HONDA

SERVICE MANUAL

85-87

ATC250ES

IMPORTANT SAFETY NOTICE

WARNING *Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.*

CAUTION: *Indicates a possibility of personal injury or equipment damage if instructions are not followed.*

NOTE: Gives helpful information.

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains *some* warnings and cautions against some specific service methods which could cause **PERSONAL INJURY** to service personnel or could damage a vehicle or render it unsafe. Please understand that those warnings could not cover all conceivable ways in which service, whether or not recommended by Honda, might be done or of the possibly hazardous consequences of each conceivable way, nor could Honda investigate all such ways. Anyone using service procedures or tools, whether or not recommended by Honda, *must satisfy himself thoroughly* that neither personal safety nor vehicle safety will be jeopardized by the service method or tools selected.

HOW TO USE THIS MANUAL

Sections 1 through 3 apply to the whole ATC, while sections 4 through 18 describe parts of the ATC, grouped according to location.

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

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

If you don't know what the source of the trouble is, refer to section 19, Troubleshooting.

HONDA MOTOR CO., LTD.
Service Publications Office

CONTENTS

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1. GENERAL INFORMATION

GENERAL SAFETY

WARNING

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

WARNING

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.

WARNING

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

WARNING

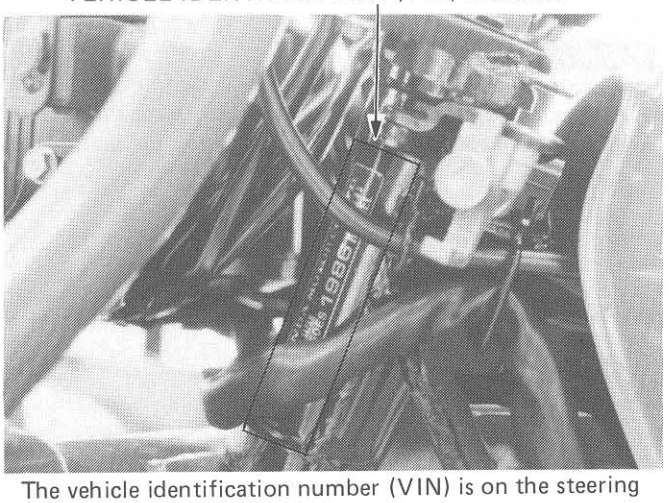
The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and call a doctor if electrolyte gets in your eyes.

SERVICE RULES

1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that don't meet HONDA's design specifications may cause damage to the ATC.
2. Use the special tools designed for this product to avoid damage and incorrect assembly.
3. Use only metric tools when servicing this ATC. Metric bolts, nuts, and screws are not interchangeable with English fasteners.
4. Install new gaskets, O-rings, cotter pins, lock plates, when reassembling.
5. When tightening bolts or nuts, begin with larger-diameter or inner bolts first. Then tighten to the specified torque diagonally in 1—5 steps, unless a particular sequence is specified.
6. Clean parts in non-flammable or high flash point solvent upon disassembly.
7. Lubricate any sliding surfaces before reassembly.
8. After reassembly, check all parts for proper installation and operation.

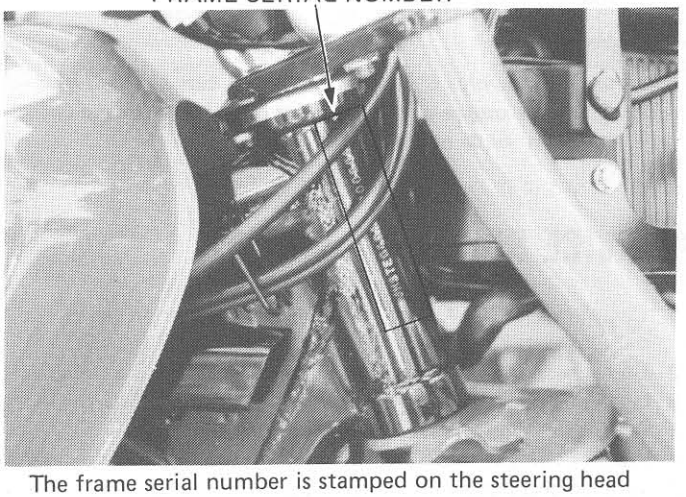
MODEL IDENTIFICATION

VEHICLE IDENTIFICATION (VIN) NUMBER



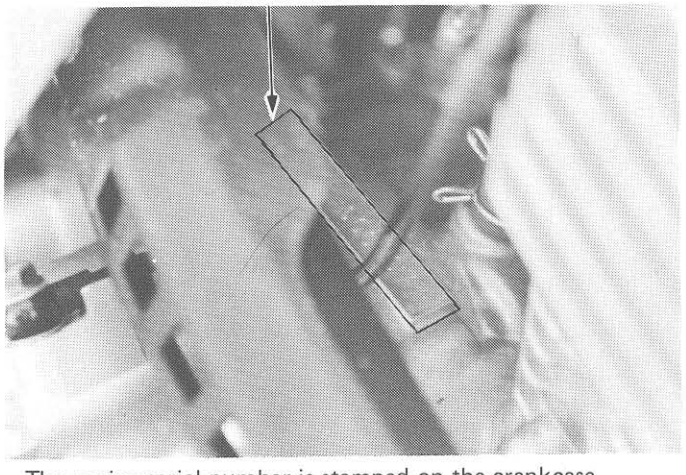
The vehicle identification number (VIN) is on the steering head's left side.

FRAME SERIAL NUMBER



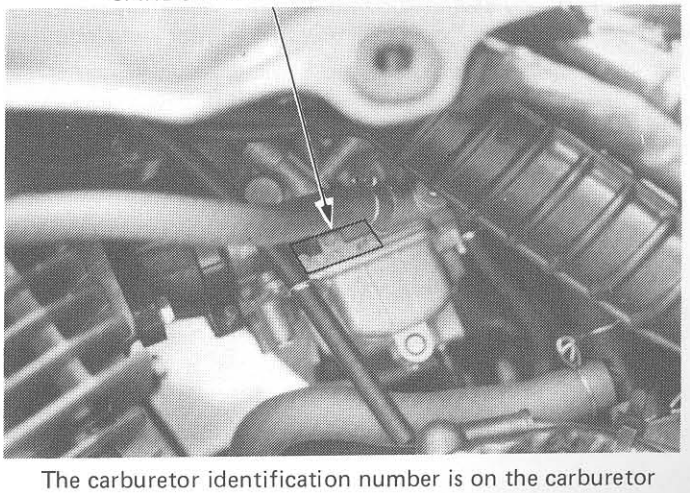
The frame serial number is stamped on the steering head right side.

ENGINE SERIAL NUMBER



The engine serial number is stamped on the crankcase lower right side.

CARBURETOR IDENTIFICATION



The carburetor identification number is on the carburetor body left side.

SPECIFICATIONS

DIMENSIONS	Overall length		1,887 mm (74.3 in)
	Overall width		1,137 mm (44.8 in)
	Overall height		1,038 mm (40.9 in)
	Wheel base		1,237 mm (48.7 in)
	Rear tread		840 mm (33.0 in)
	Seat height		705 mm (27.8 in)
	Foot peg height		267 mm (10.5 in)
	Ground clearance		165 mm (6.5 in)
	Dry weight		'85: 184 kg (406 lb) After '85: 186 kg (410 lb)
FRAME	Type		Semi-double cradle
	Front suspension, travel		Telescopic fork, 115 mm (4.5 in)
	Rear suspension, travel		Swingarm, 110 mm (4.3 in)
	Rim size	Front	9 in
		Rear	9 in
	Front tire size, pressure		25 x 12.00—9, 0.15 kg/cm² (2.2 psi)
	Rear tire size, pressure		25 x 12.00—9, 0.15 kg/cm² (2.2 psi)
	Front brake		Cable operated leading shoe
	Rear brake		Cable operated leading shoe
	Fuel capacity		12 liters (3.2 US gal, 2.6 Imp gal)
	Fuel reserve capacity		2.0 liters (0.53 US gal, 0.44 Imp gal)
	Caster		19.5°
	Trail		0 mm (0 in)
	Front fork oil capacity		113±2.5 cc (3.8±0.08 oz)
ENGINE	Type		Gasoline, air-colled 4-stroke
	Cylinder arrangement		Single cylinder inclined 20°
	Bore x stroke		74.0 x 57.3 mm (2.91 x 2.26 in)
	Displacement		246 cc (15.0 cu in)
	Compression ratio		9 : 1
	Valve train		Overhead camshaft chain drive
	Maximum horsepower		17.8 BHP/7000 rpm (18PS/7000 rpm)
	Maximum torque		1.9 kg-m/6000 rpm (13.7 ft-lb/6000 rpm)
	Oil capacity		2.5 liter (2.6 US qt, 2.2 Imp qt) after disassembly 2.1 liter (2.2 US qt, 1.8 Imp qt) after draining
	Lubrication system		Forced pressure and wet sump
	Cylinder compression		12—13 kg/cm² (170—185 psi)
	Intake valve	Opens	8° BTDC } at 1 mm lift
		Closes	35° ABDC
	Exhaust valve	Opens	40° BBDC
		Closes	5° ATDC
	Valve clearance	Intake	0.08 mm (0.003 in)
	(Cold)	Exhaust	0.08 mm (0.003 in)
	Engine dry weight		46.3 kg (102 lb)
CARBURETOR	Type		Dual valve
	Venturi dia.		27 mm (1.06 in)
	Main jet		#130
	Primary jet		#45
	Starter fuel jet		see page 4-1
	Pilot screw opening		2 turns out
	Jet needle		4 DB—2nd groove
	Float level		18.5 mm (0.73 in)
	Idle speed		1,400±100 rpm

DRIVE TRAIN	Clutch		Wet multi-plate, semi-automatic
	Transmission		5-speed constant mesh with reverse
	Primary reduction		2.407 (65/27)
	Gear ratio	SL	4.083 (49/12)
		I	2.389 (43/18)
		II	1.609 (37/23)
		III	1.179 (33/28)
		IV	0.906 (29/32)
		Reverse	7.333 (34/12) (44/17)
	Final reduction		5.684 (19/13) (35/9)
	Gearshift pattern		Left foot operated return system, Forward : N-SL-1-2-3-4 Reverse : N-R
ELECTRICAL	Ignition		C.D.I.
	Ignition timing	Initial	13° BTDC at idle
		Full advance	31° BTDC at 3,500 rpm
	Alternator	Capacity	200 W/5,000 rpm
	Battery		12V–10 AH
	Spark plug		DR8ES-L (NGK) X24ESR-U (ND)
	Spark plug gap		0.6–0.7 mm (0.024–0.028 in)
	Headlight		12V 60W/60W
	Taillight		12V 5W x 2
	Neutral indicator		12V 3W
	Reverse indicator		12V 3W

TORQUE VALUES

'85

ENGINE

Item	Q'ty	Thread Size (mm)	Torque		
			N·m	kg-m	ft-lb
Cylinder head socket bolt	3	8 x 1.25	22–28	2.2–2.8	16–20
Cylinder head cap nut	4	10 x 1.25	35–45	3.5–4.5	25–33
Crankcase SH bolt	14	6 x 1.0	8–12	0.8–1.2	6– 9
Gearshift return spring pin	1	8 x 1.25	18–25	1.8–2.5	13–18
Output gear case socket bolt	3	8 x 1.25	20–25	2.0–2.5	15–18
Output driven gear bearing holder socket bolt	3	8 x 1.25	20–25	2.0–2.5	15–18
Output gear bearing outer lock nut	1	64 x 1.5	90–110	9.0–11.0	65–80
Output driven gear bearing outer lock nut	1	60 x 1.5	90–110	9.0–11.0	65–80
Output gear bearing inner lock nut	1	28 x 1.0	70–80	7.0–8.0	51–58
Kick starter stopper plate socket bolt	2	6 x 1.0	10–14	1.0–1.4	7–10
Flywheel bolt	1	12 x 1.25	100–120	10.0–12.0	72–87
Pulse generator screw	2	5 x 0.8	8–12	0.8–1.2	6– 9
Right crankcase cover SH bolt	12	6 x 1.0	8–12	0.8–1.2	6– 9
Left crankcase cover SH bolt	11	6 x 1.0	8–12	0.8–1.2	6– 9
Oil separator plate SH bolt	2	6 x 1.0	8–12	0.8–1.2	6– 9
Manual clutch lock nut	1	18 x 1.0	100–120	10–12	72–87
Clutch lifter cap bolt	4	6 x 1.0	10–14	1.0–1.4	7–10
Centrifugal clutch lock nut	1	20 x 1.0	110–130	11.0–13.0	80–94
Cylinder base SH bolt	2	6 x 1.0	8–12	0.8–1.2	6– 9
Cam sprocket bolt	2	7 x 1.0	17–23	1.7–2.3	12–17
Cylinder head cover SH bolt	7	6 x 1.0	8–12	0.8–1.2	6– 9
Valve adjusting lock nut	2	6 x 0.75	15–18	1.5–1.8	11–13
Cam chain holder socket bolt	1	6 x 1.0	8–12	0.8–1.2	6– 9
	3	7 x 1.0	8–12	0.8–1.2	6– 9
Spark plug	1	12 x 1.25	15–20	1.5–2.0	11–15
Intake manifold band screw	1	5 x 0.8	3– 5	0.3–0.5	2– 4
Oil filter cover SH bolt	3	6 x 1.0	8–12	0.8–1.2	6– 9
Neutral/Reverse switch	2	10 x 1.25	11–15	1.1–1.5	8–11
Starter clutch socket bolt	6	8 x 1.25	18–25	1.8–2.5	13–18
Cam chain tensioner lifter SH bolt	2	6 x 1.0	8–12	0.8–1.2	6– 9
Alternator stator SH bolt	3	6 x 1.0	8–12	0.8–1.2	6– 9
Breather plate socket bolt	1	6 x 1.0	10–14	1.0–1.4	7–10
Clutch adjusting screw lock nut	1	8 x 1.25	19–25	1.9–2.5	14–18
Cam chain tensioner lifter sealing bolt	1	6 x 1.0	8 – 12	0.8–12	6– 9

FRAME

Item	Q'ty	Thread Size (mm)	Torque		
			N·m	kg-m	ft-lb
Handlebar upper holder bolt	4	8 x 1.25	18–30	1.8–3.0	13–22
Handlebar upper holder nut	2	10 x 1.25	40–50	4.0–5.0	29–36
Fork bridge bolt	2	12 x 1.25	50–70	5.0–7.0	36–51
Steering stem nut	1	24 x 1.0	70–90	7.0–9.0	51–65
Steering bearing adjustment nut (Initial) (Final)	1	24 x 1.0	 25–35 7–8	 2.5–3.5 0.7–0.8	 18–25 5– 6
Wheel nut	12	10 x 1.25	50–60	5.0–6.0	36–43
Front axle	1	14 x 1.5	70–110	7.0–11.0	51–80
Rear axle nut	2	20 x 1.5	80–120	8.0–12.0	58–87
Rear brake panel nut	4	10 x 1.25	50–60	5.0–6.0	36–43
Rear shock absorber mount bolt	2	10 x 1.25	50–60	5.0–6.0	36–43
Front fork mount bolt	4	10 x 1.25	50– 60	5.0–6.0	36–43
Swingarm right pivot bolt	1	30 x 1.5	16–20	1.6–2.0	12–15
Swingarm left pivot bolt	1	30 x 1.5	100–130	10.0–13.0	72–94
Swingarm pivot lock nut	1	30 x 1.5	100–130	10.0–13.0	72–94
Final gear case mount bolt	4	10 x 1.25	50–60	5.0–6.0	36–43
	4	8 x 1.25	28–35	2.8–3.5	20–25
Rear left bearing housing bolt	4	8 x 1.25	28–35	2.8–3.5	20–25
Engine hanger bolt	9	10 x 1.25	45–65	4.5–6.5	33–47
Gearshift pedal bolt	1	6 x 1.0	10–14	1.0–1.4	7–10
Foot peg bracket bolt	4	10 x 1.25	40–50	4.0–5.0	29–36
Intake manifold bolt	2	6 x 1.0	6– 9	0.6–0.9	5– 7
Muffler clamp bolt	2	8 x 1.25	18–28	1.8–2.8	13–20
Front fork socket bolt	2	8 x 1.25	18–25	1.8–2.5	13–18
Rear shock absorber rod lock nut	1	12 x 1.25	38–60	3.8–6.0	27–43
Final gear case cover bolt	2	10 x 1.25	45–50	4.5–5.0	25–36
	6	8 x1.25	23–28	2.3–2.8	17–20
Pinion joint nut	1	16 x 1.5	100–120	10.0–12.0	72–87
Pinion bearing outer race lock nut	1	60 x 1.5	90–110	9.0–11.0	65–80

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

Item	Torque N·m (kg-m, ft-lb)	Item	Torque N·m (kg-m, ft-lb)
5 mm bolt, nut	4.5–6 (0.45–0.6, 3–4)	5 mm screw	3.5–5 (0.35–0.5, 2–4)
6 mm bolt, nut	8–12 (0.8–1.2, 6–9)	6 mm screw, SH bolt	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	35–45 (3.5–4.5, 25–33)

AFTER '85:

ENGINE

Item	Q'ty	Thread Size (mm)	Torque		
			N·m	kg-m	ft-lb
Cylinder head socket bolt	3	8 x 1.25	22–28	2.2–2.8	16–20
Cylinder head cap nut	4	10 x 1.25	35–45	3.5–4.5	25–33
Crankcase SH bolt	14	6 x 1.0	8–12	0.8–1.2	6–9
Gearshift return spring pin bolt	1	8 x 1.25	18–25	1.8–2.5	13–18
Output gear case bolt	3	8 x 1.25	30–34	3.0–3.4	22–25
Output driven gear bearing holder socket bolt	3	8 x 1.25	20–25	2.0–2.5	14–18
Output gear bearing outer lock nut	1	64 x 1.5	90–110	9.0–11.0	65–80
Output driven gear bearing outer lock nut	1	60 x 1.5	90–110	9.0–11.0	65–80
Output gear bearing inner lock nut	1	28 x 1.0	70–80	7.0–8.0	51–58
Kick starter stopper plate socket bolt	2	6 x 1.0	10–14	1.0–1.4	7–10
Flywheel bolt	1	12 x 1.25	100–120	10.0–12.0	72–87
Pulse generator screw	2	5 x 0.8	5–7	0.5–0.7	4–5
Right crankcase cover SH bolt	12	6 x 1.0	8–12	0.8–1.2	6–9
Left crankcase cover SH bolt	11	6 x 1.0	8–12	0.8–1.2	6–9
Oil separator plate SH bolt	2	6 x 1.0	8–12	0.8–1.2	6–9
Manual clutch lock nut	1	18 x 1.0	100–120	10.0–12.0	72–87
Clutch lifter bolt	4	6 x 1.0	10–14	1.0–1.4	7–10
Centrifugal clutch lock nut	1	20 x 1.0	110–130	11.0–13.0	80–94
Cylinder base SH bolt	2	6 x 1.0	8–12	0.8–1.2	6–9
Cam sprocket bolt	2	7 x 1.0	17–23	1.7–2.3	12–17
Cylinder head cover SH bolt	7	6 x 1.0	8–12	0.8–1.2	6–9
Valve adjusting lock nut	2	6 x 0.75	15–18	1.5–1.8	11–13
Cam chain holder socket bolt	1	6 x 1.0	10–14	1.0–1.4	7–10
Oil pipe bolt	3	7 x 1.0	10–14	1.0–1.4	7–10
Spark plug	1	12 x 1.25	15–20	1.5–2.0	11–14
Intake pipe band screw	1	5 x 0.8	3–5	0.3–0.5	2–4
Oil filter cover SH bolt	3	6 x 1.0	8–12	0.8–1.2	6–9
Neutral/Reverse switch	2	10 x 1.25	11–15	1.1–1.5	8–11
Starter clutch torx bolt	6	8 x 1.25	20–25	2.0–2.5	14–18
Cam chain tensioner lifter SH bolt	2	6 x 1.0	8–12	0.8–1.2	6–9
Alternator stator SH bolt	3	6 x 1.0	8–12	0.8–1.2	6–9
Breather plate socket bolt	1	6 x 1.0	10–14	1.0–1.4	7–10
Clutch adjusting screw lock nut	1	8 x 1.25	18–25	1.8–2.5	13–18
Cam chain tensioner lifter sealing bolt	1	6 x 1.0	8–12	0.8–1.2	6–9
Engine oil drain plug	1	12 x 1.5	20–30	2.0–3.0	14–22
Intake pipe bolt	2	6 x 1.0	10–14	1.0–1.4	7–10
Gear case drain bolt	1	8 x 1.25	10–14	1.0–1.4	7–10
Gear case filler cap	1	30 x 1.5	10–14	1.0–1.4	7–10

FRAME

Item	Q'ty	Thread Size (mm)	Torque		
			N·m	kg-m	ft-lb
Handlebar upper holder bolt	4	8 x 1.25	18–30	1.8–3.0	13–22
Handlebar lower holder nut	2	10 x 1.25	40–50	4.0–5.0	29–36
Fork bridge bolt	2	12 x 1.25	50–70	5.0–7.0	36–51
Steering stem nut	1	24 x 1.0	70–90	7.0–9.0	51–65
Steering bearing adjustment nut (Initial) (Final)	1	24 x 1.0	 25–35 7–8	 2.5–3.5 0.7–0.8	 18–25 5–6
Wheel nut	12	10 x 1.25	60–70	6.0–7.0	43–51
Front axle	1	14 x 1.5	70–110	7.0–11.0	51–80
Rear axle nut	2	18 x 1.5	80–140	8.0–14.0	58–101
Rear brake panel nut	4	10 x 1.25	50–60	5.0–6.0	36–43
Rear shock absorber mount bolt	2	10 x 1.25	50–60	5.0–6.0	36–43
Front fork pinch bolt	4	10 x 1.25	50–60	5.0–6.0	36–43
Swingarm right pivot bolt	1	30 x 1.5	16–20	1.6–2.0	12–14
Swingarm left pivot bolt	1	30 x 1.5	100–130	10.0–13.0	72–94
Swingarm pivot lock nut	1	30 x 1.5	100–130	10.0–13.0	72–94
Final gear case mount bolt	4	10 x 1.25	50–60	5.0–6.0	36–43
	4	8 x 12.5	30–36	3.0–3.6	22–26
Left rear bearing housing bolt	4	8 x 1.25	30–36	3.0–3.6	22–26
Engine hanger bolt 10 mm	9	10 x 1.25	45–65	4.5–6.5	33–47
Engine hanger bolt 8 mm	2	8 x 1.25	24–30	2.4–3.0	17–22
Gearshift pedal bolt	1	6 x 1.0	14–18	1.4–1.8	10–13
Foot peg bracket bolt	4	10 x 1.25	40–50	4.0–5.0	29–36
Intake manifold bolt	2	6 x 1.0	10–14	1.0–1.4	7–10
Muffler clamp bolt	2	8 x 1.25	18–28	1.8–2.8	13–20
Front fork socket bolt	2	8 x 1.25	15–25	1.5–2.5	11–18
Rear shock absorber rod lock nut	1	12 x 1.25	38–60	3.8–6.0	27–43
Final gear case cover bolt 10 mm	2	10 x 1.25	45–50	4.5–5.0	33–36
Final gear case cover bolt 8 mm	6	8 x 1.25	23–28	2.3–2.8	17–20
Pinion joint nut	1	16 x 1.5	100–120	10.0–12.0	72–87
Pinion bearing outer race lock nut	1	60 x 1.5	90–110	9.0–11.0	65–80
Front axle holder nut	4	6 x 1.0	10–14	1.0–1.4	7–10

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

Item	Torque N·m (kg-m, ft-lb)	Item	Torque N·m (kg-m, ft-lb)
5 mm bolt, nut	4.5–6 (0.45–0.6, 3–4)	5 mm screw	3.5–5 (0.35–0.5, 2–4)
6 mm bolt, nut	8–12 (0.8–1.2, 6–9)	6 mm screw, SH bolt	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	35–45 (3.5–4.5, 25–33)

TOOLS

SPECIAL

DESCRIPTION	TOOL NUMBER	ALTERNATIVE TOOL	TOOL NUMBER	REF. SECTION
Pinion joint holder	07924—HA00000			12
Pinion gear driver	07945—HA00000	Bearing driver		12
Universal bearing puller	07631—0010000	Commercially available in U.S.A.		10, 12
Socket bit, 17 mm	07703—0020500			12
Pivot lock nut wrench	07908—4690001	Lock nut wrench (U.S.A.)	KS—HBA—08—469	12
Attachment	07965—SA00600			12
Steering stem socket	07916—3710100			11
Lock nut wrench, 34 x 44 mm	07916—ME50000			10
Clutch holder	07923—HA80000	07923—HB3000A—U.S.A. only		8
Clutch puller	07933—HA80000	07933—HB3000A—U.S.A. only		8
Hex wrench, 6 mm	07917—3230000	Commercially available in U.S.A.		11
Clutch center holder	07923—KE10001	Commercially available in U.S.A.		8
Pinion holder	07924—ME50000			10, 12
Crank assembly kit	07931—KF00000			10
—Assembly collar	07931—KF00100			10
—Threaded adapter	07931—KF00200			10
—Shaft puller	07931—ME40000			10, 12
Bearing remover, 17 mm	07936—3710300			8,10
Remover handle	07936—3710100			10, 12
Remover weight	07741—0010201	Remover weight	07936—3710200	9,10, 12
Bearing remover set, 10 mm	07936—GE00000			9
Bearing remover set, 20 mm	07936—3710001			8
—Bearing remover, 20 mm	07936—3710600			8
—Remover handle	07936—3710100			8
—Remover weight	07741—0010201			8
Bearing remover, 15 mm	07936—KC10000		07936—3710200	10
—Bearing remover, 15 mm	07936—KC10500			10
—Remover weight	07741—0010201			10
Attachment, 28 x 30 mm	07946—1870100			8, 10
Attachment	07946—3290000			11
Steering stem driver	07946—4300101	Steering stem driver and attachment (U.S.A. only)	07946—MB00000 GN-HT-54	11
Ball race remover	07953—3330000			11
Valve guide reamer	07984—0980000			6
Universal bead breaker	GN—AH—958—BB1	(U.S.A. only)		11
Lock nut wrench, 30 x 64 mm	07916—MB00000			10
Shock absorber compressor base	07959—MB10000			12
Bearing remover	07936—4150000		07936—3710500	12
Fork seal driver	07747—0010100		07947—3330000	11
Attachment	07749—0010501		07947—3330000	11
Water seal driver	07947—HA00000			12

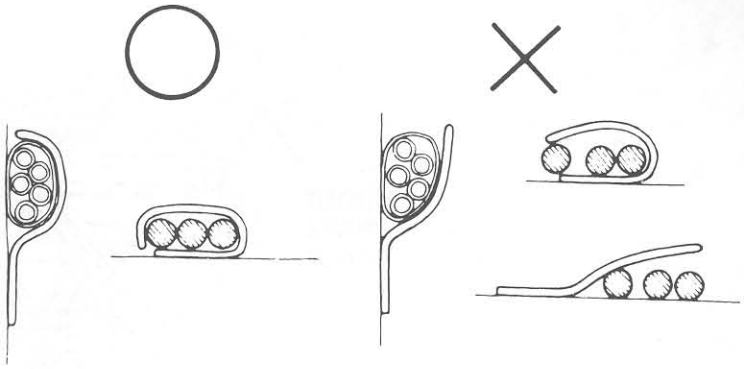
COMMON

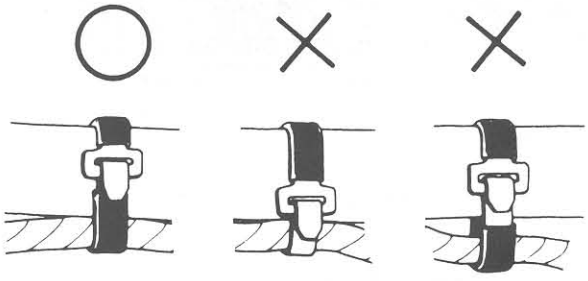
DESCRIPTION	TOOL NUMBER	ALTERNATIVE TOOL	TOOL NUMBER	REF. SECTION
Float level gauge	07401—0010000			4
Valve adjusting wrench, 10 x 12 mm	07708—0030200	Commercially available in U.S.A.		3
Valve adjusting wrench A	07708—0030300			3
Valve adjusting wrench B	07708—0030400			3
Lock nut wrench, 17 x 27 mm	07716—0020300	Commercially available in U.S.A.		8
Lock nut wrench, 30 x 32 mm	07716—0020400			11
Extension	07716—0020500	Commercially available in U.S.A.		8, 11
Flywheel holder	07725—0040000	Strap wrench commercially available in U.S.A.		9
Rotor puller	07733—0020001	Rotor puller	07933—3950000	9
Valve guide remover, 5.5 mm	07742—0010100	Valve guide remover	07942—3290100	6
Attachment, 24 x 26 mm	07746—0010700			9, 12
Attachment, 37 x 40 mm	07746—0010200			10, 12
Pilot, 17 mm	07746—0040400			8, 10
Pilot, 15 mm	07746—0040300			10, 11
Attachment, 42 x 47 mm	07746—0010300			8, 10, 11, 12
Pilot, 25 mm	07746—0040600			10
Pilot, 20 mm	07746—0040500			8, 10
Pilot, 22 mm	07746—0041000			10
Attachment, 52 x 55 mm	07746—0010400			10, 12
Pilot, 28 mm	07746—0041100			10
Attachment, 62 x 68 mm	07746—0010500			12
Pilot, 35 mm	07746—0040800			10, 12
Attachment, 72 x 75 mm	07746—0010600			10
Driver	07749—0010000			8, 9, 10, 11, 12
Driver	07746—0030100			10
Attachment, 30 mm I.D.	07746—0030300			10
Fork seal driver	07747—0010100			
Fork seal driver attachment	07747—0010501			
Valve spring compressor	07757—0010000	Valve spring compressor	07957—3290001	6
Shock absorber compressor	07959—3290001			12
Attachment, 20 mm I.D.	07746—0020400			12
Driver	07746—0020100			12
Tire breaker set	07772—0050000			11
—Breaker arm compressor	07772—0050100			11
—Breaker arm	07772—0050200			11
Pilot, 30 mm	07746—0040700			11
Digital multi-tester (KOWA)	KS—AHM—32-003	Electric tester	P/N 7308—0020000	14
Digital volt meter	07411—0020000			

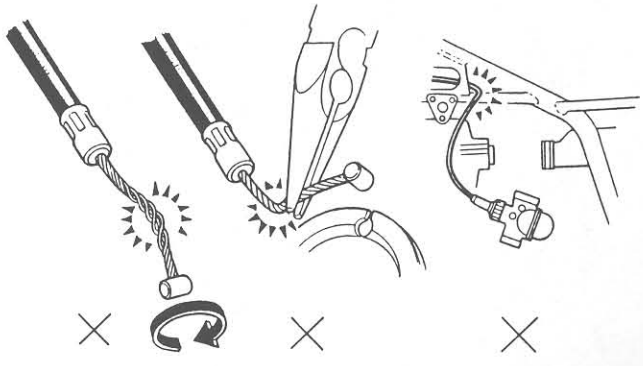
CABLE & HARNESS ROUTING

Note the following when routing cables and wire harnesses:

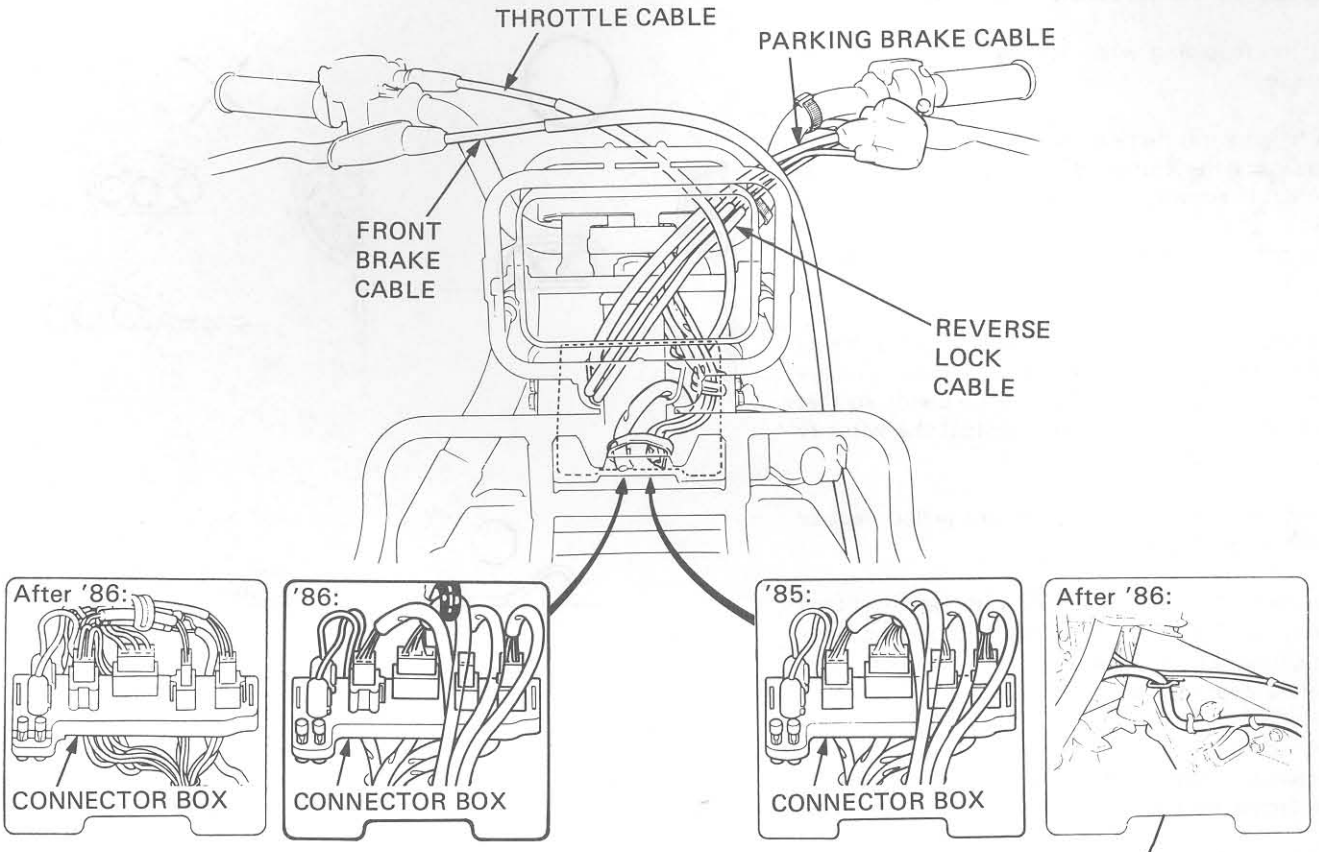
- A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.
- Do not squeeze wires against a weld or end of a clamp.
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so they are not pulled taut or have excessive slack.
- Protect wires and harnesses with electrical tape or tubing if they are in contact with a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use any 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 seated in their grooves properly.
- After clamping, check each harness to be certain that it does not interfere with any moving or sliding parts.
- Wire harnesses routed along the handlebars should not be pulled taut, have excessive slack, be pinched, or interfere with adjacent or surrounding parts in all steering positions.
- After routing, check that the wire harnesses are not twisted or kinked.
- Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.

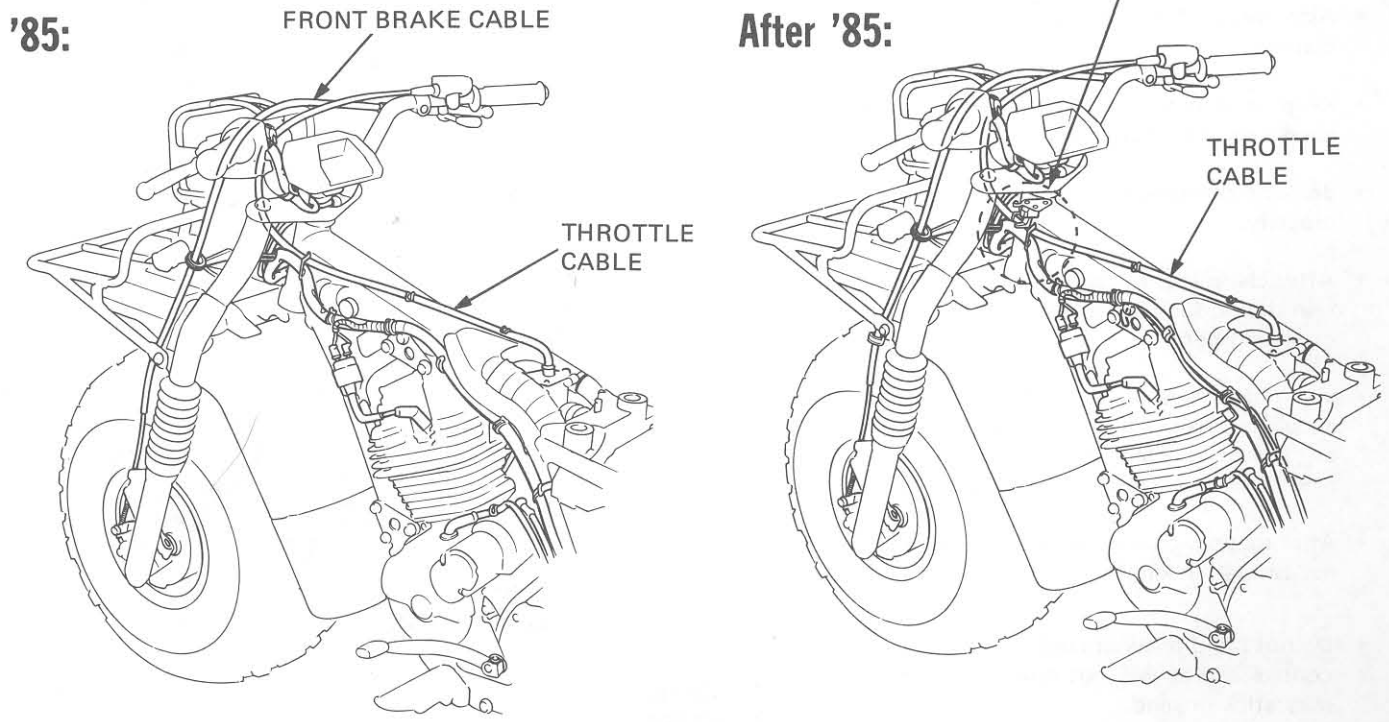


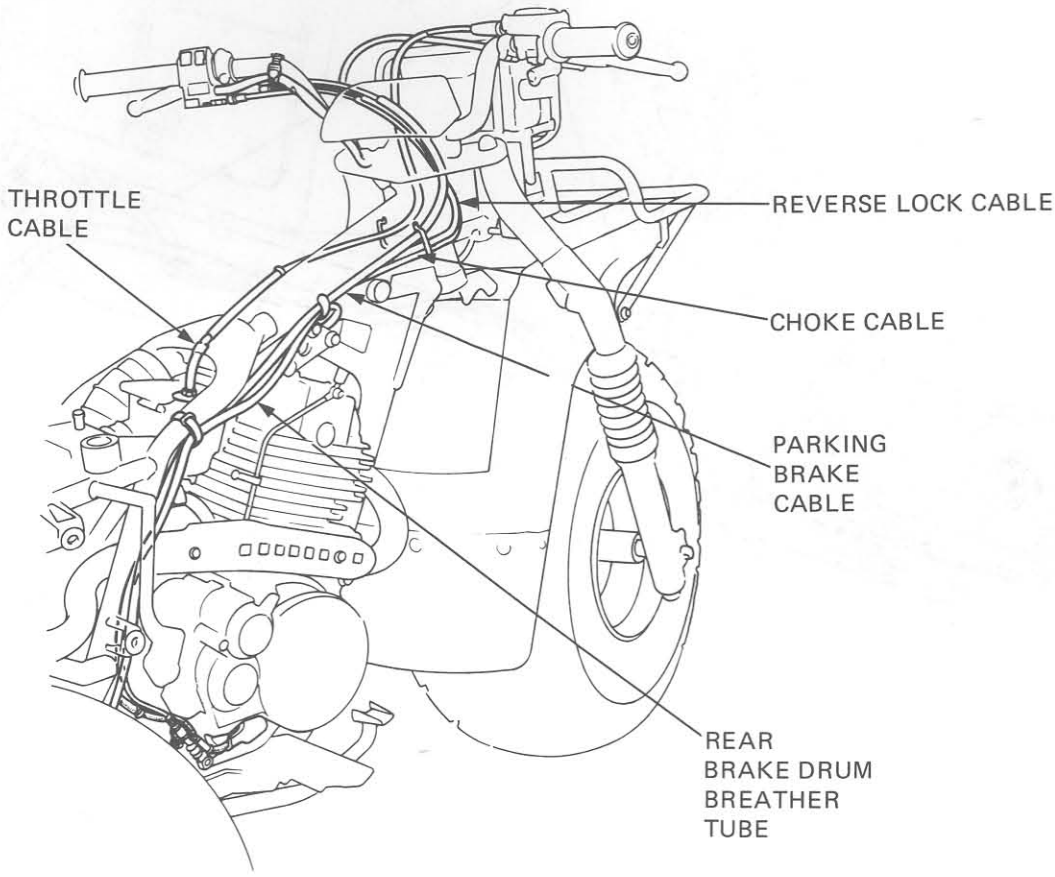




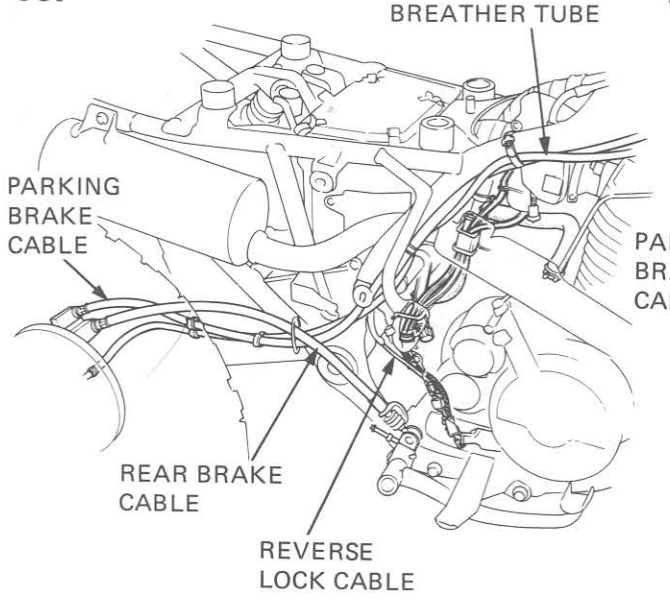
O...Correct
X...Incorrect


THROTTLE CABLE
PARKING BRAKE CABLE
FRONT BRAKE CABLE
REVERSE LOCK CABLE
After '86:
CONNECTOR BOX
'86:
CONNECTOR BOX
'85:
CONNECTOR BOX
After '86:

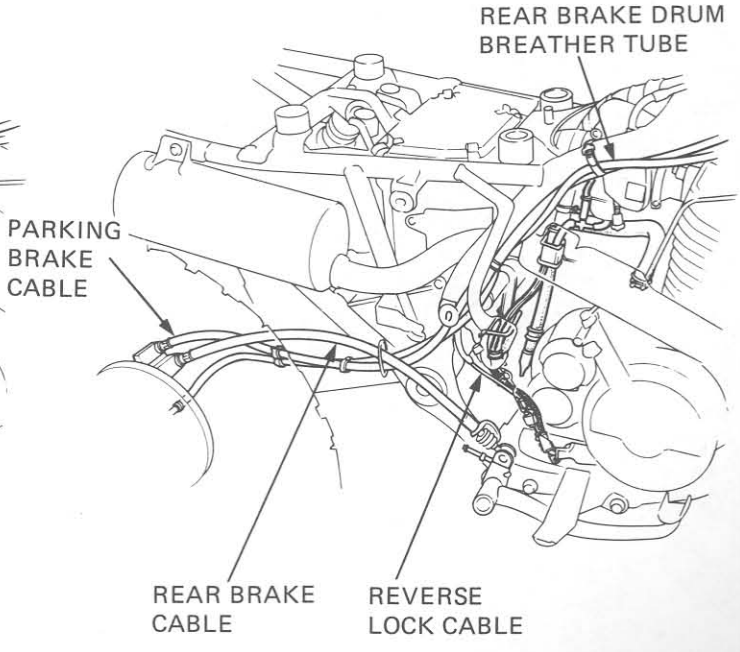

'85:
FRONT BRAKE CABLE
THROTTLE CABLE
After '85:
THROTTLE CABLE

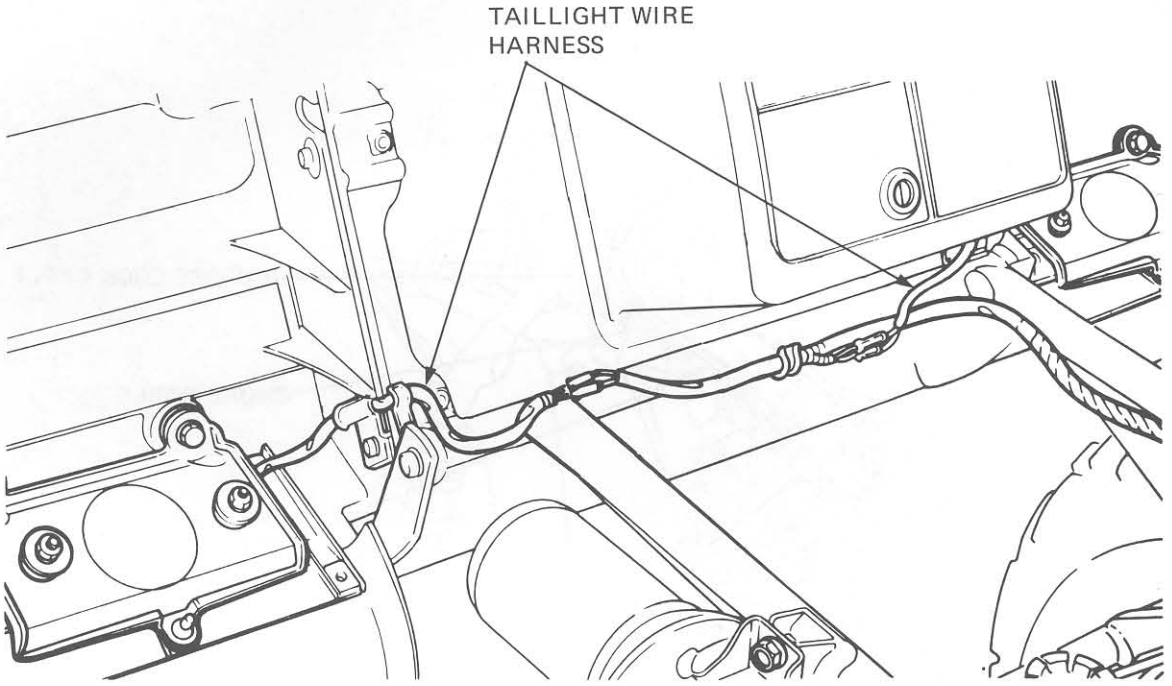

THROTTLE CABLE
REVERSE LOCK CABLE
CHOKE CABLE
PARKING BRAKE CABLE
REAR BRAKE DRUM BREATHER TUBE

'85:

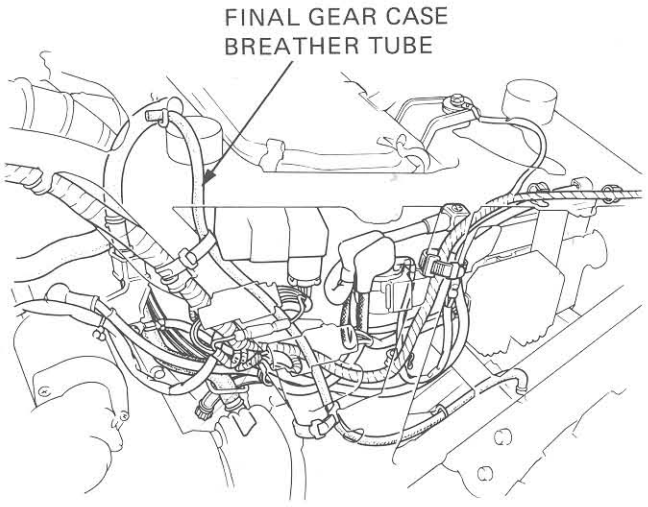

REAR BRAKE DRUM BREATHER TUBE
PARKING BRAKE CABLE
REAR BRAKE CABLE
REVERSE LOCK CABLE

AFTER '85:

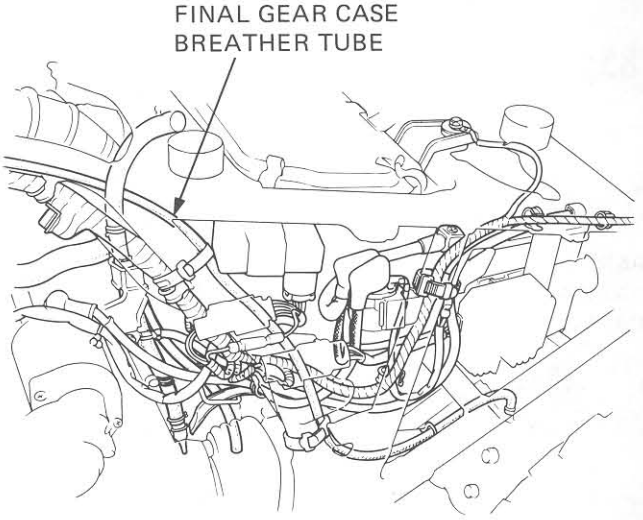

REAR BRAKE DRUM BREATHER TUBE
PARKING BRAKE CABLE
REAR BRAKE CABLE
REVERSE LOCK CABLE


TAILLIGHT WIRE
HARNESS

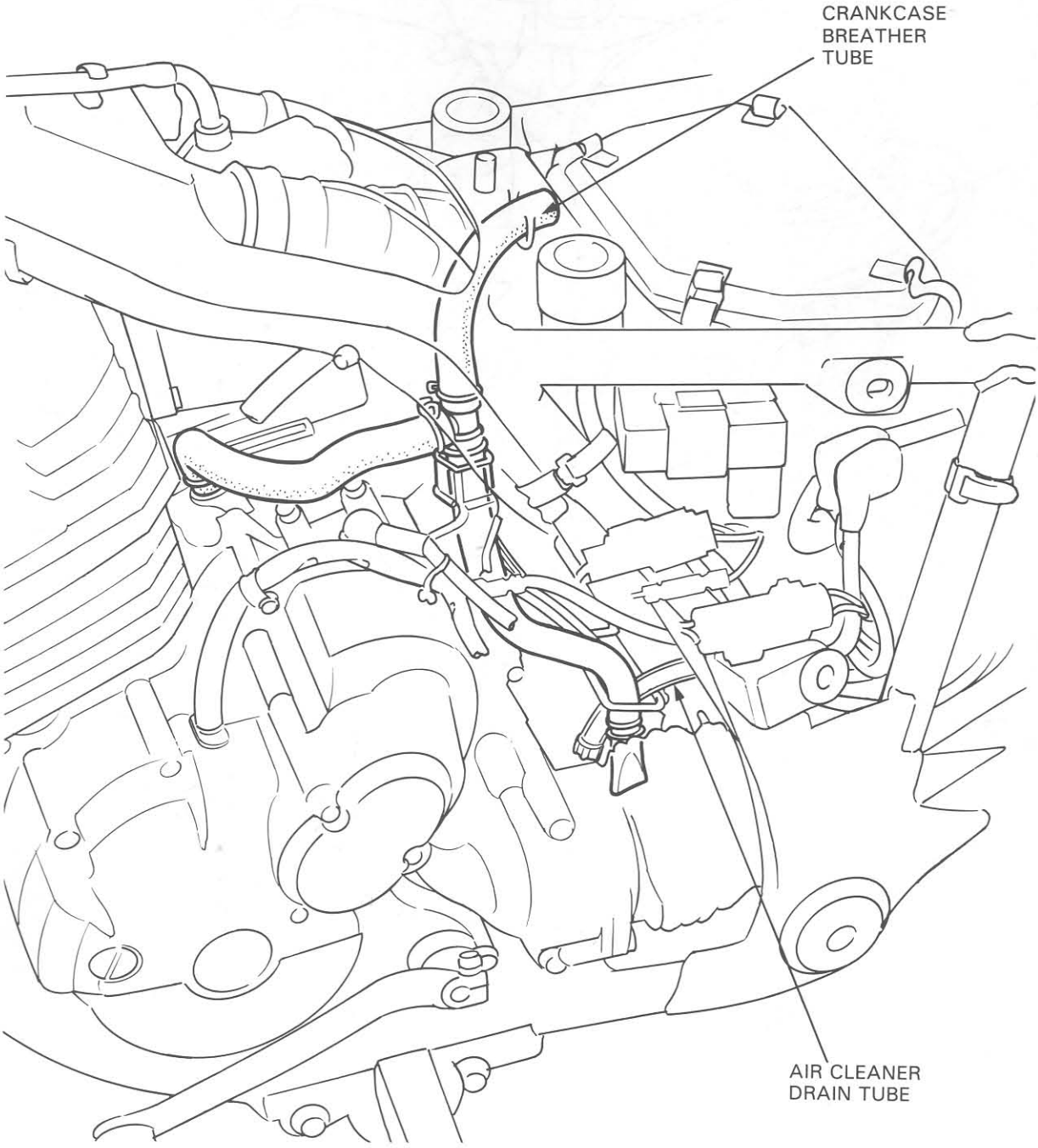
'85:


FINAL GEAR CASE
BREATHER TUBE

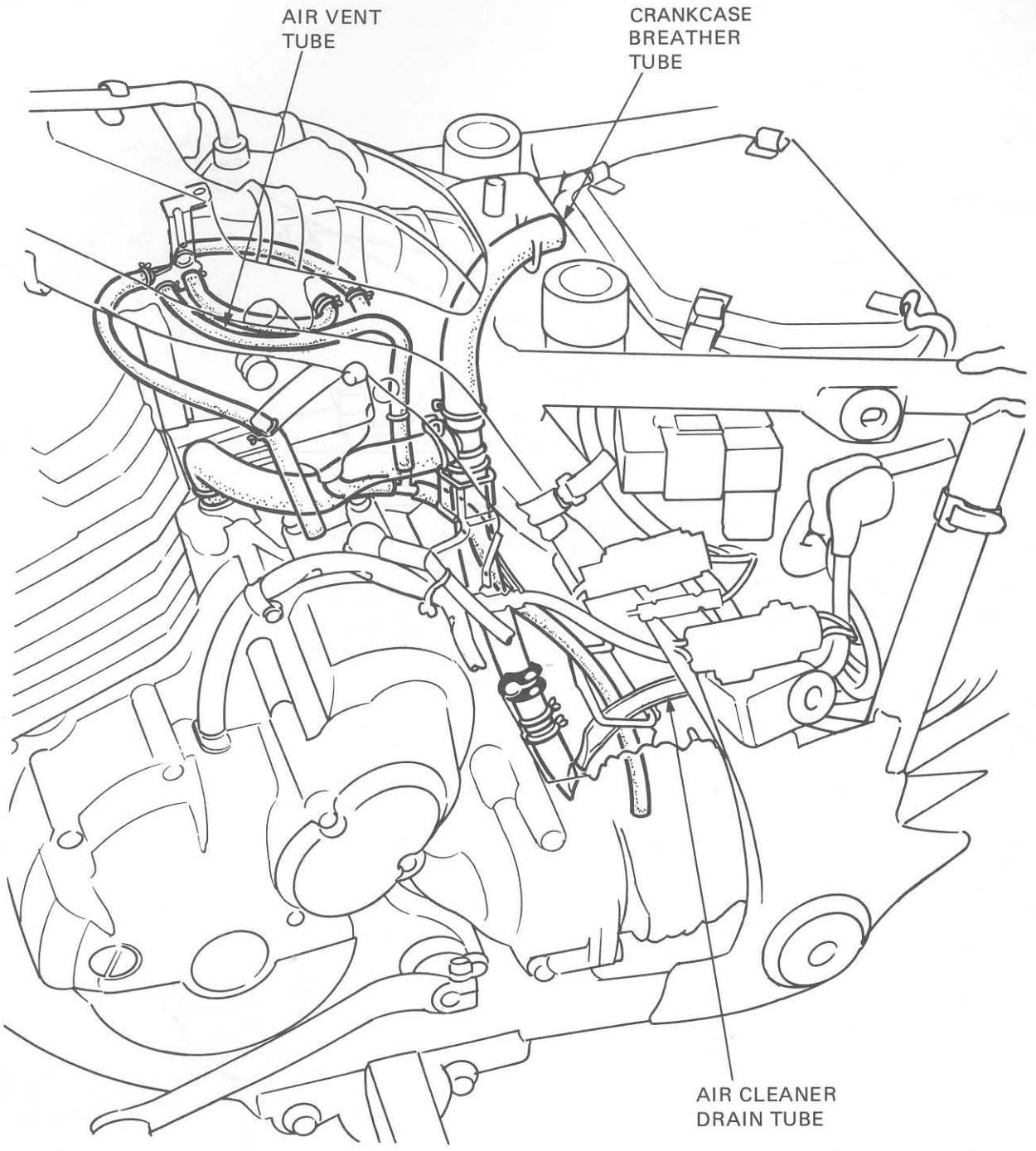
AFTER '85:


FINAL GEAR CASE
BREATHER TUBE

'85:



AFTER '85:


AIR VENT
TUBE
CRANKCASE
BREATHER
TUBE
AIR CLEANER
DRAIN TUBE

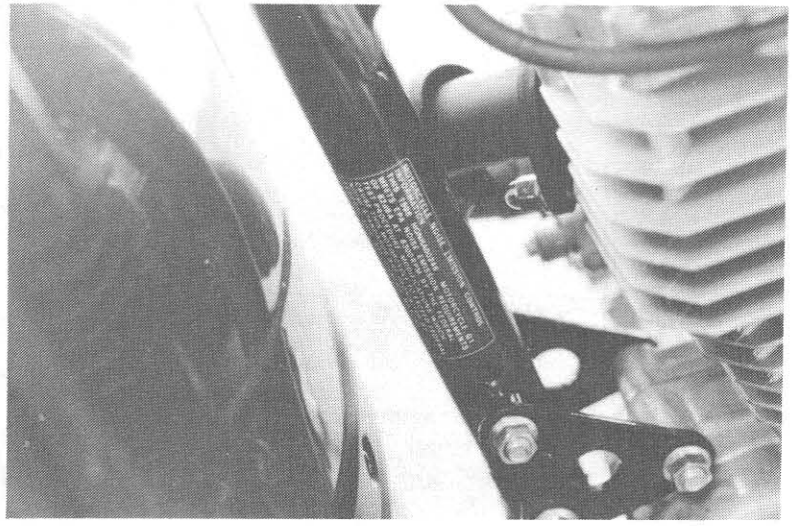
NOISE EMISSION CONTROL SYSTEM

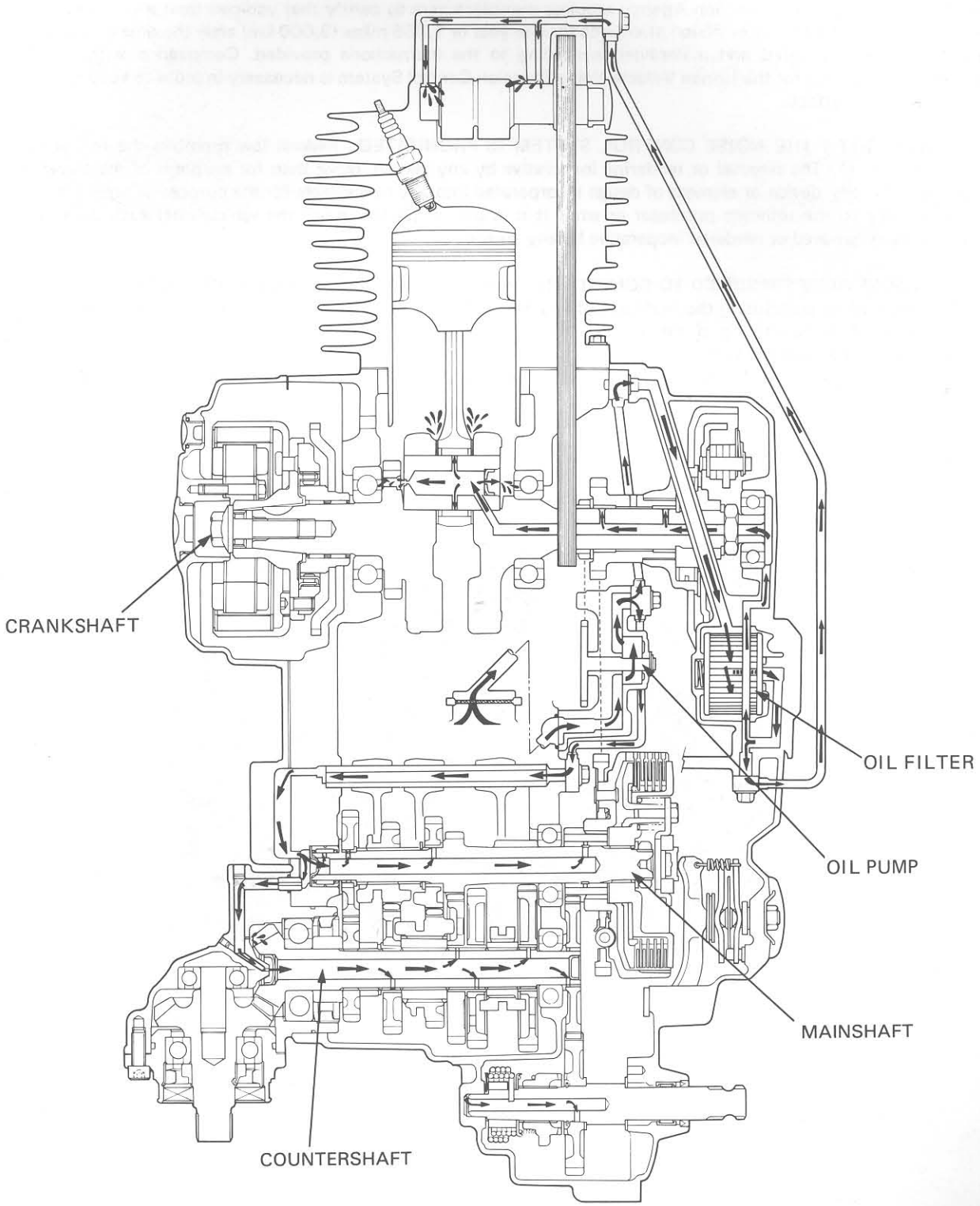
The U.S. Environmental Protection Agency requires manufacturers to certify that vehicles built after January 1, 1983 will comply with applicable noise emission standards for one year or 1,865 miles (3,000 km) after the time of sale to the ultimate purchaser, when operated and maintained according to the instructions provided. Compliance with the terms of the Distributor's Warranty for the Honda Vehicle Noise Emission Control System is necessary in order to keep the noise emission control system in effect.

TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair, or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

1. Removal of, or puncturing the muffler, baffler, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any parts of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.




CRANKSHAFT
OIL FILTER
OIL PUMP
MAINSHAFT
COUNTERSHAFT

2. LUBRICATION

SERVICE INFORMATION

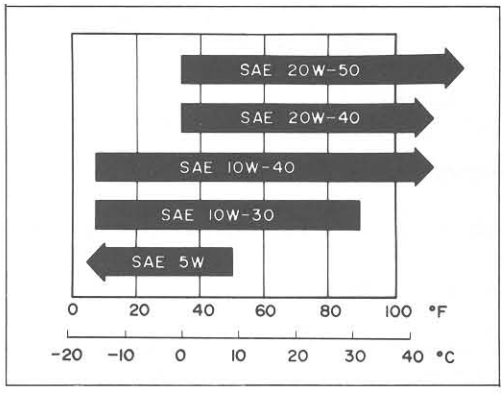
GENERAL

- Section 8 shows how to service the oil pump.

SPECIFICATIONS

Engine oil capacity	2.5 liters (2.6 US qt, 2.2 Imp qt) after disassembly 2.1 liter (2.2 US qt, 1.8 Imp qt) after draining
Engine 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.
Final drive oil capacity	100 cc (3.4 oz)
Final drive oil recommendation	Hypoid gear oil SAE #80

OIL VISCOSITIES



TORQUE VALUES

Engine drain plug	20—30 N·m (2.0—3.0 kg-m, 14—22 ft-lb)
Gear case drain bolt	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)
Gear case filler bolt	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

TROUBLESHOOTING

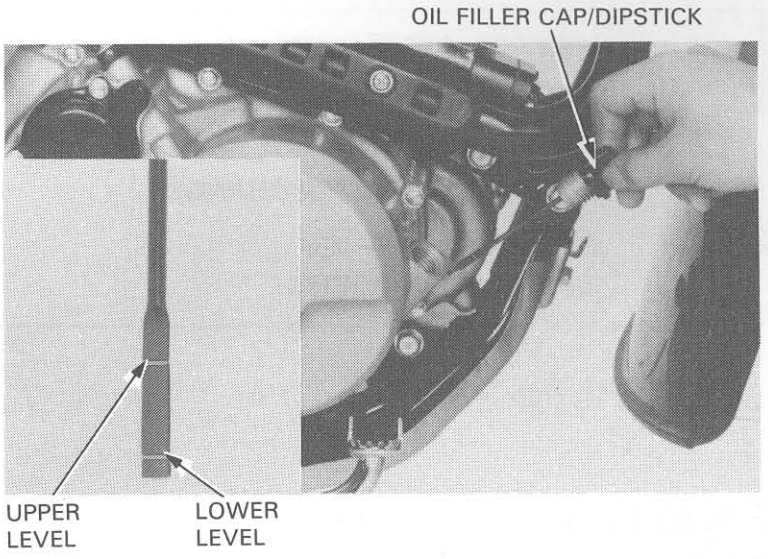
Oil level too low — high oil consumption
1. Normal oil consumption
2. External oil leaks
3. Worn piston rings
4. Oil not changed often enough
5. Faulty head gasket

Oil contamination
1. Oil or filter not changed often enough.
2. Head gasket faulty.
3. Worn piston rings.

ENGINE OIL LEVEL

Place the ATC on level ground.
Check the oil level with the oil filler cap/dipstick.
Do not screw it in when making this check.

If the oil level is below or near the lower level mark on the dipstick, add the recommended oil (page 2-1) up to the upper level line.



ENGINE OIL & FILTER CHANGE

NOTE

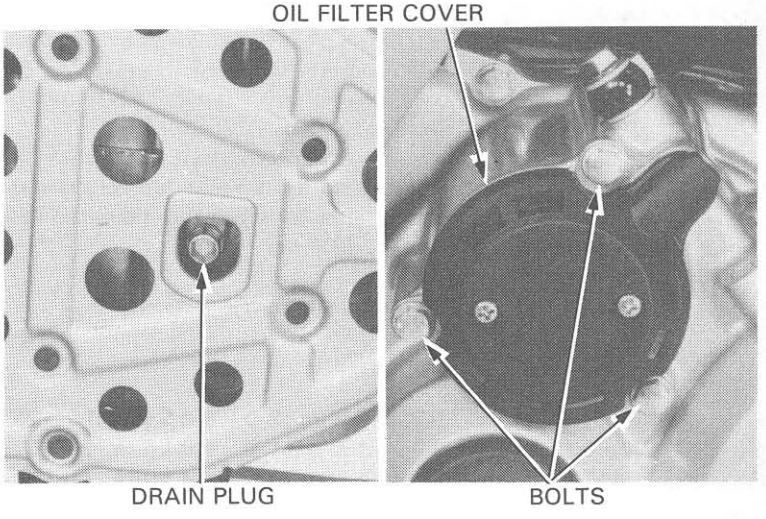
Change engine oil with the engine warm and the ATC on level ground to assure complete draining.

Remove the oil filler cap and drain plug.

Remove the three bolts attaching the oil filter cover, oil filter and spring.
Discard the oil filter.

Check that the sealing washer on the drain plug is in good condition and install the drain plug.

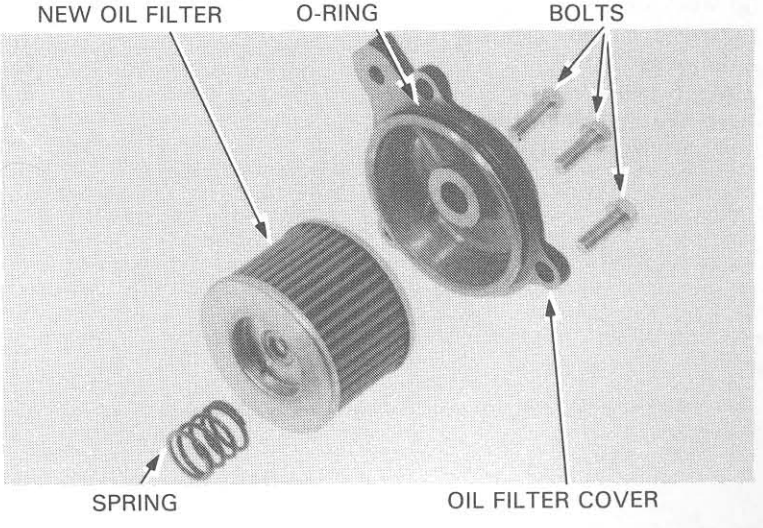
TORQUE: 20–30 N·m (2.0–3.0 kg-m, 14–22 ft-lb)



Make sure that the oil filter cover O-ring is in good condition, and coat it with oil before installing it.
Install the oil filter spring, filter and cover using the three bolts.

Fill the crankcase with 2.1 liters (2.2 US qt, 1.8 Imp qt) of the recommended oil (page 2-1).
Install the oil filler cap/dipstick.
Start the engine and let it idle for 2-3 minutes.

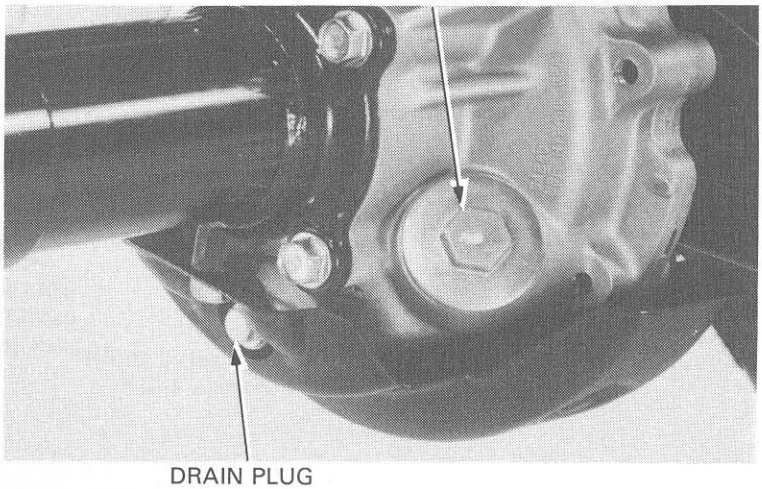
Stop the engine and check that the oil level is at the upper level line on the dipstick. Make sure there are no oil leaks.



FINAL DRIVE OIL

CHECK

Remove the oil filler cap.
Place a support block under the engine. (The front and rear axles should be in the same plane.)
Check that the oil level reaches the lower edge of the oil filler cap hole.
Check for leaks. If the level is low, pour fresh oil through the oil filler hole until it reaches the lower edge.

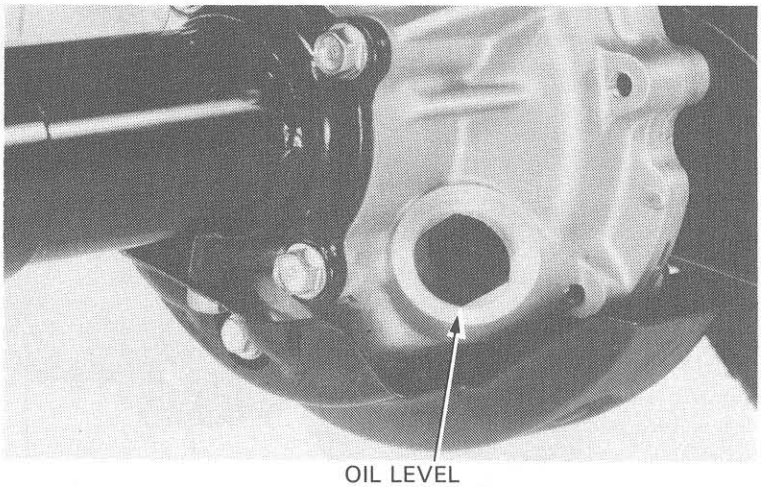


CHANGE

Remove the oil filler cap.
Remove the drain bolt to drain all oil from the final gear case.
Install the drain bolt securely.
Fill the gear case with the recommended oil up to the correct level.

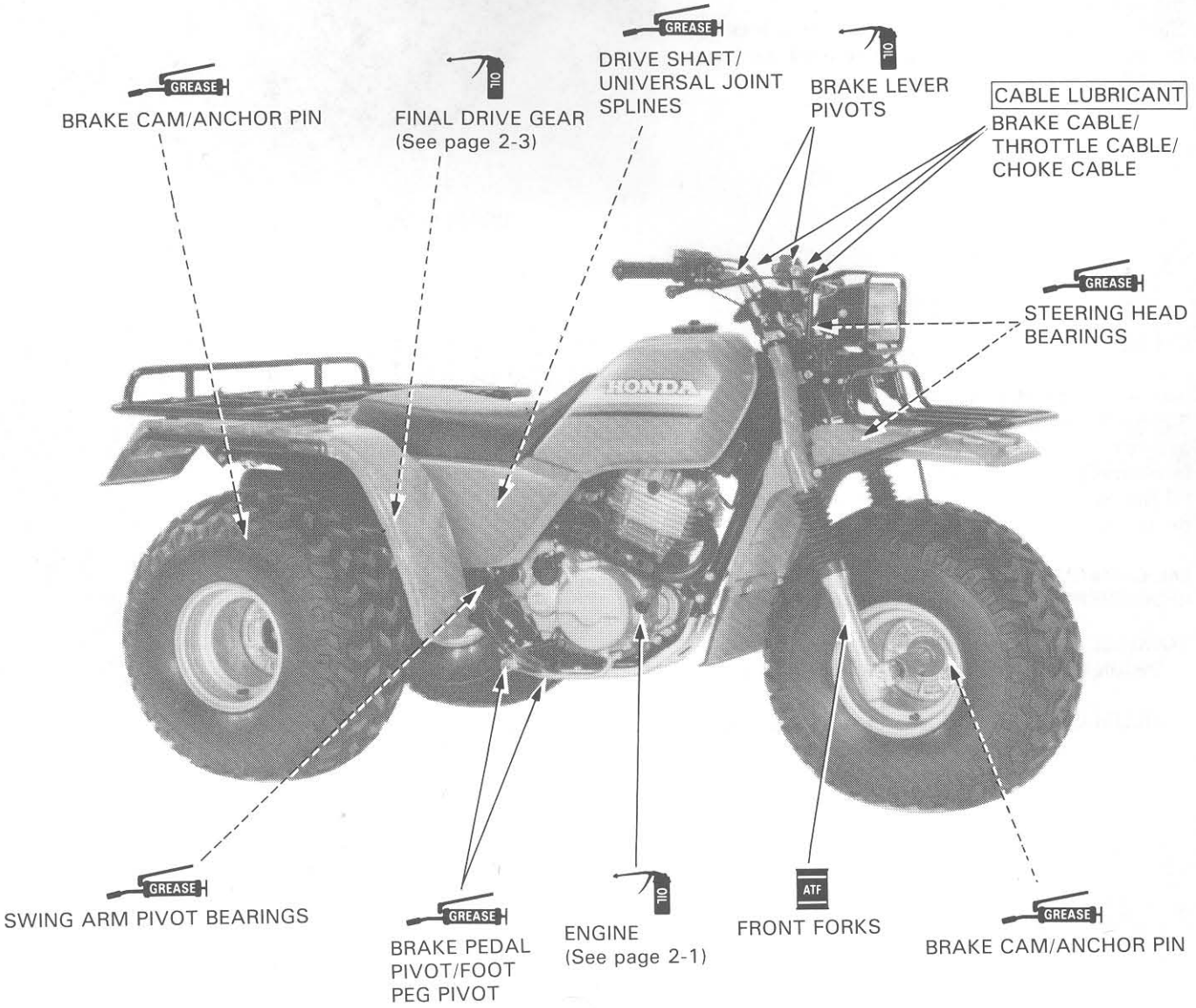
OIL CAPACITY: 100 cc (3.4 US oz)
RECOMMENDED OIL: Hypoid gear oil SAE #80

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



LUBRICATION POINTS

Use general purpose grease when no other specification is given. Apply oil or grease to any 2 sliding surfaces and cables not shown here.



3. MAINTENANCE

SERVICE INFORMATION

SPECIFICATION

Spark plug gap:		0.6–0.7 mm (0.024–0.028 in)
Recommended spark plugs:		DR8ES-L (NGK) X24ESR-U (ND)
Valve clearance:	Intake:	0.08 mm (0.003 in)
	Exhaust:	0.08 mm (0.003 in)
Idle speed:		1,400 ± 100 rpm
Throttle lever free play		3–8 mm (1/8–1/4 in)
Cylinder compression:		12–13 kg/cm^2 (170–185 psi)
Front brake lever free play:		15–20 mm (5/8–3/4 in)
Rear (parking) brake lever free play:		15–20 mm (5/8–3/4 in)
Rear brake pedal free play:		15–20 mm (5/8–3/4 in)
Reverse selector lever free play:		2–4 mm (1/16–1/8 in)
Front tire size:		25 x 12.00–9
Rear tire size:		25 x 12.00–9
Recommended tire pressure:	Front:	0.15 kg/cm^2 (2.2 psi)
	Rear:	0.15 kg/cm^2 (2.2 psi)
Standard tire circumference:	Front:	1,915 mm (75.4 in)
	Rear:	1,915 mm (75.4 in)

TORQUE VALUES

Clutch adjusting screw lock nut	18 – 25 N·m (1.8 – 2.5 kg-m, 13 – 18 ft-lb)
Valve adjusting lock nut	15 – 18 N·m (1.5 – 1.8 kg-m, 11 – 13 ft-lb)

TOOLS

Common

Valve adjusting wrench, 10 x 12 mm	07708–0030200	Commercially available in U.S.A.
'85: valve adjusting wrench A	07708–0030300	
After '85: valve adjusting wrench B	07708–0030400	

MAINTENANCE SCHEDULE

'85:

- The maintenance intervals shown in the following schedule are based upon average riding conditions. ATCs subjected to severe use, or ridden in wet or unusually dusty areas, require more frequent servicing. Items marked * should be serviced by an authorized Honda dealer, unless the owner has the proper tools and is mechanically proficient. Other maintenance items are simple to perform and may be serviced by the owner. Perform the Pre-ride Inpsection in the Owner's Manual at every maintenance period.

I: Inspect and clean, adjust, lubricate or replace, if necessary.
C: Clean
R: Replace
A: Adjust

	ITEM / FREQUENCY	INITIAL SERVICE PERIOD (First week of operation	REGULAR SERVICE PERIOD (Every 30 operating days)	Refer to page
	ENGINE OIL (NOTE 1,2)	R	R	2-1
	ENGINE OIL FILTER	R	R	2-2
	AIR CLEANER ELEMENT (NOTE 2)		C	3-4
	SPARK PLUG		I	3-5
	BREATHR TUBE		I	3-5
*	VALVE CLEARANCE	I	I	3-5
*	CARBURETOR	I	I	3-6
	FUEL LINE	I: (EVERY YEAR)		3-7
*	FUEL STRAINER	C	C	3-7
	THROTTLE OPERATION	I	I	3-7
	FINAL DRIVE OIL	I: (EVERY YEAR), R: (EVERY 2 YEARES)		2-3
*	BRAKE SHOES	I: (EVERY YEAR)		3-9
	BRAKE CONTROL LINKAGE	I	I	3-9
*	CLUTCH	A	A	3-11
*	SPARK ARRESTER		C	3-11
	REVERSE LOCK MECHANISM	I	I	3-12
	ALL NUTS, BOLTS, FASTENERS	I	I	3-12
	LIGHTING EQUIPMENT	I	I	3-12
	TIRES	I	I	3-13
*	STEERING HEAD BEARINGS	A: (EVERY YEAR)		3-14

NOTES: 1. Replace every 30 operating days or every 3 months, whichever comes first.
2. Service more frequently when riding in dusty areas.

AFTER '85:

The maintenance intervals shown in the following schedule are based upon average riding conditions. ATCs subjected to severe use, or ridden in wet or unusually dusty areas, require more frequent servicing. Items marked *should be serviced by an authorized Honda dealer, unless the owner has the proper tools and is mechanically proficient. Other maintenance items are simple to perform and may be serviced by the owner. Perform the Pre-ride Inspection in the Owner's Manual at every maintenance period. **In the interest of safety, we recommend these items be serviced only by an authorized Honda dealer.

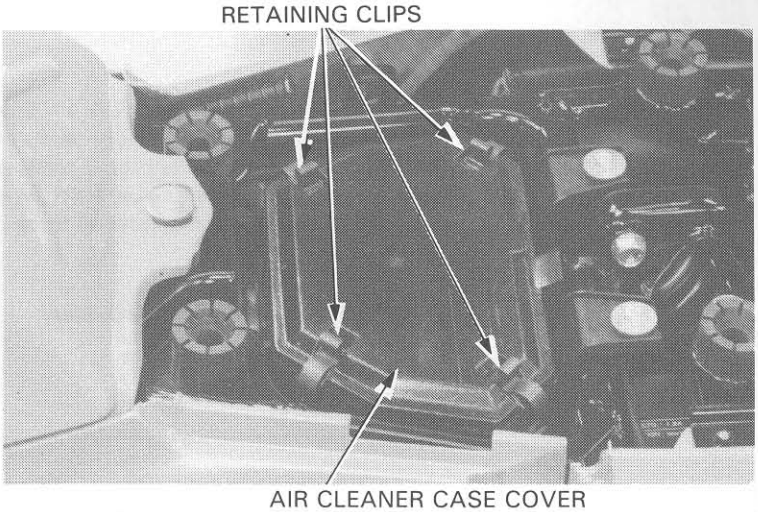
I: Inspect and clean, adjust, lubricate or replace, if necessary.
C: Clean
R: Replace
A: Adjust

		EVERY	INITIAL SERVICE PERIOD (First week of operation)	REGULAR SERVICE PERIOD (Every 30 operating days)	Refer to page
*	FUEL LINE	YEAR: I			3-7
*	FUEL STRAINER SCREEN	YEAR: C			3-7
*	THROTTLE OPERATION		I	I	3-8
*	CARBURETOR CHOKE			I	4-5
	AIR CLEANER	(NOTE 2)		C	3-4
	AIR CLEANER CASE DRAIN TUBE	(NOTE 3)		I	3-5
	SPARK PLUG			I	3-5
*	VALVE CLEARANCE		I	I	3-5
	ENGINE OIL		R	R	2-2
	ENGINE OIL FILTER		R	R	2-2
*	CARBURETOR IDLE SPEED		I	I	3-6
	FINAL DRIVE OIL	YEAR: I 2 YEARS: R			2-3
*	BRAKE SHOE WEAR	YEAR: I (NOTE 3)			3-9
	BRAKE SYSTEM		I	I	3-10
*	REVERSE LOCK SYSTEM		I	I	3-13
*	CLUTCH SYSTEM		I	I	3-11
*	SUSPENSION			I	3-12
*	SPARK ARRESTER	(NOTE 1)		C	3-12
*	NUT, BOLT, FASTENER		I	I	3-14
**	WHEELS		I	I	3-14
**	STEERING HEAD BEARING	YEAR: I			3-14
	ENGINE UNDER GUAD AND SKID PLATE	(NOTE 4)		I	3-14

NOTES: 1. USA only.
2. Service more frequently when riding in dusty areas, sand or snow.
3. Service more frequently after riding in very wet or muddy conditions.
4. After '86 models only.

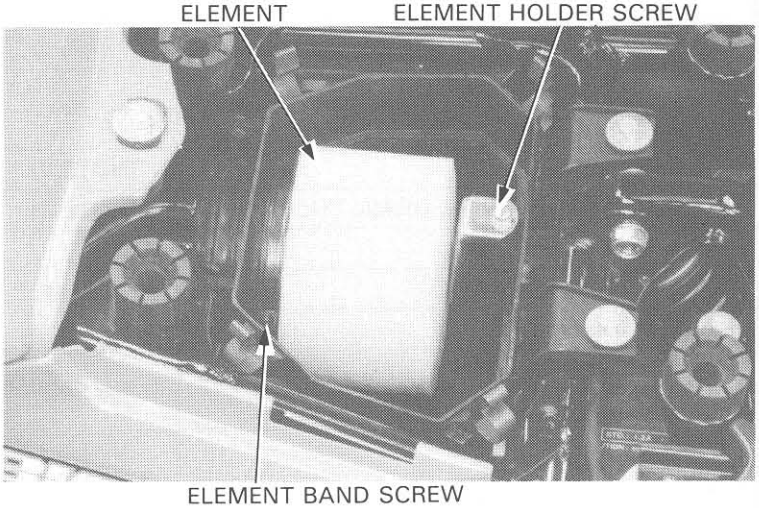
AIR CLEANER

Remove the seat by pulling the seat latch lever.
Release the retaining clips holding the air cleaner case cover.
Remove the air cleaner case cover.



Loosen the air cleaner element band screw.
Remove the element holder attaching screw and remove the air cleaner element assembly from the case.

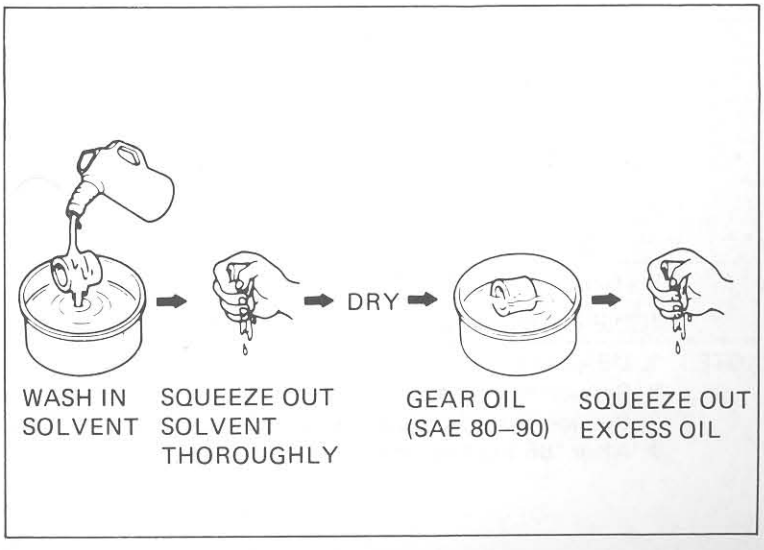
Remove the element holder by turning it counterclockwise.
Remove the element band and remove the element from the element core.



Wash the element in non-flammable or high flash point solvent, squeeze out the solvent thoroughly, and allow to dry.

Soak the element in gear oil (SAE 80—90) and squeeze out excess.
Place the element onto the element core and replace the element band and holder.

Install the element in the air cleaner case.
Install the air cleaner case cover and clips.
Install the seat.



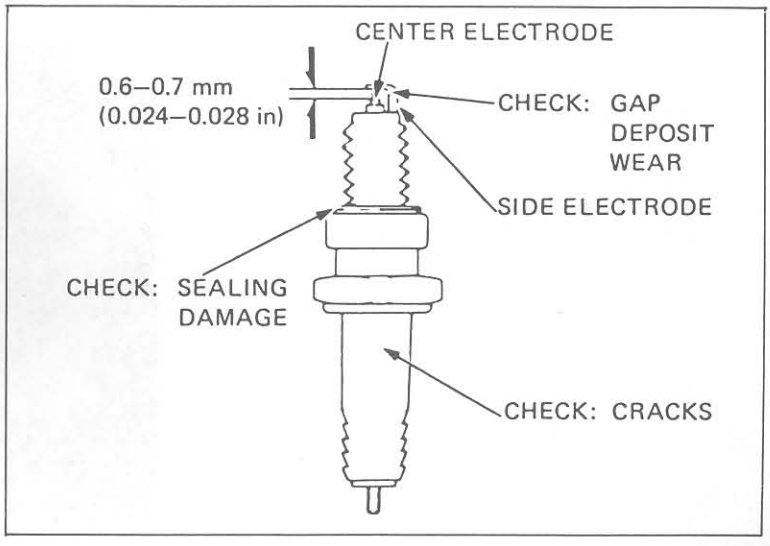
SPARK PLUG

Disconnect the spark plug cap and remove the spark plug.

Visually inspect the spark plug electrodes for wear. The center electrode should have square edges and the side electrode should have a constant thickness. Discard the spark plug if there is apparent wear or if the insulator is cracked or chipped.
Measure the gap with a wire-type feeler gauge and adjust by carefully bending the side electrode.

SPARK PLUG GAP:
0.6–0.7 mm (0.024–0.028 in)
RECOMMENDED REPLACEMENT PLUG:
DR8ES–L (NGK)
X24ESR–U (ND)

Check the sealing washer and replace with a new one if damaged.
With the sealing washer attached, thread the spark plug in by hand to prevent crossthreading. Tighten the spark plug another 1/2 turn with a spark plug wrench to compress the sealing washer.



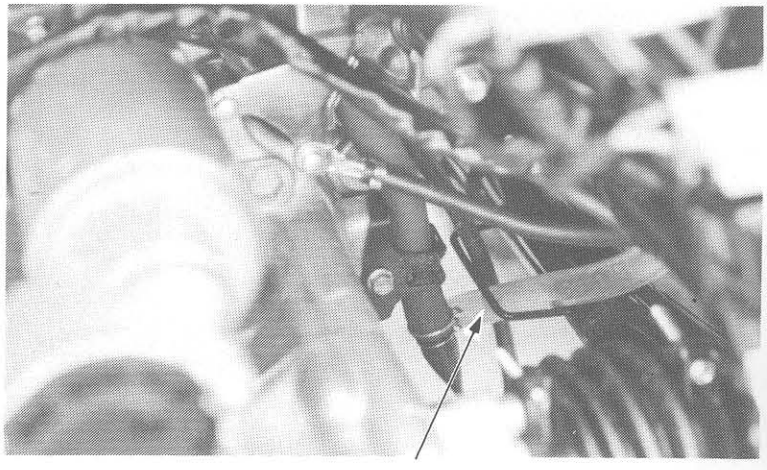
BREATHER TUBE

Remove the tube from the drain tube to empty any deposits.

Install the drain tube.

NOTE

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



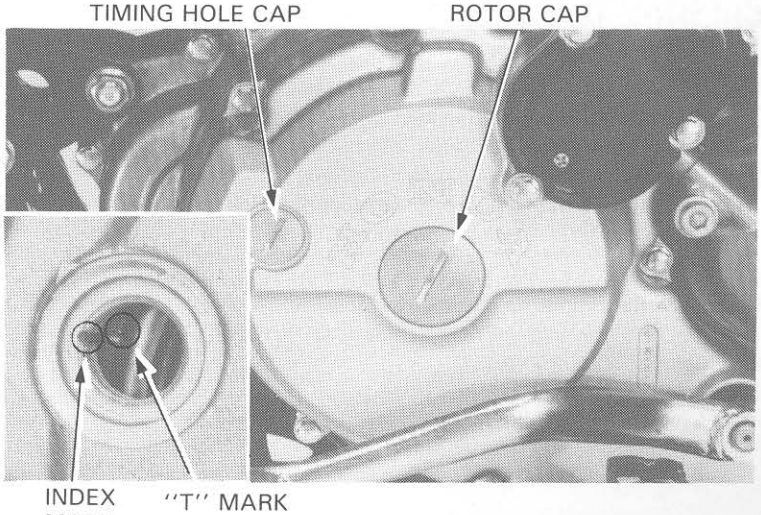
VALVE CLEARANCE

NOTE

Inspect and adjust valve clearance while the engine is cold (below 35°C/95°F).

Remove the frame side covers, seat and fuel tank.
Remove the timing hole cap and rotor cap.
Remove the valve adjusting covers.

Rotate the crankshaft clockwise and align the "T" mark in the rotor with the index mark. The piston must be at TDC on the compression stroke.

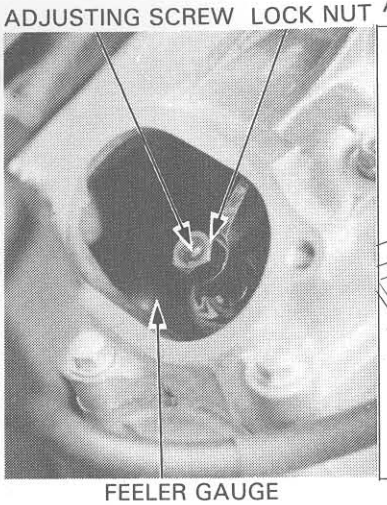


Inspect the intake and exhaust valve clearances by inserting the feeler gauge between the adjusting screw and valve stem.

VALVE CLEARANCES

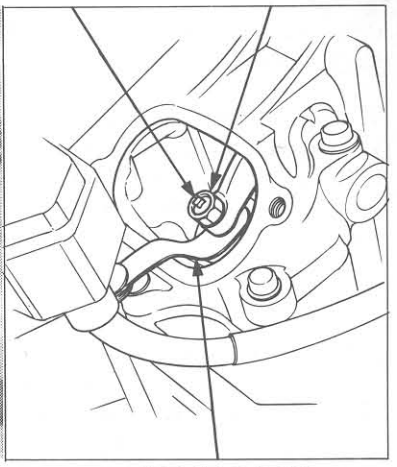
Intake: 0.08 mm (0.003 in)
Exhaust: 0.08 mm (0.003 in)

'85:



FEELER GAUGE

AFTER '85:



FEELER GAUGE

Adjust by loosening the lock nut and turning the adjusting screw until there is a slight drag on the feeler gauge.

Hold the adjusting screw and tighten the lock nut.

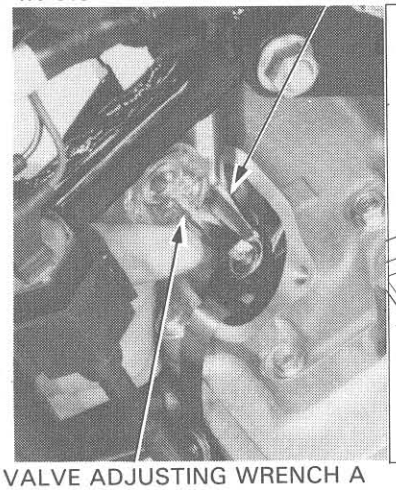
Recheck the valve clearance and install the valve adjuster covers.

Install the rotor cap and timing hole cap.

Install the fuel tank, seat and frame side covers.

'85:

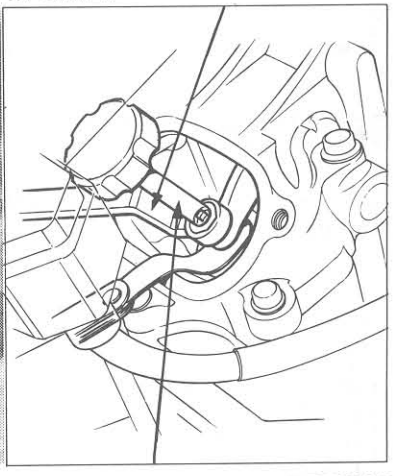
VALVE ADJUSTING WRENCH, 10 x 12 mm 07708—0030200 COMMERCIALLY AVAILABLE IN U.S.A.



VALVE ADJUSTING WRENCH A 07708—0030300

AFTER '85:

VALVE ADJUSTING WRENCH 10 x 12 mm, 07708—0030200 COMMERCIALLY AVAILABLE IN U.S.A.



VALVE ADJUSTING WRENCH B 07708—0030400

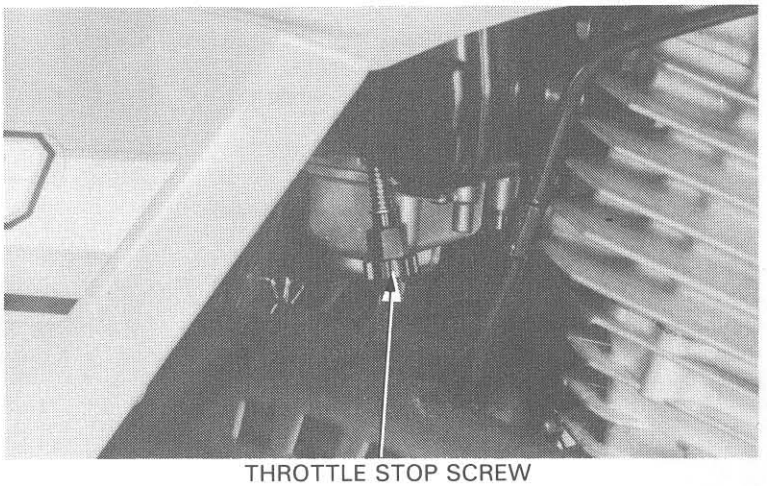
CARBURETOR IDLE SPEED

NOTE

- Inspect and adjust the idle speed after all other maintenance items have been performed and are within specifications.
- The engine must be warm for accurate idle speed inspection and adjustment.

Warm up the engine for about ten minutes.
Turn the throttle stop screw as required to obtain the specified idle speed.

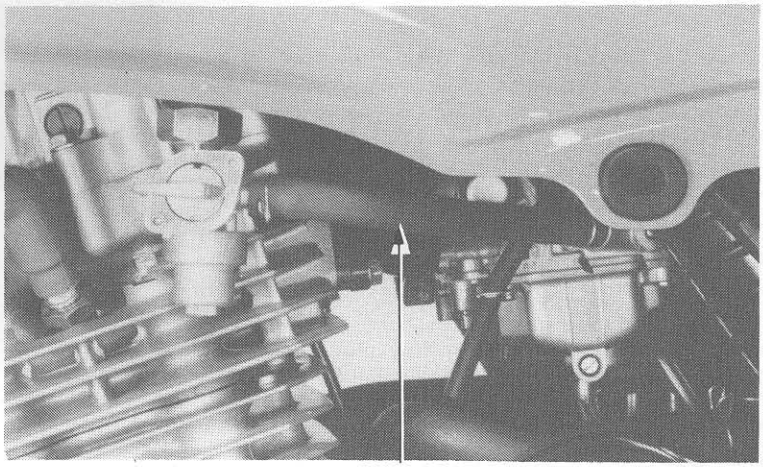
IDLE SPEED: 1,400 ± 100 rpm



THROTTLE STOP SCREW

FUEL LINE

Remove the left frame side cover and check the fuel line.
Replace any parts which show signs of deterioration, damage or leaks.

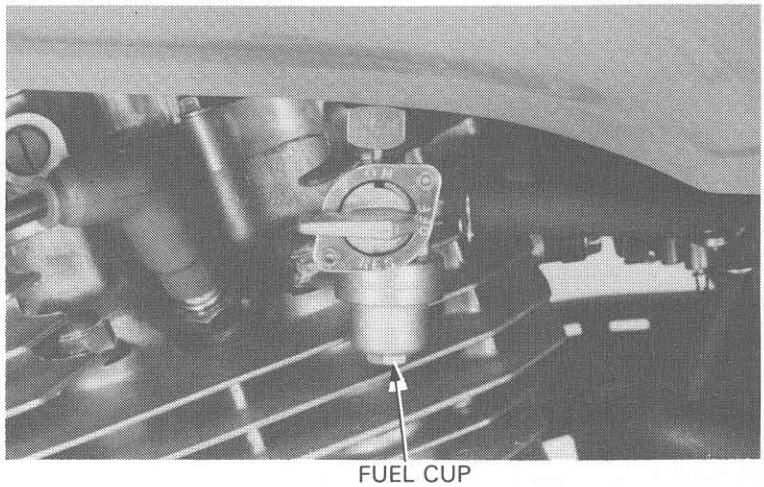

FUEL LINE

FUEL STRAINER

Turn the fuel valve OFF.
Remove the fuel cup, O-ring and filter screen, and drain the gasoline into a suitable container.

WARNING

Gasoline is flammable and is explosive under certain conditions. Do not smoke or allow flames or spakrs near the equipment while draining fuel.

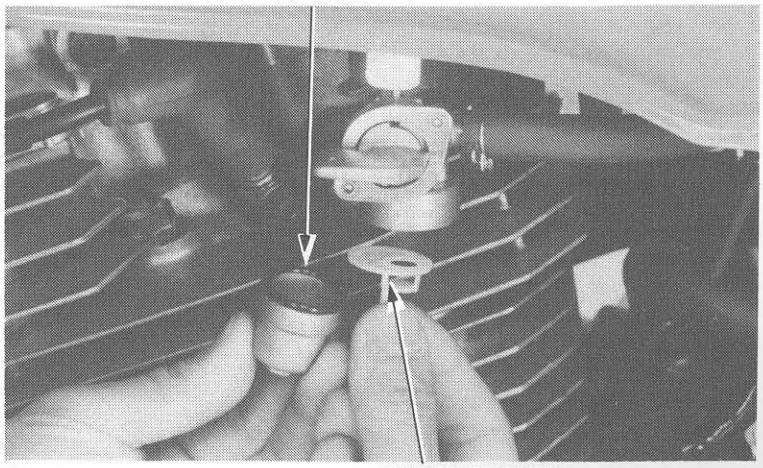

FUEL CUP

Wash the cup and filter screen in clean non-flammable or high flash point solvent.
Reinstall the screen, aligning the index marks on the fuel valve body and filter screen.
Install a new O-ring into the fuel valve body.
Reinstall the fuel cup, making sure the new O-ring is in place.
Tighten the fuel cup.

CAUTION

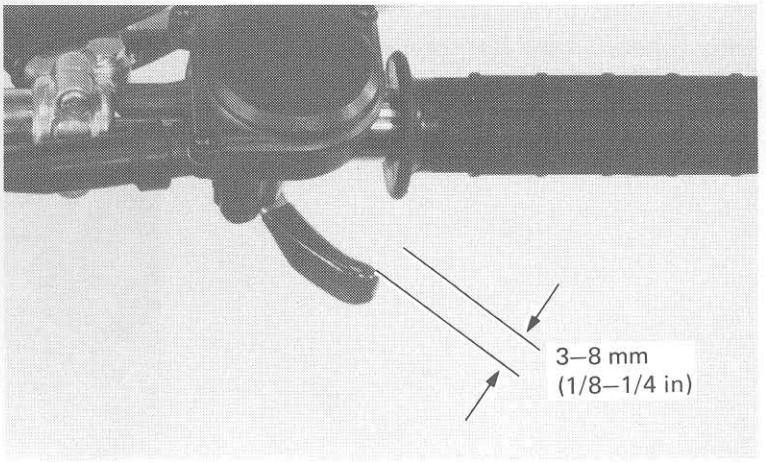
Do not overtighten the fuel cup.

After installing, turn the fuel valve ON and check that there are no fuel leaks.

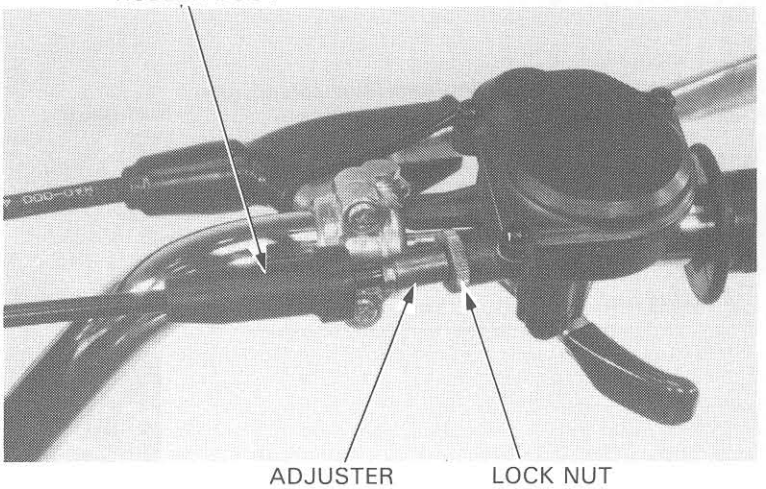


THROTTLE OPERATION

Check for smooth throttle lever full opening and automatic full closing in all steering positions. Make sure there is no deterioration, damage or kinking in the throttle cable. Replace any damaged parts. Disconnect the throttle cable at the upper end. Thoroughly lubricate the cable and pivot point with a commercially available cable lubricant to prevent premature wear.
Install the throttle cable in the reverse oder of removal.
Make sure the throttle lever free play is 3–8 mm (1/8–1/4 in) at the tip of the throttle lever.



Adjust as follows:
Slide the rubber boot off the cable adjuster.
Loosen the lock nut and adjust the throttle cable free play by turning the cable adjuster.
Tighten the lock nut and install the rubber boot securely.



CYLINDER COMPRESSION

Warm up the engine to normal operating temperature. Stop the engine and remove the spark plug.

Insert the compression gauge. Open the throttle all the way and crank the engine with the starter motor. Crank the engine until the gauge reading stops rising. The maximum reading is usually reached within 4-7 seconds.

COMPRESSION PRESSURE:
12–13 kg/cm² (170–185 psi)

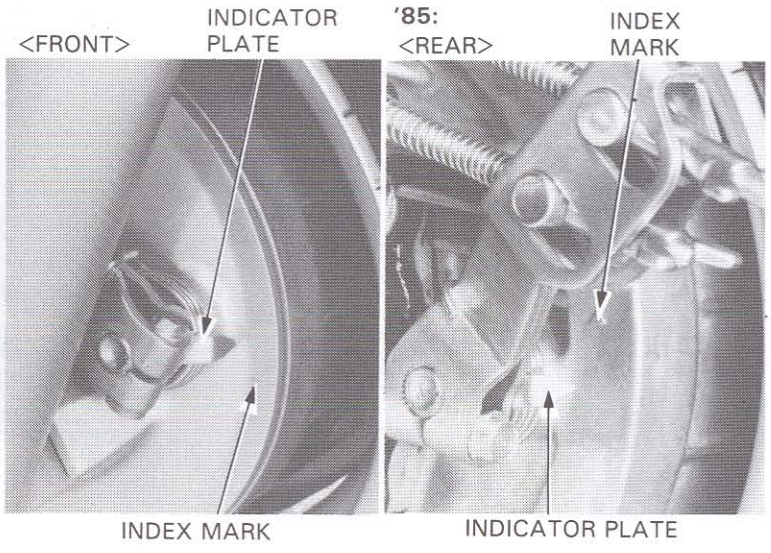
If compression is low, check for the following:
– Improper valve adjustment
– Valve leakage
– Cylinder head gasket leaking
– Worn piston ring or cylinder

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

COMPRESSION GAUGE, COMMERCIALLY AVAILABLE IN U.S.A.

BRAKE SHOES

Replace the brake shoes if the indicator plate aligns with the brake index mark when the front brake lever, rear brake lever or pedal is applied.



AFTER '85:

BRAKE CONTROL LINKAGE

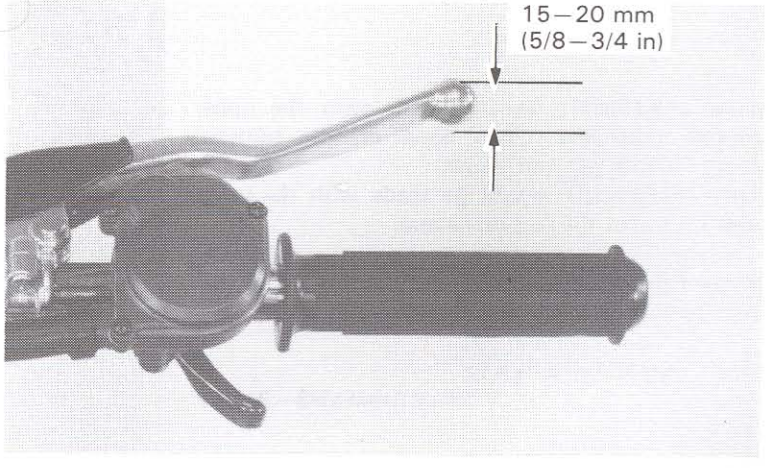
FRONT BRAKE

Check the cable and brake lever for loose connections, excessive play, or other damage. Replace or repair if necessary.

Disconnect the brake cable at the upper end. Thoroughly lubricate the cable and pivot point with a commercially available cable lubricant to prevent premature wear.

Install the brake cable.

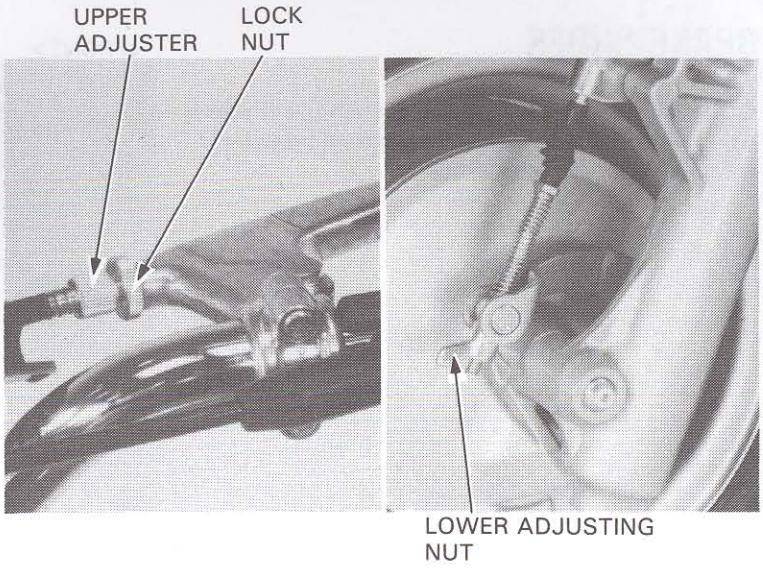
Measure the front brake lever free play at the end of the brake lever.



FRONT BRAKE LEVER FREE PLAY:
15—20 mm (5/8—3/4 in)

Minor adjustments can be made with the upper adjuster on the front brake lever. Slide the rubber cover off the adjuster, loosen the lock nut and adjust.

Major adjustments should be made with the lower adjusting nut. Adjust to the specified free play. After adjustment, make sure that the cut-out of the adjusting nut is seated on the brake arm pin.



REAR BRAKE

Check the cable, brake lever and brake pedal for loose connections, excessive play, or other damage.

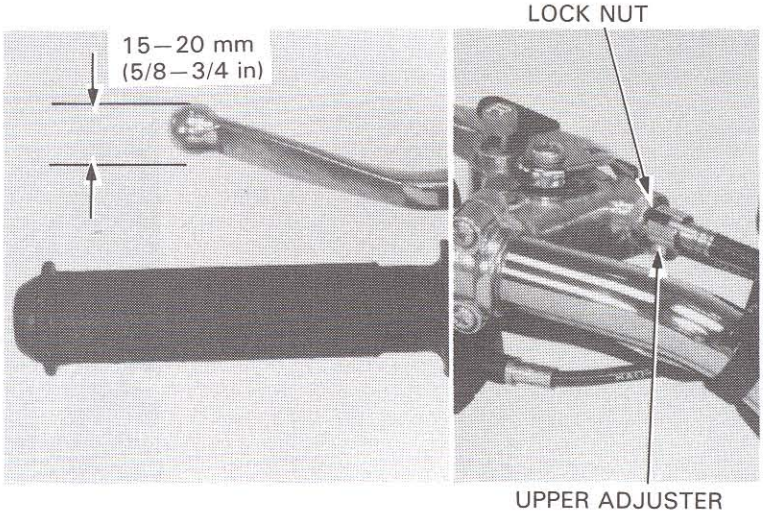
Replace or repair if necessary.
Disconnect the brake cables at the brake lever or pedal ends.

Thoroughly lubricate the cables and their pivot point with a commercially available cable lubricant to prevent premature wear.

Install the cables.

Measure the rear brake lever (parking brake) free play at the end of the brake lever.

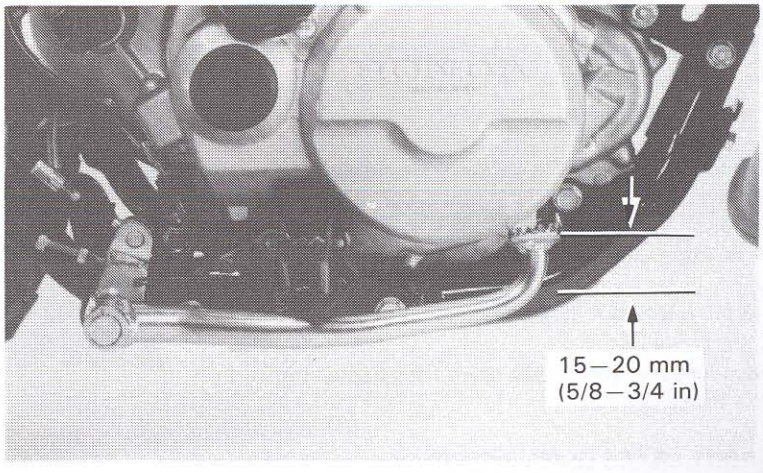
REAR BRAKE LEVER FREE PLAY:
15—20 mm (5/8—3/4 in)



Minor adjustments can be made with the upper adjuster. Slide the rubber cover off the adjuster, loosen the lock nut and adjust.
Major adjustments should be made with the lower adjusting nut at the rear brake arm.

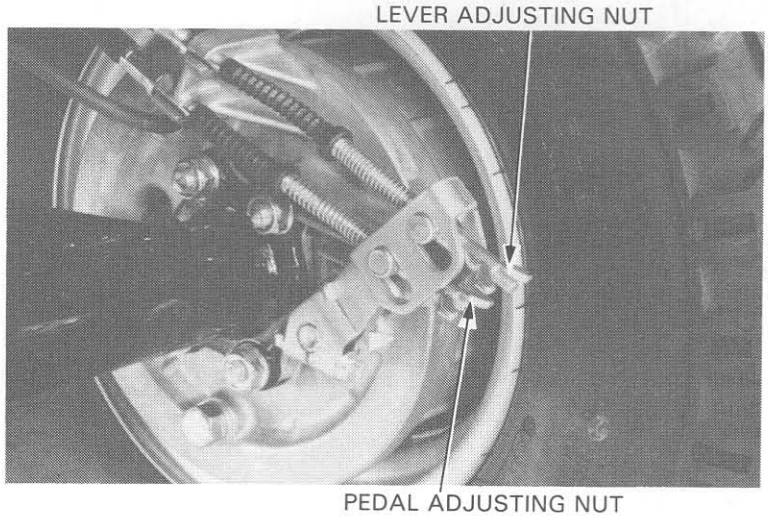
Measure the brake pedal free play at the end of the brake pedal and adjust as above.

BRAKE PEDAL FREE PLAY:
15—20 mm (5/8—3/4 in)



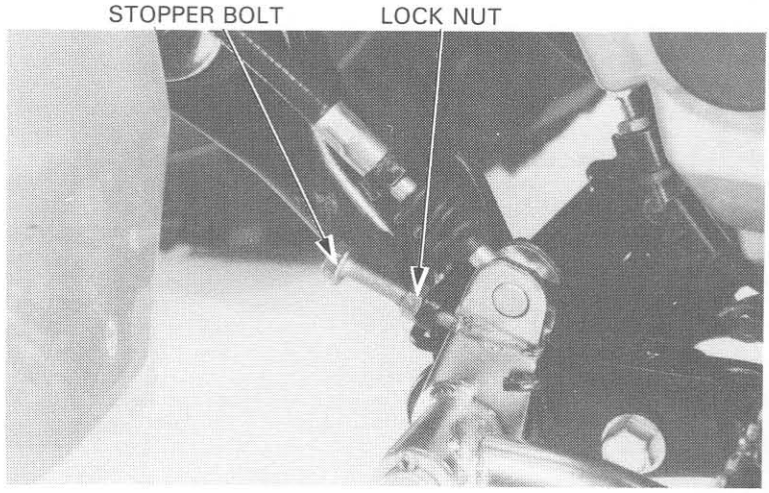
NOTE

Make sure the cut-out of each adjusting nut is seated on the brake arm pin.



REAR BRAKE PEDAL HEIGHT

Loosen the lock nut and adjust the pedal height by turning the stopper bolt.
Tighten the lock nut securely.
After adjustment, check the rear brake pedal free play and adjust if necessary.



CLUTCH

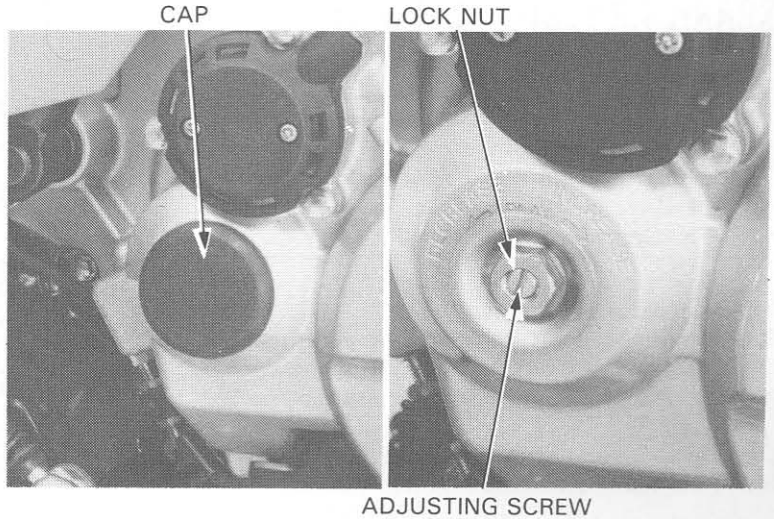
Stop the engine.
Remove the adjusting screw cap.
Loosen the clutch adjusting screw lock nut.

Slowly turn the adjusting screw counterclockwise until resistance is felt.

Then turn the adjusting screw clockwise 1/4 turn, and tirhten the lock nut.

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

Install the cap over the adjusting screw.
After adjustment, start the engine and check for proper clutch operation.



AFTER '85 SUSPENSION

WARNING

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

Check the front and rear suspensions for leaks by compressing them several times.

Check the front and rear suspensions for leaks or damage. Replace damaged components which cannot be repaired.

Tighten all nuts and bolts.

FRONT

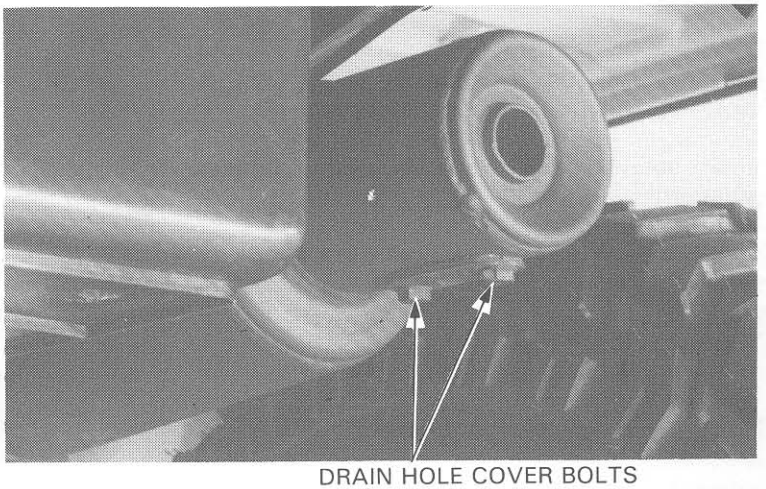
REAR

SPARK ARRESTER CLEANING

WARNING

- *Do not touch the exhaust components while the exhaust system is hot.*
- *Perform this operation in a well-ventilated area, free from fire hazard.*
- *Use adequate eye protection.*

Remove the drain hole cover.
Start the engine with the transmission in neutral, and purge accumulated carbon from the spark arrester system by momentarily revving the engine several times.
Stop the engine and allow the exhaust system to cool.
Install the drain hole cover.



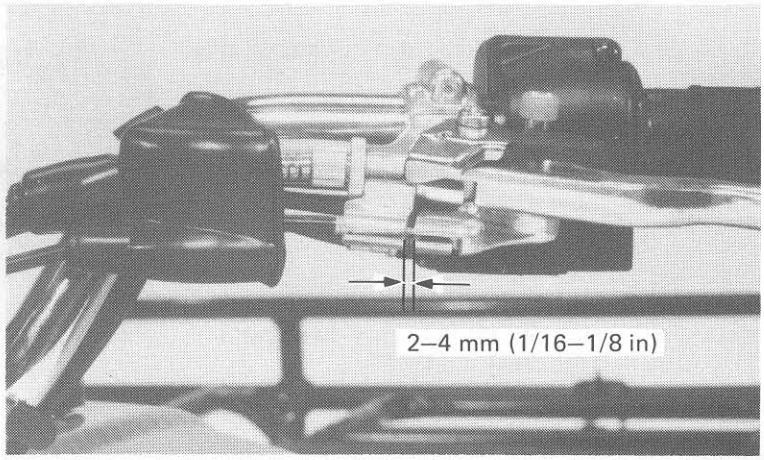
DRAIN HOLE COVER BOLTS

REVERSE LOCK SYSTEM

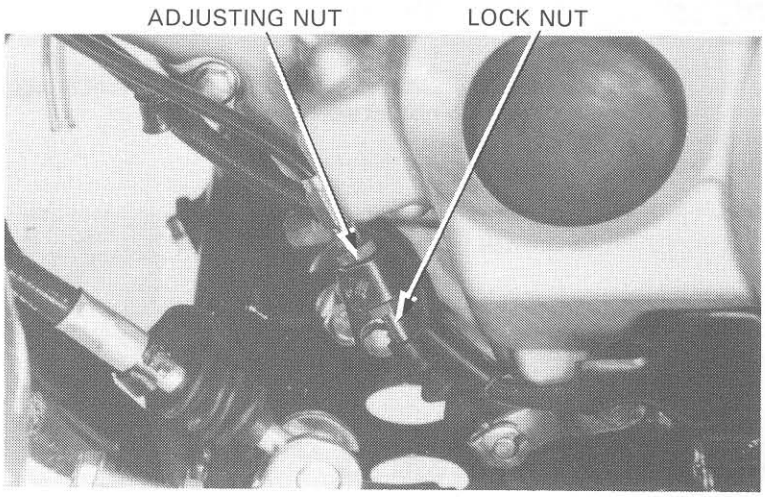
Check the reverse selector cable and lever for loose connection, excessive play, or other damage.
Replace or repair if necessary.

Measure the reverse selector lever free play at the lever end of the cable side.

FREE PLAY: 2–4 mm (1/16–1/8)



Adjust by loosening the lock nut and turning the adjusting nut.
Tighten the lock nut securely.

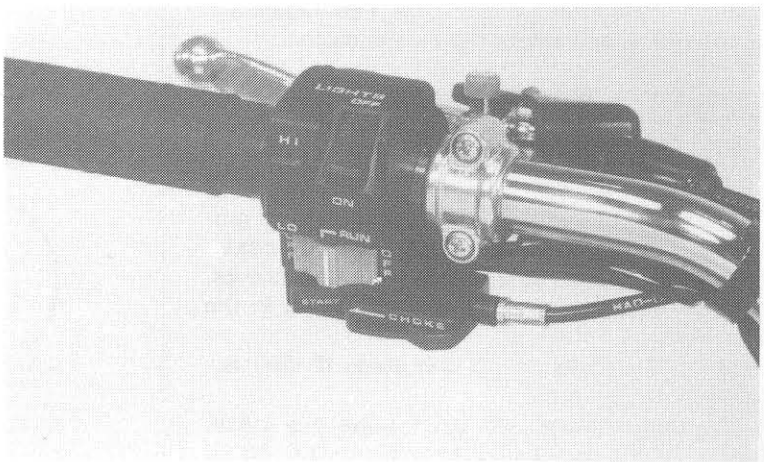


LIGHTING EQUIPMENT

Turn the ignition switch ON.
Check the headlight and taillight by operating the lighting switch and dimmer switch.

Position		Function
OFF		Headlight and taillight are OFF.
ON	LO	Headlight low beam and taillight should be ON.
	HI	Headlight high beam and taillight should be ON.

If the light does not work properly, check the bulbs and refer to page 17-5 to test the switch if necessary.



TIRES

Check the tires for cuts, imbedded objects, or other damage.

NOTE

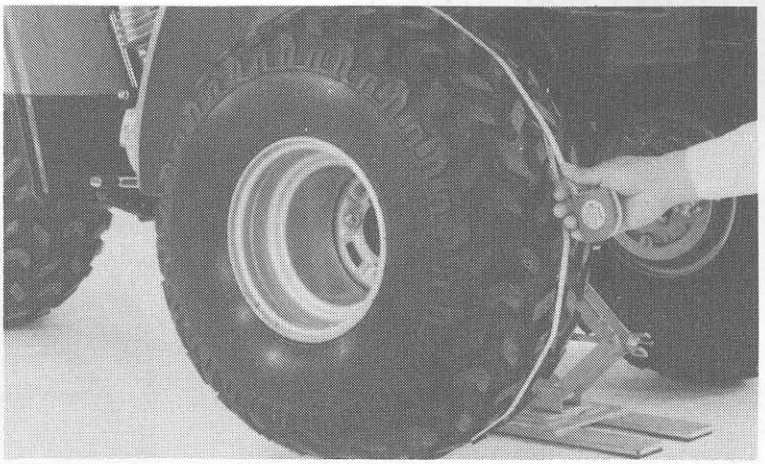
Tire pressure should be checked when the tires are COLD.

Check the tire pressures.

TIRE PRESSURES: 2.2 psi (15 kPa, 0.15 kg/cm^2)
STANDARD TIRE CIRCUMFERENCE:
1,915 mm (75.4 in)

NOTE

Raise the wheels off the ground when measuring tire circumferences.



STEERING HEAD BEARINGS

NOTE

Make sure the cables do not interfere with the rotation of the handlebar.

Raise the front wheel off the ground and make sure 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 11-29).

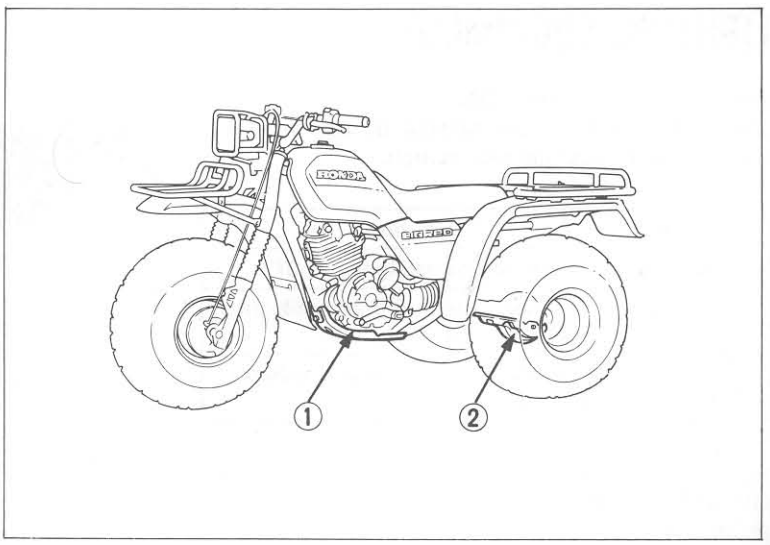
NUTS, BOLTS, FASTENERS

Tighten bolts, nuts and fasteners at regular intervals shown in the Maintenance Schedule (page 3-2).

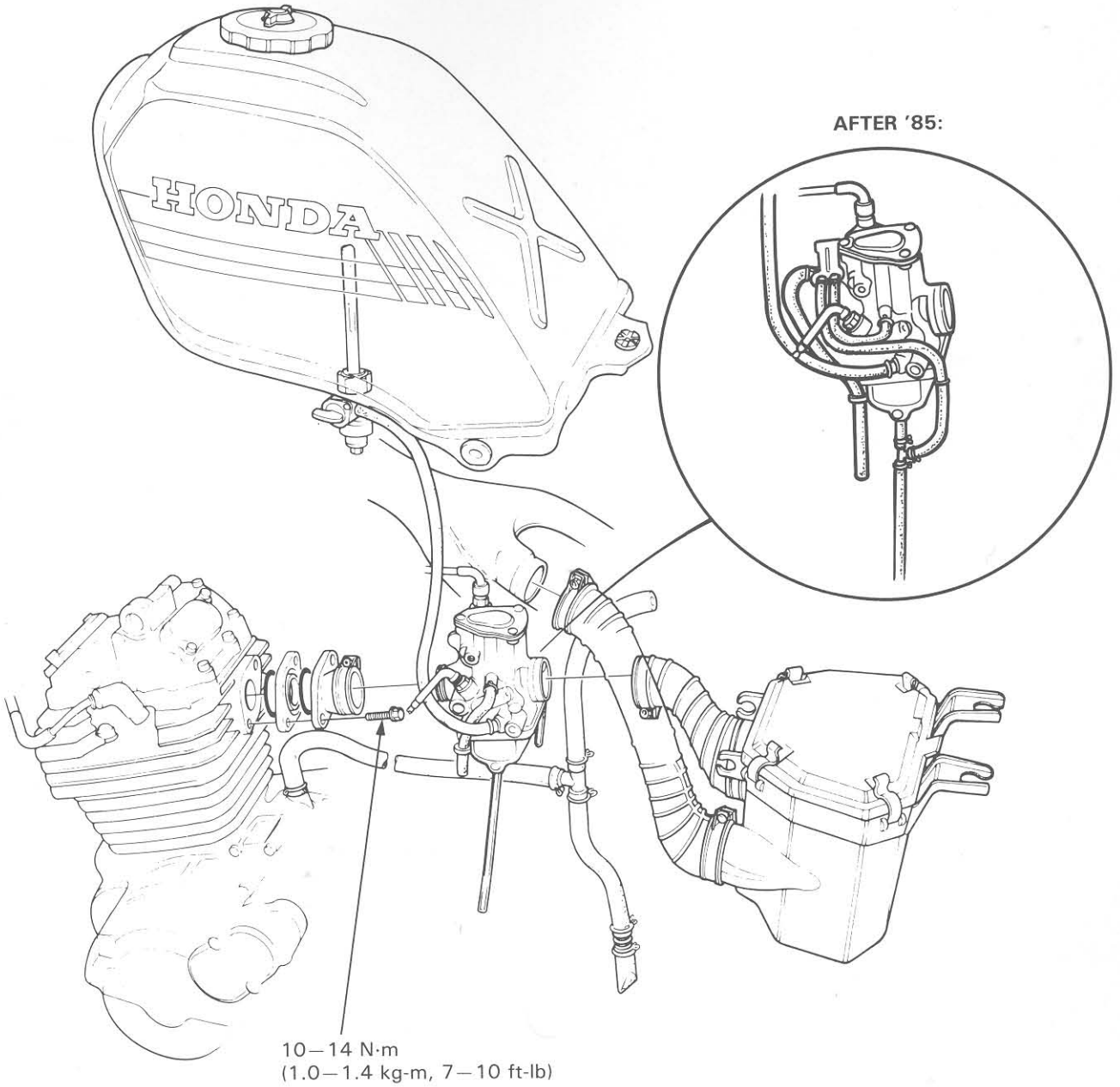
Check that all chassis nuts and bolts are tightened to their correct torque values (page 1-5). Check that all cotter pins and safety clips are in place.

ENGINE UNDER GUARD AND SKID PLATE (AFTER '86)

The engine under guard ① and skid plate ② protect the engine and rear differential from rocks. Check the under guard and plate for cracks, damage or looseness at intervals shown in the Maintenance Schedule.
Replace the under guard and plate if they are cracked or damaged.
If the under guard and plate bolts are loose, tighten them to 24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)



MEMO


HONDA
AFTER '85:
10—14 N·m
(1.0—1.4 kg-m, 7—10 ft-lb)

4. FUEL SYSTEM

SERVICE INFORMATION

GENERAL

- Use caution when working with gasoline. Always work in a well ventilated area away from sparks or flames.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new O-rings during reassembly.
- The carburetor float bowl has a drain screw that can be loosened to drain gasoline.

CAUTION

- *Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.*

SPECIFICATIONS

Fuel tank capacity	12.0 liter (3.2 US gal, 2.6 Imp. gal)
Fuel reserve capacity	2.0 liter (0.53 US gal, 0.44 Imp. gal)

Carburetor

ITEM	'85:		After '85:
Identification mark	QA01A [A], QA01A [B]	QA01A [C], QA01A [D]	QA07A [A]
Venturi dia	27 mm (1.06 in)	←	←
Float level	18.5 mm (0.73 in)	←	←
Pilot screw opening	2 turns out	←	←
Idle speed	1,400 ± 100 rpm	←	←
Main jet	#130	←	←
Primary jet	#45	←	←
Slow jet	#38	←	←
Starter fuel jet	Press fit	#70	#80
Jet needle	2nd groove	←	←
Throttle lever free play	3–8 mm (1/8–5/16 in)	←	←

TORQUE VALUES

Intake pipe bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Intake pipe band bolt	3–5 N·m (0.3–0.5 kg-m, 2–4 ft-lb)

TOOL

Common

Float level gauge	07401–0010000

TROUBLESHOOTING

Engine cranks but won't start
1. No fuel in tank
2. No fuel to carburetor
3. Too much fuel getting to cylinder
4. No spark at plug (ignition malfunction)
5. Air cleaner clogged

Engine idles roughly, stalls, or runs poorly
1. Idle speed incorrect
2. Ignition malfunction
3. Rich mixture
4. Lean mixture
5. Air cleaner dirty
6. Insulator leaks

Lean mixture
1. Carburetor fuel jet clogged
2. Fuel cap vent blocked
3. Fuel filter clogged
4. Fuel line kinked or restricted
5. Float valve faulty
6. Float level too low

Rich mixture
1. Carburetor choke stuck closed
2. Float valve faulty
3. Float level too high
4. Carburetor air jet clogged
5. Air cleaner dirty

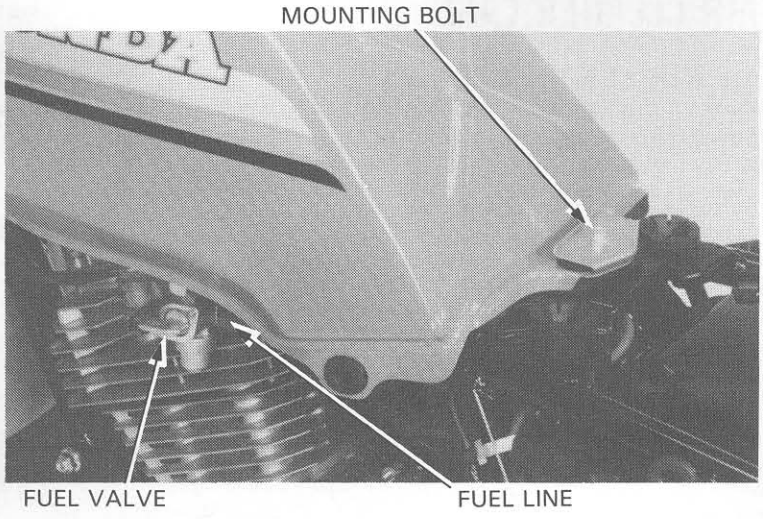
FUEL TANK

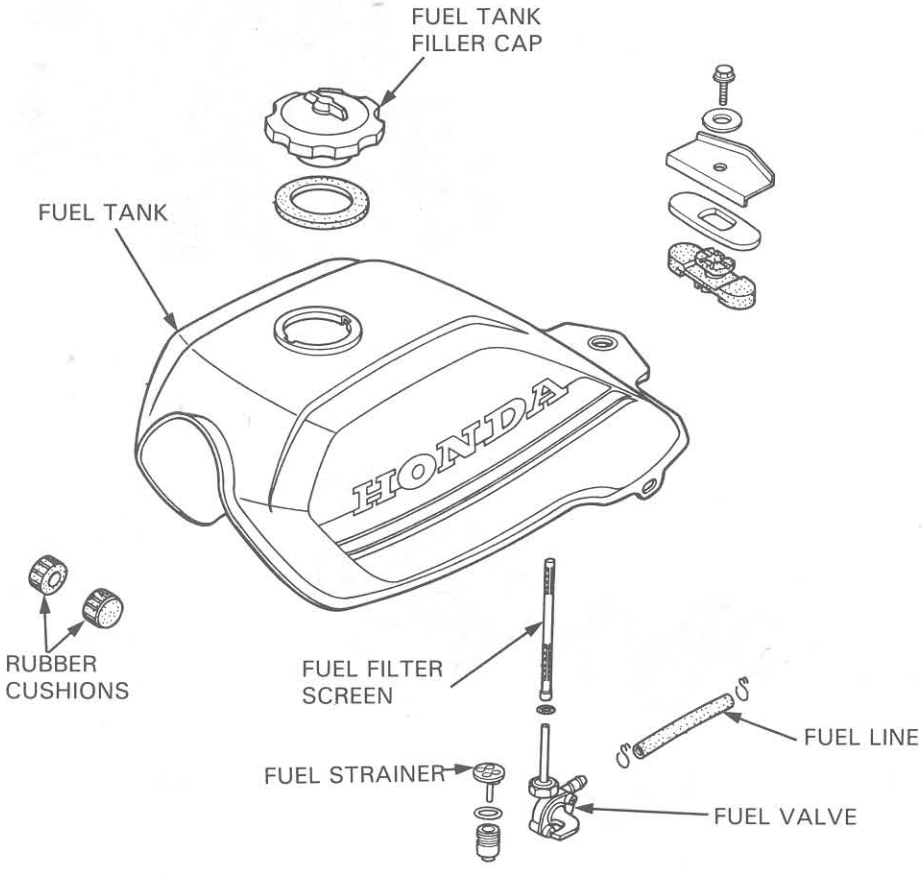
Remove the seat and both frame side covers.
Turn the fuel valve OFF and disconnect the fuel line at the fuel valve.
Remove the fuel tank mounting bolt and the tank.

WARNING

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

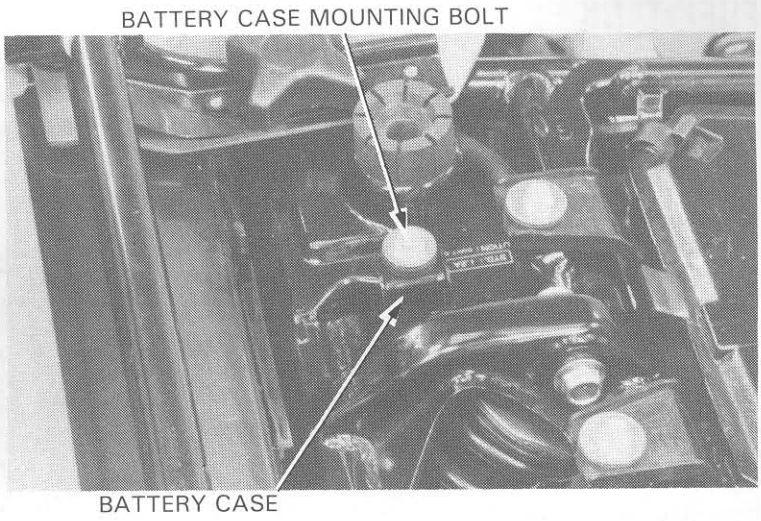
Use a drain pan and check that fuel flows freely out of the fuel valve by turning the fuel valve ON.
If flow is restricted, clean the fuel strainer (page 3-7) and fuel filter screen.
Check the vent hole in the filler cap for blockage.
Install the fuel tank by sliding its front brackets onto the rubber cushions on the frame and tighten the mounting bolt.
Connect the fuel line to the fuel valve.
Install the seat.
Turn the fuel valve ON and make sure that there are no fuel leaks.



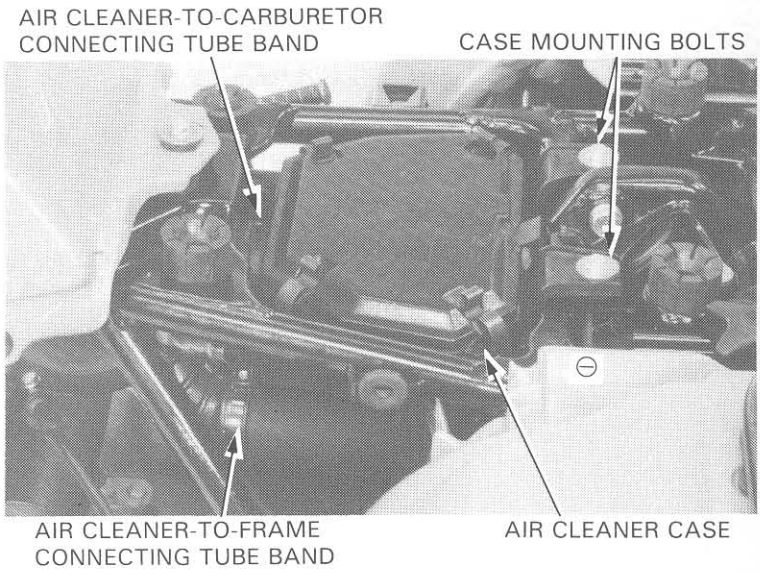


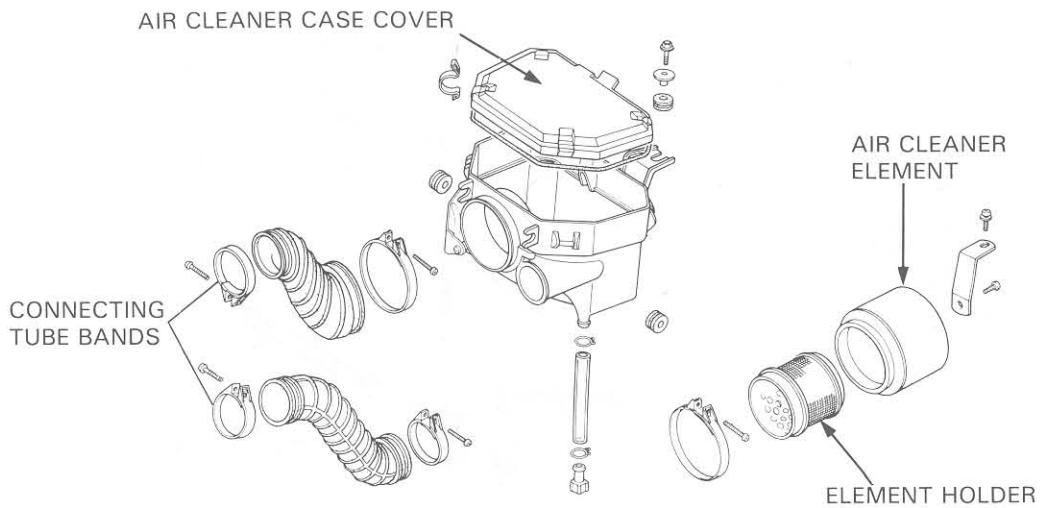
AIR CLEANER CASE

Remove the fuel tank (page 4-3).
Remove the battery case mounting bolt and move the case to the rear.



Loosen the air cleaner-to-carburetor and air cleaner-to-frame connecting tube bands.
Remove the two air cleaner case mounting bolts and the air cleaner case.

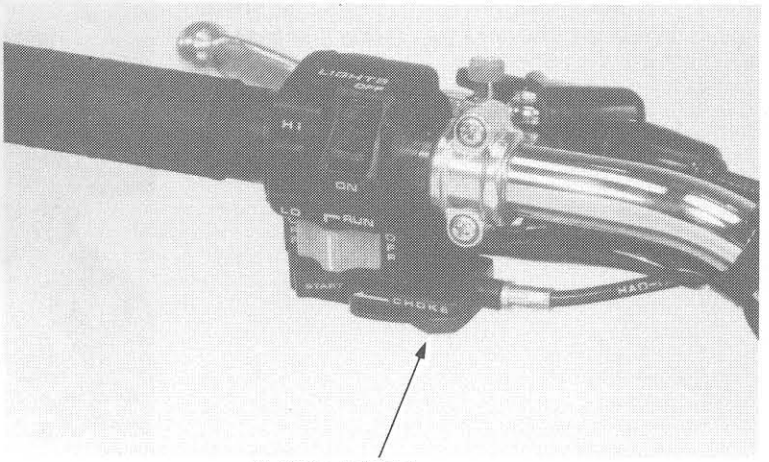




CARBURETOR CHOKE

The choke system uses a fuel enrichment circuit controlled by a starter valve. The starter valve opens the enrichment circuit via a cable when the choke lever on the handlebar is moved to the left.

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



CHOKE LEVER

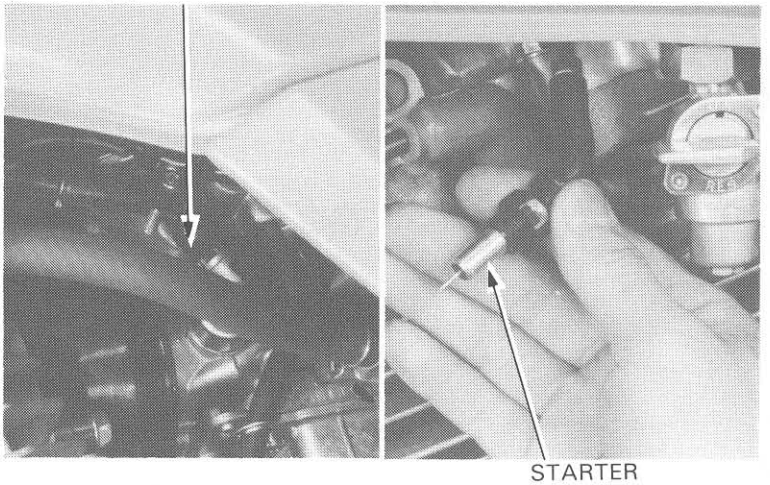
Loosen the starter valve nut and remove the valve from the carburetor.

Move the choke lever all the way to the left and measure the starter valve stroke.

STARTER VALVE STROKE: 7.0 mm (0.28 in)

Check the starter valve and spring for nicks, grooves, or other damage.

STARTER VALVE NUT

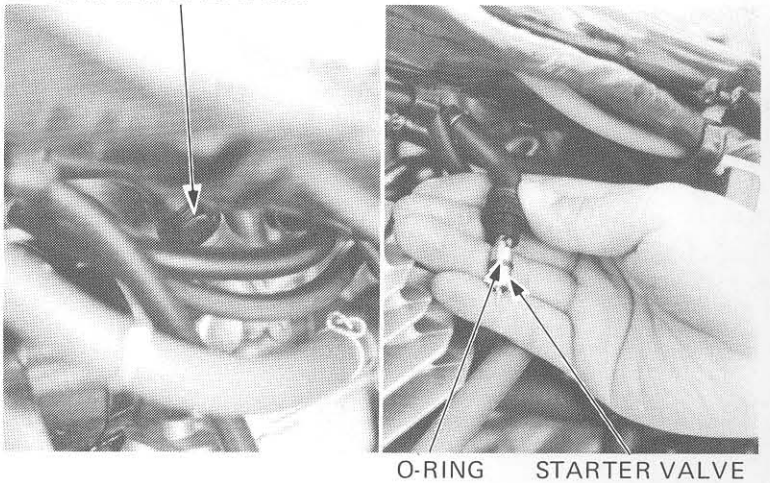


STARTER VALVE

After '85

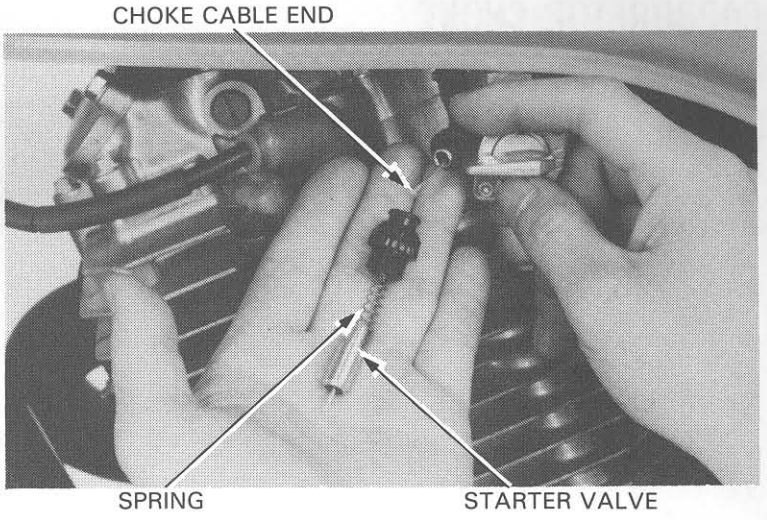
Make sure the O-ring is in good condition.

STARTER VALVE NUT

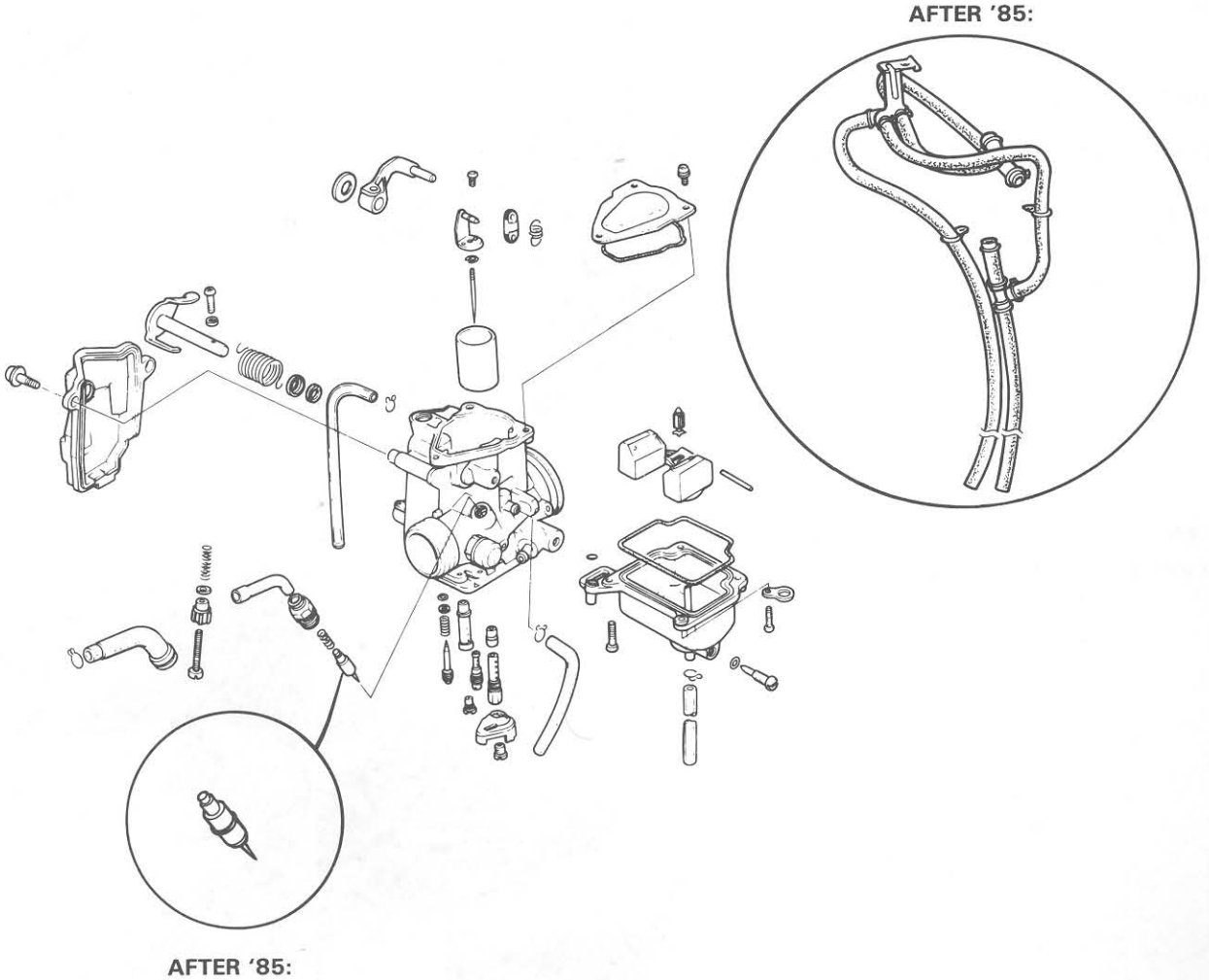


O-RING STARTER VALVE

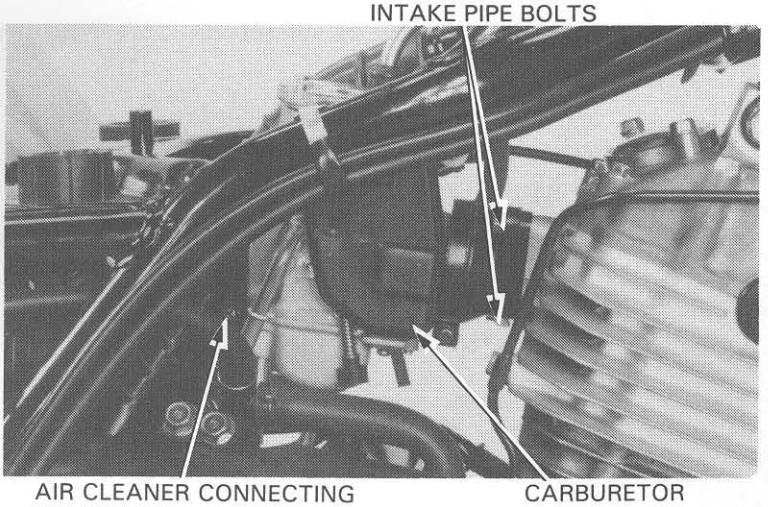
Disconnect the choke cable end from the starter valve and replace the valve and spring if necessary.



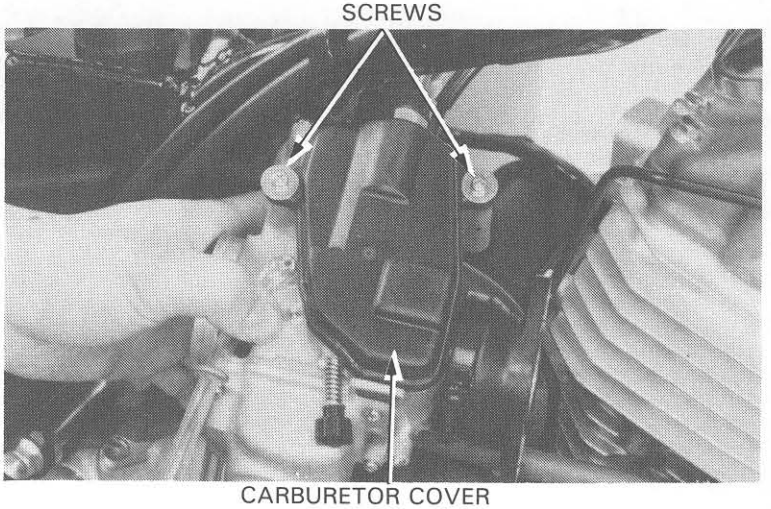
CARBURETOR REMOVAL



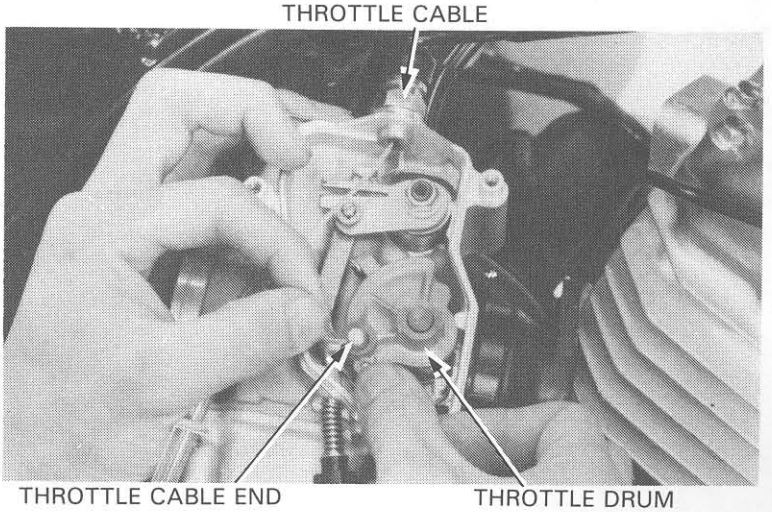
Remove the frame side covers, seat and fuel tank.
Drain the gasoline from the float chamber.
Loosen the air cleaner connecting tube band.
Remove the two intake pipe bolts and remove the carburetor from the right side.



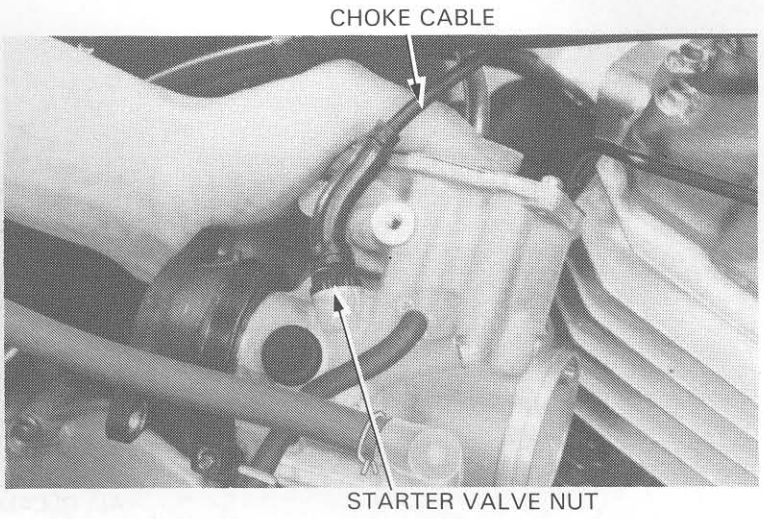
Remove the two carburetor cover screws and the cover.



Disconnect the throttle cable end from the throttle drum.
Remove the throttle cable from the carburetor body.



Loosen the starter valve nut and disconnect the choke cable from the carburetor.



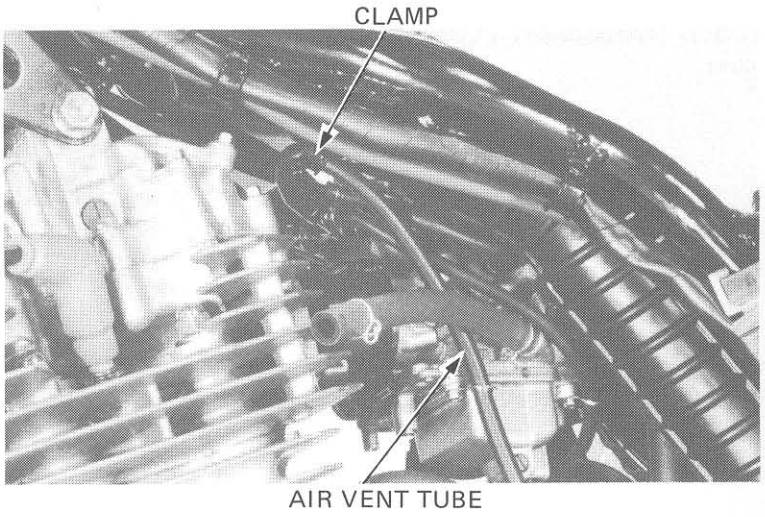
After '85

Remove the frame side covers, seat and fuel tank.

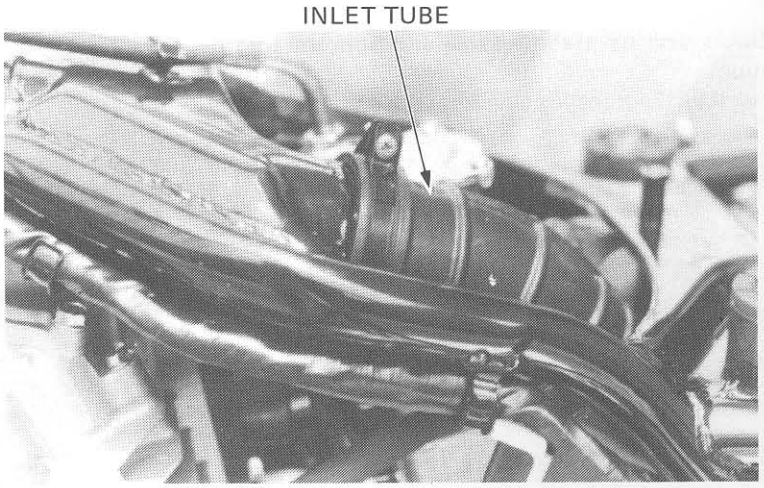
Drain the gasoline from the float chamber.

Remove the air vent tube from the frame clamp.

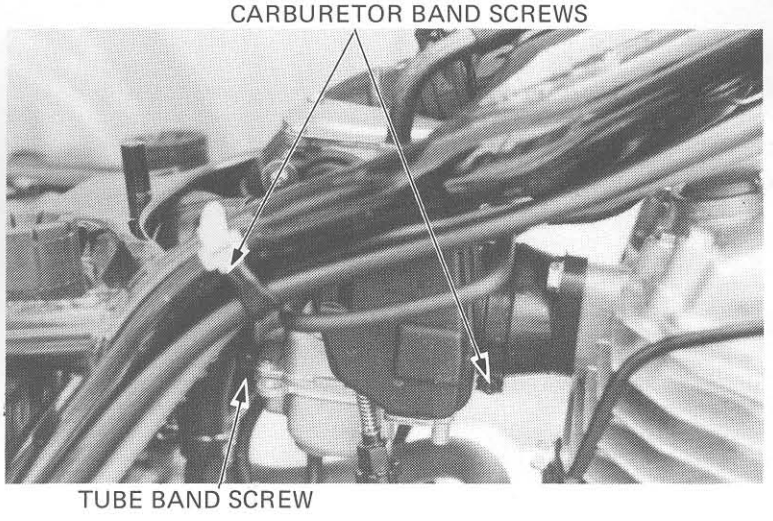
Remove the starter valve nut and disconnect the choke cable from the carburetor.



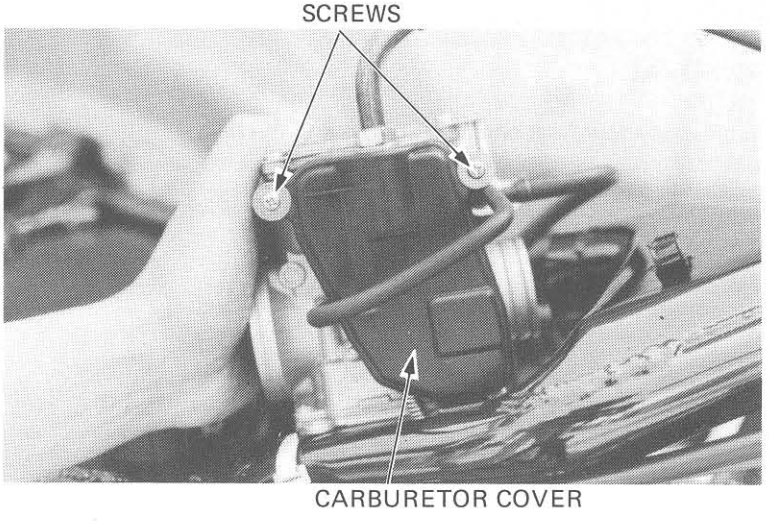
Disconnect the inlet tube from the air cleaner.



Loosen the carburetor band screws and air cleaner connecting tube band screw.
Remove the carburetor from the top side.



Remove the air vent tube of the carburetor.
Remove the two carburetor cover screws and the cover.



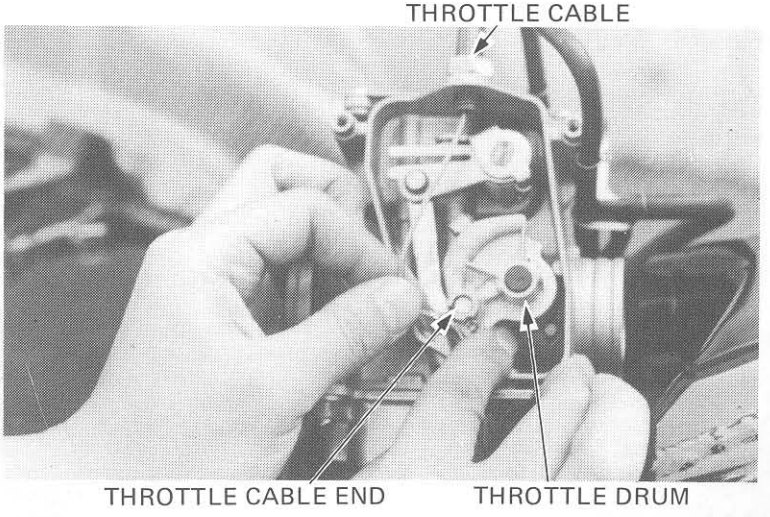
Disconnect the throttle cable end from the throttle drum.
Remove the throttle cable from the carburetor body.

NOTE

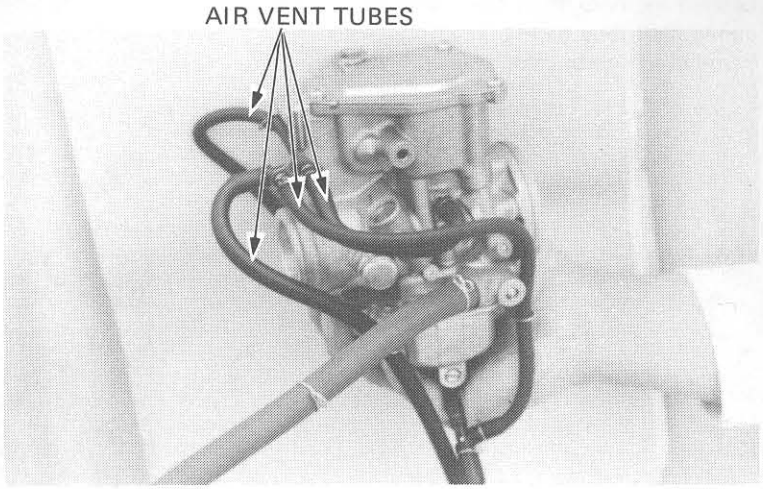
- Apply grease to the throttle cable end when installing.

CAUTION

Do not twist or bend the throttle cable when installing or removing it from the throttle drum. Use the same care when handling the carburetor assembly. Twisting or bending the cable can damage it and cause throttle operation to be rough.



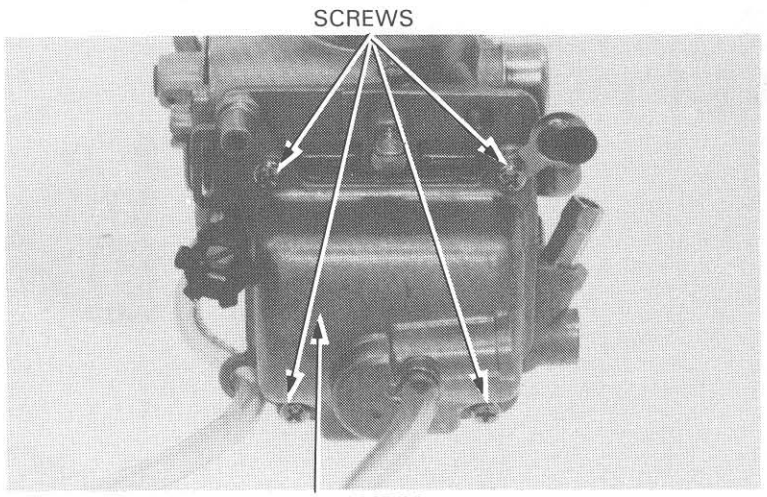
Remove the air vent tubes.



FLOAT CHAMBER

REMOVAL

Remove the four float chamber screws and the float chamber.

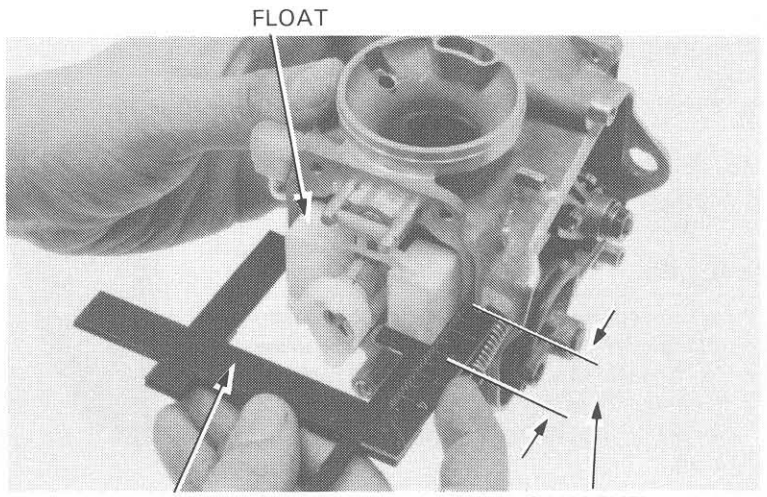


FLOAT LEVEL

Measure the float level with a float level gauge as shown.

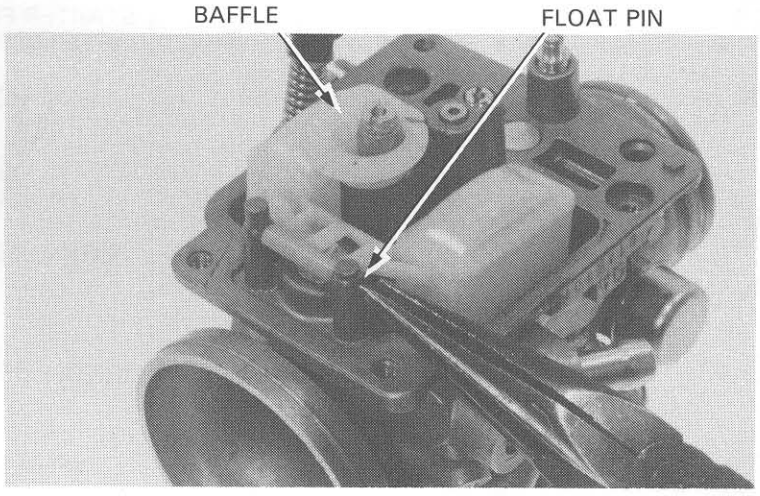
SPECIFICATIONS: 18.5 mm (0.73 in)

The float can not be adjusted.
Replace the float assembly if it is out of specification.

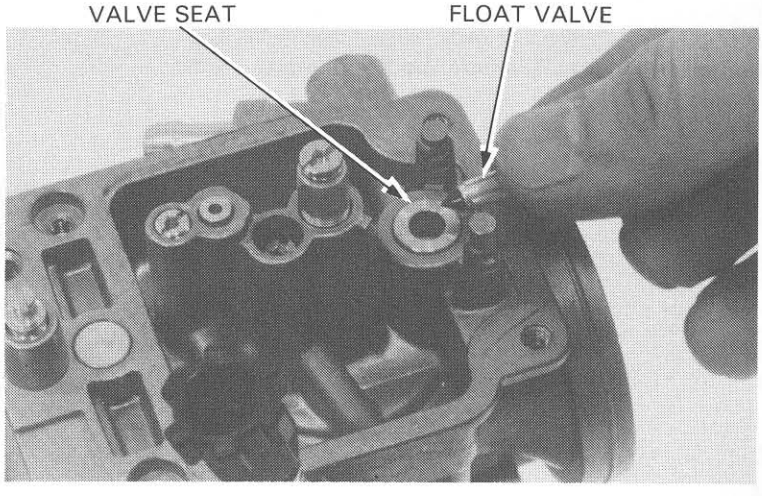


FLOAT AND JETS

Remove the float pin, baffle, float and float valve.



Inspect the float valve for grooves and nicks.
Replace as required.
Inspect the operation of the float valve.



Remove the main jet, needle jet holder and needle jet.
Remove the slow jet, primary jet and primary nozzle.
Turn the pilot screw in and record the number of turns before it seats lightly. Use this as a reference for reinstallation.

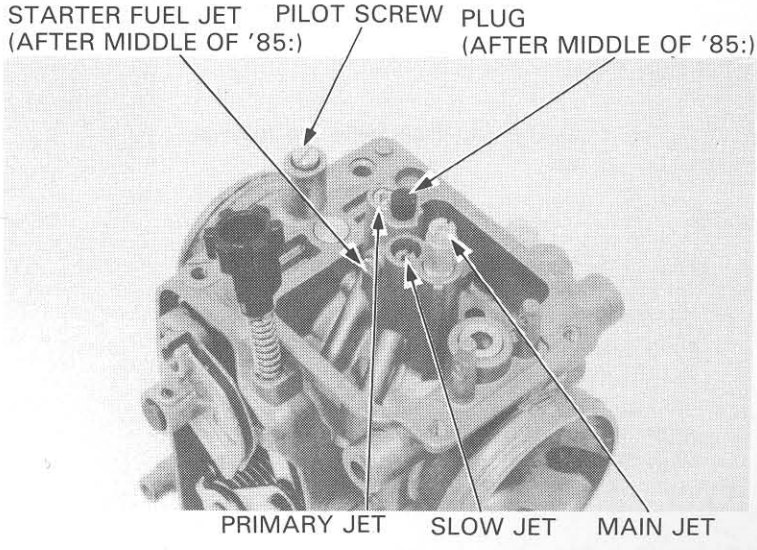
CAUTION

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

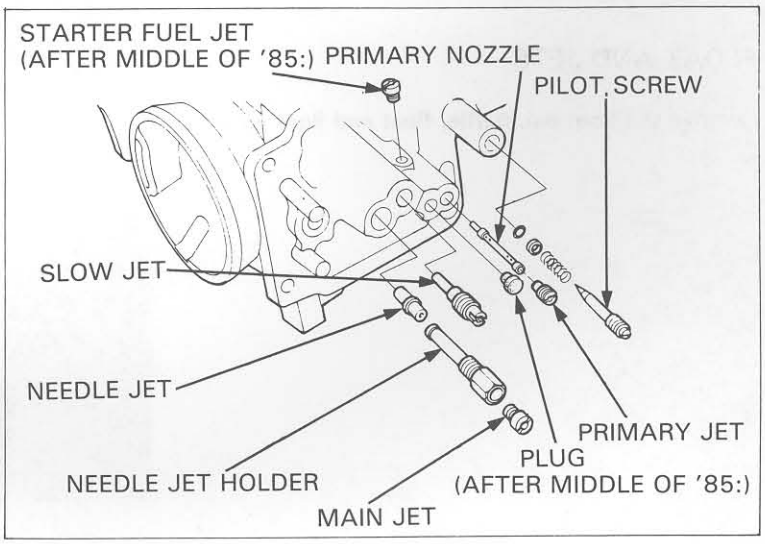
Remove the pilot screw.

NOTE

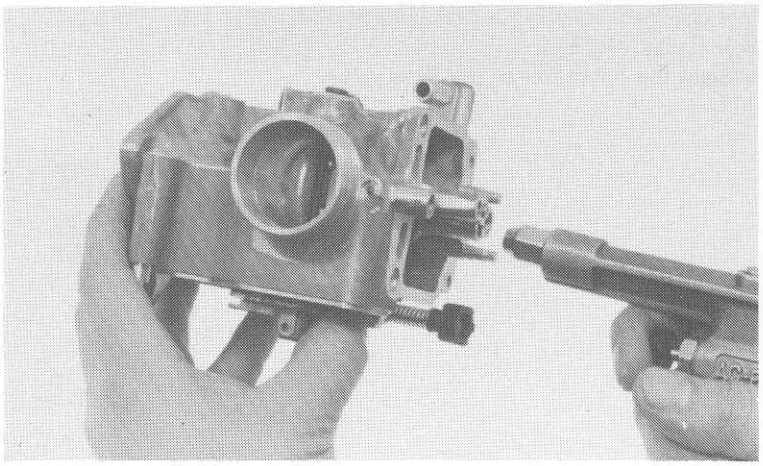
Starter jets on carburetors with I.D. Numbers QA01A [A] or QA01A [B] are press fit. Do not attempt to remove them (see page 4-1).



Inspect the pilot screw and each jet and replace them if they are worn or damaged.
Blow open all jets with compressed air.



Remove the primary throttle valve (page 4-13) and blow open all carburetor body openings with compressed air.

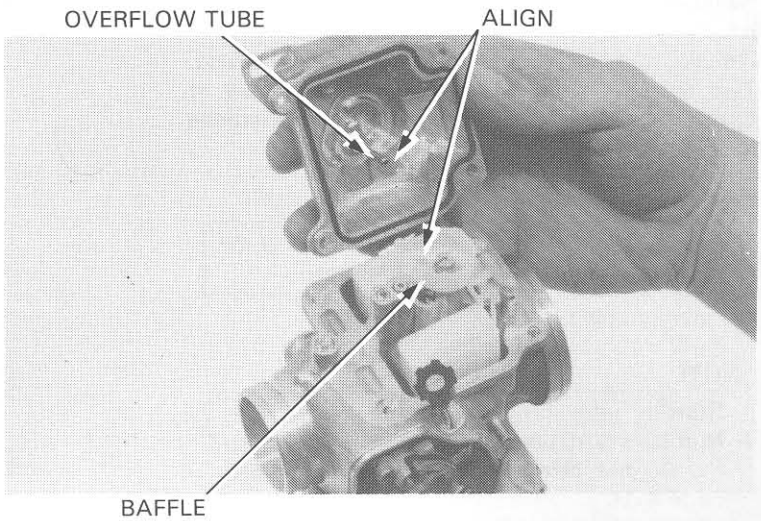


ASSEMBLY

Float chamber assembly is essentially the reverse order of disassembly.

NOTE

- Use new O-rings whenever the carburetor is reassembled.
- Handle all jets with care. They can easily be scored or scratched.
- Set the pilot screw to the position recorded during disassembly.
- Align the overflow tube on the chamber with the hole in the baffle as shown.



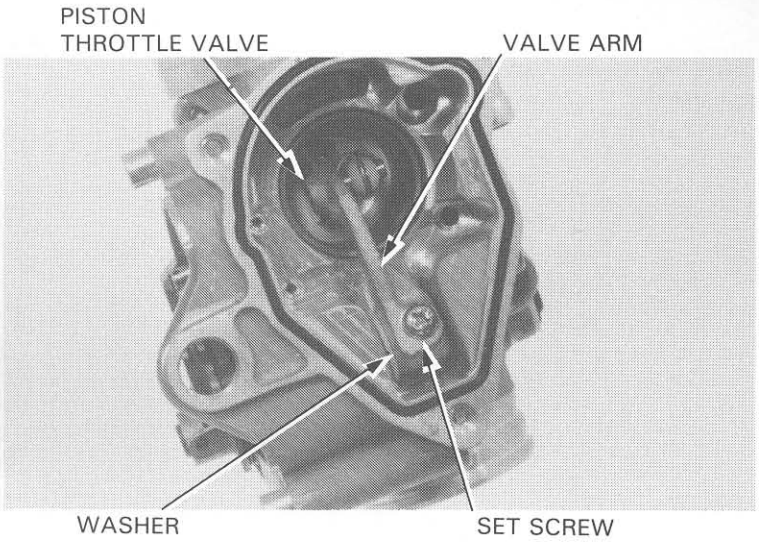
THROTTLE VALVE

NOTE

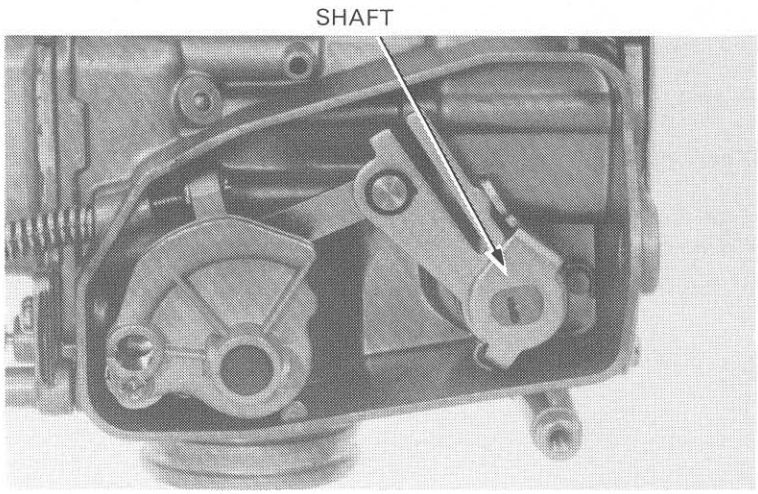
The butterfly throttle valve attaching screws are staked and the valve can not be removed.

PISTON THROTTLE VALVE REMOVAL

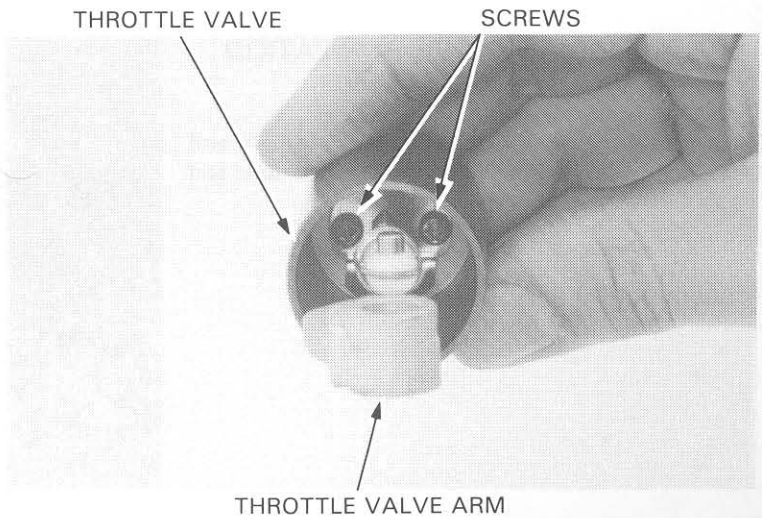
Remove the throttle valve arm set screw.



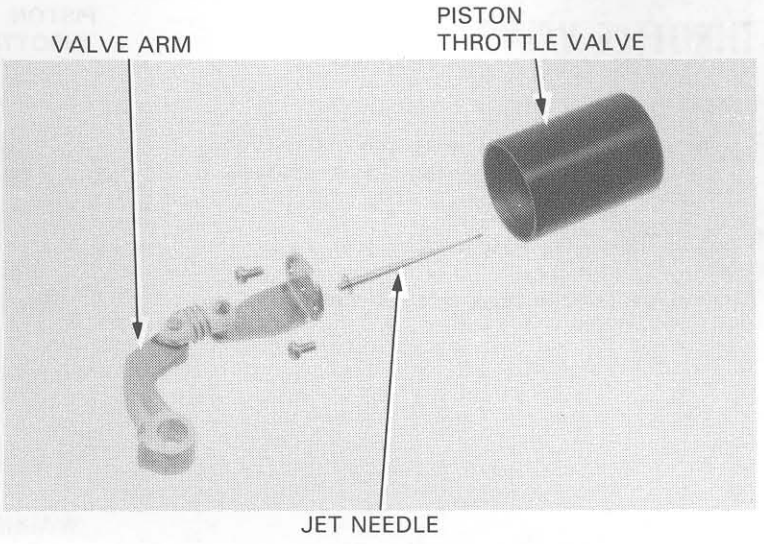
Pull the shaft out and remove the throttle valve and washer.



Remove the two screws attaching the valve arm to the valve and remove the valve and jet needle from the arm.



Check the throttle valve and jet needle for wear or damage.

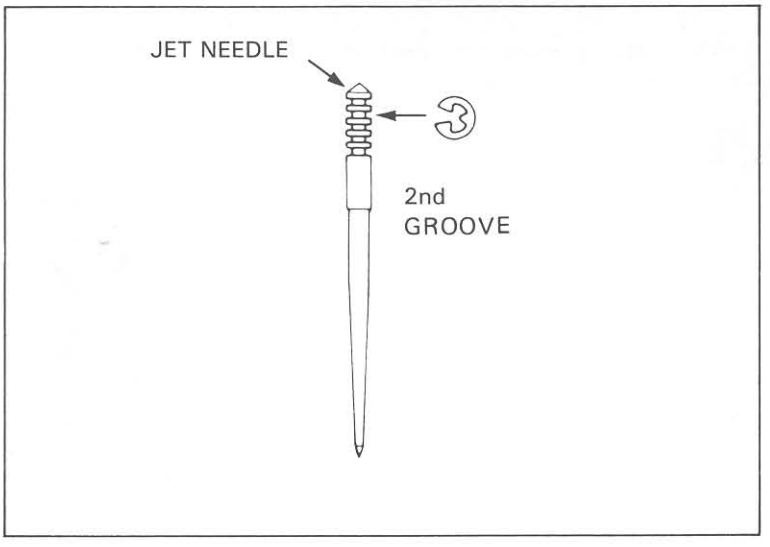


PISTON THROTTLE VALVE INSTALLATION

Install the needle clip on the jet needle.

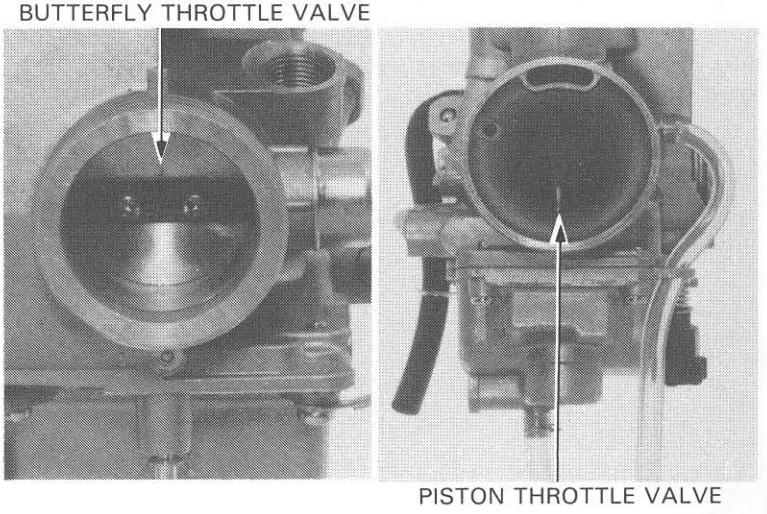
STANDARD SETTING: 2nd groove

Install the primary throttle valve in the reverse order of removal.



THROTTLE VALVE SYNCHRONIZATION

Close the throttle valve fully.
Make sure that the throttle slide is closed fully and there is no clearance between the throttle link and the throttle slide shaft arm.



Adjust synchronization by opening or closing the slot in the throttle link.

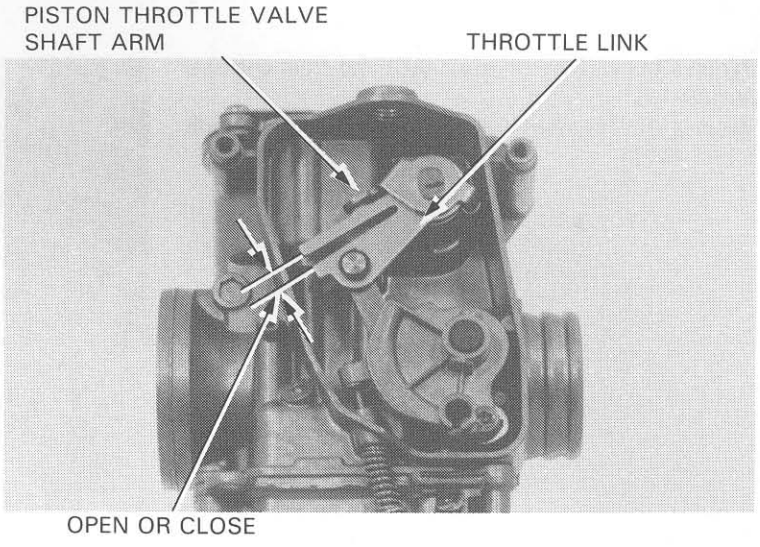
CARBURETOR INSTALLATION

Installation is essentially the reverse of removal.

NOTES

- Route the throttle and choke cables properly (page 1-12).
- Apply grease to the throttle cable end when installation.
- Damage to the wire occurs if the throttle cable is bent.

Perform the following inspections and adjustments.
- Throttle operation (page 3-8)
- Carburetor choke (page 4-5).
- Carburetor idle speed (page 3-6).



PILOT SCREW ADJUSTMENT

NOTE

The pilot screw is factory pre-set. Adjustment is not necessary unless the carburetor is overhauled or a new pilot screw is installed.

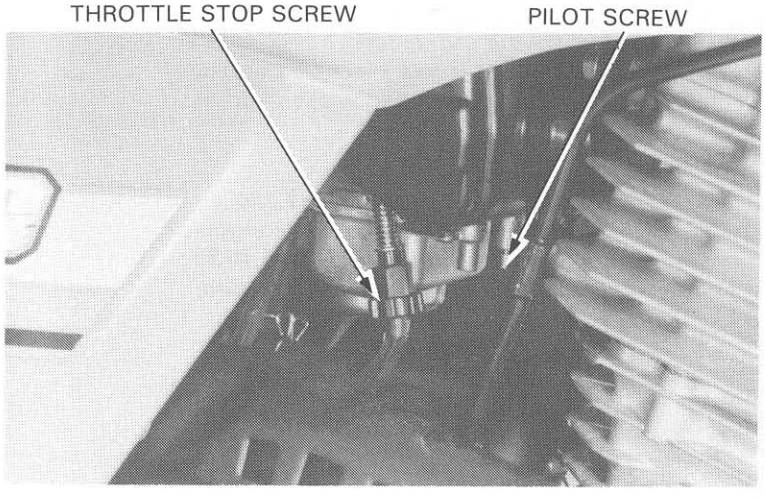
CAUTION

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

Turn the pilot screw clockwise until it seats lightly and back it out 2 turns.
This is an initial setting prior to the final pilot screw adjustment.
Warm the engine up to operating temperature.
Stop the engine and connect a tachometer.
Start the engine and adjust the idle speed with the throttle stop screw.

IDLE SPEED: 1,400 ± 100 rpm

Turn the pilot screw clockwise slowly until the engine stops, and then back it out 1 turn. Start the engine and readjust the idle speed with the throttle stop screw, if necessary.



HIGH ALTITUDE ADJUSTMENT

The carburetor must be adjusted for high altitude riding (above 6,000 ft/1,800 m).

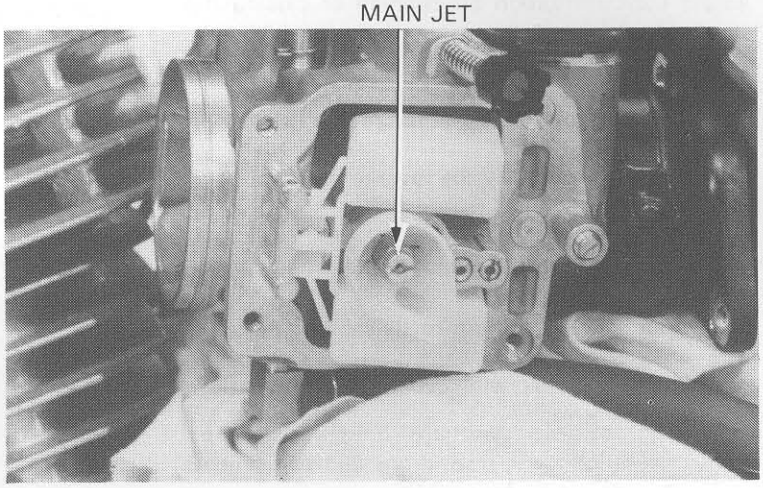
STANDARD SETTING
6,000 ft (1,800 m) max.
HIGH ALTITUDE SETTING:
5,000 ft (1,500 m) min.

High altitude carburetor adjustment is performed as follows:

SPECIFICATIONS

	Below 6,000 ft (1,800 m)	Above 5,000 ft (1,500 m)
Main jet	#130	#125
Pilot screw opening	Factory preset	1/2 Screw in

Remove the carburetor (page 4-6) and float chamber (page 4-10).
Replace the standard main jet with the high altitude type (#125).

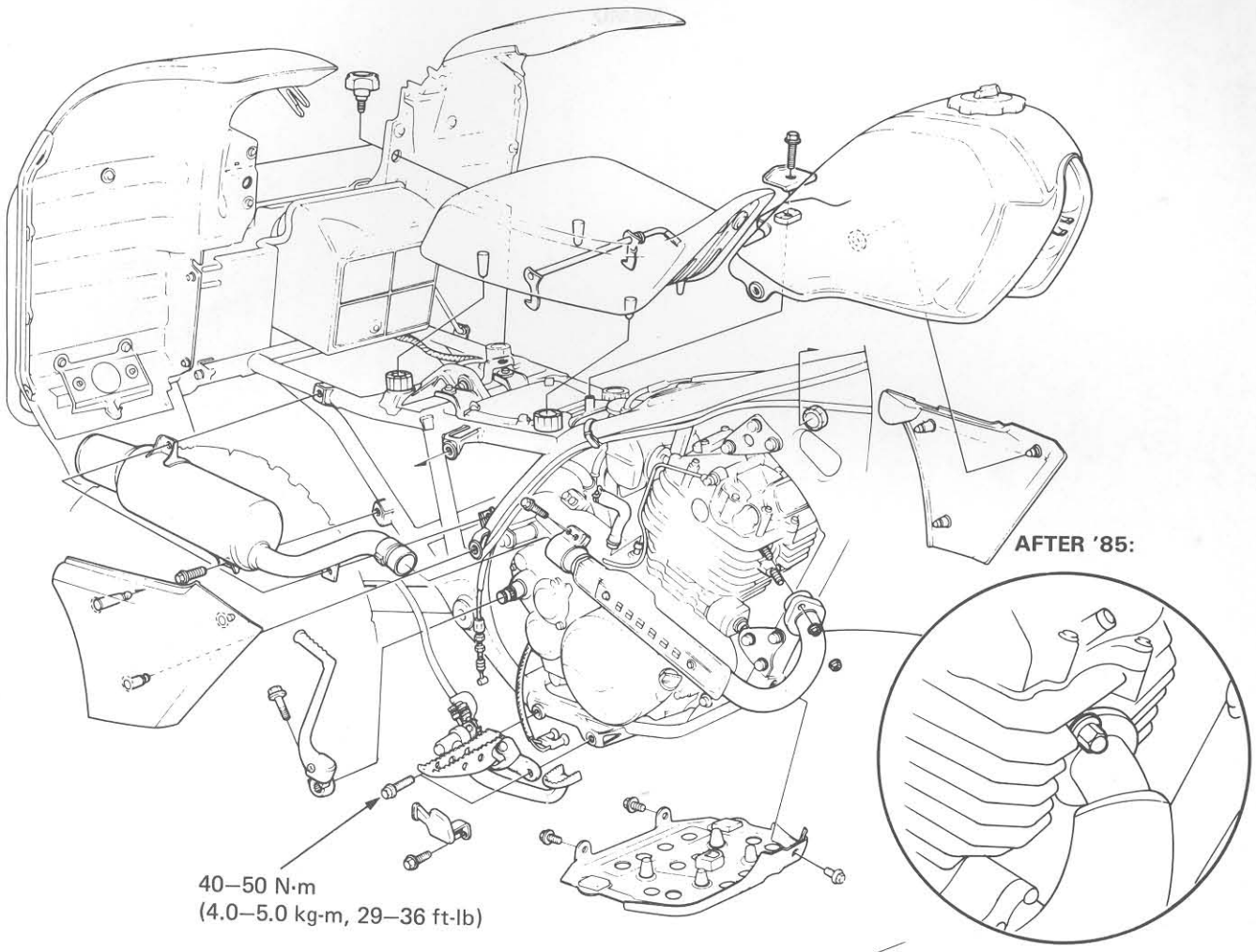


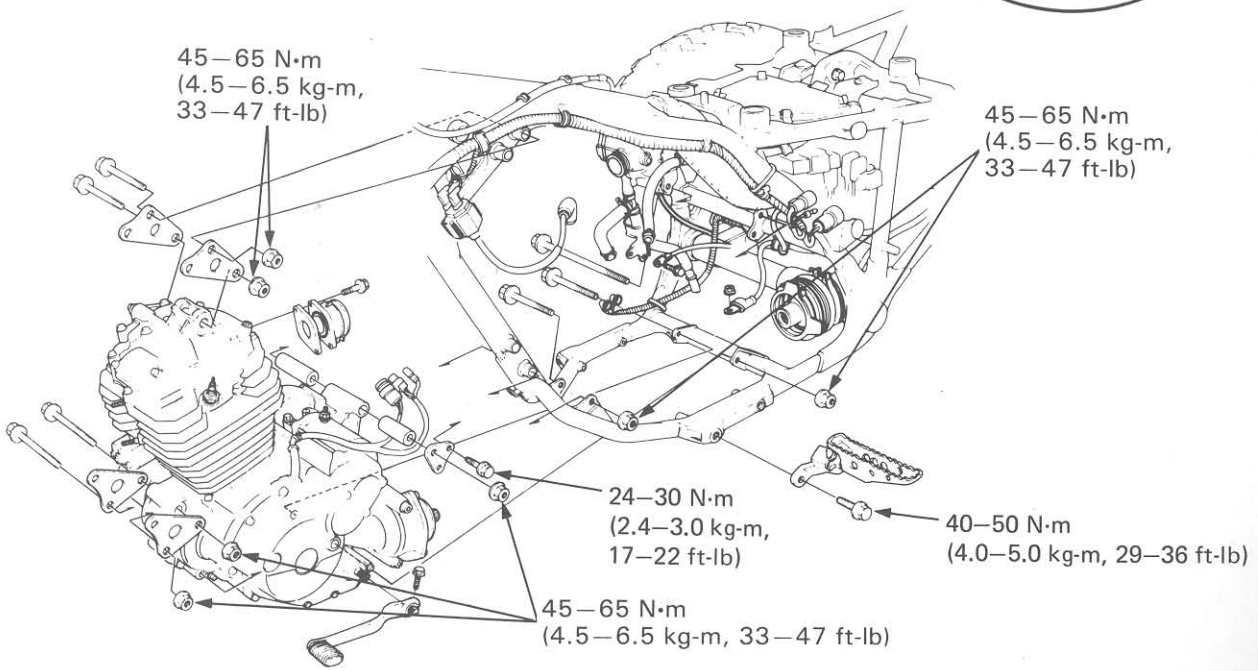
Assemble and install the carburetor.
Start the engine and adjust the idle speed at high altitude to ensure proper high altitude operation.

CAUTION

Sustained operation below 5,000 feet (1,500 m) with the high altitude settings may cause engine overheating and engine damage. Install the #130 main jet and turn out the pilot screw 1/2 turn, when riding below 5,000 feet (1,500 m).

MEMO


AFTER '85:
40–50 N·m
(4.0–5.0 kg-m, 29–36 ft-lb)


45–65 N·m
(4.5–6.5 kg-m,
33–47 ft-lb)
45–65 N·m
(4.5–6.5 kg-m,
33–47 ft-lb)
24–30 N·m
(2.4–3.0 kg-m,
17–22 ft-lb)
40–50 N·m
(4.0–5.0 kg-m, 29–36 ft-lb)
45–65 N·m
(4.5–6.5 kg-m, 33–47 ft-lb)

5. ENGINE REMOVAL/ INSTALLATION

SERVICE INFORMATION

GENERAL

- A floor jack or other adjustable support is required to support and maneuver the engine.
- The following parts or components can be serviced with the engine installed in the frame:

- Carburetor
- Oil pump
- Alternator
- Starter motor
- Cylinder and piston
- Clutch
- Kick starter
- Gearshift linkage
- Cylinder head
- Cam chain tensioner

SPECIFICATIONS

Engine dry weight	46.3 kg (102 lbs)
Engine oil capacity	2.5 lit. (2.6 US qt, 2.2 Imp qt) after disassembly 2.1 lit. (2.2 US qt, 1.8 Imp qt) after draining

TORQUE VALUES

Engine hanger bolt

8 mm bolt	24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)
10 mm bolt	45—65 N·m (4.5—6.5 kg-m, 33—47 ft-lb)
Foot peg bracket bolt	40—50 N·m (4.0—5.0 kg-m, 29—36 ft-lb)

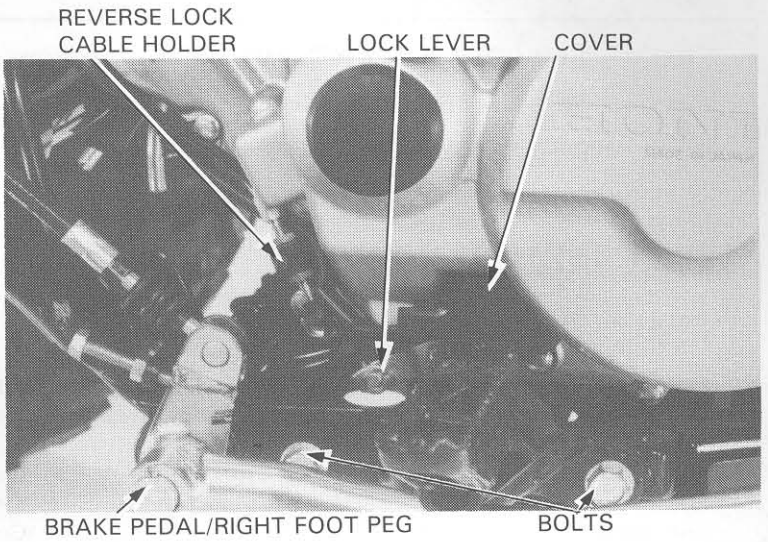
ENGINE REMOVAL

Remove the exhaust pipe and muffler (page 13-3).
Drain the engine oil (page 2-2).
Remove the seat, frame side covers and fuel tank.
Raise the rear fender.

Remove the right foot peg/rear brake pedal from the frame by removing two bolts.

Remove the bolt attaching the reverse lock cable holder and disconnect the cable from the lock lever.
Remove the neutral and reverse switch wire cover.
Disconnect the neutral and reverse switch wires from the switches.

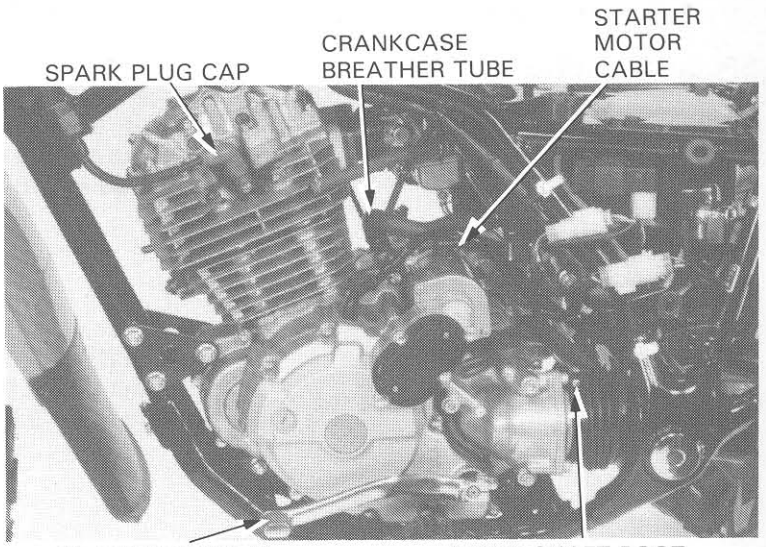
Remove the reverse lock lever by removing the bolt.



Disconnect the spark plug cap, crankcase breather tube, and the starter motor cable.

Remove the gearshift pedal.

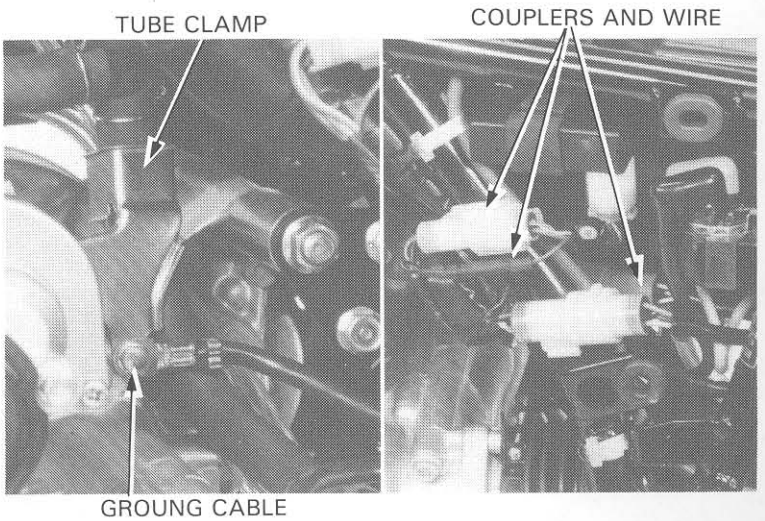
Loosen the drive shaft boot band.



Disconnect the engine ground cable and tube clamp.

Remove the carburetor (page 4-6).

Disconnect the alternator and pluse generator coplers and wire.

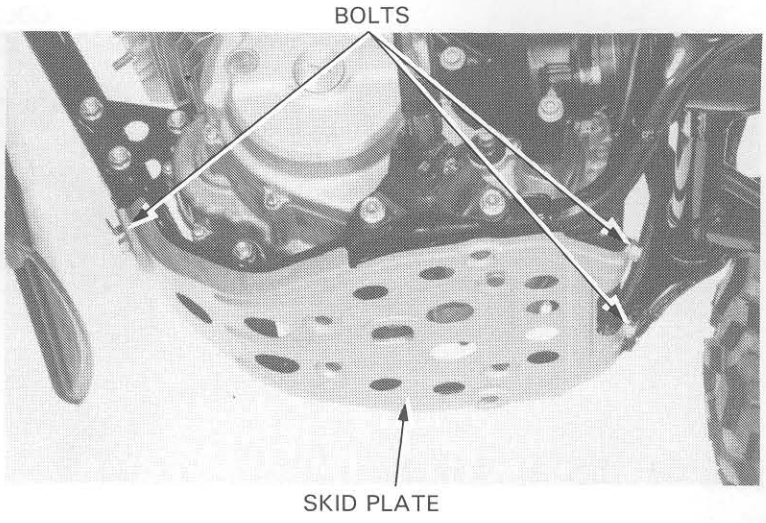


Remove the three skid plate bolts and plate.

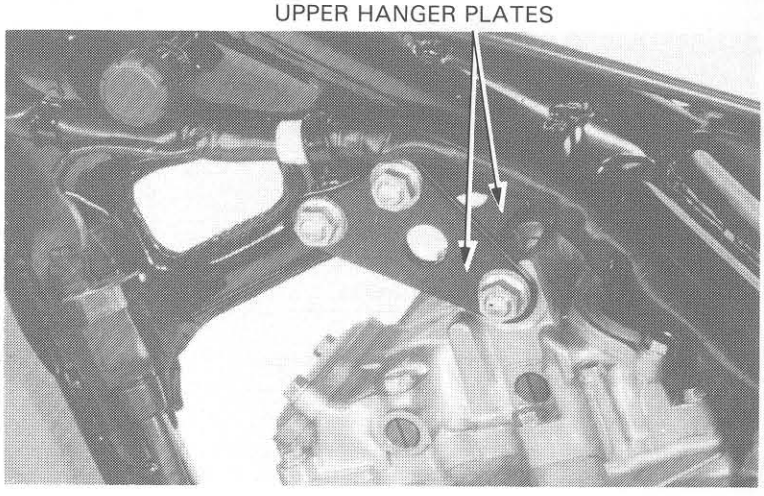
Place a floor jack or other adjustable support under the engine.

NOTE

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



Remove the upper hanger plate bolts and plates.

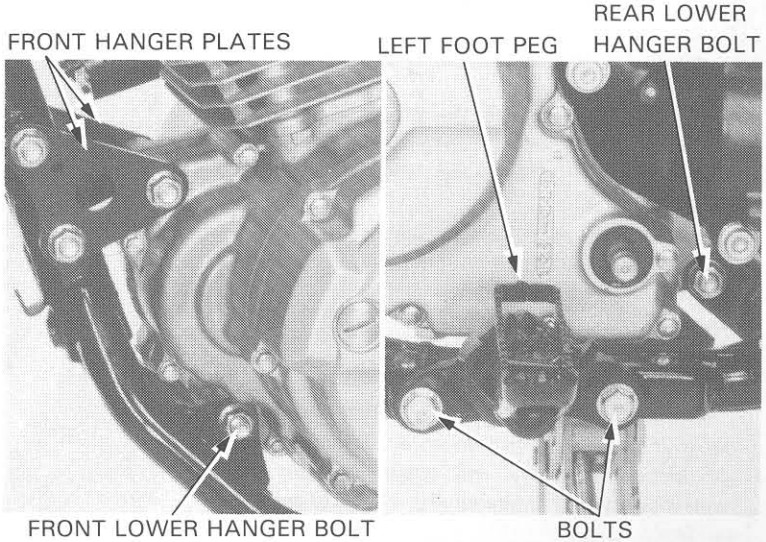


Remove the front hanger plate bolts and plate.

Remove the front lower hanger bolt.

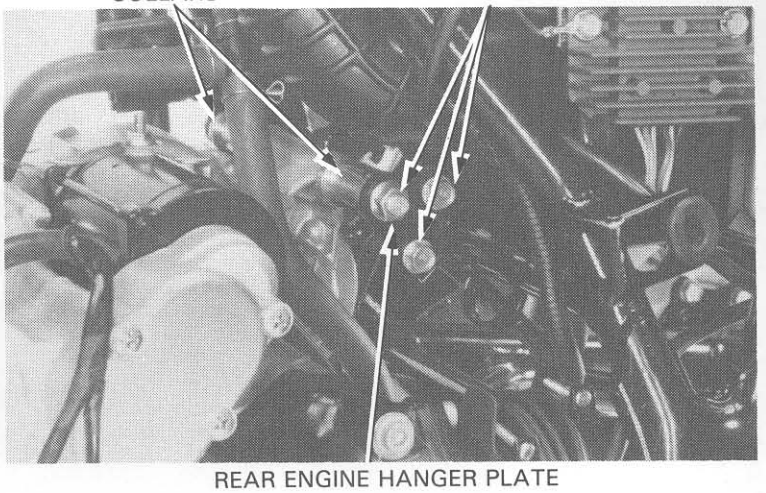
Remove the left foot peg bolts and foot peg.

Remove the engine rear lower hanger bolt.



Remove the rear engine hanger plate bolts, plate and collars.

Remove the engine from the left side while disconnecting the drive shaft universal joint from the engine.



REAR ENGINE HANGER PLATE

ENGINE INSTALLATION

Engine installation is essentially the reverse of removal.

Apply molybdenum disulfide grease to the output gear shaft splines.

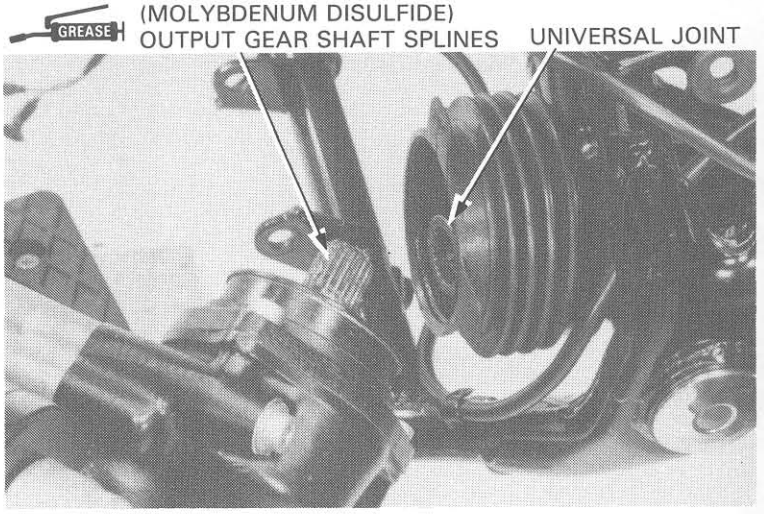
Use a floor jack or other adjustable support to carefully manuever the engine into place.

CAUTION

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

Tighten all fasteners to the specified torque.

TORQUE:
Engine mounting bolts
10 mm bolts 45—65 N·m
(4.5—6.5 kg-m, 33—47 ft-lb)
8 mm bolts 24—30 N·m
(2.4—3.0 kg-m, 17—22 ft-lb)

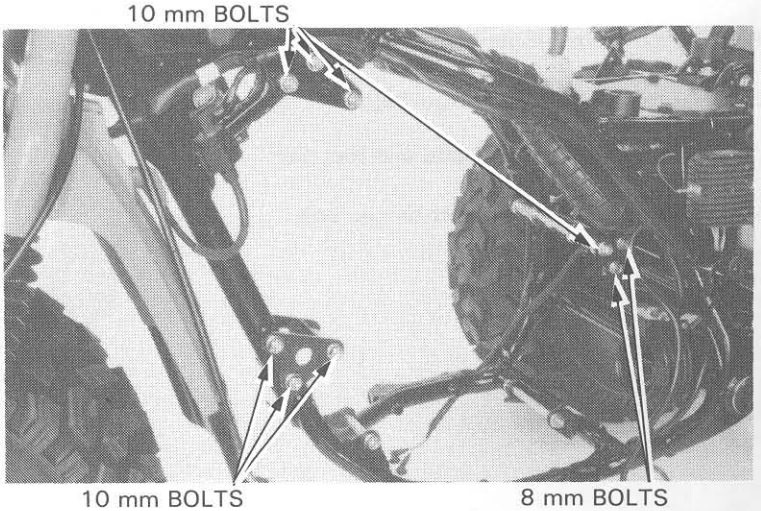


NOTE

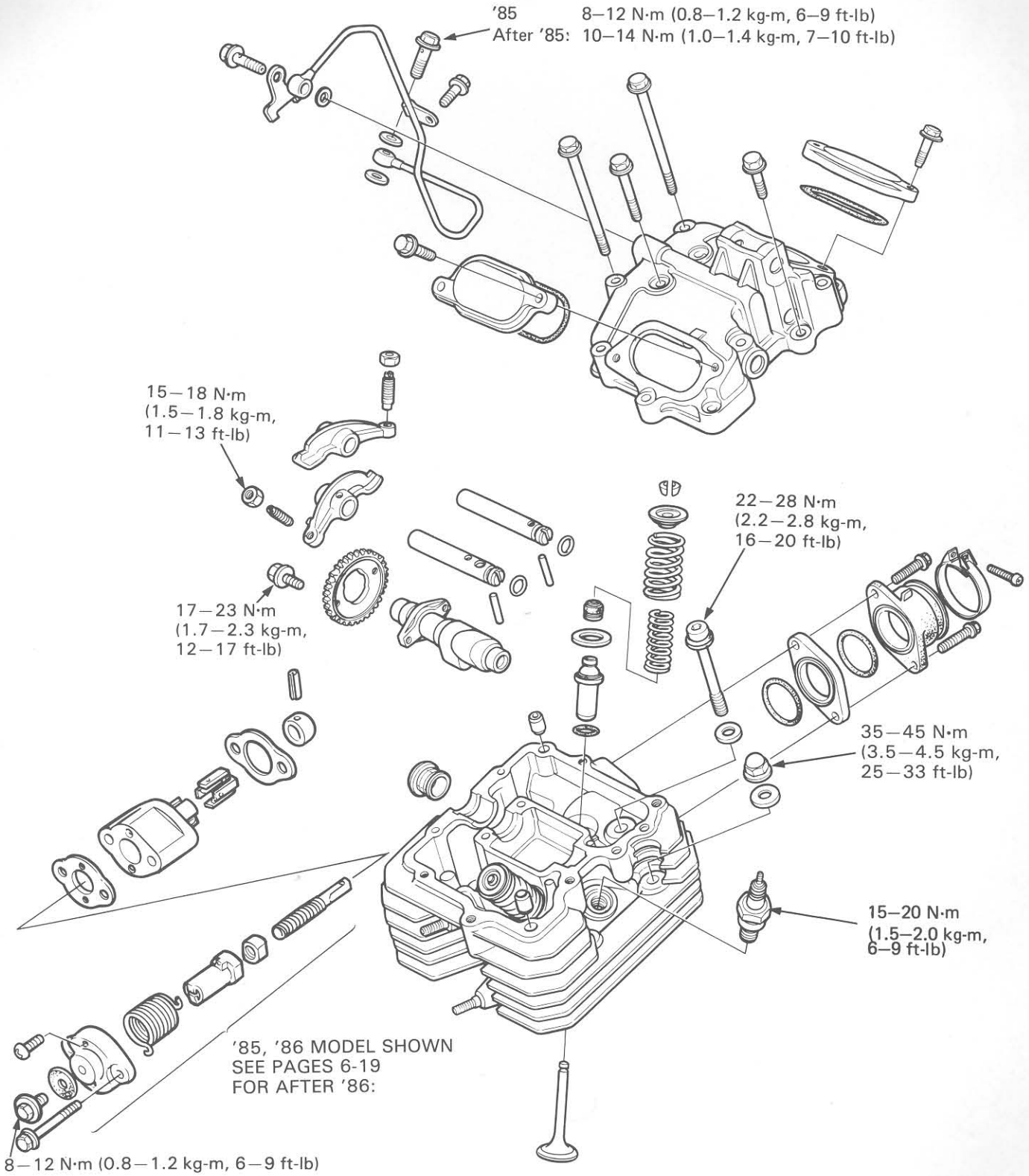
- Route the wires and cables properly (page 1-11).
- Fill the crankcase to the proper level with the recommended oil (page 2-1).
- Perform the following inspection and adjustment :
  Throttle operation (page 3-8).
  Clutch (page 3-11).
  Reverse lock cable (page 3-13).

WARNING

Connect the neutral and reverse switch wires properly. If these wire connections are interchanged, the neutral indicator will come on with the transmission in reverse and the ATC will reverse suddenly.



MEMO


'85 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
After '85: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
15–18 N·m
(1.5–1.8 kg-m,
11–13 ft-lb)
17–23 N·m
(1.7–2.3 kg-m,
12–17 ft-lb)
22–28 N·m
(2.2–2.8 kg-m,
16–20 ft-lb)
35–45 N·m
(3.5–4.5 kg-m,
25–33 ft-lb)
15–20 N·m
(1.5–2.0 kg-m,
6–9 ft-lb)
'85, '86 MODEL SHOWN
SEE PAGES 6-19
FOR AFTER '86:
8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

6. CYLINDER HEAD/VALVES

SERVICE INFORMATION

GENERAL

- This section covers cylinder head, valves, camshaft, rocker arm and cam chain tensioner lifter services. These services can be performed with the engine in the frame.
- Camshaft lubrication oil is fed to the cylinder head through an oil pipe. Be sure this pipe is not clogged before installation.
- Before assembly, apply molybdenum disulfide grease to the camshaft bearings to provide initial lubrication.
- Pour clean engine oil into the oil pockets in the cylinder head during assembly to lubricate the camshaft lobes.

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Cylinder compression			12–13 kg/cm² (170–185 psi)	
Camshaft	Cam height	IN	36.206 mm (1.4254 in)	36.026 mm (1.4183 in)
		EX	36.077 mm (1.4204 in)	35.897 mm (1.4133 in)
	Journal O.D.	R.C.	23.954–23.975 mm (0.9431–0.9439 in)	23.90 mm (0.941 in)
		After '85 C	23.934–23.955 mm (0.9423–0.9431 in)	23.88 mm (0.940 in)
		L	19.954–19.975 mm (0.7856–0.7864 in)	19.90 mm (0.784 in)
	Bearing I.D.	R, C	24.000–24.021 mm (0.9449–0.9457 in)	24.05 mm (0.947 in)
		L	20.000–20.021 mm (0.7874–0.7882 in)	20.05 mm (0.789 in)
	Oil clearance		0.025 – 0.067 mm (0.0010–0.0026 in)	0.10 mm (0.004 in)
Cylinder head warpage			———	0.10 mm (0.004 in)
Rocker arm	I.D.		12.000–12.018 mm (0.4724–0.4730 in)	12.05 mm (0.474 in)
	Shaft O.D.		11.966–11.984 mm (0.4711–0.4718 in)	11.92 mm (0.469 in)
	Arm-to-shaft clearance		0.016– 0.052 mm (0.0006–0.0020 in)	0.08 mm (0.003 in)
Valve spring	Free length	Inner	38.17 mm (1.503 in)	35.2 mm (1.39 in)
		Outer	41.04 mm (1.616 in)	38.0 mm (1.50 in)
	Preload	Inner	7.0±0.7 kg/31.6 mm (15.4±1.5 lb/1.24 in)	———
		Outer	17.0±1.7 kg/35.1 mm(37.5±3.7 lb/1.38 in)	———
Vale, valve guide	Stem O.D.	IN	5.475– 5.490 mm (0.2156–0.2161 in)	5.45 mm (0.215 in)
		EX	5.455– 5.470 mm (0.2148–0.2154 in)	5.43 mm (0.214 in)
	Guide I.D.	IN	5.500– 5.512 mm (0.2165–0.2170 in)	5.525 mm (0.2175 in)
		EX	5.500– 5.512 mm (0.2165–0.2170 in)	5.525 mm (0.2175 in)
	Stem-to-guide clearance	IN	0.010– 0.037 mm (0.0004–0.0015 in)	0.12 mm (0.005 in)
		EX	0.030– 0.057 mm (0.0012–0.0022 in)	0.14 mm (0.006 in)
Valve seat width			1.2 mm (0.05 in)	1.5 mm (0.06 in)

TORQUE VALUES

Cylinder head cap nut	35—45 N·m (3.5—4.5 kg-m, 25—33 ft-lb)
Cylinder head socket bolt	22—28 N·m (2.2—2.8 kg-m, 16—20 ft-lb)
Cam sprocket bolt	17—23 N·m (1.7—2.3 kg-m, 12—17 ft-lb)
Valve adjusting screw lock nut	15—18 N·m (1.5—1.8 kg-m, 11—13 ft-lb)
Oil bolt	8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Spark plug	15—20 N·m (1.5—2.0 kg-m, 11—14 ft-lb)
Cam chain tensioner lifter sealing bolt	8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
After '85	
Oil bolt	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

TOOLS

Special	
Valve guide reamer, 5.5 mm	07984—0980000
Common	
Valve guide remover, 5.5 mm	07742—0010100 or 07942—3290100
Valve spring compressor	07757—0010000 or 07957—3290001

TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test, or by tracing engine noises to the top-end with a sounding rod or stethoscope.

Low compression

1. Valves:
   - Incorrect valve adjustment
   - Burned or bent valve
   - Incorrect valve timing
   - Weak valve spring
2. Cylinder head:
   - Leaking or damaged head gasket
   - Warped or cracked cylinder head
3. Cylinder and piston (Section 7)

High compression

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

Excessive noise

1. Incorrect valve adjustment
2. Sticking valve or broken valve spring
3. Damaged or worn rocker arm or camshaft
4. Worn or damaged cam chain
5. Worn or damaged cam chain tensioner

Poor idling

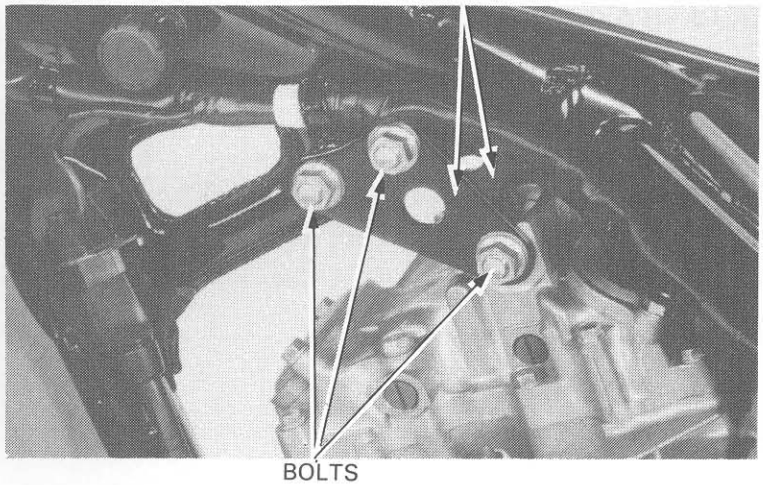
- Compression too low

CYLINDER HEAD COVER REMOVAL/DISASSEMBLY

REMOVAL

Remove the fuel tank (page 4-3).

Remove the upper engine hanger plate bolts and the plates.

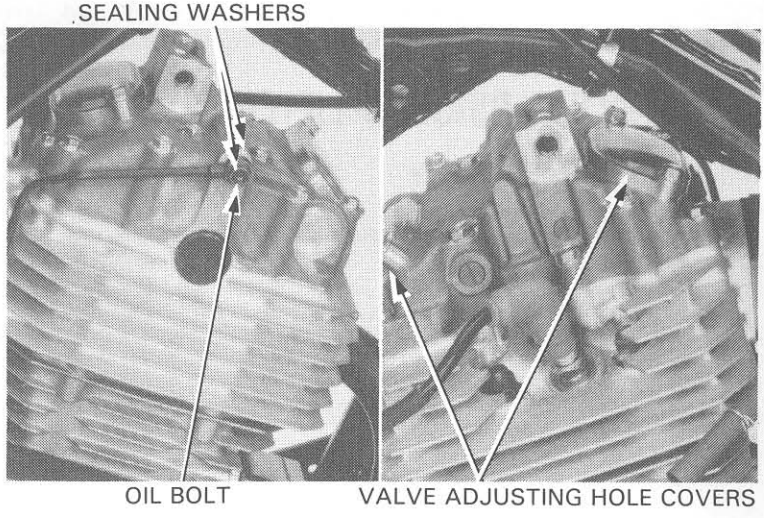


Remove the following:
- oil bolt and two sealing washers.
- valve adjusting hole covers.
- cylinder head cover bolts.

NOTE

Loosen the bolts in 2—3 steps in a crisscross pattern, starting with the center bolt.

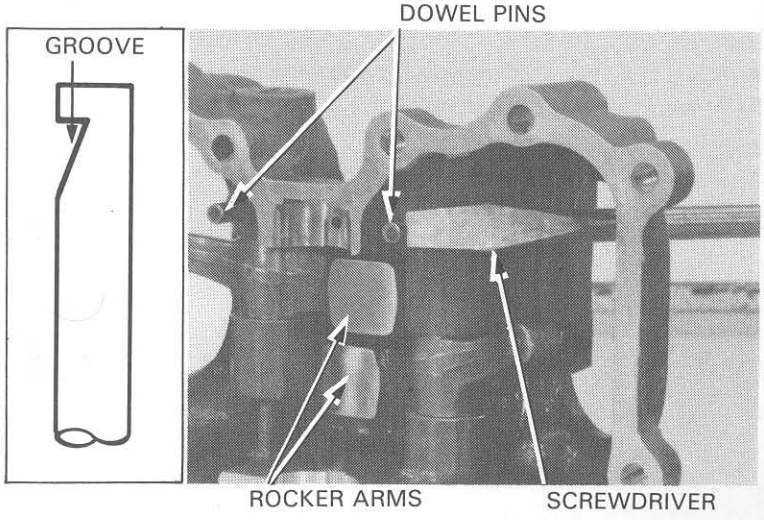
- cylinder head cover.
- dowel pins.



Disassembly

Groove each rocker arm shaft dowel pin with a grinder and drive the dowel pins out using a screwdriver as shown.

Remove the rocker arm shafts and rocker arms from the cylinder head cover.

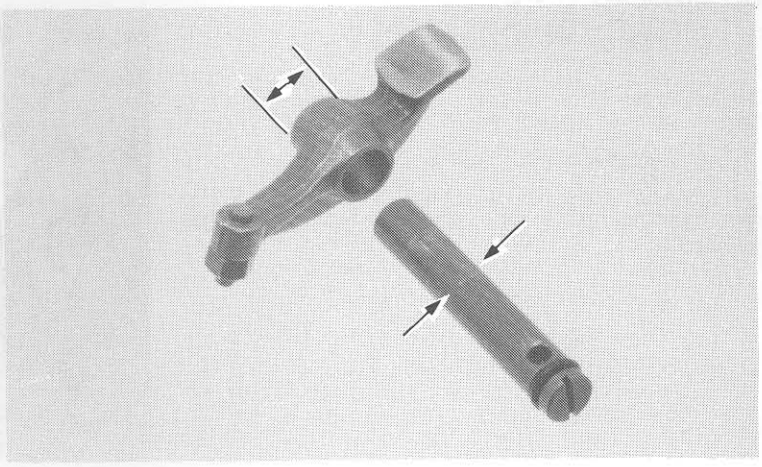


ROCKER ARM/SHAFT INSPECTION

Inspect the rocker arms and shafts for wear or damage.

NOTE

If any rocker arms require servicing or replacement, inspect the cam lobes for scoring, chipping or flat spots.



Measure the I.D. of each rocker arm.

SERVICE LIMIT: 12.05 mm (0.474 in)

Measure the O.D. of each rocker arm shaft.

SERVICE LIMIT: 11.92 mm (0.469 in)

Calculate rocker arm-to-shaft clearance.

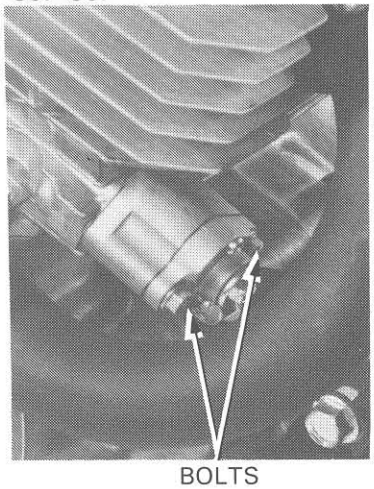
SERVICE LIMIT: 0.08 mm (0.003 in)

CAM CHAIN TENSIONER LIFTER

REMOVAL/DISASSEMBLY

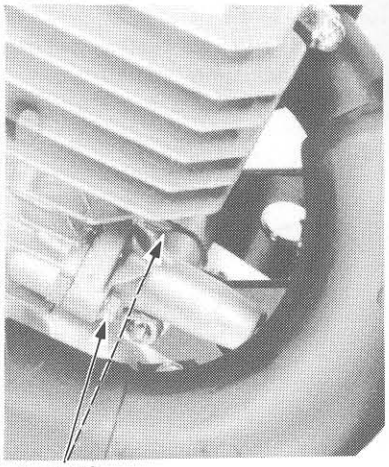
Remove the two bolts attaching the cam chain tensioner lifter and the lifter

'85: '86:



BOLTS

AFTER '86:

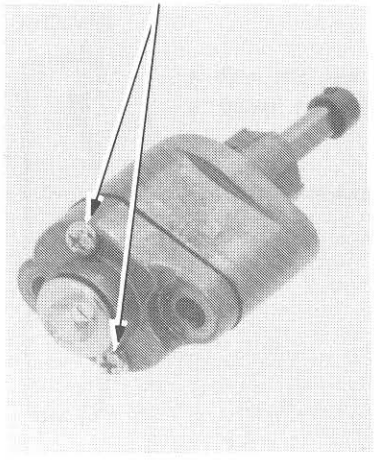


BOLTS

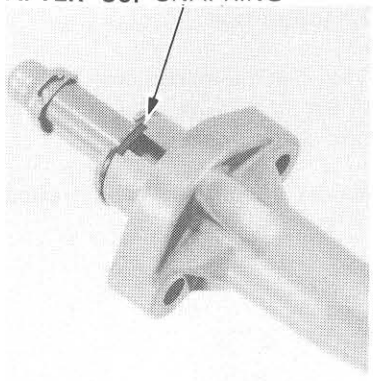
'85, '86:
Remove the two screws holding the cam chain tensioner lifter and disassemble.

AFTER '86:
Remove the snapring and disasseble the cam chain tensioner.

'85: '86: SCREWS

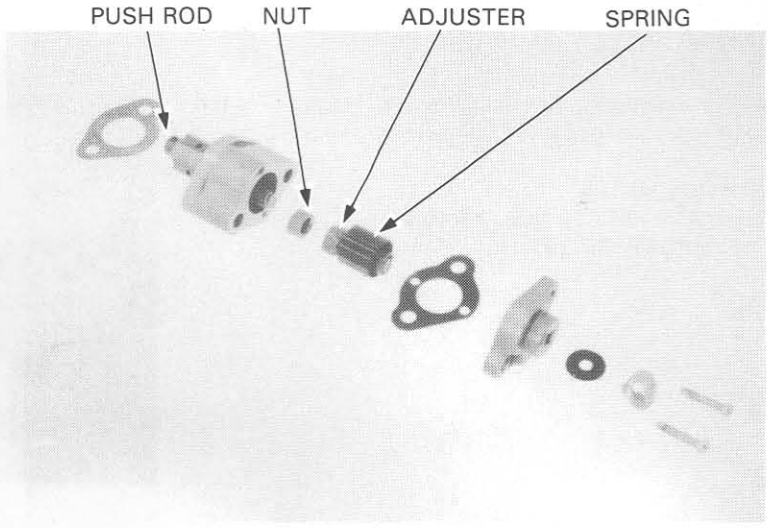


AFTER '86: SNAPRING

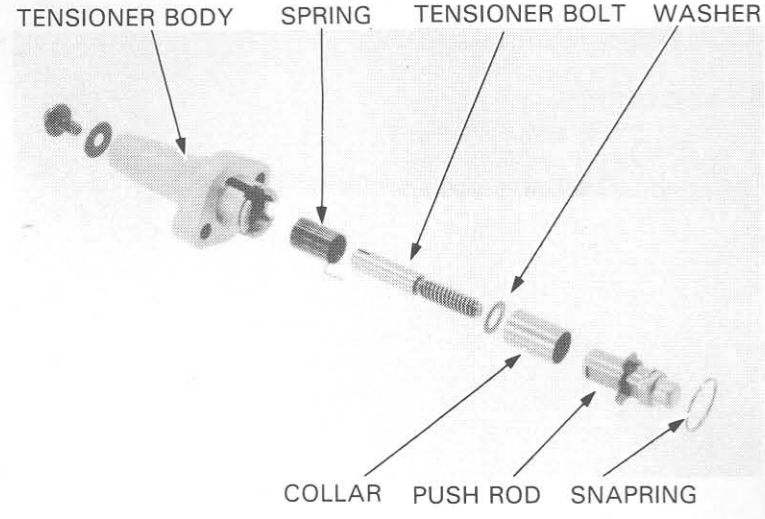


INSPECTION

Check all tensioner lifter parts for wear or damage and replace if necessary.



AFTER '86:

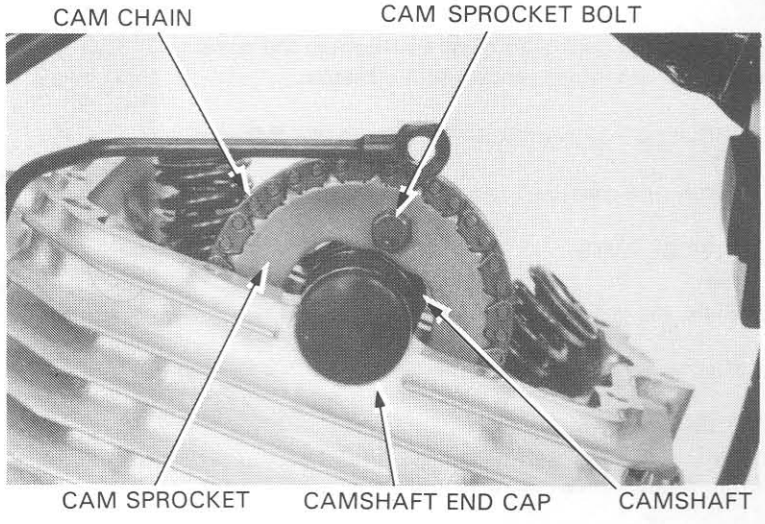


CAMSHAFT REMOVAL

REMOVAL

Remove the timing and flywheel bolt hole caps.

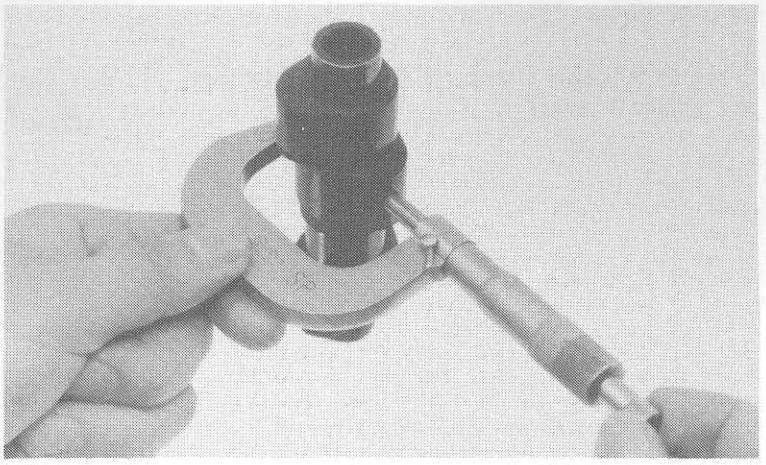
Turn the flywheel clockwise and remove the cam sprocket bolts and cam sprocket.
Remove the camshaft.
Suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.
Remove the camshaft end cap.



INSPECTION

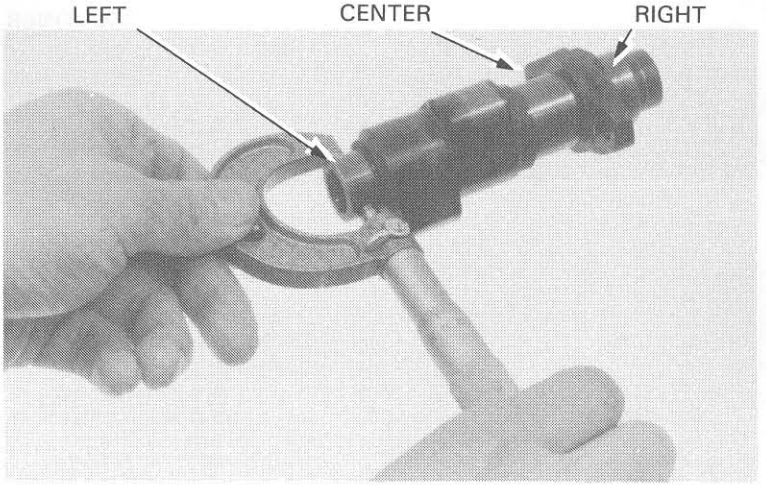
Using a micrometer, measure the height of each cam lobe and inspect it for wear or damage.

SERVICE LIMITS:
INTAKE: 36.026 mm (1.4183 in)
EXHAUST: 35.897 mm (1.4133 in)



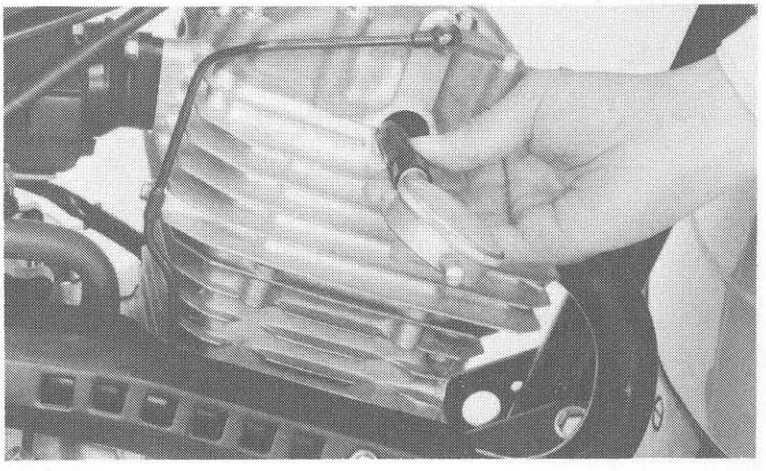
Measure the camshaft journal O.D.

SERVICE LIMITS:
Left: 19.90 mm (0.784 in)
Right: 23.90 mm (0.941 in)
Center: 23.88 mm (0.940 in)



Install the cylinder head cover and tighten the cover bolts in a crisscross pattern in 2—3steps.

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



Measure the camshaft journal bearing I.D.

SERVICE LIMITS:
Left: 20.05 mm (0.789 in)
Right and center: 24.05 mm (0.947 in)

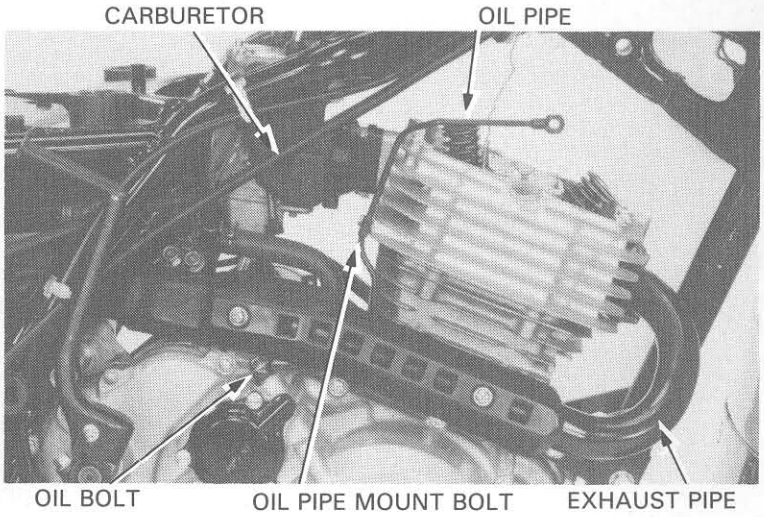
Calculate camshaft-to-bearing clearance.

SERVICE LIMITS:
Left: 0.10 mm (0.004 in)
Right and center: 0.10 mm (0.004 in)

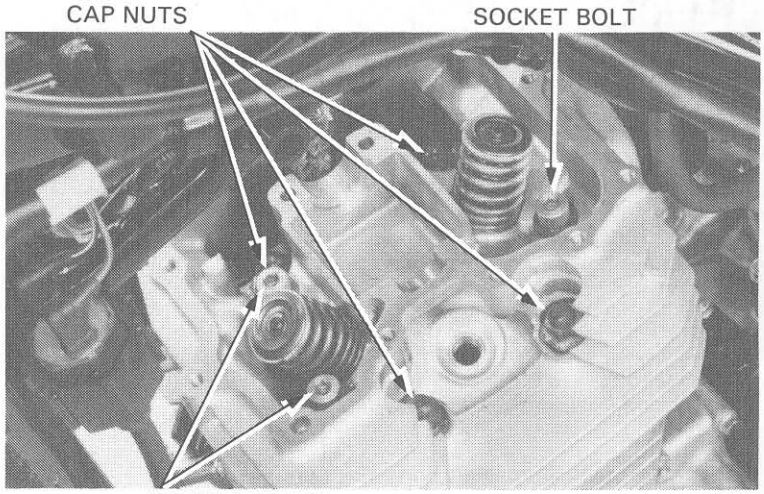
CYLINDER HEAD REMOVAL

Remove the carburetor (page 4-6) and exhaust pipe (page 13-3).

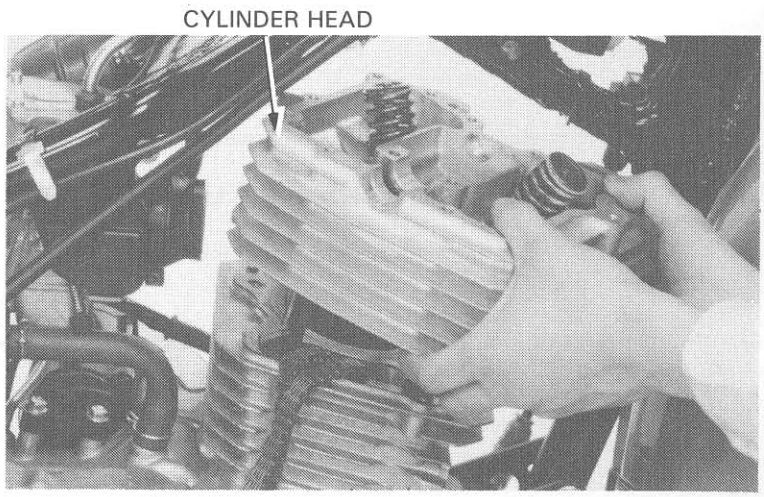
Remove the oil pipe mount bolt, oil bolt, two sealing washers and oil pipe.



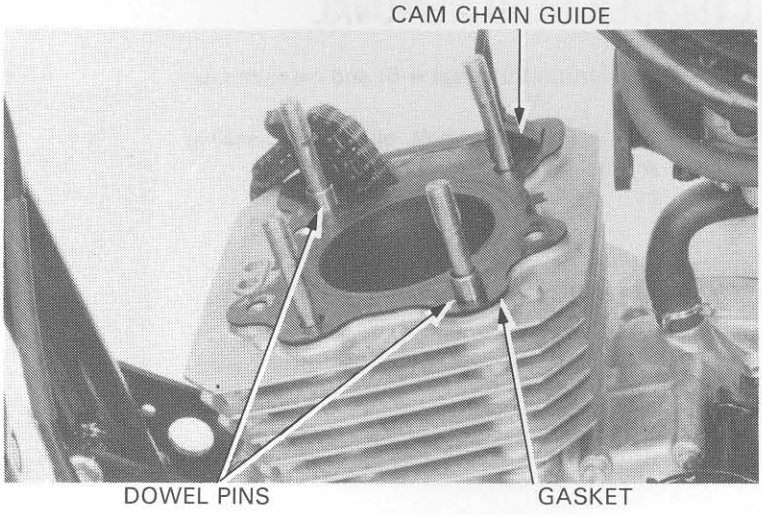
Remove the cylinder head cap nuts and socket bolts in a crisscross pattern in 2—3 steps.



Raise and rotate the cylinder head clockwise and remove it from the right side as shown.



Remove the cylinder head gasket, dowel pins and cam chain guide.



CYLINDER HEAD DISASSEMBLY

Remove the valve spring cotters, retainers, springs and valves with the Valve Spring Compressor.

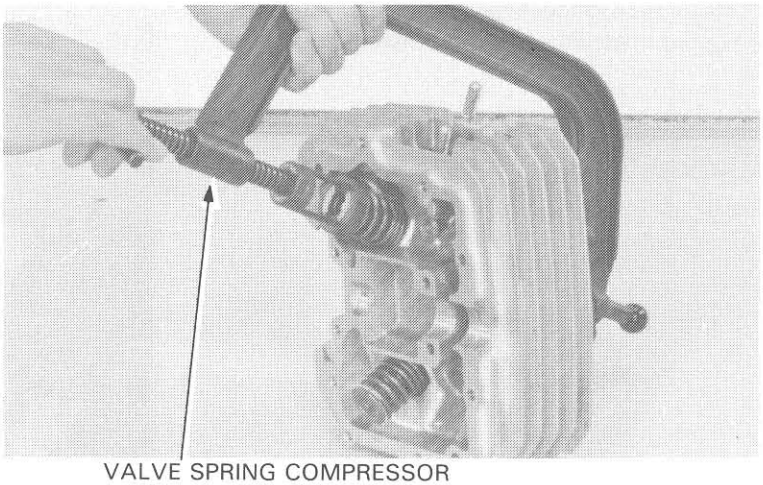
CAUTION

- *To prevent loss of tension, do not compress the valve springs more than necessary to remove the cotters.*

NOTE

Mark all parts during disassembly so they can be placed back in their original locations.

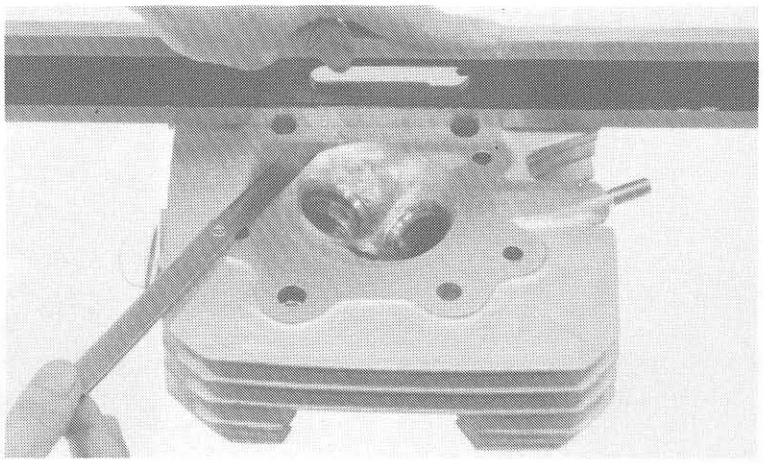
Remove the valve stem seals and valve spring seats.



INSPECTION

Remove carbon deposits from the combustion chamber.
Check the spark plug hole and valve areas for cracks.
Check the cylinder head for warpage with a straight edge and feeler gauge.

SERVICE LIMIT: 0.10 mm (0.004 in)

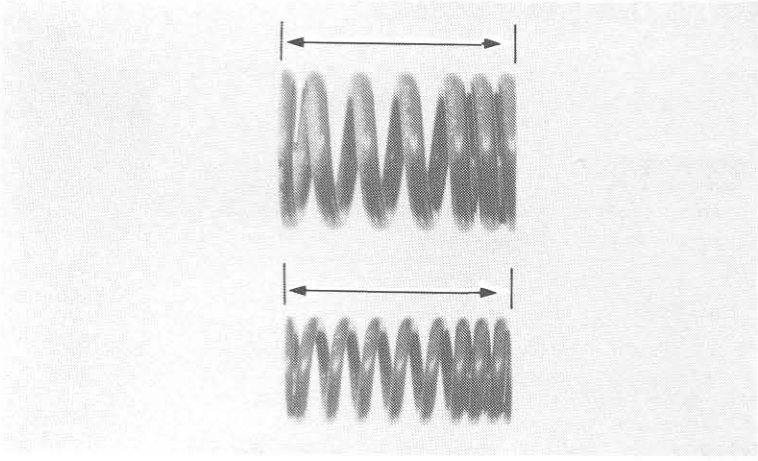


VALVE SPRINGS

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

SERVICE LIMITS:
Inner (IN): 35.2 mm (1.39 in)
(EX): 35.2 mm (1.39 in)
OUTER (IN): 38.0 mm (1.50 in)
(EX): 38.0 mm (1.50 in)

Replace the springs if they are shorter than the service limits.



VALVE STEM-TO-GUIDE CLEARANCE

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

Check valve movement in the guide and measure and record each valve stem O.D.

SERVICE LIMITS: IN: 5.45 mm (0.215 in)
EX: 5.43 mm (0.214 in)

NOTE

Ream the guides to remove any carbon deposits before checking clearances.

Measure and record each valve guide I.D.

SERVICE LIMIT: 5.525 mm (0.2175 in)

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

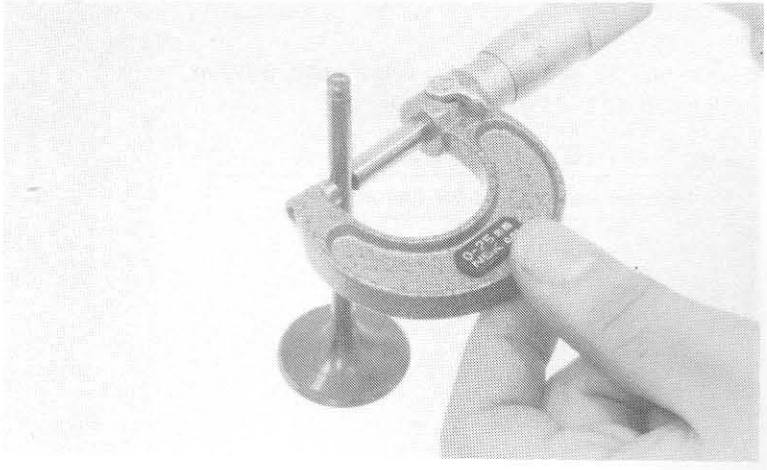
SERVICE LIMITS: IN: 0.12 mm (0.005 in)
EX: 0.14 mm (0.006 in)

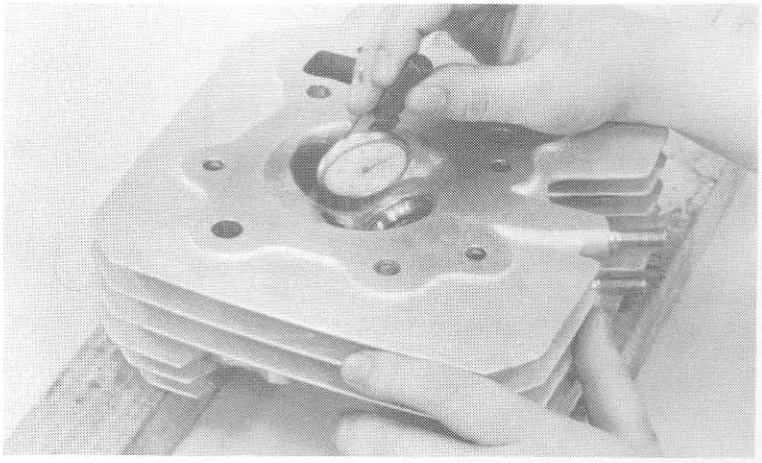
If the stem-to-guide clearance exceeds the service limits, determine if a new guide with standard dimensions would bring the clearance within tolerance. If so, replace any guides as necessary and ream to fit.

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

NOTE

Reface the valve seats whenever the valve guides are replaced.





VALVE GUIDE REPLACEMENT

Heat the cylinder head to 100—150°C (212—300°F) with a hot plate or oven.

WARNING

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

CAUTION

Do not use a torch to heat the cylinder head; it may cause warping.

Support the cylinder head and drive out the old guides from the combustion chamber side of the cylinder head.

CAUTION

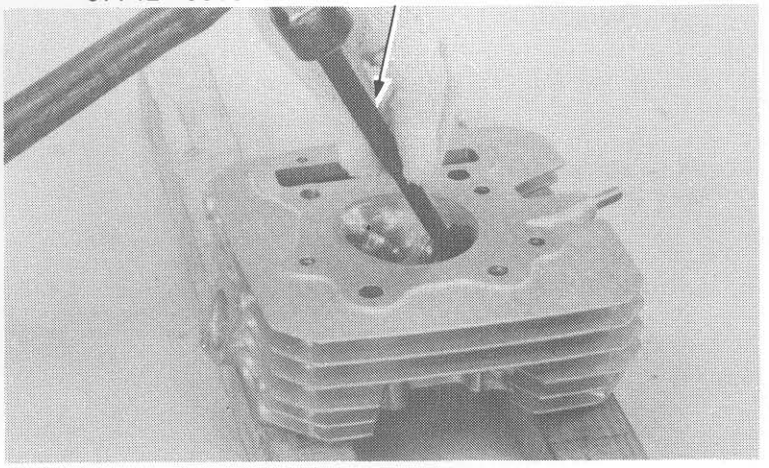
Avoid damaging the cylinder head.

Place a new O-ring on the new valve guide. Drive in the guide from the top of the head.

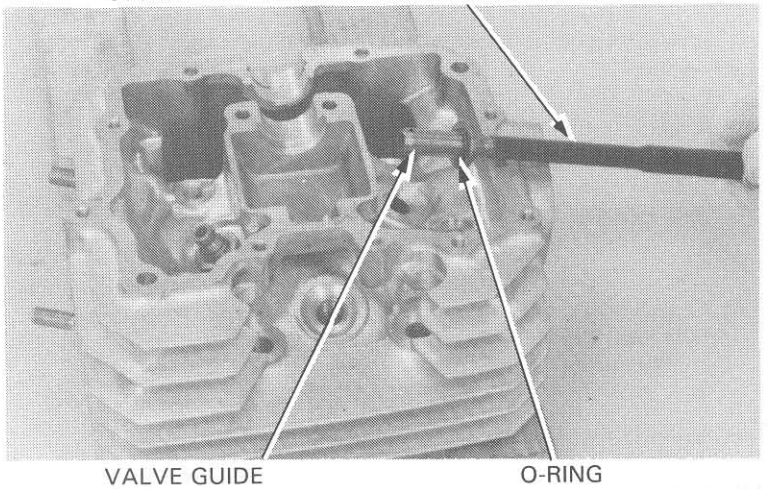
NOTE

Inspect the valve guide for damage.

VALVE GUIDE REMOVER
07742—0010100 OR 07942—3290100



VALVE GUIDE REMOVER
07742—0010100 OR 07942—3290100



VALVE GUIDE O-RING

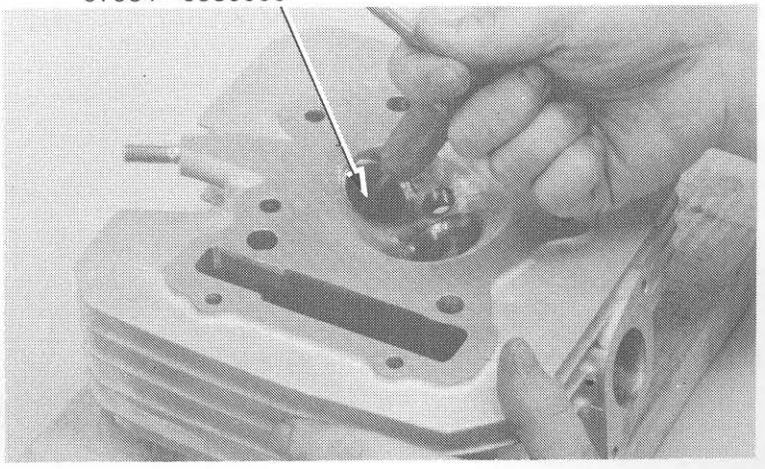
Ream the new valve guide after installation.

NOTE

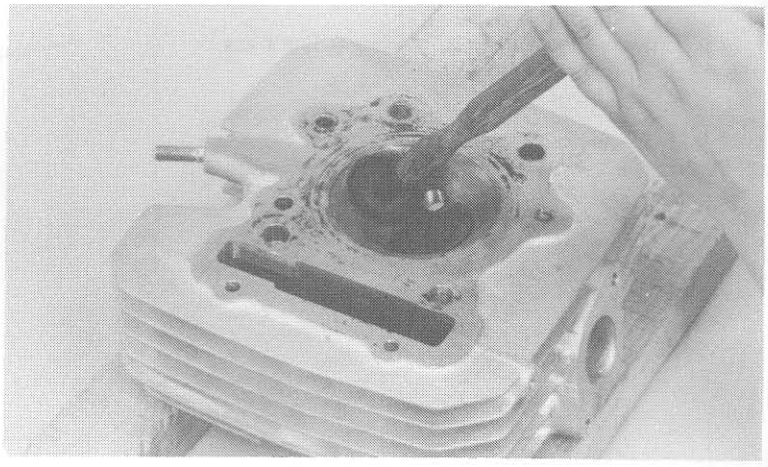
- Use cutting oil on the reamer during this operation.
- Always rotate the reamer in the same direction.

Clean the cylinder head thoroughly to remove any metal particles.
Reface the valve seat (page 6-11).

VALVE GUIDE REAMER
07984—0980000



VALVE SEAT INSPECTION/ REFACING



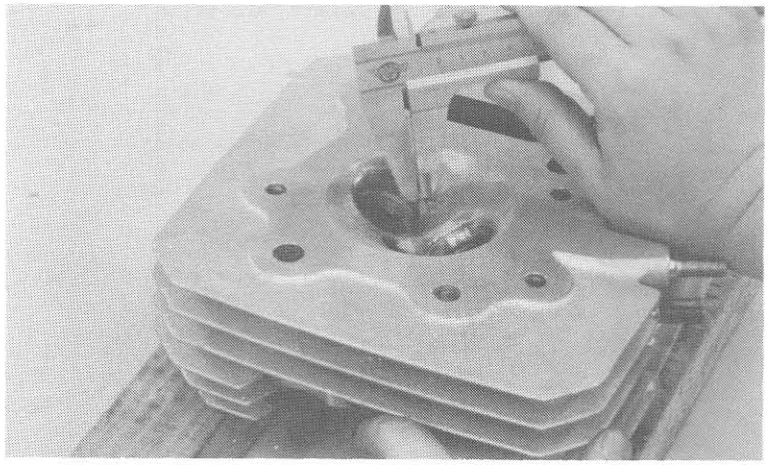
Clean all intake and exhaust valves thoroughly to remove carbon deposits.

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

Remove and inspect each valve.

CAUTION

The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.



Inspect the width of each valve seat.

STANDARD: 1.2 mm (0.05 in)
SERVICE LIMIT: 1.5 mm (0.06 in)

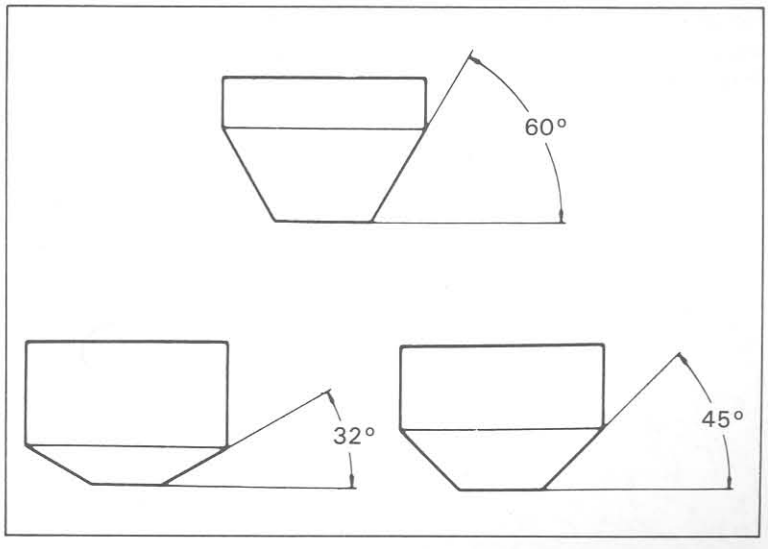
If the seat is too wide, too narrow or has low spots, the seat must be ground.

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.



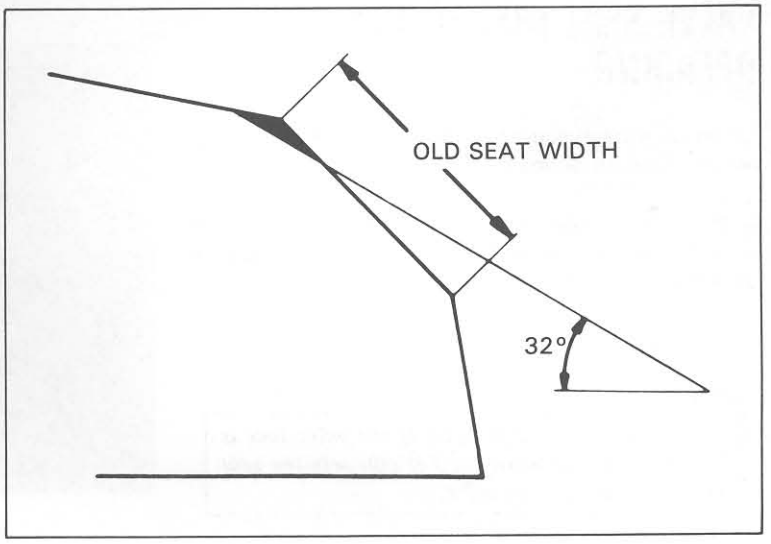
VALVE SEAT REFACING

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

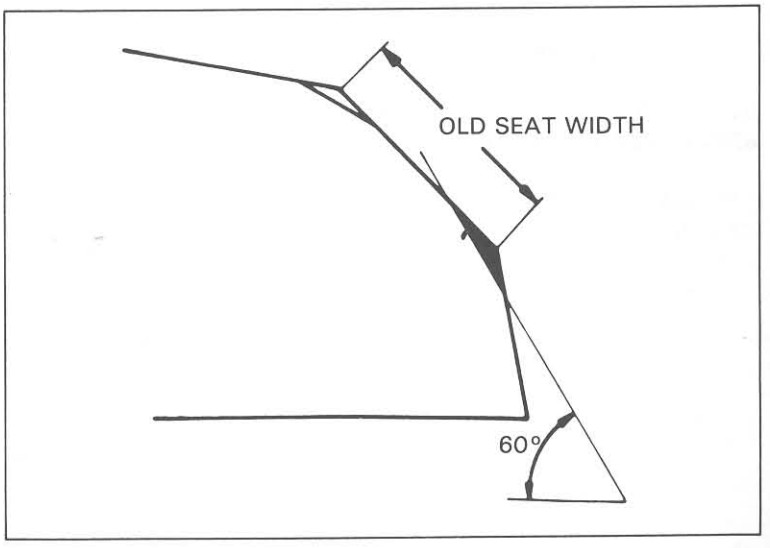
NOTE

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

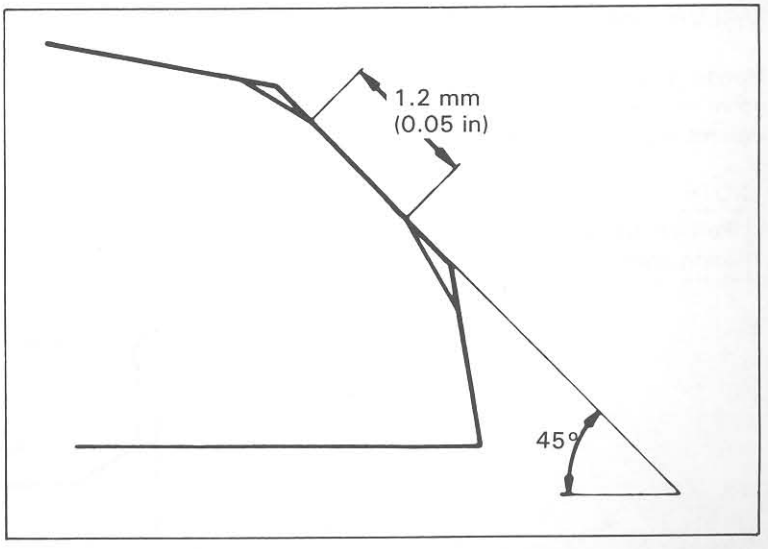
Use a 32 degree cutter to remove the top 1/4 of the existing valve seat material.



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



Install a 45 degree finish cutter and cut the seat to the proper width. Make sure that all pitting and irregularities are removed. Refinish if necessary.

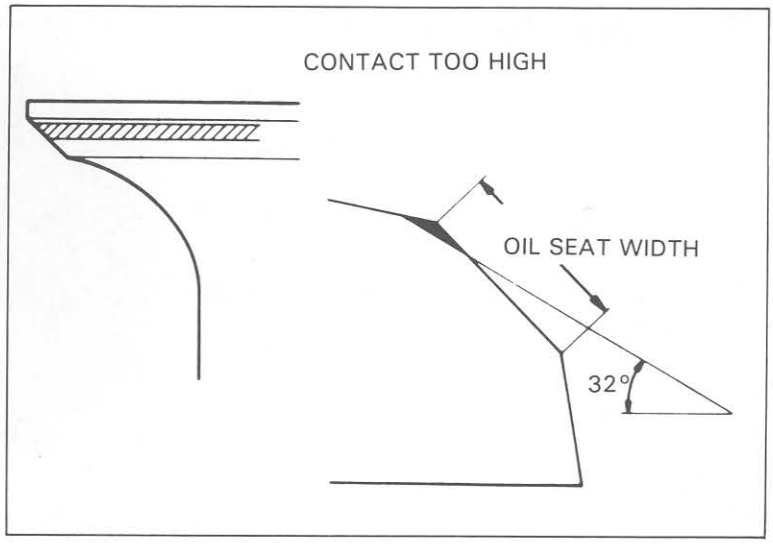


Apply a thin coating of Prussian Blue to the valve seat. Press the valve through the valve guide and onto the seat to make a clear pattern.

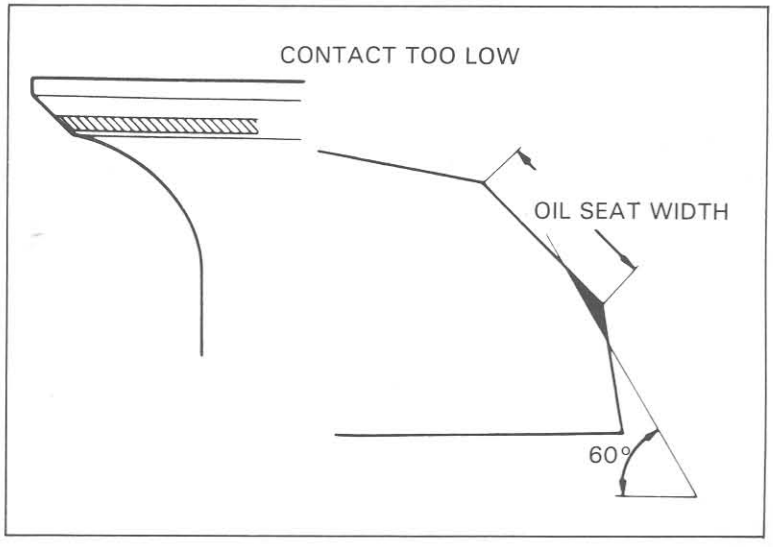
NOTE

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

If the contact area is too high on the valve, the seat must be lowered 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.

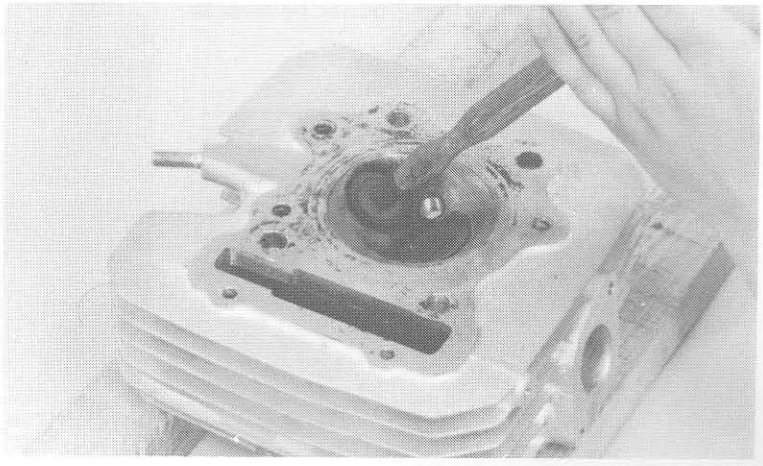


Refinish the seat to specifications, using a 45 degree finish cutter.

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

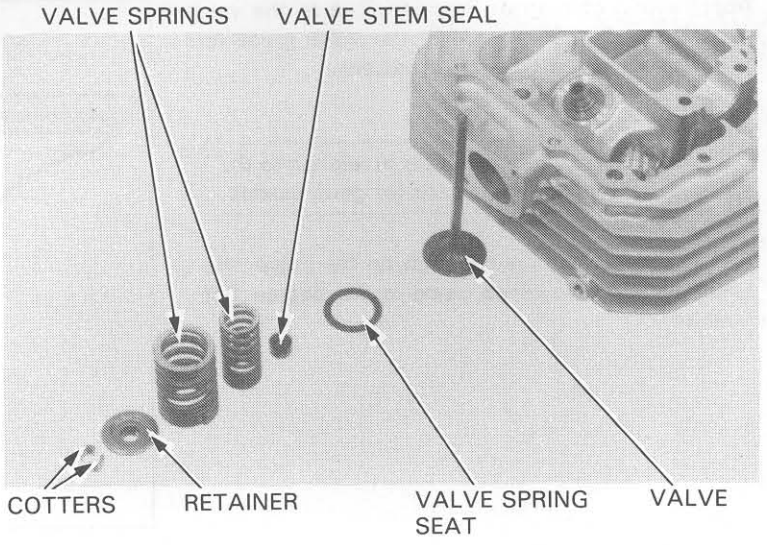
Do not allow lapping compound to enter the guides.



CYLINDER HEAD ASSEMBLY

Install the valve spring seat and a new stem seal. Lubricate each valve stem with molybdenum disulfide grease and insert the valve into the valve guide.
To avoid damage to the stem seal, turn the valve slowly when inserting.

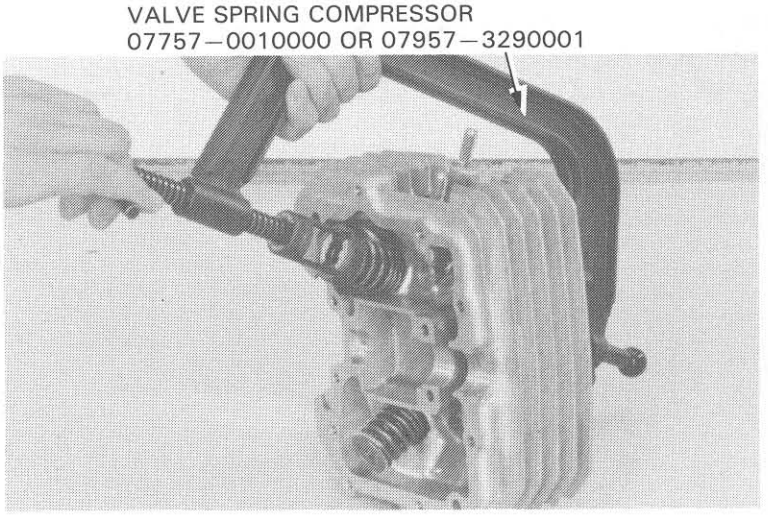
Install the valve springs with the tightly wound coils facing the cylinder head.



Install the valve spring retainers and install the valve cotters.

CAUTION

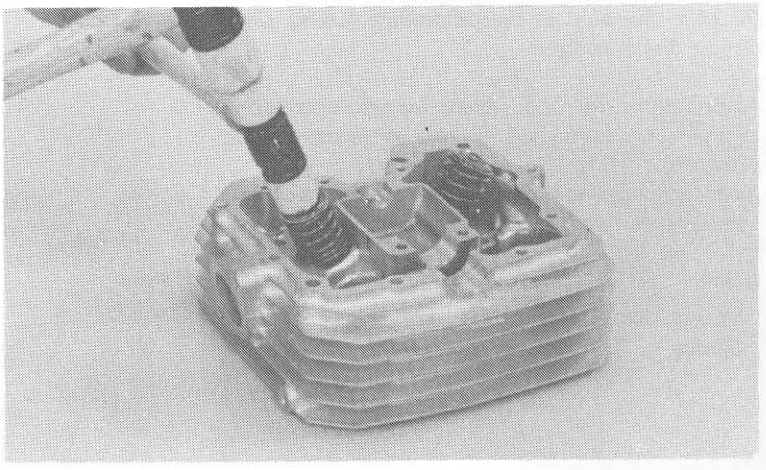
To prevent loss of tension, do not compress the valve spring more than necessary.



Tap the valve stems gently with a plastic hammer to firmly seat the cotters.

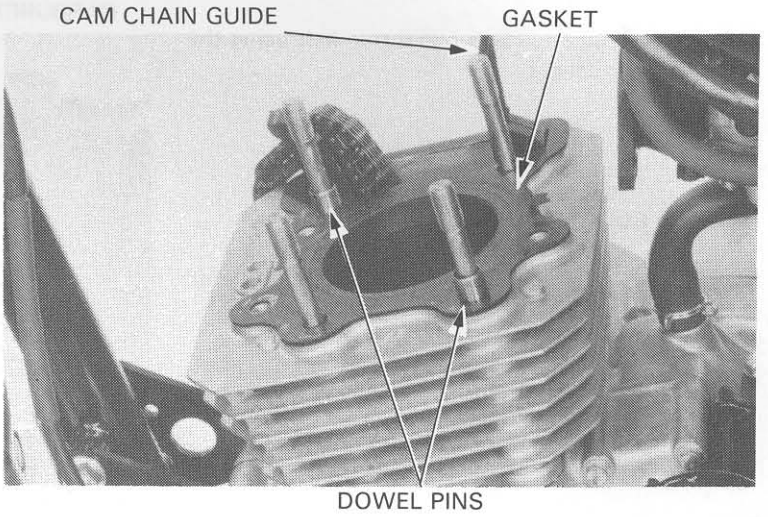
CAUTION

Support the cylinder head above the work bench surface to prevent possible valve damage.



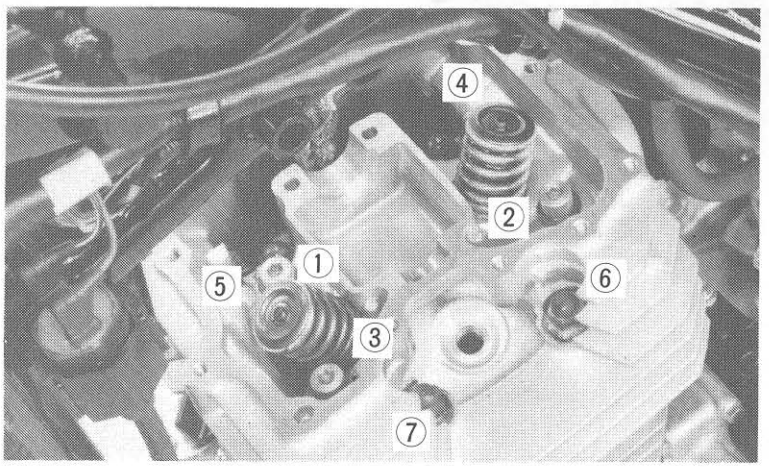
CYLINDER HEAD INSTALLATION

Clean off any gasket material from the cylinder surface.
Place the bottom end of the cam chain guide into the groove in the right crankcase, and its bosses with the grooves in the cylinder upper surface.
Install the dowel pins and a new cylinder head gasket.

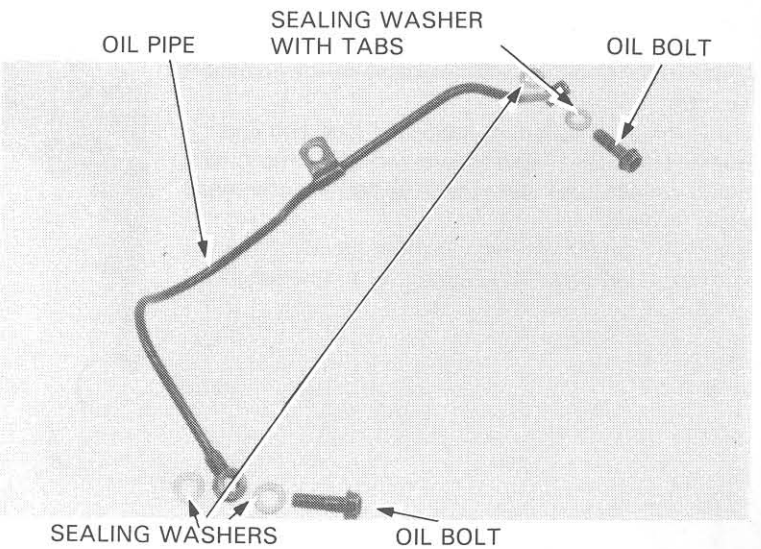


Install the cylinder head, cylinder head cap nuts and socket bolts in the sequence shown in 2-3 steps.

TORQUE VALUES:
CAP NUT: 35—45 N·m
(3.5—4.5 kg-m, 25—33 ft-lb)
SOCKET BOLT: 22—28 N·m
(2.2—2.8 kg-m, 16—20 ft-lb)



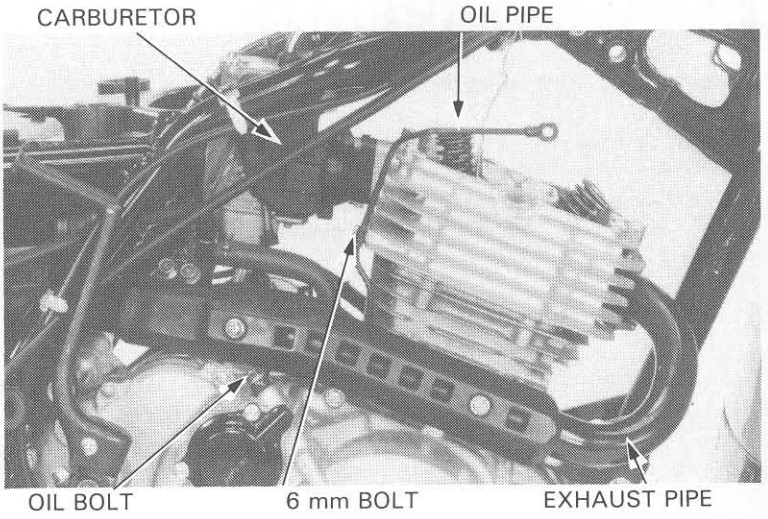
Make sure that the oil pipe and oil bolts are not clogged and the sealing washers are in good condition.



Install the oil pipe, oil bolt and 6 mm bolt using the two sealing washers.

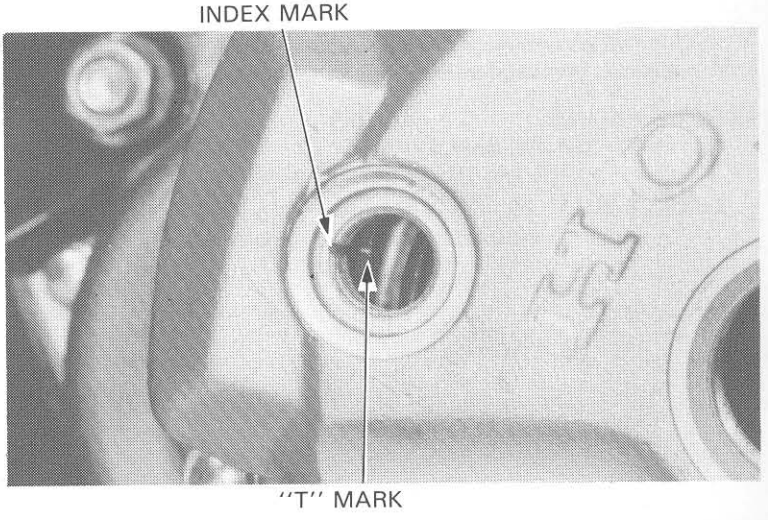
TORQUE:
Oil bolt: 8—12 N·m
(0.8—1.2 kg-m, 6—9 ft-lb)
After '85: 10—14 N·m
(1.0—1.4 kg-m, 7—10 ft-lb)

Install the exhaust pipe (page 13-3) and carburetor (page 4-15).

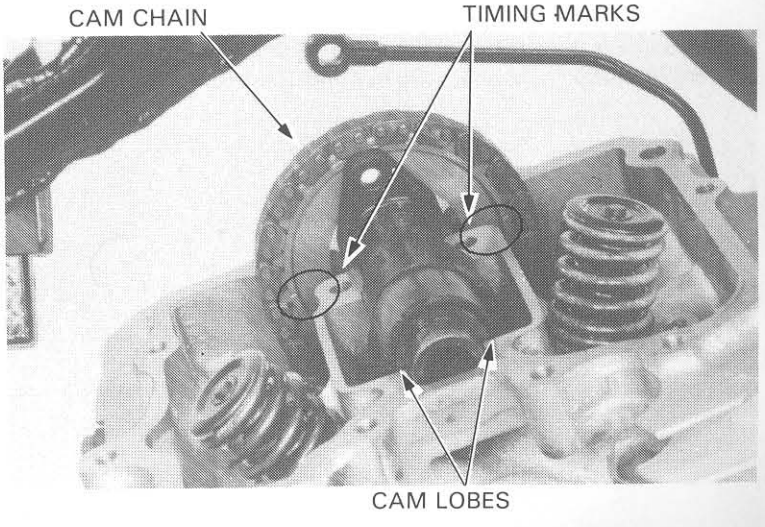


CAMSHAFT INSTALLATION

Align the "T" mark on the flywheel with the index mark on the alternator cover by turning the flywheel clockwise.

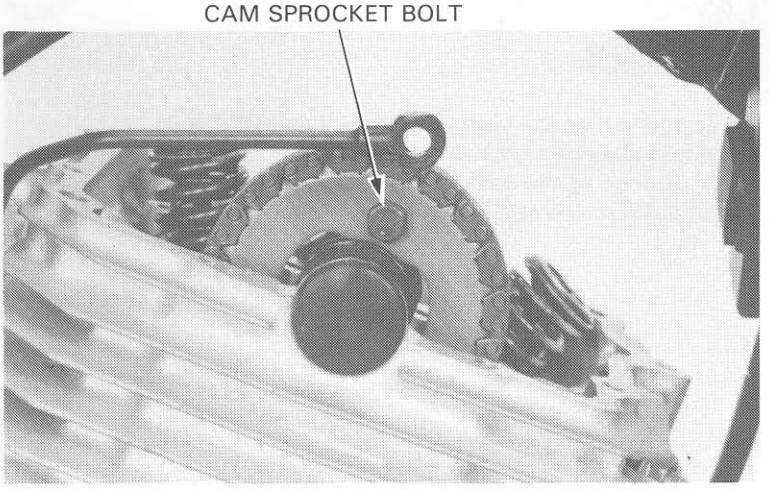


Apply molybdenum disulfide grease to the camshaft journals.
Install the cam sprocket, camshaft and end cap.
Position the cam lobes down and align the timing marks on the cam sprocket with the cylinder head upper surface.
Install the cam chain over the cam sprocket and the cam sprocket onto the shoulder of the camshaft.

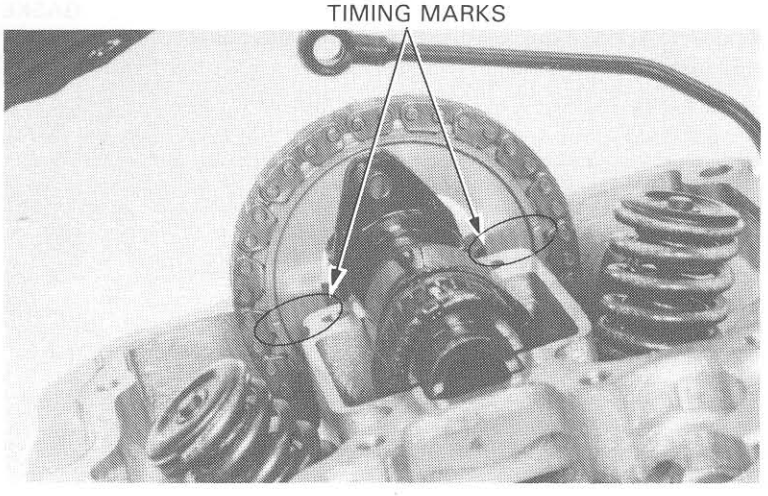


Tighten the cam sprocket bolt.
Turn the crankshaft clockwise one turn and tighten the remaining cam sprocket bolt to the same torque.

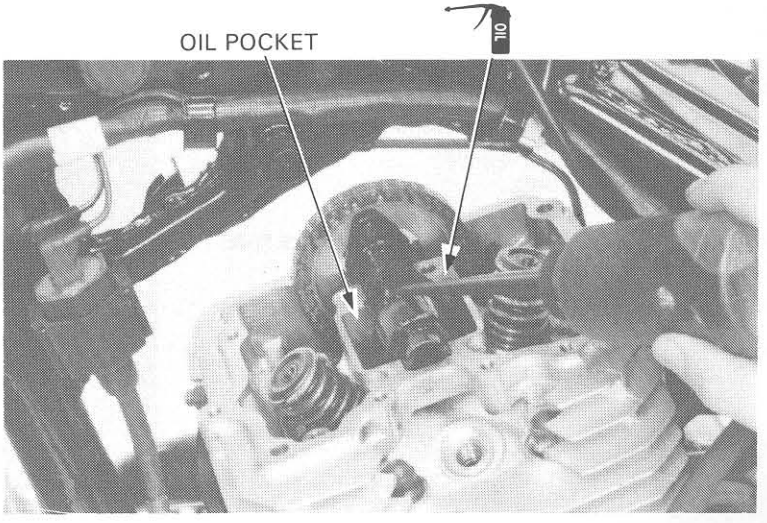
TORQUE: 17—23 N·m
(1.7—2.3 kg-m, 12—17 ft-lb)



Realign the "T" mark with index mark and recheck the cam sprocket timing marks.

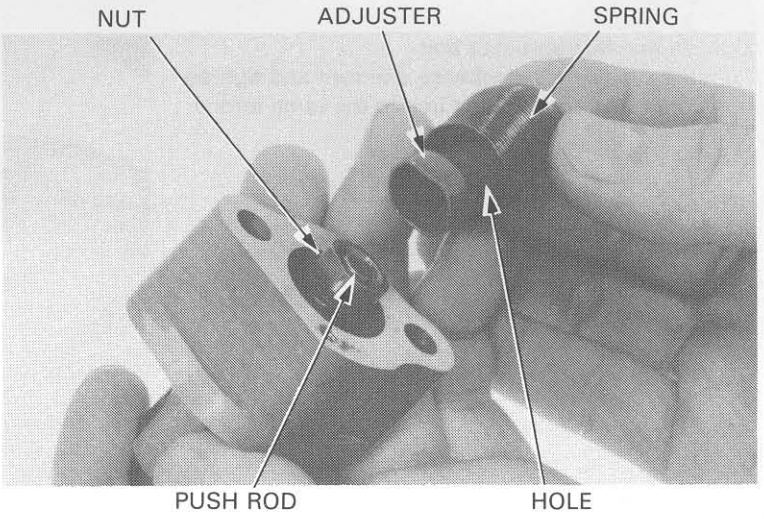


Fill the oil pocket in the cylinder head with fresh oil.

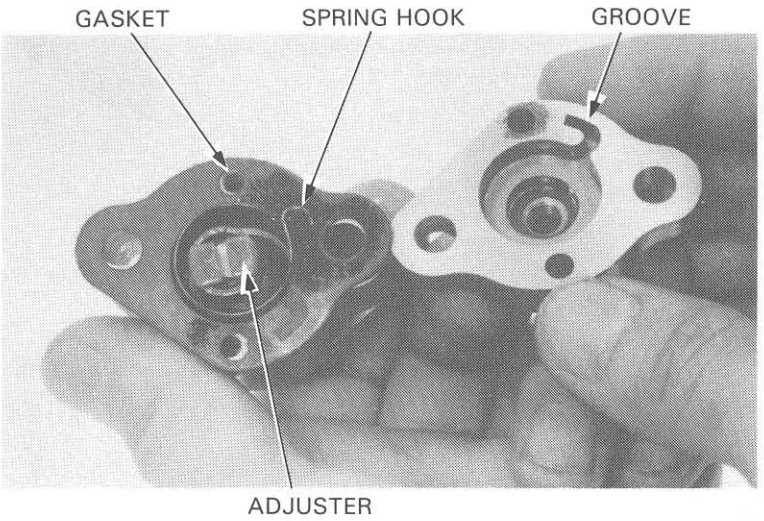


CAM CHAIN, TENSIONER LIFTER ASSEMBLY

Thread the nut on the push rod so its outside face is flush with the end of the push rod.
Hook one end of the spring into the hole in the adjuster and place the adjuster over the nut.

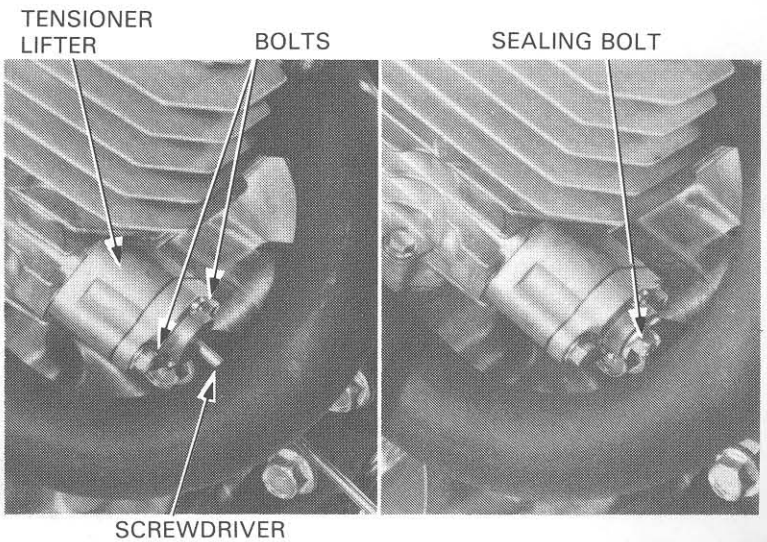


Align the spring hook with the groove in the cover and install.



Screw in the adjuster all the way through the hole in the cover and install the tensioner lifter onto the cylinder. Tighten the two tensioner lifter mount bolts and release the adjuster.
Install the sealing bolt.

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

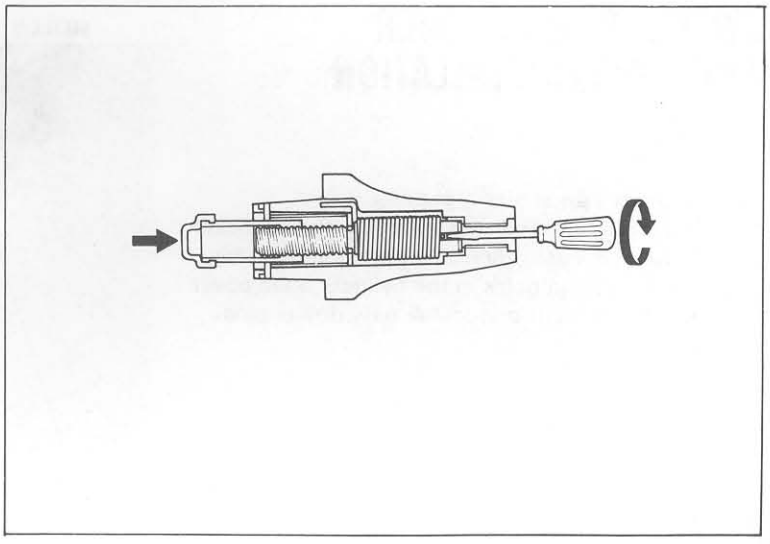


After '86:

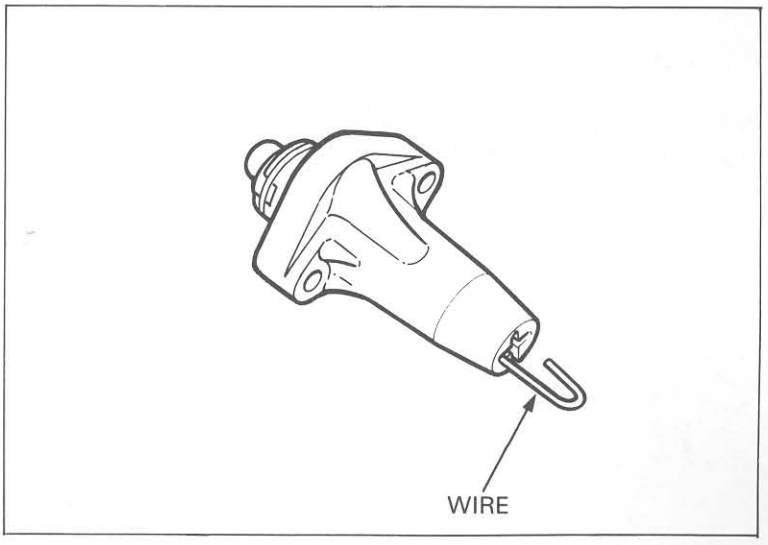
Remove the cam chain tensioner sealing bolt and gasket from the tensioner.
Turn the tensioner shaft clockwise with a small screwdriver to retract the tensioner, and hold it in the fully retracted position.

NOTE

The tensioner will be forced out by the spring when it is released.



Wedge the tensioner shaft with a piece of hard wire as shown to hold the tensioner.

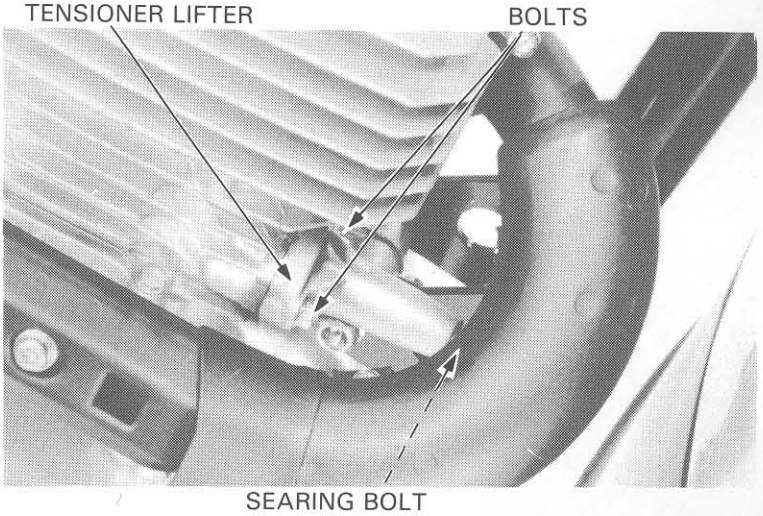


Install the cam chain tensioner gasket.

Install the cam chain tensioner and tighten the attaching bolts securely.

Remove the holder piece from the cam chain tensioner.
Install the gasket and searing bolt, and tighten the bolt securely.

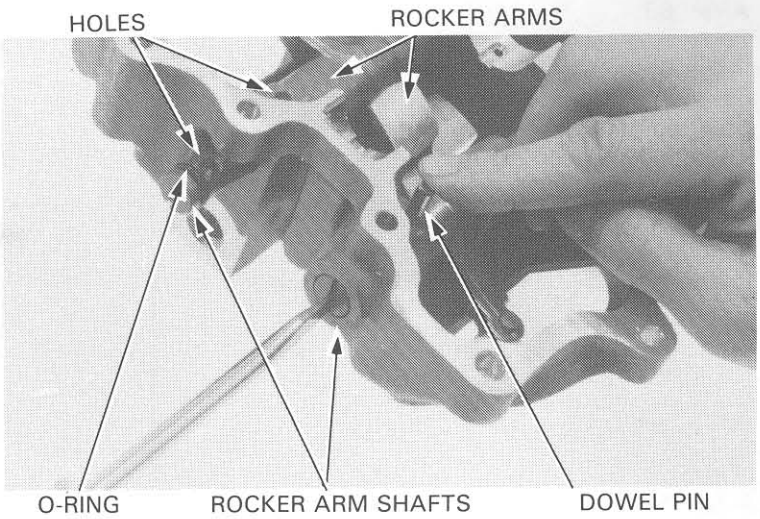
TORQUE: 8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)



CYLINDER HEAD COVER ASSEMBLY/INSTALLATION

ASSEMBLY

Oil the rocker arm shafts and arms.
Install new O-rings into the grooves of the rocker arm shafts and install the rocker arms and shafts.
Align the dowel pin holes in the cylinder head cover and rocket arm shaft and install new dowel pins.

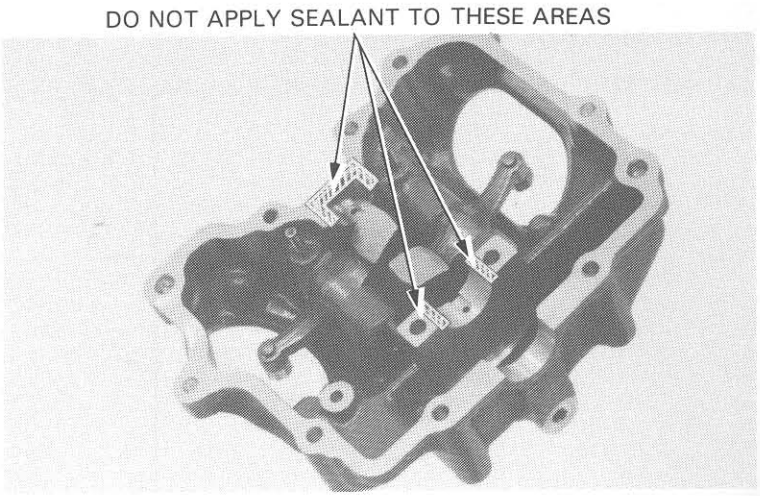


INSTALLATION

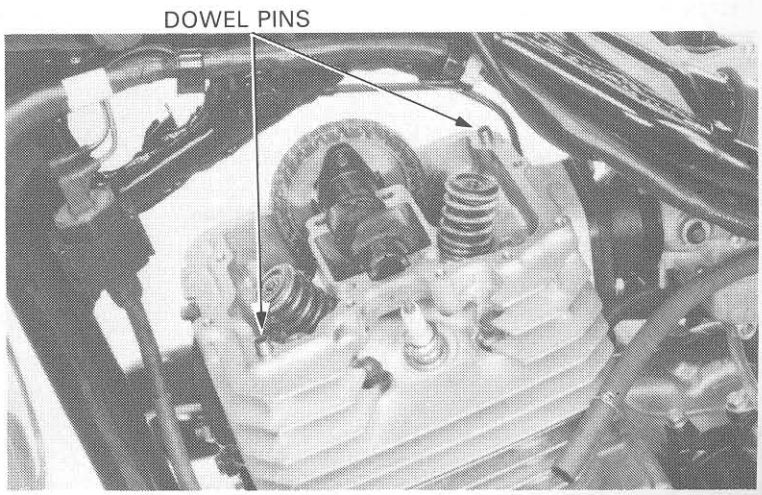
Apply liquid sealant to the mating surfaces of the cylinder head cover as shown.

NOTE

Do not apply sealant to the camshaft bearing surfaces.



Install the two dowel pins onto the cylinder head and install the cylinder head cover.



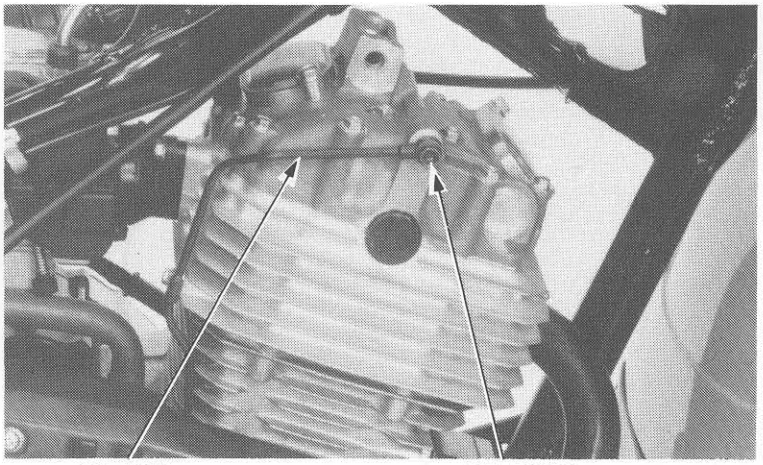
Tighten the cylinder head cover bolts in a crisscross pattern in 2-3 steps starting with the center bolt.

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

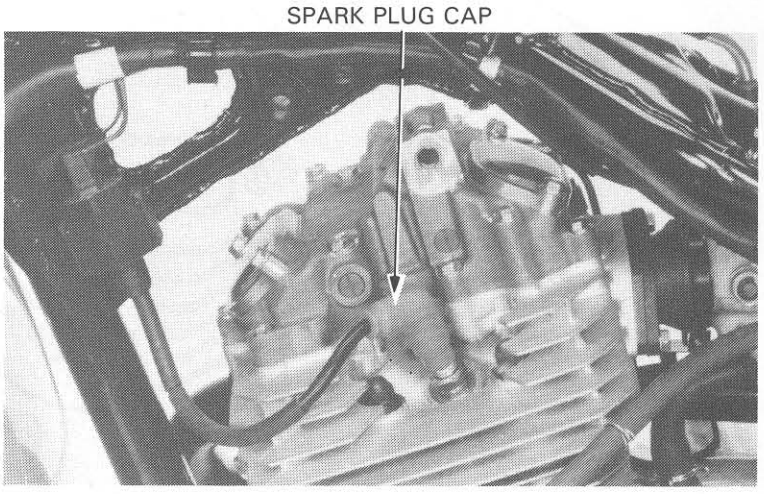
Connect the oil pipe to the cylinder head cover using the two sealing washers and oil bolt.

TORQUE: 8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
After '85 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

Make sure the sealing washers are in good condition.



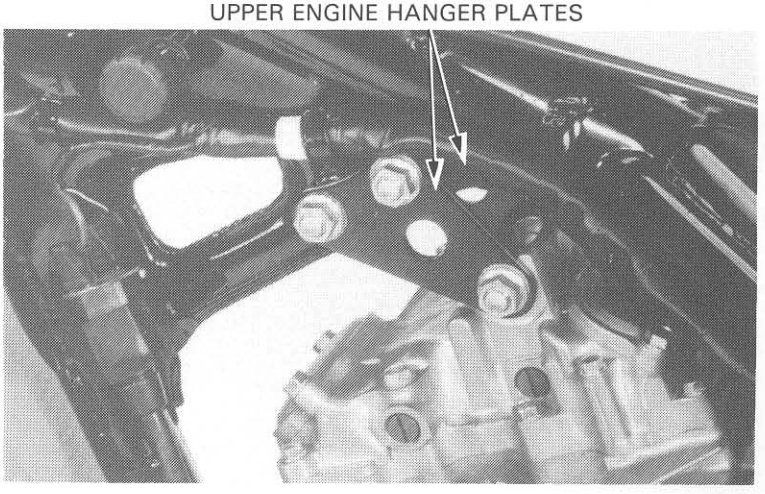
Adjust valve clearance (page 3-5).
Test cylinder compression (page 3-8).
Connect the spark plug cap to the plug.

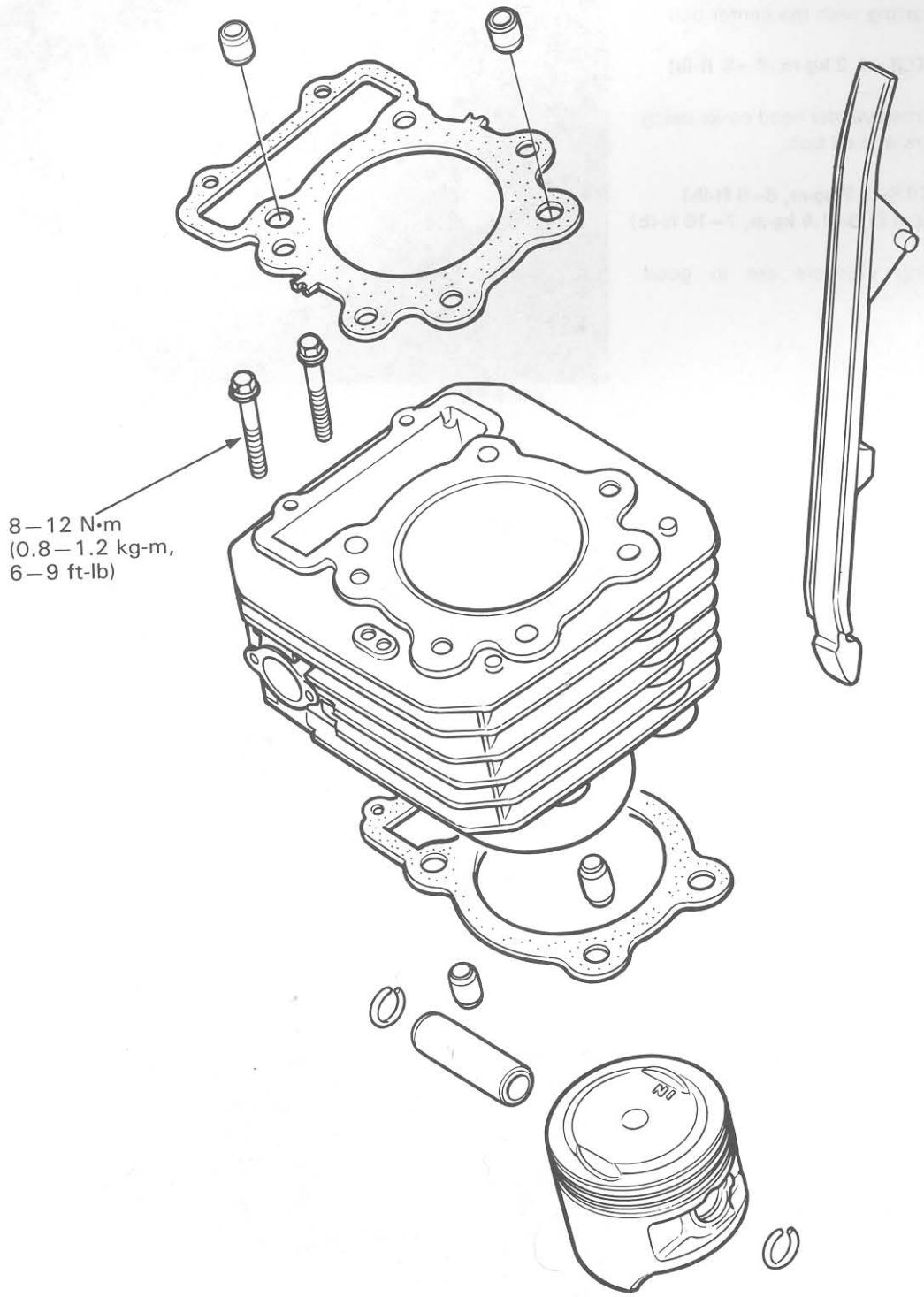


Install the upper engine hanger plates using the three bolts and nuts.

TORQUE: 40—50 N·m
(4.0—5.0 kg-m, 29—36 ft-lb)

Install the fuel tank, seat and both frame side covers.




8—12 N•m
(0.8—1.2 kg-m,
6—9 ft-lb)

7. CYLINDER/PISTON

SERVICE INFORMATION

GENERAL

- Camshaft lubrication oil is fed to the cylinder head through an orifice in the cylinder and crankcase. Be sure this orifice is not clogged and that the dowel pins are in place before installing the cylinder head.
- The cylinder can be removed with the engine in the frame.

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		74.00—74.01 mm (2.913—2.914 in)	74.10 mm (2.917 in)
	Taper		———	0.10 mm (0.004 in)
	Out of round		———	0.10 mm (0.004 in)
	Warpage across top		———	0.10 mm (0.004 in)
Piston, Piston pin, Piston rings	Piston O.D.		73.965—73.985 mm (2.9120—2.9128 in)	73.90 mm (2.909 in)
	Piston pin bore		19.002—19.008 mm (0.7481—0.7483 in)	19.04 mm (0.750 in)
	Piston pin O.D.		18.994—19.000 mm (0.7478—0.7480 in)	18.96 mm (0.747 in)
	Piston-to-pin clearance		0.002—0.014 mm (0.0001—0.0006 in)	0.02 mm (0.001 in)
	Piston ring-to-ring groove clearance	TOP	0.015—0.045 mm (0.0006—0.0018 in)	0.09 mm (0.004 in)
		SECOND	0.015—0.045 mm (0.0006—0.0018 in)	0.09 mm (0.004 in)
	Piston ring end gap	TOP/SECOND	0.15—0.30 mm (0.006—0.012 in)	0.50 mm (0.020 in)
		OIL	0.20—0.70 mm (0.008—0.028 in)	———
Cylinder-to-piston clearance			0.015—0.045 mm (0.0006—0.0018 in)	0.10 mm (0.004 in)
Crankshaft	Connecting rod small end I.D.		19.020—19.041 mm (0.7488—0.7496 in)	19.10 mm (0.752 in)

TORQUE VALUE

Cylinder mount bolt	8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)

TROUBLESHOOTING

Low or unstable compression
1. Worn cylinder or piston rings
2. Cylinder head and valves (Section 6)

Excessive smoke
1. Worn cylinder, piston, or piston rings
2. Improper installation of piston rings
3. Scored or scratched piston or cylinder wall

Overheating
—Excessive carbon buib-up on piston or combustion chamber wall

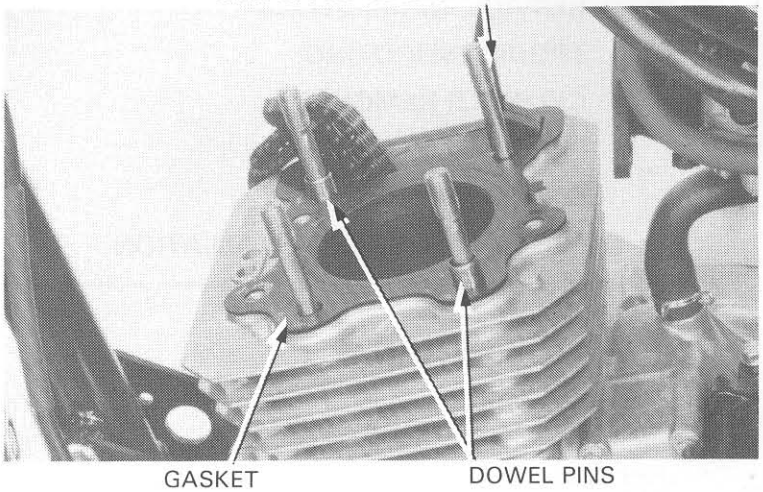
Knocking or abnormal noise
1. Worn piston and cylinder
1. Excessive carbon build-up

CYLINDER REMOVAL

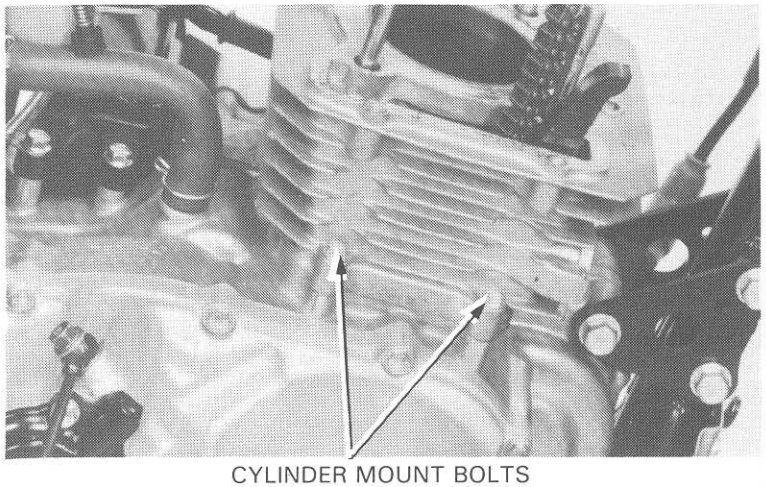
Remove the cylinder head (Section 6).
Remove the gasket, dowel pins, and cam chain guide.

NOTE

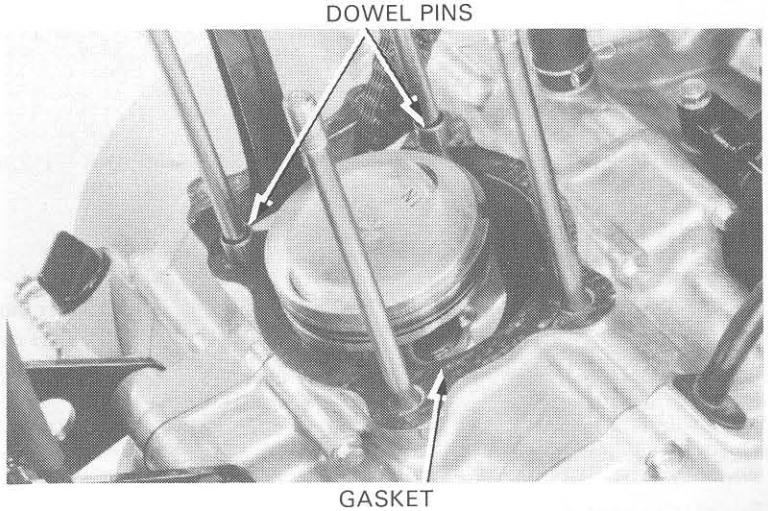
Keep the cam chain from falling into the crankcase when removing the cylinder.



Remove the cylinder mount bolts.



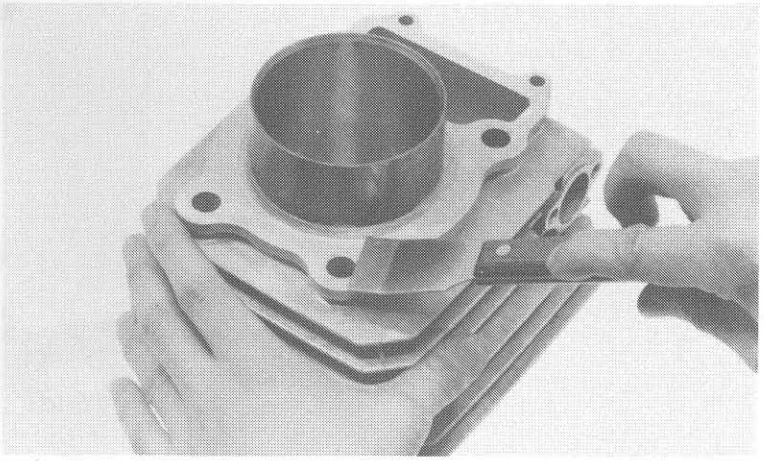
Remove the cylinder, gasket and dowel pins.



Clean off any gasket material from the cylinder surface.

NOTE

Be careful not to damage the gasket surface.



CYLINDER INSPECTION

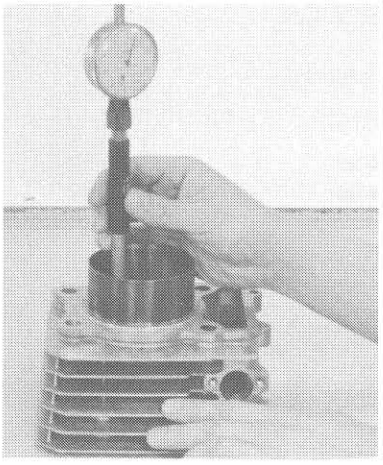
Inspect the cylinder bore for wear or damage.
Measure the cylinder I.D.
Check the cylinder I.D. at X and Y axis at three locations.

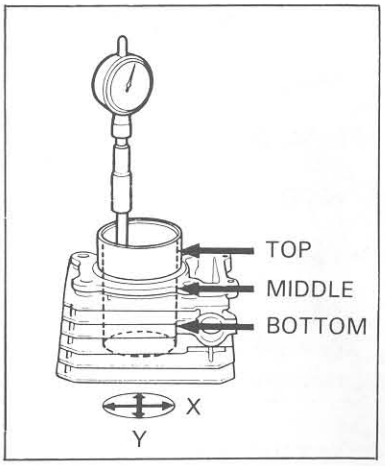
SERVICE LIMIT: 74.10 mm (2.917 in)

Calculate the taper and out of round.

SERVICE LIMITS:

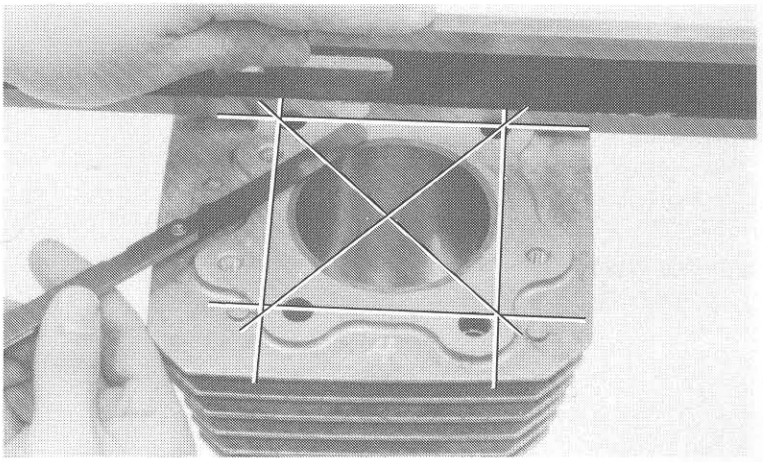
Taper:	**0.10 mm (0.004 in)**
Out of round:	**0.10 mm (0.004 in)**





Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.10 mm (0.004 in)



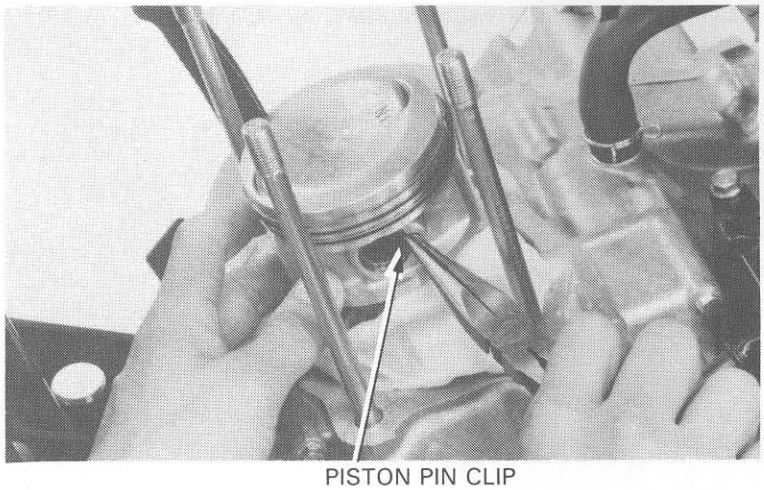
PISTON REMOVAL

Remove the piston pin clip with pliers

NOTE

Do not let the clips fall into the crankcase.

Press the piston pin out of the piston and remove the piston.



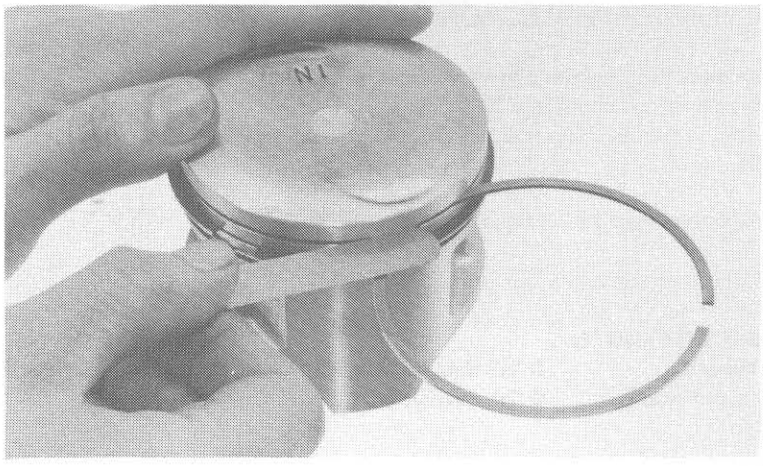
PISTON PIN CLIP

PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.

SERVICE LIMITS:

TOP:	**0.09 mm (0.004 in)**
SECOND:	**0.09 mm (0.004 in)**



Remove the piston rings.

NOTE

Do not damage the piston rings during removal.

Inspect the piston for wear or damage.

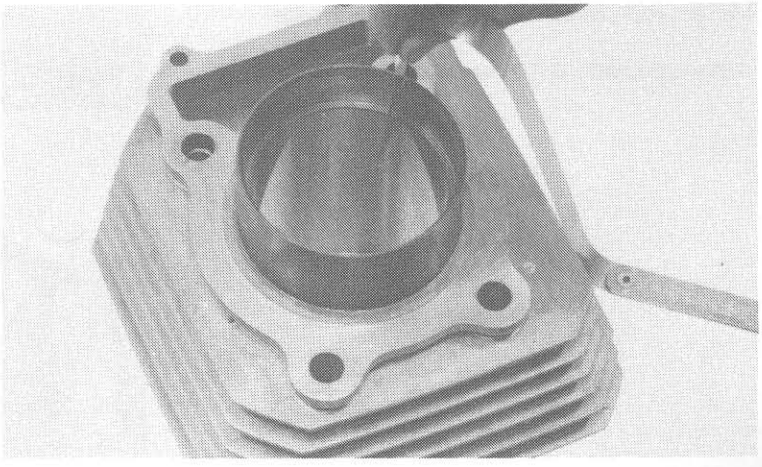
Insert each piston ring squarely into the cylinder and measure the ring end gap.

NOTE

Push the rings into the cylinder with the top of the piston to be sure they are squarely in the cylinder.

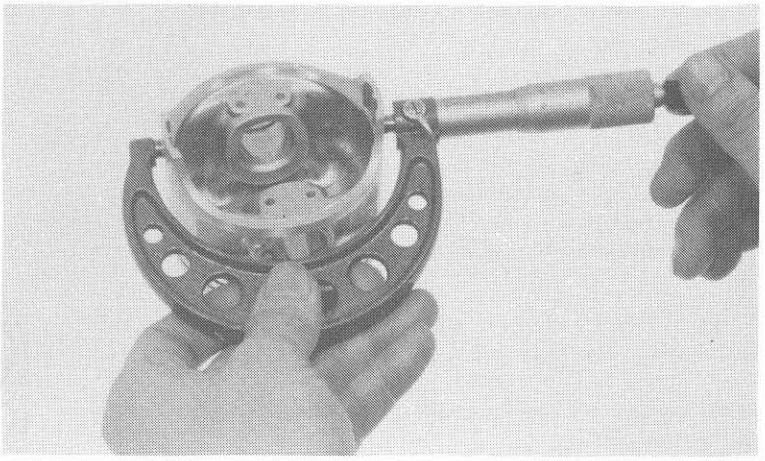
SERVICE LIMIT:

TOP/SECOND: 0.50 mm (0.020 in)



Measure the diameter of the piston 10 mm from the bottom and 90° to the piston pin hole.
Calculate the piston-to-cylinder clearance.
Refer to page 7-2 for cylinder bore inspection.

SERVICE LIMIT: 73.90 mm (2.909 in)



Measure the piston pin hole I.D.

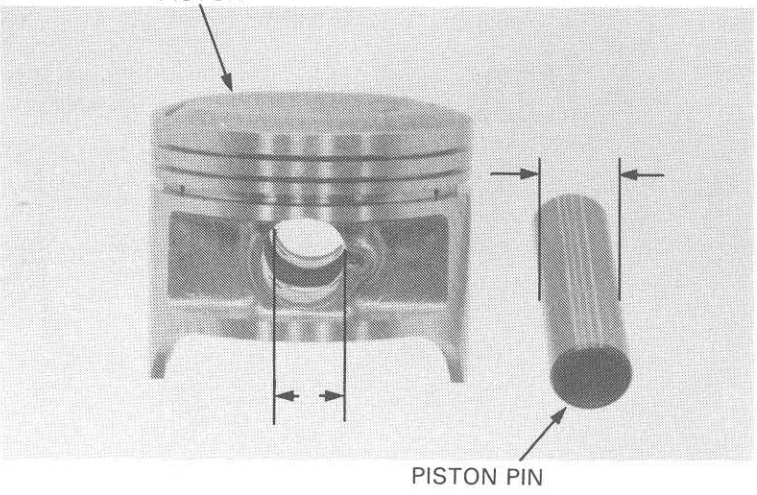
SERVICE LIMIT: 19.04 mm (0.750 in)

Measure the O.D. of the piston pin.

SERVICE LIMIT: 18.96 mm (0.747 in)

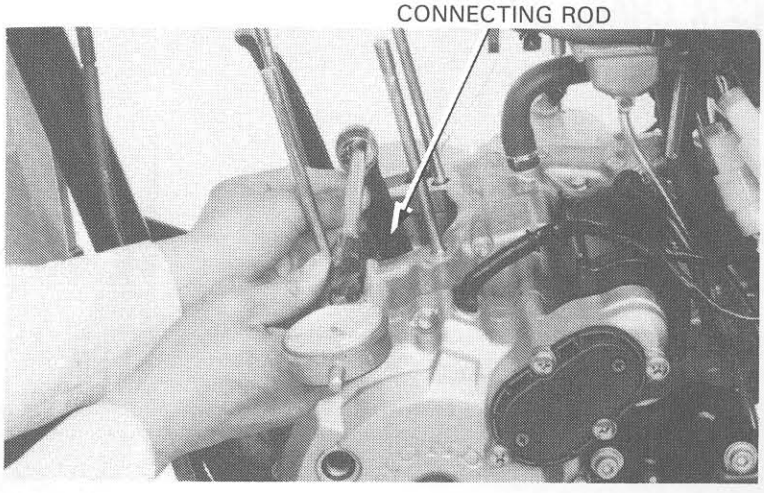
Calculate the piston-to-piston pin clearance.

SERVICE LIMIT: 0.02 mm (0.001 in)



Measure the connecting rod small end I.D.

SERVICE LIMIT: 19.10 mm (0.752 in)



PISTON RING INSTALLATION

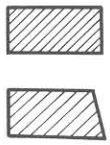
Clean the piston ring grooves thoroughly and install the piston rings.

NOTE

- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking facing up.
- Do not mix the top and second rings.

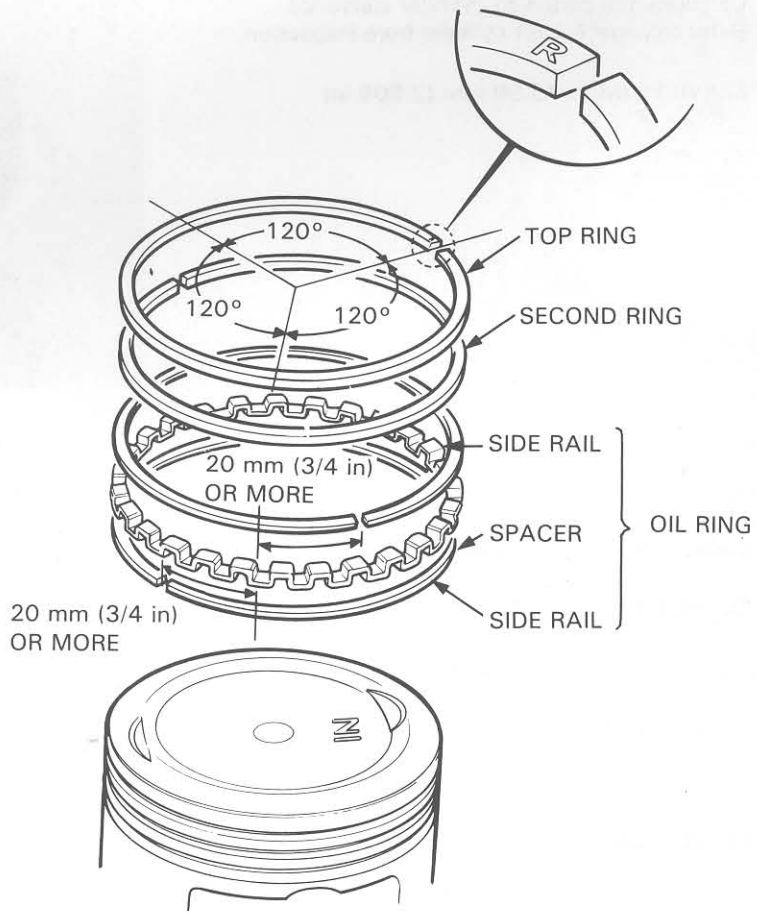
Space the piston ring end gaps 120 degrees apart. Do not align the gaps in the oil rings (side rails).

After installation, the rings should be free to rotate in the ring grooves.



TOP RING

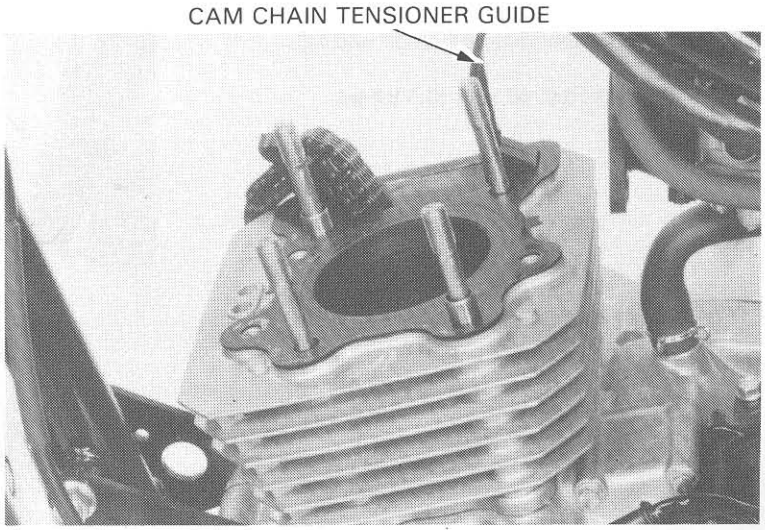
SECOND RING



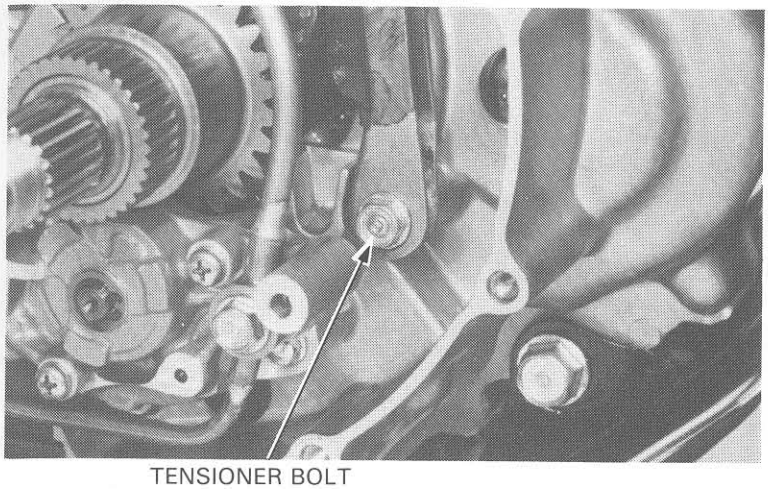
CAM CHAIN GUIDE

REMOVAL

Remove the following:
—cylinder head cover (page 6-3).
—cylinder head (page 6-7).
—tensioner lifter (page 6-4).
—tensioner guide.



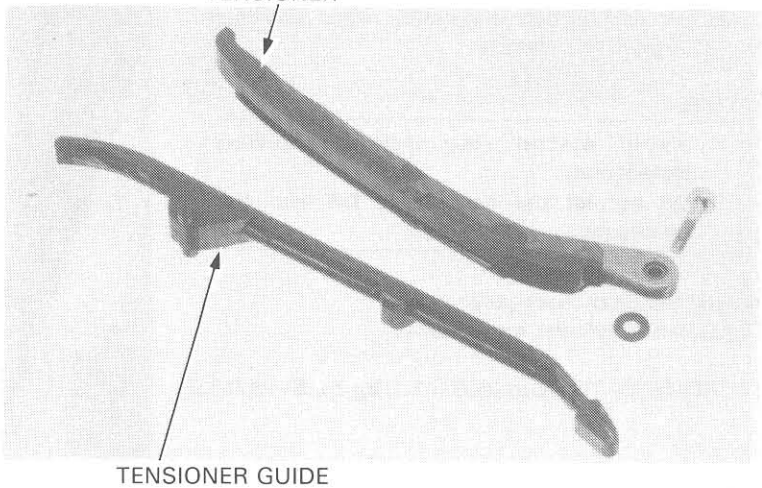
Remove the following:
—right crankcase cover (page 8-3).
—centrifugal clutch (page 8-10).
—separator plate.
—tensioner bolt, tensioner and washer.



TENSIONER BOLT

INSPECTION

Inspect the cam chain guide and tensioner for wear or damage.
Inspect the tensioner lifter for good tension, replace if necessary (page 6-18).



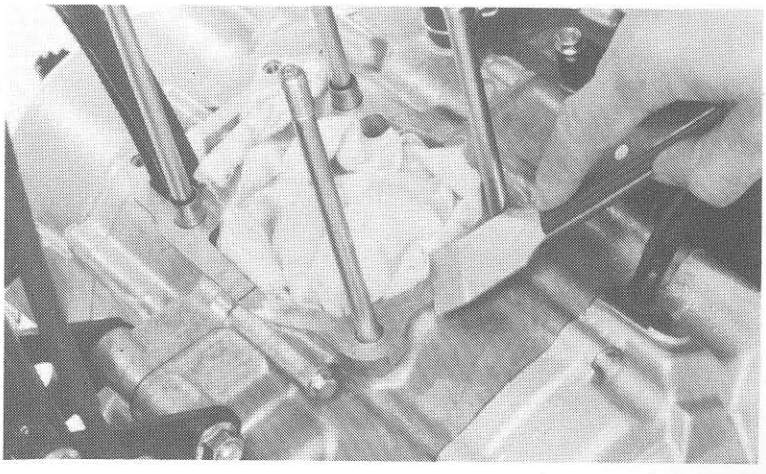
TENSIONER GUIDE

PISTON/CYLINDER INSTALLATION

Clean off any gasket material from the crankcase surface.

NOTE

Be careful not to damage the gasket surface.

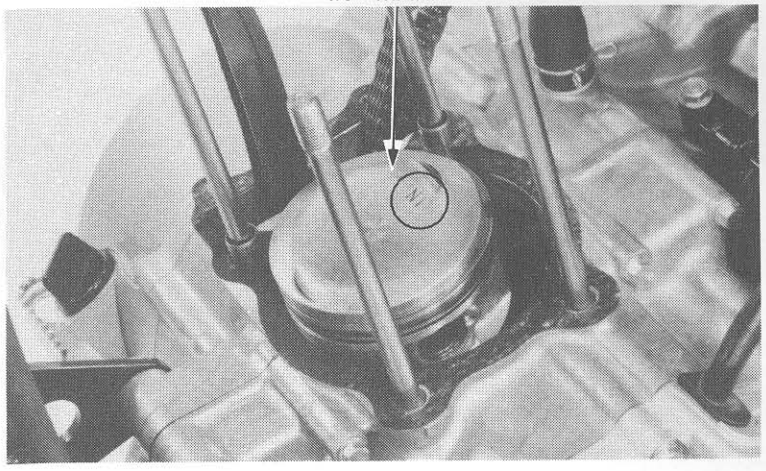


Install the piston and piston pin, using new piston pin clips.

NOTE

- Position the piston "IN" mark on the intake valve side.
- Do not align the piston pin clip end gap with the piston cutout.
- Do not let the clip fall into the crankcase.

Install a new gasket and dowel pins.



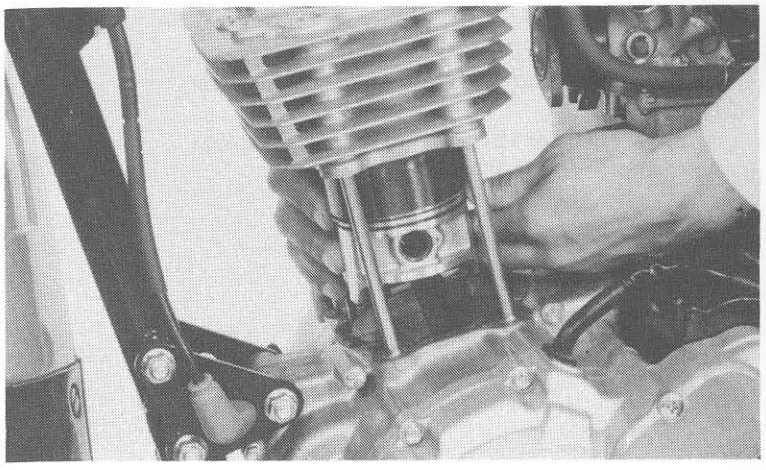
Coat the cylinder bore and piston rings with engine oil and install the cylinder.

NOTE

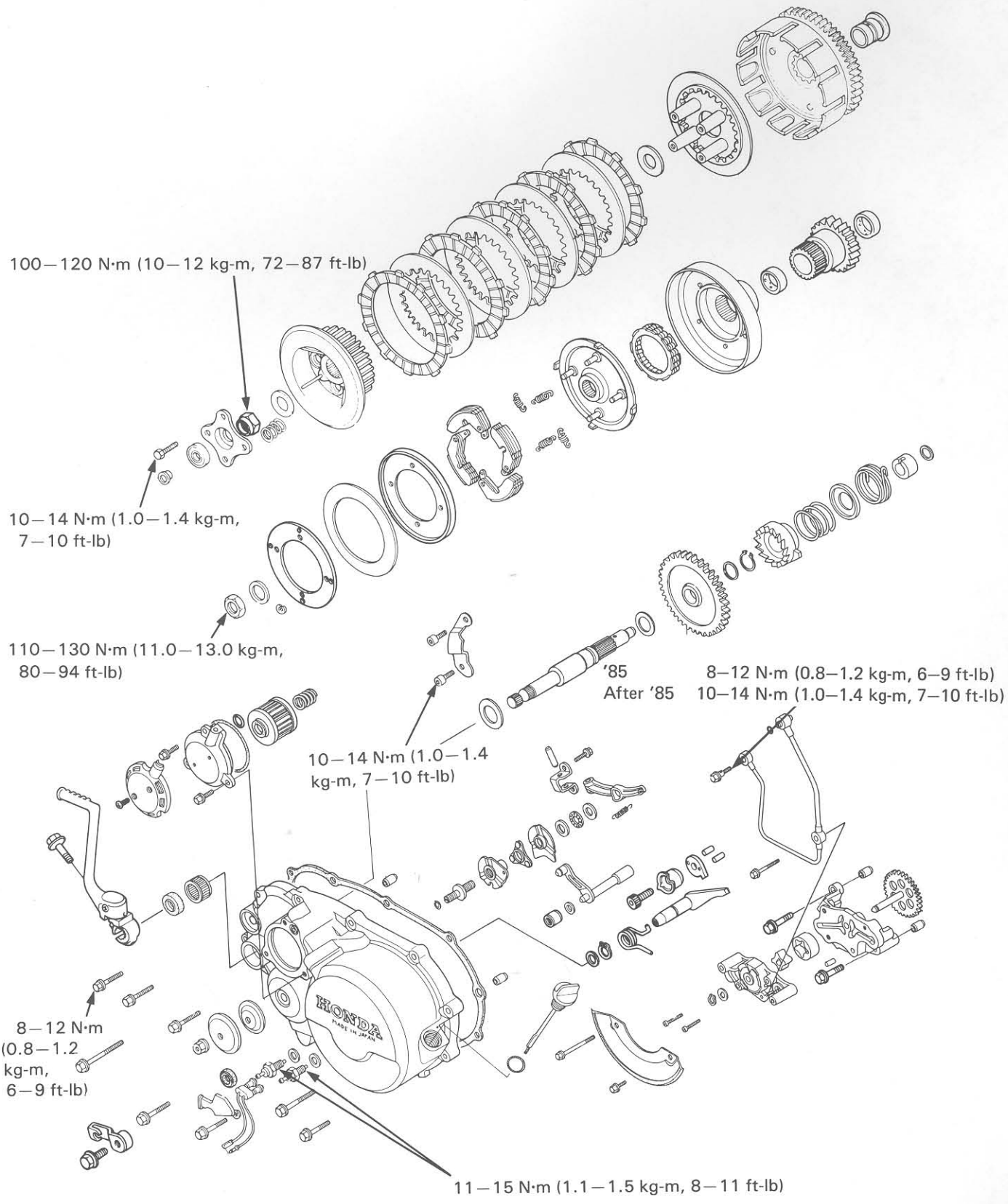
- Avoid piston ring damage during installation.
- Do not let the cam chain fall into the crankcase.

Install the cam chain guide.
Tighten the cylinder mount bolts.

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



MEMO


100—120 N·m (10—12 kg-m, 72—87 ft-lb)
10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)
110—130 N·m (11.0—13.0 kg-m, 80—94 ft-lb)
'85
After '85
8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)
10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)
8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
11—15 N·m (1.1—1.5 kg-m, 8—11 ft-lb)
HONDA

8. CLUTCH/OIL PUMP/ KICK STARTER

SERVICE INFORMATION

GENERAL

This section covers removal and installation of the centrifugal clutch, manual clutch, oil pump and kick starter.
The clutches, oil pump and kick starter can be serviced with the engine installed in the frame.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Manual clutch	Spring free length	34.98 mm (1.377 in)	34.0 mm (1.34 in)
	Spring preload	18 kg (30.68 lb)	———
	Disc thickness	2.62–2.78 mm (0.103–0.109 in)	2.3 mm (0.09 in)
	Disc warpage	———	0.20 mm (0.008 in)
	Plate warpage	———	0.20 mm (0.008 in)
	Clutch outer guide O.D.	27.959–27.980 mm (1.1007–1.1016 in)	27.92 mm (1.099 in)
Centrifugal clutch	Drum I.D.	140 mm (5.5 in)	140.2 mm (5.52 in)
	Weight lining thickness	2.95–3.05 mm (0.116–0.120 in)	2.0 mm (0.08 in)
	Clutch spring free height	3.7 mm (0.15 in)	3.55 mm (0.140 in)
Kick starter	Spindle O.D.	21.959–21.980 mm (0.8645–0.8654 in)	21.90 mm (0.862 in)
	Pinion gear I.D.	22.020–22.041 mm (0.8669–0.8678 in)	22.10 mm (0.870 in)
	Idler gear I.D.	23.020–23.041 mm (0.9063–0.9071 in)	23.07 mm (0.908 in)
	Idler gear bushing O.D.	22.959–22.980 mm (0.9039–0.9047 in)	22.93 mm (0.903 in)
	Countershaft O.D.	19.980–19.993 mm (0.7866–0.7871 in)	19.95 mm (0.785 in)
	Idler gear bushing I.D.	20.000–20.021 mm (0.7874–0.7882 in)	20.05 mm (0.789 in)
Primary driver gear	Crankshaft O.D.	23.959–12.980 mm (0.9433–0.9441 in)	23.93 mm (0.942 in)
	Gear I.D.	24.000–24.021 mm (0.9449–0.9457 in)	24.05 mm (0.947 in)
Oil pump	Pump end clearance	0.02–0.08 mm (0.0008–0.0031 in)	0.10 mm (0.004 in)
	Rotor tip clearance	0.15 mm (0.006 in)	0.20 mm (0.008 in)
	Rotor-to-body clearance	0.15–0.21 mm (0.006–0.008 in)	0.25 mm (0.010 in)

TORQUE VALUES

Oil pipe bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Kick starter stopper plate socket bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Manual clutch lock nut	100–120 N·m (10–12 kg-m, 72–87 ft-lb) Apply thread locking agent
Centrifugal clutch lock nut	110–130 N·m (11.0–13.0 kg-m, 80–94 ft-lb) Apply thread locking agent
Neutral and reverse switch	11–15 N·m (1.1–1.5 kg-m, 8–11 ft-lb)
Clutch lifter bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Right crankcase cover SH bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
After '85	
Oil pipe bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

TOOLS

Special	
Remover handle	07946–3710100
Remover weight	07741–0010201 or 07936–3710200
Bearing remover, 17 mm	07936–3710300
Attachment, 28 x 30 mm	07946–1870100
Clutch center holder	07923–KE10001
Bearing remover, 20 mm	07936–3710600
Clutch holder	07923–HA80000 or 07923–HB3000A–USA ONLY
Clutch puller	07933–HA80000 or 07933–HB3000A–USA ONLY
Bearing remover set, 20 mm	07936–3710001
Common	
Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Pilot, 17 mm	07746–0040400
Pilot, 20 mm	07746–0040500
Extension bar	07716–0020500 or commercially available in U.S.A.
Lock nut wrench, 17 x 27 mm	07716–0020300 or commercially available in U.S.A.

TROUBLESHOOTING

Faulty clutch operation can usually be corrected by adjusting the clutch.

Clutch slips when accelerating
1. Fautly clutch lifter
2. Discs worn
3. Weak spring

Clutch will not disengage
1. Faulty clutch lifter
2. Plates warped

Motorcycle creeps with clutch disengaged
1. Faulty centrifugal clutch
2. Plates warped

Clutch operation feels rough
—Outer drum slots rough

Hard to shift
1. Incorrect clutch adjustment
2. Faulty clutch lifter

Low oil pressure
1. Faulty oil pump
2. Oil pump drive gear broken

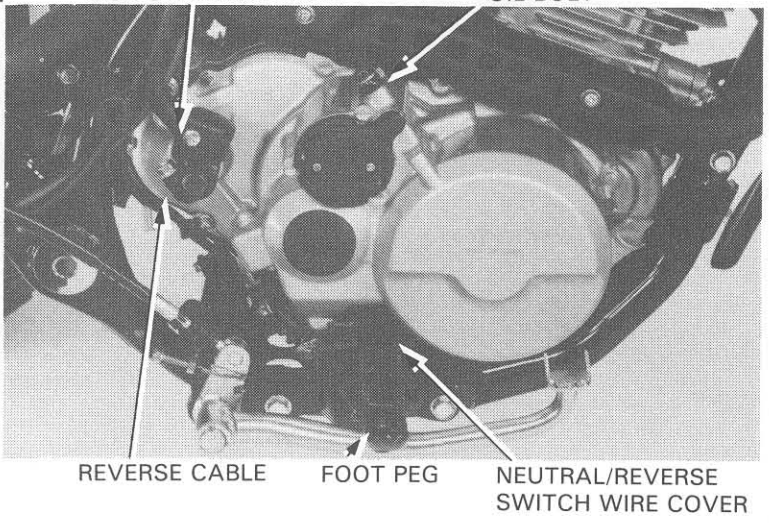
RIGHT CRANKCASE COVER REMOVAL

Shift the transmission into neutral.

Drain the oil from the engine.
Remove the right side cover.

Remove the following:
—kick pedal.
—right foot peg.
—oil pipe bolt and two sealing washers from the right crankcase cover.
—neutral/reverse switch wire cover.

Disconnect the following:
—reverse cable from the cable holder and holder arm.
—neutral and reverse switch wires.

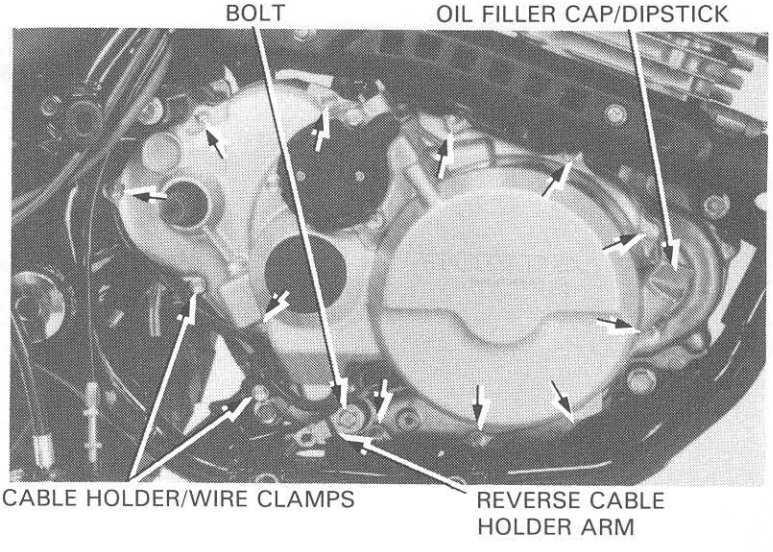


Remove the reverse cable holder arm by removing bolt from the reverse shift shaft.

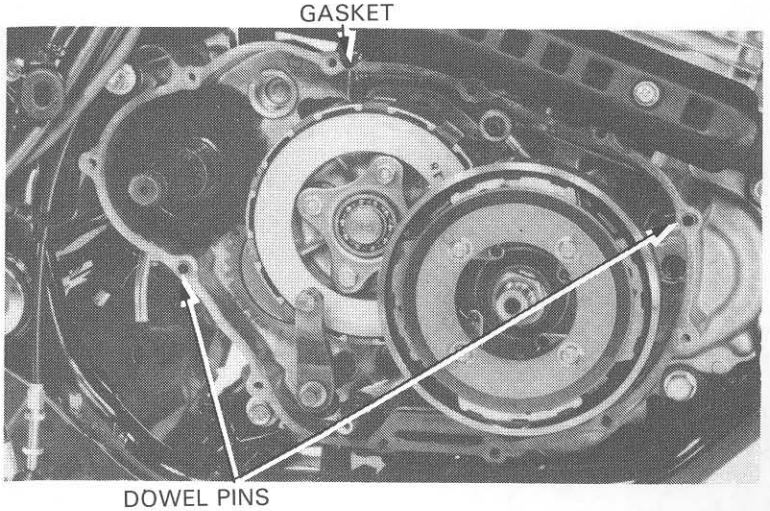
Remove the oil filler cap/dipstick.

Remove the reverse cable holder and neutral and reverse wire clamps.

Remove the right crankcase cover bolts and cover.

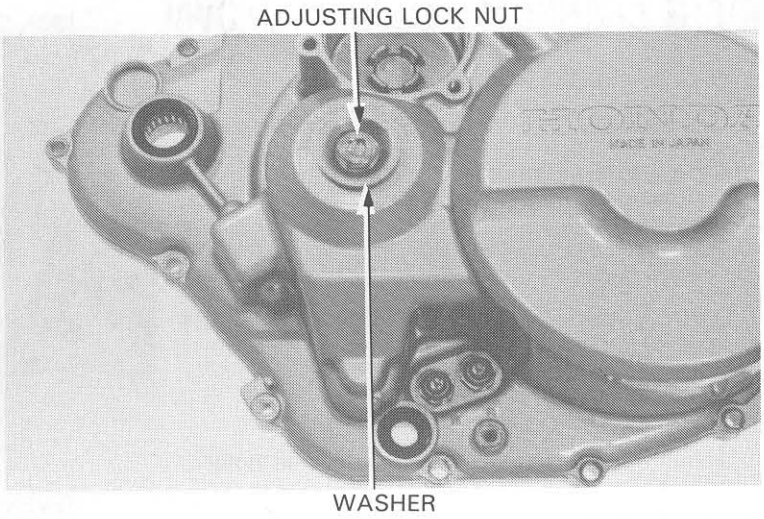


Remove the gasket and dowel pins.

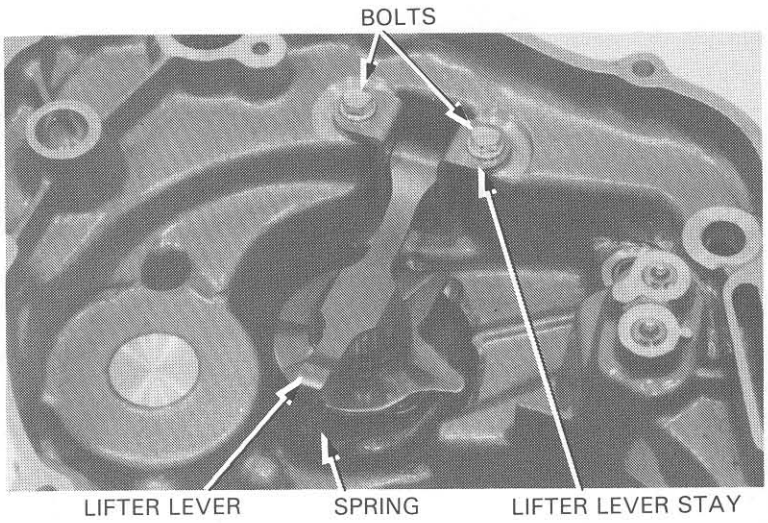


CLUTCH LIFTER DISASSEMBLY

Remove the clutch adjuster rubber cap.
Remove the clutch adjusting screw lock nut and washer.



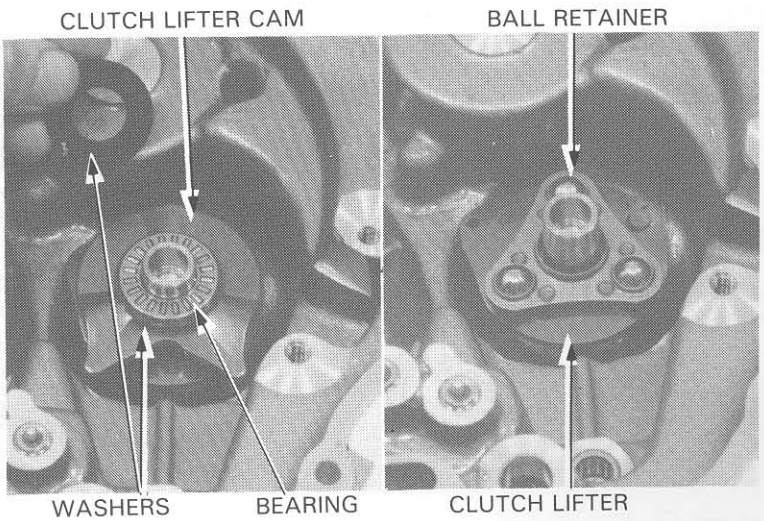
Remove the clutch lifter lever stay mount bolts, lifter lever and spring.



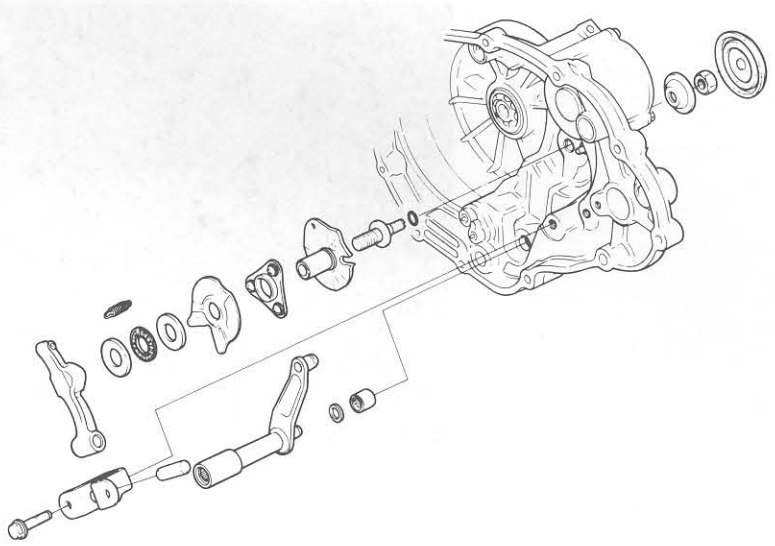
Remove the washers, bearing and clutch lifter cam.

Remove the ball retainer and clutch lifter with adjusting screw.

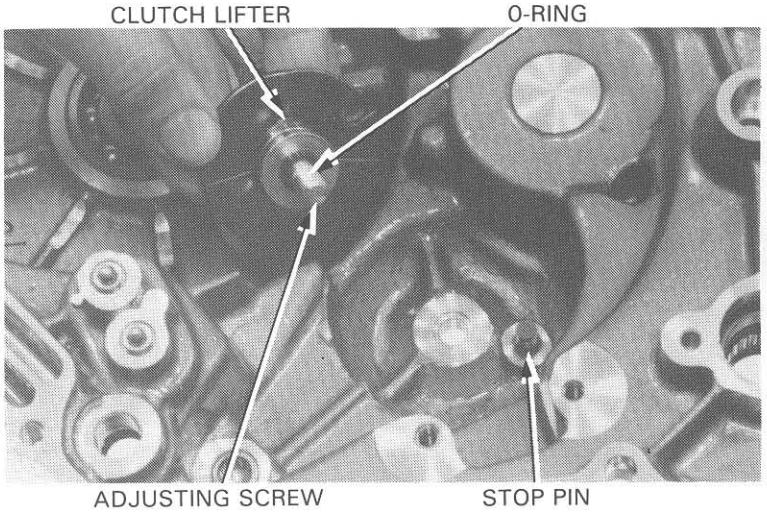
Check the disassembled parts for damage or wear, replace the parts if necessary.



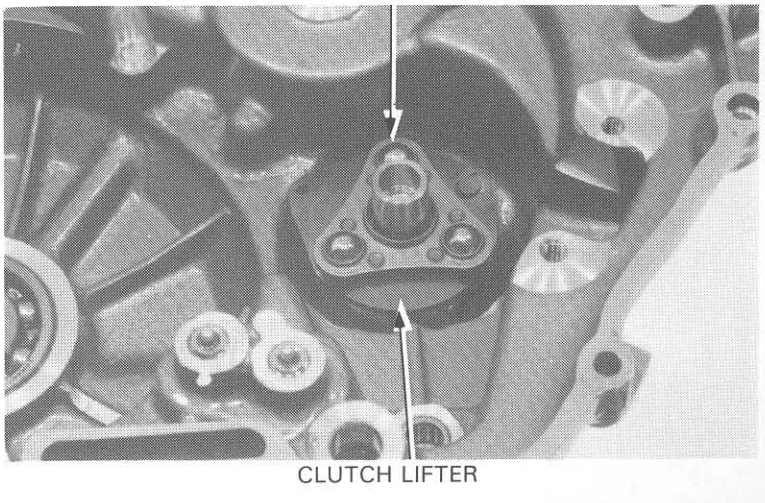
CLUTCH LIFTER ASSEMBLY/INSTALLATION



Install the following:
- —adjusting screw into the clutch lifter.
- —O-ring onto the adjusting screw.
- —clutch lifter by aligning its groove with the stop pin on the right crankcase cover.



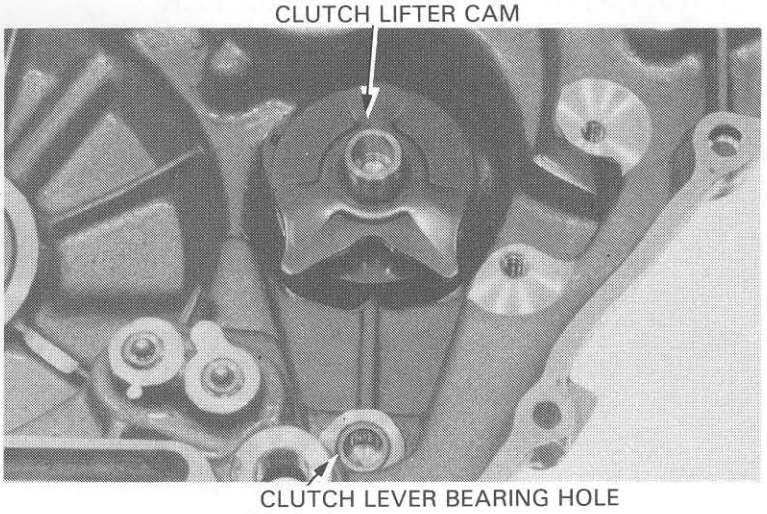
Install the ball retainer onto the clutch lifter.



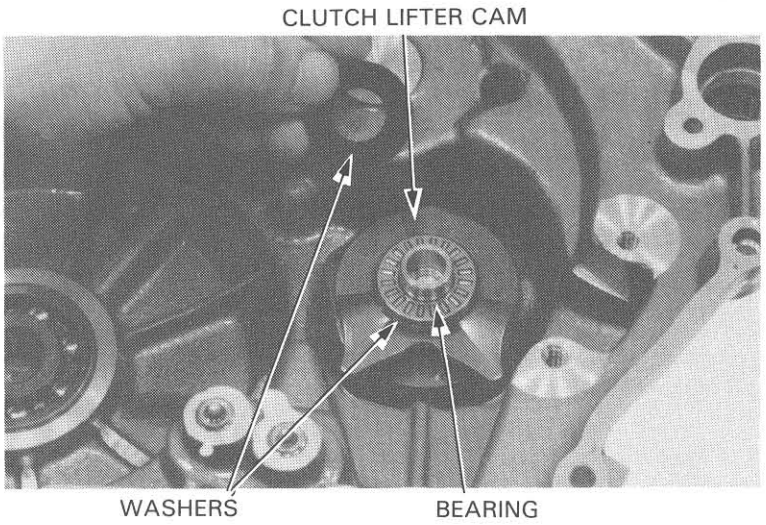
Install the clutch lifter cam.

NOTE

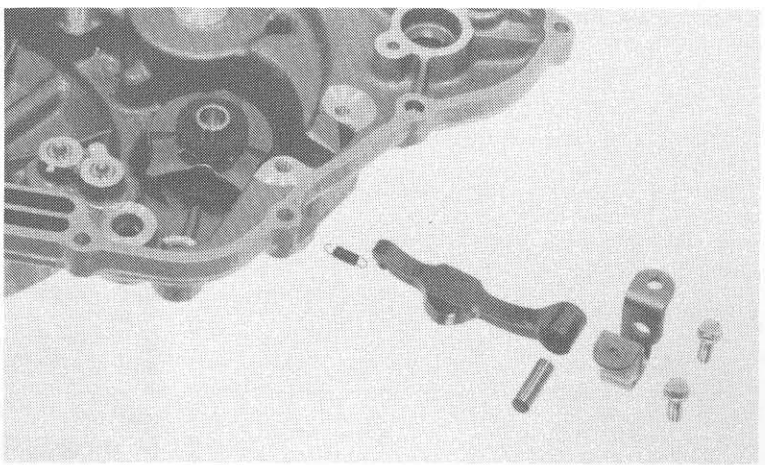
Install the clutch lifter cam aligning its groove with the clutch lever bearing hole on the right crankcase cover.



Install the washer, bearing and thrust washer onto the clutch lifter cam.

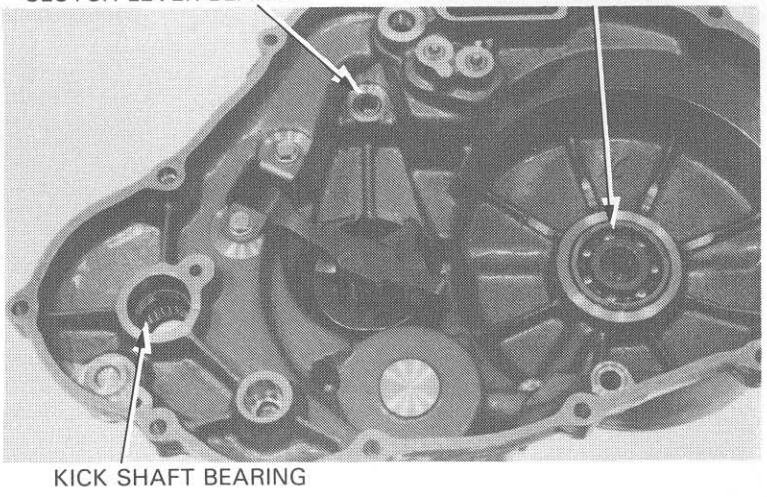


Install the lifter lever in the reverse order of removal.

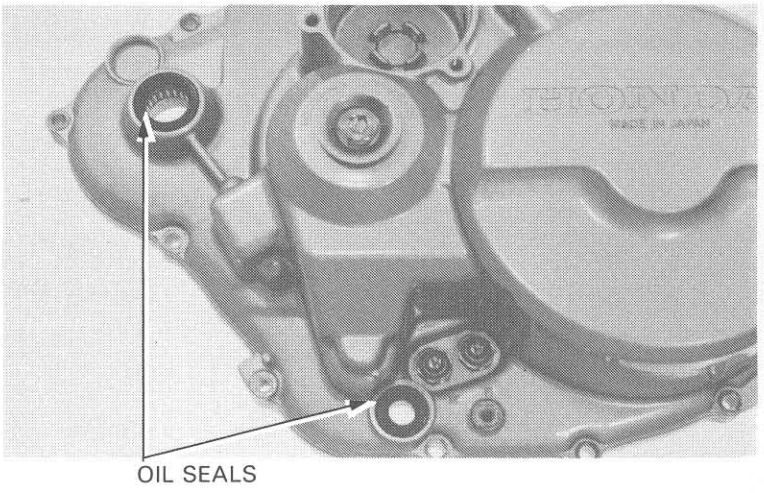


BEARING/OIL SEAL INSPECTION

Check the kick shaft, clutch lever and crankshaft bearings on the right crankcase cover for wear or damage.



Check the oil seals for wear or damage.



BEARING REPLACEMENT

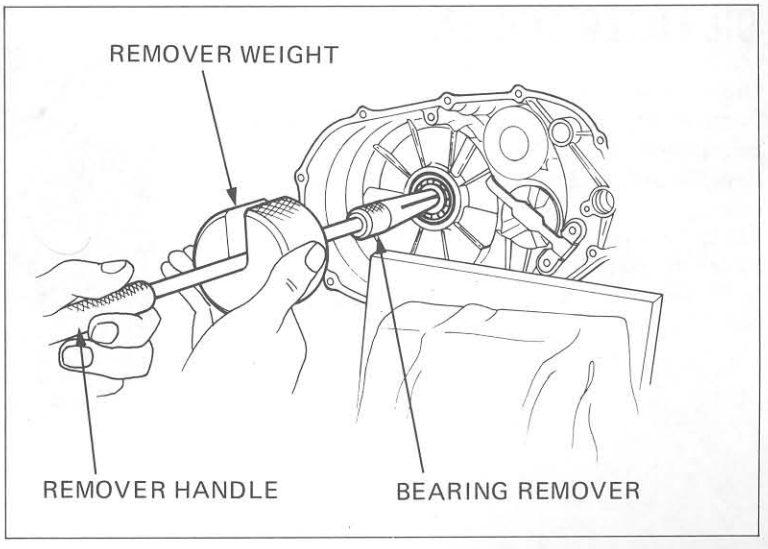
Remove the bearings from the right crankcase cover with the special tools.

Crankshaft bearing

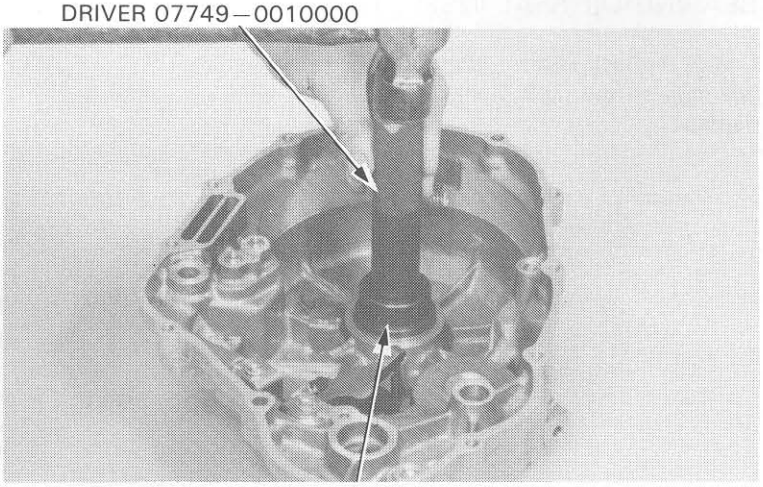
· Remover handle	07936—3710100
· Remover weight	07936—3710200 or 07741—0010201
· Bearing remover, 17 mm	07936—3710300

Kick shaft bearing

• Bearing remover set, 20 mm	07936—3710001
— Remover handle	07936—3710100
— Remover weight	07936—3710200 or 07741—0010201
— Bearing remover, 20 mm	07936—3710600

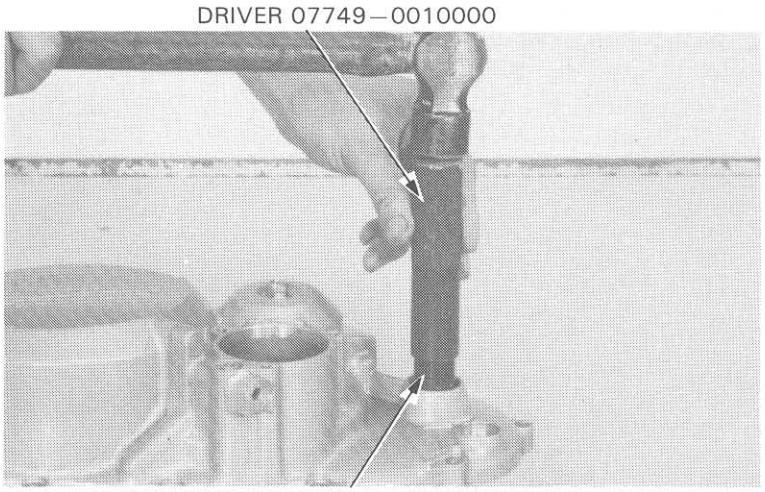


Drive a new crankshaft bearing into the cover using the special tools.



ATTACHMENT, 42 x 47 mm 07746—0010300
PILOT, 17 mm 07746—0040400

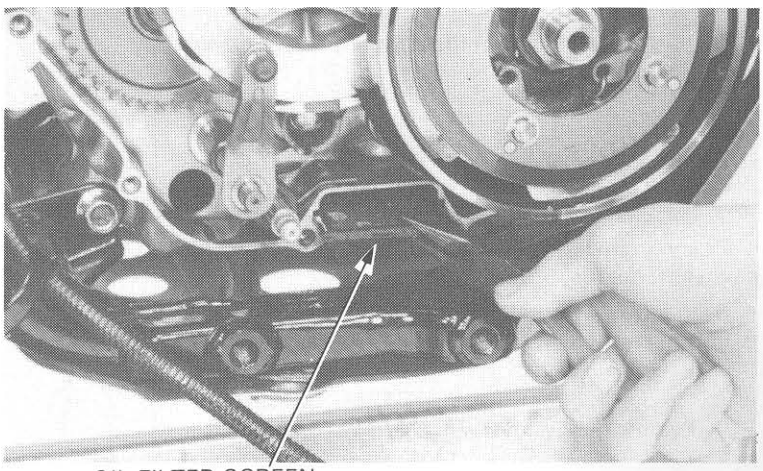
Drive a new kick shaft bearing into the cover using the special tools.



ATTACHMENT, 28 x 30 mm 07946—1870100
PILOT, 20 mm 07746—0040500

OIL FILTER SCREEN

Drain the engine oil.
Remove the right crankcase cover, gasket and dowel pins (page 8-3).
Remove the oil filter screen from the crankcase and clean.
Replace if necessary.
Install the oil filter screen and right crankcase cover in the reverse order of removal (page 8-3).

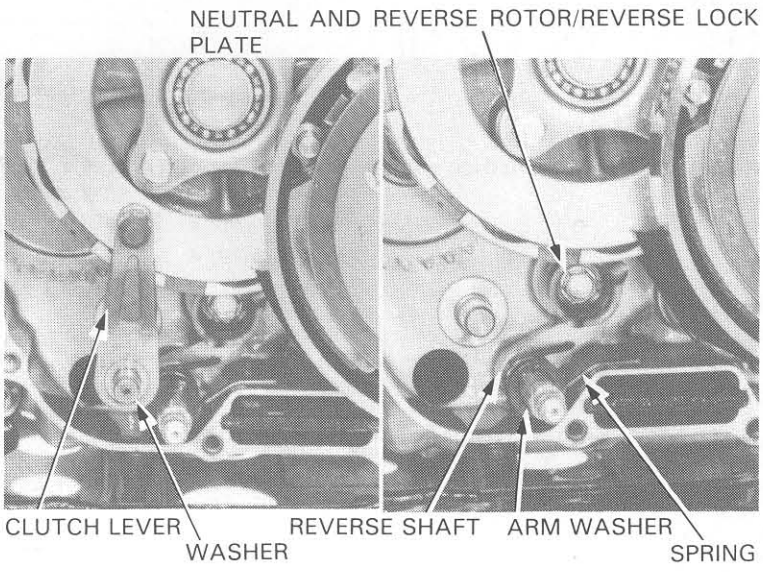


OIL FILTER SCREEN

CLUTCH LEVER/REVERSE SHAFT ARM/NEUTRAL AND REVERSE ROTOR/REVERSE LOCK PLATE REPLACEMENT

Remove the washer and clutch lever.

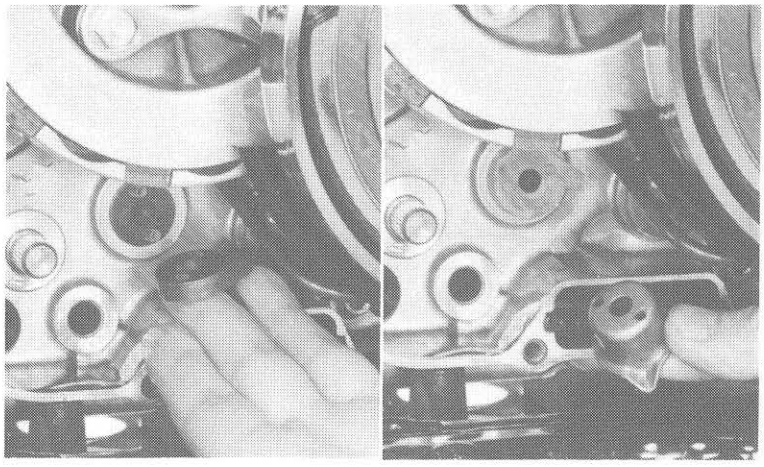
Remove the reverse shaft arm from the right crankcase.
Remove the washer and spring from the reverse shaft arm.



Align the reverse lock plate holes with the holes in the shift drum pin and install the reverse lock plate. Align the neutral and reverse rotor holes with the reverse lock plate pins and install the neutral and reverse rotor using the bolt.

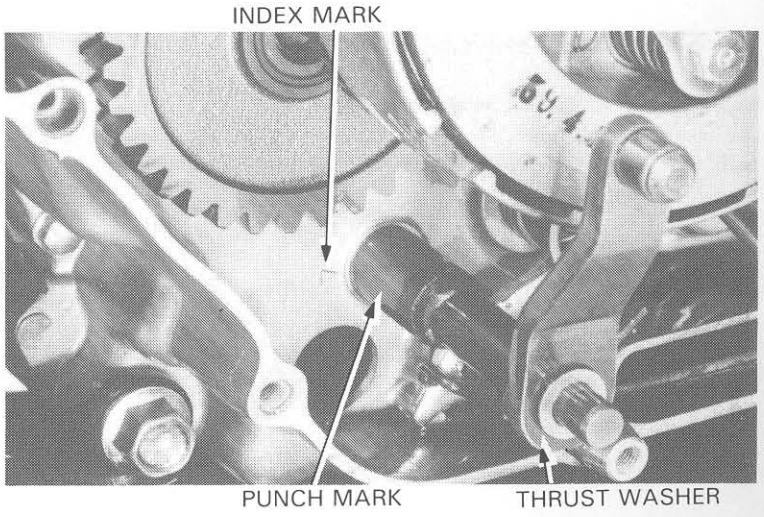
Rotate the neutral and reverse rotor and check for smooth operation.

Install the reverse shaft arm.



Align the index mark on the case with the punch mark on the clutch lever and install the clutch lever.

Install the thrust washer.



CENTRIFUGAL CLUTCH

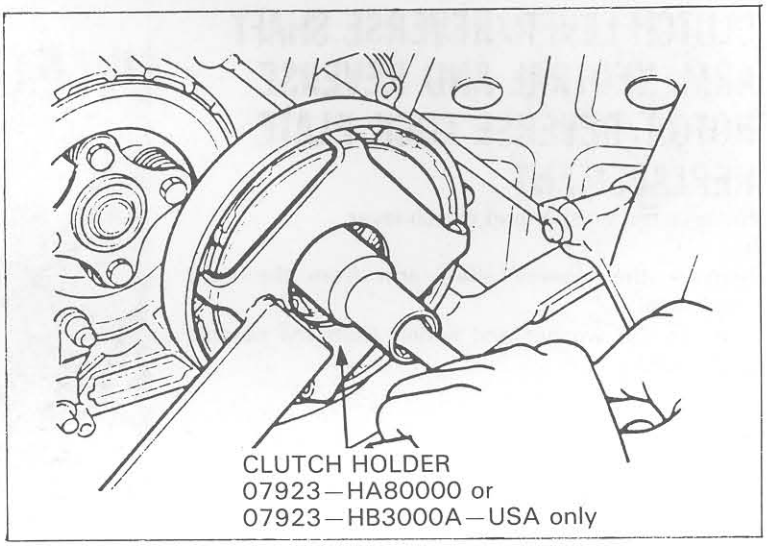
REMOVAL

Remove the right crankcase cover.

Hold the centrifugal clutch weight assembly with a clutch holder and remove the lock nut by turning it clockwise.

NOTE

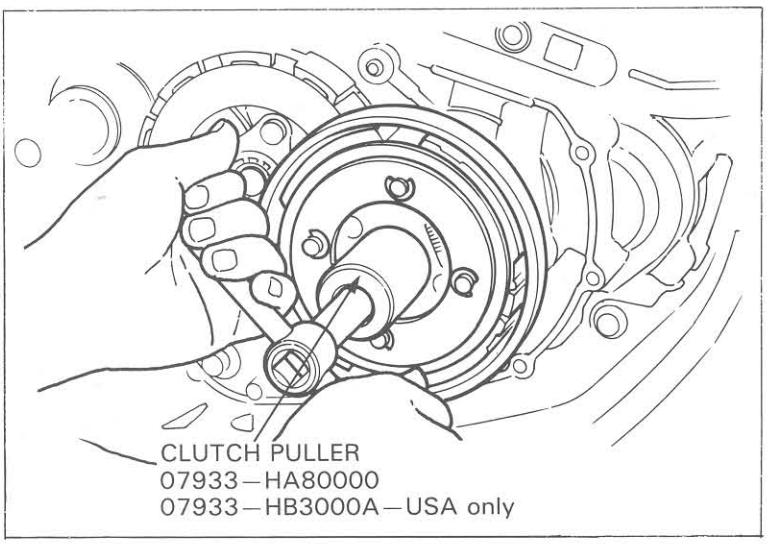
The lock nut has left hand threads.



Remove the centrifugal clutch weight assembly and drum with a clamping two jaw puller or clutch puller 07933—HA80000.

NOTE

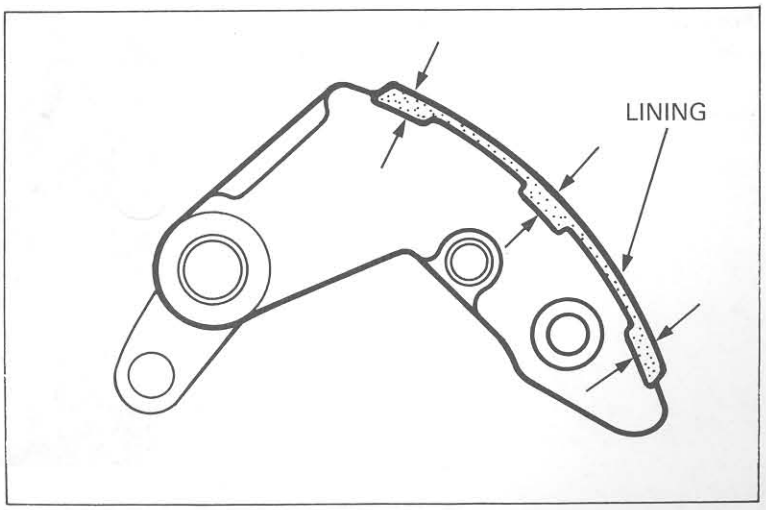
- Jaws must be clamping type to ensure fit on clutch drum.



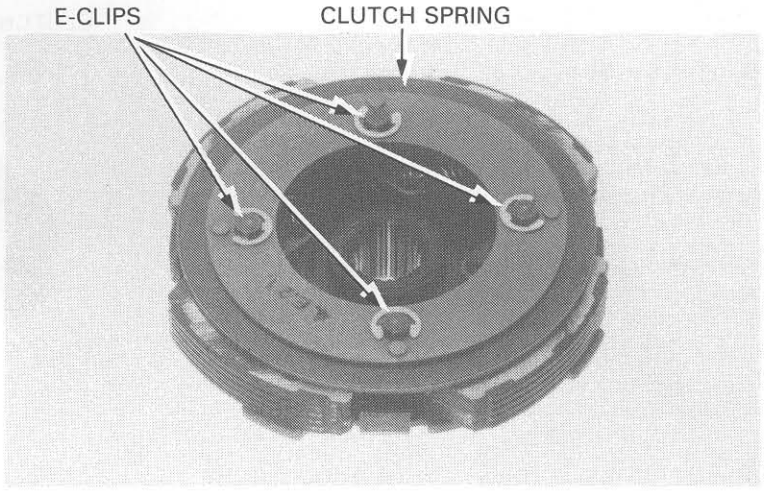
WEIGHT DISASSEMBLY/INSPECTION

Measure the weight lining thickness.

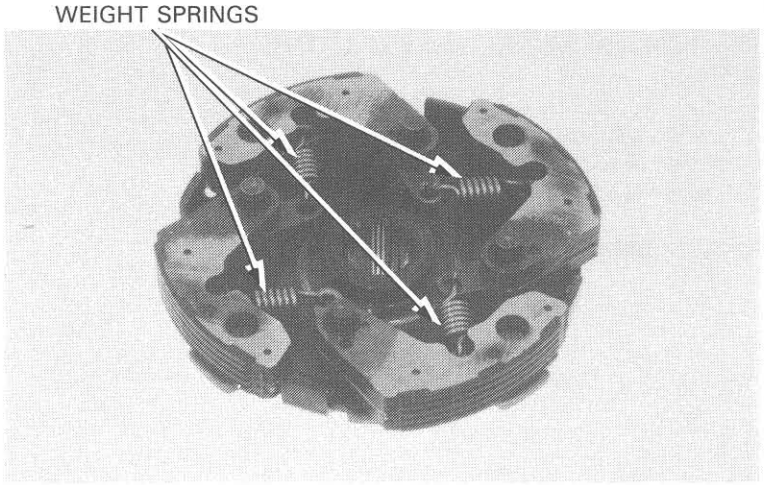
SERVICE LIMIT: 2.0 mm (0.08 in)



Remove the E-clips, washer, clutch spring and washer.



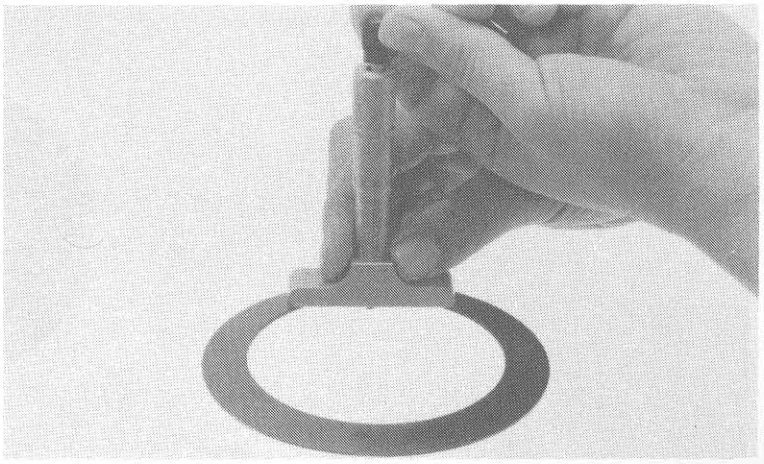
Check the weight springs for wear or damage. Replace if necessary.



Measure the height of the clutch spring.

SERVICE LIMIT: 3.55 mm (0.140 in)

Replace the spring if it is shorter than the service limit.



WEIGHT ASSEMBLY

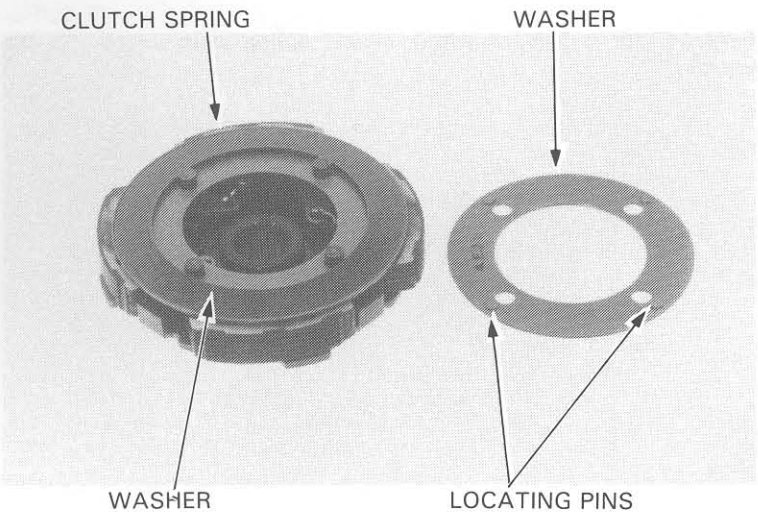
Install the washer.

NOTE

Install the clutch spring with the dished face towards the inside.

Install the outside washer with the locating pins facing out.

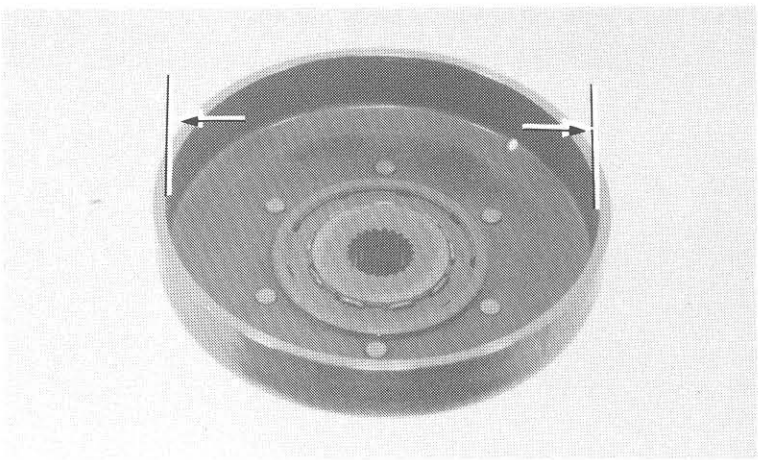
Install the E-clips aligning their gaps with the locating pins on the washer.



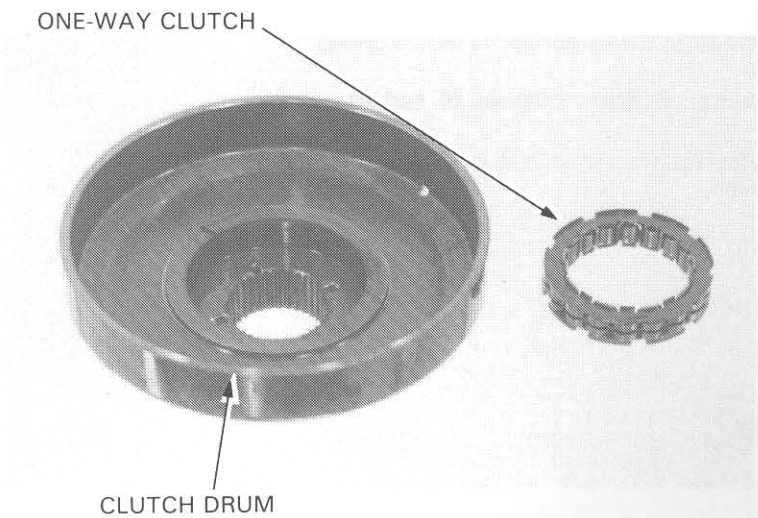
CLUTCH DRUM/ONE-WAY CLUTCH SPRING

Check the inside of the centrifugal clutch drum for scratches or excessive wear. Replace if necessary. Measure the I.D. of the clutch drum.

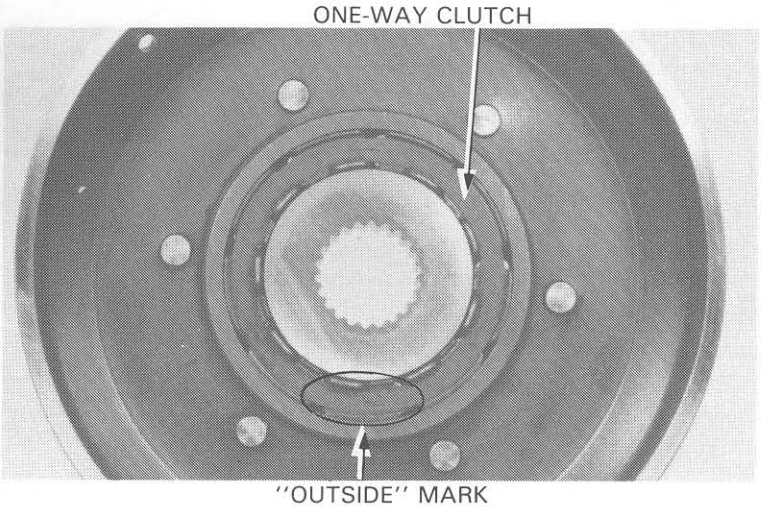
SERVICE LIMIT: 140.2 mm (5.25 in)



Inspect the one-way clutch for smooth operation. Check the rollers for excessive wear.

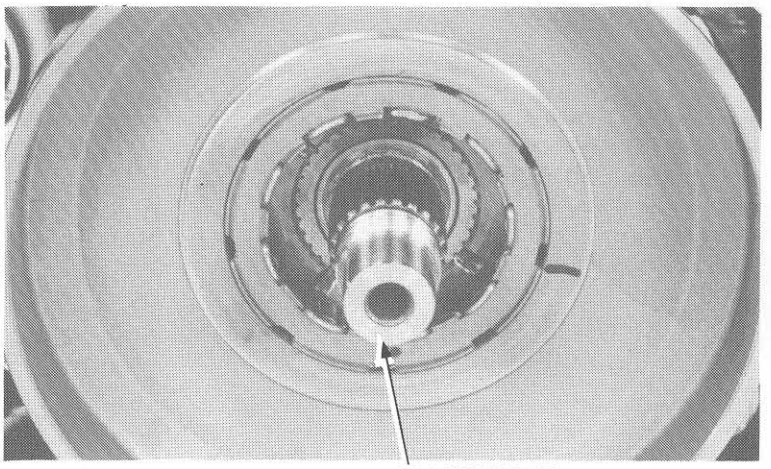


Install the one-way clutch into the clutch drum with its "OUTSIDE" mark facing out.



INSTALLATION

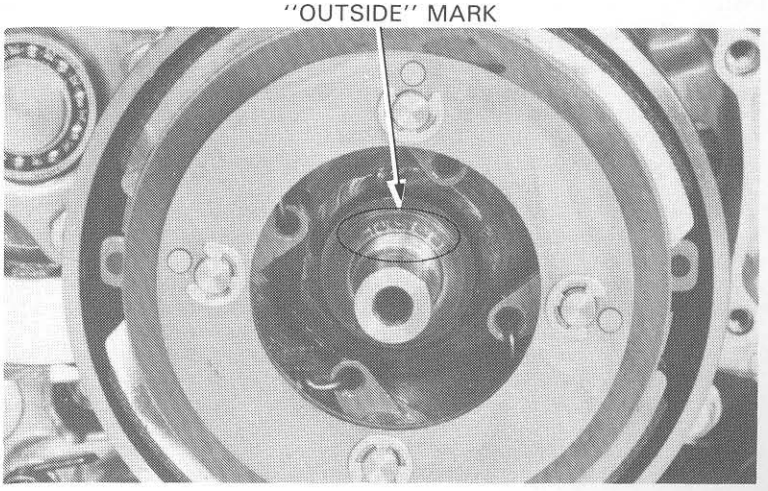
Install the centrifugal clutch drum with the one-way clutch onto the crankshaft.



Install the centrifugal clutch weight assembly onto the clutch drum without the lock washer and tighten the lock nut.
But do not tighten it securely.
Remove the lock nut and install the lock washer.

NOTE

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

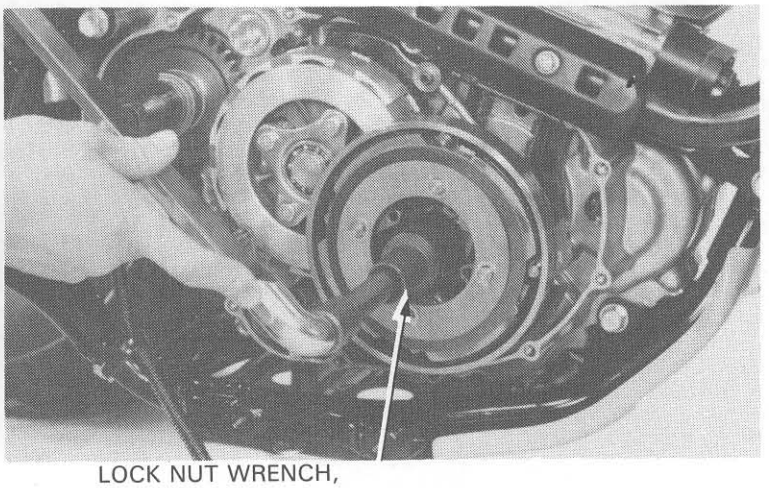


Apply thread locking agent to the lock nut and tighten it.

TORQUE: 110—130 N·m
(11.0—13.0 kg-m, 80—94 ft-lb)

NOTE

- The lock nut has left hand threads.
- Hold the flywheel with the flywheel holder or strap wrench.

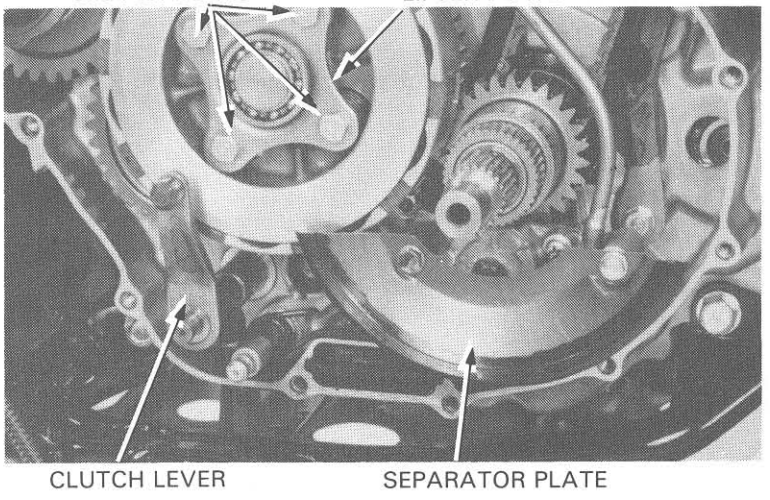


LOCK NUT WRENCH,
17 x 27 mm 07716—0020300
OR COMMERCIALLY AVAILABLE IN U.S.A.

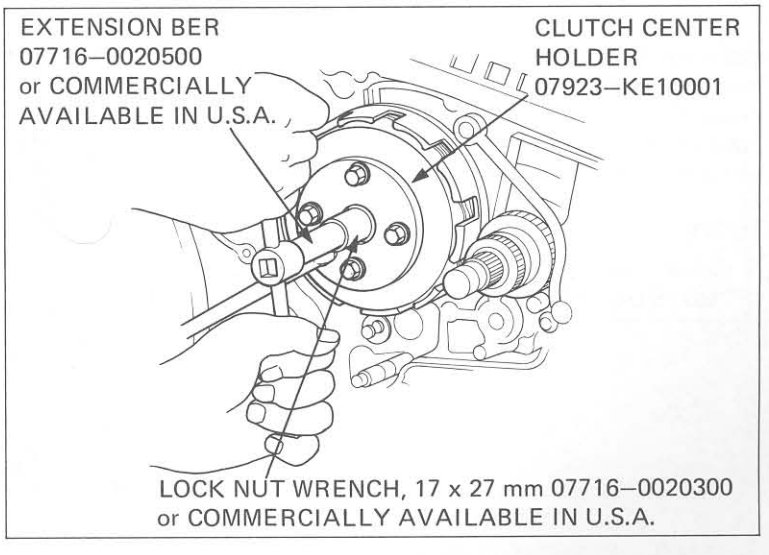
MANUAL CLUTCH

REMOVAL

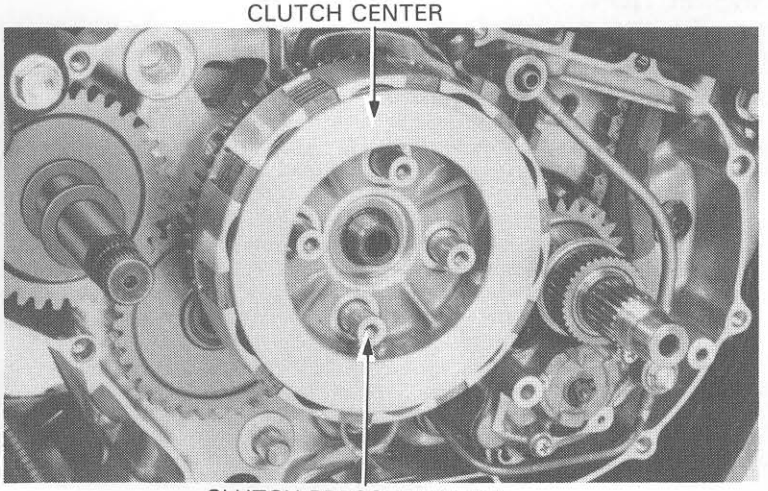
Remove the following:
—right crankcase cover (page 8-3).
—centrifugal clutch (page 8-10).
—separator plate.
—clutch lever.
—clutch bolts.
—lifter plate.
—clutch springs.



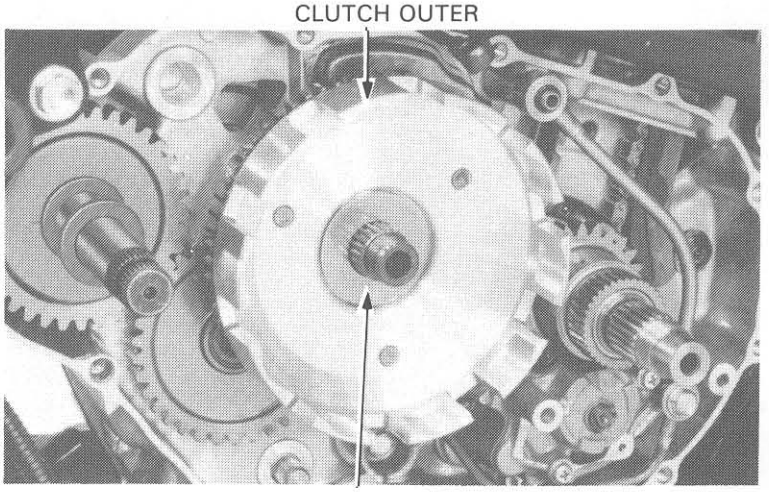
Install the clutch center holder as shown, and remove the clutch lock nut.



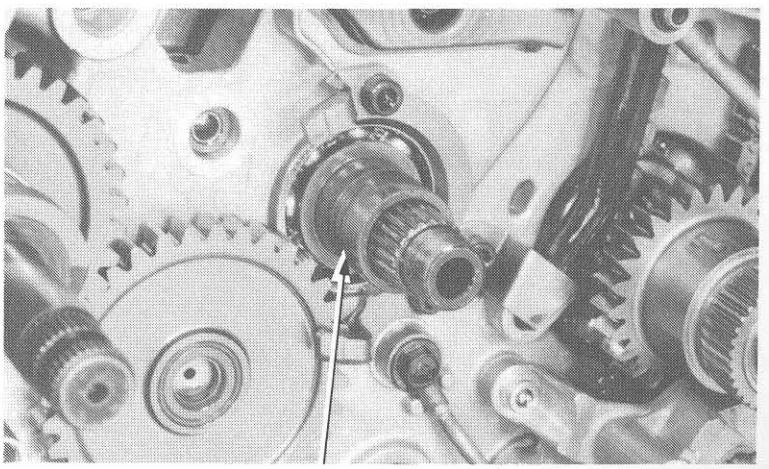
Remove the lock washer, clutch center, discs, plates and pressure plates.



Remove the thrust washer and clutch outer.



Remove the clutch outer guide from the mainshaft.

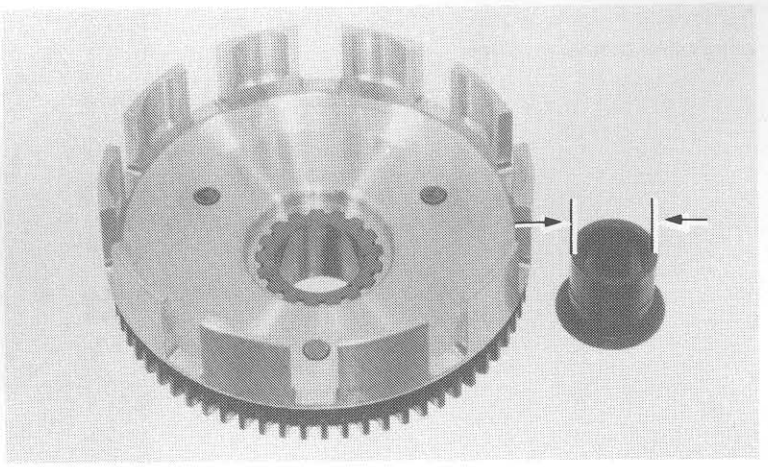


INSPECTION

Check the slots of the clutch outer for damage or wear made by the clutch discs. Replace if necessary.

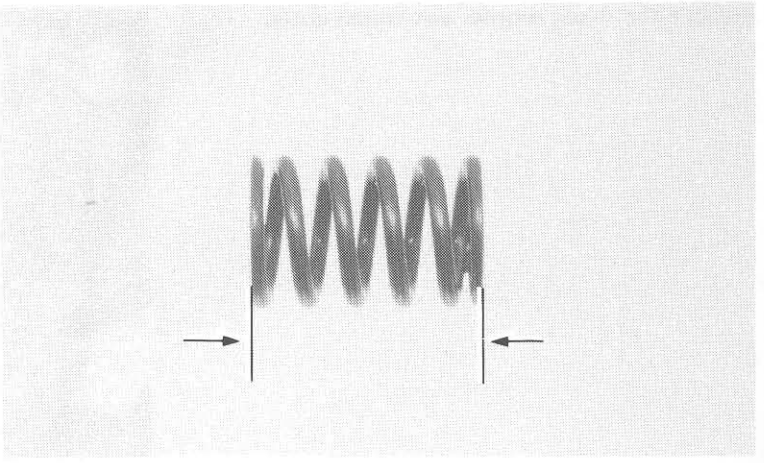
Measure the O.D. of the clutch outer guide.

SERVICE LIMIT: 27.92 mm (1.099 in)



Measure the spring free length.

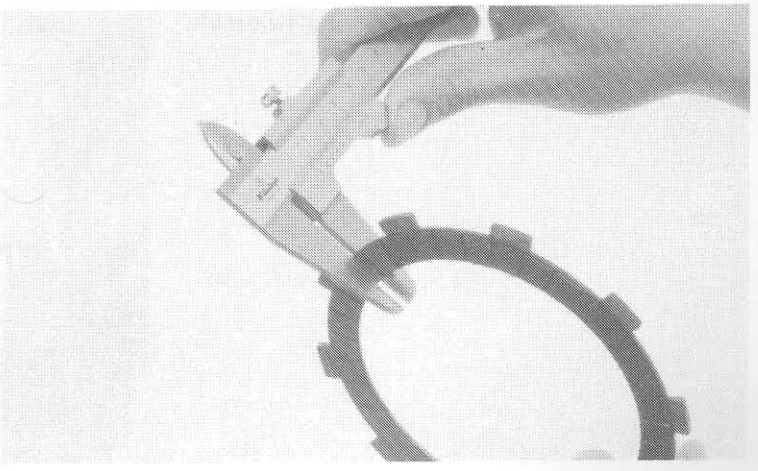
SERVICE LIMIT: 34.0 mm (1.34 in)



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

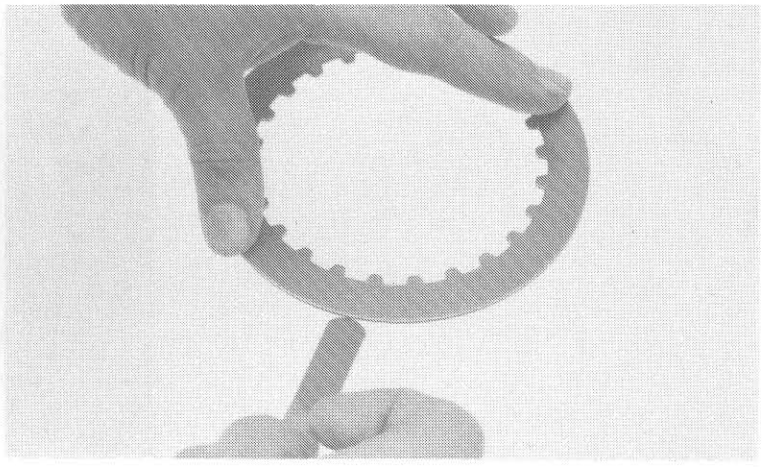
Measure the disc thickness.

SERVICE LIMIT: 2.3 mm (0.09 in)



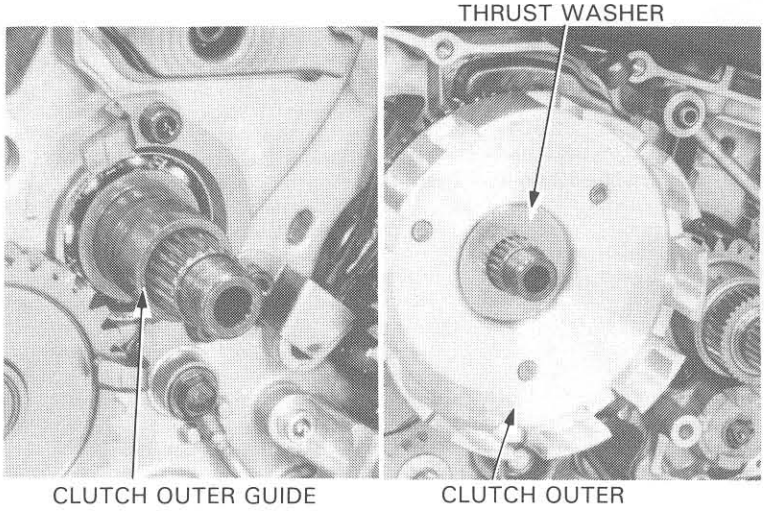
Check for plate and disc warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.20 mm (0.008 in)



INSTALLATION

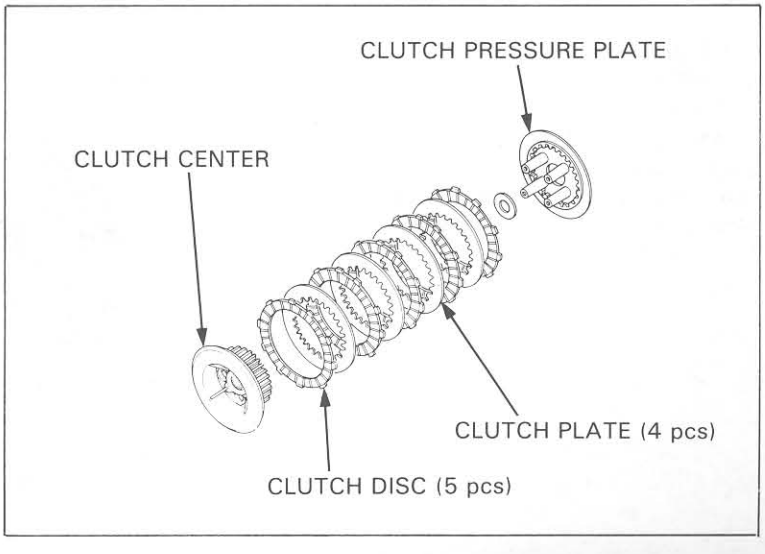
Install the clutch outer guide, clutch outer and thrust washer.



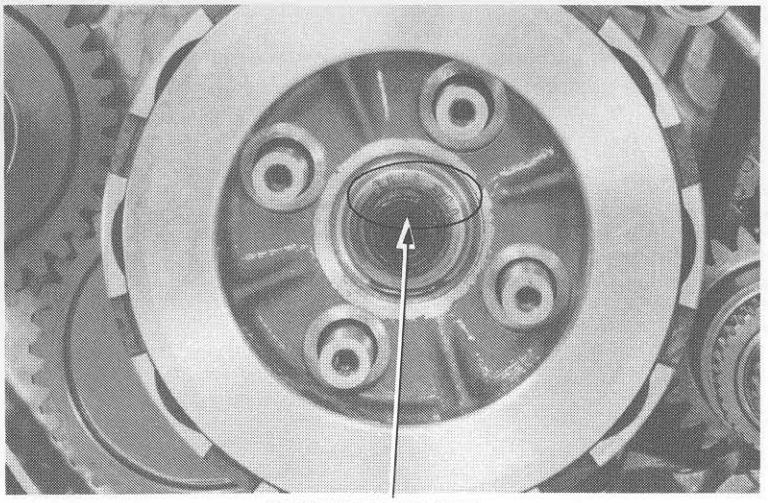
Assemble the clutch pressure plate, discs, plates and clutch center.

NOTE

- Stack the discs and plates alternately.
- Coat new clutch discs with engine oil.



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

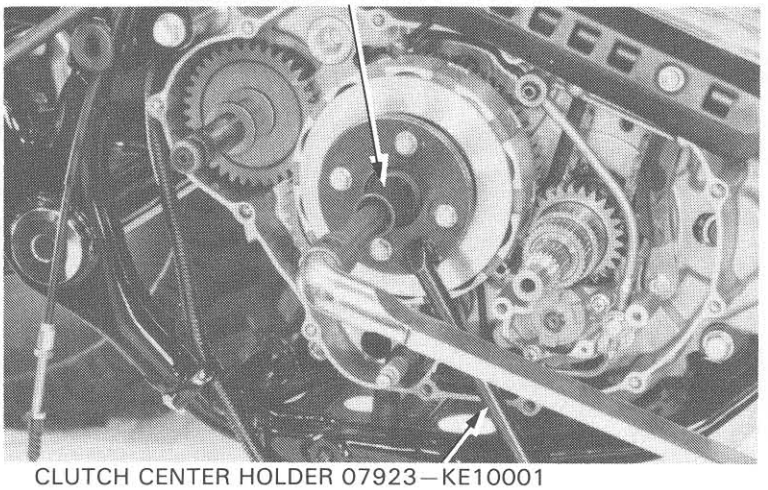


"OUTSIDE" MARK

LOCK NUT WRENCH,
17 x 27 mm 07716—0020300 OR
COMMERCIALLY AVAILABLE IN U.S.A.

Clean any grease or dirt off the shaft and apply thread locking agent to the lock nut.
Tighten the lock nut.

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

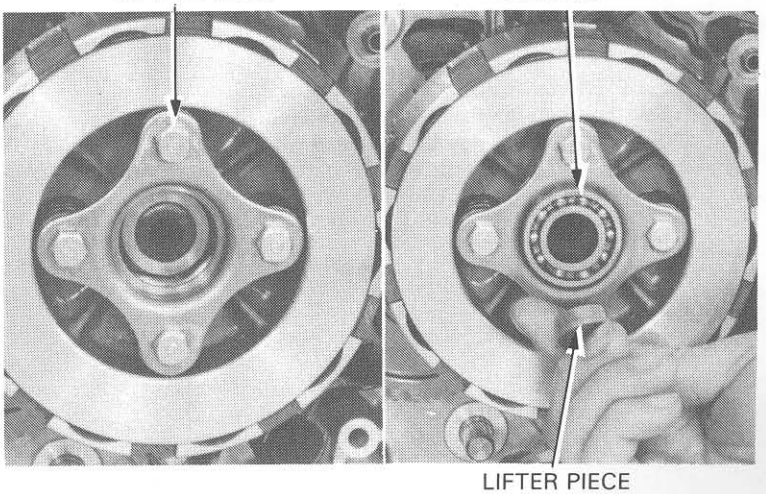


CLUTCH CENTER HOLDER 07923—KE10001

LIFTER PLATE

BEARING

Install the following:
—clutch springs and lifter plate and tighten the clutch lifter bolts.
—bearing and lifter piece
—centrifugal clutch (page 8-13).
—separator plate and clutch lever.
—right and left crankcase cover.

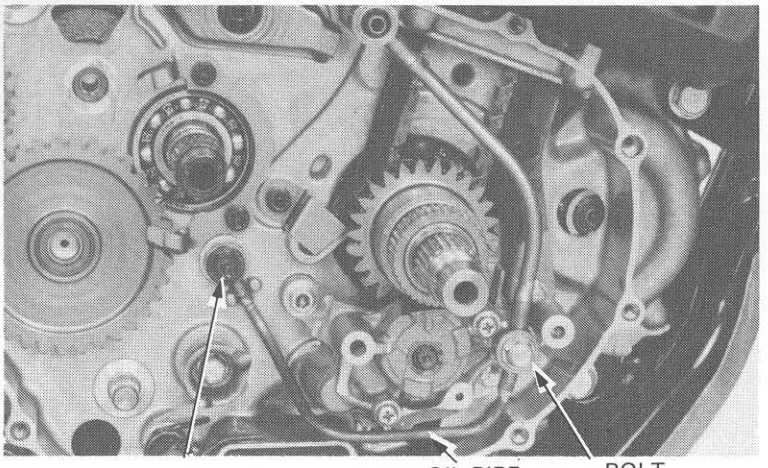


LIFTER PIECE

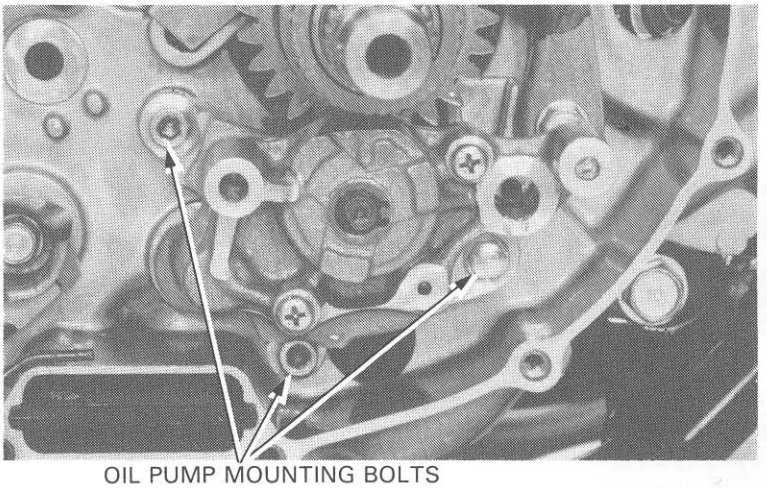
OIL PUMP/PRIMARY DRIVE GEAR

REMOVAL

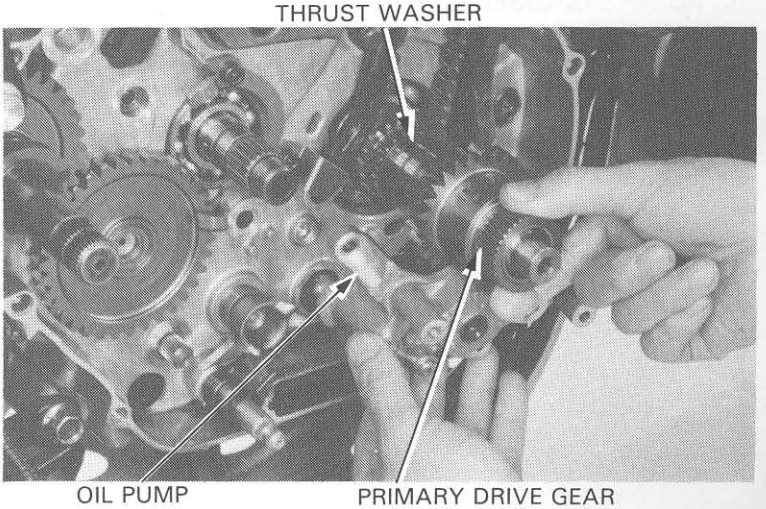
Remove the following:
—centrifugal clutch (page 8-10)
—manual clutch (page 8-14)
—bolts and oil pipe



Remove the oil pump mounting bolts.



Remove the oil pump, primary drive gear and thrust washer.
Remove the O-ring and two dowel pins.

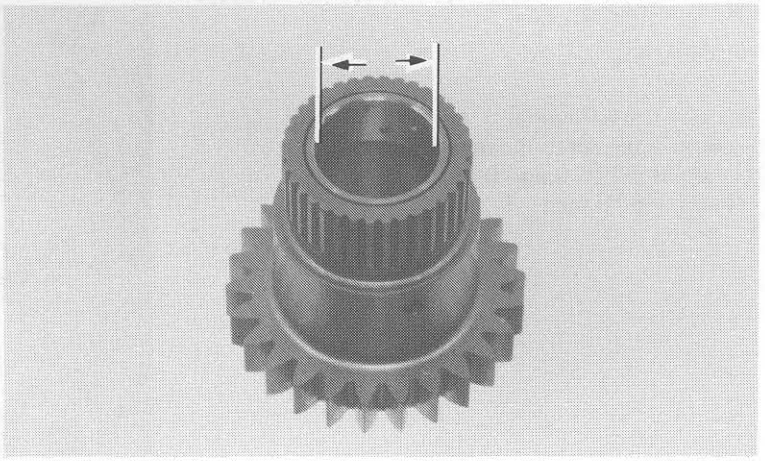


PRIMARY DRIVE GEAR INSPECTION

Inspect the primary drive gear for damage or excessive wear.

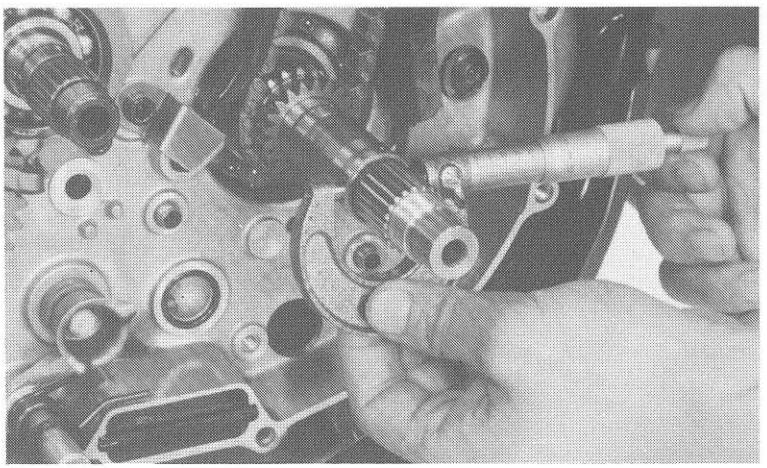
Measure the primary drive gear I.D.

SERVICE LIMIT: 24.05 mm (0.947 in)



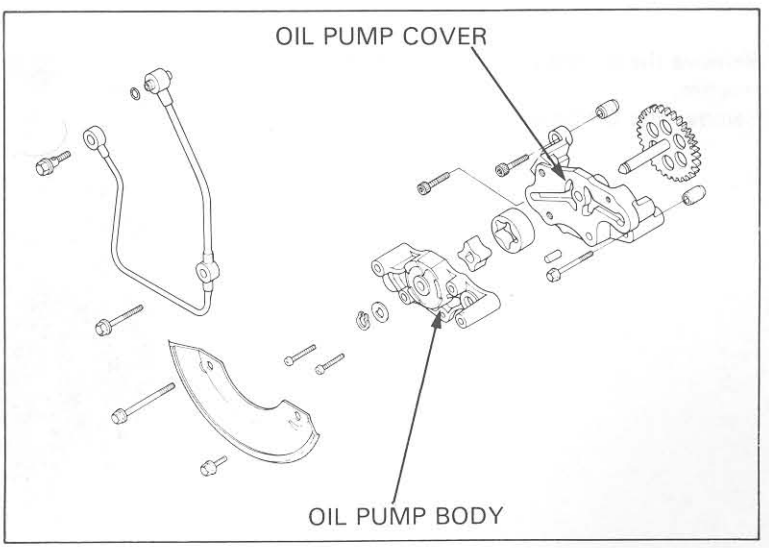
Measure the crankshaft O.D.

SERVICE LIMIT: 23.93 mm (0.942 in)



OIL PUMP DISASSEMBLY

Remove the E-clip from the oil pump driven gear.
Remove the oil pump body mounting screws.



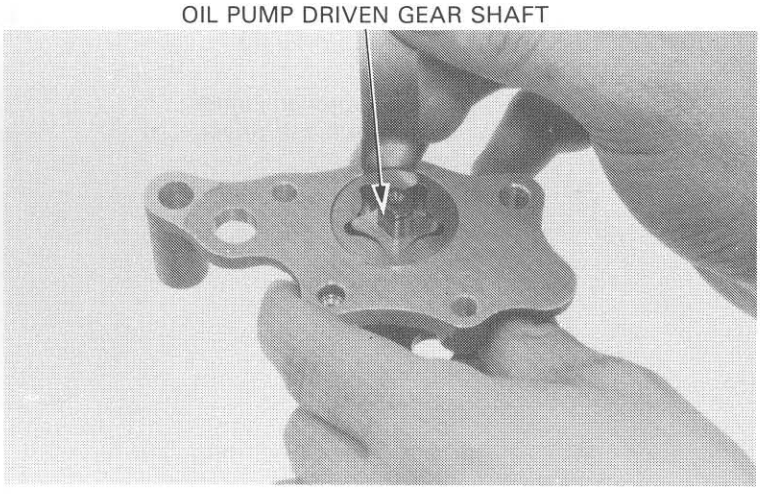
OIL PUMP INSPECTION

Install the outer and inner rotors into the body and insert the oil pump driven gear shaft.

Measure the pump body-to-rotor clearance.

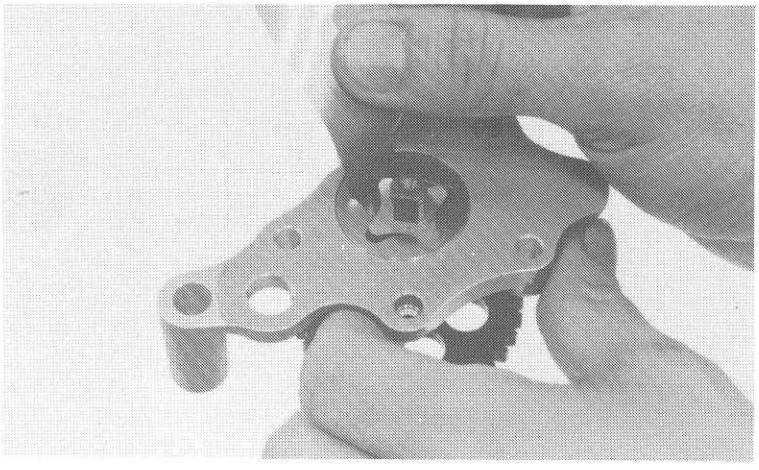
SERVICE LIMIT: 0.25 mm (0.010 in)

Clean the oil pass pipe.



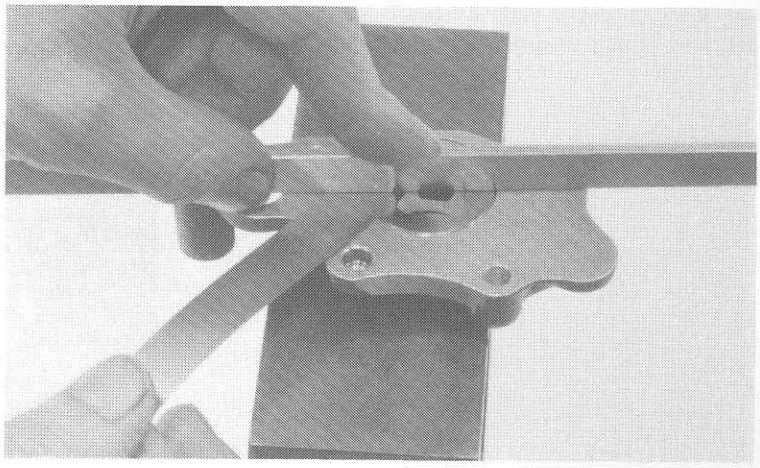
Measure the pump rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



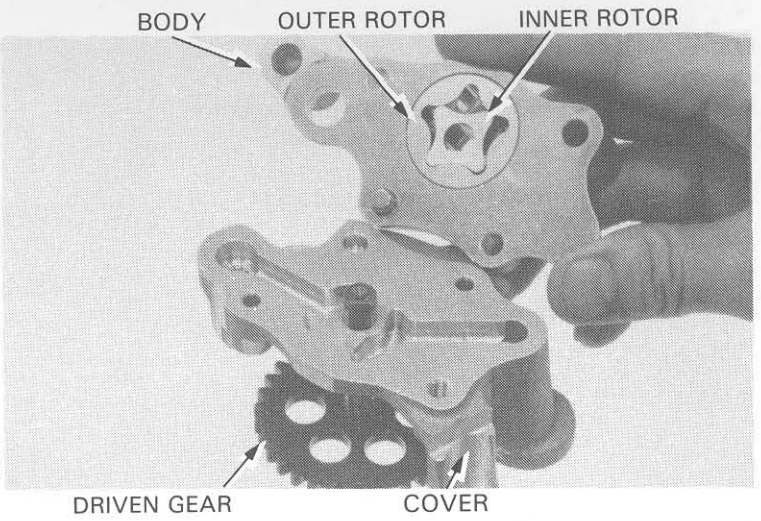
Remove the oil pump driven gear shaft from the oil pump body.
Measure the pump end clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

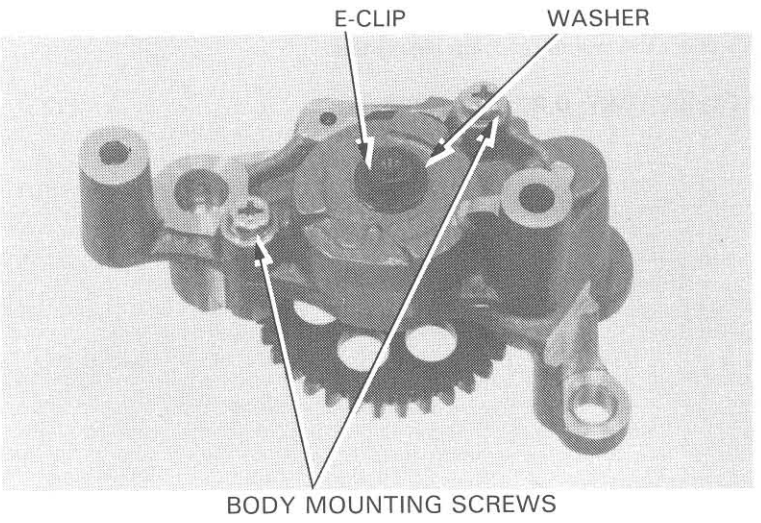


OIL PUMP ASSEMBLY/INSTALLATION

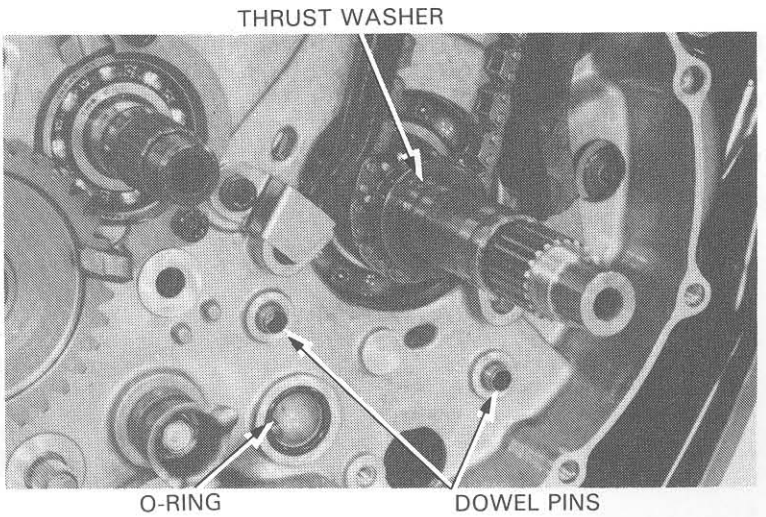
Assemble the oil pump body with outer and inner rotors onto the oil pump cover with the driven gear.



Install the washer, E-clip and oil pump body mounting screws as shown.



Install the thrust washer on the crankshaft and O-ring, dowel pins into the right crankcase.



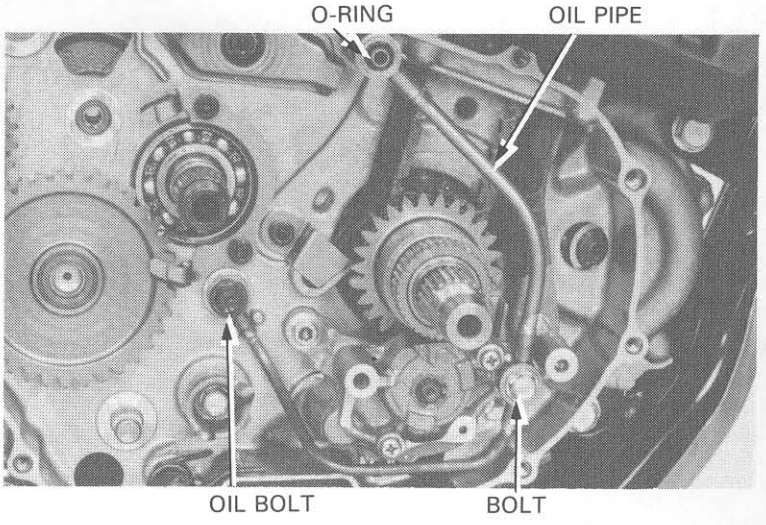
Install the oil pump and primary drive gear together and tighten the pump bolts.

Install the oil pipe with oil bolt, bolt and O-ring.

Tighten the oil bolt.

TORQUE: '85: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
After '85: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)

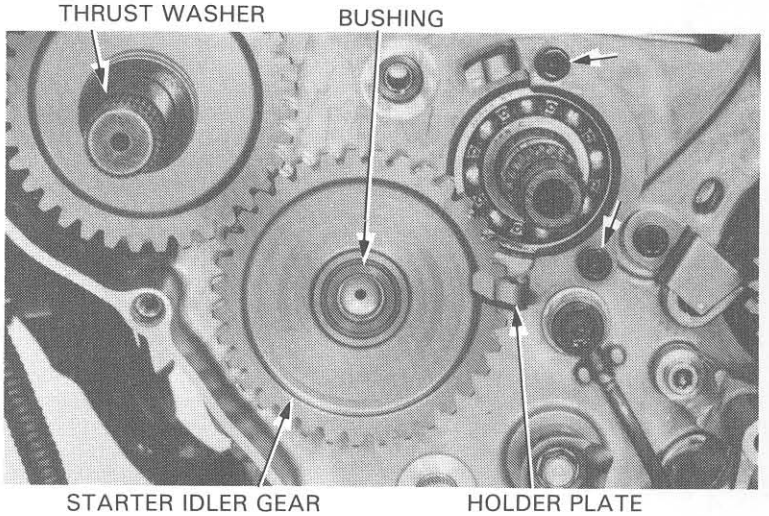
Install the removed parts in the reverse order of removal.



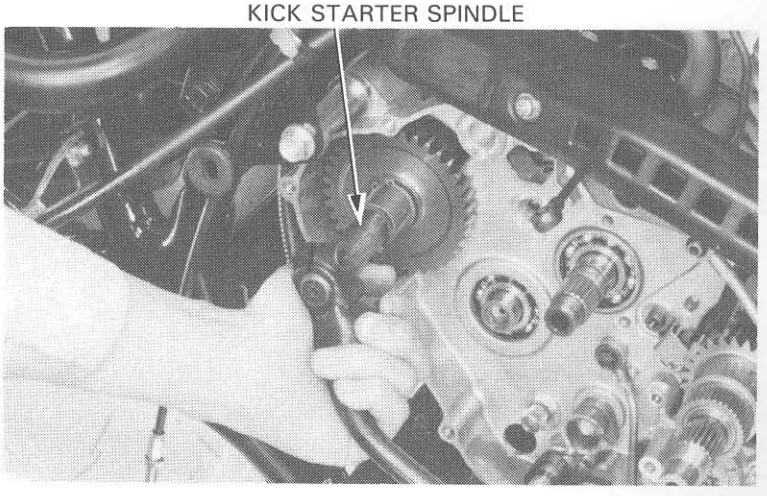
KICK STARTER

REMOVAL

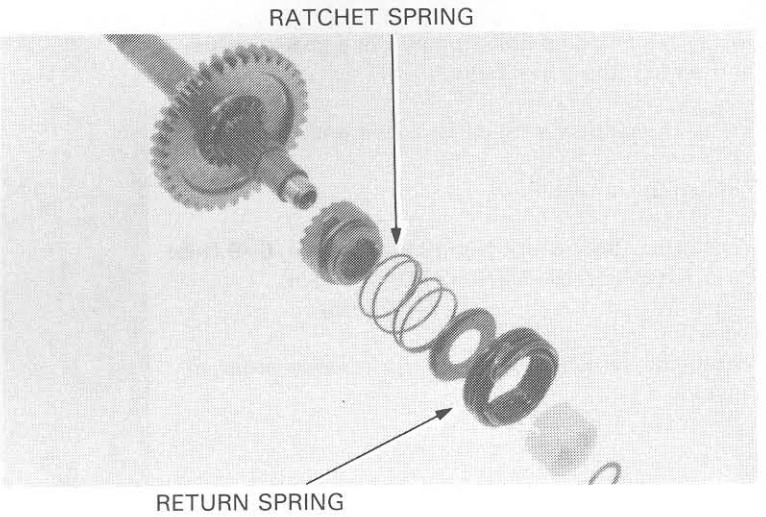
Remove the following:
- —right crankcase cover (page 8-3).
- —manual clutch (page 8-14).
- —holder plate mount bolts and plate.
- —starter idler gear and bushing.
- —thrust washer.



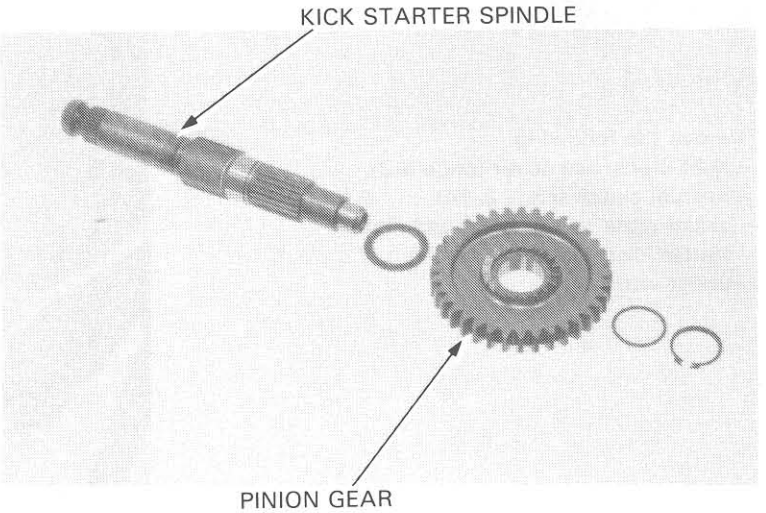
Turn the kick starter spindle clockwise to free the ratchet from the ratchet guide and remove it.



Remove the washer, collar, starter return spring, spring retainer, ratchet and ratchet spring.



Remove the circlip and disassemble the pinion gear and washers.



INSPECTION

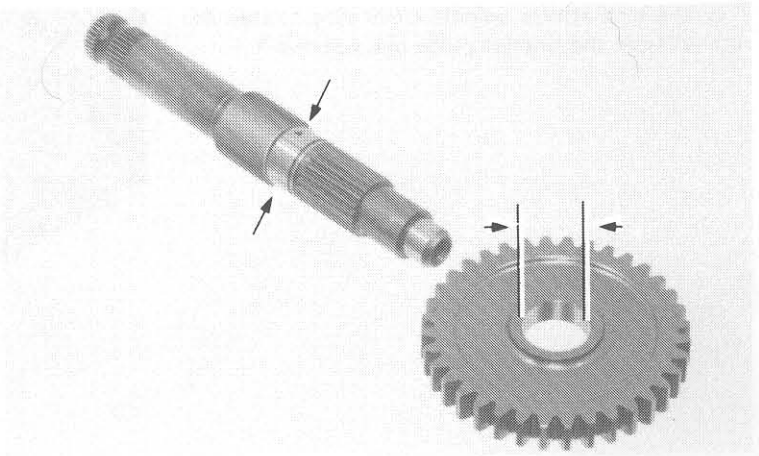
Measure the kick starter spindle O.D.

SERVICE LIMIT: 21.90 mm (0.862 in)

Inspect the pinion for damaged ratchet teeth.

Measure the kick starter pinion I.D.

SERVICE LIMIT: 22.10 mm (0.870 in)



Measure the kick starter idler gear I.D.

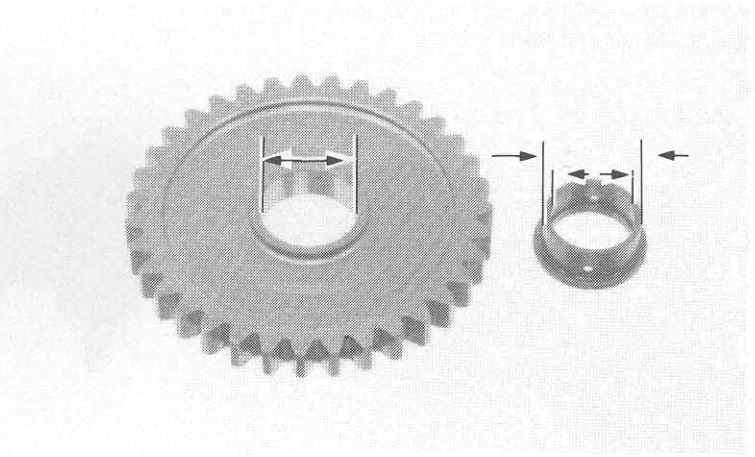
SERVICE LIMIT: 23.07 mm (0.908 in)

Measure the kick starter idler gear bushing I.D.

SERVICE LIMIT: 20.05 mm (0.789 in)

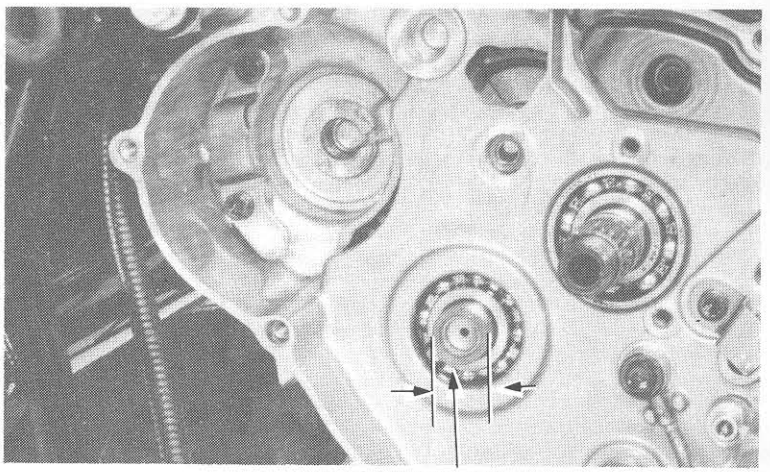
Measure the kick starter idler gear bushing O.D.

SERVICE LIMIT: 22.93 mm (0.903 in)



Measure the countershaft O.D.

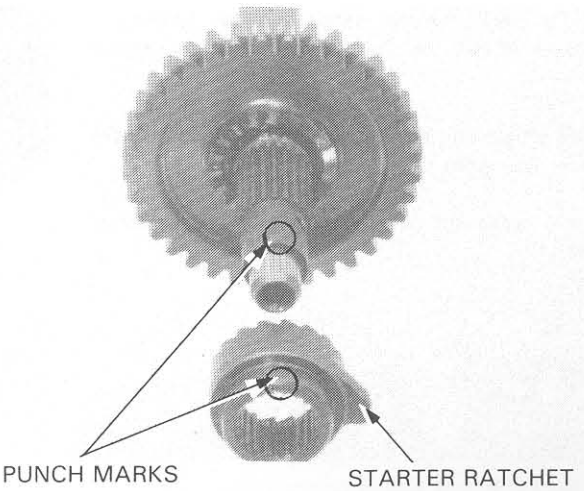
SERVICE LIMIT: 19.95 mm (0.785 in)



COUNTERSHAFT

INSTALLATION

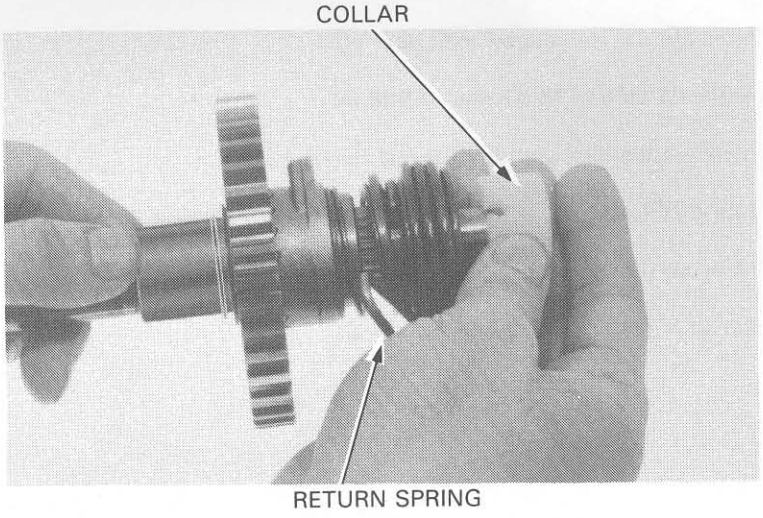
Install the inner thrust washer and pinion gear on the kick starter spindle.
Install the outer thrust washer and circlip.
Install the starter ratchet on the spindle while aligning their punch marks.



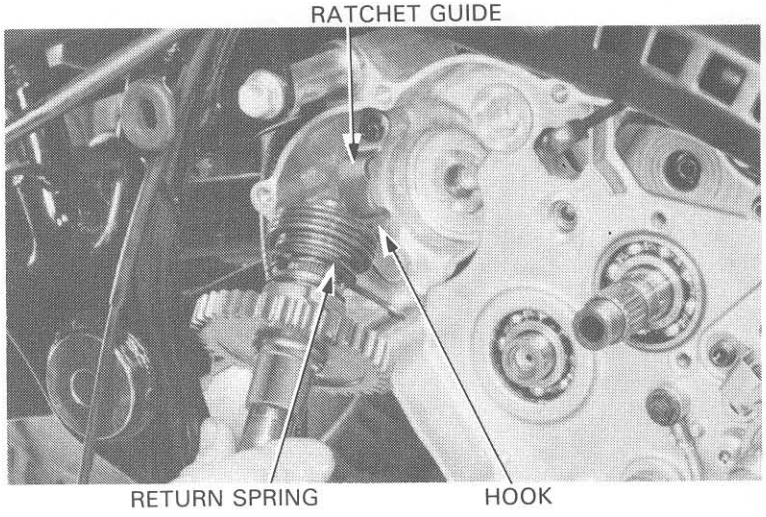
PUNCH MARKS

STARTER RATCHET

Assemble the ratchet spring, spring retainer, return spring, collar and washer.



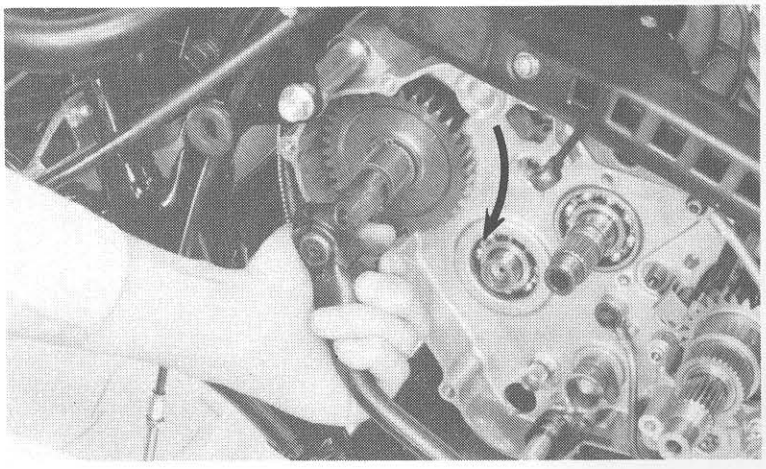
Hook the return spring onto the crankcase.



Install the kick starter assembly by turning it clockwise and aligning the ratchet with the ratchet guide.

Make sure that the punch mark on the end of the spindle is facing up.

Install the removed parts in the reverse order of removal.

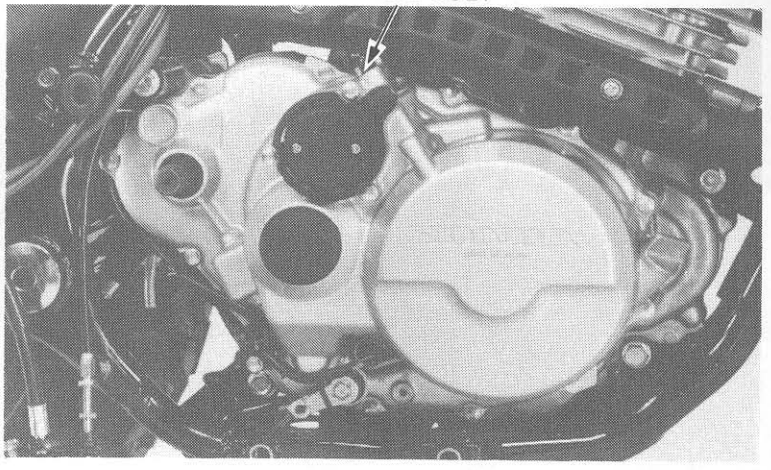


RIGHT CRANKCASE COVER INSTALLATION

Install the dowel pins and gasket.

Install the right crankcase cover and bolts.
Tighten the cover mounting bolts.
Install the oil bolt with two sealing washers.

TORQUE:
8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
After '85: 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

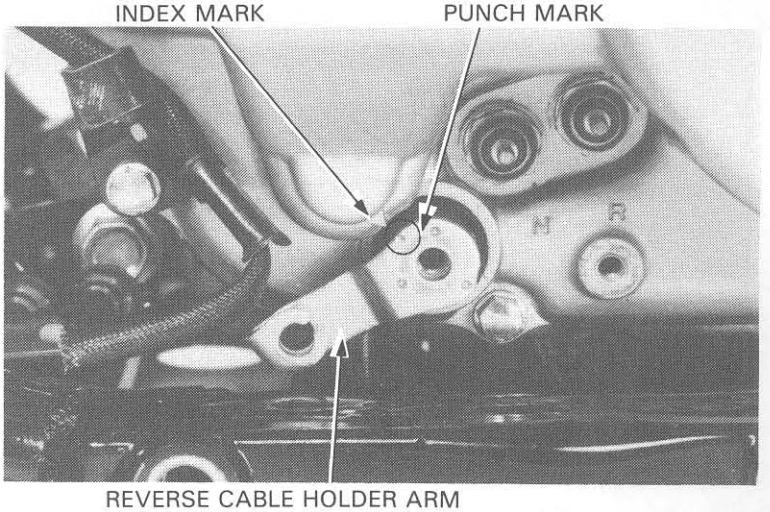


Install the reverse cable holder arm onto the reverse shaft. Be sure the punch mark aligns with the index mark.

Connect the neutral and reverse wires to the switches.

WARNING

Connect the light green/red wire to the neutral switch and the grey wire to the reverse switch

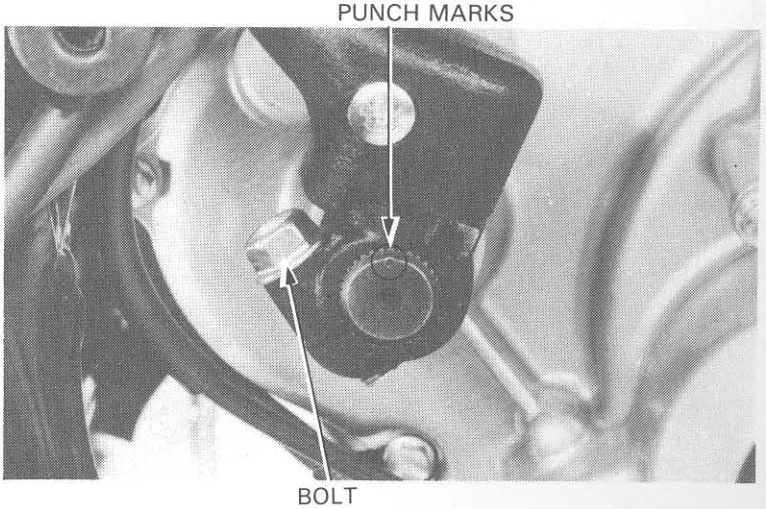


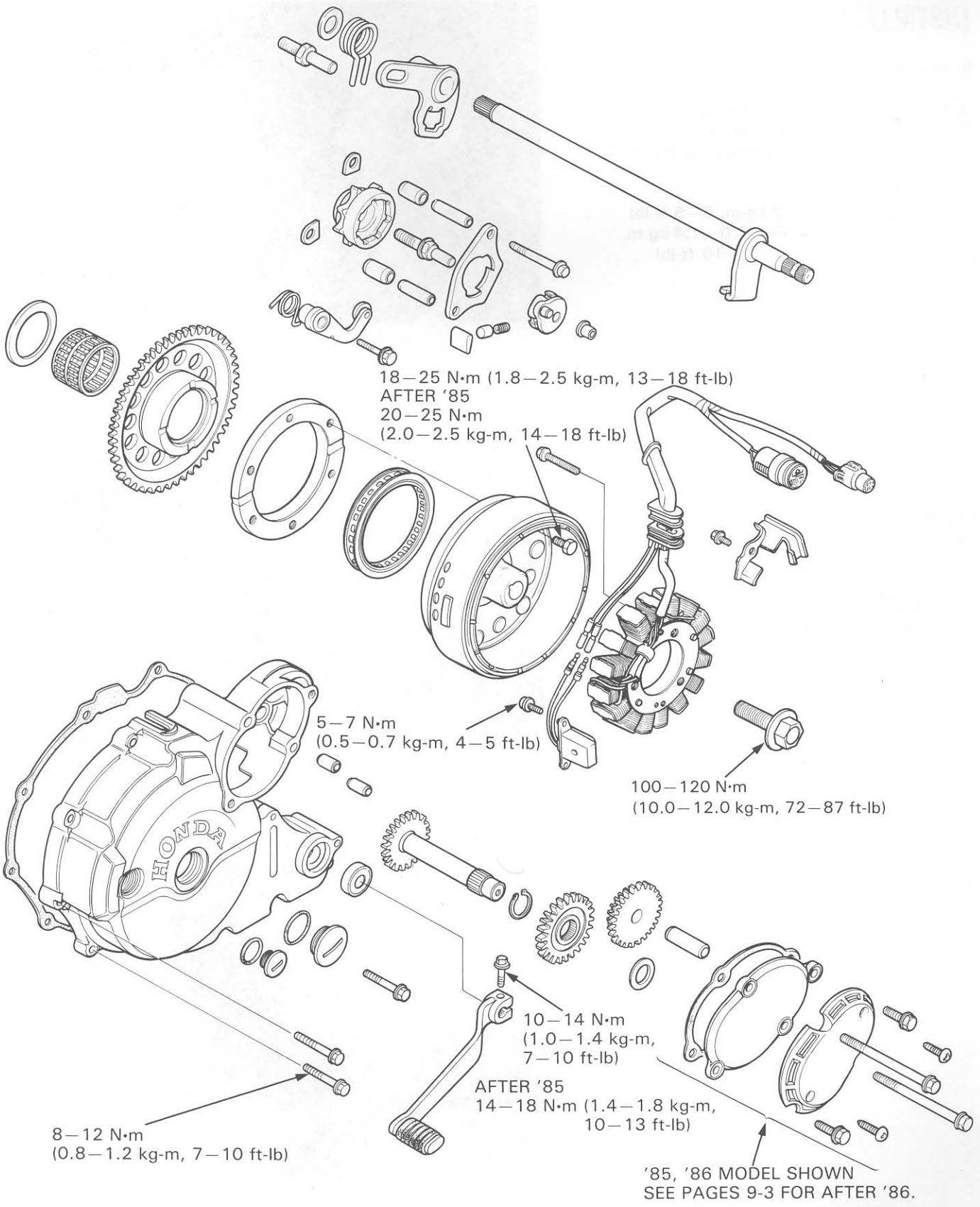
Install the following:

—reverse cable.
—neutral and reverse switch cover.
—kick starter pedal by aligning the punch marks.
—foot peg with bolts.
—right frame side cover.

Adjust the clutch (page 3-11).
Adjust the reverse cable (page 3-13).
Fill the engine with oil. Check the clutch and reverse gear for smooth operation.

Check for oil leaks.




18—25 N·m (1.8—2.5 kg-m, 13—18 ft-lb)
AFTER '85
20—25 N·m
(2.0—2.5 kg-m, 14—18 ft-lb)
5—7 N·m
(0.5—0.7 kg-m, 4—5 ft-lb)
100—120 N·m
(10.0—12.0 kg-m, 72—87 ft-lb)
HONDA
10—14 N·m
(1.0—1.4 kg-m,
7—10 ft-lb)
AFTER '85
14—18 N·m (1.4—1.8 kg-m,
10—13 ft-lb)
8—12 N·m
(0.8—1.2 kg-m, 7—10 ft-lb)
'85, '86 MODEL SHOWN
SEE PAGES 9-3 FOR AFTER '86.

9. ALTERNATOR/STARTER CLUTCH/ GEARSHIFT LINKAGE

SERVICE INFORMATION

GENERAL

This section covers removal and installation of the starter reduction gear, alternator, stater clutch and gearshift linkage. Refer to Section 15 for alternator inspection.

TORQUE VALUES

Flywheel bolt		100—120 N·m (10.0—12.0 kg-m, 72—87 ft-lb)
Starter clutch torx bolt		18—25N·m (1.8—2.5 kg-m, 13—18 ft-lb)
	After '85:	20—25 N·m (2.0—2.5 kg-m, 14—18 ft-lb)
Foot peg bolt		40—50 N·m (4.0—5.0 kg-m, 29—36 ft-lb)
Left crankcase cover SH bolt		8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Gear shift pedal bolt		10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)
	After '85:	14—18 N·m (1.4—1.8 kg-m, 10—13 ft-lb)
Alternator stator SH bolt		8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Pulse generator screw		5—7 N·m (0.5—0.7 kg-m, 4—5 ft-lb)

TOOLS

Special

Bearing remover set, 10 mm	07936—GE00000
Remover weight	07741—0010201 or 07936—3710200

Common

Flywheel holder	07725—0040000 or strap wrench, commercially available in U.S.A.
Rotor puller	07733—0020001 or 07933—3950000
Driver	07749—0010000
Attachment, 24 x 26 mm	07746—0010700

TROUBLESHOOTING

Engine does not turn
—Faultry one-way starter clutch

Transmission jumps out of gear
—Shift drum stopper broken

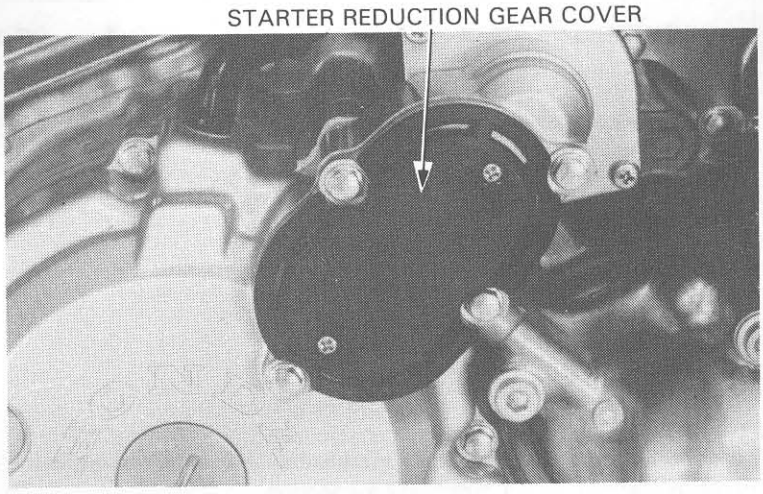
Hard to shift
—Shift drum cam plate damage

Gearshift pedal will not return
1. Weak or broken shift return spring
2. Shift spindle binding with case

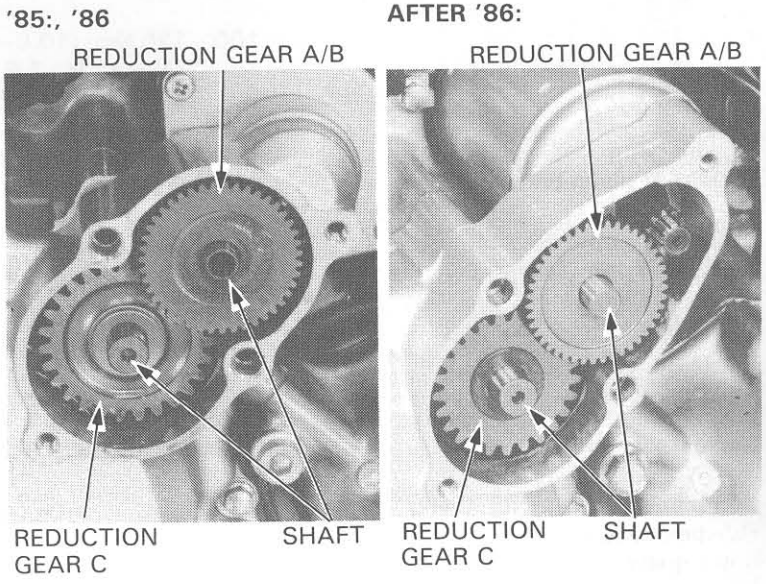
STARTER REDUCTION GEAR

REMOVAL

Remove the starter reduction gear cover bolts, cover, gasket and dowel pins.

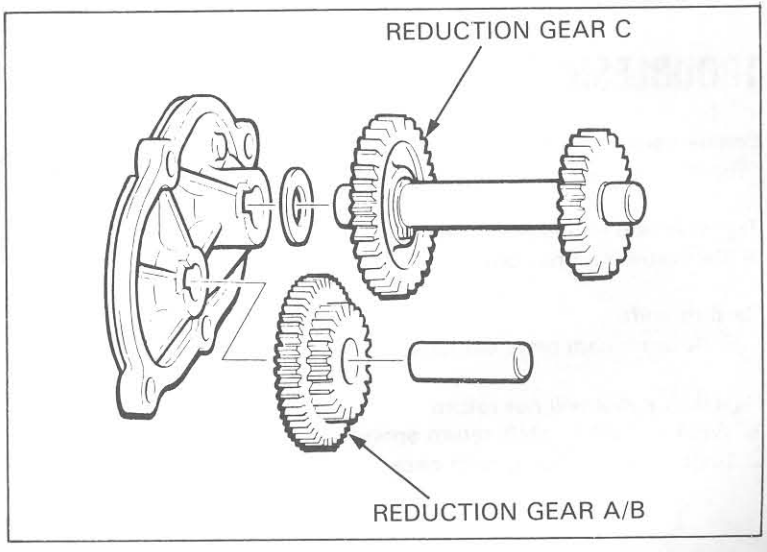


Remove the reduction gear A/B and shaft, starter reduction gear C and shaft.

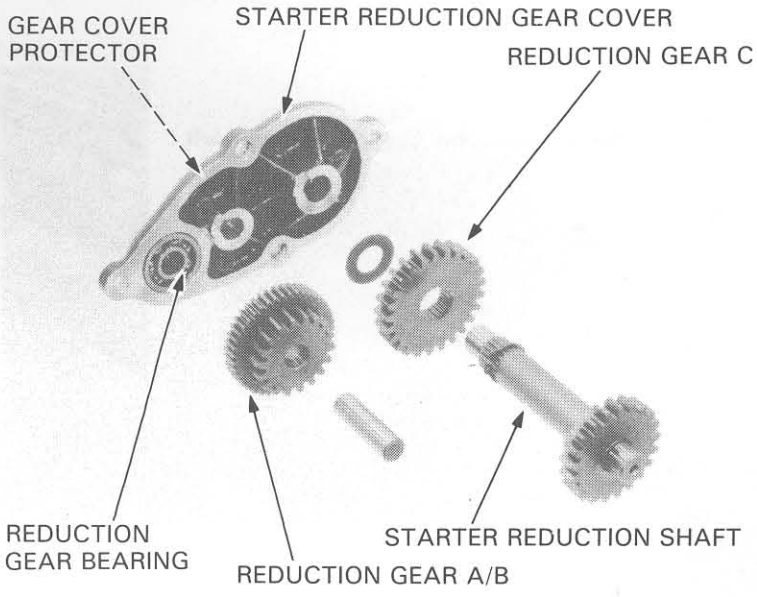


INSPECTION

'85:, '86:
Inspect the starter reduction gear teeth for wear or damage.



After '86:
Inspect the starter reduction gear teeth for wear or damage.
Check the reduction gear bearing for excessive play or damage and replace if necessary.



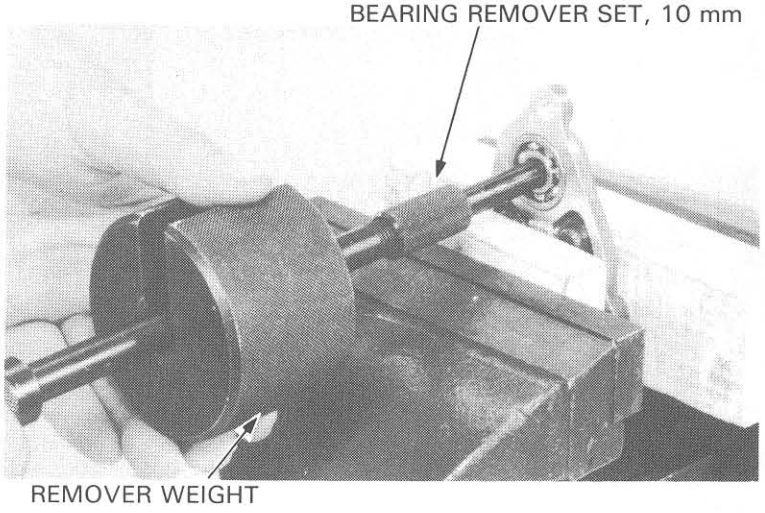
BEARING REPLACEMENT

After '86:
Remove the gear cover protector by removing the screws.
Remove the reduction gear bearing using the bearing remover tool.

TOOLS:

Bearing remover set, 10 mm	**07936—GE00000**
Remover wight	**07741—0010201 or 07936—3710200**

Drive the reduction gear bearing out from the starter reduction gear cover.

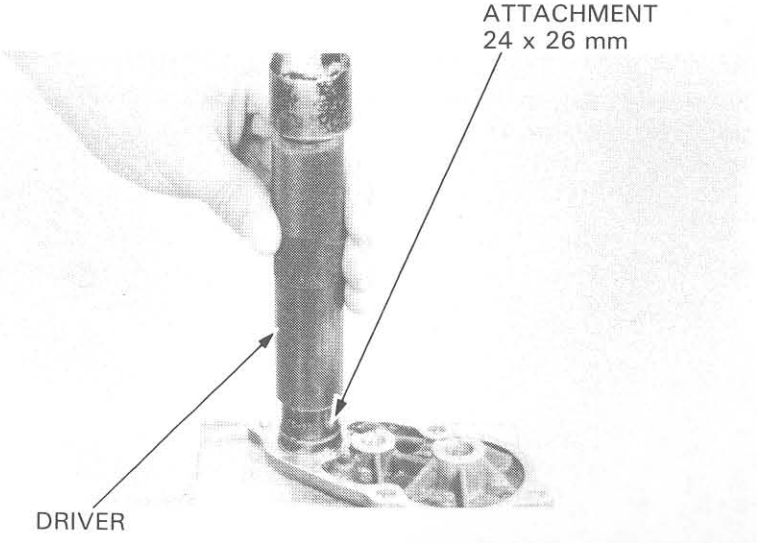


Drive the new bearing into the starter reduction gear cover.

TOOLS:

Driver	**07749—0010000**
Attachment, 24 x 26 mm	**07746—0010700**

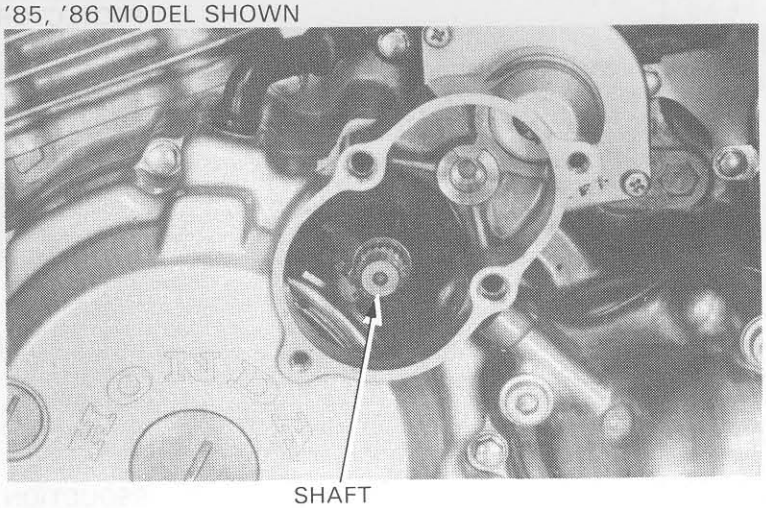
Install the gear cover protector with screws.



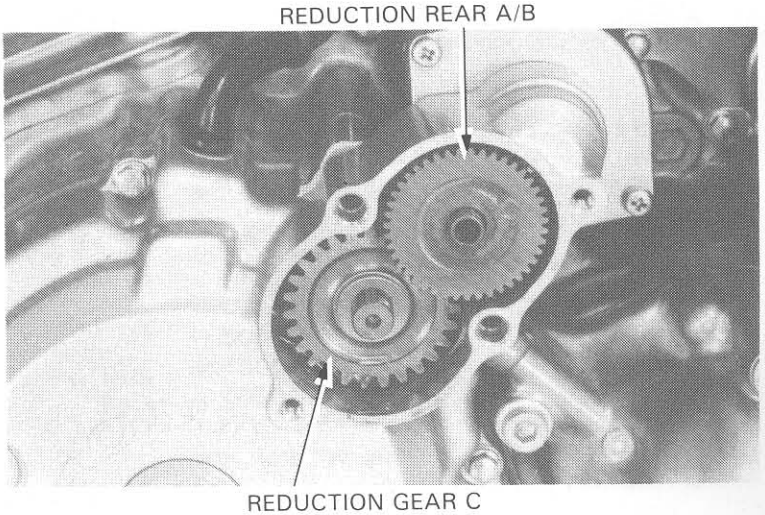
INSTALLATION

Install the starter reduction C shaft into the left crankcase.

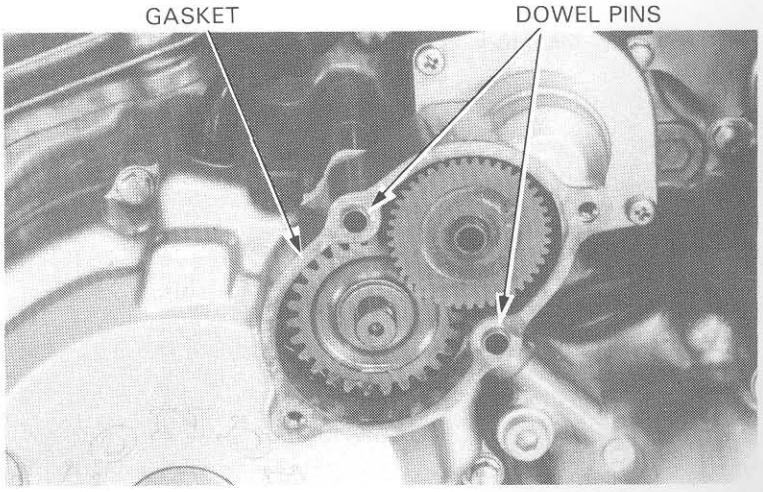
'85, '86 MODEL SHOWN



Install the starter reduction gear C, starter reduction gear A/B shaft and gear.



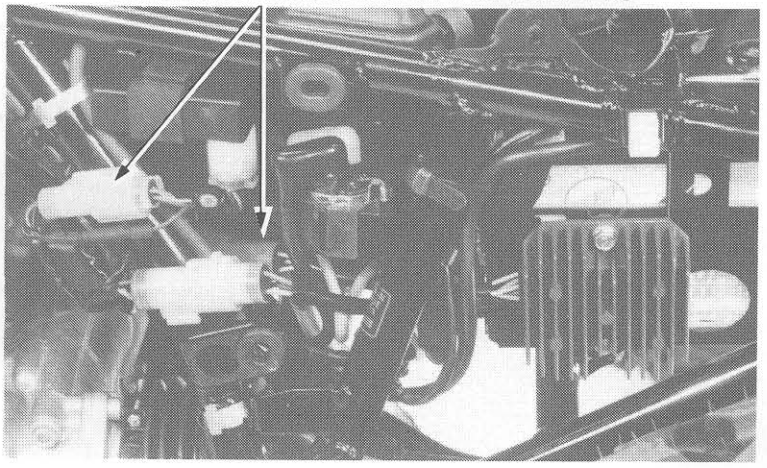
Install the gasket, dowel pins, and starter reduction gear cover with four bolts.



LEFT CRANKCASE COVER REMOVAL

Drain the oil from the engine.
Remove the left frame side cover, seat, gearshift pedal and left foot peg assembly.
Disconnect the alternator/pulse generator couplers.

ALTERNATOR/PULSE GENERATOR COUPLERS

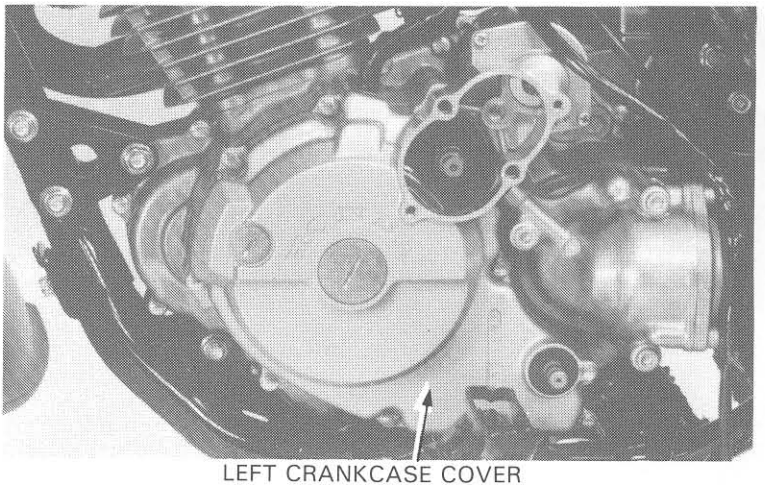


Remove the starter reduction cover and gears (page 9-2).
Remove the left crankcase cover mounting bolts and cover.

CAUTION

Do not force removal of the cover or the shift shaft seal will be damaged.
If the cover is difficult to remove, loosen the engine mount bolts and raise the engine to provide the necessary clearance to remove the cover.

Check the oil seal on the left crankcase cover for wear or damage.
Replace if necessary.



LEFT CRANKCASE COVER

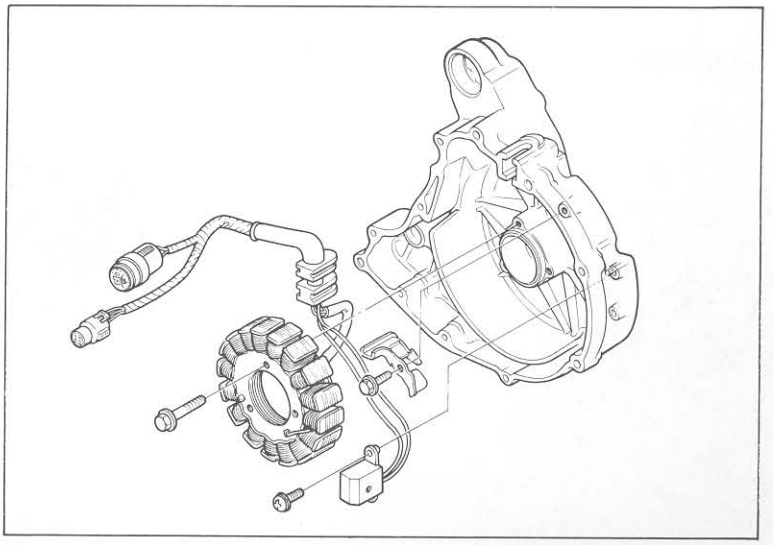
ALTERNATOR

STATOR/PULSE GENERATOR REMOVAL

Remove the wire clamp by removing the bolt.

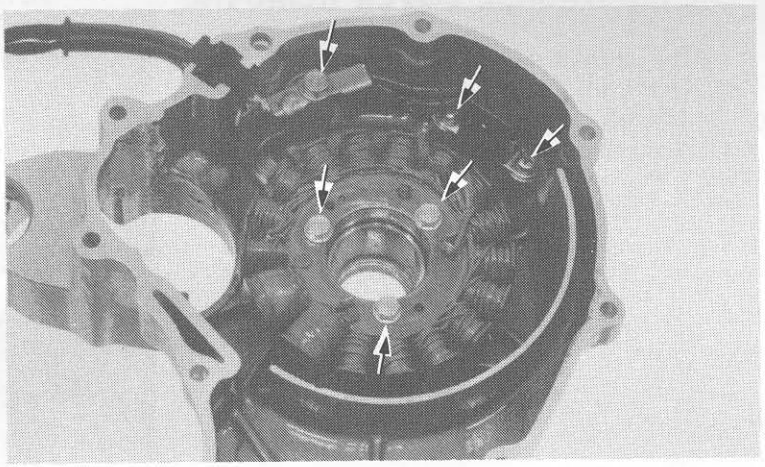
Remove the pulse generator mounting screws, disconnect the wire connector and remove the pulse generator.

Remove the three stator bolts and stator.



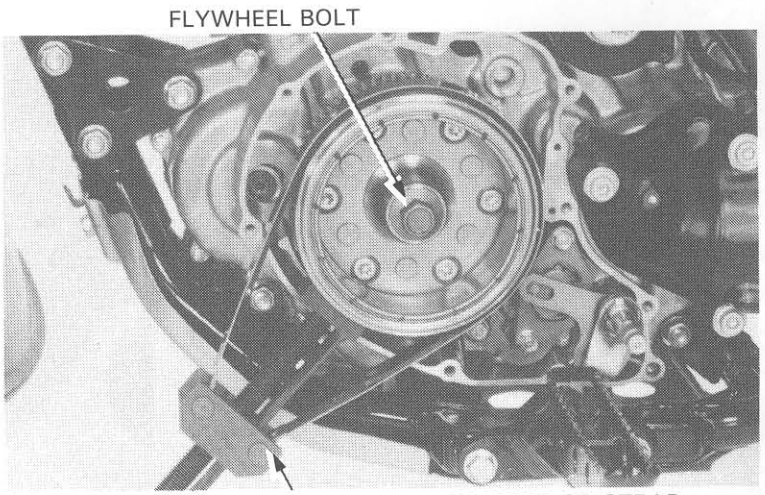
STATOR/PULSE GENERATOR INSTALLATION

Insert the wire grommet into the groove in the left crankcase cover and install the stator, pulse generator and wire clamp.



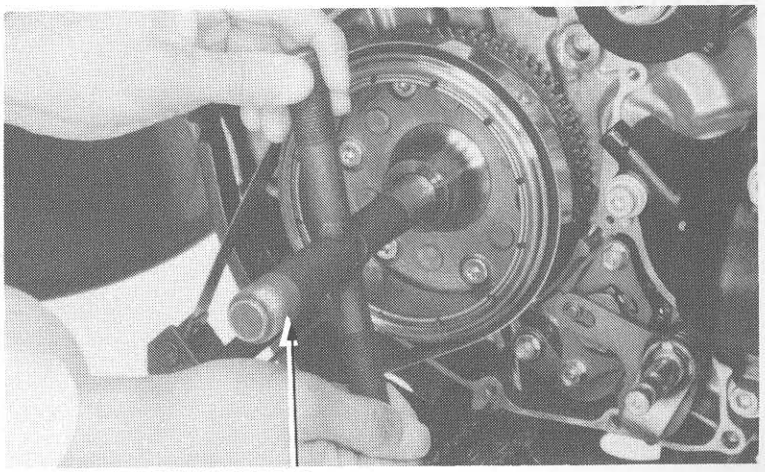
FLYWHEEL REMOVAL

Hold the flywheel with the flywheel holder and remove the flywheel bolt.



FLYWHEEL HOLDER 07725—0040000 OR STRAP WRENCH COMMERCIALLY AVAICABLE IN U.S.A.

Remove the flywheel with the rotor puller.



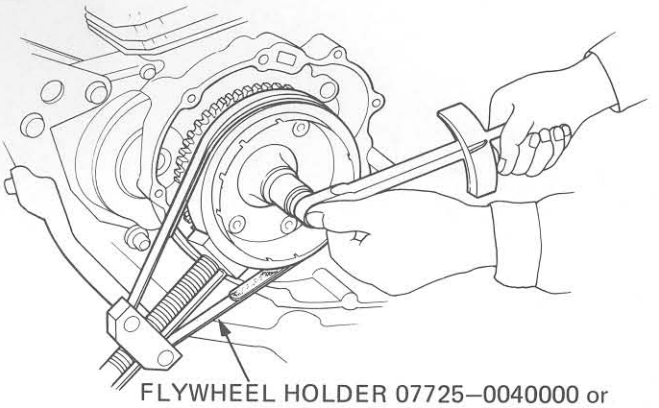
ROTOR PULLER
07733—0020001 OR 07933—3950000

FLYWHEEL INSTALLATION

Install the starter driven gear onto the flywheel.

Align the key way in the flywheel with the key on the crankshaft.
Hold the flywheel with the flywheel holder and tighten the bolt.

TORQUE: 100—120 N·m
(10.0—12.0 kg-m, 72—87 ft-lb)

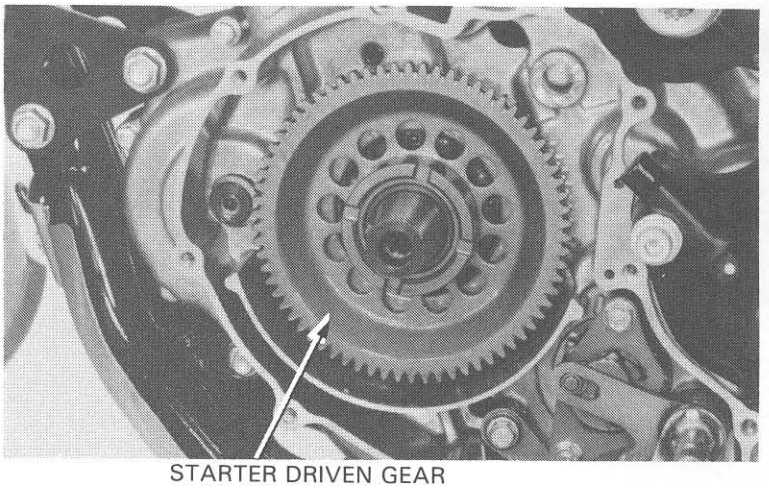


FLYWHEEL HOLDER 07725—0040000 or
STRAP WRENCH COMMERCIALLY AVAILABLE IN U.S.A.

STARTER CLUTCH

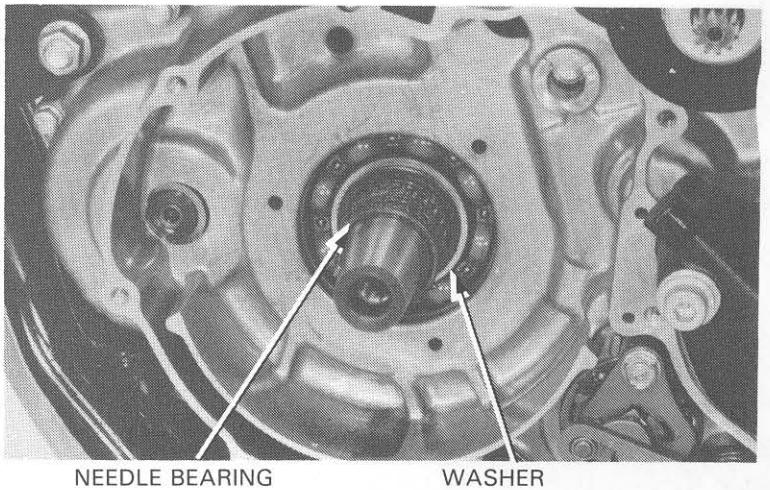
REMOVAL

Remove the left crankcase cover (page 9-5).
Remove the flywheel (page 9-6).
Remove the starter driven gear.



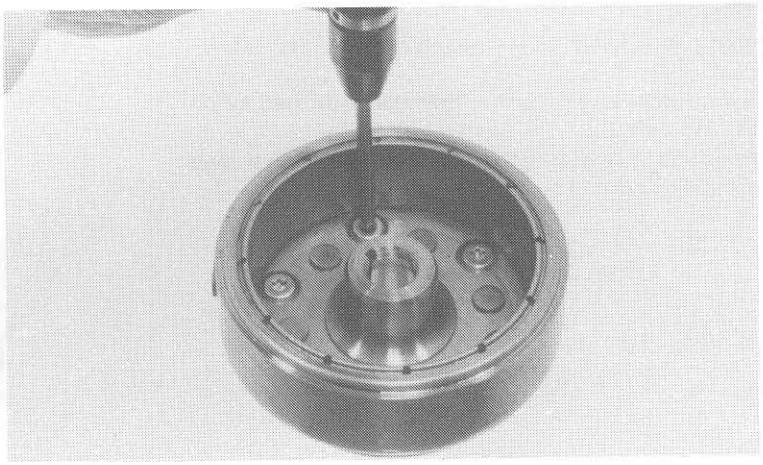
STARTER DRIVEN GEAR

Remove the needle bearing and washer.



NEEDLE BEARING WASHER

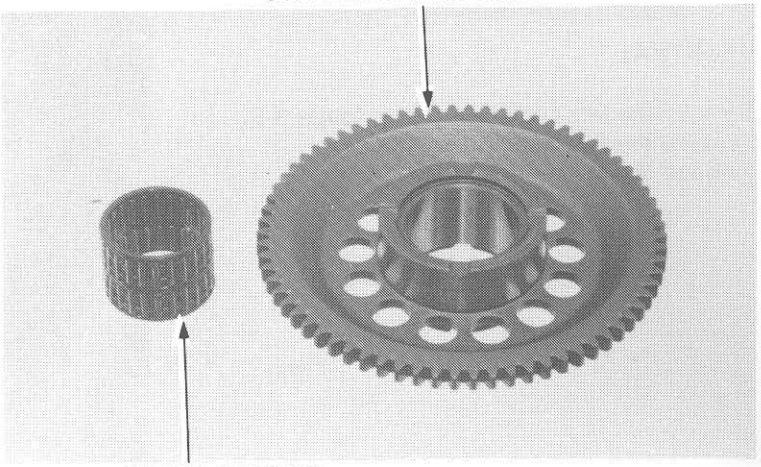
Remove the one-way clutch from the flywheel.



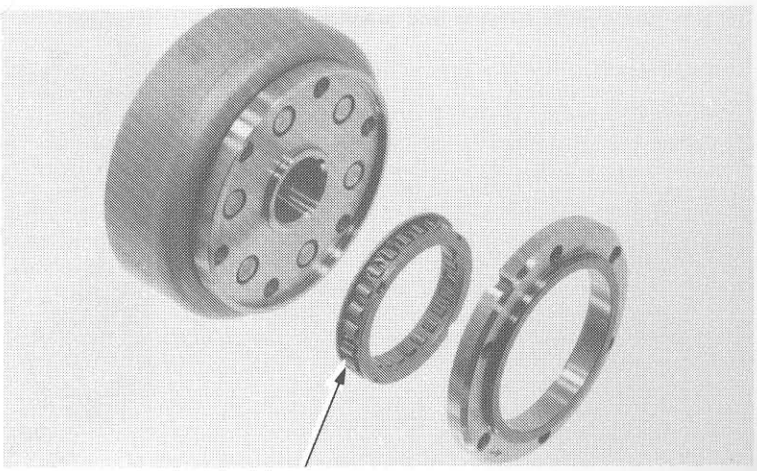
INSPECTION

Inspect the starter driven gear teeth for damage or abnormal wear.

Check the needle bearing for damage.



Check the rollers of the one-way starter clutch for wear or damage.

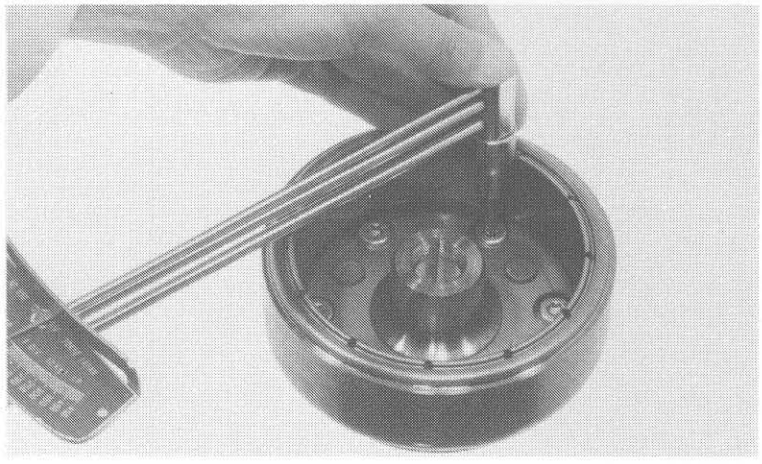


INSTALLATION

Install the one-way clutch onto the flywheel and tighten the torx bolts.

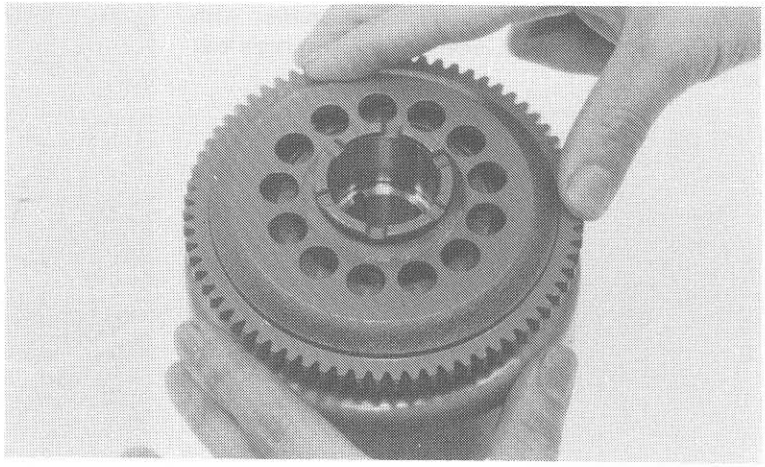
TORQUE: 18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
After '85: 20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)

Refer to flywheel installation (page 9-7).



Install the starter driven gear into the one-way clutch by turning it clockwise.

Check the operation of the one-way clutch by turning the driven gear. You should be able to turn the driven gear clockwise smoothly, but not be able to turn it counterclockwise.

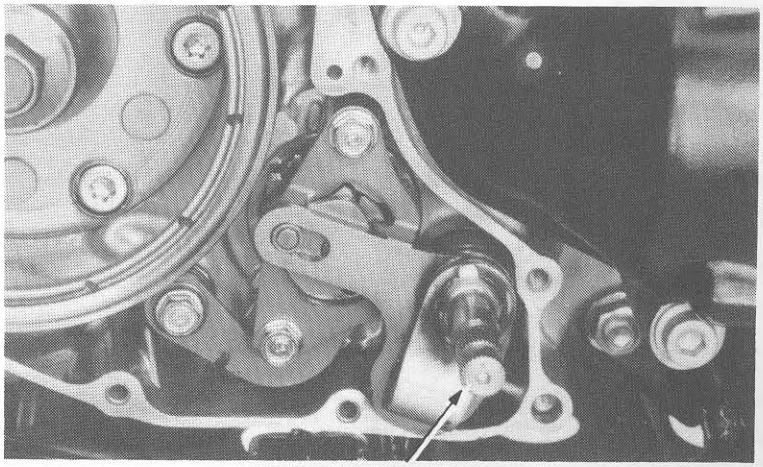


GEARSHIFT LINKAGE

REMOVAL

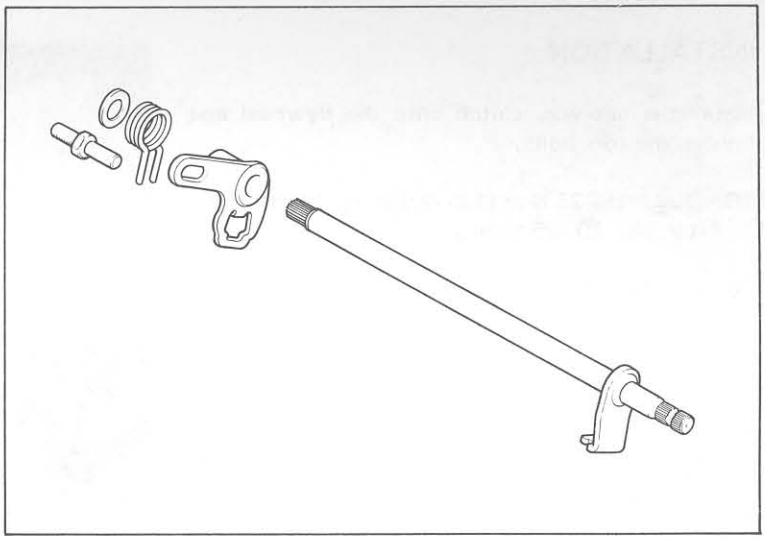
Remove the following:
– left crankcase cover (page 9-13).
–right crankcase cover (page 8-3).
–clutch lever.

Pull the gearshift spindle out of the crankcase.

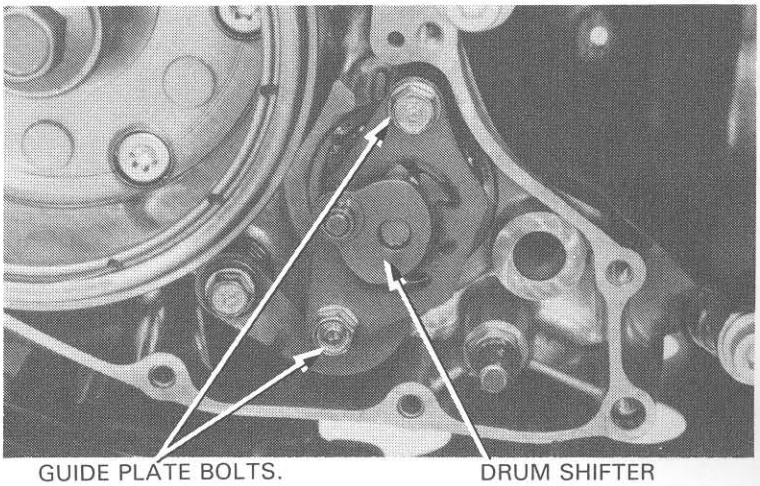


GEARSHIFT SPINDLE

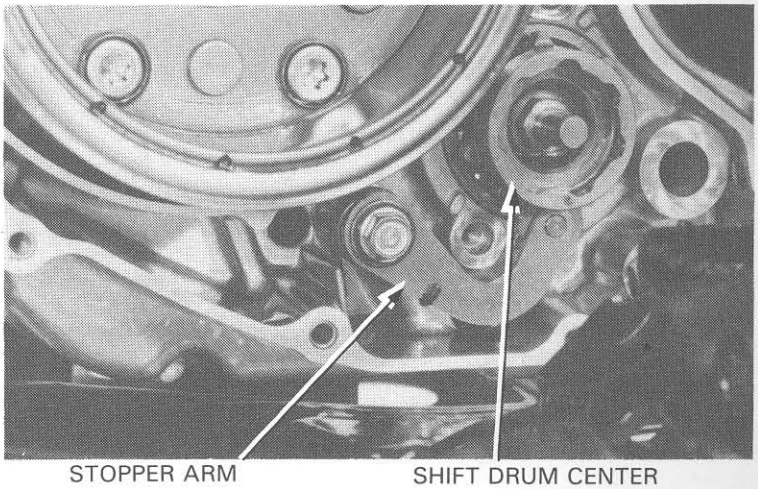
Remove the washer, and return spring.



Remove the guide plate bolts, drum shifter, with guide plate, dowel pins, bearing stopper plates and collars.

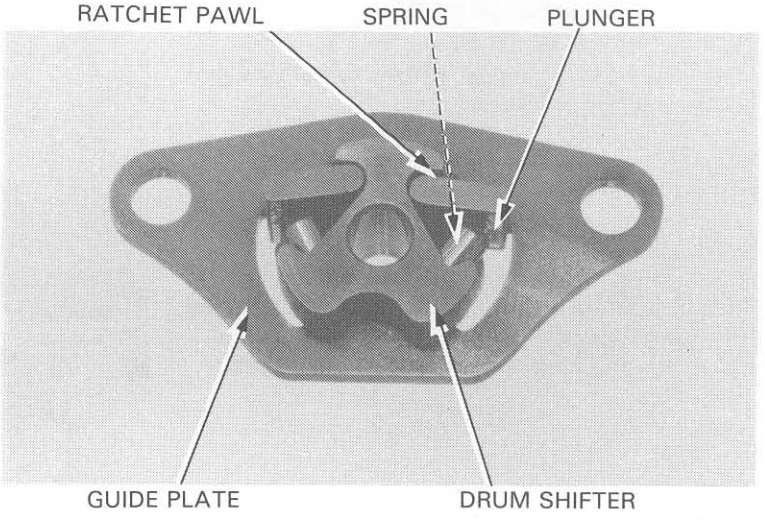


Remove the stopper arm and shift drum center.

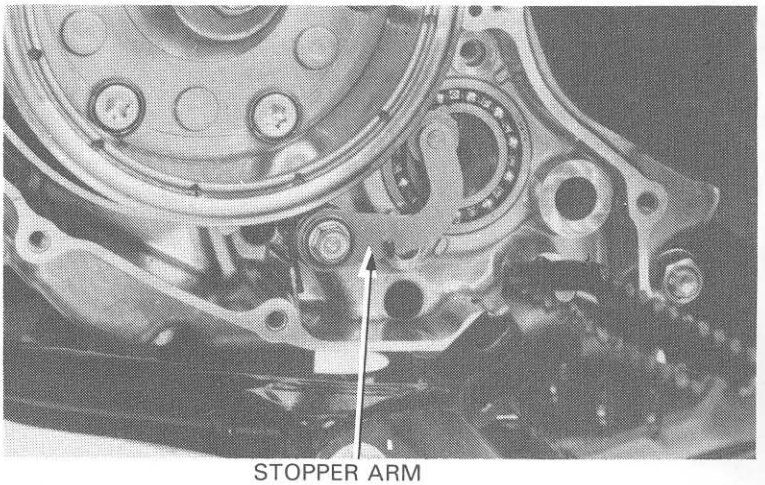


INSTALLATION

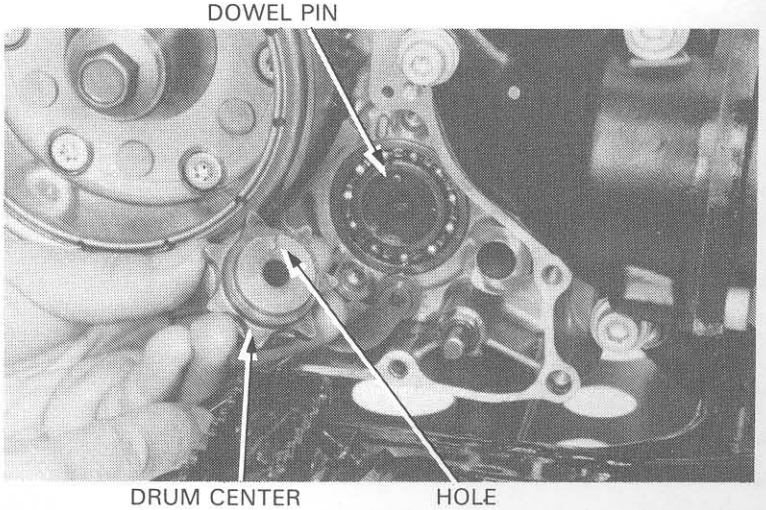
Apply clean engine oil to the ratchet pawls, springs and drum shifter.
Assemble ratchet pawls, springs and plungers onto the drum shifter, then install them in the guide plate.



Install the stopper arm and spring.



Align the drum center hole with the dowel pin on the shift drum and install the drum center.

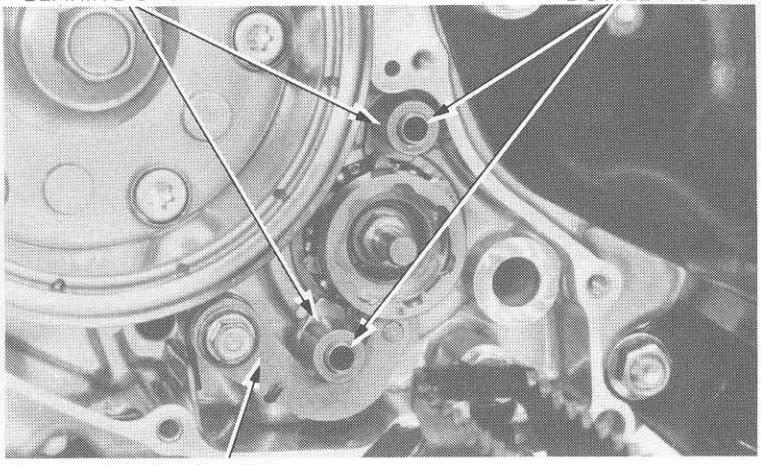


Tighten the drum center pin.
Install the bearing stopper plates, dowel pins and collars onto the crankcase.

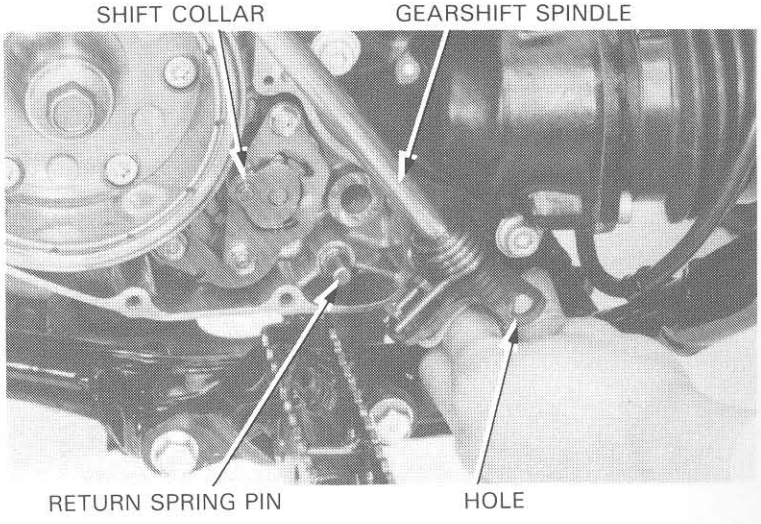
Compress the drum shifter ratchet pawls and install into the guide plate.

Install the guide plate and drum shifter assembly.

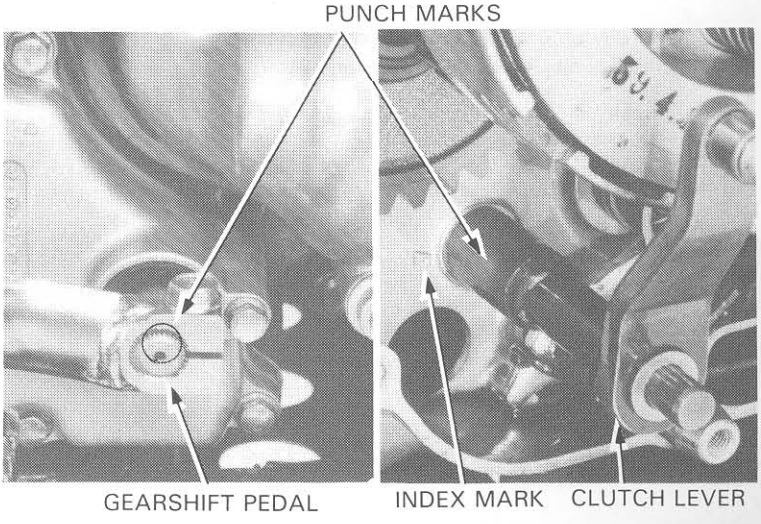
Assemble the gearshift spindle, gearshift arm and shift return spring.
Install the shift collar onto the drum shifter pin.



Align the end of the return spring with the shift return spring pin, and the hole of the gearshift spindle with the shift collar and install the gearshift spindle.



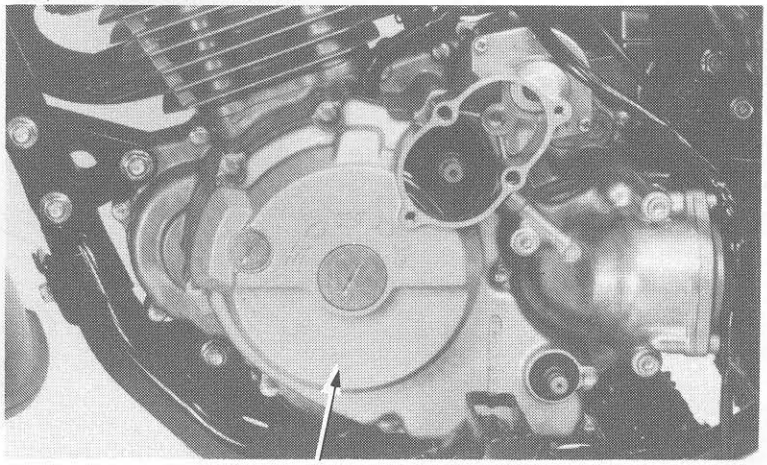
Install the following:
— left crankcase cover (page 9-13).
—gearshift pedal on the spindle while aligning the punch marks.
—clutch lever aligning the punch mark with the index mark.
—right crankcase cover (page 8-27).



LEFT CRANKCASE COVER INSTALLATION

Install a new gasket, the dowel pins, left crankcase cover and bolts.

'85, '86 MODEL SHOWN



LEFT CRANKCASE COVER

Install the starter reduction gears and cover (page 9-4).
Connect the alternator/pulse generator couplers.
Install the left frame side cover.
Align the punch marks on the gearshift pedal and gearshift spindle and install.

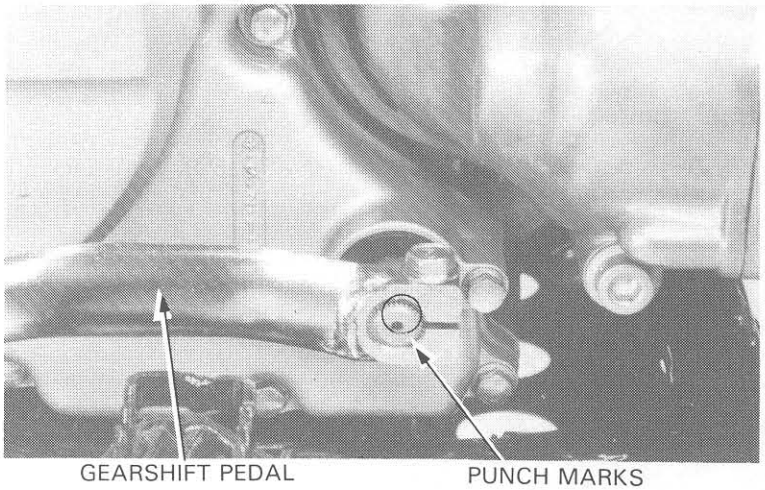
Check the operation of the gearshift mechanism.

Install the left foot peg assembly.
Fill the engine with oil.
Check the oil leaks.

TORQUE VALUES:

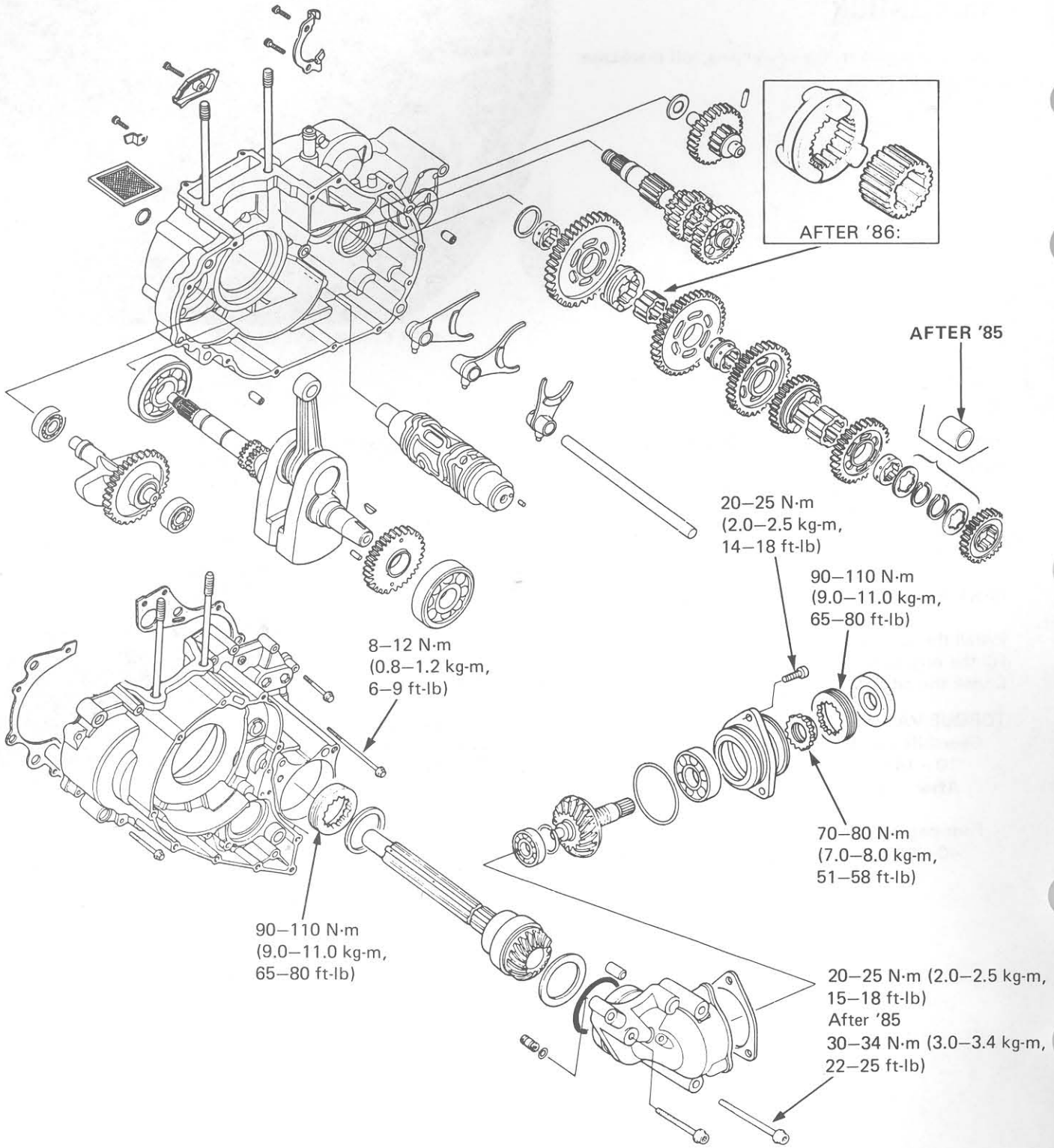
Gearshift pedal bolt
10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)
After '85: 14—18 N·m (1.4—1.8 kg-m, 10—13 ft-lb)

Foot peg bolt
40—50 N·m (4.0—5.0 kg-m, 29—36 ft-lb)



GEARSHIFT PEDAL

PUNCH MARKS


AFTER '86:
AFTER '85
20–25 N·m
(2.0–2.5 kg-m,
14–18 ft-lb)
90–110 N·m
(9.0–11.0 kg-m,
65–80 ft-lb)
8–12 N·m
(0.8–1.2 kg-m,
6–9 ft-lb)
70–80 N·m
(7.0–8.0 kg-m,
51–58 ft-lb)
90–110 N·m
(9.0–11.0 kg-m,
65–80 ft-lb)
20–25 N·m (2.0–2.5 kg-m,
15–18 ft-lb)
After '85
30–34 N·m (3.0–3.4 kg-m,
22–25 ft-lb)

10. CRANKCASE/CRANKSHAFT/ TRANSMISSION

SERVICE INFORMATION

GENERAL

- Remove the following parts before separating the crankcase.
  - Cylinder head (section 6)
  - Clutch, oil pump and kick starter (section 8)
  - Alternator and gearshift linkage (section 9)
  - Cylinder and piston (section 7).
  - Starter system (section 16).
- For crankshaft and transmission repair, the crankcase must be separated.
- Use soft jaws to prevent damage to the output gear case when placing the case in a vise.
- When replacing the following output gear components, a new adjustment shim must be selected.
  - Output gear case.
  - Output gear assembly.
  - Output gear bearing.
  - Output gear bearing holder.
- Replace the output drive and driven gear as a set.
- When using the lock nut wrench, use a deflecting beam type torque wrench 14-20 inches long. The lock nut wrench increases,the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The torque scale reading is given with the actual torque specifications.

SPECIFICATIONS

ITEM			STANDARD	SERVICE LIMIT
Crankshaft	Connecting rod small end I.D.		19.020–19.041 mm (0.7488–0.7496 in)	19.07 mm (0.751 in)
	Connecting rod big end axial clearance		0.05 – 0.65 mm (0.0020–0.0256 in)	0.80 mm (0.031 in)
	Connecting rod big end radial clearance		0.006– 0.018 mm (0.0002–0.0007 in)	0.05 mm (0.002 in)
	Runout		———	0.05 mm (0.002 in)
Shift fork, shaft	Fork	I.D.	13.000–13.021 mm (0.5118–0.5126 in)	13.04 mm (0.513 in)
		Claw thickness	4.93 – 5.00 mm (0.1941–0.1969 in)	4.50 mm (0.177 in)
	Shaft O.D.		12.966–12.984 mm (0.5105–0.5112 in)	12.96 mm (0.510 in)
Trans-mission	Gear I.D.	M4	25.000–25.021 mm (0.9843–0.9851 in)	25.05 mm (0.986 in)
		M5	20.020–20.041 mm (0.7882–0.7890 in)	20.07 mm (0.790 in)
		C1, C2, C3, CR	28.020–28.041 mm (1.1031–1.1040 in)	28.07 mm (1.105 in)
		R idler	18.000–18.021 mm (0.7087–0.7095 in)	18.05 mm (0.711 in)
	Shaft O.D.	M4	21.959–21.980 mm (0.8645–0.8654 in)	21.93 mm (0.863 in)
		M5	16.983–16.994 mm (0.6686–0.6691 in)	16.95 mm (0.667 in)
		R idler	13.966–13.984 mm (0.5498–0.5506 in)	13.93 mm (0.548 in)

ITEM			STANDARD	SERVICE LIMIT
Transmission	Gear bushing	C1 O.D.	27.984–28.005 mm (1.1017–1.1026 in)	27.93 mm (1.100 in)
		C2 CR O.D.	27.979–28.000 mm (1.1015–1.1024 in)	27.93 mm (1.100 in)
		C3 O.D.	27.959–27.980 mm (1.1017–1.1026 in)	27.93 mm (1.100 in)
		M4 O.D.	24.959–24.980 mm (0.9826–0.9835 in)	24.93 mm (0.981 in)
		M4 I.D.	22.000–22.021 mm (0.8661–0.8670 in)	22.05 mm (0.868 in)
		M5 O.D.	19.959–19.980 mm (0.7858–0.7866 in)	19.93 mm (0.785 in)
		M5 I.D.	17.016–17.034 mm (0.6699–0.6706 in)	17.06 mm (0.672 in)
		R O.D.	17.966–17.984 mm (0.7073–0.7080 in)	17.93 mm (0.706 in)
		R I.D.	14.000–14.025 mm (0.5512–0.5522 in)	14.05 mm (0.553 in)
	Gear-to-bushing clearance	M4	0.020– 0.062 mm (0.0008–0.0024 in)	0.10 mm (0.004 in)
		M5	0.040– 0.082 mm (0.0016–0.0032 in)	0.10 mm (0.004 in)
		C1	0.015– 0.057 mm (0.0006–0.0022 in)	0.10 mm (0.004 in)
		C2, CR	0.020– 0.062 mm (0.0008–0.0024 in)	0.10 mm (0.004 in)
		C3	0.040– 0.082 mm (0.0016–0.0032 in)	0.10 mm (0.004 in)
	Bushing-to-shaft clearance	M4	0.020– 0.062 mm (0.0008–0.0024 in)	0.10 mm (0.004 in)
		M5	0.022– 0.051 mm (0.0009–0.0020 in)	0.10 mm (0.004 in)
		R	0.016–0.059 mm (0.0006–0.0023 in)	0.10 mm (0.004 in)
Output gear backlash			0.080– 0.180 mm (0.0031–0.0071 in)	0.25 mm (0.010 in)

TORQUE VALUES

Crankcase SH bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Output gear case bolt '85	20–25 N·m (2.0–2.5 kg-m, 15–18 ft-lb)
After '85	30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)
Output gear bearing lock nut (Outer)	90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)
(Inner)	70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)
Output gear bearing holder socket bolt	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Output gear bearing lock nut	90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)

TOOLS

Special

Bearing remover, 17 mm	07936–3710300
Remover weight	07741–0010201 or 07936–3710200
Remover handle	07936–3710100
Pinion holder	07924–ME50000
Lock nut wrench, 30 x 64 mm	07916–MB00000
Lock nut wrench, 34 x 44 mm	07916–ME50000
Universal bearing puller	07631–00100000 or commercially available in U.S.A.
Attachment, 28 x 30 mm	07946–1870100
Attachment	07946–3290000
Crank assembly kit	07931–KF00000
– Threaded adaptor	07931–KF00200
– Crankshaft assembly collar	07931–KF00100
– Shaft puller	07931–ME40000
Bearing remover, 15 mm	07936–KC10000
– Bearing remover, 15 mm	07936–KC10500
– Remover weight	07741–0010201

Common

Driver	07749–0010000
Attachment, 72 x 75 mm	07746–0010600
Attachment, 37 x 40 mm	07746–0010200
Pilot, 35 mm	07746–0040800
Pilot, 17 mm	07746–0040400
Attachment, 52 x 55 mm	07746–0010400
Pilot, 22 mm	07746–0041000
Attachment, 42 x 47 mm	07746–0010300
Pilot, 20 mm	07746–0040500
Pilot, 25 mm	07746–0040600
Driver	07746–0030100
Attachment, 30 mm I.D.	07746–0030300
Pilot, 15 mm	07746–0040300
Pilot, 28 mm	07746–0041100

TROUBLESHOOTING

Crankshaft noisy
1. Worn connecting rod big end bearing
2. Bent connecting rod
3. Worn crankshaft main journal bearing

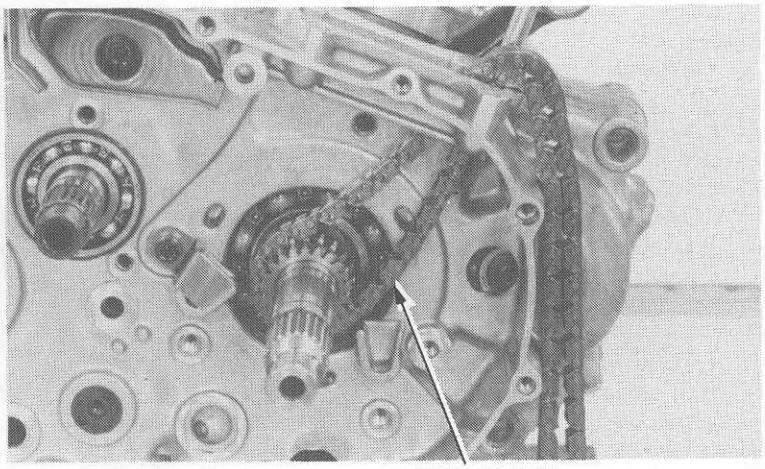
Jumps out of gear
1. Shift fork bent or damaged
2. Shift fork shaft bent
3. Shift claw bent
4. Gear engagement dogs or slots worn
5. Shift drum cam grooves damaged

Hard to shift
1. Incorrect clutch adjustment
2. Shift fork bent or damaged
3. Shift fork shaft bent

Excessive output gear noise
1. Output drive and driven gears worn on damaged
2. Bearing worn or damaged
3. Excessive backlash between output drive and driven gears
4. Improper shim thickness

CRANKCASE SEPARATION

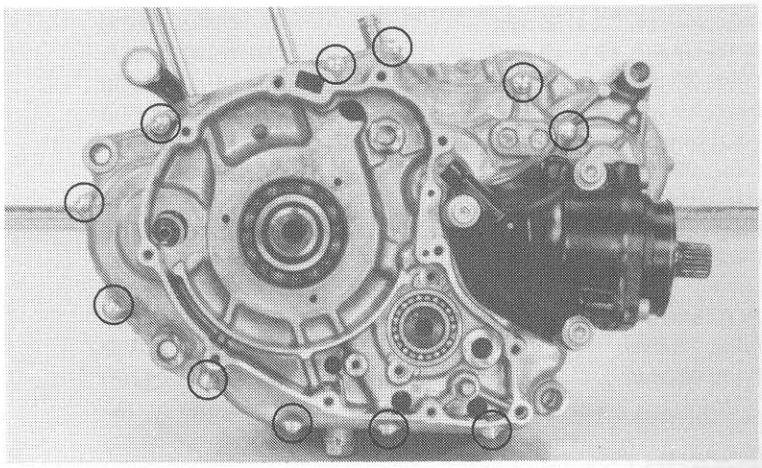
Remove the cam chain.



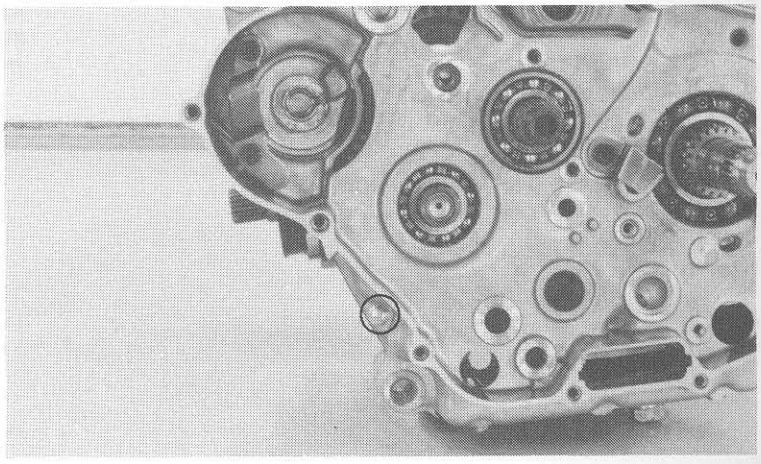
Remove the left crankcase bolts.

NOTE

Loosen the bolts in a crisscross pattern in 2-3 steps to prevent crankcase distortion.



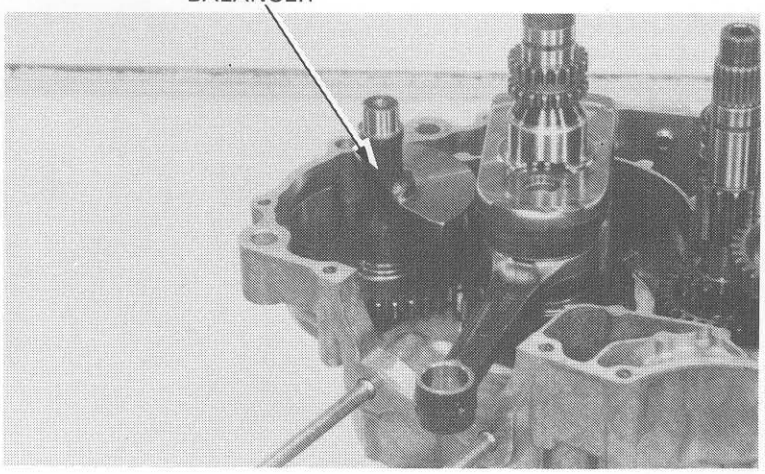
Remove the right crankcase cover bolt. Place the engine with the left crankcase down and remove the right crankcase from the left crankcase.
Remove the dowel pins and gasket.



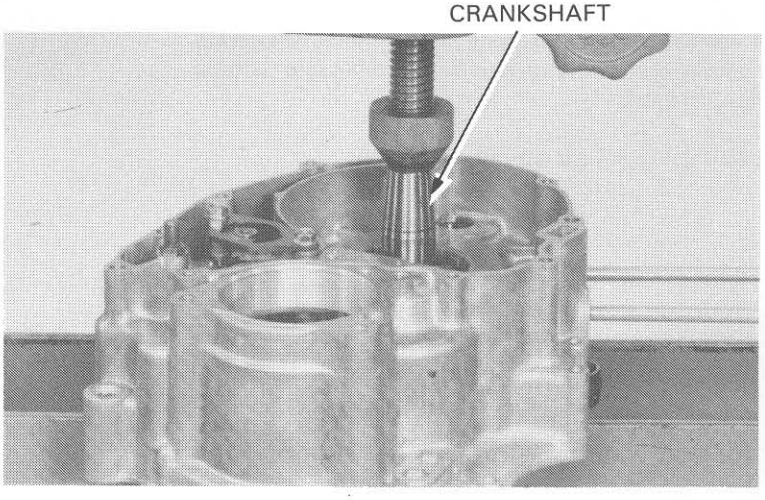
CRANKSHAFT

REMOVAL

Remoe the balancer from the left crankcase.



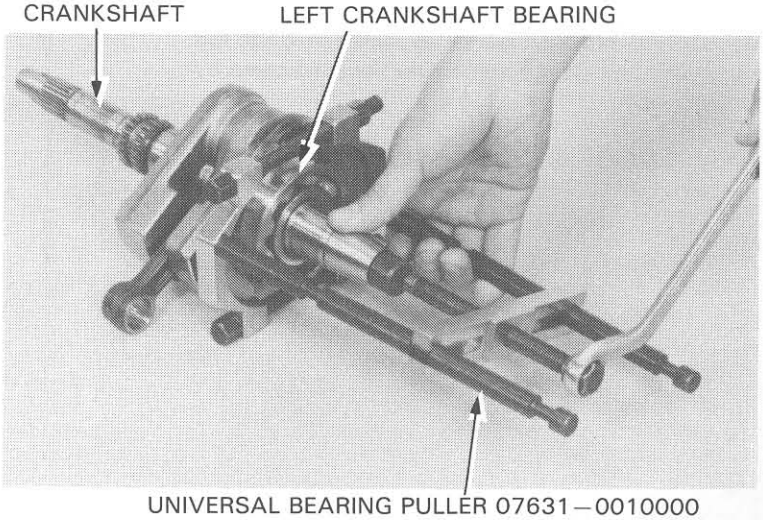
Disassemble the transmission (page 10-9).
Remove the crankshaft from the left crankcase using a hydraulic press.



If the left crankshaft bearing remains on the crankshaft, remove it with a bearing puller.
If the left crankshaft bearing remains in the left crankcase, remove it with driver 07749—0010000 and attachment, 42 x 47 mm 07746—0010300.
Discard the left crankshaft bearing.

NOTE

Always replace the left bearing with a new one whenever the crankshaft is removed from the left crankcase.

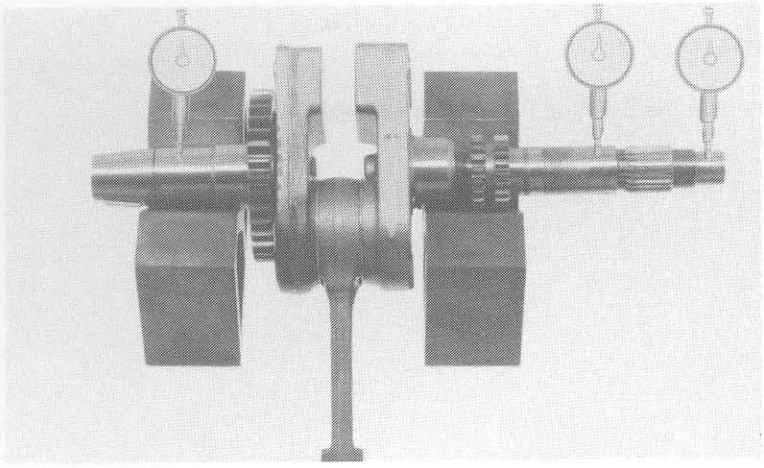


UNIVERSAL BEARING PULLER 07631—0010000
OR COMMERCIALLY AVAILABLE IN U.S.A.

INSPECTION

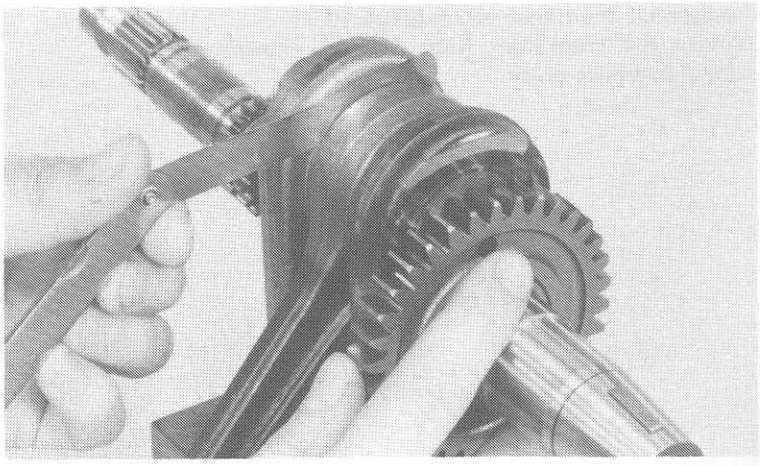
Set the crankshaft on a stand or V-blocks and read the runout using dial indicators.

SERVICE LIMIT: 0.05 mm (0.002 in)



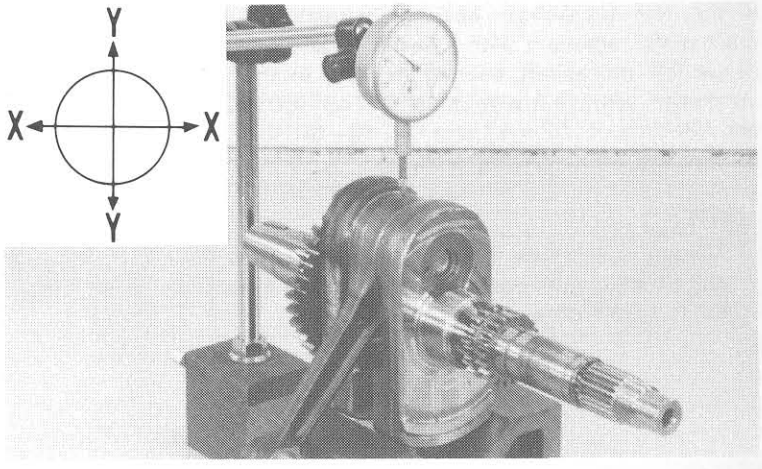
Measure the side clearance between the connecting rod big end and the crankshaft flyweight with a feeler gauge.

SERVICE LIMIT: 0.80 mm (0.031 in)

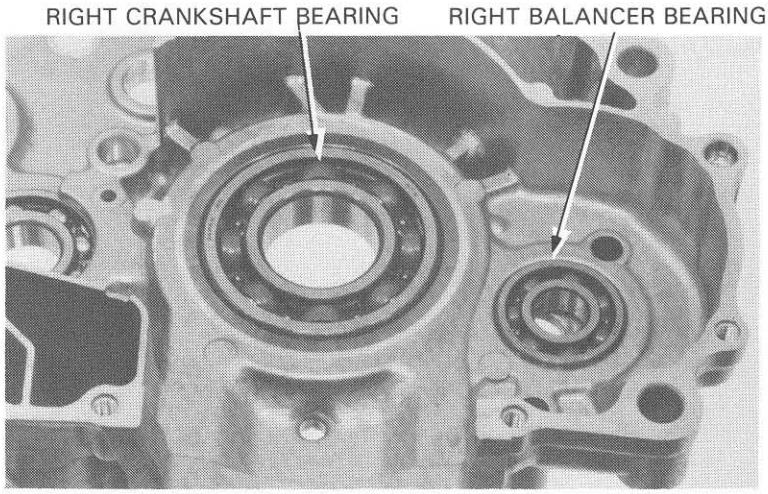


Measure the radial clearance at the connecting rod big end, at two points in the directions indicated by the arrows.

SERVICE LIMIT: 0.05 mm (0.002 in)



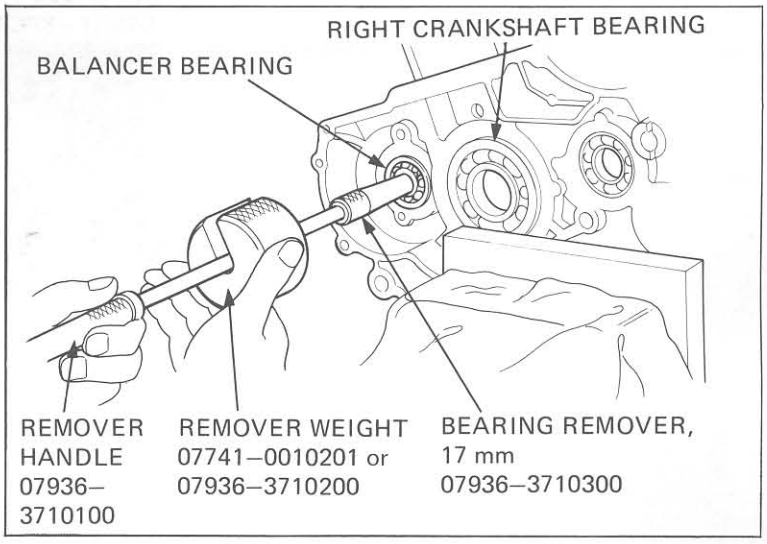
Spin the right crankshaft bearing and balancer bearings by hand and check for play.
The bearings must be replaced if they are noisy or have excessive play.



BEARING REPLACEMENT

Remove the balancer bearings using the bearing remover tool.

Drive the right crankcase bearing out from the outside using driver 07749—0010000 and attachment, 42 x 47 mm 07746—0010300.



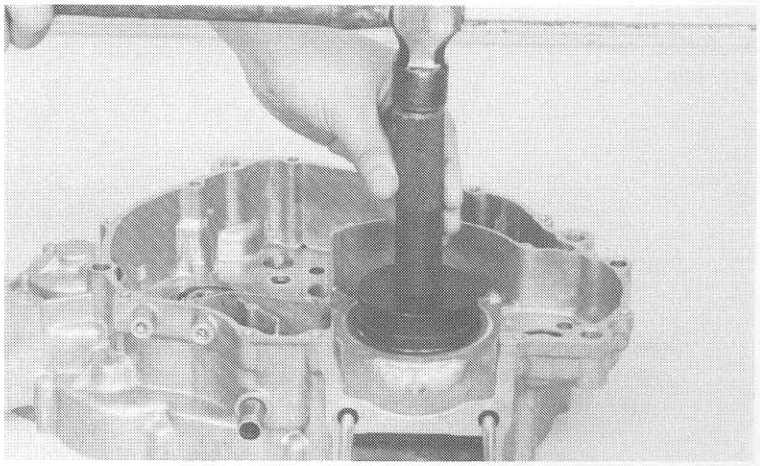
Drive new bearing with the following tools.

Right crankshaft bearing:

· **Driver**	**07749—0010000**
· **Attachment, 72 x 75 mm**	**07746—0010600**
· **Pilot, 35 mm**	**07746—0040800**

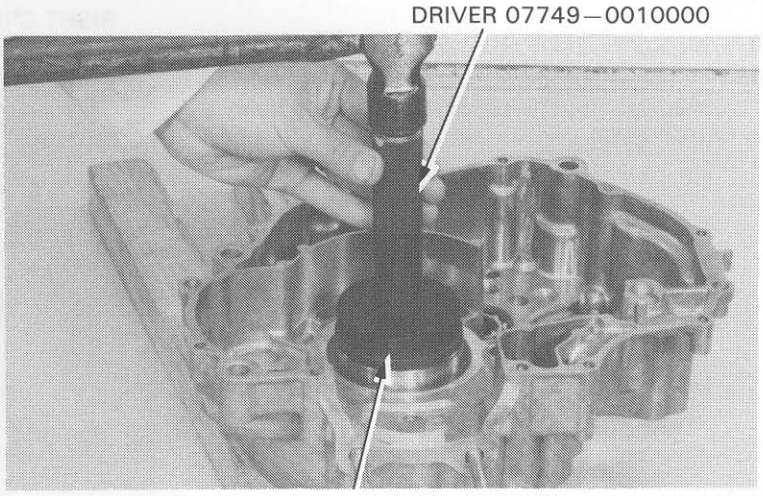
Balancer bearings:

· **Driver**	**07749—0010000**
· **Attachment, 37 x 40 mm**	**07746—0010200**
· **Pilot, 17 mm**	**07746—0040400**

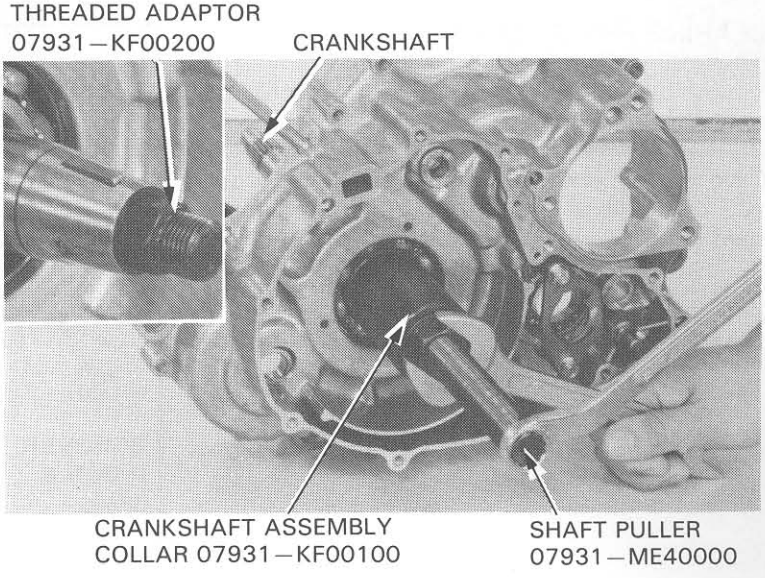


INSTALLATION

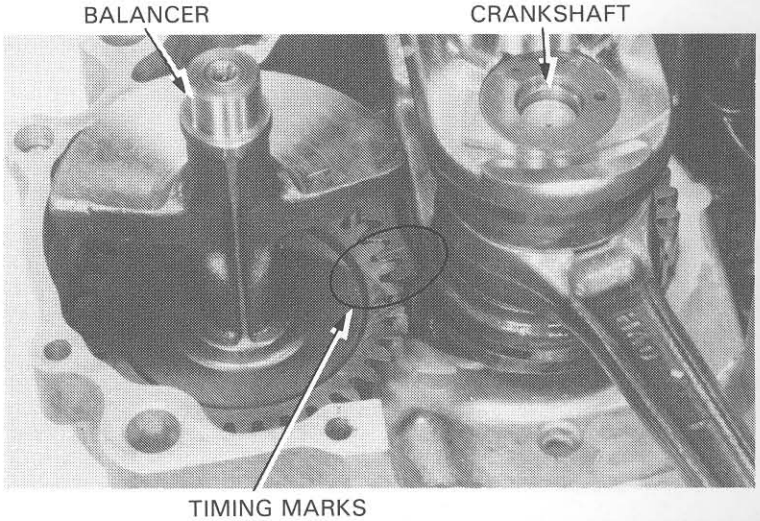
Drive new left crankshaft bearing into the left crankcase.



Draw the crankshaft into the left crankcase using the special tool.



Install the balancer into the left crankcase aligning its timing mark with the timing mark on the crankshaft gear.

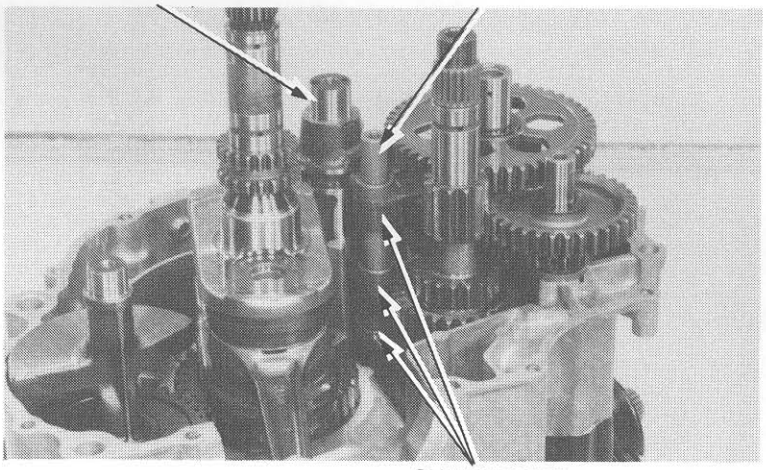


TRANSMISSION

DISASSEMBLY

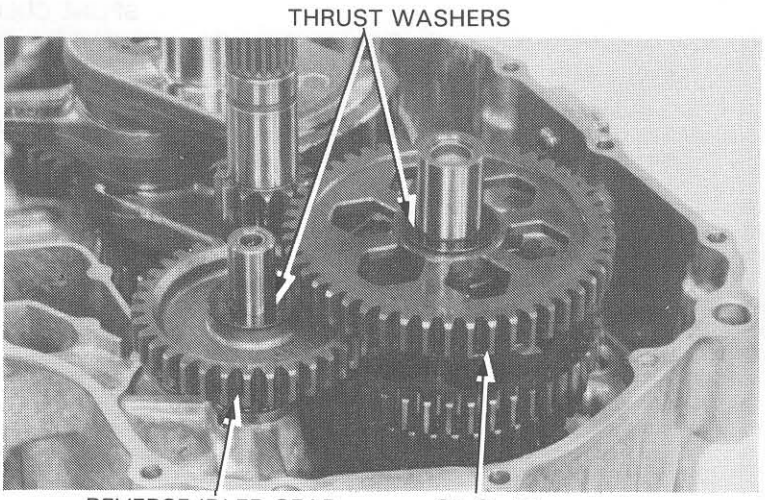
Temporarily install the gearshift drum bearing stopper plates, dowel pins,collars and shifter plate (page 9-10) to prevent the bearing from falling out while disassmbling and assembling the transmission.

Pull the gearshift fork shaft out and remove the shift forks and shift drum.



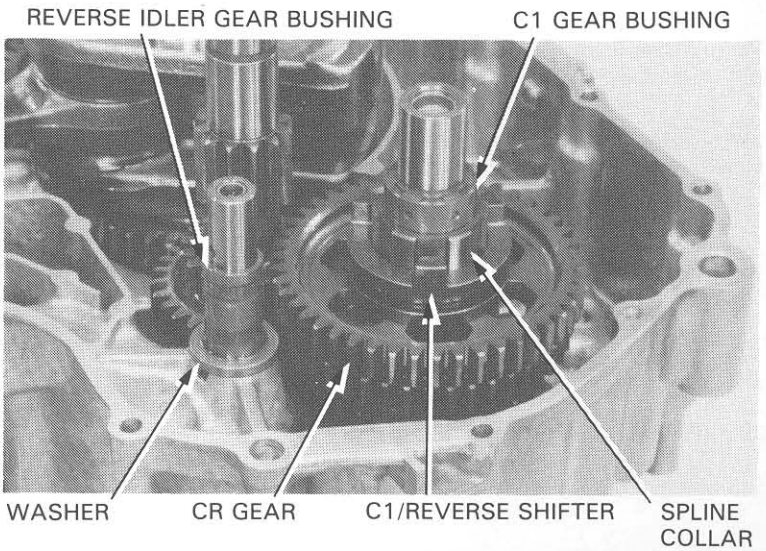
Remove the thrust washer and C1 gear from the countershaft.

Remove the thrust washer and reverse idler gear.



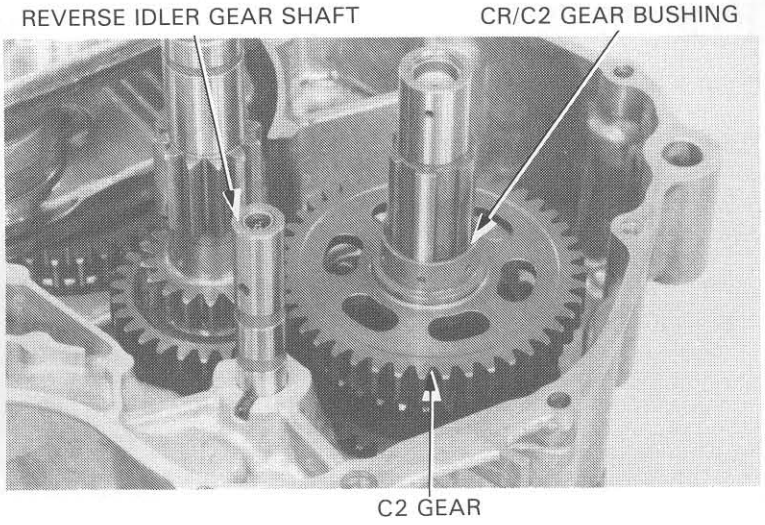
Remove the C1 gear bushing, spline collar, C1/reverse shifter and CR gear from the countershaft.

Remove the reverse idler gear bushing and washer.

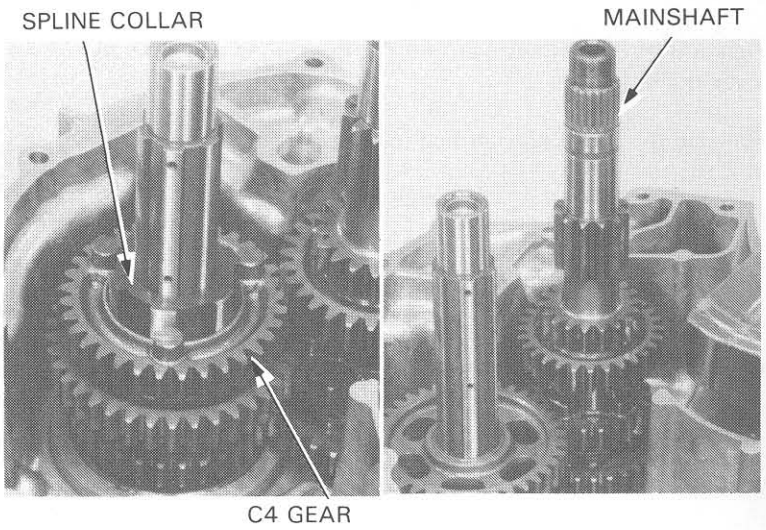


Remove the CR/C2 gear bushing and C2 gear from the countershaft.

Remove the reverse idler gear shaft.

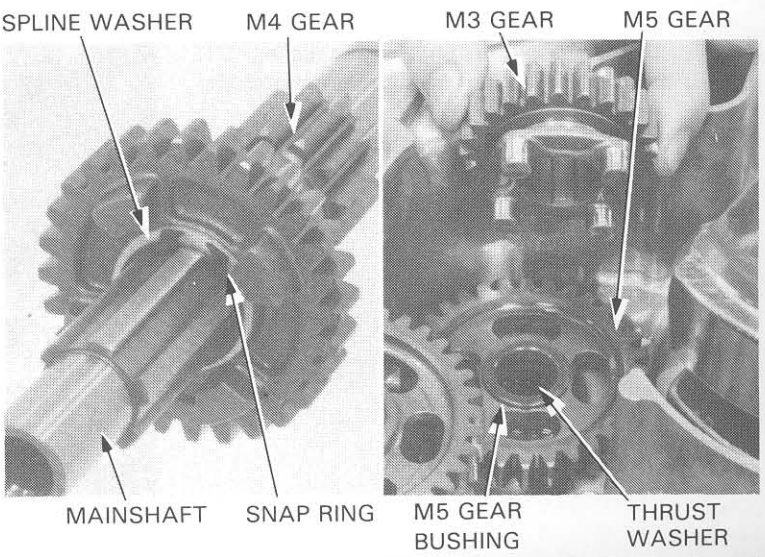


Remove the spline collar and C4 gear from the countershaft and remove the mainshaft.



Remove the snap ring, spline washer, M4 gear and M4 gear bushing from the mainshaft.

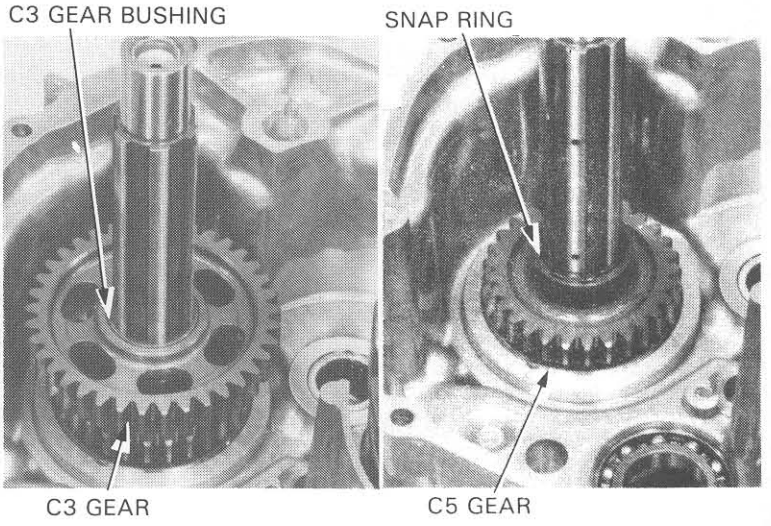
Remove the M3 gear, M5 gear bushing, M5 gear and thrust washer from the left crankcase.



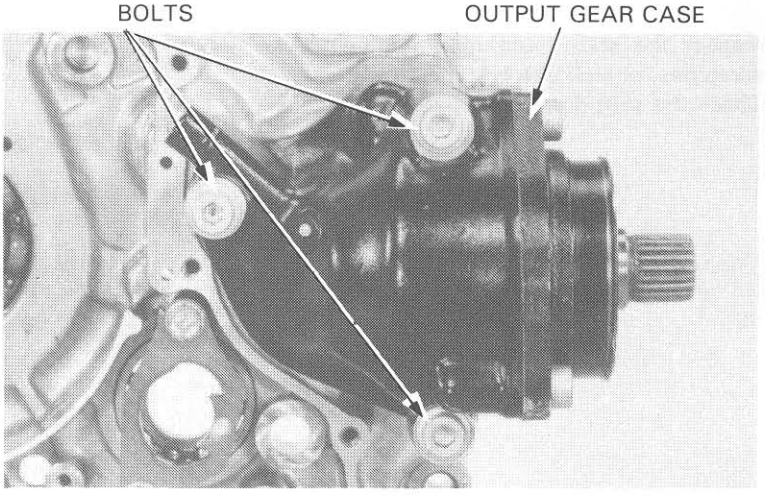
Remove the C3 gear and bushing from the countershaft.

'85:
Remove the snap rings, washers and C5 gear.

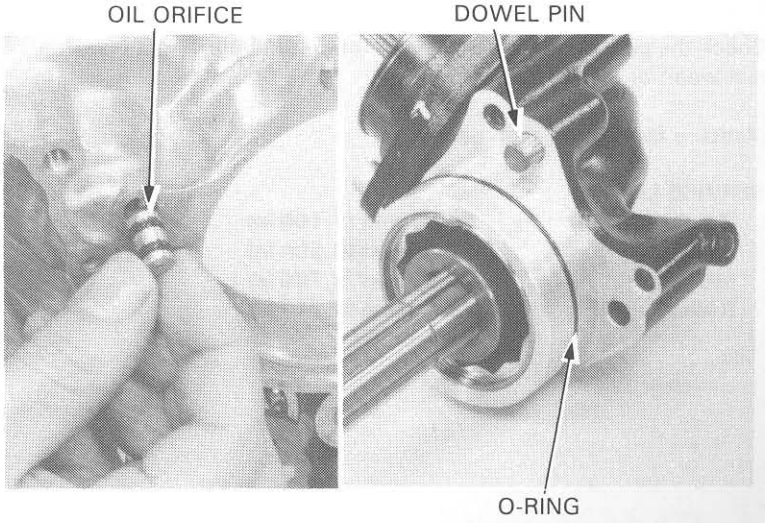
After '85:
Remove the collar and C5 gear.



Remove the three output gear case mounting bolts and remove the output gear case.



Remove the oil orifice from the left crankcase.
Remove the O-ring and dowel pin from the output gear case.



INSPECTION

Check the shift fork and shaft for wear or damage.
Measure the I.D. of the shaft hole.

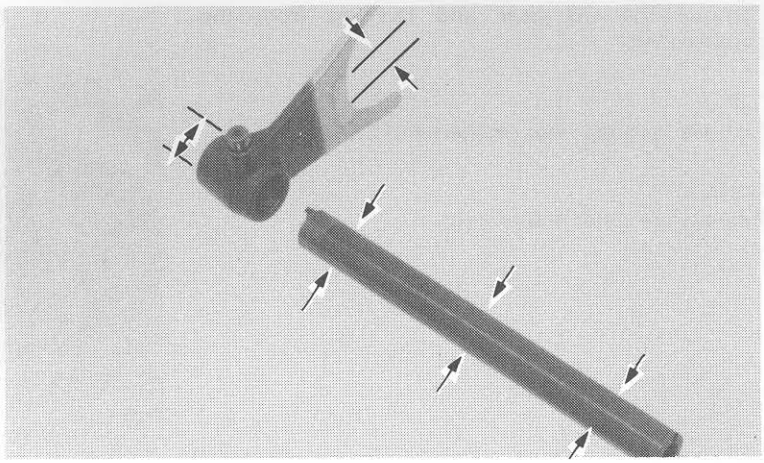
SERVICE LIMIT: 13.04 mm (0.513 in)

Measure the shift fork claw thickness.

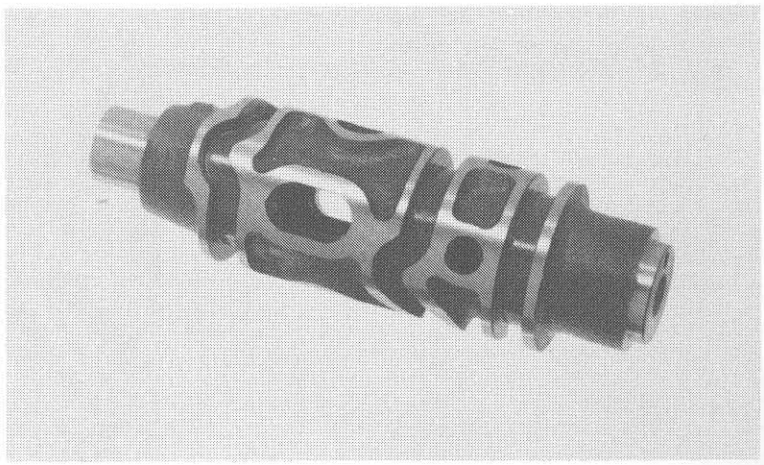
SERVICE LIMIT: 4.50 mm (0.177 in)

Measure the shift fork shaft O.D.

SERVICE LIMIT: 12.96 mm (0.510 in)



Inspect the shift drum right journal for scoring, scratches, or lack of lubrication.
Check the shift drum grooves for damage.

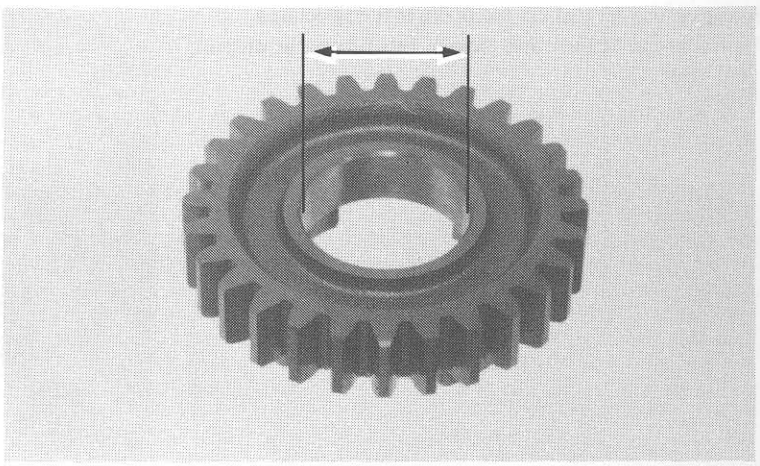


Check the gear dogs, dog holes and teeth for abnormal wear, or lack of lubrication.

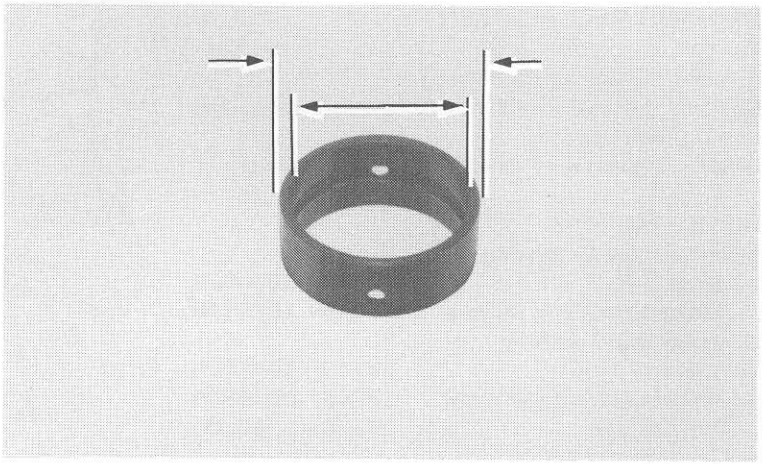
Measure the I.D. of each gear.

SERVICE LIMITS:

C1, C2, C3, CR	**28.07 mm (1.105 in)**
M4	**25.05 mm (0.986 in)**
M5	**20.07 mm (0.790 in)**
R idler	**18.05 mm (0.711 in)**



Measure the I.D. of each gear bushing.



SERVICE LIMITS:

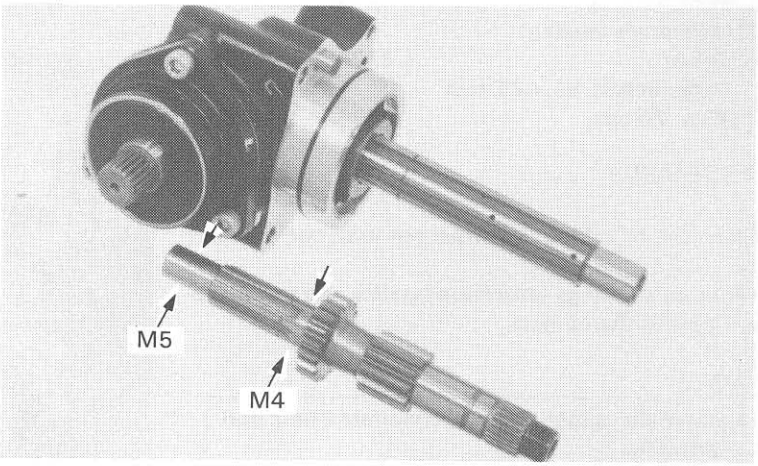
C1, C2, C3, CR O.D.	27.93 mm (1.100 in)
M4 O.D.	24.93 mm (0.981 in)
M4 I.D.	22.05 mm (0.868 in)
M5 O.D.	19.93 mm (0.785 in)
M5 I.D.	17.06 mm (0.672 in)
R O.D.	17.93 mm (0.706 in)
R I.D.	14.05 mm (0.553 in)

Calculate gear-to-bushing clearance.

SERVICE LIMITS:

C1, C2, C3, CR	0.10 mm (0.004 in)
M4	0.10 mm (0.004 in)
M5	0.10 mm (0.004 in)
R	0.10 mm (0.004 in)

Measure the O.D. of the mainshaft, countershaft, and reverse idler shaft.



SERVICE LIMITS:

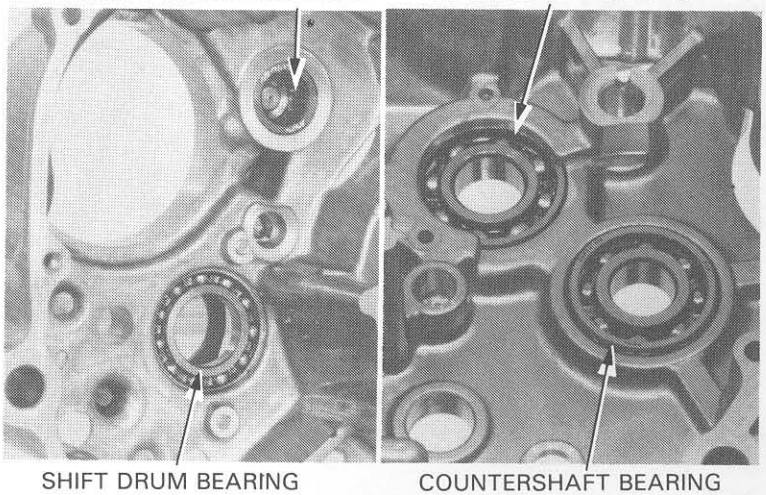
M4	21.93 mm (0.863 in)
M5	16.95 mm (0.667 in)
R	13.93 mm (0.548 in)

Calculate the gear bushing-to-shaft clearance.

SERVICE LIMITS:

M4	0.10 mm (0.004 in)
M5	0.10 mm (0.004 in)
R	0.10 mm (0.004 in)

Check the transmission bearings for excessive play or damage and replace if necessary.



BEARING REPLACEMENT

Remove the crankcase bearings.
Remove the mainshaft needle bearing using the bearing remover tool.
Drive new bearings in with the following tools.

LEFT CRANKCASE

Mainshaft needle bearing:	
Driver	**07749–0010000**
Attachment, 28 x 30 mm	**07946–1870100**
Gearshift drum bearing:	
Driver	**07749–0010000**
Attachment, 42 x 47 mm	**07746–0010300**
Pilot, 20 mm	**07746–0040500**

RIGHT CRANKCASE

Mainshaft bearing:	
Driver	**07749–0010000**
Attachment, 52 x 55 mm	**07746–0010400**
Pilot, 22 mm	**07746–0041000**
Countershaft bearing:	
Driver	**07749–0010000**
Attachment, 42 x 47 mm	**07746–0010300**
Pilot, 20 mm	**07746–0040500**

ASSEMBLY

Clean the oil orifice and blow out with compressed air.
Install new O-rings onto the oil orifice and install the orifice into the oil hole.

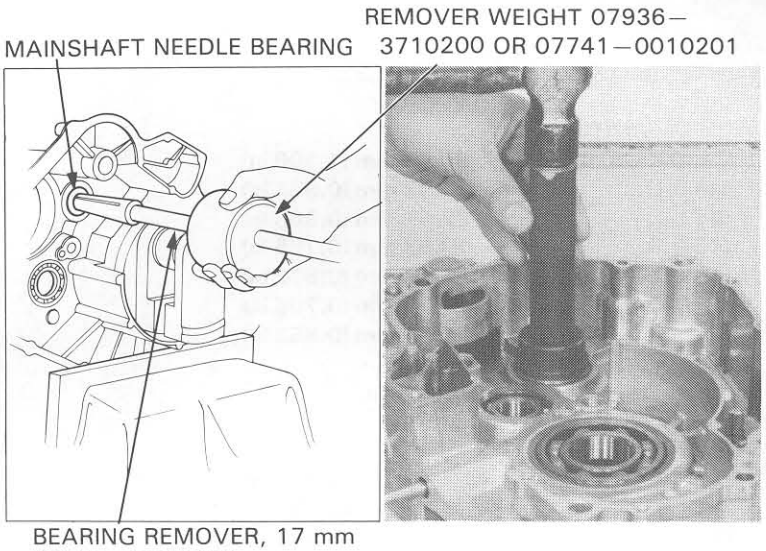
NOTE

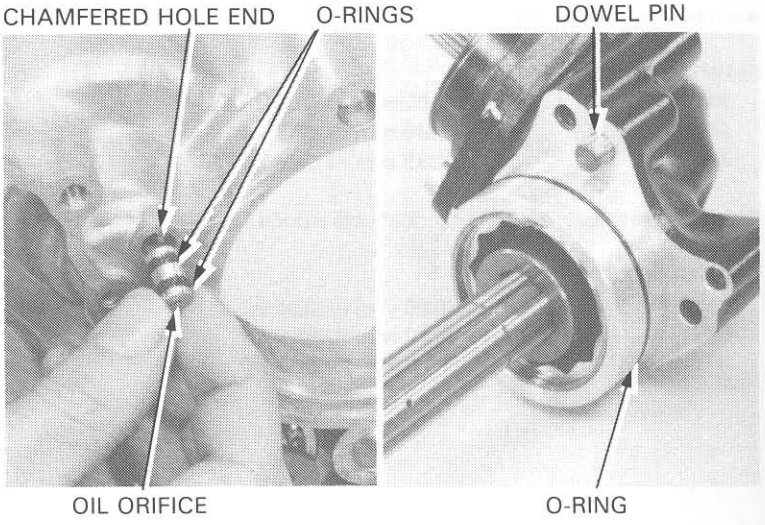
Install the orifice with its chamfered hole end facing in.

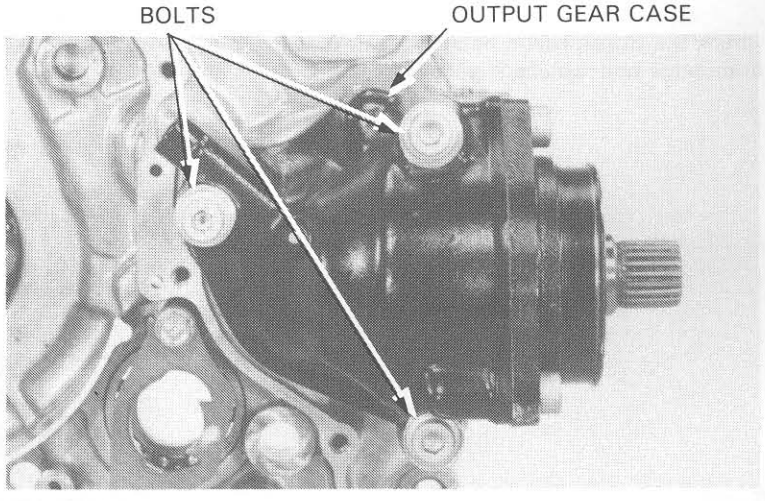
Install the dowel pin and a new O-ring onto the output gear case.

Install the output gear case onto the left crankcase and tighten the three mount bolts.

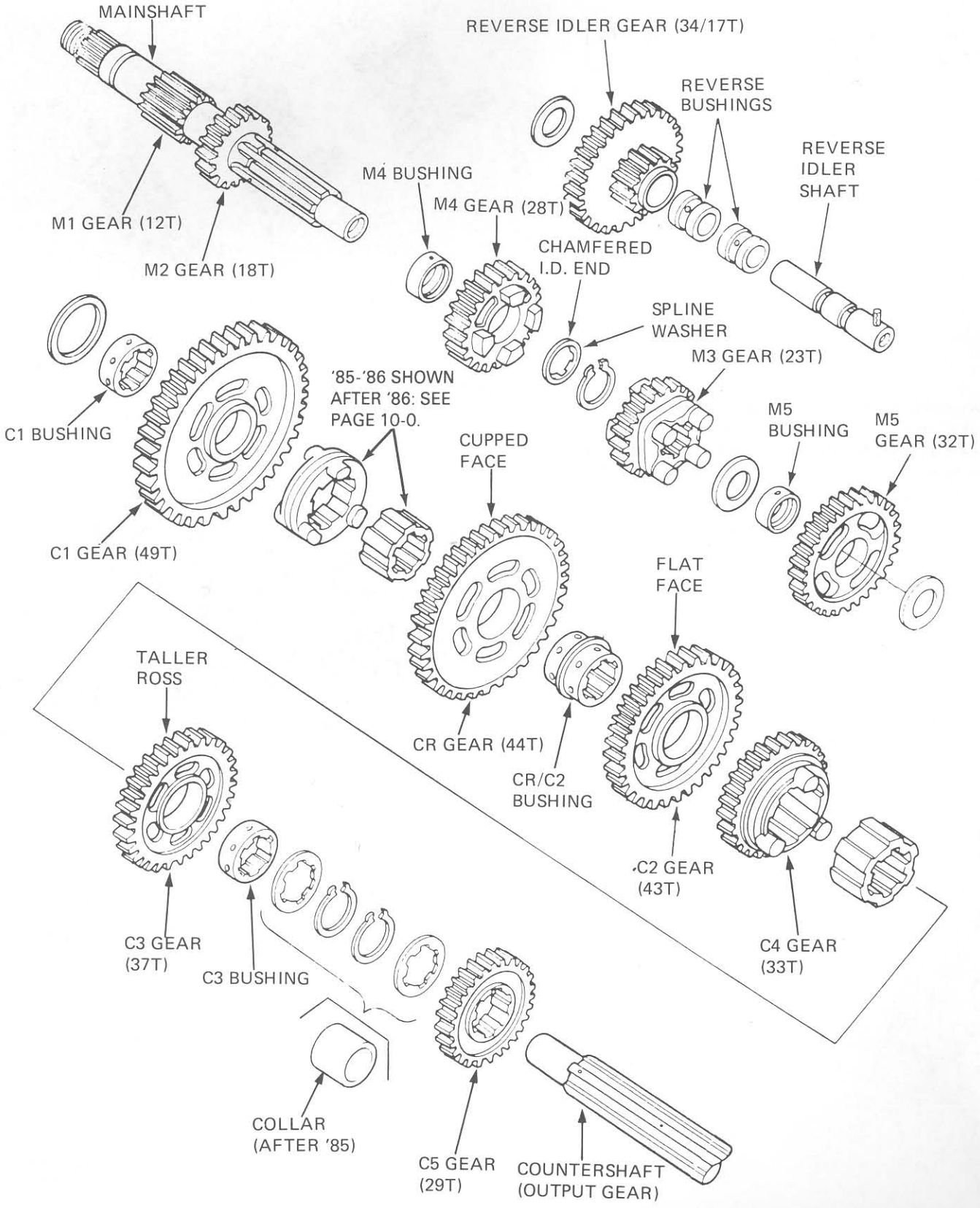
TORQUE: 20–25 N·m
(2.0–2.5 kg-m, 14–18 ft-lb)
After '85
30–34 N·m
(3.0–3.4 kg-m, 22–25 ft-lb)







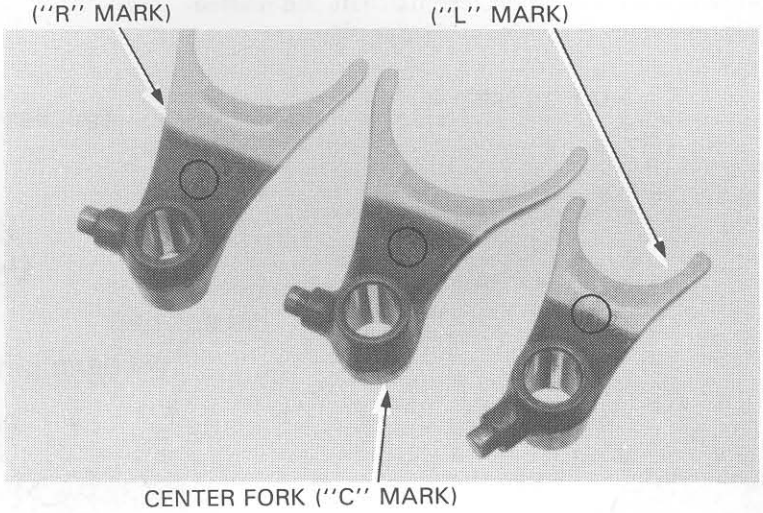
Assemble the mainshaft, countershaft and reverse idler in the reverse order of disassembly.



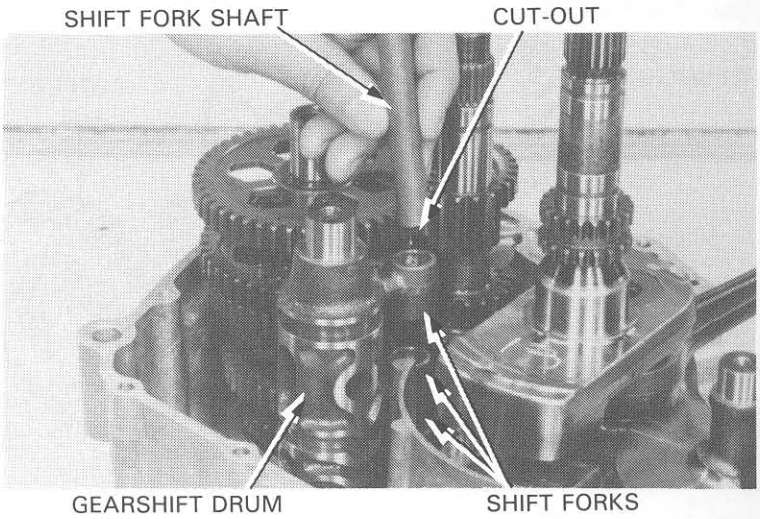
Install the gearshift forks with their marks facing up.

NOTE

The gearshift forks will have marks: L for left, C for center and R for right.



Install the gearshift drum and align each shift fork guide pin with the guide groove in the drum. Insert the shift fork shaft through the shift forks into the hole in the left crankcase and align its cut-out with the shoulder in the hole.



OUTPUT GEAR

BACKLASH INSPECTION

Place the output gear case in a vise.

CAUTION

Use soft jaws to prevent damage to the gear case.

Set a horizontal type dial indicator on the output drive shaft as shown.
Hold the output driven gear shaft and rotate the drive shaft until the gear slack is taken up.
Turn the drive shaft back and forth to read the backlash.

STANDARD: **0.080—0.180 mm (0.0031—0.0071 in)**
SERVICE LIMIT: **0.25 mm (0.010 in)**

Remove the dial indicator. Turn the output drive shaft 120° and measure the 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 the measurements exceeds the limit, it indicates that the bearing is not installed squarely.
Inspect the bearings and replace if necessary.
If backlash is excessive, replace the driven shaft adjustment shim with a thinner one.
If the backlash is too small, replace the driven shaft adjustment shim with a thicker one.

Backlach is changed by about 0.06 mm (0.002 in) when the thickness of the shim is changed by 0.10 mm (0.004 in).

OUTPUT DRIVEN GEAR SHAFT ADJUSTMENT SHIMS:

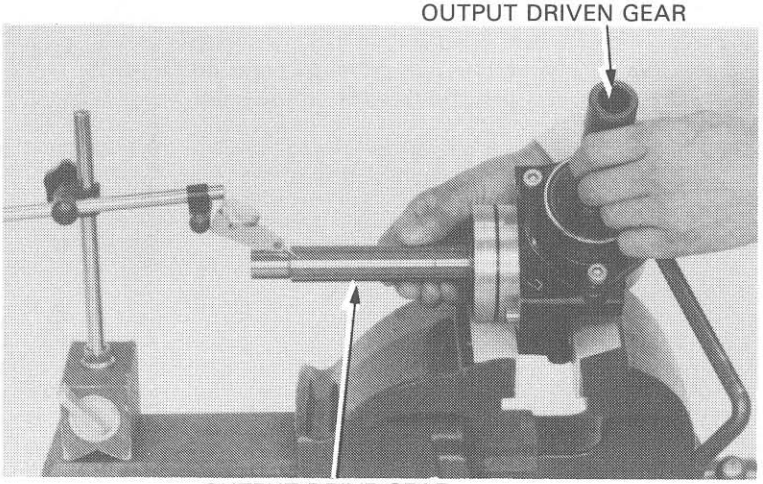
- **A: 0.40 mm (0.016 in)**
- **B: 0.45 mm (0.018 in)**
- **C: 0.50 mm (0.020 in) Standard**
- **D: 0.55 mm (0.022 in)**
- **E: 0.60 mm (0.024 in)**
- **F: 0.30 mm (0.012 in)**
- **G: 0.35 mm (0.014 in)**

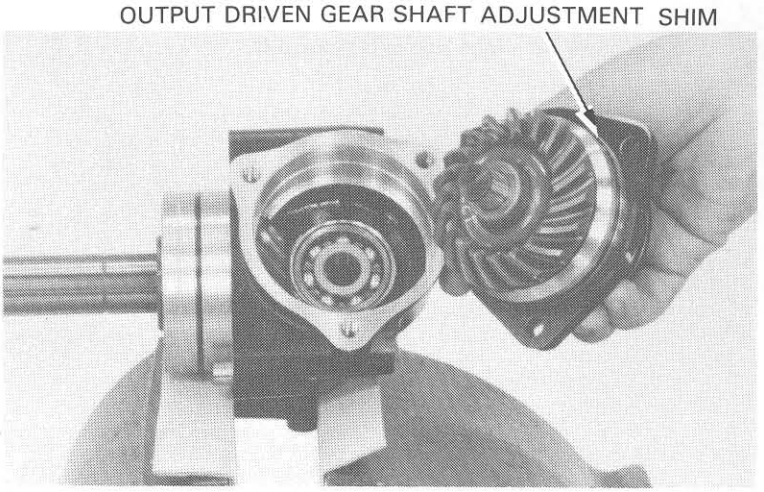
OUTPUT DRIVEN GEAR DISASSEMBLY

Place the output gear case in a vise, being careful not to distort it and remove the oil seal.

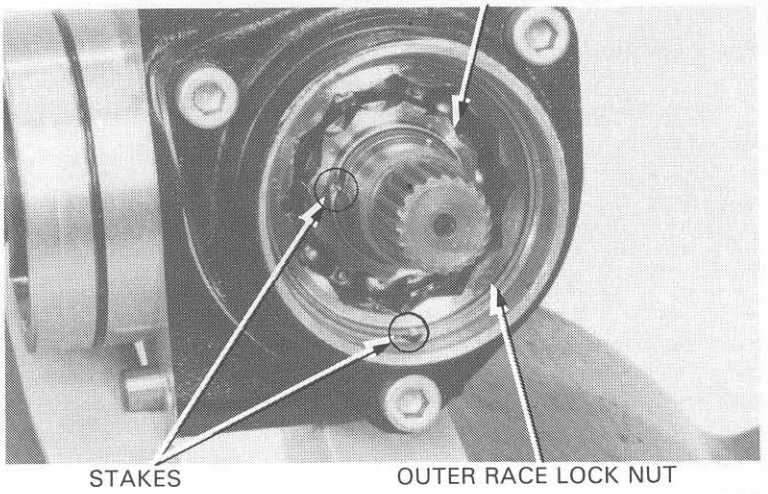
CAUTION

Use soft jaws to prevent damage to the gear case.

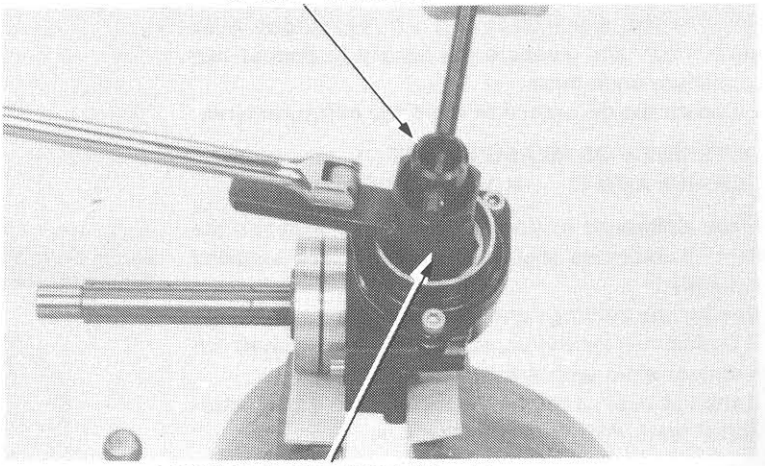




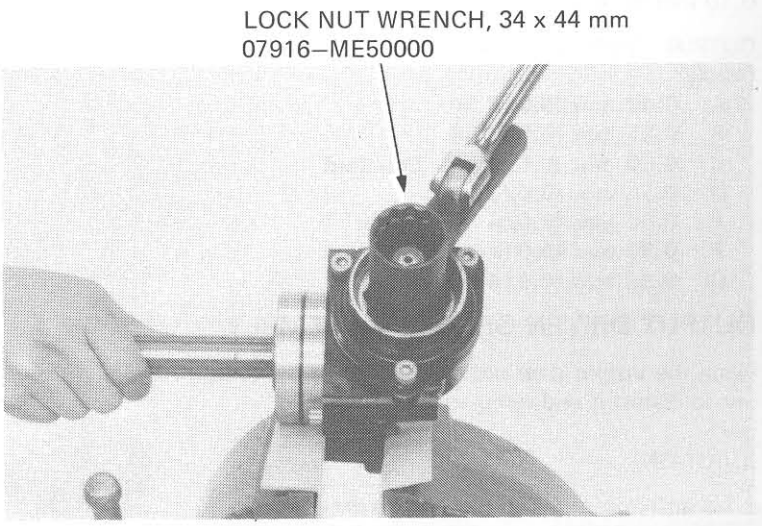
Unstake the driven gear bearing race lock nuts with a drill or grinder. Be careful that metal particles do not enter the bearing and the threads on the shaft are not damaged.



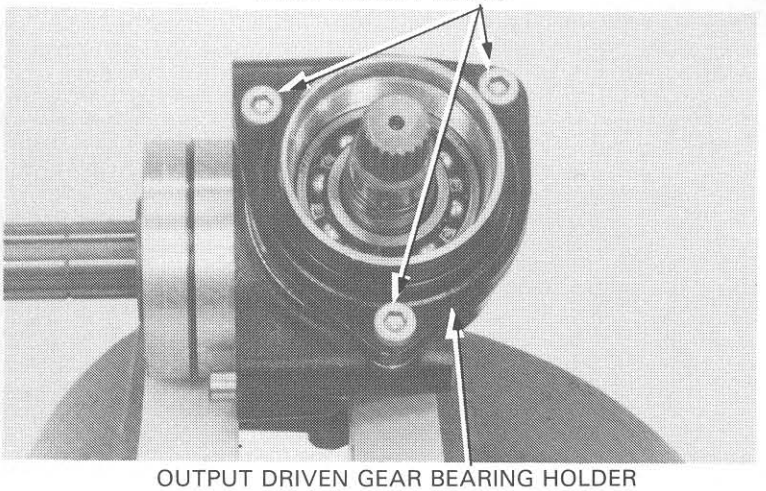
Remove the inner race lock nut and discard it.



Remove the outer race lock nut and lock washer. Discard the outer race lock nut.



Remove the 8 mm socket bolts attaching the output driven gear bearing holder and remove the driven gear assembly.

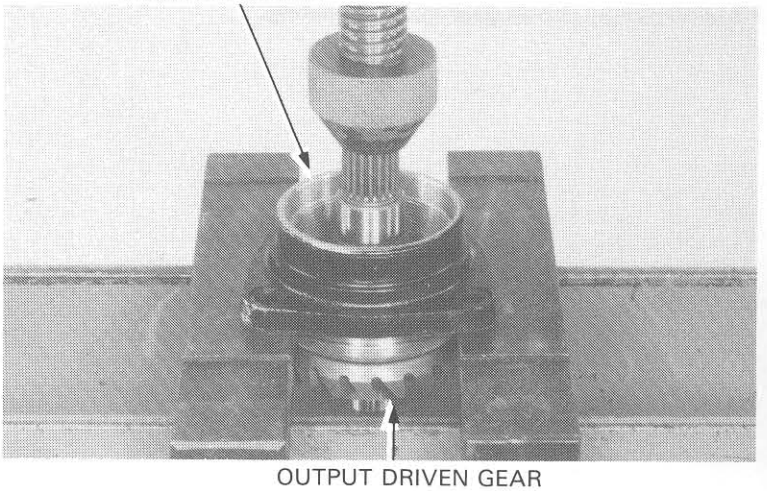


OUTPUT DRIVEN GEAR BEARING REPLACEMENT

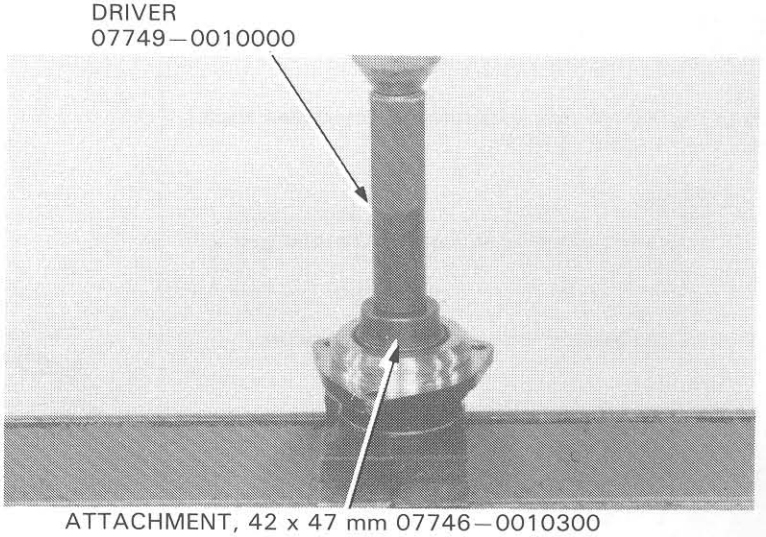
NOTE

The driven gear must be removed before replacing the bearing.

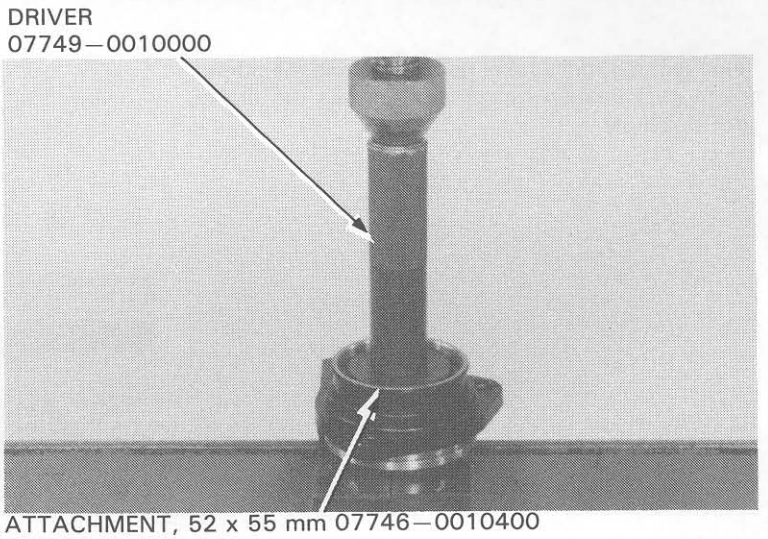
Place the bearing holder in a press and remove the driven gear.



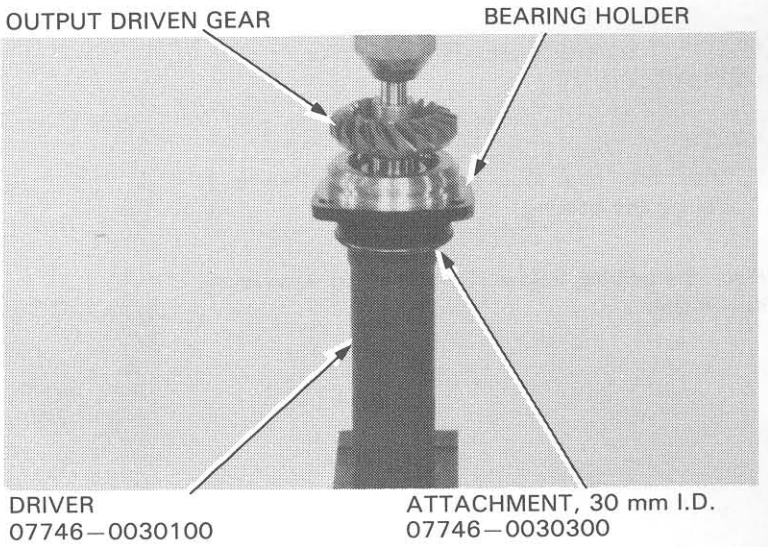
Place the bearing holder in the press and remove the bearing.



Press in a new bearing.



Press the output driven gear into the bearing.



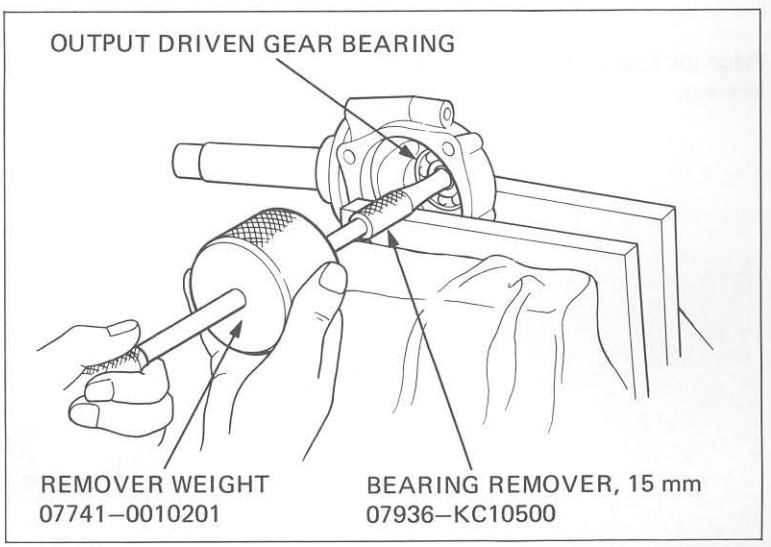
OUTPUT DRIVEN GEAR CASE BEARING REPLACEMENT

Heat the output gear case around the driven shaft bearing to 80°C (176°F).

CAUTION

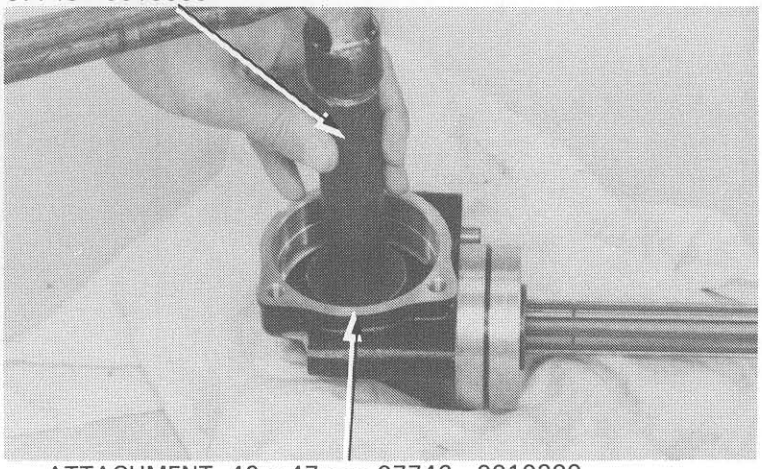
Always wear gloves when handling a heated gear case.

Remove the bearing with the bearing remover.



Drive a new bearing into the output gear case.

DIRVER
07749—0010000

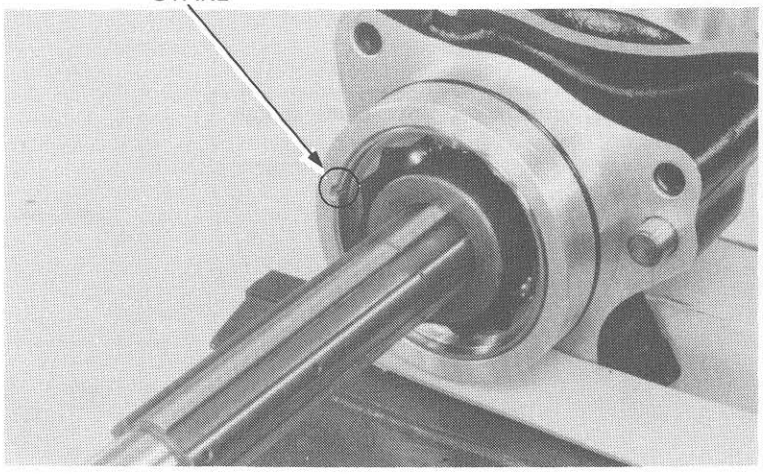


ATTACHMENT, 42 x 47 mm 07746—0010300
PILOT, 15 mm 07746—0040300

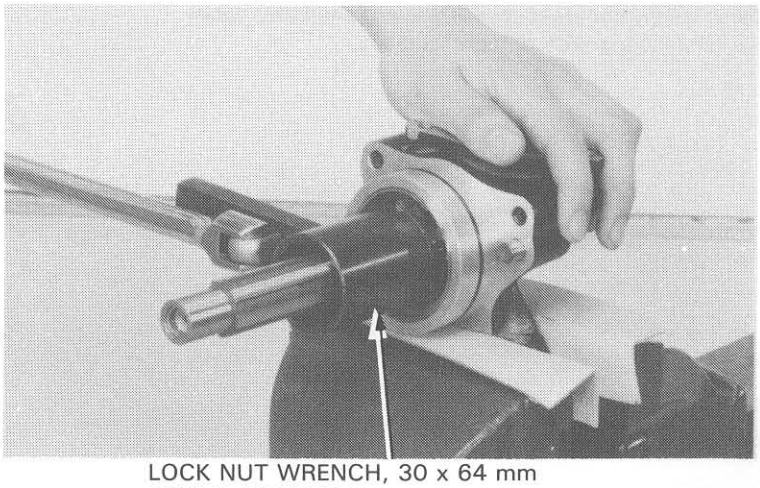
OUTPUT DRIVE GEAR DISASSEMBLY

Unstake the outer bearing race lock nut with a drill or grinder. Be careful that metal particles do not enter the bearing and the threads on the shaft are not damaged.

STAKE



Remove the outer bearing race lock nut and lock washer. Discard the lock nut.



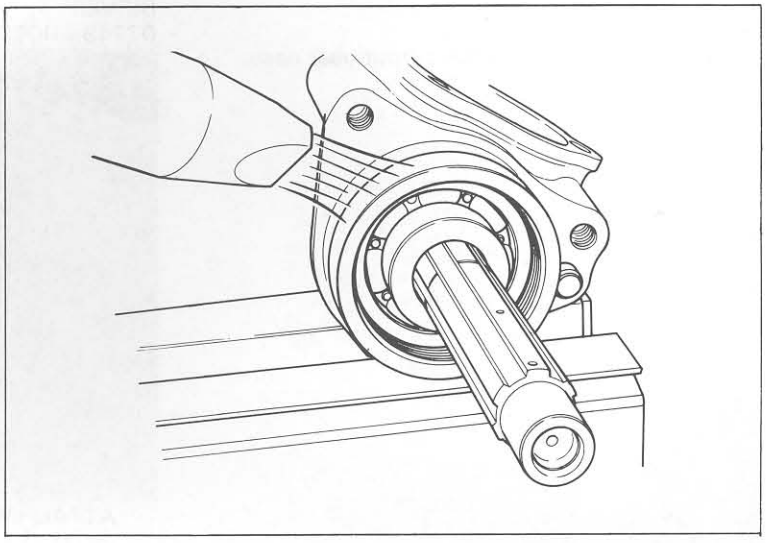
LOCK NUT WRENCH, 30 x 64 mm
07916—MB00000

Heat the output gear case around the drive shaft bearing to 80°C (176°F).

CAUTION

Always wear gloves when handling a heated gear case.

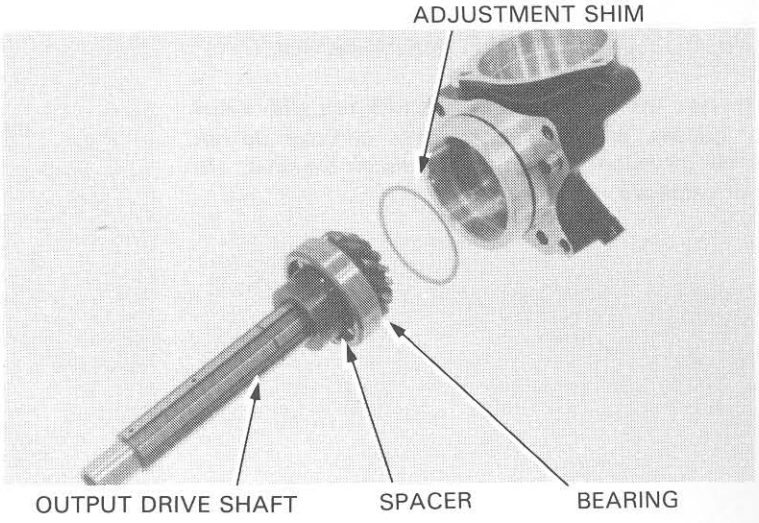
Remove the output drive gear.



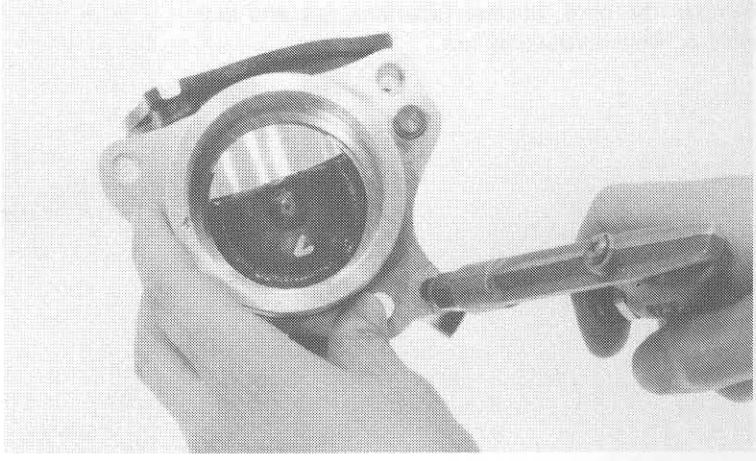
Remove the adjustment shim.

NOTE

Do not try to remove the drive shaft spacer and bearing.



Clean the output gear case in solvent and blow open the oil passage with compressed air.

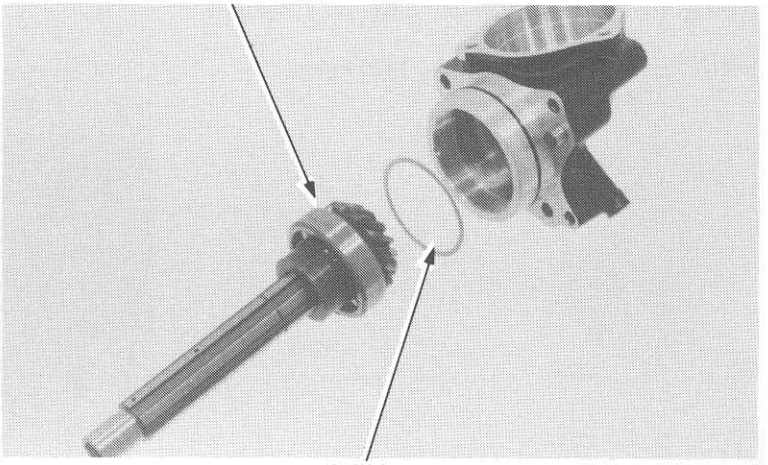


OUTPUT DRIVE GEAR ASSEMBLY

Place the shim and output drive gear into the case.

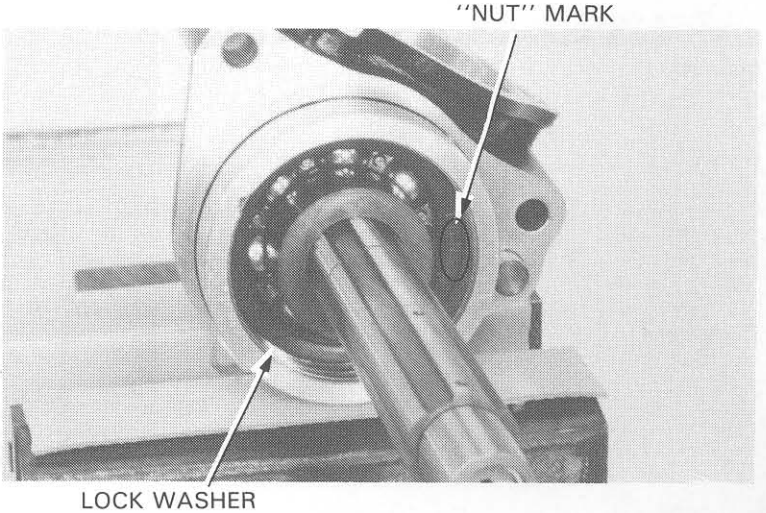
NOTE

When the gear set, driven gear bearing holder, driven gear bearing and/or gear case has been replaced, use a shim of 1.00 mm (0.039 in) thickness for initial reference.



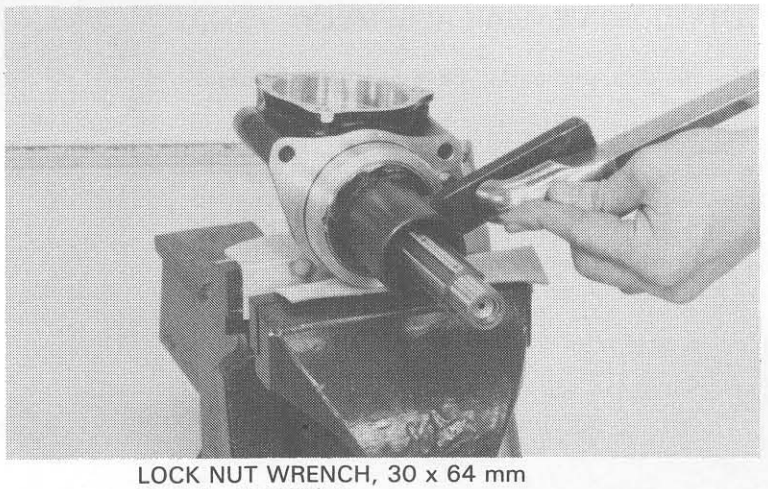
Drive the output drive gear into the case.

Install the lock washer with its "NUT" mark facing the nut.



Tighten the drive gear bearing outer race lock nut.

TORQUE: 90—110 N·m (9.0—11.0 kg-m, 65—80 ft-lb)

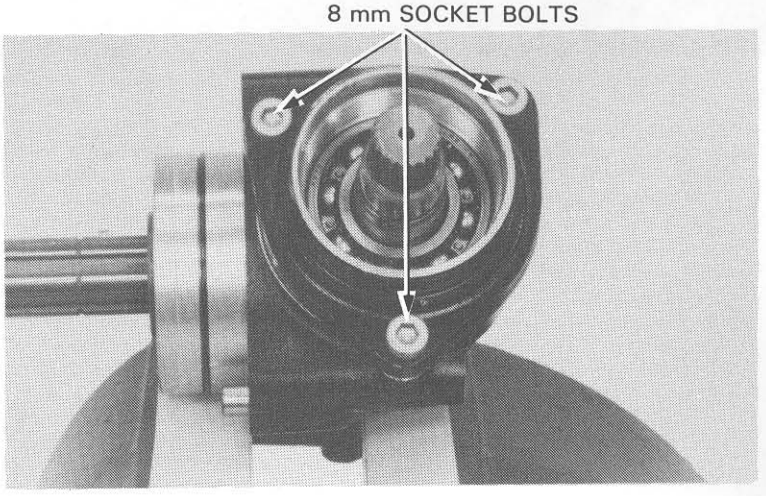


LOCK NUT WRENCH, 30 x 64 mm
07916—MB00000

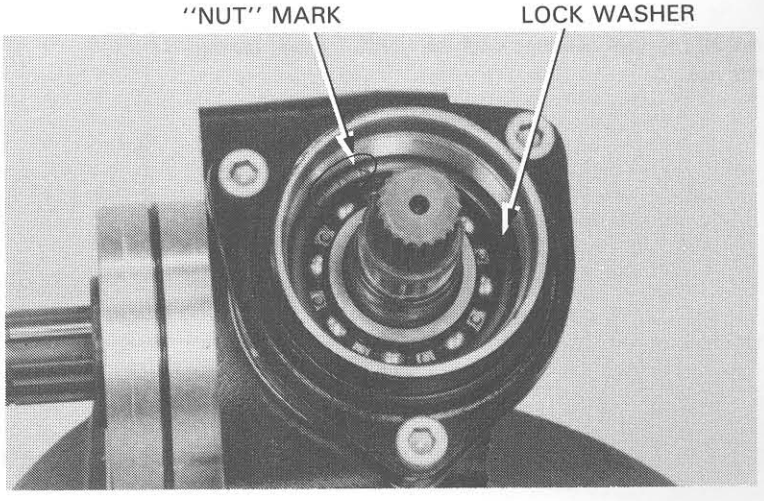
OUTPUT DRIVEN GEAR ASSEMBLY

Install the output driven gear bearing holder with the three 8 mm socket bolts.

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

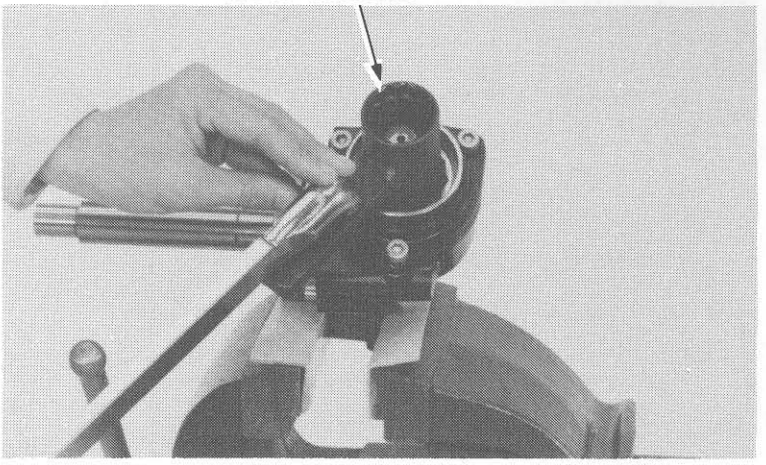


Install the lock washer with its "NUT" mark facing the nut.



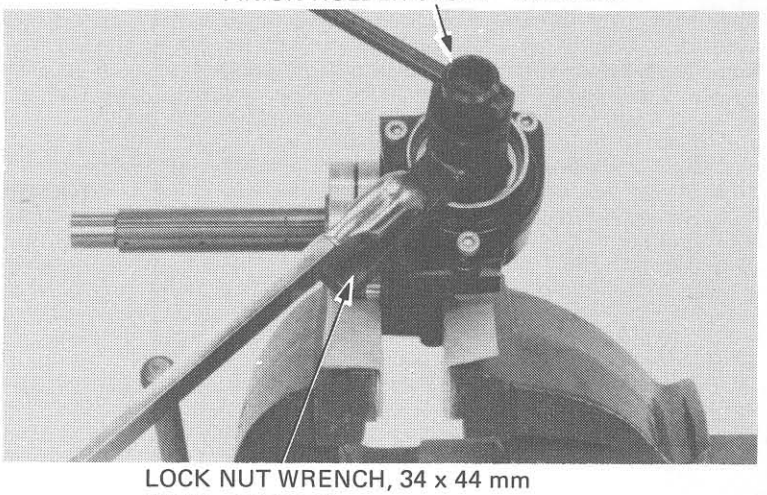
Tighten the driven gear bearing outer race lock nut.

TORQUE: 90–110 N·m
(9.0–11.0 kg-m, 65–80 ft-lb)



Hold the drive shaft with the shaft holder.
Tighten the driven gear bearing inner race lock nut.

TORQUE: 70–80 N·m
(7.0–8.0 kg-m, 51–58 ft-lb)

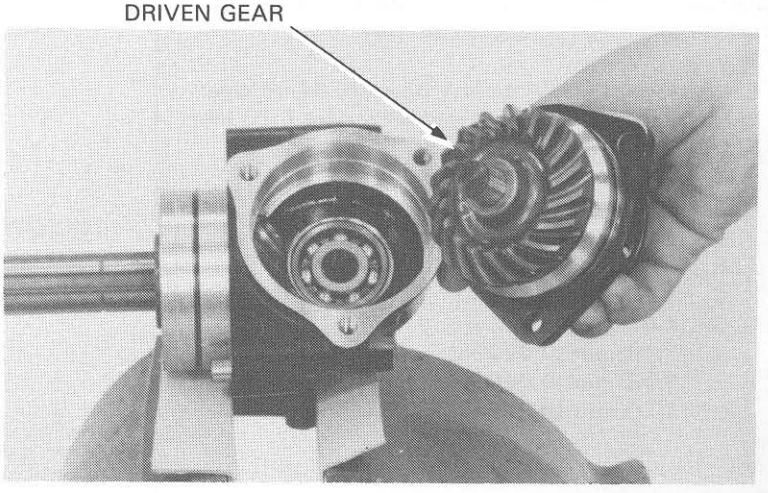


GEAR TOOTH CONTACT PATTERN CHECK

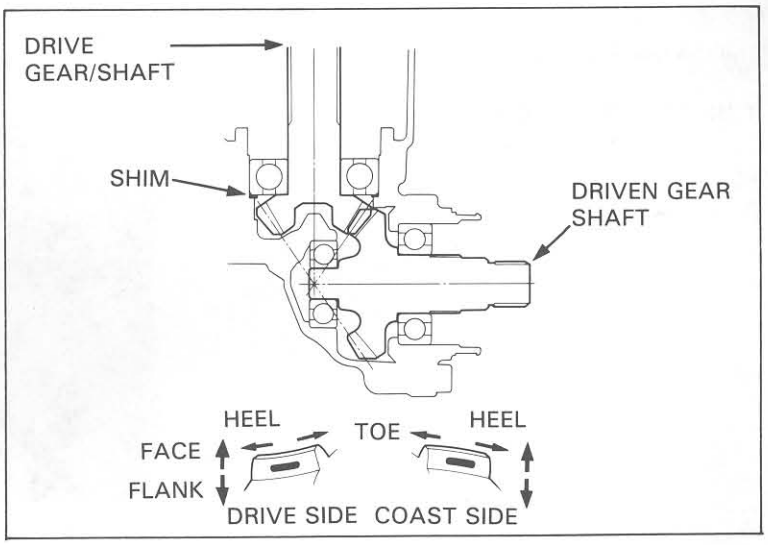
Remove the three 8 mm socket bolts attaching the driven gear holder and the driven gear assembly.

Apply Prussian Blue to the driven gear teeth.
Rotate the drive gear several times in both directions of rotation.

Check the gear tooth contact patern after removing the driven gear.

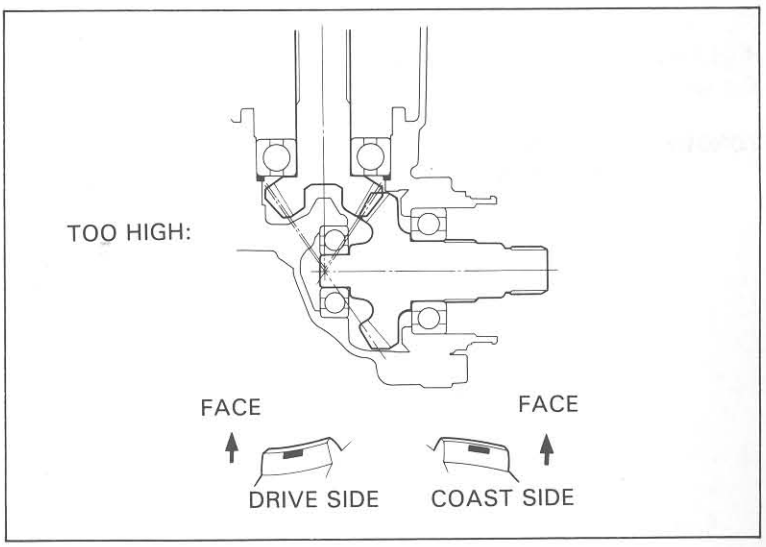


Contact is normal if Prussian Blue is transfered to the approximate center of each tooth and slightly to the side.



If the pattern is not correct, remove and replace the drive gear adjustment shim.

Replace the shim with a thinner one if the contact pattern is too high.



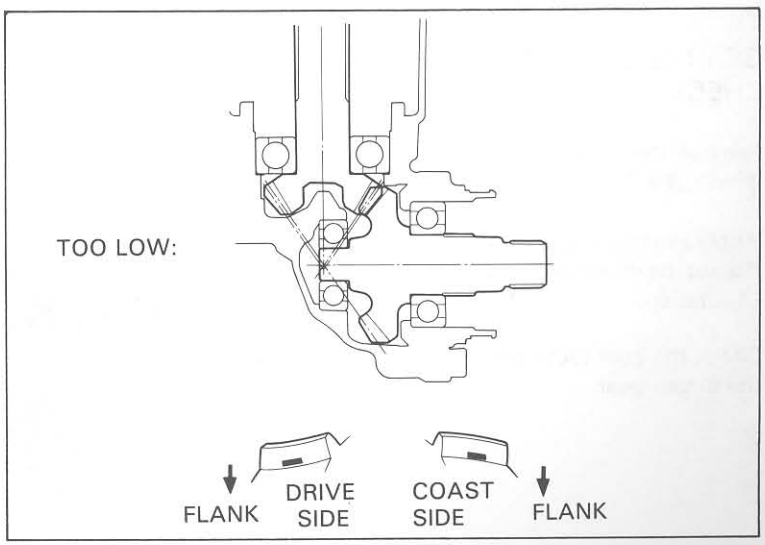
Replace the drive gear adjustment shim with a thicker one if the contact is too low.

The pattern will shift about 1.0 mm (0.04 in) when the thickness of the shim is changed by 0.10 mm (0.004 in).

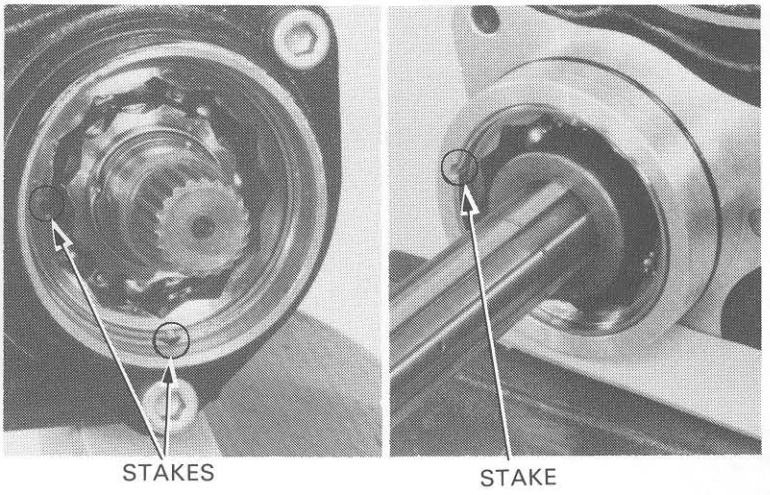
OUTPUT DRIVE GEAR ADJUSTMENT SHIM:

A:	**0.90 mm (0.035 in)**	
B:	**0.95 mm (0.037 in)**	
C:	**1.00 mm (0.039 in)**	**STANDARD**
D:	**1.05 mm (0.041 in)**	
E:	**1.10 mm (0.043 in)**	
F:	**1.15 mm (0.045 in)**	
G:	**1.20 mm (0.047 in)**	

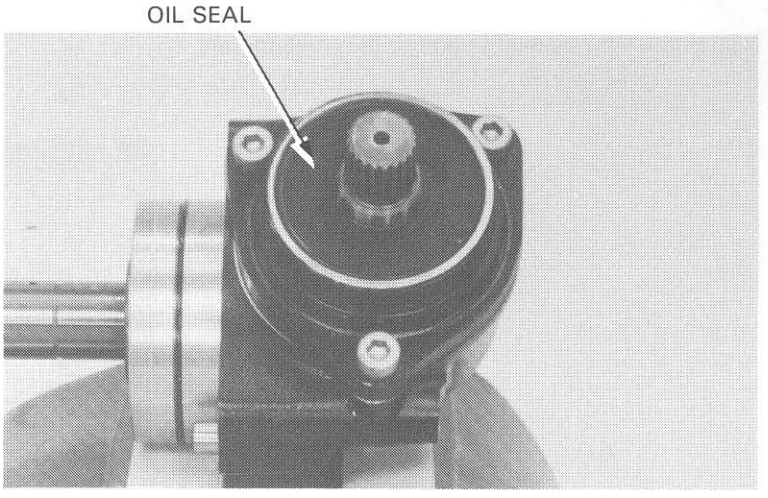
Check the backlash (See page 10-17).



Stake the outer race and inner race lock nuts.



Install a new oil seal.



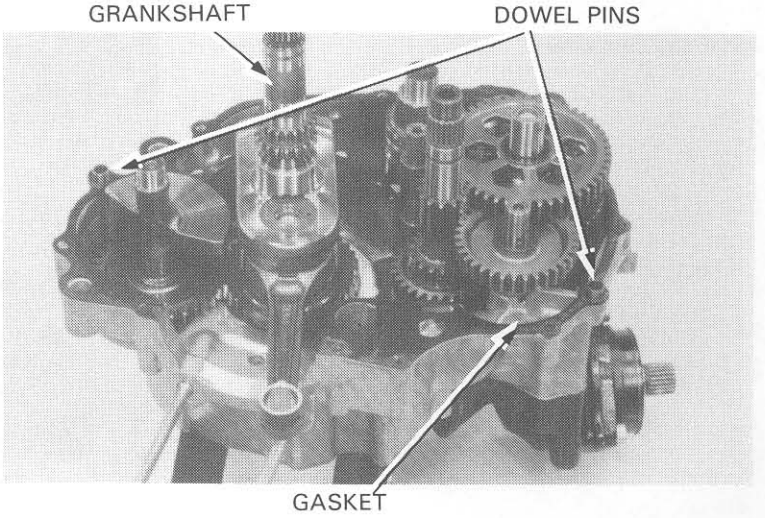
CRANKCASE ASSEMBLY

Install the dowel pins and new gasket.

Install the right crankcase onto the left crankcase.

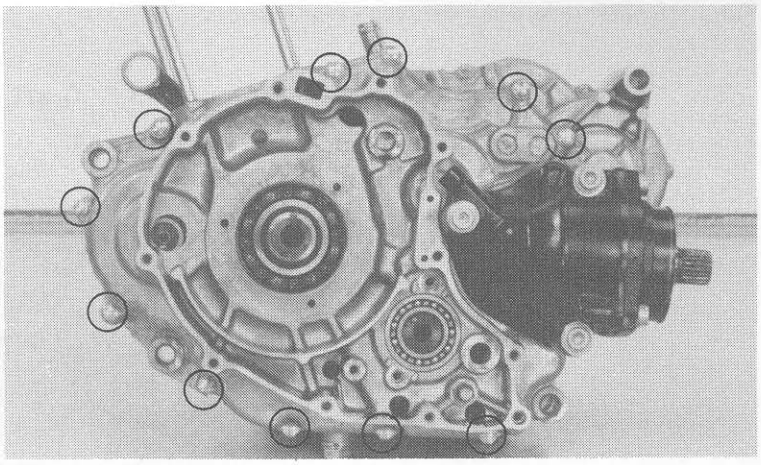
NOTE

Make sure that the gasket stays in place.

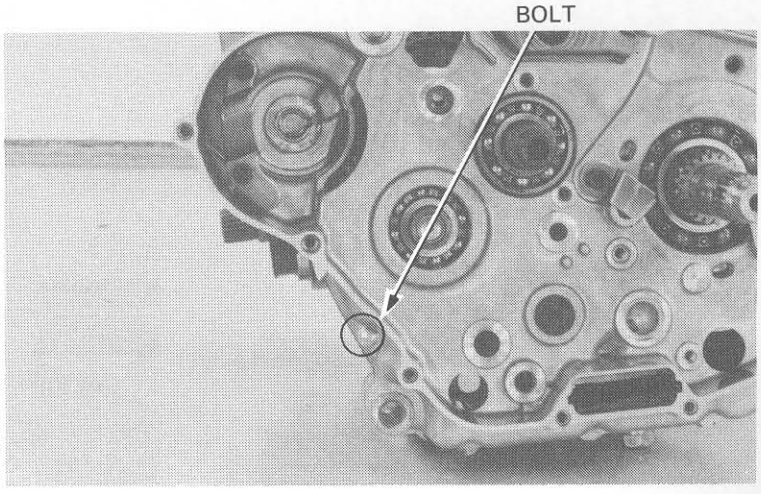


Tighten the left crankcase 6 mm bolts in a crisscross pattern.

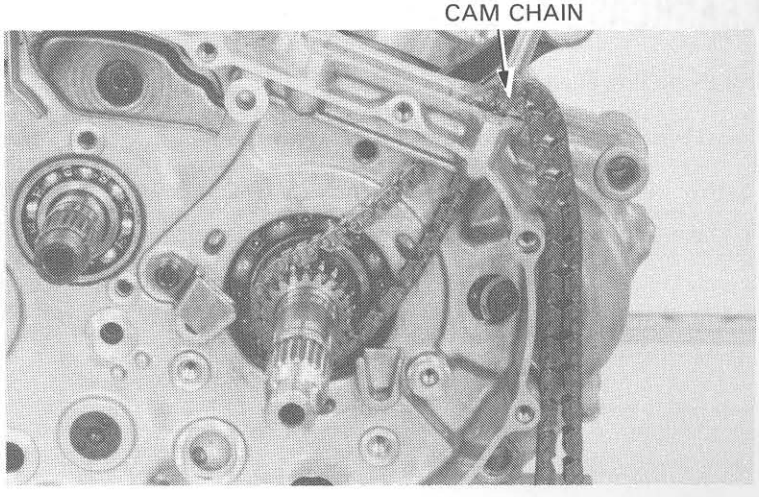
TORQUE: 8—12 N·m
(0.8—1.2 kg-m, 6—9 ft-lb)



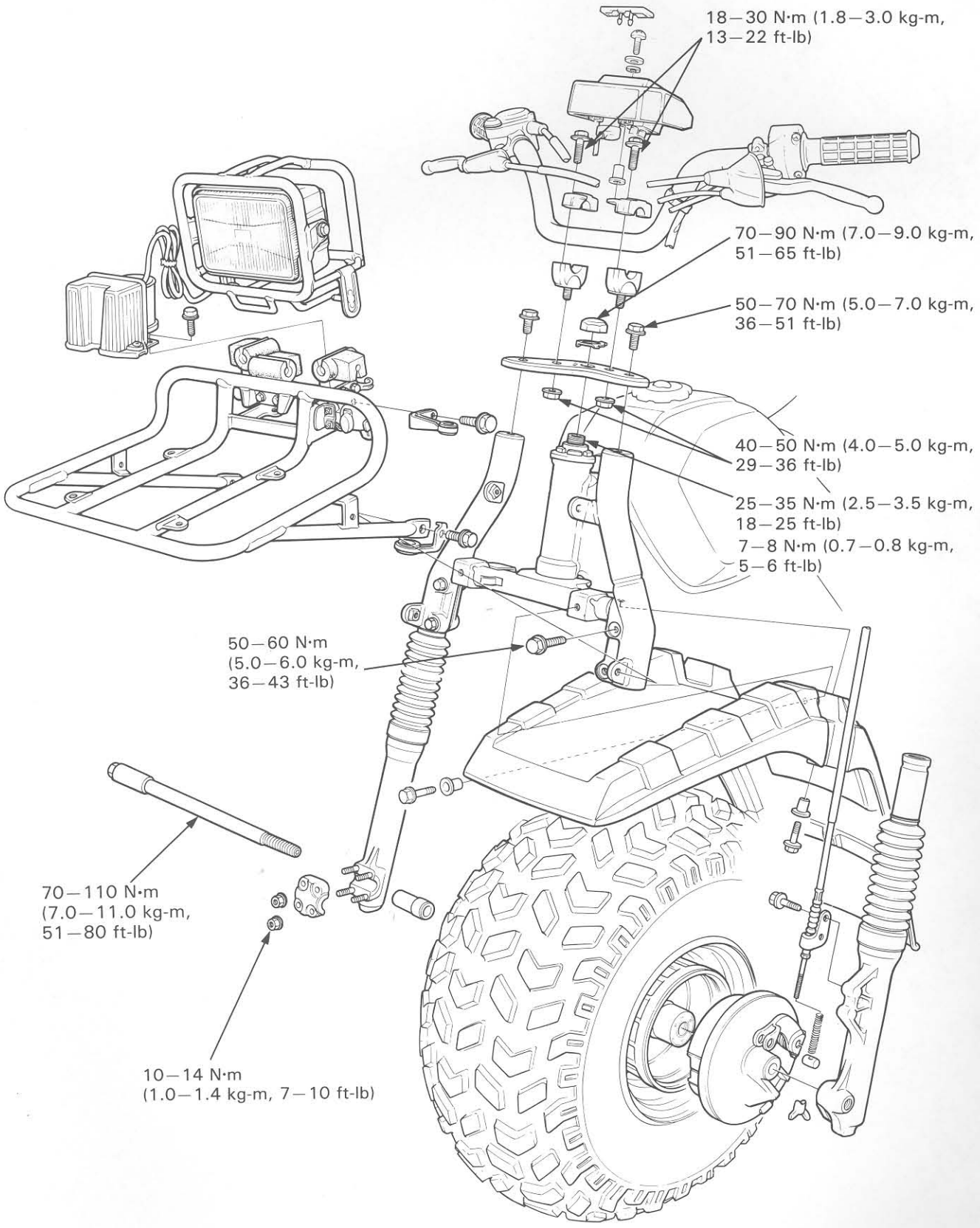
Tighten the right crankcase bolt to the same torque.



Install the cam chain.



MEMO


18—30 N·m (1.8—3.0 kg-m,
13—22 ft-lb)
70—90 N·m (7.0—9.0 kg-m,
51—65 ft-lb)
50—70 N·m (5.0—7.0 kg-m,
36—51 ft-lb)
40—50 N·m (4.0—5.0 kg-m,
29—36 ft-lb)
25—35 N·m (2.5—3.5 kg-m,
18—25 ft-lb)
7—8 N·m (0.7—0.8 kg-m,
5—6 ft-lb)
50—60 N·m
(5.0—6.0 kg-m,
36—43 ft-lb)
70—110 N·m
(7.0—11.0 kg-m,
51—80 ft-lb)
10—14 N·m
(1.0—1.4 kg-m, 7—10 ft-lb)

11. FRONT WHEEL/BRAKE/ SUSPENSION/STEERING

SERVICE INFORMATION

GENERAL

- This section covers maintenance of the front wheel, front fork, front brake and steering system.
- A jack or other support is required to support the ATC.

SPECIFICATIONS

ITEM	STANDARD	SERVICE LIMIT
Front axle runout	———	0.5 mm (0.02 in)
Front brake drum I.D.	140 mm (5.5 in)	141 mm (5.6 in)
Front brake lining thickness	4 mm (0.2 in)	2 mm (0.1 in)
Front fork spring free length	303.6 mm (11.95 in)	297.5 mm (11.71 in)
Fork tube run out	———	0.20 mm (0.008 in)
Front fork oil capacity	110.5–115.5 cc (3.73–3.91 ozs)	———

TORQUE VALUES

Handlebar upper holder bolt	18—30 N·m (1.8—3.0 kg-m, 13—22 ft-lb)
Handlebar lower holder nut	40—50 N·m (4.0—5.0 kg-m, 29—36 ft-lb)
Fork bridge bolt	50—70 N·m (5.0—7.0 kg-m, 36—51 ft-lb)
Steering stem nut	70—90 N·m (7.0—9.0 kg-m, 51—65 ft-lb)
Steering bearing adjustment nut (Initial)	25—35 N·m (2.5—3.5 kg-m, 18—25 ft-lb)
(Final)	7—8 N·m (0.7—0.8 kg-m, 5—6 ft-lb)
Front wheel nut	50—60 N·m (5.0—6.0 kg-m, 36—43 ft-lb)
	after '85: 60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb)
Front axle	70—110 N·m (7.0—11.0 kg-m, 51—80 ft-lb)
Front axle holder nuts	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)
Front fork pinch bolt	50—60 N·m (5.0—6.0 kg-m, 36—43 ft-lb)
Front fork socket bolt	18—25 N·m (1.5—2.5 kg-m, 11—18 ft-lb)

TOOLS

Special

Fork seal driver	07747–0010100 or 07947–3330000
Attachment	07747–0010501 or 07947–3330000
Attachment	07946–3290000
Ball race remover	07953–3330000
Steering stem socket	07916–3710100
Steering stem driver	07946–4300101 or 07946–MB00000 and attachment GN-MT-54 (U.S.A. only)
Universal bead breaker	GN-AH-958-BB1 (U.S.A. only)
Hex wrench, 6 mm	07917–3230000 or commercially available in U.S.A.

Common

Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Pilot, 15 mm	07746–0040300
Lock nut wrench, 30 x 32 mm	07716–0020400
Extension bar	07716–0020500 or commercially available in U.S.A.
Tire breaker set	07772–0050000
Breaker arm compressor	07772–0050100
Breaker arm	07772–0050200

TROUBLESHOOTING

Hard steering
1. Steering stem nut too tight
2. Faulty steering stem bearings
3. Damaged steering stem ball race or cone race
4. Insufficient tire pressure
5. Steering bearing adjustment nut too tight

Steers to one side or does not track straight
1. Bent front forks
2. Bent front axle, wheel installed incorrectly

Front wheel wobbling
1. Bent rim
2. Worn front wheel bearing
3. Faulty tire
4. Axle not tightened properly

Improper brake performance
1. Incorrect adjustment of lever
2. Brake shoes worn
3. Brake shoes contaminated
4. Brake cam worn
5. Brake drum worn
6. Brake arm serrations improperly engaged
7. Brake shoes worn at cam contact area

Soft suspension
1. Weak fork spring
2. Insufficient fluid in forks

Hard suspension
1. Incorrect fluid weight in forks
2. Bent fork tubes
3. Clogged fluid passage

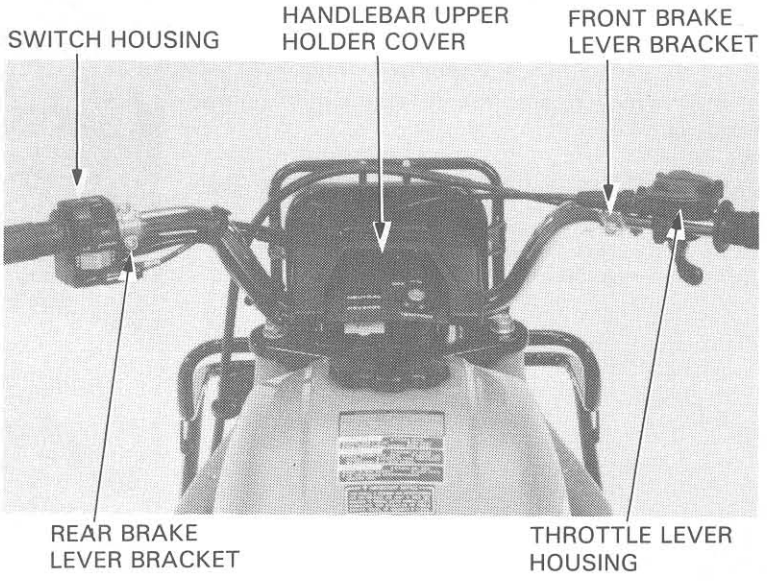
Front suspension noise
1. Loose fork fasteners
2. Insufficient fluid in forks
3. Worn slider bushing.

HANDLEBAR

REMOVAL

Remove the following:
- wire bands.
- front and rear brake lever brackets.
- throttle lever housing.
- switch housing.

- handlebar upper holder cover cap.
- handlebar upper holder cover by removing the two screws.
- handlebar upper holders and the handlebar.



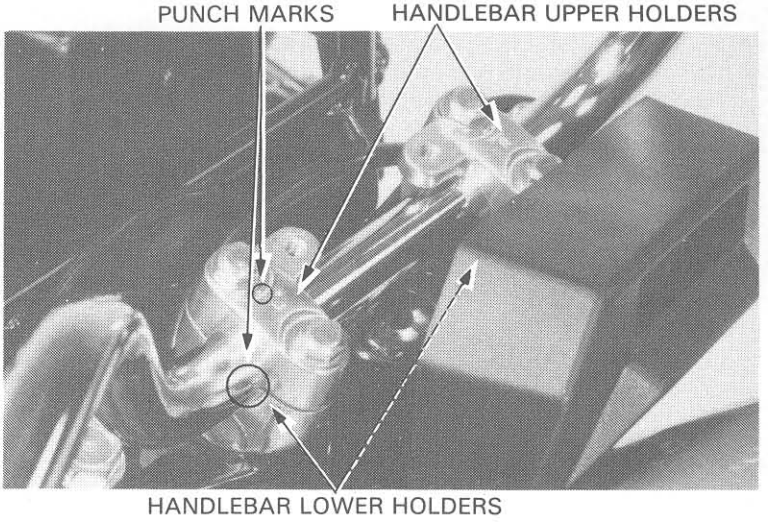
INSTALLATION

Place the handlebar on the lower holders.

Align the punch mark on the handlebar with the top of the lower holders.

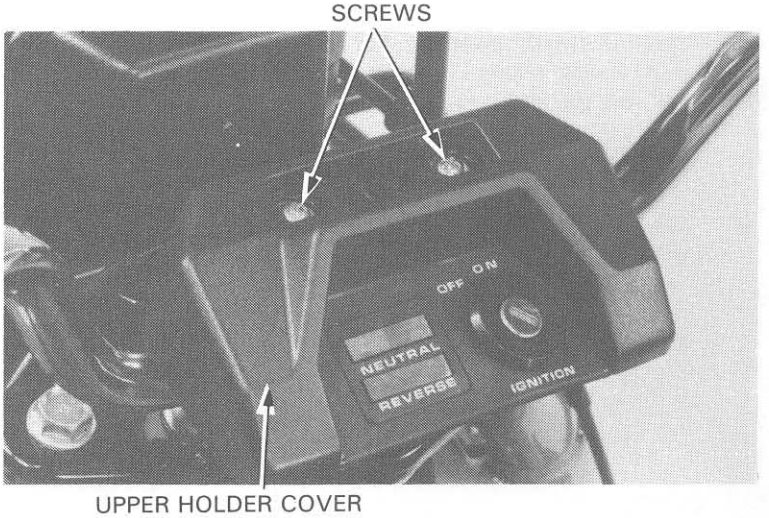
Install the upper holders on the handlebar with their punch marks forward.
Tighten the forward bolts first, then tighten the rear bolts.

TORQUE: 18—30 N·m
(1.8—3.0 kg-m, 13—22 ft-lb)



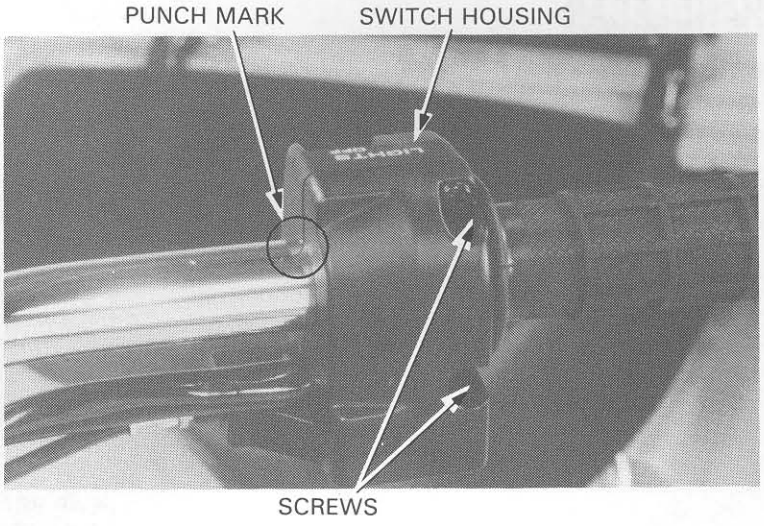
Install the upper holder cover and tighten it with the two screws.

Install the upper holder cover cap.



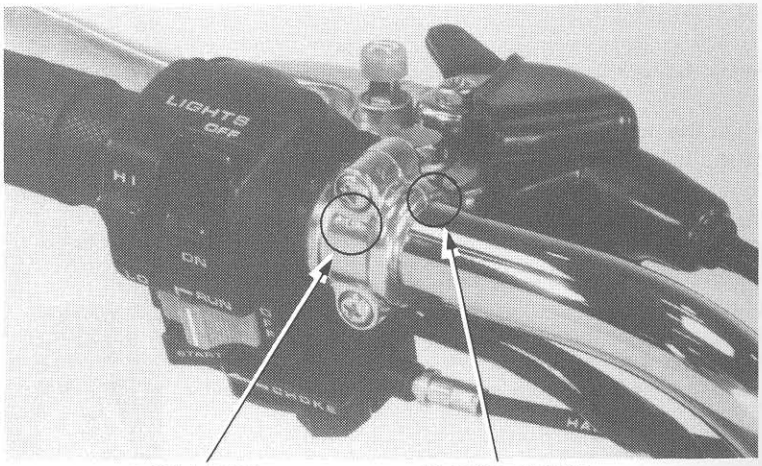
Install the switch housing onto the handlebar aligning its mating surfaces with the punch mark on the handlebar.

Tighten the upper screw first, then tighten the lower screw.



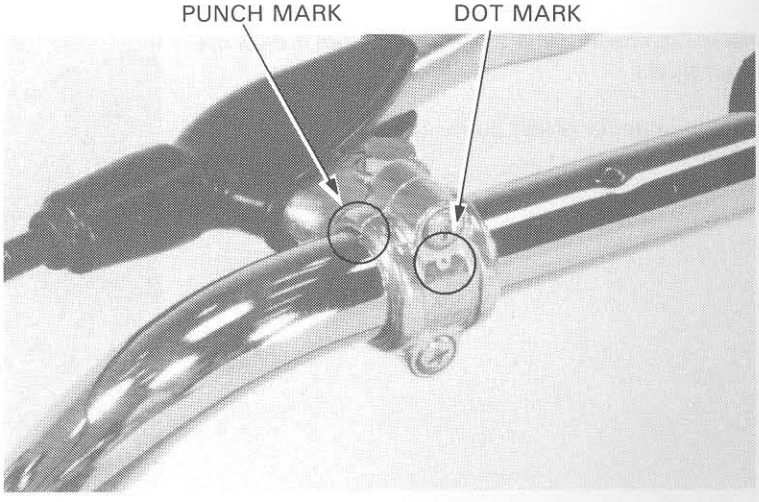
Install the rear brake lever bracket with the dot mark on the holder facing up. Align the end of the holder with the punch mark on the handlebar.

Tighten the upper screw first, then the lower screw.



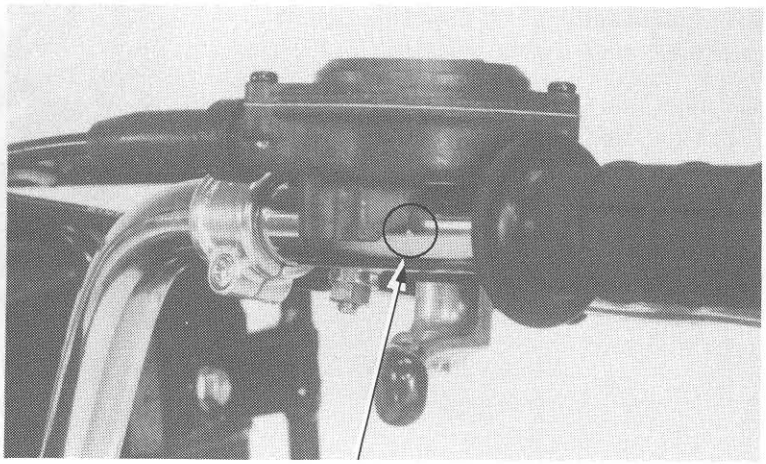
Install the front brake lever bracket with the dot mark on the holder facing up. Align the end of the holder with the handlebar punch mark.

Tighten the upper screw first, then the lower screw.



Install the throttle housing onto the handlebar.

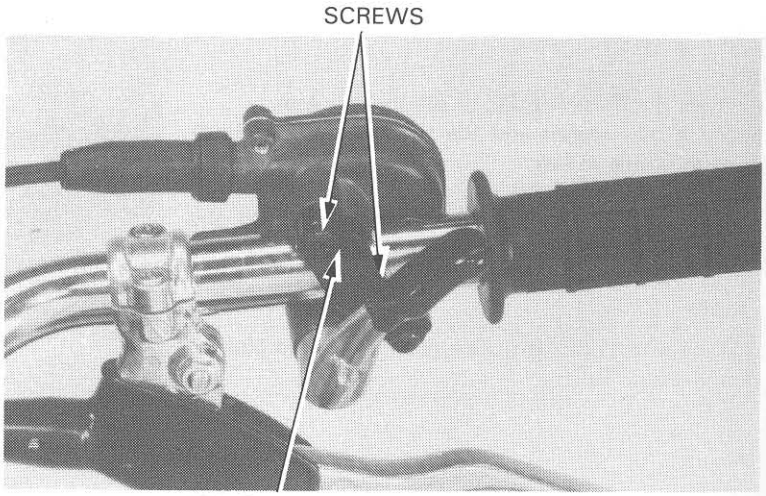
Align the end of the housing with the punch mark on the handlebar.



PUNCH MARK

Install the throttle housing holder and screws.

Tighten the forward screw first, then the rear screw.



THROTTLE HOUSING HOLDER

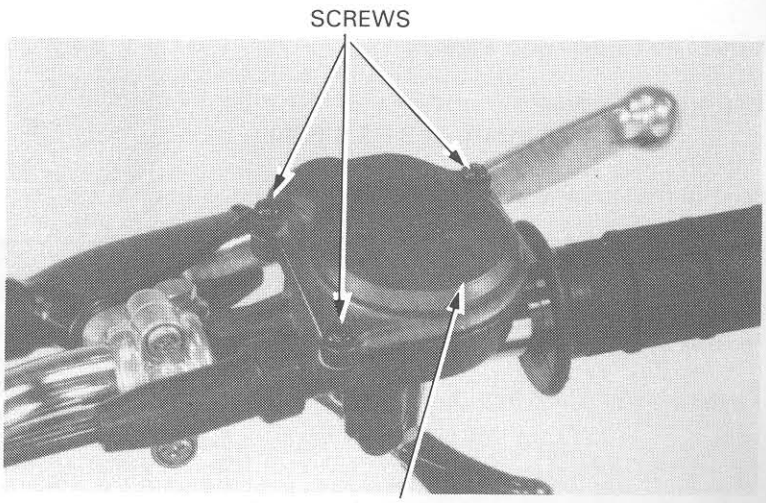
THROTTLE HOUSING

DISASSEMBLY

NOTE

> Do not dis/connect the throttle cable using a tool such as a pair of radio pliers without removing the throttle arm. Damage to the wire occurs if it is bent.

Remove the three throttle housing cover screws and the cover.
Remove the gasket.



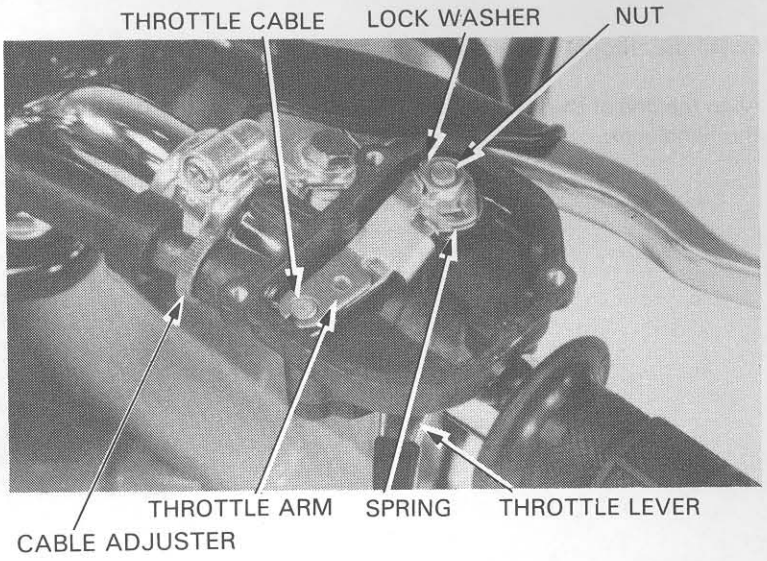
THROTTLE HOUSING COVER

Slide the rubber boot off the cable adjuster.
Loosen the throttle cable adjuster.

Bend down the lock washer tab and remove the nut and lock washer.

Disconnect the throttle cable from the throttle arm.

Remove the throttle arm, spring and throttle lever from the throttle housing.



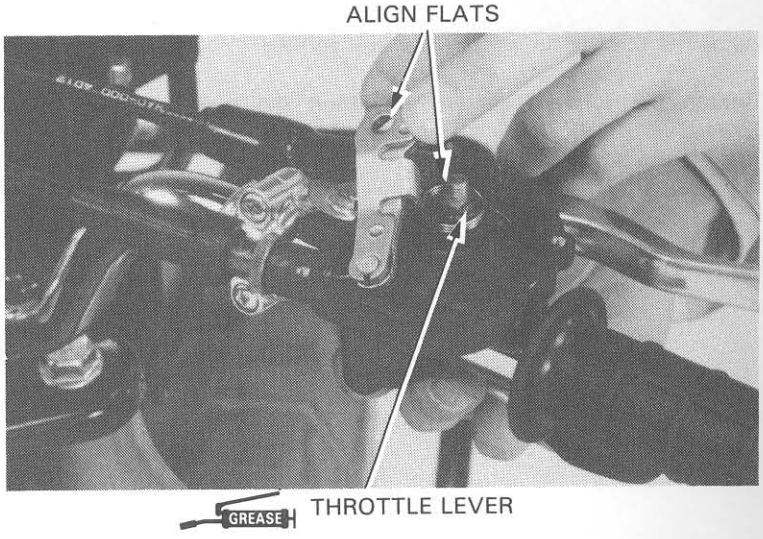
ASSEMBLY

Connect the throttle cable to the throttle arm.
Install a new gasket and the throttle housing cover using the three screws.

Install the throttle arm spring and arm onto the throttle lever aligning their flats.

NOTE

Take care of the throttle arm spring not to bind and check for it.



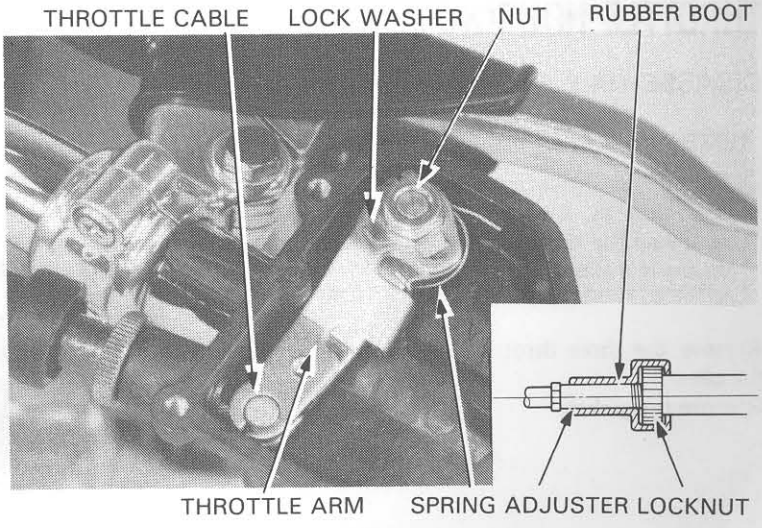
Install a new lock washer and nut.

TORQUE: 3—4 N·m
(0.3—0.4 kg-cm, 2.2—2.9 ft-lb)

Bend up the lock washer tab against the nut.

Securely set the rubber boot till it bottoms as to cover the lock nut. If the rubber boot is set improperly, water might leak into the throttle housing.

Adjust throttle lever free play (page 3-8).

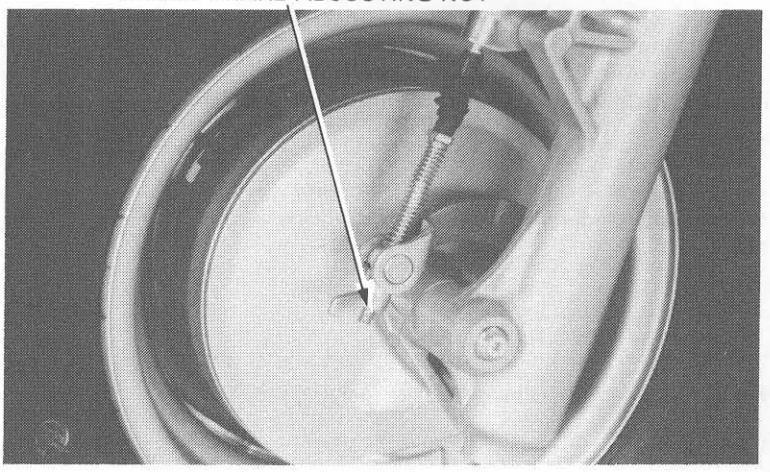


FRONT WHEEL

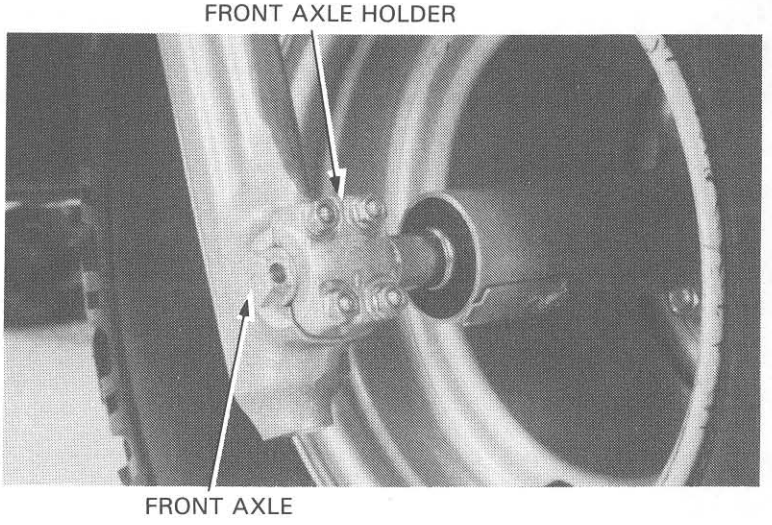
FRONT WHEEL REMOVAL

Raise the front wheel off the ground by placing a block or work stand under the engine.

Remove the front brake adjusting nut and disconnect the front brake cable.



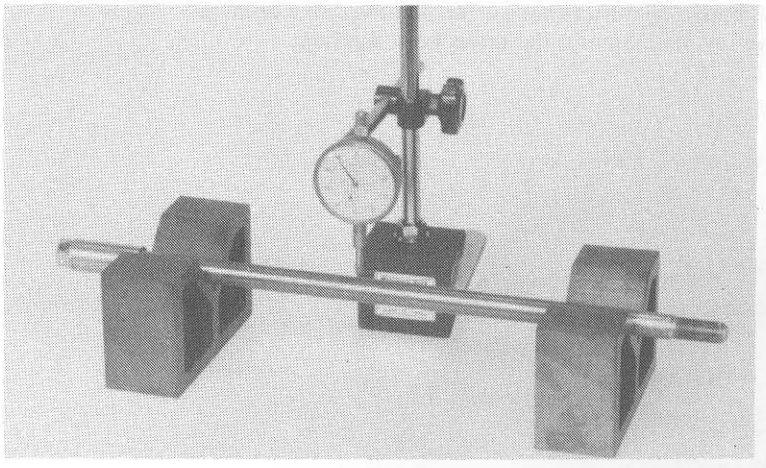
Loosen the axle holder nuts and unthread the front axle.



FRONT AXLE INSPECTION

Set the axle in V-blocks, rotate and measure the runout.

SERVICE LIMIT: 0.5 mm (0.02 in)



BEARING INSPECTION

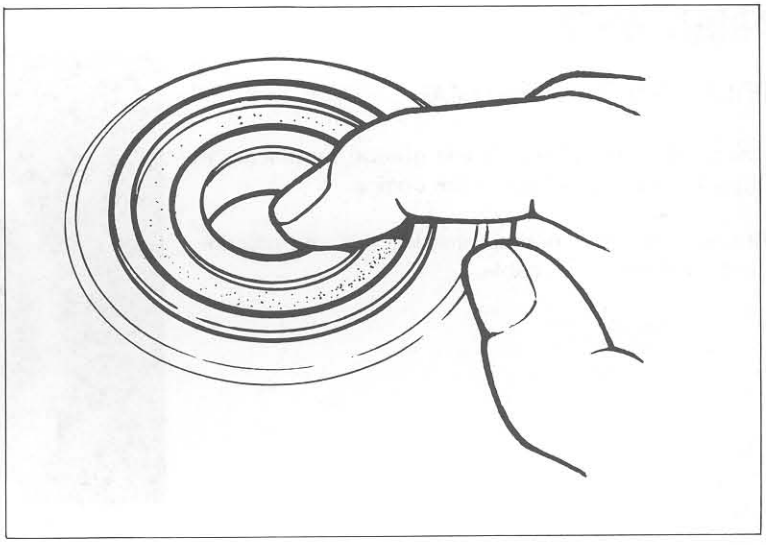
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

NOTE:

Replace hub bearings in pairs.

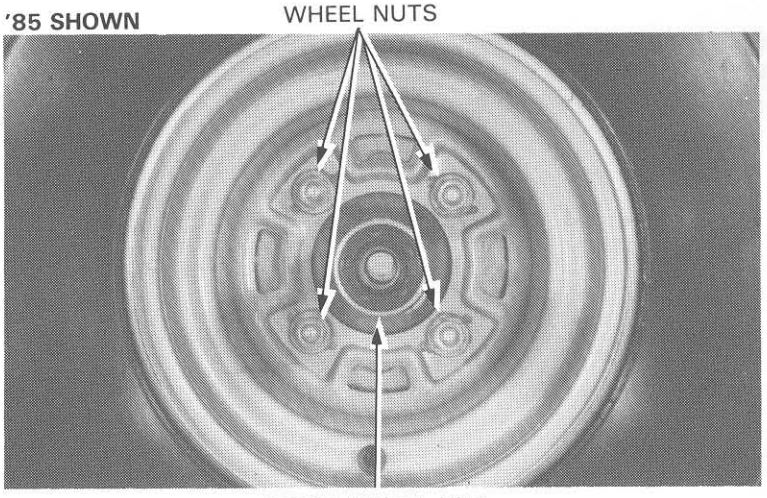
For replacement to bearings, see page 11-9 and 11-15.



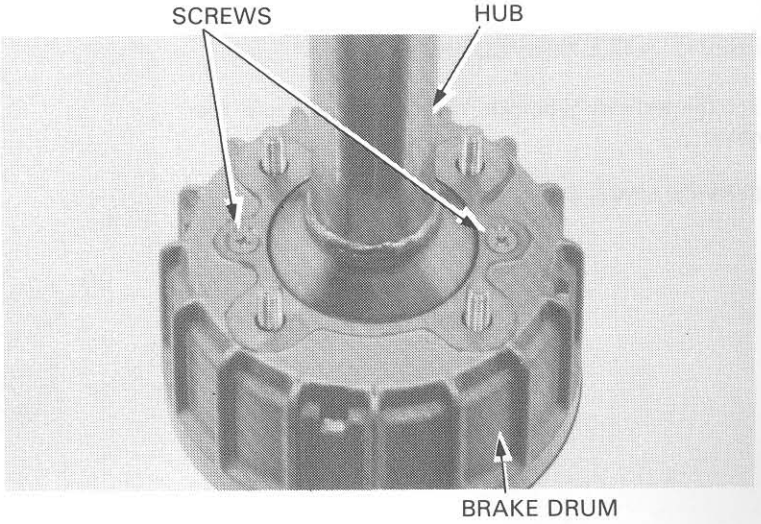
FRONT WHEEL DISASSEMBLY

Remove the front wheel nuts and hub.

'85 SHOWN

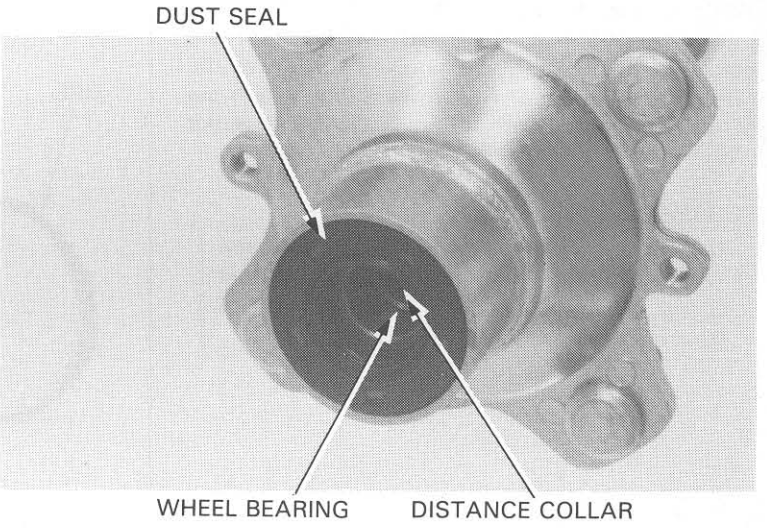


Remove the two screws attaching the brake drum to the wheel hub and the drum from the hub.



Remove the dust seals and spacer from the wheel hub.

Remove the bearings from the hub using commercially available bearing drivers/removers.



TIRE REMOVAL (U.S.A. ONLY)

NOTE

This service requires the Universal Bear Breaker (GN-AH-958-BB1) available in U.S.A. only.

Remove the core from the valve stem.

NOTE

Remove and install tires from the rim side opposite the valve stem.

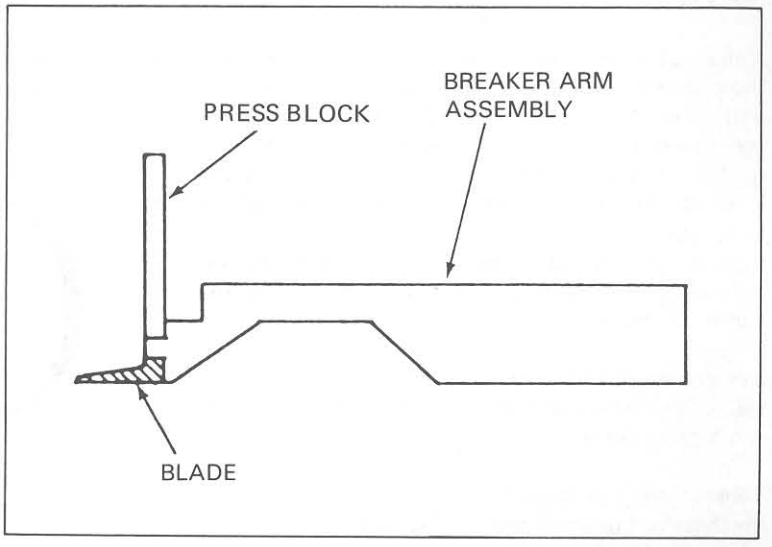
CAUTION

- *Use of the Bead Breaker tool is required for tire removal.*
- *Do not damage the bead seating area of the rin.*
- *Use a Coats 220 Tire Changer or equivalent to remove the tire from the rim. If a tire changer is not available, rim protectors and tire irons may be used.*

Install the blade for 9''/11'' rims onto the breaker arm assembly.

CAUTION

Use of an improper size blade may result in damage to the rim, tire or blade.



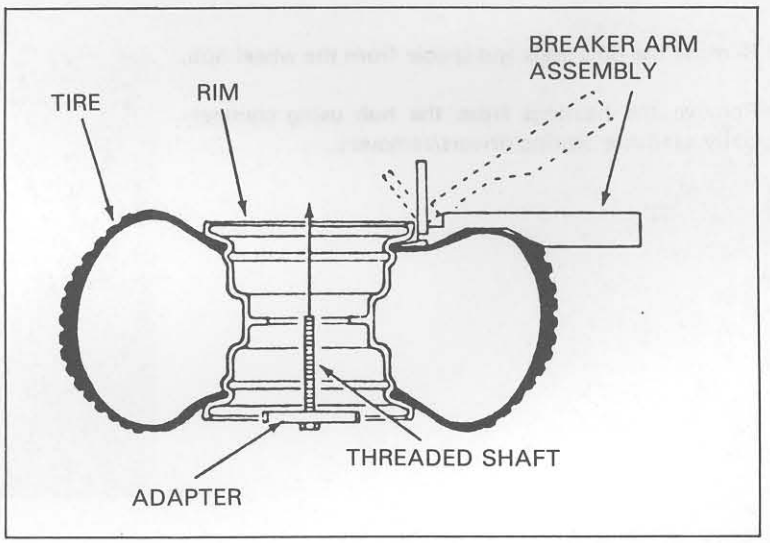
Place the proper size adapter onto the threaded shaft and then put the wheel over the threaded shaft and adapter.

Lube the bead area with rubber lubricant, pressing down on the tire sidewall/bead area in several places, to allow the lubricant to run into and around the bead, Also lube the area where the breaker arm will contact the sidewall or the tire.

While holding the breaker arm assembly at an approximate 45° position, insert the blade of the breaker arm between the tire and rim. Push the breaker arm inward and downward until it is in the horizontal position with its press block in contact with the rim.

NOTE

It may be necessary to tap the breaker arm with a brass hammer to install it the last 3 mm. While doing so, be sure to hold the arm down in the horizontal position.

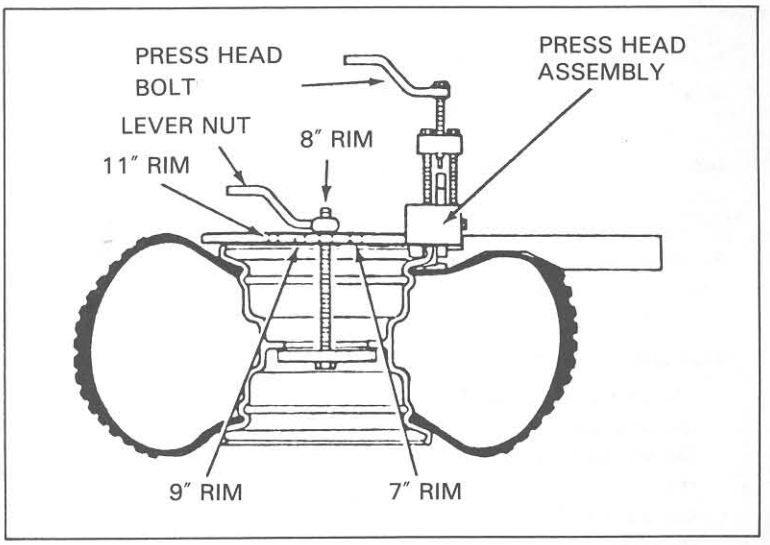


With the breaker arm in the horizontal position, place the breaker press head assembly over the breaker arm press block. Make sure the press head bolt is backed out all the way and then position the nylon buttons on the press head against the inside edge of the rim.

Insert the threaded shaft through the appropriate hole in the breaker press head assembly and then tighten the lever nut until both ends of the breaker press head assembly are in firm contact with the rim.

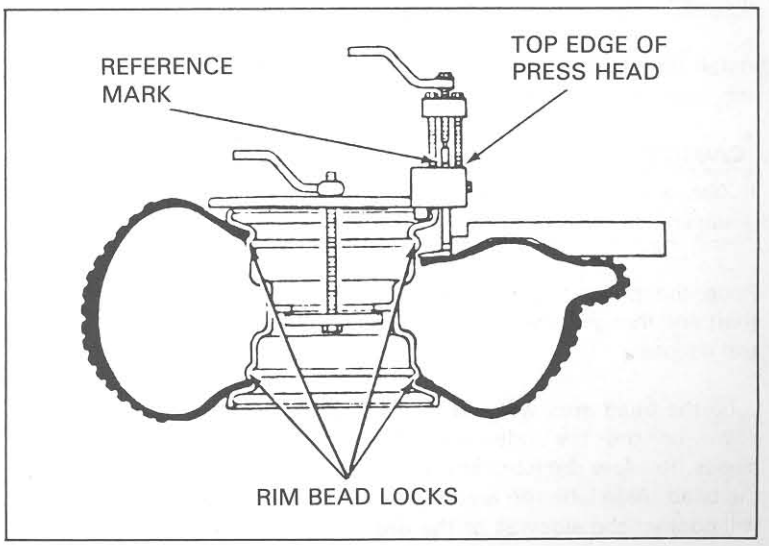
NOTE

Insert bolts throught the holes in the rim hub mounting tabs and the adapter to position the adapter properly.



Tighten the press head bolt until the reference mark on the press block is aligned with the top edge of the press head.

If the rest of the bead cannot be pushed down into the center of the rim by hand, loosen the press head bolt and the lever nut. Rotate the breaker arm assembly and breaker press head assembly 1/8 to 1/4 the circumference of the rim. Tighten the lever nut and then tighten the press head bolt as described.
Repeat this procedure as necessary until the remainder of the bead can be pushed down into the center of the rim.



Assemble the Universal Bead Breaker on the other side of the wheel and break the bead following the same procedures.

Remove the tire from the rim using a tire changer machine or tire irons and rim protectors.

TIRE REMOVAL (EXCEPT U.S.A.)

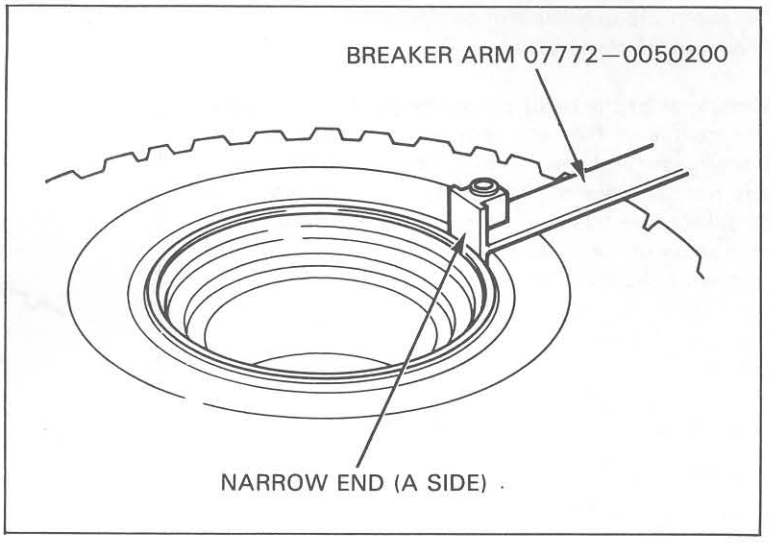
NOTE

This service requires the Tire Bead Breaker Set (07772—0050000).

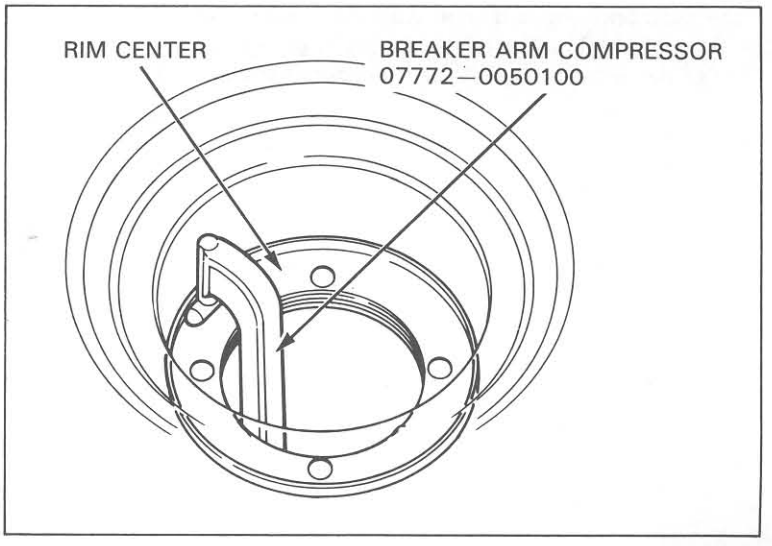
CAUTION

- *Do not apply water, soap water, oil etc. to the tire, rim and tool when removing the tire. The tool breaker arm may slip off the tire and the bead can not be broken off the tire.*
- *Do not damage the bead seating area of the rim.*
- *Follow the breaker manufacturer's instructions.*

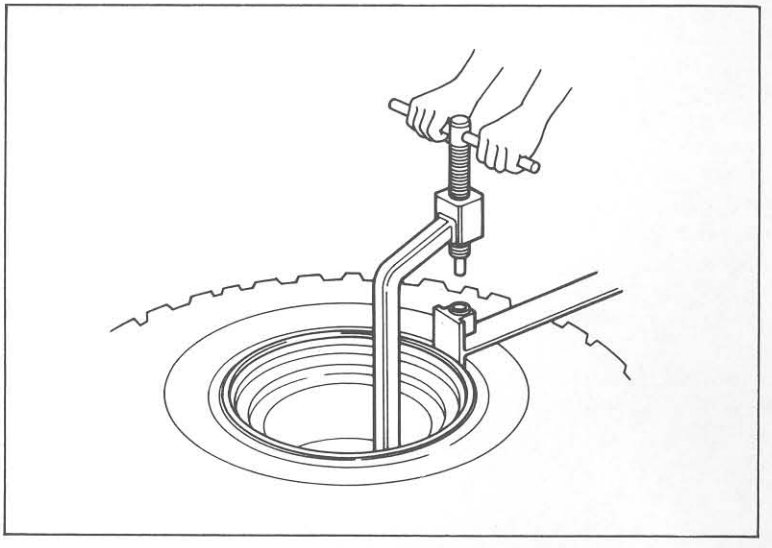
Insert the narrow end (A side) of the breaker arm between the tire and the rim.



Position the breaker arm compressor onto the rim center as shown.

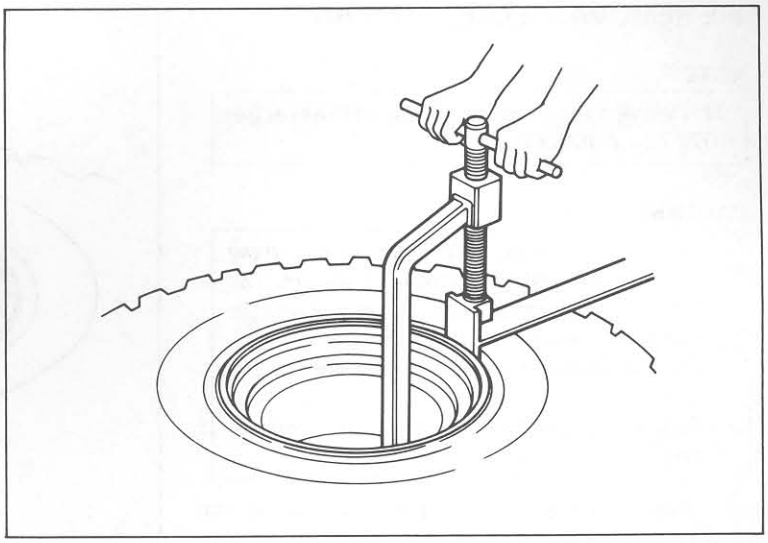


Keep the breaker arm horizontally and align the end of the compressor bolt with the arm hole.

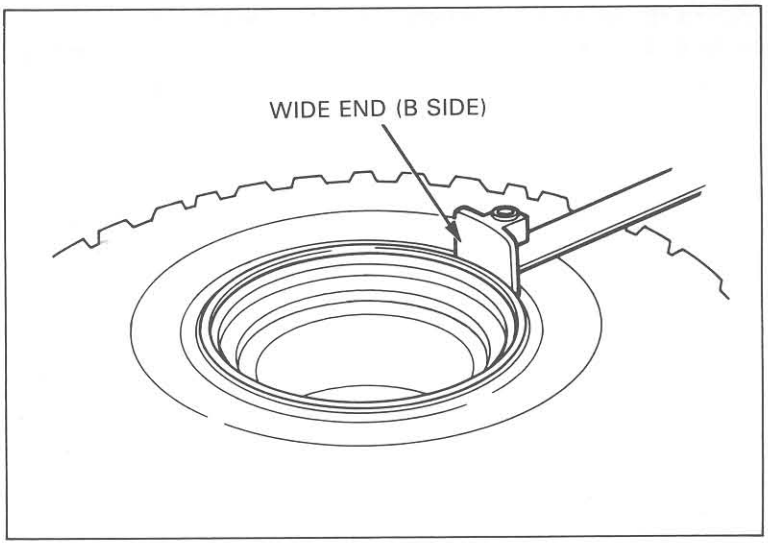


Screw in the breaker arm compressor bolt to break the bead from the tire.

If the rest of the bead cannot be pushed down into the center of the rim, remove and reposition the compressor and arm 1/8 to 1/4 the circumference of the rim. Tighten the compressor bolt to break the bead. Repeat this procedure as necessary until the remainder of the bead can be pushed down into the center of the rim.

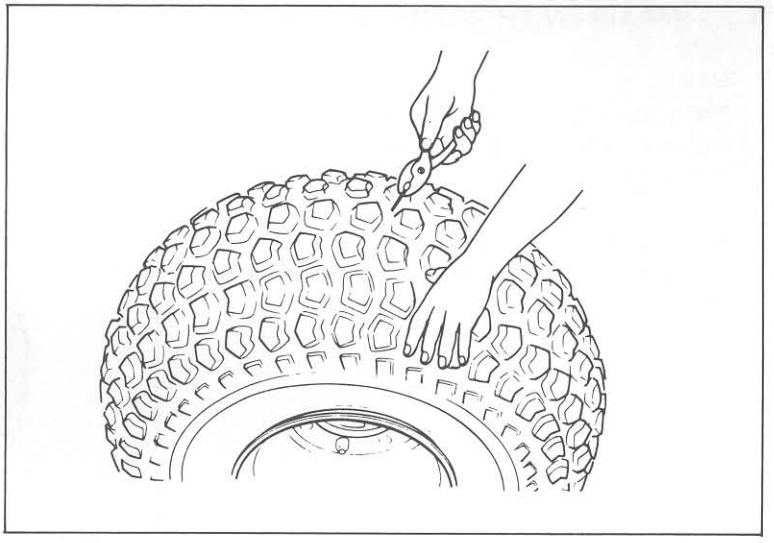


If the bead breaking is dificult with the narrow end (A side) of the breaker arm, use the wide end (B side) of the arm and repeat the procedure above.

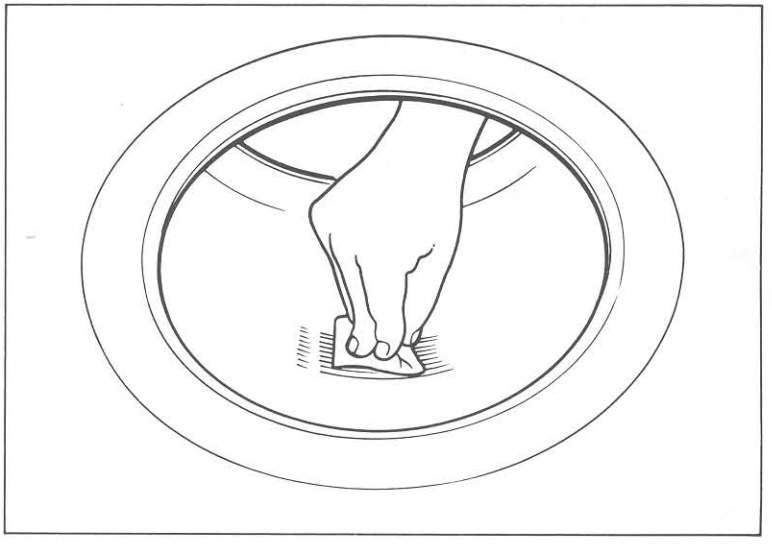


TIRE REPAIR (WITH COLD PATCH)

Check the tire tread for puncturing objects.
Chalk mark the punctured area and remove the puncturing object.



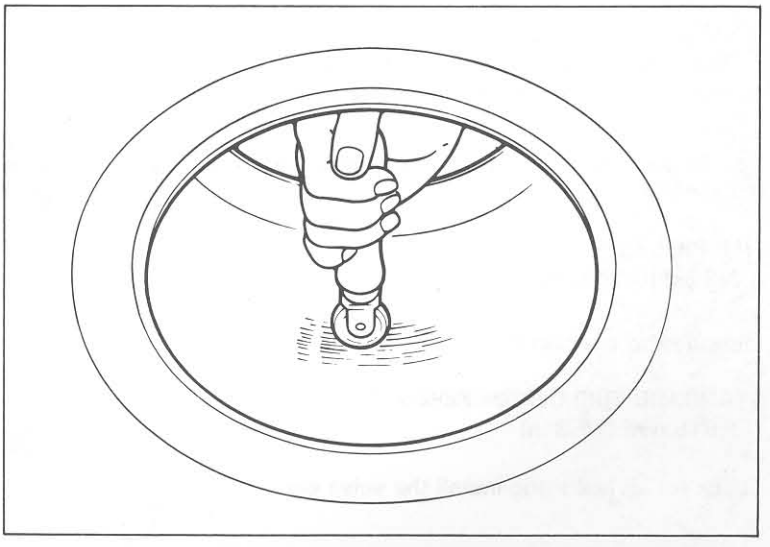
Clean and roughen the puncturd area inside the tire with a tire rubber cleaner or a wire brush. Clean the area with non-flammable solvent.



Apply rubber cement around the torn area and allow it to dry. Remove the lining from the patch and center it over the injury. Press the patch against the injury using a special roller.

NOTE

- Allow cement to dry until tacky before applying patch.
- Do not touch cement surfac with dirty or greasy hands.



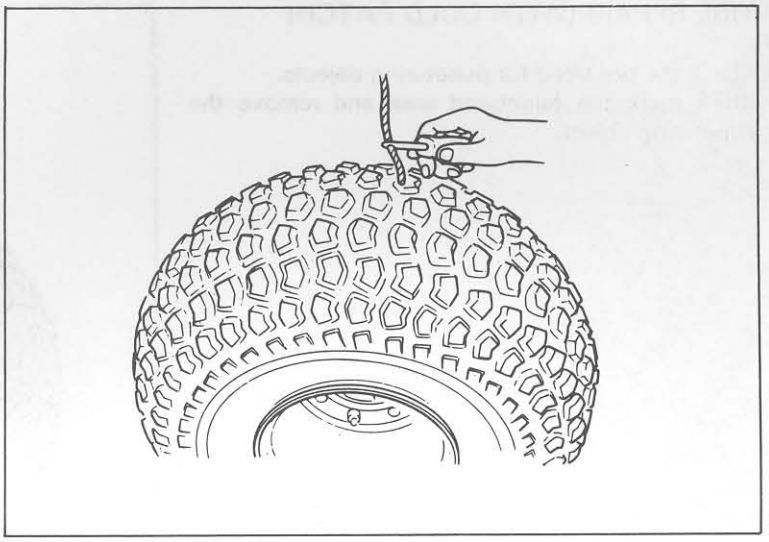
TIRE REPAIR (WITH RUBBER PLUG)

NOTE

> This method is an emergency repair only. Replace the plug at the first opportunity with a cold patch.

Remove the puncturing object.
Insert a rubber plug through the eye of an inserting needle.

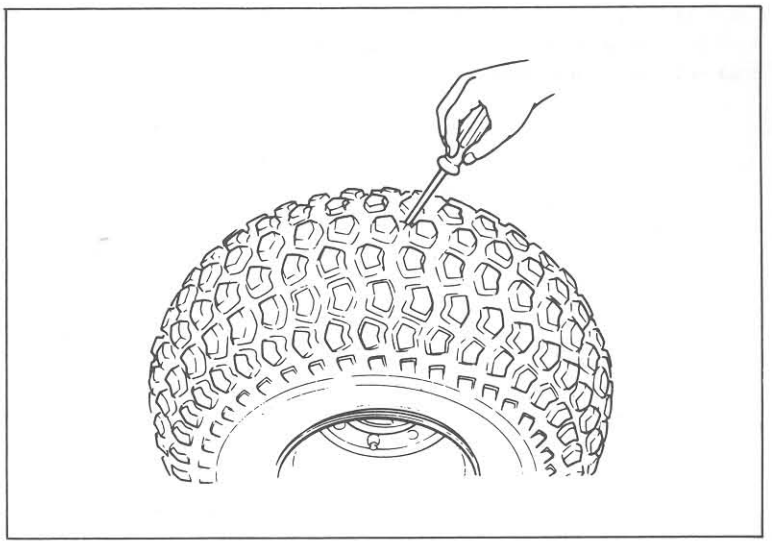
Apply patching cement to the plug.



Center the needle on the plug and insert until the plug is all the way in the tire. Twist the needle several times.

Pull the needle straight out so that the plug is about 10 mm (3/8 in) above the tread surface. Trim the plug 2 mm (1/16 in) above the surface.

Repeat the above procedure if the puncture is large.



TIRE ASSEMBLY

Clean the rim bead seat and flanges.
Apply clean water to the rim flanges, bead seat and base.
Install the valve core in the valve stem.
Inflate the tire to seat the tire bead.

NOTE

> Use tire mounting lubricant or a soap and water solution to help seat the tire bead.

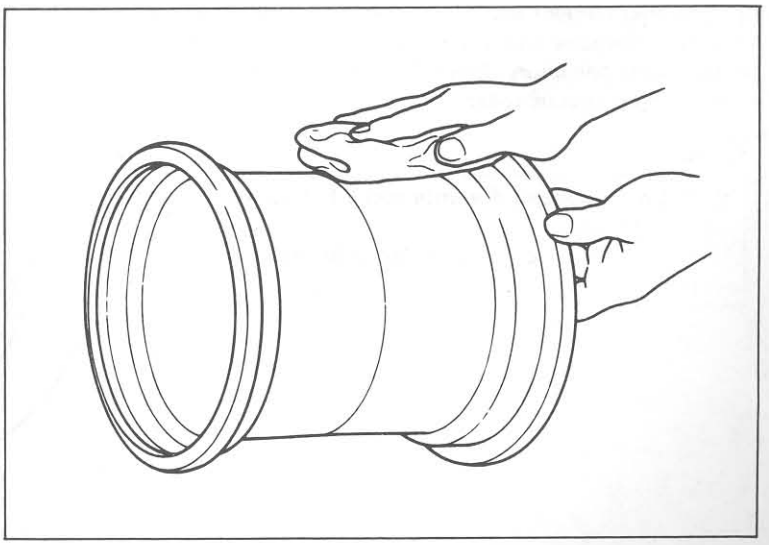
Deflate the tire. Wait 1 hour and inflate the tire to the specified pressure.

TIRE PRESSURE:
2.2 psi (0.15 kg/cm², 15 kPa)

Measure the tire circumference.

STANDARD TIRE CIRCUMFERENCE:
1,915 mm (79.3 in)

Check for air leaks and install the valve cap.



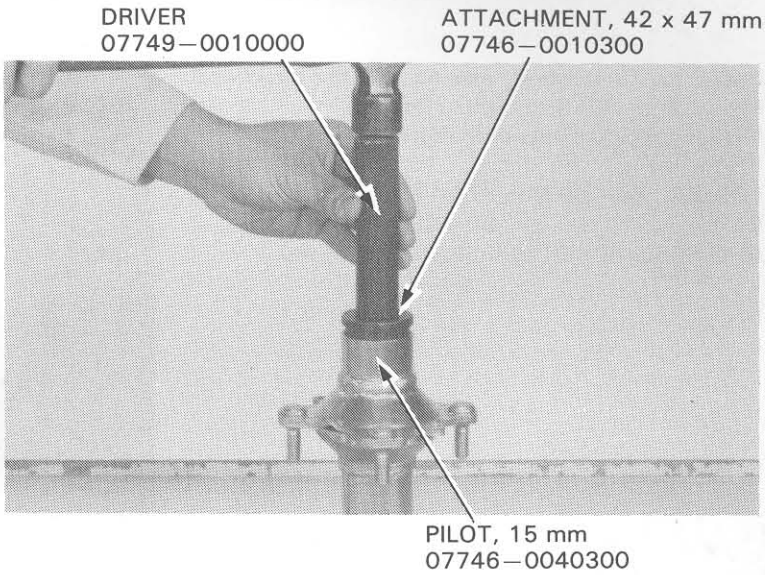
FRONT WHEEL ASSEMBLY

Pack all front wheel bearing cavities with grease.

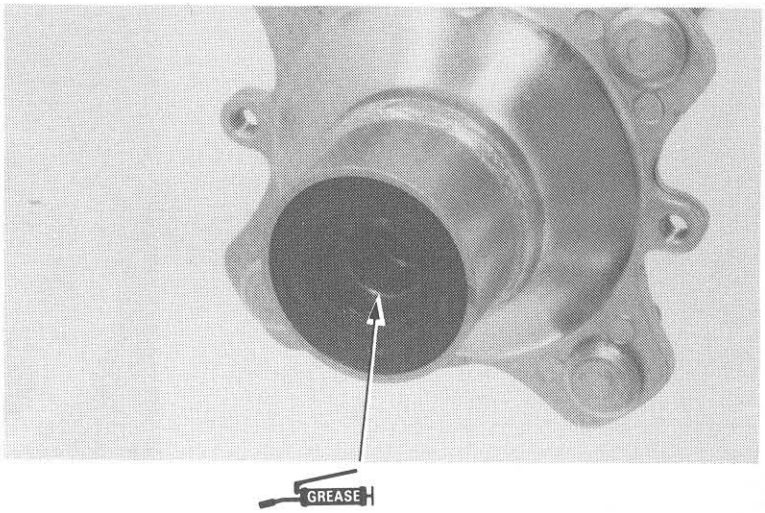
Drive in the left bearing squarely until it seats. Install the center collar and drive in the right bearing squarely until it seats.

NOTE

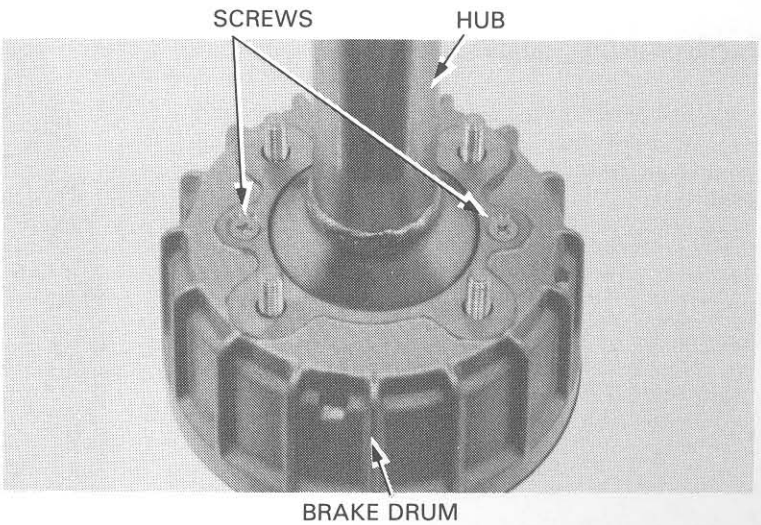
Do not allow the bearings to tilt while driving them in.



Apply grease to the inside of the dust seals and drive them into the wheel hub.



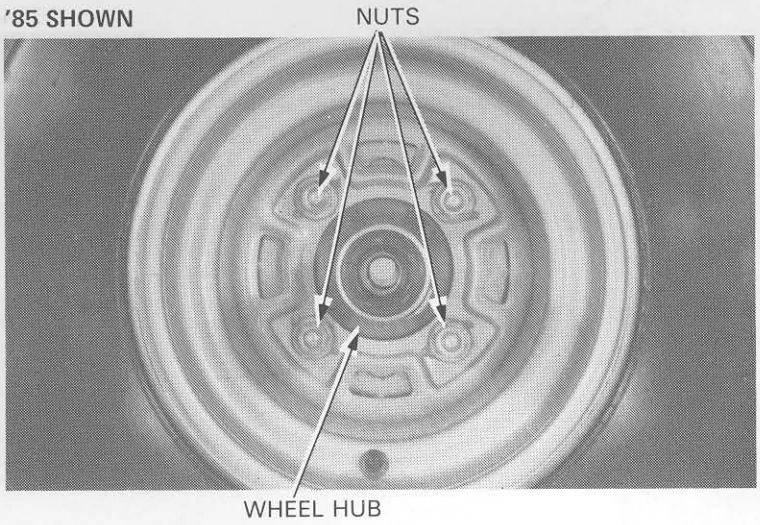
Install the brake drum onto the wheel hub and tighten it with the two screws.



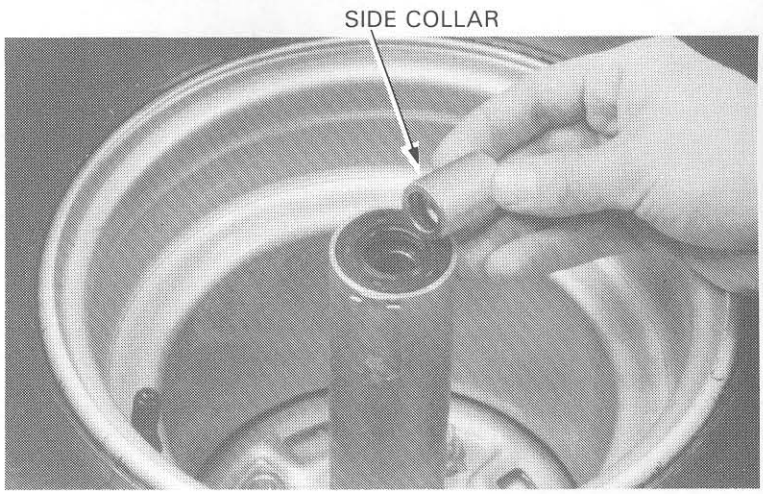
Install the front wheel, making sure the directional arrows on the tire are pointing forward.
Tighten the wheel nuts to the specified torque.

TORQUE: 50—60 N·m (5.0—6.0 kg-m, 36—43 ft-lb)
AFTER '85: 60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb)

'85 SHOWN

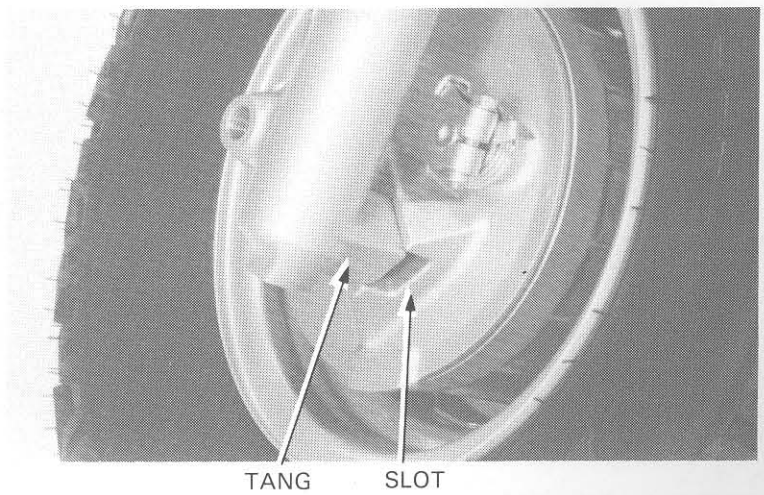


Install the side collar.



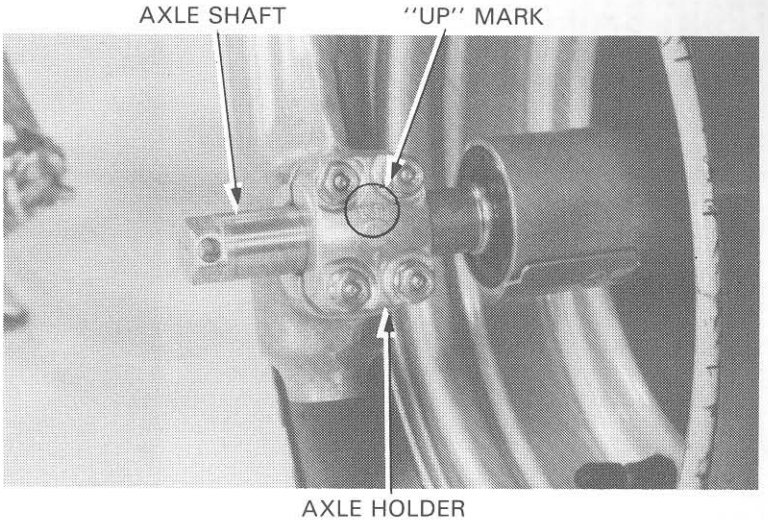
FRONT WHEEL INSTALLATION

Install the front brake panel in the wheel hub and place the front wheel between the fork legs, aligning the tang on the left fork leg with the slot in the brake panel.

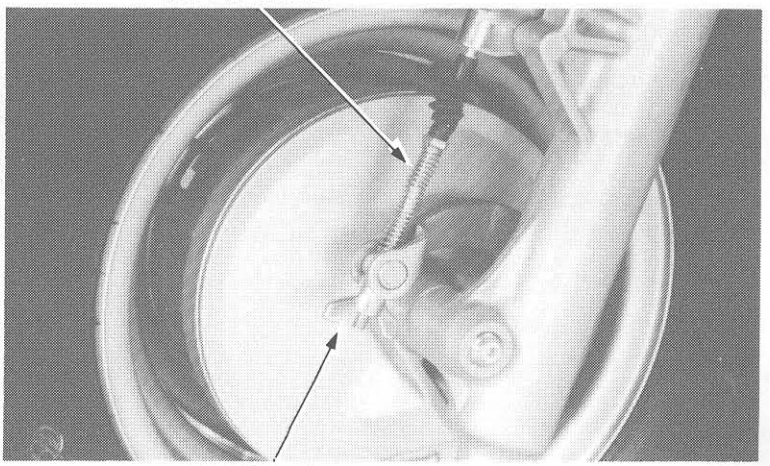


Install the axle holder loosely with its "UP" mark facing up.

Insert the axle shaft through the axle holder and wheel hub and temporarily tighten it.



Connect the front brake cable and adjust the front brake lever free play (page 3-9).



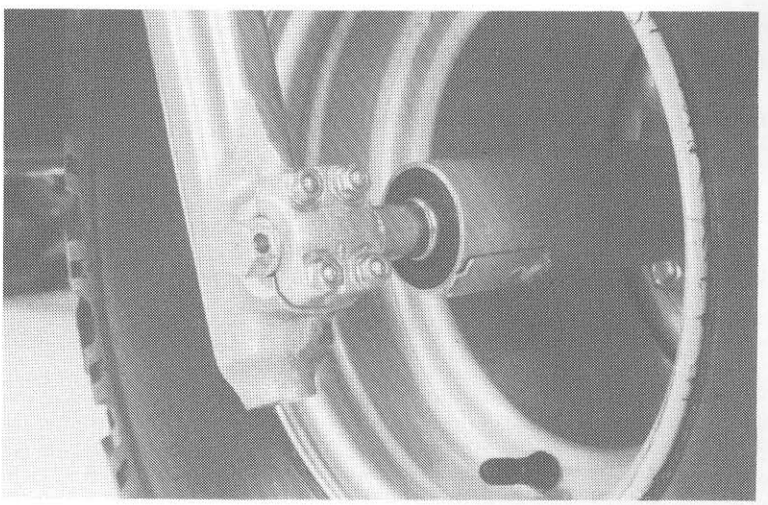
Tighten the axle shaft.

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

With the front brake applied, pump the front forks up and down several times to seat the axle.

Tighten the upper axle holder nuts first, then tighten the lower nuts.

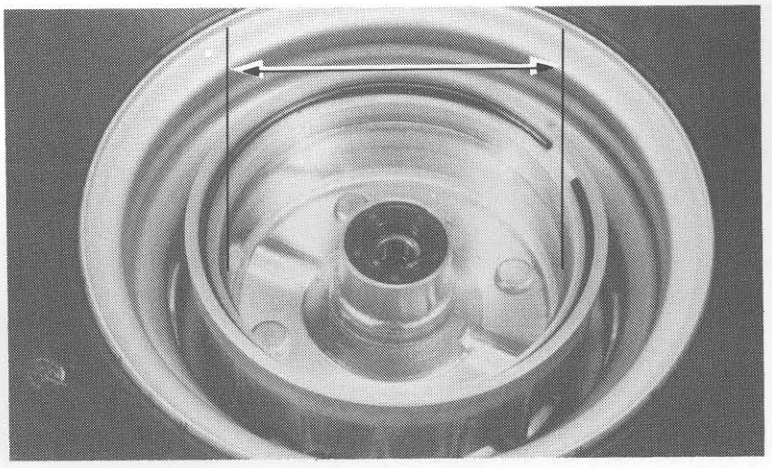
TORQUE: 10—14 N·m
(1.0—1.4 kg-m, 7—10 ft-lb)



FRONT BRAKE

BRAKE PANEL REMOVAL

Remove the front wheel (page 11-7) and the brake panel from the front wheel.



BRAKE DRUM INSPECTION

Measure the I.D. of the brake drum.

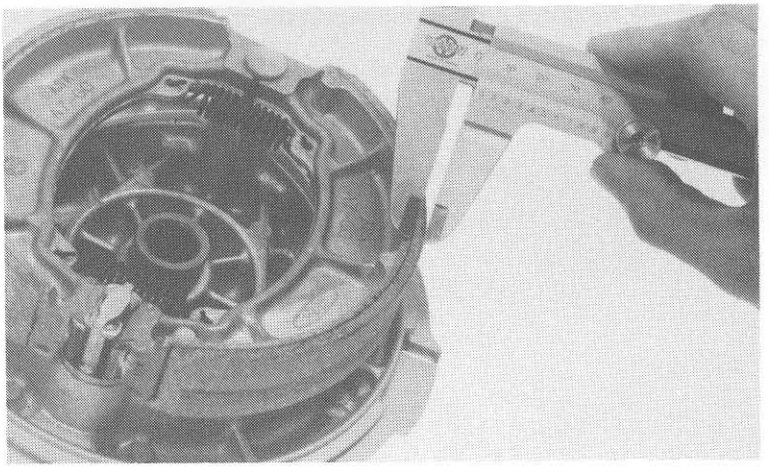
SERVICE LIMIT: 141 mm (5.6 in)

BRAKE LINING INSPECTION

Measure the brake lining thickness.

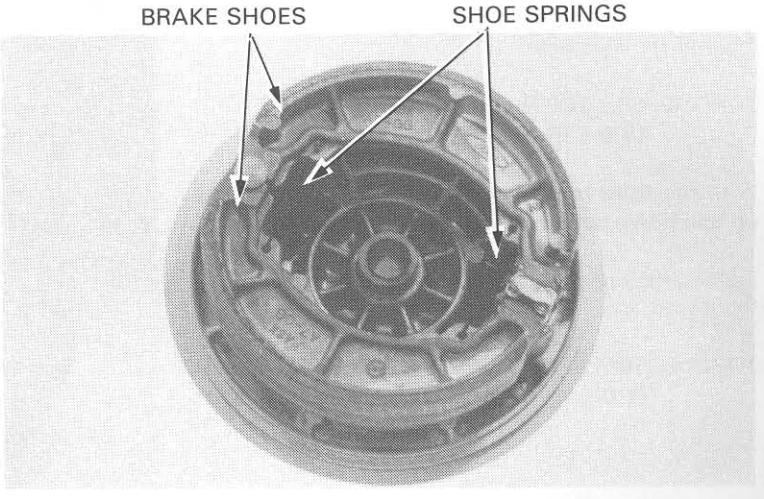
SERVICE LIMIT: 2 mm (0.1 in)

Replace the brake shoes if they are thinner than the service limit.



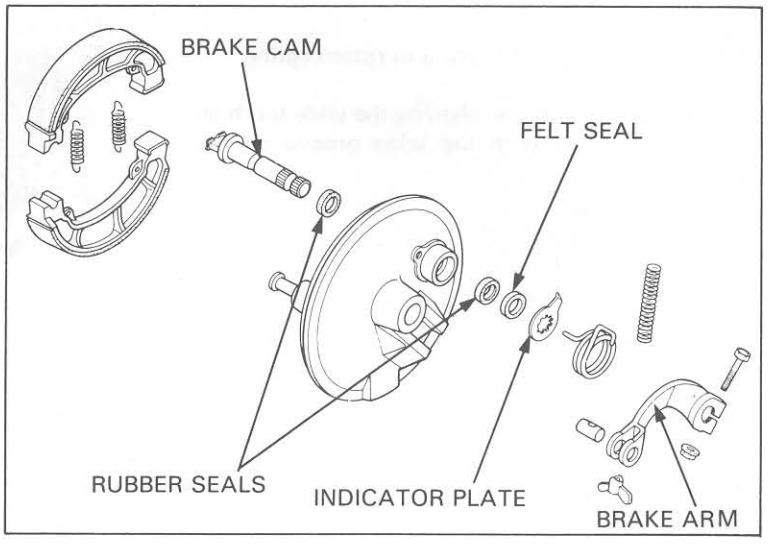
BRAKE PANEL DISASSEMBLY

Expand and remove the brake shoes by hand.



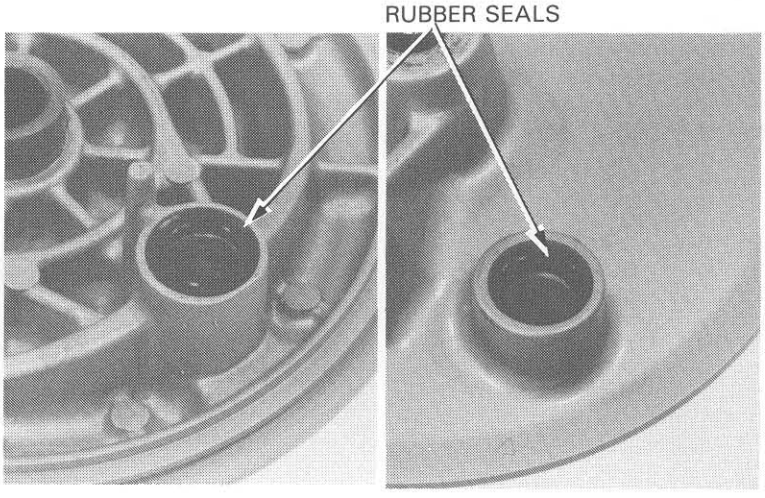
Remove the brake arm bolt, brake arm, indicator plate and spring.
Remove the brake cam and felt seal.

Check the rubber seals for wear or damage and remove if necessary.



BRAKE PANEL ASSEMBLY

Apply grease to new rubber seals and install them into the brake panel.

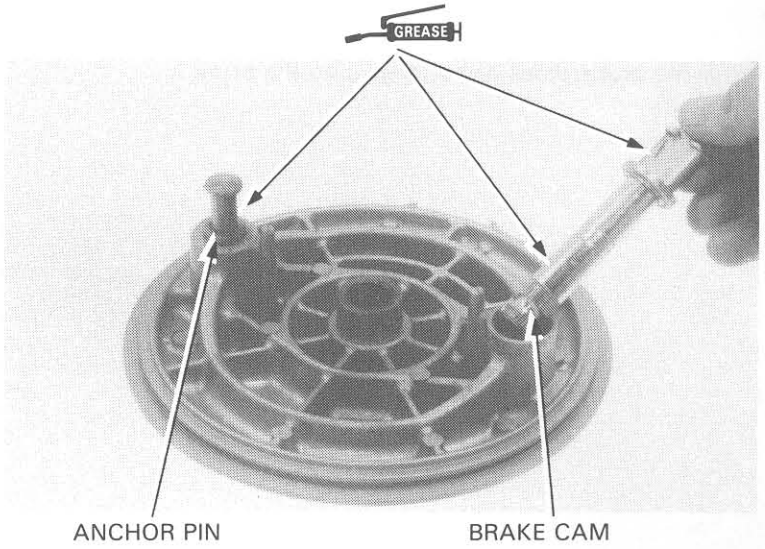


Apply grease to the brake anchor pin and brake cam.

WARNING

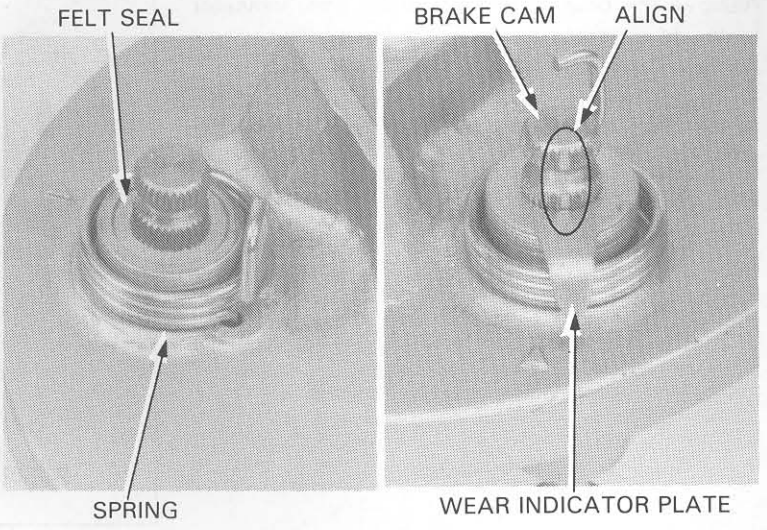
- ***A contaminated brake lining reduces stopping power.***
- ***Keep grease off the linings. Wipe excess grease off the cam.***

Install the brake cam into the brake panel.



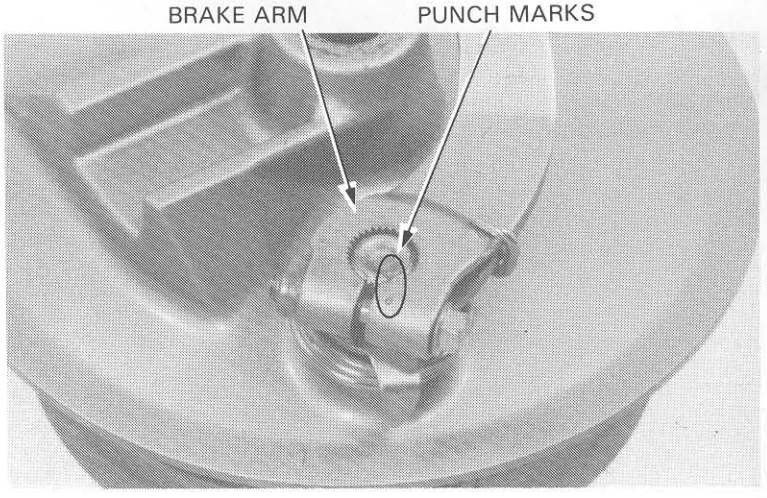
Install the felt seal and brake arm return spring.

Install the indicator plate, aligning the wide tooth on the indicator plate with the wide groove on the brake cam.

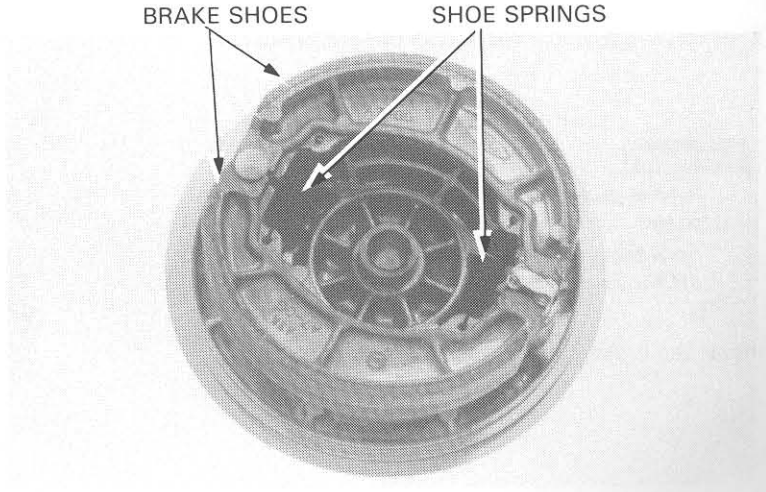


Install the brake arm, aligning the punch marks on the brake cam and arm.

Secure the brake arm using the bolt and nut.



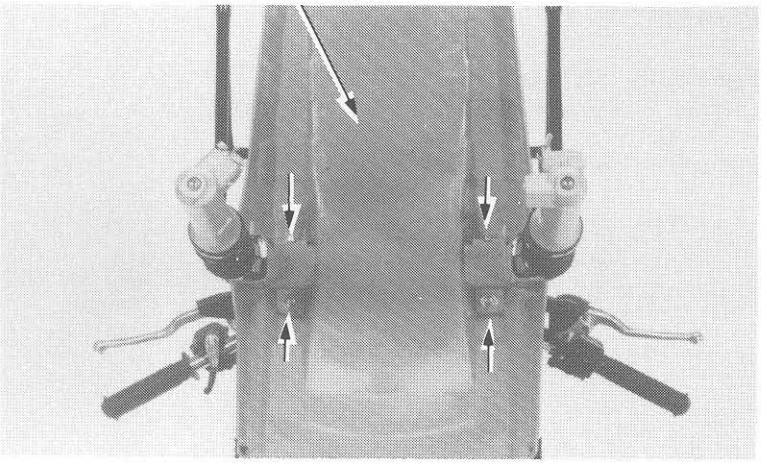
Install the brake shoes and springs onto the brake panel.



FRONT FORK

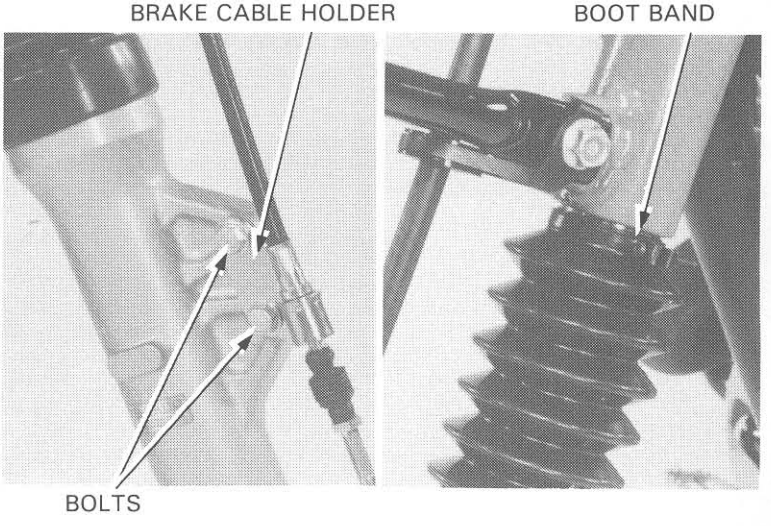
REMOVAL

Remove the front wheel (page 11-7).
Remove the front fender by removing the four mount bolts.

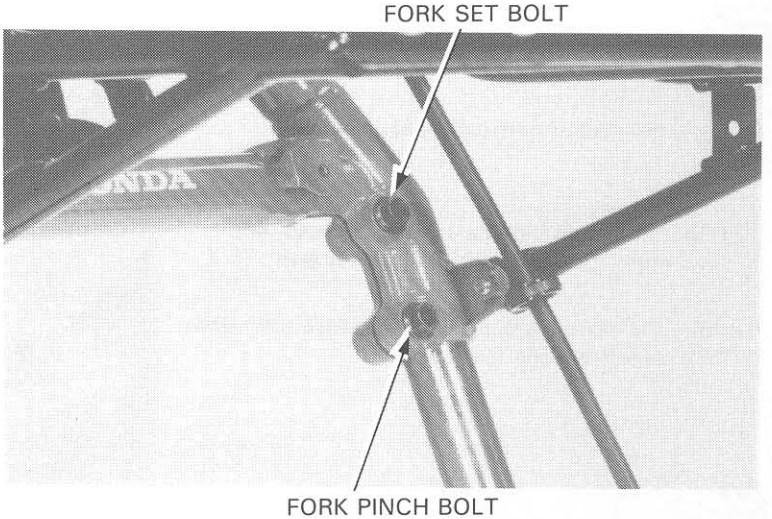


Remove the two bolts attaching the front brake cable holder to the left fork leg.

Loosen the front fork boot bands.



Remove the front fork set bolt, loosen the fork pinch bolt and remove each front fork.



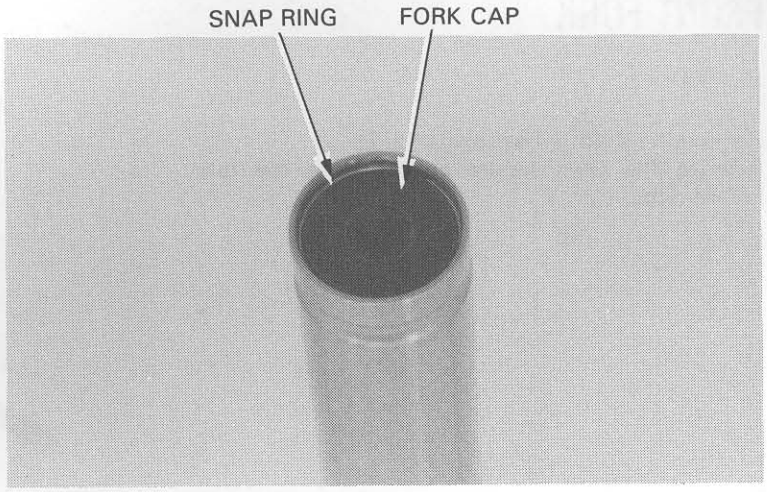
DISASSEMBLY

Remove the fork boot.
Depress the fork cap and remove the snap ring.

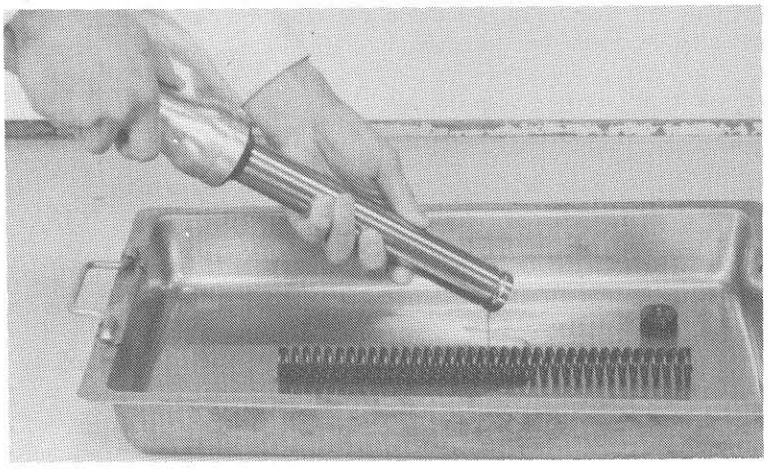
Remove the fork cap and fork spring.

CAUTION

The fork cap is under spring pressure. Use care when removing and wear eye and face protection.



Pour out the fork fluid by pumping the fork up and down several times.



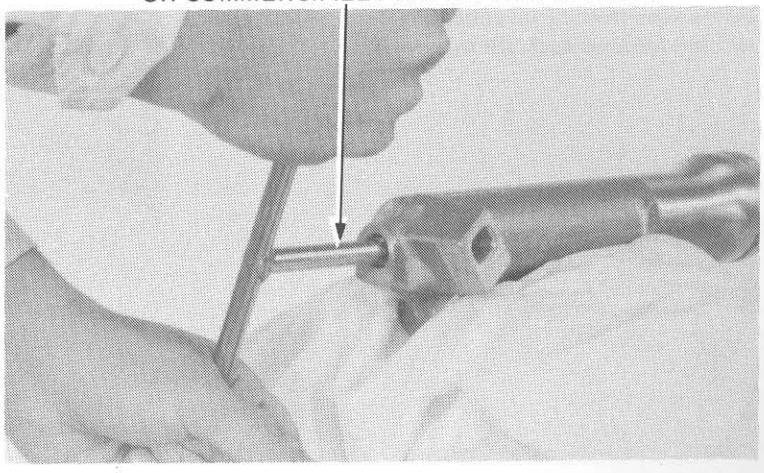
Hold the fork slider in a vise with soft jaws or use a shop towel.

Remove the socket bolt with a hex wrench.

NOTE

Temporarily reinstall the spring, fork cap, and snap ring if the bolt is difficult to remove.

Remove the piston, rebound spring, fork tube and oil lock piece from the fork slider.

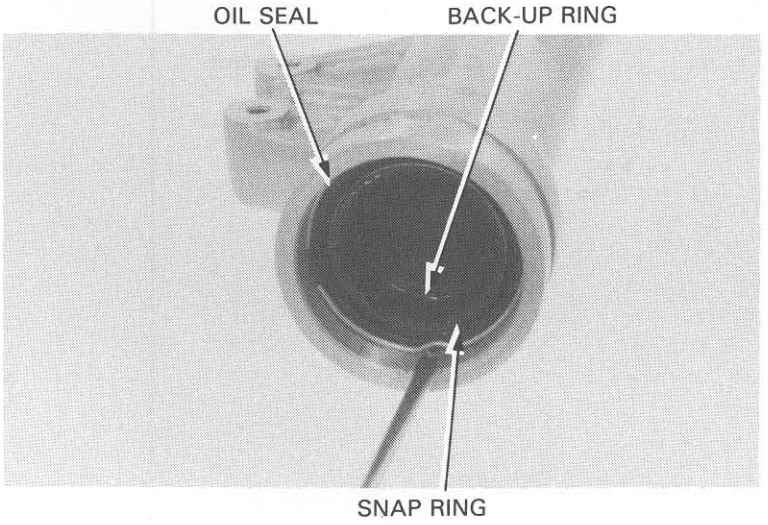


Remove the dust seal and snap ring.

Pry the oil seal and back-up ring out of the fork slider.

CAUTION

- *Be careful not to damage the fork slider when prying out the oil seal and back-up ring.*
- *Replace the oil seal and back-up ring with new ones whenever they are remove.*



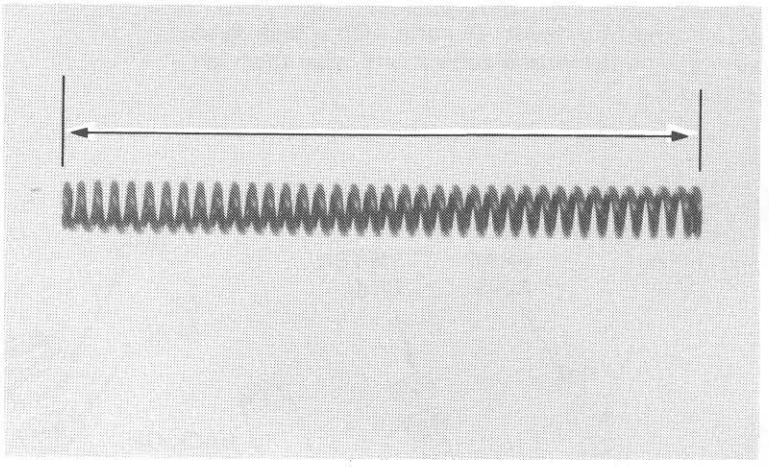
INSPECTION

FORK SPRING FREE LENGTH

Measure the fork spring free length.

SERVICE LIMIT: 297.5 mm (11.71 in)

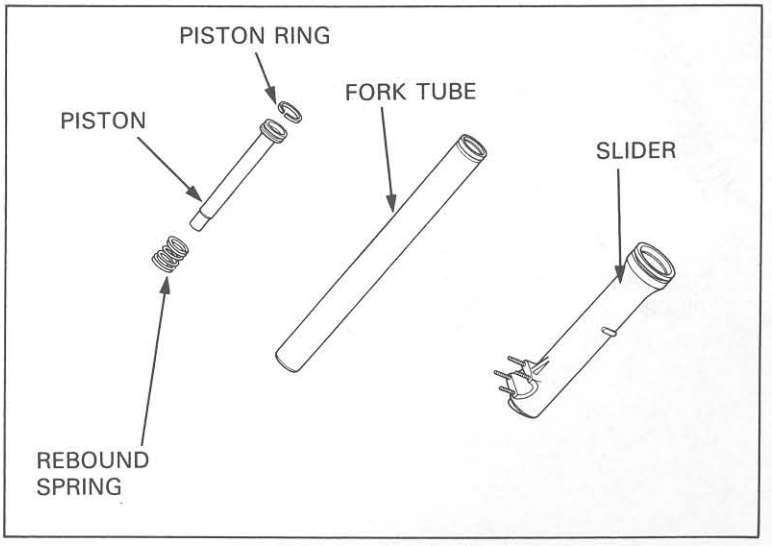
Replace the spring if it is shorter than the service limit.



FORK TUBE/FORK SLIDER/PISTION

Check the fork tube, fork slider and piston for scoring, scratches, or excessive or abnormal wear. Replace any components which are worn or damaged.

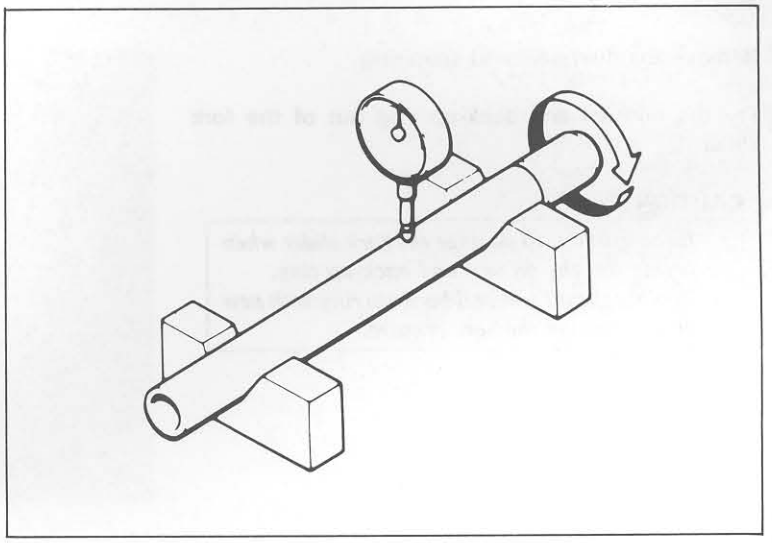
Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.



FORK TUBE

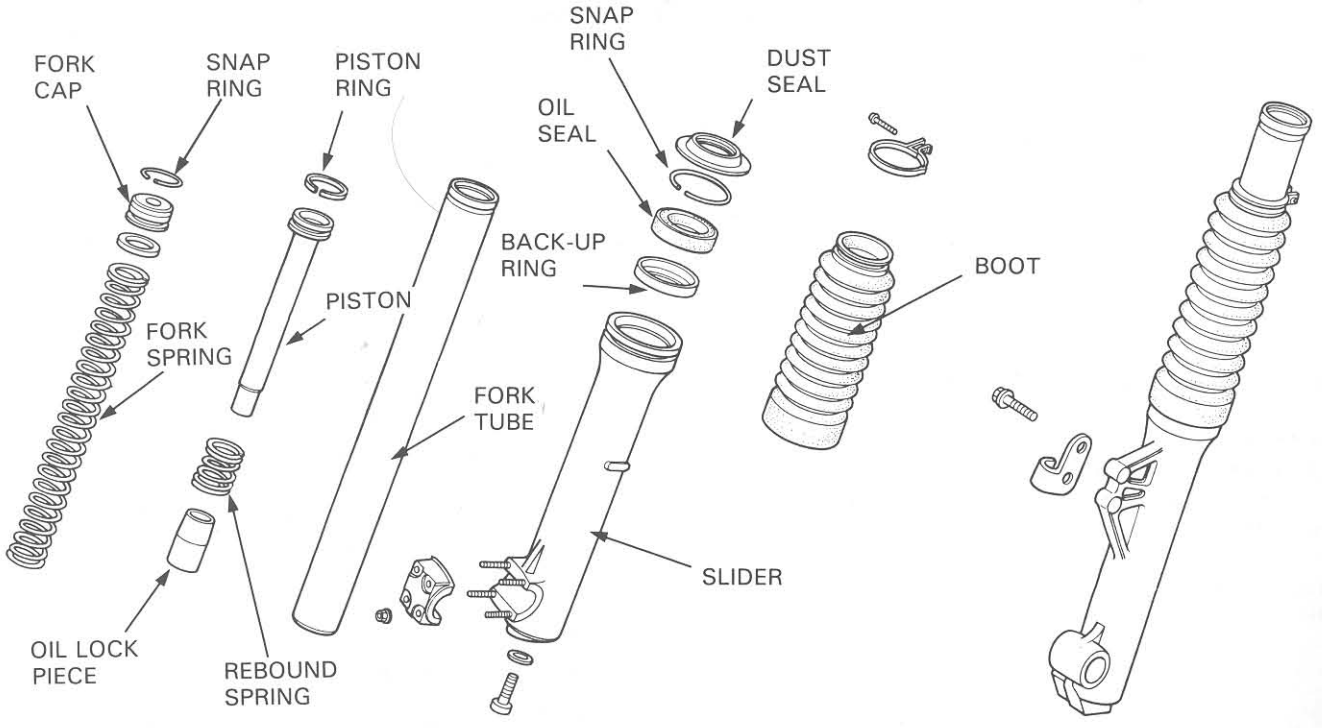
Set the fork tube in V blocks and read the runout.

SERVICE LIMIT: 0.20 mm (0.008 in)



ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



Insert the rebound spring and piston into the fork tube.

Place the oil lock piece on the end of the piston and insert the fork tube into the slider.

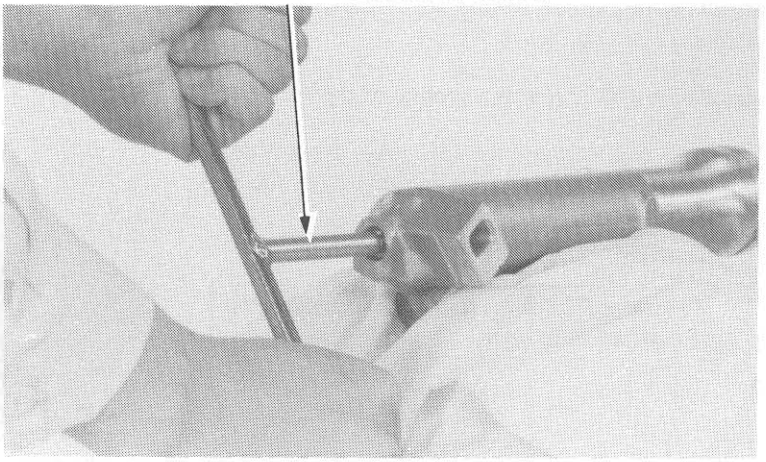
Place the fork slider in a vise with soft jaws or use a shop towel. Apply a locking agent to the socket bolt and thread it into the piston. Tighten with a 6 mm hex wrench.

NOTE

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

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

HEX WRENCH, 6 mm 07917—3230000
OR COMMERCIALLY AVAILABLE IN U.S.A.

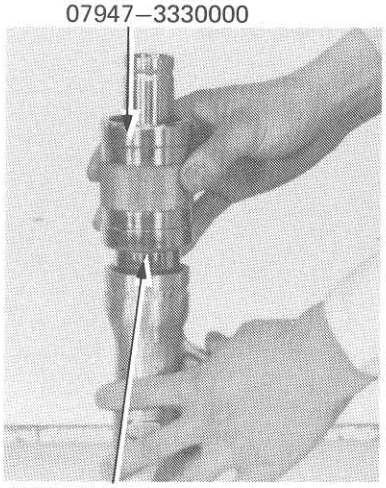


Install the back-up ring.

Coat a new oil seal with AFT and install it with the seal markings facing up. Drive the seal in with the seal driver.

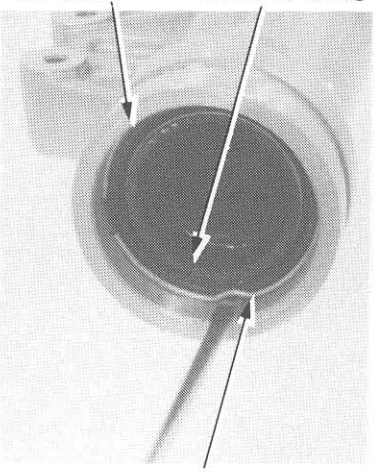
Install the snap ring and dust seal.

FORK SEAL DRIVER
07747—0010100 OR
07947—3330000



OIL SEAL

BACK-UP RING

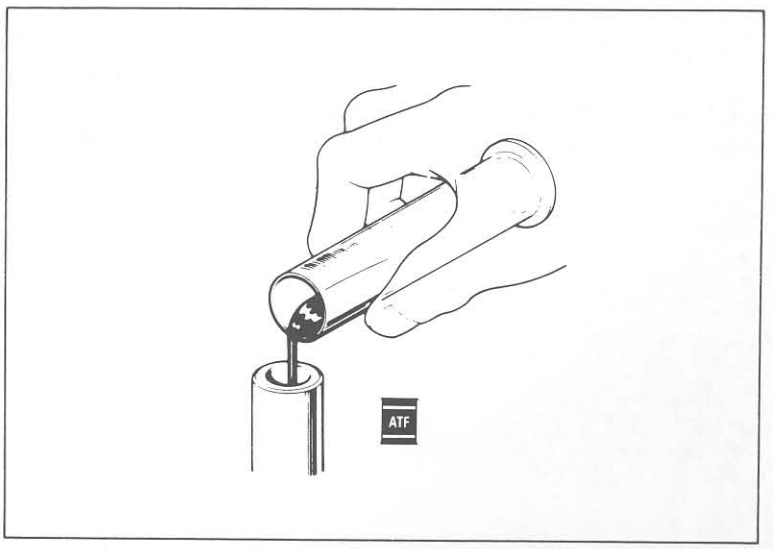


ATTACHMENT
07747—0010501 OR
07947—3330000

SNAP RING

Pour the specified amount of AFT into the fork tube.

CAPACITY: 110.5—115.5 cc (3.73—3.91 ozs)



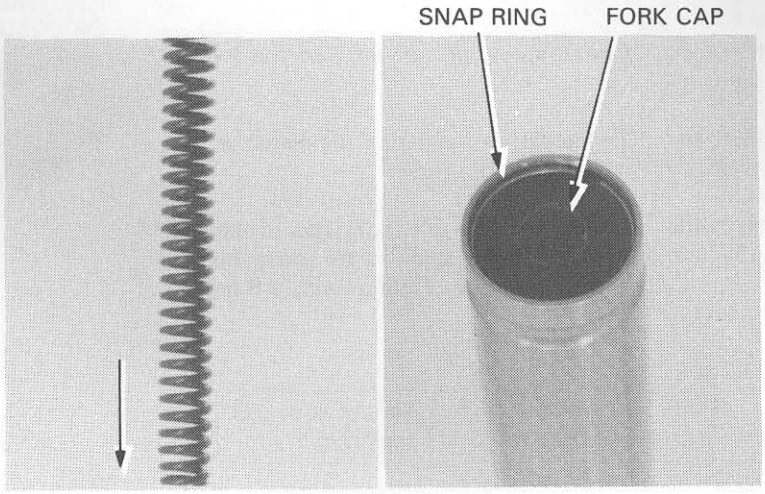
Install the fork spring into the fork tube with its small diameter coil end down.

Install a new O-ring in the groove of the fork cap.

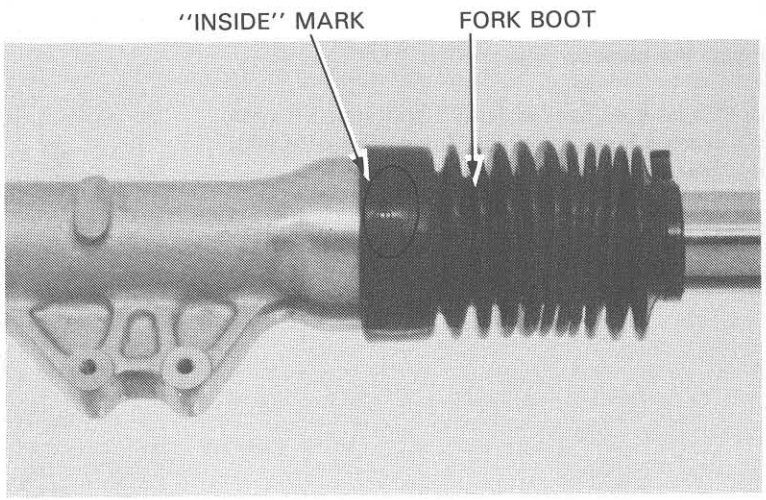
Install the fork cap into the fork tube, press it down and install the snap ring in the groove in the fork tube.

CAUTION

Use eye and face protection when installing the fork cap and snap ring.

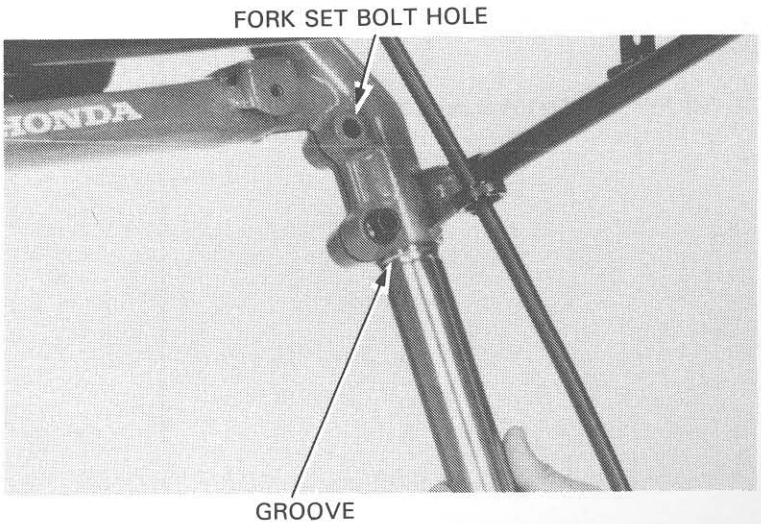


Install the fork boot with its "INSIDE" mark facing in.



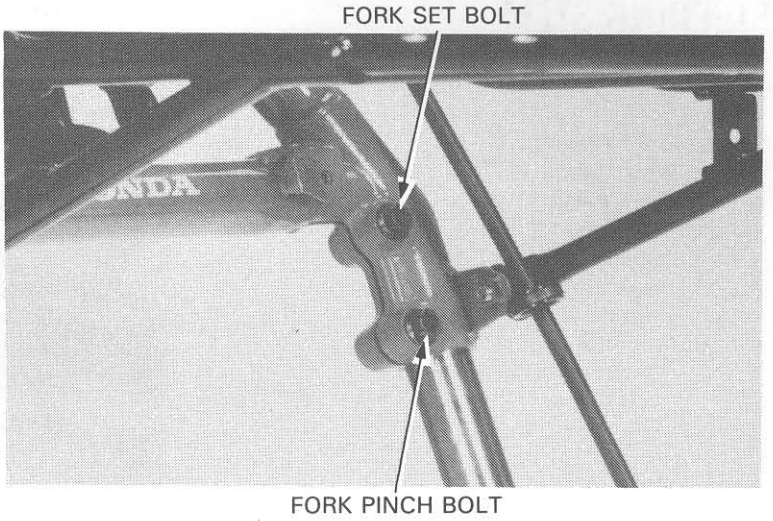
INSTALLATION

Insert the fork tube into the steering stem and align its groove with the fork set bolt hole.



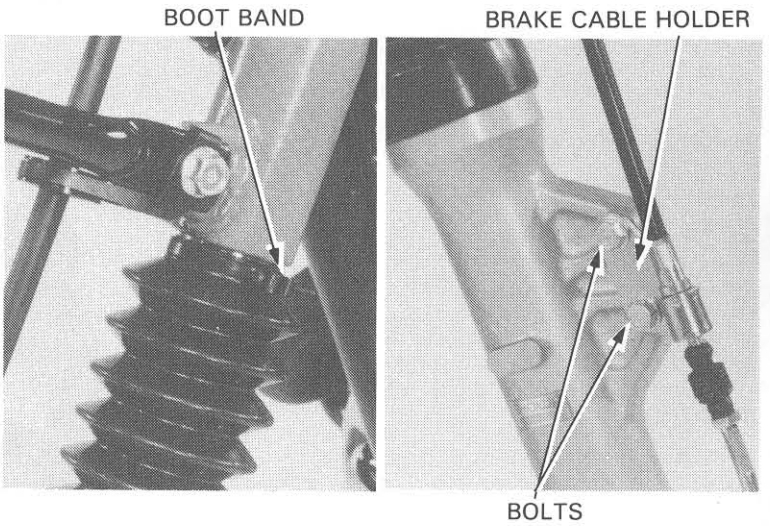
Install the fork set bolt and tighten the fork set and pinch bolts.

TORQUE: 50—60 N·m
(5.0—6.0 kg-m, 36—43 ft-lb)

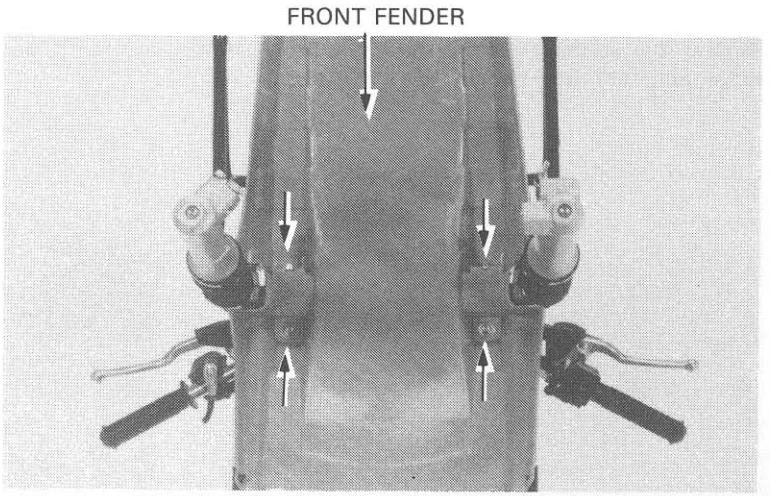


Align the upper end of the fork boot with the lower end of the steering stem and tighten the boot band.

Install the front brake cable holder onto the left fork leg using the two bolts.



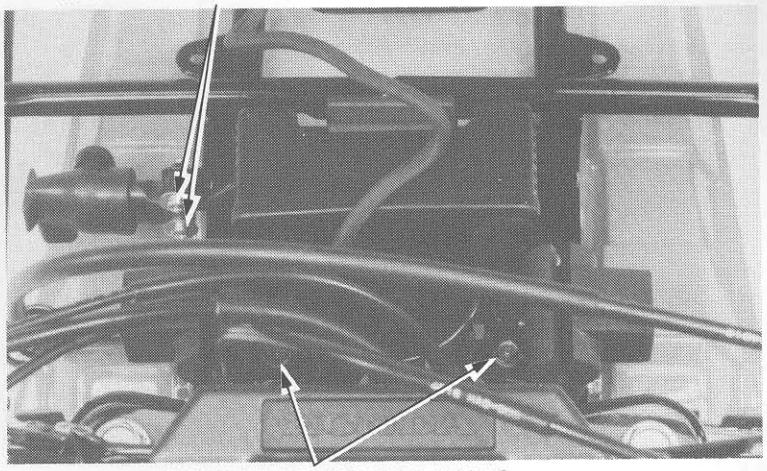
Install the front fender and the front wheel (page 11-16).



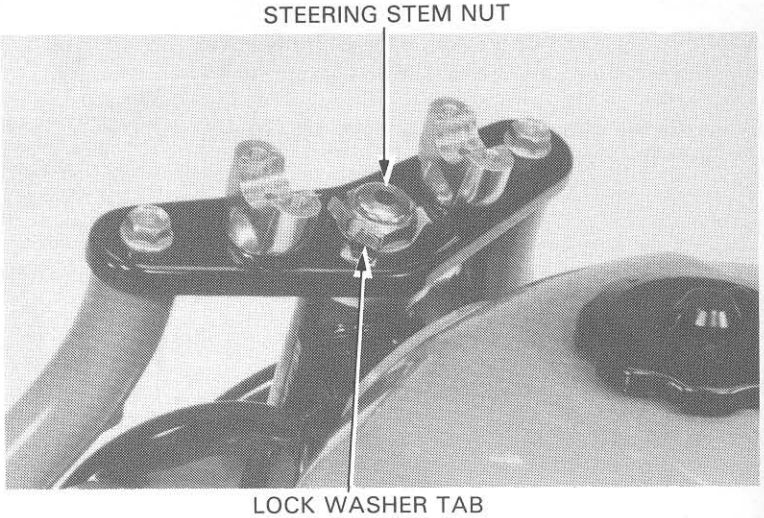
STEERING STEM

REMOVAL

Remove the following:
- front wheel (page 11-7).
- handlebars (page 11-3).
- front forks (page 11-21).
- two coupler box mount bolts
- two receptacle mount bolts
- front carrier.
- front fender.

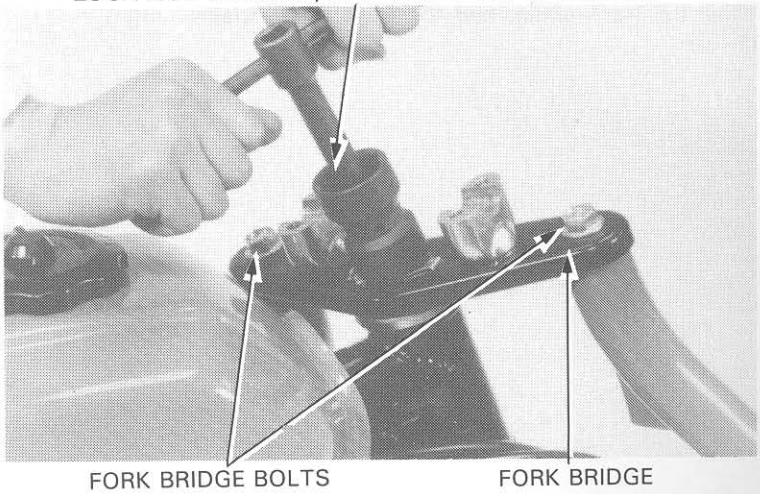


Bend down the steering stem nut lock washer tab.



Remove the steering stem nut, lock washer, fork bridge bolts and fork bridge.

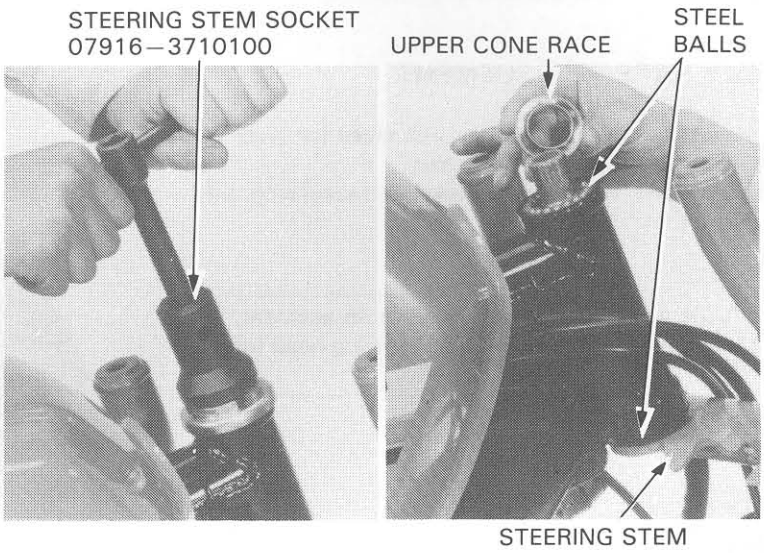
EXTENSION BAR 07716–0020500
OR COMMERCIALLY AVAILABLE IN U.S.A.
LOCK NUT WRENCH, 30 x 32 mm 07716–0020400



Remove the bearing adjustment nut.
Remove the steering stem, upper cone race, dust seal and steel balls.

NOTE

The steel ball bearings are loose and easily dropped. Place shop towels on the floor to catch any that do drop.

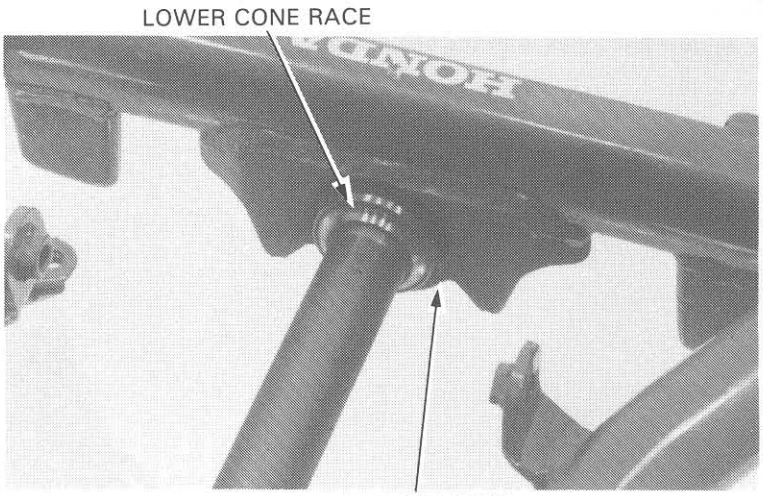


LOWER CONE RACE REPLACEMENT

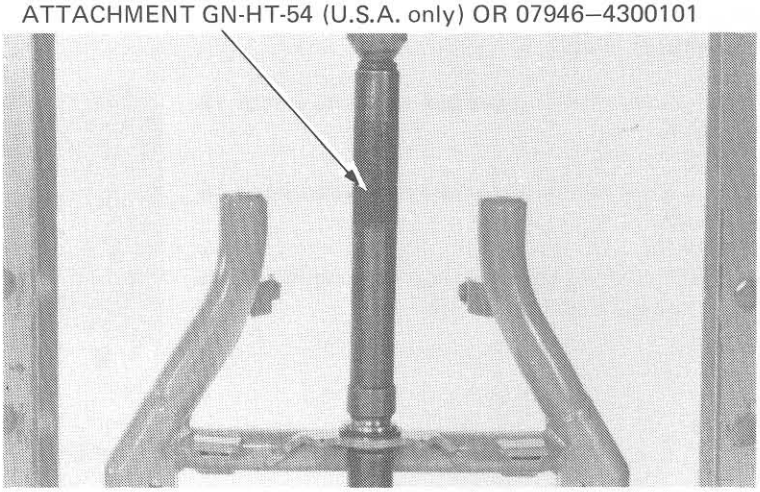
Inspect the lower cone race for wear or damage and replace if necessary.

Install the stem nut onto the stem to prevent the threads from being damaged when removing the lower cone race from the stem.

Remove the race with a chisel, being careful not to damage the stem.
Remove the dust seal and washer.



Install a new washer and dust seal and drive a new cone race into place.



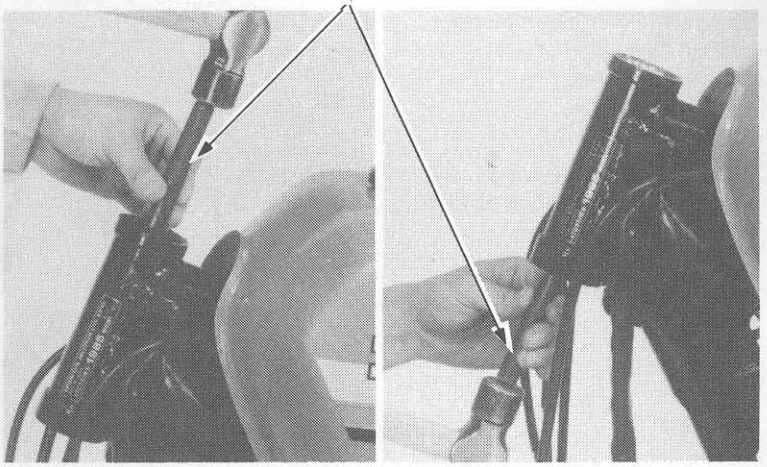
BALL RACE REPLACEMENT

Inspect the upper and lower ball races for wear of damage and replace if necessary.
Remove the upper and lower ball races with the special tool.

NOTE

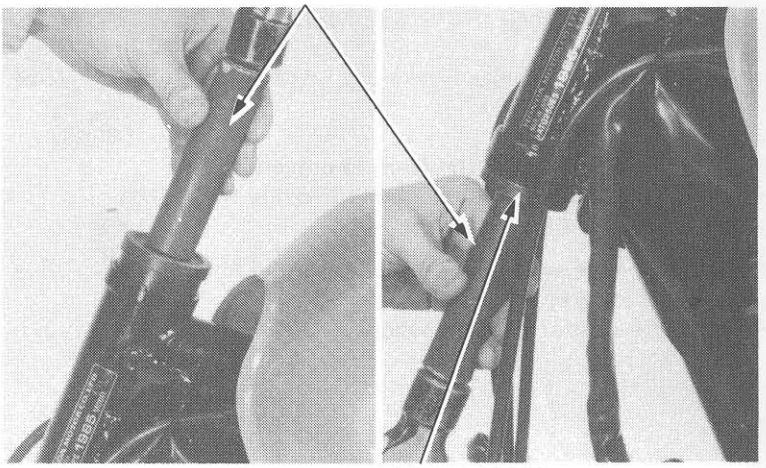
If the ATC has been involved in an accident, examine the area around the steering head for cracks.

BALL RACE REMOVER 07953—3330000



Drive new ball races with the special tools.

DRIVER 07749—0010000



ATTACHMENT 07946—3290000

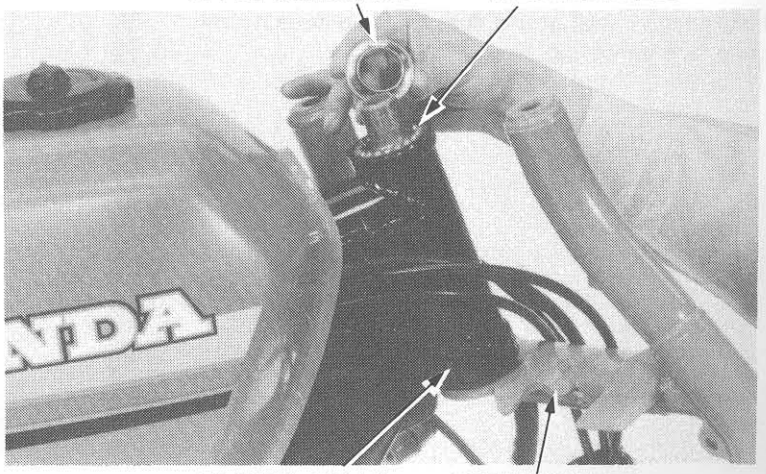
INSTALLATION

Apply grease to the upper ball race and install 18 steel balls.

Apply grease to the lower ball race and install 18 steel balls.

Insert the steering stem into the steering head pipe and install the upper cone race.

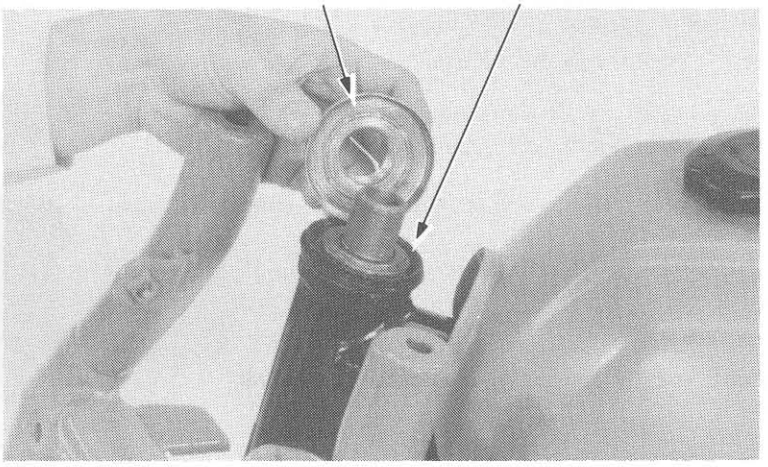
UPPER CONE RACE 18 STEEL BALLS



18 STEEL BALLS STEERING STEM

Apply grease to the dust seal and install it onto the steering head pipe.
Install the bearing adjustment nut.

BEARING ADJUSTMENT NUT DUST SEAL



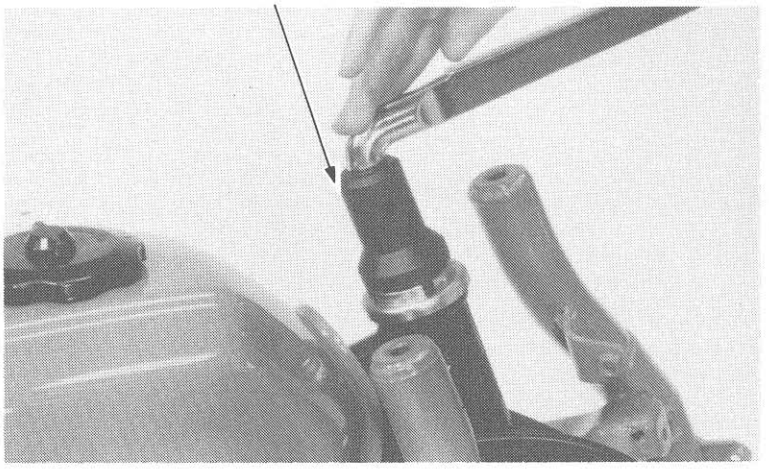
Tighten the bearing adjustment nut to the specified torque.

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

Turn the steering stem lock-to-lock several times to seat the bearings, then loosen the adjustment nut and retighten it to the final torque.

TORQUE: 7—8 N·m
(0.7—0.8 kg-m, 5—6 ft-lb)

STEERING STEM SOCKET 07916—3710100



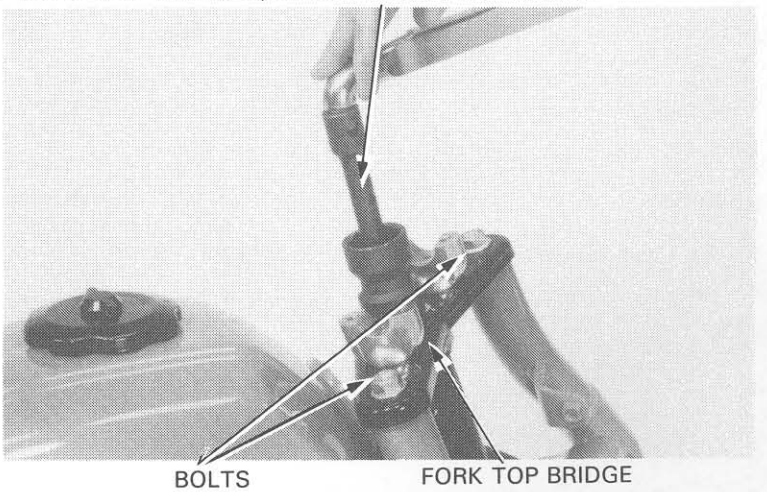
Install the fork bridge and tighten the bridge bolts.

TORQUE: 50—70 N·m
(5.0—7.0 kg-m, 36—51 ft-lb)

Install a new lock washer and tighten the steering stem nut.

TORQUE: 70—90 N·m
(7.0—9.0 kg-m, 51—65 ft-lb)

EXTENSION BAR 07716—0020500
OR COMMERCIALLY ABAILABLE IN U.S.A.
LOCK NUT WRENCH, 30 x 32 mm 07716—0020400



BOLTS FORK TOP BRIDGE

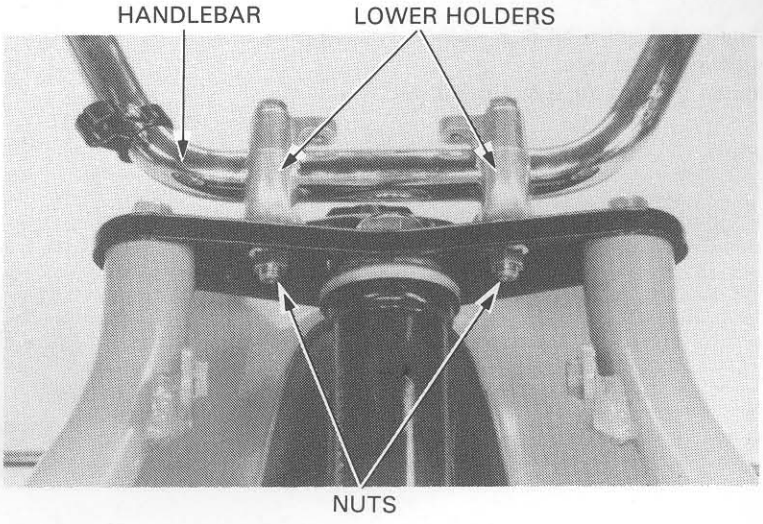
If the handlebar lower holder was removed from the fork bridge, install them loosely.

Temporarily install the handlebar with the upper holders and tighten the upper holder bolts.

Tighten the lower holder nuts to the specified torque.

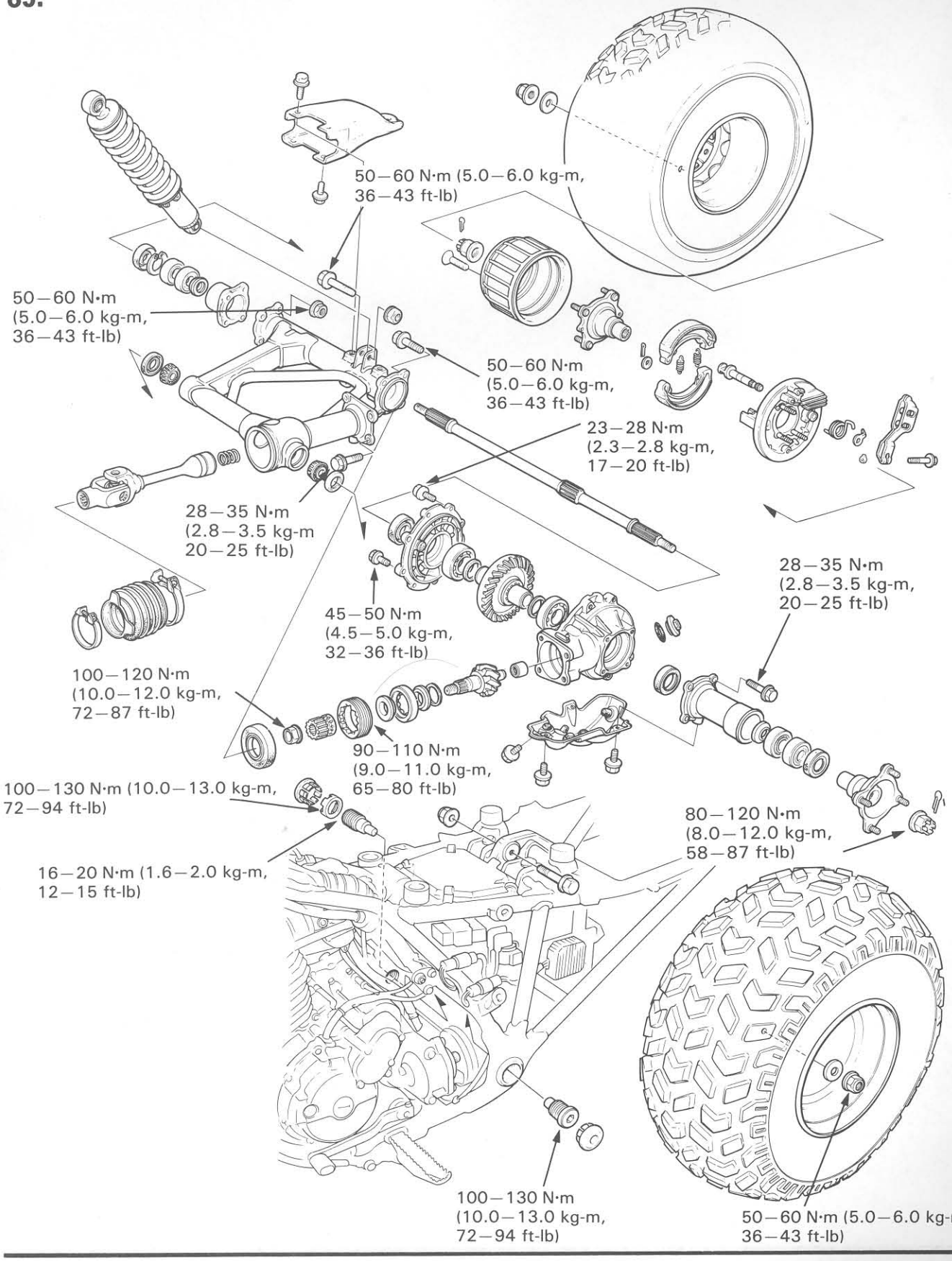
TORQUE: 40—50 N·m
(4.0—5.0 kg-m, 29—36 ft-lb)

Install the parts in the reverse order of removal.

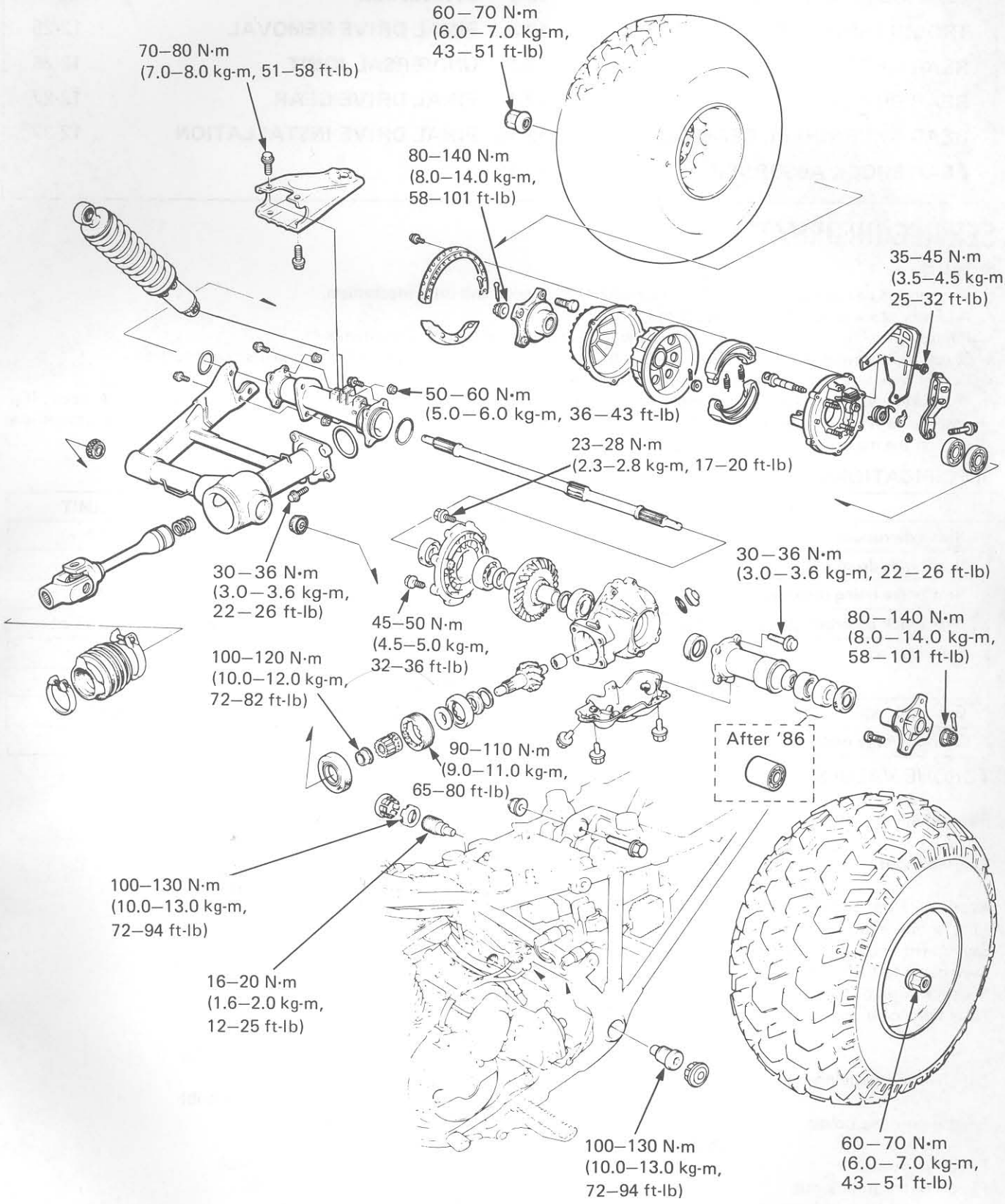


MEMO

'85:


50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)
28–35 N·m (2.8–3.5 kg-m 20–25 ft-lb)
45–50 N·m (4.5–5.0 kg-m, 32–36 ft-lb)
28–35 N·m (2.8–3.5 kg-m, 20–25 ft-lb)
100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)
90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)
100–130 N·m (10.0–13.0 kg-m, 72–94 ft-lb)
16–20 N·m (1.6–2.0 kg-m, 12–15 ft-lb)
80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb)
100–130 N·m (10.0–13.0 kg-m, 72–94 ft-lb)
50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)

AFTER '85:


60–70 N·m
(6.0–7.0 kg-m,
43–51 ft-lb)
70–80 N·m
(7.0–8.0 kg-m, 51–58 ft-lb)
80–140 N·m
(8.0–14.0 kg-m,
58–101 ft-lb)
35–45 N·m
(3.5–4.5 kg-m,
25–32 ft-lb)
50–60 N·m
(5.0–6.0 kg-m, 36–43 ft-lb)
23–28 N·m
(2.3–2.8 kg-m, 17–20 ft-lb)
30–36 N·m
(3.0–3.6 kg-m,
22–26 ft-lb)
45–50 N·m
(4.5–5.0 kg-m,
32–36 ft-lb)
30–36 N·m
(3.0–3.6 kg-m, 22–26 ft-lb)
80–140 N·m
(8.0–14.0 kg-m,
58–101 ft-lb)
100–120 N·m
(10.0–12.0 kg-m,
72–82 ft-lb)
After '86
90–110 N·m
(9.0–11.0 kg-m,
65–80 ft-lb)
100–130 N·m
(10.0–13.0 kg-m,
72–94 ft-lb)
16–20 N·m
(1.6–2.0 kg-m,
12–25 ft-lb)
100–130 N·m
(10.0–13.0 kg-m,
72–94 ft-lb)
60–70 N·m
(6.0–7.0 kg-m,
43–51 ft-lb)

12. REAR WHEEL/BRAKE/ SUSPENSION/FINAL DRIVE

SERVICE INFORMATION

GENERAL

- This section covers maintenance of the rear wheel, suspension and drive mechanism.
- A jack or block is required to support the ATC.
- Replace all oil seals and O-rings whenever the final drive gear assembly is disassembled.
- Check tooth contact pattern and gear backlash when the bearing, gear set and/or gear case has been replaced.
- Do not remove the output gear case unless the transmission is to be removed.
  If it is removed, the transmission mainshaft will be removed with it and the mainshaft gears will fall into the crankcase. It is possible to reinstall it by aligning the gears, however the right crankcase cover must be removed to place the kick starter idle gear on the mainshaft.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Rear axle runout		———	3.0 mm (0.12 in)
Rear brake drum I.D.		160 mm (6.29 in)	161 mm (6.34 in)
Rear brake lining thickness		4 mm (0.2 in)	2 mm (0.1 in)
Rear shock absorber spring free length		273.8 mm (10.78 in)	269.1 mm (10.59 in)
Final gear oil	Capacity	100 cc (3.38 US oz)	———
	Recommended oil	Hypoid-gear oil SAE #80	———
Gear backlash		0.08–0.18 mm (0.003–0.007 in)	0.25 mm (0.010 in)
Gear assembly preload		0.2–0.4 N·m (2–4 kg-cm, 1.7–3.5 in-lb)	———

TORQUE VALUES

Rear wheel nut		50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb) after '85: 60–70 N·m (6.0–7.0 kg-m, 43–51 ft-lb)
Rear axle nut		80–120 N·m (8.0–12.0 kg-m, 58–87 ft-lb) after '85: 80–140 N·m (8.0–14.0 kg-m, 58–101 ft-lb)
Rear brake panel nut		50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
Rear shock absorber mount bolt		50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
Swingarm right pivot bolt		16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)
Swingarm left pivot bolt		100–130 N·m (10.0–13.0 kg-m, 72–94 ft-lb)
Swingarm pivot lock nut		100–130 N·m (10.0–13.0 kg-m, 72–94 ft-lb)
Final gear case mount bolt	(10 mm)	50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
	(8 mm)	28–35 N·m (2.8–3.5 kg-m, 20–25 ft-lb) after '85: 30–36 N·m (3.0–3.6 kg-m, 22–26 ft-lb)
Left bearing housing bolt		28–35 N·m (2.8–3.5 kg-m, 20–25 ft-lb) after '85: 30–36 N·m (3.0–3.6 kg-m, 22–26 ft-lb)
Final gear case cover	(10 mm)	45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)
	(8 mm)	23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)
Pinion joint nut		100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)
Pinion bearing lock nut		90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)
Brake panel assembly nut		50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)

TOOLS

Special

Universal bearing puller	07631–0010000 or commercially available in U.S.A.
Shock absorber compressor base	07959–MB10000
Lock nut wrench	07908–4690001 or KS–HBA–08–469 (U.S.A.)
Socket bit, 17 mm	07703–0020500
Bearing remover	07936–4150000 or 07936–3710500
Remover handle	07936–3710100
Remover weight	07741–0010201 or 07936–3710200
Pinion joint holder	07924–HA00000
Shaft puller	07931–ME40000
Lock nut wrench, 34 x 44 mm	07916–ME50000
Pinion gear driver	07945–HA00000
Water seal driver	07947–HA00000
Attachment	07965–SA00600

Common

Driver	07749–0010000
Attachment, 62 x 68 mm	07746–0010500
Rear shock absorber spring compressor	07959–3290001
Pilot, 35 mm	07746–0040800
Attachment, 20 mm I.D.	07746–0020400
Driver	07746–0020100
Attachment, 52 x 55 mm	07746–0010400
Attachment, 42 x 47 mm	07746–0010300
Pilot, 30 mm	07746–0040700
Attachment, 24 x 26 mm	07746–0010700
Attachment, 37 x 40 mm	07746–0010200

TROUBLESHOOTING

Wobble or vibration in ATC
1. Bent rim
2. Loose wheel bearing
3. Faulty rear axle bearing holder
4. Faulty tire
5. Axle not tightened properly
6. Swingarm bearings worn

Poor brake performance
1. Improper brake adjustment
2. Worn brake shoes
3. Brake linings oily, greasy or dirty
4. Worn brake cam
5. Worn brake drum
6. Brake arm serrations improperly engaged
7. Brake shoes worn at cam contact area

Excessive final drive noise
1. Worn or scored drive pinion and splines
2. Worn pinion and ring gears
3. Excessive backlash between pinion and ring gear
4. Oil level too low

Final drive oil leak
1. Clogged breather
2. Oil level too high
3. Seals damaged

Soft suspension
– Weak spring

Head suspension
– Bent shock absorber

Suspension noise
1. Shock case binding
2. Loose fasteners

REAR WHEEL

REMOVAL

Raise the rear wheels off the ground with a jack and place a block under the engine.

Remove the wheel nuts and wheels.

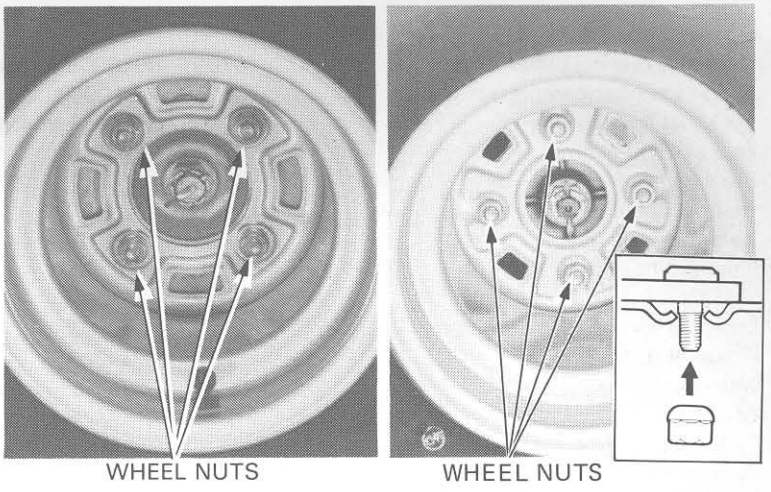
INSTALLATION

Install the rear wheel with the tire valve facing out.

'85: Install the wheel nuts and tighten them.
After '85: Install the wheel nuts with their tapers on the inside and tighten them.

TORQUE: 50—60 N·m
(5.0—6.0 kg-m, 36—43 ft-lb)
AFTER '85:
60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb)

'85: AFTER '85:



REAR BRAKE

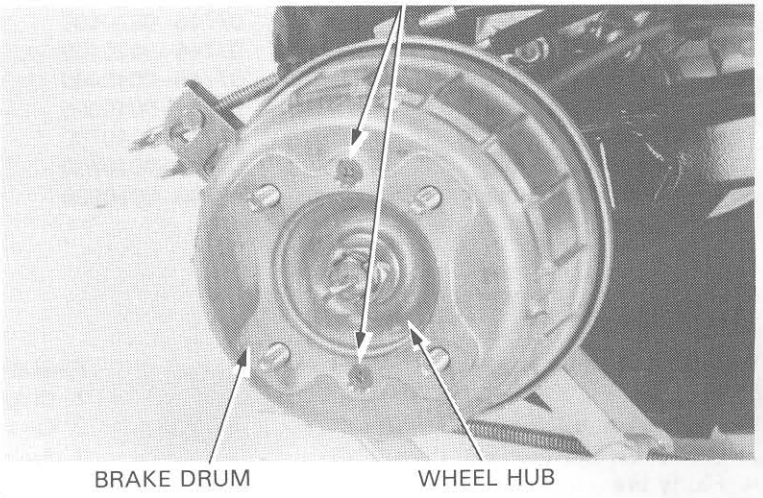
BRAKE DRUM REMOVAL

'85:

Remove the right rear wheel.

Remove the two screws attaching the brake drum and the drum from the wheel hub.

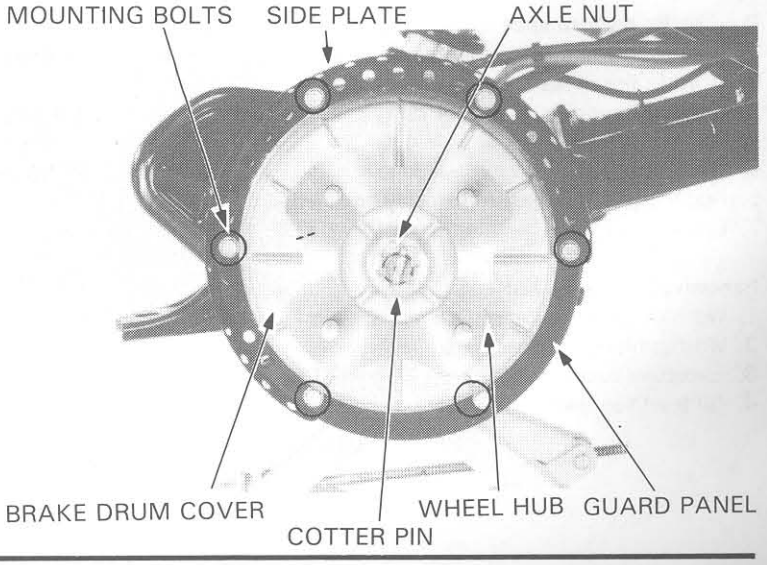
'85:



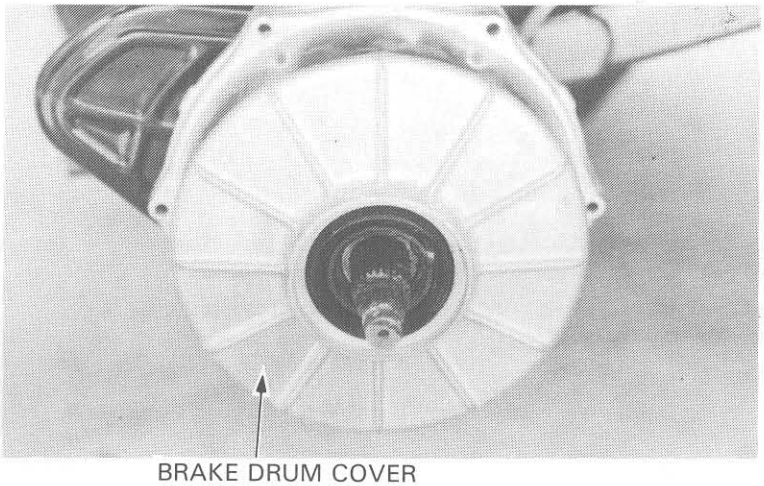
After '85

Remove the right rear wheel.
Remove the cotter pin and axle nut.
Remove the wheel hub.
Remove the side pleat and guard panel by remove the mounting bolts.

AFTER '85:

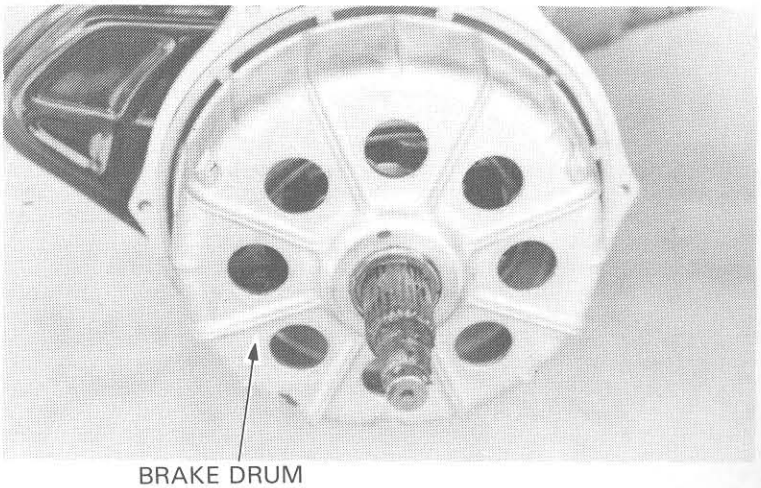


Remove the brake drum cover.



BRAKE DRUM COVER

Remove the brake drum.



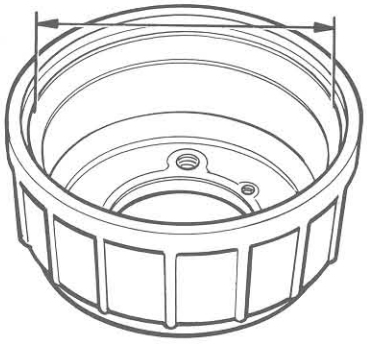
BRAKE DRUM

BRAKE DRUM INSPECTION

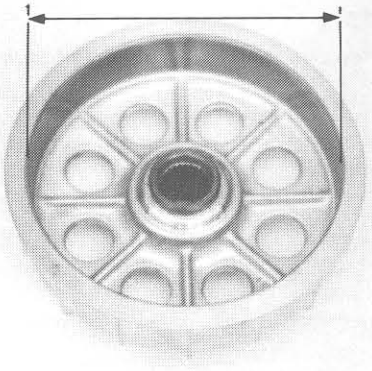
Measure the I.D. of the brake drum.

SERVICE LIMIT: 161 mm (6.34 in)

'85:



AFTER '85:



BRAKE LINING INSPECTION

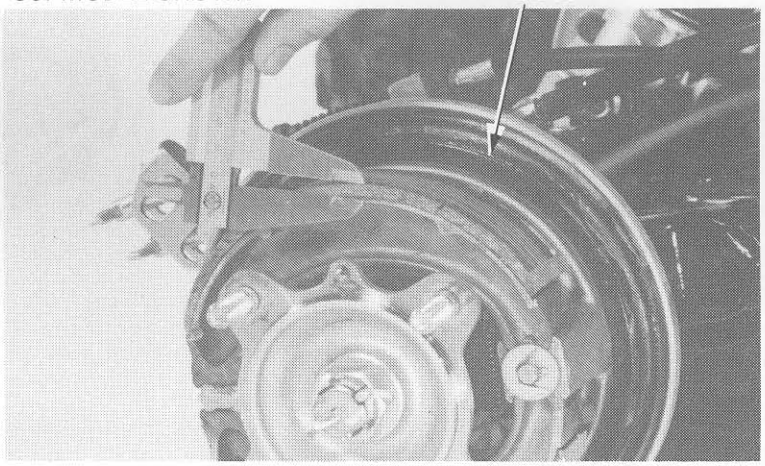
Measure the brake lining thickness.

SERVICE LIMIT: 2 mm (0.1 in)

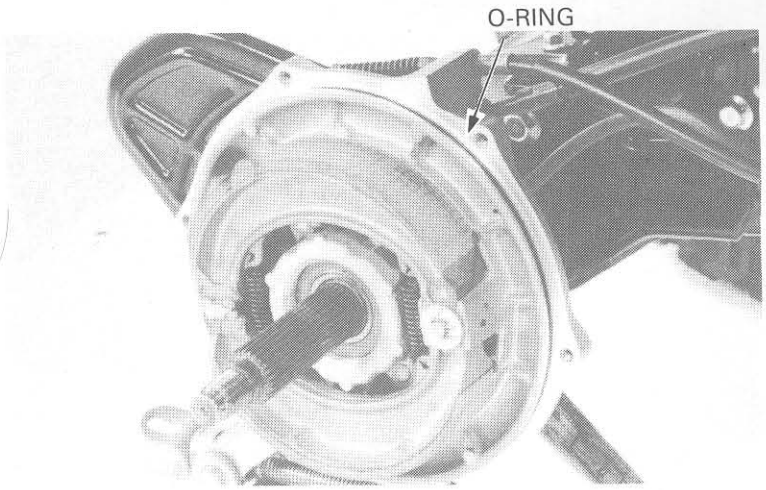
BRAKE DRUM SEAL INSPECTION

'85:
Check the brake drum seal for wear or damage and replace it and the seal ring on the brake drum as a set, if necessary (page 12-9).

'85: MODEL SHOWN

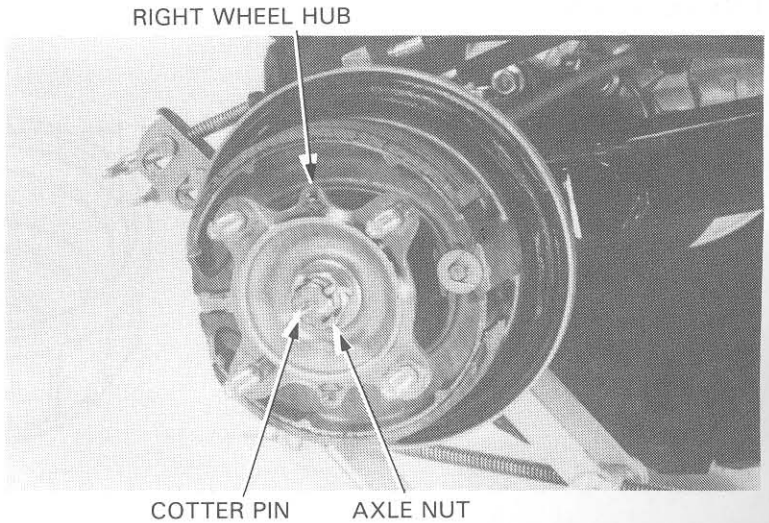


After '85:
Check the rear brake panel O-ring for wear or damage and replace if necessary.

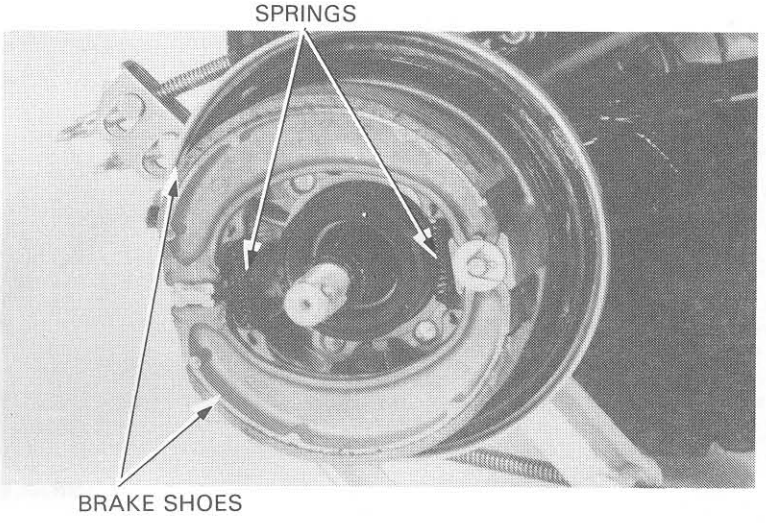


REAR BRAKE DISASSEMBLY

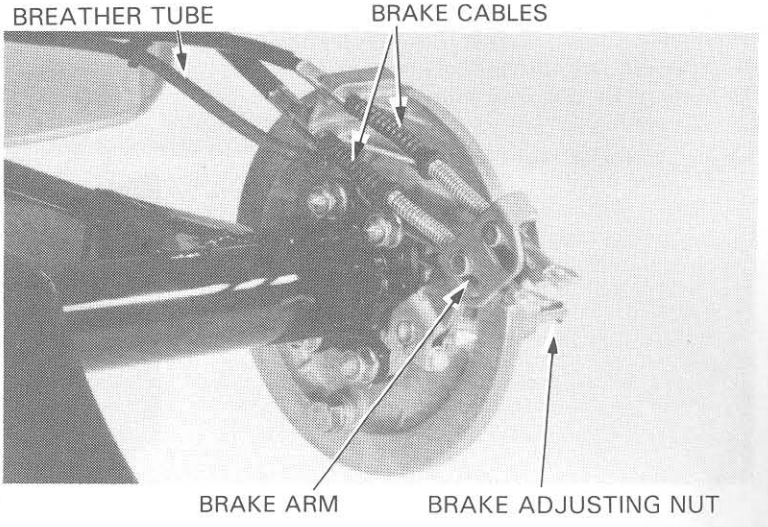
'85:
Remove the brake shoes and springs.



Remove the cotter pin, axle nut and right wheel hub.

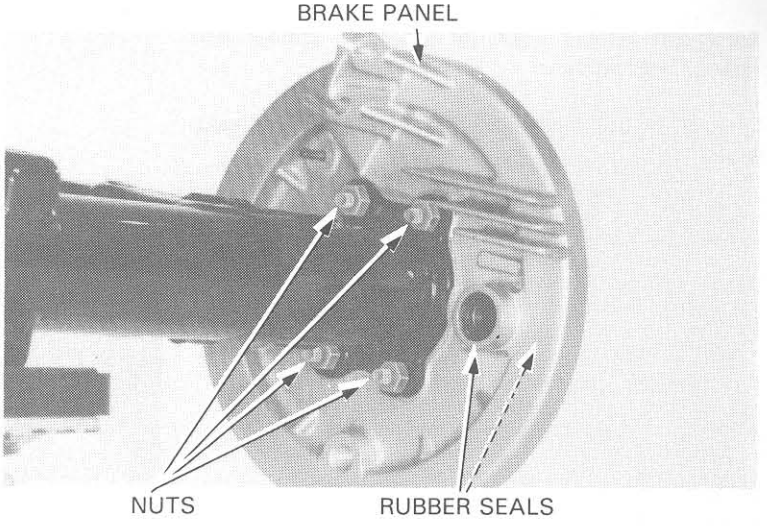


Remove the brake adjusting nut and disconnect the rear brake cables from the brake arm.
Disconnect the breather tube.
Remove the brake arm bolt, nut, brake arm, wear indicator plate, spring, brake cam and felt seal.

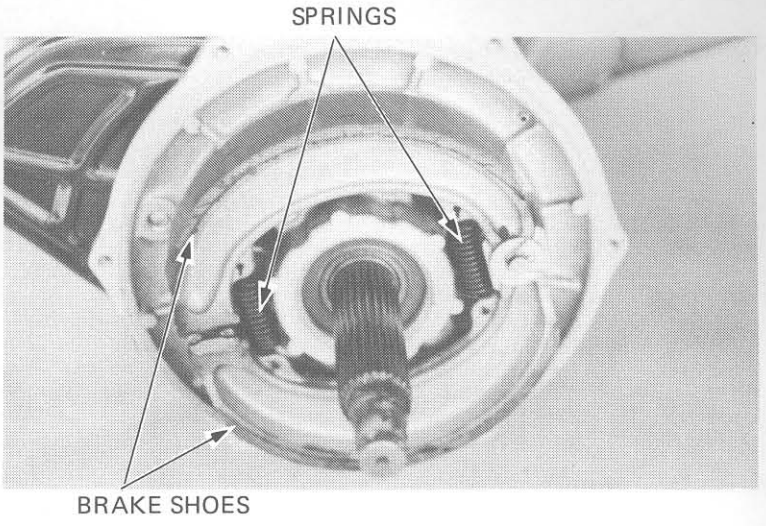


Check the rubber seals for wear or damage and replace if necessary.

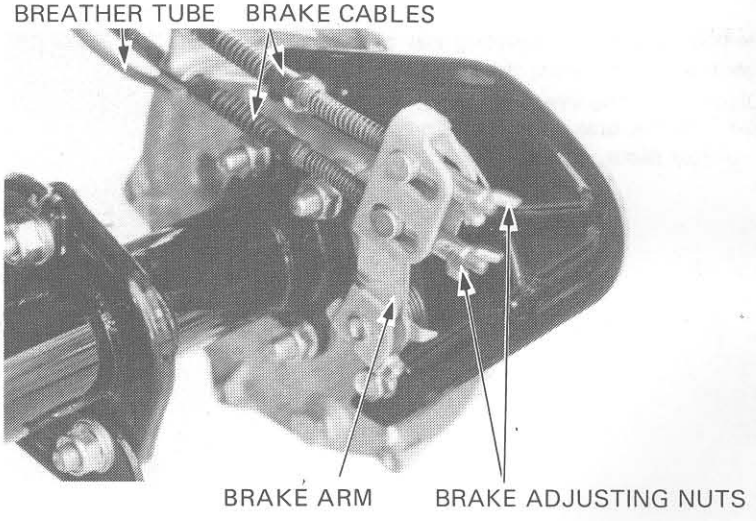
Remove the brake panel mounting nuts and the brake panel.



After '85:
Remove the brake shoes and springs.

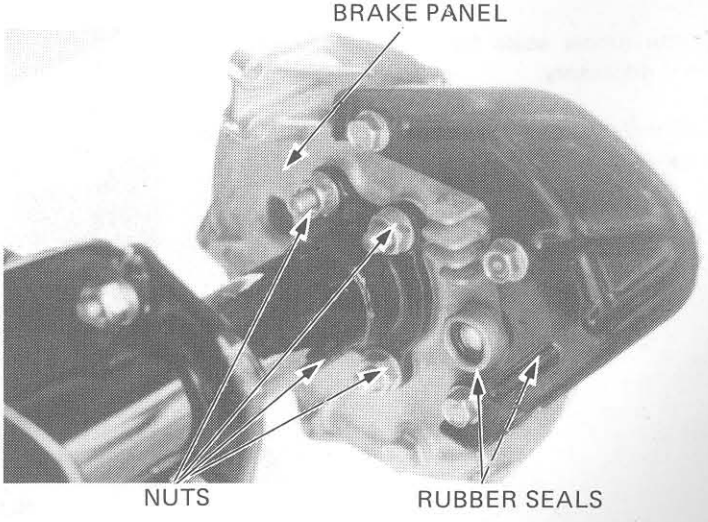


Remove the brake adjusting nut and disconnect the rear brake cables from the brake arm.
Disconnect the breather tube.
Remove the brake arm bolt, nut, brake arm, wear indicator plate, spring, brake cam and felt seal.



Check the rubber seals for wear or damage and replace if necessary.

Remove the brake panel mounting nuts and the brake panel.



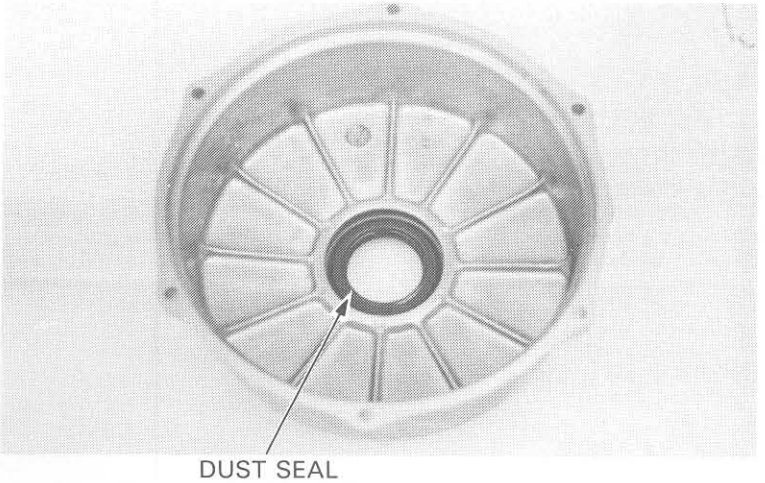
BRAKE DRUM/COVER INSPECTION

AFTER '85:

Check the brake drum cover dust seal for damage and replace, if necessary.
Remove the dust seal from the brake drum cover.
Install the dust seal into the brake drum cover using the attachment and driver.
Apply grease to new dust SEAL lip.

TOOLS

Attachment	**07965–SA00600**
Driver	**07749–0010000**

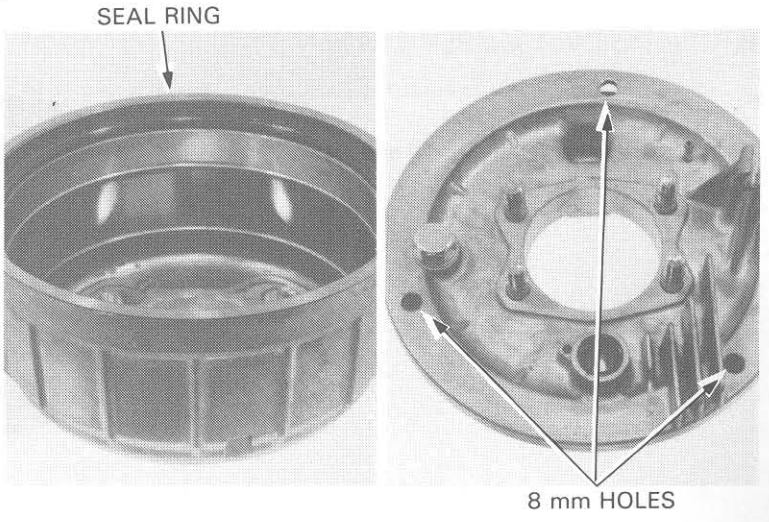


BRAKE DRUM WATER SEAL REPLACEMENT

'85:

Remove the seal ring from the brake drum.

Drive the water seal out through the three 8 mm holes in the brake panel.



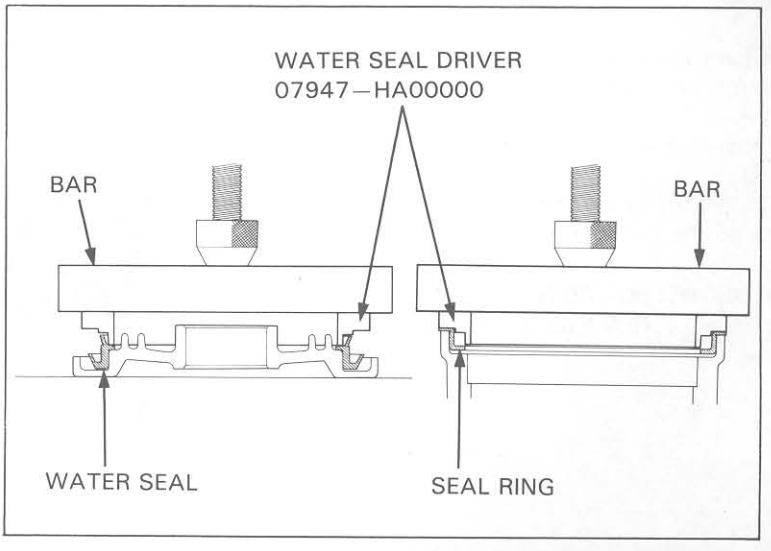
Apply a soap and water solution to the new drum seal and seal ring.

Press the drum seal onto the brake panel using the special tool and a suitable bar until it seats fully.

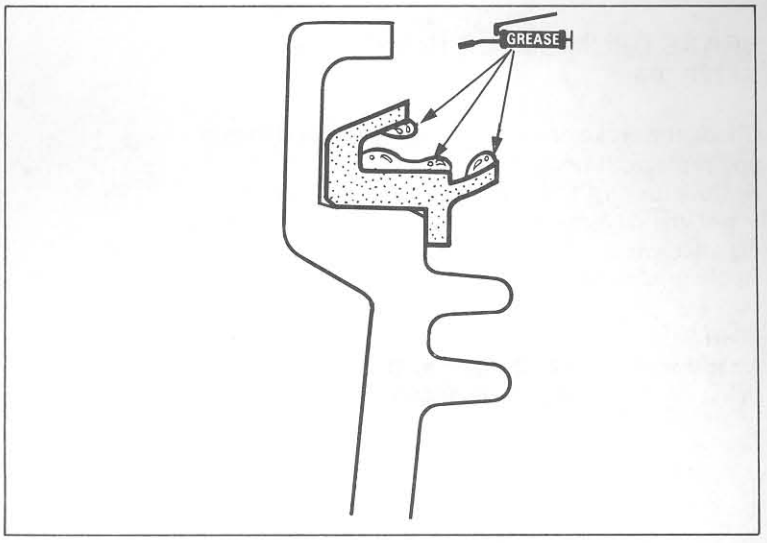
Make sure that there is no clearance between the brake panel and the drum seal .

Press the seal ring onto the brake drum using the same tool until it seats fully.

Make sure that there is no clearance between the drum and the seal ring.



Pack grease in the cavity and lips of the drum seal as shown.

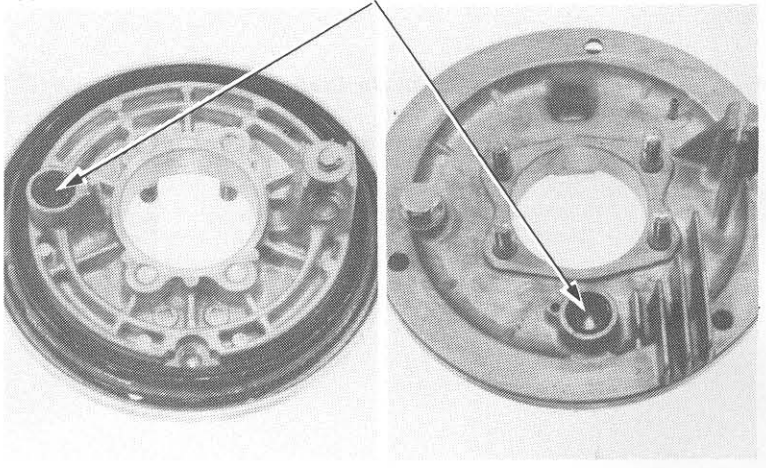


REAR BRAKE ASSEMBLY

'85:

Apply grease to new rubber seal and install them into the brake panel.

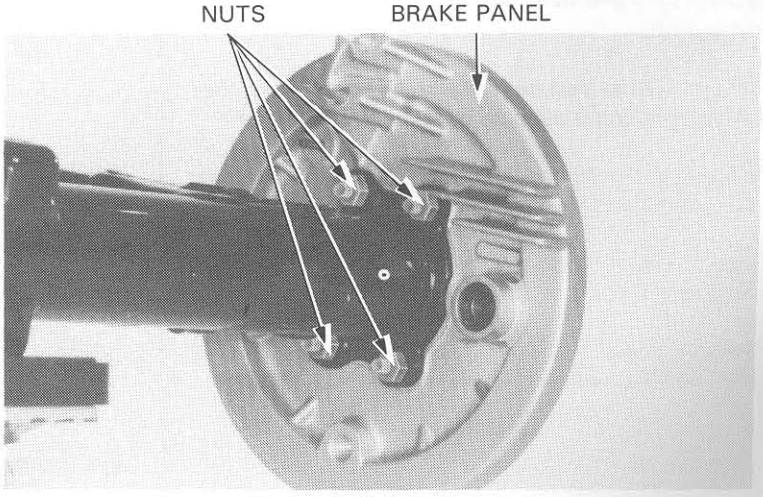
'85:



Clean the mating surfaces between the swingarm, the right bearing housing and the brake panel.
Apply liquid sealant to mating surfaces.

Install the brake panel and right bearing housing onto the swingarm.

TORQUE: 50—60 N·m
(5.0—6.0 kg-m, 36—43 ft-lb)

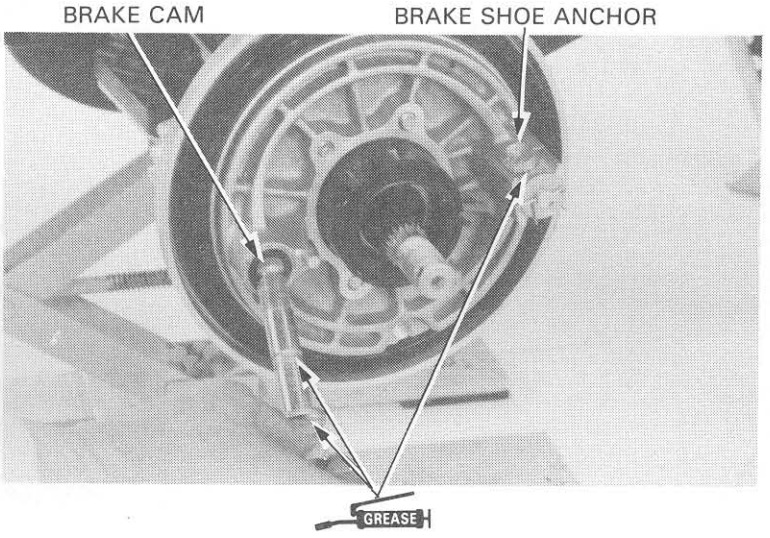


Apply grease to the brake shoe anchor and brake cam.

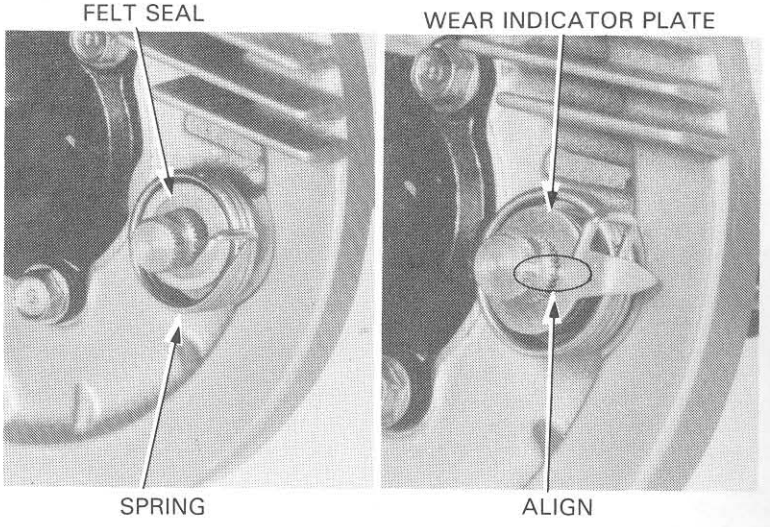
WARNING

Contaminated brake linings reduce stopping power. Keep grease off the linings. Wipe excess grease off the cam.

Install the brake cam.



Install the felt seal, spring and wear indicator plate, aligning its wide tooth with the wide groove on the brake cam.

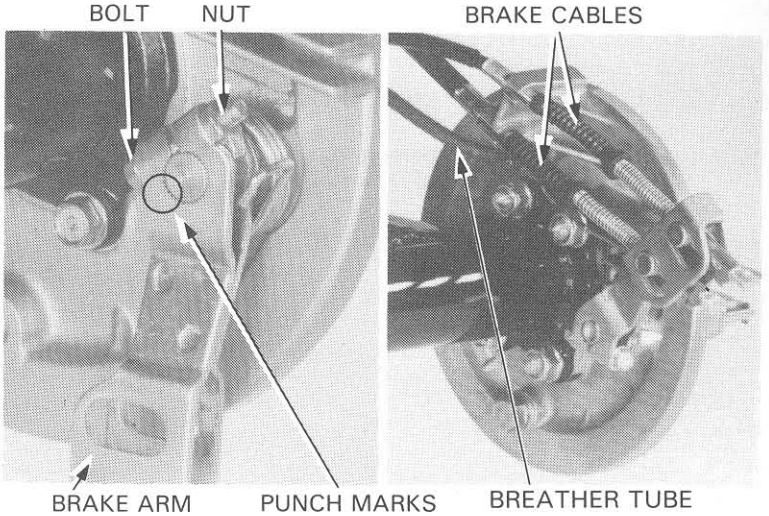


Install the brake arm, aligning the punch marks on the brake cam and arm.

Secure the brake arm using the bolt and nut.

Connect the brake cables to the brake arm.

Connect the breather tube.



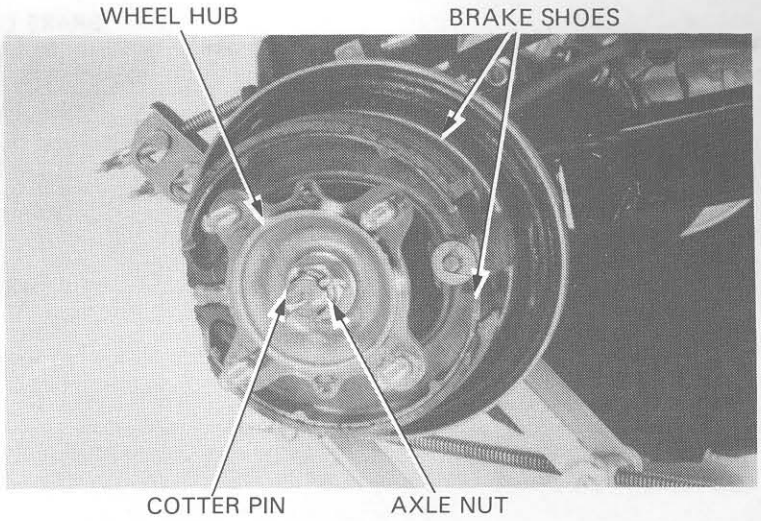
Install the brake shoes and springs.
Install the right wheel hub and axle nut.

TORQUE: 80—120 N·m (8.0—12.0 kg-m, 58—87 ft-lb)

Install a new cotter pin.

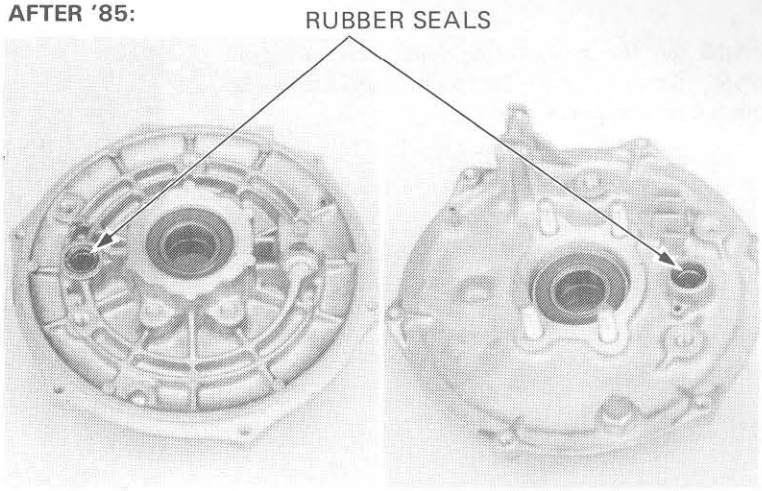
Clean the mating surfaces between the brake drum and the wheel hub and apply liquid sealant to them.

Install the brake drum and two screws.



After '85:
Apply grease to new rubber seals and install them into the brake panel.

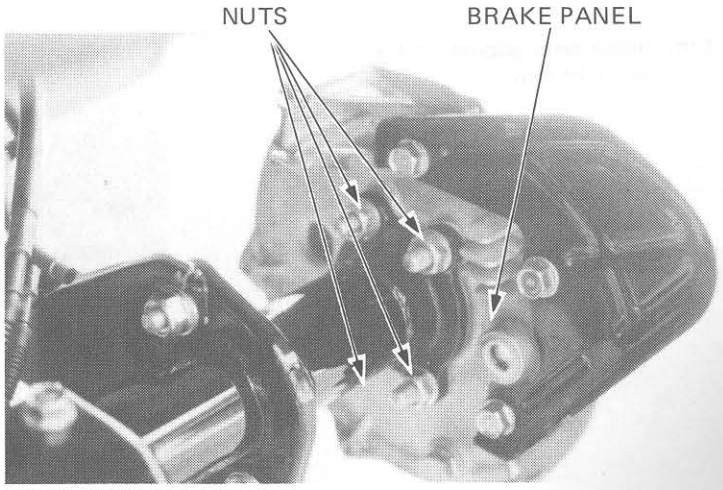
AFTER '85:



Clean the mating surfaces between the swing arm and the brake panel.
Apply liquid sealant to the mating surfaces.

Install the brake panel onto the swingarm.

TORQUE: 50—60 N·m (5.0—6.0 kg-m, 36—43 ft-lb)

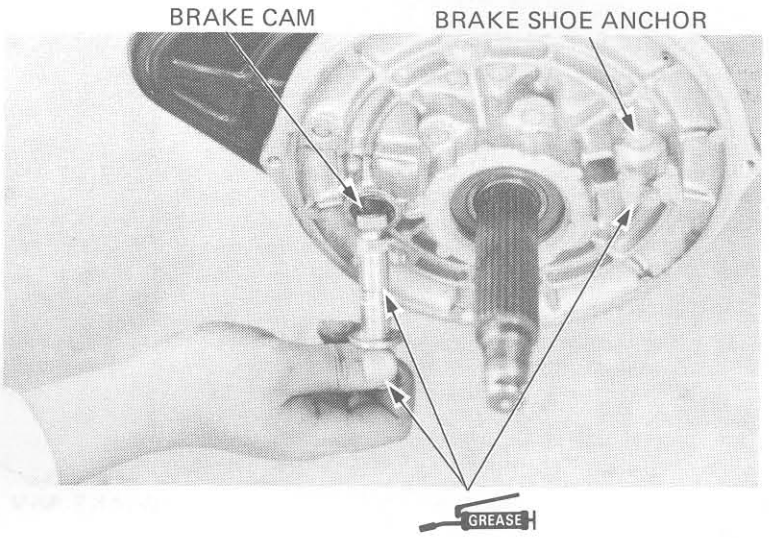


Apply greast to the brake shoe anchor and brake cam.

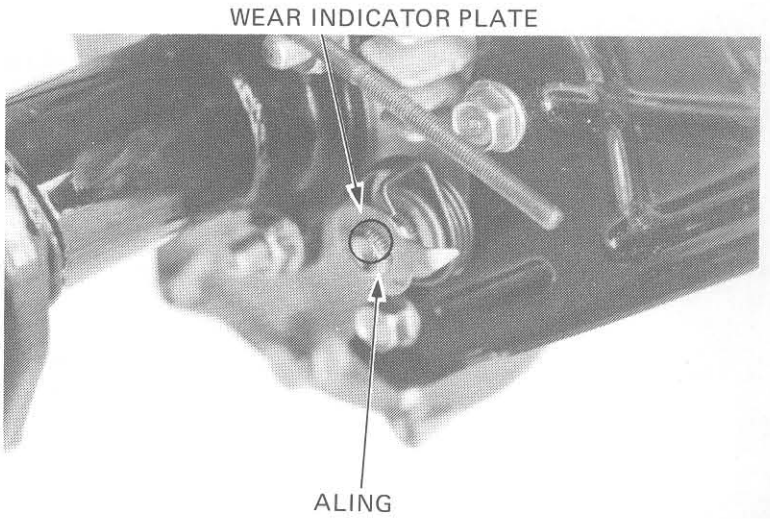
WARNING

Contaminated brake linings reduce stopping power. Keep grease off the linings. Wipe excess grease off the cam.

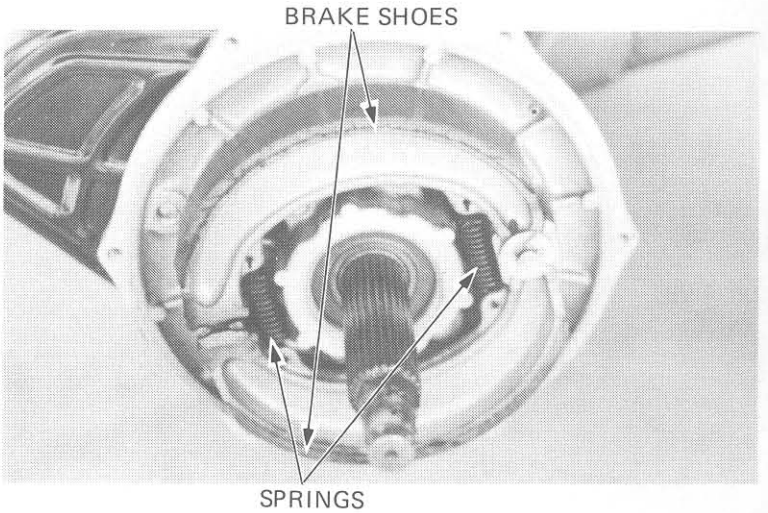
Install the brake cam.



Install the felt seal, spring and wear indicator plate, aligning its wide tooth with the wide groove on the brake cam.



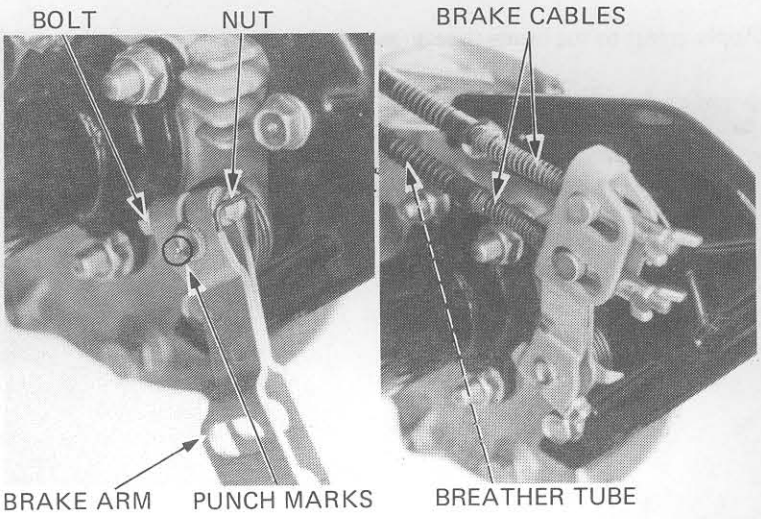
Install the brake shoes and springs.



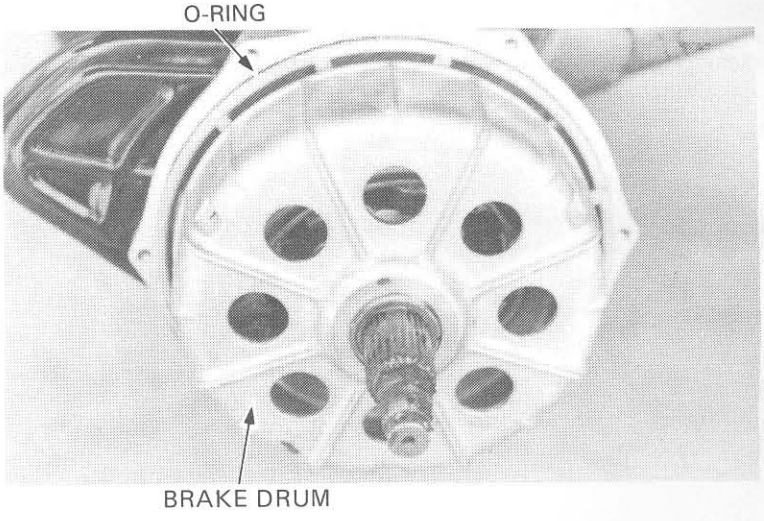
Install the brake arm, aligning the punch marks on the brake cam and arm.

Secure the brake arm using the bolt and nut.

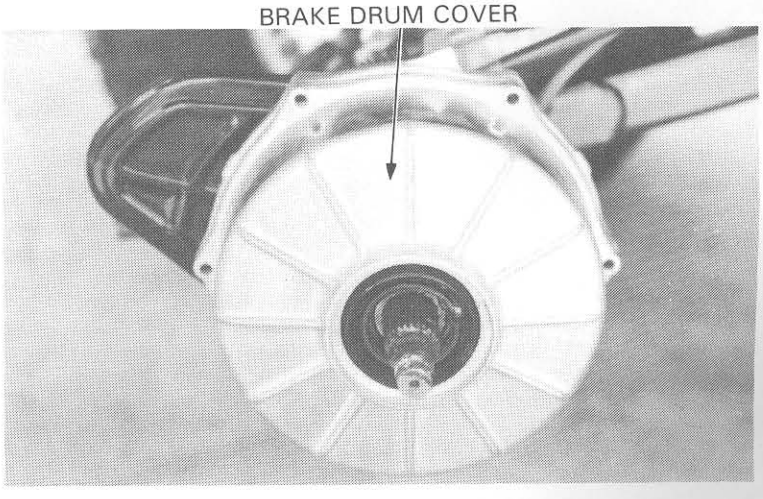
Connect the brake cables to the brake arm.
Connect the breather tube.



Install the O-ring.
Install the brake drum.



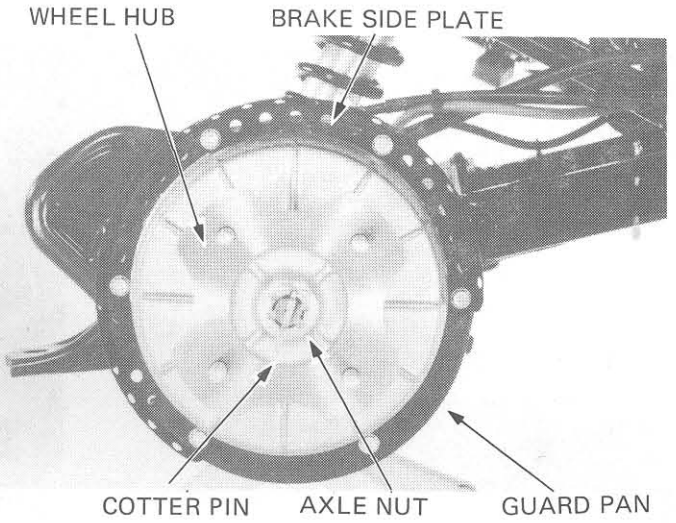
Install the brake drum cover.



Install the brake side plate and guard panel.
Install the right wheel hub and axle nut.

TORQUE: 80–140 N·m
(8.0–14.0 kg-m, 58–101 ft-lb)

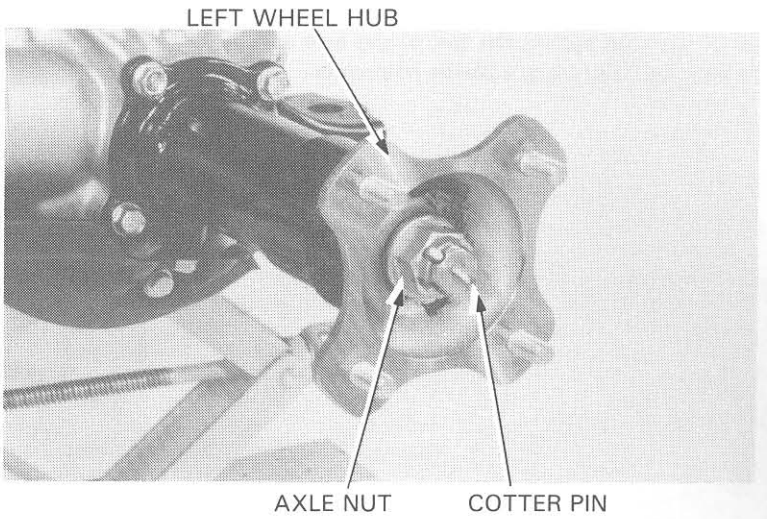
Install a new cotter pin.
Install the wheel.



REAR AXLE/WHEEL BEARINGS

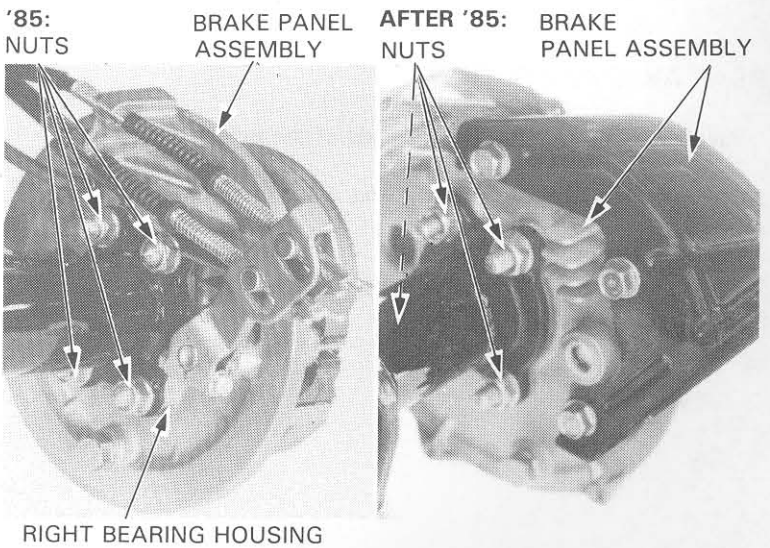
REMOVAL

Remove the following:
- right and left rear wheels (page 12-4).
- brake drum (page 12-4).
- cotter pins, axle nuts and both wheel hubs from the axle shaft.



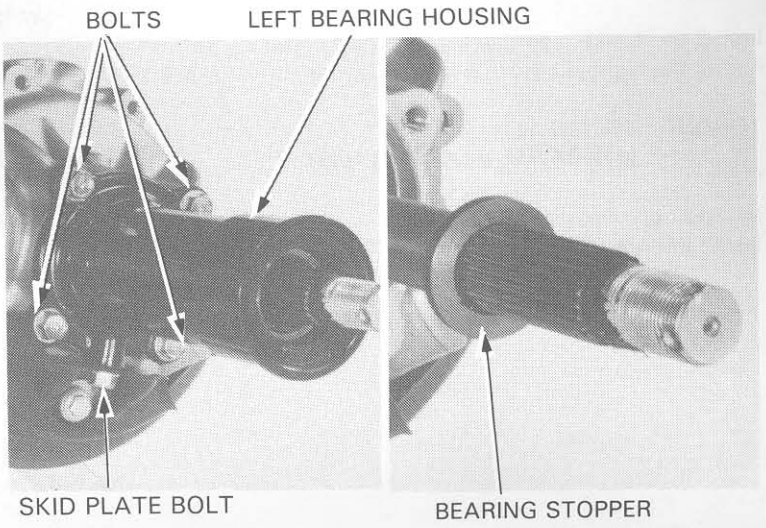
Remove the brake panel mount nuts, brake panel assembly and right bearing housing.

After '85:
Remove the brake panel mount nuts, and the brake panel assembly.



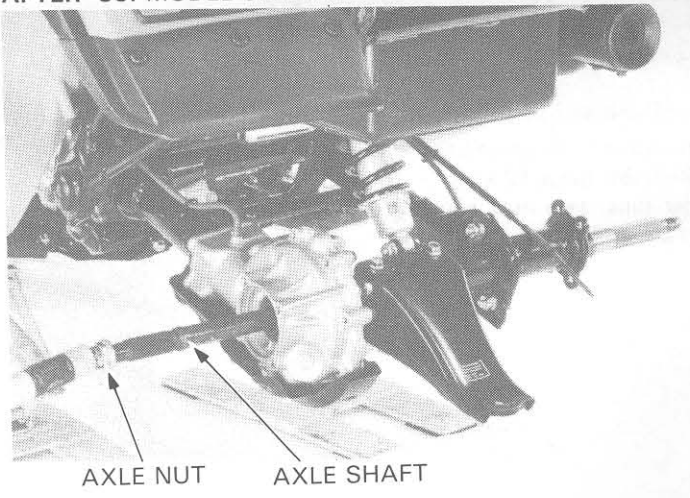
Remove the skid plate bolt, left bearing housing mounting bolts and the bearing housing from the swingarm.

Remove the bearing stopper from the axle shaft.



Install the axle nut on the end of the axle and drive the axle shaft out using a plastic hammmer.

AFTER '85: MODEL SHOWN

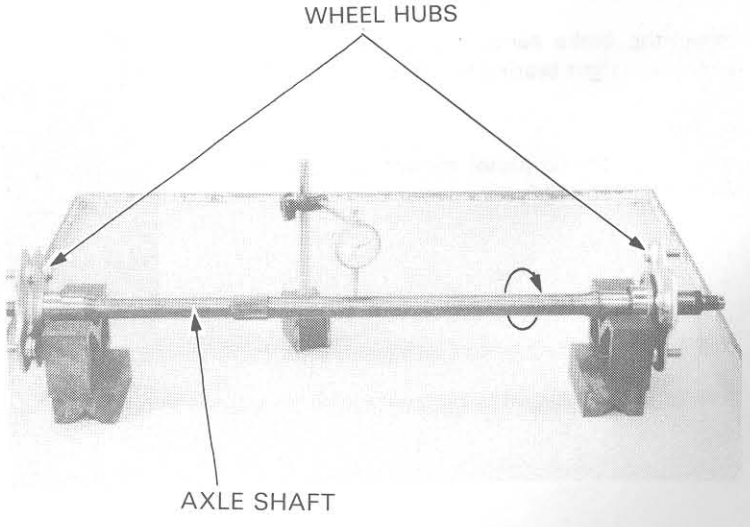


REAR AXLE INSPECTION

Install the wheel hubs onto both ends of the axle.

Place the rear axle in V-blocks and measure the runout.

SERVICE LIMIT: 3.0 mm (0.12 in)



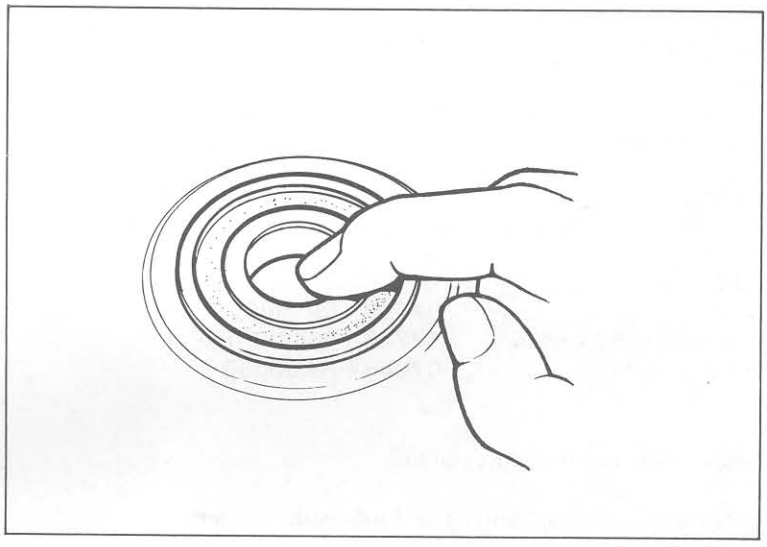
BEARING INSPECTION

Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the left and right bearing housings ('85) or brake panel and left bearing housing (After '85).
Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the left and right bearing housings ('85) or brake panel and left bearing housing (After'85).

NOTE:

Replace flange bearings in pairs.

For replacement to bearing see page 12-17 and 12-18.



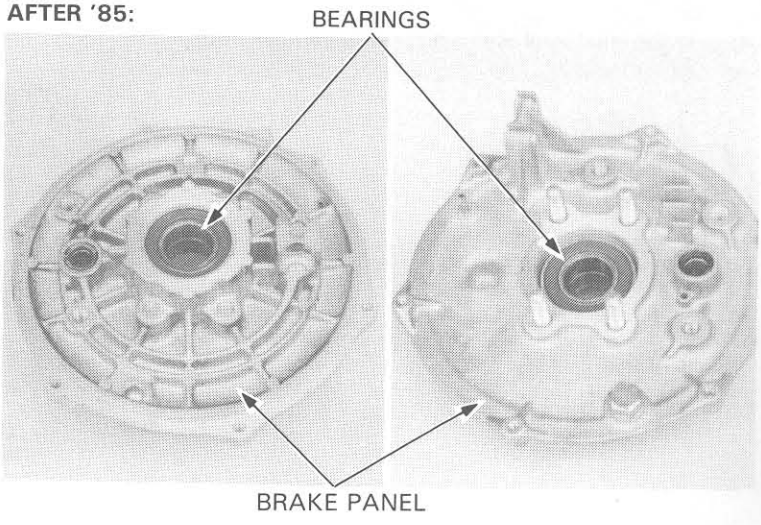
After '85:

Drive the bearings out.
Drive the new bearings into the panel with the sealed side out-ward each other.

TOOLS

Driver	**07749—0010000**
Attachment 52 x 55 mm	**07746—0010400**
Pilot 28 mm	**07746—0041100 or**
Pinion gear driver	**07945—HA00000**

AFTER '85:



REAR WHEEL BEARING REPLACEMENT '85:

Remove the dust seal and drive the bearings out of the left housing with the tools listed below:

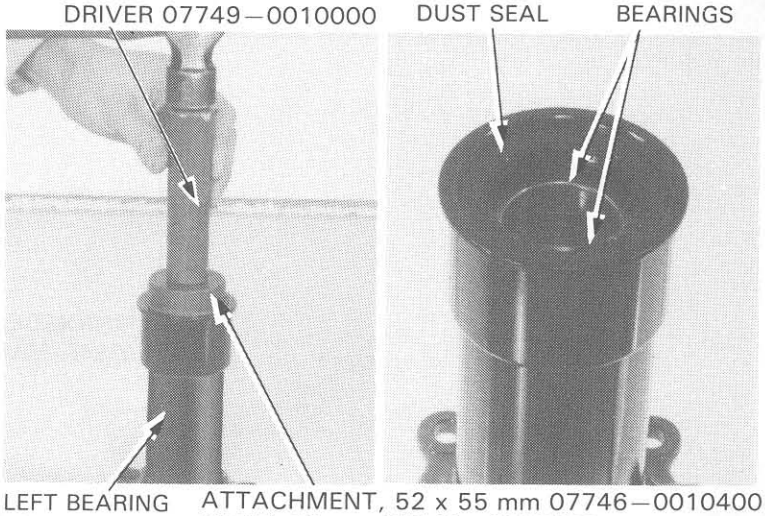
Driver	**07749—0010000**
Attachment, 52 x 55 mm	**07746—0010400**
Pilot 30 mm	**07746—0040700 or**
Pinion gear driver	**07945—HA00000**

NOTE

Use the 30 mm end of the attachment as a pilot.

Drive the new bearings into the housing with the tools shown in the photographs.

Apply grease to the new dust seal and install it.



REAR WHEEL BEARING REPLACEMENT

After '85

Remove the dust seal and drive the bearings out of the left housing using attachment (07746—0010400) and driver (07749—010000).

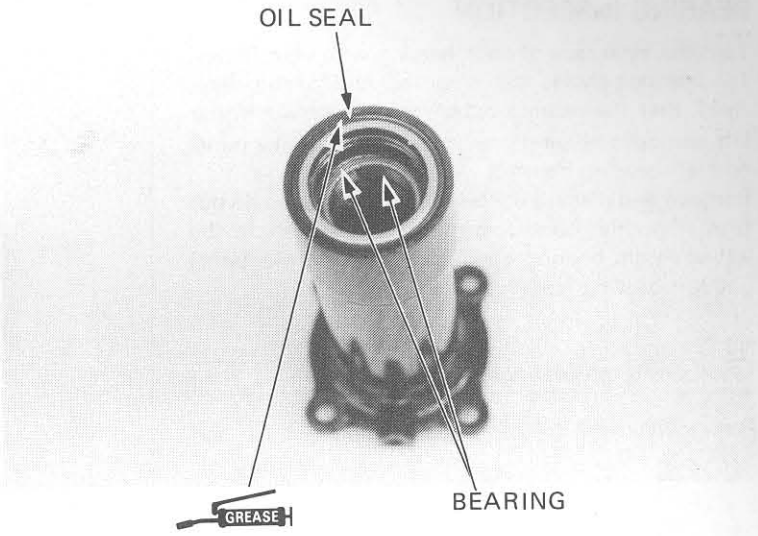
Drive the new bearings into the housing.

TOOLS

Driver	**07749—0010000**
Attachment, 52 x 55 mm	**07746—0010400 or**
Pinion gear driver	**07945—HA00000**

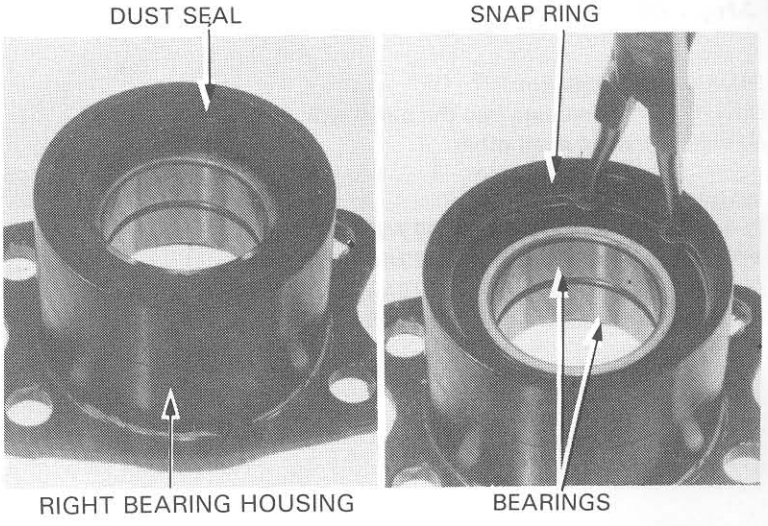
Apply grease to a new dust seal lip.

Install the dust seal until it is flush with the left bearing housing flange.

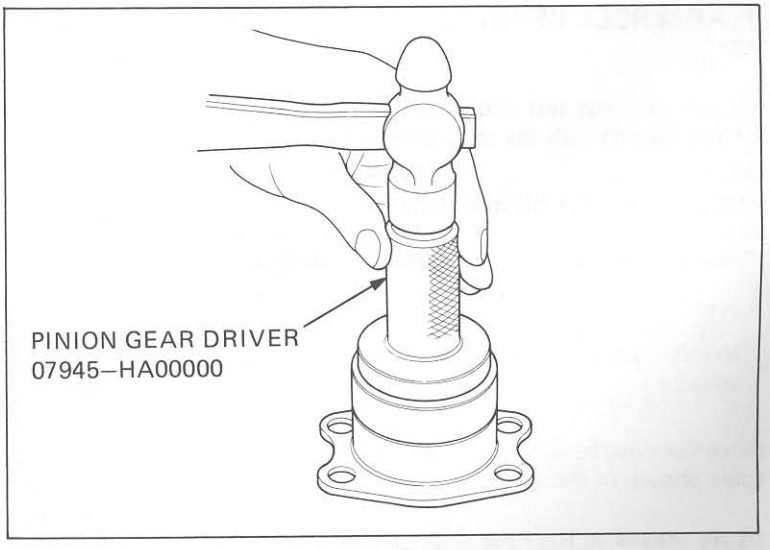


'85:

Remove the dust seal, snap ring and bearings from the right housing.



Dirve new bearings into the housing and install the snap ring. Apply grease to the new dust seal, and install it.

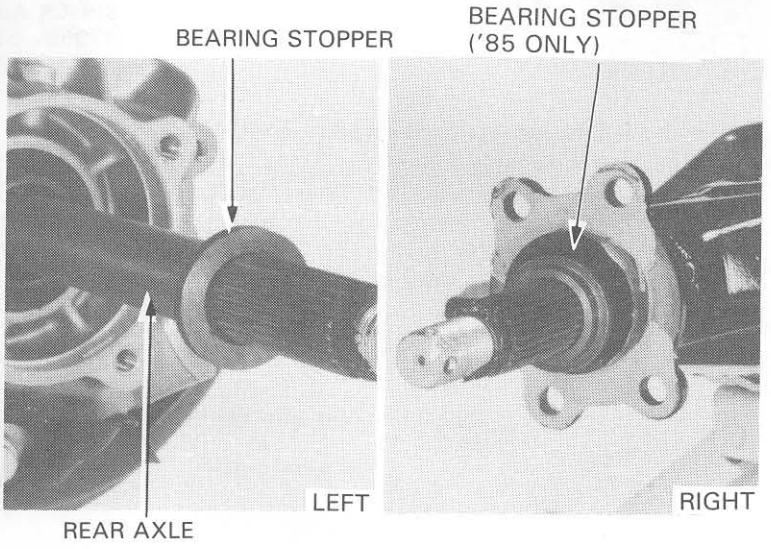


INSTALLATION

Insert the rear axle into the final gear through the swingarm.

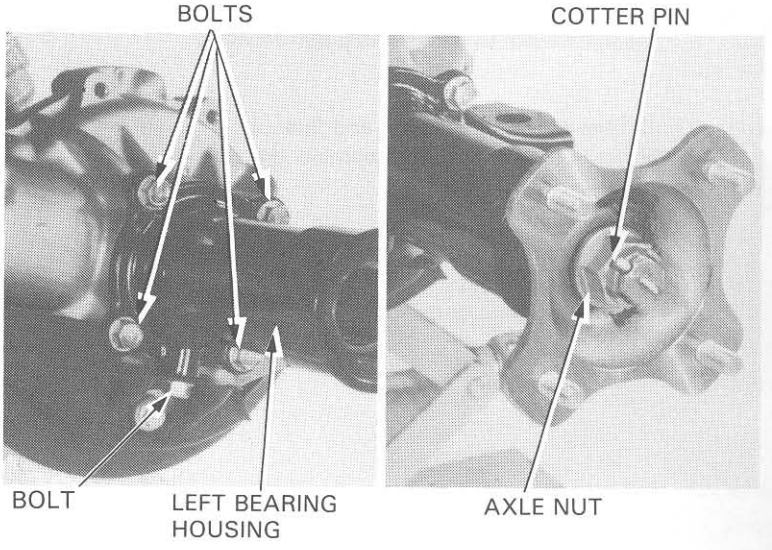
Install the bearing stopper onto the axle with their chamfers facing in.

Clean the mating surfaces of the right and left bearing housing, swingarm, final gear case and brake panel.
Apply liquid sealant to mating surfaces.



Install the following:
— left bearing housing and tighten the bolts.

TORQUE: 28—35 N·m
(2.8—3.5 kg-m, 20—25 ft-lb)
AFTER '85: 30—36 N·m
(3.0—3.6 kg-m, 22—26 ft-lb)
— right bearing housing and brake panel assembly (see pages 12-10 and 12-12).
— wheel hubs and tighten the axle nuts.
TORQUE: 80—100 N·m
(8.0—10.0 kg-m, 58—72 ft-lb)
AFTER '85: 80—140 N·m
(8.0—14.0 kg-m, 58—101 ft-lb)
— new cotter pins.
— brake drum.
— rear wheels (page 12-4).



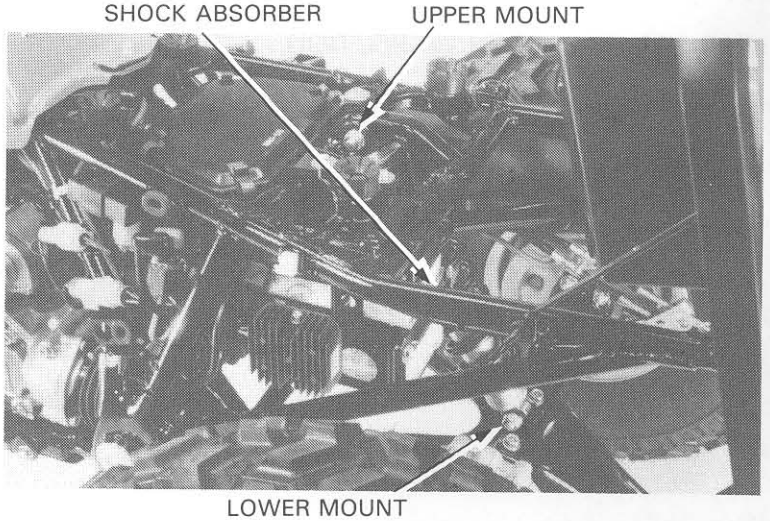
REAR SHOCK ABSORBER

REMOVAL

Raise the rear wheels off the ground with a jack and place a block under the engine.

Raise the rear fender to access the shock absorber.

Remove the rear shock absorber upper and lower mount nuts and bolts and remove the shock absorber.



DISASSEMBLY

Set the shock absorber in the compressor as shown and compress the spring 20 mm.

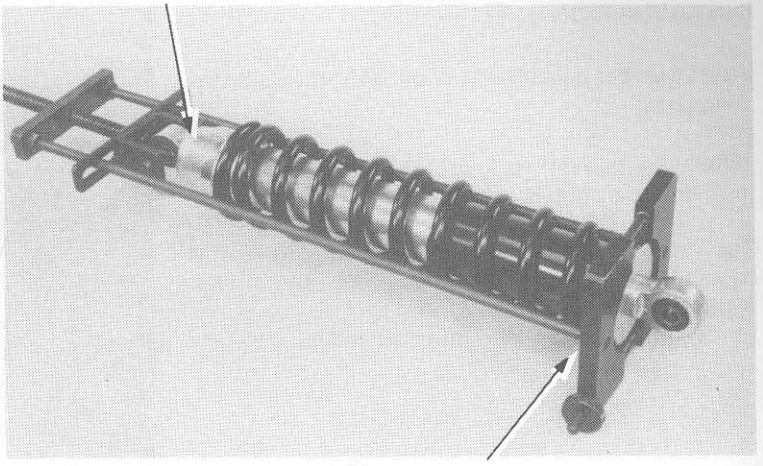
CAUTION

Be sure the base is adjusted correctly for the shock spring seat and the clevis pin is all the way in.

NOTE

Be sure to use base 07959–MB10000 with the compressor.

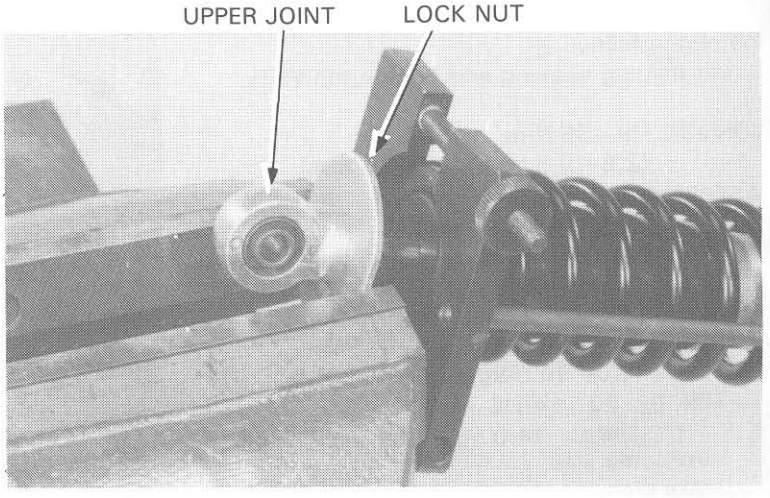
SHOCK ABSORBER COMPRESSOR
07959–3290001



BASE
07959–MB10000

Place the shock lock nut in a vise and pull the shock rod out.

Loosen and remove the upper joint and lock nut. Remove the compressor and disassemble the rear shock absorber.

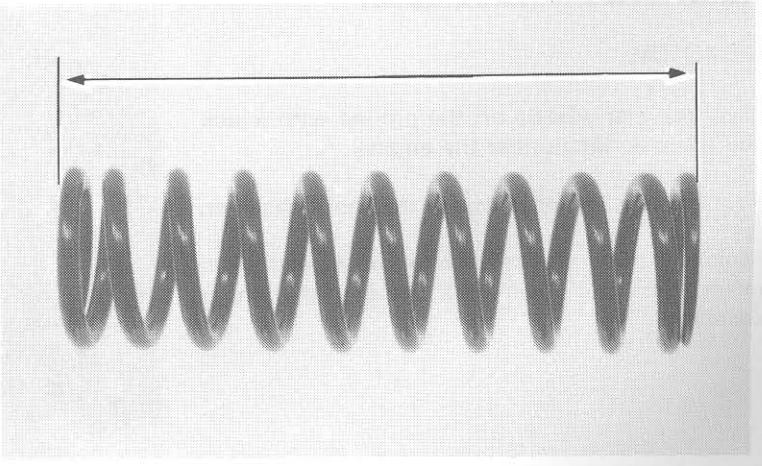


SPRING FREE LENGTH INSPECTION

Measure the rear shock absorber spring free length.

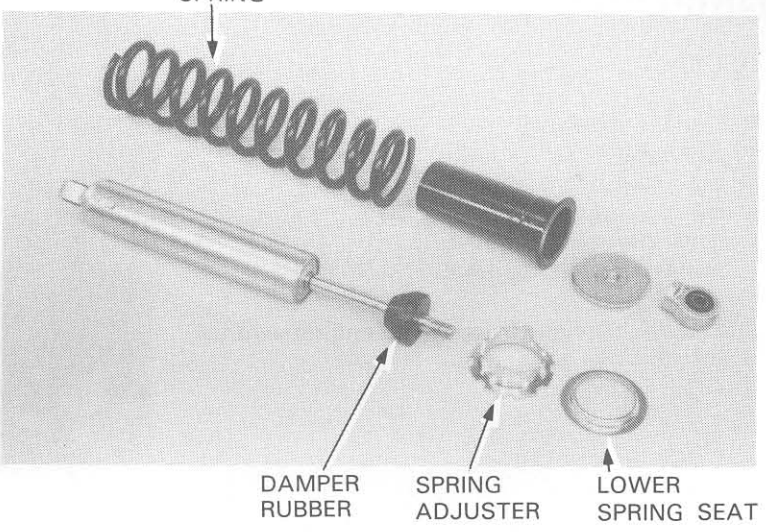
SERVICE: 269.1 mm (10.59 in)

Replace the spring if it is shorter than the service limit.



ASSEMBLY

Place the spring adjuster, spring lower seat, spring, spring upper seat and damper rubber on the damper.



CAUTION

Be sure the base is adjusted correctly for the shock spring seat and the clevis pin is all the way in.

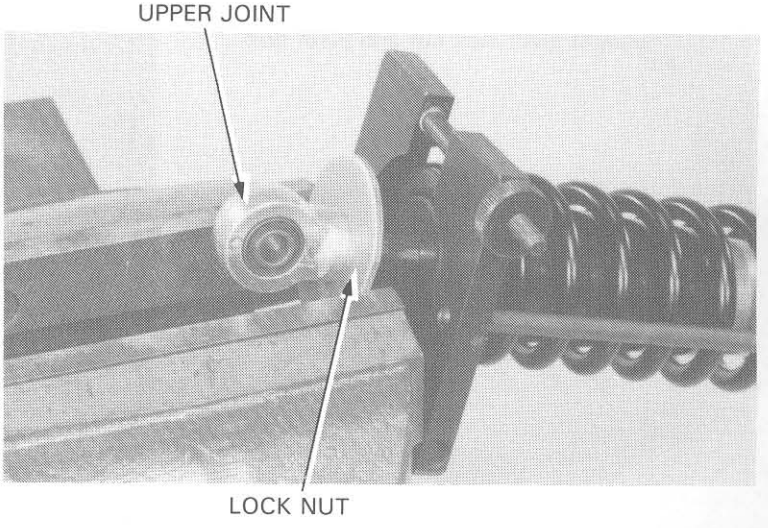
Apply a locking agent to the rod threads and install the lock nut.

Attach the shock absorber compressor, screwing in the compressor's base adjuster nut.

Apply a locking agent to the damper rod threads and screw the upper joint on. Hold the lock nut in a vise and tighten the upper joint securely.

NOTE

Check that the lock nut is seated against the rod's bottom thread.

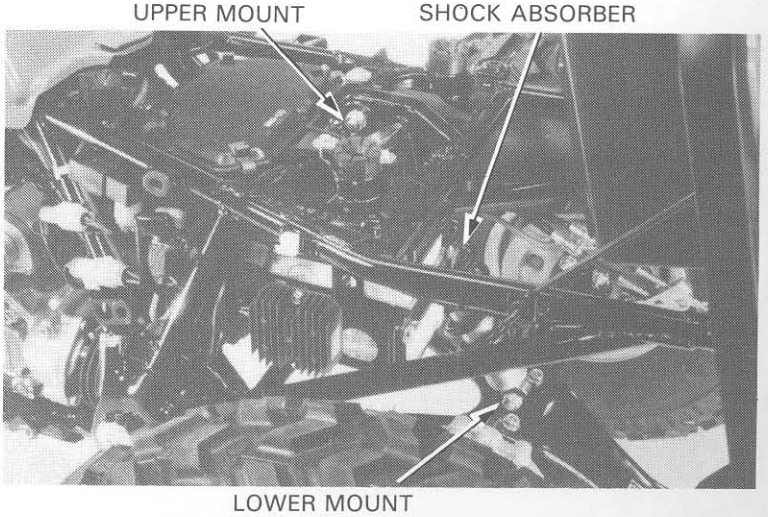


Align the spring seat with the lock nut while releasing the compressor.

INSTALLATION

Install the shock absorber onto the frame and swing arm and tighten the upper and lower mounts.

TORQUE: 50–60 N·m
(5.0–6.0 kg-m, 36–43 ft-lb)

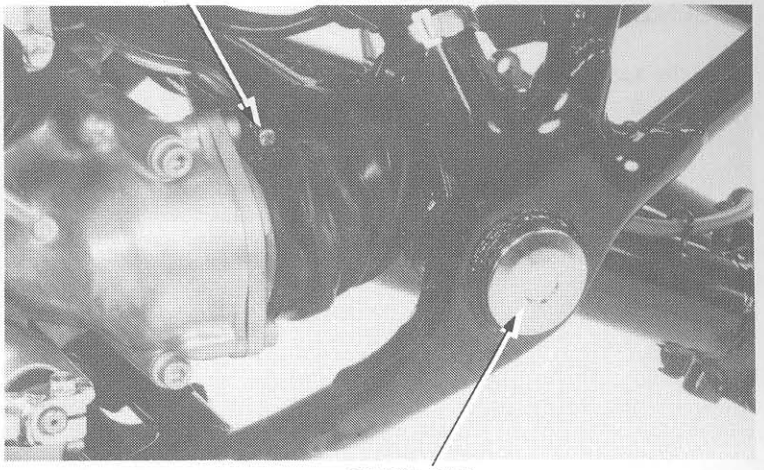


SWINGARM

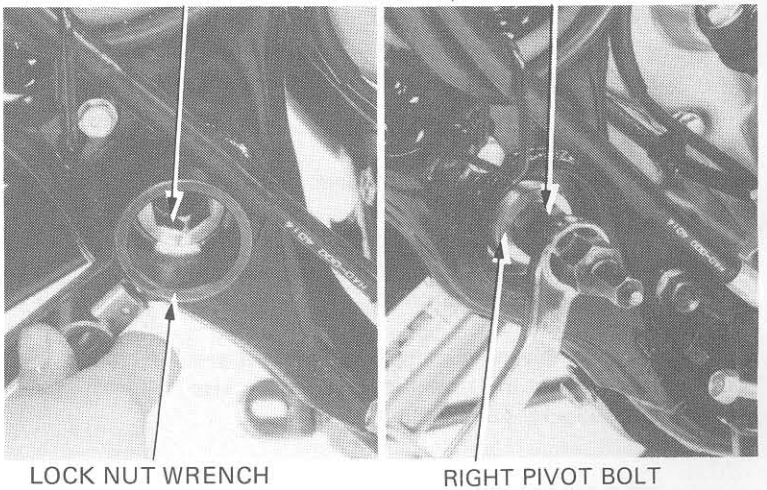
REMOVAL

Remove the following:
- rear wheel (page 12-4).
- rear brake panel assembly (page 12-4).
- rear axle (page 12-15).
- shock absorber (page 12-19).
- final drive case (page 12-25).

Loosen the swingarm boot band and remove the pivot caps.



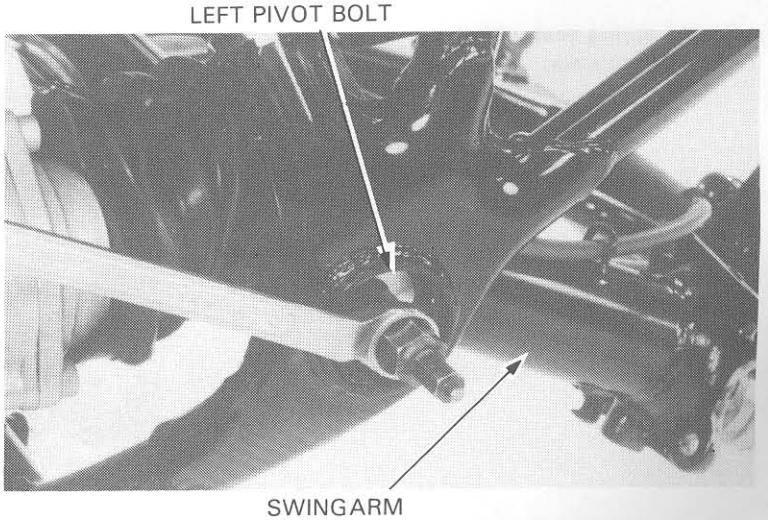
Remove the right pivot lock nut and pivot bolt.



Remove the left pivot bolt.

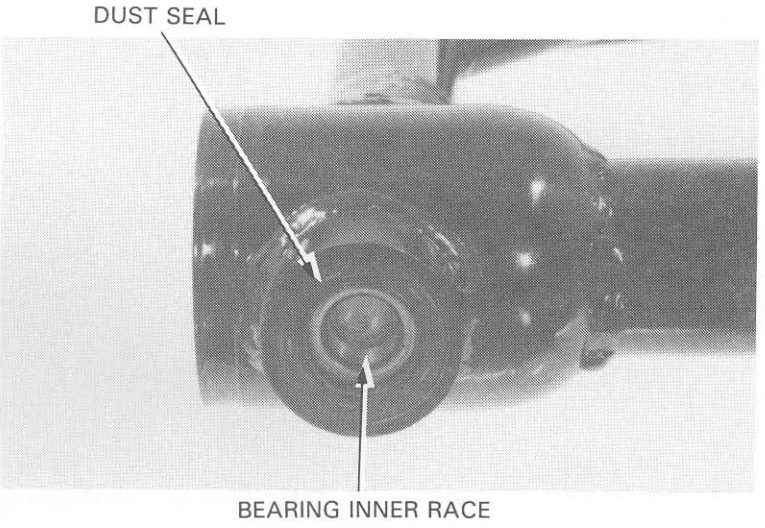
Remove the boot from the swingarm.

Have someone pull the universal joint back and hold it back to disengage the splines from the output gear case, while you remove the swingarm.



PIVOT BEARING REPLACEMENT

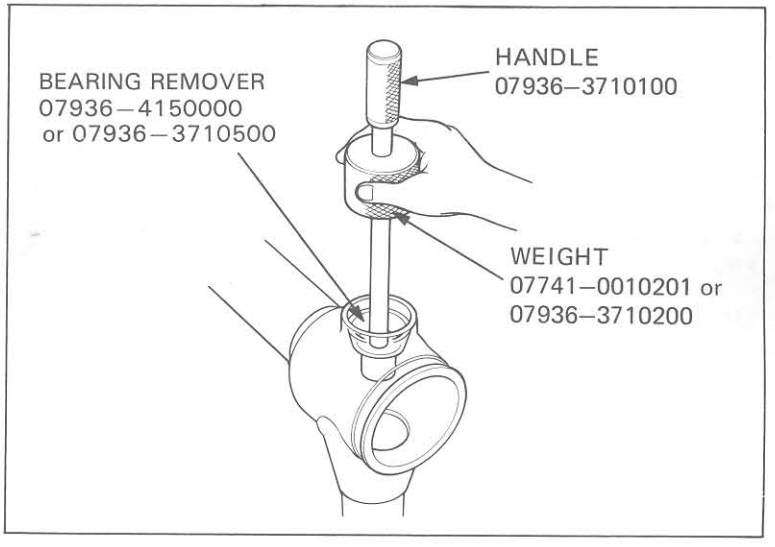
Remove the dust seals and bearing inner races from the swingarm pivot.



Punch or drill a 13 mm (1/2 in) hole into each grease retainer.

LEFT BEARING RACE:

Remove the attachment from the special tool, 07936–3710500. Slide the shaft through the hole and install a 29 mm (O.D.) washer or equivalent attachment onto the shaft.
Install the slide hammer and handle and remove the race.



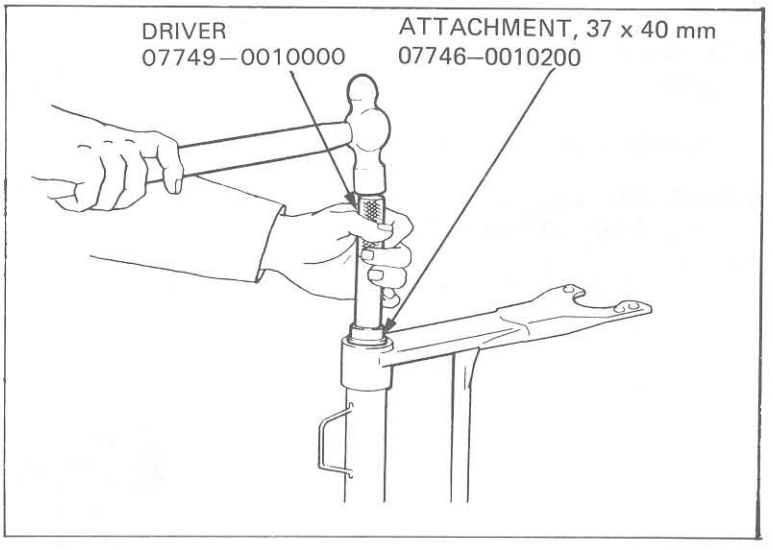
RIGHT BEARING RACE:

Slide the special tool with the attachment into the swingarm through the hole in the grease retainer.
Install the slide hammer weight on the handle and remove the race.

NOTE

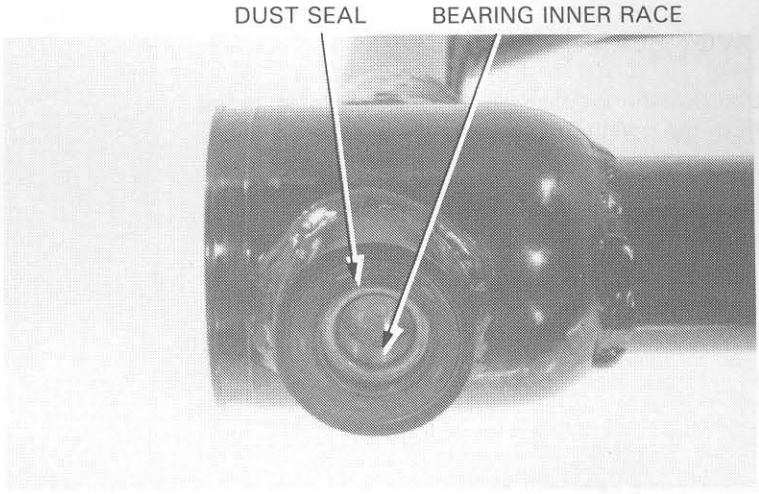
> Replace the bearing inner and outer races as a set. Replace the grease retainer plate whenever it is removed.

Install new grease retainer plates and drive new bearing outer races into the swingarm pivot.



Apply grease to the bearing inner races and dust seals.

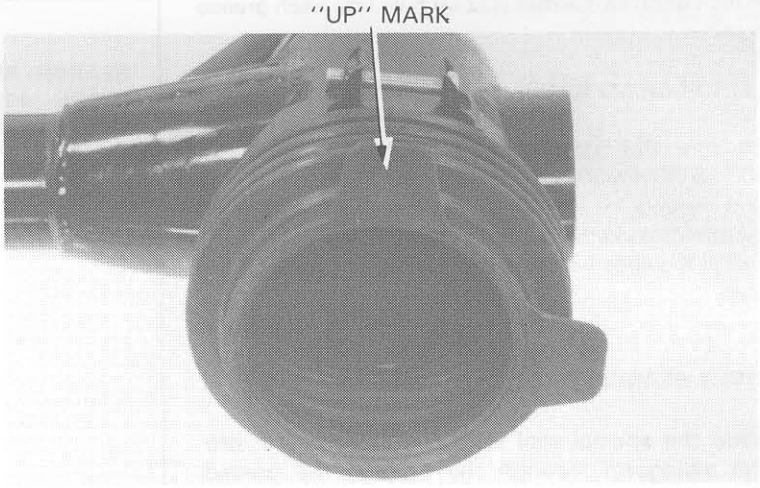
Then install them into the swingarm.



INSTALLATION

Install the swingarm boot with its "UP" mark up.

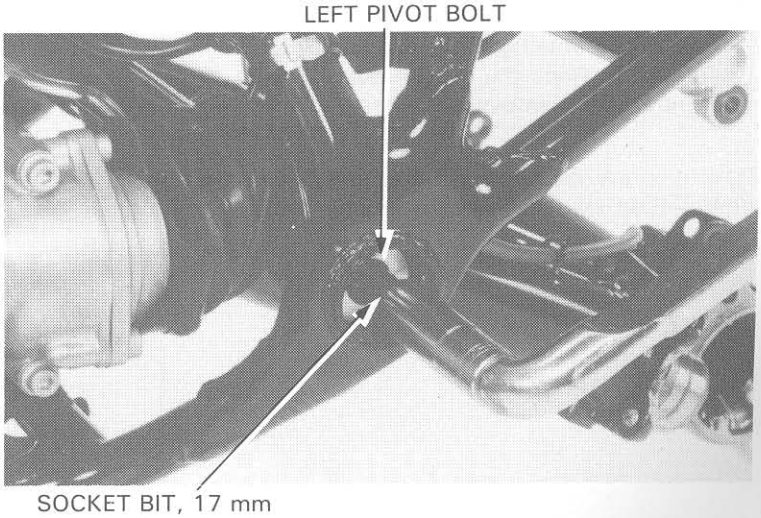
Apply grease to the pivot bolt tips.
Install the swingarm; hold the universal joint back to align and engage the splines of the output gear case.



Apply grease to the pivot bolt tips and install the swingarm.

Tighten the left pivot bolt to the specified torque.

TORQUE: 100—130 N·m
(10.0—13.0 kg-m, 72—94 ft-lb)

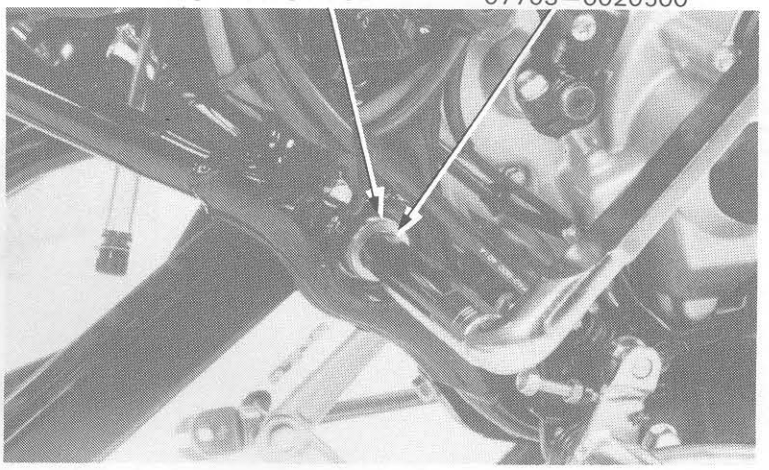


Tighten the right pivot bolt to the specified torque.

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

Move the swingarm up and down several times.

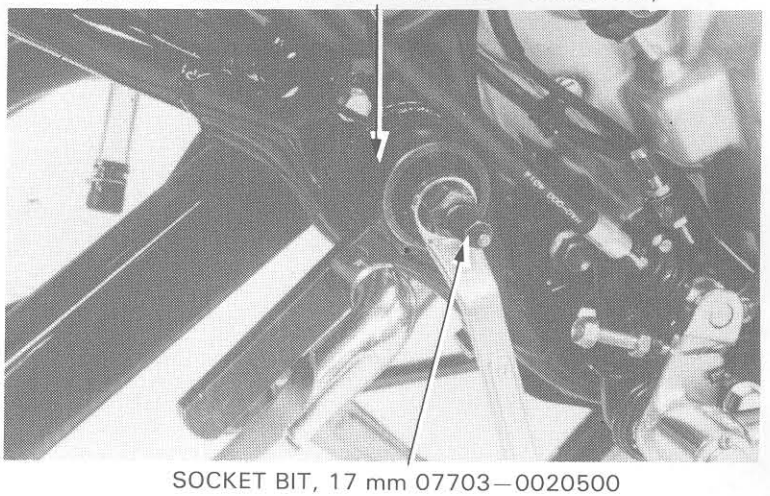
Retighten the right pivot bolt to the same torque.



Tighten the lock nut while holding the right pivot bolt.

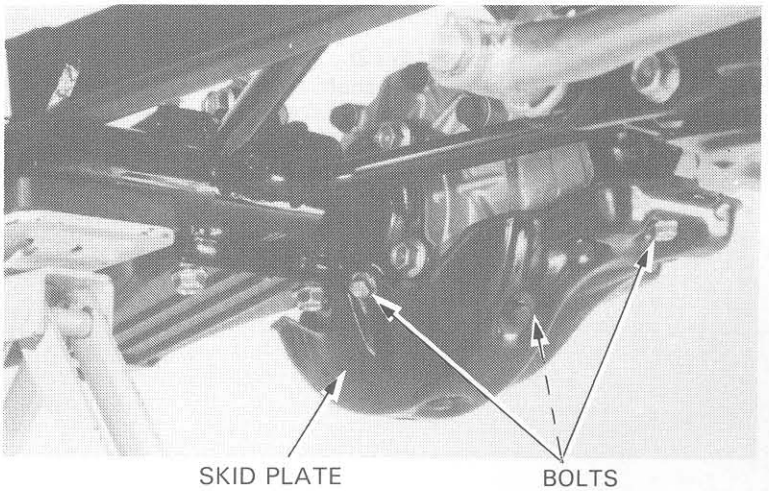
TORQUE: 100–130 N·m (10.0–13.0 kg-m,
72–94 ft-lb)

Install the following
– final drive (page 12-37)
– shock absorber (page 12-21)
– rear axle (page 12-19)
– rear brake panel (page 12-10)
– rear wheels (page 12-4)



FINAL DRIVE REMOVAL

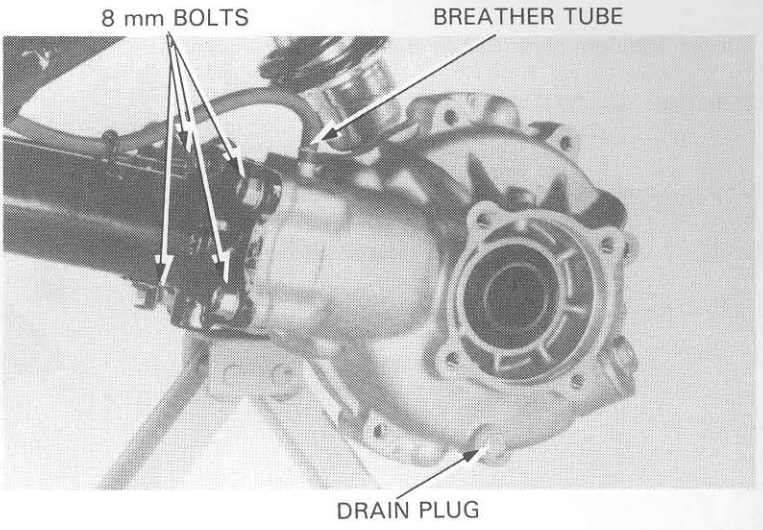
Remove the following:
– rear wheels (page 12-4)
– rear axle (page 12-15)
– three bolts mounting the skid plate.



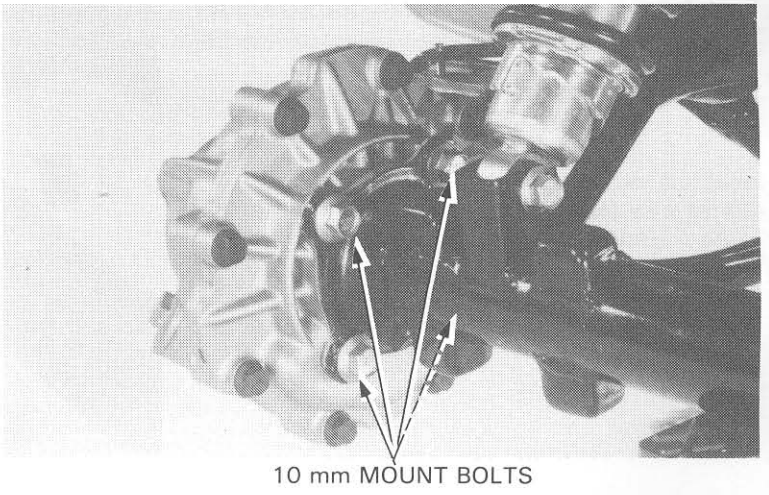
Disconnect the breather tube from the gear case.

Drain the final gear oil (page 2-3).

Remove the gear case 8 mm bolts.

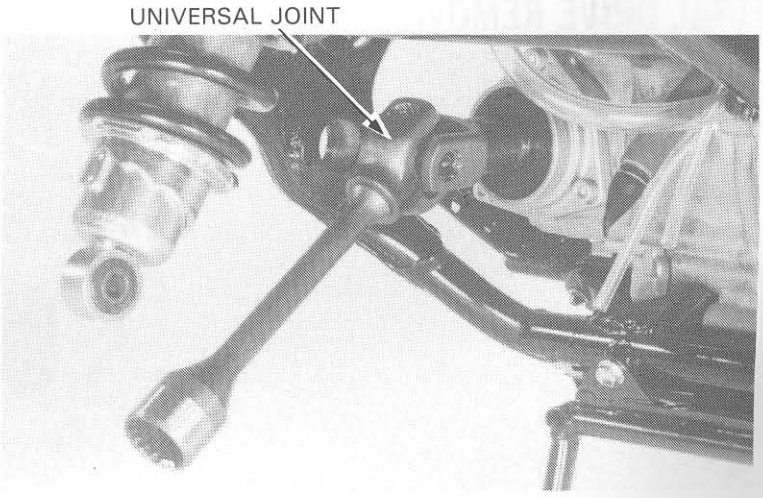


Remove the gear case 10 mm bolts, final gear case, spring and drive shaft from the swingarm.



UNIVERSAL JOINT

Remove the swingarm (page 12-22).
Remove the universal joint drive shaft from the engine output shaft.



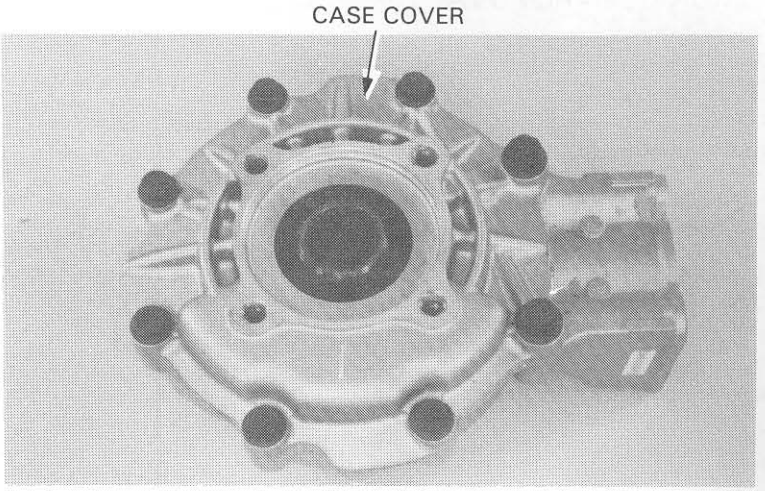
Inspect the universal joint bearings for excessive play or damage.

Apply molybdenum disulfide grease to the splines and install the universal joint.

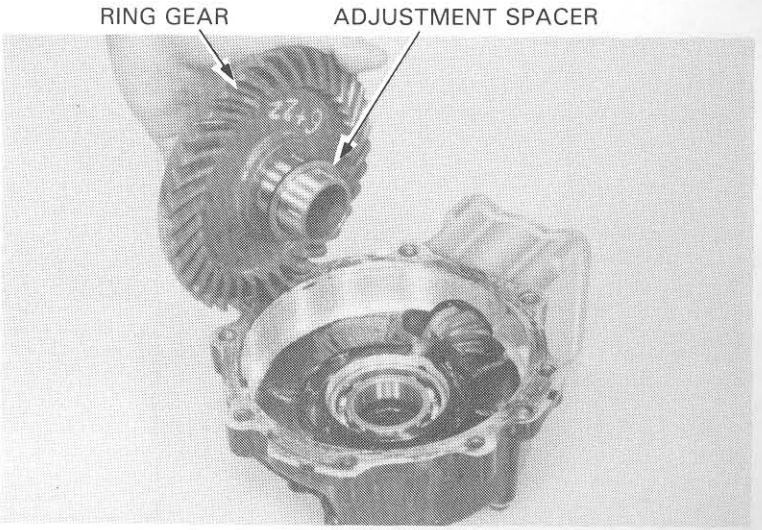
FINAL DRIVE GEAR

RING GEAR REMOVAL

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 securely supported.
Press the ring gear out of the cover with driver 07749–0010000 and attachment 07746–0010100.



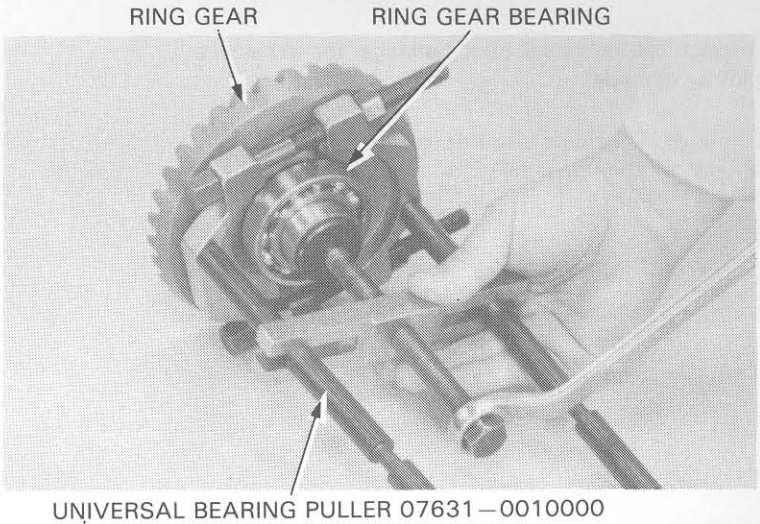
Remove the ring gear and adjustment spacer.



RING GEAR BEARING REMOVAL

Remove the ring gear bearing and adjustment spacer.

If the ring gear bearing stays in the cover, remove it using driver 07749—0010000 and attachment, 42 x 47 mm 07746—0010300.

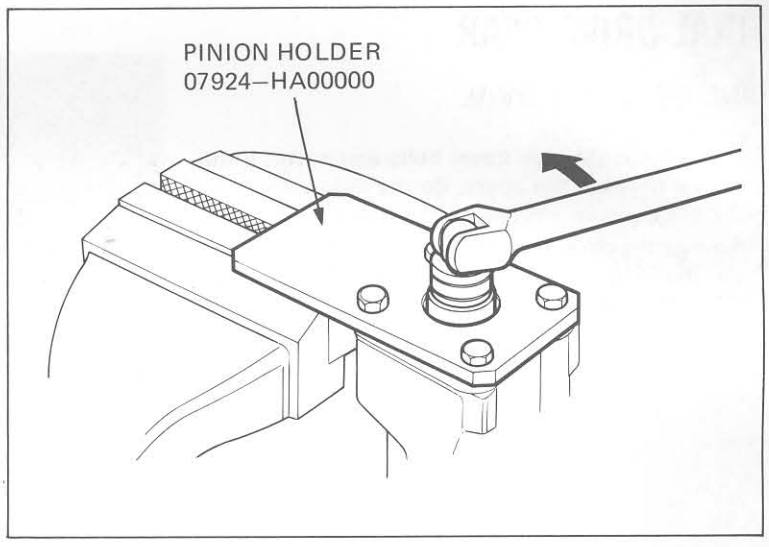


UNIVERSAL BEARING PULLER 07631—0010000
OR COMMERCIALLY AVAILABLE IN U.S.A.

PINION GEAR REMOVAL

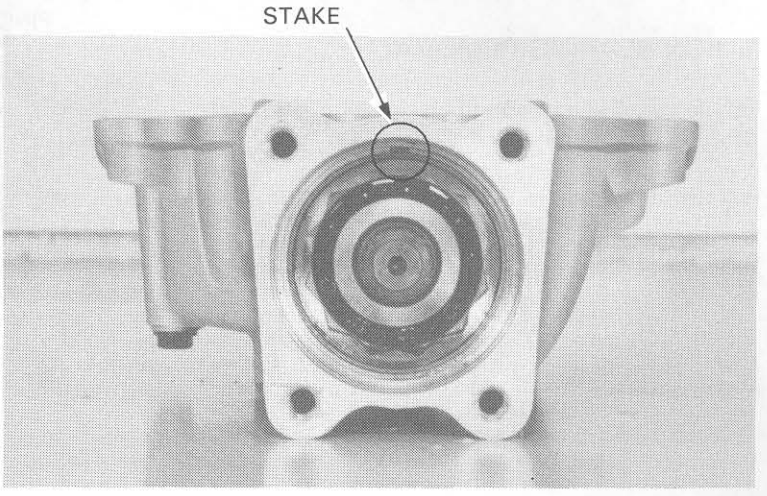
Place the pinion holder onto the pinion joint. Align the holes in the pinion holder with the four holes in the final drive gear case and secure to the case with four 8 mm bolts.

Remove the pinion joint nut.
Remove the pinion holder and pinion joint.



Remove the oil seal.

Unstake the pinion bearing lock nut with a drill or grinder



Remove the pinion bearing lock nut with the lock nut wrench.

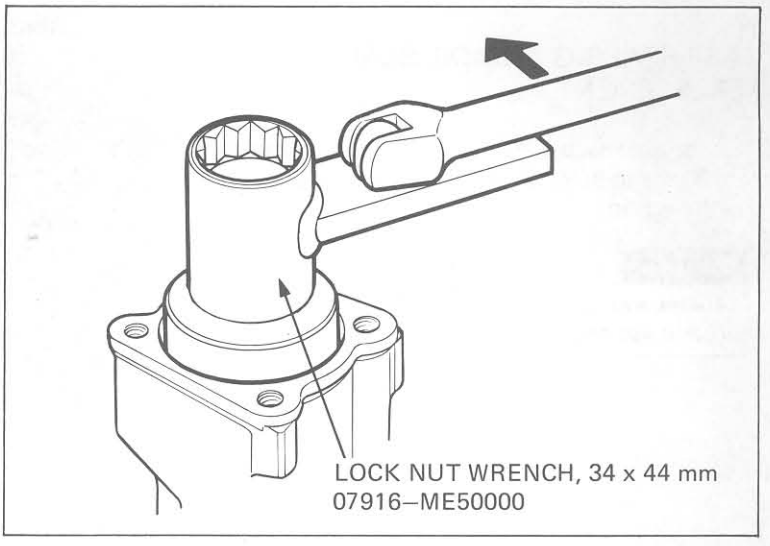
Position the pinion holder on the final gear case. Screw the shaft puller onto the end of the pinion gear shaft.

NOTE

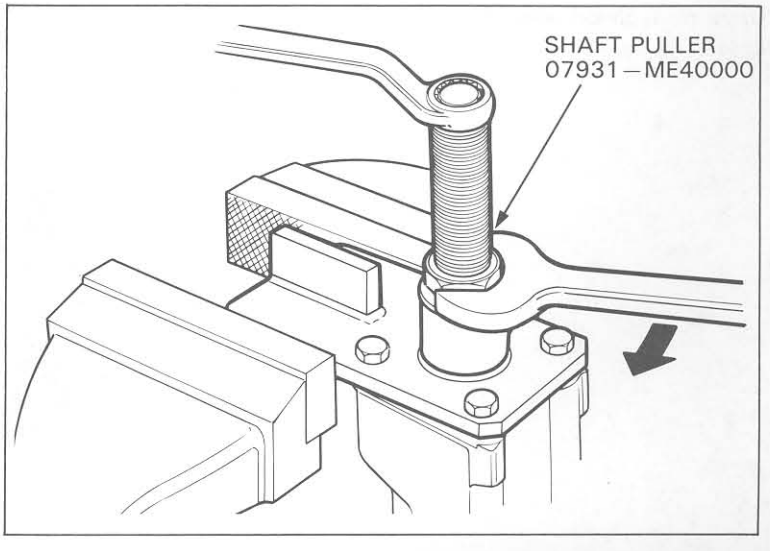
Be sure that the 27 mm special nut is backed off far enough to allow full thread engagement between the puller and the pinion gear shaft.

Screw the 27 mm special nut down until it contacts the pinion holder, and hold it with a 27 mm wrench.

Turn the puller shaft clockwise with a 17 mm wrench to remove the pinion gear from its housing.



Pull the pinion assembly off with the pinion puller.

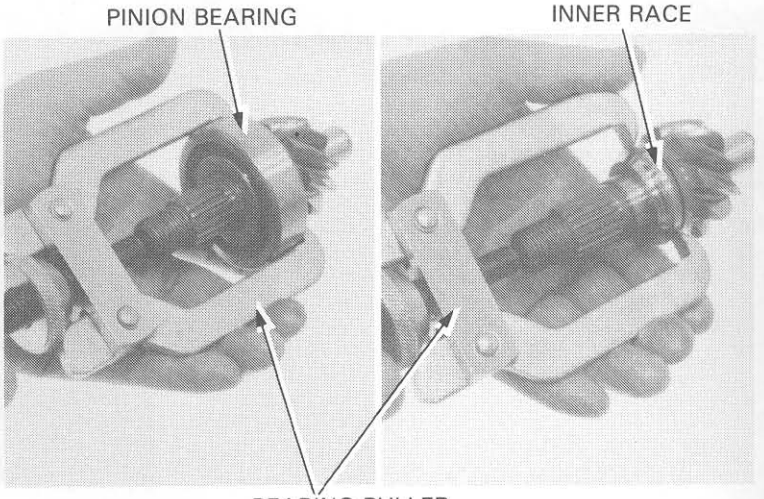


PINION BEARING REMOVAL

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.

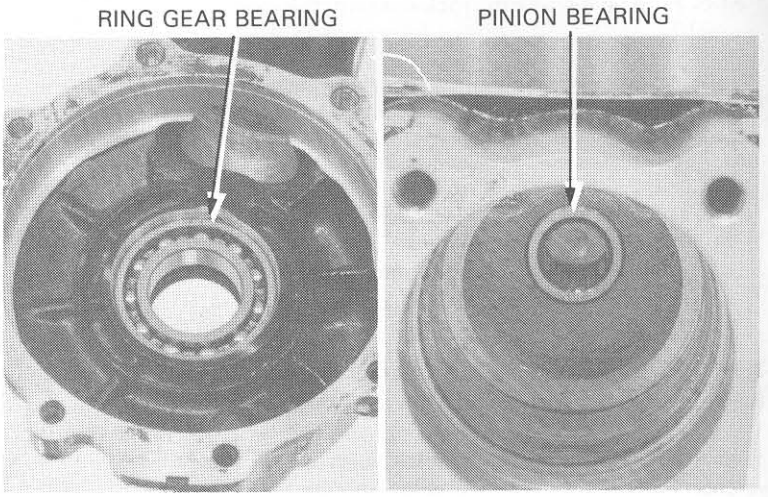


CASE BEARING AND OIL SEAL REPLACEMENT

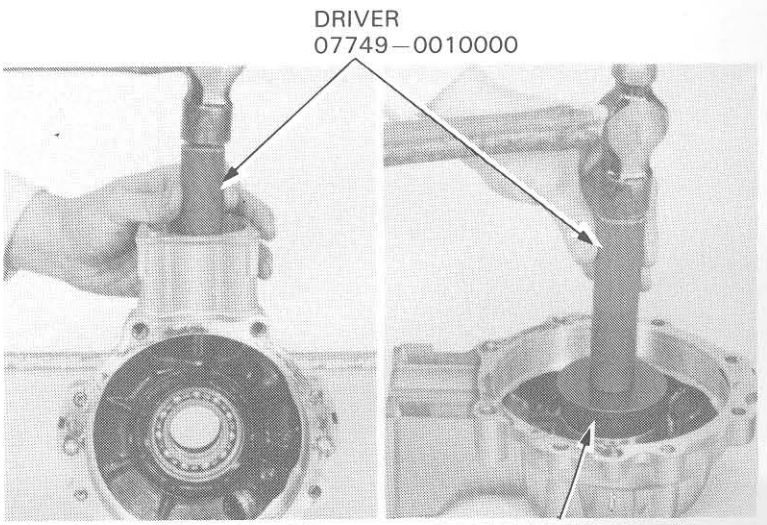
Heat the gear case 80°C (176°F). Tap the gear case with a plastic hammer to remove the ring gear and pinion bearing.

WARNING

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



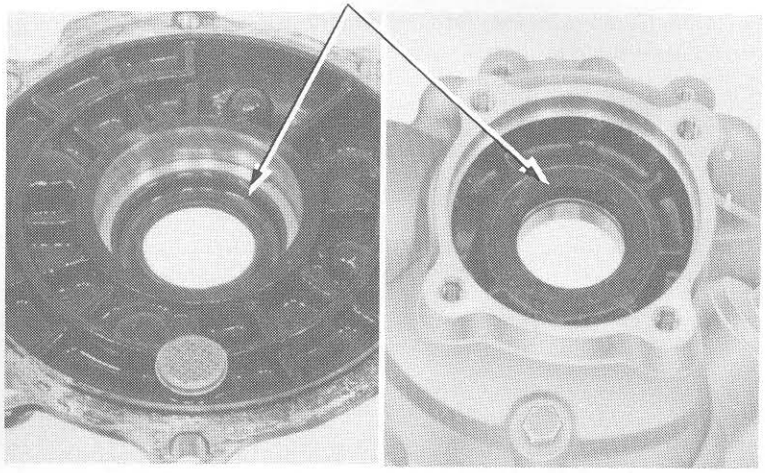
Drive new pinion and ring gear bearings into the case.



CASE AND COVER OIL SEAL REPLACEMENT

Remove the oil seals from the cover and the case.

Drive in new oil seals with the driver, 07749–0010000 and attachments, 07746–0010300 for the case, and 07746–0010400 for the cover.



BREATHER HOLE CLEANING

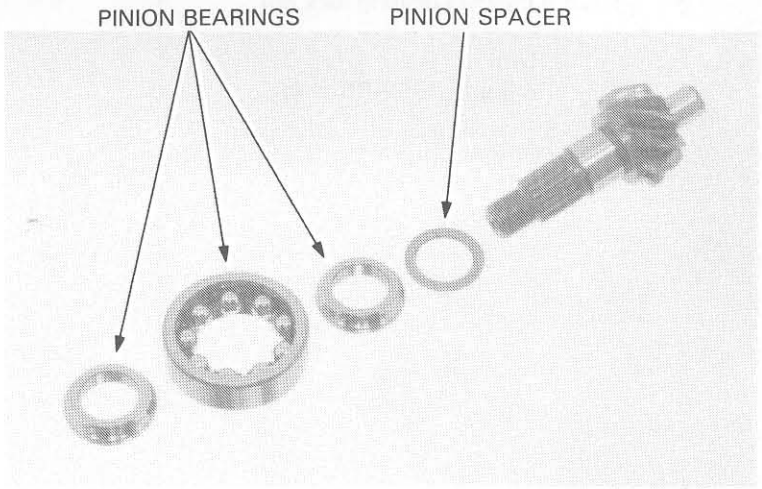
Blow compressed air through the breather hole in the gear case.

PINION GEAR ASSEMBLY

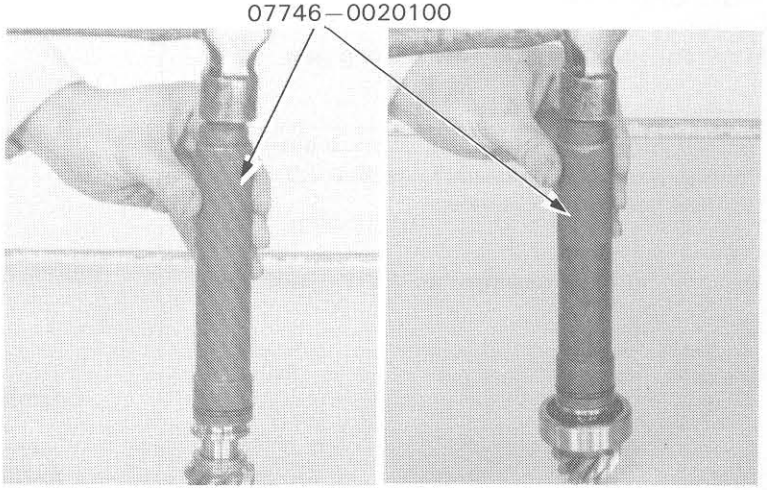
Install the original pinion gear spacer.

NOTE

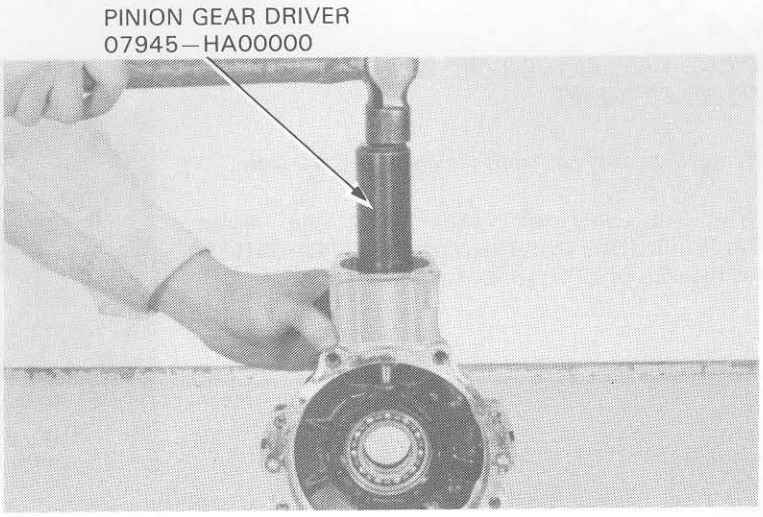
When the gear set, pinion bearing and/or gear case has been replaced, use a 2.00 mm (0.079 in) thickness spacer.



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

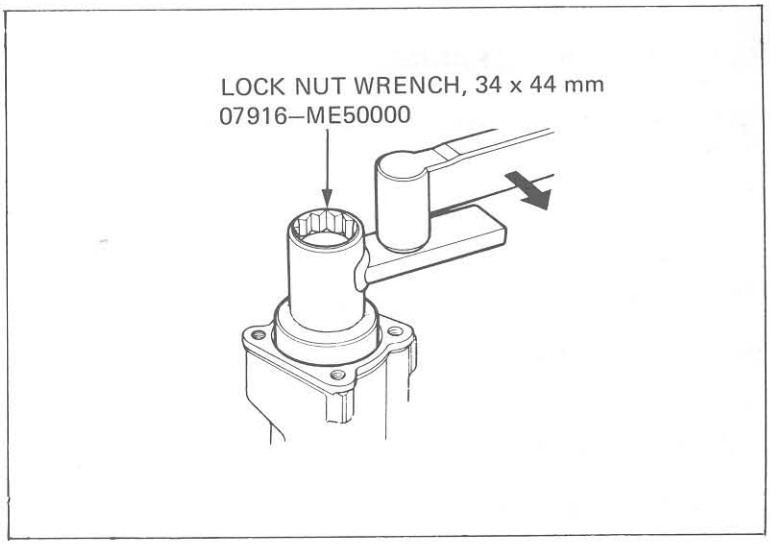


Place the pinion assembly into the gear housing and drive it into the gear case.



Install and tighten the pinion bearing lock nut.

TORQUE: 90—110 N·m
(9.0—11.0 kg-m, 65—80 ft-lb)



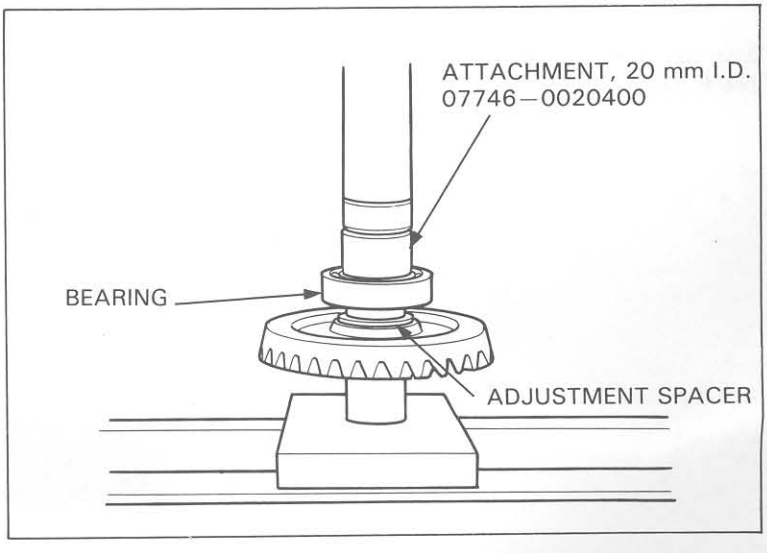
RING GEAR ASSEMBLY

Install the original spacer onto the ring gear.

NOTE

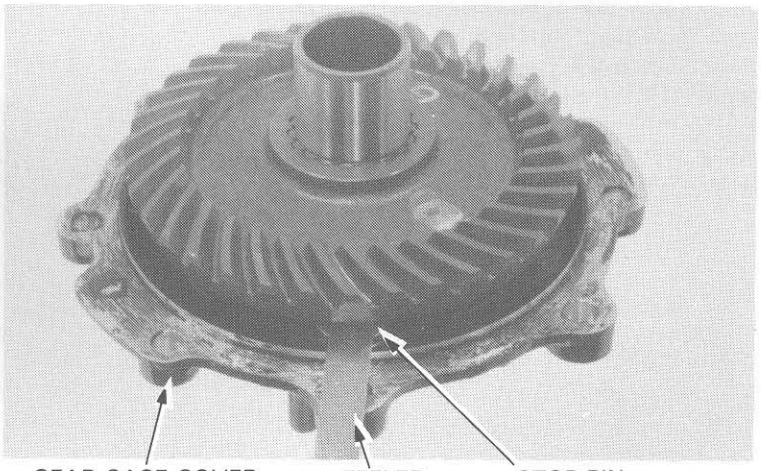
If the gear set, pinion bearing, ring gear bearing and/or gear case is replaced, install a 2.0 mm (0.079 in) thickness spacer.

Press the ring gear bearing 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.

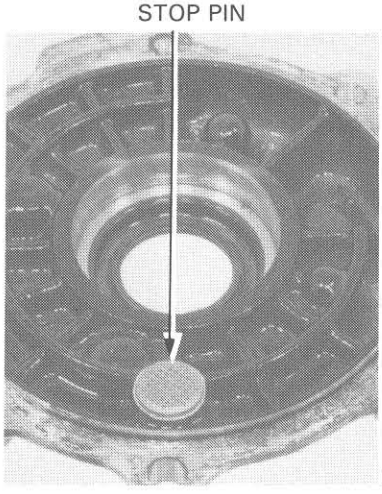
CLEARANCE: 0.30—0.60 mm (0.012—0.024 in)

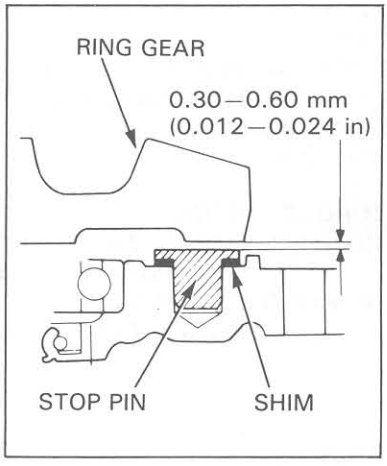


Remove the ring gear. If the clearance exceeds the service limit, heat the gear case cover to approximately 80°C (176°F) and remove the stop pin by tapping the cover.

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.

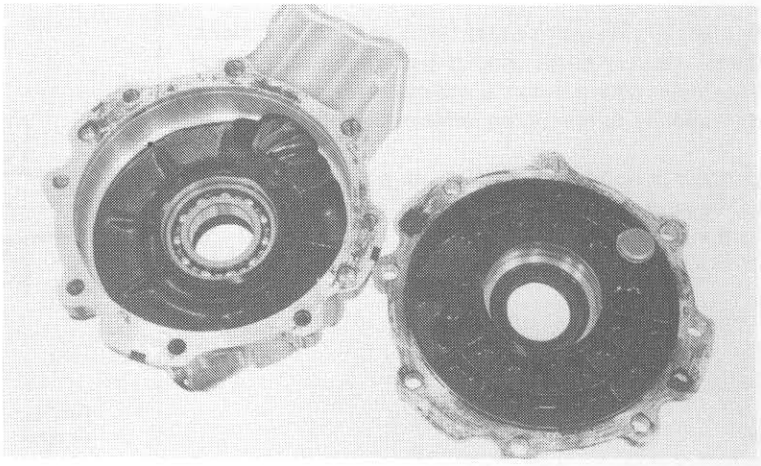
GEAR TOOTH CONTACT PATTERN CHECK

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

NOTE

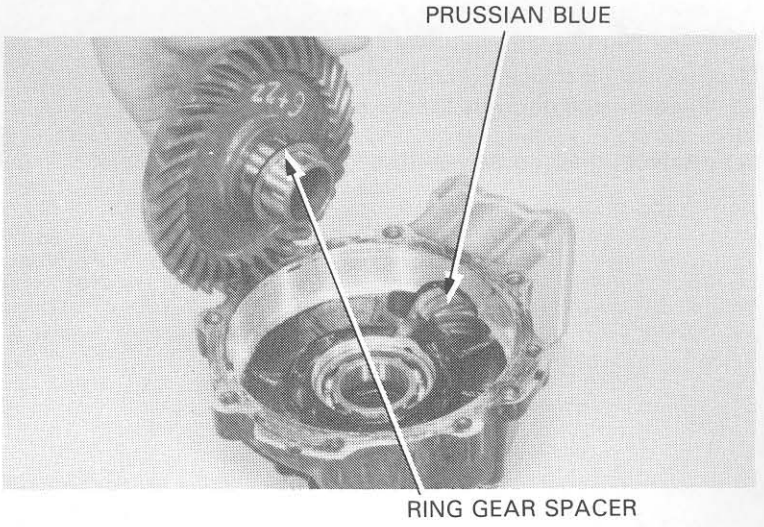
- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.

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



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

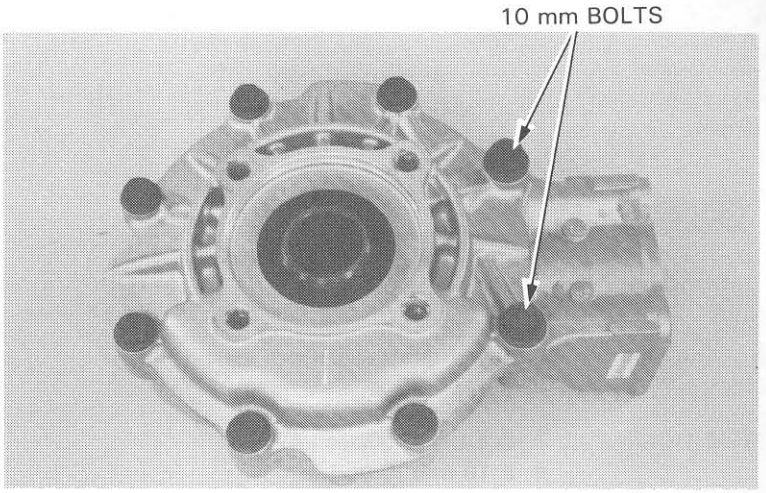
Apply gear oil to the lip of the oil seal on the gear case cover and install the gear case cover.



Apply a thread locking agent to the 10 mm cover bolts.
Tighten the cover bolts in 2–3 steps until the cover evenly touches the gear case, then tighten the bolts to the specified torque in a crisscross pattern in two or more steps.

TORQUE VALUES:

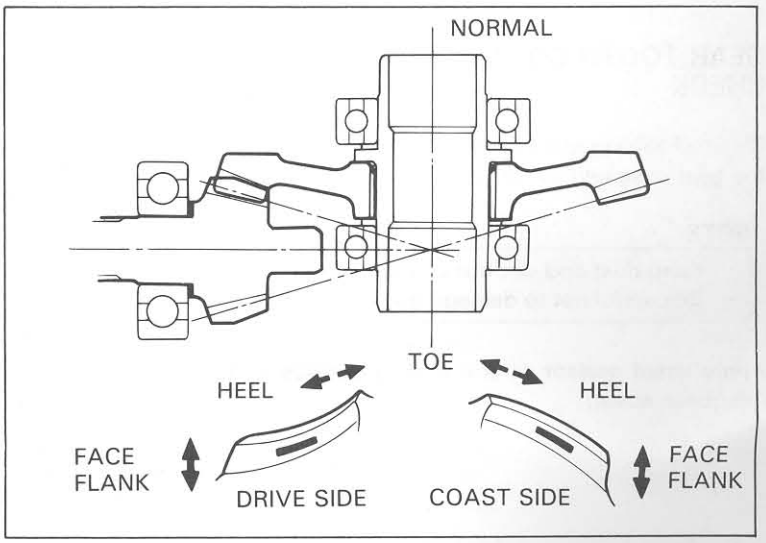
10 mm bolt	**45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)**
8 mm bolt	**23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)**



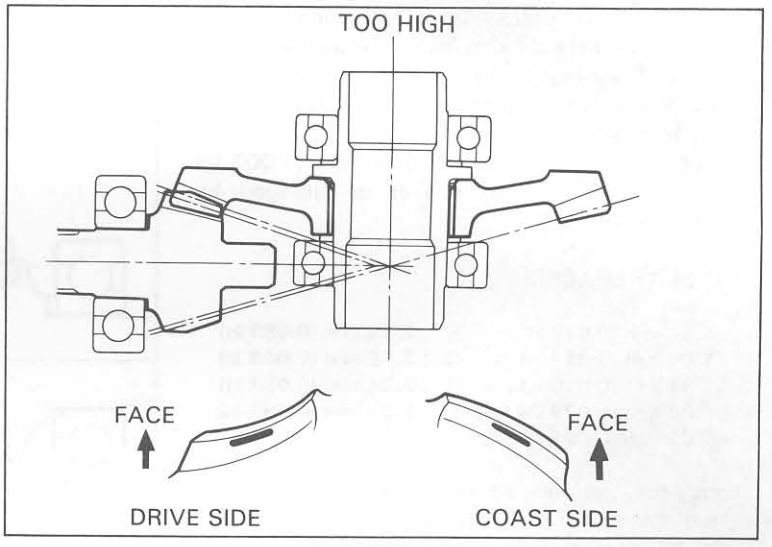
Remove the oil filler cap from the final gear case.

Rotate the ring gear several times in both directions. 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.

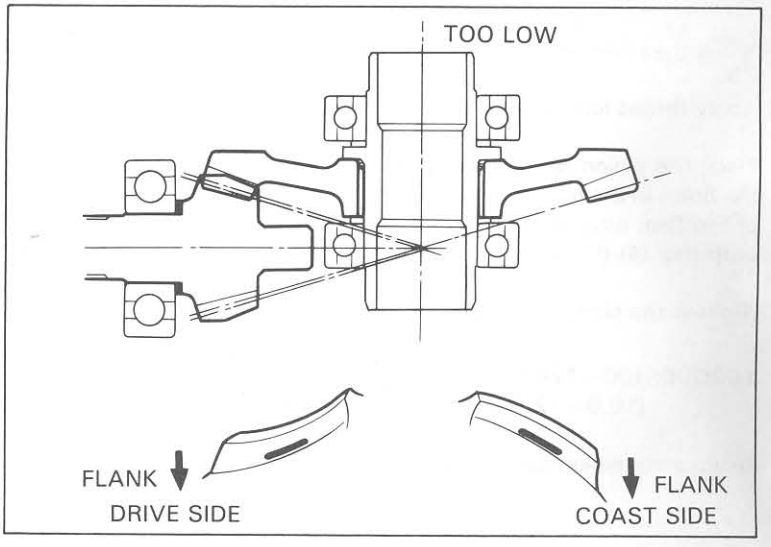
Contact is normal if the Prussian Blue is transfered to the approximate center of each tooth and slightly to the flank side.



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



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



PINION SPACER:
A :1.82 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 (0.083 in)
G :2.18 mm (0.086 in)

BACKLASH INSPECTION

Remove the oil filler cap.

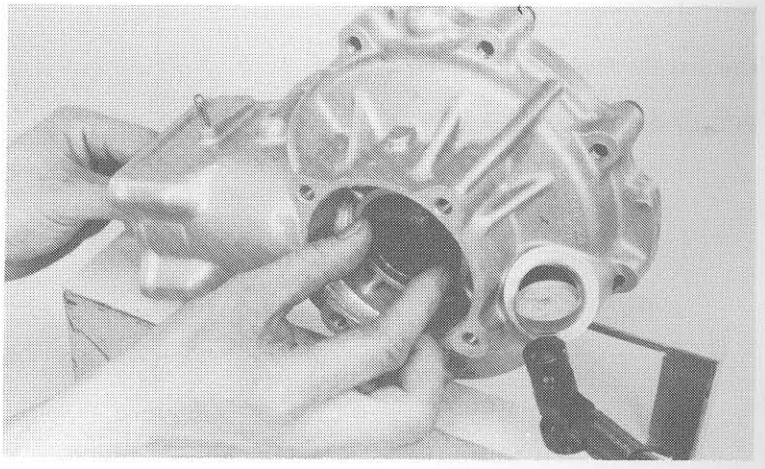
Set the final gear assembly into a jig or stand to hold it steady. Set a horizontal type dial indicator on the ring gear, through the oil filler hole.
Hold the pinion gear spline by hand. Rotate the ring gear by hand until gear slack is taken up. Turn the ring gear back and forth to read backlash.

STANDARD: 0.08—0.18 mm (0.003—0.007 in)
SERVICE LIMIT: 0.25 mm (0.010 in)

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

Compare the differences of the three measurements.

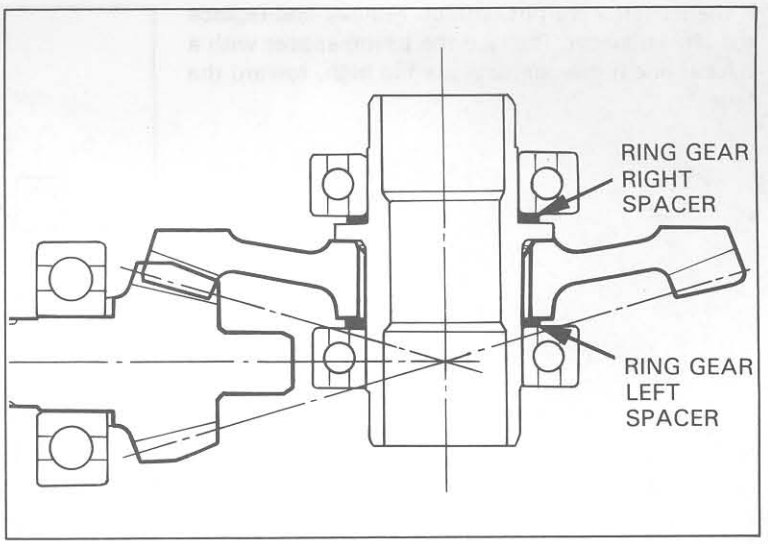
DIFFERENCE OF MEASUREMENTS
SERVICE LIMIT: 0.10 mm (0.004 in)



If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.
If backlash is too small, replace the ring gear left side spacer with a thicker one.
Backlash is changed by about 0.06 mm (0.002 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)	**F : 2.12 mm (0.083 in)**
B : 1.88 mm (0.074 in)	**G : 2.18 mm (0.086 in)**
C : 1.94 mm (0.076 in)	**H : 2.24 mm (0.088 in)**
D : 2.00 mm (0.079 in)	**I : 2.30 mm (0.091 in)**
E : 2.06 mm (0.081 in)	



Change the right side spacer thickness an opposite amount to what the left side spacer was changed; if the left spacer was replaced with a 0.10 mm (0.004 in) thicker spacer, replace the right spacer with one that is 0.10 mm (0.004 in) thinner.

Install the pinion joint onto the pinion.

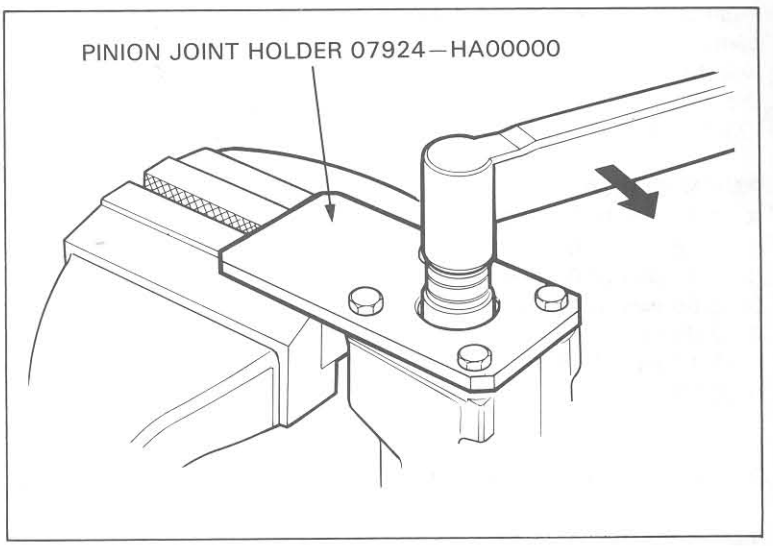
Apply thread locking agent to the pinion threads.

Place the pinion holder onto the pinion joint. Align the holes in the pinion holder with the four (4) holes in the final drive gear case and secure to the case with four (4) 8 mm bolts.

Tighten the pinion joint nut.

TORQUE: 100—120 N·m
(10.0—12.0 kg-m, 72—87 ft-lb)

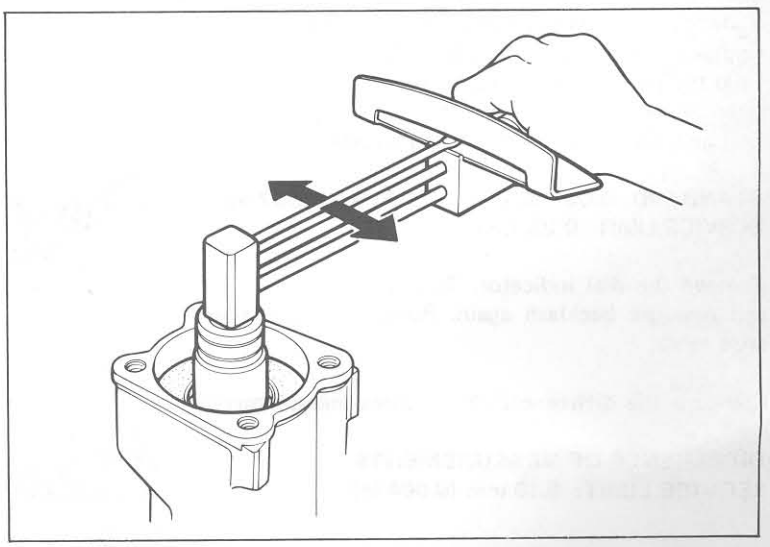
Remove the pinion joint holder.



Make sure the gear assembly rotates smoothly without binding.

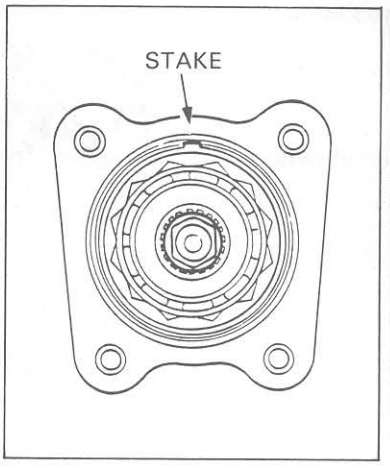
Measure the final gear assembly preload.

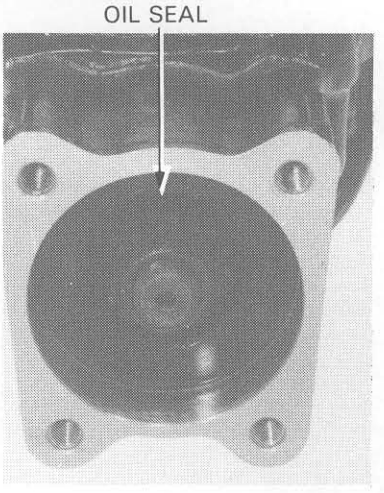
PRELOAD: 0.2—0.4 N·m
(2—4 kg-cm, 1.7—3.5 in-lb)



Stake the pinion bearing lock nut.

Install a new drive shaft oil seal.





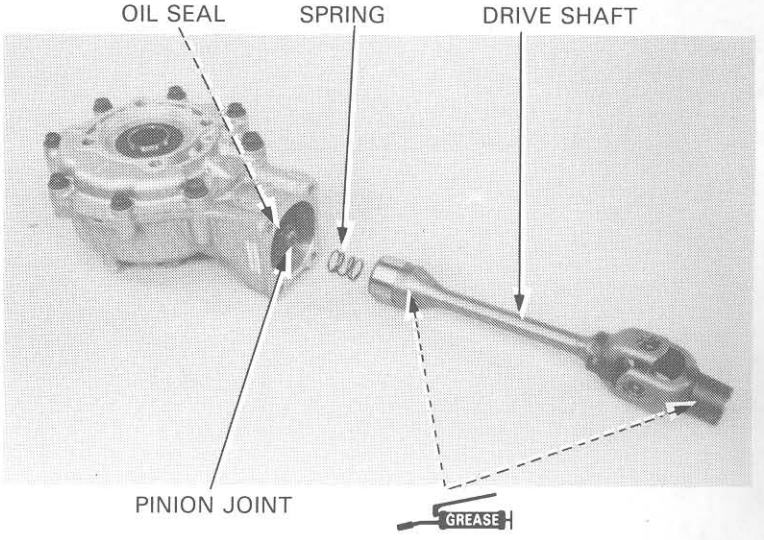
FINAL DRIVE INSTALLATION

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

Install the spring and insert the pinion joint into the drive shaft.

Clean the mating surfaces between the gear case and the swingarm. Apply liquid sealant to the mating surfaces.

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

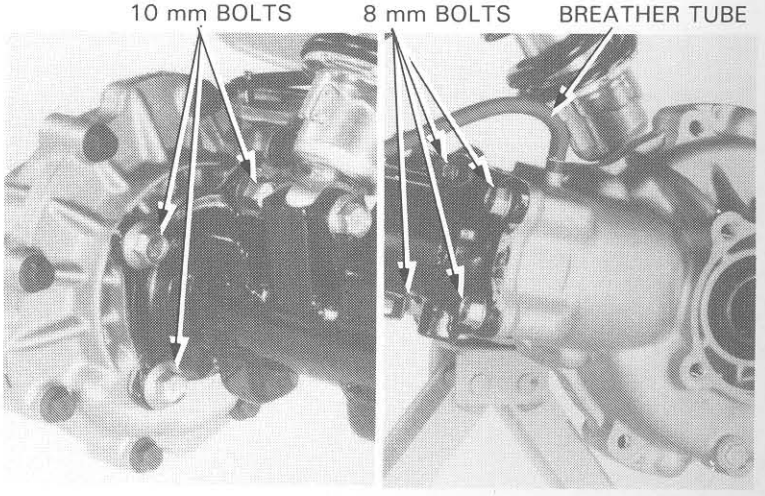


Install the final gear case mount bolts.

Tighten the 10 mm bolts first, then the 8 mm bolts.

TORQUE VALUES:
10 mm bolt 50—60 N·m
(5.0—6.0 kg-m, 36—43 ft-lb)
8 mm bolt 28—35 N·m
(2.8—3.5 kg-m, 20—25 ft-lb)
AFTER '85: 30—36 N·m
(3.0—3.6 kg-m, 22—26 ft-lb)

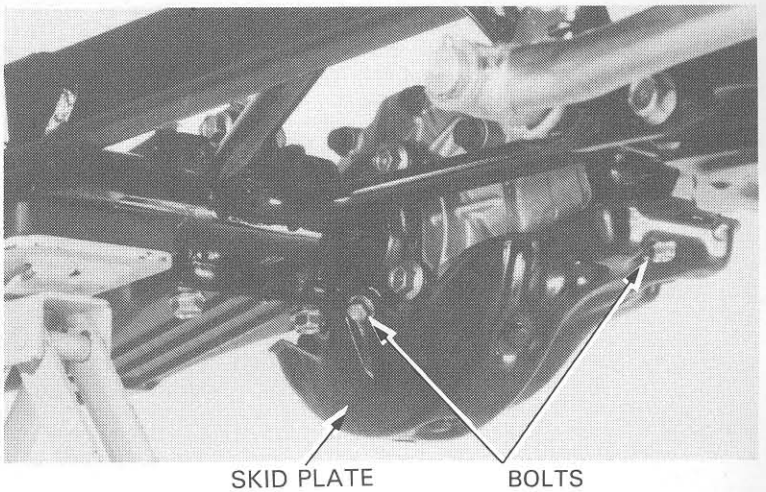
Connect the breather tube to the gear case.



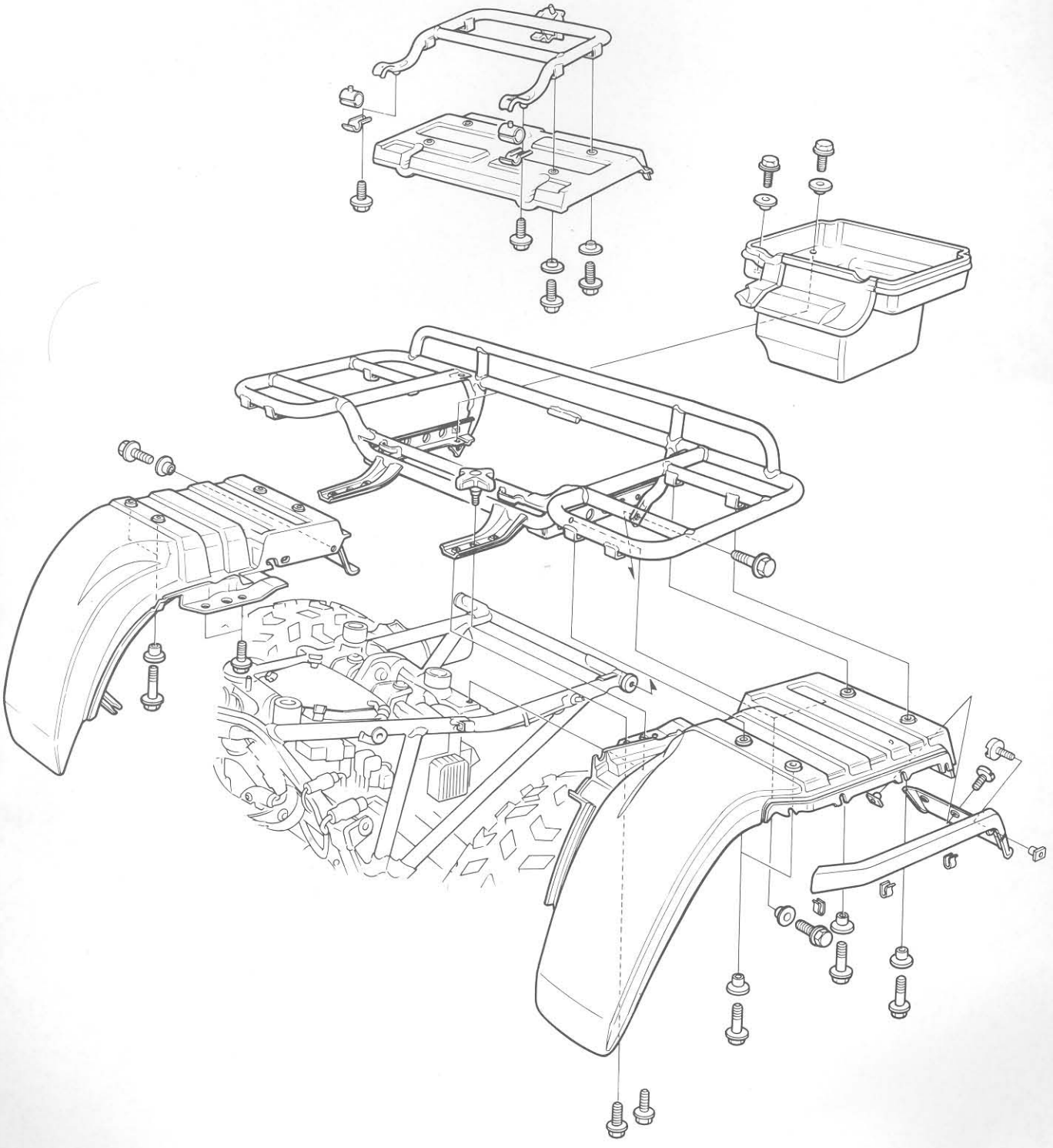
Install the skid plate with the three bolts.

Fill the gear case with the recommended oil (page 2-1)

Install the parts in the reverse order of removal.



MEMO



13. CARRIERS/REAR FENDER/ EXHAUST MUFFLER

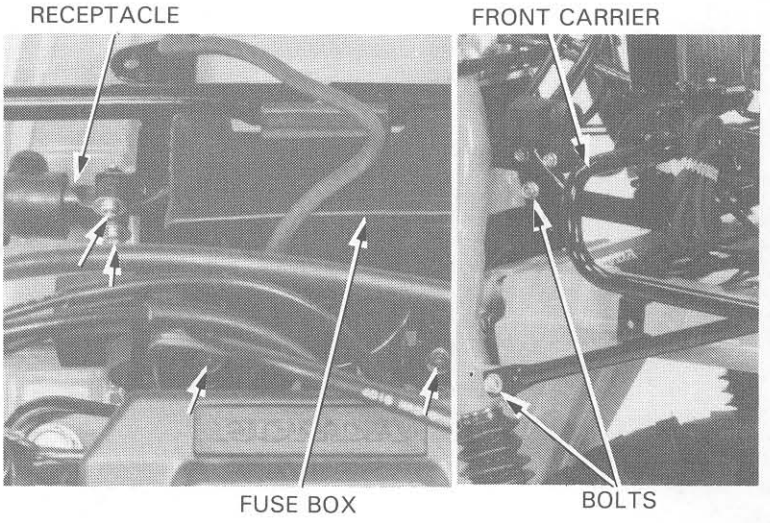
FRONT CARRIER

REMOVAL

Remove the headlight.
Remove the receptacle and fuse box mounting bolts.
Remove the four front carrier mount bolts and the carrier.

INSTALLATION

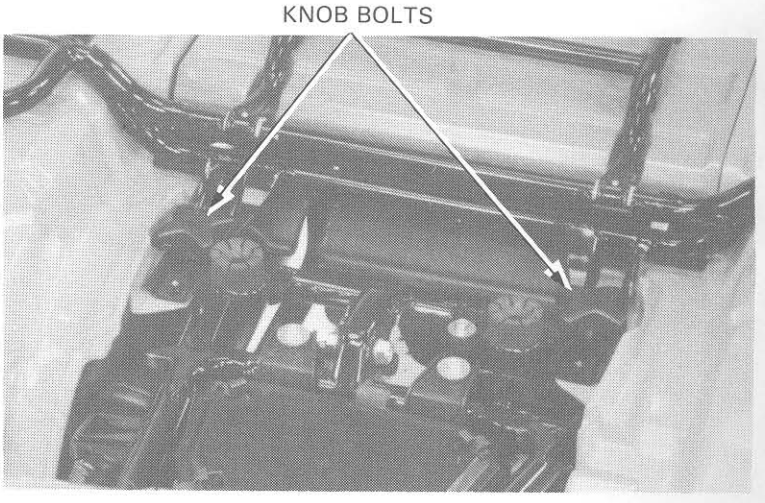
Install the front carrier in the reverse order of removal.



REAR CARRIER/REAR FENDER

REMOVAL

Remove the frame side covers and seat.
Remove the two rear fender mount knob bolts and open the fender.



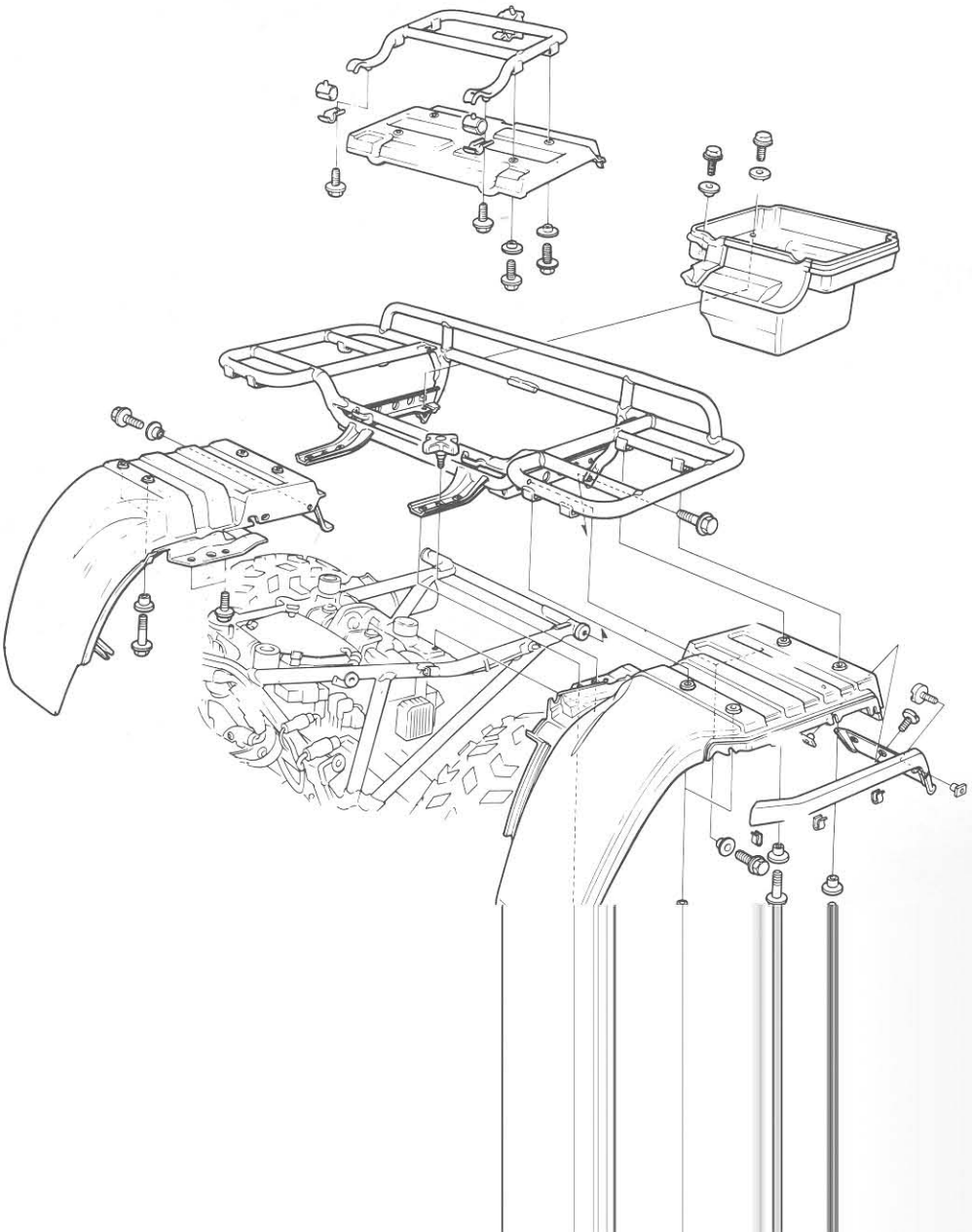
Disconnect the taillight wire connectors.

Remove the two rear fender pivot bolts and remove the rear fender.


PIVOT BOLT

INSTALLATION

Install the rear fender in the reverse order of removal.



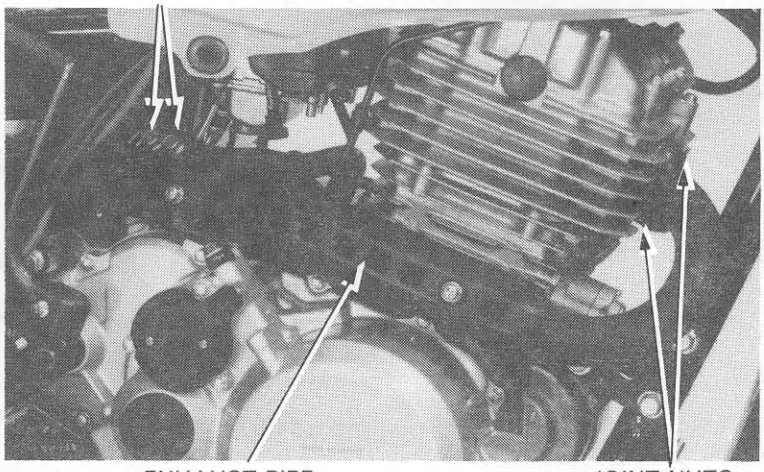
EXHAUST PIPE

WARNING

Do not service the exhaust pipe or muffler when they are hot.

REMOVAL

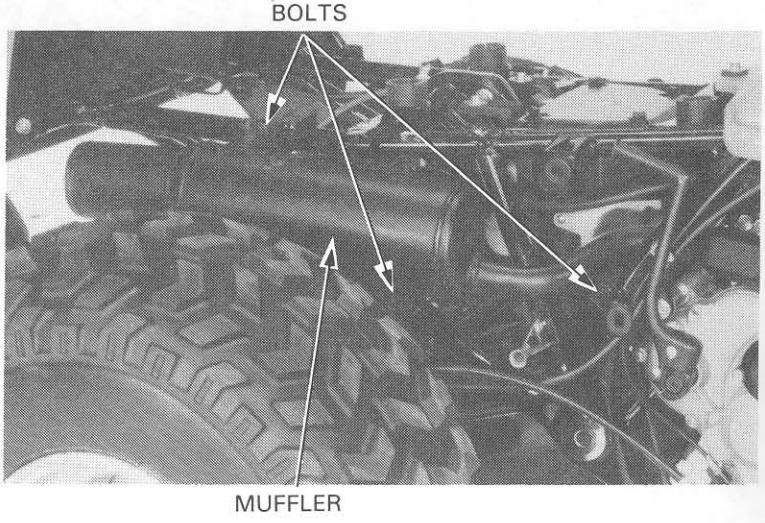
Remove the left side cover and loosen the exhaust pipe clamp bolts.
Remove the exhaust pipe joint nuts and remove the exhaust pipe.



Raise the fender.
Remove the three muffler mounting bolts and the muffler.

NOTE

Check the gasket and pipe seal for wear. Replace them with new ones.

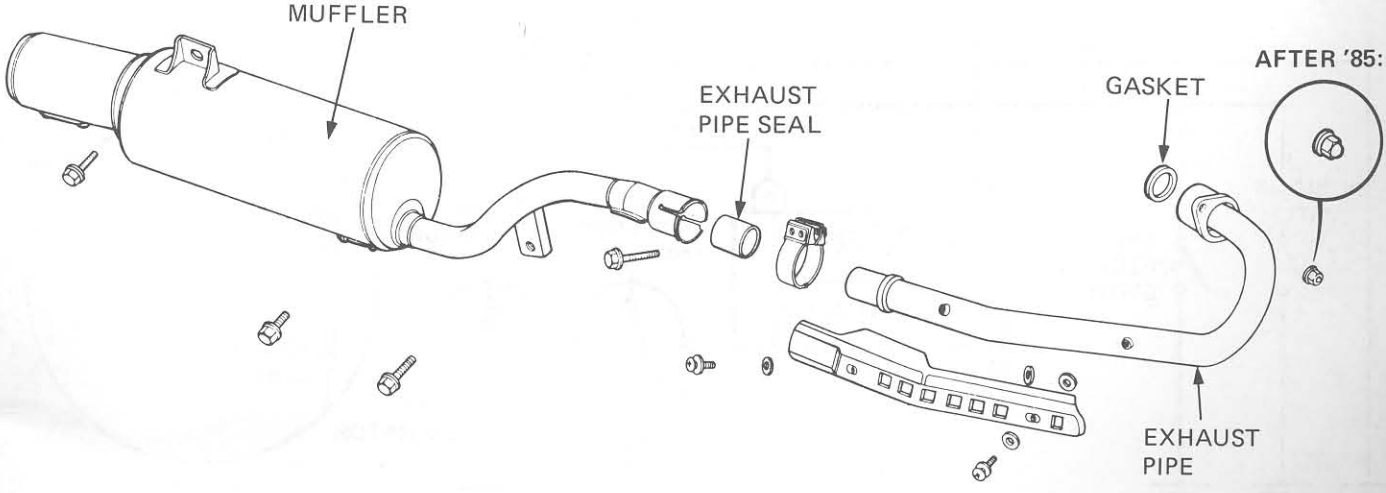


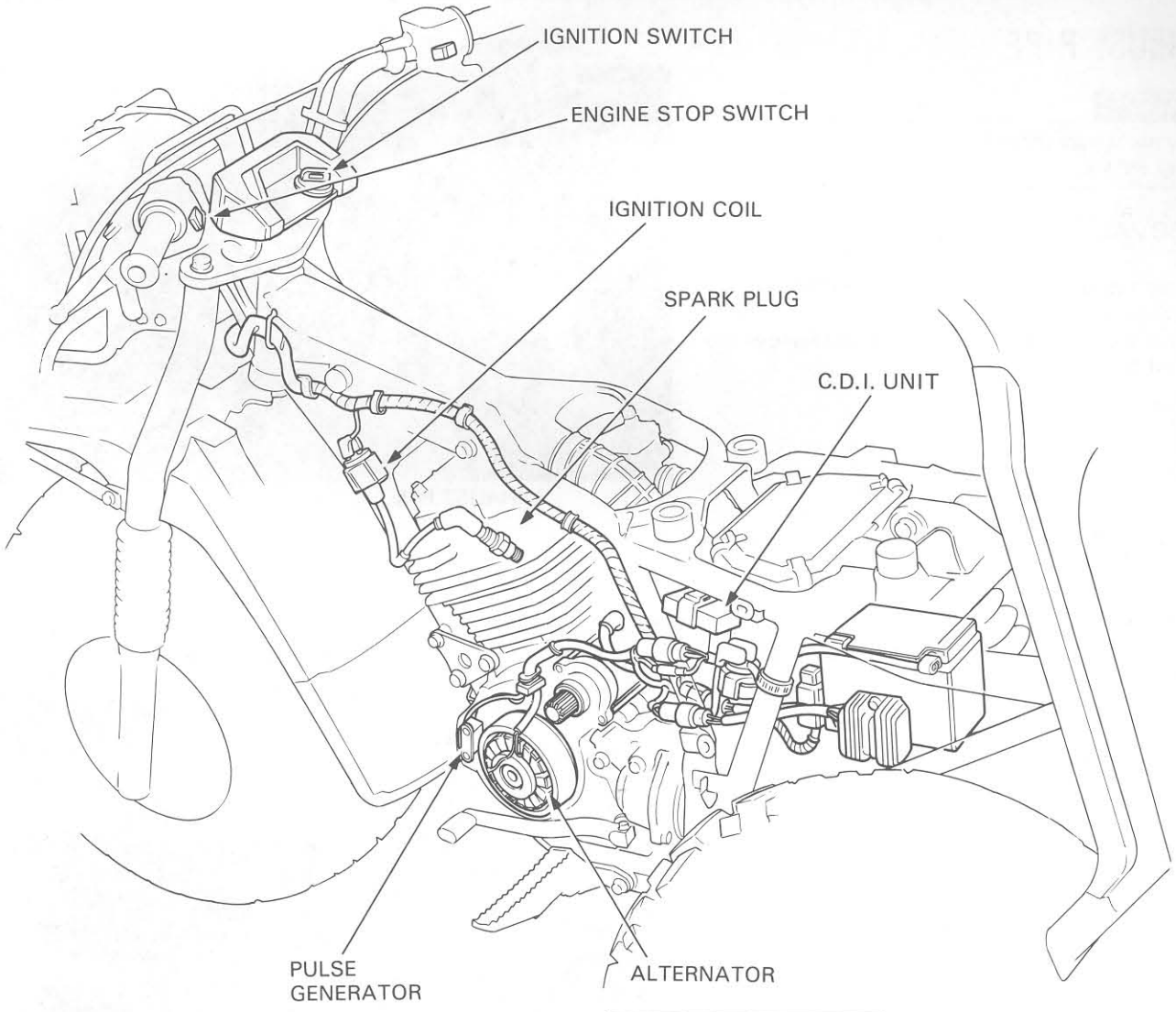
INSTALLATION

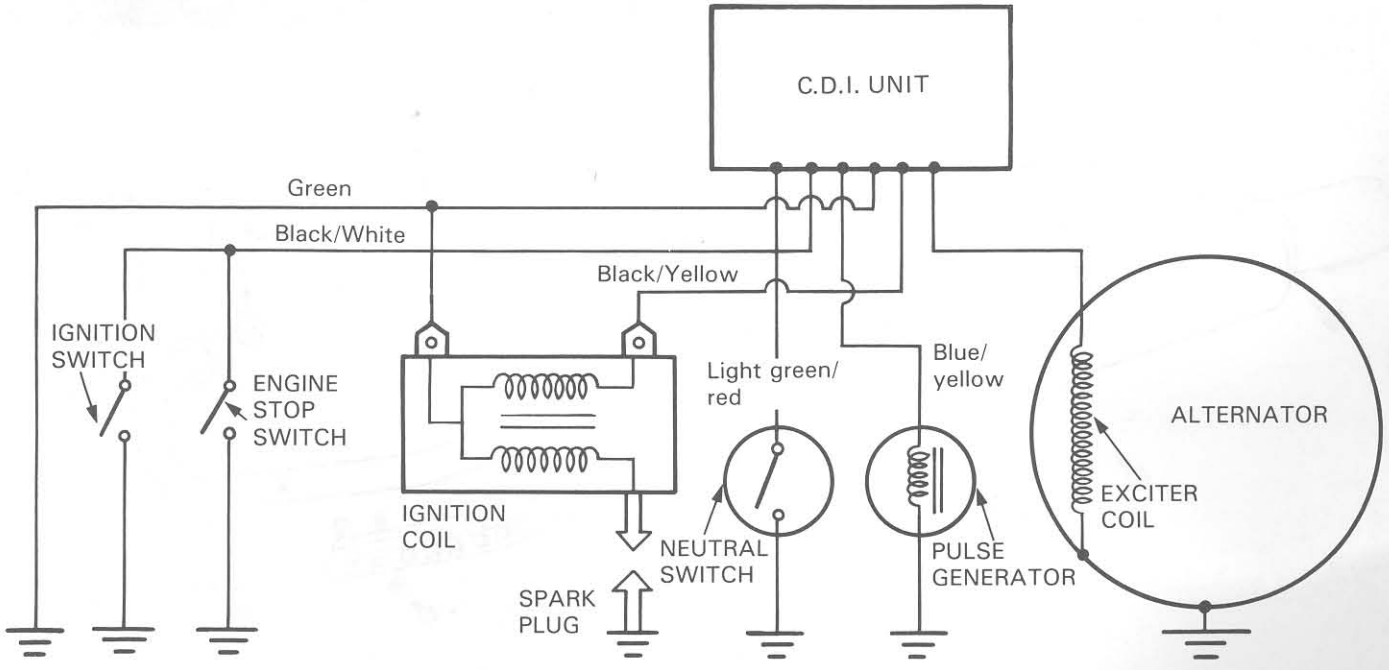
Install the exhaust pipe in the reverse order of removal.

NOTE

Make sure there are no exhaust leaks after installation.




IGNITION SWITCH
ENGINE STOP SWITCH
IGNITION COIL
SPARK PLUG
C.D.I. UNIT
PULSE GENERATOR
ALTERNATOR


C.D.I. UNIT
Green
Black/White
Black/Yellow
IGNITION SWITCH
ENGINE STOP SWITCH
IGNITION COIL
Light green/ red
Blue/ yellow
NEUTRAL SWITCH
PULSE GENERATOR
SPARK PLUG
ALTERNATOR
EXCITER COIL

14. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL

- Ignition timing does not normally need to be adjusted since the C.D.I. (Capacitive Discharge Ignition) unit is factory preset.
- For spark plug inspection, refer to page 3-5.
- For pulse generator and exciter coil removal, refer to section 9.

SPECIFICATIONS

Spark plug		DR8ES-L (NGK), X24ESR-U (ND)
Spark plug gap		0.6–0.7 mm (0.024–0.028 in)
Ignition timing	At idle	13° ± 2° BTDC at 1,400 rpm
	Full advance	31° ± 2° BTDC at 3,500 rpm
Ignition coil	Primary coil resistance	0.18 ± 0.018 Ω
	Secondary coil resistance (With spark plug cap)	9.1 ± 1.66 kΩ
	Secondary coil resistance (Without spark plug cap)	4.1 ± 0.41 kΩ
Exciter coil	Resistance	50–200 Ω
Pulse generator	Resistance	325 ± 10% Ω

TOOL

Digital multi-tester — KS-AHM-32-003 (U.S.A. only)

TROUBLESHOOTING

Engine starts but stops

1. No spark at plug
2. Improper ignition timing
3. Faulty spark plug

No spark at plug

1. Engine stop switch "OFF"
2. Poorly connected, broken or shorted wires
3. – Between alternator and C.D.I. unit
   – Between C.D.I. unit and engine stops switch
   – Between C.D.I. unit and ignition coil
   – Between ignition coil and spark plug
   – Between pulse generator and C.D.I. unit
3. Faulty ignition coil
4. Faulty C.D.I. unit
5. Faulty pulse generator
6. Faulty alternator

Engine starts but runs poorly

1. Ignition primary circuit
   – Faulty ignition coil
   – Loose or bare wire
   – Faulty alternator
2. Ignition secondary circuit
   – Faulty plug
   – Faulty C.D.I. unit
   – Faulty pulse generator
   – Faulty spark plug wire
3. Improper ignition timing
   – Faulty pulse generator
   – Faulty C.D.I. unit

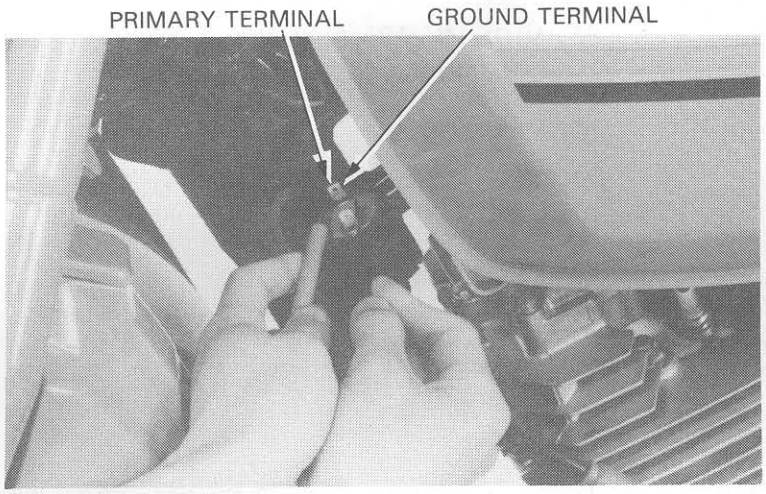
IGNITION COIL

CONTINUITY TEST

Disconnect the primary wire and ground wire from the ignition coil.

Measure the primary coil resistance between the terminals.

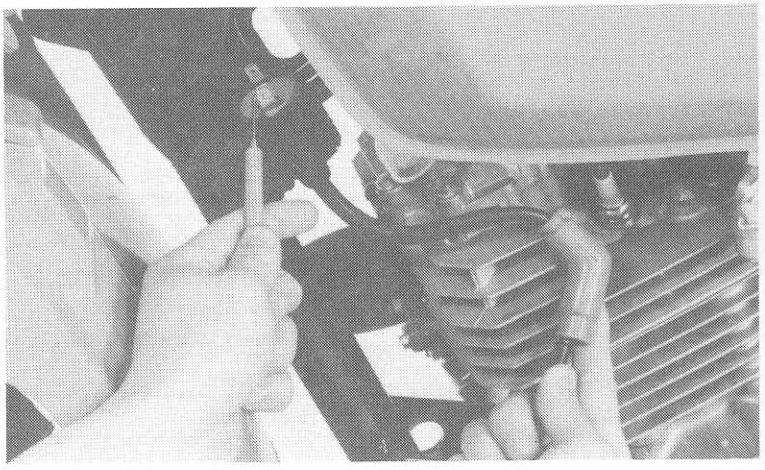
RESISTANCE: 0.18 ±0.018 Ω



Remove the spark plug cap from the spark plug.

Measure the secondary coil resistance between the ground terminal and spark plug cap.

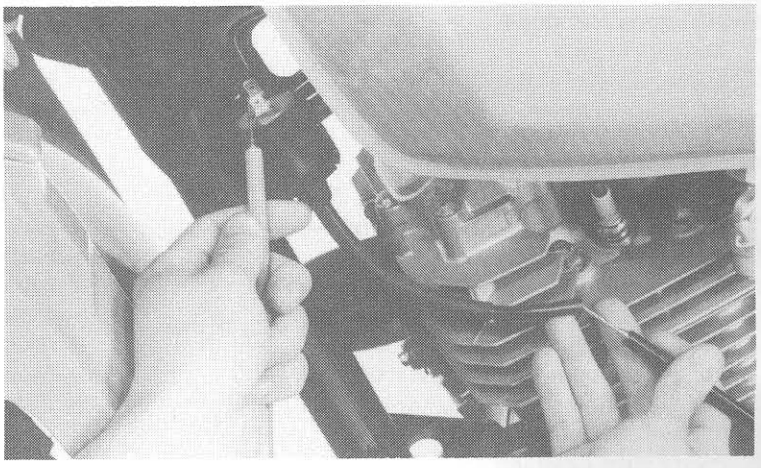
RESISTANCE: 9.1 ±1.66 kΩ



Remove the spark plug cap from the high tension cord.

Measure the secondary coil resistance with the spark plug cap removed.

RESISTANCE: 4.1 ±0.41 kΩ



EXCITER COIL/PULSE GENERATOR

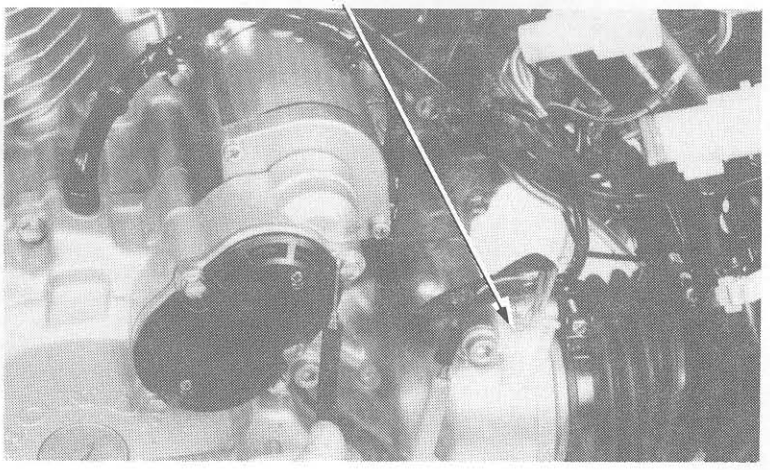
CONTINUITY TEST

NOTE

It is not necessary to remove the exciter coil (stator) and pulse generator to perform this test.

Remove the left frame side cover and disconnect the pulse generator/exciter coil wire coupler.

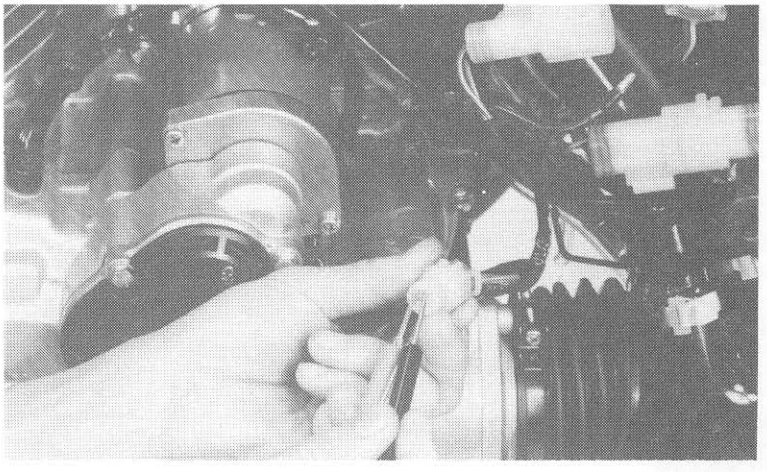
PULSE GENERATOR/EXCITER COIL WIRE COUPLER



- Exciter coil

Measure the exciter coil resistance between the black/red wire terminal and ground.

RESISTANCE: 50—200 Ω



- Pulse generator

Measure the pulse generator coil resistance between the blue/yellow and green/white wire terminals.

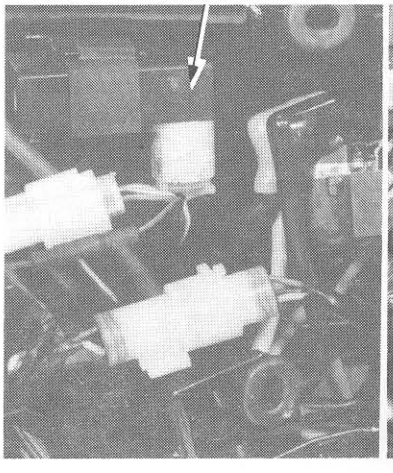
RESISTANCE: 325 ± 10% Ω

For replacement, see section 9.

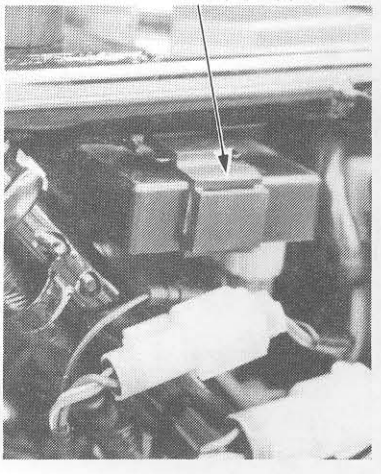
C.D.I. UNIT

Disconnect the C.D.I. unit connector and remove the C.D.I. unit.

'85: C.D.I. UNIT



AFTER '85: C.D.I. UNIT

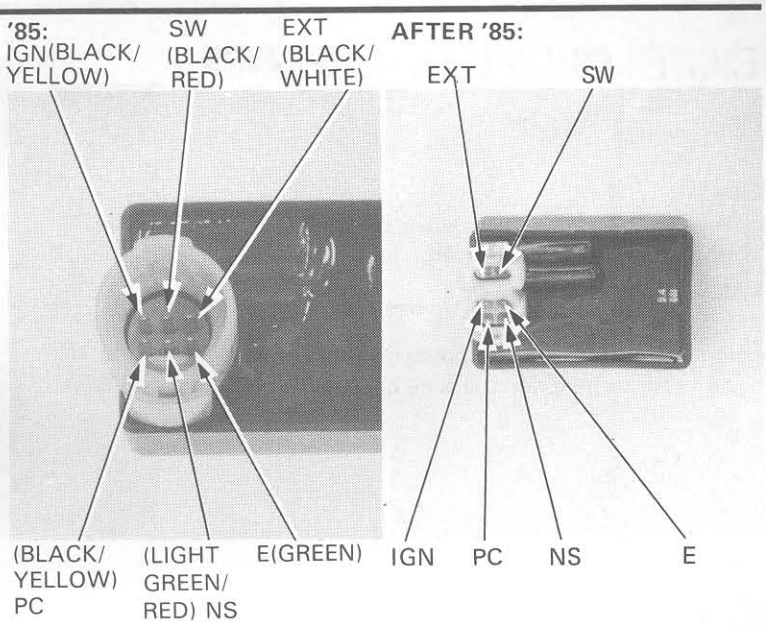


INSPECTION

Replace the C.D.I. unit if the readings are not within the limits shown in the table.

NOTE

- The C.D.I. unit is fully transistorized. For accurate testing, it is necessary to use a specified electrical tester. Use of an improper tester may give false readings.
- Use a SANWA ELECTRIC TESTER (P/N 07308—0020000) or a KOWA DIGITAL MULTI-METER (KS-AHM-32-003) U.S.A. only.



'85:

Set the tester on the R x kΩ.

Unit: KΩ

(+) / (−)	SW (Black/White)	EXT (Black/Red)	PC (Blue/Yellow)	E (Green)	IGN (Black/Yellow)	NS (Lg/R)
SW (Black/White)		∞	∞	∞	∞	∞
EXT (Black/Red)	0.5—50		100—∞	50—500	∞	20—200
PC (Blue/Yellow)	50—500	∞		10—100	∞	50—500
E (Green)	0.5—50	∞	0.5—50		∞	0.5—50
IGN (Black/Yellow)	∞	∞	∞	∞		∞
NS (Lg/R)	∞	∞	∞	∞	∞	

After '85:

Set the tester on the R x kΩ.

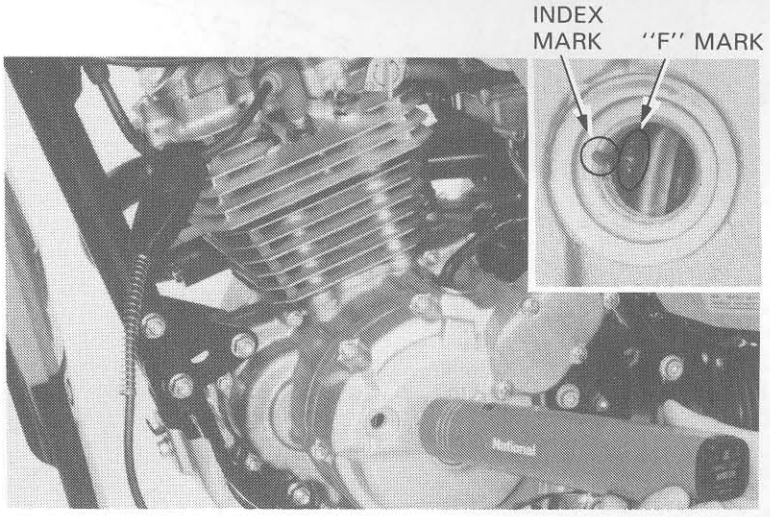
Unit: KΩ

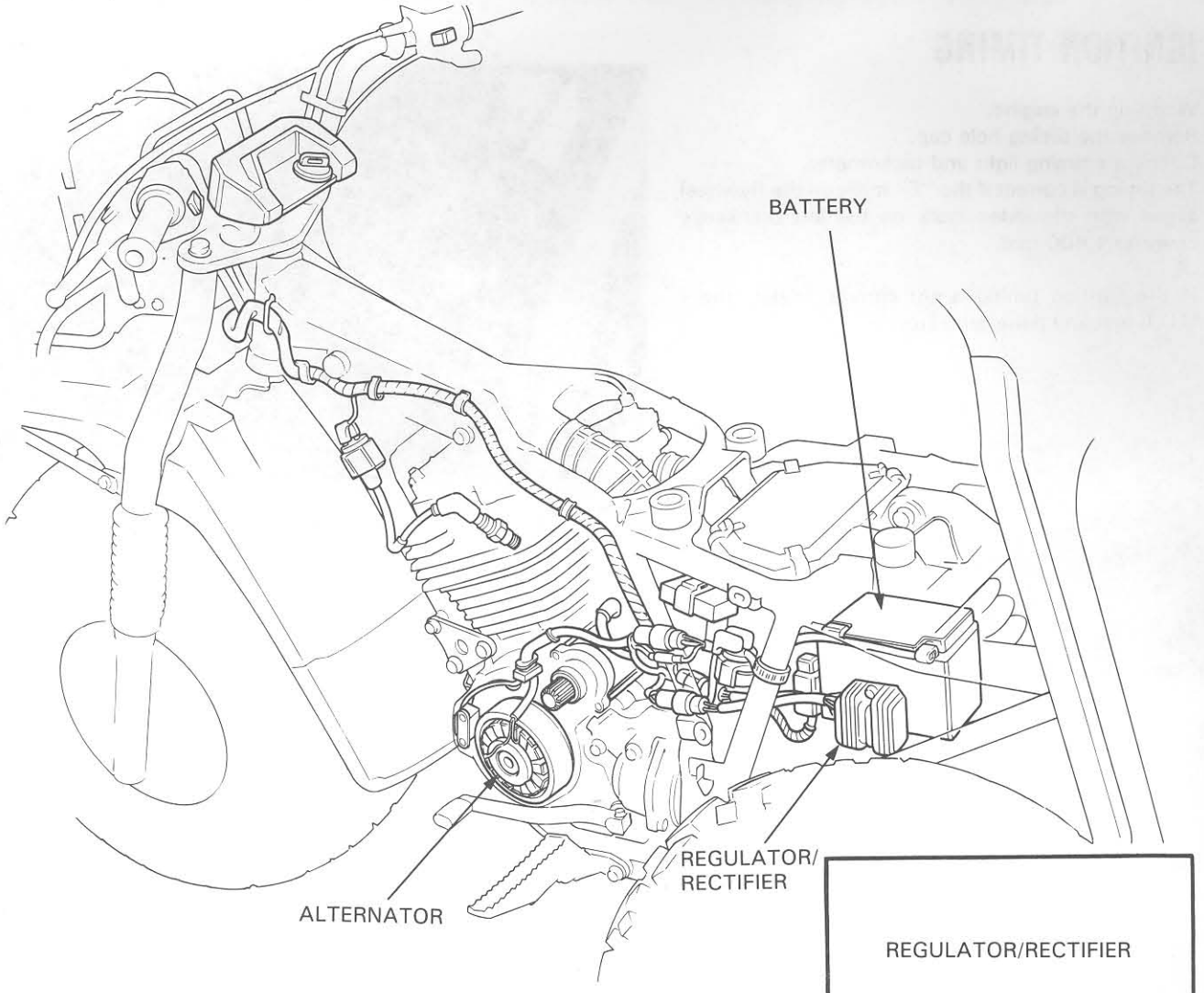
(+) / (−)	SW (Black/White)	EXT (Black/Red)	PC (Blue/Yellow)	E (Green)	IGN (Black/Yellow)	NS (Lg/R)
SW (Black/White)		∞	∞	∞	∞	∞
EXT (Black/Red)	0.5—50		100—∞	50—500	∞	20—200
PC (Blue/Yellow)	50—500	∞		10—100	∞	50—500
E (Green)	0.5—50	∞	0.5—50		∞	0.5—50
IGN (Black/Yellow)	∞	∞	∞	∞		∞
NS (Lg/R)	∞	∞	∞	∞	∞	

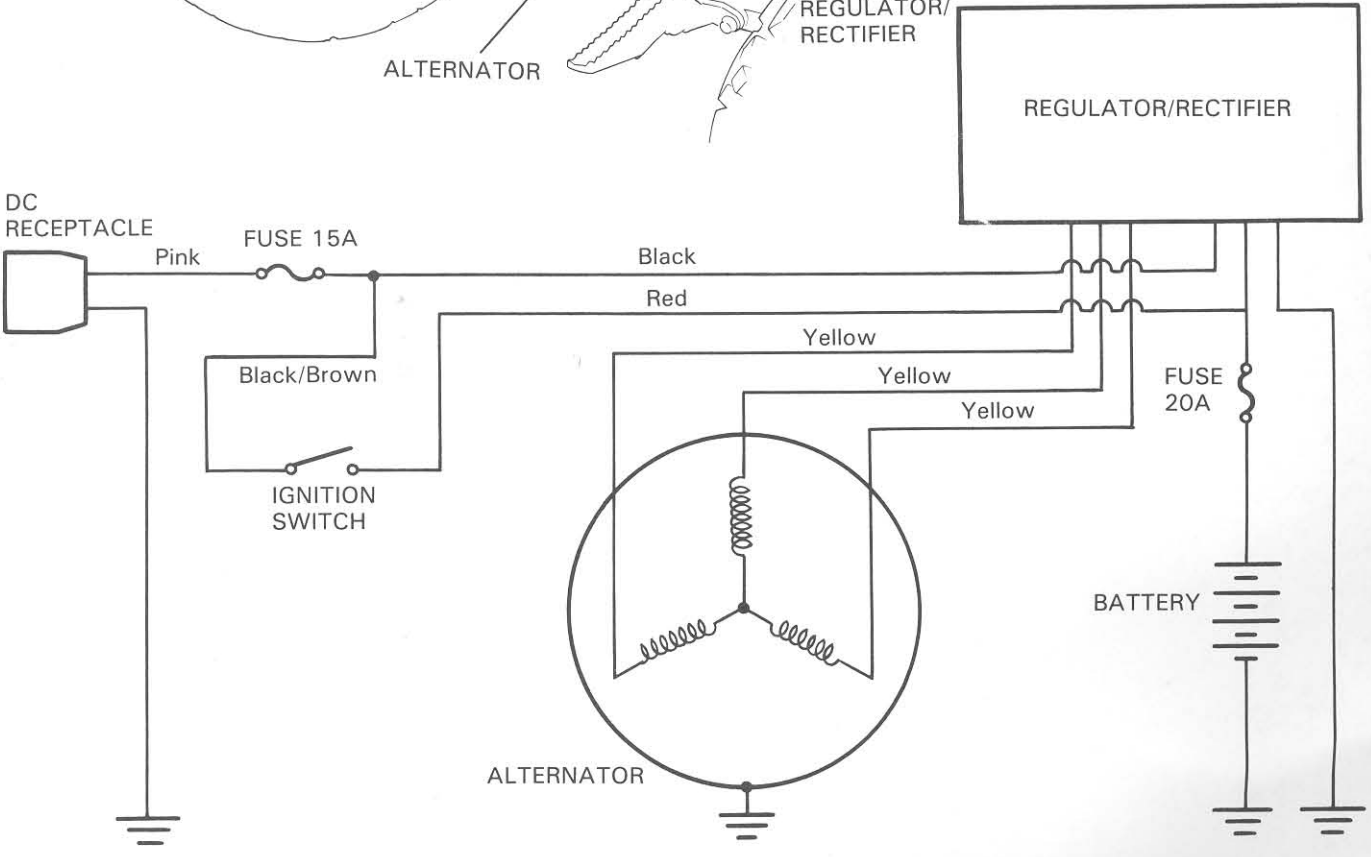
IGNITION TIMING

Warm up the engine.
Remove the timing hole cap.
Connect a timing light and tachometer.
The timing is correct if the ''F'' mark on the flywheel aligns with the index mark on the left crankcase cover at 1,400 rpm.

If the ignition timing is not correct, inspect the C.D.I. unit and pulse generator.




BATTERY
REGULATOR/
RECTIFIER
ALTERNATOR


REGULATOR/RECTIFIER
DC
RECEPTACLE
Pink
FUSE 15A
Black
Red
Yellow
Yellow
Yellow
FUSE
20A
Black/Brown
IGNITION
SWITCH
BATTERY
ALTERNATOR

15. BATTERY/ CHARGING SYSTEM

SERVICE INFORMATION

GENERAL

- Quick charge a 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 ATC, disconnect the battery cables; the negative cable first, then the positive cable.
- The battery on this vehicle is a sealed type. Never remove the filling hole caps, even when the battery is being charged.
- Be sure to charge the battery with the amount of current and for the time indicated on the battery label and or on page 15-3. Charging with excessive current or too fast may cause the battery failure.

WARNING

Do not smoke around a charging battery, and keep sparks away from it. The gas produced by a battery will explode if a flame or spark is brought near.

- Use only a sealed type battery on this vehicle.
- All charging system components can be tested on the vehicle.

SPECIFICATIONS

Battery	Capacity	12 V–10 AH
	Charging current	Standard: 1.0 A, Maximum: 5.0 A
	Charging time	At standard: 5.0 hours, At maximum: 1.0 hour
Alternator capacity		200W/5,000 rpm
Voltage regulator		Transistorized non-adjustable regulator
Voltage	Fully charged	13.1 V
	Under charged	12.8 V
Alternator charging coil resistance		0.2–1 Ω

TOOL

Digital voltmeter	07411–0020000

TROUBLESHOOTING

No power—key turned on
1. Dead battery
2. Disconnected battery cable
3. Main fuse burned out
4. Faulty ignition switch

Low power—key turned on
1. Weak battery
2. Loose battery connection

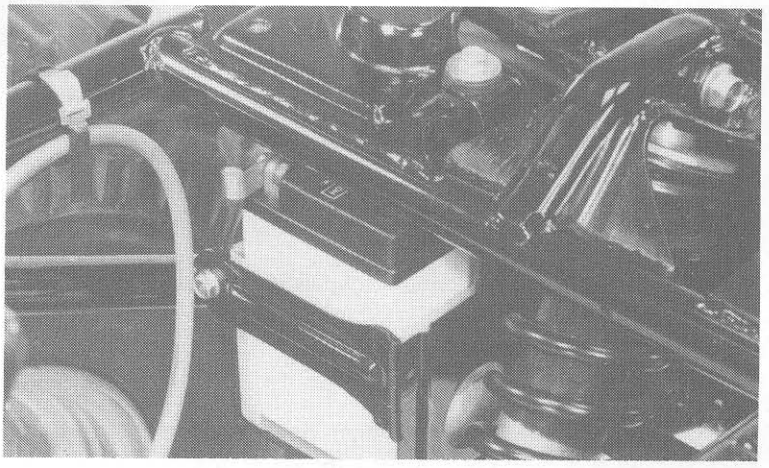
Low power—engine running
1. Battery undercharged
2. Charging system failure
3. Loose connection or short circuit in lighting system

Intermittent power
1. Loose battery connection
2. Loose charging system connection
3. Loose starting system connection

Charging system failure
1. Loose, broken, or shorted wire or connection
2. Faulty voltage regulator
3. Faulty alternator

BATTERY

REMOVAL

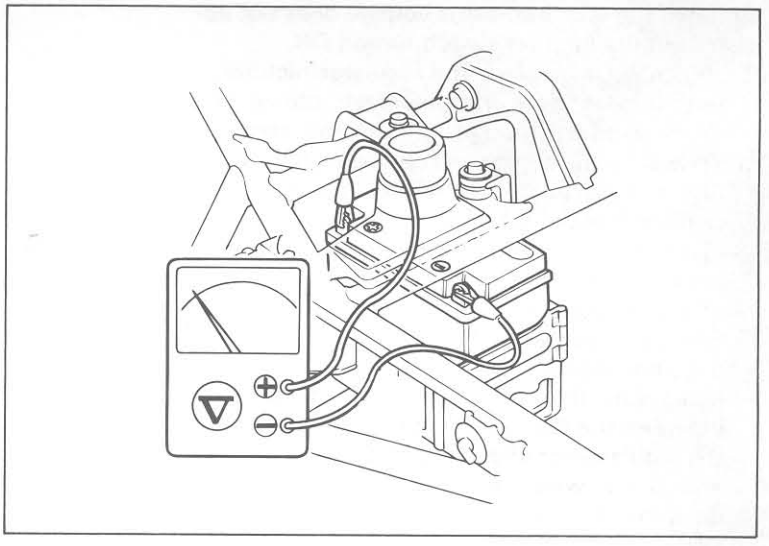


Remove the left and right frame side covers.
Remove the seat.
Raise the rear fender and support it with the stay.
Remove the battery holder bolt.
Disconnect the negative cable, and then the positive cable.
Remove the battery.

VOLTAGE INSPECTION

Measure the battery voltage using a digital voltmeter (07411—0020000).

VOLTAGE: Fully charged: 13.1V
Under charged : 12.8V

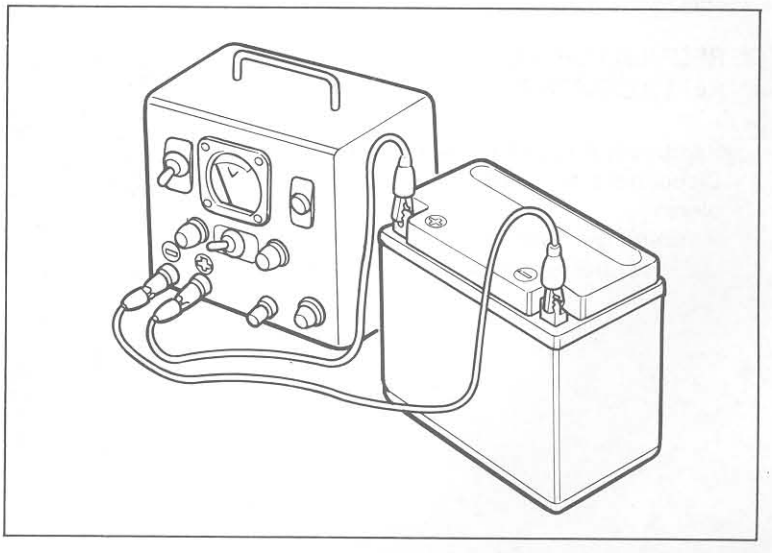


CHARGING

Connect the charger positive(+) cable to the battery positive (+) terminal.

Connect the charger negative (−) cable to the battery negative (−) terminal.

	Standard	Maximum
Charging current	1.0 A	5.0 A
Charging time	5 hours	1 hour



WARNING

- ***Keep flames and sparks away from a charging battery.***
- ***Turn power ON/OFF at the charger, not at the battery terminals.***

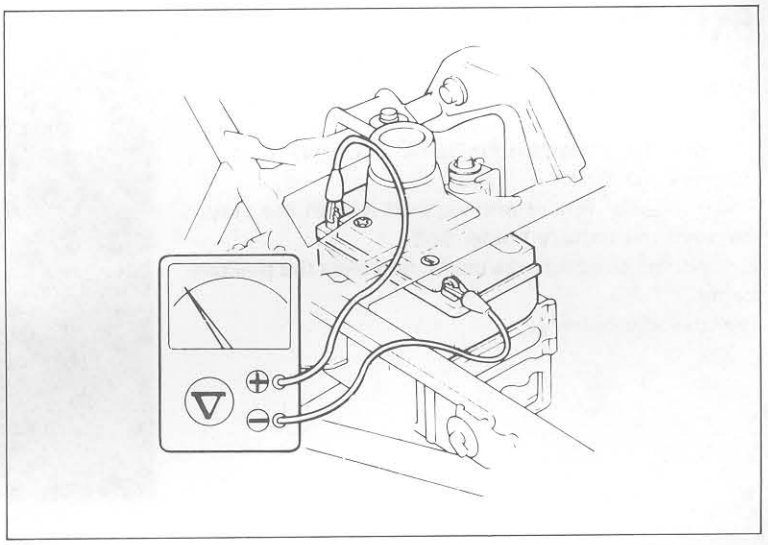
CAUTION

- *Quick-charging should only be done in an emergency; slow-charging is preferred.*
- *Be sure to charge the battry with the correct current and for the time indicated above. Charging with excessive current and or too fast may cause battery failure.*

After installing the battery, coat the terminals with clean grease.

CHARGING SYSTEM

CHARGING OUTPUT TEST



Warm up the engine before testing.
Open the rear fender and support it with the stay.
Connect a voltmeter between the battery positive and negative terminals.
Start the engine turn the headlight on and read the voltmeter.
Gradually increase the engine speed and check that the voltage is regulated.

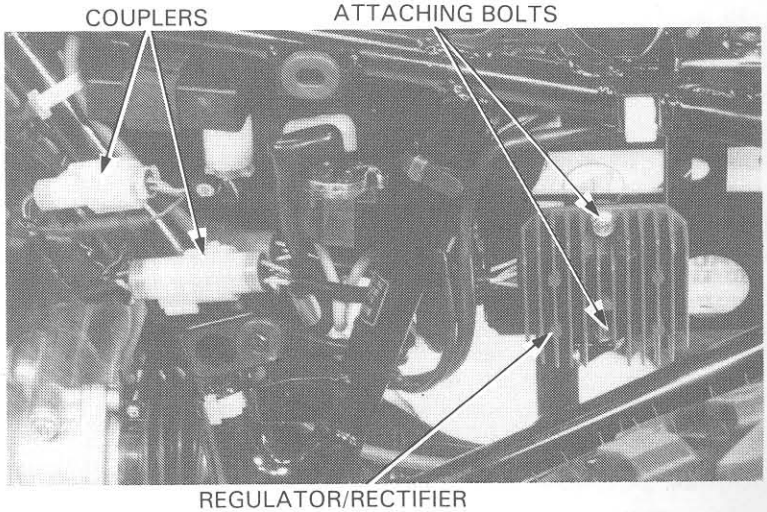
REGULATED VOLTAGE: 14.0–15.0 V

If it exceeds the regulated voltage, make sure that the battery voltage appears between the Black and Green terminals of the regulator/rectifier coupler when the ignition switch is turned ON. Check the Black and Green wires for an open circuit in the wire harness if voltage does not appear with the ignition switch turned ON.
If voltage is OK, replace the regulator/rectifier.
If the voltage does not increase above the previous reading though the engine rpm increases, stop the engine and check the following:

- Check the regulator/rectifier coupler for loose or disconnected terminals.
- Make sure that the battery voltage appears between the Red (+) and Green (–) terminals of the regulator/rectifier couplers. Check the Red and Green wires for open circuit if voltage does not appear.
- Make sure that the battery voltage appears between the Black (+) and Green (–) wires of the regulator/rectifier coupler. Check the Black and Green wires for open circuit if voltage does not appear with ignition switch turned ON.
- Check the charging coil of the alternator as described below.

REGULATOR/RECTIFIER REPLACEMENT

Remove the left frame side cover.
Disconnect the voltage regulator wire couplers.
Remove the two bolts attaching the regulator/rectifier and replace it with a new one.



REGULATOR/RECTIFIER INSPECTION

Check the resistance between the leads with an ohmmeter.

Range: Sanwa: k Ω
Kowa: 100 Ω

⊕ Probe / ⊖ Probe	Yellow	Yellow	Yellow	Red	Green	Black
Yellow		∞	∞	1–20 (100–5 K)	∞	∞
Yellow	∞		∞	1–20 (100–5 K)	∞	∞
Yellow	∞	∞		1–20 (100–5 K)	∞	∞
Red	∞	∞	∞		∞	∞
Green	1–20 (100–5 K)	1–20 (100–5 K)	1–20 (100–5 K)	5–30 (500–8 K)		1–20 (1 K–5 K)
Black	10–80 (10 K–80 K)	10–80 (10 K–80 K)	10–80 (10 K–80 K)	20–200 (50K–∞)	10–50 (10 K–50 K)	

( ) : Kowa tester

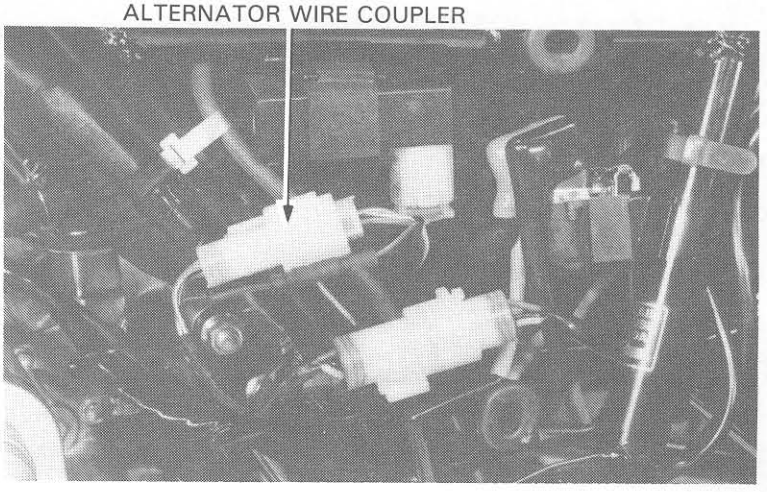
ALTERNATOR CHARGING COIL

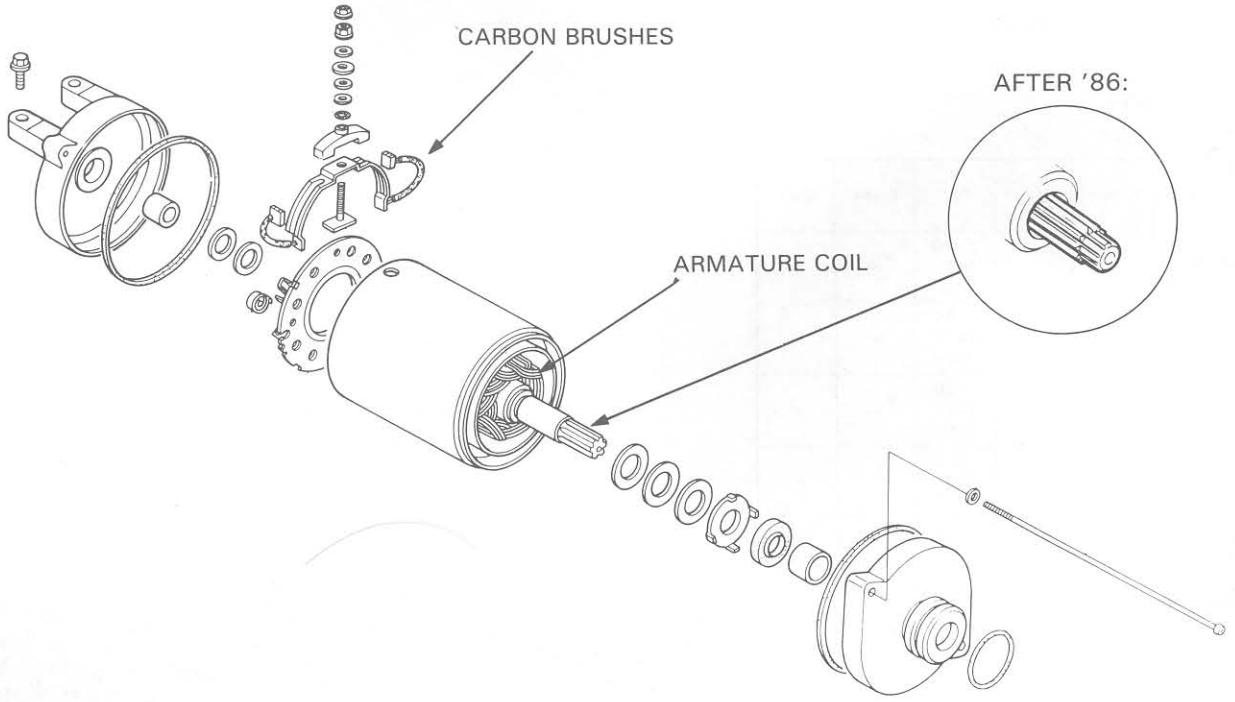
Disconnect the alternator wire coupler.
Check the resistance between the coupler terminals.

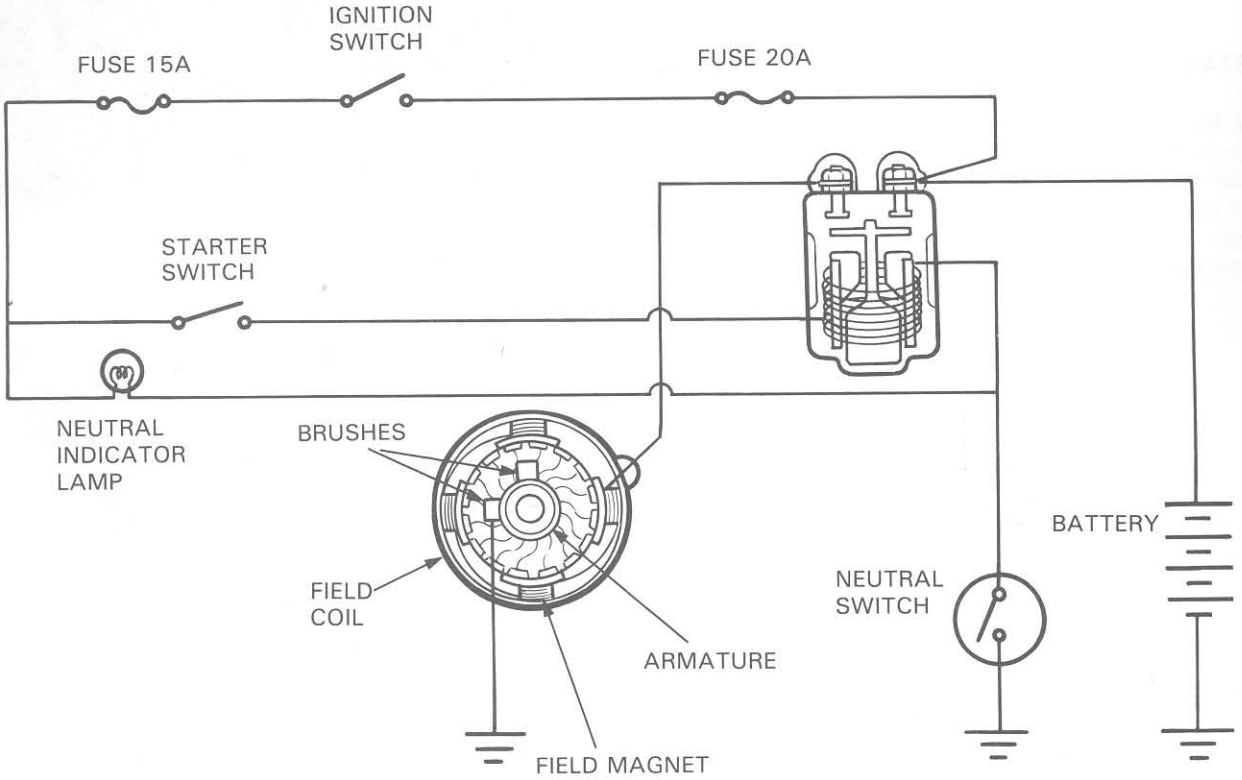
RESISTANCE: 0.2–1 Ω

Check for continuity between the coupler terminal and ground.
Replace the alternator stator if readings are not within the limit or if any lead has continuity to ground.
Refer to section 9 for stator removal.

ALTERNATOR WIRE COUPLER




CARBON BRUSHES
AFTER '86:
ARMATURE COIL


IGNITION SWITCH
FUSE 15A
FUSE 20A
STARTER SWITCH
NEUTRAL INDICATOR LAMP
BRUSHES
FIELD COIL
ARMATURE
FIELD MAGNET
NEUTRAL SWITCH
BATTERY

16. STARTER SYSTEM

SERVICE INFORMATION

GENERAL

The starter motor can be removed with the engine in the frame.

SPECIFICATIONS

			STANDARD	SERVICE LIMIT
Starter motor	Brush spring tension	Mitsuba	800±120 g (28.2±4.2 oz)	740 g (26 oz)
		ND	970±120 g (34.2±4.2 oz)	
	Brush lengh	Mitsuba	12—12.5 mm (0.47—0.49 in)	5.5 mm (0.22 in)
		ND	11.7—12.3 mm (0.46—0.48 in)	8.5 mm (0.33 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

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

STARTER MOTOR

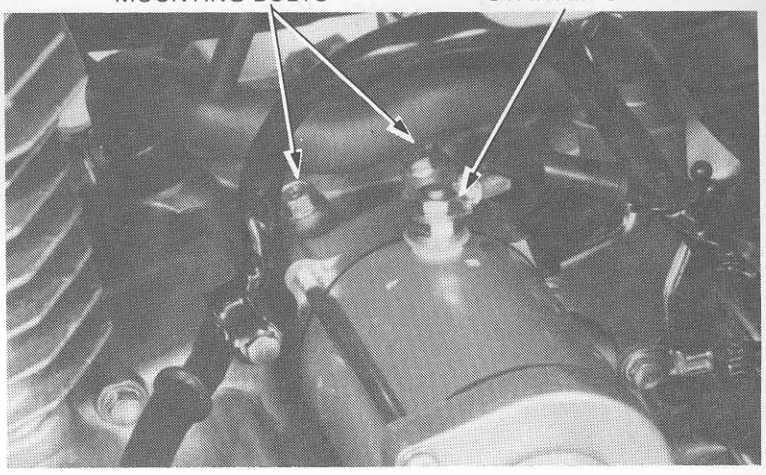
REMOVAL

WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Disconnect the starter cable from the stater motor.

Remove the two mounting bolts and the starter motor.



BRUSH INSPECTION

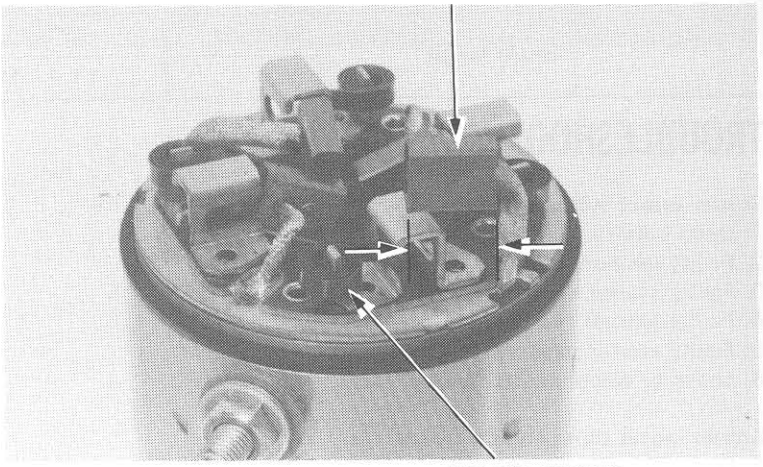
Remove the two starter motor case screws, and front and rear covers.
Remove the armature and the brushes.

Inspect the brushes and measure the brush length.

SERVICE LIMIT: Mitsuba 5.5 mm (0.22 in)
ND 8.5 mm (0.33 in)

Measure brush spring tension with a spring scale.

SERVICE LIMITS: 740 g (26 oz)



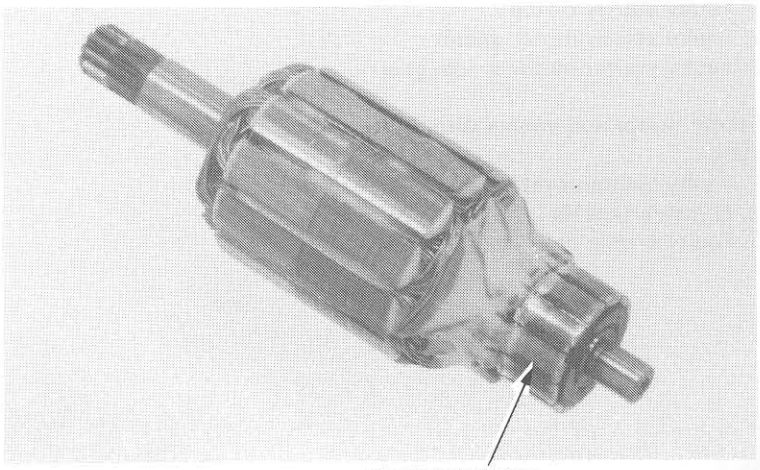
COMMUTATOR INSPECTION

NOTE

Record the location and number of thrust washers for correct assembly.

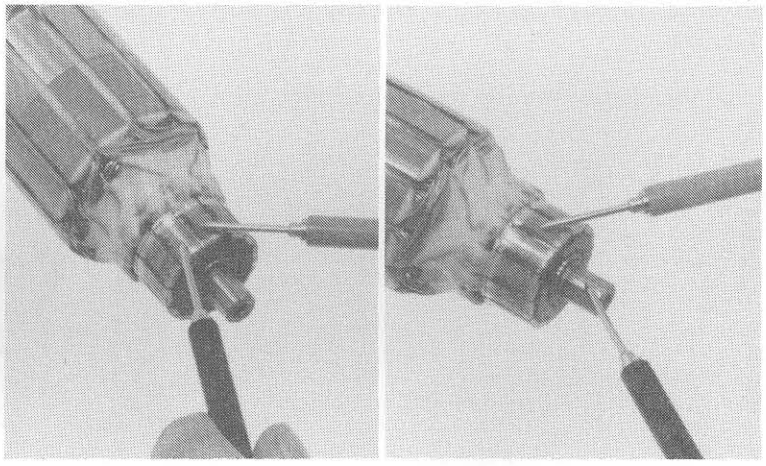
Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils, in which case the starter motor must be replaced.

'85, '86 MODEL SHOWN



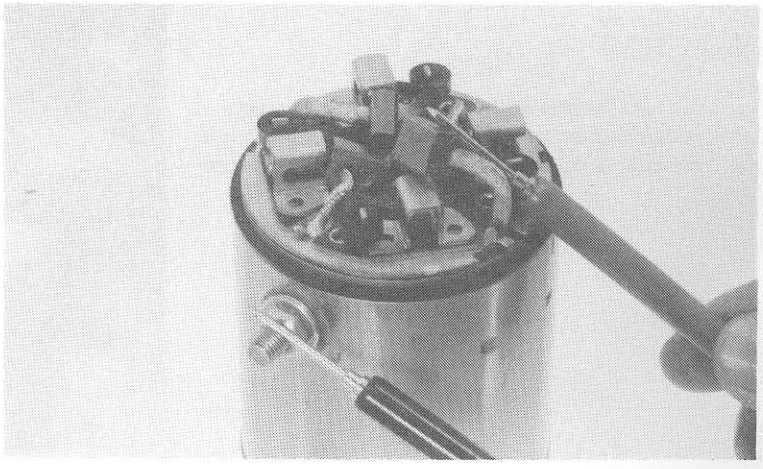
Check for continuity between pairs of commutator bars; there should be continuity.

Also, check for continuity between individual commutator bars and armature shaft; there should be no continuity.



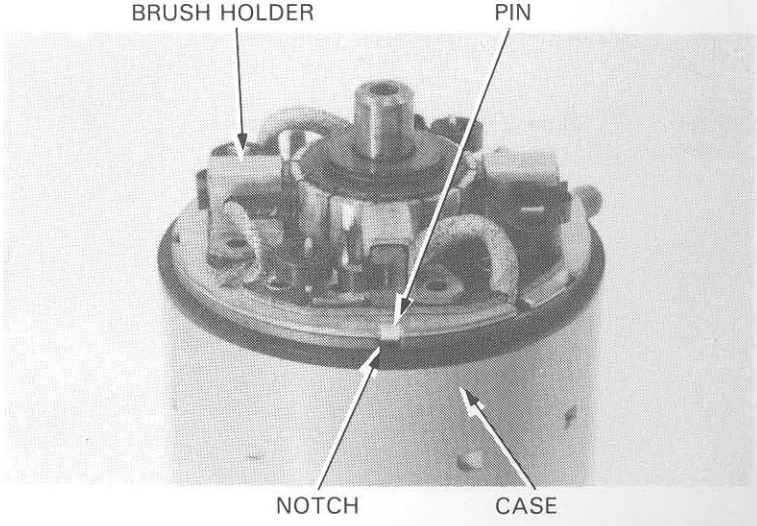
FIELD COIL INSPECTION

Check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wire. Replace the starter motor if the field coil is not continuous or if it is shorted to the motor case.



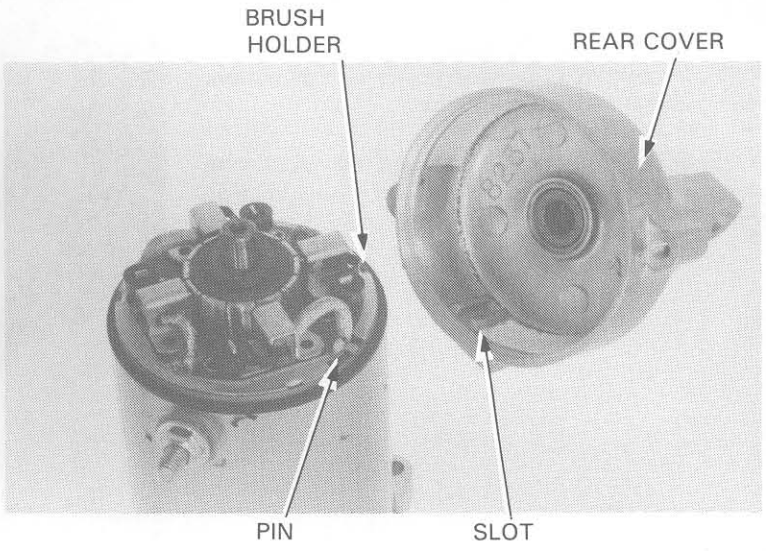
ASSEMBLY/INSTALLATION

Assemble the starter motor. Align the case notch with the brush holder pin.



Install the rear cover aligning its slot with the brush holder pin.

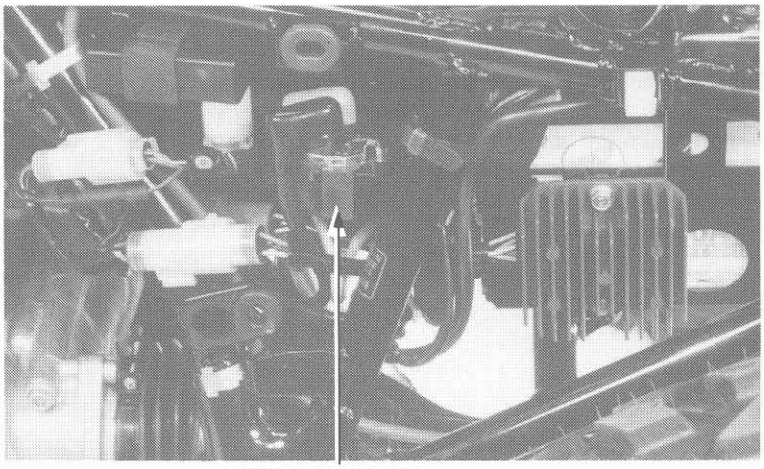
Install the starter motor in the reverse order of removal.



STARTER RELAY SWITCH

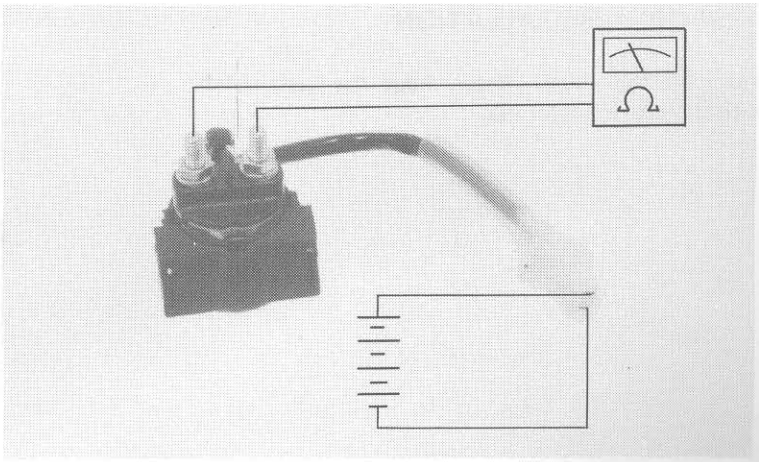
INSPECTION

Raise the rear fender and support it with the stay. Depress the starter switch button with the ignition ON. The coil is normal if the starter relay switch clicks.



Connect an ohmmeter to the starter relay switch terminals.

Connect a 12 V battery to the switch cable terminals. The switch is normal if there is continuity.



17. LIGHTS/SWITCHES

SERVICE INFORMATION

GENERAL

A continuity check can usually be made without removing the part from the ATC by simply disconnecting the wires and connecting a continuity tester or voltmeter to the terminals.

Headlight	12V 60W/60W
Taillight	12V 5W x 2
Neutral indicator	12V 3W
Reverse indicator	12V 3W

TROUBLESHOOTING

Light does not come on when light switch is turned on (Engine is running)
1. Bulb burned out
2. Faulty switch
3. Wiring to that component has open circuit

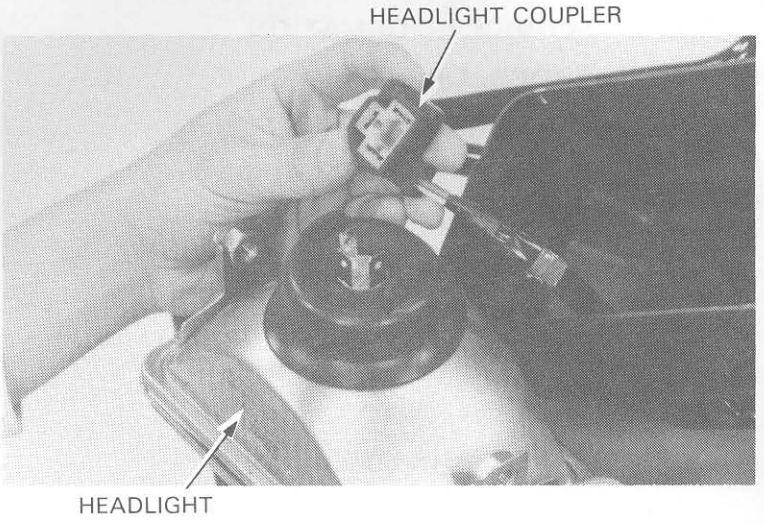
Headlight beams do not shift when hi-lo switch is operated
1. Faulty dimmer switch
2. Bulb burned out
3. Wiring to that component has open circuit

HEADLIGHT

BULB REPLACEMENT

Remove the headlight case mounting bolts and case from the bracket.
Remove the headlight from the case.

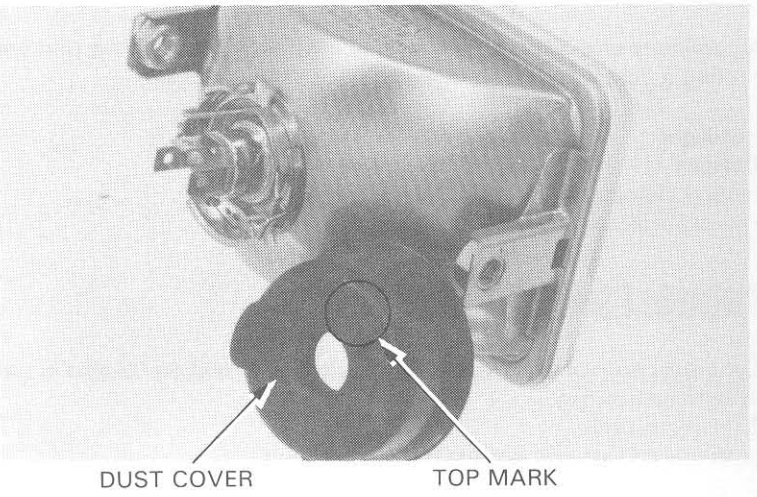
Disconnect the headlight coupler.



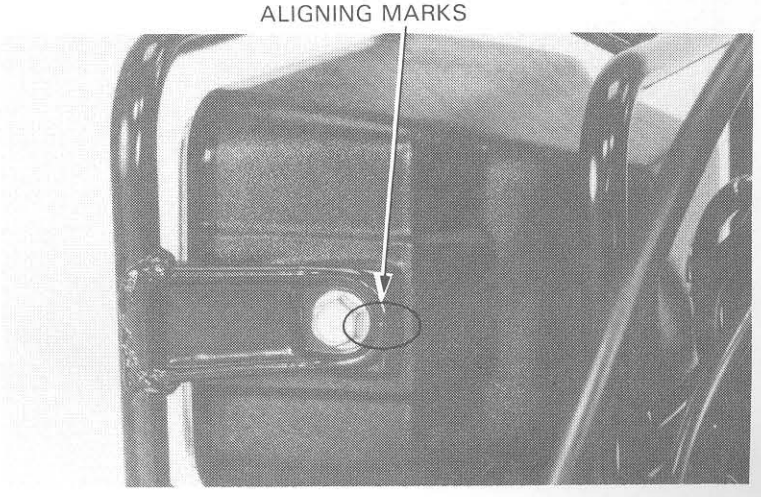
Remove the dust cover.
Remove the retainer clip to replace the headlight bulb.

Install the dust cover with the TOP mark facing up.

Connect the headlight coupler and install the headlight into the case.



Install the headlight case onto the bracket, align the marks on the case and bracket.

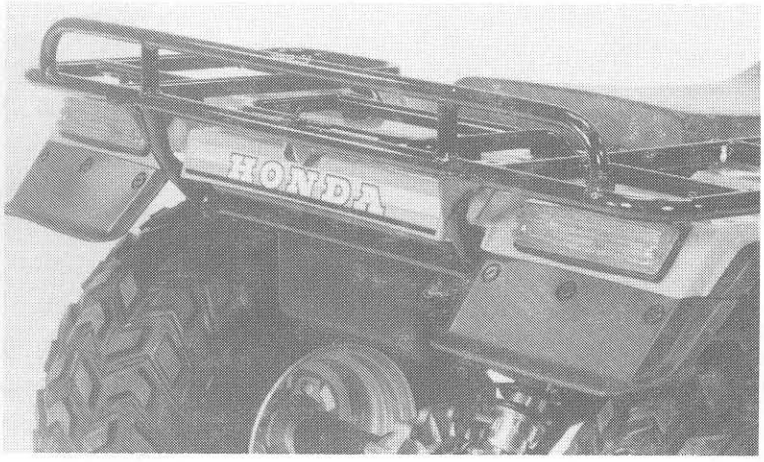


TAILLIGHT

BULB REPLACEMENT

Remove the taillight lens screws.
Disconnect the taillight wires.
Replace the taillight bulb.

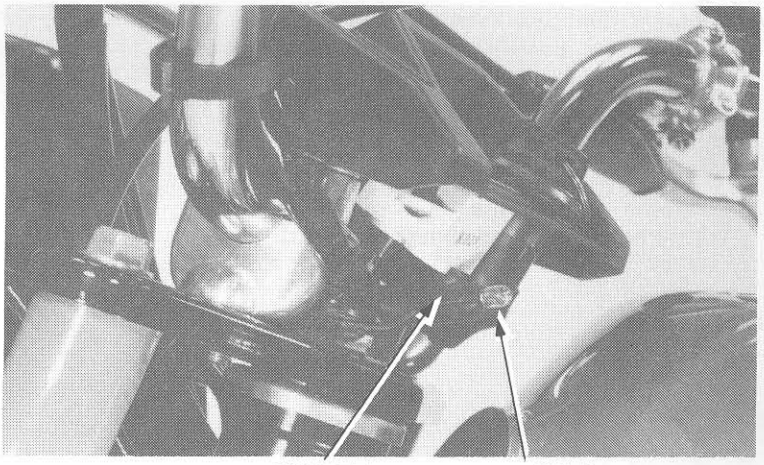
Connect the taillight wires.
Make sure that the lens seal rubber is correctly installed, then install the lens and secure it with screws.



INDICATOR LAMP

BULB REPLACEMENT

Pull the bulb socket out of the indicator lamp housing and remove the bulb.
Install a new bulb and push the socket back into the housing.



NEUTRAL SWITCH/REVERSE SWITCH

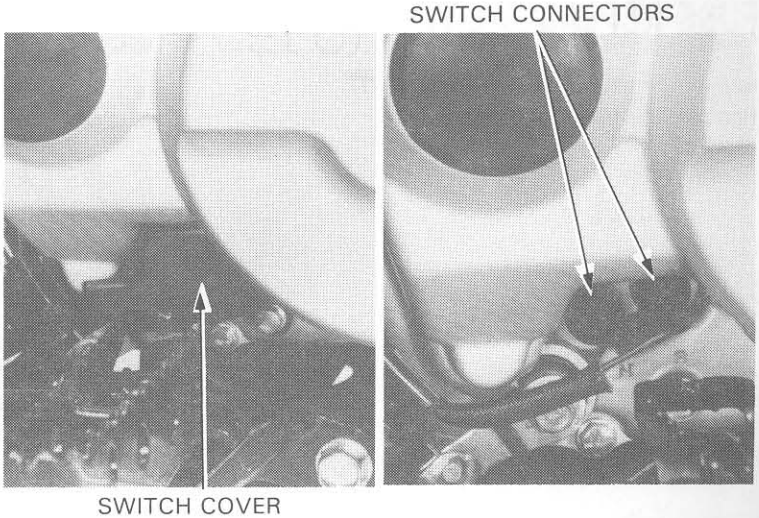
Remove the switch cover and connectors.
Check the continuity between the switch terminal and ground.

The neutral switch is functional if continuity exists with the transmission in neutral.

The reverse switch is functional if continuity exists with the transmission in reverse.

WARNING

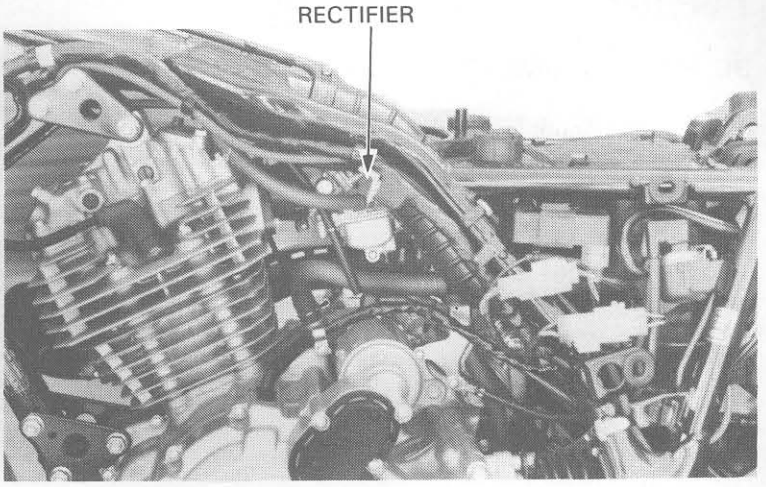
Connect the neutral (Light green/Red) and reverse (Green) switch wires properly. If the switch wire connections are interchanged, the neutral indicator comes on in the transmission in reverse and the ATC will reverse suddenly.



RECTIFIER

INSPECTION

Remove the frame left side cover.
Remove the rectifier from the holder under the battery with the coupler connected.
Disconnect the coupler from the rectifier.



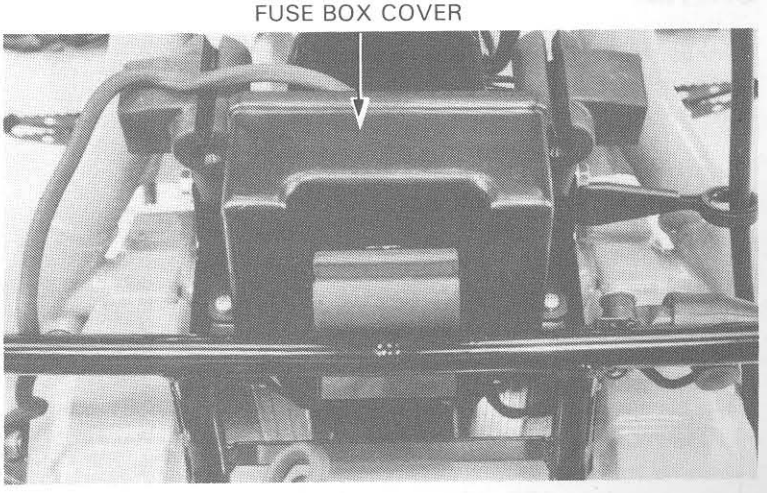
Check for continuity with an ohmmeter.
The rectifier is good if continuity exists in the direction of the arrow.

NOTE:

> The test results shown are for a positive ground ohmmeter and opposite results will be obtained when a negative ground ohmmeter is used.

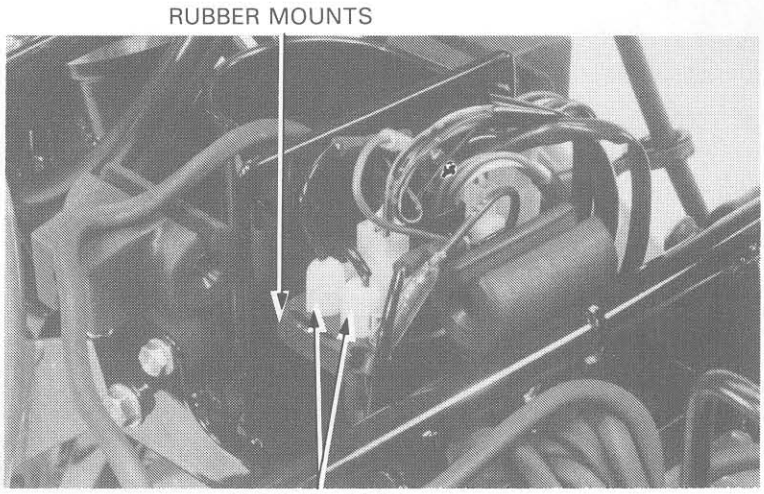
FUSE REPLACEMENT

Remove the front carrier (page 13-1).
Remove the fuse box cover.



Remove the fuse holder from its rubber mounts, loosen the fuse holder cap and remove the cap and fuse.

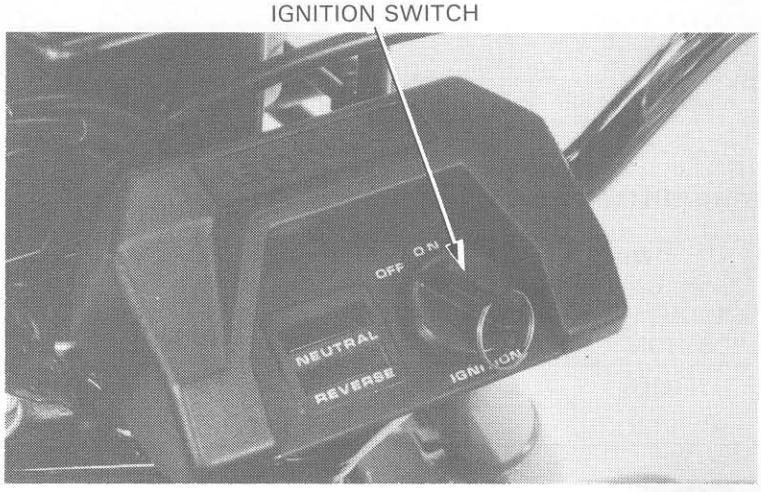
Install the fuse in the reverse order of removal.



IGNITION SWITCH

Remove the fuse/junction cover.
Disconnect the ignition switch wire connectors and coupler.
Check continuity between the terminals in the chart shown below.

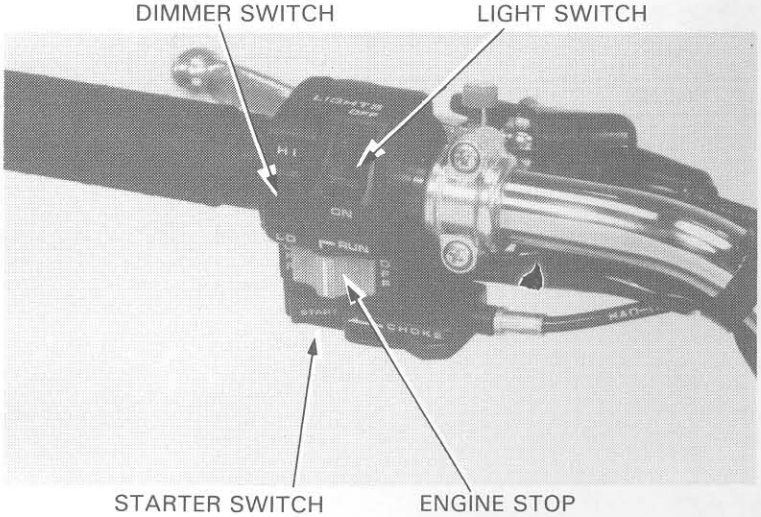
WIRE COLOR / SWITCH POSITION	BLACK/ WHITE	GREEN	RED	BLACK
OFF	○	○		
ON			○	○



HANDLEBAR SWITCH

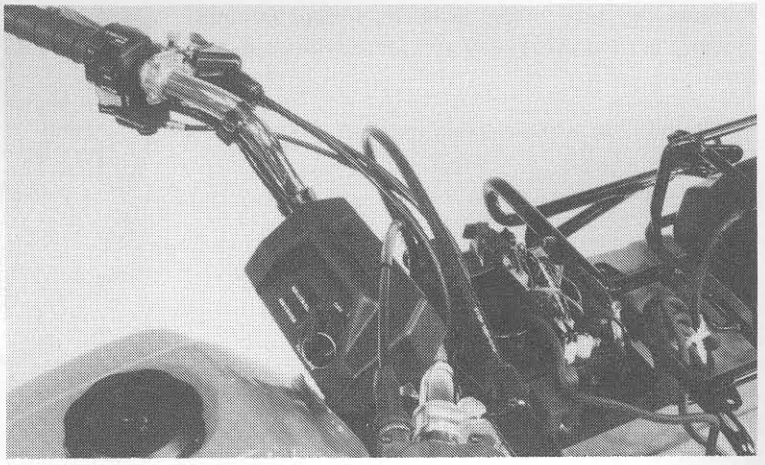
The handlebar switch (light/dimmer switch, engine stop switch, starter switch) must be replaced as an assembly.
Remove the fuse box cover.
Disconnect the handlebar switch coupler.

Check continuity between the terminals.
Continuity should exist between the color coded wire terminals in each chart.



'85:
LIGHT/DIMMER SWITCH

WIRE COLOR / SWITCH POSITION	BROWN	BLACK BROWN	WHITE	BLUE
OFF				
LO	○	○	○	
(N)	○	○	○	○
HI	○	○		○



ENGINE STOP SWITCH

WIRE COLOR / SWITCH POSITION	GREEN	BLACK/ WHITE
OFF	○	○
RUN		

STARTER SWITCH

WIRE COLOR / SWITCH POSITION	BLACK/ BROWN	YELLOW/ RED
PUSH	○	○
FREE		

AFTER '85:
IGNITION SWITCH

	IG	E	BAT	HO
OFF	○	○		
ON			○	○
COLOR	BI/W	G	R	BI

ENGINE STOP SWITCH

	E	IG
OFF	○	○
RUN		
COLOR	G	BI/W

LIGHTING SWITCH

	C	TL	(HL)
OFF			
ON	○	○	○
COLOR	BL/Br	Br	●

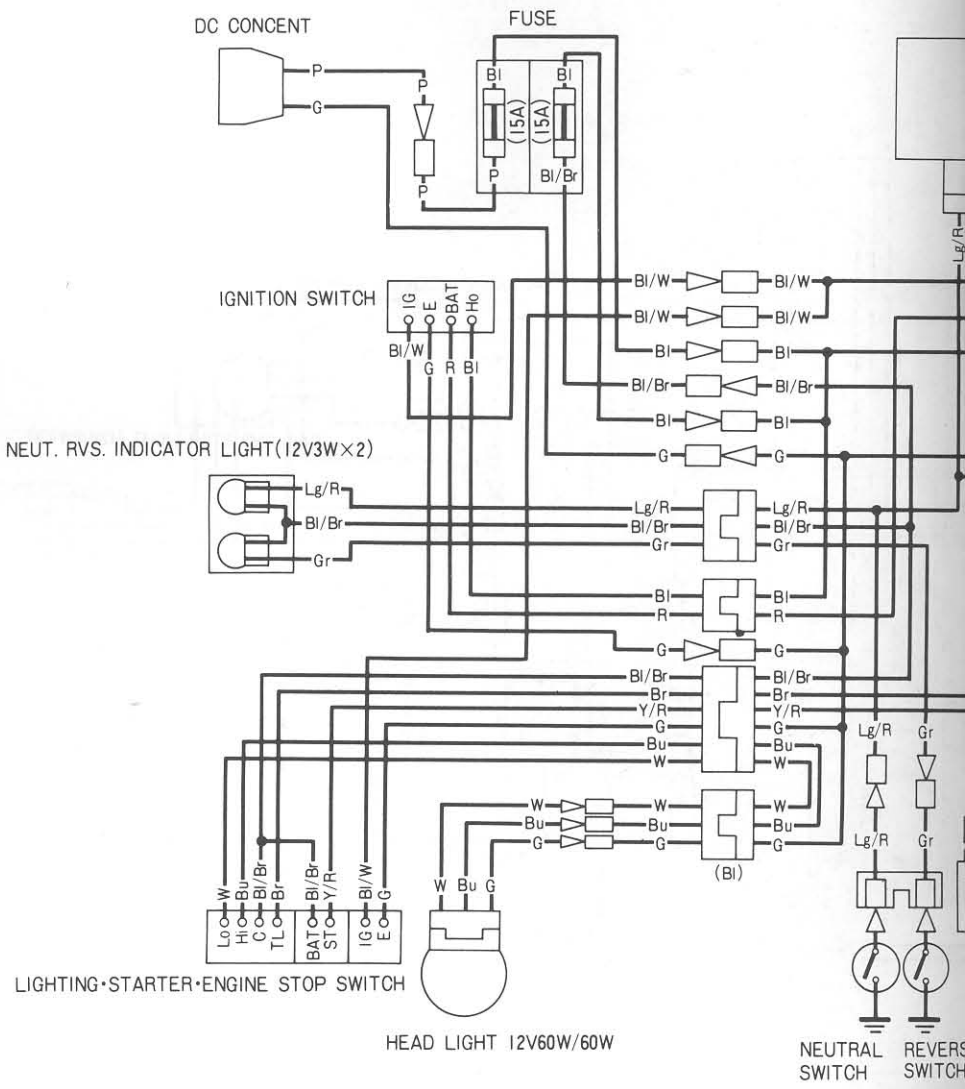
DIMMER SWITCH

	HI	(HL)	LO
HI	○	○	
(N)	○	○	○
LO		○	○
COLOR	Bu	●	W

STARTER SWITCH

	BAT	ST
PUSH	○	○
FREE		
COLOR	Bl/Br	Y/R

MEMO



SWITCH CONTINUITY

IGNITION SWITCH

	IG	E	BAT	Ho
OFF	○—○			
ON			○—○	
COLOR	Bl/W	G	R	Bl

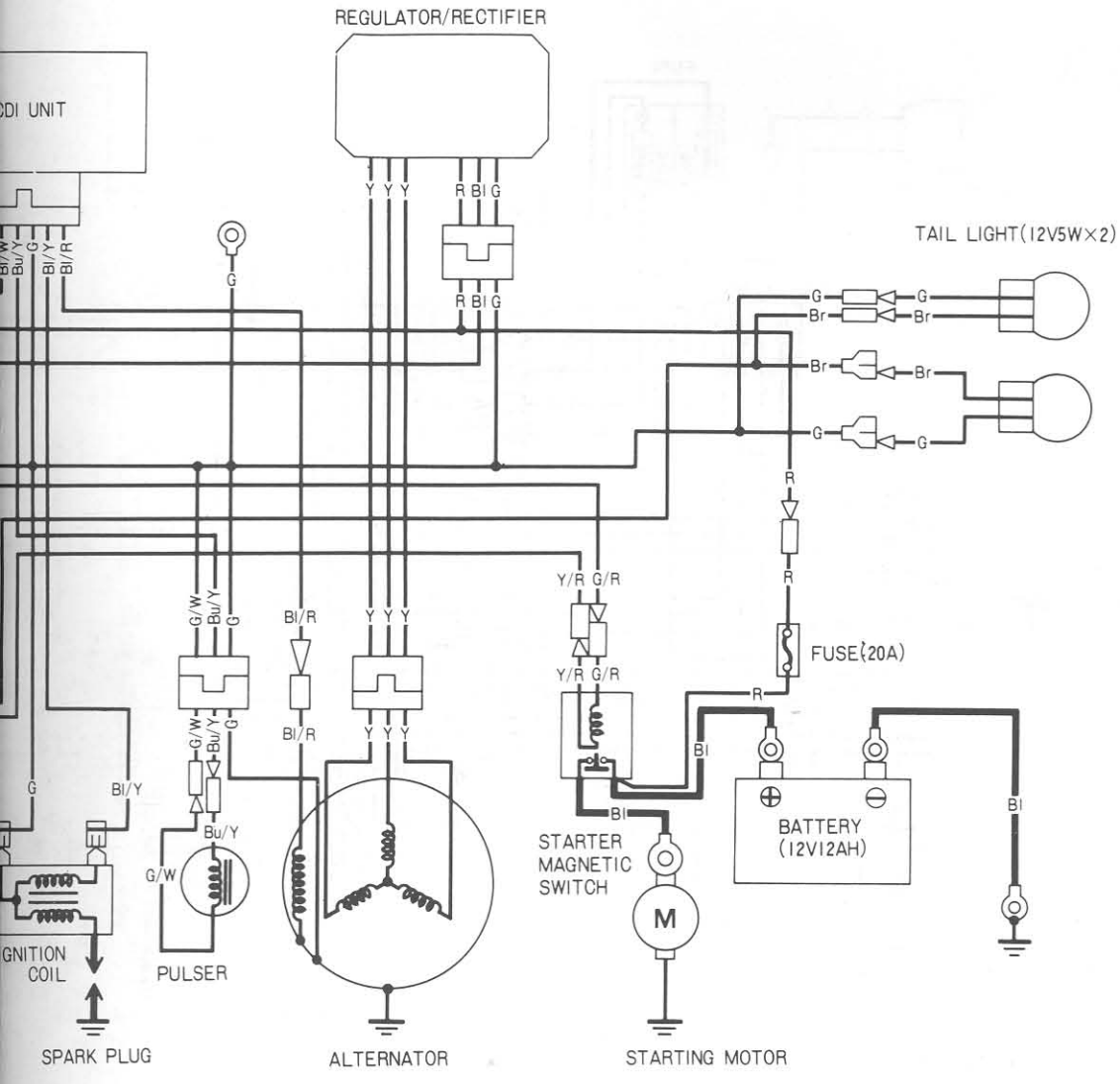
LIGHTING SWITCH

	TL	C	Lo	Hi
OFF				
Lo	○—○	○—○	○—○	
(N)	○—○	○—○	○—○	○—○
Hi	○—○	○—○		○—○
COLOR	Br	Bl/Br	W	Bu

STARTER SWIT

	BAT
PUSH	○
FREE	
COLOR	Bl/Br

18. WIRING DIAGRAMS

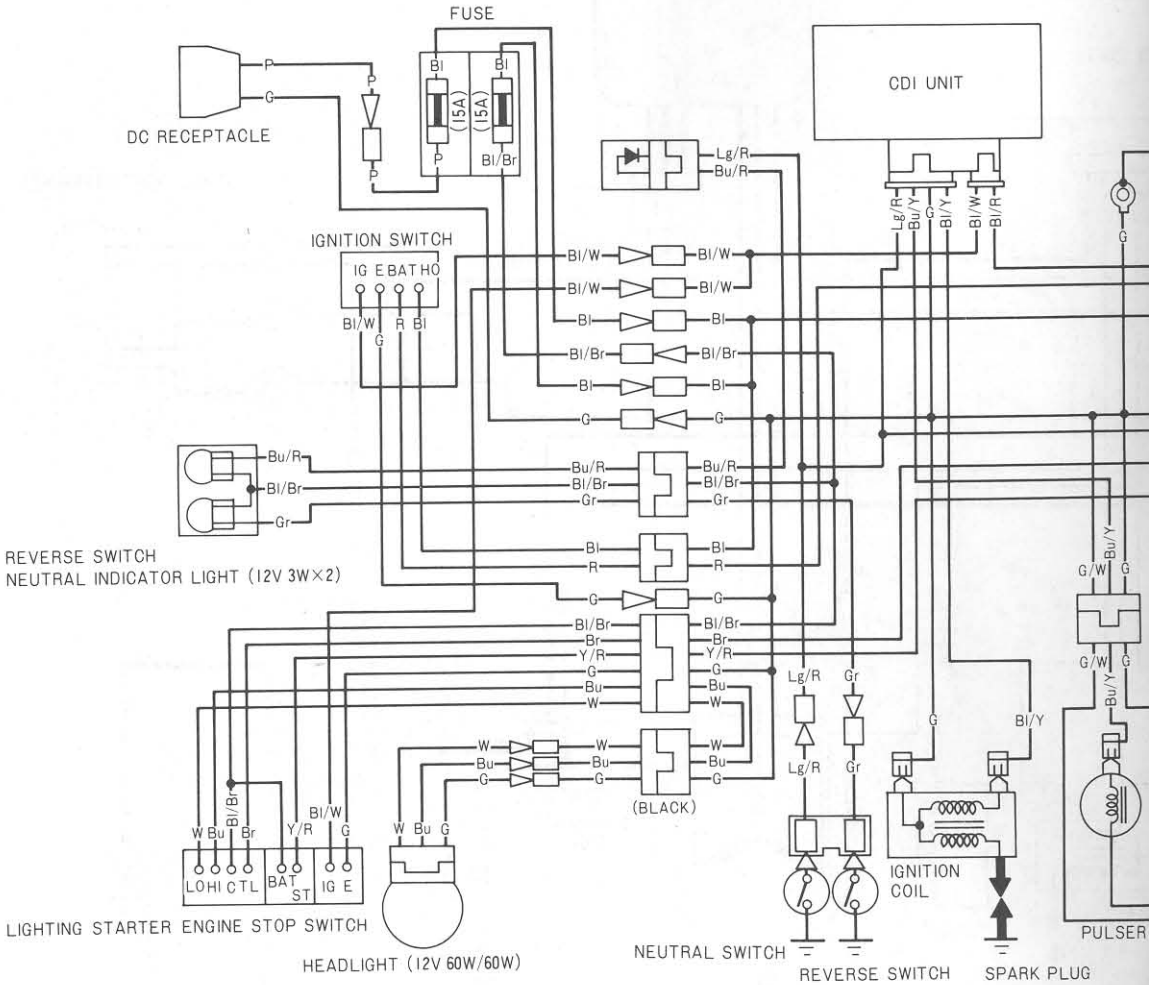


CH	ENGINE STOP SWITCH		
ST		E	IG
○	OFF	○—○	
	RUN		
Y/R	COLOR	G	Bl/W

Bl ·····Black	Br ·····Brown
Y ·····Yellow	O ·····Orange
Bu·····Blue	Lb·····Light Blue
G ·····Green	Lg·····Light Green
R ·····Red	P ·····Pink
W ·····White	Gr·····Grey

0030Z-HA0 -0100-

AFTER '85



SWITCH CONTINUITY

IGNITION SWITCH

	IG	E	BAT	HO
OFF	○	○		
ON			○	○
COLOR	Bl/W	G	R	Bl

LIGHTING SWITCH

	C	TL	(HL)
OFF			
ON	○	○	○
COLOR	Bl/Br	Br	

DIMMER SWITCH

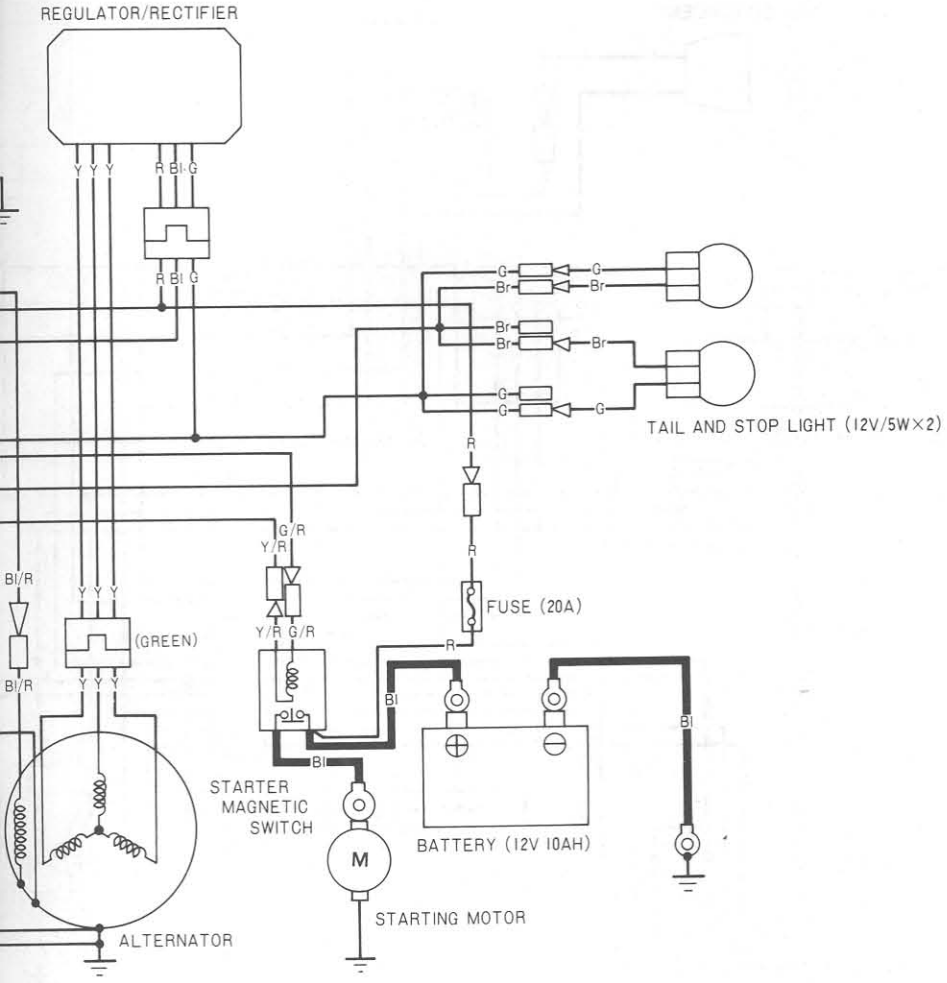
	HI	(HL)	LO
HI	○	○	
(N)	○	○	○
LO			○
COLOR	Bu		W

STARTER SWITCH

	BAT	ST
PUSH	○	○
FREE		
COLOR	Bl/Br	Y/R

ENGINE ST

	E
OFF	○
RUN	
COLOR	G



P SWITCH

IG
Bl/W

Bl ·····Black	Br ·····Brown
Y ·····Yellow	O ·····Orange
Bu·····Blue	Lb·····Light Blue
G ·····Green	Lg·····Light Green
R ·····Red	P ·····Pink
W ·····White	Gr·····Gray

19. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

		Probable Cause
1. Check if fuel is getting to carburetor. GETTING TO CARBURETOR ↓	NO FUEL TO CARBURETOR →	(1) No fuel in fuel tank (2) Clogged fuel tube or fuel filter (3) Clogged float valve (4) Clogged fuel tank cap breather tube
2. Try spark test. GOOD SPARK ↓	WEAK OR NO SPARK →	(1) Faulty spark plug (2) Fouled spark plug (3) Faulty CDI unit (4) Broken or shorted spark plug wire (5) Faulty alternator (6) Broken or shorted ignition coil (7) Faulty pulse generator (8) Poorly connected, broken or shorted wires (9) Pulse generator rotor gap incorrect (10) Faulty ignition switch
3. Test cylinder compression. COMPRESSION NORMAL ↓	LOW COMPRESSION →	(1) Low battery charge (2) Valve clearance too small (3) Valve stuck open (4) Worn cylinder and pistion rings (5) Damaged cylinder head gasket (6) Seized valve (7) Improper valve timing
4. Start by following normal starting procedure. ENGINE DOES NOT FIRE ↓	ENGINE FIRES BUT SOON STOPS →	(1) Choke excessively open (2) Choke outer cable out of place (3) Carburetor pilot screw excessively closed (4) Air leaking past carburetor insulator (5) Improper ignition timing (CDI unit or pulse generator faulty)
5. Remove spark plug. DRY ↓	WET PLUG →	(1) Carburetor flooded (2) Carburetor choke excessively open (3) Throttle valve excessively open (4) Air cleaner dirty
6. Start with choke applied		

ENGINE LACKS POWER

		Probable Cause
1. Raise wheels off ground and spin by hand. WHEEL SPINS FREELY	WHEEL DOES NOT SPIN FREELY →	(1) Brake dragging (2) Worn or damaged wheel bearing (3) Wheel bearing needs lubrication (4) Faulty final gear
2. Check tire pressure with tire gauge. PRESSURE NORMAL	PRESSURE TOO LOW →	(1) Punctured tire (2) Faulty tire valve
3. Try rapid acceleration from low to second. ENGINE SPEED LOWERED	ENGINE SPEED DOES NOT CHANGE →	(1) Clutch slipping (2) Worn clutch disc/plate (3) Warped clutch disc/plate
4. Lightly accelerate engine. ENGINE SPEED INCREASED	ENGINE SPEED NOT INCREASED SUFFICIENTLY →	(1) Carburetor choke opened (2) Clogged air cleaner (3) Restricted fuel flow vent (4) Clogged fuel tank breather hole (5) Clogged muffler
5. Check ignition timing. CORRECT	INCORRECT →	(1) Faulty CDI unit (2) Faulty pulse generator (3) Improper flywheel installation
6. Check valve clearance. CORRECT	INCORRECT →	(1) Improper valve adjustment (2) Worn valve seat
7. Test cylinder compression using a compression gauge. NORMAL	TOO LOW →	(1) Valve stuck open (2) Worn cylinder and piston rings (3) Leaking head gasket (4) Improper valve timing
8. Check carburetor for clogging. NOT CLOGGED	CLOGGED →	(1) Carburetor not serviced frequently enough
9. Remove spark plug. NOT FOULED OR DISCOLORED	FOULED OR DISCOLORED →	(1) Plug not serviced frequently enough (2) Use of plug with improper heat range

10. Remove oil level gauge and check oil level. CORRECT ↓	OIL LEVEL INCORRECT →	(1) Oil level too high (2) Oil level too low (3) Contaminated oil
11. Remove cylinder head cover and inspect lubrication. VALVE TRAIN LUBRICATED PROPERLY ↓	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage (2) Clogged oil
12. Check if engine overheats. NOT OVERHEATED ↓	OVERHEATED →	(1) Excessive carbon build-up in combustion chamber (2) Use of improper quality of fuel (3) Clutch slipping (4) Fuel-air mixture too lean
13. Accelerate or run at high speed. ENGINE DOES NOT KNOCK	ENGINE KNOCKS →	(1) Worn piston and cylinder (2) Fuel-air mixture too lean (3) Use of improper grade of fuel (4) Excessive carbon build-up in combustion chamber (5) Ignition timing too advanced (Faulty CDI unit or pulse generator)

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		Probable Cause
1. Check ignition timing and valve clearance. CORRECT ↓	INCORRECT →	(1) Improper valve clearance (2) Improper ignition timing (Faulty CDI unit or pulse generator)
2. Check carburetor pilot screw adjustment. CORRECT ↓	INCORRECT →	(1) Fuel-air mixture too lean (2) Fuel-air mixture too rich
3. Check if air is leaking past carburetor insulator. NOT LEAKING ↓	LEAKING →	(1) Deteriorated insulator O-ring (2) Loose carburetor
4. Try spark test. GOOD SPARK	WEAK OR INTERMITTENT SPARK →	(1) Faulty, carbon or wet fouled spark plug (2) Faulty CDI unit (3) Alternator faulty (4) Faulty ignition coil (5) Faulty pulse generator

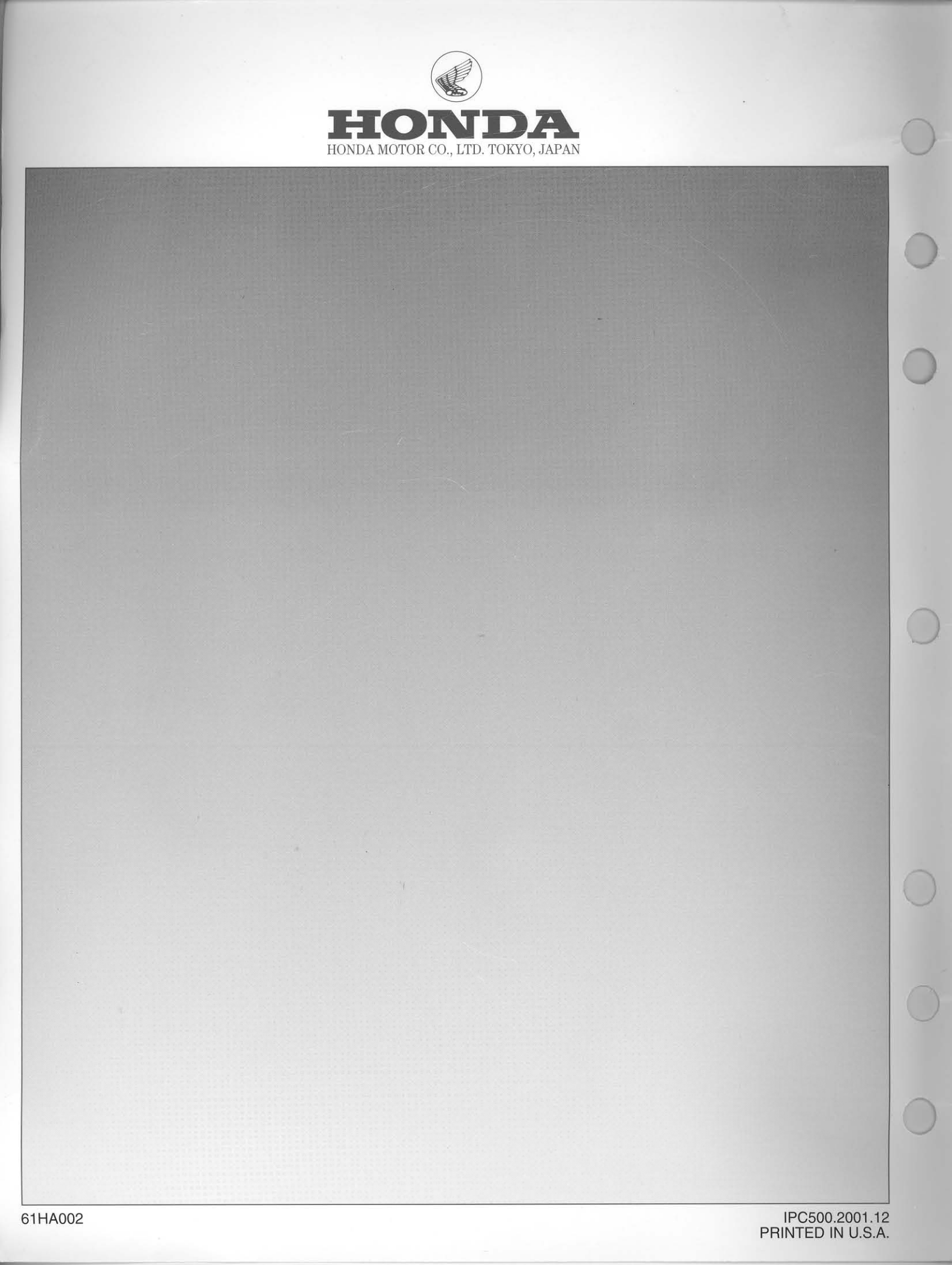
POOR PERFORMANCE AT HIGH SPEEDS

		Probable Cause
1. Check ignition timing and valve clearance.	INCORRECT →	(1) Improper valve clearance (2) Faulty CDI unit (3) Faulty pulse generator (4) Improper flywheel installation
CORRECT ↓		
2. Disconnect fuel tube at carburetor.	FUEL FLOW RESTRICTED →	(1) Lack of fuel in tank (2) Clogged fuel line (3) Clogged fuel tank breather hole (4) Clogged fuel valve
FUEL FLOWS FREELY ↓		
3. Remove carburetor and check for clogged jet.	CLOGGED →	Clean
NOT CLOGGED ↓		
4. Check valve timing.	INCORRECT →	Cam sprocket not installed properly
CORRECT ↓		
5. Check valve spring tension.	WEAK →	Faulty spring
NOT WEAKENED		

POOR HANDLING — Check tire pressure

	Probable Cause
1. If steering is heavy →	(1) Steering head adjuster too tight (2) Damaged steering cones or steel balls
2. If either wheel is wobbling →	(1) Excessive wheel bearing play (2) Bent rim (3) Improperly installed wheel hub (4) Bent frame (5) Bent swing arm
3. If the ATC pulls to one side →	(1) Tire air pressure incorrect (2) Bent front fork

20. INDEX



HONDA

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