HONDA

CX650E

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

D

INTRODUCTION

This addendum contains information for the CX650E. Refer to the base shop manual "CX400·500 SPORTS SHOP MANUAL (NO. 66MC500)" and its subsequent addendum for service procedures and data not included in this addendum.

TABLE OF CONTENTS

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SOMMAIRE

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SOMMAIRE

1. GENERAL INFORMATION

SPECIFICATIONS

Item					Area (Type)
DIMENSIONS	Overall length			2,250 mm (88.6 in)	
	Overall width			760 mm (29.9 in)	
	Overall height			1,190 mm (46.9 in)	
	Wheel base			1,500 mm (59.1 in)	
	Seat height			795 mm (31.3 in)	
	Ground clearance			150 mm (5.9 in)	
	Dry weight			210 kg (463 lbs)	
	Curb weight (Wet)			230 kg (507 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			0 — 40 kPa (0 — 0.4 kg/cm², 0 — 6 psi)	
	R. suspension air pressure			0 — 500 kPa (0 — 5.0 kg/cm², 0 — 71 psi)	
	Front tire size			100/90 — 18 56 H	
	Rear tire size			120/80 — 18 62H	
	Cold tire pressures	Up to 90 kg (200 lbs) load	Front	225 kPa (2,25 kg/cm², 32 psi)	
			Rear	225 kPa (2.25 kg/cm², 32 psi)	
		Up to vehicle capacity load	Front	225 kPa (2.25 kg/cm², 32 psi)	
			Rear	280 kPa (2.8 kg/cm², 40 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			28°	
	Trail length			105 mm (4.1 in)	
	Front fork oil capacity (Right)			275 cm³ (9.30 US oz, 7.74 Imp. oz)	
	(Left)			290 cm³ (9.80 US oz, 8.17 Imp. oz)	
	Rear shock oil capacity			270 cm³ (9.1 US oz, 7.6 Imp. oz)	
	Rear shock air chamber capacity			180 cm³ (6.09 US oz, 5.07 Imp. oz)	
ENGINE	Type			Liquid cooled 4 stroke OHV engine	
	Engine weight			74.5 kg (164 lbs)	
	Bore and stroke			82.5 x 63.0 mm (3.25 x 2.48 in)	
	Displacement			673 cc (41.1 cu-in)	
	Compression ratio			9.8 : 1	
	Cylinder compression			1,200 kPa (12.0 kg/cm², 171 psi)	
	Valve train			Chain driven camshaft and push rod	
	Lubrication system			Forced pressure and wet sump	
	Oil capacity			3.6 lit. (3.8 US qt, 3.2 Imp qt) after disassembly	
				3.0 lit. (3.2 US qt, 2.6 Imp qt) after draining	
	Oil type			SE or SF (10W—40)	
	Cooling system capacity			2.08 lit (2.2 US qt, 1.8 Imp qt) after disassembly	
				1.7 lit (1.8 US qt, 1.5 Imp qt) after draining	

Item				Area (Type)
ENGINE	Camshaft (at 1 mm lift)			
	Intake valve	Opens	7° (BTDC)	
		Closes	53° (ABCD)	
	Exhaust valve	Opens	40° (BBDC)	
		Closes	15° (ATDC)	
	Valve clearance	IN	0.10 mm (0.003 in)	
	(cold)	EX	0.12 mm (0.005 in)	
	Idle speed		1.100 ± 100 min^{-1} (rpm)	
CARBURETION	Type		Constant vacuum piston valve	
	Identification number		VB2BA	
			VB2BB	G1
			VB2BC	G2
	Pilot screw initial opening		2-3/8	
	Float level		15.5 mm (0.61 in)	
DRIVE TRAIN	Clutch		Wet, multi plate type	
	Transmission		5 speed constant mesh	
	Primary reduction ratio		2.114 (74/13)	
	Gear ratio 1st		2.500 (40/16)	
	Gear ratio 2nd		1.714 (36/21)	
	Gear ratio 3rd		1.280 (32/25)	
	Gear ratio 4th		1.035 (29/28)	
	Gear ratio 5th		0.838 (26/31)	
	Final reduction ratio		3.090 (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		DPR8EA-9 (NGK), X24EPR-U9 (ND)	
	For extended high speed riding		DPR9EA-9 (NGK), X27EPR-U9 (ND)	
	Spark plug gap		0.8—0.9 mm (0.031—0.035 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 Indicator		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	Q'TY	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	9	41–45	4.1–4.5	30–33
Cylinder head bolt	8	12	50–55	5.0–5.5	36–43
Valve adjuster lock nut	8	7	20–25	2.0–2.5	14–18
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
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	Q'TY	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	0.9–1.5	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	16	60–80	6.0–8.0	43–58
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
Rear axle pinch bolt	1	8	20–30	2.0–3.0	14–22
Final gear case nut	4	8	30–35	3.0–3.5	22–25
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	0.6–0.9	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, 2–29)

SPECIAL TOOLS/COMMON TOOLS

SPECIAL TOOLS

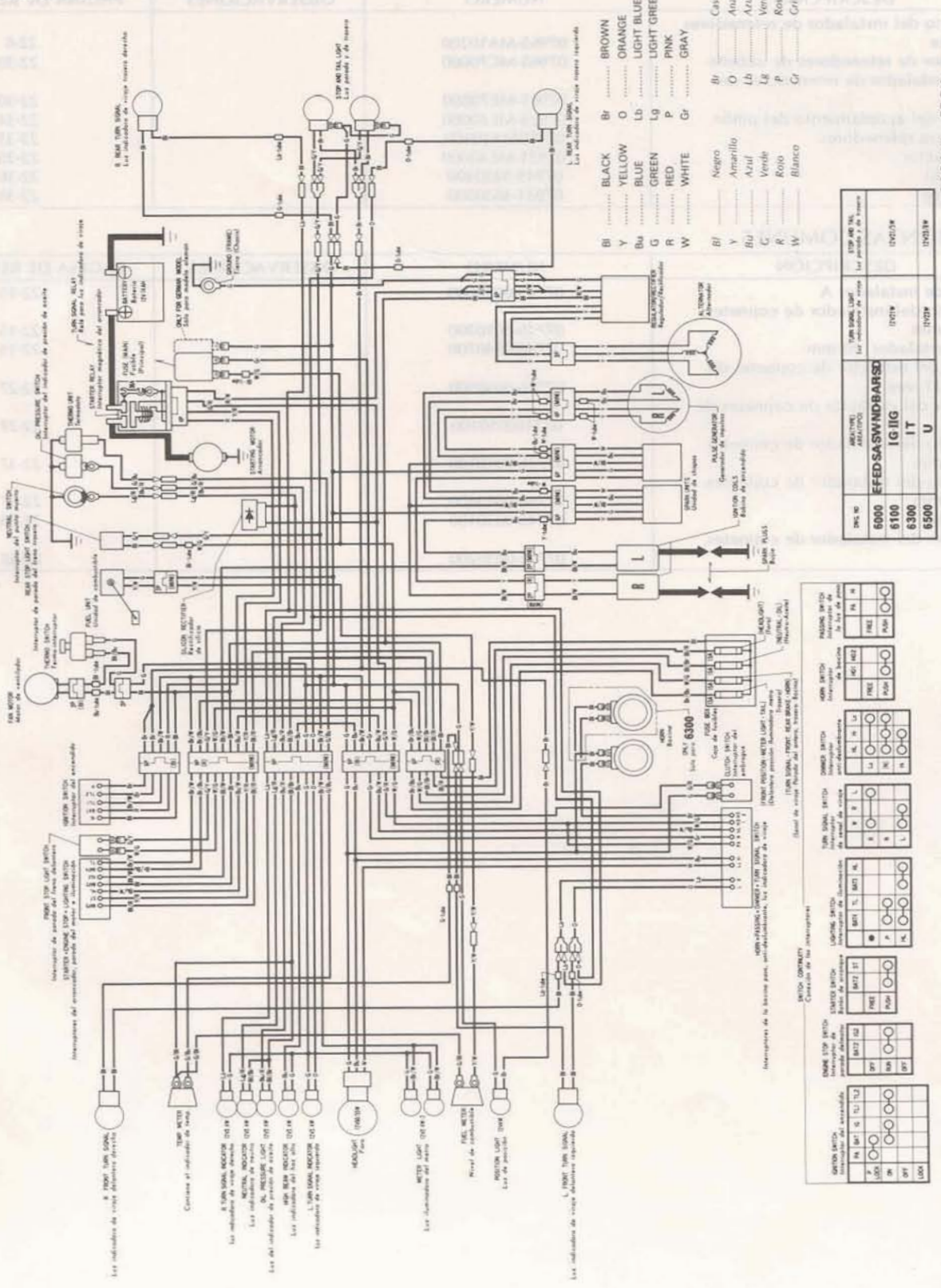
DESCRIPTION	NUMBER	REMARKS	REF. PAGE
Oil seal driver attachment	07965-MA10200		22-28
Oil seal driver	07965-MC70000		22-30
Oil seal driver ring	07965-ME70000		22-30
Pinion joint holder	07924-ME40000		22-34
Retainer wrench	07910-MA10100		22-35
Puller shaft	07931-ME40000		22-35
Attachment	07945-3330300		22-36
Driver	07931-4630300		22-38

COMMON TOOLS

DESCRIPTION	NUMBER	REMARKS	REF. PAGE
Driver handle A	07749-0010000		22-15
Bearing driver attachment, 42 x 47 mm	07746-0010300		22-15
Driver pilot, 30 mm	07746-0040700		22-15
Wheel bearing remover head, 17 mm	07746-0050500		22-27
Wheel bearing remover expander	07746-0050100		22-27
Bearing driver attachment, 32 x 35 mm	07746-0010100		22-37
Bearing driver attachment, 52 x 55 mm	07746-0010400		22-37
Driver	07746-0030100		22-38
Bearing driver attachment, 25 mm	07746-0030200		22-38

HONDA
CX650E

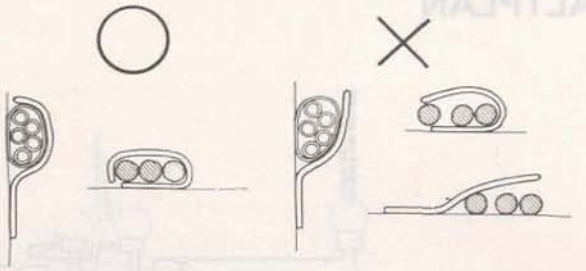
WIRING DIAGRAM
DIAGRAMA DE CABLEADO

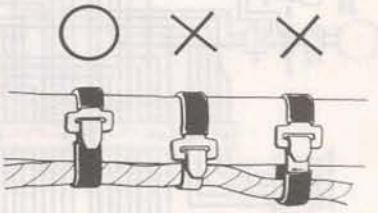


CABLE AND HARNESS ROUTING

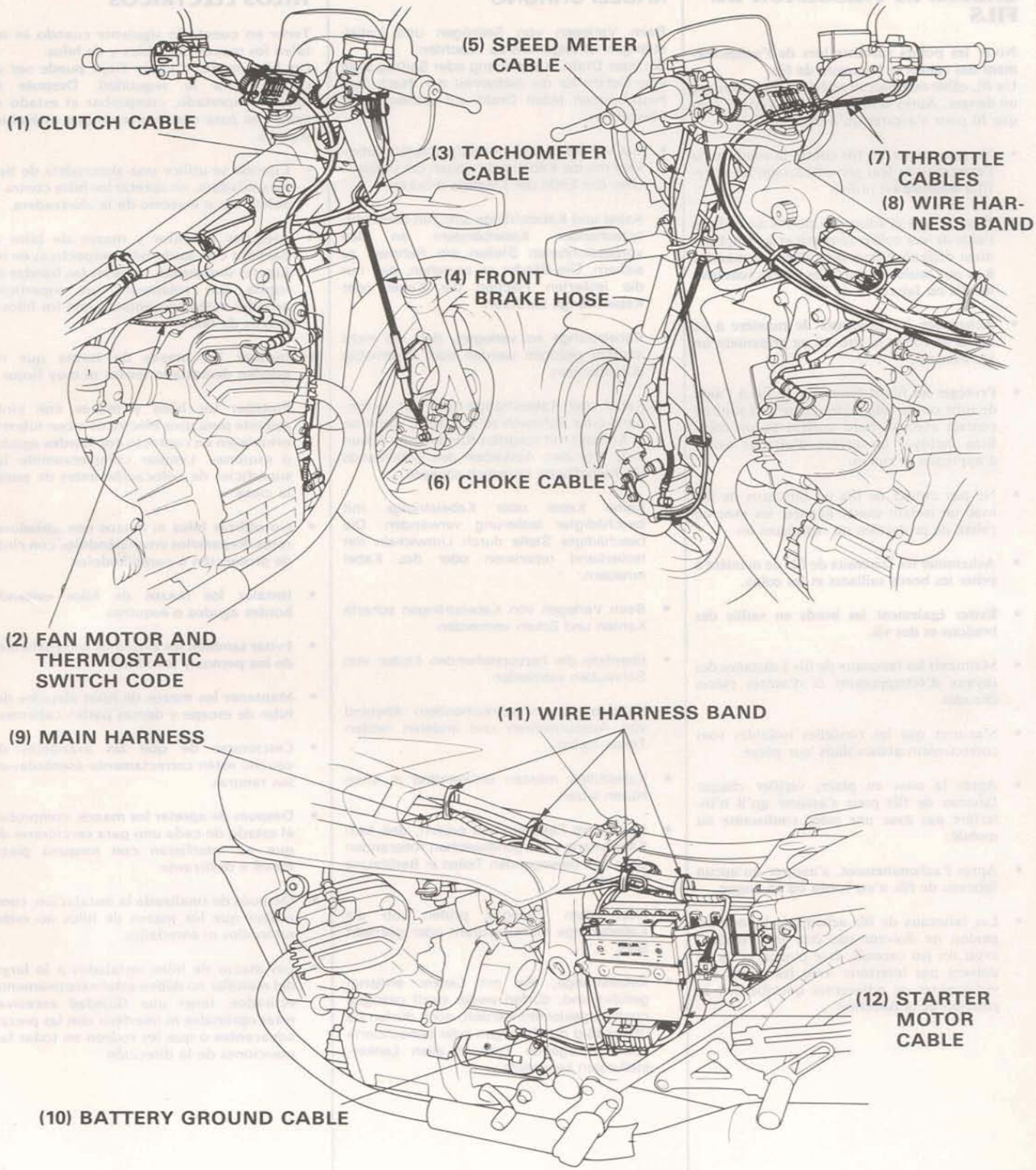
Note the following when routing cables and wire harnesses.
A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.

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





CABLE AND HARNESS ROUTING



2. LUBRICATION

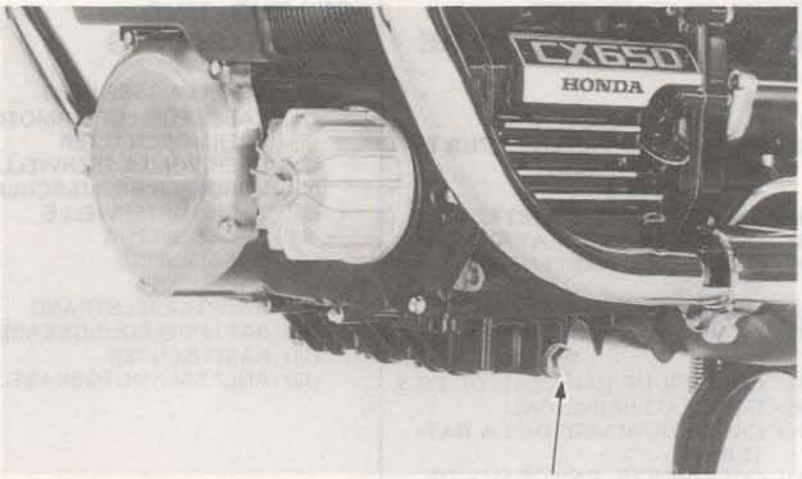
ENGINE OIL CHANGE

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 recesses of the engine.

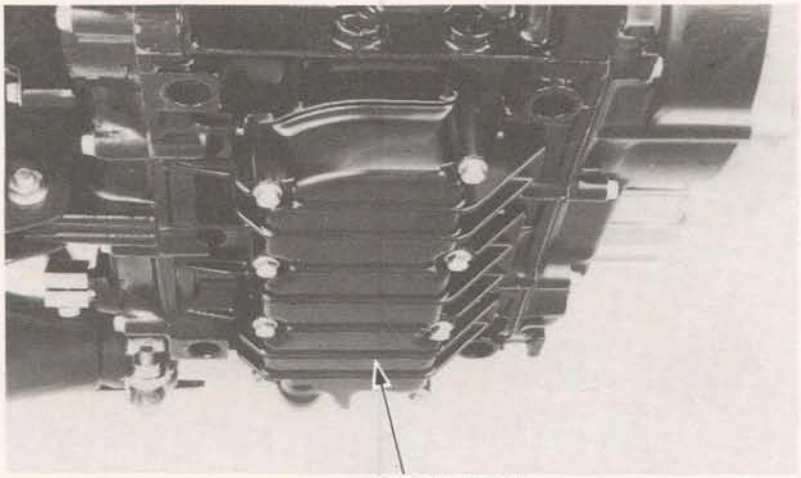
Reinstall the drain plug and fill the crankcase with approximately 3.0 liters (3.2 US qt) of recommended oil through the oil filler opening.



(1) DRAIN BOLT

OIL STRAINER CLEANING

Drain the engine oil.
Remove the oil pan by removing the eight bolts.
Remove the oil strainer.



(1) OIL PAN

Clean the oil strainer and oil pan throughly. Make sure the O-ring on the oil strainer outlet pipe is in good condition.

(1) OIL STRAINER

(2) O-RING

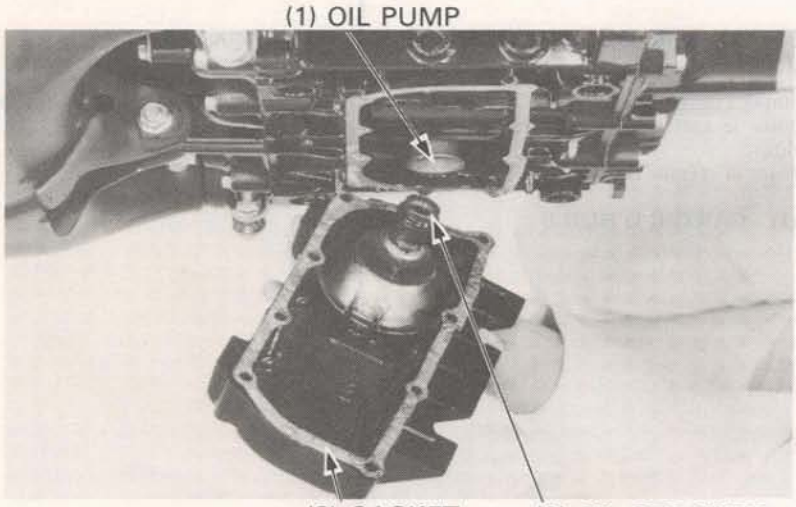
Install the strainer in the oil pan.

NOTE

Align the tabs of the strainer body with the lug in the oil pan.

Replace the oil pan gasket with a new one.

Install the oil pan on the engine case, inserting the end of the strainer into the oil pump inlet.



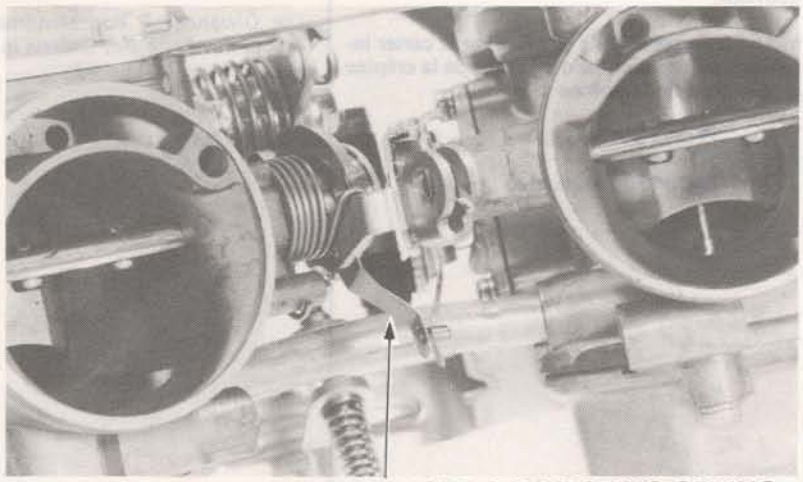
3. FUEL SYSTEM

SPECIFICATIONS

Type	ED,E,F,IT,SW,ND,B,AR,SD,U,SA	G1	G2
Venturi diameter	35 mm (1.38 in)	←	←
I.D. No.	VB2BA	VB2BB	VB2BC
Float level	15.5 mm (0.61 in)	←	←
Pilot screw	2-3/8 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)	←	←

CARBURETOR SEPARATION

Disconnect the choke connecting springs.

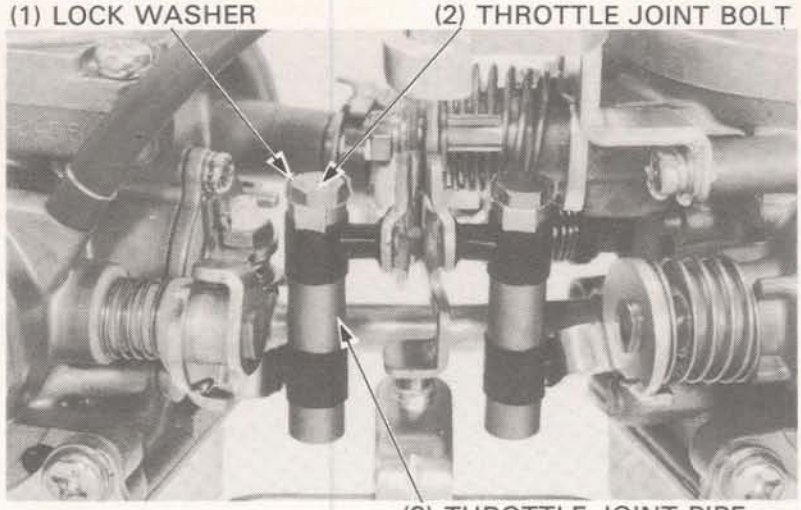


(1) CHOKE CONNECTING SPRING

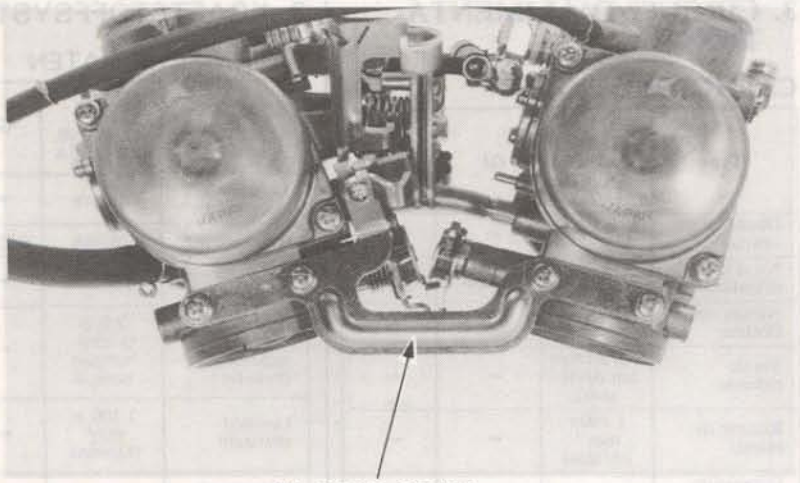
Bend the throttle joint bolt lock washer tabs down.

Remove the throttle joint bolt and lock washer.

Disconnect the ball joint of the throttle link from the throttle joint pipe.

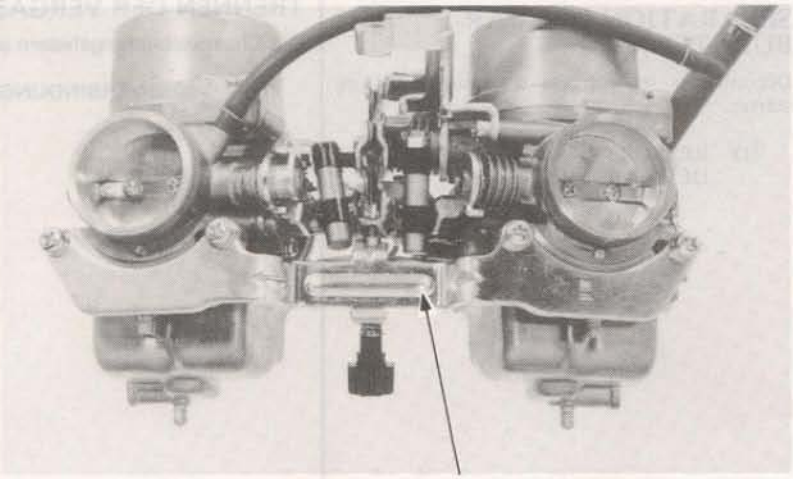


Remove the rear stay holding each pair of carburetors together.



(1) REAR STAY

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

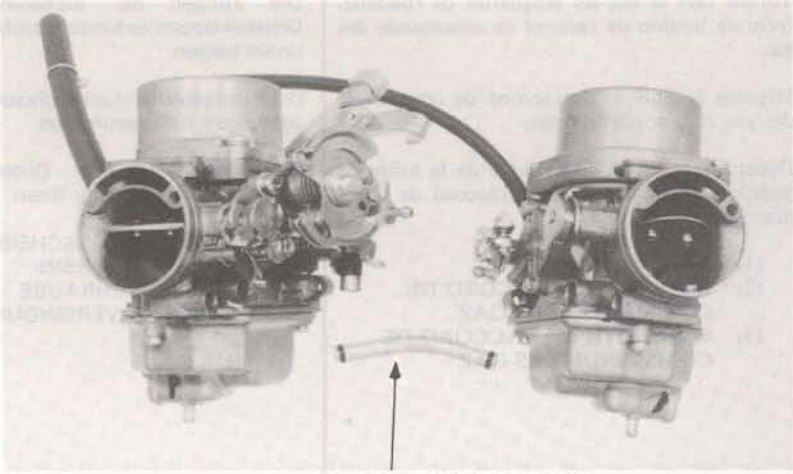


(1) FRONT STAY

Separate the carburetor.

CAUTION

Separate the carburetors horizontally to prevent damage to the joint pipes.



(1) FUEL JOINT PIPES

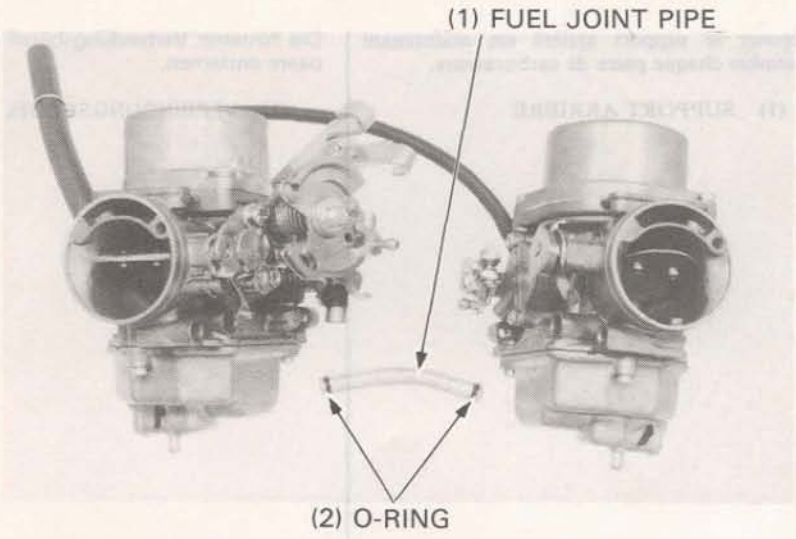
CARBURETOR ASSEMBLY

Install the new O-rings on the fuel joint pipe.

NOTE

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

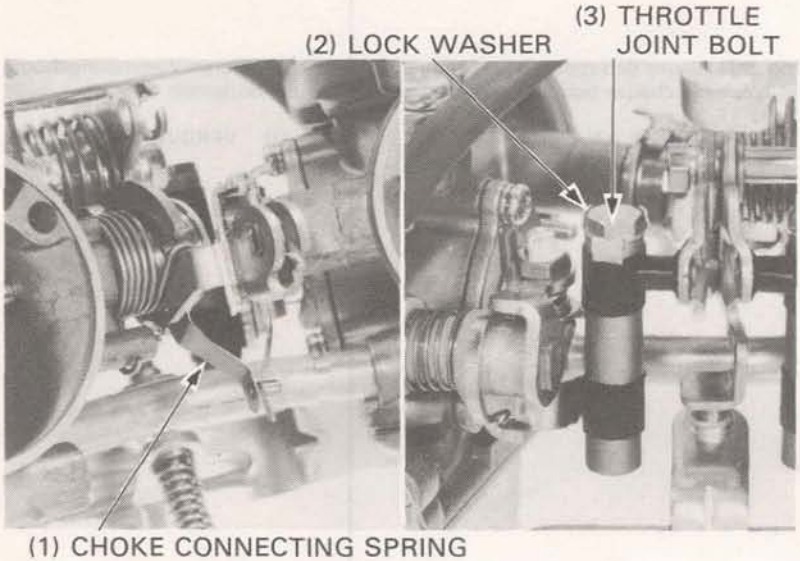
Assembly the right and left carburetors.



Install the front and rear stay plates. Connect the choke connecting springs.

Install the throttle joint pipe, lock washer and bolt.

Tighten the joint bolt and bend up the lock washer tabs against the bolt head.

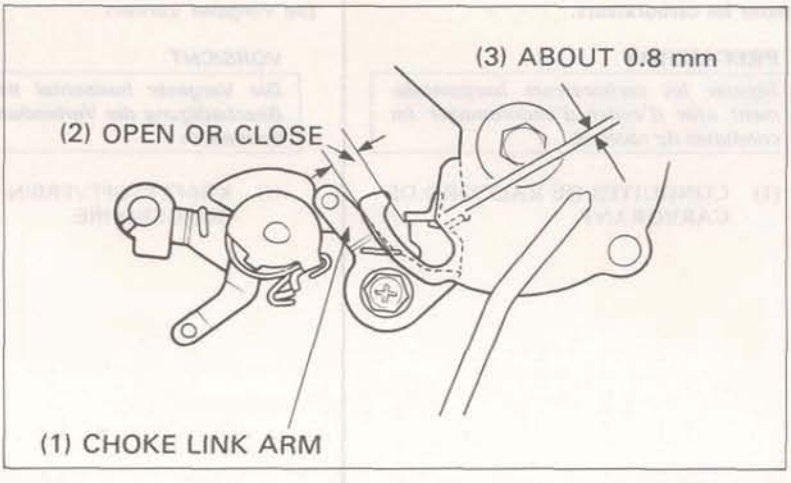


FIRST IDLE ADJUSTMENT

FAST IDLE: 1,500—2,500 rpm

If fast idle adjustment is necessary, remove the carburetors. Then, unscrew the throttle stop screw until the throttle valve is completely closed.

Adjust by opening or closing the fork end of the choke link arm until the clearance between the choke link arm and the throttle drum is about 0.8 mm (0.047 in).



4. VALVE

SPECIFICATION

Unit: mm (in)

Item	Standard	Service Limit
Valve spring free length (inner)	49.5 (1.949)	47.6 (1.874)

5. CLUTCH

CLUTCH OUTER REMOVAL

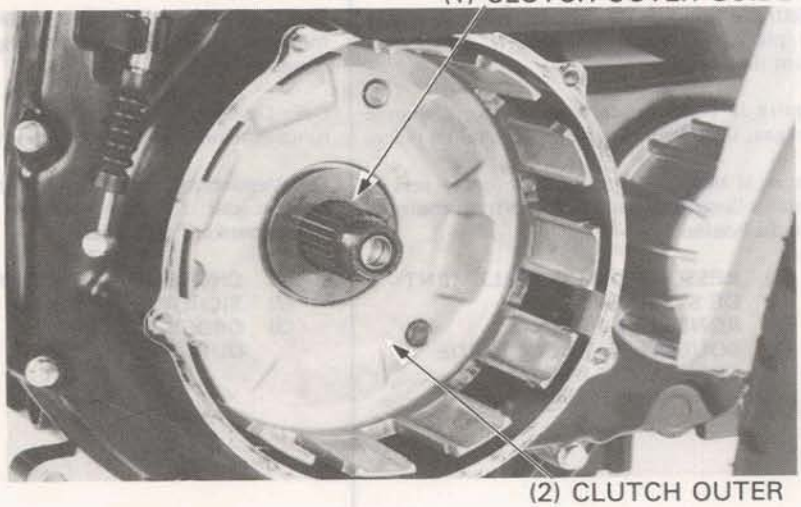
Remove the clutch cover (page 7-2).

Remove the lifter plate and spring (page 7-2).

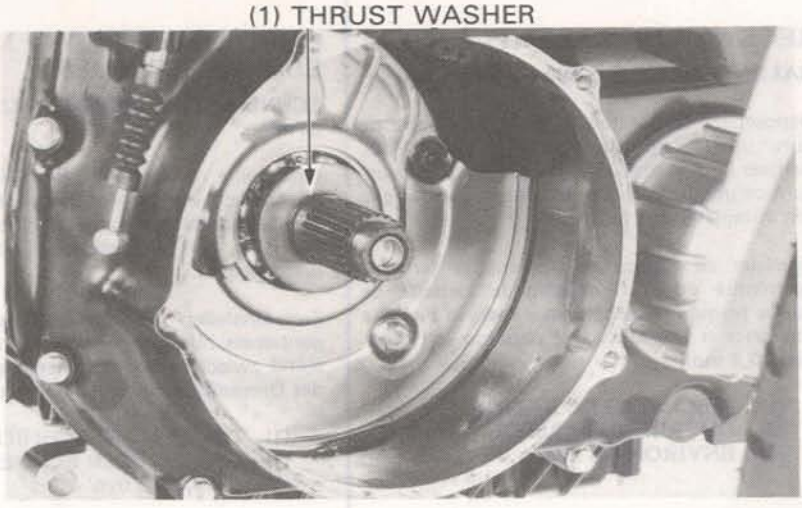
Remove the lock nut and lock washer (page 7-3).

Remove the pressure plate discs, plates and clutch center as a unit.

Remove the clutch outer guide and clutch outer.



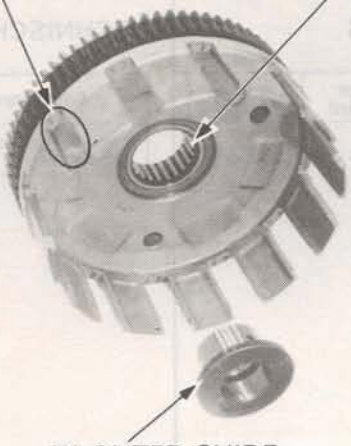
Remove the thrust washer.



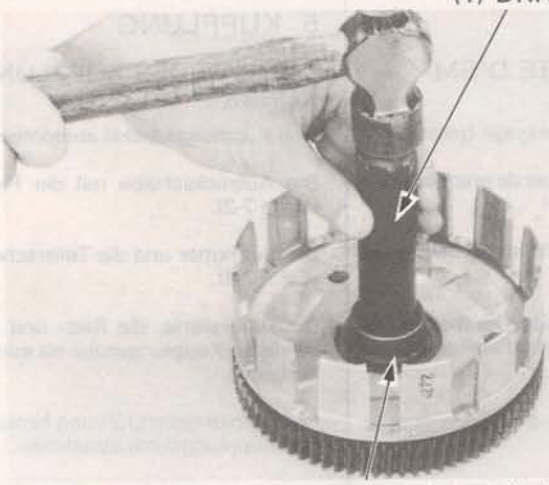
CLUTCH OUTER AND OUTER GUIDE INSPECTION

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.
SERVICE LIMIT: 25.09 mm (0.988 in)

Check the cluth outer needle bearing for damage or excessive play.

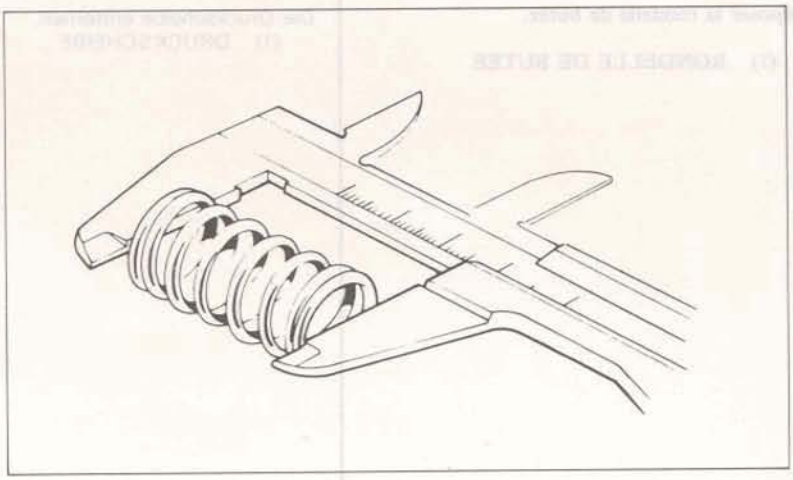


Replace the needle bearing with a new one if necessary.



CLUTCH SPRING INSPECTION

Measure the spring free length.
SERVICE LIMIT: 37.9 mm (1.49 in)



6. COOLING SYSTEM

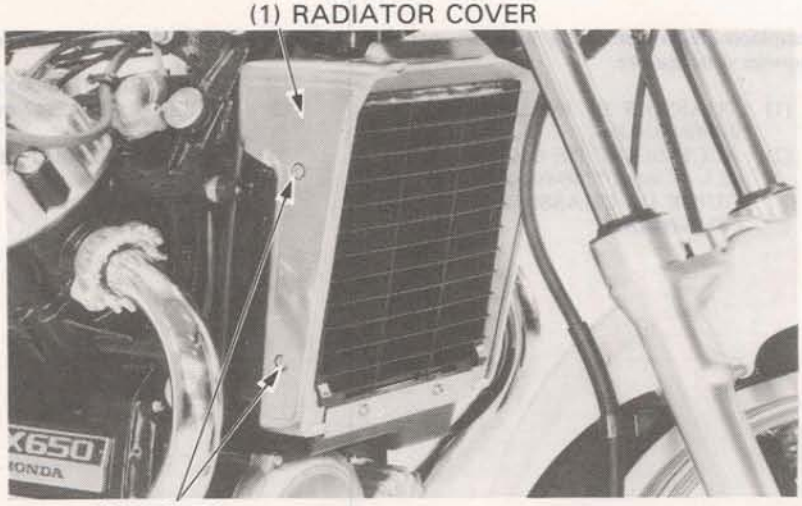
SPECIFICATION

Item		Standard
Coolant capacity:	Radiator and engine	1.7 ℓ (1.8 US qt)
	Reserve tank	0.38 ℓ (0.4 US qt)
	Total system	2.08 ℓ (2.2 US qt)

RADIATOR/COOLING FAN

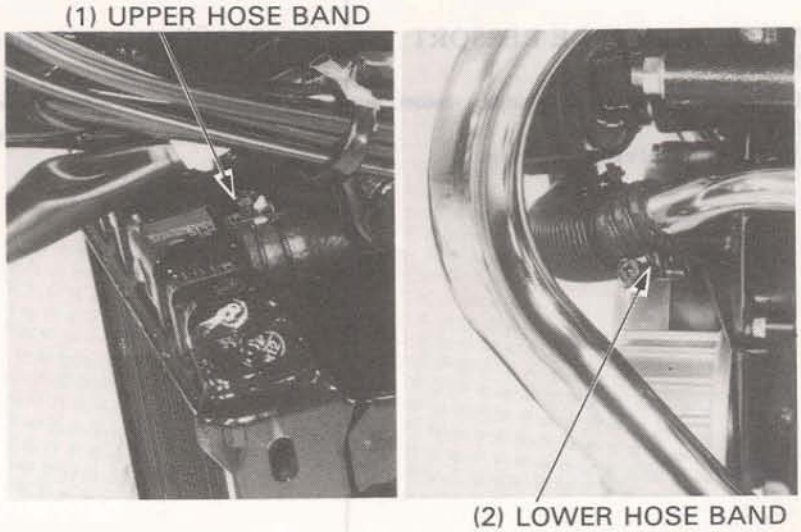
RADIATOR REMOVAL

Remove the side covers, seat and fuel tank.
Remove the radiator cover by removing the side bolts.

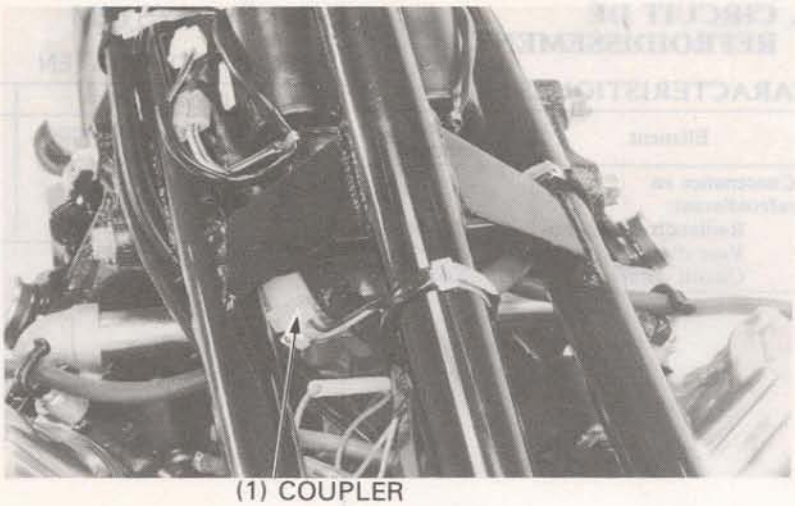


Drain the coolant from the radiator (page 9-3).

Loossen the upper and lower radiator hose bands.



Disconnect the fan motor and thermostatic switch wire coupler.



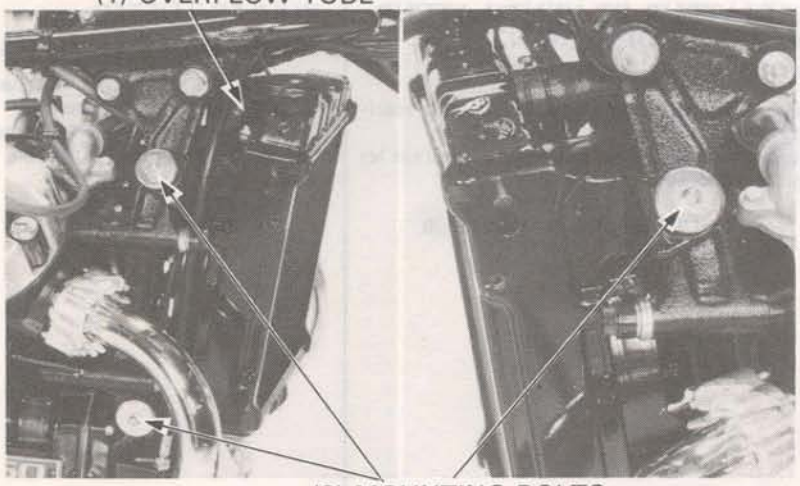
(1) COUPLER

Remove the three radiator mounting bolts.
Pull the radiator and disconnect the radiator hoses.
Disconnect the overflow tube from the radiator.

CAUTION

Do not damage the radiator fins.

(1) OVERFLOW TUBE



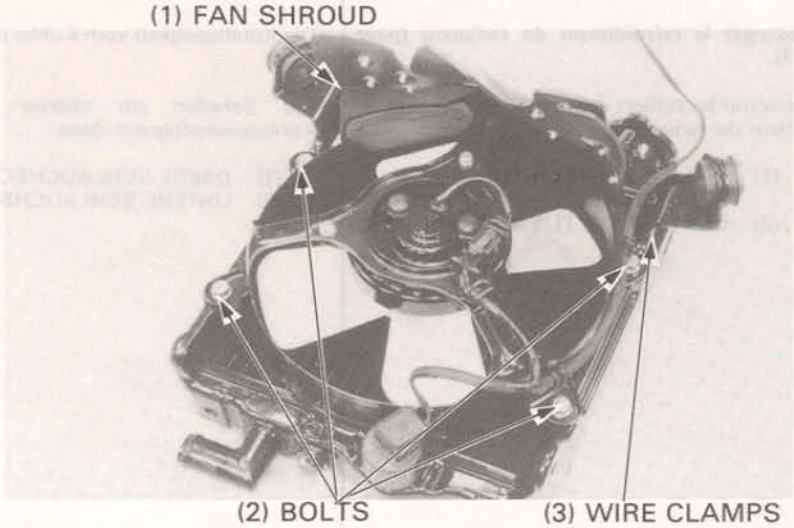
(2) MOUNTING BOLTS

RADIATOR DISASSEMBLY

Bend down the thermostatic switch and fan motor wire clamps and remove the wires.

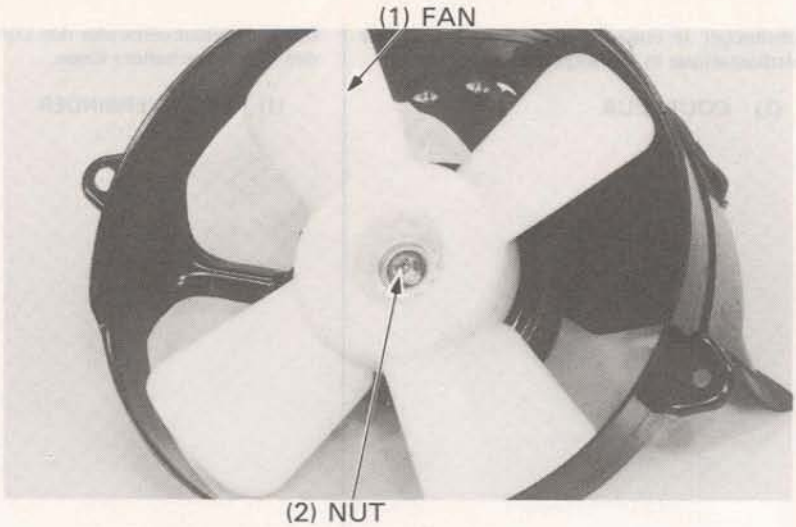
Remove the four fan shroud mounting bolts and fan shroud from the radiator.

(1) FAN SHROUD

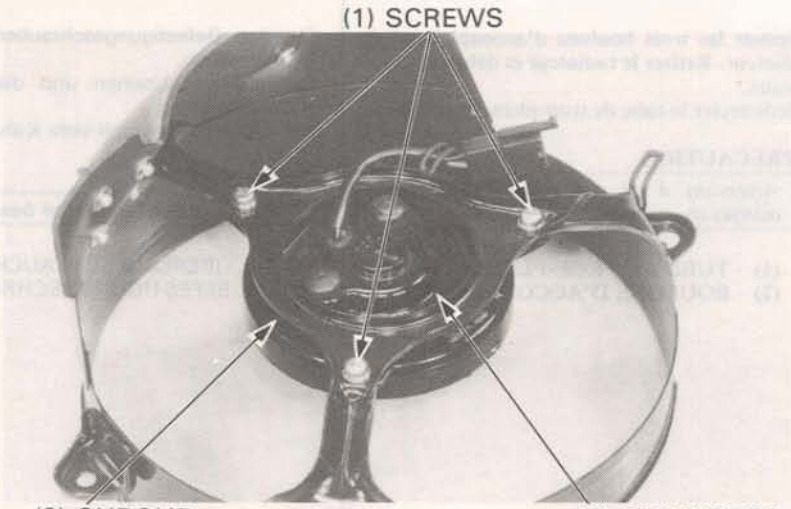


(2) BOLTS (3) WIRE CLAMPS

Remove the fan attaching nut and pull the fan off the fan motor.



Remove the three fan motor attaching screws and remove the fan motor from the shroud.



RADIATOR INSPECTION

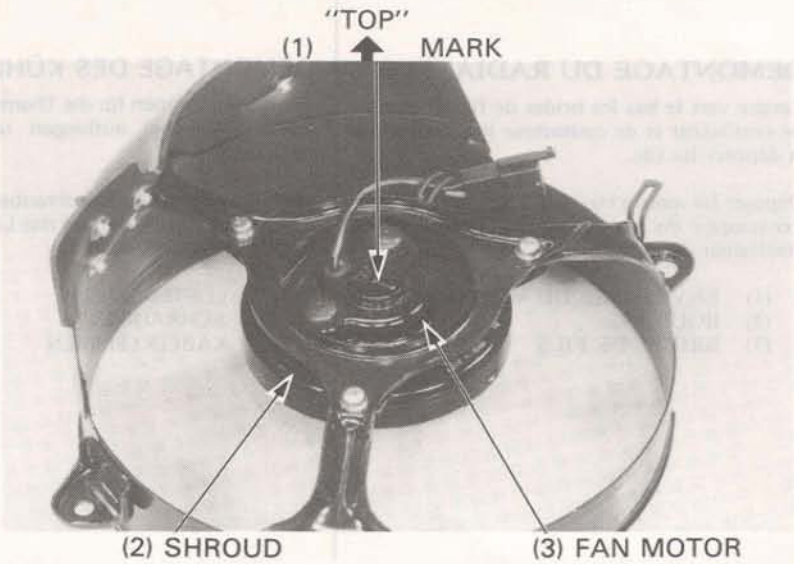
Inspect the radiator soldered joints and seams for leaks.

Blow dirt out from between core fins with compressed air. If insects, etc., are clogging the radiator, wash them off with low pressure water.

Carefully straighten any bent fins.

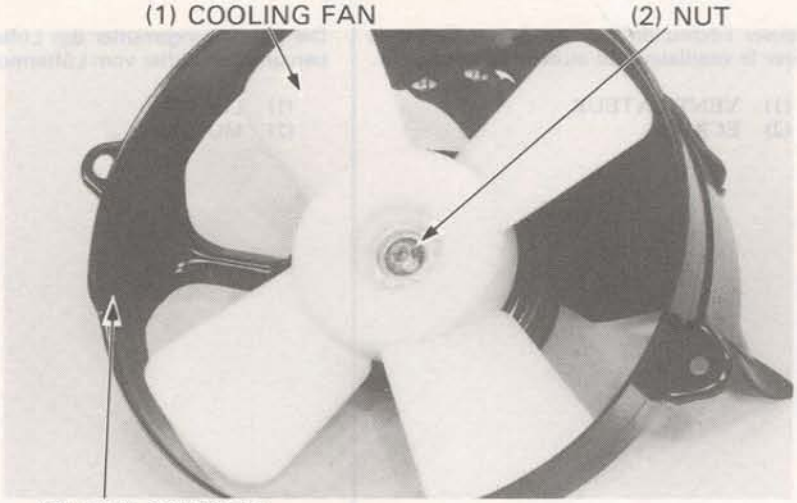
RADIATOR ASSEMBLY

Place the fan motor on the shroud with its "TOP" mark facing up and tighten the three screws.



Place the fan over the motor shaft.

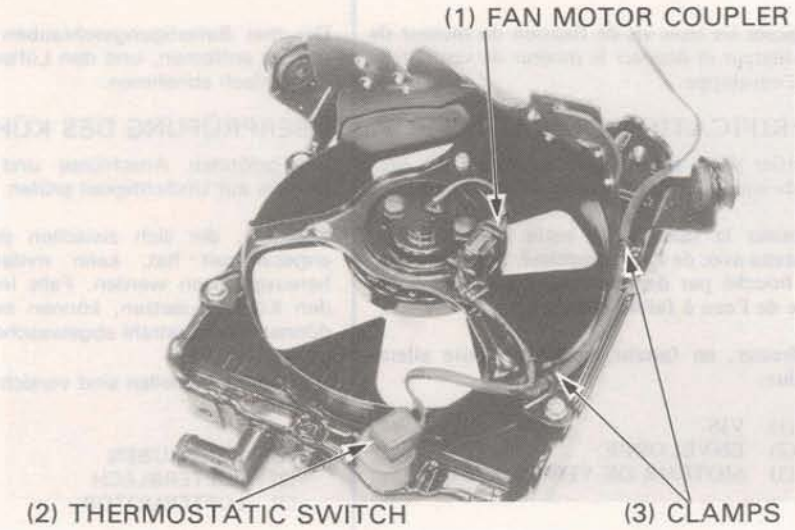
Apply a locking agent to the fan motor shaft threads, install and torque the plain washer, lock washer and nut.



Attach the fan shroud to the radiator with the four bolts.

Connect the wire to the fan motor coupler and the thermostatic switch.

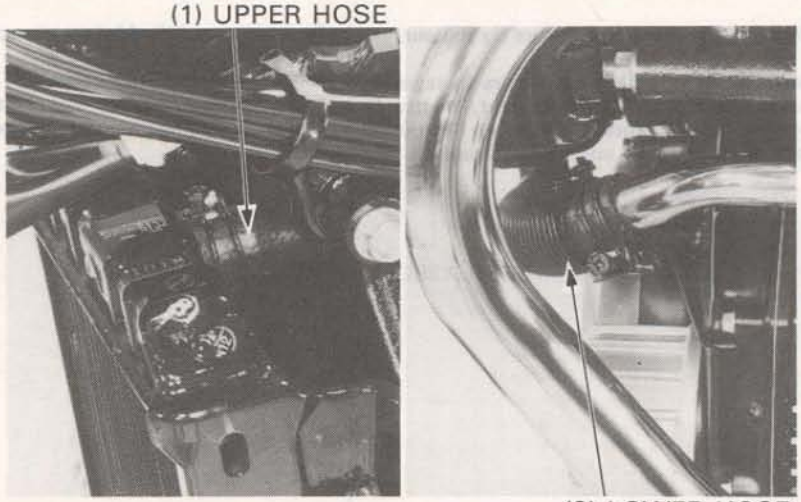
Secure the wires witht the clamps on the shroud.



RADIATOR INSTALLATION

Install the radiator onto the frame and tighten the mounting nuts.

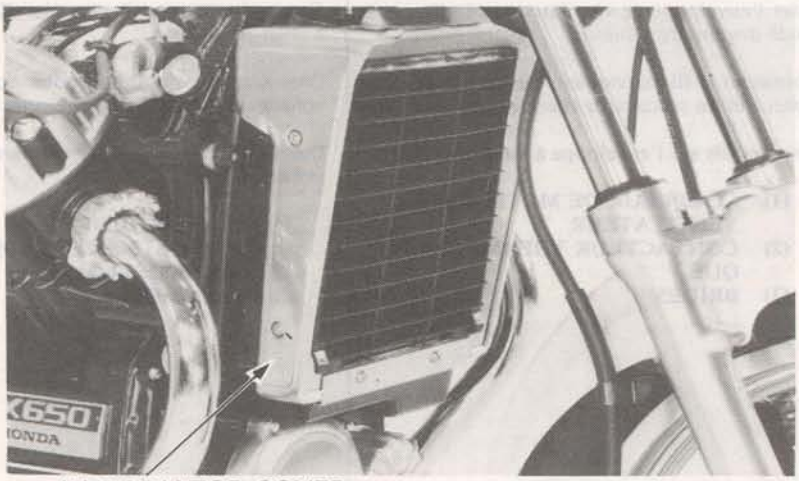
Connect the upper and lower hoses to the radiator and tighten the hose bands.



Connect the thermostatic swith and fan motor wire coupler to the wire harness.

Install the radiator covers.

Fill the cooling system.



7. CAMSHAFT

SPECIFICATION

Unit: mm

Item			Standard	Service Limit
Camshaft	Cam height	IN	37.988 (1.4959)	37.866 (1.4907)
		EX	38.143 (1.5017)	38.021 (1.4969)

8. TRANSMISSION

SPECIFICATION

Unit: mm (in)

Item			Standard	Service Limit
Transmission	M4 and M5 gear	I.D.	29.020 — 29.041 (1.1425 — 1.1433)	29.10 (1.146)
		Bushing O.D.	28.979 — 29.000 (1.1409 — 1.1417)	28.95 (1.140)
	C1 gear	I.D.	24.020 — 24.041 (0.9457 — 0.9465)	24.10 (0.949)
	C1 gear bushing	O.D.	23.984 — 24.005 (0.9443 — 0.9451)	23.95 (0.943)
		I.D.	20.020 — 20.041 (0.7882 — 0.7890)	20.06 (0.790)
	C2 gear	I.D.	31.025 — 31.050 (1.2215 — 1.2224)	31.10 (1.224)
	C2 gear bushing	O.D.	30.985 — 31.010 (1.2199 — 1.2209)	30.95 (1.219)
		I.D.	27.500 — 27.521 (1.0827 — 1.0835)	27.54 (1.084)
	C3 gear	I.D.	29.020 — 29.041 (1.1425 — 1.1433)	29.10 (1.146)
		Bushing O.D.	28.979 — 29.000 (1.1409 — 1.1417)	28.95 (1.140)
	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 — 1.0819)	27.44 (0.1080)
	Gear-to-bushing clearance		—	0.15 (0.006)
	Bushing-to-shaft clearance		—	0.10 (0.004)
Shift fork	Claw thickness		5.93 — 6.00 (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)
Shift drum	Drum-to-transmission holder clearance		0.025 — 0.075 (0.0010 — 0.0030)	0.15 (0.06)

TORQUE VALUES

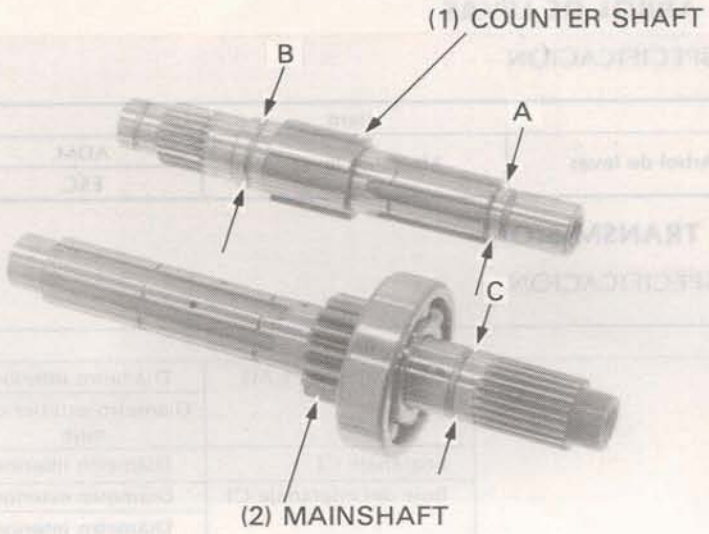
Transmission 6 x 20 mm bolt : 15—20 N·m (1.5—2.0 kg-m, 11—14 ft-lb)
6 x 32 mm bolt : 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

TRANSMISSION INSPECTION

Disassembly the transmission (page 11-4).

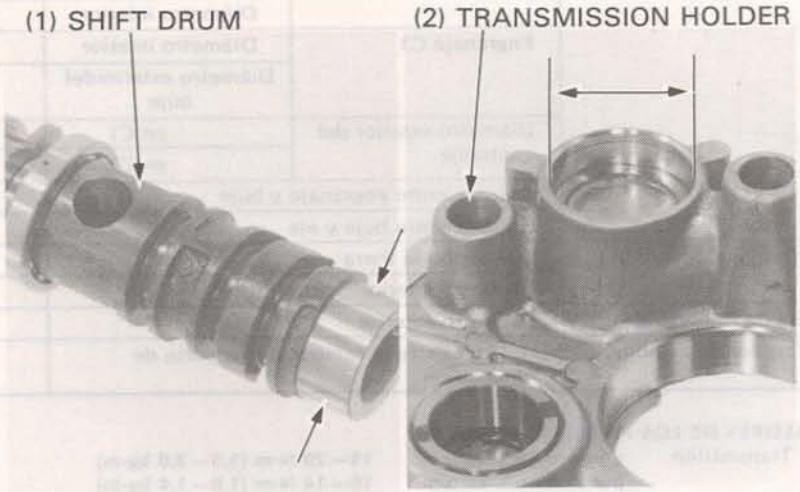
Measure the O.D. of the mainshaft and countershaft at the locations shown.

SERVICE LIMITS:
A (C1): 19.96 mm (0.786 in)
B (C2): 27.44 mm (1.080 in)
C (Outer guide): 24.91 mm (0.781 in)



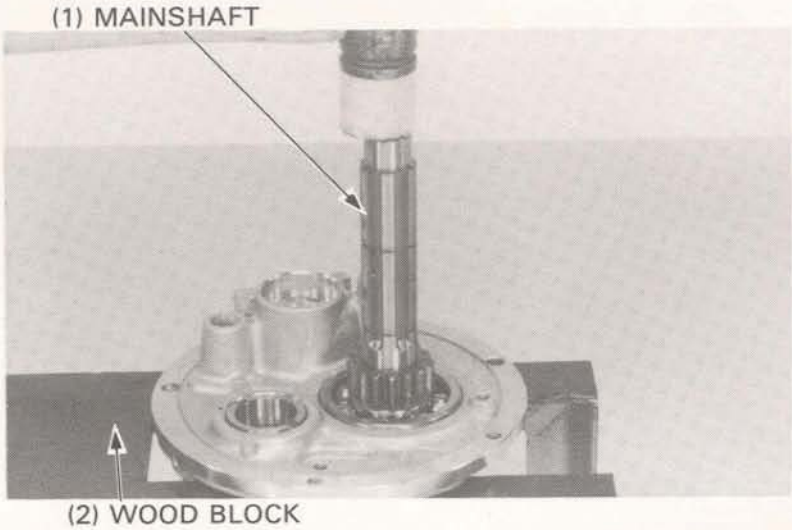
Measure and record the shift drum O.D. and transmission holder I.D. calculate the clearance between the shift drum and the transmission holder.

SERVICE LIMIT: 0.15 mm (0.06 in)



TRANSMISSION ASSEMBLY

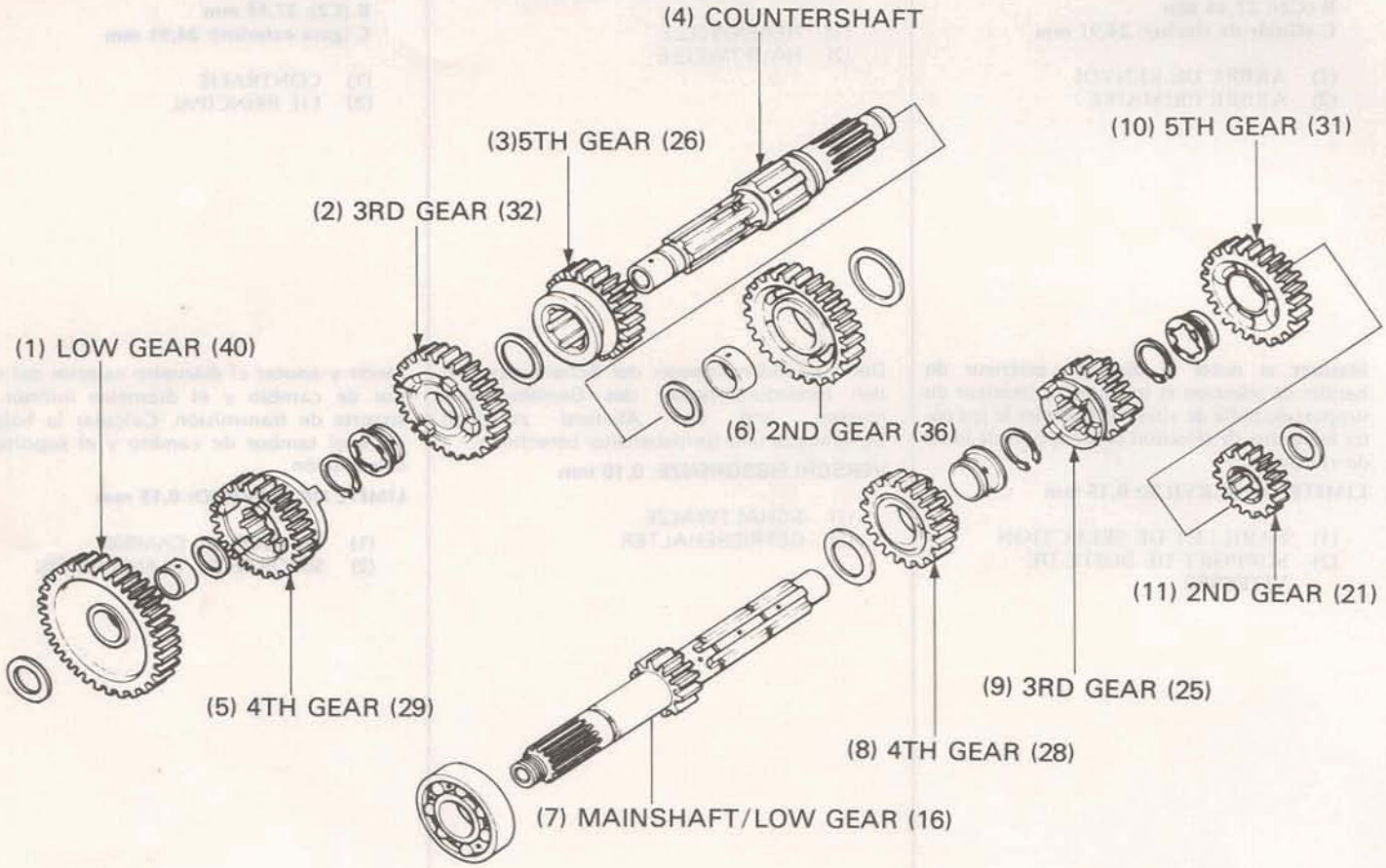
Drive the mainshaft into the mainshaft bearing.



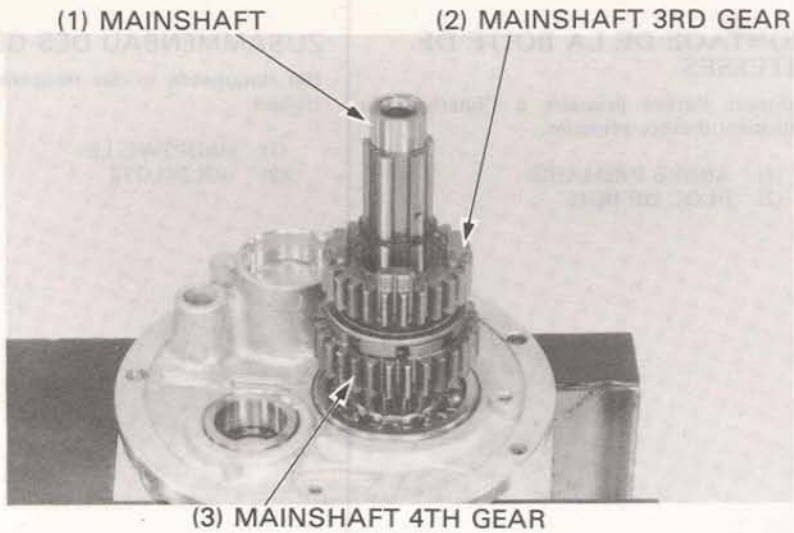
Assemble the mainshaft and countershaft as described in the illustration shown below.

NOTE

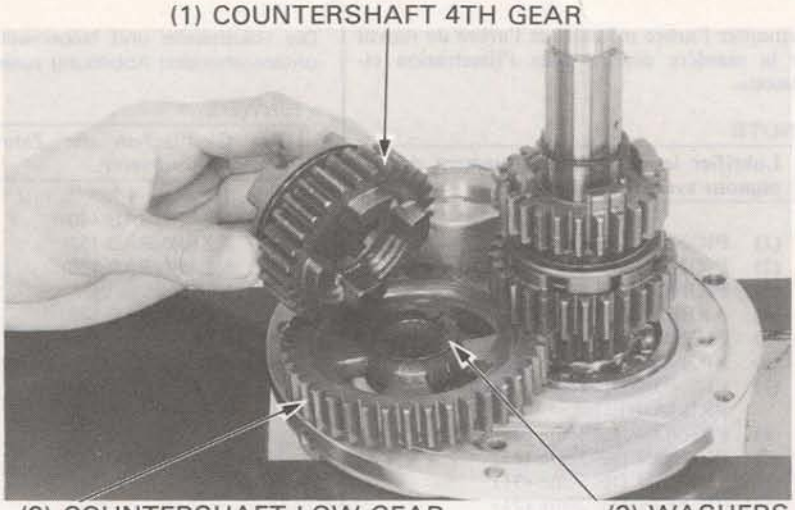
Lubricate the sliding faces of the gears with engine oil.



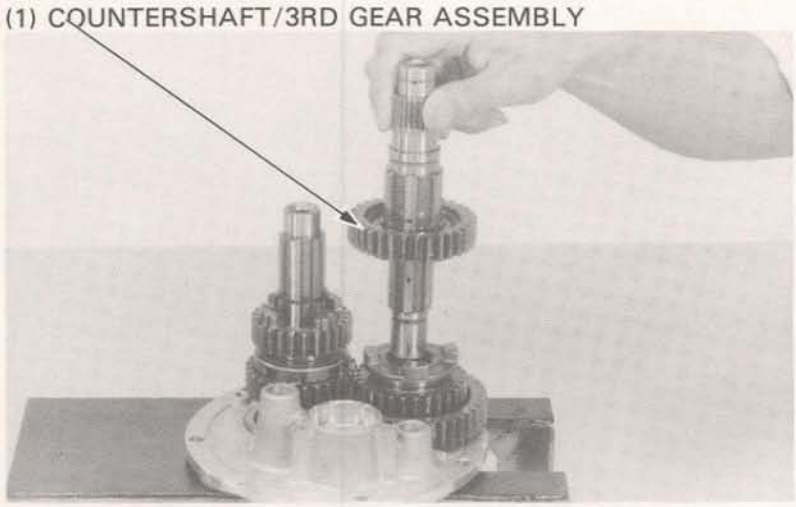
Install the mainshaft 4th and 3rd gears onto the mainshaft.



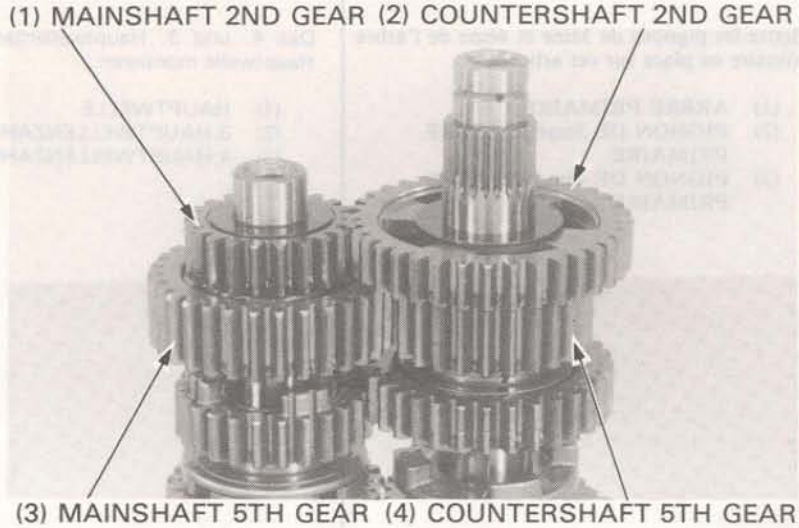
Place the countershaft low gear, washer and 4th gear over the needle bearing outer race.



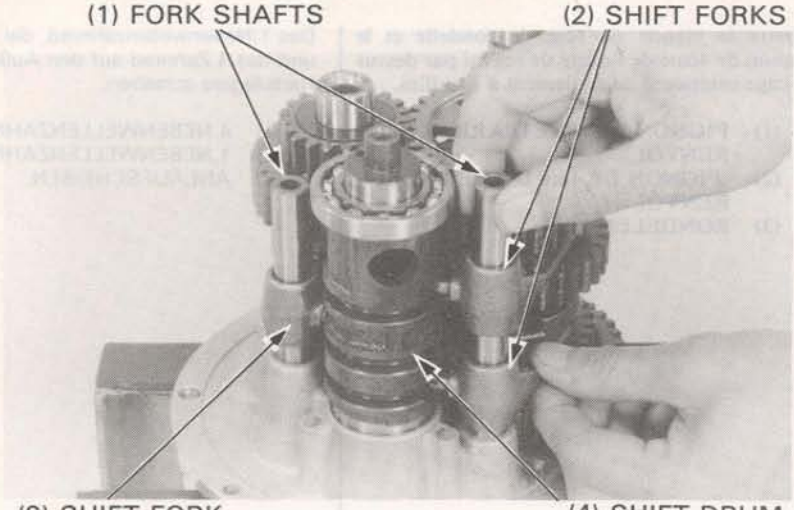
Install 3rd gear and the splined bushing onto the countershaft.
Install the countershaft and 3rd gear assembly through 4th and 1st gears and into the needle bearing.



Slide the 5th and 2nd gears onto the countershaft and mainshaft.
Check the engagement of the gears on the countershaft and mainshaft.



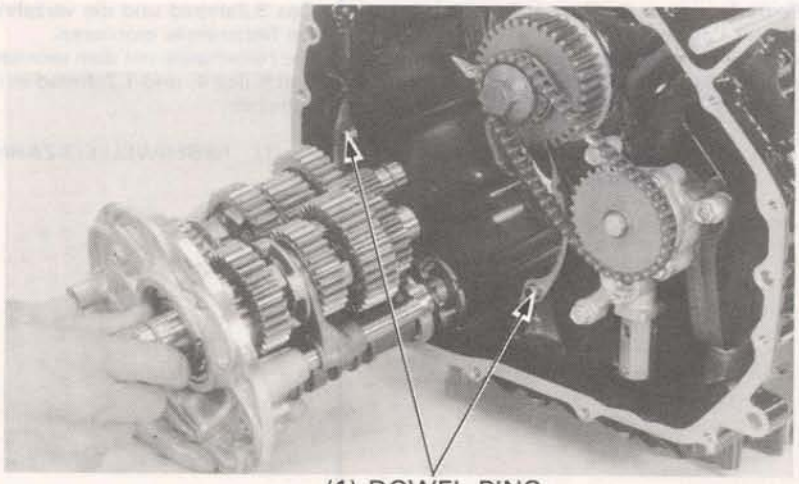
Install the shift drum.
Engage the shift forks with the gears and shift drum groove.
Install the shift fork shafts.



Install the dowel pins.
Place the transmission in neutral and insert the transmission assembly into the engine case.

NOTE

Align the projection on the shift drum with the cutout in the engine case.

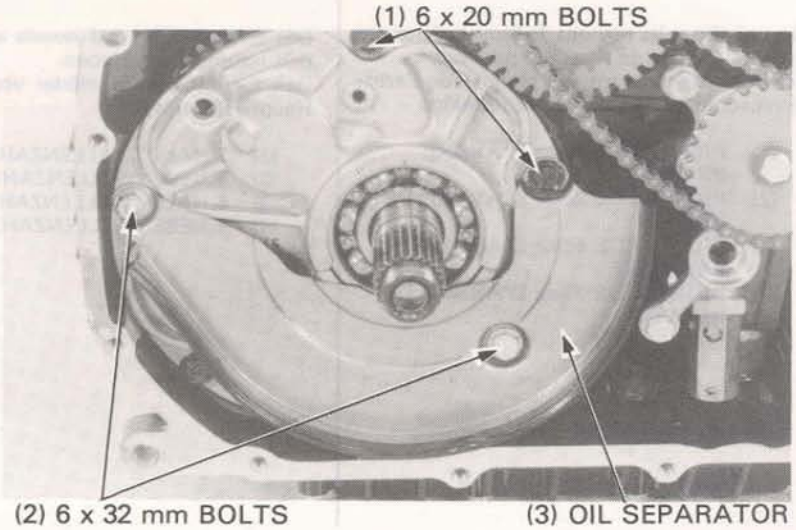


Press the transmission holder into place while rotating the mainshaft and torque the holder bolts.

TORQUE:
6 x 20 mm bolt: 15—20 N·m (1.5—2.0 kg-m, 11—14 ft-lb)

Install the oil separator and torque the bolts.

TORQUE:
6 x 32 mm bolt: 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)



9. CRANKSHAFT/PISTON

SPECIFICATION

Unit: mm (in)

Item			Standard	Service Limit
Crankshaft	Crankpin oil clearance		0.028—0.052 (0.0011—0.002)	0.085 (0.0033)
	Connecting rod side clearance		0.150—0.350 (0.0059—0.014)	0.50 (0.020)
Cylinder	I.D.		82.50—82.515 (3.2480—3.2486)	82.60 (3.352)
Piston ring	Ring end gap	Top	0.20—0.35 (0.008—0.014)	0.60 (0.024)
		Second	0.20—0.35 (0.008—0.014)	0.60 (0.024)
		Oil (side rail)	0.30—0.90 (0.012—0.035)	1.10 (0.043)
Piston	Piston O.D.		82.460—82.485 (3.2465—3.2474)	82.365 (3.2427)

10. FRONT SUSPENSION

SPECIFICATIONS

Unit: mm (in)

Item		Standard	Service Limit
Front cushion spring free length		480.5 (18.92)	470.9 (18.54)
Front fork oil capacity	Right	275 cm³ (7.7 imp. oz)	—
	Left (Anti-dive)	290 cm³ (8.2 imp. oz)	—
Front fork air pressure		0—40 kPa (0—0.4 kg/cm², 0—6 psi)	—

FRONT FORK BRACE

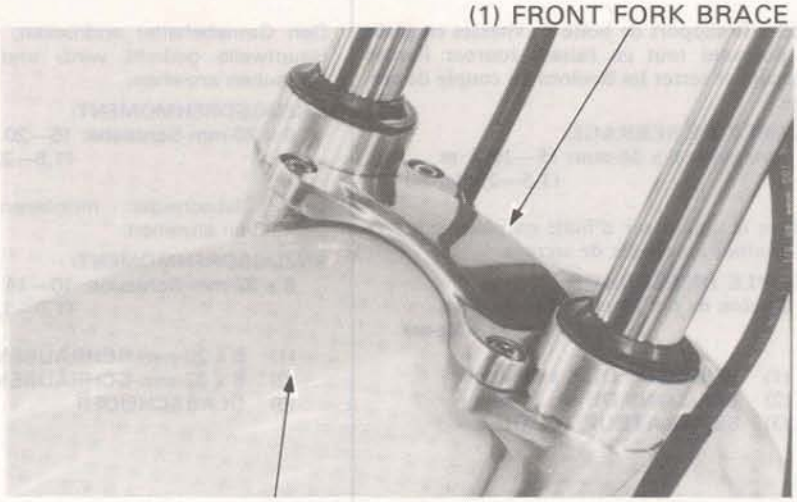
Remove the front fork brace before removing the front fork (page 13-12).

Install the removed parts in the reverse order of removal.
— front fork and front fender (page 13-20).
— front wheel (page 13-11).

Tighten the front fork brace to the specified torque.

TORQUE: 18—28 N·m
(1.8—2.8 kg-m, 13—20 ft-lb)

Install the bolt caps.



11. REAR WHEEL/SUSPENSION/FINAL DRIVE

SPECIFICATIONS

Unit: mm (in)

Item	Standard	Service Limit
Final gear assembly preload	0.2—0.4 N·m (2—4 kg-cm, 1.7—3.5 in-lb)	—
Final gear recommended oil	Hypoid-gear oil AP1, GL-5 Above 5°C/41°F SAE #90 Below 5°C/41°F SAE #80	—

WHEEL BEARING REMOVAL

Remove the rear wheel (page 14-3).

Remove the final driven flange and rear broke discs.

Remove the wheel bearings and distance collar witht he special tool.

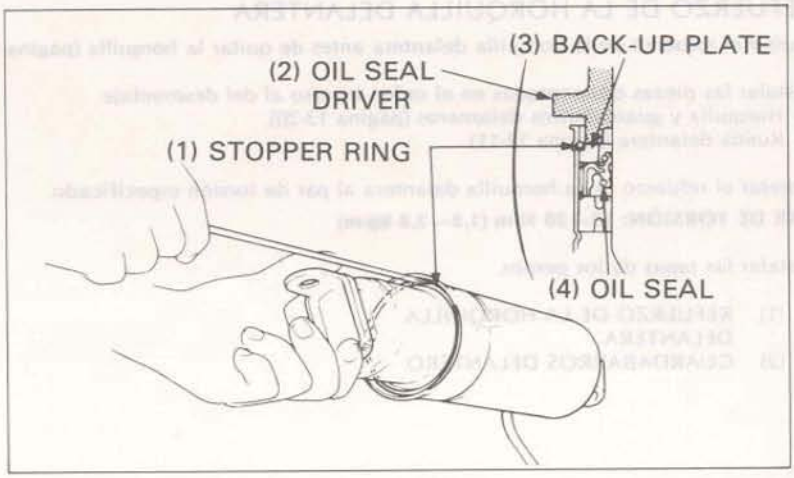
(1) WHEEL BEARING REMOVER HEAD, 17 mm
07746-0050500

(2) WHEEL BEARING REMOVER EXPANDER
07746-0050100

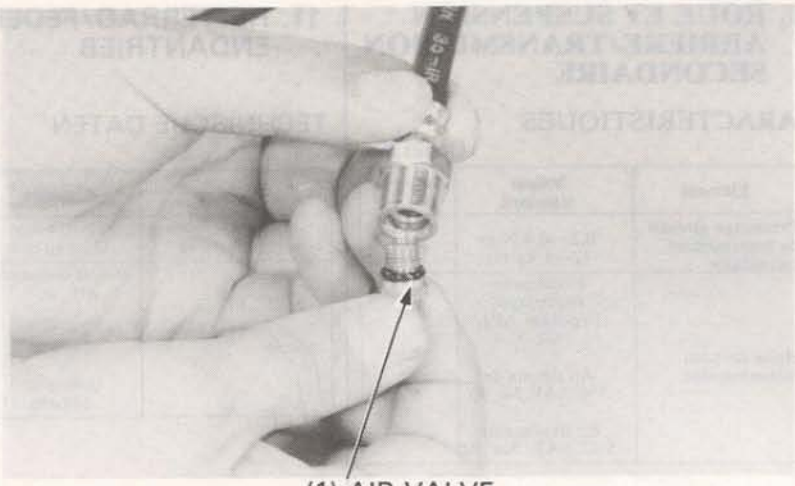
REAR SHOCK ABSORBER OIL SEAL REMOVAL

Remove the rear shock absorber (page 14-9).

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.



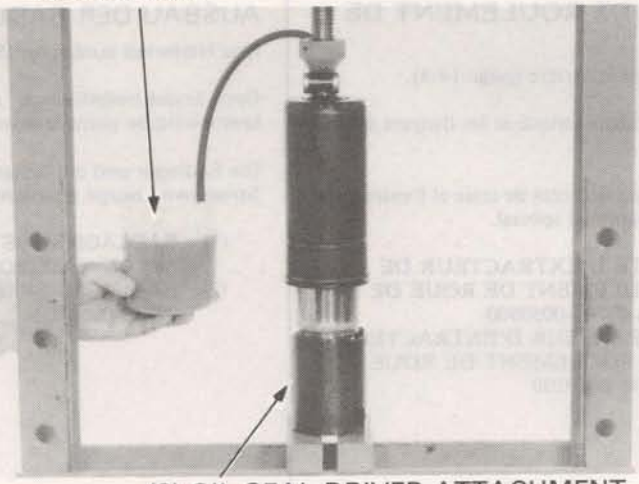
(1) AIR VALVE

(1) DAMPER OIL (ATF OR EQUIVALENT)

Place about 300 cm^3 (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.

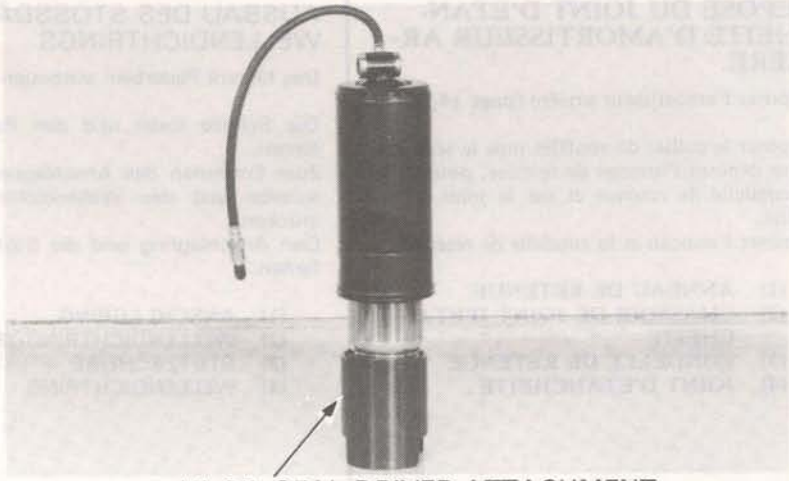
NOTE

- Do not over-press the shock.
- This shock absorber's store is 43 mm (1.69 in).



(2) OIL SEAL DRIVER ATTACHMENT
07965-MA10200

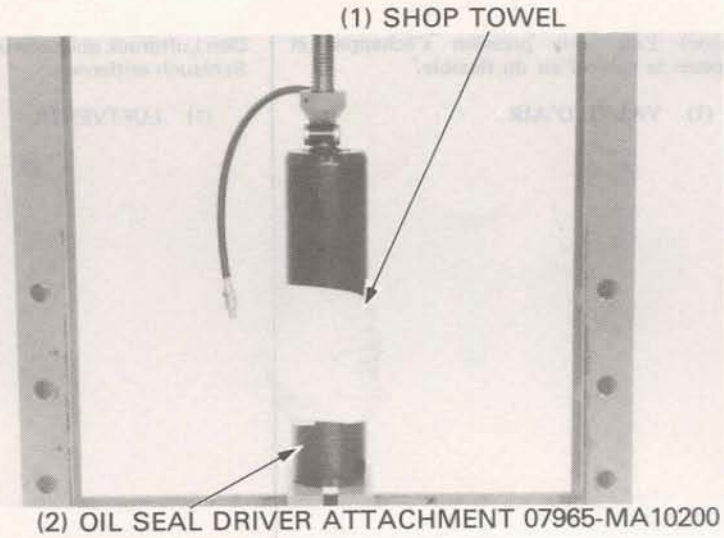
Place the shock absorber up right in an oil drain pan. Let the shock stand for 5 minutes to allow air to escape.



(1) OIL SEAL DRIVER ATTACHMENT
07965-MA10200

Reinstall the air valve in the air hose. Place the shock absorber in the hydraulic press using the oil seal driver attachment.

Wrap a shop towel around the shock absorber.
Press the oil seal out by compressing the shock absorber.



Leave the shock absorber for another 10 minutes to let any remaining ATF drain out.

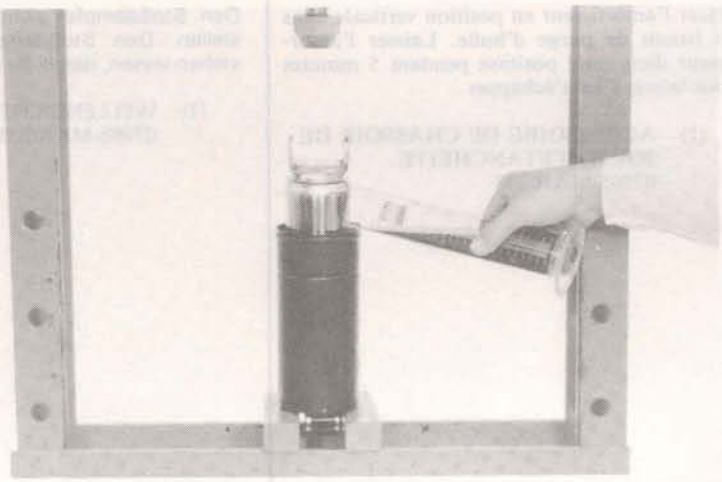
NOTE

Do not tilt the shock abosrber or ATF will flow out of the damper case.

OIL SEAL INSTALLATION

Turn the shock absorber upside down as soon as all the ATF has drained from the outer case.
Fill the damper case with the specified amount of ATF.

SPECIFIED AMOUNT:
270 cc (9.1 U.S. oz., 7.6 Imp. oz.)

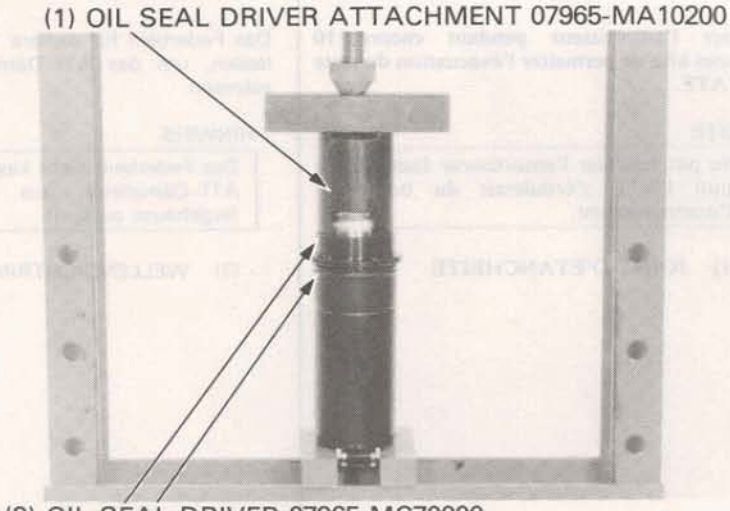


Install the guide bushing into the damper case.
Wrap a piece of tape around the groove at the end of the shock absorber.
Dip the oil seal in damper oil and install it on the damper.

CAUTION

Be careful not to damage the oil seal during installation.

Press the oil seal into the shock absorber with a hydraulic press until the oil seal driver and oil seal driver ring stops at the edge of the outer case.



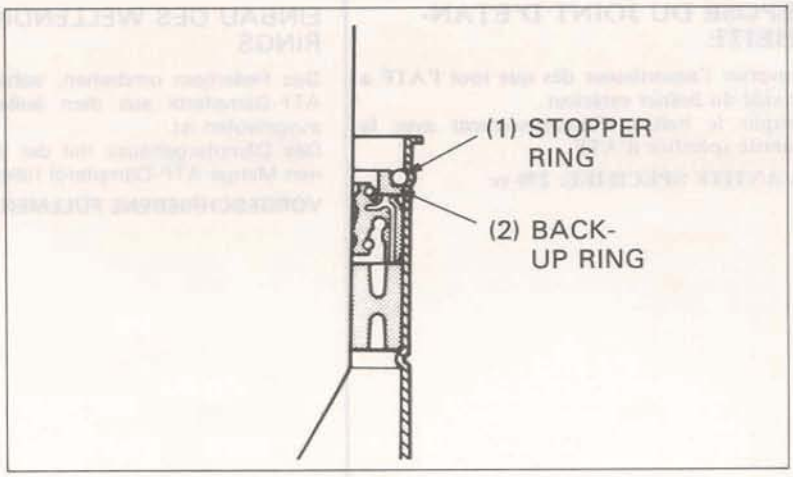
Install the back-up ring.

Install the stop ring, being certain that it is seated in the ring groove in the outer case.

WARNING

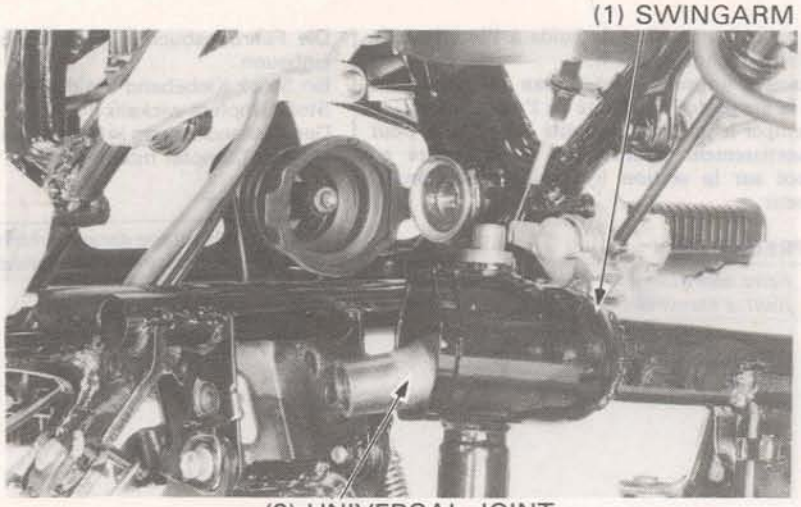
Be sure stop ring is seated in the ring groove all the way around.

Install the boot and boot clip.

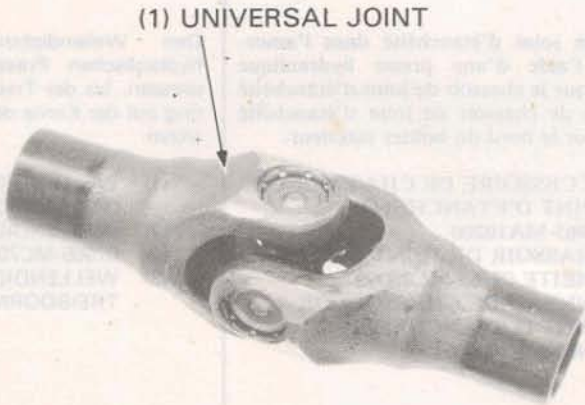


UNIVERSAL JOINT

Remove the swingarm (page 14-15) and universal joint.



Inspect the universal joint bearings for excessive play or damage.
Apply grease to the splines.
Install the universal joint and swingarm.



FINAL DRIVE REMOVAL

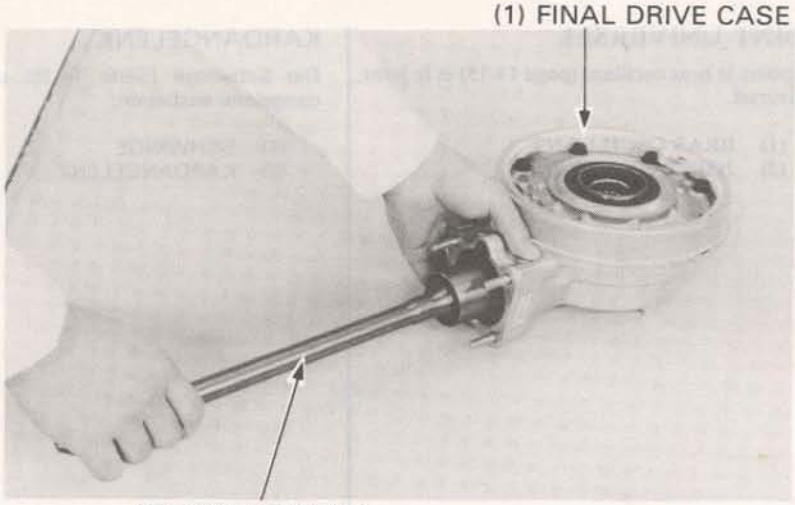
Place the motorcycle on its center stand.
Drain the final gear oil (page 2-3).
Remove the rear wheel (page 14-9).

Remove the final gear case attaching nuts and remove the gear case from the swingarm.

DRIVE SHAFT

REMOVAL

Separate the drive shaft from the gear case by gently revolving the shaft in a circular motion while tugging slightly.

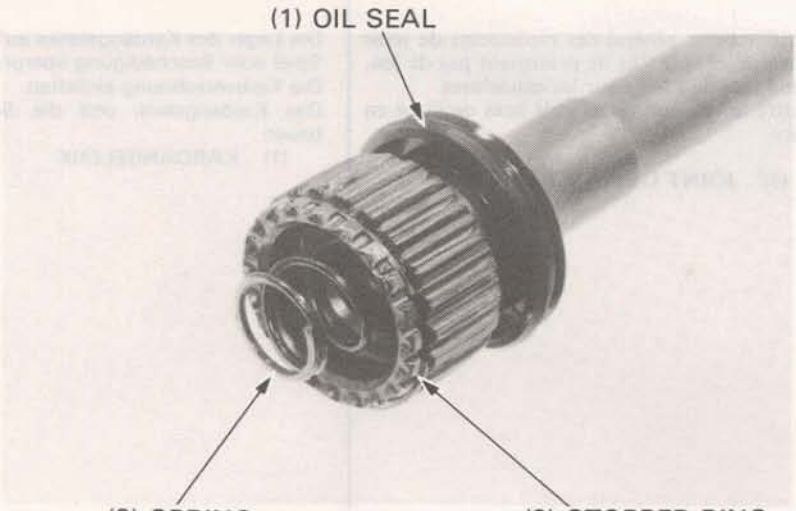


DISASSEMBLY

Remove the spring, oil seal and stop ring from the drive shaft.

NOTE

Replace the oil seal with a new one if it is removed.

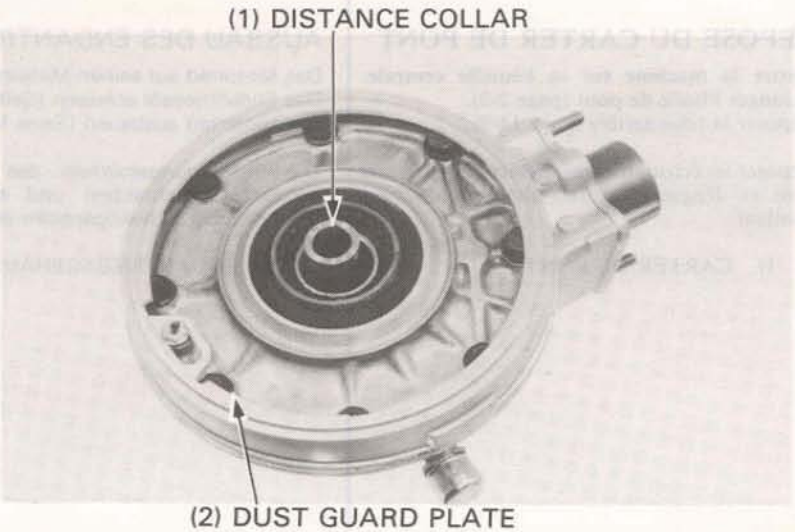


FINAL DRIVE GEAR

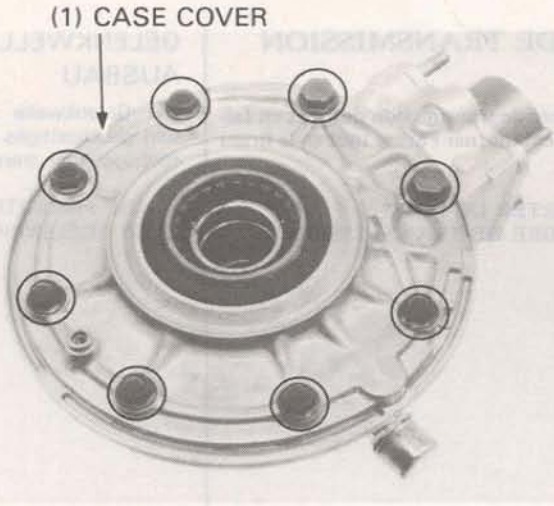
RING GEAR REMOVAL

Remove the distance collar.

Remove the dust guard plate bolts. Remove the dust guard plate by turning it clockwise.

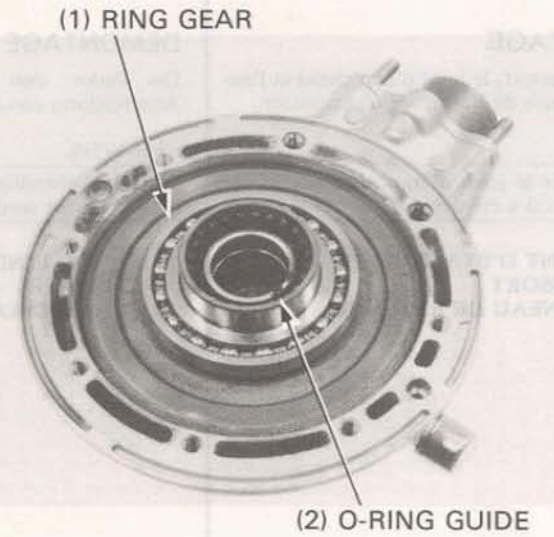


Remove the eight case cover bolts and cover. If the ring gear stays in the cover, do the following:
Place the cover in a press with the ring gear down. Make sure the cover is secrely supported.
Press the ring gear out of the cover with driver 07749-0010000 and attachment 07746-0010100.



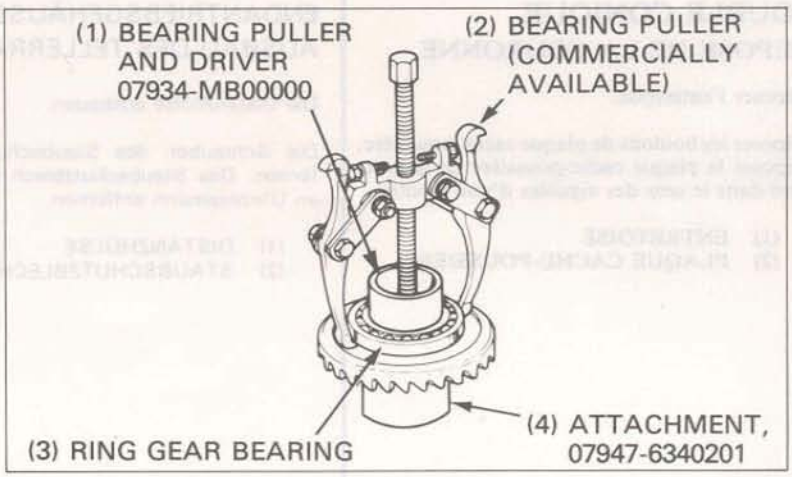
Remove the ring gear from the final drive case.

Remove the O-ring guide by tapping it from the opposite side.



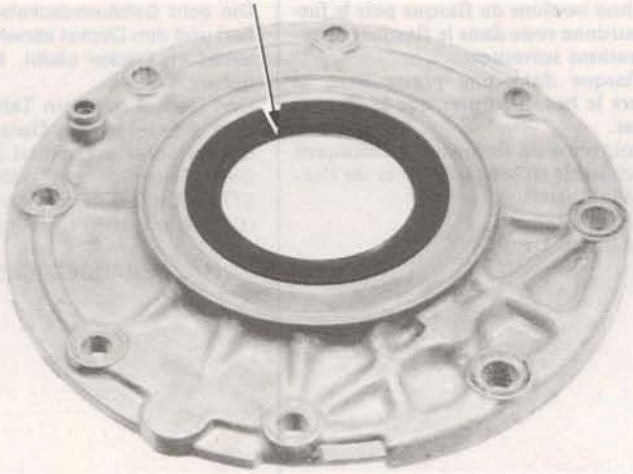
RING GEAR BEARING REMOVAL

Remove the ring gear bearing and gear adjusting spacer.



CASE COVER OIL SEAL REPLACEMENT

Remove the oil seal from the case cover and press in a new oil seal.

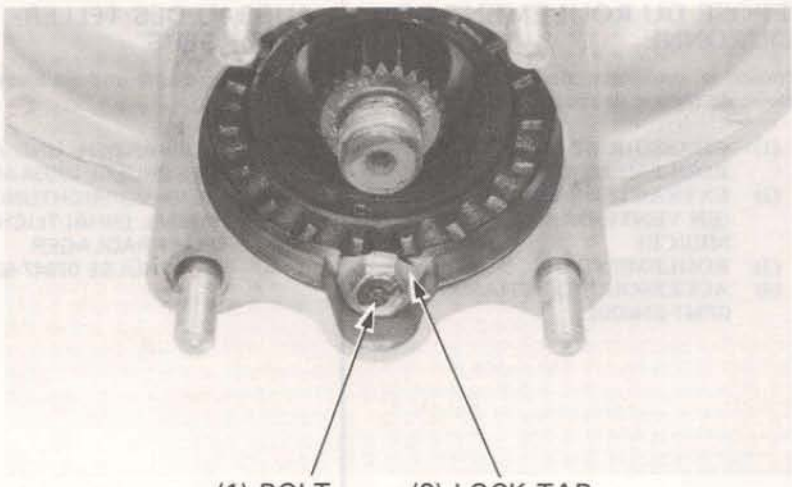


PINION GEAR REMOVAL

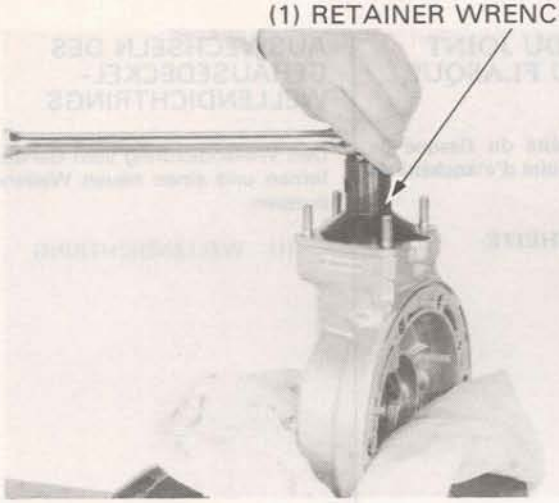
Install the pinion joint holder onto the pinion joint and remove the pinion shaft nut.

Remove the tool and pinion joint.

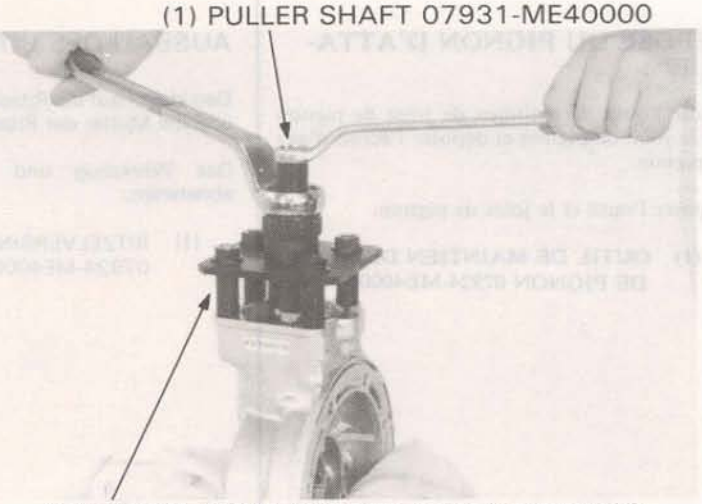
Remove the retainer lock tab.



Remove the pinion retainer with the pinion retainer wrench.



Pull the pinion assembly off with the pinion puller.

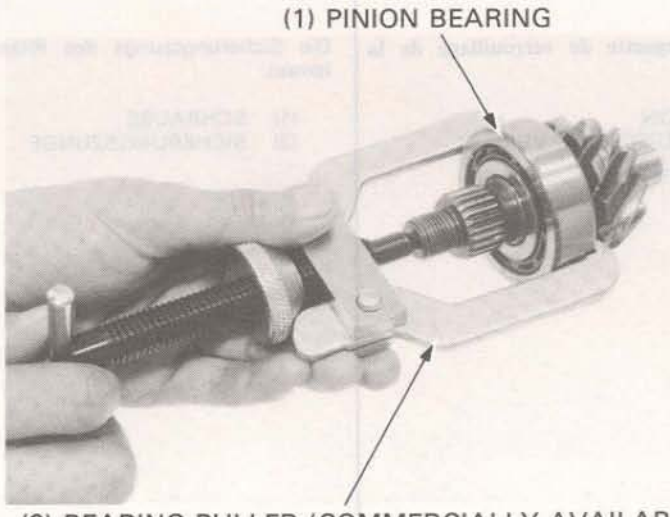


PINION BEARING REMOVAL

Pull the bearing outer and inner races off the shaft with the bearing puller.

Pull the other inner race off with the same tool.

Remove the pinion adjustment spacer.

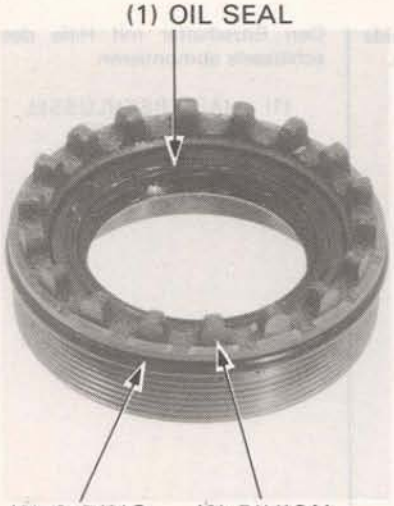


PINION RETAINER OIL SEAL REPLACEMENT

Remove the O-ring and oil seal from the pinion retainer.

Drive a new oil seal into the retainer.

Coat a new O-ring with oil and install it onto the retainer.



CASE BEARING AND OIL SEAL REPLACEMENT

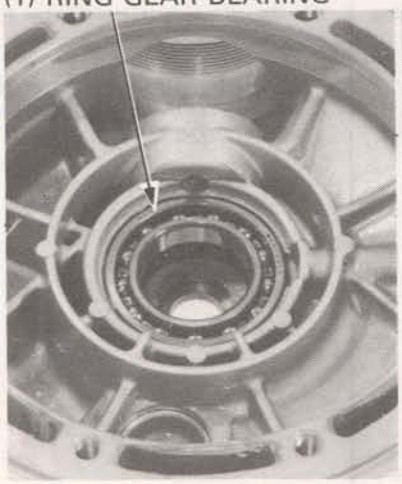
Heat the gear case 80°C (176°F). Tap the gear case with a plastic hammer and remove the ring gear and pinion bearings.

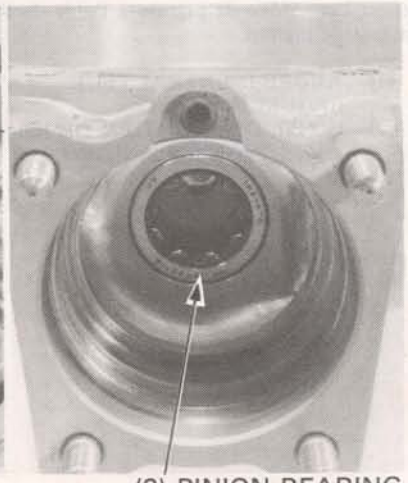
WARNING

Always wear gloves when handling the gear case after it has been heated.

NOTE

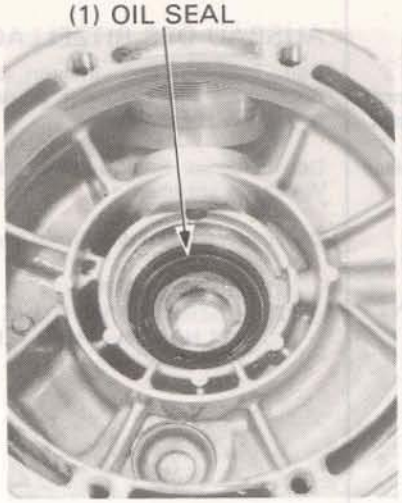
Use bearing remover, 35 mm, 07936-3710400 to remove ring gear case bearing.

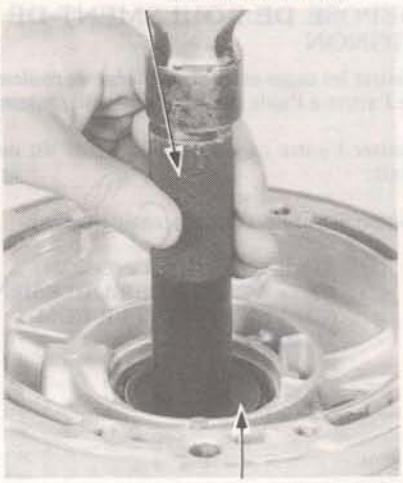




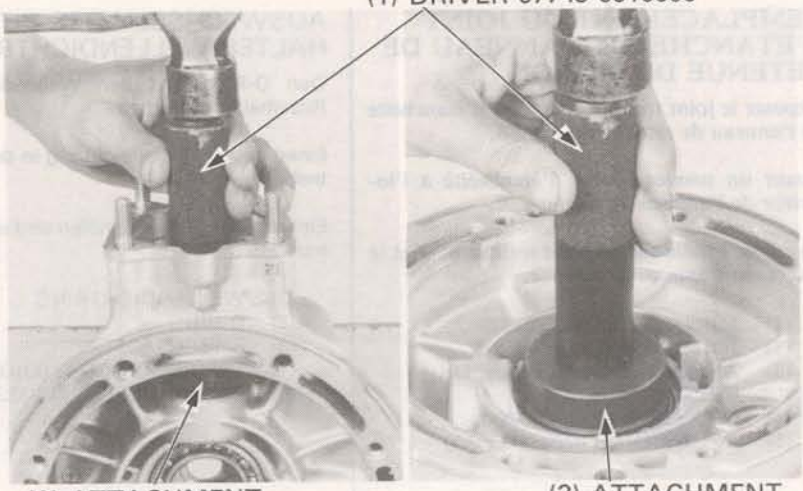
Remove the ring gear shaft oil seal.

Drive a new oil seal into the case, using the special tools.



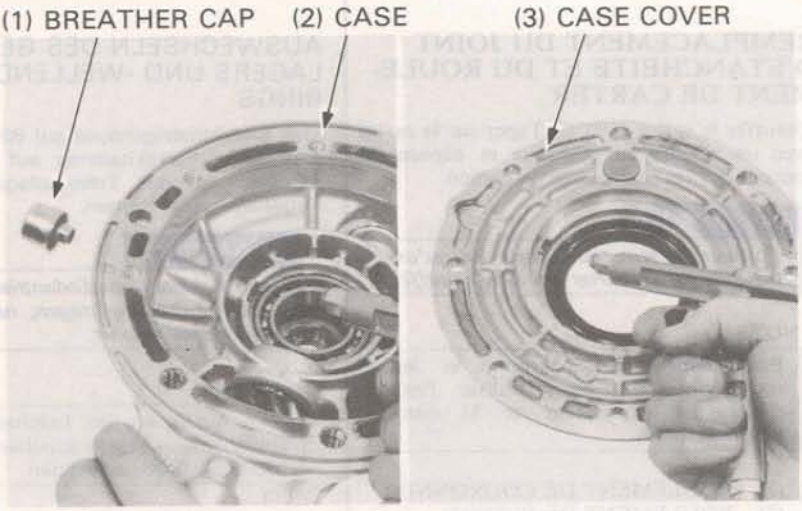


Drive new pinion and ring gear bearings into the case.



BREATHER HOLE CLEANING

Remove the breather hole cap and blow through the breather hole with compressed air.

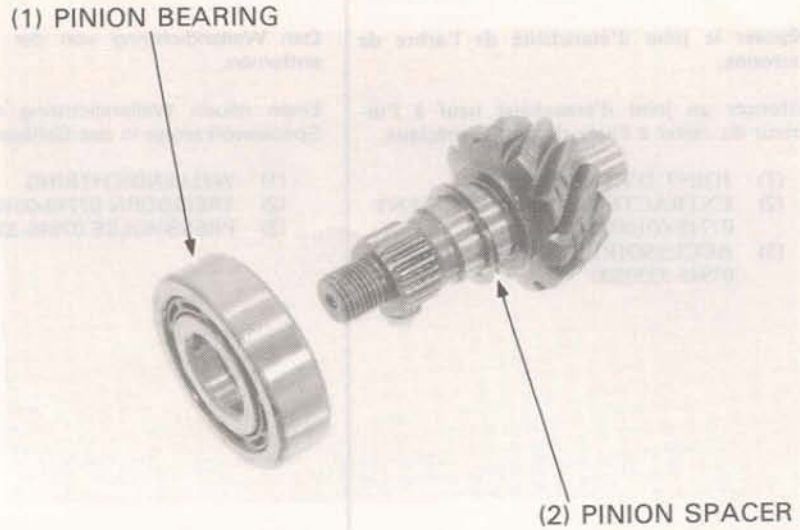


PINION GEAR ASSEMBLY

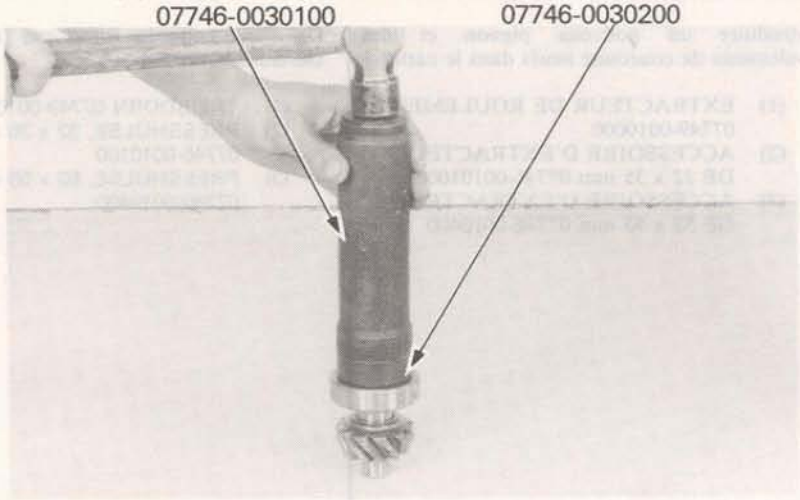
Install the original pinion gear spacer.

NOTE

When the gear set, pinion bearing and/or gear case has been replaced, use a 2.0 mm thick spacer.



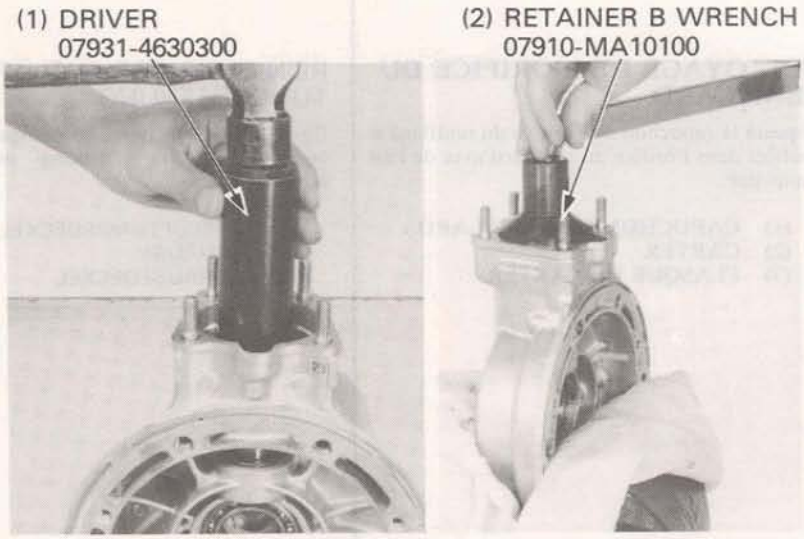
Press the bearing onto the pinion gear shaft with the special tools shown.



Place the pinion assembly into the gear housing. Drive the pinion assembly into the gear case until pinion retainer threads can engage with the case threads.
Apply gear oil to the O-ring and threads on the pinion retainer. Install the O-ring guide tool.

Screw in the pinion retainer to press the pinion bearing in place, then tighten it to the specified torque.

TORQUE: 100—120 N·m (10—12 kg-m. 72—87 ft-lb)



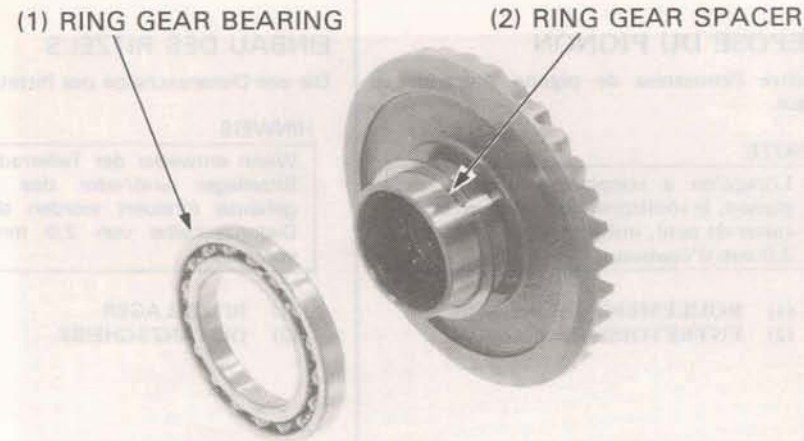
RING GEAR ASSEMBLY

Install the original spacer onto the ring gear.

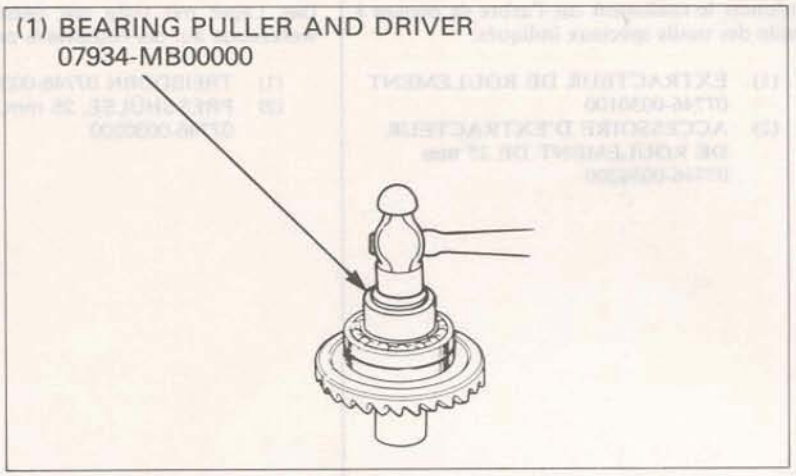
NOTE

If the gear set, pinion bearing, ring gear bearing and/or gear case is replaced, install a 2.0 mm thick spacer.

Place the ring gear bearing over the ring gear shaft.

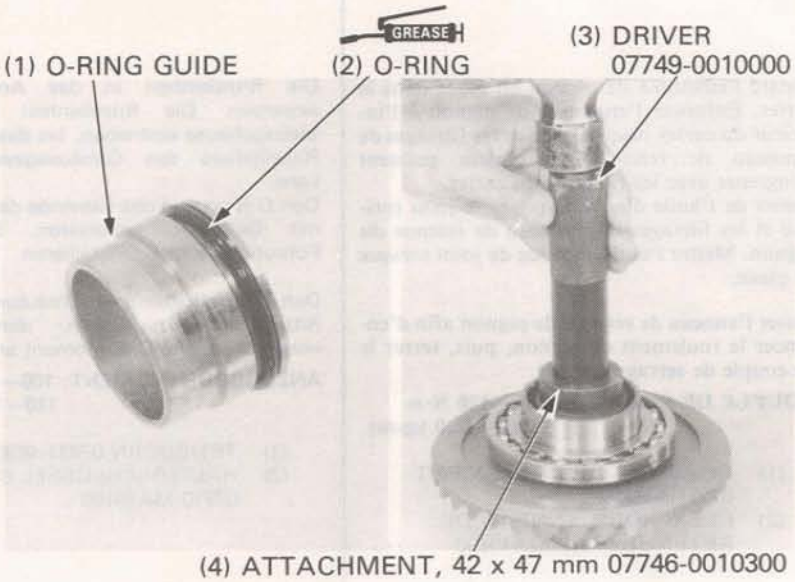


Place a new ring gear bearing on the ring gear shaft. Then, drive the new bearing onto the shaft with the bearing puller and driver.



Install a new O-ring onto the O-ring guide.

Apply grease to the O-ring and drive the O-ring guide onto the ring gear shaft.

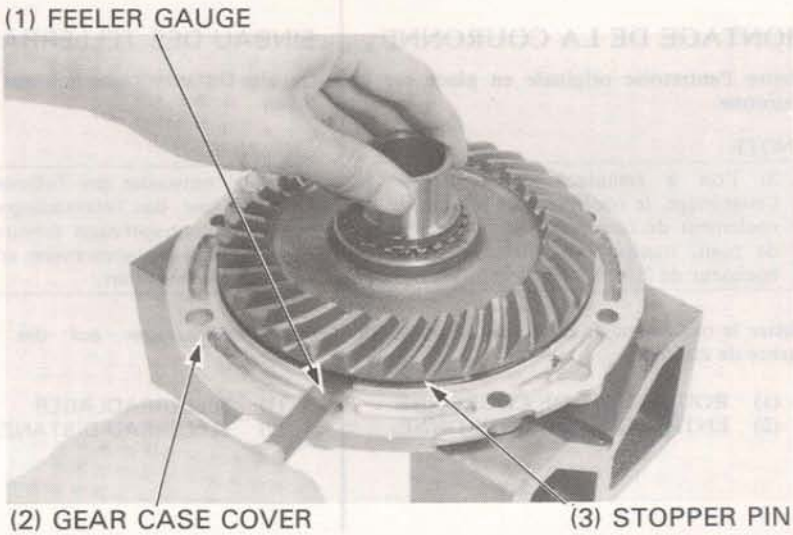


Install the ring gear into the gear case cover.

Measure the clearance between the ring gear and the ring gear stop pin with a feeler gauge.

CLEARANCE:

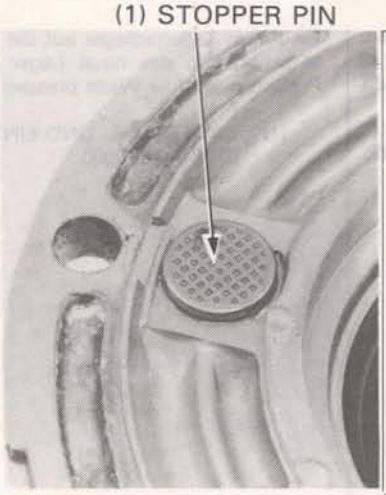
0.30—0.60 mm (0.012—0.024 in)

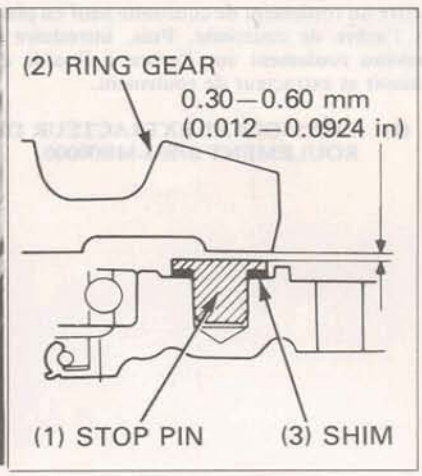


Remove the ring gear. If the clearance exceeds the service limit, heat the gear case cover to approximately 80°C (176°F) and remove the stop pin by tapping the cover.

WARNING

Always wear gloves when handling the gear case after it has been heated.





Install a stop pin shim to obtain the correct clearance.

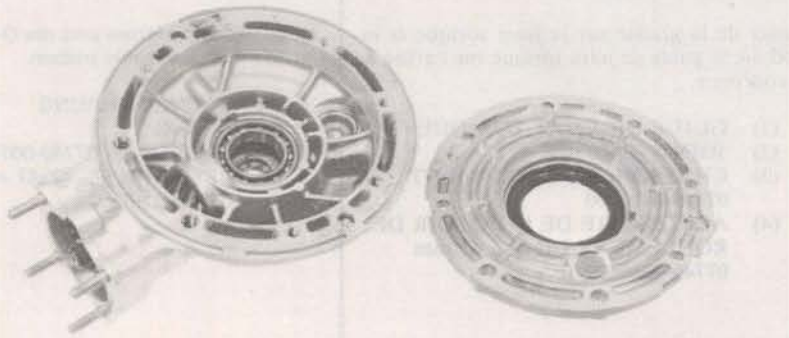
SHIM THICKNESS:
A: 0.10 mm (0.004 in)
B: 0.15 mm (0.006 in)

Install the shim and drive the stop pin into the case cover.

Clean all sealing material off the mating surfaces of the gear case and cover.

NOTE

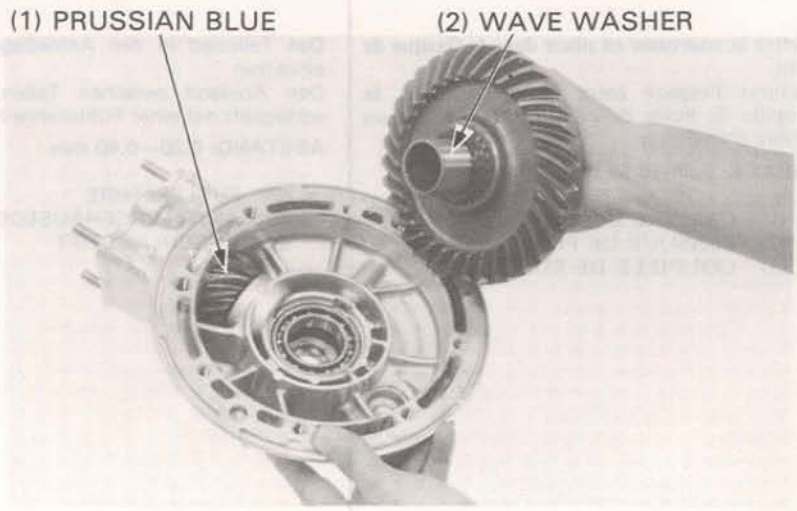
- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.



Apply liquid sealant to the mating surface of the gear case cover.

GEAR TOOTH CONTACT PATTERN CHECK

Apply a thin coat of Prussian Blue to the pinion gear teeth for a gear tooth contact pattern check. Place the wave washer and ring gear into the gear case.



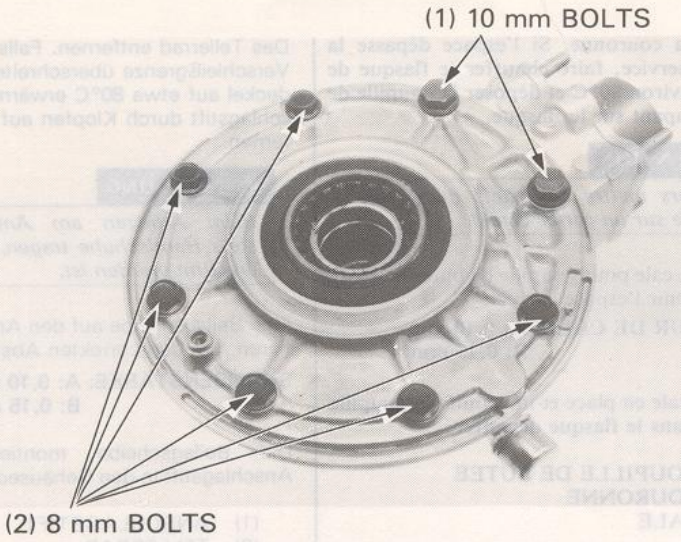
Apply gear oil to the lip of the oil seal on the gear case cover and install the gear case cover.

Tighten the cover bolts in 2—3 steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps.

TORQUE: 23—28 N·m (2.3—2.8 kg-m, 17—20 ft-lb)

Then tighten the 10 mm bolts.

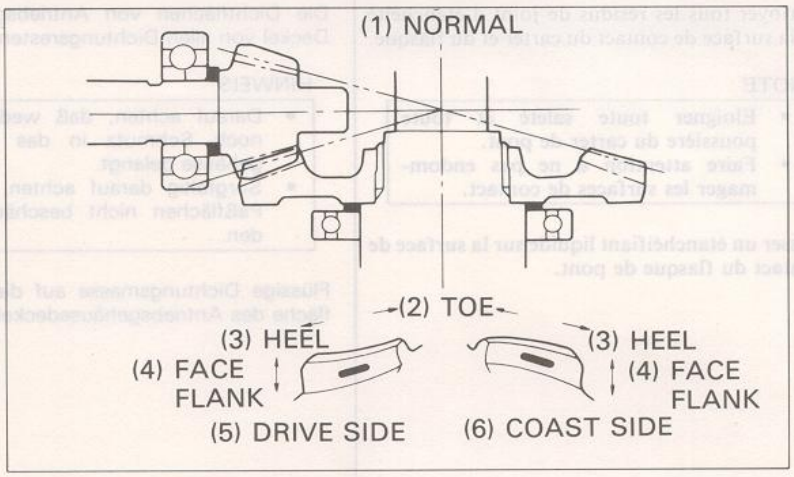
TORQUE: 40—50 N·m (4.5—5.0 kg-m, 33—36 ft-lb)



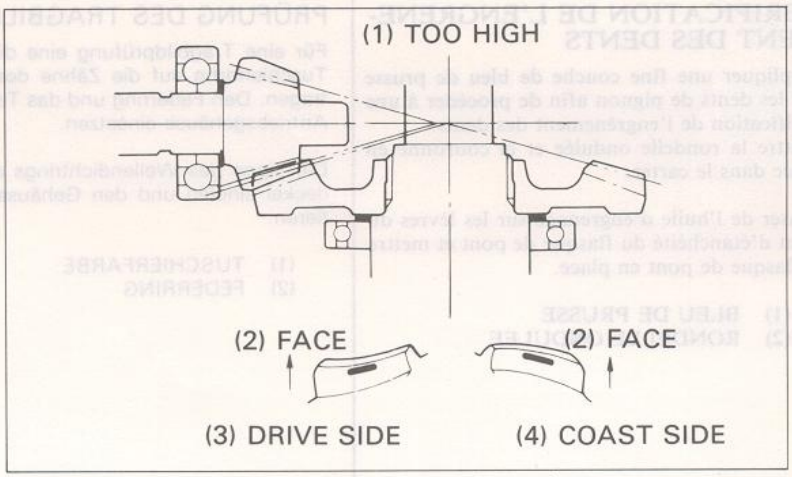
Remove the oil filler cap from the final gear case.

Rotate the ring gear several times in the normal direction of rotation. Check the gear tooth contact pattern through the oil filler hole. The pattern is indicated by the Prussian Blue applied to the pinion before assembly.

Contact is normal if the Prussian Blue is transfered to the approximate center of each tooth and slightly to the flank side.



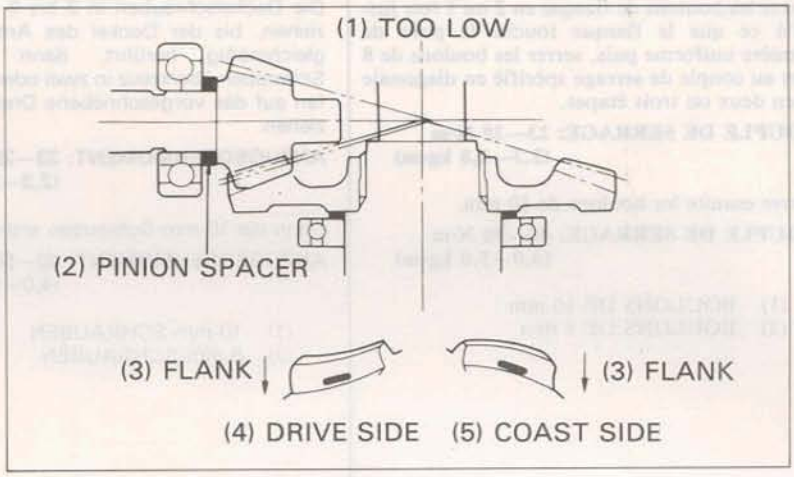
If the patterns are not correct, remove the replace the pinion spacer. Replace the pinion spacer with a thicker one if the contacts are too high, toward the face.



Replace the pinion spacer with a thinner one if the contacts are too low, to the flank side. The patterns will shift about 1.5—2.0 mm (0.06—0.08 in) when the thickness of the spacer is changed by 0.10 mm (0.004 in).

PINION SPACER:

A 1.82 mm (0.072 in)
B 1.88 mm (0.074 in)
C 1.94 mm (0.076 in)
D 2.00 mm (0.079 in) Standard
E 2.06 mm (0.081 in)
F 2.12 mm (0.084 in)
G 2.18 mm (0.086 in)

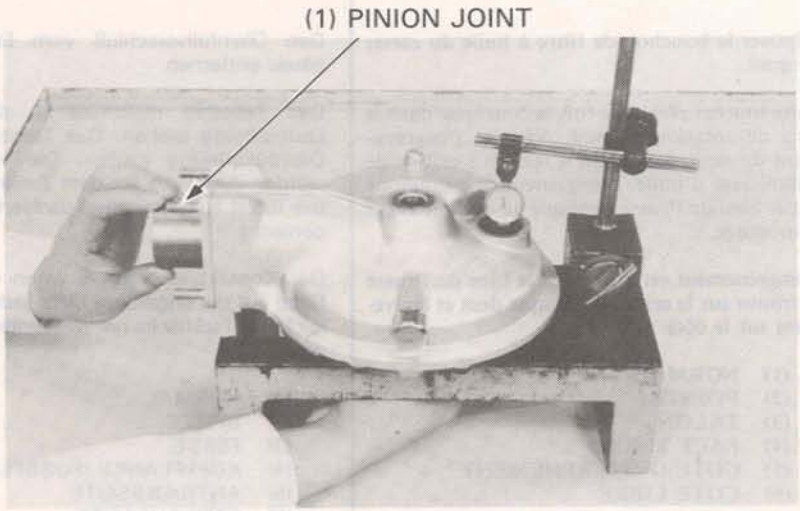


BACKLASH INSPECTION

Remove the oil filler cap.

Set the final gear assembly into a jig or stand to hold it steady. Set a horizontal type dial indicator on the ring gear, through the oil filler hole.

Temporally install the pinion joint onto the pinion gear and hold the pinion joint by hand.



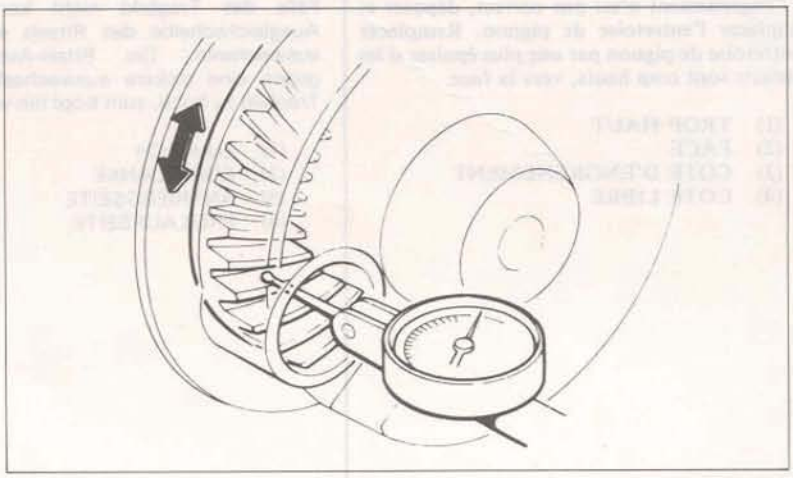
Rotate the ring gear by hand until gear slack is taken up. Turn the ring gear back and forth to read backlash.

STANDARD: 0.08—0.18 mm (0.003—0.007 in)
SERVICE LIMIT: 0.30 mm (0.02 in)

Remove the dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more.

Compare the difference of the three measurements.

DIFFERENCE OF MEASUREMENT
SERVICE LIMIT: 0.10 mm (0.004 in)



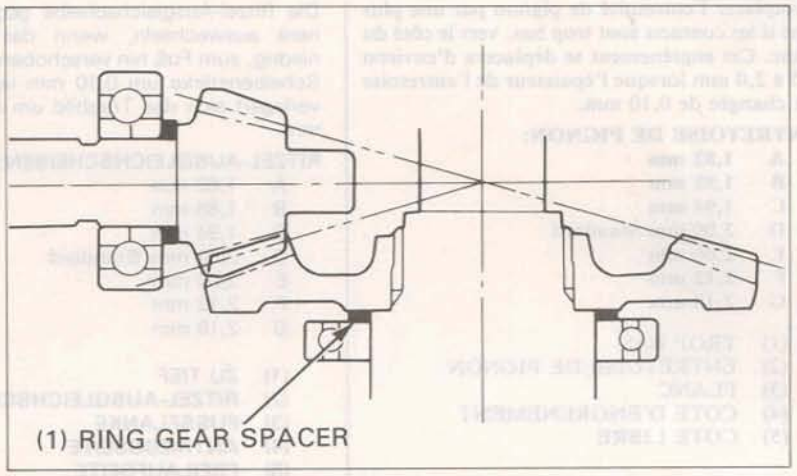
If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.

If backlash is too small, replace the ring gear spacer with a thinner one.

Backlash is changed by about 0.06—0.07 mm (0.002—0.003 in) when thickness of the spacer is changed by 0.10 mm (0.004 in).

RING GEAR SPACER:

- **A 1.82 mm (0.072 in)**
- **B 1.88 mm (0.074 in)**
- **C 1.94 mm (0.076 in)**
- **D 2.00 mm (0.079 in) Standard**
- **E 2.06 mm (0.081 in)**
- **F 2.12 mm (0.084 in)**
- **G 2.18 mm (0.086 in)**
- **H 2.24 mm (0.088 in)**
- **I 2.30 mm (0.091 in)**



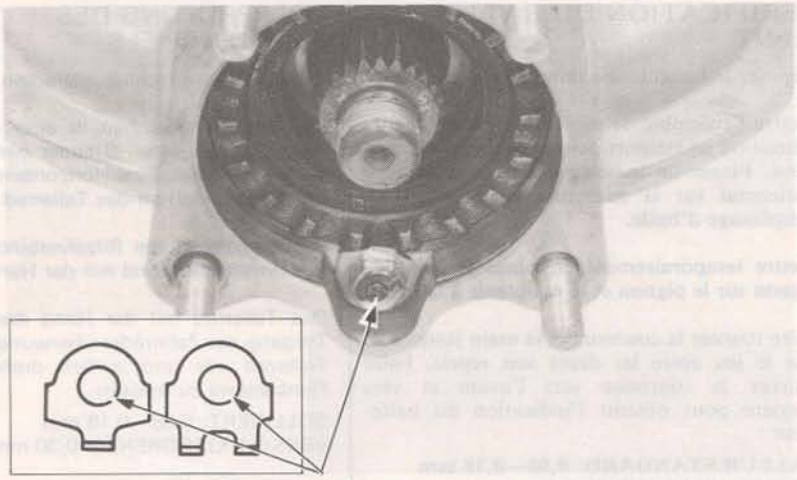
Remove the pinion joint from the pinion gear.

PINION JOINT INSTALLATION

Install the appropriate pinion retainer lock tab.

NOTE

There are two types of lock tabs as shown.



Apply gear oil to the oil seal lip contact surface of the pinion joint and install the pinion joint.

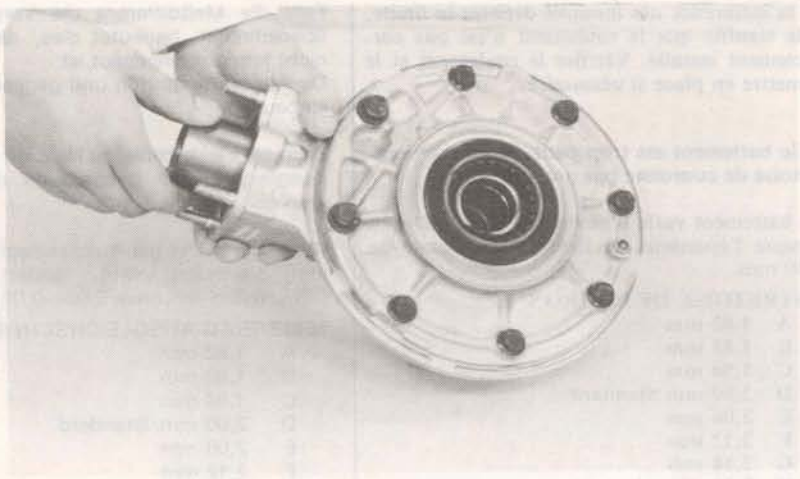
Install the pinion joint holder tool and tighten pinion nut.

TORQUE: 100—120 N·m (10—12 kg-m, 72—87 ft-lb)

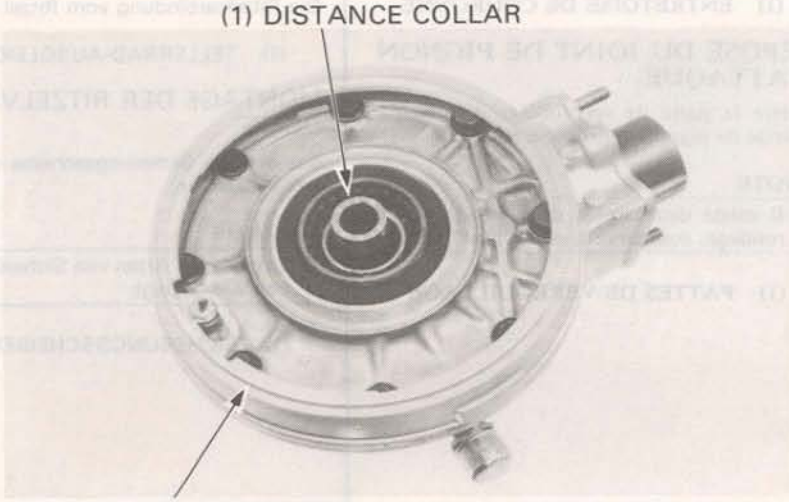
Remove the pinion joint holder tool.

Make sure that the gear assembly rotates smoothly without binding by turning the pinion joint.

GEAR ASSEMBLY PRELOAD:
2–4 N·m
(0.2–0.4 kg-m, 1.7–3.5 in-lb)



Install the dust guard plate and torque the bolt.
Install the distance collar.



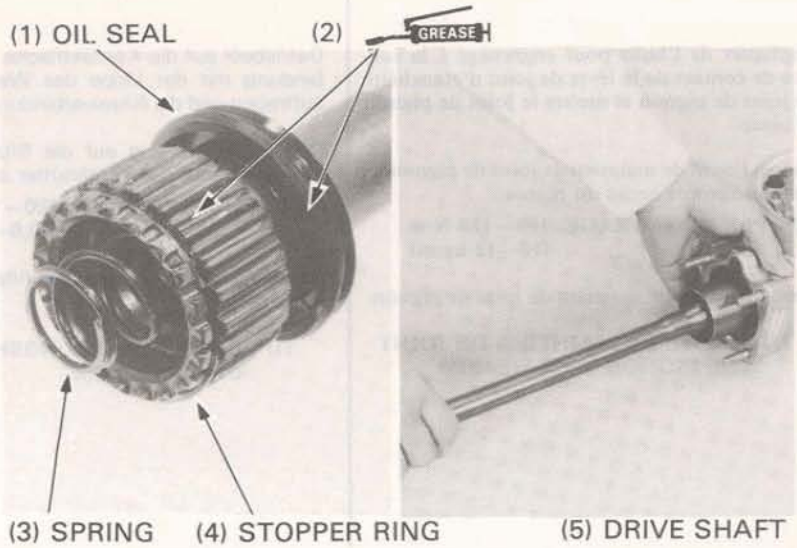
FINAL DRIVE INSTALLATION

Apply grease to the pinion joint splines and drive shaft oil seal.

Insert the drive shaft into the pinion joint until the stop ring seats in the pinion joint spline grooves.

NOTE

- Make sure that the stop ring is seated properly by pulling on the drive shaft lightly.
- Be careful not to damage the drive shaft oil seal.



Insert the drive shaft assembly into the swingarm and align its splines with the universal joint.

Attach the gear case onto the swingarm loosely.

NOTE

To ease axle installation, do not tighten the gear case nuts until after the axle is installed.

Install the rear wheel (page 14-9).
Tighten the axle nut.

TORQUE: 55—65 N·m (5.5—6.5 kg-m, 40—43 ft-lb)

Tighten the four final gear case attaching nuts.

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

Tighten the axle pinch bolt.

TORQUE: 20—30 N·m (2.0—3.0 kg-m, 14—22 ft-lb)

Place the motorcycle on its center stand.

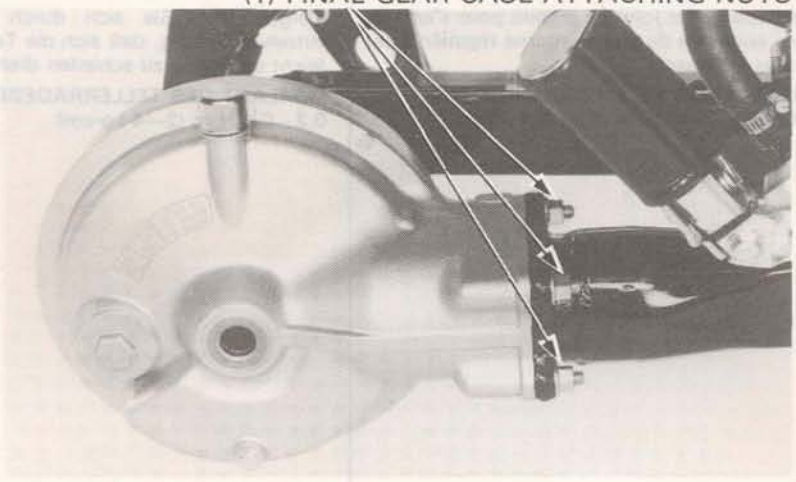
Make sure that the drain bolt is tightened.

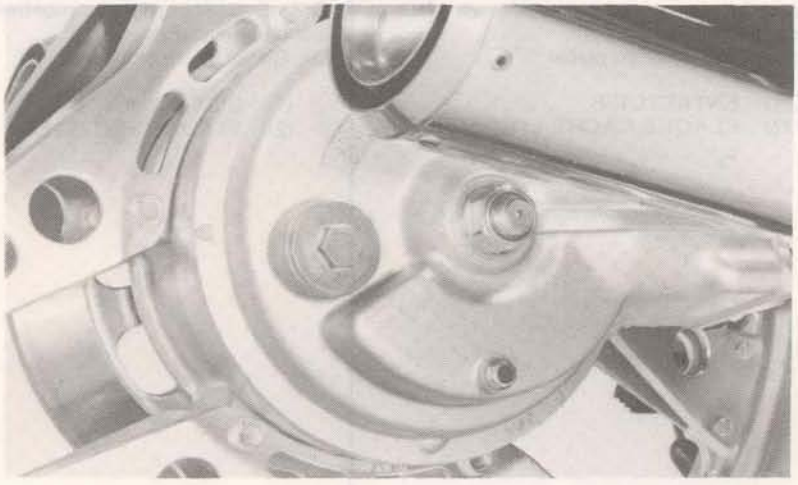
Remove the oil filler cap and pour the specified amount of recommended oil up to the filler neck.

RECOMMENDED OIL:
HYPOID GEAR OIL
Above 5°C: SAE 90
Below 5°C: SAE 80

OIL CAPACITY:
160—180 cc
(4.5—5.1 Imp. oz., 5.4—6.1 U.S. oz.)

(1) FINAL GEAR CASE ATTACHING NUTS





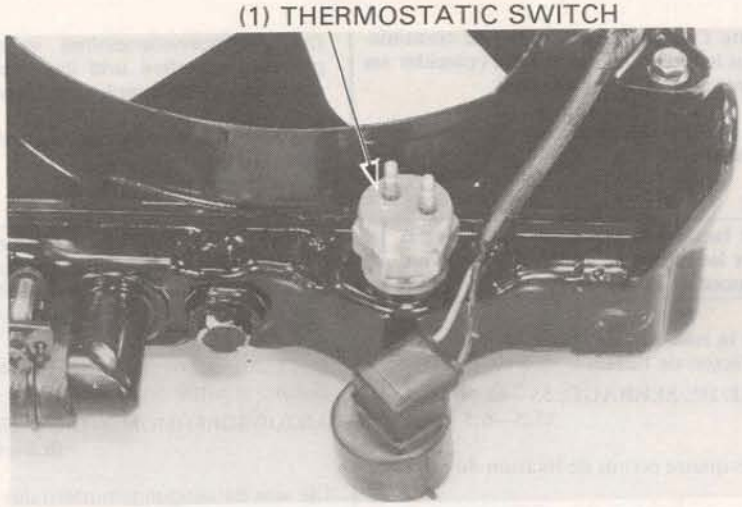
12. SWITCHE

THERMOSTATIC SWITCH

The cooling fan motor is actuated by the thermostatic switch.

Run the engine until coolant temperature reaches 98—102°C (208—216°F). The fan motor should stop when the coolant temperature drops to 93—97°C (200—207°F).

(1) THERMOSTATIC SWITCH

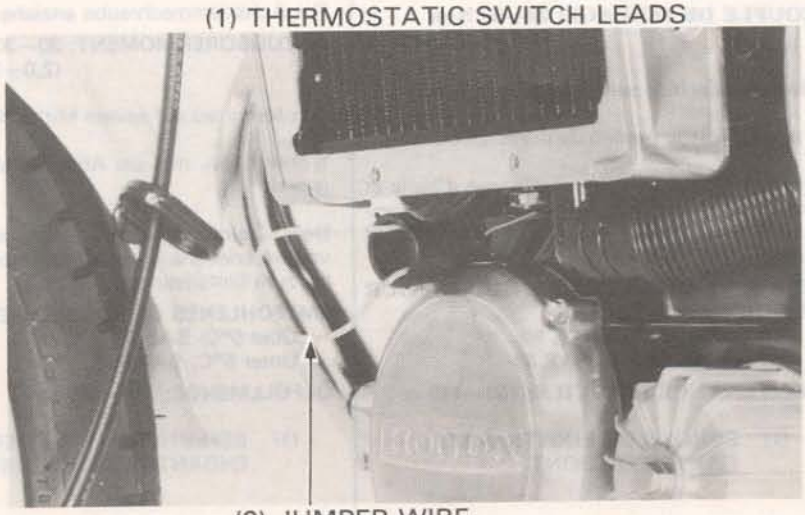


If the fan motor does not start, disconnect the black/blue and green leads from the thermostatic switch and short them together with a jumper wire as shown.

Turn the ignition switch on. The cooling fan motor should start running. If it starts, replace the fan thermostatic switch and retest.

If it does not start, check for battery voltage from the black lead (positive) to the green lead (negative) of the fan motor coupler.
If there is no voltage, check for a blown or faulty fuse, loose terminals or connectors, or an open circuit.

(1) THERMOSTATIC SWITCH LEADS



(2) JUMPER WIRE