HONDA

CX400·500 SPORTS

SHOP MANUAL
MANUEL D'ATELIER
WERKSTATT-HANDBUCH
MANUAL DE TALLER

HOW TO USE THIS MANUAL

This manual is based on the ED (Europian Direct Sales model). For other than ED model, descriptions are preceded by any of the following abbreviations whenever discrepancies occur:
E (U.K.), G_1 • G_2 (Germany), F (France), B (Belgium), IT (Italy), SW (Switzerland), AR (Austria), DE (Denmark), ND (Norway • Finland), SD (Sweden), U (Australia) and SA (South Africa).

Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 19 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 for the section.

If you are not familiar with this motorcycle, read the TECHNICAL FEATURES in section 20.

If you don't know what the source of the trouble is, go to section 21, TROUBLESHOOTING.

**HONDA MOTOR CO., LTD.
SERVICE PUBLICATION OFFICE**

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1 GENERAL INFORMATION

HONDA CX400 · 500 SPORTS

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GENERAL SAFETY

WARNING

If the engine must be running to do some work, make sure the area is well-ventilated. Never turn 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 your eyes were exposed.

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-ring 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, unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.

SPECIFICATIONS

Item					Area (Type)
DIMENSIONS	Overall length			2,240 mm (89.0 in) 2,235 mm (88.0 in)	U.SA
	Overall width			755 mm (29.7 in)	
	Overall height			1,190 mm (46.9 in)	
	Wheel base			1,495 mm (58.9 in)	
	Seat height			795 mm (31.3 in)	
	Ground clearance			165 mm (6.5 in)	
	Dry weight			208 kg (459 lbs)	
	Curb weight (Wet)			228 kg (503 lbs)	
FRAME	Type			Diamond Type	
	F. suspension, travel			Telescopic with anti-drive 150 mm (5.9 in)	
	R. suspension, travel			Swingarm, Pro-link 110 mm (4.3 in)	
	F. suspension air pressure			80—120 kPa (0.8—1.2 kg/cm², 11—17 psi)	
	R. suspension air pressure			0—500 kPa (0—5.0 kg/cm², 0—71 psi)	
	Front tire size			100/90—18 56S	
	Rear tire size			120/80—18 62S	
	Cold tire pressures	Up to 90 kg (200 lbs) load	Front	200 kPa (2.0 kg/cm², 28 psi)	
			Rear	200 kPa (2.0 kg/cm², 36 psi)	
		Up to vehicle capacity load	Front	200 kPa (2.0 kg/cm², 28 psi)	
			Rear	250 kPa (2.5 kg/cm², 36 psi)	
	F. Brake and lining swept area			Double disc brake, 952 cm² (147.6 sq. in)	
	R. brake and lining swept area			Single disc brake, 476 cm² (73.8 sq. in)	
	F. disc diameter			276 mm (10.9 in)	
	R. disc diameter			276 mm (10.9 in)	
	Caster angle			63°	
	Trail length			105 mm (4.1 in)	
	Front fork oil capacity (Right)			250 cm³ (8.45 US oz, 7.04 Imp. oz)	
	(Left)			265 cm³ (8.95 US oz, 7.46 Imp. oz)	
	Rear shock oil capacity			270 cm³ (9.1 US oz, 7.6 Imp. oz)	
	Rear shock air chamber capacity			135 cm³ (4.6 US oz, 3.8 Imp. oz)	
ENGINE	Type			Liquid cooled 4 stroke OHV engine	
	Engine weight			72 kg (159 lbs)	
	Bore and stroke			78 x 52 mm (3.07 x 2.05 in)	
				73 x 47.4 mm (2.87 x 1.87 in)	CX400E
	Displacement			496 cc (30.2 cu-in)	
				396 cc (24.1 cu-in)	CX400E
	Compression ratio			10 : 1	
	Cylinder compression			1,200 kPa (12.0 kg/cm², 171 psi)	
	Valve train			Chain driven camshaft and psh rod	
	Lubrication system			Forced pressure and wet sump	
	Oil capacity			3.0 lit. (3.2 US qt, 2.6 Imp qt) after disassembly	
				2.5 lit. (2.6 US qt, 2.2 Imp qt) after draining	
	Oil type			SE or SF (10W—40)	
	Cooling system capcity			2.0 lit (0.52 US qt, 0.44 Imp qt) after disassembly	
				1.4 lit (0.36 US qt, 0.24 Imp qt) after draining	

Item			Area (Type)
ENGINE	Camshaft (at 1 mm lift)		
	Intake valve Opens	5° (BTDC)	
	Closes	30° (ABCD)	
	Exhaust valve Opens	30° (BBDC)	
	Closes	5° (ATDC)	
	Valve clearance IN	0.08 mm (0.003 in)	
	(cold) EX	0.10 mm (0.004 in)	
	Idle speed	1.100 ± 100 min^{-1} (rpm)	
CARBURETION	Type	Constant vaccum piston valve	
	Identification number	VB1AA	
		VB1BA	CX400E
	Pilot screw initial opening	2	
	Float level	15.5 mm (0.61 in)	
DRIVE TRAIN	Clutch	Wet, multi plate type	
	Transmission	5 speed constant mesh	
	Primary reduction ratio	2.242 (74/33)	
		2.452 (76/31)	CX400E
	Gear ratio 1st	2.733 (41/15)	
	Gear ratio 2nd	1.850 (37/20)	
	Gear ratio 3rd	1.416 (34/24)	
	Gear ratio 4th	1.148 (31/27)	
	Gear ratio 5th	0.931 (27/29)	
		0.966 (28/29)	CX400E
	Final reduction ratio	3.091 (34/11)	
	Gear shift pattern	Left foot operated return system 1-N-2-3-4-5	
	Final gear oil capacity	170 cm^3 (5.7 US oz, 4.8 Imp oz)	
ELECTRICAL	Ignition	Full transister	
	Ignition timing "F" mark	15° BTDC at 1,100 min^{-1} (rpm)	
	Starting system	Starter motor	
	Alternator	AC generator, 12V—252W/5000 rpm	
	Battery capacity	12V—14 AH	
	Spark plug		
	Standard	DR8ES-L (NGK), X24ESR-U (ND)	
	For extended high speed riding	DR8ES (NGK), X27ESR-U (ND)	
	Spark plug gap	0.6—0.7 (0.024—0.028 in)	
	Fuse	30 A (main), 15 A (sub)	
LIGHTS	Headlight (High/Low)	12V—60/55W	
	Tail/Stoplight	12V—21/5W	
		12V—23/8W	U
	Turn signal light	12V—21W	
		12V—23W	U
	Meter light	12V—3.4W	
	Neutral Indicatort	12V—3.4W	
	Turn signal indicator	12V—3.4W	
	High beam indicator	12V—3.4W	
	Oil pressure warning light	12V—3.4W	

TORQUE VALUES

ENGINE

ITEM	QT'Y	Thread Dia. (mm)	Torque		
			N·m	kg-m	ft-lb
Crankshaft cap bolt	7	8	20–24	2.0–2.4	14–17
Connecting rod cap nut	4	8	28–32	2.8–3.2	20–23
Cylinder head bolt	8	12	50–55	5.0–5.5	36–43
Valve adjuster lock nut	8	6	15–18	1.5–1.8	11–13
Flywheel bolt	1	12	90–105	9.0–10.5	65–76
Clutch center lock nut	1	20	80–100	8.0–10.0	58–72
Primary drive gear bolt	1	12	80–95	8.0–9.5	58–69
Starting clutch torx bolt	3	8	18–25	1.8–2.5	13–18
Cooling fan bolt	1	8	20–25	2.0–2.5	14–18
Cam sprocket lock nut	1	20	80–100	8.0–10.0	58–72
Cam sprocket bolt	2	7	16–20	1.6–2.0	12–14
Radiator drain bolt	1	12	1.5–3.0	0.15–0.30	1.1–2.2

FRAME

ITEM	QT'Y	Thread Dia. (mm)	Torque		
			N·m	kg-m	ft-lb
Engine mount bolt	2	12	60–80	6.0–8.0	43–58
Engine mount bolt	4	10	45–70	4.5–7.0	33–51
Front engine hanger bolt	4	10	30–40	3.0–4.0	22–29
Front axle shaft	1	12	55–65	5.5–6.5	40–47
Front axle holder nut	2	8	18–25	1.8–2.5	22–29
Steering stem nut	1	24	90–120	9.0–12.0	65–87
Fork bridge pinch bolt (upper)	2	7	9–15	0.7–1.5	7–11
(lower)	2	10	30–40	3.0–4.0	22–29
Handleber holder bolt	4	8	25–35	2.5–3.5	18–25
Rear axle nut	1	14	50–80	5.0–8.0	36–58
Final driven flange bolt	5	10	40–50	4.0–5.0	29–36
Rear shock absorber mount bolt	2	10	45–55	4.5–5.5	33–40
Shock linkage pivot bolt	4	10	45–55	4.5–5.5	33–40
Rear brake stopper arm bolt	2	8	18–25	1.8–2.5	11–18
Foot peg bolt	2	10	30–40	3.0–4.0	22–29
Passenger foot peg bolt	2	10	45–60	4.5–6.0	33–43
Rear brake pedal bolt	1	6	10–15	1.0–1.5	7–11
Gear shift pedal bolt	1	6	10–14	1.0–1.4	7–10
Swingarm pivot bolt	1	30	17–21	1.7–2.1	12–15
Swingarm pivot lock nut	1	30	90–120	9.0–12.0	65–87
Drive shaft lock bolt	1	8	18–28	1.8–2.8	13–20
Rear axle pinch bolt	1	8	20–30	2.0–3.0	14–22
Final gear case nut	3	10	45–70	4.5–7.0	33– 51
Brake hose bolt	8	10	25–35	2.5–3.5	18–25
Caliper pivot bolt	3	12	25–30	2.5–3.0	18–22
Caliper bolt	3	10	20–25	2.0–2.5	14–18
Right caliper bracket bolt	2	10	30–40	3.0–4.0	22–28
Left caliper bracket bolt (upper)	1	10	35–45	3.5–4.5	25–33
(lower)	1	8	20–24	2.0–2.4	14–17
Exhaust pipe joint nut	4	8	8–14	0.8–1.4	6–10
Muffler band bolt	4	8	18–28	1.8–2.8	13–20
Muffler bracket bolt	2	10	30–40	3.0–4.0	22–29
Brake pedal bolt	1	6	6–9	0.6–0.4	4–7
Side stand pivot bolt	1	10	10–20	1.0–2.0	7–14
Side stand pivot nut	1	10	30–40	3.0–4.0	22–29
Main stand bolt	2	10	30–40	3.0–4.0	22–29
Power chamber bolt	3	8	24–30	2.4–3.0	17–22

Torque specifications listed above are for the most important tightening points. If a torque specification is not listed, follow the standards given below.

STANDARD TORQUE VALUES

Type	Torque N·m (kg-m, ft-lb)	Type	Torque N·m (kg-m, ft-lb)
5 mm bolt, nut	4.5–6.0 (0.45–0.6, 3.3–4.3)	5 mm screw	3.5–5.0 (0.35–0.5, 2.5–3.6)
6 mm bolt, nut	8–12 (0.8–1.2, 6–9)	6 mm screw	7–11 (0.7–1.1, 5–8)
8 mm bolt, nut	18–25 (1.8–2.5, 13–18)	6 mm flange bolt, nut	10–14 (1.0–1.4, 7–10)
10 mm bolt, nut	30–40 (3.0–4.0, 22–29)	8 mm flange bolt, nut	24–30 (2.4–3.0, 17–22)
12 mm bolt, nut	50–60 (5.0–6.0, 36–43)	10 mm flange bolt, nut	30–40 (3.0–4.0, 22–29)

SPECIAL TOOLS/COMMON TOOLS

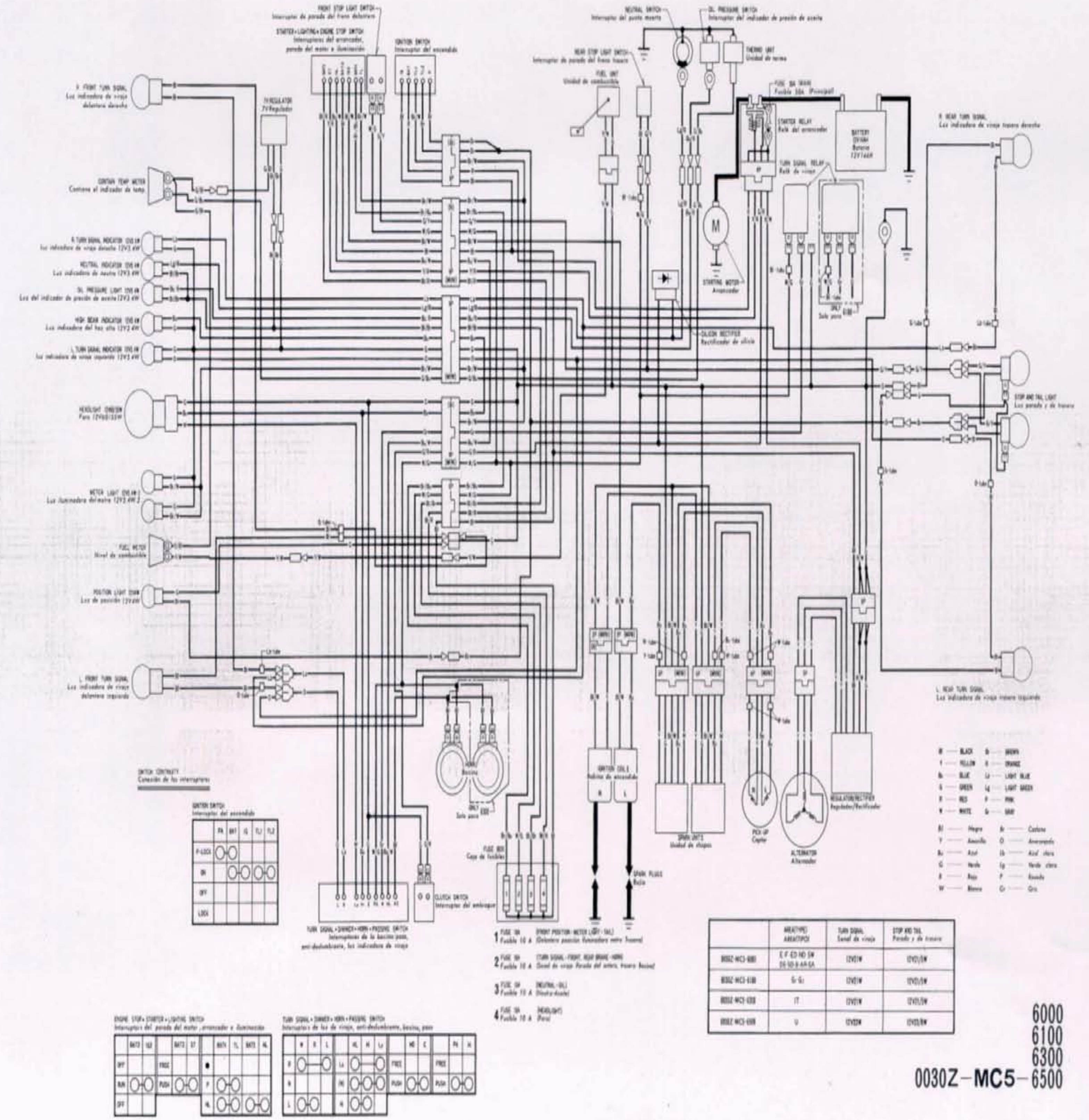
SPECIAL TOOLS

DESCRIPTION	NUMBER	REMARKS	REF. SECT
Inspection plug	07999—4150000		3
Vacuum gauge tester	07404—0020000		3
Gauge attachment A	07510—3000100		3
Valve guide driver attachment	07934—4150000		6
Valve guide reamer	07984—6110000	07984—6570100	6
Clutch center holder	07923—4150000		7
Gear holder	07924—MC70000	07924—4150000	8, 10, 12
Torque driver bit	07703—0010100		8
Ball race & bearing driver attachment	07945—3330300		8, 11, 13, 14
Mechanical seal driver attachment	07945—4150400		9
Lock nut socket wrench 17 x 27 mm	07907—MC70000	07907—4150000	10
Crank cap driver	07945—4150100		11, 12
Bearing remover, 20 mm	07936—3710600		11
Bearing remover handle	07936—3710100	07936—3710000	11
Bearing remover weight	07936—3710200		11
Piston remover	07941—4150000		12
Crank cap puller	07935—4150000		12
Main bearing dis/assembly tool	07973—4150000		12
Circlip pliers	07914—3230001		13, 15
Hex. wrench, 6 mm	07917—3230000		13
Fork seal driver, attachment	07947—3710101		13
Ball race remover	07953—KA50000		13
Ball race & bearing driver attachment	07946—3290000		13
Steering stem driver	07946—MB00000	07946—3710601	13
Oil seal driver	07965—MC70000		14
Oil seal driver attachment	07965—MA10200		14
Swingarm lock nut wrench	07908—4690001		14
Shock absorber base	07965—MA60201		14
Bearing remover set	07936—8890100		14
Retainer wrench	07910—4300000		14
Final retainer wrench	07910—3710000		14
Pinion puller attachment	07934—MA10100		14
Pinion retainer wrench	07910—MA10100		14
Pinion puller catcher	07934—MA10200		14
Ring gear dis/assembly tool set	07965—4150001		14
O-ring guide	07973—MA10200		14
Preload inspection tool	07998—MC70000		14
Oil seal guide	07973—MA10100		14

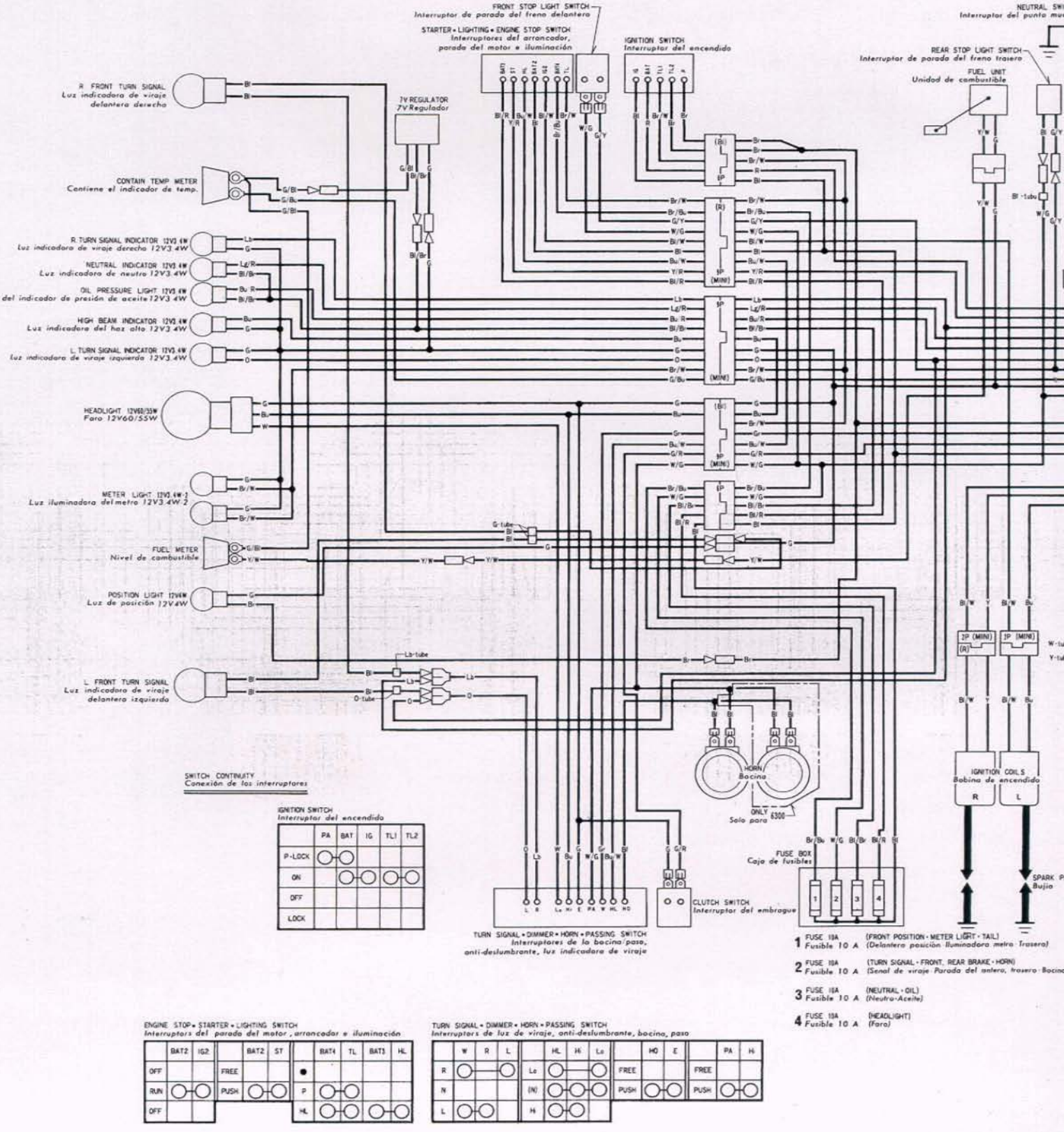
COMMON TOOLS

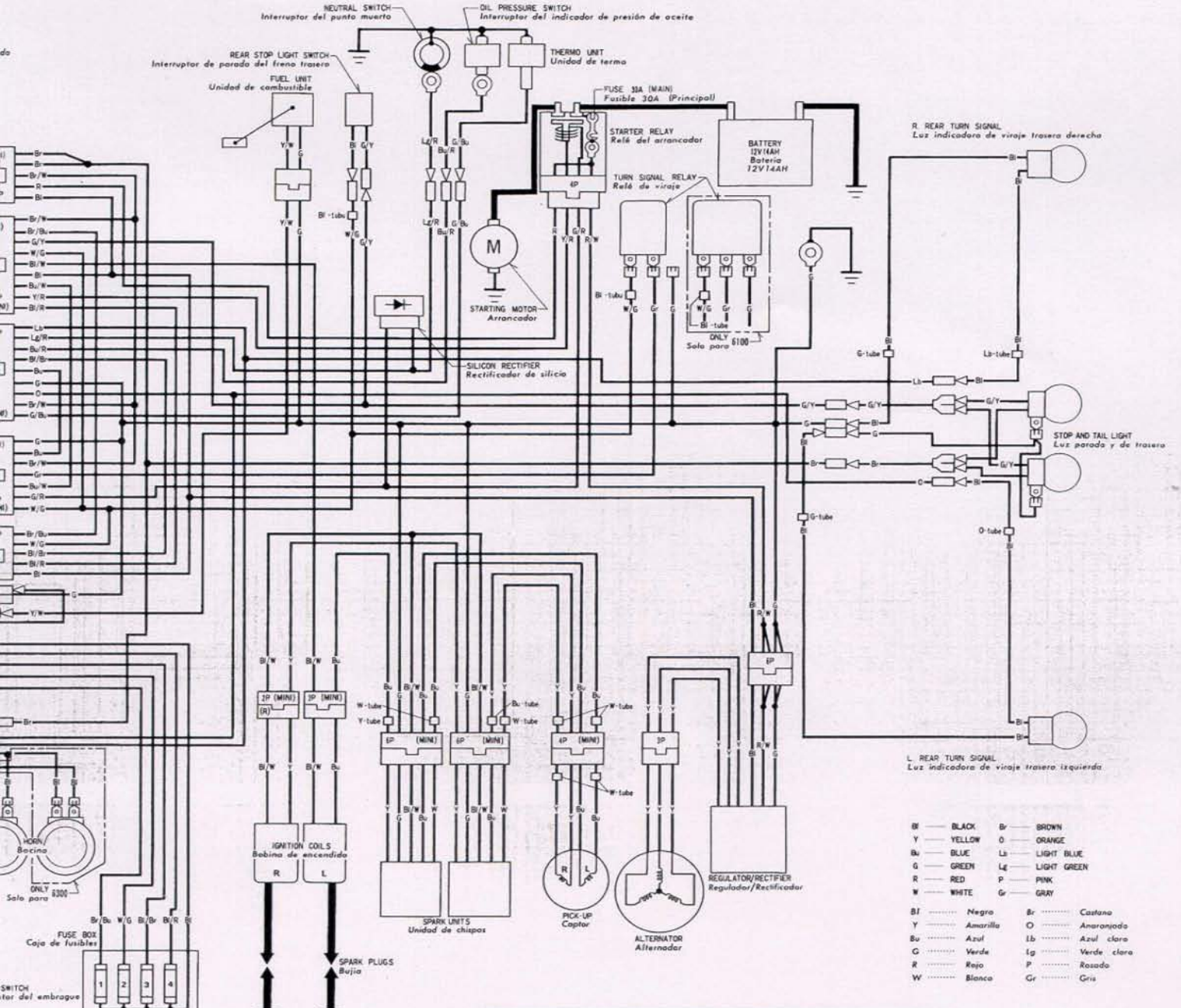
DESCRIPTION	NUMBER	REMARKS	REF. SECT
Valve adjusting wrench, 10 x 12 mm	07708—0030200	07908—3640000	3
Valve adjuster B	07708—0030400		3
Float level gauge	07401—0010000		4
Valve spring compressor	07757—0010000	07957—3290001	6
Valve gude remover (6.6 mm)	07742—0010200	07942—3000000 07942—5420200 07942—5510000	6
Lock nut socket wrench, 26 x 30 mm	07716—0020203	07942—6110000	7
Extension bar	07716—0020500		7, 8, 13
Flywheel puller	07733—0020001	07933—3000000	8
Driver handle A	07749—0010000	07949—6110000 07949—2860000	8, 9, 11, 13, 14
Driver pilot, 22 mm	07746—0041000	07946—3600000	8
Rotor puller	07733—0010000	07933—2000000	9
Bearing driver attachment, 42 x 47 mm	07746—0010300	07945—3330100 07946—4300200 07946—3640000	11, 13, 14
Bearing driver attachment, 52 x 55 mm	07746—0010400	07948—8830000 07946—3290000	11, 14
Bearing driver attachment, 62 x 68 mm	07746—0010500		11
Bearing driver attachment, 32 x 35 mm	07746—0010100		11
Driver pilot, 25 mm	07746—0040600		11
Pin spanner	07702—0010000	07902—2400000	13
Socket wrench, 30 x 32 mm	07716— 002040	07907—6890100	13
Driver pilot, 15 mm	07746—0040300		13
Socket bit, 17 mm	07703—0020500		14
Driver pilot, 17 mm	07746—0040400		14
Pin driver, 3.5 mm	07744—0010300	07944—6340100	14
Bearing driver attachment, 37 x 40 mm	07746—0010200		14
Driver pilot, 30 mm	07746—0040700		14

WIRING DIAGRAM
DIAGRAMA DE CABLEADO



WIRING DIAGRAM
DIAGRAMA DE CABLEADO





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	Castaño
O	Anaranjado
Lb	Azul claro
Lg	Verde claro
P	Rosado
Gr	Gris

1 FUSE 10A (FRONT POSITION · METER LIGHT · TAIL)
Fusible 10 A (Delantera posición iluminadora metro · Trasera)

2 FUSE 10A (TURN SIGNAL · FRONT, REAR BRAKE · HORN)
Fusible 10 A (Señal de viraje· Parada del antero, trasero· Bocina)

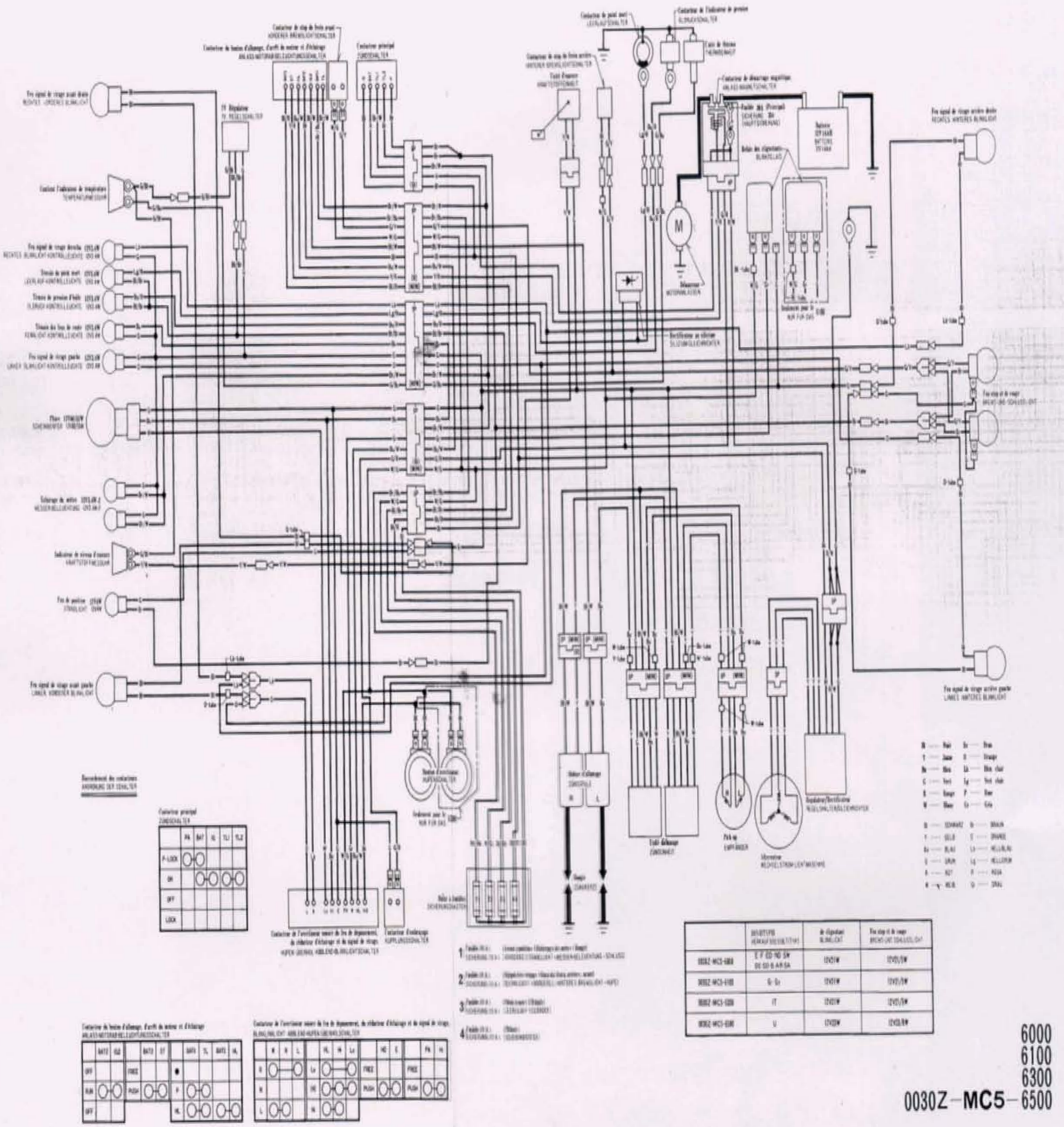
3 FUSE 10A (NEUTRAL · OIL)
Fusible 10 A (Neutro·Aceite)

4 FUSE 10A (HEADLIGHT)
Fusible 10 A (Faro)

	AREA(TYPE) *AREA(TIPO)*	TURN SIGNAL *Señal de viraje*	STOP AND TAIL *Parada y de trasera*
0030Z-MC5-6000	E·F·ED·ND·SW DE·SD·B·AR·SA	12V21W	12V21/3W
0030Z-MC5-6100	G_1·G_2	12V21W	12V21/5W
0030Z-MC5-6300	IT	12V21W	12V21/5W
0030Z-MC5-6500	U	12V23W	12V23/8W

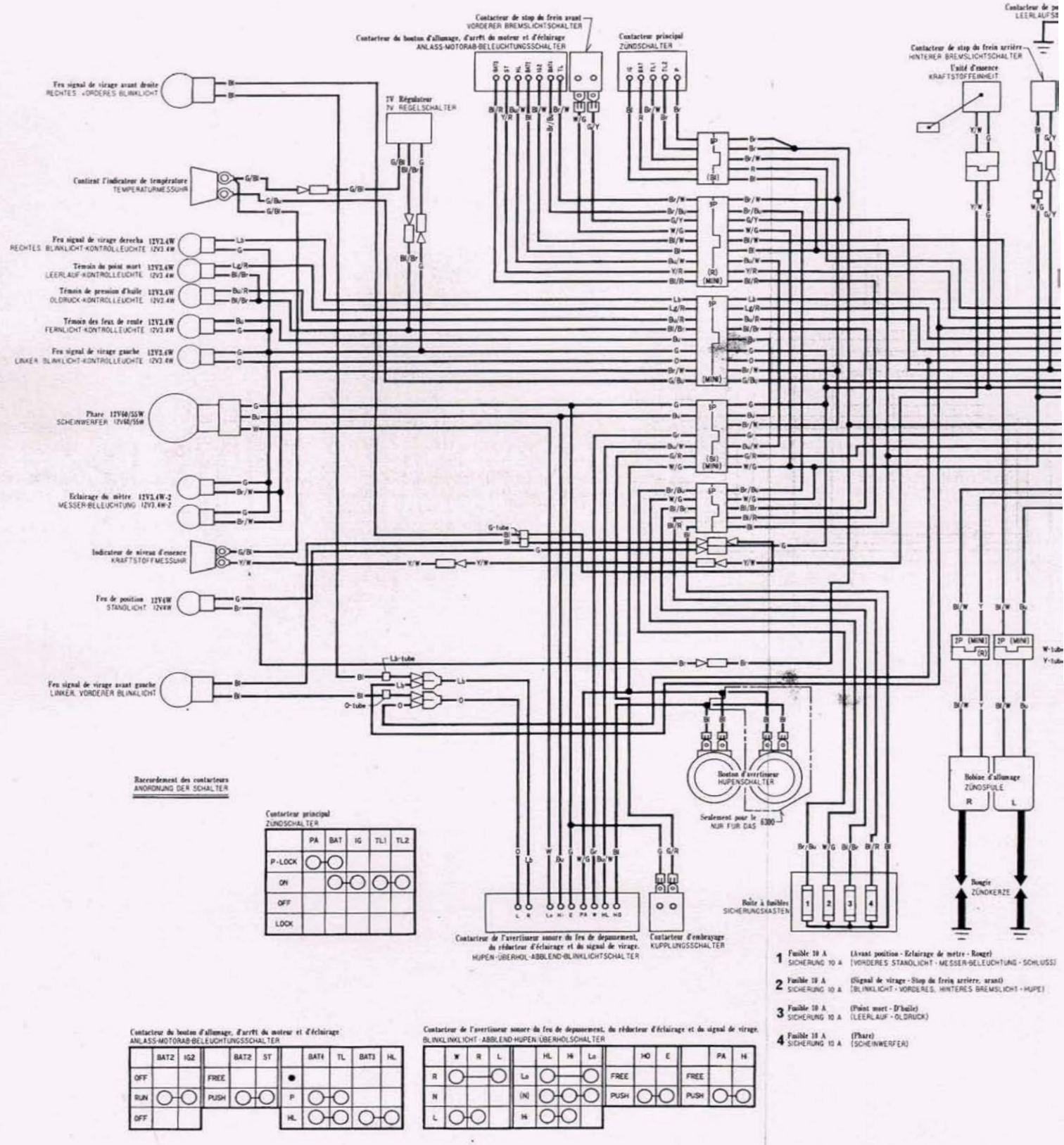
6000
6100
6300
0030Z—MC5—6500

SCHEMA DE CABLAGE
SCHALTPLAN



6000
6100
6300
0030Z-MC5-6500

SCHEMA DE CABLAGE
SCHALTPLAN



Raccordement des contacteurs
ANORDNUNG DER SCHALTER

Contacteur principal
ZÜNDSCHALTER

	PA	BAT	IG	TL1	TL2
P-LOCK	○	○			
ON		○	○	○	○
OFF					
LOCK					

Contacteur du bouton d'allumage, d'arrêt du moteur et d'éclairage
ANLASS-MOTORAB-BELEUCHTUNGSSCHALTER

	BAT2	IG2
OFF		
RUN	○	○
OFF		

	BAT2	ST
FREE		
PUSH	○	○

	BAT4	TL	BAT3	HL
●				
P	○	○		
HL	○	○	○	○

Contacteur de l'avertisseur sonore du feu de dépassement, du réducteur d'éclairage et du signal de virage.
BLINKLICHT-ABBLEND-HUPEN-ÜBERHOLSCHALTER

	W	R	L
R	○	○	
N			
L	○	○	

	HL	Hi	Lo
Lo	○	○	
(N)	○	○	○
Hi	○	○	

	HO	E
FREE		
PUSH	○	○

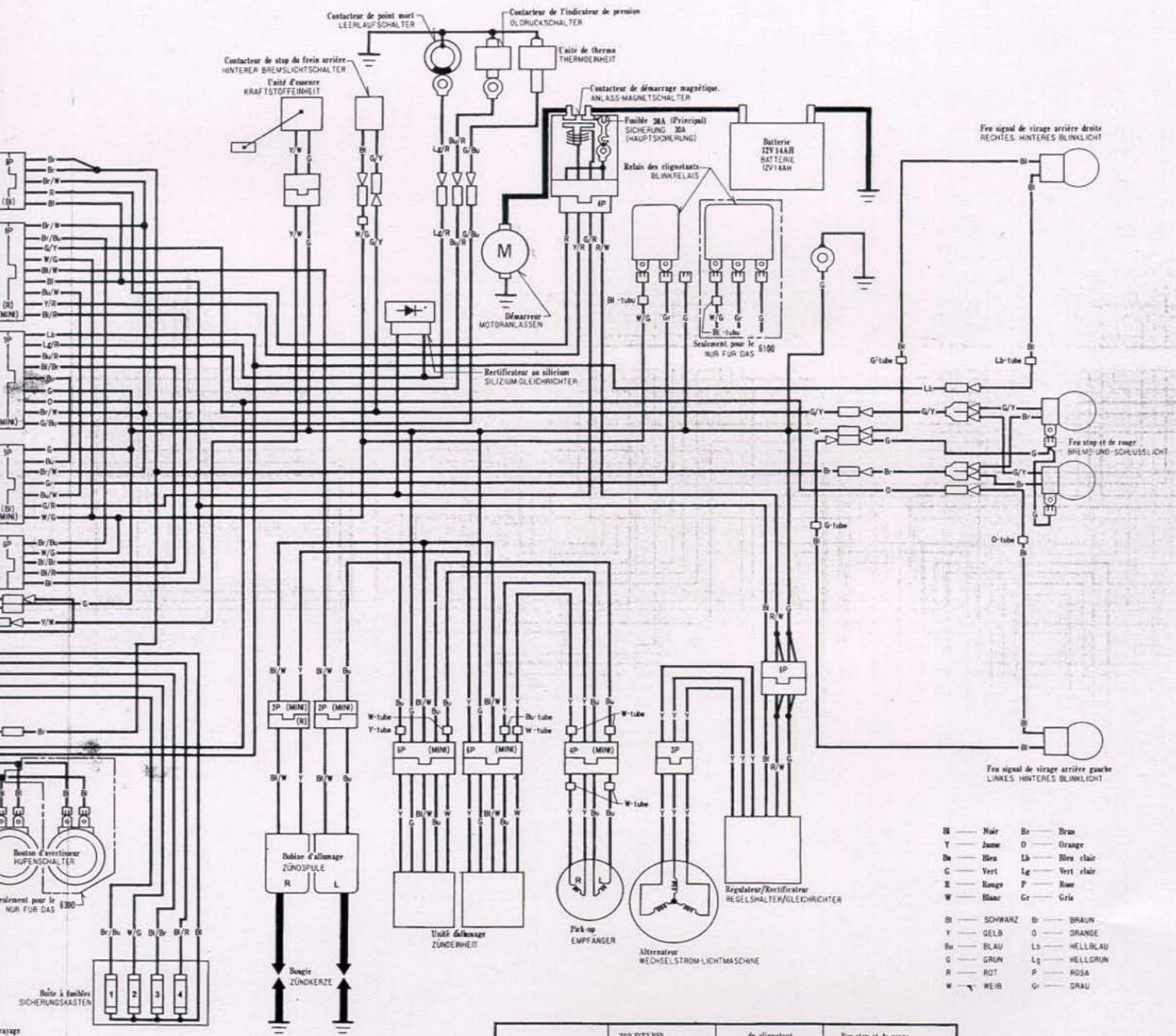
	PA	Hi
FREE		
PUSH	○	○

1 Fusible 10 A (Avant position - Eclairage de mètre - Rouge)
SICHERUNG 10 A (VORDERES STANDLICHT - MESSER-BELEUCHTUNG - SCHLUSS)

2 Fusible 10 A (Signal de virage - Stop du frein arrière, avant)
SICHERUNG 10 A (BLINKLICHT - VORDERES, HINTERES BREMSLICHT - HUPE)

3 Fusible 10 A (Point mort - D'huile)
SICHERUNG 10 A (LEERLAUF - OLDRUCK)

4 Fusible 10 A (Phare)
SICHERUNG 10 A (SCHEINWERFER)



Bl	Noir	Br	Brun
Y	Jaune	O	Orange
Bu	Bleu	Lb	Bleu clair
G	Vert	Lg	Vert clair
R	Rouge	P	Rose
W	Blanc	Gr	Gris

Bl	SCHWARZ	Br	BRAUN
Y	GELB	O	ORANGE
Bu	BLAU	Lb	HELLBLAU
G	GRÜN	Lg	HELLGRÜN
R	ROT	P	ROSA
W	WEIß	Gr	GRAU

1 Fusible 10 A (Avant position - Eclairage de metre - Rouge)
SICHERUNG 10 A (VORDERES STANDLICHT - MESSER-BELEUCHTUNG - SCHLUSS)

2 Fusible 10 A (Signal de virage - Stop du frein arriere, urant)
SICHERUNG 10 A (BLINKLICHT - VORDERES, HINTERES BREMSLICHT - HUPE)

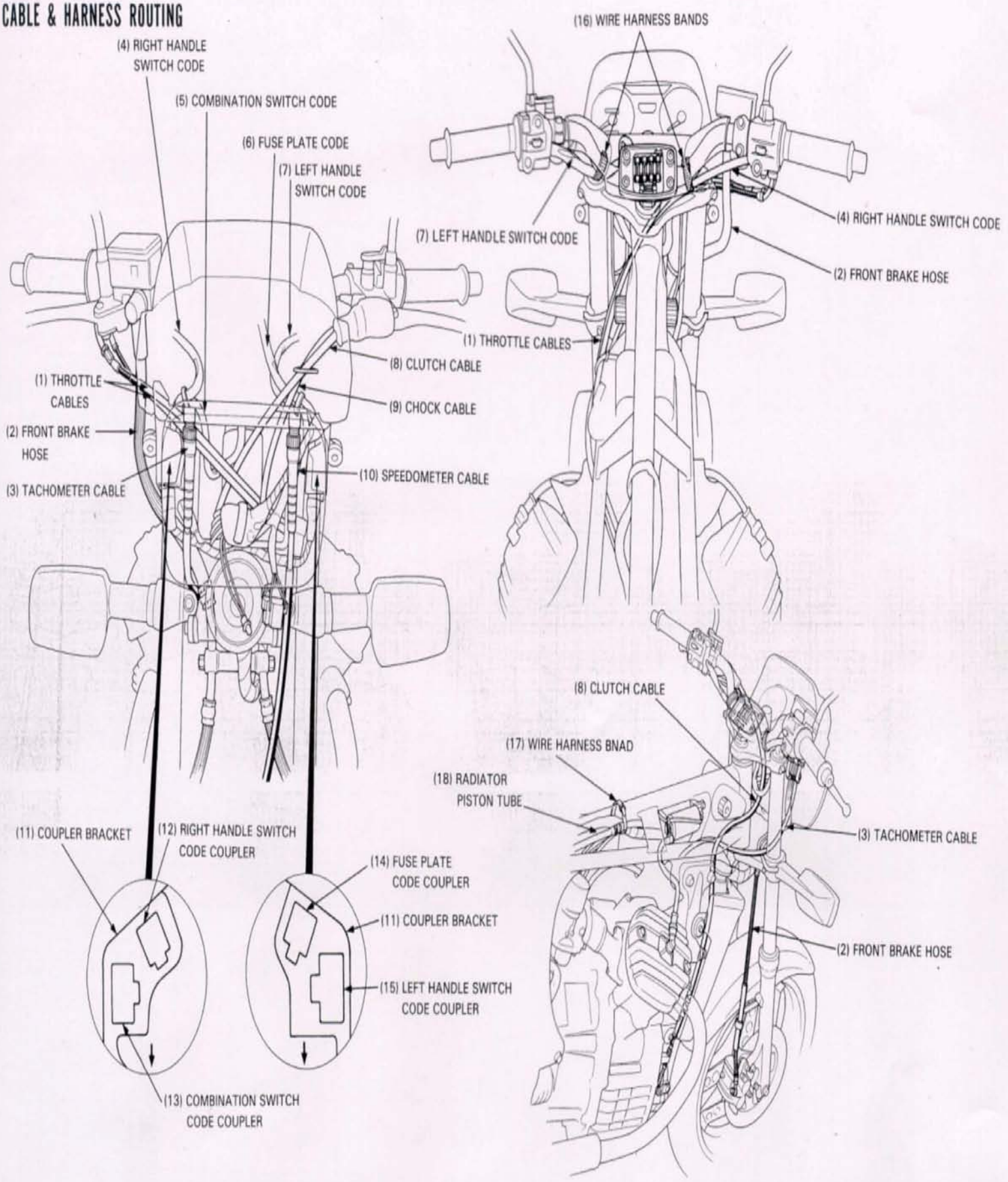
3 Fusible 10 A (Point mort - D'huile)
SICHERUNG 10 A (LEERLAUF - OLDRUCK)

4 Fusible 10 A (Phare)
SICHERUNG 10 A (SCHEINWERFER)

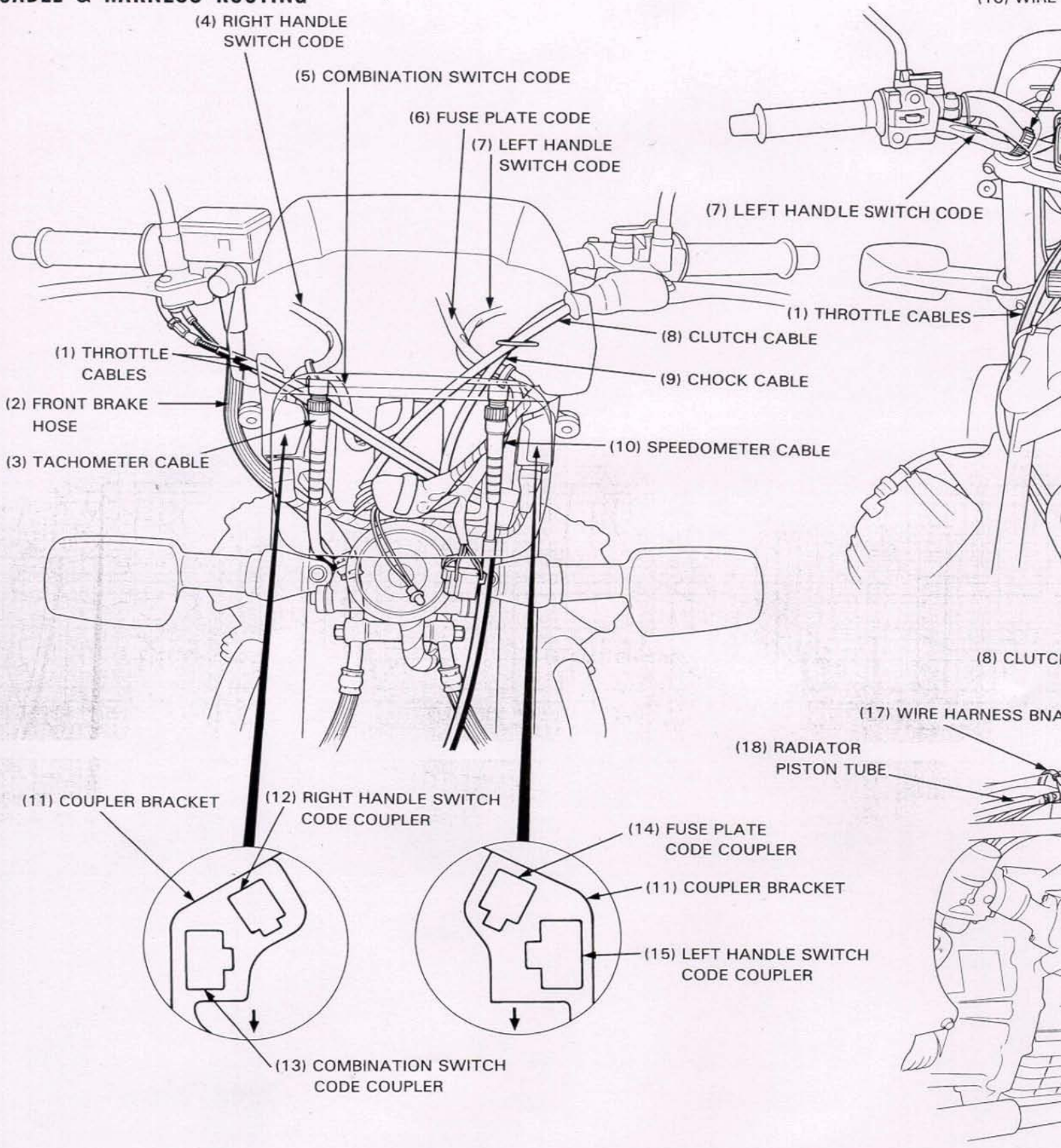
	ZONETYPE VERKAUFSGEBIET(TYP)	de clignotant BLINKLICHT	Feu stop et de rouge BREMS-UND SCHLUSSLICHT
0030Z-MC5-6000	E·F·ED·ND·SW DE·SD·B·AR·SA	12V21W	12V21/5W
0030Z-MC5-6100	G₁ G₂	12V21W	12V21/5W
0030Z-MC5-6300	IT	12V21W	12V21/5W
0030Z-MC5-6500	U	12V23W	12V23/8W

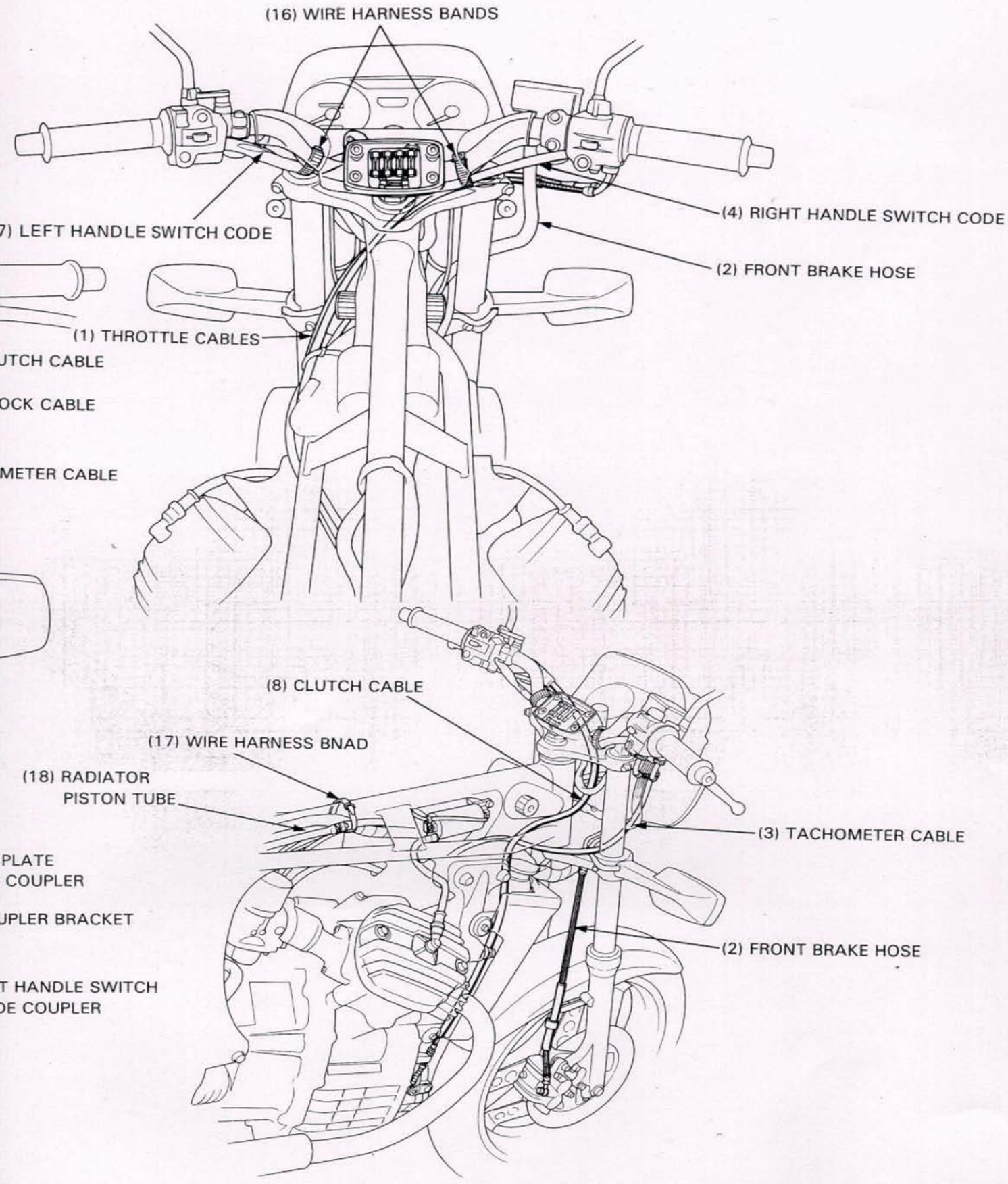
6000
6100
6300
0030Z—MC5—6500

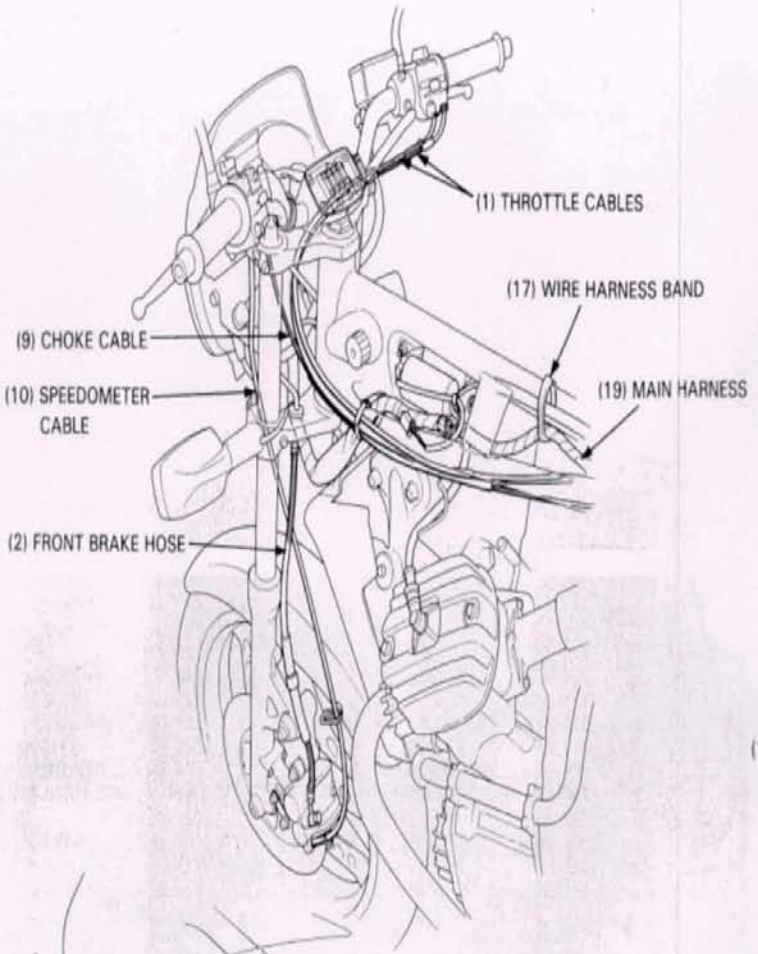
CABLE & HARNESS ROUTING

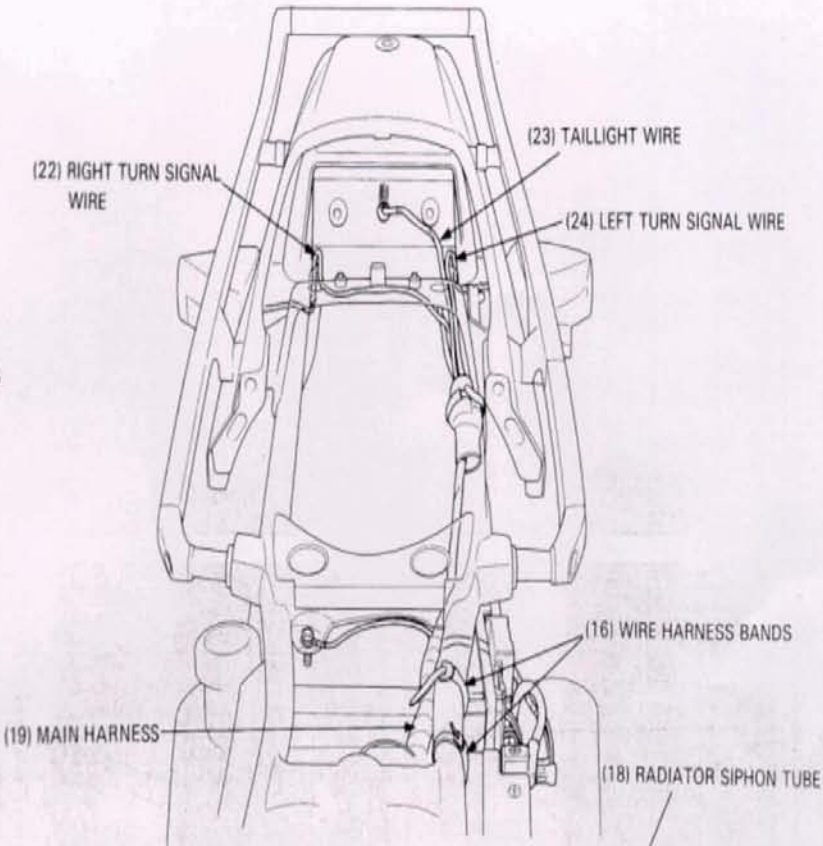


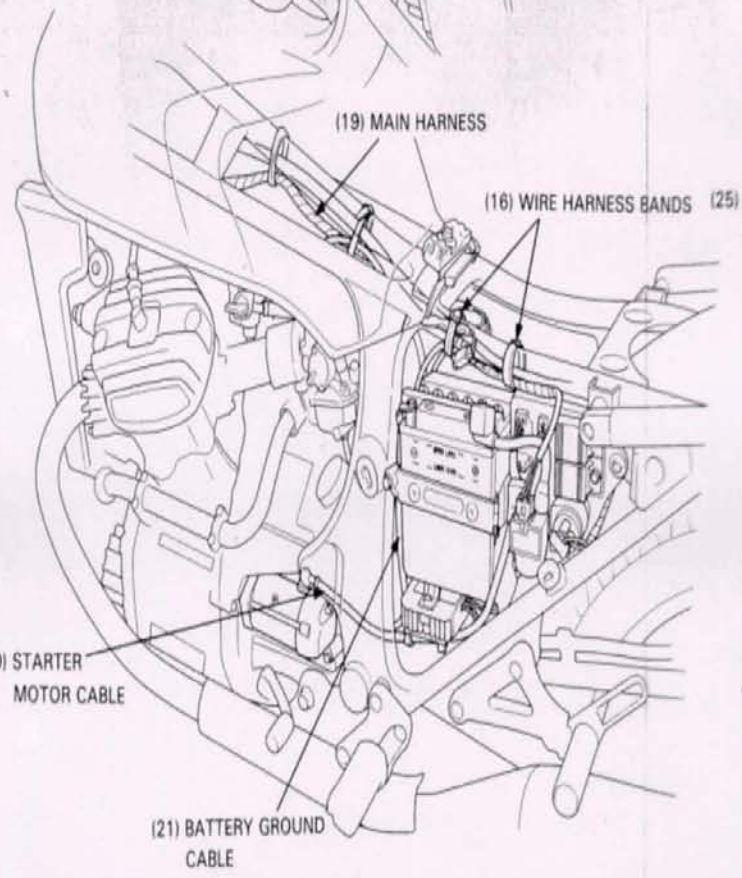
CABLE & HARNESS ROUTING

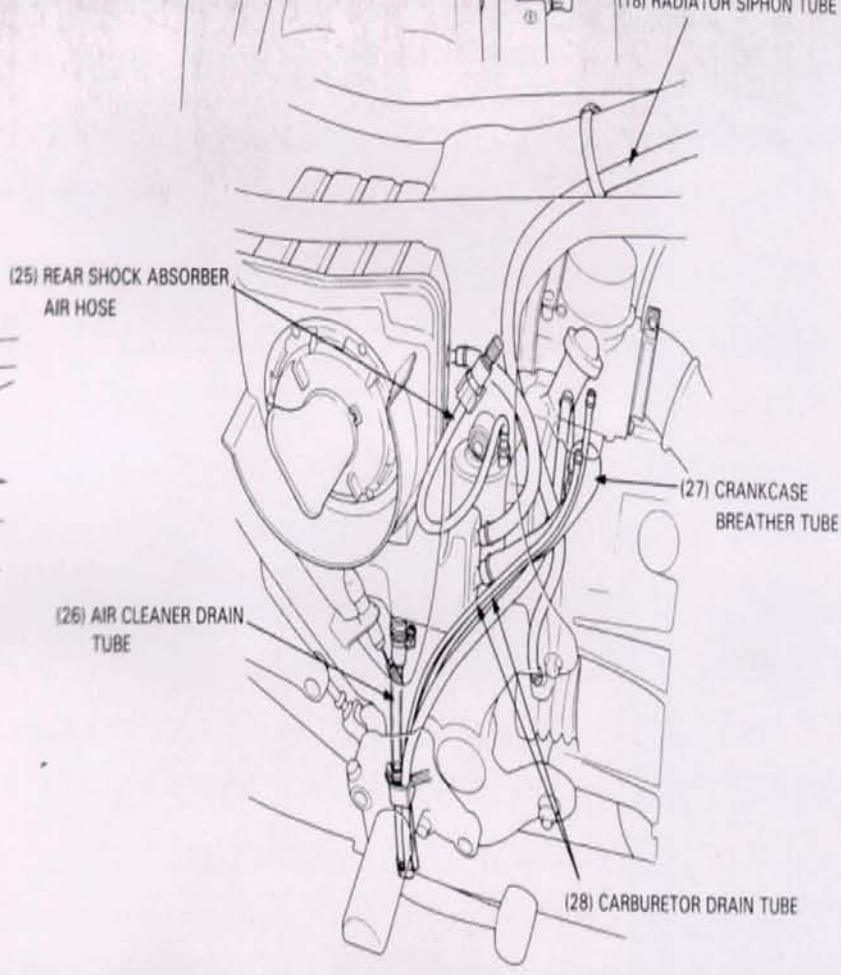


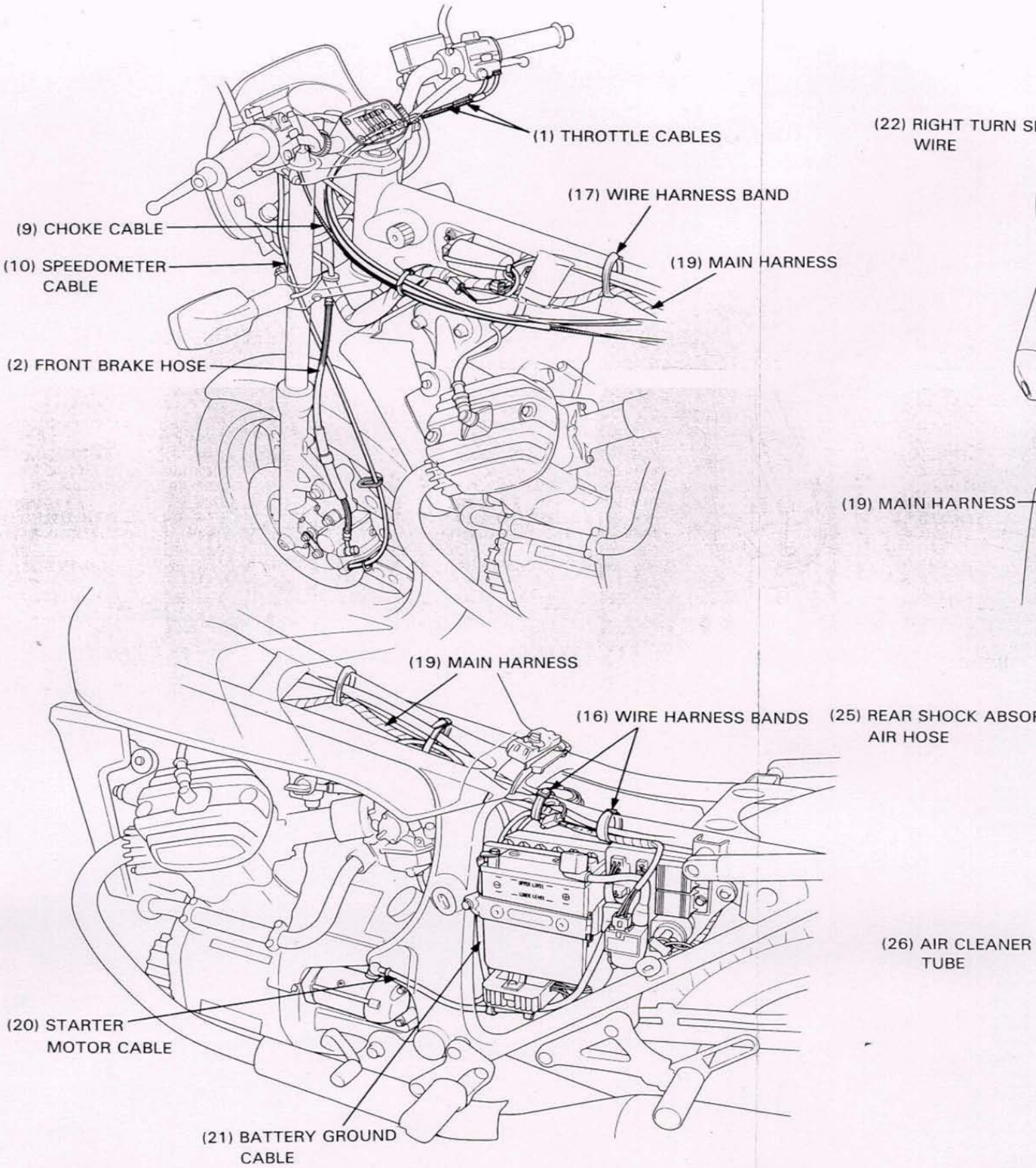

(16) WIRE HARNESS BANDS
7) LEFT HANDLE SWITCH CODE
(4) RIGHT HANDLE SWITCH CODE
(2) FRONT BRAKE HOSE
(1) THROTTLE CABLES
UTCH CABLE
OCK CABLE
METER CABLE
(8) CLUTCH CABLE
(17) WIRE HARNESS BNAD
(18) RADIATOR
PISTON TUBE
(3) TACHOMETER CABLE
PLATE
COUPLER
UPLER BRACKET
(2) FRONT BRAKE HOSE
T HANDLE SWITCH
DE COUPLER


(1) THROTTLE CABLES
(17) WIRE HARNESS BAND
(9) CHOKE CABLE
(10) SPEEDOMETER CABLE
(19) MAIN HARNESS
(2) FRONT BRAKE HOSE


(22) RIGHT TURN SIGNAL WIRE
(23) TAILLIGHT WIRE
(24) LEFT TURN SIGNAL WIRE
(16) WIRE HARNESS BANDS
(19) MAIN HARNESS


(19) MAIN HARNESS
(16) WIRE HARNESS BANDS
(20) STARTER MOTOR CABLE
(21) BATTERY GROUND CABLE


(18) RADIATOR SIPHON TUBE
(25) REAR SHOCK ABSORBER AIR HOSE
(27) CRANKCASE BREATHER TUBE
(26) AIR CLEANER DRAIN TUBE
(28) CARBURETOR DRAIN TUBE


(1) THROTTLE CABLES
(22) RIGHT TURN SI
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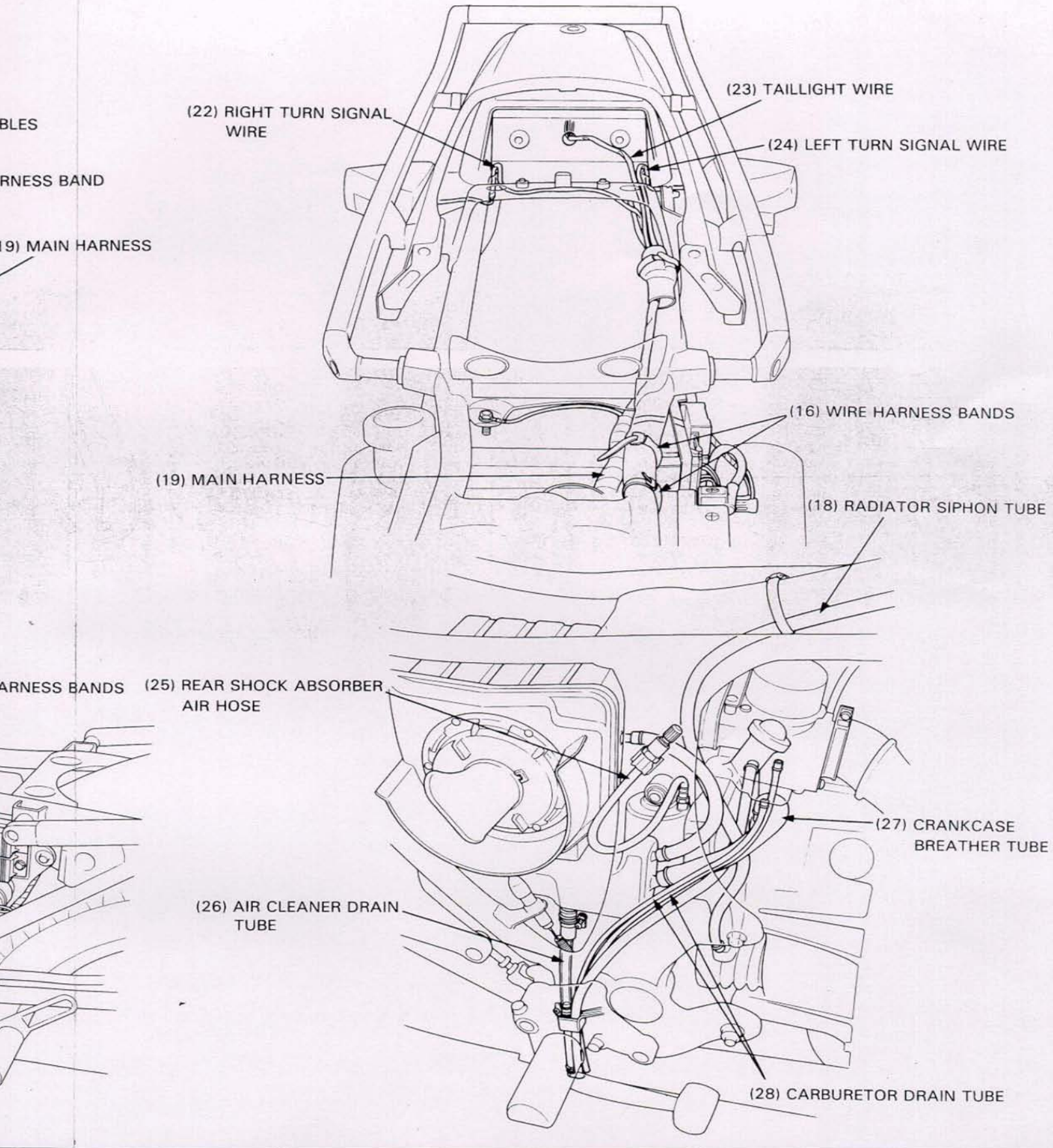
(17) WIRE HARNESS BAND
(9) CHOKE CABLE
(10) SPEEDOMETER CABLE
(19) MAIN HARNESS
(2) FRONT BRAKE HOSE
(19) MAIN HARNESS
(19) MAIN HARNESS
(16) WIRE HARNESS BANDS
(25) REAR SHOCK ABSOR
AIR HOSE
(26) AIR CLEANER
TUBE
(20) STARTER MOTOR CABLE
(21) BATTERY GROUND CABLE


(22) RIGHT TURN SIGNAL WIRE
(23) TAILLIGHT WIRE
(24) LEFT TURN SIGNAL WIRE
(16) WIRE HARNESS BANDS
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(26) AIR CLEANER DRAIN TUBE
(28) CARBURETOR DRAIN TUBE

LUBRICATION

GRAISSAGE

SCHMIERUNG

LUBRICACION

(1) SCHEMA DE GRAISSAGE
(2) CULBUTEURS
(3) ORIFICE D'HUILE
(4) ARBRE A CAMES
(5) MANOMETRE D'HUILE
(6) FILTRE D'HUILE
(7) POMPE A HUILE
(8) VILEBREQUIN
(9) ARBRE DE RENVOI DE TRANSMISSION
(10) CREPINE D'HUILE
(11) CLAPET DE SURPRESSION
(12) ARBRE SECONDAIRE
(13) ORIFICE D'HUILE

(1) SCHMIERDIAGRAMM
(2) KIPPHEBEL
(3) ÖLBLENDE
(4) NOCKENWELLE
(5) ÖLDRUCKCHALTER
(6) ÖLFILTER
(7) VORGELEGE
(8) KURBELWELLE
(9) VORGELEGE
(10) ÖLSIEB
(11) ÜBERDRUCKVENTIL
(12) GETRIEBHAUPTWELLE
(13) ÖLBLENDE

(1) DIAGRAMA DE LUBRICACION
(2) BRAZOS OSCILANTES
(3) ORIFICIO DE ACEITE
(4) EJE DE LEVAS
(5) INTERRUPTOR DE PRESION DE ACEITE
(6) FILTRO DE ACEITE
(7) BOMBA DE ACEITE
(8) CIGUEÑAL
(9) CONTRAEJE DE TRANSMISION
(10) COLARDOR DE ACEITE
(11) VALVULA DE DESCARGA DE PRESION
(12) EJE PRINCIPAL DE TRANSMISION
(13) ORIFICO DE ACIETE

SERVICE INFORMATION	2–1
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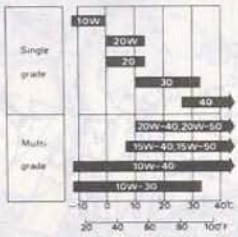
ENGINE OIL & OIL FILTER CHANGE	2–2
FINAL GEAR OIL CHECK/REPLACEMENT	2–3
DRIVE SHAFT JOINT	2–3
CONTROL CABLE LUBRICATION	2–3
LUBRICATION POINTS	2–4

SERVICE INFORMATION

GENERAL INSTRUCTIONS

Oil pump	Refer to Section 7.
Oil pressure relief valve	Refer to Section 7.
Oil strainer	Refer to Section 7.

Engine Oil

Oil capacity	2.5 lit (2.6 US qt, 2.2 Imp qt(at change 3.0 lit. (3.2 US qt, 2.6 Imp qt) at disassembly
Oil recommendation	Use HONDA 4-STROKE OIL or equivalent. API SERVICE CLASSIFICATION: SE or SF VISCOSITY: SAE 10W–40 Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range. **OIL VISCOSITIES** 
Oil pump delivery	9.3–9.5 lit/min at 3,000 rpm

Final drive gear

Oil capacity	160 – 180 cm³ (4.5–5.2 Imp oz, 5.4–6.1 US oz)		
Recommended oil	Hypoid gear oil	Above 5°C/41°F	SAE 90
		Below 5°C/41°F	SAE 80

TROUBLESHOOTING

Oil Level Too Low:
1. Normal oil consumption
2. External oil leaks
3. Worn piston rings

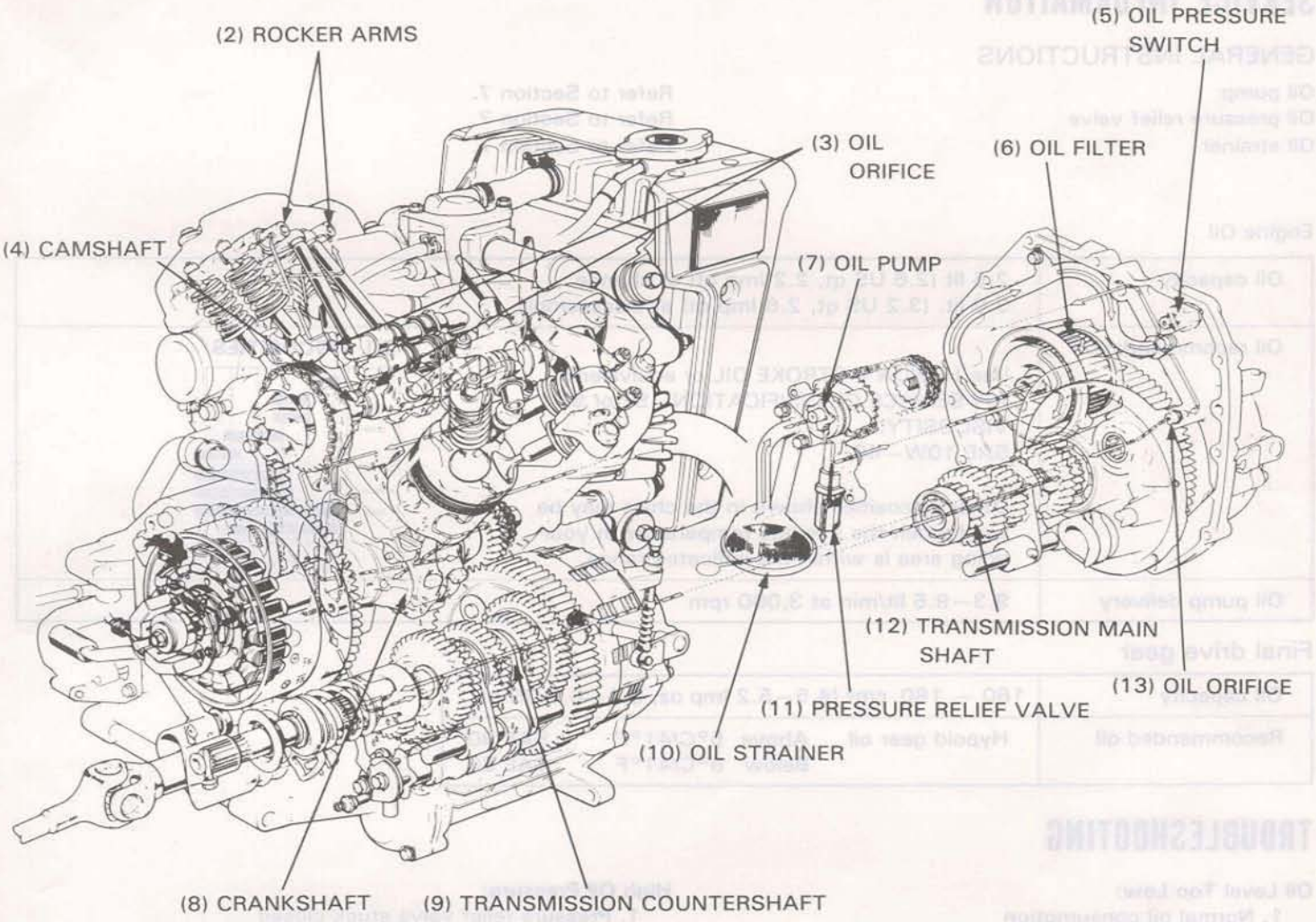
Oil Contamination
1. Oil or filter not changed often enough
2. Defective head gasket

Low Oil Pressure
1. Faulty warning light switch
2. Pressure relief valve stuck open
3. Plugged oil pick-up screen
4. Oil pump worn

High Oil Pressure:
1. Pressure relief valve stuck closed
2. Plugged oil filter, gallery, or metering orifice
3. Incorrect oil being used

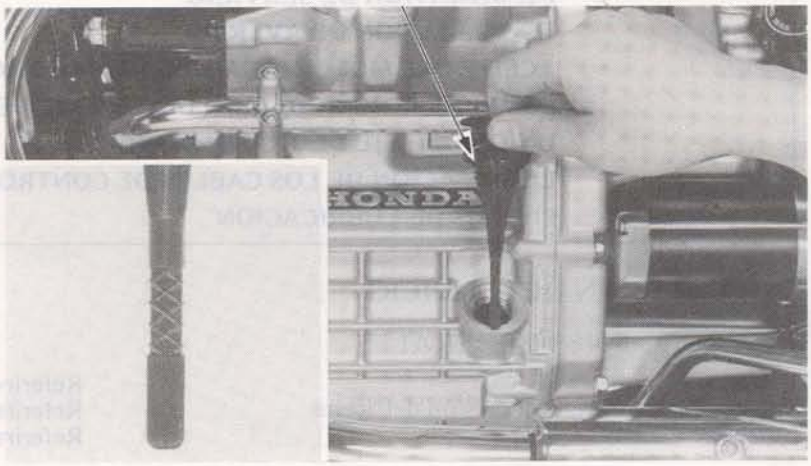
No Oil Pressure
1. Oil level too low
2. Oil pump drive chain broken
3. Faulty oil pump

(1) LUBRICATION DIAGRAM



ENGINE OIL & OIL FILTER

(1) OIL FILTER CAP DIPSTICK



• OIL LEVEL CHECK

Stop the engine and support the motorcycle on the center stand or hold it upright. Check the oil level with the filler cap dipstick after 2—3 minutes. Do not screw in the cap when making this check. If the level is below the lower level mark on the dipstick, fill to the upper level mark.

• ENGINE OIL CHANGE/OIL FILTER REPLACEMENT

NOTE

Engine oil change is performed with the engine at normal operating temperature and vehicle upright or on center stand to assure complete and rapid draining.

Remove the oil filler cap.
Remove the drain plug to drain oil from the engine.

NOTE

Crank the engine electrically for 2—3 seconds to drain any oil which may be left in the recesses of the engine.

Screw out the oil filter lock bolt and remove the oil filter element from the oil filter case. Check operation of the by-pass valve in the oil filter bolt.
Install a new oil filter element and retighten the oil filter lock bolt.

NOTE

- Make sure that the o-rings on the filter bolt and the oil filter cover are not damaged and are in good condition.
- Torque the oil filtr bolt.

TORQUE: 20—25 N·m
(2.0—2.5 kg-m, 145—18 ft-lb)

Reinstall the drain plug.

NOTE

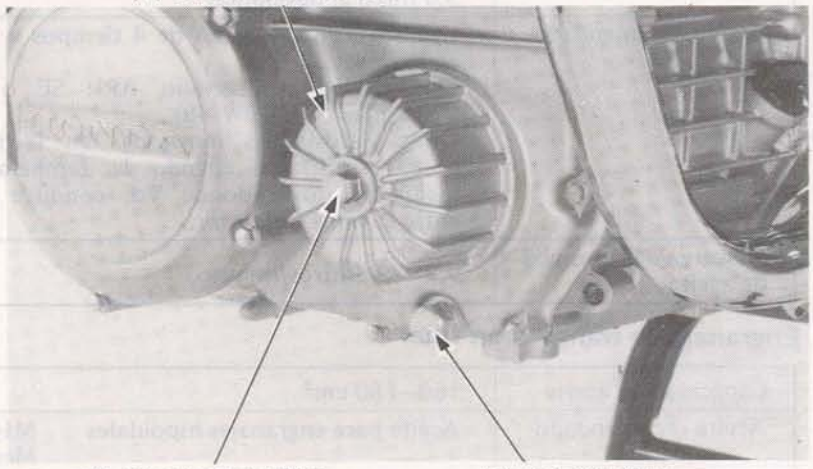
Check that the sealing washer on the drain plug is not damaged and in good condition.

Fill the crankcase with approximately 2.5 liters (2.6 U.S. qt) of recommended oil through the oil filler opening.

RECOMMENDED OIL:
Use HONDA 4-STROKE OIL or equivalent.
API Service Classification: SE or SF
General, all temperatures: SAE 10W-40

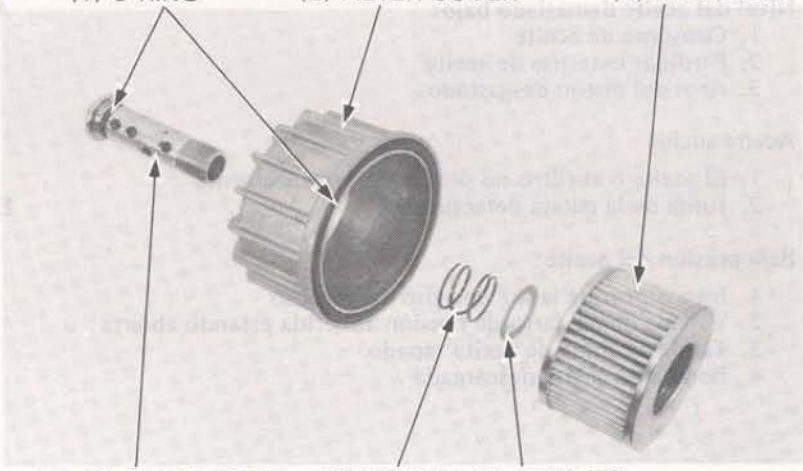
Start the engine and allow to idle for a few minutes. Stop the engine, make sure that the oil level is at the upper level mark with the motorcycle in an upright position, and there are not oil leaks.

(1) OIL FILTER COVER



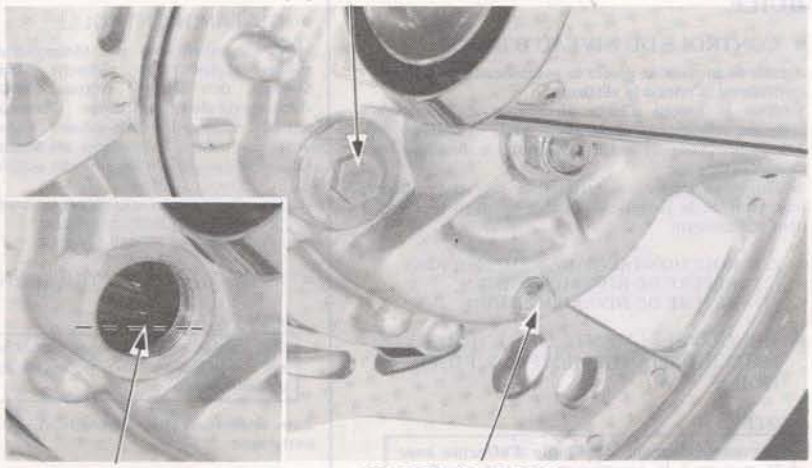
(3) OIL FILTER BOLT (2) DRAIN BOLT

(1) O-RING (2) FILTER COVER (4) OIL FILTER



(6) OIL FILTER BOLT (3) SPRING (5) WASHER

FINAL GEAR OIL CHECK/ REPLACEMENT



- OIL LEVEL CHECK

Remove the oil filler cap.
Check that the final gear case is filled up to the lower edge of the oil filler cap hole

NOTE

If the level is low, check for leaks that must be corrected. Pour fresh oil through the oil filler opening until it flows out of the opening.

- OIL REPLACEMENT

Remove the drain bolt to drain all oil from the final gear case.
Reinstall the drain bolt.
Fill the gear case with the recommended oil up to the correct level.

OIL CAPACITY:
160—180 cm³ (4.5—5.1 Imp oz, 5.4—6.1 US oz)
RECOMMENDED OIL: HYPOID GEAR OIL
SAE 90 (Above 5°C, 41°F)
SAE 80 (Below 5°C, 41°F)

DRIVE SHAFT JOINT

Apply approx. 18gr (20 cc 1.2 cu-in) lithiumbased MULTIPURPOSE NLGI No. 2 (with molbdenum disulfide-MoS_2-additive) GREASE through the drive shaft joint grease fitting

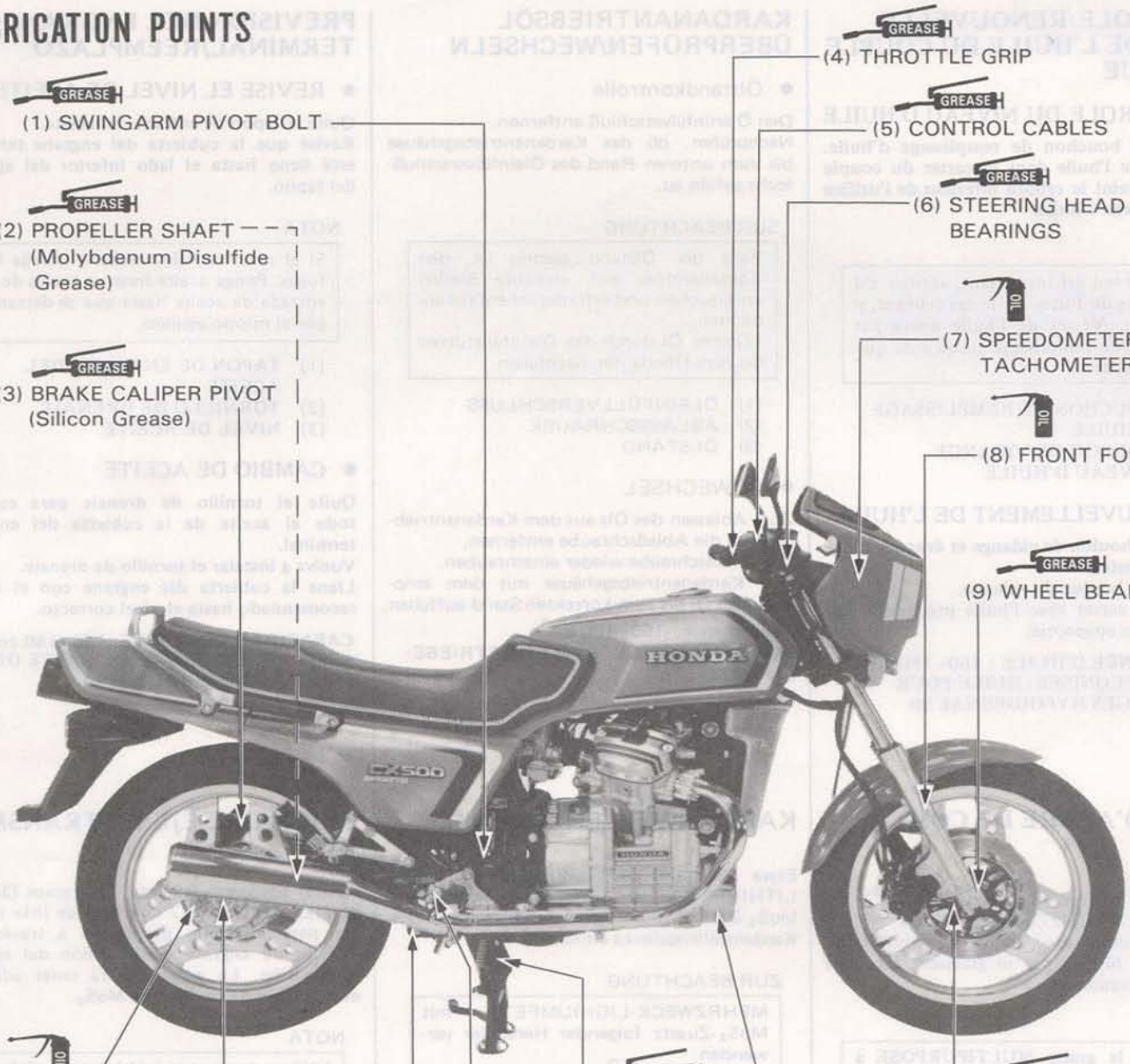
NOTE

Use lithium-based MULTIPURPOSE grease the MoS_2-additive as follows:
- MOLYKOTE® BR2-S manufactured by Dow Corning, U.S.A.
- MULTIPURPOSE M-2 manufactured by Mitsubishi Oil, japan.
- Other lubricants of equivalent quality.

CONTROL CABLE LUBRICATION

Periodically, disconnect the throttle and clutch cables at their upper ends.
Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant.

LUBRICATION POINTS



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AIR CLEANER	3—3	BRAKE SYSTEM	3— 9
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SPARK PLUG	3—4	HEADLIGHT AIM	3—10
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THROTTLE OPERATION	3—6	SUSPENSION	3—11
CARBURETOR IDLE SPEED	3—6	CRANKCASE BREATHER	3—13
CARBURETOR SYNCHRONIZATION	3—7	WHEELS	3—13
COOLANT	3—7	STEERING HEAD BEARINGS	3—14
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COOLING SYSTEM HOSES	3—8	NUTS, BOLTS, FASTENERS	3—14
BATTERY	3—8		

SERVICE INFORMATION

GENERAL INSTRUCTIONS

Refer to the Section 2 LUBRICATION for the details of the following items:
- Engine oil
- Engien oil filter
- Final drive ger oil
- Drive shaft joint

TOOLS

Special

Inspection plug	: 07999—4150000
Vacuum gauge tester	: 07404—0020000
Gauge attaachment A	: 07510—3000100

Common

Valve adjusting wrench 10 x 12 mm	: 07708—0030200
Valve adjuster B	: 07708—0030400

SPECIFICATIONS

< Engine >

Spark plug: Recommended spark plug:

	Standard	Optional
NGK	DR8ES-L	DR8ES
ND	X24ESR-U	X27ESR-U

Spark plug gap : 0.6—0.7 (0.024—0.028 in)
Valve clearance IN : 0.08 mm (0.035 in)
EX: 0.10 mm (0.004 in)
Throttle grip free play : 2—6 mm (0.08—0.24 in)
Idle speed : 1,100 ± 100 min^{-1} (rpm)
Cylinder compression : 1,200 kPa (12.0 kg/cm^2, 171 psi)
Clutch free play : 10—20 mm (0.4—0.8 in)

< CHASSIS >

Rear brake pedal free play: 20—30 mm (3/4 — 1/4 in)

Cold tire pressures kPa (kg/cm^2, psi)	Front	200 (2.0, 28)	
	Rear	200 (2.0, 28)	
Driver and passenger	Front	200 (2.0, 28)	
	Rear	250 (2.5, 36)	
Tire size	Front	100/90—18	56S
	Rear	120/80—18	62S

Tire brand	Front	Rear
BRIDGESTONE	L303	G510
DUNLOP	F11	K527
YOKOHAMA	Y994	Y995

Suspension air pressure:
Front : 80—120 kPa (0.8—1.2 kg/cm^2, 11—17 psi)
Rear : 0—500 kPa (0—5.0 kg/cm^2, 0—71 psi)

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
A: ADJUST
L: LUBRICATE

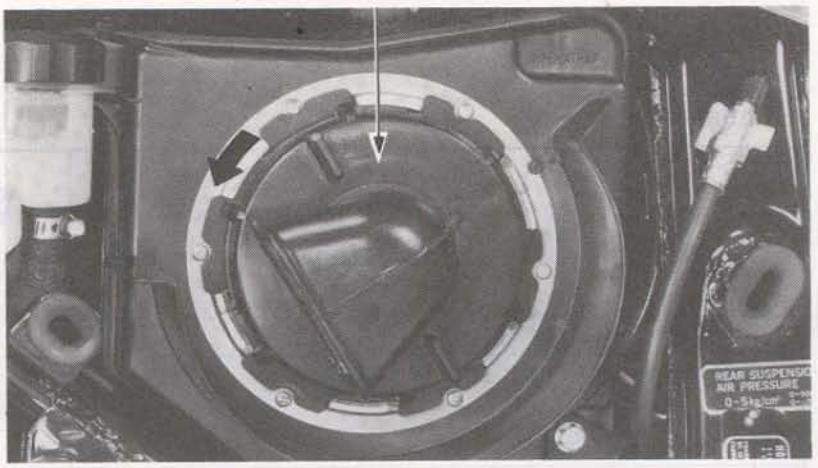
	ITEM \ FREQUENCY	WHICHEVER COMES FIRST ⇩ EVERY	⇨ ODOMETER READING NOTE (3) 1000 km (600 mi)	6000 km (3,600 mi)	12,000 km (7,200 mi)	18,000 km (10,800 mi)	24,000 km (14,400 mi)	30,000 km (18,000 mi)	36,000 km (21,600 mi)
	ENGIN OIL	YEAR	R		R		R		R
	OIL FILTER ELEMENT	YEAR	R		R		R		R
	AIR CLEANER	NOTE (1)		C	R	C	R	C	R
*	FUEL LINES				I		I		I
	FUEL STRAINER		C	C	C	C	C	C	C
	CRANKCASE BREATHER	NOTE (2)		C	C	C	C	C	C
	SPARK PLUGS			I	R	I	R	I	R
*	VALVE CLEARANCE		I	I	I		I		I
*	THROTTLE OPERATION		I		I		I		I
*	CARBURETORS IDLE SPEED		I	I	I	I	I	I	I
*	CARBURETORS CHOKE				I		I		I
*	CARBURETORS—SYNCHRONIZE		I		I		I		I
*	COOLANT				I		I		I
*	COLING SYSTEM, HOSES		I		I		I		I
*	RADIATOR CORE				I		I		I
*	DRIVE SHAFT JONT				L		L		L
*	FINAL DRIVE LUBRICANT				I		I		R
*	BATTERY ELECTROLYTE	MONTH	I	I	I	I	I	I	I
	BRAKE FLUID LEVEL	MONTH	I	I	I	I	I	I	I
	BRAKE FLUID	2 YEAR							R
*	BRAKE PADS			I	I	I	I	I	I
	BRAKE LIGHT SWITCH				I		I		I
*	HEADLIGHT AIM				I		I		I
*	CLUTCH		I	I	I	I	I	I	I
	SIDE STAND				I		I		I
	SUSPENSION		I		I		I		I
*	ALL NUTS, BOLTS, FASTERNERS		I		I		I		I
*	WHEELS		I		I		I		I
**	STEERING HEAD BEARING		I		I		I		I

* SHOULD BE SERVICED BY AN AUTHORIZED HONDA DEALER, UNLESS THE OWNER HAS PROPER TOOLS AND SERVICE DATA AND IS MECHANICALLY QUALIFIED.
** IN THE INTERST OF SAFETY, WE RECOMMEND THESE ITEMS BE SERVICED ONLY BY AN AUTHORIZED HONDA DEALER.
NOTES: (1) SERVICE MOPRE FREQUENTLY WHEN RIDING IN DUSTY AREAS.
(2) SERVICE MORE FREQUENTLY WHEN RIDING IN RAIN OR AT FULL THROTTLE.
(3) FOR HIGHER ODOMETER READINGS, REPEAT AT THE FREQUENCY INTERVAL ESTABLISHED HERE.

AIR CLEANER

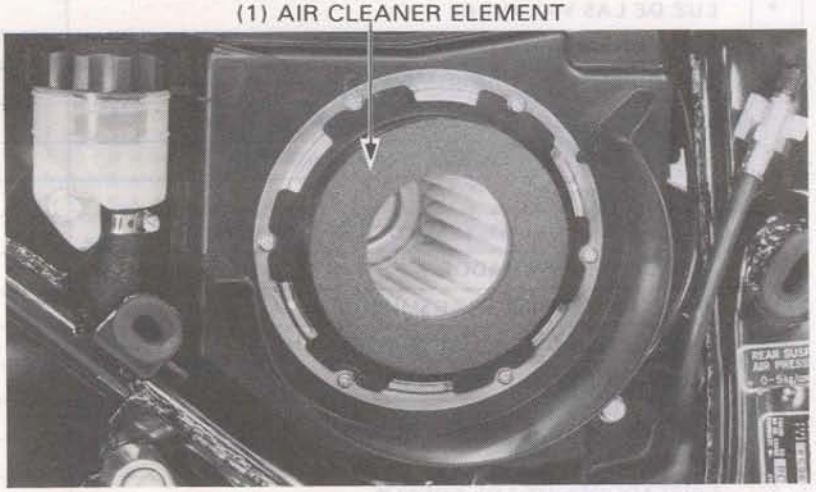
Remove the right side cover.
Remove the air cleaner by turning it counter-clockwise.

(1) AIR CLEANER COVER

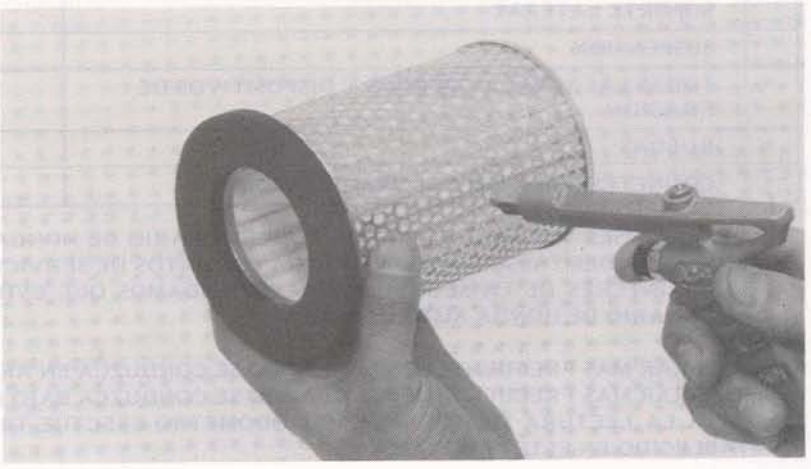


Remove the air cleaner element.

(1) AIR CLEANER ELEMENT



Clean the air cleaner element by tapping it lightly to loosen dust.
Blow away remaining dust by compressed air from the outside of the element.
Replace the element if it is excessively dirty, torn or damaged.



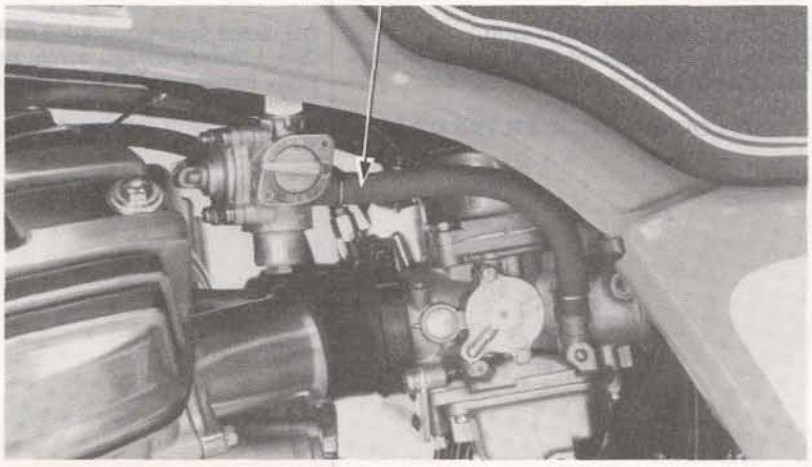
NOTE

Install the cover with the "TOP" mark facing upward.

Install element and cover.
Install the right side cover.

FUEL LINES

Make sure that the fuel lines and connections are not deteriorated, damaged or leaking.
Replace any parts which have signs of deterioration, damage or leakage.

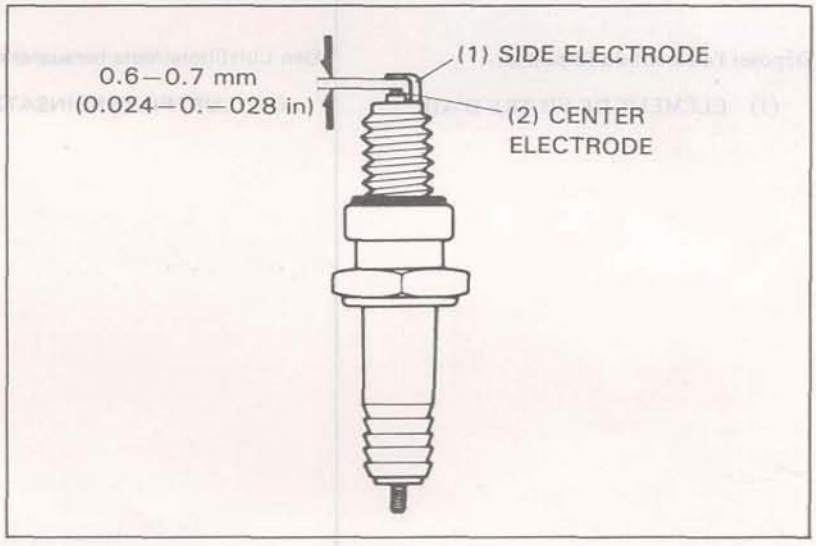


SPARK PLUG

Disconnect the spark plug cap and remove the spark plug.
Visually inspect the spark plug electrodes for wear. The center electrode should have square edge and the side electrodes 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.
Adjust the spark plug gap by bending the side electrode.

SPARK PLUG GAP:

0.6—0.7 mm (0.024—0.028 in)

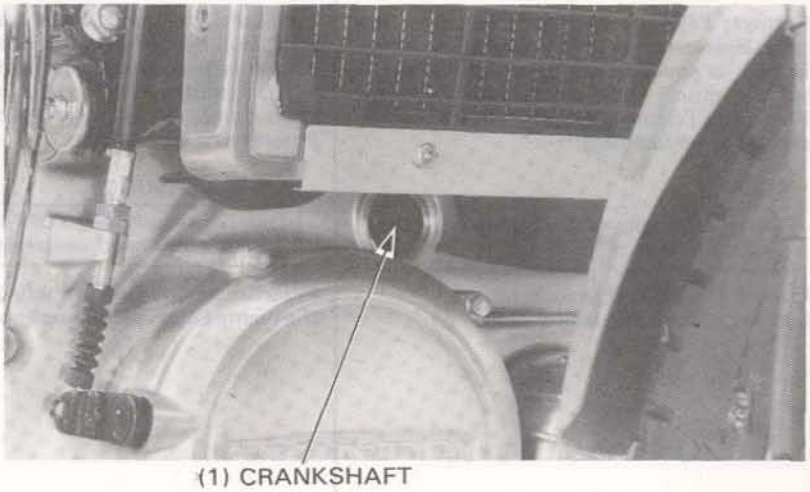


VALVE CLEARANCE

NOTE

This inspection and adjustment must be performed while the engine is cold (below 35°C).

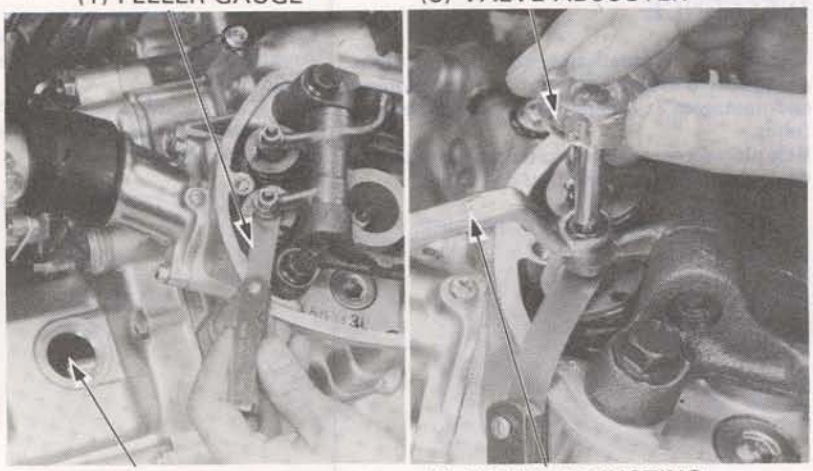
Remove the radiator cover.
Remove the crankshaft hole cap from the transmission cover and the timing inspection hole cap from the rear cover.
Remove the spark plug caps.
Remove the cylinder head covers.



Turn the crankshaft clockwise and align the "TL" mark on the rotor with the index mark. The left cylinder must be at T.D.C. of the compression stroke.
Check the intake and exhaust valve clearance of the left cylinder by inserting a feeler gauge between the clearance adjusting screw and valve stem.

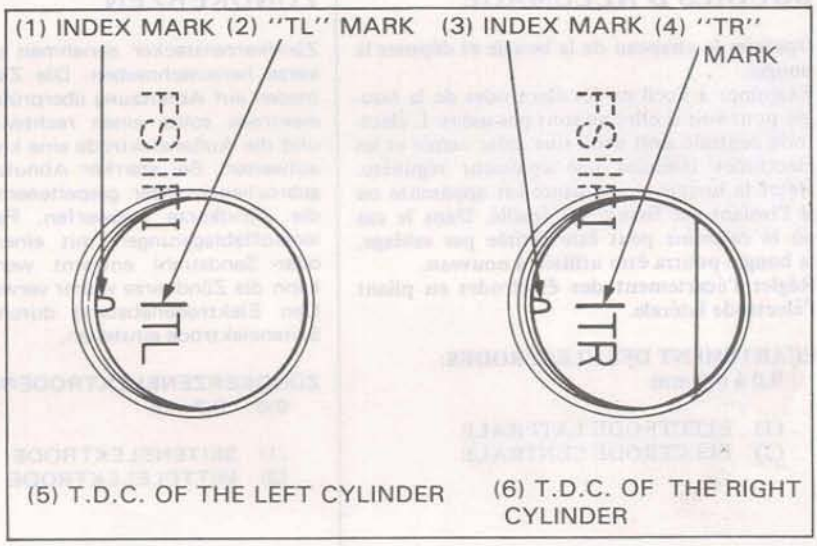
VALVE CLEARANCE

IN: 0.08 mm (0.003 in)
EX: 0.10 mm (0.004 in)



Adjust, by loosening the lock nut, and turning the screw until there is a slight drag on the feeler gauge. Hold the screw and tighten the lock nut.
Recheck the valve clearances.

Turn the crankshaft clockwise and align the "TR" mark on the rotor with the index mark. The right cylinder must be at the T.D.C. of the compression stroke.
Check the intake and exhaust valve clearance of the right cylinder as described for the left cylinder.



Install the removed parts in the reverse order of disassembly.

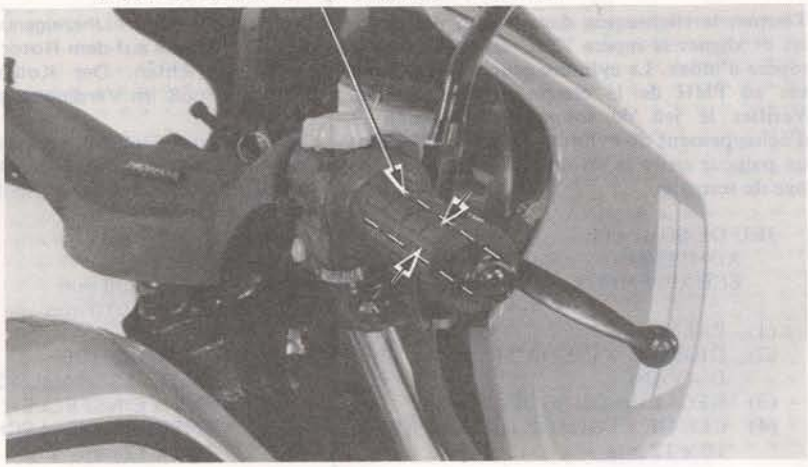
NOTE

Coat the cylinder head cover bolt rubbers with oil before tightening.

THROTTLE OPERATION

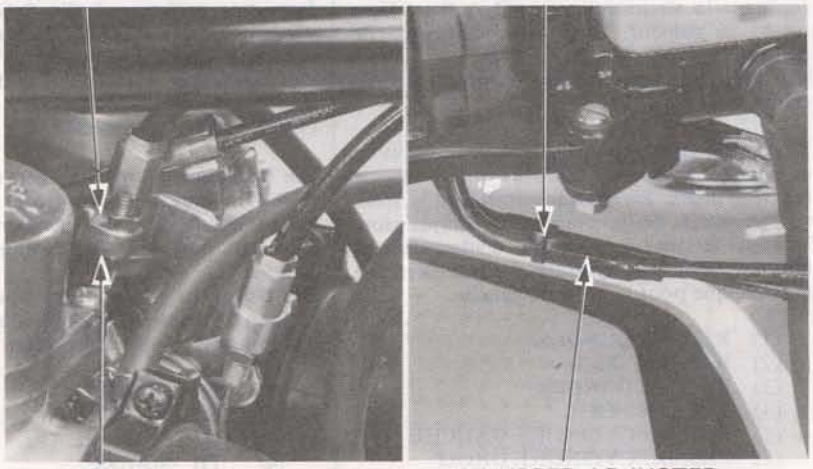
Make sure that there is no deterioration, damage, or kink in the throttle cables, and that the throttle grip free play is 2—6 mm (0.08—0.24 in) on the outer edge of the throttle grip flange.
Check for smooth throttle grip rotation from fally closed to fully open positing at all steering positions.
Adjust or replace, if necessary.

(1) FREE PLAY 2—6 m (0.08—0.24 in)



Throttle grip free play can be adjusted at either end of the throttle PULL cable. Major adjustments must be made at the lower adjuster. To adjust, loosen the grip free play adjuster lock nut and turn the adjuster in either direction. Minor adjustments must be made at the upper adjuster.

(1) LOWER ADJSUTER (3) LOCK NUT



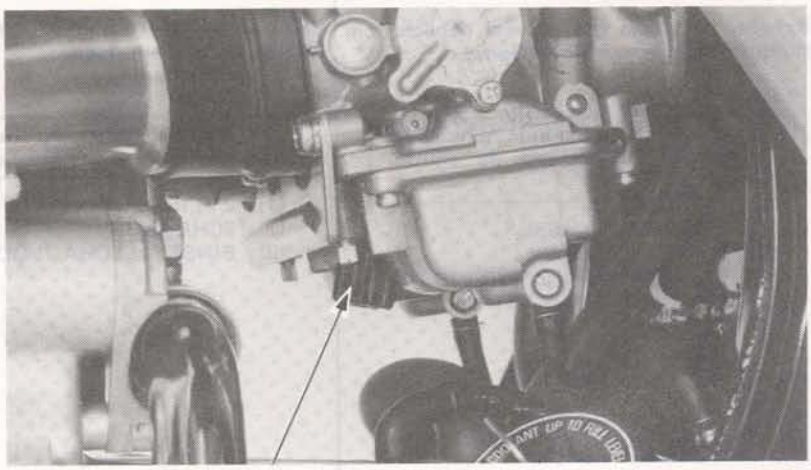
(2) LOCK NUT (4) UPPER ADJUSTER

CARBURETOR IDEL SPEED

NOTE

The engine must be warm for accurate idle adjustment. The minutes of stop and go driving is sufficient, or when the temperature gauge needle is in the wide white line.

Warm up the engine, place the transmission in neutral and the motorcycle on its center stand.
Adjust idle speed with the throttle stop screw.
IDLE SPEED: 1,100 ± 100 min^{-1} (rpm)



(1) THROTTLE STOP SCREW

CARBURETOR SYNCHRONIZATION

NOTE

This adjustment is performed with engine at normal operating temperature, transmission in neutral, and vehicle on center stand

Remove plug screws from carburetor spacers and install adapters to carburetor spacers, then connect the vacuum gauges to them.

Start the engine and set the idle speed to 1100 ±100 rpm then make sure that the difference of vacuum of each cylinder is indicating within 40 mmHg.

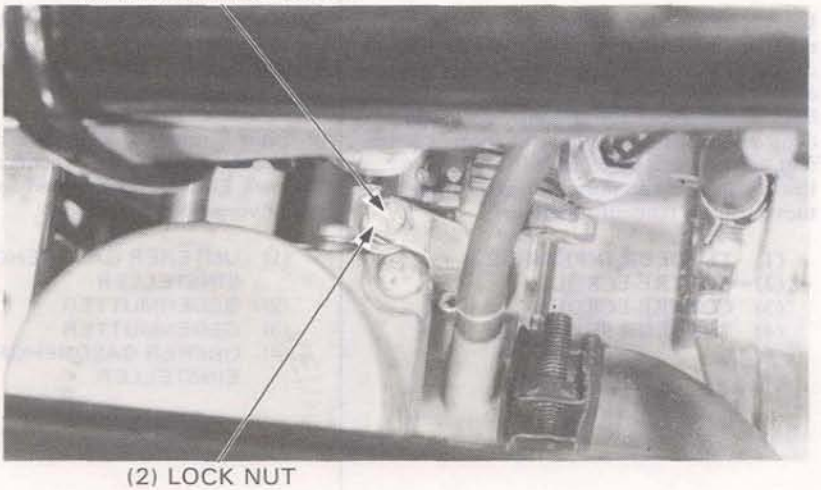
(1) VACUUM GAUGE

(2) VACUUM GAUGE ATTACHMENT

ADJUSTMENT

Prepare a longer tube and reconnect it to the fuel tank and carburetor.
Position fuel tank higher than normal tank position.
Loosen adjusting screw lock nut.
Start the engine and set the idle speed within the specification.
Turn adjusting screw to achieve the difference of vacuum of each cylinder within 40 mmHg. Hold adjusting screw, and retighten adjusting screw lock nut.
Check the idle speed and synchronization.
Reinstall fuel tank and seat, and replace a longer fuel tube with a normal one.

(1) ADJUSTING SCREW

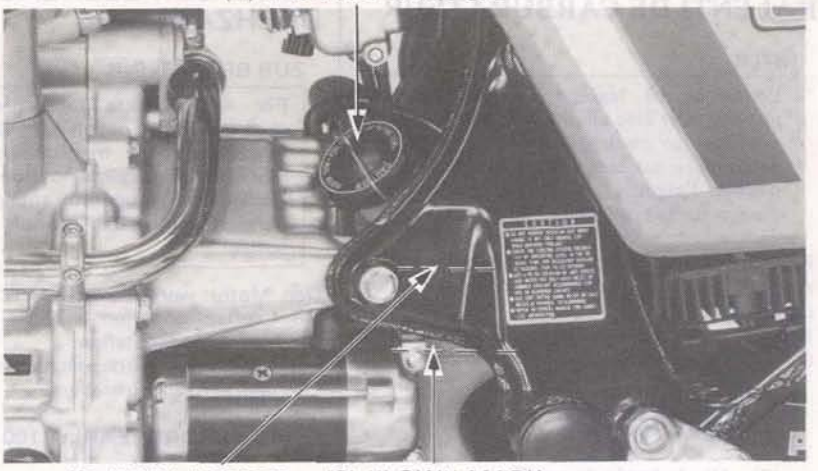


(2) LOCK NUT

COOLANT

Check the coolant level of the reserve tank with the engine running at normal operating temperature.
The level should be between the "FULL" and "LOW" level lines.
If necessary, remove the reserve tank cap and refill up to the "FULL" level line.

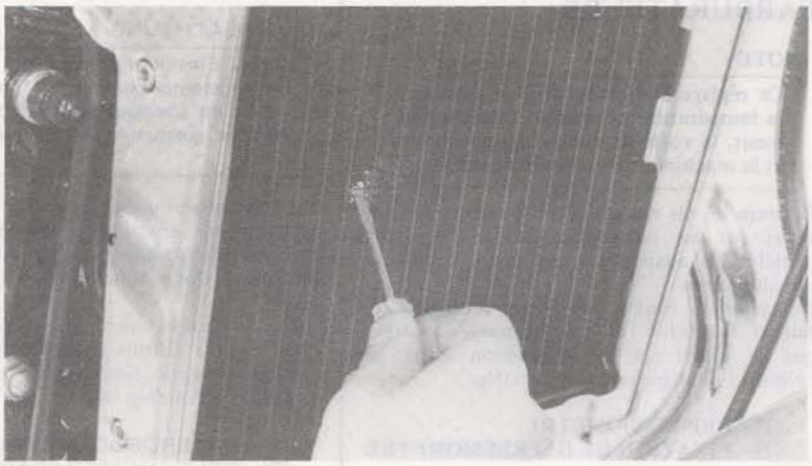
(1) RESERVE TANK CAP



(2) "FULL" MARK (3) "LOW" MARK

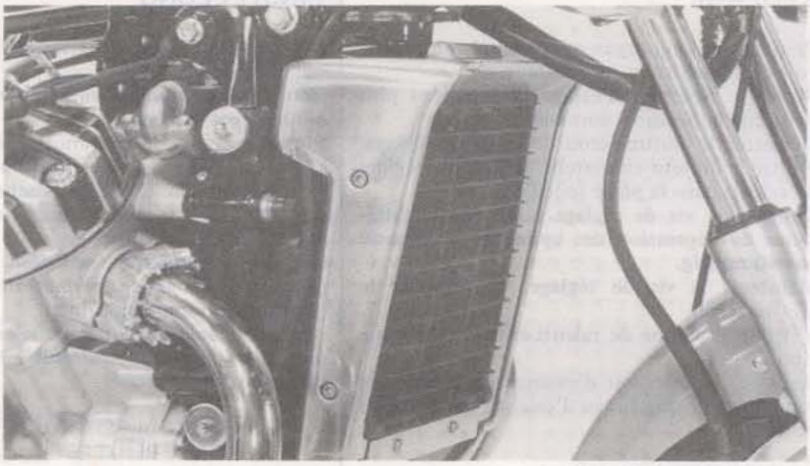
RADIATOR CORE

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



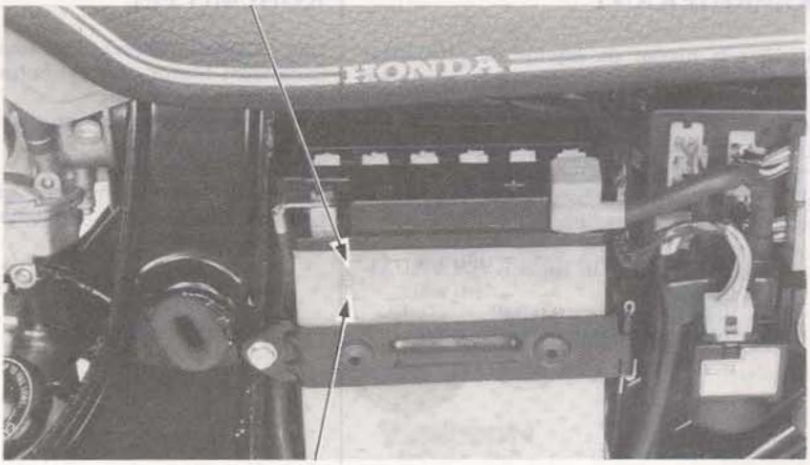
COOLING SYSTEM HOSES

Inspect the hoses for crocks or deterioration, and replace if necessary.
Check the hose clamps, and tighten if necessary.



BATTERY

Remove the left side cover.
Inspect the battery electrolyte.
When the electrolyte level nears the lower limit, refill with distilled water to the upper level. Fill all cells to the same level.
If sulfation forms on the battery walls or sediments (paste) accumulate on the bottom of the battery, replace the battery with a new one.

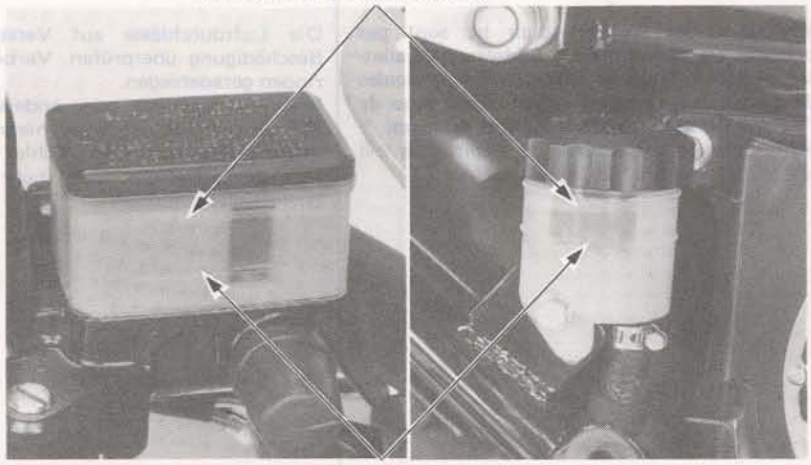


BRAKE FLUID

Check the front and rear brake fluid reservoir level. If the level nears the lower level mark, fill the reservoir with SAE J1703 or DOT-3 BRAKE FLUID to the upper level mark. 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.*
- *Avoid operating the brake lever with the cap removed. Brake fluid will squirt out if the lever is pulled.*
- *Do not mix different types of fluid, as they are not compatible.*



BRAKE PAD WEAR

Check the brake pads for excessive wear from behind the brake caliper.

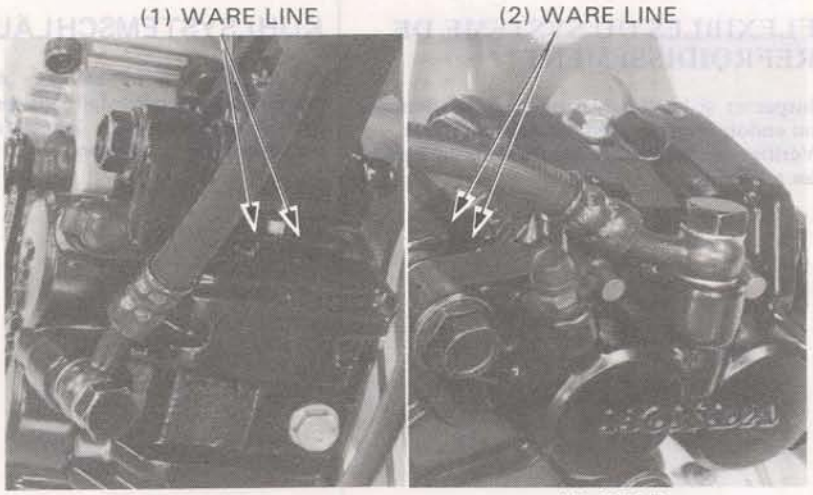
NOTE

To inspect the rear brake, it is necessary to remove the dust cover.

Replace the brake pads if the wear line on the pads reaches the edge to the brake disc.

CAUTION

Always repalce the brake pads in pairs to assure even disc pressure.



BRAKE SYSTEM

BRAKE SYSTEM HOSE

Make sure that the brake hose is not deteriorated and check the entire brake system for leaks.

BRAKE PEDAL HEIGHT

Loosen the lock nut and turn the push rod until the correct pedal height is obtained. Turning the bush rod in direction (A) decrease the height. Turn the (B) to increase the height. Retighten the lock nut.

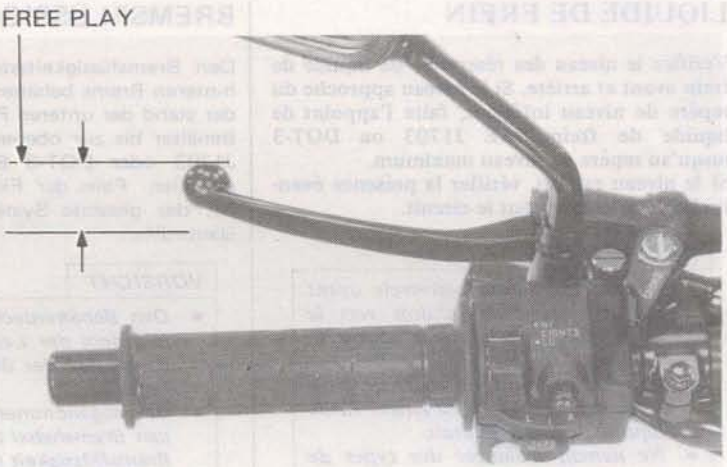
NOTE

After adjusting the brake pedal height, check the rear brake light switch and adjust if necessary.

CLUTCH ADJUSTMENT

Measure the clutch lever free play.

CLUTCH LEVER FREE PLAY:
10—20 mm (0.4—0.8 in)



Major adjustments should be made using the adjuster located at the clutch housing. Loosen the lock nut and turn the clutch cable adjusting nut. Minor adjustments can be made with the clutch cable adjuster located on the clutch lever. Loosen the lock nut and turn the adjuster.

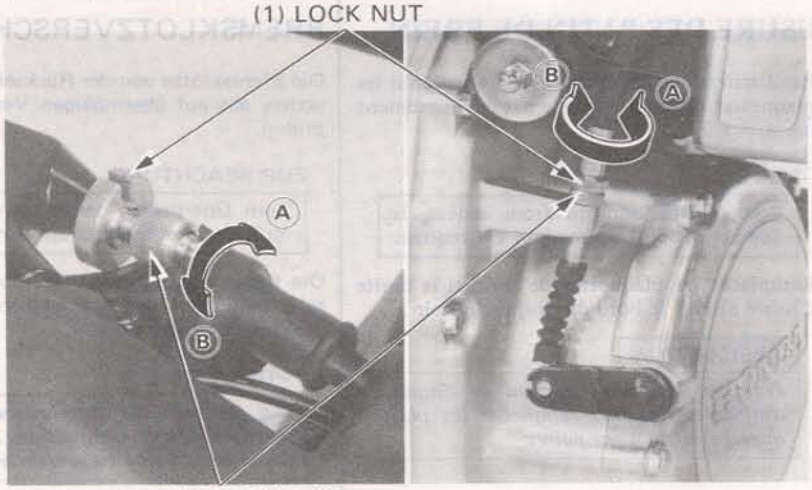
NOTE

Do not allow the threads at the adjuster to come out by more than 8 mm (0.3 in).

NOTE

Do not touch the exhaust pipe.

Recheck the clutch operation.



(2) ADJUSTER
(A) INCREASE PLAY (B) DECREASE PLAY

HEADLIGHT AIM

To adjust vertical aim, turn the left adjusting screw. To adjust horizontal aim, turn the right adjusting screw.

NOTE

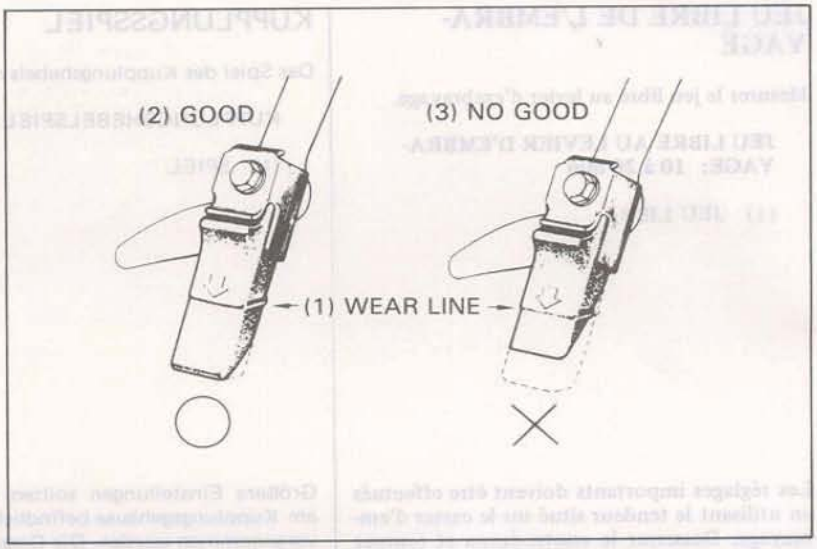
Adjust the headlight beam as specified by local laws and regulations.

WARNING

An improperly adjusted headlight may blind on coming drivers or it may fail to light the road for a safe distance.

SIDE STAND

Check the rubber pad for deterioration or wear. Replace if any wear extends to wear line as shown.
Check the side stand spring for damage and loss of tension, and the side stand assembly for freedom of movement.



NOTE

- When replacing, use a rubber pad with the mark "Over 260 lbs. ONLY".
- Spring tension is correct if the measurements fall within 2—3 kg (4.4—4.6 lbs) when pull the side stand lower end using a spring scale.

SUSPENSION

WARNING

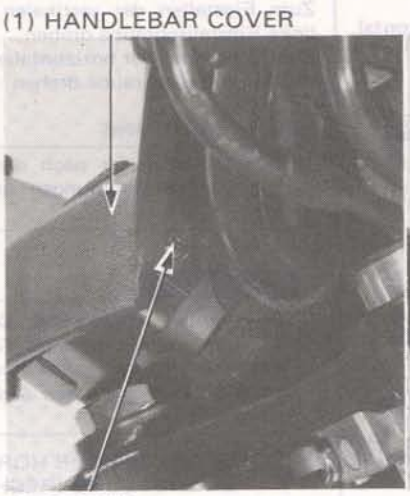
Do not ride a vehicle with faulty suspension. Loose, worn or damaged suspension parts impair vehicle stability and control.

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 front forks are cold.
Place the handlebar cover by removing the two screws.
Remove the valve cap and measure the front fork air pressure.

FROTN FORK AIR PRESSURE:
80—120 kPa (0.8—1.2 kg/cm², 11—17 psi)



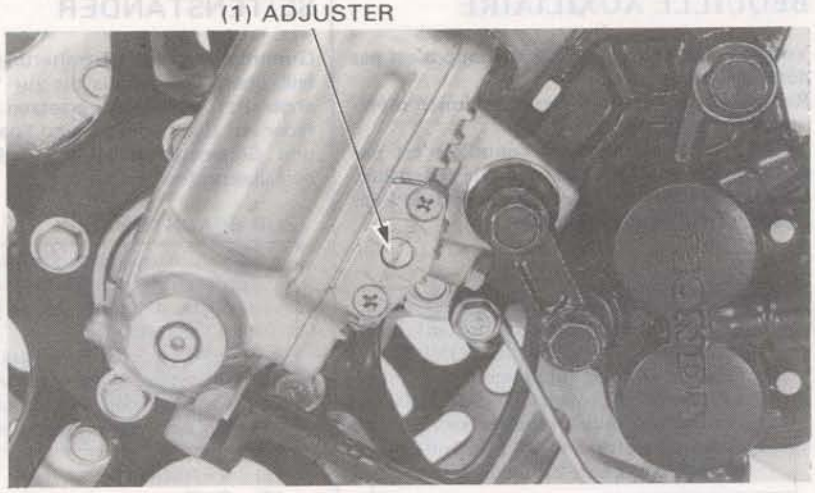
ANTI-NOSE DIVE SYSTEM INSPECITON

Check operation of the anti-nose dive system at each adjuster position by runing the motorcycle and applying the brakes.

WARNING

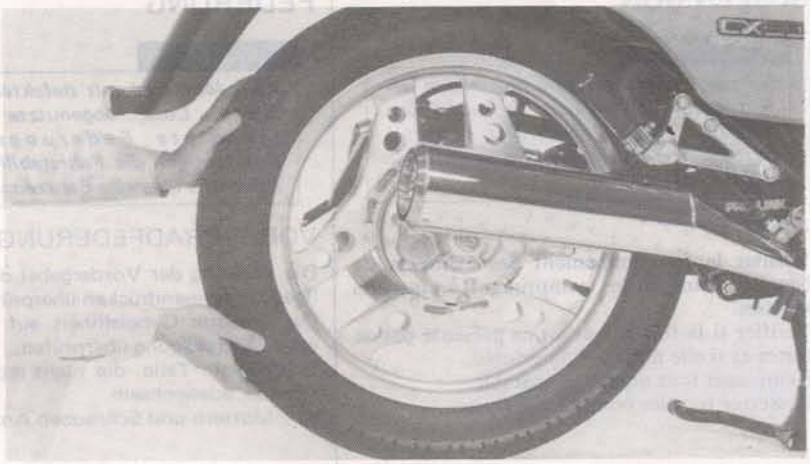
Select a safe place away from trafic to perform this test.

(1) ADJUSTER



REAR

Place the rear wheel side ways with force to see if the swingarm bearings are worn.
Replace if excessively worn.
Check the shock absorber for leaks or damage.
Tighten all rear suspension nuts and bolts.



Remove the right side cover.
Remove the valve cap and measure the rear shock absorber air pressure.

REAR SHOCK ABSORBER AIR PRESSURE:
0—500 kPa (0—5 kg/cm², 0—70 psi)

NOTE

Check the air pressure when the rear shock absorber is cold.

(1) VALVE CAP

(2) AIR VALVE

CRANKCASE BREATHER

Remove the plug from the drain tube to drain deposits.
Install the drain plug.

NOTE

Service more frequently when ridden in rain, or at full throttle or if the deposit level can be seen in the transparent section of the drain tubes.

(1) DRAIN PLUG

WHEELS

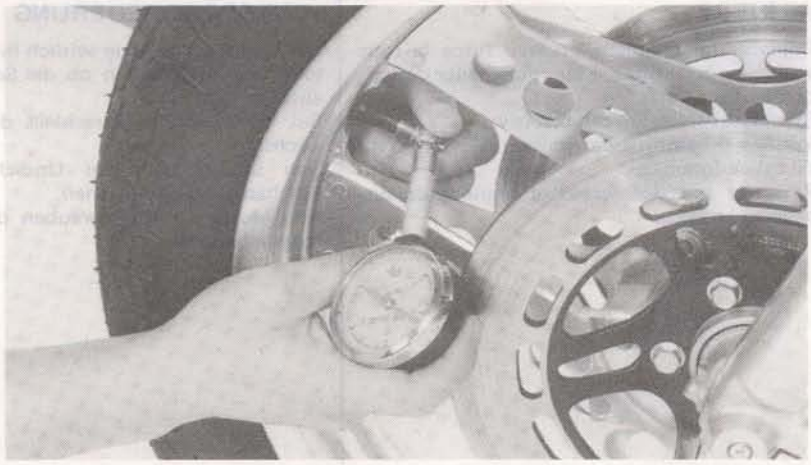
NOTE

Tire pressure should be checked when tires are COLD.

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

RECOMMENDED TIRE PRESSURE AND TIRE SIZE:

		Front	Rear
Tire size		100/90–18 56S	120/80–18 62S
Cold tire pressure kPa (kg/cm², psi)	Driver only	200 (2.0, 28)	200 (2.0, 28)
	Driver and passenger	200 (2.0, 28)	250 (2.5, 36)
Tire brand	BRIDGE-STONE	L303	G510
	DUNLOP	F11	K527
	YOKOHAMA	Y994	Y995



Check the front and rear wheels for trueness. Measure the tread depth at the center of the tires. Replace the tires if the thread depth reaches the following limit.

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

STEERING HEAD BEARINGS

NOTE

Check that the control cables do not interfere with handlebar rotation.

Raise the front wheel off the ground.
Check that the handlebar rotates freely.

If the handlebar moves unevenly, binds, or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut (page 13-25).

COMPRESSION TEST

Warm up the engine.
Remove all spark plugs.
Insert the compression gauge.
Open the choke and throttle valves fully.
Crank the engine with the starter motor.

NOTE

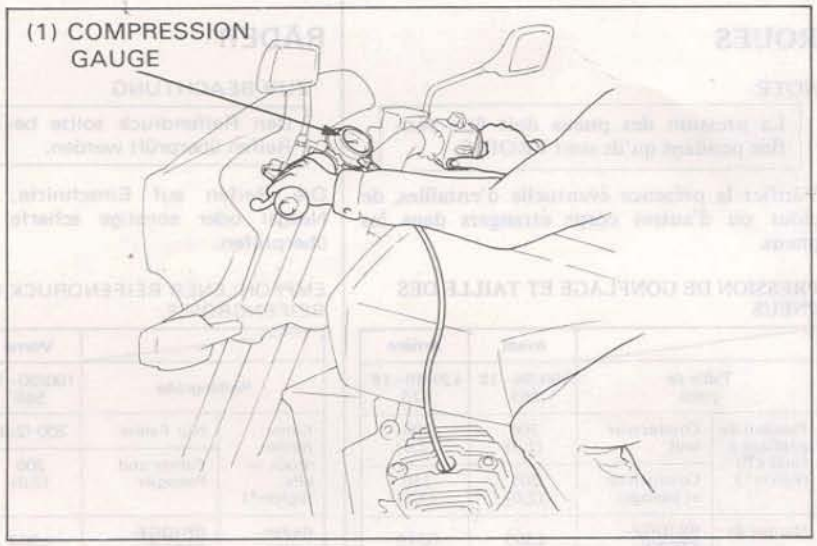
Crank the engine until the gauge reading stops rising. The maximum reading is usually reached within 4-7 seconds.

COMPRESSION PRESSURE:
1200 ± 200 kPa
(12 ± 2 kg/cm²2, 170 ± 28 psi)

If compression is low, check the following:

- Leakly valves
- Improper valve clearance
- Leaking cylinder head gasket
- Worn piston/ring/cylinder

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber or the piston crown.



NUTS, BOLTS, FASTENERS

Check that all chassis nuts and bolts are tightened to correct torque values.
Check all cotter pins and safety clips.

FUEL SYSTEM

CIRCUIT D'ESSENCE

KRAFTSTOFFSYSTEM

SISTEMA DEL COMBUSTIBLE

SERVICE INFORMATION	4—1	AIR CUT-OFF VALVE DISASSEMBLY	4— 8
TROUBLESHOOTING	4—1	COMPONENT ASSEMBLY	4— 9
CARBURETOR REMOVAL	4—2	FLOAT LEVEL	4—10
CARBURETOR SEPARATION	4—2	FAST IDEL ADJUSTMENT	4—10
CARBURETOR ASSEMBLY	4—4	CARBURETOR INSTALLATION	4—10
VACUUM CYLINDER DISASSEMBLY/INSPECTION	4—5	IDLE SPEED ADJUSTMENT	4—11
VACUUM PISTON INSPECTION	4—6	FUEL TANK	4—11
FLOAT CHAMBER DISASSEMBLY	4—6	AIR CLEANER CASE	4—13

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Use caution when working with gasoline. Always work in a well-ventilated area and away from sparks or open flames.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- The float bowls have drain plugs that can be loosened to drain residual gasoline.

TOOLS

Common

Float level gauge	07401—0010000

SPECIFICATIONS

Type	E, ED, F,IT, ND, SW, U.SA	G1	G2	CX400E
Venturi diameter	35 mm (1.38 in)	←	←	32 mm (1.26 in)
I.D. No.	VB1AA	VB1AB	VB1AC	VB1BA
Float level	15.5 mm (0.61 in)	←	←	←
Pilot screw	1-7/8 turns out	←	1-3/4 turns out	2 turns out
Idle speed	1,100 ± min^{-1} (rpm)	←	←	←
Vacuum (at idle speed)	200 mmHg	←	←	←
Throttle grip free play	2—6 mm (1/8—1/4 in)	←	←	←

TROUBLESHOOTING

Engine Cranks But Won't Start

1. No fuel in tank
2. No fuel getting to cylinders
3. Too much fuel getting to cylinders
4. No spark at plugs — ignition malfunciton
5. Fuel flow restricted

Engin Idles Roughly, Stalls, or Runs Poorly

1. Idle speed incorrect
2. Ignition malfunction
3. Low compression
4. Rich mixture
5. Lean Mixture
6. Air cleaner clogged
7. Air leaking into manifold
8. Fuel flow resticted
9. Fuel contaminated
10. Carburetors not synchronized
11. Faulty vacuum piston

Lean Mixture

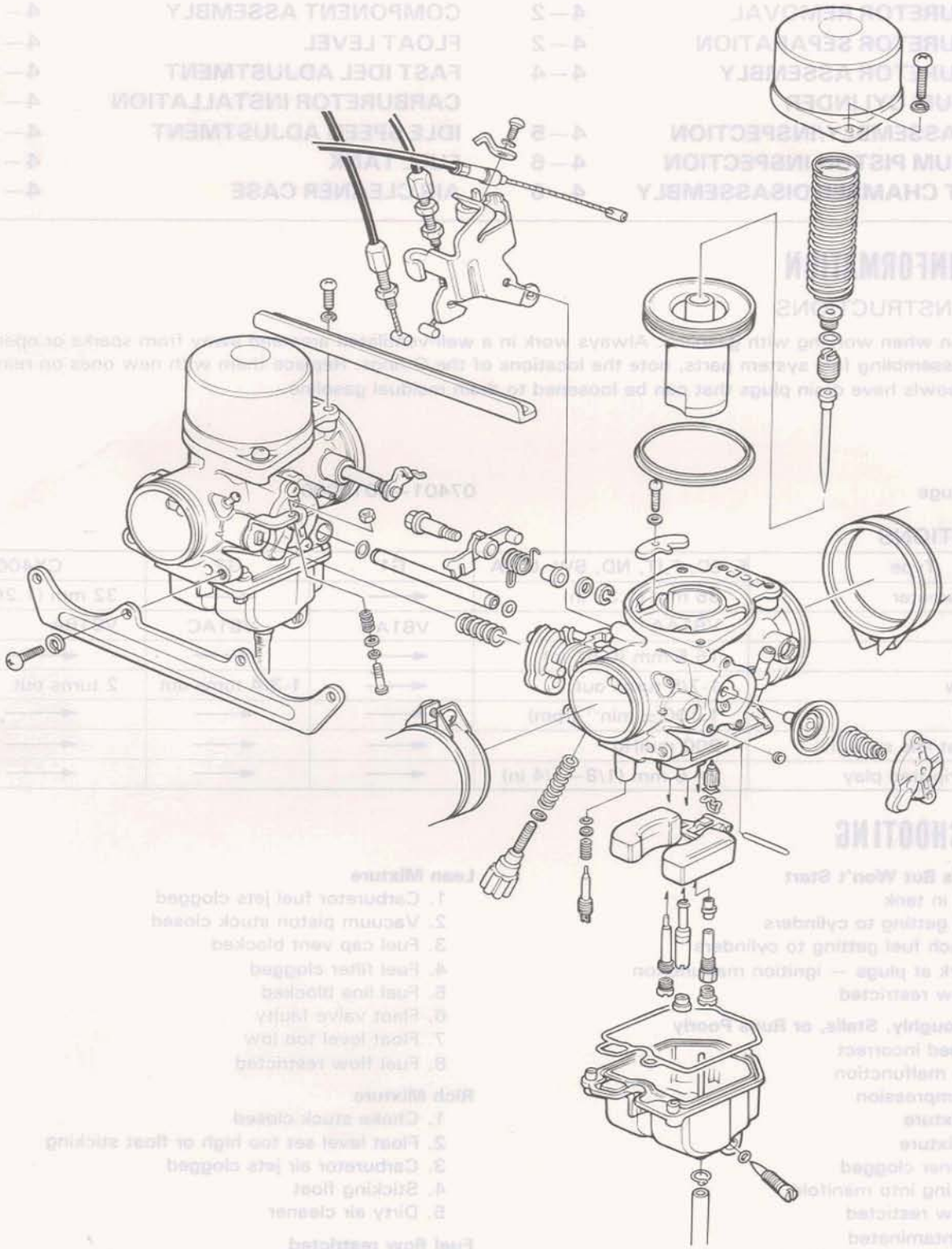
1. Carburetor fuel jets clogged
2. Vacuum piston stuck closed
3. Fuel cap vent blocked
4. Fuel filter clogged
5. Fuel line blocked
6. Flaot valve faulty
7. Float level too low
8. Fuel flow restricted

Rich Mixture

1. Choke stuck closed
2. Float level set too high or float sticking
3. Carburetor air jets clogged
4. Sticking float
5. Dirty air cleaner

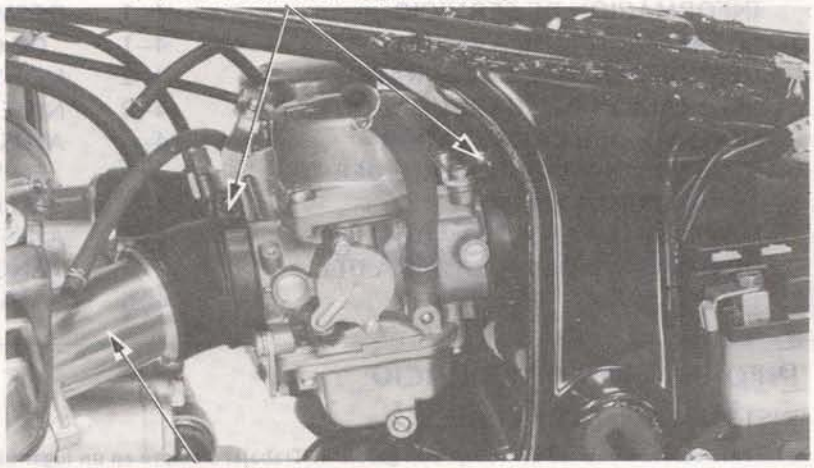
Fuel flow restricted

1. Fuel striner or fuel valve clogged
2. Fuel tank cap breather hole clogged
3. Vacuum tube or air vent tube clogged
4. Fuel valve diaphragm faulty

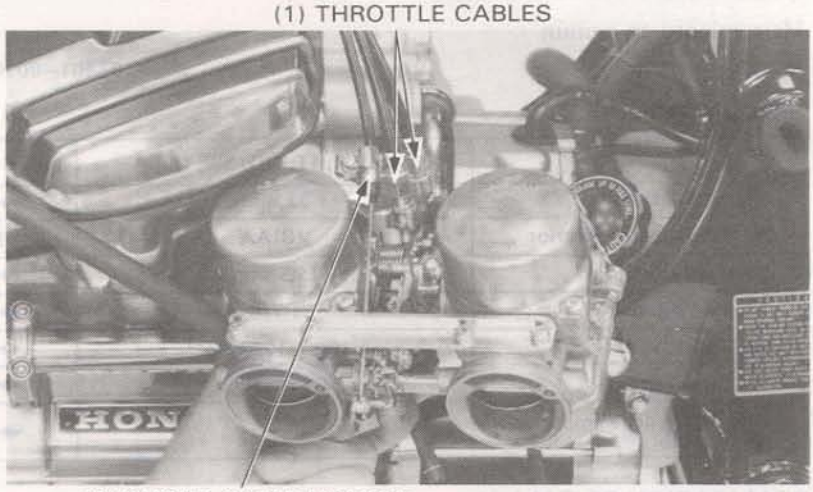


CARBURETOR REMOVAL

Remove the fuel tank.
Disconnect the carburetor overflow drain tubes.
Loosen the carburetor band screws.
Remove the carburetor manifolds and remove the carburetor assembly to the left side.



Loosen the choke cable holder screw and disconnect the choke cable.
Loosen the cable lock nuts and disconnect the throttle cables.
Remove the carburetors.
Disconnect the fuel and vacuum tubes from the carburetor.

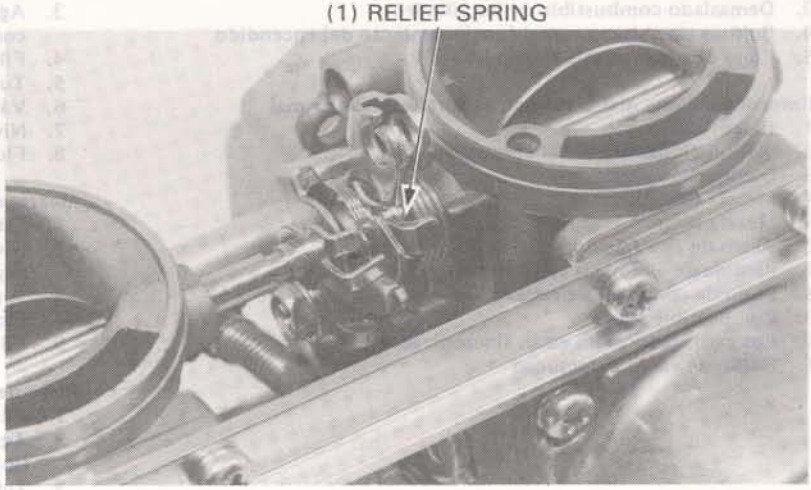


CARBURETOR SEPARATION

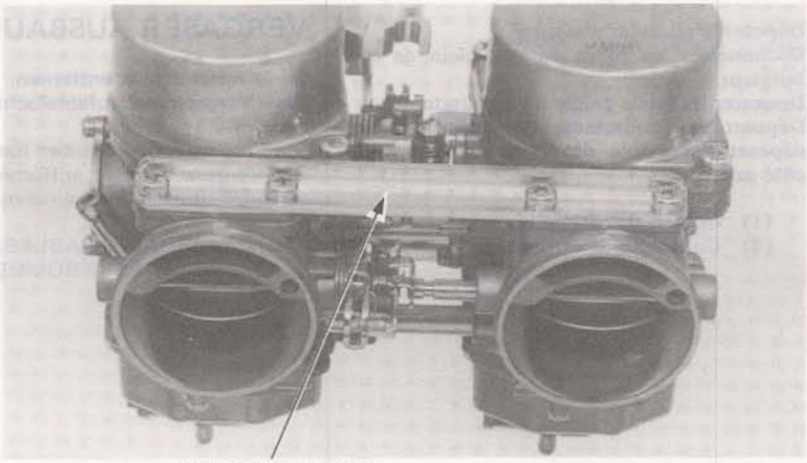
CAUTION

The carburetor is pre-set at the factory and pilot screw adjustment is not necessary except after overhauling it.

Remove the choke relief spring.

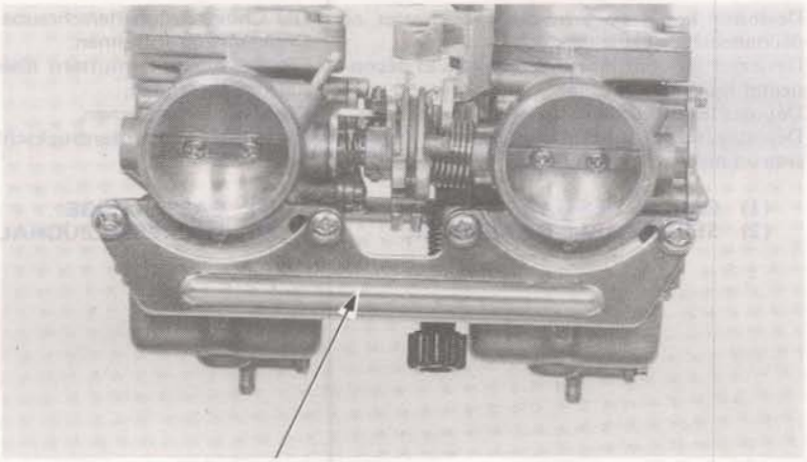


Remove the rear stay holding each pair of carburetors together.



(1) REAR STAY

Remove the front stay plate holding each pair of carburetors together.

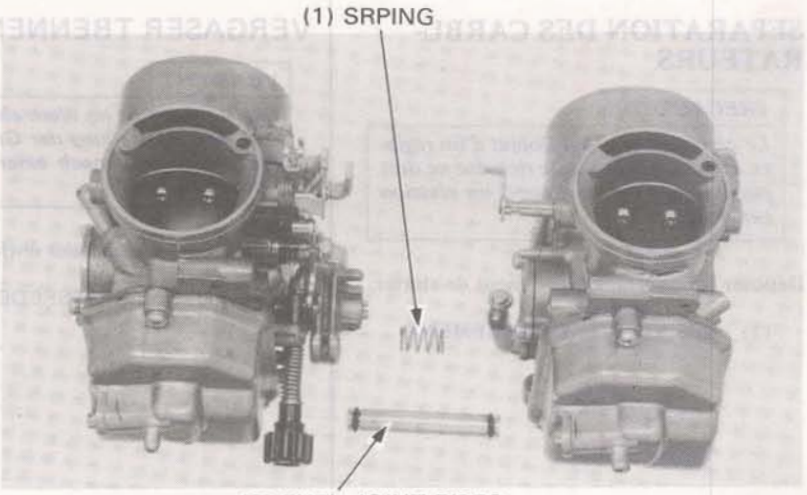


(1) FRONT STAY

Separate the carburetors.

CAUTION

Separate the carburetors horizontally to prevent damage to the joint pipes and choke linkage.



(1) SRPING

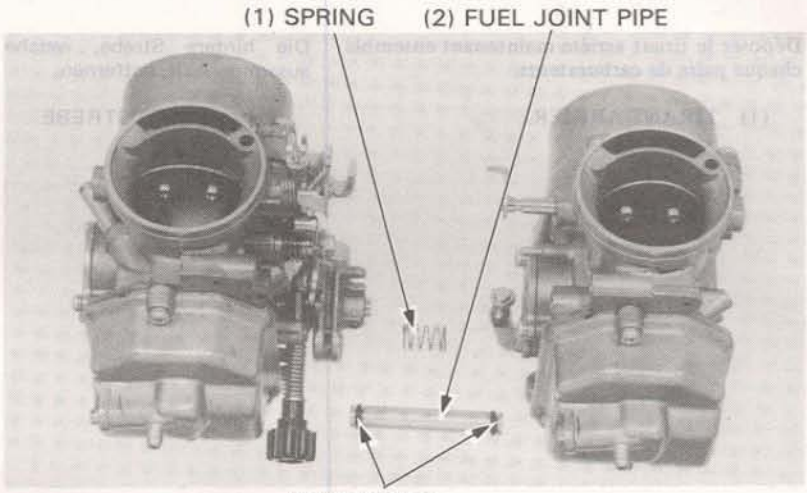
(2) FUEL JOINT PIPES

CARBURETOR ASSEMBLY

Install new O-rings on the fuel joint pipes.

NOTE

Apply a thin coating of oil to the O-rings.

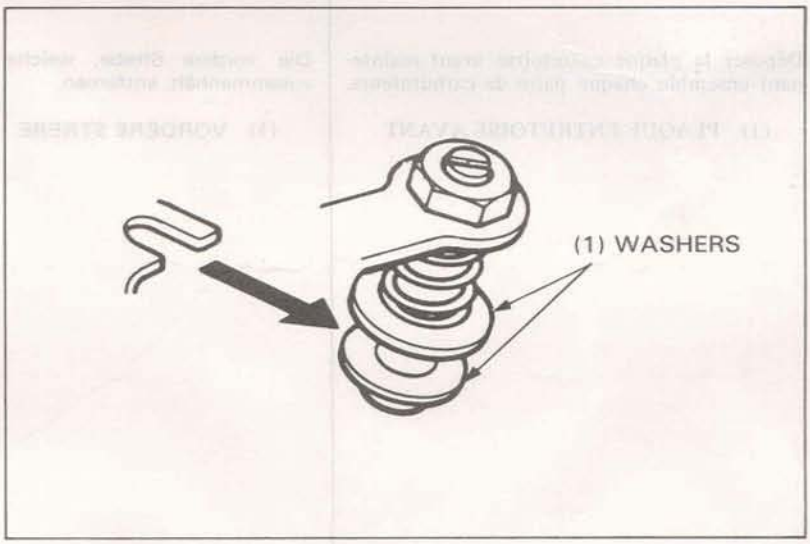


Assemble the right and left carburetors.

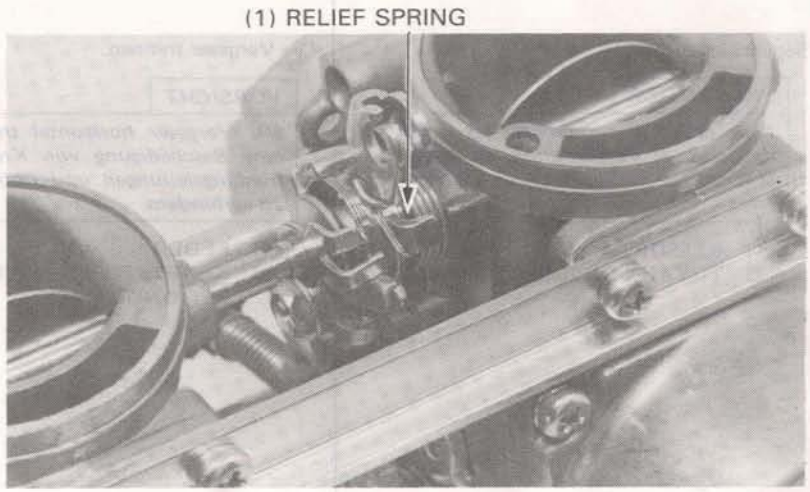
NOTE

- Insert the left carburetor throttle link between the plain washers.
- Make sure the spring is properly positioned.

Install the thrust spring between the throttle links.

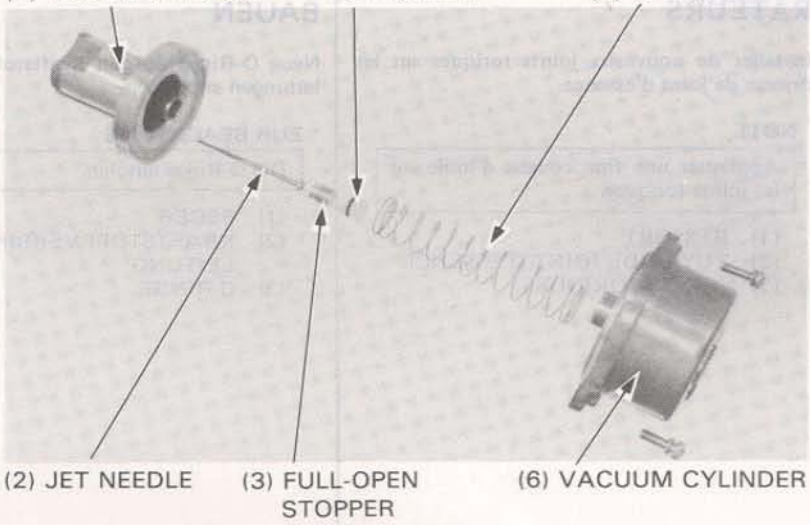


Install the front and rear stay plates.
Hook the relief spring to the choke shaft arm.
Close the choke valve and check the choke relief operation.

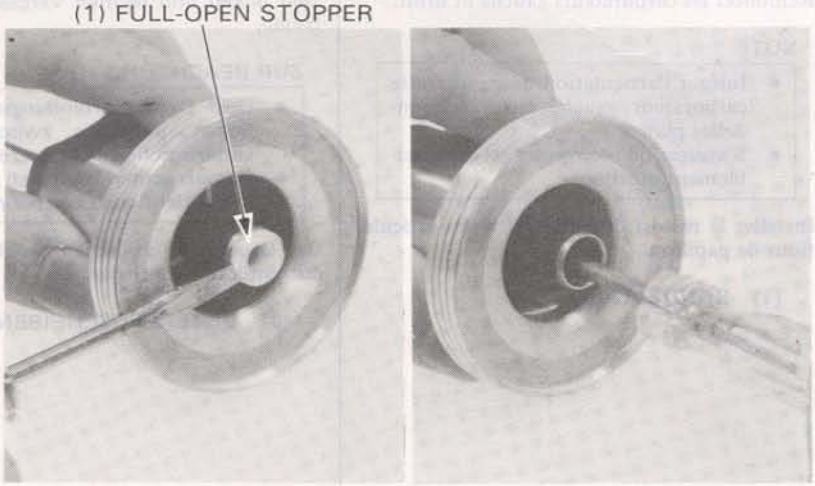


VACCUM CYLINDER DISASSEMBLY/ INSPECTION

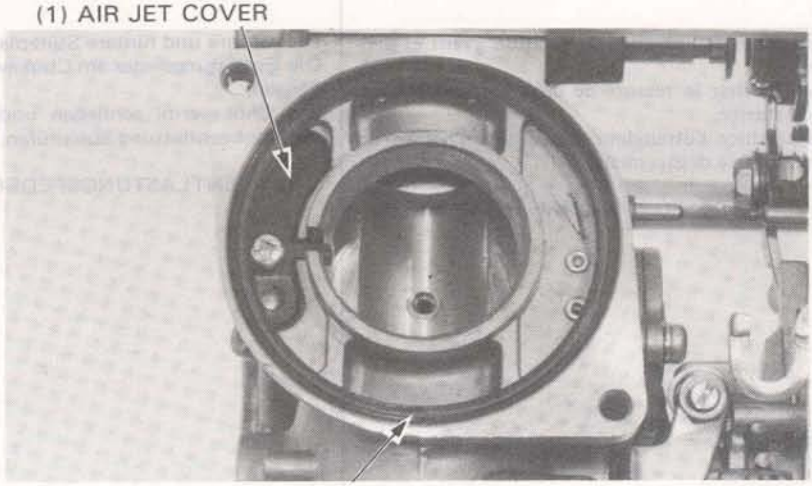
Remove the vacuum cylinder from the carburetor. Take out the compression spring, and vacuum piston.



Remove the full-open stopper.
Remove the needle set screw from the vacuum piston and then remove the jet needle.



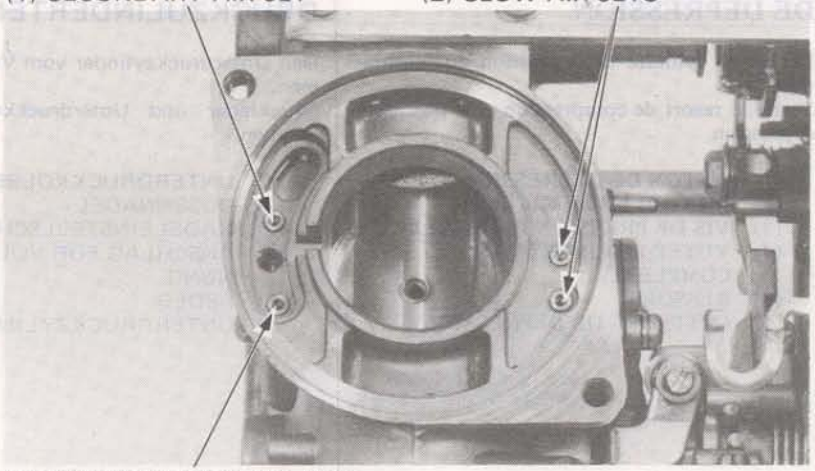
Remove the air jet cover.



Blow open the primary main air jet, secondary air jet, and slow air jet. Inspect for hardened deposits, grooving, or other damage and replace if necessary.

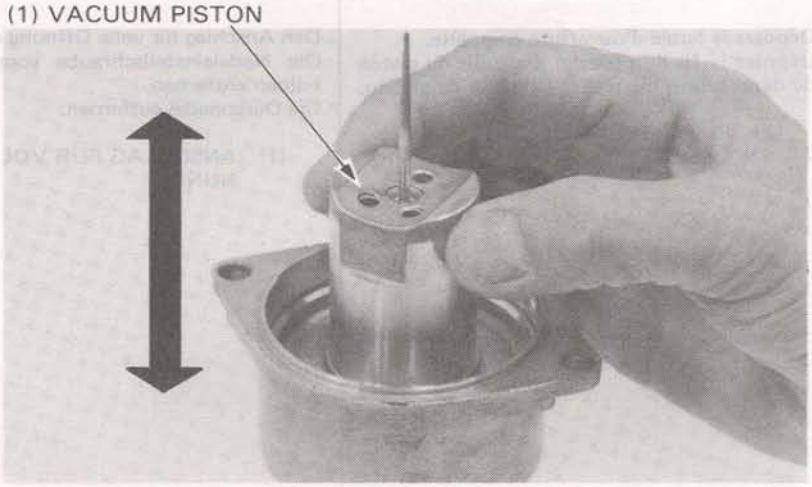
CAUTION

Never clean carburetor jets with wire or drills. This would probably enlarge the openings and result in excessive air consumption.



VACUUM PISTON INSPECTION

Check the vacuum piston for free movement in the cylinder.

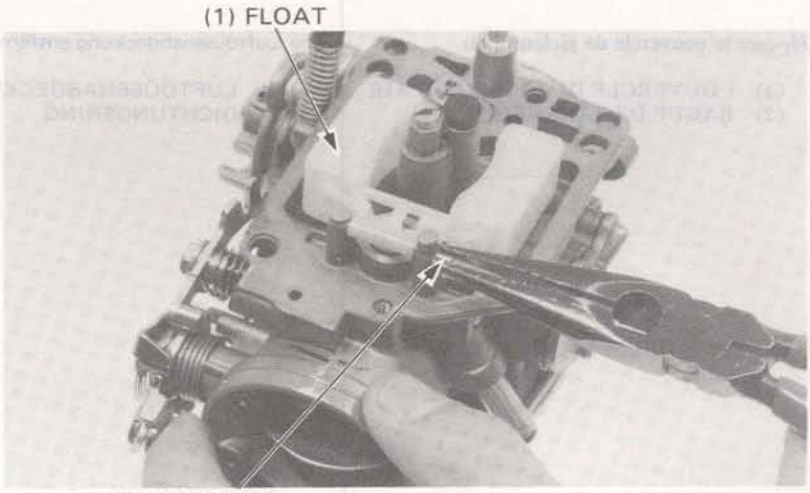


FLOAT CHAMBER DISASSEMBLY

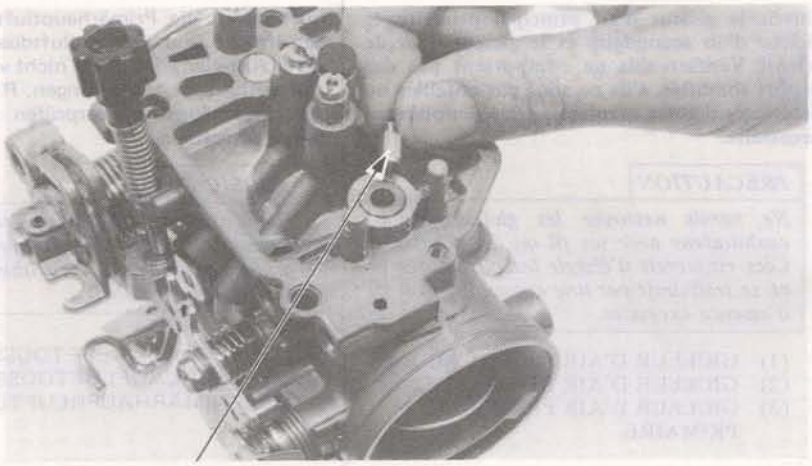
Remove the float chamber body.
Remove the float arm pin using a needle nose plier.
Remove the float and float valve.

NOTE

The pilot screws are factory pre-set and should not be removed unless the carburetor is overhauled.



Inspect the float valve and seat for deposits, grooves or other damage.



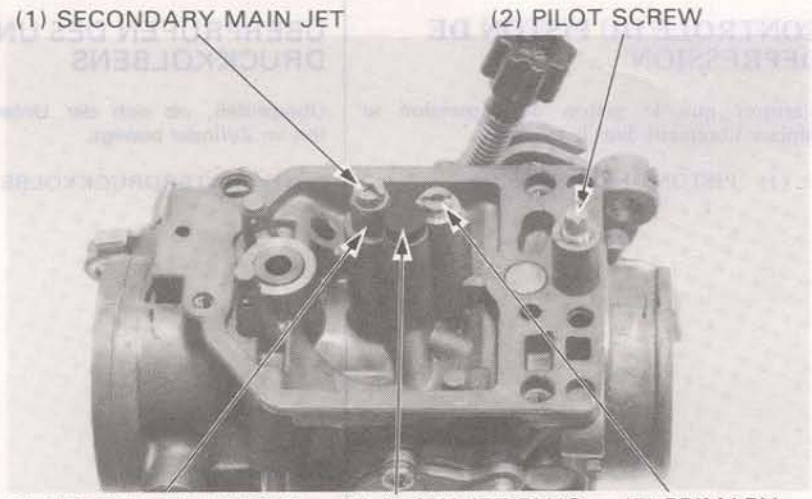
(1) FLOAT VALVE

Remove the secondary main jet and jet needle holder.
Remove the primary main jet.
Turn the pilot screw in and carefuly count the number of turns before it seats lightly.
Make a note of this to use as a reference when reinstalling the pilot screw.

CAUTION

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

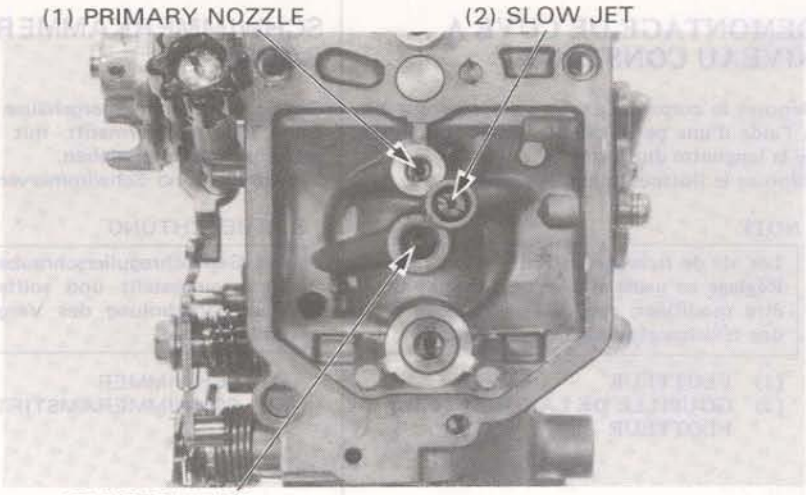
Remove the pilot screw.
Inspect the pilot screw and replace if worn or damaged.



(1) SECONDARY MAIN JET (2) PILOT SCREW

(3) NEEDLE JET HOLDER (4) SLOW JET PLUG (5) PRIMARY MAIN JET

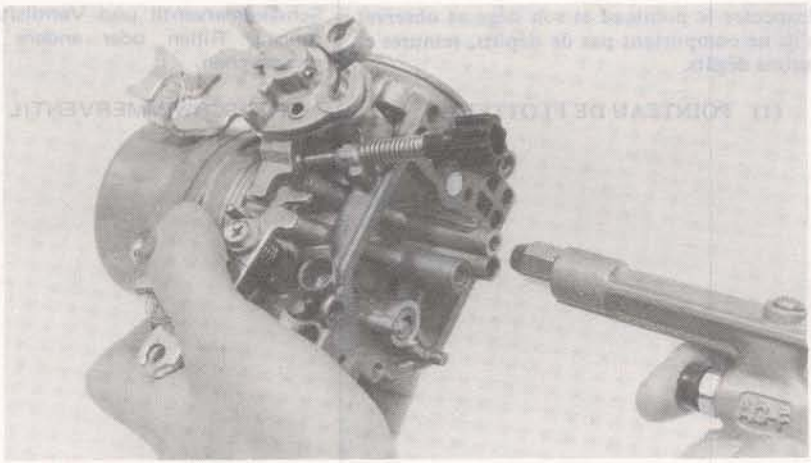
Remove the primary nozzle.
Remove the slow jet.
Tilt the carburetor to remove the needle jet.



(1) PRIMARY NOZZLE (2) SLOW JET

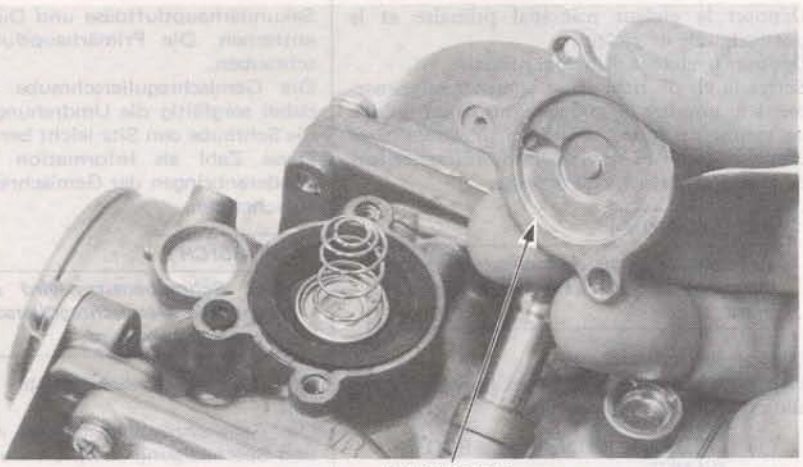
(3) NEEDLE JET

Clean the passages and jets with compressed air.



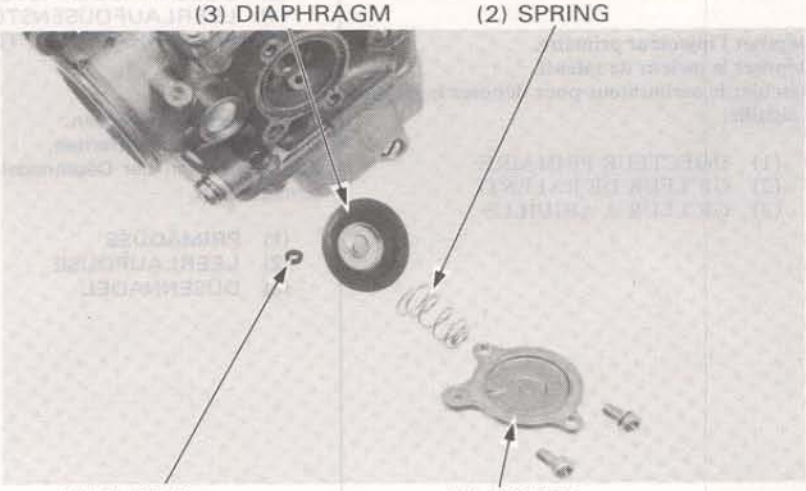
AIR CUT-OFF VALVE DISASSEMBLY

Remove the air cut-off valve cover and spring.
Remove the diaphragm, exercising care not to damage it.
Remove the O-ring.



(1) COVER

Inspect the parts for damage. Make sure that the valve travels freely. Inspect the air hoses and replace as needed.
Check the diaphragm for cracks and brittleness.



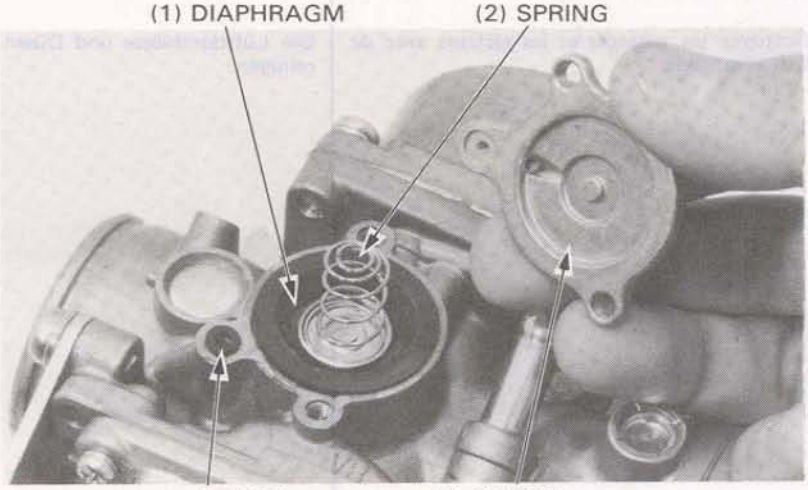
(3) DIAPHRAGM
(2) SPRING
(4) O-RING
(1) COVER

COMPONENT ASSEMBLY

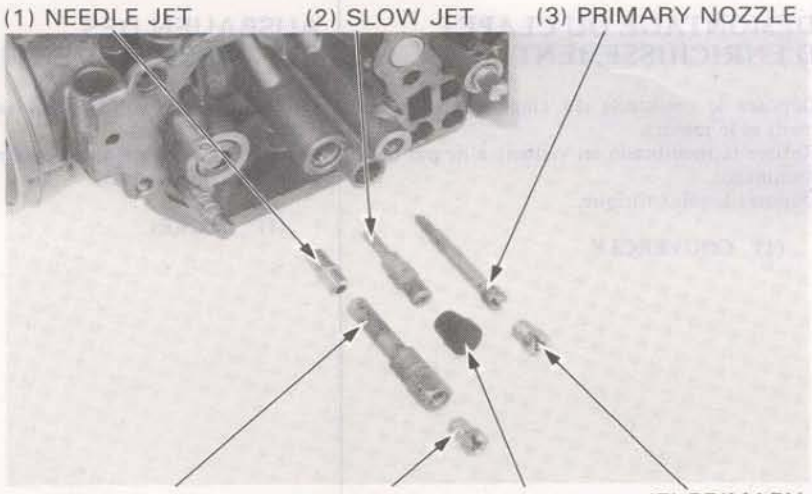
To assemble the accelerator pump, air cut-off valve and vacuum cylinder, reverse the disassembly procedure.

NOTE

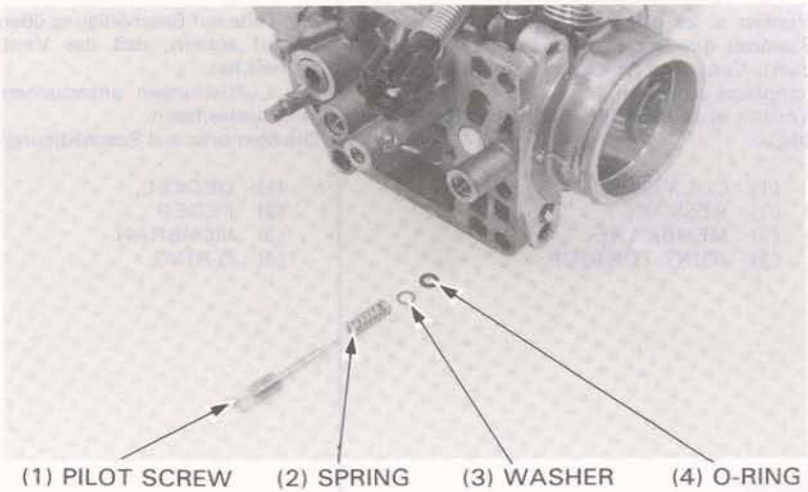
When installing the air cut-off valve O-ring, make sure the flat surface is toward the body.



Install the jets in the carburetor body.



Install the pilot screw and return it to its original position as noted during removal.

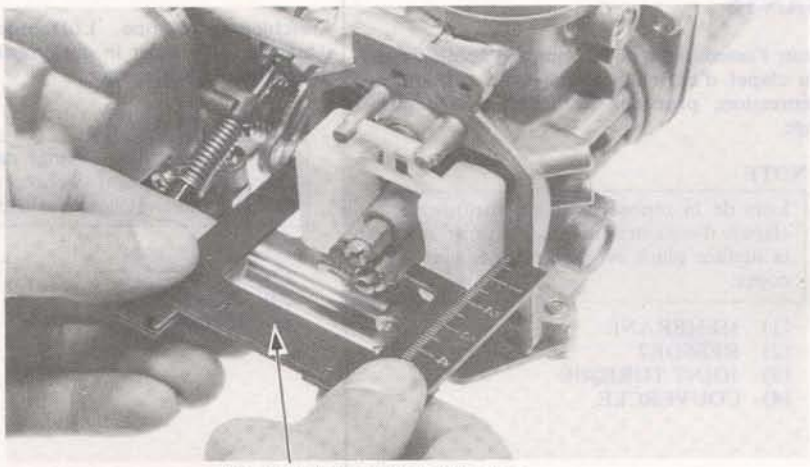


FLOAT LEVEL

Remove the float chamber.
Measure the float level with the float tip just contacting the float valve and the carburetor inclined 15°—45° from vertical.

FLOAT LEVEL: 15.5 ± 1 mm (0.61 ± 0.04 in)

Replace the float level is not within the specification.



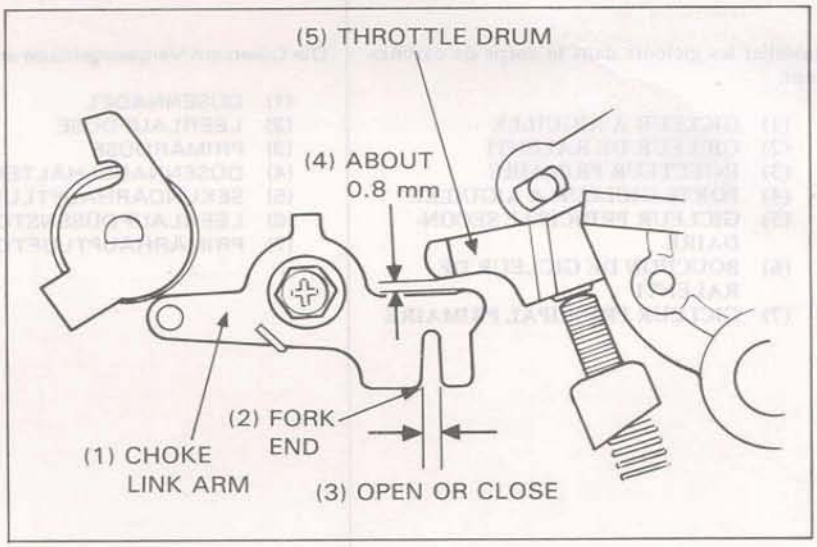
(1) FLOAT LEVEL GAUGE
07401—0010000

FAST IDLE ADJUSTMENT

Warm up the engine by pulling out the choke knob, and check fast idle adjustment.

FAST IDLE: 1,500—2,500 rpm

If adjustment of the fast idle is necessary, remove the carburetor, return the throttle stop screw, and close the throttle valve.
Adjust by opening or closing the fork end of the fast idle lever until the clearance between the fast idle lever and throttle drum is about 0.8 mm (0.031 in).



CARBURETOR INSTALLATION

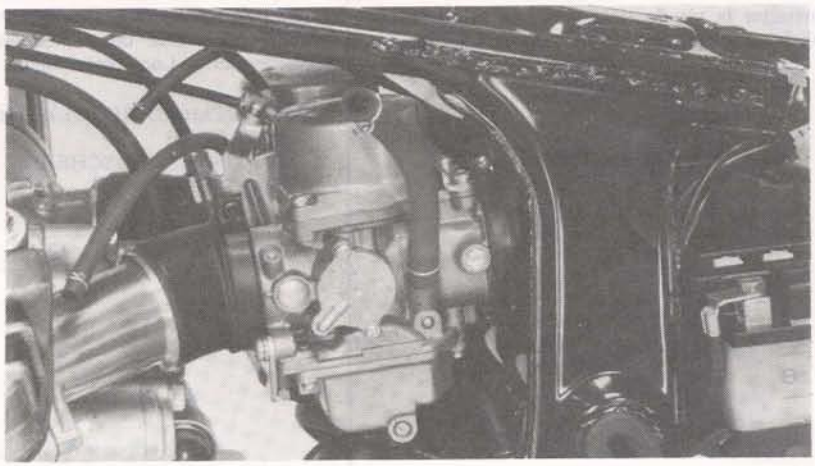
The installation sequence is essentially the reverse of removal.

NOTE

Check the throttle and choke valve operation before installation.

After installation, perform the following adjustment.

- Throttle grip free play (page 3-6).
- Carburetor synchronization (page 3-7).
- Idle speed adjustment (page 4-11).



IDLE SPEED ADJUSTMENT

NOTE

Perform this operation after the carburetors have been synchronized when they are overhauled. Warm up the engine to operating temperature (50—70°C) (120—160°F.)

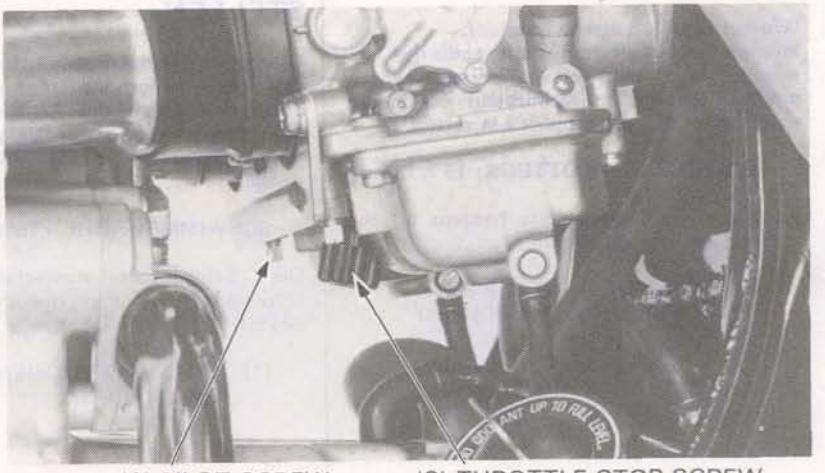
Staring with either the right or left carburetor, turn each throttle stop screw to find the point of lowest rpm (about 1,000 rpm).
Turn the pilot screw to find the point of highest rpm.
Set the idle speed to specifications with the throttle stop screw.

IDLE SPEED: 1100 ± 100 rpm

Turn the pilot screw to see if the speed is raised. If it is, repeat the above procedure.

NOTE

Turning the pilot screw in produces a lean fuel air mixture, turning the screw out produces a rich mixture.



(1) PILOT SCREW (2) THROTTLE STOP SCREW

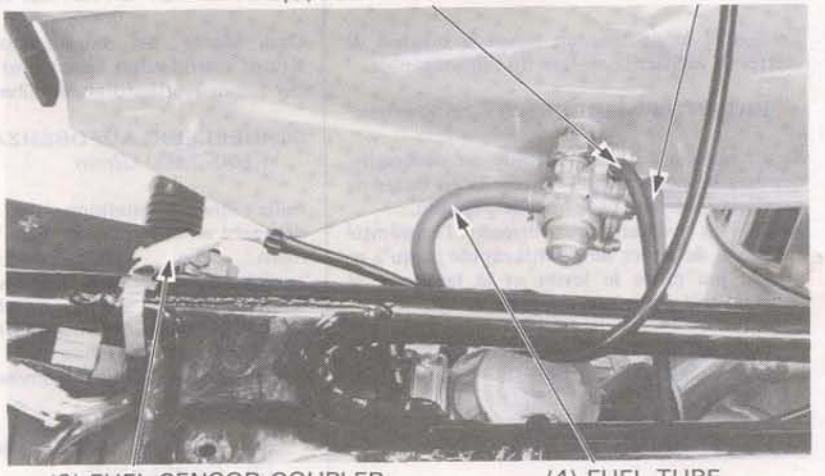
FUEL TANK

WARNING

Keep gasoline away from open flames or sparks. Wipe up spilled gasoline at once.

FUEL TANK REMOVAL

Remove the seat.
Remove the fuel tank mount bolt.
Disconnect the fuel tube, vacuum tube, air vent and fuel gauge sensor coupler.
Remove the fuel tank.



(1) AIR VENT TUBE (2) VACUUM TUBE

(3) FUEL SENSOR COUPLER (4) FUEL TUBE

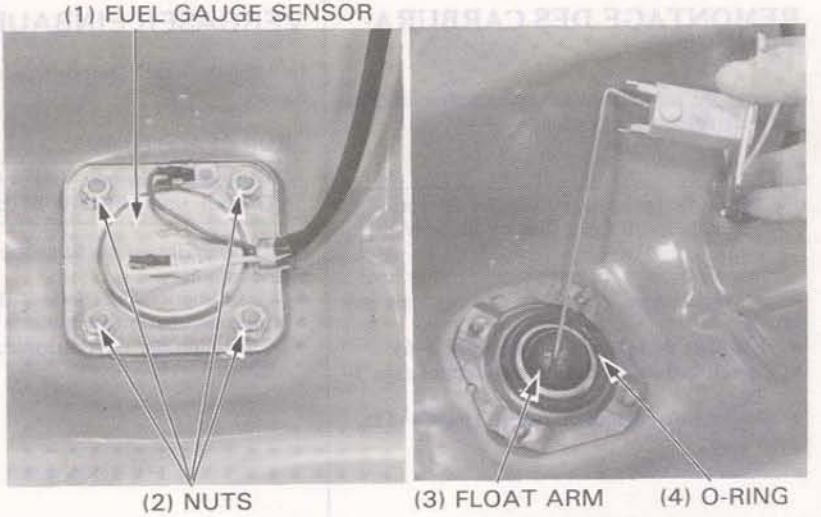
FUEL GAUGE SENSOR

Drain the fuel tank.
Remove the four nuts and remove the fuel gauge sensor from the fuel tank.

NOTE

Do not bend the sensor arm.

Check the O-ring for deterioration or damage and replace it with a new one if necessary.



(1) FUEL GAUGE SENSOR

(2) NUTS (3) FLOAT ARM (4) O-RING

FUEL VALVE INSPECTION

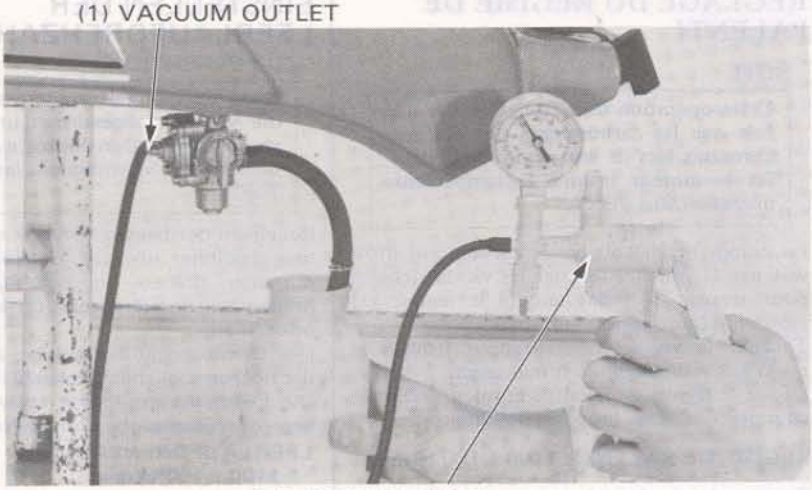
Check that the fuel tank is full and turn the fuel valve ON.

Fuel should flow out from the fuel outlet tube when 12—20 mmHg (0.5—0.8 inHg) of vacuum is applied.

If the flow of fuel is restricted, turn the fuel valve to RES and check if the fuel will flow out.

If fuel is flows out of the fuel outlet, the fuel valve diaphragm is damaged or fuel or vacuum circuit is clogged.

If the flow of fuel is still restricted with the fuel valve in RES, this indicates that the fuel valve strainer, fuel passage or fuel tank cap breather hole is clogged.



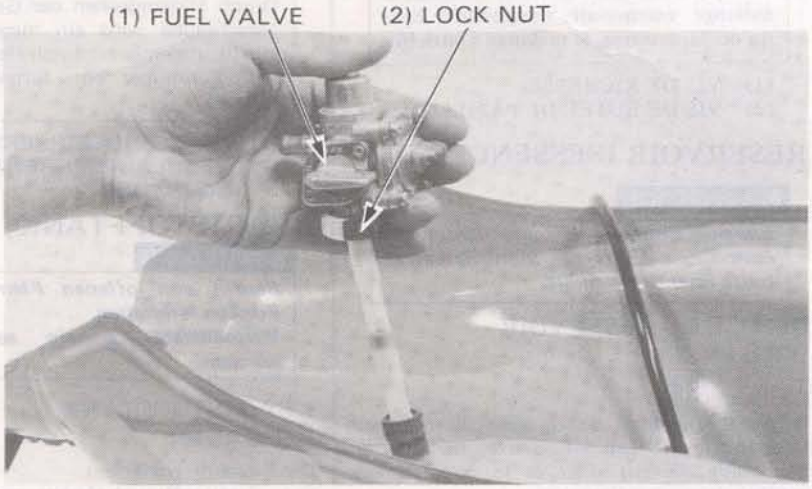
FUEL STRAINER DISASSEMBLY

Drain the fuel from the fuel tank.

Remove the fuel valve by loosening the lock nut.

NOTE

Hold the fuel valve body while turning the lock nut.

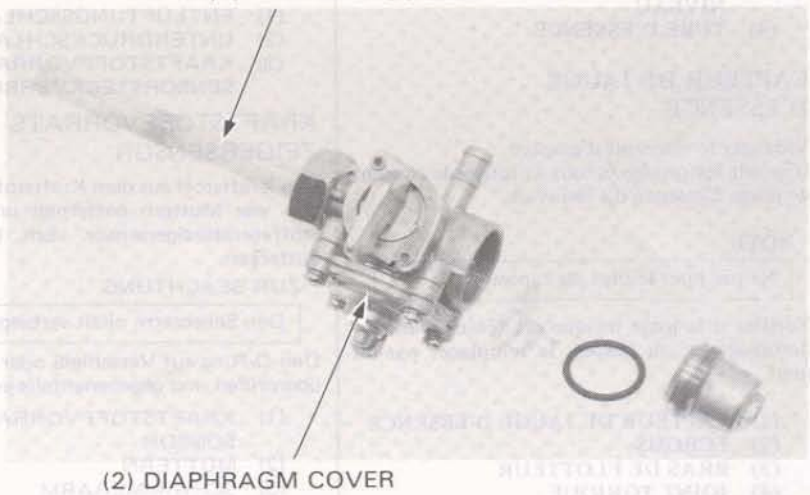


Remove the fuel strainer screen.

Blow dust and sediment off the screen using compressed air.

Check the O-ring for deterioration or damage and replace it with a new one if necessary.

Remove the diaphragm cover by removing the four attaching screws.

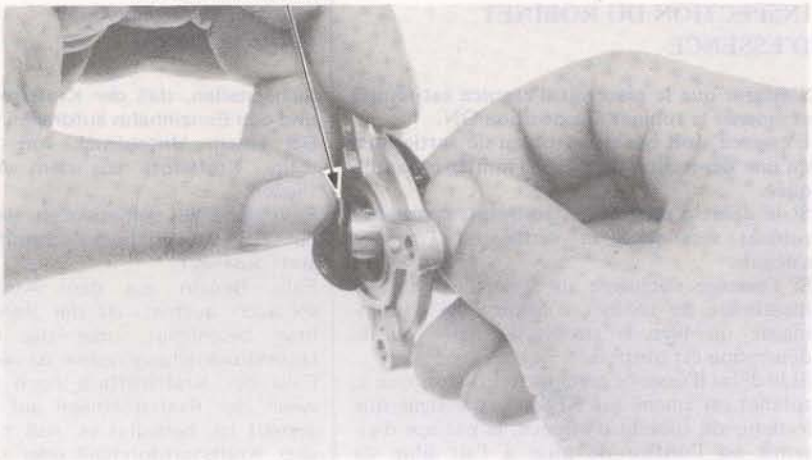


Inspect the diaphragm for deterioration or damage.
Clean the fuel valve using compressed air.

NOTE

Blow open all passages with the valve in On and RES positions.

(1) DIAPHRAGM

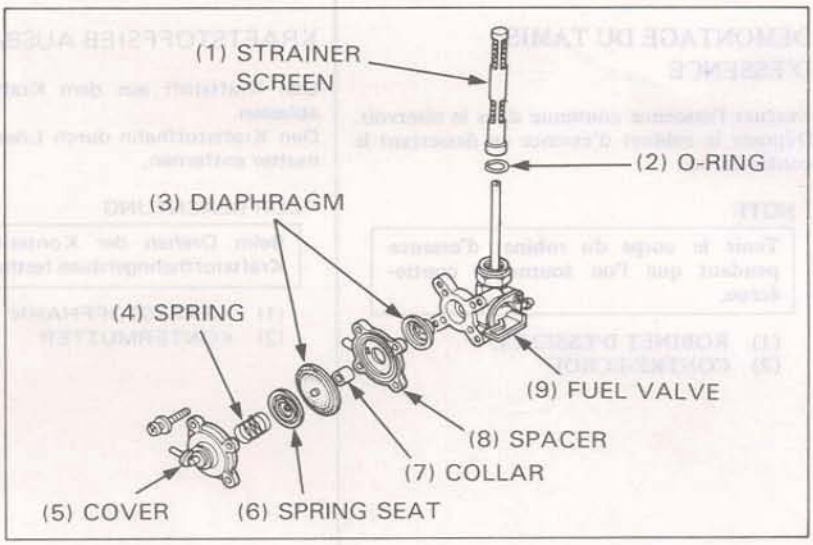


FUEL VALVE ASSEMBLY

Assembly is the reverse order or disassembly.

NOTE

- Make sure that the diaphragm is not pinched in the valve body.
- After installation, check the operation of the fuel valve. Also make sure that fuel is not leaking.
- Hold the fuel valve while turning the fuel valve retaining nut.

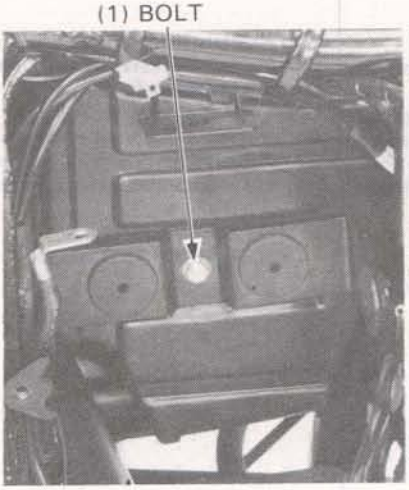


AIR CLEANER CASE

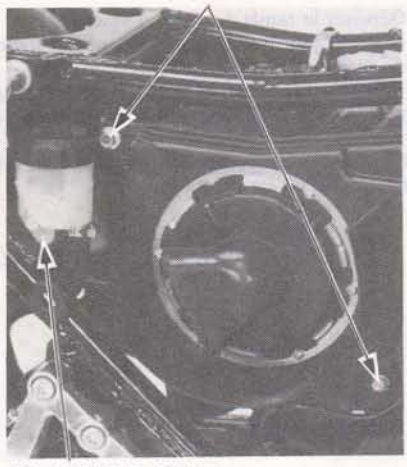
AIR CLEANER CASE REMOVAL

Remove the battery and remove the 6 mm bolt.
Remove the three 6 mm bolts and rear brake reservoir mount bolt.
Loosen the intake tube band screws.

(1) BOLT

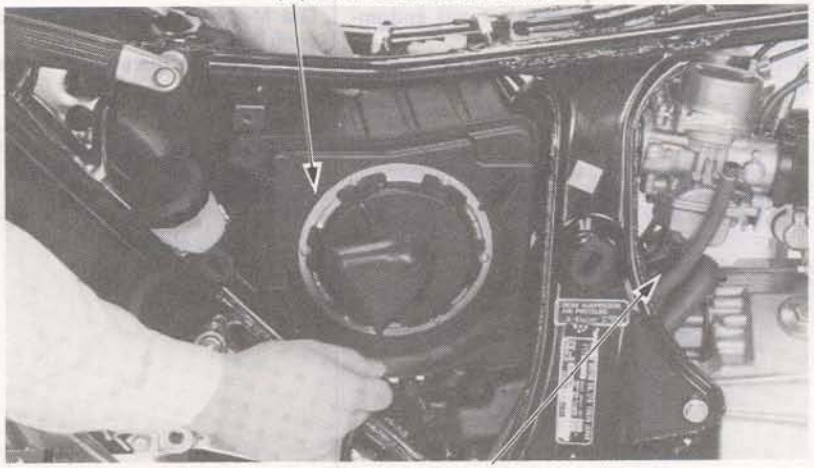


(1) BOLT

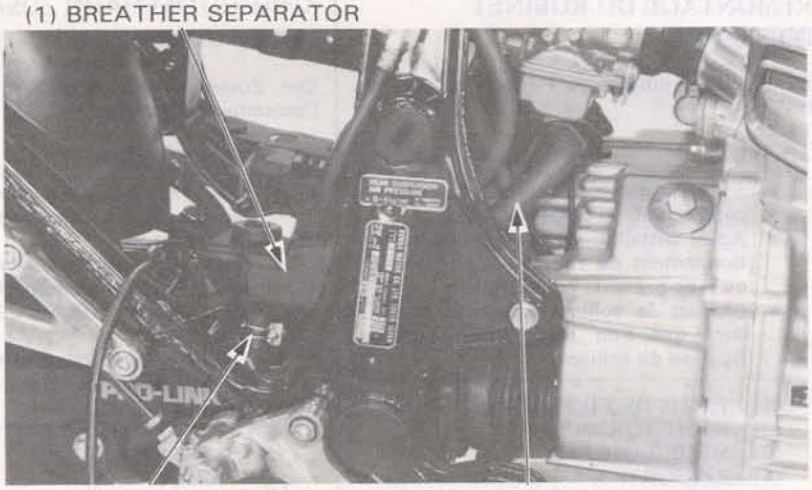


(2) MOUNT BOLT

Disconnect the breather separator tube from the air cleaner case and remove the air cleaner case from the right side.



Disconnect the breather tube and drain tube from the breather separator.
Remove the breather separator.

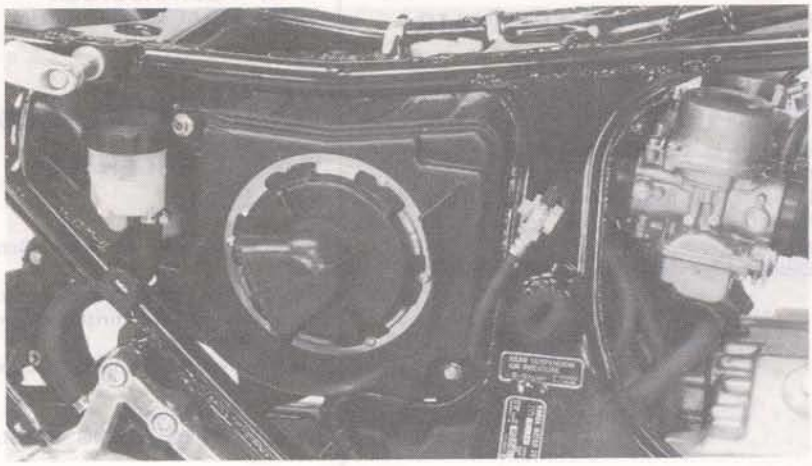


AIR CLEANER CASE INSTALLATION

Installation of the air cleaner case is essentially the reverse order of removal.

NOTE

Apply sealing agent to the intake tube when installing.



ENGINE REMOVAL/INSTALLATION

DEPOSE/REPOSE DU MOTEUR

MOTOR AUSBAUEN/ EINBAUEN

DESMONTAJE/INSTALACION DEL MOTOR

SERVICE INFORMATION	5—1
ENGINE REMOVAL	5—2
ENGINE INSTALLATION	5—7

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Parts requiring engine removal for servicing:
  - Crankshaft, Piston
  - Connecting rods
  - Camshafts
  - Flywheel and starting clutch
  - Gearshift spindle
  - Transmission
  - Water pump mechanical seal

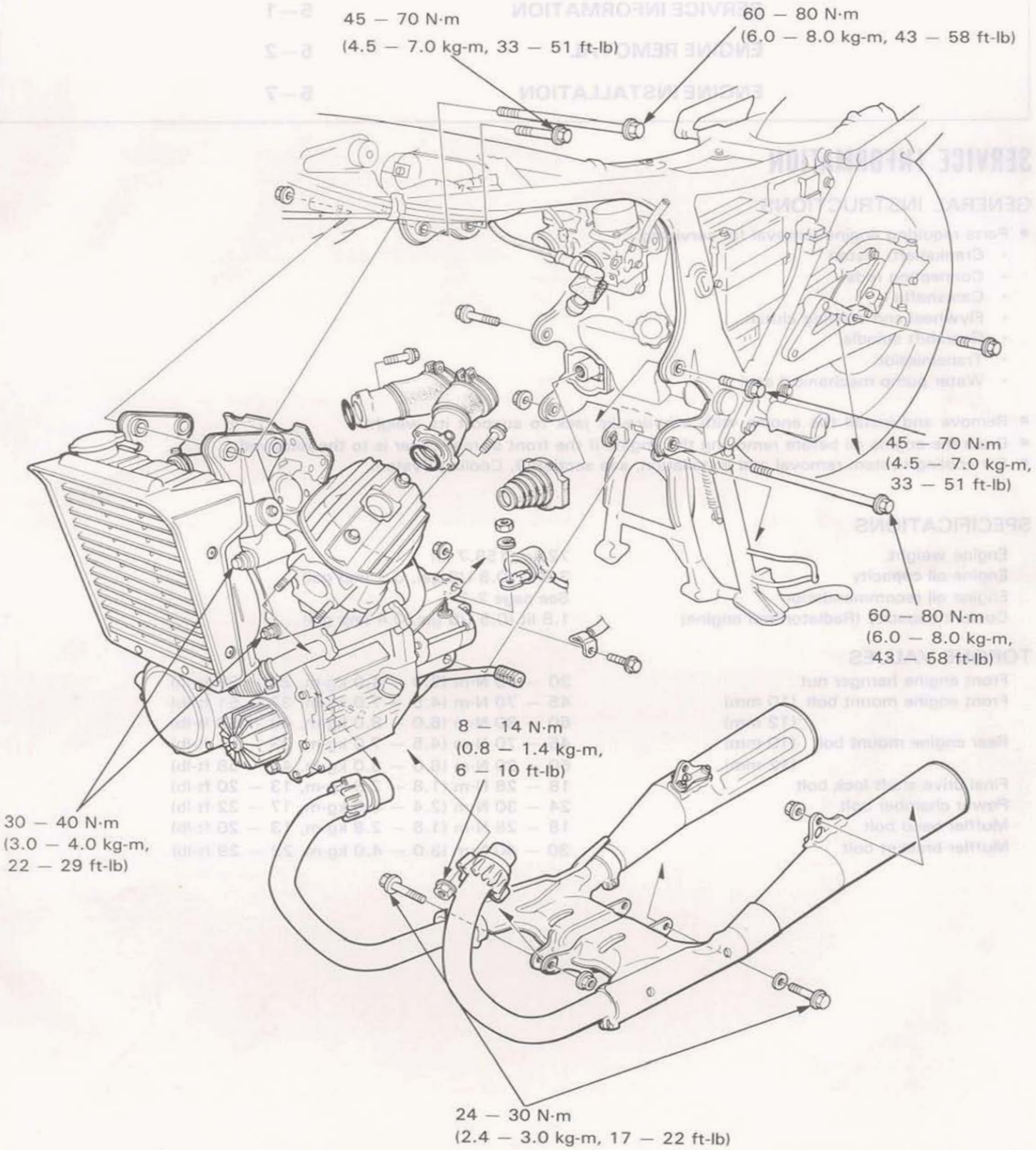
- Remove and install the engine with a hydraulic jack to support its weight.
- Drain the engine oil before removing the engine if the front or rear cover is to the removed.
- For cooling system removal and installation, see section 9, Cooling System.

SPECIFICATIONS

Engine weight	72 kg (158.7 lb)
Engine oil capacity	3.0 lit (0.8 US gal, 0.7 Imp gal)
Engine oil recommendation	See page 2-1
Coolant capacity (Radiator and engine)	1.8 lit (0.5 US gal, 0.4 Imp gal)

TORQUE VALUES

Front engine harnger nut	30 — 40 N·m (3.0 — 4.0 kg-m, 22 — 29 ft-lb)
Front engine mount bolt (10 mm)	45 — 70 N·m (4.5 — 7.0 kg-m, 33 — 51 ft-lb)
(12 mm)	60 — 80 N·m (6.0 — 8.0 kg-m, 43 — 58 ft-lb)
Rear engine mount bolt (10 mm)	45 — 70 N·m (4.5 — 7.0 kg-m, 33 — 51 ft-lb)
(12 mm)	60 — 80 N·m (6.0 — 8.0 kg-m, 43 — 58 ft-lb)
Final drive shaft lock bolt	18 — 28 N·m (1.8 — 2.8 kg-m, 13 — 20 ft-lb)
Power chamber bolt	24 — 30 N·m (2.4 — 3.0 kg-m, 17 — 22 ft-lb)
Muffler band bolt	18 — 28 N·m (1.8 — 2.8 kg-m, 13 — 20 ft-lb)
Muffler bracket bolt	30 — 40 N·m (3.0 — 4.0 kg-m, 22 — 29 ft-lb)


45 — 70 N·m
(4.5 — 7.0 kg-m, 33 — 51 ft-lb)
60 — 80 N·m
(6.0 — 8.0 kg-m, 43 — 58 ft-lb)
45 — 70 N·m
(4.5 — 7.0 kg-m,
33 — 51 ft-lb)
60 — 80 N·m
(6.0 — 8.0 kg-m,
43 — 58 ft-lb)
8 — 14 N·m
(0.8 — 1.4 kg-m,
6 — 10 ft-lb)
30 — 40 N·m
(3.0 — 4.0 kg-m,
22 — 29 ft-lb)
24 — 30 N·m
(2.4 — 3.0 kg-m, 17 — 22 ft-lb)

5

ENGINE REMOVAL

Turn the fuel valve off.
Remove the seat and fuel tank.
Remove the side covers.

Remove the exhaust pipe clamp nuts.
Loosen the exhaust pipe clamp bolts and remove the exhaust pipes.

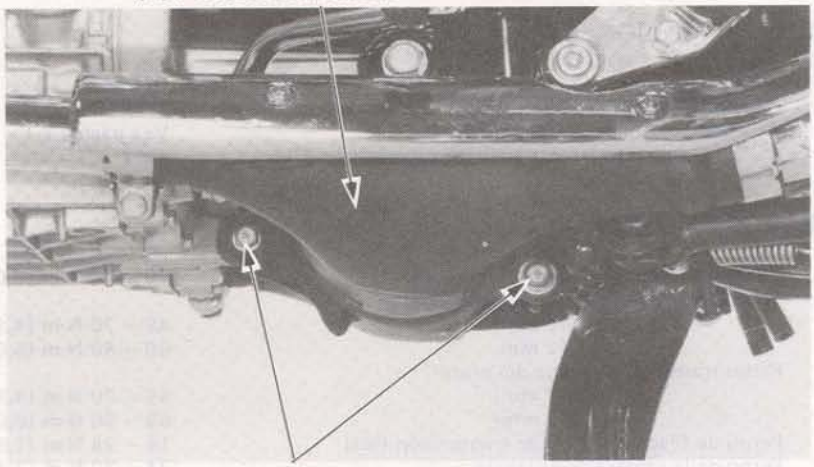
Remove the muffler mounting bolts.
Loosen the muffler clamp bolts, and remove the exhaust mufflers.

(1) EXHAUST PIPE CLAMP NUTS

(2) EXHAUST PIPE (3) CLAMP BOLT (4) MOUNTING BOLT

Remove the power chamber bolts.
Remove the power chamber.

(2) POWER CHAMBER

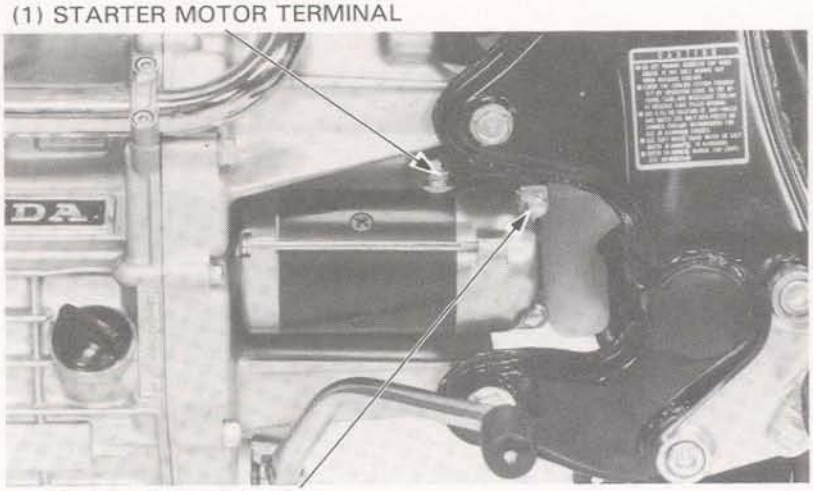


(1) POWER CHAMBER BOLTS

Disconnect the starter motor and battery ground cables.

Remove the left foot pag bracket.

(1) STARTER MOTOR TERMINAL

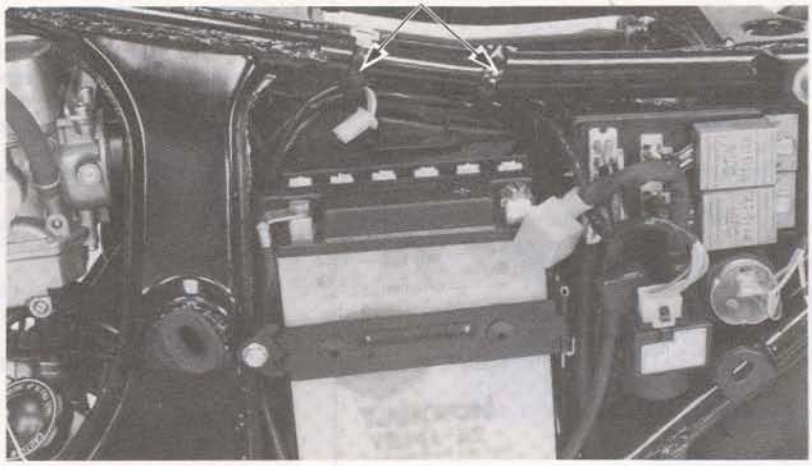


(2) BATTERY GROUND

Remove the wire harness bands.
Disconnect the pulse generator and A.C. generator cables at the couplers.

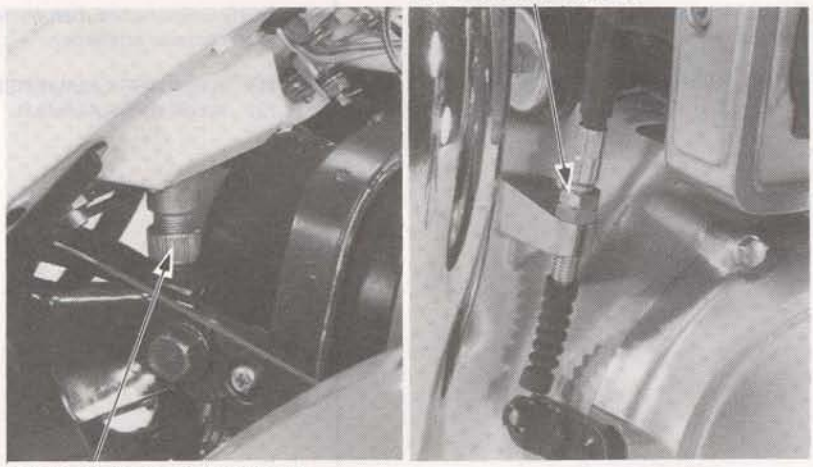
Disconnect the neutral switch wire.

(1) WIRE HARNESS BAND



Disconnect the clutch cable at the lower end.
Disconnect the tachometer cable at the tachometer.

(2) CLUTCH CABLE

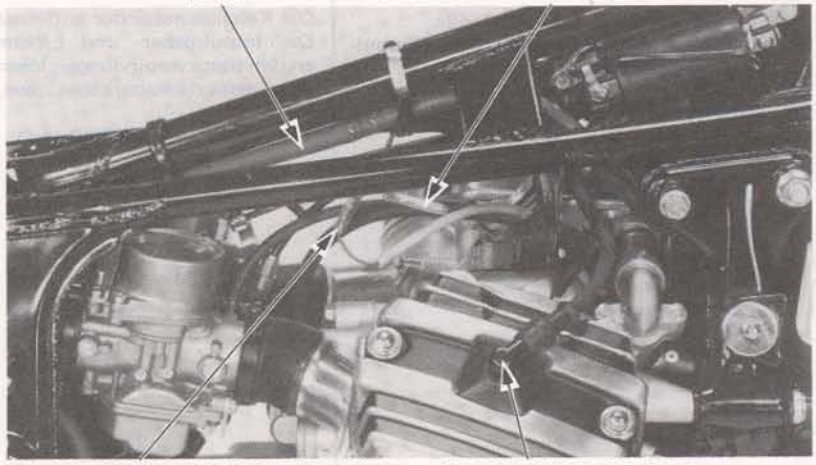


(1) TACHOMETER CABLE

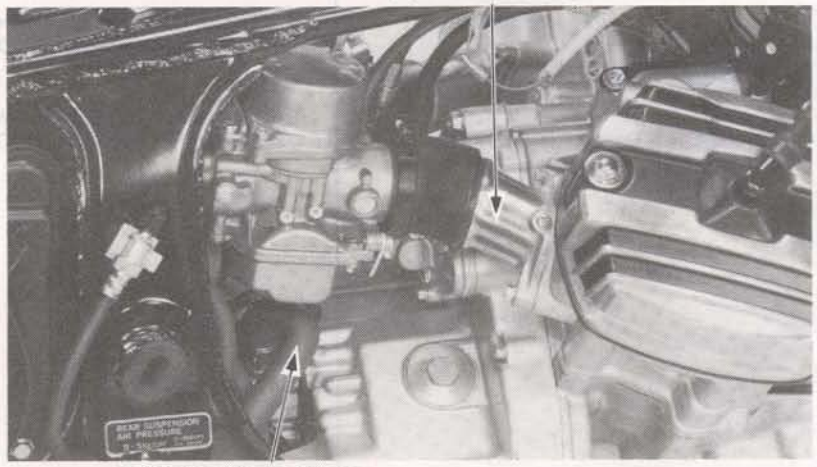
Remove the drive shaft lock bolt.

(1) LOCK BOLT

Disconnect the siphon tube at the connection.
Disconnect the thermostatic switch (Green/Blue) and oil pressure switch (Blue/Red) wires.
Remove the plug caps.



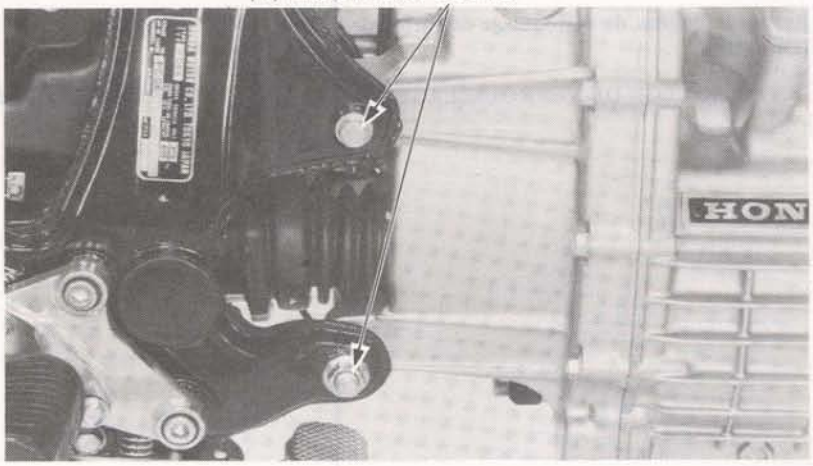
Remove the carburetor intake pipes.
Disconnect the crankcase breather tube.



Remove the engine rear mounting bolts.

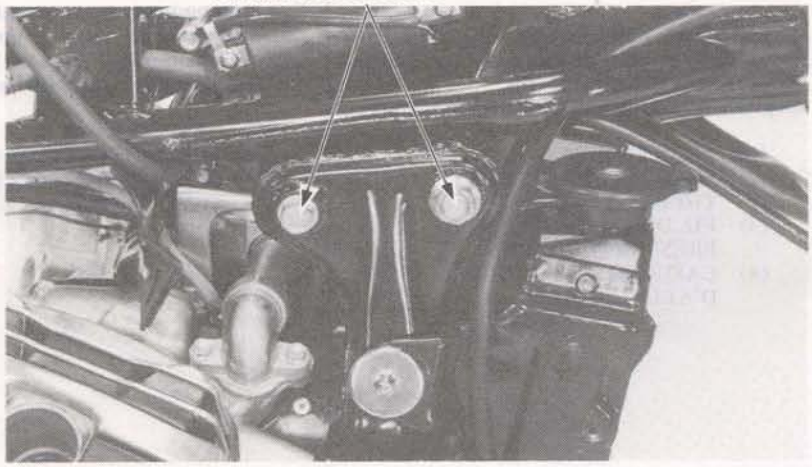
CAUTION

Place a jack under the engine.



Remove the engine front hanger bolts.

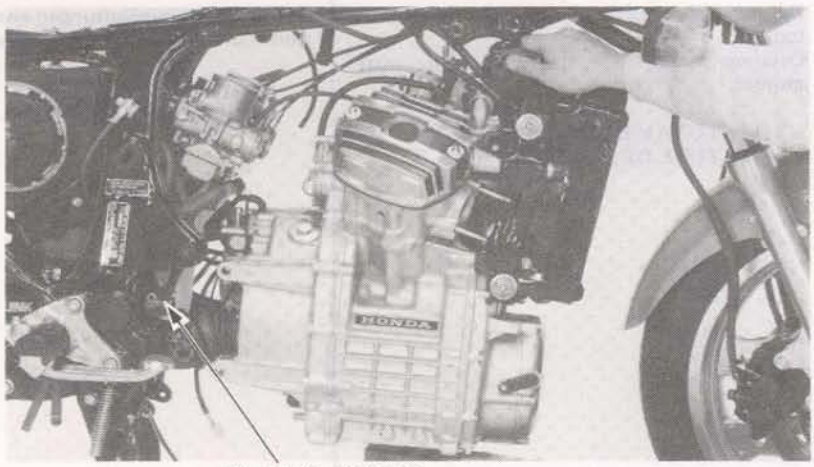
(1) HANGER BOLTS



To disengage the final shaft from the U-joint assembly, adjust the jack height and move the engine forward.
Separate the engine from the frame.

CAUTION

Jack height must be continuously adjusted during engine removal and installation to prevent damage to mounting bolt threads, wire harnesses and cables.

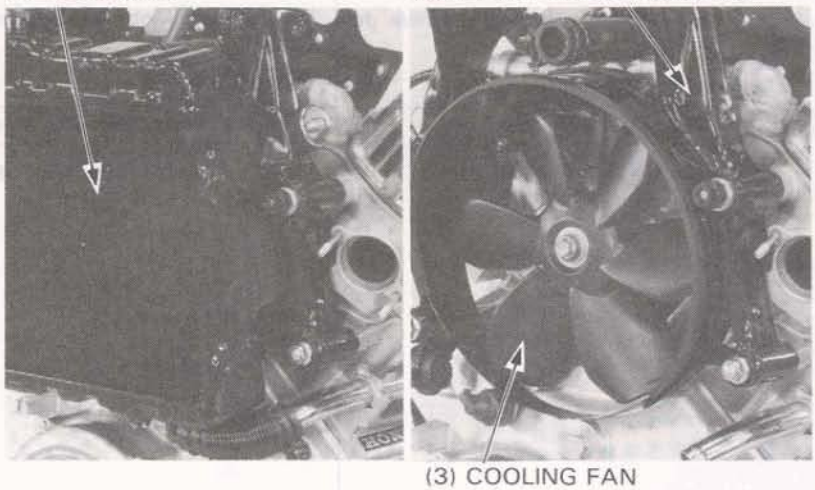


(1) FINAL SHAFT

Drain the coolant from the radiator (page 9-3).
Remove the radiator cover and racliator (page 9-5).
Remove the cooling fan and front engine hanger (page 9-6).

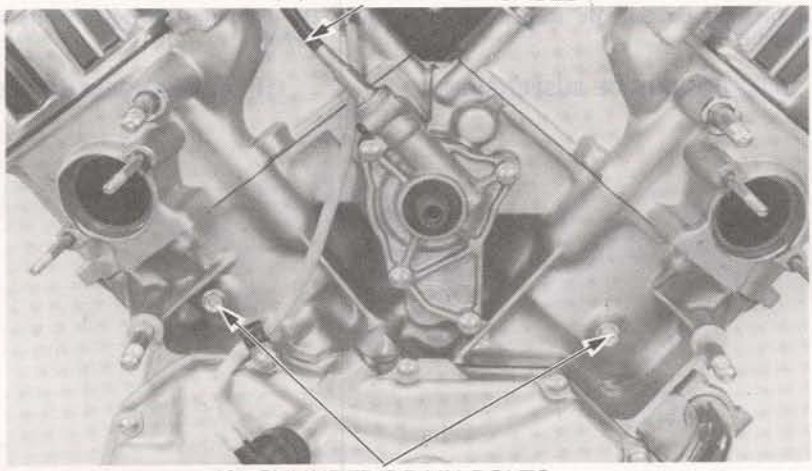
(1) RADIATOR

(2) FRONT ENGINE MOUNTS

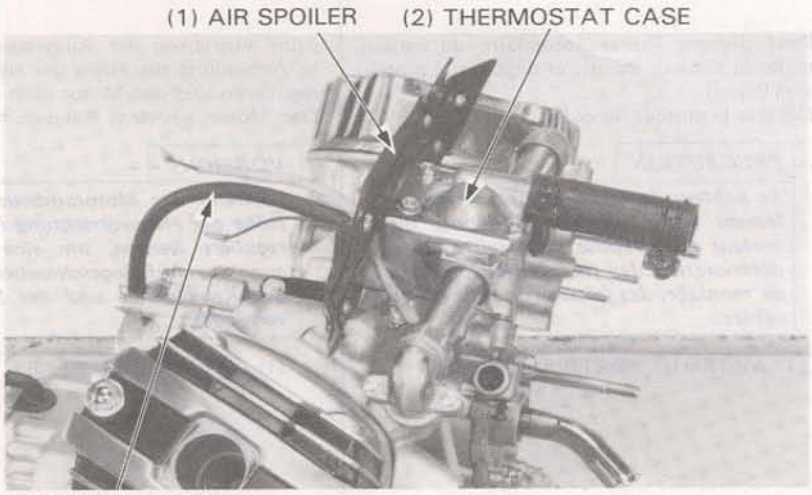


(3) COOLING FAN

Remove the tachometer cable.
Remove the drain bolts and drain the coolant from the cylinders.



Disconnect the by-pass hose.
Remove the air spoiler thermostat and water pipes.

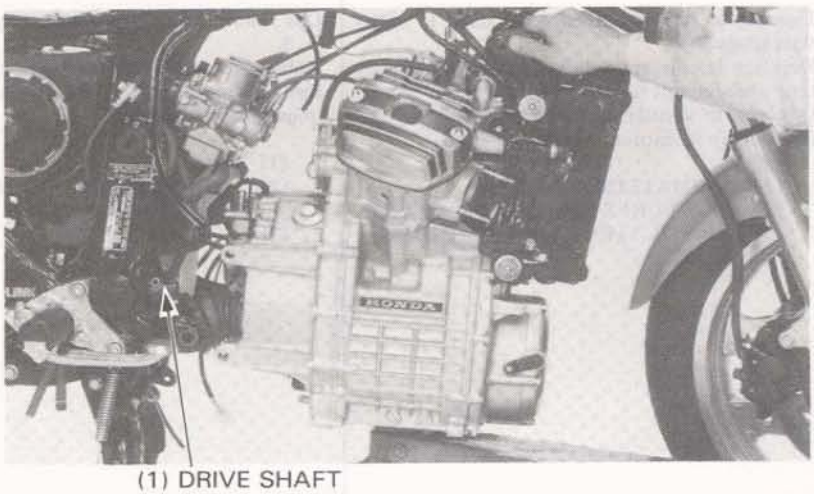


ENGINE INSTALLATION

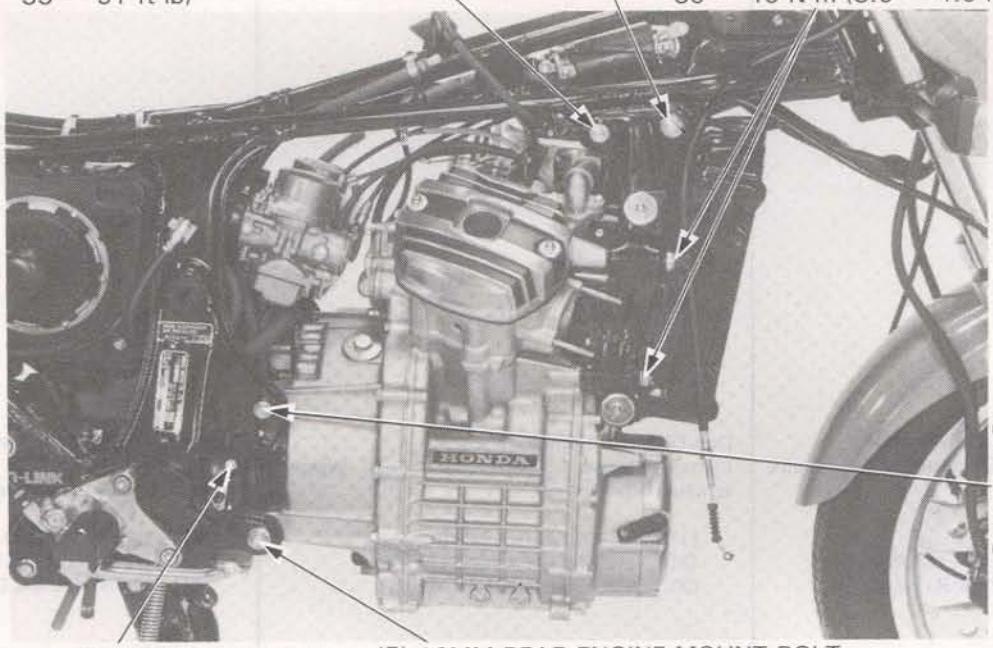
The installation sequence is essentially the reverse of removal.
Place the transmission into gear.
Raise the engine with a jack and align the drive shaft with the final shaft.
Slide the drive shaft into the U-joint assembly by moving the engine backward.

NOTE

- Make sure that the final drive splines are exposed 5-6mm from the end of the U-joint.
- Lubricate the final shaft splines with lithium—based multipurpose grease NLGI No. 2 (MoS_2 additive) before installation.
- Align the mounting surfaces carefully to prevent damage to mounting bolt threads, wire harnesses and cables.
- Route the wire and cable properly (page 1-9).



Tighten the engine mount bolt and drive shaft lock bolt.



NOTE

- Fill the engine with the recommended oil and coolant.
- Perform the following inspections and adjustments :

Clutch free play (page 3-10)	Radiator coolant (page 3-7)
Engine oil level (page 2-2)	Engine oil, coolant leakage

CYLINDER HEAD/VALVE

CULASSES/SOUPAPES

ZYLINDERKOPF/ VENTILE

CULATAS/VALVULAS

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ROCKER ARM/CYLINDER HEAD REMOVAL	6— 3
CYLINDER HEAD DISASSEMBLY	6— 7
VALVE GUIDE REPLACEMENT	6— 9
VALVE SEAT INSPECITON AND GRINDING	6—10
CYLINDER HEAD ASSEMBLY	6—13
ROCKER ARM ASSEMBLY	6—14
CYLINDER HEAD/ROCKER ARM INSTALLATION	6—14

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- All cylinder head maintenance and inspection can be accomplished with the engine installed. Before removing the cylinder heads, it is necessary to drain coolant from the cylinder water jackets by removing the drain bolts.
- The engine must be cool before removing the cylinder head.

TOOLS

Special

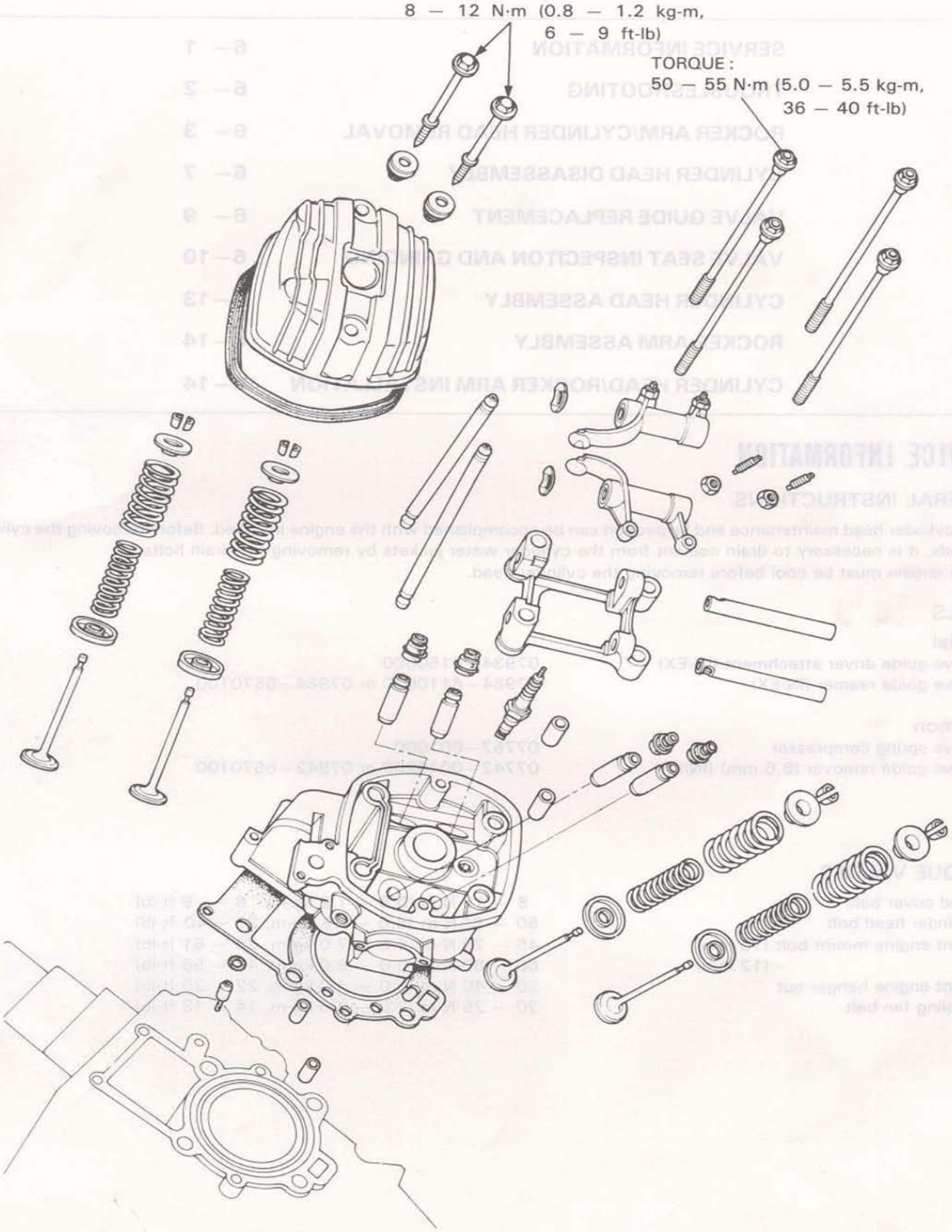
Valve guide driver attachment (IN/EX)	07934—4150000
Valve guide reamer (IN/EX)	07984—6110000 or 07984—6570100

Common

Valve spring compressor	07757—001000
Valve guide remover (6.6 mm) (IN/EX)	07742—0010200 or 07942—6570100

TORQUE VALUES

head cover bolt	8 — 12 N·m (0.8 — 1.2 kg-m, 6 — 9 ft-lb)
Cylinder head bolt	50 — 55 N·m (5.0 — 5.5 kg-m, 36 — 40 ft-lb)
Front engine mount bolt (10 mm)	45 — 70 N·m (4.5 — 7.0 kg-m, 33 — 51 ft-lb)
(12 mm)	60 — 80 N·m (6.0 — 8.0 kg-m, 43 — 58 ft-lb)
Front engine hanger nut	30 — 40 N·m (3.0 — 4.0 kg-m, 22 — 29 ft-lb)
Cooling fan bolt	20 — 25 N·m (2.0 — 2.5 kg-m, 14 — 18 ft-lb)


8 — 12 N·m (0.8 — 1.2 kg-m,
6 — 9 ft-lb)
TORQUE :
50 — 55 N·m (5.0 — 5.5 kg-m,
36 — 40 ft-lb)

SPECIFICATIONS

Unit: mm (in)

Item			Standard	Service Limit
Cylinder compression (cold)			1,200 kPa (1.20 kg/cm², 171 psi)	———
Rocker arms	Shafts and holders	Rocker arm I.D.	15,000–15.018 (0.5906–0.5913)	15.04 (0.592)
		Rocker arm shaft O.D.	14.966–14.984 (0.5982–0.5899)	14.95 (0.589)
		Rocker arm holder I.D.	14.988–15.006 (0.5901–15.908)	15.03 (0.592)
Valve spring	Free length	Outer (IN)	50.40 (1.984)	48.50 (1.909)
		Inner (IN)	50.30 (1.980)	48.40 (1.905)
		Outer (EX)	50.40 (1.984)	48.50 (1.909)
		Inner (EX)	50.30 (1.980)	48.40 (1.905)
	Tension at compressed length	Outer (IN)	28 kg/39.9 mm (61.7 lbs/1.5709 in)	26.5 kg/39.8 mm (58.4 lbs/1.5670 in)
		Inner (IN)	11.5 kg/37.9 mm (25.4 lbs/1.4921 in)	10.5 kg/37.9 mm (23.2 lbs/5.4291 in)
		Outer (EX)	28.5 kg/39.9 mm (62.8 lbs/1.5709 in)	26.5 kg/39.8 mm (58.4 lbs/1.5670 in)
		Inner (EX)	11.5 kg/37.9 mm (25.4 lbs/1.492 in)	10.5 kg/37.9 mm (23.2 lbs/1.4921 in)
Valves and valve guides	Stem O.D.	(IN)	6.580–6.590 (0.2591–0.2594)	6.54 (0.258)
		(EX)	6.550–6.560 (0.2579–0.2583)	6.54 (0.258)
	Guide I.D.	(IN)	6.600–6.620 (0.2598–0.2606)	6.70 (0.264)
		(EX)	6.600–6.620 (0.2598–0.2606)	6.70 (0.264)
	Stem-to-guide clearance	(IN)	—	0.10 (0.040)
		(EX)	—	0.10 (0.040)
Cylinder head	Valve seat width		1.1–1.3 (0.04–0.05)	2.0 (0.08)
	Warpage		—	0.10 (0.040)

TROUBLESHOOTING

Engine top-end problems are usually performance related which can be diagnosed by a compression test, or are noises which can usually be traced to the top-end with a sounding rod or stethoscope.

Low compression or Uneven Compression

1. Valve
   - Incorrect valve clearance
   - Burned or bent valves
   - Broken valve spring
   - Incorrect valve timing
   - Sticking valve
2. Cylinder head
   - Leaking or damaged head gasket
   - Warped ro cracked cylinder head
3. Cylinder and piston troubles

High Compression

1. Excessive carbon build-up on piston crown or combustion chamber

Excessive Noise

1. Incorrect valve adjustment
2. Sticking valve or broken valve spring
3. Damaged rocker arm or camshaft
4. Bent push rod

Contaminated Engine Oil or Coolant

1. Leaking head gasket

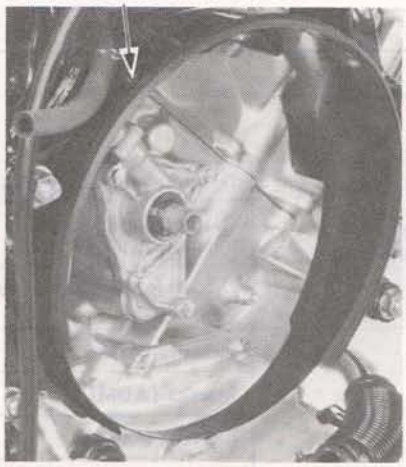
ROCKER ARM/CYLINDER HEAD REMOVAL

NOTE

Rocker arm can be removed without removing the cooling system.

Remove the radioator and cooling fan (page 9-6).
Remove the cooling fan cover and exhausst page.

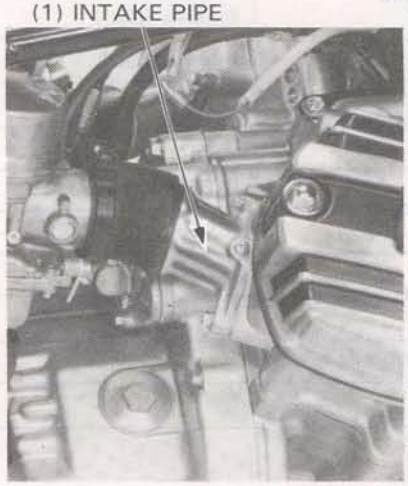
(1) COOLING FAN COVER



(2) EXHAUST PIPE

Remove the carburetor intake pipe.
Remove the front engine hanger.

(1) INTAKE PIPE

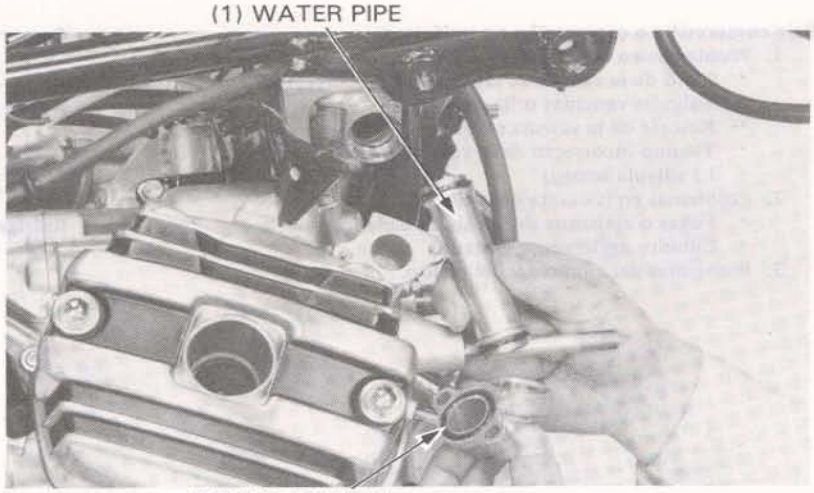


(2) FRONT ENGINE HANGER

Remove the water pipe joints and water pipes.

Remove the spark plug cap.

(1) WATER PIPE

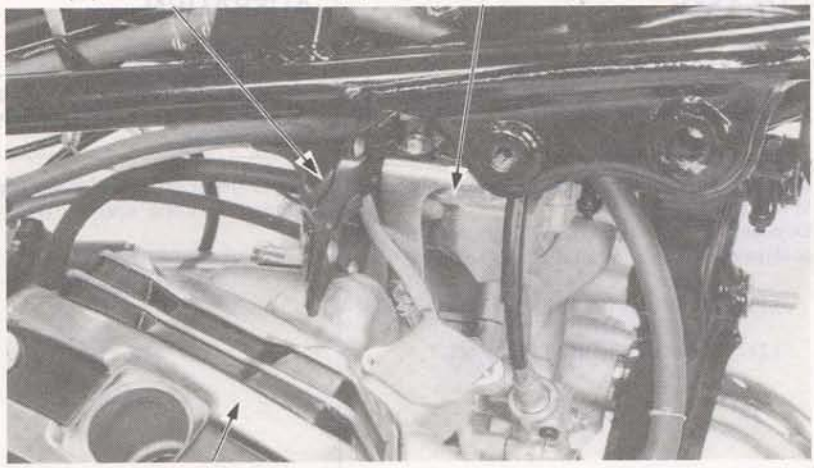


(2) WATER JOINT

Remove the air spoiler.
Remove the thermostat unit with bracket (page 9-4).

Remove the cylinder head cover.

(1) AIR SPOILER (2) THERMOSTAT UNIT



(3) CYLINDER HEAD COVER

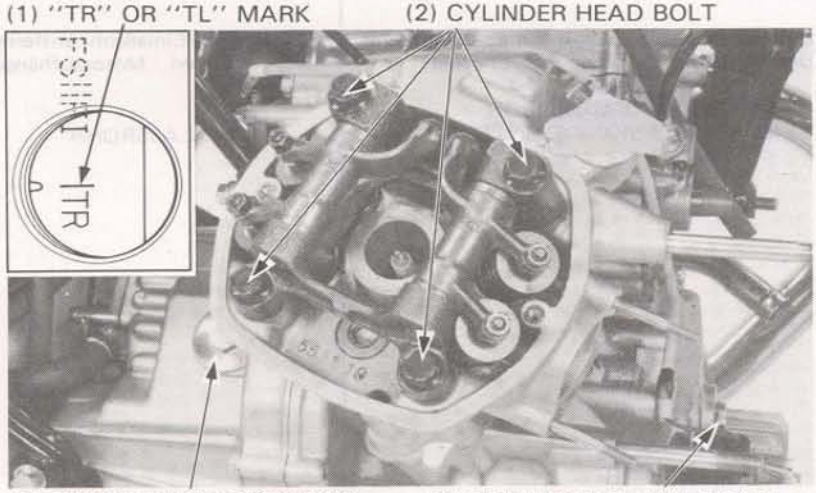
Remove the crankshaft hole cap and timing inspection cap.
Bring the piston to T.D.C. of the compression stroke by turning the crankshaft.

NOTE

- Align the index mark with the "TR" mark for the right cylinder.
- Align the index mark with the "TL" mark for the left cylinder.

Loosen the cylinder head bolts in a crisscross pattern in two or more steps.

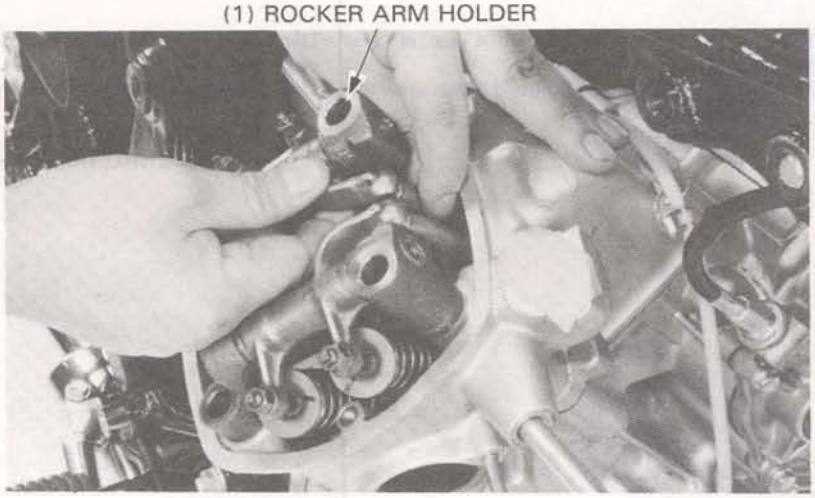
(1) "TR" OR "TL" MARK (2) CYLINDER HEAD BOLT



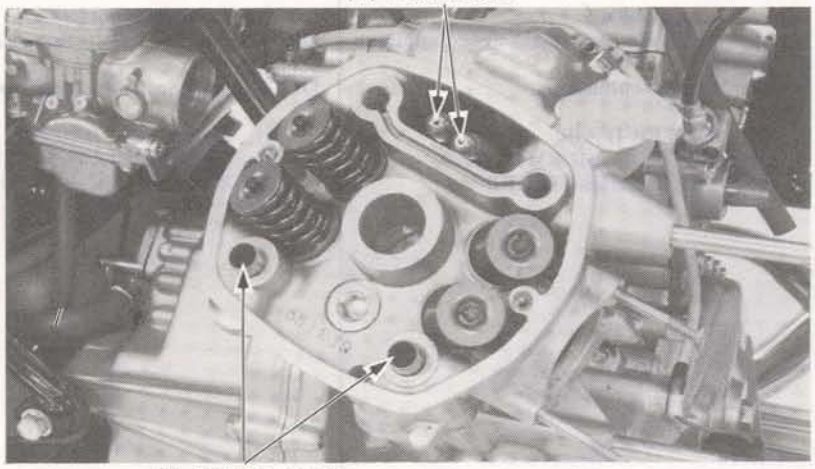
(3) TIMING INSPECTION CAP (4) CRANKSHAFT HOLE CAP

Remove the rocker arm holder assembly.

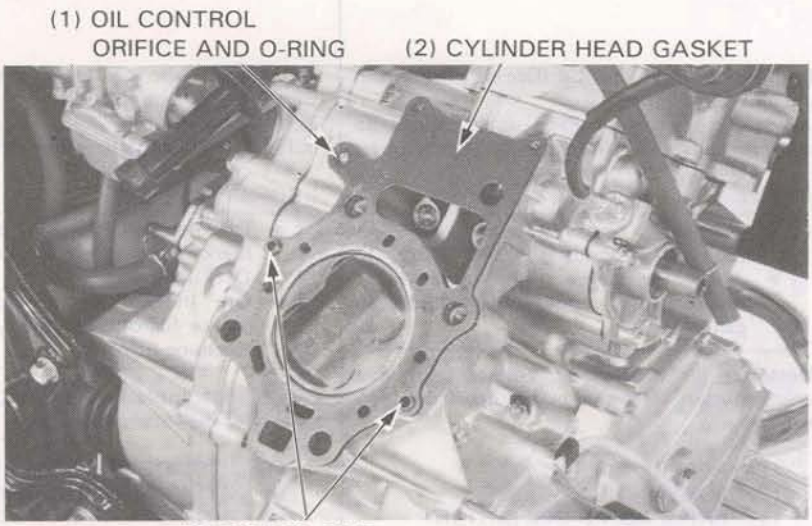
(1) ROCKER ARM HOLDER



Remove the push rods.
Remove the cylinder head dowel pins.
Remove the cylinder head.

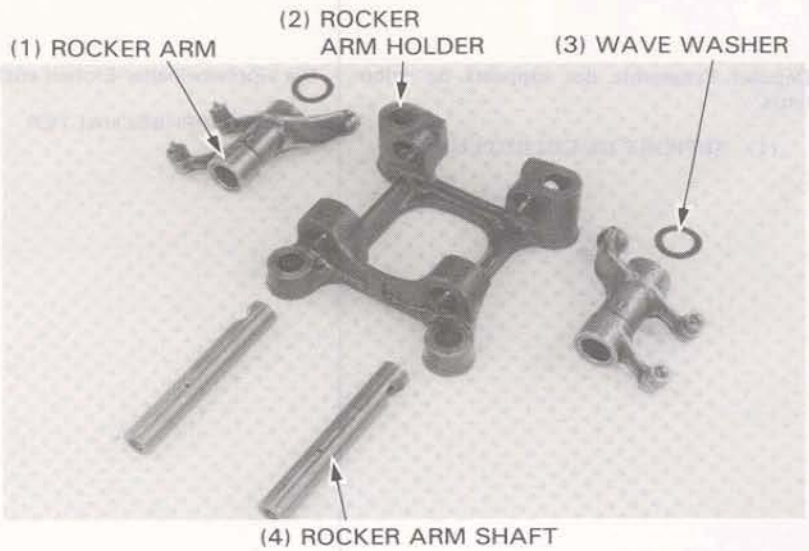


Remove the cylinder base dowel pins.
Remove the oil control orifice and O-ring.
Remove the cylinder head gasket.



ROCKER ARM HOOLDER DISASSEMBLY

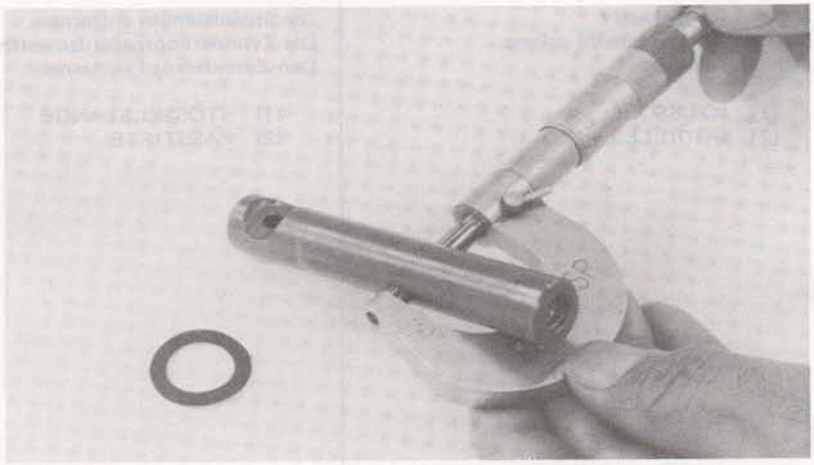
Withdraw the rocker arm shafts and remove the wave washers and rocker arms.



ROCKER ARM SHAFT INSPECTION

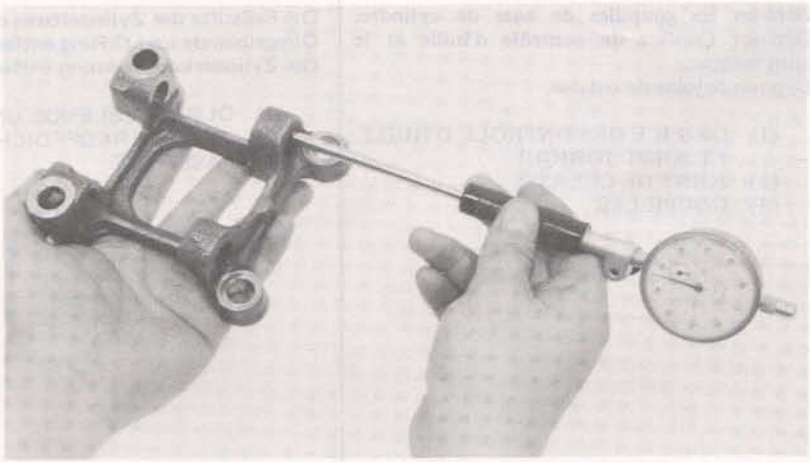
Masure the O.D. of each rocker arm shaft.
Examine the thrust washers for damage.
Inspect each shaft for damage, scoring, nicks and other defects.

SERVICE LIMIT : 14.95 mm (0.589 in)



ROCKER ARM HOLDER INSPECTION

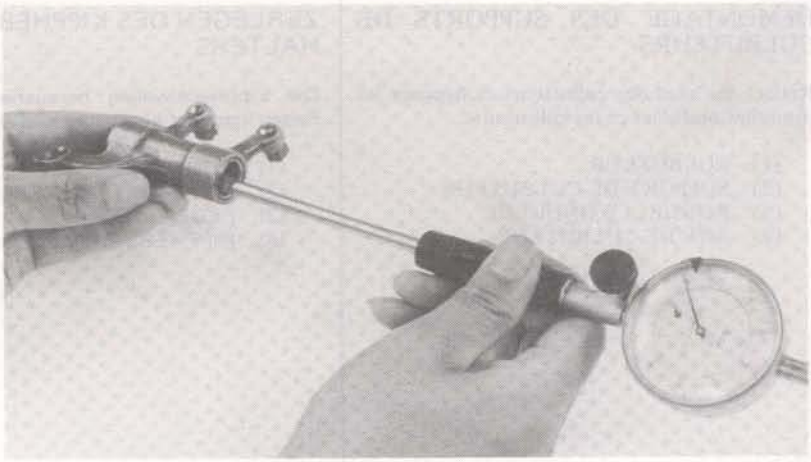
Measure the rocker arm holder I.D.
SERVICE LIMIT : 15.03 mm (0.592 in)



ROCKER ARM INSPECTION

Inspect each rocker arm for scoring, scratches or other defects. Measure the rocker arm I.D. Make sure the oil passages are clear.
SERVICE LIMIT : 15.04 mm (0.592 in)

If any rocker arms show wear or damage to the adjust screw or push rod contacing faces, inspect the push rods and stem contacting faces for scoring, scratches, or evidence of insufficient lubrication.
Inspect the push rods for wear, damage or bend.



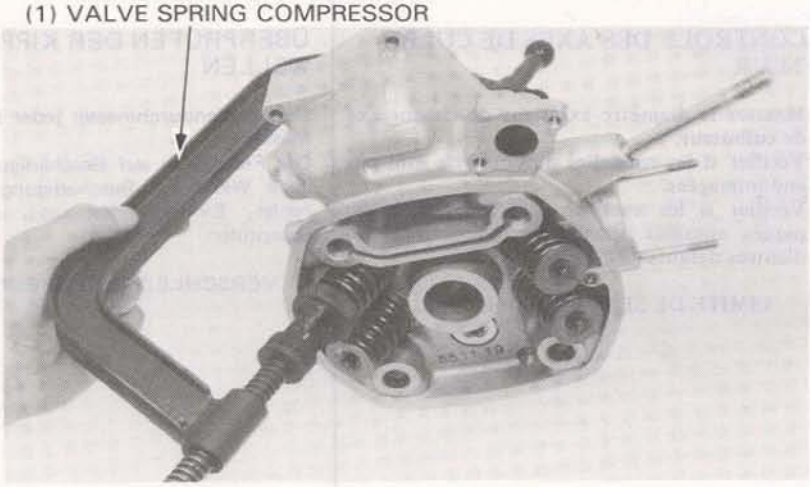
CYLINDER HEAD DISASSEMBLY

Remove the valve spring cotters, retainers, and valves.

NOTE

- Do not compress the valves more than enough to remove the valve cotters.
- Identify each part for proper assembly.

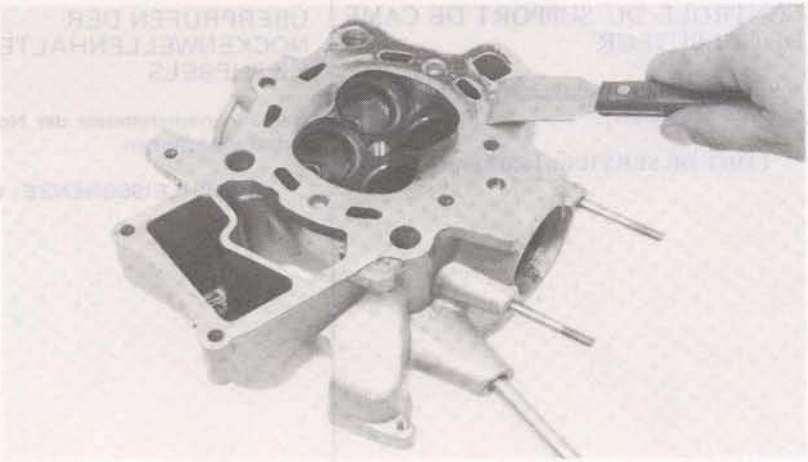
(1) VALVE SPRING COMPRESSOR



Clean carbon deposits from the combustion chambers.
Clean the head gasket surfaces of any gasket material.

NOTE

- Do not remove metal from the head.
- Avoid dropping gasket material into the jackets or oil passages.
- Gaskets will come off easier if soaked in solvent.



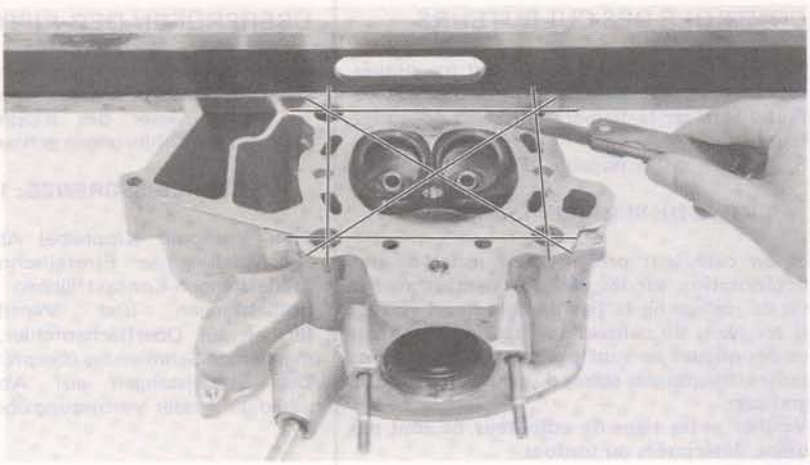
CYLINDER HEAD INSPECTION

Check the spark plug hole and valve areas carefully for cracks.
Check the cylinder head for warpage with a straight edge and a feeler gauge.

NOTE

Check for warpage in an X pattern.

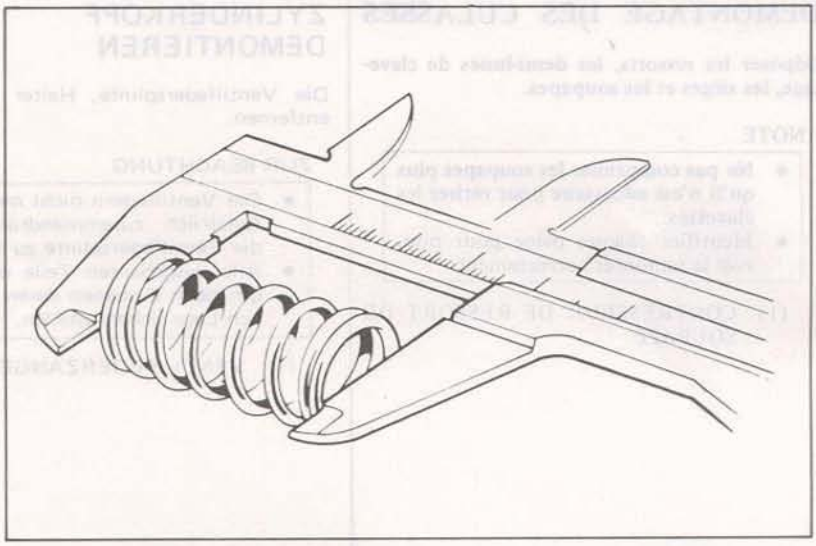
SERVICE LIMIT : 0.1 mm (0.040 in.)



VALVE SPRING INSPECTION

Measure the free length of the inner and outer valve springs.

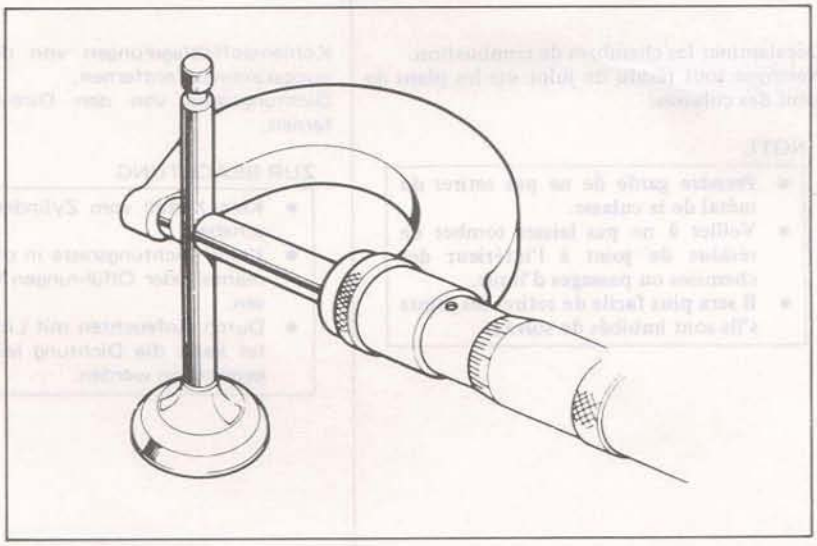
SERVICE LIMITS :
INNER (IN) : 48.4 mm (1.9055 in.)
(EX) : 48.4 mm (1.9055 in.)
OUTER (IN) : 48.5 mm (1.9094 in.)
(EX) : 48.5 mm (1.9094 in.)



VALVE INSPECTION

Clean the valves and inspect for bend, burring, scoring, scratches or local wear on the stem end.
Check the valve movement in the guide.
Measure and record each valve stem O.D.

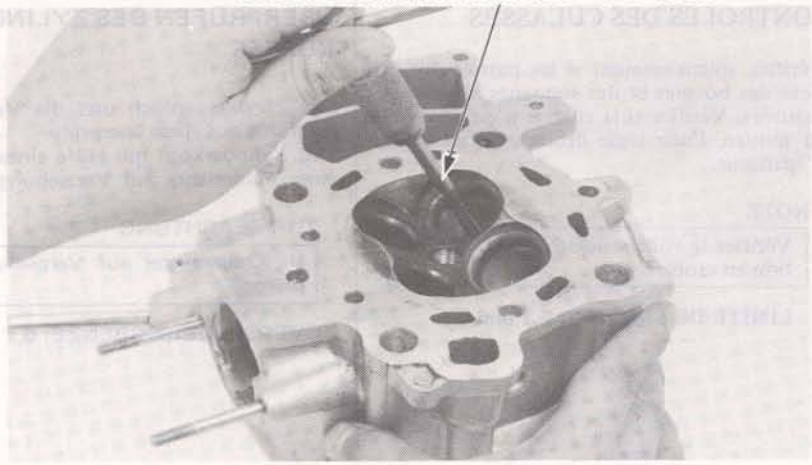
SERVICE LIMITS :
(IN) : 6.54 mm (0.2575 in.)
(EX) : 6.54 mm (0.2575 in.)



VALVE GUIDE INSPECTION

Ream the guides to remove any carbon build-up before checking clearance.

(1) VALVE GUIDE REAMER
07984—6570100 or 07984—6110000



STEM-TO-GUIDE CLEARANCE INSPECTION

Measure and record each valve guide I.D. using a ball gauge or inside micrometer.

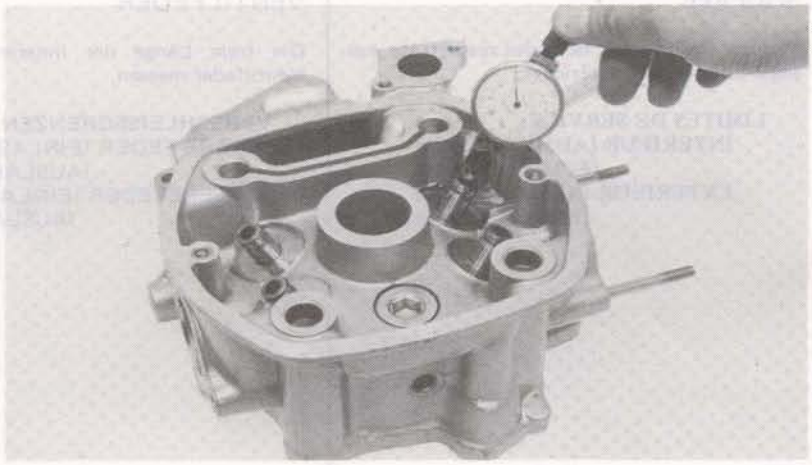
SERVICE LIMITS : (IN) : 6.70 mm (0.2638 in.)
(EX) : 6.70 mm (0.2638 in.)

Subtract each valve stem O.D. from the corresponding valve guide I.D. to obtain the stem to guide clearance.

SERVICE LIMITS : (IN) : 0.10 mm (0.040 in.)
(EX) : 0.10 mm (0.040 in.)

NOTE

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



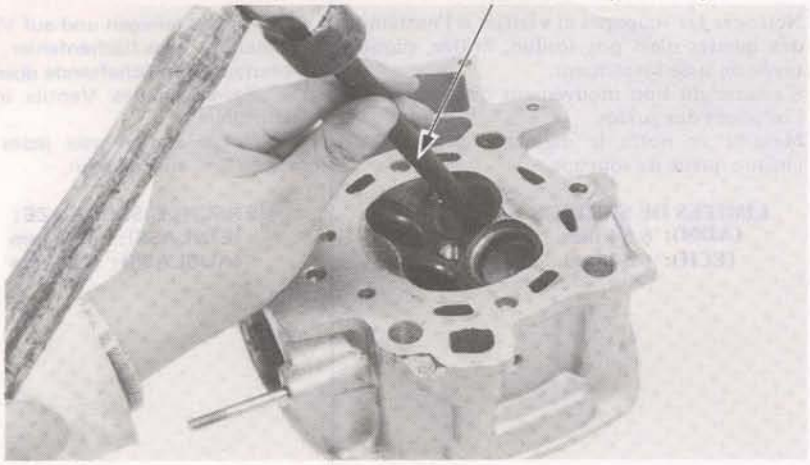
VALVE GUIDE REPLACEMENT

If the stem-to-guide clearance still exceeds the service limits with new guides, replace the valves and guides.

NOTE

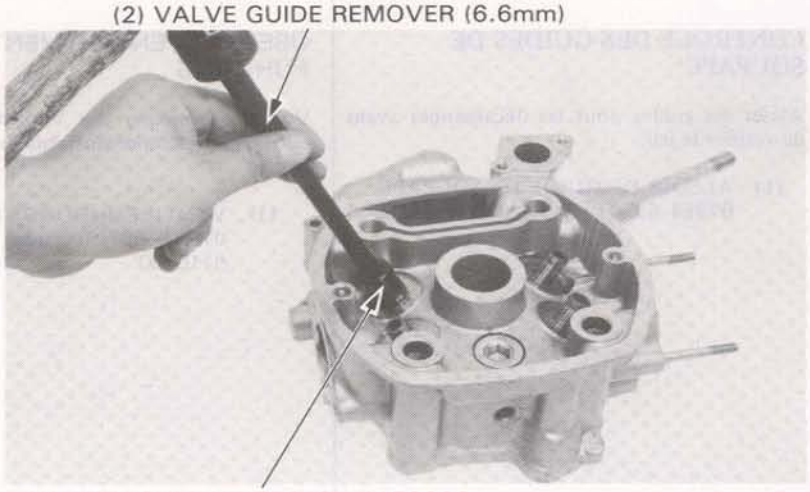
Do not damage the cylinder head when replacing valve guides.

(1) VALVE GUIDE REMOVER (6.6mm)



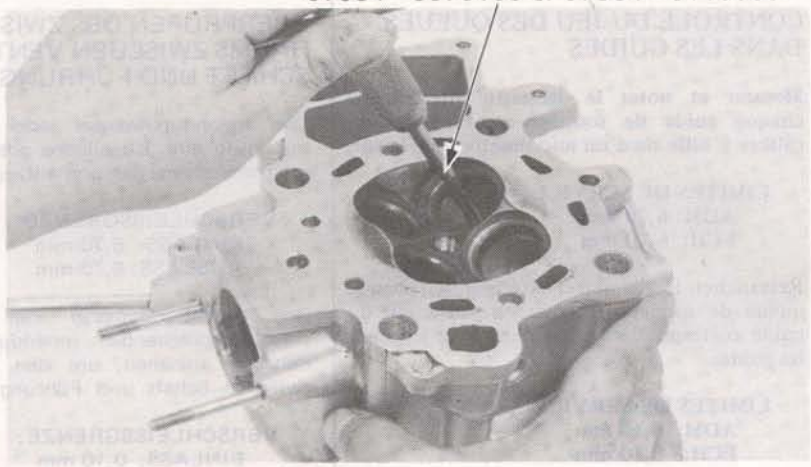
Set the ATTACHMENT on the VALVE GUIDE REMOVER, Drive the guides into place.

(2) VALVE GUIDE REMOVER (6.6mm)



(1) ATTACHMENT 07943—4150000

(1) VALVE GUIDE REAMER
07984—6570100 or 07984—6110000

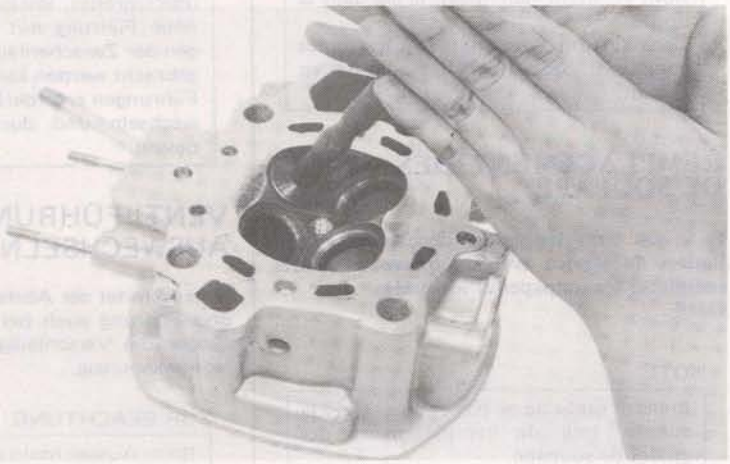


Ream the new valve guides after installation.

NOTE

- Use cutting oil on the reamer during this operation.
- It is important that the reamer must be rotated when it is inserted or removed.

VALVE SEAT INSPECTION AND GRINDING

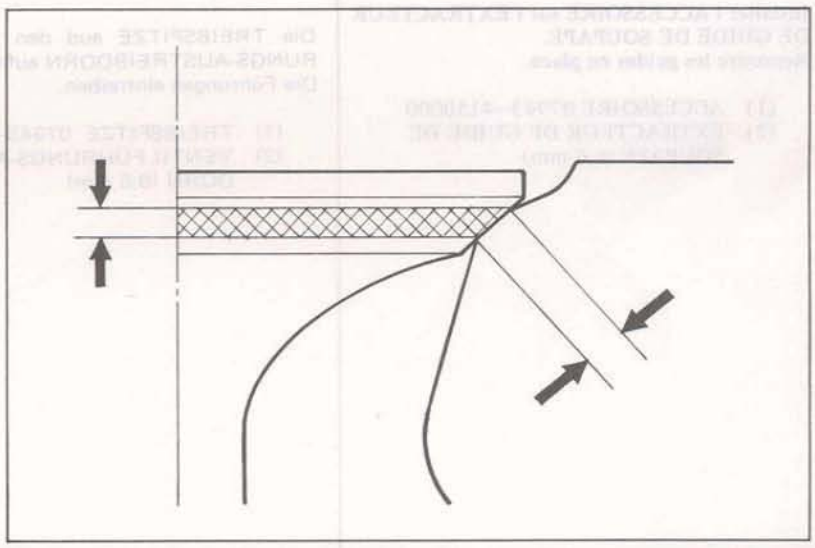


Clean all intake and exhaust valves throughly to remove carbon deposits.
Apply a light coating of valve lapping compound to each valve face. Lap each valve and seat using a rubber hose or other hand-lapping tool.
Remove the valve and inspect the face.

NOTE

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

Inspect each valve seat width.
STANDARD : 1.1 — 1.3 mm (0.04—0.05 in.)
SERVICE LIMIT : 2.0 mm (0.08 in.)
If the seat too wide, too narrow or has low spots, the seat must be ground.

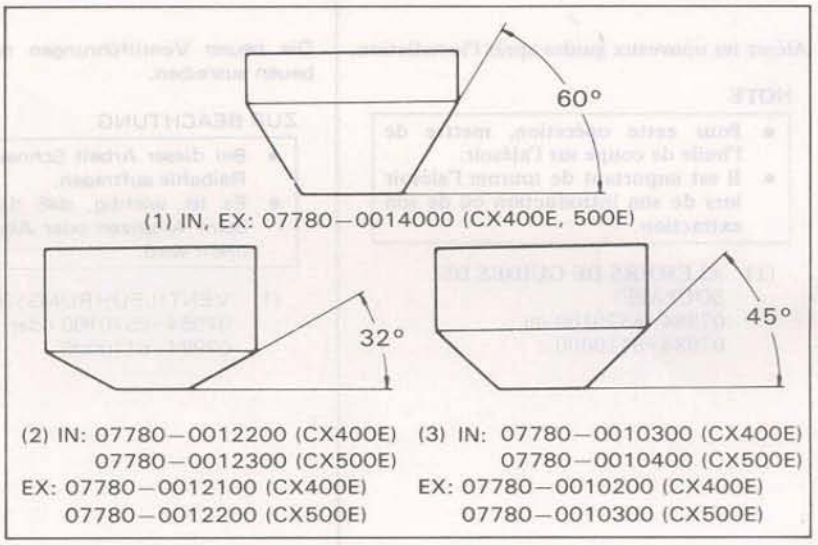


VALVE SEAT CUTTERS

HONDA VALVE SEAT CUTTERS, grinder or equivalent valve seat refacing equipment are recommended to correct a worn valve seat.

NOTE

Follow the refacer manufacturer's operating instructions.



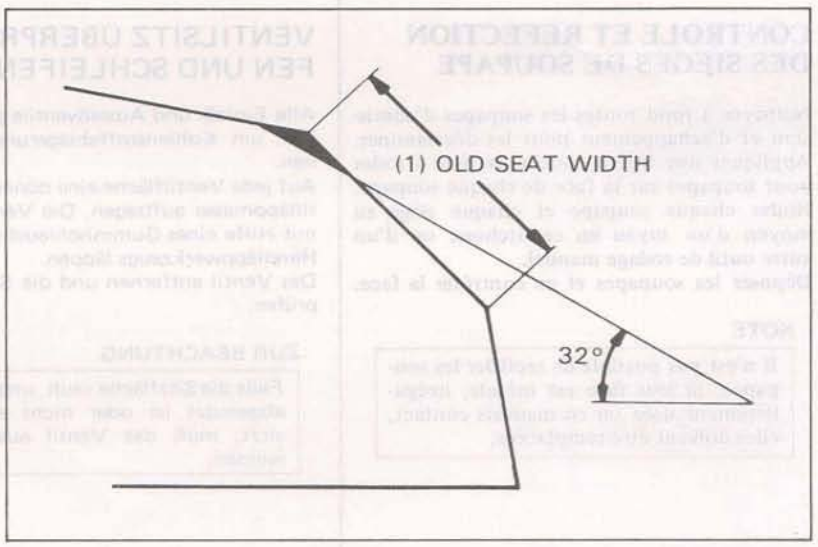
VALVE SEAT REFACING

Use a 45 degree cutter to remove any roughness or irregularities from the seat.

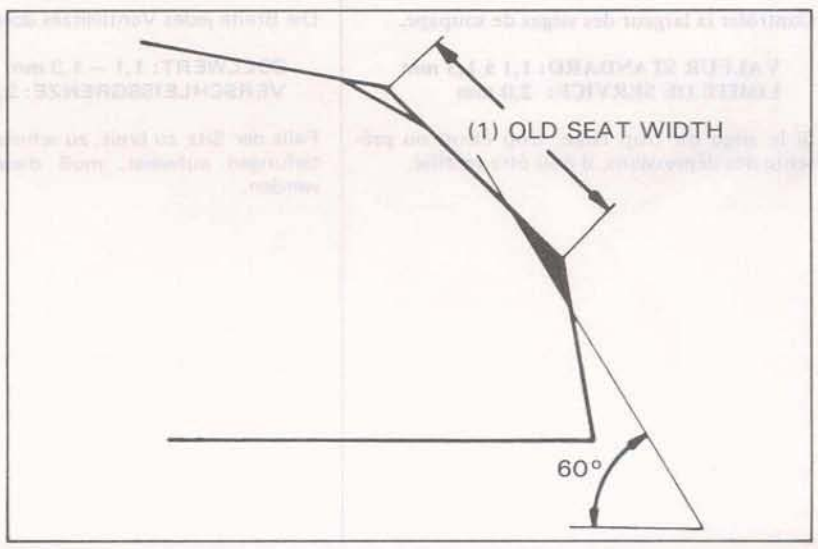
NOTE

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

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



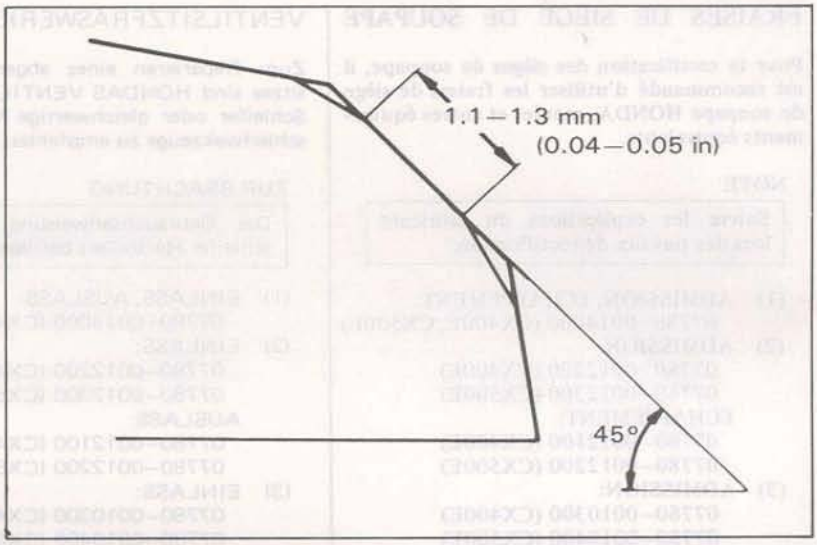
Use a 60 degree cutter to remove the bottom 1/4 of the old seat. Remove the cutter and inspect the area you have just removed.



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

NOTE

Make sure that all pitting and irregularities are removed. Refinish if necessary.

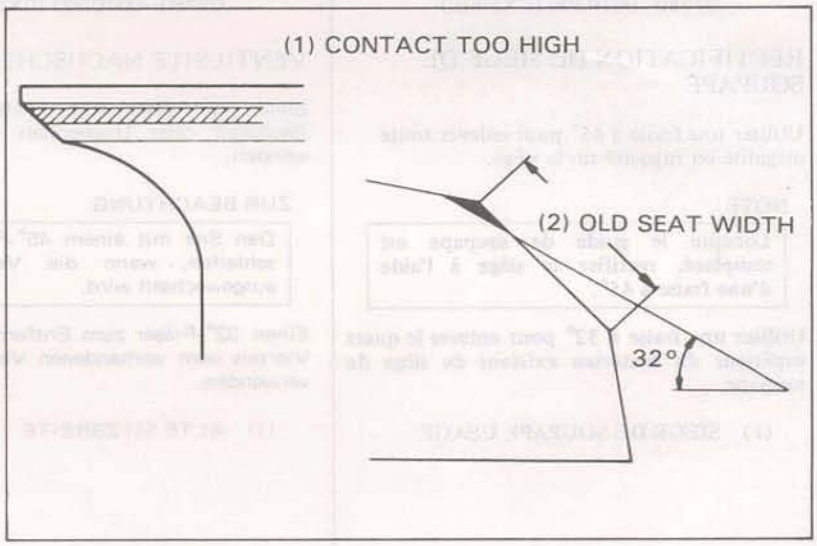


Apply a light coating of valve lapping compound to each valve face.
Press the valve through the valve guide and onto the seat to make a clear pattern.

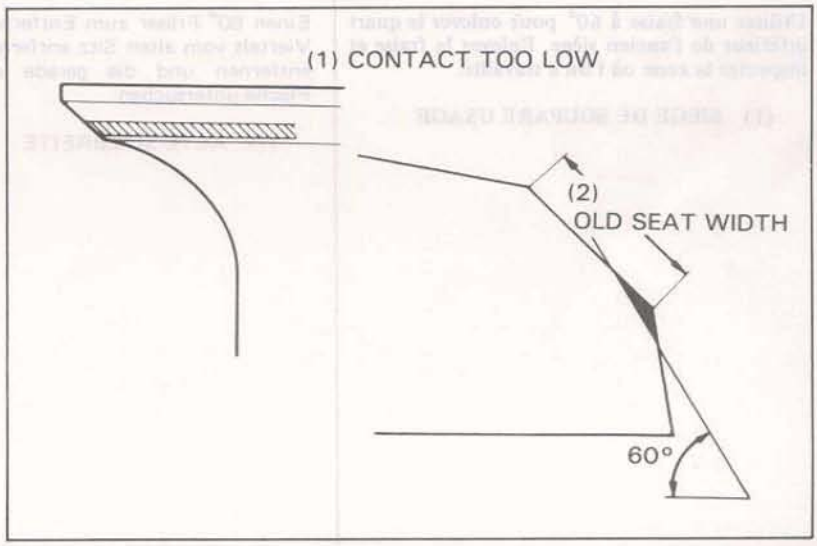
NOTE

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

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



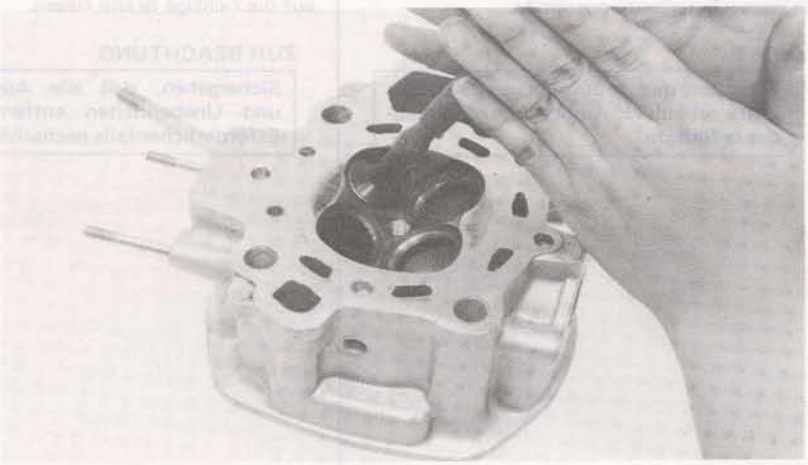
If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter.



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.

NOTE

Do not allow lapping compound to enter the guides.

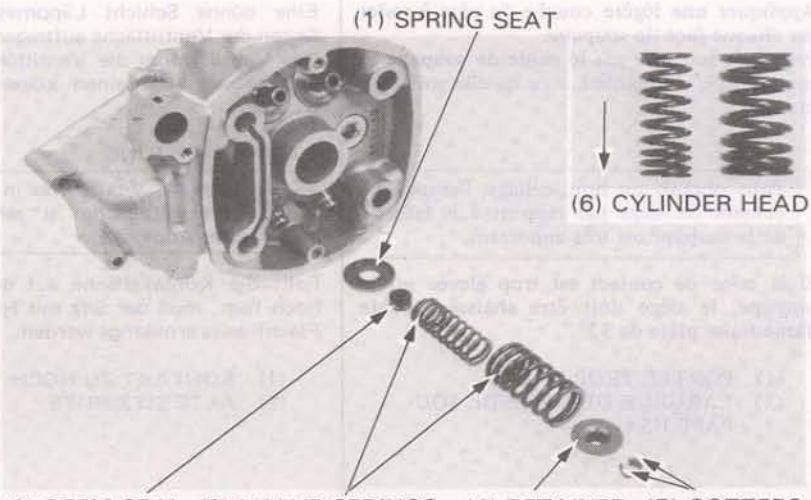


CYLINDER HEAD ASSEMBLY

Install the valve stem seals and spring seats. Lubricate the valve stems with a light coating of engine oil, and insert the valve into the guides.

NOTE

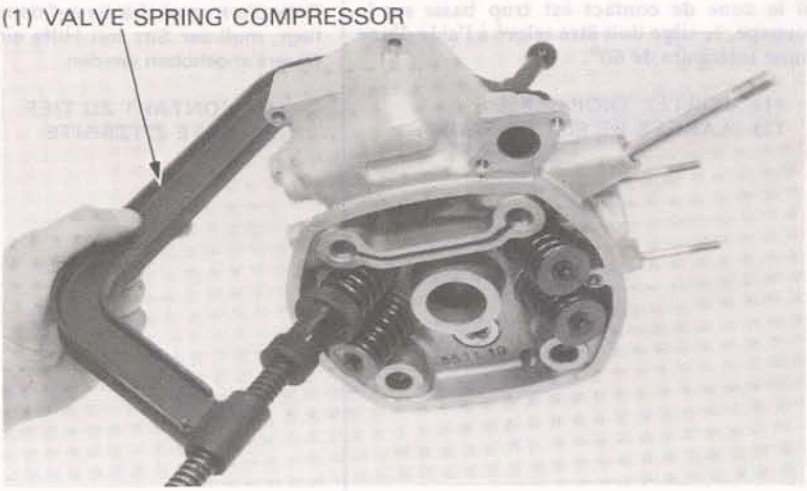
- Install the valves with the tightly wound end facing the head.
- Replace the stem seals with new ones whenever disassambled.



Install the valve cotters.

NOTE

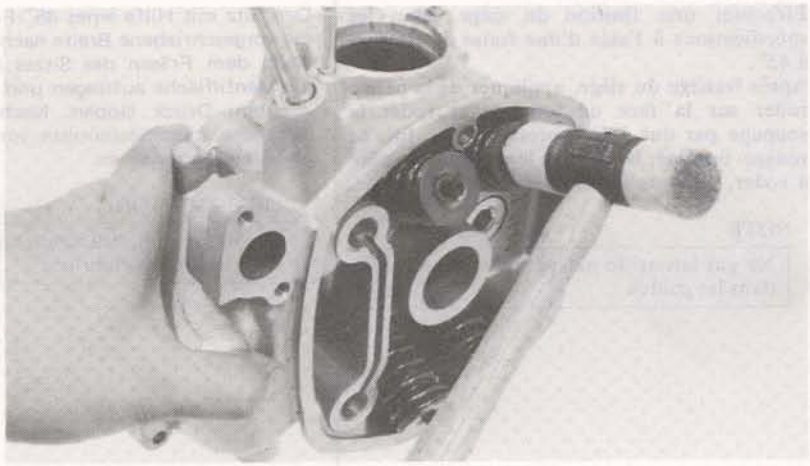
Do not tighten more than necessary.



Tap the valve stems gently with a soft hammer to be certain the cotters are firmly seated.

NOTE

Do not damage the valves while tapping the stem ends.

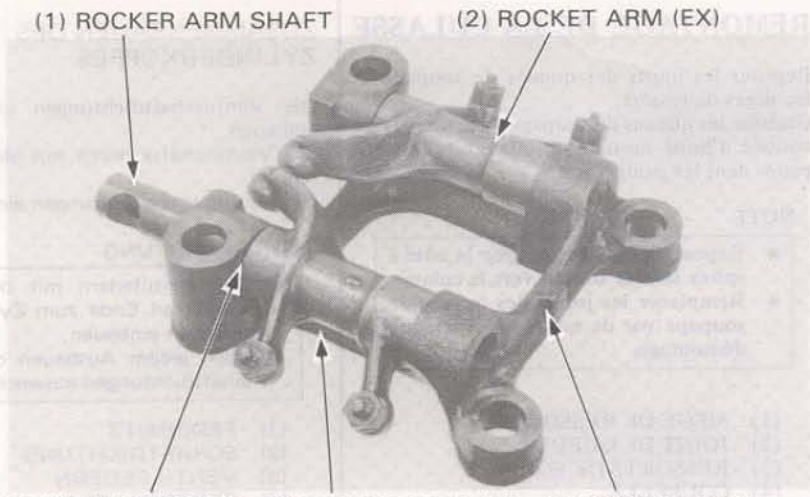


ROCKER ARM ASSEMBLY

Assemble the rocker arms, rocker arm shafts and wave washer in each rocker arm holder.

NOTE

- Note the rocker arm shaft direction.
- Lubricate each shaft with thin oil before assembly.

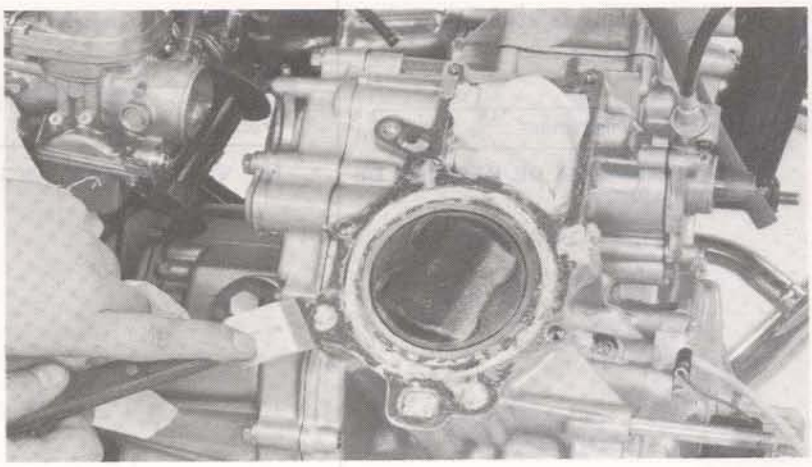


CYLINDER HEAD/ROCKER ARN INSTALLATION

Clean the head gasket surfaces of any gasket material.

NOTE

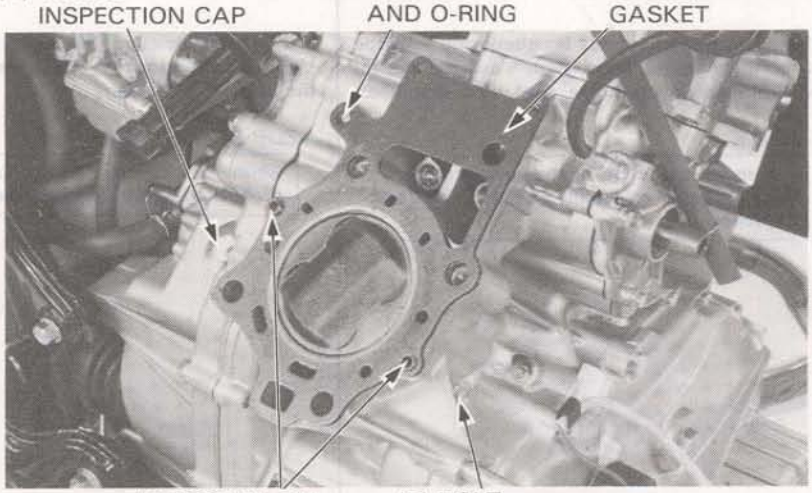
Do not remove metal from the gasket surfaces.



Install the O-rings and cylinder base dowel pins.
Coat the cylinder and head surfaces with liquid sealer, and install the head gasket.
Make sure that the oil orifices are not obstructed by the gaskets.
Install the cylinder drain bolts.
Remove the timing inspection cap.
Check the timing mark to be certain that the cylinder to be serviced is at T.D.C. on the compression stroke.

NOTE

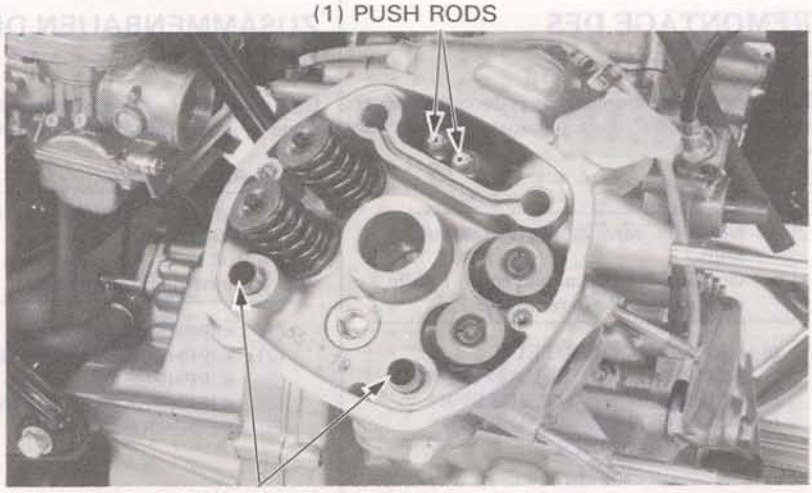
- Align the index mark with the "TR" mark for the right cylinder.
- Align the index mark with the "TL" mark for the left cylinder.



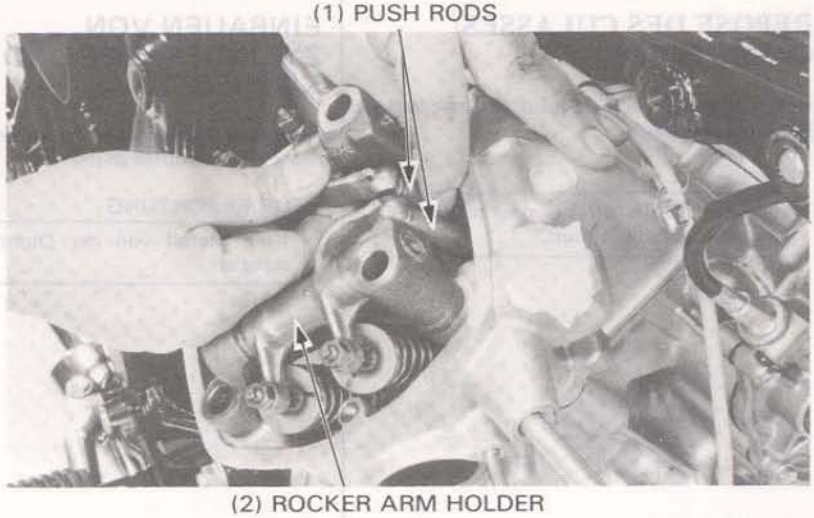
Install each cylinder head.
Install the cylinder head dowel pins.
Install the push rods into the rocker arm retainers.

NOTE

Apply MULTIPURPOSE NLGI No. 2 (MoS_2 additive) GREASE to the end of each push rod.



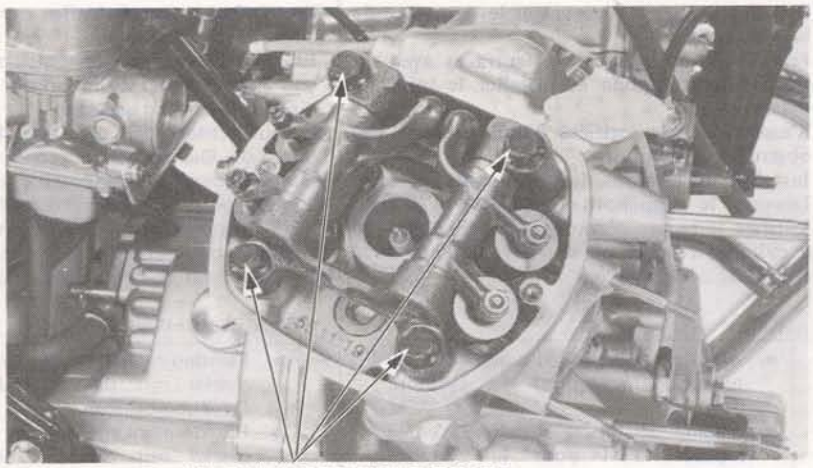
Install the rocker arm holder assembly.
Align the rocker arms with the push rods.



Tighten the cylinder head bolts in 2—3 steps in a crisscross pattern.

TORQUE: 50—55 N·m (5.0—5.5 kg-m, 36—40 ft-lb)

Check the valve clearance (Page 3-5) and adjust if necessary.



(1) CYLINDER HEAD BOLTS

Install the cylinder head cover and connect the spark plug caps.

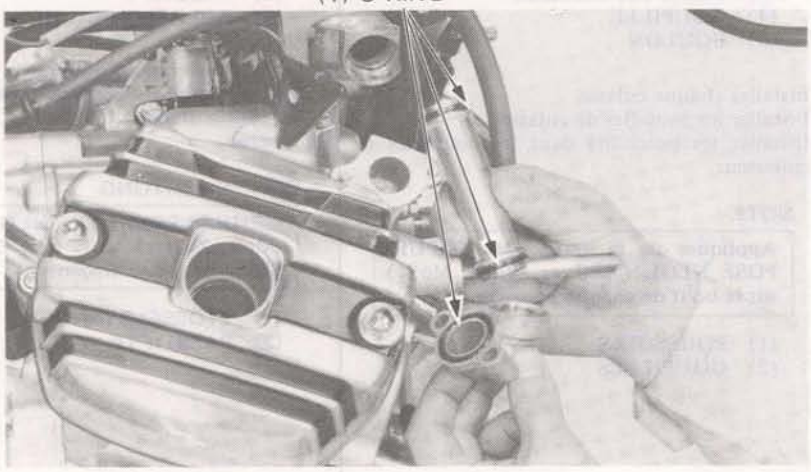
Install the air spoiler and thermostat unit (Page 9-8).

Install the water pipes and pipe joints.

NOTE

Make sure that the O-rings are not deteriorated or damaged.

(1) O-RING



(1) FRONT ENGINE HANGER

Install the carburetor intake pipe and exhaust pipe.

Install the front engine hanger.

TORQUE:

10 mm bolt: 45—70 N·m (4.5—7.0 kg-m, 33—51 ft-lb)

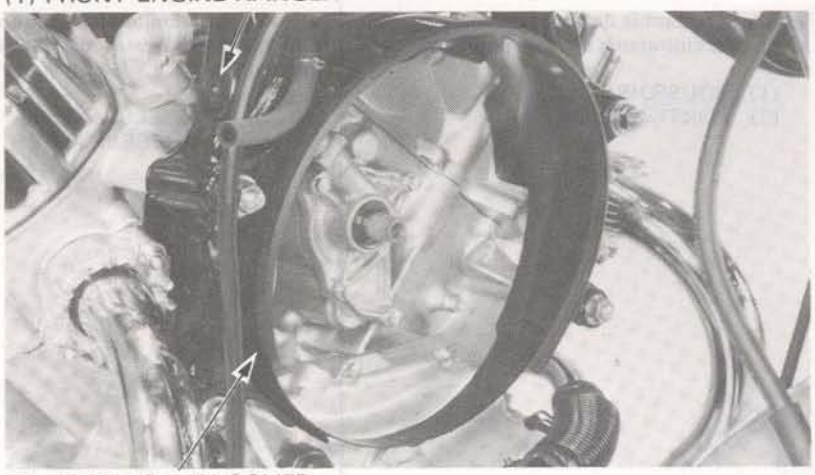
12 mm bolt: 60—80 N·m (6.0—8.0 kg-m, 43—58 ft-lb)

Install the cooling fan cover.

TORQUE: 30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)

Install the cooling fan and radiator (page 9-9).

Fill the cooling system with the recommended coolant (Page 9—3).



(2) COOLING FAN COVER

CLUTCH/OIL PUMP

EMBRAYAGE/ POMPE A HUILE

KUPPLUNG/ÖLPUMPE

EMBRAGUE/BOMBA DE ACEITE

SERVICE INFORMATION	7— 1
TROUBLESHOOTING	7— 1
CLUTCH REMOVAL	7— 2
CLUTCH INSTALLATION	7— 5
OIL PUMP REMOVAL	7— 9
OIL PUMP INSTALLATION	7—12

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Clutch discs, plates "A" and "B", clutch center, and clutch plates can be serviced by removing the clutch cover.
- To service the oil pump, it is necessary to remove the radiator and transmission cover.
- All these operations can be accomplished with the engine in the frame.

TOOLS

Special

Clutch center holder	07923—4150000

Common

Lock nut socket wrench 26 x 30 mm	07716—0020203
Extension	07716—0020500

SPECIFICATIONS

Unit: mm (in)

Item			Standard	Service Limit
Clutch	Lever free play (at lever end)		10—20 (3/8—3/4)	—
	Clutch spring	Free length	33.90 (1.335)	32.5 (1.28)
		Tension	19.7—22.3 kg/23.5 mm (43.4—49.2 lbs/0.93 in)	18.0 kg/23.5 mm (39.7 lbs/0.93 in)
	Disc thickness	A	2.7 (0.11)	2.3 (0.091)
		B	3.5 (0.14)	3.1 (0.122)
	Plate warpage	A	—	0.20 (0.008)
		B	—	0.20 (0.008)
	Clutch outer I.D.		32.000—32.025 (1.2598—1.2608)	32.07 (1.263)
	Outer guide O.D.		31.959—31.975 (1.2582—1.2589)	31.90 (1.256)
Oil pump	Inner-to-outer rotor clearance		—	0.10 (0.004)
	Outer rotor-to-body clearance		—	0.35 (0.014)
	Rotor-to-body clearanee			0.10 (0.004)
Oil pressure relief valve relief pressure			500—600 kPa (5.0—6.0 kg/cm², 71—85 psi)	—

TROUBLESHOOTING

Oil Pump Troubles

1. Refer to apge 21-2 for oil pump troubleshooing

Clutch Troubles

1. Faulty clutch operation can usually be corrected by adjusting the free play.

Clutch Slips When Accelerating

1. No free play
2. Discs worn
3. Spring weak

Clutch Will Not Disengage

1. Too much free play
2. Plates warped

Clutch Chatters Rattles

1. Worn clutch outer and disc splines

Motorcycle Creeps With Clutch Disengaged

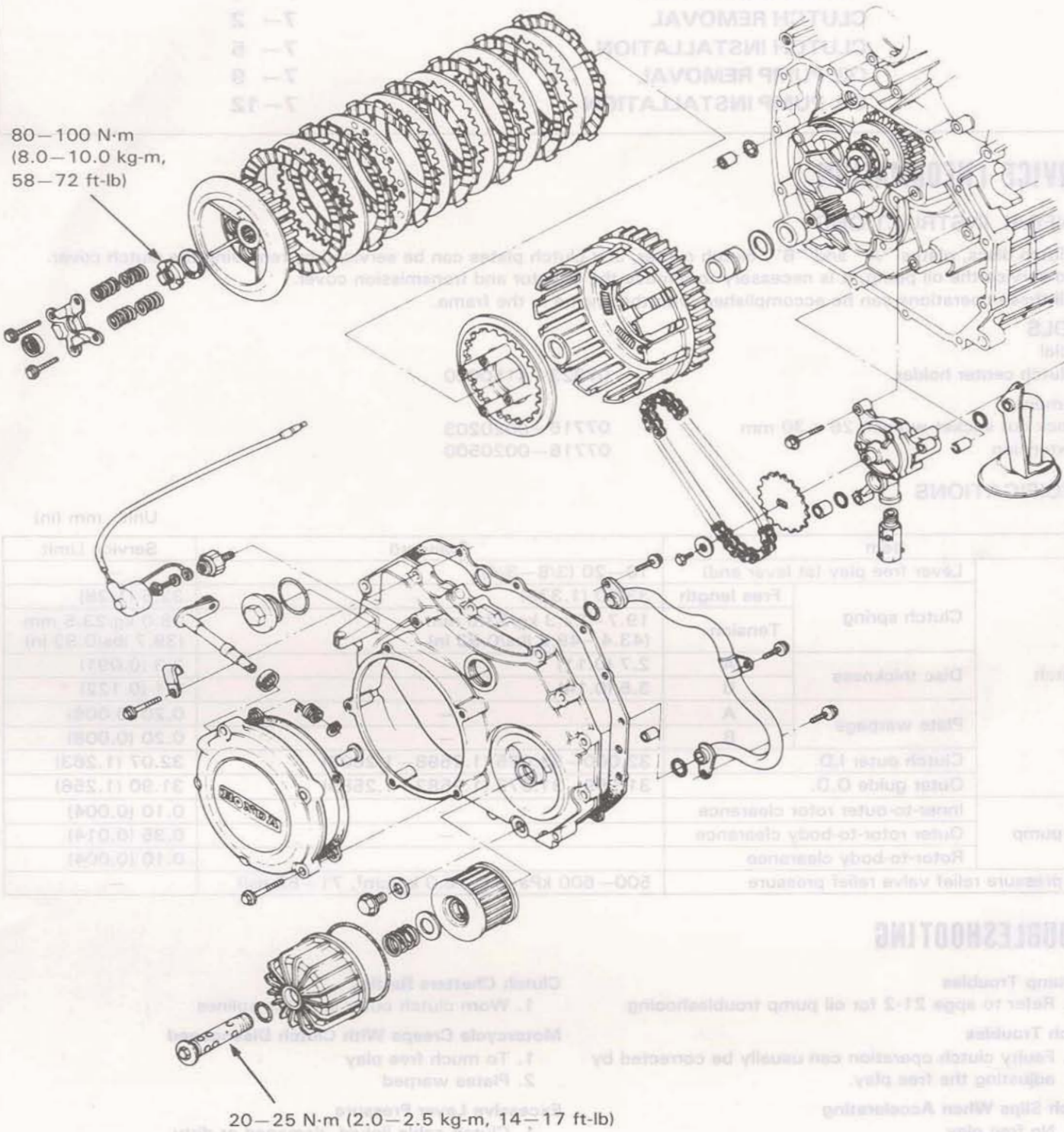
1. To much free play
2. Plates warped

Excessive Lever Pressure

1. Clutch cable linked, damaged or dirty
2. Lifter mechanism damaged

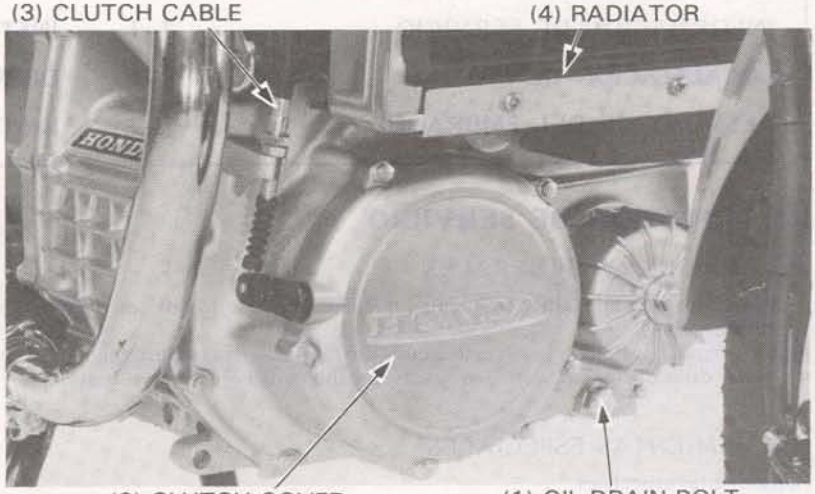
Clutch Operation Feels Rough

1. Outer drum slots rough
2. Disc plate wave spring weak or damaged


80—100 N·m
(8.0—10.0 kg-m,
58—72 ft-lb)
20—25 N·m (2.0—2.5 kg-m, 14—17 ft-lb)

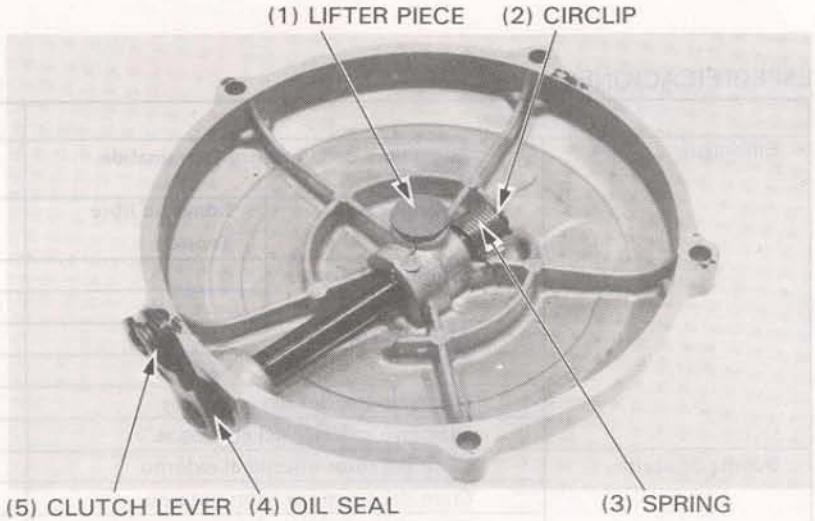
CLUTCH REMOVAL

Drain all oil from the engine.
Disconnect the cluth cable at the lower adjuster.
Remove the clutch cover.



CLUTCH LIFTER REMOVAL

Remove the lifter piece, circlip, spring, clutch lever and O-ring.

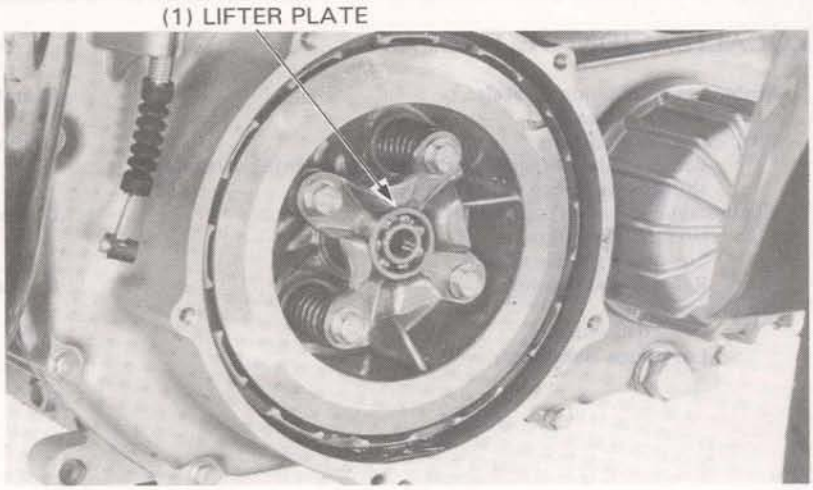


CLUTCH LIFTER PLATE REMOVAL

Remove the bolts, springs and clutch lifter plate.

NOTE

Loosen the bolts in an X pattern in two or more steps.



CLUTCH REMOVAL

Set the clutch center holder on the pressure plate boss with the 6 mm bolts.

NOTE

Tighten the 6 mm bolts finger tight.

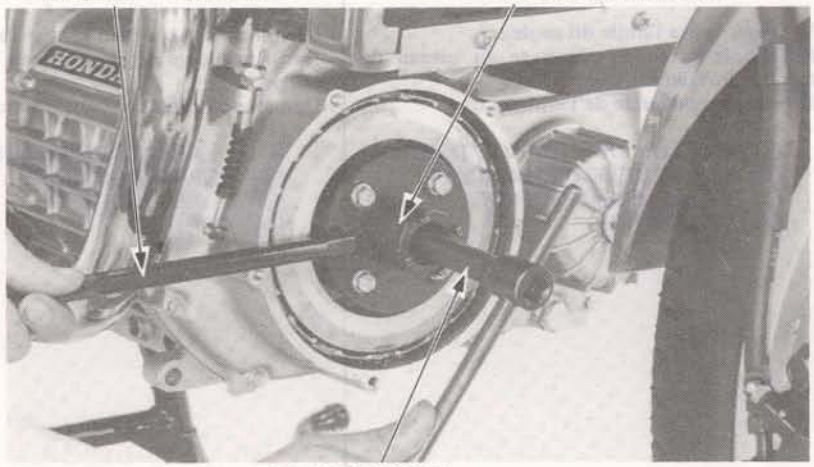
CAUTION

Damage to the pressure plate will occur if the clutch center holder is not attached with 4 bolts.

Remove the lock nut and lock washers.

(1) CLUTCH CENTER HOLDER 07923—4150000

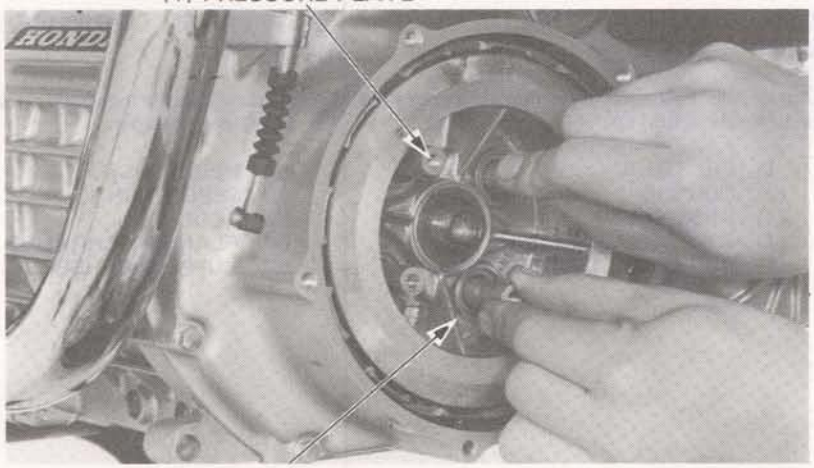
(2) LOCK NUT SOCKET WRENCH 26×30 mm



(3) EXTENSION

Remove the pressure plate, discs "A" and "B", disc plate, and clutch center as a unit.

(1) PRESSURE PLATE



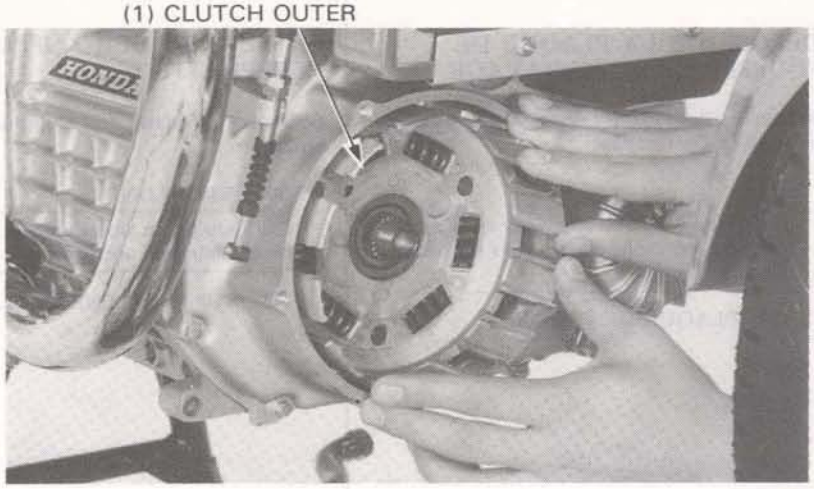
(2) CLUTCH CENTER

Remove the clutch outer.
Remove the clutch outer guide and thrust washer.

NOTE

Do not rotate the crankshaft after the clutch outer has been removed. If the shaft is turned, the drive gear is out of engagement with the driven gear, resulting in difficulty in assembling the gears.

(1) CLUTCH OUTER



CLUTCH DISC INSPECTION

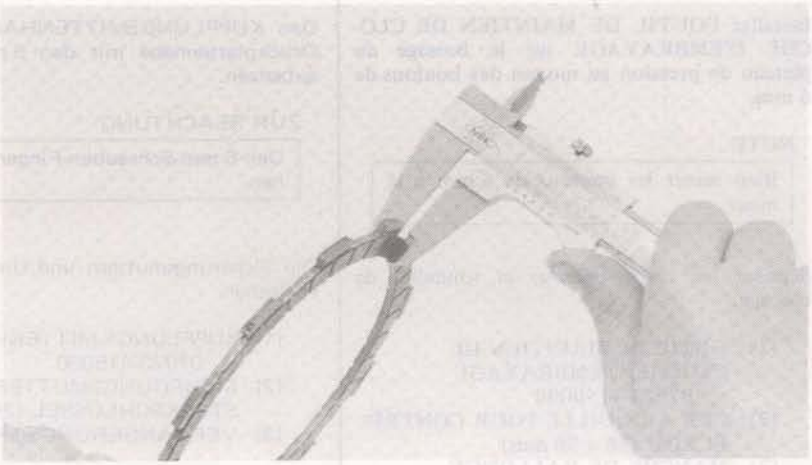
Replace the clutch discs if they show signs of scoring or discoloration.

Measure the disc thickness.

SERVICE LIMITS :

Disc A : 2.30 mm (0.0905 in.)

Disc B : 3.10 mm (0.1220 in.)

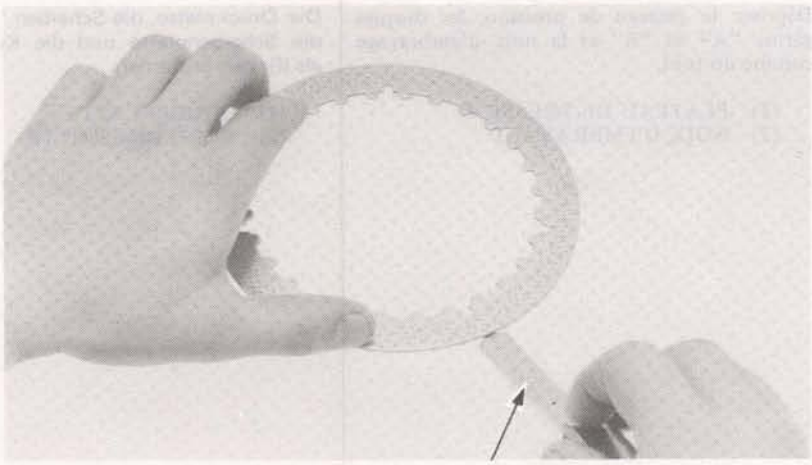


CLUTCH PLATE INSPECTION

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

WARPAGE SERVICE LIMITS :

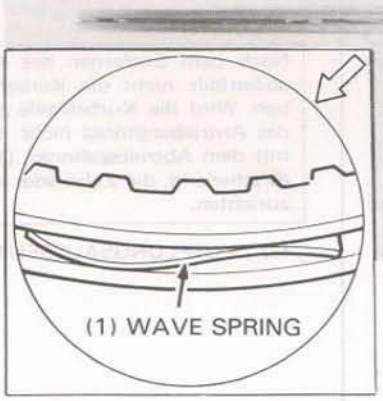
Plates A and B : 0.20 mm (0.008 in.)



(1) FEELER GAUGE

CLUTCH PLATE B INSPECTION

Check the wave spring for damage or other defects.

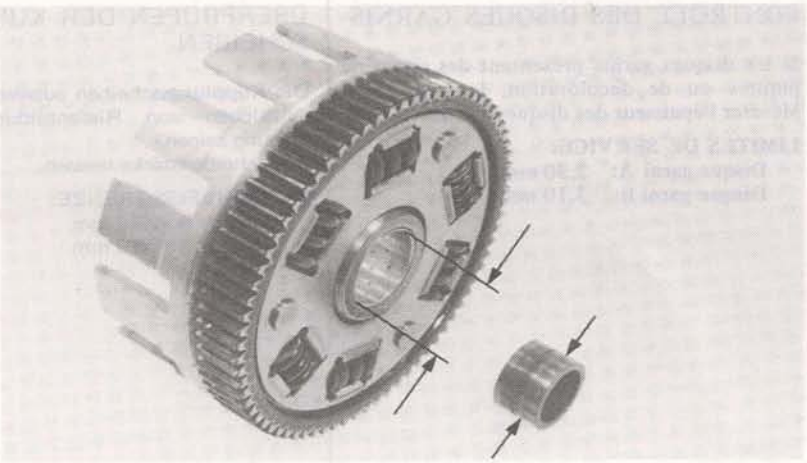


(1) WAVE SPRING

CLUTCH OUTER AND OUTER GUIDE INSPECTION

Check the slots in the outer drum for nicks, cuts or indentations made by the friction discs.
Measure the I.D. of the clutch outer and the O.D. of the outer guide.

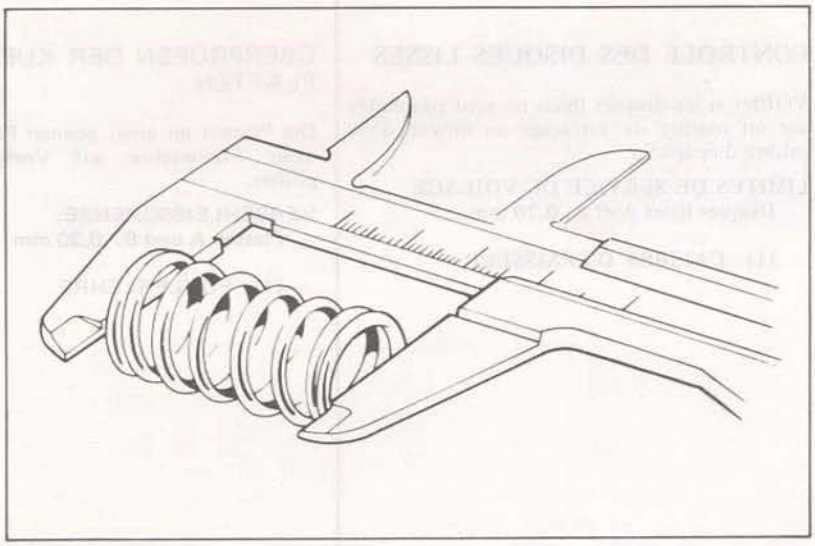
SERVICE LIMITS :
Outer I.D: 32.07 mm (1.263 in)
Guide O.D : 31.90 mm (1.256 in)



CLUTCH SPRING INSPECTION

Measure the spring free length.

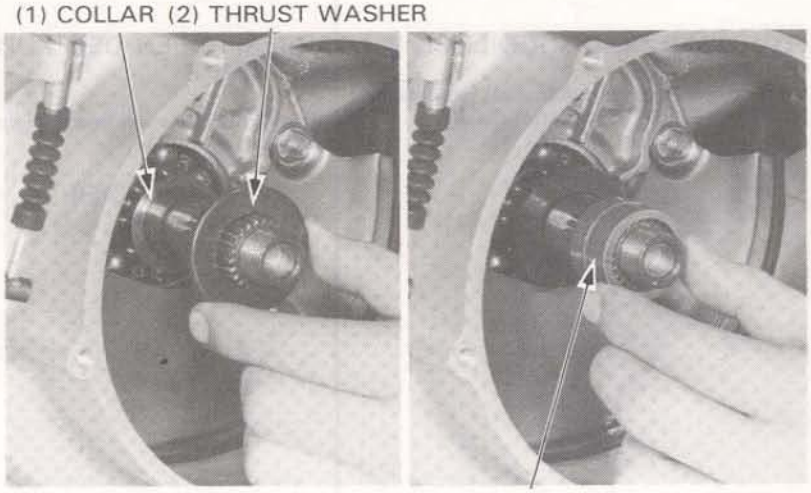
SERVICE LIMIT : 32.5 mm (1.28 in)



CLUTCH INSTALLATION

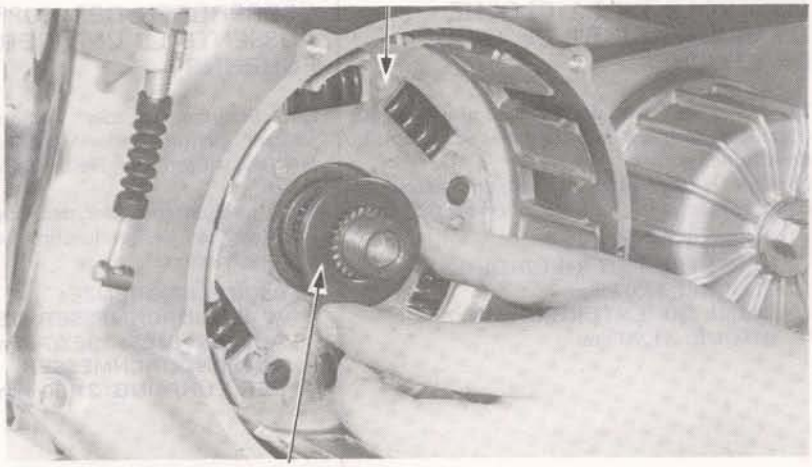
Install the collar, thrust washer and outer guide to the transmission mainshaft.

(1) COLLAR (2) THRUST WASHER



(3) OUTER GUIDE

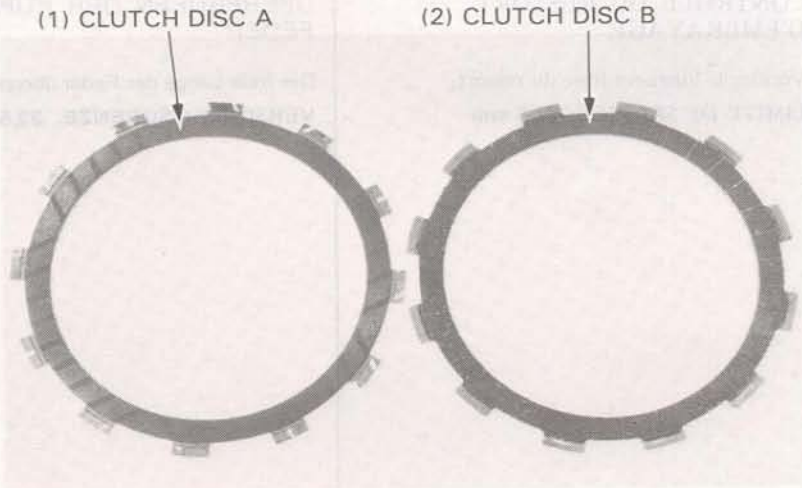
Install the clutch outer.
Install the thrust washer.

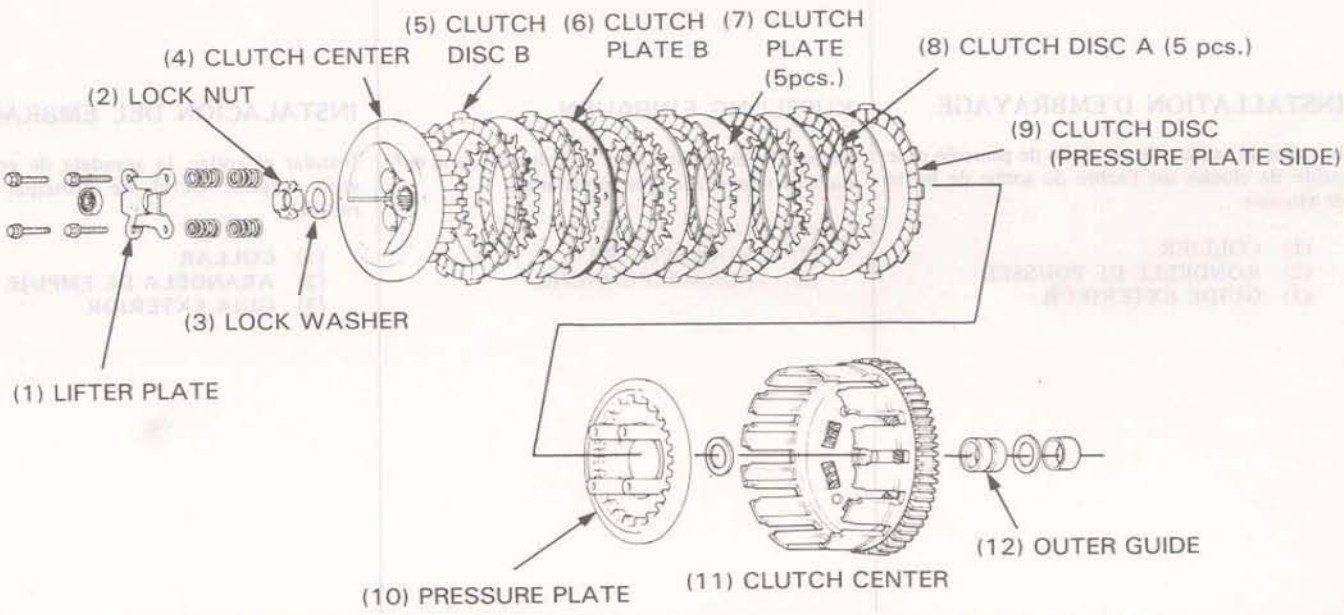


Install the prssure plate on the clutch outer.
Install the clutch plates and discs in the clutch outer as shown.

NOTE

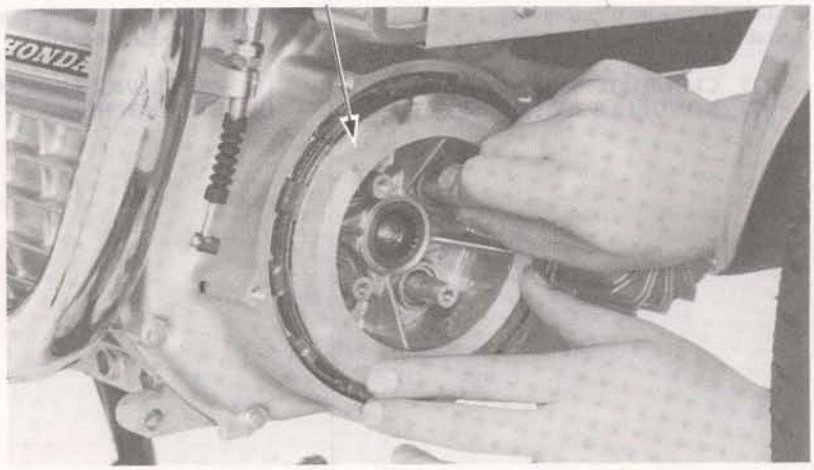
- The disc on the pressure plate is identified by the grooves in its lining.
- The clutch disc A to be placed on the pressure plate side is thinner than clutch disc B that is placed on the clutch center.





Install the clutch center, alinging the splines by rotating the clutch center.

(1) CLUTCH CENTER

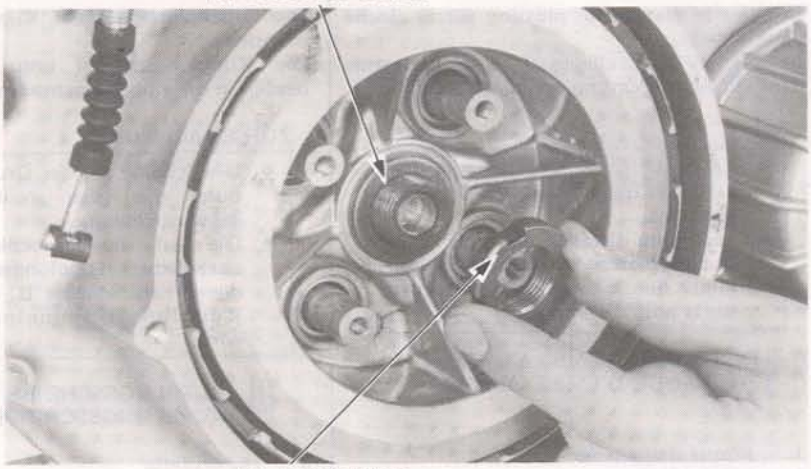


Install the clutch on the mainshaft.
Install the lock washer and lock nut.

NOTE

- Install the lock washer with the mark "OUT SIDE" facing out.
- Install the lock nut with the flat end facing out.

(1) LOCK WASHER



(2) LOCK NUT

Attach the CLUTCH CENTER HOLDER to the pressure plate boss to prevent it from turning.
Tighten the lock nut.

TORQUE: 80—100N·m
(8.0—10.0 kg-m, 58—72 ft-lb)

(1) LOCK NUT WRENCH 26×30 mm (2) EXTENSION

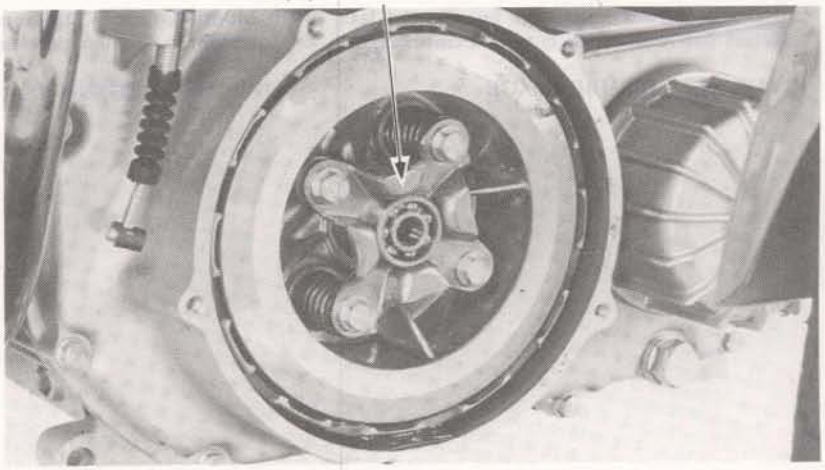
(3) CLUTCH CENTER HOLDER 07923—4150000

Install the clutch springs and lifter plate bolts.

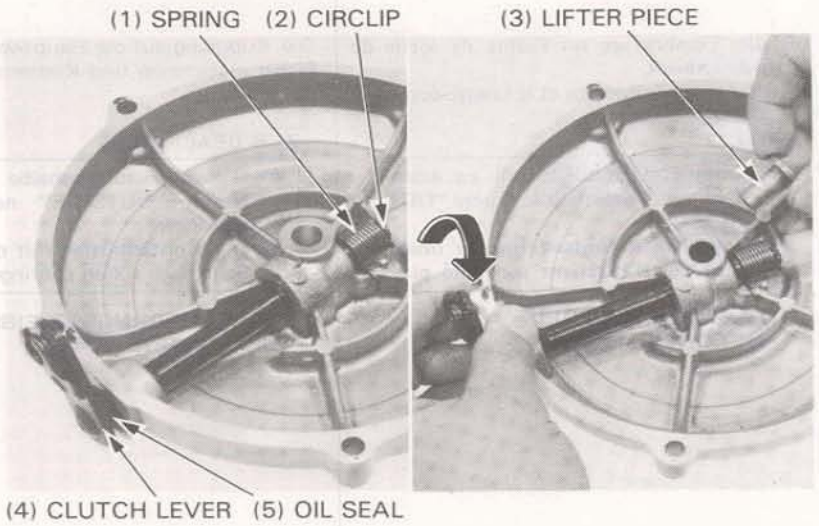
NOTE

Tighten the bolts evenly 2—3 sreps using a crisscross pattern.

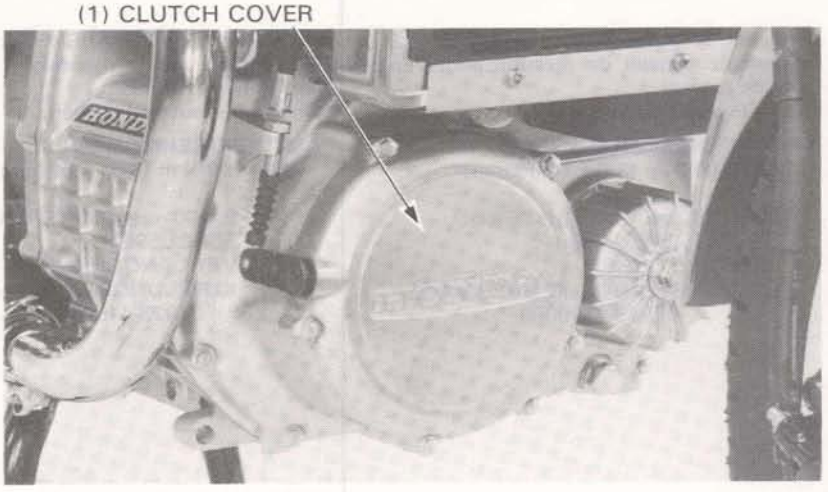
Install the clutch cover gasket.



Install the O-ring in the clutch cover.
Install the clutch lever.
Install the spring and circlip.
Rotate the clutch lever to align the hole in the lever with the hole in the clutch cover and insert the lifter piece.

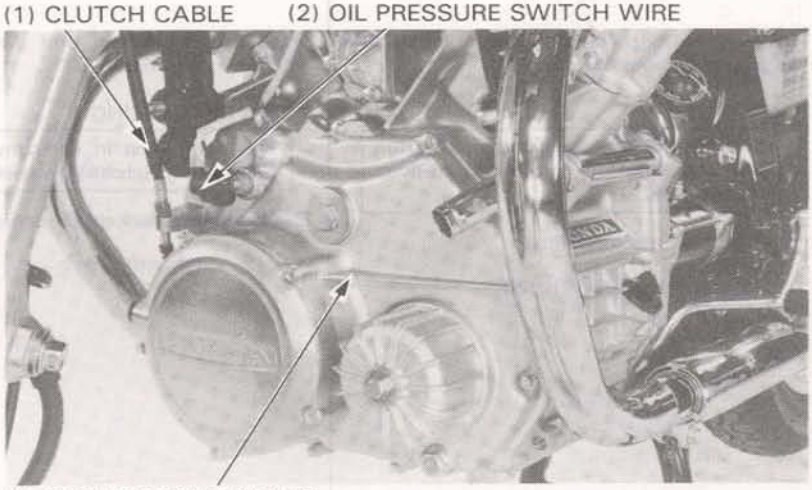


Install the clutch cover.
Connect the clutch cable.
Adjust the clutch (Page 3-10).

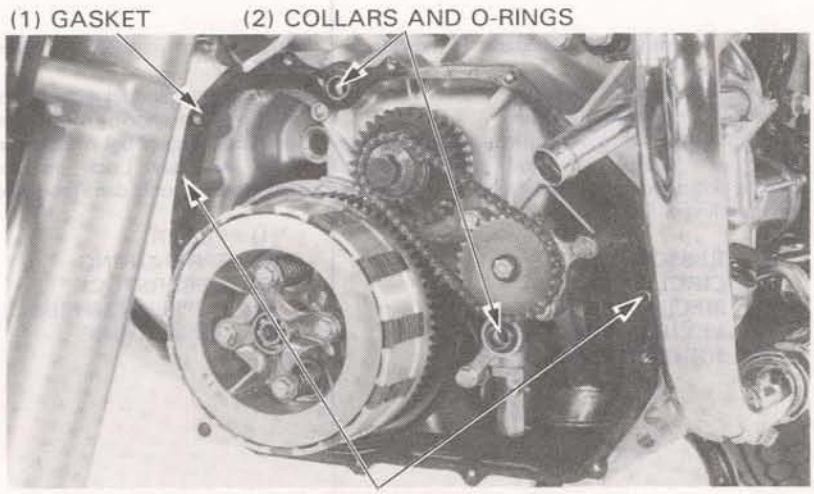


OIL PUMP REMOVAL

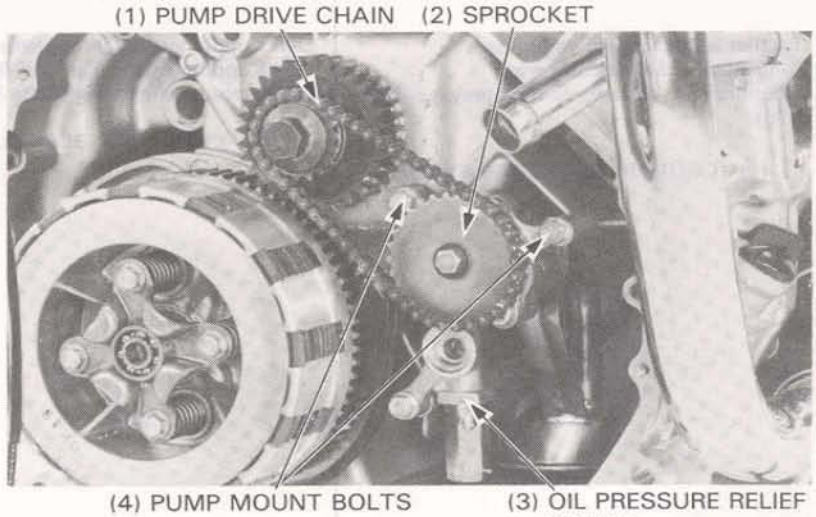
Remove the radiator (Page 9-5).
Remove the cooling fan and fan cover (Page 9-6).
Remove the right front engine hanger (Page 9-6).
Drain the oil from the engine.
Disconnect the clutch cable at the lower end.
Disconnect the oil pressure switch wire.
Remove the engine front cover.



Remove the dowel pins collars. O-rings and gasket.

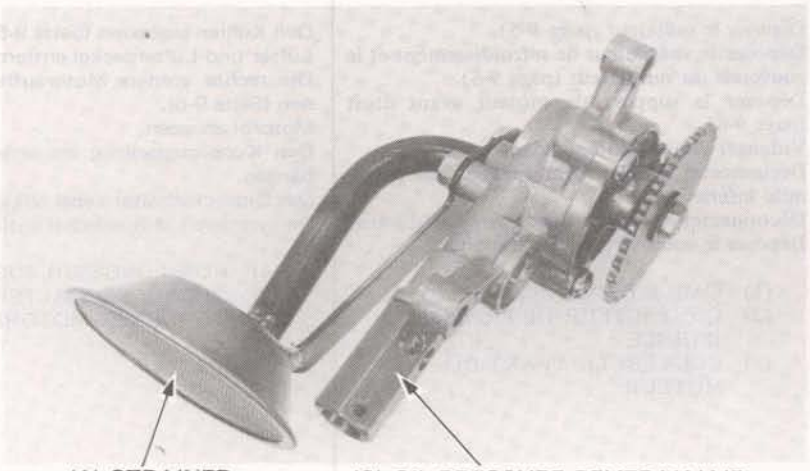


Remove the 6 mm bolt and take out the oil pump drive chain.



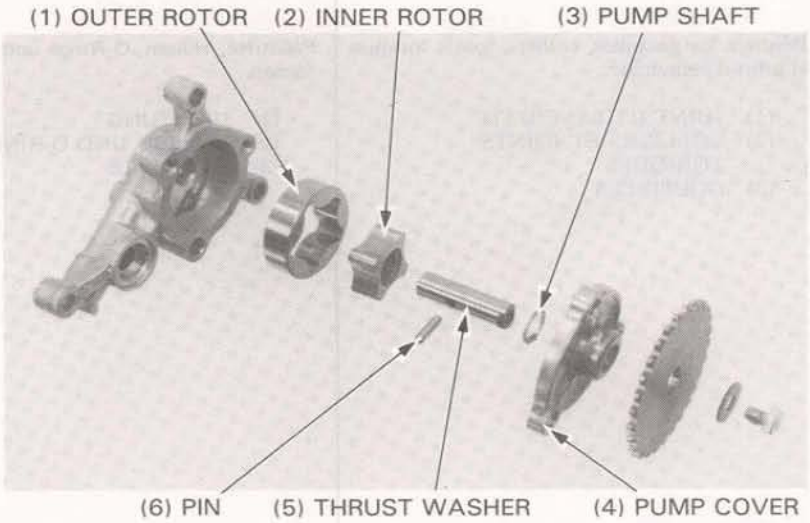
OIL PUMP DISASSEMBLY

Remove the pressure relief valve and oil strainer. Inspect the strainer and clean in solvent if necessary.



(1) STRAINER (2) OIL PRESSURE RELIFE VALVE

Remove the sprocket.
Remove the pump cover, thrust washer, pump shaft, and driving pin.
Remove the inner and outer rotors out of the pump body.

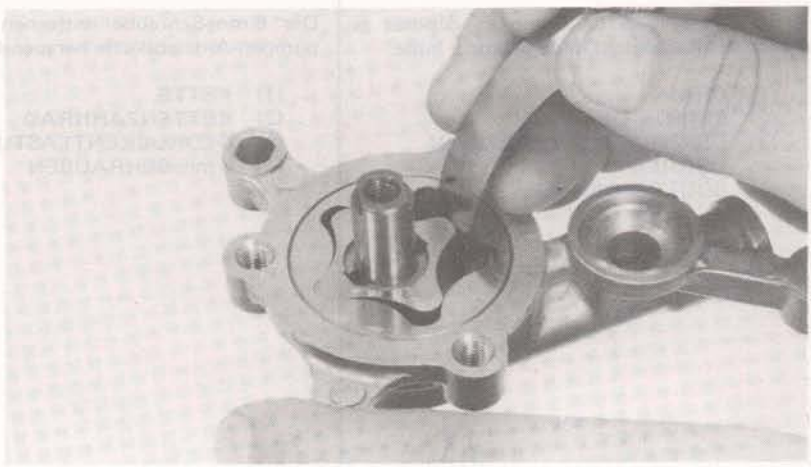


(1) OUTER ROTOR (2) INNER ROTOR (3) PUMP SHAFT

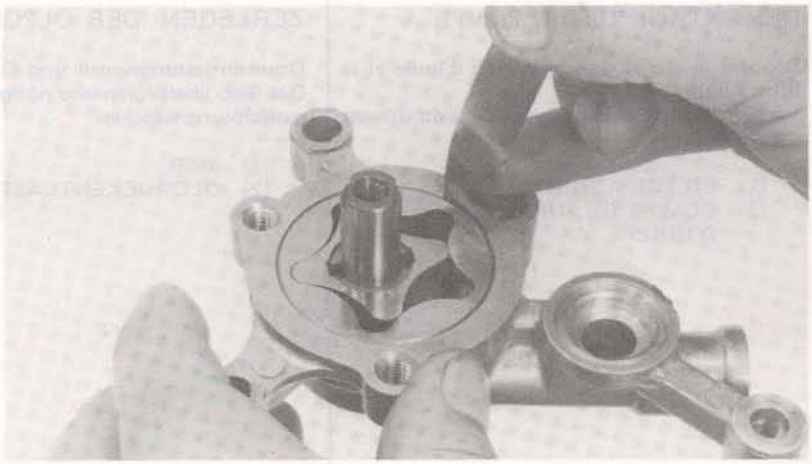
(6) PIN (5) THRUST WASHER (4) PUMP COVER

OIL PUMP INSPECTION

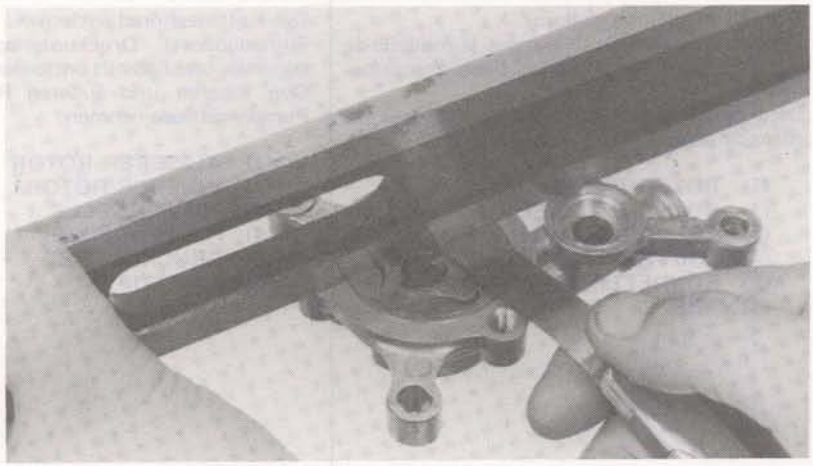
Measure the pump tip clearaance.
SERVICE LIMIT : 0.1 mm (0.004 in.)



Measure the pump body clearance.
SERVICE LIMIT : 0.35 mm (0.014 in.)

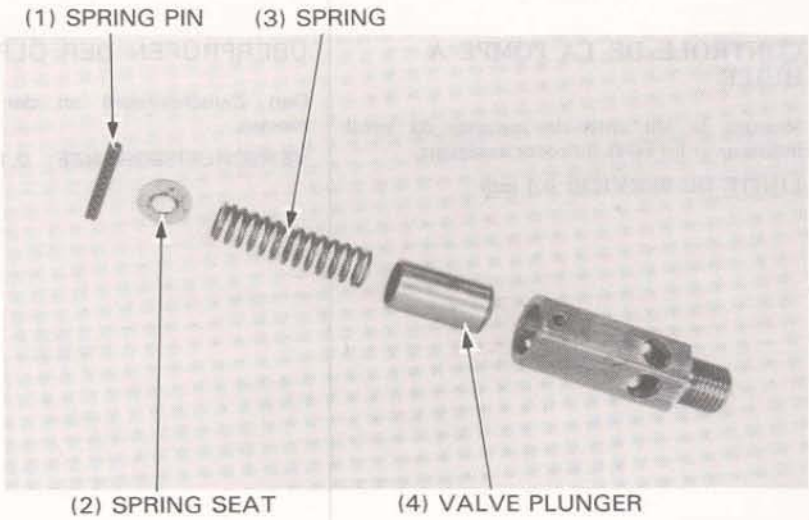


Measure the pump end clearance. Lay straight edge on the pump body.
SERVICE LIMIT : 0.1 mm (0.004 in.)



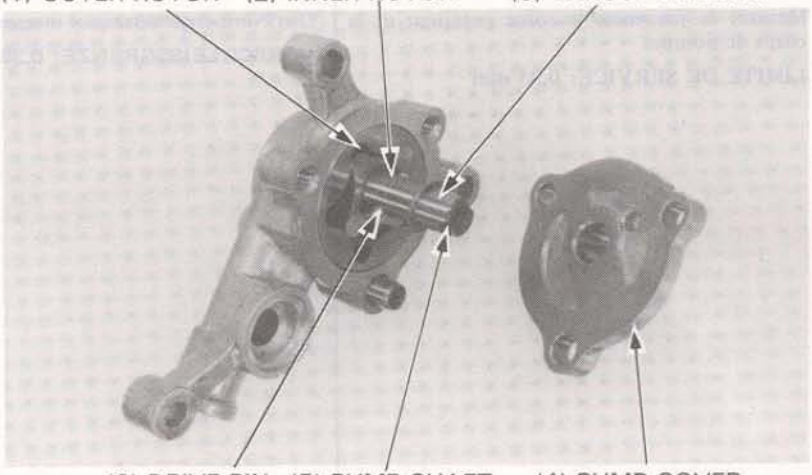
RELIEF VALVE INSPECTION

Remove the valve as an assembly and check operation.
If the valve does not operate properly, disassemble it and check for a stuck valve or damaged or weak spring.
Replace the relief valves as a unit if the spring or plunger is broken.

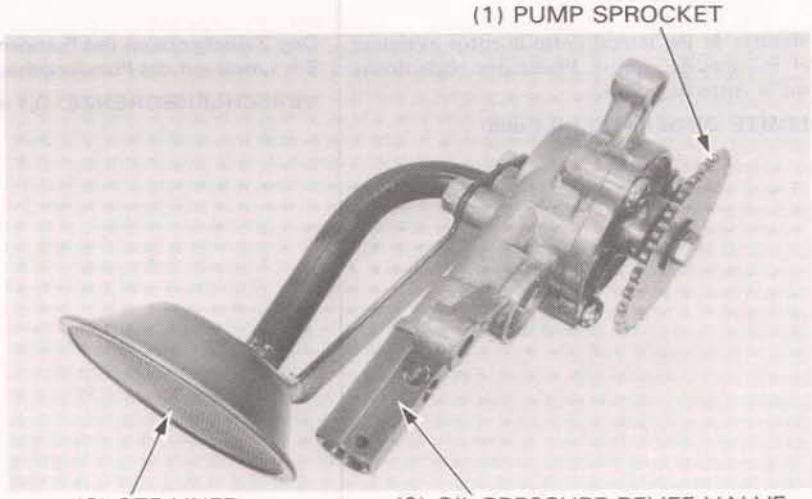


OIL PUMP ASSEMBLY

Insert the outer and inner rotors into the pump body.
Slide the drive pin into the pump shaft, and install the shaft, aligning the pin with the cut-out in the inner rotor.
Install the thrust washer and drive pin.
Install the pump cover.

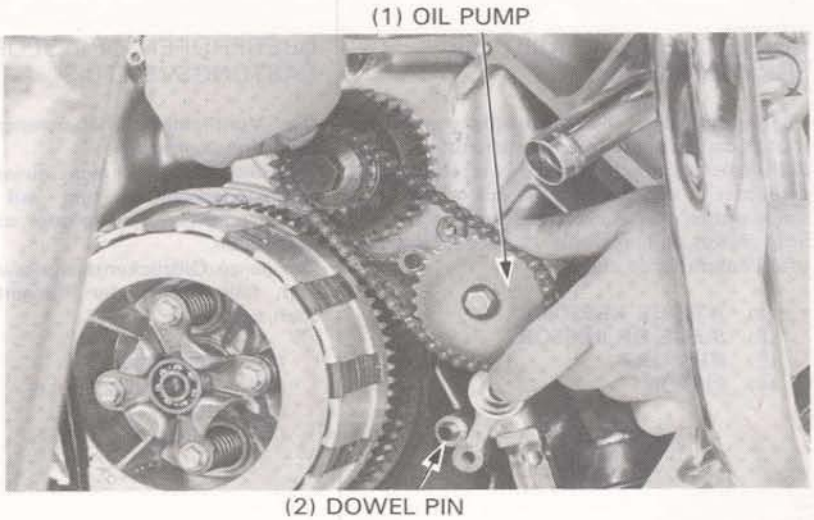


Install the oil strainer.
Temporarily the oil pressure relief valve and pump sprocket.



OIL PUMP INSTALLATION

Install the dowel pin.
Install the oil pump.
Do not tighten the mounting bolts at this time.
Place the drive chain over the pump and drive sprockets.

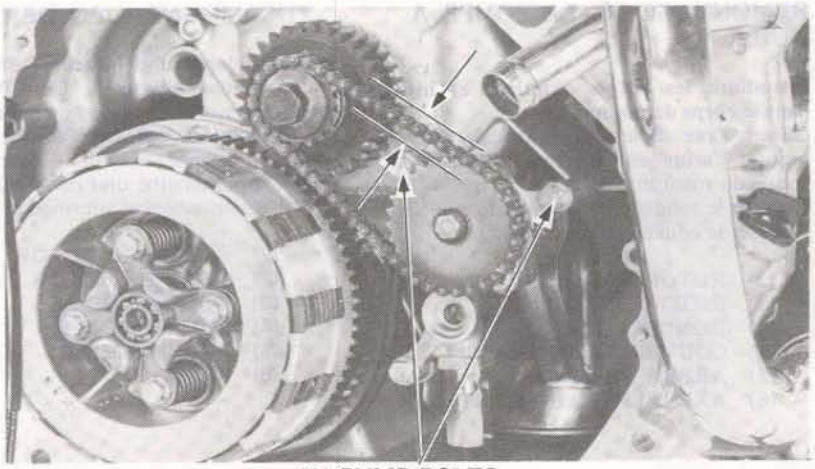


Tighten the pump sprocket bolt and relief valve.
Adjust the chain free play by rotating the pump right or left, then torque the pump bolts.

FREE PLAY : 2.0—3.5 mm (0.08—0.14 in)

Tighten the three pump bolts.

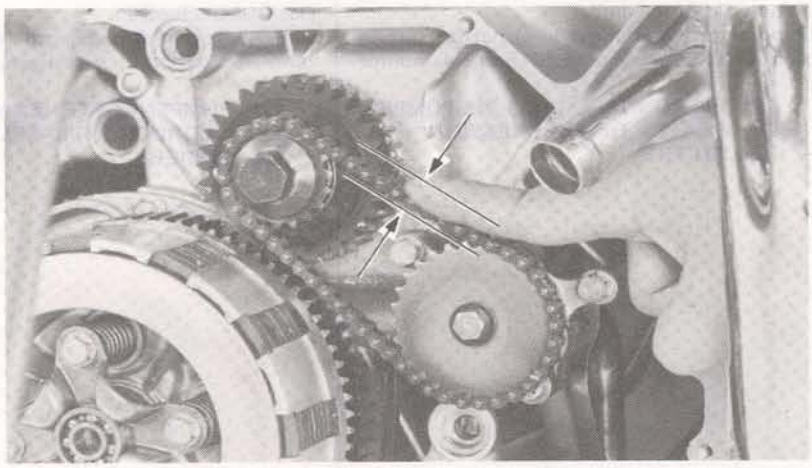
TORQUE : 8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)



(1) PUMP BOLTS

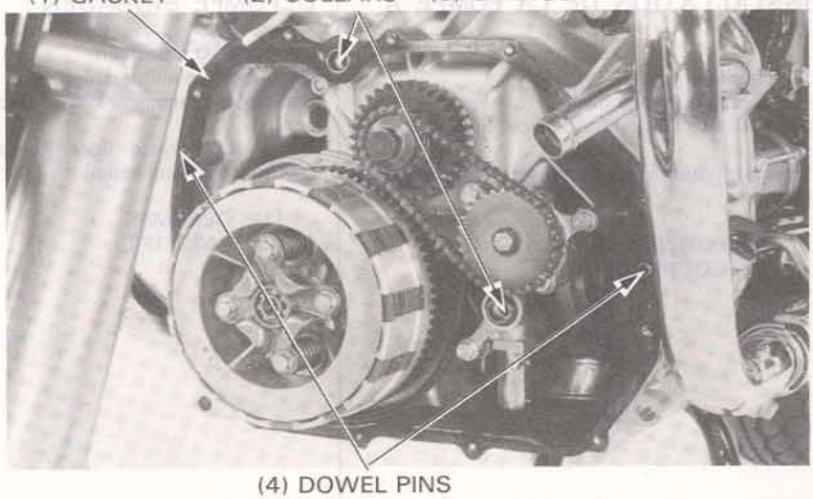
Recheck the oil pump drive chain free play.

FREE PLAY : 2.0—3.5 mm (0.08—0.14 in)



(1) GASKET (2) COLLARS (3) O-RINGS

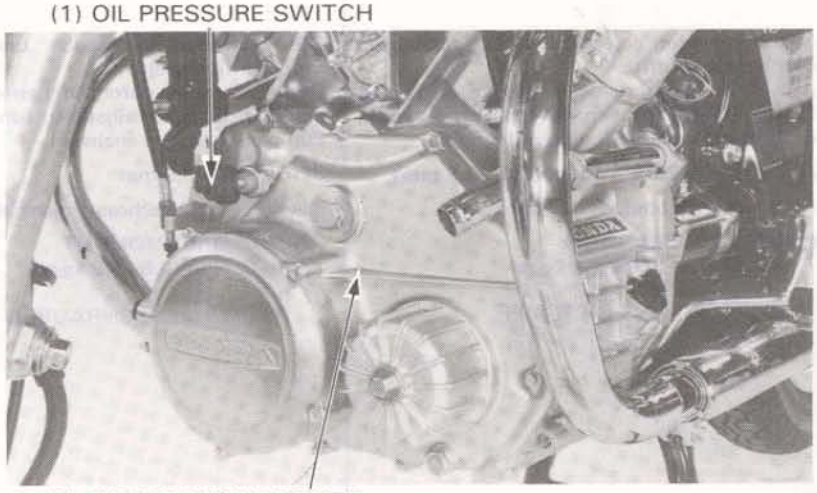
Install the dowel pins, collars, O-rings and gasket.



(4) DOWEL PINS

Install the transmission cover.
Connect the oil pressure switch cords.

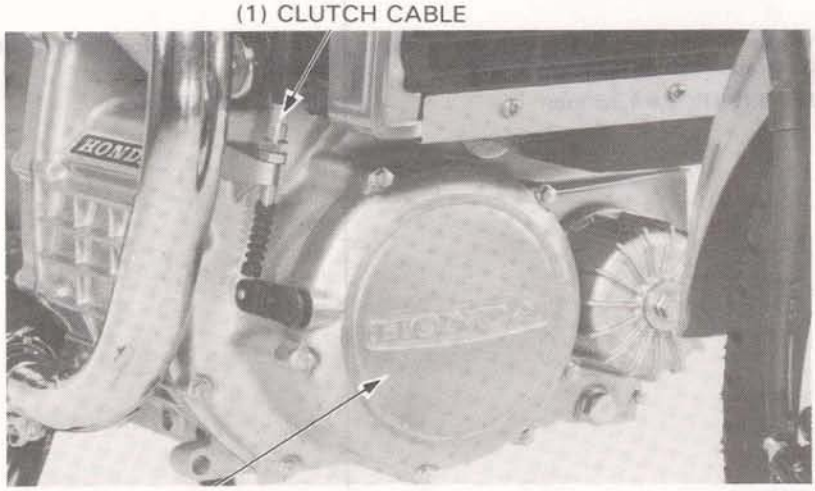
(1) OIL PRESSURE SWITCH



(2) ENGINE FRONT COVER

Connect the clutch cable.
Adjust the clutch free play (Page 3-10).
Install the right engine hanger (Page 5-6).
Install the cooling fan cover and cooling fan (Page 9-9).
Install the radiator and fill to the proper level with coolant (Page 9-10).
Add the specified amount of engine oil.

(1) CLUTCH CABLE



(2) RADIATOR

A.C. GENERATOR/FLYWHEEL/ REAR COVER

GENERATRICE DE COURANT ALTERNATIF/ VOLANT/COUVERCLE ARRIERE

LICHTMASCHINE/ SCHWUNGRAD/ HINTERER ABSCHLUSSDECKEL

GENERADOR DE CA/ VOLANTE/CUBIERTA TRASERA

SERVICE INFORMATION 8—1
ENGINE REAR COVER REMOVAL 8—2
FLYWHEEL REMOVAL 8—4
STARTER CLUTCH OUTER REMOVAL 8—6
STARTER CLUTCH OUTER INSTALLATION 8—7
FLYWHEEL INSTALLATION 8—8
ENGINE REAR COVER INSTALLATION 8—9

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- To inspect and adjust the pulse generator, see Section 17 IGNITION SYSTEM.
- Be sure to adjust the ignition timing whenever the rear engine cover is removed.
- The pulse generator, starter motor and water pump impeller can be serviced with the engine installed in the frame.
- Take care not to cut the AC generator and stator wires and wire harnesses when removing or installing parts.
- For AC generator inspection, see Section 16 BATTERY CHARGING SYSTEM.

TOOLS

Special

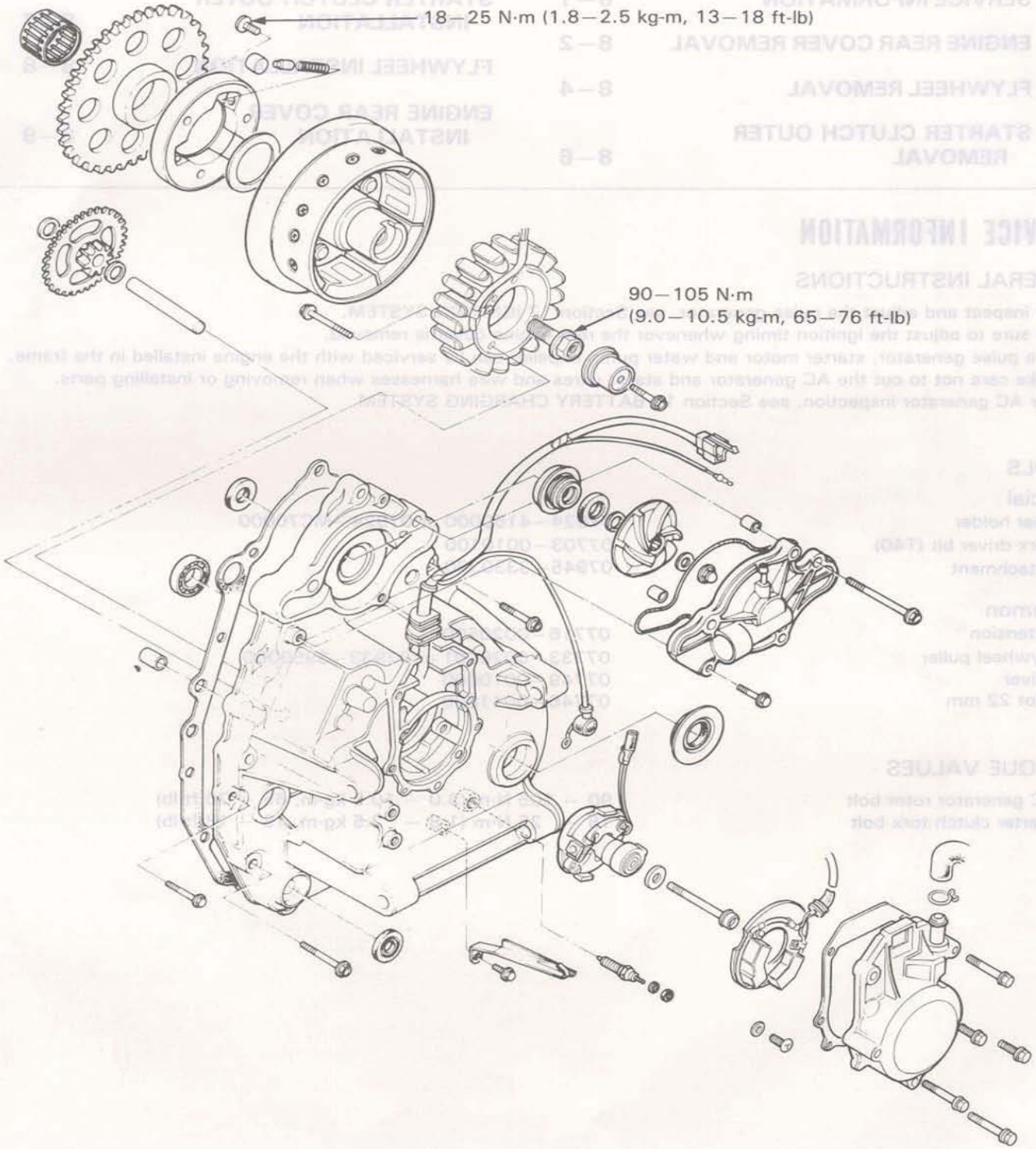
Gear holder	07924—4150000 or 07924—MC70000
Torx driver bit (T40)	07703—0010100
Attachment	07945—3330300

Common

Extension	07716—0020500
Flywheel puller	07733—0020001 or 07933—3950000
Driver	07749—0010000
Pilot 22 mm	07746—0041000

TORQUE VALUES

AC generator rotor bolt	90 — 105 N·m (9.0 — 10.5 kg-m, 65 — 76 ft-lb)
Starter clutch torx bolt	18 — 25 N·m (1.8 — 2.5 kg-m, 13 — 18 ft-lb)

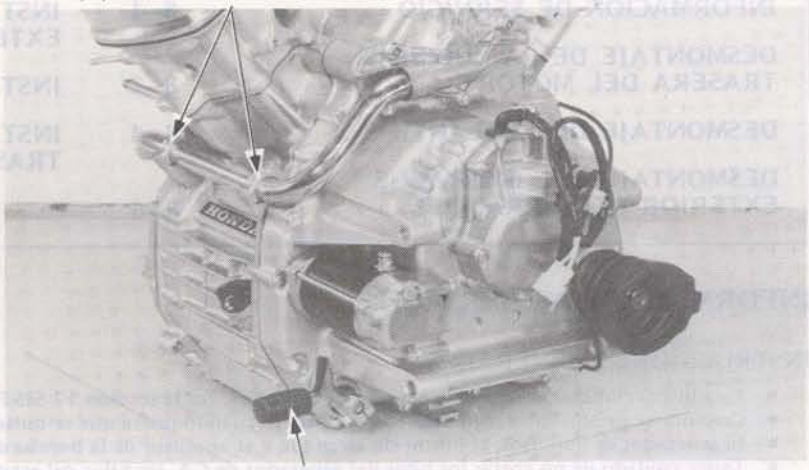

18—25 N·m (1.8—2.5 kg-m, 13—18 ft-lb)
90—105 N·m
(9.0—10.5 kg-m, 65—76 ft-lb)

ENGINE REAR COVER REMOVAL

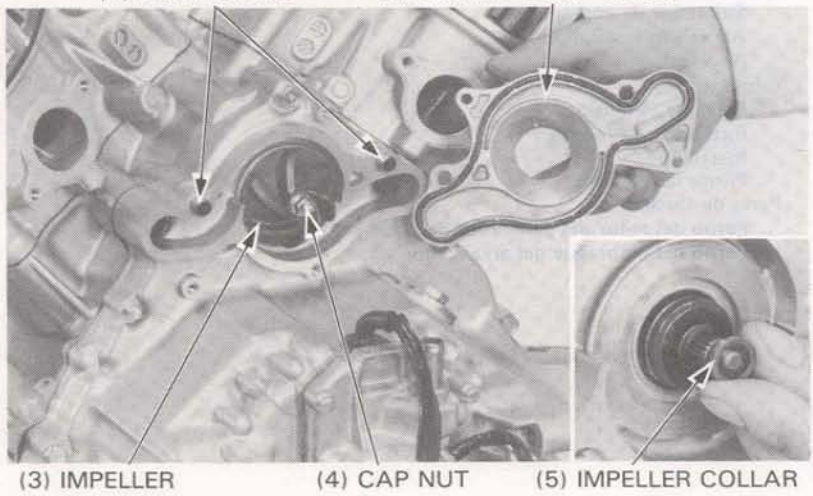
Drain engine oil.
Remove the engine from the frame (Section 5).

WATER PUMP REMOVAL

Remove the gearshift pedal.
Remove the water pipe holders.
Remove the water pipe.

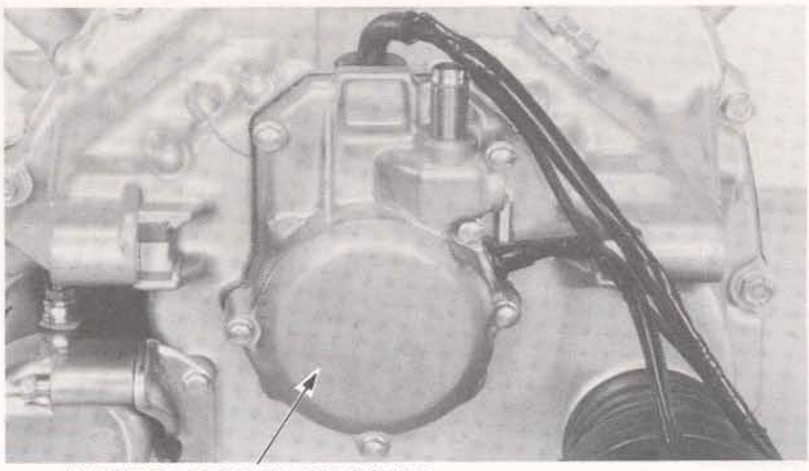


Remove the water pump cover.
Remove the dowel pins.
Remove the cap nut, copper washer and impeller.
Remove the impeller collar.



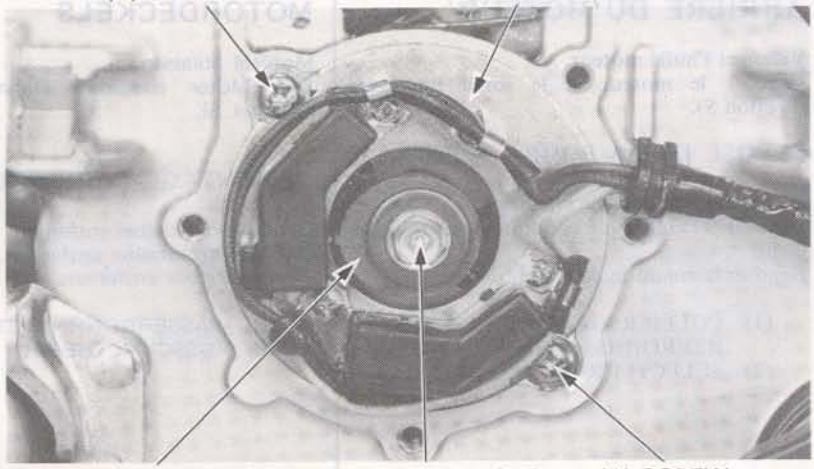
PULSE GENERATOR REMOVAL

Remove the pulse generator cover.



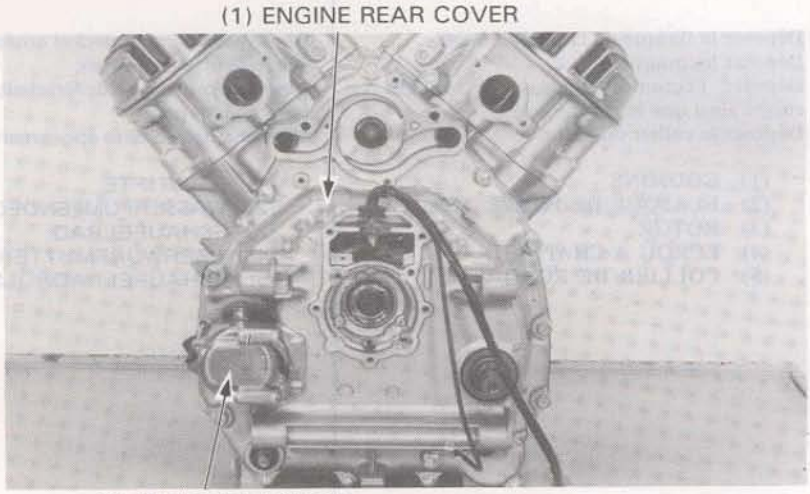
Remove the pulse generator by removing the two screws.

Remove the 6 mm bolt and spark advancer from the crankshaft.

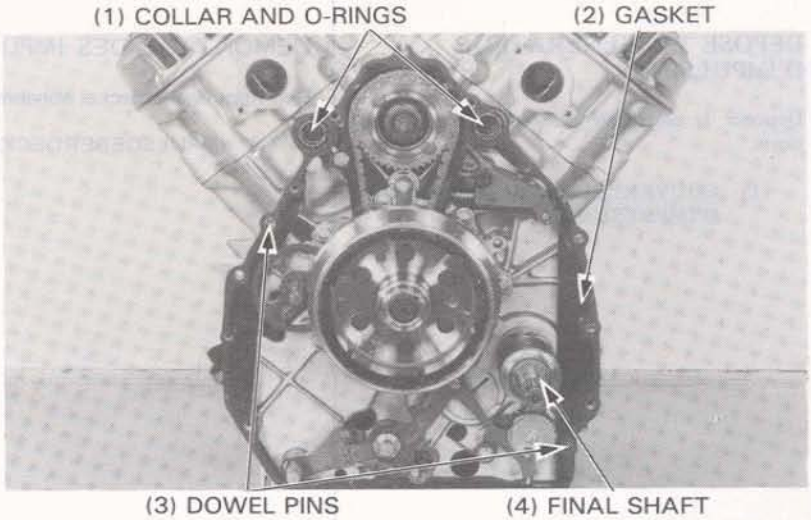


ENGINE REAR COVER REMOVAL/DISASSEMBLY

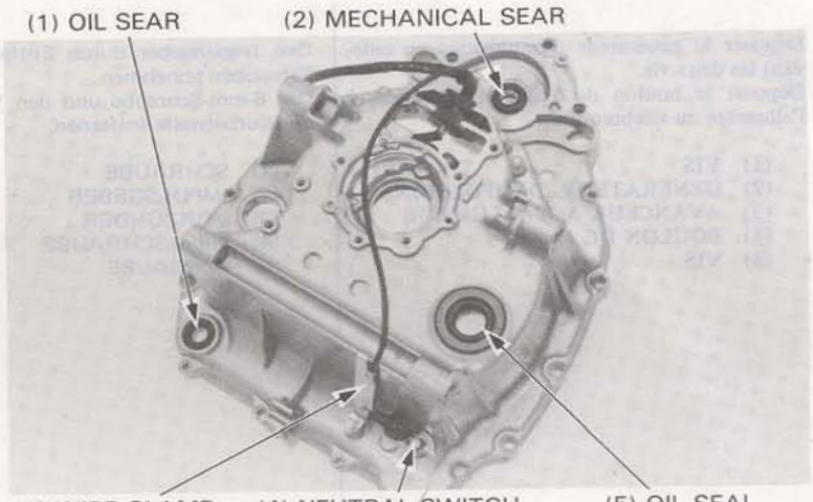
Remove the starter motor.
Remove the rear cover.



Remove the collars, O-rings, dowel pins and gasket.
Remove the final shaft.



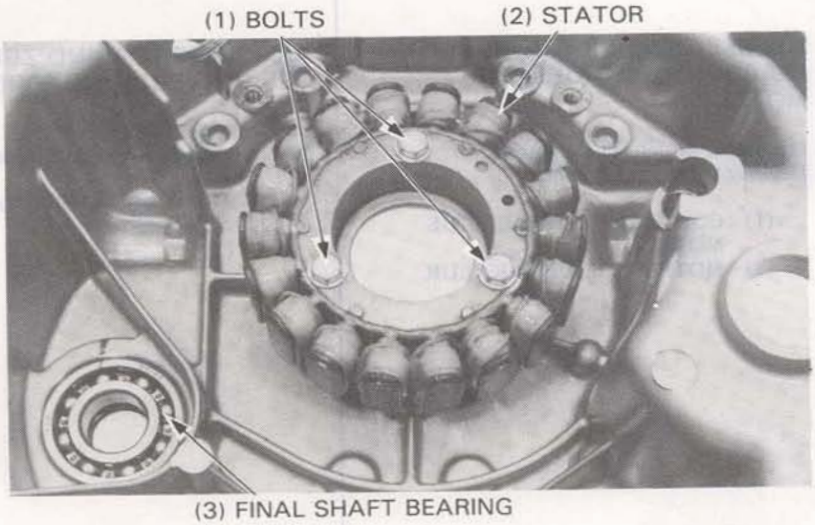
Remove the water pump mechanical seal (Page 9-7).
Remove the final shaft and shift spindle oil seals.
Remove the neutral wire clamp and disconnect it from the neutral switch.
Remove the neutral switch and sealing washer.



Remove the AC generator stator and the final shaft bearing.

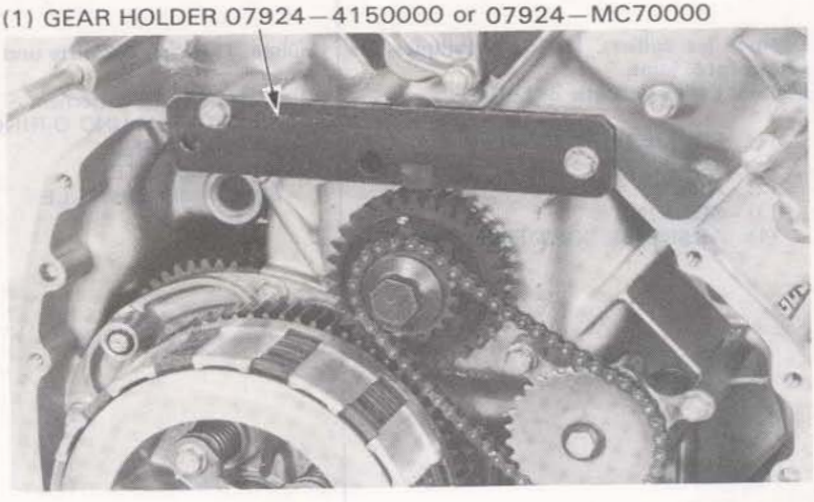
NOTE

- Do not damage the stator oil.
- Refer to page 19-4, for neutral switch inspection.



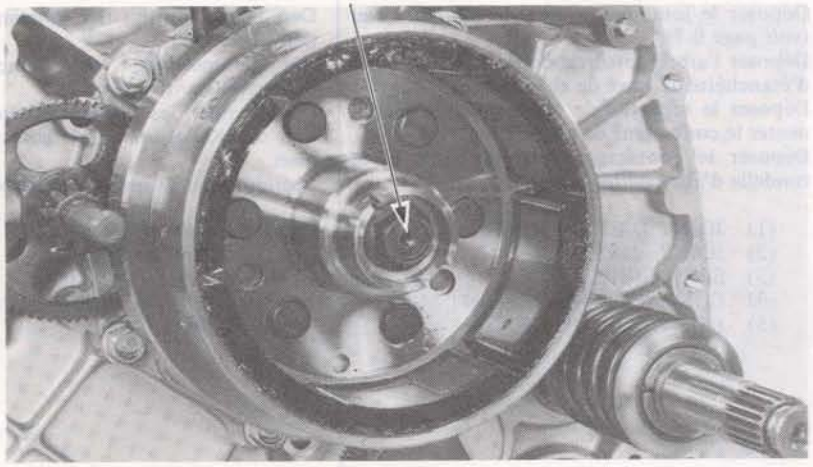
FLYWHEEL REMOVAL

Remove the front engine cover (Page 7-9).
Attach the GEAR HOLDER to the primary drive gear.



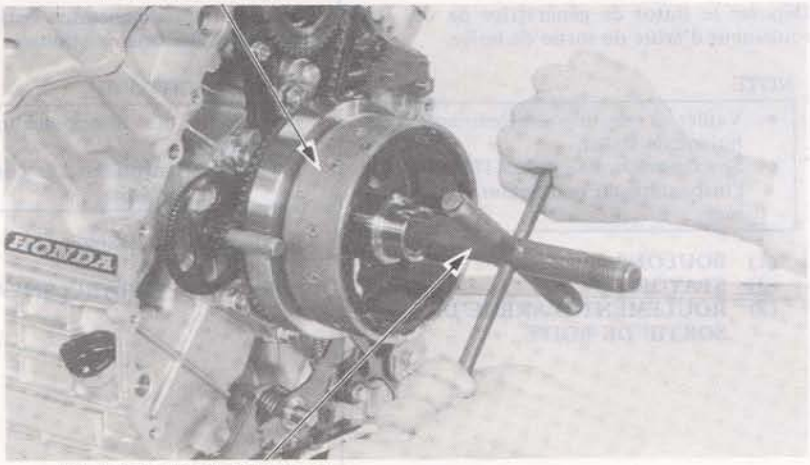
Remove the flywheel bolt.

(1) FLYWHEEL BOLT



Remove the flywheel.

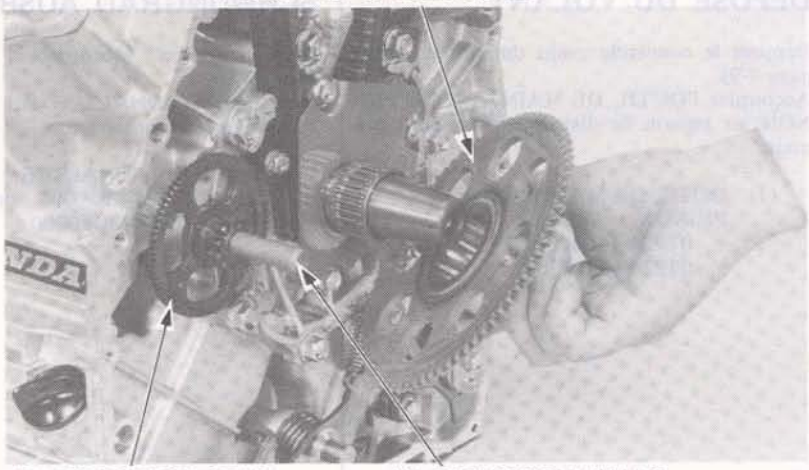
(1) FLYWHEEL



(2) FLYWHEEL PULLER

Remove the starter driven gear.
Remove the starter reduction shaft and gear.

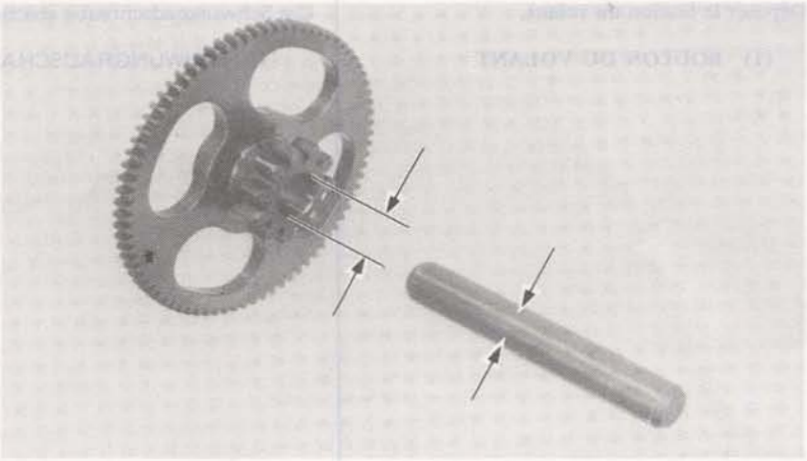
(1) STARTER DRIVEN GEAR



(2) REDUCTION GEAR (3) REDUCTION SHAFT

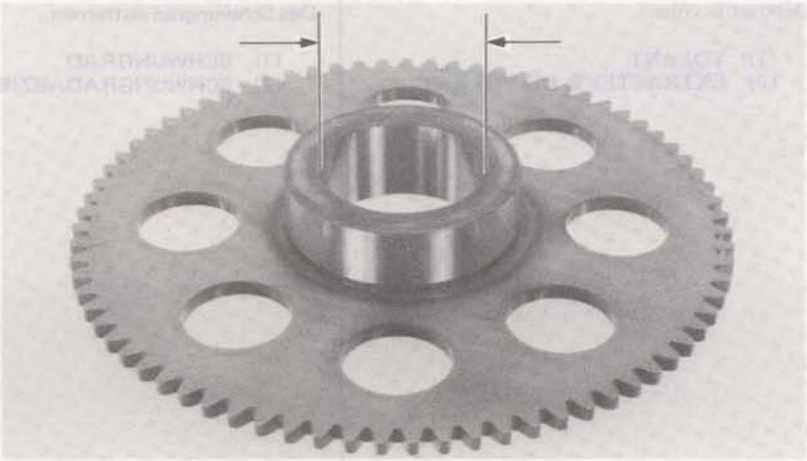
REDUCTION GEAR INSPECTION

Inspect the reduction gear for damage to the gear teeth.
Measure and record the reduction gear I.D. Measure and record the reduction gear shaft O.D.
Subtract the reduction gear shaft O.D. from the reduction fear I.D. to determine the clearance.
SERVICE LIMIT : 0.2 mm (0.0079 in.)



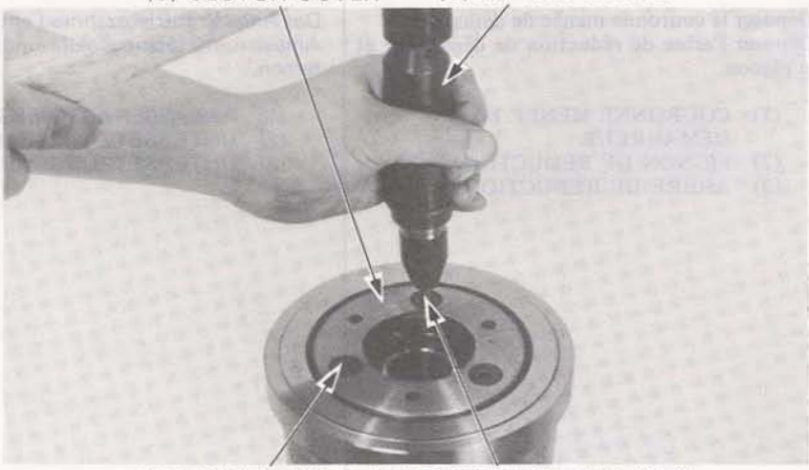
STARTER DRIVE GEAR INSPECTION

Check the drive gear for damage, local wear, indentation and other defects. Measure the gear I.D. and replace if the service limit is exceeded.
SERVICE LIMIT : 37.100 mm (1.4606 in.)



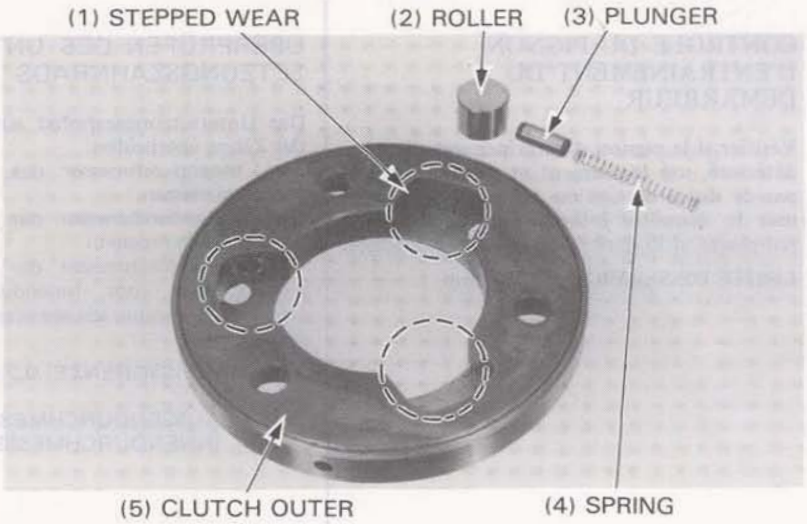
STARTER CLUTCH OUTER REMOVAL

Remove the starter clutch rollers, springs and plunger.
Back off the TORX bolts with special tool.



STARTER CLUTCH OUTER INSPECTION

Inspect the rollers for freedom of movement in their grooves.
Inspect each roller and replace if it is worn or damaged excessively.
Inspect the clutch outer for damaged or worn roller surfaces.
Examine the springs and plungers for distortion, bend or local wear.



STARTER CLUTCH OUTER INSTALLATION

Slide the clutch outer into the flywheel, aligning the holes with the dowel pins in the flywheel.
Install and torque the TORX bolts.

NOTE

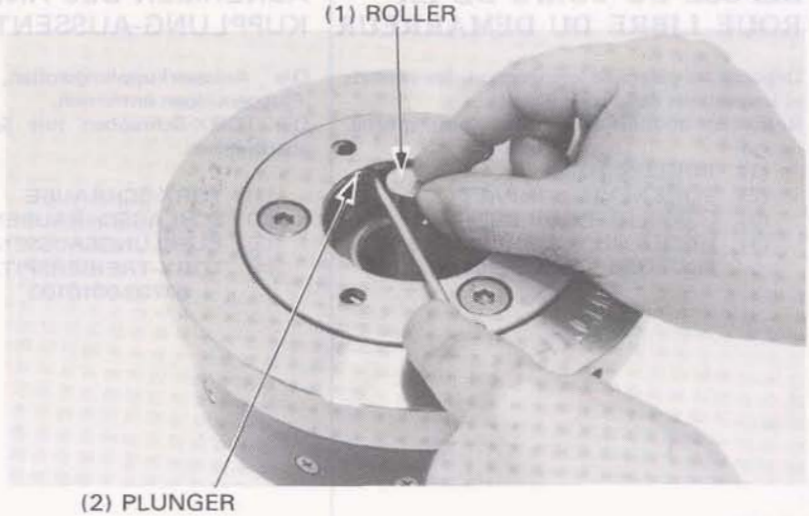
Replace used TORX bolts.

TORQUE: 18—25 N·m (1.8—2.5 kg-m, 13—18 ft-lb)

NOTE

Coat the threads and undersides of the TORX bolts with a locking agent prior to installation.

Slide the spring into the plunger and install the spring in the clutch outer.
Install the roller into place in the clutch outer while holding the plunger down with the end of a screwdriver as shown.

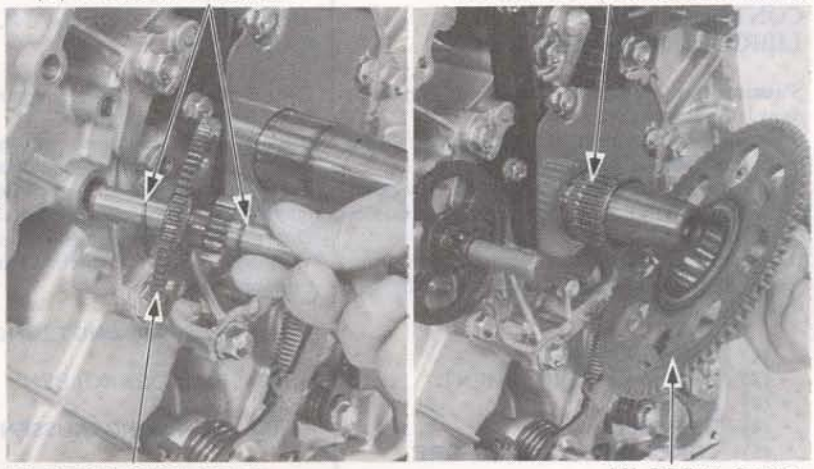


Install the reduction shaft, thrust washers and reduction gear.

NOTE

Use two thrust washers, one on each side of the reduction gear.

Install the needle roller bearing in the drive gear.
Install the drive gear onto the crankshaft.



FLYWHEEL INSTALLATION

Install the flywheel onto the crankshaft.

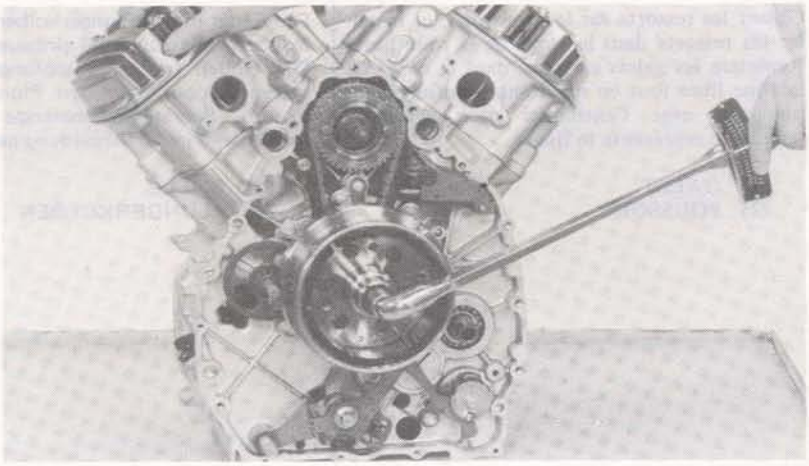
NOTE

- Align the key in the crankshaft with the keyway in the flywheel.
- Rotate the flywheel counterclockwise to aid installation.

Install and tighten the flywheel bolt.

TORQUE : 90—10.5 N·m (9.0—10.5 kg-m, 65—76 ft-lb)

Remove the GEAR HOLDER from the primary drive gear.
Install the front engine cover.



ENGINE REAR COVER INSTALLATION

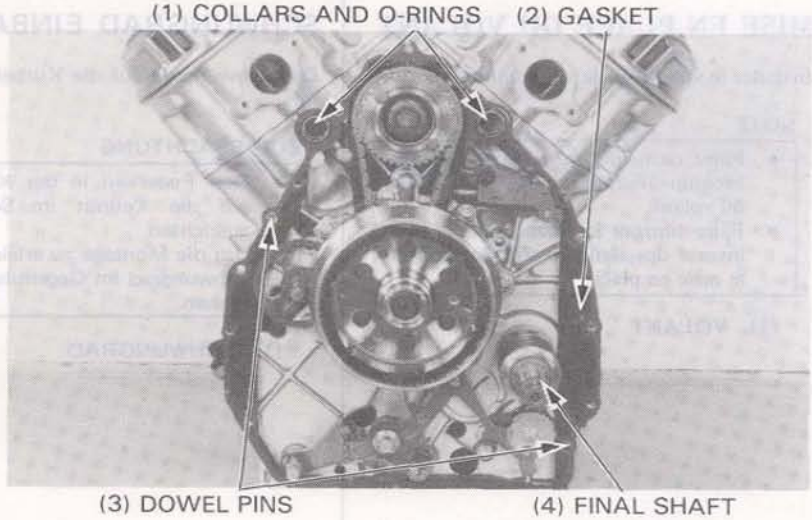
REAR COVER ASSEMBLY

The assembly sequence is essentially the reverse of disassembly.

NOTE

- Install the final shaft bearing until it seats.
- Refer to page 9-7 for water pump mechanical seal installation.

Install the final shaft.
Install the dowel pins, O-rings, collars and gasket.



Install the engine rear cover and tighten the bolts.

TORQUE :

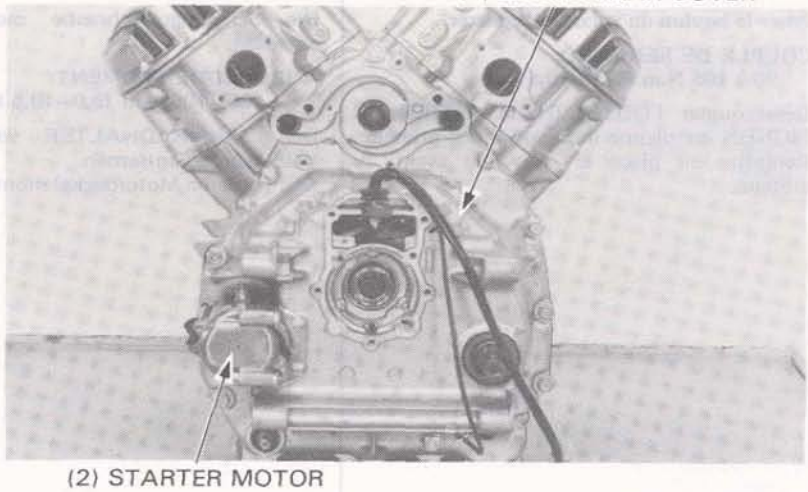
6 mm bolts :
8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)

8 mm bolts :
18—25 N·m (1.8—2.5 kg-m, 13—18 ft-lb)

Install the starter motor.

NOTE

- Engage the stater drive gear with the reduction gear before tightening the cover.
- Tighten the rear cover bolts in a crisscross pattern in 2-3 steps.



REAR COVER INSTALLATION

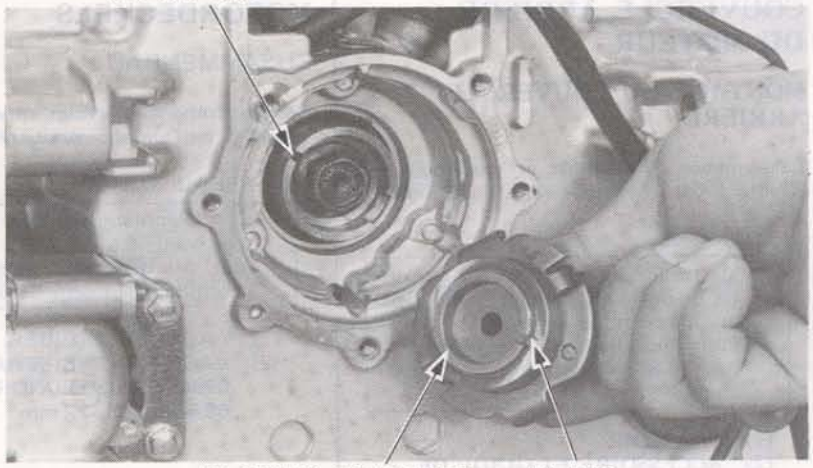
Install the spark advancer.

NOTE

Align the lug of the advancer with the cut-out in the crankshaft.

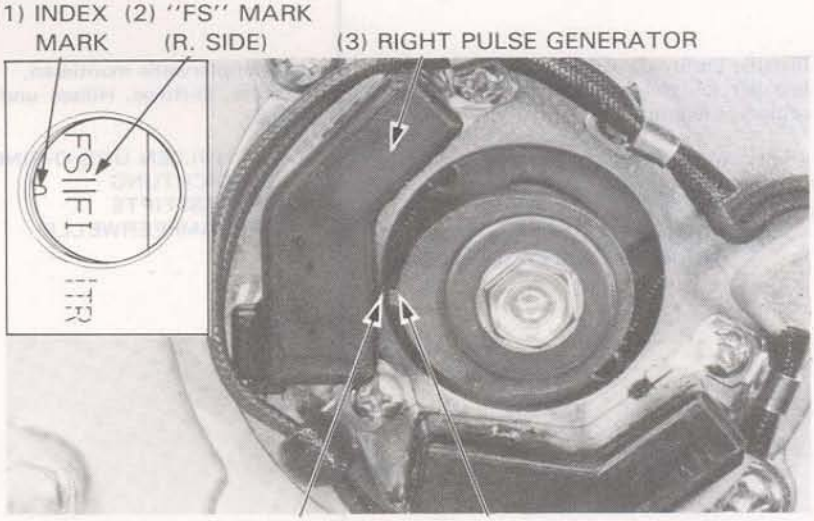
Tighten the 6 mm bolt.

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



IGNITION TIMING ADJUSTMENT

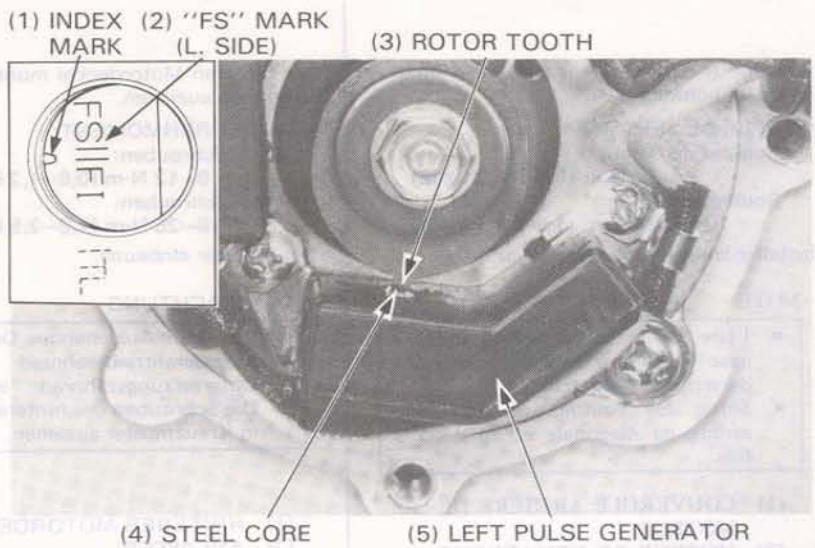
Remove the timing inspection hole cap.
Rotate the crankshaft, and align the "FS" mark on the right side with the index mark on the rear engine cover.
Install the pulse generator assembly, aligning the right pulse generator steel core with the rotor tooth. Tighten the screws securely.



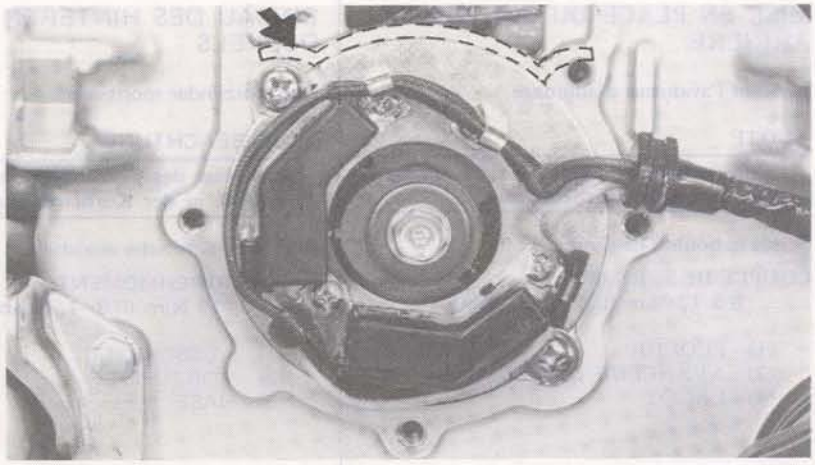
Rotate the crankshaft clockwise, and align the "FS" mark on the left side with the index mark on the rear engine cover. Check that the rotor tooth is aligned with the left pulse generator steel core.

Check the air gap between the rotor tooth and steel core and adjust if necessary (Page 17-6).

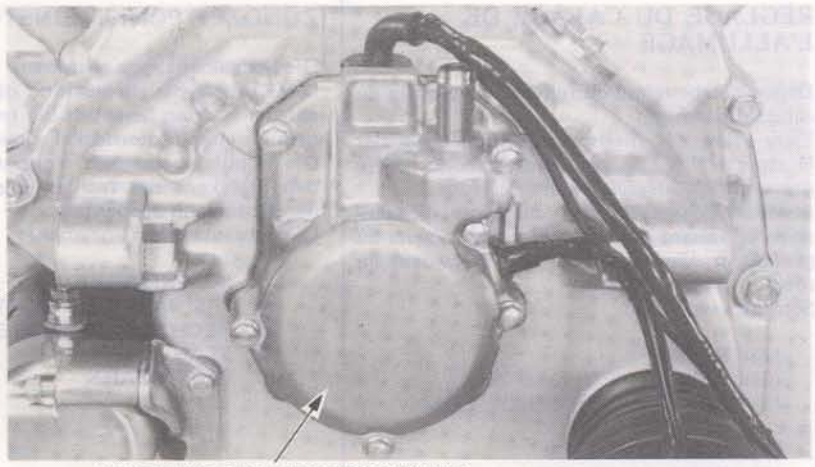
Adjust if necessary, move the pulse generator to right or left by loosening the generator attaching screws. Tighten the attaching screws.



Apply adhesive to surface indicated by the arrow and install the gasket over the surface.



Install the pulse generator cover.

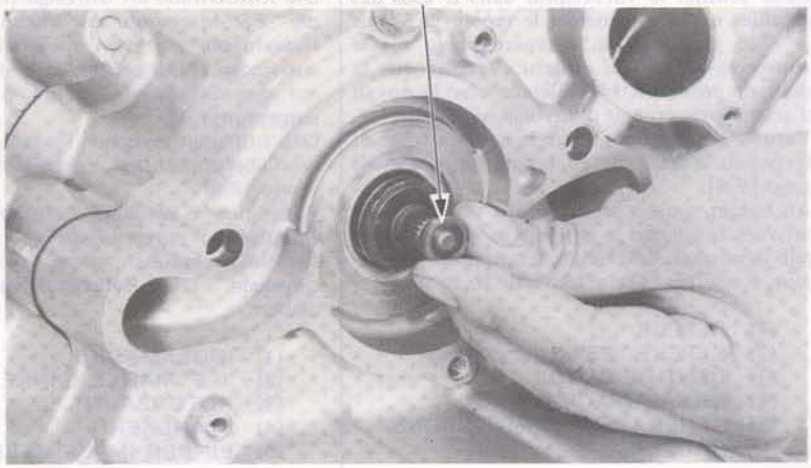


(1) PULSE GENERATOR COVER

WATER PUMP INSTALLATION

Install the impeller collar on the camshaft.

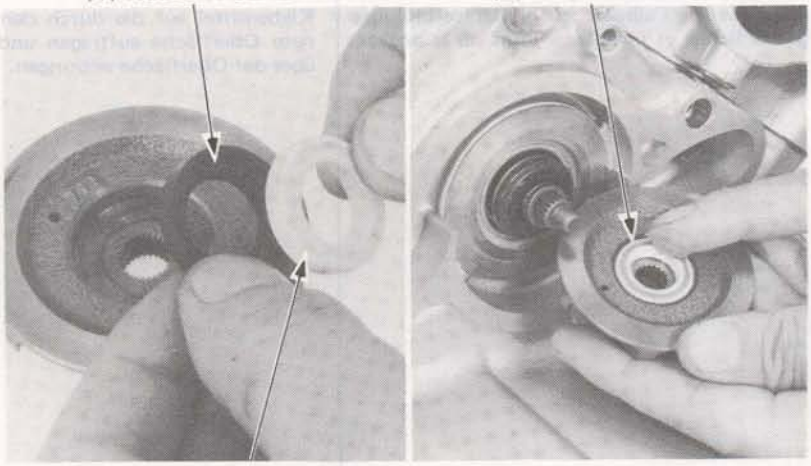
(1) IMPELLER COLLAR



Install the rubber seal and seal washer in the impeller and apply soapy water to the sliding surfaces.

NOTE

- Dip the rubber seal in soapy water to facilitate installation.
- Check that the seal rubber is positioned properly.

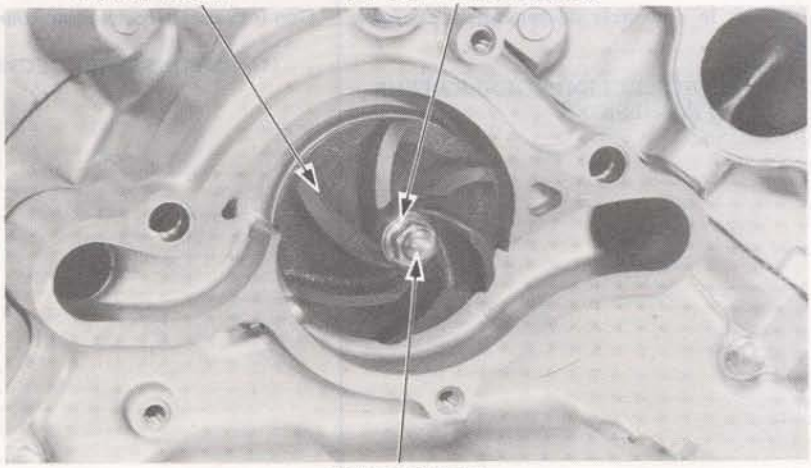


Install the impeller, copper washer and cap nut on the camshaft.

Tighten the cap nut.

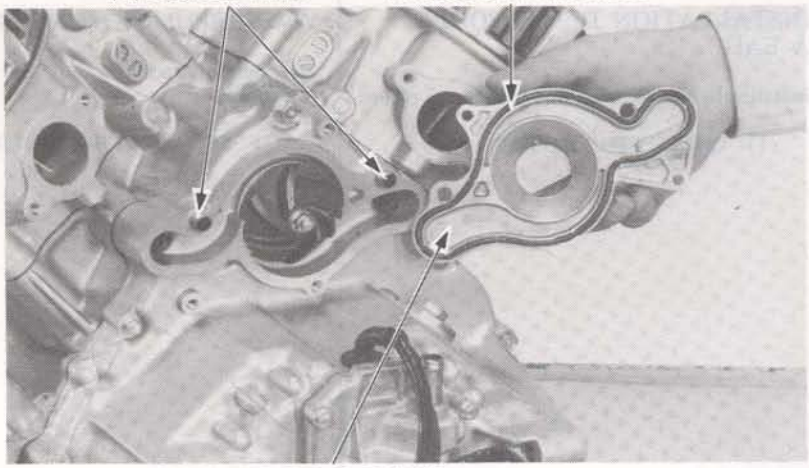
TORQUE : 8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)

Rotate the crankshaft to make sure that the pump turns freely without binding.



Check the pump cover rubber packing for deterioration or damage and replace if necessary.

Install the dowel pins in the case and install the cover.



Tighten the pump cover bolts.

TORQUE :

6 mm bolts :

8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)

8 mm bolts :

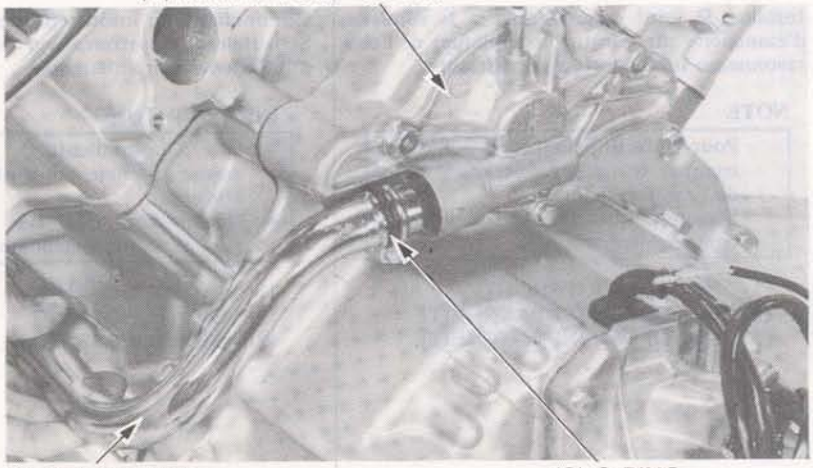
18—25 N·m (1.8—2.5 kg-m, 13—18 ft-lb)

Apply a soapy water to the water pipe O-ring and insert the water pipe in the pump cover.

NOTE

Make sure that the O-ring is not twisted.

(1) WATER PUMP COVER



(2) WATER PIPE

(3) O-RING

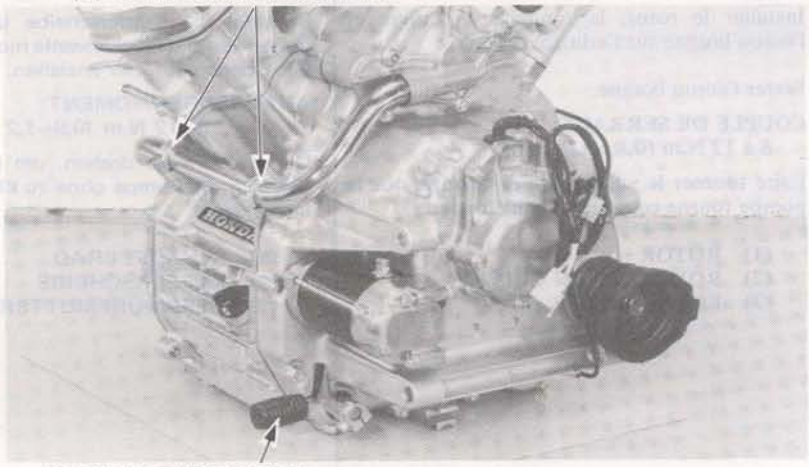
Install the water pipe holders.

NOTE

Tighten the upper bolts first then tighten the lower bolts.

Install the gearshift pedal.

(1) WATER PIPE HOLDERS



(3) GEARSHIFT DEDAL

COOLING SYSTEM

CIRCUIT DE RERFOIDISSEMENT

KÜHLSYSTEM

SISTEMA DE ENFRIAMIENTO

SERVICE INFORMATION	9—1	COOLING FAN REMOVAL	9—6
TROUBLESHOOTING	9—1	WATER PUMP MECHANICAL SEAL REPLACEMENT	9—7
INSPECTION	9—2	THERMOSTAT INSTALLATION	9—8
COOLANT REPLACEMENT	9—3	COOLING FAN INSTALLATION	9—9
THERMOSTAT REMOVAL	9—3	RADIATOR INSTALLATION	9—9
RADIATOR REMOVAL	9—5		

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- To service the water pump seal, it is necessary to remove the rear engine cover. All the other cooling system services can be made with the engine in the frame.
- 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 radiator rester.
- Refer to the section 8 for water pump service.

TOOLS

Special

Mechanical seal driver attachment	07945—4150400

Common

Rotor puller	07933—2000001
Driver handle A.	07749—0010000

SPECIFICATIONS

Radiator cap relief pressure	0.75 — 1.05 kg/cm² (10.7 — 14.9 psi)
Freezing point (Hydrometer test):	55% Distilled water +45% ethylene glycol: −32°C (−25°F) 55% Distilled water +50% ethylene glycol: −37°C (−34°F) 45% Distilled water +55% ethylene glycol: −44.5°C (−48°F)
Coolant capacity: Radiator and engine Reserve tank Total system	 1.8 liters (1.9 U.S. qt) 0.2 liters (0.21 qt.) 2.0 liters (2.16 qt.)
Thermostat	Begins to open: 80° to 84°C (176° to 183°F) Fully open: 93° to 97°C (199° to 205°F) Valve lift: Minimum of 8 mm at 95°C (0.315 in at 203°F)
Boiling point (with 50 — 50 mixture):	Unpressurized: 107.7°C (226°F) Cap on, pressurized: 125.6°C (258°F)

TORQUE VALUES

Cooling fan bolt	20 — 25 N·m (2.0 — 2.5 kg-m, 14 — 18 ft-lb)
Engine hanger nut	30 — 40 N·m (3.0 — 4.0 kg-m, 22 — 29 ft-lb)

TROUBLESHOOTING

Engine Temperature Too High

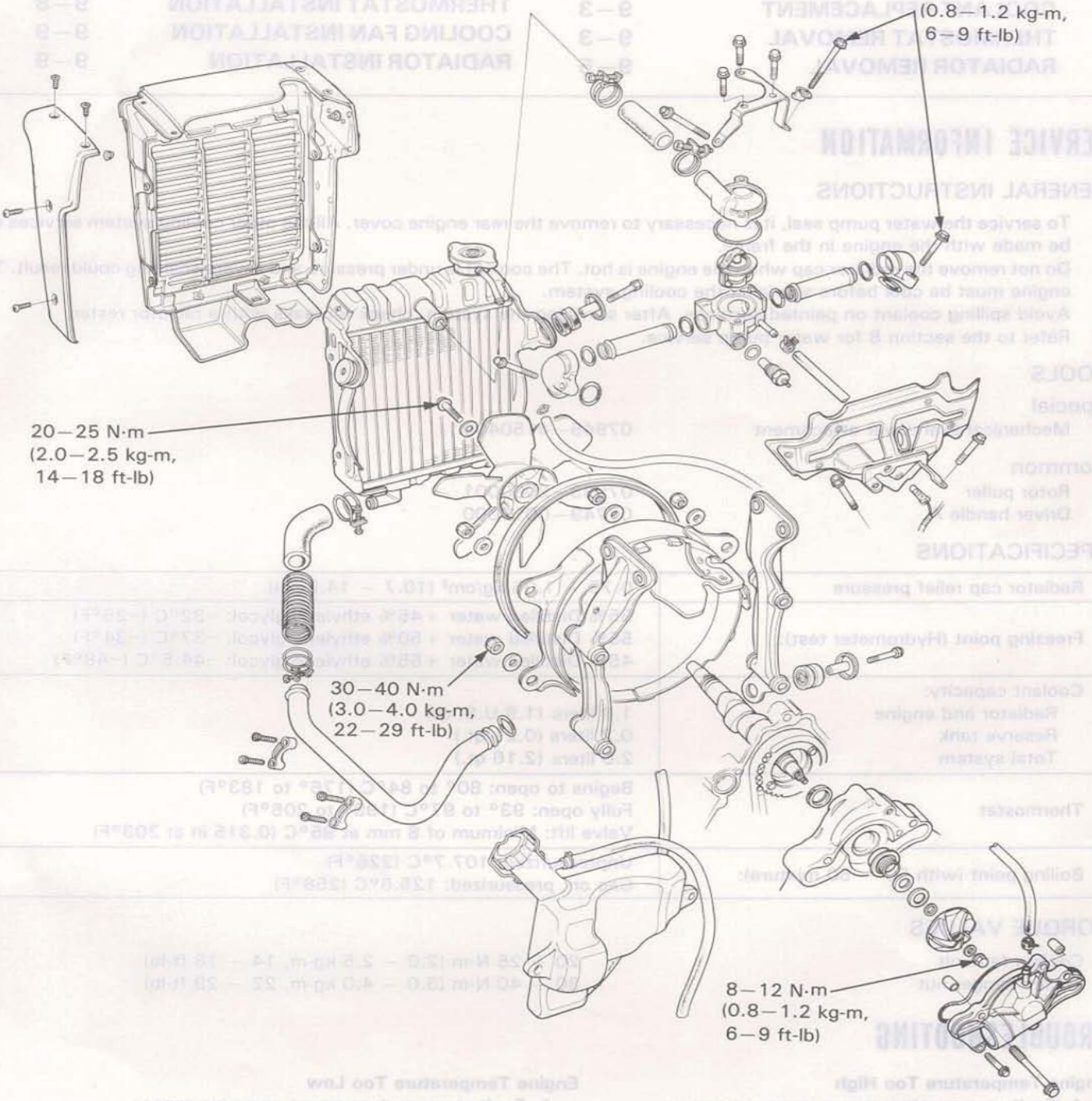
1. Faulty temperature gauge or gauge sensor
2. Thermostat stuck closed
3. Faulty radiator cap
4. Insufficient coolant
5. Passages blocked in radiator, hoses, or water jacket
6. Fan blades bent

Engine Temperature Too Low

1. Faulty temperature gauge or gauge sensor
2. Thermostat stuck open

Coolant Leaks

1. Faulty pump oil seal
2. Deteriorated O-rings
3. Radiator hose damage


8–12 N·m
(0.8–1.2 kg-m,
6–9 ft-lb)
20–25 N·m
(2.0–2.5 kg-m,
14–18 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
8–12 N·m
(0.8–1.2 kg-m,
6–9 ft-lb)

INSPECTION

COOLANT

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

(1) ANTIFREEZE TESTER

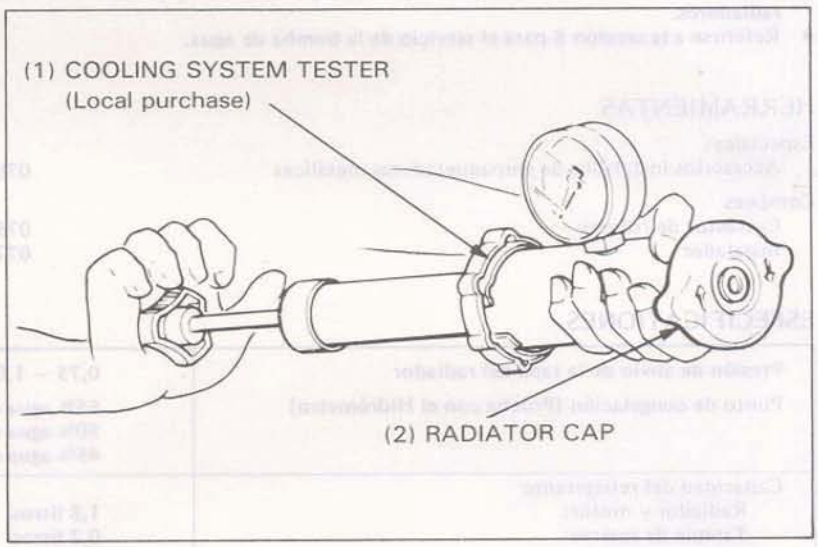
RADIATOR CAP INSPECTION

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 to the sealing surfaces.

RADIATOR RELIEF PRESSURE :
90 ± 15 kPa (0.9 ± 0.15 kg/cm², 12.8 ±2.1 psi)



Remove the engine (section 5).
Pressurize the radiator, engine and horse, and check for leaks.

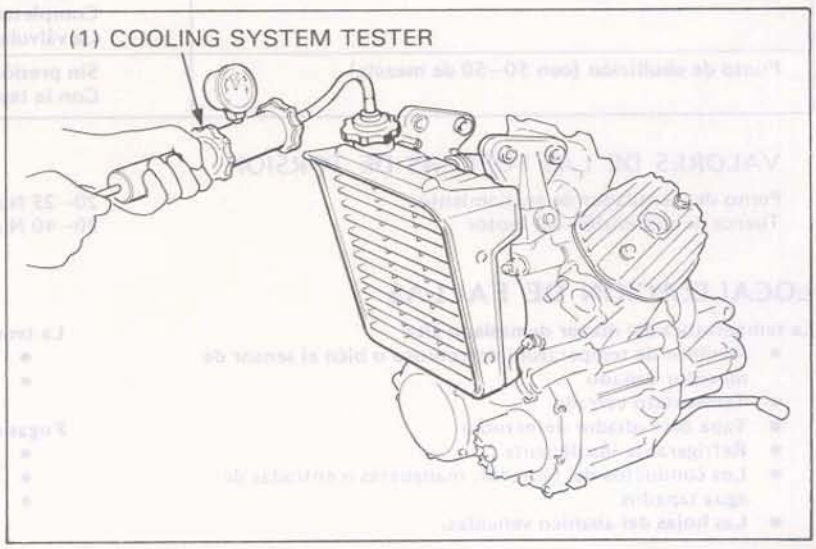
NOTE

Do not disassemble the cooling system.

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 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 fuel tank.
Remove the radiator cap.
Remove the radiator cover by removing the side screws.

(1) RADIATOR CAP

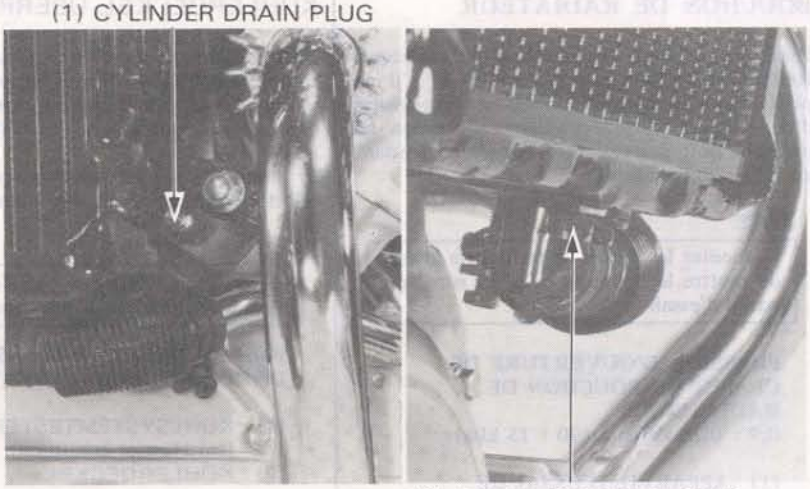
Remove the radiator drain plug, and drain the coolant (about 1.4 liters).
To drain coolant from the cylinders, remove the cylinder drain plugs (about 0.4 liters).
Replace the cylinder and radiator drain bolts.

CAUTION

Do not overtighten the radiator drain plug.

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

(1) CYLINDER DRAIN PLUG

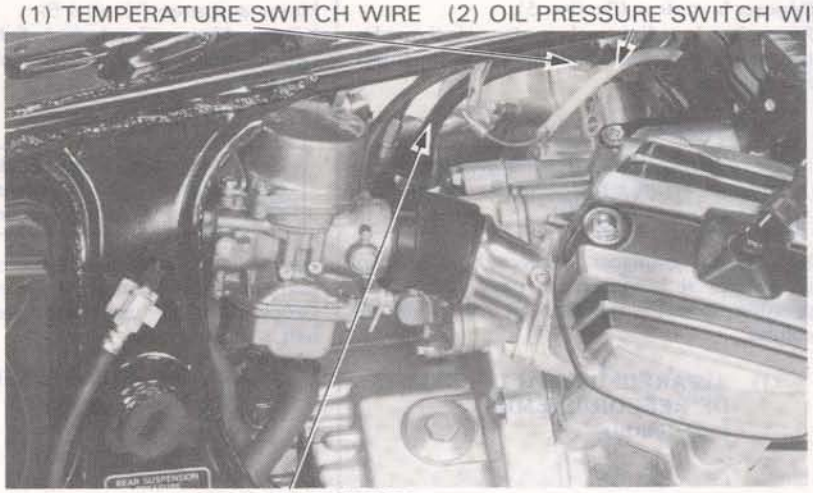


(2) RADIATOR DRAIN PLUG

THERMOSTAT REMOVAL

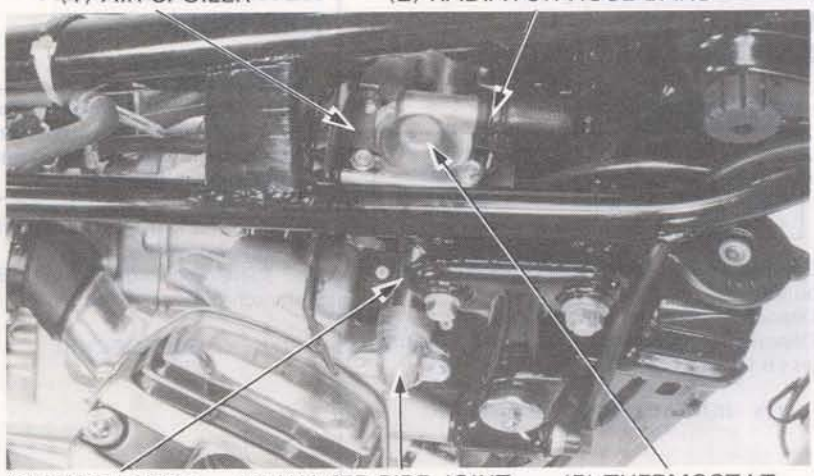
Remove the seat and fuel tank.
Remove the coolant drain plug, and drain the coolant.
Disconnect the by-pass hose.
Disconnect the temperature and oil pressure switch wires.

(1) TEMPERATURE SWITCH WIRE (2) OIL PRESSURE SWITCH WIRE

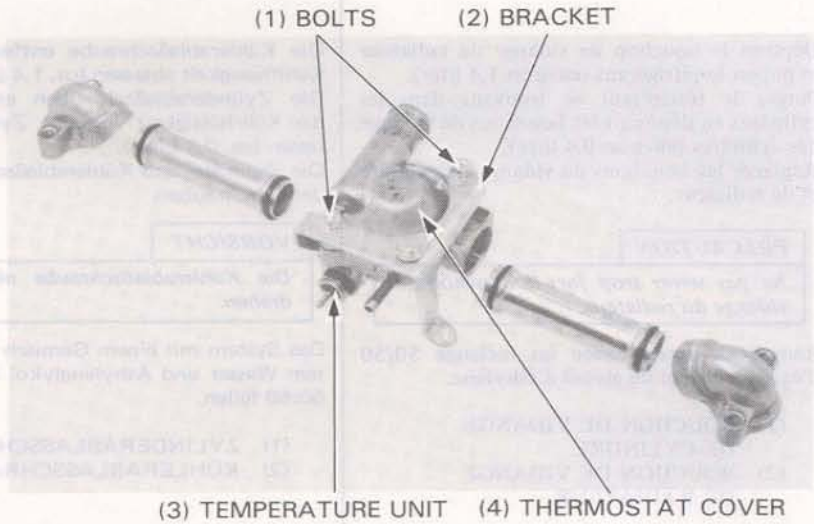


(3) BY-PASS HOSE

Remove the air spoiler.
Remove the water pipe joints and water pipes.
Remove the thermostat braket bolts.
Loosen the radiator hose band and pull the thermostat off the hose.



Separate the thermostat bracket from the thermostat housing.
Remove the thermostat cover and take out the thermostat.
Remove the water temperature unit.



TEMPERATURE UNIT INSPECTION

Suspend the unit in oil and measure the resistance through the unit as the oil heats.

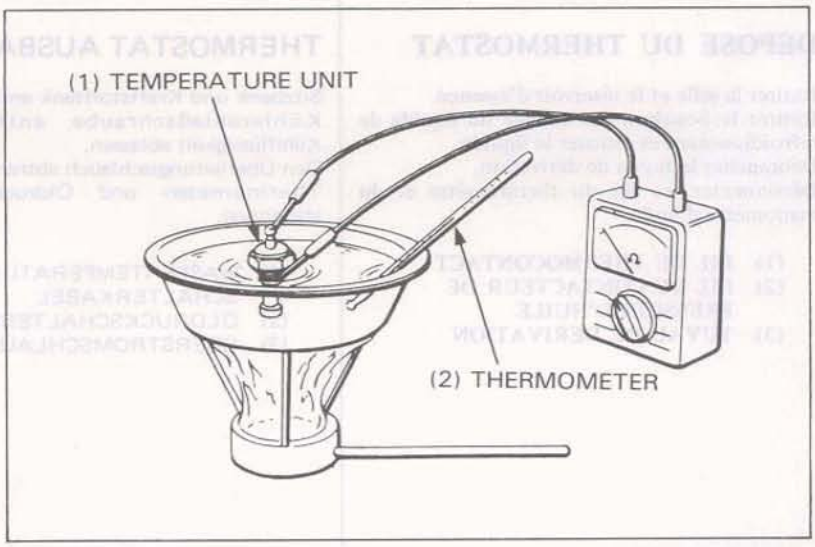
	60°C	85°C	110°C	120°C
Temperature	140°F	185°F	230°F	248°F
Resistance	104.0Ω	43.9Ω	20.3Ω	16.1Ω

Do not let the unit or thermometer touch the pan or false readings will result.

WARNING
Wear glovers and eye protection.

NOTE

Oil must be used as the heated liquid to check operation above 100°C (212°F).



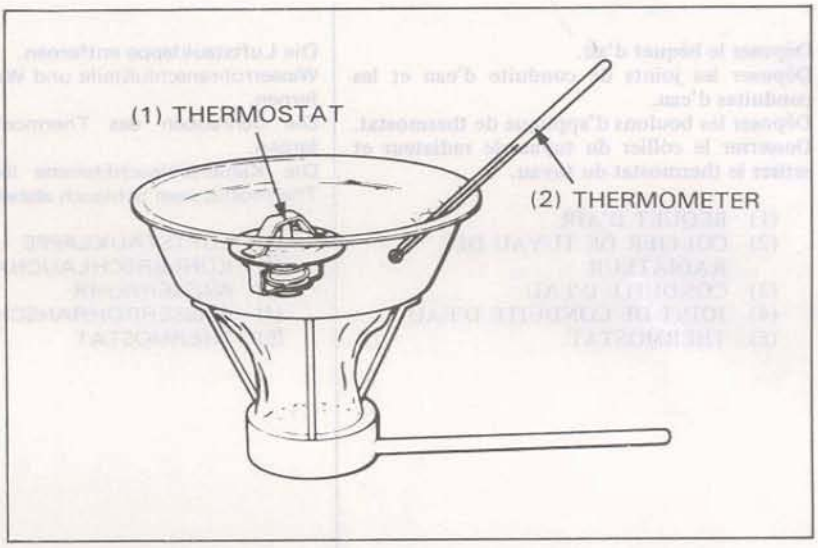
THERMOSTAT INSPECTION

Inspect the thermostat visually for damage.
Suspend the thermostat in hot water to check operation.
Do not let the thermostat or thermometer touch the pan or false readings will result.
Technical Data

Start to open	80° to 84°C (176° — 183°F)
Fully open	95°C (203°F)
Valve lift	8 mm (0.31 in) minimum

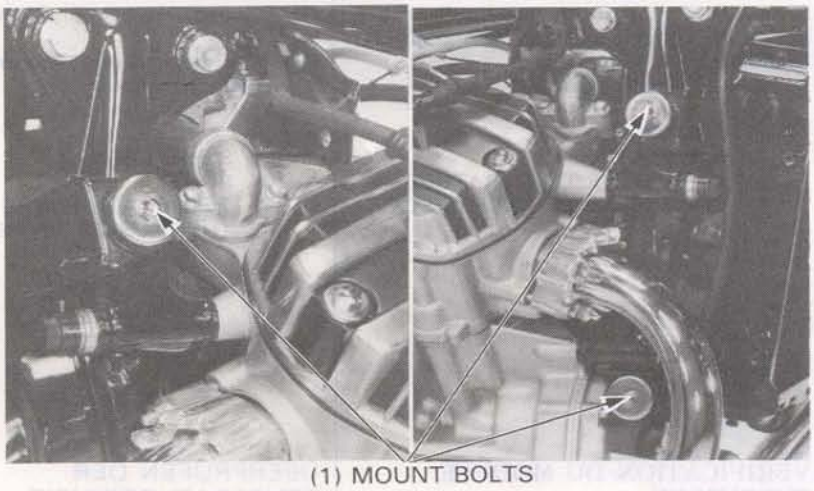
NOTE

- Replace thermostat if 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.

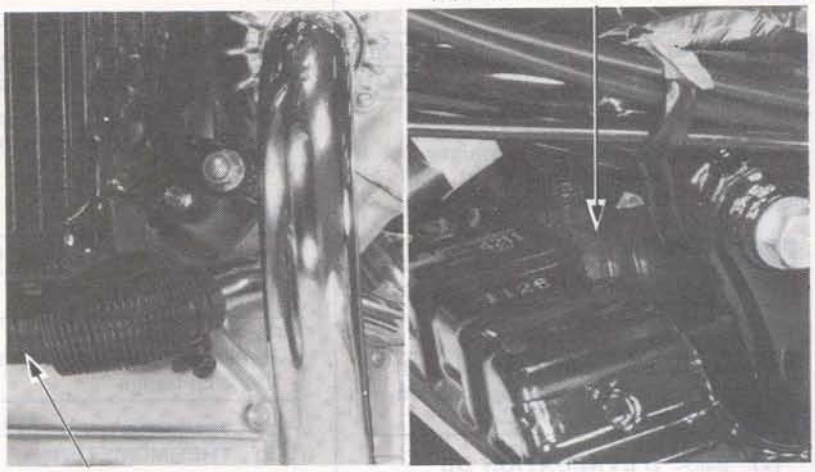


RADIATOR REMOVAL

Remove the seat and fuel tank.
Drain the coolant from the radiator.
Remove the three radiator mounting bolts.



Loosen the upper and lower radiator hose bands.



Pull the radiator and disconnect the radiator hoses from the radiator.
Disconnect the siphon tube from the radiator.

CAUTION

Do not damage the radiator fins.

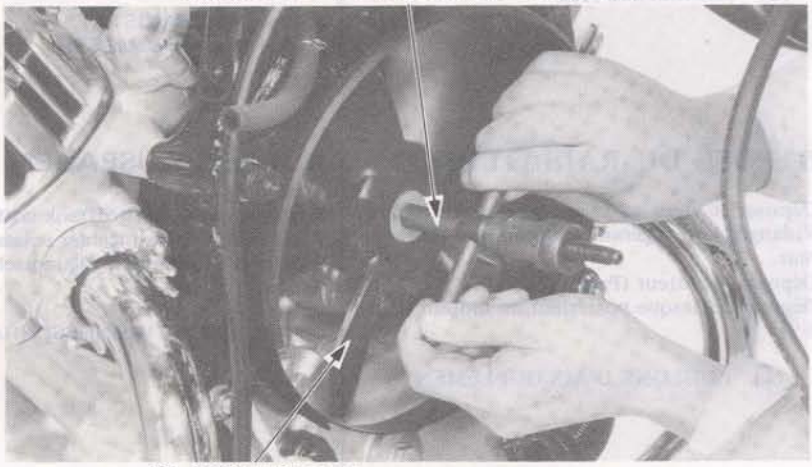
(1) SIPHON TUBE

(2) RADIATOR

COOLING FAN REMOVAL

Remove the fan bolt.
Remove the cooling fan with a ROTOR PULLER.

(1) ROTOR PULLER 07933—2000001



(2) COOLING FAN

Remove the cooling fan cover by removing the four nuts.

(1) COOLING FAN COVER

(2) NUTS

WATER PUMP MECHANICAL SEAL REPLACEMENT

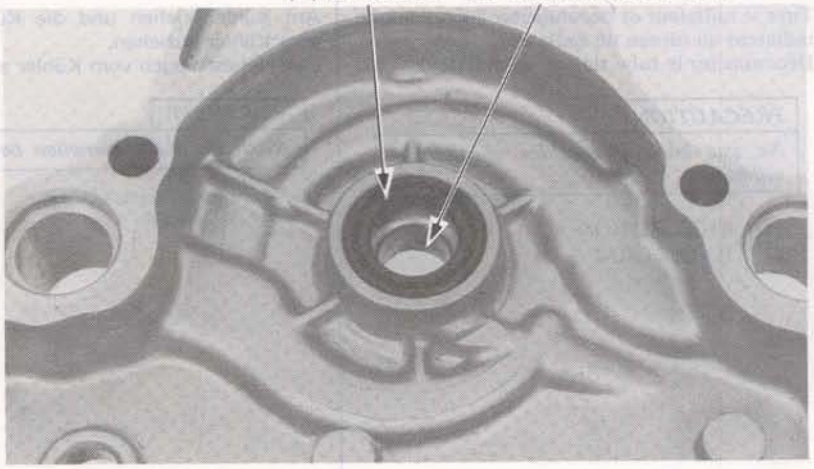
Remove the engine rear cover (Page 8-3).

REMOVAL

Drive the mechanical seal out from the inside.

NOTE

Aviod damagine the rear cover when driving the seal out.

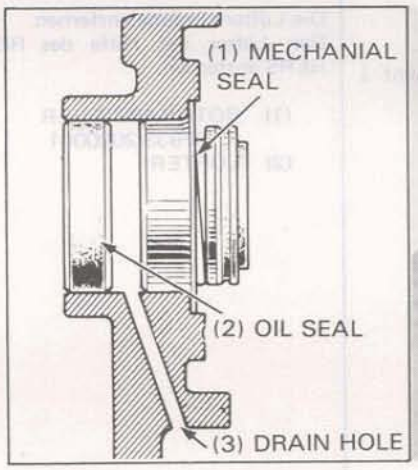


INSTALLATION

Apply a thin coat of liquid sealant to the outer egde of the mechanical seal.

NOTE

Check that the water pump drain hole is clear.

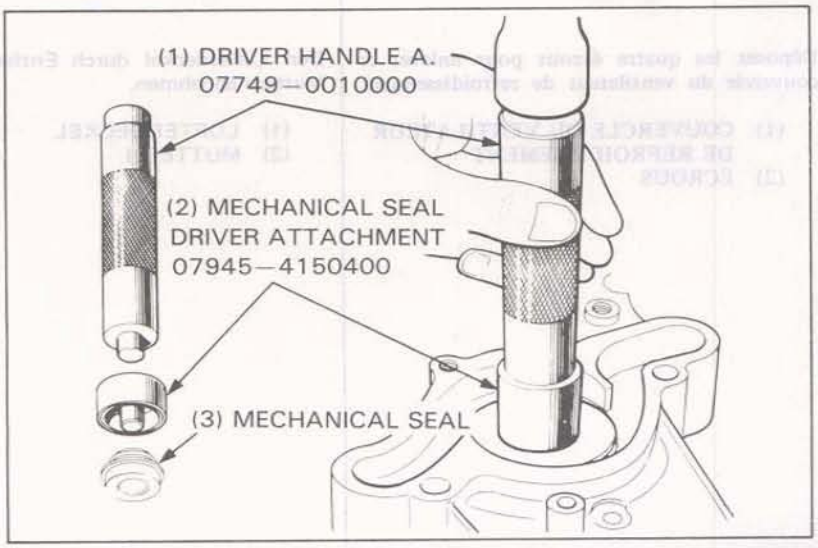


Drive the mechanical seal into position in the rear cover with the mechanical seal driver attachment and bearing driver handle.

NOTE

- Assemble the driver as follows :
  Install the seal driver attachment to the driver handle. Place the mechanical seal into the attachment.
- Drive in the seal squarely.

Install the rear cover (Page 8-9).

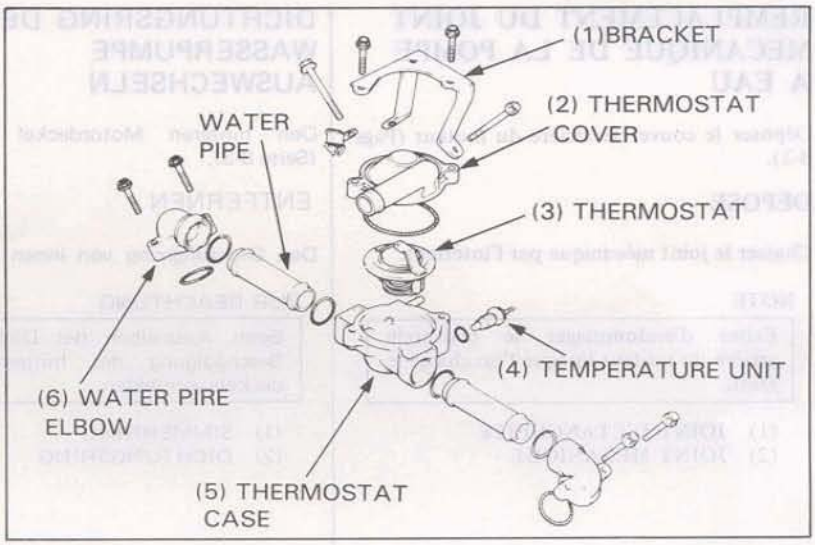


THERMOSTAT INSTALLATION

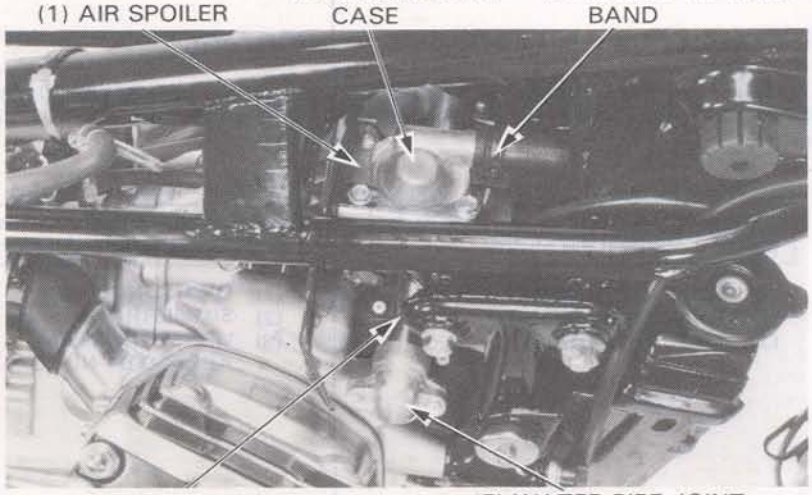
Insert the thermostat into the thermostat case.
Install a new O-ring on the thermostat case and attach the tehrmostat cover and bracket.
Install the temperature unit, slide new O-rings onto the water pipes, press the water pipes into the thermostat case and elbows.

NOTE

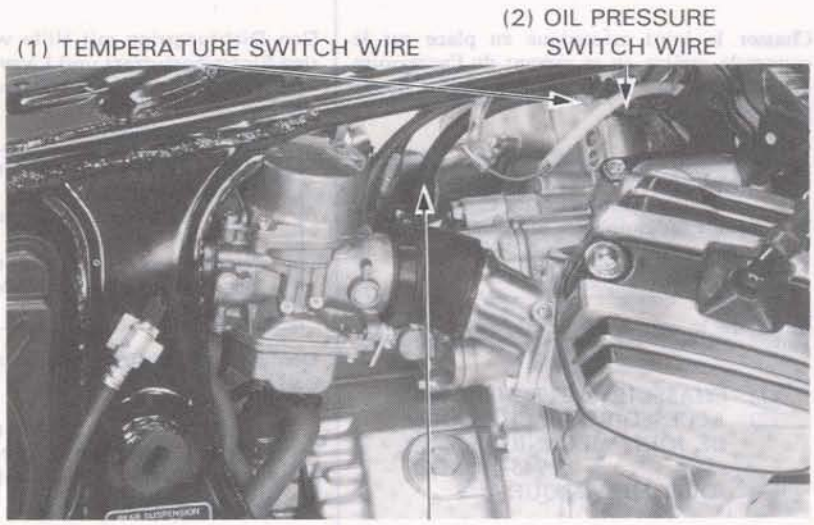
Check that the O-rings are not dislodged.



Install the thermostat case to the engine.
Slide new O-rings onto the water pipes and press the water pipes into the thermostat case.
Install the water pipe joints.
Connect the radiator hose and tighten the hose band bolt.
Install the air spolier and route the water by-pass hose and oil pressure wire.



Route the water by-pass hose, water temperature and oil pressure switch wires through the hole in the air spoiler.
Connect the wires and hose.



COOLING FAN INSTALLATION

Tighten the cylinder drain plug before installing the cooling fan.

Install the cooling fan cover.
Tighten the nuts.

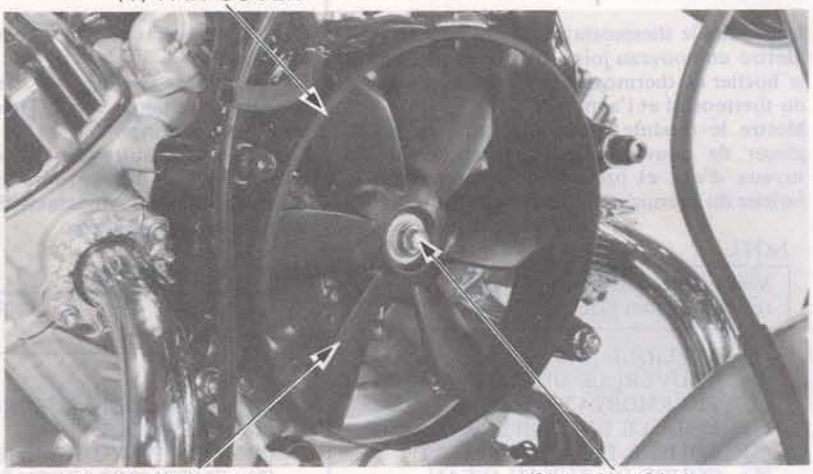
TORQUE : 30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)

Install the cooling fan and tighten the fan bolt.

TORQUE : 20—25 N·m (2.0—2.5 kg-m, 14—18 ft-lb)

NOTE

Make sure that the fan cover rubber seat is correctly positioned.



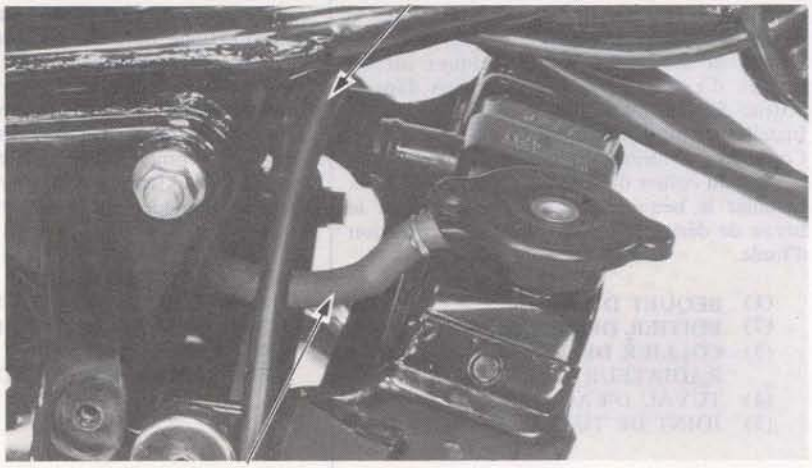
RADIATOR INSTALLATION

NOTE

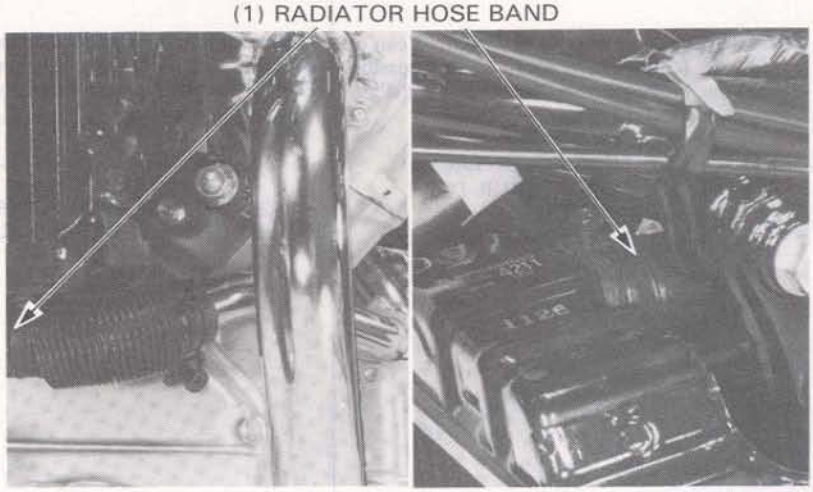
Do not damage the radiator fins.

Connect the radiator lower hose to the radiator.
Connect the siphon tube.

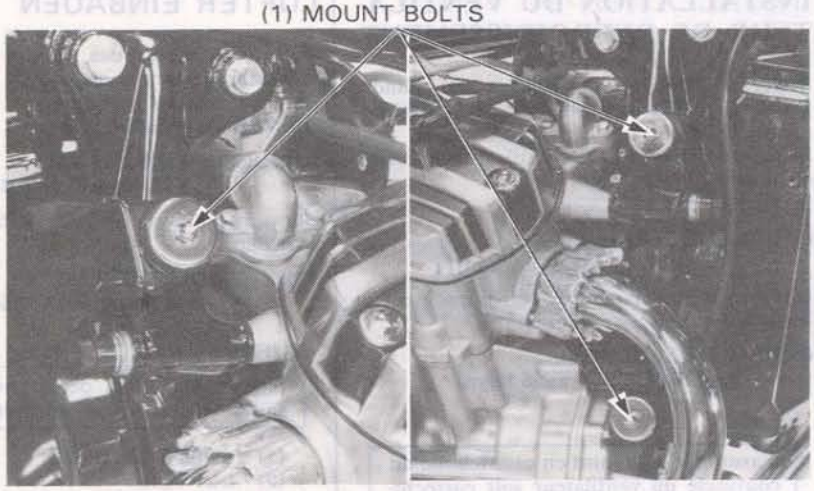
Connect the radiator upper hose by pushing the radiator backward.



Tighten the upper and lower hose bands securely.



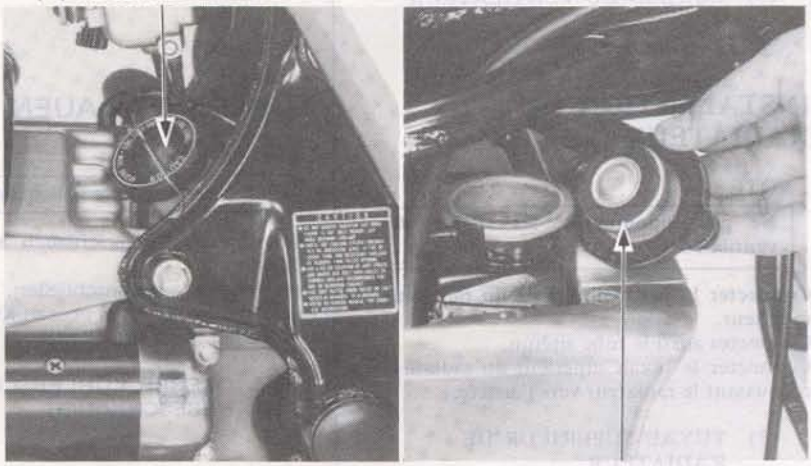
Tighten the radiator mount bolts.
Install the radiator cover.



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

Bleed air from the radiator

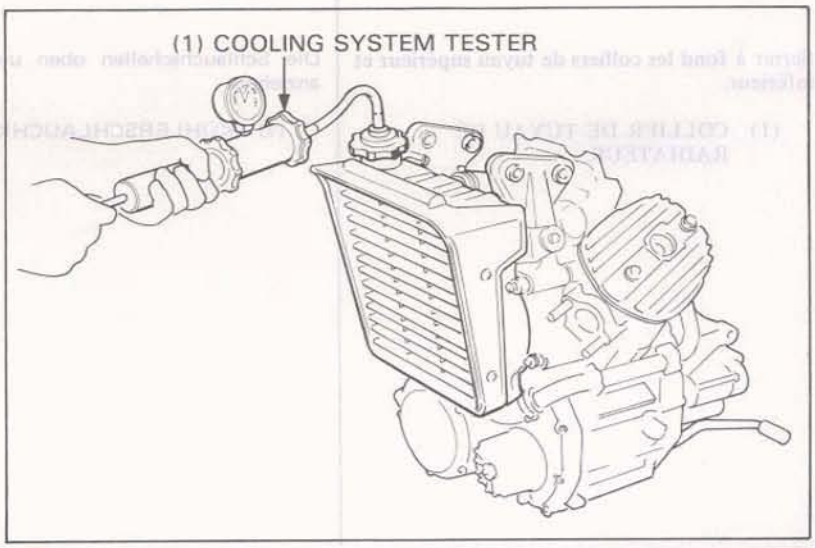
- Start the engine and run until there are no air bubbles in the coolant, and the level stabilizes.
- Stop the engine and add coolant up to the proper level if necessary.
- Reinstall the radiator cap.
- Check the level of coolant in the reserve tank and raise to the coorect level if the level is low.



Remove the engine (Section 5).
Pressurize the radiator, engine and hoses and check for leaks.
Repair or replace components if the system will not hold specified pressure for at least 6 seconds.

CAUTION

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



CAMSHAFT/CAM CHAIN

ARBRE A CAMES ET CHAINE DE DISTRIBUTION

NOCKENWELLE/ STEUERKETTE

EJE DE LEVAS/CADENA DE DESTRIBUCIÓN

SERVICE INFORMATION	10—1
TROUBLESHOOTING	10—1
CAM CHAIN REMOVAL	10—2
CAMSHAFT REMOVAL	10—3
ROCKER ARM REMOVAL	10—5
ROCKER ARM INSTALLATION	10—6
CAMSHAFT INSTALLATION	10—7
VALVE TIMING ADJUSTMENT	10—9

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Camshaft lubricating oil is fed from the oilfilter to the front bearing through an oil control orifice located int he engine case, and to the rear bearing through an oil control orifice in the camshaft rear holder.
- Be sure these orifices are not clogged and that the O-rings and dowel pins are in place before asembling the engine.
- Before assembling the camshaft, lubricate the bearings with engine oil and pour 100 cc of engine oil into the engine block oil pockets to provide initial lubrication.

TOOLS

Special

Gear holder	07924—4150000 or 07924—MC70000
Lock nut socket wrench 17 x 27 mm	07907—4150000 or 07907—MC70000

SPECIFICATIONS

Unit: mm (in)

Item			Standard	Service Limit
Camshaft	Cam height	IN	37.046 (1.4585)	36.058 (1.4196)
		EX	37.015 (1.4573)	36.027 (1.4184)
	Journal O.D.	Front	21.959—21.980 (0.8645—0.8654)	21.910 (0.8526)
		Rear	25.959—26.980 (1.0220—1.0622)	25.910 (1.0201)
Rocker arms and shafts	Arm I.D.		14.016—14.027 (0.5518—0.5522)	14.046 (0.5530)
	Shaft O.D.		13.982—14.000 (0.5505—0.5512)	13.966 (0.5510)
	Camshaft holder I.D.		22.000—22.021 (0.8661—0.8670)	22.050 (0.8681)
	Camshaft bearing I.D.		26.000—26.021 (1.0236—1.0244)	26.170 (1.0303)

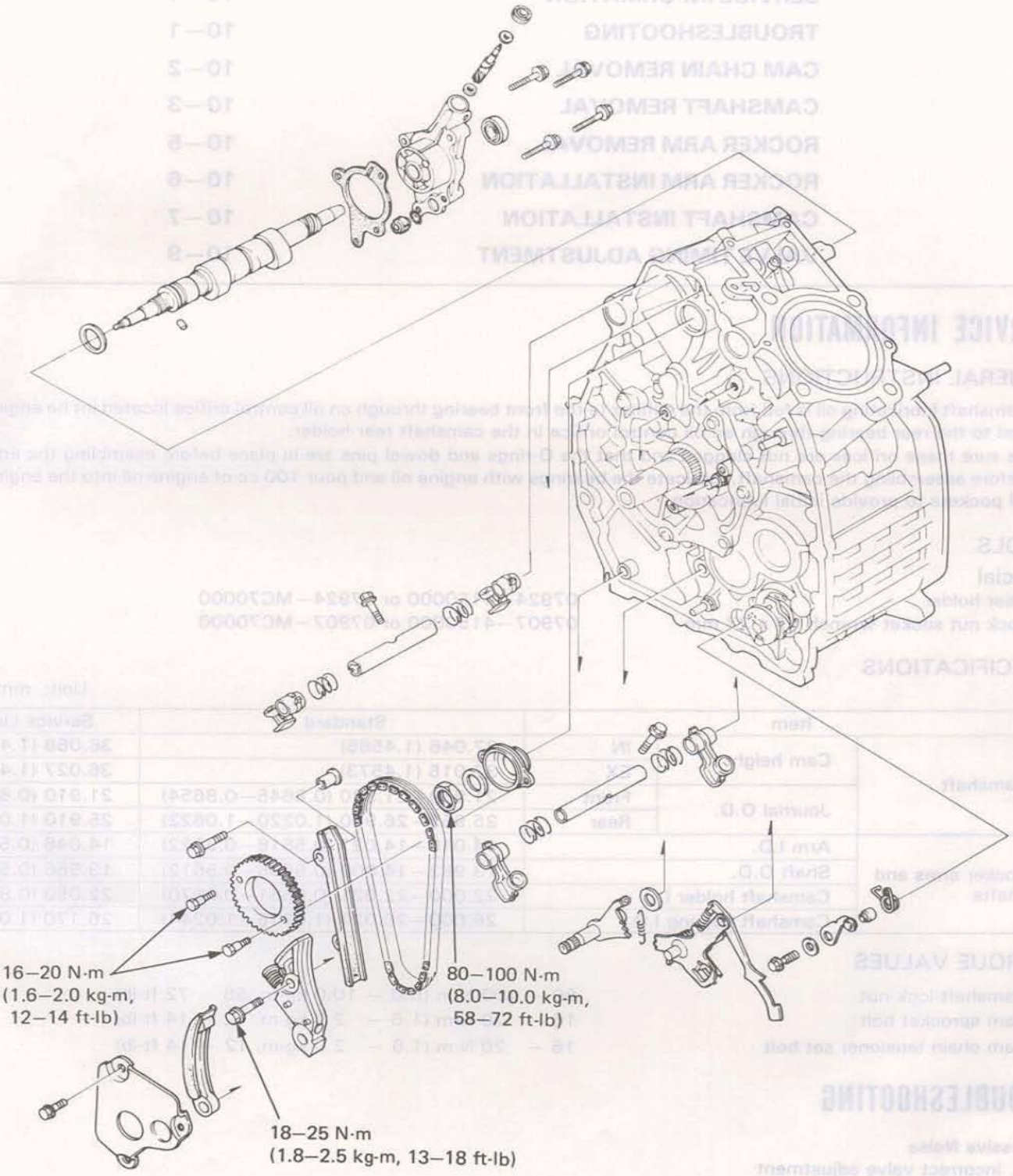
TORQUE VALUES

Camshaft lock nut	80 — 100 N·m (8.0 — 10.0 kg-m, 58 — 72 ft-lb)
Cam sprocket bolt	16 — 20 N·m (1.6 — 2.0 kg-m, 12 — 14 ft-lb)
Cam chain tensioner set bolt	16 — 20 N·m (1.6 — 2.0 kg-m, 12 — 14 ft-lb)

TROUBLESHOOTING

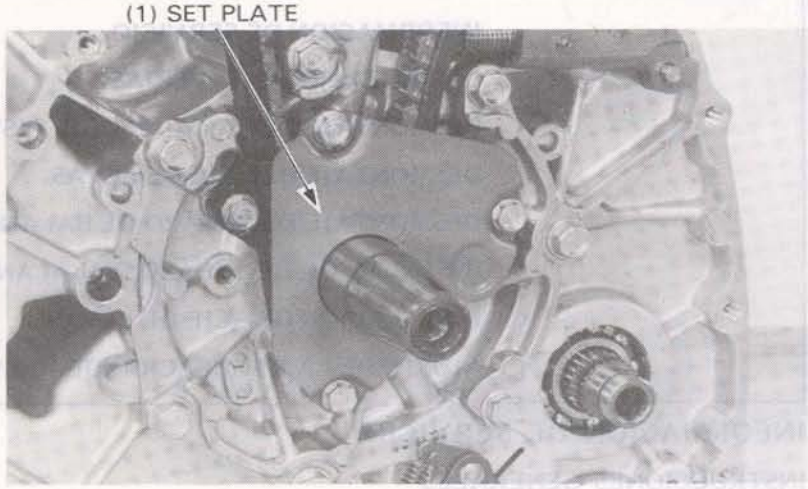
Excessive Noise

1. Incorrect valve adjustment
2. Worn or damaged rocker arms or camshaft
3. Worn or damaged cam chain tensioner or cam chain guide
4. Worn cam sprocket teeth
5. Worn camshaft holder


16–20 N·m
(1.6–2.0 kg-m,
12–14 ft-lb)
80–100 N·m
(8.0–10.0 kg-m,
58–72 ft-lb)
18–25 N·m
(1.8–2.5 kg-m, 13–18 ft-lb)

CAM CHAIN REMOVAL

Remove the engine (Page 5-2).
Remove the engine rear cover (Page 8-9).
Remove the starter reduction gear, flywheel and starter drive gear (Page 8-5).
Remove the chain guide set plate bolts.
Remove the chain guide set plate.

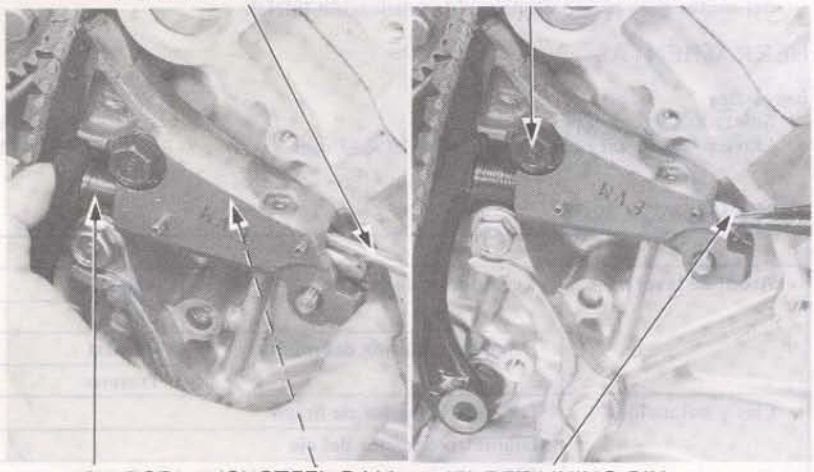


Remove the cam chain tensioner by compressing the push rod while pressing in the steel ball with a flat-end screwdriver as shown.

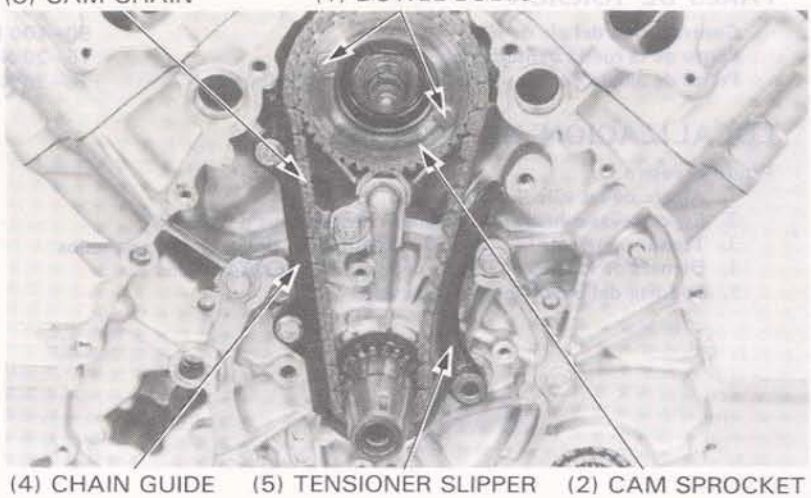
Hold the push rod by inserting the retaining pin through push rod to tensioner bose.
Remove the cam chain tensioner set bolt and tensioner.

CAUTION

The set bolt has a special thread pinch. Do not use any other bolt in its place.

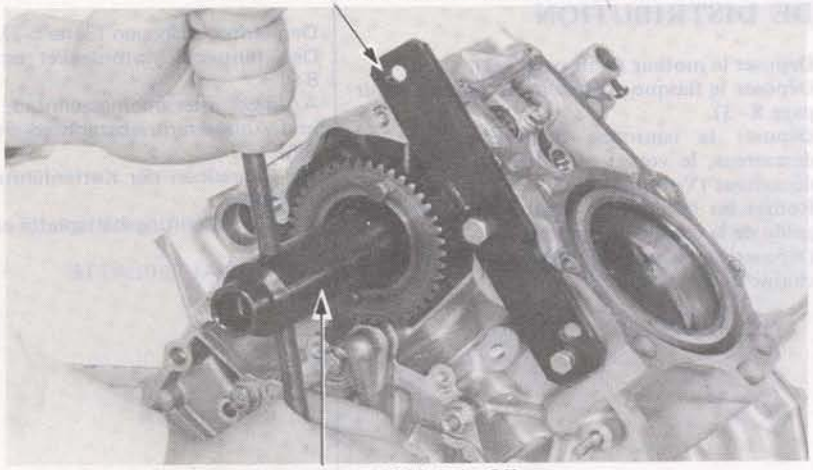


Remove the cam chain guide and tensioner slipper.
Remove the cam sprocket dowel bolts, cam sprocket and cam chain.

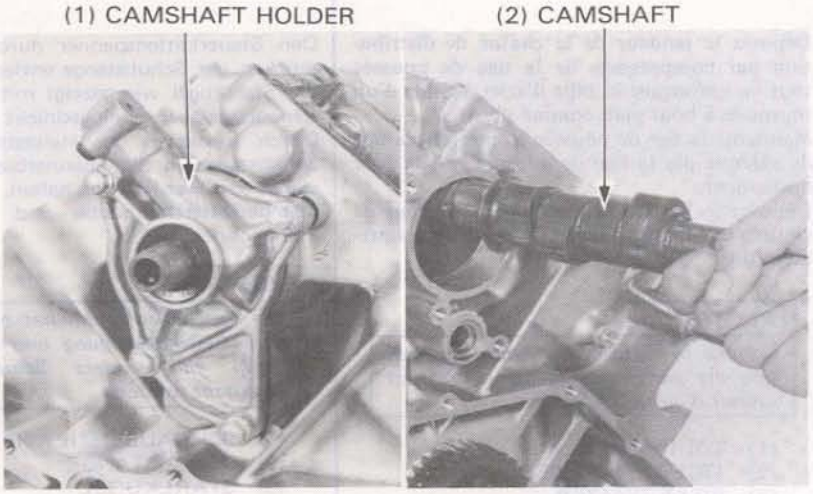


CAMSHAFT REMOVAL

Remove the cylinder head (Page 6-3).
Temporarily install the cam sprocket.
Hold the cam sprocket with a GEAR HOLDER to prevent it from turning.
Loosen the 27 mm nut and remove te cam sprocket and cam sprocket boss.



Remove the radiator and cooling fan (Page 9-6).
Remove the camshaft holder.
Remove the camshaft from the front.

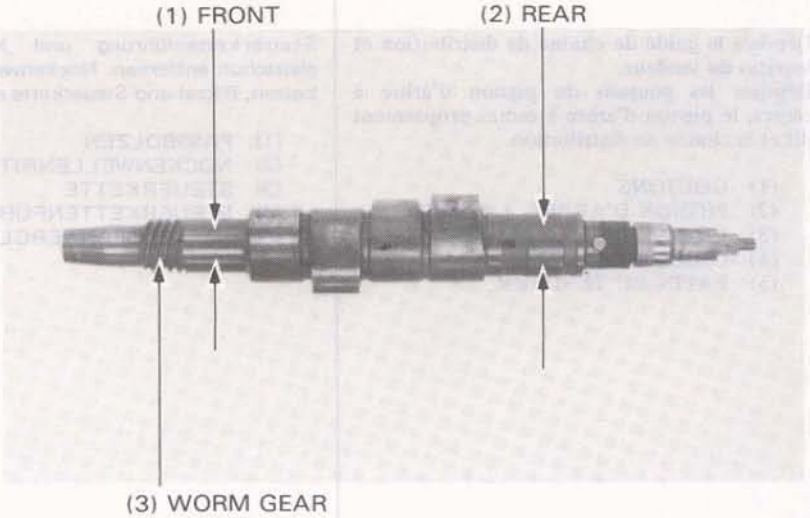


CAMSHAFT INSPECTION

Measure the O.D. of each camshaft bearing journal.
SERVICE LIMIT :
FRONT : 21.910 mm (0.8526 in)
REAR : 25.910 mm (1.0201 in)

Calculate the journal and bearing clearance.
SERVICE LIMIT : 0.260 mm (0.0102 in)

Inspect the worm gear for wear or damage.

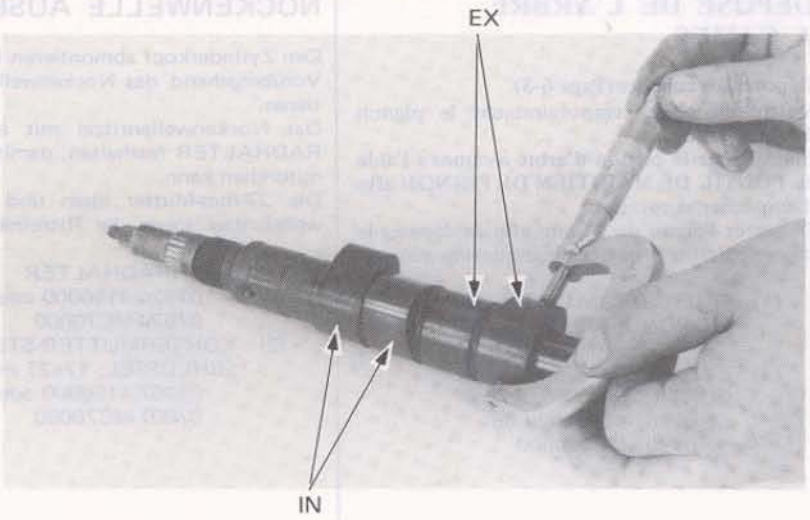


Check each cam lobe for wear with a micrometer. Replace the cam if lobe wear exceeds the srrvice limits.

SERVICE LIMITS :

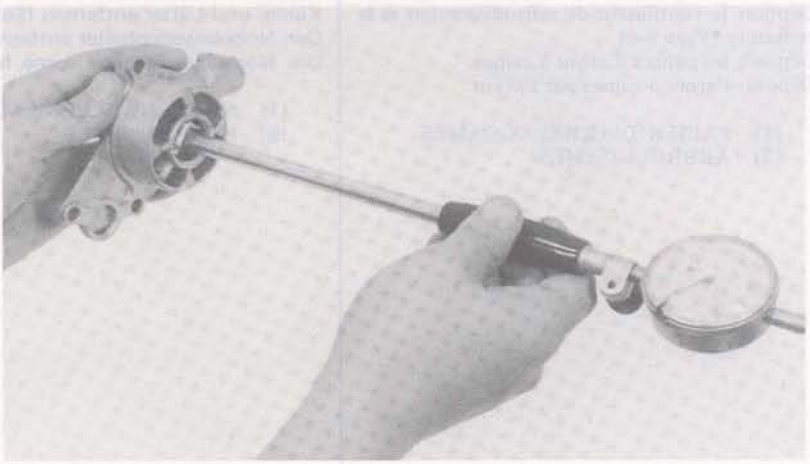
IN : 36.058 mm (1.4196 in.)
EX : 36.027 mm (1.4184 in.)

Inspect the camshaft lobes for scoring, chipping or flat spots.



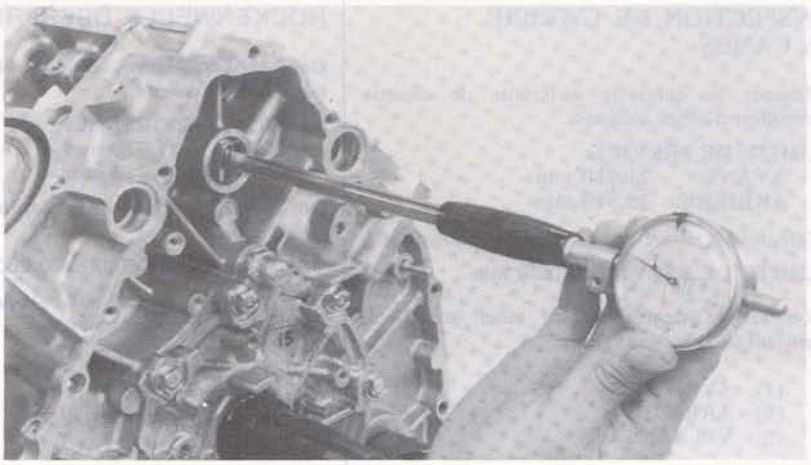
CAMSHAFT HOLDER INSPECTION

Measure the camshaft holder I.D. as shown.
SERVICE LIMIT : 22.050 mm (0.8681 in.)



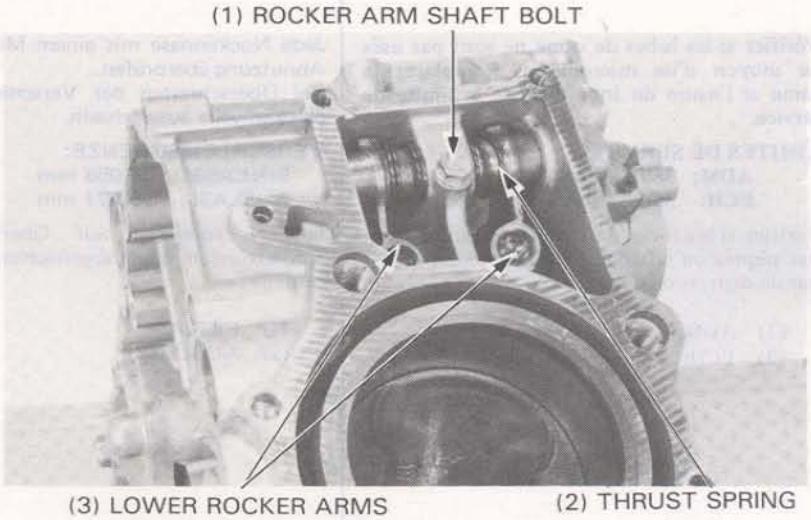
CYLINDER BLOCK CAMSHAFT BEARING INSPECTION

Measure the bearing I.D.
SERVICE LIMIT : 26.170 mm (1.0303 in.)

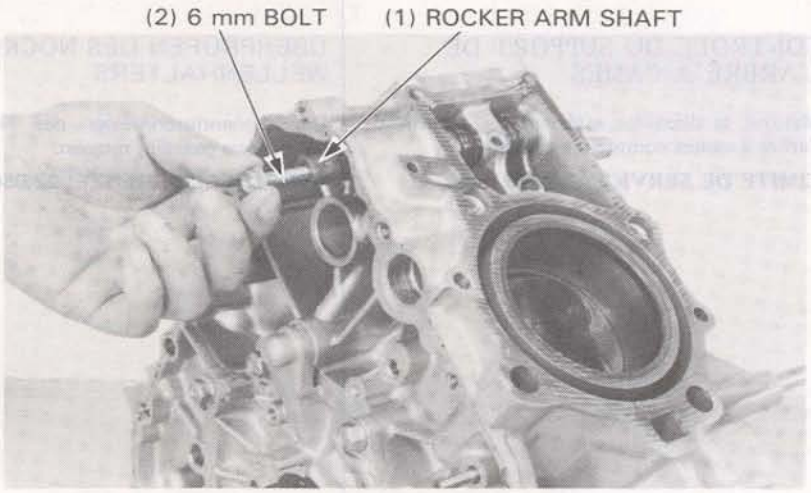


ROCKER ARM REMOVAL

Remove rocker arm shaft bolts.



Screw the 6 mm bolt into the rocker arm shaft until it clears the rocker arm. Remove the rocker arm and thrust spring.



ROCKER ARM INSPECTION

Inspect the rocker arms for wear or damage to the slipper surfaces, or clogged oil hole.
Measure and record the I.D. of each rocker arm.
SERVICE LIMIT : 14.046 mm (0.5530 in.)

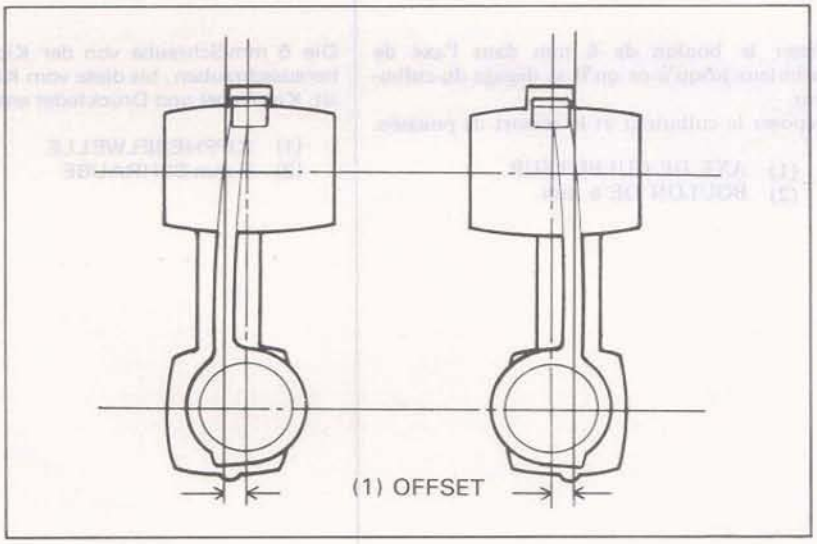
ROCKER ARM SHAFT INSPECTION

Check each rocker arm shaft O.D. with a micrometer. Replace the shaft if it is damaged.
SERVICE LIMIT : 13.966 mm (0.5510 in.)

The difference between the O.D. of a rocker arm shaft and the I.D. of its rocker arm is the clearance.
SERVICE LIMIT : 0.08 mm (0.0031 in.)

ROCKER ARM INSTALLATION

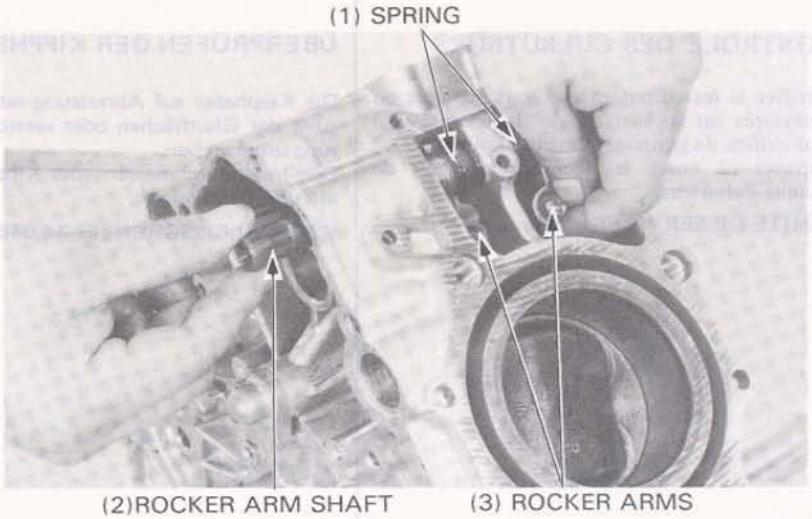
Install the rocker arms with the offset sides toward the inside.



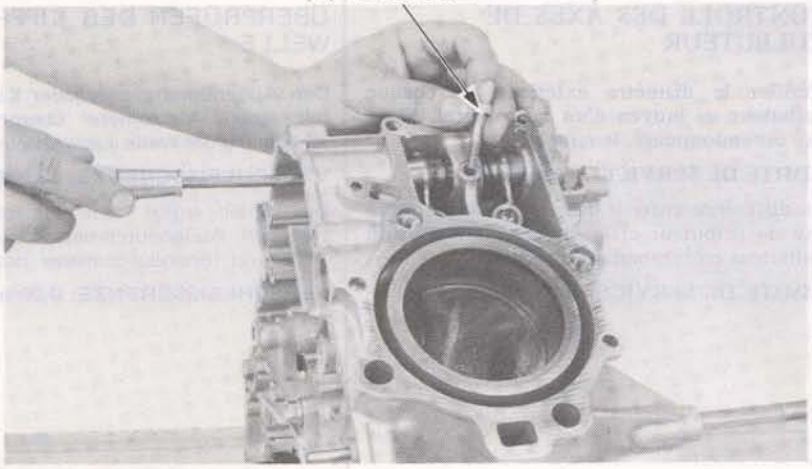
Install the rocker arms and thrust springs in the cylinder block, and then insert the rocker arm shafts.

NOTE

- Lubricate the rocker arm shafts with engine oil before installation.
- Install each rocker arm shaft with the threaded end facing the rear (cam sprocket side).



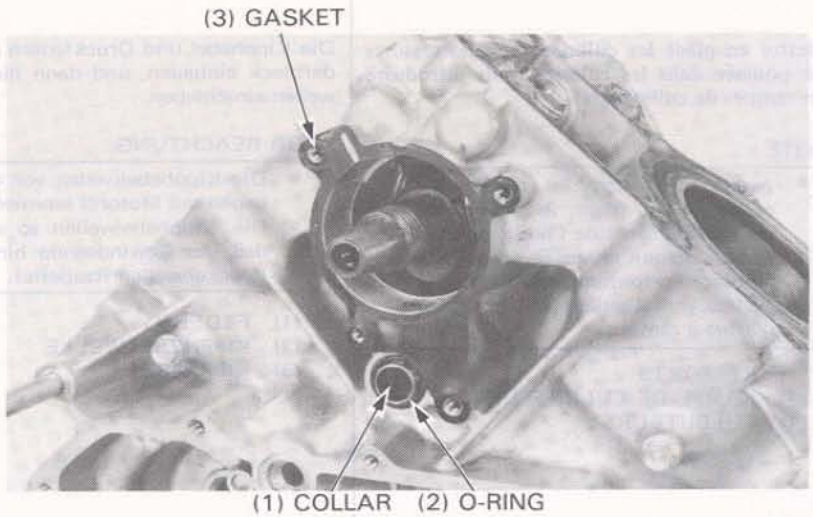
Rotate the rocker arm shaft with a screwdriver to align with the lock bolt hole. Install the lock bolt.



CAMSHAFT INSTALLATION

Lubricate the camshaft journals with MULTIPURPOSE NLG1 No. 2 (MoS_2 additive) GREASE.
Install the camshaft thrust washer.
Insert the camshaft from the front.

Install the camshaft holder gasket, O-ring, and collar.

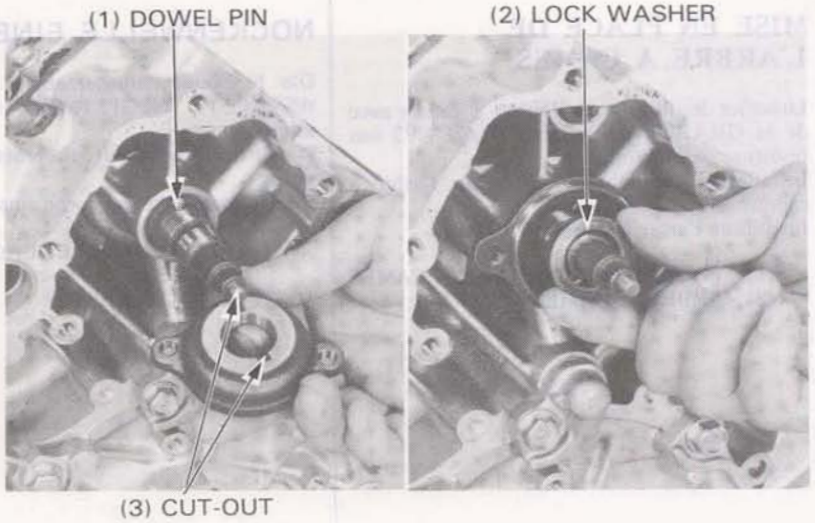


Lubricate the cam holder oil seal lip with engine oil.
Install the camshaft holder.

Install the cam sprocket boss aligning the cutout with the camshaft dowel pin.
Install the lock nut and lock washer and tighten the nut temporarily.

NOTE

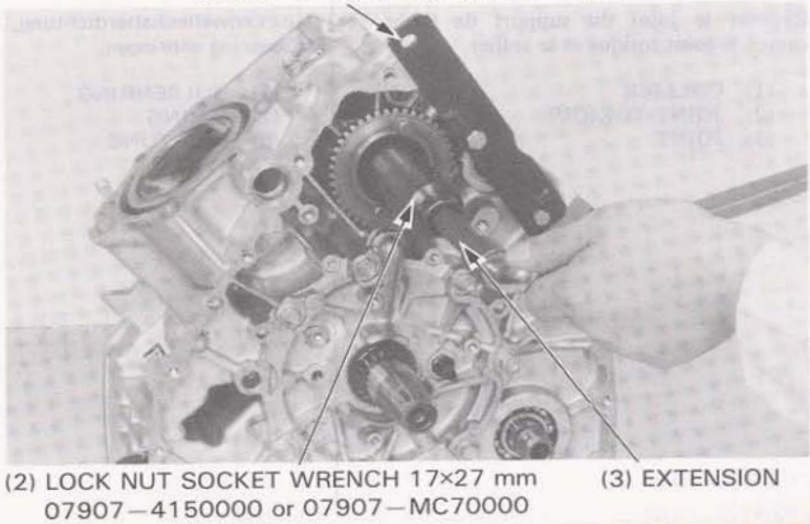
Install the lock washer with the mark "OUTSIDE" facing out.



Install the cam sprocket and finger tighten the bolts. Hold the cam sprocket with the GEAR HOLDER.
Tighten the lock nut.

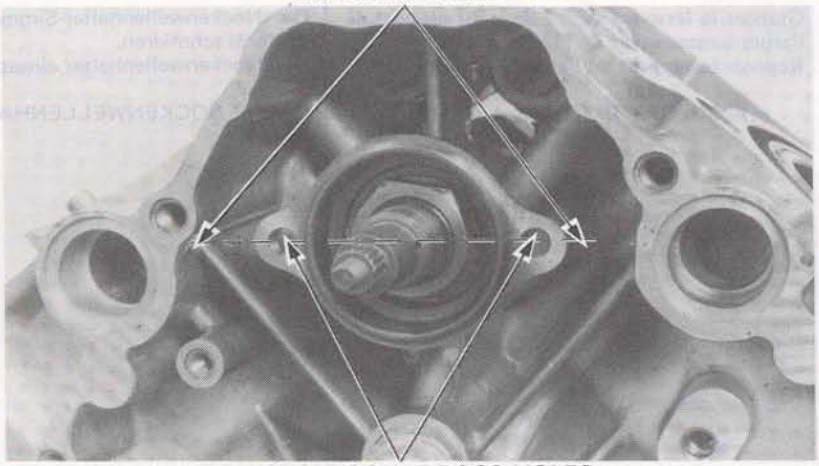
TORQUE : 80—100 N·m (8.0—10.0 kg-m, 58—72 ft-lb)

Remove the cam sprocket.



VALVE TIMING ADJUSTMENT

Align the holes in the cam sprocket boss with the aligning marks on the cylinder block.

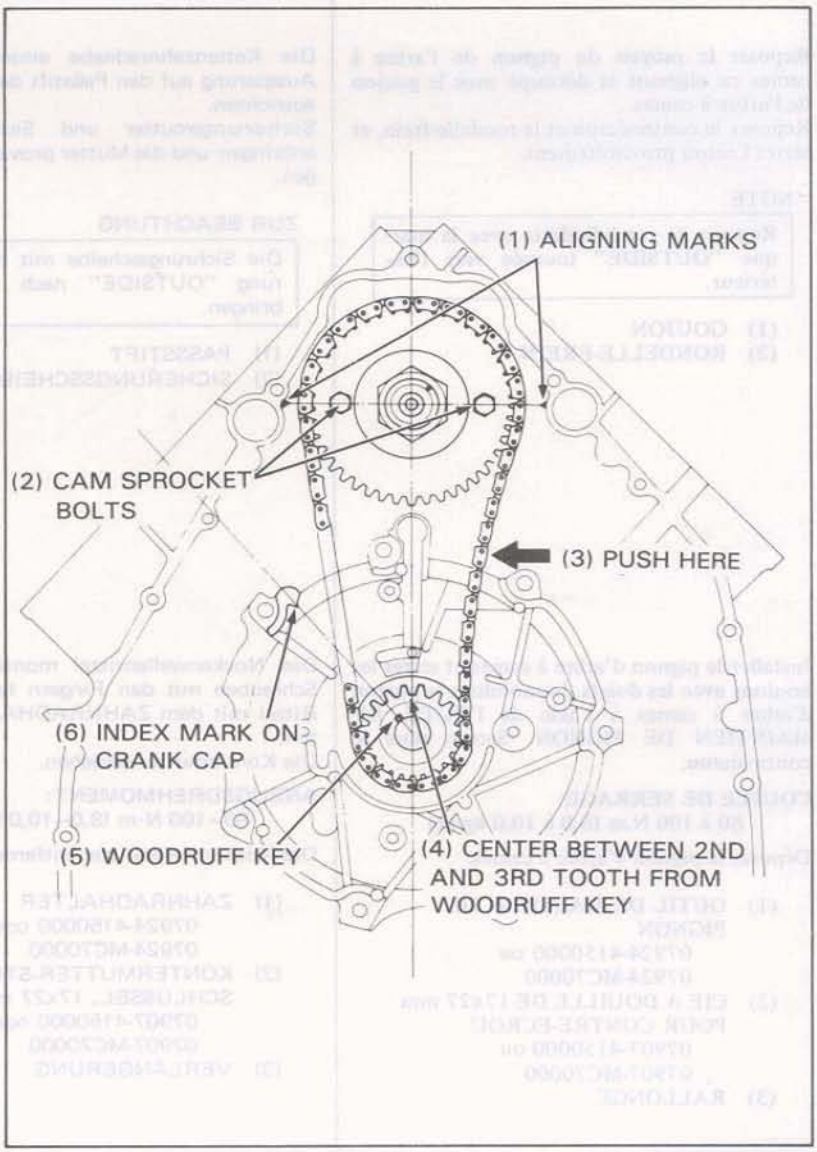


Turn the crankshaft to bring the left piston at TDC.
Verify the valve timing by observing the following :

- Make sure that the cam sprocket bolts are in line with the aligning marks on the cylinder block.
- Check that the flywheel woodruff key aligns with the index mark on the crank cap.

NOTE

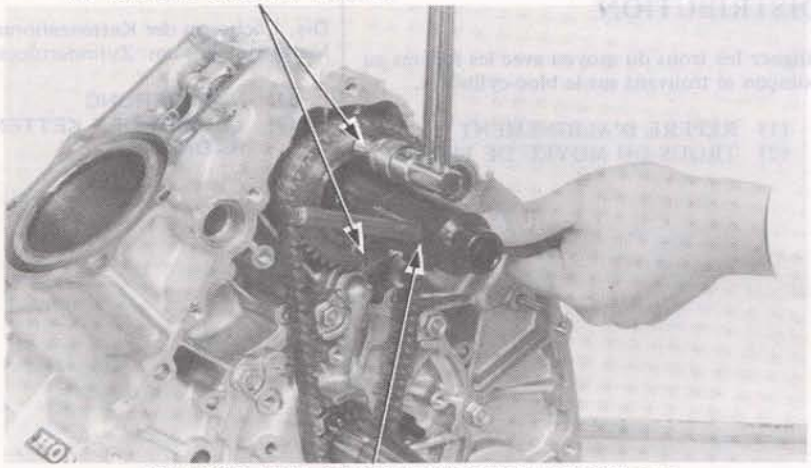
When inspecting the valve timing, push the cam chain from the right side so that the tensioner side of the chain is pulled taut.



Hold the camshaft with the LOCK NUT SOCKET WRENCH.
Torque the cam sprocket bolts.

TORQUE : 16—20 N·m
(1.6—2.0 kg-m, 12—14 ft-lb)

(1) CAM SPORCKET BOLTS

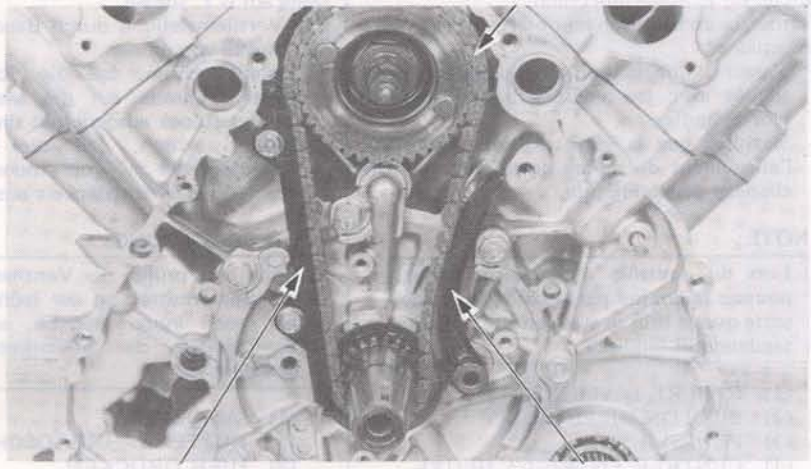


(2) LOCK NUT SOCKET WRENCH 17×27 mm
07907—4150000 or 07907—MC70000

AUTOMATIC CAM CHAIN TENSIONER INSTALLATION

Install the cam chain guide and tensioner slipper.

(1) CAM CHAIN

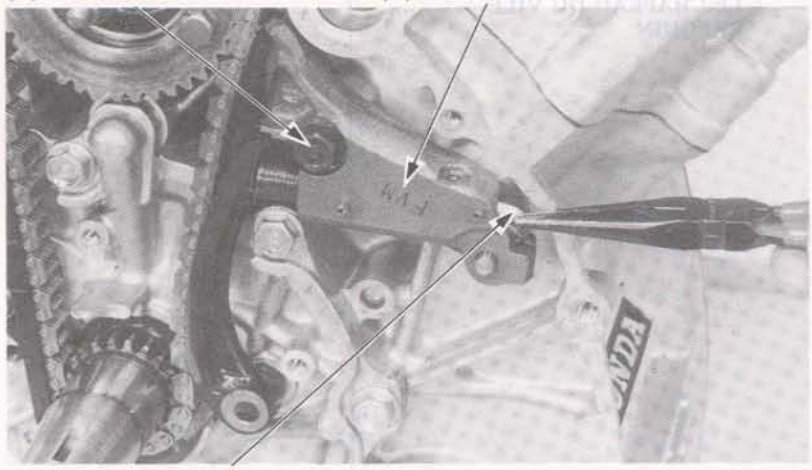


(2) CAM CHAIN GUIDE (3) SLIPPER

Install the cam chain tensioner.
Install and torque the tensioner set bolt.

TORQUE : 16—20 N·m
(1.6—2.0 kg-m, 12—14 ft-lb)

(1) TENSIONER SET BOLT (2) TENSIONER BODY



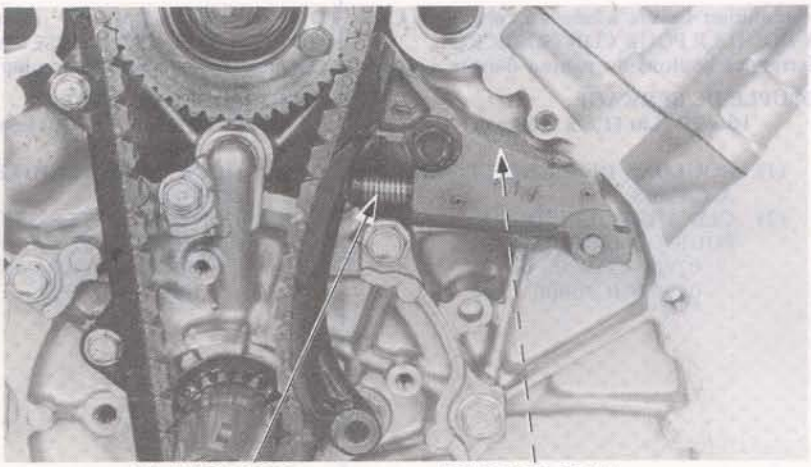
(3) RETAINING PIN

CAUTION

Be sure to use the correct set bolt.
Failure to use the special bolt will ruine the thread hole in the engine case.

Remove the previous installed push rod retaining pin, the tensioner will give tension to the cam chain automatically.

Make sure that the push rod moves smoothly by pressing the steel ball in.

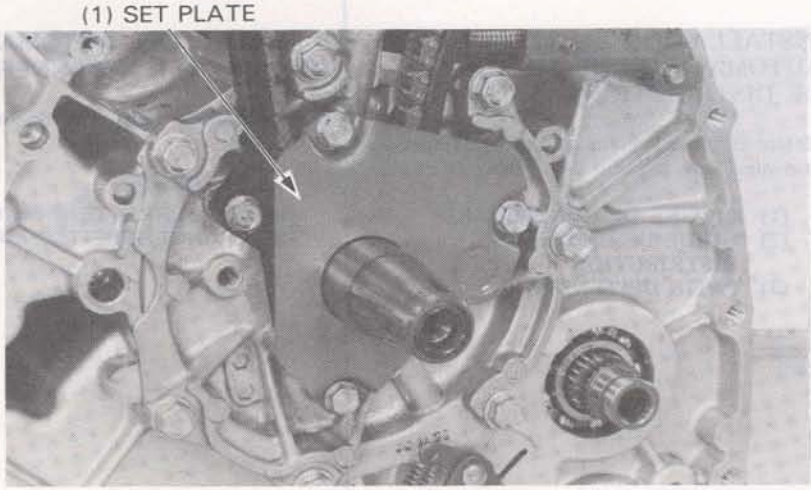


(1) PUSH ROD (2) STEEL BALL

Install the set plate.

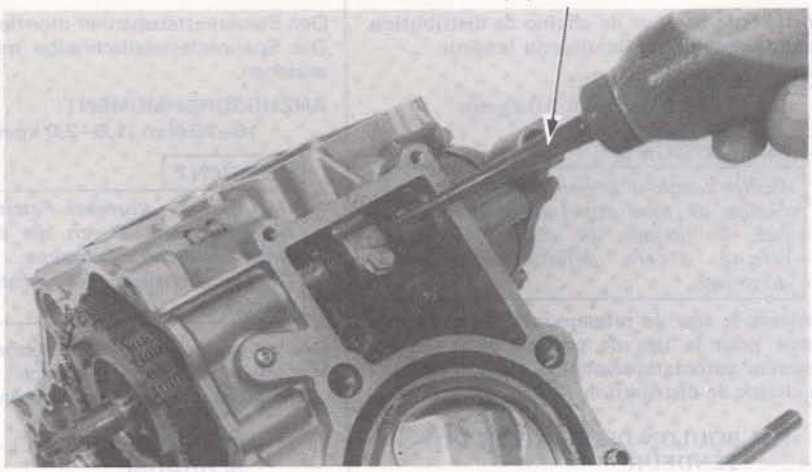
TORQUE : 8—12 N·m
(0.8—1.2 kg-m, 6—9 ft-lb)

(1) SET PLATE



Pour about 10 cc of engine oil into oil pockets of the engine block.
Install the flywheel (Section 9) and the cylinder head (Section 7).
Adjust the valve clearance (Section 3).
Install the engine (Section 5).
Add the specified amount of engine oil (Section 2).

(1) ENGINE OIL



TRANSMISSION

TRANSMISSION

GETRIEBE

TRANSMISION

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FINAL SHAFT DISASSEMBLY	11— 3
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SERVICE INFORMATION

GENERAL INSTRUCTIONS

- Before reassembling, lubricate the M4 and M5 gears with MULTIPURPOSE NLG1 No. 2 (molybdenum disulfide additive) GREASE or an equivalent.
- Apply engine oil to the other gears.
- To service the transmission, it is necessary to remove the engine from the frame.

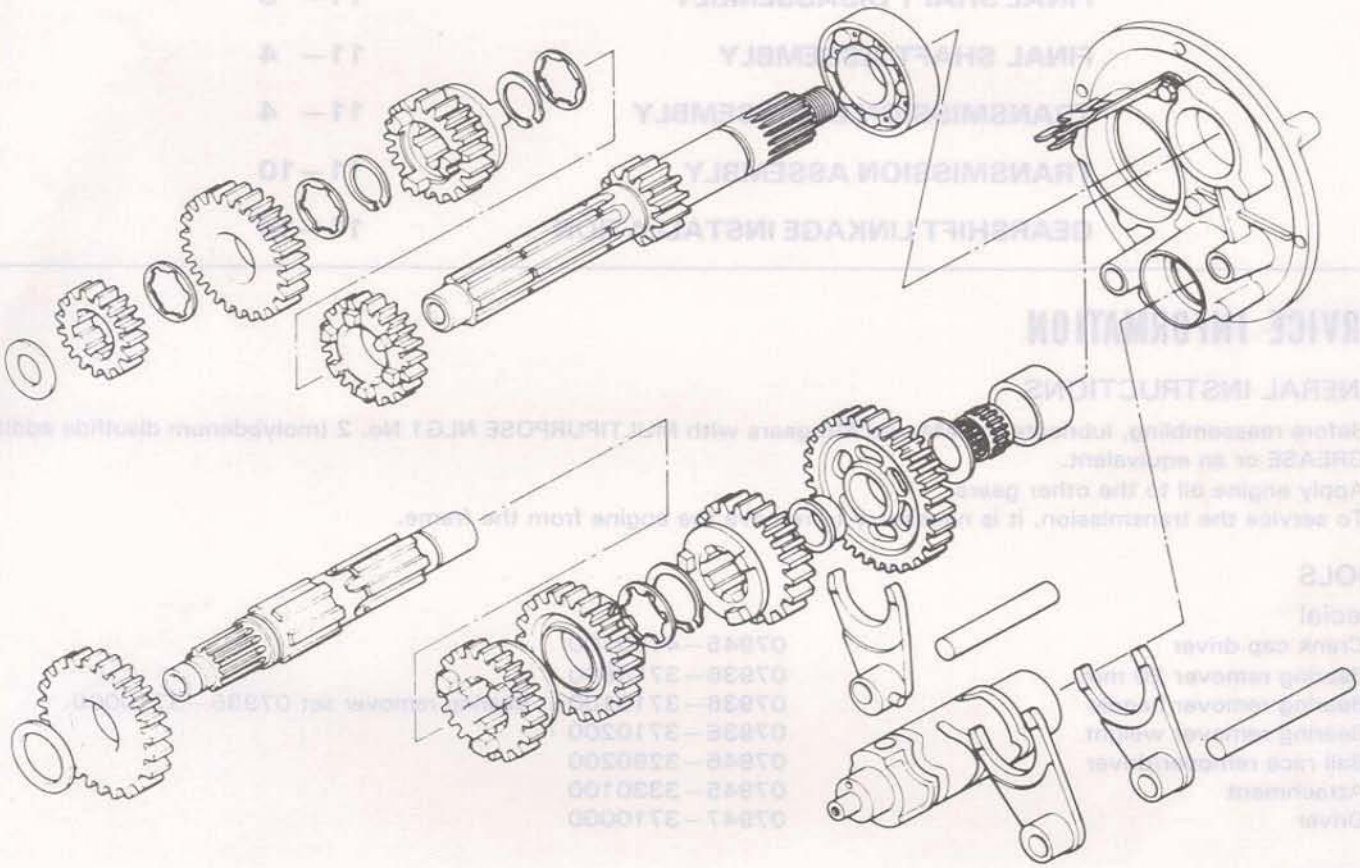
TOOLS

Special

Crank cap driver	07945—4150100	
Bearing remover 20 mm	07936—3710600	Bearing remover set 07936—3710000
Bearing remover handle	07936—3710100	
Bearing remover weight	07936—3710200	
Ball race remover/driver	07946—3290200	
Attachment	07945—3330100	
Driver	07947—3710000	

Common

Attachment 42 x 47 mm	07746—0010300	or 07945—3330100
Driver	07749—0010000	
Attachment 52 x 55 mm	07746—0010400	or 07946—3710200
Pilot 25 mm	07746—0040600	
Attachment 62 x 68 mm	07746—0010500	
Pilot 20 mm	07746—0040500	
Attachment 32 x 35 mm	07746—0010100	or 07946—3640000 or 07946—6920100



SPECIFICATIONS

Unit: mm (in)

Item			Standard	Service Limit
Transmission	M2, M3, M4 and M5 gear I.D.		25.020–25.041 (0.9850–0.9859)	25.10 (0.988)
	C1 gear I.D.		24.020–24.041 (0.9457–0.9465)	24.10 (0.949)
	C2 gear I.D.		27.520–27.541 (1.0835–1.0843)	27.60 (1.087)
	C3 and C4 gear I.D.		25.020–25.041 (0.9850–0.9859)	25.10 (0.988)
	C5 gear I.D.		32.000–32.025 (1.2598–1.2608)	32.10 (1.264)
	C1 gear bushing	I.D.	20.020–20.041 (0.7882–0.7890)	20.06 (0.790)
		O.D.	23.984–24.005 (0.9443–0.9451)	23.95 (0.943)
	Mainshaft O.D.		24.940–24.959 (0.9819–0.9827)	24.91 (0.781)
	Countershaft O.D.	At C1	19.987–20.000 (0.7869–0.7874)	19.96 (0.786)
		At C2	27.459–27.480 (1.0811–1.0818)	27.43 (1.080)
		At C3 and C4	24.959–24.980 (0.9826–0.9835)	24.93 (0.981)
		At C5	31.950–31.975 (1.2579–1.2586)	31.91 (1.256)
	Gear-to-bushing clearance		—	0.15 (0.006)
Shift drum	O.D.		34.950–34.975 (1.3760–1.3770)	34.90 (1.374)
	I.D.		35.00 –35.025 (1.3780–1.3789)	35.06 (1.380)
Shift fork	Claw thickness		5.930 –6.000 (0.233 –0.236)	5.50 (0.217)
	I.D.		13.000–13.018 (0.5118–0.5125)	13.05 (0.514)
Fork shaft	O.D.		12.966–12.984 (0.5105–0.5112)	12.95 (0.510)
Final shaft spring	Free length		73.0 (2.87)	72.0 (2.83)

TROUBLESHOOTING

Hard to Shift

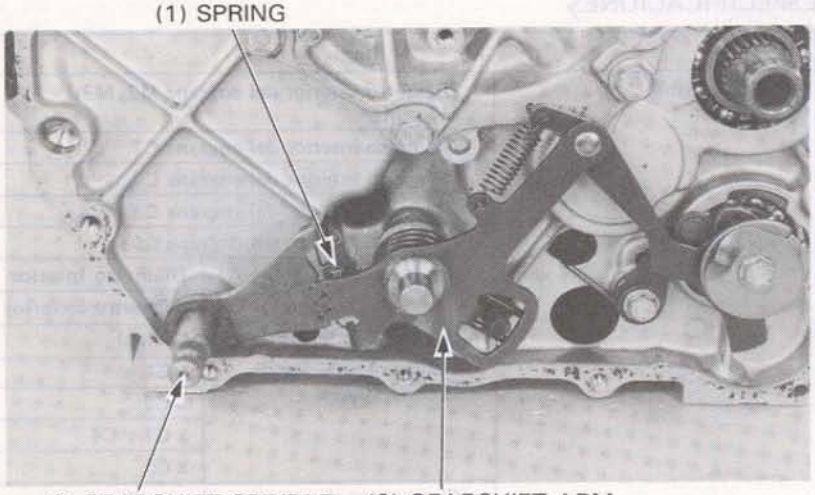
1. Improper clutch adjustment: too much free play
2. Shift forks bent
3. Shift shaft bend
4. Shift fork claw bent
5. Shift drum cam grooves damaged
6. Shift guide pin damaged

Transmission Jumps Out of Gear

1. Gear dogs worn
2. Shift shaft bend
3. Shift drum stopper broken
4. Shift forks bent

GEARSHIFT LINKAGE REMOVAL

Remove the engine (Page 5-2).
Remove the engine front cover (Page 7-9).
Remove the rear cover (Page 8-3).
Remove the rear final shaft.
Remove the gearshift spindle and shift spring.
Remove the gearshift arm.

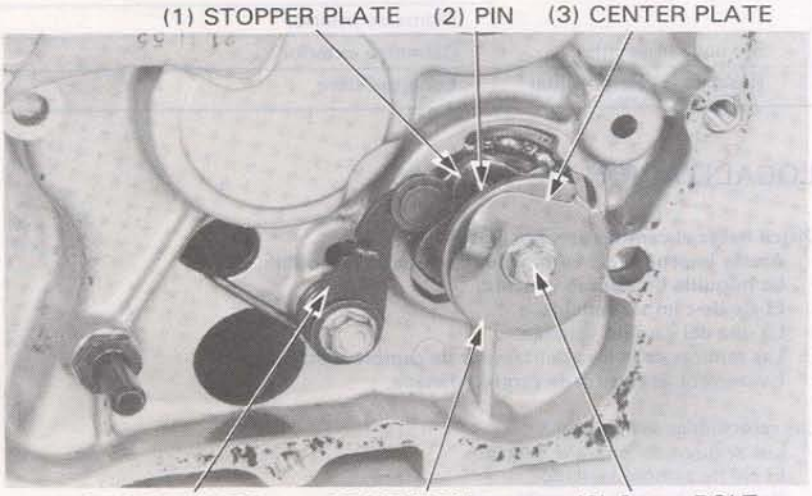


Remove the shift drum stopper bolt.
Remove the shift drum stopper arm.
Remove the neutral switch plate, shift drum stopper plate, gearshift drum pin, and collar.

NOTE

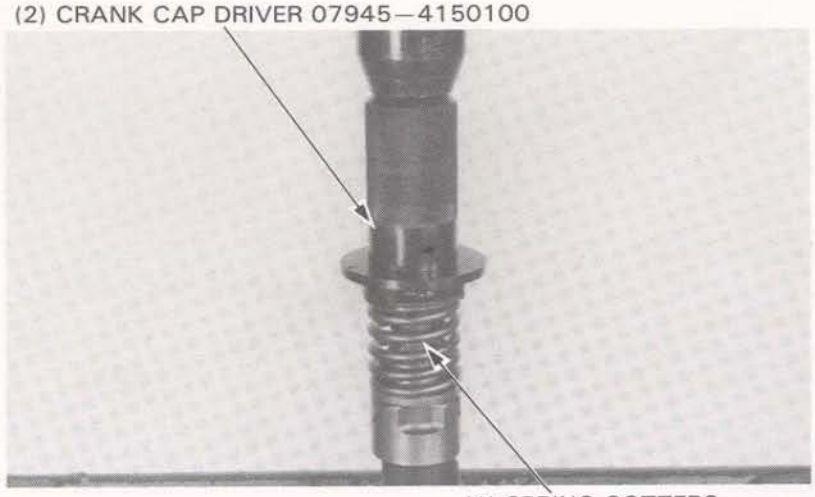
Do not disassemble the shift drum plates and pin except when replacement is necessary.

Check all removed parts for wear or damage.

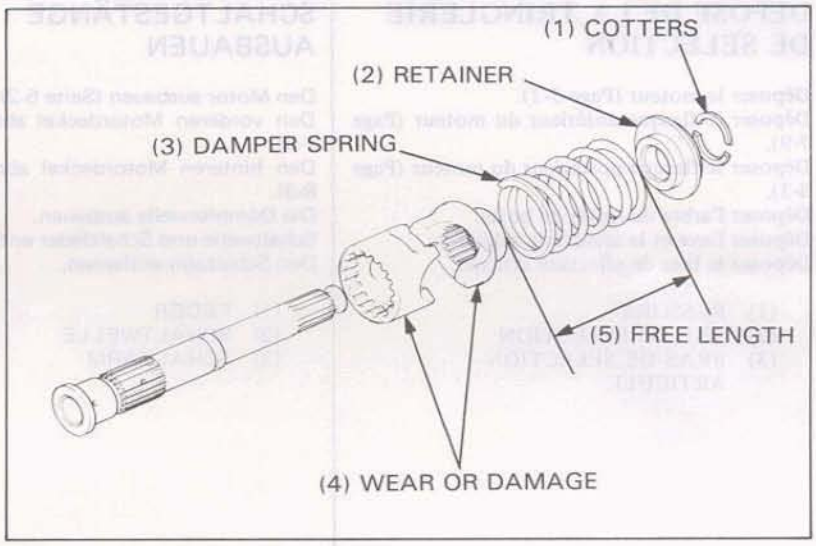


FINAL SHAFT DISASSEMBLY

Compress the spring with a press and CRANK CAP DRIVER and remove the spring cotters.
Remove the spring retainer, damper lifter and cam from the shaft.



Measure the free length of the damper spring.
SERVICE LIMIT : 68.0 mm (2.677 in.)
Inspect the damper lifter, damper shaft, and retainer for wear or damage.

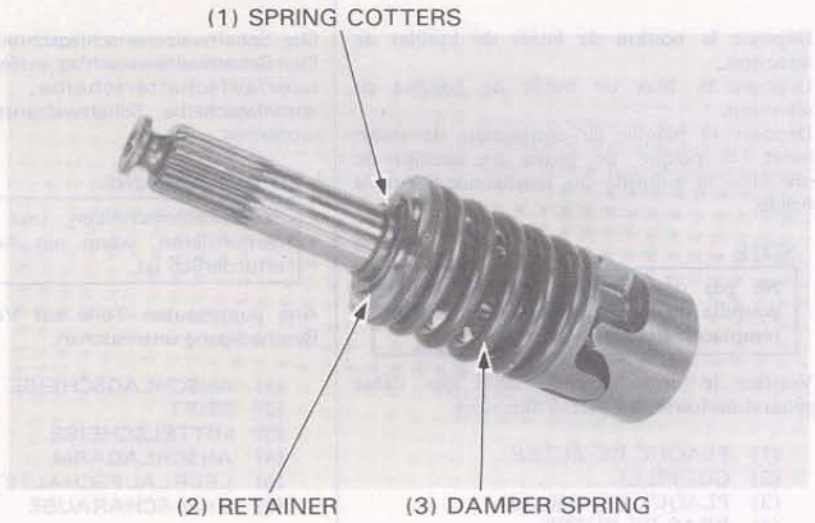


FINAL SHAFT ASSEMBLY

Slide the damper lifter, spring and retainer over the damper shaft. Compress the spring in the CRANK CAP DRIVER and install the spring cotters.

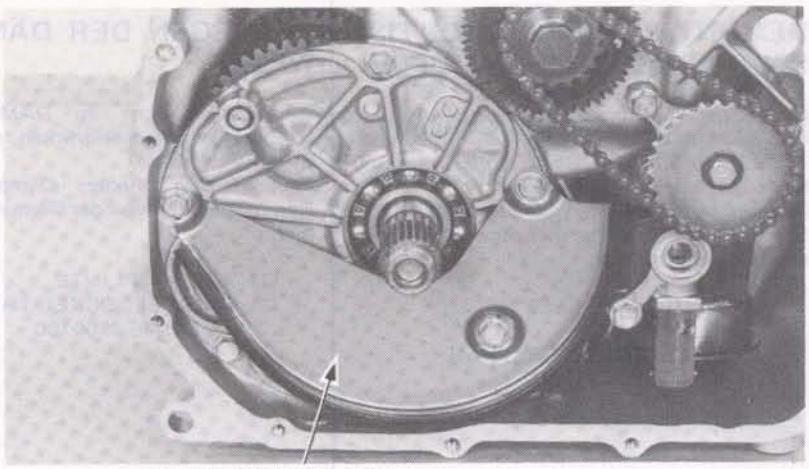
NOTE

Make sure that the spring cotters are seated in the shaft groove properly.

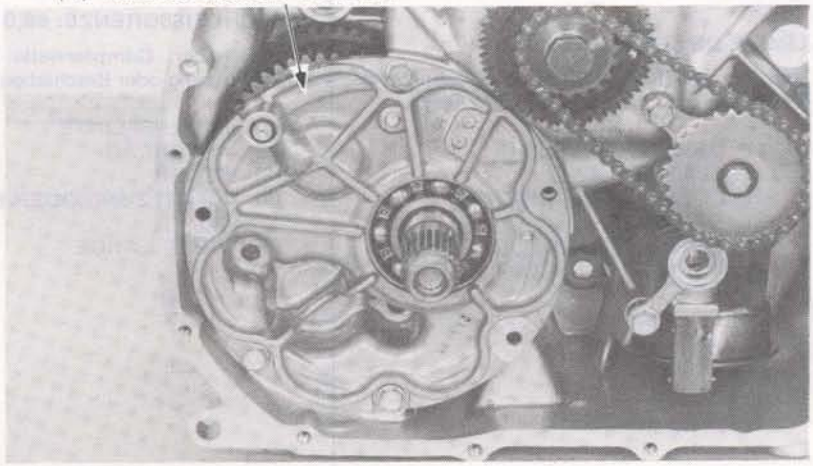


TRANSMISSION DISASSEMBLY

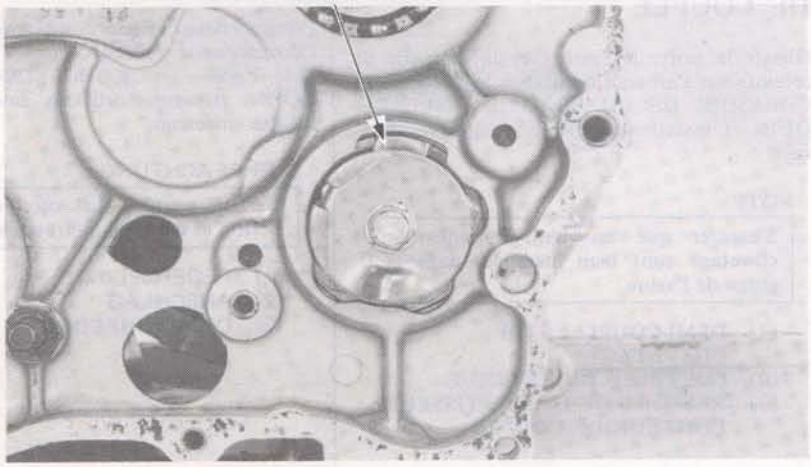
Remove the transmission cover and take out the clutch as an assembly (See section 7).
Remove the oil separator.



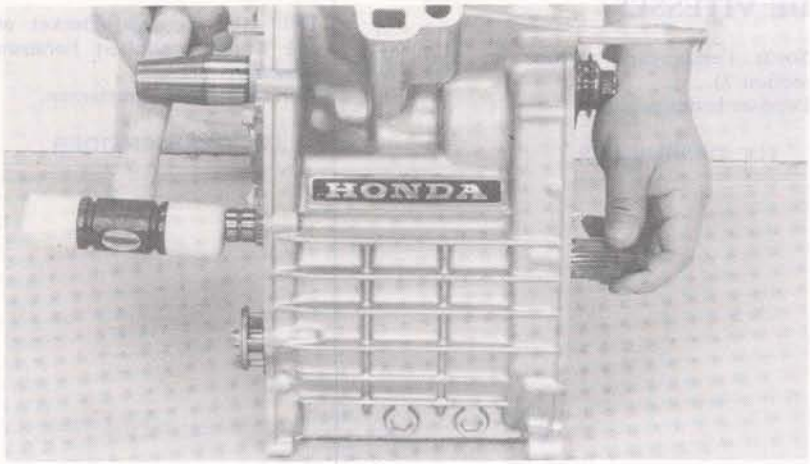
Remove the transmission holder bolts.



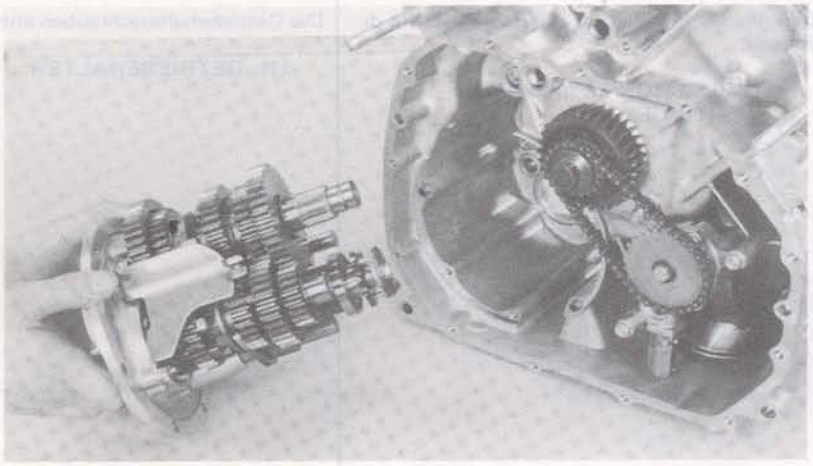
Align the projection on the stopper plate with the cut-out in the engine case by rotating the shift drum.



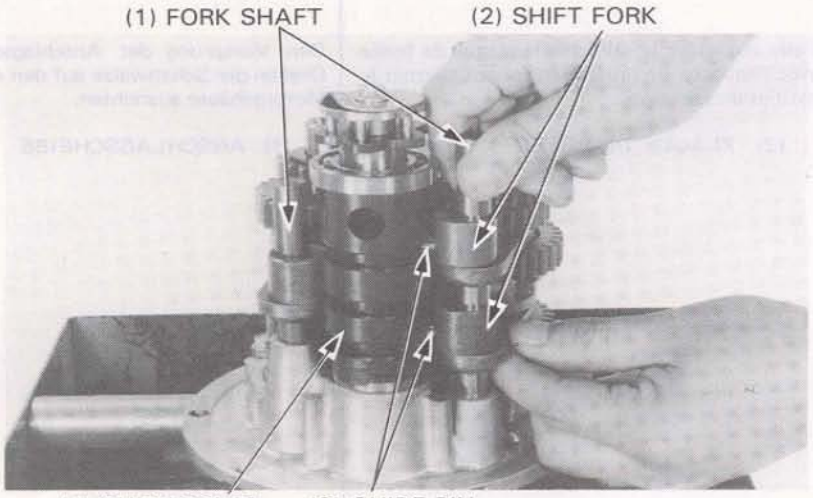
Drive the ends of the countershaft and shift drum carefully and evenly with a soft hammer until the transmission holder is clear of the engine case.



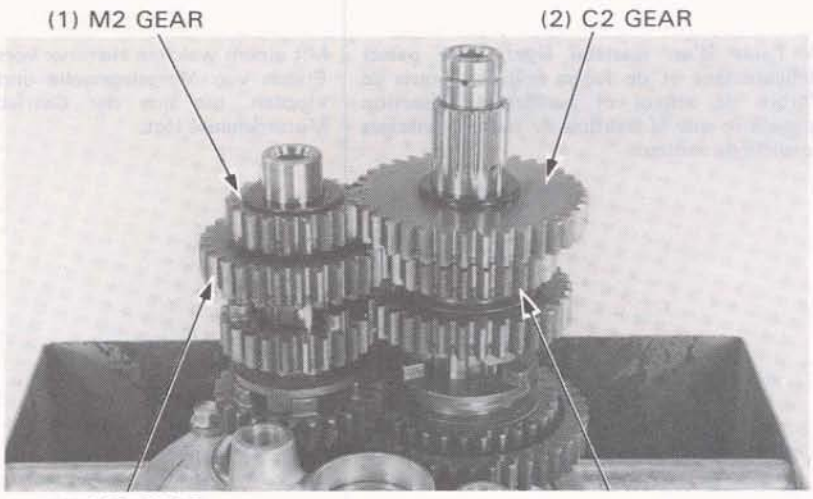
After removing the transmission, place it on a work bench or clean surface.



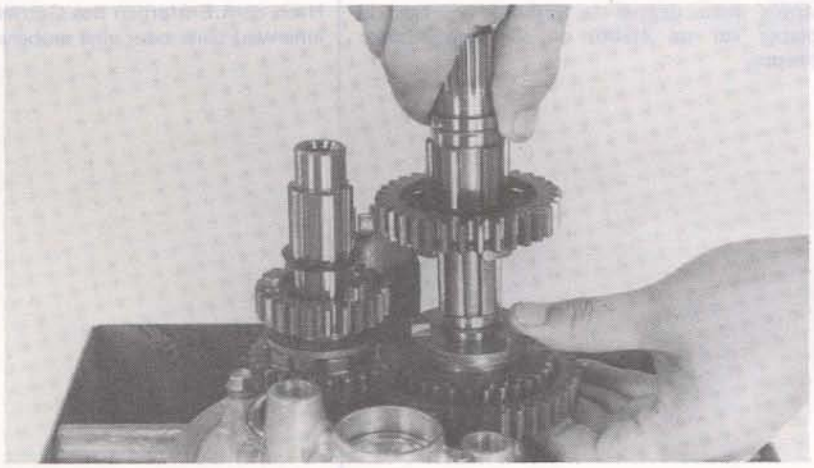
Lift the fork shafts out.
Remove the shift forks and take out the guide pins.
Remove the shift drum.



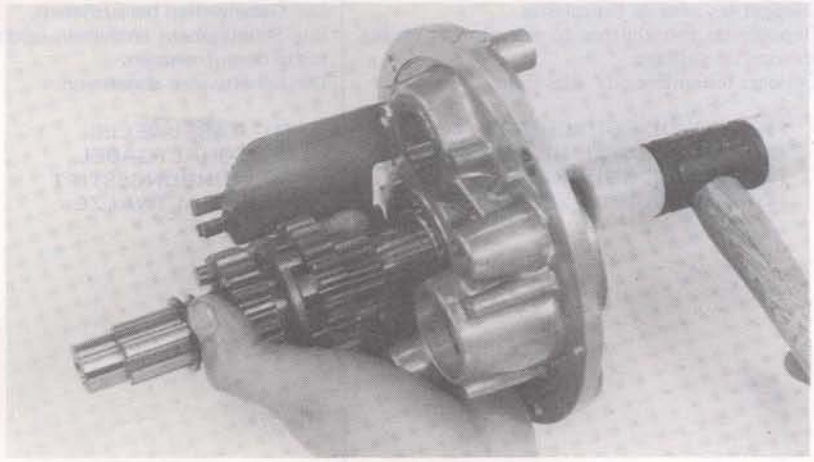
Remove the 2nd and top gears from the countershaft and mainshaft.



Disasemble the countershaft.



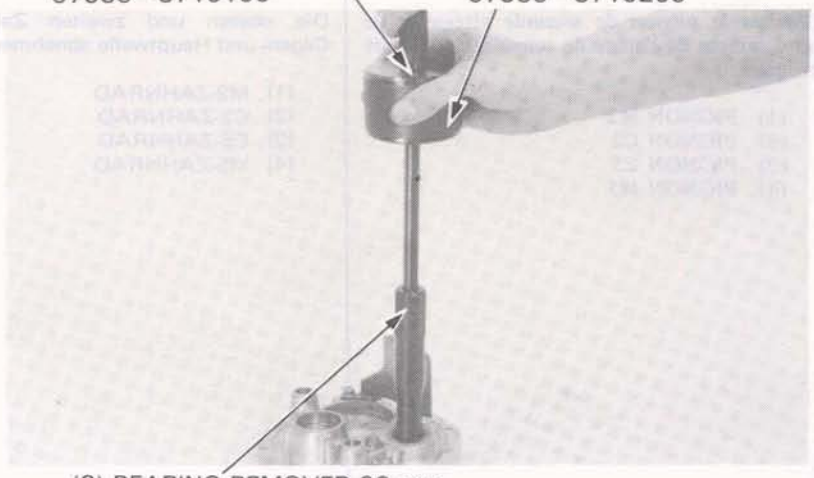
Lightly tap the end of the mainshaft with a soft hammer until it clears the transmission holder. Remove gears by prying off the snap ring.



Inspect each holder bearing for wear or damage. They should rotate freely and free of play or rattle. Remove the countershaft needle bearing from the transmission holder.

(1) BEARING REMOVER HANDLE
07936—3710100

(2) BEARING REMOVER WEIGHT
07936—3710200



(3) BEARING REMOVER 20 mm
07936—3710600

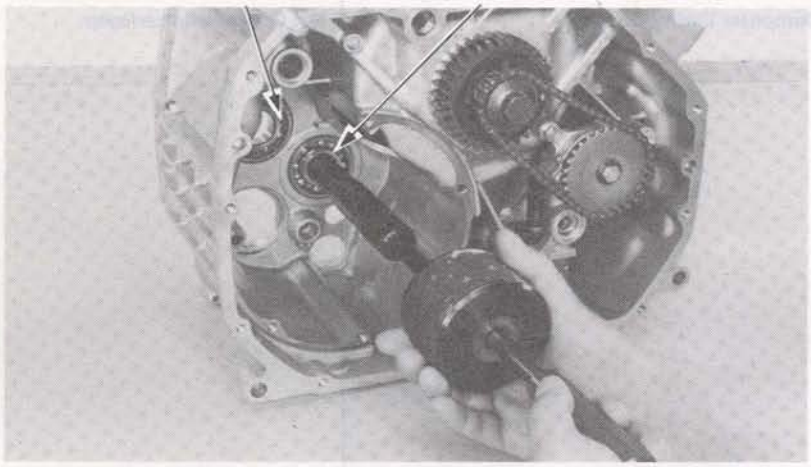
Remove the mainshaft, countershaft bearings and oil guide plate.

NOTE

Bearings should be replaced if removed from the case.

TOOLS
MAINSHAFT BEARING
BEARING REMOVER (20 mm)
07936—3710600
BEARING REMOVER HANDLE
07936—3710100
BEARING REMOVER WEIGHT
07936—3710200

(1) COUNTERSHAFT BEARING (2) MAINSHAFT BEARING

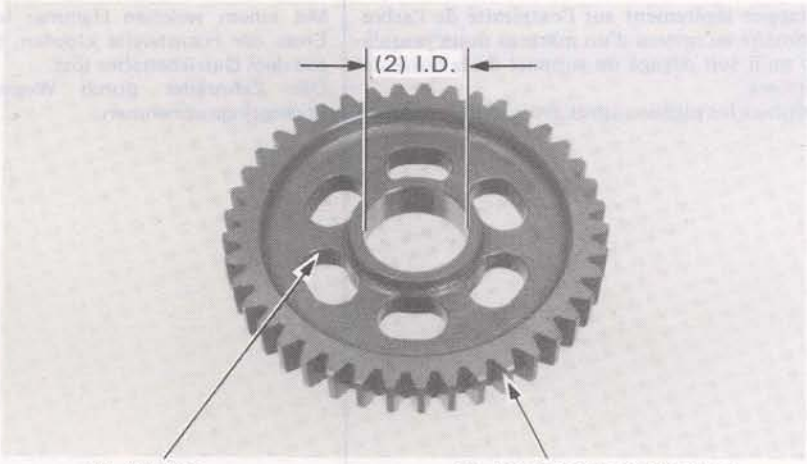


TRANSMISSION INSPECTION

Check the gears for freedom of movement or rotation on the shaft.
Examine the gear dogs for evidence of abnormal wear.
Measure each gear I.D. If any gear wear exceeds the limit, the gear must be replaced.

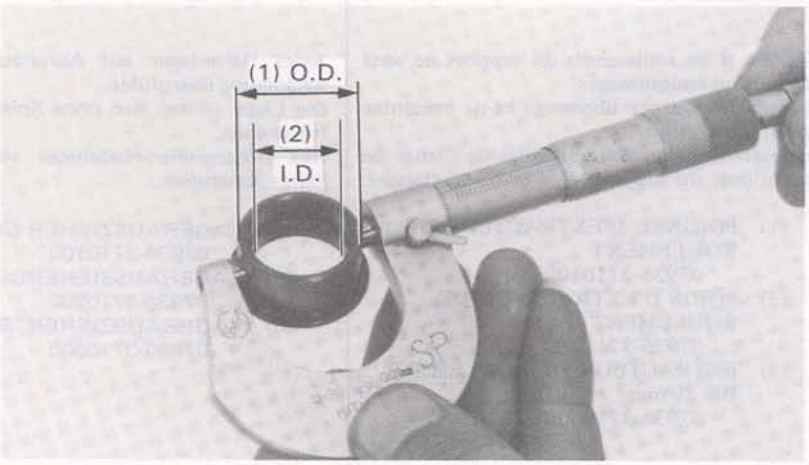
SERVICE LIMITS :

M2, M3, M4 and M5 GEARS	**: 25.10 mm (0.988 in.)**
C1 GEAR	**: 24.10 mm (0.949 in.)**
C2 GEAR	**: 27.60 mm (1.087 in.)**
C3 and C4 GEARS	**: 25.10 mm (0.988 in.)**
C5 GEARS	**: 32.10 mm (1.264 in.)**



Measure the countershaft low gear (C1) bushing I.D. and O.D.

SERVICE LIMIT :
I.D. : 20.06 mm (0.790 in.)
O.D. : 23.95 mm (0.943 in.)



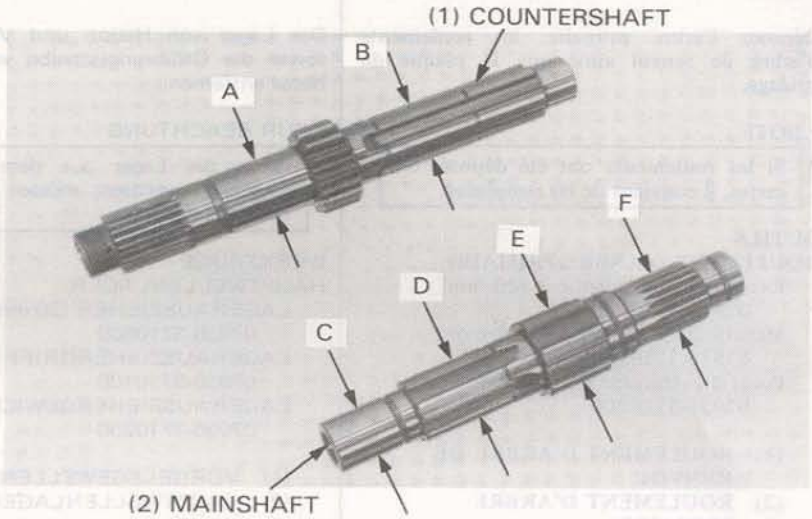
Measure and record the O.D. of the mainshaft and countershaft at the locations shown.

SERVICE LIMITS :

A : 27.43 mm (1.080 in.)
B : 31.91 mm (1.256 in.)
C : 24.93 mm (0.982 in.)
D : 19.96 mm (0.786 in.)
E : 24.91 mm (0.781 in.)
F : 24.91 mm (0.781 in.)

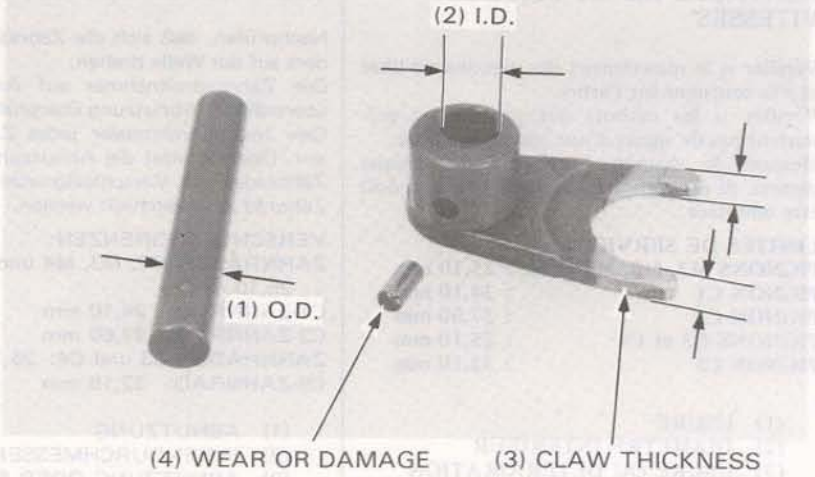
Subtract each shaft O.D. from the corresponding gear or bushing I.D. to determine clearance.

SERVICE LIMIT : 0.15 mm (0.0059 in.)



Measure the I.D. and claw thickness of each shift fork. Measure the fork shaft O.D.

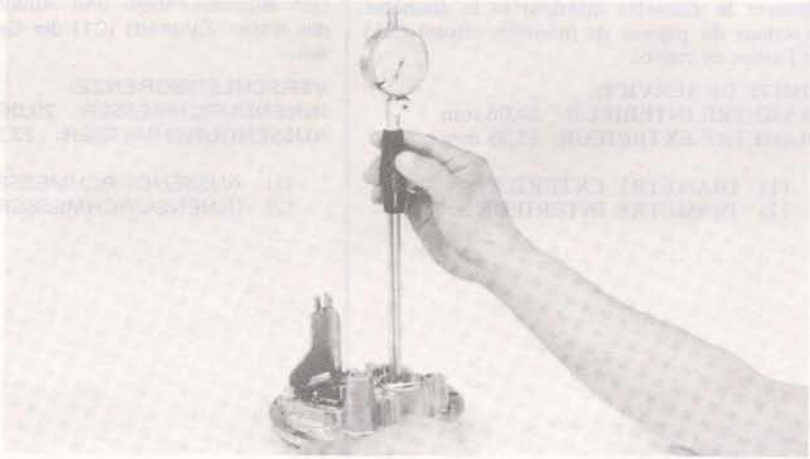
SHIFT FORK :
SERVICE LIMITS :
I.D. : 13.05 mm (0.514 in.)
CLAW THICKNESS : 5.50 mm (0.217 in.)
FORK SHAFT :
SERVICE LIMIT : 12.95 mm (0.510 in.)



Measure the transmission holder I.D.

SERVICE LIMIT : 35.06 mm (1.380 in.)

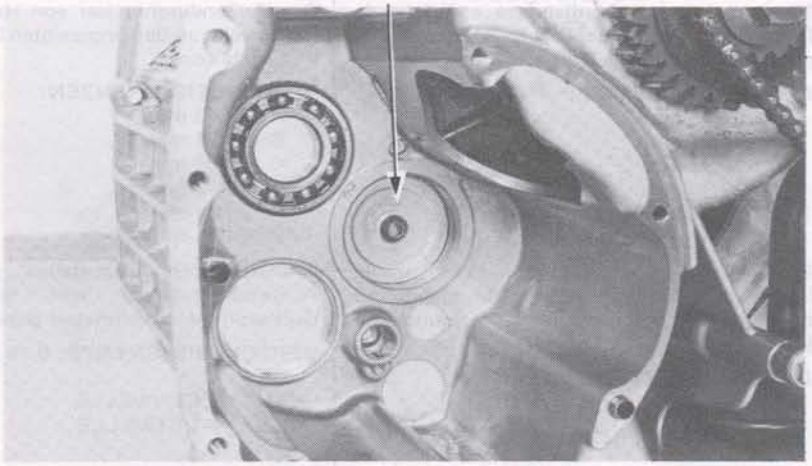
Spin the bearing by hand. The bearing must be replaced with a new one if it is noisy or has excessive play.



TRANSMISSION ASSEMBLY

Install the oil guide plate in the mainshaft bearing hole.

(1) OIL GUIDE PLATE



Install the mainshaft and countershaft bearings into the case.

TOOLS

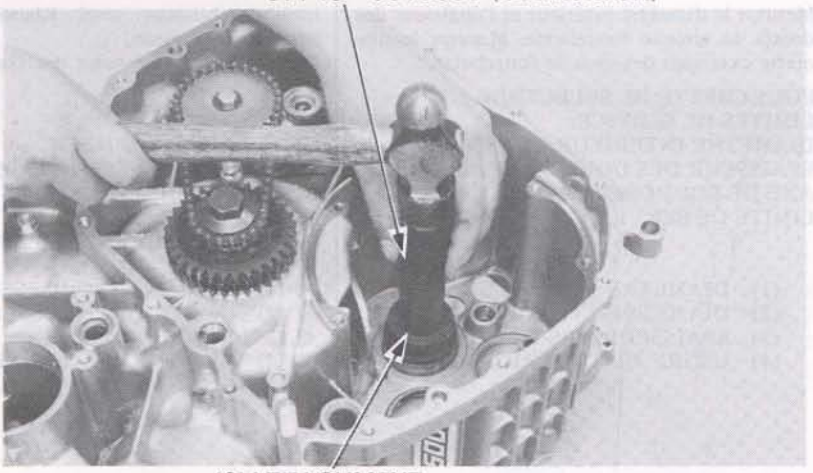
MAINSHAFT BEARING

- Attachment 42 x 47 mm
- Driver

COUNTERSHAFT BEARING

- 52 x 55 mm
- Pilot 25 mm
- Driver

(1) DRIVER 07942—3710000 (Mainshaft)
07749—0010000 (Countershaft)



(2)ATTACHMENT

Install the transmission holder bearing.

NOTE

Support the transmission holder above the workbench to prevent damaging it.

TOOLS

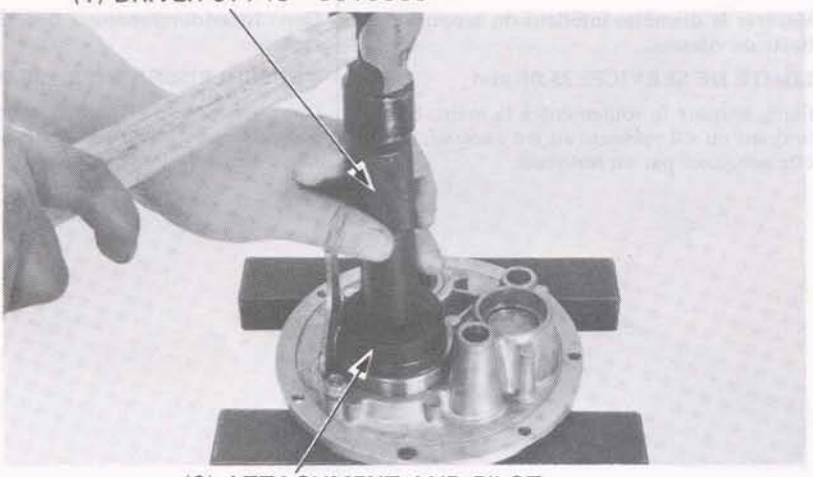
MAINSHAFT BEARING

- Attachment 62 x 68 mm
- Pilot 25 mm
- Driver

COUNTERSHAFT BEARING

- Attachment 32 x 35 mm
- Pilot 20 mm
- Driver

(1) DRIVER 07749—0010000

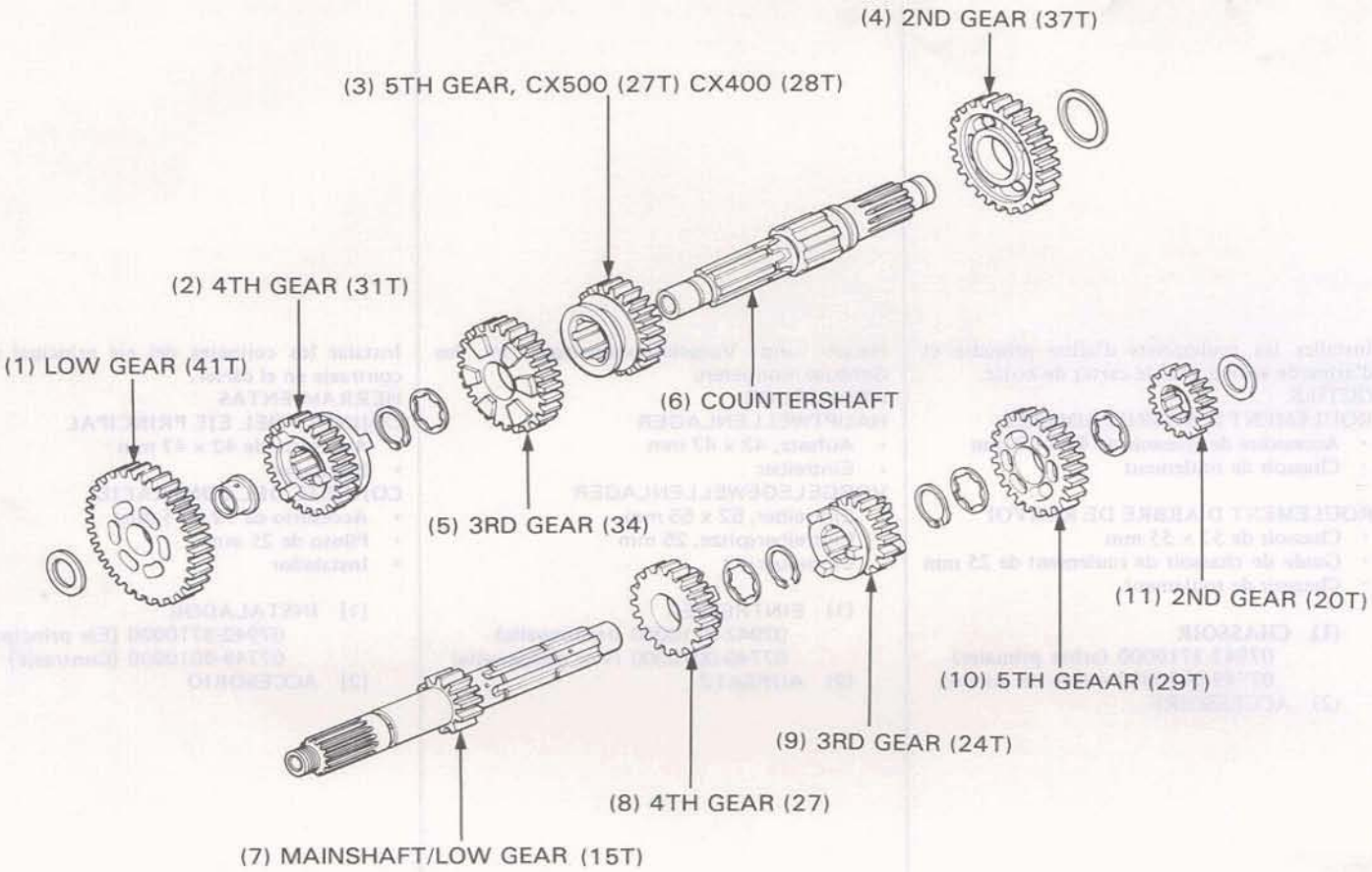


(2) ATTACHMENT AND PILOT

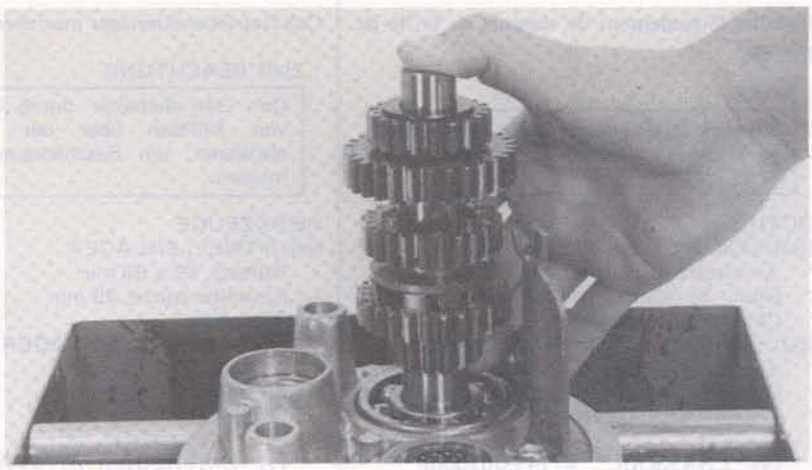
Assemble the mainshaft and countershaft.

NOTE

- Check the gears for freedom of movement or rotation.
- Check that all circlips are seated in their grooves.
- Lubricate the sliding surfaces of the gears with engine oil.



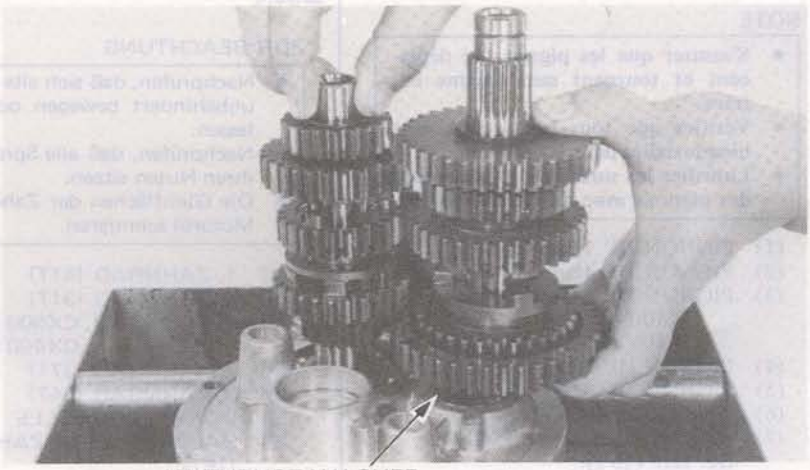
Insert the mainshaft assembly into the holder bearing until it seats lightly.



Insert the countershaft assembly into the bearing holder.
Check the engagement of the gears on the countershaft and mainshaft.

NOTE

During installation, hold the thrust washer to prevent it from falling.

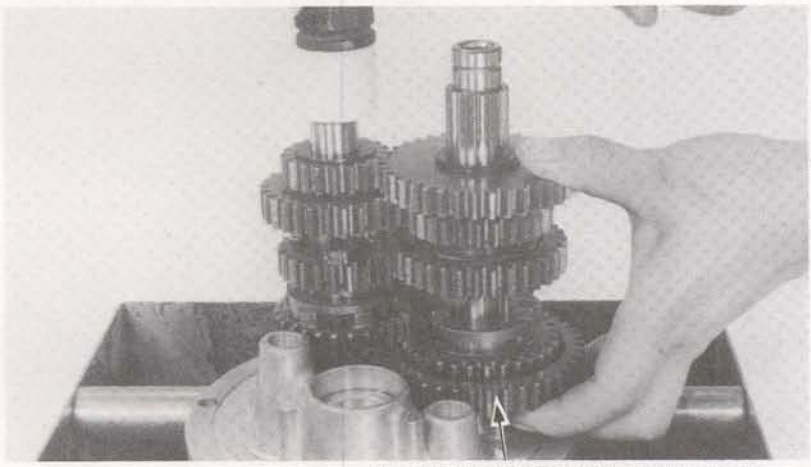


(1) THRUST WASHER

Press the gear assembly into position by lightly tapping the mainshaft with a soft hammer.

NOTE

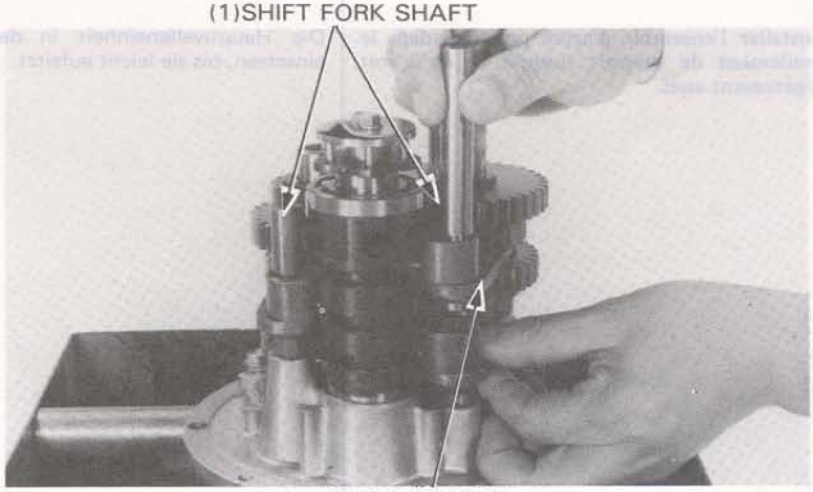
Hold the countershaft low gear to prevent if from coming off.



(1) COUNTERSHAFT LOW GEAR

Install the shift drum.
Insert a guide pin into each shift fork.
Engage the shift forks with the gears and shaft drum groove.
Install the shift fork shafts.

(1)SHIFT FORK SHAFT

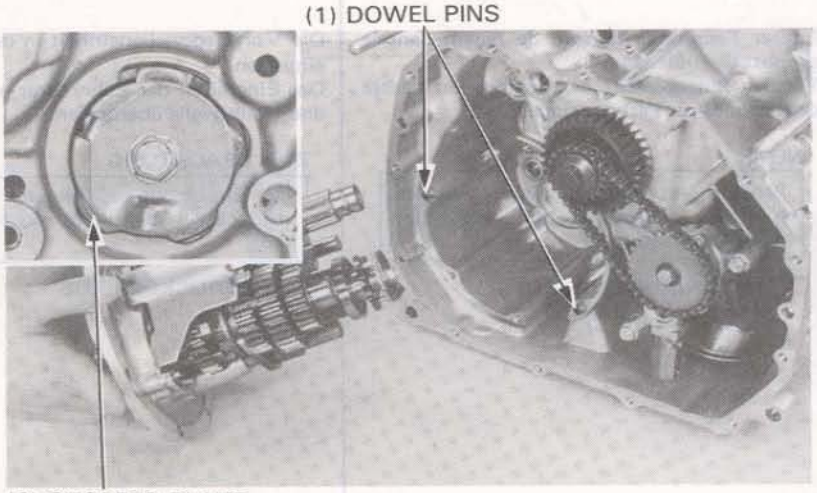


(2) SHIFT FORK

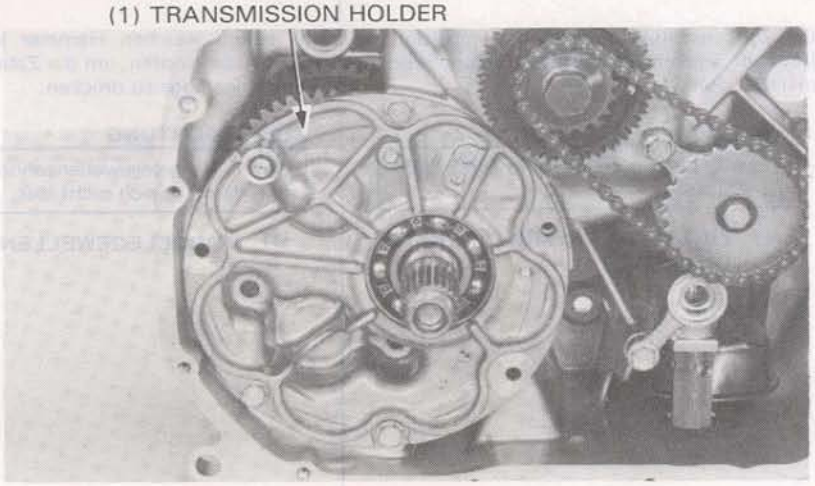
Place the transmission in neutral.
Insert the transmission assembly into the engine case.

NOTE

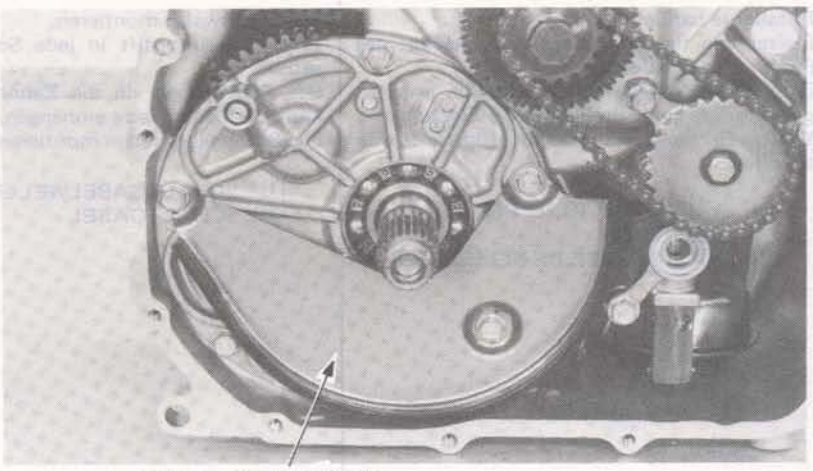
Align the projection on the shift drum with the cut-out in the engine case.



Press the transmission holder into place while rotating the mainshaft.
Torque the holder bolts.

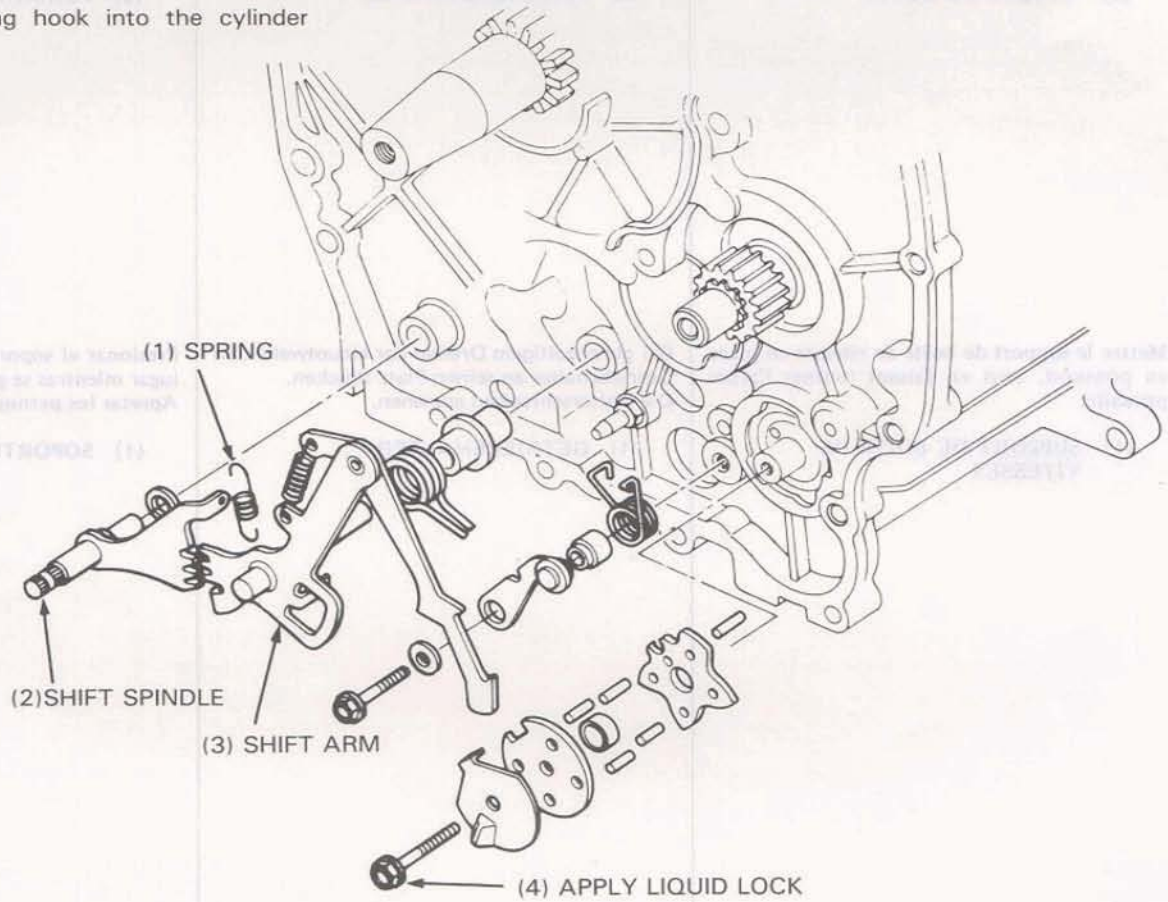


Install the oil separator.
Install the clutch (Page 7-5).
Install the engine front cover (Page 7-4).

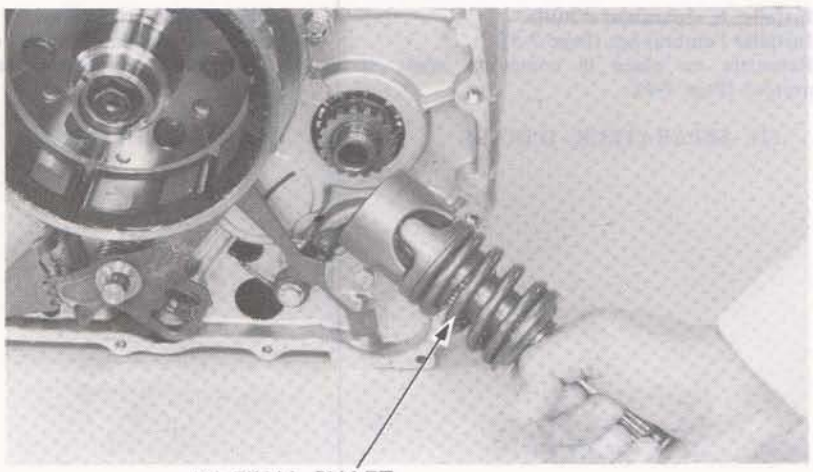


GEARSHIFT LINKAGE INSTALLATION

Install the shift drum cam plate, pin, collar, center plate, and point plate.
Install the gearshift arm.
Install the spring on the shift arm and shift splindle.
Install the spindle.
Place the sfift drum in neutral.
Position the drum on the drum stopper cam plate and tighten with 6 mm bolt.
Insert the stopper spring hook into the cylinder block.



Install the final shaft.
Install the rear cover (Page 8-9).



CRANKSHAFT/PISTON

VILEBREQUIN/PISTON

KURBELWELLE/KOLBEN

CIGÜEÑAL/PISTON

SERVICE INFORMATION	12–1	ROD BEARING SELECTION	12–10
TROUBLESHOOTING	12–2	MAIN JOURNAL BEARING REMOVAL	12–11
CONNECTING ROD REMOVAL	12–3	MAIN JOURNAL INSTALLATION	12–13
PISTON REMOVAL	12–4	CRANKSHAFT INSTALLATION	12–14
CYLINDER INSPECTIONN	12–5	PISTON INSTALLATION	12–16
CRANKSHAFT REMOVAL	12–6	CONNECTING ROD INSTALLATION	12–17
BEARING INSPECTION	12–8		

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- All bearing inserts are a select fit and are identified by color coldes. Select replacement bearing from the color code table.
- After installing new bearings, recheck them with plastigauge.
- Before removing the piston and connecting rod assemblies, clean the top of the cylinder of carbon deposits.
- The right piston can be serviced by removing the oil pump and transmission cover. To service the left piston, it is necessary to remove the transmission.
- Apply molybdenum disulfide grease to the journals, crankpins and bearings during assembly.

TOOLS

Special

Gear holder	07924–4150000 or 07924–MC70000
Piston remover	07941–4150000
Crank cap puller	07935–4150000
Crank cap driver	07945–4150100
Main bearing dis/assembly tool	07973–4150000

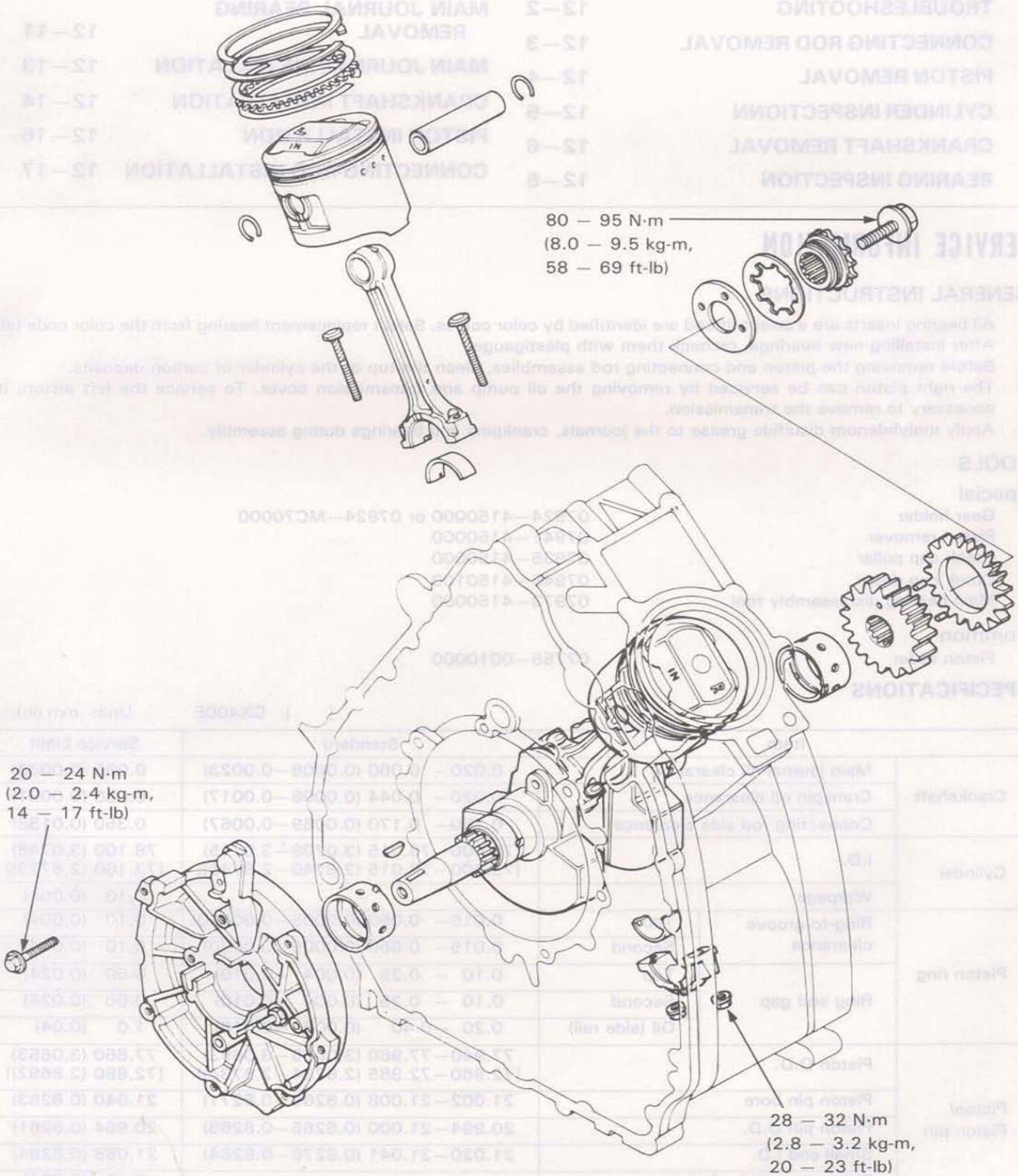
Common

Piston slider	07755–0010000

SPECIFICATIONS

[ ]: CX400E Unit: mm (in)

Item			Standard	Service Limit
Crankshaft	Main journal oil clearance		0.020– 0.060 (0.0008–0.0023)	0.085 (0.0033)
	Crankpin oil clearance		0.020– 0.044 (0.0008–0.0017)	0.080 (0.0031)
	Connecting rod side clearance		0.150– 0.170 (0.0059–0.0067)	0.350 (0.0138)
Cylinder	I.D.		78.000–78.015 (3.0709–3.0715) [73.000–73.015 (2.8740–2.8746)]	78.100 (3.0748) [73.100 (2.8779)]
	Warpage		—	0.10 (0.004)
Piston ring	Ring-to-groove clearance	Top	0.015– 0.050 (0.0005–0.00020)	0.10 (0.004)
		Second	0.015– 0.050 (0.0006–0.0020)	0.10 (0.004)
	Ring end gap	Top	0.10 – 0.25 (0.004 –0.010)	0.60 (0.024)
		Second	0.10 – 0.25 (0.004 –0.010)	0.60 (0.024)
		Oil (side rail)	0.20 –0.40 (0.008 –0.016)	1.0 (0.04)
Piston/ Piston pin	Piston O.D.		77.940–77.960 (3.0685–3.0693) [72.960–72.985 (2.8724–2.8734)]	77.860 (3.0653) [72.880 (2.8692)]
	Piston pin bore		21.002–21.008 (0.8268–0.8271)	21.040 (0.8283)
	Piston pin O.D.		20.994–21.000 (0.8265–0.8268)	20.984 (0.8261)
	Small end I.D.		21.020–21.041 (0.8276–0.8284)	21.068 (0.8294)
	Piston-to-cylider clearance		—	0.10 (0.004)


80 — 95 N·m
(8.0 — 9.5 kg-m,
58 — 69 ft-lb)
20 — 24 N·m
(2.0 — 2.4 kg-m,
14 — 17 ft-lb)
28 — 32 N·m
(2.8 — 3.2 kg-m,
20 — 23 ft-lb)

TORQUE VALUES

Crankshaft cap bolt	20—24 N·m (2.0—2.4 kg-m, 14—17 ft-lb)
Connecting rod cap nut	28—32 N·m (2.8—3.2 kg-m, 20—23 ft-lb)
Primary drive gear bolt	80—95 N·m (8.0—9.5 kg-m, 58—69 ft-lb)

TROUBLESHOOTING

Excessive Noise

1. Crankshaft
   - Worn main bearing
   - Worn rod bearing
2. Piston and Connecting Rod
   - Worn piston or cylinder
   - Worn piston pin or pin hole
   - Worn rod small end

Low Compression or Uneven Compression

1. Worn cylinder or piston ring

Excessive Smoke

1. Worn cylinder, piston or piston rings
2. Improperly installed piston rings
3. Damaged piston or cylinder

Overheating

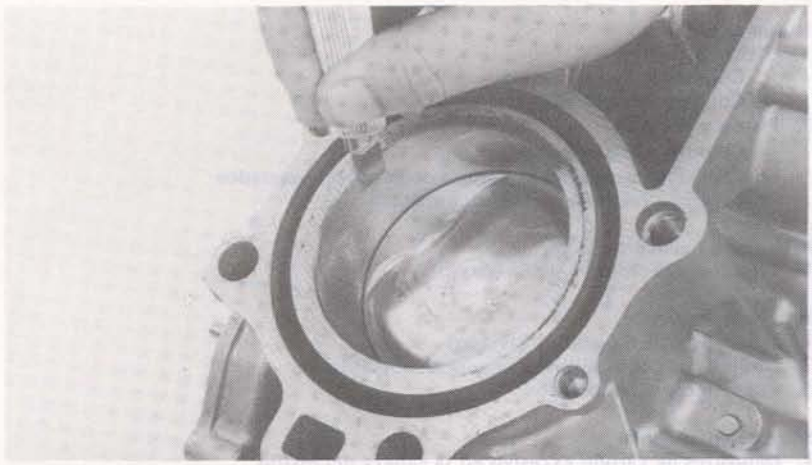
1. Excessive carbon build-up on piston head
2. Blocked or restricted flow of coolant
3. Sticking thermostat

Knocking or Abnormal Nose

1. Worn pistons and cylinders
2. Excessive carbon build-up on piston head

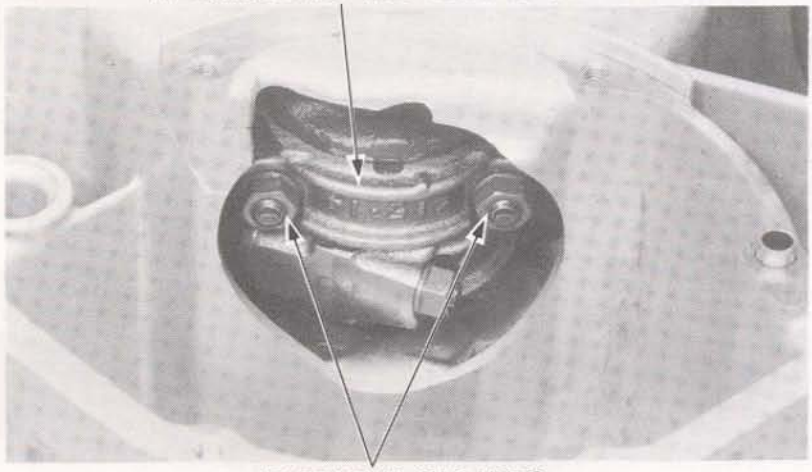
CONNECTING ROD REMOVAL

Remove the cylinder head (Page 6-4).
Remove the oil pump (Page 7-9).
Remove the transmission (Page 11-5).
Scrape all deposits from the top of the cylinder block.



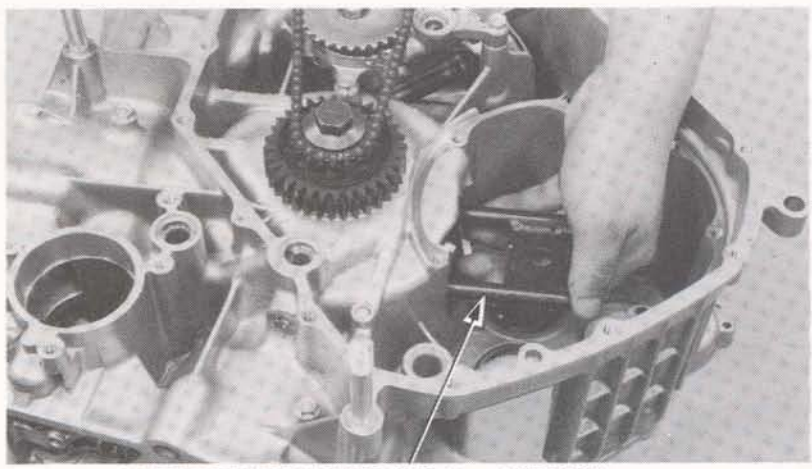
(1) CONNECTING ROD BEARING CAP

Turn the cranksahft so that the piston to be removed is at B.D.C. (Bottom Dead Center).
Remove the bearing cap.
Mark the bearing caps through the transmission side. To remove the right side cap, work through the hole on the pump side.



(2) BEARING CAP NUTS

Turn the crankshaft so that the piston is at T.D.C. (Top Dead Center).
Place the PISTON REMOVER over the rod bolts, and then push out the piston and rod assembly.



(1) PISTON REMOVER 07941—4150000

PISTON REMOVAL

Remove the piston pin clips.
Press the pin free of the piston.

NOTE

Mark the pins to indicate the piston position.

PISTON INSPECTION

Measure the ring-to-groove clearance.

SERVICE LIMIT :
(TOP/SECOND) : 0.10 mm (0.004 in)

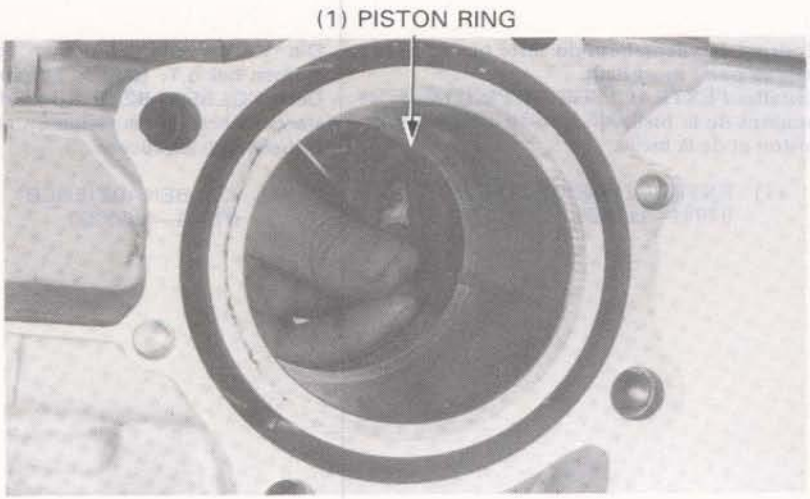
Remove the piston rings.

NOTE

Mark the rings so they can be assembled in their original position.

Clean and inspect the piston crown.
Insprct the piston for damage and cracks; check the ring grooves for excessive wear.

Measure each piston ring end gap.



NOTE

To test the gap, use a piston and push the ring down into the cylinder. Make sure that the ring is square in the cylinder.

SERVICE LIMITS :

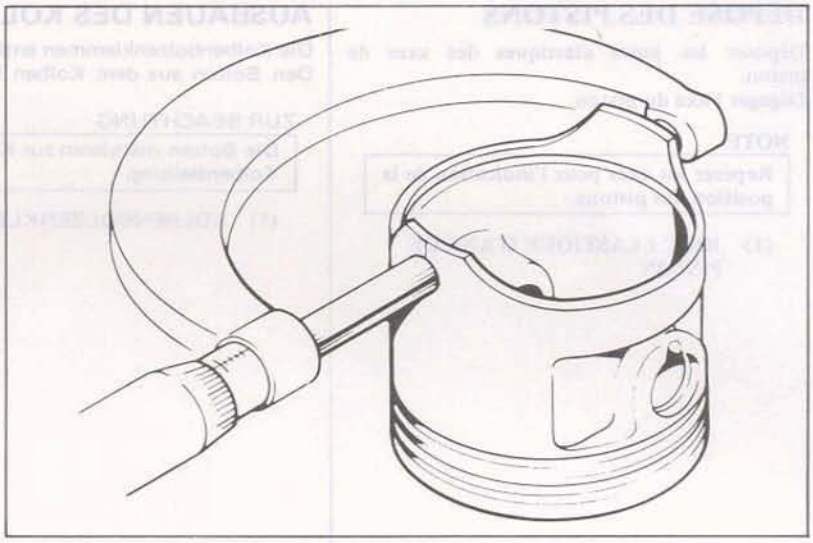
TOP	**: 0.60 mm)0.024 in.)**
SECOND	**: 0.60 mm (0.024 in.)**
OIL (SIDE RAIL)	**: 1.10 mm (0.043 in.)**

Measure each piston diameter at the skirt. If the pistons show wear beyond limits, replacement is necessary.

SERVICE LIMIT (CX500E): 77.860mm (3.0653 in.)
(CX400E): 72.880mm (2.8692 in.)

NOTE

Measure the position diameter at a point 7—10 mm (0.28—0.4 in.) up from the end of the piston.



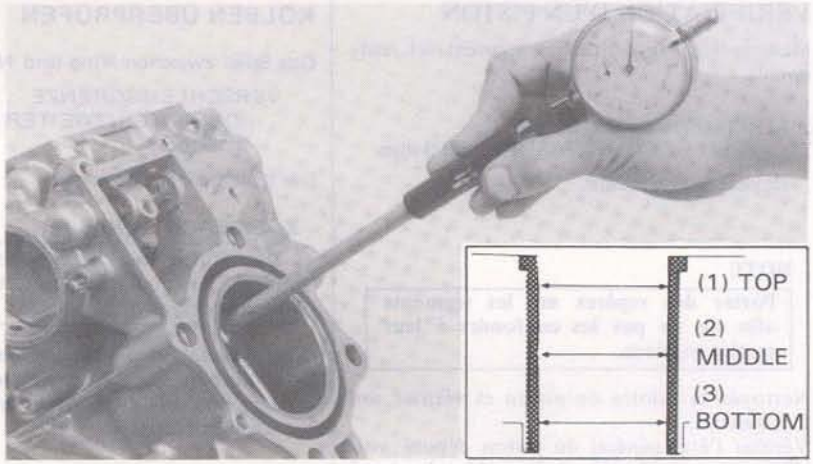
CYLINDER INSPECTION

Measure the cylinder I.D.

SERVICE LIMIT (CX500E): 78.100mm (3.0748 in.)
(CX400E): 73.100mm (2.8779 in.)

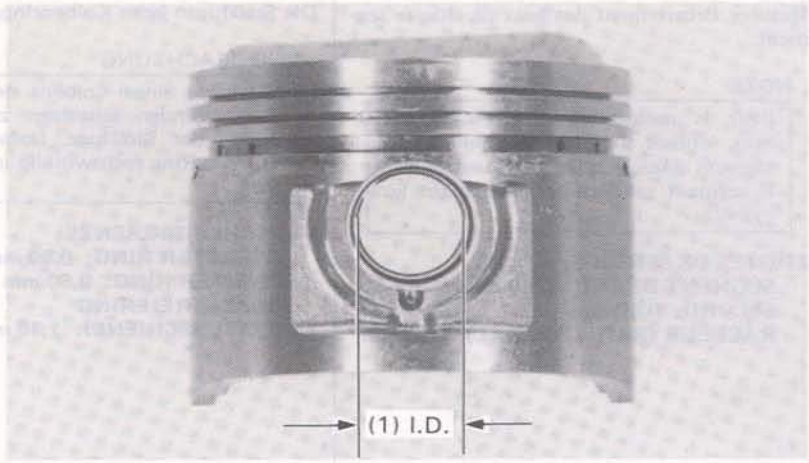
Calculate the piston to cylinder clearance.

SERVICE LIMIT : 0.10 mm (0.004 in.)



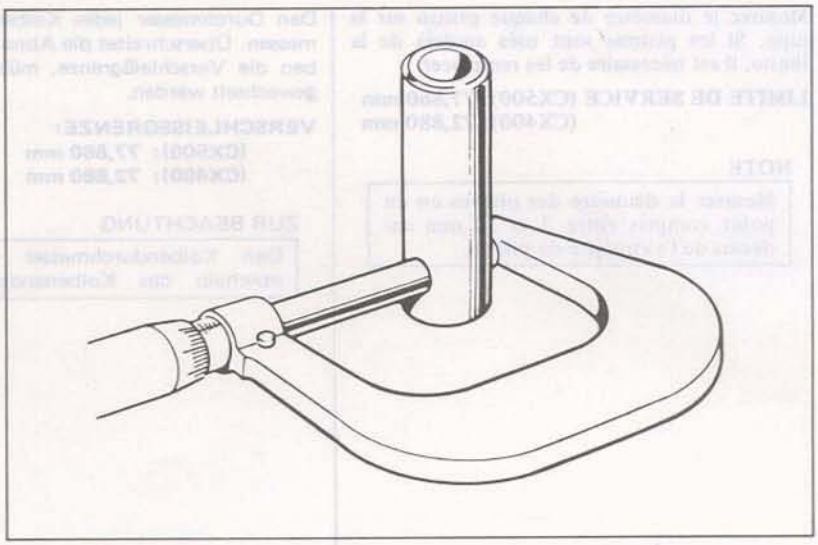
Measure each piston pin bore.

SERVICE LIMIT : 21.040 mm (0.8283 in.)



Measure each piston pin O.D.
SERVICE LIMIT : 20.984 mm (0.8261 in.)

Calculate the piston pin to piston clearance.
SERVICE LIMIT : 0.05 mm (0.002 in.)



Measure the end I.D. If the reading exceeds the service limit, replace the rod.
SERVICE LIMIT : 21.068 mm (0.8294 in.)

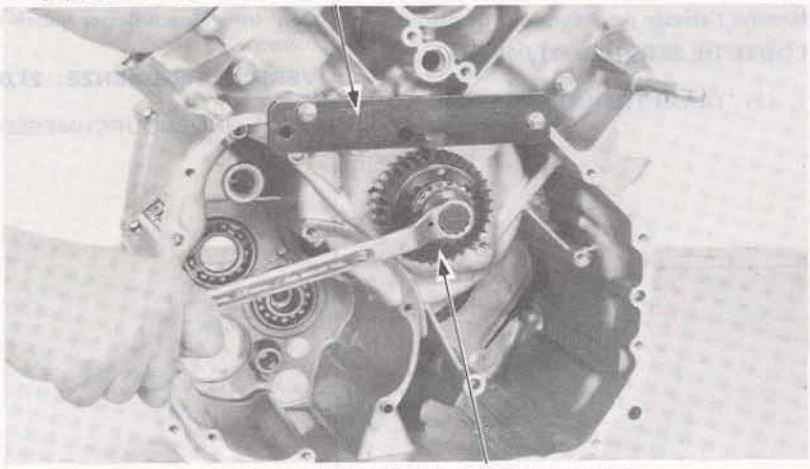
CRANKSHAFT REMOVAL

Hold the primary drive gear with a GEAR HOLDER. Remove the 12 mm bolt and the oil pump sprocket, disc spring, side plate, sub gear and primary gear.

NOTE

Mark the sub gear and side plate so that they will face the coorect direction during reassembly.

(1) GEAR HOLDER 07924—4150000 or 07924—MC70000



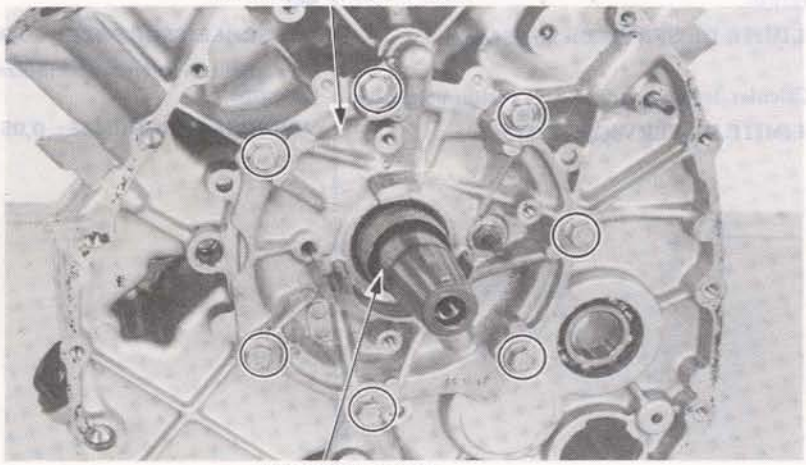
(2) PRIMARY DRIVE GEAR

Remove the flywheel and cam chain (Page 10-2).
Remove the crankshaft cap bolts.

NOTE

Before removing the crankshaft, wrap the splines of the primary gear and timing sprocket with vinyl tape to prevent damage to them.

(2) CRAFTSHAFT CAP



(1) VINYL TAPE

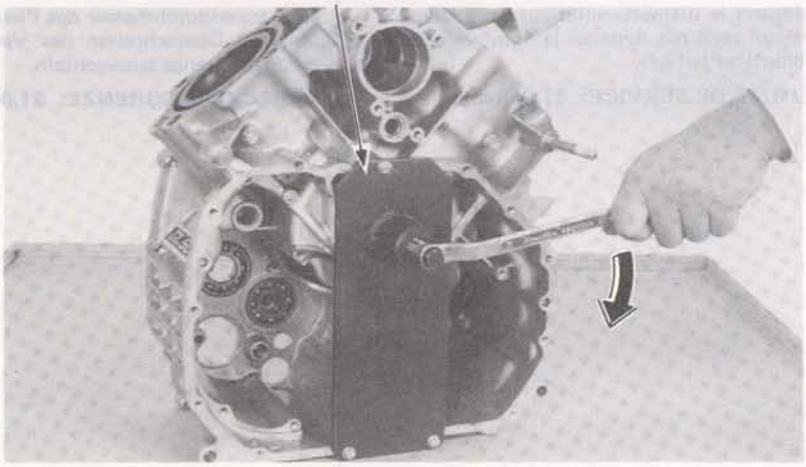
Attach the CRANK CAP PILLER to front of the engine.

Press the crankshaft out by screwing in the CRANK CAP PULLER, or use a press to remove the crankshaft.

WARNING

Do not damage the bearing when removing the crankshaft.

(1) CRANK CAP PULLER 07935—4150000



ROD SIDE CLEARANCE INSPECTION

Install each connecting rod and bearing cap in its original position and torque to specifications.

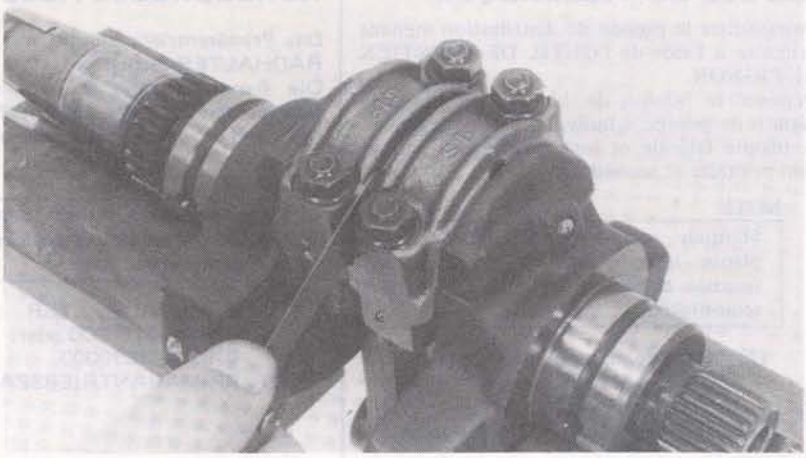
TORQUE : 28—32 N·m (2.8—3.2 kg-m, 20—23 ft-lb)

NOTE

- Torque the cap bolts evenly in 2—3 steps.
- Do not rotate the crankshaft during inspection.

Measure the rod side clearance with a feeler gauge.

SERVICE LIMIT : 0.35 mm (0.0138 in.)



BEARING INSPECTION

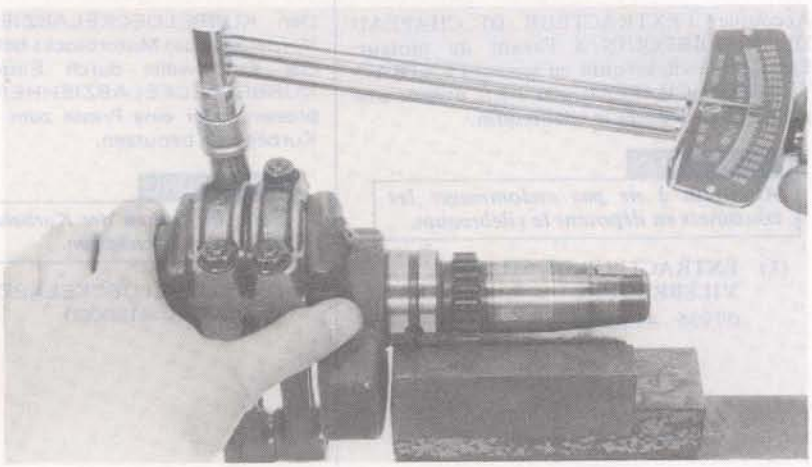
CRANKPIN

Check each bearing insert for damage, flaking and other damage.
Put the connecting rod inserts in each rod cap.
Place a plastigauge strip across each rod crankpin as shown.

NOTE

Avoid placing plastigauge across the crankshaft oil hole.

Inseall each connecting rod on the corresponding crankpin and torque to specifications.
TORQUE : 28—32 N·m
(2.8—3.2 kg-m, 20—23 ft-lbs)



NOTE

- Torque the cap bolts evenly in 2—3 steps.
- Do not rotate the crankshaft during the inspection.

Remove the caps and measure the width of each plastigauge.

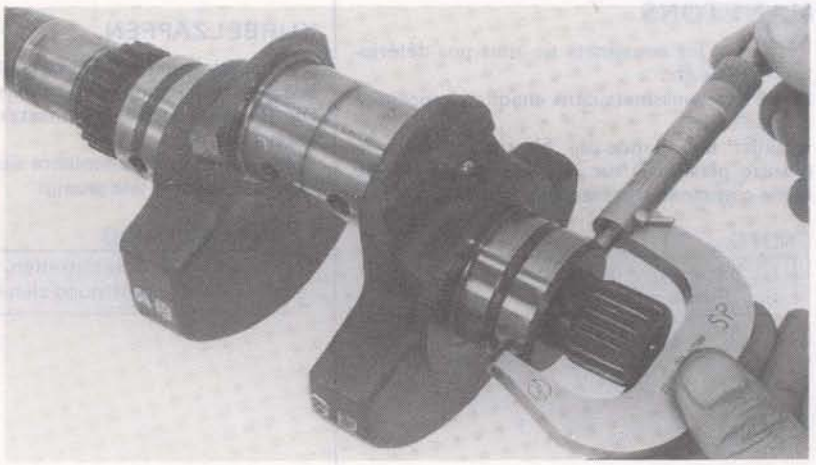
NOTE

The widest thickness determines the oil clearance.

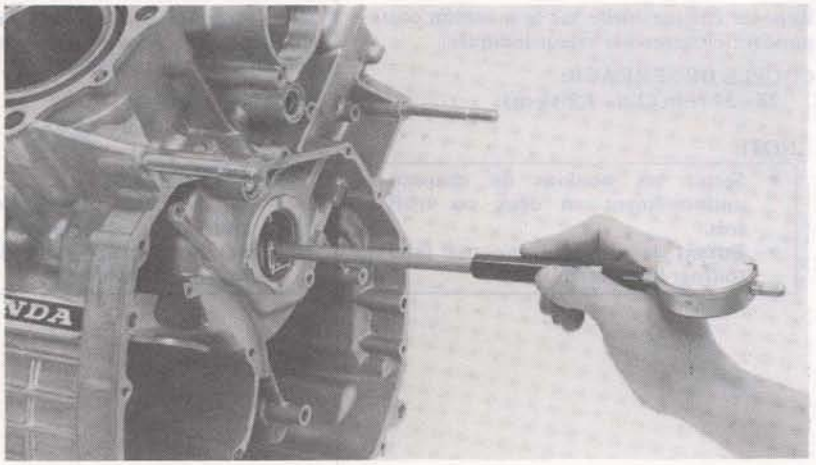
SERVICE LIMIT : 0.08 mm (0.0031 in.)

MAIN JOURNAL

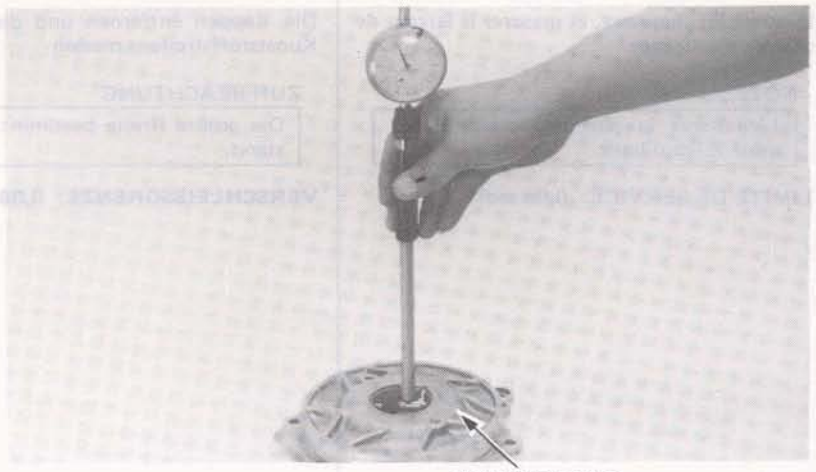
Measure and record each journal O.D.



Measure the engine case and crankshaft bearing cap I.D.
Calculate the journal to bearing cap clearance.
SERVICE LIMIT : 0.085 mm (0.0033 in.)



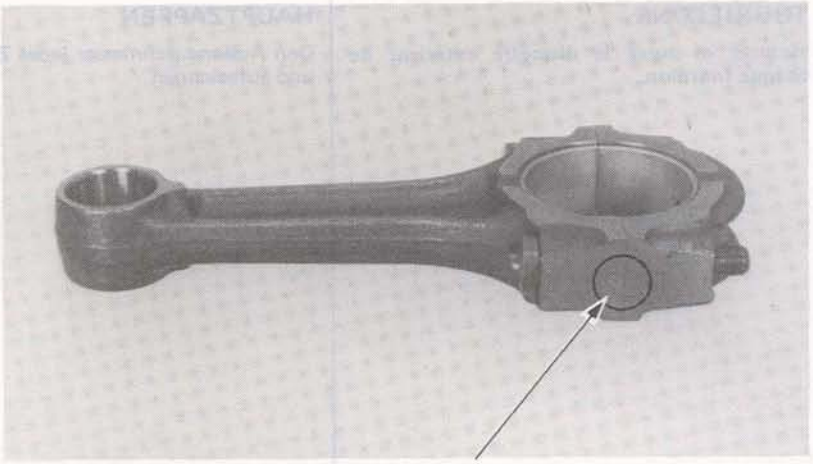
Measure the crankshaft bearing cap I.D. Calculate the journal to bearing cap clearance.
If rod bearing clearance is beyond to lerance, slect replacement bearings.



BEARING CAP

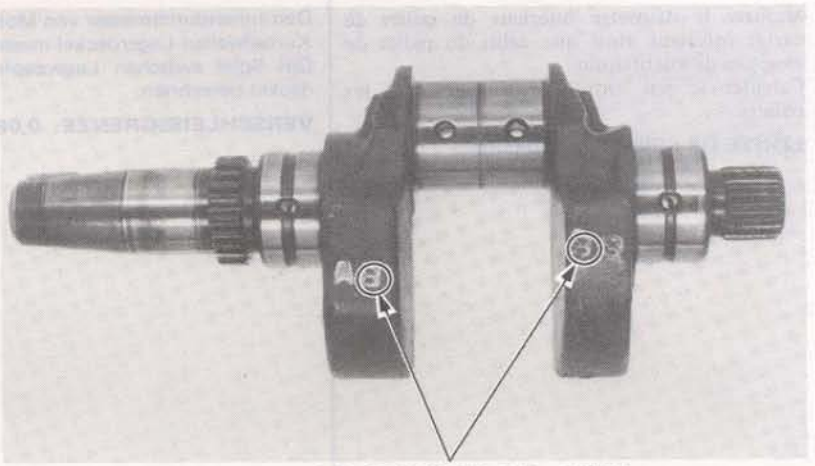
ROD BEARING SELECTION

Determine and record each connecting rod I.D. code number.



(1) CODE NO.

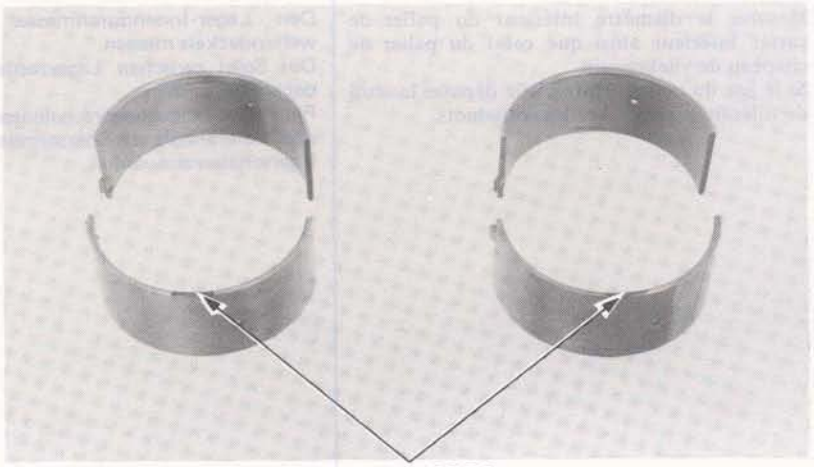
Determine and record the corresponding crankpin O.D. code letters.
Cross reference the crank pin and rod codes to determine the replacement bearing color.



(1) CRANKPIN O.D. CODE

ROD BEARING SELECTION

CONNECTING ROD I.D. CODE NUMBER		CRANKPIN SIZE CODE LETTER: A	B	C
		39.992— 40.000 mm (1.5745— 1.5748 in)	39.984— 39.992 mm (1.5742— 1.5745 in)	39.976— 39.984 mm (1.5739— 1.5742 in)
		COLOR IDENTIFICATION		
1	43.00— 43.008 mm (1.6929— 1.6932 in)	PINK	YELLOW	GREEN
2	43.008— 43.016 mm (1.6932— 1.6935 in)	YELLOW	GREEN	BROWN
3	43.016— 43.024 mm 1.6935— 1.6939 in)	GREEN	BROWN	BLACK



(2) COLOR CODE

ROD BEARING SIZES

COLOR	BEARING THICKNESS
BLACK	1.503 — 1.507 mm
BROWN	1.499 — 1.503 mm
GREEN	1.495 — 1.499 mm
YELLOW	1.491 — 1.495 mm
PINK	1.487 — 1.491 mm

NOTE

After fitting new bearing inserts, they should be rechecked with plastigauge.

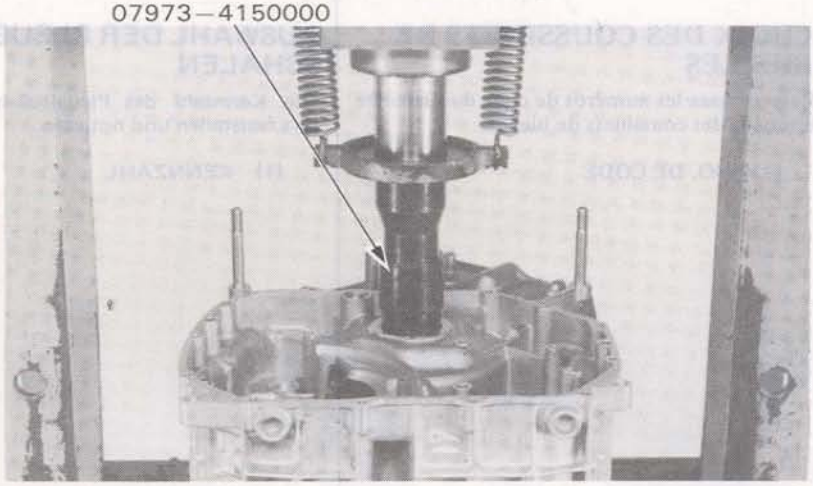
MAIN JOURNAL BEARING REMOVAL

Press bearings free with a hydraulic press and bearing DIS/ASSEMBLY tool.

CAUTION

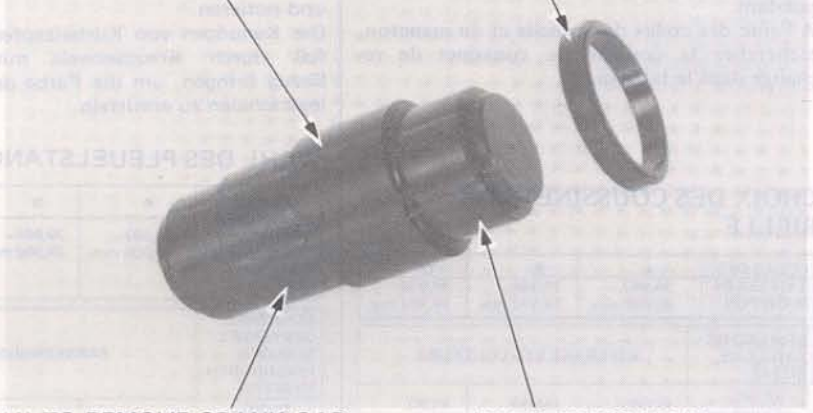
Always use a hydraulic press and bearing removal tool to remove bearings.

(1) MAIN BEARING DIS/ASSEMBLY TOOL
07973—4150000



(2) TOOL
07973—4150000
(Stamped "R")

(3) ATTACHMENT :
(Part of 07973—4150000) (Stamped "P")
TO PRESS CRANK CAP BEARINGS



(4) TO REMOVE CRANK CAP AND CRANKCASE BEARING

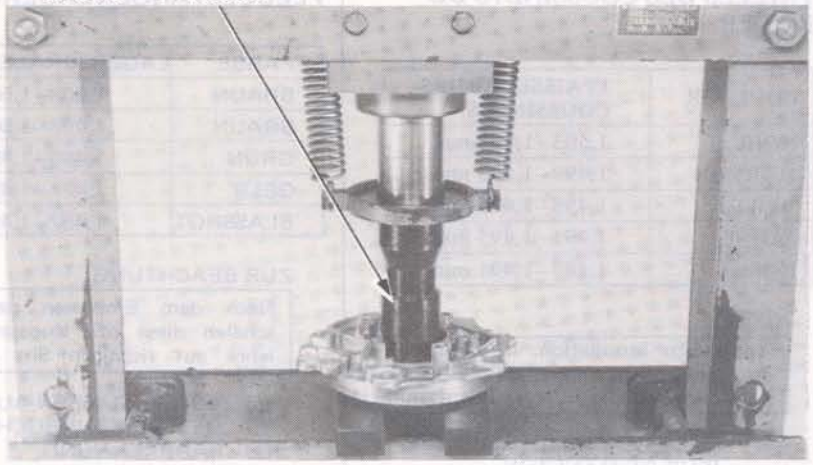
(5) TO PRESS MAIN JOURNAL BEARINGS

Press bearings free of the crankshaft cap bearing supports with a hydraulic press and bearing removal tool.

CAUTION

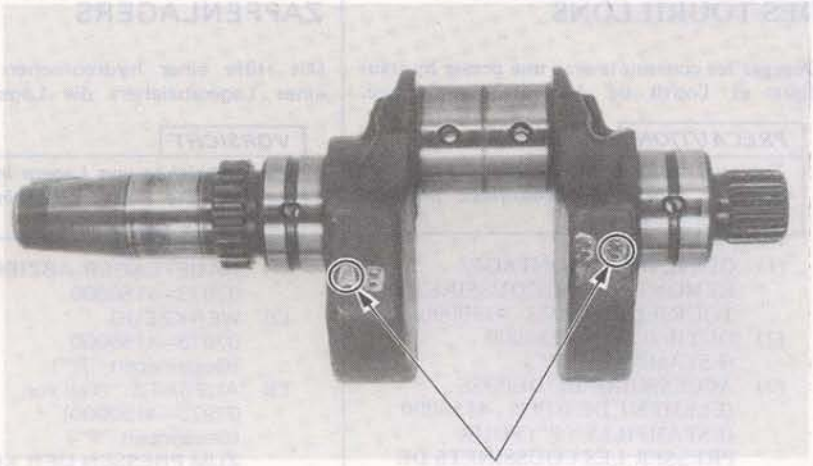
Always use a hydraulic press and bearing removal tool to remove bearings.

(1) MAIN BEARING DIS/ASSEMBLY TOOL
07973—4150000



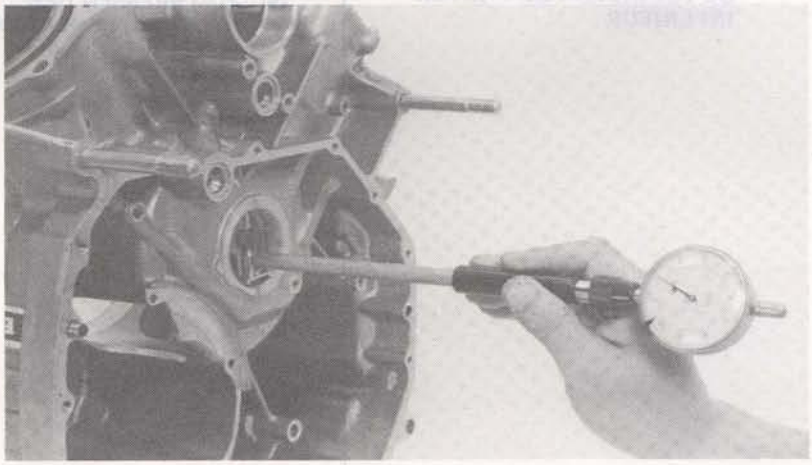
SELECTION

Determine and record the main journal O.D. codes.



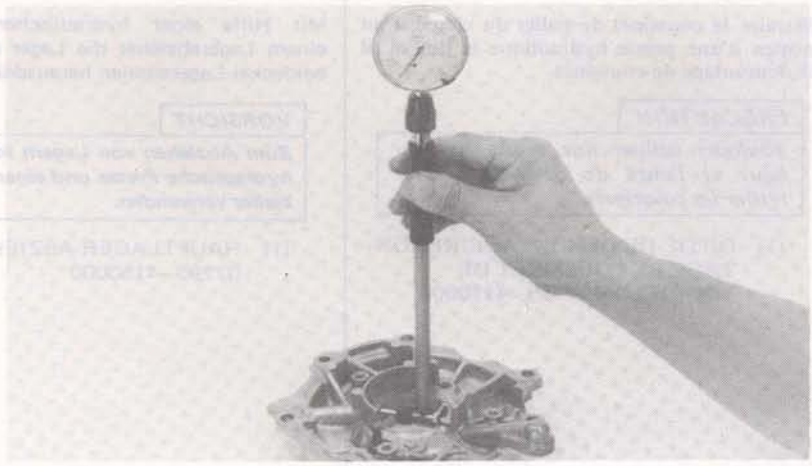
(1) MAIN JOURNAL O.D. CODE

Measure the engine case bearing support I.D.



Measure the crankshaft cap bearing support I.D.

Cross reference the bearing support I.D. and crank journal codes to determine the replacement bearing color (Page 12-13).



MAIN BEARING SELECTION

	MAIN JOURNAL SIZE CODES	
	A	B
CRANKCASE/CAP BEARING SUPPORT I.D.	BEARING IDENTIFICATION COLOR	
47.000—47.010 mm (1.8504—1.8508 in)	BROWN	BLACK
47.010—47.020 mm (1.8508—1.8517 in)	BLACK	BLUE

JOURNAL BEARING SIZES

COLOR	THICKNESS
BROWN	1.989—1.999 mm (0.0783—0.0787 in)
BLACK	1.994—2.004 mm (0.0785—0.0789 in)
BLUE	1.999—2.009 mm (0.0787—0.0791 in)

MAIN JOURNAL BEARING INSTALLATION

Apply engine oil or molybdenum dislfide grease to the bearing outer surface.
Align the tab of bearing insert with the holder cap groove and press the bearing into place. Use the end of the tool with the "P" mark.

NOTE

Draw two lines on the outside of the bearings to match the tab to aid in bearing alignment.

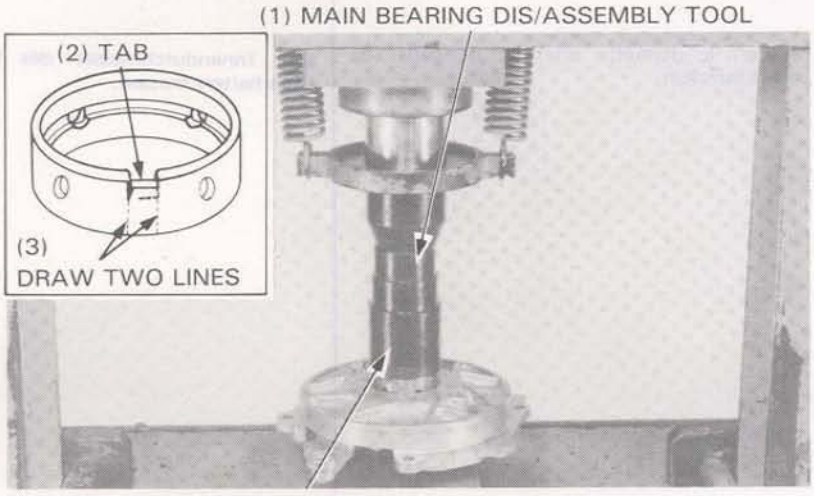
CAUTION

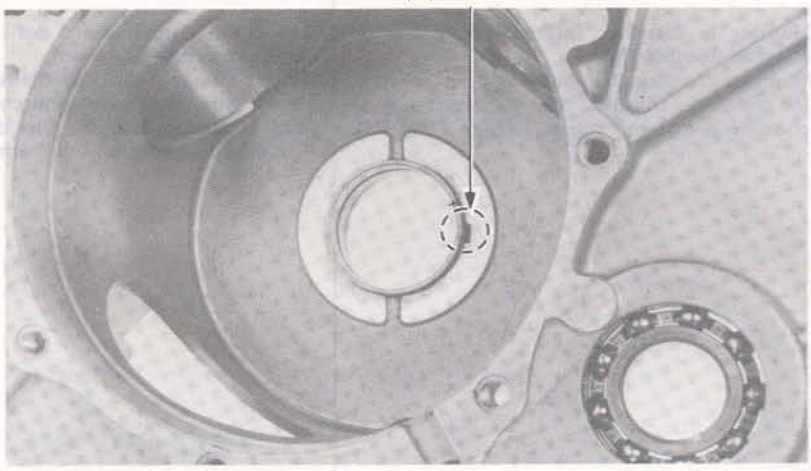
Be careful not to damage the bearing when press fitting them.

Lubricate the outer surface of each bearing with engine oil or molybdenum disulfide grease. Align the tab of bearing insert with the crankcase bearing support groove.

NOTE

Draw two lines on the outside of the bearings to match the tab to aid in bearing alignment.



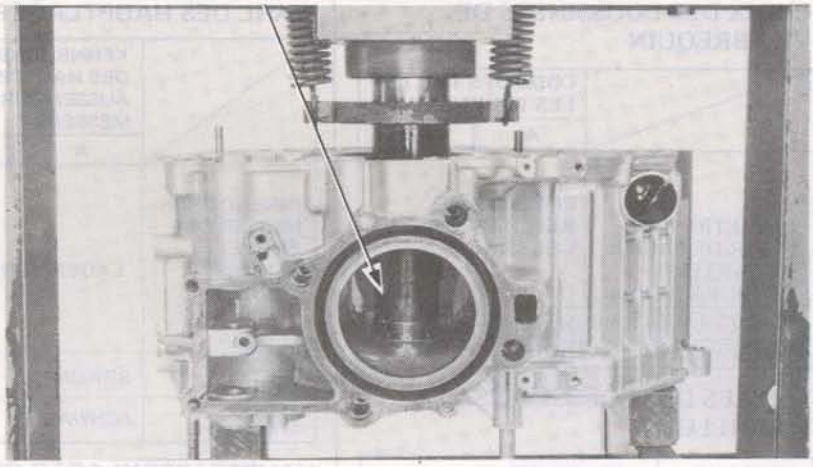


Press the bearing into engine case.
Use the end of the tool with "P" mark.

CAUTION

Be careful not to damage the bearing when press fitting them.

(1) MAIN BEARING DIS/ASSEMBLY TOO 07973—4150000



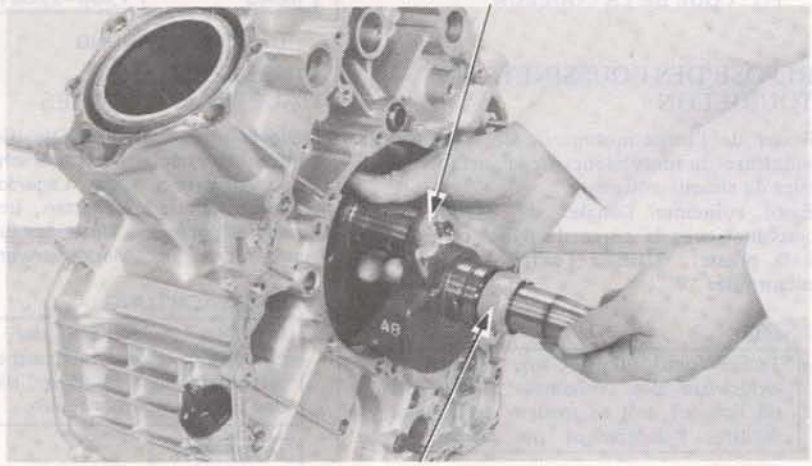
CRANKSHAFT INSTALLATION

Install the lower main bearing inserts.
Install the crankshaft.

NOTE

- Lubricate the bearings, main journals and crankpins with molybdenum disulfide grease.
- Wrap the splines of the crankshaft and timing gear area with vinyl tape to prevent damage.

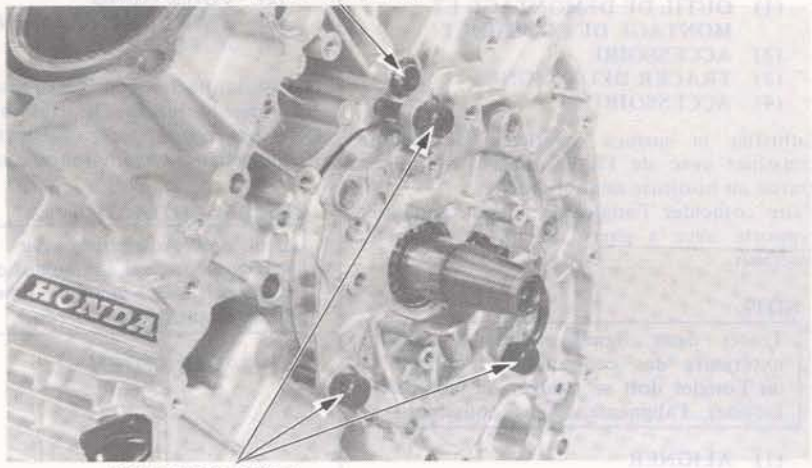
(1) CRANKSHAFT



(2) VINLY TAPE

Install the O-ring and collar.
Install the crankshaft holder cap.
Install the guide bolts in the crankshaft holder cap as shown.

(1) O-RING AND COLLAR



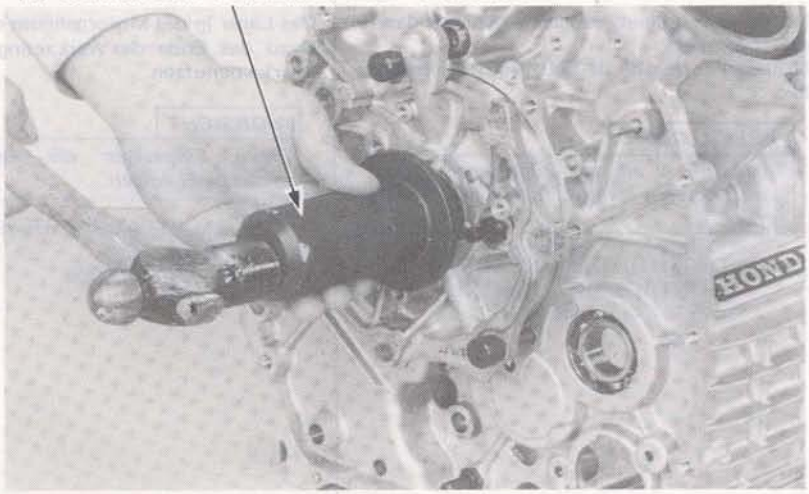
(2) GUIDE BOLT

NOTE

- Lubricate the bearing with molybdenum disulfide grease.
- Screw in the guide bolts so that the cap is not tilted.

Drive the cap into place with a hammer.

(1) CRANK CAP DRIVER 07945—4150100

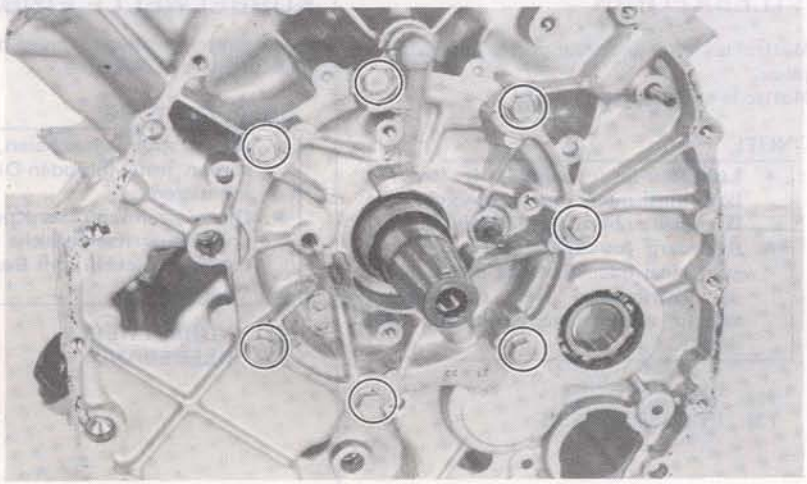


Tighten the cap bolts.

TORQUE : 20—24 N·m (2.0—2.4 kg-m, 14—17 ft-lb)

NOTE

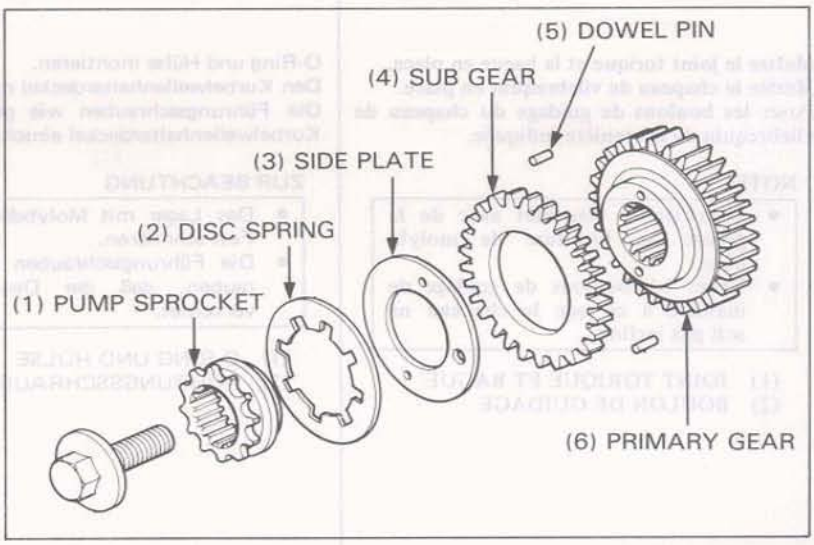
After tightening the bolts, make sure that the crankshaft rotates freely.



Install the primary gear, primary sub gear, side plate, disc spring and oil pump drive sprocket.

NOTE

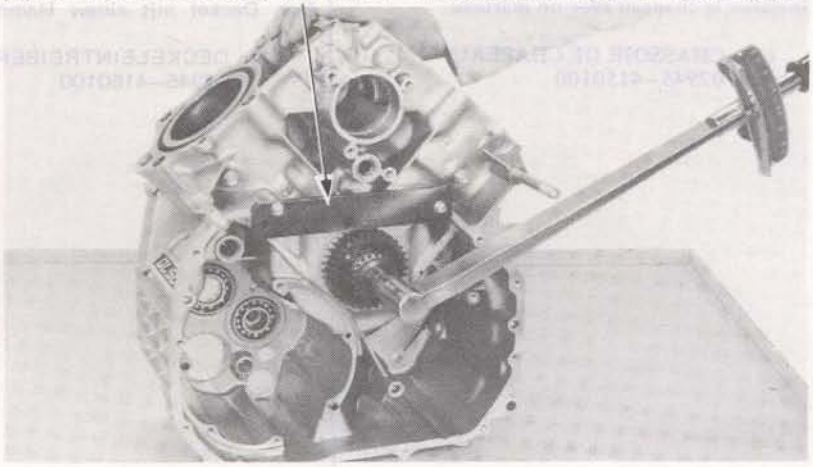
- Install the disc spring with the pawls placed over the dowel pins to prevent them from coming out during operation.
- Before assembling, lubricate all parts with engine oil.
- Note the primary sub gear and side plate directions by referring to the marks made during disassembly.



Install the DRIVE GEAR HOLDER to prevent the drive gear from turning.
Torque the primary gear.

TORQUE : 80—95 N·m (8.0—9.5 kg-m, 58—69 ft-lb)

(1) DRIVE GEAR HOLDER 07924—4150000 or 07924—MC70000

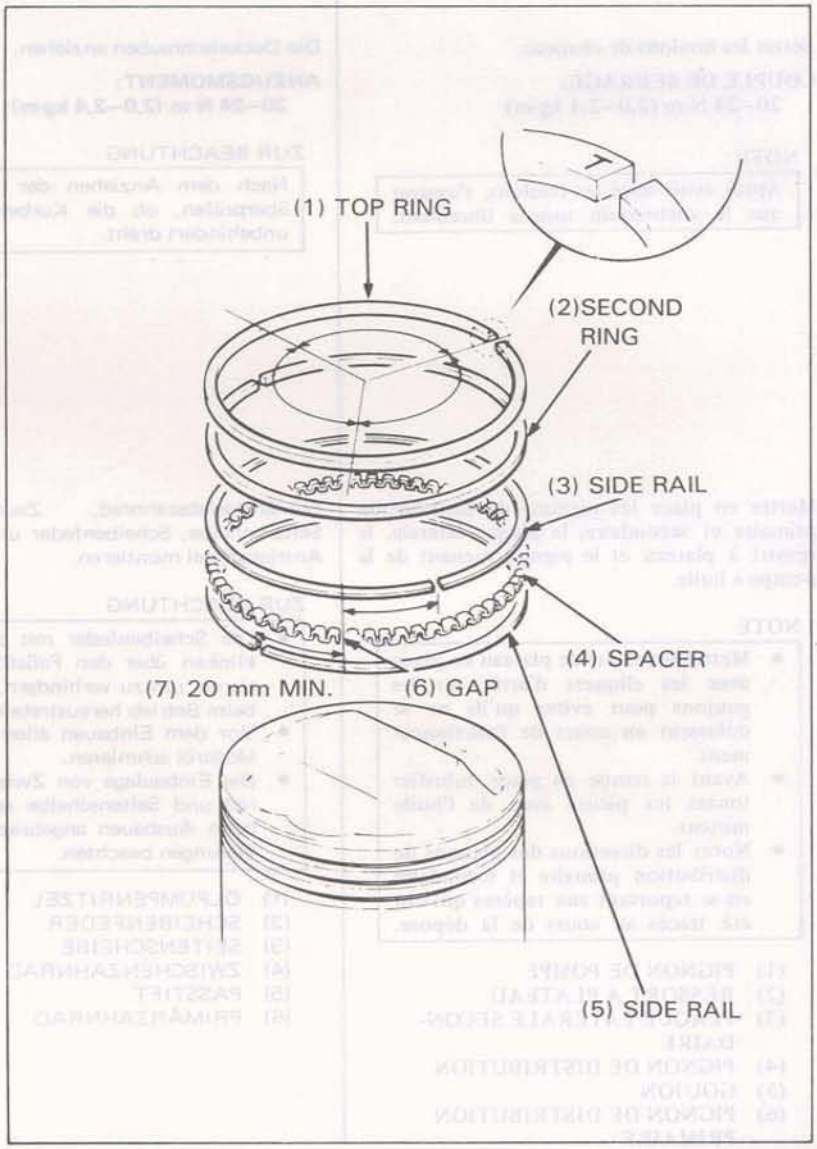


PISTON INSTALLATION

Clean the piston domes, ring lands, and side gaces.
Carefully install the piston rings.

NOTE

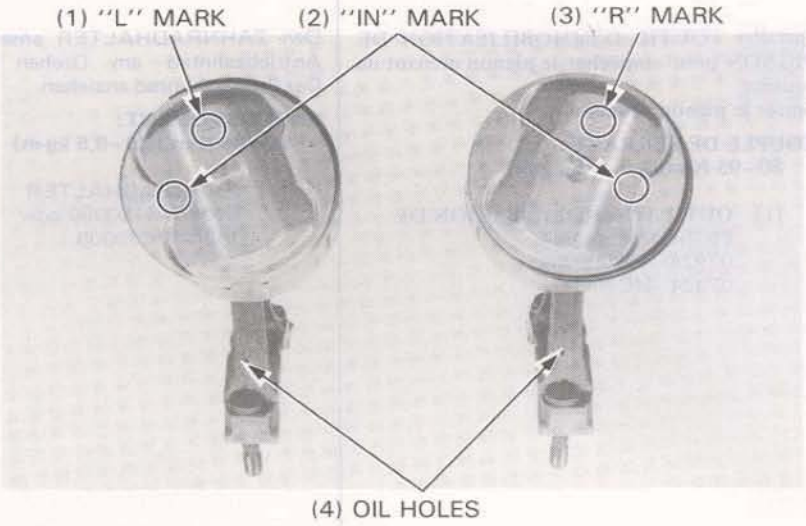
- Do not damage the pistons and piston rings during assembly.
- All rings should be installed with the markings facing up.
- Space the piston ring end gaps 120 degrees apart, avoiding the piston pin and thrust sides.
- Stagger the side rail end gaps 180 degrees apart.
- After installing the rings they should be free to rotate.



Coat the rod small end with molybdenum disulfide grease.
Assemble the pistons and connecting rods with the piston pins and new piston pin clips.

NOTE

- Do not interchange the pistons, piston pins and connecting rods.
- Make sure that the piston pin clips are properly seated.
- Install the piston with the "L" mark on the left and the piston with the "R" mark on the right.



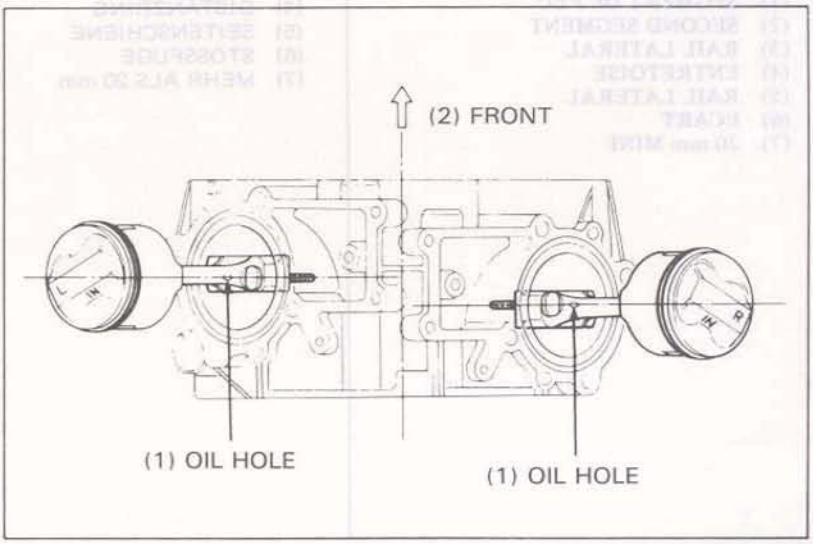
CONNECTING ROD INSTALLATION

Lubricate the rod bearings with molybdenum disulfide grease.

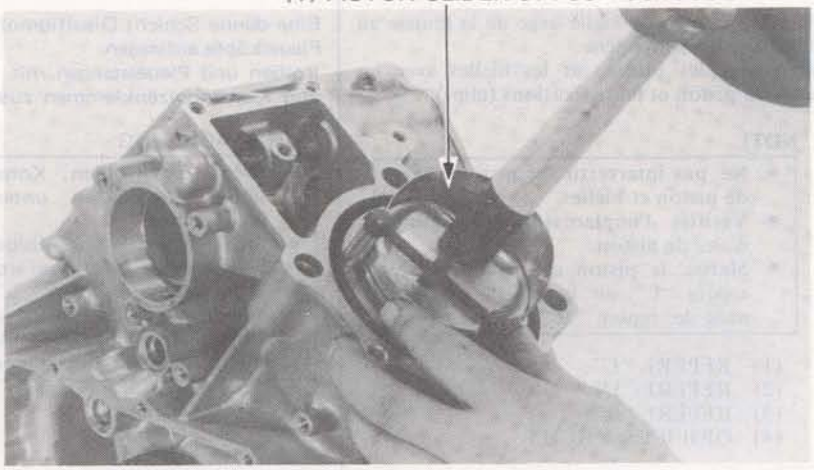
Install the rod assemblies into the cylinders from the top of the cylinder block.

NOTE

- The rod assemblies should be installed with the "IN" markings to the engine rear side.
- Lubricate the piston ring grooves and cylinder walls with engine oil.



(1) PISTON SLIDER 07755—0010000

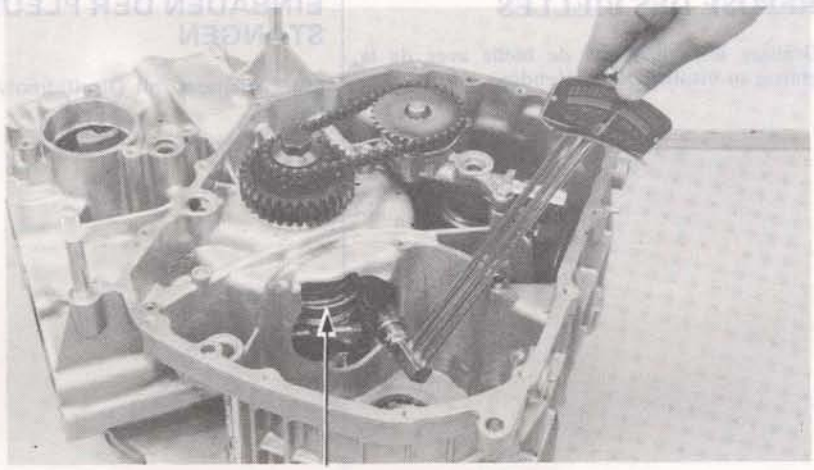


Bring the piston at TDC.
Compress the piston rings with the PISTON SLIDER and push the piston into the cylinder.

NOTE

- Do not damage the pistons and piston rings during assembly.
- Push the piston down into the cylinder, aligning the big end with the crankpin.

Torque the connecting cap bolts.
TORQUE : 28—32 N·m (2.8—3.2 kg-m, 20—23 ft-lb)



(1) CONNECTING ROD BEARING CAP

NOTE

- Be sure the bearing caps are installed in their correct location.
- After tightening the cap bolts, turn the crankshaft to make sure it rotates freely.

FRONT WHEEL/SUSPENSION

ROUE AVANT/ SUSPENSION

VORDERRAD/ AUFHÄNGUNG

RUEDA DELANTERA/ SUSPENSION

SERVICE INFORMATION	13—1	HANDLEBAR	13— 4
TROUBLESHOOTING	13—2	FRONT WHEEL	13— 7
HEADLIGHT	13—3	FRONT FORK	13—12
INSTRUMENTS	13—4	STEERING STEM	13—22

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- A jack or other support is required to support the motorcycle.
- COMSTAR® wheels are not serviceable. If either the spokes, rim or hub are damaged the entire wheel must be replaced.
- Never ride on the spoles.
- Tubeless tire removal, repair and remounting procedures are covered in the Tubeless Tire Manual.
- Check the fork tube bushing, slider bushing and back-up ring for damage after disassembling the front fork and replace if necessary.

TOOLS

Special

Circlip pliers	: 07914—3230001
Hex. wrench 6 mm	: 07917—3230000
Fork oil seal driver	: 07947—3710100
Ball race remover	: 07953—KA50000
Ball race remover attachment (upper)	: 07946—3290000
(lower)	: 07945—3330300
Steering stem driver	: 07946—MB00000

Common

Pin spanner	: 07702—0010000
Socket wrench 30 x 32 mm	: 07716—0020400
Extension	: 07716—0020500
Bearing driver attachment 42 x 47 mm	: 07746—0010300
Bearing driver pilot 15 mm	: 07746—0040300
Bearing driver handle A	: 07749—0010000

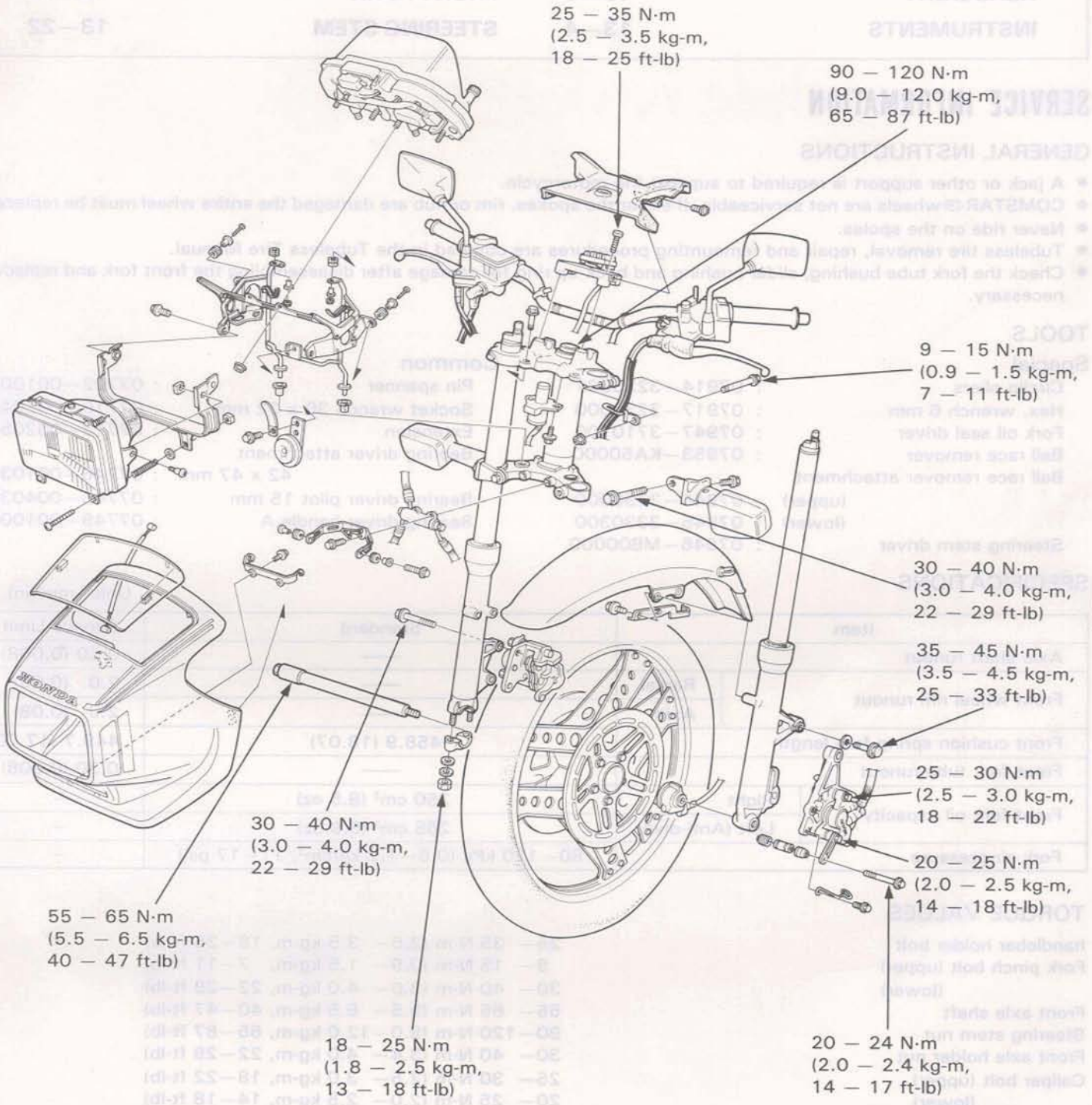
SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Axle shaft runout		—	0.20 (0.008)
Front wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Front cushion spring free length		458.9 (18.07)	449.7 (17.70)
Front fork tube runout		—	0.20 (0.008)
Front fork oil capacity	Right	250 cm³ (8.5 oz)	—
	Left (Anti-dive)	265 cm³ (8.9 oz)	—
Fork air pressure		80—120 kPa (0.8—1.2 kg/cm², 11—17 psi)	—

TORQUE VALUES

handlebar holder bolt	25— 35 N·m (2.5— 3.5 kg-m, 18—25 ft-lb)
Fork pinch bolt (upper)	9— 15 N·m (0.9— 1.5 kg-m, 7—11 ft-lb)
(lower)	30— 40 N·m (3.0— 4.0 kg-m, 22—29 ft-lb)
Front axle shaft	55— 65 N·m (5.5— 6.5 kg-m, 40—47 ft-lb)
Steering stem nut	90—120 N·m (9.0—12.0 kg-m, 65—87 ft-lb)
Front axle holder nut	30— 40 N·m (3.4— 4.0 kg-m, 22—29 ft-lb)
Caliper bolt (upper)	25— 30 N·m (2.5— 3.0 kg-m, 18—22 ft-lb)
(lower)	20— 25 N·m (2.0— 2.5 kg-m, 14—18 ft-lb)
Right caliper bracket bolt	30— 40 N·m (3.0— 4.0 kg-m, 22—29 ft-lb)
Left caliper bracket bolt (upper)	35— 45 N·m (3.5— 4.5 kg-m, 25—33 ft-lb)
(lower)	20— 24 N·m (2.0— 2.4 kg-m, 14—17 ft-lb)


25 — 35 N·m
(2.5 — 3.5 kg-m,
18 — 25 ft-lb)
90 — 120 N·m
(9.0 — 12.0 kg-m,
65 — 87 ft-lb)
9 — 15 N·m
(0.9 — 1.5 kg-m,
7 — 11 ft-lb)
30 — 40 N·m
(3.0 — 4.0 kg-m,
22 — 29 ft-lb)
35 — 45 N·m
(3.5 — 4.5 kg-m,
25 — 33 ft-lb)
25 — 30 N·m
(2.5 — 3.0 kg-m,
18 — 22 ft-lb)
20 — 25 N·m
(2.0 — 2.5 kg-m,
14 — 18 ft-lb)
30 — 40 N·m
(3.0 — 4.0 kg-m,
22 — 29 ft-lb)
55 — 65 N·m
(5.5 — 6.5 kg-m,
40 — 47 ft-lb)
18 — 25 N·m
(1.8 — 2.5 kg-m,
13 — 18 ft-lb)
20 — 24 N·m
(2.0 — 2.4 kg-m,
14 — 17 ft-lb)

13

TROUBLESHOOTING

hard Steering

1. Steering stem nut too tight
2. Faulty steering stem bearings
3. Damaged steering stem ball rce and/or cone race
4. Insufficient tire pressure

Steers to One Side or Does Not Track Straight

1. Bent forks
2. Bent frame
3. Forks installed incorrectly
4. Axle installed incorrectly
5. Bent swingarm
6. Wheel installed incorrectly

Front Wheel Wobbing or Vibration

1. Loose axle (front or rear)
2. Loose wheel bearings
3. Loose steering stem nut or bearings
4. Loose lock nut(s) on swingarm pivot bolt
5. Unbalanced tire and wheel
6. Bent wheel
7. Excessive lateral runout in wheel
8. Bent forks
9. Bent swingarm
10. Bent or cracked frame
11. Loose engine mounts

Soft Suspension

1. Weak fork spring
2. Insufficient fluid in front forks
3. Insufficient fork air pressure

hard Suspension

1. Incorrect fluid weight in front forks
2. Clogged fork hydraulic passage
3. Bent fork tubes
4. Slider binding
5. Too much air pressure
6. Clogged anti-noise dive orifice

Front Suspension Noise

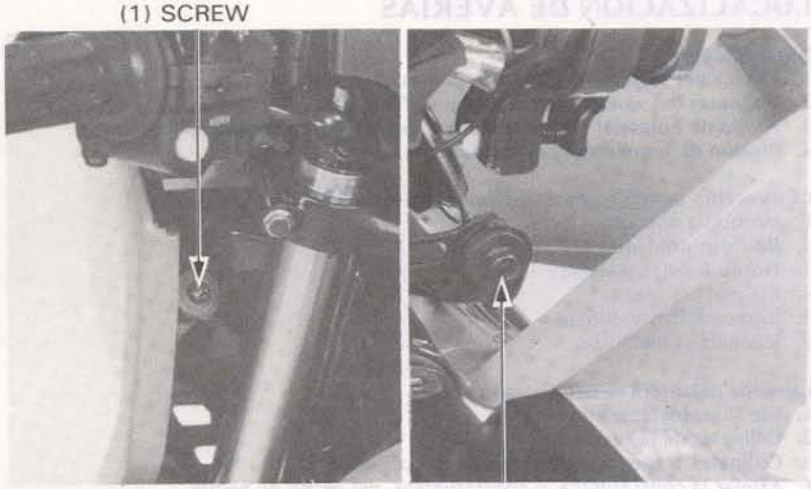
1. Slider binding
2. Insufficient fluid in forks
3. Loose front fork fasteners
4. Steering stem nut loose
5. Broken parts in forks

HEADLIGHT

HEADLIGHT REMOVAL

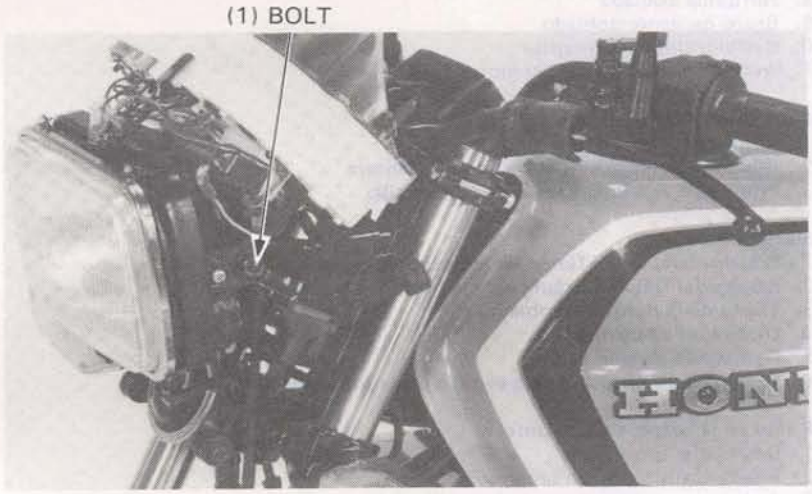
Open the headlight cover by removing the two screws.

Disconnect the cable stopper and lossen the two bolts.
Remove the headlight cover.



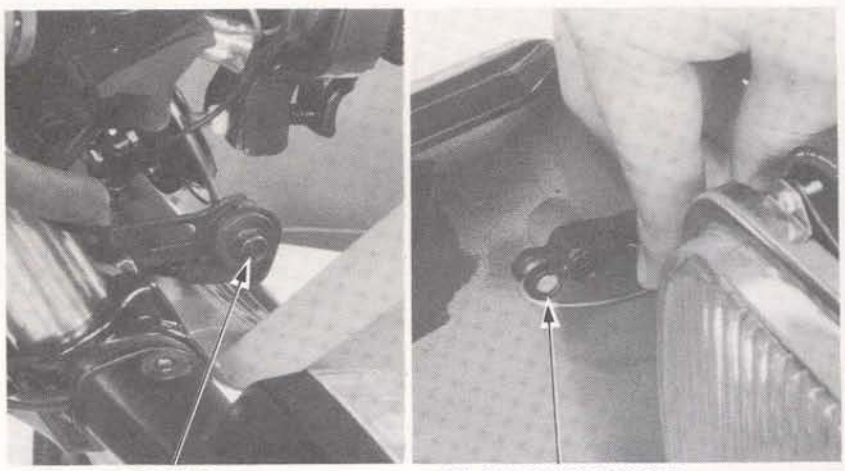
Remove the two bolts and disconnect the headlight coupler.

Remove the headlight.



HEADLIGHT INSTALLATION

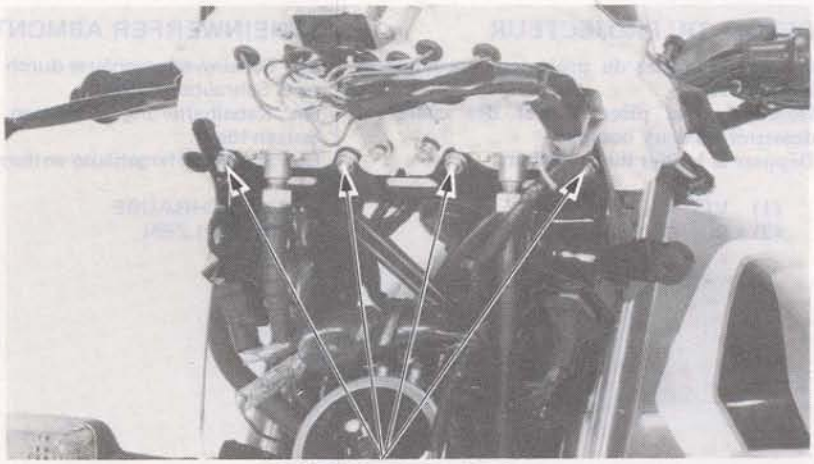
Connect the headlight coupler and install the headlight.
Position lower headlight cover and insert the projected part securely.
Install the cable stopper to headlight cover.
Install the headlight cover with two screws.
Adjust the headlight aim after assembly (Page 3-10).



INSTRUMENTS

REMOVAL

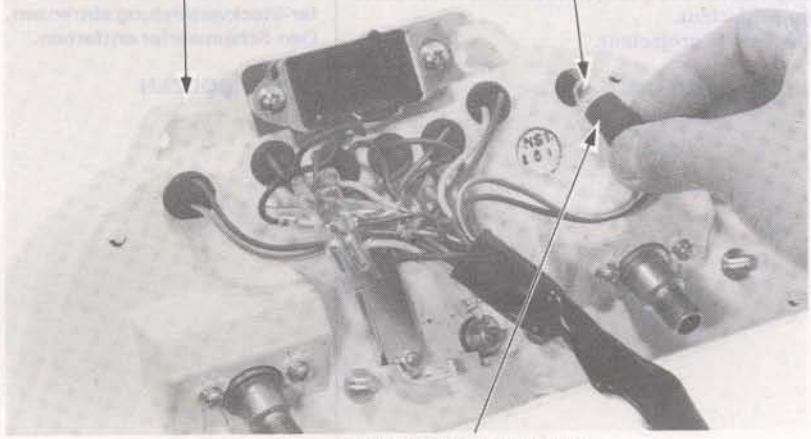
Remove the headlight cover and headlight.
Disconnect the instrument wire connectors and coupler.
Remove the speedometer and tachometer cables from the instruments.
Remove the instrument mounting nuts and the instruments.



(1) MOUNTING NUTS

BULB REPLACEMENT

To replace a bulb, pull the rubber socket out of the panel. The bulb can then be removed by pulling it straight out from the socket without turning.

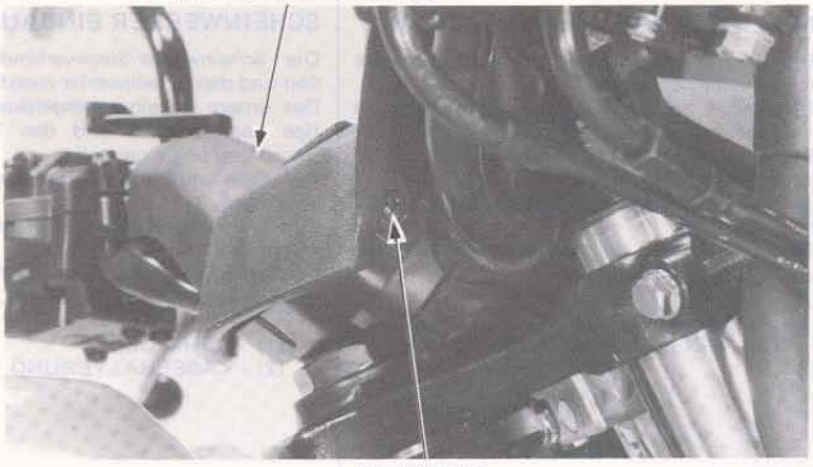


(2) RUBBER SOCKET

HANDLEBAR

REMOVAL

Remove the two screws and handlebar cover.



(2) SCREW

Disconnect the front brake stoplight 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.*
- *Do not hang the master cylinder by the brake hose.*

Loosen the three screws attaching the right handlebar switch housing.

(2) RIGHT HANDLEBAR SWITCH HOUSING

(1) STOPLIGHT SWITCH WIRE

Disconnect the clutch and choke cables.
Remove the three screws holding the left handlebar switch housing.
Remove the wire bands.
Remove the left grip and clutch lever holder.

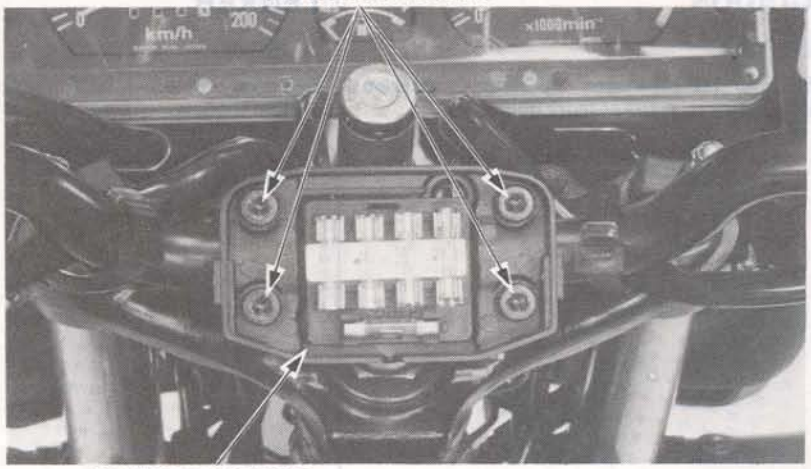
(1) LEFT HANDLEBAR SWITCH HOUSING

(2) CLUTCH CABLE

(3) CHOKE CABLE (4) WIRE BAND

Remove the four upper holder socket bolts and upper holder.
Remove the handlebar.

(1) SOCKET BOLTS



(2) UPPER HOLDER

INSTALLATION

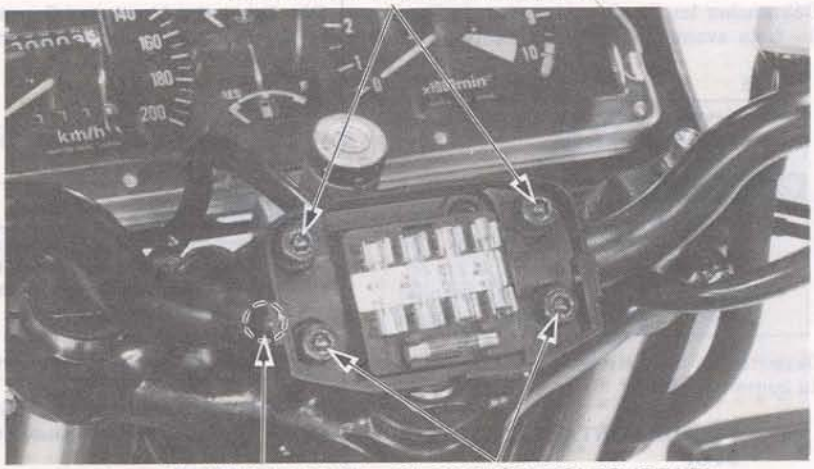
Installation of the handlebar is essentially the reverse order of removal.

NOTE

Coat the throttle grip area of the handlebar with grease.

Align the punch marks on the handlebar with the split of the upper holder and fork brige.
Tighten the forward socket bolts first then tighten the rear socket bolts.

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

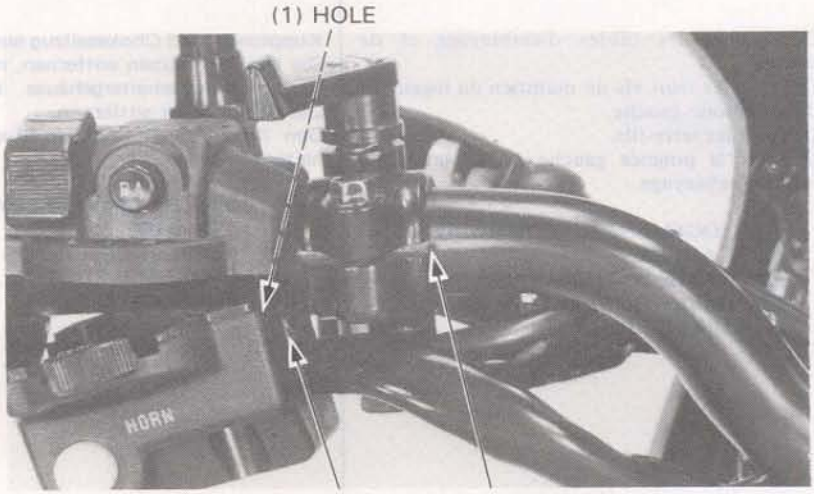


Position the clutch lever holder so the gap aligns with the punch mark on the handlebar and tighten the bolt securely.

Insert the pin on the bottom half of each switch assembly into the hole in the handlebar.
Tighten the forward screws first, then tighten the rear screws to the same torque.

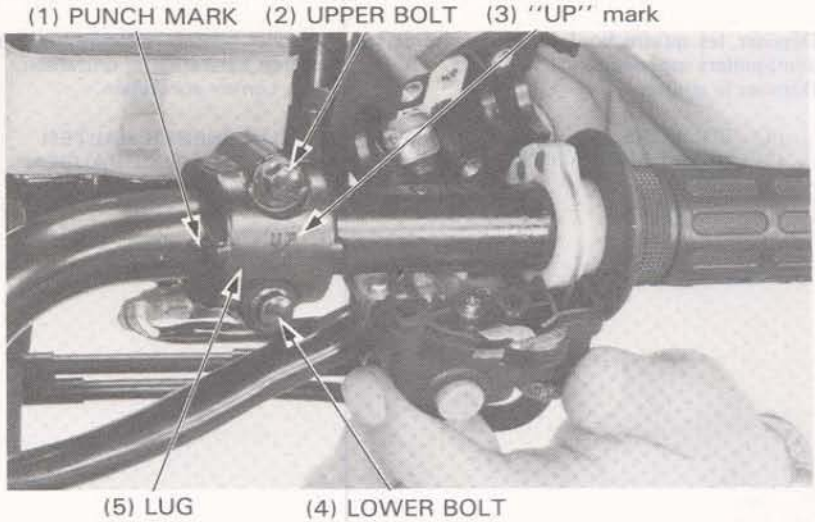
CAUTION

Make sure the wire harness is not pinched between the switch asssembly and the handlebar.



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.
Apply contact cement to the left handlebar grip and push it into place.

Install the handlebar cover.



FRONT WHEEL

FRONT WHEEL REMOVAL

Raise the front wheel off the ground by placing a block or Safety stand under the engine.
Disconnect the speedometer cable from the speedometer gearbox.

(1) SPEEDOMETER CABLE

Remove the right caliper by removing the caliper mounting bolts.
Support the caliper so that it doesn't hang from the brake hose.

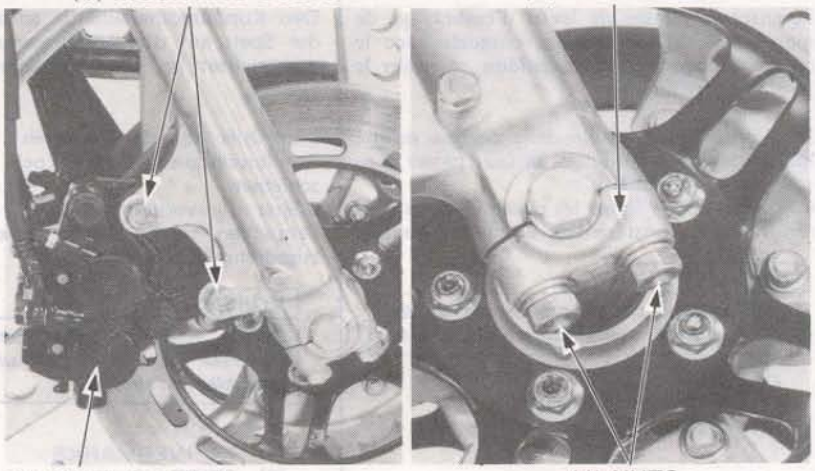
Remove the axle holder.
Remove the front axle from the left fork leg.
Remove the front wheel.

NOTE

Do not operate the front brake lever after removing the front wheel. To do so will cause difficulty in refitting the brake disc between the brake pads.

(1) MOUNTING BOLTS

(3) AXLE HOLDER



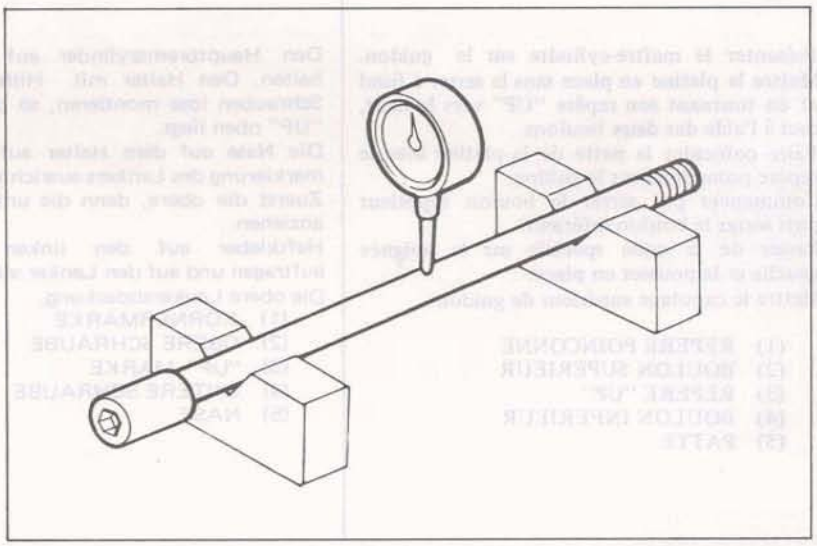
(2) RIGHT CALIPER

(4) NUTS

AXLE INSPECTION

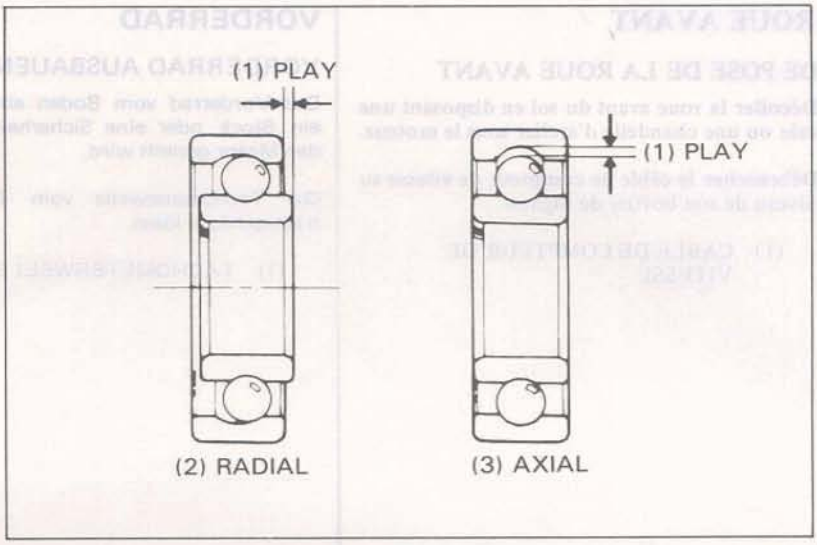
Set the axle in V blocks and measure the runout.
The actual runout is 1/2 of the total indicator reading.

SERVICE LIMIT : 0.2 mm (0.01 in)



WHEEL BRARING 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.



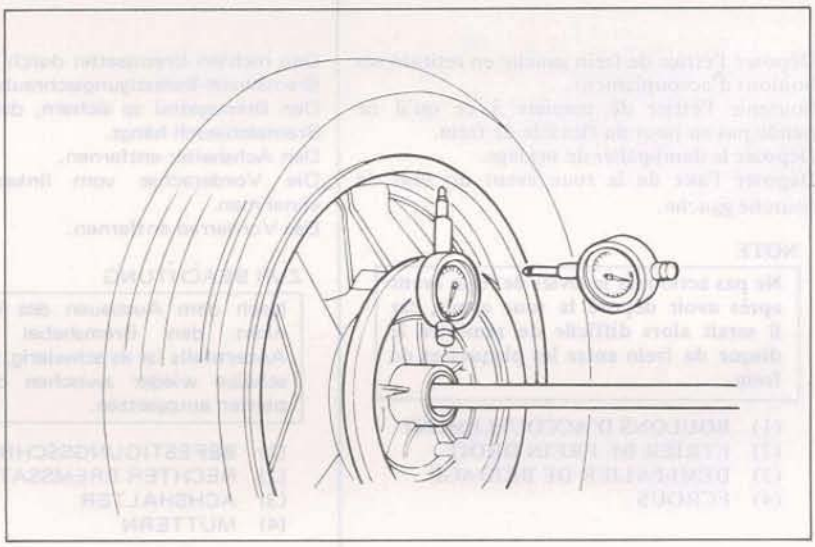
WHEEL INSPECTION

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)

NOTE

The COMSTER WHEEL cannot be replaired and must be replaced if the service limits are exceeded.

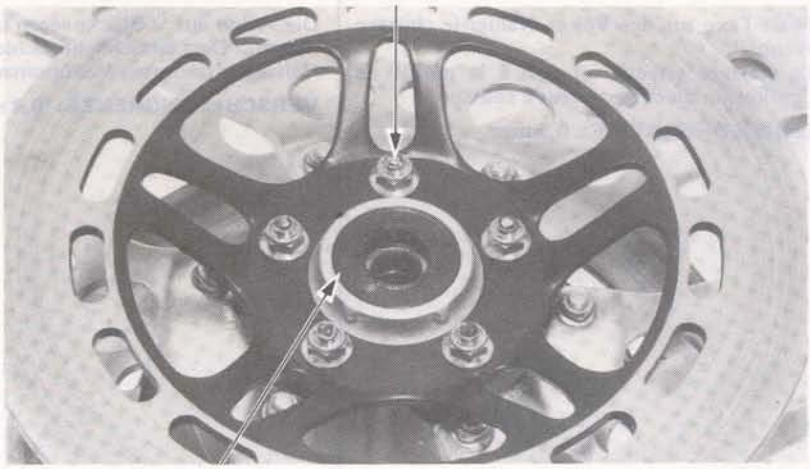


FRONT WHEEL DISASSEMBLY

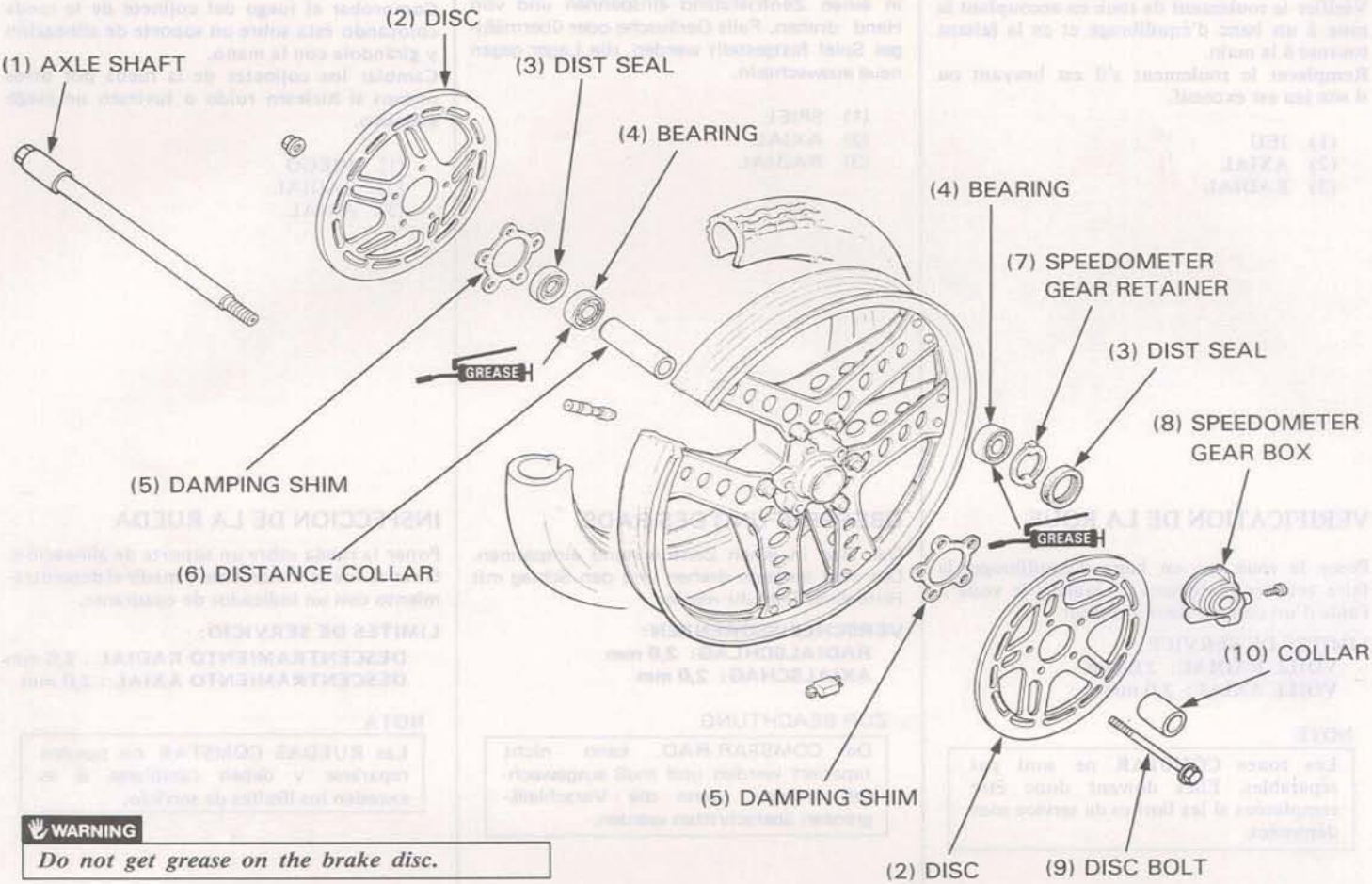
Remove the disc bolts, disc and dust seal. Remove the bearings and the distance collar from the hub.

NOTE

If the bearings are removed, replace them with new bearings during assembly.



FRONT WHEEL ASSEMBLY



WARNING

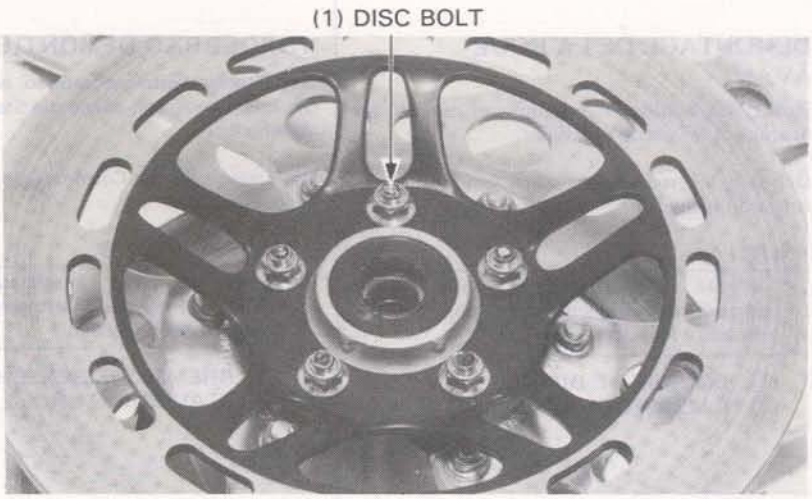
Do not get grease on the brake disc.

NOTE

- The COMSTAR WHEEL has no rim band.
- Install the bearings with the closed end facing out.

Install the disc, disc bolts and nuts.

TORQUE : 27—33 N·m (2.7—3.3 kg-m, 20—24 ft-lb)



Pack all bearing cativities with grease.
Drive in the right bearing first.
Press the distance collar into place.

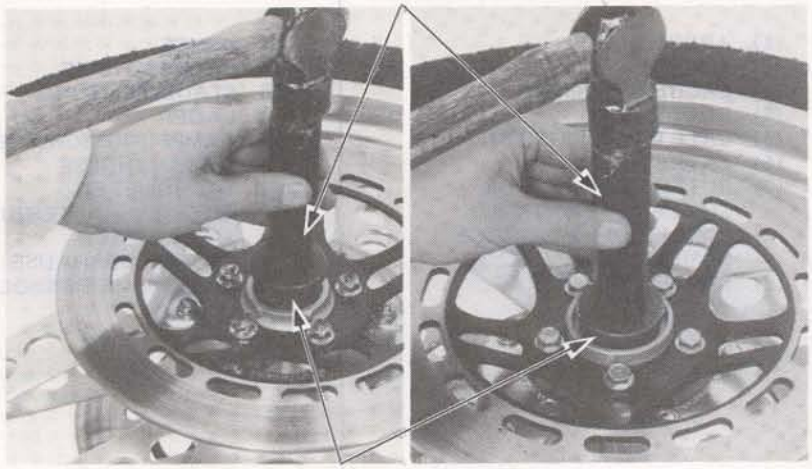
NOTE

Be certain the distance collar is in position before installing the left bearing.

Drive in the left bearing.

NOTE

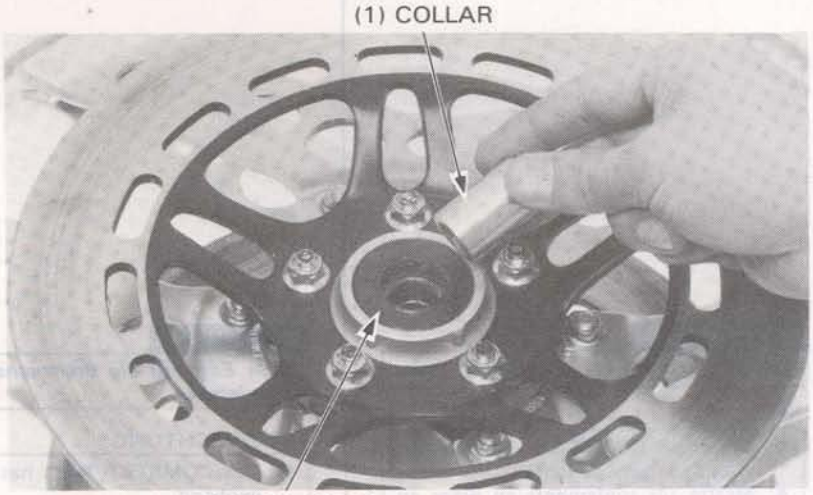
Drive the bearing squarely. Make sure that it is fully seated and that the sealed side is facing out.



Lubricate the dust seal lip with grease.
Install the dust seal and collar in the hub.

CAUTION

Remove all the grease around the outside of the dust seal.

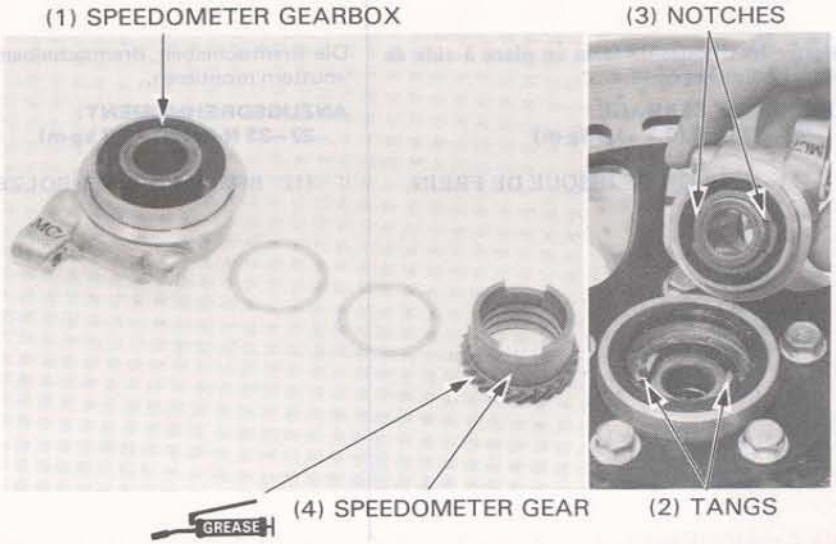


Install the speedometer gear retainer in the hub from the left side.
Lubricate the dust seal lip and install.
Disassemble the speedometer gear box and lubricate the gears and sliding surfaces.

Install the speedometer gearbox 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.

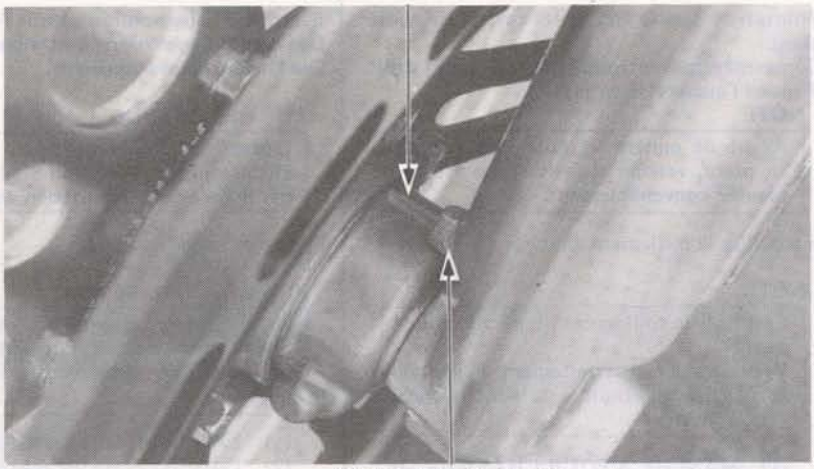


FRONT WHEEL INSTALLATION

Position front wheel between fork legs with speedometer gearbox on left.

NOTE

Be sure that the lug on the speedometer gear box is behind the left fork leg lug.



Tighten the front axle.

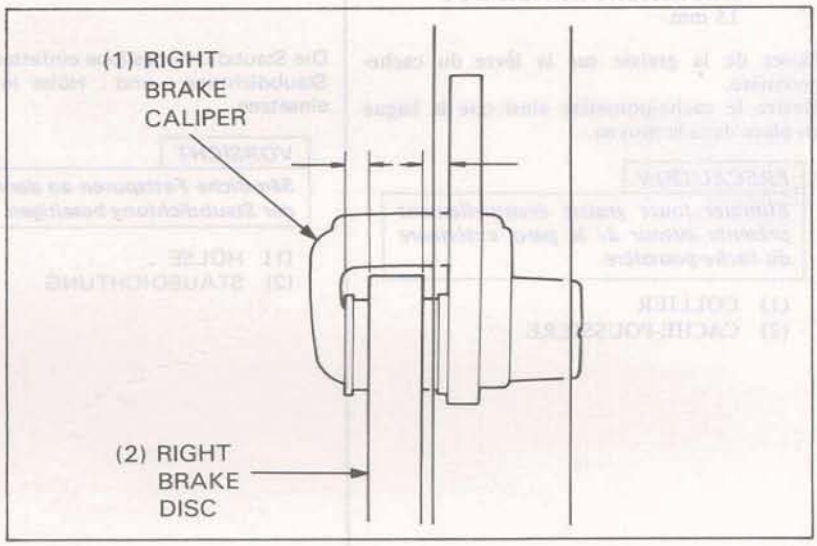
TORQUE : 55—65 N·m (5.5—6.5 kg-m, 40—47 ft-lb)

Install the right caliper and tighten the bolts.

TORQUE : 30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)

Measure the clearance between each surface of the right brake disc and the right brake capliper with a 0.7 mm (0.028 in) feeler gauge.

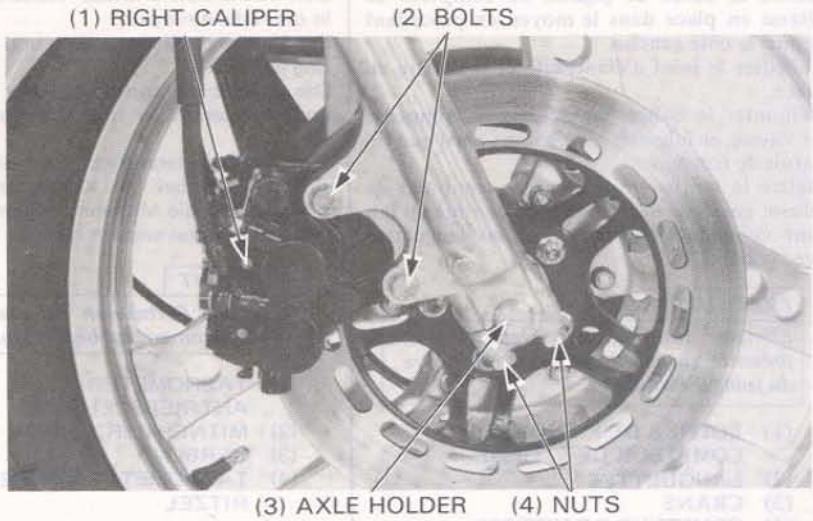
If the feeler gauge cannot be inserted easily, pull the right fork outward or push inward until the gauge can be inserted.



Install the axle holders with the "F" mark and arrow forward.

Tighten the axle holders nuts starting with the forwards nuts.

TORQUE : 18—25 N·m (1.8—2.5 kg-m, 13—18 ft-lb)



CAUTION

After installing the wheel, apply the brakes several times and recheck the clearance.

Connect the speedometer cable to the speedometer gearbox.

FRONT FORK

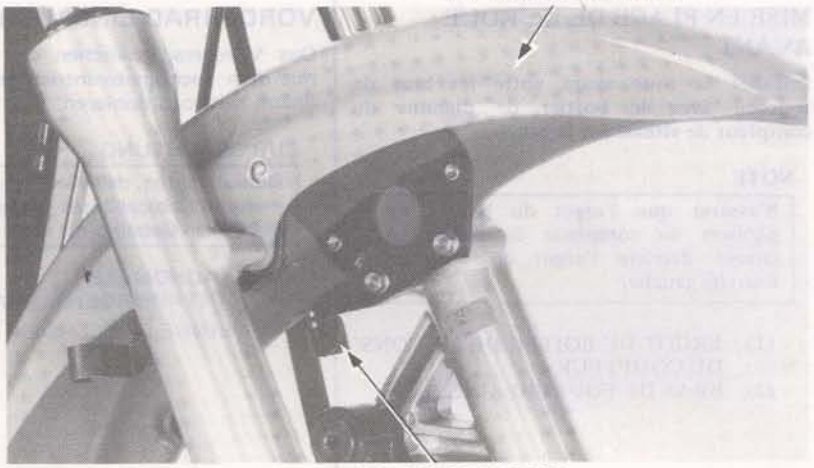
FRONT FORK REMOVAL

Remove the front wheel (Page 13-7).
Remove the brake caliper by unscrewing the caliper mount bolts.
Remove the brake hose clamp.
Remove the headlight cover (Page 13-3).

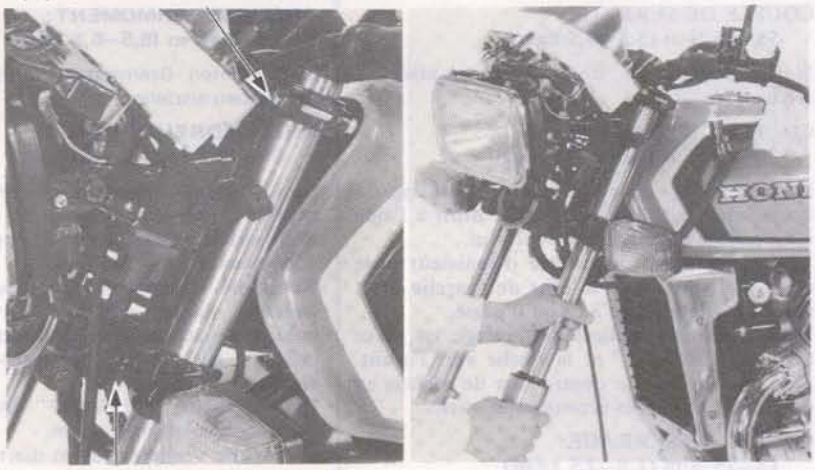
NOTE

Do not loosen the brake hose unless necessary.

Remove the front fender.



Loosen the fork pinch bolts.
Remove the fork tubes, rotating them by hand if necessary.



FRONT FORK DISASSEMBLY

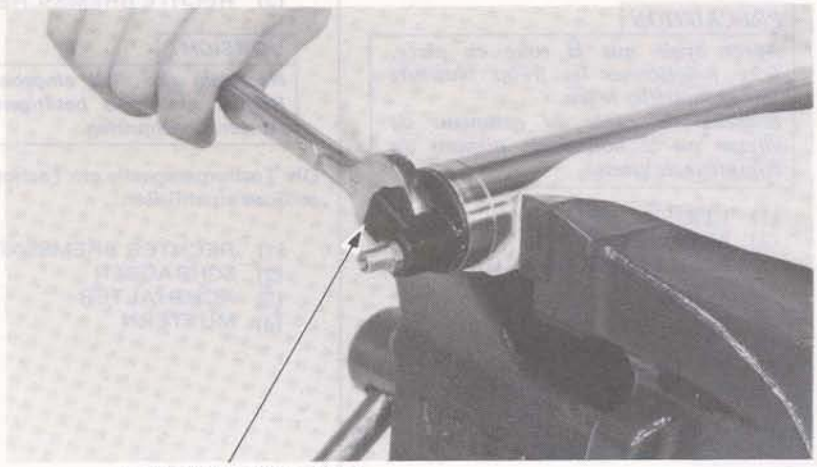
Hold the fork tube in a vise.
Remove the fork cap bolt.

CAUTION

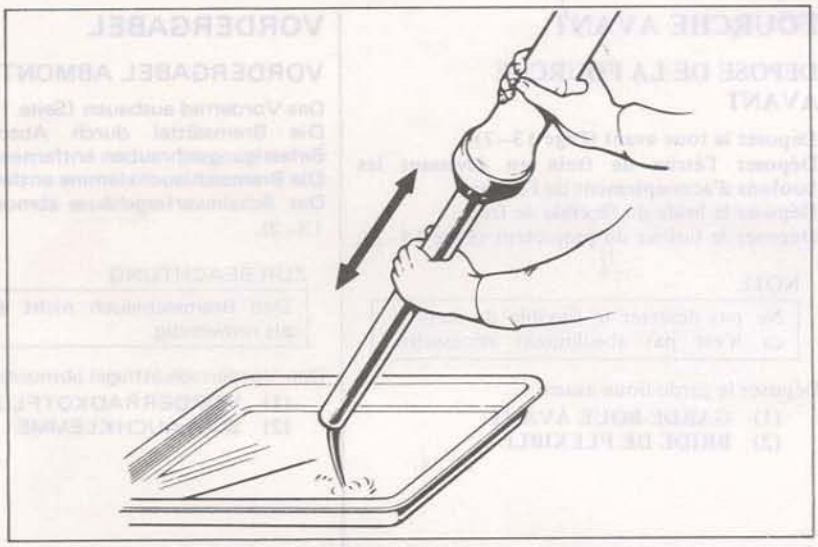
Do not damage or bend the sliding sufface.

WARNING

Use care when loosening the bolt or the spring will pop out as a projectile, which may cause injury.



Remove the fork spring.
Pour out any remaining fork fluid by pumping the fork up and down several times.



(1) HEX WRENCH (6 mm)
07917—3230000

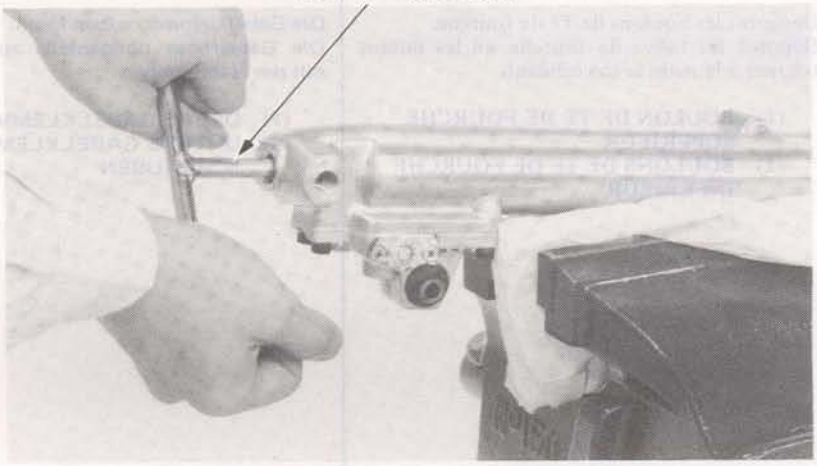
Hold the fork slider in a vise with soft jaws.
Remove the hex bolt.

CAUTION

Excessive vise pressure can damage the fork slider.

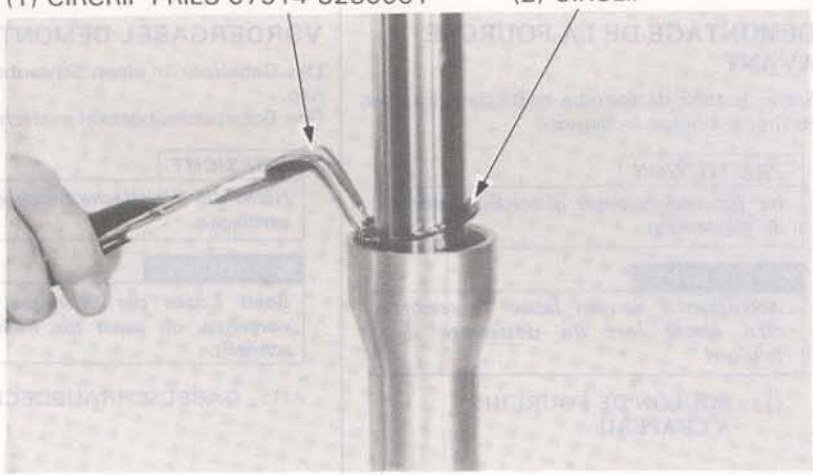
NOTE

Temporarily install the spring and fork bolt if difficulty is encountered in removing the bolt.



(1) CIRCRIP PRIES 07914-3230001 (2) CIRCLIP

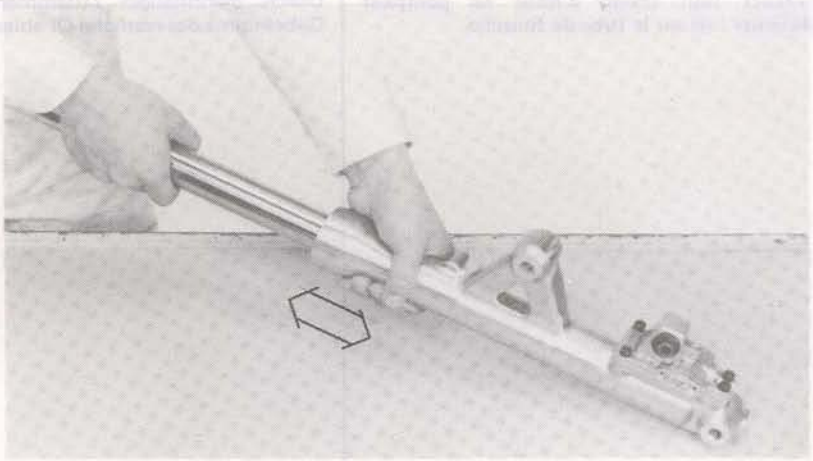
Remove the dust seal, circlip and back-up plate.



Remove the fork tube from the slider by pumping it in and out several times.

NOTE

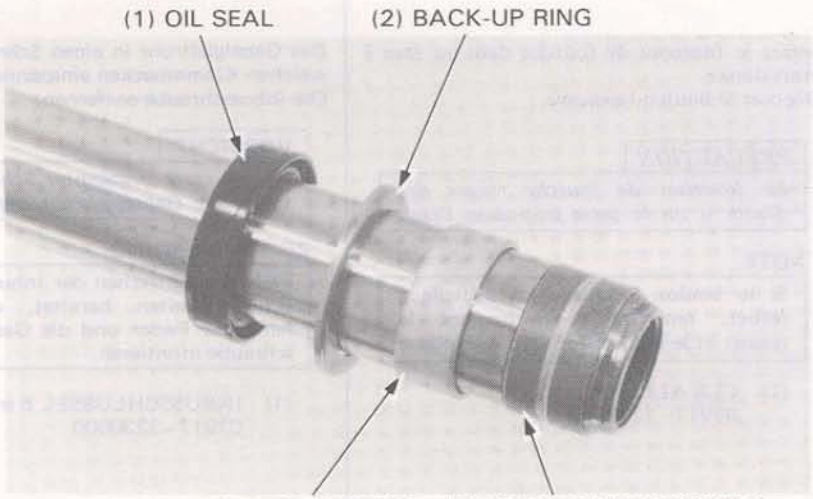
The slider bushing causes resistance and the fork tube bushing must force it out.



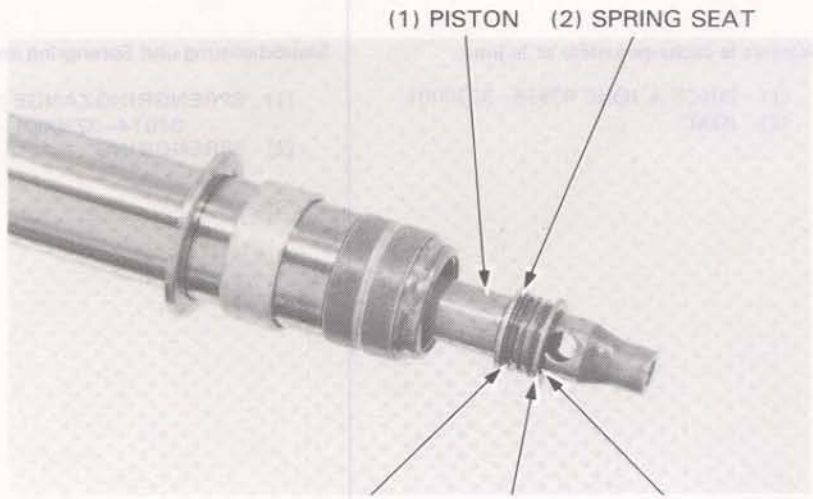
Remove the oil seal, back-up ring and slider bushing from the fork tube.

NOTE

Do not remove the fork tube bushing unless it is necessary to replace it with a new one.



On the left fork, remove the circrip, oil lock valve spring, and spring seat from the piston and rebound spring from the fork tube.



FRONT FORK SPRING FREE LENGTH INSPECTION

Measure the fork springs free length.

SERVICE LIMIT : 449.7 mm (17.70 in)

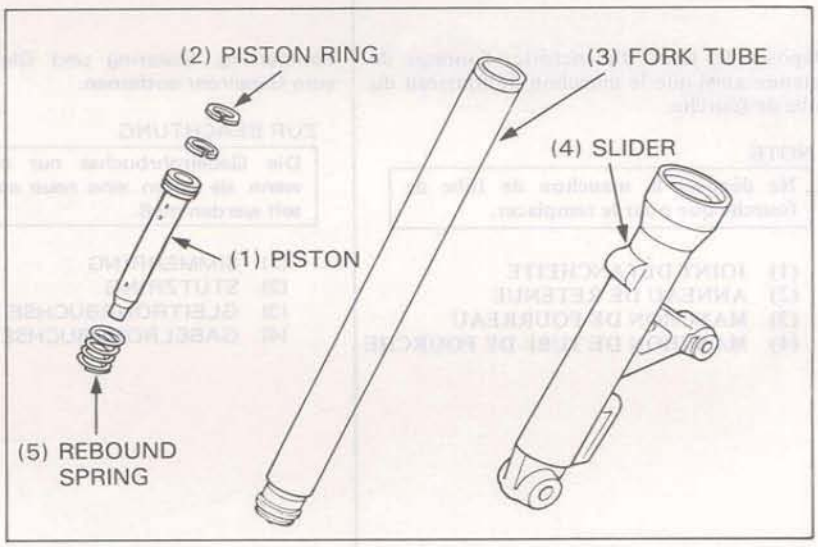
FORK TUBE / FORK SLIDER / PISTON INSPECTION

Check the fork tubes, fork sliders and pistons for score marks, scatches, or excessive or abnormal wear.

Replace any components which are worn or damaged.

Check the fork piston ring for wear or damage.

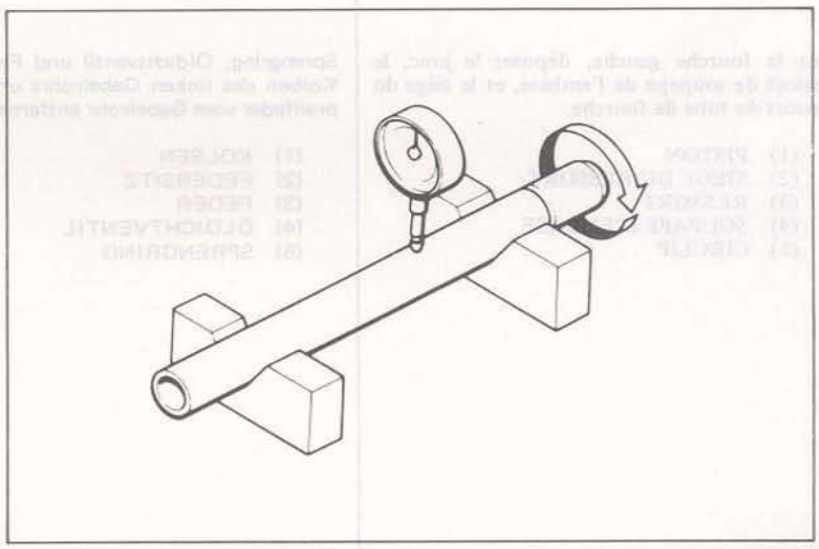
Check the rebound spring for fatigue or damage.



FORK TUBE INSPECTION

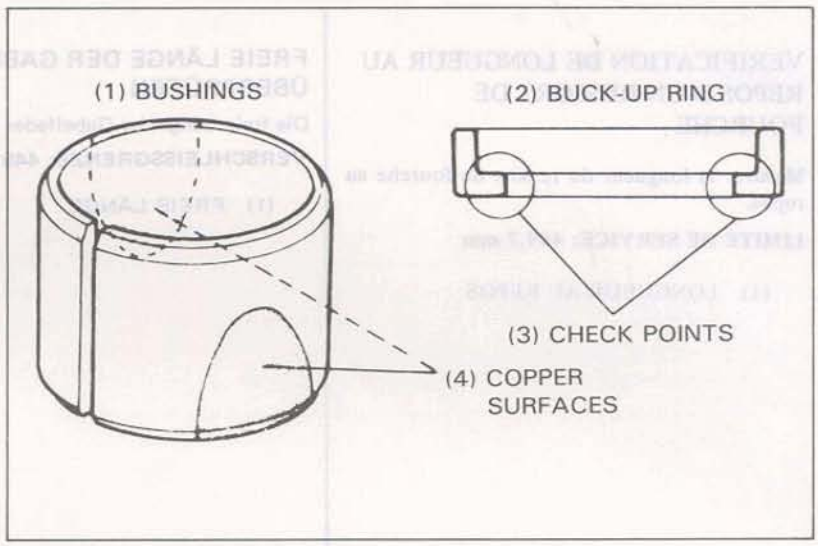
Set the tube in V blocks and read the runout. Take 1/2 the total indicator reading to determine the actual runout.

SERVICE LIMIT : 0.20 mm (0.008 in)



BUSHING/BACK-UP RING INSPECTION

Visually inspect the slider and fork tube bushing.
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 points shown.

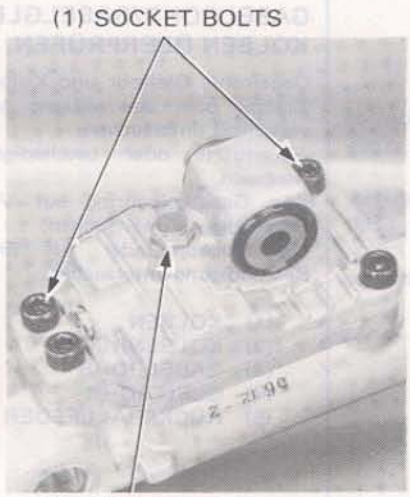


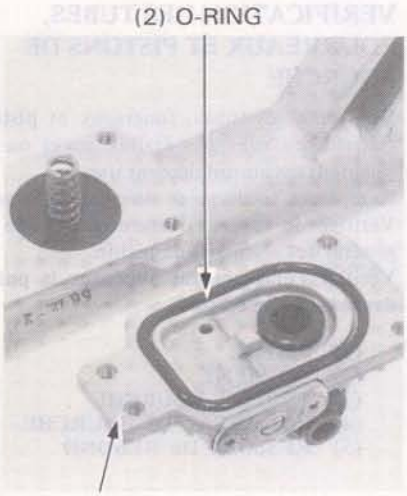
ANTI-DIVE CASE REMOVAL

Remove the four socket bolts and remove the anti-dive case.

NOTE

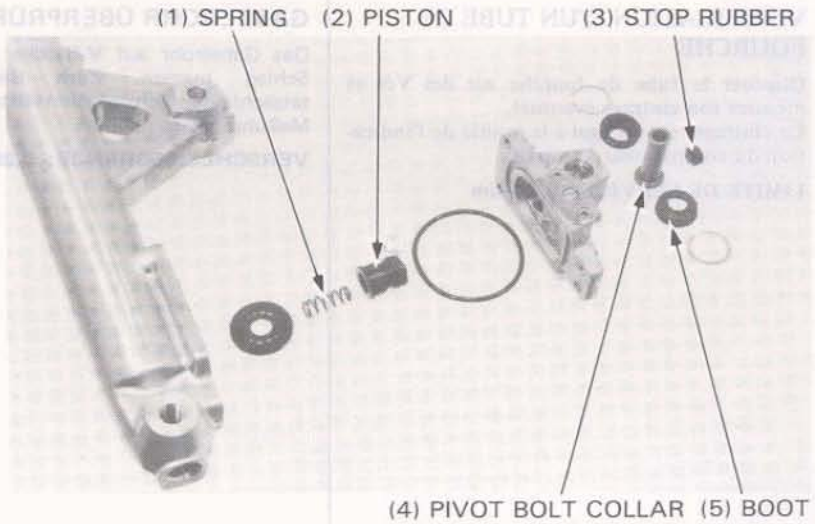
Drain the oil before servicing the ant-dive system.



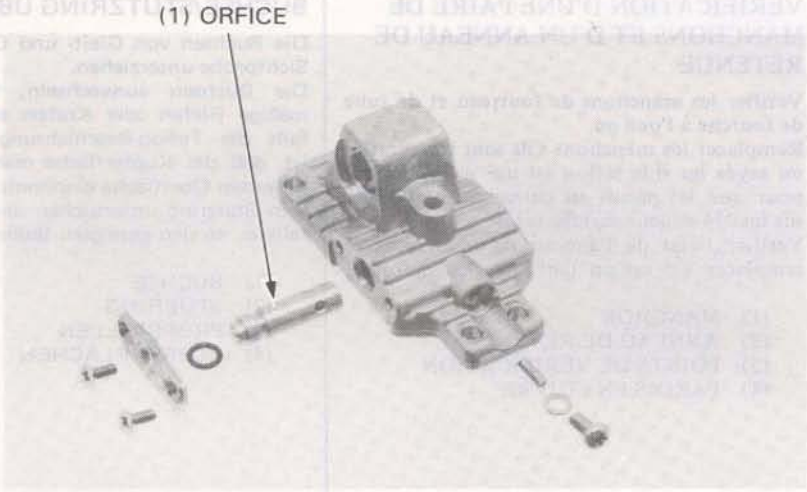


Remove the piston and spring.
Remove the boots, pivot collar and stop rubber.

Check the spring and piston for wear or damage.



Remove the orifice setting plate screws, setting plate and orifice.
Check the orifice for clogging by applying compressed air. Also check the orifice for damage and replace if necessary.
Remove the check valve setting screw, valve spring and check ball.

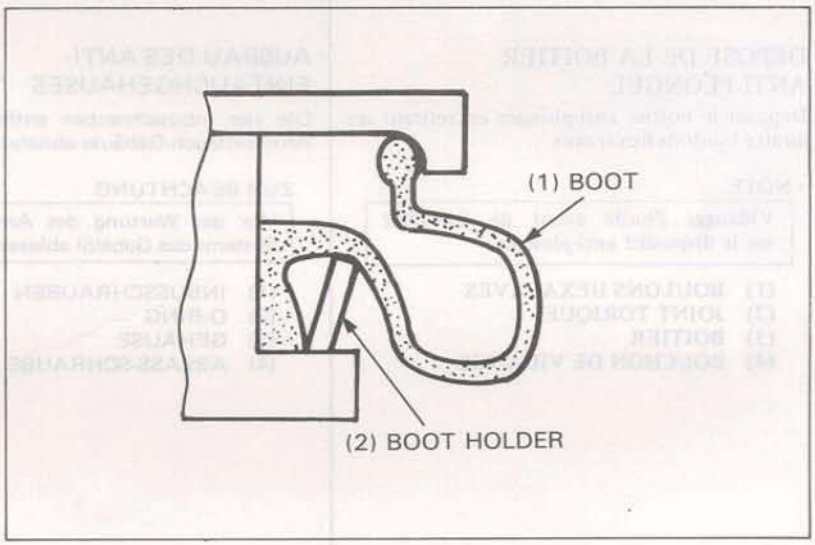


ASSEMBLY

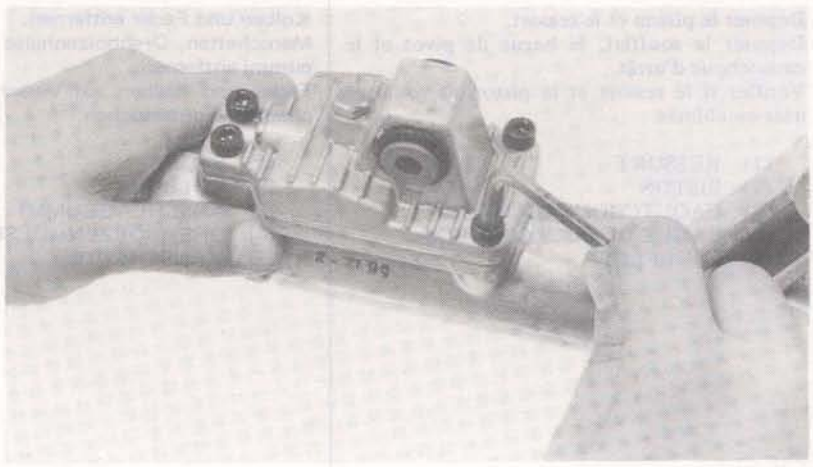
Assemble the anti-dive case in the reverse order of disassembly.

NOTE

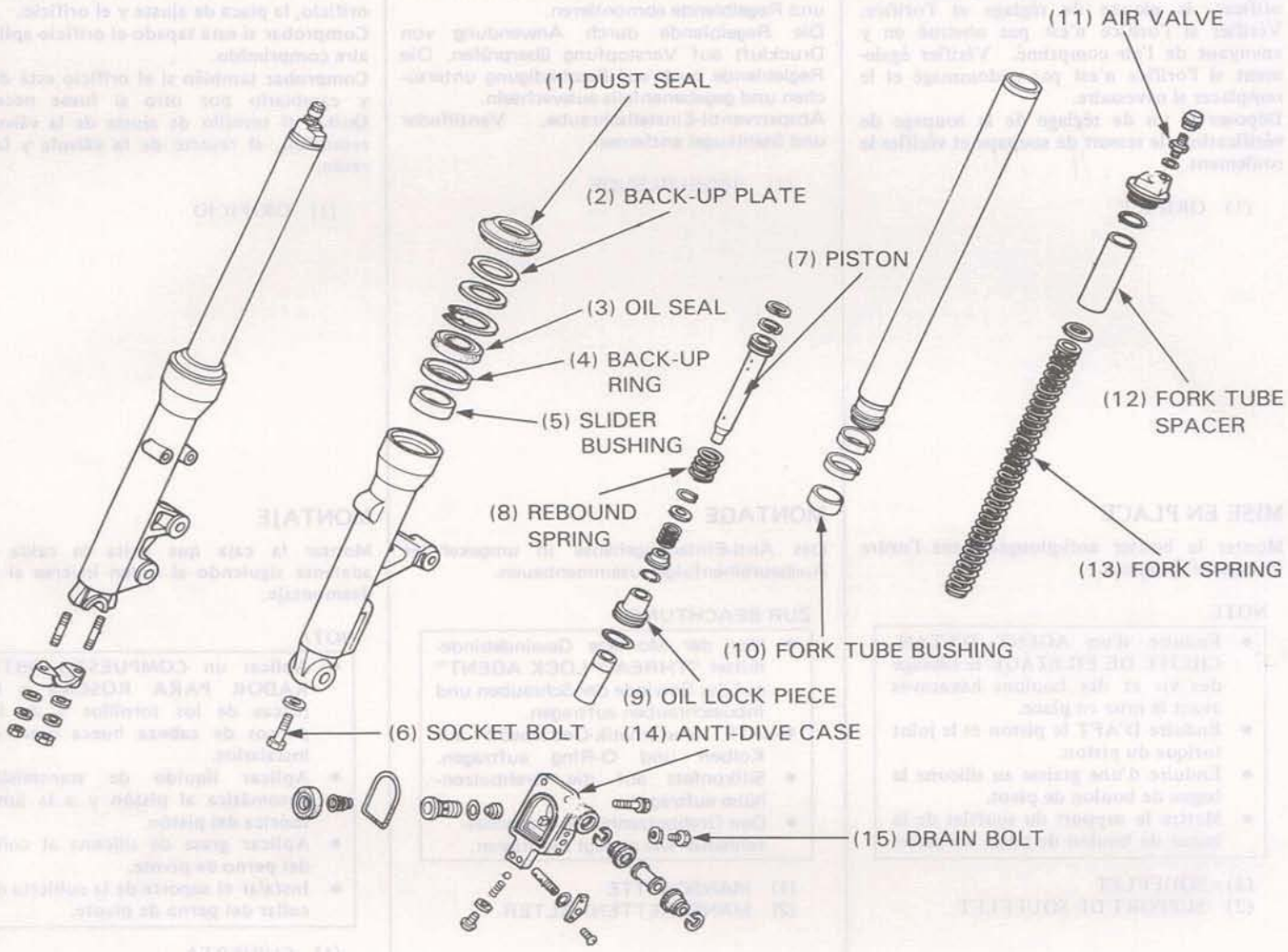
- Apply a THREAD LOCK AGENT to the threads of the screws and socket bolts before assembly.
- Apply ATF to the piston and piston O-ring.
- Apply silicone grease to the pivot bolt collar.
- Install the pivot bolt collar boot holder as shown.



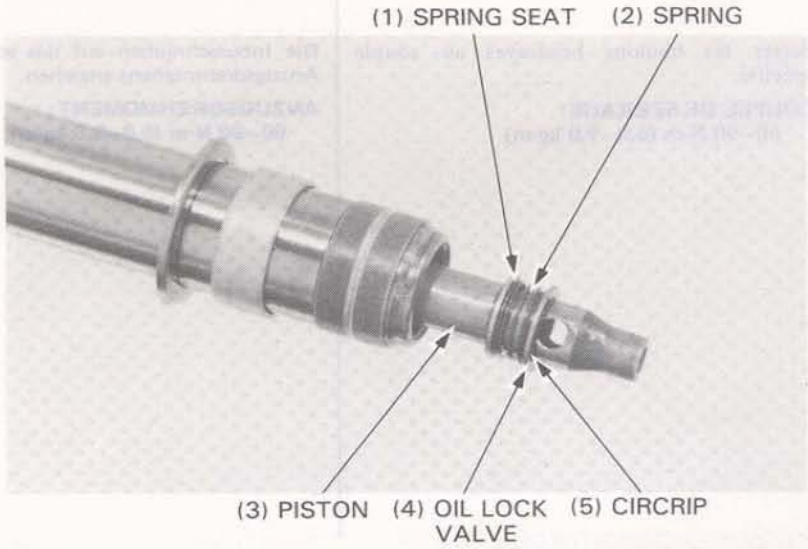
Tighten the socket bolts to the specified torque.
TORQUE : 60—90 N·m (0.6—0.9 kg-m, 4.3—6.5 ft-lb)



FRONT FORK ASSEMBLY



Insert the rebound spring and piston into the fork tube.
On the left fork, install the spring seat, valve spring, oil lock valve and circlip on the piston.
Place the oil lock piece on the end of the piston and insert the fork tube into the slider.



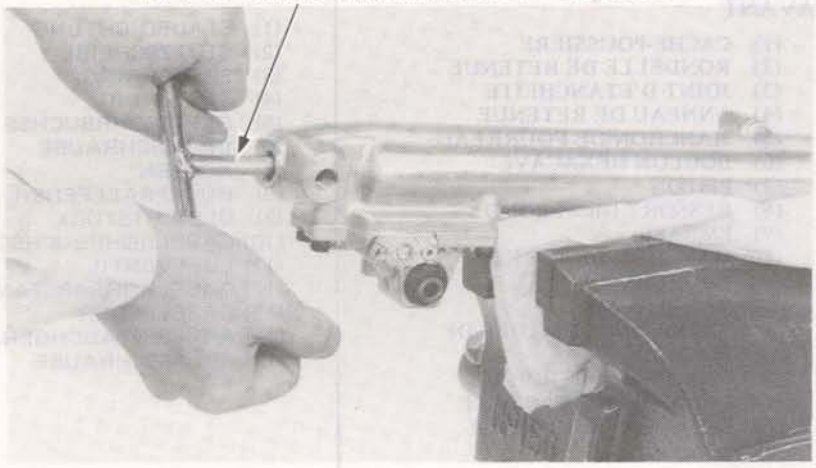
Place the fork slider in a vise with soft jaws.
Apply a locking agent to the socket bolt and thread it into the piston. Tighten with a 6 mm hex wrench.

NOTE

Temporarily install the fork spring and fork cap bolt to tighten the socket bolt.

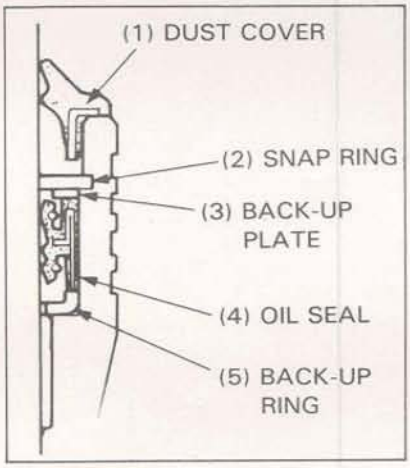
TORQUE: 15—25 N·m (1.5—2.5 kg-m, 11—18 ft-lb)

(1) HEX WRENCH (6 mm) 07917—3230000

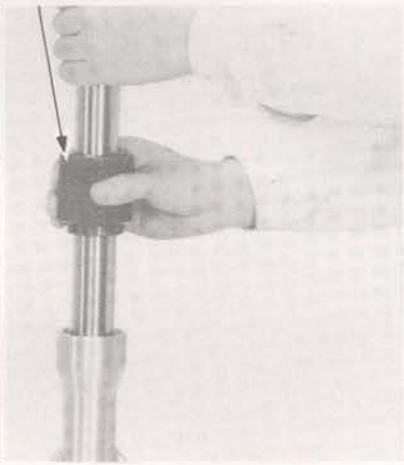


Place the slider bushing over the fork tube and rest it on the slider. Put the back-up ring and an old bushing or equivalent tool on top.
Drive the bushing into place with the seal driver.
Remove the old bushing.

Install the back-up ring.
Coat a new oil seal with ATF and install it with the seal marking facing up.



(6) FORK SEAL DRIVER
07947—3710100



NOTE

Before installing the oil seal, check the groove and top edge of the fork tube for burrs or scratches.
Wrap the fork tube groove or top edge with vinyl tape to prevent damage to the oil seal lip, if necessary.

Drive the oil seal in with the seal driver.

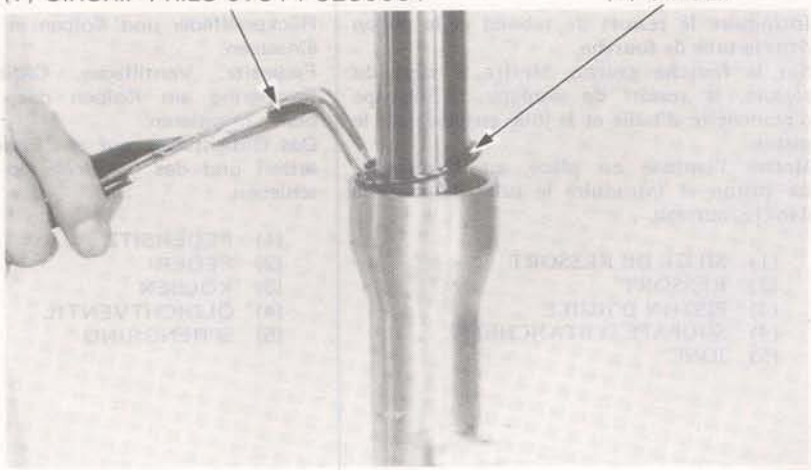
NOTE

If additional seal depth is needed, install the back-up plate and repeat driving the seal in.

Install the back-up plate, circlip and dust cover.

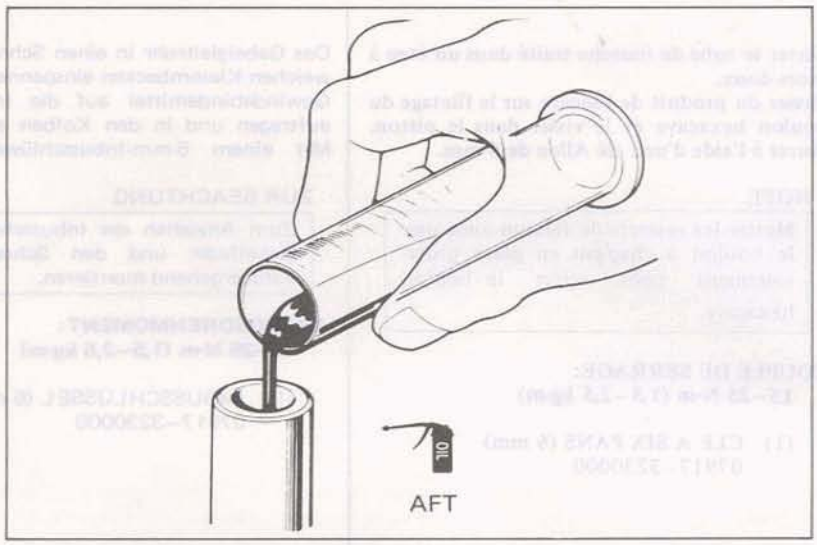
(7) CIRCRIP PRIES 07914-3230001

(8) CIRCLIP



Pour the specified amount of ATF into the fork tube.

CAPACITY : Right fork :250 cm³ (8.45 oz)
Left fork :265 cm³ (8.96 oz)

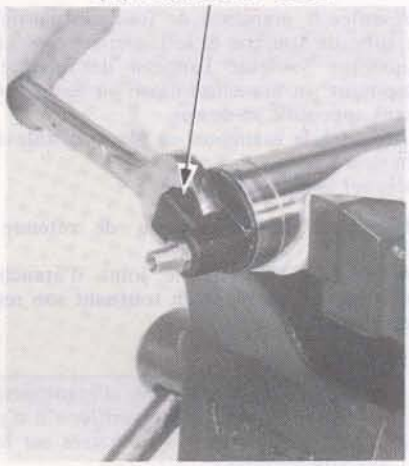


Wipe all oil from the fork springs and install them into the fork tube.
Install and torque the fork cap bolt.

TORQUE : 15—30 N·m (1.5—3.0 kg-m, 11—22 ft-lb)

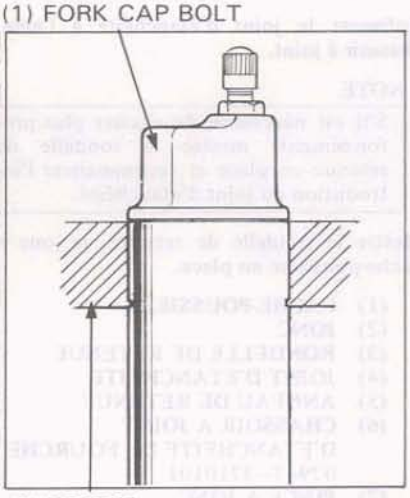
NOTE

- Place the folk tube in soft jaws, avoiding the sliding surface.
- Note the spring direction. The narrow coils should face up.



FRONT FORK INSTALLATION

Install the front forks and align the top surface of each fork tube with the top surface of the fork bridge.



Tighten the upper pinch bolts.

TORQUE : 9—15 N·m (0.9—1.5 kg-m, 7—11 ft-lb)

Tighten the lower pinch bolts.

TORQUE : 30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)

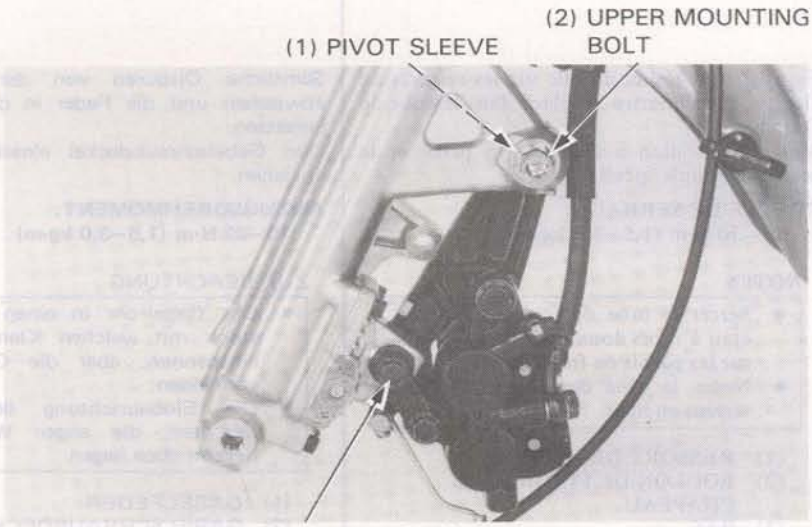
Install the front fender and secure the brake hose.

Install the left caliper and coat the outer side of the caliper bracket pivot sleeve with molybdenum disulfied (MoS_2) paste (containing more than 45% of MoS_2).

NOTE

Use MoS_2 paste (containing more than 45% of MoS_2) as follows :

- MOLYKOTE® G-n PASTE manufactured by Dow Corning U.S.A.
- Rocol PASTE manufactured by Sumico Lubricant Co., Ltd., Japan.
- Other lubricants of equivalent quality.



Tighten the caliper braket mounting bolts.

TORQUES :

UPPER : 35—45 N·m (3.5—4.5 kg-m, 26—33 ft-lb)

LOWER : 20—24 N·m (2.0—2.4 kg-m, 14—17 ft-lb)

Install the front wheel (Page 13-11).

Make sure all weight is off the front wheel, and charge the forks with air.

RECOMMENDED PRESSURE :

80—120 kPa (0.8—1.2 kg/cm², 11—17 psi)

CAUTION

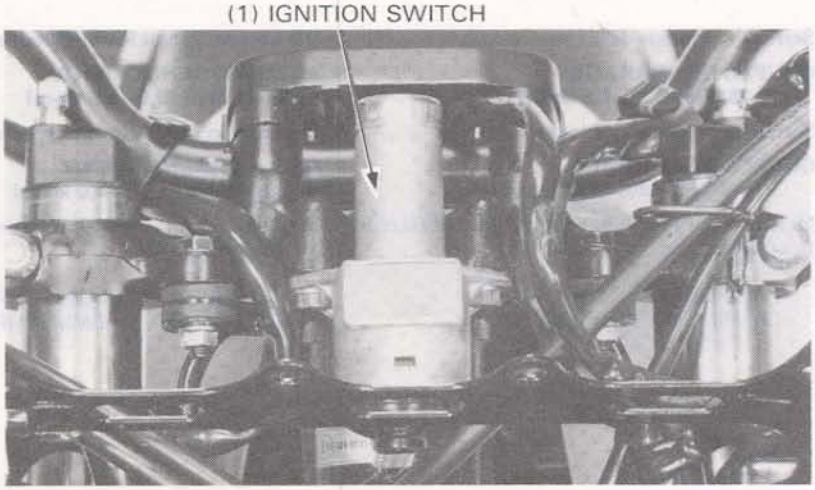
Use a low-volume, low-pressure pump to charge the forks. Excessive pressure can damage the fork tube components.

Check the front forks up and down several times. Install the handlebar upper cover.

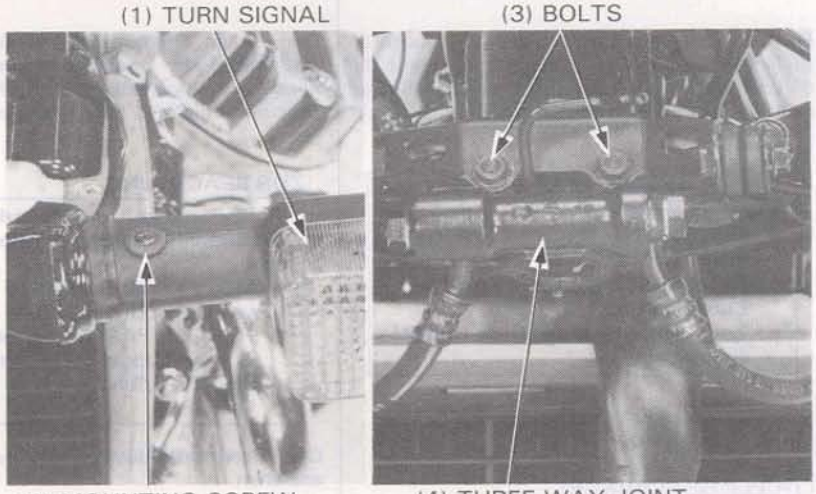
STEERING STEM

STEERING STEM REMOVAL

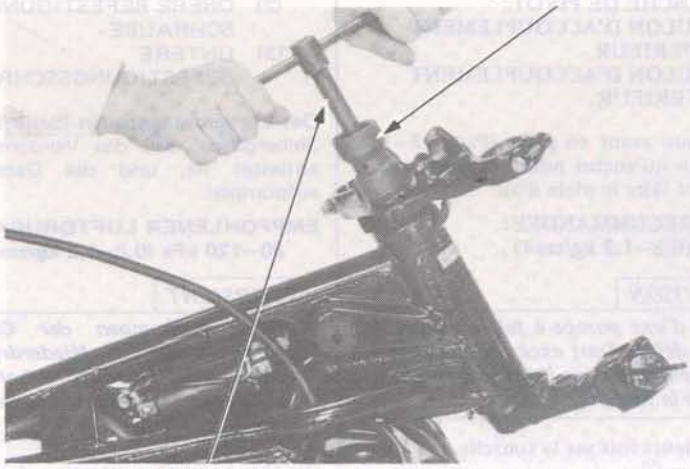
Remove the folowing components :
- —headlight cover and headlight (Page 13-3)
- —instruments (Page 13-4)
- —ignition switch and headlight cover bracket
- —handle bar (Page 13-5)
- —front wheel (Page 13-7)
- —front forks (Page 13-12)



Remove the right and left turn signals.
Remove the 3-way joint.



Remove the steering stem nut.



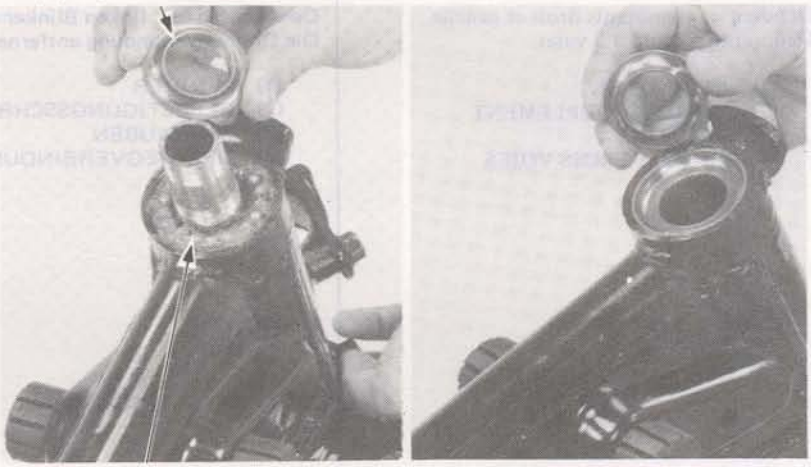
Remove the steering stem adjuster nut.

NOTE

Hold the steering stem to prevent the steel balls and the stem from falling.

Remove the top cone race and upper bearing steel balls.
Remove the steering stem and lower bearing steel balls.

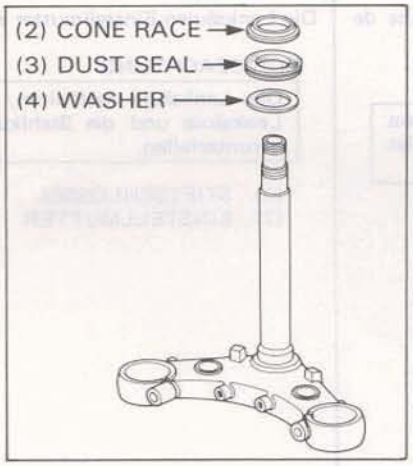
Check the upper and lower bearing race surfaces for wear or damage.
Replace if necessary.



BOTTOM CONE RACE REPLACEMENT

Inspect the bottom cone race for wear or damage and replace with a new one if necessary.
To remove the bottom cone race, use a hammer and a drift as shown.

Drive a new bottom cone race into place using a new washer and a dust seal.

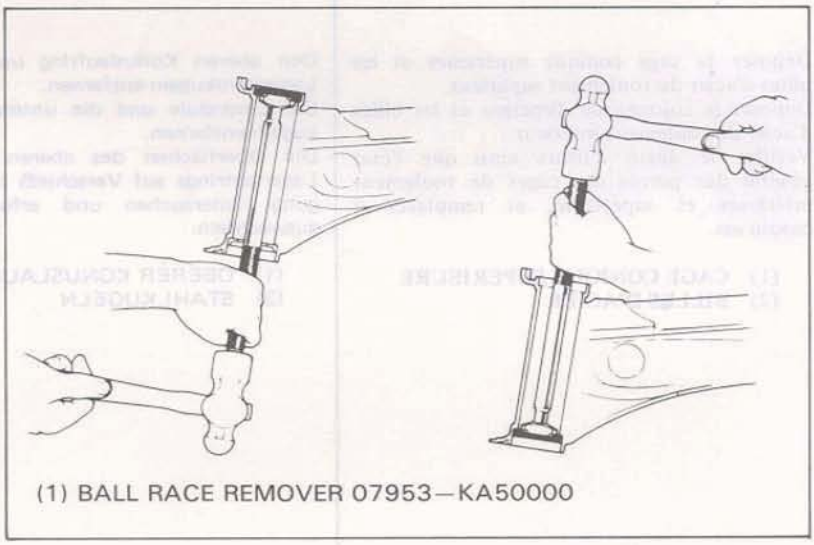


BALL RACE REPLACEMENT

Inspect the top and bottom ball races and replace if worn or damaged.
Drive out the top ball race.
Drive out the bottom ball race.

NOTE

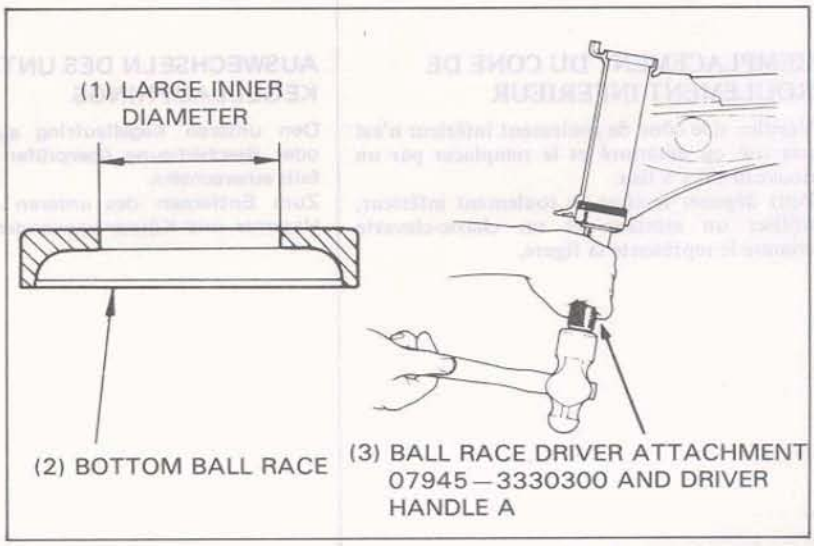
Always remove the top ball race before driving out the bottom ball race.



Install a new bottom ball race.

NOTE

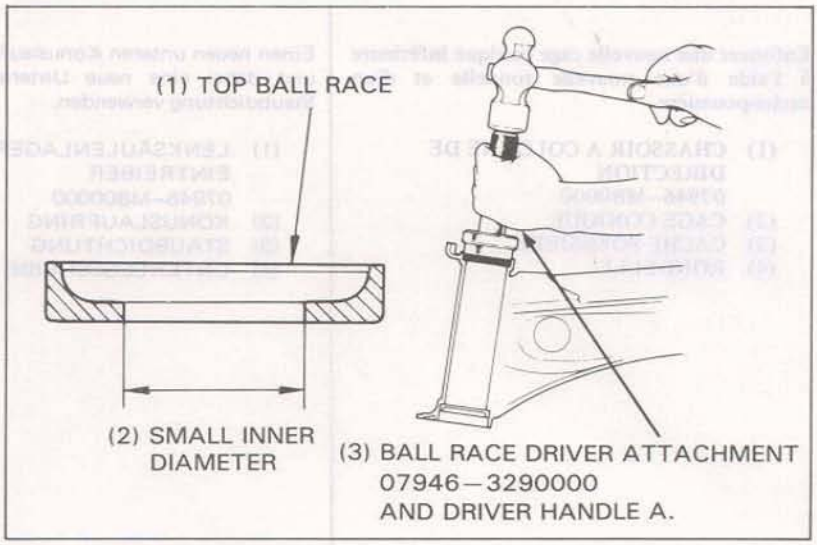
The bottom ball race has a larger I.D. than the top ball race. Be sure to install the races in their proper places.



Install the a new top ball race.

NOTE

Drive the ball races in squarely until they seat.

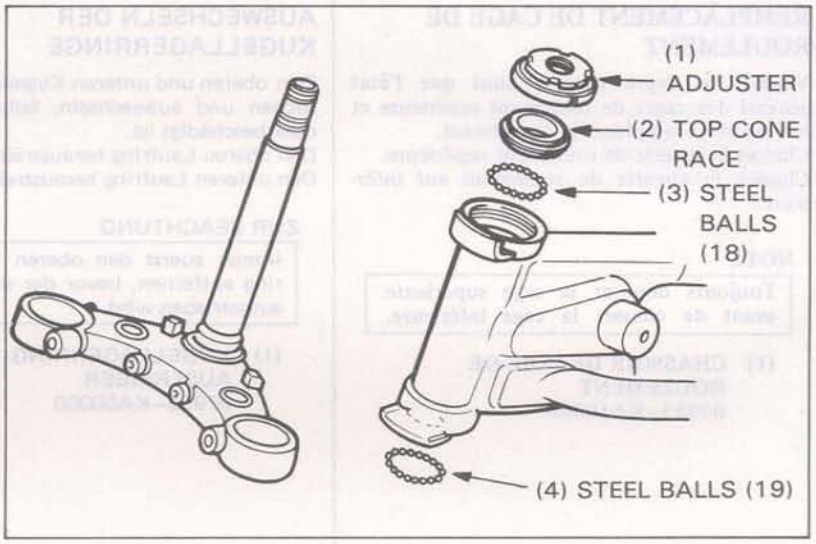


STEERING STEM INSTALLATION

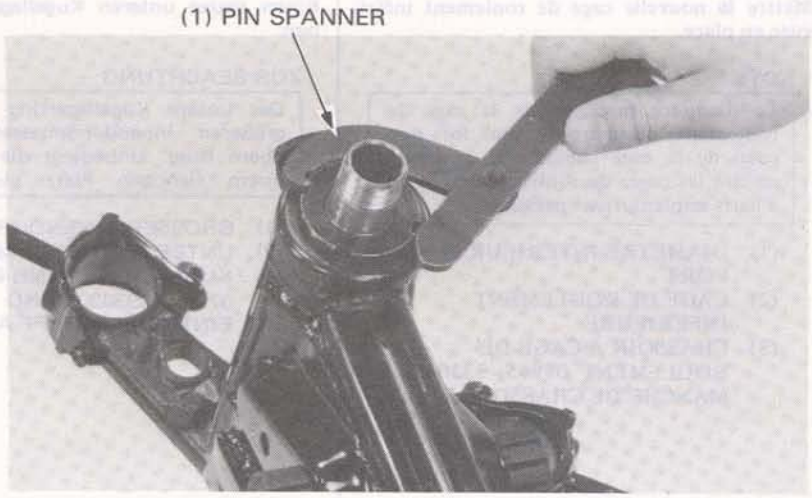
Grease the race and install 18 ball bearings.
Grease the lower cone race and install the 19 ball bearings on the race.

NOTE

Do not allow the ball to fall.



Install the adjuster in the frame neck and tighten it until snug against the top cone race.
Then, back it out 1/8 turn.
Make sure that there is no vertical movement and the stem rotates freely.



Install the front fork leg.

NOTE

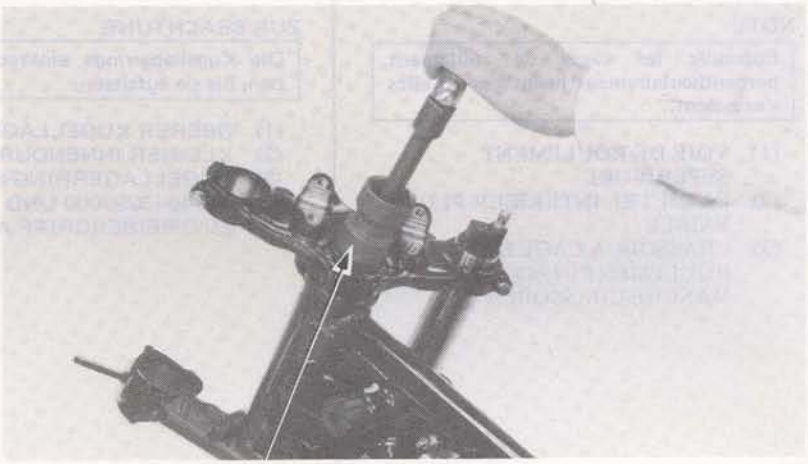
Do not intercharge the right and left fork legs.

Temporarily hold the fork tubes by tightening the steering stem bolts.

Install the fork bridge.

Install the washer and stem nut on the steering stem.

TORQUE : 90—120 N·m (9.0—12.0 kg-m, 65—87 ft-lb)



(1) SOCKET WRENCH 30 x 32 mm

Tighten the front fork pinch bolts.

TORQUE :

UPPER PINCH BOLT :
9—15 N·m (0.9—1.5 kg-m, 7—11 ft-lb)

LOWER PINCH BOLT :
30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)

Install the removed parts in the reverse order of removal :

—Front wheel (Page 13-11).
—Handlebar (Page 13-6).
—Headlight cover (Page 13-3).

REAR WHEEL/SUSPENSION/ FINAL DRIVE

ROUE ARRIERE/ SUSPENSION/COUPLE CONIQUE

HINTERRAD/ AUFHÄNGUNG/ KARDANANTRIEB

RUEDA TRASERA/ SUSPENSION/ TRANSMISION FINAL

SERVICE INFORMATION	14— 1
TROUBLESHOOTING	14— 2
REAR WHEEL/REAR BRAKE	14— 3
SHOCK ABSORBER	14— 9
SWINGARM/DRIVERSHAFT	14—15
SUSPENSION LINKAGE	14—23
FINAL DRIVE	14—25

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- COMSTAR wheels are not serviceable. If either the spokes, rim or hub are damaged the entire wheel must be replaced.
- Never ride on the spokes.
- Tubeless tire removal, repair and remounting procedures are covered in the Tubeless Tire Manual.
- Before installing the rear wheel, apply MULTIPURPOSE NLGI No. 2 Grease (Molybdenum disulfide additive) to the final driven flange and splines on the final drive shaft.
- Take care not to damage the body when removing and installing the shock absorber.
- Perform the following inspections when reassembling the final gear case:
  - Pinion gear preload
  - Final gear assembly preload
  - Gear backlash
  - Tooth contact

WARNING

Use only genuine rear suspension linkage and shock absorber pivot/mount bolts. Others may not have adequate strength. Note the installation direction of the bolts.

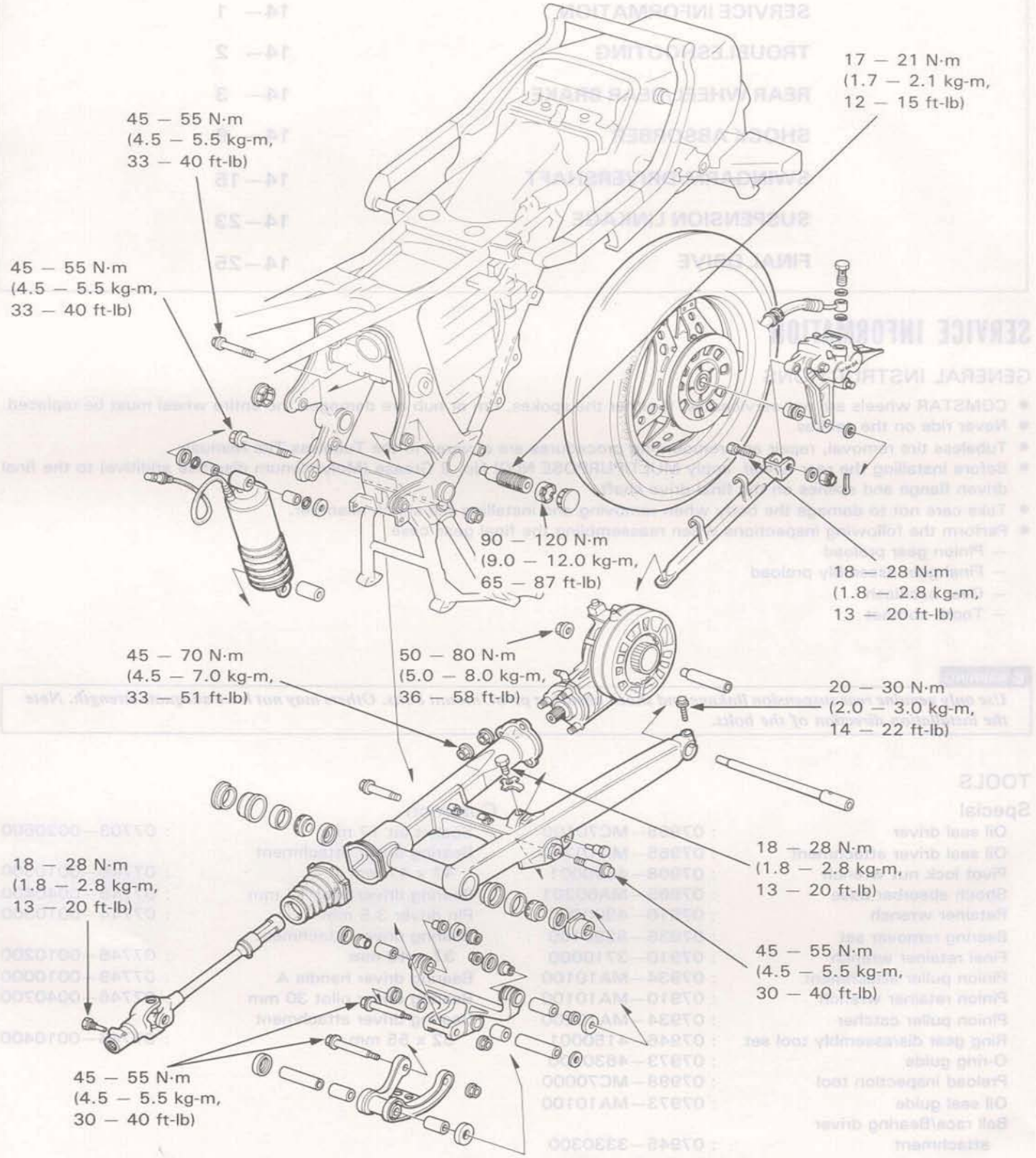
TOOLS

Special

Oil seal driver	: 07965—MC70100
Oil seal driver attachment	: 07965—MA10200
Pivot lock nut wrench	: 07908—4690001
Shoch absorber base	: 07965—MA60201
Retainer wrench	: 07910—4300000
Bearing remover set	: 07936—8890100
Final retainer wrench	: 07910—3710000
Pinion puller attachment	: 07934—MA10100
Pinion retainer wrench	: 07910—MA10100
Pinion puller catcher	: 07934—MA10200
Ring gear dis/assembly tool set	: 07946—4150001
O-ring guide	: 07973—4630200
Preload inspection tool	: 07998—MC70000
Oil seal guide	: 07973—MA10100
Ball race/Bearing driver attachment	: 07945—3330300

Common

Socket bit 17 mm	: 07703—0020500
Bearing driver attachment 42 x 47 mm	: 07746—0010300
Bearing driver pilot 17 mm	: 07746—0040400
Pin driver 3.5 mm	: 07744—0010300
Bearing driver attachment 37 x 40 mm	: 07746—0010200
Bearing driver handle A	: 07749—0010000
Bearing driver pilot 30 mm	: 07746—0040700
Bearing driver attachment 52 x 55 mm	: 07746—0010400


17 — 21 N·m
(1.7 — 2.1 kg-m,
12 — 15 ft-lb)
45 — 55 N·m
(4.5 — 5.5 kg-m,
33 — 40 ft-lb)
45 — 55 N·m
(4.5 — 5.5 kg-m,
33 — 40 ft-lb)
90 — 120 N·m
(9.0 — 12.0 kg-m,
65 — 87 ft-lb)
18 — 28 N·m
(1.8 — 2.8 kg-m,
13 — 20 ft-lb)
45 — 70 N·m
(4.5 — 7.0 kg-m,
33 — 51 ft-lb)
50 — 80 N·m
(5.0 — 8.0 kg-m,
36 — 58 ft-lb)
20 — 30 N·m
(2.0 — 3.0 kg-m,
14 — 22 ft-lb)
18 — 28 N·m
(1.8 — 2.8 kg-m,
13 — 20 ft-lb)
18 — 28 N·m
(1.8 — 2.8 kg-m,
13 — 20 ft-lb)
45 — 55 N·m
(4.5 — 5.5 kg-m,
30 — 40 ft-lb)
45 — 55 N·m
(4.5 — 5.5 kg-m,
30 — 40 ft-lb)

TORQUE VALUES

Shock absorber mount bolt	45— 55 N·m (4.5— 5.5 kg-m, 33—40 ft-lb)
Suspension linkage pivot bolt	45— 55 N·m (4.5— 5.5 kg-m, 33—40 ft-lb)
Rear axle nut	50— 80 N·m (5.0— 8.0 kg-m, 36—58 ft-lb)
Rear axle pinch bolt	20— 30 N·m (2.0— 3.0 kg-m, 14—22 ft-lb)
Swingarm pivot bolt	17— 21 N·m (1.7— 2.1 kg-m, 12—15 ft-lb)
Swingarm pivot lock nut	90—120 N·m (9.0—12.0 kg-m, 65—87 ft-lb)
Final gear case nut	45— 70 N·m (4.5— 7.0 kg-m, 33—51 ft-lb)
Drive shaft lock nut	18— 28 N·m (1.8— 2.8 kg-m, 13—20 ft-lb)
Brake stopper arm bolt	18— 28 N·m (1.8— 2.8 kg-m, 13—20 ft-lb)
Rear brake pedal bolt	10— 15 N·m (1.0— 1.5 kg-m, 7—11 ft-lb)

SPECIFICATIONS

Item		Standard	Service Limit
Axle bend		—	0.2 mm (0.008 in)
Rear wheel runout	Radial	—	2.0 mm (0.08 in)
	Axial	—	2.0 mm (0.08 in)
Rear shock absorber oil capacity		270cm^3 (7.60 Imp oz, 9.13 US oz)	—
Rear shock absorber air pressure		0 — 500 kPa (0 — 5.0 kg/cm^2, 0 — 70 psi)	—
Final drive	Backlash	0.08 — 0.18 mm (0.003 — 0.077 in)	0.25 mm (0.010 in)
	Backlash difference	—	0.10 mm (0.004 in)
	Pinion gear preload	0.4 — 0.5 N·m (4.0 — 5.0 kg-cm, 3.48 — 4.32 in-lb)	—
	Assembly preload	0.6 — 0.9 N·m (6.0 — 9.0 kg-cm, 5.16 — 7.80 in-lb)	—
	Final gear oil capacity	160 — 180 cc (4.5 — 5.0 Imp oz, 5.4 — 6.1 US oz)	—

TROUBLESHOOTING

Wobble or Vibration
1. Distorted rim
2. Loose wheel bearing
3. Loose or distorted spokes
4. Faulty tire
5. Loose axle

Soft Suspension
1. Weak spring
2. Shock absorbers improperly adjusted
3. Weak rear damper

Hard Suspension
1. Shock absorbers improperly adjusted

Suspension Noise
1. Shock case binding
2. Loose fasteners

Rear Wheel Will Not Rotote Freely
1. Rear brake dragging
2. Damaged wheel bearing
3. Damaged ring and pinion gear bearings
4. Bent rear axle
5. Bent swingarm
6. Excessive final gear assembly preload

Excessive Noise
1. Worn or scored ring gear shaft and driven flange
2. Scored driven flange and wheel hub
3. Worn or scored drive pinion and splines
4. Worn pinion and ring gears
5. Excessive backlash between pinion and ring gear
6. Oil level too low

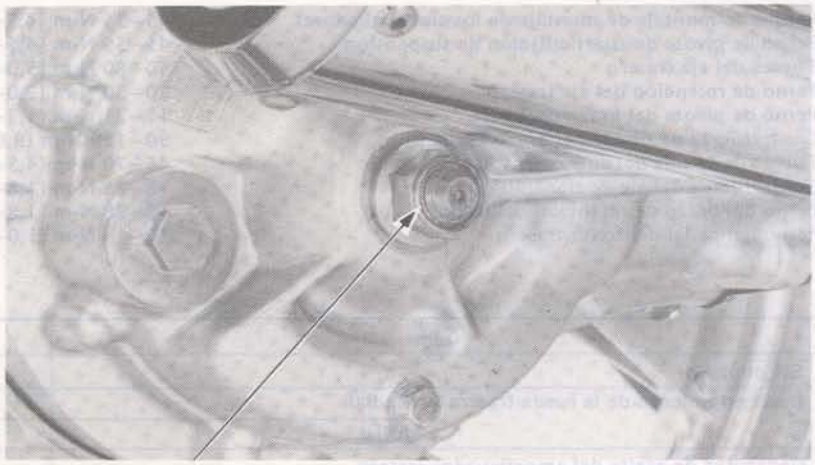
Oil Leak
1. Clogged hub breather
2. Oil level too high
3. Seals damaged

Final Drive Gear Noise
1. Oil level too low
2. Excessive backlash
3. Drive shaft splines damaged or worn
4. Insufficient lubricant

REAR WHEEL/REAR BRAKE

REAR WHEEL REMOVAL

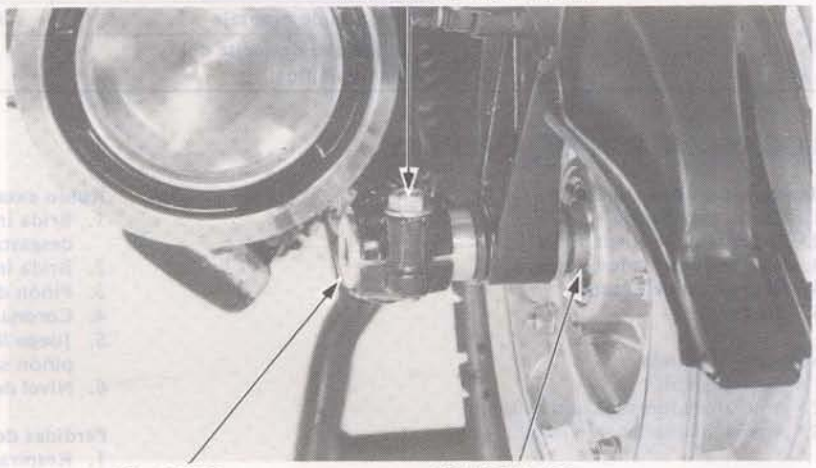
Place the motorcycle on its center stand.
Loosen the axle nut.



(1) AXLE NUT

Remove the axle pinch bolt.
Remove the rear axle.

(1) AXLE PINCH BOLT



(2) AXLE

(3) COLLAR

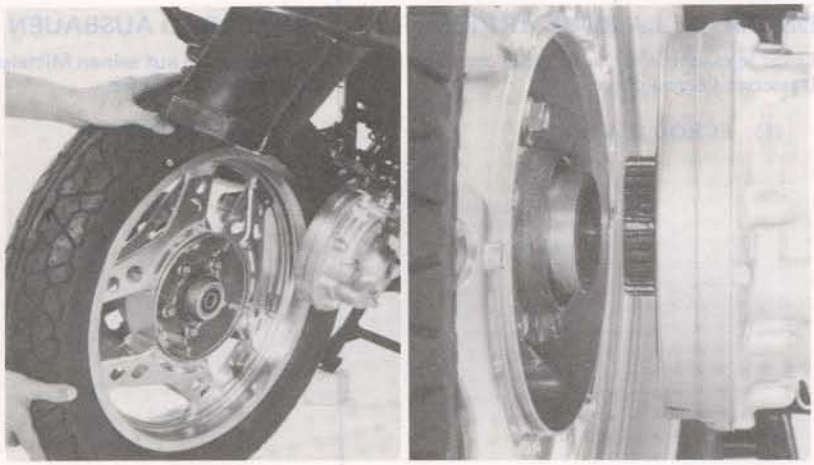
Turn the rear brake caliper up and pull the brake torque link outward to allow removal of the rear wheel.

(1) REAR BRAKE CALIPER

Push the rear wheel toward the left away from the final drive gear and then remove the wheel by leaning the motorcycle to right side with your helper.

NOTE

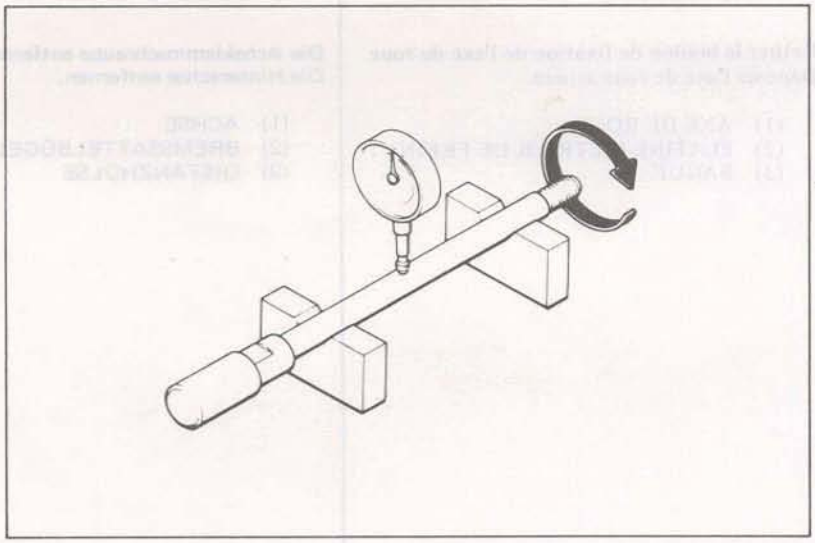
Ask your helper to lean the motorcycle.



AXLE INSPECTION

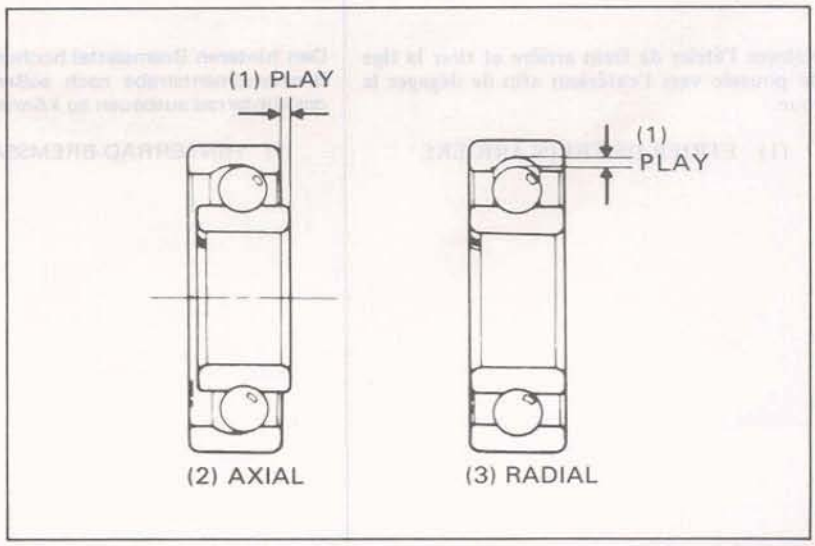
Set the axle shaft in V-blocks and measure the runout. The actual runout is 1/2 of the total indicator reading.

SERVICE LIMIT : 0.20 mm (0.008 in.)



REAR WHEEL BEARING INSPECTION

Rotate the rear wheel bearing by hand.
Replace the wheel bearings with new ones if they are noisy or have excessive play.

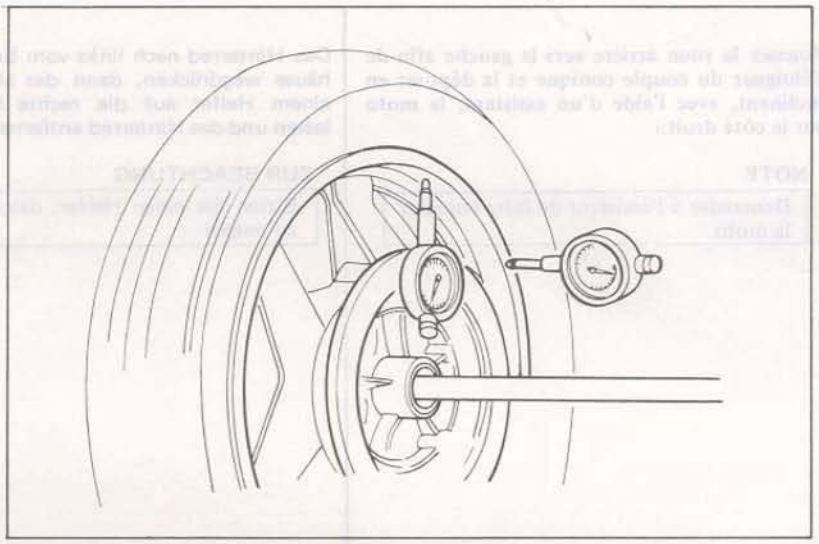


REAR WHEEL RIM RUNOUT INSPECTION

Place the wheel in a truing stand. Spin the wheel slowly and measure the runout with a dial indicator.

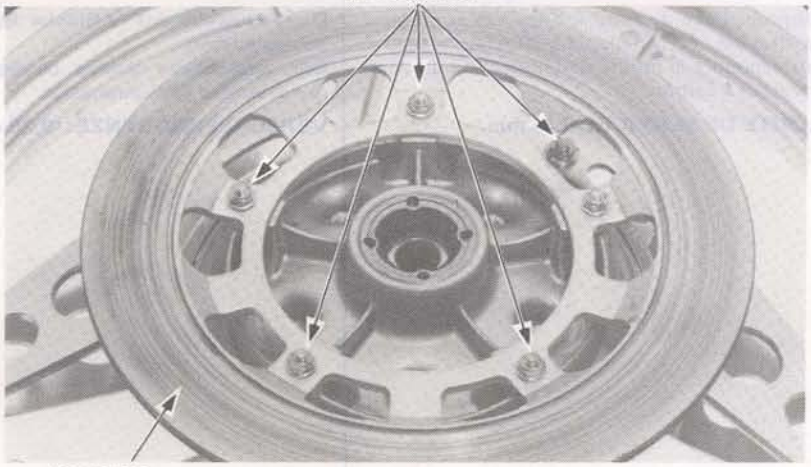
SERVICE LIMITS :

RADIAL RUNOUT : 2.0 mm (0.08 in)
AXIAL RUNOUT : 2.0 mm (0.08 in)



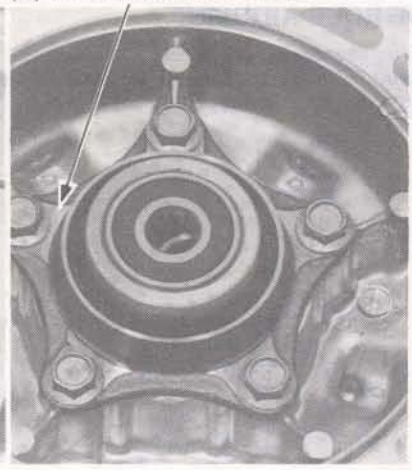
REAR WHEEL DISASSEMBLY

Remove the rear brake discs.



Remove the bearing retainer with the RETAINER WRENCH.

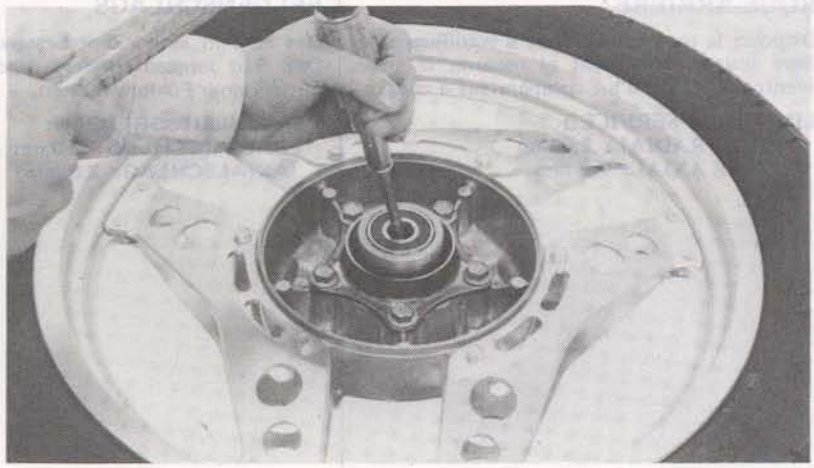
Remove the final driver flange.



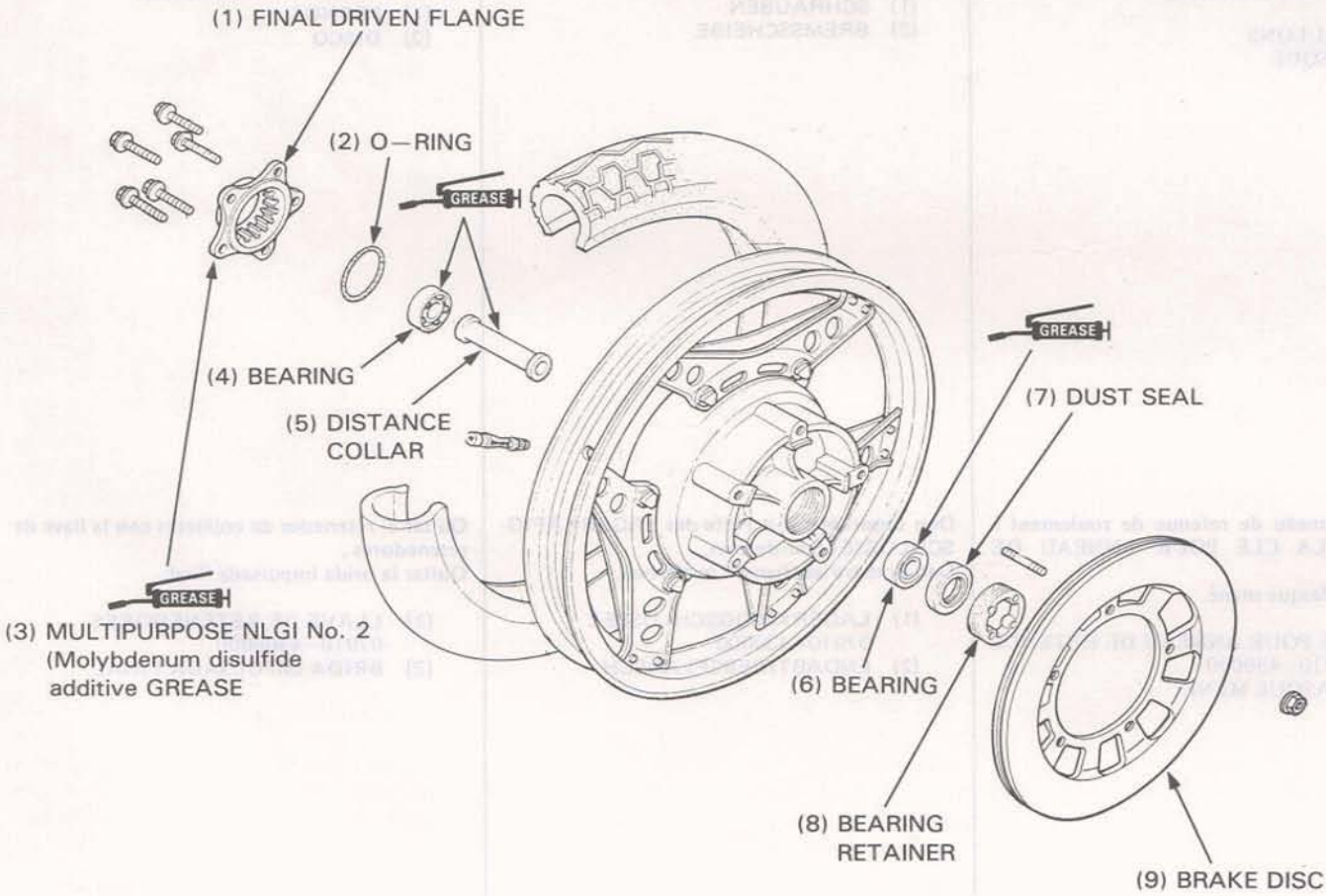
Remove the bearings and distance collar from the rear wheel hub.

NOTE

If the bearings are removed, replace them with new bearings during assembly.



REAR WHEEL ASSEMBLY

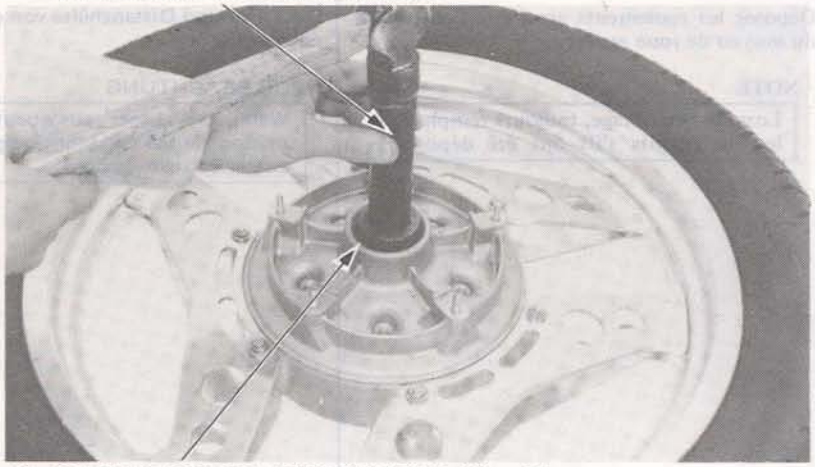


Pack all bearing cavities with grease and drive in the bearing with a bearing driver.
Drive the left (retainer side) bearing first.

CAUTION

Drive the bearings in squarely with the sealed end facing out, making sure they are fully seated.

(1) BEARING DRIVER HANDLE A

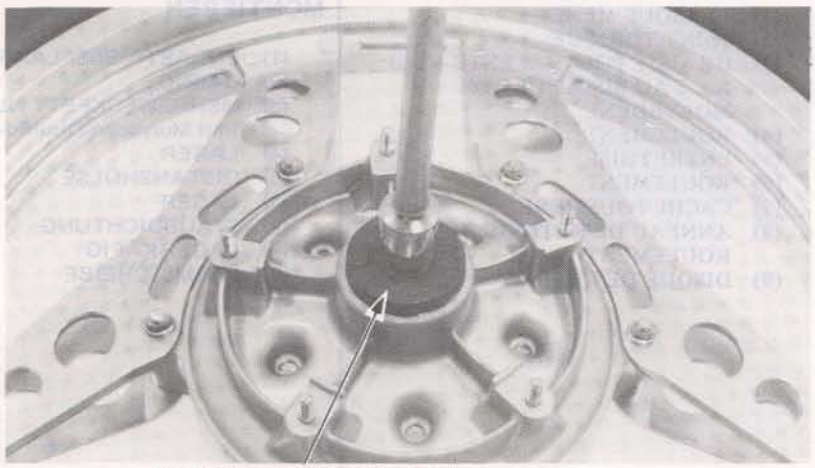


(2) BEARING DRIVER ATTACHMENT 42 x 47 mm AND PILOT 17 mm

Install the dust seal.
Install the bearing retainer with the RETAINER WRENCH as shown.
Calk the retainer.

NOTE

Check the condition of the bearing retainer. Replace the retainer if the threads are damaged.

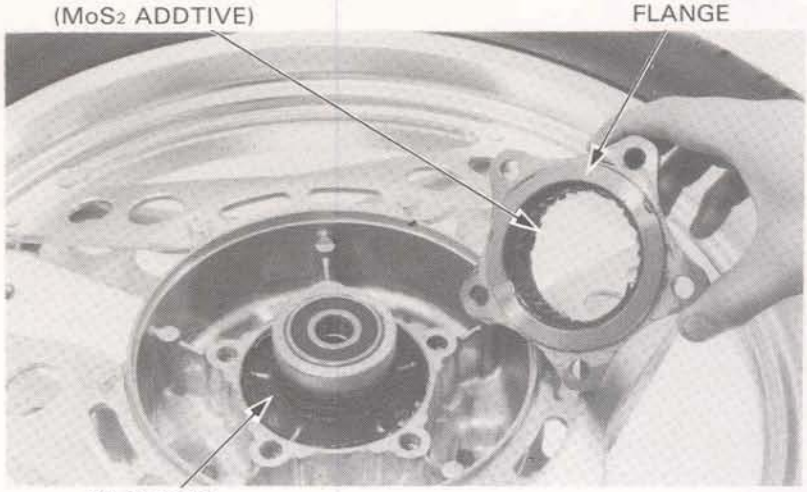


(1) RETAINER WRENCH
07910—4300000

Install the O-ring. Lubricate the splines of the final driven flange and the O-ring with lithium-based MULTIPURPOSE NLGI No. 2 (molybdenum disulfide additive) GREASE.

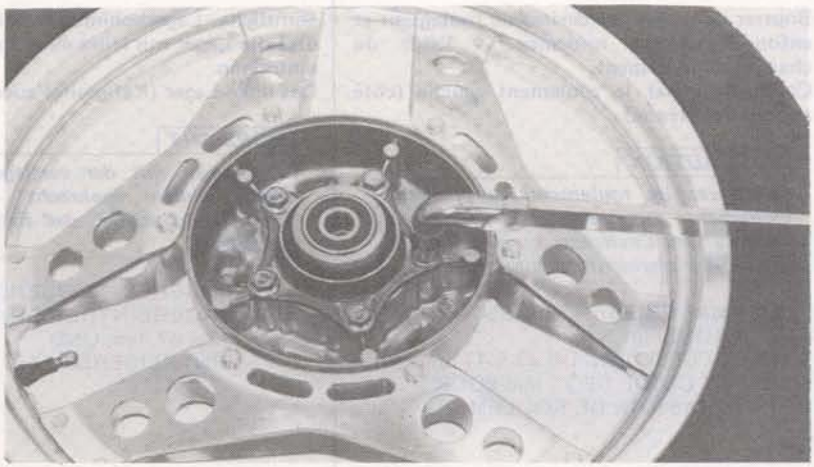
(1) MULTIPURPOSE NLGI No. 2 (MoS_2 ADDTIVE)

(2) FINAL DRIVEN FLANGE

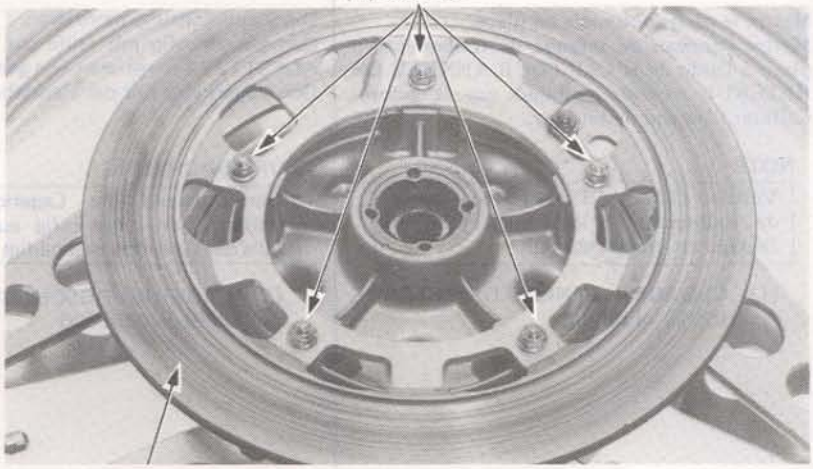


(3) O-RING

Install the final drive flange and torque the bolts.
TORQUE : 40—50 N·m (4.0—5.0 kg-m, 29—36 ft-lb)

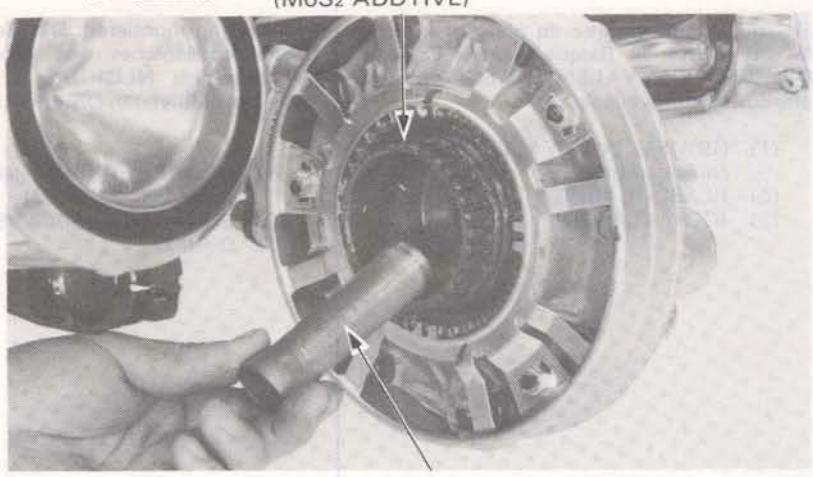


Install the rear brake disc.
TORQUE : 10—12 N·m (1.0—1.2 kg-m, 7—9 ft-lb)



REAR WHEEL INSTALLATION

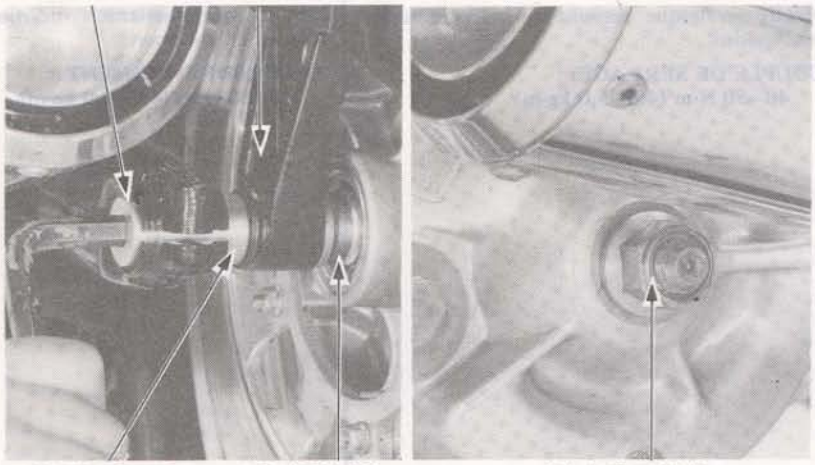
Apply MULTIPURPOSE NLGI No. 2 (Molybdenum disulfide additive) GREASE to the final driven flange spline of the rear wheel and ring gear.
Insert the distance collar into the final gear case in the direction shown.



Install the rear wheel.
Insert the rear axle through the swingarm, washer, brake caliper bracket, collar and rear wheel.

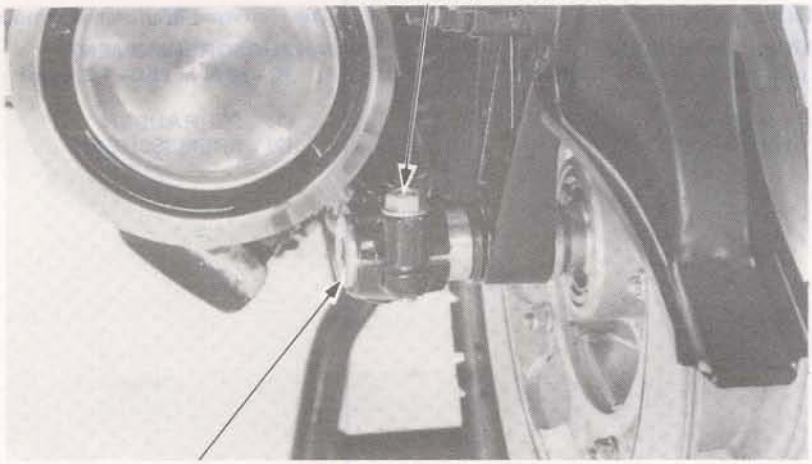
Tighten the axle nut while holding the left axle end with hex wrench.

TORQUE : 50—80 N·m (5.0—8.0 kg-m, 36—58 ft-lb)



Tighten the axle pinch bolt.

TORQUE : 20—30 N·m (2.0—3.0 kg-m, 14—22 ft-lb)



SHOCK ABSORBER

REMOVAL

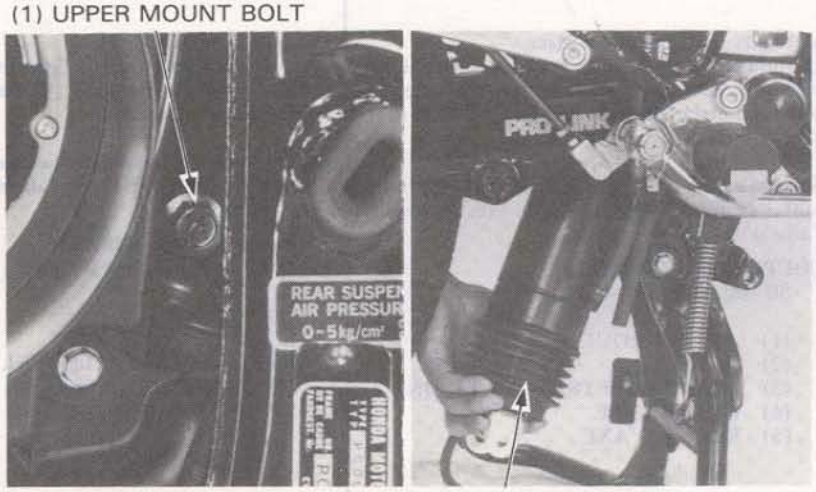
Place the motorcycle on the center stand.
Remove the muffler.
Remove the shock absorber breather tube.
Remove the shock absorber lower mount bolt.
Remove the shock arm and shock link.

Disconnect the air hose from the hose clamp.
Remove the shock absorber upper mount bolt.

NOTE

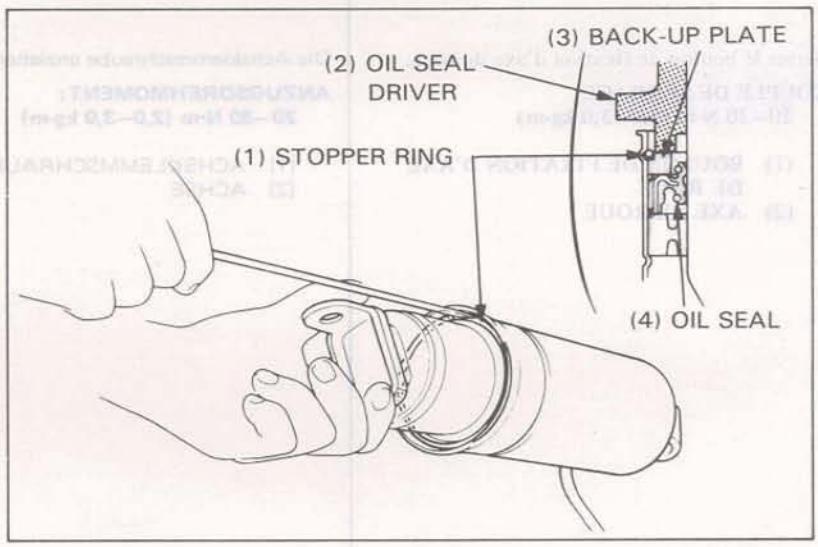
Hold the shock absorber to prevent it from falling.

Remove the shock absorber.

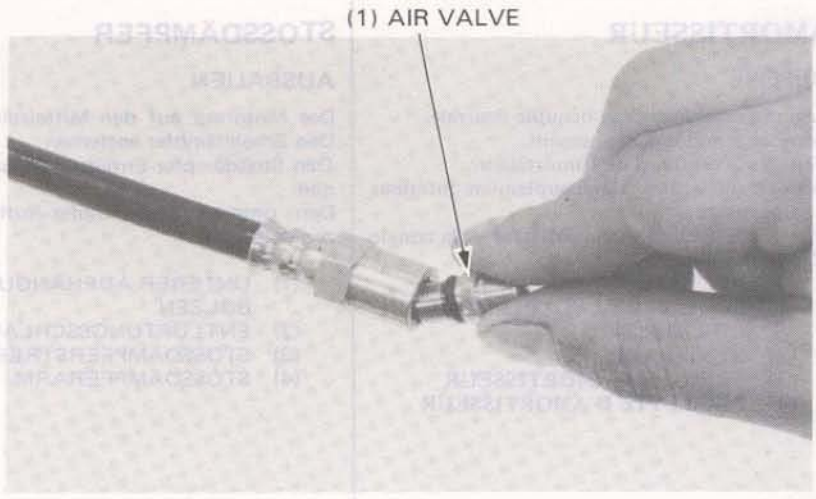


OIL SEAR REPLACEMENT

Remove the boot band and boot.
To remove the stopper ring, press down on the back-up plate and oil seal.
Remove the stopper ring and back-up plate.



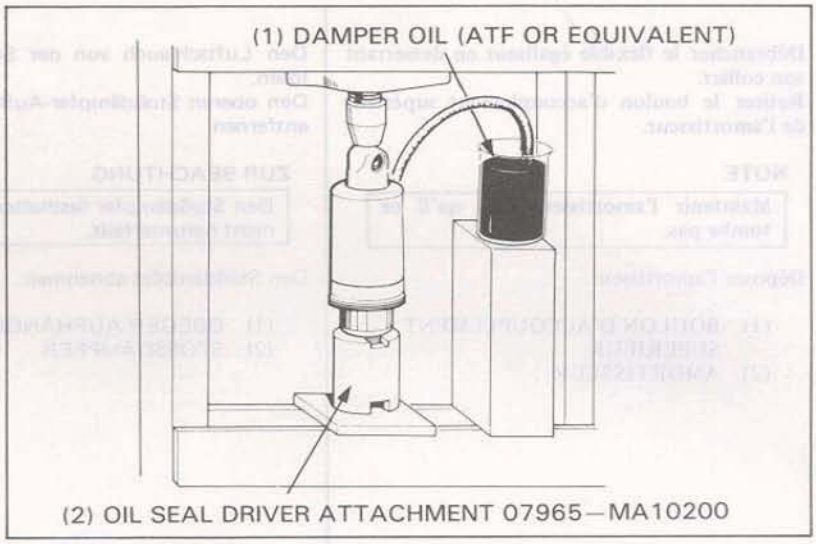
Release air pressure and remove the air valve from the hose.



Place about 300 cm³ (10.1 oz) of damper oil (ATF or equivalent) in a clean container.
Place the shock absorber in a hydraulic press with an OIL SEAR DRIVER ATTACHMENT positioned as shown.
Place the air hose in the oil and press the shock absorber several times until the damper is filled with the oil.

NOTE

- Do not over-press the shock.
- This shock absorber's store is 43 mm (1.69 in).



Remove the shock from the press.
Reinstall the air valve in the air hose.
Place the OIL SEAL DRIVER on the oil seal.
Place the shock absorber in the hydraulic press using the OIL SEAL DRIVER ATTACHMENT and SHOCK ABSORBER BASE.
Press the oil seal out by copmressing the shock absorber.

CAUTION

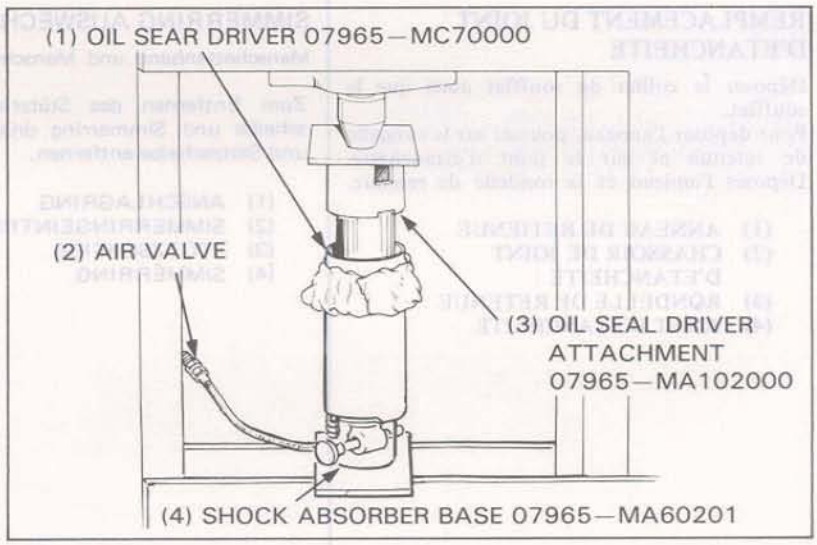
Spill as little ATF as possible to prevent air from entiring the shock. Air in the shock will cause the damping to be too soft.

NOTE

The oil seal will not be pressed out if there is air in the ATF or if the shock absorber is not filled with ATF.

CAUTION

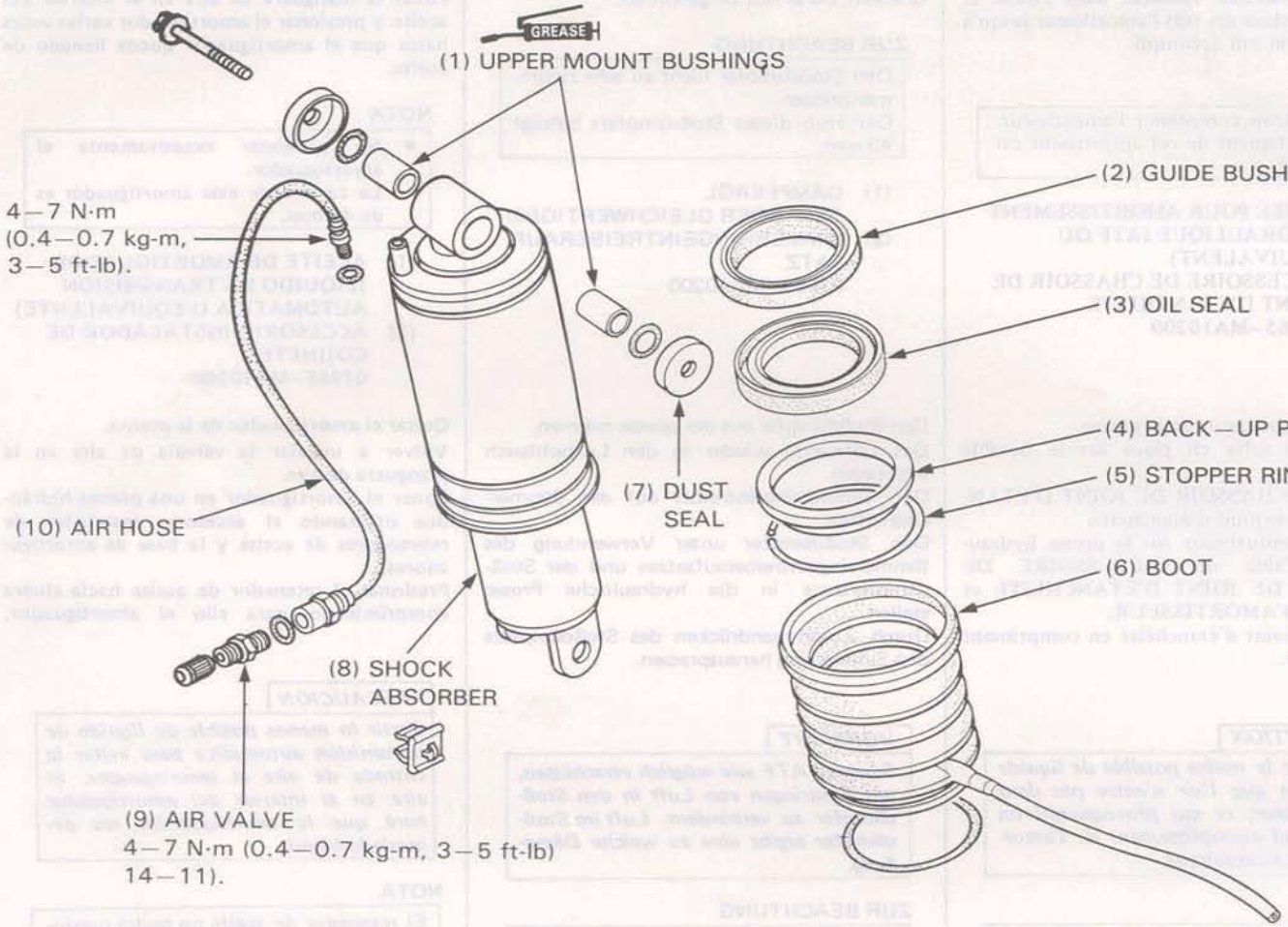
Place the shock absorber in the hydraulic press on its clevis, not on its case.



ASSEMBLY

NOTE

Apply MULTIPURPOSE NLGI No. 2 (Molybdenum disulfied) GREASE to the upper mount bushings.



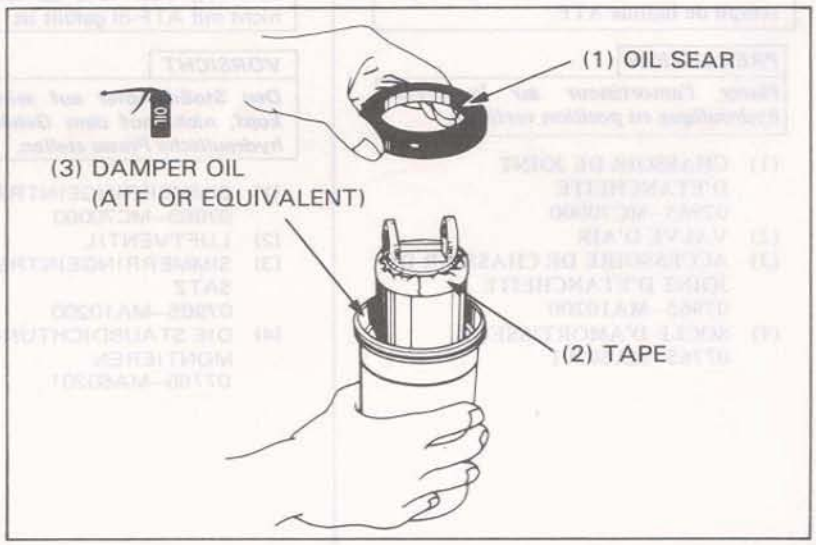
Fill the shock absorber with damper oil (ATF or equivalent).

Wrap a piece of tape around the groove at the end of the shock absorber.

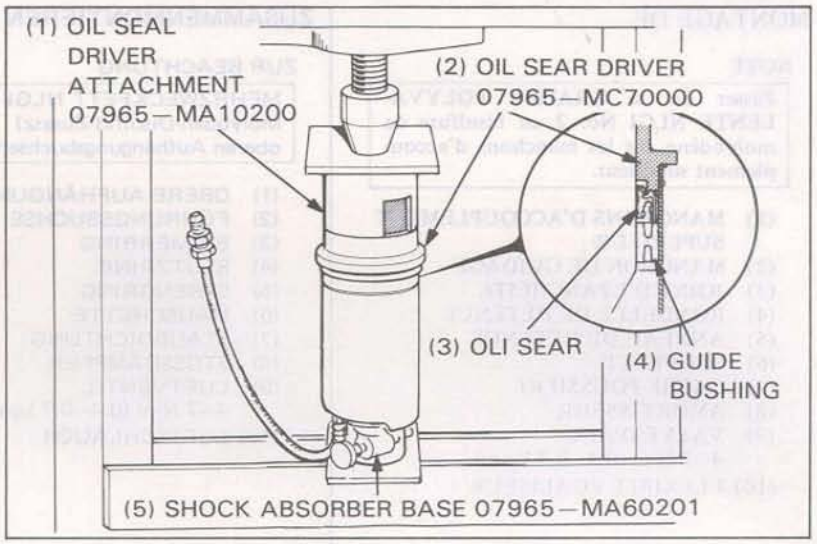
Dip the oil seal in damper oil and install it on the damper.

CAUTION

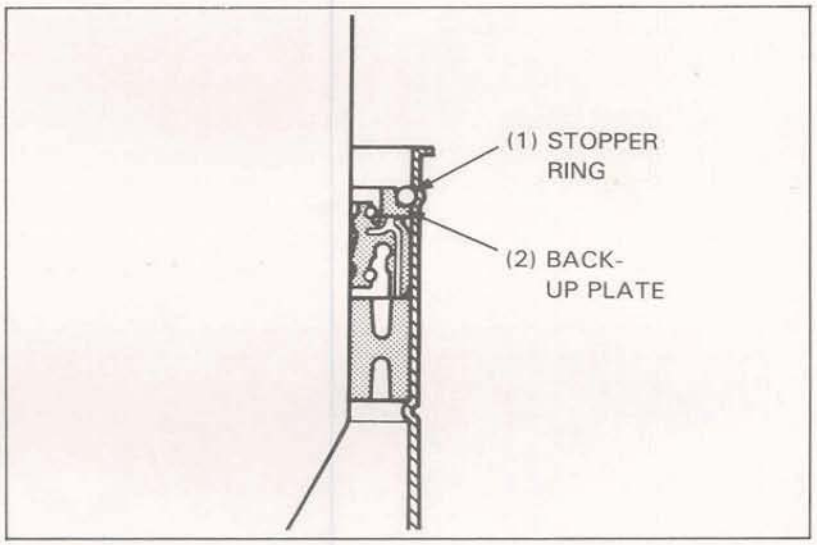
Be careful not to damage the oil seal during installation.



Remove the air valve from the air hose.
Press the oil seal in the shock absorber with a hydrauric press until the oil seal driver stops at the edge of the outer case.



Install the back-up plate.
Install the stopper ring.



Fill the shock absorber with damper oil (page 14-11).

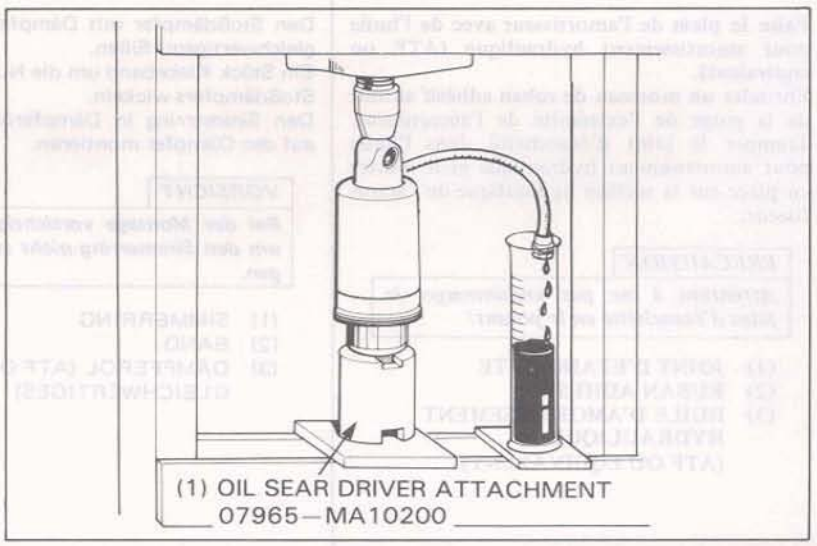
CAUTION

Make sure that the damper is completely empty of air.

Drain the damper oil to specified capacity by compressing the shock absorber slowly.

SPECIFIED CAPACITY : 135 cm³ (3.80 Imp oz 4.56 US oz)

Remove the shock absorber from the hydraulic press and install the air valve.
Install the boot and boot clip



Apply molybdenum disulfied (MoS_2) paste (containing more than 45% of MoS_2) to the upper mount bushings.

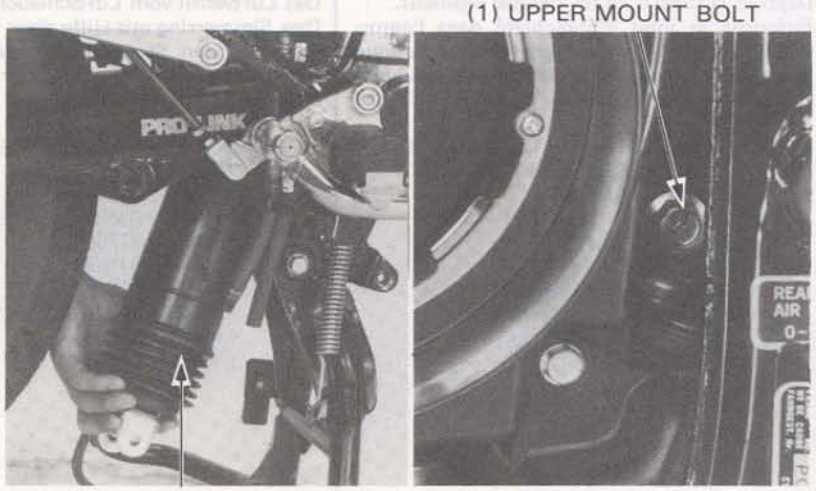
NOTE

Use MoS_2 paste (containing more than 45% of MoS_2) as follows :

- Molykote® G-n Paste manufactured by Dow Corning U.S.A.
- Rocol Paste manufactured by Sumico Lubricant Co., Lt., Japan
- Other lubricants of equivalent quality
- Do not damage the shock absorber body.

Install and tighten the upper mount bolt.

TORQUE : 45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)

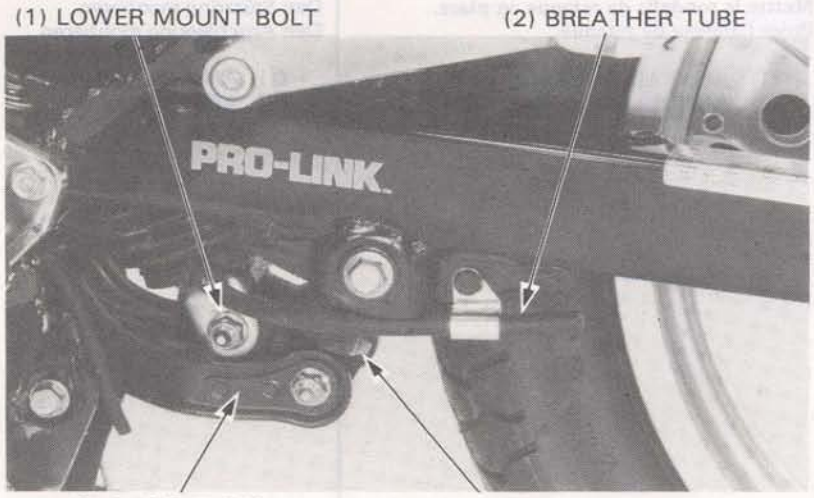


Lubricate the linkage pivots with paste grease.
Install the shock arm and shock link (Page 14-25).

Tighten the lower mount bolt.

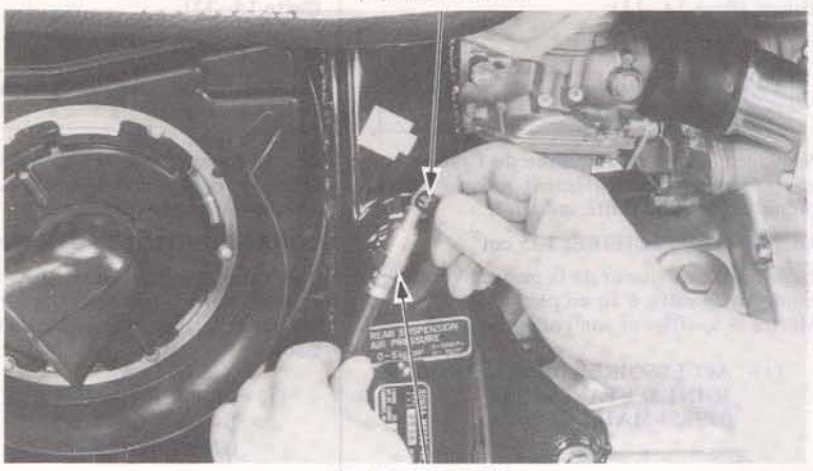
TORQUE : 45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)

Install the muffler.



Make sure all weight is off the rear wheel and charge the shock absorber with air.

RECOMMENDED PRESSURE :
0—500 kPa (0—5.0 kg/cm², 0—70 psi)



SWINGARM/DRIVESHAFT

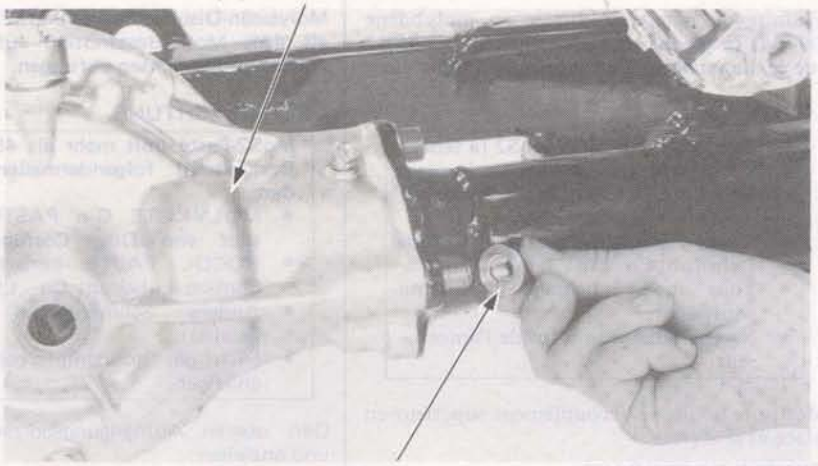
REMOVAL

Remove the rear wheel (Page 14-3).
Remove the shock absorber (Page 14-9).
Remove the final gear case (Page 14-25).

CAUTION

Pump grease into the final gear case through the grease nipple whenever the drive shaft it removed from the engine.

(1) FINAL GEAR CASE



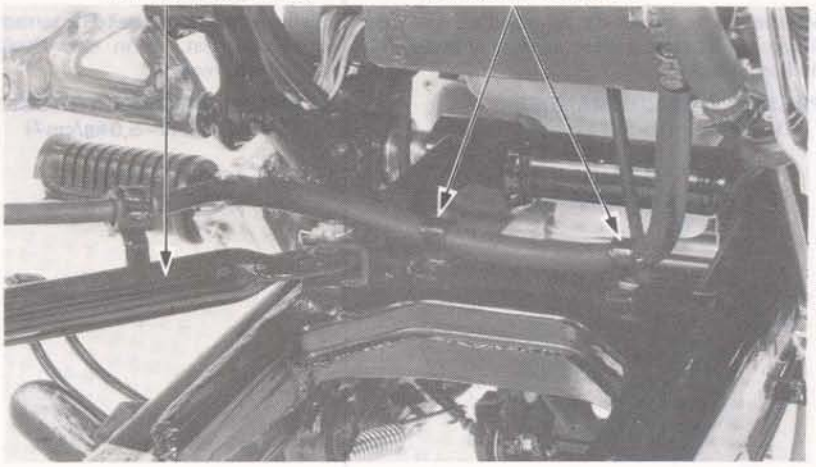
(2) FINAL GEAR CASE NUT

Slide the boot forward and remove the drive shaft lock bolt.

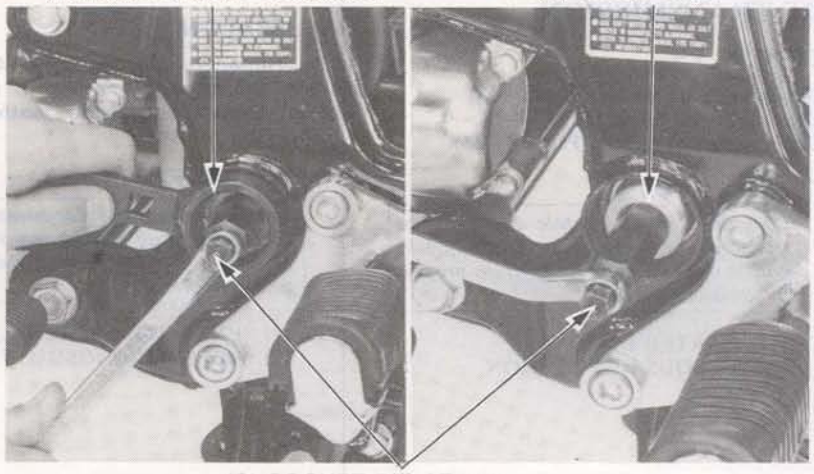
(1) DRIVER SHAFT LOCK BOLT

Remove the rear brake hose from the clamps.
Remove the torque link.

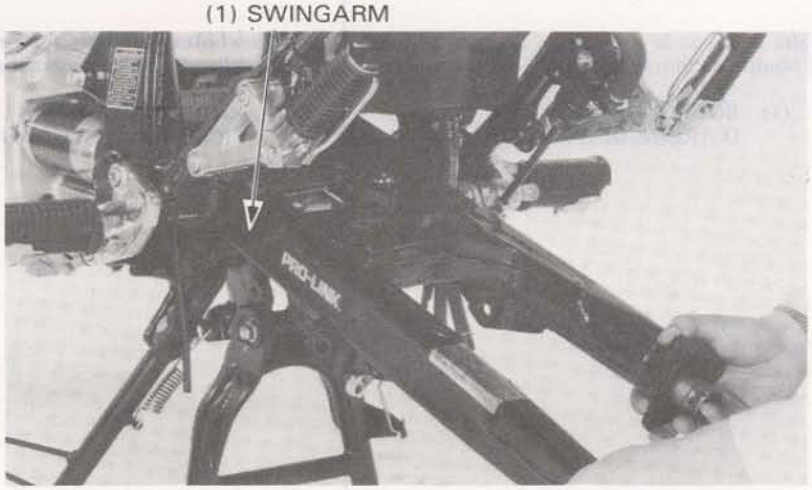
(1) TORQUE LINK (2) HOSE CLAMPS



Loosen the swingarm pivot lock nut and bolt.

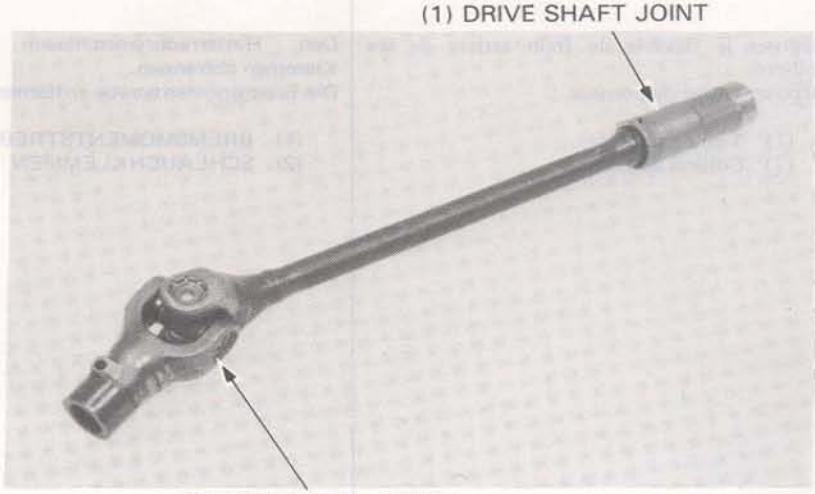


Remove the swingarm pivot lock nut and bolt.
Remove the swingarm.

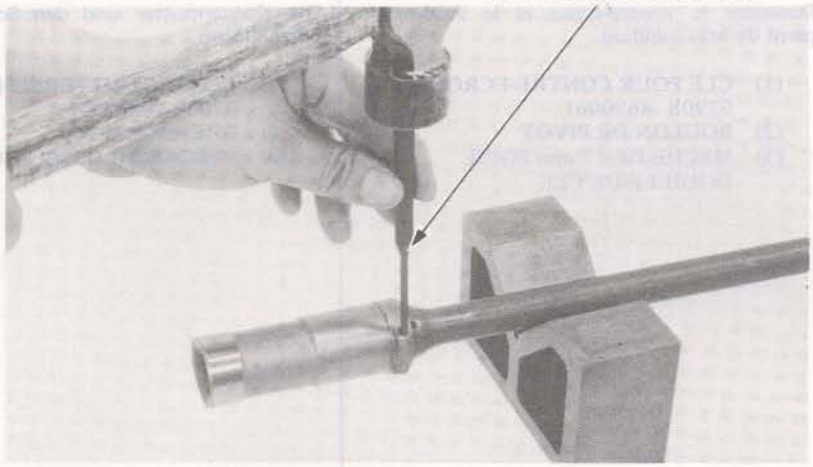


DRIVE SHAFT INSPECTION

Remove the drive shaft from the swingarm.
Inspect the drive shaft and drive shaft joint splines for wear and damage.
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 shaft must be replaced.



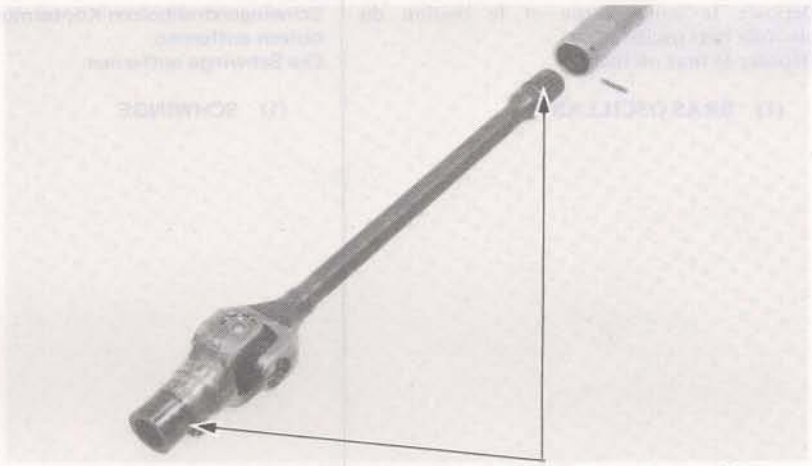
Drive out the spring pin.
Separate the drive shaft joint from the drive shaft.



Lubricate the splines with MULTIPURPOSE NLGI No. 2 (molybdenum disulfide additive) GREASE.
Assemble the drive shaft and drive shaft joint and drive in the spring pin.

NOTE

The spring pin should be below the drive shaft joint.



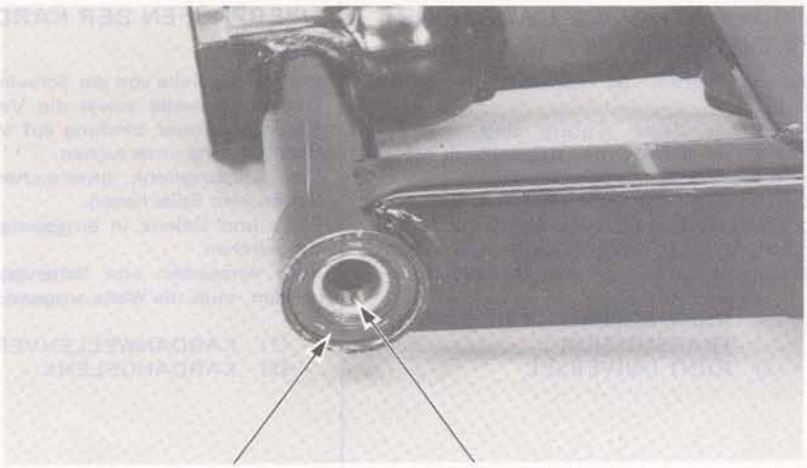
PIVOT BEARING REPLACEMENT

Inspect the tapered roller bearings and races for damage and wear.
If bearing replacement is required, remove the outer races from the swingarm.

NOTE

Always replace pivot bearings in pairs.

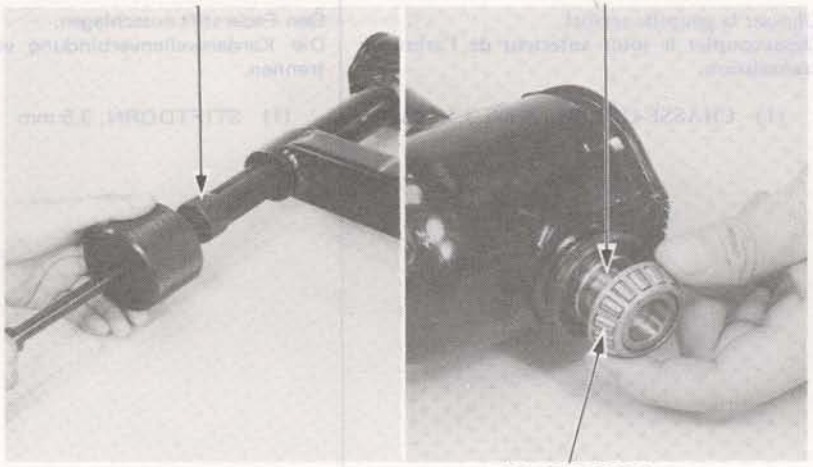
Remove the left pivot bearing dust seal and inner bearing.



(1) BEARING REMOVER SET
07936 – 8890100

(2) DUST SEAL

Remove the outer race with the bearing remove.
Remove the right pivot bearing and dust seal.

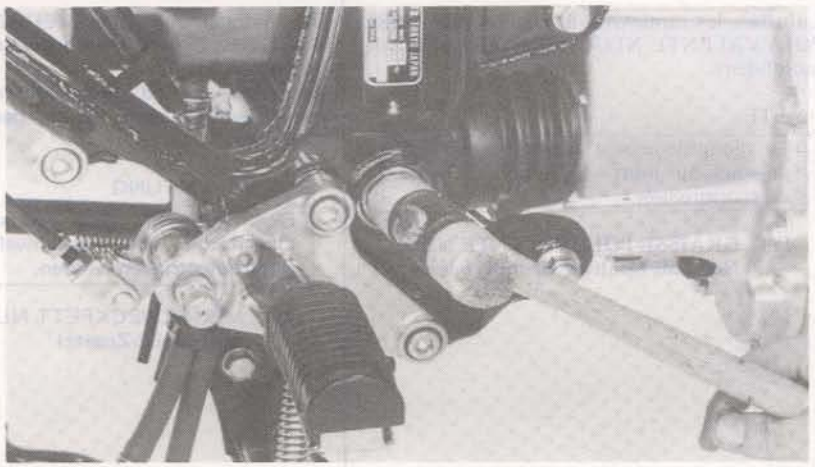


(3) BEARING

Remove the cap and drive the pivot bearing holder out.

CAUTION

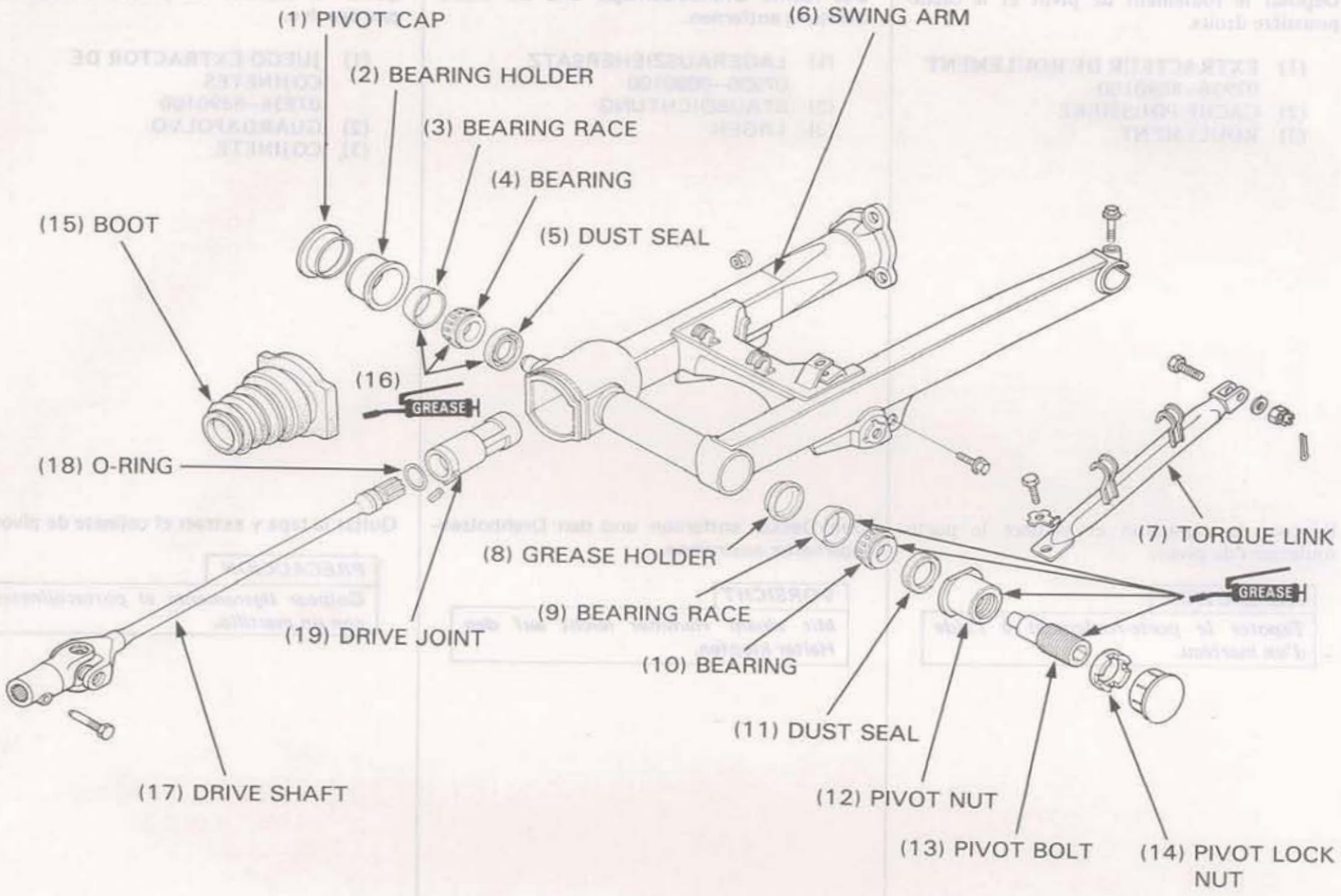
Lightly tap the holder with a hammer.



(1) BEARING HOLDER

Install the new bearing race and bearing holder so that the flange is seated against the frame body.

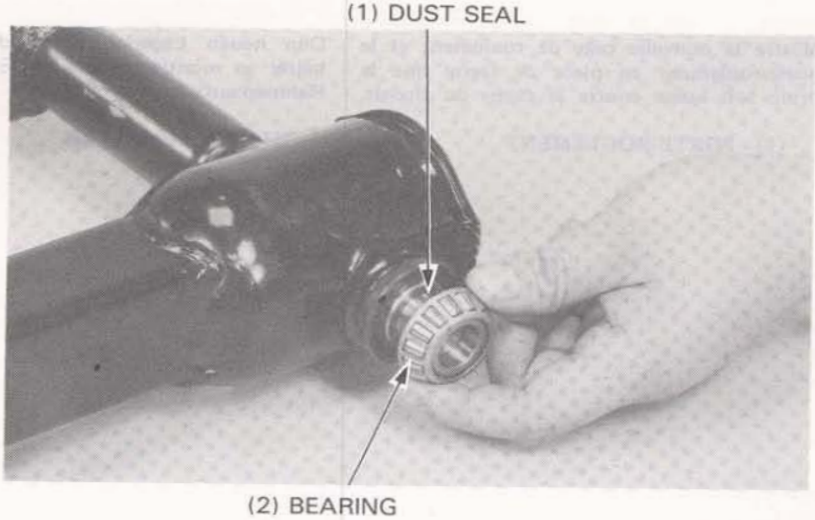
Pack all bearing cavities with grease and grease the oil seal lip.



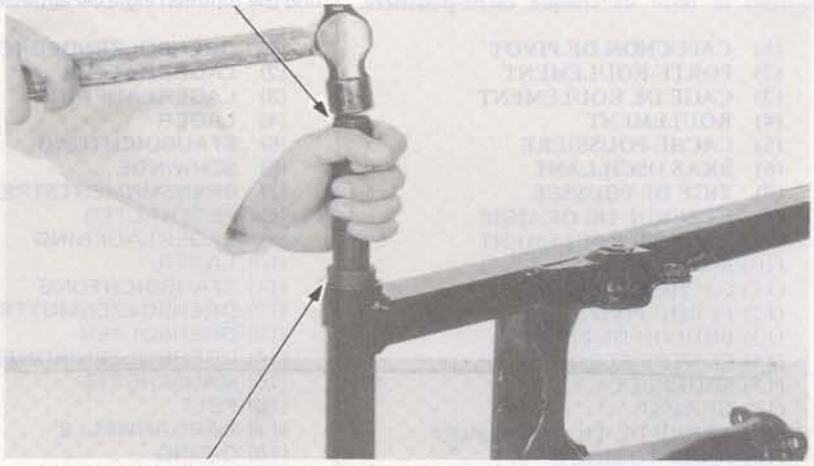
Install the dust seal and bearing into the swingarm.

NOTE

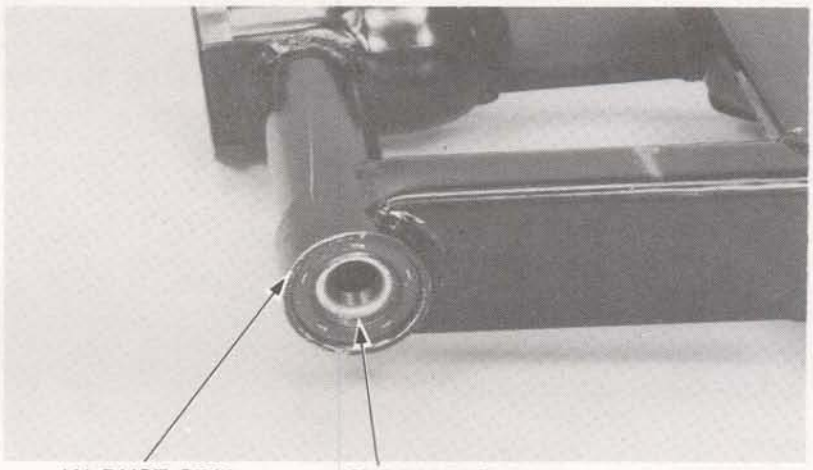
Note the installation direction of the dust seal.



Drive the new bearing race into the swingarm.



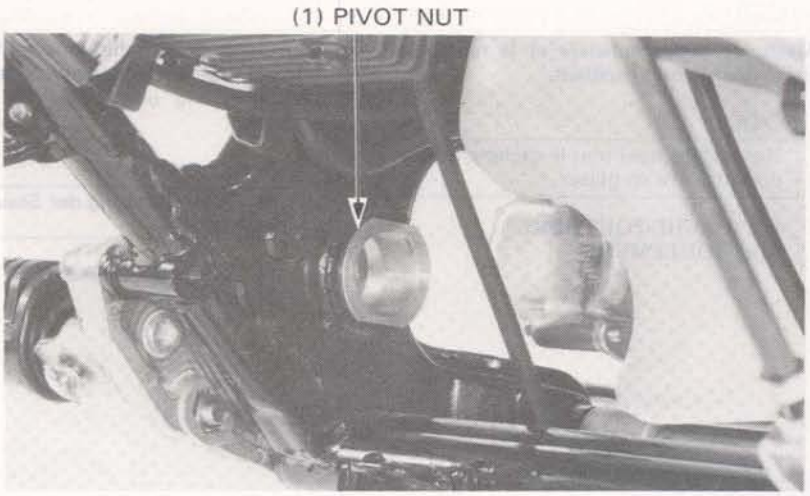
Install the bearing and dust seal into the swingarm.



Install the pivot nut if removed.

NOTE

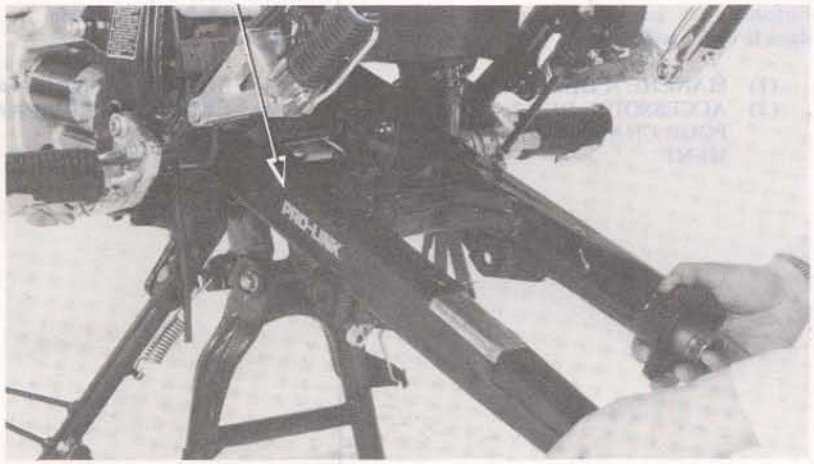
Align the tab of the pivot nut with the slot in the frame.



SWINGARM INSTALLATION

Install the drive shaft into the swingarm.
Install the swingarm on the pivot bearing holder from the right side.

(1) SWINGARM

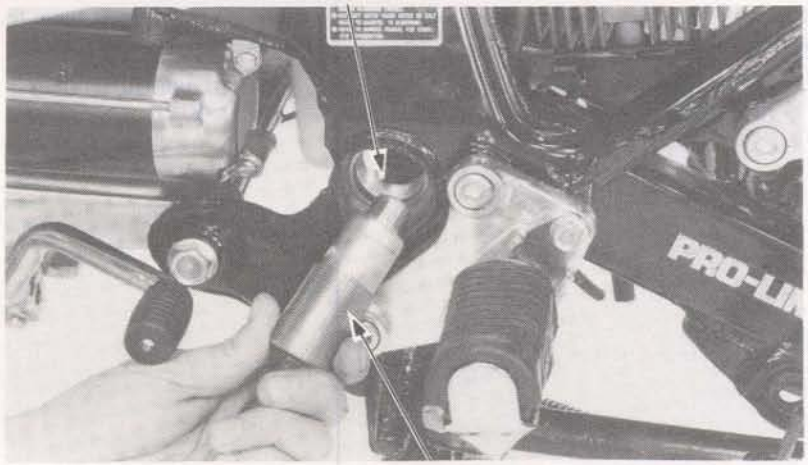


Apply grese to the tip of the pivot bolt and loosely install it.

NOTE

Make sure that the end of the pivot bolt is inserted into the bearing inner.

(1) GREASE



(2) PIVOT BOLT

Tighten the pivot bolt to the specified torque.

TORQUE : 17—21 N·m (1.7—2.1 kg-m, 14—15 ft-lb)

Move the swingarm up and down several times to seat the bearings with the pivot bolt.
Retighten the pivot bolt to the specified torque.

(1) PIVOT BOLT

(2) SOCKET BIT 17 mm

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 82—108 N·m (8.2—10.8 kg-m, 59—78 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 valve 90—120 N·m (9.0—12.0 kg-m, 65—87 ft-lb).

Install the pivot caps.

(1) SWINGARM LOCK NUT WRENCH 07908—4690001

(2) SOCKET BIT 17 mm

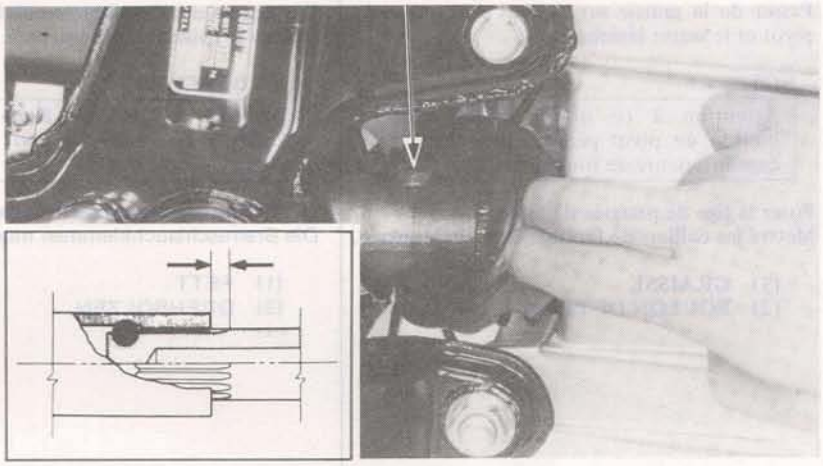
Lubricate the drive shaft splines with MULTI-PURPOSE NLGI No. 2 (molybdenum disulfide additive) GREASE.
Attach the drive shaft and torque the lock bolt.

TORQUE: 18—28 N·m
(1.8—2.8 kg-m, 13—20 ft-lb)

WARNING

Check that the final shaft does not have more than 10 mm of the splines showing.

(1) DRIVE SHAFT LOCK BOLT



Install the rear shock absorber (Page 14-15).
Install the final gear case and rear wheel (Page 14-37).

(1) FINAL GEAR CASE

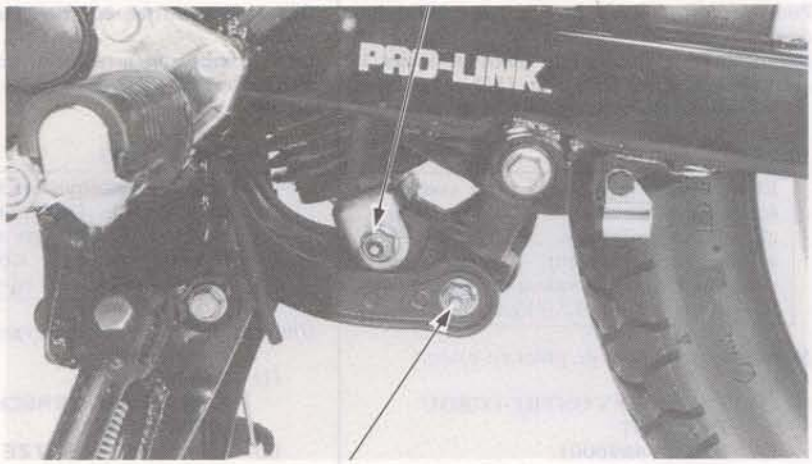
SUSPENSION LINKAGE

REMOVAL

Renove the muffler.

Remove the rear shock absorber lower mount bolt.

Remove the bolt connecting the shock arm to the shock link.



Remove the pivot bolts attaching the shock arm to the swingarm.

Remove the shock link by removing the povot bolt.

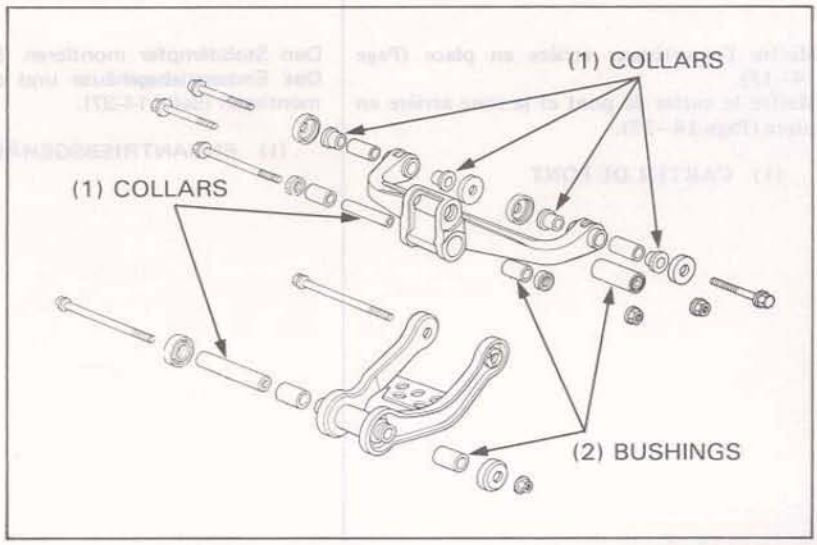
INSPECION

Inspect the outside surface of the collars and the inside of the bushings.

Replace them if they have score marks, scratches, or excessive or abnormal wear.

NOTE

> The bushings are press-fitted. Do not remove the bushings unless they have to be replaced.



INSTALLATION

Apply molybdenum disulfied (MoS_2) paste (containing more than 45% of MoS_2) to the inside of the bushings and dust seal lips.

NOTE

Use MoS_2 paste (containing more than 45% of MoS_2) as follows:
- Molykote® G-n Paste manufactured by Dow Corning U.S.A.
- Rocol Paste manufactured by Sumico Lubricant Co., LTD., Japan
- Other lubricants of equivalent quality

Install the collars and dust seals making sure that the sealing lips seat properly.

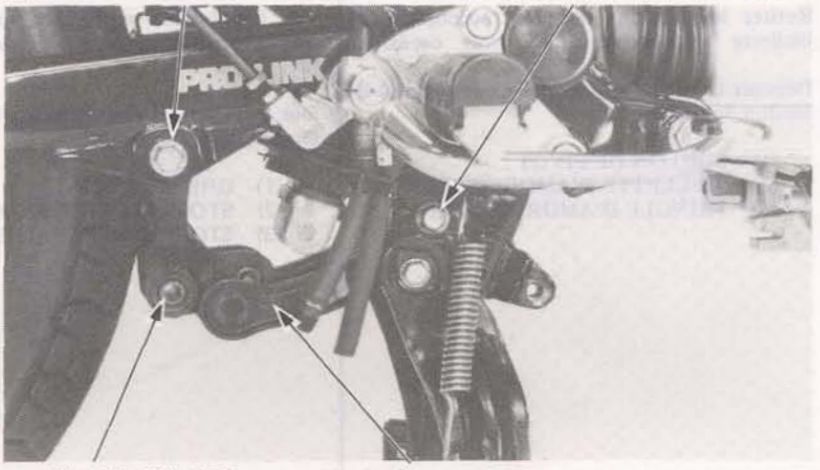
Attach the shock link onto the frome and torque the pivot bolt.

TORQUE: 45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)

Install the shock arm to the swingarm and torque the pivot bolts.

TORQUE: 45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)

Check the shock link and arm operation by moving them.



Install the shock absorber lower mount to the shock arm and torque the mount bolt.

TORQUE: 45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)

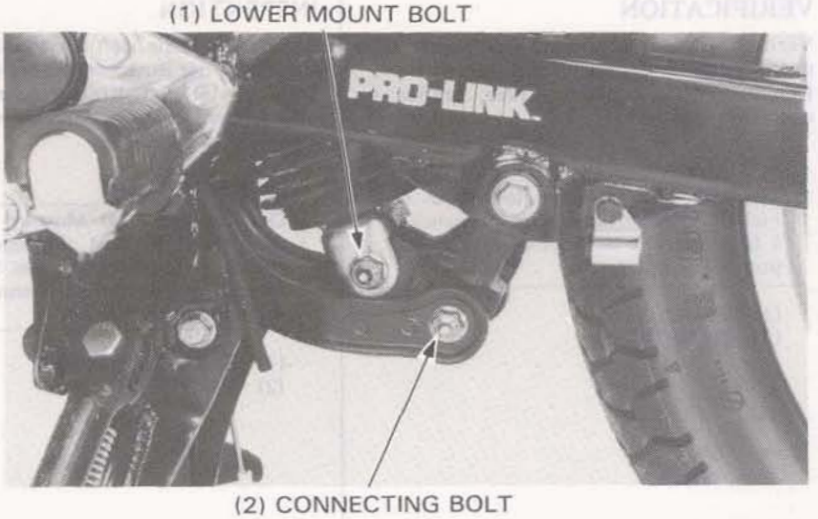
Connect the shock arm to the shock link and torque the connecting bolt.

TORQUE: 45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)

Install the muffler.

NOTE

Check that the rear shock absorber upper mount rubber bushing and shock arm lower mount bushing are not twisted.

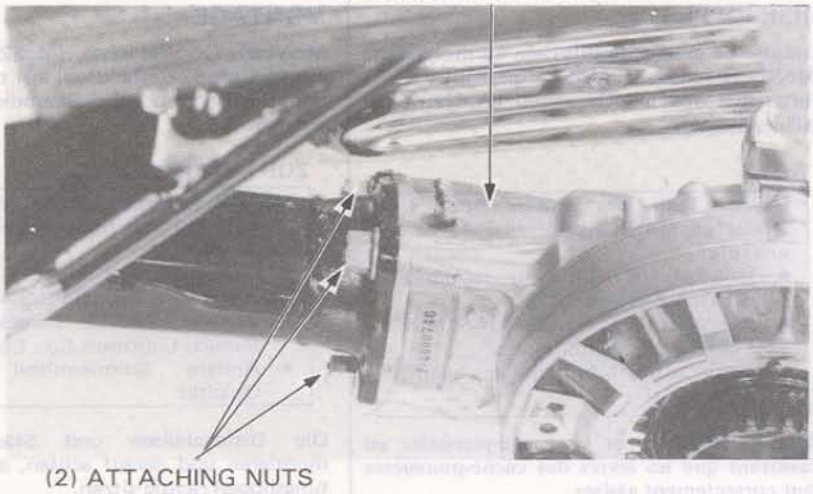


FINAL DRIVE

FINAL GEAR CASE REMOVAL

Place the motorcycle on its center stand.
Remove the rear wheel (Page 14-3).
Remove the distance collar.
Remove the final gear case attaching nuts.
Remove the final gear case from the swingarm.

Drain the final gear case oil if disassembling the gear case.

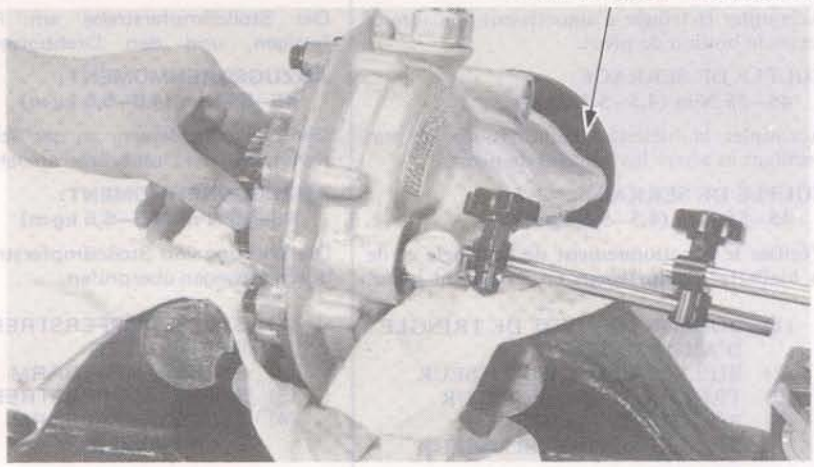


BACKLASH INSPECTION

Place the final gear case in a vise.

NOTE

Do not tighten the drive hub in the vise excessively.

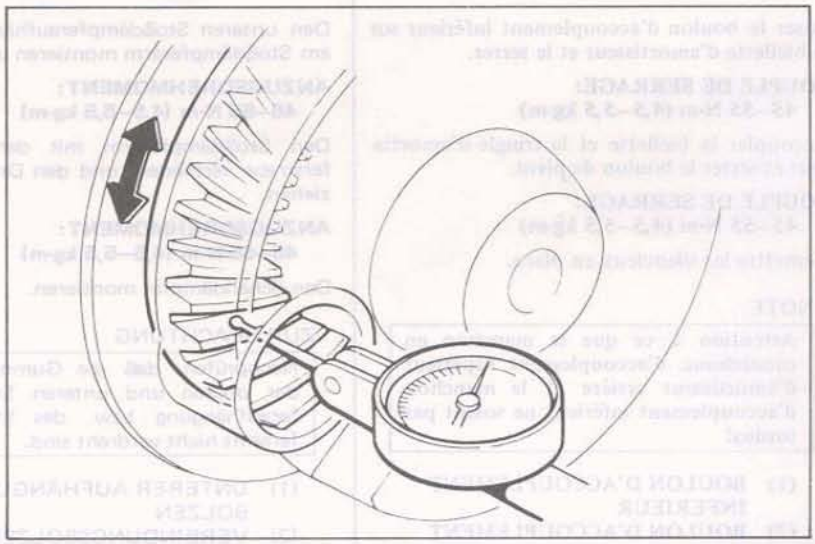


Install the preload inspection tool to hold the pinion gear securely.
Set up a dial indicator on the ring gear teeth.
Remove the oil filler cap.
Set a horizontal type dial indicator on the ring gear, through the oil filler hold.
Rotate the ring gear until gear slack is taken up.
Turn the ring gear back and forth to read backlash.

Standard: 0.08—0.18 mm (0.003—0.071 in)
Service Limit: 0.25 mm (0.010 in)

Remove the preload inspection tool and dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more. Compare the difference between the three measurements.

Difference Of Measurement
Service Limit: 0.10 mm (0.004 in)

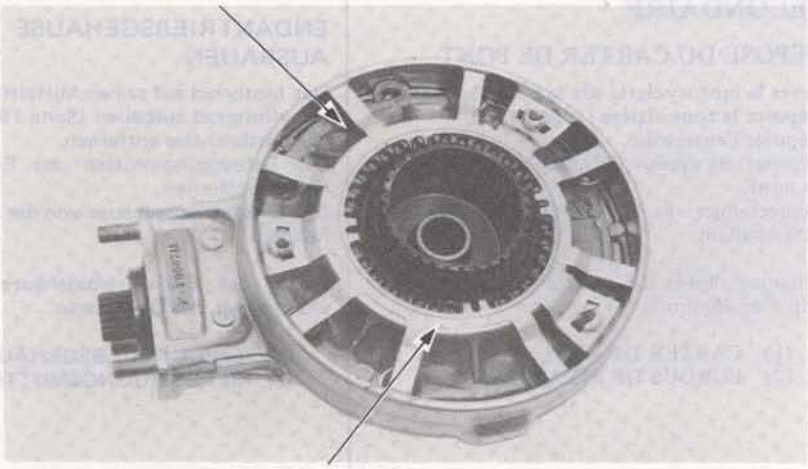


If backlash is excessive, check the pinion gear preload and final gear assembly preload.

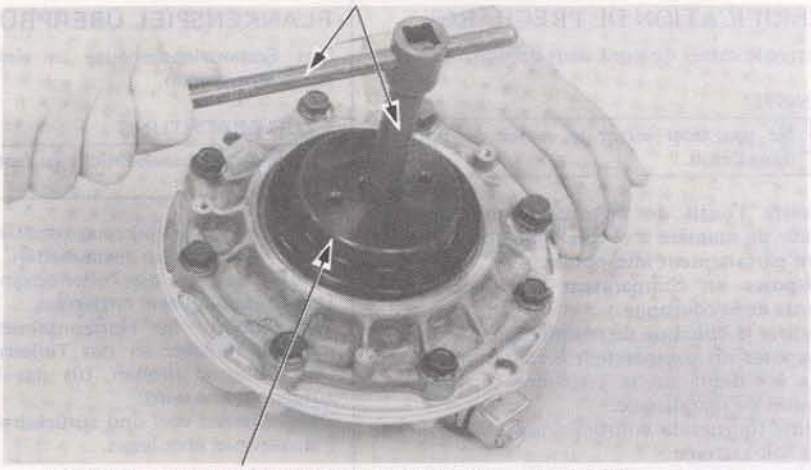
If preload is incorrect, the final drive assembly must be replaced.

RING GEAR OIL SEAL REPLACEMENT

Staighten the tabs of the lock plates and remove the dust guard plate.



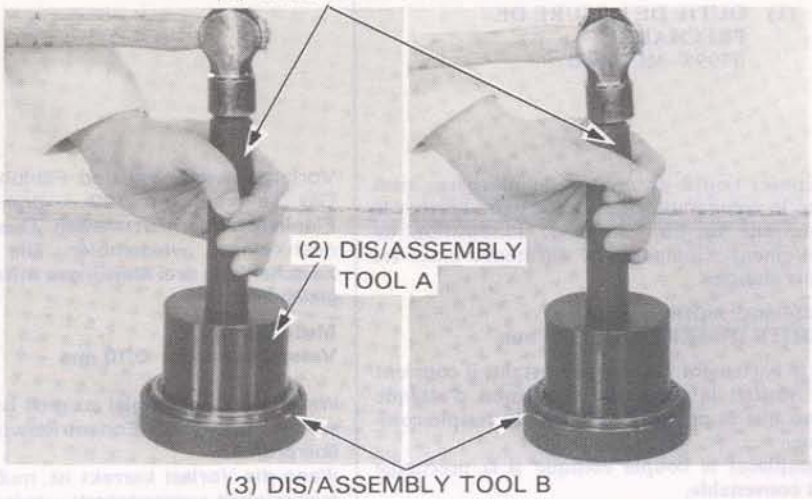
Remove the ring gear bearing retainer with the retainer wrench.
Remove the O-ring from the retainer.
Inspect the oil seal. If the lip is worn or damaged, or if the spring band is distorted, replace the oil seal.



Remove the dust and oil seals from the retainer.
Coat the outer edges of both seals with gear oil.
Press the new seals into the retainer.
Coat the new O-ring with gear oil and install it.
Install the ring gear bearing retainer being careful not to fold or damage the ol seal lips.

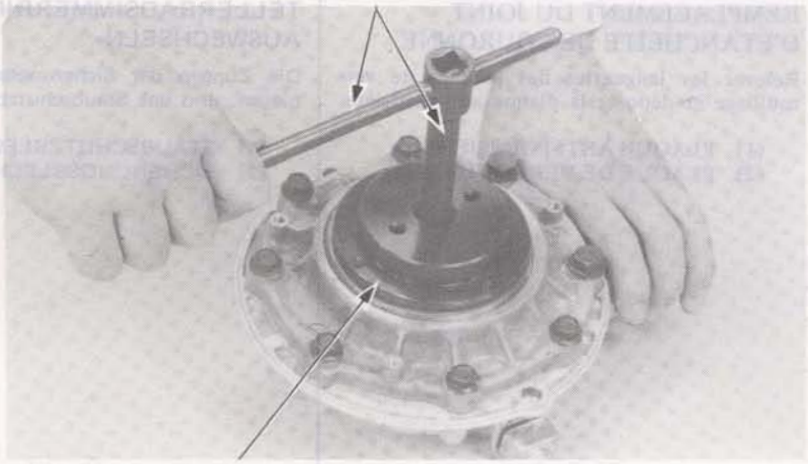
NOTE

After installing the ring gear bearing preload retainer, do the following:
- Final gear assembly preload check
- Backlash inspection

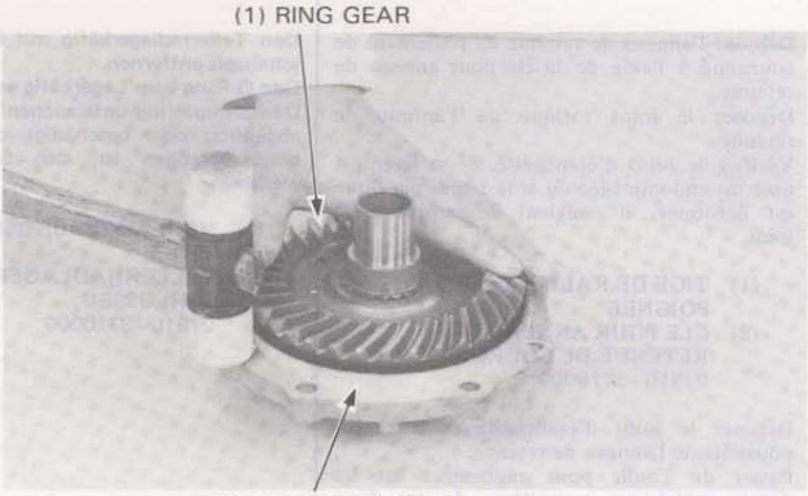


RING GEAR REMOVAL/GEAR CASE OIL SEAL REPLACEMENT

Loosen the ring gear bearing preload retainer 5 notches with the retainer wrench.
Remove the eight gear casse bolts.
Lift the cover from the gear case.



Separate the left case cover from the ring gear and bearing by tapping it lightly with a plastic hammer to avoid damaging the parts.



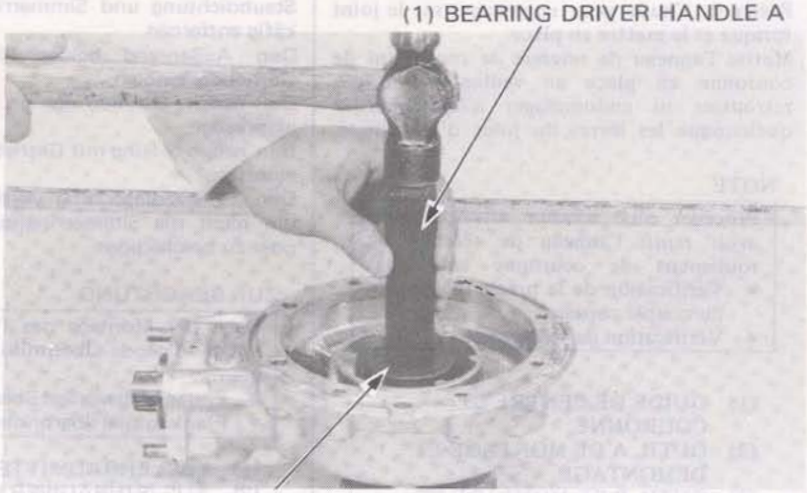
Inspect the ring gear oil seal for leaks.
Replace the seal if the lip is damaged or if the spring band is distorted. If replacement is necessary, it is necessasy to remove the ring gear bearing.

NOTE

Drive the oil seal in squarely.

CAUTION

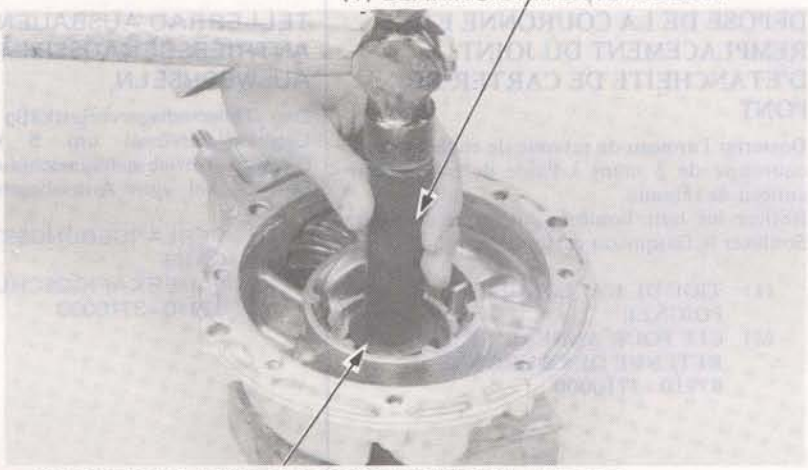
Heat the gear case evenly when removing the ring gear bearing race.



Inspect the bearing for smooth operation while spinning it by hand. replace the bearing with a new one if it is noisy or has excessive play.

NOTE

- Drive the bearing in squarely.
- After replacing the bearing, check gear backlash, tooth contact and final gear assembly preload.



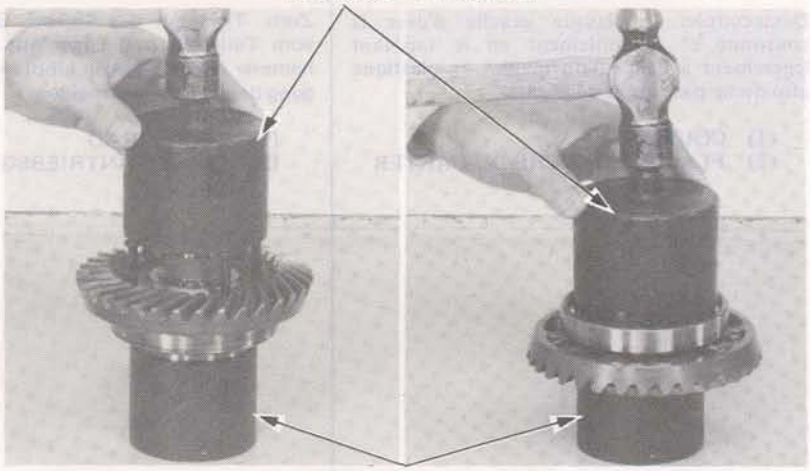
RING GEAR BEARING REPLACEMENT

Replace the bearing if it is noisy or has excessive play or rattle.

Install the ring gear bearing on the ring gear.

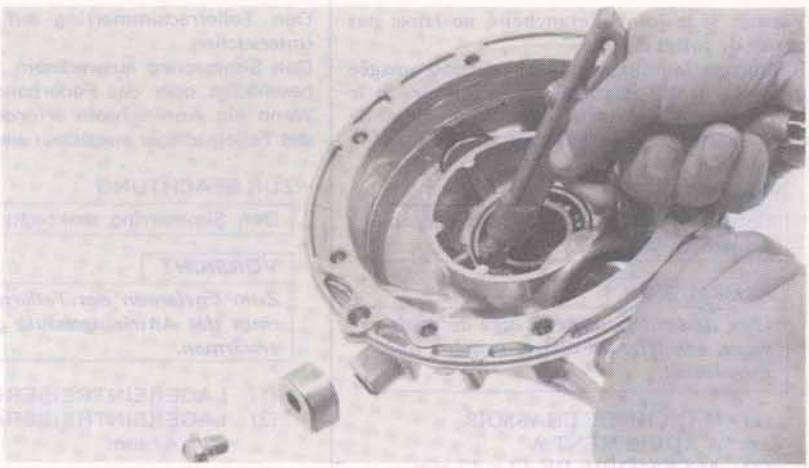
NOTE

Drive the bearing in until it rests on the side of the ring gear.



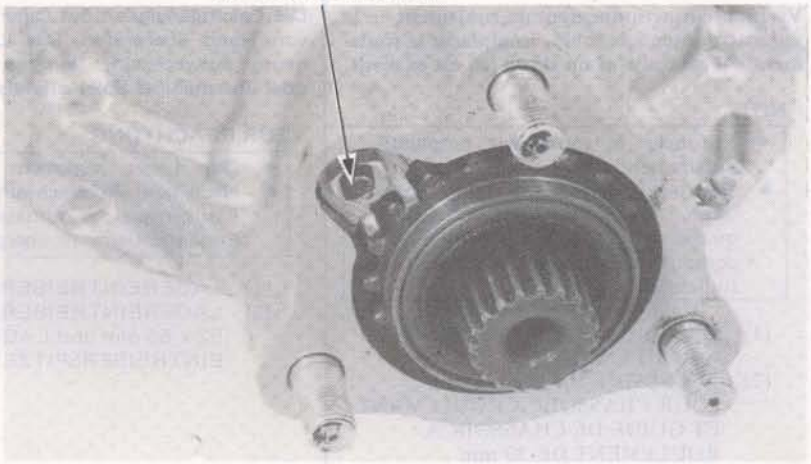
BREATHER SYSTEM MAINTENANCE

Check the breather hole for clogging. Clean if necessary.
Clean around and inside of the breather cap.

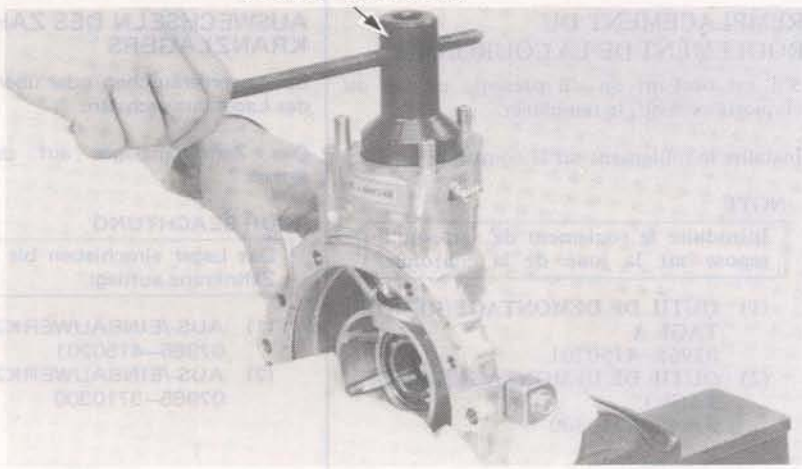


PINION GEAR RETAINER REMOVAL

Remove the pinion gear retainer lock washer.



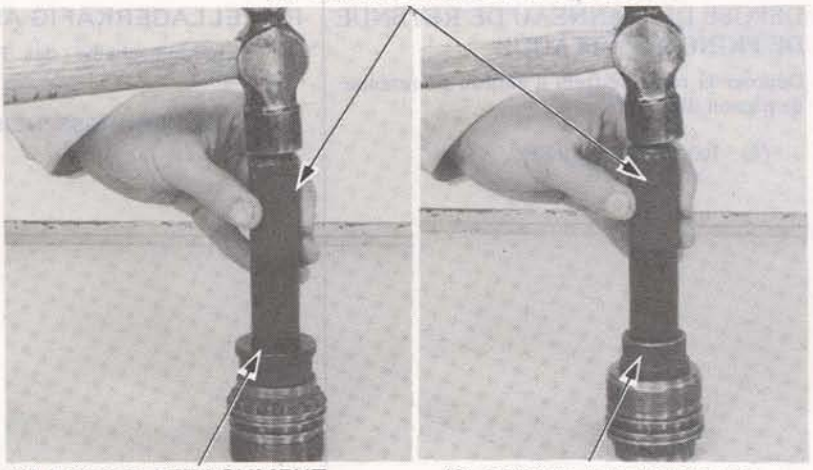
Remove the retainer.



PINION GEAR RETAINER OIL SEAL, O-RING REPLACEMENT

Inspect the retainer oil seal. Replace the seal if the lip is worn or damaged, or if the spring band is distorted. replace the O-rings.

FILL THE NEW OIL SEAL GROOVE WITH MULTIPURPOSE NLGI No. 2 (molybdenum disulfide additive) GREASE and install the oil seal into the retainer.
Coat the new O-rings with the same grease and install them onto the retainer.



PINION GEAR RETAINER INSTALLATION

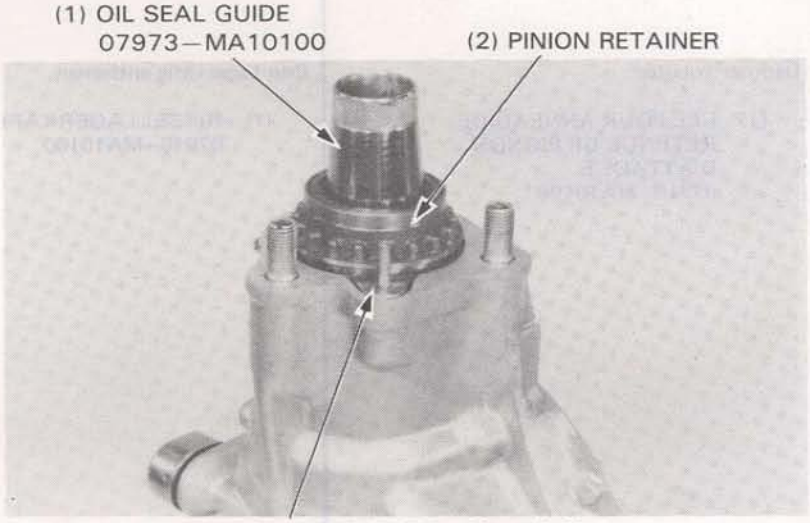
Set the O-ring guide into the gear cast cut-out, and oil seal guide over the pinion shaft.

Push the retainer into place with the retainer wrench until the oil seal guide is contacted.

CAUTION

- *Be careful not to damage the O-rings.*
- *The retainer has very fine threads, so be careful not to cross-thread it.*

Remove the oil seal guide.

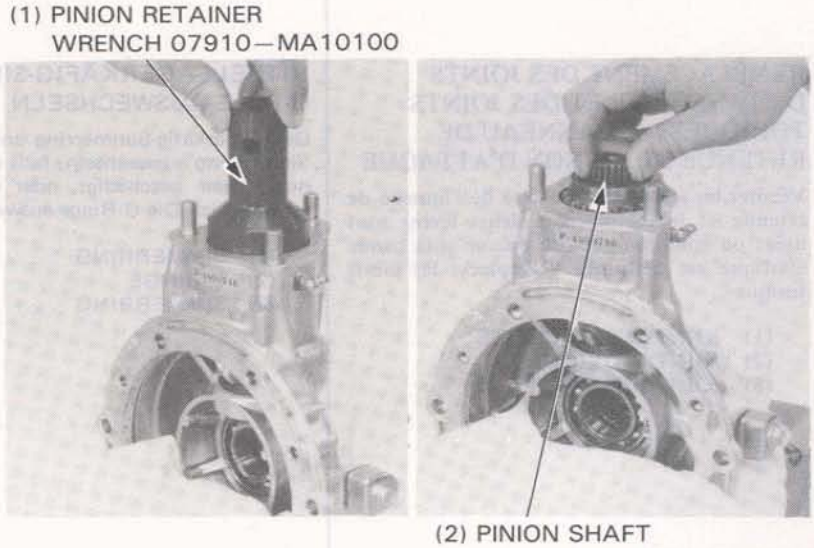


Thread the retainer into the case by hand. Turn the pinion shaft intermittently. Stop tightening the retainer when pinion shaft rotating resistance is felt. Do not overtighten the retainer.

Remove the O-ring guide.

NOTE

- If the retainer is overtightened, it will cause excessive preload.
- A high amount of drag is normal because of the O-rings.



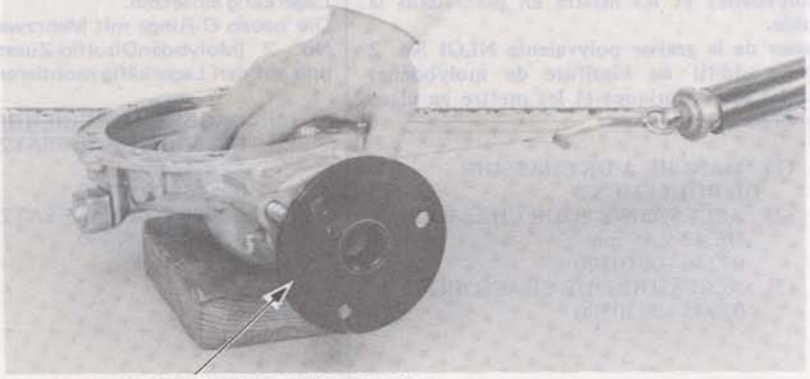
PINION GEAR PRELOAD INSPECTION AND ADJUSTMENT

Wrap a wire around the tool groove and attach a spring scale. Measure the preload force needed to turn the pinion shaft in the normal direction of rotation.

Pinion Gear Preload:
Force: 800—1.000g (1.76—2.2 lbs)
Torque: 0.4—0.5 N·m
(4.0—5.0 kg-cm,
3.48—4.32 in-lb)

NOTE

- If measurements are not consistant, rotate the pinion gear 50—60 turns, then check preload.
- Force required to begin movement may exceed preload specifications.



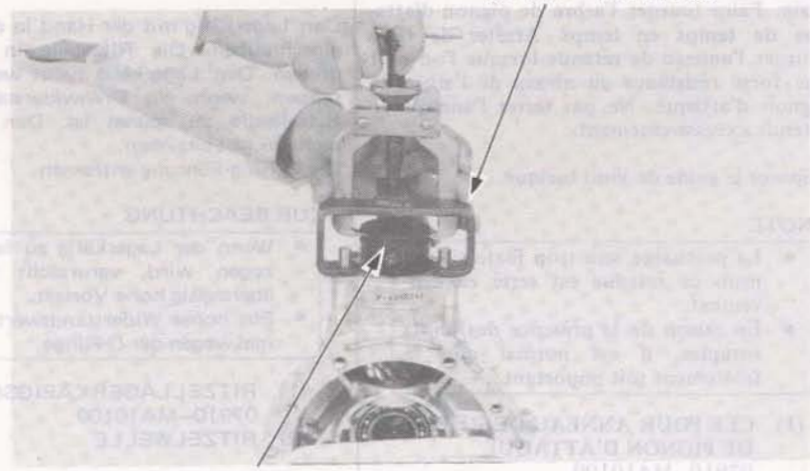
(1) PRELODE INSPECTION TOOL
07998—MC70000

If preload is insufficient, remove the preload inspection tool, then install pinion gear retainer wrench and tighten the retainer.
Recheck the pinion gear preload.

(1) PINION GEAR RETAINER WRENCH
67910—MA10100

If preload is excessive, remove the preload inspection tool, then install the pinion gear retainer wrench and remove the retainer.
Pull up on the pinion shaft with the special tools, then recheck pinion preload.

(1) PULLER ATTACHMENT
07934—MA10100



(2) CATCHER 07934—MA10200

Intall the retainer lock tab.

NOTE

The lock tabs are available in two types. Be sure to use the proper type lock tab.

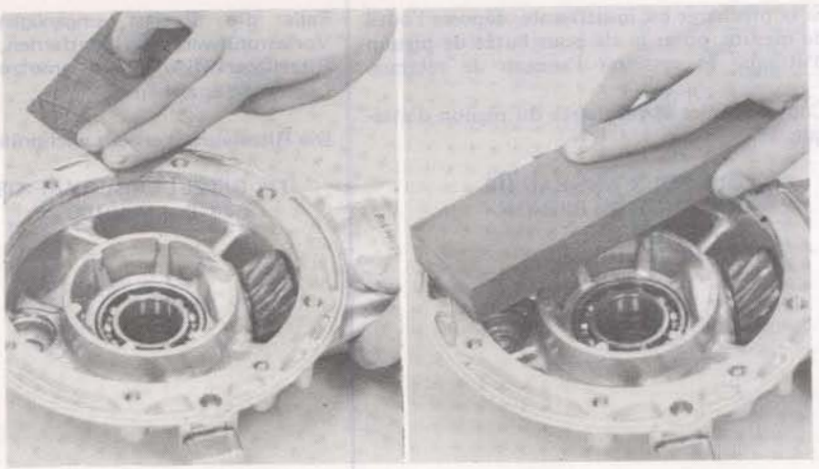
RING GEAR INSTALLATION

Clean all sealing material off the mating surfaces of the gear case and cover.

NOTE

- Do not allow dust and dirt to enter the gear case.
- Do not damage the mating surfaces of the gear case and cover.

Clean the gear case cover mating surface with an oil stone.

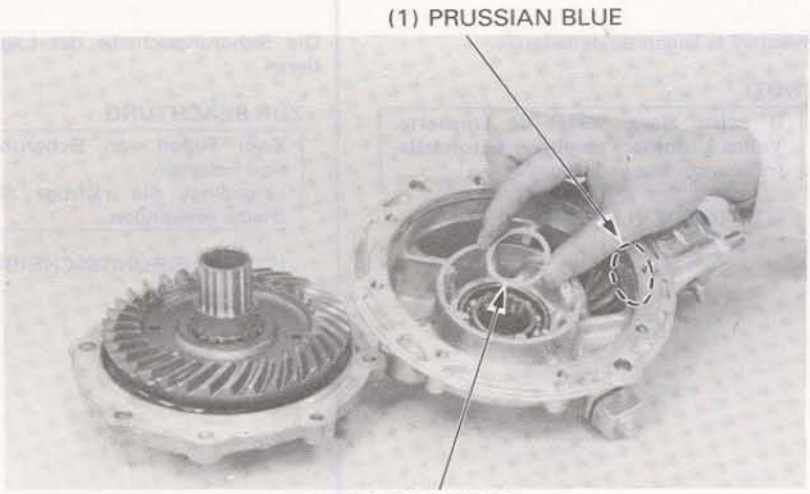


Apply liquid sealant to the mating surfaces of the gear case and cover.

Apply a thin coating of Prussian Blue to the pinion gear teeth for gear tooth contact pattern check, prior to installing the rig gear.
Install the ring gear assembly, being careful not to damage or fold the oil seal lips.

NOTE

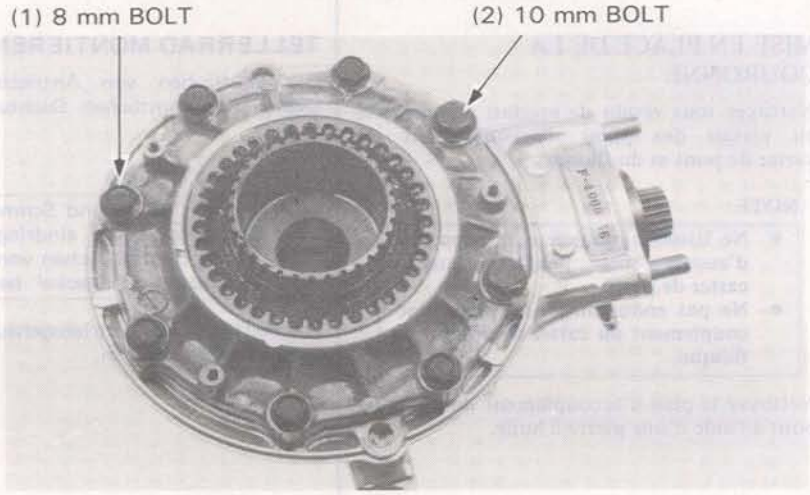
Do not allow the left gear case cover to tilt during installation.



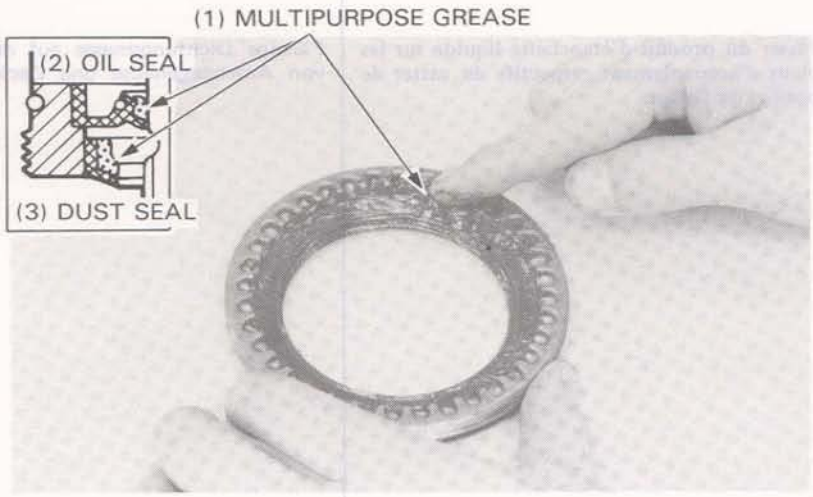
Place the gear case cover onto the final gear case. Tighten the cover bolts in 2-3 steps until the left gear case cover touches the gear case. Torque the bolts in a criss cross pattern in two or more steps.

TORQUE SPECIFICATION:

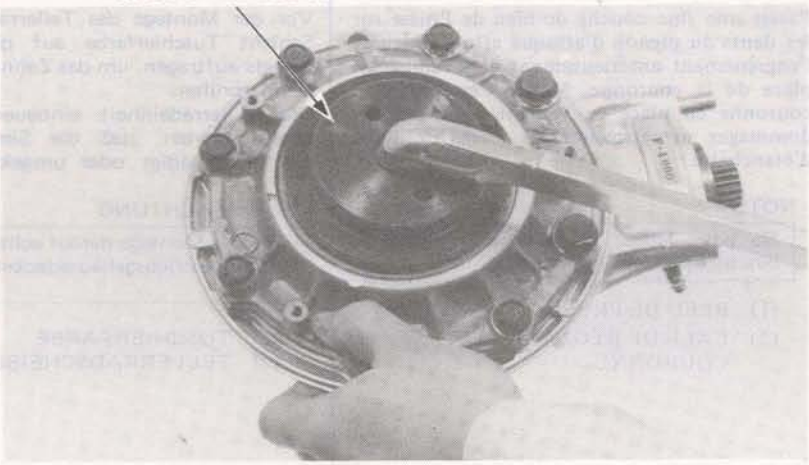
8 mm bolt: 23-28 N·m
2.3—2.8 kg-m, 17—20 ft-lb)
10 mm bolt: 35—45 N·m
(3.5—4.5 kg-m,
25—33 ft-lb)



Fill the ring gear bearing retainer oil and dust seals with MULTIPURPOSE NLGI No. 2 (MoS_2 additive) GREASE.



(1) FINAL RETAINER WRENCH
07910—3710000



Install the ring gear retainer onto the gear case cover.
Before the retainer bottoms against the bearing, measure the torque (T) to overcome the friction caused by the O-ring.
Then tighten the retainer to T + 40 N·m (4.0 kg-m, 29 ft-lb) back off and retighten to T + 10 N·m (1.0 kg-m, 7 ft-lb).

NOTE

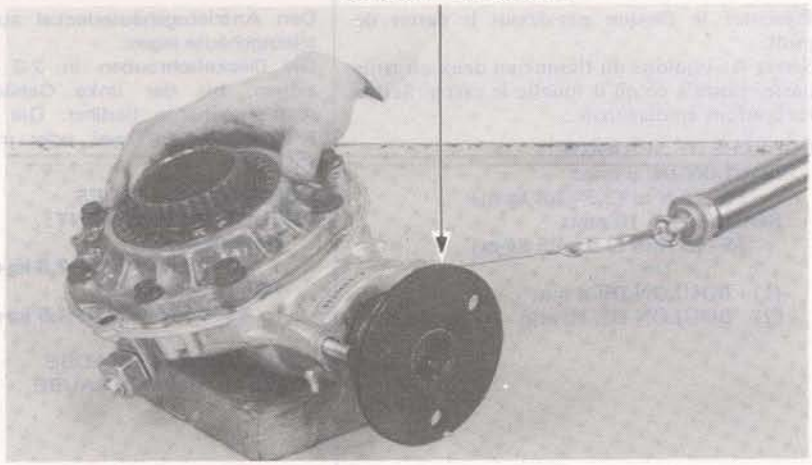
After assembling the final gear case, perform the following operations:
- Backlash inspection
- Final gear preload check
- Final gear tooth contact pattern check

FINAL GEAR ASSEMBLY PRELOAD INSPECTION AND ADJUSTMENT

NOTE

Use this inspection and adjustment whenever the ring gear retainer is removed, or if final gear assembly preload is being checked.

(1) PREROAD INSPECTION TOOL
07998—MC70000



Install the preload inspection tool.
Attach a spring scale to the wire. Measure the preload force needed to run the pinion shaft in the normal direction of rotation.

FINAL GEAR ASSEMBLY PRELOAD:
Force: 1,200—1,800g (2.65—3.97 lbs)
Torque: 0.6—0.9 N·m (6.0—9.0 kg-cm, 5.16—7.80 in-lb)

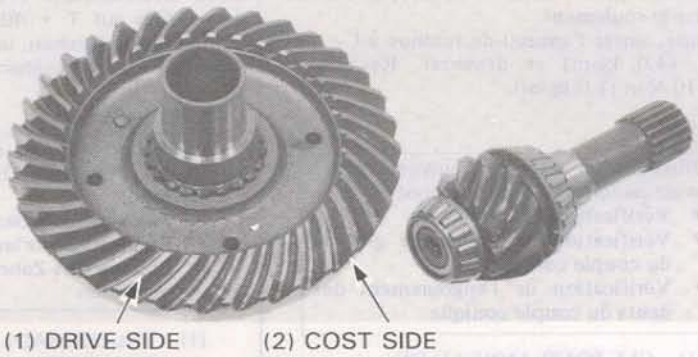
If the preload exceeds specifications, remove the ring gear and check the pinion gear preload (Page 14-33).
If the pinion gear preload is within the specifications, install the ring gear and ring gear retainer and adjust the final gear asembly preload by tightening the retainer.

NOTE

- Tighten the retainer gradually while measuring the preload.
- Loosen the ring gear retainer and turn the pinion gear several timers, if preload is excessive.

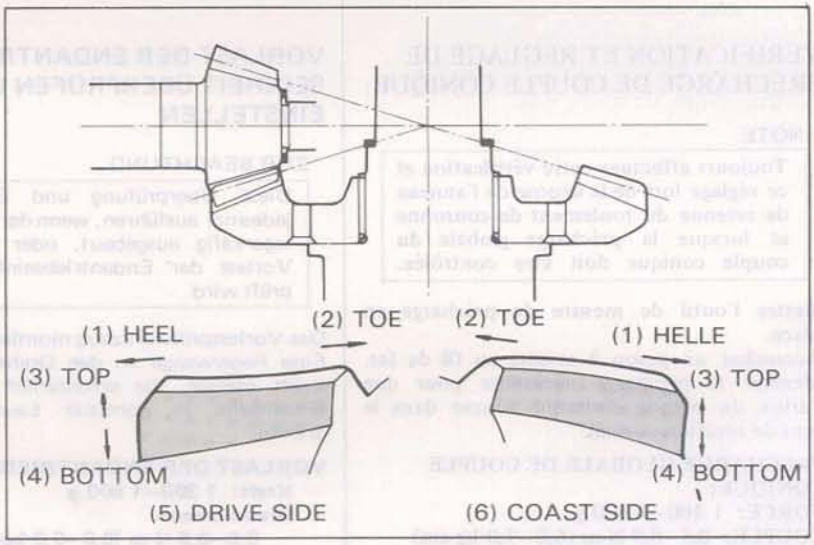
GEAR TOOTH CONTACT PATTERN CHECK AND ADJUSTMENT

Remove the oil filler cap from the final gear case.
Check the gear tooth contact pattern by rotating the ring gear several times in the normal direction of rotation. The gear tooth contact pattern is indicated by Prussian Blue applied to the pinion before assembly.

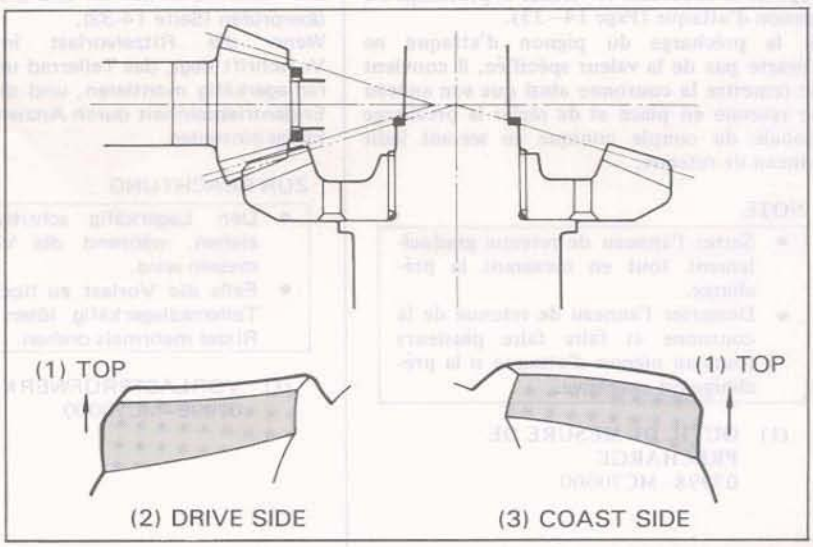


Contact is normal if the Prussian Blue is reansferred to the approximate center of each tooth flank slightly ectending toward the toe side.

If the patterns are not correct, adjust contact by replacing the pinion shim. (The ring gear shim affests the contact patterns very little).

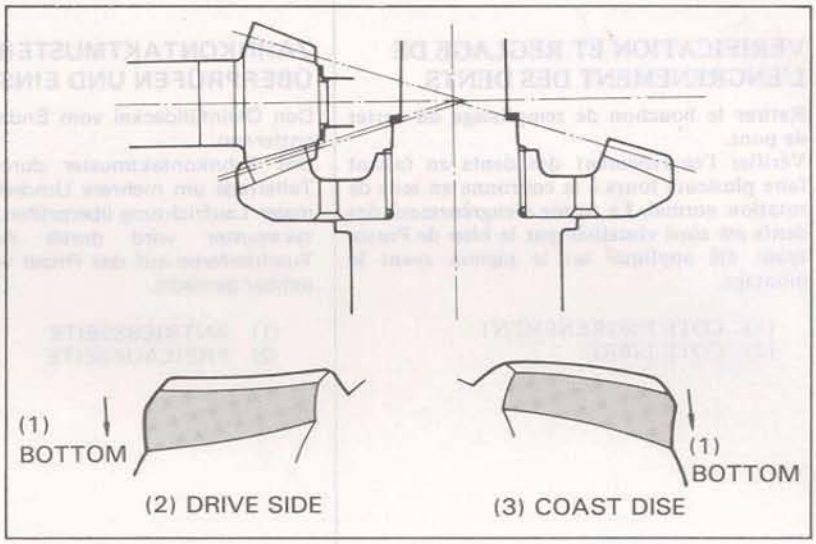


The pattern will be too high on both the drive and coast side if the shim is too thick.
Use a thinner shim to correct the pattern.



The pattern will be too low on both the drive and coast sides if the shim is too thin.

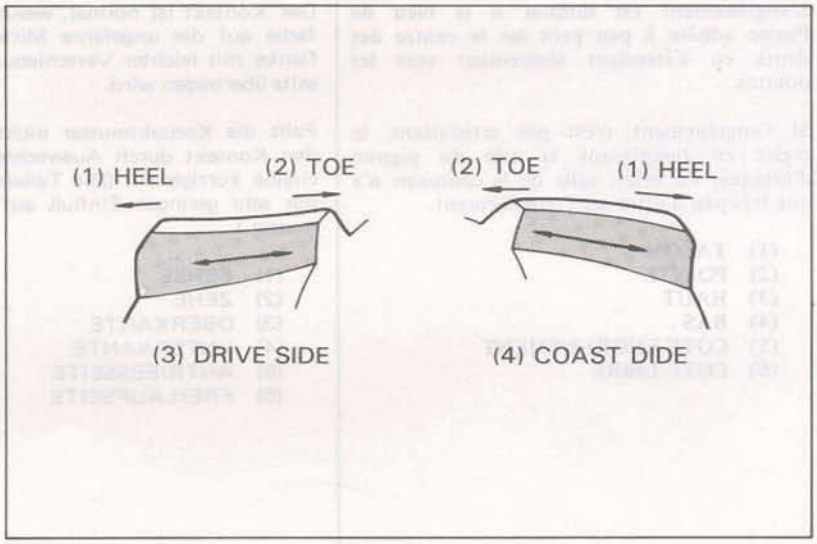
Use a thicker shim to correct the pattern.



The pattern will be shifted toward the toe or heel on both sides if the bearings are not installed squarely. Re-install the bearings to correct the pattern.

NOTE

Use of a worn pinion on a new ring gear or a worn ring gear on a new pinion can cause improper contact pattern.

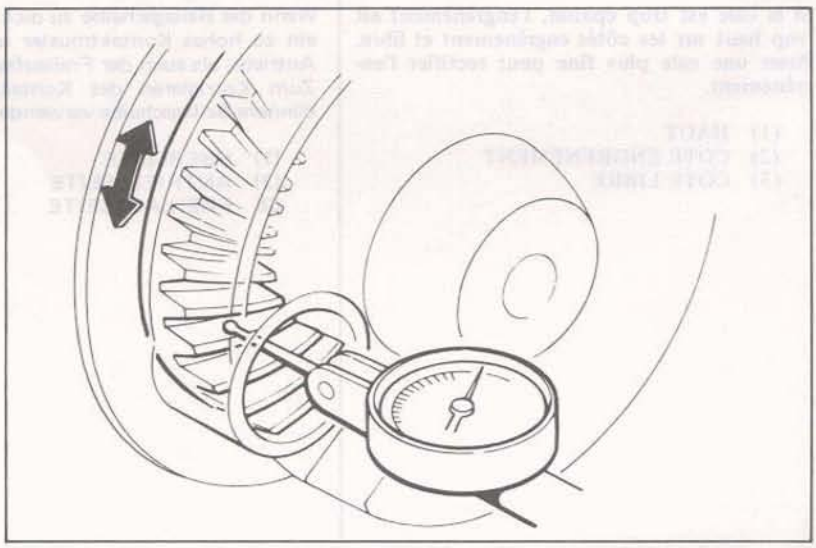


BACKLASH INSPECTION AND ADJUSTMENT

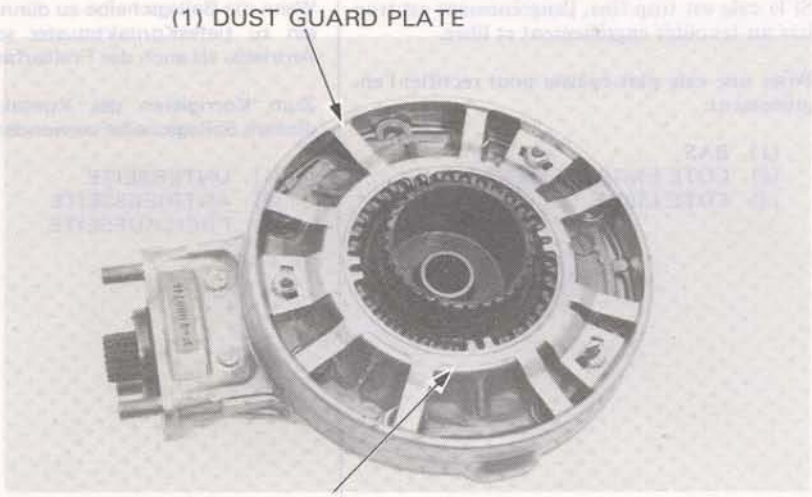
Measure the backlash (Page 14-26).
If the backlash is excessive, replace the ring gear shim with a thinner one. If the backlash is too small, replace the ring gear shim with a thicker one.

NOTE

Backlash adjustment should be made with the ring gear shim as the pinion shim hardly affects the backlash.



Install the dust guard plate and torque the bots.
Bend the tabs of the lock plates up to prevent the bolts from being turned out during operation.
Bend one of the four ring gear bearing retainer lock tabs.

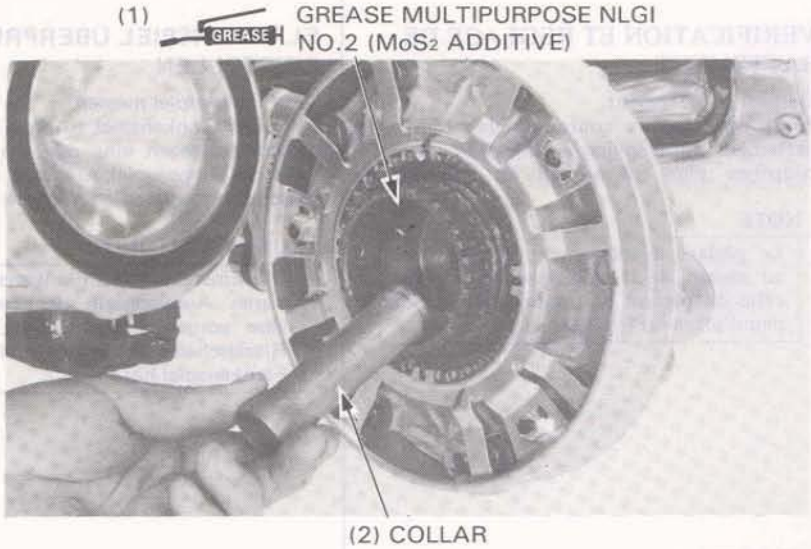


FINAL GEAR CASE INSTALLATION

Lubricate the splines of the propeller shaft and pinion gear shaft with MULTIPURPOSE NLGI No. 2 (molybdenum disulfide additive) GREASE, and engage.
Temporarily install the gear case on the swingarm.

Insert the distance collar into the ring gear shaft.

Apply MULTIPURPOSE NLGI No. 2 (molybdenum disulfide additive) GREASE to the splines of the rear wheel and ring gear shaft.



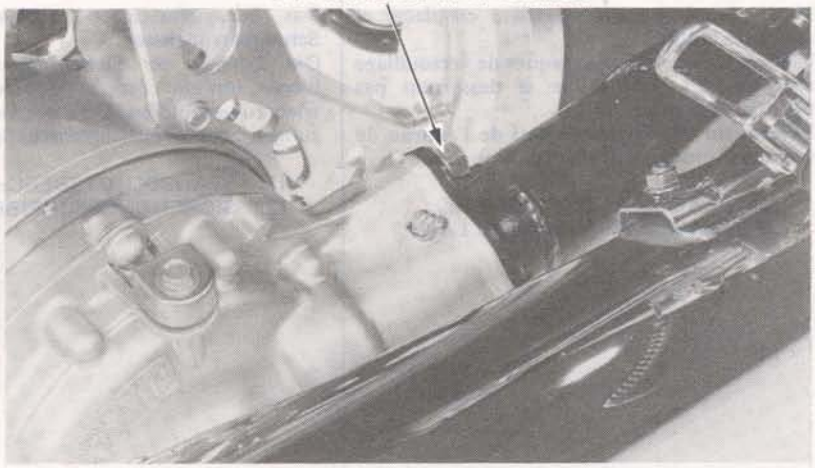
Install the rear wheel (Page 14-8).

Tighten the final gear case nuts.
TORQUE: 45—70 N·m
(4.5—7.0 kg-m, 33—51 ft-lb)

Tighten the axle nut.
TORQUE: 50—80 N·m
(5.0—8.0 kg-m, 36—58 ft-lb)

Tighten the axle pinch bolt.
TORQUE: 20—30 N·m
(2.0—3.0 kg-m, 14—22 ft-lb)

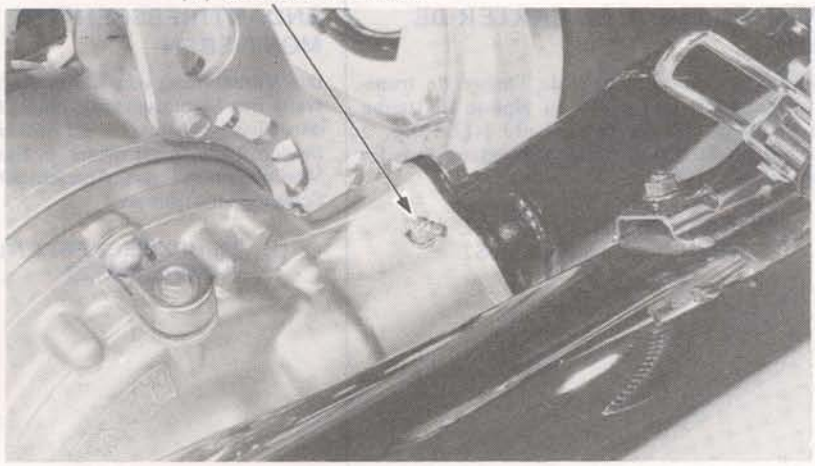
(1) FINAL GEAR CASE NUT



PINION GEAR LUBRICATION

Pump lithium-based multipurpose grease through the grease fitting.
GREASE QUANTTITY: 45 cc approx.
(1.3 Impoz, 1.5 USoz)

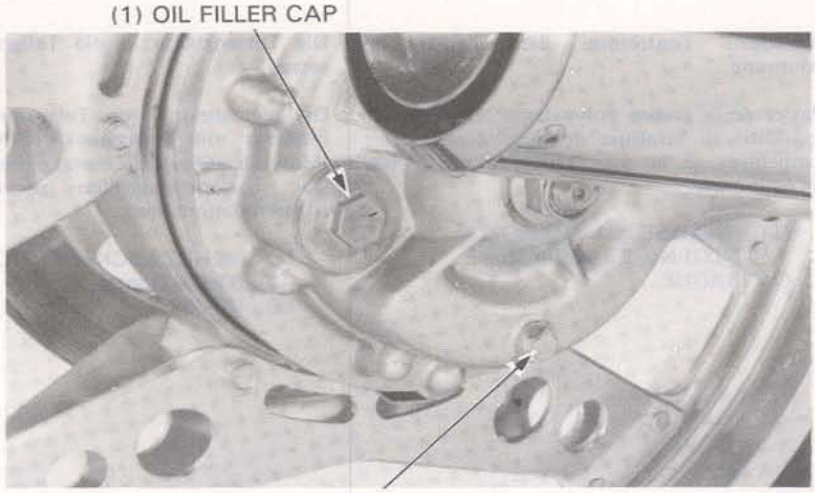
(1) GREASE FITTING



FILLING FINAL GEAR CASE

Place the motorcycle on its center stand.
Make sure that the drain bolt is tightened.
Remove the oil filler cap.
Pour the specified amount of recommended oil up to the filler neck.
RECOMMENDED OIL: HYPOID GEAR OIL
Over 5°C: SAE 90
Below 5°C: SAE 80
OIL CAPACITY: 160—180 cc

(1) OIL FILLER CAP



(2) DIAIN BOLT

HYDRAULIC DISK BRAKE

FREIN A DISQUE HYDRAULIQUE

HYDRAULISCHE SCHEIBENBREMSE

FRENO DE DISCO HIDRAULICA

SERVICE INFORMATION	15—1	BRAKE PADS/DISC PLATES	15— 4
TROUBLESHOOTING	15—1	BRAKE MASTER CYLINDER	15— 7
BRAKE FLUID REPLACEMENT/ AIR BLEEDING	15—2	BRAKE CALIPER	15—12

SERVICE INFORMATION

GENERAL INFORMATION

- 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.
- Avoid spilling brake fluid on painted surfaces or instrument lenses, as severe damage will result.
- Always check brake operation before riding the motorcycle.

TOOLS

< Special >

Snap Ring Pliers	07914—3230001

TORQUE VALUES

Brake hose bolt	25—35 N·m (2.5—3.5 kg-m, 18—25 ft-lb)
Caliper pivot bolt	25—30 N·m (2.5—3.0 kg-m, 18—22 ft-lb)
Caliper bolt	20—25 N·m (2.0—2.5 kg-m, 14—18 ft-lb)
Right caliper bracket bolt	30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
Left caliper bracket bolt (upper)	35—45 N·m (3.5—4.5 kg-m, 25—33 ft-lb)
(lower)	20—24 N·m (2.0—2.4 kg-m, 14—17 ft-lb)

SPECIFICATIONS

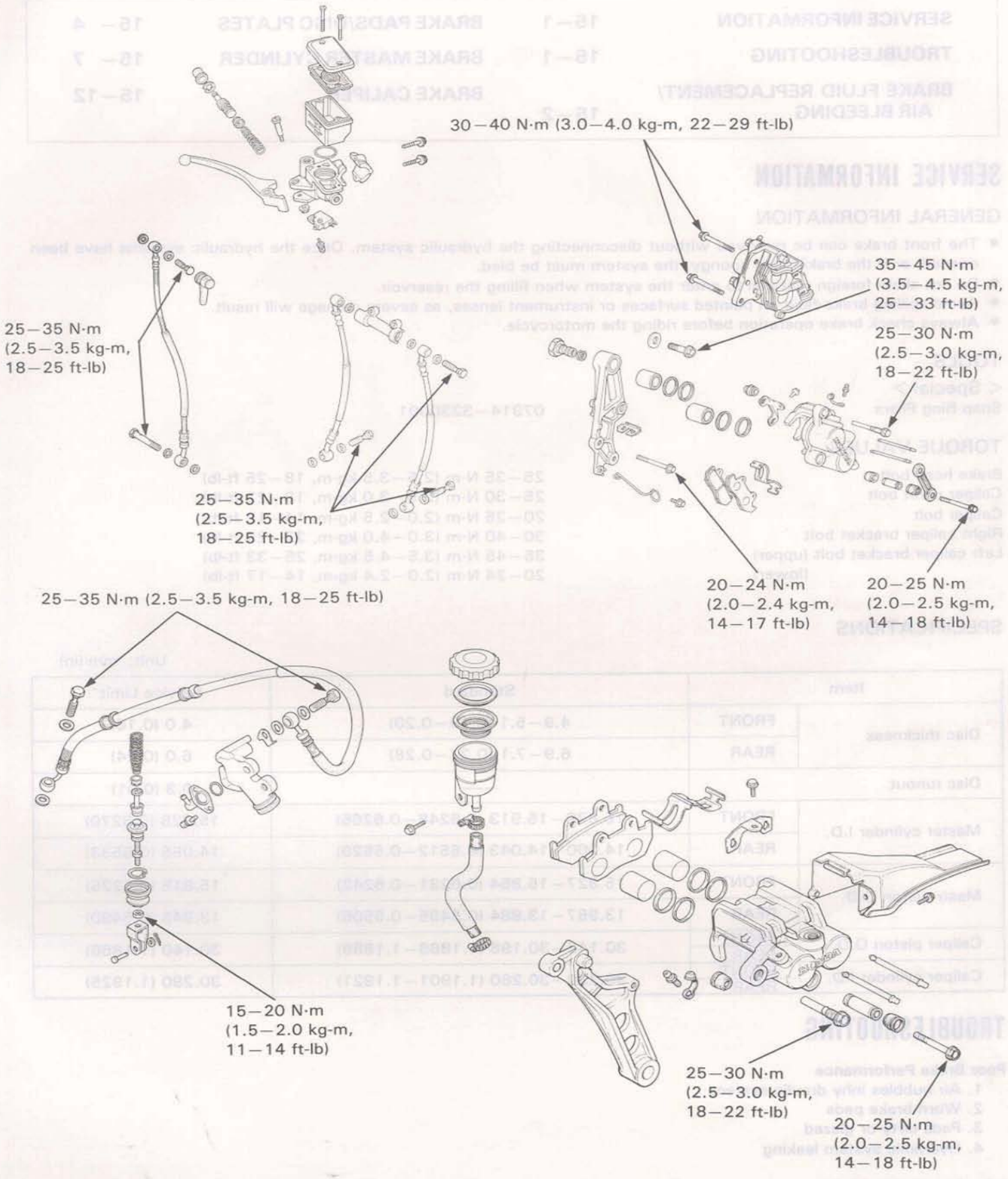
Unit: mm (in)

Item		Standard	Service Limit
Disc thickness	FRONT	4.9—5.1 (0.19—0.20)	4.0 (0.16)
	REAR	6.9—7.1 (0.27—0.28)	6.0 (0.24)
Disc runout		—	0.3 (0.01)
Master cylinder I.D.	FRONT	15.870—15.913 (0.6248—0.6265)	15.925 (0.6270)
	REAR	14.000—14.043 (0.5512—0.5529)	14.055 (0.5533)
Mastr piston O.D.	FRONT	15.827—15.854 (0.6231—0.6242)	15.815 (0.6226)
	REAR	13.957—13.984 (0.5495—0.5506)	13.945 (0.5490)
Caliper piston O.D.	FRONT REAR	30.148—30.198 (1.1869—1.1889)	30.140 (1.1866)
Caliper cylinder I.D.	FRONT REAR	30.230—30.280 (1.1901—1.1921)	30.290 (1.1925)

TROUBLESHOOTING

Poor Brake Performance

1. Air bubbles inhy draulic system
2. Worn brake pads
3. Pads dirty or glazed
4. Hydraulic system leaking


30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
35—45 N·m
(3.5—4.5 kg-m,
25—33 ft-lb)
25—30 N·m
(2.5—3.0 kg-m,
18—22 ft-lb)
25—35 N·m
(2.5—3.5 kg-m,
18—25 ft-lb)
25—35 N·m
(2.5—3.5 kg-m,
18—25 ft-lb)
20—24 N·m
(2.0—2.4 kg-m,
14—17 ft-lb)
20—25 N·m
(2.0—2.5 kg-m,
14—18 ft-lb)
25—35 N·m (2.5—3.5 kg-m, 18—25 ft-lb)
15—20 N·m
(1.5—2.0 kg-m,
11—14 ft-lb)
25—30 N·m
(2.5—3.0 kg-m,
18—22 ft-lb)
20—25 N·m
(2.0—2.5 kg-m,
14—18 ft-lb)

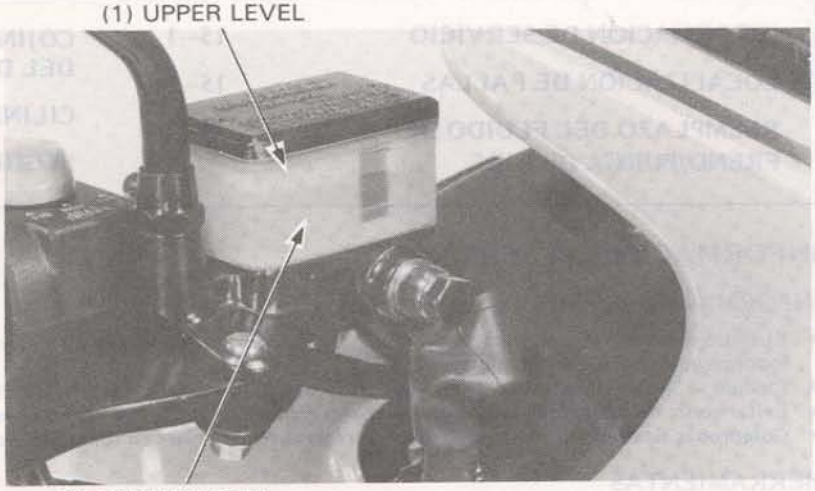
15

BRAKE 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 brake lever.*
  Failure to do so will allow brake fluid to squirt out of the reservoir during brake operation.
- *Aboid spilling fluid on painted surfaces. Place a rag over the fuel tank whenever the system is serviced.*

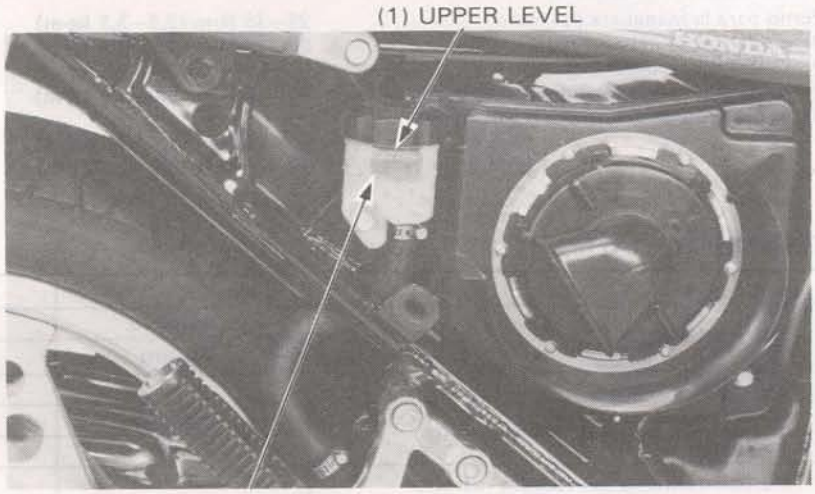


BRAKE FLUID DRAINING

Connect a bleed hose to the breeder valve.
Loosen the caliper bleed valve and pump the brake lever.
Stop pumping the lever when no more fluid flows out of the bleed valve.

WARNING

A brake disc or pad contaminated with brake fluid or grease reduces stopping power. Discard contaminated pads and clean the disc with a high quality brake degreasing agent.

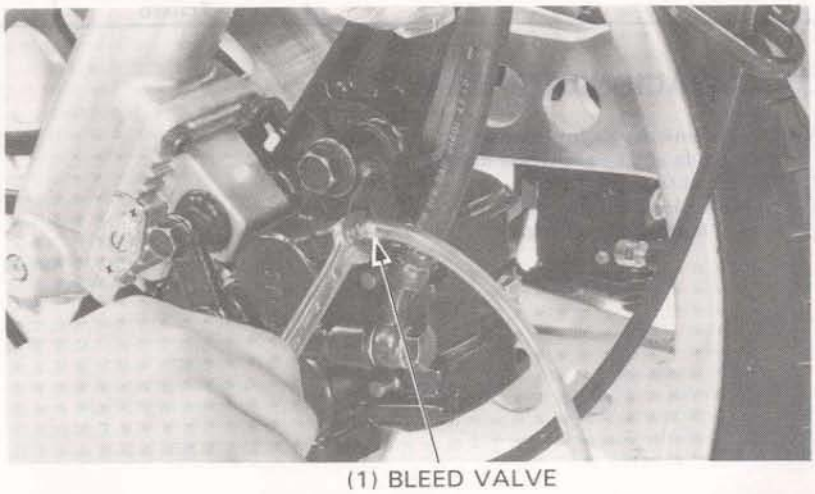


BRAKE FLUID FILLING

NOTE

Use ONLY DOT—3 brake fluid from a sealed container.

Close the bleed valve, fill the reservoir, and install the diaphragm.



AIR BLEEDING

To prevent piston overtravel and brake fluid seepage, keep a 20 mm (3/4 in(space to the handlebar grip when bleeding the front brake system. Pump up the system pressure with the lever (or pedal) until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever (or pedal) resistance is felt.

NOTE

Check the fluie level often while bleeding the brake to prevent air from being pumped into the system.

Use only DOT-3 brake fluid from a sealed container. do not mix brake fluid types and never re-use the contaminated fluid which has been pumped out during brake bleeding, because this will impair the efficiency of the brake system.

(1) Squeeze the brake lever (or depress the brake pedal), open the bleeder valve 1/2 turn then close the valve.

NOTE

Do not release the brake lever (or pedal) until the bleeder valve has been closed again.

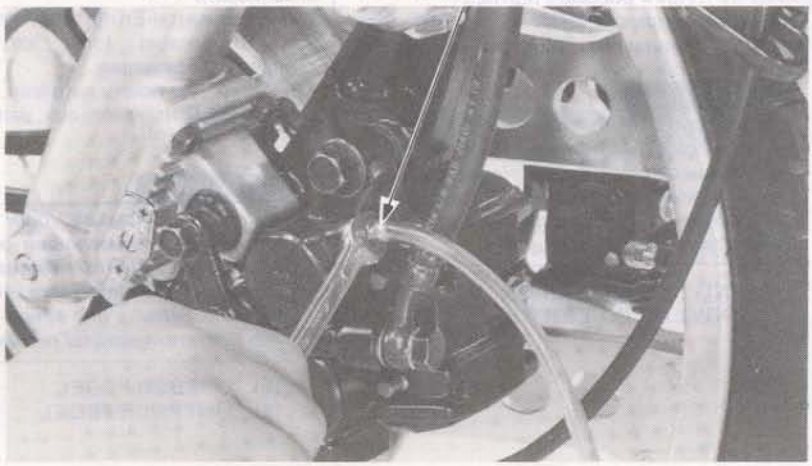
(2) Release the brake lever (or pedal) slowly and wait several seconds after it reaches the end of its travel.

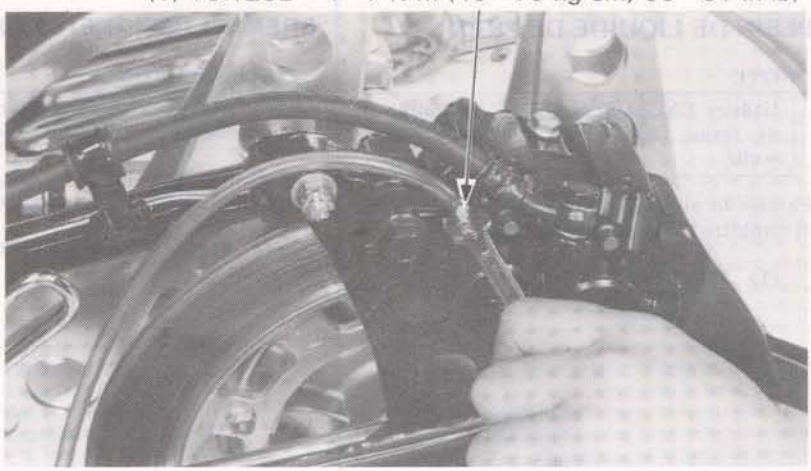
Repeat the above steps (1) and (2) until bubbles cease to appear in the fluid at the caliper bleeder valve.

Fill the fluid reservoir to the upper level mark.

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 PADS/DISC PLATES

PAD REPLACEMENT

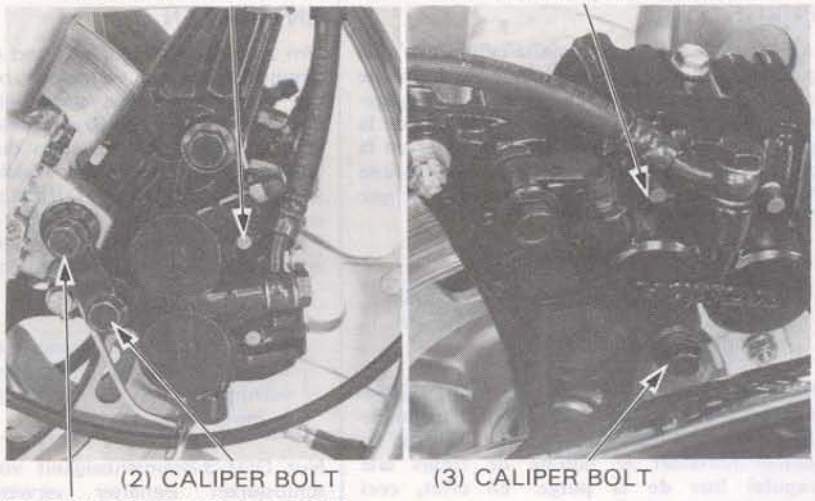
NOTE

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

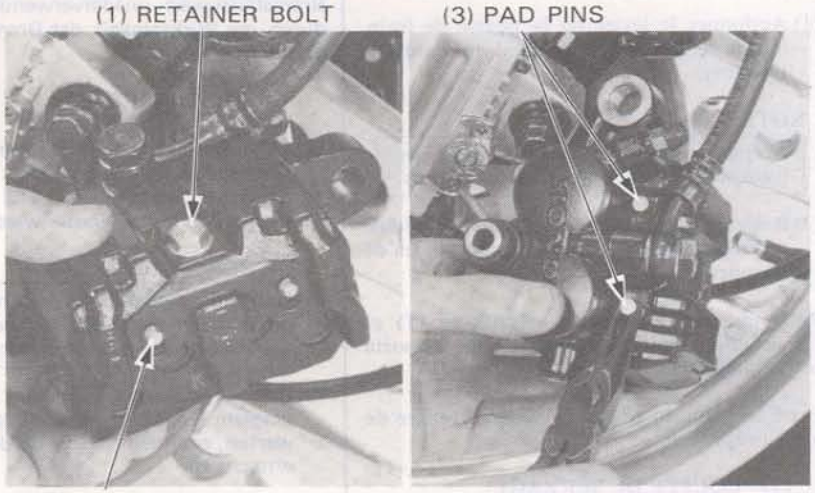
Remove the caliper bolt and pivot bolt and remove the caliper up out of the way.

NOTE

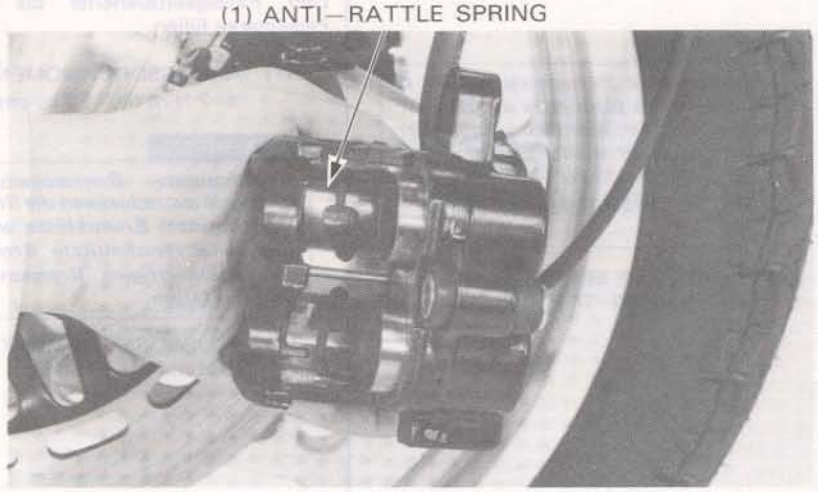
At the left caliper, loosen the caliper bracket bolt.



Remove the retainer bolt and the pad pin retainer.
Pull the pad pins out of the caliper.
Remove the brake pads.



Position the anti-rattle spring in the caliper as shown.

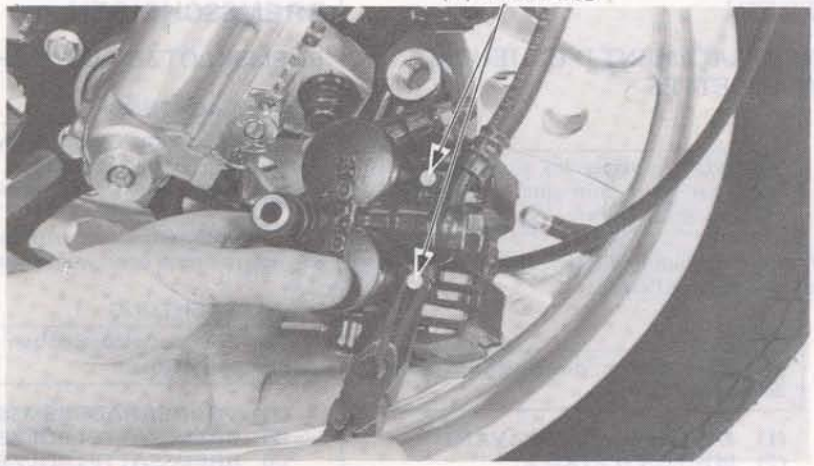


Install the new pads in the caliper.
Install the pad pins.

NOTE

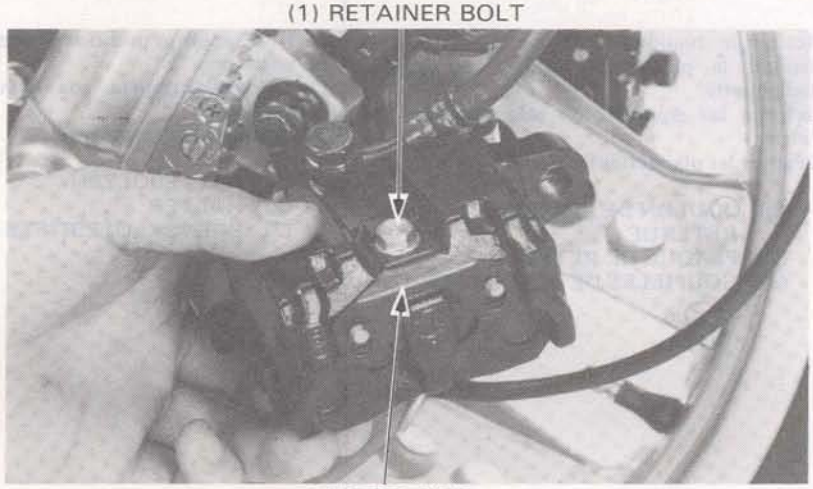
Install one pad pin first then install the other pin by pushing the pads against the caliper to depress the anti-rattle spring.

(1) PAD PINS



Slide the pad pin retainer over the pad pins through the larger side of the slots in the retainer and slide the retainer to secure the pad pins.
Install the pad pin retainer bolt.

(1) RETAINER BOLT

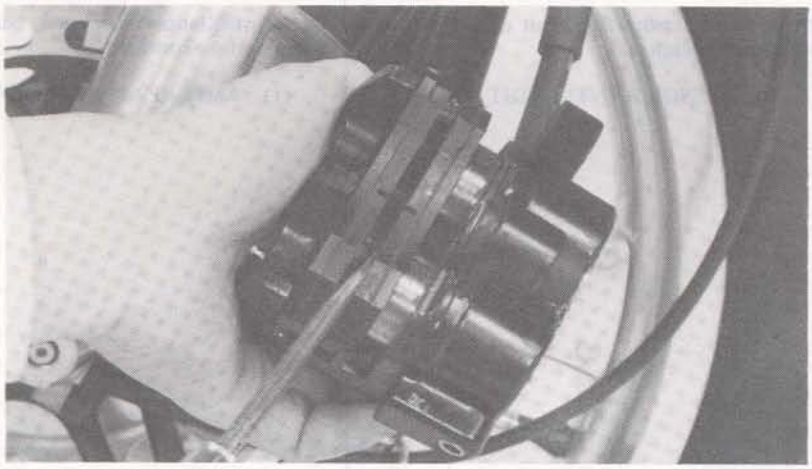


(2) RETAINER

Push the piston all the way in to allow installation of new brake pads.

NOTE

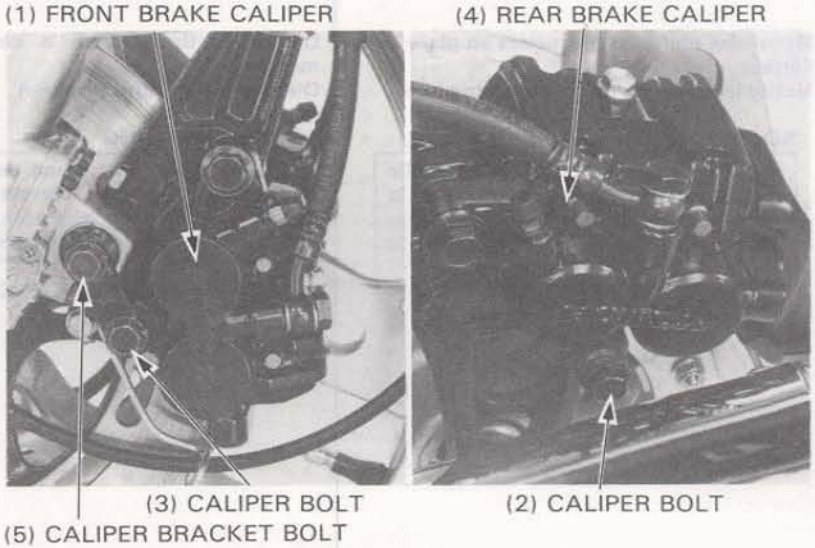
Check the brake fluid level in the brake master cylinder reservoir as such operation causes the level to rise.



Pivot the caliper down so the brake disc is positioned between the pads, making sure not to damage the pads.

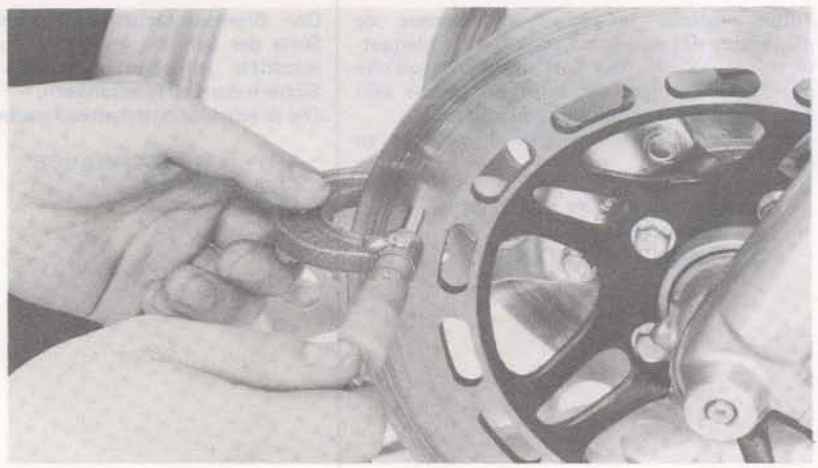
Install the caliper bolt and tighten it.
TORQUE: 20—25 N·m
(2.0—2.5 kg-m, 14—18 ft-lb)

Tighten the caliper bracket bolt.
TORQUE: 20—24 N·m
(2.0—2.4 kg-m, 14—17 ft-lb)



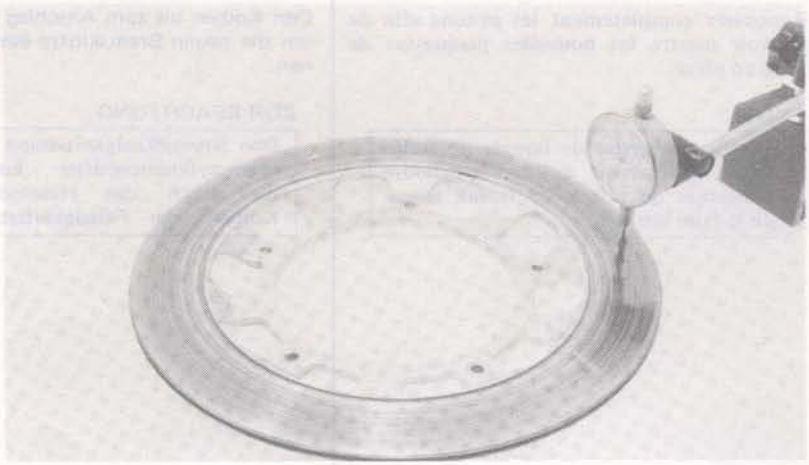
BRAKE DISC THICKNESS

Measure the brake disc thickness.
SERVICE LIMIT:
FRONT: 4.0 mm (0.16 in)
REAR: 6.0 mm (0.24 in)



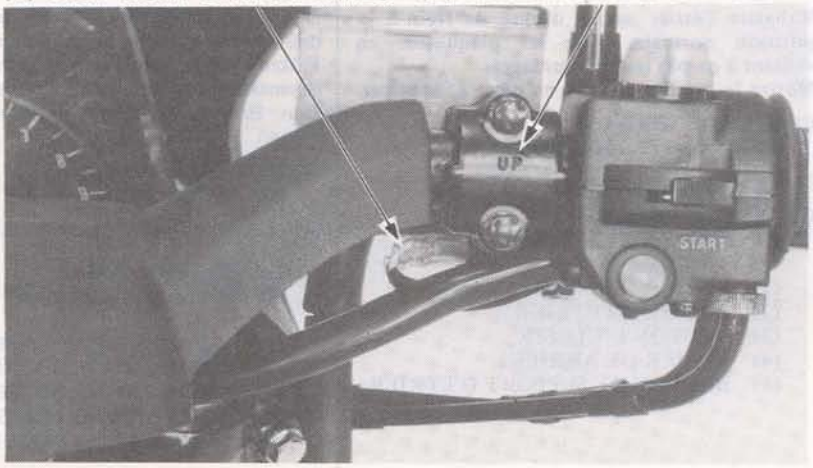
BRAKE DISC WARPAGE

Measure the brake disc warpage.
SERVICE LIMIT: 0.30 mm (0.012 in)



BRAKE MASTER CYLINDER

(1) STOP LIGHT SWITCH WIRES (2) MASTER CYLINDER HOLDER



MASTER CYLINDER DISASSEMBLY

Remove the rear view mirror and brake lever.

Disconnect the brake stop light switch wires.
Drain the brake fluid from the hydraulic system.
Remove the brake hose bolt and disconnect the brake hose.

CAUTION

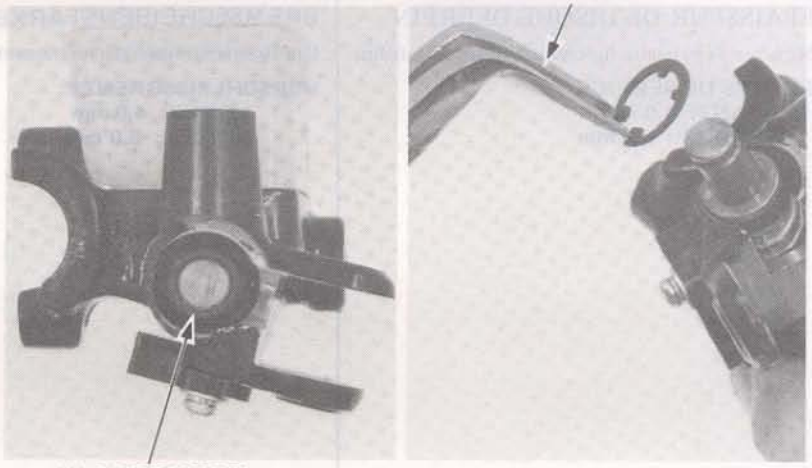
Avoid spilling brake fluid on painted surfaces. Place a rag over the fuel tank and instrument whenever the brake system is serviced.

Remove the master cylinder.

Remove the dust boot.

Remove the circlip.
Clean the interior of the master cylinder and reservoir with brake fluid.

(2) CIRCLIP PLIERS



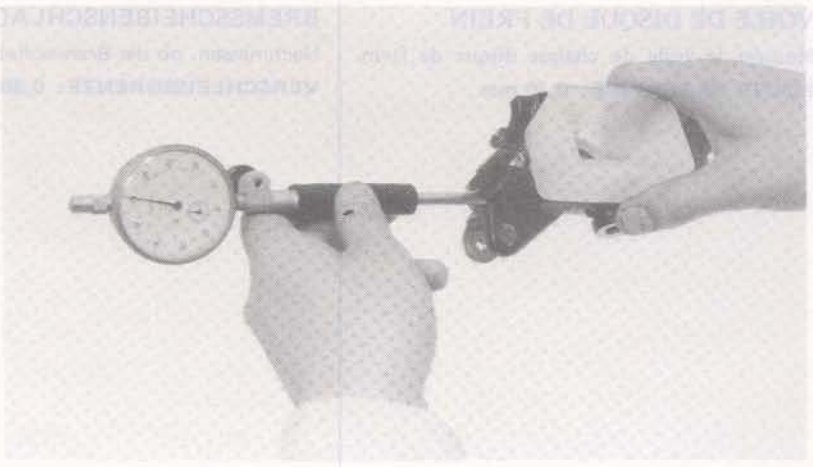
(1) DUST BOOT

FRONT MASTER CYLINDER I.D. INSPECTION

Measure the master cylinder bore I.D.

SERVICE LIMIT:
15.925 mm (0.6269 in)

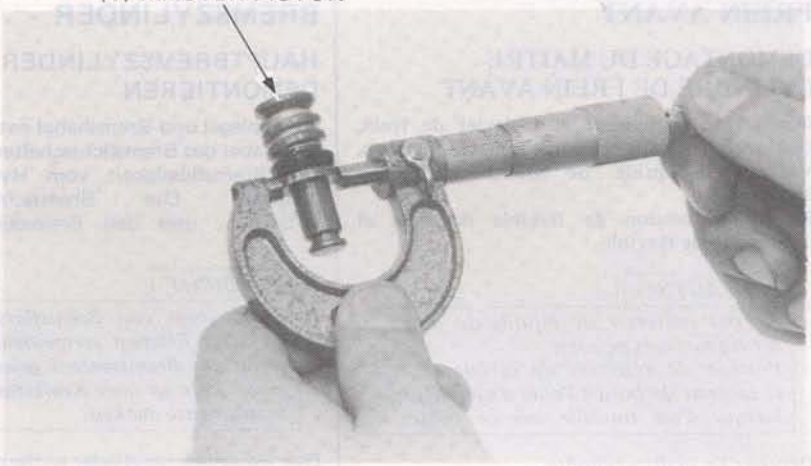
Check for scores, scratches, nicks or other damage.



FRONT MASTER PISTON O.D. INSPECTION

Measure the master piston O.D.

SERVICE LIMIT:
15.815 mm (0.6226 in)

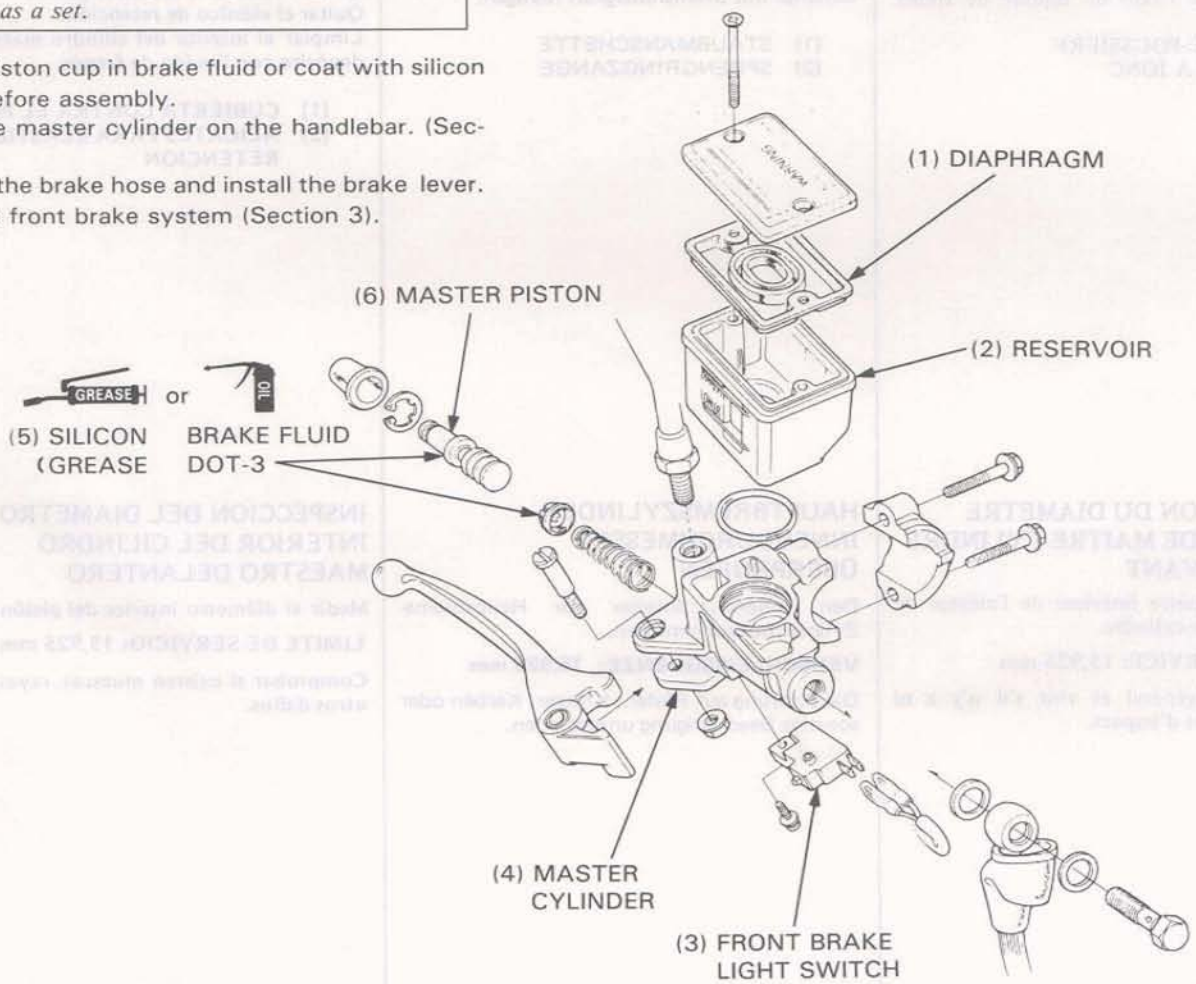


FRONT MASTER CYLINDER ASSEMBLY

CAUTION

Replace the master cylinder piston, cylinder and spring as a set.

Dip the piston cup in brake fluid or coat with silicon grease before assembly.
Install the master cylinder on the handlebar. (Section 13).
Connect the brake hose and install the brake lever.
Bleed the front brake system (Section 3).



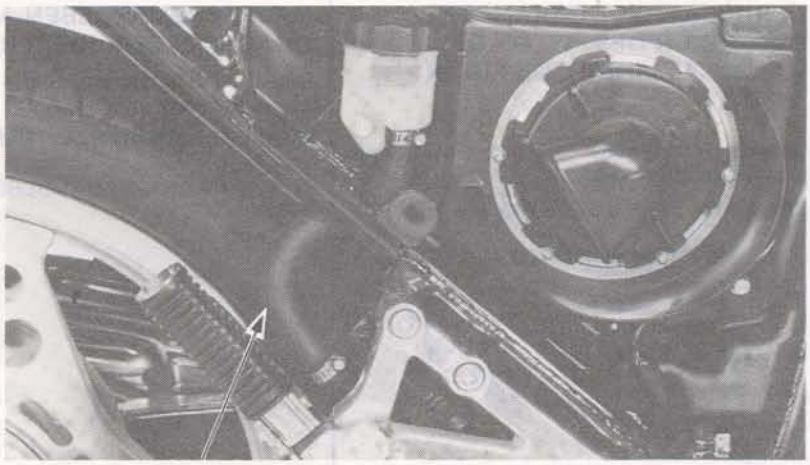
REAR BRAKE MASTER CYLINDER

REAR MASTER CYLINDER DISASSEMBLY

Remove the right side cover.
Place a clean drip pan under the braek line.
Disconnect the brake line on the back of the master cylinder.

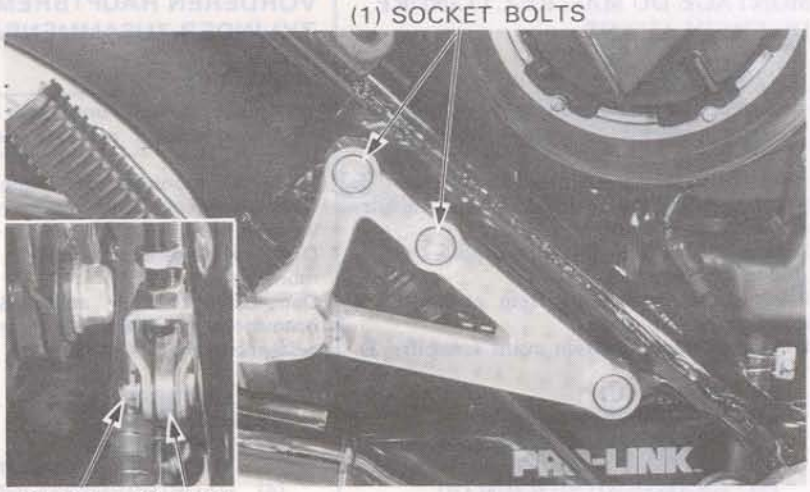
CAUTION

Avoid spilling brake fluid on painted surfaces.



(1) BRAKE LINE

Remove the pin from the rod eye and remove the two socket bolts.



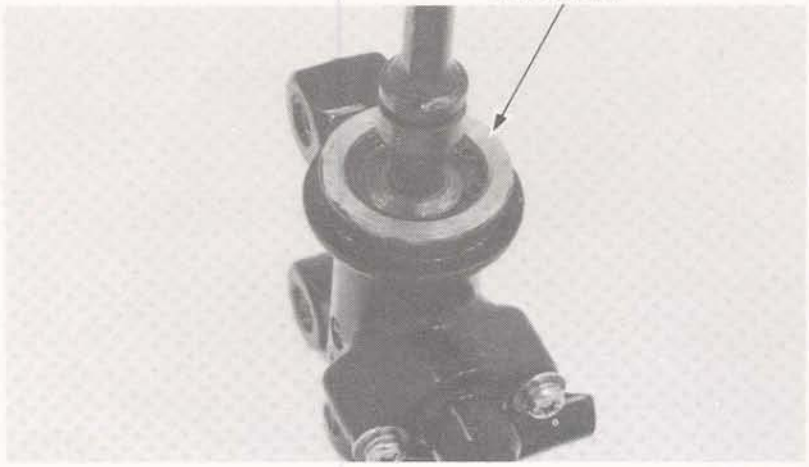
(1) SOCKET BOLTS

(2) PIN (3) ROD

Remove the rubber cover.
Remove the circlip and pull the rod from the master cylinder body.

CAUTION

Take care that the piston rod will pop out when remove the circlip.

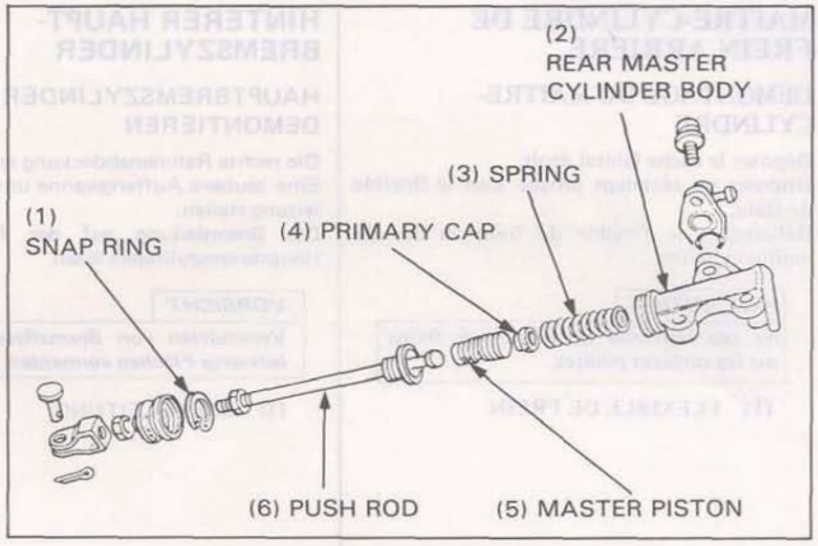


(1) CIRCLIP

Remove the master 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 brake fluid.

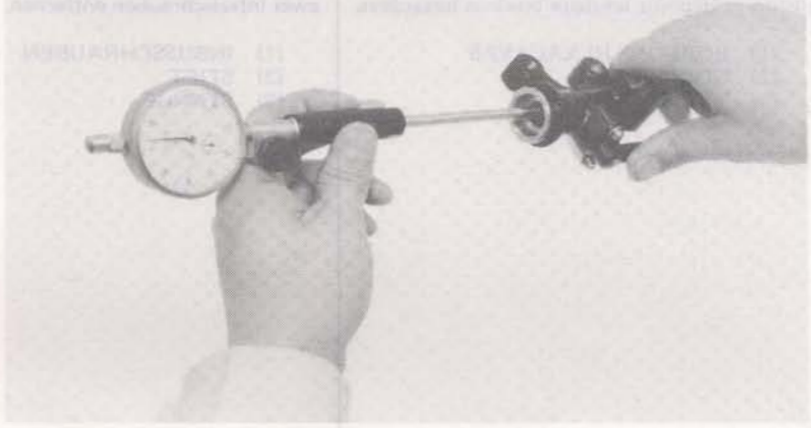


REAR MASTER CYLINDER I.D. INSPECTION

Measure the inside diameter of the master cylinder bore.

SERVICE LIMIT: 14.055 mm (0.5533 in)

Check for scores, scratches or nicks.

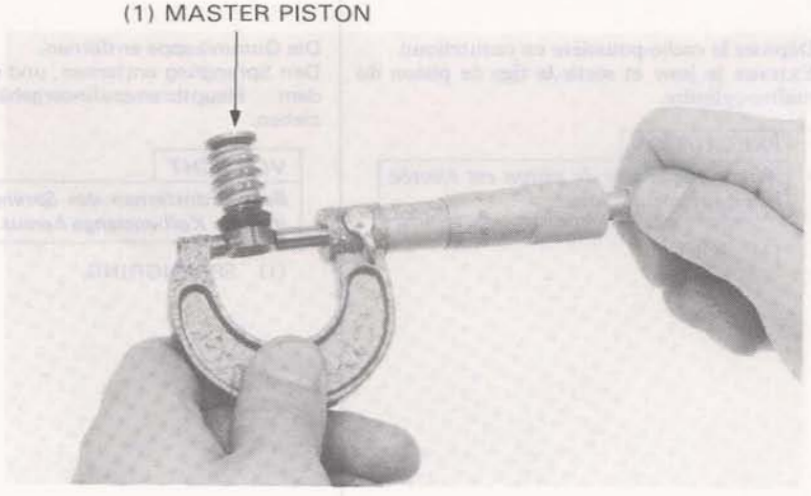


REAR MASTER PISTON O.D. INSPECTION

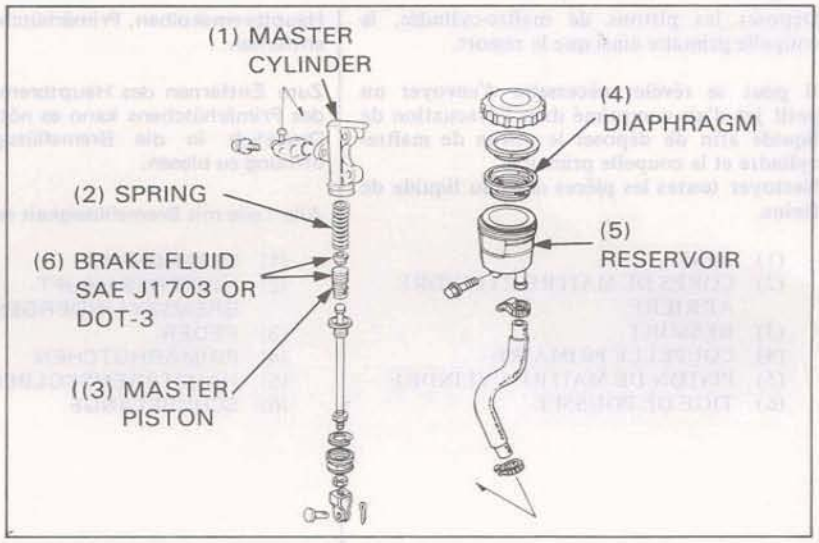
Measure the master piston O.D.

SERVICE LIMIT: 13.945 mm (0.549 in)

Check the primary cup and secondary cup for damages before assembly.



REAR MASTER CYLINDER ASSEMBLY



CAUTION

Handle the master cylinder piston, cylinder and spring as a set.

Assemble the master cylinder.
Coat all parts with clean brake fluid.

Dip the piston cup in brake fluid before assembly.

CAUTION

When installing the cups, do not allow the lips to turn inside out. Be certain the snap ring is seated firmly in the groove.

Install the primary cup and piston
Install the push rod and circlip.
Install the bot, nut and rod eye.

NOTE

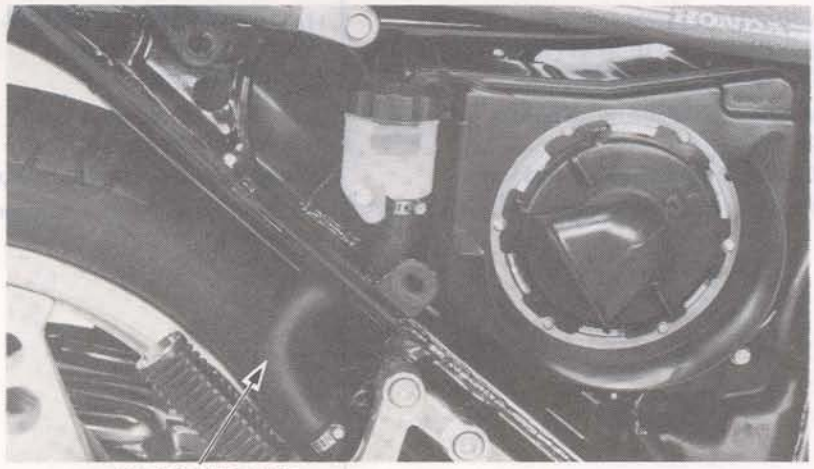
Be sure that the boot is installed in the groove.

Install the master cylinder on the master cylinder bracket.

TORQUE: 24—29 N·m
(2.4—2.9 kg-m, 17—21 ft-lb)

Connect the brake hose and brake rod.

Bleed the brake hydraulic system after assembly.



BRAKE CALIPER

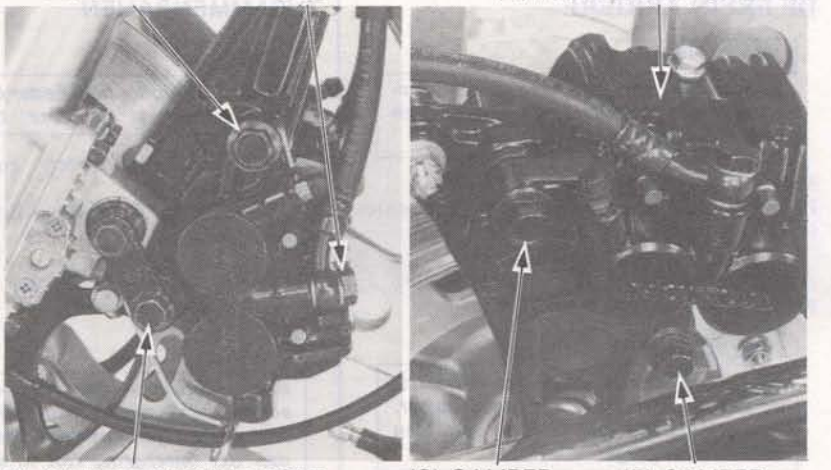
CALIPER REMOVAL

Drain the brake hydraulic system
Disconnect the brake hose.

NOTE

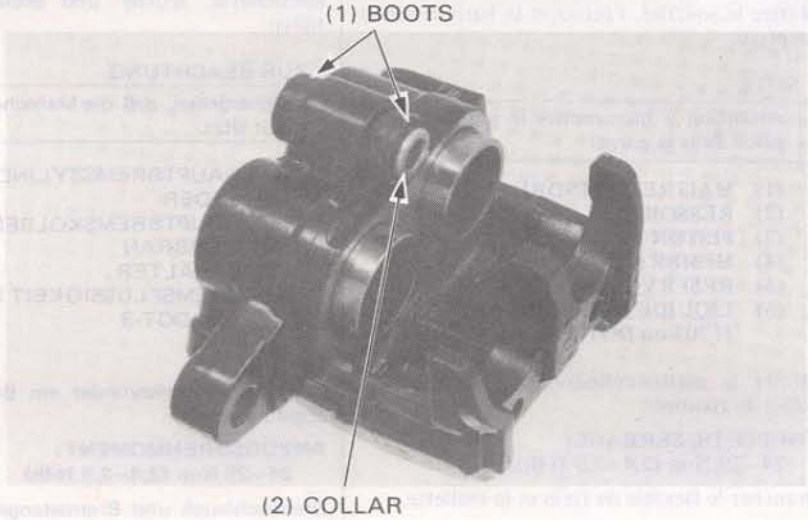
Avoid spilling brake fluid on painted surfaces, front forks and disc plate.

To remove the brake caliper, remove the caliper pivot bolt and mount bolt.



CALIPER DISASSEMBLY

Remove the pads and anti-rattle spring.
Remove the caliper pivot collar and boots.



Position the caliper with the piston down and apply small squirts of air pressure to the fluid inlet.

WARNING

Do not use high pressure air or bring the nozzle too close to the inlet.

NOTE

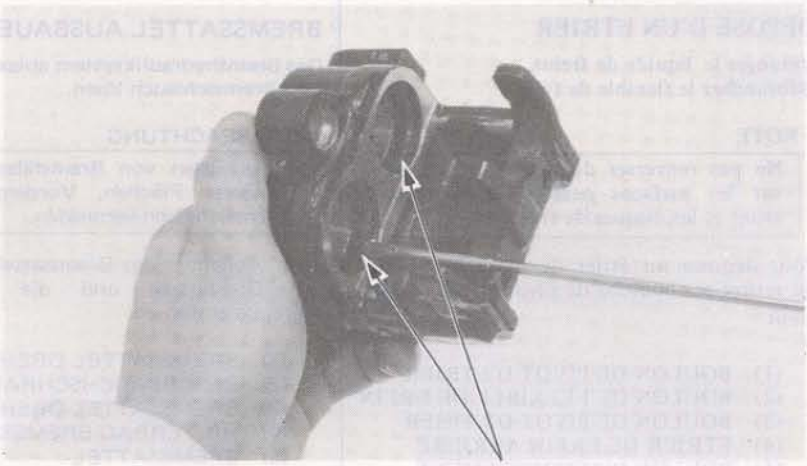
Place a shop towel over the pistons to prevent the pistons from becoming projectiles.

Examine the pistons and cylinders for scoring, scratches or other damage, and replace if necessary.

Push the oil seals in and then lift them out. Clean the oil seal grooves with brake fluid.

CAUTION

Do not damage the piston sliding surfaces.



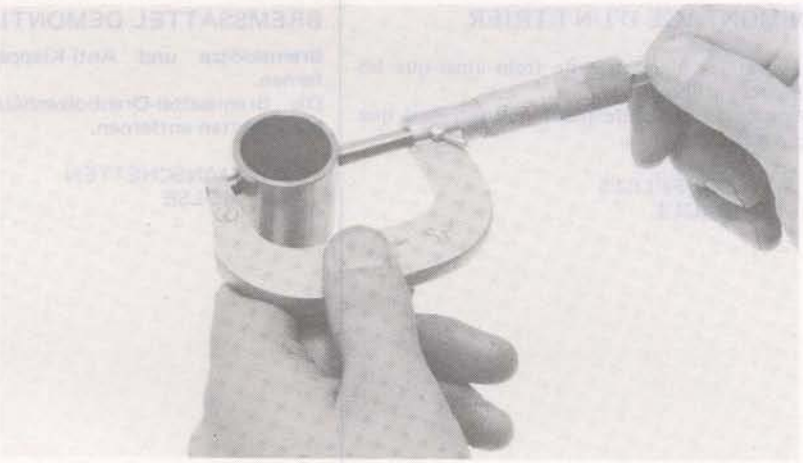
(1) OIL SEALS

CALIPER PISTON O.D. INSPECITON

Check the piston for scoring, scratches or other faults. Measure the piston diameter with a micrometer.

SERVICE LIMIT:

FRONT REAR	30.140 mm (1.1866 in)



CALIPER CYLINDER I.D. INSPECTION

Check the caliper cylinder for scoring, scratches or other faults. Measure the caliper cylinder bore.

SERVICE LIMIT:

FRONT REAR	30.290 mm (1.1925 in)

CALIPER ASSEMBLY

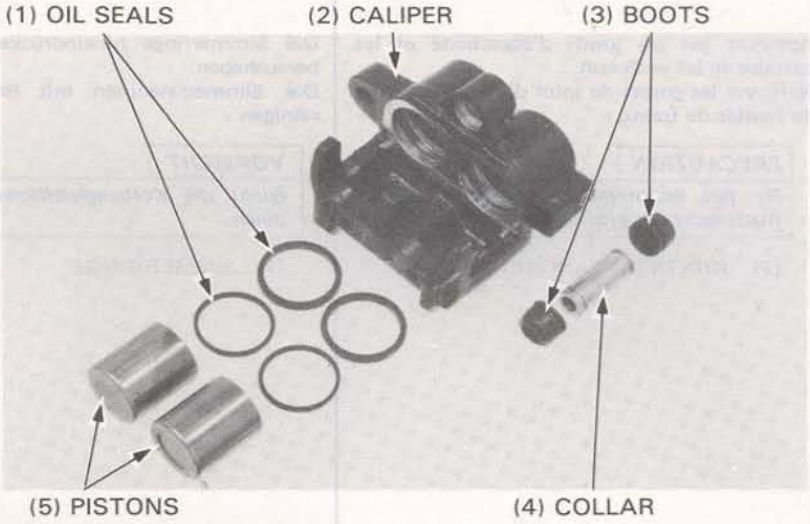
The oil seals must be replaced whenever the caliper is disassembled.

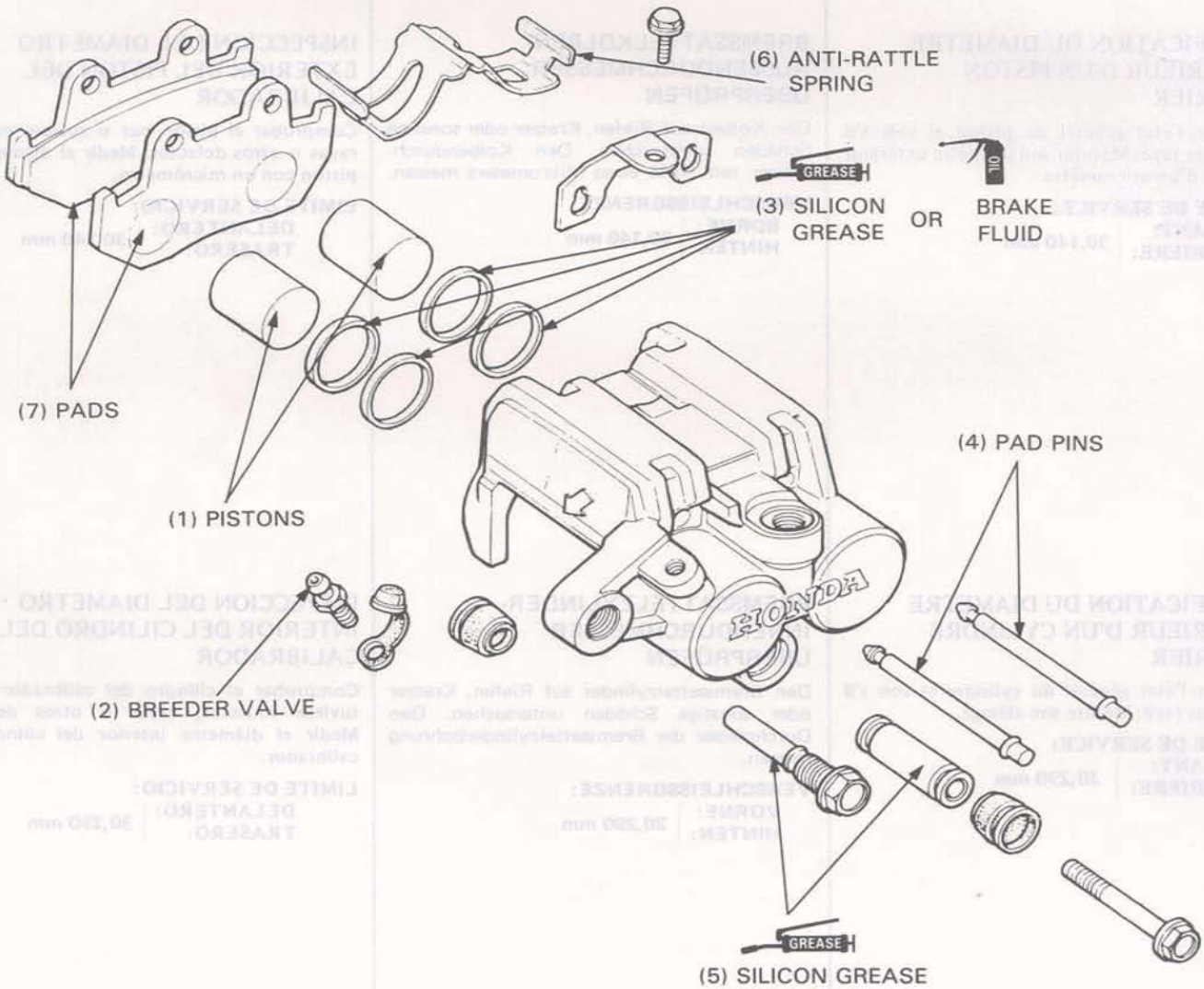
Cost the oil seals with silicon grease or brake fluid before assembly.

Install the pistons with the dished ends toward the pad side.

Install the boots and collar making sure that the boots are seated in the collar and caliper grooves properly.

Install the anti-rattle spring and the pads.





CALIPER INSTALLATION

On the left caliper bracket, inspect the caliper of the pivot boots.
Check the O-rings for damage.
Apply molybdenum disulfied (MoS_2) paste (containing more than 45% of MoS_2) to pivot sleeve.

NOTE

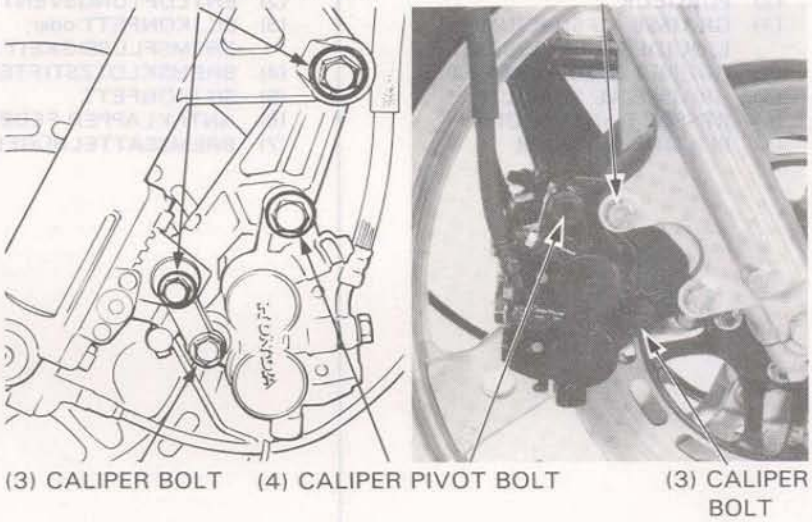
use MoS_2 paste (containing more than 45% of MoS_2) as follows:
- Molykote® G-n Paste manufactured by Dow Corning U.S.A.
- Rocol Paste manufactured by Sumico Lubricant Co., Ltd., Japan.
- Other lubricants of equivalent quality.

Install the caliper bracket.
Tighten the left caliper bracket bolts.

TORQUE:
UPPER: 35—45 N·m
(3.5—4.5 kg-m, 25—33 ft-lb)
LOWER: 20—24 N·m
(2.0—2.4 kg-m, 14—17 ft-lb)

Tighten the right caliper bracket bolt.

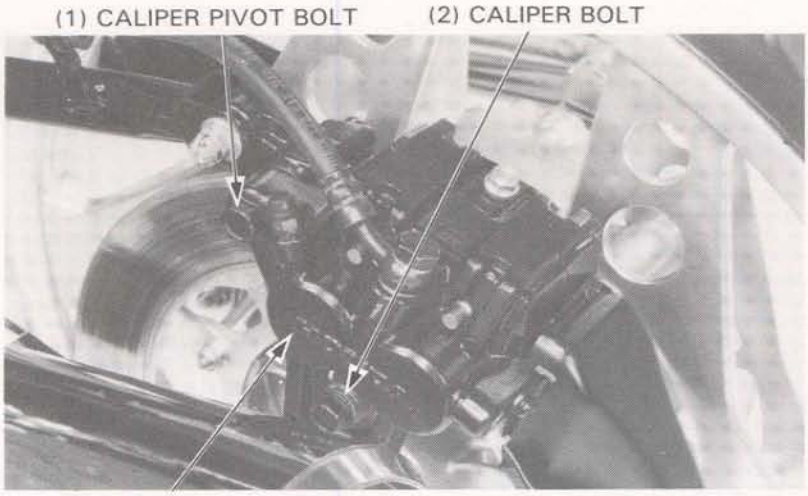
TORQUE: 30—40 N·m
(3.0—4.0 kg-m, 22—29 ft-lb)



Apply silicon grease to the pivot bolts.
Install the caliper assembly over the disc.
Tighten the caliper pivot and caliper bolts.

TORQUE:
CALIPER PIVOT BOLT:
25—30 N·m
(2.5—3.0 kg-m, 18—25 ft-lb)
CALIPER BOLT:
20—25 N·m
(2.0—2.5 kg-m, 14—18 ft-lb)

Fill the brake fluid reservoir and bleed the brake system (page 15-2).



BATTERY/CHARGING SYSTEM

BATTERIE/CIRCUIT DE CHARGE

BATTERIE/LADESYSTEM

BATERIA/SISTEMA DE CARGA

(1) BATTERIE
(2) REGULATEUR/REDRESSEUR
(3) ALTERNATEUR
(4) SCHEMA DU CIRCUIT DE CHARGE
(5) ALTERNATEUR
(6) REGULATEUR/REDRESSEUR
(7) CAPTEUR DE TENSION
(8) FUSIBLE DE 30 A
(9) CONTACTEUR GENERAL
(10) BATTERIE
(11) JAUNE
(12) ROUGE/BLANC
(13) VERT
(14) ROUGE
(15) NOIR

(1) BATTERIE
(2) REGLER/GLEICHRICHTER
(3) LICHTMASCHINE
(4) SCHALTSCHEMA DES BATTERIE-LADESYSTEMS
(5) LICHTMASCHINE
(6) REGLER/GLEICHRICHTER
(7) SPANNUNGSSENSOR
(8) SICHERUNG, 30
(9) ZÜNDSCHALTER
(10) BATTERIE
(11) GELB
(12) ROT/WEISS
(13) GRÜN
(14) ROT
(15) SCHWARZ

(1) BATERIA
(2) REGULADOR/RECTIFICADOR
(3) GENERADOR DE CA
(4) DIAGRAMA DE CARGA DE LA BATERIA
(5) GENERADOR DE CA
(6) REGULADOR/RECTIFICADOR
(7) SENSOR DE TENSION
(8) FUSIBLE DE 30 A
(9) INTERRUPTOR PRINCIPAL
(10) BATERIA
(11) AMARILLO
(12) ROJO/BLANCO
(13) VERDE
(14) ROJO
(15) NEGRO

SERVICE INFORMATION	16—1
TROUBLESHOOTING	16—1
BATTERY	16—2
CHARGING SYSTEM	16—3

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- The battery fluid 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 cable.

WARNING

Do not smoke or have flames near a charging battery. The gas produced by a battery is highly flammable and can explode.

- For A.C. generator removal and installation, refer to Section 8.
- All charging system components can be tested on the motorcycle.

SPECIFICATIONS

Battery	Capacity	12V, 14 ampere-hours
	Specific gravity	1.28/20°C (68°F)
	Charging rate	1.4 amperes maximum (20°C, 68°F)
A.C. generator	Capacity	18 amperes minimum/5,000 rpm (14 volts)
Voltage regulator	Type	Transistorized, non-adjustable

TROUBLESHOOTING

No power — key turned on

1. Dead battery
   - Low fluid level
   - Low specific gravity
   - Charging system failure
2. Disconnected battery cable
3. Main fuse burned out
4. Faulty ignition switch

Low power — key turned on

1. Weak battery
   - Low fluid level
   - Low specific gravity
   - Charging system failure
2. Loose battery connection

Low power — engine running

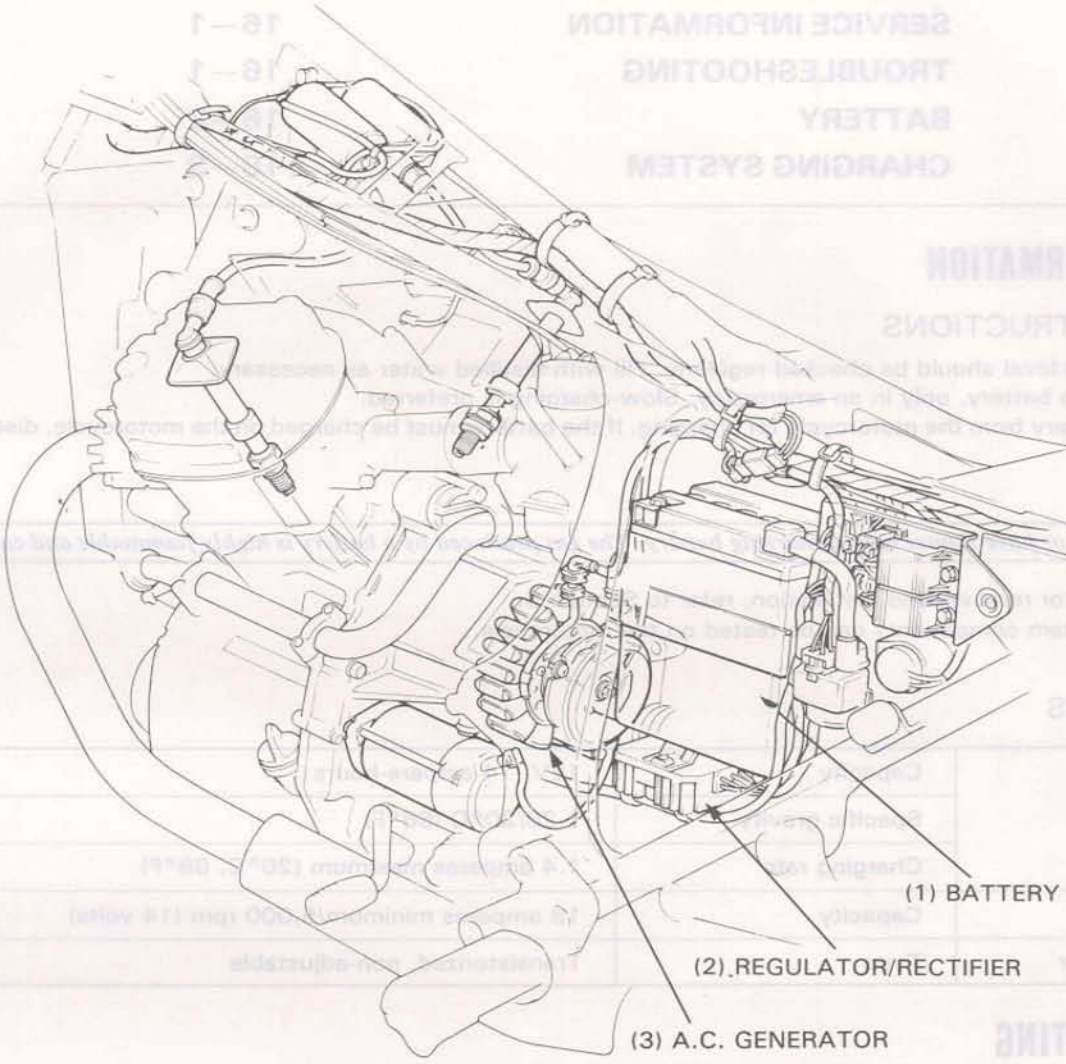
1. Battery undercharged
   - Low fluid level
   - One or more dead cells
2. Charging system failure

Intermittent power

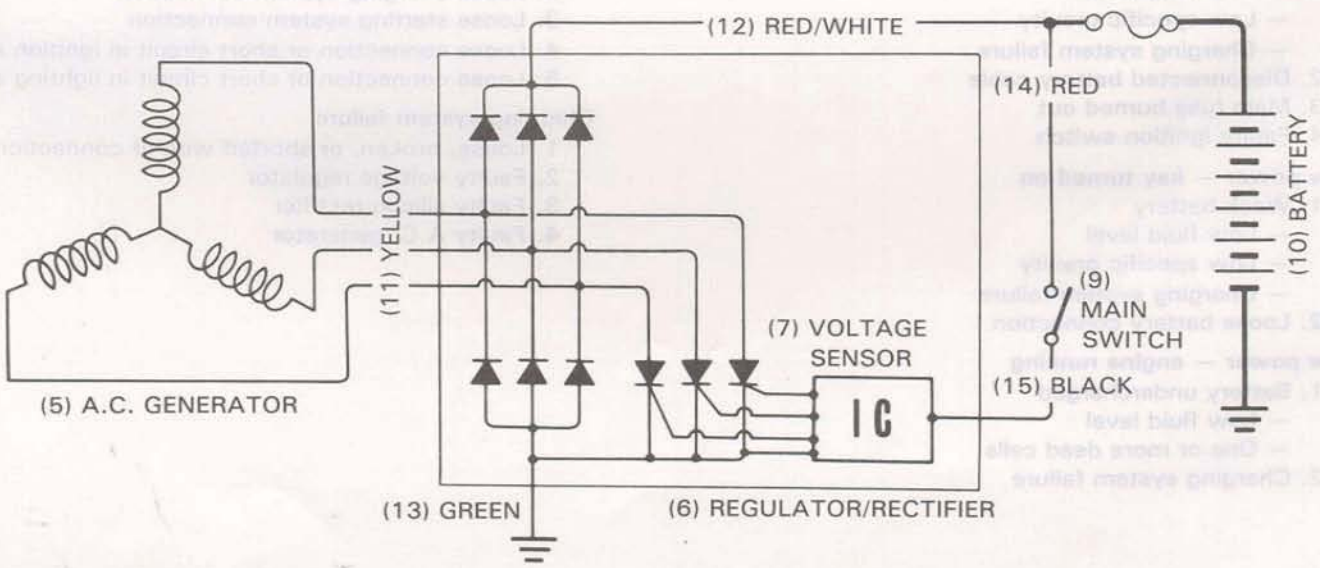
1. Loose battery connection
2. Loose charging system connection
3. Loose starting system connection
4. Loose connection or short circuit in ignition system
5. Loose connection or short circuit in lighting system

Charging system failure

1. Loose, broken, or shorted wire or connection
2. Faulty voltage regulator
3. Faulty silicon rectifier
4. Faulty A.C. generator



(4) BATTERY CHARGING DIAGRAM



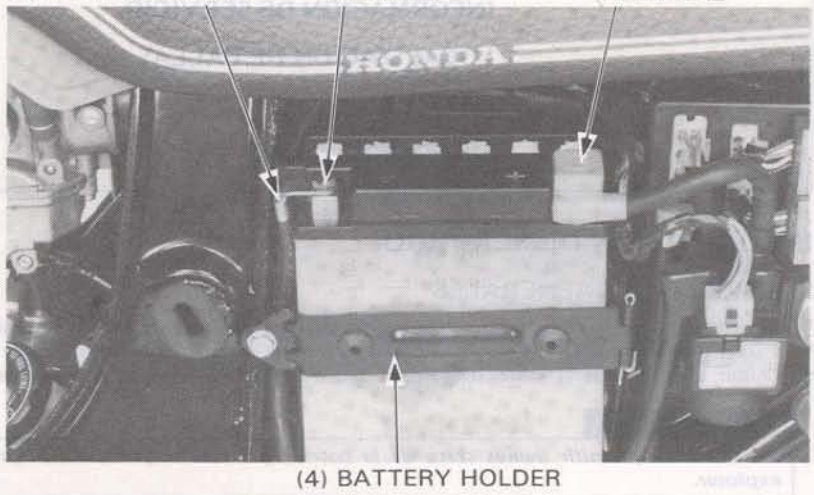
16

BATTERY

Disconnect the ground cable.
Remove the battery holder.
Disconnect the positive (+) cable at the battery
Disconnect the battery breather tube, and remove the battery.

NOTE

- Do not drop the battery.
- Installation is the reverse order of removal.



TESTING SPECIFIC GRAVITY

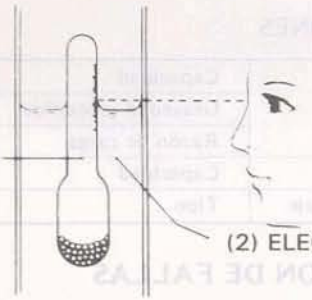
Test each cell by drawing electrolyte into the hydrometer.
SPECIFIC GRAVITY (20°C, 68°F)
Fully charged: 1.27—1.29
Undercharged: Below 1.26

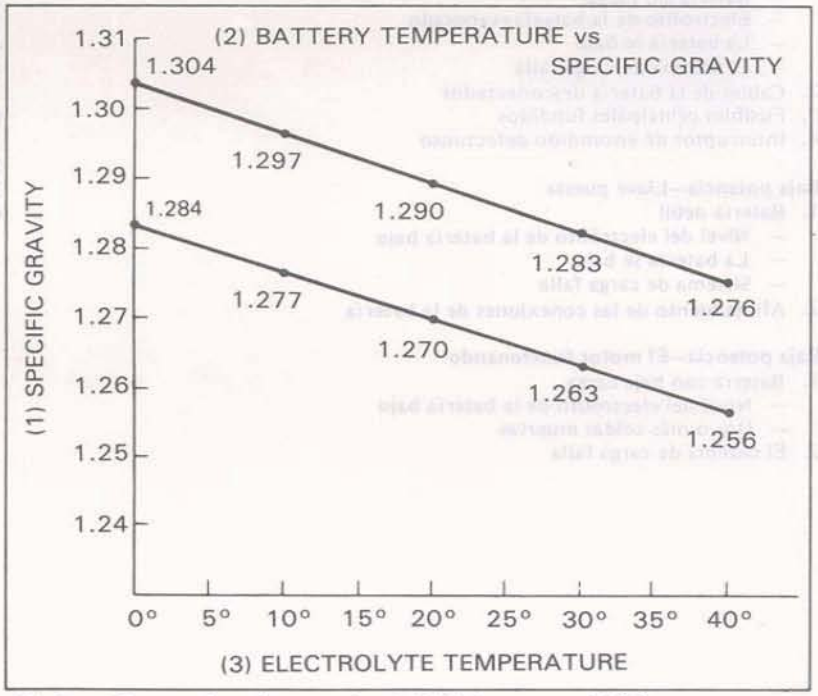
NOTE

- The battery must be recharged if the specific gravity is below 1.23.
- The specific gravity varies with the temperature as shown in the accompanying table.
- Replace the battery if sulfation is evident.
- The battery must be replaced if there are pastes settled on the bottom of each cell.

WARNING

The battery contains sullfuric acid. Avoid contact with skin, eyes, or clothing.
Antidote: Flush with water and get prompt medical attention

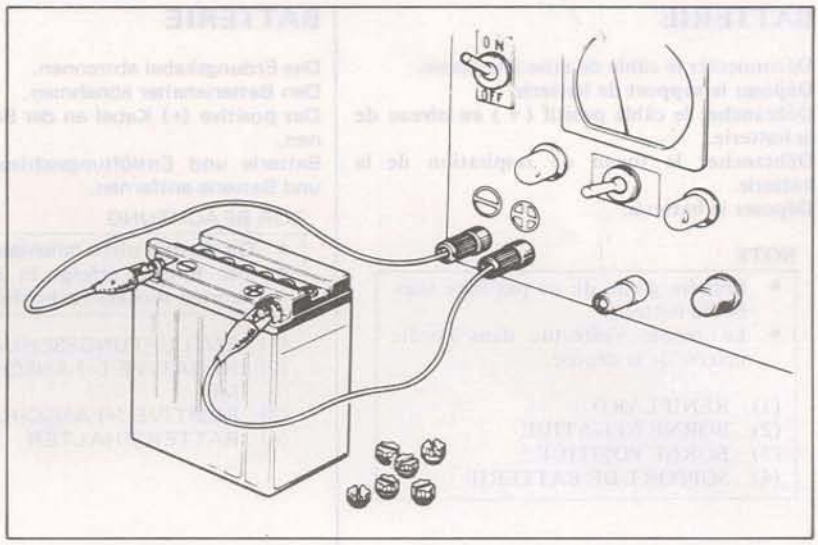




(4) Specific gravity changes by 0.007 for every 10°C

BATTERY CHARGING

Remove the battery cell caps.
Connect the charger positive (+)cable to the battery positive (+) terminal.
Connect the charger negative (−) cable to the battery negative (−) terminal.
Charging current:
1.4 amperes maximum
Charging:
Charge the battery until specific gravity is 1.27 ~ 1.29 at 20°C (68°F)



WARNING

- *Before charging a battery, remove the cap from each cell.*
- *Keep fire and sparks away from a charging battery.*
- *Turn power ON/OFF at the charger, not at the battery terminals.*
- *Discontinue charging if the electrolyte temperature exceeds 45°C (113°F).*

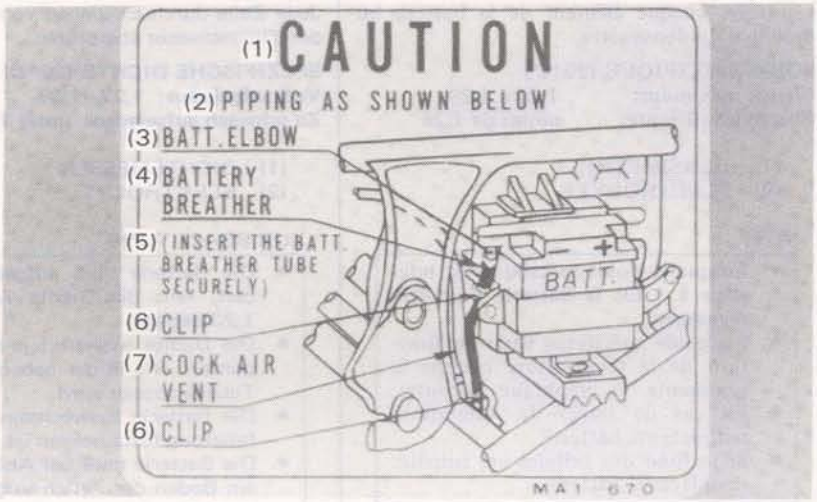
CAUTION

Quick-charging should only be done in an emergency; slow-charging is preferred.

After installing the battery, coat the terminals with clean grease.

CAUTION

Route the breather tube as shown on the battery caution label.



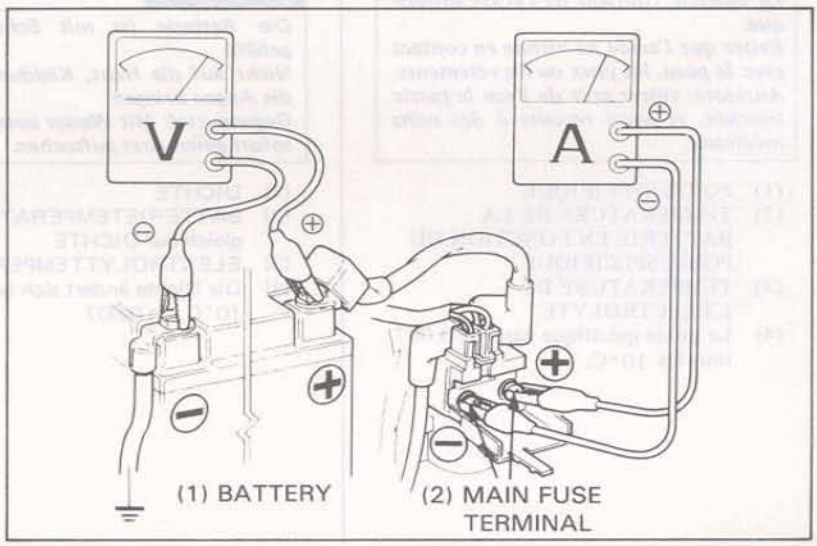
CHARGING SYSTEM

CHARGING OUTPUT TEST

Warm the engine up to operating temperature before taking readings.
Disconnect the main fuse coupler
Open the main fuse cover and remove the main fuse, then reconnect the coupler.
Connect a voltmeter and ammeter as shown.

NOTE

Use a fully charged battery to check the charging system output.

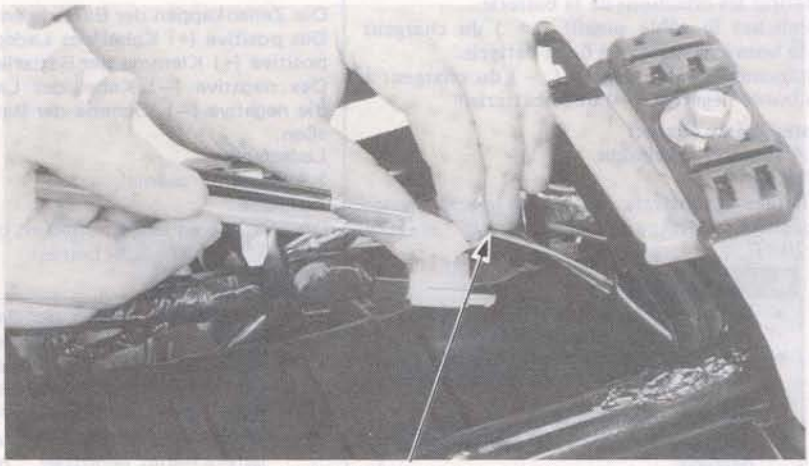


TECHNICAL DATA:

MAIN SWITCH	LIGHTING SWITCH	INITIAL CHARGING RPM	CHARGING AT 5,000 rpm
ON	ON (High beam)	1,300 min^{-1} (rpm)	(8.8 amperes minimum/ 14.0 volts)

STATOR COIL CONTINUITY TEST

Check the yellow leads to the A.C. generator stator for continuity with each other. Replace the stator if any yellow lead is not continuous with the others, or if any lead has continuity to ground.
REMOVAL (Page 8-4).



(1) A.C. GENERATOR WIRE

VOLTAGE REGULATOR/ RECTIFIER TEST

Check the resistances between the leads with an ohmmeter.

WARNING

Do not use a high voltage source such as insulation resistance tester since it may damage the rectifier and give you a shock.

NORMAL DIRECTION: CONTINUITY

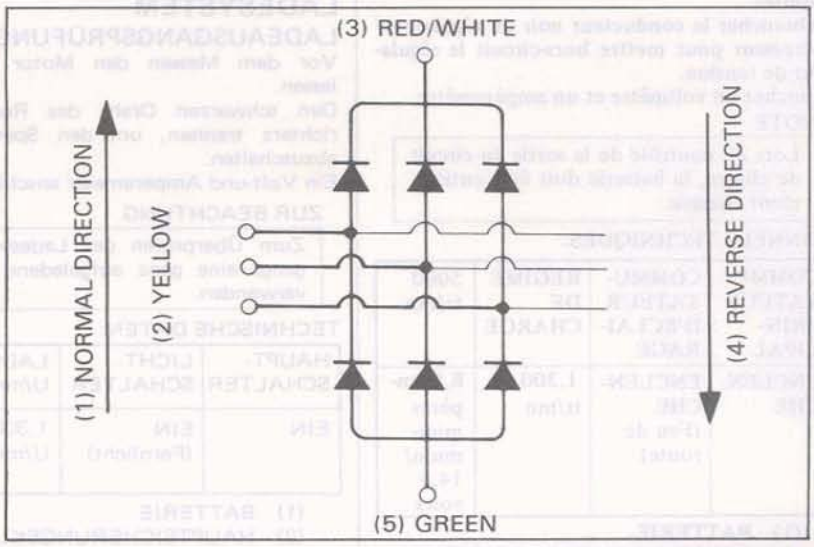
	⊕ probe	⊖ probe
I	YELLOW	GREEN
II	RED/WHITE	YELLOW

REVERSE DIRECTION: NO CONTINUITY

	⊕ probe	⊖ probe
I	GREEN	YELLOW
II	YELLOW	RED/WHITE

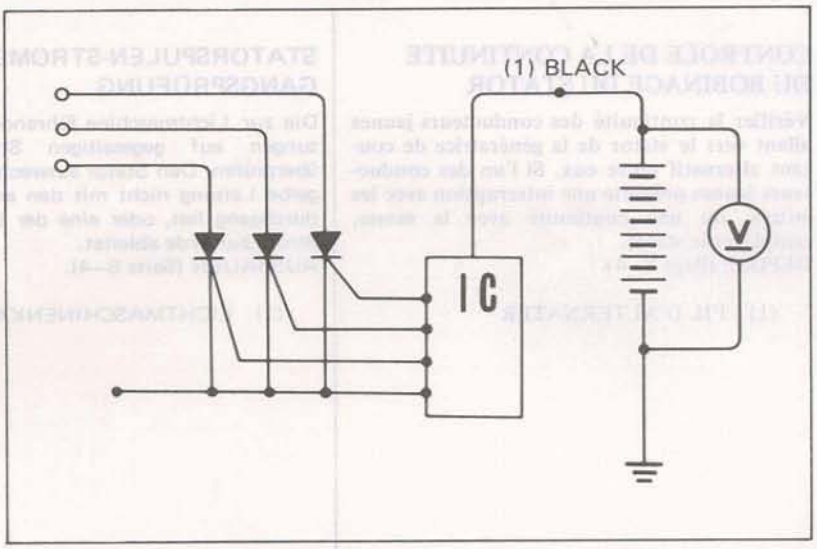
NOTE

The test results shown are for a positive ground ohmmeter and the opposite results will be obtained when a negative ground ohmmeter is used.

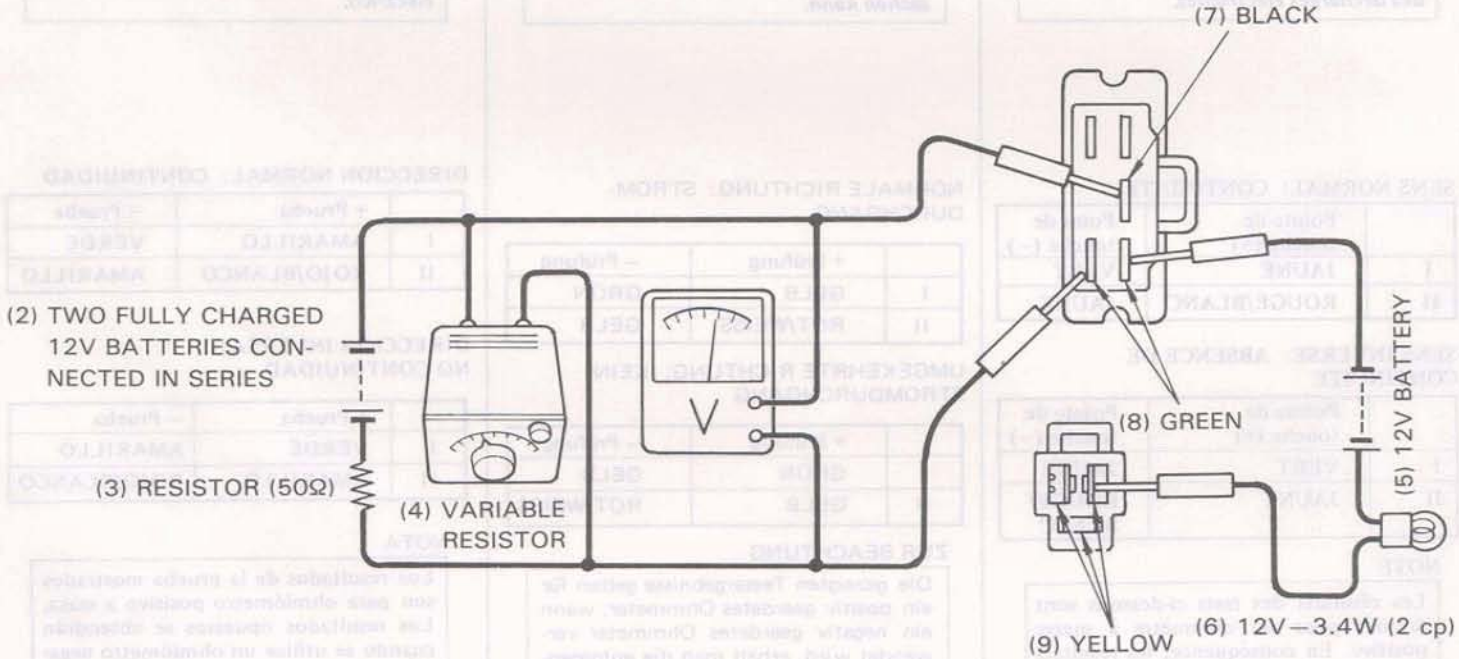


VOLTAGE REGULATOR PERFORMANCE TEST

a. Testing with a voltmeter
Connect a voltmeter across the battery.
Check regulator performance with the engine running.
Regulator must divert current to ground when battery voltage reaches 14.0 ~ 15.0V.



b. Testing with a variable resistor
Connect a variable resistor (0 ~ 100 Ω) across the battery with a 50 Ω resistor in between.
Check for continuity between green and each of three yellow terminals.
Test lamp must come on when voltage reads 14 to 15V on the voltmeter by adjusting the variable resistor.



IGNITION SYSTEM

CIRCUIT D'ALLUMAGE

ZÜNDSYSTEM

SISTEMA DE IGNICION

(1) BOBINE D'ALLUMAGE
(2) HODULE D'ALLUMAGE
(3) BOUGIE D'ALLUMAGE
(4) GENERATEUR D'IMPULSIONS
(5) BOBINE D'ALLUMAGE
(6) BOUGIE D'ALLUMAGE
(7) DIODE
(8) MODULE D'ALLUMAGE
(9) GENERATEUR D'IMPULSIONS
(10) MODULE D'ALLUMAGE
(11) COUPE-CIRCUIT DU MOTEUR
(12) CONTACTEUR A CLE
(13) FUSIBLE
(14) BATTERIE

(1) ZÜNDSPULE
(2) ZÜNDEINHEIT
(3) ZÜNDKERZE
(4) IMPULSGEBER
(5) ZÜNDSPULE
(6) ZÜNDKERZE
(7) DIODE
(8) ZÜNDEINHEIT
(9) IMPULSGEBER
(10) ZÜNDEINHEIT
(11) MOTORABSTELLSCHALTER
(12) ZÜNDSHALTER
(13) SICHERUNG
(14) BATTERIE

(1) BOBINA DE ENCENDIDO
(2) UNIDAD DE ENCENDIDO
(3) BUJIA
(4) GENERADOR DE IMPULSOS
(5) BOBINA DE ENCENDIDO
(6) BUJIA
(7) DIODO
(8) UNIDAD DE ENCENDIDO
(9) GENERADOR DE IMPULSOS
(10) UNIDAD DE ENCENDIDO
(11) INTERRUPTOR DE PARADA DEL MOTOR
(12) INTERRUPTOR DE ENCENDIDO
(13) FUSIBLE
(14) BATTERIA

SERVICE INFORMATION	17—1
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TRANSISTORIZED IGNITION SYSTEM (Pulse Generator, Spark Unit)	17—4
SPARK UNIT	17—4
SPARK ADVANCER	17—5
IGNITION TIMING CHECK	17—6

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- A TRANSISTORIZED IGNITION SYSTEM is used and no adjustments are to be made unless the pulse generator screws are loosened or the pulse generator is removed.
- To adjust the ignition timing, see page 8-10.
- For spark plug information, see page 3-7.

SPECIFICATIONS

RECOMMENDED SPARK PLUG

	Standard	For extended high speed riding
NGK	DR8ES-L	DR8ES
ND	X24ESR-U	X27ESR-U

Spark plug gap:	0.6—0.7 mm (0.02—0.03 in)
Ignition timing:	"F" mark: 15° BTDC at 1,100 rpm Full advance: 45 ± 1.5° BTDC at 3,000 rpm
Pulse generator air gap:	0.45—0.65 mm (0.018—0.026 in)
Ignition coil	3-point spark test 6 mm (1/4 in) minimum

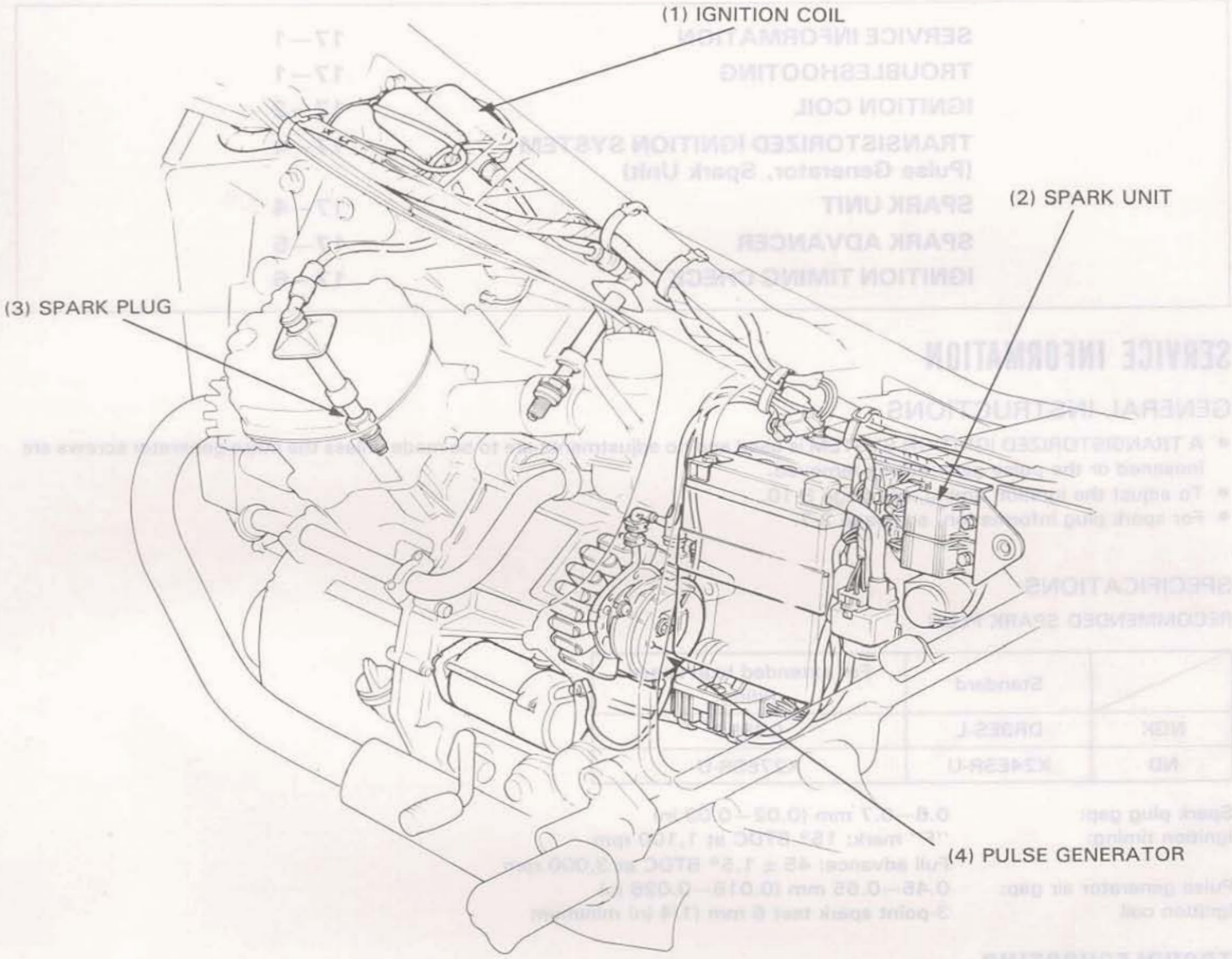
TROUBLESHOOTING

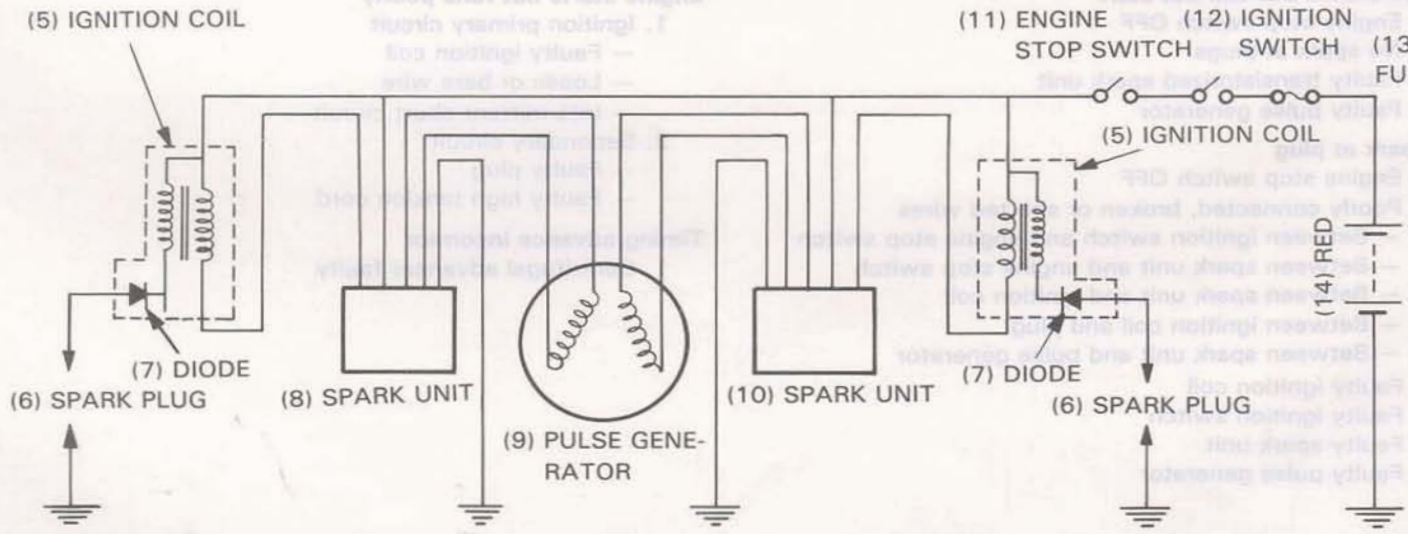
Engine cranks but will not start
1. Engine stop switch OFF
2. No spark at plugs
3. Faulty transistorized spark unit
4. Faulty pulse generator

No spark at plug
1. Engine stop switch OFF
2. 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
3. Faulty ignition coil
4. Faulty ignition switch
5. Faulty spark unit
6. Faulty pulse generator

Engine starts but runs poorly
1. Ignition primary circuit
   - Faulty ignition coil
   - Loose or bare wire
   - Intermittent short circuit
2. Secondary circuit
   - Faulty plug
   - Faulty high tension cord

Timing advance incorrect
1. Centrifugal advancer faulty


(1) IGNITION COIL
(2) SPARK UNIT
(3) SPARK PLUG
(4) PULSE GENERATOR

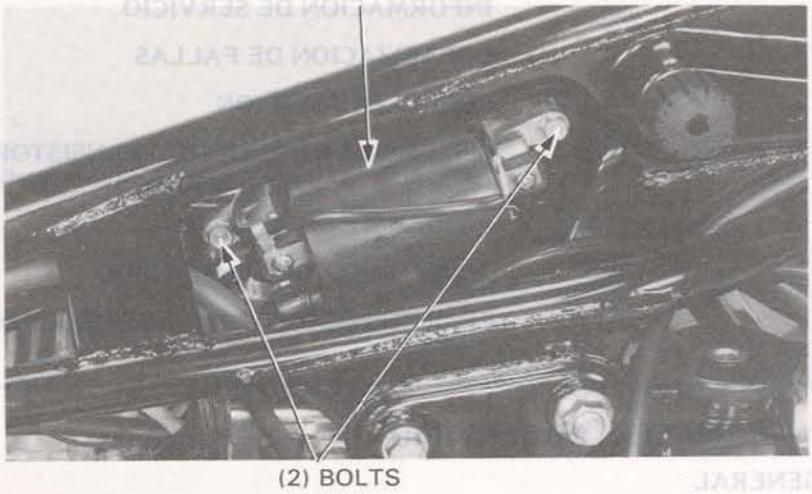

(5) IGNITION COIL
(11) ENGINE STOP SWITCH
(12) IGNITION SWITCH
(13) FUSE
(5) IGNITION COIL
(14) RED
(7) DIODE
(6) SPARK PLUG
(8) SPARK UNIT
(9) PULSE GENE-RATOR
(10) SPARK UNIT
(7) DIODE
(6) SPARK PLUG

17

IGNITION COIL

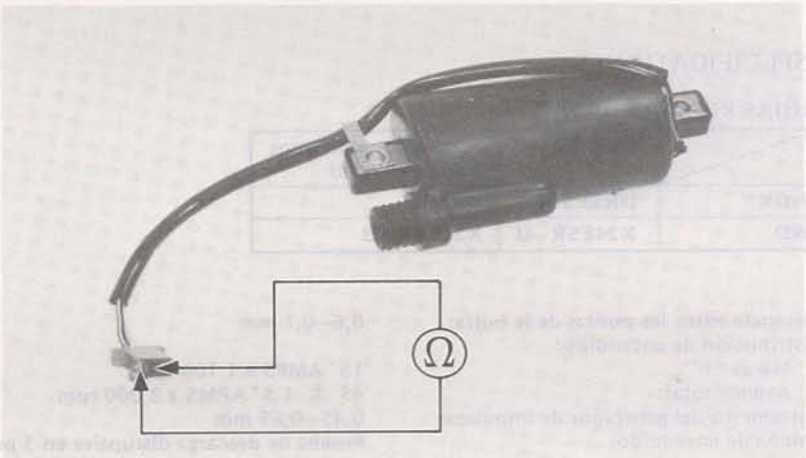
REMOVAL

Remove the fuel tank.
Disconnect the ignition switch couplers.
Remove the coil by removing the attaching bolts.



PRIMARY COIL INSPECTION

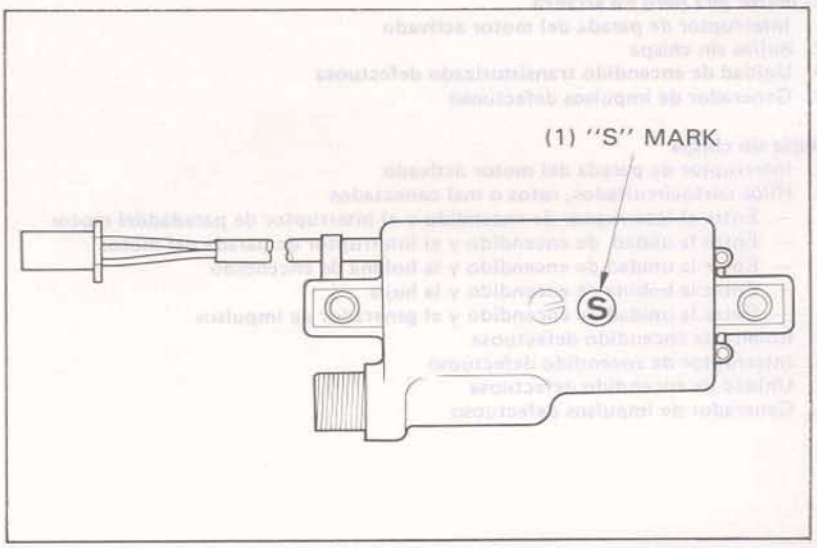
Measure the primary coil resistance.
RESISTANCE: 2—3Ω



SECONDARY COIL INSPECTION

NOTE

The secondary coil inspection method differs depending on whenver or not there is a mark on the ignition coil body. Look for an "S" mark before testing.



WITH "S" MARK

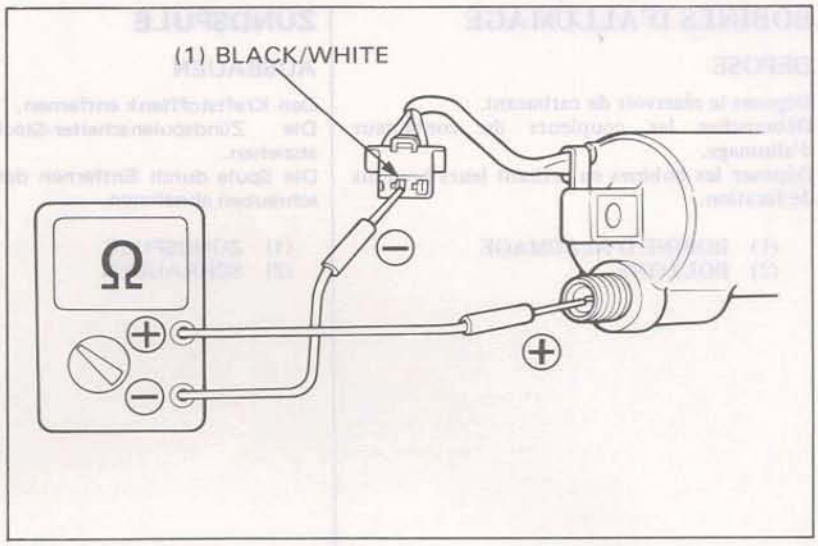
Measure the resistance between the black/white coupler terminal and the high tension cord terminal.

NOTE

- Use SANWA TESTER (07308—0020000) or KOWA TESTER (TH-5H).
- Use new test batteries for this test.

1. Connect the negative probe of the tester to the coupler terminal and positive probe to the high tension terminal and measure the resistance.
   RESISTANCE:
   SANWA TESTER: 200—350 kΩ
   KOWA TESTER: 50—200 kΩ

2. Change the tester polarities and measure the resistance.
   RESISTANCE: ∞ ohms



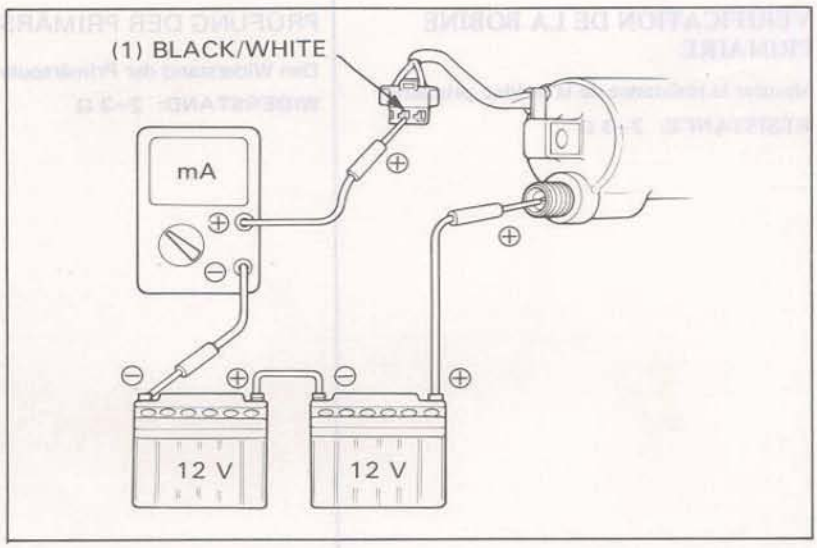
Repalce the ignition coil if the resistance of test 1 and/or 2 exceeds the limit.

WITHOUT "S" MARK

Connect the ignition coil, tester and two 12V batteries as shown in the figure.

NOTE

make sure the battery voltage is 23—25V before measuring.



Replace the ignition coil if the reading does not meet the specification.

Tester	Measuring range	Specification
SANWA	25 mA	Approximately 3 mA
KOWA	100 mA	Needle should swing slightly.

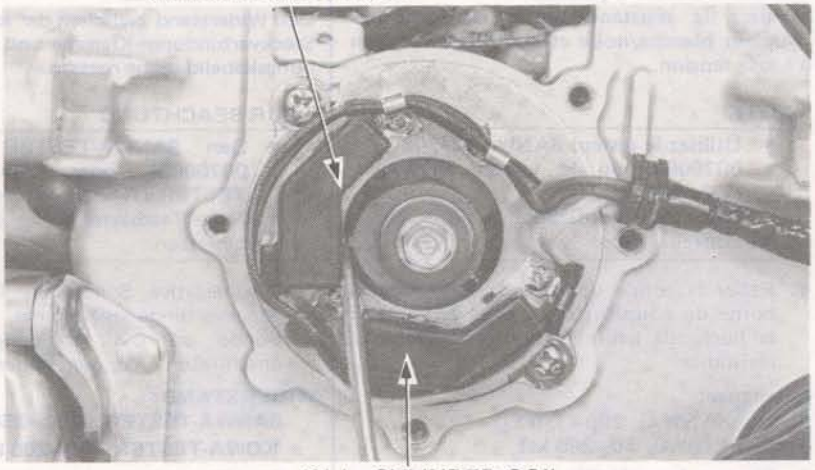
Change the tester polarities.
Replace the ignition coil if there is continuity.

TRANSISTORIZED IGNITION SYSTEM

INSPECTION

Remove the swingarm (Page 14-16).
Remove the pulse generator cover.
Disconnect the spark plugs.
Hold each plug against any convenient engine ground.
Turn the ignition switch on.
Touch the end of a screwdriver to one pulse generator steel core.
A good spark to the plug means that the ignition system for that cylinder is in good shape.
Repeat the above for the other pulse generator.

(1) R. CYLINDER COIL



(2) L. CYLINDER COIL

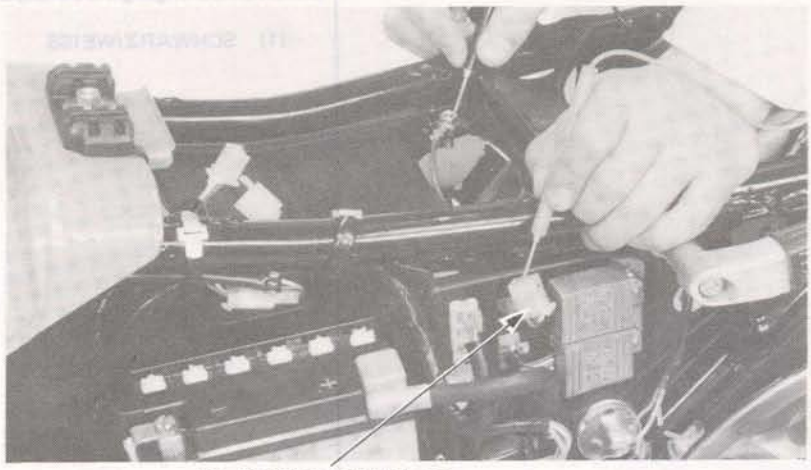
Measure the coil resistance.
COIL RESISTANCE: 530 ± 50Ω (20°C, 68°F)
Between yellow with white tube and yellow leads (Right cylinder)
Between blue with white tube and blue leads (Left cylinder)

(1) PULSE GENERATOR WIRE

SPARK UNIT

Disconnect the wires at the pulse generator coupler.

Attach the positive lead of a voltmeter to the blue with yellow tube wire terminal (L) or yellow with white tube wire terminal (R) of the 6-pole coupler.
Attach the negative lead to any convenient ground.
Turn the ignitin switch on.



(1) 6-POLE COUPLER

Ground each corresponding terminal (L: blue with white tube wire terminal, R: yellow with white tube wire terminal) of the 4-pole coupler intermittently.

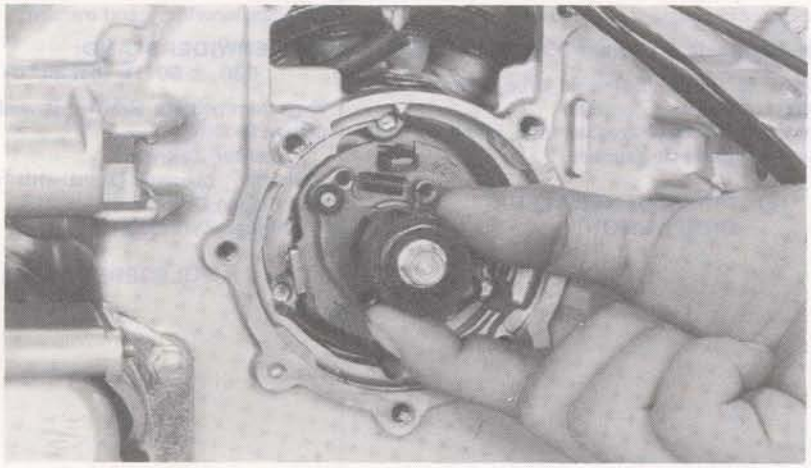
The transistor unit is normal if the voltage indicated by the voltmeter changes from 12V to 0V in each test.

SPARK ADVANCER

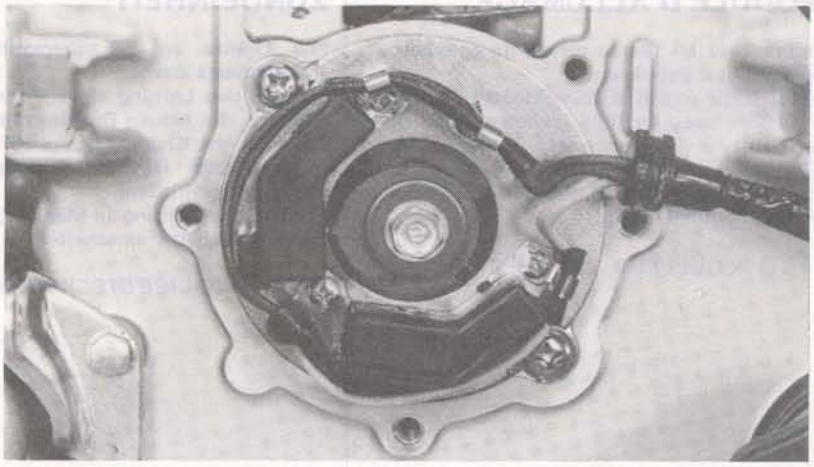
Remove the pulse generator (Page 8-3).
Check the mechanical advancer cam for sticking. Lubricate thé sliding surfaces, and check the spring for loss of tension and advancer pin for excessive wear.

NOTE

Align the rotor tooth with the cut-out of the advancer when assembling.



Install the spark advancer.
Install the pulse generator and adjust the ignition timing (Page 8-10).

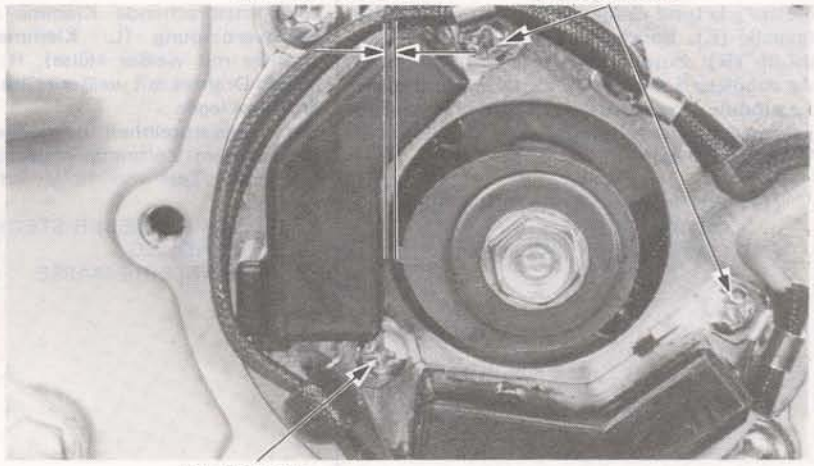


PULSE GENERATOR AIR GAP ADJUSTMENT

Measure the air gaps between the pulse generators and the rotor tooth.

AIR GAP: 0.45—0.65 mm (0.018—0.026in)

When adjustment is necessary, loosen the pulse generator coil attaching screws and move the coil to achieve the correct gap.
Recheck the ignition timing.



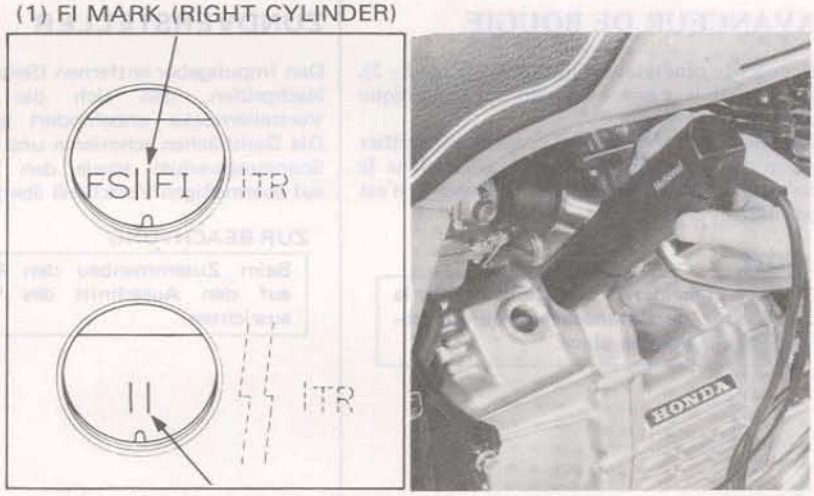
IGNITION TIMING CHECK

Remove the timing hole cap and install the timing inspection plug.
Connect atiming light to the right cylinder.
Connect a tachometer.
Start the engine and check the ignition timing:

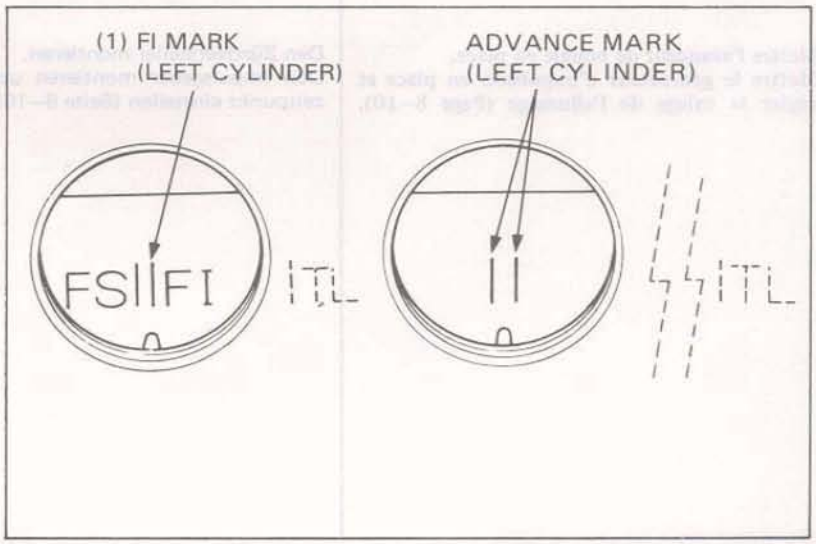
At 1,100 ± 100 rpm:
The index mark should be aligned with the FI mark.

At 1,500 ± 100 rpm:
Timing advance should start.

At 3,000 ± 150 rpm:
Timing advance should cease.
The index mark should be between the full advance marks.



Check the left cylinder using the FI mark and the full advance marks.



STARTER SYSTEM

ANLASSERSYSTEM

DEMARREUR

ARRANCADOR

(1) BOBINAGE INDUCTEUR
(2) BALAIS
(3) MOTEUR DE DEMARRAGE
(4) INDUIT
(5) ELECTRO-AIMANT D'EXCITATION
(6) ROUGE
(7) INTERRUPTEUR DE DEMARREUR
(8) FUSIBLE 20 A
(9) ROUGE
(10) INTERRUPTEUR MAGNETIQUE DE DEMARREUR
(11) JAUNE/ROUGE
(12) BOBINE DE RELAIS
(13) NOIR
(14) COMMUTATEUR PRINCIPAL
(15) BATTERIE
(16) VERT/ROUGE
(17) DIODE
(18) VERT/ROUGE
(19) VERT
(20) CONTACTEUR D'EMBRAYAGE
(21) CONTACTEUR DE POINT-MORT
(22) VERT CLAIR/ROUGE
(23) TEMOIN DE POINT-MORT

(1) FELDSPULE
(2) BÜRSTEN
(3) ANLASSERMOTOR
(4) ANKER
(5) FELDMAGNET
(6) ROT
(7) ANLASSERSCHALTER
(8) SICHERUNG 20 A
(9) ROT
(10) ANLASSER-MAGNETSCHALTER
(11) GELB/ROT
(12) RELAISSPULE
(13) SCHWARZ
(14) HAUPTSCHALTER
(15) BATTERIE
(16) GRÜN/ROT
(17) DIODE
(18) GRÜN/ROT
(19) GRÜN
(20) KUPPLUNGSSCHALTER
(21) LEERLAUFSCHALTER
(22) HELLGRÜN/ROT
(23) LEERLAUFLAMPE

(1) CAMPO DE LA BOBINA
(2) ESCOBILLAS
(3) MOTOR DE ARRANQUE
(4) ARMADURA
(5) CAMPO DEL IMAN
(6) ROJO
(7) INTERRUPTOR DE ARRANQUE
(8) FUSIBLE 20/A
(9) ROJO
(10) INTERRUPTOR MAGNETICO DEL ARRANQUE
(11) AMARILLO/ROJO
(12) BOBINA RELE
(13) NEGRO
(14) INTERRUPTOR PRINCIPAL
(15) BATERIA
(16) VERDE/ROJO
(17) DIODO
(18) VERDE/ROJO
(19) VERDE
(20) INTERRUPTOR DEL EMBRAGUE
(21) INTERRUPTOR DE NEUTRAL
(22) LUCES VERDE/ROJA
(23) LAMPARA DE NEUTRAL

SERVICE INFORMATION	18—1
TROUBLESHOOTING	18—1
STARTER MOTOR	18—2
RELAY SWITCH	18—4
SILICONE RECTIFIER	18—4

SERVICE INFORMATION

GENERAL INSTRUCTIONS

The starter motor can be removed with the engine in the frame. Starter clutch repairs (Page 8-6).

SPECIFICATIONS

		Standard	Service Limit
Starter motor	Brush spring tension	495—605 g	400 g
	Brush length	11.0—12.5 mm (0.43—0.49 in)	5.5 mm (0.21 in)

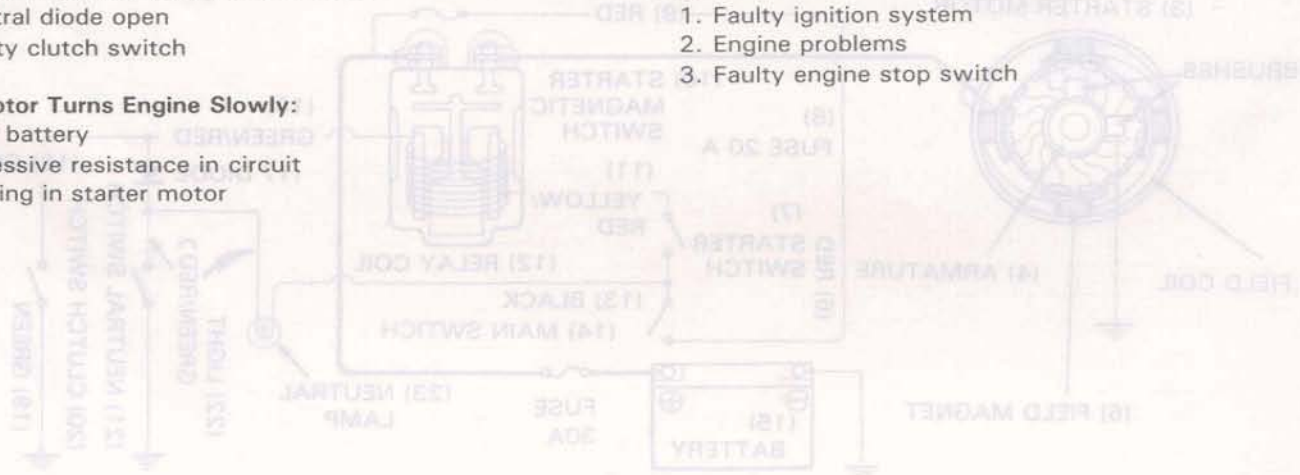
TROUBLESHOOTING

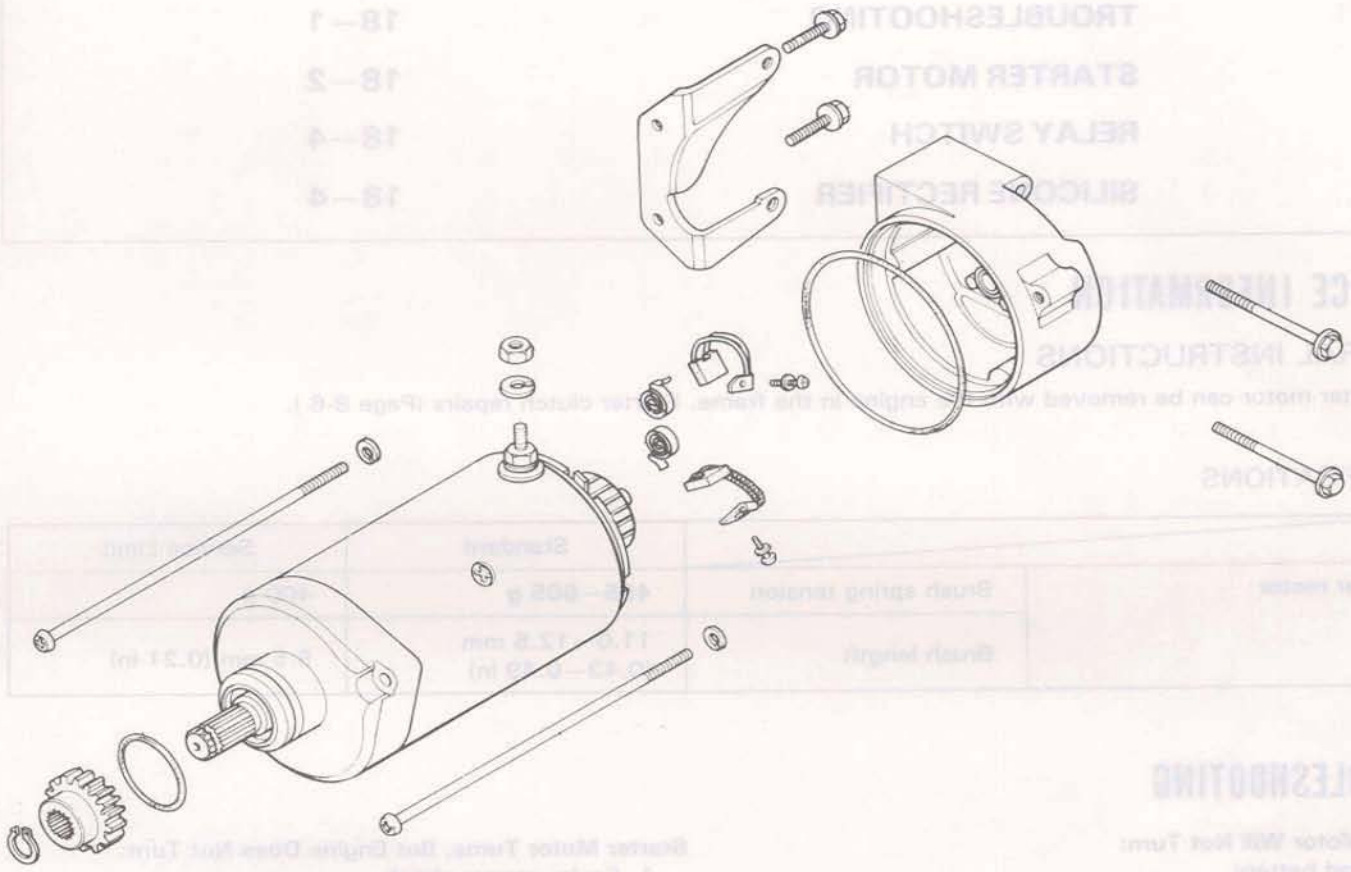
Starter Motor Will Not Turn:
1. Dead battery
2. Faulty ignition switch
3. Faulty starter switch
4. Faulty neutral switch
5. Faulty starter relay switch
6. Loose or disconnected wire or cable
7. Neutral diode open
8. Faulty clutch switch

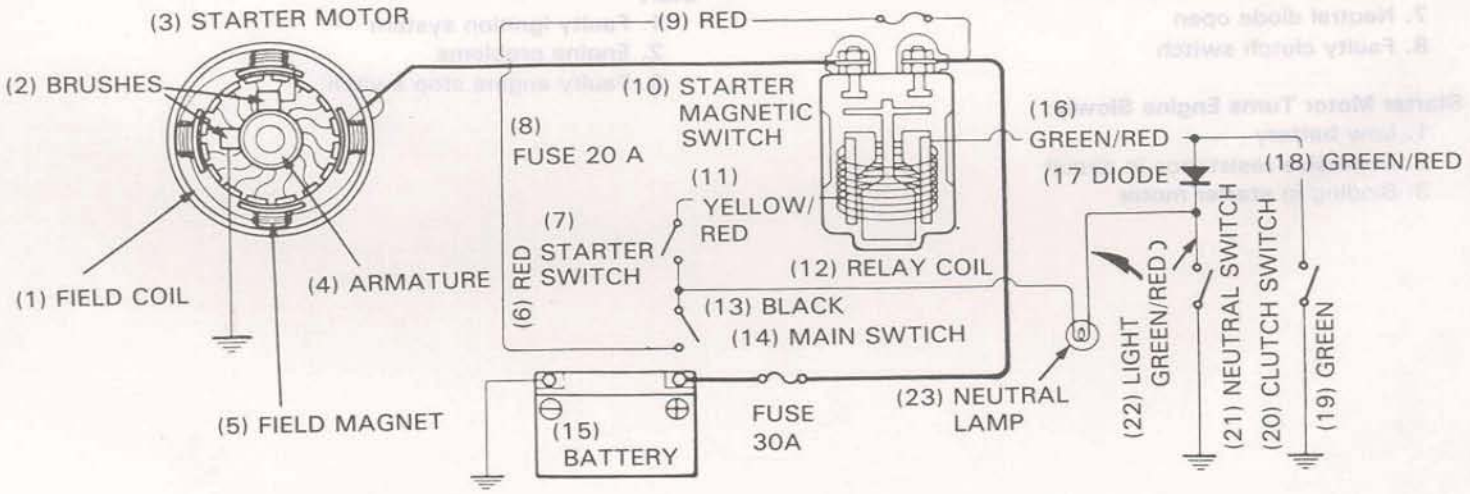
Starter Motor Turns Engine Slowly:
1. Low battery
2. Excessive resistance in circuit
3. Binding in starter motor

Starter Motor Turns, But Engine Does Not Turn:
1. Faulty starter clutch
2. Faulty starter motor gears
3. Faulty starter motor or idle gear

Starter Motor and Engine Turn, But Engine Does Not Start
1. Faulty ignition system
2. Engine problems
3. Faulty engine stop switch






(3) STARTER MOTOR
(2) BRUSHES
(1) FIELD COIL
(4) ARMATURE
(5) FIELD MAGNET
(9) RED
(10) STARTER MAGNETIC SWITCH
(8) FUSE 20 A
(11) YELLOW/ RED
(7) STARTER SWITCH
(6) RED
(12) RELAY COIL
(13) BLACK
(14) MAIN SWTICH
(15) BATTERY
FUSE 30A
(16) GREEN/RED
(17 DIODE
(18) GREEN/RED
(22) LIGHT GREEN/RED
(21) NEUTRAL SWITCH
(20) CLUTCH SWITCH
(19) GREEN
(23) NEUTRAL LAMP

18

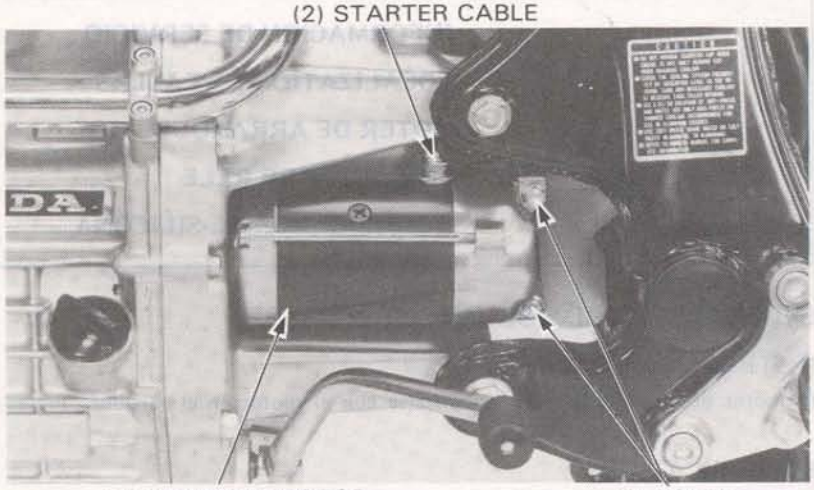
STARTER MOTOR

REMOVAL

WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

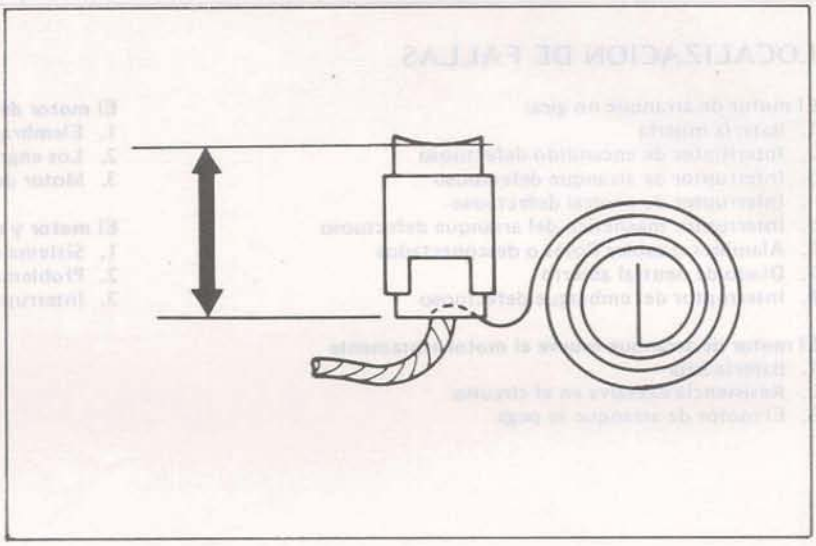
Remove the starter mounting bolts and pull the motor out of the engine case.
Disconnect the starter cable.



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: 5.5 mm (0.21 in)
Brush spring tension: 400 g



COMMUTATOR INSPECTION

Remove the case.

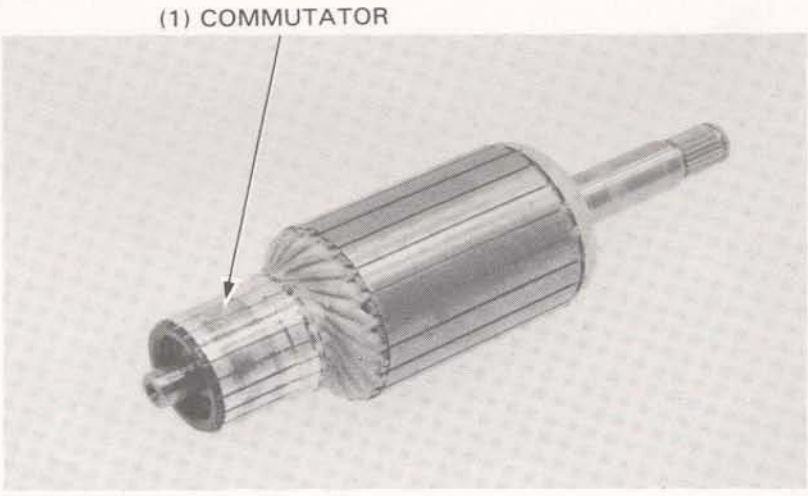
NOTE

Record the location and number of the thrust washers.

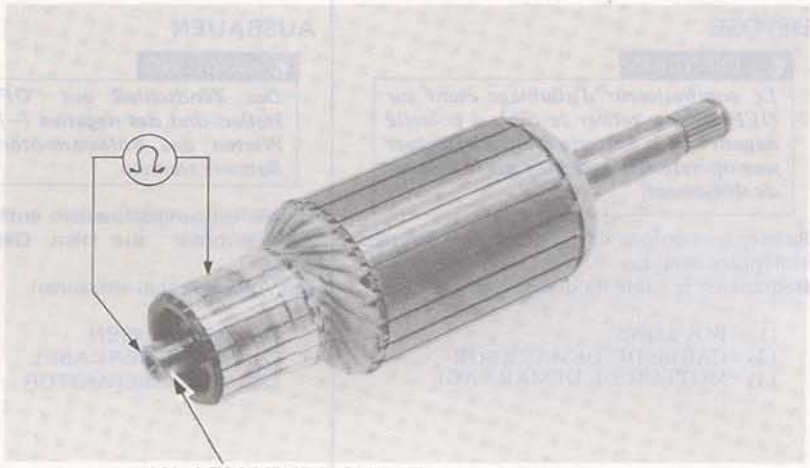
Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils.

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 starter motor if armature coils are open, or shorted to armature shaft.

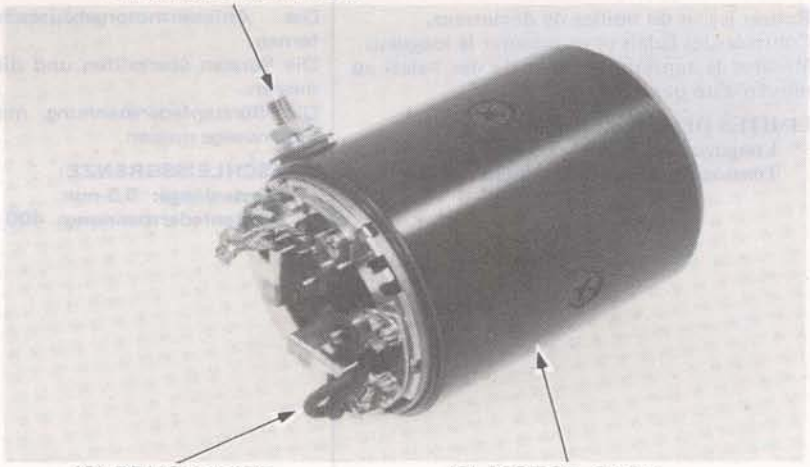


(1) ARMATURE SHAFT

FIELD COIL INSPECITON

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.

CABLE TERMINAL-MOTOR CASE
NO CONTINUITY: NORMAL
CABLE TERMINAL-BRUSH WIRE
CONTINUITY: NORMAL



(1) CABLE TERMINAL
(2) BRUSH WIRE
(3) MOTOR CASE

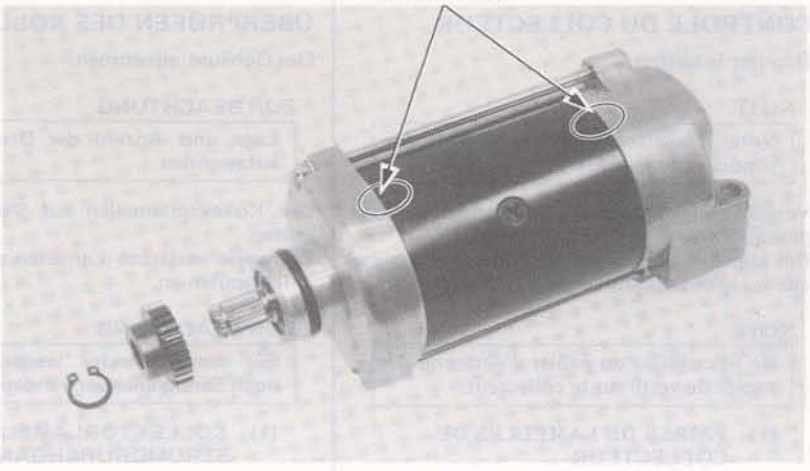
ASSEMBLY/INSTALLATION

Assemble the starter motor.

NOTE

Aligh the punch mark on the case to the punch mark on the cover.

Connect the starter motor cable.
Install the starter motor on the engine.



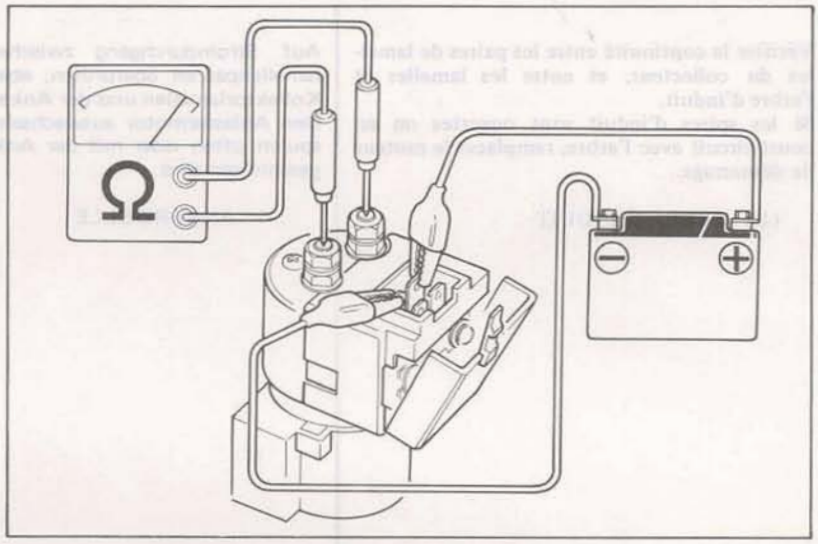
(1) MARKS

RELAY SWITCH

INSPECTION

To test if the switch primary coil is normal, depress the switch button. The coil is normal if the switch clicks into position.

Connect an ohmmeter and 12V battery to the starter relay switch as shwon.
The switch is normal if there is continuity.



SILICONE RECTIFIER

INSPECTION

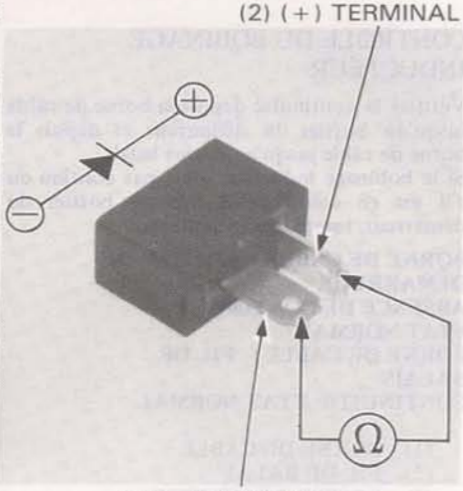
Remove the left side cover and remove the silicone rectifier from the wire harness. Check for continuity with an ohmmeter.

NORMAL DIRECTION: CONTINUITY
- ⊕ probe: Light green/Red (+)
- ⊖ probe: Green/Red (−)

REVERSE DIRECTION: NO CONTINUITY
- ⊕ probe: Green/Red (−)
- ⊖ probe: Light green/Red (+)

NOTE

The test chart is for a positive ground ohmmeter. The test results will be reversed if a negative ground ohmmeter is used.



SERVICE INFORMATION	19—1	HANDLEBAR SWITCHES	19—4
BULB REPLACEMENT	19—2	CLUTCH SWITCH	19—6
OIL PRESSURE WARNING SWITCH	19—3	IGNITION SWITCH	19—6
BRAKELIGHT SWITCHES	19—3	TEMPERATURE GAUGE	19—8
NEUTRAL SWITCH	19—3	FUEL GAUGE	19—9

SERVICE INFORMATION

GENERAL INSTRUCTIONS

- 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 used 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 ussally 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.
- Do not turn the ignition switch ON once the fuel tank is removed to prevent fuel from squirting out of the fuel line.

BULB REPLACEMENT

HEADLIGHT

Remove the headlight (Section 13).
Remove the bulb cover and headlight bulb.

CAUTION

Wear clean gloves when installing the halogen bulb. If you touch the bulb with your bare hands, clean it with a cloth moistended with alcohol to prevent its early failure.

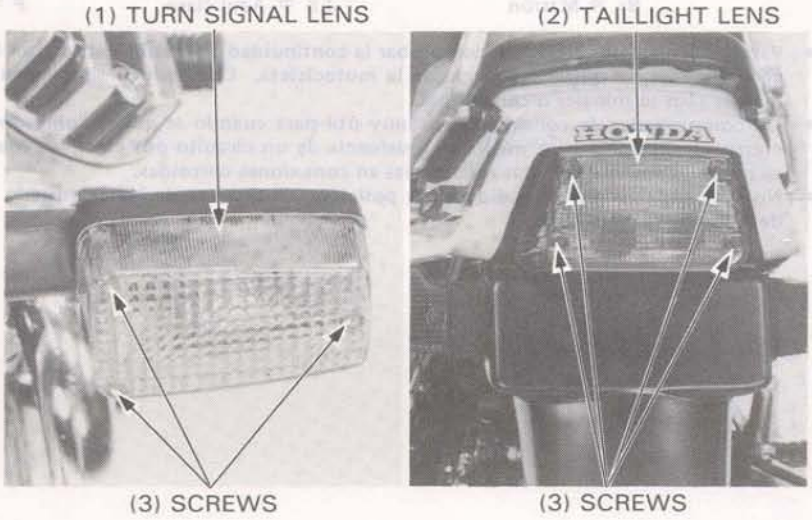
Install in reverse order of removal.

TURN SIGNAL AND TAILLIGHT

Remove the lens to remove the bulb.

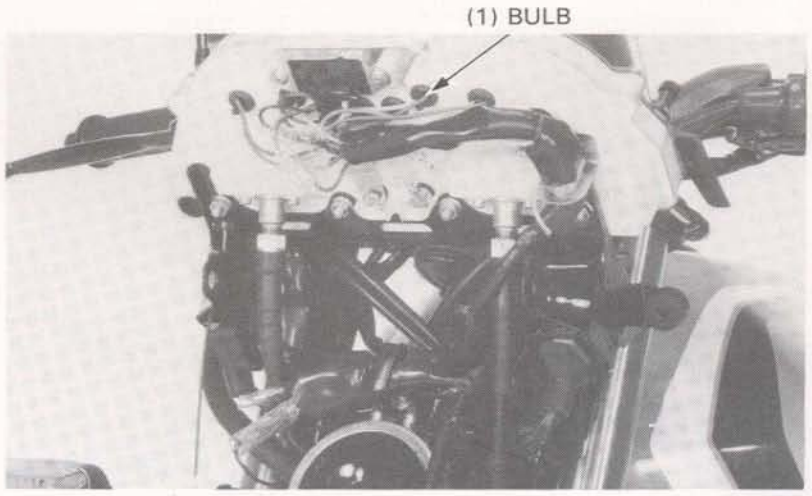
CAUTION

Do not overtighten the lens mounting screws to prevent cracking the lens.



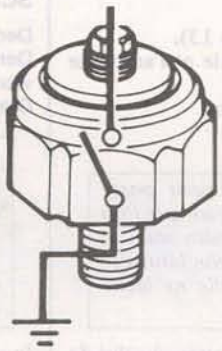
INSTRUMENT BULB

Open the headlight cover and remove the headlight.
Reaching from behind the instrument panel, remove the bulb.



OIL PRESSURE WARNING SWITCH

Check for continuity while applying pressure to the switch.
Continuity: Below 20 kPa (0.2 kg/cm², 2.8 psi)
No continuity: Above 20—40 kPa
(0.2—0.4 kg/cm², 2.8—5.6 psi)
Replace the switch if necessary.
Apply a liquid sealant to the switch threads.



BRAKELIGHT SWITCHES

Check the rear brakelight switch for continuity with the rear brake applied.

Check the front brakelight switch for continuity with the front brake applied.

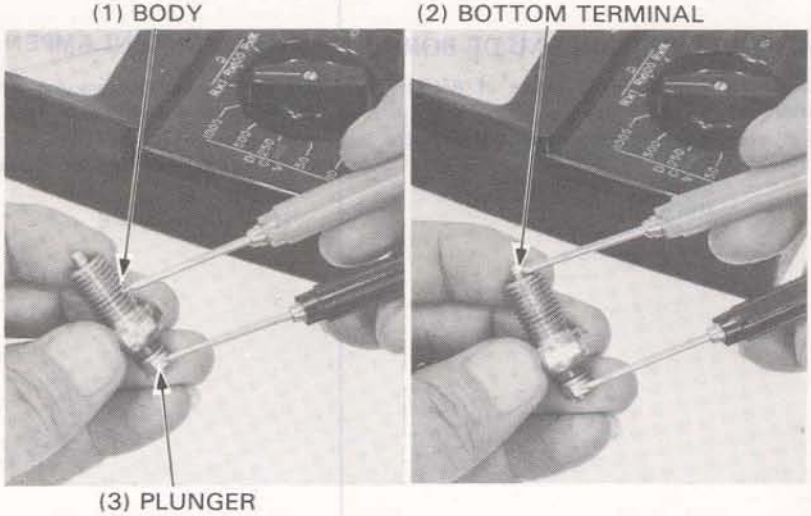
Replace the switches if necessary.

(3) BRAKE APPLIED: CONTINUITY
(4) BRAKE NOT APPLIED: NO CONTINUITY

NEUTRAL SWITCH

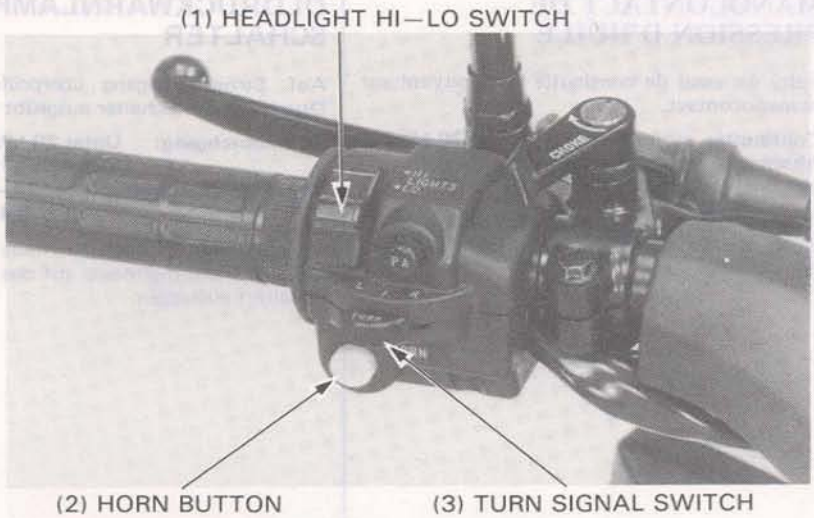
NOTE
Refer to page 8-4, for neutral switch removal.

Check the neutral switch for continuity between the top and bottom terminals. The switch is normal if there is continuity.
Check for shorts between the top terminal and body ground. Replace the switch if there is continuity.
Inspect the neutral switch wire.



HANDLEBAR SWITCHES

The handlebar cluster switches (lights, turn signals, horn) must be repalced 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	Hi	Lo
Hi	○	○	
(N)	○	○	○
Lo	○		○
Code color	Bu/W	Bu	W

TURN SIGNAL SWITCH

LEFT: Gr to O
OFF: No continuity
RIGHT: Gr to Lb

Turn Signal Switch

	W	L	R
LEFT	○	○	
OFF			
RIGHT	○		○
Code color	Gr	O	Lb

HORN BUTTON

Bl to G with button depressed.
No continuity with button released.

Horn Button

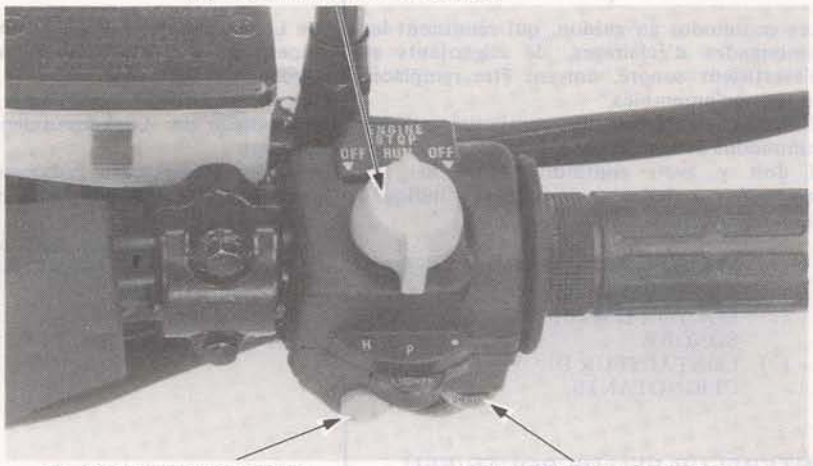
	Ho	E
	○	○
Code color	Bl	G

LIGHTING SWITCH

OFF: No continuity
P: Br/Bu to Br/W
HL: Br/Bu to Br/W, Bl/R to Bu/W

	BAT4	TL	BAT3	HL
• (OFF)				
P	○	○		
HL	○	○	○	○
Code color	Br/Bu	Br/W	Bl/R	Bu/W

(1) ENGIEN STOP SWITCH



(2) STARTER BUTTON

(3) LIGHTING SWITCH

STARTER BUTTON

Bl to Y/R with button depressed.

Starter Button

	BAT2	ST
FREE		
START	○	○
Code color	Bl	Y/R

ENGINE STOP SWITCH

RUN: Bl to Bl/W
OFF: No continuity

	BAT2	IG2
OFF		
RUN	○	○
OFF		
Code color	Bl	Y/R

CLUTCH SWITCH

(1) CLUTCH SWITCH

Check continuity of the clutch lever (safety) switch with the clutch released and aplied.
Replace if necessary.
CLUTCH APPLIED: CONTINUITY
CLUTCH RELEASES: NO CONTINUITY

REMOVAL

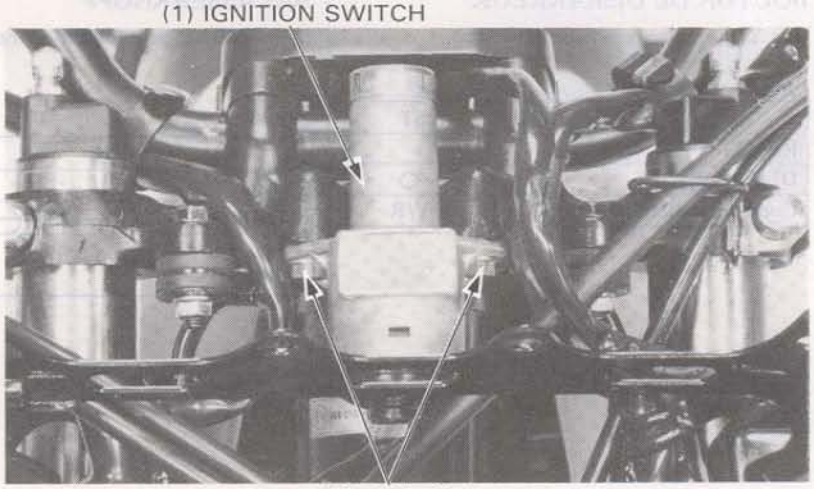
Unplug the wires and remove the clutch lever and cable.
Remove the switch.

NOTE

The switch case has a small protrusion that must point toward the handlebar when installed.

IGNITION SWITCH

(1) IGNITION SWITCH



(2) BOLTS

Remove the headlight and instrument (Page 13-3).
Disconnect the coupler and remove the ignition switch.

NOTE

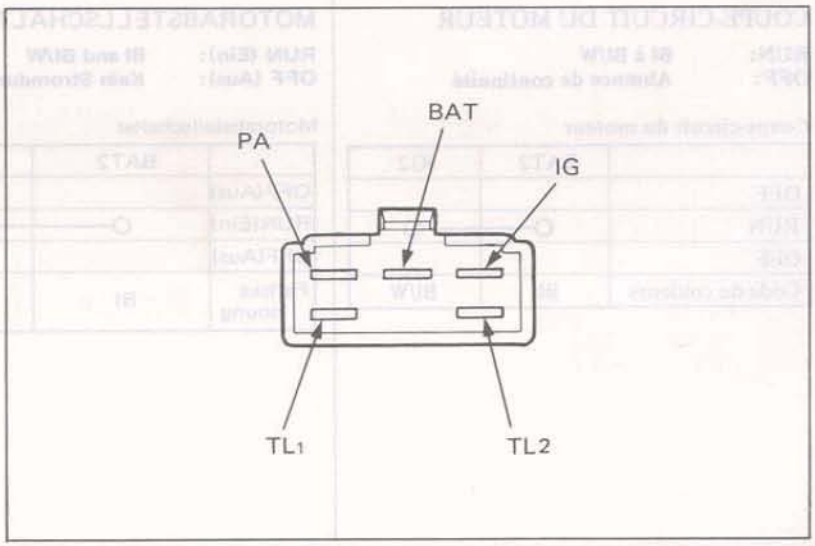
Identify the wire colors at the connector.
There are no colors on the switch.

Check continuity of terminals on the ignition switch in each switch position.

SWITCH POSITINO

ON: **BAT to IG, TL1 to TL2**
OFF: **No continuity**
P. LOCK: **BAT to PA**
LOCK: **No continuity**

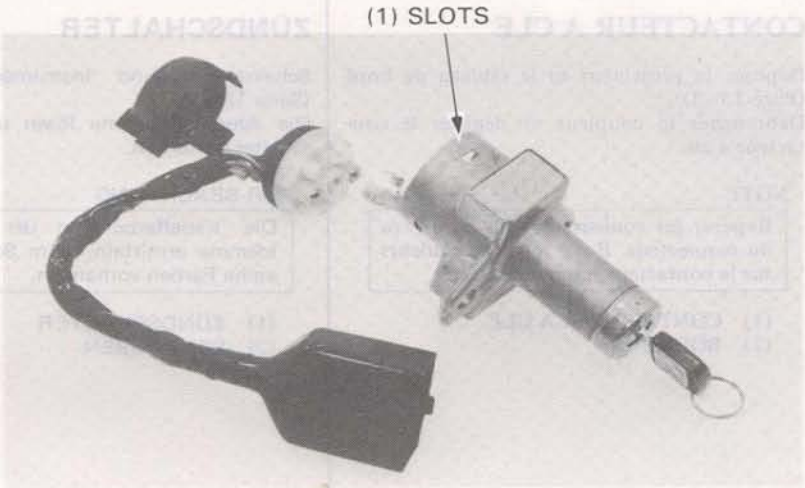
CODE	PA	BAT	IG	TL1	TL2
ON		O——O		O——O	
OFF					
P. LOCK	O——O				
LOCK					
Code color	Br	R	Bl	Br/W	Br



IGNITION SWITCH DISASSEMBLY

Insert the key and position it in the middle of "ON" and "OFF" position.

Push the lugs from the slots and reverse the contact bast.



TEMPERATURE GAUGE

TEMPERATURE GAUGE INSPECTION

Connect a tested sensor and instrument as shown to the gauge to be tested.

CAUTION:

The temperature gauge operates on 7 volts. Do not apply 12 volts directly to the gauge.

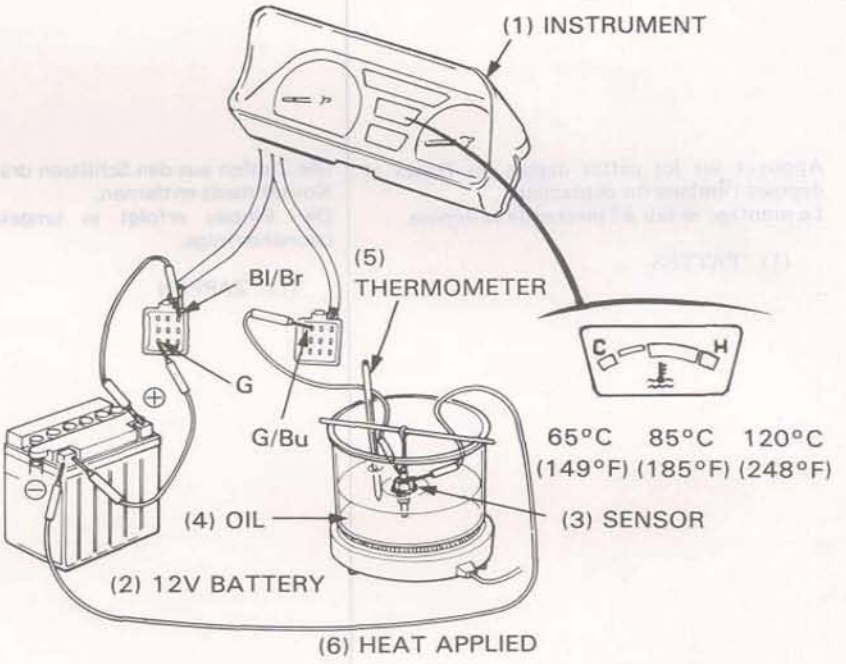
Suspend the sensor in a pan of oil.

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.

NOTE

Refer to page 9-4 for temperature unit inspection.

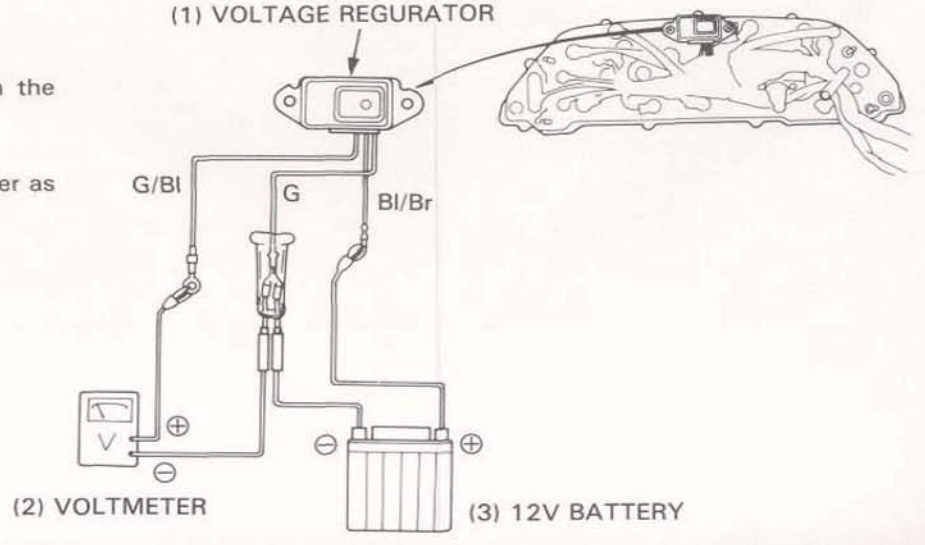


AUXILIARY VOLTAGE REGULATOR INSPECTION

Remove the auxiliary voltage regulator from the rear of the instrument.

Test the regulator with a battery and voltmeter as shown.

Regulator output voltage shoulds be 7 Volts.



FUEL GAUGE

NOTE

The fuel gauge operates on 7 volts. Do not apply 12 volts directly to the gauge.

FUNCTION TEST

Place the motorcycle on its center stand.
Remove the seat and fuel tank.

Remove the fuel valve. Replace the fuel tank upside down to drain the remaining fuel thoroughly.

Refer to page 4-14, for removal of the fuel valve.

WARNING

Keep gasoline away from open flames or sparks. Wipe up spilled gasoline at once.

Reinstall the fuel valve and fill the fuel tank with the specified amount of fuel, making sure that the gauge pointer registers properly.

Position	RES	1/2	F
Amount	6 lit US gal Imp gal	10.5 lit US gal Imp gal	16 lit US gal Imp gal

Remove the headlight and disconnect the instrument coupler and code.

NOTE

The fuel gauge operates on 7 volts. Do not apply 12 volts directly to the gauge.

Measure the resistances between the Y/W code and G terminals using a taster as shown.

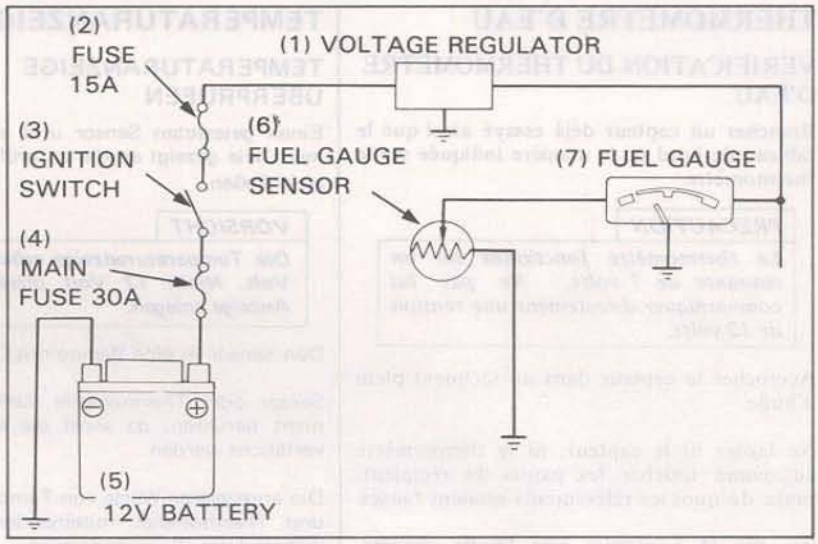
Position	RES	1/2	F
Resistance	9.5—100Ω	31.5Ω	4—10Ω

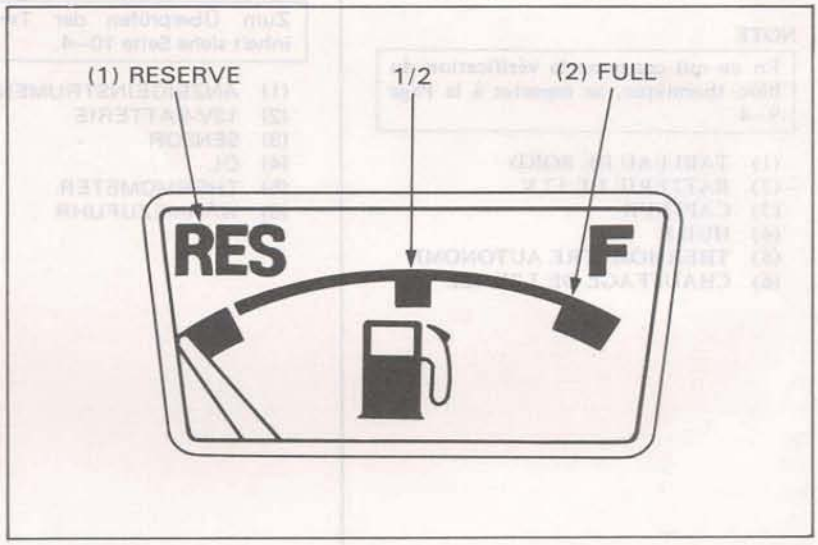
NOTE

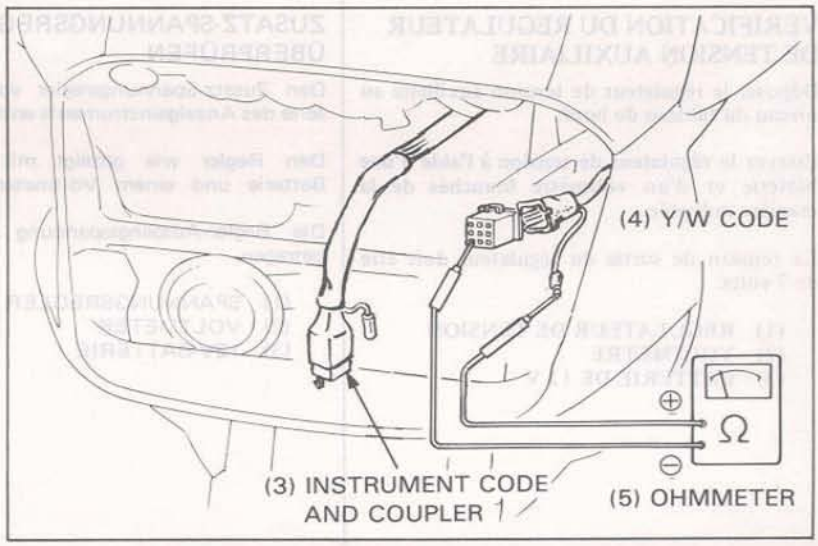
- Connect the instrument couplers and turn ON the ignition switch before checking the pointer indications.
- Turn the ignition switch OFF before measuring the resistances.

Replace the fuel gauge as an assembly when the pointer indications are abnormal, even if the resistances are correct.

Remove the sensor and replace with a new one if the resistances are not correct.
Refer to Page 4-14 for removal of the fuel gauge sensor.







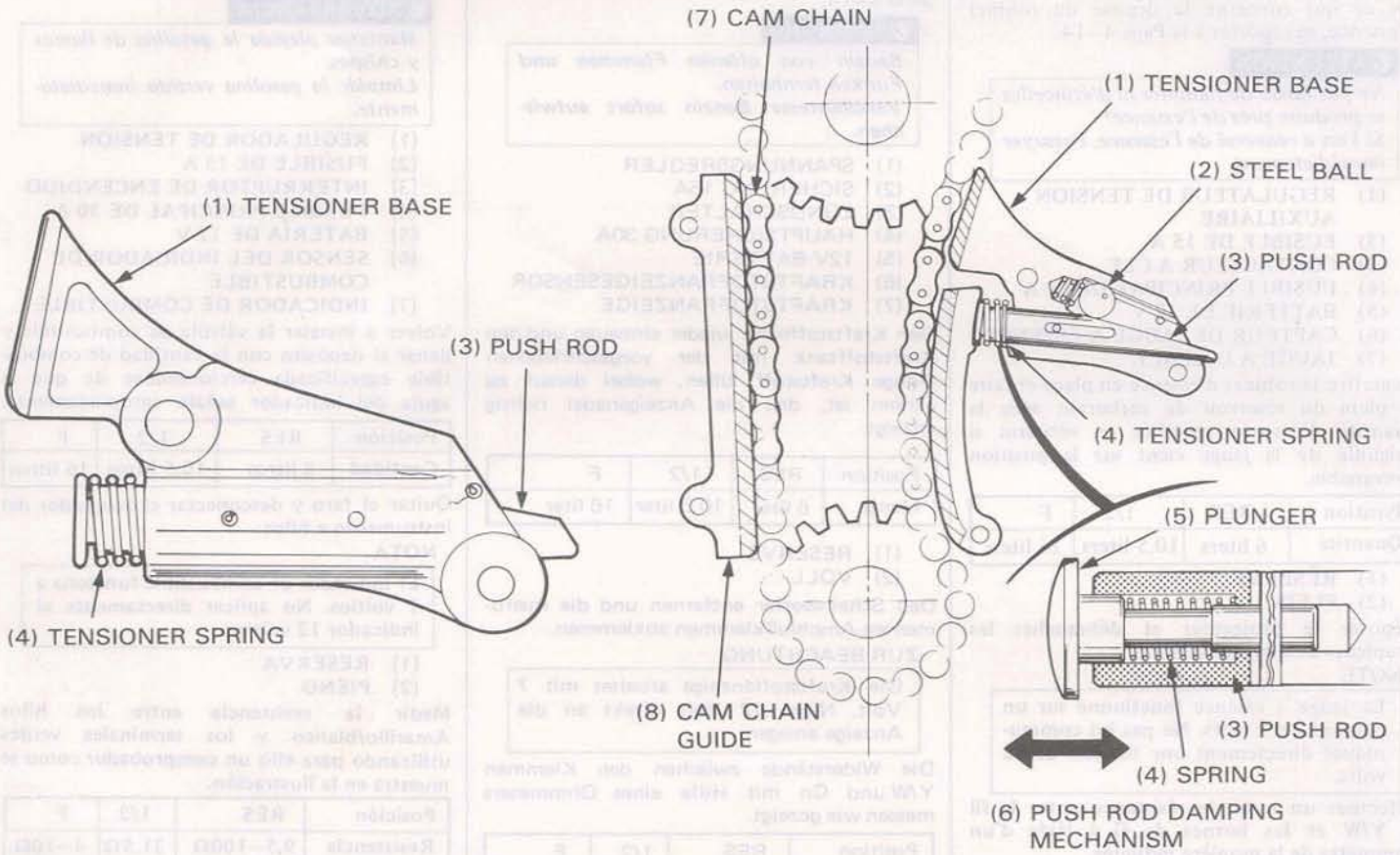
AUTOMATIC CAM CHAIN TENSIONER

GENERAL

This motorcycle is equipped with an automatic cam chain tensioner to compensate for chain wear, eliminating periodic adjustment and maintenance service.

CONSTRUCTION

The unit consists of a spring-loaded steel ball and push rod having a damper at its end. The damper is comprised of a plunger that is also spring loaded within the push rod as shown.



OPERATION

1. A push rod is placed between the chain guide and a steel ball. The steel ball is held against the wedge end of the push rod, keeping the push rod from being pushed back by the chain guide.
   The damper absorbs minor chain lash when the cam chain is driven by the sprockets.

2. As the chain slackens, the steel ball forces the push rod towards the chain guide until an equilibrium is reached between it and the chain guide, causing the tensioner to adjust itself to take up any cam chain.

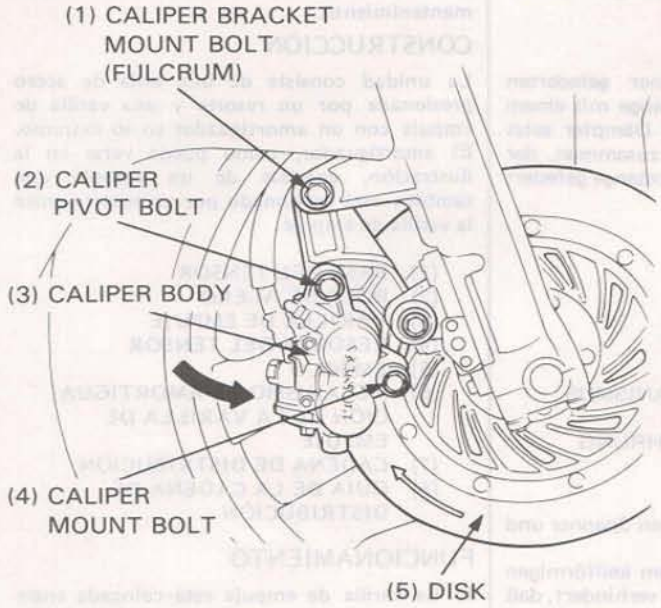
FEATURE

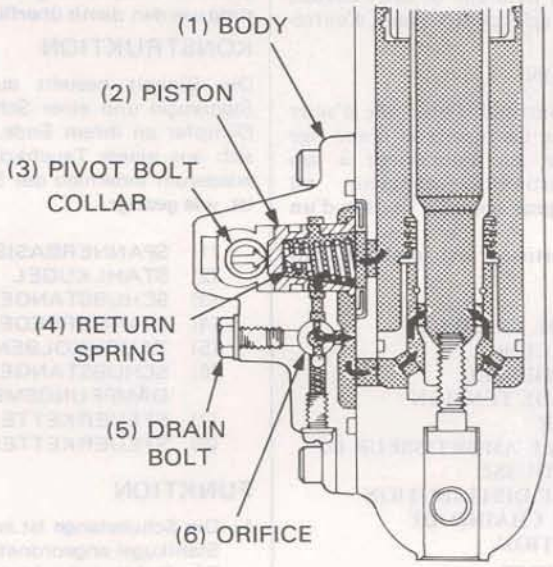
Need for least possible pressure on the cam chain contributes to longer life of the cam chain.

ANTI-DIVE FRONT SUSPENSION

GENERAL

This motorcycle has an anti-dive front suspension system with four-way adjustability to provide the desired ride under various braking conditins. The system consists of a piston, return spring, oil control orifice and body.



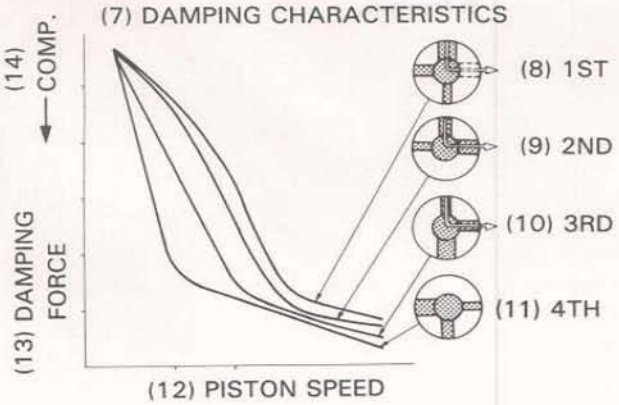


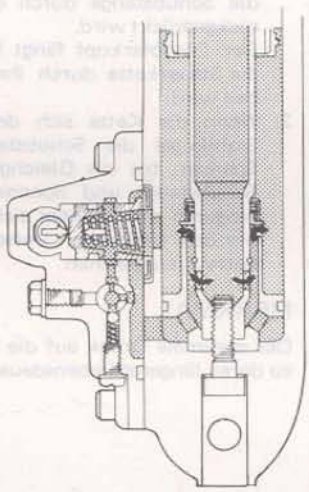
OPERATION

When the motorcycle is slowed or stopped, the brake disc is squeezed by the brake pads, causing the brake caliper to pivot on its bracket mounting bolt.

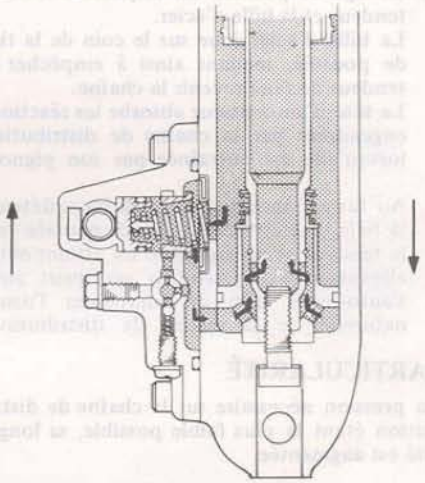
This movement causes the pivot bolt to push the piston in, uncovering the oil control orifice.

Since the orifice has four oil passages of different diameters, the desired damping can be selected by truning it. Always adjust the right and left to the same position.





(15) REBOUND



(16) COMPRESSION

Front Suspension Adjustment Chart

POSITION	DAMPING EFFECT
1	SOFT
2	STANDARD
3	FIRM
4	EXTRA FIRM

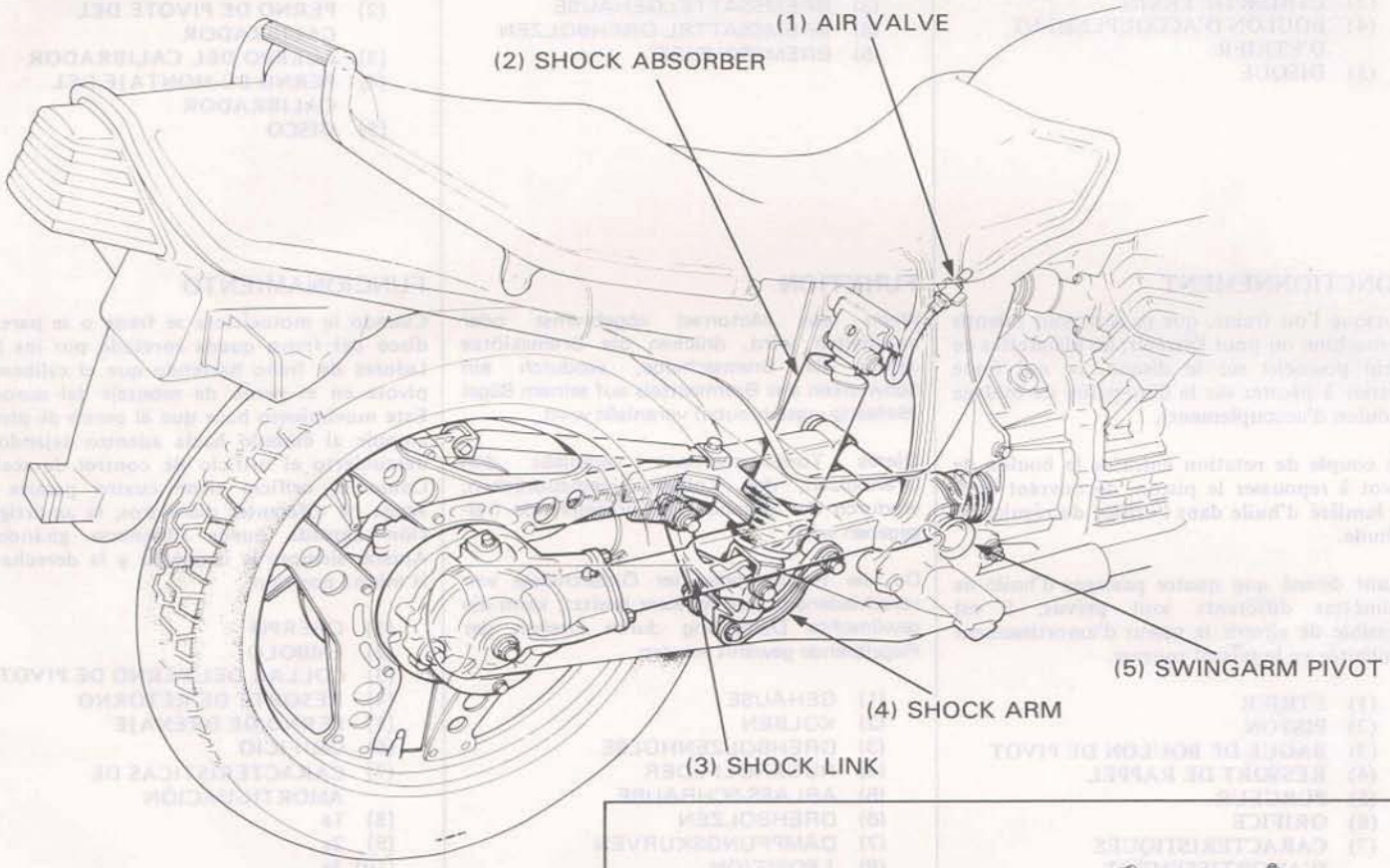
PRO-LINK REAR SUSPENSION

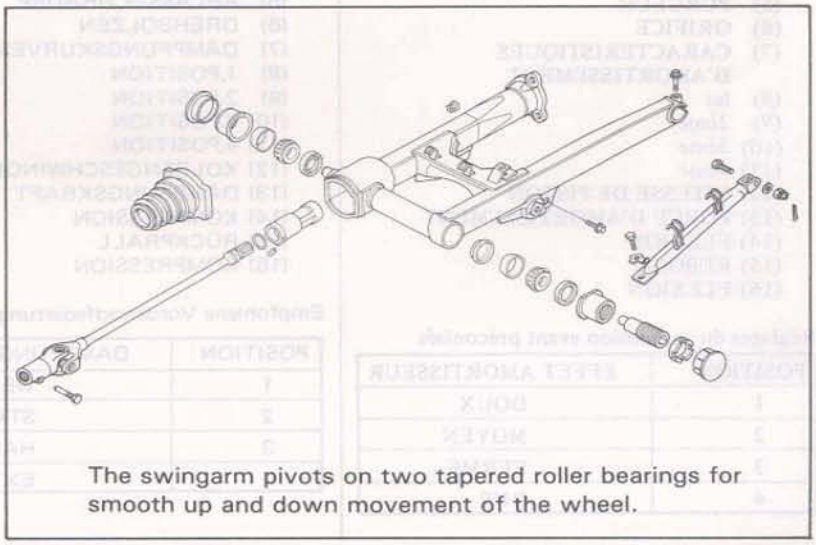
GENERAL

The Pro-Link suspension system is a single shock absorber connected to the swingarm and the lower frame with a shock arm and shock link. The shock absorber and linkage are located in front of the rear tire.

The carefully designed pivoting shock arm and shock link, combined with the shock's matched spring and damping rates, provide what is known as a "progressively rising rate" suspension. This provides relatively soft springing and damping during initial wheel travel and increasing spring and damping rates to meet increasing wheel travel with greater resistance.

This "progressively rising rate" enables the rear wheel to transfer more power to the ground, giving the rider greater comfort as well as the best possible control over rough roads.



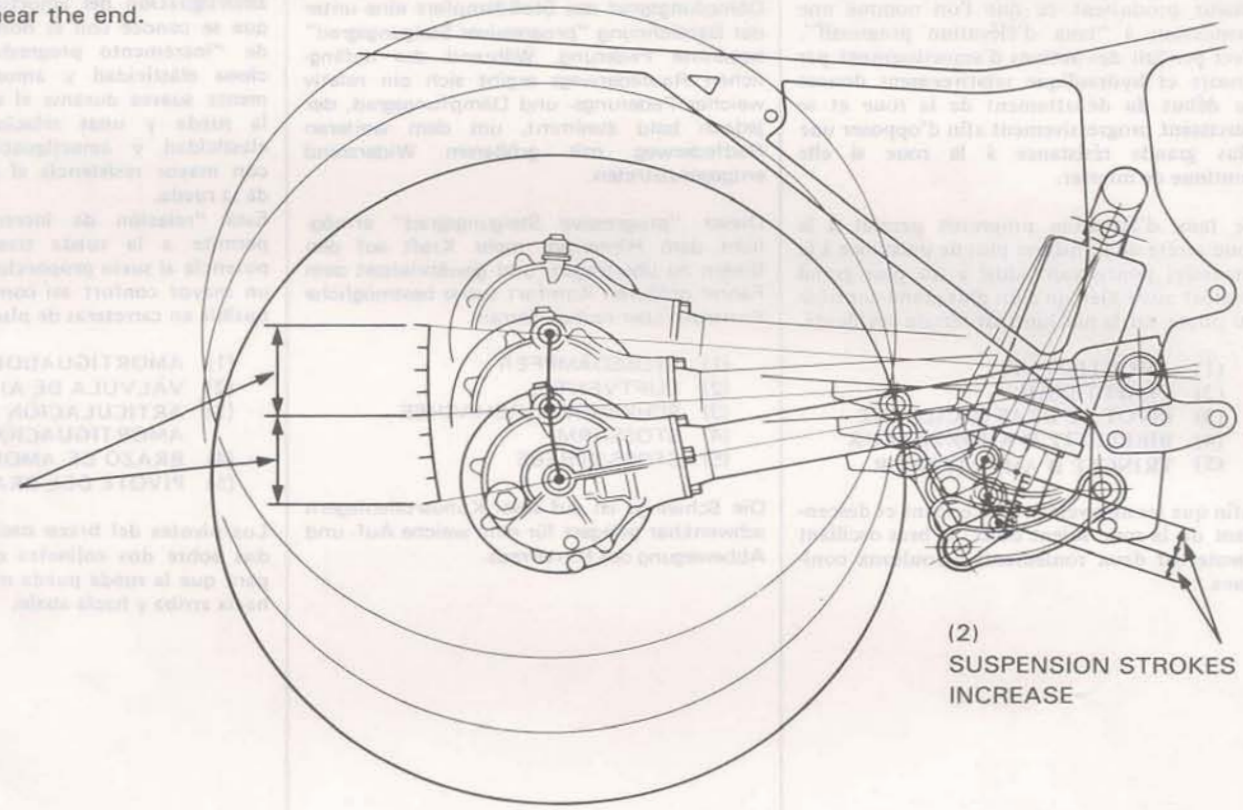


The swingarm pivots on two tapered roller bearings for smooth up and down movement of the wheel.

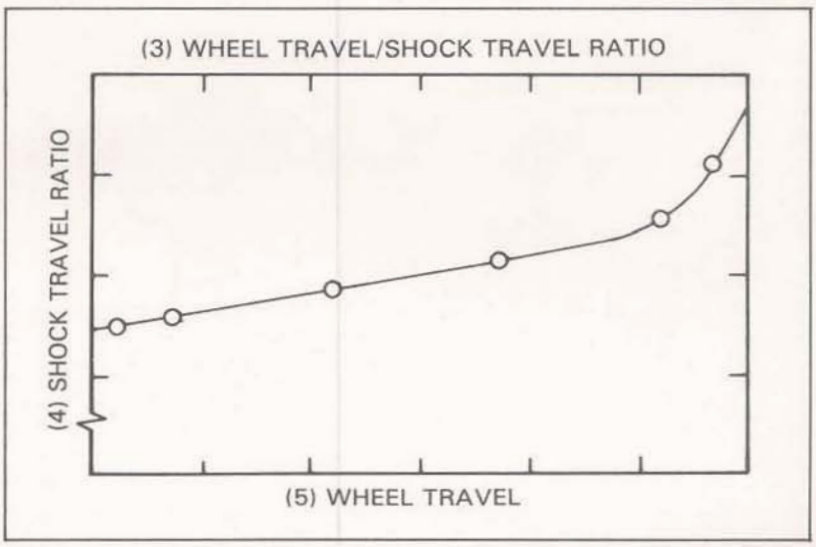
OPERATION

As the wheel and swingarm are driven up by bumps, the shock absorber is compressed by the shock arm which is held in a precise are by the shock link. As wheel travel increases the shock arm rises above the swingarm proportionately increasing absorber compression (more shock rod travel per unit of rear wheel travel.).

This provides the progressive rise rate; the shock absorber moves only about one-fourth of wheel travel at the beginning and moves about one-third of wheel travel near the end.



This graph shows the wheel travel/shock travel ratio through the entire stroke of a CX400 • 500 SPORTS Pro-Link system.



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 tube or fuel filter (3) Sticking float valve (4) Clogged fuel tank cap breather hole (5) Faulty fuel valve diaphragm (6) Clogged fuel valve vacuum and air vent tube.
REACHING CARBURETOR ↓		
2. Perform spark test	WEAK OR NO SPARK →	(1) Faulty spark plugs (2) Fouled spark plugs (3) Faulty spark unit (4) Broken or shorted high tension wires (5) Broken or shorted ignition coil (6) Faulty ignition switch (7) Faulty pulse generator (8) Low battery charge
GOOD SPARK ↓		
3. Test cylinder compresion	LOW COMPRESSION →	(1) Improper valve clearance (2) Valve stuck open (3) Worn cylinder and pistion rings (4) Damnaged cylinder head gasket (5) Seized valve (6) Improper valve timing
COMPRESSION NORMAL ↓		
4. Start by following normal procedure	ENGINE FIRES BUT STOPS →	(1) Improper choke operation (2) Carburetor incorrectly adjusted (3) Intake pipe leaking (4) Improper ignition timing (Spark unit or pulse generator) (5) Incorrect fast idle (6) Fuel contaminated
ENGINE DOES NOT FIRE ↓		
5. Remove and inspect spark plug	WET PLUG →	(1) Carburetor flooded (2) Choke closed (3) Throttle valve open (4) Air cleaner dirty

ENGINE LACKS POWER

		POSSIBLE CAUSE
1. Raise wheels off ground and spin by hand	WHEELS DO NOT SPIN FREELY →	(1) Brake dragging (2) Worn or damaged wheel bearings (3) Wheel bearing needs lubrication (4) Final gear bearing damaged
WHEEL SPINS FREELY		
2. Check tire pressure	PRESSURE LOW →	(1) Punctured tire (2) Faulty tire valve
PRESSURE NORMAL		
3. Accelerate rapidly from low to second	ENGINE SPEED CHANGED WHEN CLUTCH IS RELEASED →	(1) Clutch slipping (2) Worn clutch disc/plate (3) Warped clutch disc/plate
ENGINE SPEED LOWERED WHEN CLUTCH IS RELEASED		
4. Accelerate lightly	ENGINE SPEED DOES NOT INCREASED →	(1) Carburetor choke closed (2) Clogged air cleaner (3) Restricted fuel flow (4) Clogged fuel tank breather tube (5) Clogged muffler
ENGINE SPEED INCREASES		
5. Check ignition timing	INCORRECT →	(1) Faulty spark unit (2) Faulty pulse generator (3) Faulty ignition advancer
CORRECT		
6. Check valve clearance	INCORRECT →	(1) Improper valve adjustment (2) Worn valve seat
CORRECT		
7. Test cylinder compression	TOO LOW →	(1) Valve stuck open (2) Worn cylinder and piston rings (3) Leaking head gasket (4) Improper valve timing
NORMAL		
8. Check carburetor for clogging	CLOGGED →	(1) Carburetor not serviced frequently enough
NOT CLOGGED		
9. Remove spark plug	FOULED OR DISCOLORED →	(1) Plugs not serviced frequently enough (2) Spark plug with incorrect heat range
NOT FOULED OR DISCOLORED		

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10. Check oil level and condition	INCORRECT →	(1) Oil level too high (2) Oil level too low (3) Contaminated oil
CORRECT ↓		
11. Remove cylinder head cover and inspect lubrication	VALVE TRANS NOT LUBRICATED PROPERLY →	(1) Clogged oil passage (2) Clogged oil control orifice
VALVE TRAIN LUBRICATED PROPERLY ↓		
12. Check for engine overheating	OVERHEATING →	(1) Excessive carbon build-up in combustion chamber (2) Use of poor quality fuel (3) Clutch slipping
NOT OVERHEATING ↓		
13. Accelerate or run at high speed	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 (Faulty spark unit or advancer)
ENGINE DOES NOT KNOCK		

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		POSSIBLE CAUSE
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Improper ignition timing (Faulty spark unit or spark advancer)
CORRECT ↓		
2 Check carburetor pilot screw adjustment	INCORRECT →	See Fuel System Section
CORRECT ↓		
3. Check for leaking intake pipe	LEAKING →	(1) Deteriorated insulator O-ring (2) Loose carburetor (3) Damaged fuel valve vacuum tube
NO LEAK ↓		
4. Perform spark test	WEAK OR INTERMITTENT SPARK →	(1) Faulty, carbon or wet fouled spark plug (2) Faulty spark unit (3) Faulty ignition coil (4) Faulty spark advancer
GOOD SPARK		

POOR PERFORMANCE AT HIGH SPEED

		POSSIBLE CAUSE
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Faulty spark unit (3) Improper pulse generator air gap. (4) Faulty pulse generator (5) Faulty spark advancer
CORRECT ↓		
2. Disconnect fuel tube at carburetor and check for fuel flow	FUEL FLOW RESTRICTED →	(1) Lack of fuel in tank (2) Clogged fuel line (3) Clogged fuel tank breather hole (4) Clogged fuel strainer or fuel valve (5) Faulty fuel valve diaphragm (6) Clogged fuel valve vacuum tube or air vent tube
FUEL FLOWS FREELY ↓		
3. Remove carburetor and check for clogged jet	CLOGGED →	(1) Clean
NO CLOG ↓		
4. Check valve timing	INCORRECT →	(1) Cam sprocket not installed properly
CORRECT ↓		
5. Check valve spring tension	WEAK →	(1) Faulty spring
NOT WEAKENED		

POOR HANDLING → Check tire pressure

	POSSIBLE CAUSE
1. If steering is heavy →	(1) Steering top thread nut too tight (2) Damaged steering head bearings
2. If either wheel is wobbling →	(1) Excessive wheel bearing play (2) Distorted rim (3) Improperly installed wheel hub (4) Swingarm pivot bearing excessively worn (5) Distorted frame (6) Swingarm pivot adjusting bolt too tight
3. If the motorcycle pulls to one side →	(1) Bent frame (2) Front and rear wheels not aligned (3) Bent front fork tube of fork bridge (4) Bent swingarm