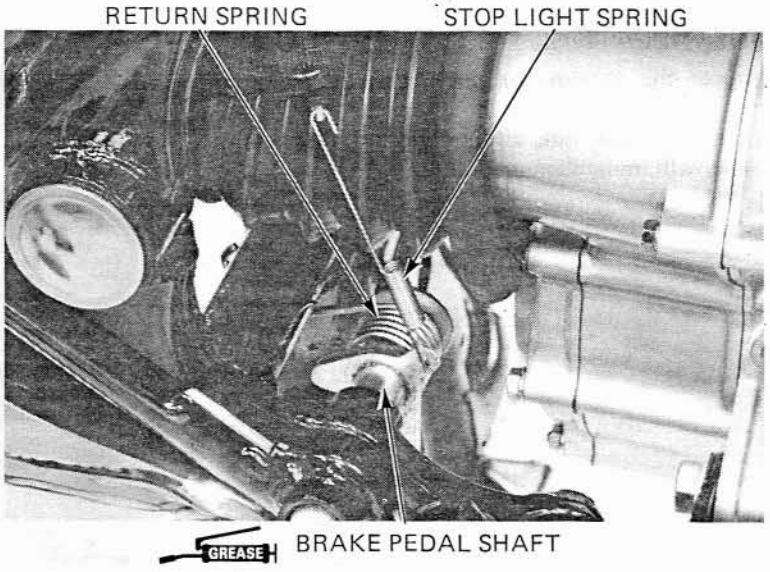
Remove the cotter pin and clevis pin.
Disconnect the brake rod clevis from the brake arm.

Remove the brake pedal bolt and brake pedal.
Remove the stop light spring from the brake arm.
Remove the brake arm.



INSTALLATION

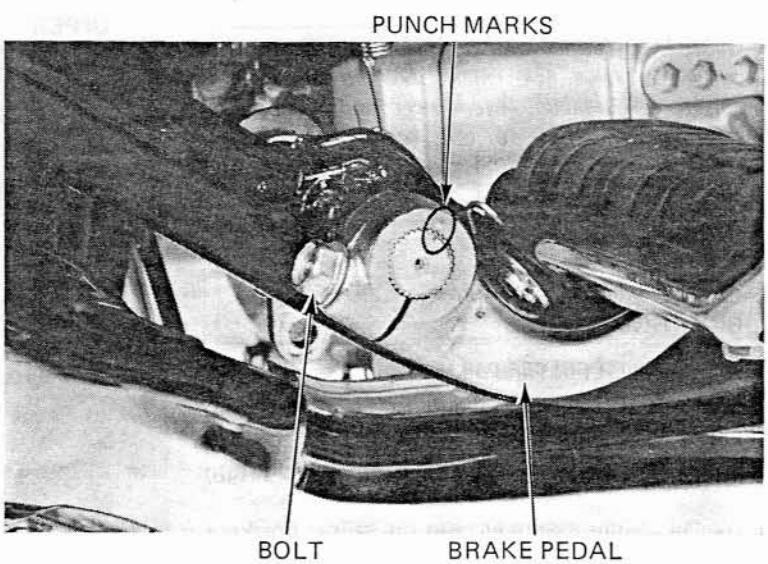
Install the brake pedal return spring and stop light spring as shown.
Apply grease to the brake pedal shaft.



Install the brake pedal aligning the punch marks as shown.

Tighten the brake pedal bolt.

TORQUE: 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)

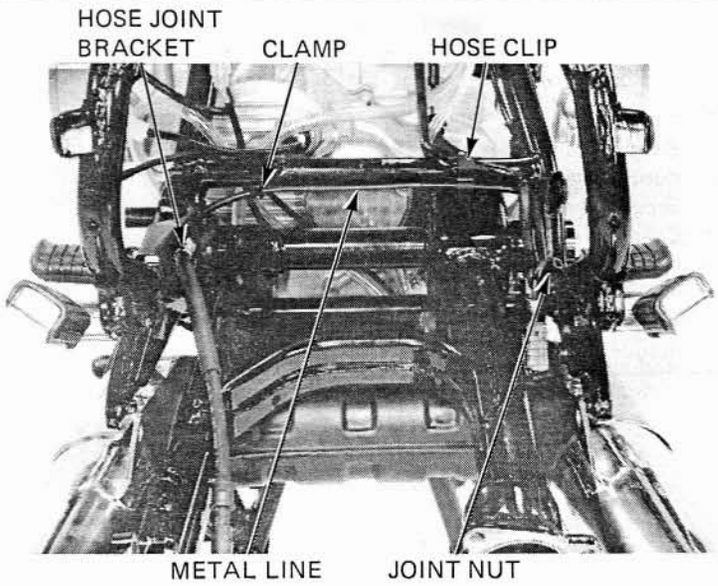


METAL BRAKE LINES

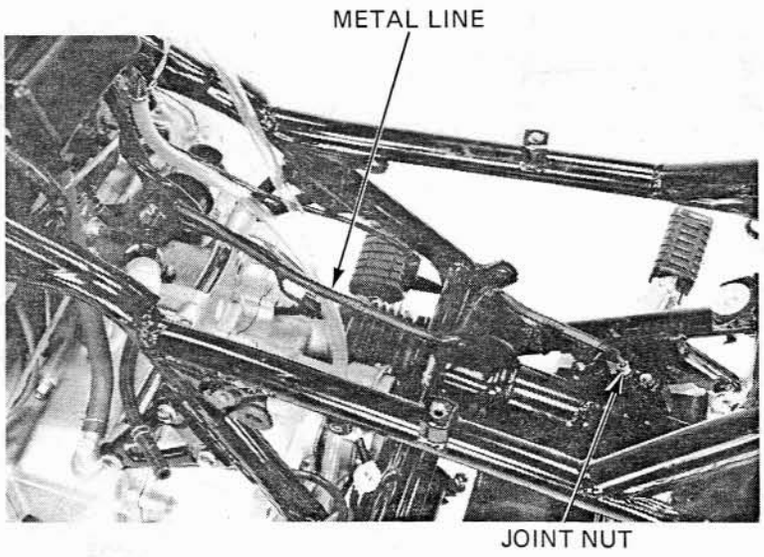
REMOVAL

Remove the seat, top compartment and fuel tank.
Drain the brake fluide from the brake system.
Disconnect the metal line from the rear master cylinder.
Remove the clamp and hose clip from the metal lines.

Remove the rear caliper metal line.



Remove the air cleaner case and ignition coil.
Disconnect the metal line from the rear master cylinder.
Disconnect the metal line from the front brake hose. Remove the metal line.



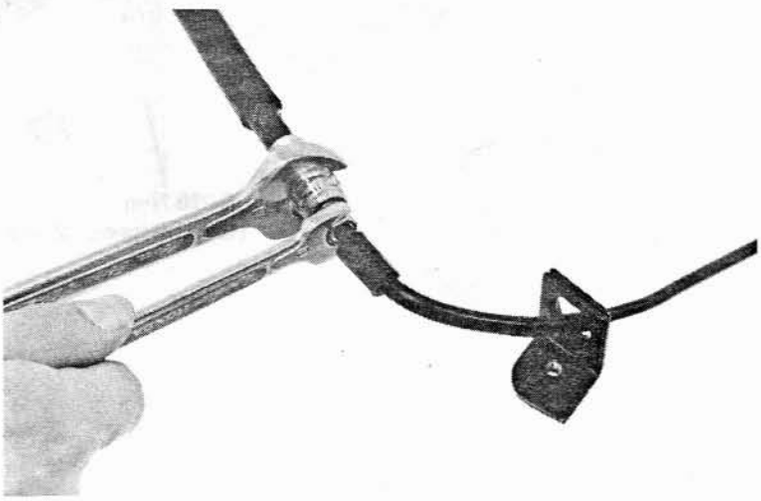
INSTALLATION

Connect the metal line to the brake hose. Tighten the joint nut to the specified torque.

TORQUE: 16–18 N·m (1.6–1.8 kg-m, 12–13 ft-lb)

NOTE:

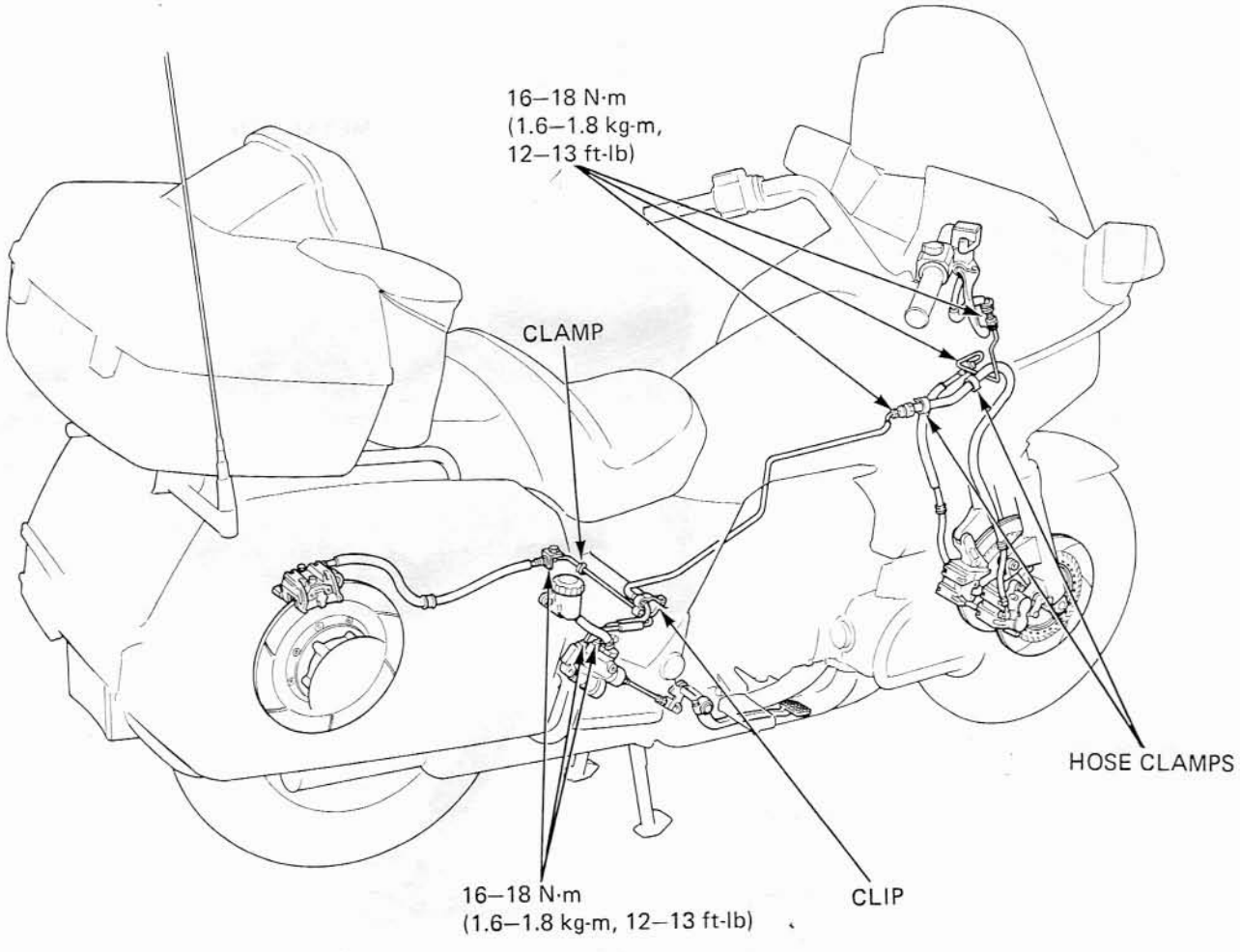
> Be careful not to twist the metal lines when tightening.



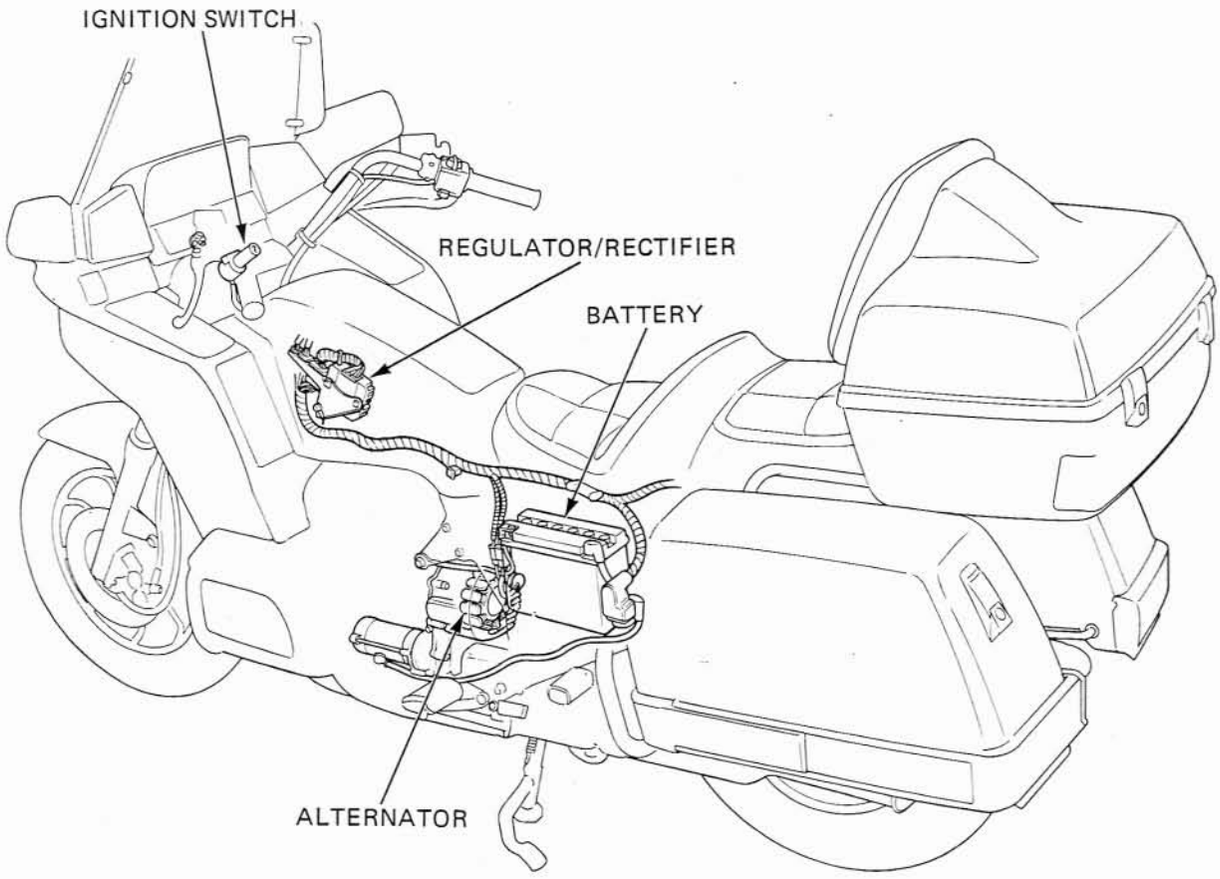
Installation sequence is essentially the reverse order of removal.

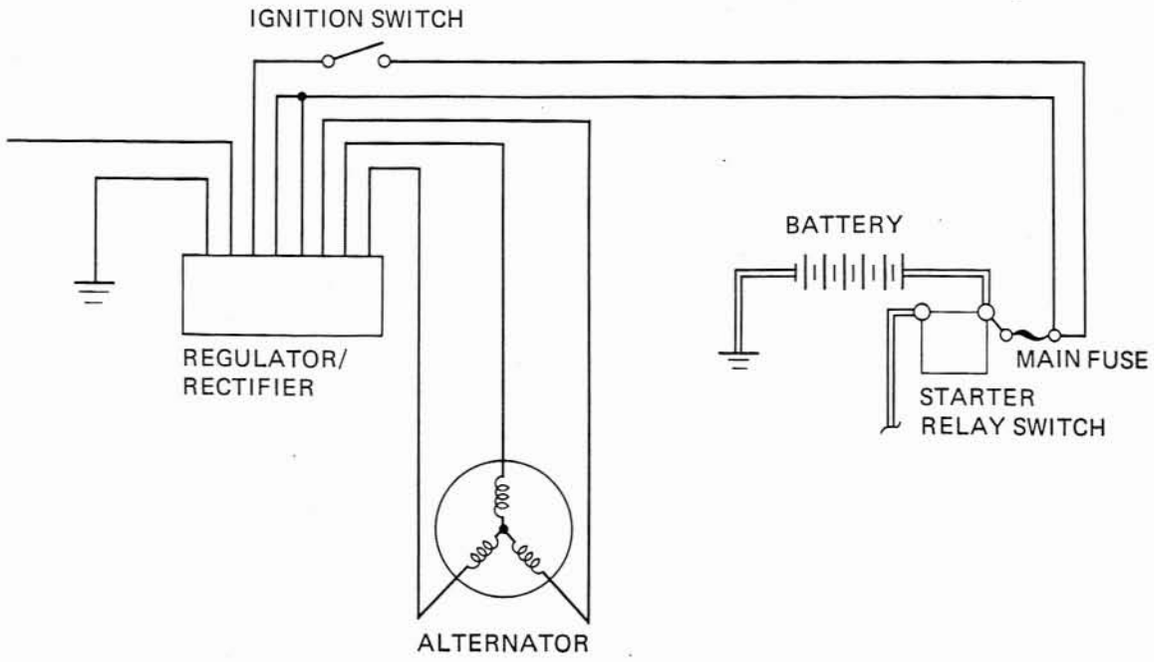
NOTE:

- Be careful not to twist the metal lines during installation.
- Secure the lines with clamps as shown.
- Check each line to be certain that it does not contact or interfere with any moving or sliding parts.
- After installation, check that there are no fluid leaks.



MEMO





16. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION

GENERAL

- The battery electrolyte level should be checked regularly. Fill with distilled water as necessary.
- Quick charge the battery only in an emergency. Slow-charging is preferred.
- Remove the battery from the motorcycle for charging. If the battery must be charged on the motorcycle, disconnect the battery cables.

WARNING

Do not smoke or hove flames near a charging battery. The hydrogen gas produced by a battery is highly flammable and can explode.

- For Alternator removal and installation, refer to Section 9.
- All charging system components can be tested on the motorcycle.

SPECIFIATIONS

Battery	Capacity		12V, 20 ampere-hours
	Specific gravity at 20°C (68°F)	Fully charged	1.280
		Normal charge	1.260
		Need charging	1.200
	Charging rate		2.0 amperes max.
Alternator capacity			14V, 360W/5,000 min^{-1} (rpm)
Regulator/rectifier	Type		Transistorized, non-adjustable
	Regulated voltage		13–15V
Charging current		Charging start rpm	1,000–1,200 min^{-1} (rpm)
		At idle	(–) 1–0A/Above 12V
		At 3,000 min^{-1} (rpm)	(+) 0–8A/14–15V
		At 5,000 min^{-1} (rpm)	(+) 0–8A/14–15V

TROUBLESHOOTING

No power – key turned on
- Dead battery
  - Low fluid level
  - Low specific gravity
  - Charging system failure
- Disconnected battery cable
- Main fuse burned out
- Faulty ignition switch

Low power – key turned On
- Weak battery
  - Low fluid level
  - Low specific graivty
  - Charging system failure
- Loose battery connection

Low power – engine running
- Battery undercharged
  - Low fluid level
  - One or more dead cells
- Charging system failure

Intermittent power:
- Loose battery connection
- Loose charging system connection
- Loose starting system connection
- Loose connection or short circuit in ignition system
- Loose connection or short circuit in lighting system

Charging system failure
- Loose, broken, or shorted wire or connection
- Faulty voltage regulator/rectifier
- Faulty alternator

BATTERY

REMOVAL

Disconnect the negative cable first, then the positive cable.
On installation, reconnect the negative cable last.

Remove the battery from the motorcycle for charging whenever possible. If the battery must be charged on the motorcycle, disconnect the battery cables.

CAUTION:

Make sure the positive cable is not forced against any metal parts, otherwise a short may occur.

INSPECTION

Check for cracked or broken case or plates. Check the plates for sulphation.

Replace the battery if damaged or sulphated.

Check electrolyte level in cells. If low, add distilled water to bring the level to the upper mark.

NOTE:

In order to obtain accurate test readings when checking the charging system, the battery must be fully charged and in good condition. Perform the following inspections and tests before attempting to troubleshoot charging system problems.

SEPCIFIC GRAVITY

The specific gravity must be checked with a hydrometer. Test each cell by drawing electrolyte into the hydrometer.

Fully Charged: 1.280 at 20°C (68°F)
Normal Reading: 1.260 at 20°C (68°F)
Needs Charging: 1.200 at 20°C (68°F)

Make sure the variance between the high and low cells is less than 0.05.

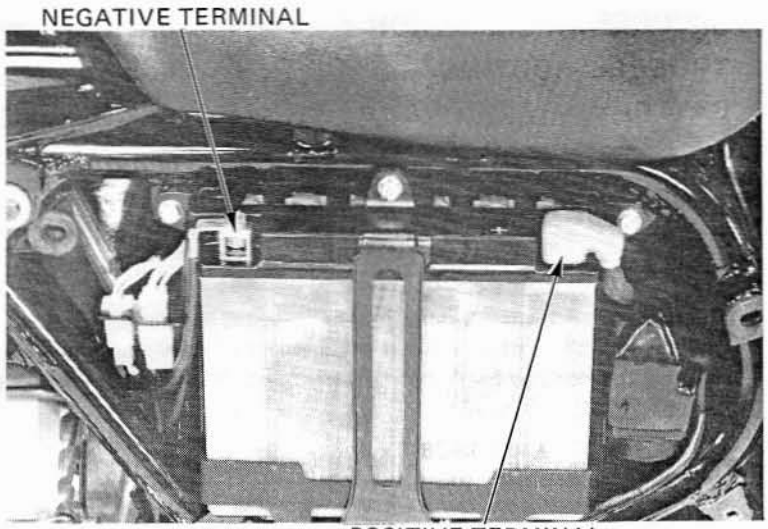
WARNING

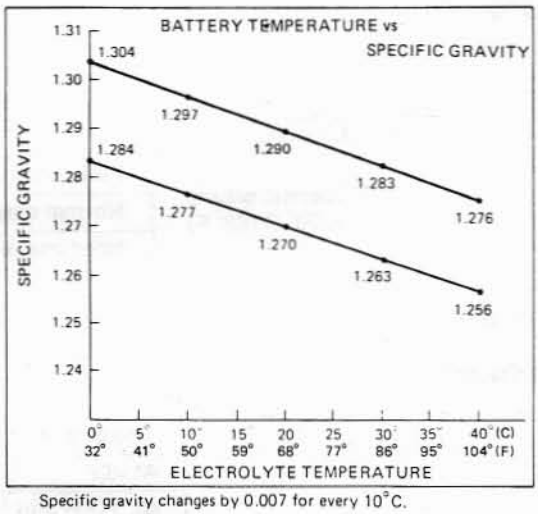
The battery electrolyte contains sulfuric acid. Avoid contact with skin, eyes, or clothing. Antidote: Flush with water and call a doctor if electrolyte gets in your eyes.

BATTERY VOLTAGE

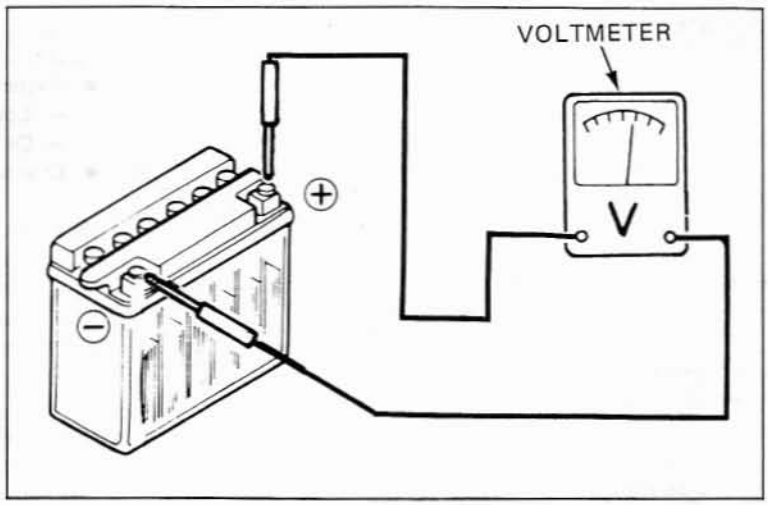
Set meter to the DCV-Scale. Connect the Red lead to the battery (+) terminal and the Black lead to the (–) terminal.

Fully Charged: 12–13 volts
Normal Reading: 11–12 volts
Needs Charging: Below 11 volts





Specific gravity changes by 0.007 for every 10°C.



BATTERY CHARGING

When the specific gravity reading is low, the battery must be recharged. Slow-charge the battery; do not quick charge it.

Remove the battery cell caps.
Charge until specific gravity reaches 1.260–1.280.

CHARGING RATE: 2 ampers maximum

The reading should remain stable for at least one hour after charging.

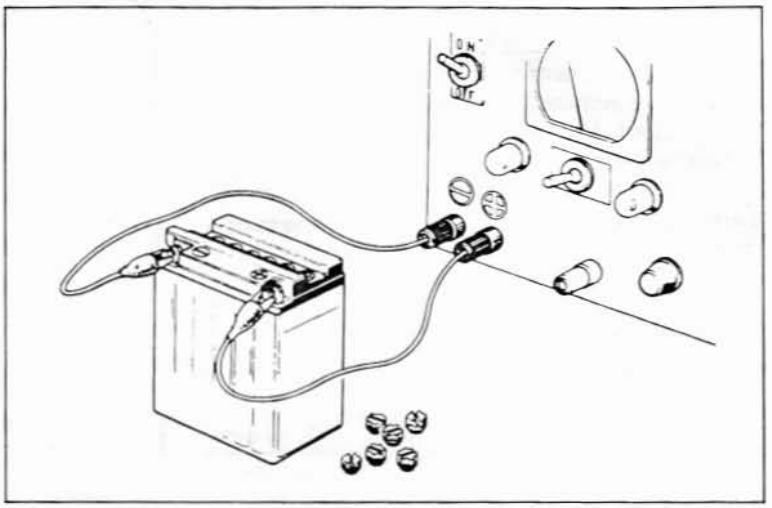
Check electrolyte level periodically.
After charging, wash the battery with water. After installation coat the terminals with petroleum jelly.

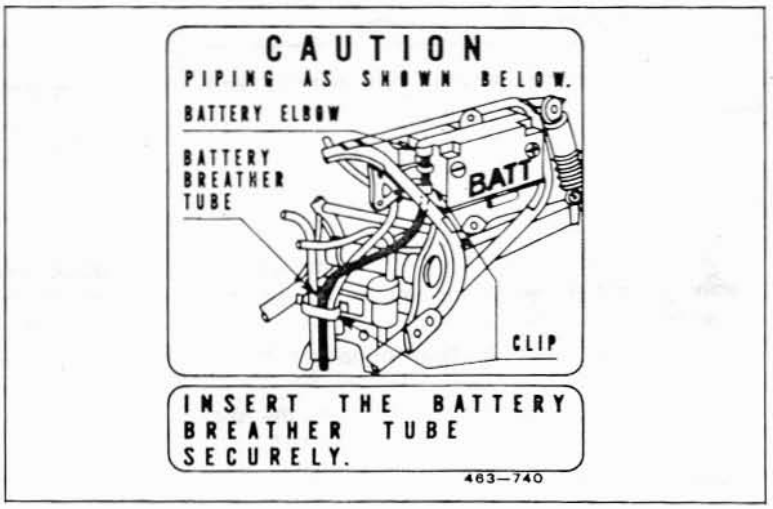
WARNING

- *Before charging a battery, remove each cell cap.*
- *Batteries produce explosive gases. Keep sparks and flames away.*
- *Ventilate when charging in an enclosed area.*
- *Turn power ON/OFF at the charger, not at the battery terminals.*
- *The battery contains sulphuric acid; avoid contact with skin, eyes, or clothing. Always shield eyes when working with batteries.*

CAUTION:

Route the breather tube as shown on the battery caution label.





BATTERY CHARGING SYSTEM

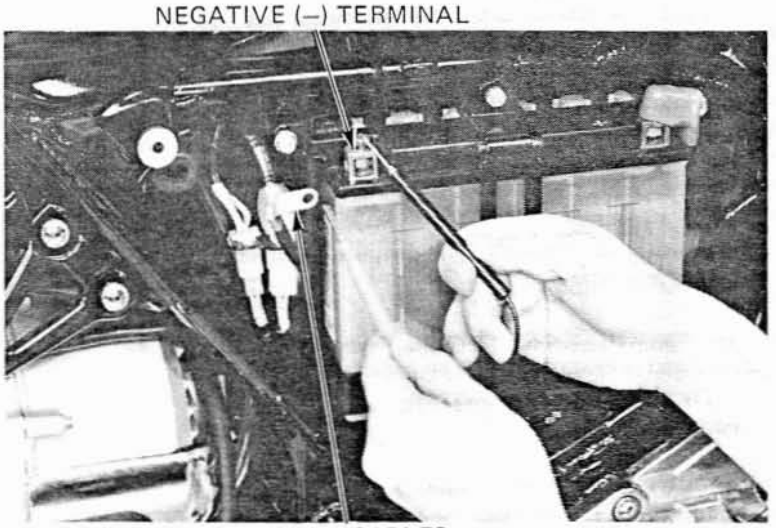
LEAKAGE INSPECTION

Inspect the battery voltage leakage before charging output inspection.

Turn the ignition switch OFF. Remove the ground cable from the battery.
Connect the voltmeter between the ground cable and battery (–) terminal.

The voltmeter should be indicate 0V when the ignition switch off.

NEGATIVE (–) TERMINAL



GROUND CABLES

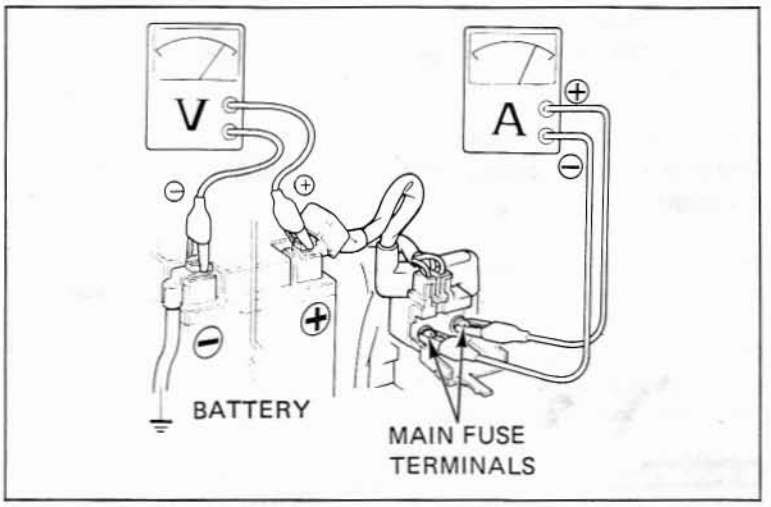
CHARGING SYSTEM INSPECTION

NOTE:

> Use a fully charged 12V battery (electrolyte specific gravity above 1.260) to test the charging output. Use of a low battery will result in false readings.

Start the engine and warm it up to operating temperature.

Remove the main fuse; connect an ammeter to the positive (+) and negative (–) terminals of the fuse holder as shown.



NOTE:

> - Use an ammeter which can measure the rate of flow of current in both directions.
> - Do not hook up an ammeter between the battery positive (+) terminal and the positive (+) cable of the battery. Failure to do so can lead to a broken ammeter.

Connect a voltmeter between the positive and negative terminals of the battery.

Start the engine and take the readings on the meters:

- Allow the engine to run at 2,500 min^{-1} (rpm) immediately after starting. The needle of the ammeter should be swung widely toward the positive range of the dial, then returned to ±0A.
- Check the charging outputs at the speeds shown right.
- Gradually raise the engine speed from the idle to find the speed at which the output is ±0A.

CHARGING START: 1,000–1,200 min^{-1} (rpm)

NOTE:

> Measure the current after the fan motor has come to a complete stop.

If the ammeter shows discharging even when the engine speed is raised, the probabilities are:

- Short circuit (excessive current draw)
- Overcharged battery
- Faulty alternator
- Loose or poor contact between alternator and voltage regulator.

If the ammeter shows charging even when the engine speed is lowered, this is an indication of:

- Faulty voltage regulator/rectifier
- Discharged battery

If the output voltage is outside of 14–15V when the engine speed is increased, the likelihood is:

- Faulty voltage regulator/rectifier

CHARGING OUTPUT SPECIFICATIONS (At hi-beam)

ENGINE PRM	AMPERAGE	VOLTAGE
950 min^{-1} (rpm)	(–) 1–0A	ABOVE 12V
3,000 min^{-1} (rpm)	(+) 0–8A	14–15V
5,000 min^{-1} (rpm)	(+) 0–8A	14–15V

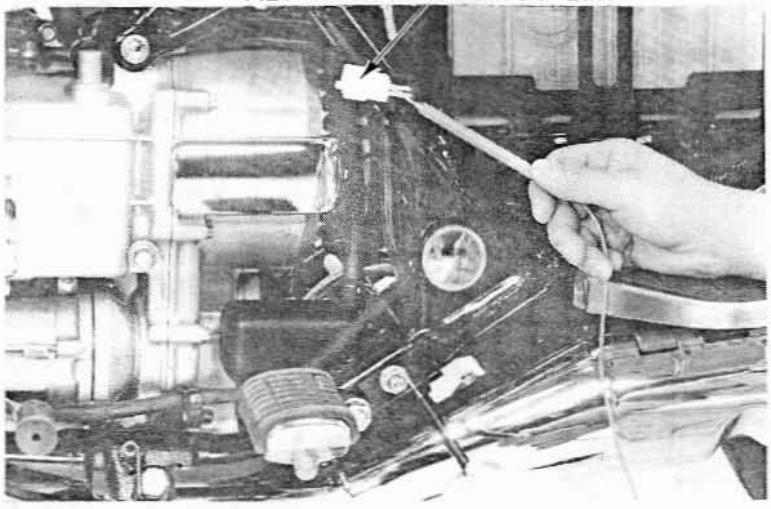
ALTERNATOR

STATOR COIL INSPECTION

Remove the left side cover.

Disconnect the alternator and regulator/rectifier coupler.
Check for continuity between the leads, and between the leads and ground.
Replace the stator if there is no continuity between the leads, or if there is continuity between the leads and ground.

ALTERNATOR WIRE COUPLER



VOLTAGE REGULATOR/RECTIFIER

Remove the seat and top compartment.
Disconnect the regulator/rectifier couplers.

Check for continuity between the leads with an ohmmeter.

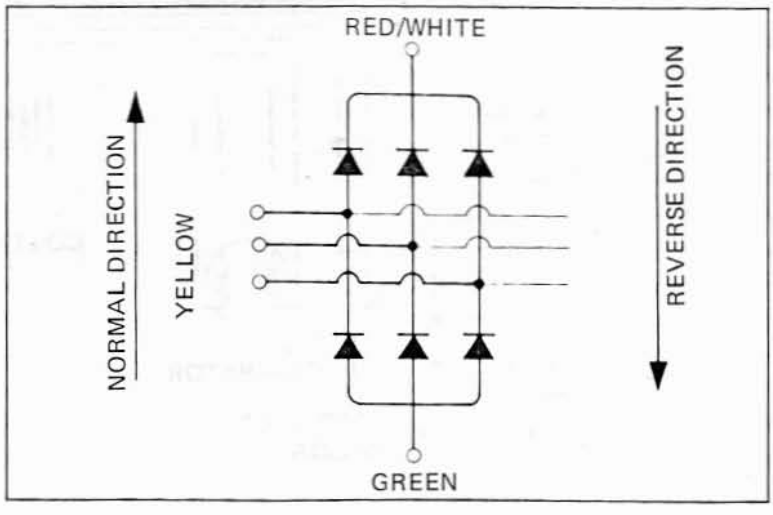
REGULATOR/RECTIFIER COUPLER

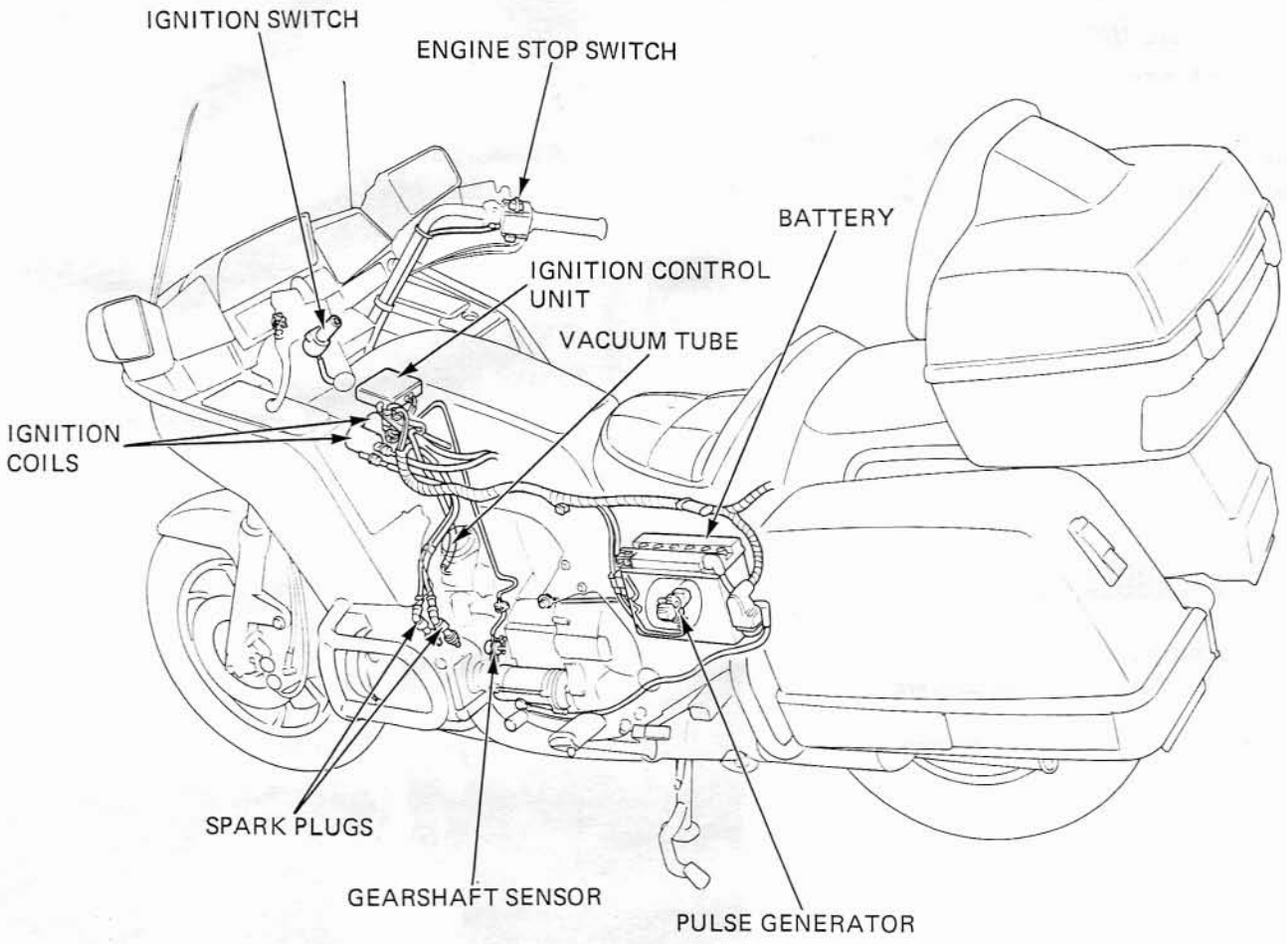
NORMAL DIRECTION: CONTINUITY (5-40 Ω)

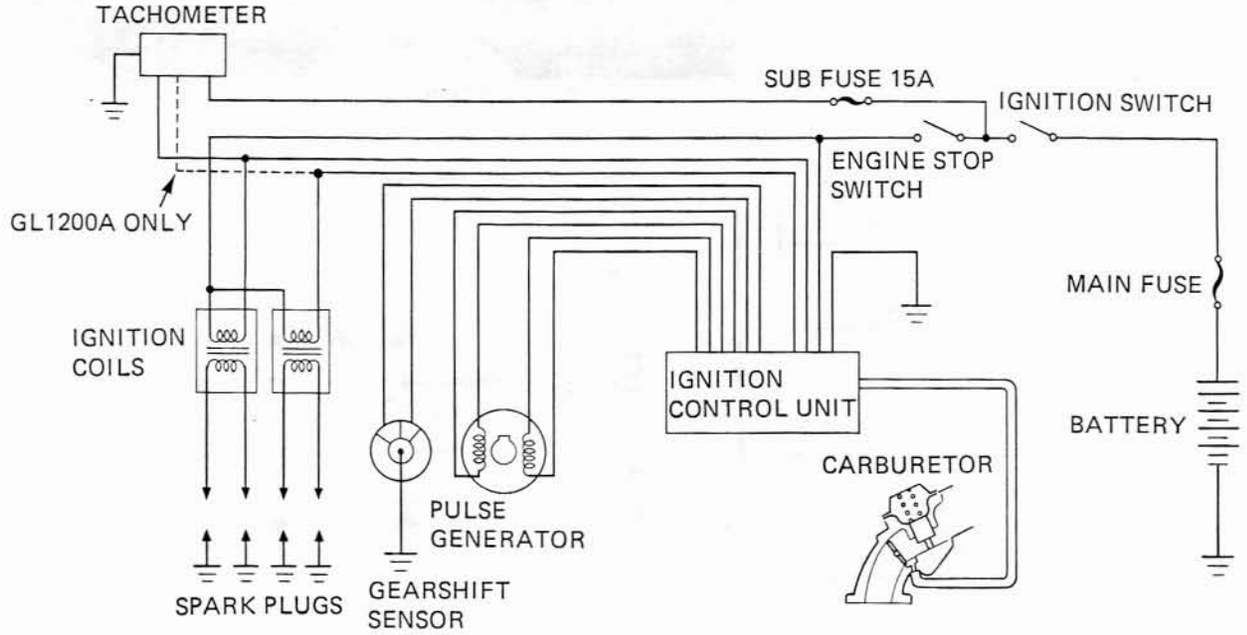
	⊕ probe	⊖ prove
I	YELLOW	GREEN
II	RED/WHITE	YELLOW

REVERSE DIRECTION: NO CONTINUITY
(Over 6,000 Ω)

	⊕ probe	⊖ probe
I	GREEN	YELLOW
II	YELLOW	RED/WHITE







17. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL

- All electrical components can be inspected on the motorcycle.
- Be sure the battery is fully charged before diagnosing the ignition system.
- Current is sent through the ignition coil primary circuit by the spark unit as the pulse generator rotor tooth approaches the generator tooth. When the rotor tooth just passes the generator tooth the primary circuit is broken causing the primary coil flux field to collapse and secondary coil voltage rapidly rises, firing the spark plugs.
- The GL1200 incorporations a new ignition system. The ignition control unit electronically varies ignition timing according to engine speed when the transmission is in 1st through 3rd gears. When the transmission is shifted into 4th or 5th (overdrive) gears, a gearshift sensor signals the ignition control unit to electronically very ignition timing according to carburetor vacuum.

SPECIFICATIONS

Recommended spark plugs:

	For cold climate (Blow 5°C, 41°F)	Standard	For extended high speed riding
NGK	DPR7EA-9	DPR8EA-9	DPR9EA-9
ND	X22EPR-U9	X24EPR-U9	X27EPR-U9

Spark plug gap:	0.8–0.9 mm (0.031–0.035 in)
Ignition timing F mark:	10° BTDC
Full advance:	32° BTDC (without vacuum advance) 45° BTDC (with vacuum advance)
Firing order:	1–3–2–4
Pulse generator air gap:	0.40–1.10 mm (0.016–0.043 in)
Ignition coil resistances	
Primary coil:	2.4–3.0 Ω
Secondary coil:	20.1–27.9 KΩ (with spark plug cap) 12.6–15.4 KΩ (without spark plug cap)
Pulse generator coil resistance:	1.1–1.3 KΩ (at 20°C, 68°F)
Vacuum advance	
Start vacuum:	36–44 mmHg (1.4–1.7 in Hg)
Cease vacuum:	63–77 mmHg (2.5–3.0 in Hg)
Electrical advance	
Start:	1,500–1,750 min^{-1} (rpm)
Cease:	2,800–3,200 min^{-1} (rpm)

TOOL

Special

Timing inspection plug	07999–3710001

TROUBLESHOOTING

Engine cranks but will not start
- Engine stop switch OFF
- No spark at plugs
- Faulty ignition control unit
- Faulty pulse generator

No spark at plug
- Engine stop switch OFF
- Poorly connected, broken or shorted wires
  - Between ignition switch and engine stop switch
  - Between spark unit and engine stop switch
  - Between spark unit and ignition coil
  - Between ignition coil and plug
  - Between spark unit and pulse generator
- Faulty ignition coil
- Faulty ignition switch
- Faulty ignition control unit
- Faulty pulse generator

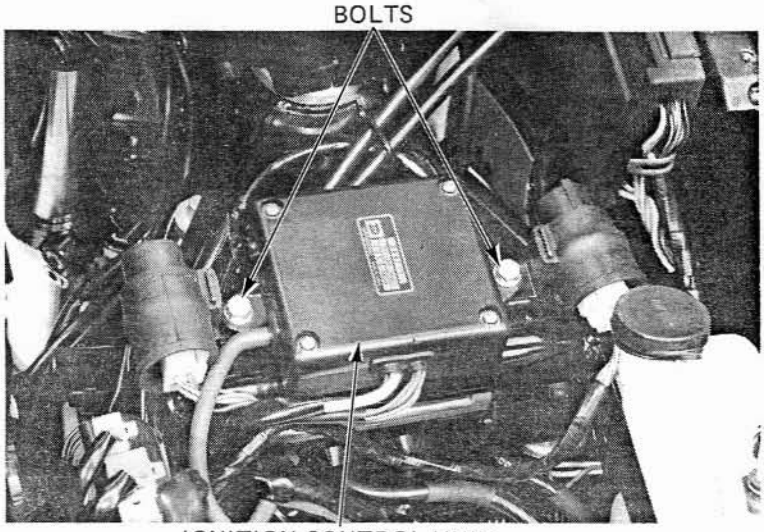
Engine starts but runs poorly
- Ignition primary circuit
  - Faulty ignition coil
  - Loose or bare wire
  - Intermittent short circuit
- Secondary circuit
  - Faulty plug
  - Faulty high tension cord

Timing advance incorrect
- Faulty ignition control unit
- Faulty pulse generator
- Faulty shift sensor

IGNITION COIL

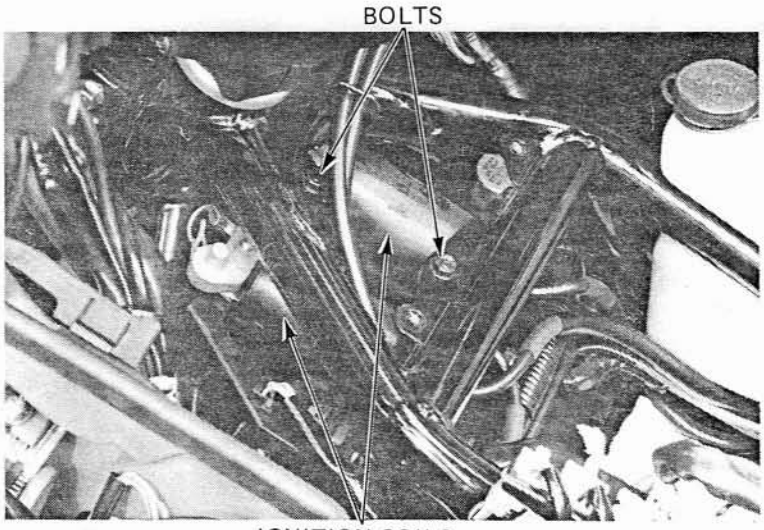
REMOVAL

Remove the top compartment.
Remove the air cleaner case and element holder from the air chamber.
Remove the ignition control unit and relay bracket by removing two bolt.



IGNITION CONTROL UNIT

Disconnect the primary wires from the ignition coils.
Disconnect the three coupler from the coupler holder and remove the turn signal relay from the ignition coil bracket.
Remove the ignition coils and cable guide by removing two bolts.
Remove the spark plug wires from the ignition coil.

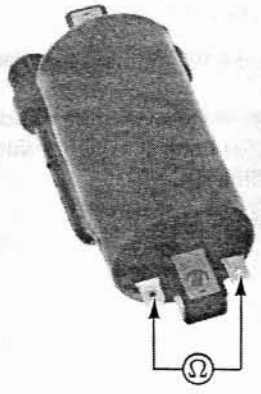


IGNITION COILS

PRIMARY COIL INSPECTION

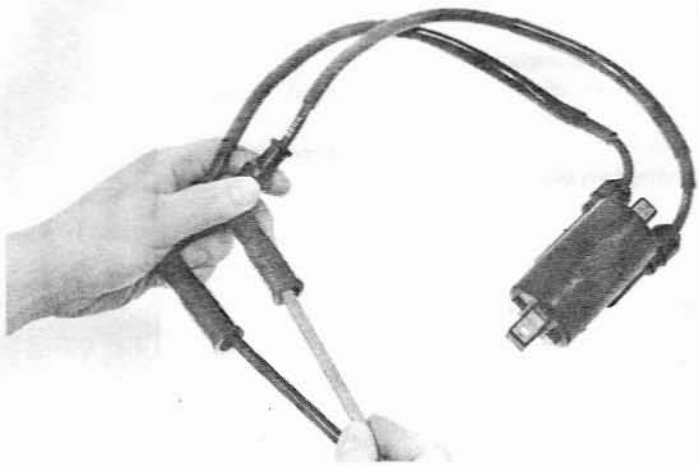
Check the resistance between the terminals with an ohmmeter as shown.

RESISTANCE: 2.4–3.0 Ω



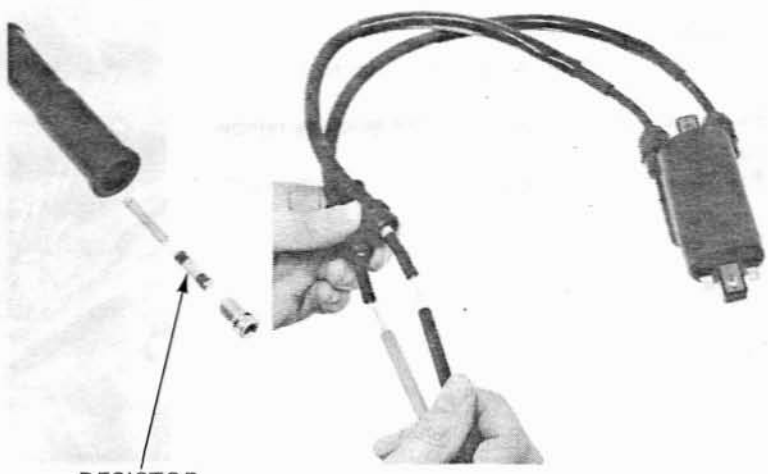
Measure the secondary coil resistance with the spark plug caps in place.

RESISTANCE: 20.1–27.9 KΩ



Remove the spark plug cap resistor retainers, resistors and spring from the caps.
Measure the secondary coil resistance.

RESISTANCE: 12.6–15.4 KΩ



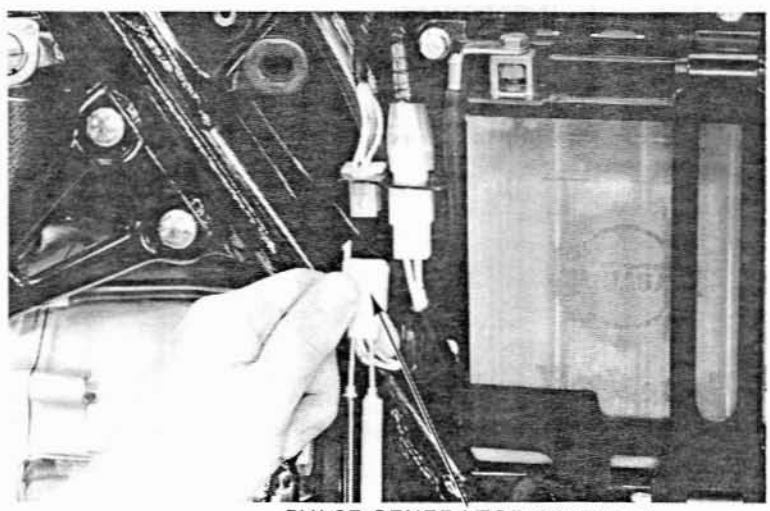
RESISTOR

TRANSISTORIZED IGNITION SYSTEM

PULSE GENERATOR INSPECTION

Remove the left side cover and disconnect the pulse generator coupler.
Measure the coil resistance between white/yellow and yellow lead (No. 1, 2 cylinders) or white/blue and blue lead (No. 3, 4 cylinders).

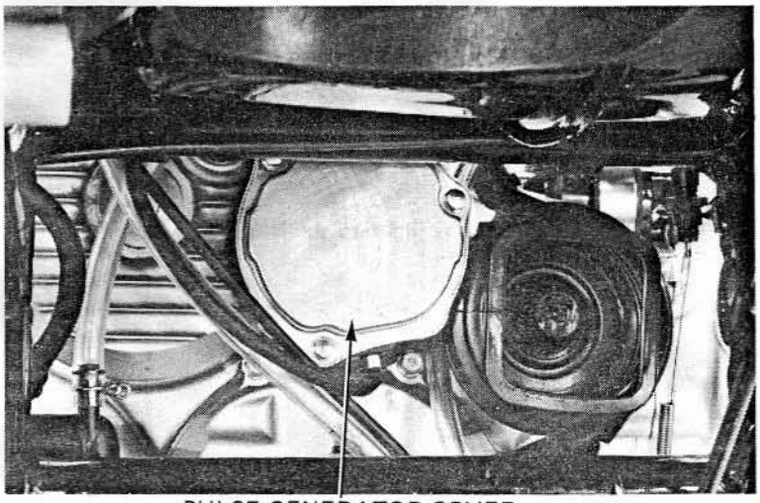
RESISTANCE: 1.1–1.3 KΩ at 20°C (68°F)



PULSE GENERATOR COUPLER

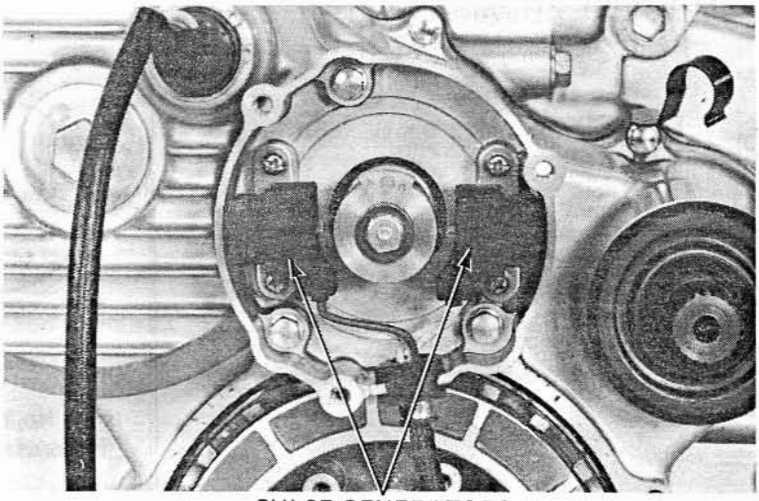
PULSE GENERATOR REPLACEMENT

Remove the swing arm (page 13-8).
Remove the pulse generator cover.


PULSE GENERATOR COVER

Remove the pulse generator mounting screws and pulse generators.

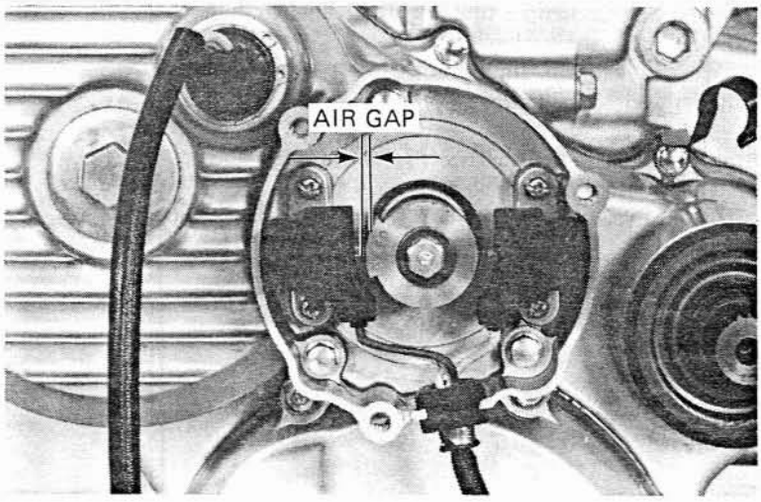
Install the new pulse generators.


PULSE GENERATORS

Inspect the air gap between the pulse generator rotor and pickup.

AIR GAP: 0.40–1.10 mm (0.016–0.043 in)

Install the pulse generator cover.
Install the swing arm (page 13-21).

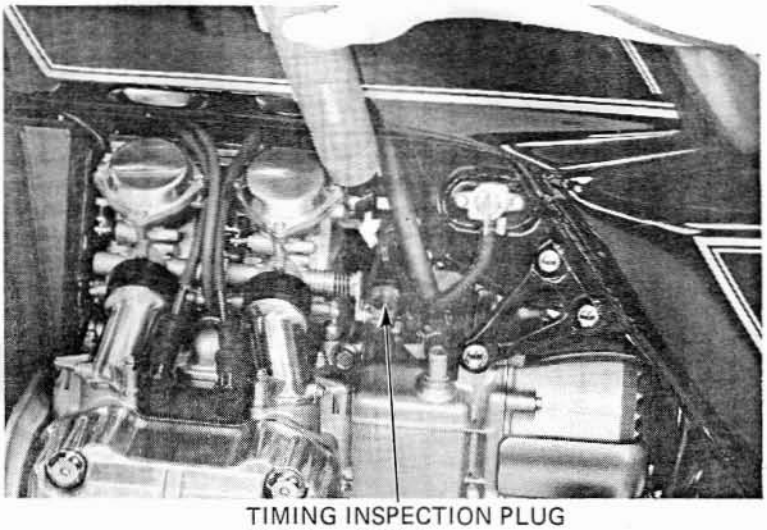


IGNITION TIMING INSPECTION

Start the engine and warm it up to operating temperature.

Remove the timing hole cap and attach a timing inspection plug.

Connect a stroboscopic timing light to the No. 1 or No. 2 cylinder spark plug wires.



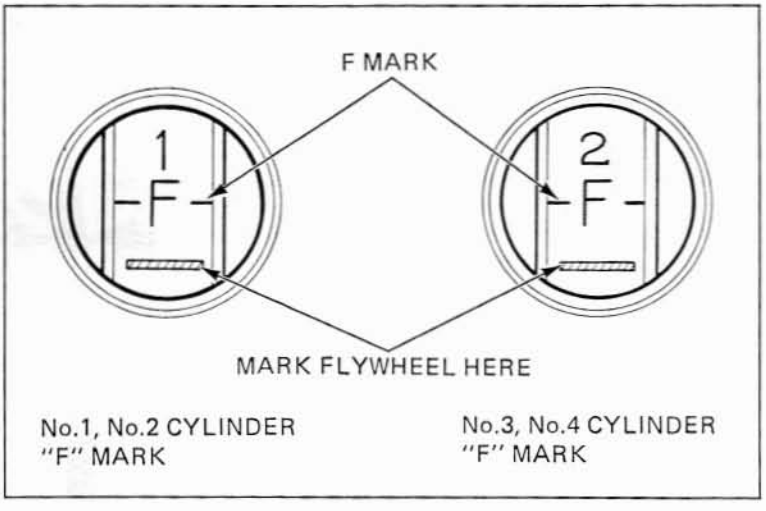
TIMING INSPECTION PLUG
07999–3710001

ELECTRICAL ADVANCE SYSTEM

Make the flywheel below the "F1" and "F2" marks as shown.

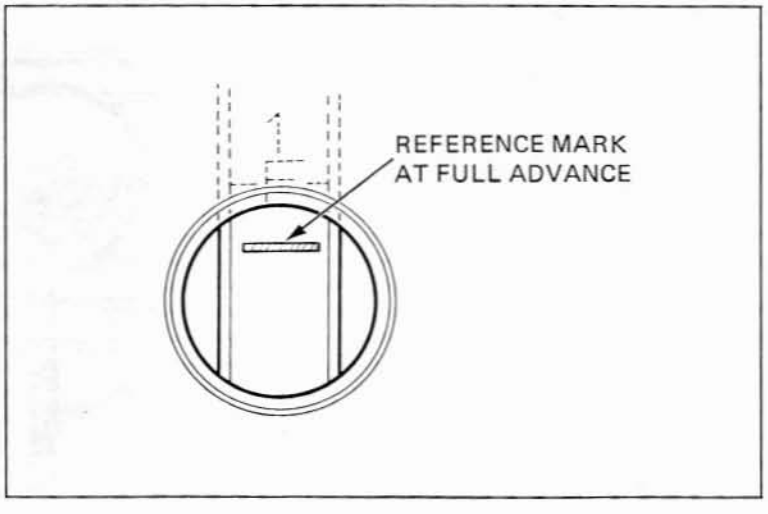
Start the engine and check the electrical advance system by reference mark.

At 950 ± 100 min^{-1} (rpm):
The F mark should be aligned with the index mark.
At 1,500–1,750 min^{-1} (rpm):
Ignition timing should start to advance.
At 2,800–3,200 min^{-1} (rpm):
Ignition timing should cease to advance.



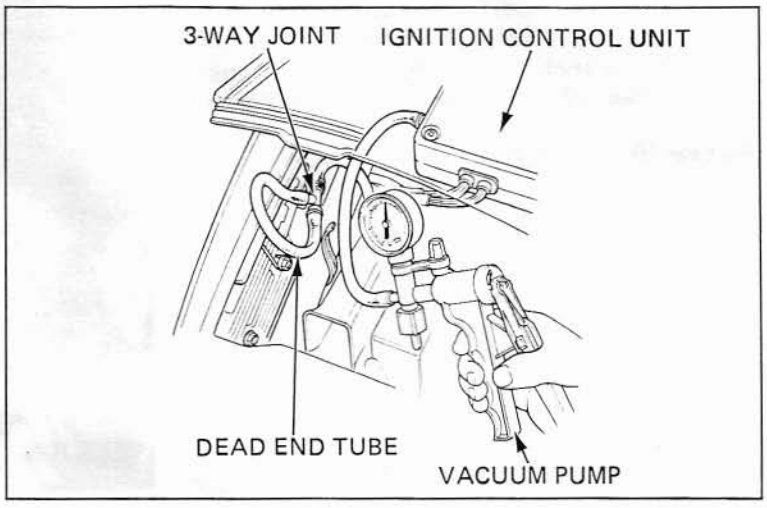
Connect a stroboscopic timing light to the No. 3 or No. 4 cylinder spark plug wires.
Check the ignition timing for No. 3 and No. 4 cylinder as described above.

Stop the engine and check the vacuum advance system as described on next page.

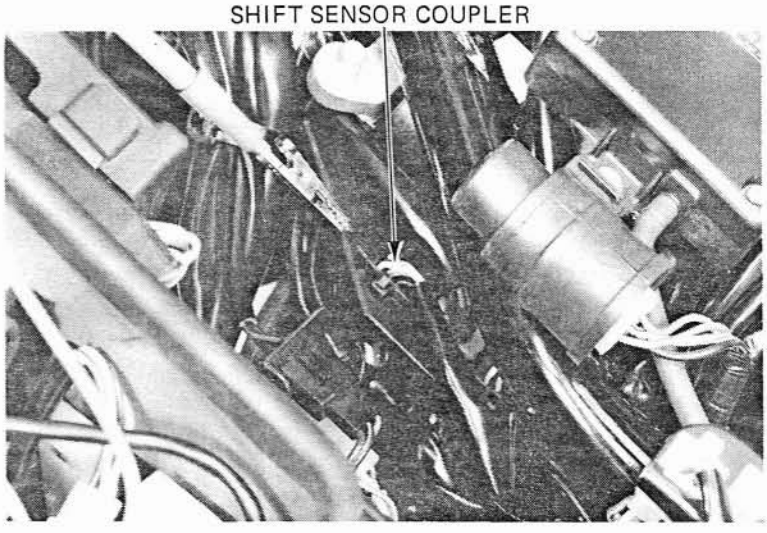


VACUUM ADVANCE SYSTEM

Open the top compartment.
Disconnect the vacuum tube that goes to the ignition control unit from the 3-way joint.
Connect the vacuum pump to this tube.
Remove the plug from the dead end tube and connect the dead end tube to the 3-way joint as shown.



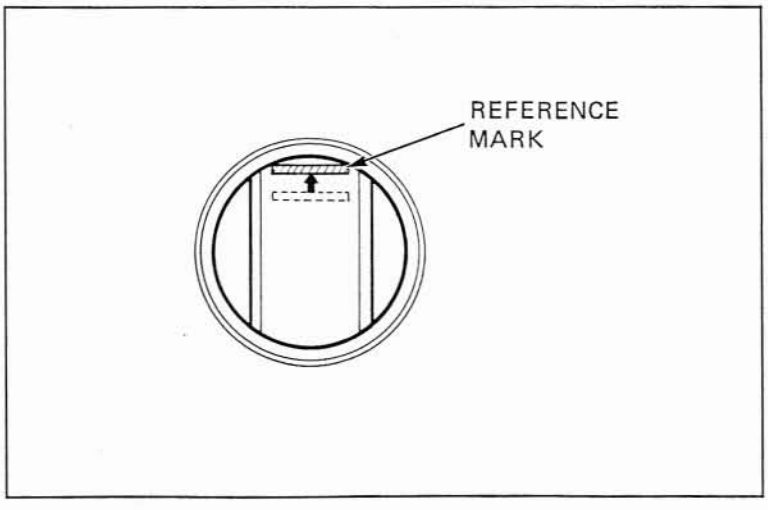
Ground the RED/WHITE or GREEN/ORANGE terminal of shift sensor coupler to the ground.



Start the engine and let it run at 2,800–3,200 min^{-1} (rpm).
Apply vacuum to the vacuum tube and check the reference mark movement.

The advance starts at 36–44 mm (1.4–1.7 in) Hg applied.
The advance ceases at 63–77 mm (2.5–3.0 in) Hg applied.

If ignition timing is not correct, check all individual ignition system components except the ignition control unit. If the individual components are good, replace the ignition control unit.

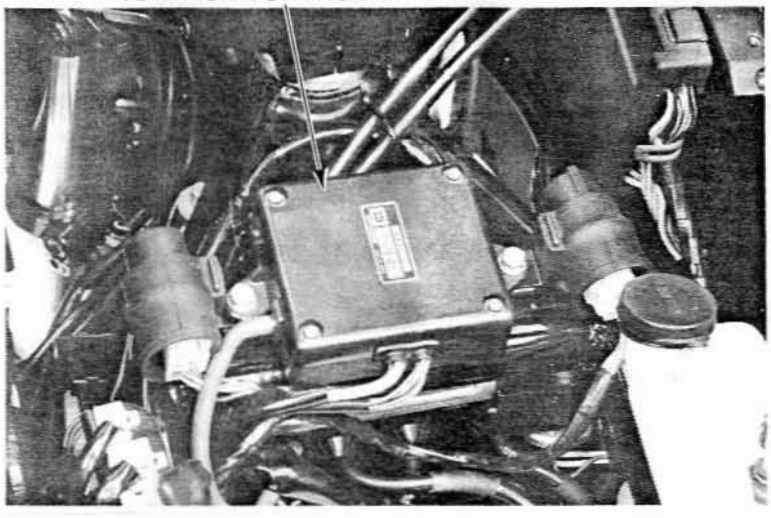


IGNITION CONTROL UNIT

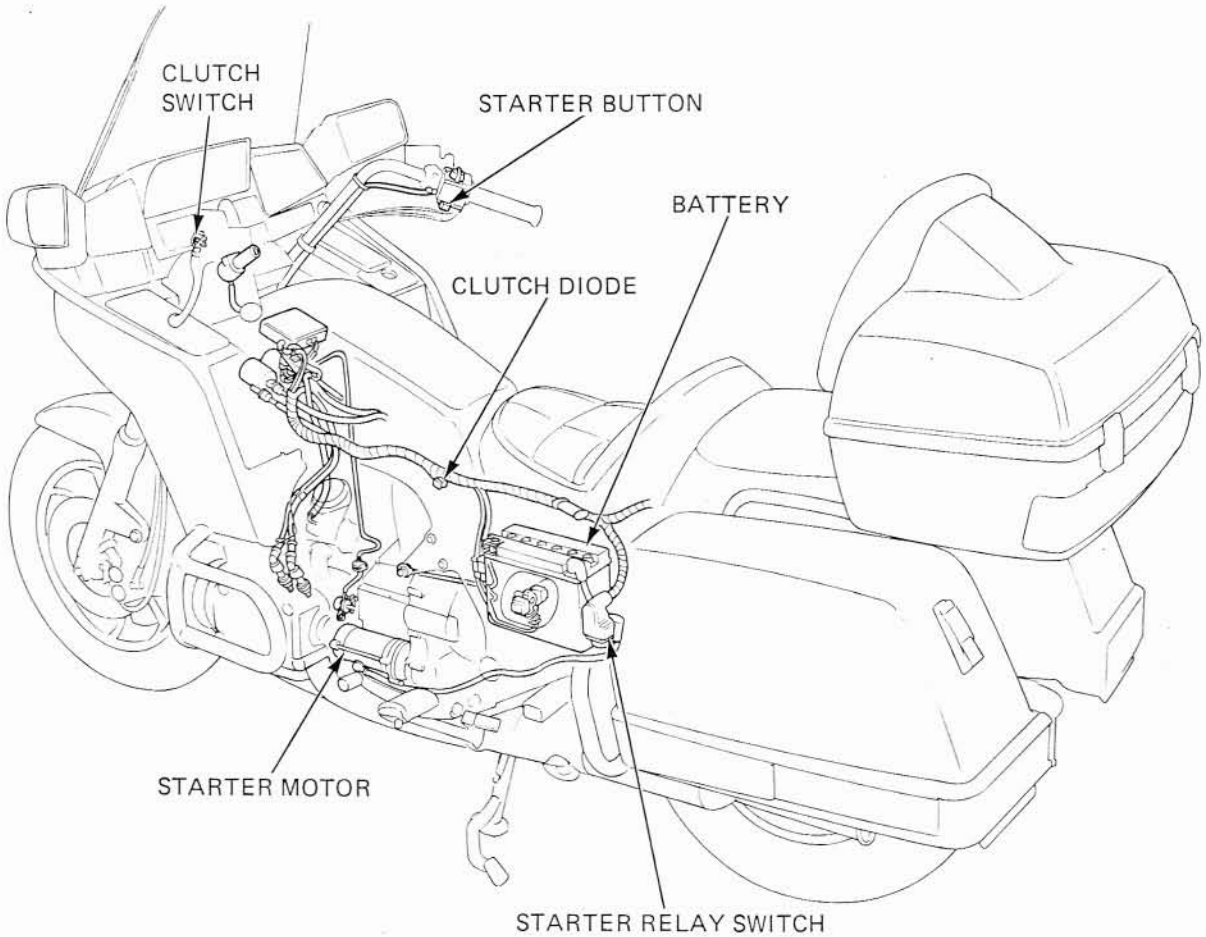
If the pulse generators, ignition coils, shift sensor and wiring are good, and the ignition timing is not within specification, replace the ignition control unit with new one and recheck the ignition timing.

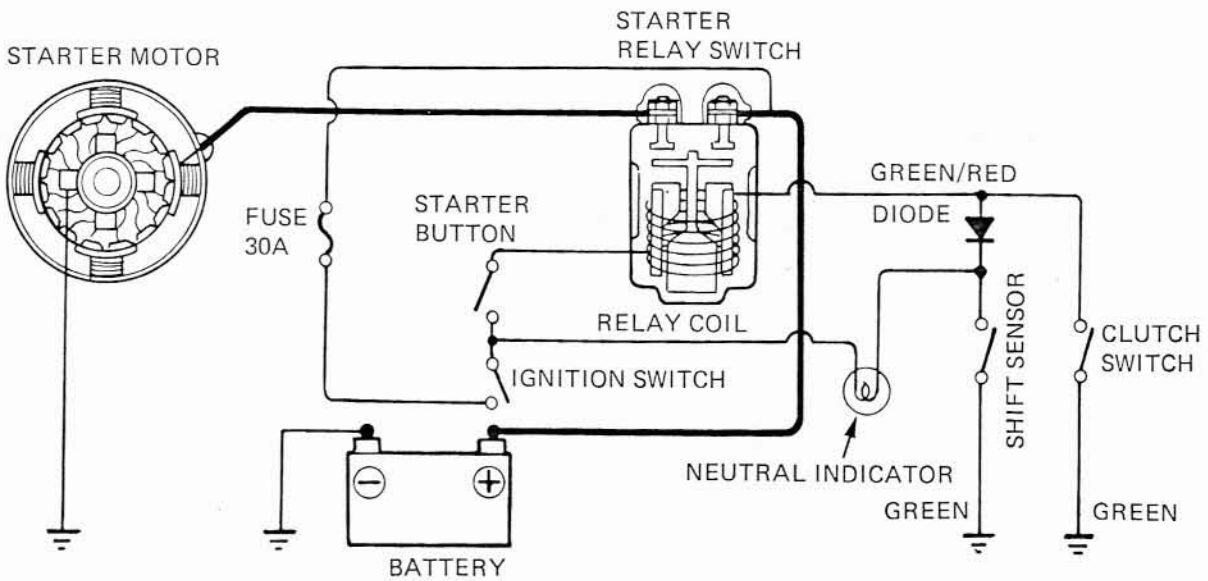
See page 19-11 for shift sensor inspection.

IGNITION CONTROL UNIT



MEMO





18. STARTER SYSTEM

SERVICE INFORMATION

GENERAL

- To service the starter motor and starter clutch, the engine must be removed from the frame.
- For starter clutch inspection, see Section 9.
- Starter motor engagement is controlled by an electromagnetic relay which is energized by pushing the starter switch. This closes a contact to provide battery voltage to the starter. A starter or "overrunning" clutch is used to prevent damage to the starter armature due to "overspeed" when the engine starts. The starter remains engaged until the starter button is released.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Starter motor	Brush spring tension	560–680 g (19.8–24.0 oz)	440 g (15.5 oz)
	Brush length	12–13 mm (0.47–0.51 in)	7.5 mm (0.30 in)

TROUBLESHOOTING

Starter motor will not turn
- Dead battery
- Faulty ignition switch
- Faulty starter switch
- Faulty neutral switch
- Faulty starter relay switch
- Loose or disconnected wire or cable
- Clutch switch diode open
- Faulty clutch switch

Starter motor turns engine slowly
- Low battery
- Excessive resistance in circuit
- Binding in starter motor

Starter motor turns, but engine does not turn
- Faulty starter clutch
- Faulty starter motor reduction gears
- Faulty starter motor sprockets or chain

Starter motor and engine turn, but engine does not start
- Faulty ignition system
- Engine problems, see engine related sections
- Faulty engine stop switch

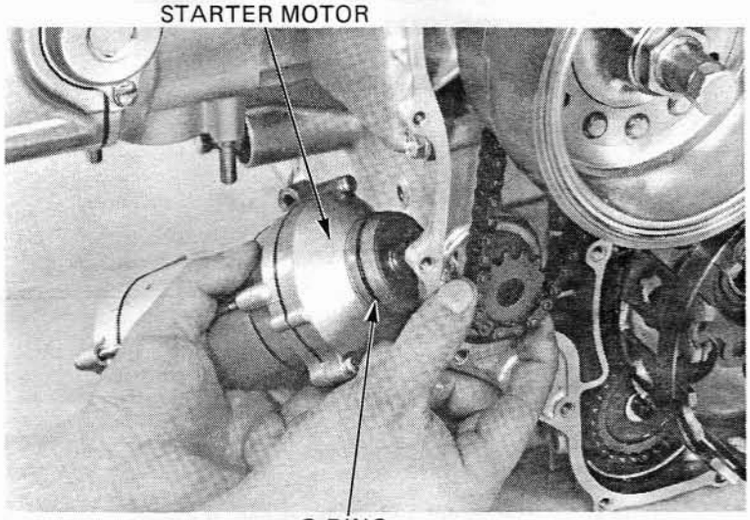
STARTER MOTOR

REMOVAL

WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Remove the rear engine cover (Section 8).
Remove the two starter mounting bolts and pull the motor out of the engine case.
Inspect the O-rings for damage or deterioration.

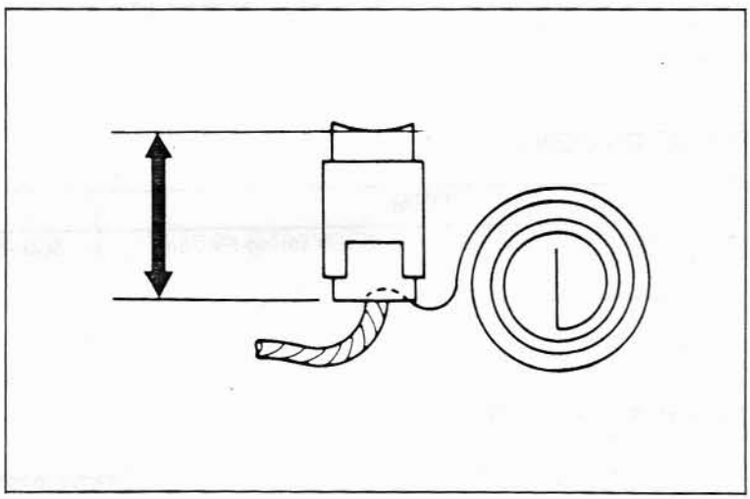


BRUSH INSPECTION

Remove the starter motor case screws. Inspect the brushes and measure brush length. Measure brush spring tension with a spring scale.

SERVICE LIMITS:

Brush length:	**7.5 mm (0.30 in)**
Brush spring tension:	**440 g (15.5 oz)**

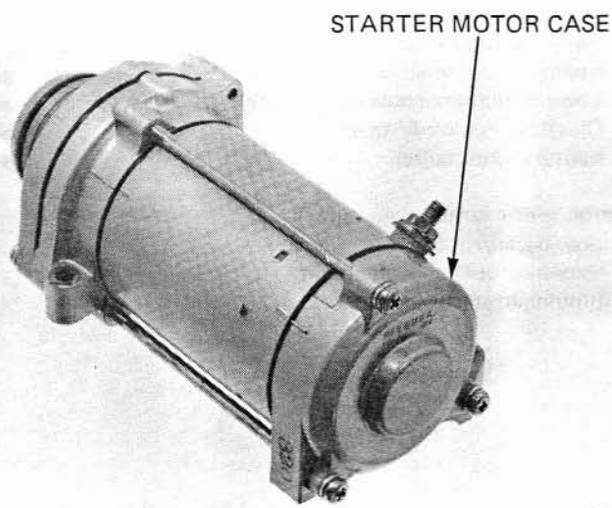


COMMUTATOR INSPECTION

Remove the starter motor case.

NOTE:

Record the location and number of the thrust washers.



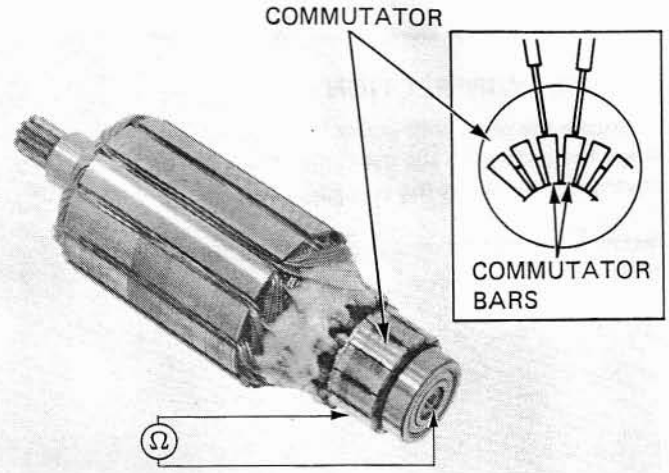
Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils.

NOTE:

> Do not use emery or sand paper on the commutator.

Check for continuity between pairs of commutator bars, and also between commutator bars and armature shaft.

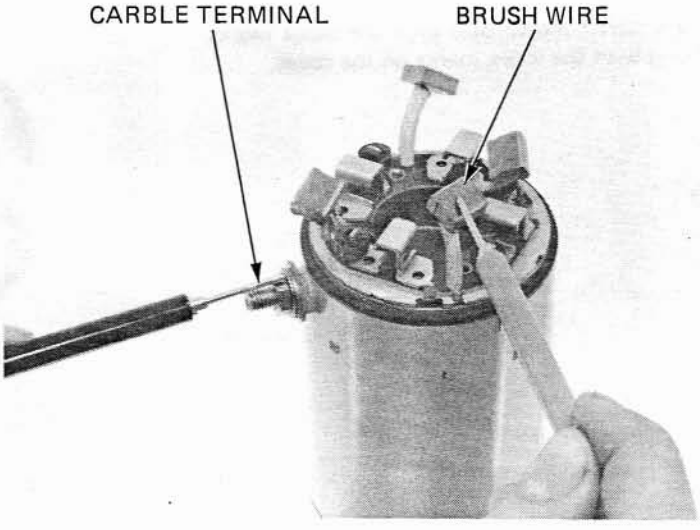
Replace the starter motor if armature coils are open, or shorted to the armature shaft.



FIELD COIL INSPECTION

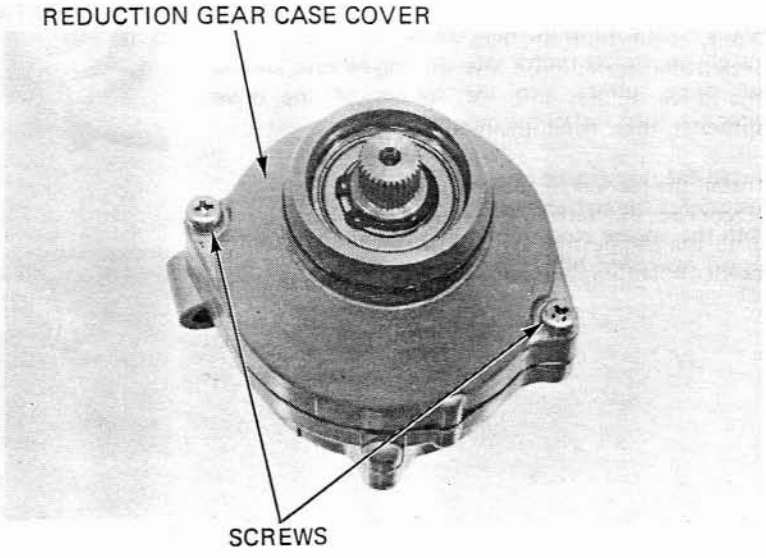
Check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wire.

Replace the starter motor if the field coil is not continuous or if it is shorted to the motor case.



STARTER MOTOR REDUCTION GEAR INSPECTION

Remove the reduction gear case cover.

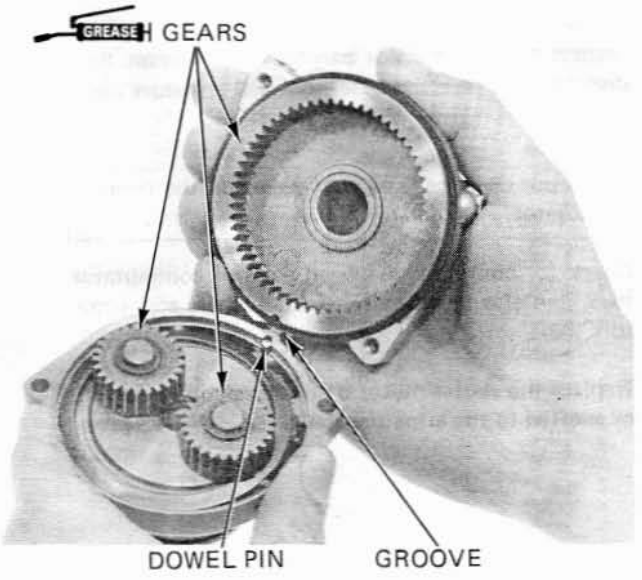


Inspect the gears for worn or damage.

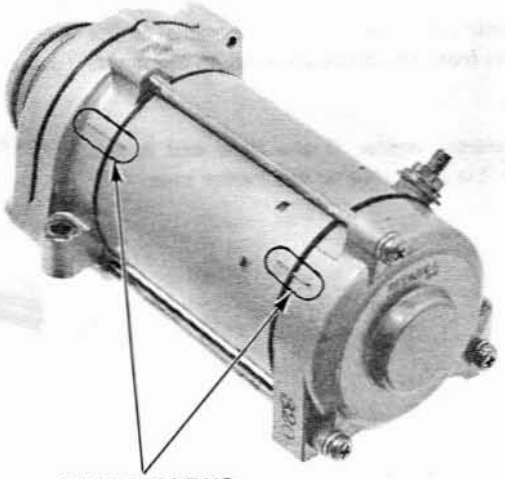
ASSEMBLY/INSPECTION

Lubricate the gears with grease.
Align the groove on the gear with dowel pin on the cover when installing the gear case cover.

Install the armature in the case, being careful not to damage the brushes.

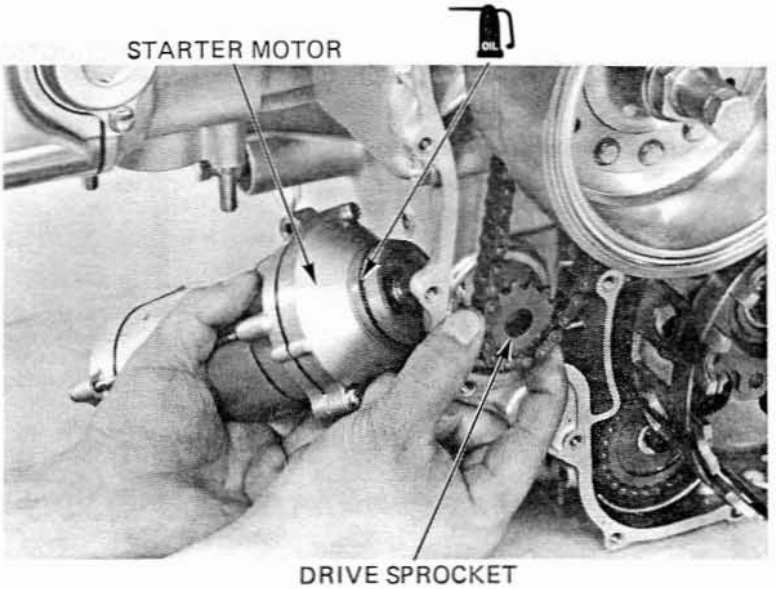


Install the starter motor case align the index marks on the case with the index marks on the cover.



Apply engine oil to the new O-ring.
Install the starter motor into the engine case, sliding the drive splines into the splines of the drive sprocket, then install the mounting bolts.

Install the rear engine cover.
Reconnect the battery cables at both ends.
With the engine stop switch off, test the starter for proper operation before engine installation.



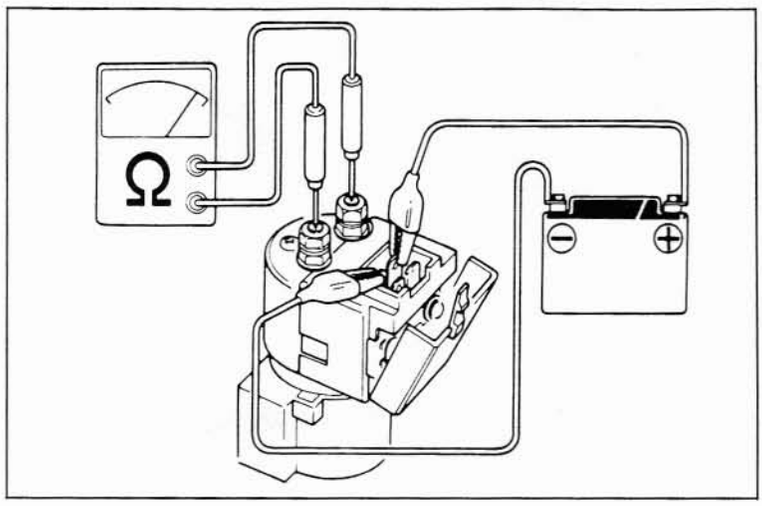
STARTER RELAY SWITCH

INSPECTION

To test if the switch primary coil is normal, depress the switch button. The coil is normal the switch clicks into position.

Remove the starter relay switch.

Connect an ohmmeter and 12V battery to the starter relay switch as shown. The switch is normal if there is continuity.



CLUTCH SWITCH DIODE

INSPECTION

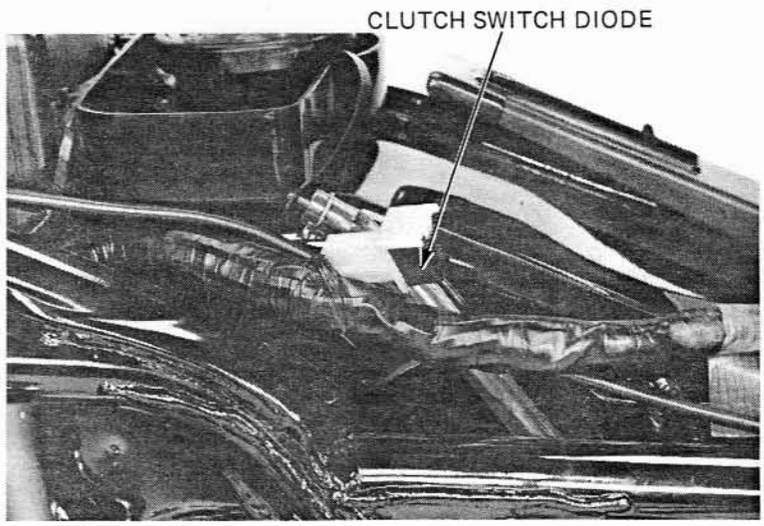
Remove the clutch switch diode from the wire harness. Check for continuity with an ohmmeter.

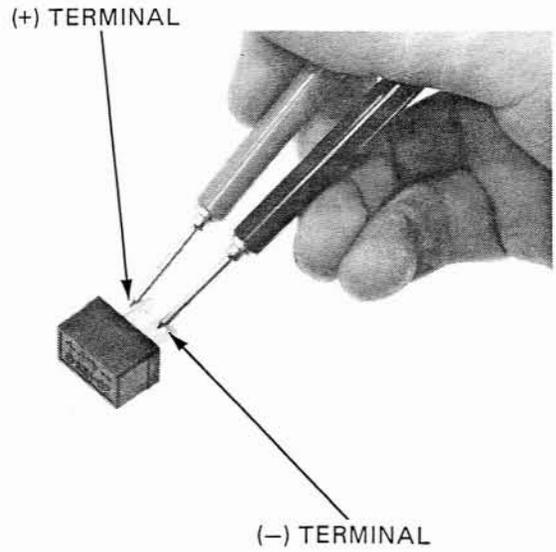
NOTE:

> The test chart is for a positive ground ohmmeter. The test results will be reversed if a negative ground ohmmeter is used.

NORMAL DIRECTION: CONTINUITY
⊕ probe: (+) terminal
⊖ probe: (–) terminal

REVERSE DIRECTION: NO CONTINUITY
⊕ probe: (–) terminal
⊖ probe: (+) terminal





MEMO

19. LIGHTS/SWITCHES/INSTRUMENTS

SERVICE INFORMATION

GENERAL

- Some wires have different colored bands around them near the connector. These are connected to other wires which correspond with the band color.
- All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- The following color codes are indicated throughout this section and on the wiring diagram.

Bu = Blue	G = Green	Lg = Light Green	R = Red
Bl = Black	Gr = Grey	O = Orange	W = White
Br = Brown	Lb = Light Blue	P = Pink	Y = Yellow

- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle. Simply disconnect the wires and connect a continuity tester or volt-ohmmeter to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance of a circuit, as when there is a specific coil resistance involved, or when checking for high resistance by corroded connections.

TOOLS

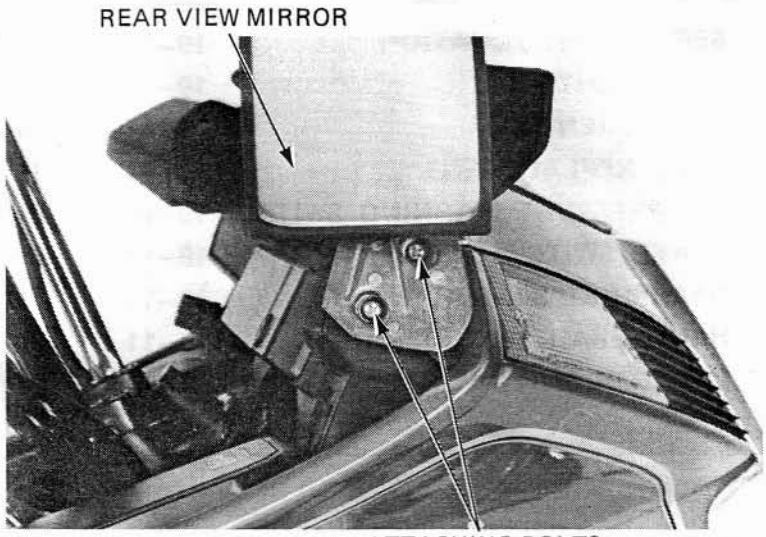
Special

Fuel unit wrench	07920–SB20000

HEADLIGHT

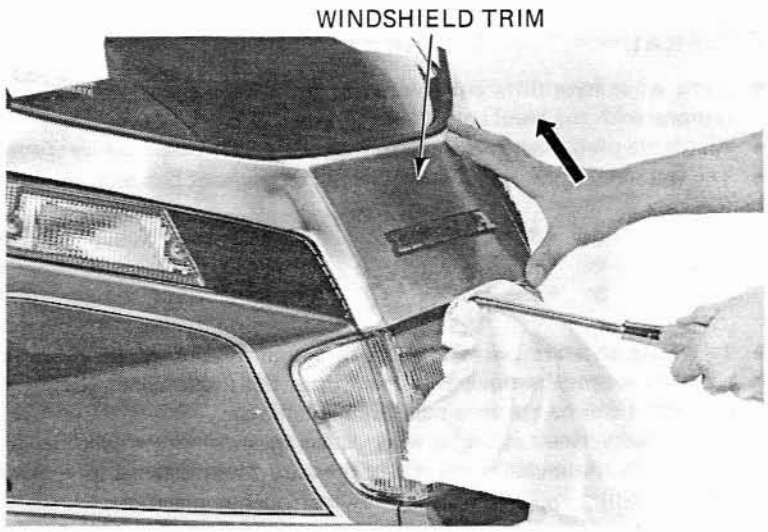
REMOVAL

U type:
Rotate the right and left rear view mirrors on mirror mounts about 90° as shown.
Remove the rear view mirrors by removing the attaching bolts.



Except U type:
Remove the right and left blind covers from the fairing.
Remove the windshield trim mount bolts.

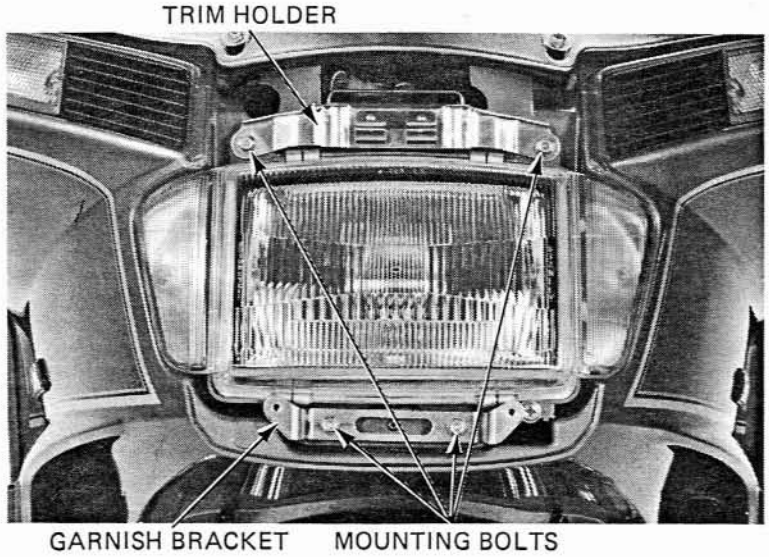
Remove the windshield trim by lifting it with screwdriver.



NOTE:

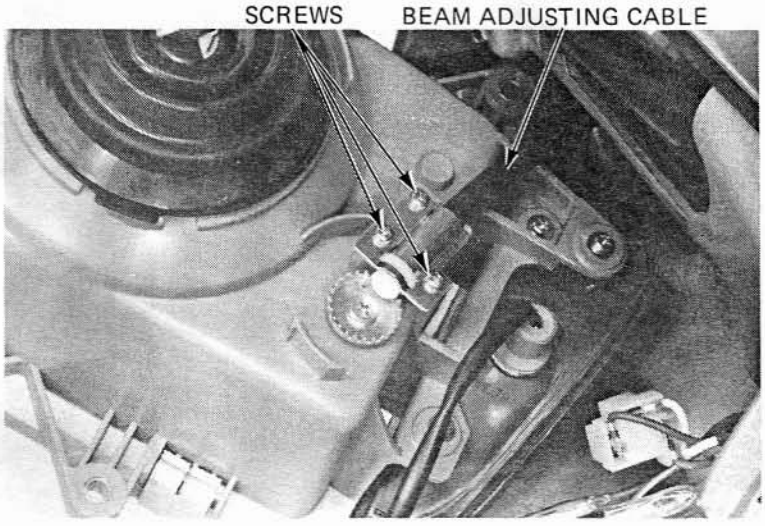
> Protect the headlight with shop towel to prevent damaging the headlight lens.

Remove the headlight garnish.
Remove the headlight mounting bolts.
Remove the headlight garnish bracket and trim holder.



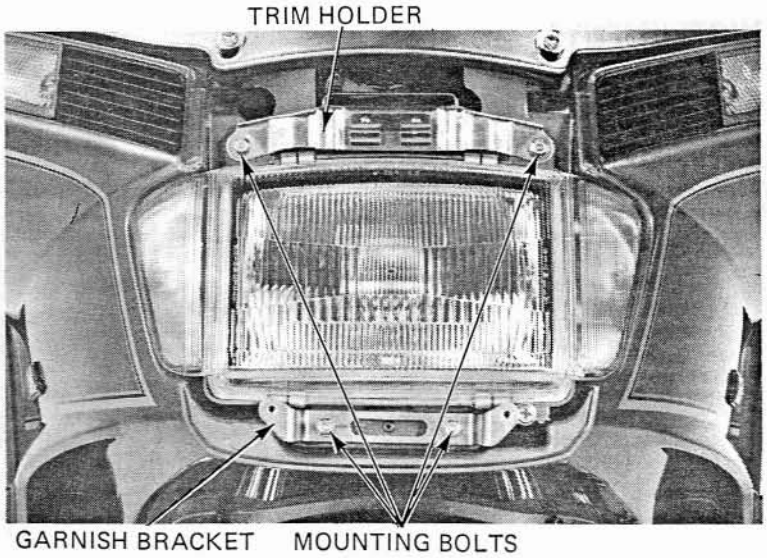
Remove the three screws and disconnect the beam adjusting cable from the headlight.

Disconnect the headlight coupler and position light wires and remove the headlight.

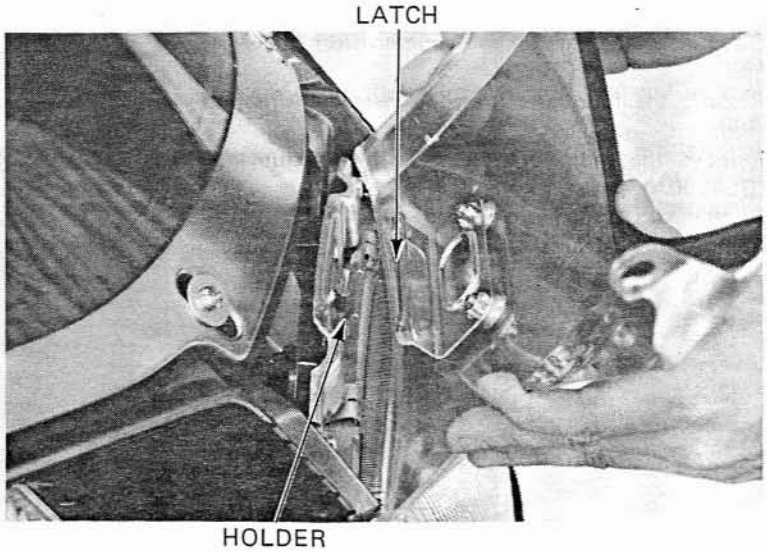


INSTALLATION

Connect the headlight coupler, position light wire and beam adjusting cable to the headlight.
Install the headlight, trim holder bracket and garnish bracket.
Install the headlight garnish.



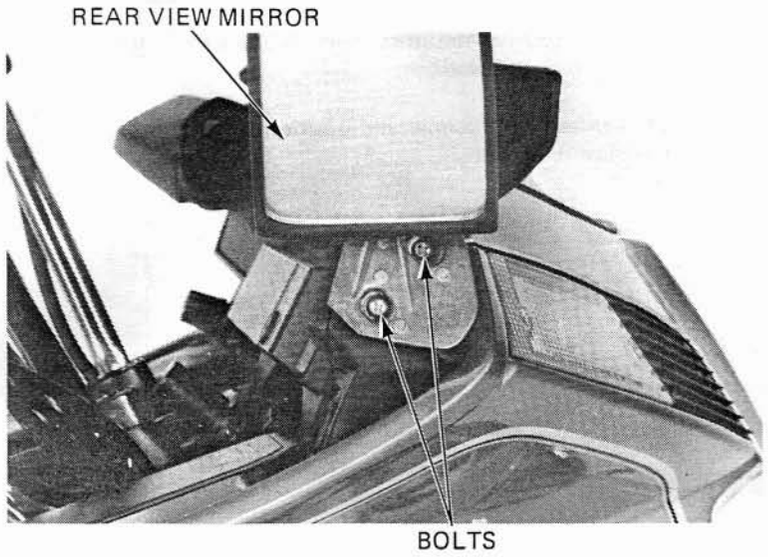
Latch the windshiled trim into position by pushing it down on top.



U type:
Install the right and left rear view mirrors.
Install the boots onto mirrors.
Adjust the headlight beam if necessary.

Except U type:
Install the windshield trim mount bolts and tighten it securely.
Install the right and left blind covers.

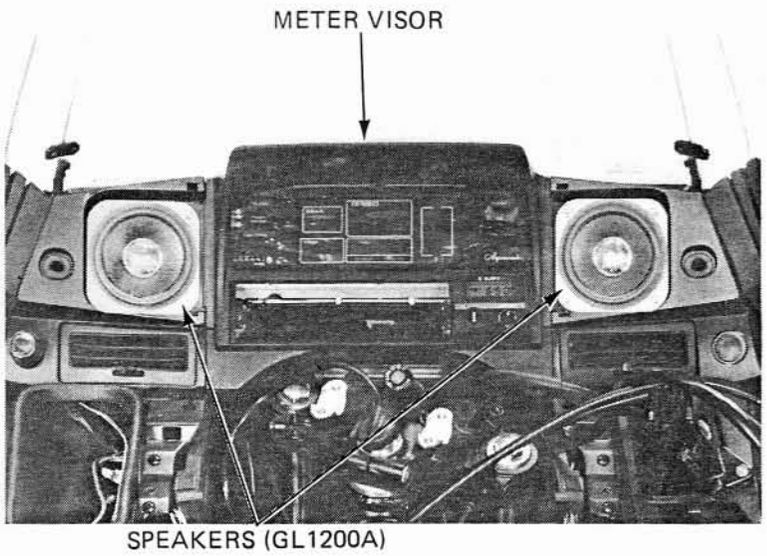
Adjust the headlight beam if necessary.



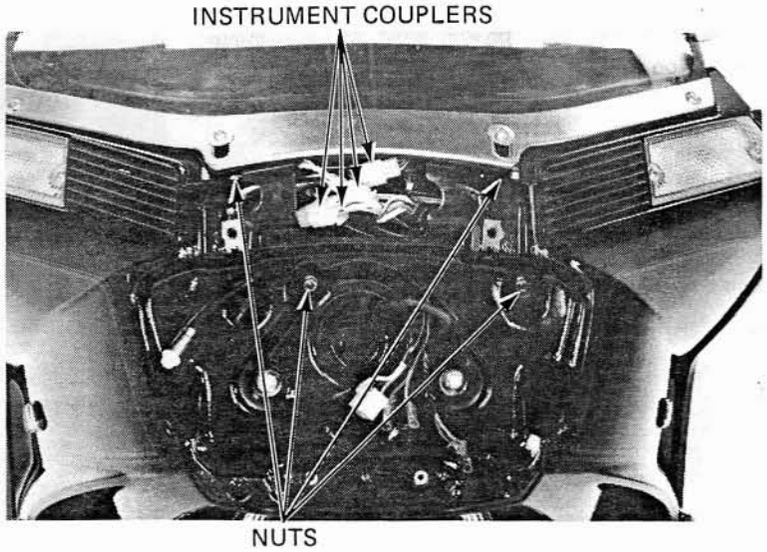
INSTRUMENTS

REMOVAL

Remove the headlight from the faring.
Remove the spark covers, speakers (GL1200A) and meter visor.

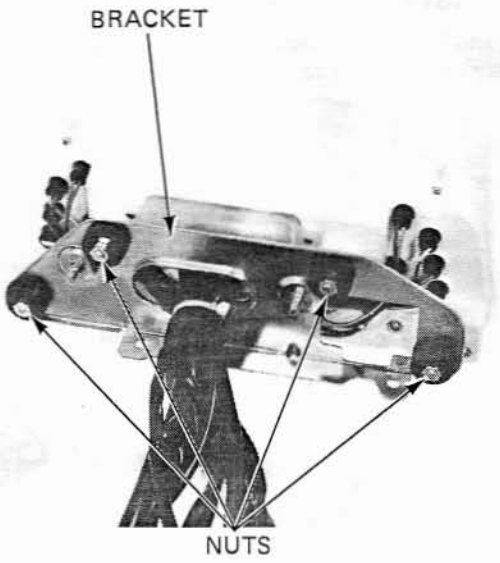


Disconnect the instrument coupler from the wire harness.
Remove the four nuts from the instrument mount studs.
Remove the radio bracket from the instrument (GL1200A).
Disconnect the speedometer cable (GL1200D).
Remove the instruments from the faring.

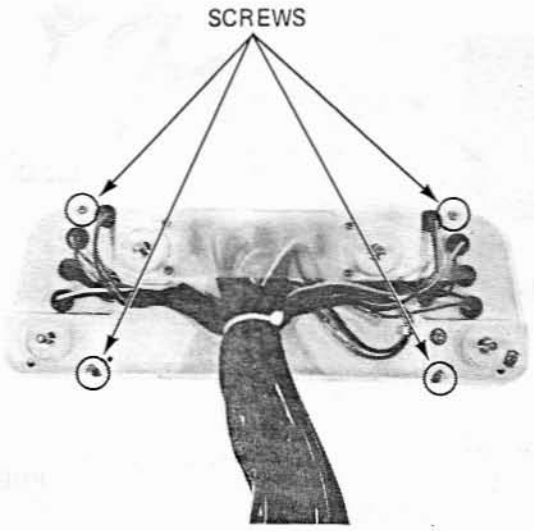


DISASSEMBLY

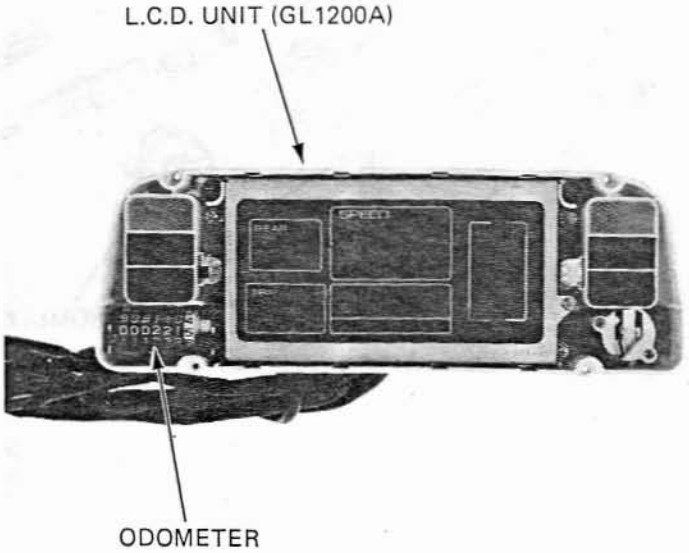
Remove the instrument mounting bracket from the instrument case.



Remove the tripmeter knob (GL1200D).
Remove the instrument glass and instrument panel by removing four screws.



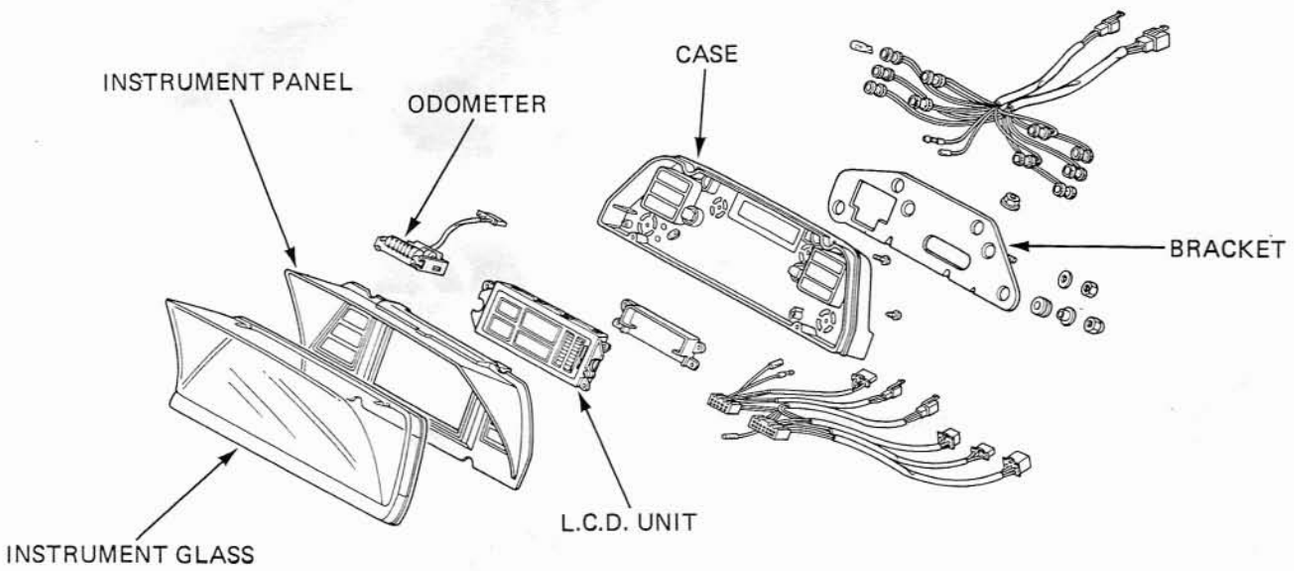
Remove the meters from the instrument case.



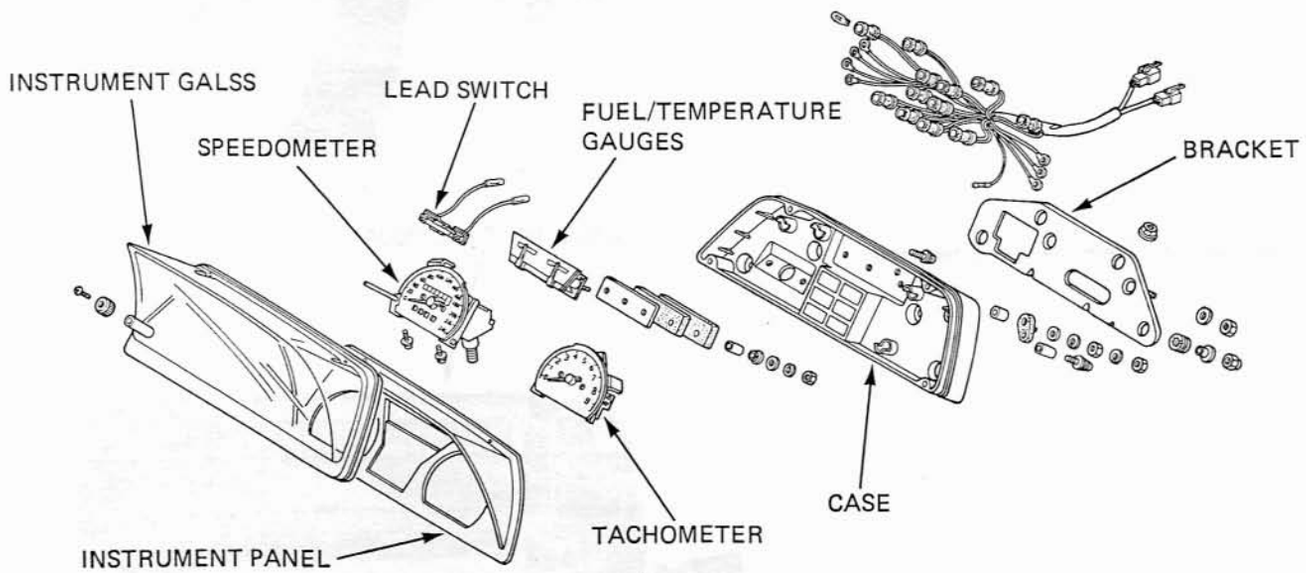
ASSEMBLY/INSTALLATION

The assembly and installation sequences are reverse order of disassembly and removal.

(GL1200A)



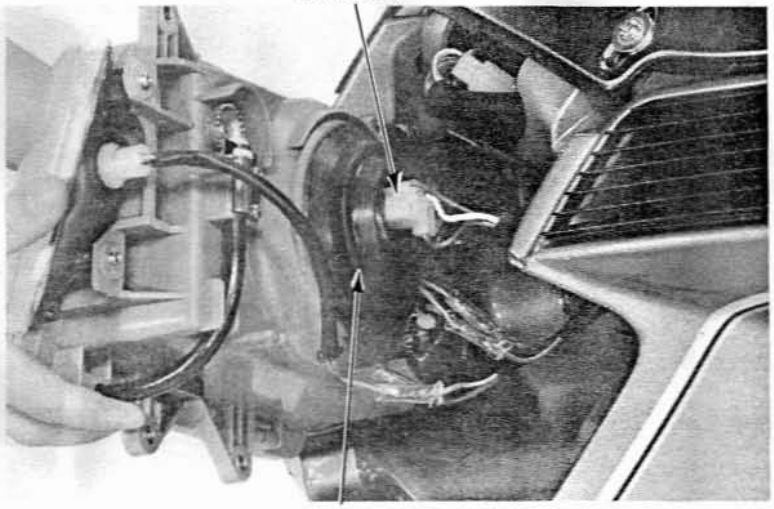
(GL1200D)



BULB REPLACEMENT

HEADLIGHT

Remove the headlight (Page 19-2).
Remove the headlight coupler and bulb cover.

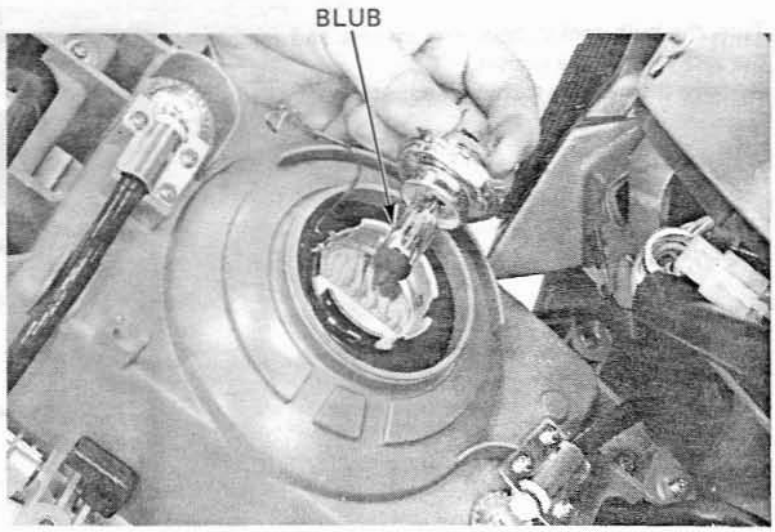


Remove the headlight bulb.
Install a new headlight bulb.

CAUTION:

Do not put finger prints on the headlight bulb, they may create hot spots on the bulb. If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.

Install the headlight in the reverse order of removal (Page 19-3).



FRONT TURN SIGNALS

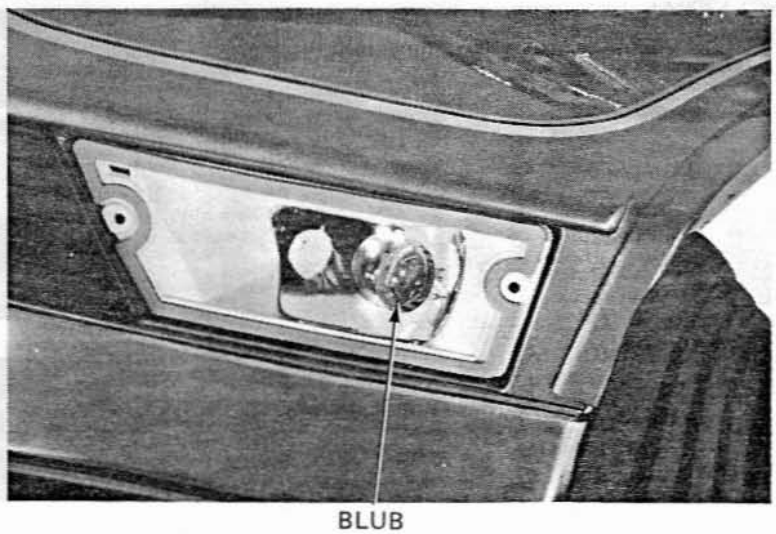
Remove the turn signal lens by removing screws.

Remove the bulbs from the base plates.

The installation sequence is the reverse order of removal.

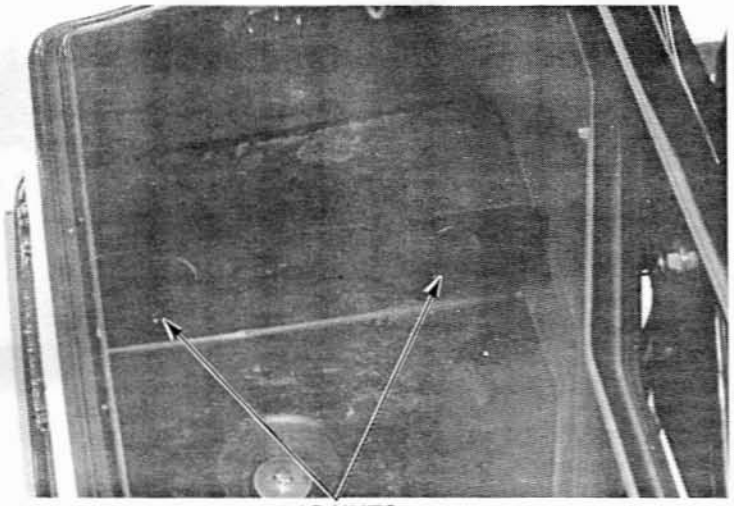
CAUTION:

Be careful not to overtighten the lens mounting screws to prevent cracking the lens.



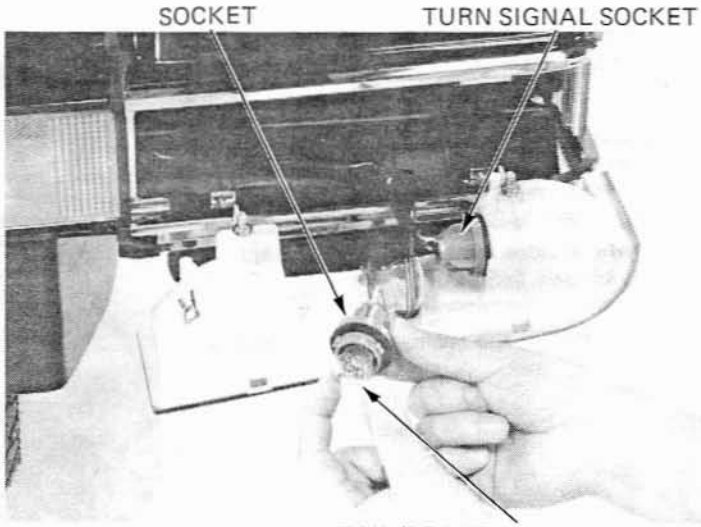
REAR TURN SIGNAL/BRAKE LIGHT

Remove the saddlebag lid.
Remove the two cap nuts.



CAP NUTS

Turn the bulb socket counterclockwise and remove the socket from the housing.
Remove the bulb by turning it counterclockwise.

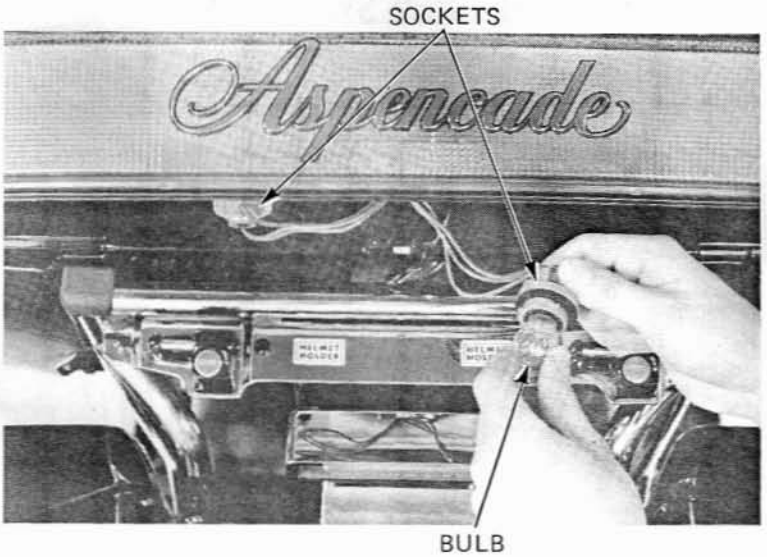


TAIL/BRAKE LIGHT BULB
(U TYPE ONLY)

(GL1200A)
Remove the under cover by removing three screws.

SCREWS

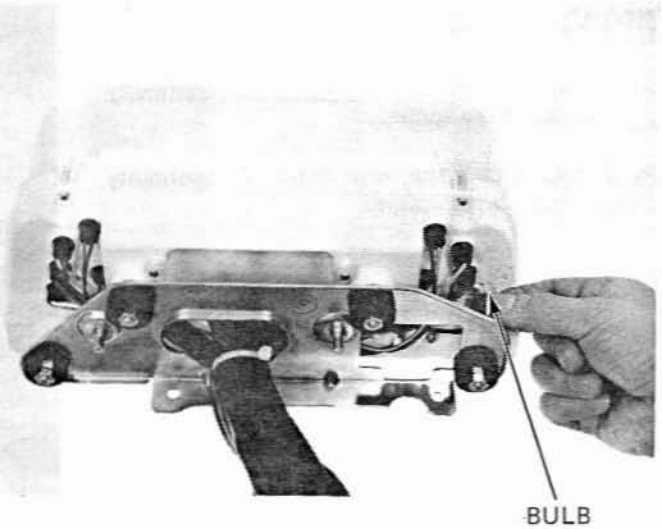
Remove the bulb socket by turning the socket counterclockwise.
Remove the bulb by turning it counterclockwise.



METER/INDICATOR BULB

Remove the instruments (Page 19-4).

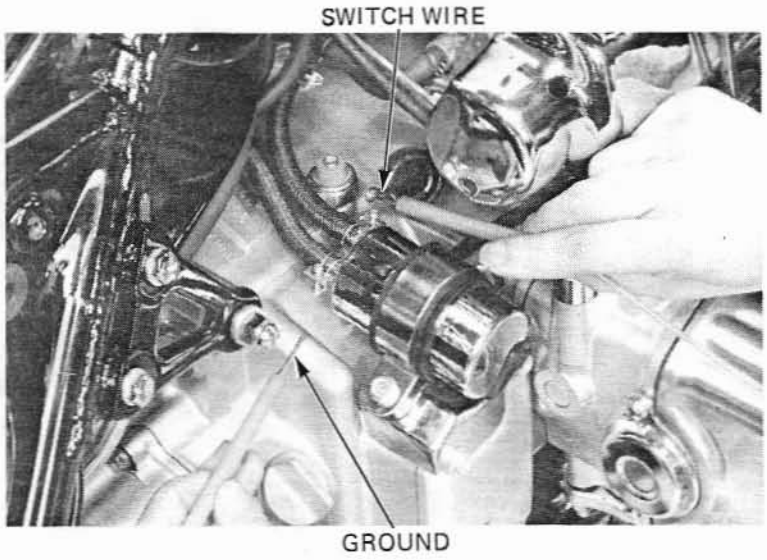
Remove the socket from the meter case.
Remove the bulb from the socket by pulling the bulb.



OIL PRESSUR WARNING SWITCH

Disconnect the wires from the oil pressure switch. Turn the ignition switch on, and ground the wire terminal to the body ground.
The warning indicator comes on if system is normal. Inspect the indicator bulb or connector for faulty or loose.

Measure the oil pressure if warning indicator system is normaly.
Replace the oil pressure switch if warning indicator system and oil pressure are normaly.



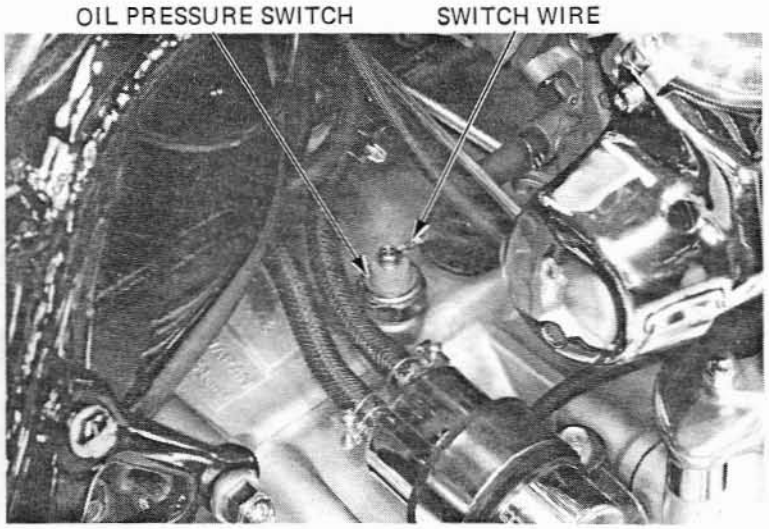
Apply a liquid sealant to the switch threads.
Install and tighten the switch.

TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

CAUTION:

> *Be careful not to overtighten the switch to prevent damaging the threads of the engine cover.*

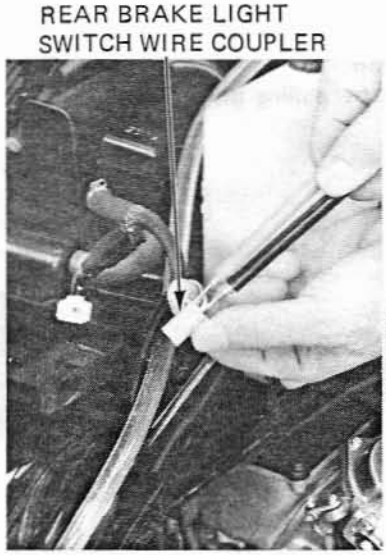
Connect the switch wire to the switch.
Install the rubber cover onto the switch.

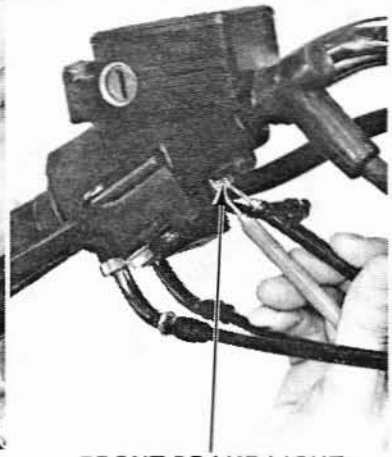


BRAKE SWITCHES

Check the rear brake light switch for continuity with the rear brake applied.

Check the front brake light switch for continuity with the front brake applied.





GEARSHIFT SENSOR

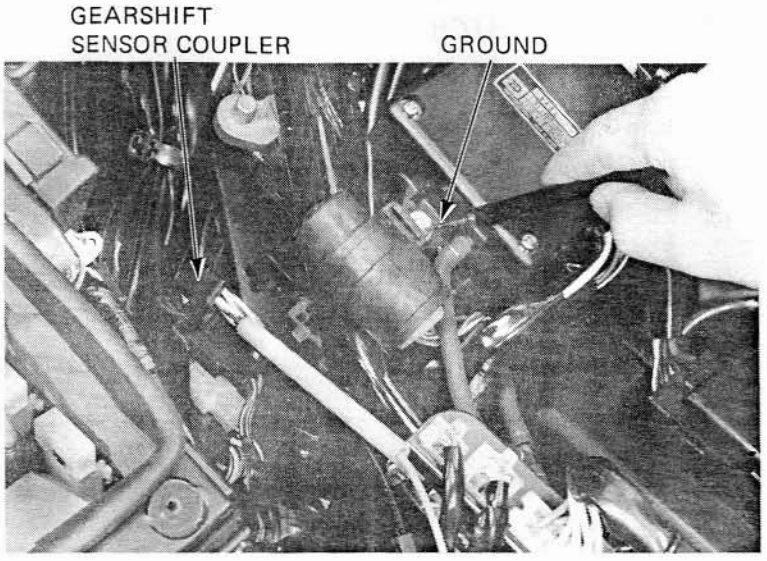
Check the gearshift sensor for continuity between the sensor terminal and body ground in each gear position.

GL1200D

Gear position	Terminal
N	Lg/R
4	R/W
5 (O.D.)	G/O

GL1200A

Gear position	Terminal
1	Y
N	Lg/R
2	Bl/Y
3	W/Bu
4	R/W
5 (O.D.)	G/O

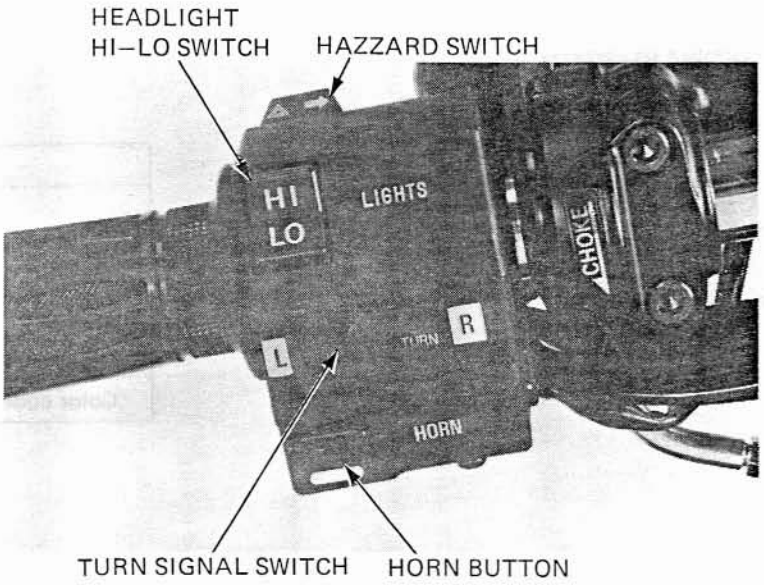


HANDLEBAR SWITCHES

The handlebar cluster switches (lights, turn signals, horn, etc.) must be replaced as assemblies.

Continuity tests for the components of the handlebar cluster switches follow:

Continuity should exist between the color coded wires on each chart.



HEADLIGHT HI – LOW SWITCH

HI: Bu/W to Bu
MIDDLE(N): Bu/W to W to Bu
LO: Bu/W to W

Headlight HI – Low Switch

	HL	Lo	Hi
Lo	○——	——○	
(N)	○——	——○	——○
Hi	○——		——○
Color code	Bu/W	W	Bu

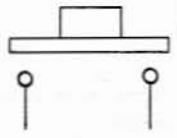
TURN SIGNAL SWITCH

R: Gr to Lb, Br/W to O/W
N: Br/W to Lb/W to O/W
L: Gr to O, Br/W to Lb/W

	W	R	L	TL1	PR	PL
R	○	○		○		○
N				○	○	○
L	○		○	○	○	
Color code	Gr	Lb	O	Br/W	Lb/W	O/W

HORN BUTTON

W/G to Lg with button depressed.
No cintinuity with button released.

	BAT3	Ho
		
Color code	W/G	Lg

HAZZARD SWITCH

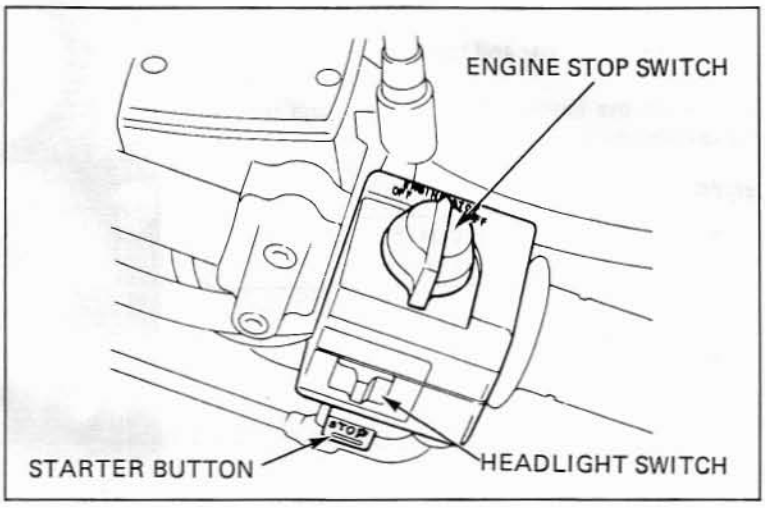
OFF: No continuity.
ON: P to Lb to O

	W	R	N
OFF			
ON	○	○	○
Color code	P	Lb	O

HEADLIGHT SWITCH

- No continuity
P: Br/Bu to Br/W
H: Br/Bu to Br/W, Bl/R to Bu/W

	BAT4	TL	BAT5	HL
•				
P	○——○			
H	○——○		○——○	
Color code	Br/Bu	Br/W	Bl/R	Bu/W



STARTER BUTTON

Bl to Y/R with button depressed.
No continuity with button released.

	BAT2	ST
FREE		
PUSH	○——○	
Color code	Bl	Y/R

ENGINE STOP SWITCH

RUN: Bl to Bl/W
OFF: No continuity

	BAT2	IG
OFF		
RUN	○——○	
Color code	Bl	Bl/W

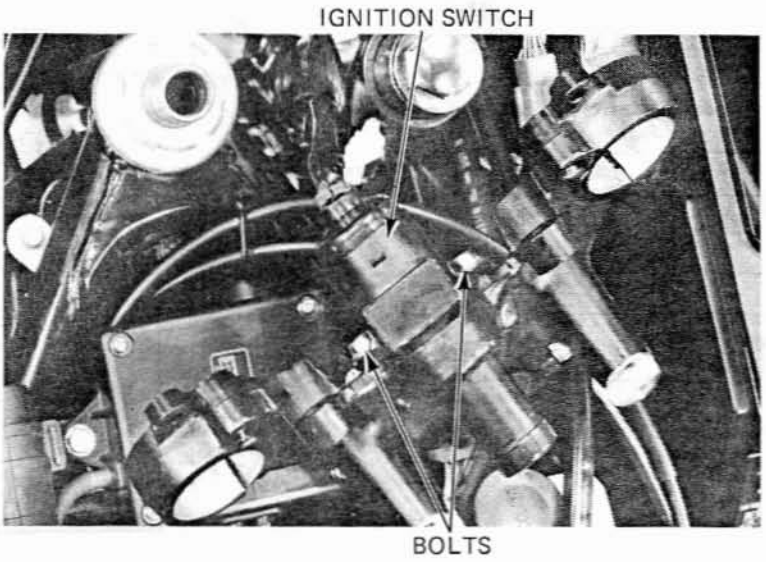
IGNITION SWITCH

Remove the handlebar and top bridge.

Disconnect the ignition switch coupler and remove the ignition switch.

NOTE:

> Identify the wire colors at the connector. There are no colors on the switch.



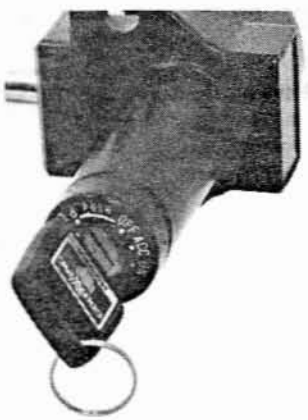
Check continuity of the terminals on the ignition switch in each position.

LOCK, OFF: No continuity
ACC: R to Lg/Bl
ON: R to Bl to Lg/Bl to Bu/O, Br/W to Br
P: R to Lg/Bl to Br

	BAT	IG	ACC	FAN	P	TL1	TL2
LOCK							
OFF							
ACC	○		○				
ON	○	○	○	○		○	○
P	○		○		○		
Color code	R	Bl	Lg/Bl	Bu/O	Br	Br/W	Br

IGNITION SWITCH DISASSEMBLY

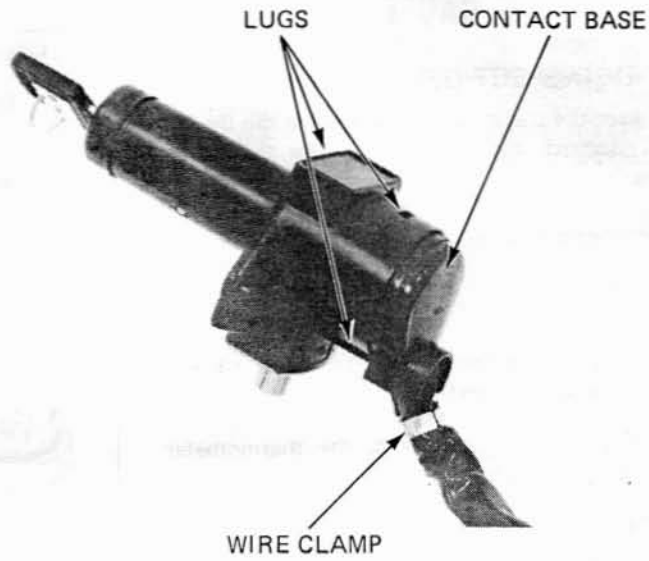
Insert the key and position it "P" position.



Release the wire from the wire clamp.

Push the lugs from the slots and remove the contact base.

Assemble in the reverse order of removal.



CLUTCH SWITCH

Check continuity of the clutch lever (safety) switch with the clutch released and applied and replace if necessary.

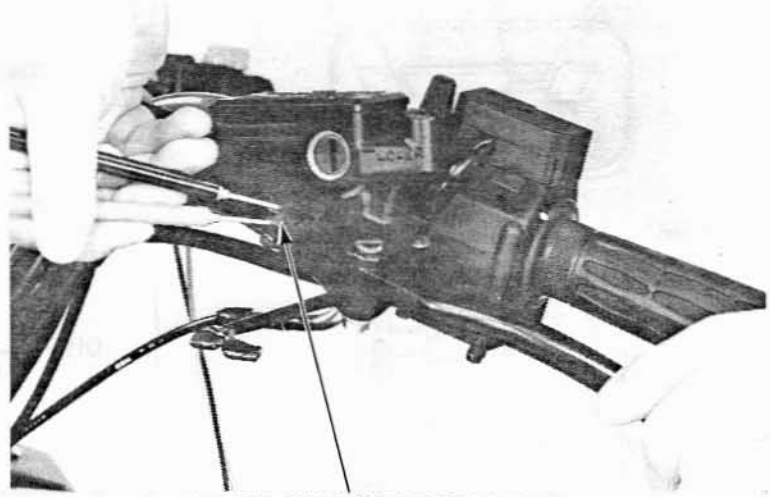
CLUTCH APPLIED: CONTINUITY
CLUTCH RELEASED: NO CONTINUITY

REMOVAL

Unplug the wires and remove the clutch lever and cable.
Remove the switch.

NOTE:

> The switch case has a small protrusion that must point toward the handlebar when installation.



TEMPERATURE GAUGE

SYSTEM INSPECTION

Disconnect the thermo sensor wire from the thermo sensor. Remove the sensor from the thermostat housing.

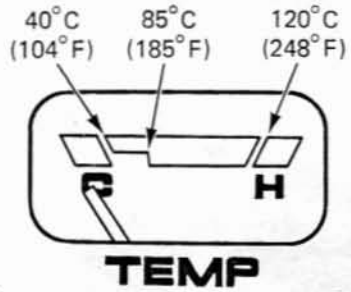
Connect the sensor and instruments as shown.

Suspend the sensor in a pan of oil.

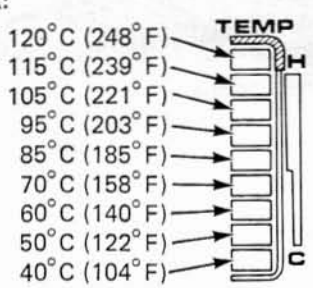
Do not let the sensor or thermometer touch the pan or false readings will result.

Compare the gauge readings to the thermometer readings as the oil heats.

GL1200D:



GL1200A:



SENSOR INSPECTION

Suspend the sensor in oil and measure the resistance through the sensor as the oil heats up.

Temperature	60°C	85°C	110°C	120°C
	140°F	185°F	230°F	248°F
Resistance	140 Ω	44 Ω	20 Ω	16 Ω

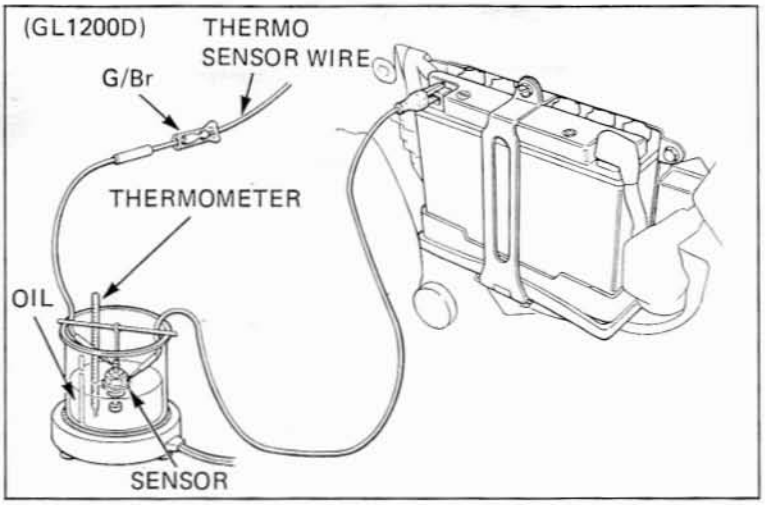
Do not let the unit or thermometer touch the pan or false readings will result.

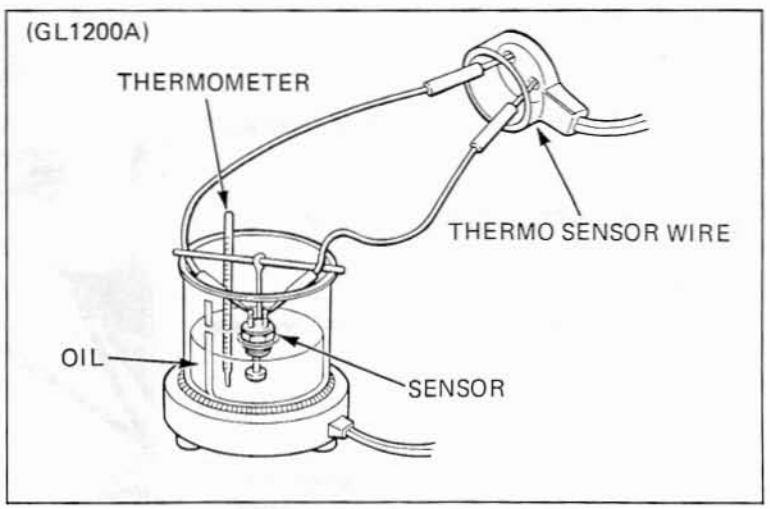
WARNING

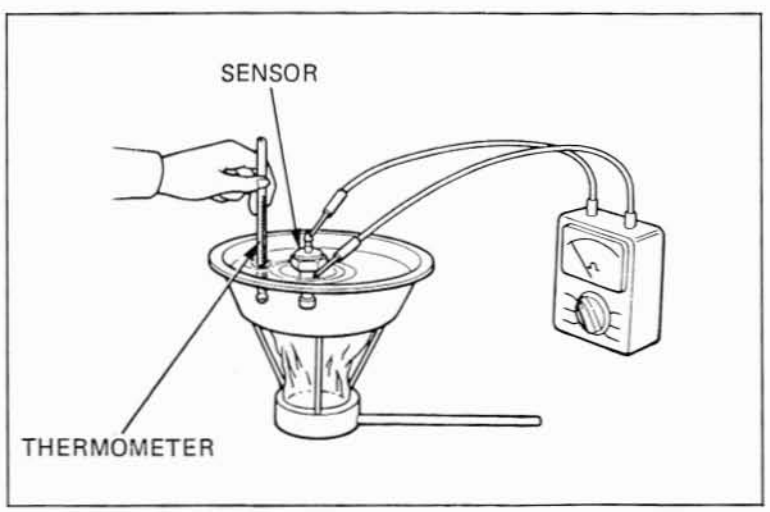
Wear gloves and eye protection.

NOTE:

Oil must be used as the heated liquid to check operation above 100°C (212°F)







FUEL GAUGE

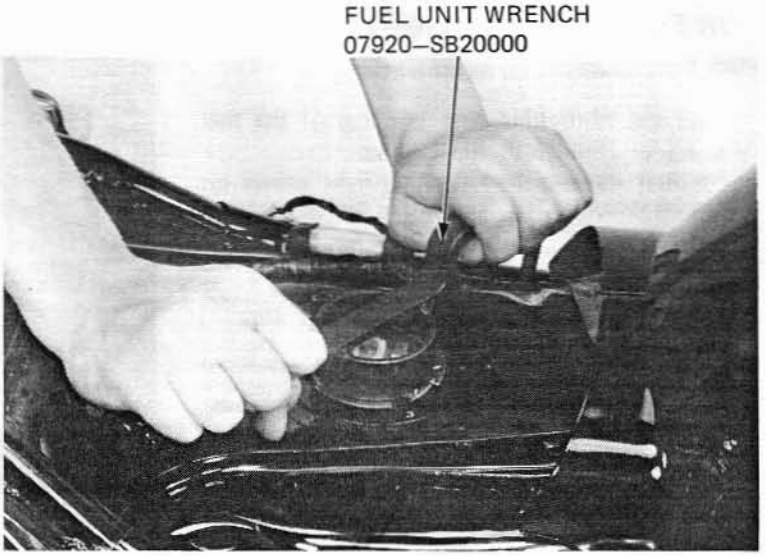
FUNCTION TEST

Remove the seat and disconnect the sensor wires from the fuel level sensor.

Remove the fuel level sensor.

WARNING

Keep gasoline away from open flames or sparks. Wipe up spilled gasoline at once.



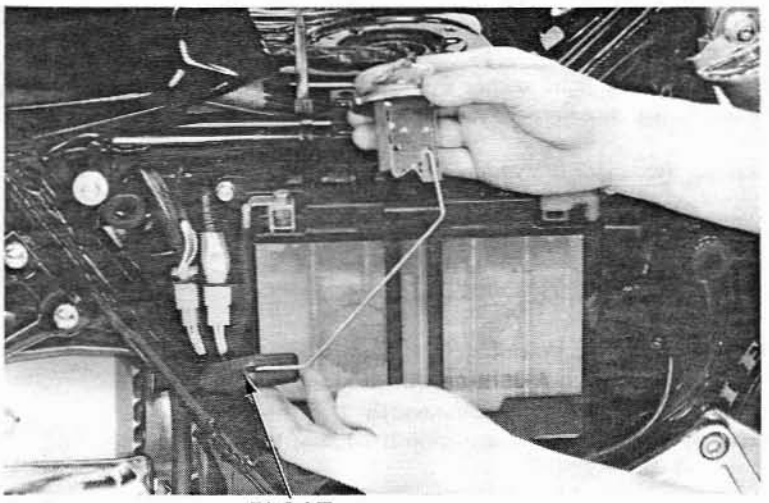
Reconnect the sensor wires to the fuel level sensor.

Turn the ignition on, and inspect the fuel gauge operation by moving the float arm.

Float at bottom: Gauge should read empty
Float at top: Gauge should read full.

NOTE:

Do not bend the float arm.



SENSOR INSPECTION

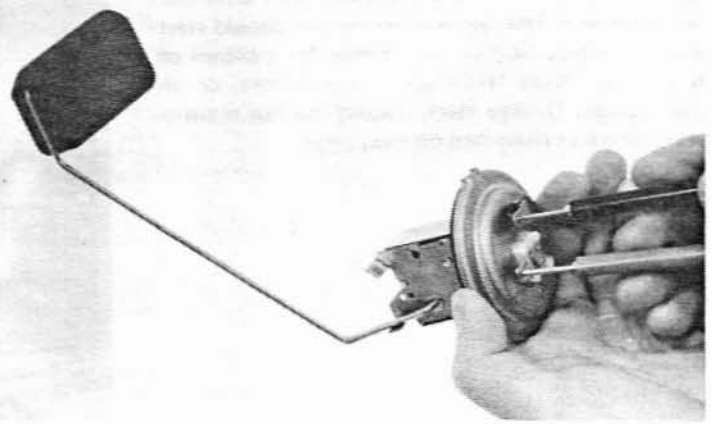
Check the resistance of the fuel level sensor with an ohmmeter.

Float at bottom:	**101–102 Ω**
Float at center (1/2):	**43–52 Ω**
Float at top:	**0–10 Ω**

NOTE:

Check the resistance at top of travel first then move the float arm to the bottom position.

Reinstall the fuel level sensor.



LOW FUEL WARNING LIGHT

Place the motorcycle on its center stand.

Gronud the white/Blue wire terminal of the fuel level sensor coupler to the ground.

Check that the low fuel warning light comes on within 30 seconds after the ignition switch has been turned ON.

NOTE:

> The light will not come on immediately after the ignition switch is turned ON.

If the light does not come on within 30 seconds, check for a blown fuse or bulb, loose connector or open circuit in the wire harness.

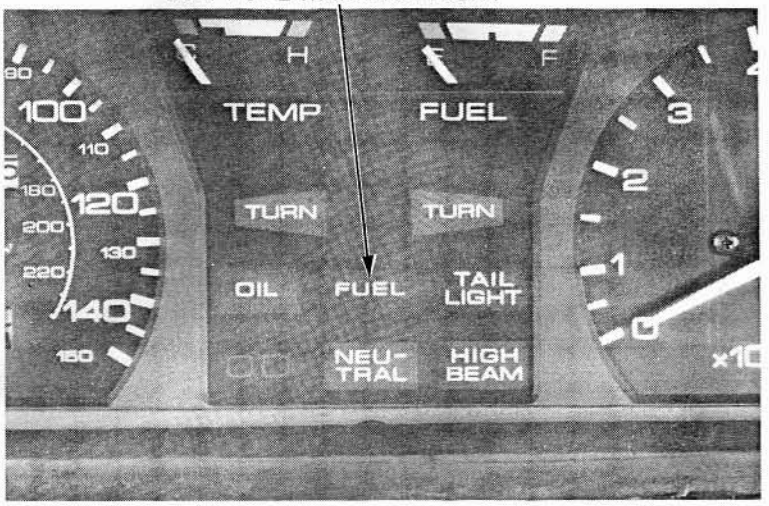
Replace the sensor if the above procedure does not indicate that anything is wrong.

Check that the low fuel warning light will not light when the ignition switch is turned ON with disconnected the coupler from the fuel level sensor.

If the warning light comes on, check for a short circuit in the wire harness or coupler.

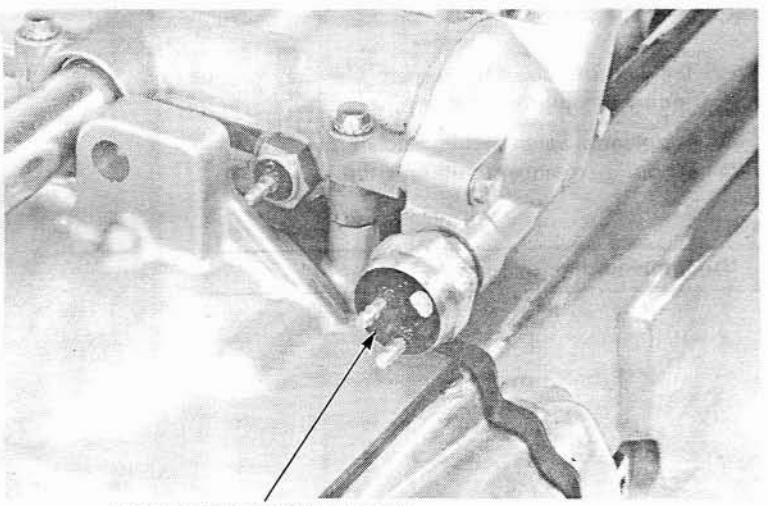
Replace the sensor if nothing wrong is indicated.

LOW FUEL WARNING LIGHT



THERMOSTATIC SWITCH

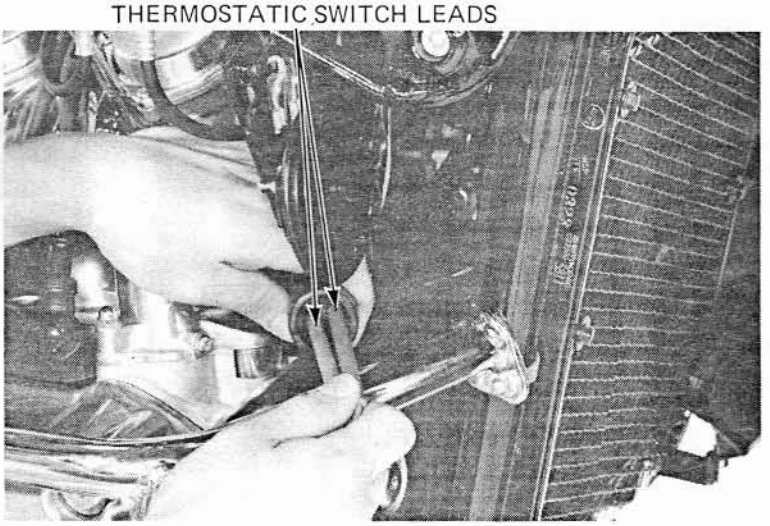
If the fan motors do not start, inspect the coolant level (page 3-11) before switch inspection. Fill the cooling system with recommended coolant and recheck the fan motor operation if coolant level is low.



THERMOSTATIC SWITCH

Remove the right fairing lower cover and disconnect the wire coupler from the thermostatic switch. Short the coupler terminals together with a jumper wire as shown. The cooling fan motors should start running. If they do not start, check for a blown or faulty fuse, loose terminals or connectors, or an open circuit. If they start, inspect the fan thermostatic switch as described on next page.

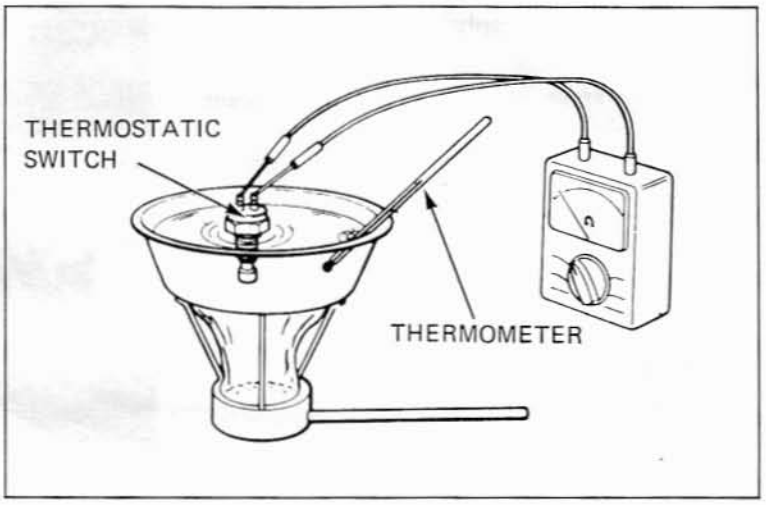
THERMOSTATIC SWITCH LEADS



Suspend the switch in a pan of coolant (50–50 mixture) and check the temperatures at which the switch opens and closes. Make sure that there is no switch continuity with room temperature and gradually raise the coolant temperature. The switch should be continuity (close) at 98–102°C (208–216°F).

NOTE:

- Keep temperature for 3 minutes before testing continuity. A sudden change of temperature will cause error of temperature reading between the thermometer and the switch.
- Do not let the thermometer or switch touch the pan as it will give a false reading.
- Soak the switch in coolant up to its threads.



BRAKE AND TAIL LIGHT SENSOR

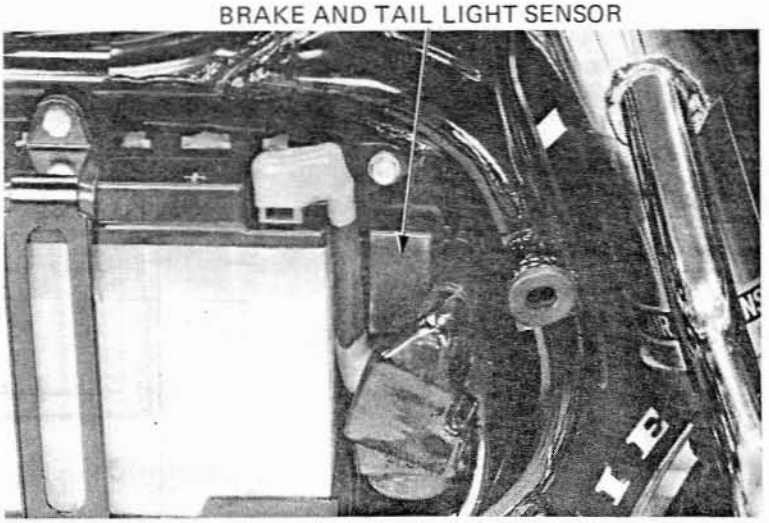
SYSTEM INSPECTION

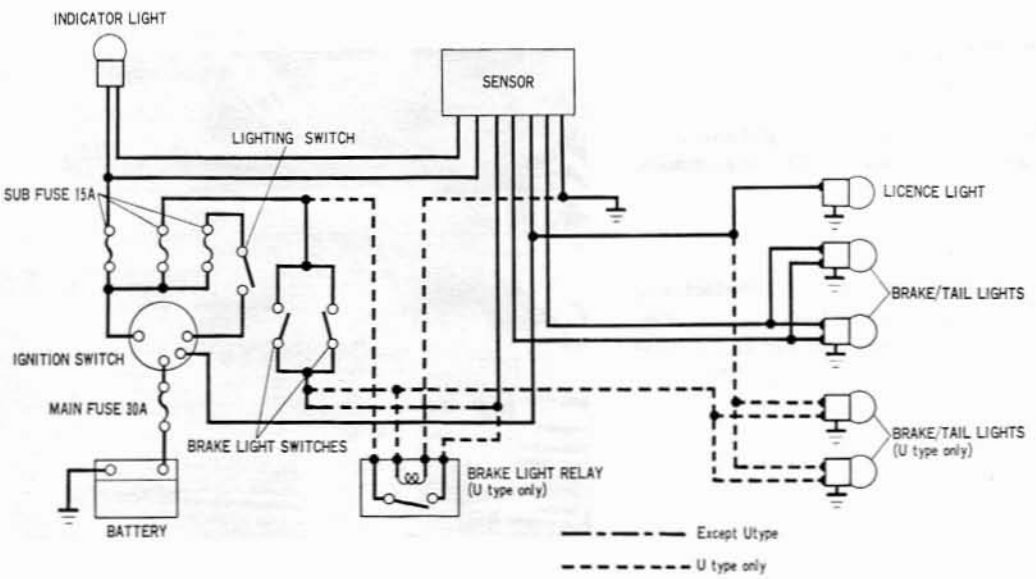
Turn the ignition switch ON. The tail light warning light should light for a few seconds and go out.

– If the warning light does not light, check the warning light bulb filament, or wiring for an open or short circuit. If there is no problem in the bulb or wiring, replace the brake and tail light sensor with a new one.

– If the warning light does not go out after a few seconds, check the brake/tail light bulb filaments and replace if necessary.
If the brake/tail light bulb is OK, check the wiring for an open or short circuit. If there is no problem in the wiring, replace the brake and tail light sensor with a new one.

BRAKE AND TAIL LIGHT SENSOR



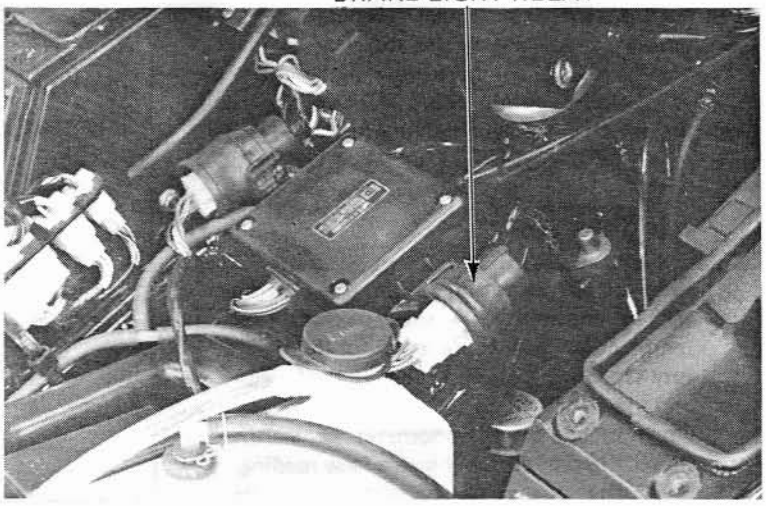


BRAKE LIGHT RELAY

(GL1200A U type only)

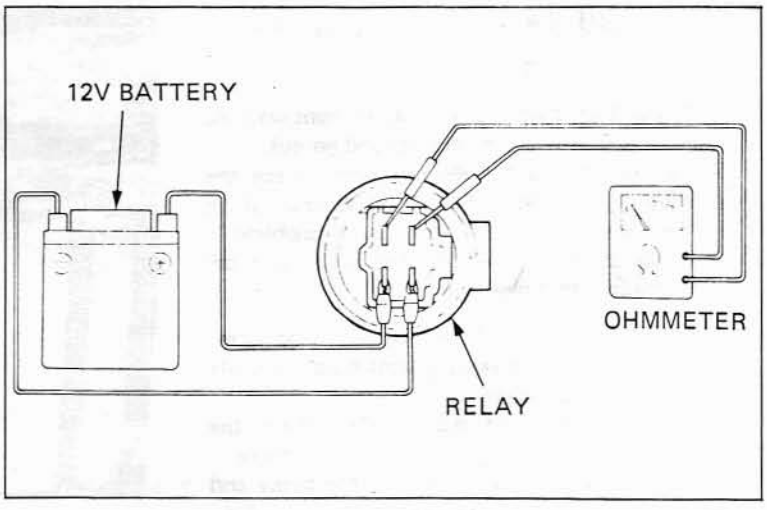
Remove the brake light relay from the bracket.

BRAKE LIGHT RELAY



Remove the brake light relay from the coupler. Connect a fully charged 12V battery and an ohmmeter to the relay terminals as shown.

The relay is normal if there is continuity when voltage is applied.

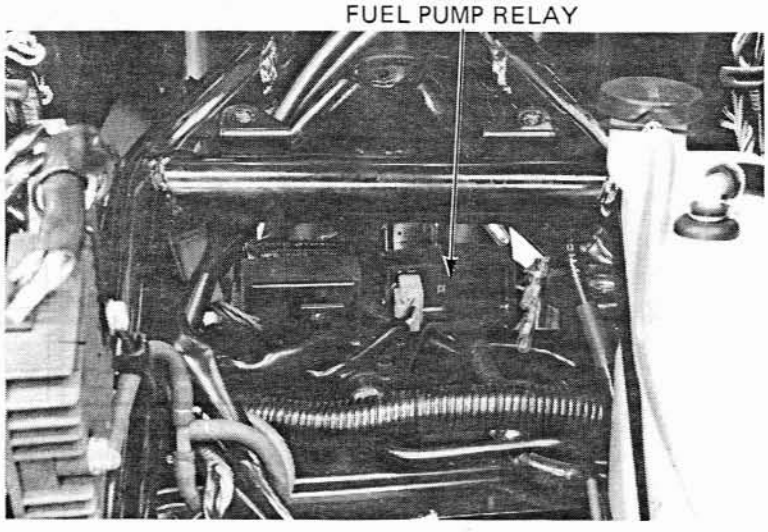


FUEL PUMP RELAY

Remove the top compartment and ignition coils. Remove the fuel pump relay from the mount bracket.

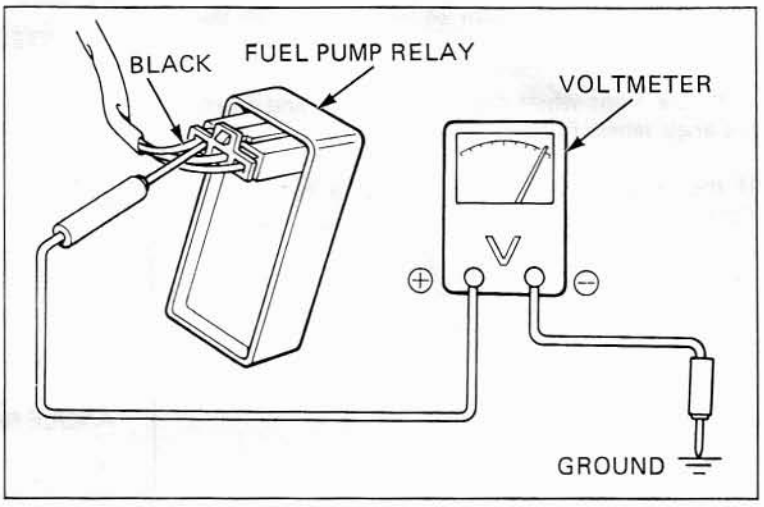
Check for a burnt sub-fuse.
Check the relay coupler for improper contact and looseness. Measure the voltage between the relay black wire and abody ground. The battery voltage should reqister with the ignition switch ON.

FUEL PUMP RELAY



Make sure that the fuel pump operates while the relay coupler black and white wires are shorted and the ignition switch is ON.
If the pump does not operate, check the fuel pump coupler for improper contact and the fuel pump.

Check for cotinuity between the ignition control unit blue/yellow wire and the fuel pump relay coupler biue/yellow wire. If there is continuity, replae the fule pump relay.If there is no continuity, replace the wire harness.



SELF CANCELLING TURN SIGNAL SYSTEM

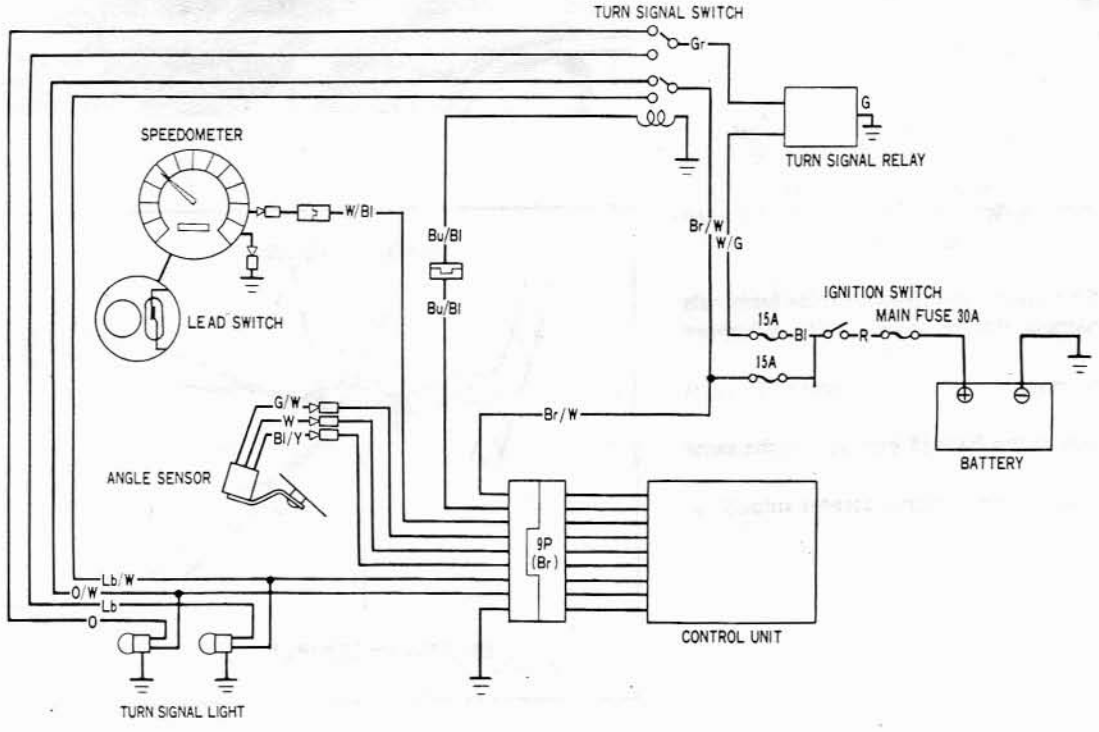
INSPECTION

Test ride the motorcycle to check the turn signal cancelling system operation.

If the system is faulty, proceed as follows.

NOTE:

- Before going into detailed inspections, first check that the sub fuse is not blown.
- Also check that all wires and cables are not loosen or disconnected.

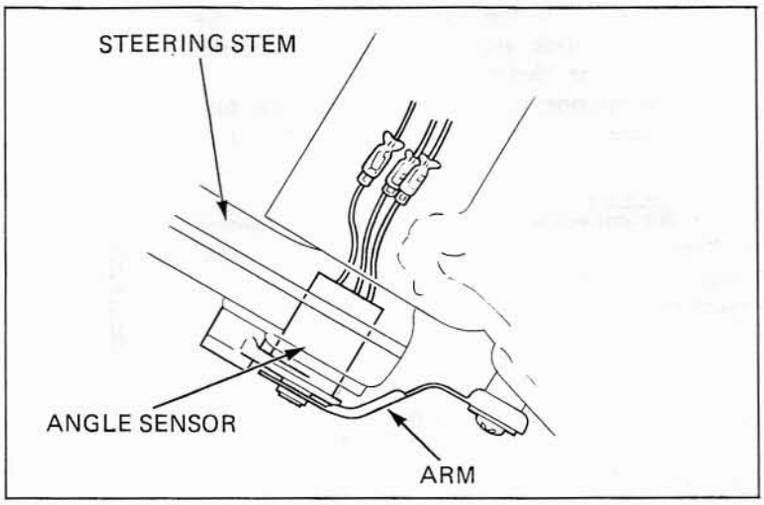


ANGLE SENSOR

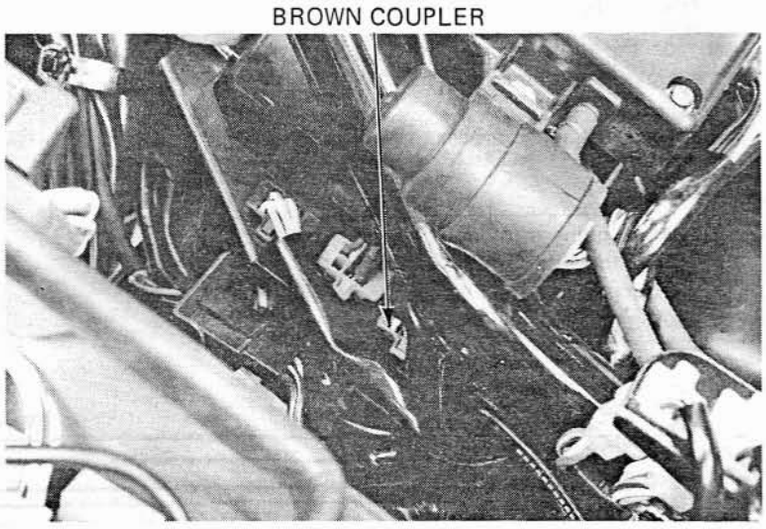
Remove the stem bottom cover and reinstall the set screws.

Turn the front wheel from right to left and check the angle sensor for wear or looseness.

If the sensor is worn, replace, and if it is loose, tighten the mounting screws.

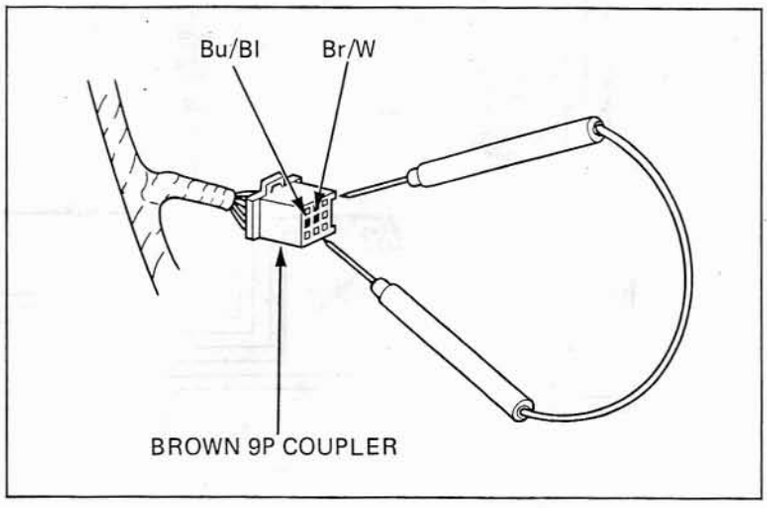


Remove the seat and top compartment.
Disconnect the brown control unit coupler.



Turn the ignition switch to ON and push the turn signal switch to the LEFT position.

Connect the Blue/Black and Brown/White terminals in the wire harness side connector with a jumper wire.
If the switch returns to neutral (cancels) it is normal.
Check the switch in the RIGHT position in the same way.
Also check to see if the switch operates smoothly.



SOLENOID WIRE HARNESS

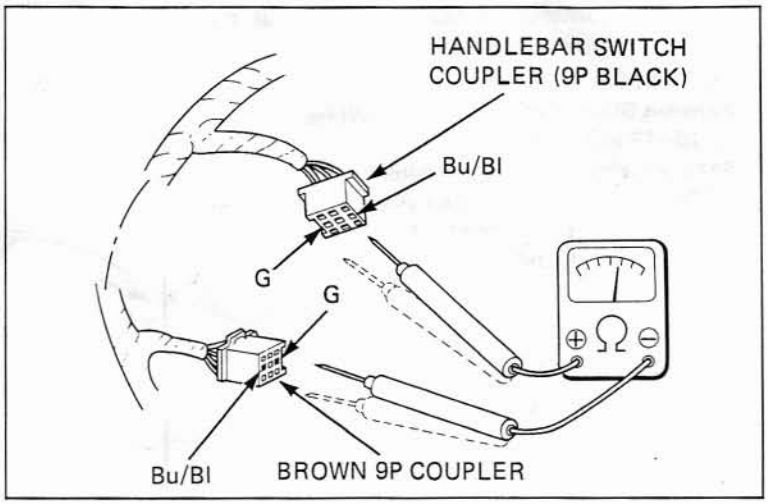
Disconnect the left handlebar switch coupler located inside of the fairing.

Check the continuity between brown coupler and black coupler.

Between same colors: Continuity
Between different colors: No continuity

Check the continuity between Blue/Black and Green in the Brown coupler.

Between Blue/Black and Green: Continuity

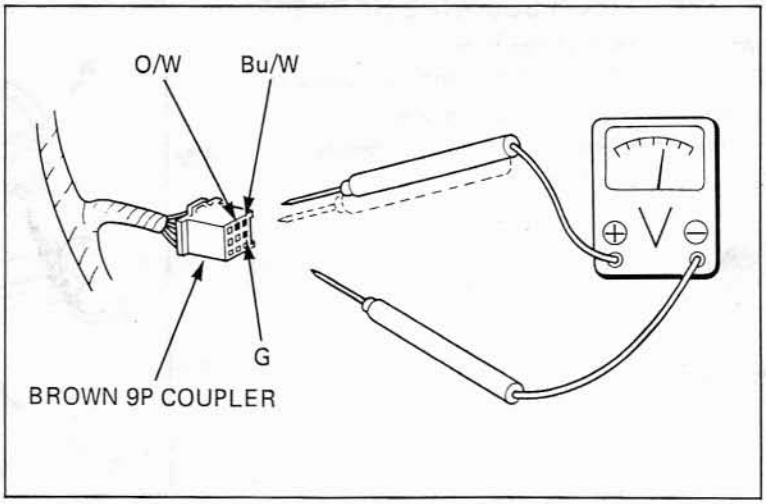


MAIN TURN SIGNAL WIRING HARNESS

Turn the ignition switch to ON.

Measure the voltage between the Green and Blue/White and Green and Orange/White terminals with the turn signal switch in each position.

Position	Bu/W to G	O/W to G
RIGHT	0V	Minimum 10V
NEUTRAL	Minimum 10V	Minimum 10V
LEFT	Minimum 10V	0V

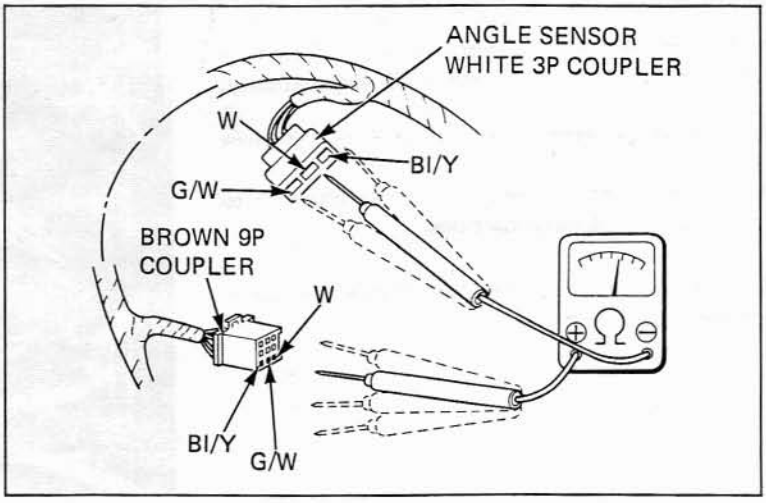


ANGLE SENSOR HARNESS

Disconnect the angle sensor coupler (3P white) located inside of the fairing.
Check the continuity between the angle sensor harness terminals and control unit brown coupler terminals.

○ : Continuity X: No continuity

	Black/ Yellow	Green/ White	White	To Ground
Black/ Yellow	○	X	X	X
Green/ White	X	○	X	X
White	X	X	○	X



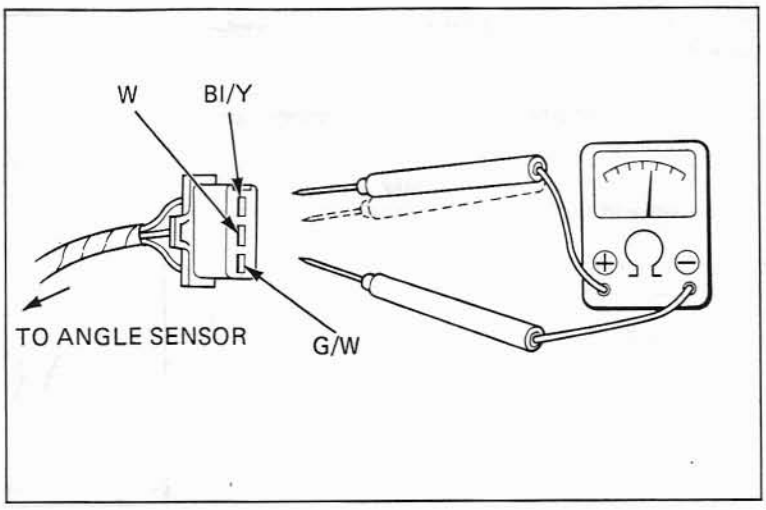
ANGLE SENSOR RESISTANCE

Measure the resistance of the angle sensor at the angle sencor coupler or connectors.

RESISTANCES:

Between Black/Yellow and Green/White:
10–19 KΩ

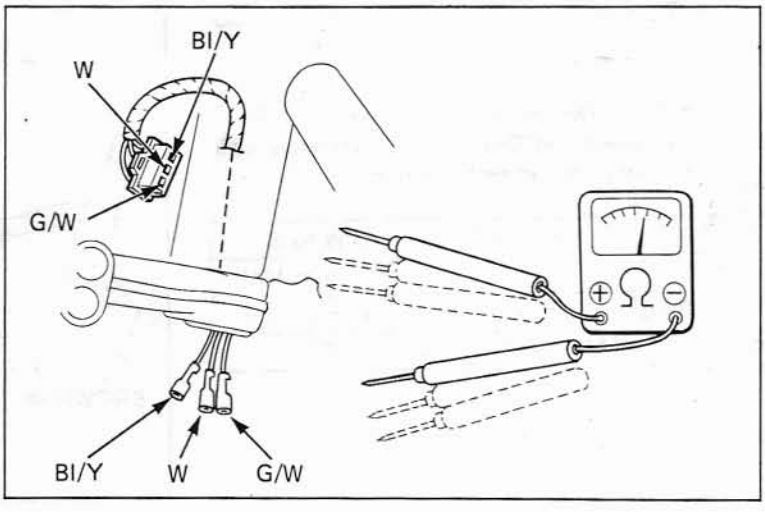
Between White and Green/White:
Resistance should increase steadily when front wheel is turned slowly from left to right (resistance should not change suddenly)



ANGLE SENSOR SUB-WIRE HARNESS

Remove the angle sensor from the steering stem.
Check the continuity, end to end, for each wire.

Between same colors: Continuity
Between different colors: No continuity

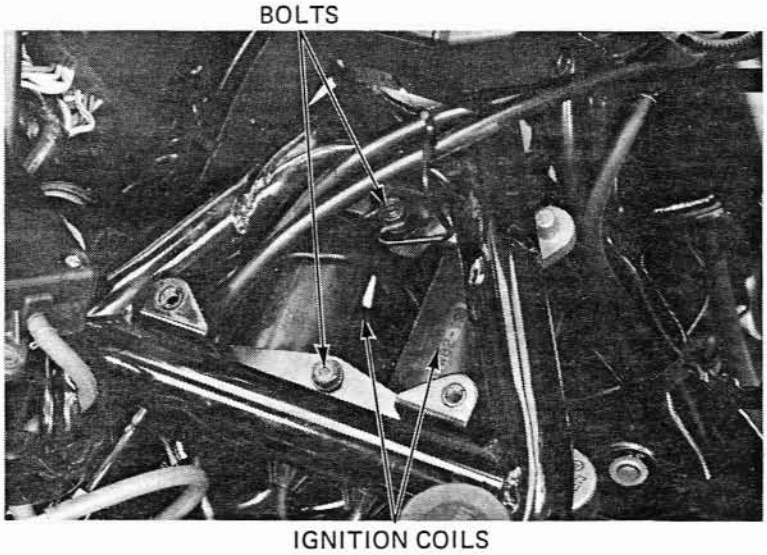


CONTROL UNIT REPLACEMENT

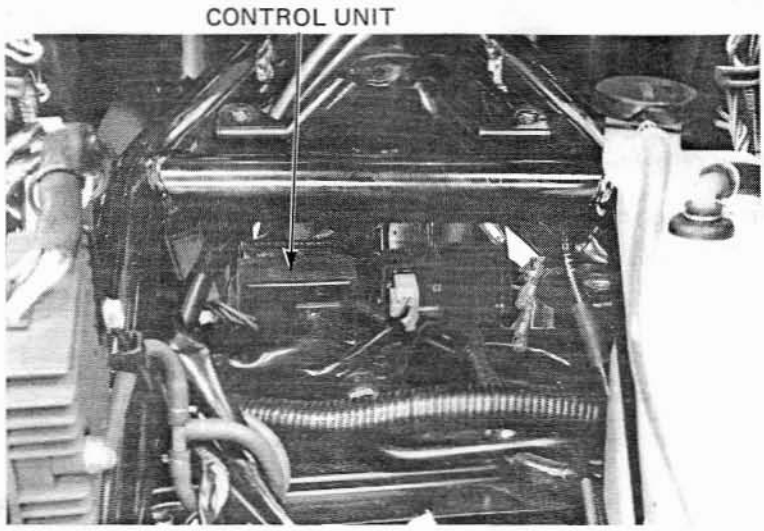
Replace the control unit with a new one if the turn signal switch is still not cancelled automatically.

Remove the air cleaner case and air cleaner element holder.
Place a rag or shop towel over the air chamber to prevent entry of foreign particles.

Remove the ignition control unit and relay bracket.
Remove the ignition coil.



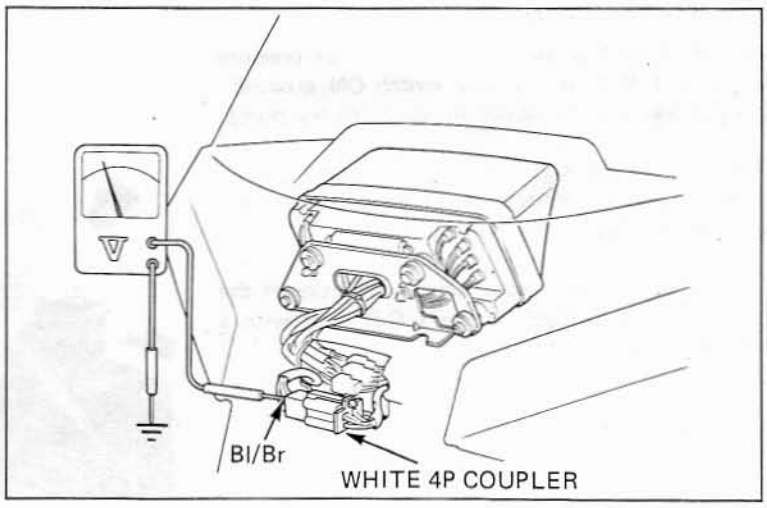
Disconnect the coupler and remove the control unit from the bracket.



L.C.D. METER (GL1200A)

INPUT VOLTAGE INSPECTION

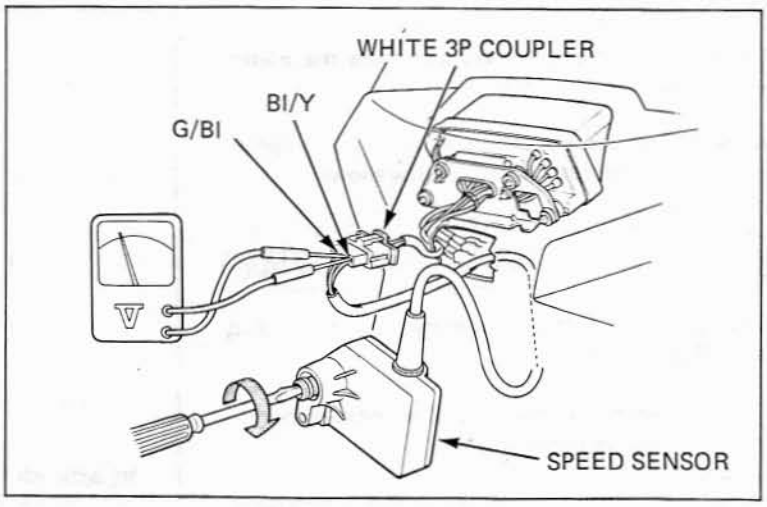
If the meter does not indicate any voltage, measure voltage between the Black/Brown wire terminal of the white 4-P coupler and body ground. Battery voltage should be indicated.



SPEED SENSOR INSPECTION

Disconnect the speed sensor from the speedometer gearbox.
Connect a voltmeter across the Green/Black and Black/Yellow terminals of the sensor white 3-P coupler.

Turn the ignition switch to ON.
The sensor is normal if the voltmeter needle swings from 0 to about 5V slowly eight times when the sensor drive shaft is turned gradually one full turn.

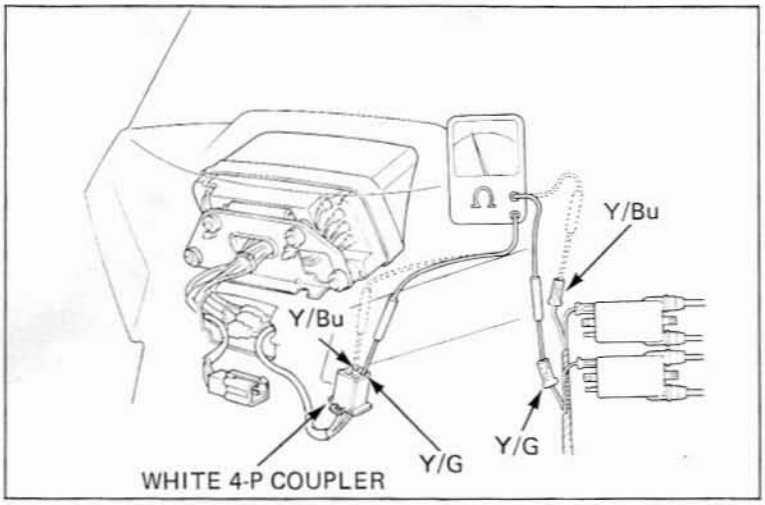


TACHOMETER

If the tachometer does not indicate engine speed properly, check for continuity between the Yellow/Blue terminals of the meter white 4-P coupler and #1.2 ignition coil, and Yellow/Green terminal and Blue/Yellow terminal of the #3.4 ignition coil.

If there are continuity, check for loose or improperly connected meter wires in the meter unit.

Replace the meter unit with a new one if the wires are connected properly.

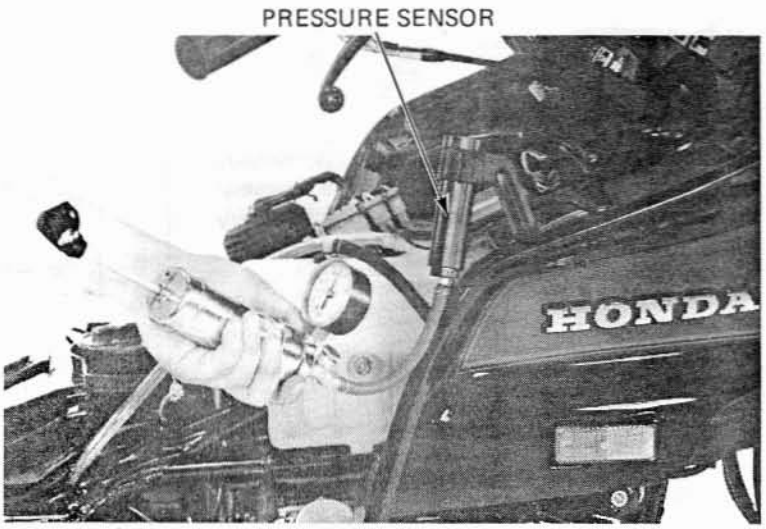


AIR PRESSURE GAUGE

Connect a hand pressure pump to the air pressure sensor inlet. With the ignition switch ON, gradually apply pressure to the sensor by operating the pump.

Check the pressure sensor if the pressures applied to the sensor do not agree with the pressures indicated on the pressure gauge (Page 13-26).

Check the wire for loose or poor connection if the sensor is normal. Replace the L.C.D. unit with a new one if necessary.



GEAR POSITION INDICATOR

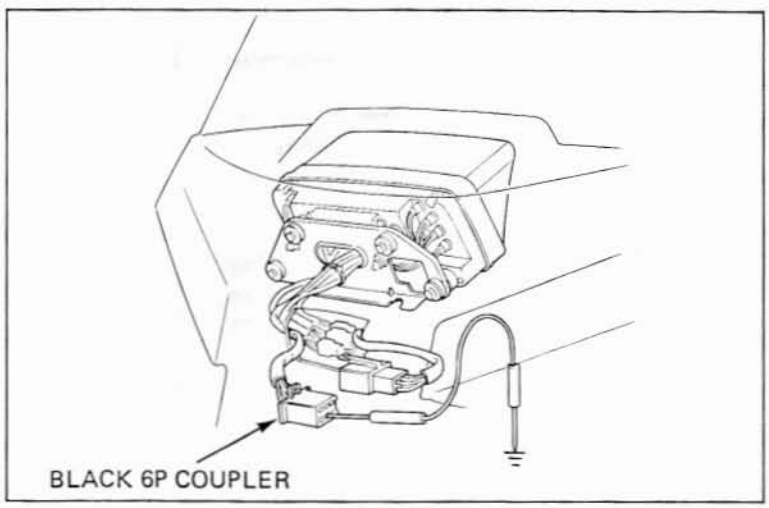
Disconnect the black 6-P coupler from the meter; turn on the ignition switch.

Check for correct indication in each gear position by grounding the coupler terminal as shown.

Gear position	1	N	2	3	4	5
Color code	Y	Lg/R	Bl/Y	W/Bu	R/W	G/O

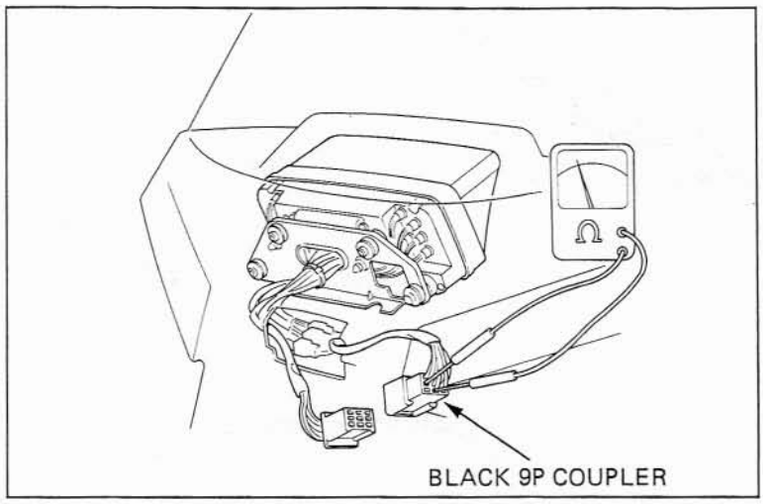
If the indicator displays properly, check the shift sensor (Page 19-14).

If the shift sensor is good, check for loose or poorly connected with or connection.
nection.
Replace the L.C.D. unit with a new one if necessary.



L.C.D. METER CONTROL BUTTONS

Disconnect the black 9-P coupler from the meter unit and check for continuity between the terminals in each switch position.



*: E, U type only

Color code / BUTTON	Y/G	Y/Bl	Y/W	G/B	R/Y	R/G	Lg/Y	Bu/Bl
TRIP 1	○			○				
TRIP 10		○		○				
TRIP 100			○	○				
TRIP +/–				○	○			
0-SET				○		○		
DIG. TACH				○			○	
mph km/h*				○				○

MEMO

20. ACCESSORIES

SERVICE INFORMATION

GENERAL

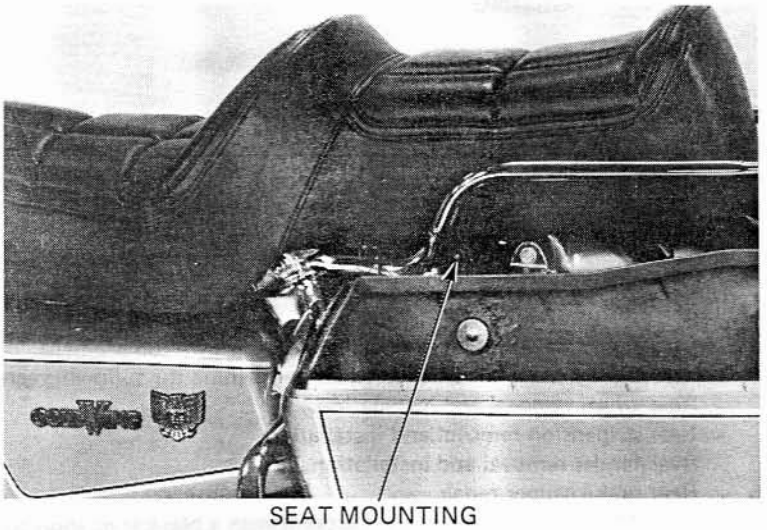
- The fairing needs not to be removed except for own replacement.
- The saddlebags must be removed when performing the following services:
  - Rear wheel removal and installation.
  - Rear suspension removal and installation.
  - Rear fender removal and installation.
  - Rear brake caliper repair.
- After removing the fairing, wrap it around with a blanket or shop towel to prevent damage to it.
- Avoid contact with chemicals, brake and clutch fluid, gasoline, thinner or other solvents.
- Use two people when removing and installing the fairing.

FAIRING

SEAT AND TOP COMPARTMENT REMOVAL

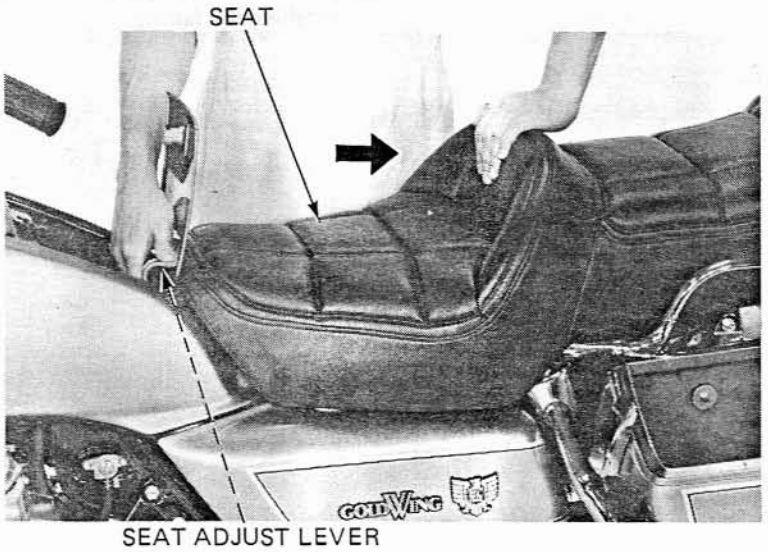
Remove the saddlebag lid.

Remove the two seat mounting socket bolts.

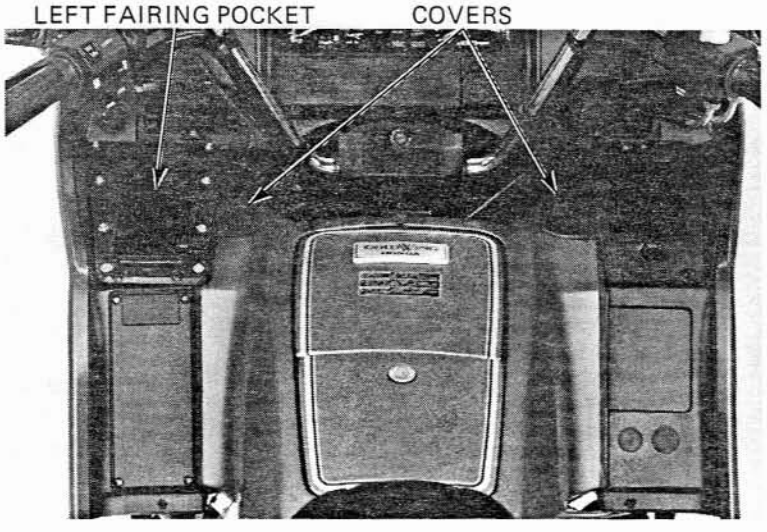


SEAT MOUNTING SOCKET BOLT

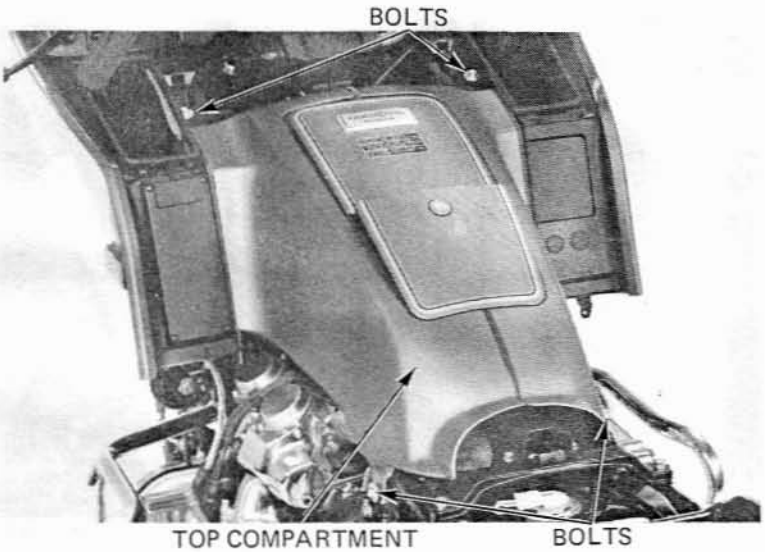
Pull the seat adjust lever.
Move the seat toward the rear of the motorcycle and remove the seat.



Remove the right fairing pocket lid, covers and left fairing pocket.



Remove the side covers.
Remove the top compartment by removing the four bolts.

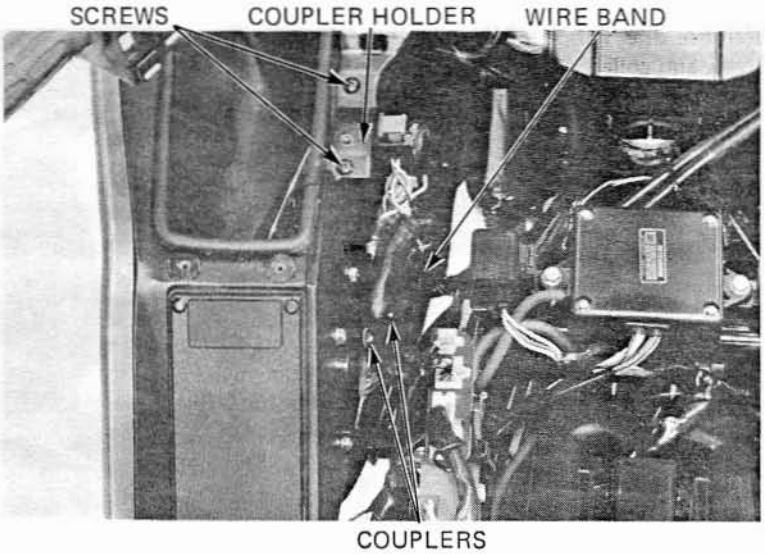


FAIRING REMOVAL

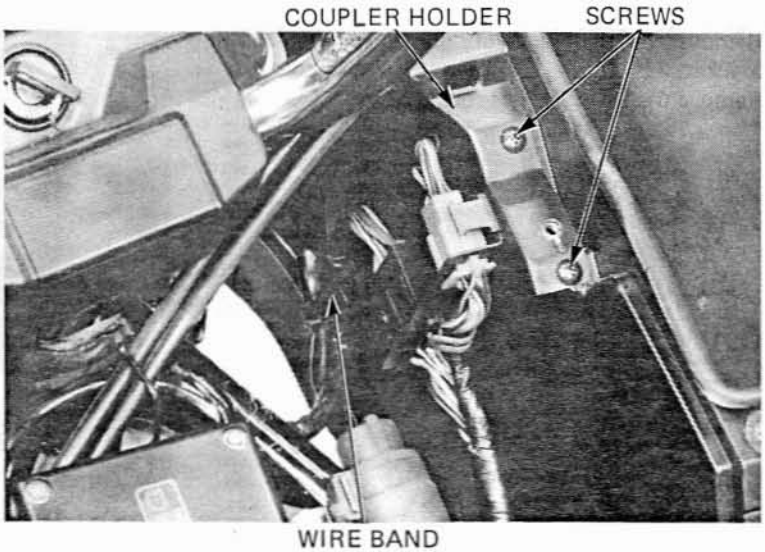
Disconnect the fairing harness coupler from the main wire harness coupler.

Remove the coupler holder mounting screws. Replease the wire band securing the wire harness to the fairing bracket.

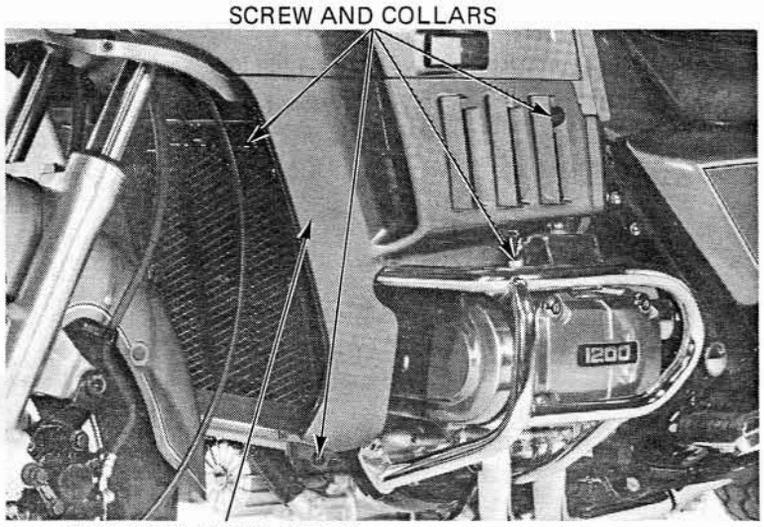
Disconnect the antenna wire terminals from the wire harness terminals inside the fairing. Remove the wires from the fairing (GL1200A).



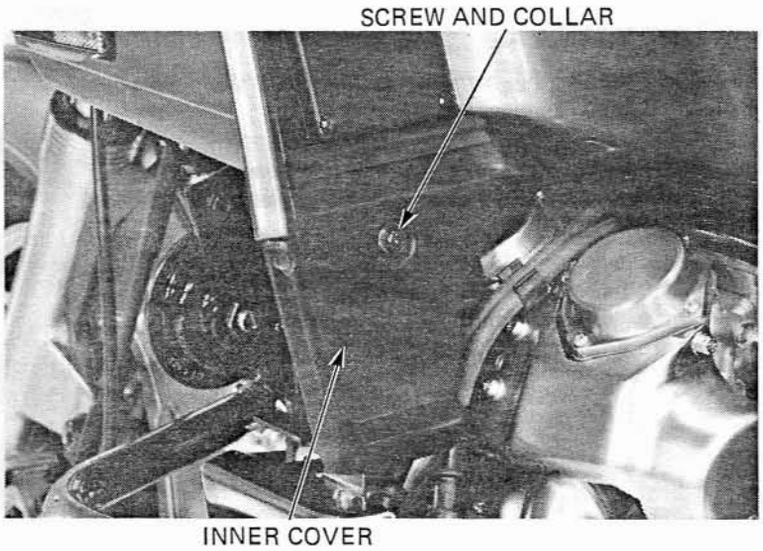
Remove the coupler holder mounting screws. Release the wire band securing the wire harness to the fairing bracket.



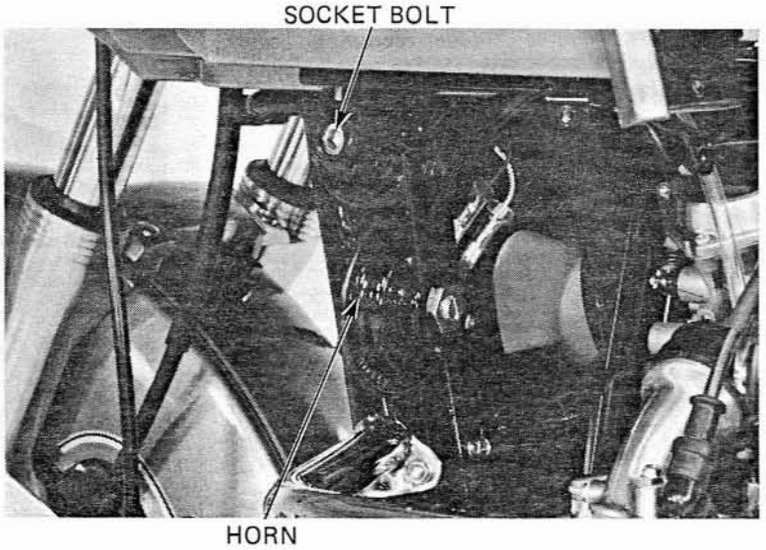
Remove the right and left fairing lower covers by removing screws and collars.



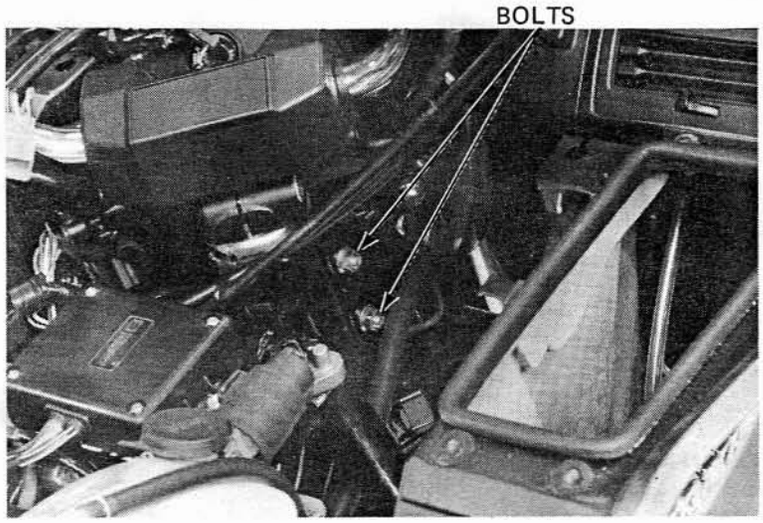
Remove the fairing inner cover by removing the screw and collar.



Remove the right and left horns from the fairing bracket.
Remove the right and left socket bolts.

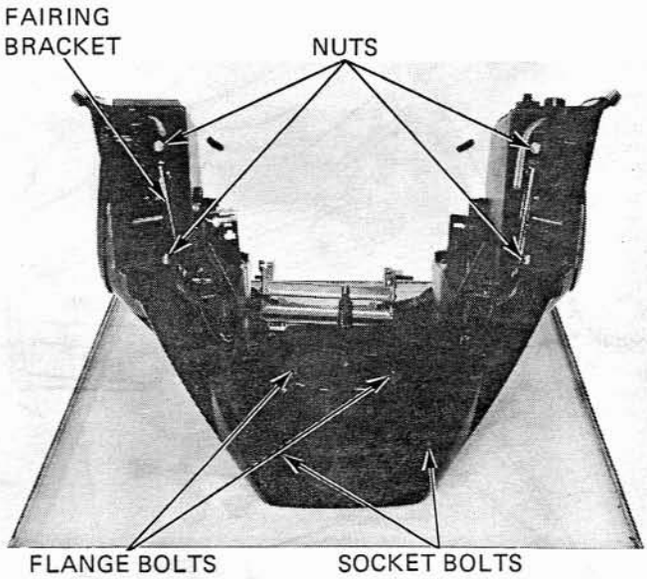


While holding the fairing, remove the two center bracket mount bolts. Remove the fairing.

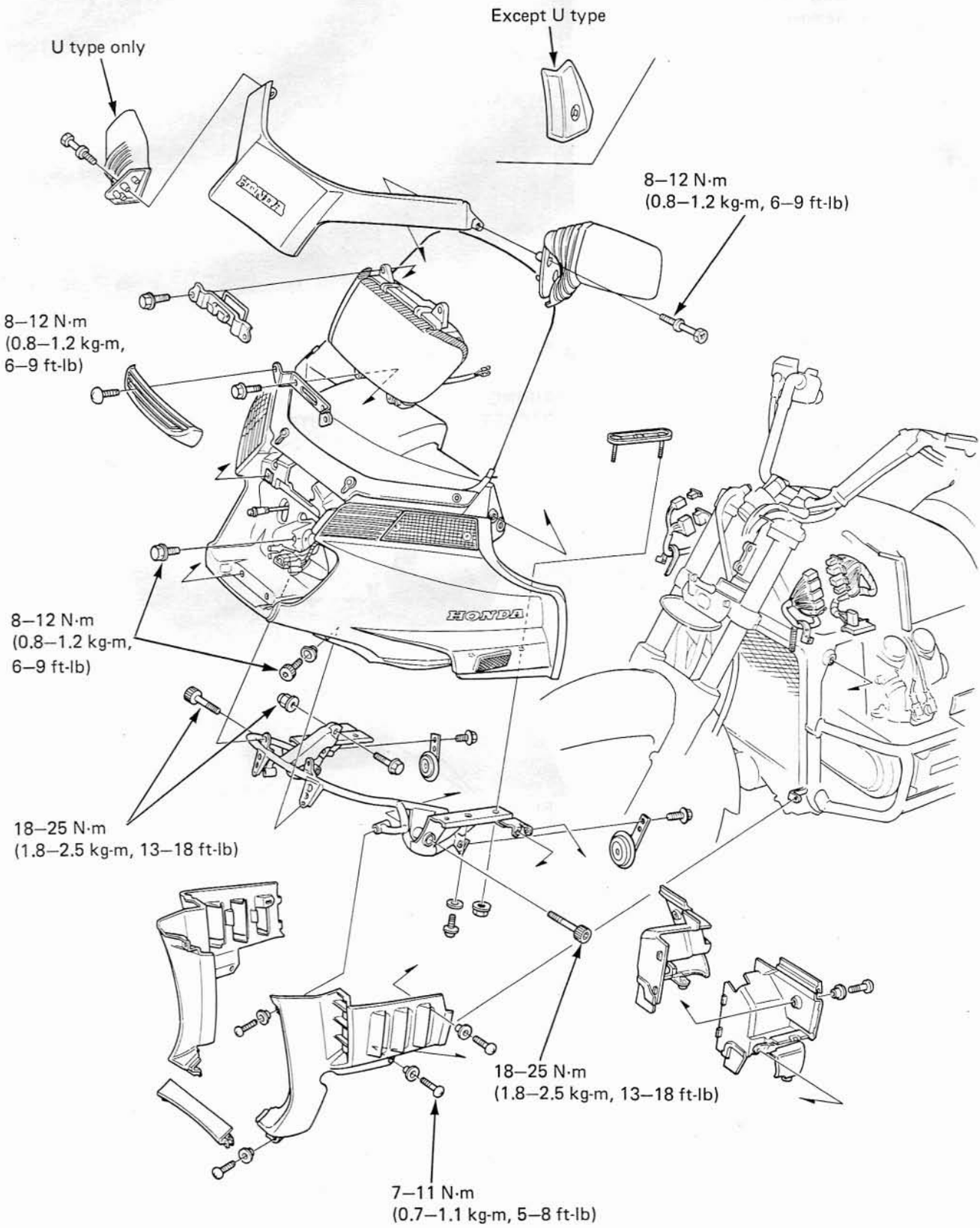


FAIRING BRACKET REMOVAL

Remove the fairing bracket from the fairing by remove the two socket bolts, two flange bolts and four nuts.

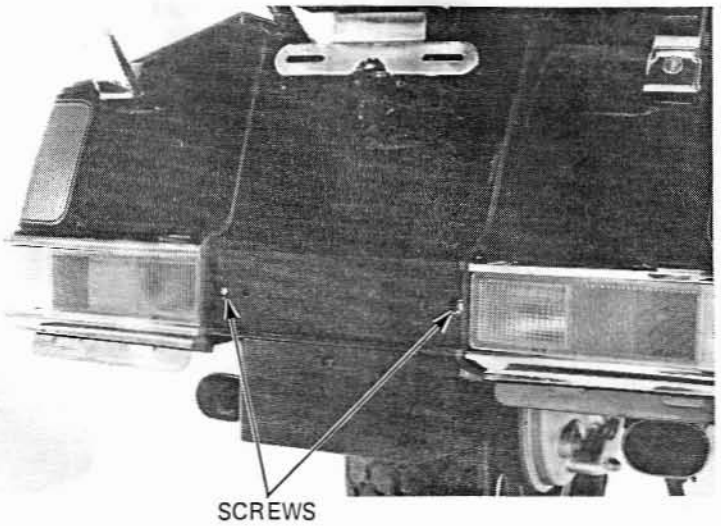


FAIRING ASSEMBLY

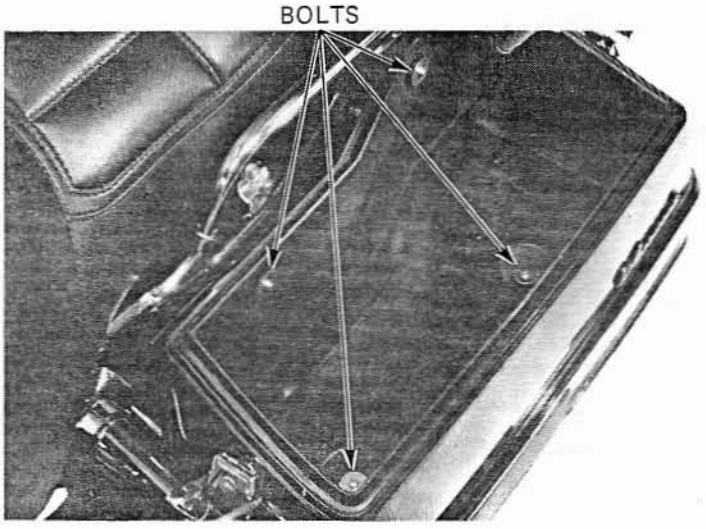


SADDLEBAG/TRAVEL TRUNK

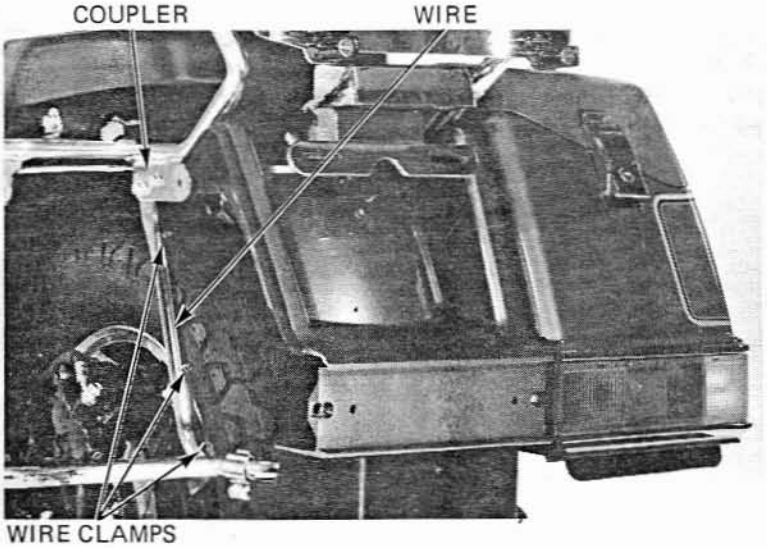
Remove the reflex reflector from the rear fender. Unscrew the two screws attaching the saddlebags to the rear fender.



Remove the four saddlebag mount bolts.

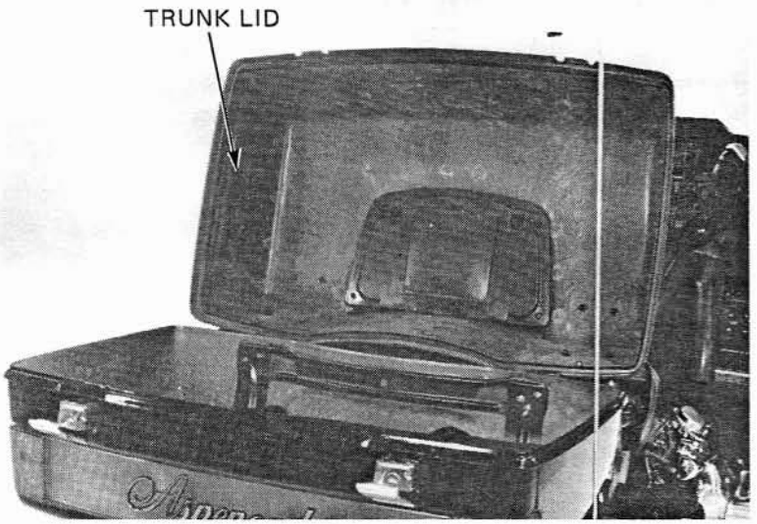


Release the tail/brake light switch wires and rear turn signal wires from the wire clamps on the saddlebag bracket. Disconnect the wire coupler and remove the saddlebags.



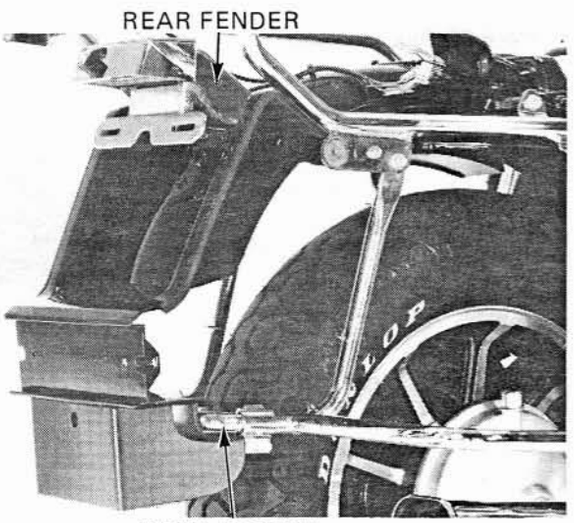
Remove the seat and disconnect the rear brake light switch wire coupler (GL1200A).

Open the rear travel trunk lid and remove the travel trunk by removing the four mount bolts.

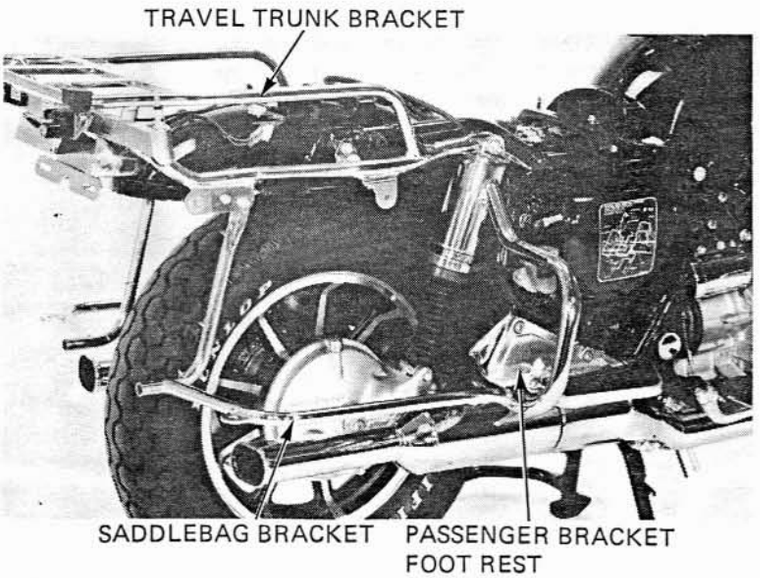


SADDLEBAG/TRAVEL TRUNK/TRUNK BRACKET REMOVAL

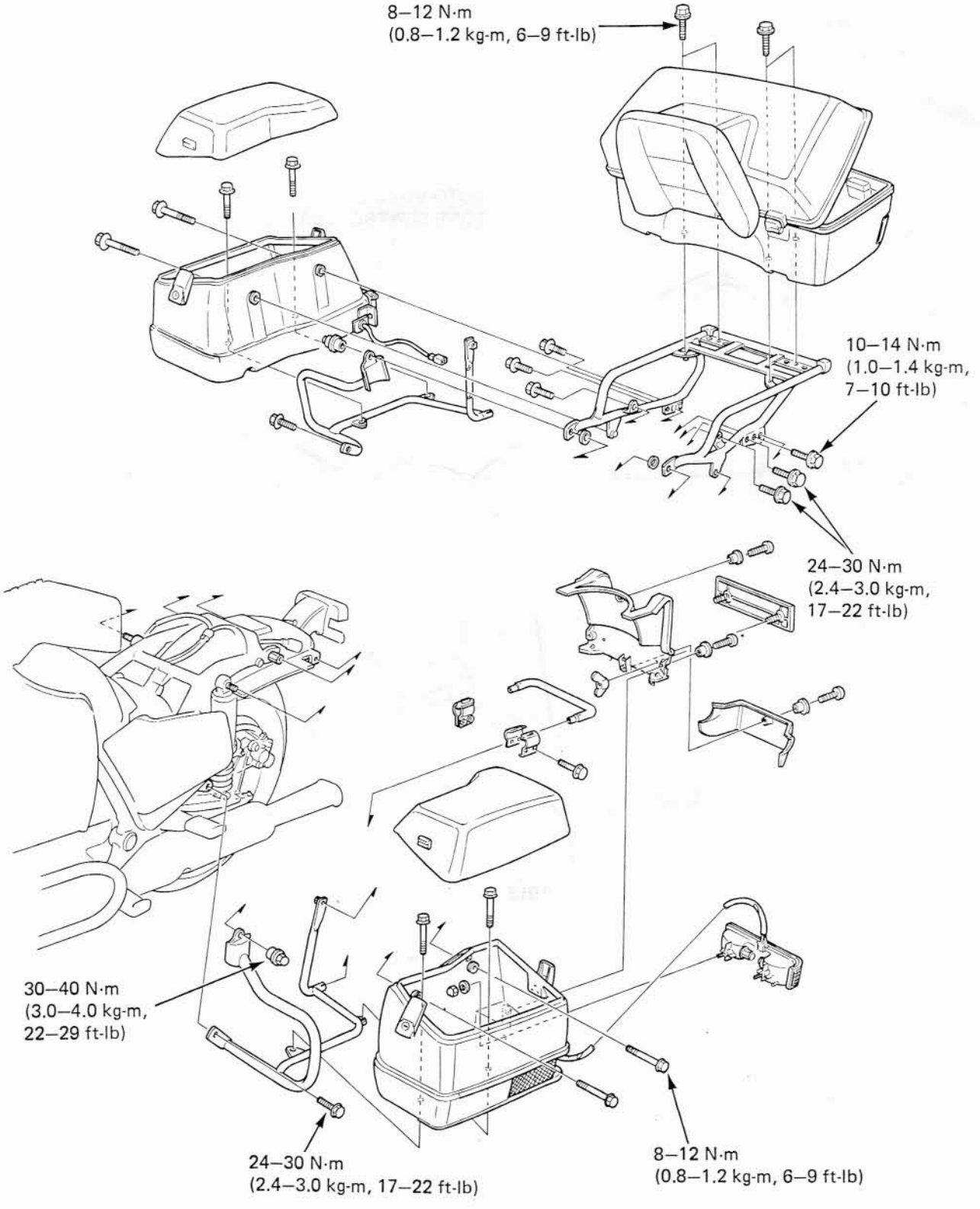
Remove the rear fender and mud guard.
Remove the rear bumper.



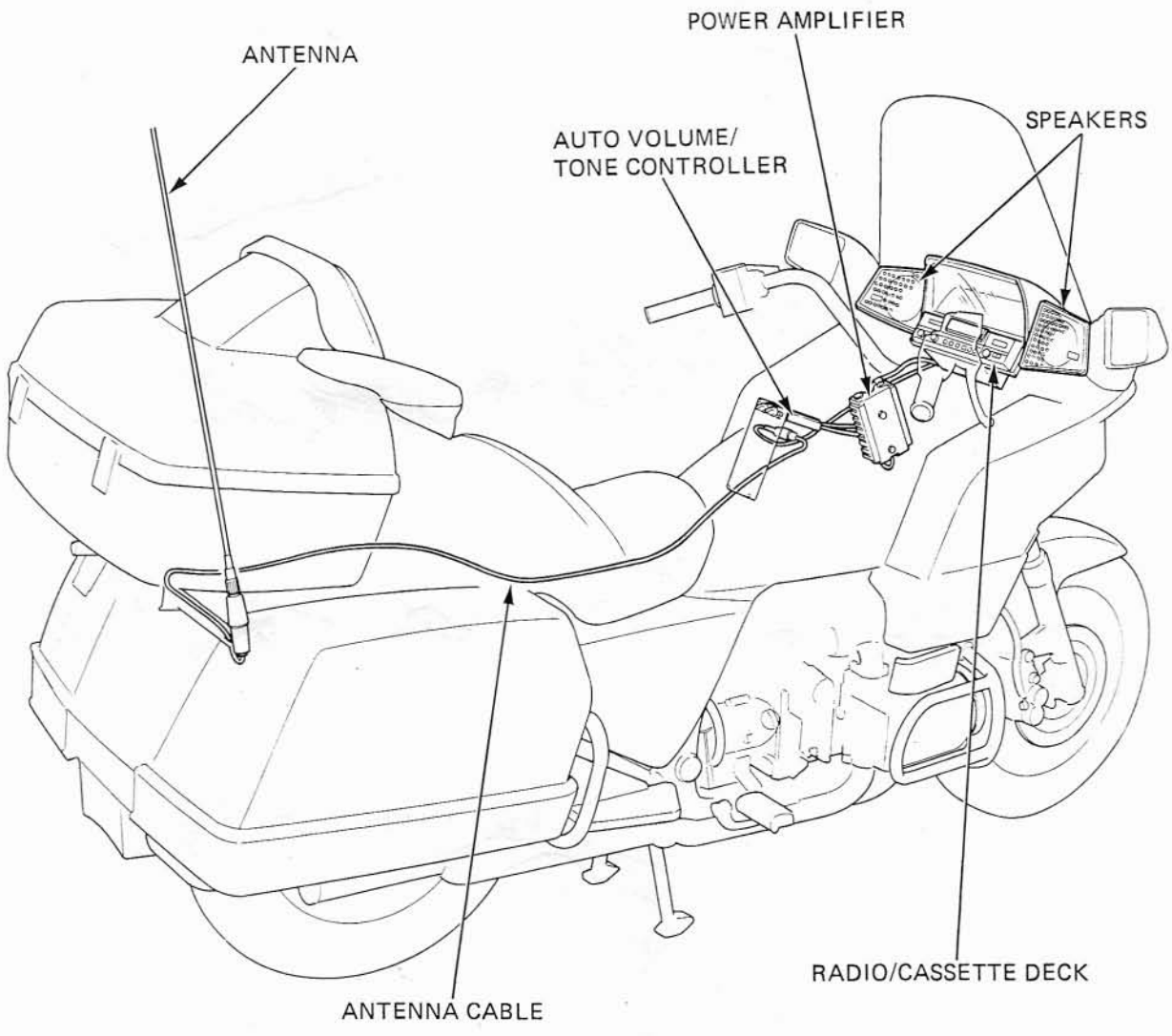
Remove the passenger foot rest brackets (GL-1200A).
Remove the saddlebag/travel trunk bracket bolts, and remove the bracket.



INSTALLATION



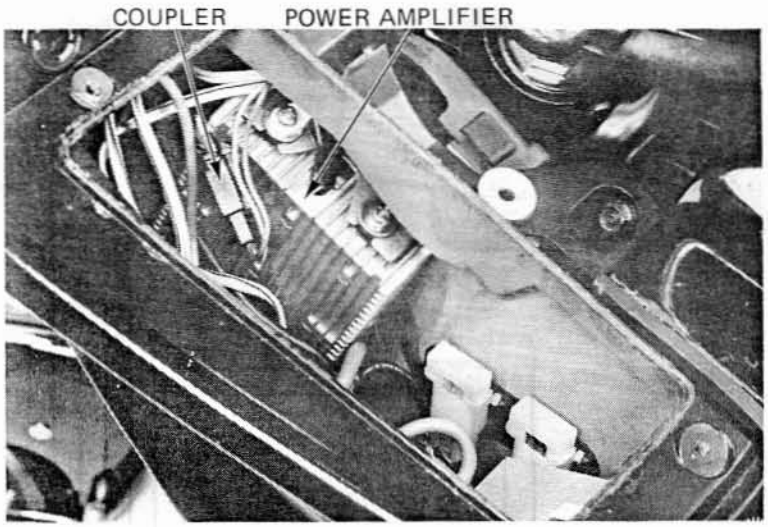
AUDIO SYSTEM (GL1200A)



POWER AMPLIFIER

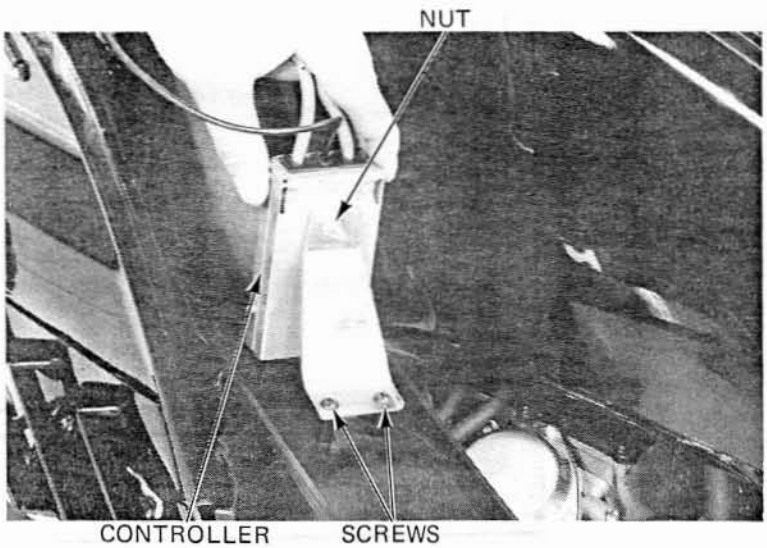
Remove the left fairing pocket.

Disconnect the coupler, two cap nuts, and remove the power amplifier from inside the fairing.



AUTO VOLUME/TONE CONTROLLER

Remove the controller panel from the fairing.
Remove the controller from the panel by removing the mount nut and screws.



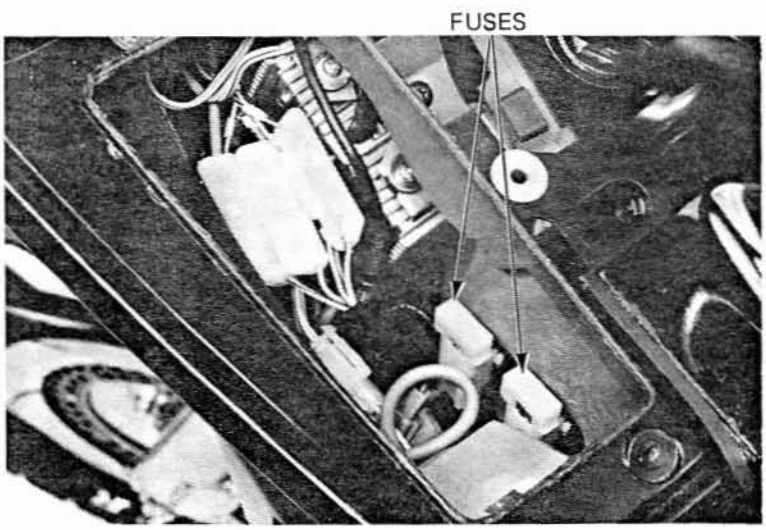
FUSE REPLACEMENT

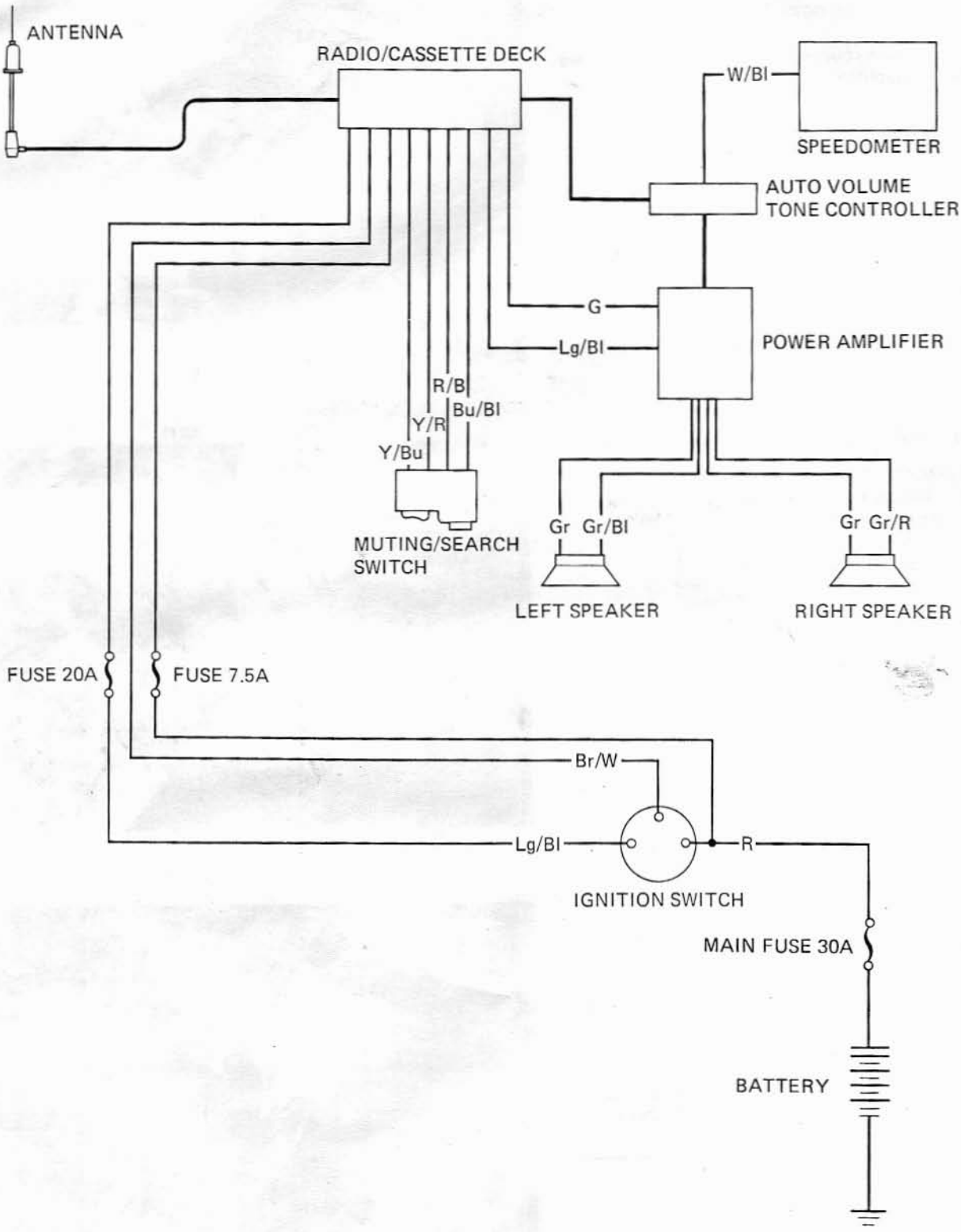
The fuses from the motorcycle's audio system and accessories are located inside the left fairing pockt.

Back-up power supply: 7.5A
Radio/cassette deck: 20A

CAUTION:

Whenver a fuse is blown, be sure to isolate the cause and take corrective measure, before installing a new one.



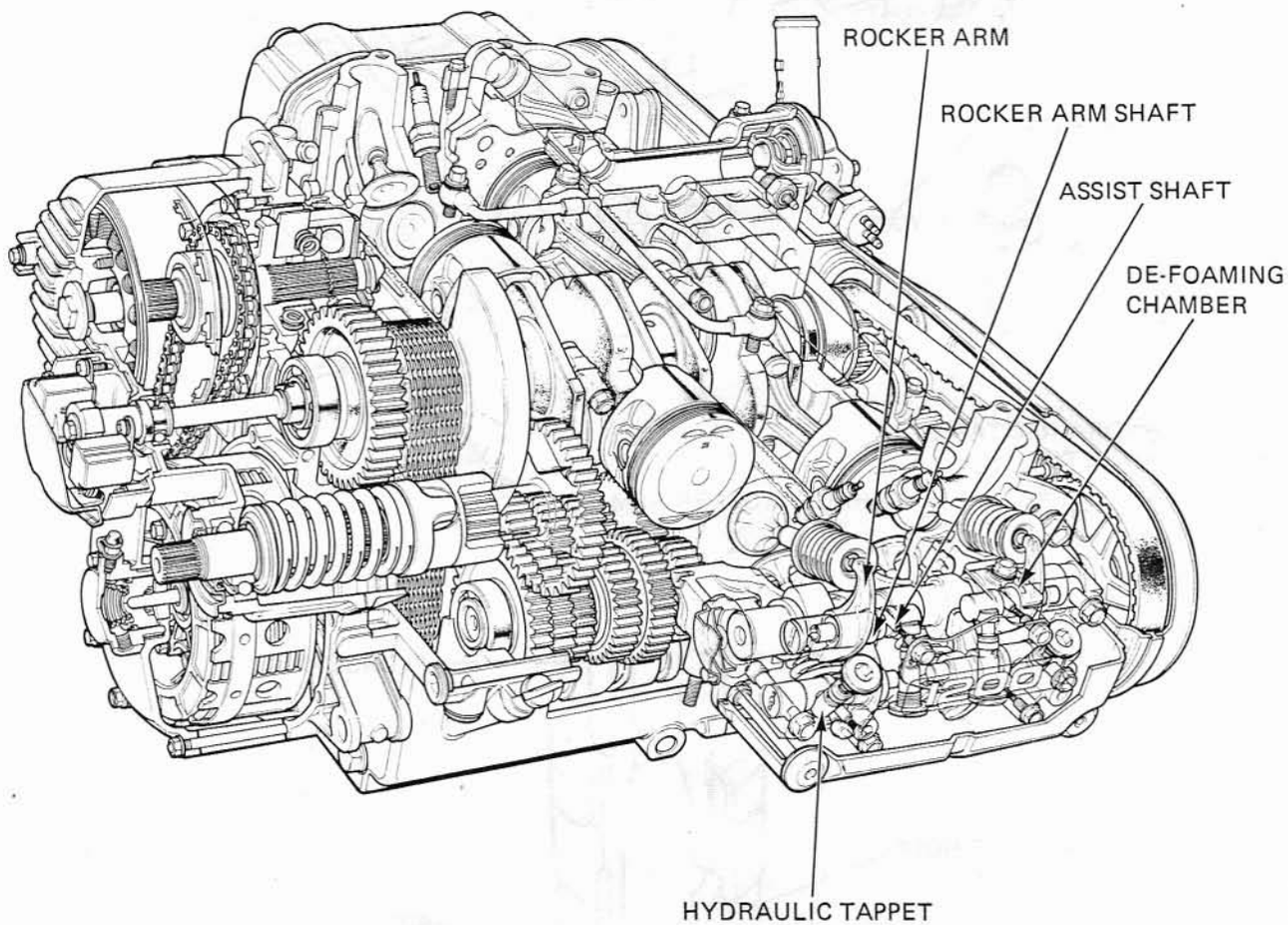


21. TECHNICAL FEATURERS

HYDRAULIC VALVE ADJUSTER SYSTEM

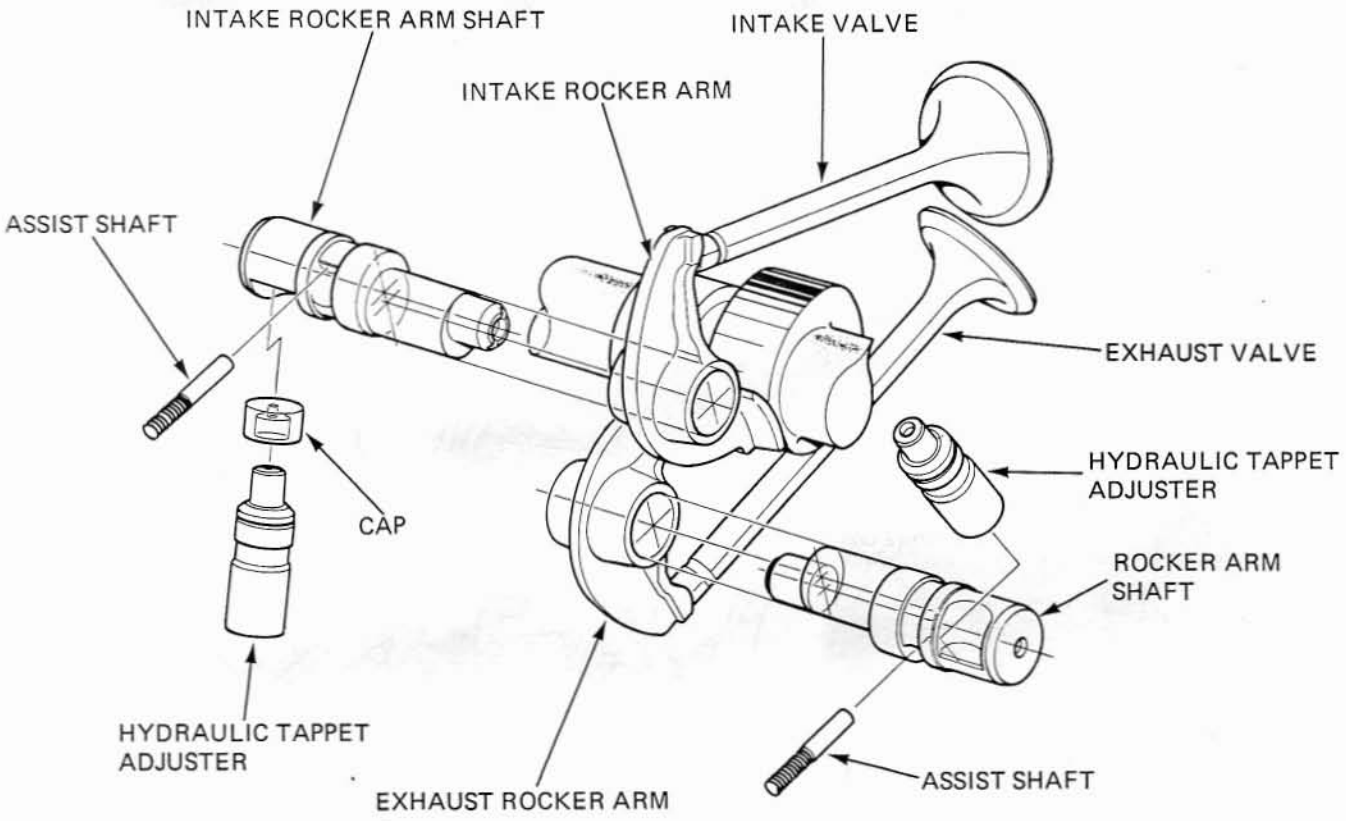
The engine is equipped with hydraulic valve tappets. Hydraulic tappets do not require adjustment and help the engine to run quieter by keeping valve clearance at zero at all engine temperatures and engine speeds up to redline.

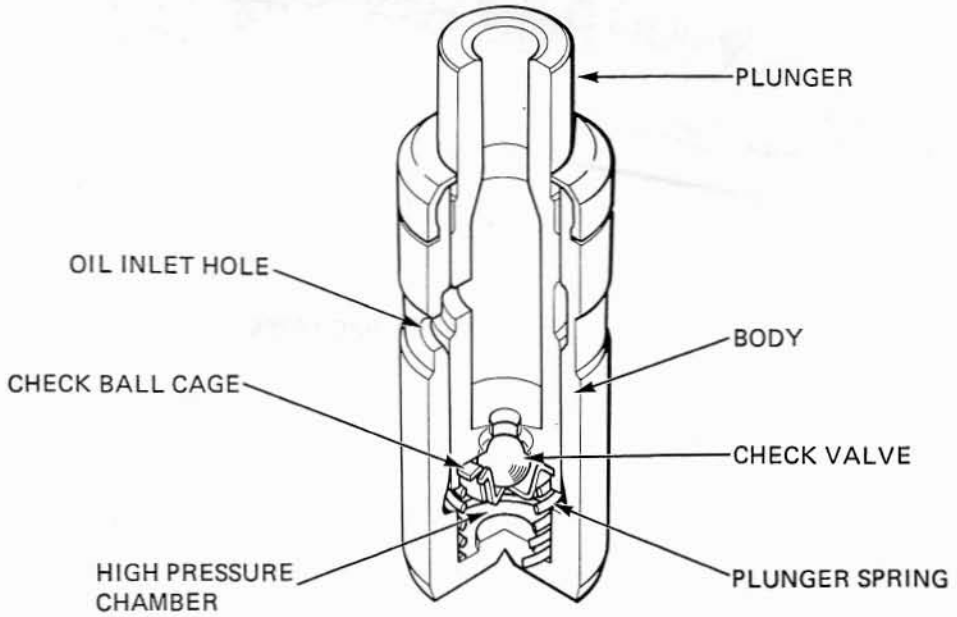
The tappets are continuously supplied with air-bled oil from the de-foaming chamber in the rocker arm holder where oil passes through.



• **Construction**

A rocker arm is installed on an eccentric rocker arm shaft. An assist shaft and spring fit in a notch in the shaft. The hydraulic tappet fits in another notch in the shaft. Together, they make the eccentric rocker arm shaft revolve to help maintain zero valve clearance.

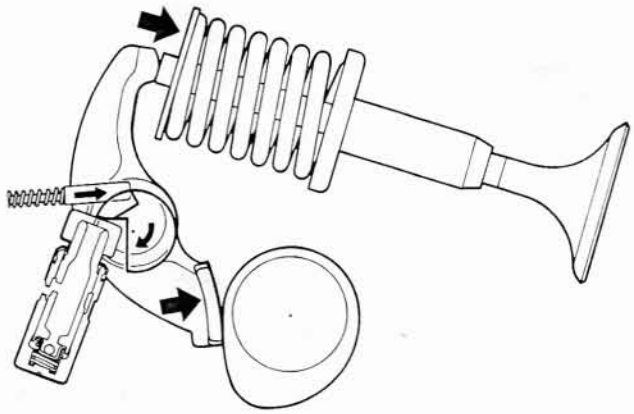




• Operation

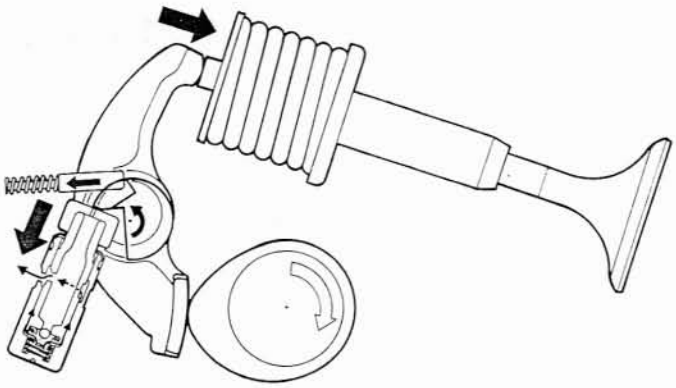
When the camshaft lobe is not lifting the rocker arm, the tappet plunger is at rest. In this position its oil inlet hole aligns with the tappet body oil inlet hole. Oil enters the tappet reservoir through these holes.

As the assist shaft pushes on the rocker arm shaft, the eccentric rocker arm shaft is rotated. As a result, the rocker arm is held by the valve stem and camshaft; that is, the valve clearance is naught (zero).



As the camshaft turns and lifts the rocker arm to open the valve, the eccentric rocker arm shaft revolves. The shaft pushes the tappet plunger down and oil pressure in the tappet high pressure chamber increases causing the check valve to close.

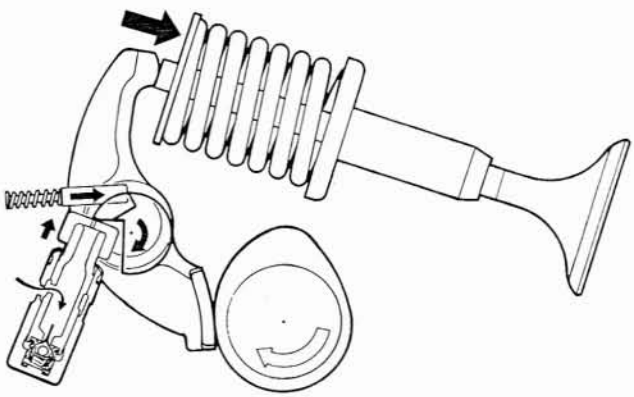
As the cam lobe nears maximum lift, oil pressure in the high pressure chamber increases rapidly (because the check valve is closed). The high oil pressure keeps the check valve against the plunger. At the same time the rocker arm is pushing against the tappet plunger. This causes a very small amount of oil to leak out of the high pressure chamber between the plunger and body. This allows the plunger to absorb the shock from the effects of the cam lobe reaching maximum lift.



After the cam lobe passes maximum lift, the engine valve springs force the engine valve to close and to push against the rocker arm which follows the cam profile. This also causes the eccentric rocker arm shaft to change direction allowing the tappet plunger to be pushed up by the spring in the high pressure chamber. Oil pressure decreases as a result, the check valve leaves its seat and the plunger and body oil inlet holes realign allowing oil to re-enter the reservoir and high pressure chamber.

At the same time, the assist shaft causes the eccentric rocker arm shaft to rotate. As this happens, the rocker arm is held by the valve stem and camshaft.

All of the above actions keep valve clearance at zero under all normal operating conditions.



MEMO

22. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

		POSSIBLE CAUSE
1. Check fuel flow to carburetor	NOT REACHING CARBURETOR →	(1) Fuel tank empty (2) Clogged fuel line or fuel filter (3) Sticking float valve (4) Faulty fuel pump (5) Faulty fuel pump relay (6) Clogged fuel tank cap vent hole
REACHING CARBURETOR ↓		
2. Perform spark test	WEAK OR NO SPARK →	(1) Faulty spark plugs (2) Fouled spark plugs. (3) Faulty ignition control unit (4) Broken or shorted high tension wires (5) Opened or shorted in ignition circuit (6) Broken or shorted ignition coil (7) Faulty ignition switch (8) Faulty pulse generator
GOOD SPARK ↓		
3. Test cylinder compression	LOW COMPRESSION →	(1) Low battery charge (2) Improper valve clearance (Faulty hydraulic tappet) (3) Valve stuck open (4) Worn cylinder and piston rings (5) Damaged cylinder head gasket (6) Seized valve (7) Improper valve timing (8) Worn or damaged valve seat (9) Warped or cracked cylinder head
COMPRESSION NORMAL ↓		
4. Start by following normal procedure	ENGINE STARTS BUT STOPS →	(1) Improper choke operation (2) Carburetor incorrectly adjusted (3) Intake pipe leaking (4) Improper ignition timing (Ignition control unit or pulse generator) (5) Fuel contaminated.
ENGINE DOES NOT FIRE ↓		
5. Remove and inspect spark plug	WET PLUG →	(1) Carburetor flooded (2) Incorrect choke cable free play (3) Cylinder flooded (4) Air cleaner dirty (5) Faulty carburetor (Rich mixture)

ENGINE LACKS POWER

		POSSIBLE CAUSE
1. Raise wheels off ground and spin by hand WHEEL SPINS FREELY	WHEELS DO NOT SPIN FREELY →	(1) Brake dragging (2) Worn or damaged wheel bearings (3) Wheel bearing needs lubrication (4) Drive chain too tight (5) Rear axle nut excessively tight (6) Final gear bearing damaged
2. Check tire pressure PRESSURE NORMAL	PRESSURE LOW →	(1) Punctured tire (2) Faulty tire valve
3. Check clutch slipping CLUTCH ENGAGED PROPERLY	CLUTCH SLIPS →	(1) Faulty clutch hydraulic system (2) Clutch spring weak (3) Worn clutch disc/plate (4) Warped clutch disc/plate
4. Accelerate lightly ENGINE SPEED INCREASES	ENGINE SPEED DOES NOT INCREASE →	(1) Incorrect choke cable free play (2) Clogged air cleaner (3) Restricted fuel flow (4) Clogged muffler (5) Clogged fuel tank vent hole (6) Faulty carburetor
5. Check ignition timing CORRECT	INCORRECT →	(1) Faulty ignition control unit (2) Faulty pulse generator
6. Check tappet noise NORMAL	ABNORMAL →	(1) Faulty hydraulic tappet (2) Worn valve seat or camshaft (3) Oil level too low
7. Test cylinder compression NORMAL	TOO LOW →	(1) Valve stuck open (2) Worn cylinder and piston rings (3) Leaking head gasket (4) Improper valve timing (5) Faulty hydraulic tappet
8. Check carburetor for clogging NOT CLOGGED	CLOGGED →	(1) Carburetor not serviced frequently enough
9. Remove spark plug NOT FOULED OR DISCOLORED	FOULED OR DISCOLORED →	(1) Plugs not serviced frequently enough (2) Spark plug with incorrect heat range
10. Check oil level and condition CORRECT	INCORRECT →	(1) Oil level too high (2) Oil level too low (3) Contaminated oil
11. Remove cylinder head cover and inspect lubrication VALVE TRAIN LUBRICATED PROPERLY	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage (2) Clogged oil control orifice (3) Clogged oil filter or screen
12. Check for engine overheating NOT OVERHEATING	OVERHEATING →	(1) Collant level too low (2) Fan motor not working (thermostatic switch faulty) (3) Thermostat stuck closed (4) Excessive carbon build-up in combustion chamber (5) Use of poor quality fuel (6) Improper ignition timing
13. Accelerate or run at high speed ENGINE DOES NOT KNOCK	ENGINE KNOCKS →	(1) Worn piston and cylinder (2) Wrong type of fuel (3) Excessive carbon build-up in combustion chamber (4) Ignition timing too advanced

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		POSSIBLE CAUSE
1. Check ignition timing and tappet noise	INCORRECT →	(1) Faulty hydraulic tappet (2) Improper ignition timing
CORRECT ↓		
2. Check carburetor pilot screw adjustment	INCORRECT →	See Fuel System Section
CORRECT ↓		
3. Check for leaking intake pipe and vacuum tubes	LEAKING →	(1) Deteriorated insulator O-ring (2) Loose carburetor (3) Damaged or deteriorated vacuum tubes.
NO LEAK ↓		
4. Perform spark test	WEAK OR INTERMITTENT SPARK →	(1) Faulty, carbon or wet fouled spark plug (2) Faulty ignition control unit (3) Faulty ignition coil or high tension wire (4) Faulty pulse generator
GOOD SPARK		

POOR PERFORMANCE AT HIGH SPEED

		POSSIBLE CAUSE
1. Check ignition timing and tappet noise	INCORRECT →	(1) Faulty hydraulic tappet (2) Faulty ignition control unit (3) Faulty pulse generator
CORRECT ↓		
2. Disconnect fuel line at carburetor	FUEL FLOW RESTRICTED →	(1) Fuel tank empty (2) Clogged fuel line or fuel filter (3) Clogged fuel tank cap vent hole (4) Sticking float valve (5) Faulty fuel pump (6) Faulty fuel pump relay
FUEL FLOWS FREELY ↓		
3. Remove carburetors and check for clogged jets	CLOGGED →	Clean
NO CLOGGED JETS ↓		
4. Check valve timing	INCORRECT →	Cam drive pulley not installed properly
CORRECT ↓		
5. Check valve spring tension	WEAK →	Faulty spring
NOT WEAKENED		

POOR HANDLING → Check tire and suspension pressures

	POSSIBLE CAUSE
1. If steering is heavy →	(1) Steering bearing adjustement nut too tight (2) Damaged steering head bearings
2. If either wheel is wobbling →	(1) Excessive wheel bearing play (2) Bent rim (3) Improperly balanced or misaligned wheels (4) Swing arm pivot bearing excessively worn (5) Bent frame
3. If the motorcycle pulls to one side →	(1) Bent frame (2) Front and rear wheels not aligned (3) Bent front fork (4) Bent swing arm

HYDRAULIC VALVE ADJUSTER SYSTEM

NOISY TAPPET

		POSSIBLE CAUSE
1. Check for low oil level. Ride for five minutes with the engine speed over 3,000 min^{-1} (rpm) Check oil level and condition.	INCORRECT →	(1) Contaminated oil (2) Use of poor quality oil
CORRECT ↓		
2. Check oil pressure	INCORRECT →	(1) Clogged oil filter screen (2) Clogged oil filter (3) Oil level too low (4) Faulty oil pump (5) Relief valve stuck open (6) Internal oil leakage (7) Worn crankshaft bearing (8) Clogged oil control orifice (9) Clogged oil passage (10) Clogged oil pipe
CORRECT ↓		
3. Remove cylinder head cover and check lubrication	NOT LUBRICATED PROPERLY →	(1) Clogged camshaft holder oil passage (2) Clogged oil control orifice
CORRECT ↓		
4. Remove hydraulic tappet and check it	INCORRECT →	(1) Plunger sticking (2) Faulty hydraulic tappet (3) Air in hydraulic tappet (4) Worn or sticking hydraulic tappet (5) Improper hydraulic tappet installation
CORRECT ↓		
5. Disassemble camshaft holder and check parts	INCORRECT →	(1) Worn or damaged rocker arm or shaft (2) Worn valve stem (3) Broken or weak assist spring (4) Sticking assist shaft (5) Use of improper shim (6) Improper installation (7) Worn camshaft

LOW CYLINDER COMPRESSION

		POSSIBLE CAUSE
1. Check oil level and condition	INCORRECT →	(1) Contaminated oil (2) Use of poor quality oil
CORRECT ↓		
2. Check oil pressure	INCORRECT →	See above item 2
NORMAL ↓		
3. Remove hydraulic tappet and check it	INCORRECT →	(1) Sticking hydraulic tappet (2) Faulty hydraulic tappet (3) Improper hydraulic tappet installation
CORRECT ↓		
4. Disassemble camshaft holder and check parts	INCORRECT →	(1) Worn or damaged rocker arm or shaft (2) Use of improper shim (3) Improper installation
CORRECT ↓		
5. Check valve and valve seat	INCORRECT →	(1) Worn valve seat or valve face
CORRECT →		(1) Engine over rev

MEMO

IMPORTANT SAFETY NOTICE

WARNING *Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.*

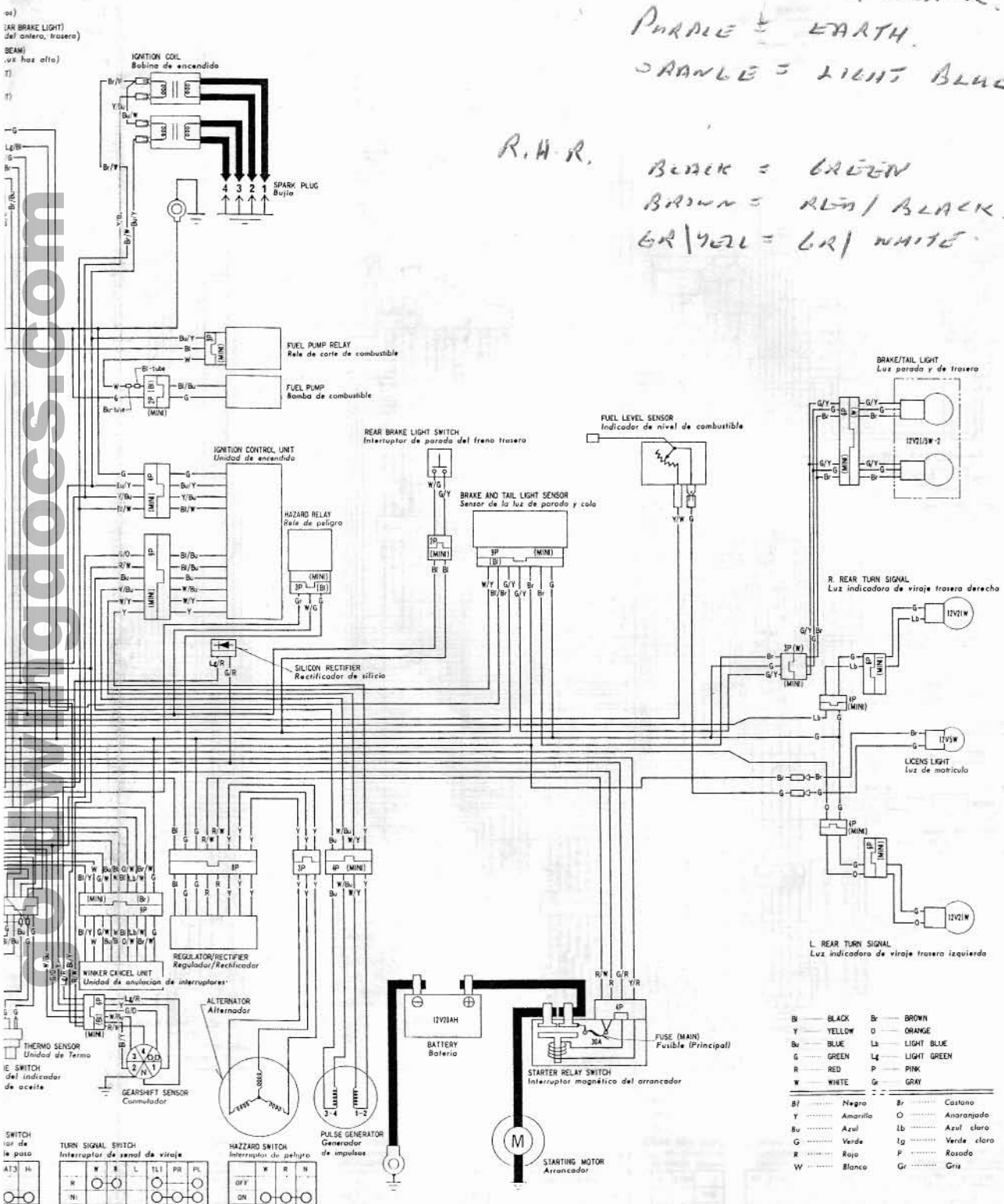
CAUTION: *Indicates a possibility of personal injury or equipment damage if instructions are not followed.*

NOTE: Gives helpful information.

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains *some* warnings and cautions against some specific service methods which could cause **PERSONAL INJURY** to service personnel or could damage a vehicle or render it unsafe. Please understand that those warnings could not cover all conceivable ways in which service, whether or not recommended by Honda might be done or of the possibly hazardous consequences of each conceivable way, not could Honda investigate all such ways. Anyone using service procedures or tools, whether or not recommended by Honda *must satisfy himself thoroughly* that neither personal safety nor vehicle safety will be jeopardized by the service methods or tools selected.

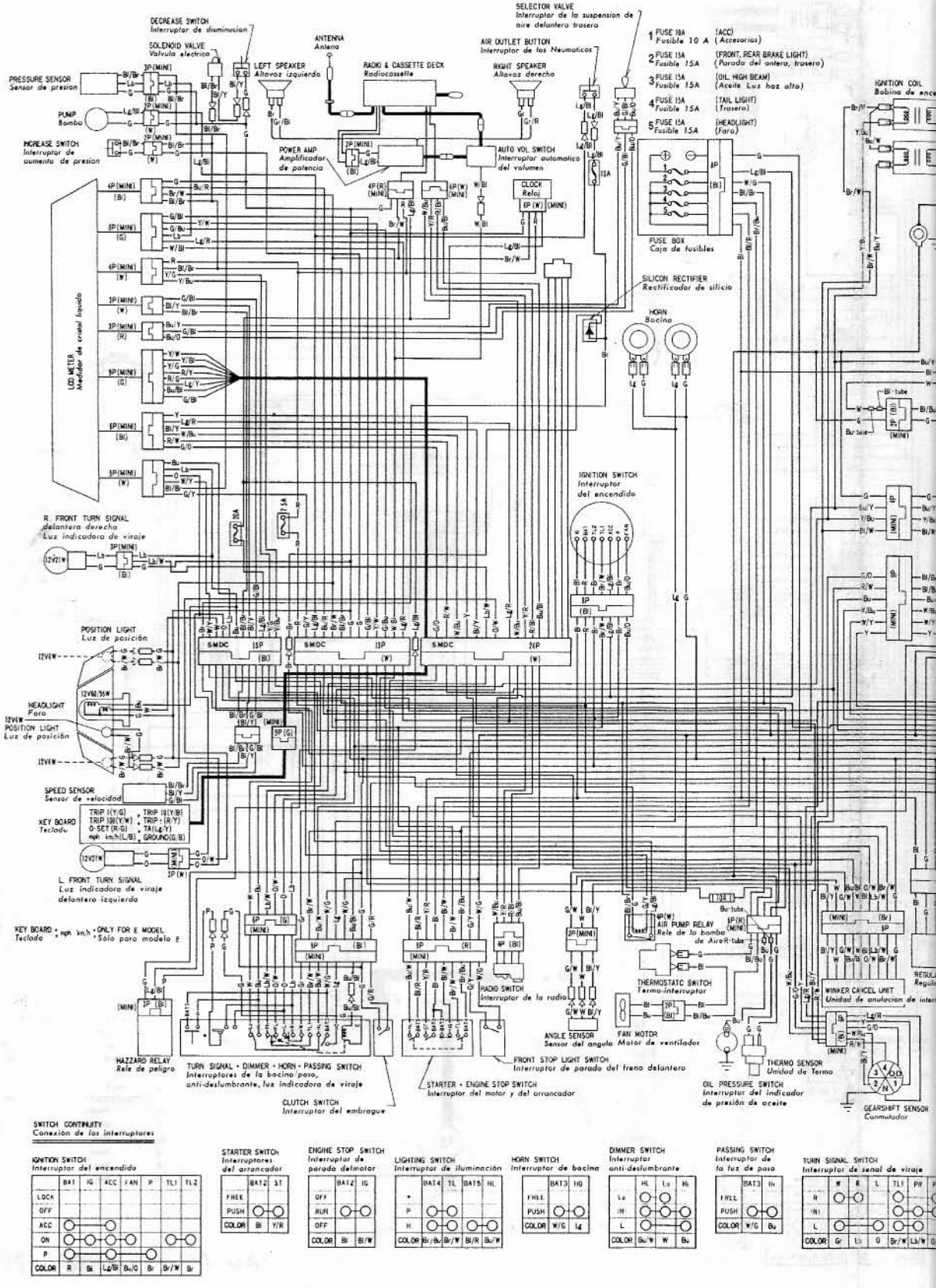
L.H.R. RED = GR/WHITE
BR = RED/BLACK.
PURPLE = EARTH.
ORANGE = LIGHT BLUE.

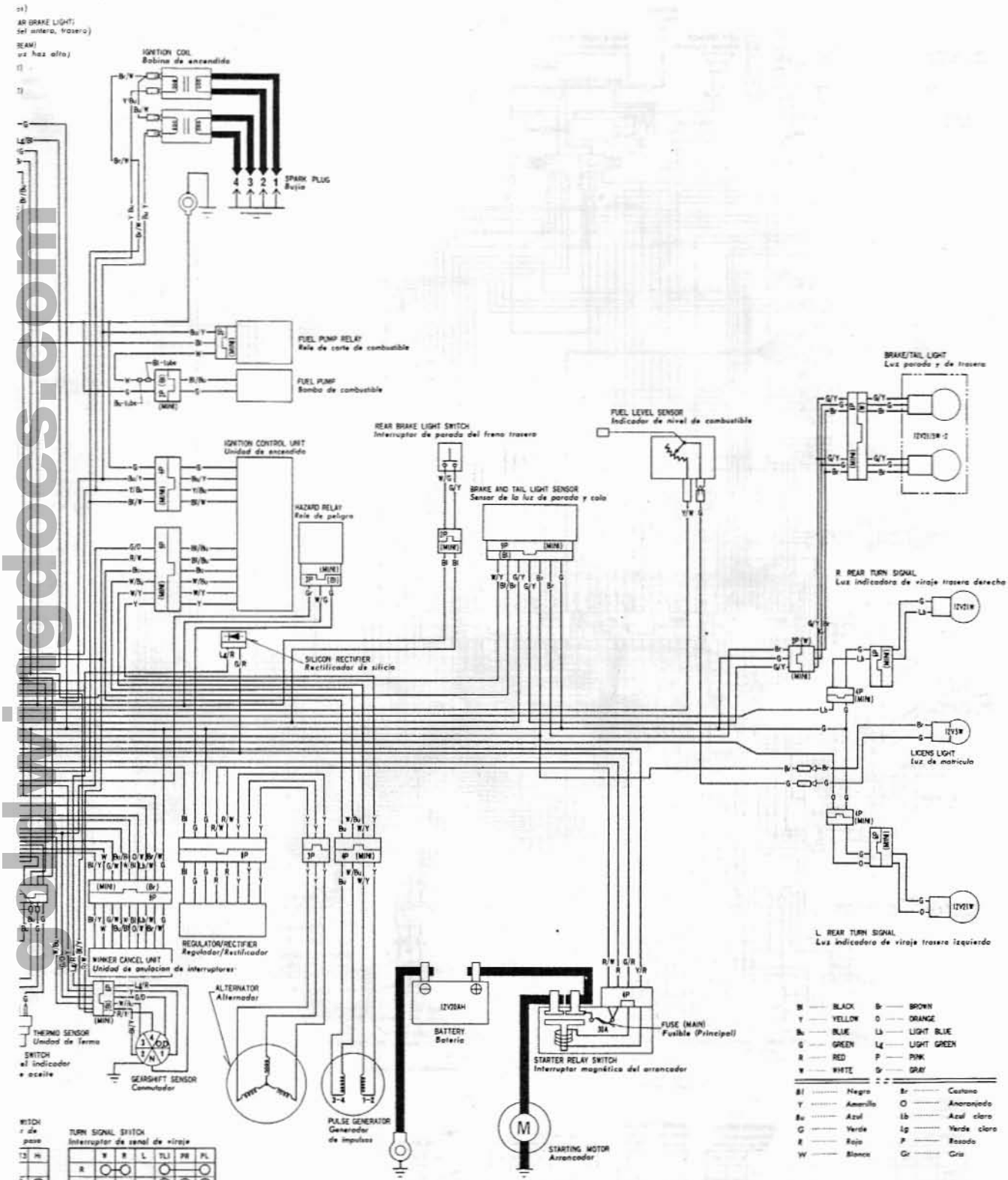
R.H.R. BLACK = GREEN
BROWN = RED/BLACK.
GR/YELL = GR/WHITE.



英 西 E F ED SW 0030Z—MG9—8300

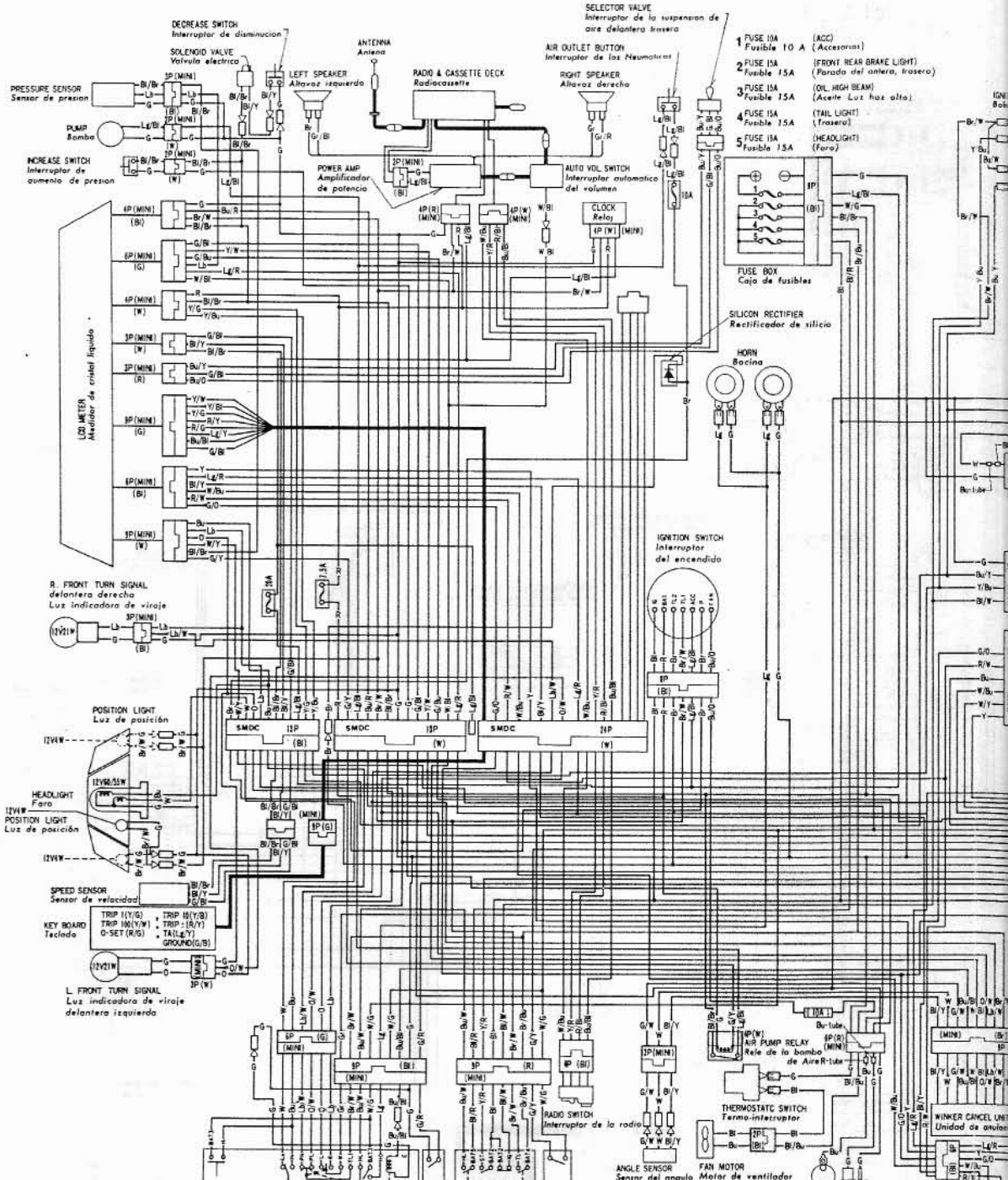
GL1200A E, F, ED, SW





英西 (SD) 0030Z—MG9—9700

GL1200A SD



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	FAN	P	TL1	TL2
LOCK							
OFF							
ACC			○				
ON	○	○	○	○		○	○
P	○		○		○		
COLOR	R	Bl	Lg/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
•				
P	○			
H	○	○		
COLOR	Gr/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti-deslumbrante

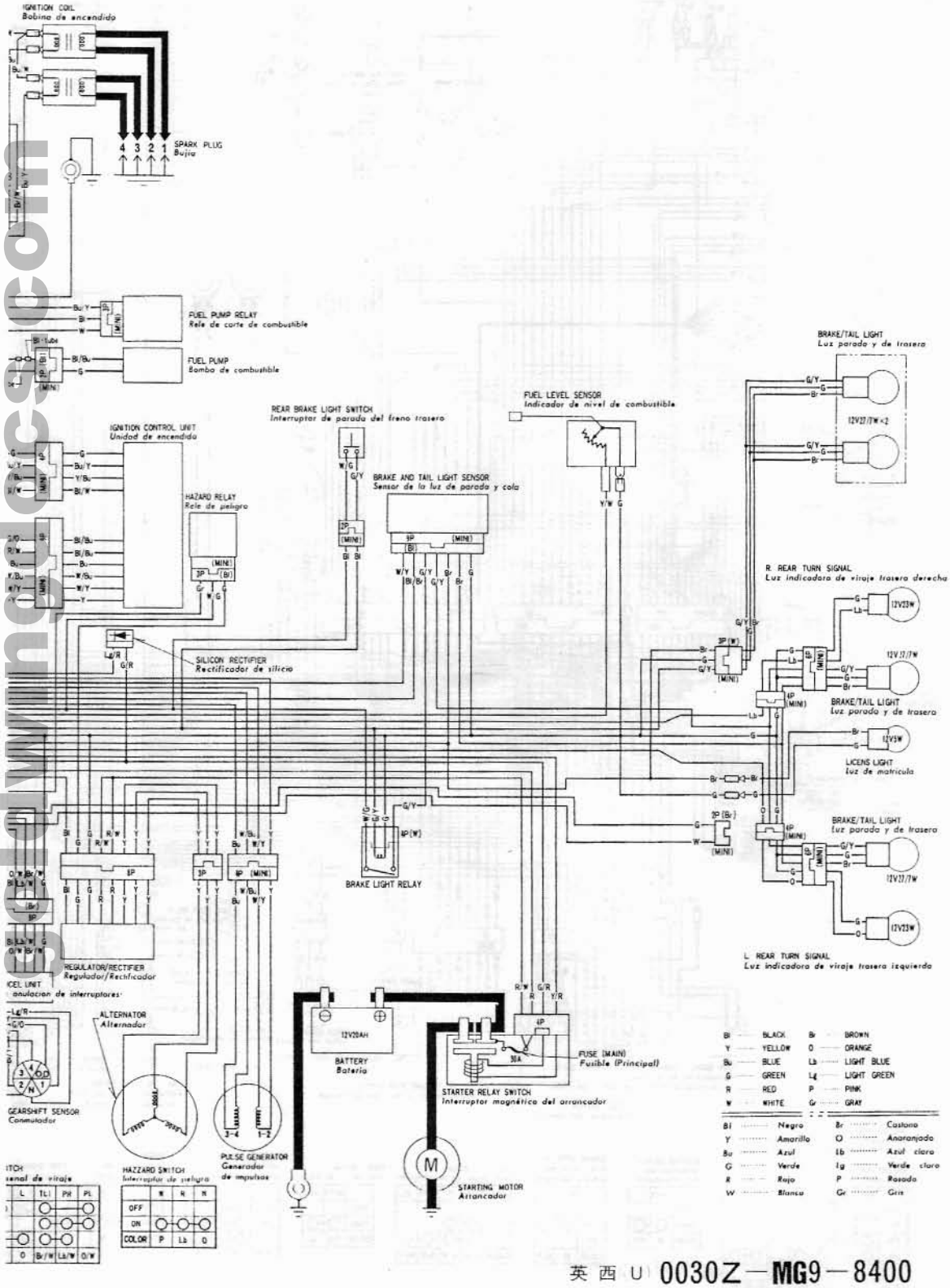
	HL	Lo	Hi
Lo		○	○
NI	○	○	○
L	○		○
COLOR	Bu/W	W	Bu

PASSING SWITCH
Interruptor de la luz de paso

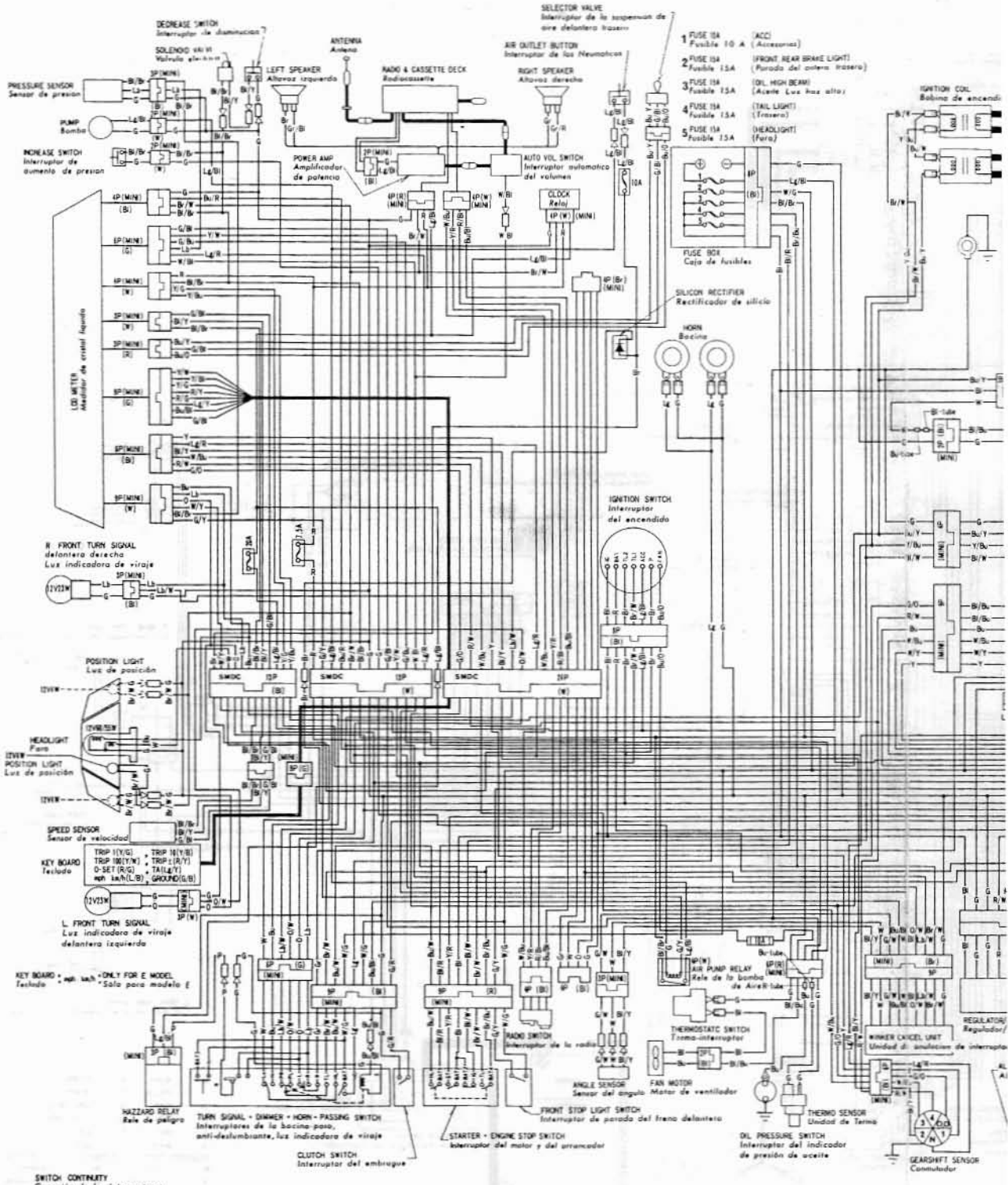
	BAT3	HL
FREE		
PUSH	○	○
COLOR	W/G	Bu

TURN SIGNAL SYITCH
Interruptor de senal d

	W	R	L
R	○		
NI			
L		○	
COLOR	Gr	Lb	O


IGNITION COIL
Bobina de encendido
SPARK PLUG
Bujía
FUEL PUMP RELAY
Relé de corte de combustible
FUEL PUMP
Bomba de combustible
IGNITION CONTROL UNIT
Unidad de encendido
HAZARD RELAY
Relé de peligro
REAR BRAKE LIGHT SWITCH
Interruptor de parada del freno trasero
BRAKE AND TAIL LIGHT SENSOR
Sensor de la luz de parada y cola
FUEL LEVEL SENSOR
Indicador de nivel de combustible
SILICON RECTIFIER
Rectificador de silicio
BRAKE LIGHT RELAY
REGULATOR/RECTIFIER
Regulador/Rechificador
ALTERNATOR
Alternador
GEARSHIFT SENSOR
Conmutador
HAZZARD SWITCH
Interruptor de peligro
PULSE GENERATOR
Generador de impulsos
BATTERY
Batería
12V20AH
FUSE (MAIN)
Fusible (Principal)
STARTER RELAY SWITCH
Interruptor magnética del arrancador
STARTING MOTOR
Arrancador
BRAKE/TAIL LIGHT
Luz parada y de trasera
12V27/7W×2
R. REAR TURN SIGNAL
Luz indicadora de viraje trasera derecha
12V23W
12V27/7W
BRAKE/TAIL LIGHT
Luz parada y de trasero
LICENS LIGHT
luz de matrícula
L. REAR TURN SIGNAL
Luz indicadora de viraje trasera izquierda
Bl — BLACK
Y — YELLOW
Bu — BLUE
G — GREEN
R — RED
W — WHITE
Br — BROWN
O — ORANGE
Lb — LIGHT BLUE
Lg — LIGHT GREEN
P — PINK
Gr — GRAY
Negro
Amarillo
Azul
Verde
Rojo
Blanco
Castaño
Anaranjado
Azul claro
Verde claro
Rosado
Gris

GL1200A U



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	FAN	P	TL1	TL2
LOCK							
OFF							
ACC	○		○				
ON	○		○	○		○	○
P	○		○	○	○		
COLOR	R	Bl	Lg/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
*				
P	○	○		
H	○	○	○	○
COLOR	Bl/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti deslumbrante

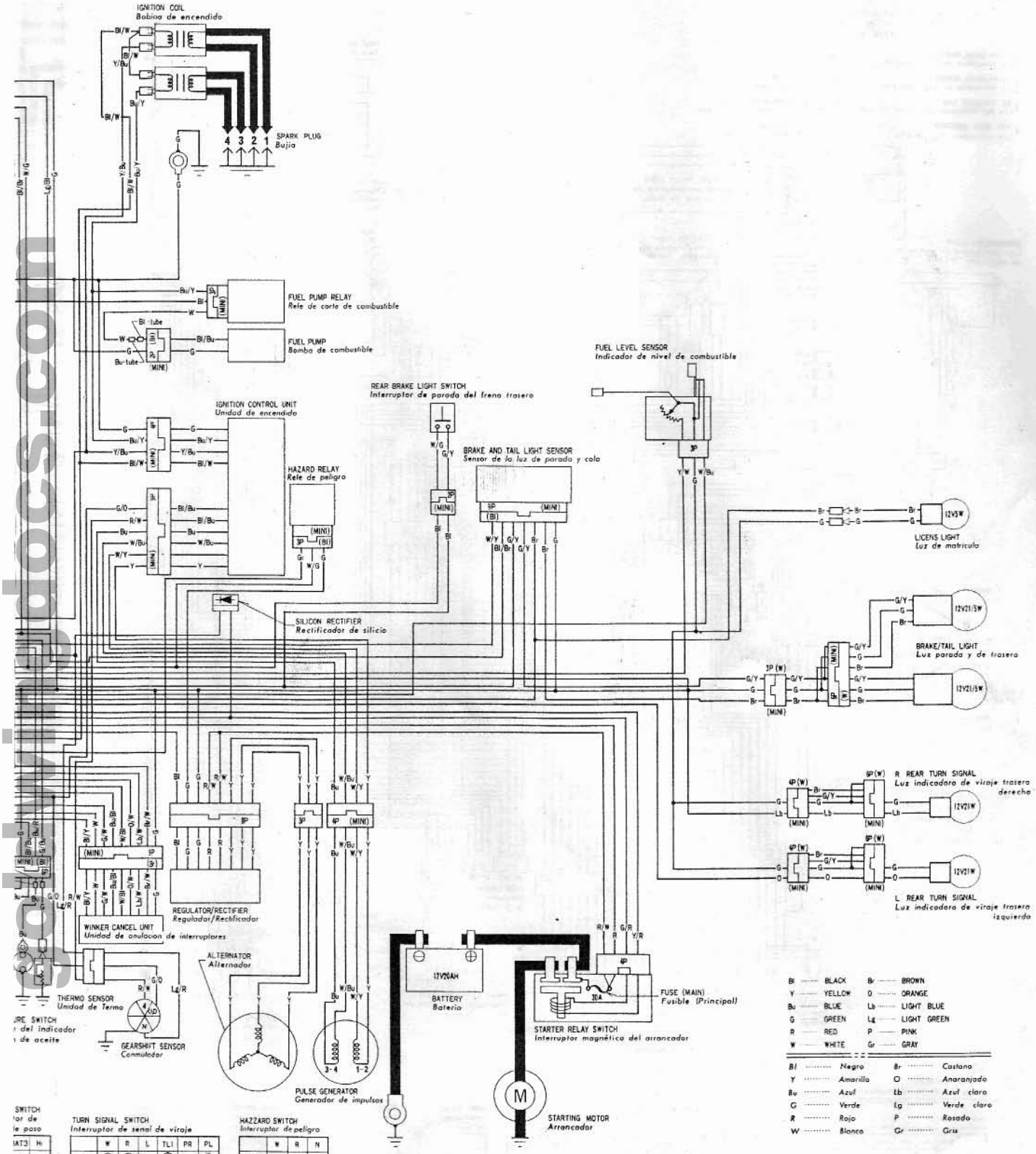
	HL	Lo	Hi
Lo	○		
Hi	○	○	
L	○	○	○
COLOR	Bu/W	W	Bu

PASSING SWITCH
Interruptor de la luz de paso

	BAT3	HL
FREE		
PUSH	○	○
COLOR	W/G	Bu

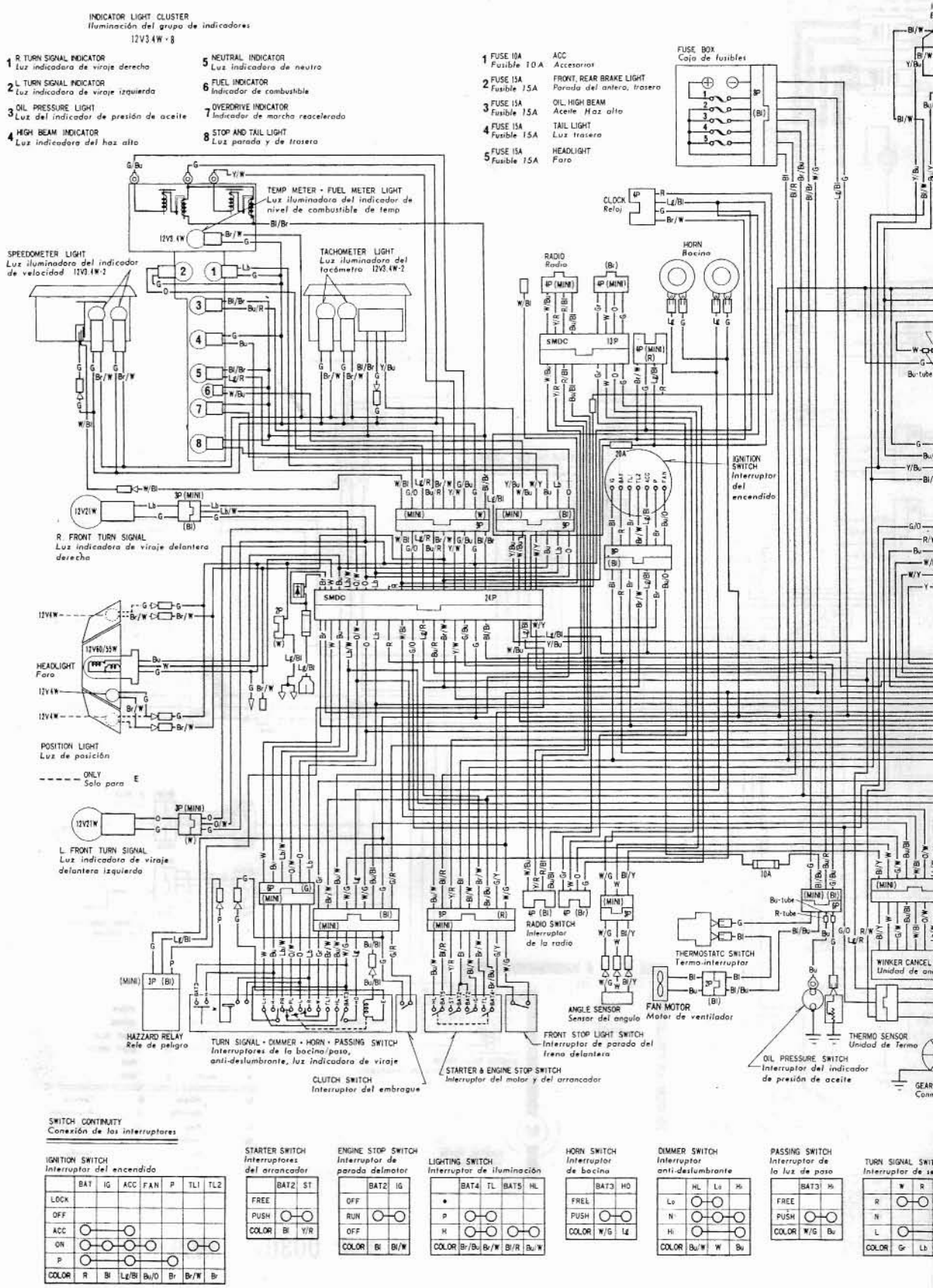
TURN SIGNAL SWITCH
Interruptor de señal de viraje

	W	R	L	TL1	PR	PL
R	○	○		○	○	○
IN!				○	○	○
L	○		○	○	○	
COLOR	Gr	Lg	O	Br/W	Lg/W	O/W



英 西 (E) F (ED) SW 0030Z—MG9—7000

GL1200D E, F, ED, SW



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	F.AN	P	TLI	TL2
LOCK							
OFF							
ACC	○		○				
ON	○	○	○	○		○	○
P	○		○		○		
COLOR	R	Bl	Lg/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
•				
P	○	○		
H	○	○	○	○
COLOR	Br/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti-deslumbrante

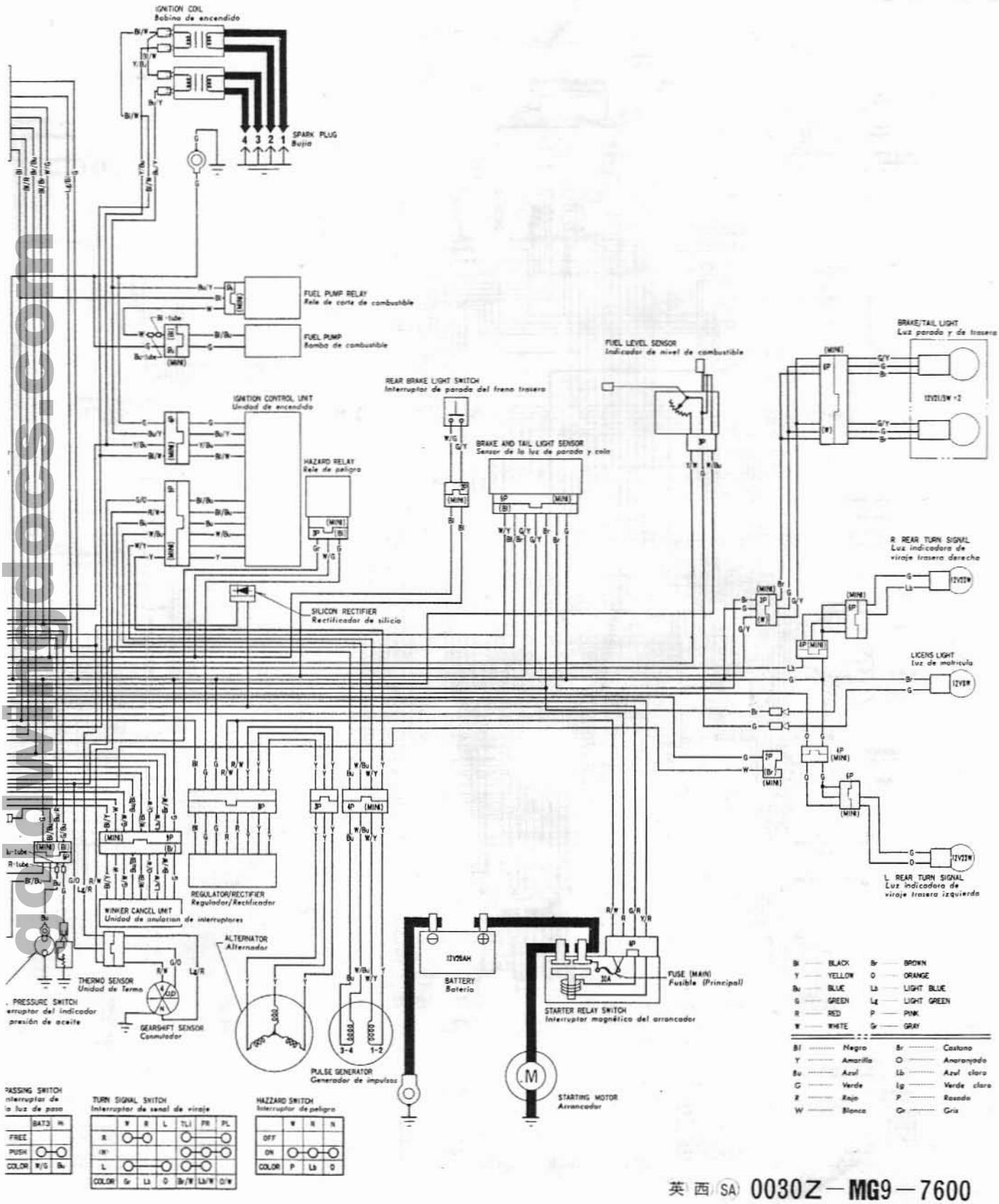
	HL	Lo	Hi
Lo	○	○	
N		○	
Hi	○	○	○
COLOR	Bu/W	W	Bu

PASSING SWITCH
Interruptor de la luz de paso

	BAT3	Hi
FREE		
PUSH	○	○
COLOR	W/G	Bu

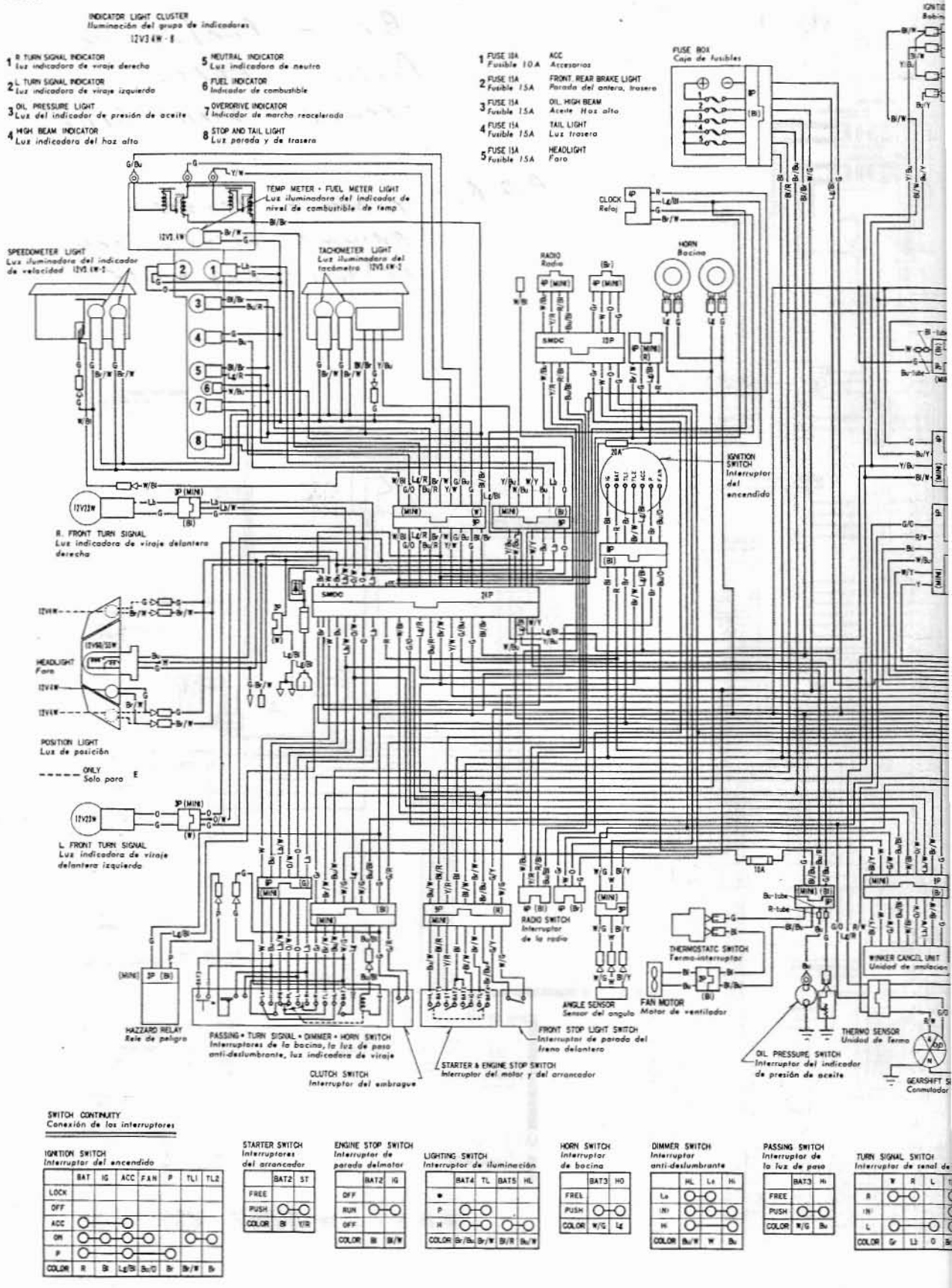
TURN SIGNAL SWI
Interruptor de se

	W	R
R	○	○
N		
L	○	
COLOR	Gr	Lb



英 西 SA 0030Z－MG9－7600

GL1200D SA



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	FAN	P	TL1	TL2
LOCK							
OFF							
ACC	○		○				
ON	○	○	○	○		○	○
P	○		○		○		
COLOR	R	Bl	Lg/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
•				
P	○	○		
H	○		○	○
COLOR	Br/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti-deslumbrante

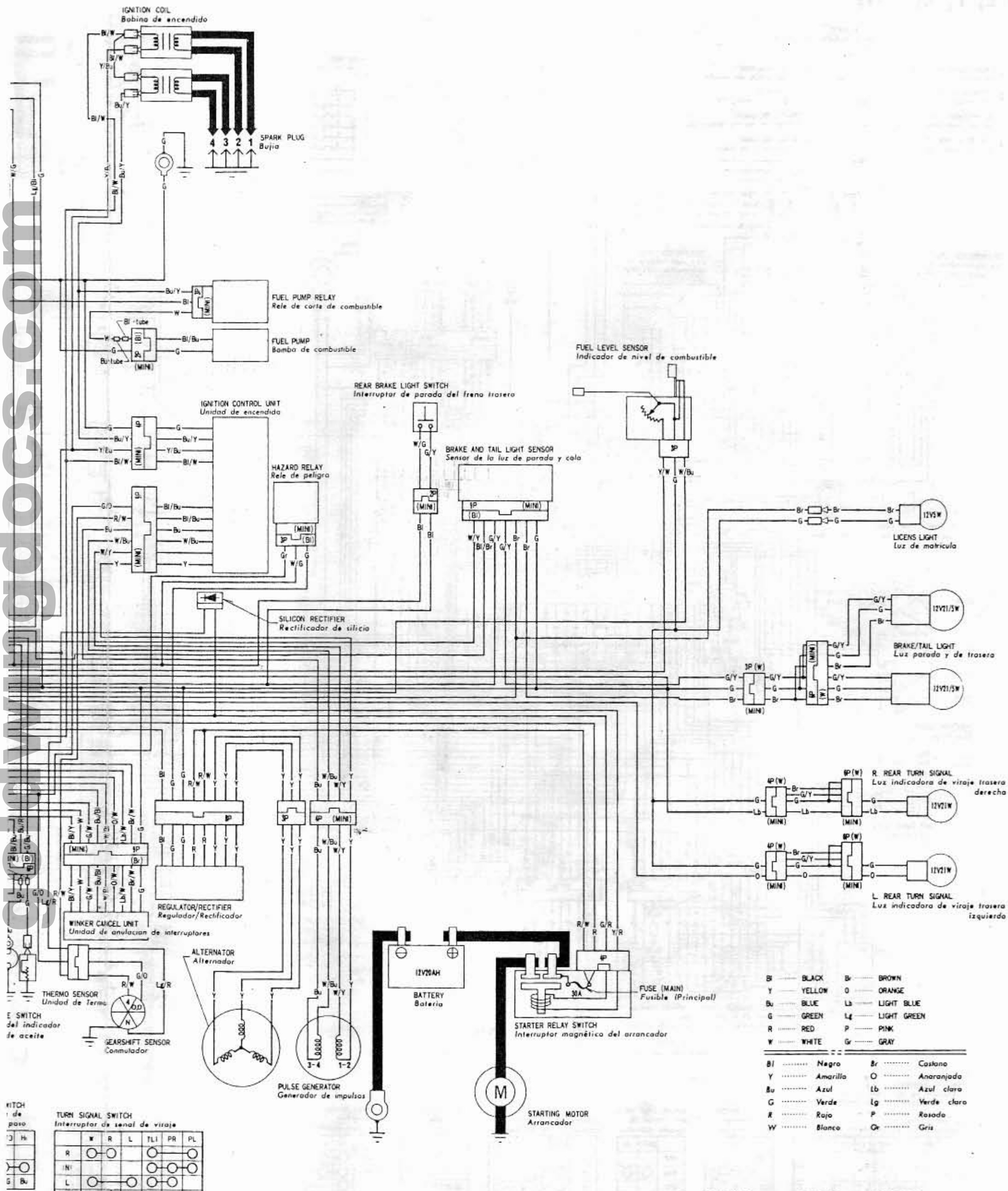
	HL	Lo	Hi
Lo	○	○	
(N)	○	○	○
Hi		○	○
COLOR	Bu/W	W	Bu

PASSING SWITCH
Interruptor de la luz de paso

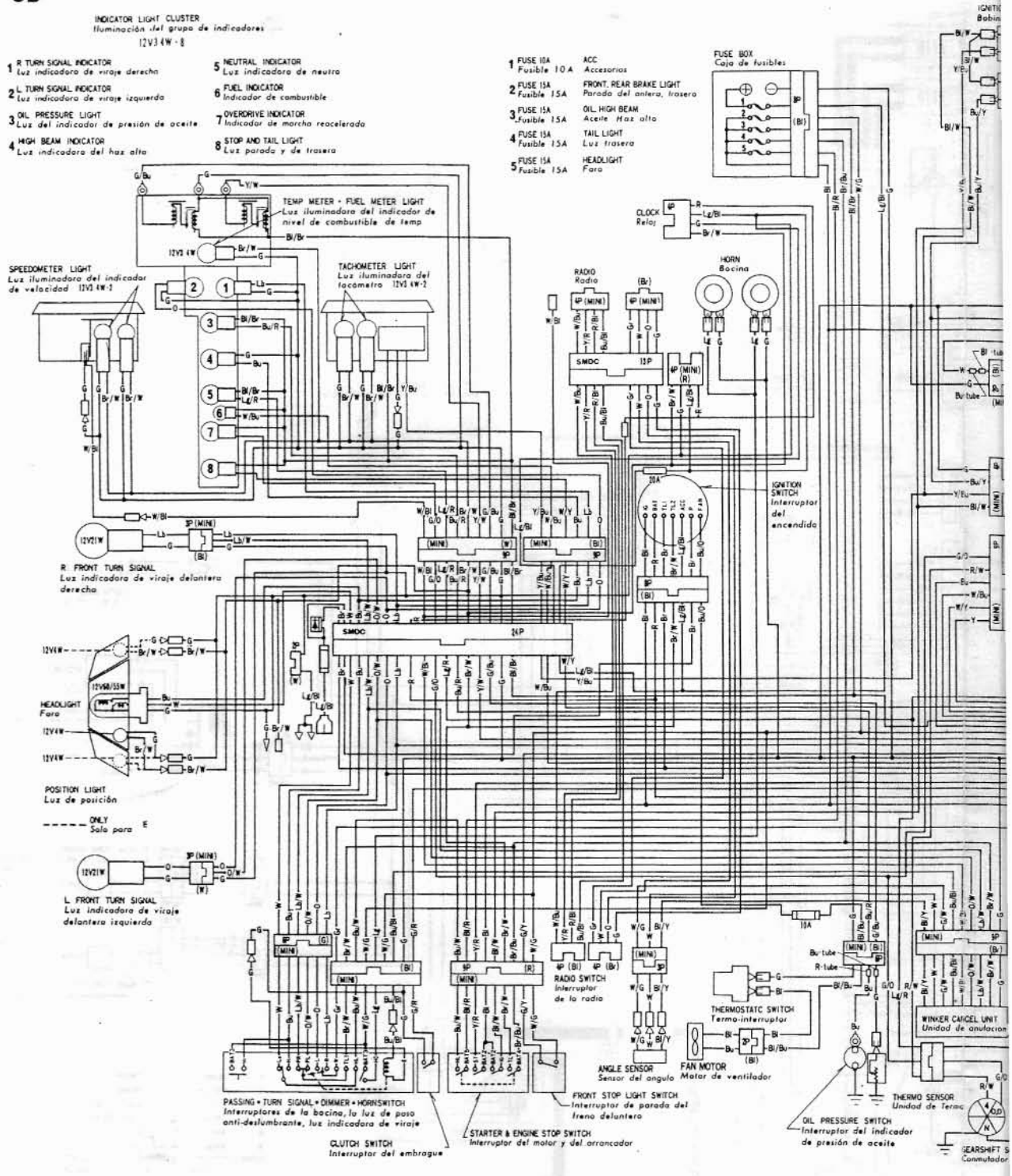
	BAT3	Hi
FREE		
PUSH	○	○
COLOR	W/G	Bu

TURN SIGNAL SWITCH
Interruptor de señal de

	W	R	L
R	○	○	
(N)			
L	○		○
COLOR	Gr	Lg	O



GL1200D SD



SWITCH CONTINUITY
Conexión de los interruptores

IGNITION SWITCH
Interruptor del encendido

	BAT	IG	ACC	FAN	P	TLI	TL2
LOCK							
OFF							
ACC	○		○				
ON	○	○	○	○		○	○
P	○		○		○		
COLOR	R	Bl	Lg/Bl	Bu/O	Br	Br/W	Br

STARTER SWITCH
Interruptores del arrancador

	BAT2	ST
FREE		
PUSH	○	○
COLOR	Bl	Y/R

ENGINE STOP SWITCH
Interruptor de parada delmotor

	BAT2	IG
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

LIGHTING SWITCH
Interruptor de iluminación

	BAT4	TL	BAT5	HL
●				
P	○	○		
H	○	○	○	○
COLOR	Br/Bu	Br/W	Bl/R	Bu/W

HORN SWITCH
Interruptor de bocina

	BAT3	HO
FREE		
PUSH	○	○
COLOR	W/G	Lg

DIMMER SWITCH
Interruptor anti-deslumbrante

	HL	Lo	Hi
Lo	○		
INI	○	○	
Hi	○	○	○
COLOR	Bu/W	W	Bu

PASSING SWITCH
Interruptor de la luz de paso

	BAT3	Hi
FREE		
PUSH	○	○
COLOR	W/G	Bu

TURN SIGNAL SWITCH
Interruptor de señal de

	W	R	L	T
R	○	○		
INI				
L	○		○	
COLOR	Gr	Lb	O	Br