HONDA

SERVICE MANUAL

85-87

ATC®250SX

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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 and all the required specifications, torque values, general instructions, tools and troubleshooting for the section. The subsequent pages give detailed procedures.

If you don't know the source of the trouble, see 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. that may cause loss of consciousness and lead to death.

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

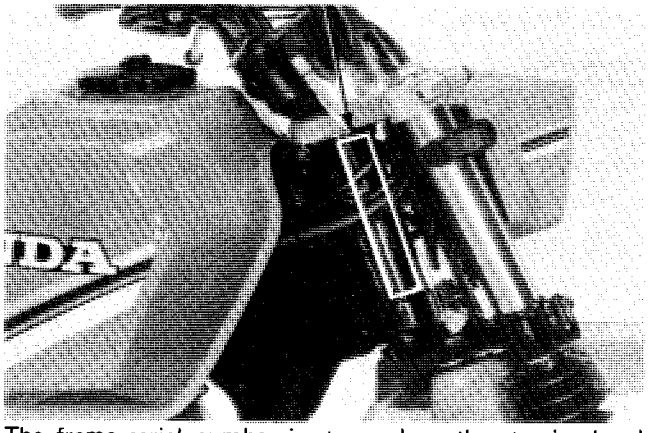
The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and call a doctor if electrolyte gets in your eyes.

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. Use of incorrect fasteners may damage the ATC.
4. Install new gaskets, O-rings cotter pins, and lock plates, etc. when reassembling.
5. When tightening bolts or nuts, begin with the larger-diameter or inner bolt first. Then tighten to the specified torque diagonally in 2-3 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.
9. Route all electrical wires and control cables as shown on page 1-10 through 1-15 cable and Harness Routing.

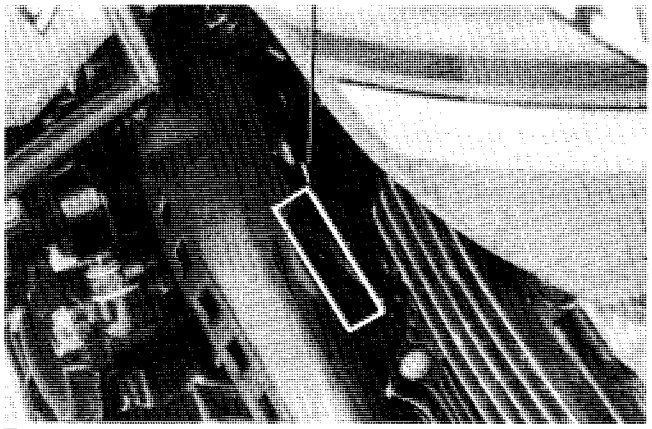
MODEL IDENTIFICATION

FRAME SERIAL NUMBER



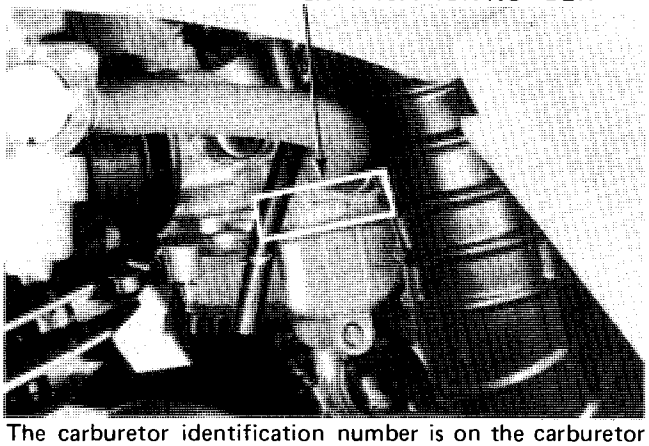
The frame serial number is stamped on the steering head right side.

ENGINE SERIAL NUMBER



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

CARBURETOR IDENTIFICATION NUMBER



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

SPECIFICATIONS

*: After '85, **: After '86

DIMENSIONS	Overall length		1,785 mm (70.3 in)
	Overall width		1,060 mm (41.7 in)
	Overall height		1,028 mm (40.5 in)
	Wheel base		1,175 mm (46.3 in)
	Rear tread		800 mm (31.5 in)
	Seat height		720 mm (28.3 in)
	Foot peg height		275 mm (10.8 in)
	Ground clearance		145 mm (5.7 in)
	Dry weight		162 kg (357 lb) *165 kg (364 lb)
FRAME	Type		Semi-double cradle
	Front suspension, travel		Telescopic, 135 mm (5.3 in)
	Rear suspension, travel		Swingarm 120 mm (4.7 in)
	Rim size	Front	8 in
		Rear	8 in
	Front tire size, pressure		22 x 11.0–8, 2.5 psi (17 kPa, 0.17 kg/cm^2)
			**22 x 11.0–8, 2.5 psi (17.5 kPa, 0.175 kg/cm^2)
	Rear tire size, pressure		22 x 11.0–8, 2.5 psi (17 kPa, 0.17 kg/cm^2)
			**22 x 11.0–8, 2.5 psi (17.5 kPa, 0.175 kg/cm^2)
	Front brake		Cable operated leading shoe
	Rear brake		Cable operated leading shoe
	Fuel capacity		9.8 liters (2.6 US gal, 2.2 Imp gal)
	Fuel reserve capacity		1.8 liters (0.46 US gal, 0.4 Imp gal)
	Caster		21°
	Trail		22 mm (0.9 in) **19 mm (0.8 in)
	Front fork oil capacity		180 cc (6.1 US oz, 6.3 Imp oz)
ENGINE	Type		Gasoline, air-cooled 4-stroke
	Cylinder arrangement		Single cylinder inclined 20°
	Bore x stroke		74 x 57.3 mm (2.9 x 2.3 in)
	Displacement		246 cc (15.0 cu in)
	Compression ratio		9 : 1
	Valve train		Overhead camshaft chain driven
	Maximum horsepower		18 PS/7,000 rpm
	Maximum torque		1.9 kg-m (13.7 ft-lb)/6,000 rpm
	Oil capacity		2.5 liters (2.6 US qt, 2.2 Imp qt)
			2.1 liters (2.2 US qt, 1.8 Imp qt) after draining
	Lubrication system		Forced pressure and wet sump
	Cylinder compression		12.5 ± 1.0 kg/cm^2 (178 ± 14 psi)
	Intake valve	Opens	8° BTDC } at 1 mm lift
		Closes	35° ABDC } at 1 mm lift
	Exhaust valve	Opens	5° BBDC } at 1 mm lift
		Closes	40° ATDC } at 1 mm lift
	Valve clearance	Intake	0.08 mm (0.003 in)
	(Cold)	Exhaust	0.08 mm (0.003 in)
CARBURETOR	Type		Dual valve
	Venturi dia.		27 mm (1.06 in)
	Main jet		#130
	Pilot screw opening		2 turns out **1-1/4 turns out
	Jet needle		2nd groove
	Float level		18.5 mm (0.73 in)
	Idle speed		1,400 ± 100 rpm

*: After '85, **: After '86

DRIVE TRAIN	Clutch		Wet multi-plate, semi-automatic
	Transmission		5-speed constant mesh with reverse
	Primary reduction		2.407 (65/27)
	Gear ratio	S/L	3.615 (47/13)
		I	2.000 (40/20)
		II	1.400 (35/25)
		III	1.069 (31/29)
		VI	0.848 (28/33)
		Reverse	7.785 (33/13–46/15)
	Final reduction		4.969 (13/19–10/34)
	Gearshift pattern		Left foot operated return system, Forward: N–S/L–1–2–3–4 Reverse: N–R
ELECTRICAL	Ignition		CDI
	Ignition timing	Initial	13° BTDC at idle
		Full advance	31° BTDC at 3,500 rpm
	Alternator	Capacity	200W/5,000 rpm
	Battery		12V–10AH **12V–12AH
	Spark plug		DR8ES-L (NGK) X24ESR-U (ND)
	Spark plug gap		0.6–0.7 mm (0.024–0.028 in)
	Headlight		12V 45W/45W *12V 60W/55W
	Taillight		12V 5W
	Neutral indicator		**12V3W

TORQUE VALUES

ENGINE

Item	Q'ty	Thread Size (mm)	Torque		
			N·m	kg-m	ft-lb
Cylinder head socket bolts	3	8 x 1.25	22–28	2.2–2.8	16–20
Cylinder head cap nuts	4	10 x 1.25	35–40	3.5–4.0	25–29
Cylinder stud bolt	4	10 x 1.25	8–12	0.8–1.2	6–9
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 drive gear bearing outer lock nut	1	64 x 1.5	90–110	9.0–11.0	65–80
Output gear case socket bolt	3	8 x 1.25	20–25	2.0–2.5	14–18
Output driven gear bearing holder shockt bolt	3	8 x 1.25	20–25	2.0–2.5	14–18
Output driven gear bearing outer lock nut	1	60 x 1.5	90–110	9.0–11.0	65–80
Output driven 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
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 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 guide holder socket bolt	1	6 x 1.0	8–12	0.8–1.2	6–9
Oil pipe bolt	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	11–14
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 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
Drain bolt	1	12 x 1.5	15–25	1.5–2.5	11–18
Cam chain tensioner lifter sealing bolt	1	6 x 1.0	8–12	0.8–1.2	6–9

FRAME

Item		Q'ty	Thread Size (mm)	Torque N·m	Torque kg-m	Torque ft-lb
Handlebar upper holder bolts		4	8 x 1.25	18–30	1.8–3.0	13–22
Steering stem nut	'85:	1	24 x 1.0	70–100	7.0–10.0	51–72
	After '85:	1	24 x 1.0	70–90	7.0–9.0	51–65
Steering bearing adjustment nut	(Initial)	1	24 x 1.0	25–35	2.5–3.5	18–25
	(Final)	1	24 x 1.0	7–8	0.7–0.8	5–6
Wheel nuts	'85:	12	10 x 1.25	50–60	5.0–6.0	36–43
	After '85:	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
Front fork axle holder		4	6 x 1.0	10–14	1.0–1.4	7–10
Rear axle nuts	'85:	2	20 x 1.5	80–120	8.0–12.0	58–87
	After '85:	2	18 x 1.5	80–140	8.0–14.0	58–100
Rear brake panel nuts	'85:	4	10 x 1.25	50–60	5.0–6.0	36–43
	After '85:	4	10 x 1.25	80–90	8.0–9.0	58–65
Rear shock absorber mount bolts		2	10 x 1.25	50–60	5.0–6.0	36–43
Fork pinch bolts		6	8 x 1.25	30–35	3.0–3.5	22–25
Swing arm right pivot bolt		1	30 x 1.5	16–20	1.6–2.0	12–14
Swing arm 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	30–36	3.0–3.6	22–26
Gear case oil cap		1	30 x 1.5	10–14	1.0–1.4	7–10
Final drive left bearing housing bolt		4	8 x 1.25	30–36	3.0–3.6	22–26
Engine hanger bolt		9	10 x 1.25	45–65	4.5–6.5	32–48
Gearshift pedal bolt	'85 and '86	1	6 x 1.0	10–14	1.0–1.4	7–10
	After '86	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 pipe bolt		2	6 x 1.0	6–9	0.6–0.9	5–7
Muffler clamp bolt	'85:	2	8 x 1.25	18–28	1.8–2.8	13–20
	After '85	2	8 x 1.25	28–35	2.8–3.5	20–25
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		2	10 x 1.25	45–50	4.5–5.0	33–36
		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	9.0–10.0	65–80
Muffler mounting bolt	'85 and '86	2	10 x 1.25	45–55	4.5–5.5	33–40
	After '86	2	10 x 1.25	50–60	5.0–6.0	36–43
		1	8 x 1.25	28–35	2.8–3.5	20–25
Throttle housing cover screw		3	4 x 0.7	3–4	0.3–0.4	2–3
Brake arm guard		2	10 x 1.25	35–45	3.5–4.5	25–33
Final gear case drain bolt		1	8 x 1.25	10–14	1.0–1.4	7–10
Left bearing housing mounting bolt		4	8 x 1.25	30–36	3.0–3.6	22–26

Torque specifications listed on pages 1-5 and 1-6 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. PAGE
Pinion joint holder	07924–HA00000			12-21,12-22,12-29
Pin gear driver	07945–HA00000			12-12
Bearing driver attachment	07946–HA00000	Not available in U.S.A.		10-23
Universal bearing puller	07631–0010000	Commercially available in U.S.A.		10-5,12-20
Socket bit, 17 mm	07703–0020500	Equivalent commercially available in U.S.A.		12-15,12-17,12-18
Lock nut wrench	07908–4690001	Lock nut wrench	KS-HBA-08-469	12-15,12-18
Steering stem socket	07916–3710100			11-27,11-29
Lock nut wrench, 34 x 44 mm	07916–ME50001	Lock nut wrench	07916–ME50000	10-18,10-25,12-22, 12-25
Clutch holder	07923–HA80000			
Clutch puller	07933–HA80000			
Hex wrench, 6 mm	07917–3230000	Equivalent commercially available in U.S.A.		11-21
Clutch center holder	07923–KE10001			8-15,8-18
Shaft holder	07924–ME50000			10-17,10-18,10-25
Crank assembly kit	07931–KF00000			10-8
– Assembly collar	07931–KF00100			10-8
– Threaded adapter	07931–KF00200			10-8
– Shaft puller	07931–ME40000	Shaft puller	07931–ME4000A	10-8,12-22
Bearing remover, 17 mm	07936–3710300			8-8,10-7,10-13
Remover handle	07936–3710100			8-8,10-7,10-13, 12-16
Remover weight	07741–0010201	Remover weight	07936–3710200	8-8,10-7,12-16
Bearing remover set, 20 mm	07936–3710001	Not available U.S.A.		8-8
– Bearing remover, 20 mm	07936–3710600			8-8
– Remover handle	07936–3710100			8-8
– Remover weight	07741–0010201	Remover weight	07936–3710200	8-8
Bearing remover set	07936–8890101			12-16
– Bearing remover assy	07936–8890300			12-16
– Bearing remover	07936–8890200			12-16
– Remover weight	07741–0010201	Remover weight	07936–3710200	12-16
Bearing remover set, 15 mm	07936–KC10000	Not available in U.S.A.		10-20
– Bearing remover, 15 mm	07936–KC10500			10-20
– Remover weight	07741–0010201	Remover weight	07936–3710200	10-20
Attachment, 28 x 30 mm	07946–1870100			8-8,10-13
Steering stem driver	07946–4300001	Steering stem driver and attachment (U.S.A. only)	07946–MB00000 HG-HT-54	11-28
Ball race remover	07953–3330000			11-28
Valve guide reamer, 5.5 mm	07984–2000000	Valve guide remover (U.S.A. only)	07984–200000A	6-10
Universal bead breaker	GN-AN-958-BB1	U.S.A. only		11-11
Lock nut wrench, 30 x 64 mm	07916–MB00001	Lock nut wrench	07916–MB00000	10-21,10-24,
Water seal driver	07947–HA00000			12-6
Shock absorber base	07959–MB10000			12-13
Collar	07965–GA70101			12-19
Clutch holder	07923–HA80000	Not available in U.S.A.	07923–HB3000A (U.S.A. only)	8-10,8-14
Clutch puller	07933–HA80000	Not available in U.S.A.	07933–HB3000A (U.S.A. only)	8-10
Lock nut wrench attachment	07916–HA0020A	U.S.A. only		10-21
Bearing driver attachment	07946–HA00000			10-23
Bearing remover set, 10 mm	07936–GE00000			9-3
Remover weight	07741–0010201	Remover weight	07936–3710200	9-3
Attachment	07946–3290000			11-9
Lock nut wrench attachment	07916–HA0010A	U.S.A. only		12-22,12-25
Bearing remover set, 10 mm	07936–GE00000			9-3

COMMON

DESCRIPTION	TOOL NUMBER	ALTERNATIVE TOOL	TOOL NUMBER	REF. PAGE
Float level gauge	07401–0010000			4-8
Valve adjusting wrench, 10 x 12 mm	07708–0030200	Equivalent commercially available in U.S.A.		3-6
Tappet wrench	89201–200–000			3-6
Lock nut wrench, 17 x 27 mm	07716–0020300	Equivalent commercially available in U.S.A.		8-10,8-14,8-15, 8-18,
Lock nut wrench, 30 x 32 mm	07716–0020400			11-27,11-30
Extension	07716–0020500	Equivalent commercially available in U.S.A.		8-10,8-14,8-15, 8-18,11-27,11-30
Flywheel holder	07725–0040000	Strap wrench commercially available in U.S.A.		9-6,9-7
Rotor puller	07733–0020001	Rotor puller	07933–3950000	9-7
Valve guide remover, 5.5 mm	07742–0010100	Valve guide remover	07942–3290100	6-10
Attachment, 24 x 26 mm	07746–0010700			9-3,12-23
Attachment, 37 x 40 mm	07746–0010200			10-7,12-16
Pilot, 17 mm	07746–0040400			8-8,10-7
Pilot, 15 mm	07746–0040300			10-21,11-15
Attachment, 42 x 47 mm	07746–0010300			8-8,10-5,10-7,10-13 10-19,11-15,10-21 12-23
Pilot, 25 mm	07746–0040600			10-13
Pilot, 20 mm	07746–0040500			8-8,10-13
Pilot, 22 mm	07746–0041000			10-13,12-23
Attachment, 52 x 55 mm	07746–0010400			10-13,10-20,12-11, 12-23
Pilot, 28 mm	07746–0041100			10-19,10-20
Attachment, 62 x 68 mm	07746–0010500			12-23
Pilot, 35 mm	07746–0040800			10-7,12-23
Attachment, 72 x 75 mm	07746–0010600			10-7
Attachment, 32 x 35 mm	07746–0010100			12-11
Pilot, 30 mm	07746–0040700			12-11,12-12
Attachment, 20 mm I.D.	07746–0020400	Attachment, 35 mm I.D.	07746–0030400	12-25
Driver	07749–0010000			
Driver	07746–0030100			10-20,10-23,12-24
Attachment, 30 mm I.D.	07746–0030300			10-20
Fork seal driver	07747–0010000	Fork seal driver	07947–3330000	11-24
Fork seal driver attachment	07747–0010501			11-24
Valve spring compressor	07757–0010000	Valve spring compressor	07957–3290001	6-8,6-14
Shock absorber spring compressor	07959–3290001			12-13,12-19
Tire breaker set	07772–0050000	Not available in U.S.A.		11-9
– Breaker arm compressor	07772–0050100			11-11
– Breaker arm	07772–0050200			11-11
Driver	07946–0020100			12-24,12-25
Pilot, 28 mm	07746–0041100			12-12
Driver	07746–0030100			12-12,12-24
Attachment, 24 x 26 mm	07746–0010700			9-3

VALVE SET CUTTER

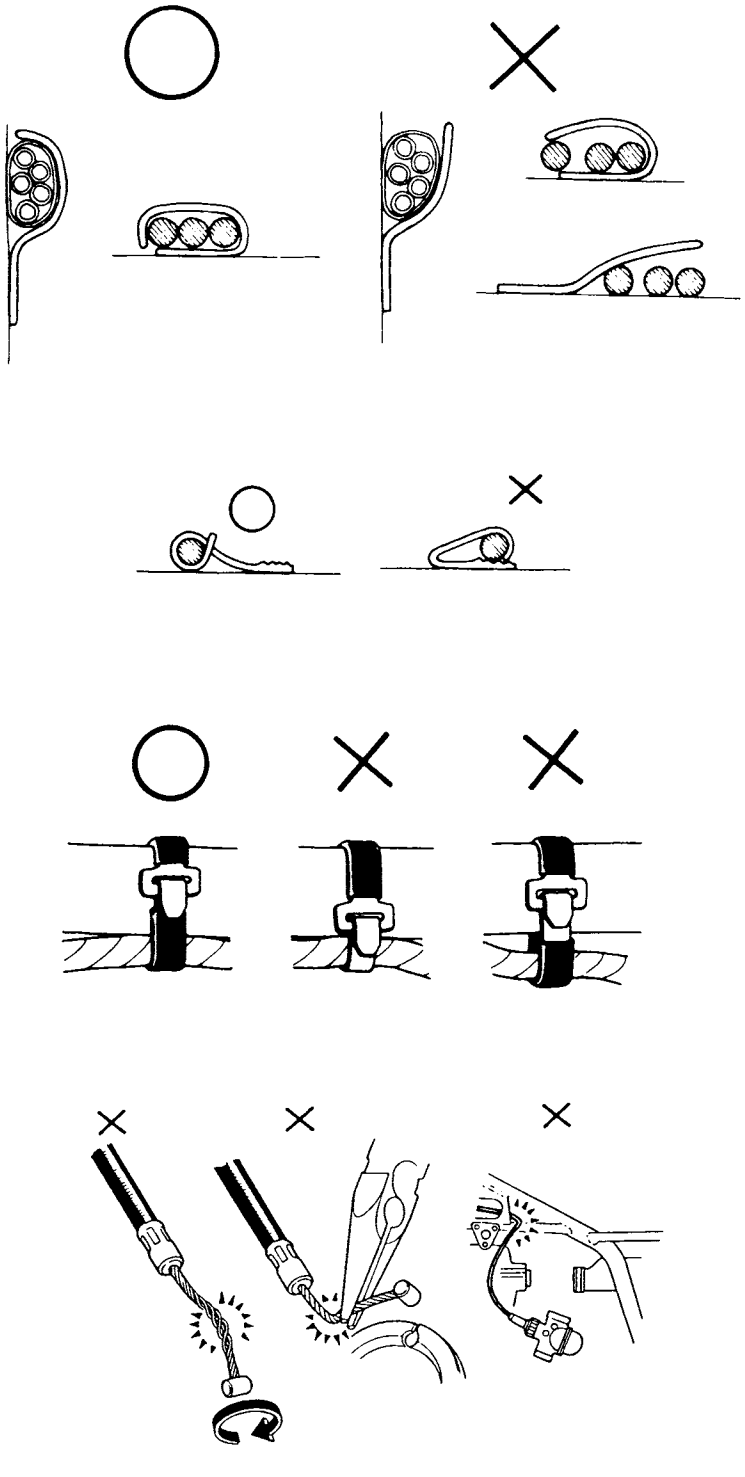
The valve seat cutters listed below are commercially available in the U.S.A. Therefore, these cutters are not required in the U.S.A.

DESCRIPTION	TOOL NUMBER	REF. PAGE
Valve seat cutter, 29 mm (EX 45°)	07780–0010300	6-11
Valve seat cutter, 25 mm (IN 45°)	07780–0010400	6-11
Valve seat cutter, 30 mm (EX 32°)	07780–0012200	6-11
Valve seat cutter, 35 mm (IN 32°)	07780–0012300	6-11
Valve seat cutter, 30 mm (EX 60°) (Interior)	07780–0014000	6-11
Valve seat cutter, 37.5 mm (IN 60°) (Interior)	07780–0014100	6-11
Valve seatcutter holder, 5.5 mm	07781–0010101	6-11

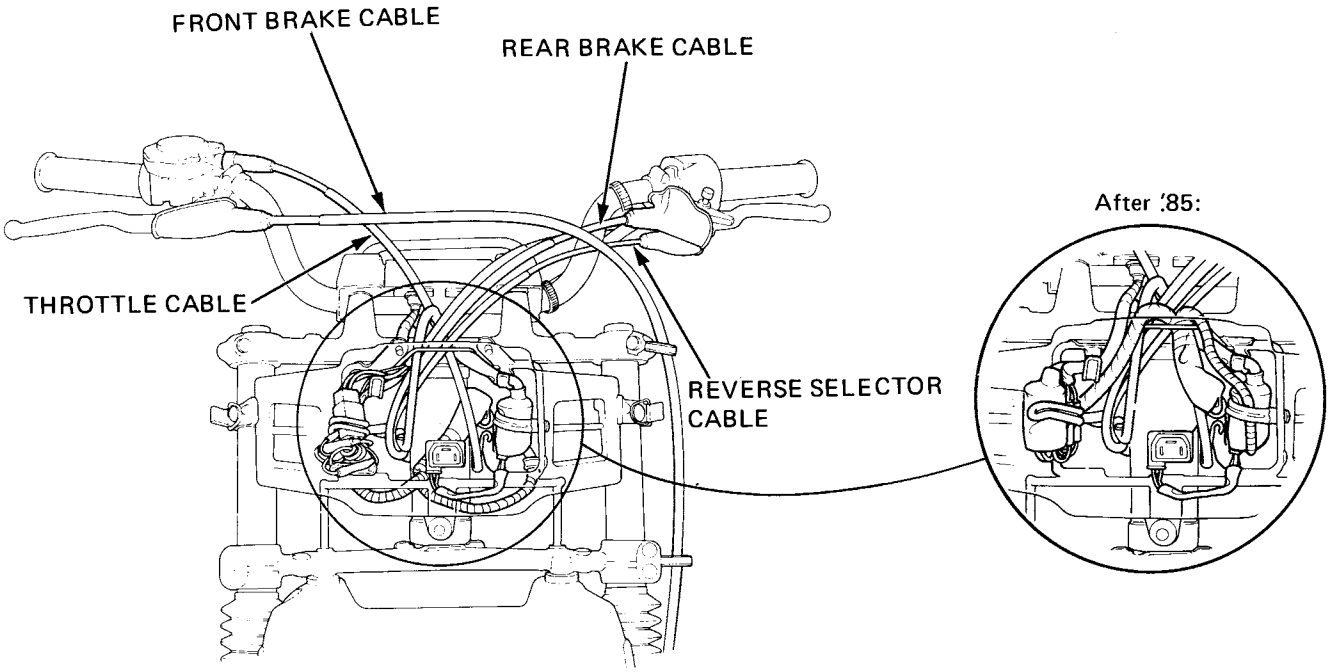
CABLE & HARNESS ROUTING

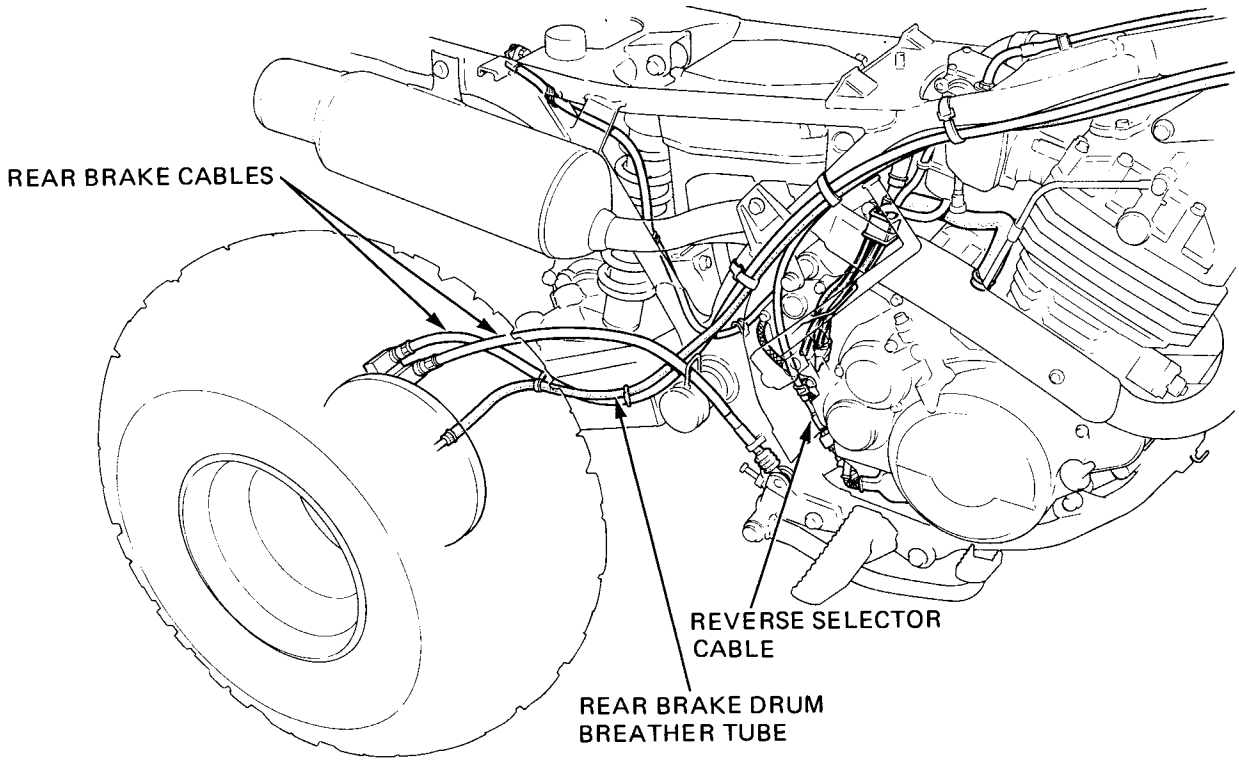
Note the following when routing cables and wire harnesses:

- 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 a wire against a weld or end of its clamp when a weld-on clamp is used.
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so they are not pulled taut or have excessive slack.
- Protect wires and harnesses with electrical tape or tubes if they contact a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use a wire or harness with a broken insulator. Repair by wrapping them with 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 pipe and other parts that get hot.
- Be sure grommets are seated in their grooves properly.
- After clamping, check each harness to be certain that it is not interfering with any moving of sliding parts.
- Wire harnesses routed along the handlebars should not be pulled taut, have excessive slack, be pinched by, 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 the control cables. Damaged control cables will not operate smoothly and may stick or bind.

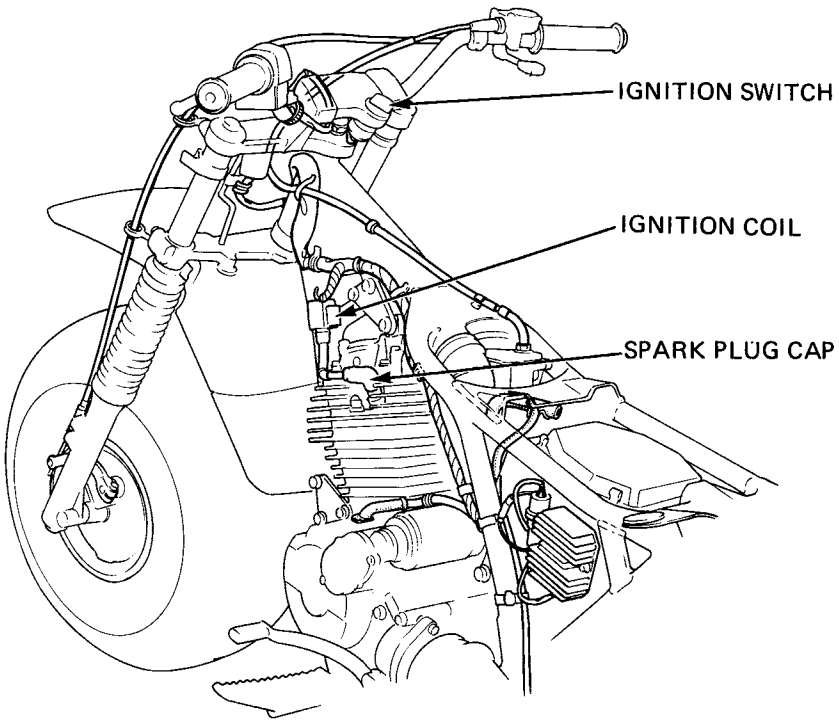


O: CORRECT
×: INCORRECT

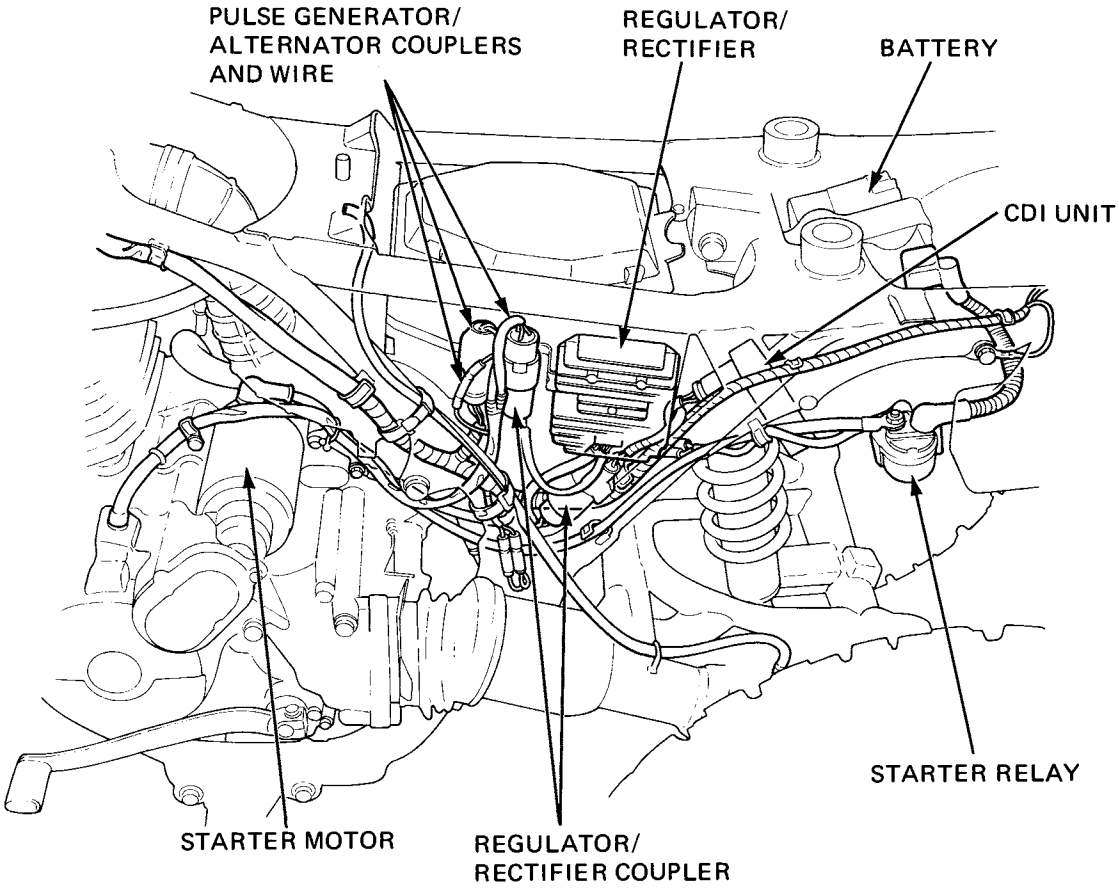

FRONT BRAKE CABLE
REAR BRAKE CABLE
THROTTLE CABLE
REVERSE SELECTOR CABLE
After '85:


REAR BRAKE CABLES
REVERSE SELECTOR CABLE
REAR BRAKE DRUM BREATHER TUBE

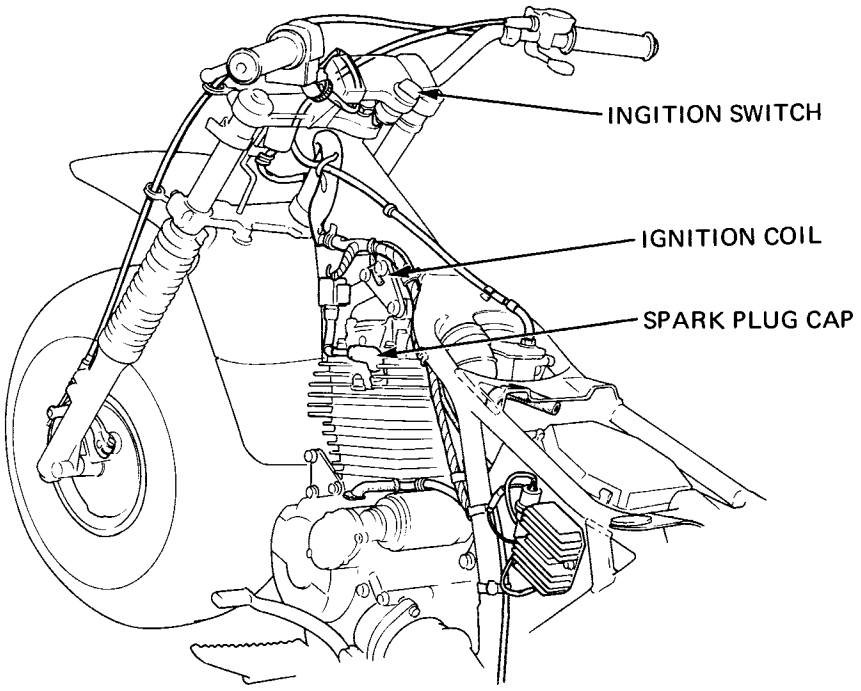
'85:


IGNITION SWITCH
IGNITION COIL
SPARK PLUG CAP

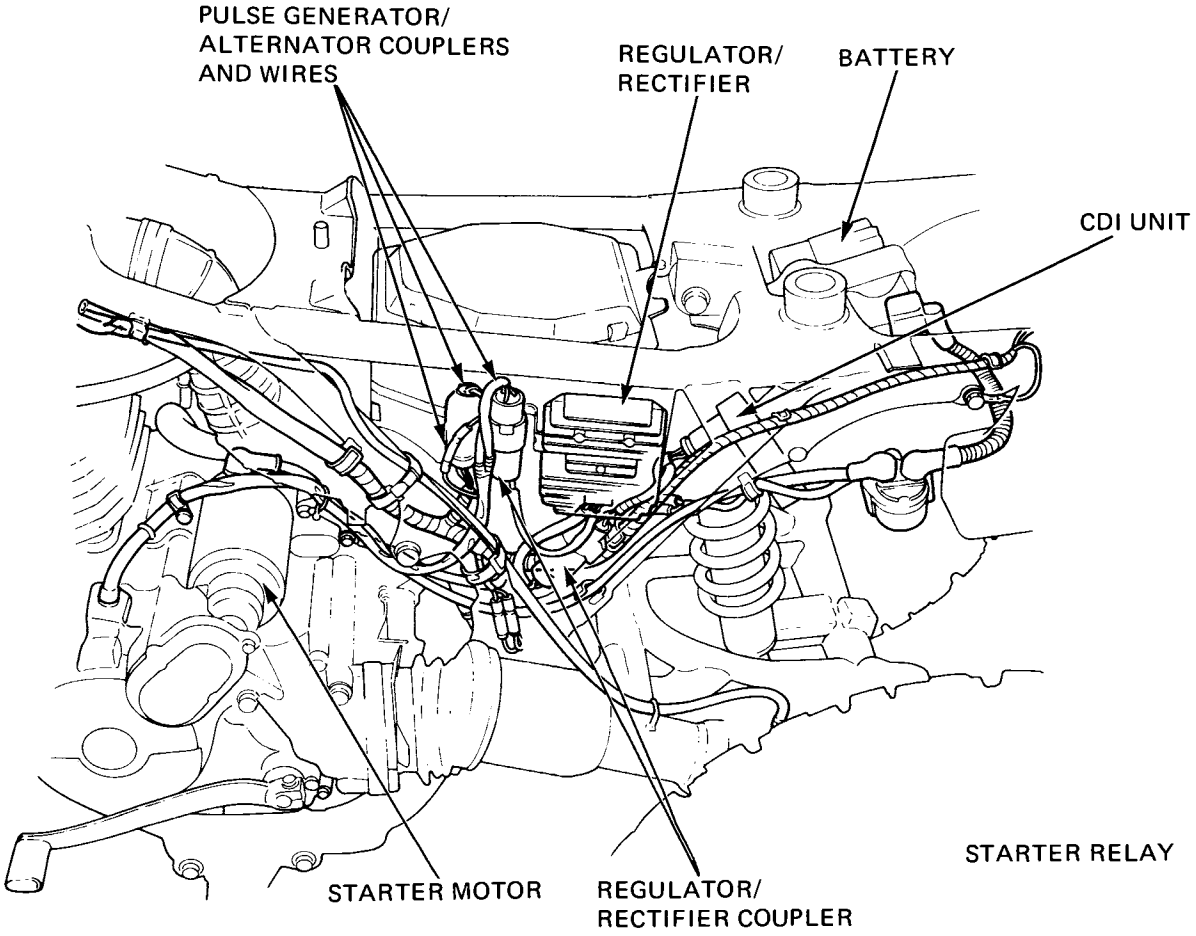
'85:

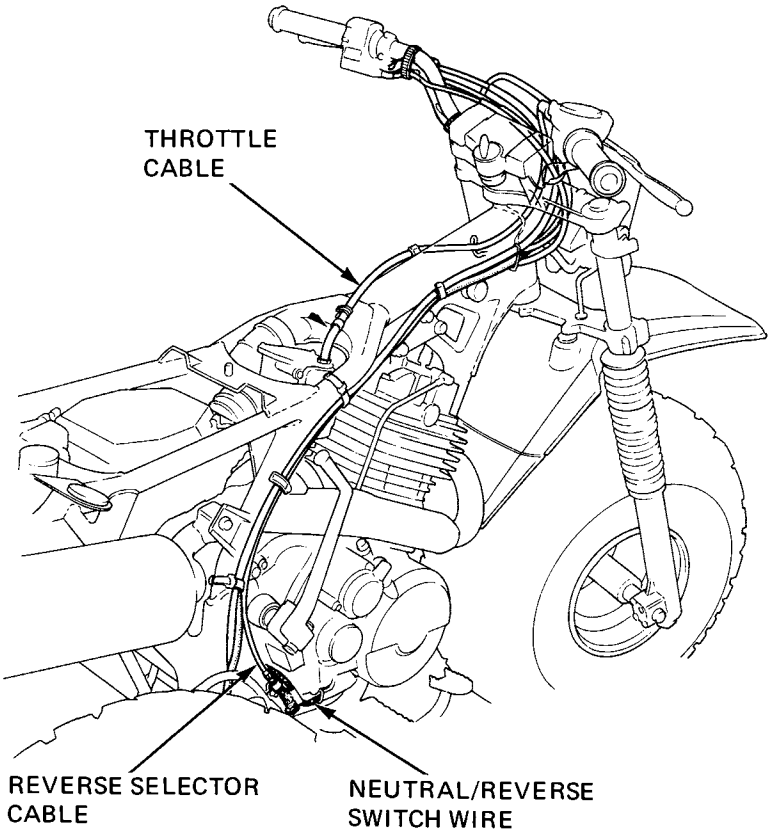

PULSE GENERATOR/
ALTERNATOR COUPLERS
AND WIRE
REGULATOR/
RECTIFIER
BATTERY
CDI UNIT
STARTER RELAY
STARTER MOTOR
REGULATOR/
RECTIFIER COUPLER

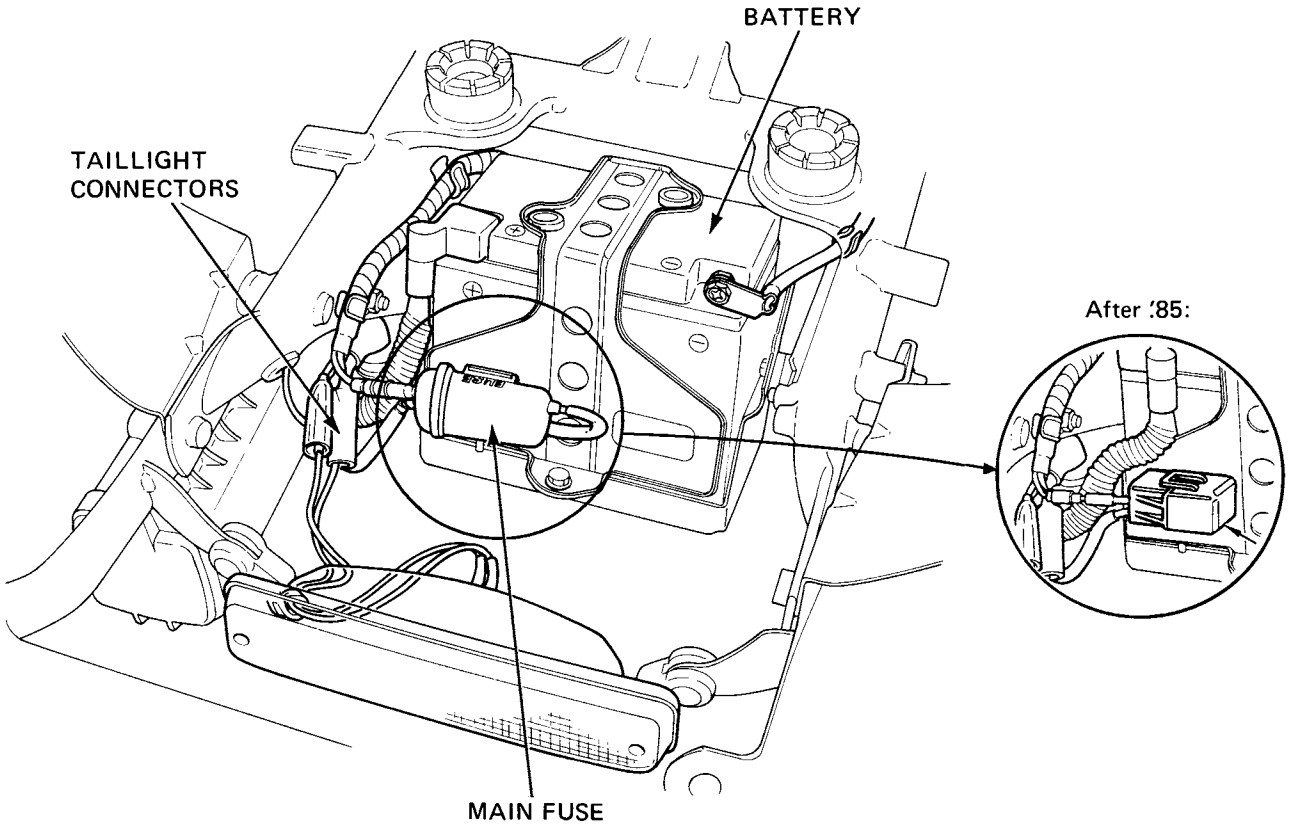
After '85:



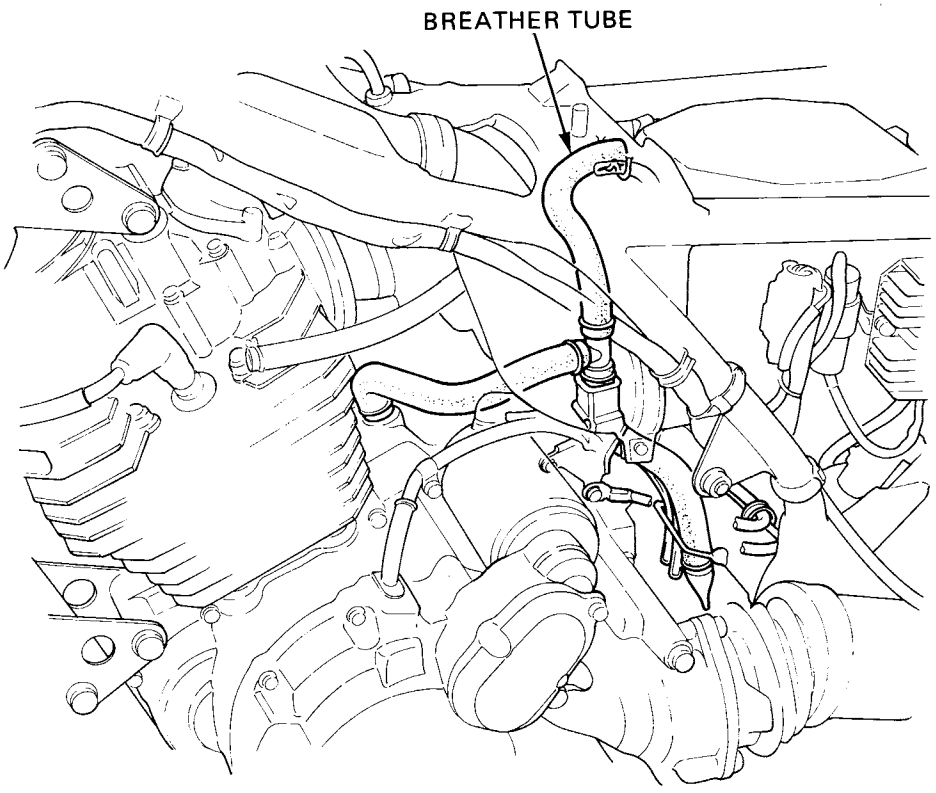
After '85:



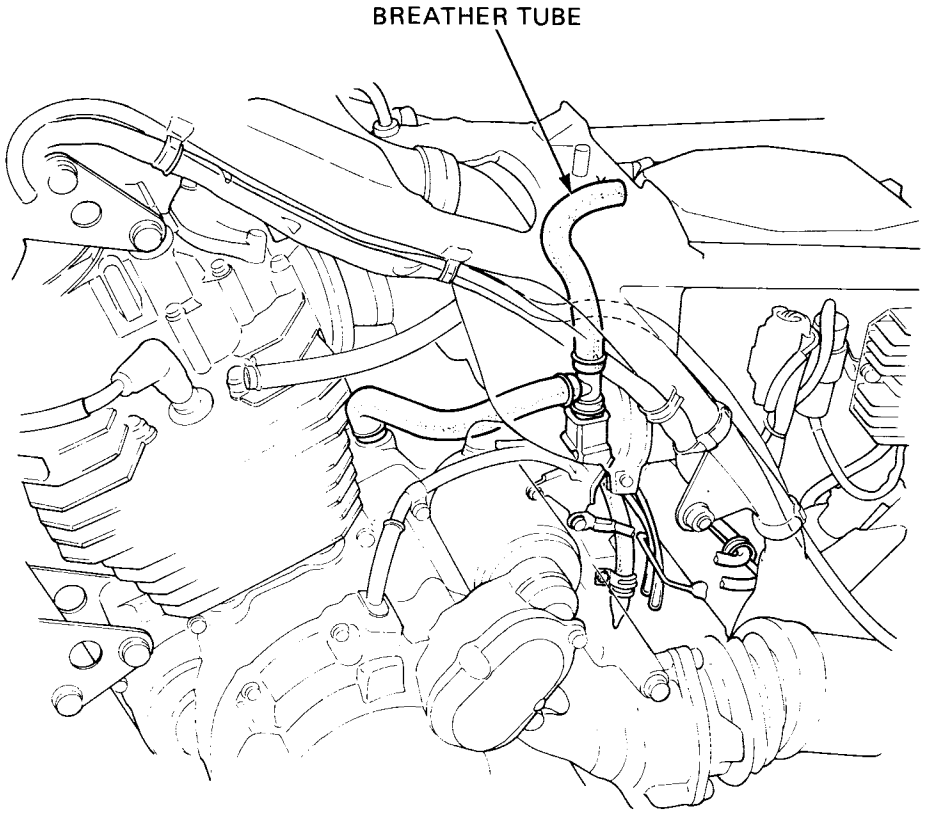

THROTTLE CABLE
REVERSE SELECTOR CABLE
NEUTRAL/REVERSE SWITCH WIRE


BATTERY
TAILLIGHT CONNECTORS
After '85:
MAIN FUSE

'85:



After '85:



NOISE EMISSION CONTROL SYSTEM

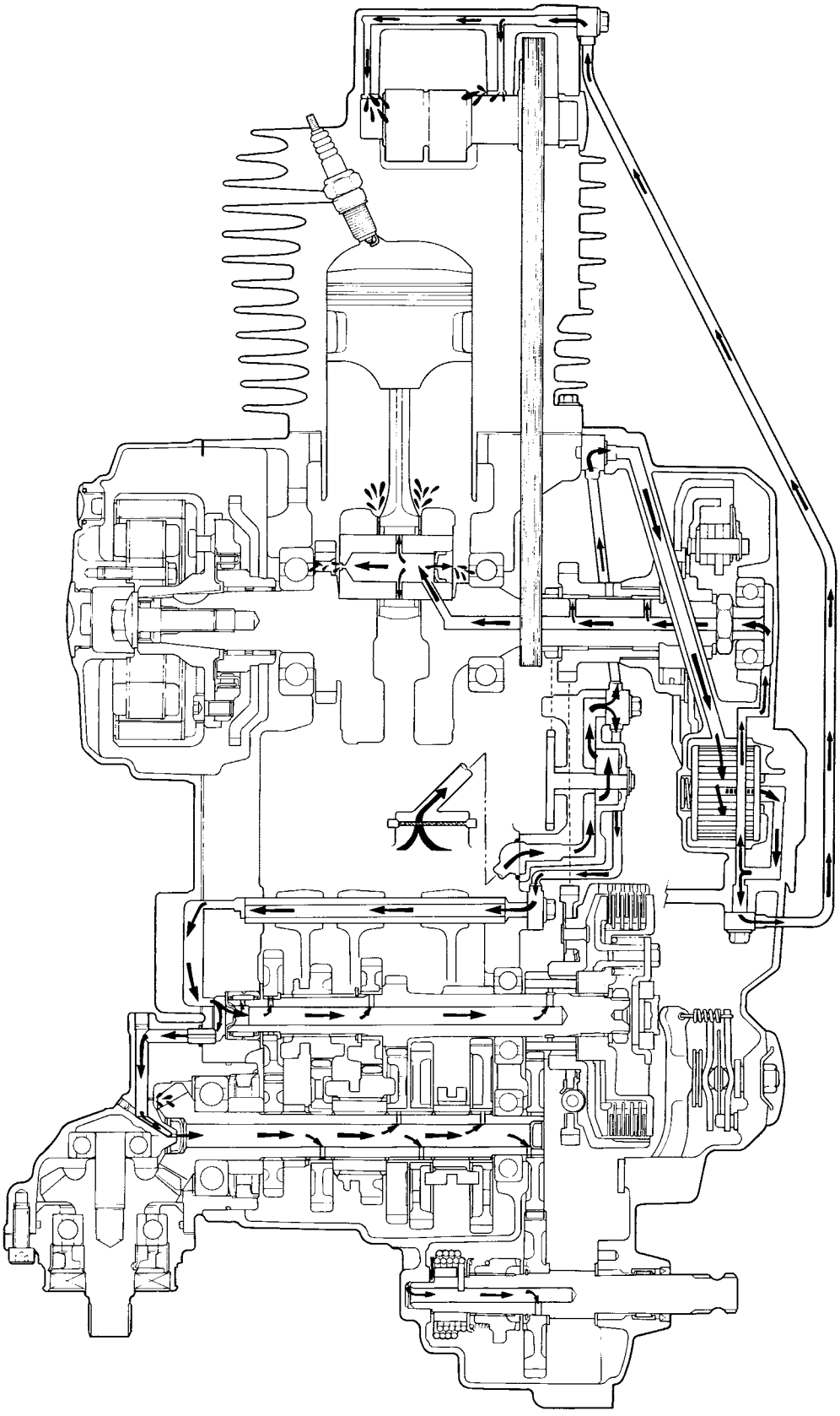
The U.S. Environmental Protection Agency requires manufacturers to certify that vehicles built after January 1, 1983 will comply with applicable noise emission standards for one year or 1,865 miles (3,000 km) after the time of sale to the ultimate purchaser, when operated and maintained according to 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, baffles, header pipe or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part 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.

MEMO



2. LUBRICATION

SERVICE INFORMATION

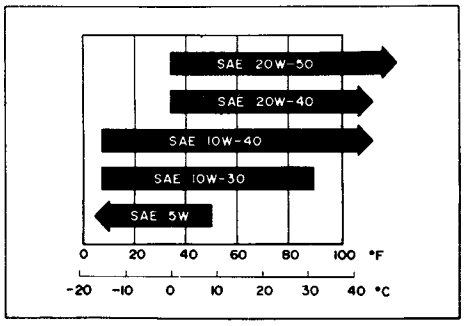
GENERAL

- Section 8 shows how to service the oil pump.

SPECIFICATIONS

Engine oil capacity	2.5 liters (2.6 US qt, 2.2 Imp qt) at disassembly 2.1 liters (2.2 US qt, 1.8 Imp qt) at 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.

OIL VISCOSITY



Final drive oil capacity	100 cc (3.4 US oz)
Final drive oil recommendation	Hypoid gear oil SAE #80

TORQUE VALUE

Engine drain plug	15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)

TROUBLESHOOTING

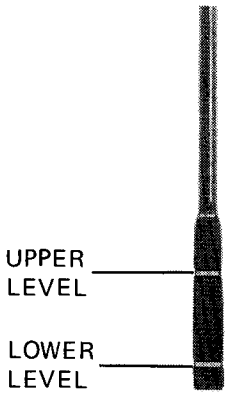
Oil level too low – high oil consumption
1. Normal oil consumption
2. External oil leaks
3. Worn piston rings
4. Oil not changed often enough
5. Faulty head gasket

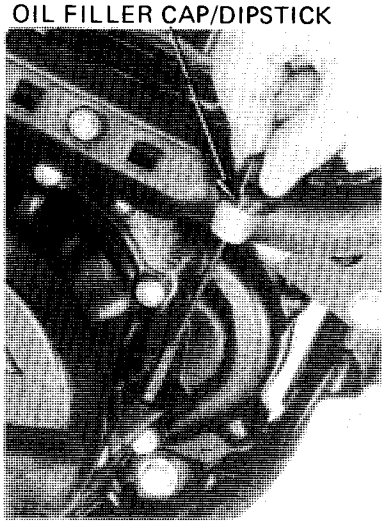
Oil contamination
1. Oil or filter not changed often enough.
2. Head gasket faulty.
3. Worn piston rings.

ENGINE OIL LEVEL

Place the ATC on level ground.
Check the oil level with the oil filter cap/dipstick. (Do not screw in the dipstick 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

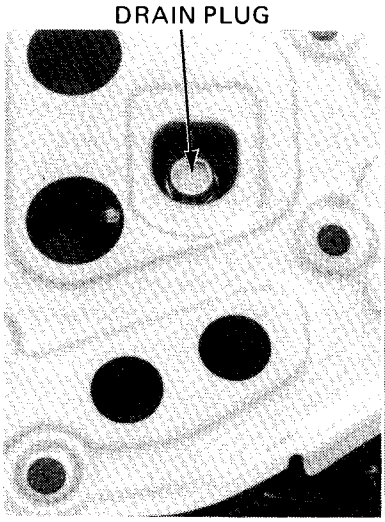
> Change engine oil with the engine warm and the ATC on level ground to assure complete draining.

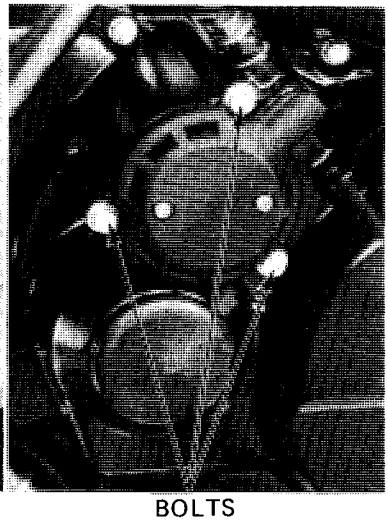
Remove the oil filler cap and drain plug.

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.

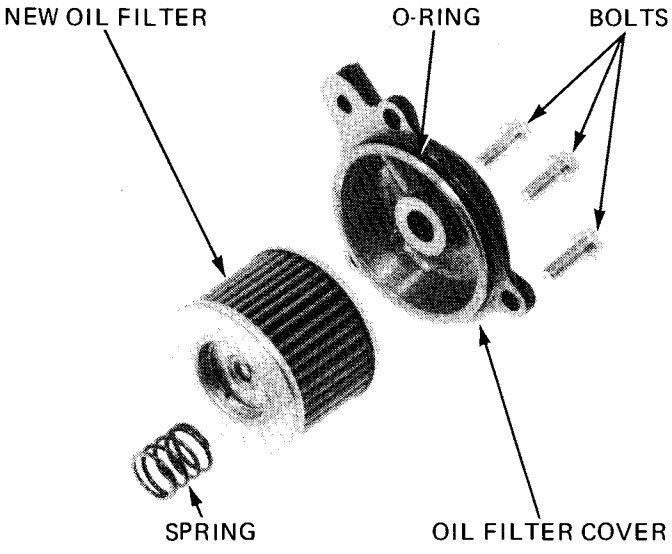
TORQUE: 15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)





Make sure that the O-ring on the oil filter cover is in good condition.
Install the oil filter spring, filter and cover and tighten the cover with 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 or 3 minutes.
Stop the engine and check that the oil level is at the upper level line on the dipstick. Add more oil if necessary. Make sure there are no oil leaks.



FINAL DRIVE OIL

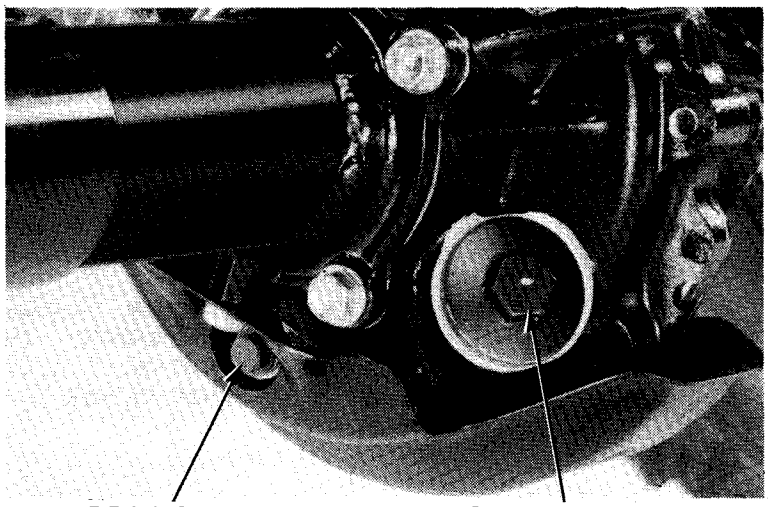
CHECK

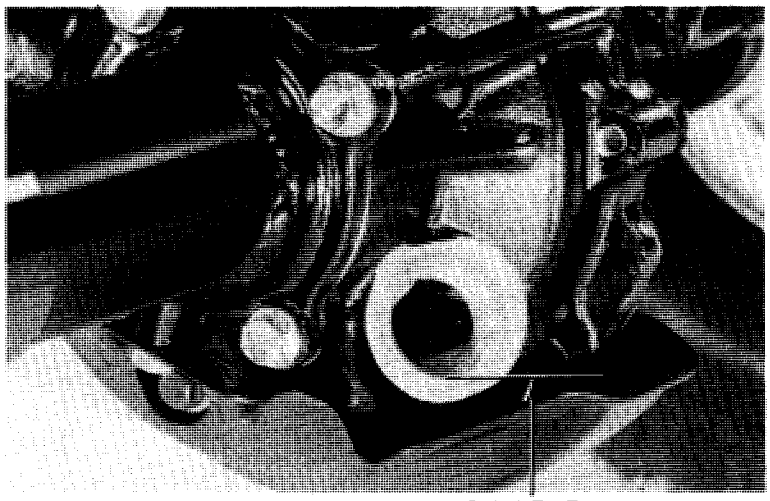
Make sure the ATC is on level ground.
Remove the oil filler cap.
Check that the oil level reaches the lower edge of the oil filler cap hole.
Check for leaks, if the level is low. Pour fresh oil through the oil filler hole unit it reaches the lower edge.

CHANGE

Change the oil with the final drive warm and the ATC on level ground to assure rapid and complete draining.
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





LUBRICATION POINTS

Use general purpose grease when on other specification is given. Apply oil or grease to any 2 sliding surfaces and cables not shown here.

3. MAINTENANCE

SERVICE INFORMATION

SPECIFICATIONS

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 (1/8–5/16 in)
Cylinder compression:		12.5 ± 1.0 kg/cm^2 (178 ± 14 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 (5/64–5/32 in)
Front tire size:		22 x 11 – 8
Rear tire size:		22 x 11 – 8
Recomended tire pressure:		
'85, '86:	Front:	2.5 psi (17 kPa, 0.17 kg/cm^2)
	Rear:	2.5 psi (17 kPa, 0.17 kg/cm^2)
After '86:	Front:	2.5 psi (17.5 kPa, 0.175 kg/cm^2)
	Rear:	2.5 psi (17.5 kPa, 0.175 kg/cm^2)
Standard the circumference:		
'85, '86 only:	Front:	1,775 mm (69.9 in)
	Rear:	1,775 mm (69.9 in)
Minimum tread depth:		4 mm (0.16 in)

TORQUE VALUE

Clutch adjusting screw lock nut	19–25 N·m (1.9–2.5 kg-m, 14–18 ft-lb)

TOOL

Common

Valve adjusting wrench, 10 x 12 mm	07708–0030200 or 07908–MB00100 or equivalent commercially avilable in U.S.A.
After '85:	
Tappet wrench	89201–200–000

MAINTENANCE SCHEDULE

- The maintenance intervals shown in the following schedule are based upon average riding conditions. ATC's subjected to severe use, or ridden in wet or unusually dusty areas, require more frequent servicing. Perform the Pre-ride Inspection in the Owner's Manual at every maintenance period.

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

'85 and '86:

	ITEM \ FREQUENCY	EVERY	INITIAL SERVICE PERIOD (First week of operation)	REGULAR SERVICE PERIOD (Every 30 operating days)	Refer to page
	ENGINE OIL		R	R	2-2
	ENGINE OIL FILTER		R	R	2-2
	AIR CLEANER ELEMENT	NOTE 2		C	3-4
	SPARK PLUG			I	3-5
*	CARBURETOR IDLE SPEED		I	I	3-5
*	VALVE CLEARANCE		I	I	3-5
*	CARBURETOR CHOKE			I	4-5
*	FUEL LINE	YEAR; I			3-7
*	FUEL STRAINER SCREEN	YEAR; C			3-7
*	THROTTLE OPERATION		I	I	3-8
	FINAL DRIVE OIL	YEAR; I 2 YEARS; R			2-3
*	BRAKE SHOE WEAR	YEAR; I NOTE; 3			3-9
	BRAKE SYSTEM		I	I	3-9
*	CLUTCH SYSTEM		I	I	3-11
*	SPARK ARRESTER (U.S.A. only)	NOTE 1		C	3-11
*	REVERSE LOCK SYSTEM		I	I	3-12
	NUTS, BOLTS, FASTENERS		I	I	3-12
*	SUSPENSION			I	12-13
**	TIRES		I	I	3-13
**	STEERING HEAD BEARINGS	YEAR; I			3-13

* Should be serviced by an authorized Honda dealer, unless the owner has proper tools and is mechanically qualified.
** In the interest of safety, we recommend these items be serviced an authorized Honda dealer.

NOTE: 1. U.S.A. 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.

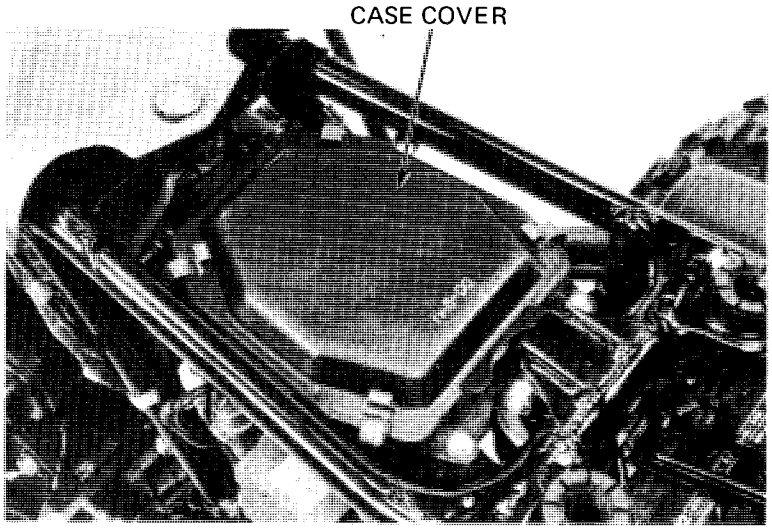
After '86:

	ITEM \ FREQUENCY	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	3-5
	FINAL DRIVE OIL	YEAR; I 2 YEARS; R			2-3
*	BRAKE SHOE WEAR	YEAR; I NOTE 3			3-9
	BRAKE SYSTEM		I	I	3-9
*	REVERSE LOCK SYSTEM		I	I	3-12
	SKID PLATE, GUARD PLATE			I	3-14
*	CLUTCH SYSTEM		I	I	3-11
*	SUSPENSION			I	11-20, 12-13
*	SPARK ARRESTER (U.S.A. only)	NOTE 1		C	3-11
*	NUT, BOLT, FASTENER		I	I	3-12
**	TIRES		I	I	3-13
**	STEERING HEAD BEARING	YEAR; I			3-13

* Should be serviced by an authorized Honda dealer, unless the owner has proper tools and is mechanically qualified.
** In the interest of safety, we recommend these items be serviced an authorized Honda dealer.
NOTE: 1. U.S.A. 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.

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.



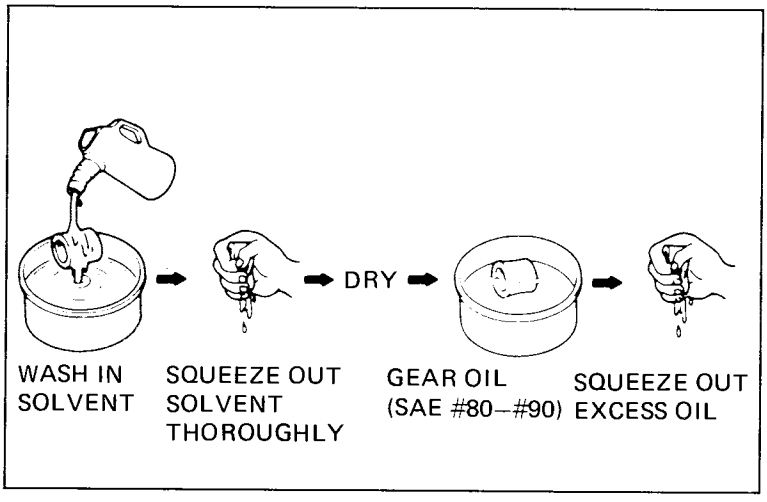
Loosen the air cleaner element band screw.
Remove the element holder attaching screw and remove the air cleaner element assembly from the case.

Remove the element holder by turning it counter-clockwise.
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 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.

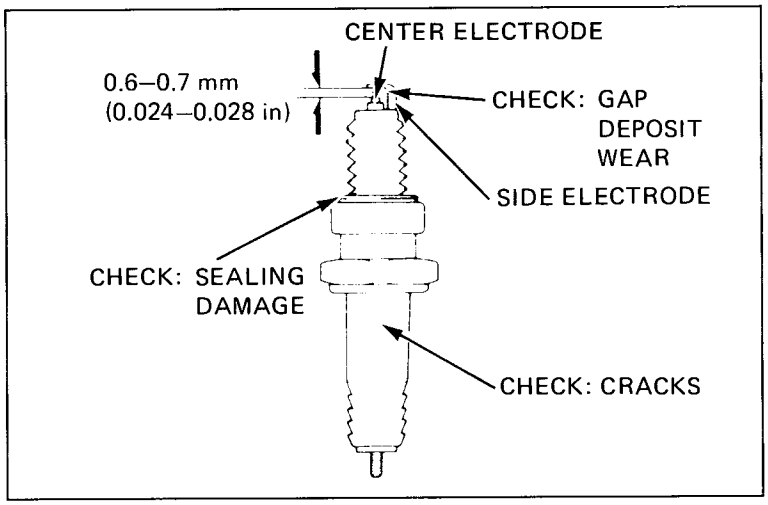
Visually inspect the spark plug electrodes for wear. The center electrode should have square edges and the side electrode should have a constant thickness. Discard the spark plug if there is apparent wear or if the insulator is cracked or chipped.
Measure the gap with a wire-type feeler gauge and adjust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

Thread the spark plug in by hand to prevent cross-threading. Tighten the spark plug another 1/2 turn with a spark plug wrench to compress the sealing washer.



BREATHER TUBE

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

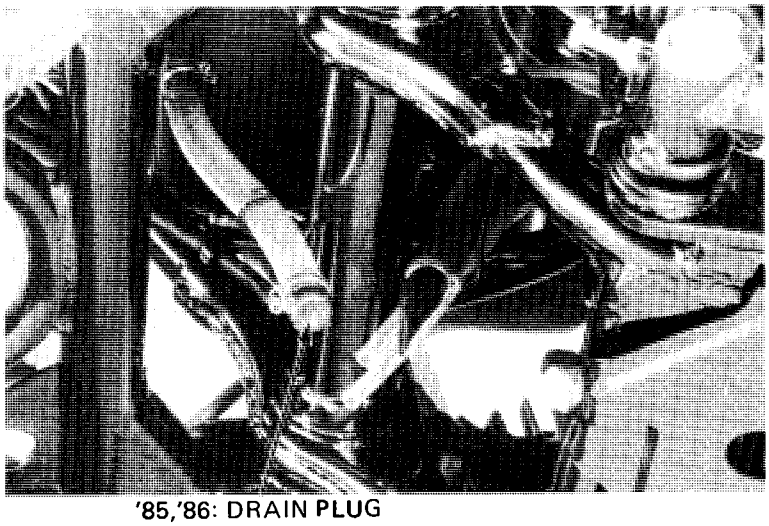
Reinstall the drain plug.

After '85:
Remove the drain tube and drain to empty any deposits.

Reinstall 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.


'85,'86: DRAIN PLUG

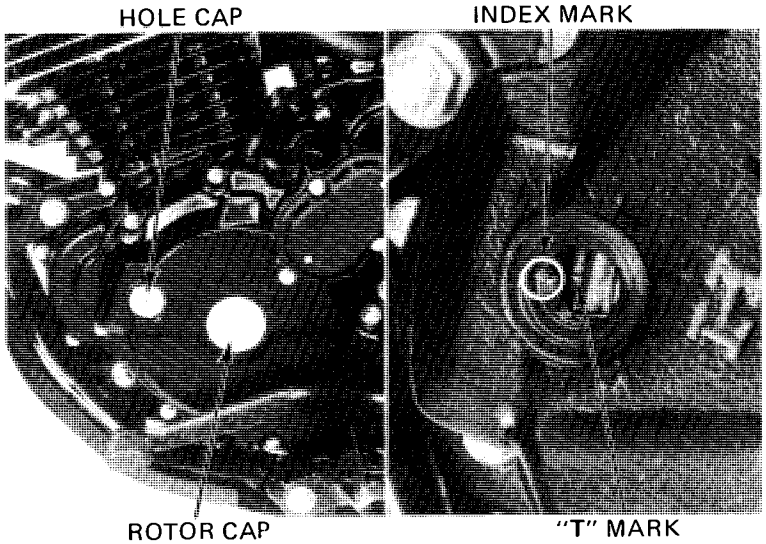
VALVE CLEARANCE

NOTE

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

Remove the fuel tank.
Remove the timing hole cap and rotor cap.
Remove the valve adjusting covers.

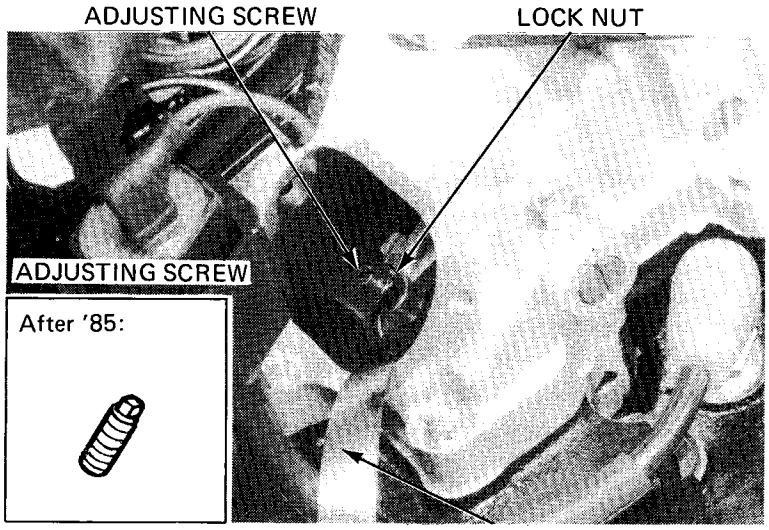
Rotate the crankshaft clockwise and align the "T" mark in the rotor with the index mark. The piston must be at TDC on the compression stroke.



Inspect the intake and exhaust valve clearances by inserting a 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)**

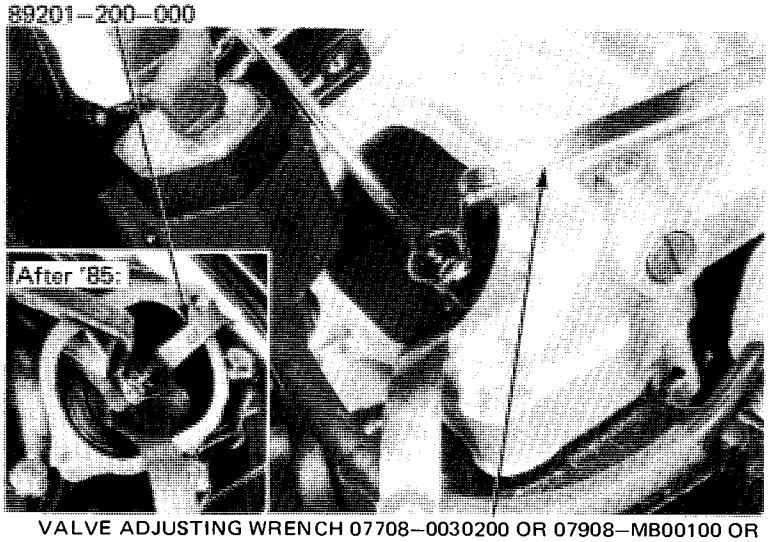


AFTER '85
TAPPET WRENCH
89201-200-000

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 cover.
Install the rotor cap and timing hole cap.
Install the fuel tank and seat.



VALVE ADJUSTING WRENCH 07708-0030200 OR 07908-MB00100 OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

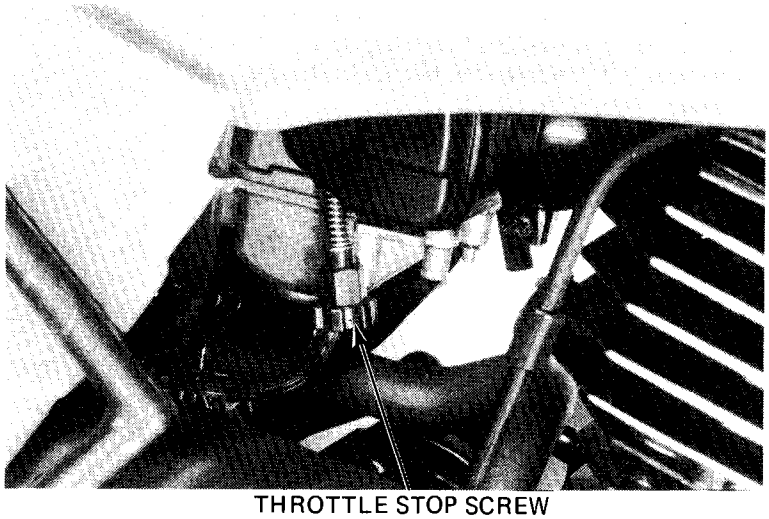
CARBURETOR IDLE SPEED

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.

Connect a tachometer.
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

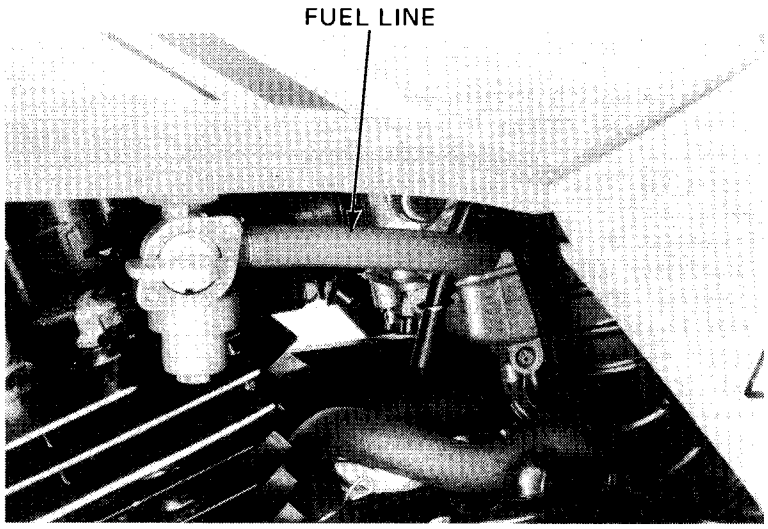


THROTTLE STOP SCREW

FUEL LINE

Check the fuel line.

Replace the fuel line if it shows signs of deterioration, damage or leaks.



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 sparks near the equipment while draining fuel.

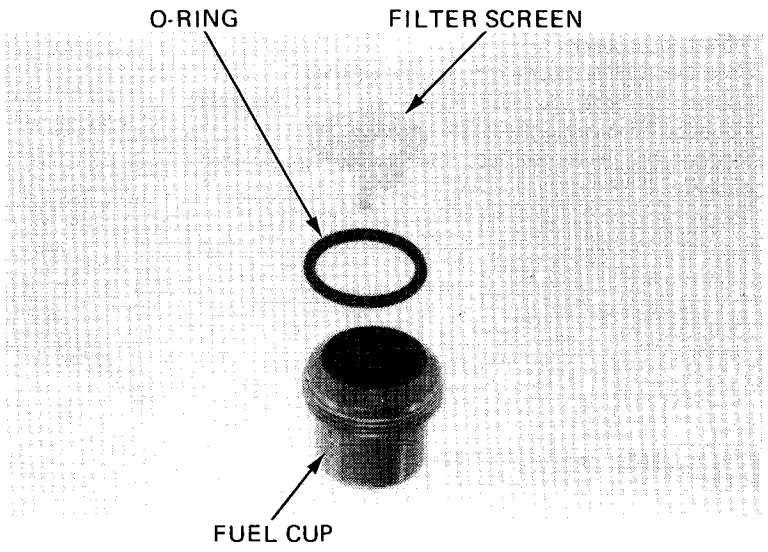
Wash the cup and filter screen in clean non-flammable or high flash point solvent.
Reinstall the screen, aligning the index marks on the fuel valve body and filter screen.
Install a new O-ring into the fuel valve body.
Reinstall the fuel cup, making sure the new O-ring is in place.
Hand tighten the fuel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

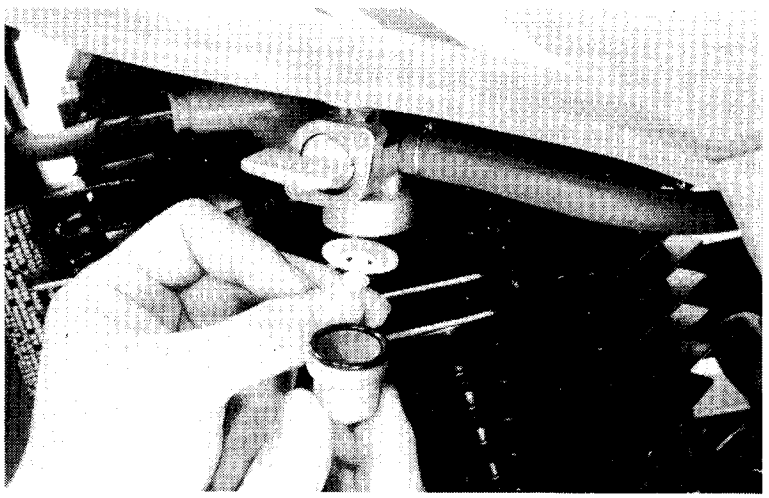
TORQUE: 3–5 N·m (0.3–0.5 kg-m, 2–4 ft-lb)

CAUTION

Do not overtighten the fuel cup.

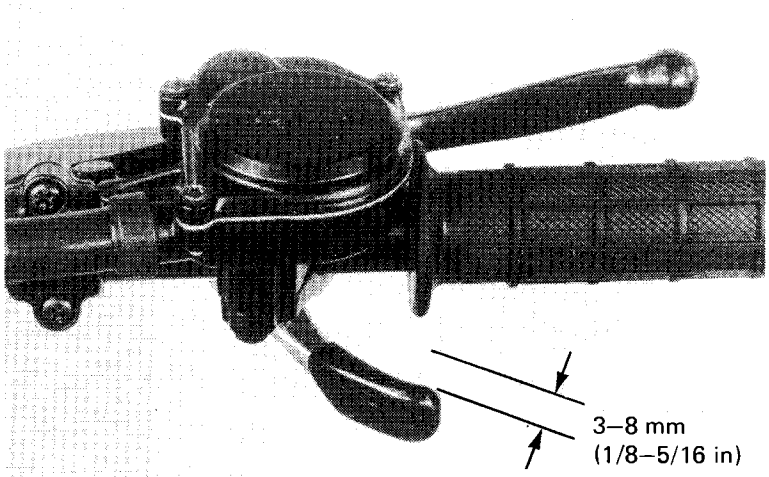
After installing, turn the fuel valve ON and check that there are no fuel leaks.



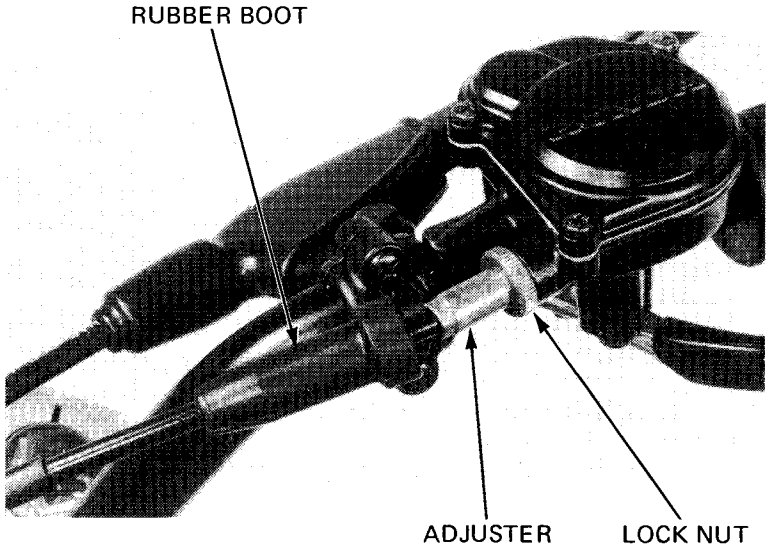


THROTTLE OPERATION

Check for smooth throttle lever full opening and automatic full closing in all steering positions. Make sure there is no detrioration, 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 order of removal.
Make sure the throttle lever free play is 3–8 mm (1/8–5/16 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

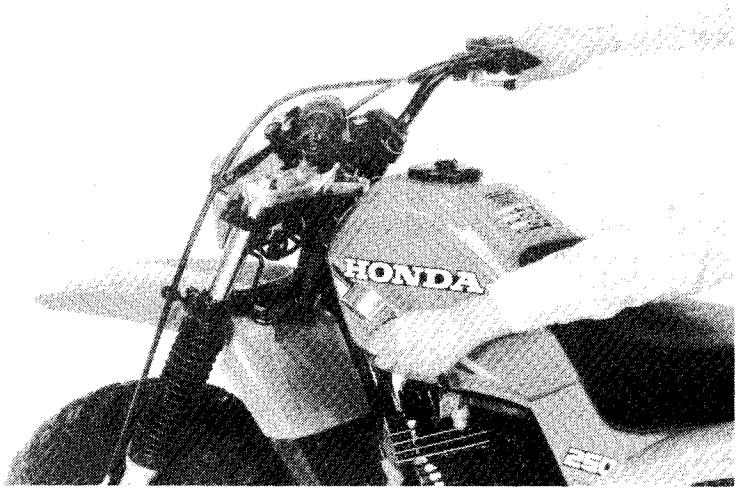
Warm up the engine to normal operating temperature.
Stop the engine and remove the spark plug.

Insert a 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:
12.5 ± 1.0 kg/cm² (178 ± 14 psi)

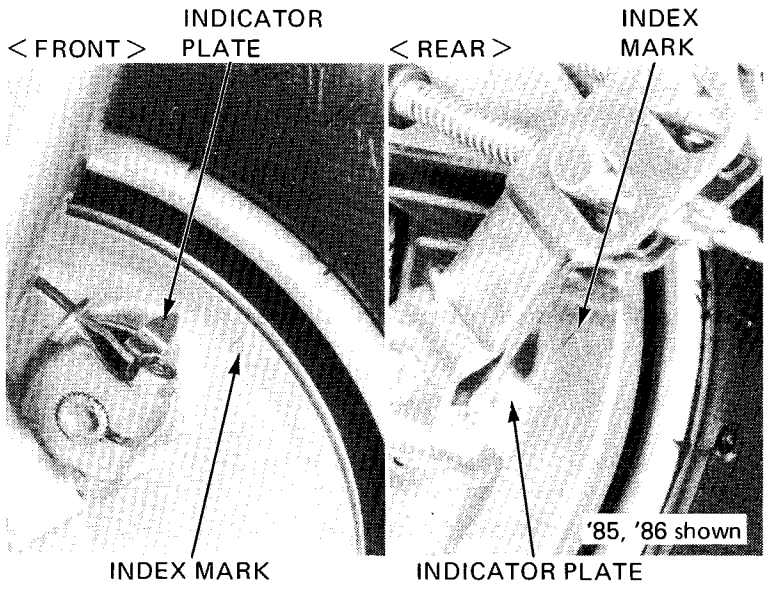
If compression is low, check for the following:
– Improper valve adjustment
– Valve leakage
– Cylinder head gasket leaking
– Worn piston ring or cylinder

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



BRAKE SHOES

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



BRAKE CONTROL LINKAGE

FRONT BRAKE

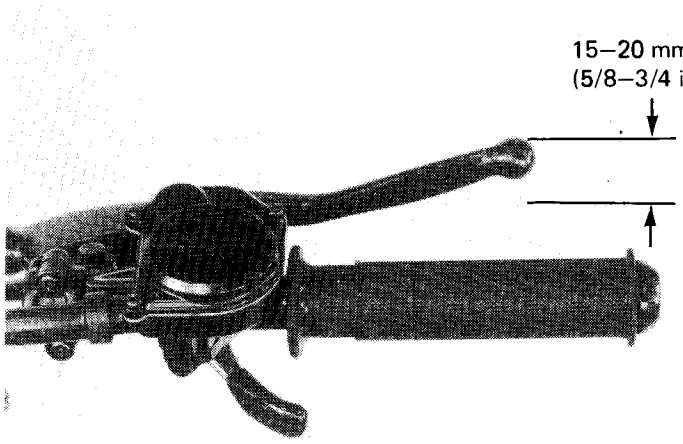
Check the brake cable and lever for loose connections, excessive play, or other damage. Replace or repair if necessary.

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.

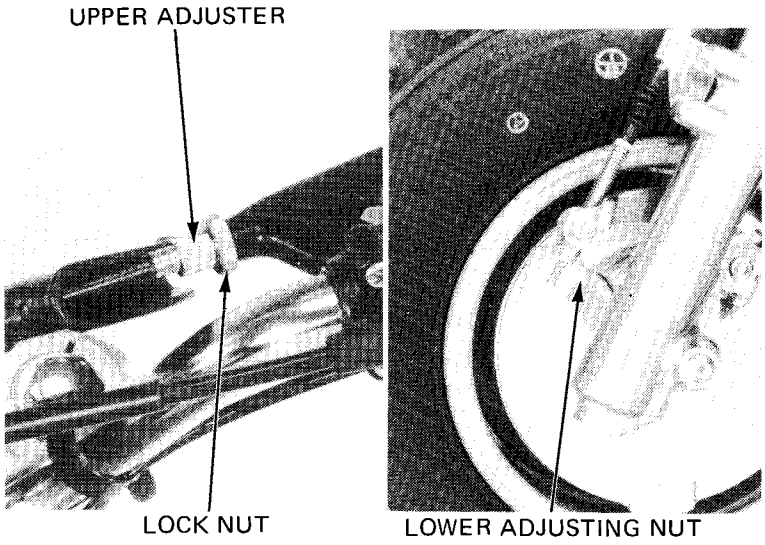
Measure the front brake lever free play at the end of the brake lever.

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.

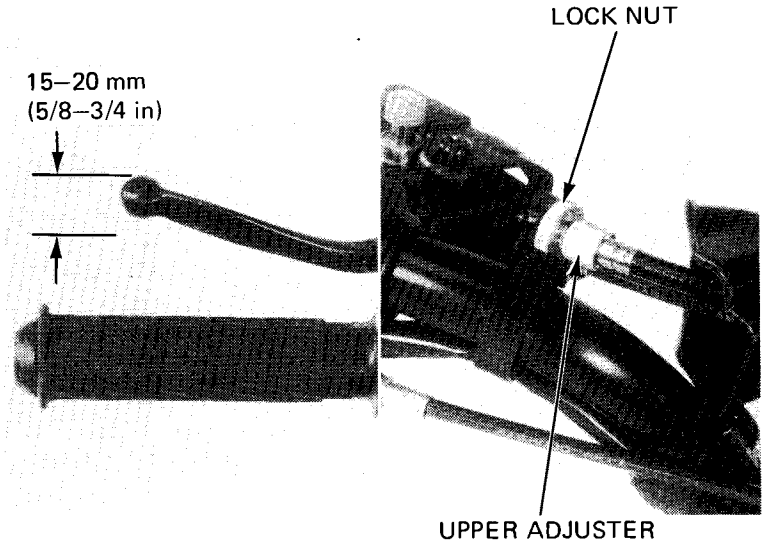
Replace or repair if necessary.
Disconnect the brake cables at the brake lever or pedal ends.

Thoroughly lubricate the cables and their pivot points 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.

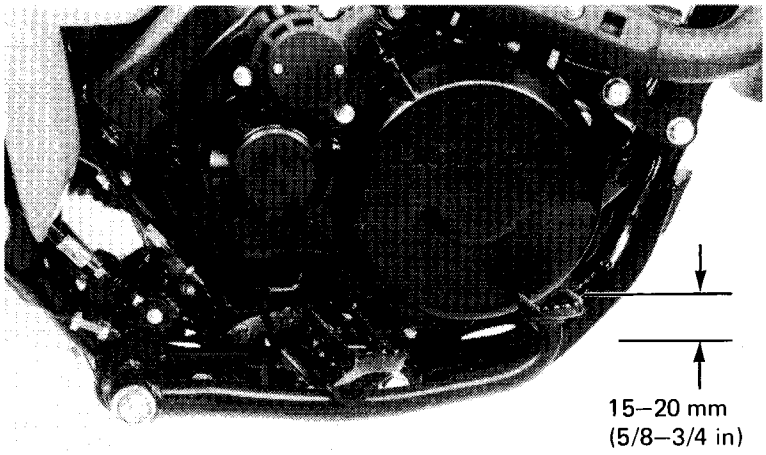
REAR BRAKE LEVER FREE PLAY:
15–20 mm (5/8–3/4 in)



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

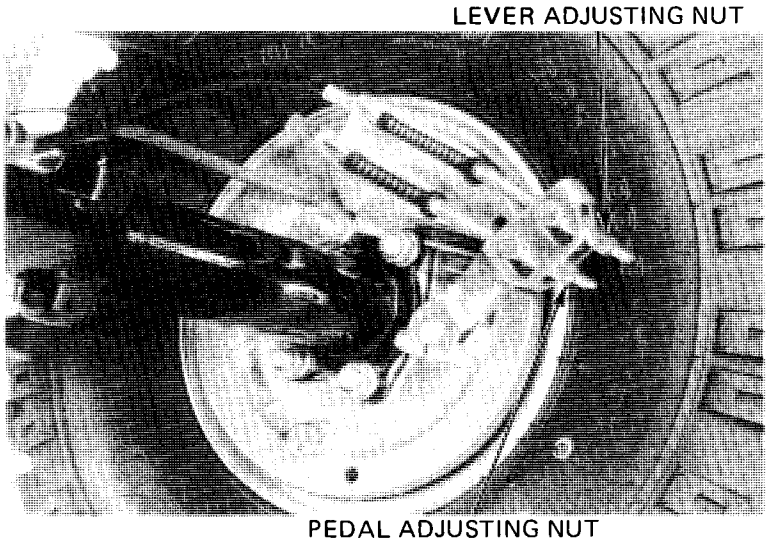
Measure the brake pedal free play at the end of the brake pedal and adjust as above.

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



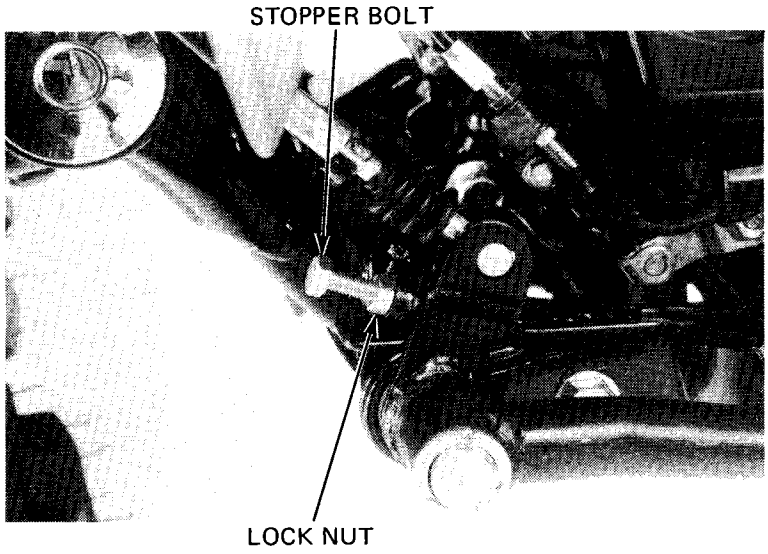
NOTE

> 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

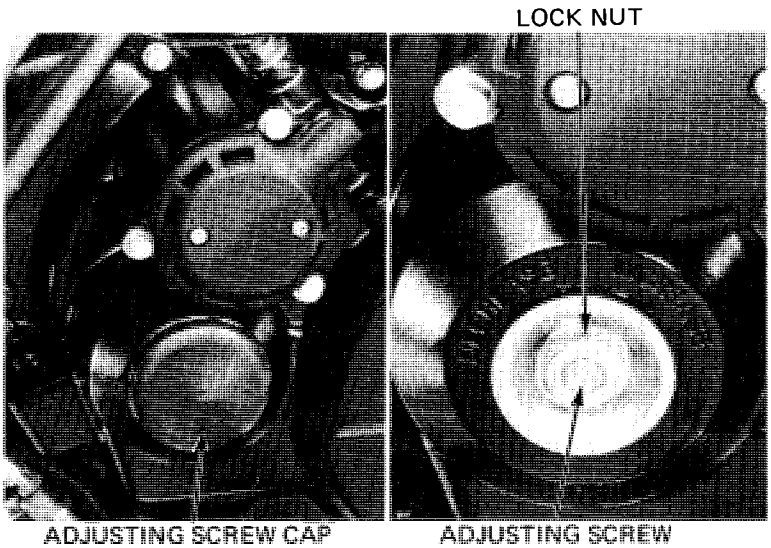
Stop the engine.
Remove the adjusting screw cap.
Loosen the clutch adjusting screw lock nut.

Slowly turn the adjusting screw counterclockwise until resistance is felt.

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

TORQUE: 19–25 N·m (1.9–2.5 kg-m, 14–18 ft-lb)

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

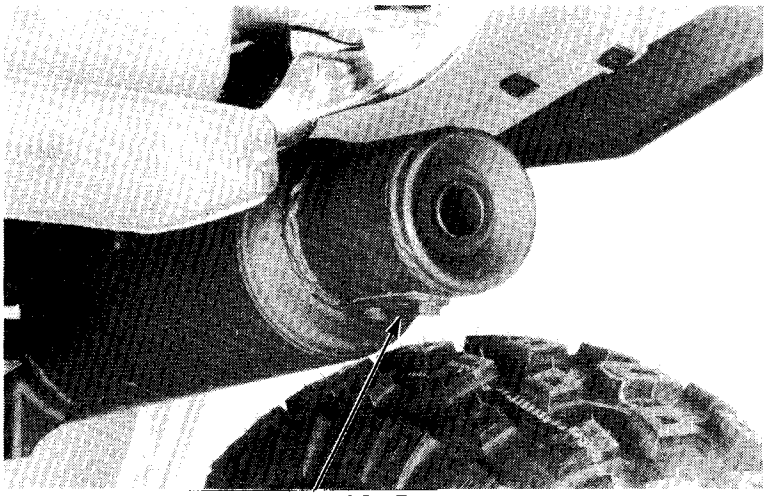


SPARK ARRESTER

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 reving the engine several times.
Stop the engine and allow the exhaust system to cool.
Install the drain hole cover.

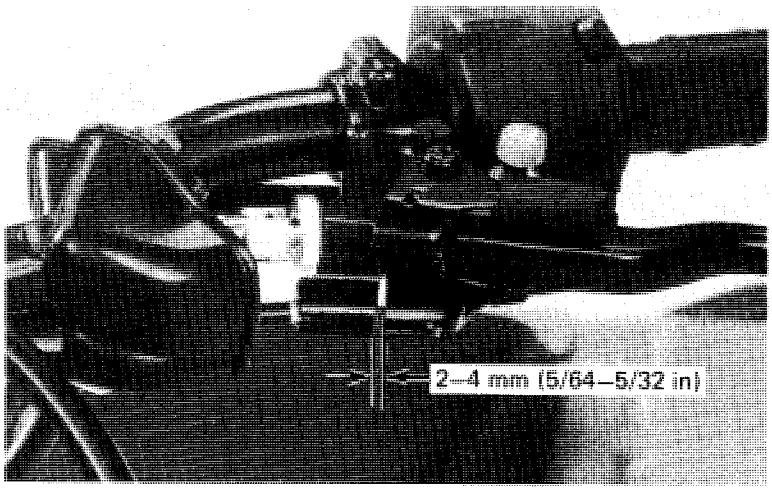


REVERSE LOCK MECHANISM

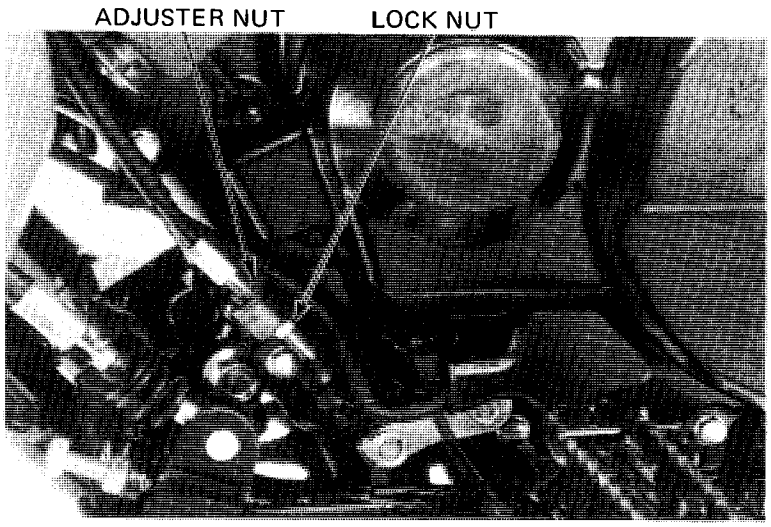
Check the reverse selector cable and lever for a loose connection, excessive play, or damage.
Replace or repair if necessary.

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

FREE PLAY: 2–4 mm (5/64–5/32 in)



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



NUTS, BOLTS, FASTENERS

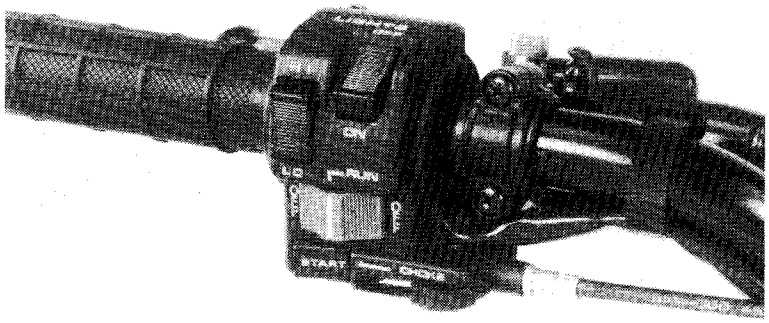
Tighten all bolts, nuts and fasteners at regular intervals shown in the Maintenance Schedule (Pages 3-2, 3-3).

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.

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 a light does not work properly, check the bulb.
Refer to page 17-5 to test the switch if necessary.

TIRES

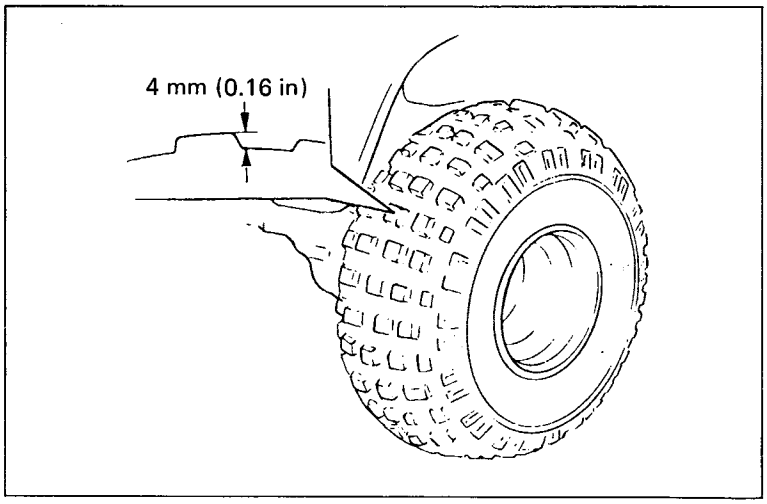
Check the tire for cuts, imbedded nails, or other damage.

Measure the groove depth of tires at the center as shown. Operating the vehicle with excessively worn tires will decrease traction and cause skidding.

WARNING

Replace tires before tread depth at the center of the tires reachers the following limit.

Minimum tread depth: 4 mm (0.16 in)



NOTE:

Tire pressure should be checked when the tires are COLD.

Check the tire pressures.

TIRE PRESSURES:

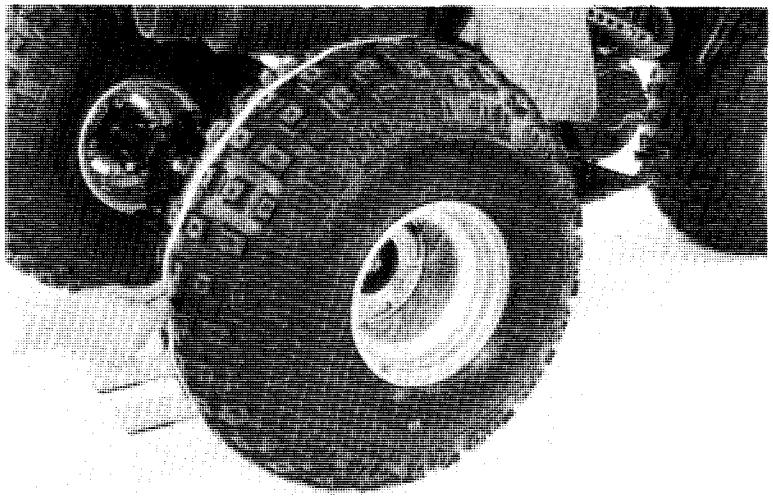
Recommended pressure:
'85, '86: 2.5 psi (17 kPa, 0.17 kg/cm^2)
After '86: 2.5 psi (17.5 kPa, 0.175 kg/cm^2)

STANDARD TIRE CIRCUMFERENCE ('85, '86 only): 1,775 mm (69.9 in)

NOTE:

Raise the wheels off the ground when measuring the tire circumferences.

'85, '86:



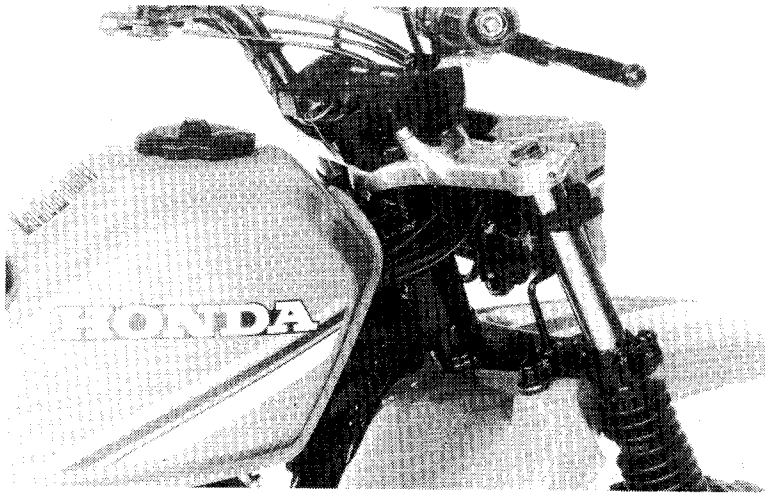
STEERING HEAD BEARINGS

NOTE:

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

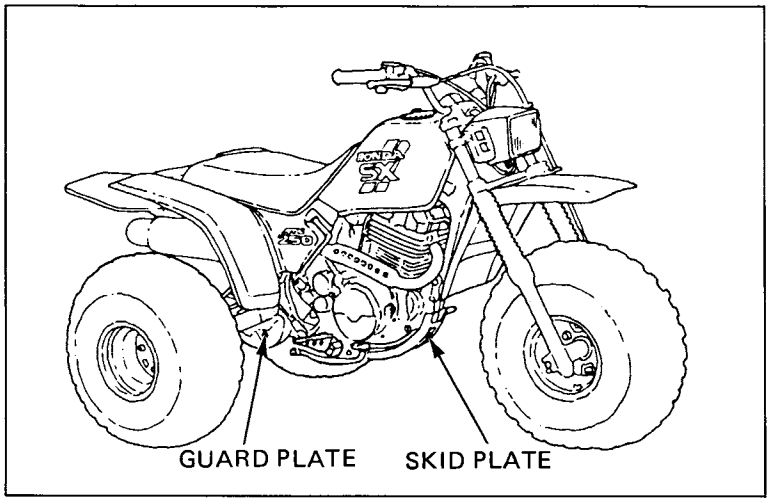
Raise the front wheel off the ground and make sure that the handlebar rotates freely.

If the handlebar moves unevenly, binds or has vertical movement, adjust the steering head bearing by turning the steering head adjusting nut.

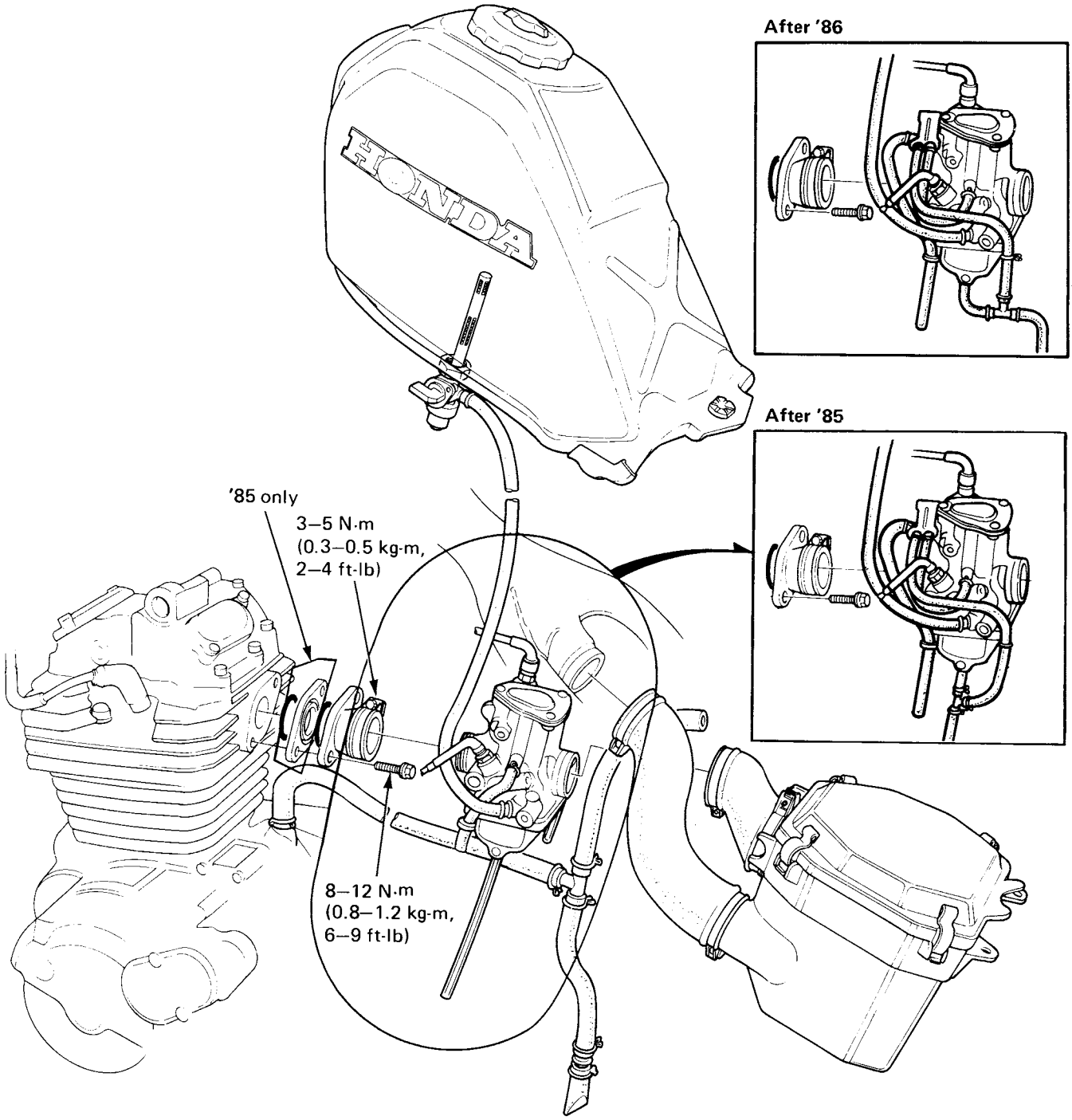


SKID PLATE, GUARD PLATE

After '86:
Skid and guard plates protect the engine and final drive from pebbles and stones. Check the plates for cracks, damage or looseness at intervals shown in the Maintenance Schedule.
Replace the plates with new ones if they are cracked or damaged.
If the plate bolts are loose, tighten them securely.



MEMO


After '86
After '85
'85 only
3–5 N·m
(0.3–0.5 kg-m,
2–4 ft-lb)
8–12 N·m
(0.8–1.2 kg-m,
6–9 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	9.8 liter (2.6 US gal, 2.16 Imp. gal)
Fuel reserve capacity	1.8 liter (0.46 US gal, 0.39 Imp. gal)
Carburetor	

**: After '86

Identification mark	QA02A, **QA08A
Type	Dual valve
Venturi diameter	27 mm (1.06 in)
Float level	18.5 mm (0.73 in)
Pilot screw opening	2 turns out, **1-1/4 turns out
Idle speed	1,400 ± 100 rpm
Main jet	# 130
Slow jet	# 38
Throttle lever free play	3–8 mm (1/8–5/16 in)
Jet needle	4BD – 2nd groove

TORQUE VALUES

Intake pipe bolt	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Intake pipe band	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 link 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

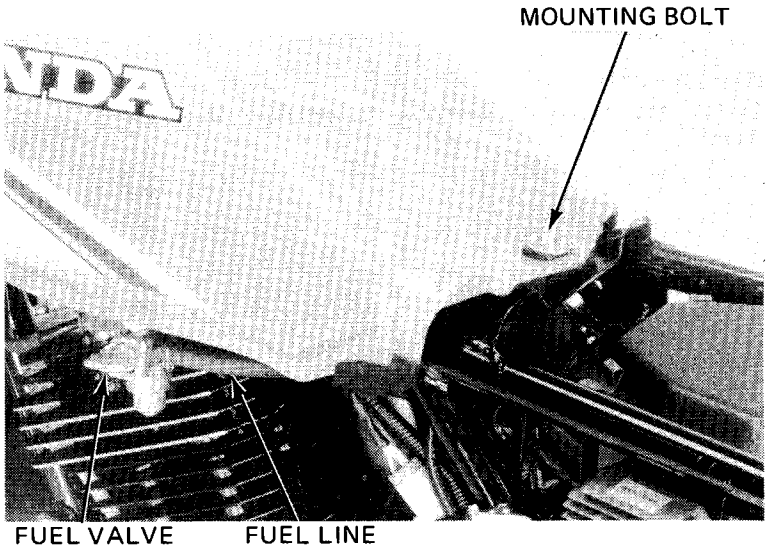
FUEL TANK

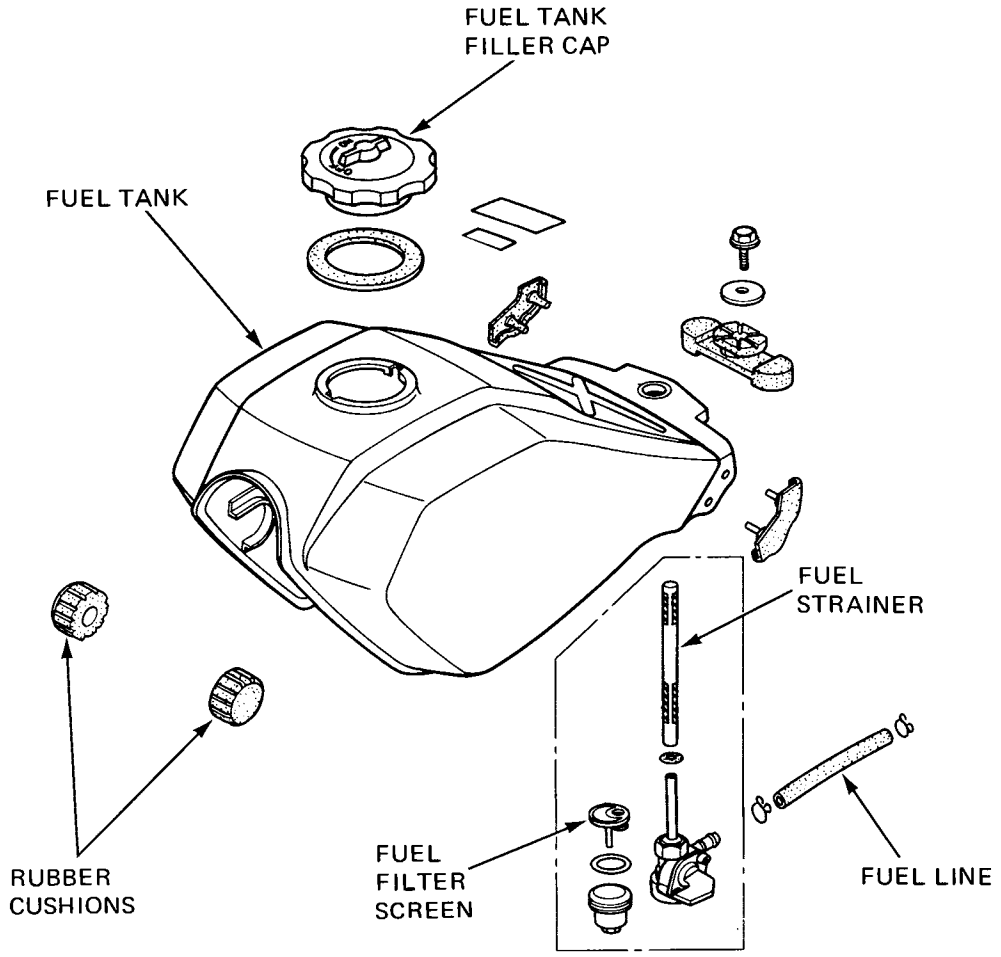
Remove the seat.
Turn the fuel valve OFF and disconnect the fuel line at the fuel valve.
Remove the fuel tank mounting bolt and the tank.

WARNING

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

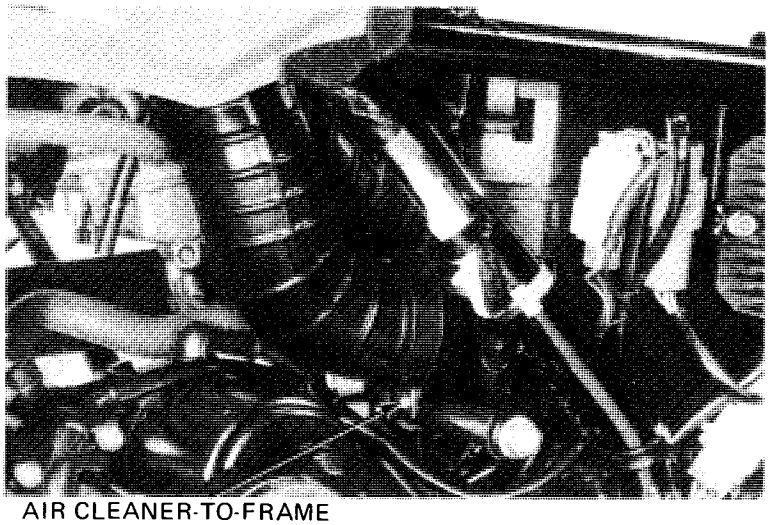
Use a drain pan and check that fuel flows freely out of the fuel valve by turning the fuel valve ON.
If flow is restricted, clean the fuel strainer (Page 3-6) and fuel filter screen.
Check the vent hole in the filler cap for blockage.
Install the fuel tank aligning its front brackets onto the rubber 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

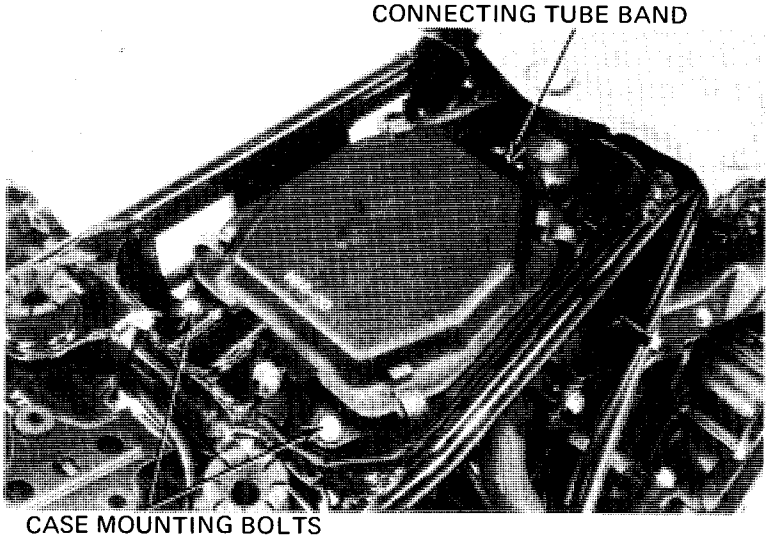
Remove the seat.
Loosen the air cleaner-to-frame connecting tube band.



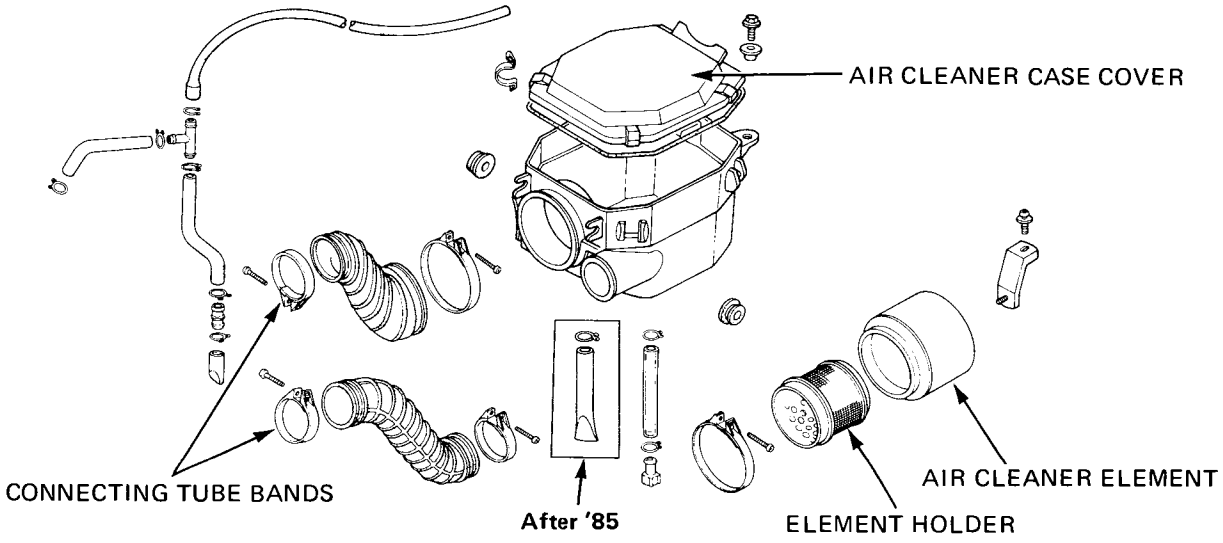
AIR CLEANER-TO-FRAME CONNECTING TUBE BAND

AIR CLEANER-TO-CARBURETOR CONNECTING TUBE BAND

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



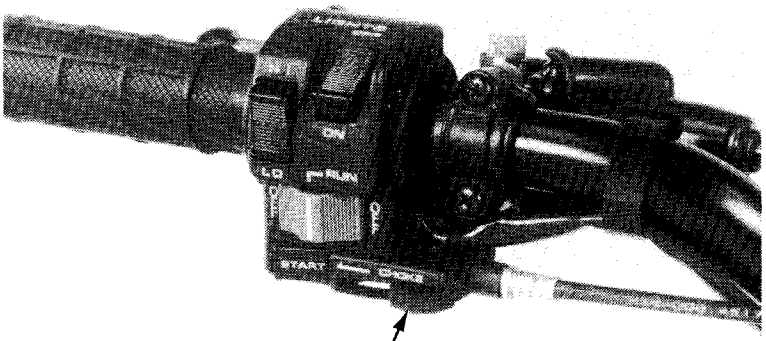
CASE MOUNTING BOLTS



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.

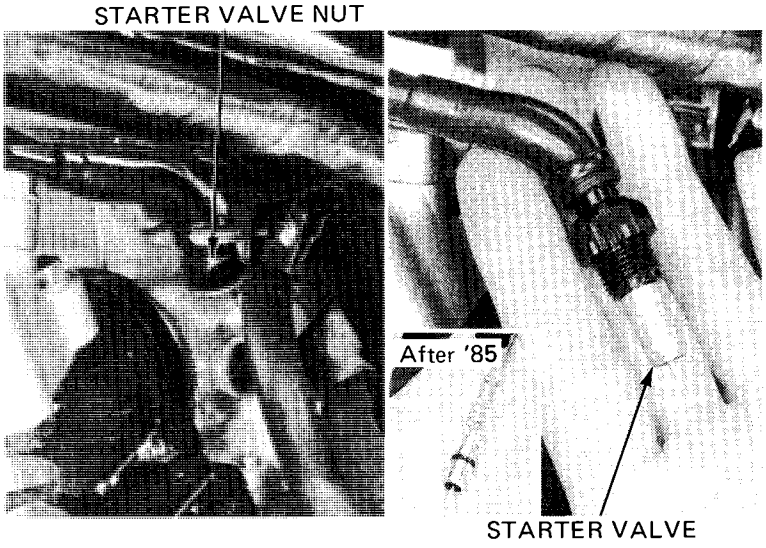


Loosen the starter valve nut and remove the valve from the carburetor.

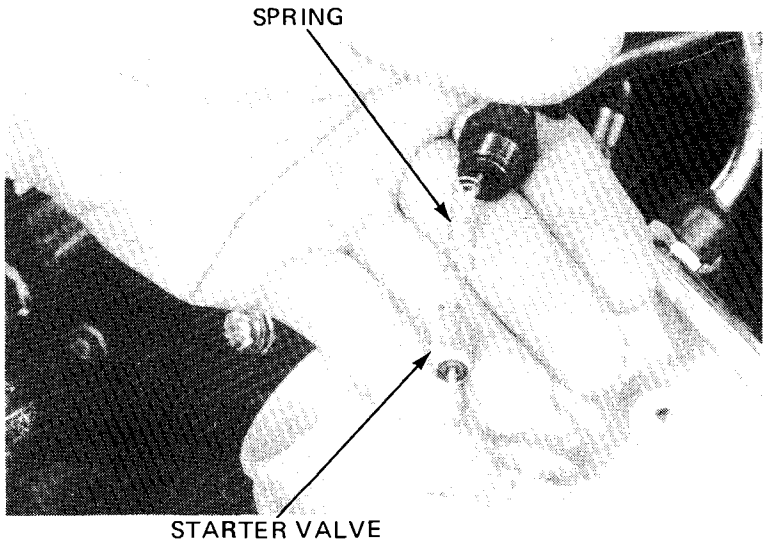
Move the choke lever all the way to the left and measure the starter valve stroke.

STARTER VALVE STROKE: 7.0 mm (0.28 in)

Check the starter valve and spring for nicks, grooves, or other damage.
After '85:
Check the O-ring for cuts or other damage.

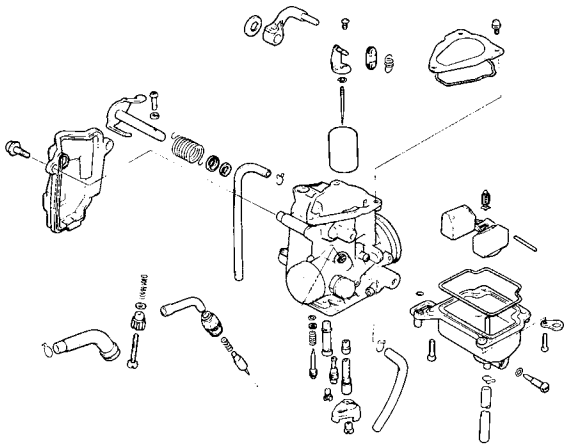


Disconnect the choke cable end from the starter valve and replace the valve and spring if necessary.

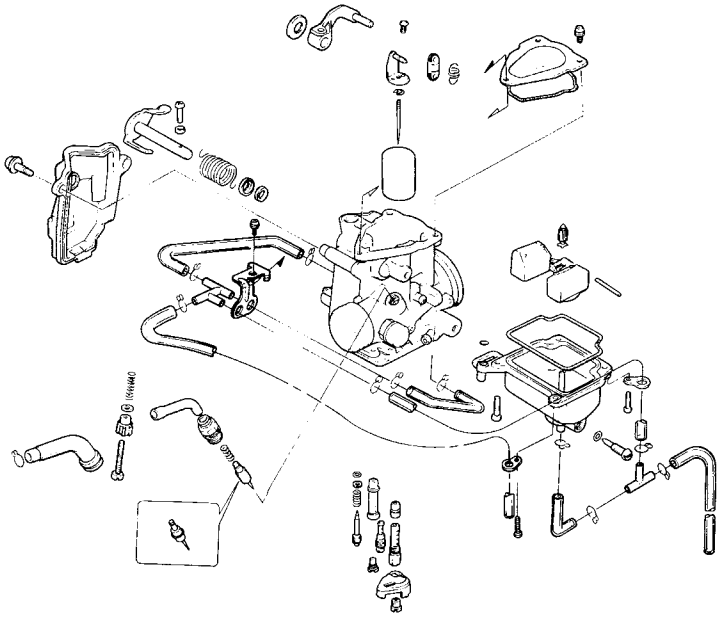


CARBURETOR REMOVAL

'85

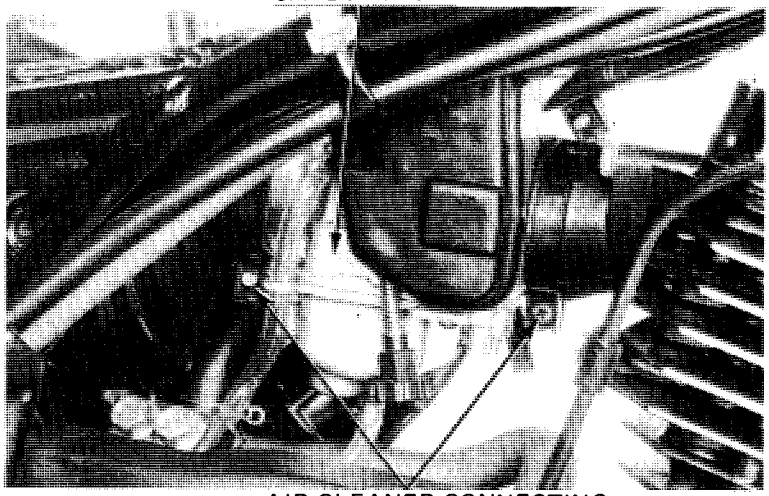


After '85



Remove the seat and fuel tank.
Loosen the air cleaner connecting tube bands.
Remove the carburetor from the right side.

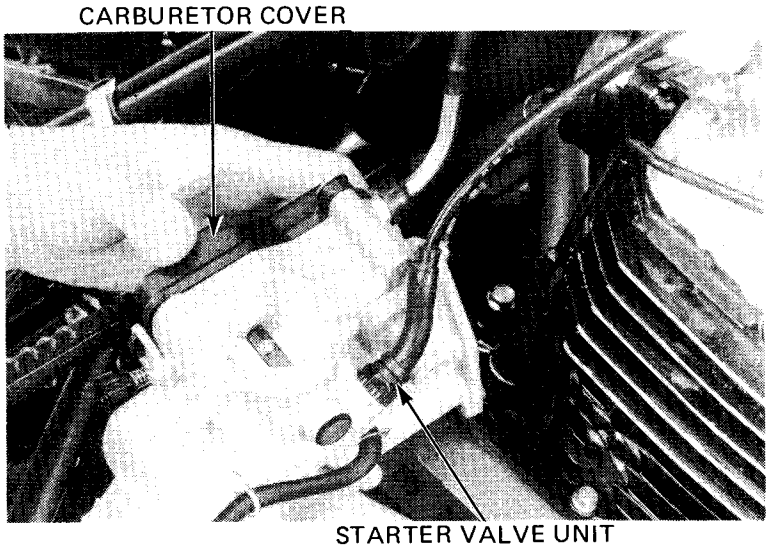
CARBURETOR



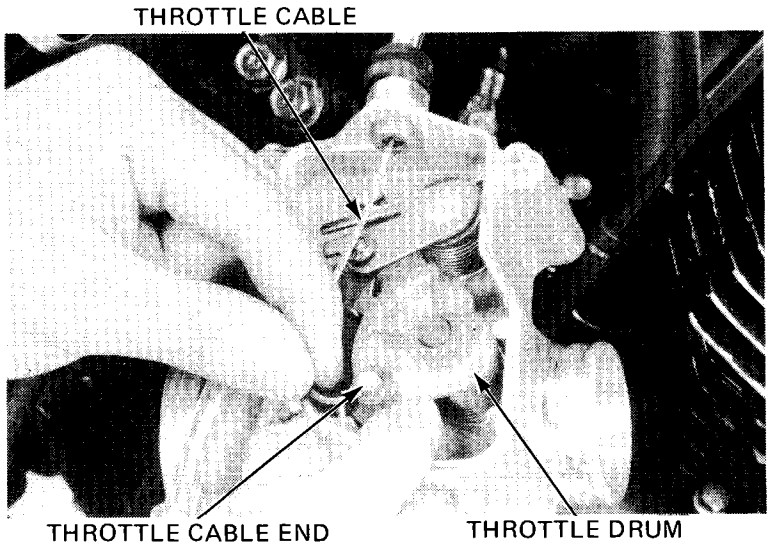
AIR CLEANER CONNECTING TUBE BANDS

Remove the two carburetor cover screws and the cover.

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



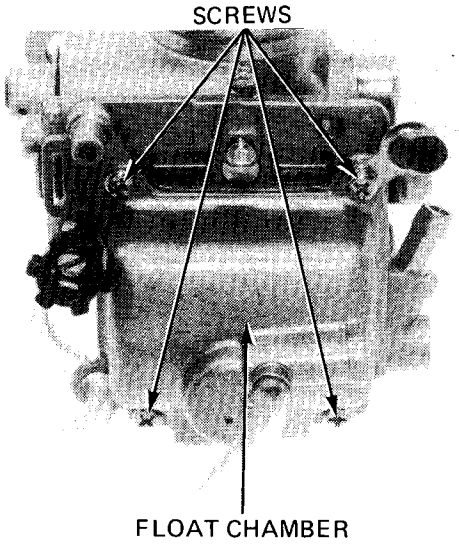
Disconnect the throttle cable end from the throttle drum and remove the throttle cable from the carburetor body.



FLOAT CHAMBER

FLOAT CHAMBER REMOVAL

Remove the four float chamber screws and the float chamber.



FLOAT LEVEL

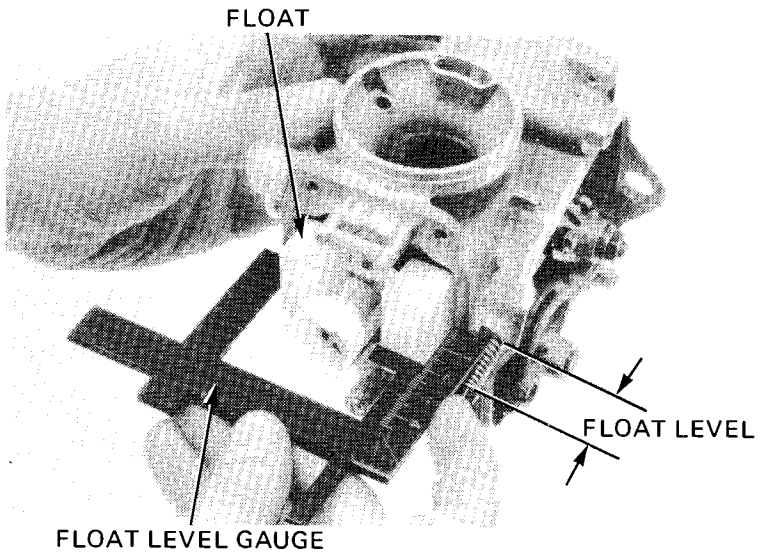
Measure the float level with a float level gauge as shown.

SPECIFICATIONS: 18.5 mm (0.73 in)

Replace the float if it is out of specification.

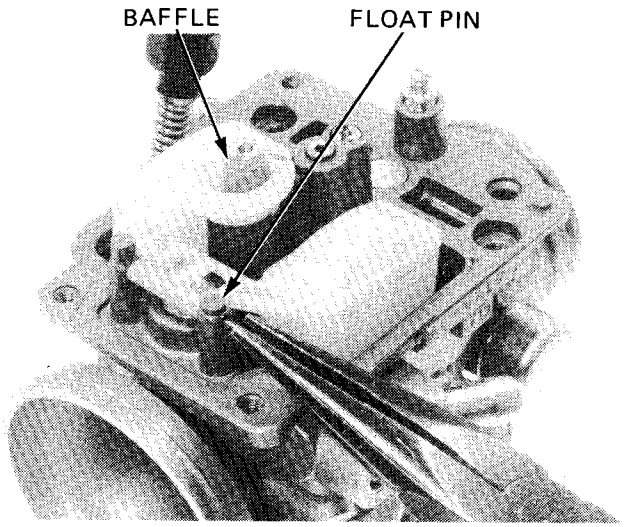
NOTE:

> Floats are plastic and can't be adjusted.



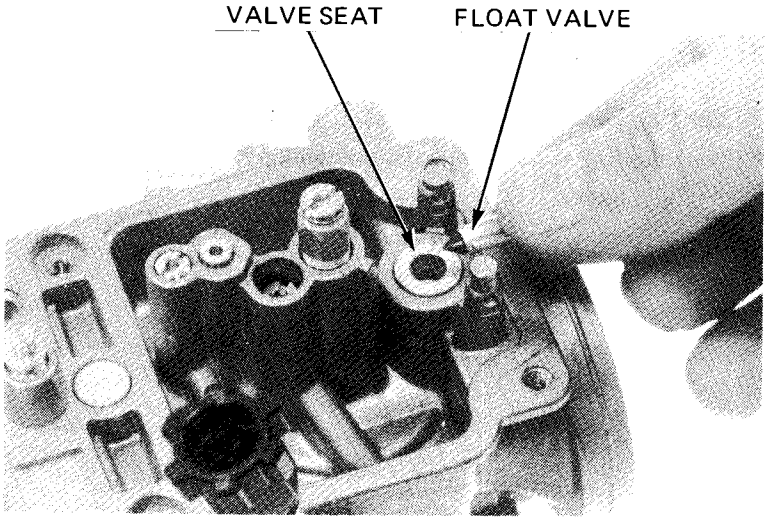
FLOAT AND JETS

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.

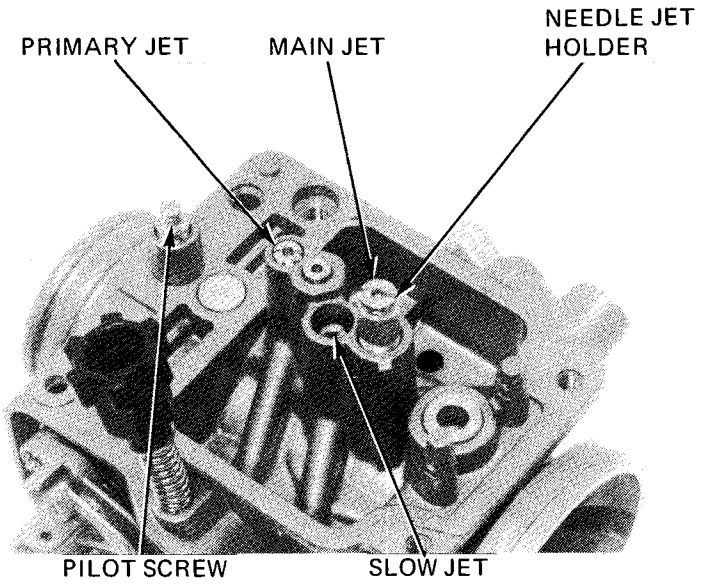


'85:
Remove the main jet, needle jet holder and needle jet.
Remove the slow jet, primary jet and primary nozzle.
Turn the pilot screw in and record the number of turns before it seats lightly. Use this as a reference for reinstallation.

CAUTION

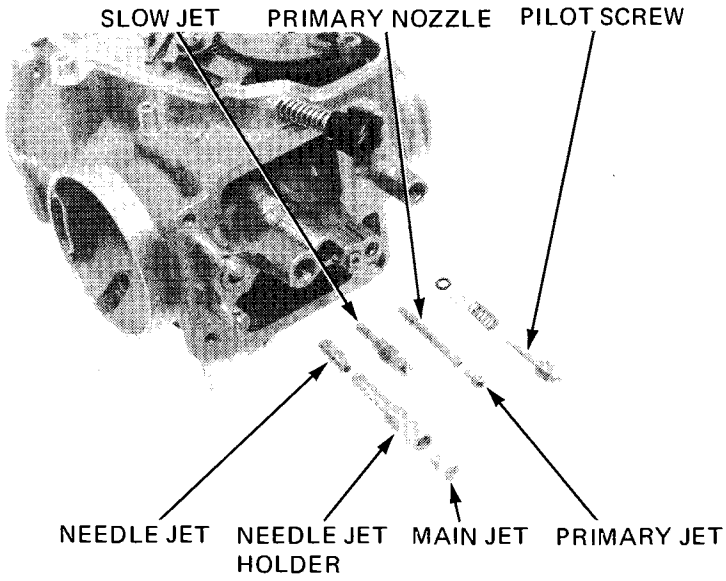
Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.

Remove the pilot screw.



Inspect the pilot screw and each jet and replace them if they are worn or damaged.

Blow open all jets with compressed air.



After '85:
Remove the main jet, needle jet holder and needle jet.
Remove the slow jet.

CAUTION:

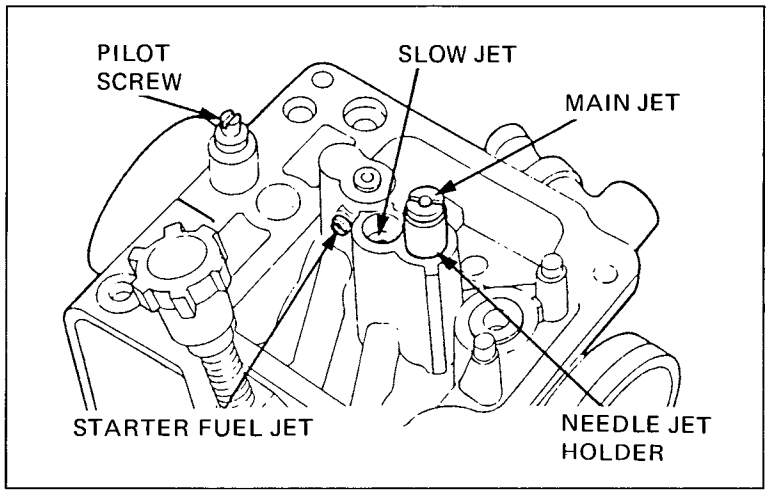
Do not try to remove the starter fuel jet from the carburetor body.

Turn the pilot screw and record the number of turns before it seats lightly. Use this as a reference for reinstallation.

CAUTION:

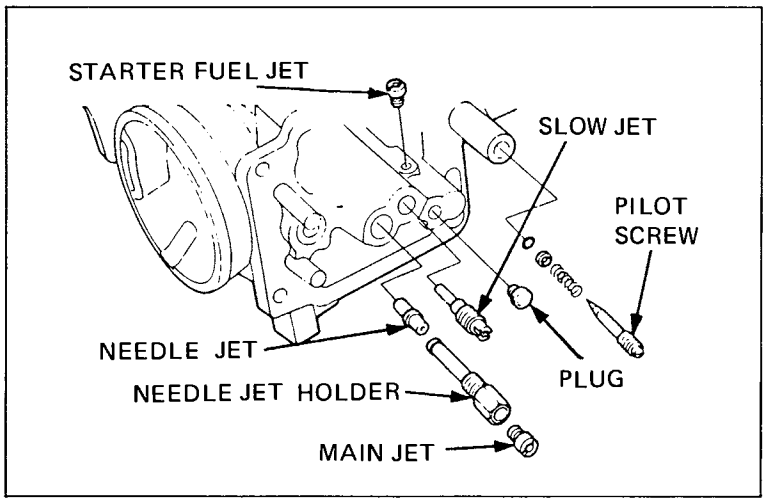
Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.

Remove the pilot screw.

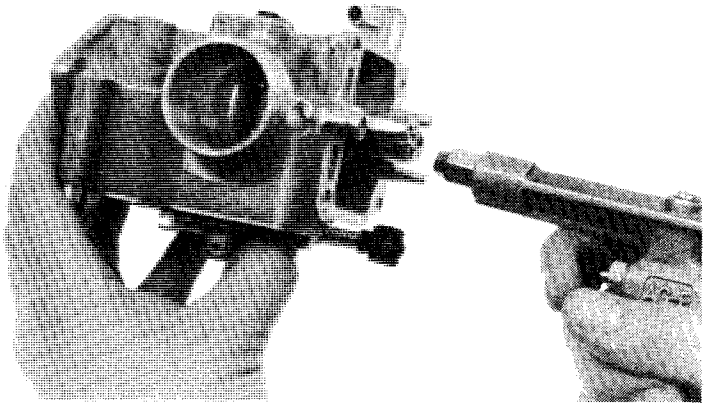


Remove the needle jet by pressing it out from the cylinder side carefully.

Inspect the screw and each jet and replace them if they are worn or damaged.



Remove the piston throttle valve (Page 4-11) and blow open all carburetor body openings with compressed air.

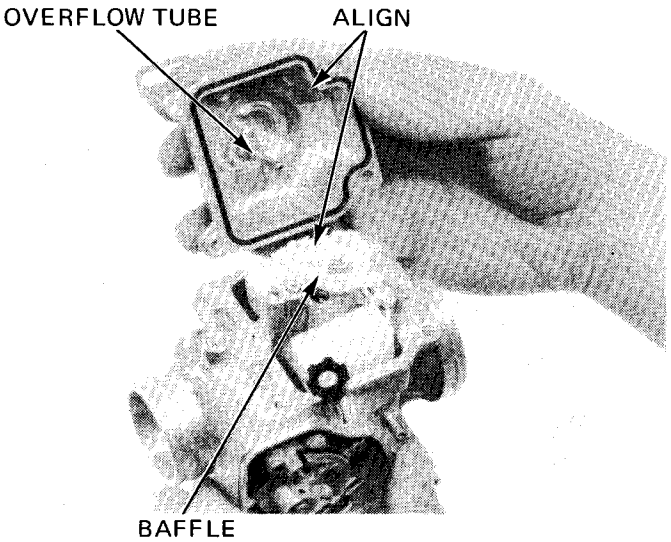


ASSEMBLY

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.



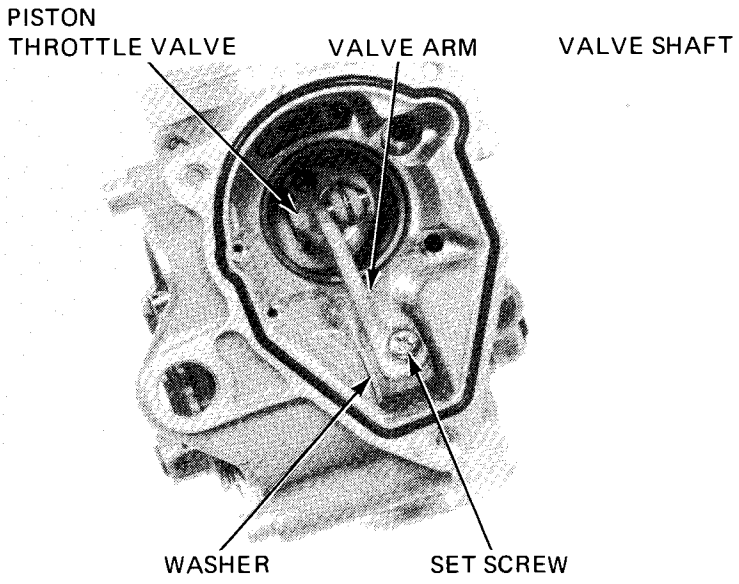
THROTTLE VALVE

NOTE

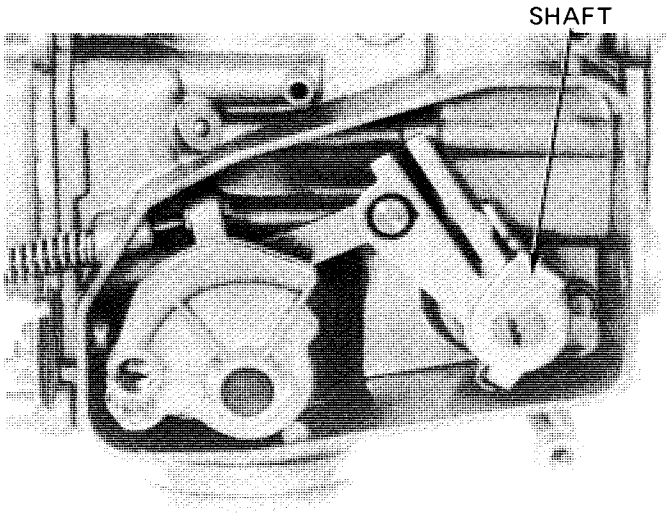
> The butterfly throttle valve attaching screws are staked and the valve can be not be removed.

PISTON THROTTLE VALVE REMOVAL

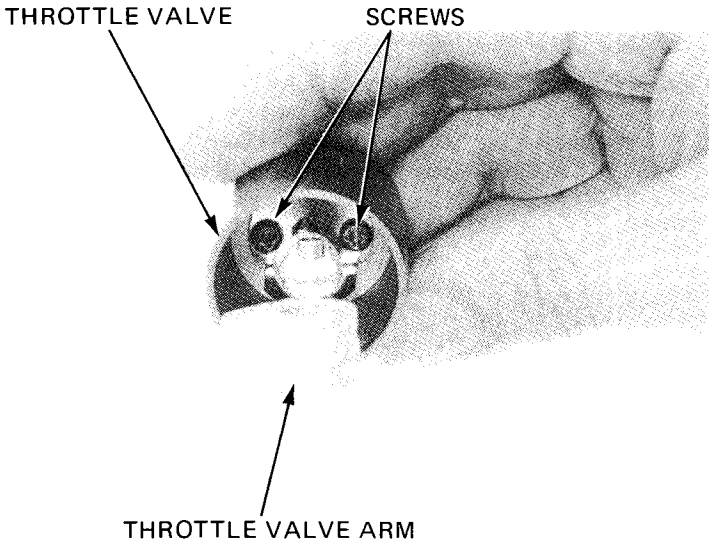
Remove the throttle valve arm set screw.



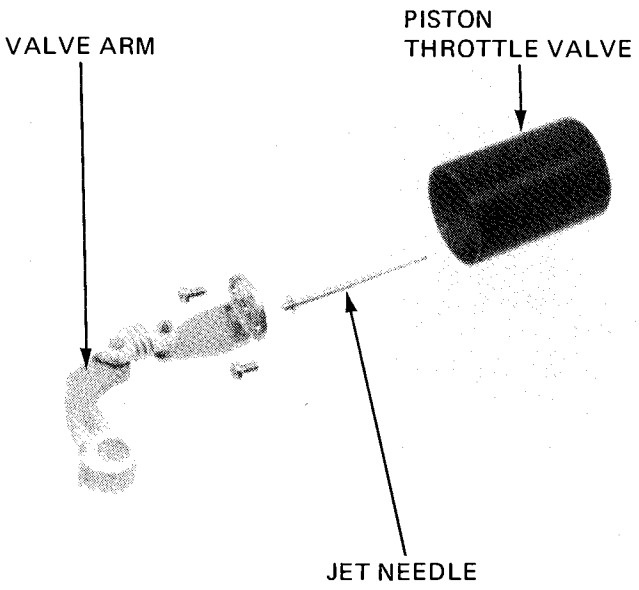
Pull the shaft out and remove the throttle valve and washer.



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



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

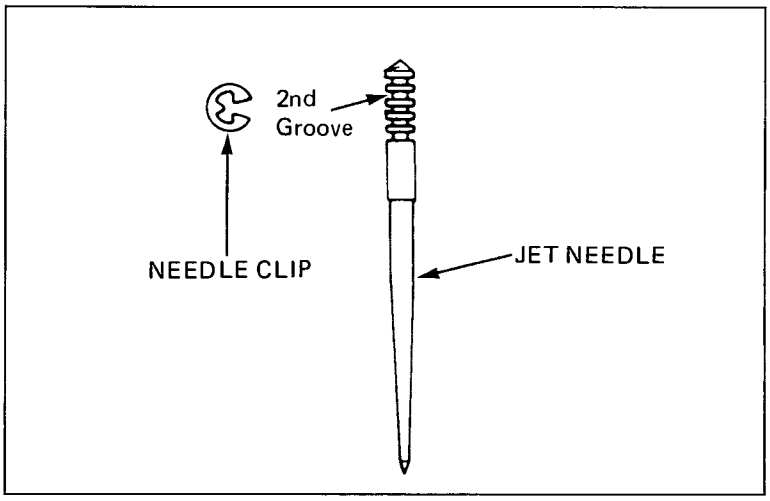


PISTON THROTTLE VALVE INSTALLATION

Install the needle clip on the jet needle.

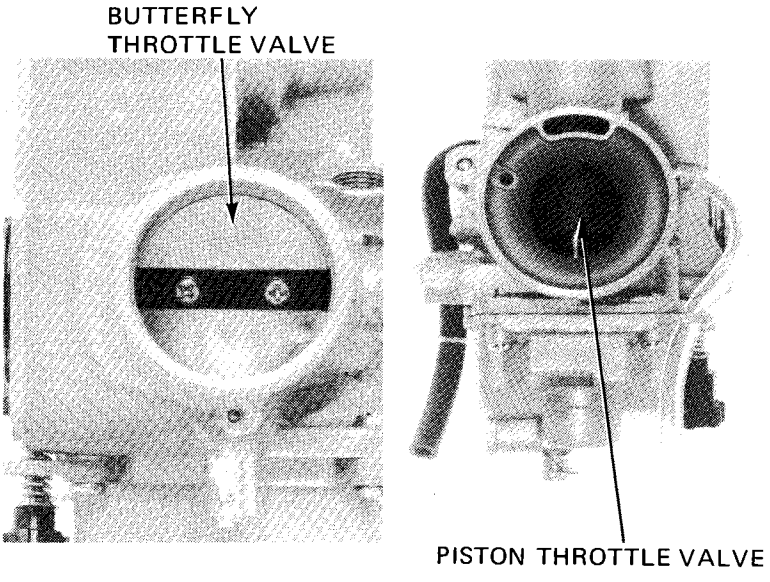
STANDARD SETTING: 2nd groove

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

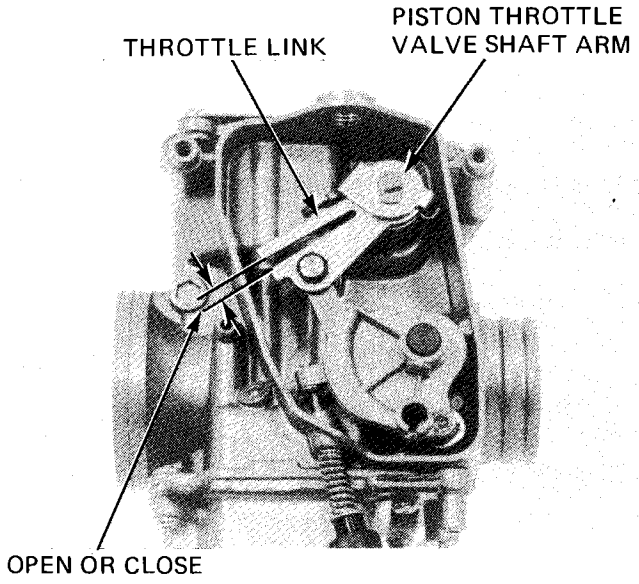


THROTTLE VALVE SYNCHRONIZATION

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



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



CARBURETOR INSTALLATION

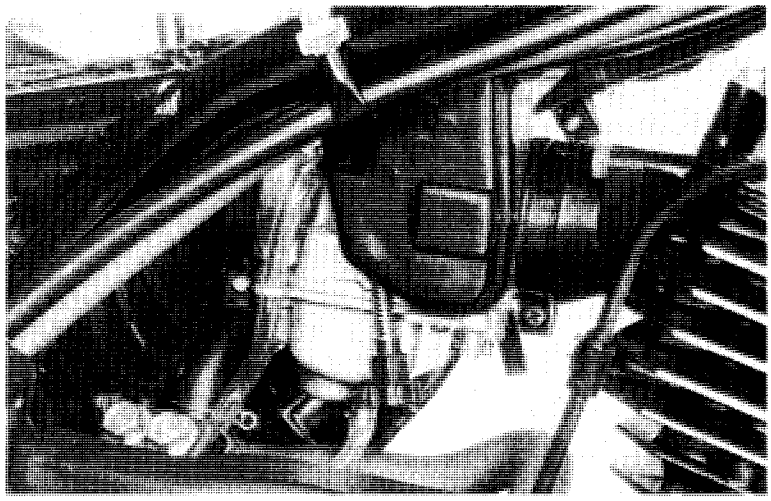
Installation is essentially the reverse of removal.

NOTE

> Route the throttle and choke cables properly (Pages 1-11, 1-14).

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.

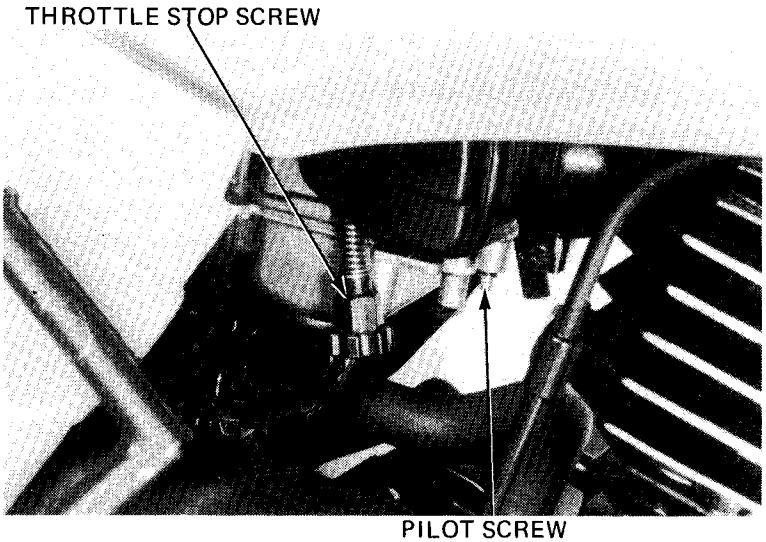
CAUTION

> *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 (1-1/4 turns: After '86).
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:

Remove the carburetor (page 4-6) and float chamber (page 4-7).
Replace the standard primary main jet with the high altitude type (#125).

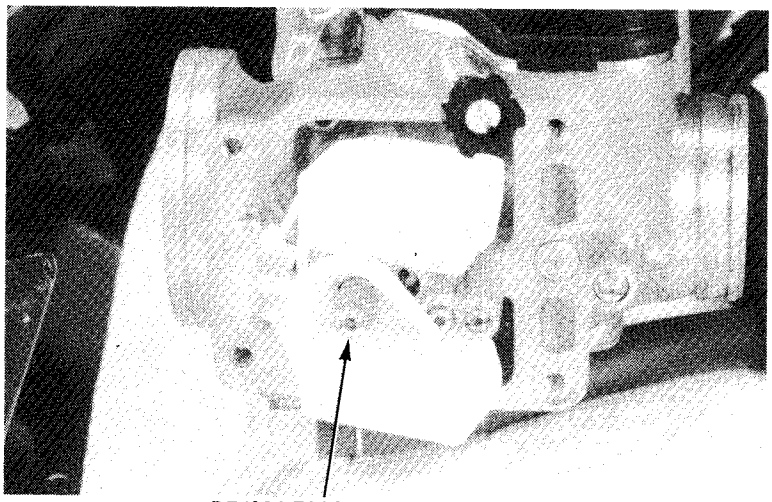
Assemble and install the carburetor.
Start the engine and adjust the idle speed at high altitude to ensure proper high altitude operation.

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 when riding below 5,000 feet (1,500 m).

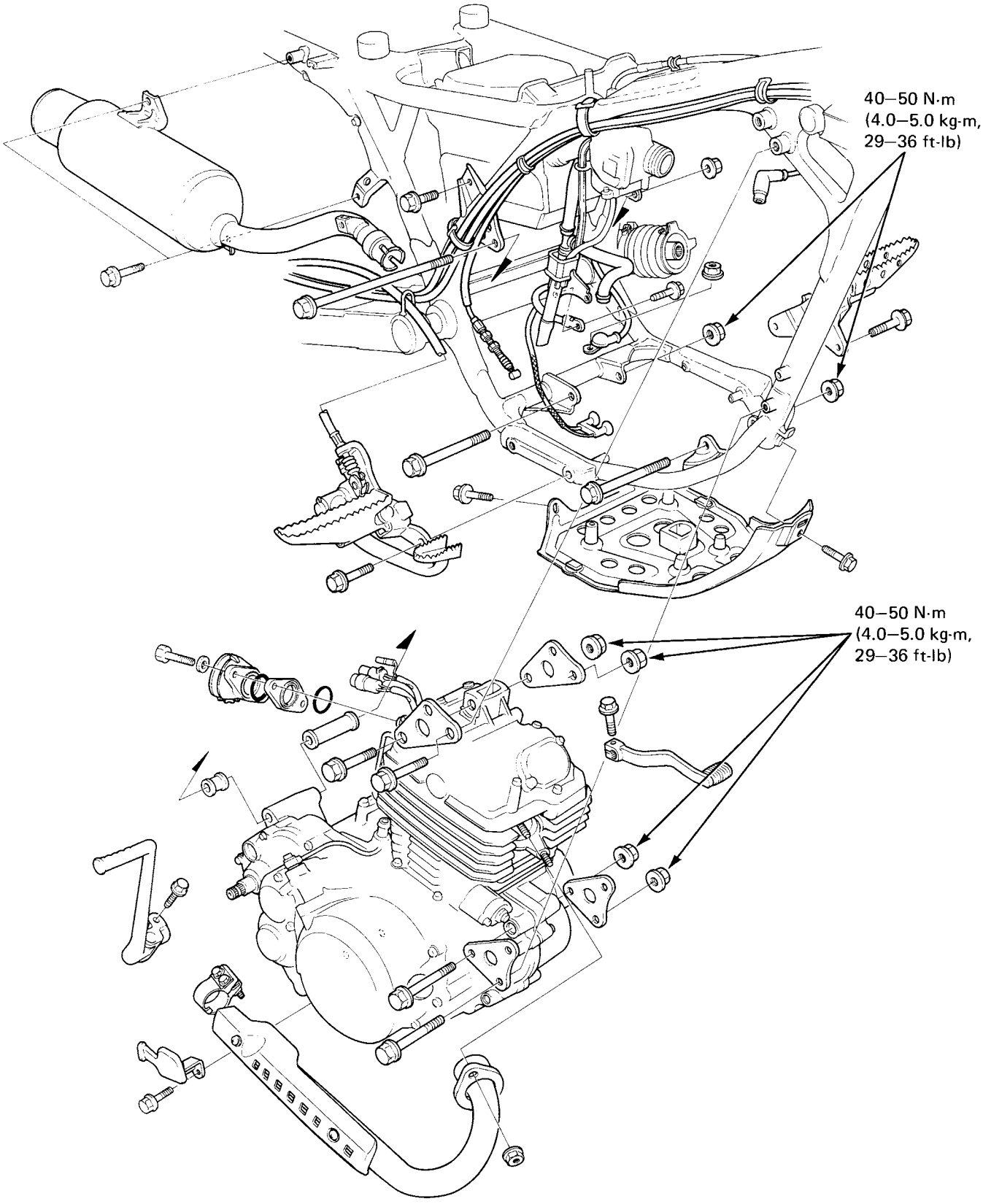
SPECIFICATIONS

	Below 6,000 ft (1,800 m)	Above 5,000 ft (1,500 m)
Main jet	# 130	# 125
Pilot screw opening	Factory preset	1/4 screw in



PRIMARY MAIN JET

MEMO


40–50 N·m
(4.0–5.0 kg-m,
29–36 ft-lb)
40–50 N·m
(4.0–5.0 kg-m,
29–36 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 VALUE

Engine hanger bolt 10 mm bolt	40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)

ENGINE REMOVAL

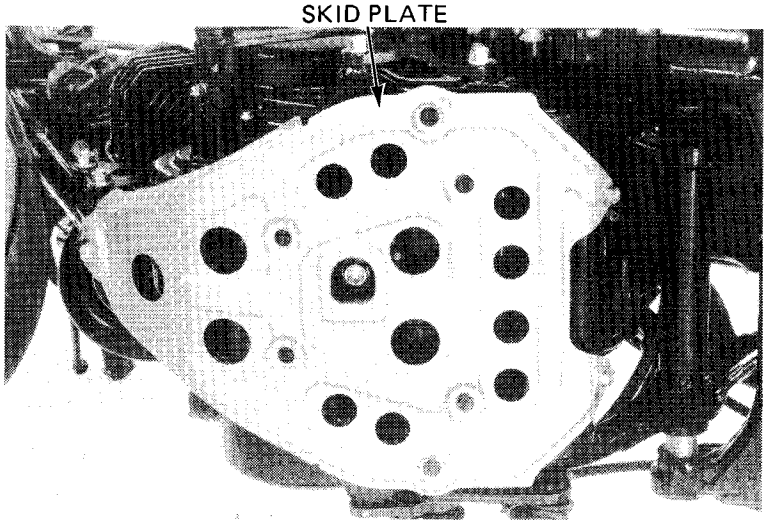
Drain the oil from the engine.
Remove the seat.

Turn the fuel valve OFF, disconnect the fuel tube and remove the fuel tank.

Shift the transmission to neutral.

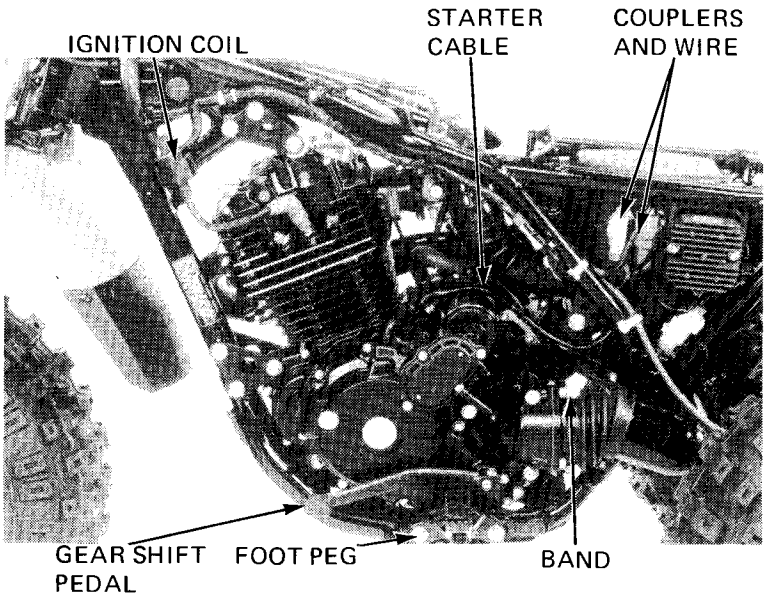
Disconnect the battery negative cable at the battery.

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

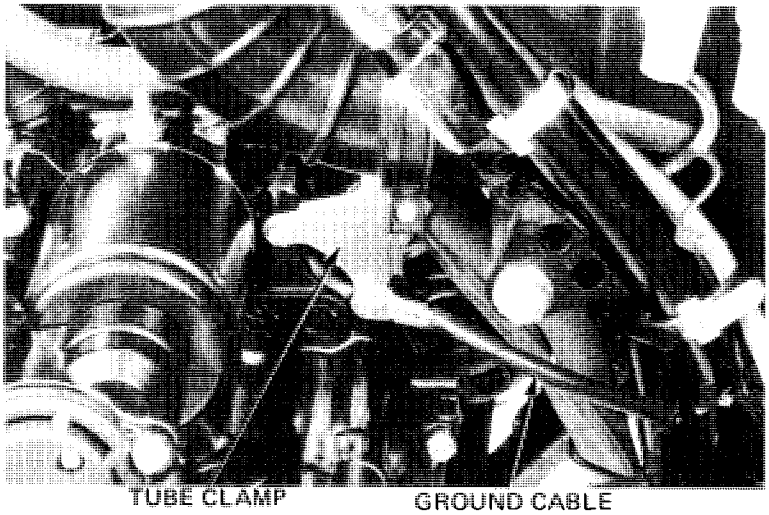


Remove the following:
- spark plug cap from the spark plug
- ignition coil from the frame
- left foot peg
- gearshift pedal
- drive shaft boot band

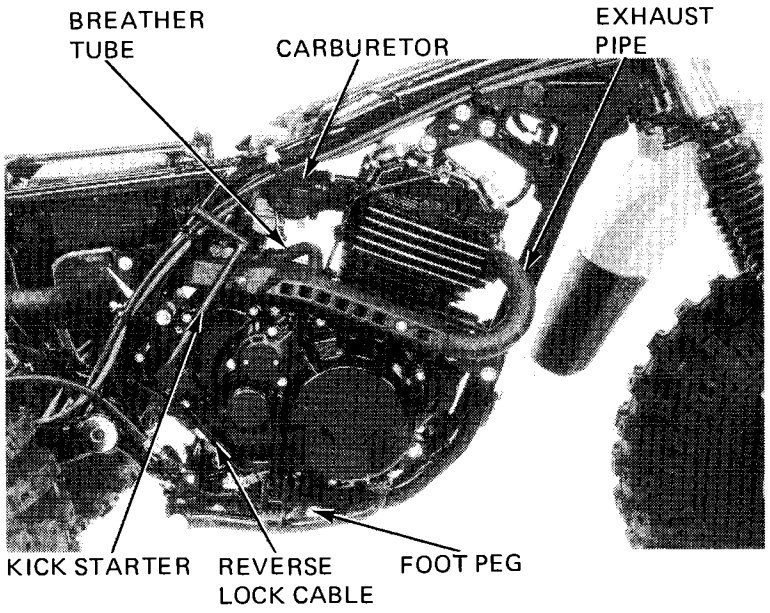
Disconnect the following:
- alternator/pulse generator couplers and wire
- starter cable



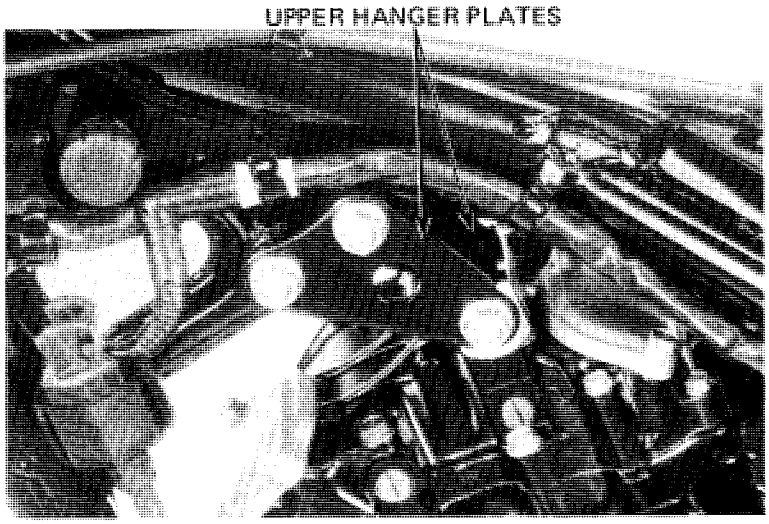
Remove the ground cable and tube clamp.



Remove the exhaust pipe and muffler.
Remove the foot peg, kick starter.
Disconnect the breather tube from the engine and the reverse lock cable from the right crankcase cover.
Disconnect the neutral/reverse switch wires (Page 8-3).
Remove the carburetor (Page 4-6).

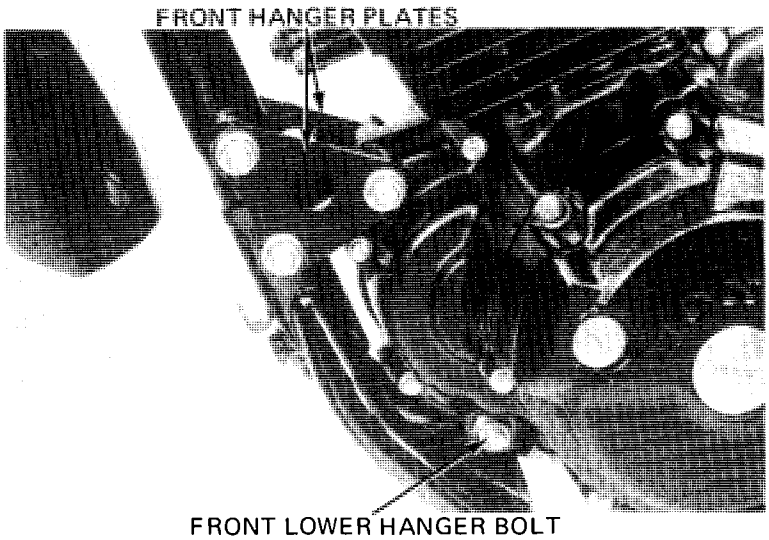


Remove the upper hanger plate bolts and plates.

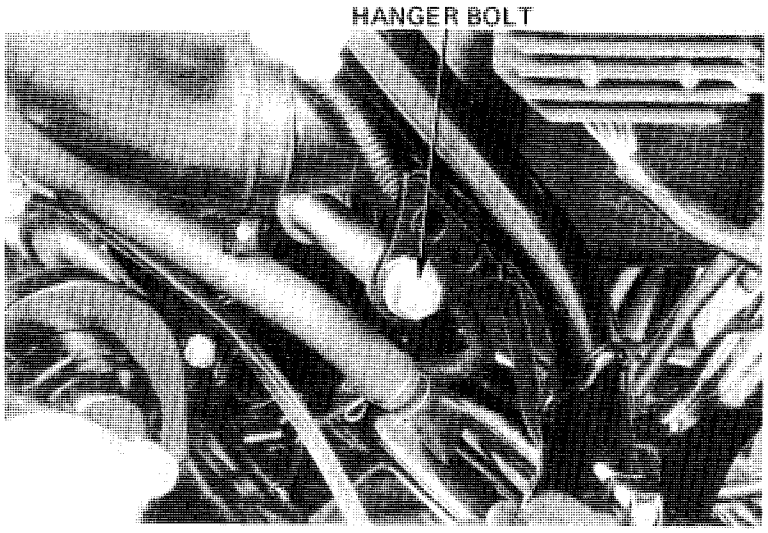


Remove the front hanger plate bolts and plates.

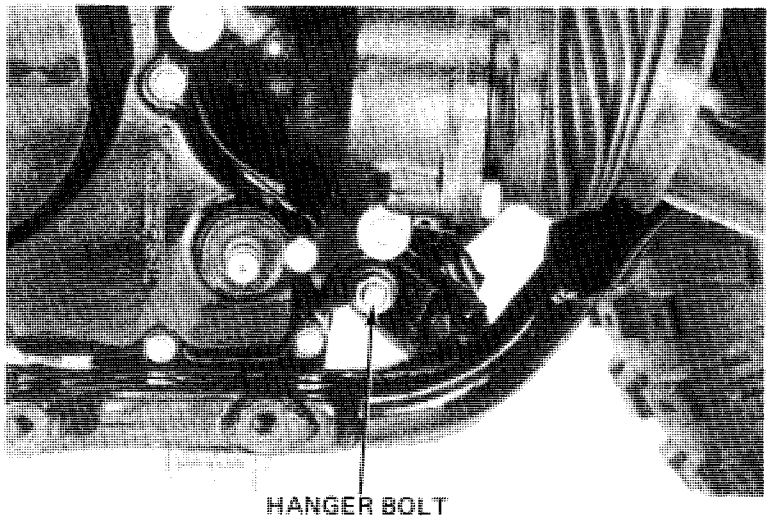
Remove the front lower hanger bolt.



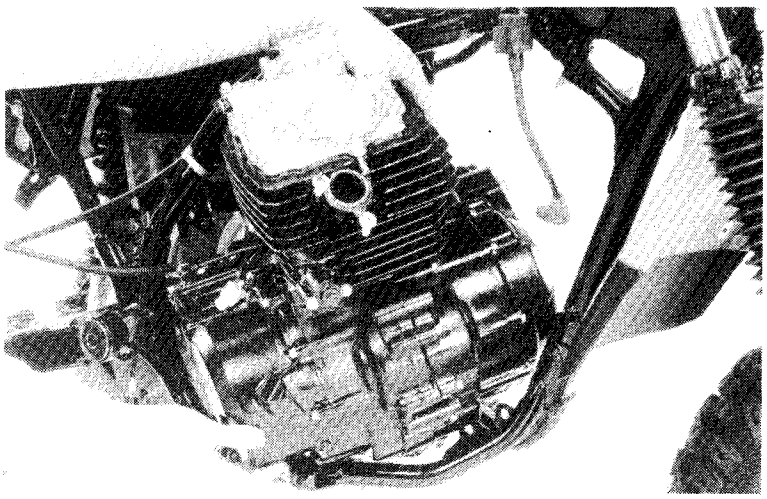
Remove the upper rear engine hanger bolt and collars.



Remove the lower rear hanger bolt.



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



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

Tighten the fasteners to the specified torque values:

TORQUE:

Engine mount 10 mm bolts:

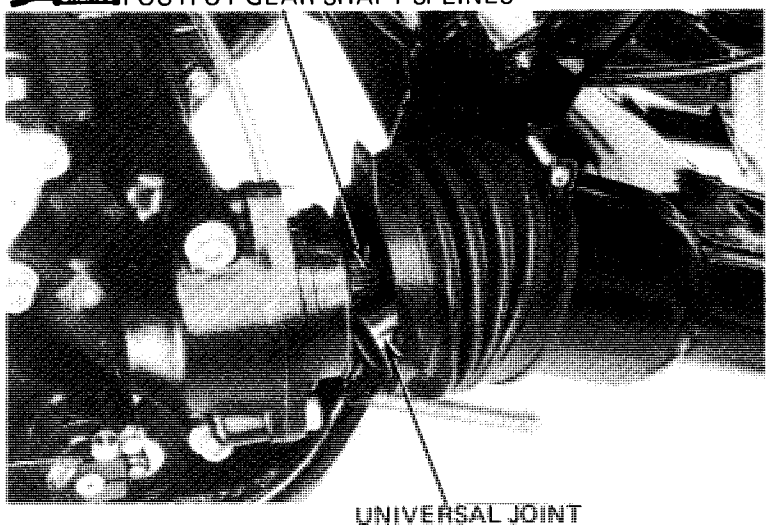
'85: 40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)

AFTER '85:

45–65 N·m (4.5–6.5 kg-m, 32–48 ft-lb)

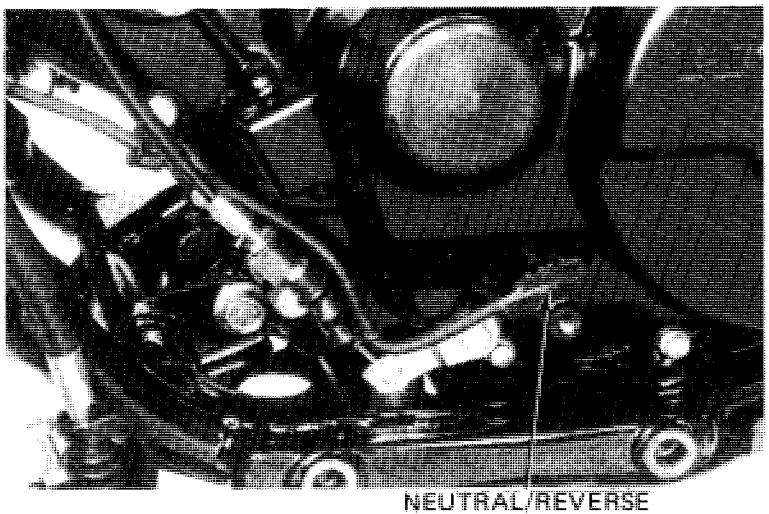
NOTE

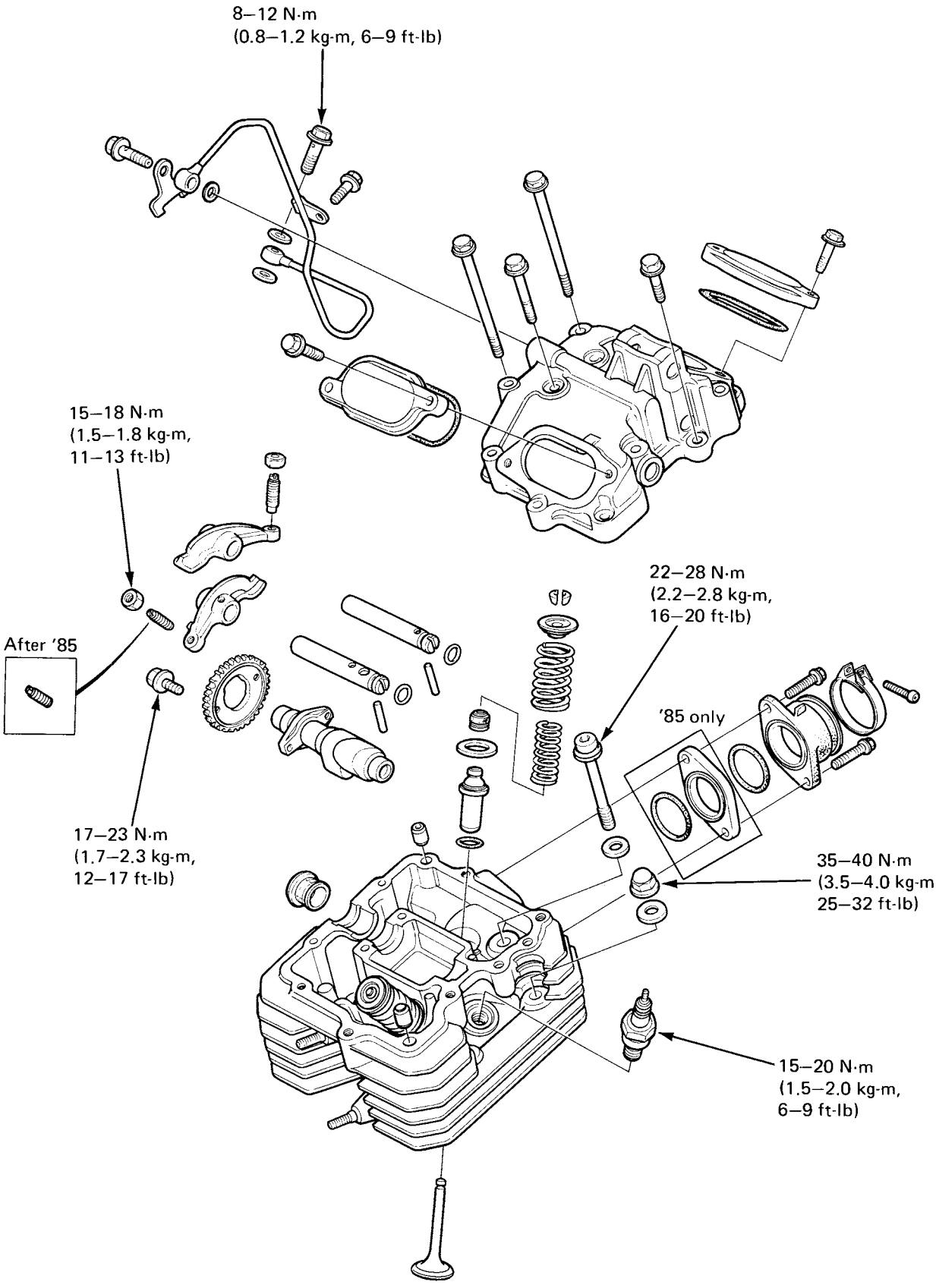
- Route the wires and cables properly (Page 1-9).
- Fill the crankcase to the proper level with the recommended oil (Page 2-1).
- Perform the following inspections and adjustments:
  Throttle operation (Page 3-7).
  Clutch (Page 3-10).
  Reverse lock cable (Page 3-11).



WARNING

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




8–12 N·m
(0.8–1.2 kg-m, 6–9 ft-lb)
15–18 N·m
(1.5–1.8 kg-m,
11–13 ft-lb)
After '85
22–28 N·m
(2.2–2.8 kg-m,
16–20 ft-lb)
'85 only
17–23 N·m
(1.7–2.3 kg-m,
12–17 ft-lb)
35–40 N·m
(3.5–4.0 kg-m,
25–32 ft-lb)
15–20 N·m
(1.5–2.0 kg-m,
6–9 ft-lb)

6. CYLINDER HEAD/VALVES

SERVICE INFORMATION

GENERAL

- This section covers the cylinder head, valves, camshaft, rocker arm and cam chain tensioner lifter services. These components can be serviced 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			12.5 ± 1.0 kg/cm^2 (178 ± 14 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	23.954–23.975 mm (0.9431–0.9439 in)	23.90 mm (0.941 in)
		C	23.934–23.955 mm (0.9420–0.9431 in)	23.90 mm (0.941 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)	—
Valve, 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	35–40 N·m (3.5–4.0 kg-m, 25–32 ft-lb)
Cylinder head socket bolt	22–28 N·m (2.2–2.7 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 pipe 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, 11–15 ft-lb)
Cam chain tensioner lifter sealing bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

TOOLS

Special

Valve guide reamer, 5.5 mm	07984–2000000 or 07984–200000A (U.S.A. only)

Common

Valve guide remover, 5.5 mm	07742–0010100 or 07942–3290100	
Valve spring compressor	07757–0010000 or 07957–3290001	
Valve seat cutter, 29 mm (EX 45°)	07780–0010300	Equivalent commercially available in U.S.A.
Valve seat cutter, 35 mm (IN 45°)	07780–0010400	
Valve seat cutter, 30 mm (EX 32°)	07780–0012200	
Valve seat cutter, 35 mm (IN 32°)	07780–0012300	
Valve seat cutter, 30 mm (EX 60°)	07780–0014000	
Valve seat cutter, 37.5 mm (IN 60°)	07780–0014100	
Valve seat cutter holder	07781–0010101	

TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These problems can be diagnosed by a compression test, or by tracing engine noise 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
6. Worn cam sprocket teeth

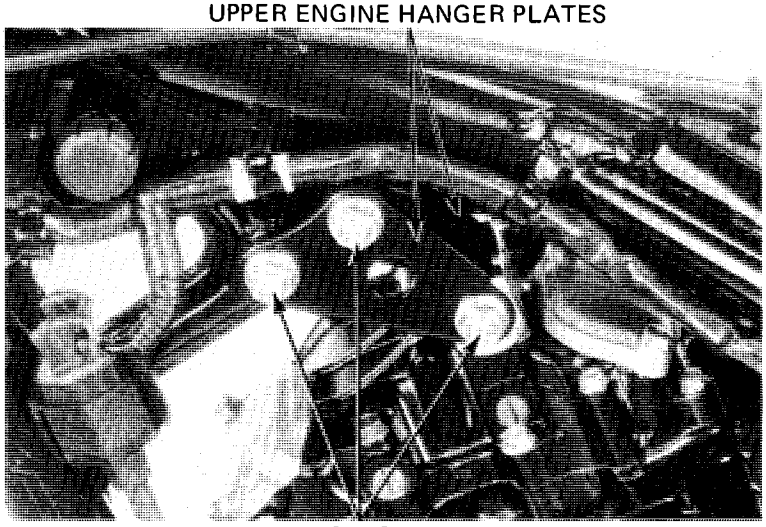
Poor idling

- Compression too low

CYLINDER HEAD COVER REMOVAL/ DISASSEMBLY

Remove the fuel tank (page 4-3).

Remove the upper engine hanger plate bolts and the plates.



Remove the following:
– the oil bolt and two sealing washers.

NOTE

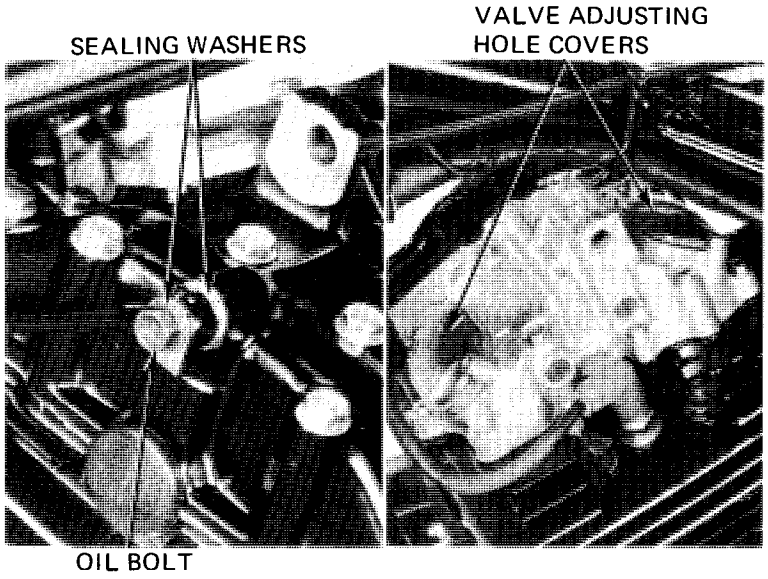
New sealing washers are required whenever the oil bolt is removed.

– the valve adjusting hole covers.
– the cylinder head cover bolts.

NOTE

Loosen the bolts in 2 or 3 steps in a criss-cross pattern, starting with the center bolt.

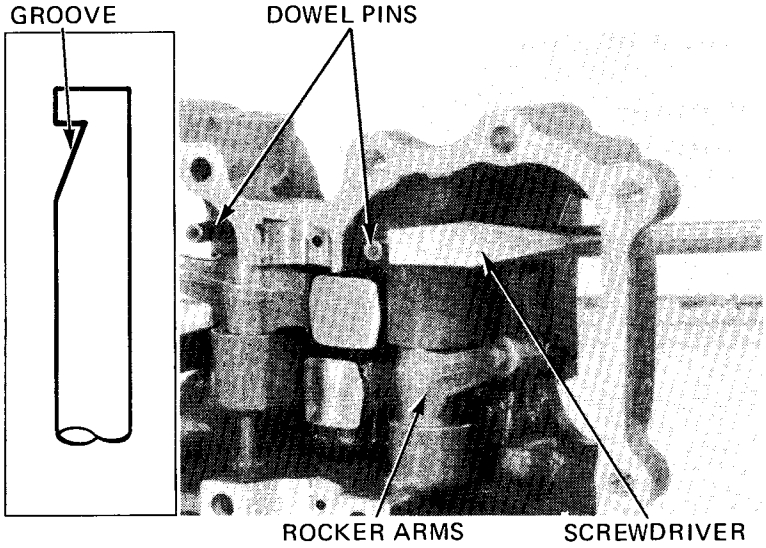
– cylinder head cover.
– dowel pins.



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.

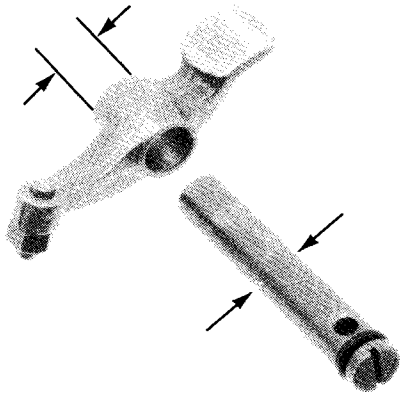


ROCKER ARM/SHAFT INSPECTION

Inspect the rocker arms and shafts for wear or damage.

NOTE

> If the 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.

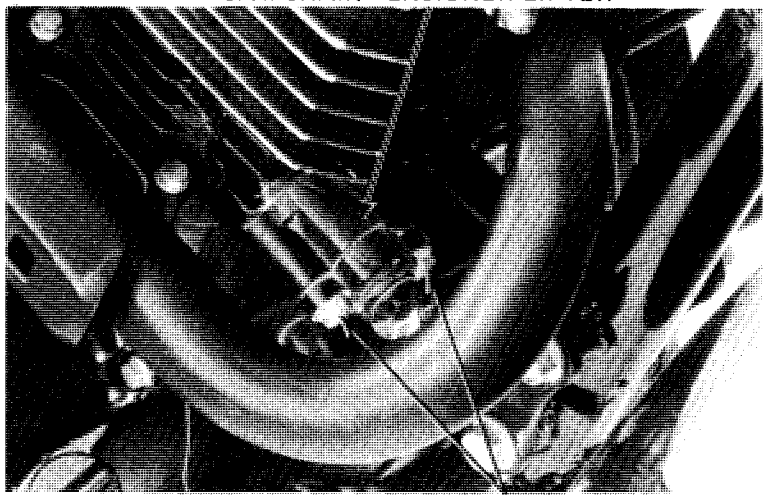
SERVICE LIMIT: 0.08 mm (0.003 in)

CAM CHAIN TENSIONER LIFTER REMOVAL/DISASSEMBLY

REMOVAL

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

CAM CHAIN TENSIONER LIFTER

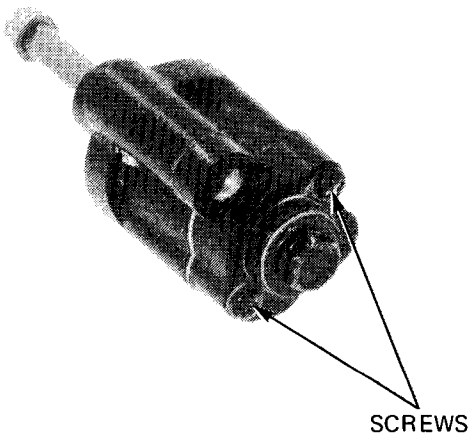


BOLTS

DISASSEMBLY/INSPECTION

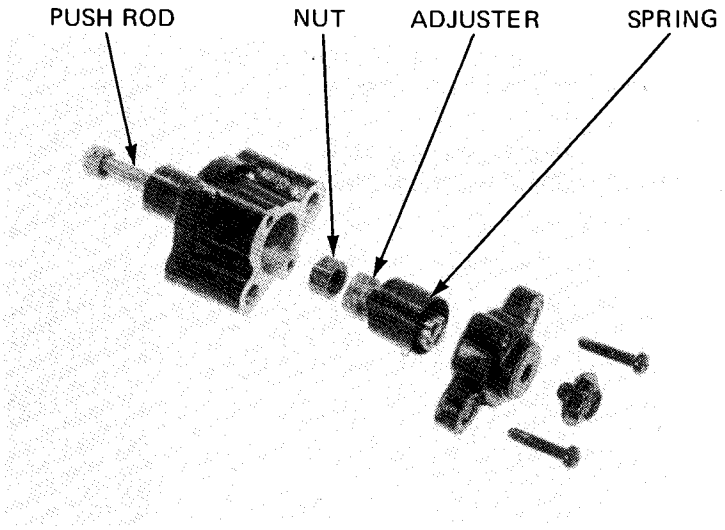
'85, '86 only:

Remove the two screws and disassemble the tensioner lifter.



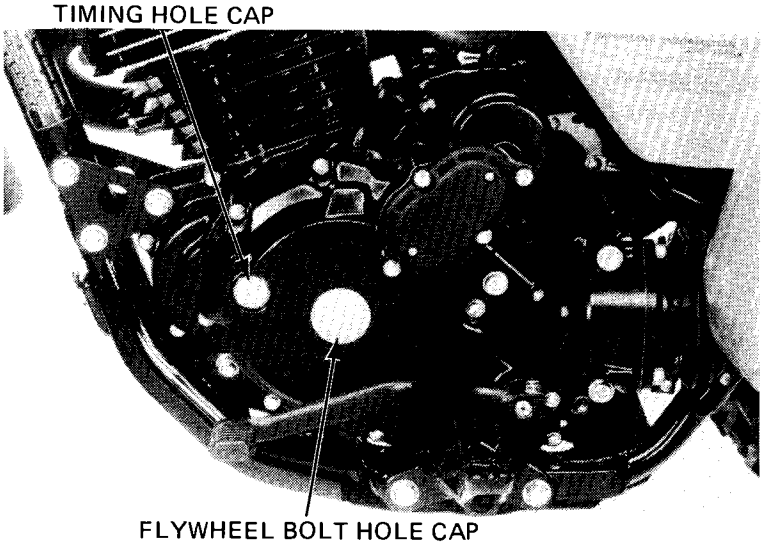
SCREWS

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

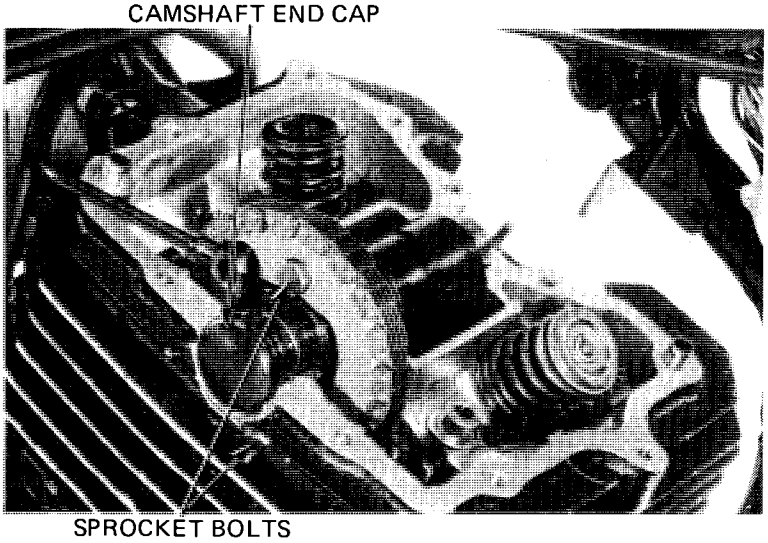


CAMSHAFT REMOVAL

Remove the timing and flywheel bolt hole caps.



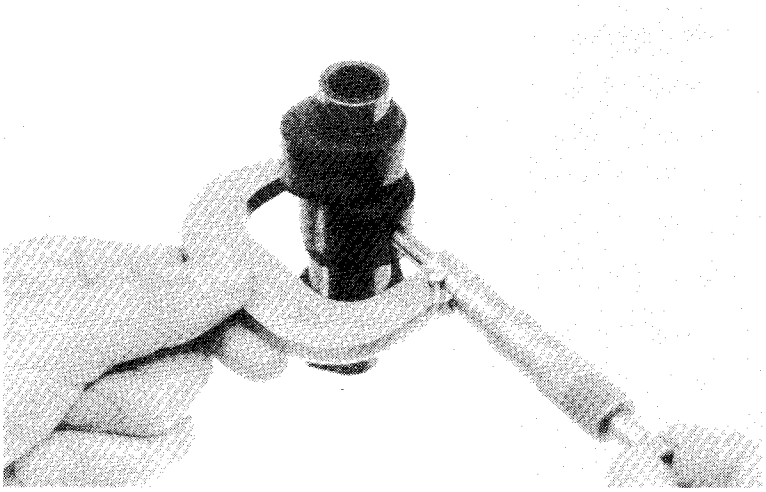
Turn the flywheel clockwise and remove the cam sprocket bolts and the sprocket.
Remove the camshaft.
Suspend the cam chain with a piece of wire to prevent it from falling into the crankcase.
Remove the camshaft end cap.



INSPECTION

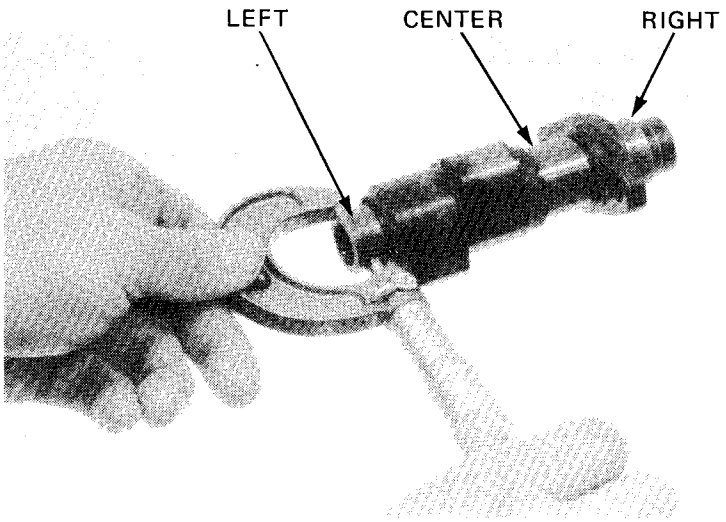
Using a micrometer, measure the height of each cam lobe and inspect it for wear or damage.

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



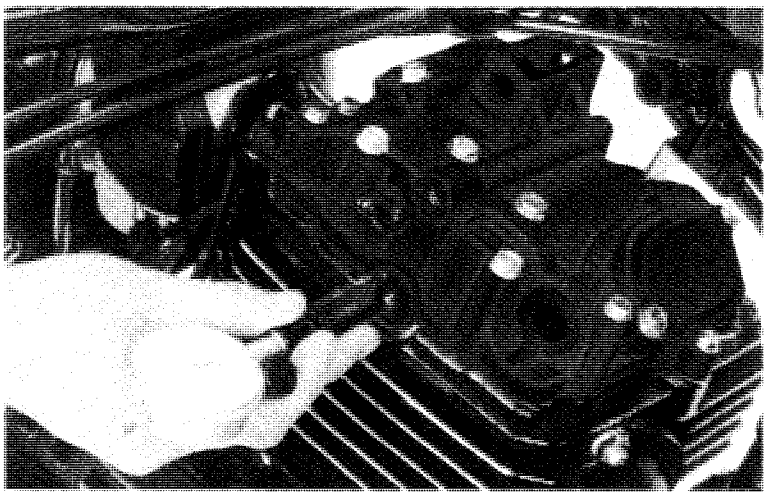
Measure the camshaft journal O.D.

SERVICE LIMIT:
Right and center: 23.90 mm (0.941 in)
Left: 19.90 mm (0.784 in)



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

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



Measure the camshaft journal bearing I.D.

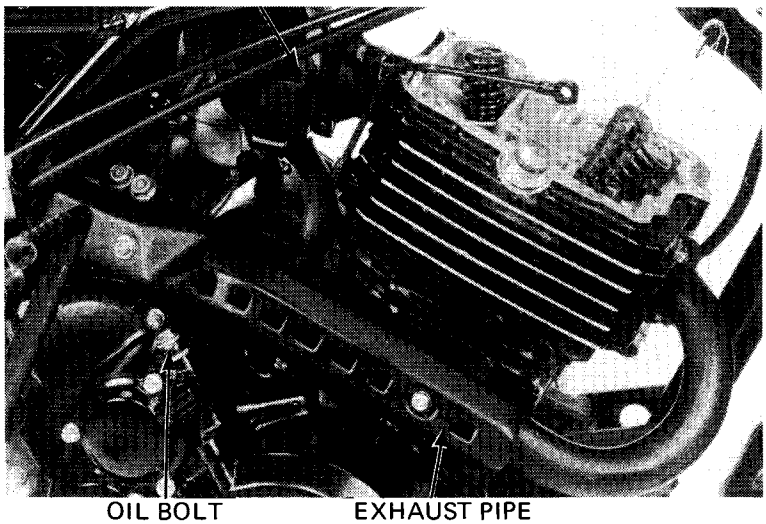
SERVICE LIMIT:
Left: 20.05 mm (0.790 in)
Right and center: 24.05 mm (0.947 in)

Calculate camshaft-to-bearing clearance.

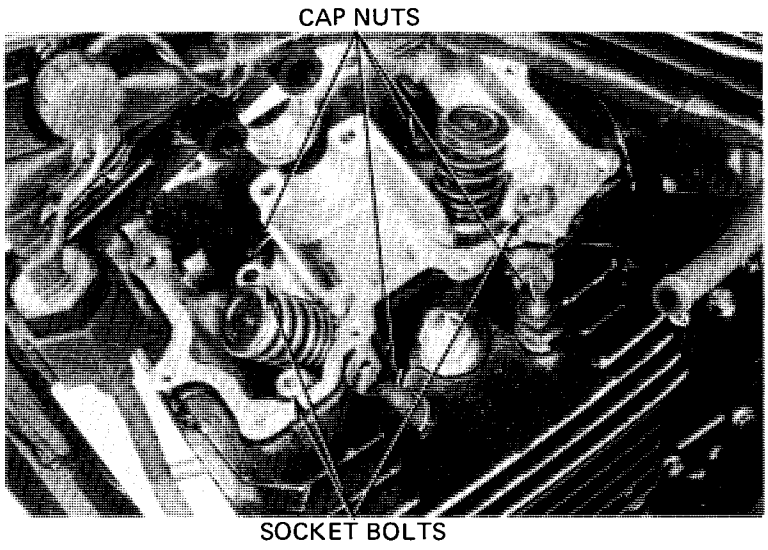
SERVICE LIMIT:
Left: 0.10 mm (0.004 in)
Right and center: 0.10 mm (0.004 in)

CYLINDER HEAD REMOVAL

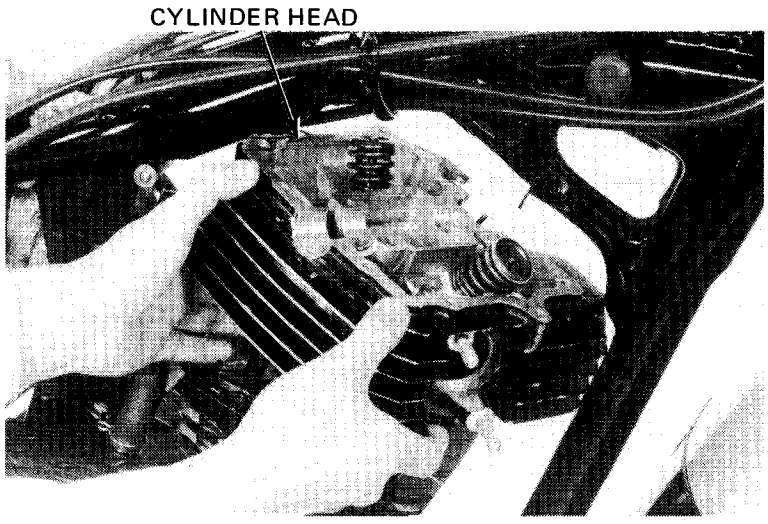
Remove the carburetor (Page 4-6) and exhaust pipe (Page 13-3).
Remove the oil pipe mount bolt, oil bolt and sealing washers, and remove the oil pipe.



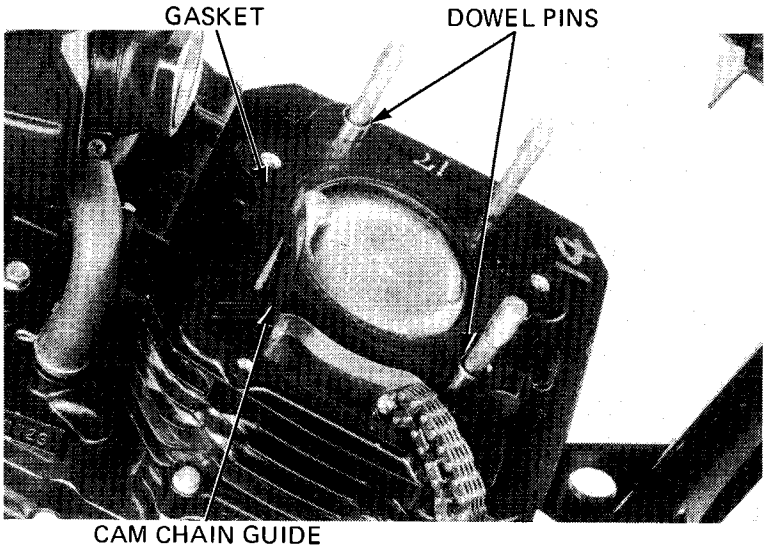
Remove the cylinder head cap nuts and socket bolts in a crisscross pattern in 2 or 3 steps.



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.

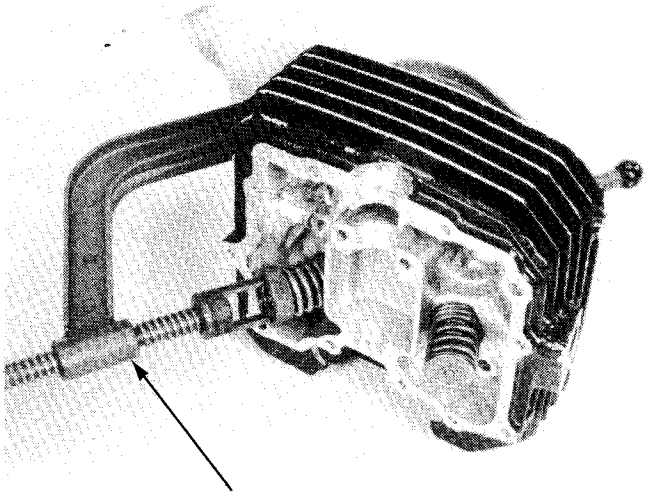
CAUTION

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

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.



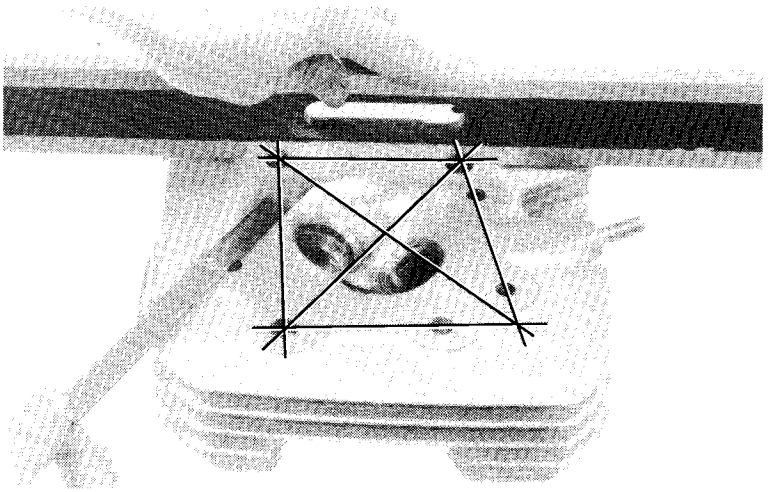
INSPECTION

CYLINDER HEAD

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)

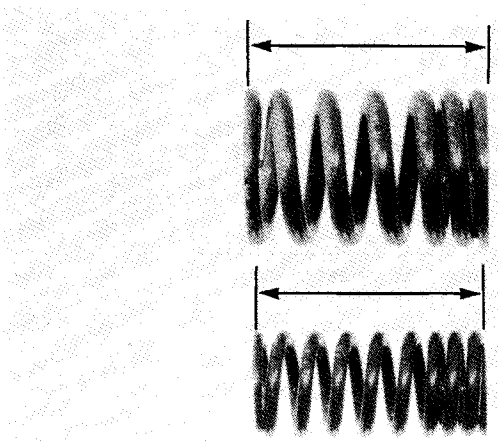


VALVE SPRINGS

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.

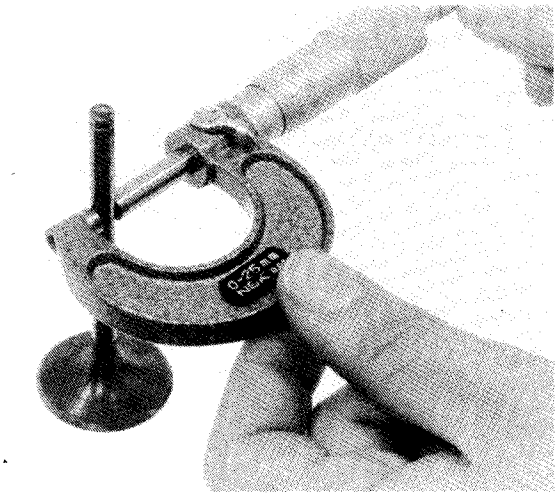


VALVE STEM-TO-GUIDE CLEARANCE

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

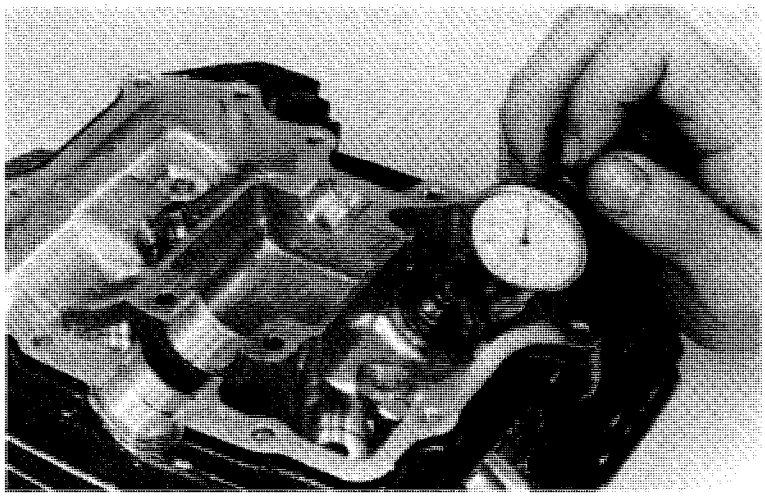
> Ream the guides to remove any carbon deposits before checking clearances.

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

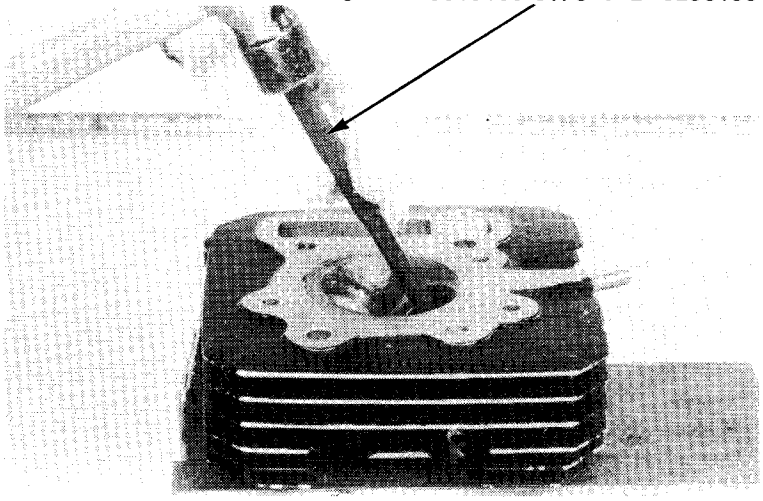
Avoid damaging the cylinder head.

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

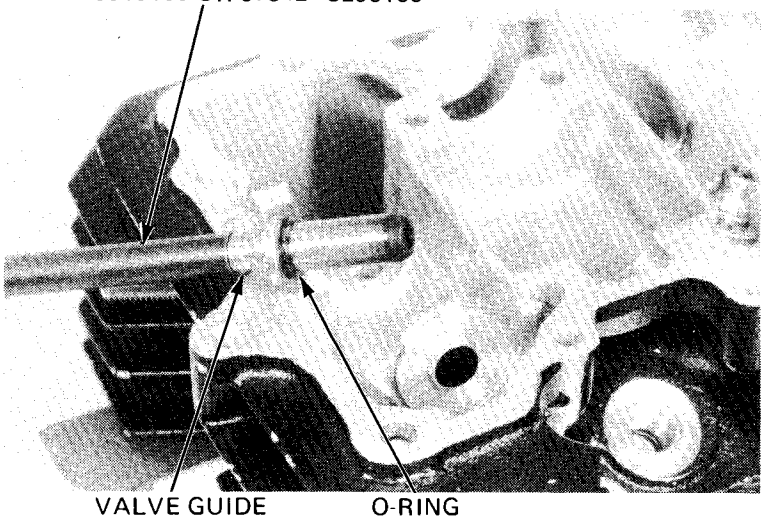
NOTE

Inspect the valve guide for damage.

VALVE GUIDE REMOVER
07742–0010100 OR 07942–3290100



VALVE GUIDE REMOVER
07742–0010100 OR 07942–3290100

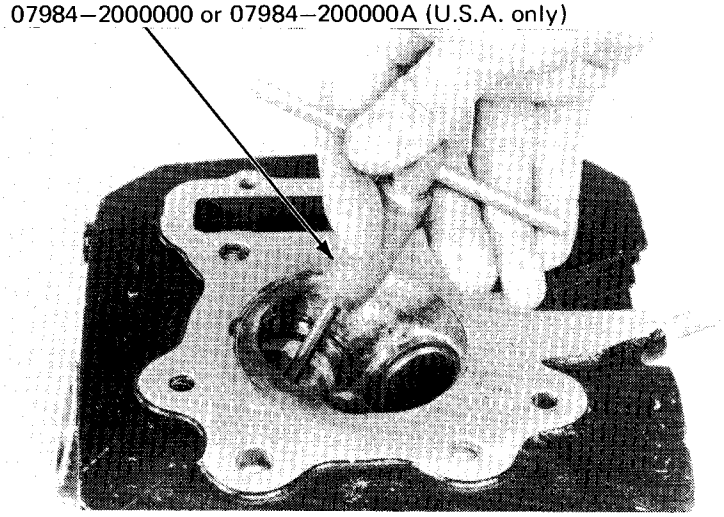


Ream the new valve guide after installation.

NOTE

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

VALVE GUIDE REAMER
07984–2000000 or 07984–200000A (U.S.A. only)



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

VALVE SEAT INSPECTION/REFACING

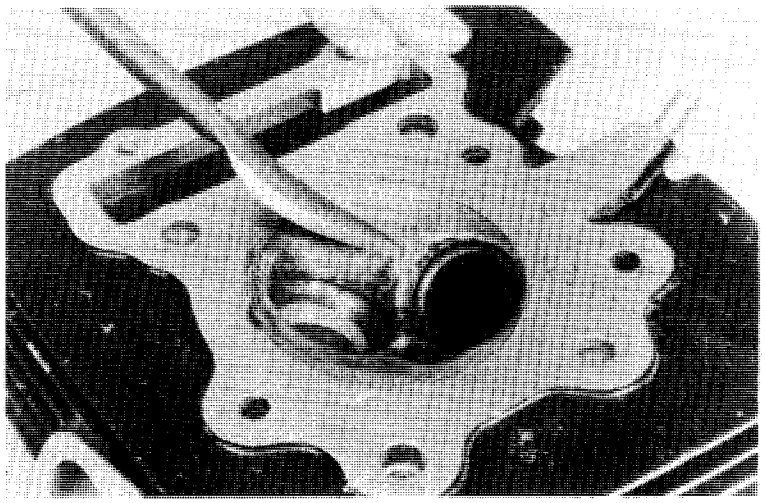
Clean both the intake and exhaust valve thoroughly to remove carbon deposits.

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

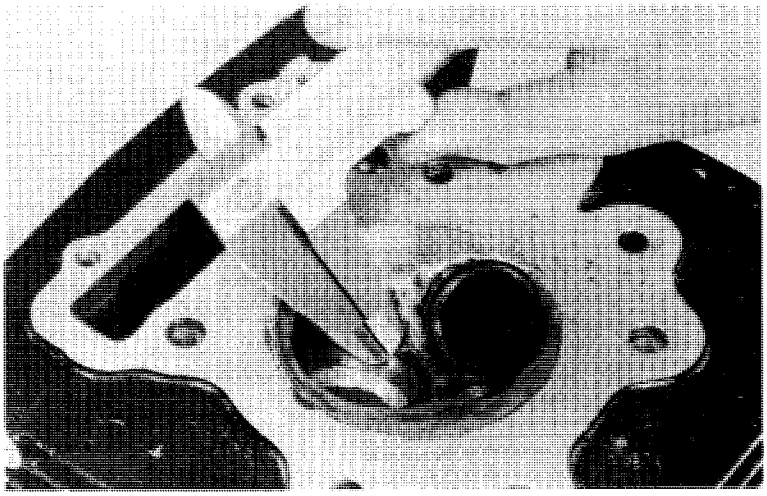
The valve cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.



Inspect the width of each valve seat.

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

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

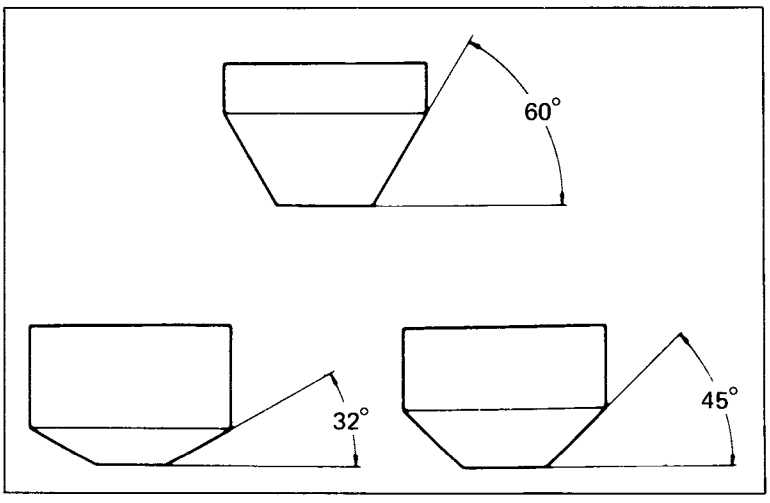


VALVE SEAT CUTTERS

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.



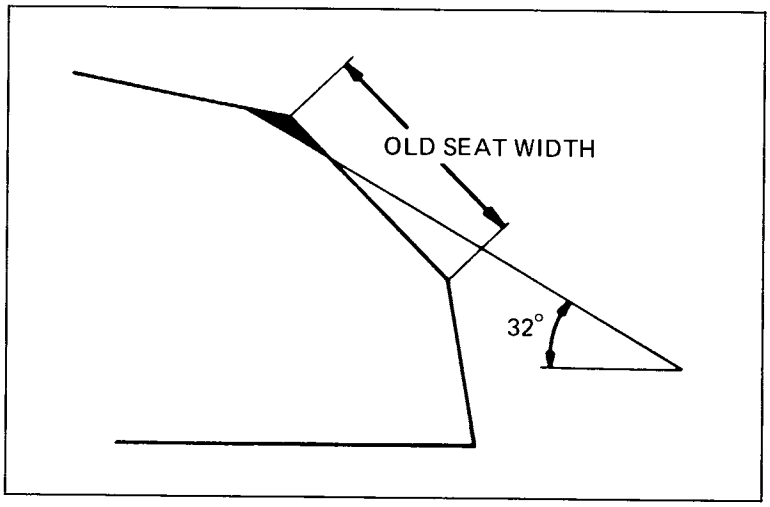
VALVE SEAT REFACING

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

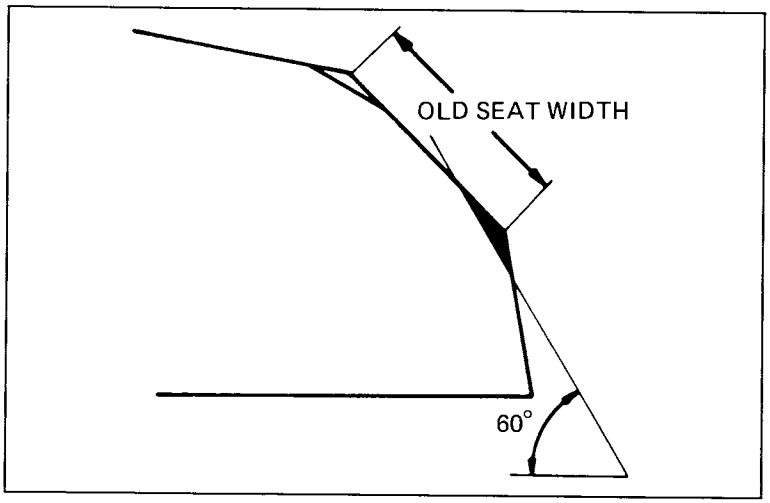
NOTE

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

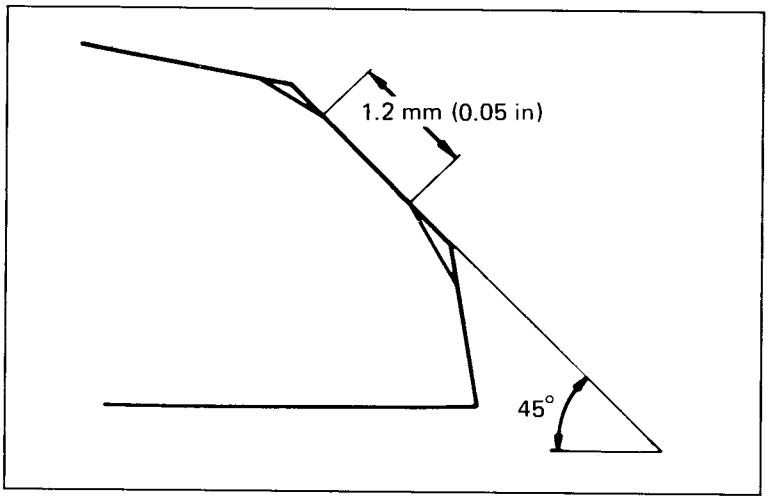
Use a 32 degree cutter to remove the top 1/4 of the existing valve seat material.



Use a 60 degree cutter to remove the bottom 1/4 of the old seat. Remover 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.

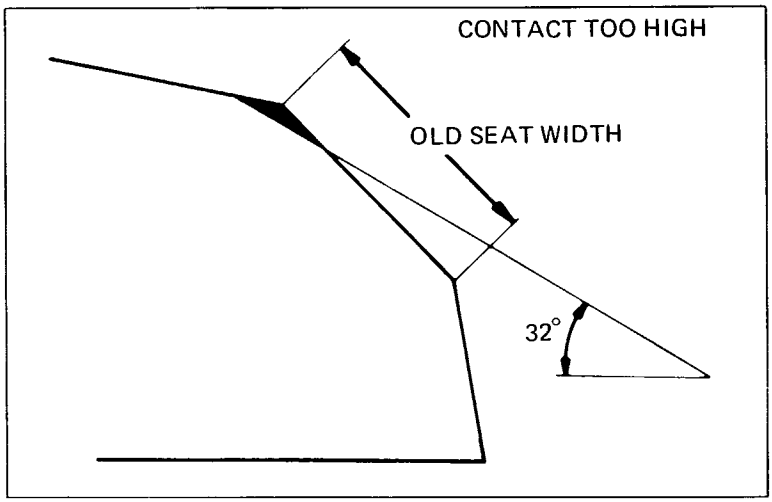


Apply a thin coating of Prussian Blue to the valve seat. Press the valve through the valve guide and onto the seat to make a clear pattern.

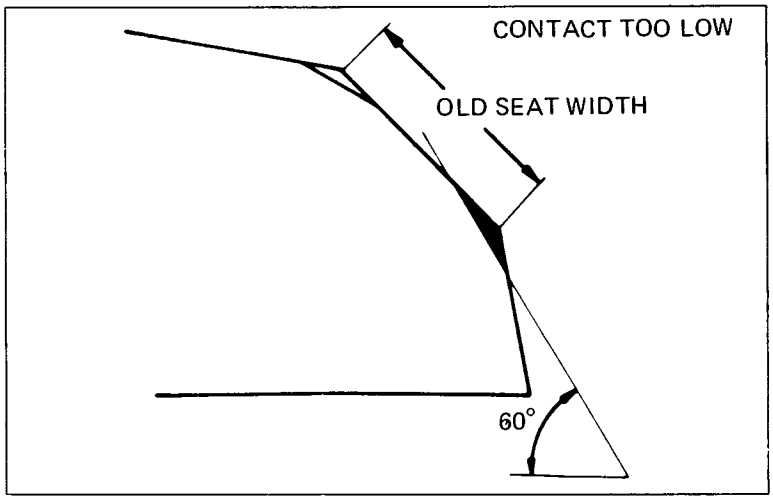
NOTE

> 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.

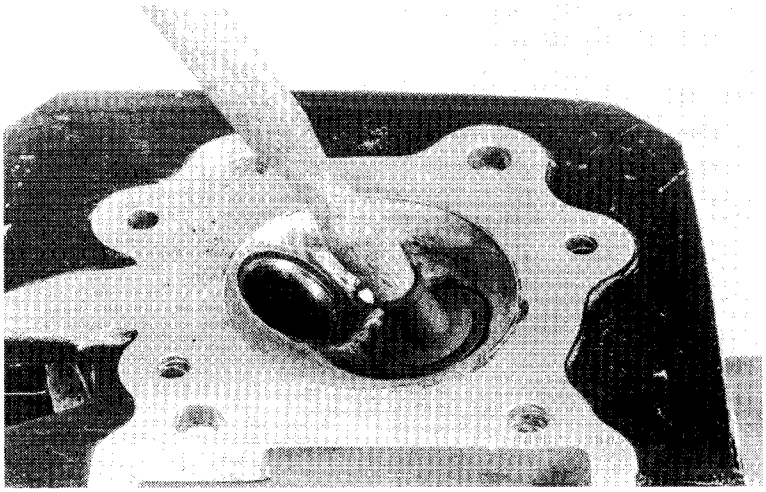


Refinish the seat to specifications, using a 45 degree finish cutter.

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

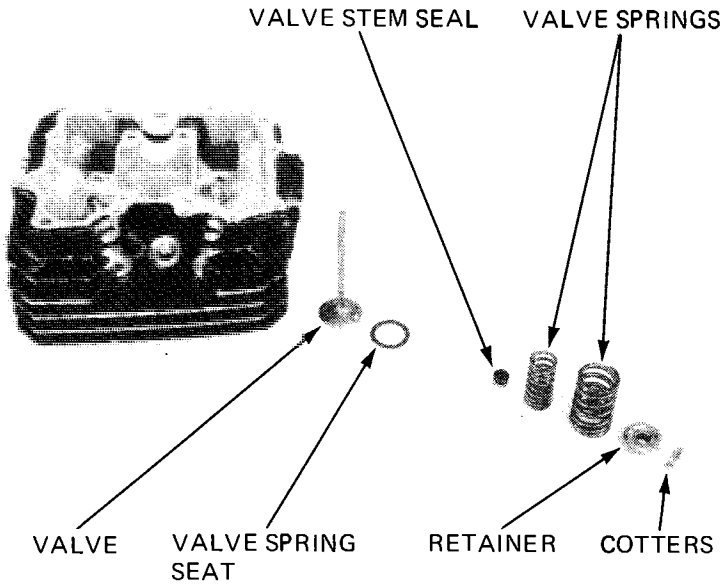
> Do not allow lapping compound to enter the guides.



CYLINDER HEAD ASSEMBLY

Install the valve spring seats 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.

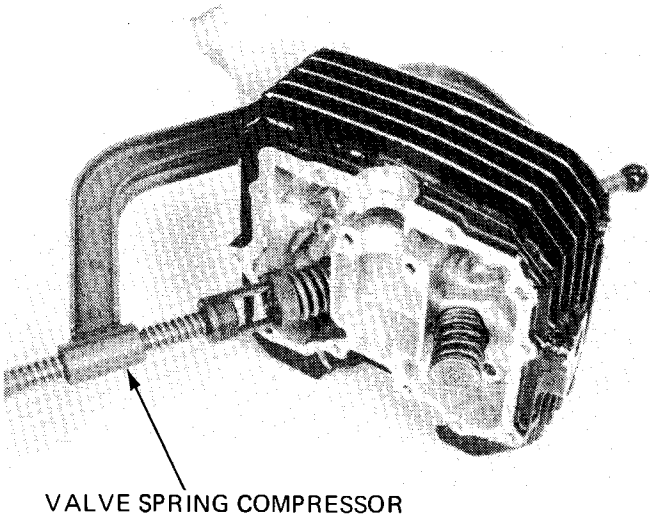
Install the valve springs with the tightly wound coils facing the cylinder head.



Install the valve spring retainers and install the valve cotters.

CAUTION

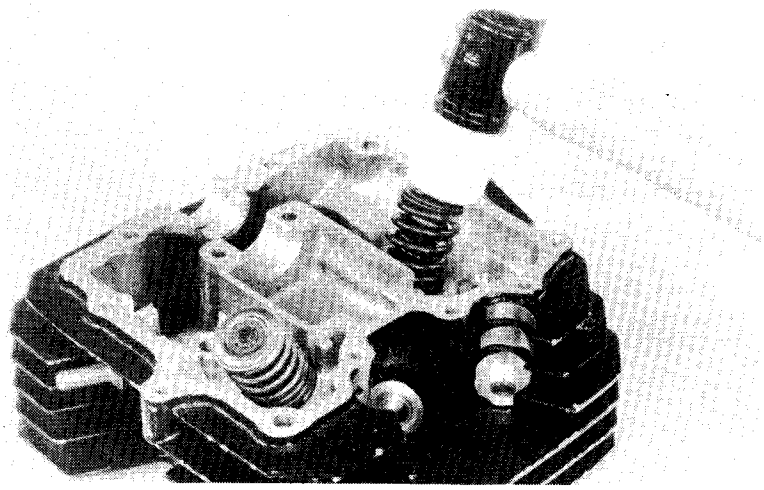
To prevent loss of tension, do not compress the valve spring more than necessary.



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

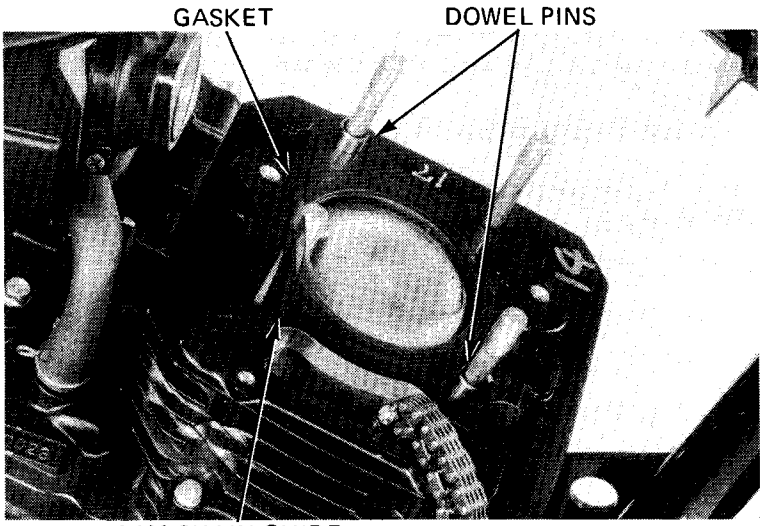
CAUTION

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



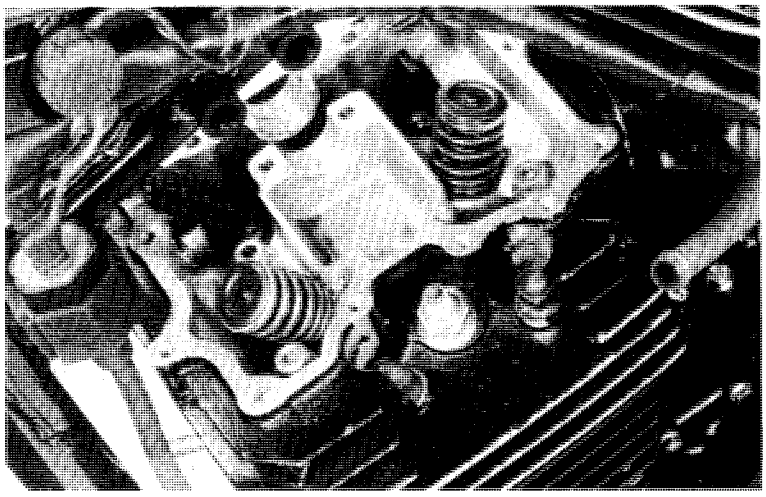
CYLINDER HEAD INSTALLATION

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.

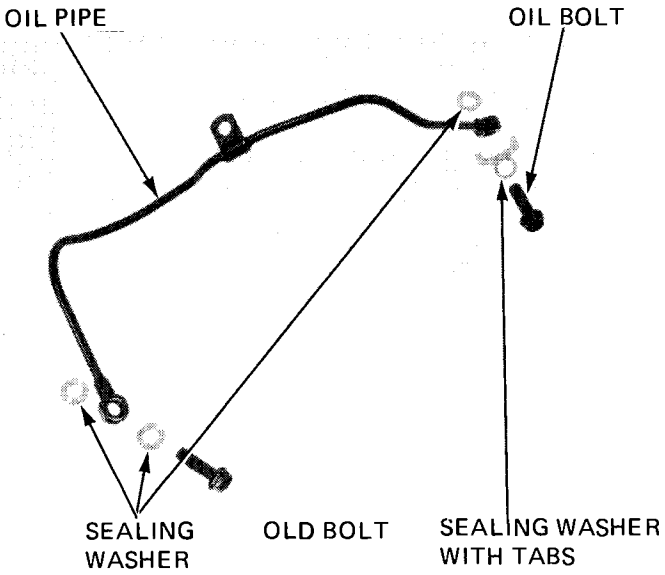
TORQUE:
CAP NUT:
35–40 N·m (3.5–4.0 kg-m, 25–32 ft-lb)
SOCKET BOLT:
22–28 N·m (2.2–2.8 kg-m, 16–20 ft-lb)



Make sure that the oil pipe and oil bolts are not clogged.

NOTE

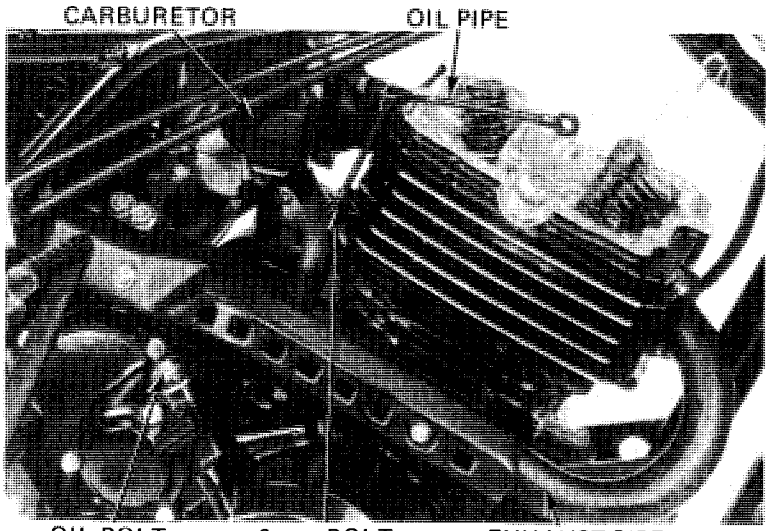
> Never reinstall old sealing washers with the oil pipe. To maintain a tight seal, the copper washers are crushed when the oil bolts are torqued.



Install the oil pipe with the oil bolts and new sealing washers, and the 6 mm mounting bolt.

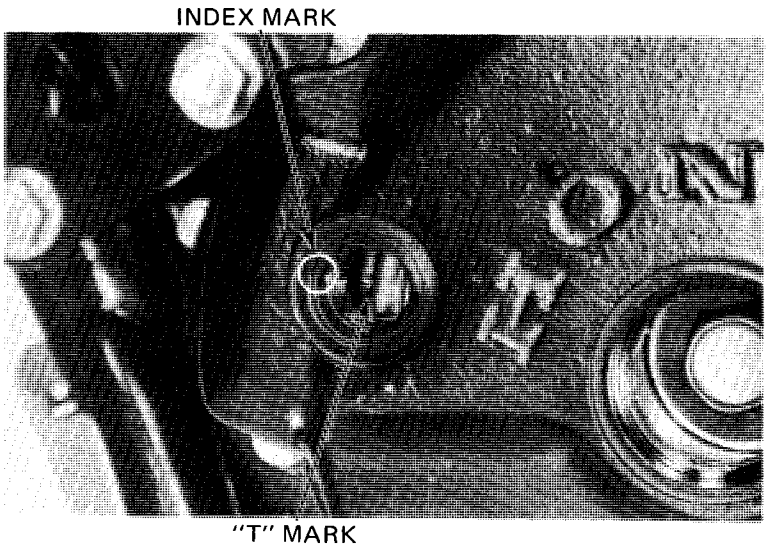
TORQUE:
Oil bolt: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

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



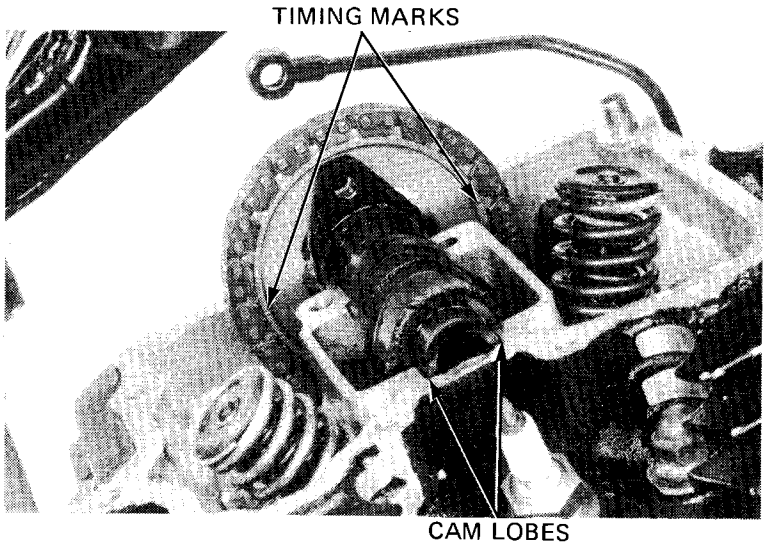
CAMSHAFT INSTALLATION

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 sprocket and the cam sprocket onto the shoulder of the camshaft.

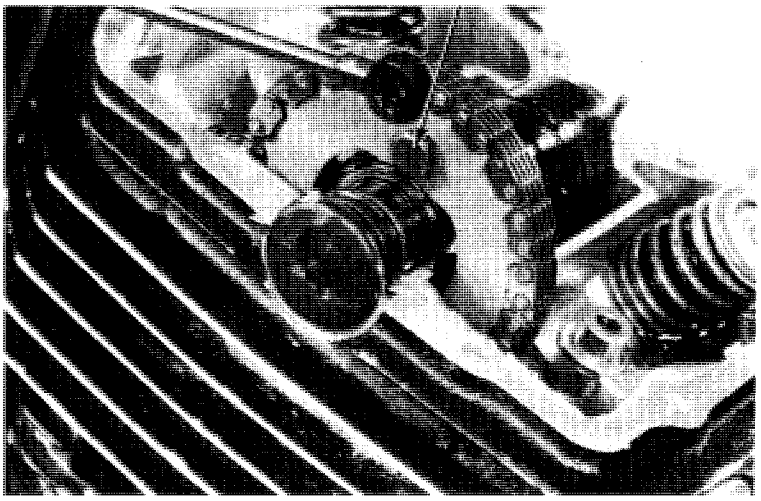


Tighten the cam sprocket bolt.

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

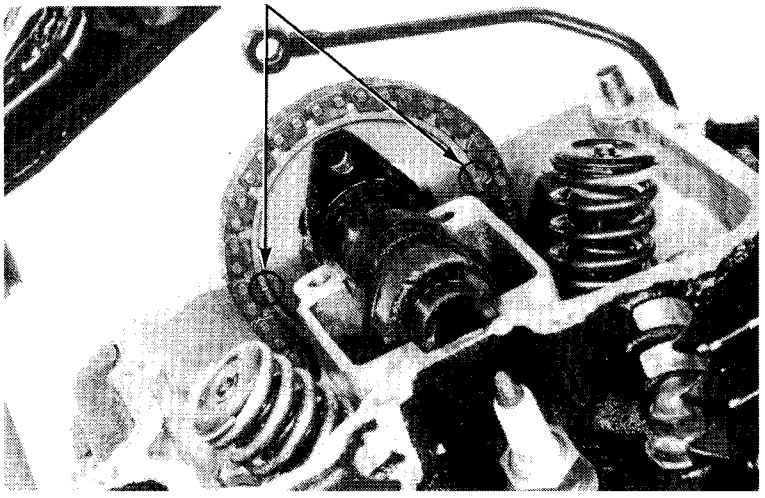
TORQUE: 17–23 N·m (1.7–2.3 kg-m, 12–17 ft-lb)

CAM SPROCKET BOLT



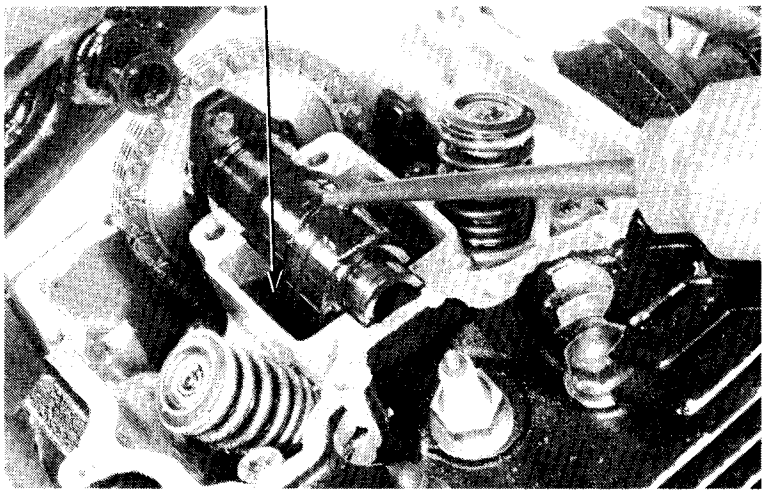
Realign the "T" mark with the index mark and recheck the cam sprocket timing marks.

TIMING MARKS



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

OIL POCKET

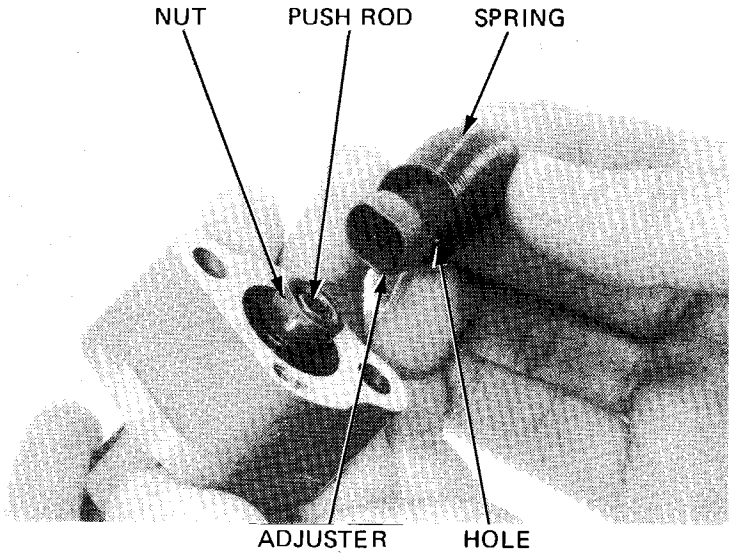


CAM CHAIN TENSIONER LIFTER ASSEMBLY/INSTALLATION

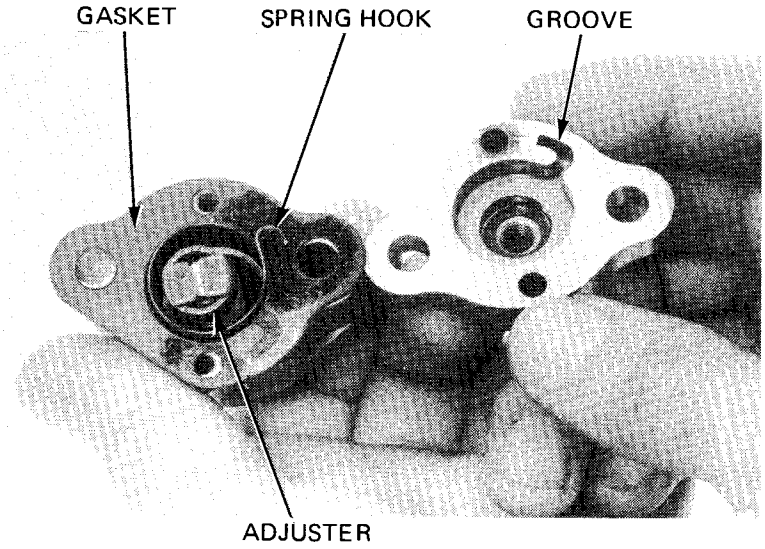
ASSEMBLY

'85, '86:

Thread the nut on the push rod until 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.

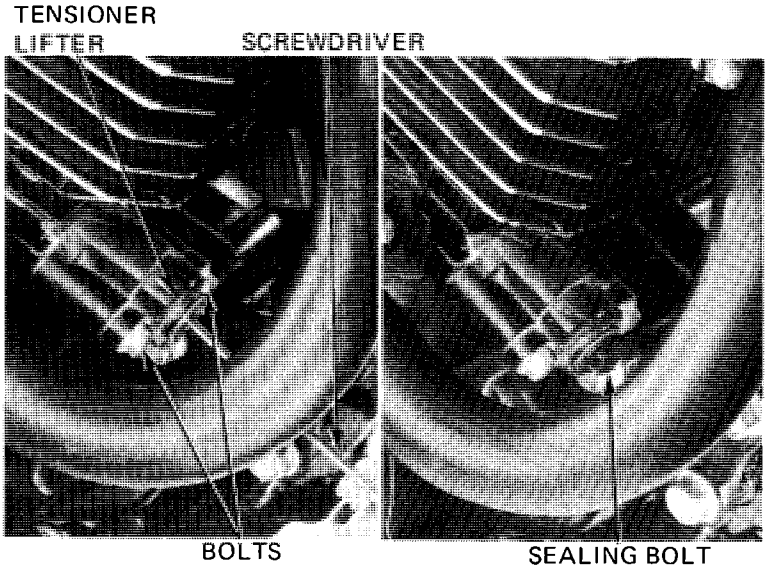


INSTALLATION

'85, '86:

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.

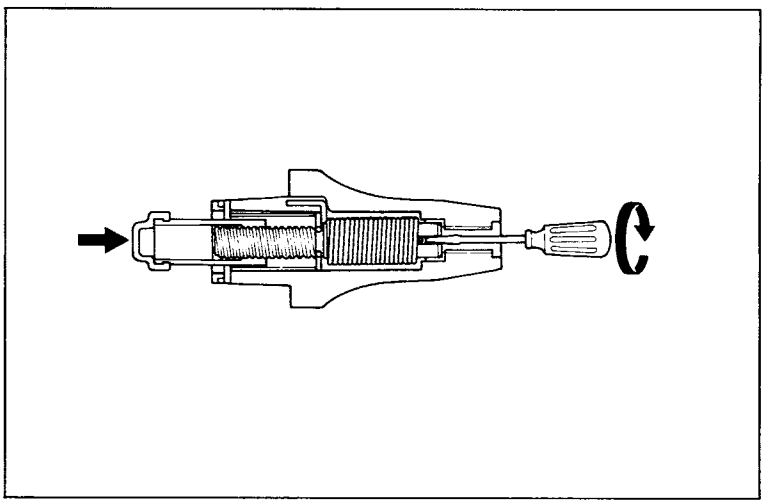
TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)



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.



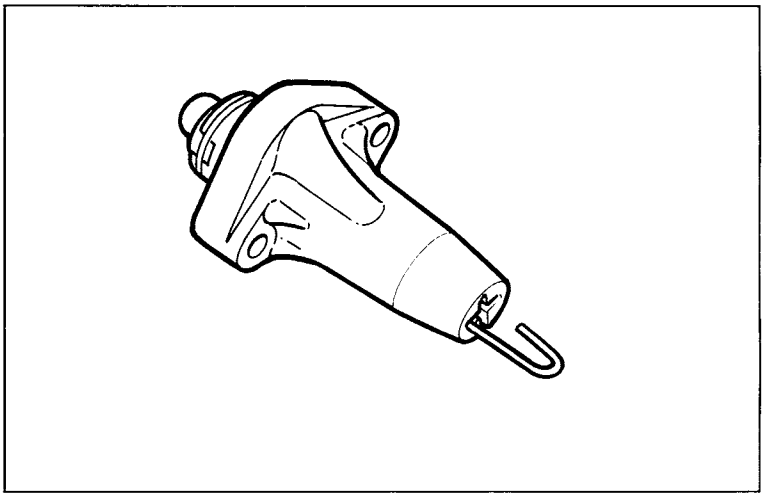
Wedge the tensioner shaft with a piece of heard wire as shown to hold the tensioner.

Install the cam chain tensioner gasket.

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

Remove the holder piece from the chain tensioner.

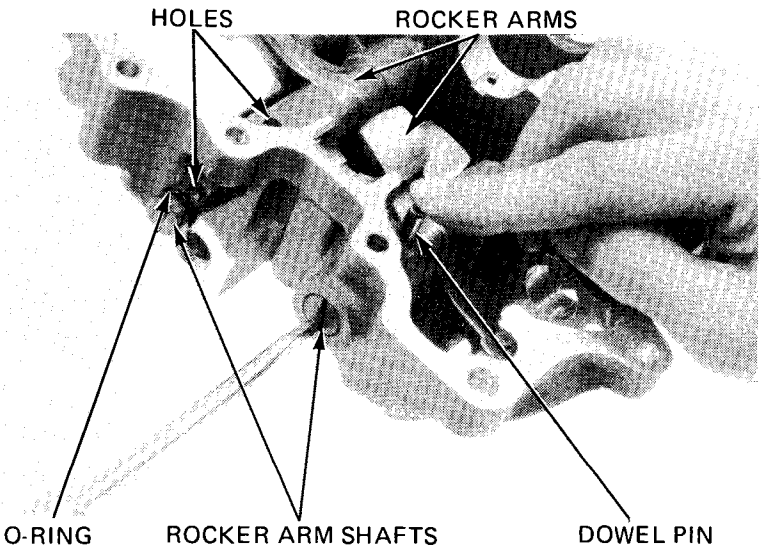
Install the gasket and bolt, and tighten the bolt securely.



CYLINDER HEAD COVER ASSEMBLY/ INSTALLATION

ASSEMBLY

Apply oil to the rocker arm shafts and arms.
Install new O-rings into the groove of the rocker arm shafts and install the rocker arms and shafts.
Align the dowel pin holes in the cylinder head cover and rocker arm shaft and install new dowel pins.

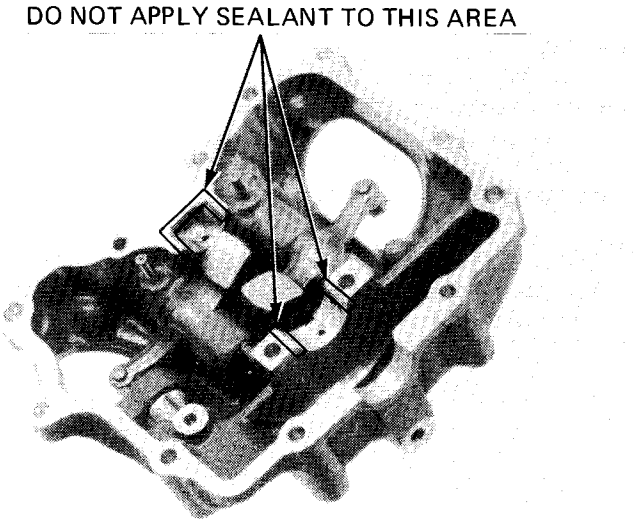


INSTALLATION

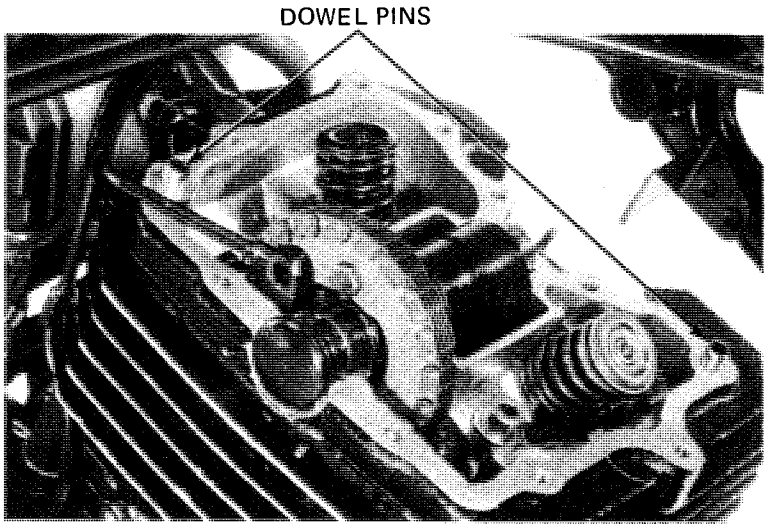
Apply liquid sealant to the mating surfaces of the cylinder head as shown.

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 or 3 steps starting with the center bolt.

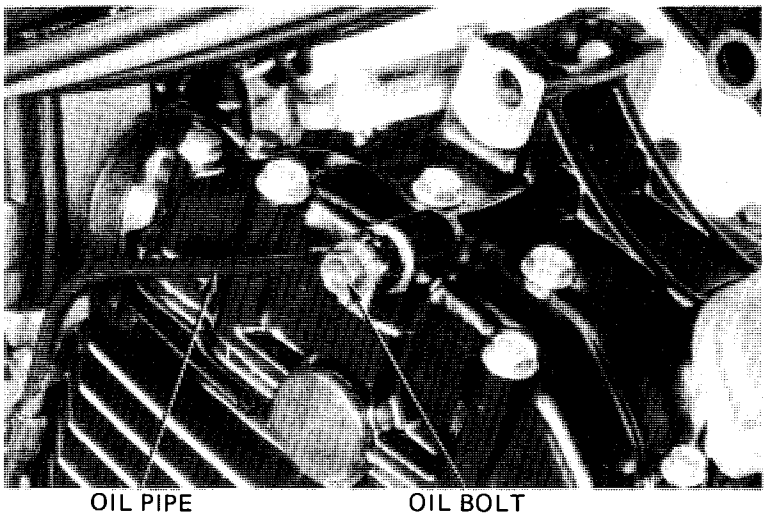
TORQUE: 8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

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

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

NOTE

Do not reinstall the old washers. New washers must be used to maintain a tight seal.



Adjust valve clearance (Page 3-5).

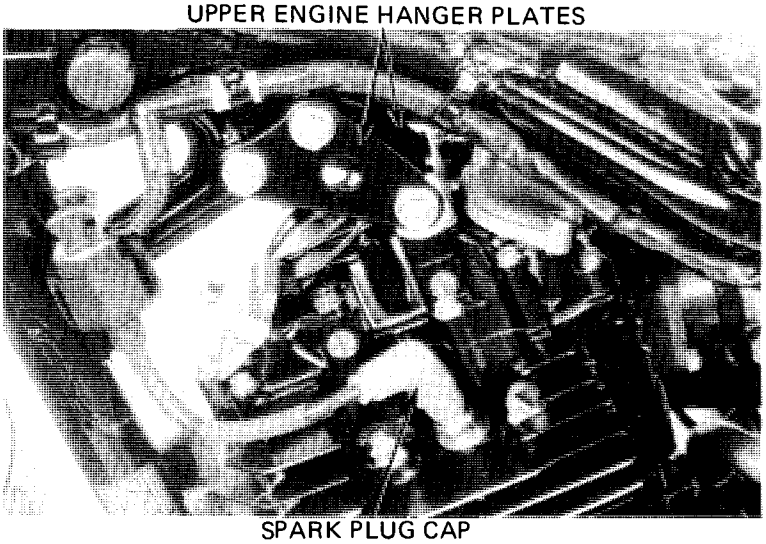
Test cylinder compression (Page 3-8).
Connect the spark plug cap to the plug.

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

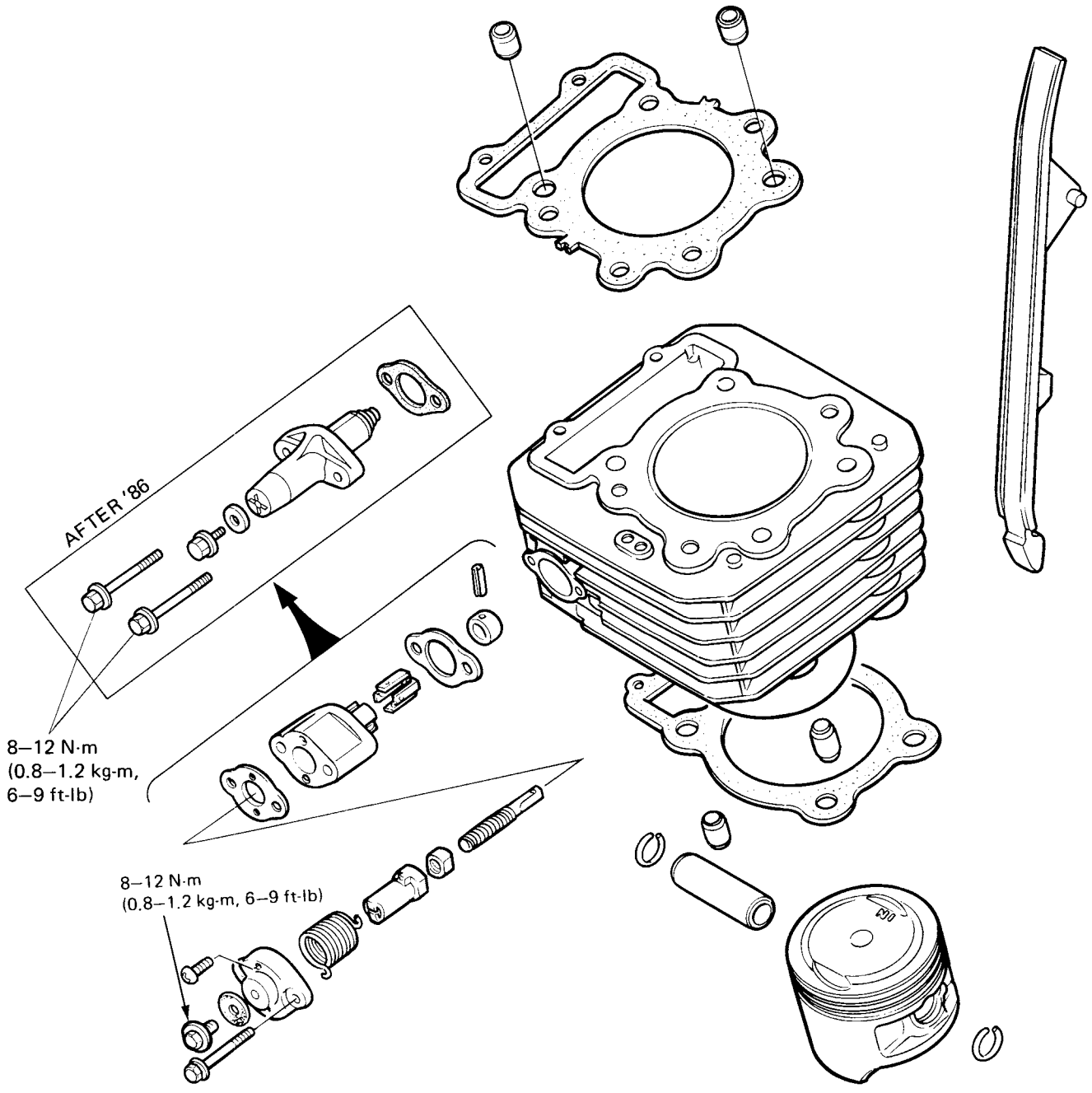
TORQUE: 40–50 N·m (4.0–5.0 kg-m, 29–36 ft-lb)

Install the fuel tank and seat.

UPPER ENGINE HANGER PLATES



SPARK PLUG CAP


AFTER '86
8–12 N·m
(0.8–1.2 kg-m,
6–9 ft-lb)
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 a pipe. Be sure this pipe is not clogged 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)
	Outer 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	0.15–0.3 mm (0.006–0.012 in)	0.50 mm (0.020 in)
		OIL	0.2–0.7 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)
Cranksahft	Connecting rod small end I.D.		19.020–19.041 mm (0.7488–0.7496 in)	19.10 mm (0.752 in)

TROUBLESHOOTING

Low or unstable compression
1. Worn cylinder or piston rings

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 build-up on piston or combustion chamber wall

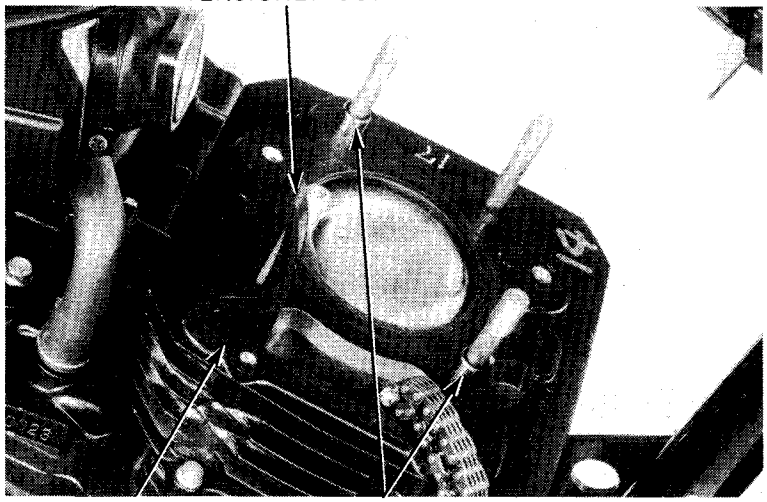
Knocking or abnormal noise
1. Worn piston and cylinder
2. Excessive carbon build-up

CYLINDER REMOVAL

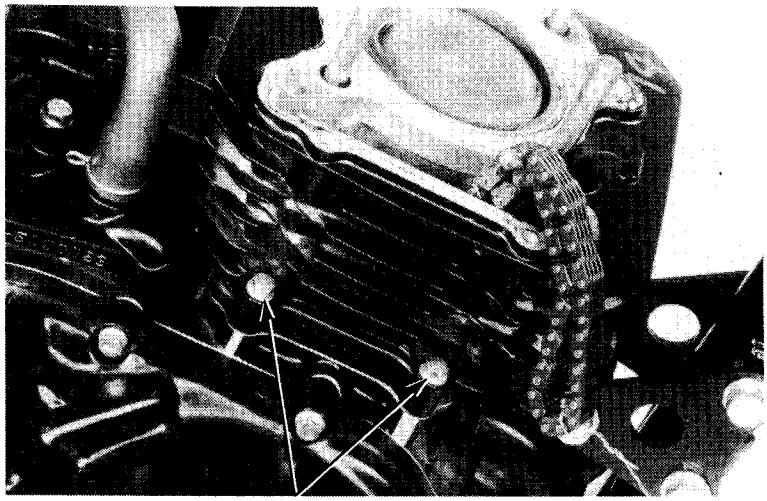
Remove the cylinder head (Section 6).
Remove the gasket, dowel pins and the cam chain guide.

NOTE

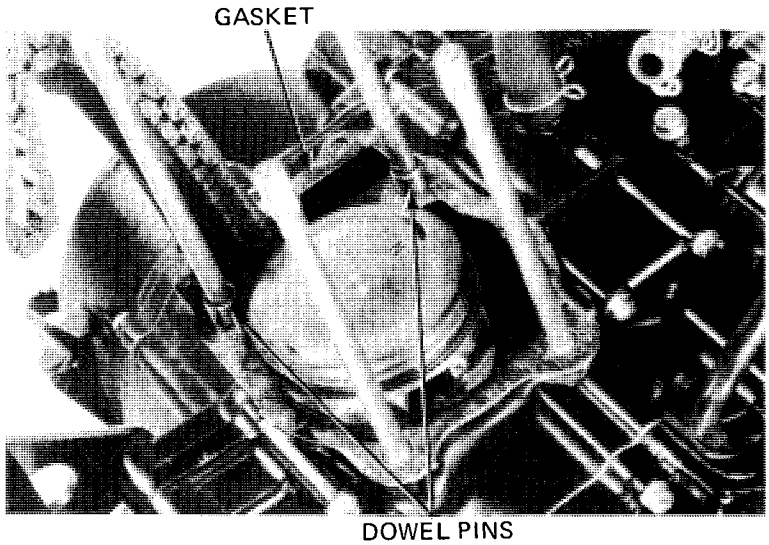
Keep the cam chain from falling into the crankcase when removing the cylinder.



Remove the cylinder mount bolts.



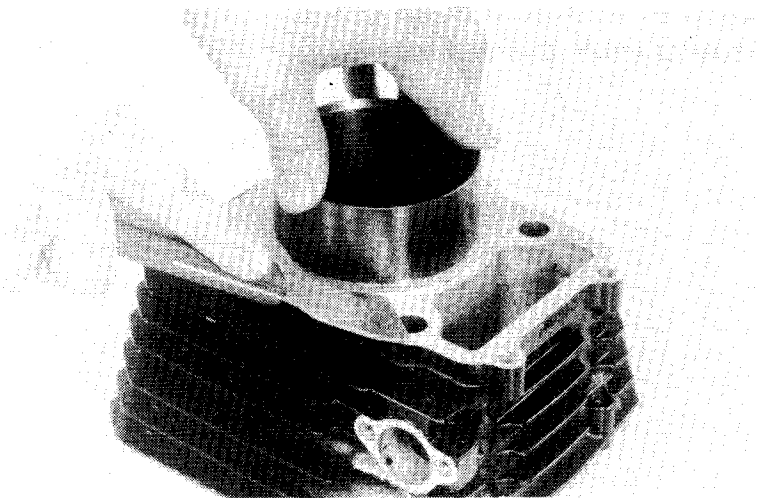
Remove the cylinder.
Remove the gasket and dowel pins.



Clean off any gasket material from the cylinder surface.

NOTE

Be careful not to remove any metal from the gasket surface.



CYLINDER INSPECTION

Inspect the cylinder wall for scratches and wear. Measure and record the cylinder I.D. at three levels in both an X and Y axis for a total of six measurement. Take the maximum reading to determine the cylinder wear.

SERVICE LIMIT: 74.10 mm (2.917 in)

Calculate the piston-to-cylinder clearance by taking the maximum reading and subtracting the piston O.D.
Refer to page 7-5 for measurement of the piston O.D.

SERVICE LIMIT: 0.10 mm (0.004 in)

Calculate the cylinder taper by taking the readings at the three levels and subtracting the minimum from the maximum reading.

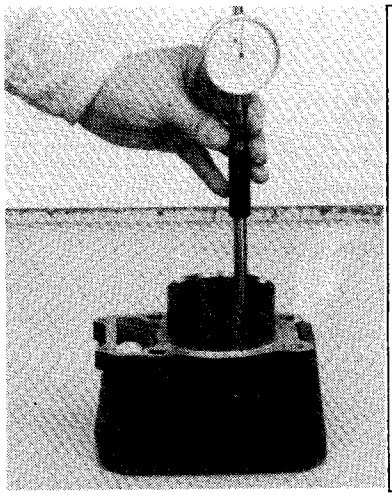
SERVICE LIMIT: 0.10 mm (0.004 in)

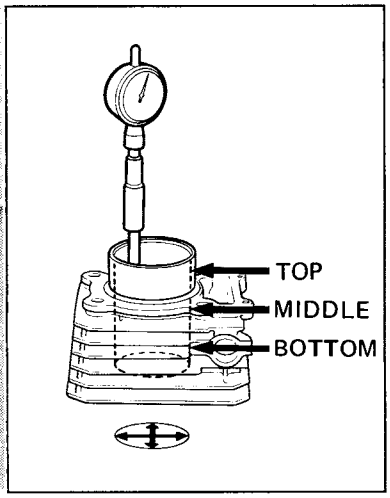
Calculate the cylinder out-of-round by checking for a difference between the X and Y readings at each of the three levels.
If there is any difference, take the maximum reading to determine the out-of-round.

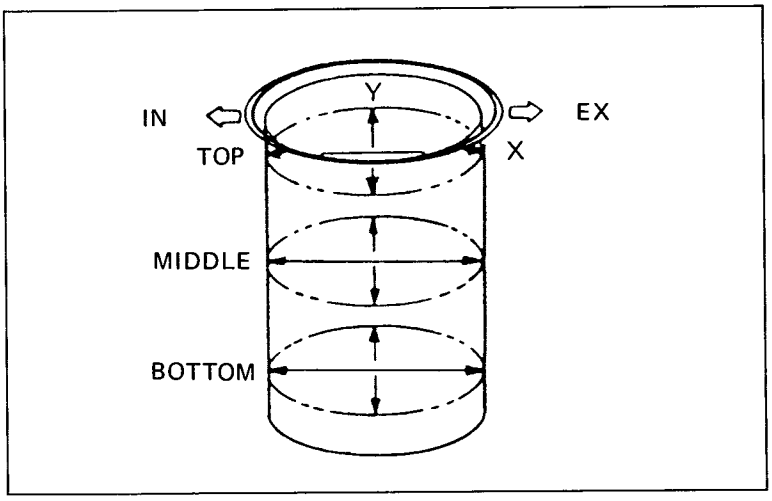
SERVICE LIMIT: 0.10 mm (0.004 in)

The cylinder must be rebored, and oversize pistons fitted, if any of the service limits are exceed.
The following oversize pistons are available:
0.25 mm (0.010 in), 0.50 mm (0.020 in), 0.75 mm (0.030 in) and 1.00 mm (0.039 in)

The cylinder must be rebored so that the clearance to an oversize piston is 0.015–0.045 mm (0.0006–0.0018 in).

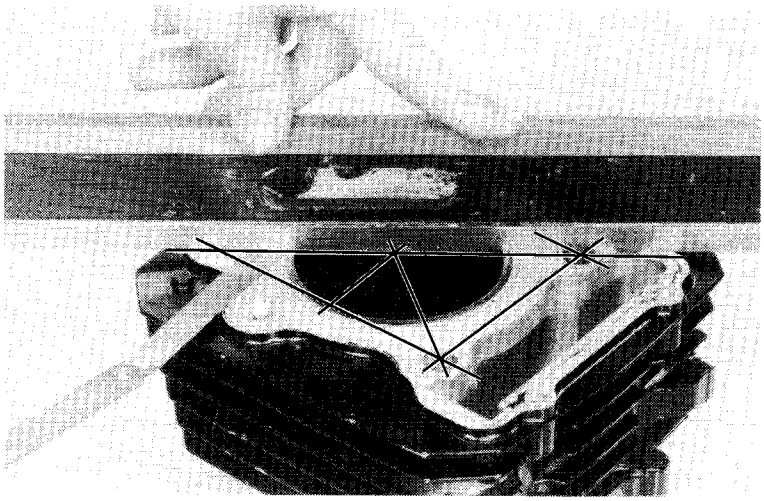






Inspect the top of the cylinder for warpage.

SERVICE LIMIT: 0.10 mm (0.004 in)



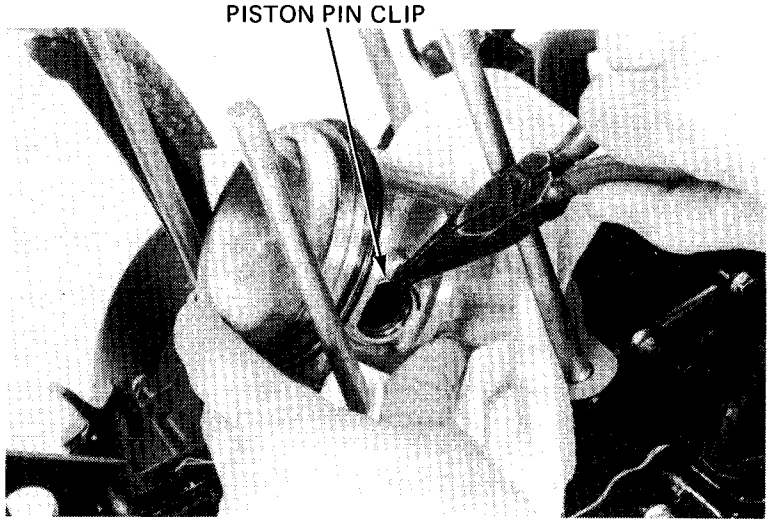
PISTON REMOVAL

Remove the piston pin clip with pliers.

NOTE

Do not let the clip fall into the crankcase.

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



PISTON/PISTON RING INSPECTION

Measure the piston ring-to-groove clearance.
Remove the piston rings.

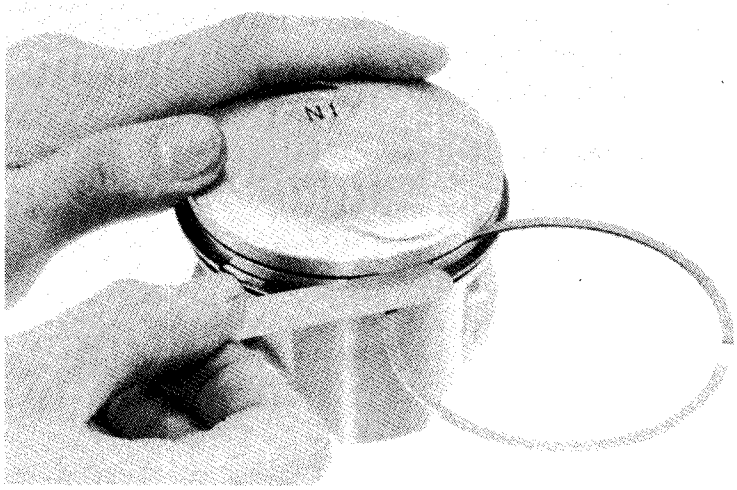
NOTE

Do not damage the piston rings during removal.

Inspect the piston for wear or damage.

SERVICE LIMITS:

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

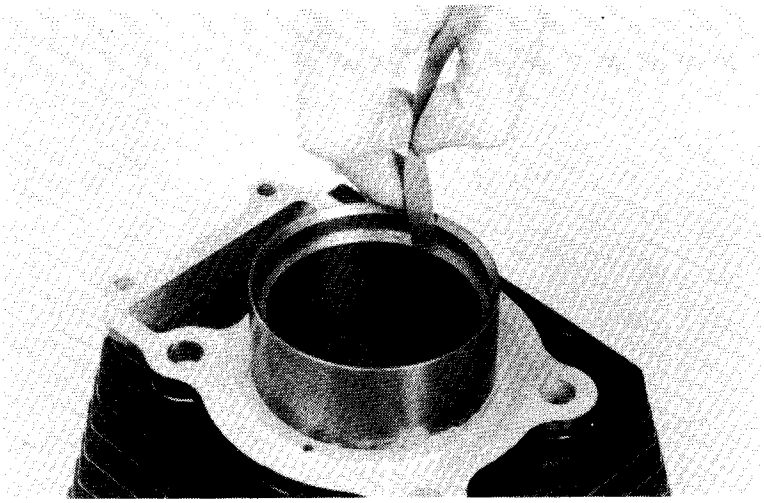


Insert each piston ring squarely into the cylinder and measure the ring end gap.

NOTE

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

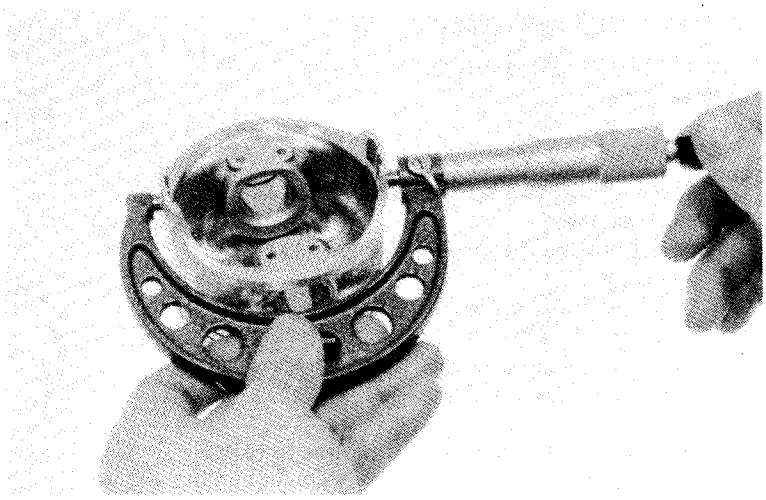
SERVICE LIMITS:
TOP/SECOND: 0.50 mm (0.020 in)



Measure and record the piston O.D. at a point 10 mm (0.4 in) from the bottom, and 90° to the piston pin bore.

SERVICE LIMIT: 73.90 mm (2.909 in)

Compare this measurement against the service limit and calculate piston-to-cylinder clearance.
Refer to page 7-3 for measuring the cylinder.



Measure the piston pin hole I.D.

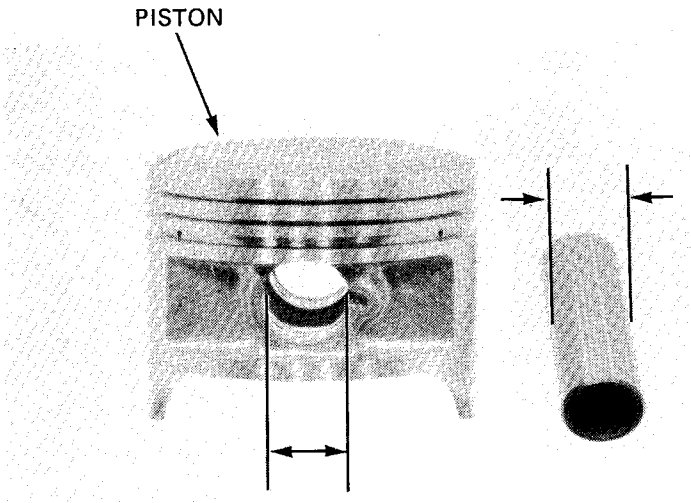
SERVICE LIMIT: 19.04 mm (0.750 in)

Measure the O.D. of the piston pin.

SERVICE LIMIT: 18.96 mm (0.747 in)

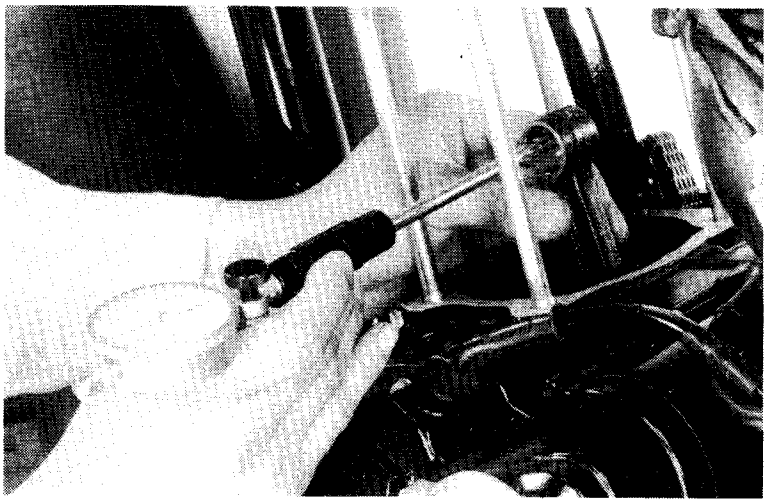
Calculate the piston-to-piston pin clearance.

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

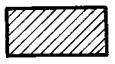
Clean the piston ring grooves thoroughly and install the piston rings.

NOTE

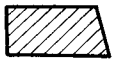
- Avoid piston and piston ring damage during installation.
- Install the piston rings with the marking facing up.
- Do not mix the top and second rings.

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

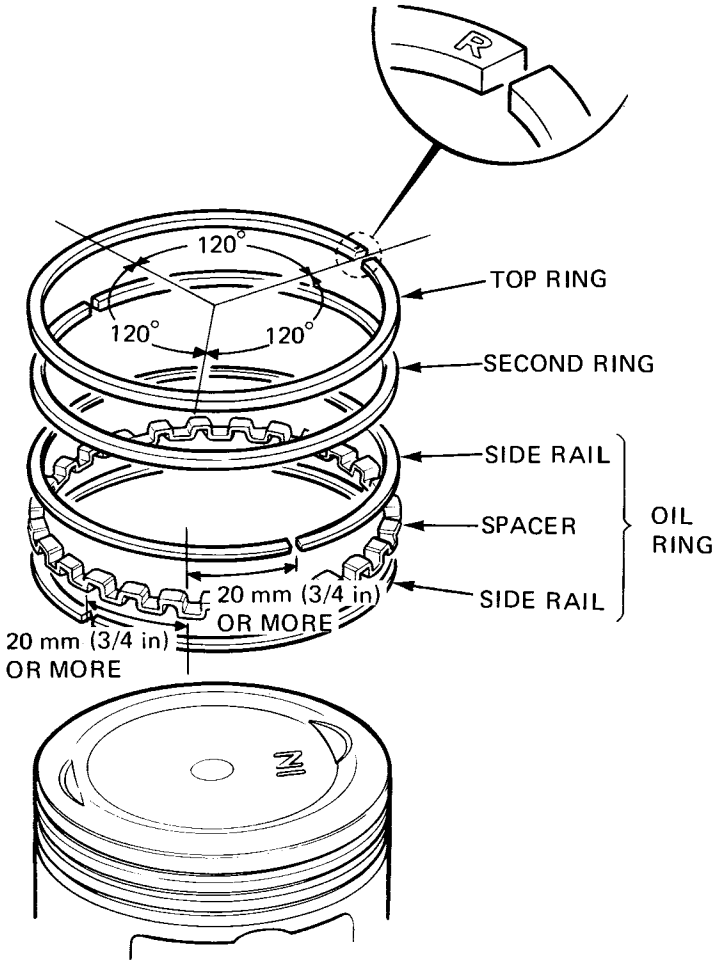
After installation, the rings should be free to rotate in the ring grooves.



TOP RING



SECOND RING

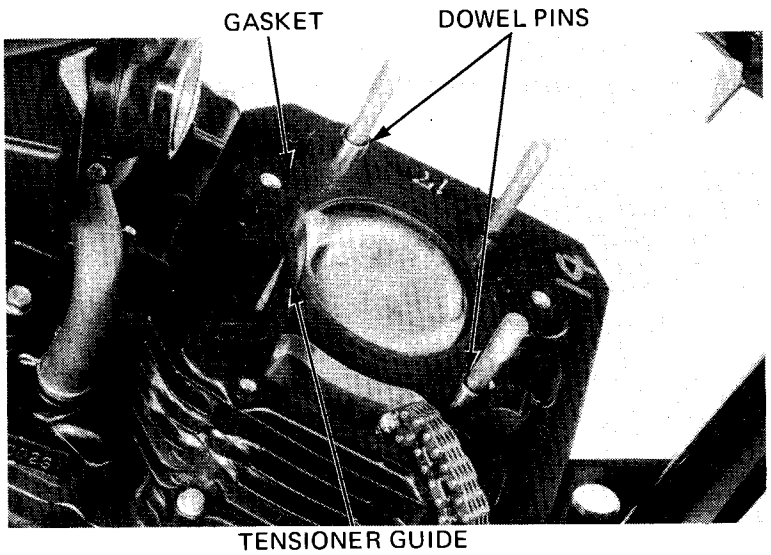


CAM CHAIN GUIDE

REMOVAL

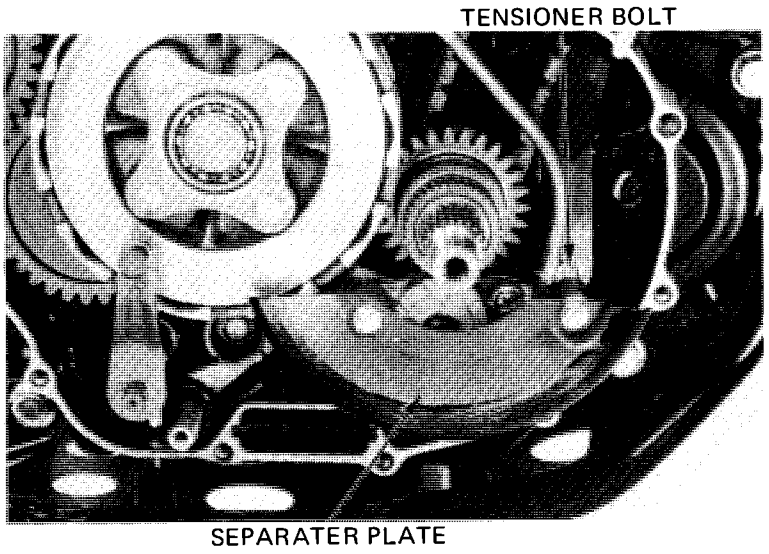
Remove the cylinder head (Page 6-7).

Remove the tensioner lifter (Page 6-4) and tensioner guide.



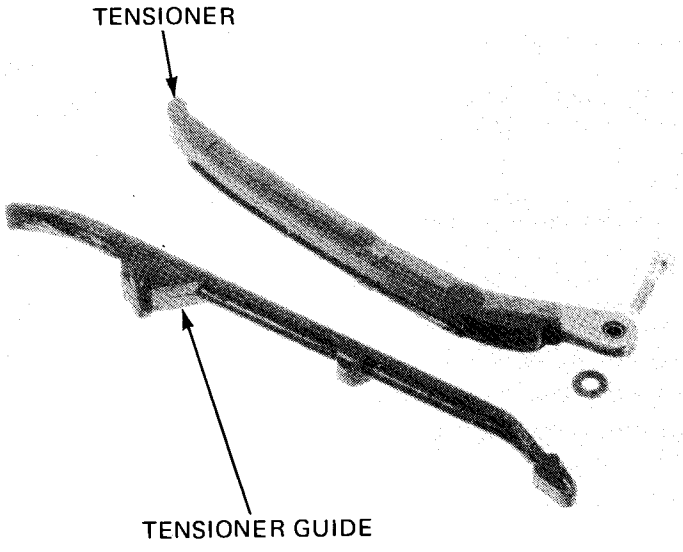
Remove the right crankcase cover (Page 8-3), centrifugal clutch (Page 8-10) and separater plate.

Remove the tensioner bolt and tensioner washer.



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).

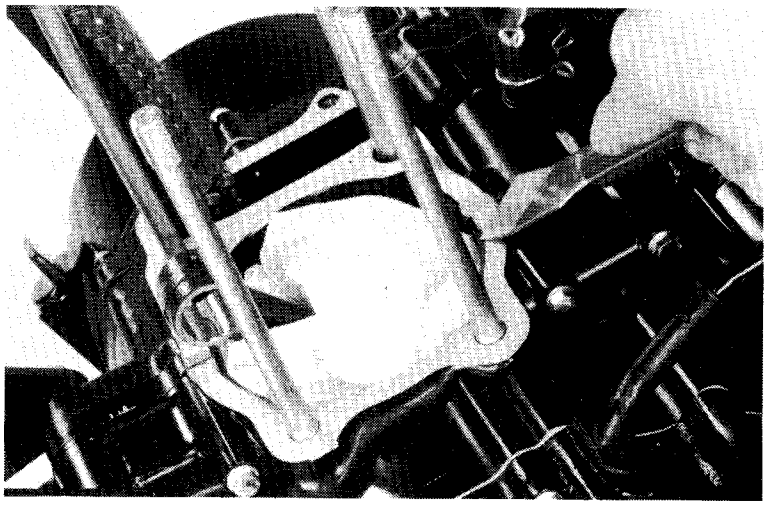


PISTON/CYLINDER INSTALLATION

Clean off any gasket material from the crankcase surface.

NOTE

Be careful not to remove any metal from the gasket surface.



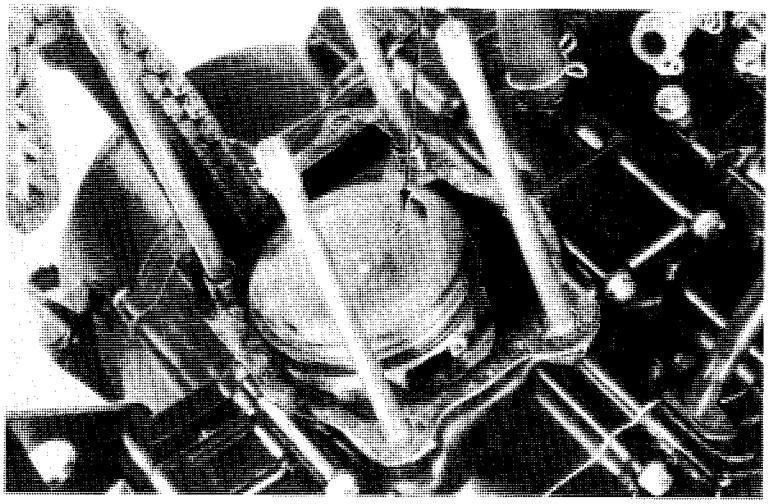
Install the piston and piston pin, using new piston pin clips.

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 the dowel pins and a new O-ring.

"IN" MARK



Stagger the piston ring end gaps 120° part.

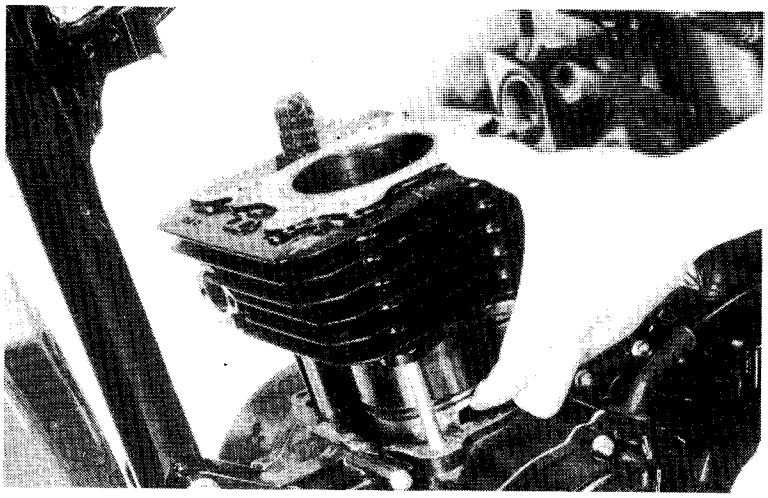
Coat the cylinder bore and piston rings with engine oil and install the cylinder.

NOTE

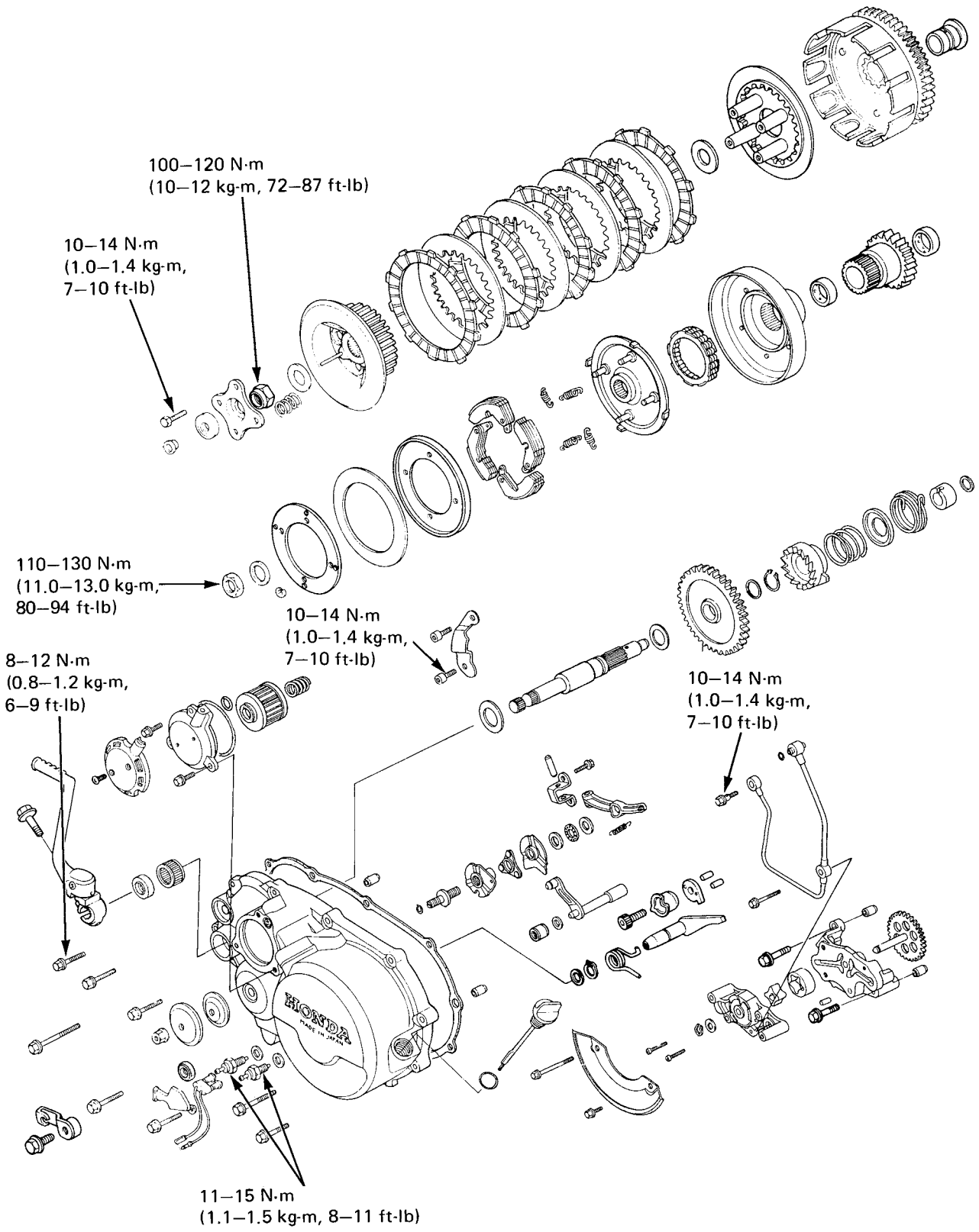
- Avoid piston ring damage during installation.
- Do not let the cam chain fall into the crankcase.

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)
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)
10–14 N·m
(1.0–1.4 kg-m,
7–10 ft-lb)
11–15 N·m
(1.1–1.5 kg-m, 8–11 ft-lb)

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 (39.68 lb)	—
	Disc thickness	2.62–2.78 mm (0.103–0.109 in)	2.3 mm (0.091 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)
	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)
Kick starter	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 drive gear	Crankshaft O.D.	26.959–26.980 mm (1.0613–1.0622 in)	26.93 mm (1.060 in)
	Gear I.D.	27.000–27.021 mm (1.0630–1.0638 in)	27.05 mm (1.065 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-cover clearance	0.15–0.21 mm (0.006–0.008 in)	0.25 mm (0.010 in)

TORQUE VALUES

Oil bolts	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Kick stopper plate	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 agency
Centrifugal clutch lock nut	110–130 N·m (11.0–13.0 kg-m, 80–94 ft-lb) Apply thread locking agency
Neutral and reverse switch	11–15 N·m (1.1–1.5 kg-m, 8–11 ft-lb)
Clutch bolts	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Right crankcase cover bolts	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)

TOOLS

Special

Remover handle	07936–3710100
Remover weight	07936–3710200 or 07741–0010201
Bearing remover, 17 mm	07936–3710300
Attachment, 28 x 30 mm	07946–1870100
Clutch center holder	07923–KE10001 or equivalent commercially available in U.S.A.
Bearing remover, 20 mm	07936–3710600
Clutch holder	07923–HA80000 not available in U.S.A. or 07923–HB3000A (U.S.A. only)
Clutch puller	07933–HA80000 not available in U.S.A. or 07933–HB3000A (U.S.A. only)

Common

Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300
Pilot, 17 mm	07746–0040400
Pilot, 20 mm	07746–0040500
Extension	07716–0020500 or equivalent commercially available in U.S.A.
Lock nut wrench, 17 x 27 mm	07716–0020300 or equivalent commercially available in U.S.A.
Flywheel holder	07725–0040000 or strap wrench commercially available in U.S.A.

TROUBLESHOOTING

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

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

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

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

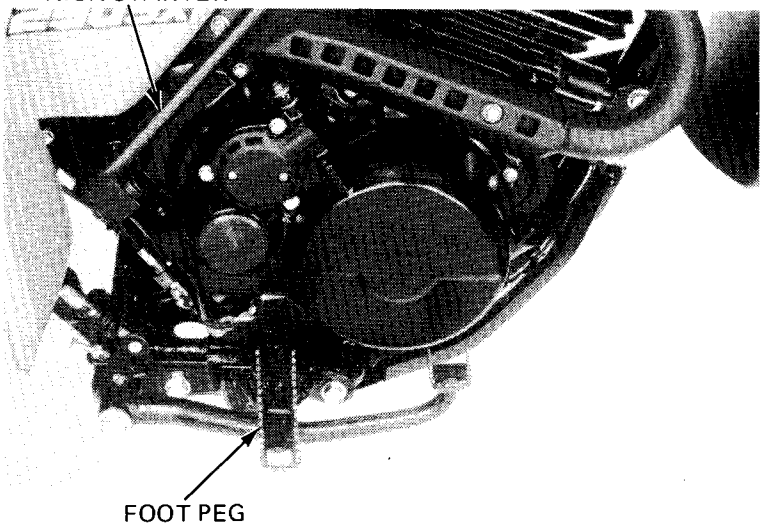
Clutch operation feels rough
– Outer drum slots rough

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

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

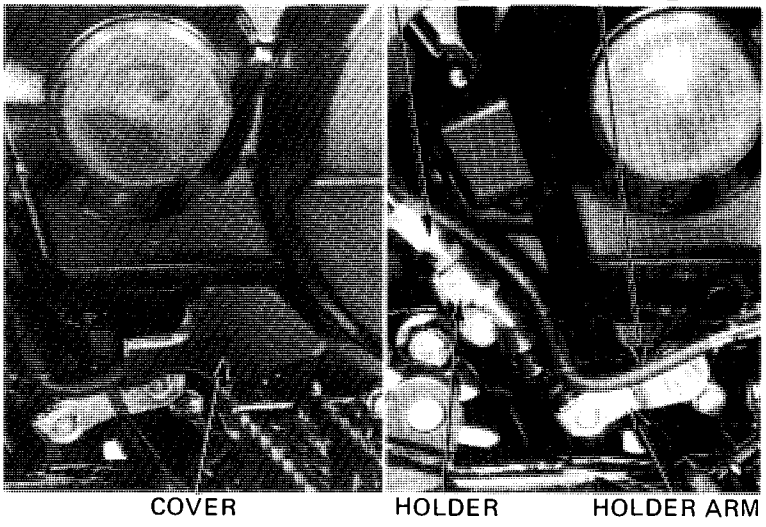
RIGHT CRANKCASE COVER REMOVAL

Drain the oil from the engine.
Shift the transmission to neutral.
Remove the kick starter and right foot peg.



Remove the cable holder and cable holder arm with bolts.

Remove the neutral/reverse switch wire cover and disconnect the wire from the switches.

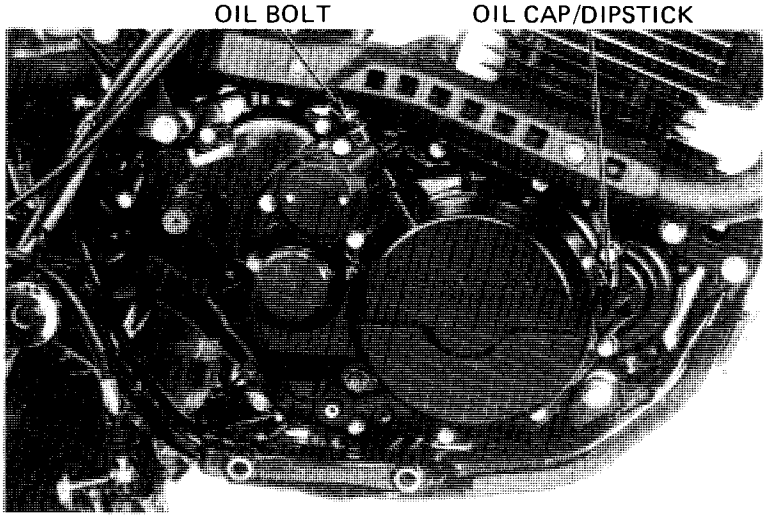


Remove the oil bolt, and two sealing washers from the right crankcase cover.

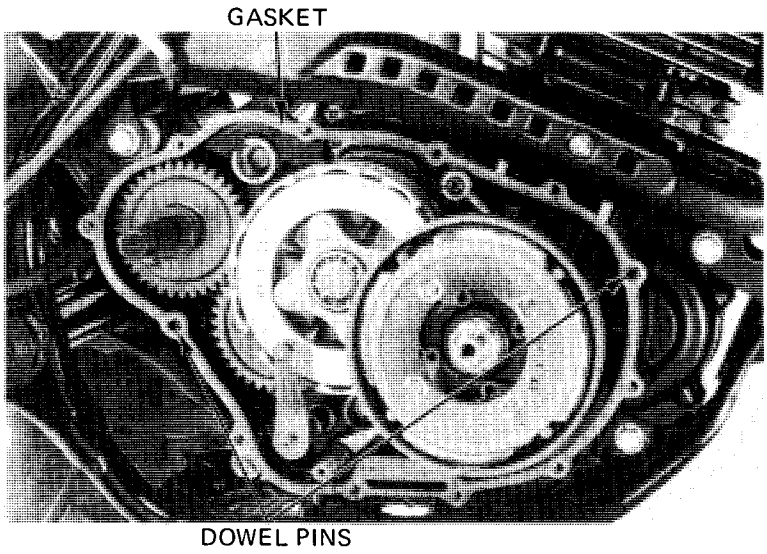
NOTE

> New sealing washers are required when never the oil bolt is removed.

Remove the oil cap/dipstick.
Remove the right crankcase cover bolts and the cover.

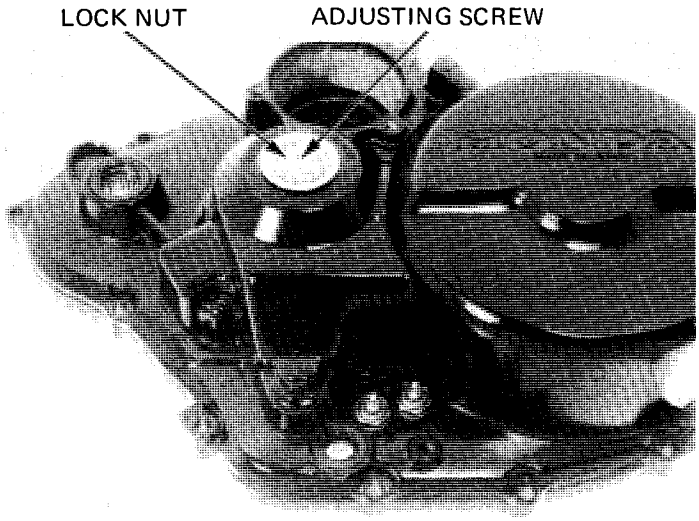


Remove the gasket and dowel pins.

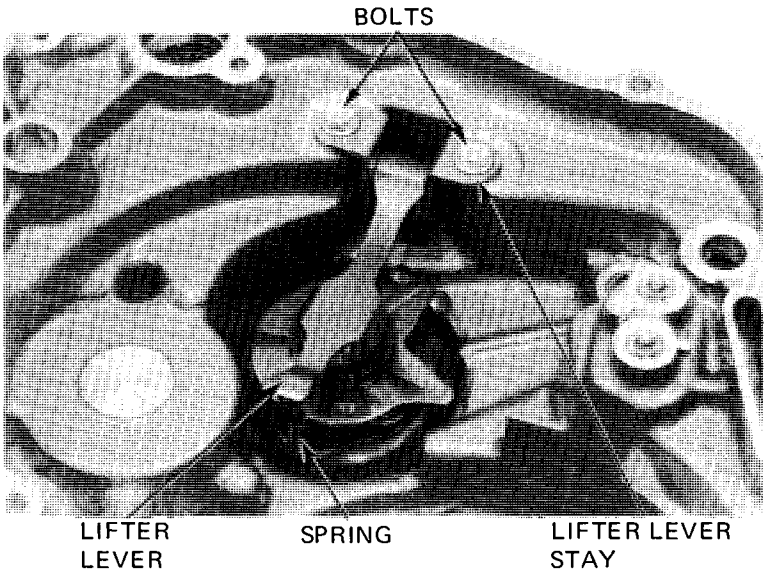


CLUTCH LIFTER DISASSEMBLY

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



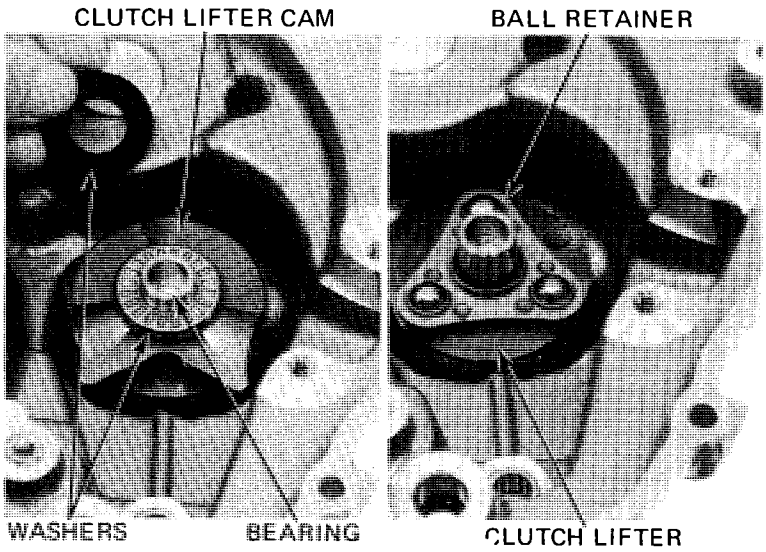
Remove the clutch lifter lever stay mount bolts, lifter lever and spring.



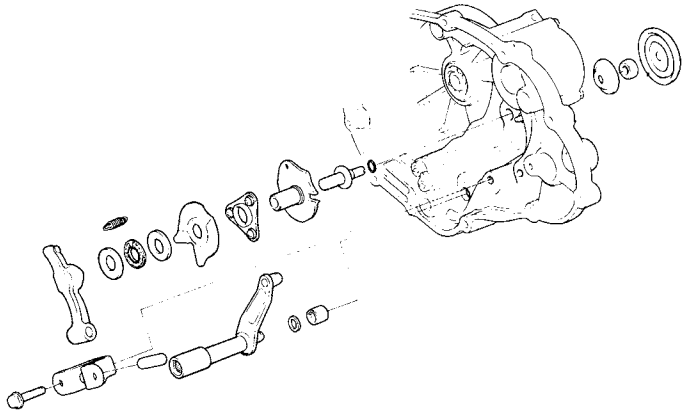
Remove the washers, bearing and clutch lifter cam.

Remove the ball retainer and clutch lifter with adjusting screw.

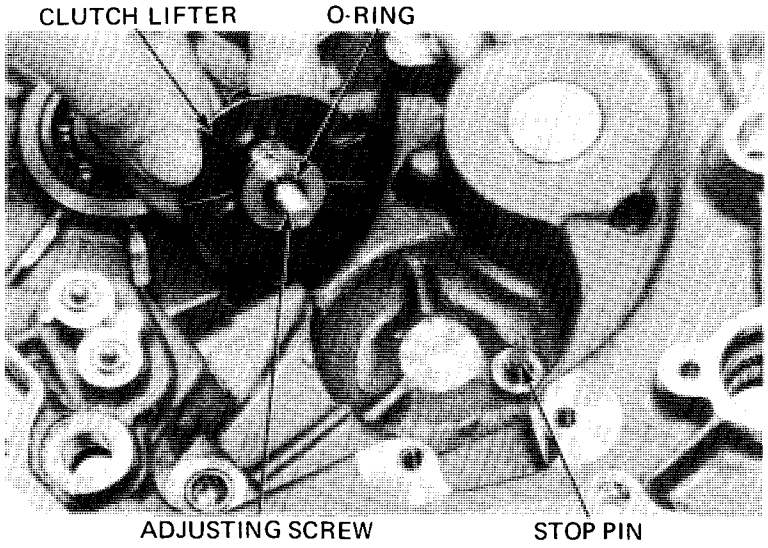
Check the disassembled parts for damage or wear, replace the parts if necessary.



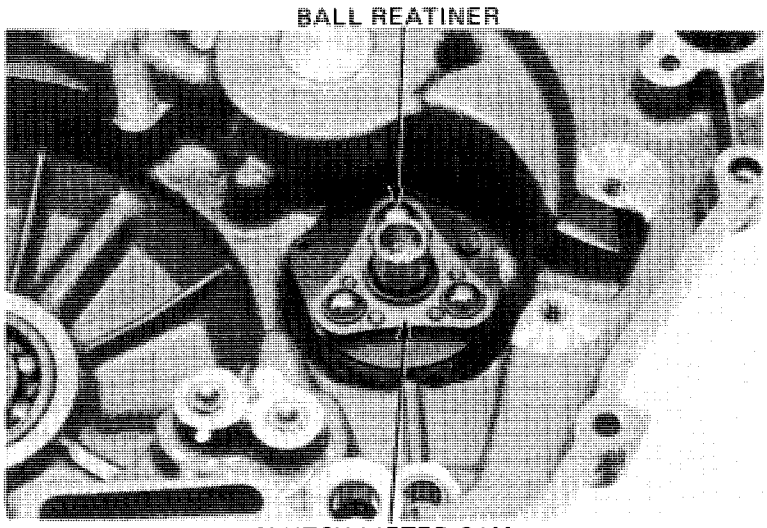
CLUTCH LIFTER ASSEMBLY/ INSTALLATION



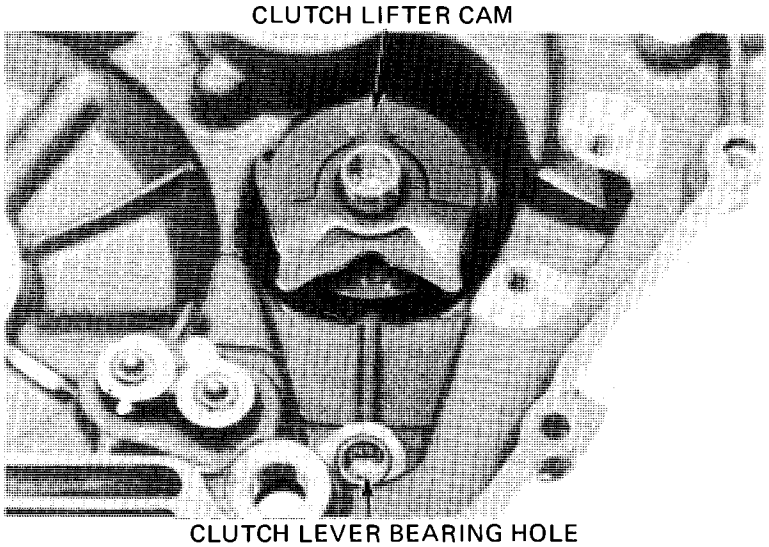
Install the adjusting screw into the clutch lifter cam.
Install the O-ring onto the adjusting screw.
Install the clutch lifter cam by aligning its groove with the stop pin on the right crankcase cover.



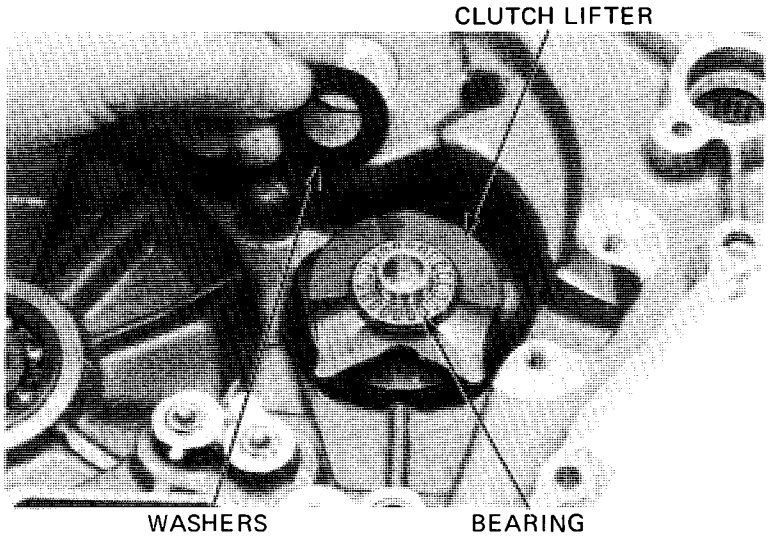
Install the ball reatiner onto the clutch lifter cam.



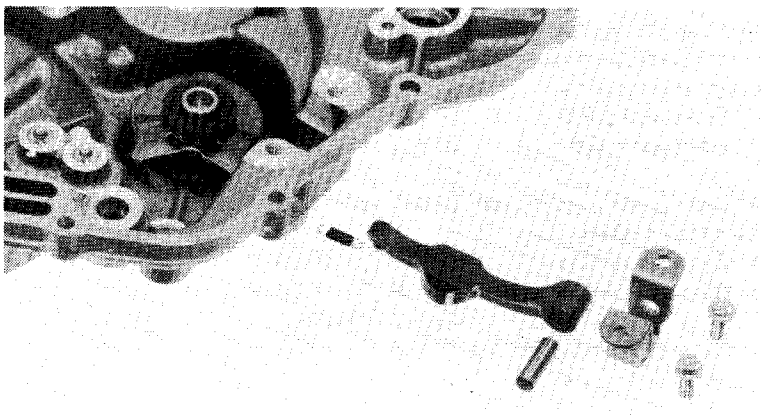
Install the clutch lifter cam with its groove facing the clutch lever bearing hole on the right crankcase cover.



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

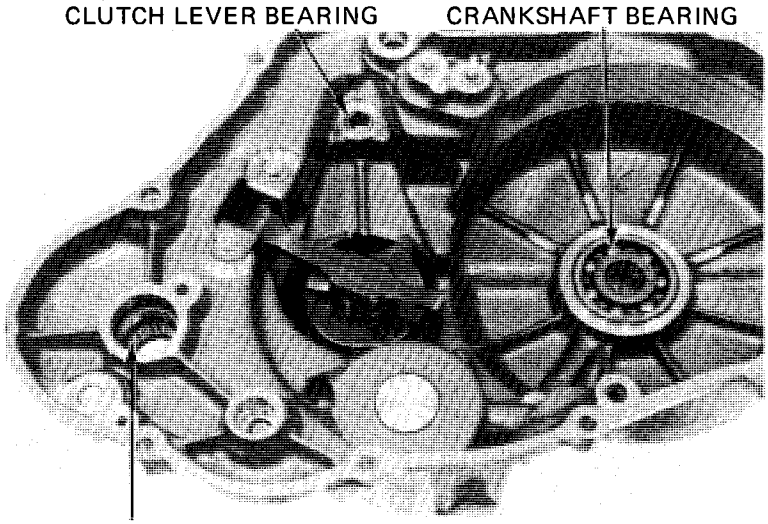


Install the removing parts in the reverse order of removal.

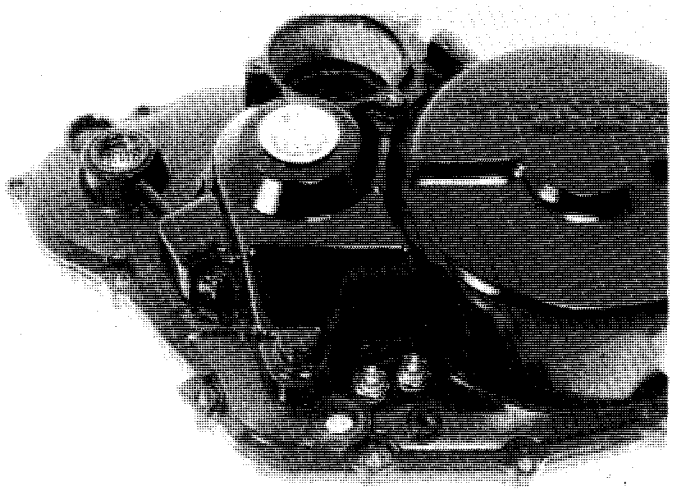


BEARING/OIL SEAL INSPECTION

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



Check the oil seals for wear or damage.

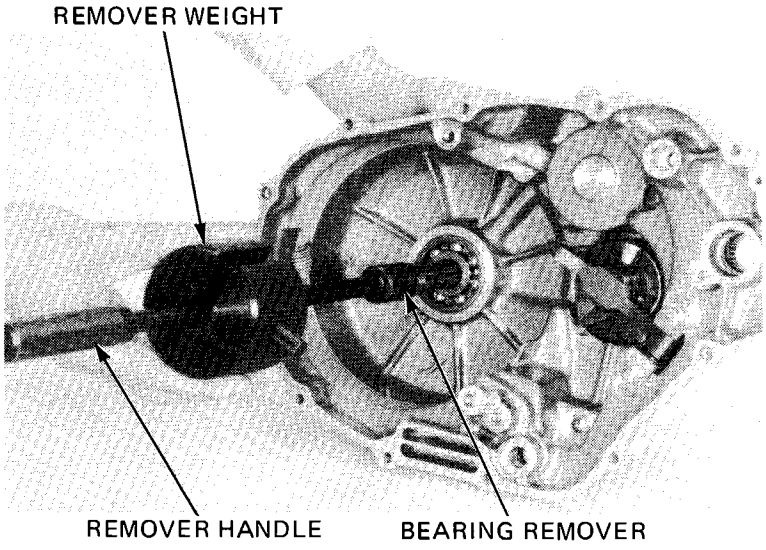


BEARING REPLACEMENT

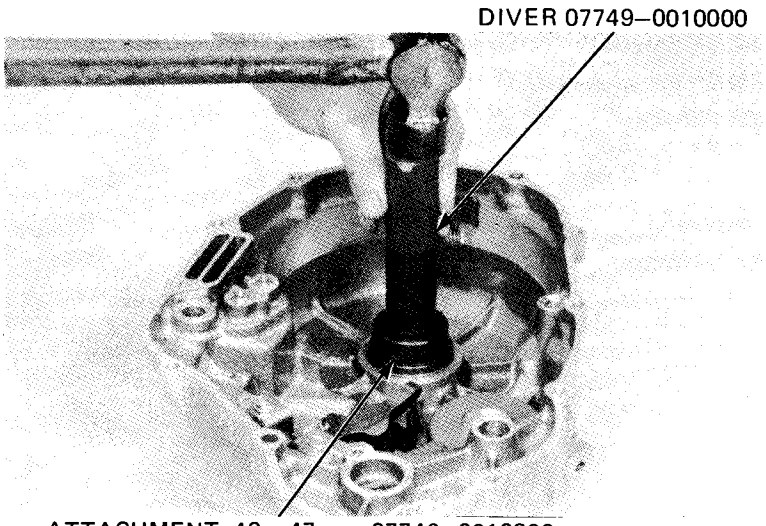
Remove the bearings from the right crankcase cover with the special tools.

Crankshaft bearing
- Remover handle 07936–3710100
- Remover weight 07936–3710200 or 07741–0010201
- Bearing remover, 17 mm 07936–3710300

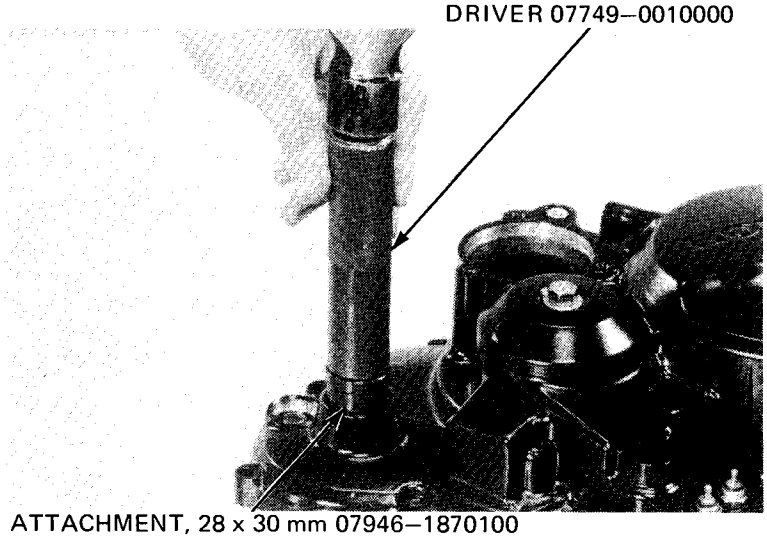
Kickshaft bearing
- Remover handle 07936–3710100
- Remover weight 07936–3710200 or 07741–0010201
- Bearing remover, 20 mm 07936–3710600



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

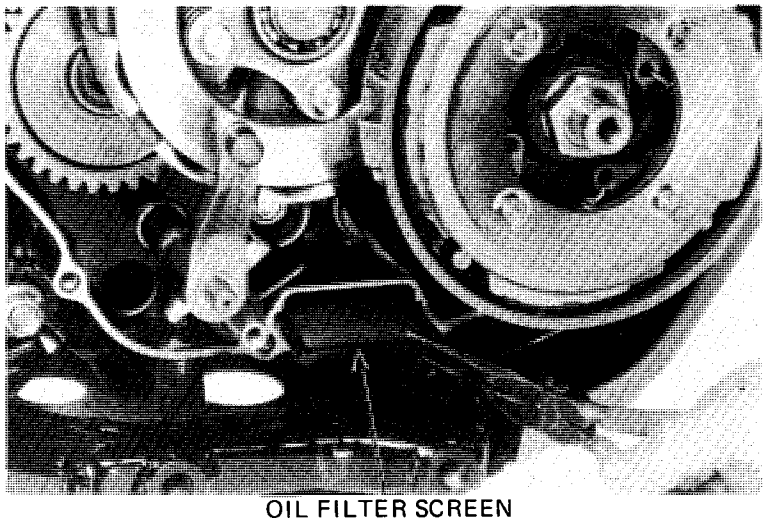


Drive a new kickshaft bearing into the cover using the special tools.



OIL FILTER SCREEN

Drain the engine oil.
Remove the right crankcase cover, gasket and dowel pins (Page 8-2).
Remove the oil filter screen from the crankcase.
Clean and inspect the filter screen; replace if necessary.
Install the filter screen in the right crankcase, then install the cover in the reverse order of removal (Page 8-3).

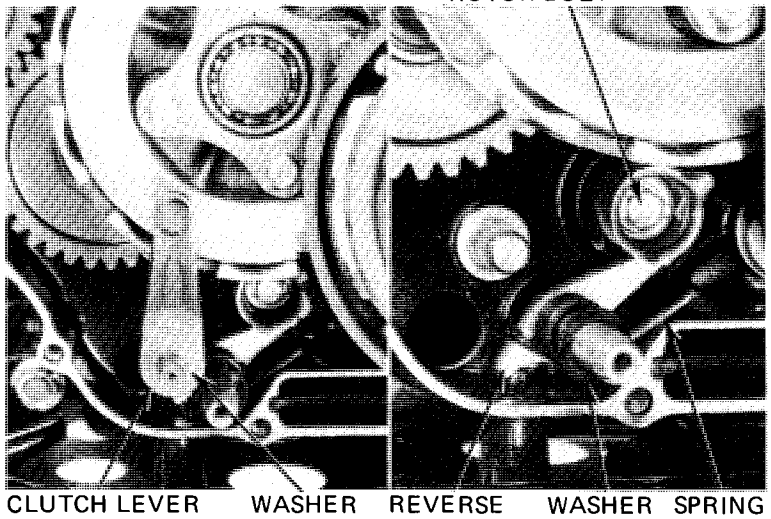


OIL FILTER SCREEN

NEUTRAL/REVERSE ROTOR 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.
Remove the neutral/reverse rotor bolt, neutral/reverse rotor, reverse lock plate and pins.

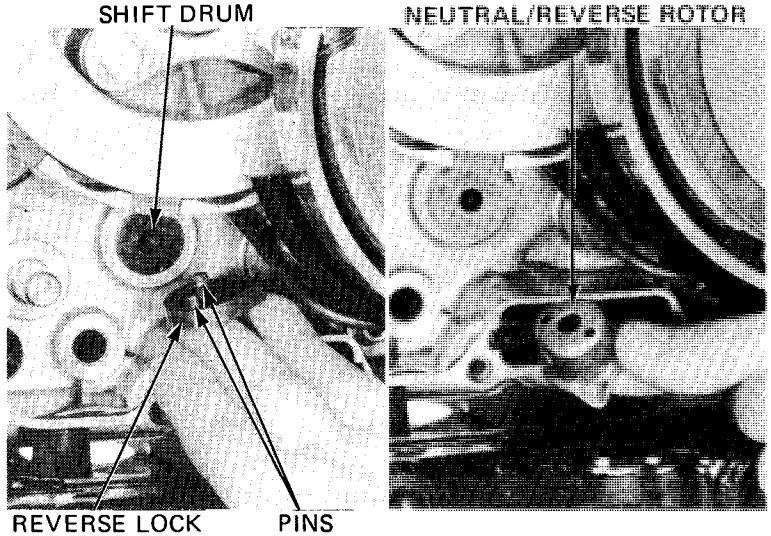


NEUTRAL/REVERSE ROTOR BOLT
CLUTCH LEVER
WASHER
REVERSE SHAFT ARM
WASHER
SPRING

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

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

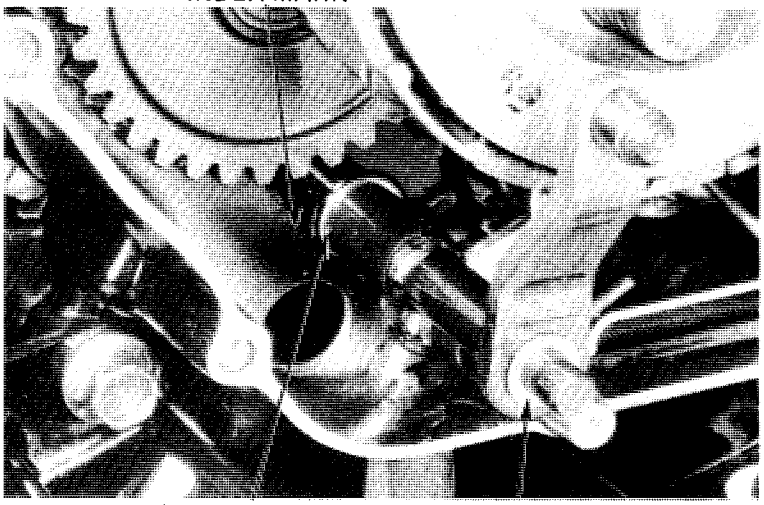
Install the reverse shaft arm.



SHIFT DRUM
NEUTRAL/REVERSE ROTOR
REVERSE LOCK PLATE
PINS

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

Install the thrust washer.



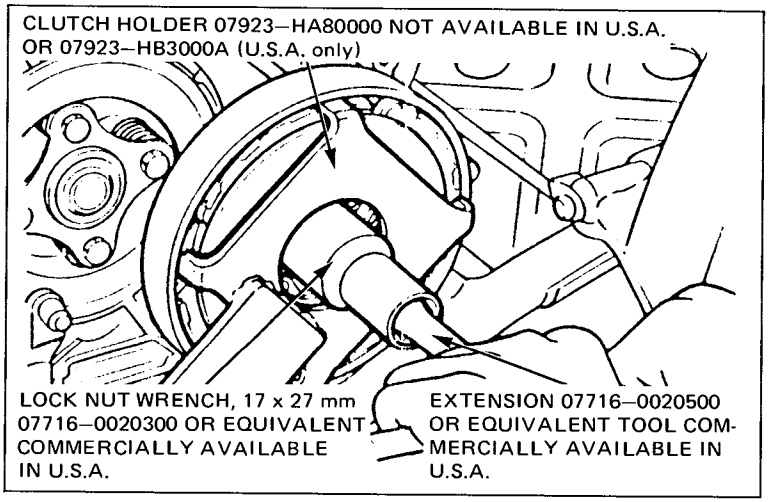
CENTRIFUGAL CLUTCH

REMOVAL

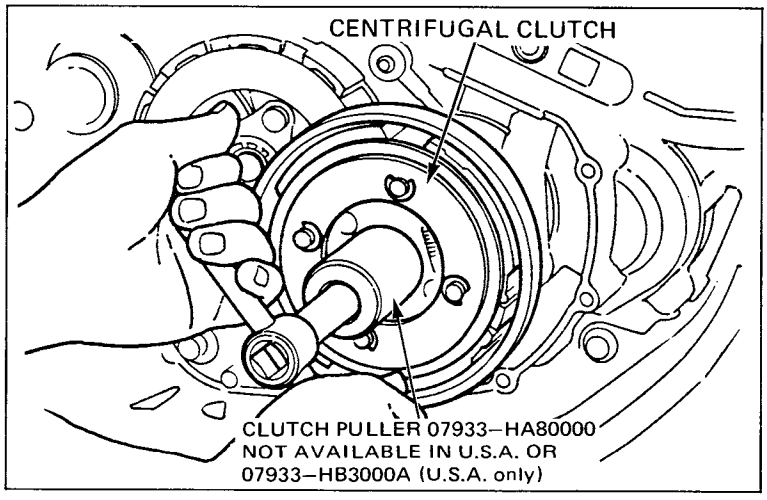
Remove the right crankcase cover (Page 9-12).
Hold the centrifugal clutch weight assembly with a clutch holder and remove the lock nut by turning it clockwise.

NOTE

The lock nut has left hand thread.



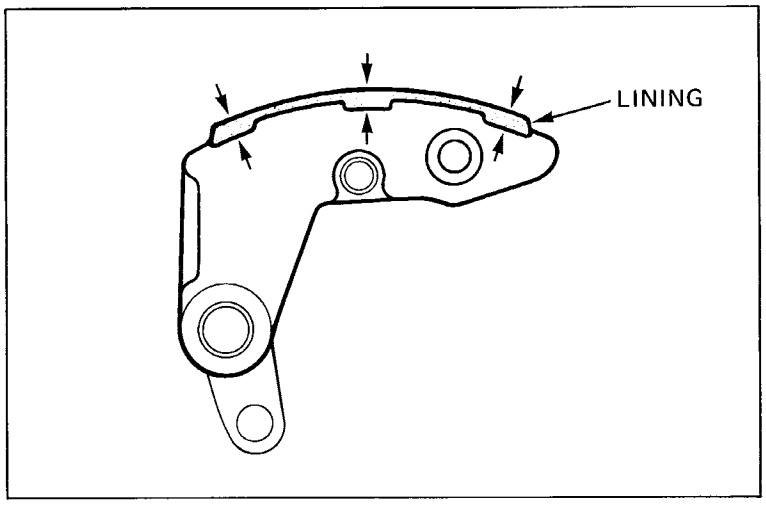
Remove the centrifigal clutch weight assembly and drum with a clamping two jaw puller or clutch puller 07933–HA80000 (Not available in U.S.A.)



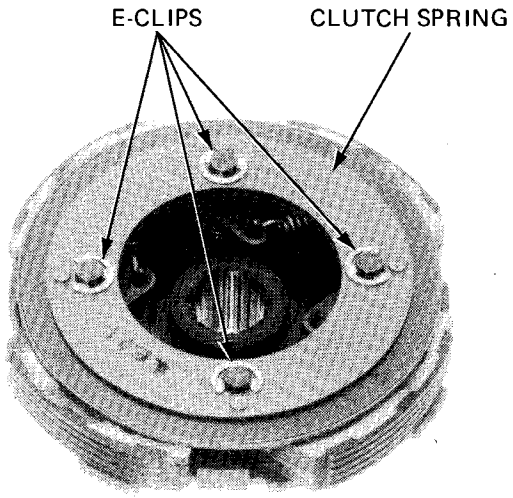
DISASSEMBLY/INSPECTION

Measure the weight lining thickness.

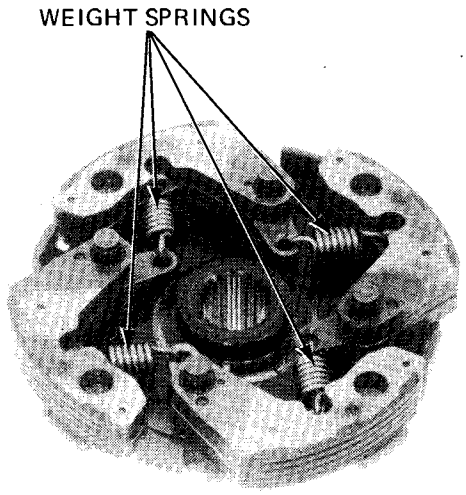
SERVICE LIMIT: 2.0 mm (0.08 in)



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



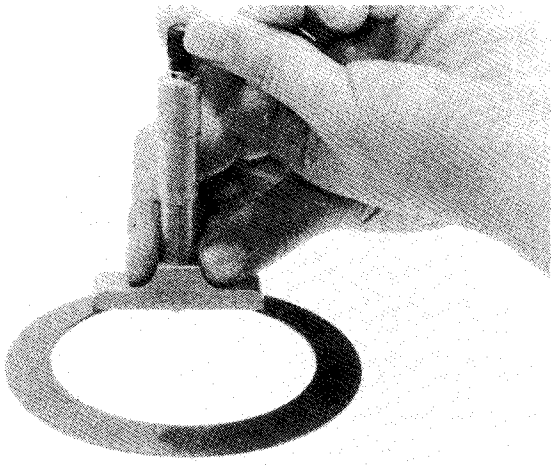
Check the weight springs for wear or damage. Replace if necessary.



Measure the height of the clutch spring.

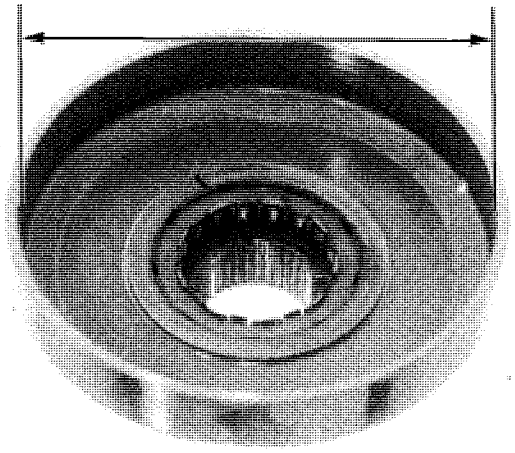
SERVICE LIMIT: 3.55 mm (0.140 in)

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

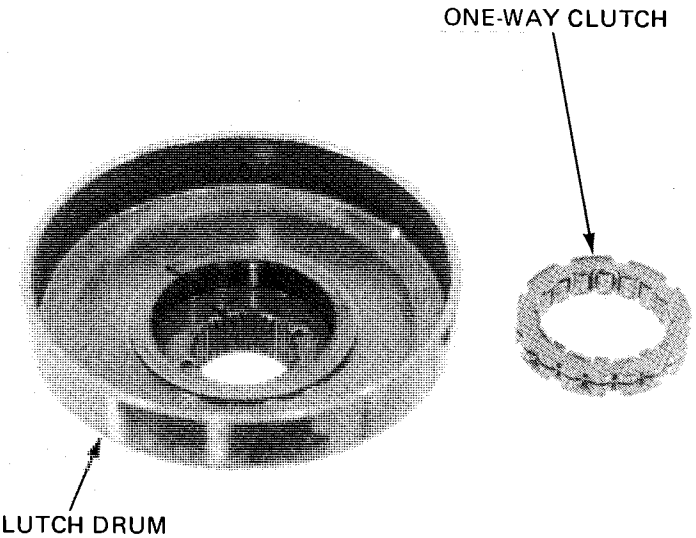


Check the inside of the centrifugal clutch drum for scratches or excessive wear. Replace if necessary. Measure the I.D. of the clutch drum.

SERVICE LIMIT: 140.2 mm (5.52 in)



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



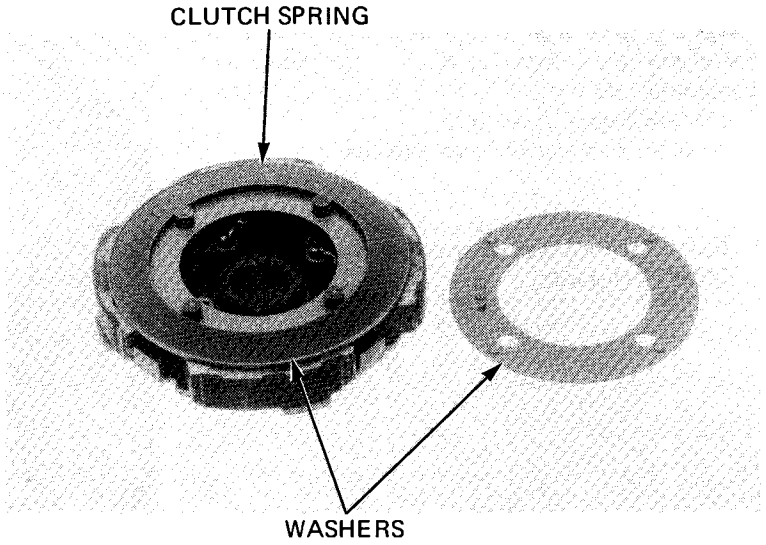
INSTALLATION

Install the washer.

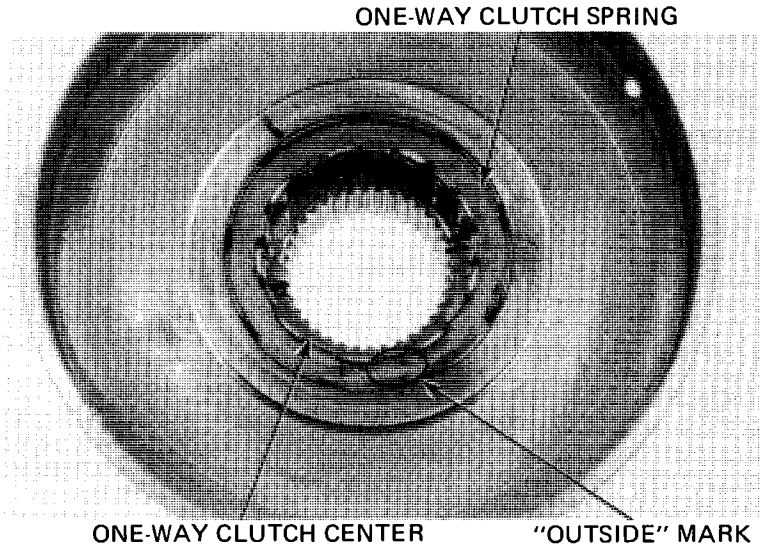
Install the clutch spring with the dished face towards the inside.

Install the outside washer with the locating pins facing out.

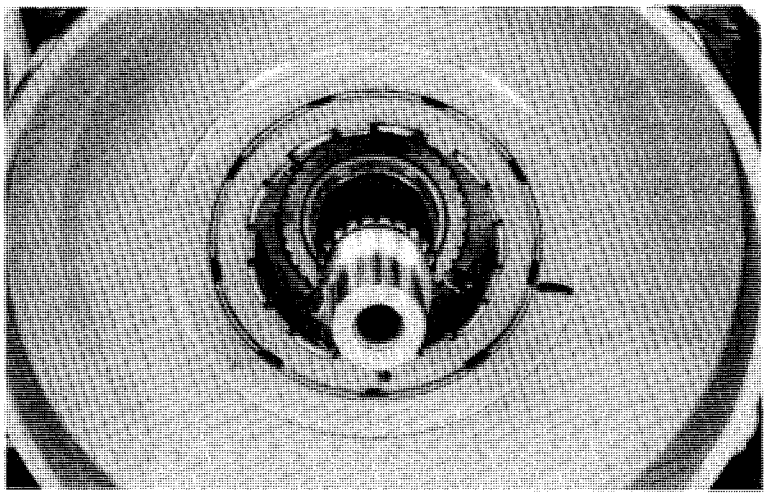
Install the E-clips aligning their gaps with the locating pins on the washer.



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



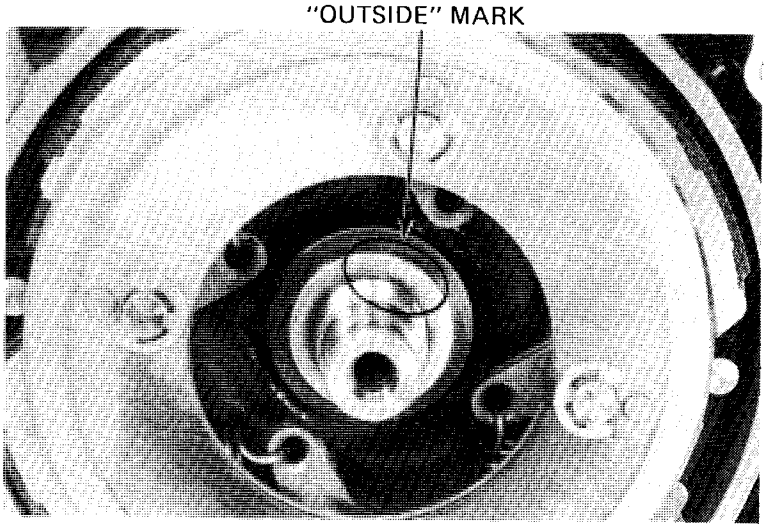
Install the centrifugal clutch drum with the one-way clutch onto the crankshaft.



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

NOTE

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

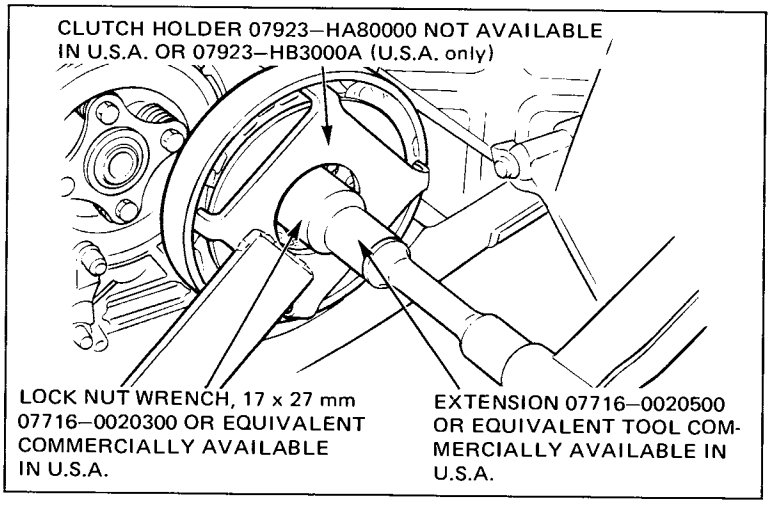


Hold the centrifugal clutch weight assembly with a clutch holder and apply thread locking agent to the lock nut and tighten it.

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

NOTE

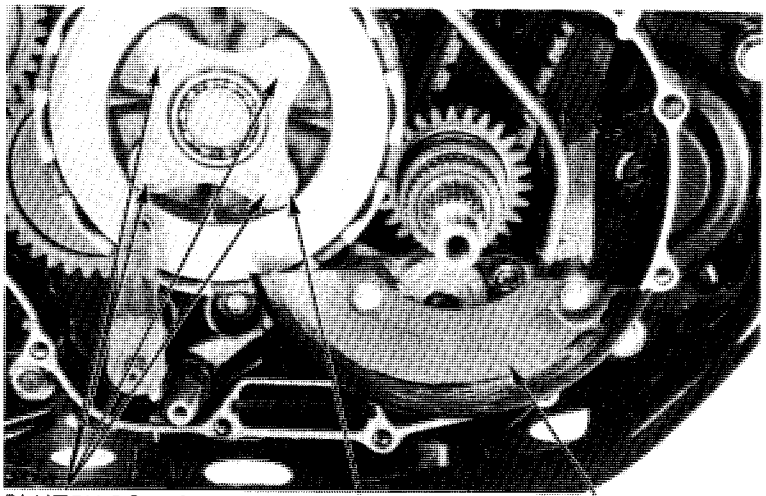
The lock nut has left hand threads.



MANUAL CLUTCH

REMOVAL

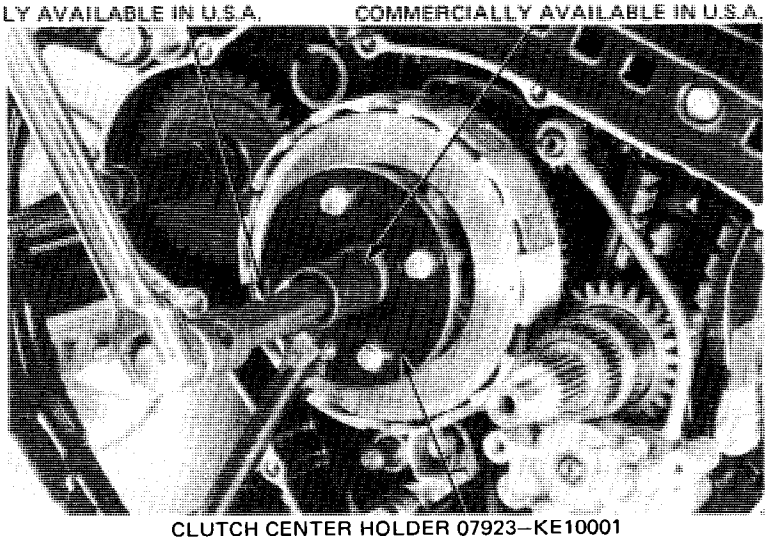
Remove the following:
- right crankcase cover (Page 8-3)
- centrifugal clutch (Page 8-10)
- separator plate
- clutch lever.
- clutch bolts.
- lifter plate.
- clutch springs.



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

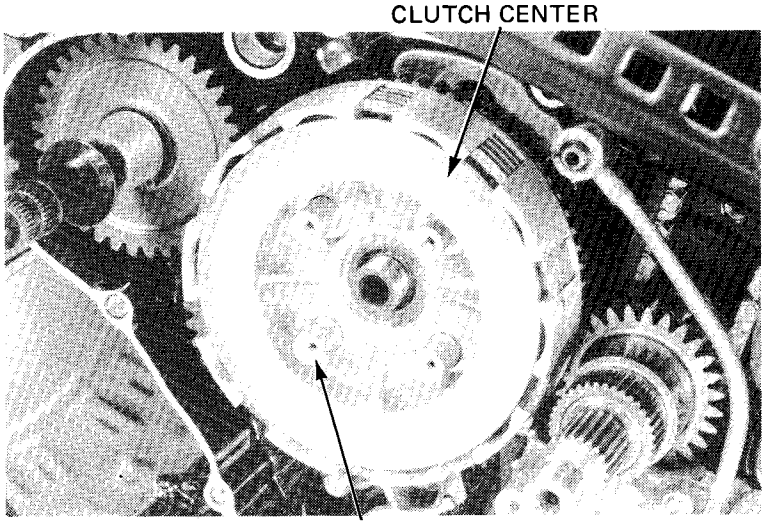
EXTENSION 07716–0020500 OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

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

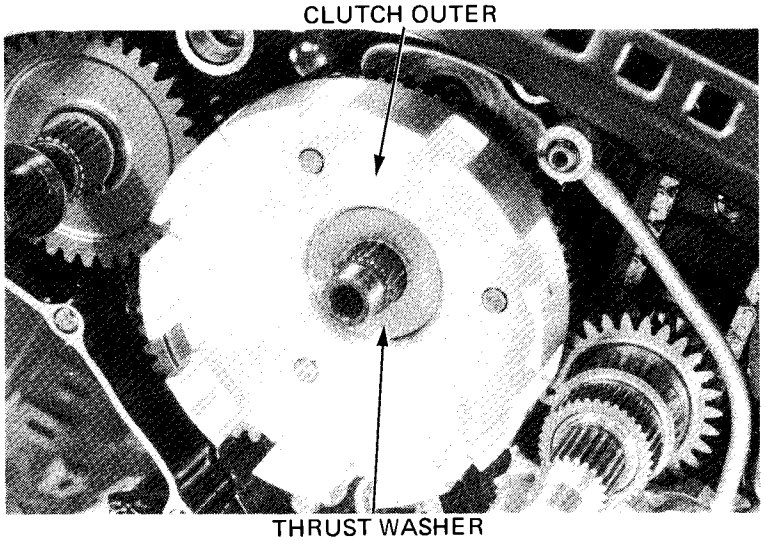


CLUTCH CENTER HOLDER 07923–KE10001 OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

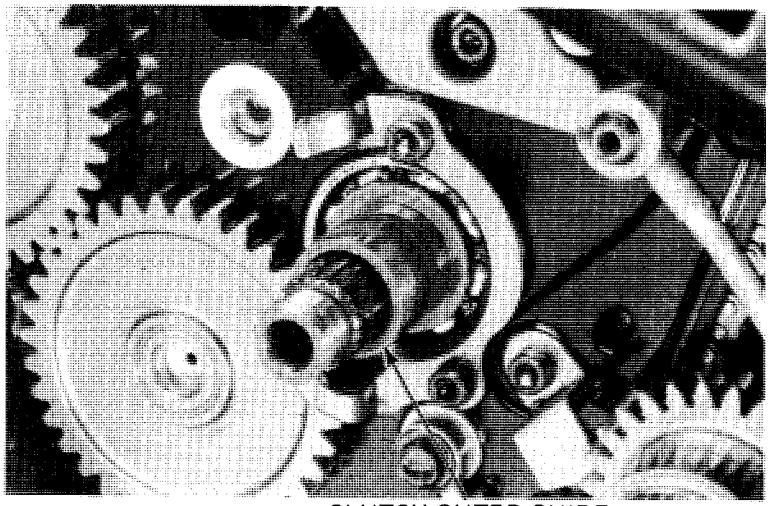
Remove the outside washer, clutch, center, discs, plates and pressure plates.



Remove the thrust washer and clutch outer.



Remove the clutch outer guide from the mainshaft.



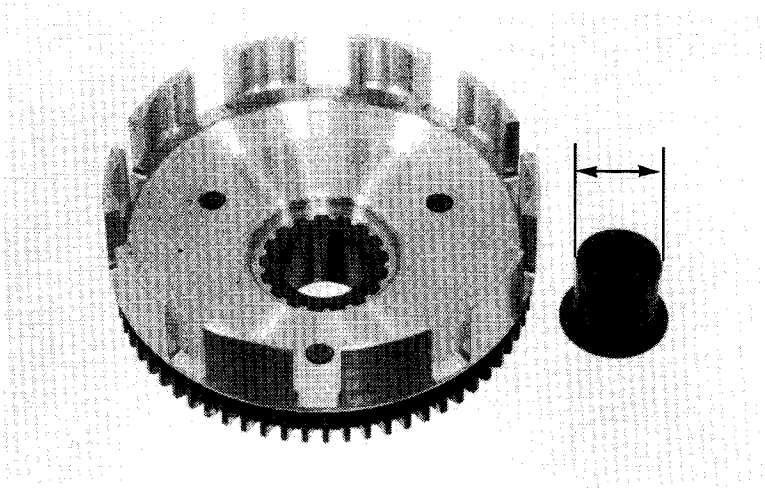
CLUTCH OUTER GUIDE

INSPECTION

Check the slots of the clutch outer for nicks, cuts or indentations made by the clutch discs. Replace if necessary.

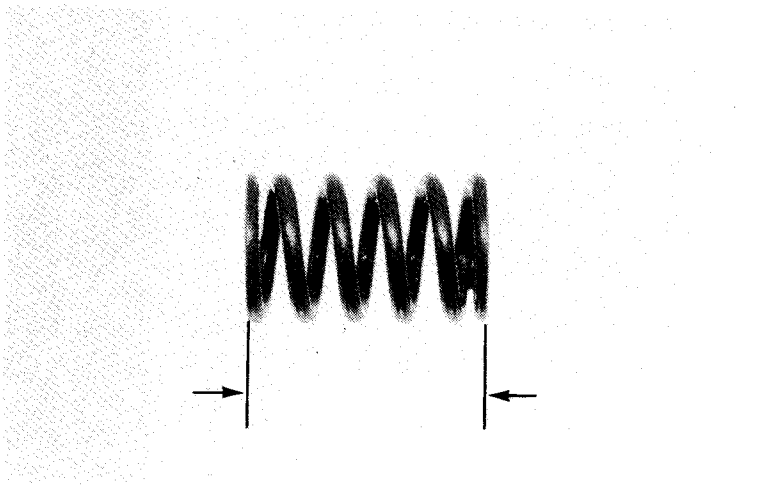
Measure the O.D. of the clutch outer guide.

SERVICE LIMIT: 27.92 mm (1.099 in)



Measure the spring free length.

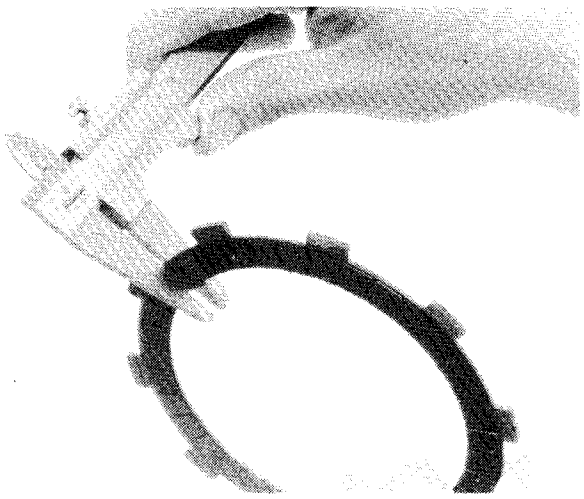
SERVICE LIMIT: 34.0 mm (1.34 in)



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

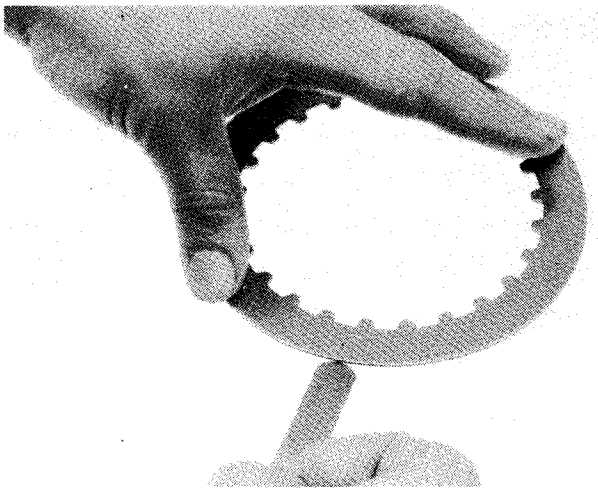
Measure the disc thickness.

SERVICE LIMIT: 2.3 mm (0.09 in)



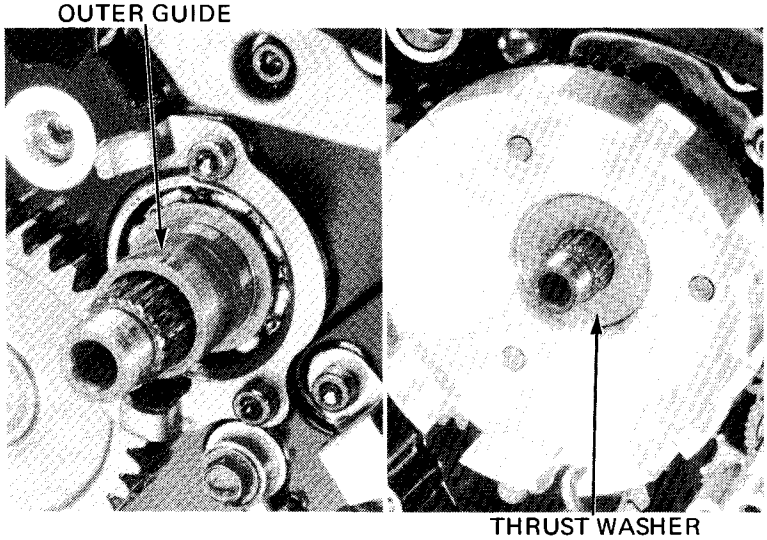
Check for plate and disc warpage on a surface plate using a feeler gauge.

SERVICE LIMIT: 0.20 mm (0.008 in)



INSTALLATION

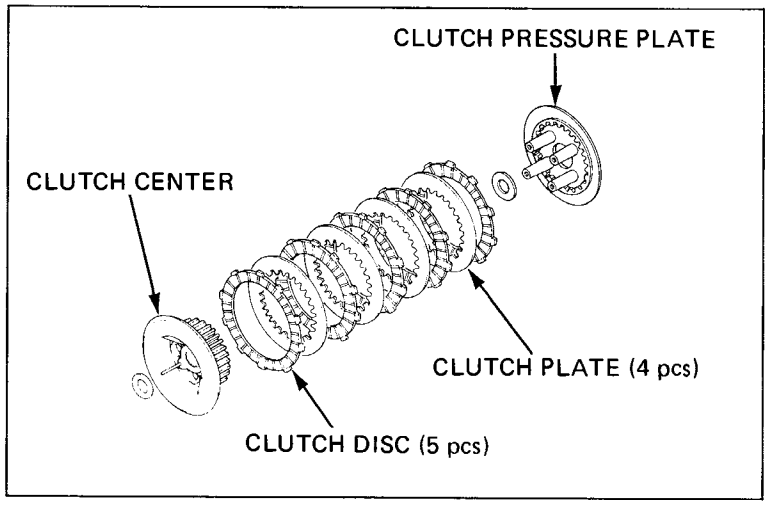
Install the clutch outer guide, clutch outer and thrust washer.



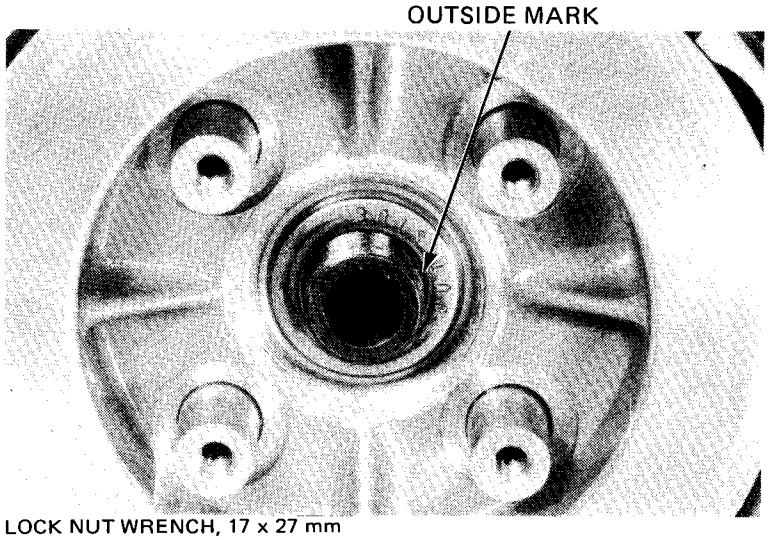
Assemble the clutch pressure plate, discs, plates and clutch center.

NOTE

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



Install the lock washer with the word OUTSIDE facing out.

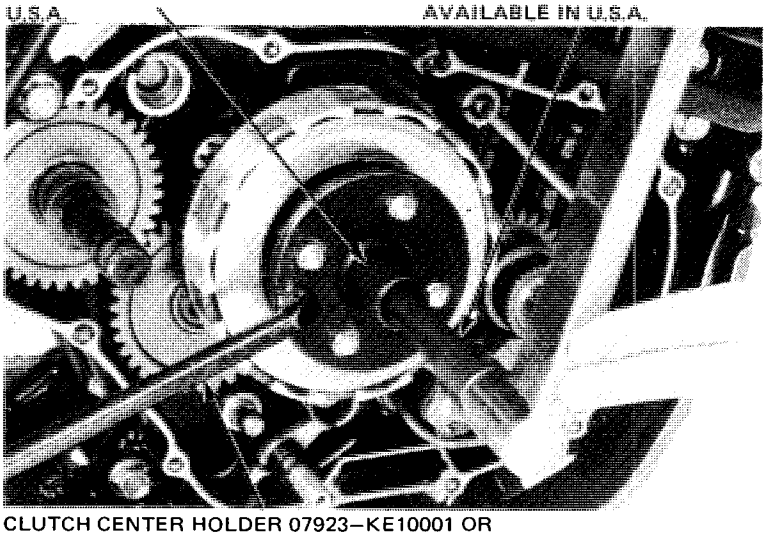


LOCK NUT WRENCH, 17 x 27 mm
07716–0020300 OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

EXTENSION 07716–0020500 OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

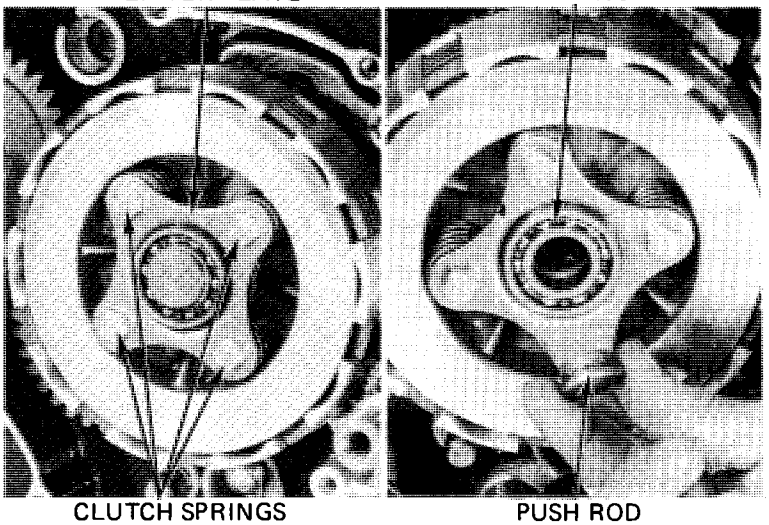
Clean any grease or dirt off the shaft and apply thread locking agency to the lock nut.
Tighten the lock nut.

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



CLUTCH CENTER HOLDER 07923–KE10001 OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

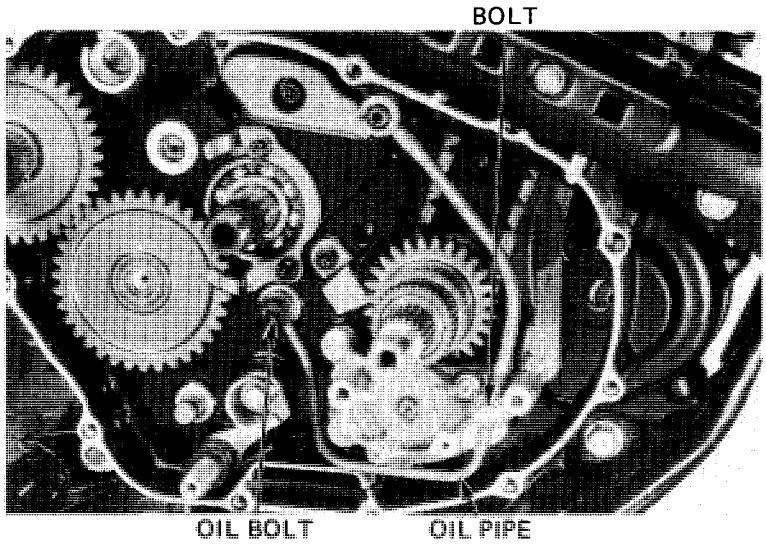
Install the following:
- clutch springs and lifter plate and tighten the clutch bolts.
- bearing and push rod.
- centrifugal clutch (Page 8-13).
- separator plate and clutch lever.
- right and left crankcase cover.



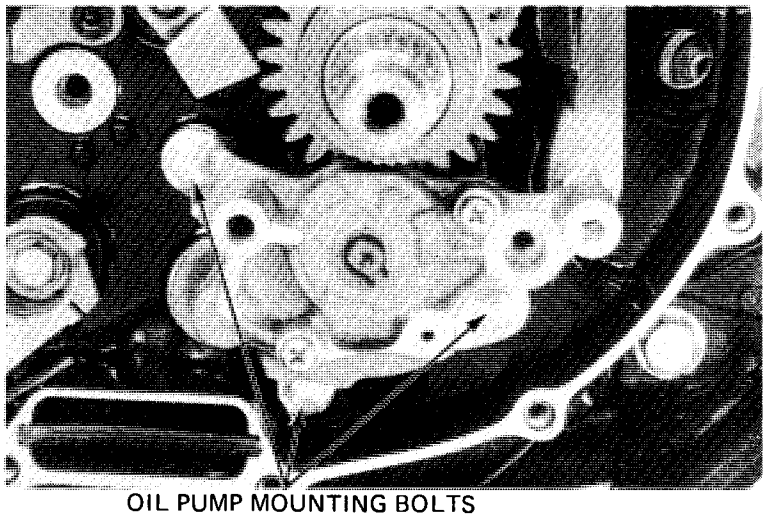
OIL PUMP/PRIMARY DRIVE GEAR

REMOVAL

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

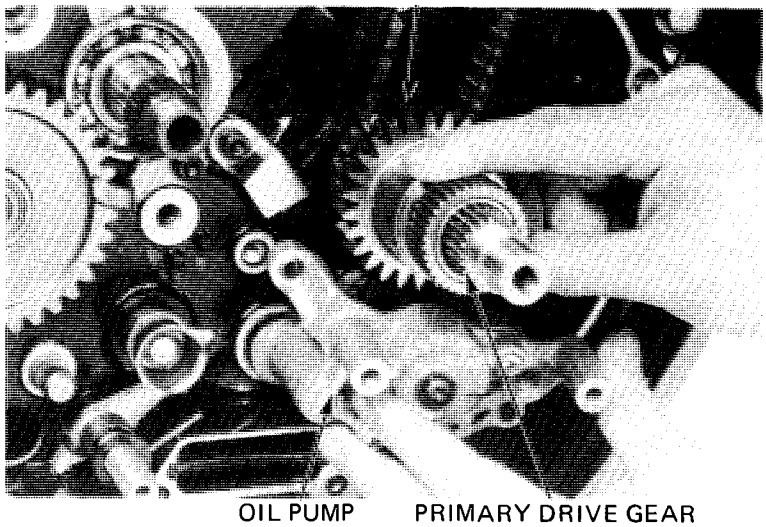


Remove the oil pump mounting bolts.



Remove the oil pump, primary drive gear and thrust washer.

Remove the O-ring and two dowel pins.

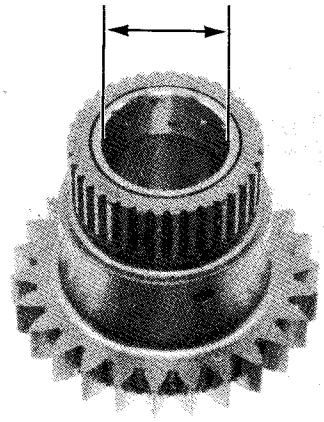


PRIMARY DRIVE GEAR INSPECTION

Inspect the primary drive gear for damage or excessive wear.

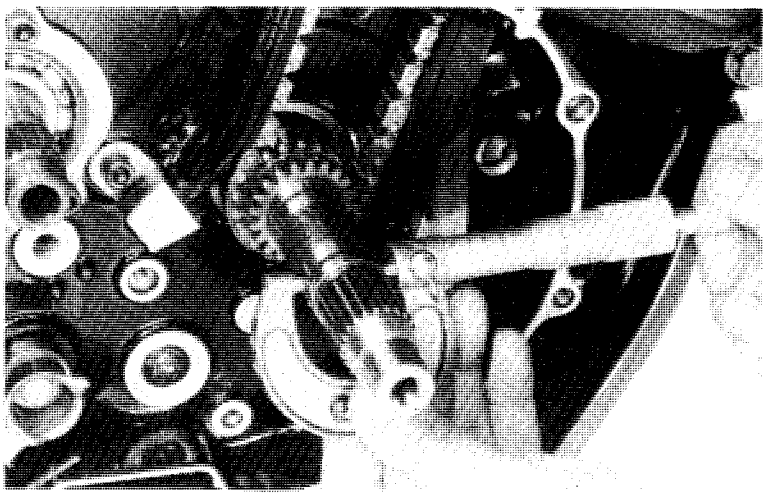
Measure the primary drive gear I.D.

SERVICE LIMIT: 27.05 mm (1.065 in)



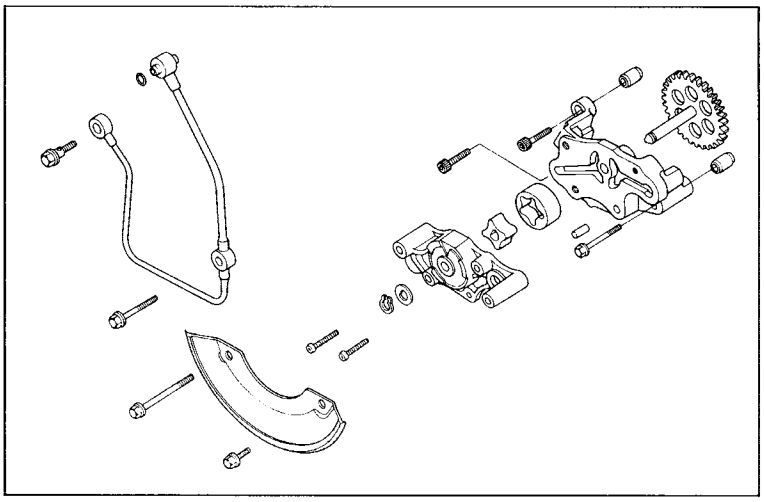
Measure the crankshaft O.D.

SERVICE LIMIT: 26.93 mm (1.060 in)



OIL PUMP DISASSEMBLY

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



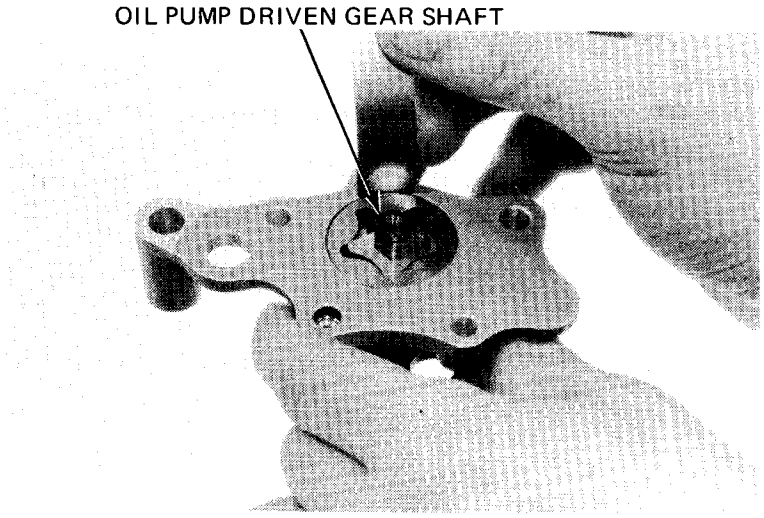
OIL PUMP INSPECTION

Install the outer and inner rotor into the cover and insert the oil pump driven gear shaft.

Measure the pump cover to rotor clearance.

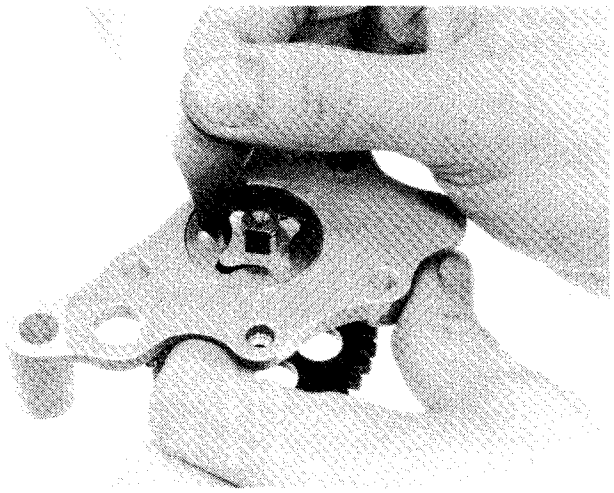
SERVICE LIMIT: 0.25 mm (0.1010 in)

Clean the oil pipe.



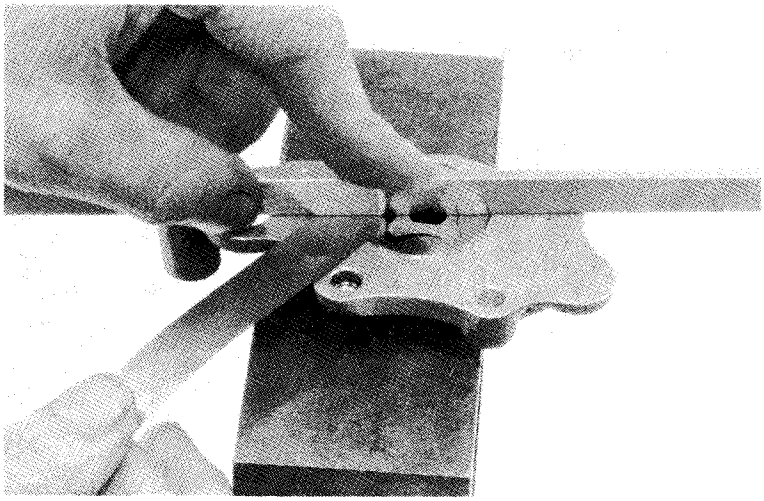
Measure the pump rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



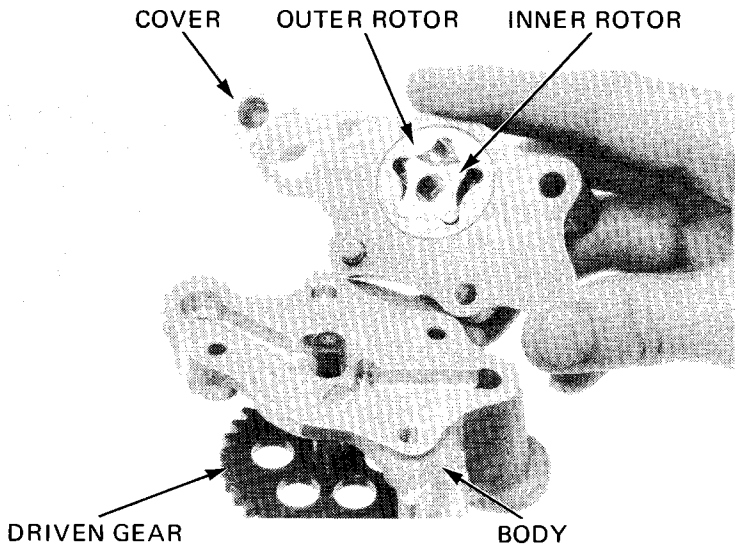
Remove the oil pump driven gear shaft from the oil pump cover.
Measure the pump end clearance.

SERVICE LIMIT: 0.10 mm (0.004 in)

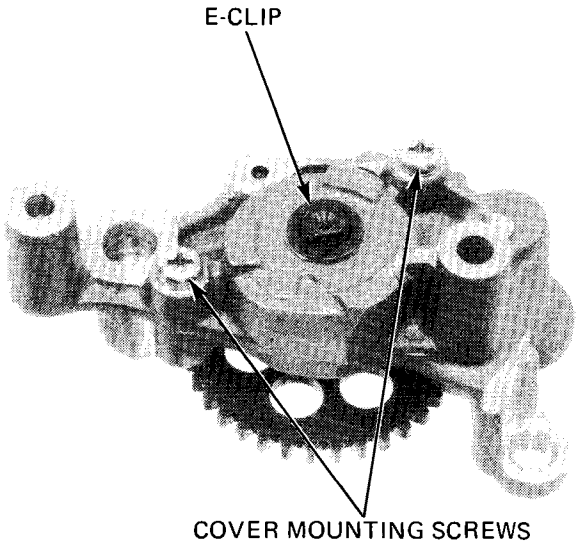


OIL PUMP ASSEMBLY/INSTALLATION

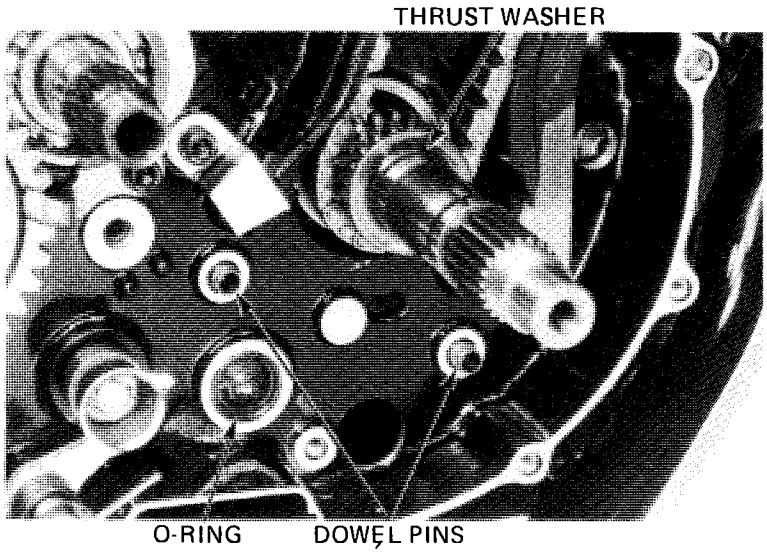
Assemble the oil pump cover with outer and inner rotors onto the oil pump body with the driven gear.



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



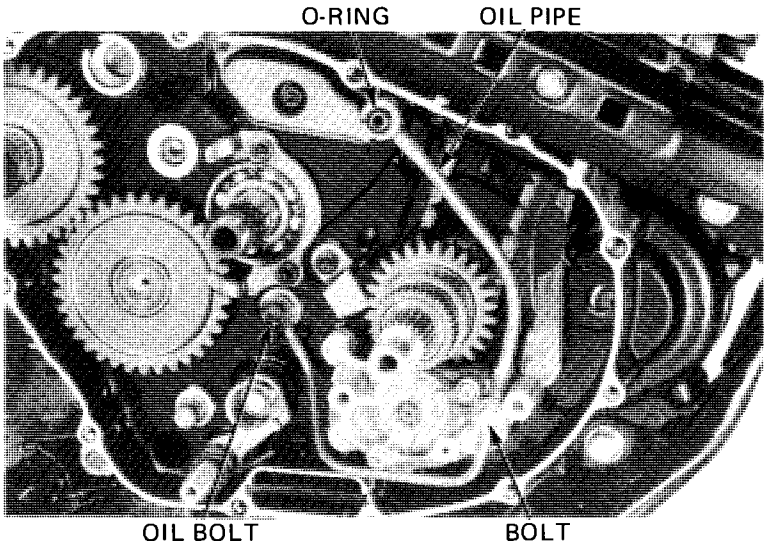
Install the thrust washer on the crankshaft and O-ring, dowel pins into the right crankcase.



Install the oil pump and primary drive gear together and tighten the pump bolts.
Install the oil pipe with the oil bolt and O-ring.
Tighten the oil bolt.

TORQUE: 10–14 N·m 91.0–1.4 kg-m, 7.2–10 ft-lb)

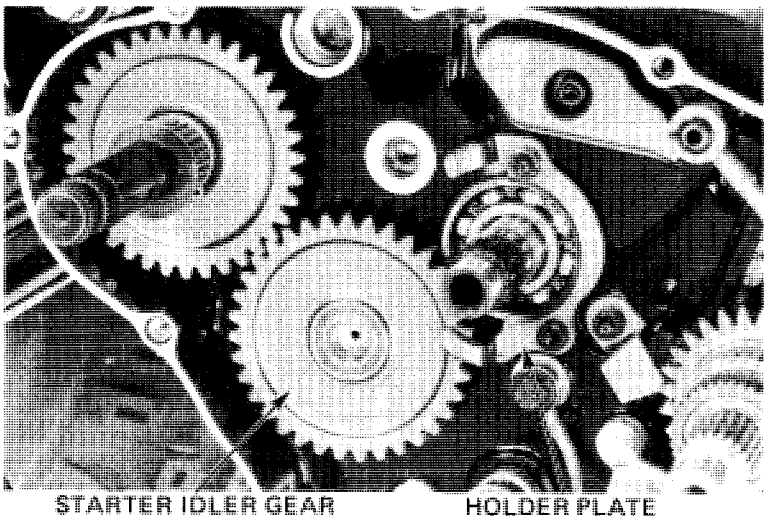
Install the removed parts in the reverse order of removal.



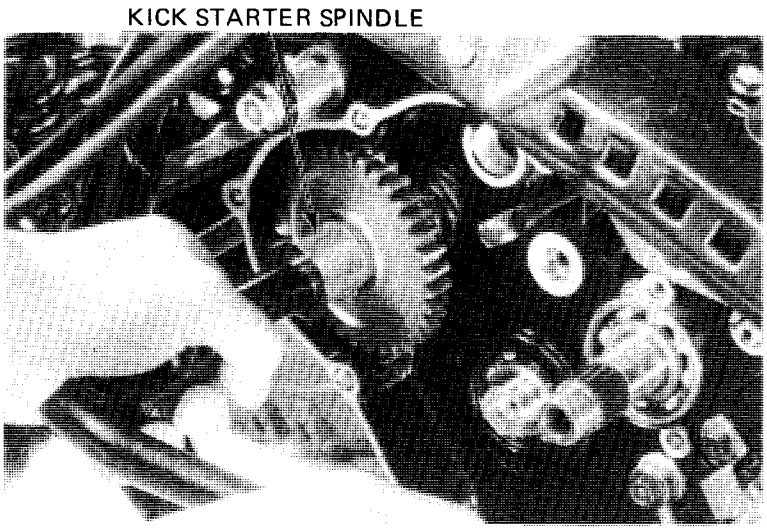
KICK STARTER

REMOVAL

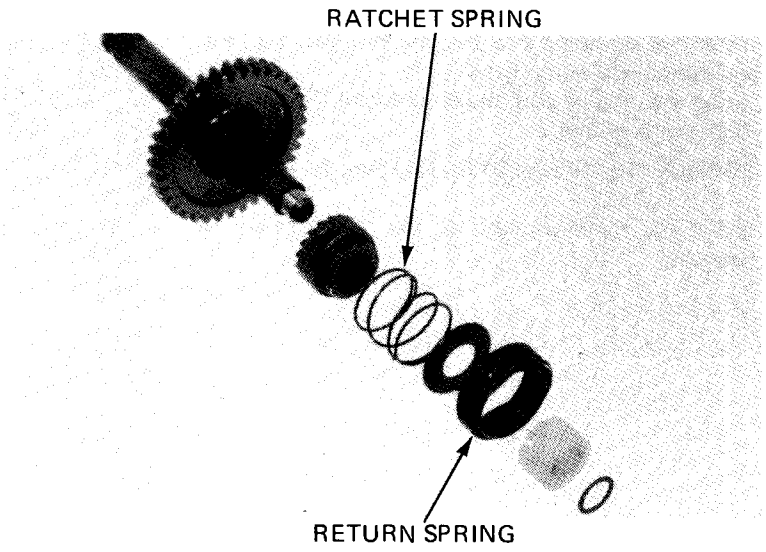
Remove the following:
- right crankcase cover (Page 8-2).
- manual clutch (Page 8-14).
- holder plate mount bolts and plate.
- starter idler gear and bushing.
- thrust washer.



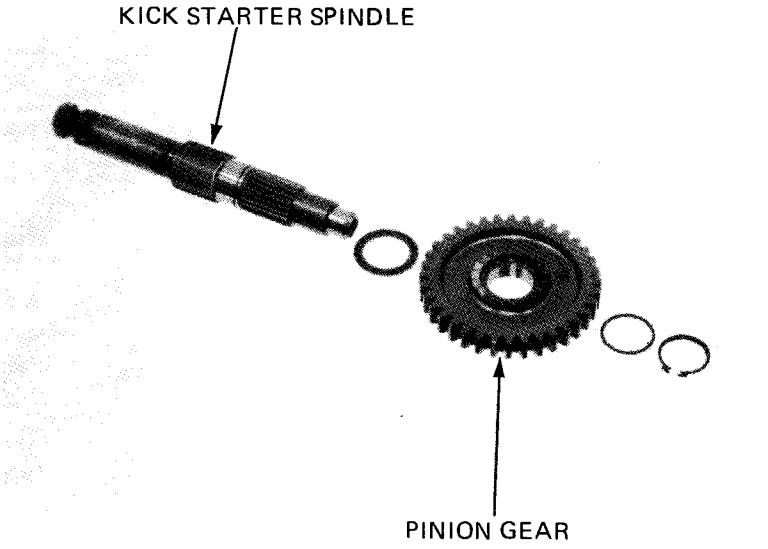
Remove the kick starter spindle from the crankcase boss and free the return spring.



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



Remove the circlip and disassemble the pinion gear and washers.

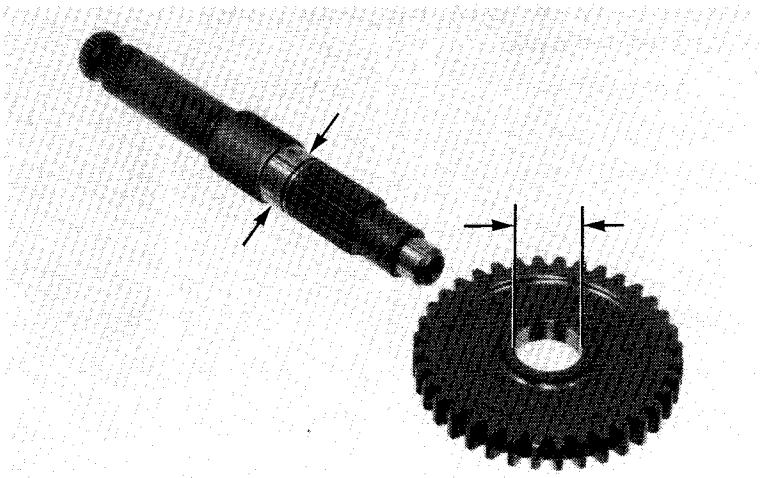


INSPECTION

Measure the kick starter spindle O.D.
SERVICE LIMIT: 21.90 mm (0.862 in)

Measure the kick starter pinion I.D.
SERVICE LIMIT: 22.10 mm (0.870 in)

Inspect the pinion for damaged ratchet teeth.

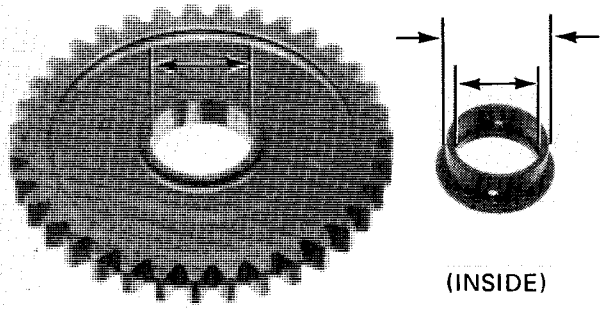


Measure the kick starter idler gear I.D.
SERVICE LIMIT: 23.07 mm (0.908 in)

Measure the kick starter idler gear bushing I.D.
SERVICE LIMIT: 20.05 mm (0.789 in)

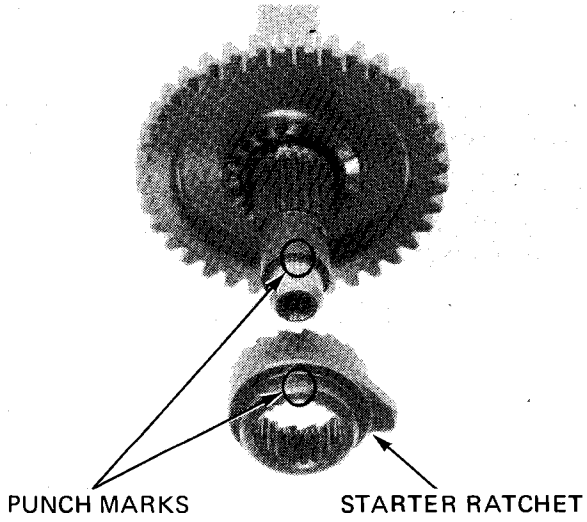
Measure the kick starter idler gear bushing O.D.
SERVICE LIMIT: 22.93 mm (0.903 in)

Measure the countershaft O.D.
SERVICE LIMIT: 19.95 mm (0.785 in)

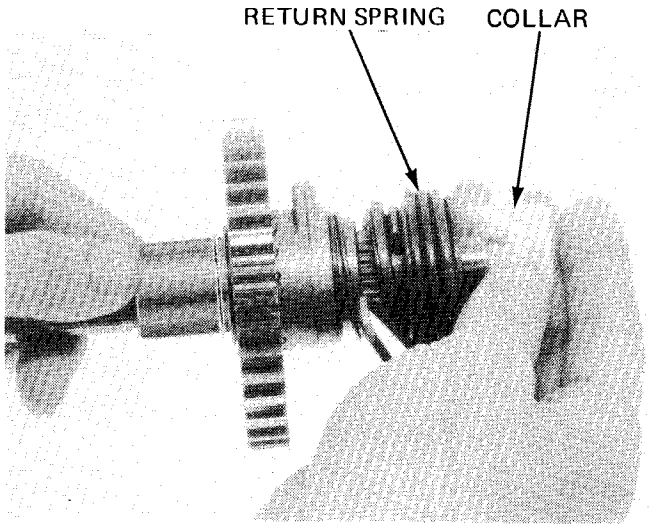


INSTALLATION

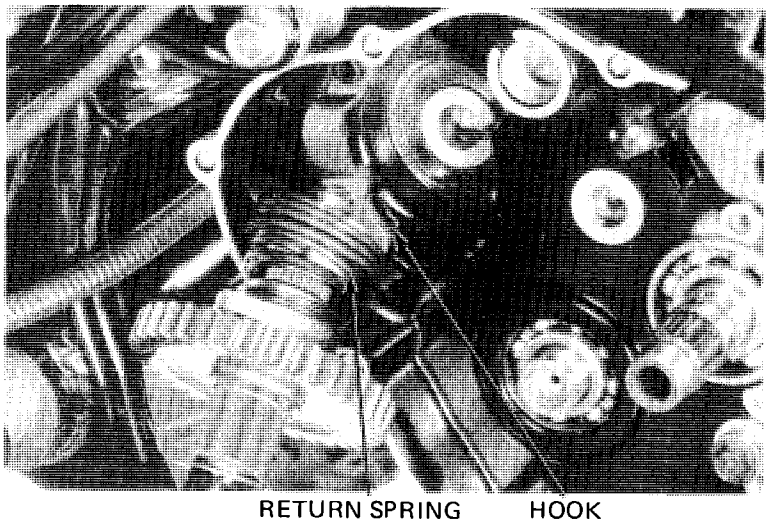
Install the inner thrust washer and pinion gear on the kick starter spindle.
Install the outer thrust washer and circlip.
Install the starter ratchet on the spindle while aligning their punch marks.



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



Hook the return spring onto the crankcase.

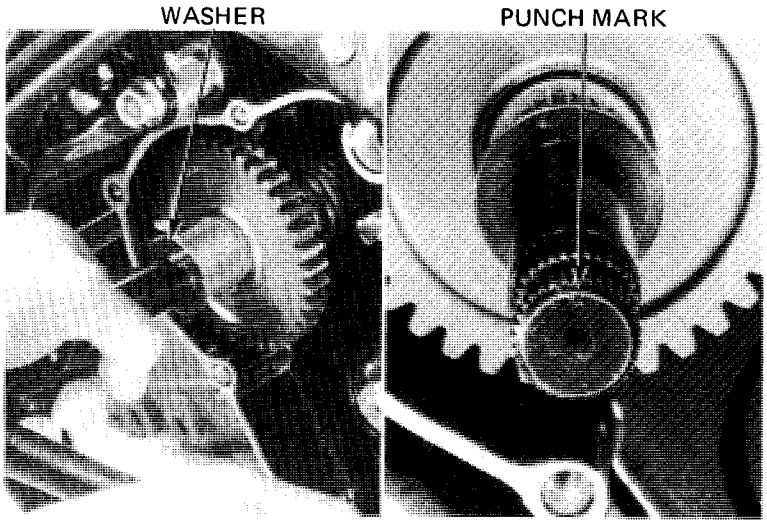


Install the kick starter assembly by turning it clockwise.

NOTE

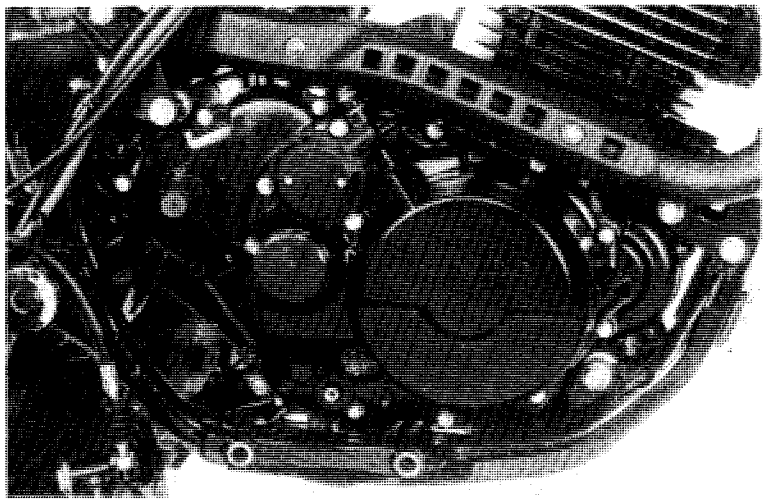
> The punch mark on the spindle should face up.

Install the washer onto the kick starter spindle. Install the remaining parts in the order of removal.



RIGHT CRANKCASE COVER INSTALLATION

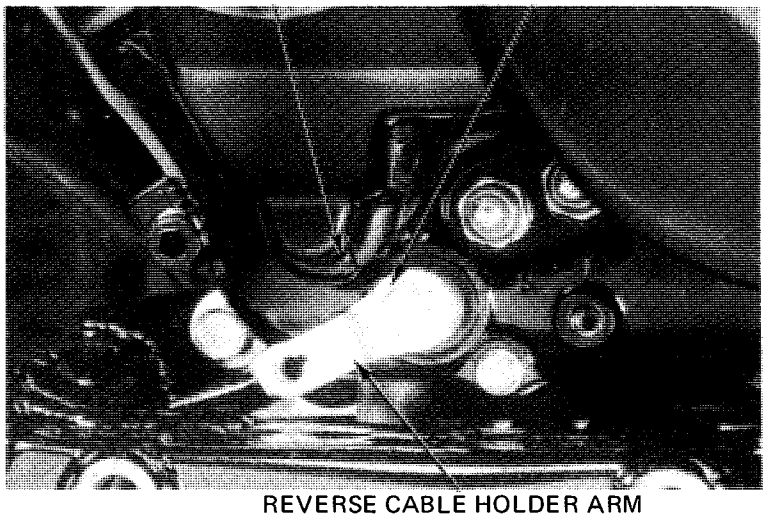
Install the dowel pins and gakset.
Install the right crankcase cover and bolts.
Tighten the cover mounting bolts.
Install the oil bolt with two sealing washers.



Install the reverse cable holder arm onto the reverse shaft. Be sure the punch mark alignes 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.

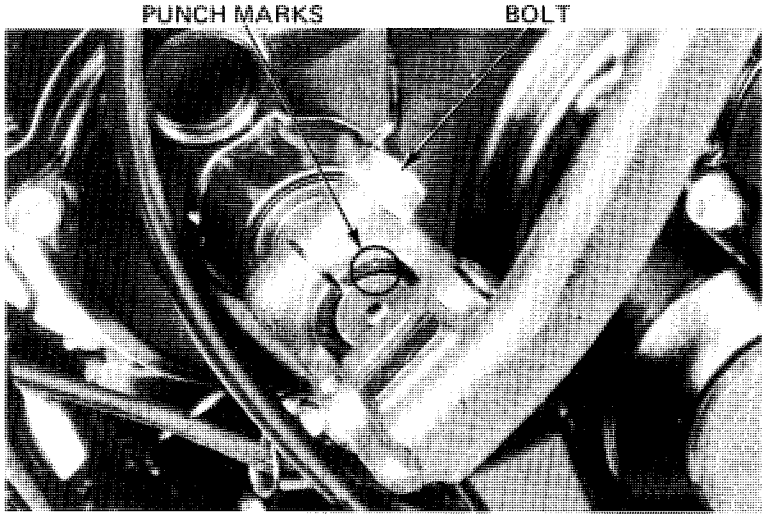


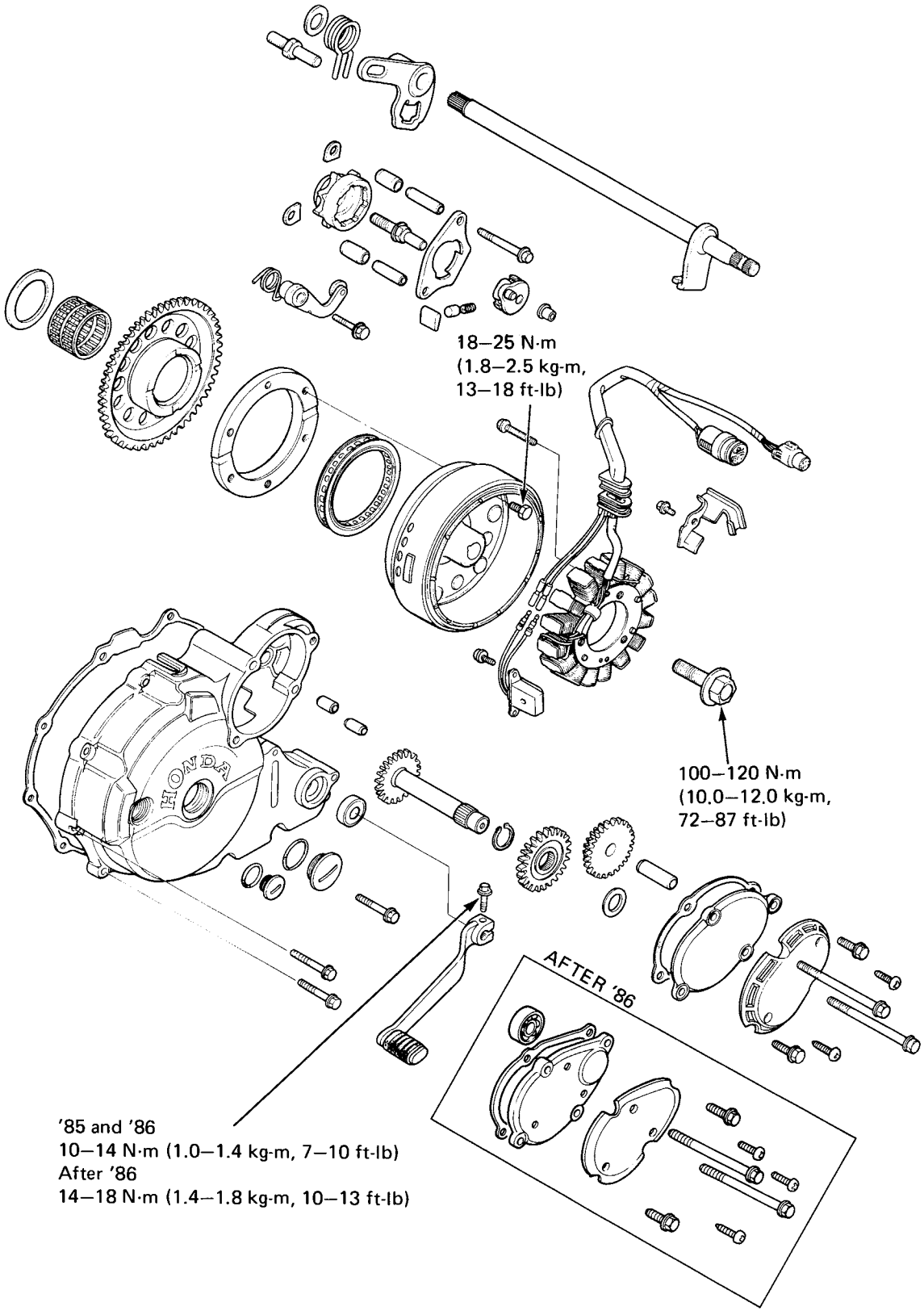
REVERSE CABLE HOLDER ARM

Install the following:
- reverse cable.
- neutral and reverse switch cover.
- kick starter pedal by aligning the punch marks.
- foot peg with bolts.

Adjust the clutch (Page 3-10).
Adjust the reverse cable (Page 3-11).
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)
100–120 N·m
(10.0–12.0 kg-m,
72–87 ft-lb)
HONDA
AFTER '86
'85 and '86
10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
After '86
14–18 N·m (1.4–1.8 kg-m, 10–13 ft-lb)

9. ALTERNATOR/STARTER CLUTCH/ GEARSHIFT LINKAGE

SERVICE INFORMATION

GENERAL

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

TORQUE VALUE

Flywheel bolt		100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)
Starter clutch Torx bolt		18–25 N·m (1.8–2.5 kg-m, 13–18 ft-lb)
Gearshift pedal bolt	'85 and '86	10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
	After '86	14–18 N·m (1.4–1.8 kg-m, 10–13 ft-lb)

TOOLS

Special

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

Common

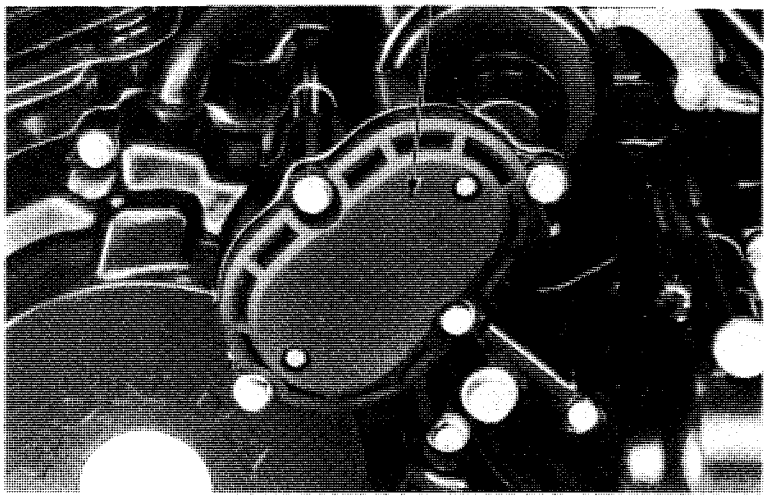
Flywheel holder	07725–0040000 or strap wrench, commercially available in U.S.A.
Rotor puller	07733–0020001 or 07933–3950000
Attachment, 24 x 26 mm	07746–0010700
Driver	07749–0010000

STARTER REDUCTION GEAR

REMOVAL

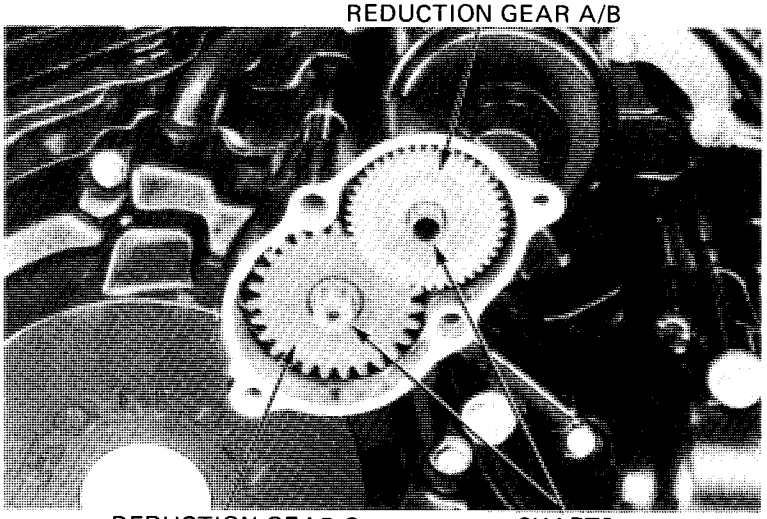
Remove the starter reduction gear cover bolts, cover gasket and dowel pins.

STARTER REDUCTION GEAR COVER



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

REDUCTION GEAR A/B

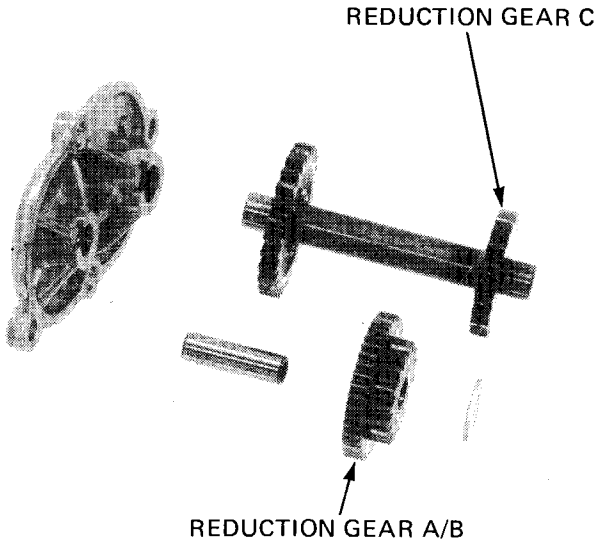


REDUCTION GEAR C

SHAFTS

INSPECTION

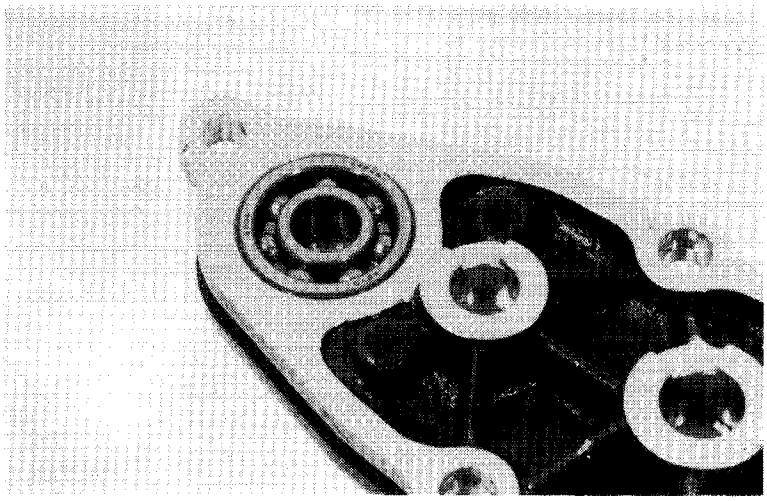
Inspect the starter reduction gear teeth for wear or damage.



After '86

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

Remove and discard the bearing if the race does not turn smoothly, quietly, or if it fit loosely in the cover.



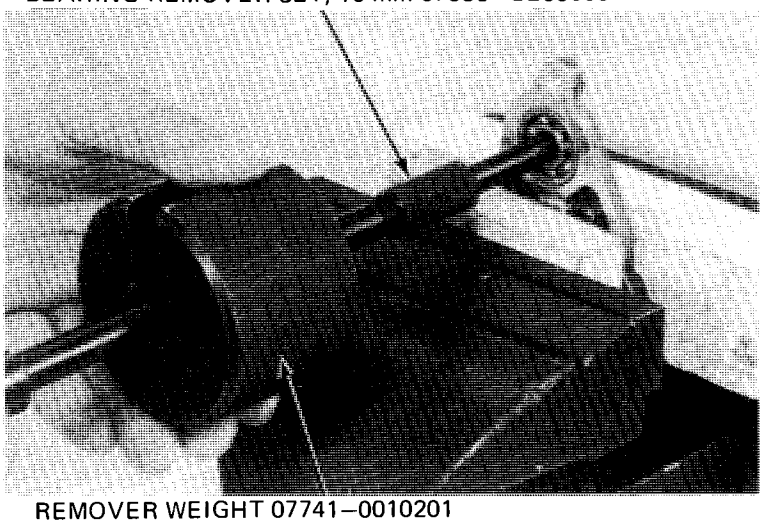
After '86

BEARING REPLACEMENT

Remove the gear cover protector by removing the screws.

Remove the reduction gear bearing using the bearing remover tool.

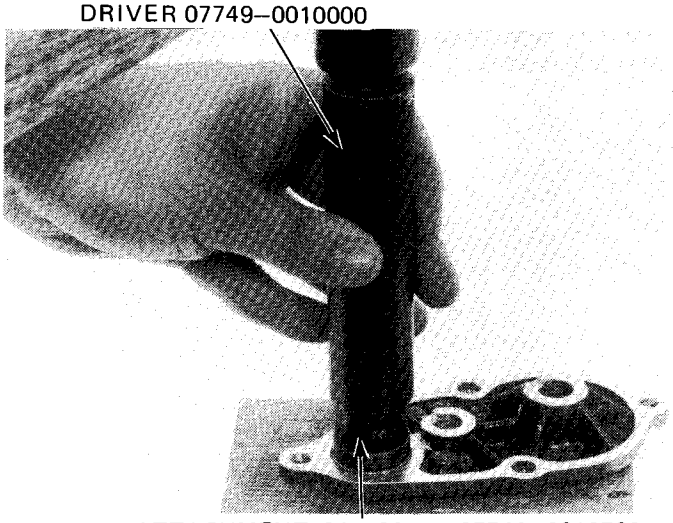
BEARING REMOVER SET, 10 mm 07936–GE00000



REMOVER WEIGHT 07741–0010201
or 07936–3710200

Drive the new bearing into the starter reduction gear cover.

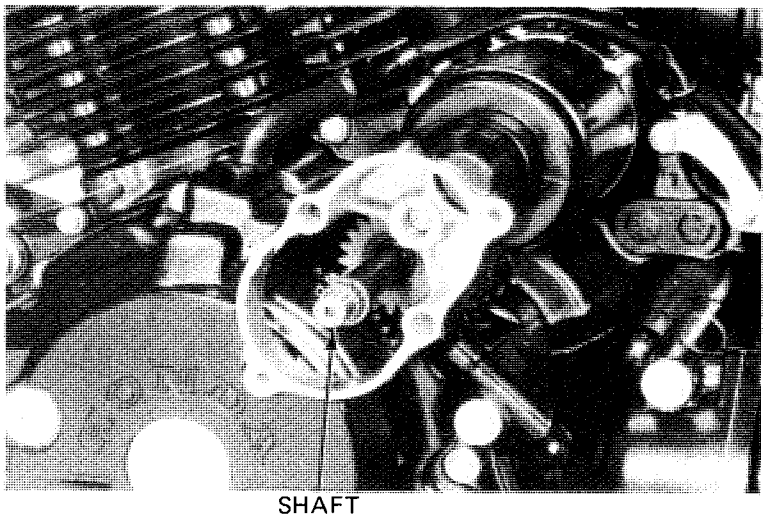
DRIVER 07749–0010000



ATTACHMENT, 24 x 26 mm 07746–0010700

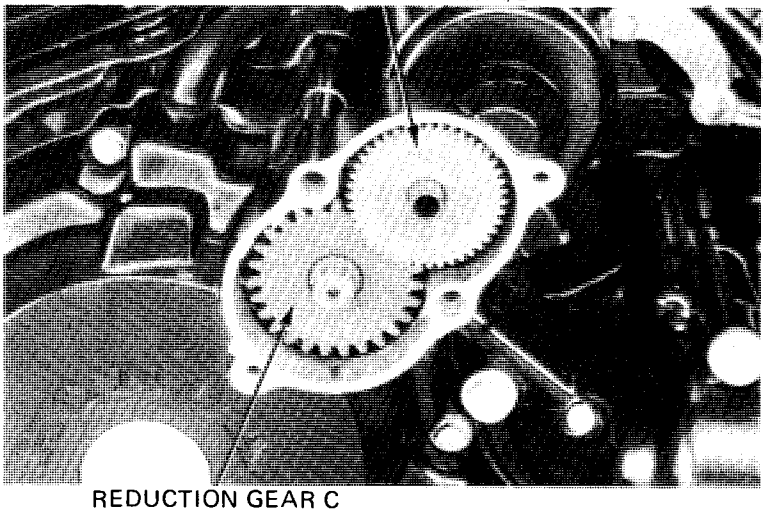
INSTALLATION

Install the starter reduction C shaft into the left crankcase.



SHAFT

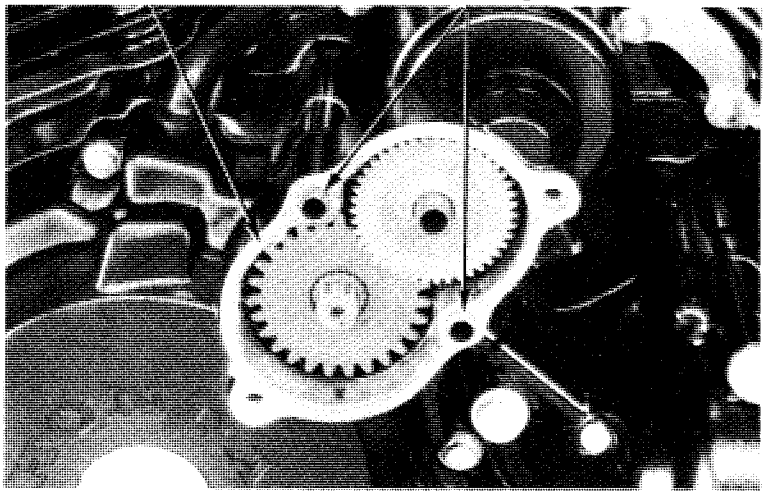
Install the starter reduction gear C, starter reduction gear A/B and shaft and gear.



REDUCTION GEAR A/B

REDUCTION GEAR C

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

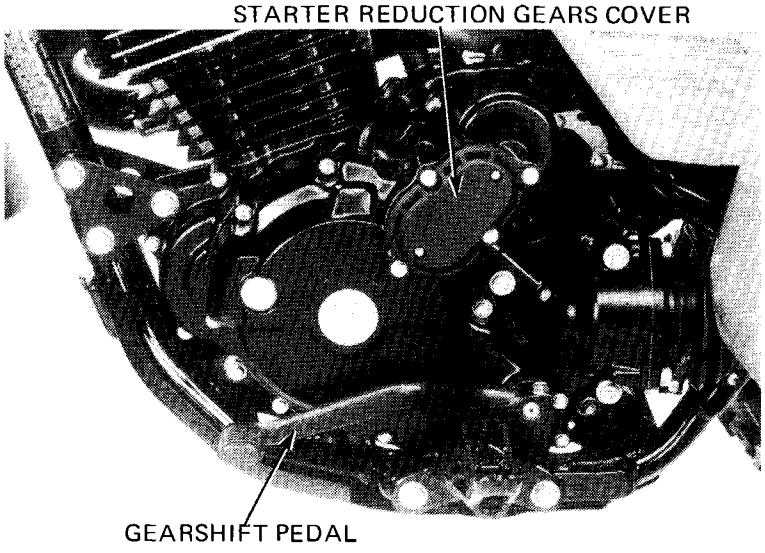


GASKET

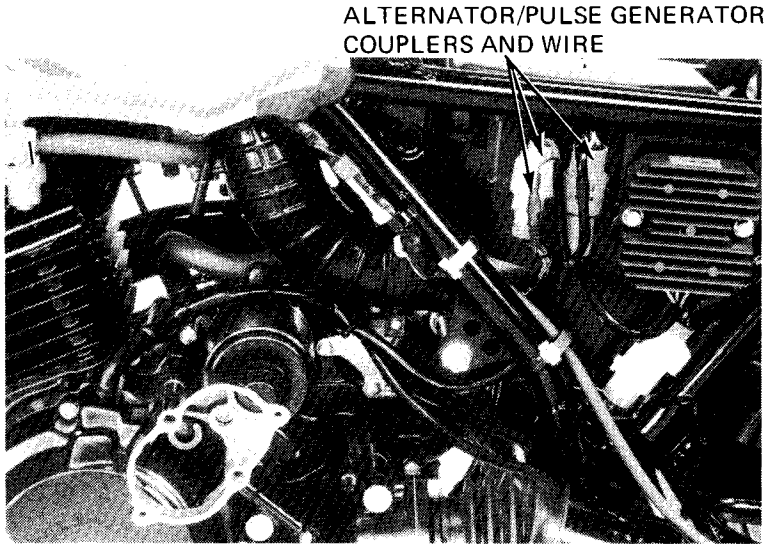
DOWEL PINS

LEFT CRANKCASE COVER REMOVAL

Remove the starter reduction cover and gears (Page 9-2).
Remove the seat.
Remove the gearshift pedal.



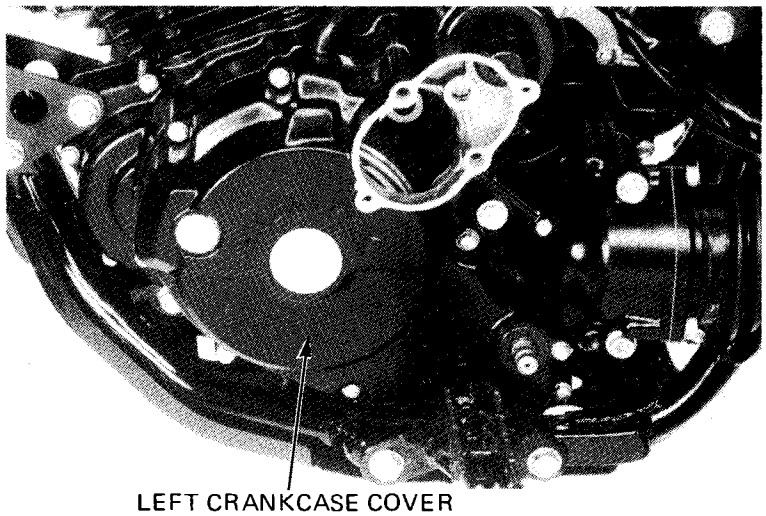
Disconnect the alternator/pulse generator couplers and wire.



Remove the left crankcase cover mounting bolts and cover.

NOTE

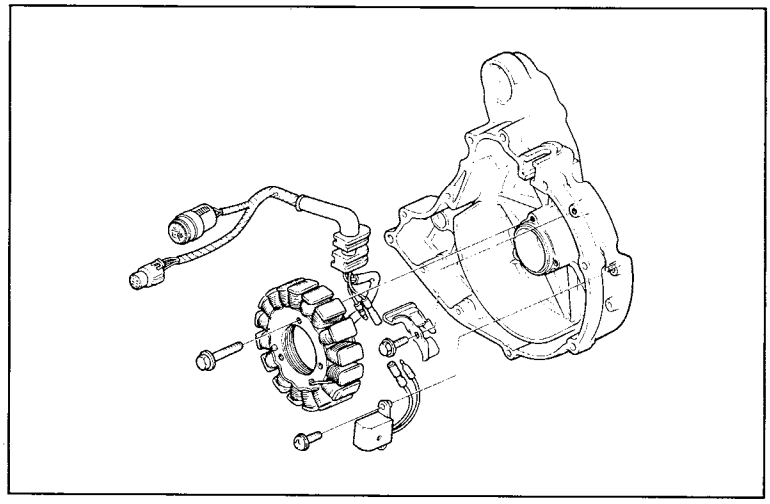
> To ease the left crankcase cover removal, loosen the engine mount bolts and move the engine to provide adequate clearance between the cover and frame.



ALTERNATOR

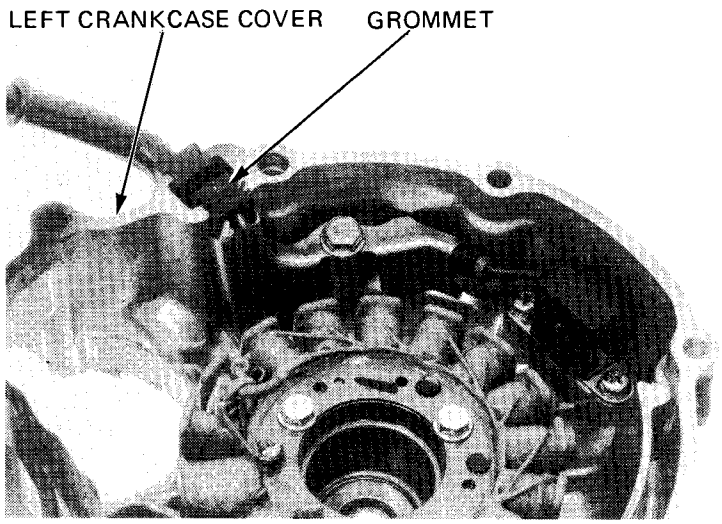
STATOR/PULSE GENERATOR REMOVAL

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



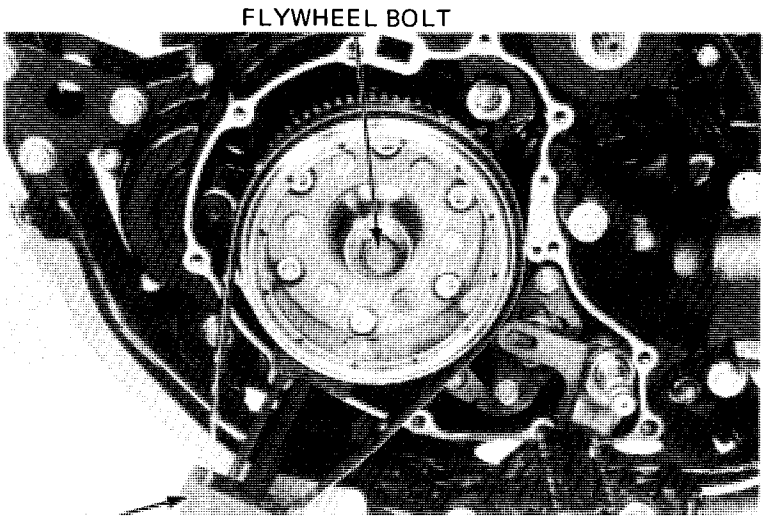
STATOR/PULSE GENERATOR INSTALLATION

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



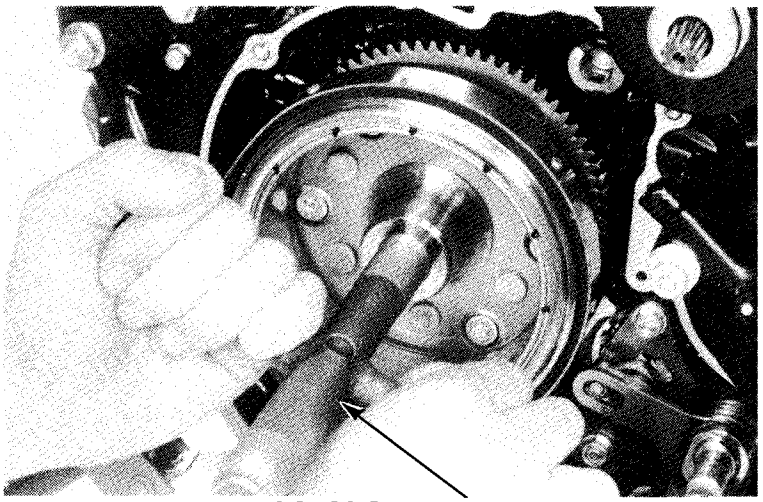
FLYWHEEL REMOVAL

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



FLYWHEEL HOLDER 07725–0040000 OR STRAP WRENCH, COMMERCIALLY AVAILABLE IN U.S.A.

Remove the flywheel with the rotor puller.

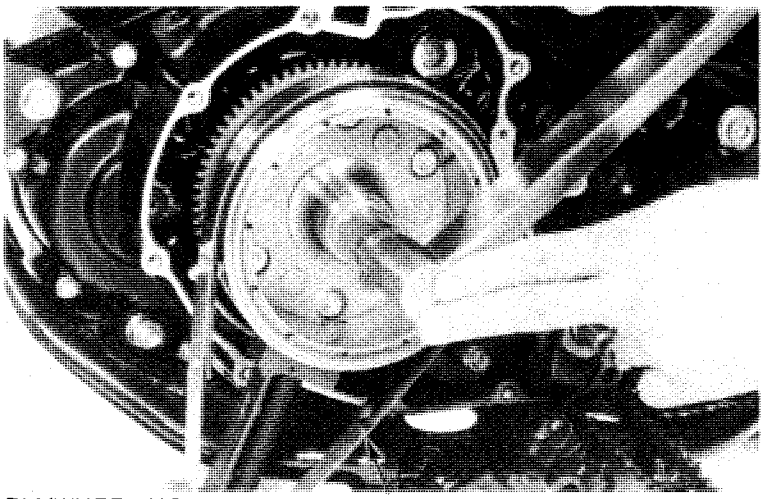


ROTOR PULLER 07733–0020001 OR 07933–3950000

FLYWHEEL INSTALLATION

Install the starter drive 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)

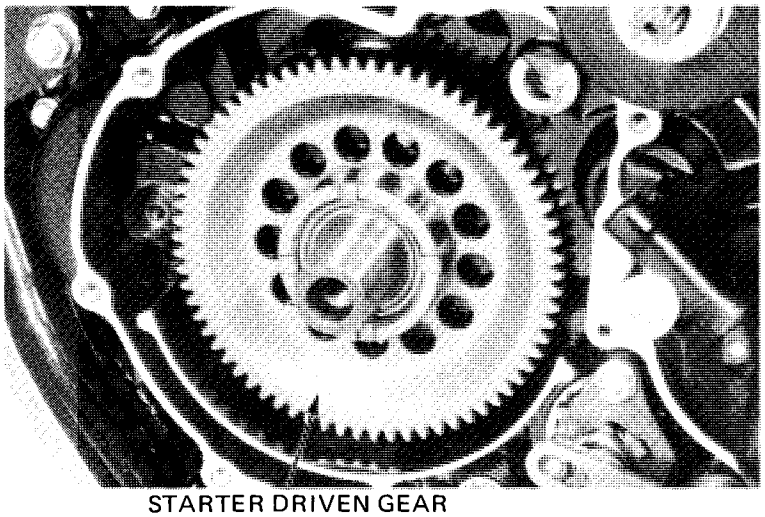


FLYWHEEL HOLDER 07725–0040000 OR STRAP WRENCH, COMMERCIALLY AVAILABLE IN U.S.A.

STARTER CLUTCH

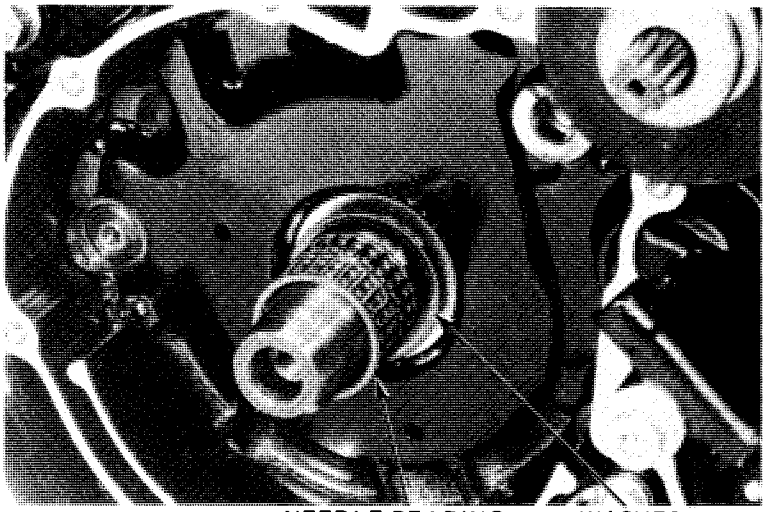
REMOVAL

Remove the left crankcase cover (Page 9-4).
Remove the flywheel (Page 9-5).
Remove the starter driven gear.

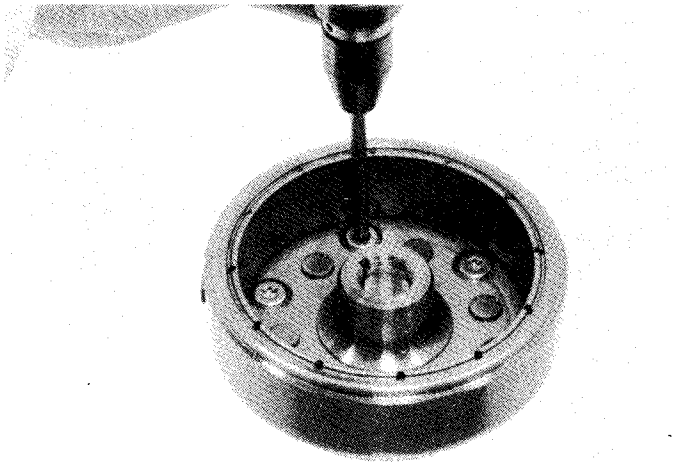


STARTER DRIVEN GEAR

Remove the needle bearing and washer.



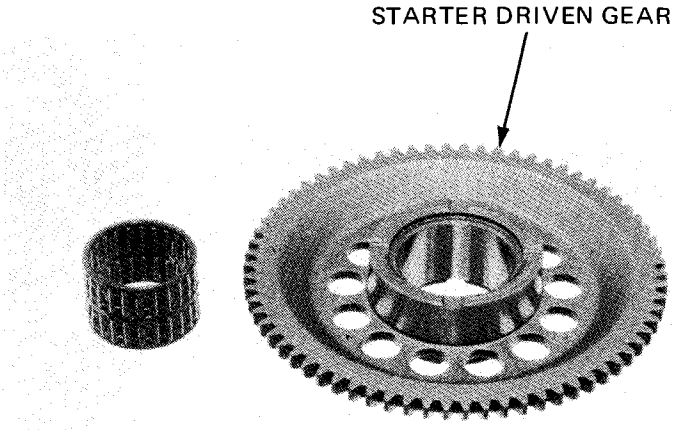
Remove the one-way clutch from the flywheel using a shock driver and Torx bit.



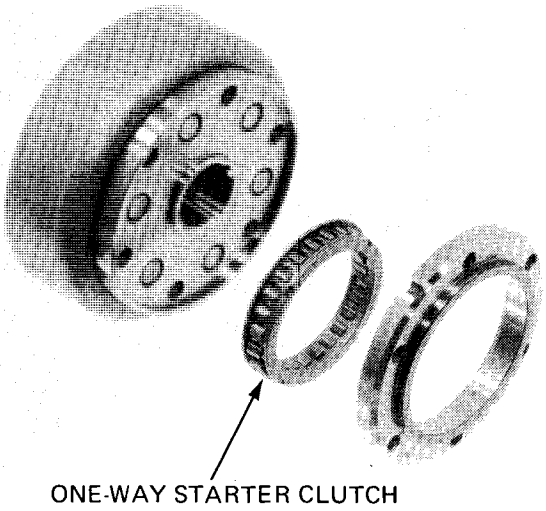
INSPECTION

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

Check the needle bearing for damage or excessive play.



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

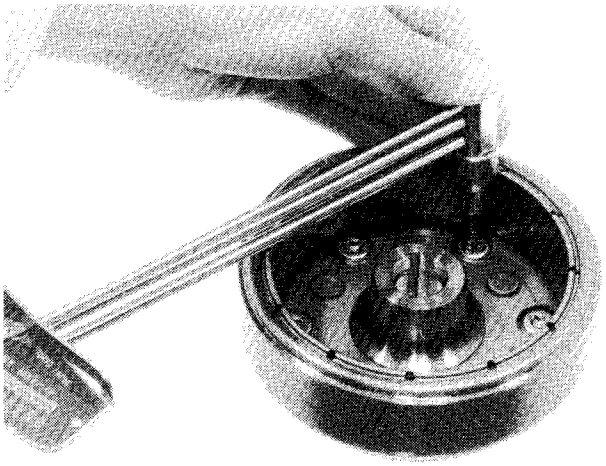


INSTALLATION

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

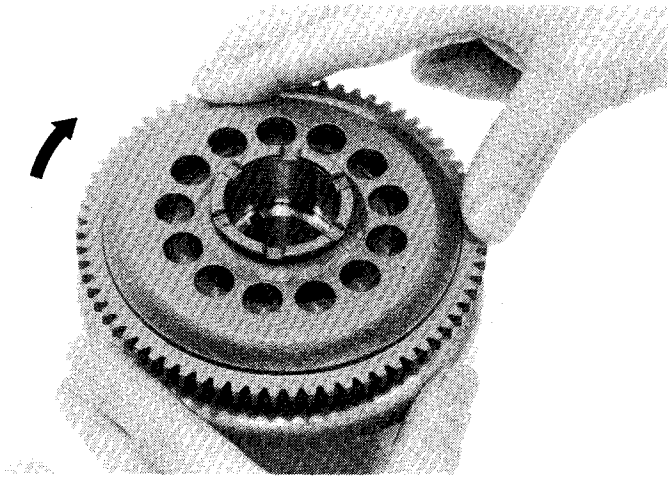
TORQUE: 18–25 N·m (1.8–2.5 kg-m, 13–58 ft-lb)

Refer to flywheel installation (Page 9-6).



Install the starter driven gear by turning it clockwise.

Check for smooth operation of the driven gear and one-way clutch. You should be able to turn the gear clockwise, but not counter-clockwise.

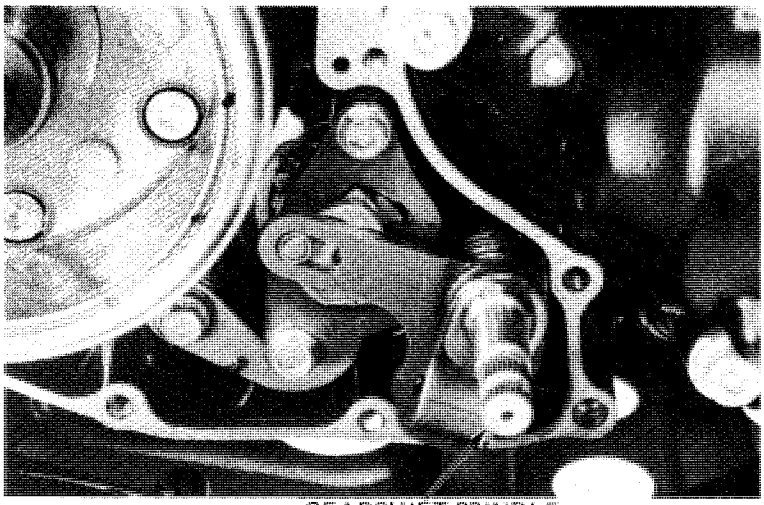


GEARSHIFT LINKAGE

REMOVAL

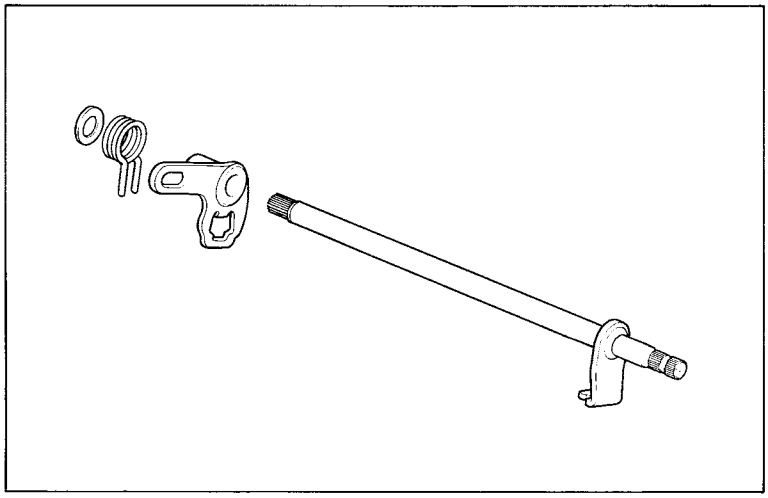
Remove the left crankcase cover (Page 9-4).
Remove the right crankcase cover (Page 8-3).
Remove the clutch lever.

Pull the gearshift spindle out of the crankcase.

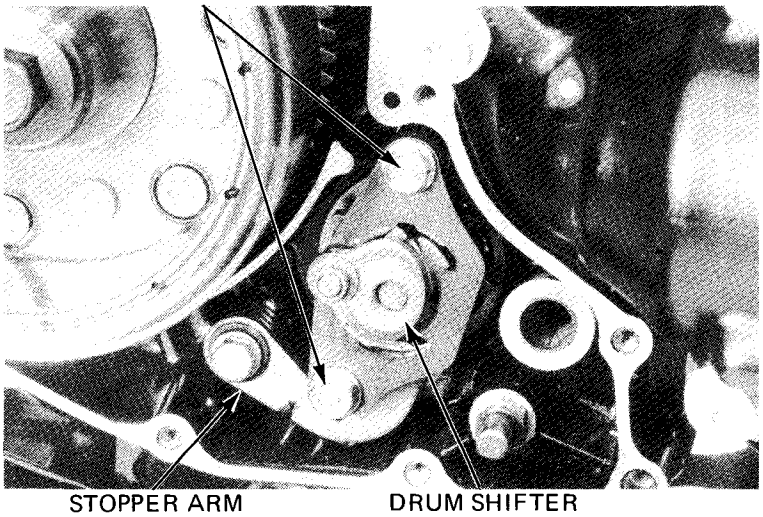


GEARSHIFT SPINDLE

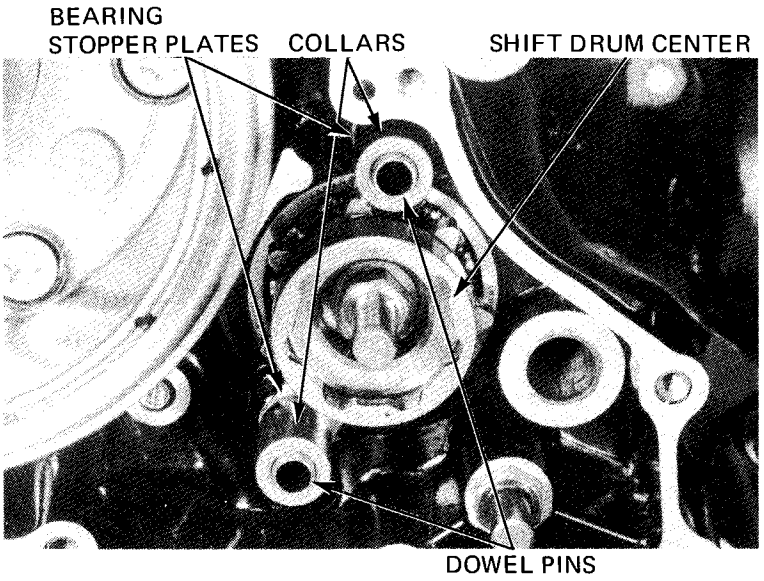
Remove the washer, and return spring.



Remove the guide plate bolts, then remove the drum shifter with the plate.
Remove the stopper arm.



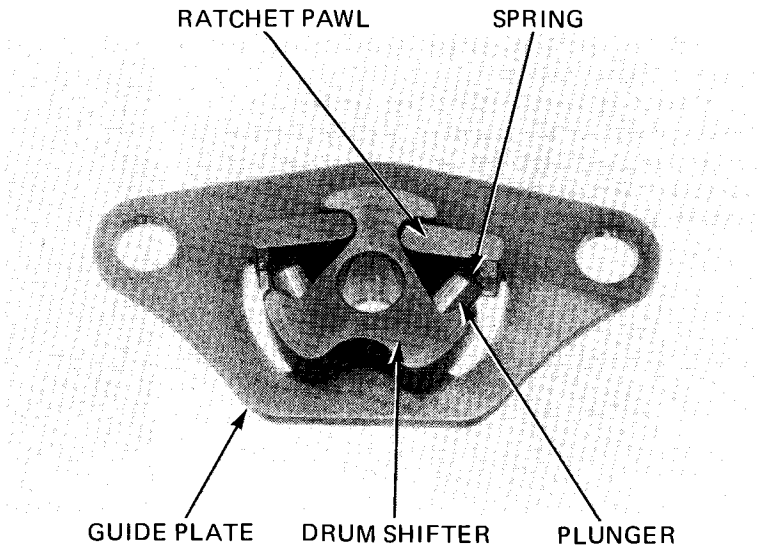
Remove the collars, dowel pins and bearing stopper plate.
Remove the shift drum center by removing drum center pin.



INSTALLATION

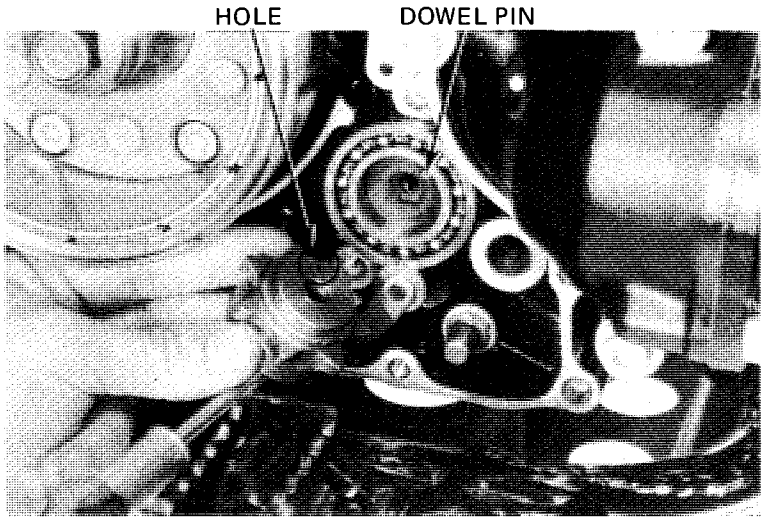
Apply clean engine oil to the ratchet pawls, springs and drum shifter.

Assemble ratchet pawls, springs and plungers onto the drum shifter, then install them in the guide plate.



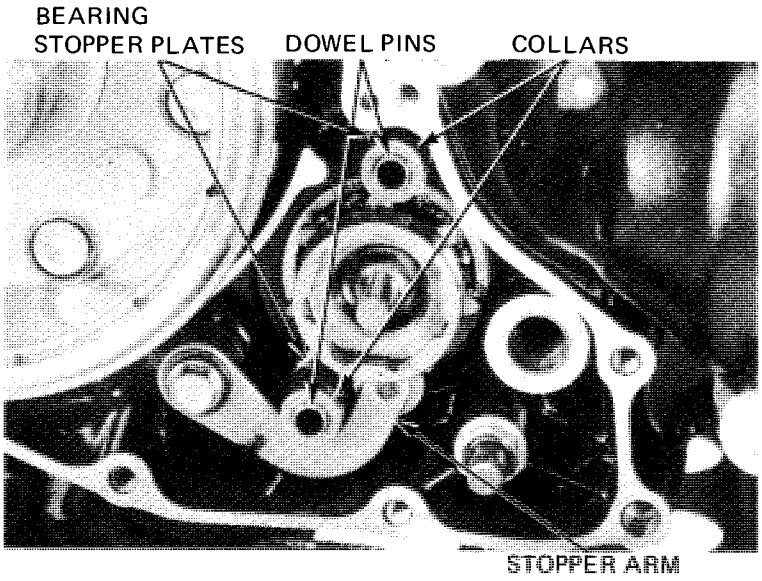
Install the stopper arm and spring with the bolt.

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

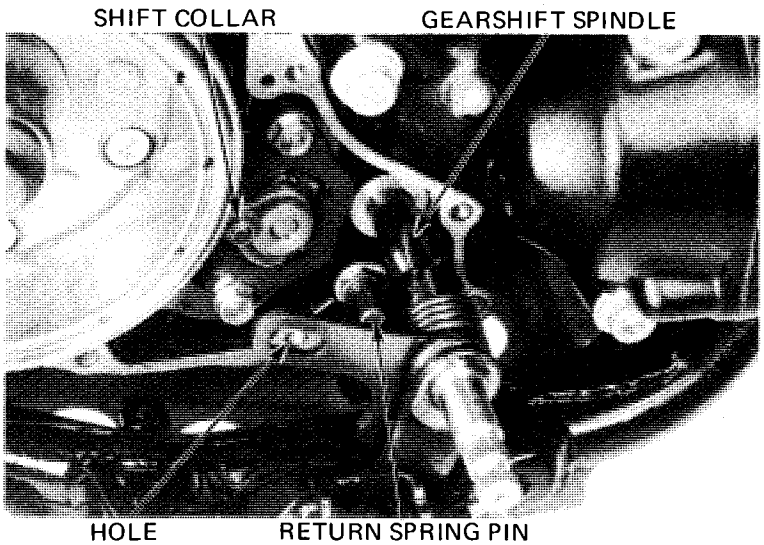


Tighten the drum center pin.
Install the bearing stopper plates, dowel pins and collars onto the crankcase.

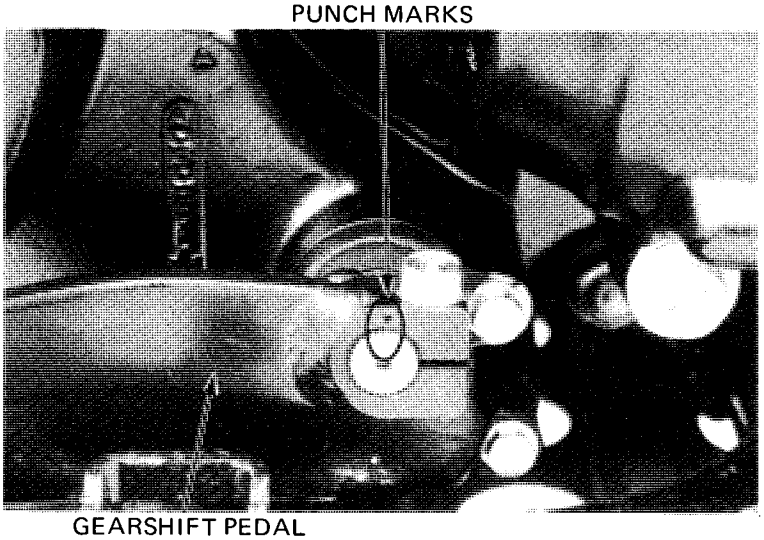
Compress the drum shifter ratchet pawls and install into the guide plate.
Install tighten the gudie plate bolts and



Assemble the gearshift spindle, gearshift arm, shift return spring and washer.
Install the shift collar onto the drum shiften pin.
Insert the end of the return spring into the return spring pin and install the gearshift spindle in the crankcase. Attach the spindle cam to the shift collar through the hole.

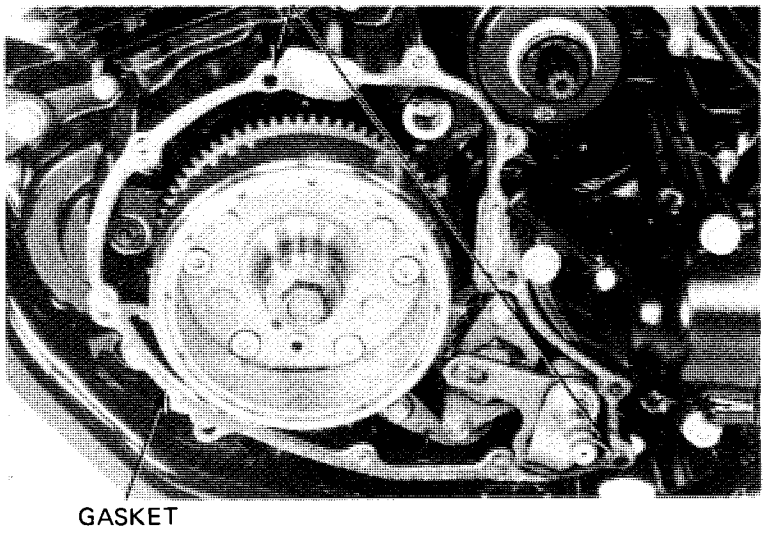


Install the follows:
- left crankcase cover (Page 9-12).
- gearshift pedal on the spindle while aligning the punch marks.
- clutch lever aligning the punch mark with the index mark (Page 8-10).
- right crankcase cover (Page 8-3).



LEFT CRANKCASE COVER INSTALLATION

Install a new gasket, the dowel pins.



Install the left crankcase cover and bolts.

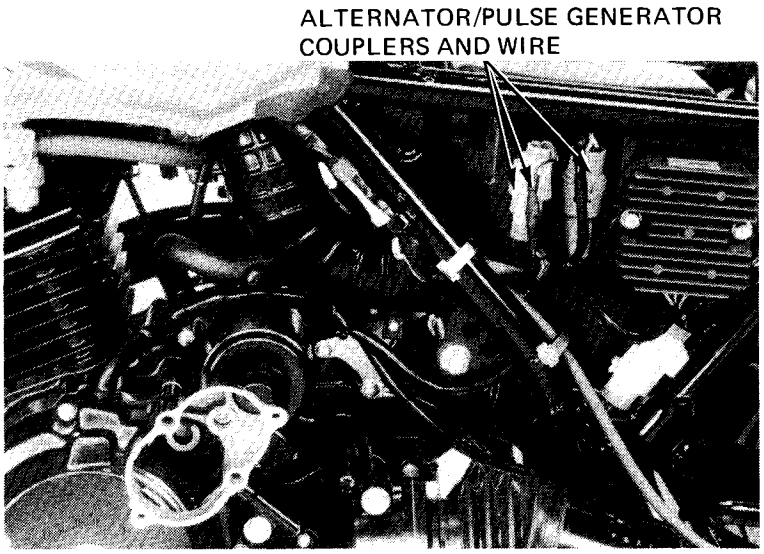
Install the starter reduction gears and cover (Page 9-3).
Connect the alternator/pulse generator couplers and wire.

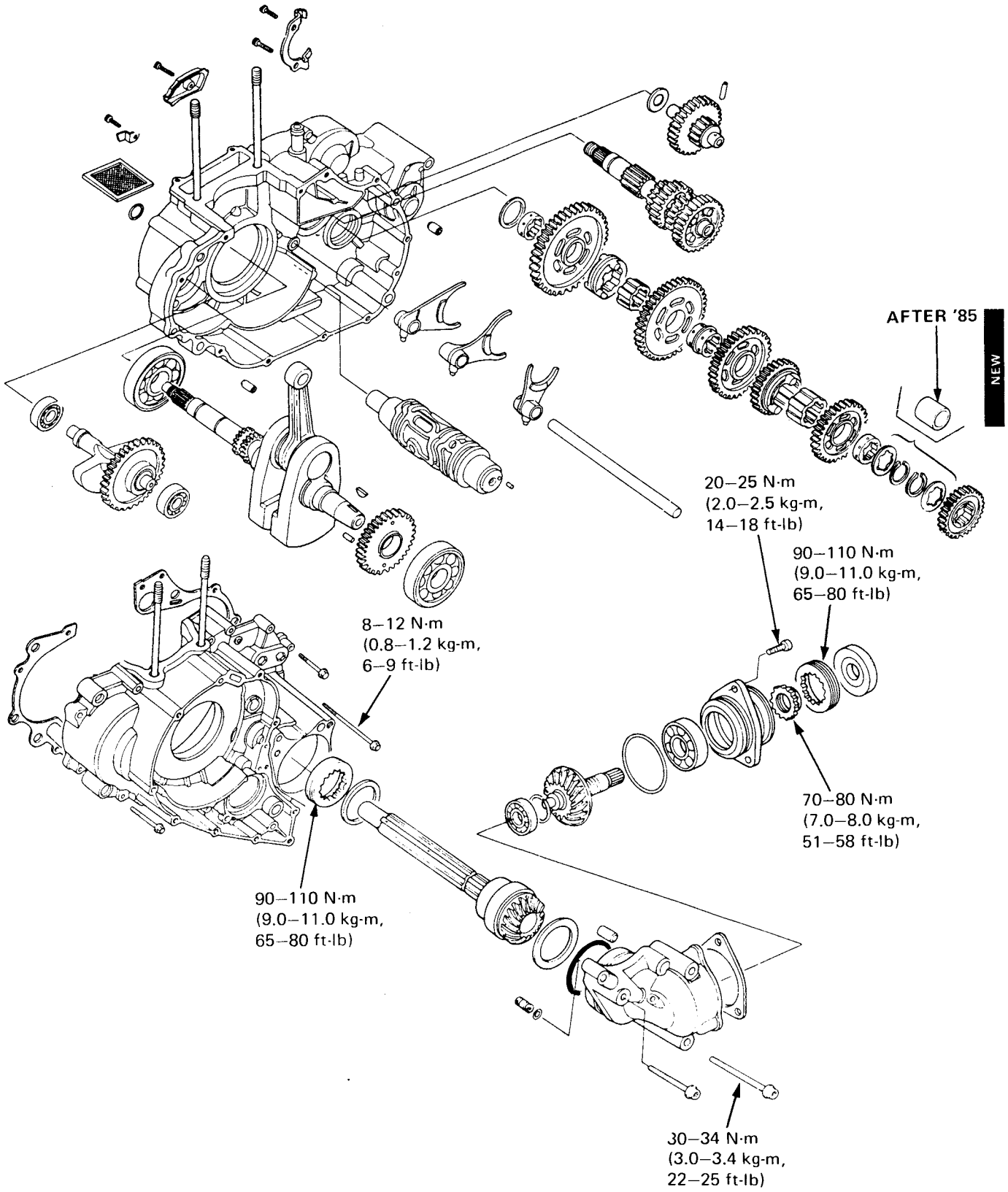
Align the punch marks on the gearshift pedal and spindle and install the gearshift pedal.

Install the seat.

Check the ignition timing (Page 14-4).

Check for smooth shifting in all gears.





Revised: April 1987

MSV 1418 (8704) '85-'87 ATC250SX

10. CRANKCASE/CRANKSHAFT/ TRANSMISSION

SERVICE INFORMATION

GENERAL

- For crankshaft and transmission repair, the crankcase must be separated.
- Remove the following parts before separating the crankcase.
  - Cyinder head (Section 6)
  - Clutch oil pump and kick starter (Section 8)
  - Alternator and gear shift linkage (Section 9)
  - Cylinder and piston (Section 7)
  - Starter motor (Section 16)
- 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 bearing
  - Output gear assembly
  - 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 20 inches long. The lock nut wrench increase the torque wrenche'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)
Transmission	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 (0.6680–0.6691 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)
	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 (1.1007–1.1016 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)

ITEM			STANDARD	SERVICE LIMIT
Transmission	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 VLUES

Crankcase bolt	8–12 N·m (0.8–1.2 kg-m, 6–9 ft-lb)
Output gear case socket bolt	20–25 N·m (2.0–2.5 kg-m, 14–18 ft-lb)
Output gear driven 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	30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)
Output gear drive bearing outer 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
Shaft holder	07924–ME50000
Lock nut wrench, 30 x 64 mm	07916–MB00001 or 07916–MB00000
Bearing remover, 15 mm	07936–KC10500
Lock nut wrench, 34 x 44 mm	07916–ME50001 or 07916–ME50000
Universal bearing puller	07631–0010000 or commercially available in U.S.A.
Crankshaft assembly collar	07931–KF00100
Shaft puller	07931–ME40000 or 07931–ME4000A (U.S.A. only)
Threaded adaptor	07931–KF00200
Attachment, 28 x 30 mm	07946–1870100
Lock nut wrench attachment	07916–HA0020A (U.S.A. only)
Bearing driver attachment	07916–HA00000

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

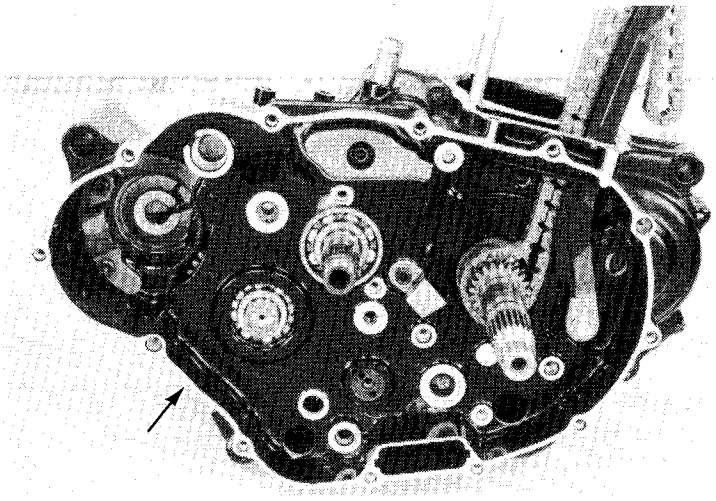
Jumps out of gear
1. Shift firk bent or damaged
2. Shift fork shaft bent
3. Shift claw bent
4. Gear engagement dogs or slots worn
5. Shift drum cam grooves damaged

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

Excessive output gear noise
1. Output drive and driven gears worn or 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 and tensioner.
Remove the right crankcase cover bolt.

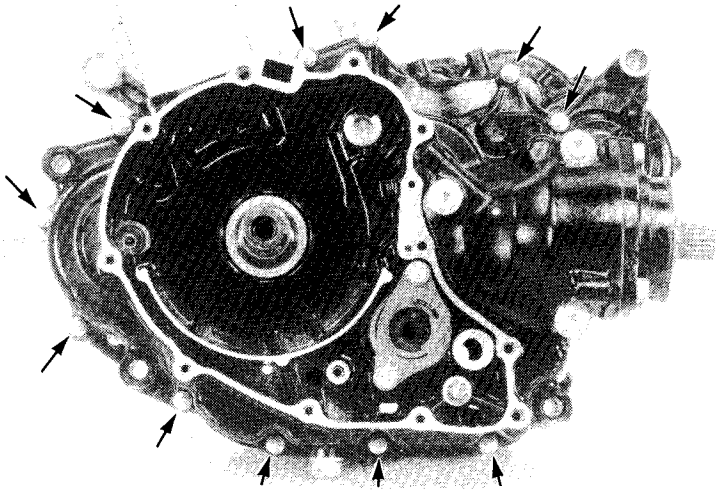


Remove the left crankcase bolts.

NOTE

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

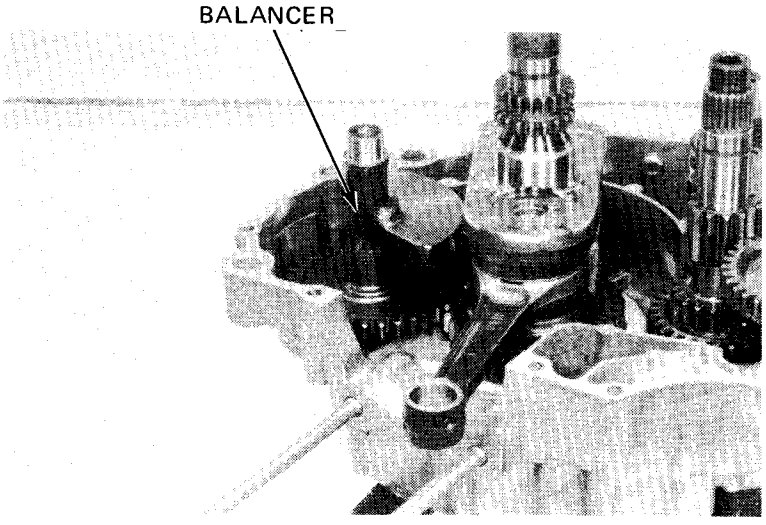
Place the engine with the left crankcase down and remove the right crankcase from the left crankcase.
Remove the dowel pins and gasket.



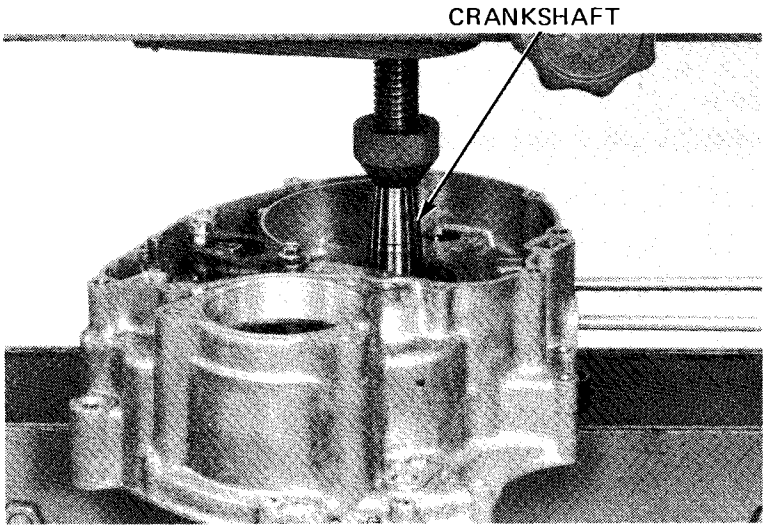
CRANKSHAFT

REMOVAL

Remove the balancer from the left crankcase.



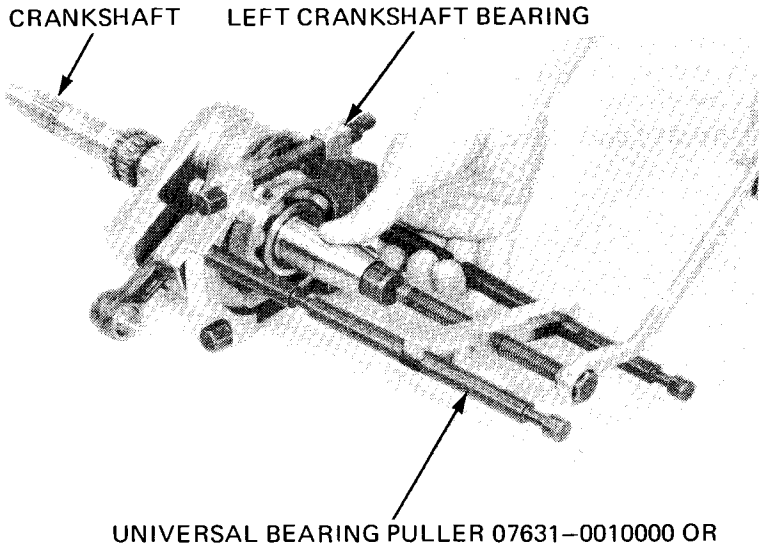
Disassemble the transmission (Page 10-8).
Remove the crankshaft from the left crankcase using a hydraulic press.



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 a driver 07749–0010000 and attachment, 42 x 47 mm 07746–0010300.
Discard the left crankshaft bearing.

NOTE

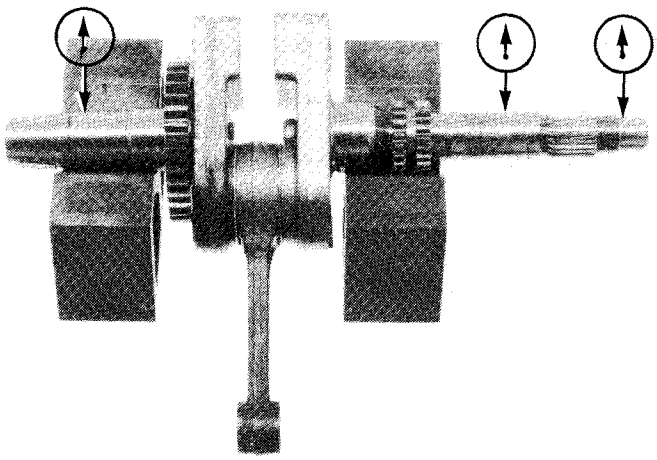
> Always replace the left bearing with a new one whenever the crankshaft is removed from the left crankcase.



INSPECTION

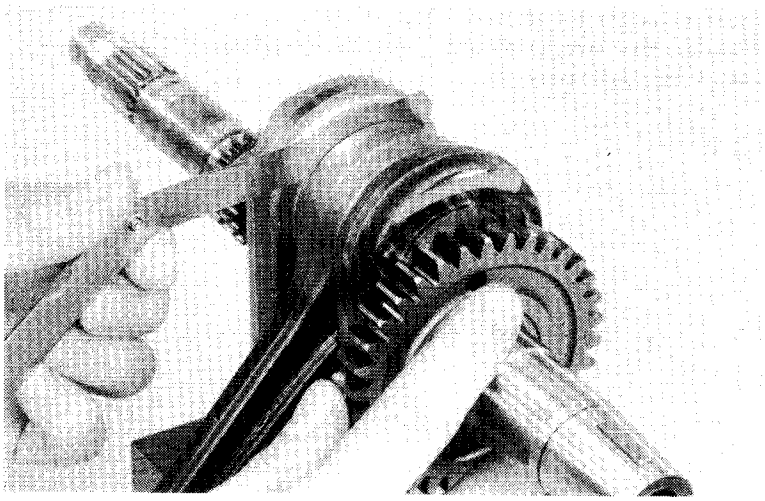
Set the crankshaft on a standard or V-blocks and read the runout using dial indicators.

SERVICE LIMIT: 0.05 mm (0.002 in)



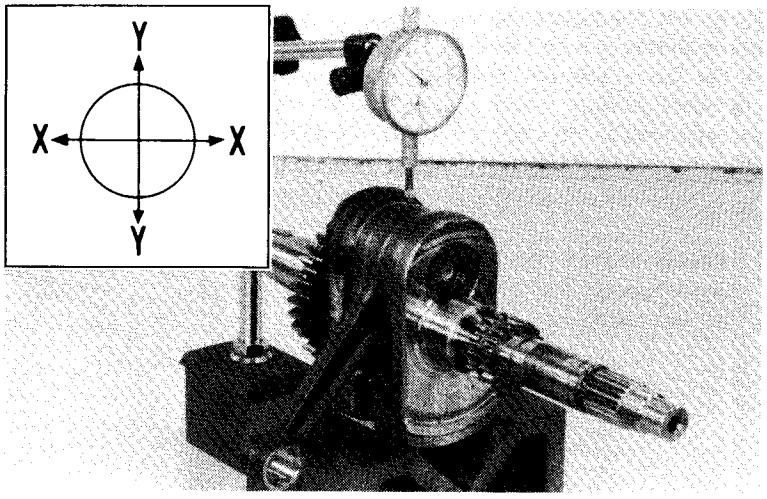
Measure the side clearance at the connecting rod end and the crankshaft flyweight with a feeler gauge.

SERVICE LIMIT: 0.80 mm (0.031 in)



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

SERVICE LIMIT: 0.005 mm (0.002 in)



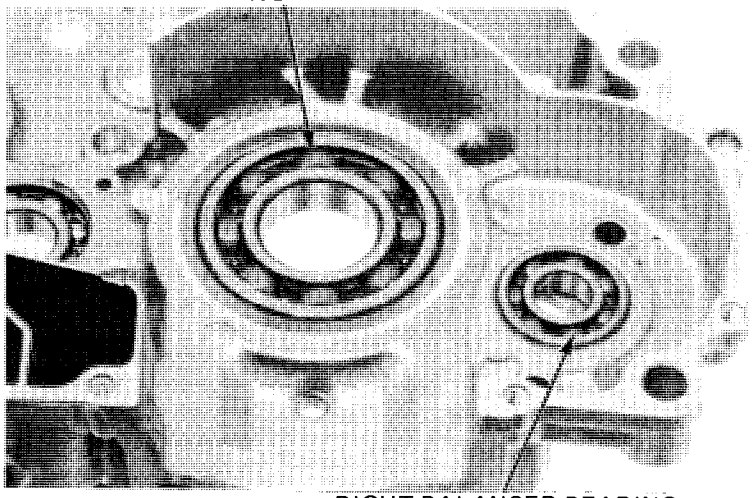
Turn the inner race of each bearing in the crankcase with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer races fit tightly in the crankcase.

Remove and discard the bearings if the races do not turn smoothly, quietly or if they fit loosely in the crankcase.
Refer to page 10-6 for bearing replacement.

NOTE:

Replace the crankshaft bearings in pairs.

RIGHT CRANKSAHFT BEARING

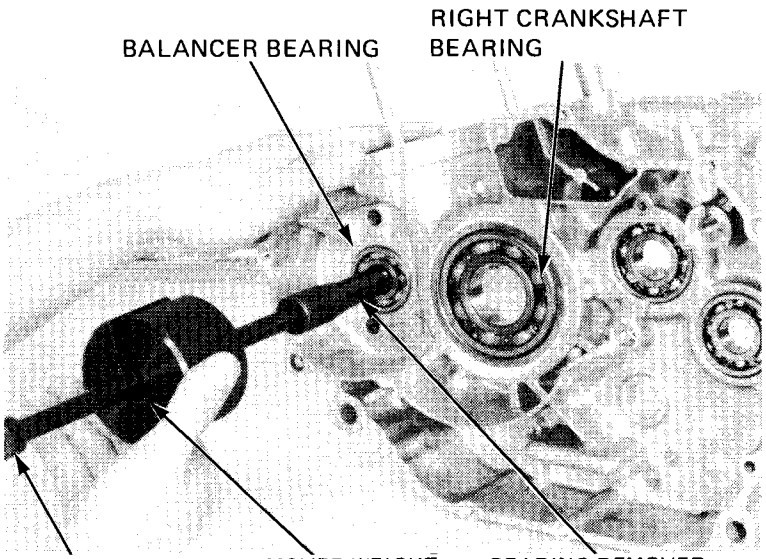


RIGHT BALANCER BEARING

BEARING REPLACEMENT

Remove the balancer bearings using the bearing remover tool.

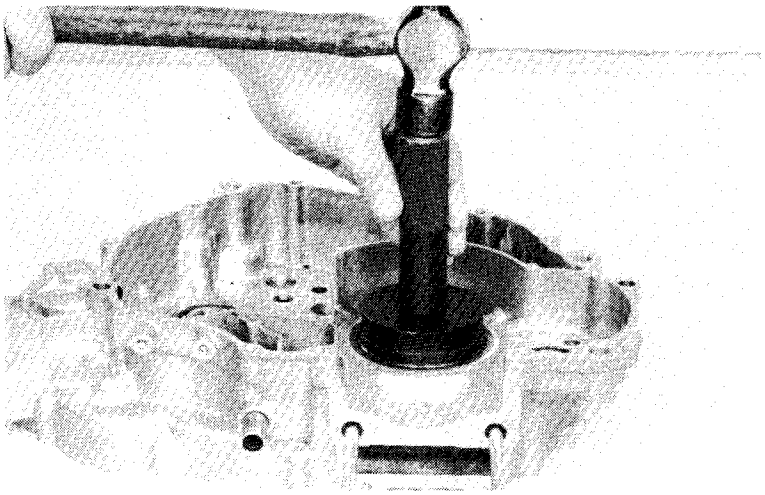
Drive the right crankcase bearing out from the outside using driver 07749–0010000 and attachment, 42 x 47 mm 07746–0010300.



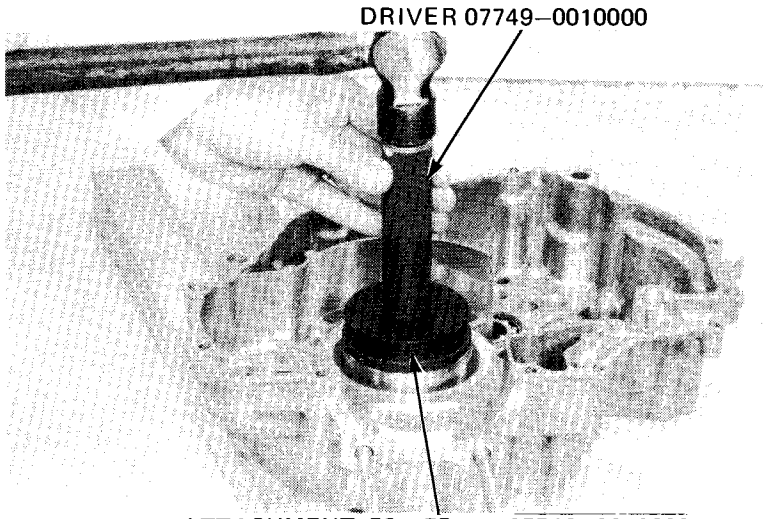
INSTALLATION

Drive new bearings with the following tools.

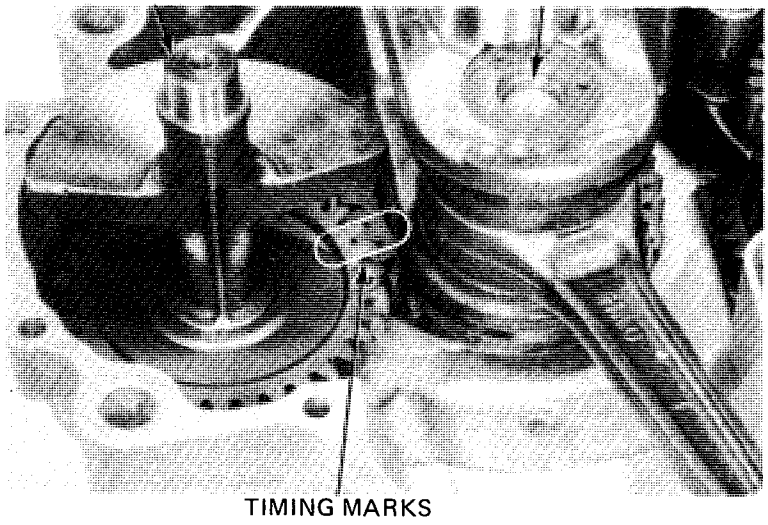
Right crankshaft bearing:	
• Driver	07749–0010000
• Attachment, 72 x 75 mm	07746–0010600
• Pilot, 35 mm	07746–0040800
Balancer bearings:	
• Driver	07749–0010000
• Attachment, 37 x 40 mm	07746–0010200
• Pilot, 17 mm	07746–0040400



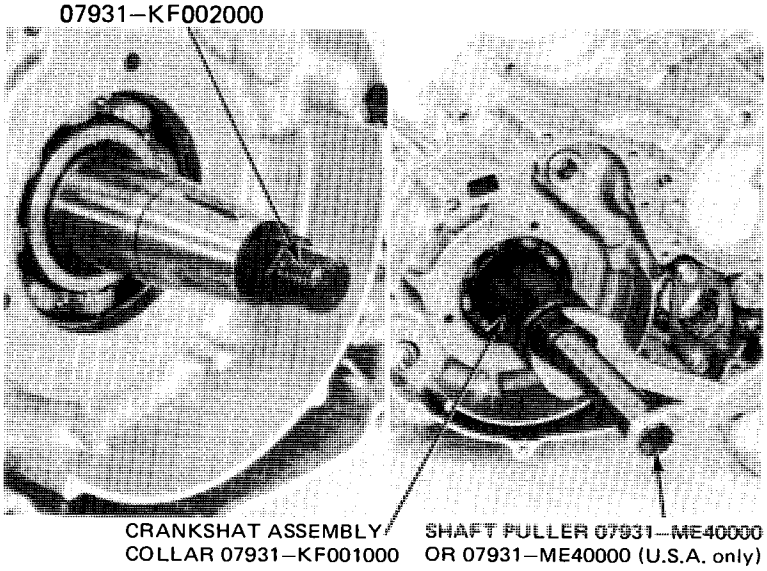
Drive new left crankshaft bearing into the left crankcase.



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



Install the crankshaft onto the left crankcase using the special tool.



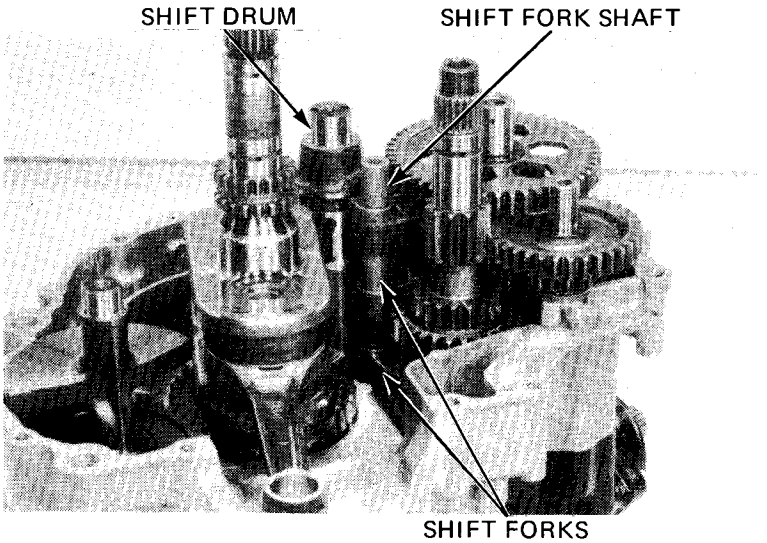
TRANSMISSION

DISASSEMBLY

NOTE

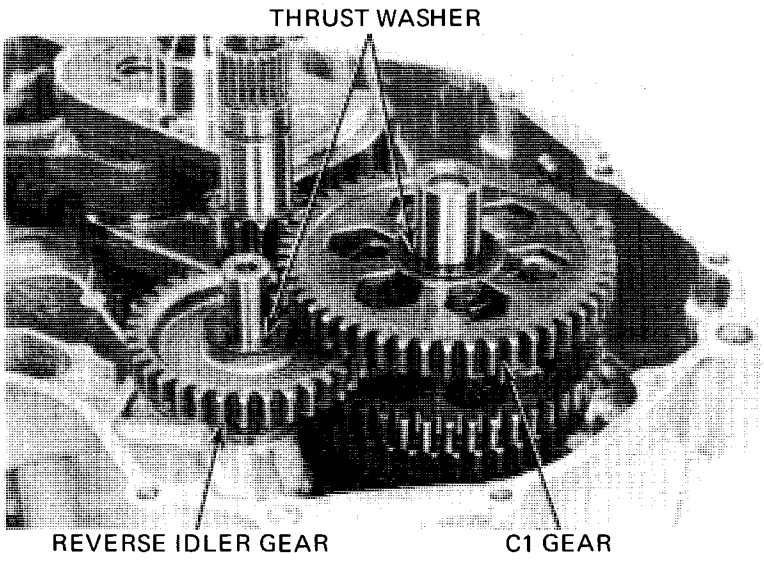
> Temporarily install the gearshift drum bearing stopper plates, dowel pins, collars and shifter plate (Page 9-10) to prevent the bearing frame falling out while disassembling and assembling the transmission.

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



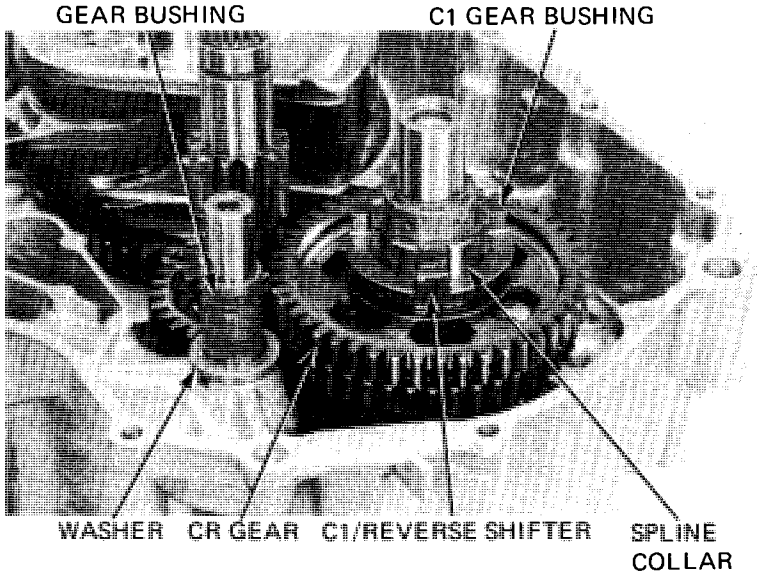
Remove the thrust washer and C1 gear from the countershaft.

Remove the thrust washer and reverse idler gear.



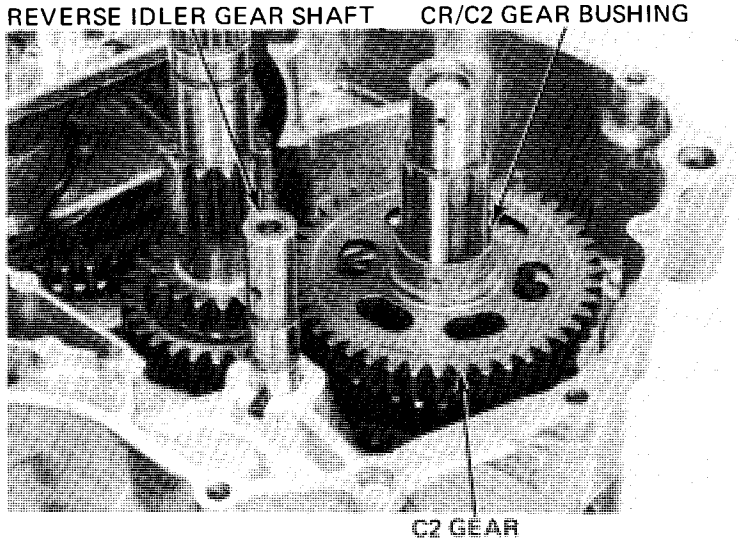
Remove the C1 busing, spline collar, C1 reverse shifter and CR gear from the countershaft.

Remove the reverse idler gear bushing and washer.

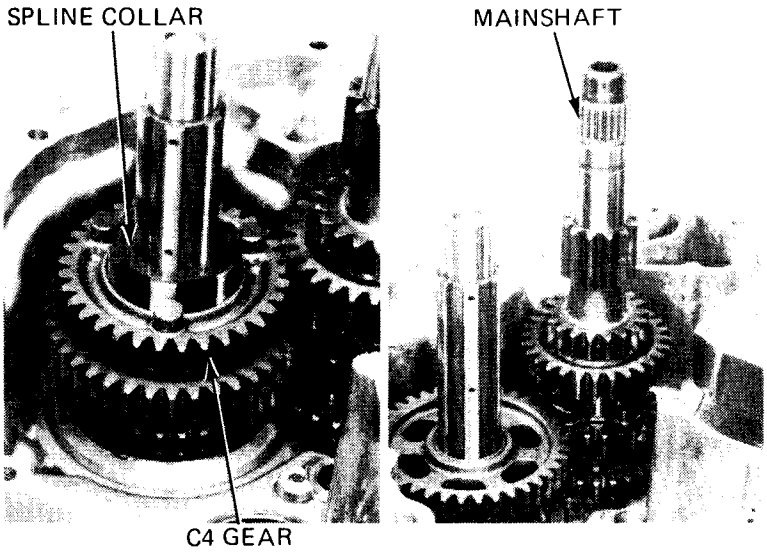


Remove the CR/C2 gear bushing and C2 gear from the countershaft.

Remove the reverse idler gear shaft.

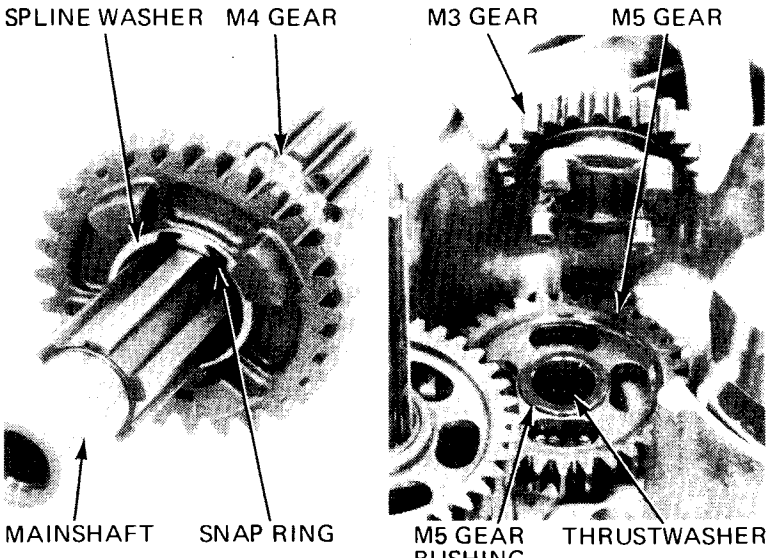


Remove the spline collar and C4 gear from the countershaft and remove the mainshaft.



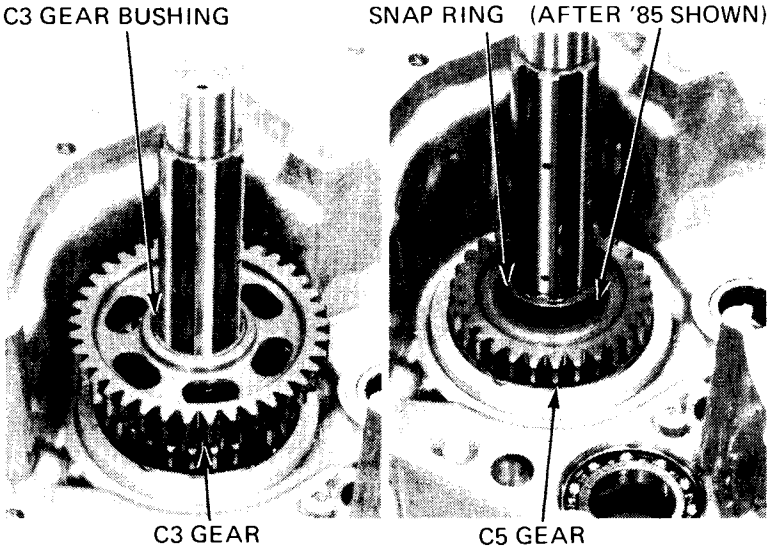
Remove the snap ring, spline washer, M4 gear and M4 gear bushing from the mainshaft.

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.

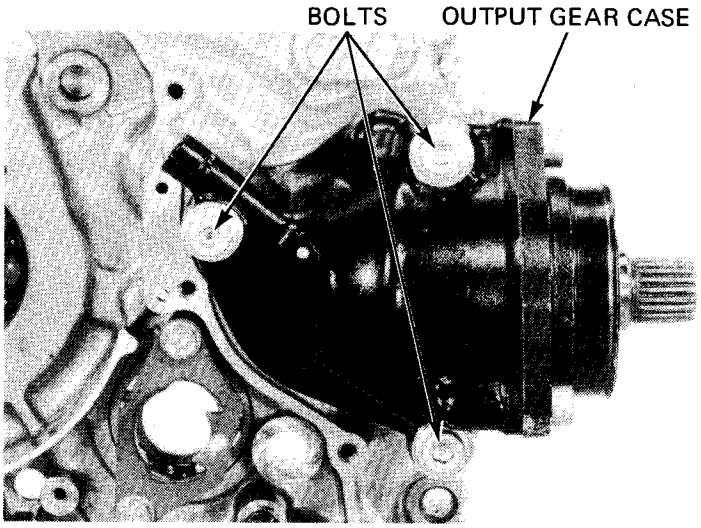
'85:
Remove the snap rings, collars and C5 gear.
After '85:
Remove the collar and C5 gear.



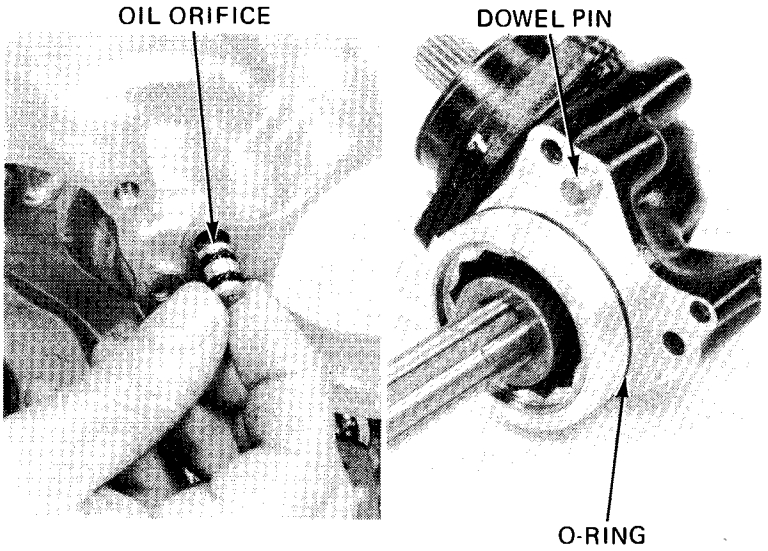
Revised: April 1987

MSV 1418 (8704) '85-'87 ATC250SX

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, bending or damage.
Measure the I.D. of the shaft hole.

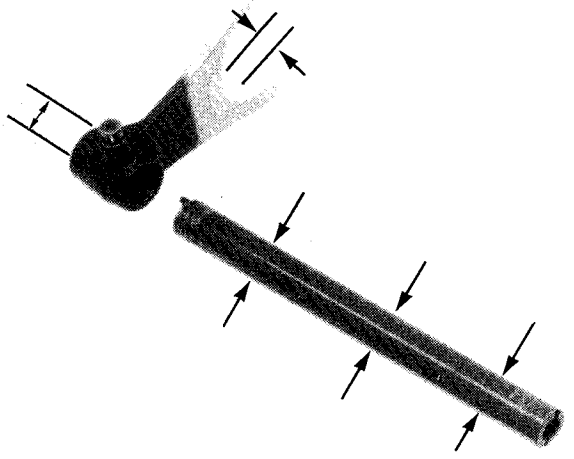
SERVICE LIMIT: 13.04 mm (0.513 in)

Measure the shift fork claw thickness.

SERVICE LIMIT: 4.50 mm (0.177 in)

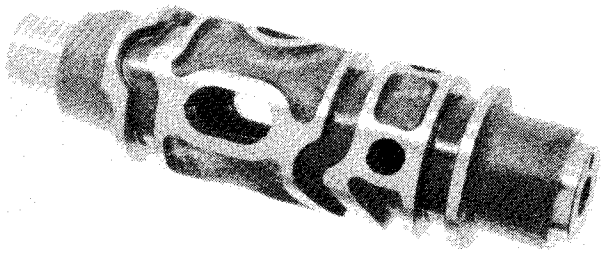
Measure the shift fork shaft O.D.

SERVICE LIMIT: 12.96 mm (0.510 in)



Inspect the shift drum right journal for scoring, scratches, or evidence of insufficient lubrication.

Check the shift drum grooves for damage.

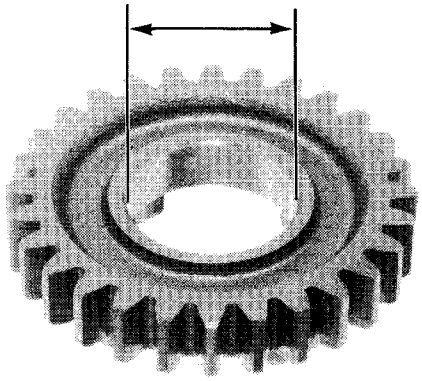


Check the gear dogs, dog holes and teeth for excessive or abnormal wear, or evidence of insufficient lubrication.

Measure the I.D. of each gear.

SERVICE LIMIT:

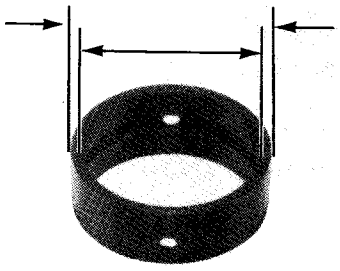
C1, C2, C3, CR	**28.07 mm (1.105 in)**
M4	**25.05 mm (0.986 in)**
M5	**20.07 mm (0.790 in)**
R	**18.05 mm (0.711 in)**



Measure the I.D. and O.D. of each gear bushing.

SERVICE LIMIT:

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)**



Calcualte gear-to-bushing clerance.

SERVICE LIMIT:

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 and countershaft and reverse ilder shaft.

SERVICE LIMIT:

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

Calculate gear bushing-to-shaft clearance.

SERVICE LIMIT:

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

Turn the inner race of the transmission bearings with your finger.
The bearings should turn smoothly and quietly. Also check that the bearing outer races fit tightly in the case.
Remove and discard the bearings if the races do not turn smoothly, quietly, or if loosely in the case.

BEARING REPLACEMENT

Crush the convex portion of the orifice plate in the mainshaft bearing hole to the bearing remover expander properly.

Remove the mainshaft bearing from the left crankcase.

TOOLS

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

Remove the mainshaft and countershaft bearings from the right crankcase.
Remove the gearshift drum bearing from the left crankcase.

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, 25 mm	07746–0040600

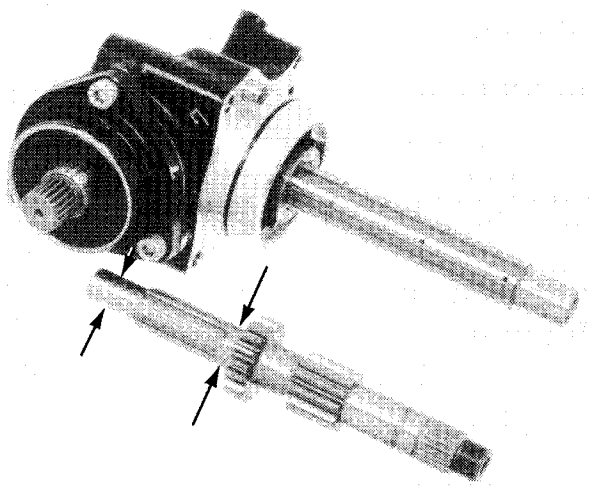
RIGHT CRANKCASE

Mainshaft bearing:

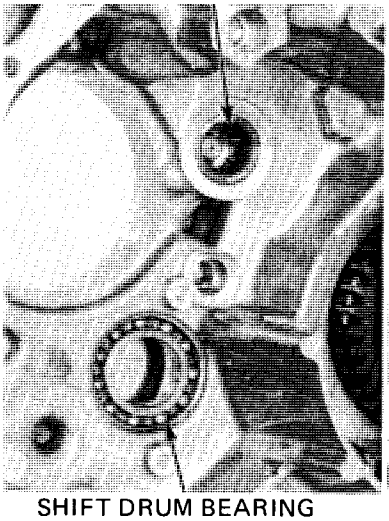
• Driver	07749–0010000
• Attachment, 52 x 55 mm	07746–0010400
• Pilot, 22 mm	07746–0041000

Countershaft bearing:

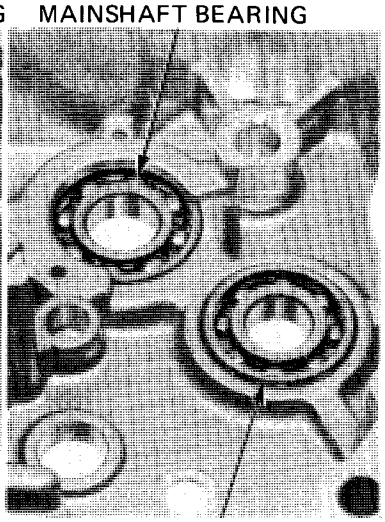
• Driver	07749–0010000
• Attachment, 42 x 47 mm	07746–0010300
• Pilot, 20 mm	07746–0040500



MAINSHAFT NEEDLE BEARING



MAINSHAFT BEARING

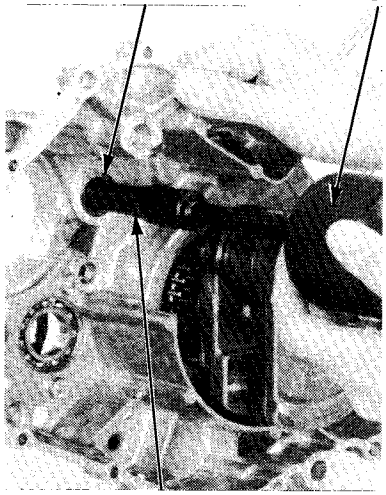


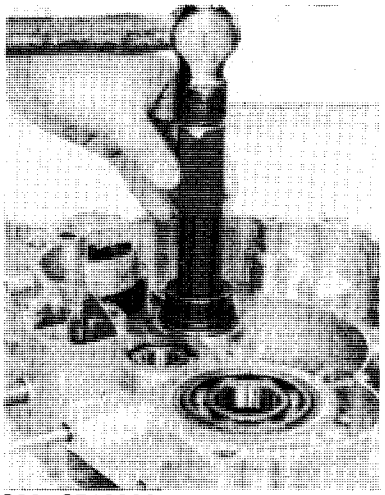
SHIFT DRUM BEARING

COUNTERSHAFT BEARING

MAINSHAFT NEEDLE BEARING

REMOVER WEIGHT 07741–0010201 OR 07936–3710200





BEARING REMOVER, 17 mm 07936–3710300
REMOVER HANDLE 07936–3710100

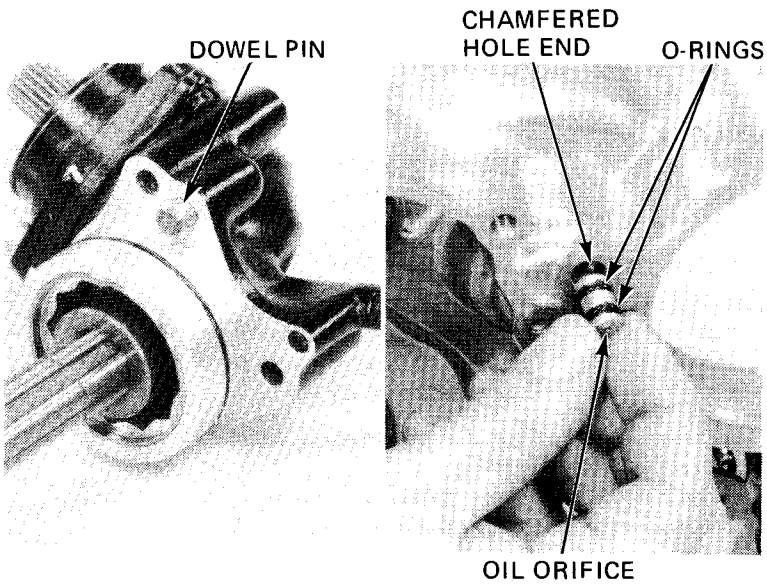
ASSEMBLY

Clean the oil orifice and blow out with compressed air.
Install the orifice into the oil hole.

NOTE

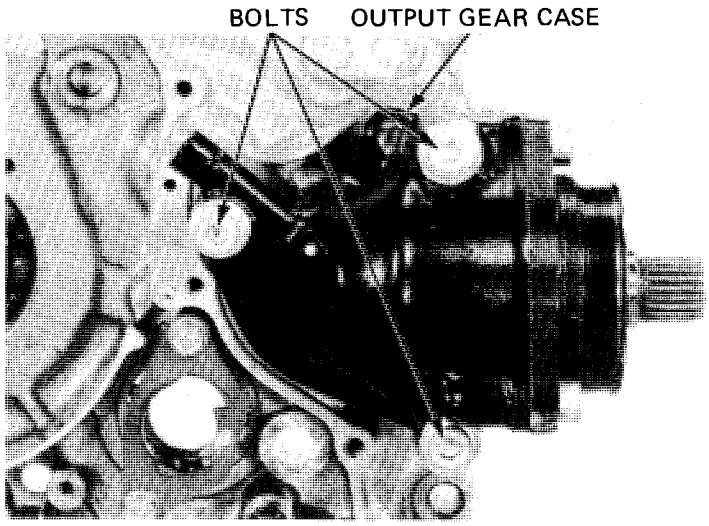
> Install the orifice with its chamfered hole end facing in.

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

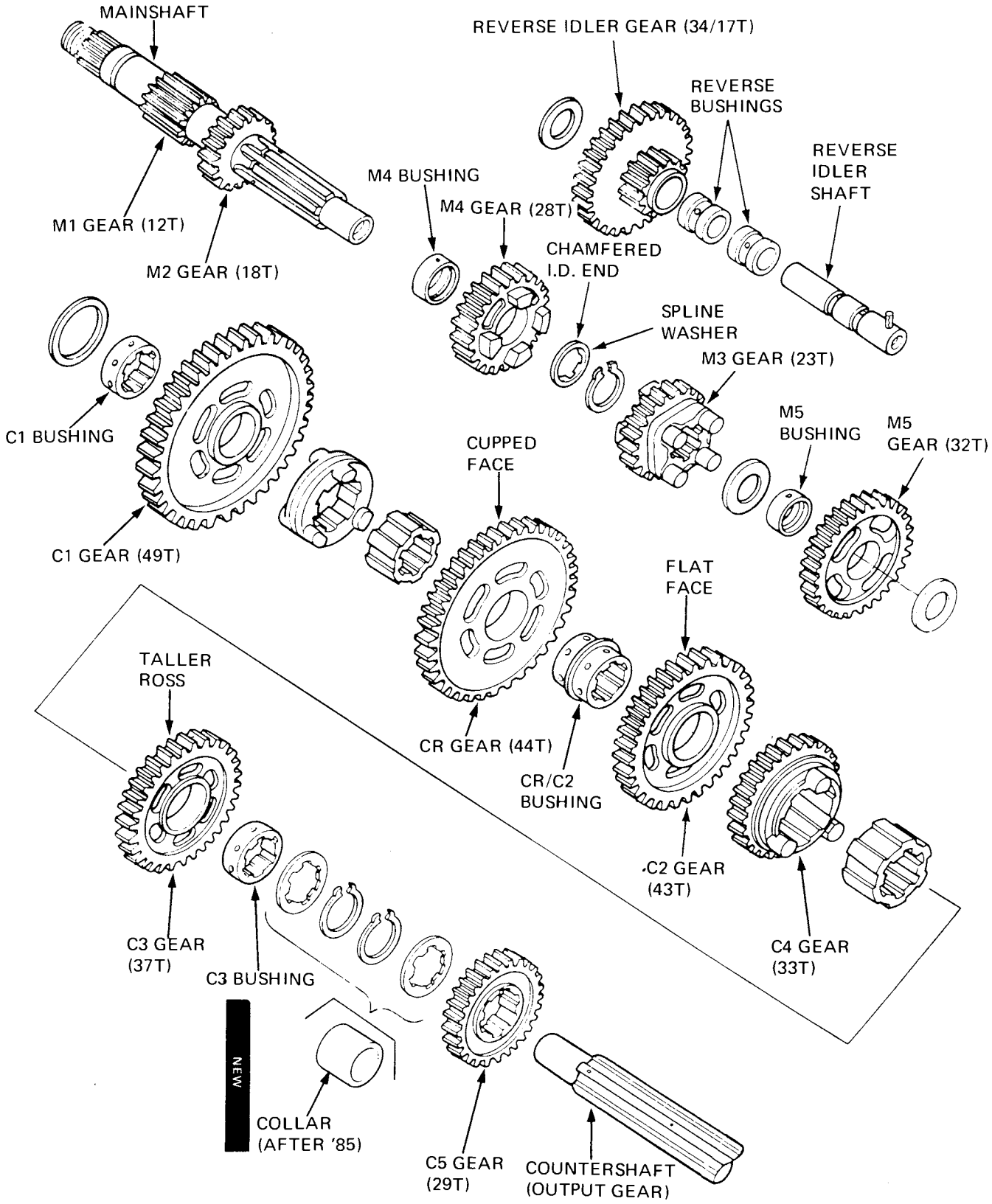


Install the output gear case onto the left crankcase and tighten the three mount bolts.

TORQUE: 30–34 N·m (3.0–3.4 kg-m, 22–25 ft-lb)



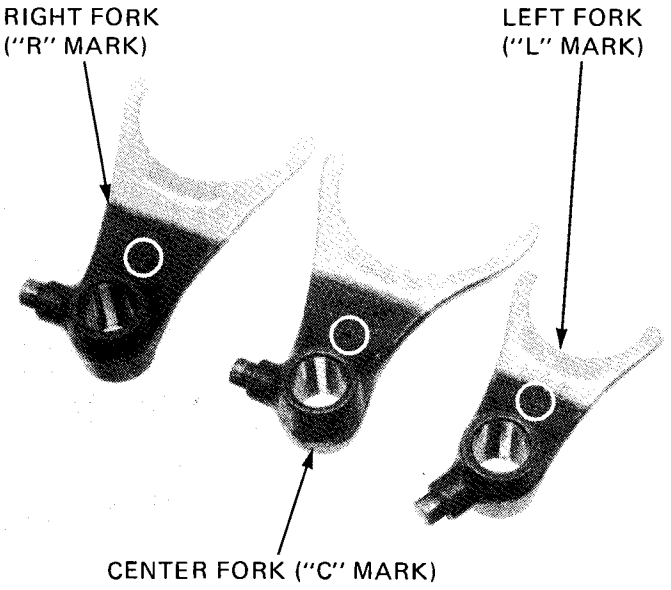
Assemble the mainshaft, countershaft and reverse idler the reverse order of disassembly.



Install the gearshift forks with their marks facing up.

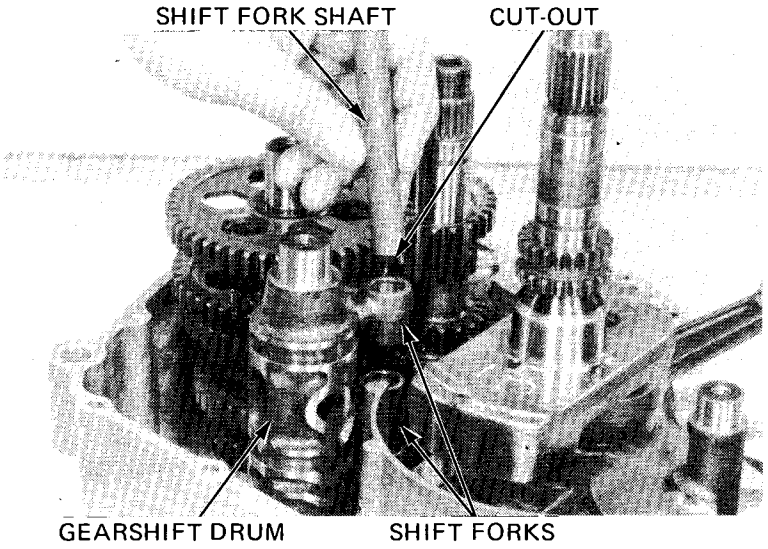
NOTE

> 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 the 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: 0.250 mm (0.0098 in)

Remove the dial indicator. Turn the output drive shaft 120° and measure the backlash. Repeat this procedure one more.
Compare the difference of the three measurement.

DIFFERENCE OF MEASUREMENTS
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.

Backlash 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:

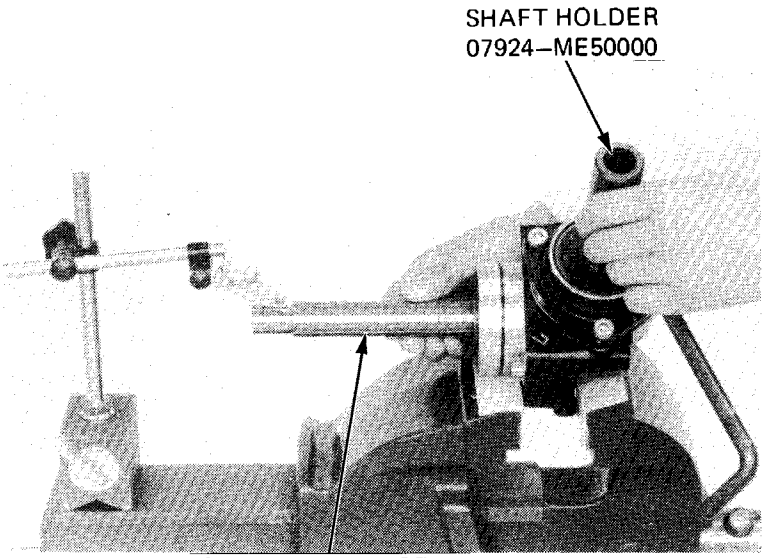
A:	**0.40 mm (0.016 in)**	
B:	**0.45 mm (0.018 in)**	
C:	**0.50 mm (0.020 in)**	**Standard**
D:	**0.55 mm (0.022 in)**	
E:	**0.60 mm (0.024 in)**	
F:	**0.30 mm (0.012 in)**	
G:	**0.35 mm (0.014 in)**	

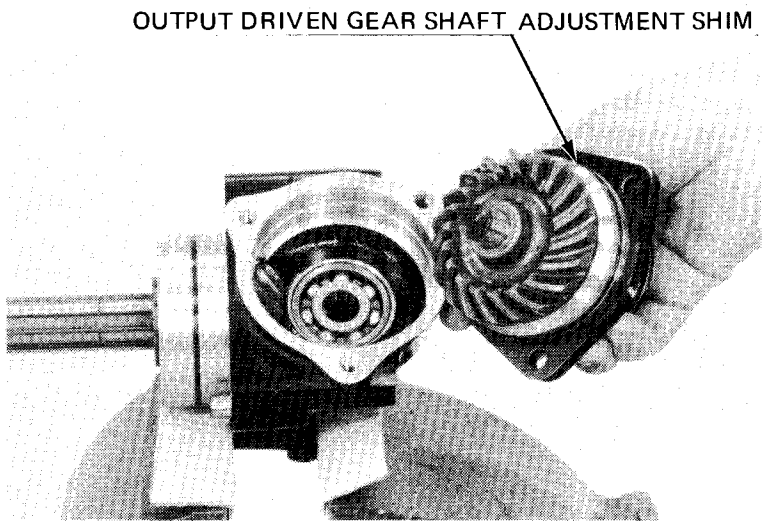
OUTPUT DRIVEN GEAR DISASSEMBLY

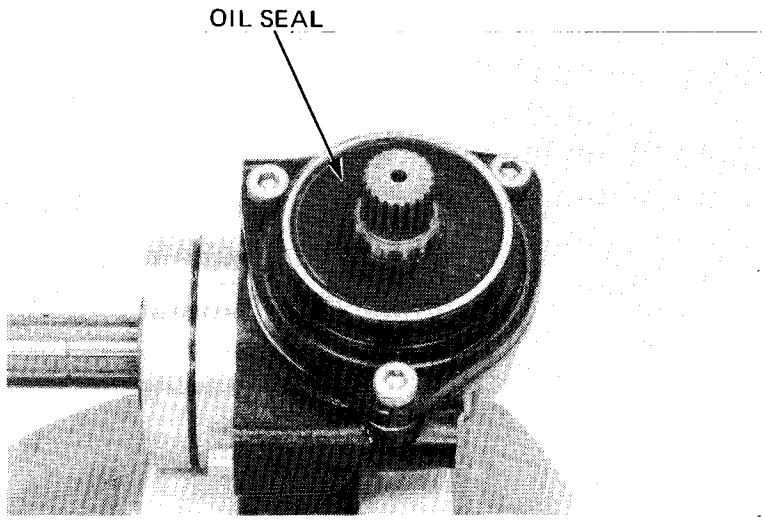
Place the output gear case in a vise, being careful not to distort it and remove the oil seal.

CAUTION

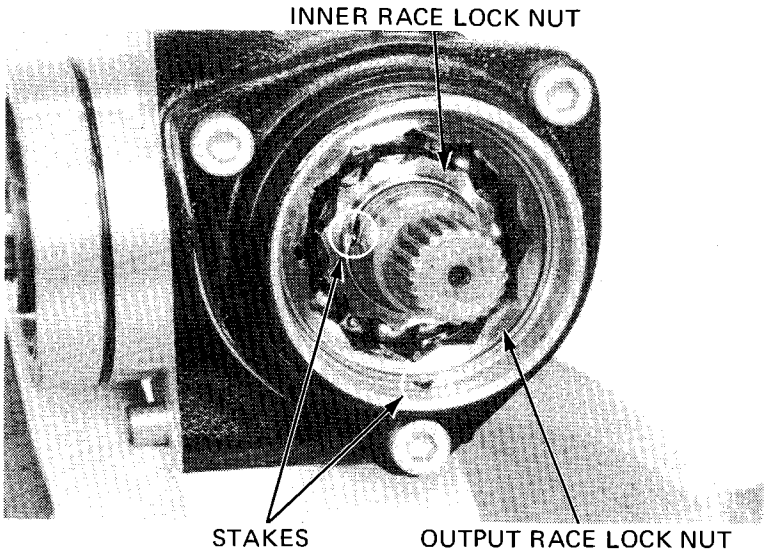
Use soft jaws to prevent damage to the gear case.



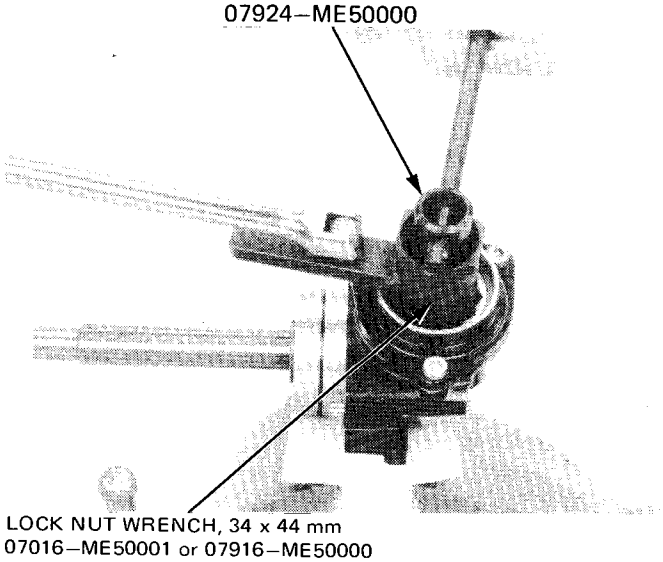




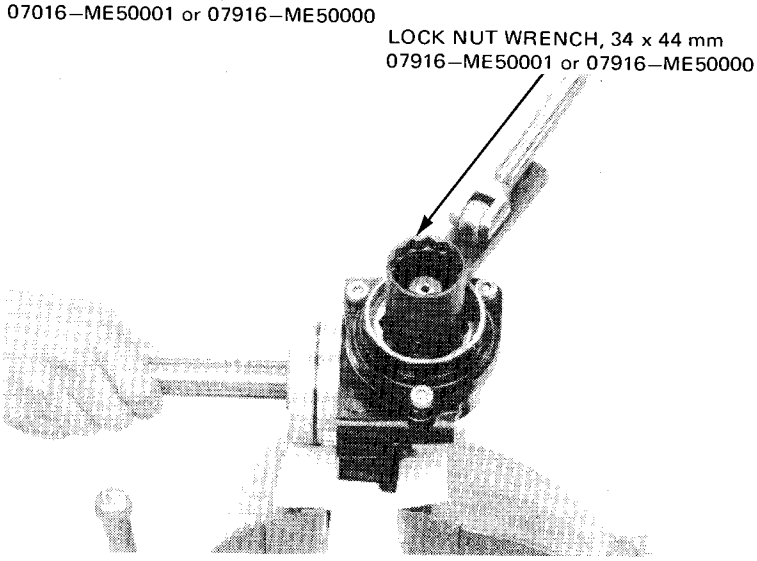
Remove the inner race lock nut and discard it.



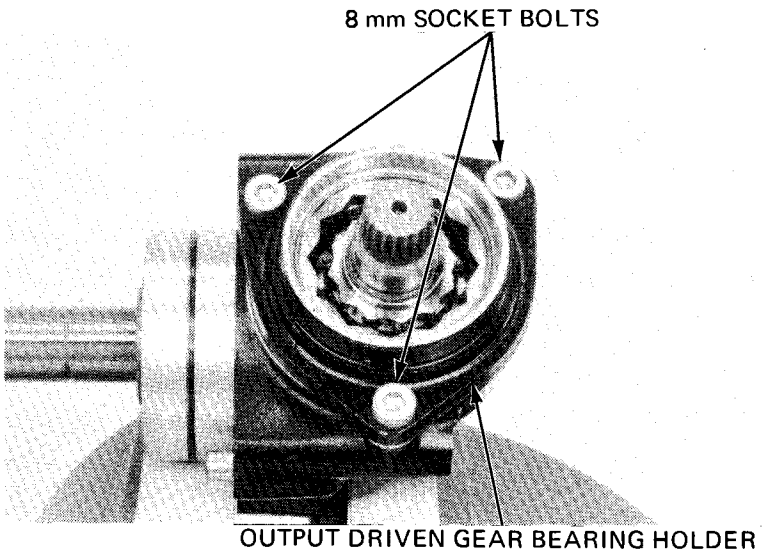
Unstake the driven gear bearing race lock nuts with a drill or grinder. Be careful that metal particles do not enter the bearing and the threads on the shaft are not damaged.



Remove the 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.

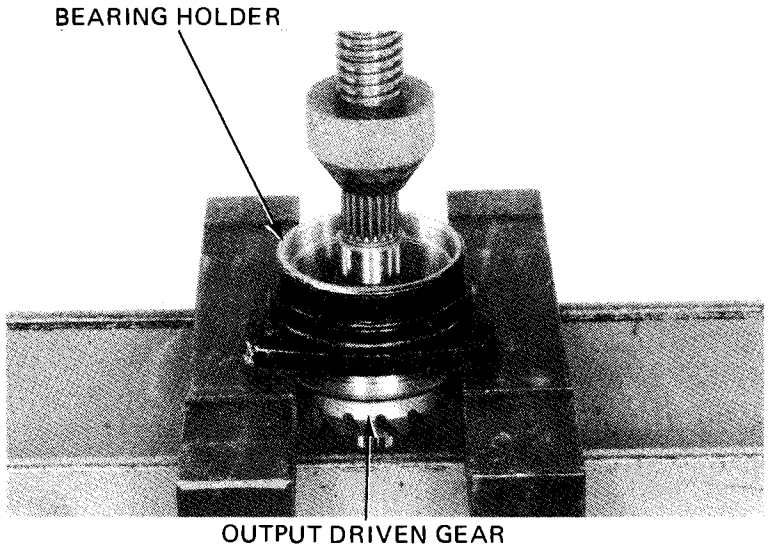


OUTPUT DRIVEN GEAR BEARING REPLACEMENT

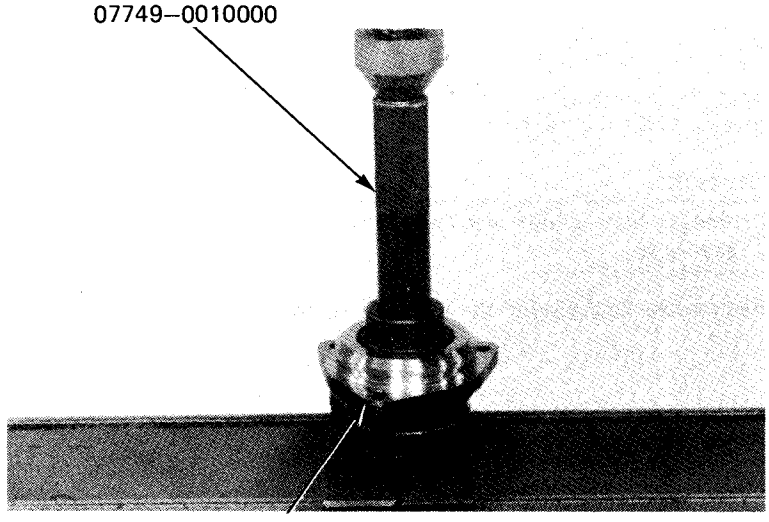
NOTE

> The driven gear must be removed before replacing the bearing.

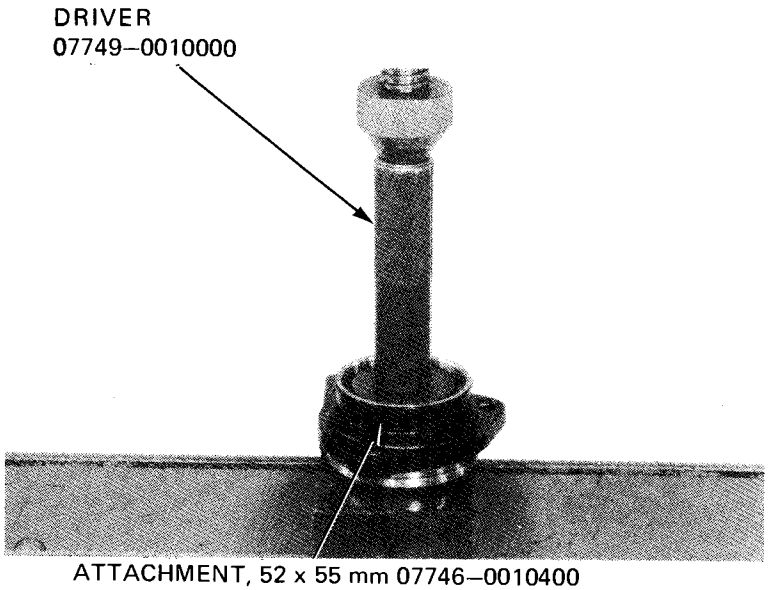
Place the bearing holder in a press and remove the driven gear.



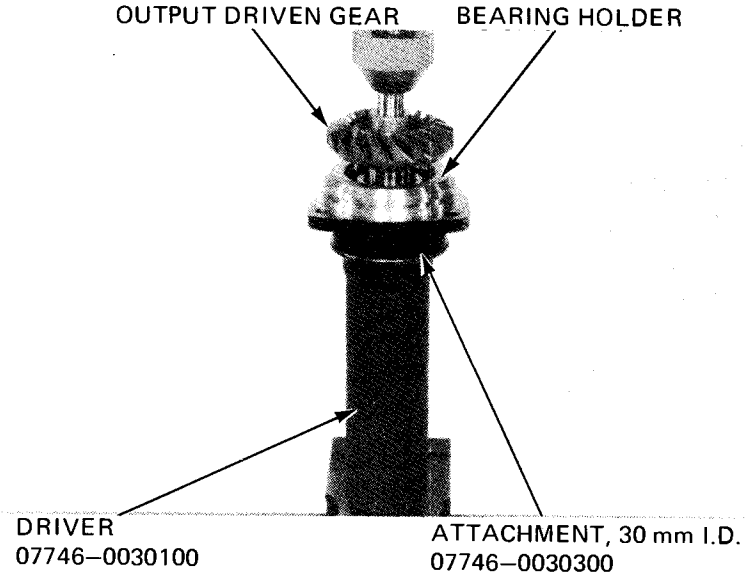
Place the bearing holder in the press and remove the bearing.



Press in a new bearing.



Press the output driven gear into the bearing.



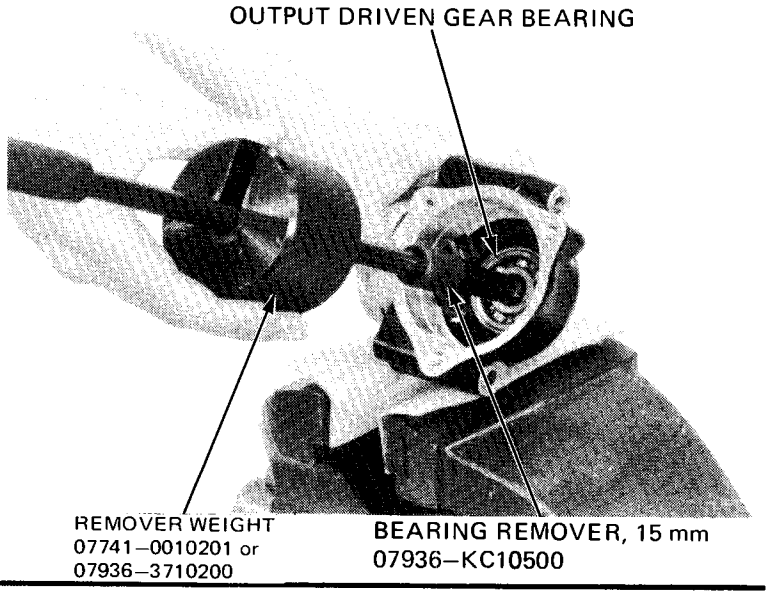
OUTPUT DRIVEN GEAR CASE BEARING REPLACEMENT

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

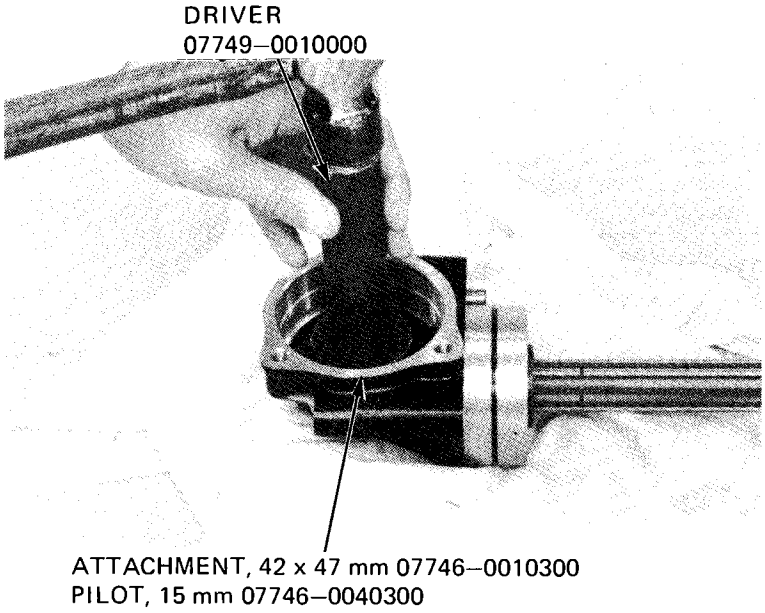
CAUTION

Always wear gloves when handling a heated gear case.

Remove the bearing with the bearing remover.

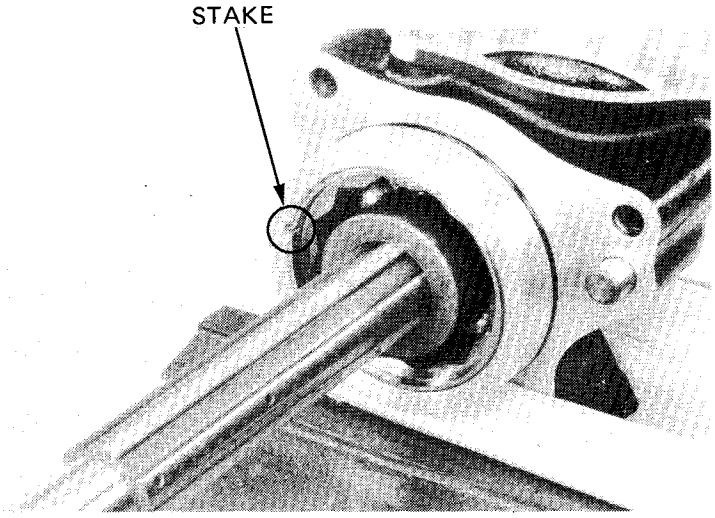


Drive a new bearing into the output gear case.

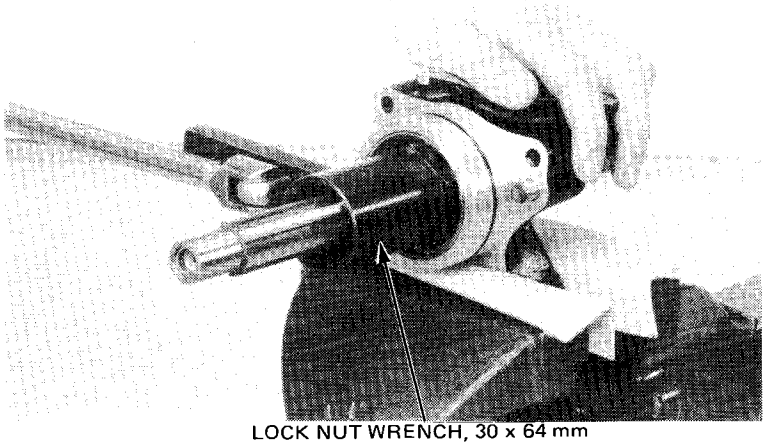


OUTPUT DRIVE GEAR DISASSEMBLY

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.



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

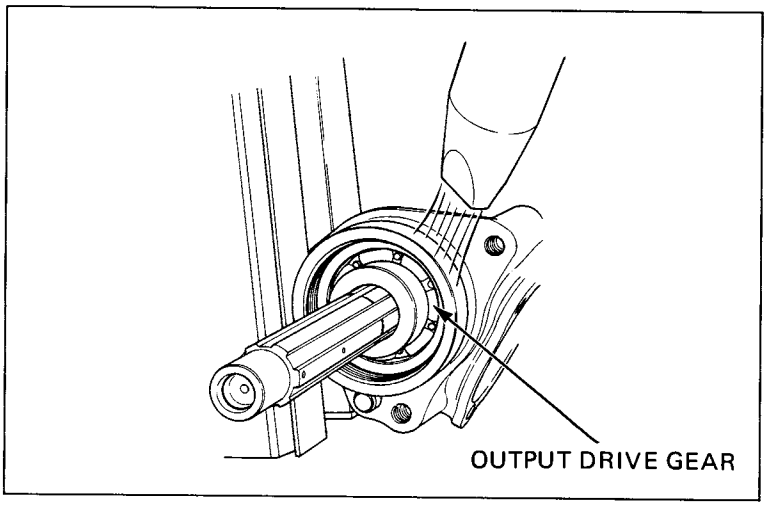


Heat the output gear case around the drive shaft bearing to 80°C (176°F).

CAUTION

Always wear gloves when handling a heated gear case.

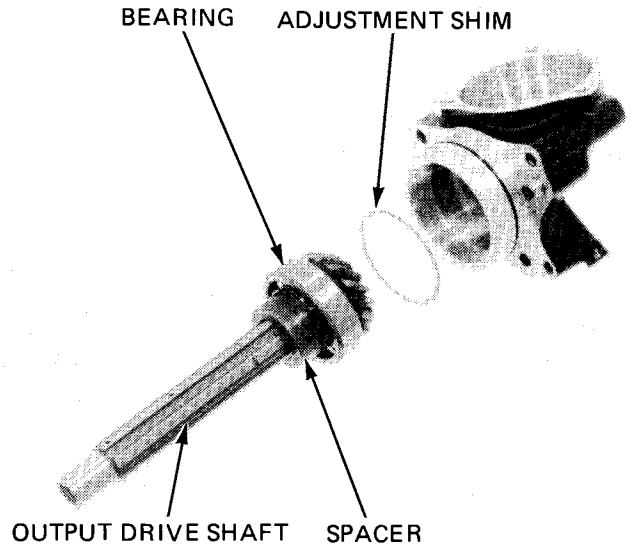
Remove the output drive gear.



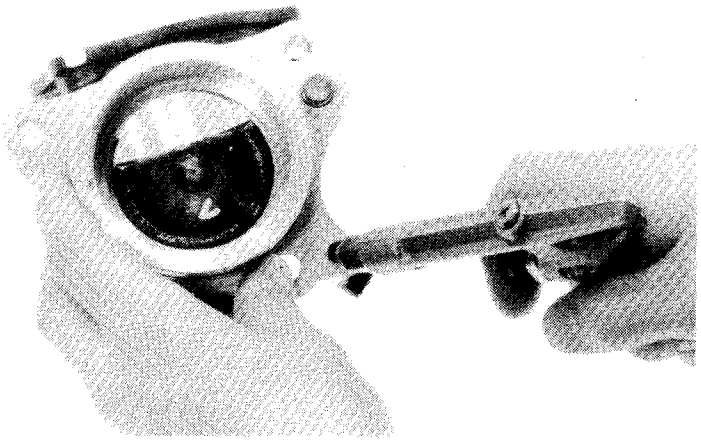
Remove the adjustment shim.

NOTE

Do not try to remove the driveshaft 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.

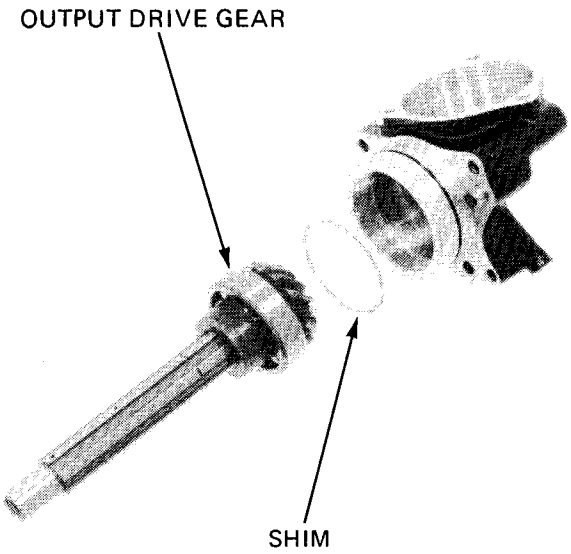
NOTE

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.

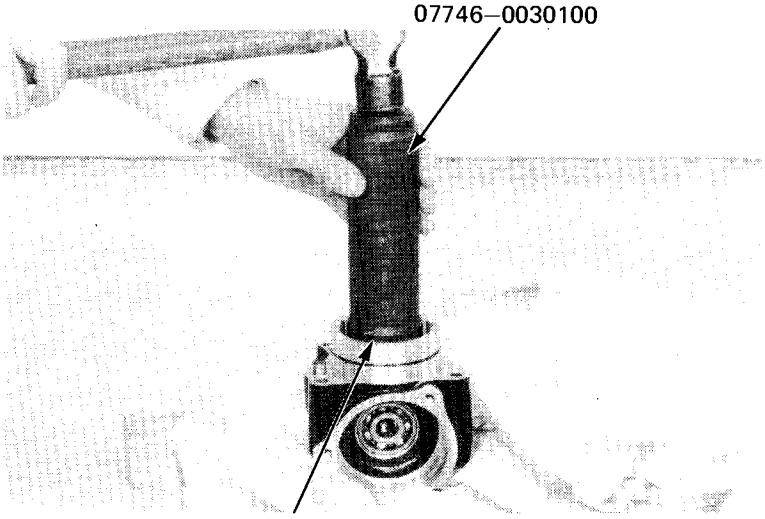
Heat the output gear case around the drive shaft bearing to 80°C (176°F).

WARNING

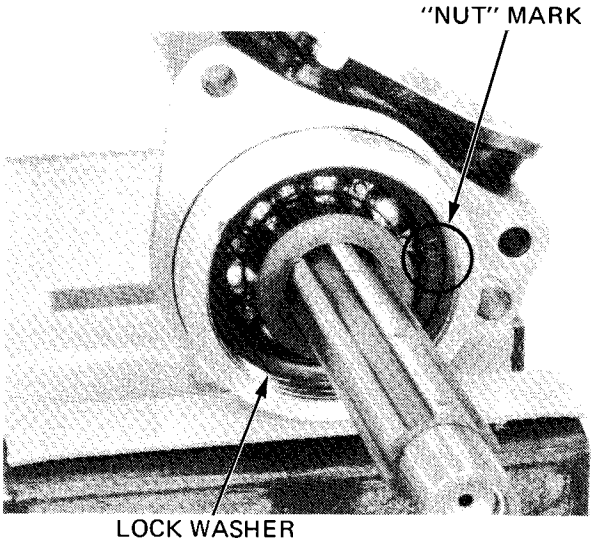
Always wear gloves when handling a heated gear case to prevent burning your hands.



Drive the output drive gear into the case.

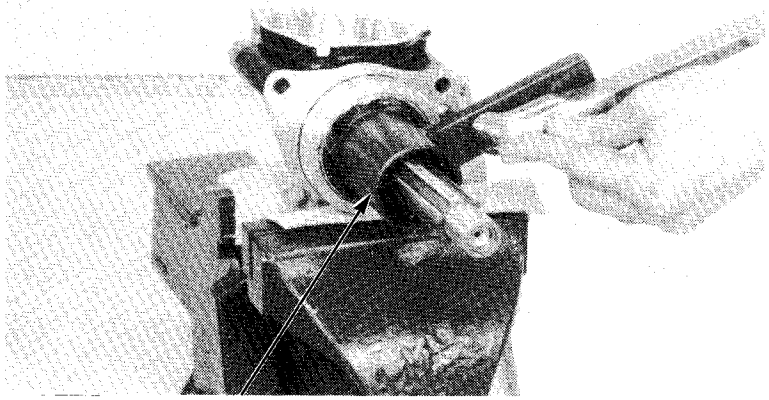


Install the lock washer with its "NUT" mark facing nut.



Tighten the drive gear bearing outer race lock nut.

TORQUE:
Actual:
90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)
Indicated:
82–100 N·m (8.2–10.0 kg-m, 59–72 ft-lb)

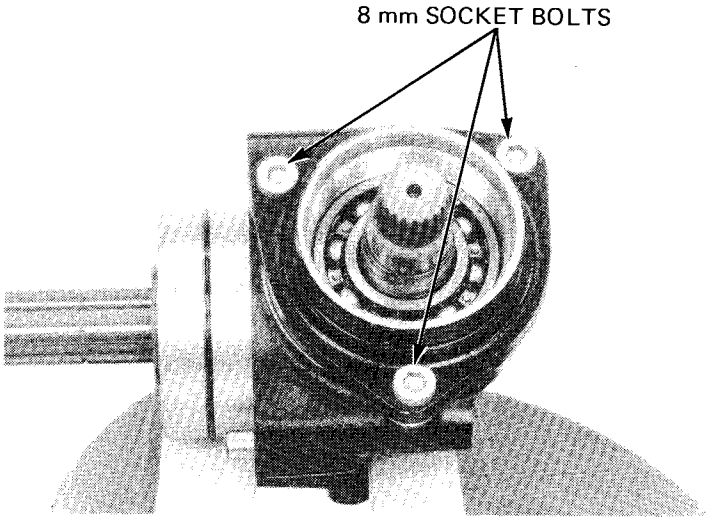


LOCK NUT WRENCH, 30 x 64 mm 07916–MB00001 OR 07916–MB00000 AND 07916–HA0020A (U.S.A. only)

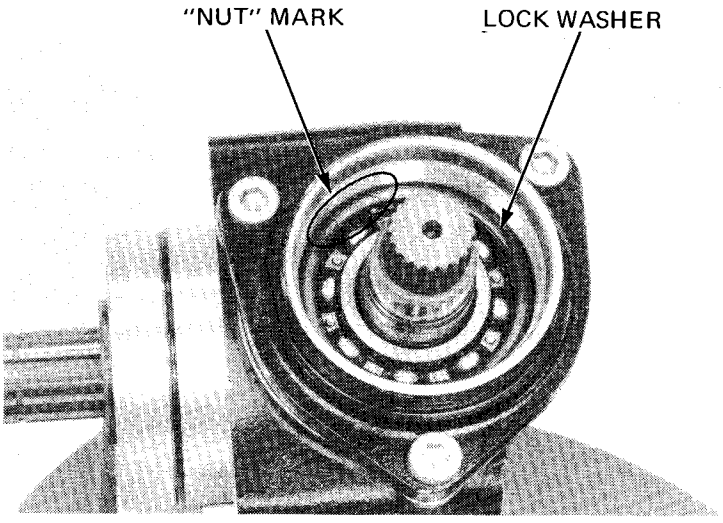
OUTPUT DRIVEN GEAR ASSEMBLY

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, 15–18 ft-lb)

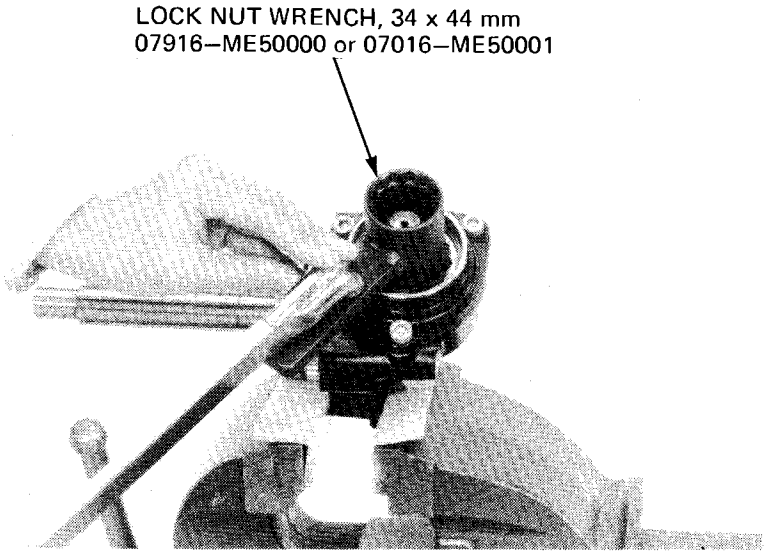


Install the lock washer with its "NUT" mark facing nut.



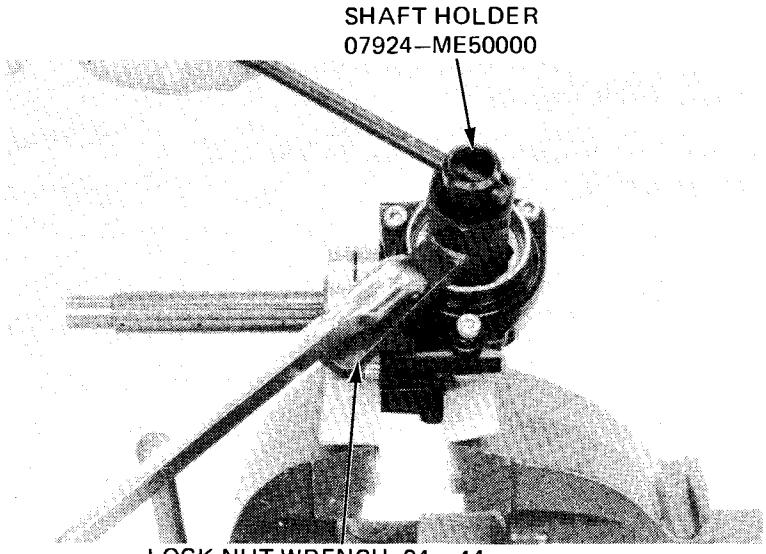
Tighten the driven gear bearing outer race lock nut.

TORQUE:
Actual:
90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)
Indicated:
82–100 N·m (8.2–10.0 kg-m, 59–72 ft-lb)



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

TORQUE:
Actual:
70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)
Indicated:
64–73 N·m (6.4–7.3 kg-m, 46–53 ft-lb)

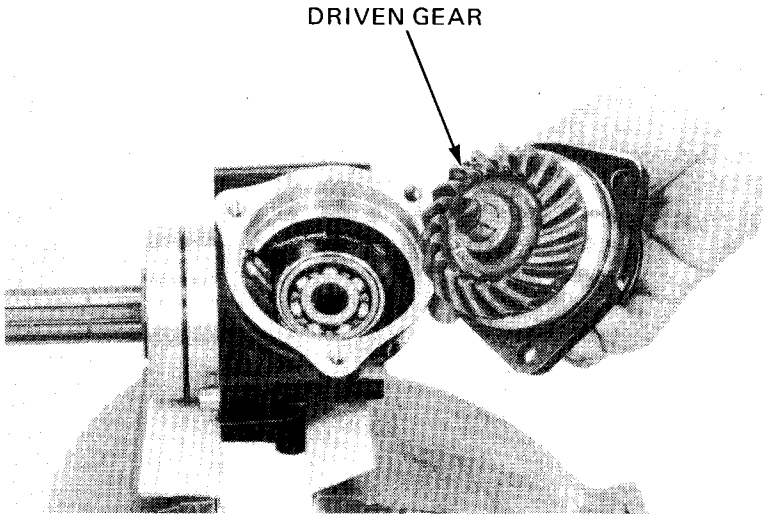


GEAR TOOTH CONTACT PATTERN CHECK

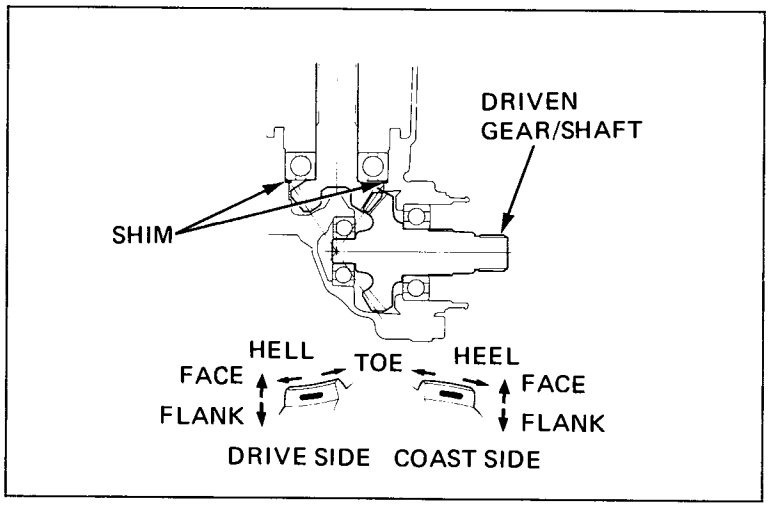
Remove the three 8 mm socket bolts attaching the driven gear holder and the driven gear assembly.

Apply Prussian Blue to the driven gear teeth.
Install the driven gear with the standard shim.
Rotate the drive gear several times in both directions.

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

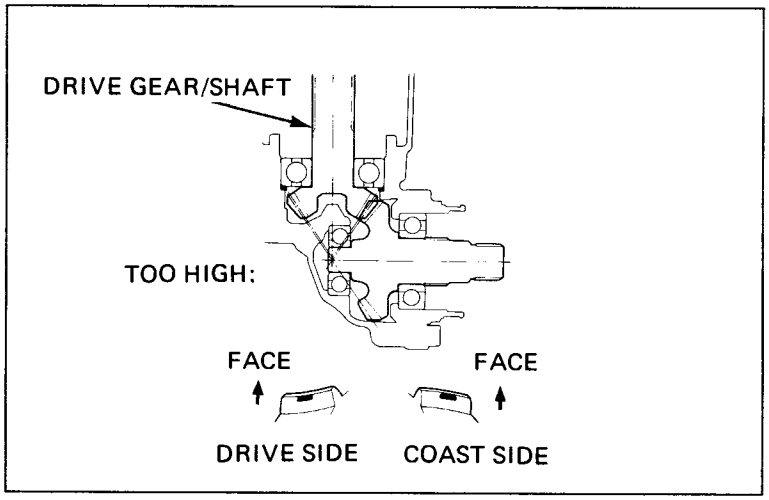


Contact is normal if Prussian Blue is transfered to the approximate center of each tooth and slightly to the side.



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.

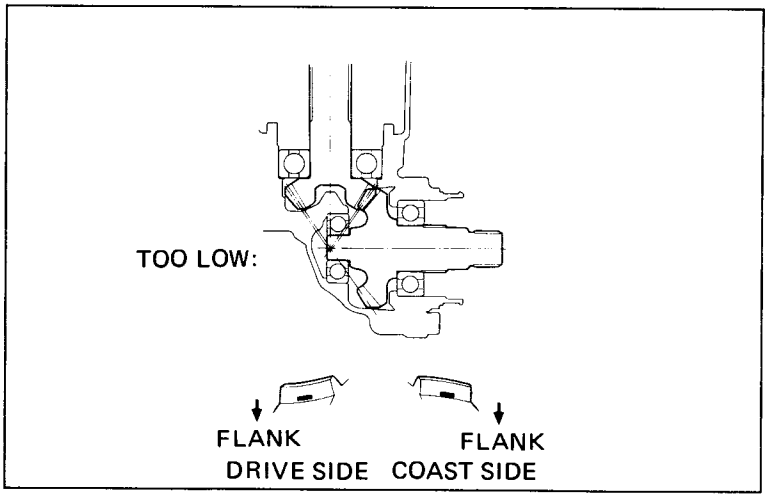


Replace the drive gear adjustment shim with a thicker one if the contact is too low.

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

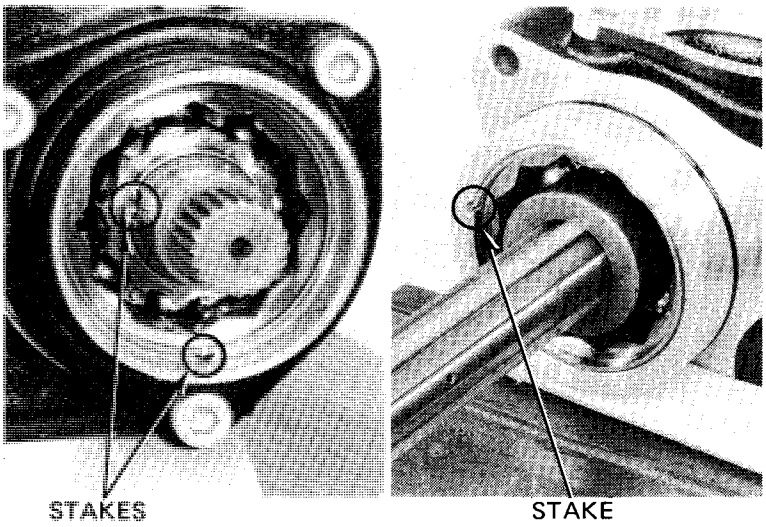
OUTPUT DRIVE GEAR ADJUSTMENT SHIM:

- **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)**

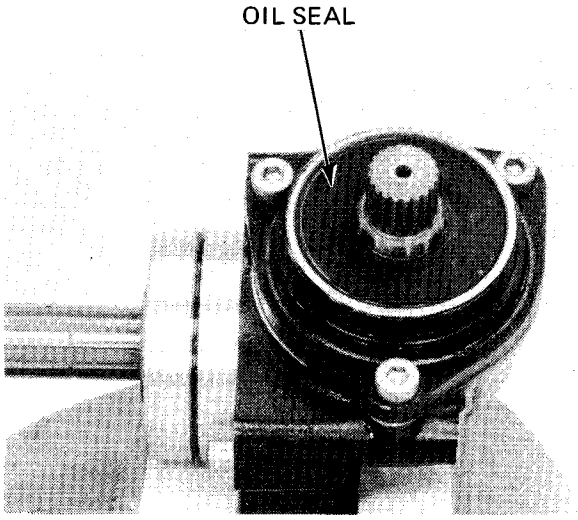


Check the backlash (See page 10-17).

Stake the outer race and inner race lock nuts.



Install a new oil seal.

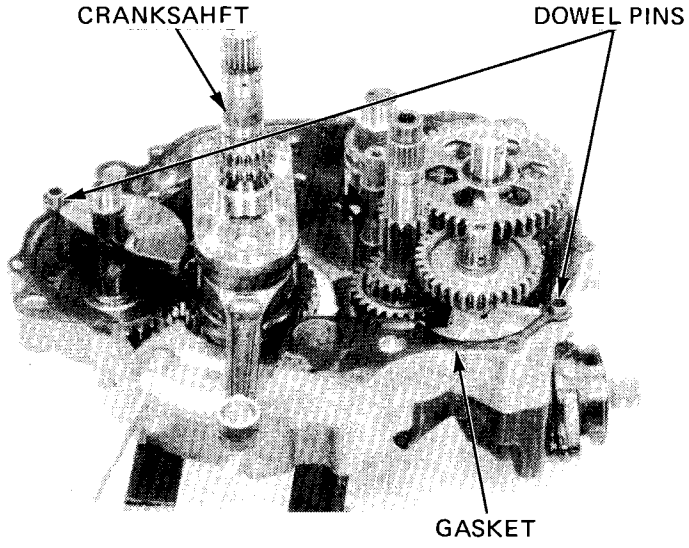


CRANKCASE ASSEMBLY

Install the dowel pins and a new gasket.
Install the right crankcase onto the left crankcase.

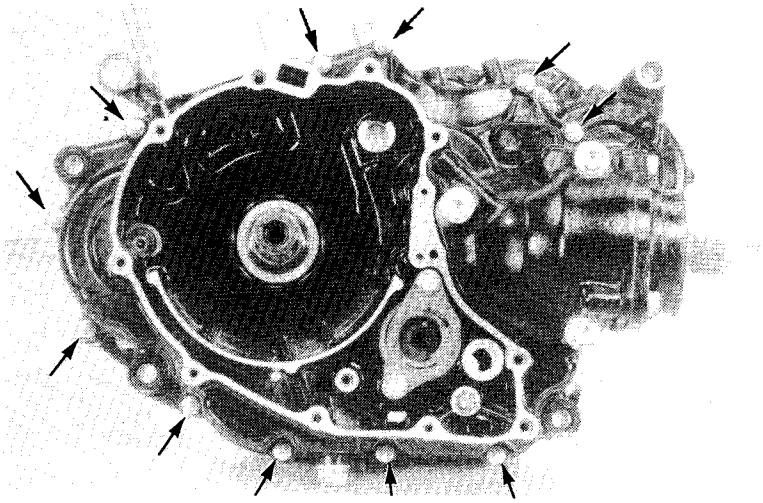
NOTE

Make sure that the gasket stays in place.



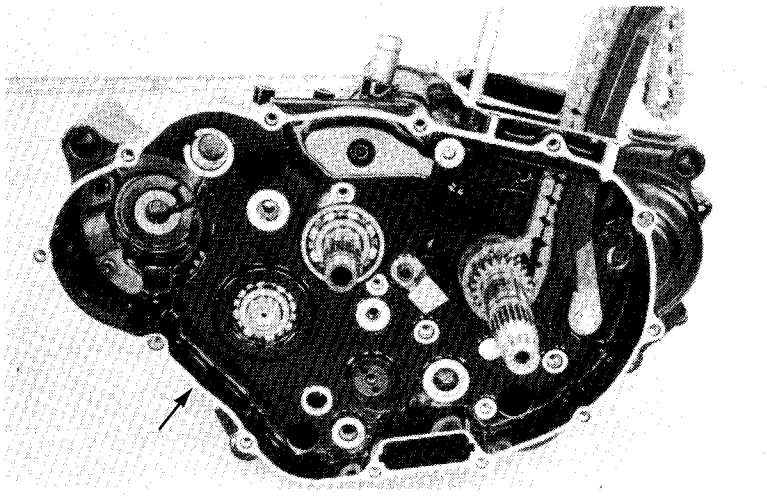
Tighten the left crankcase 6 mm bolts in a criss-cross pattern.

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

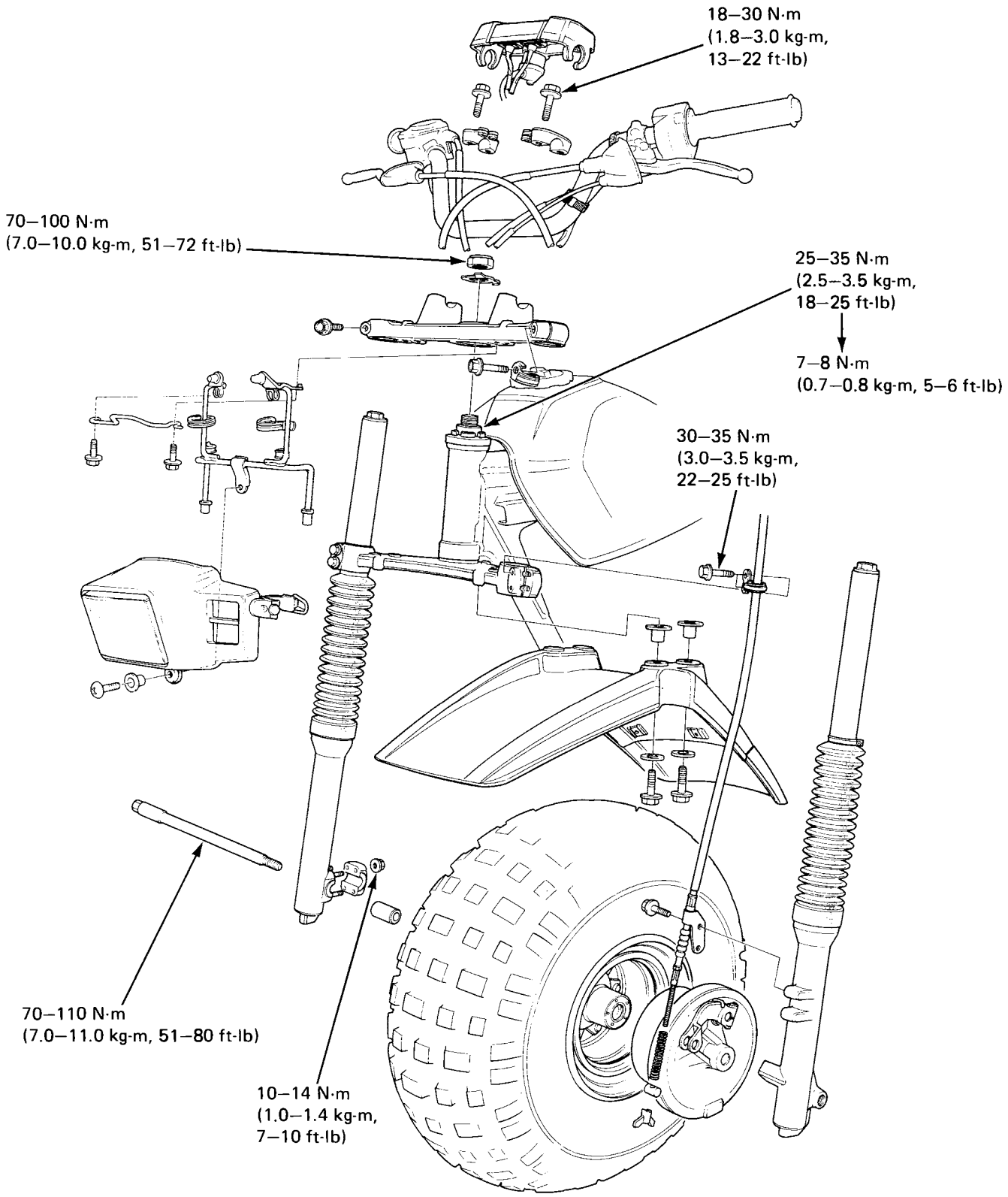


Tighten the right crankcase bolt to the same torque.

Install the cam chain and tensioner.



MEMO


18–30 N·m
(1.8–3.0 kg-m,
13–22 ft-lb)
70–100 N·m
(7.0–10.0 kg-m, 51–72 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)
30–35 N·m
(3.0–3.5 kg-m,
22–25 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 barke 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	A	100.1 mm (3.94 in)	98 mm (3.8 in)
	B	418.3 mm (16.47 in)	410 mm (16.1 in)
Front fork tube runout		—	0.20 mm (0.008 in)

TORQUE VALUES

Handlebar upper holder bolt		18–30 N·m (1.8–3.0 kg-m, 13–22 ft-lb)
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)
Steering stem nut		70–100 N·m (7.0–10.0 kg-m, 51–72 ft-lb)
Front wheel nut		'85: 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 nut		10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)
Fork pinch bolt		30–35 N·m (3.0–3.5 kg-m, 22–25 ft-lb)
Front fork socket bolt		15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)

TOOLS

Special

Universal bead breaker	GN–AH–958–BB1 (U.S.A. only)
Hex wrench, 6 mm	07917–3230000 or equivalent commercially available in U.S.A.
Attachment	07946–3290000
Ball race remover	07953–3330000
Steering stem socket	07916–3710100
Steering stem driver	07946–4300001 or 07946–MB00000 and attachment GN–HT–54 (U.S.A. only)

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	07716–0020500 ┘ or commercially available in U.S.A.
Tire breaker set	07772–0050000 Not available in U.S.A.
– Breaker arm	07772–0050200
– Breaker arm compressor	07772–0050100
Fork seal driver	07747–0010000 ┐
Fork seal driver attachment	07747–0010501 ┘ or 07947–3330000

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.

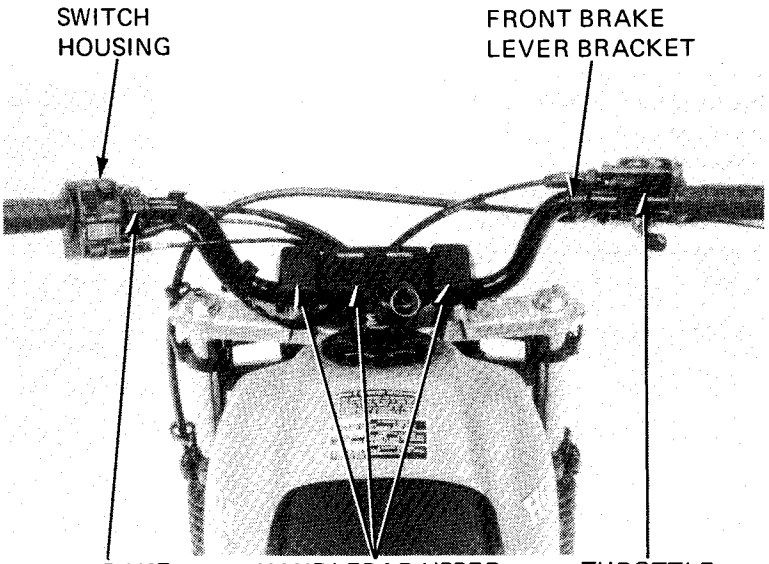
HANDLEBAR

REMOVAL

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

Remove the handlebar upper holder covers.

Remove the handlebar upper holders and the handlebar.



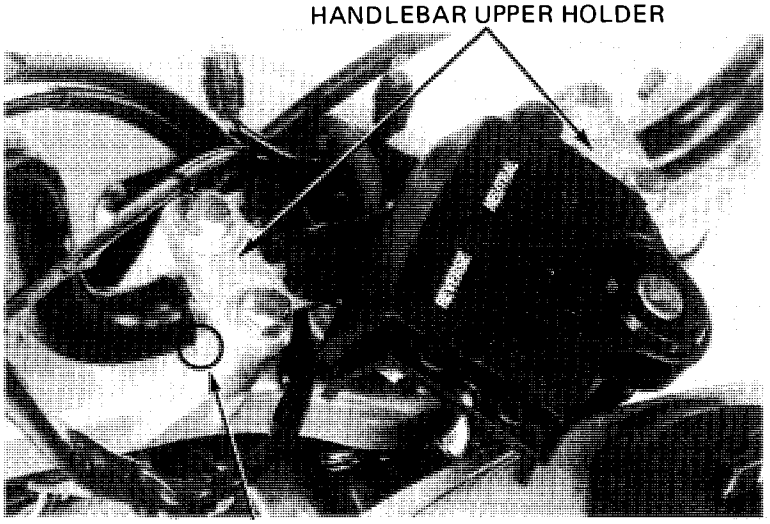
INSTALLATION

Place the handlebar on the handlebar lower holder.

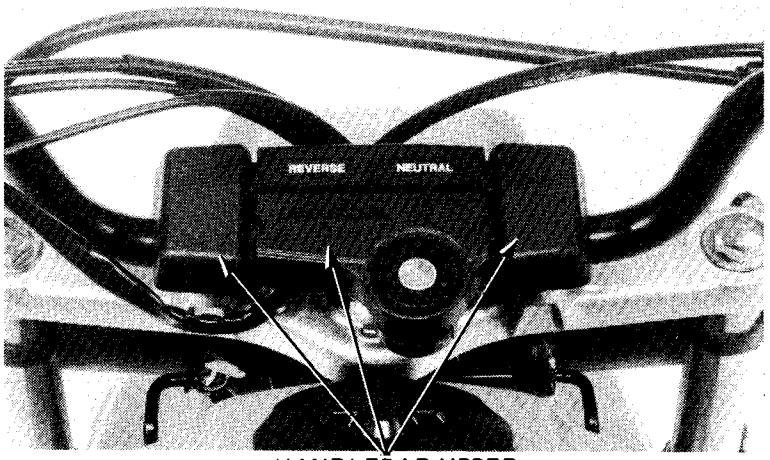
Align the punch mark on the handlebar with the top of the handlebar lower holder.

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

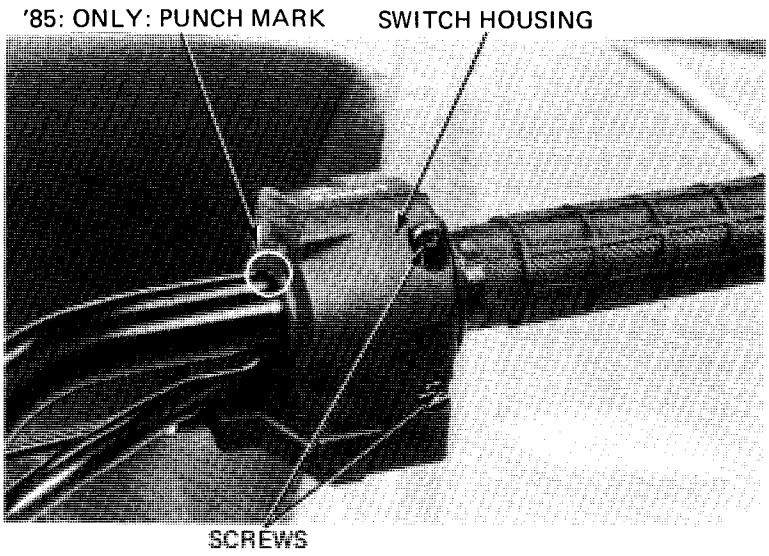
TORQUE: 18–30 N·m (1.8–3.0 kg-m, 13–22 ft-lb)



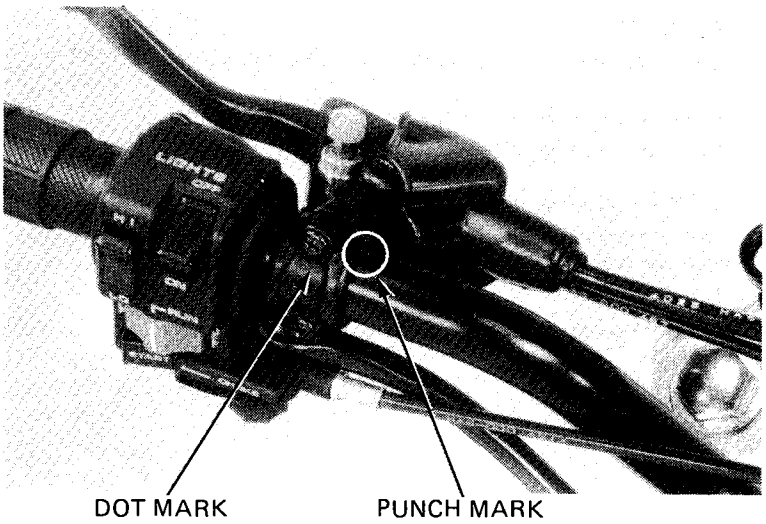
Install the handlebar upper holder covers.



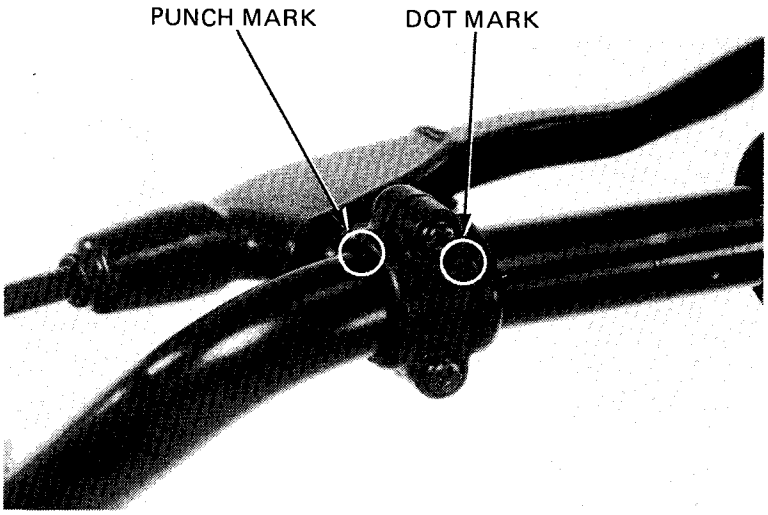
Install the switch housing onto the handlebar aligning its mating surfaces with the punch mark on the handlebar.
After '85:
Insert the pin on the handlebar lower holder into the hole in the upper holder.
Tighten the upper screw first, then tighten the lower screw.



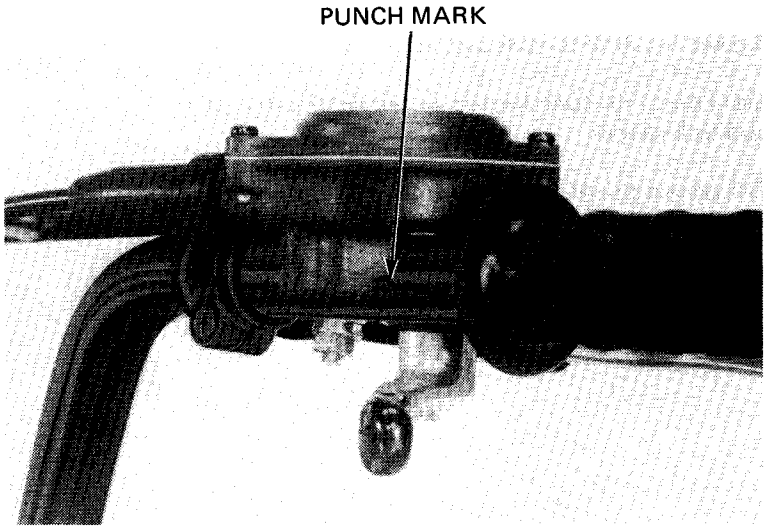
Install the rear brake lever bracket with the dot mark on the holder facing up. Align the end of the holder with the punch mark on the handlebar.
Tighten the upper screw first, then the lower screw.



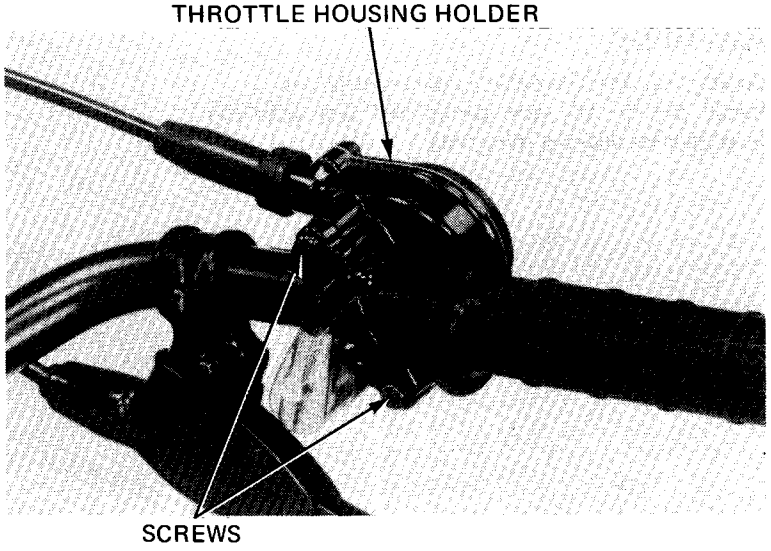
Install the front brake lever bracket with the dot mark on the holder facing up. Align the end of the holder with the handlebar punch mark.
Tighten the upper screw first, then the lower screw.



Install the throttle housing onto the handlebar. Align the end of the housing with the punch mark on the handlebar.



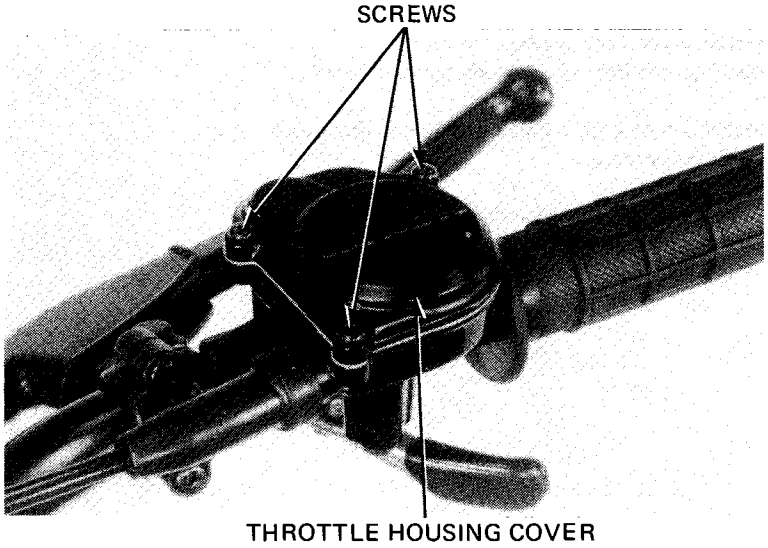
Install the throttle housing holder and screws. Tighten the forward screw first, then the rear screw.



THROTTLE HOUSING

DISASSEMBLY

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

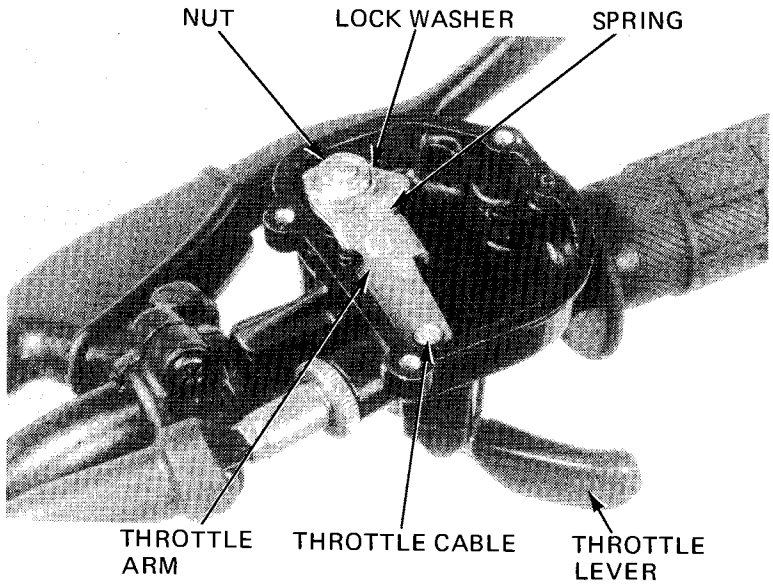


Loosen the throttle cable adjuster.

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

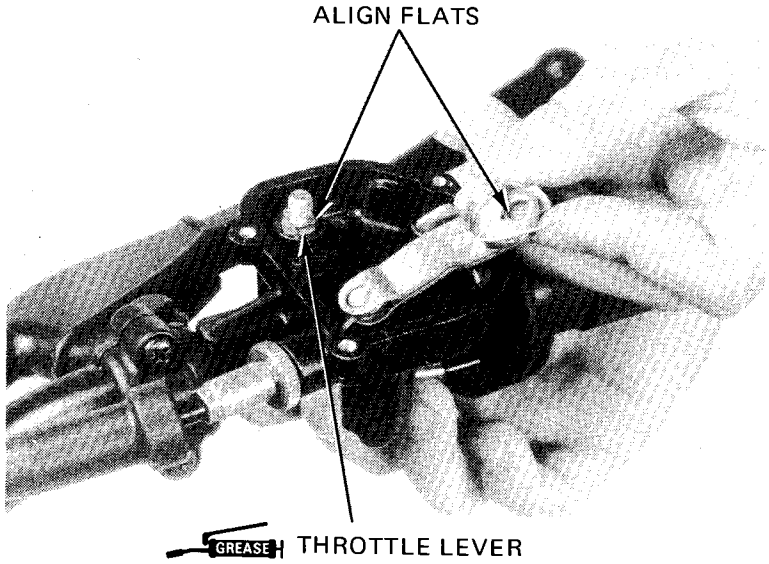
Disconnect the throttle cable from the throttle arm.

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



ASSEMBLY

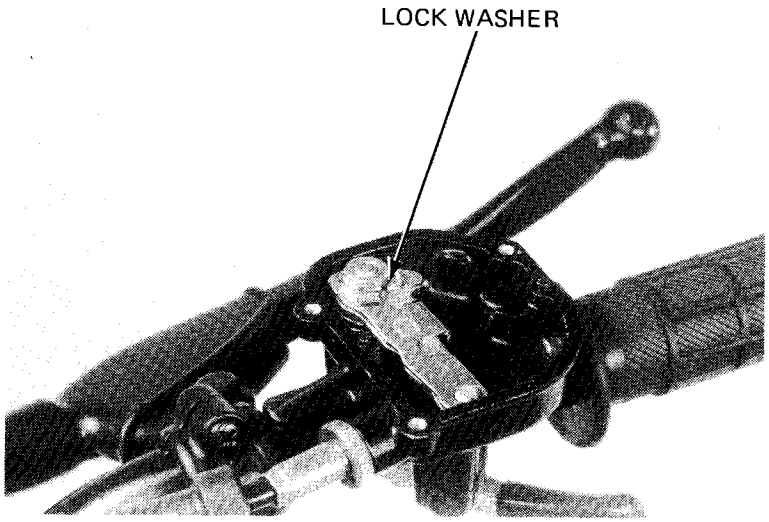
Connect the throttle cable to the throttle arm.
Install the throttle arm spring and arm onto the throttle lever aligning their flats.



Install a new lock washer and nut.
Bend up the lock washer tab against the nut.

Install a new gasket and throttle housing cover using the three screws.

Adjust the throttle lever free play (Page 3-7).

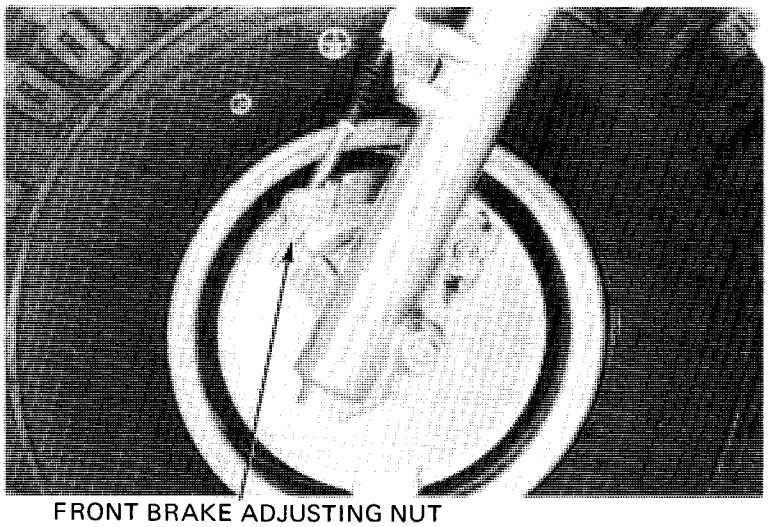


FRONT WHEEL

FRONT WHEEL REMOVAL

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

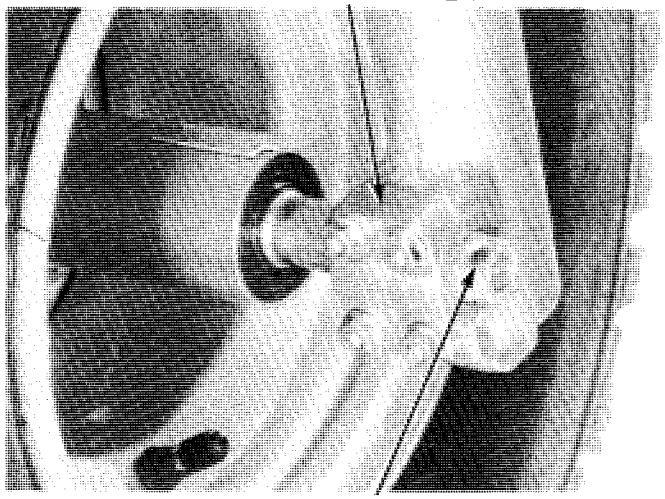
Remove the front brake adjusting nut and disconnect the front brake cable.



FRONT BRAKE ADJUSTING NUT

Loosen the axle holder nuts and unthread the front axle.

FRONT AXLE HOLDER

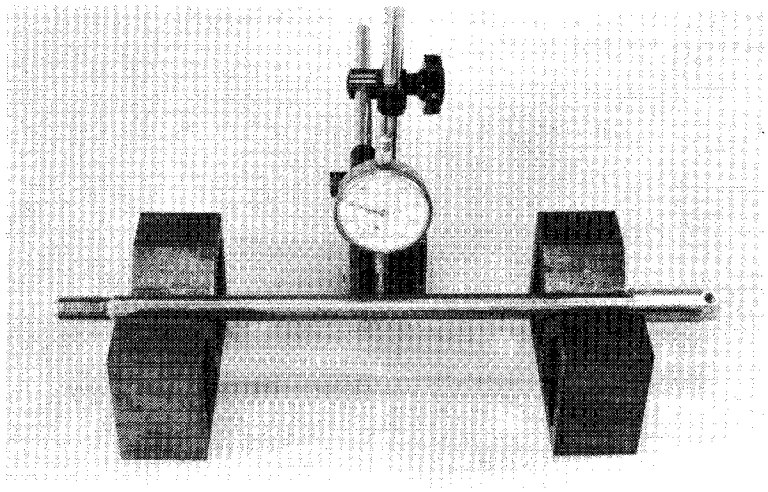


FRONT AXLE

FRONT AXLE INSPECTION

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

SERVICE LIMIT: 0.5 mm (0.02 in)



BEARING INSPECION

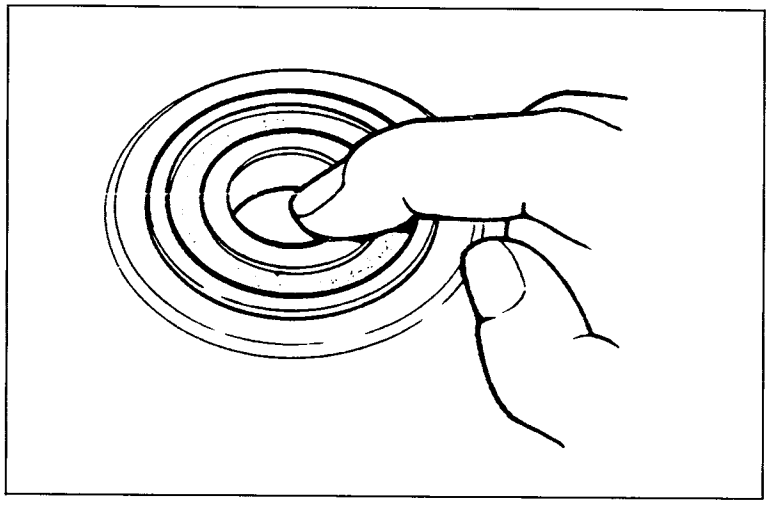
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

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

NOTE:

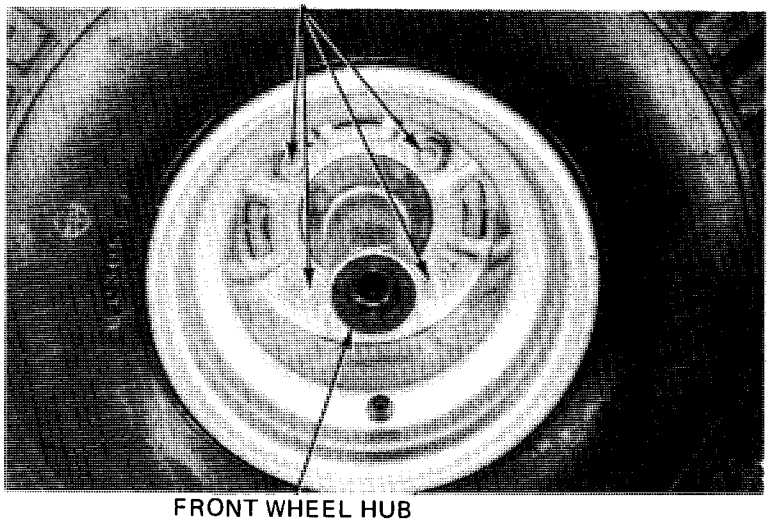
Replace hub bearings in pairs.

For replacement of bearings, see page 11-8 and 11-9.

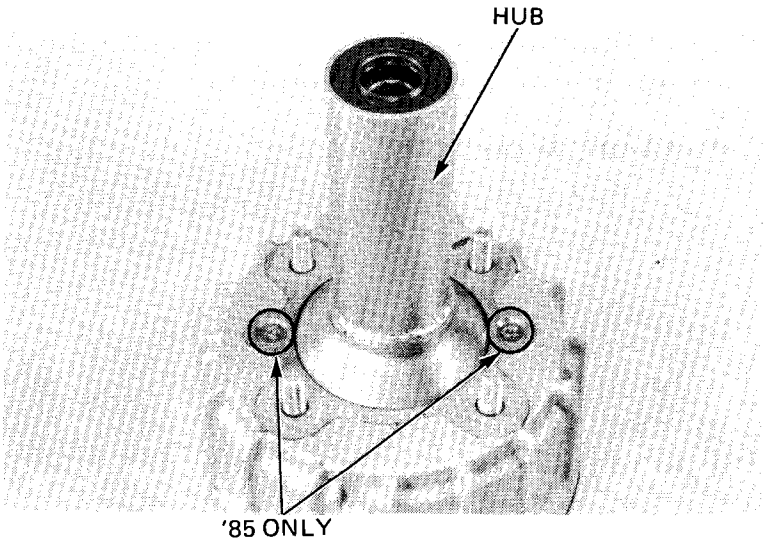


FRONT WHEEL DISASSEMBLY

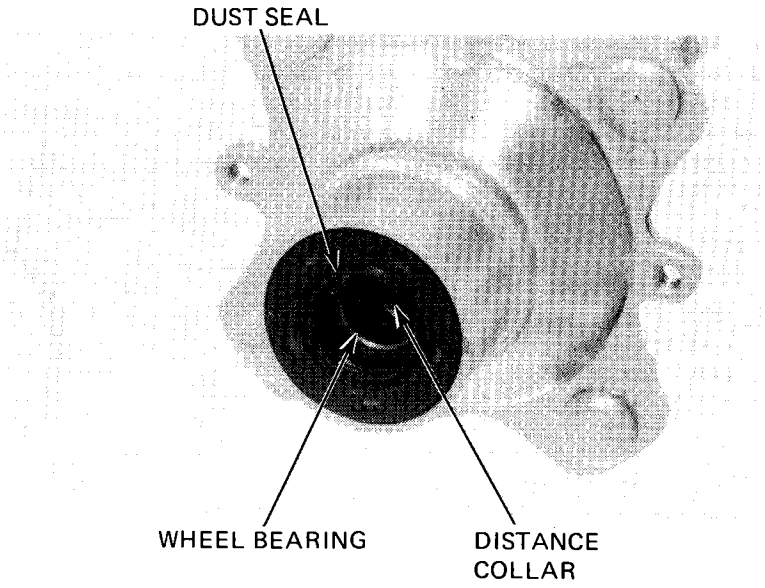
Remove the wheel nuts and wheel rim from the hub.



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



Remove the dust seals, wheel bearings and distance collar from the wheel hub.



TIRE REMOVAL (U.S.A. ONLY)

NOTE:

- This service requires the Universal Bead Breaker (GN–AH–958–BB1) available in U.S.A. only.
- Always remove and reinstall the tire from the rim from the side opposite the valve stem.

Remove the core from the valve stem.

CAUTION

- *Use of the Bead Breaker tool is required for tire removal.*
- *Do not damage the bead seating area of the rim.*
- *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.*

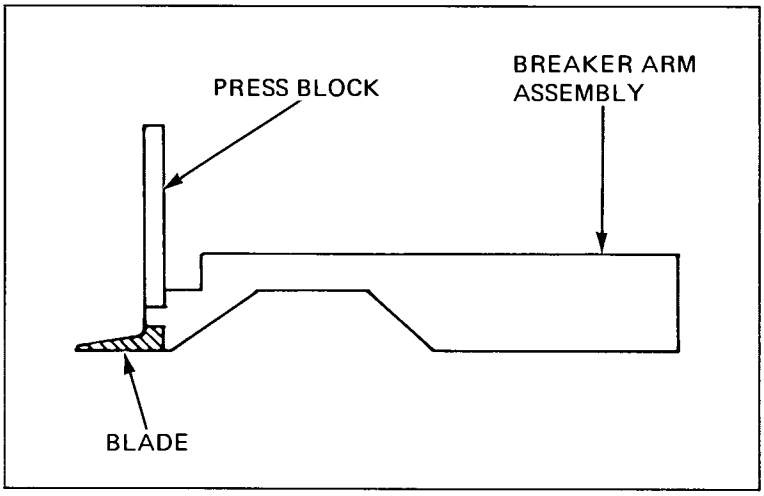
Install the blade for 9"/11" rims onto the breaker arm assembly.

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 of 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 through 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.

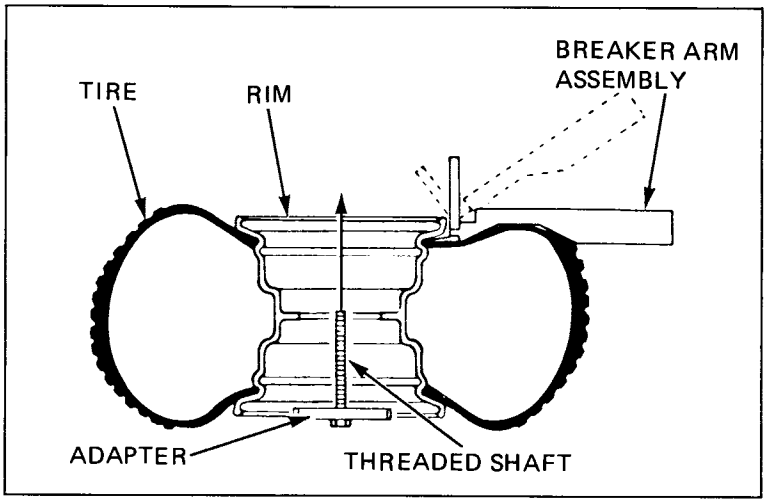
If the rest of the bead cannot be pushed down into the center of the rim by hand, loosen the press head bolt and the lever nut. Rotate the breaker arm assembly and breaker press head assembly 1/8 to 1/4 the circumference of the rim. Tighten the lever nut and then tighten the press head bolt as described.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

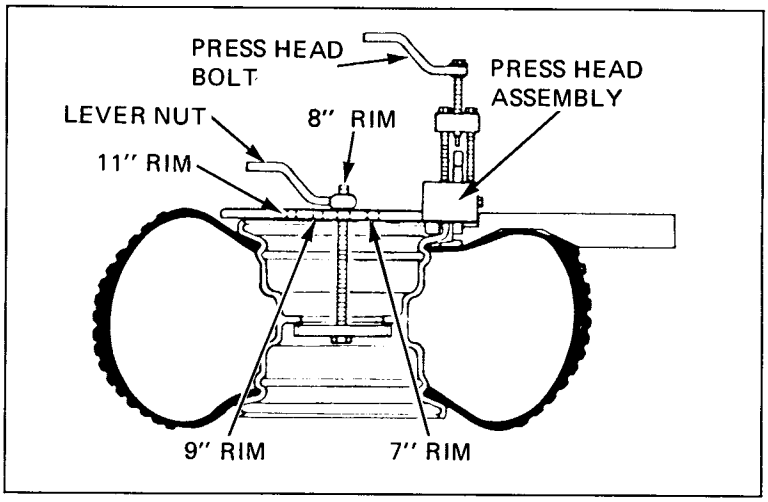
Assemble the Universal Bead Breaker on the other side of the wheel and break the bead following the same procedures.

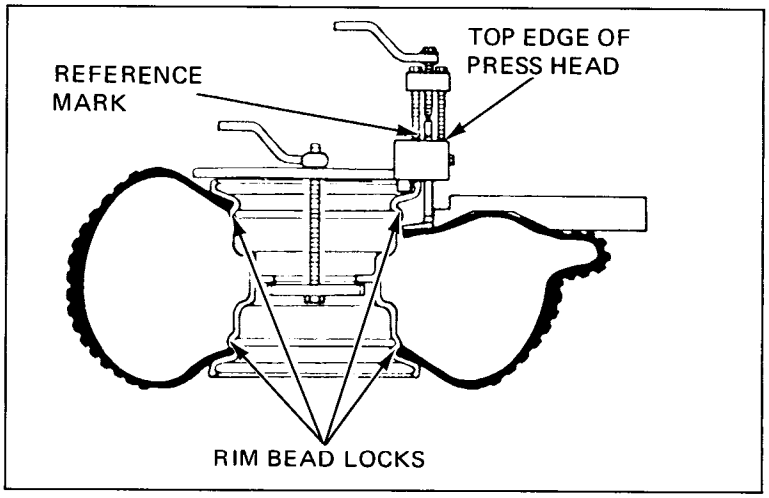
Remove the tire from the rim using a tire changer machine or tire irons and rim protectors.

NOTE:

Remove and install the tire from the rim from the opposite side of the valve stem.







TIRE REMOVAL (EXCEPT U.S.A.)

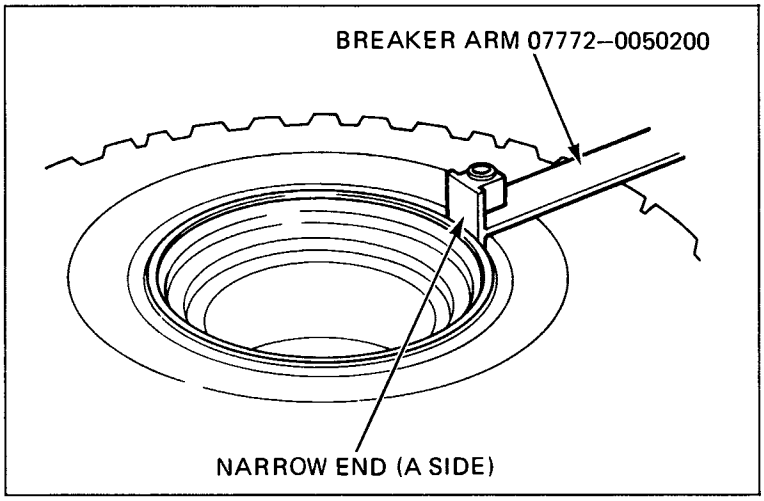
NOTE

This service requires the Tire Bead Breaker Set (07772–0050000) not available in U.S.A.

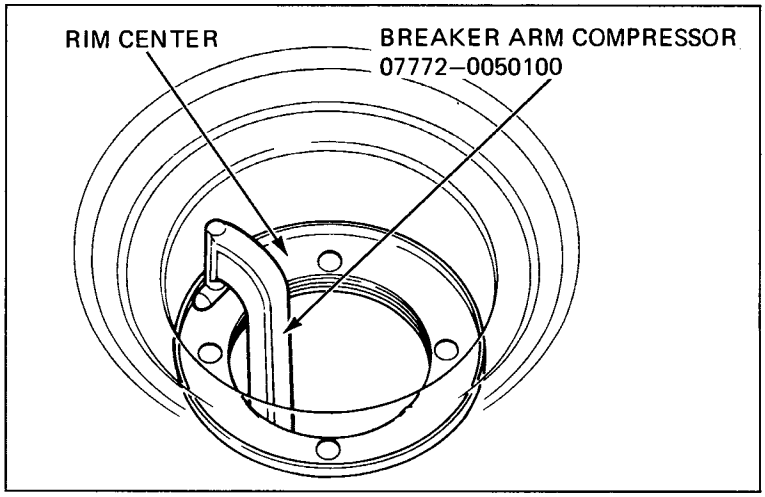
CAUTION

- *Do not apply water, soap water, oil etc. to the tire, rum 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.*

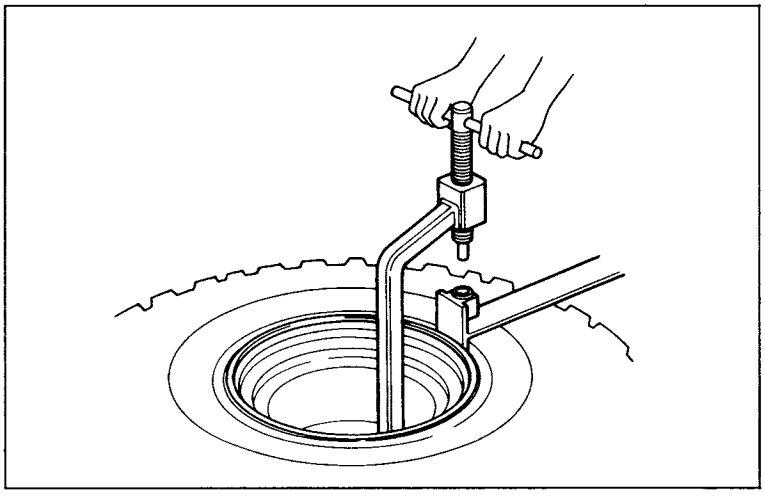
Insert the narrow end (A side) of the breaker arm between the tire and the rim.



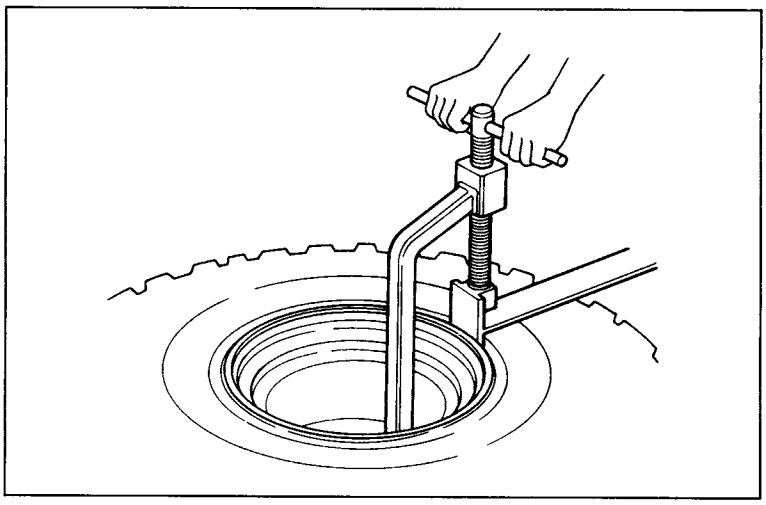
Position the breaker arm compressor onto the rim center as shown.



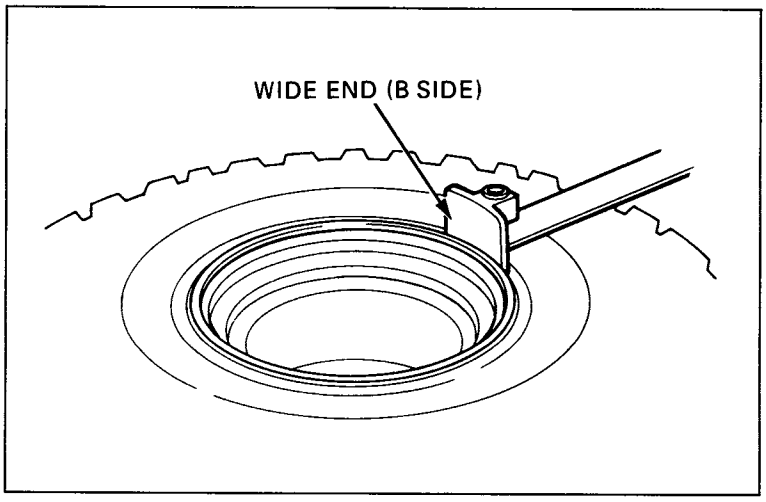
Keep the breaker arm horizontally and align the end of the compressor bolt with the arm hole.



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.

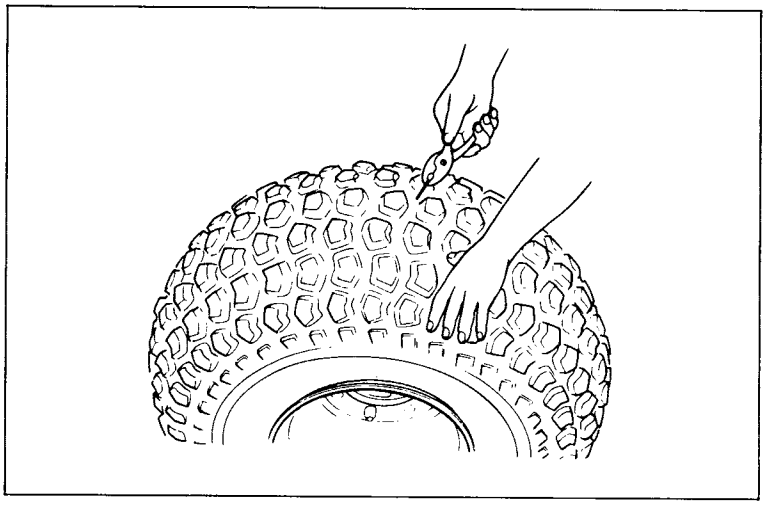


If the bead breaking is difficult with the narrow end (A side) of the breaker arm, use the wide end (B side) of the arm and repeat the procedure above.

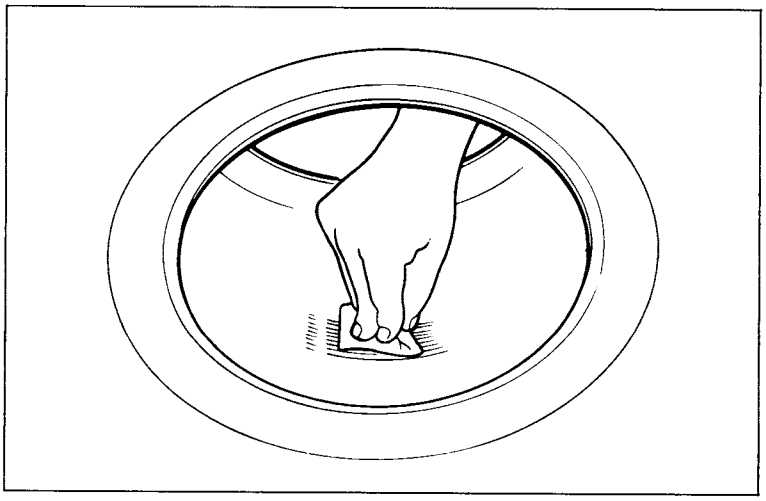


TIRE REPAIR (WITH COLD PATCH)

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



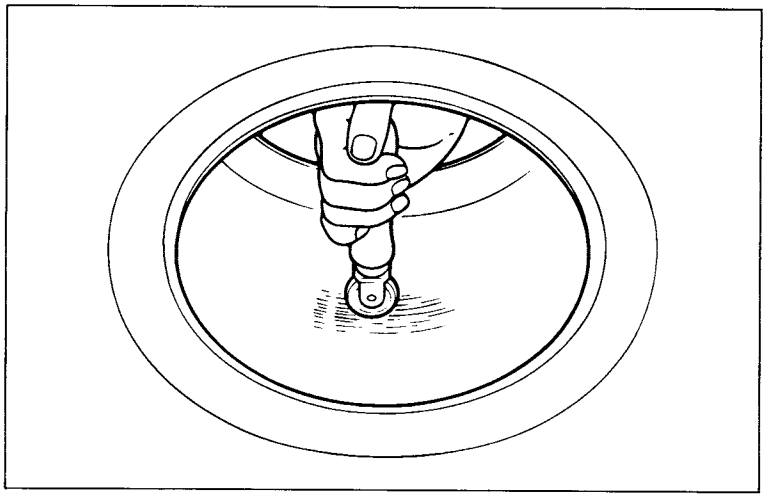
Clean and roughen the punctured area inside the tire with a tire rubber cleaner or a wire brush. Clean the area with non-flammable solvent.



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 surface with dirty or greasy hands.

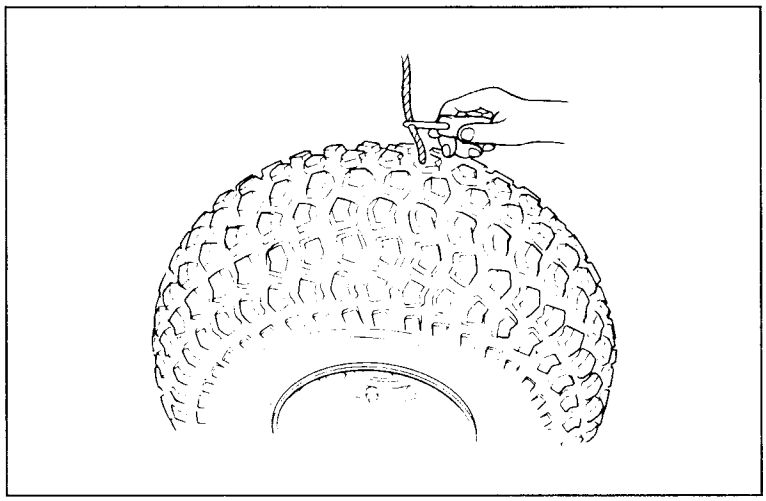


TIRE REPAIR (WITH RUBBER PLUG)

NOTE

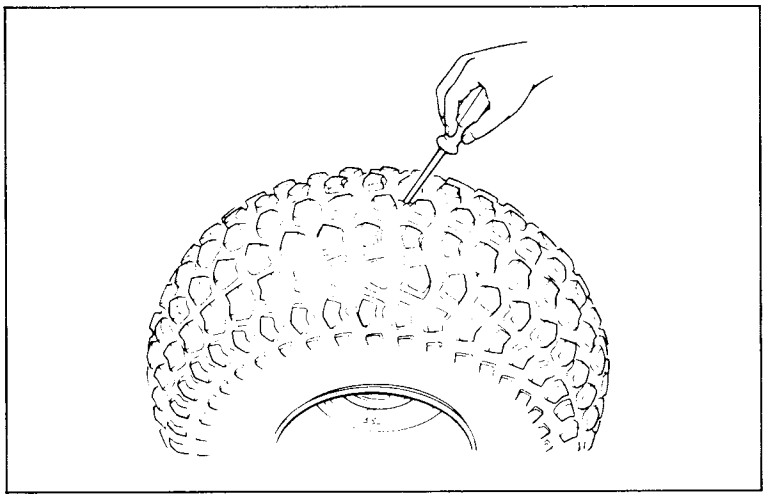
> This method is an emergency repair only. Replace the plug at the first opportunity with a cold patch.

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.



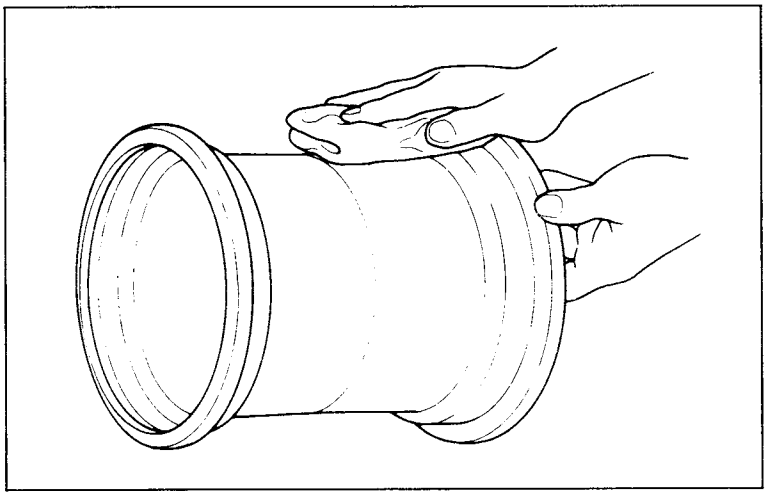
Pull the needle straight out so that the plug is about 10 mm (3/8 in) above the tread surface. Trim the plug 2 mm (1/16 in) above the surface.

Repeat the above procedure if the puncture is large.

TIRE ASSEMBLY

Clean the rim bead seat and flanges.
Make sure the arrow on the tire points in the direction of rotation, and mount the tire on the rim.
Apply clean water to the rim flanges, bead seat and base.
Inflate the tire to seat the tire bead.

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



TIRE PRESSURE:
'85, '86: 2.5 psi (0.17 kg/cm^2, 17 kPa)
After '86: 2.5 psi (0.175 kg/cm^2, 17.5 kPa)
Min. Pressure:
'85, '86: 2.0 psi (0.14 kg/cm^2, 14 kPa)
After '86: 2.1 psi (0.145 kg/cm^2, 14.5 kPa)
Max. Pressure:
'85, '86: 2.9 psi (0.20 kg/cm^2, 20 kPa)
After '86: 2.9 psi (0.205 kg/cm^2, 20.5 kPa)

Measure the tire circumference.

STANDARD TIRE CIRCUMFERENCE:
('85, '86 only)
1,775 mm (70 in)

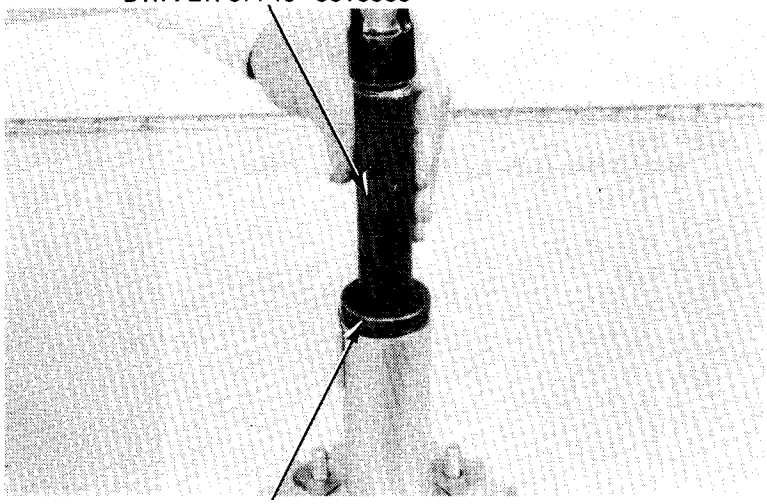
Check for air leaks and install the valve cap.

Pack all front wheel bearing cavities with grease.

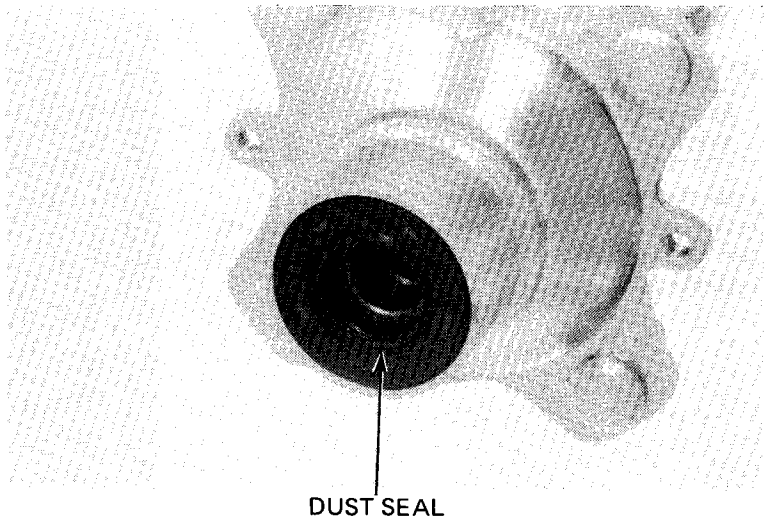
Drive in the left bearing squarely until it seats. Install the center collar.

NOTE

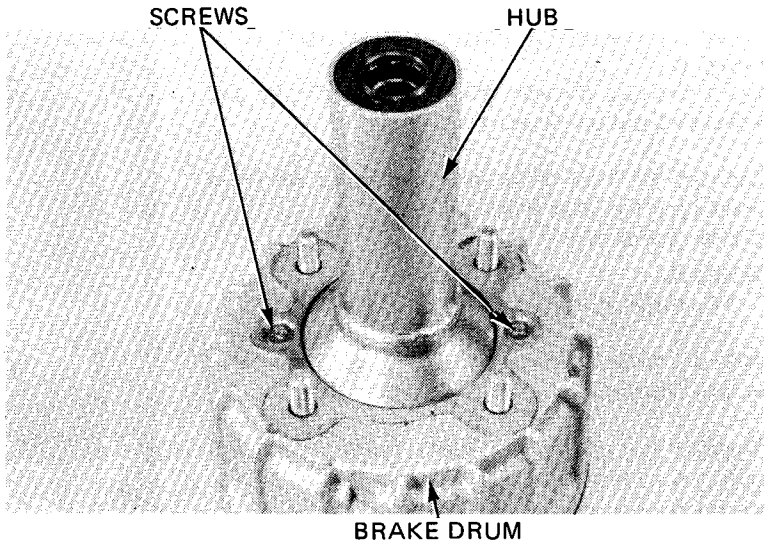
> Do not allow the bearings to tilt while driving them in.



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

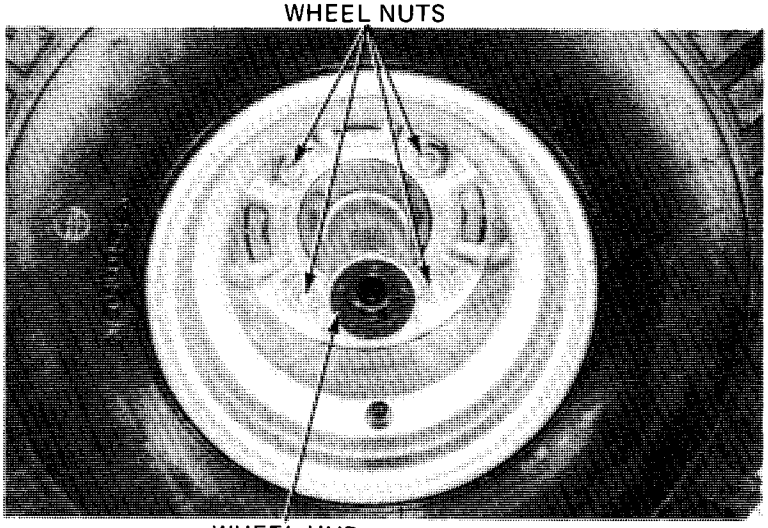


Install the brake dram onto the wheel hub and tighten it with the two screws.



Install the front wheel hub and tighten the wheel nuts.

TORQUE:
'85: 50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
After '85:
40–70 N·m (4.0–7.0 kg-m, 43–51 ft-lb)

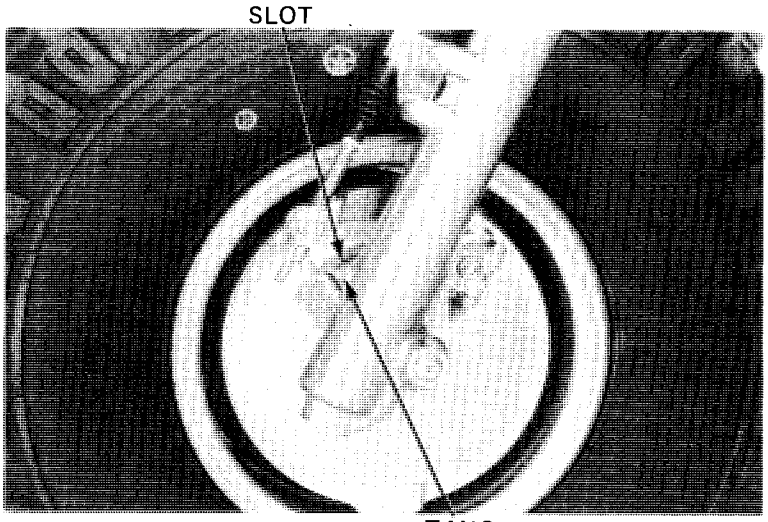


FRONT WHEEL INSTALLATION

NOTE

> Be sure the arrow on the tire points in the direction of forward wheel rotation.

Install the front brake panel onto the wheel hub.
Install the front wheel between the fork legs and align 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 through the axle holder, collar and wheel hub and temporarily tighten it.

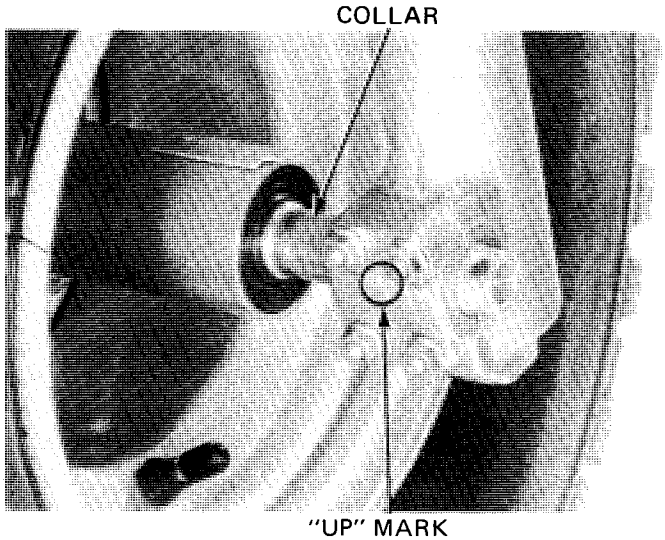
Connect the front brake cable and adjust the front brake lever free play (Page 3-8).
Tighten the axle.

TORQUE:
70–110 N·m (7.0–11.0 kg-m, 51–80 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.

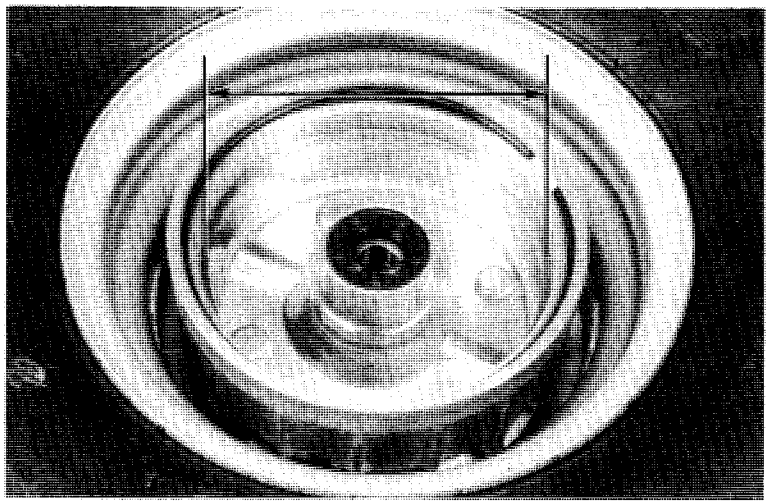
TORQUE: 10–14 N·m (1.0–1.4 kg-m, 7–10 ft-lb)



FRONT BRAKE

BRAKE PANEL REMOVAL

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



BRAKE DRUM INSPECTION

Measure the I.D. of the brake drum.

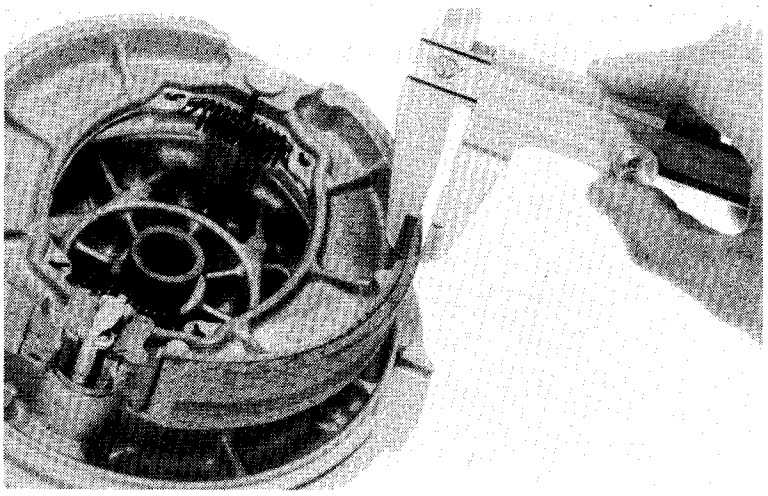
SERVICE LIMIT: 141 mm (5.6 in)

BRAKE LINING INSPECTION

Measure the brake lining thickness.

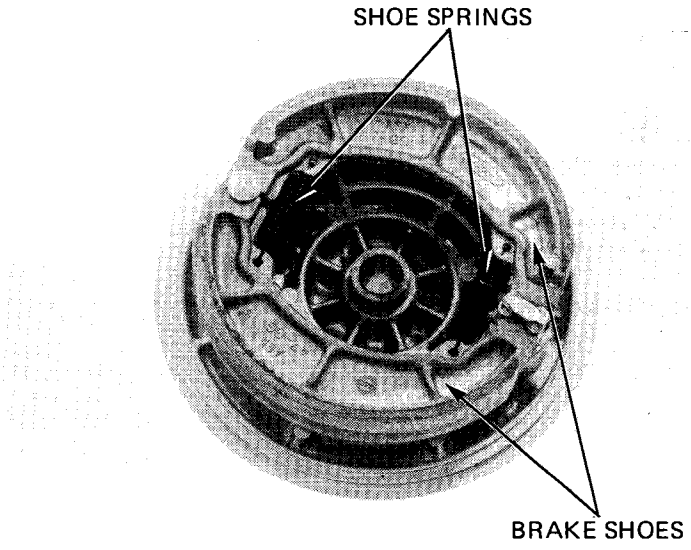
SERVICE LIMIT: 2 mm (0.1 in)

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



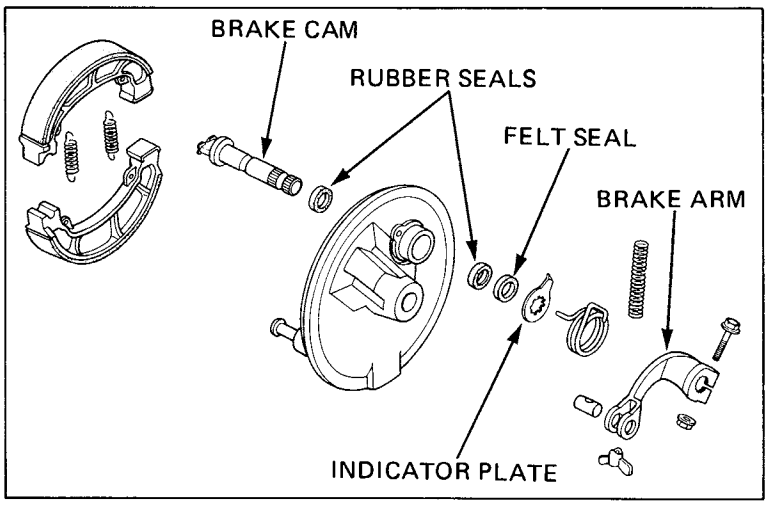
BRAKE PANEL DISASSEMBLY

Expand and remove the brake shoes by hand.



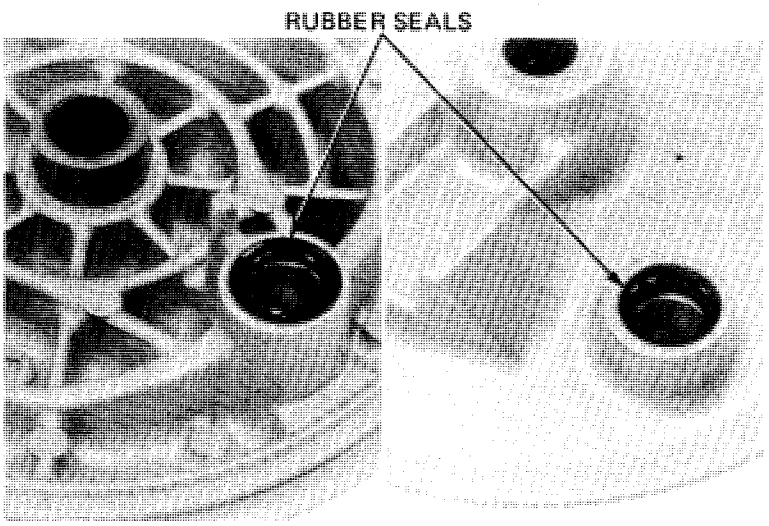
Remove the brake arm bolt, brake arm, indicator plate and spring.

Remove the brake cam and felt seal.
Check the rubber seals for wear or damage and replace if necessary.



BRAKE PANEL ASSEMBLY

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

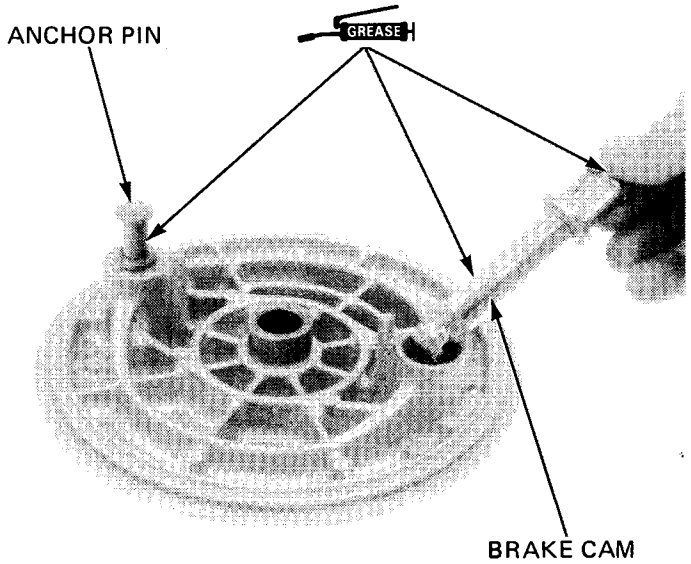


Apply grease to the brake anchor pin and brake cam.

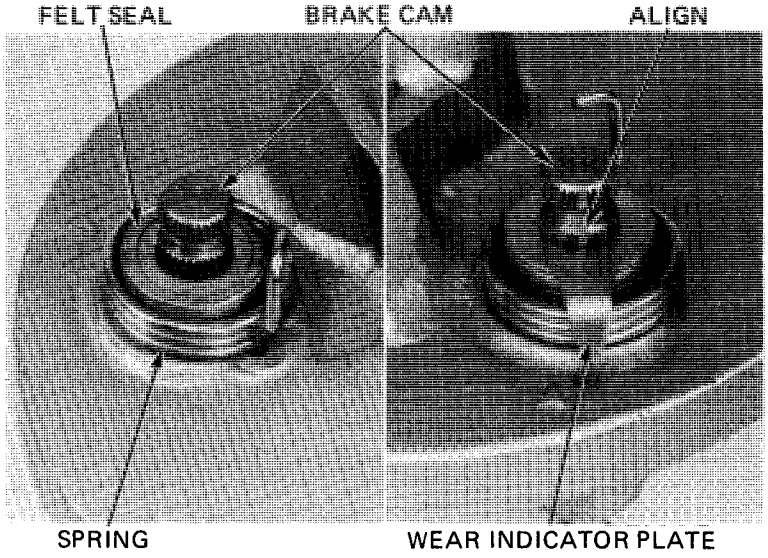
WARNING

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

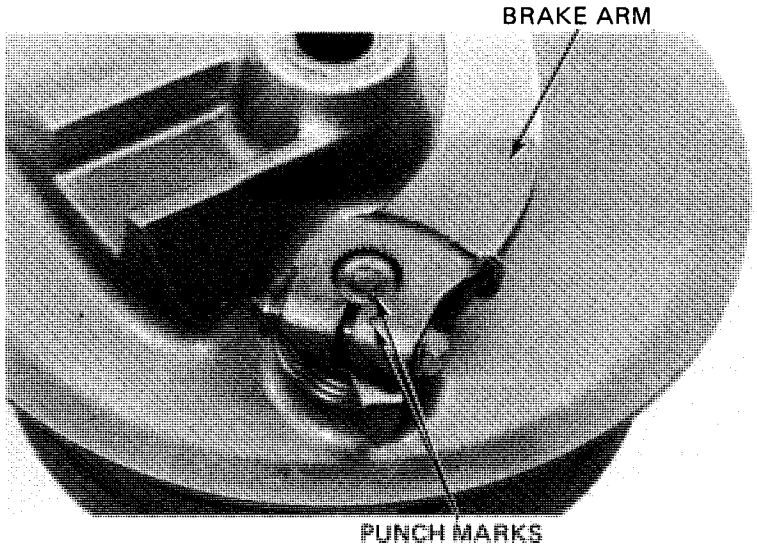
Install the brake cam into the brake panel.



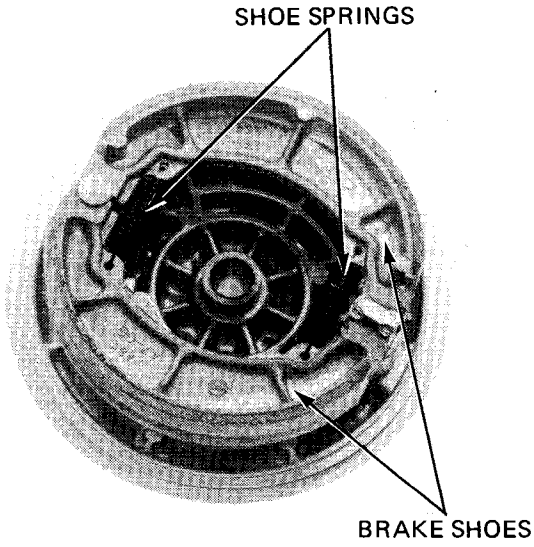
Install the felt seal and brake arm return spring.
Install the indicator plate, aligning the wide tooth on the indicator plate with the wide groove on the brake cam.



Install the brake arm, aligning the punch marks on the brake cam and arm.
Secure the brake arm using the bolt and nut.



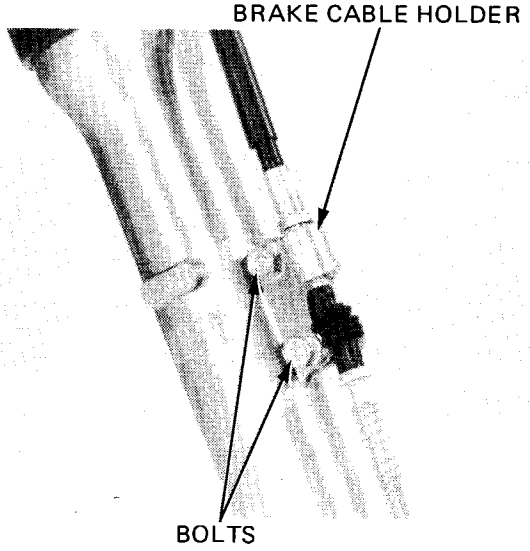
Install the brake shoes and springs onto the brake panel.



FRONT FORK

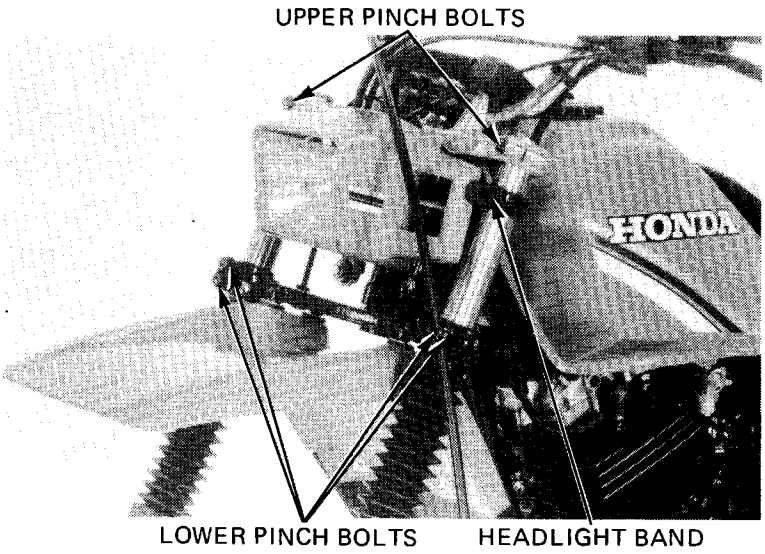
REMOVAL

Remove the front wheel (Page 11-7).
Remove the two bolts attaching the front brake cable holder to the left fork leg.



Remove the headlight bands from the front fork.
Loosen the fork upper and lower pinch bolts.

Remove the fork top rings.
Loosen the fork boot bands and slide boots down.
Remove the front forks from the fork top and bottom bridges.

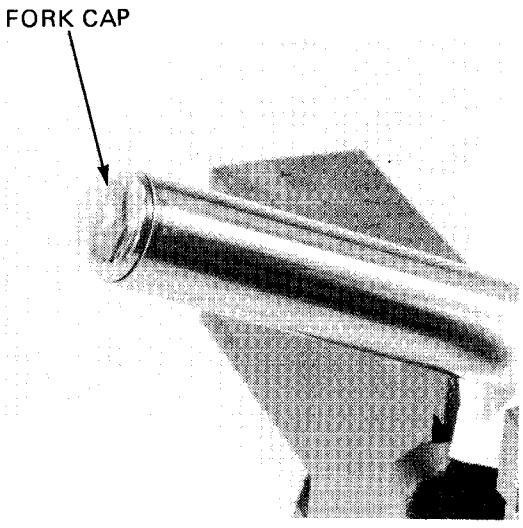


DISASSEMBLY

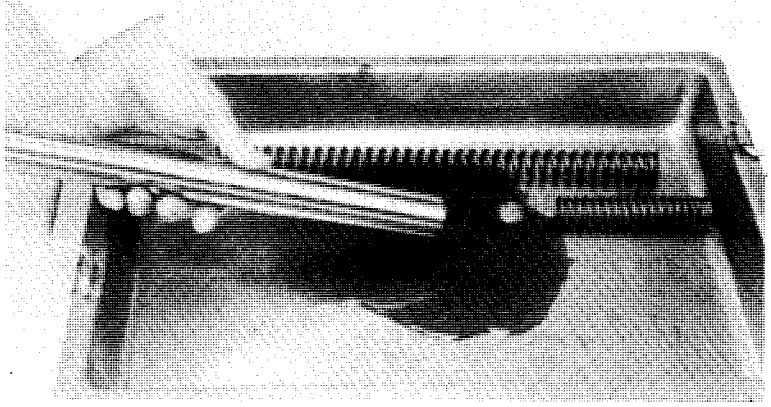
Remove the fork boot.
Hold the fork tube in a vise with soft jaws or shop towel and remove the fork tube cap.

CAUTION

Do not damage the tube's sliding surface.



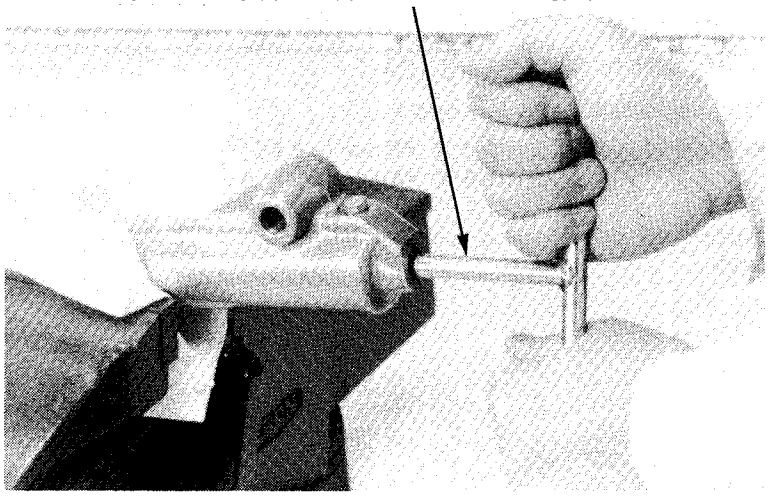
Remove the fork springs and spacer.
Drain the fork fluid by pumping the fork up and down several times.



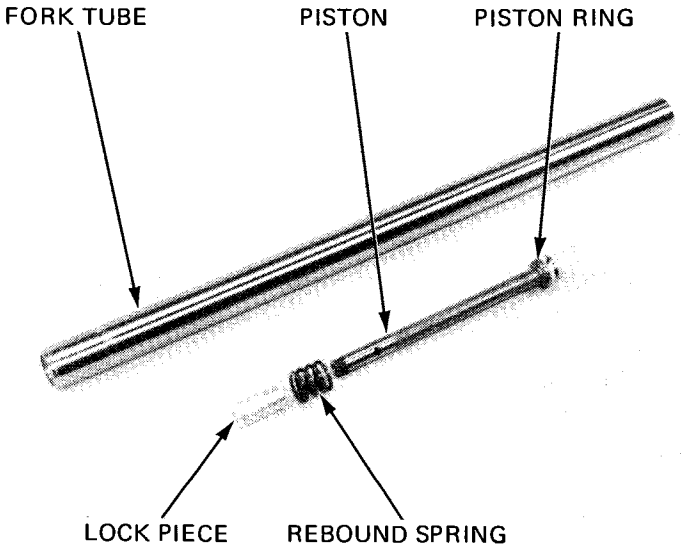
Hold the fork slider in a vise with soft jaws or a shop towel.
Remove the socket bolt with a hex wrench.

NOTE

> Temporarily install the springs and fork cap if the bolt is difficult to remove.



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

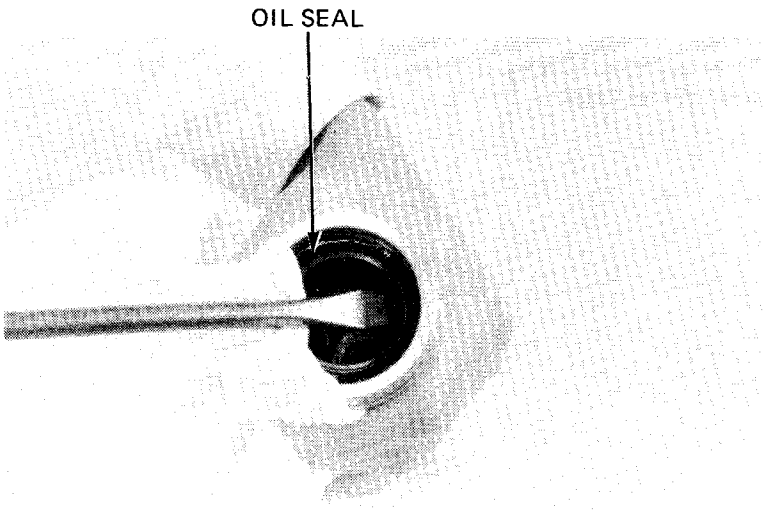


Remove the dust seal and snap ring.

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

CAUTION

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



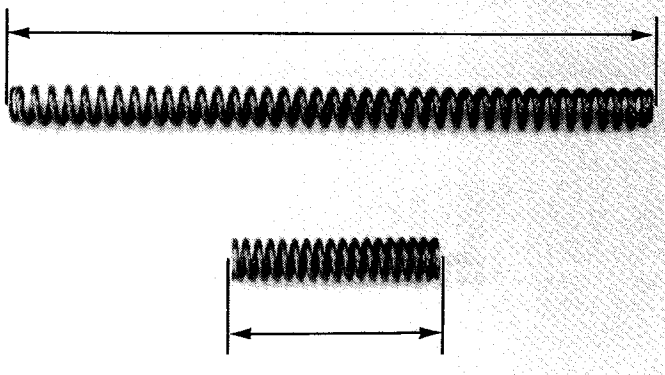
INSPECTION

FORK SPRING FREE LENGTH

Measure the fork spring free length..

SERVICE LIMITS: SPRING A: 98 mm (3.8 in)
SPRING B: 410 mm (16.1 in)

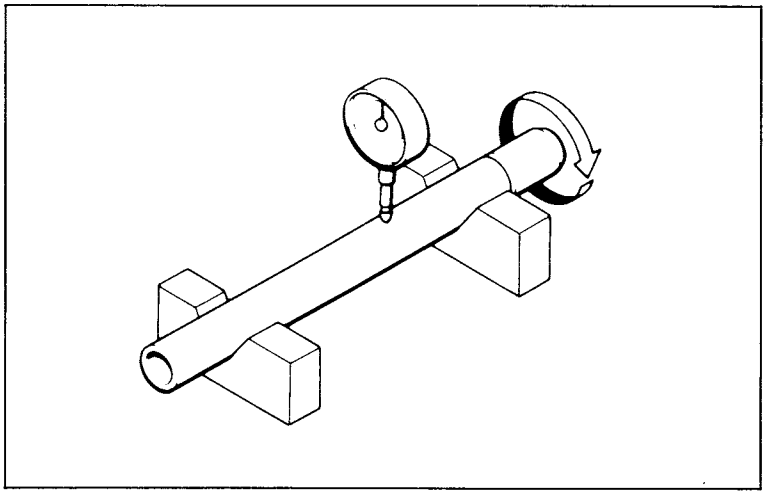
Replace the spring if it is shorter than the service limit.



FORK TUBE

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

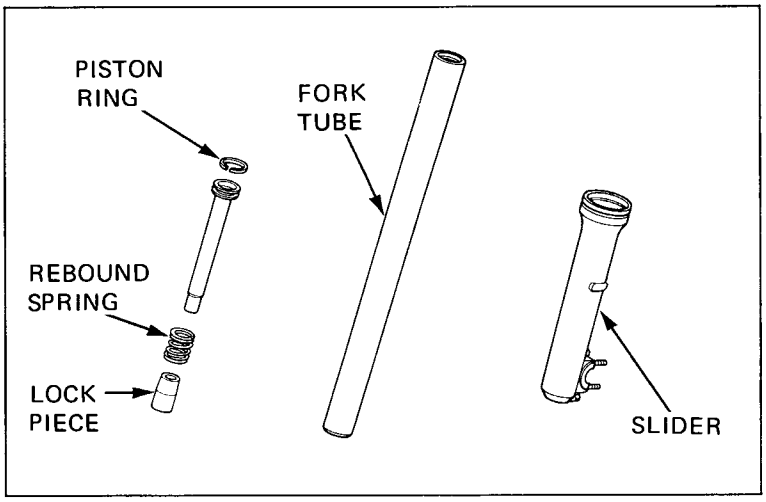
SERVICE LIMIT: 0.20 mm (0.008 in)



FORK TUBE/FORK SLIDER/PISTON

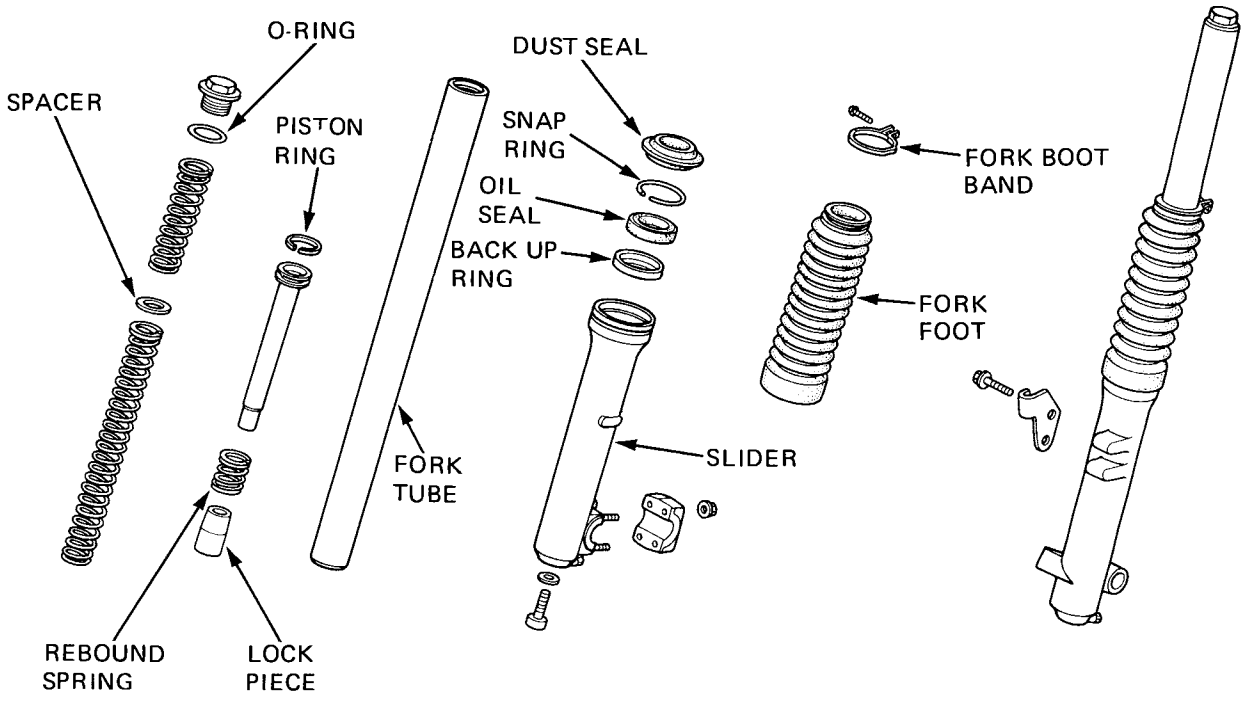
Check the fork tube, fork slider and piston for score marks, scratches, or excessive or abnormal wear. Replace any components which are worn or damaged.

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



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.

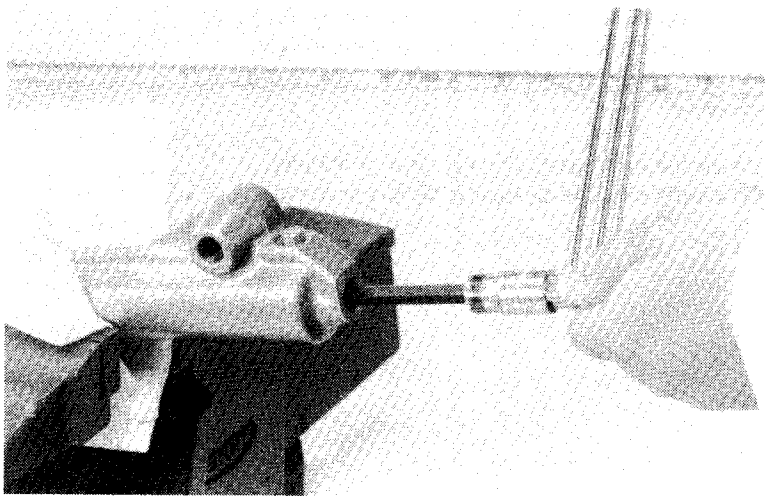
Place the oil lock piece on the end of the piston and insert the fork tube into the slider.

Place the fork slider in a vise with soft jaws or 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

If the socket bolts is difficult to install, temporarily install the fork springs and cap.

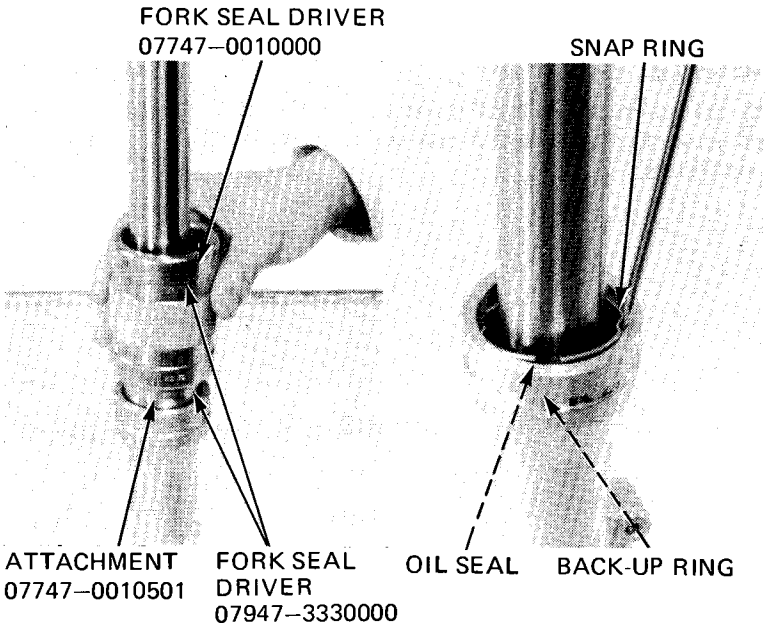
TORQUE: 15–25 N·m (1.5–2.5 kg-m, 11–18 ft-lb)



Install the back-up ring.
Coat a new oil seal with ATF and install it with the seal markings facing up. Drive the seal in with the seal driver.

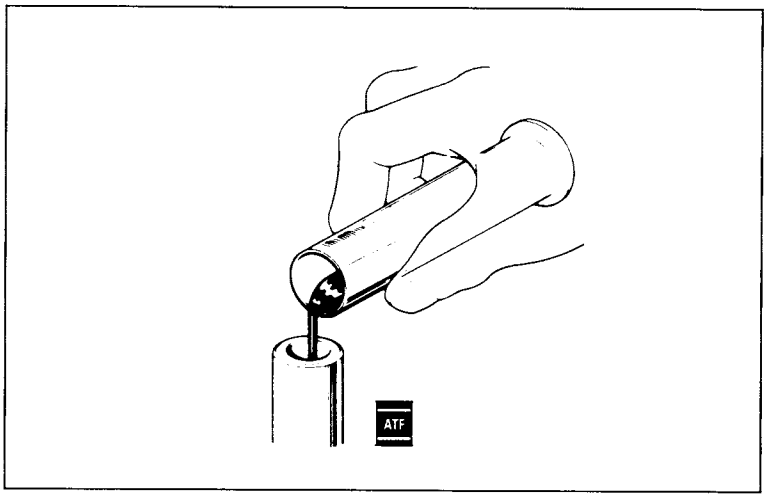
Install the snap ring and dust seal.

TOOLS
07747–0010000 ┐
07747–0010501 ┘ or 07947–3330000



Pour the specified amount of ATF into the fork tube.

CAPACITY: 180 cc (6.08 ozs)

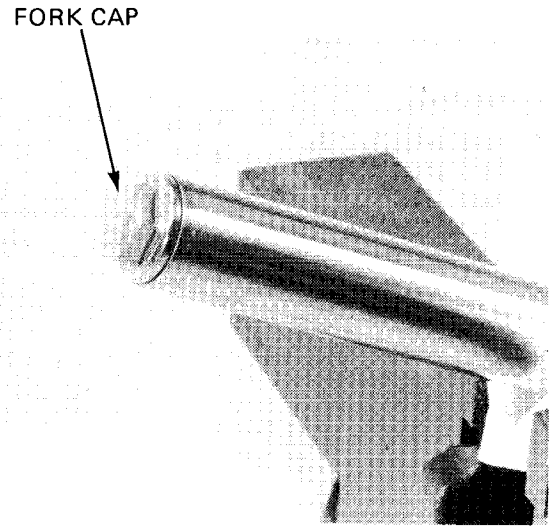


Install the fork spring B into the fork tube with the small diameter coil end down.

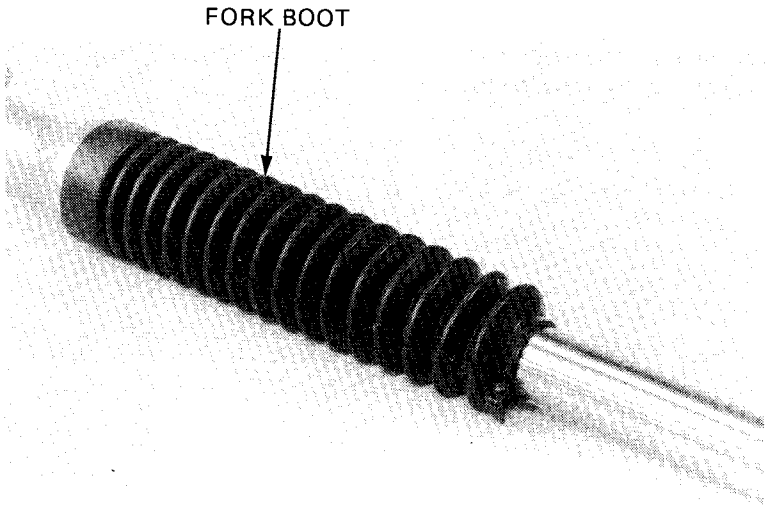
Install the spacer and spring A.

Install the fork cap into the fork tube and tighten it.

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



Install the fork boot.



INSTALLATION

Install the forks and loosely tighten the upper and lower pinch bolts.

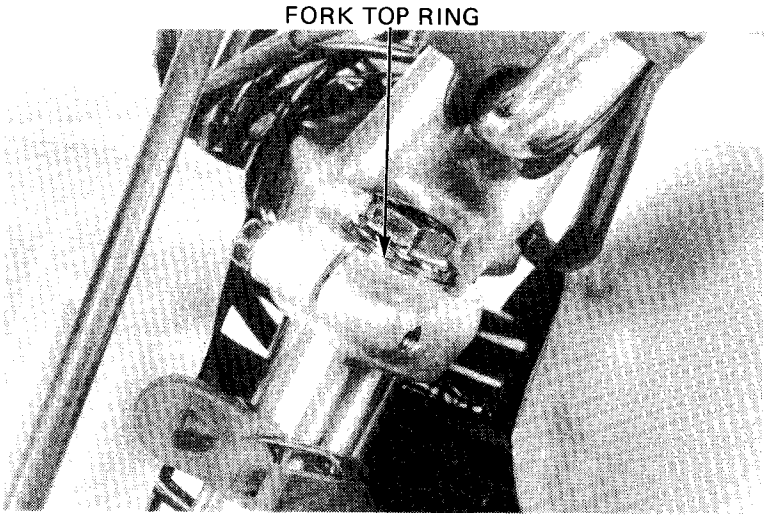
Install the fork top rings in the grooves in the fork tubes.

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

Tighten the upper and lower pinch bolts.

TORQUE: 30–35 N·m (3.0–3.5 kg-m, 22–25 ft-lb)

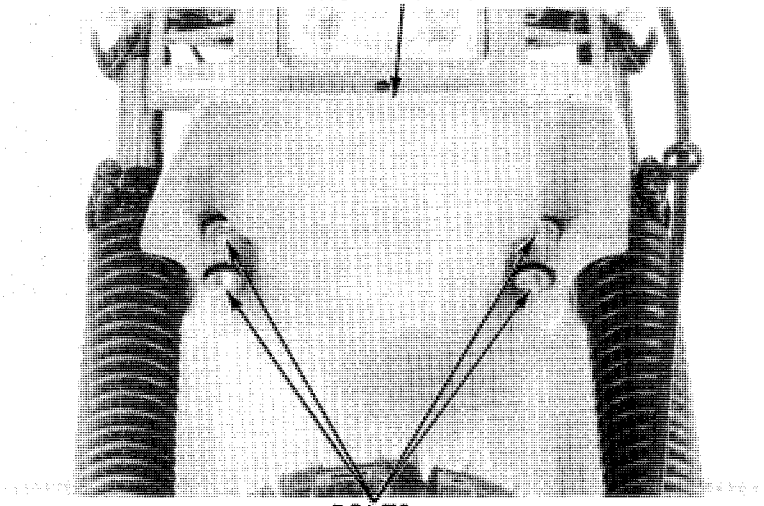
Slide the fork boots up to the steering stem and tighten the boot hands.
Install the removed parts in the reverse order of removal.



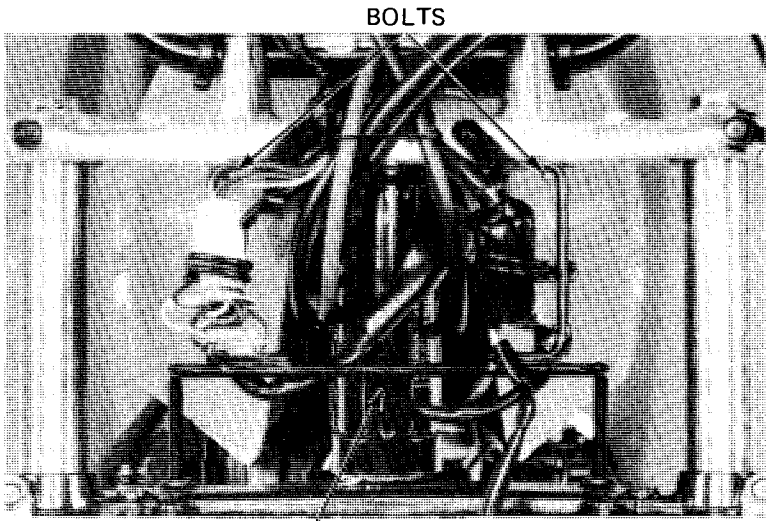
STEERING STEM

REMOVAL

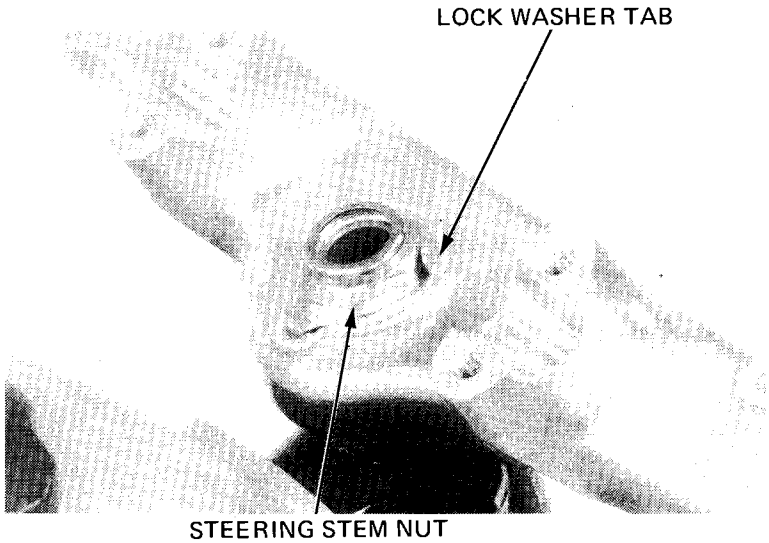
Remove the following:
- front wheel (Page 11-7)
- front fender
- handlebar (Page 11-3)
- headlight (Page 17-2)



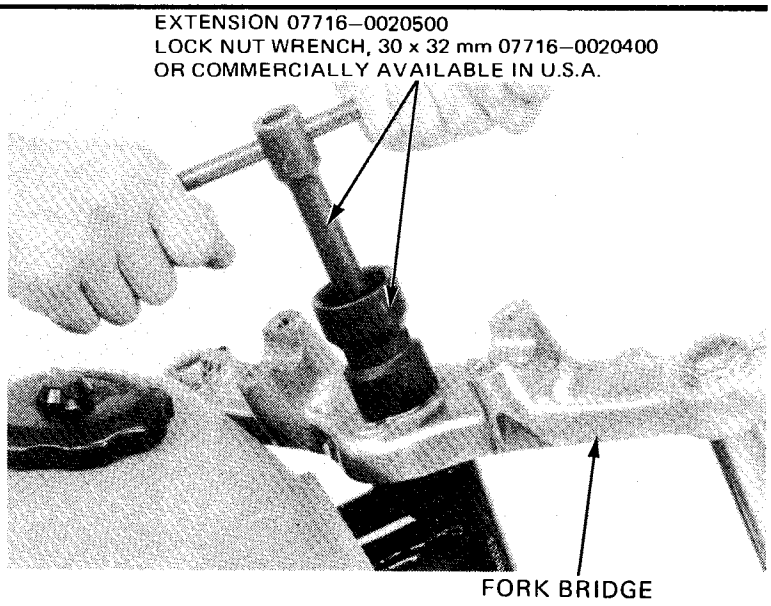
Disconnect all wires and remove the headlight bracket by removing the two bolts.



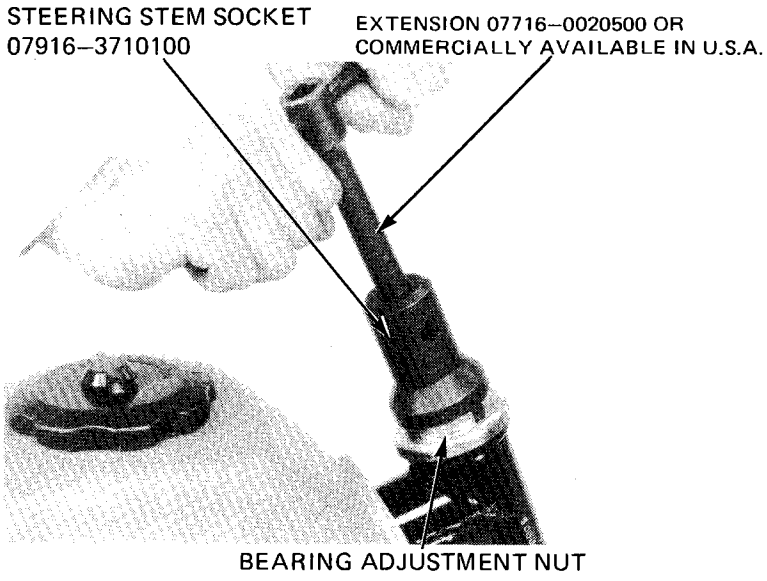
Bend down the steering stem nut lock washer tab.



Remove the steering stem nut and lock washer.
Remove the forks (Page 11-20).
Remove the fork bridge.



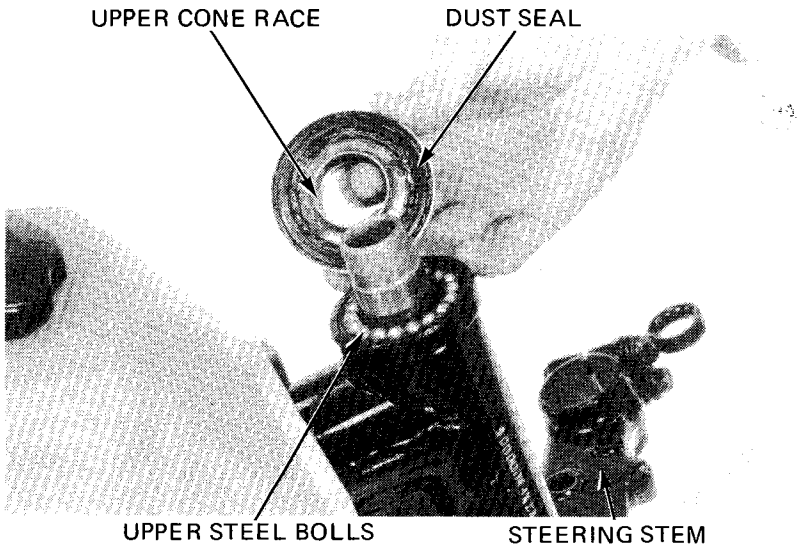
Remove the bearing adjustment nut.



Remove the steering stem, upper cone race, dust seal and upper and lower steel balls.

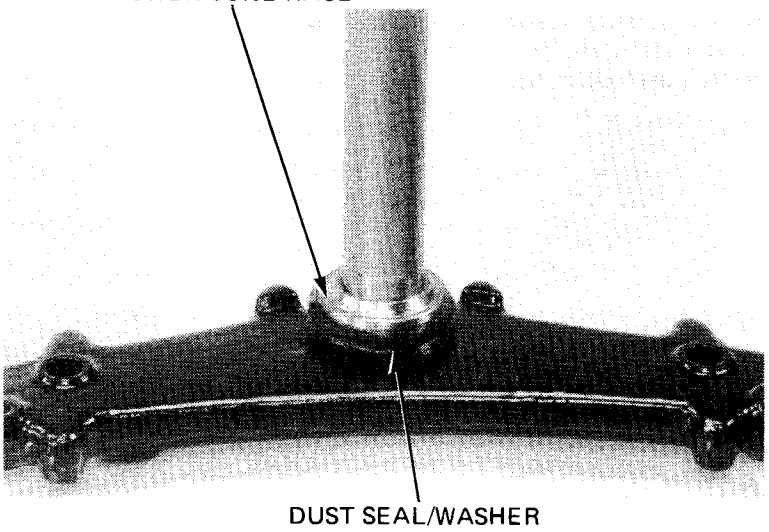
NOTE:

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

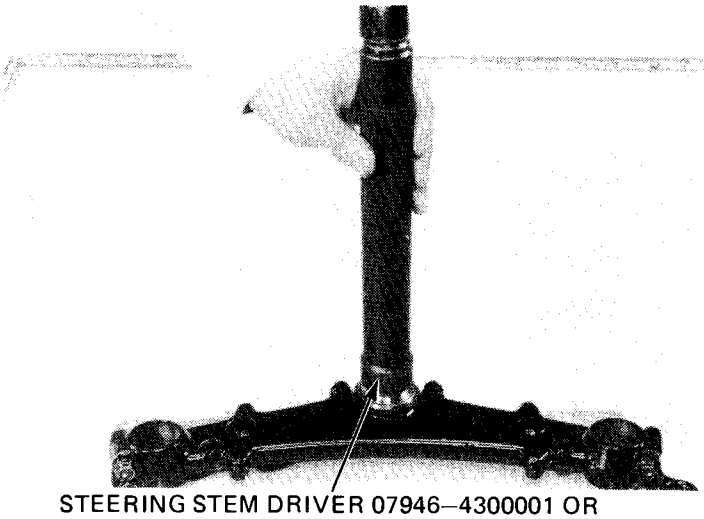


LOWER CONE RACE REPLACEMENT

Inspect the lower cone race for wear or damage and replace if necessary.
Remove the lower cone race, dust seal and washer with a hammer and drift.



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

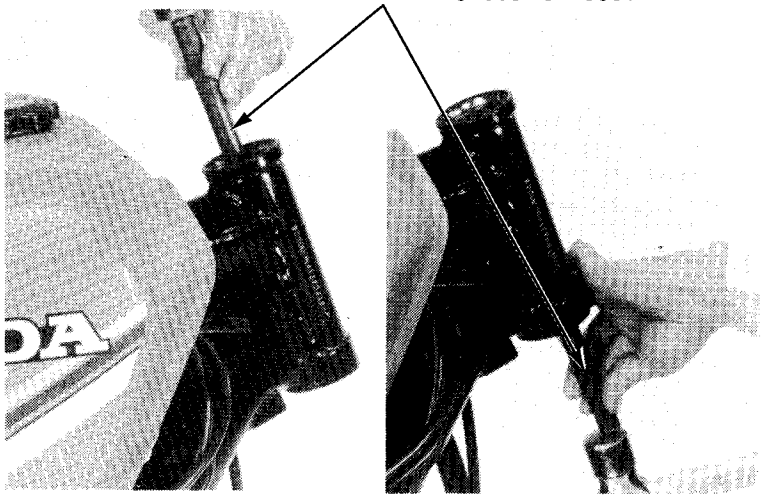


BALL RACE REPLACEMENT

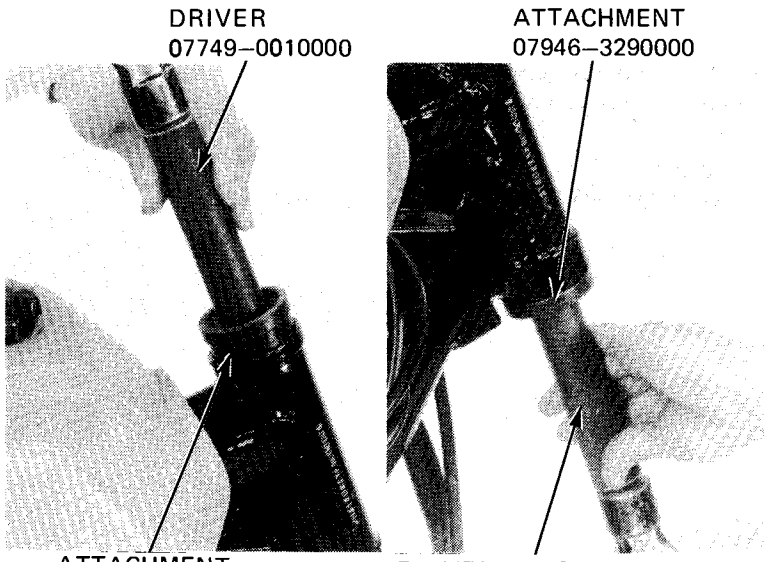
Inspect the upper and lower ball races for wear or damage and replace if necessary.
Remove the upper and lower ball races with the special tool.

NOTE:

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



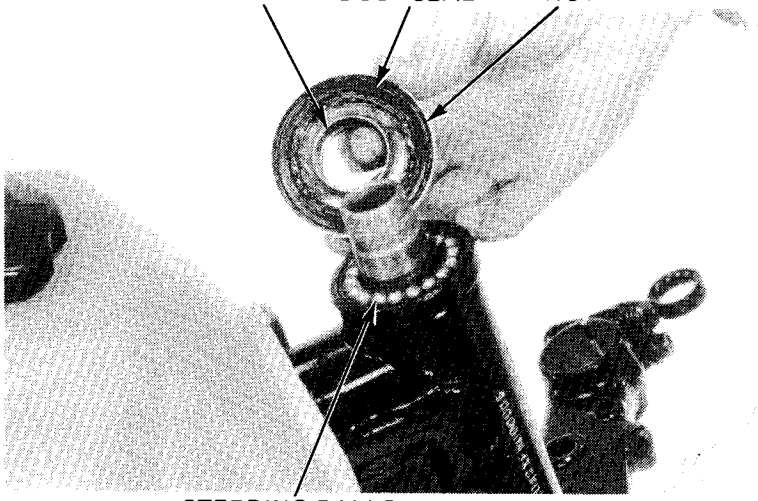
Drive in new ball races with the special tools.



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.

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

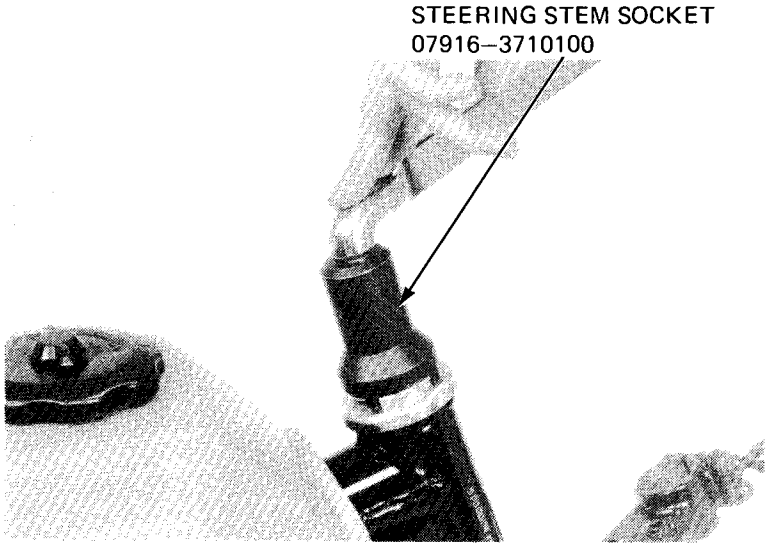


Tighten the bearing adjustment nut to the specified torque.

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.

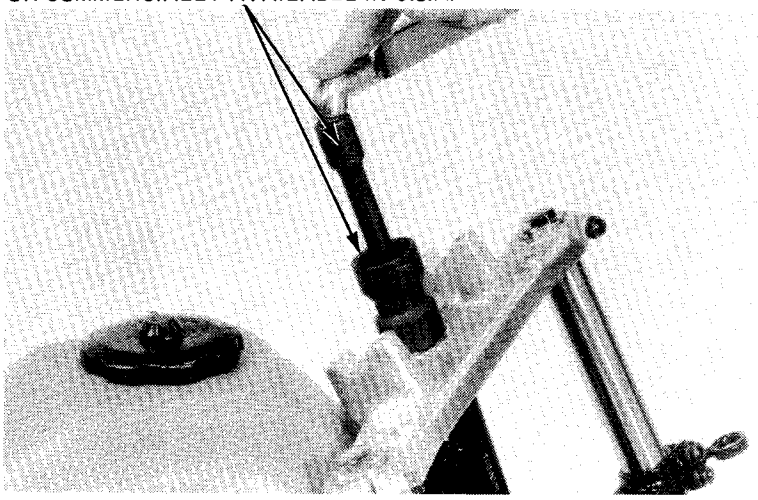
TORQUE: 7–8 N·m (0.7–0.8 kg-m, 5–6 ft-lb)



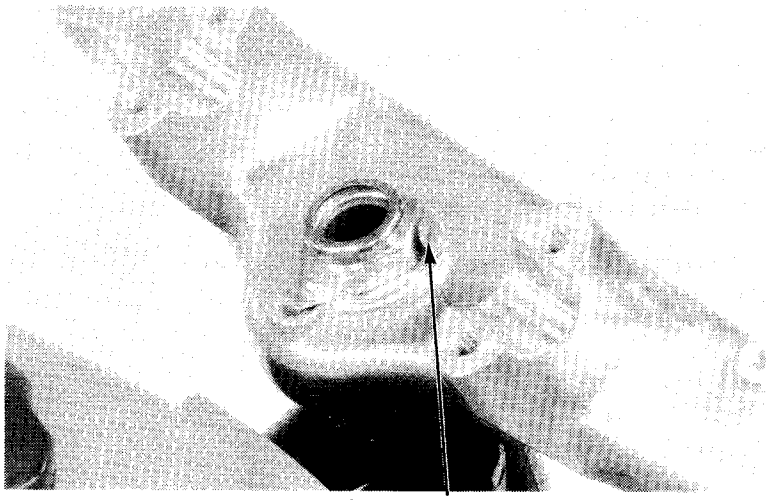
Install the fork bridge and forks (Page 11-25).
Install a new lock washer and tighten the steering stem nut.

TORQUE:
70–100 N·m (7.0–10.0 kg-m, 51–72 ft-lb)

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



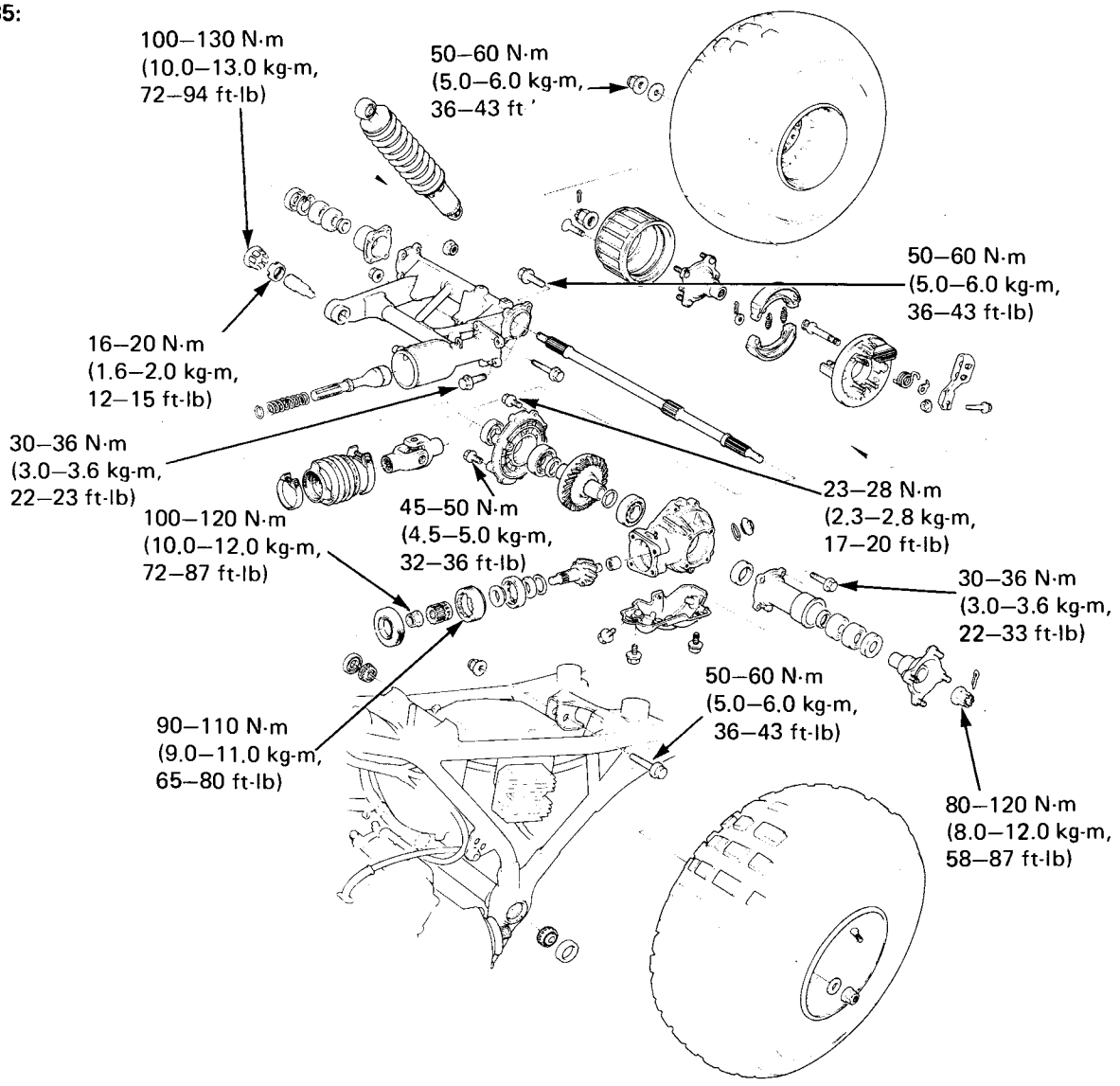
Bend up the lock washer tab.
Install the remaining removed parts in the reverse order of removal.



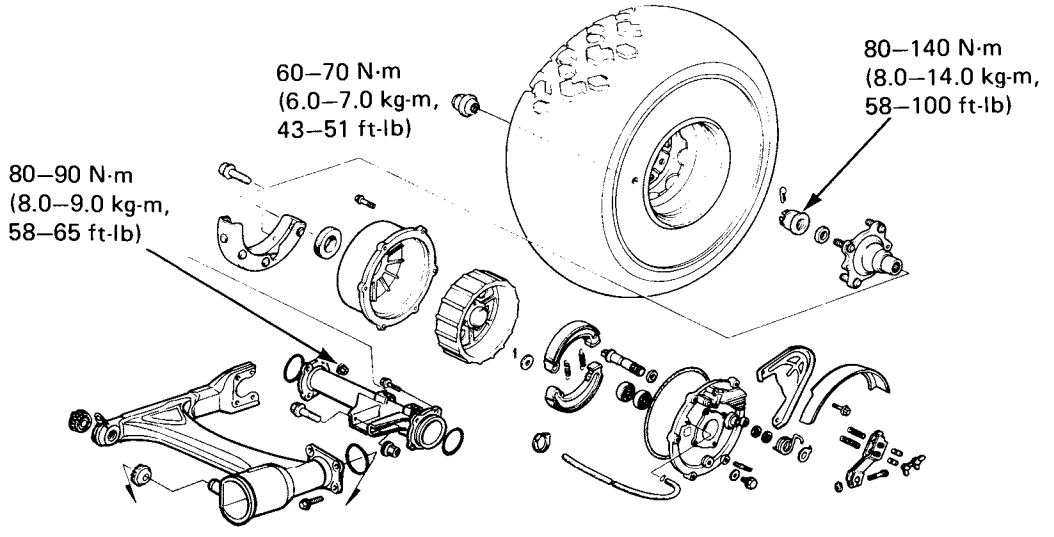
LOCK WASHER TAB

MEMO

'85:


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)
50–60 N·m
(5.0–6.0 kg-m,
36–43 ft-lb)
16–20 N·m
(1.6–2.0 kg-m,
12–15 ft-lb)
30–36 N·m
(3.0–3.6 kg-m,
22–23 ft-lb)
23–28 N·m
(2.3–2.8 kg-m,
17–20 ft-lb)
100–120 N·m
(10.0–12.0 kg-m,
72–87 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,
22–33 ft-lb)
50–60 N·m
(5.0–6.0 kg-m,
36–43 ft-lb)
90–110 N·m
(9.0–11.0 kg-m,
65–80 ft-lb)
80–120 N·m
(8.0–12.0 kg-m,
58–87 ft-lb)

After '85:


60–70 N·m
(6.0–7.0 kg-m,
43–51 ft-lb)
80–140 N·m
(8.0–14.0 kg-m,
58–100 ft-lb)
80–90 N·m
(8.0–9.0 kg-m,
58–65 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.
- When using the lock nut wrench, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases, the torque wrenche'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
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)
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		25 N·m (2.5 kg-cm, 2.2 in-lb) max.	—
Rear shock absorber spring free length		273.8 mm (10.78 in)	269.1 mm (10.59 in)

TORQUE VALUES

Rear wheel nuts	'85	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 nuts	'85	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, 58–00 ft-lb)
Rear brake panel nuts	'85	50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
	After '85	80–90 N·m (8.0–9.0 kg-m, 58–65 ft-lb)
Rear shock absorber mount bolt		50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
Swing arm right pivot bolt		16–20 N·m (1.6–2.0 kg-m, 12–15 ft-lb)
Swing arm 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)	30–36 N·m (3.0–3.6 kg-m, 22–23 ft-lb)
Final bearing housing bolt		30–36 N·m (3.0–3.6 kg-m, 22–23 ft-lb)
Final gear case cover	(10 mm)	45–50 N·m (4.5–5.0 kg-m, 32–36 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)

TOOLS

Special

Shock absorber base	07959–MB10000
Lock nut wrench	07908–4690001 or KS–HBA–08–469 (U.S.A. only)
Socket bit, 17 mm	07917–3230000 or equivalent commercially available in U.S.A.
Bearing remover set	07936–8890101
– Bearing remover assy	07936–8890300
– Bearing remover	07936–8890200
– Remover weight	07741–0010201 or 07936–3710200
Pinion joint holder	07924–HA00000
Shaft puller	07931–ME40000 or 07931–ME4000A (U.S.A. only)
Lock nut wrench, 33 x 44 mm	07916–ME50001 or 07916–ME50000
Lock nut wrench attachment	07916–HA0010A (U.S.A. only)
Pinion gear	07945–HA00000
Water seal driver	07947–HA00000
Collar	07965–GA70101
Universal bearing puller	07631–0010000 or commercially available in U.S.A.

Common

Attachment, 32 x 35 mm	07746–0010100
Attachment, 37 x 40 mm	07746–0010200
Attachment, 42 x 47 mm	07746–0010300
Attachment, 52 x 55 mm	07746–0010400
Pilot, 30 mm	07746–0040700
Attachment, 62 x 68 mm	07746–0010500
Driver	07749–0010000
Driver	07746–0020100
Attachment, 20 mm ID	07746–0020400 or 07746–0030400
Shock absorber spring compressor	07959–3290001
Attachment, 22 mm	07746–0410000
Pilot, 35 mm	07746–0040800
Pilot, 28 mm	07746–0041100
Driver	07746–0030100

TROUBLESHOOTING

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

Soft suspension
– Weak spring

Hard suspension
– Bent shock absorber

Suspension noise
1. Shock case binding.
2. Loose fasteners.

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

REAR WHEEL

REMOVAL

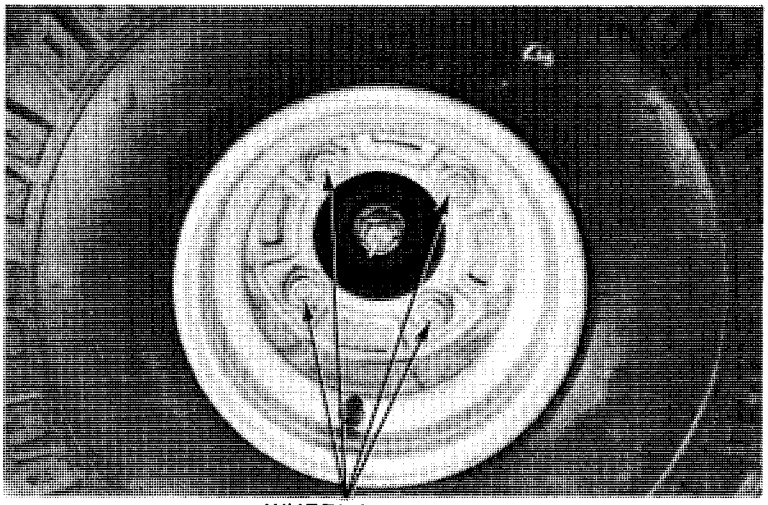
Raise the rear wheels off the ground with a jack or block under the engine.

Remove the wheel nuts and wheels.

INSTALLATION

Install the rear wheel with the tire valve facing out. Install the wheel nuts and tighten them.

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

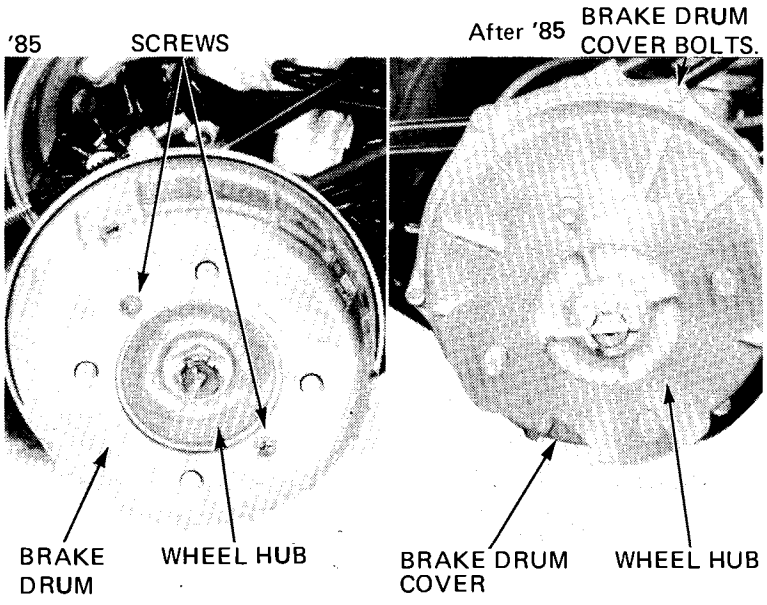


WHEEL NUTS

REAR BRAKE

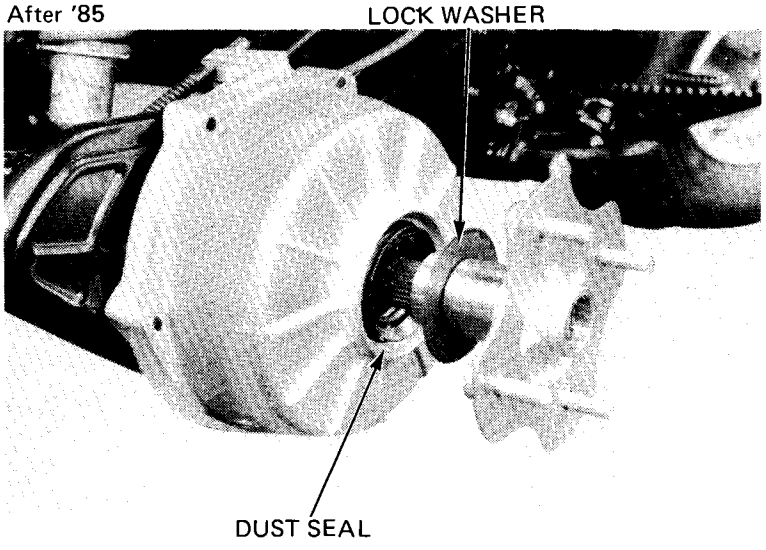
BRAKE DRUM REMOVAL

Remove the right rear wheel.
'85:
Remove the two screws attaching the brake drum and remove the drum from the wheel hub.
After '85:
Remove the skid plate, and stone guard.
Remove the cotter pin, axle nut, lock washer and wheel hub from the exle.
Remove the drum cover mounting bolts and drum brake cover.



BRAKE DRUM/COVER INSPECTION

After '85:
Check the brake drum cover dust seal for damage. Replace, if necessary.

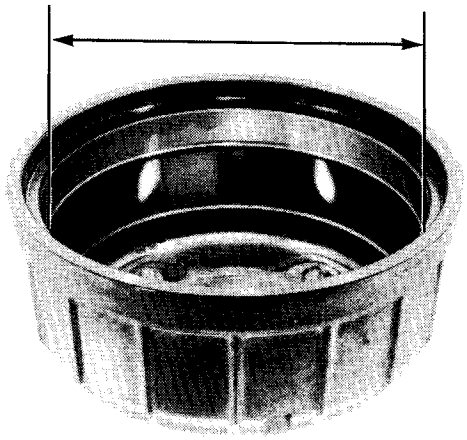


BRAKE DRUM INSPECTION

Measure the I.D. of the brake drum.

SERVICE LIMIT: 161 mm (6.34 in)

Inspect the brake drum for scoring, cracks and concentricity.



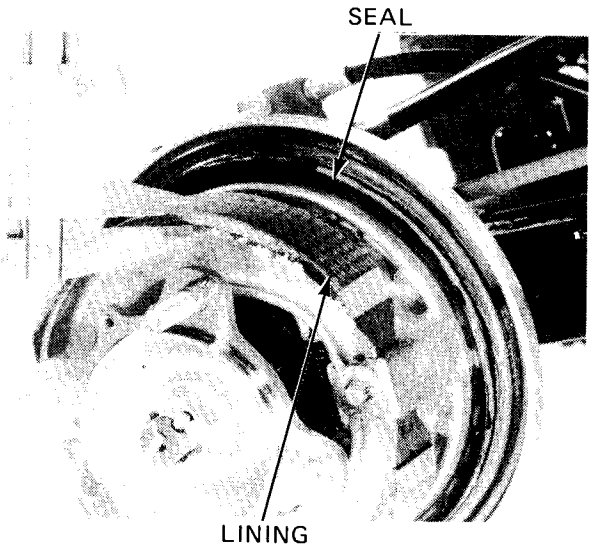
BRAKE LINING INSPECTION

Measure the brake lining thickness.

SERVICE LIMIT: 2 mm (0.01 in)

BRAKE DRUM SEAL INSPECTION

Check the brake drum seal for wear or damage and replace if and the seal ring on the brake drum as a set, if necessary (Page 12-5).

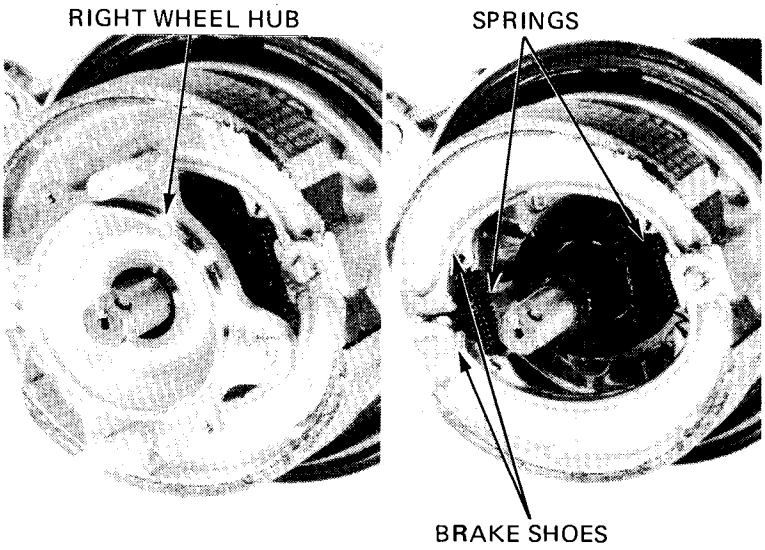


REAR BRAKE DISASSEMBLY

'85;

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

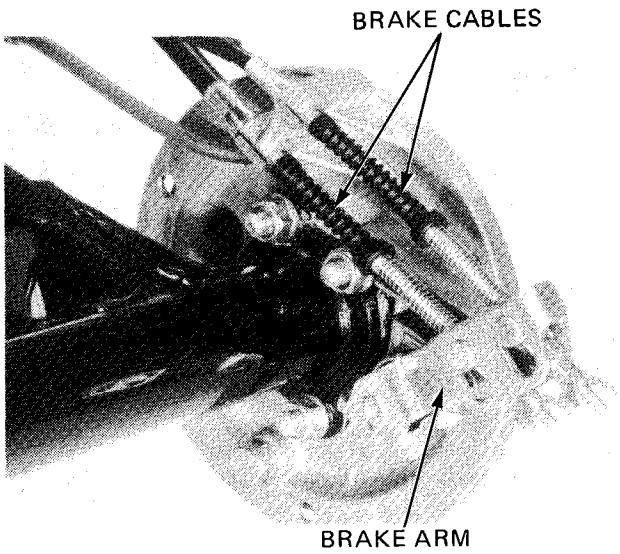
Remove the brake shoes and springs.



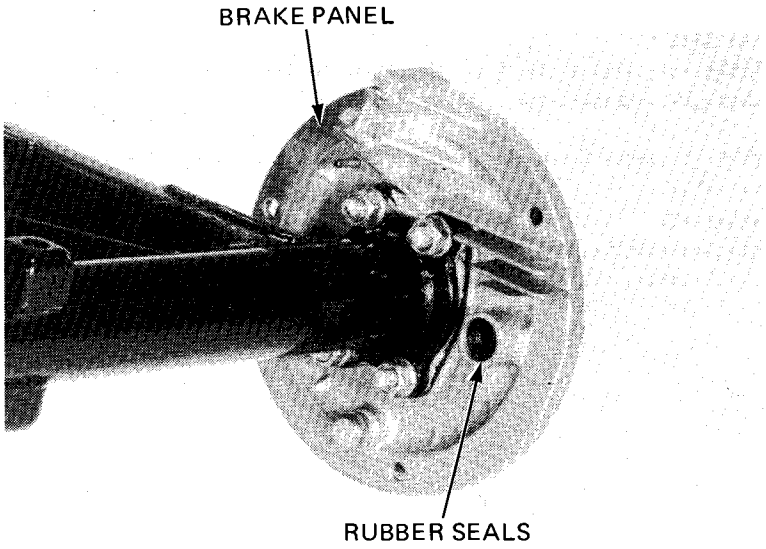
Remove the brake adjusting nuts and disconnect the rear brake cables from the brake arm.

After '85;
Remove the brake arm gurd.

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



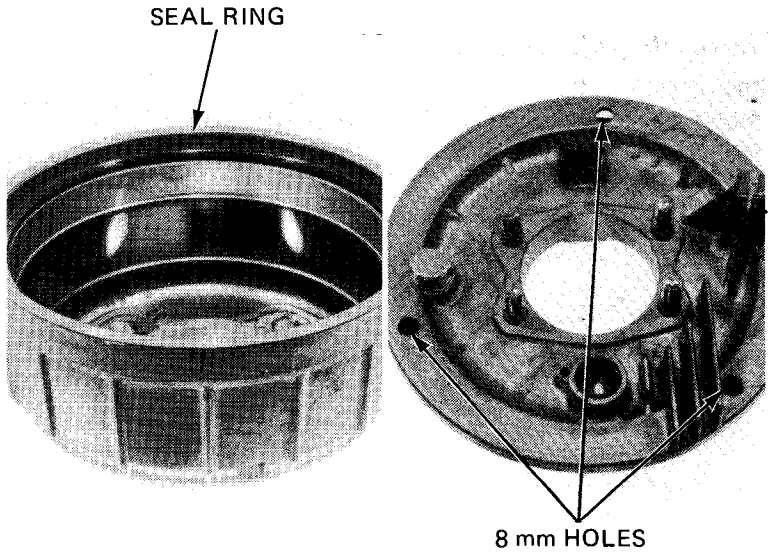
Remove the brake pedal mount nuts and the brake panel.
Check the rubber seals for wear or damage and replace if necessary.



BRAKE DRUM WATER SEAL REPLACEMENT

'85;
Remove the seal ring from the brake drum.

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



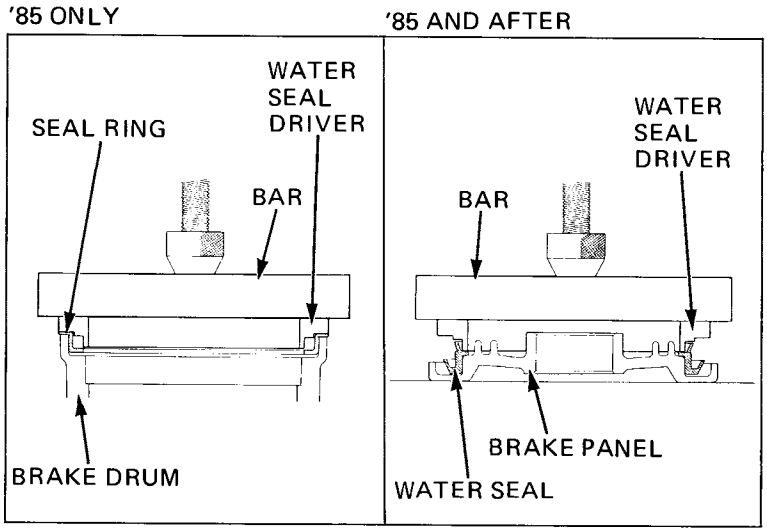
'85 AND AFTER
Apply a soap and water solution around new drum seal.

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

TOOL
WATER SEAL DRIVER 07947–HA00000

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

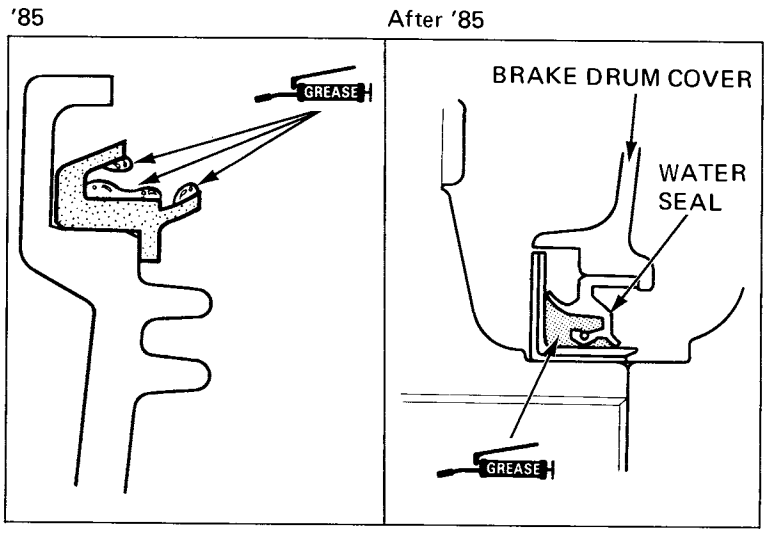
'85 ONLY
Apply a soap and water solution around the seal ring and press it onto the brake drum using the same tool until it seats fully.



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

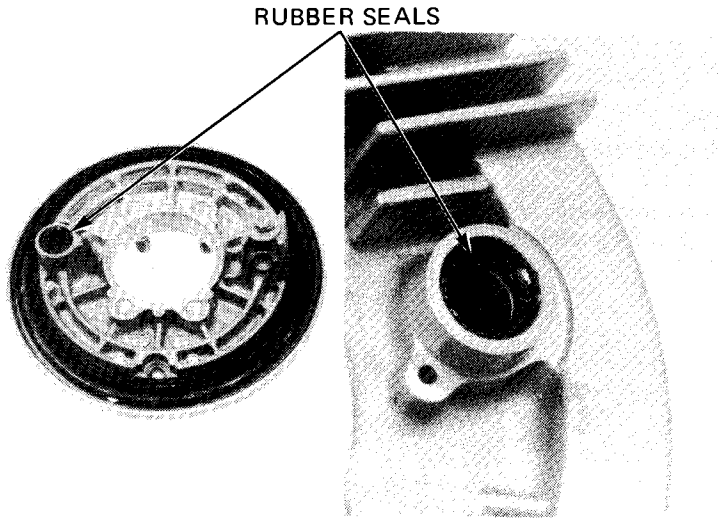
Pack grease in the cavity and lips of the drum seal as shown.

After '85:
Apply grease to the water seal as shown.
Apply grease to the dust seal in the wheel hub.



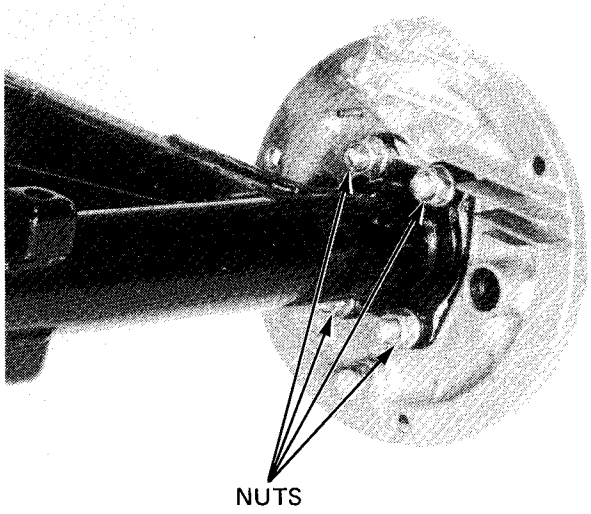
REAR BRAKE ASSEMBLY

'85 ONLY
Apply grease to new rubber seals and install the seals into the brake panel.



Clean the mating surfaces between the swing arm, the right bearing housing and the brake panel and apply liquid sealant to them.
Install the brake panel and right bearing housing onto the swing arm and tighten the four mount nuts.

TORQUE:
'85: 50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)
After '85:
80–90 N·m (8.0–9.0 kg-m, 58–65 ft-lb)

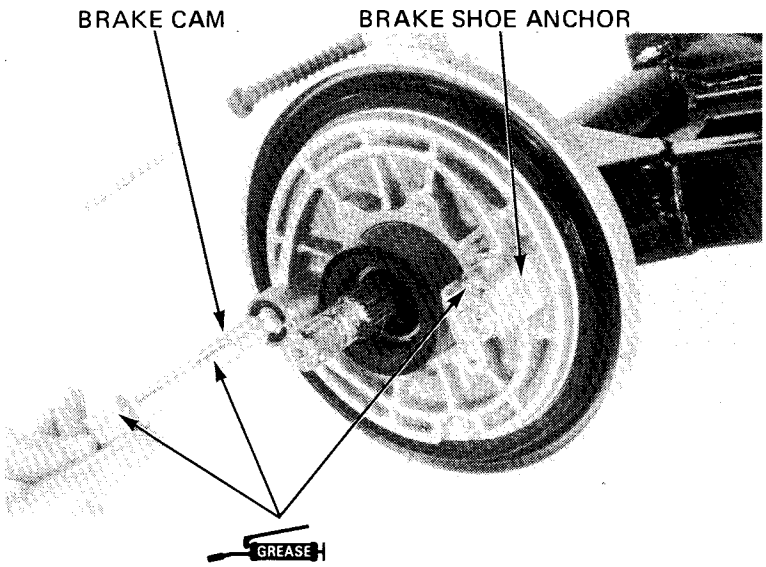


Apply grease to the brake shoe anchor and brake cam.

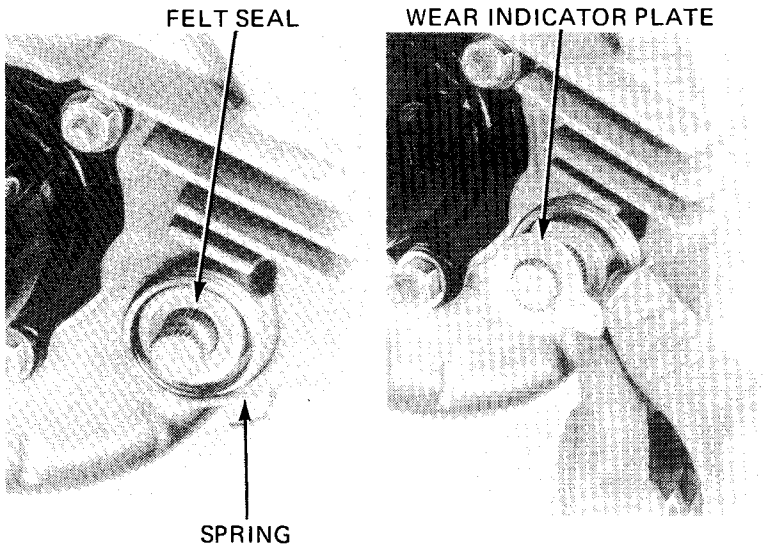
WARNING

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

Install the brake cam.



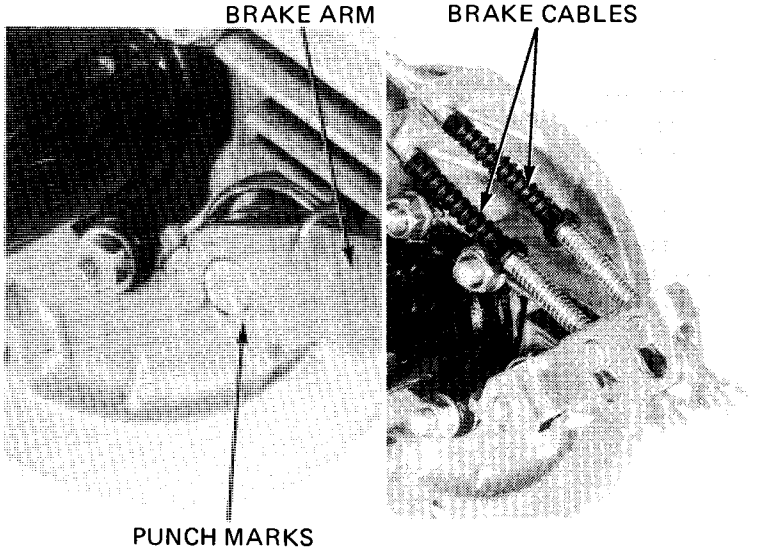
Install the felt seal, spring and wear indicator plate, aligning its wide tooth with the wide groove on the brake cam.



Install the brake arm, aligning the punch marks on the brake cam and arm.
Tighten the brake arm using the bolt and nut.
Connect the brake cables to the brake arm.
Install the brake shoes and springs.

WARNING

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



'85:
Install the right wheel hub and tighten the axle nut.

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

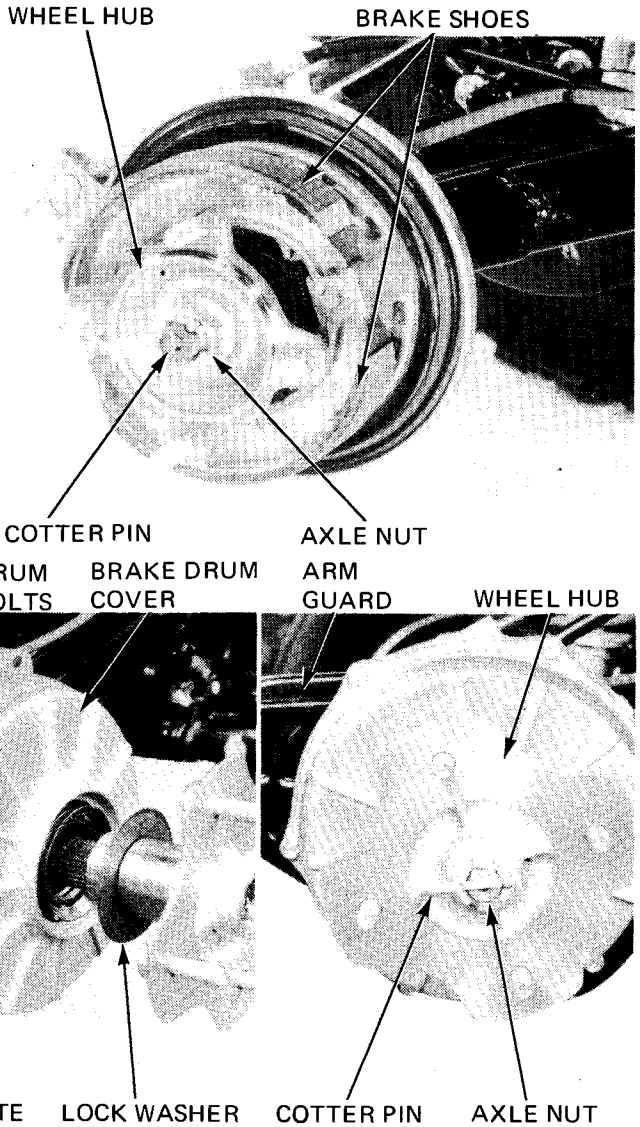
Secure the nut with a new cotter pin.
Clean the mating surfaces between the brake drum and the wheel hub and apply liquid sealant to them.

Install the drum.
Install and tighten the flat head screw. (page 12-3)

After '85:
Install the brake drum. (page 12-3)
Install the brake drum cover, arm guard and skid plate, and tighten the cover mounting bolts.
Check the water seal in the brake drum cover for wear or damage, and replace if necessary. (page 12-3).

Install the lock washer and axle nut.
Tighten the axle nut.

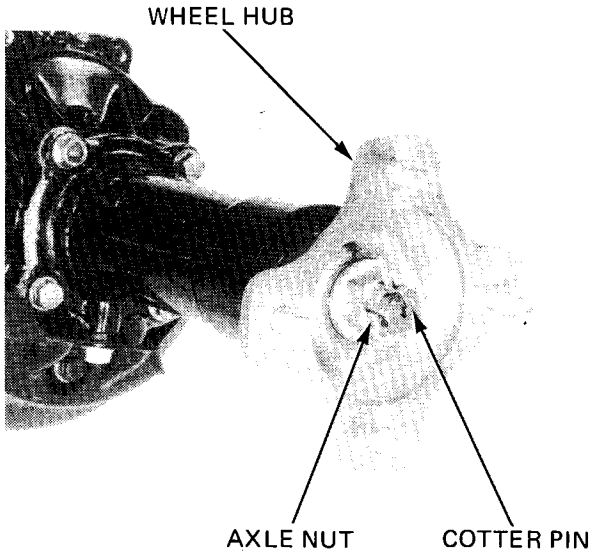
TORQUE:
80–140 N·m (8.0–14.0 kg-m, 58–100 ft-lb)



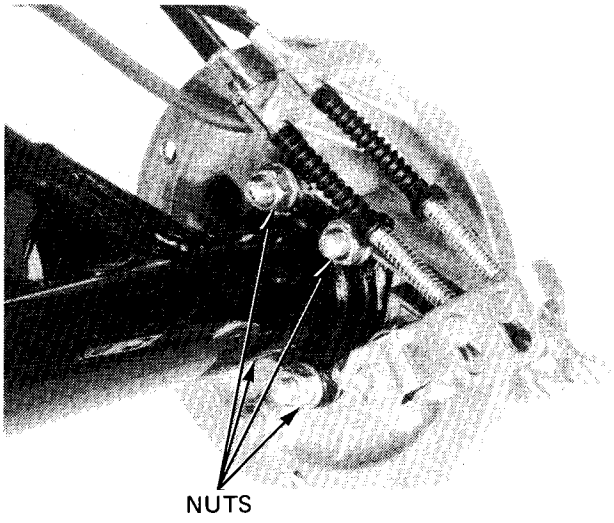
REAR AXLE/WHEEL BEARINGS

REMOVAL

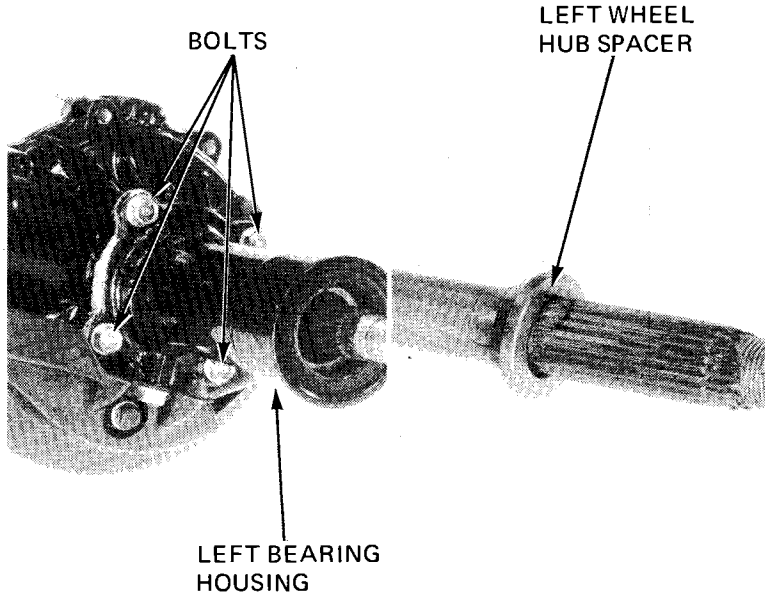
Remove the following:
- the right and left rear wheels (Page 12-3).
- the brake drum (Page 12-3).
- cotter pins, axle nuts and both rear wheel hubs from the axle shaft.



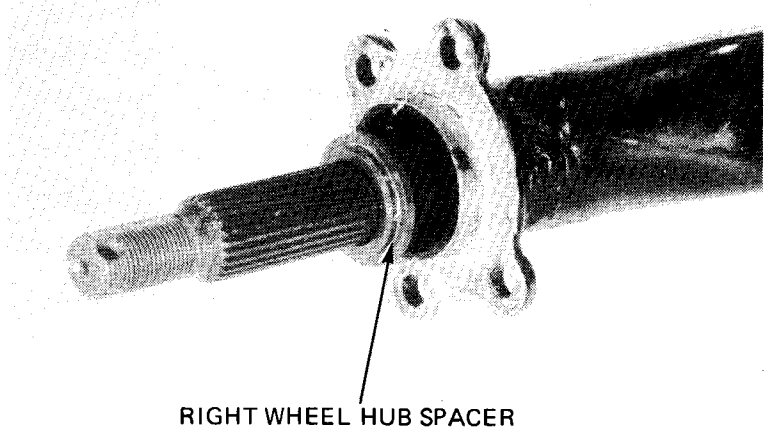
Disconnect the breather tube from the brake panel.
Remove the rear brake adjuster nuts and brake cables from the brake panel.
Remove the brake panel mounting nuts and the panel.



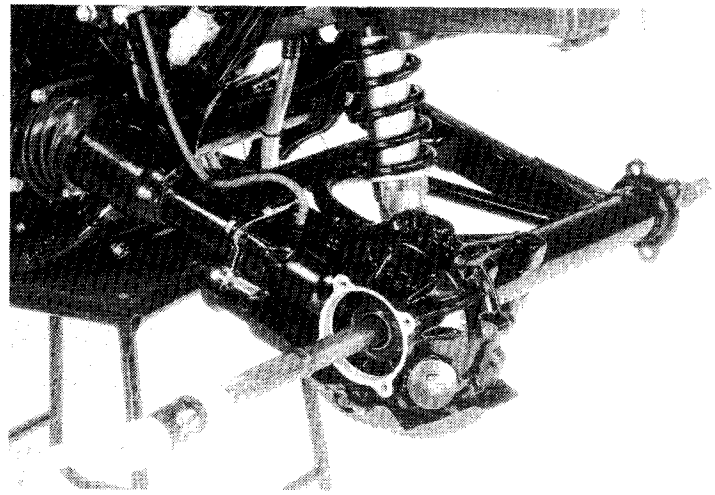
Remove the left bearing housing mounts bolts and the bearing housing from the swing arm.
Remove the wheel hub speacer left end of the axle shaft.



Remove the wheel hub spacer from right end of the axle shaft.



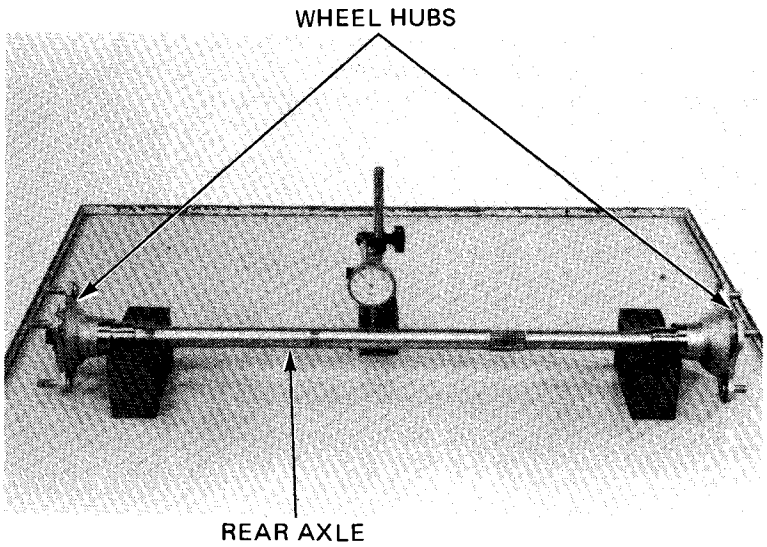
Install the axle nut to the end of the axle and drive out the axle shaft with a plastic hammer.



REAR AXLE INSPECTION

Install the wheel hubs onto both end of the axle. Place the rear axle in V-blocks and measure the runout.

SERVICE LIMIT: 3.0 mm (0.12 in)



REAR WHEEL BEARING INSPECTION

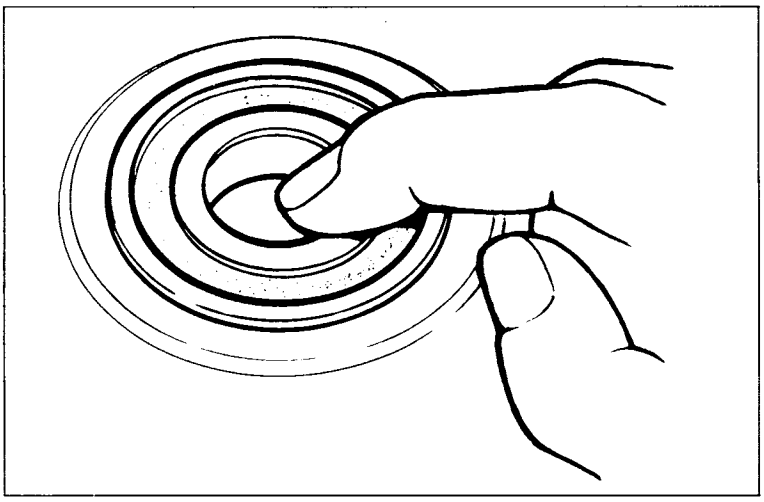
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

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 of bearings, see page 11-8 and 11-9.



REAR LEFT WHEEL BEARING REPLACEMENT

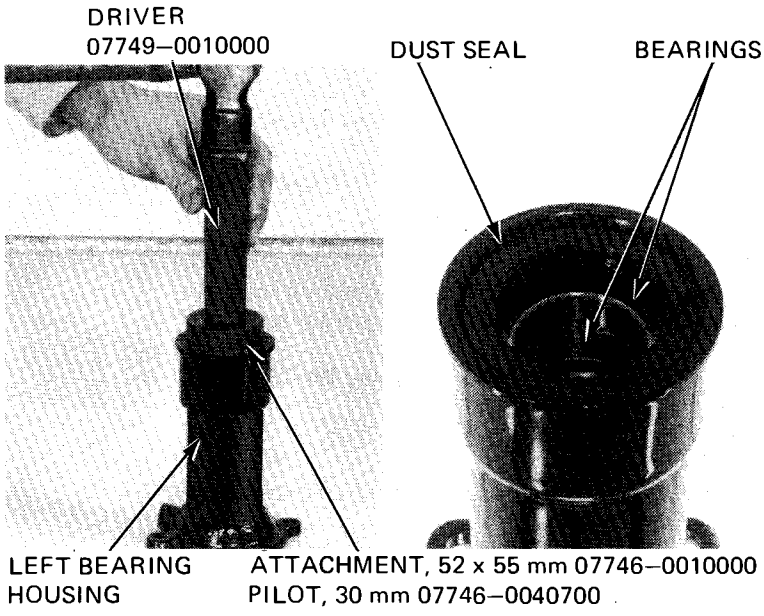
Remove the dust seal and drive out the bearings from the housing.

Driver	07749–0010000
Attachment, 32 x 35 mm	07746–0010100

NOTE

> Use the 32 mm end of the attachment as a pilot and the 35 mm step to drive the bearing out.

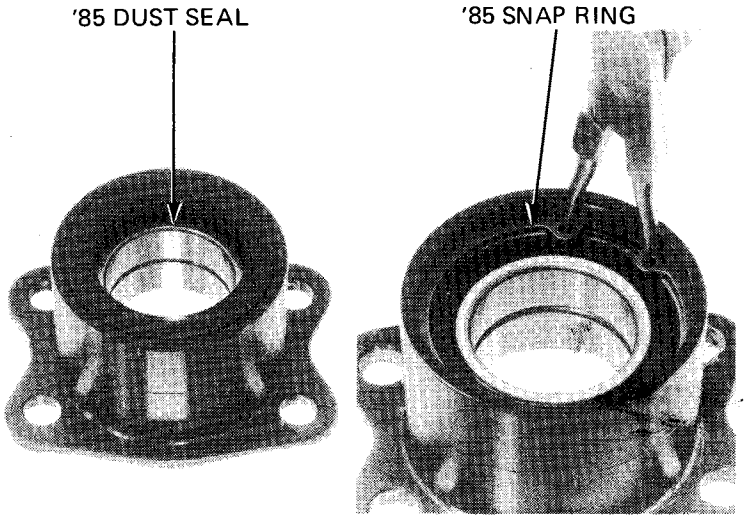
Drive new bearings into the housing.



RIGHT WHEEL BEARING REPLACEMENT

'85:

Remove the dust seal, snap ring and bearings from the right housing.



Drive new bearings into the housing and install the snap ring.

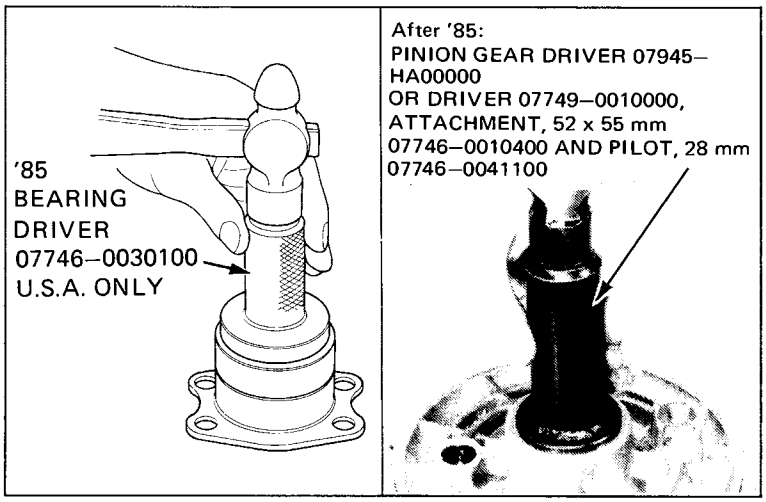
Apply grease to a new dust seal and install it.

After '85:
Remove the brake shoes, arm and cam from the brake panel (page 12-3).
Drive the bearing out.

Drive the new bearings into the panel with the sealed side out ward each other.

TOOLS

Pinion gear driver	**07945–HA00000 or**
Driver	**07749–0010000**
Attachment, 52 x 55 mm	**07746–0010400**
Pilot, 28 mm	**07746–0041100**



INSTALLATION

Insert the rear axle into the final gear through the swing arm.
Install the wheel hub spacers onto both ends of the axle with their chamfered faces out.
Install the left bearing housing and tighten the bolts.

Clean the mating surfaces of the left bearing housing and final gear case and apply liquid sealant to them.

TORQUE: 30–36 N·m (3.0–3.6 kg-m, 22–26 ft-lb)

'85
Install the following:
– right bearing housing and brake panel assembly (Page 12-7).
– the wheel hubs and tighten the axle nuts.

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

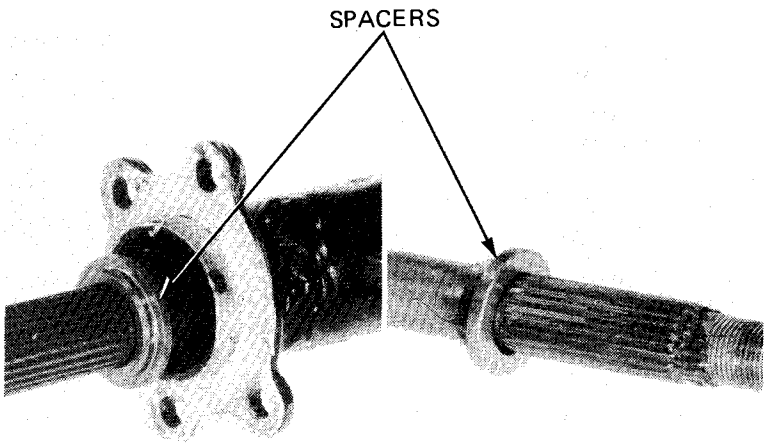
– new cotter pins.
– the rear wheels (Page 12-3).

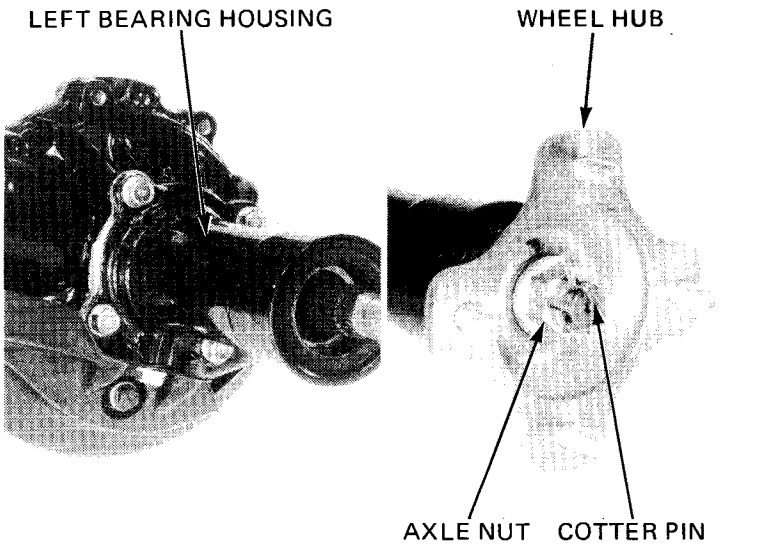
After '85:
Install the following:
– left wheel hub onto the axle.
– lock washer.
– axle nut and tighten to the specified torque.

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

'85 AND AFTER
Install a new cotter pin.
Install the right and left rear wheels and tighten the wheel nuts.

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

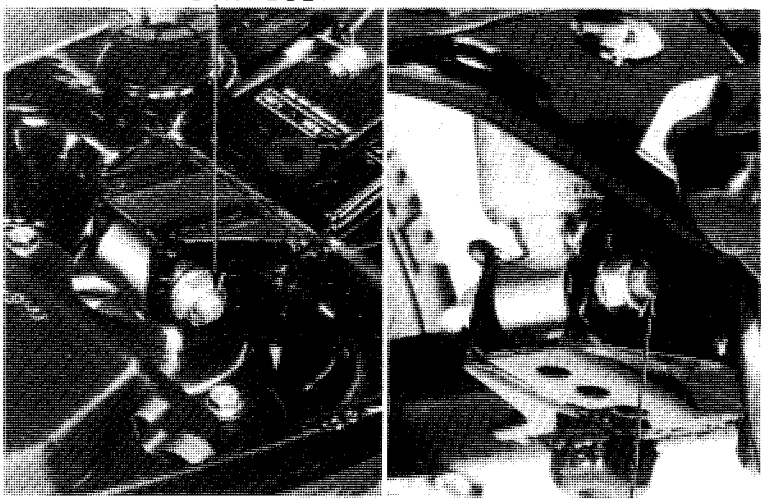




REAR SHOCK ABSORBER

REMOVAL

Raise the rear wheels off the ground by placing a jack or block under the engine.
Remove the seat.
Remove the rear shock absorber upper and lower mount nuts and bolts and remove the shock absorber.



DISASSEMBLY

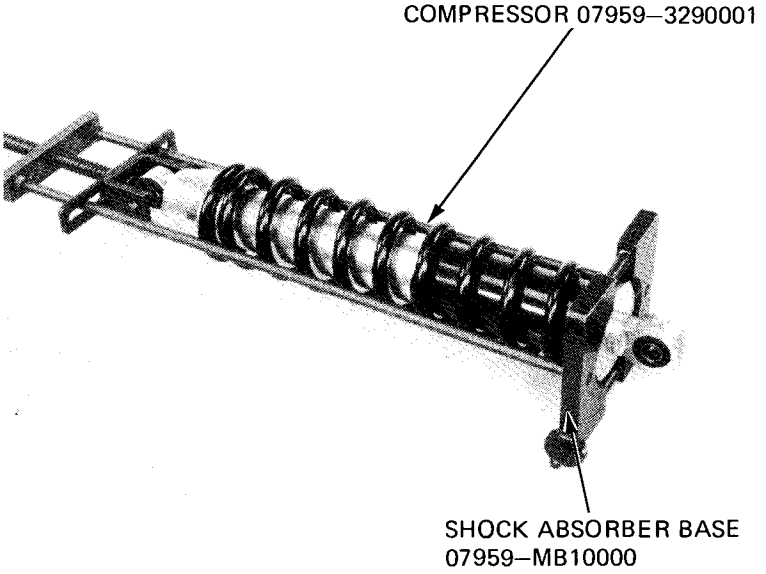
Set the shock in the compressor as shown and compress the spring 20 mm.

CAUTION

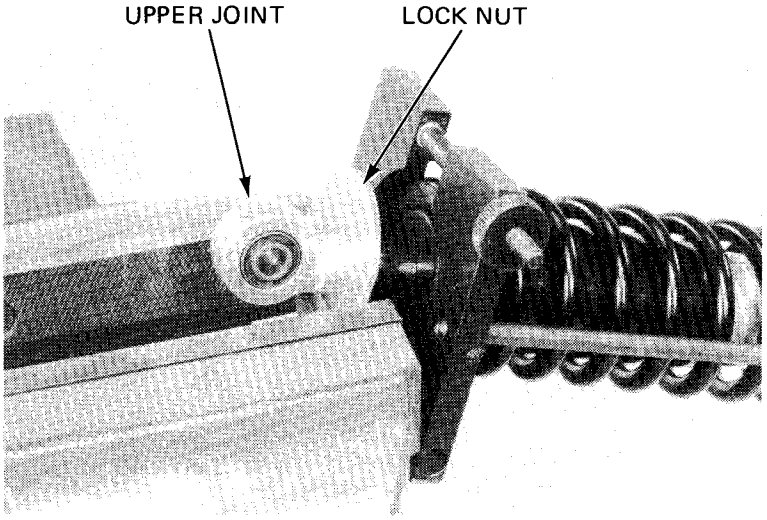
Be sure the base is adjusted correctly for the sock spring seat and the clevis pin is all the way in.

NOTE

Exchange the base of the shock compressor with 07959–MB10000.



Place the 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.

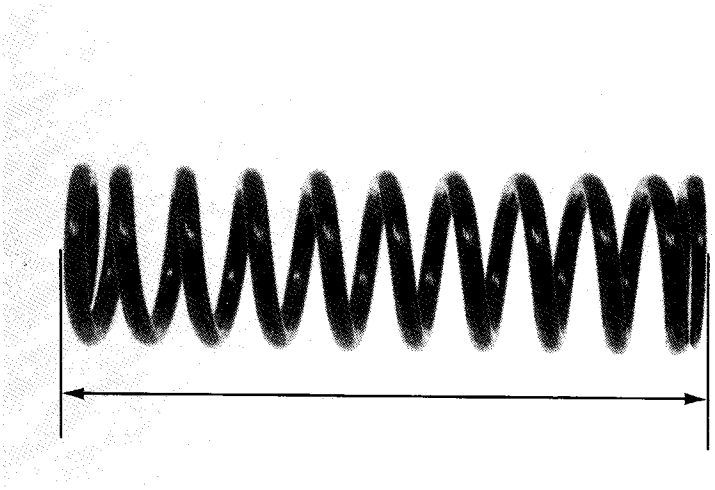


SPRING FREE LENGTH INSPECTION

Measure the rear shock absorber spring free length.

SERVICE LIMIT: 269.1 mm (10.59 in)

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



ASSEMBLY

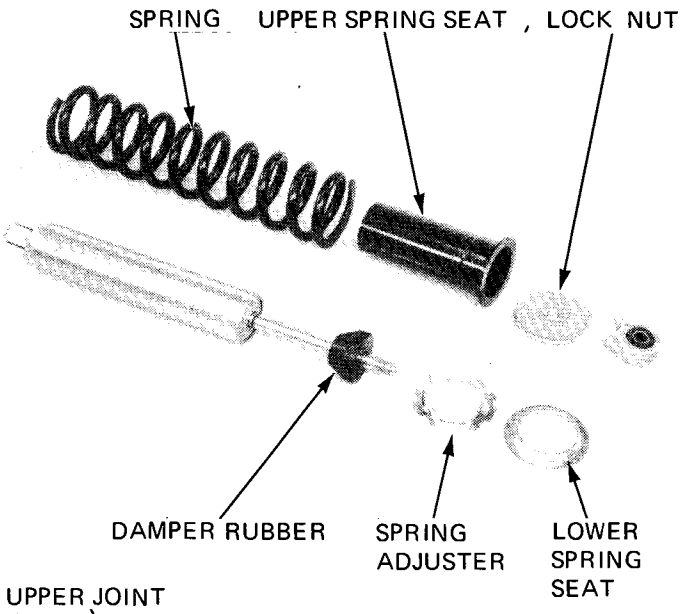
Place the spring adjuster, spring lower seat, spring, spring upper seat and damper rubber on the damper.

Attach the shock absorber compressor, screwing in the compressor's base adjuster nut to seat the tool with the spring. 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.

Apply a locking agent to the rod threads and install the lock nut.

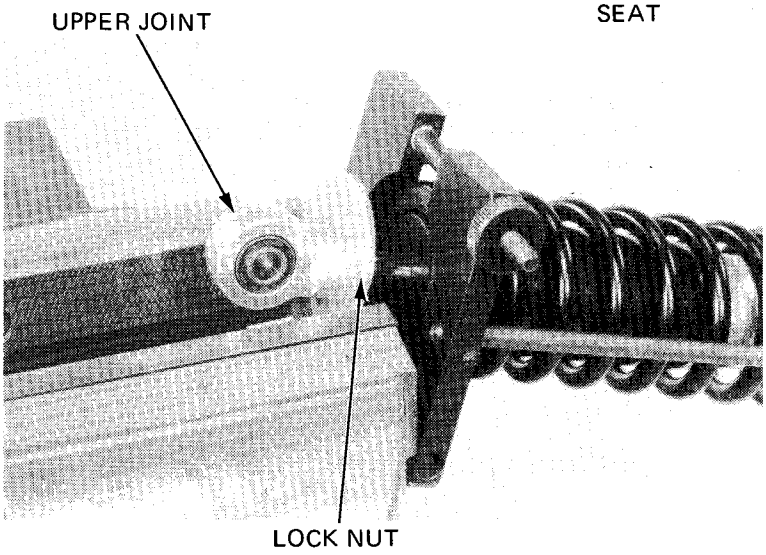


Apply a locking agent to the damper rod threads and screw the upper joint on.
Hold the lock nut in a vise and tighten the upper joint securely.

NOTE

Check that the lock nut is seated against the rod's bottom thread.

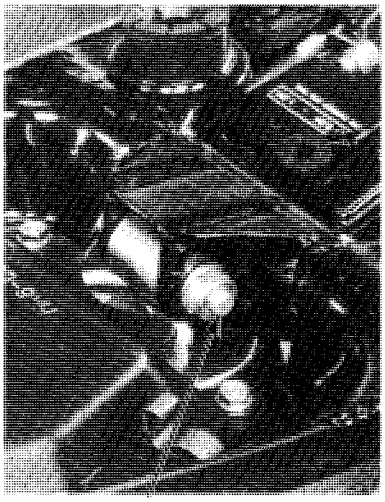
Align the spring seat with the lock nut while releasing the compressor.



INSTALLATION

Install the shock absorber onto the frame and swing arm and tighten the upper and lower mount bolts.

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



UPPER MOUNT BOLT

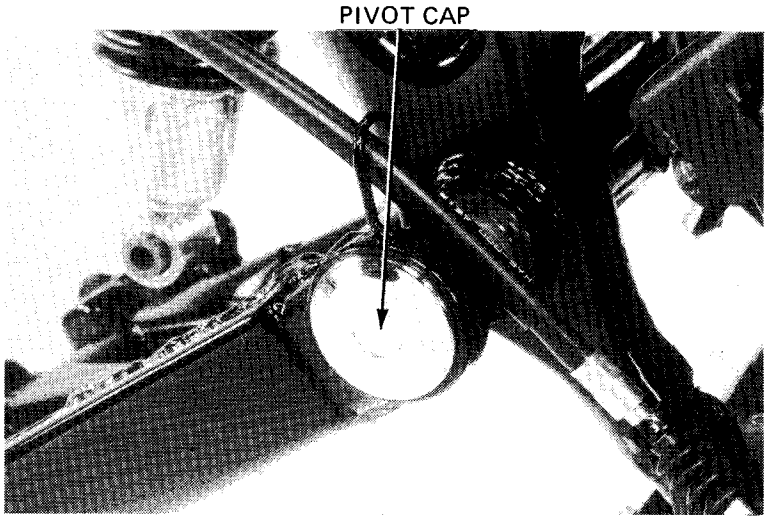
LOWER MOUNT BOLT

SWING ARM

REMOVAL

Remove the following components.
- rear wheels (Page 12-3).
- rear brake panel assembly (Page 12-3).
- rear axle (Page 12-9).
- shock absorber lower mount bolt.
- final gear case (Page 12-18).

Loosen the swing arm boot band and remove the pivot cap.



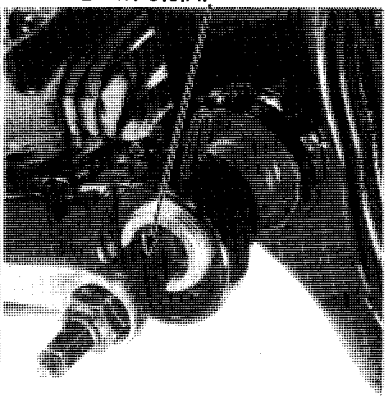
LOCK NUT WRENCH, 07908–4690001 KS-HBA-OB-469 (U.S.A. ONLY)

SOCKET BIT, 17 mm 07917–3230000 OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

Remove the right pivot lock nut and pivot bolt.

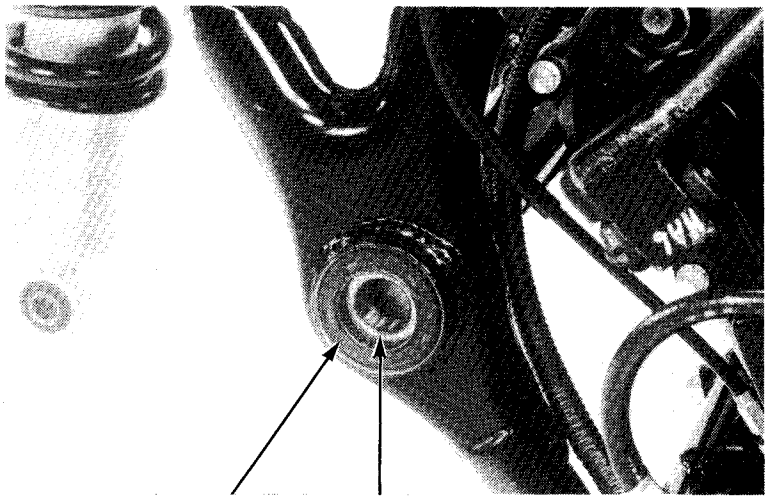
Remove the swing arm from the frame.

Have someone pull the universal joint back and hold it back to disengage the splines from the output gearcase, while you remove the swing arm.

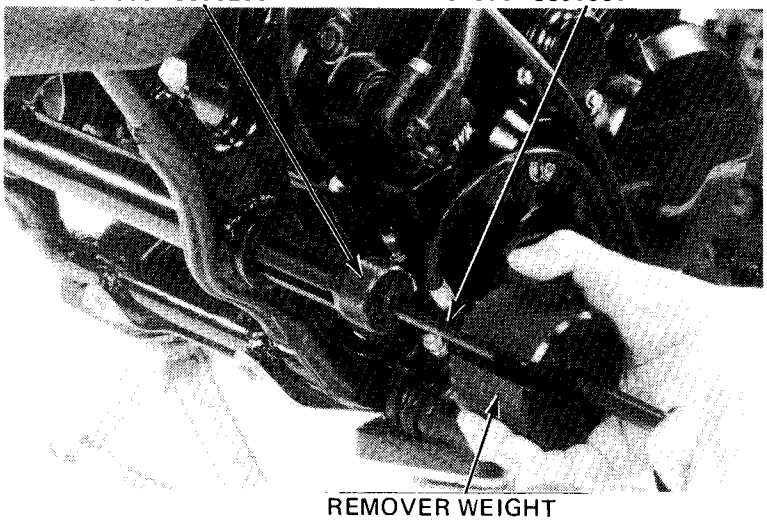


PIVOT BEARING REPLACEMENT

Remove the dust seals and bearing inner races from the frame.



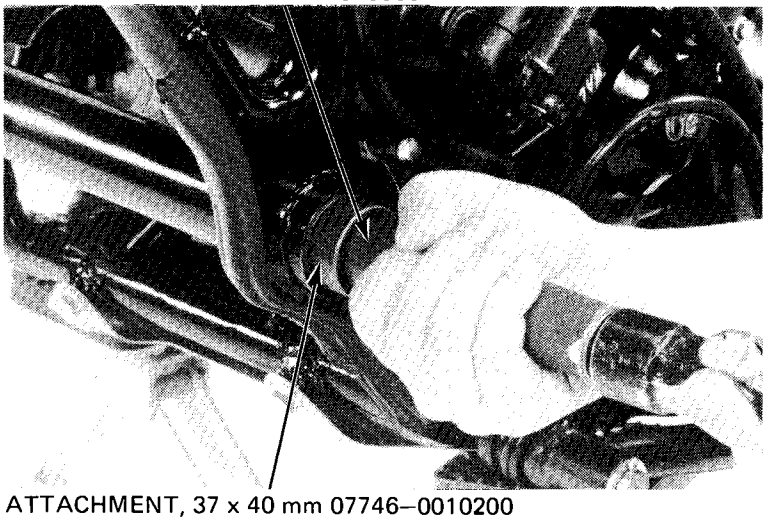
Remove the bearing using the bearing remover, as shown.



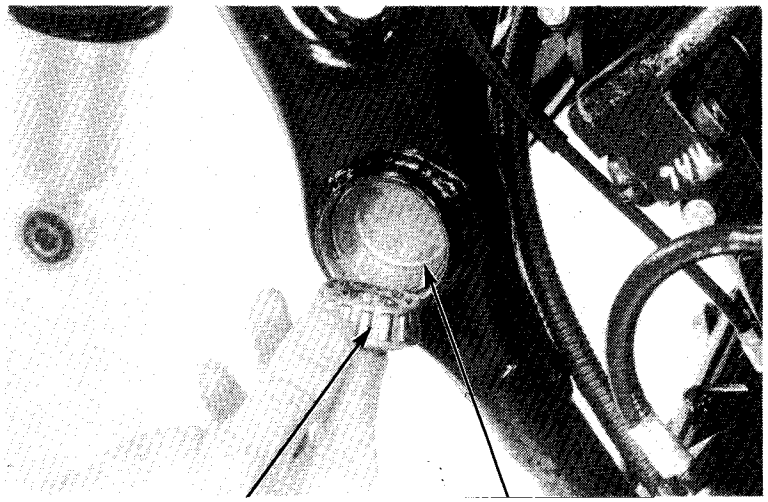
Install new grease retainer plates and drive new bearing outer races into the swingarm pivot.

NOTE

> Replace the bearing inner and outer races as a set. Replace the grease retainer plate whenever it is removed.

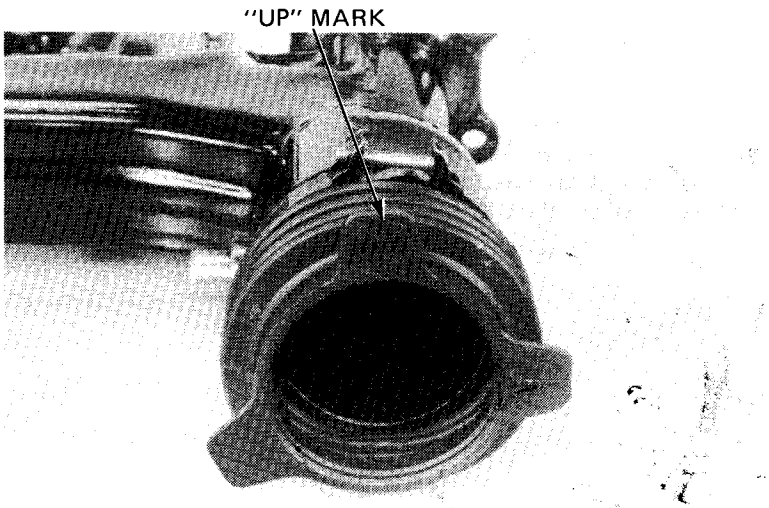


Apply grease to the bearing inner races and dust seals and install them onto the swing arm.

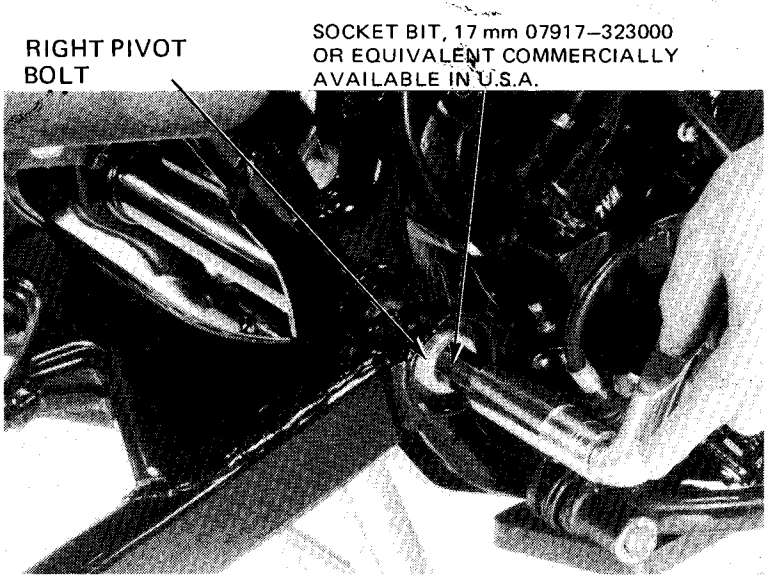


INSTALLATION

Install the swing arm boot with its "UP" mark up.



Apply grease to the pivot bolt tips and install the swing arm and pivot bolts.



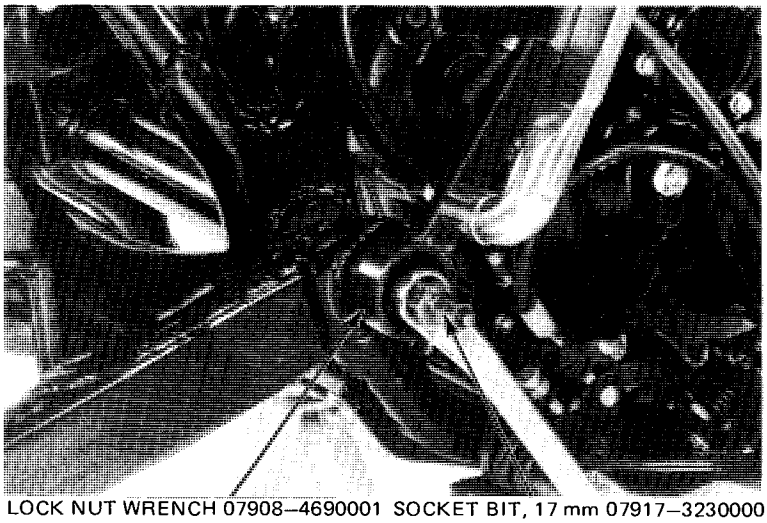
Tighten the right pivot bolt to the specified torque.

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

Move the swing arm up and down several times.
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 components:
- final gear (Page 12-30).
- shock absorber (Page 12-15).
- rear axle (Page 12-12).
- rear brake panel (Page 12-5).
- rear wheels (Page 12-3).

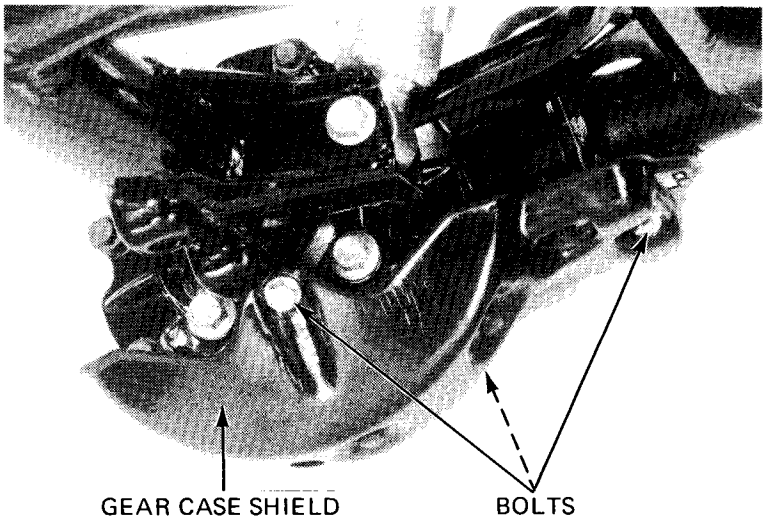


LOCK NUT WRENCH 07908–4690001 OR KS–HBA–08–469 U.S.A. only

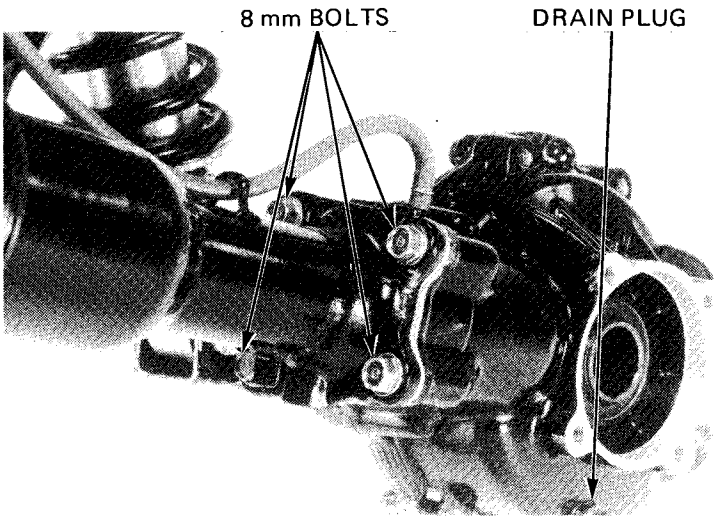
SOCKET BIT, 17 mm 07917–3230000 OR EQUIVALENT COMMERCIALLY AVAILABLE IN U.S.A.

FINAL DRIVE REMOVAL

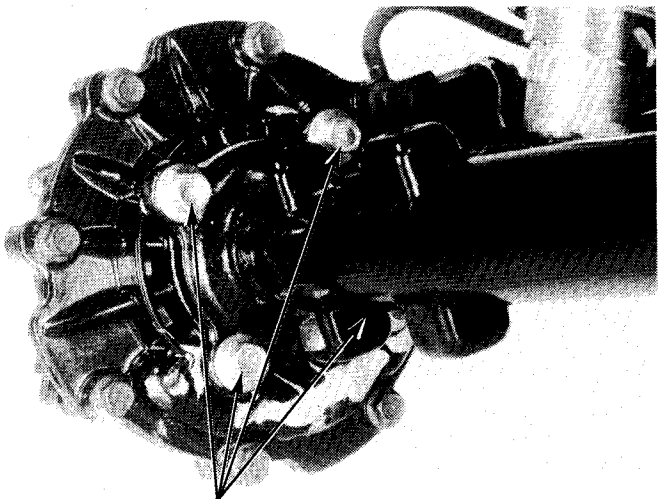
Remove the rear wheels (Page 12-3).
Remove the rear axle (Page 12-9).
Remove the two bolts mounting the gear case shield and remove the shield.



Drain the final gear oil (Page 2-3).
Remove the gear case 8 mm mount bolts.



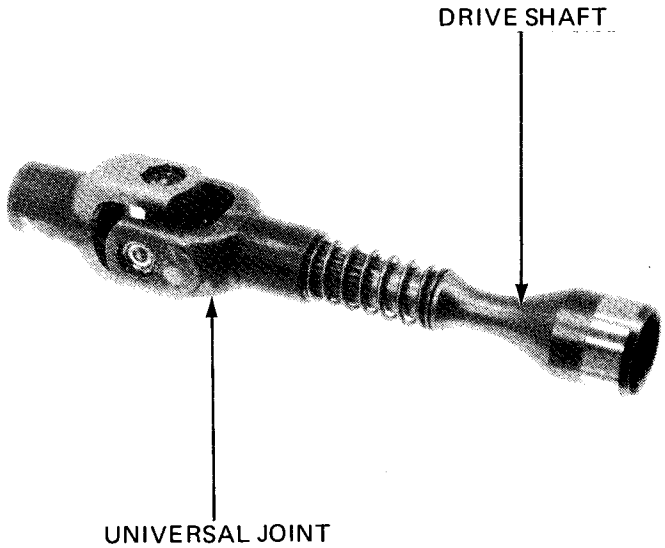
Remove the gear case mount 10 mm bolts, final gear case, spring and drive shaft from the swing arm.



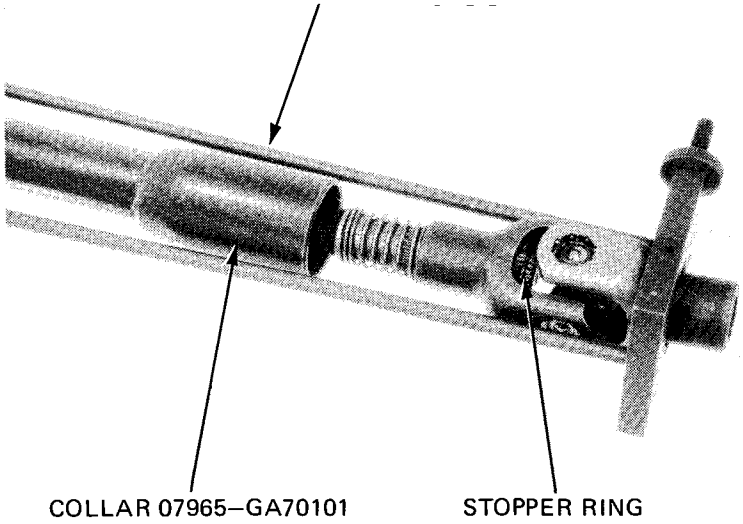
10 mm MOUNT BOLTS

UNIVERSAL JOINT/DRIVE SHAFT

Remove the swing arm (Page 12-15).
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 drive shaft.



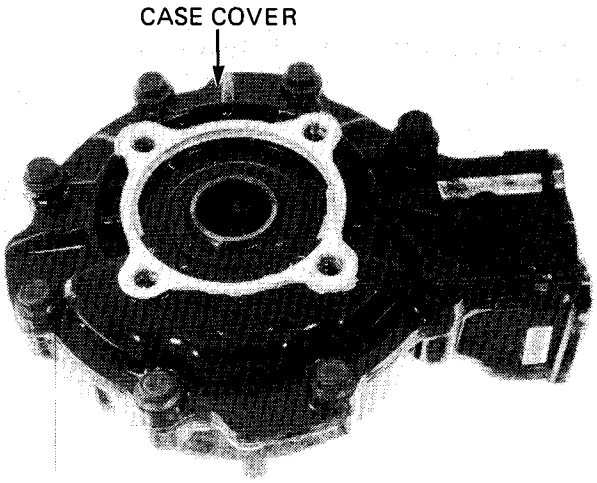
Set the universal joint in the compressor as shown and compress the spring.
Remove the stopper ring from the drive shaft.



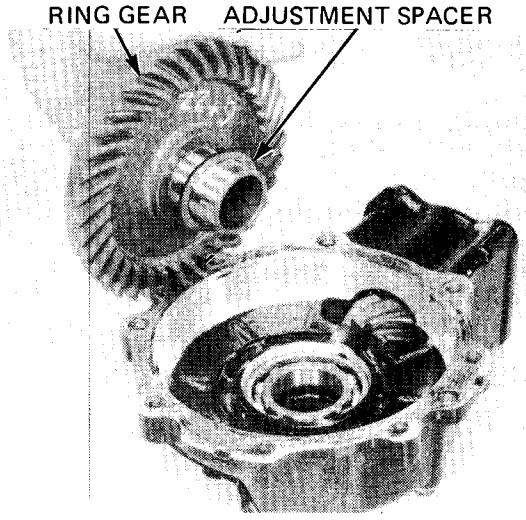
FINAL DRIVE GEAR

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.

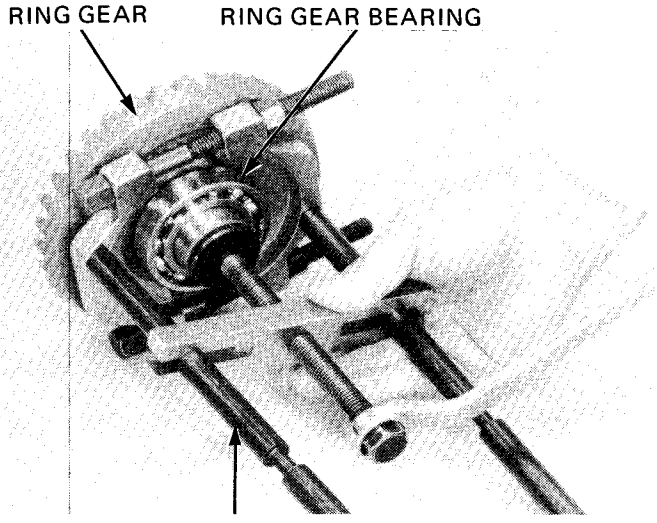


RING GEAR BEARING REMOVAL

Remove the ring gear bearing and adjustment spacer.

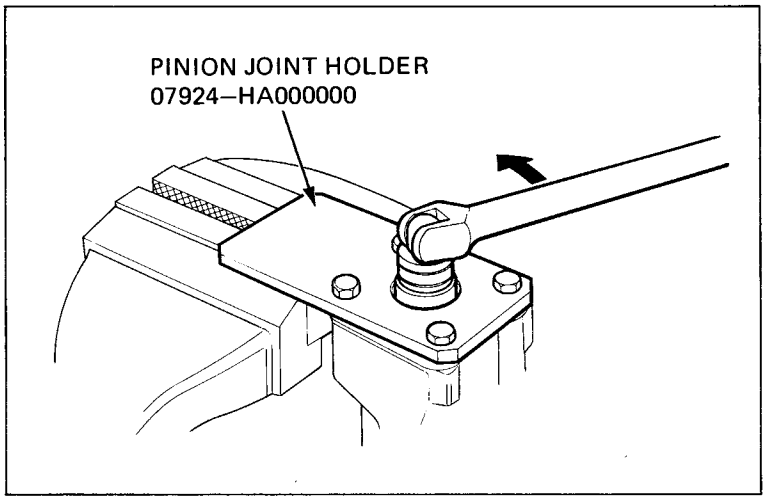
If the ring gear bearing stays in the cover, use the listed to remove it.

Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300

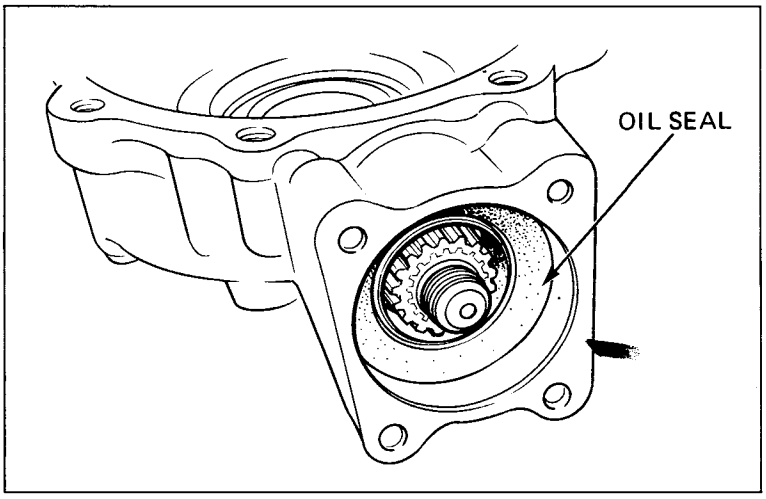


PINION GEAR REMOVAL

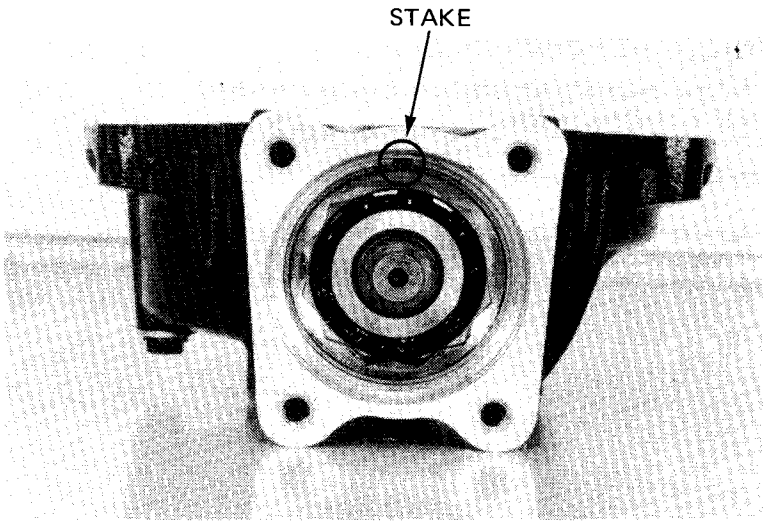
Place the pinion holder onto the pinion joint. Align the holes in the pinion holder with the four (4) holes in the final drive gear case and secure to the case with four (4) 8 mm bolts.
Secure the holder in a vise.
Remove the pinion joint nut.
Remove the pinion holder and pinion joint.



Remove the oil seal.



Unstake the pinion bearing lock nut with a drill or grinder.



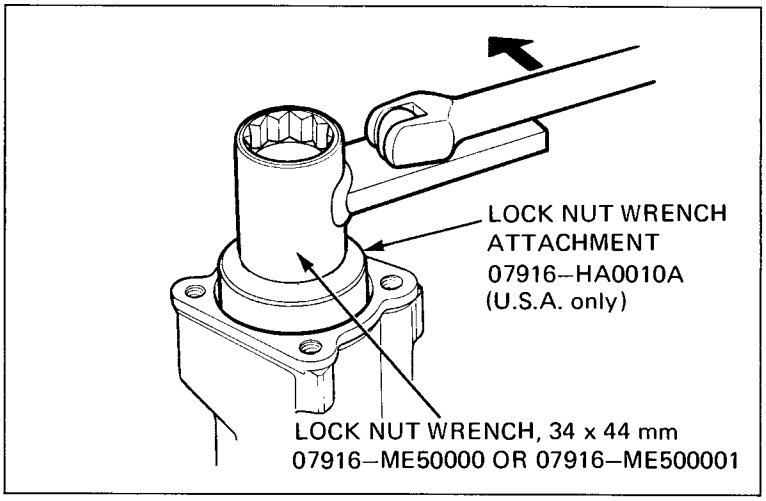
Remove the pinion bearing lock nut with the lock nut wrench.

Position the pinion holder on the final gear case. Screw the shaft puller onto the end of the pinion gear shaft.

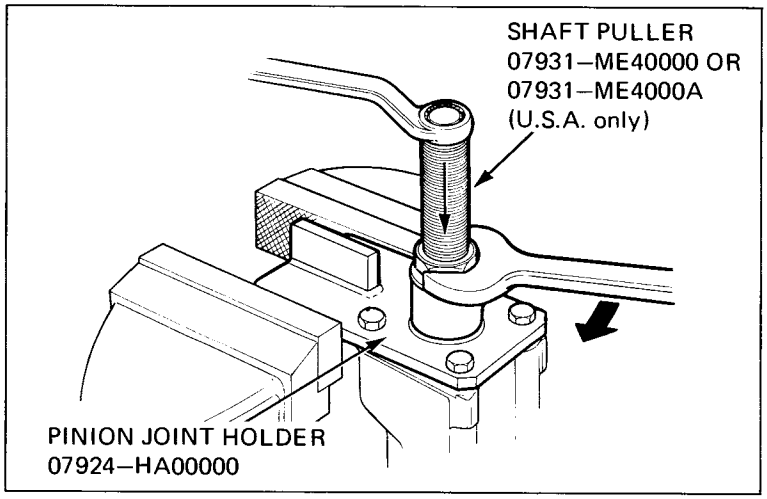
NOTE

> 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 the housing.

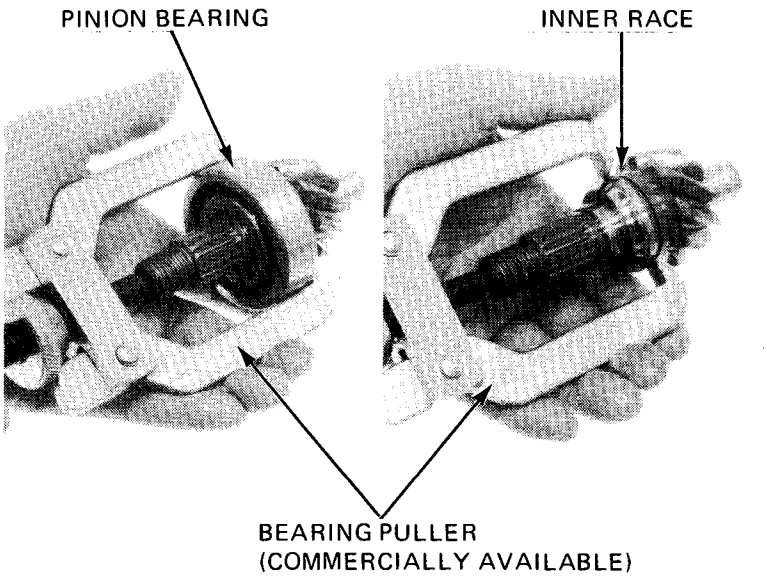


PINION BEARING REMOVAL

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.

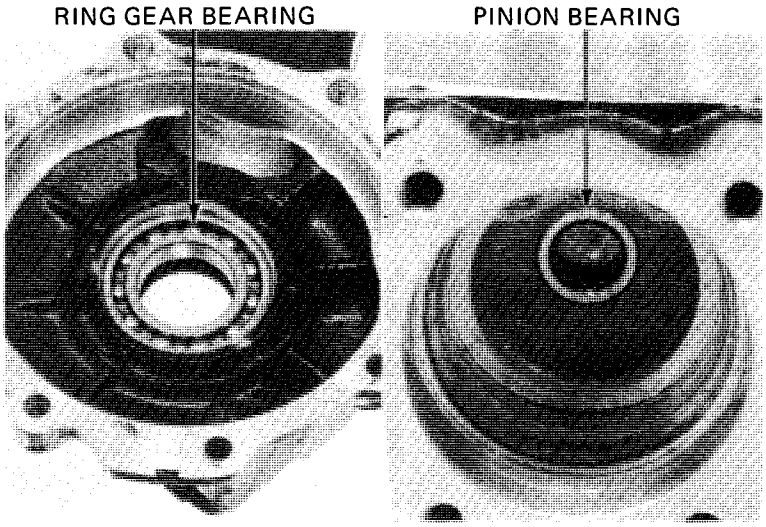


CASE BEARING AND OIL SEAL REPLACEMENT

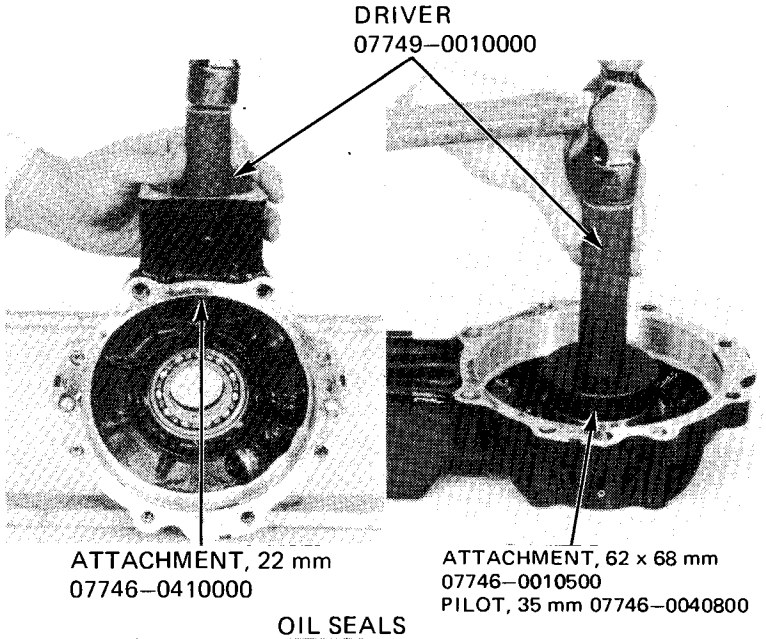
Heat the gear case to 80°C (176°F). Tap the gear case with a plastic hammer and remove the ring gear and pinion bearings.

WARNING

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



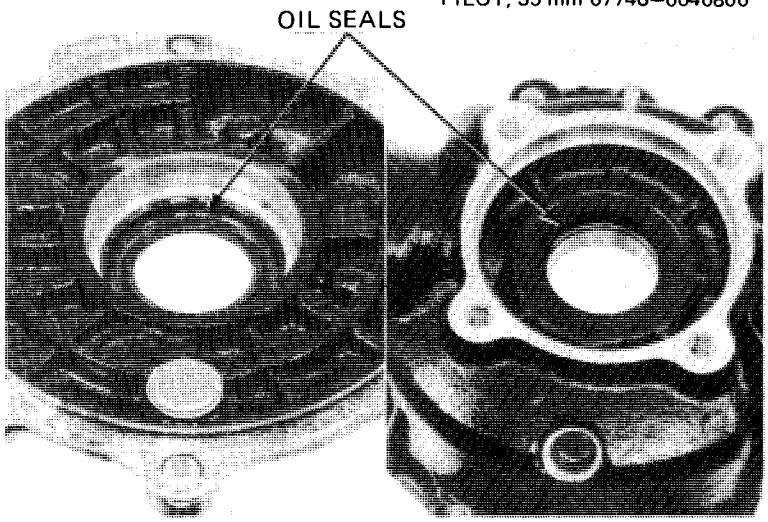
Drive new pinion and ring gear bearings into the case.



CASE AND COVER OIL SEAL REPLACEMENT

Remove the oil seals from the cover and case. Drive in a new seals using the tools listed.

Cover:	
Driver	07749–0010000
Attachment, 52 x 55 mm	07746–0010400
Case:	
Driver	07749–0010000
Attachment, 42 x 47 mm	07746–0010300



BREATHER HOLE CLEANING

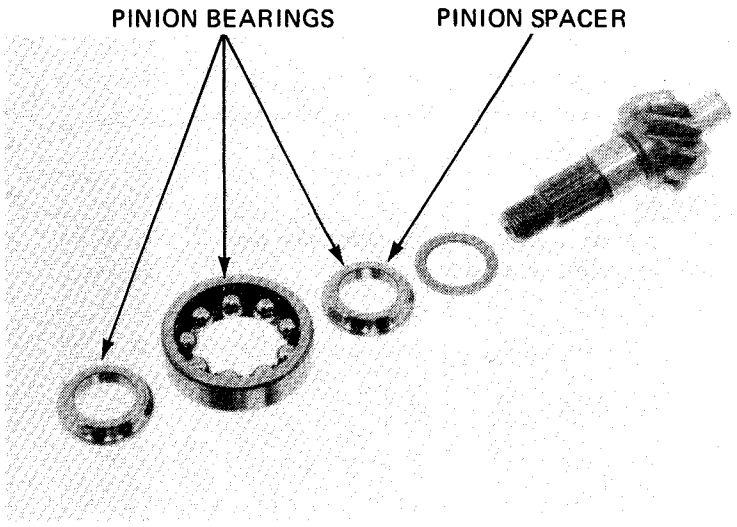
Blow through the breather hole with compressed air.

PINION GEAR ASSEMBLY

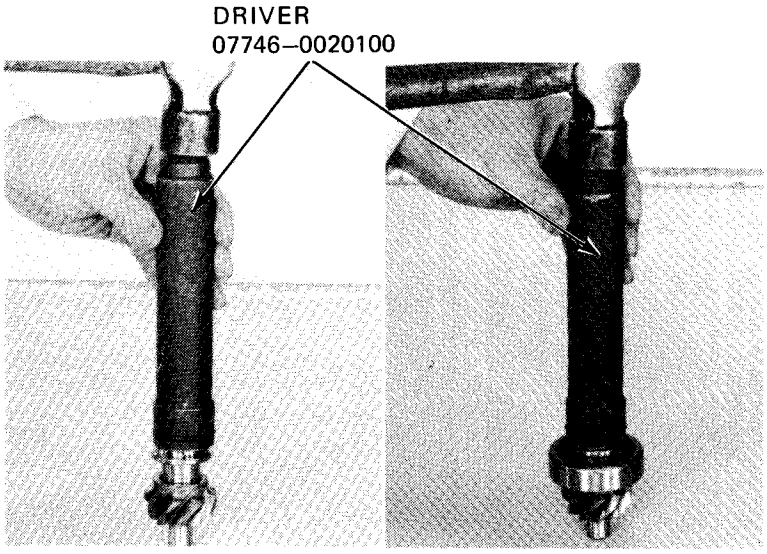
Install the original pinion gear spacer.

NOTE

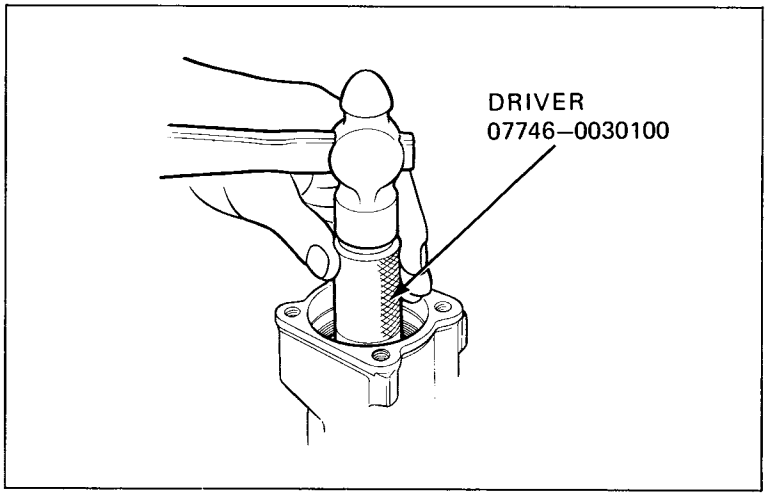
When the gear set, pinion bearing and/ or gear case has been replaced, use a 2.00 mm (0.079 in) thickness spacer.



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

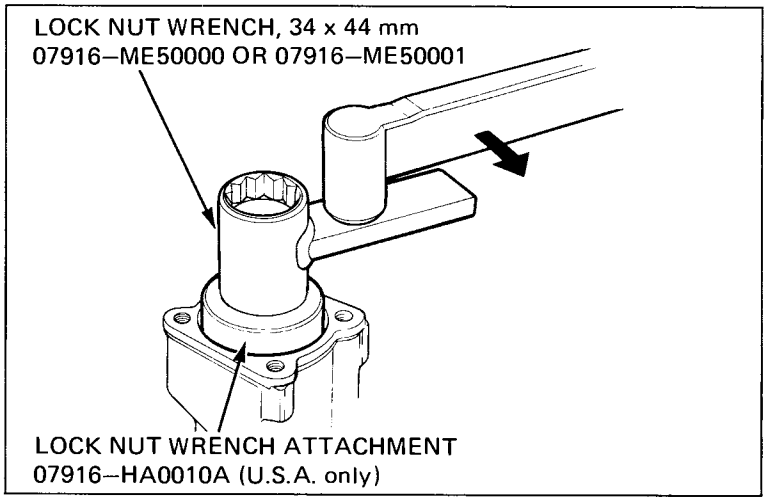


Place the pinion assembly into the gear housing. Drive the pinion assembly into the gear case.



Install the tighten the pinion bearing lock nut.

TORQUE:
Actual:
90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)
Indicated:
82–100 N·m (8.2–10.0 kg-m, 59–72 ft-lb)



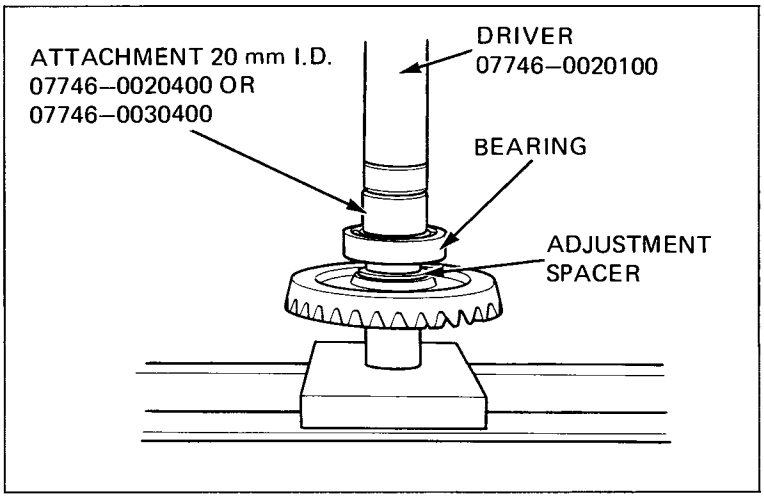
RING GEAR ASSEMBLY

Install the original spacer onto the ring gear.

NOTE

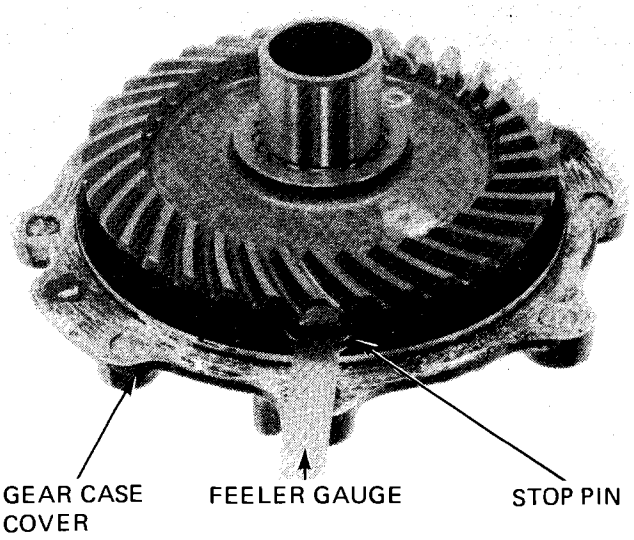
> If the gear set, pinion bearing, ring gear bearing and/or gear case is replaced, install a 2.0 mm thick spacer.

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.

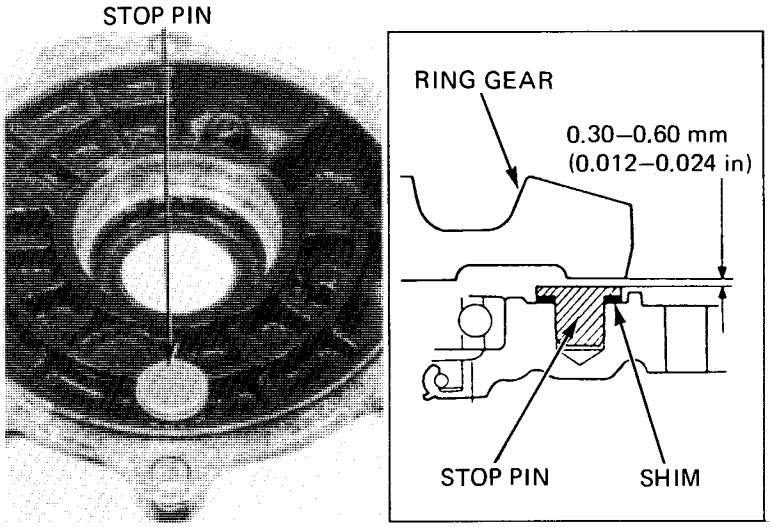
WARNING

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.



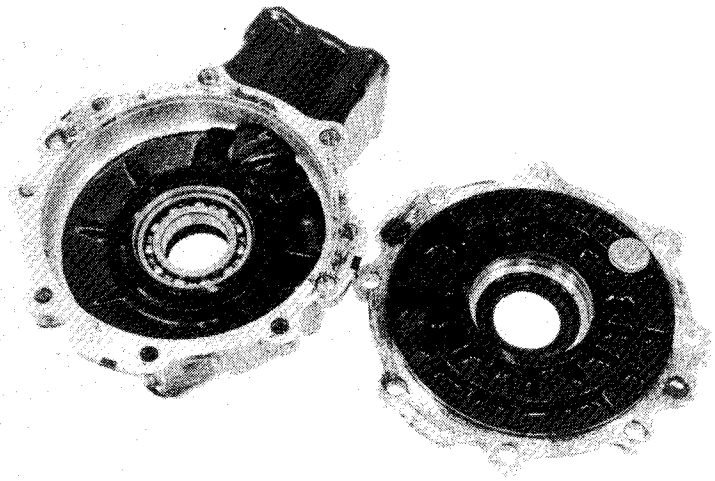
GEAR TOOTH CONTACT PATTERN CHECK

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

NOTE

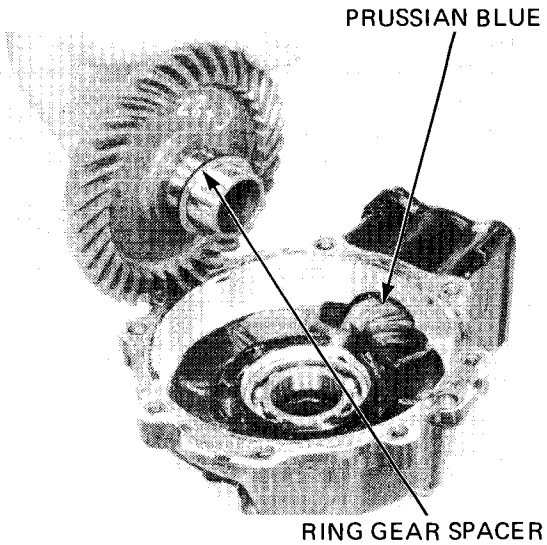
- Keep dust and dirt out of the gear case.
- Be careful not to damge the mating surfaces.

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.

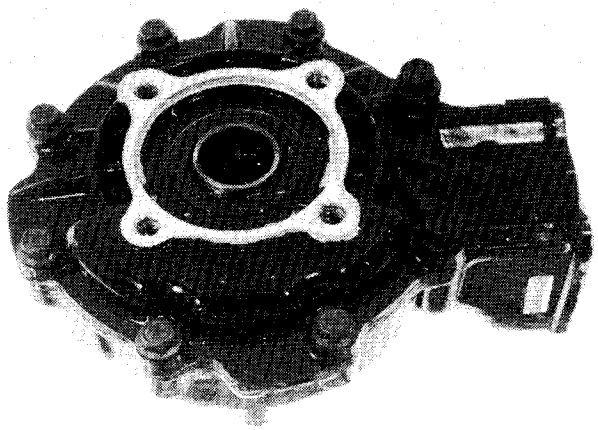
Apply gear oil to the lip of the oil seal on the gear case cover and install the gear case cover.



Tighten the cover bolts 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:

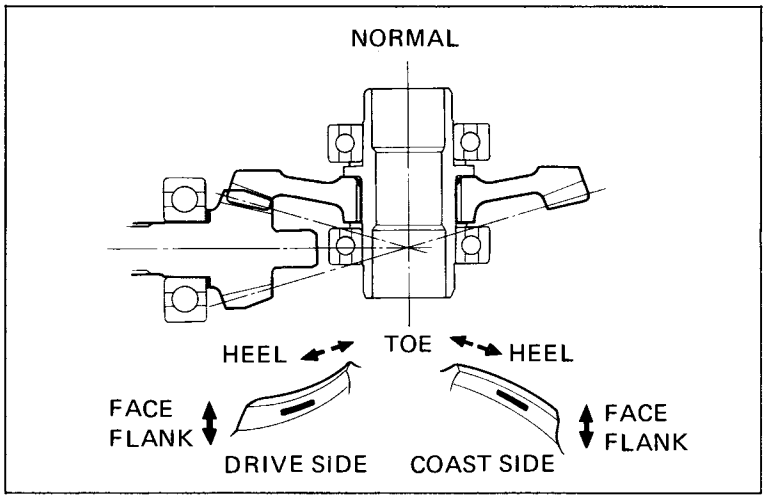
10 mm bolt
45–50 N·m (4.5–5.0 kg-m, 32–36 ft-lb)
8 mm bolt
23–28 N·m (2.3–2.8 kg-m, 17–18 ft-lb)



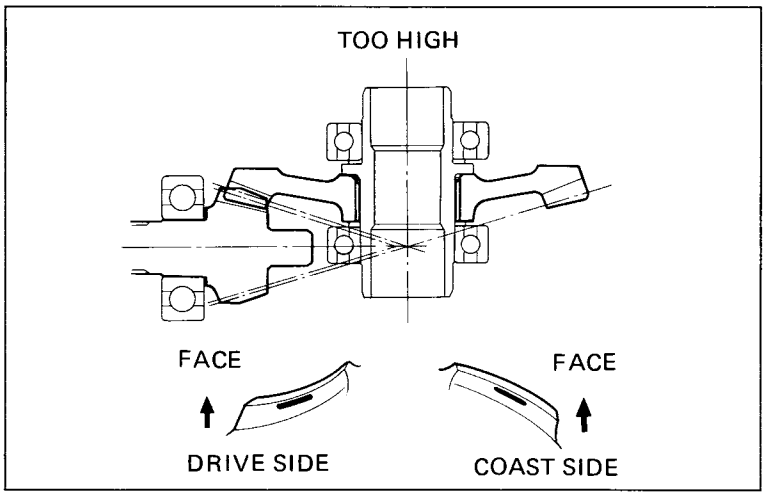
Remove the oil filler cap from the final gear case.

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

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



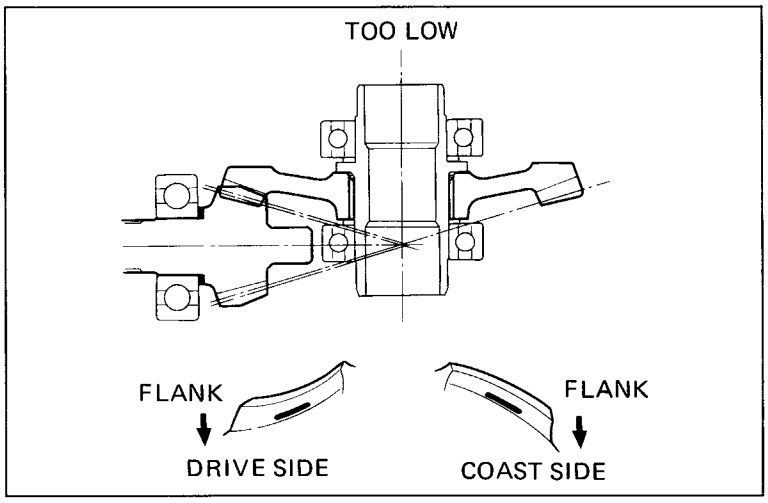
If the patterns are not correct, remove and replace the pinion spacer. Replace the pinion spacer with a thicker one if the contacts are too high, toward the face.



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)**	

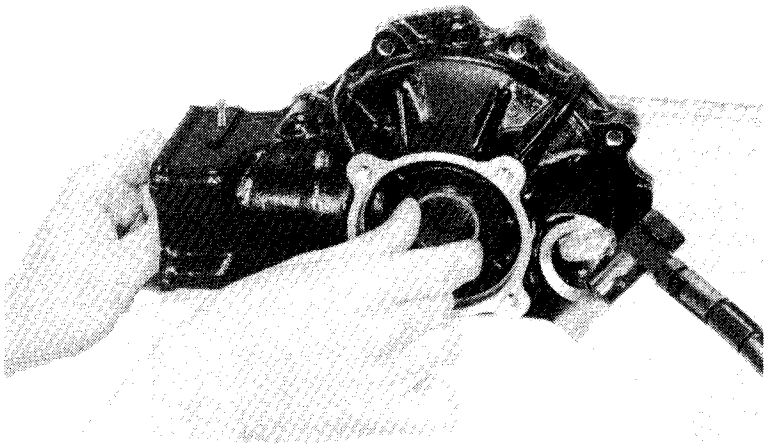


BACKLASH INSPECTION

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: 0.30 mm (0.02 in)



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

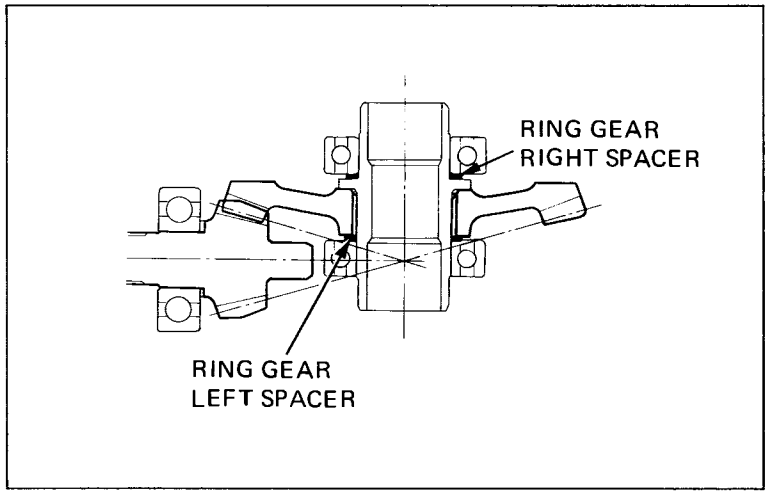
Compare the difference of the three measurements.

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

If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.
If backlash is too small, replace the ring gear 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)**
B:	**1.88 mm (0.074 in)**
C:	**1.94 mm (0.076 in)**
D:	**2.00 mm (0.079 in)**
E:	**2.06 mm (0.081 in)**
F:	**2.12 mm (0.083 in)**
G:	**2.18 mm (0.086 in)**
H:	**2.24 mm (0.088 in)**
I:	**2.30 mm (0.091 in)**

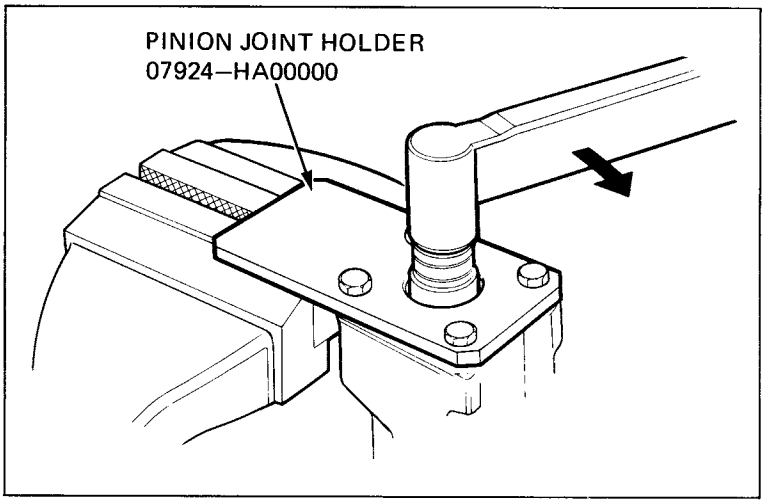


Change the right side spacer thickness an opposite amount to what the left side spacer was changed; if the left spacer was replaced with a 0.10 mm (0.004 in) thicker spacer, replace the right spacer with one that is 0.10 mm (0.004 in) thinner.

Install the pinion joint onto the pinion.
Apply thread looking 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.
Secure the holder in a vise.
Tighten the pinion joint nut.

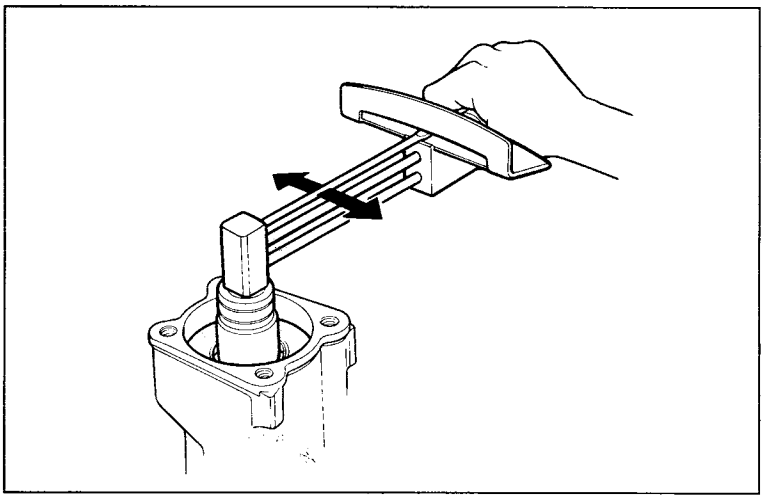
TORQUE:
100–120 N·m (10.0–12.0 kg-m, 72–87 ft-lb)

Remove the pinion joint holder.

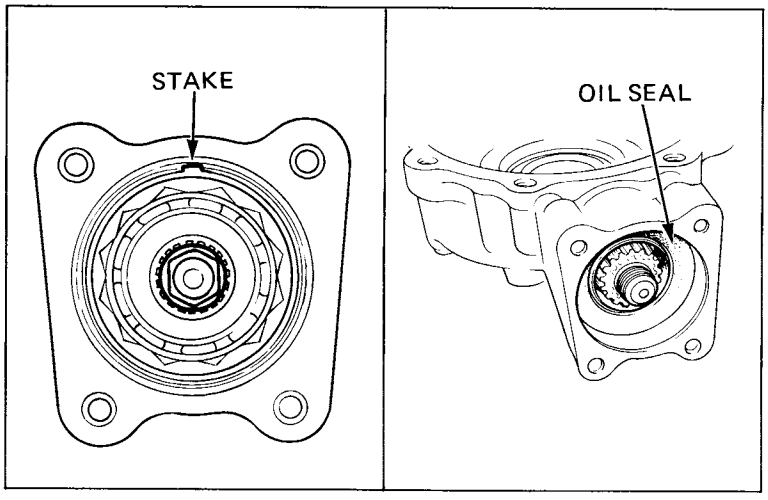


Make sure the gear assembly rotates smoothly without binding by turning the pinion joint.
Measure the final gear assembly preload.

PRELOAD:
0.2–0.4 N·m (2–4 kg-cm, 1.7–3.5 in-lb) max.

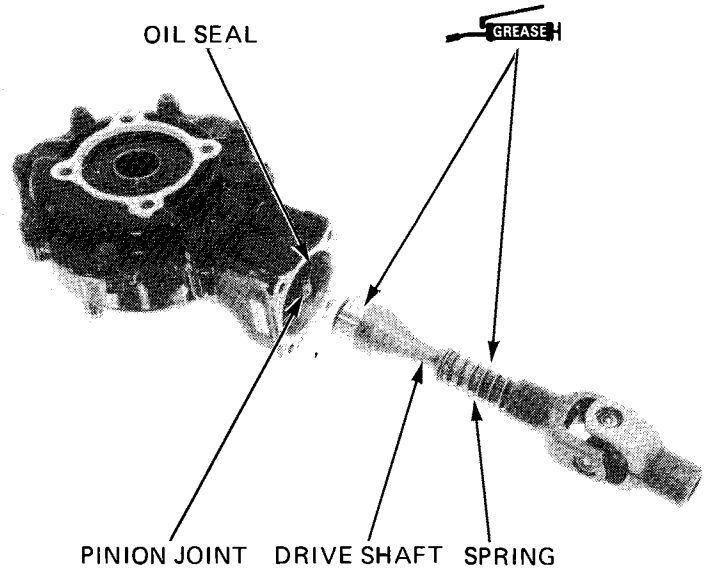


Stake the pinion bearing lock nut.
Install a new drive shaft bearing oil seal.



FINAL DRIVE INSTALLATION

Apply molybdenum disulfide grease to the drive shaft oil seal, pinion joint and drive shaft splines.
Clean the mating surfaces between to gear case and the swing arm and apply liquid sealant to them.
Insert the drive shaft into the swing arm and align its splines with the universal joint.

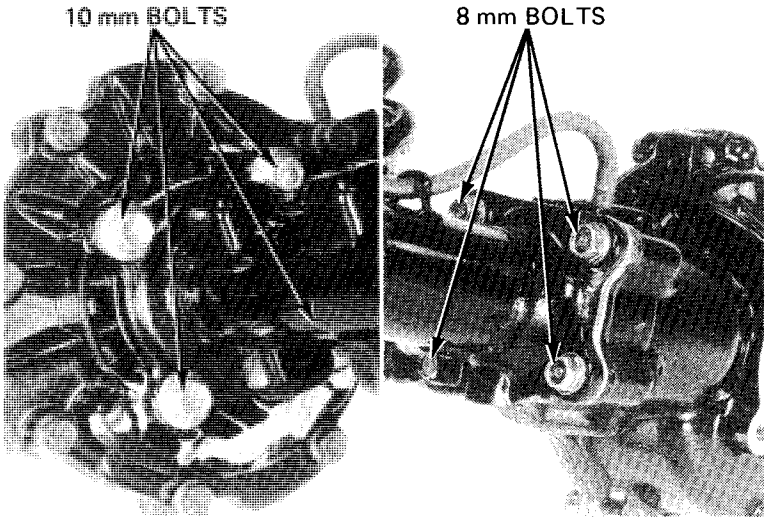


Install the final gear case mount bolts.
Tighten the 10 mm bolts first, then the 8 mm bolts.

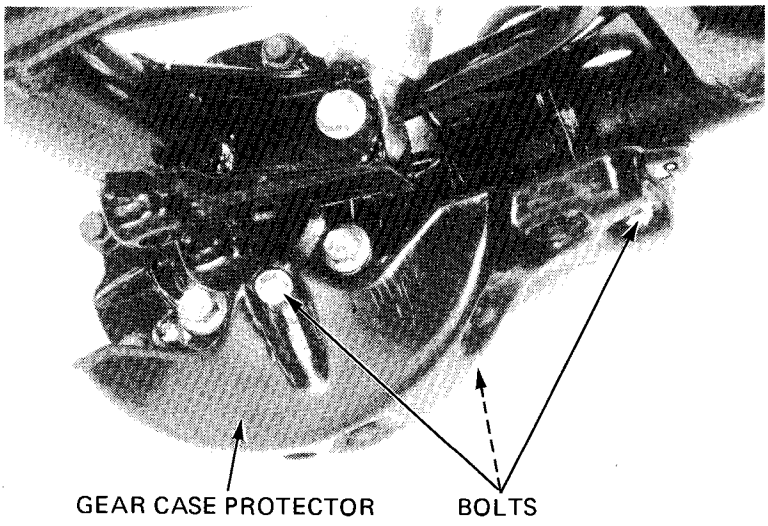
TORQUE:

10 mm bolt
50–60 N·m (5.0–6.0 kg-m, 36–43 ft-lb)

8 mm bolt
35–45 N·m (3.5–4.5 kg-m, 25–32 ft-lb)



Install the gear case shield with the two bolts.
Fill the gear case with the recommended oil (Page 2-1).
Install the parts in the reverse order of removal.



13. FRONT FENDER/SEAT/ REAR FENDER/EXHAUST MUFFLER

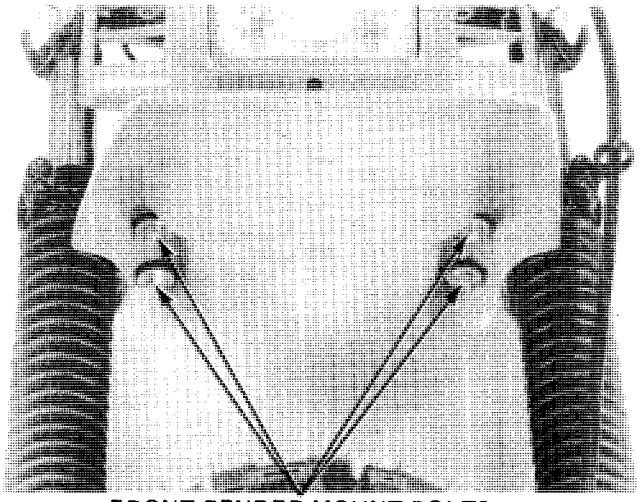
FRONT FENDER

REMOVAL

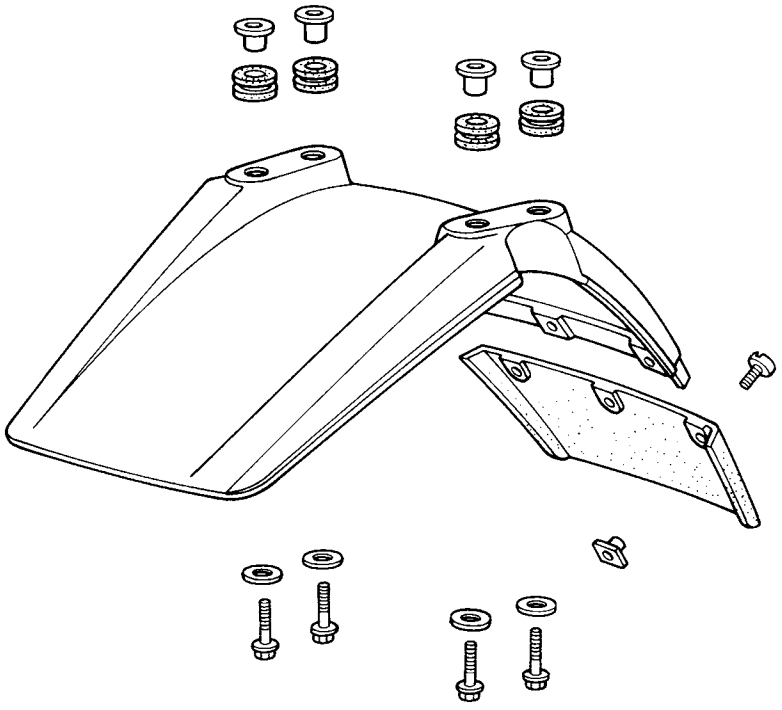
Remove the four fender mount bolts and the front fender.

INSTALLATION

Install the removed parts in the reverse order of removal.



FRONT FENDER MOUNT BOLTS



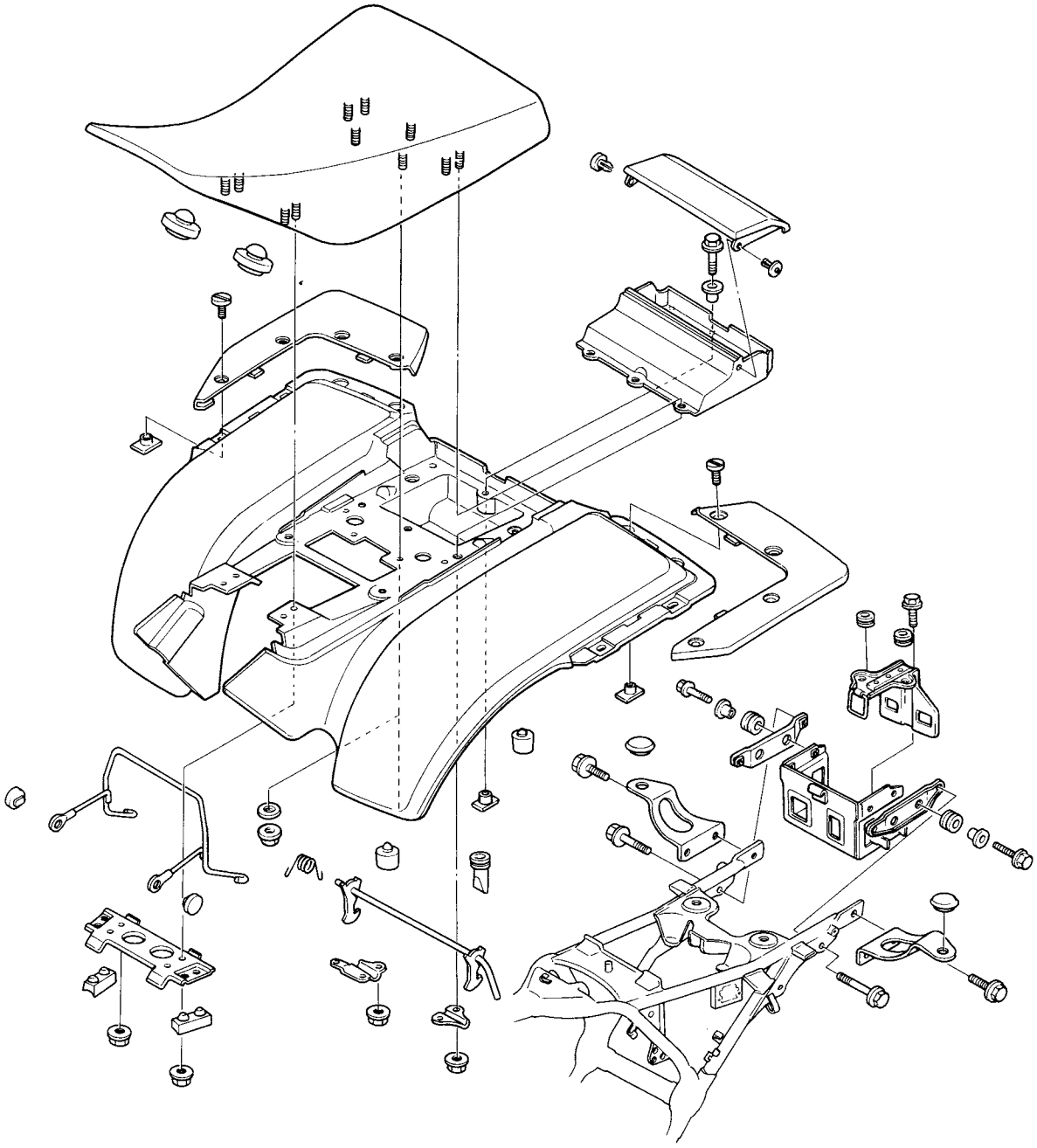
SEAT/REAR FENDER

REMOVAL

Remove the seat and rear fender by pulling the lever.

INSTALLATION

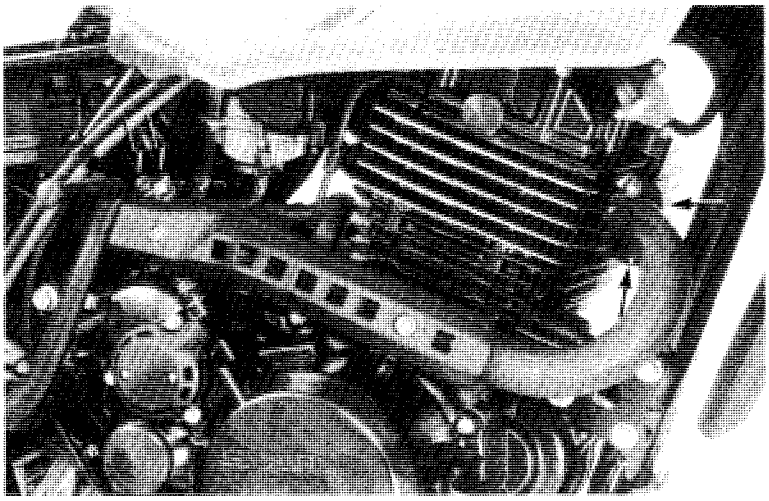
Install the seat and rear fender in the reverse order of removal.



EXHAUST PIPE

WARNING

Do not service the exhaust pipe or muffler when they are hot.



REMOVAL

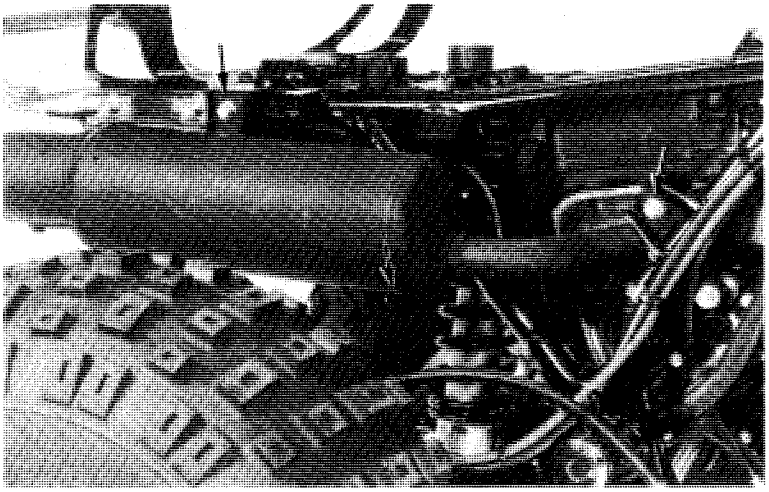
Remove the seat.
Remove the exhaust pipe clamp bolts.
Remove the exhaust pipe joint nuts and remove the exhaust pipe.
Remove the three muffler mounting bolts and the muffler.

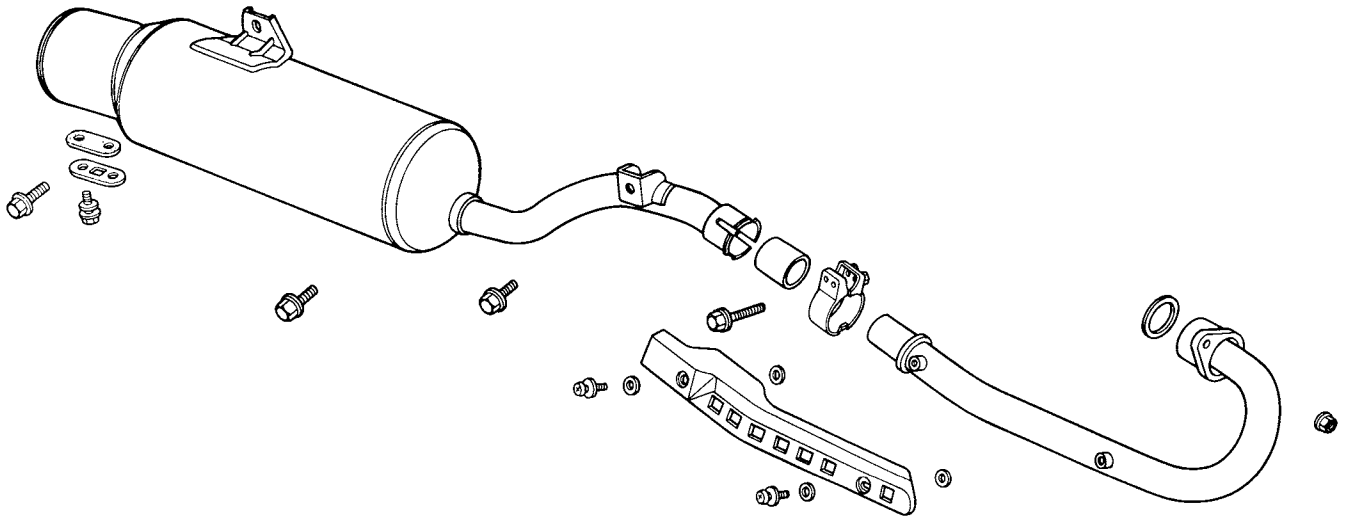
INSTALLATION

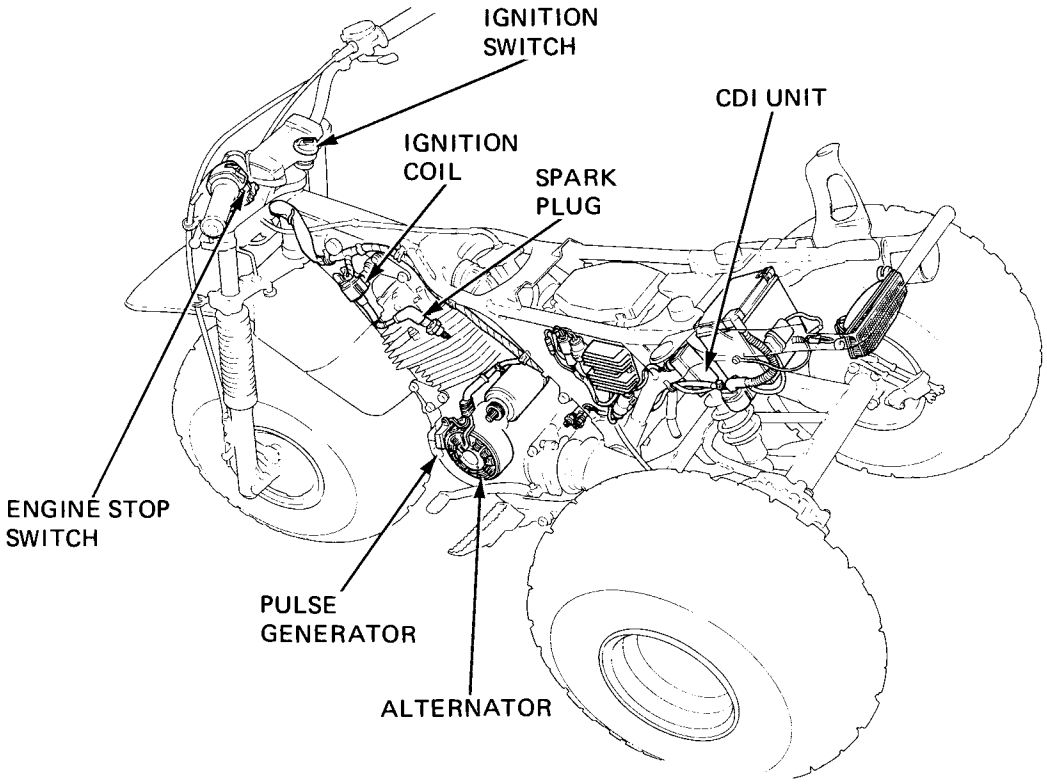
Installation is the reverse order of removal.

NOTE

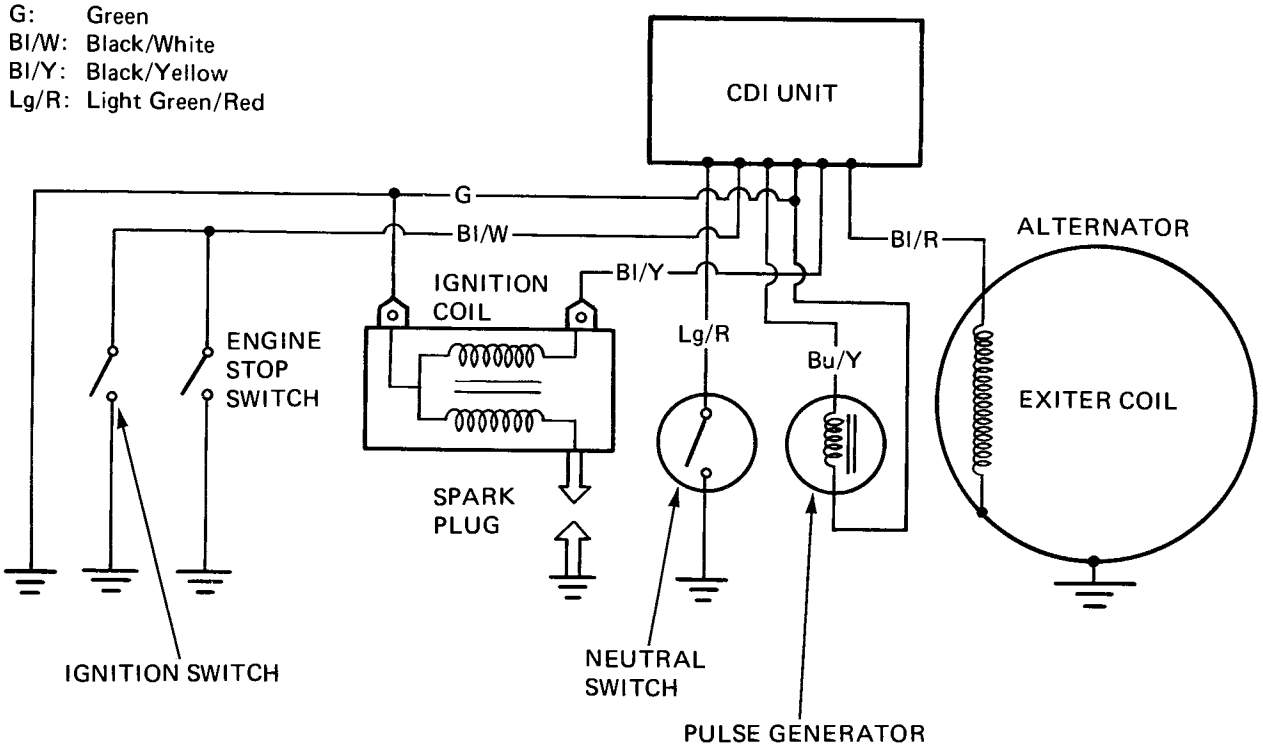
After installing the exhaust pipe, make sure that there are no exhaust leaks.







G: Green
Bl/W: Black/White
Bl/Y: Black/Yellow
Lg/R: Light Green/Red



14. IGNITION SYSTEM

SERVICE INFORMATION

GENERAL

- Ignition timing does not normally need to be adjusted since the CDI (Capacitive Discharge Ignition) unit is factory preset.
- For spark plug inspection, refer to Page 3-5.
- For pulse generator removal, see 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:	
– Initial	13 ± 2° BTDC/1,400 rpm
– Full advance	31 ± 2° BTDC/3,500 rpm

Ignition coil	
– Primary coil resistance	0.1–0.3Ω
– Secondary coil resistance (with spark plug cap)	7.4–11.0 kΩ
– Secondary coil resistance (without spark plug cap)	3.7–4.5 kΩ
Exciter coil:	
– Resistance	50–200 Ω (ND) 250–400 Ω (MITUBA)
Pulse generator	
– Resistance	290–360 Ω

TOOLS

Sanwa electric tester	07308–0020000 or
Kowa electric tester	TH-5H
Kowa digital multi-tester	07411–0020000 or 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
   - Between alternator and CDI unit
   - Between CDI unit and engine stop switch
   - Between CDI unit and ignition coil
   - Between ignition coil and spark plug
   - Between pulse generator and CDI unit
3. Faulty ignition coil
4. Faulty CDI 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
   - Faulty CDI unit
2. Ignition secondary circuit
   - Faulty spark plug
   - Faulty pulse generator
   - Faulty high tension wire
3. Improper ignition timing
   - Faulty pulse generator
   - Faulty CDI unit

CDI UNIT

SYSTEM INSPECTION

NOTE:

> If the ignition timing is incorrect, perform the following inspection.

Remove the seat and disconnect the CDI unit coupler.

Check the continuity between the BL/W and G wires with the ignition switch and engine stop switch in each position.
- continuity with the ignition switch and engine stop switch OFF.
- countinuity with the ignition switch OFF and engine stop switch to RUN.
- continuity with the ignition switch ON and engine stop switch OFF.
- no continuity with the ignition switch ON and engine stop switch to RUN.

If any of the above checks fails, check the following:
- wiring between the CDI unit and engine stop switch and/or ignition switch for open or short circuit, or loose connection.
- ignition switch (page 17-4).
- engine stop switch (page 17-5).

Measure the resistance between the BI/Y and G wire terminals.

STANDARD: 0.1–0.3 Ω

If the resistance is not within the standard, check the ignition coil (page 14-3) and retest.

Measure the resistance between the Bu/Y and G/W wire terminals.

STANDARD: 290–360 Ω

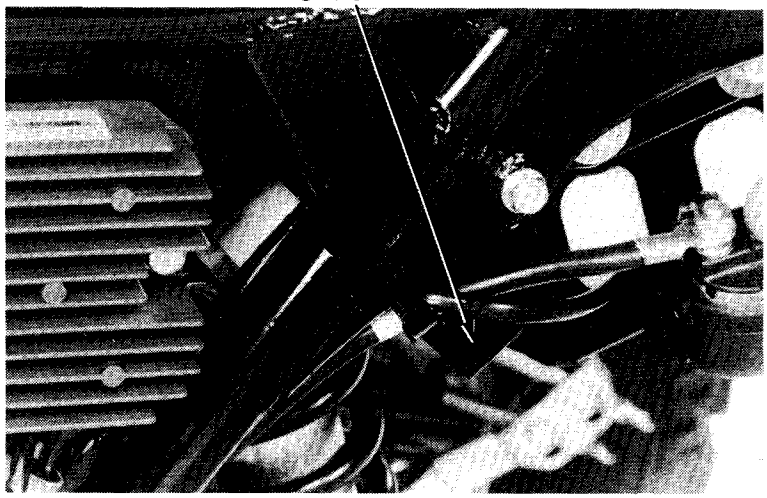
If the resistance is not within the standard, check the pulse generator (page 14-4) and retest.

Measure the resistance between the BI/R and ground.

STANDARD: 50–200 Ω (ND)
250–400 Ω (MITUBA)

If all related systems are in good condition but the ignition timing is incorrect, replace the CDI unit with a new one and recheck the ignition timing (page 14-5).

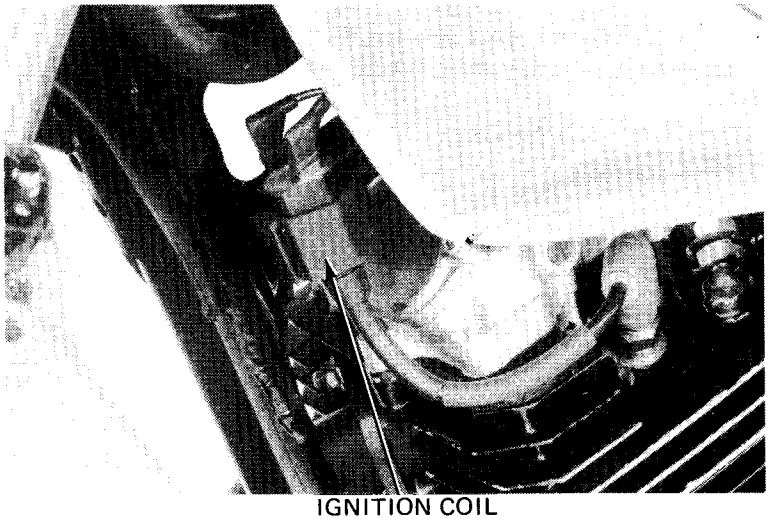
CDI UNIT



IGNITION COIL

REMOVAL

Remove the spark plug cap from the spark plug.
Disconnect the ignition coil primary wire and remove the ignition coil.



IGNITION COIL

INSPECTION

Disconnect the CDI unit coupler and measure the ignition coil primary coil resistance between the Bl/Y and G wire terminals.

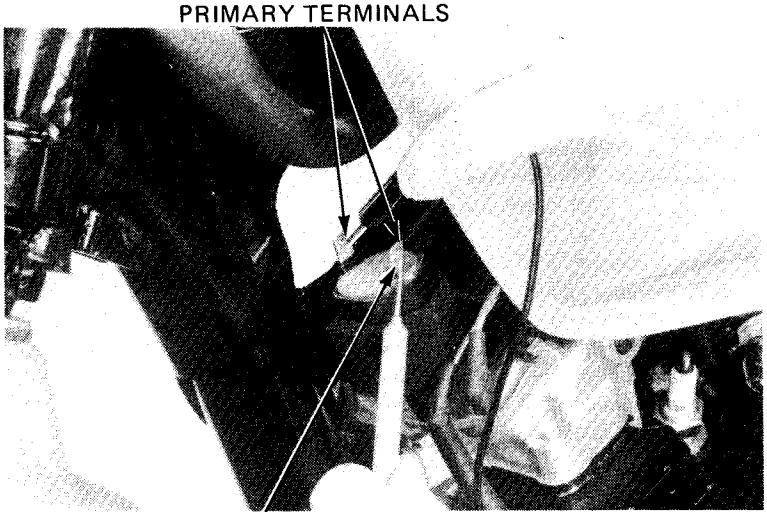
STANDARD: 0.1–0.3 Ω

If the resistance is not within standard, disconnect the ignition coil primary wires from the ignition coil and measure the resistance.

STANDARD: 0.1–0.3 Ω

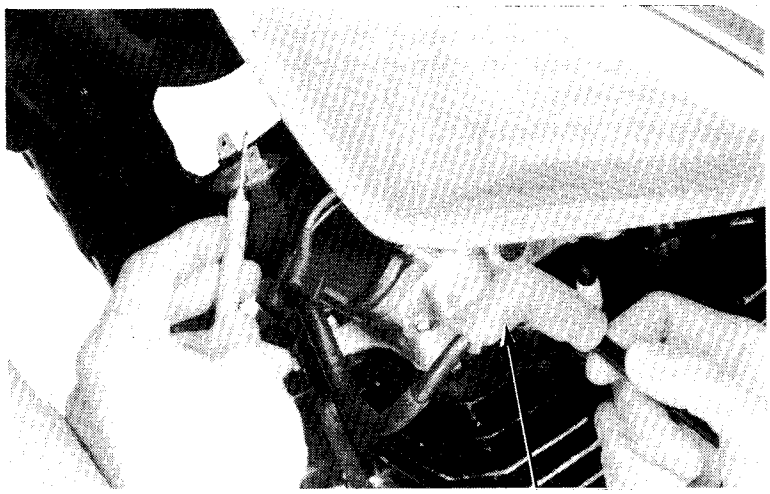
If the resistance is still not within standard, replace the ignition coil.
If the resistance is within the standard, check the wire harness between the CDI unit and ignition coil (Bl/Y and G) and repair or replace the wire harness.

PRIMARY TERMINALS



Disconnect the spark plug cap from the spark plug and measure the ignition coil secondary coil resistance between the coil primary terminal (G) and the spark plug cap.

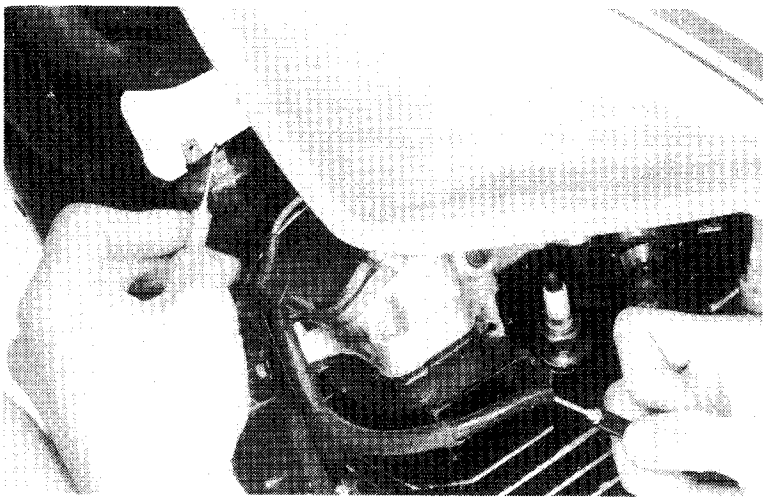
STANDARD: 7.4–11.1 kΩ



SPARK PLUG CAP

If the secondary coil resistance is not within the standard, remove the spark plug cap from the spark plug wire and measure the resistance without the cap.

STANDARD: 3.7–4.5 kΩ



ALTERNATOR EXCITER COIL

Remove the seat

Disconnect the CDI unit coupler and measure the resistance between the Bl/R wire terminal and ground.

STANDARD: ND 50–200 Ω
MITUBA 250–400 Ω

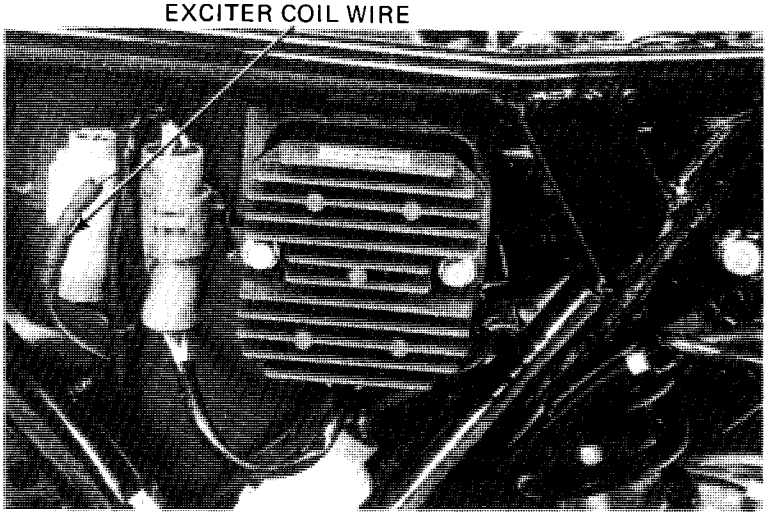
If the resistance is not within the standard, disconnect the exciter coil wire terminal and measure the resistance.

STANDARD: ND 50–200 Ω
MITUBA 250–400 Ω

If the resistance is still not within the standard, replace the alternator.

If the resistance is within the standard, check the wire harness between the CDI unit and alternator (Bl/R) for open or shorted circuit, and repair or replace the wire harness.

EXCITER COIL WIRE



PULSE GENERATOR

Remove the seat.

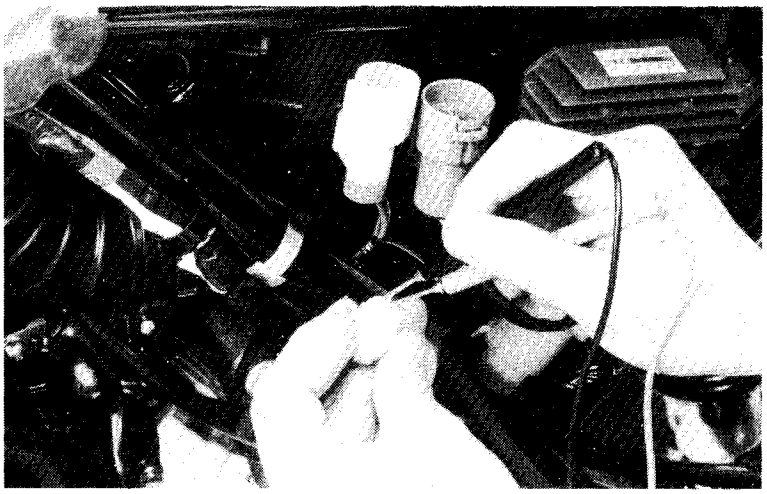
Disconnect the CDI unit coupler and measure the pulse generator resistance between the Bu/Y and G/W wire terminals.

STANDARD: 290–360 Ω

If the resistance is not within standard, disconnect the pulse generator wire coupler and measure the resistance between the Bu/Y and G/W wire terminals.

STANDARD: 290–360 Ω

If the resistance is still not within the standard, replace the pulse generator.
If the resistance is within the standard, check the wire harness between the CDI unit and pulse generator (Bu/Y and G/W) for open or shorted circuit and repair or replace the wire harness.

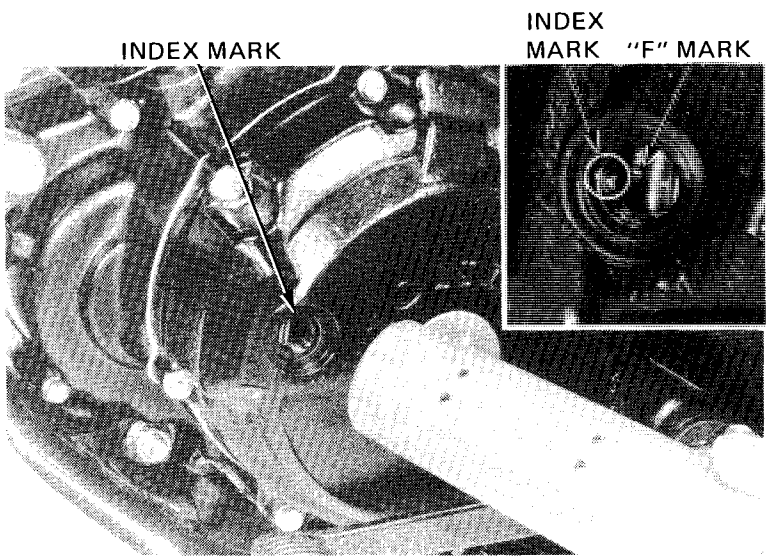


IGNITION TIMING

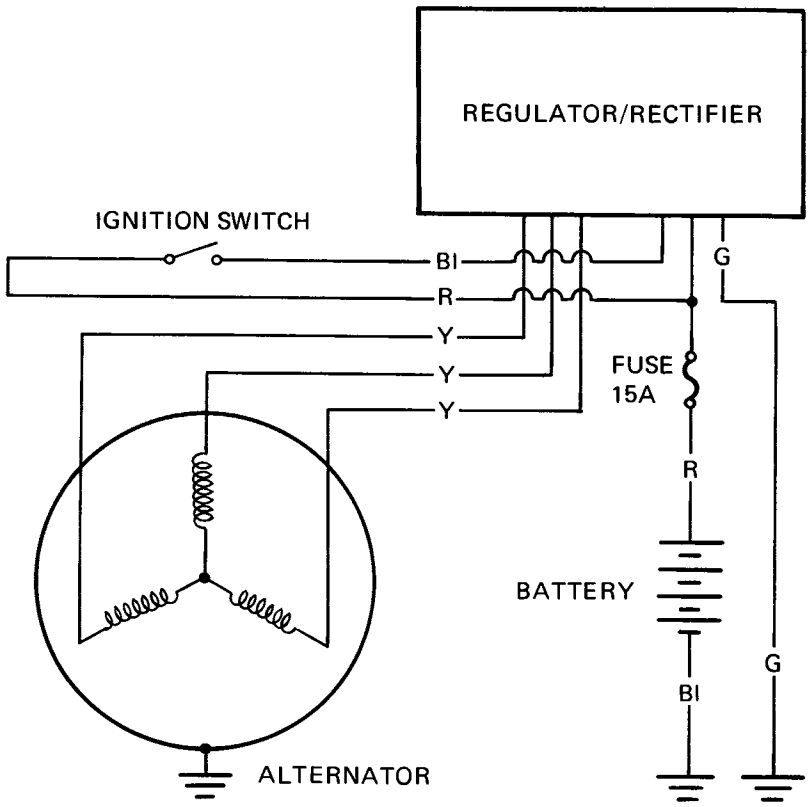
Remove the timing hole cap.
Connect a timing light.
Start the engine and allow it to idle.

IDLE (1,400 rpm): "F" mark should be aligned with the index mark

If ignition timing cannot be corrected, inspect the CDI unit and pulse generator.



P: Pink
Bl: Black
G: Green
Y: Yellow
R: Red



15. BATTERY/ CHARGING SYSTEM

SERVICE INFORMATION

GENERAL

- Quick charge a battery, only in an emergency. Slow-charing is preferred.
- Remove the battery from the motorcycle for charging. If the battery must be charged on the ATC, disconnect the battery cables.
- The battery on this vehicle is a sealed type. Do not remove the filling hole caps even during charging. Do not use a non-sealed battery as a replacement.
- All charging system components can be tested on the vehicle.

WARNING

Do not smoke, and keep flames away from a charging battery. The gas produced by a battery will explode if a flame or spark is brought near.

CAUTION

For battery charging, do not exceed the charging current and time specified on the battery cover (and shown below). Using excessive current or extending the charging time may damage the battery.

SPECIFICATIONS

Battery	Capacity	12V–10AH
	Charging current	Standard: 1.2A Maximum 5.0A
	Charging time	Standard: 5.0 hours Maximum: 1.0 hour
Alternator capacity		0.15 KW/5,000 rpm
Voltage regulator		Transistorized non-adjustable regulator

TOOLS

Sanwa electric tester	07308–0020000 or
Kowa electric tester	TH-5H
Kowa digital multi-tester	07411–0020000 or KS–AHM–32–003 (U.S.A. only)

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 underchanged
2. Charging system failure
3. Loose connection or short circuit in lighting system

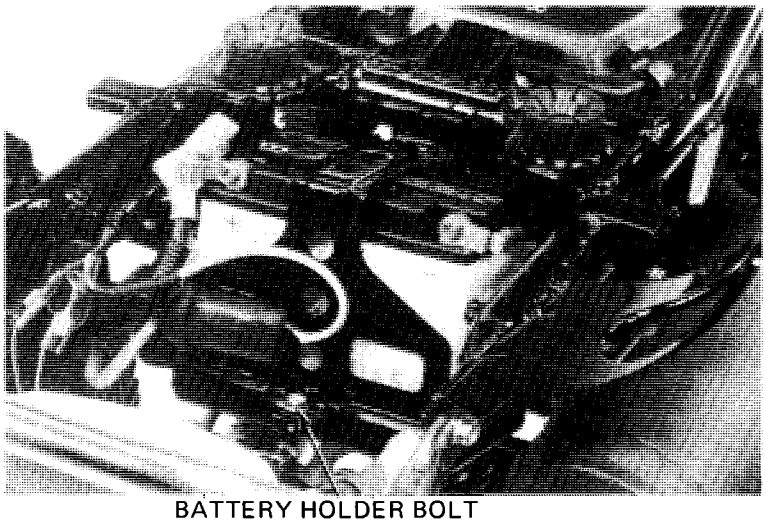
Intermittent power:
1. Loose battery connection
2. Loose charging system connection
3. Loose starting system connection

Charging system failure:
1. Loose, broken, or shorted wire or connection
2. Faulty voltage regulator
3. Faulty alternator

BATTERY

REMOVAL

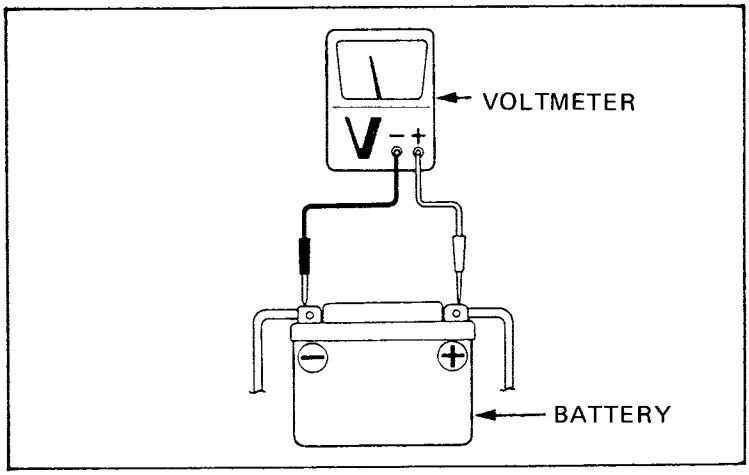
Remove the seat.
Remove the battery holder bolt.
Disconnect the negative cable, and then positive cable.
Remove the battery.



BATTERY HOLDER BOLT

Measure the battery voltage using a digital voltmeter (07411–0020000 or KS–AHM–32–003: U.S.A. only).

VOLTAGE: Fully charged: 13.1V
Under changed: Blow 12.8V



CHARGING

Connect the charger positive (+) cable to the battery positive (+) terminal.

Connect the charger negative (–) cable to the battery negative (–) terminal.

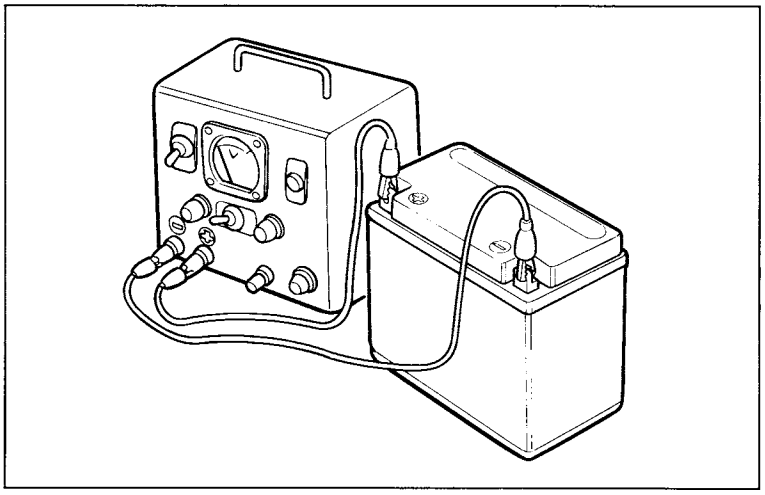
	Standard	Maximum
Charging current	1.0A	5.0A
Charging time	5 hours	1 hour

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.*
- *For battery charging, do not exceed the charging current and time specified on the battery cover. Using excessive current or extending the charging time may damage the battery.*

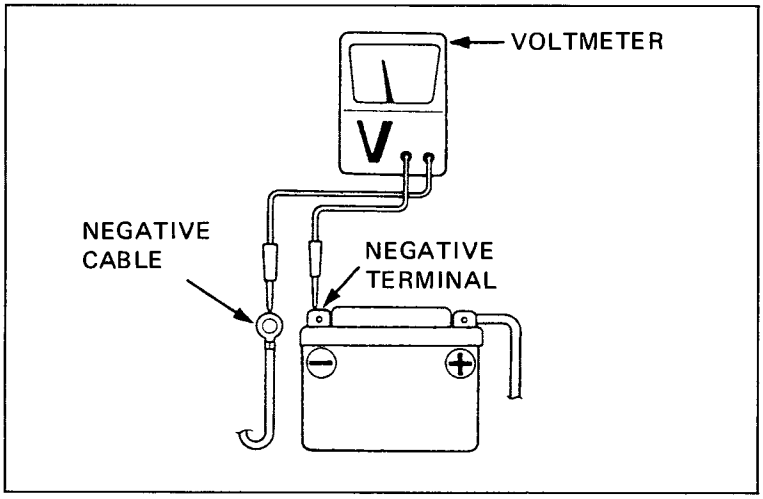


After installing the battery, coat the terminals with clean grease.

CHARGING SYSTEM

LEAK TEST

Turn the ignition switch off and disconnect the negative cable from the battery.
Measure the voltage between the battery negative terminal and negative (ground) cable.
There should be no voltage with the ignition switch off.



CHARGING VOLTAGE INSPECTION

NOTE:

> The battery voltage must be above 12.3 V when performing this test.

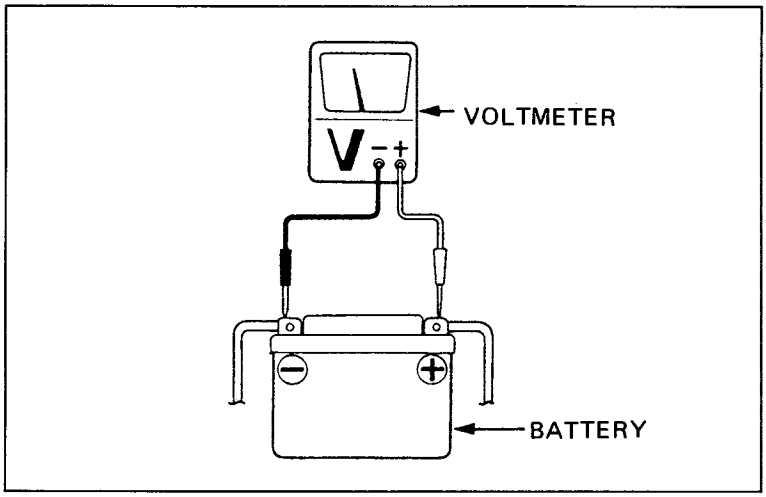
Warm up the engine.
Connect a voltmeter between the battery terminals.

CAUTION

> *Be careful not to let the battery positive cable contact the frame while testing.*

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 the voltage exceeds the specification, measure the battery voltage, between the Black and Green terminals of the regulator/rectifier coupler when the ignition switch is turned ON.
Check the Black or Green wires for an open circuit in the wire harness if there is no voltage with the ignition switch ON.
If voltage is OK, replace the regulator/rectifier.
If the voltage does not increase above the previous measurement, though the engine speed rises, stop the engine and check the following:

- Check the regulator/rectifier coupler for looseness or disconnection.
- Make sure that the battery voltage appears between the Red (+) and Green (–) terminals of the regulator/rectifier couplers. Check the Red or Green wires for an open circuit if voltage does not appear.
- Check the charging coil of the alternator as described on page 15-5.

REGULATOR/RECTIFIER INSPECTION

Check the resistance between the leads with an ohmmeter.
Replace the regulator/rectifier if the readings are not within the limits shown in the table.

TOOLS:
Sanwa electric tester **07308–0020000 or**
Kowa electric tester **TH-5H**

NOTE

Do not use the Digigal Multi-Tester (07411–0020000 or KS–AHM–32–003: U.S.A. only) for the regulator/rectifier.

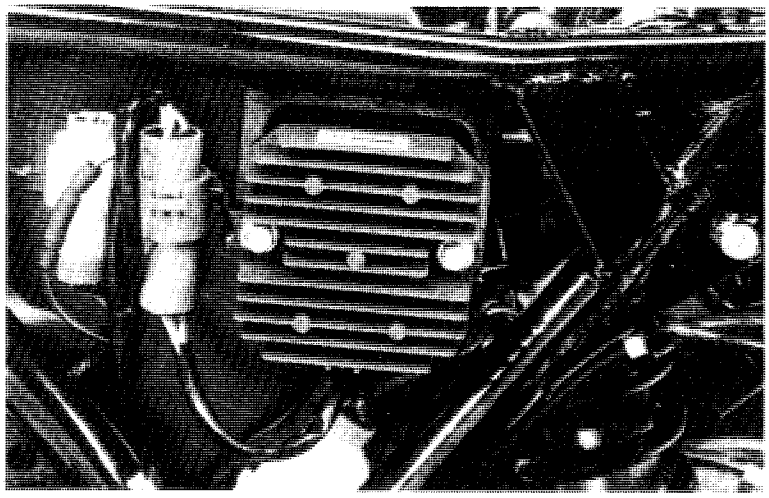
Range: Sanwa: kΩ
Kowa: 100Ω

Unit: Ω

(+)Probe / (–)Probe	Yellow	Yellow	Yellow	Red	Green	Black
Yellow		∞	∞	1–20 (100–5K)	∞	∞
Yellow	∞		∞	1–20 (100–5K)	∞	∞
Yellow	∞	∞		1–20 (100–5K)	∞	∞
Red	∞	∞	∞		∞	∞
Green	1–20 (100–5K)	1–20 (100–5K)	1–20 (100–5K)	5–30 (500–8K)		1–20 (1K–5K)
Black	10–80 (10K–80K)	10–80 (10K–80K)	10–80 (10K–80K)	20–100 (50K–∞)	10–50 (10K–50K)	

REGULATOR/RECTIFIER REPLACEMENT

Remove the seat.
Disconnect the voltage regulator wire couplers.
Remove the two bolts attaching the regulator/recrifier and replace it with a new one.



ALTERNATOR CHARGING COIL

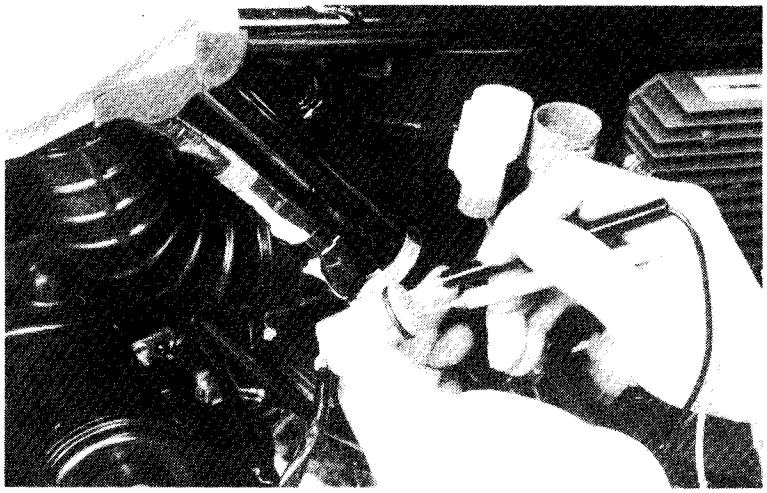
Disconnect the alternator pulse generator couplers and wire.

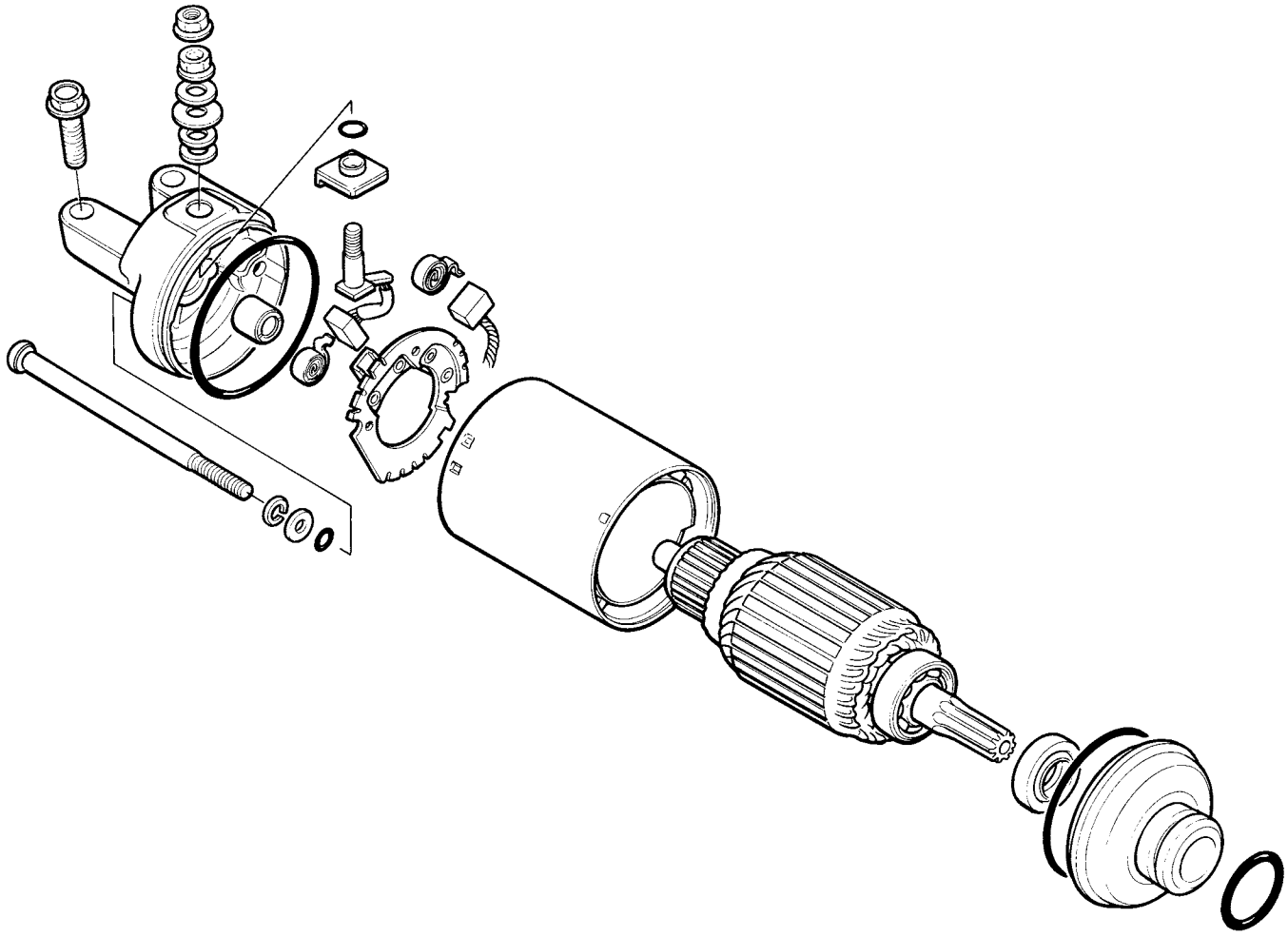
Check the resistance between the coupler terminals.

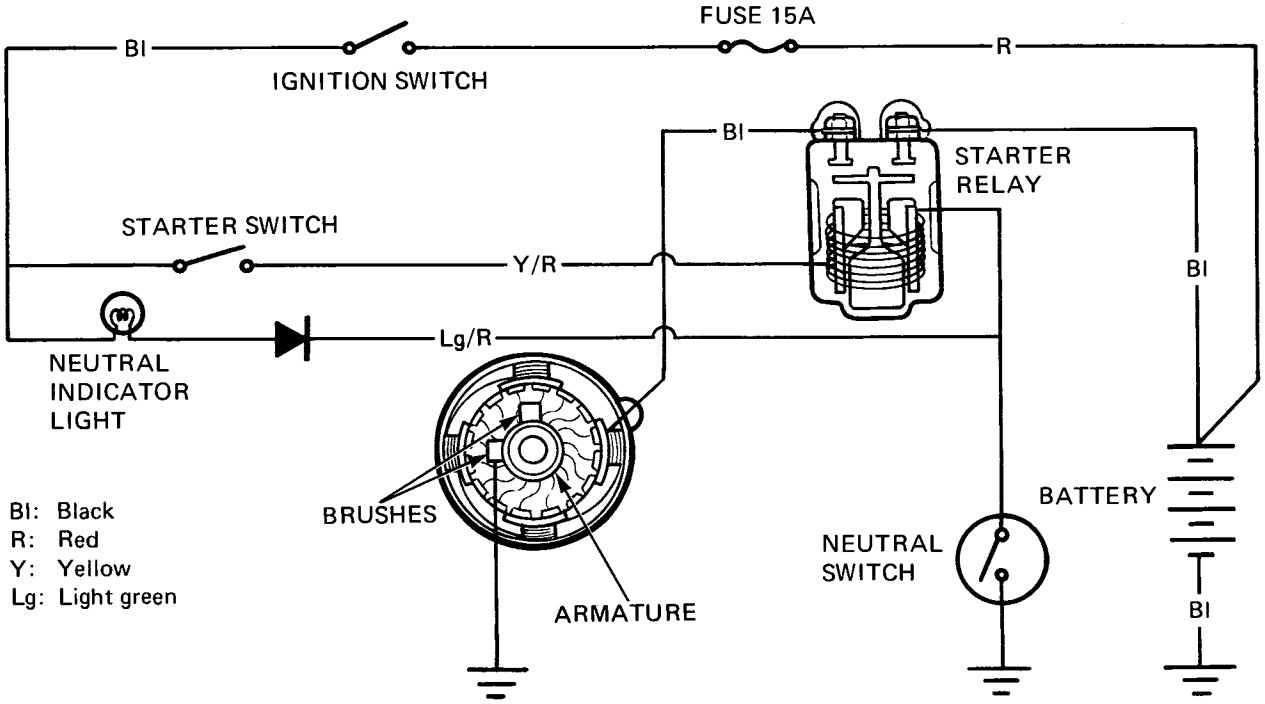
RESISTANCE: 0.2–1 ohms

Check for no continuity between each 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.






FUSE 15A
Bl
R
IGNITION SWITCH
Bl
STARTER
RELAY
STARTER SWITCH
Y/R
Bl
Lg/R
NEUTRAL
INDICATOR
LIGHT
Bl: Black
R: Red
Y: Yellow
Lg: Light green
BRUSHES
ARMATURE
NEUTRAL
SWITCH
BATTERY
Bl

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	Mituba	800 ± 120 g (28.2 ± 4.2 oz)	740 g (26 oz)
		ND	900 ± 120 g (34.2 ± 4.2 oz)	740 g (26 oz)
	Brush length	Mituba	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

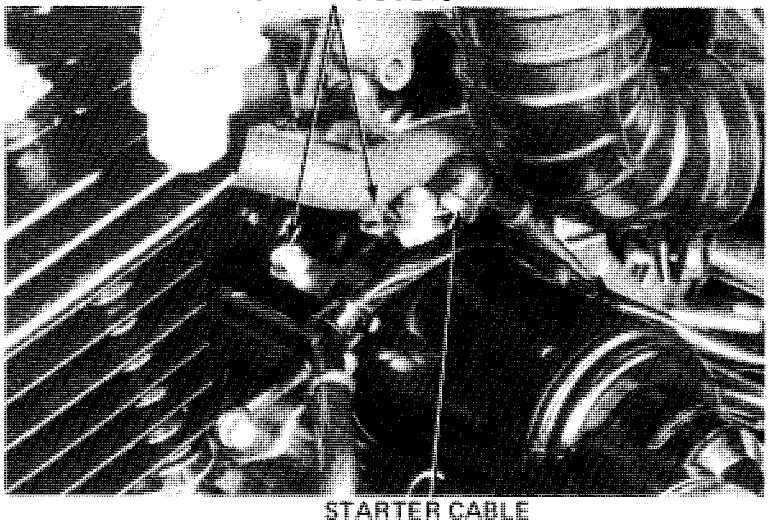
STARTER MOTOR

REMOVAL

WARNING

With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.

Disconnect the starter cable.
Remove the starter motor mounting bolts and pull the motor out of the crankcase.



BRUSH INSPECTION

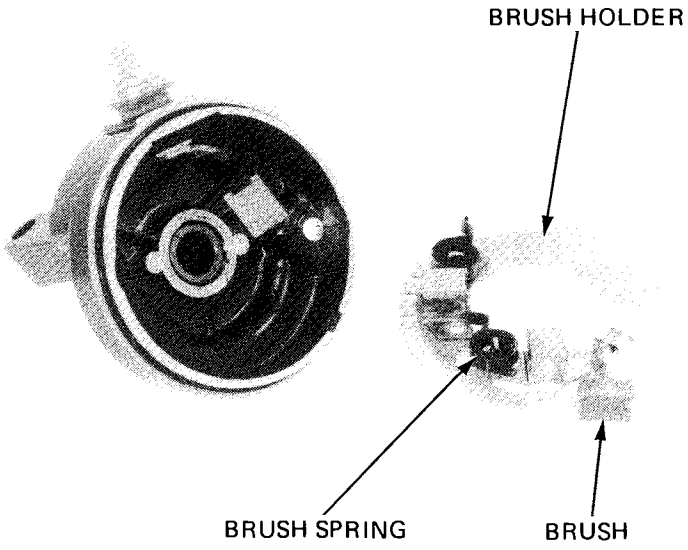
Remove the two starter motor case screws, front and rear cover.
Remove the armature and the brush holder.

Inspect the brushes and measure the brush length.

SERVICE LIMIT: Mituba 5.5 mm (0.22 in)
ND 8.5 mm (0.33 in)

Measure brush spring tension with a spring scale.

SERVICE LIMIT: 740 g (26 oz)



COMMUTATOR INSPECTION

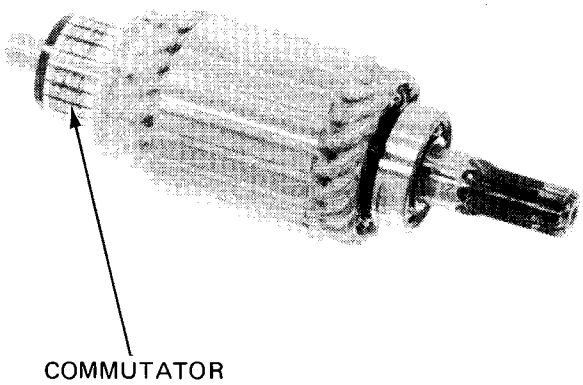
NOTE

Record the location and number of thrust washers for correct assembly.

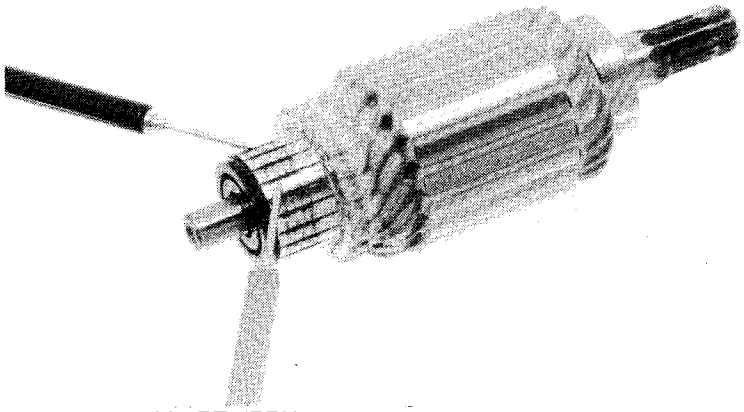
Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils, in which case the starter motor must be replaced.

NOTE

Do not use emery or sand paper on the commutator.

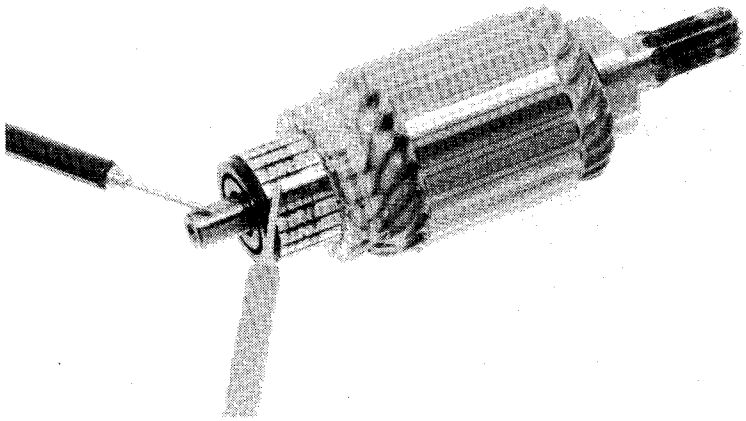


Check for continuity between pairs of commutator bars; there should be continuity.



CONTINUITY BETWEEN
COMMUTATOR BAR PAIRS: NORMAL

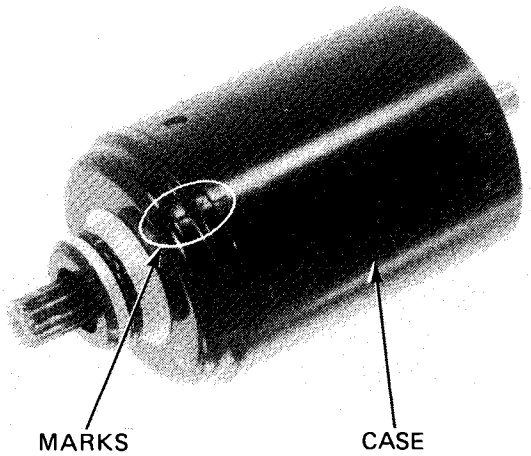
Also, check for continuity between individual commutator bars and armature shaft; there should be no continuity.



NO CONTINUITY BETWEEN COMMUTATOR BARS
AND ARMATURE SHAFT: NORMAL

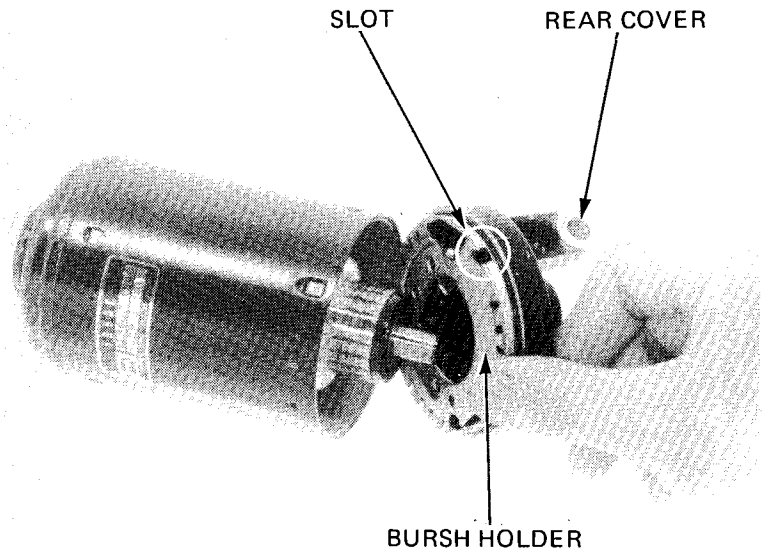
ASSEMBLY/INSTALLATION

Assemble the starter motor. Align the marks onthe case and cover.



Install the rear cover aligning its slot with the brush holder slot.

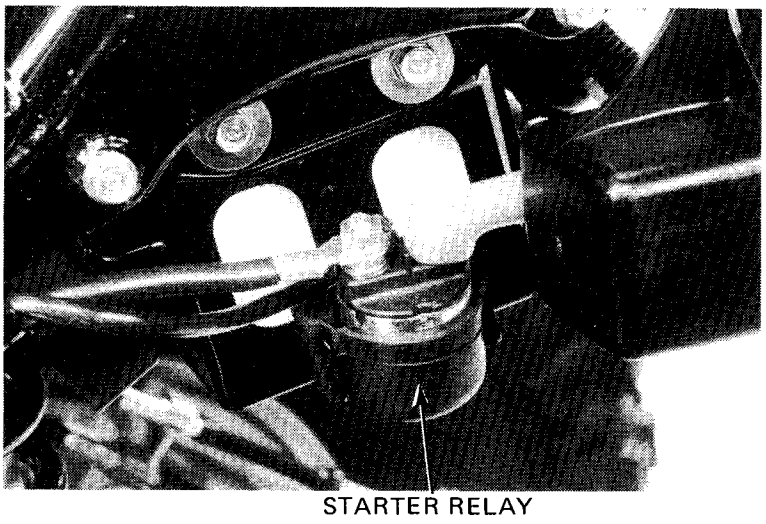
Install the starter motor in the reverse order of removal.



STARTER RELAY

INSPECTION

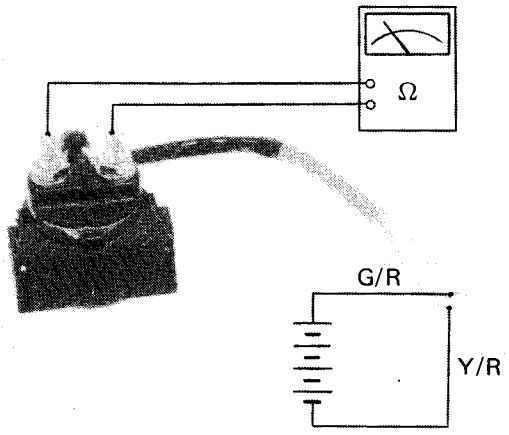
Remove the seat.
Depress the starter switch botton with the ignition switch ON. The coils are normal if the starter relay clicks.



Connect an ohmmeter to the large starter relay terminals.

Connect the Yellow/Red wire to a 12 V battery positive terminal and the Green/Red wire to the negative battery terminal using jumper wires.

Replace the starter relay with a new one if there is no 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 ohmmeter to the terminals.

SPECIFICATIONS

Headlight	'85:	12V 45W/45W
	After '85:	12V 60W/55W
Taillight		12V 5W
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

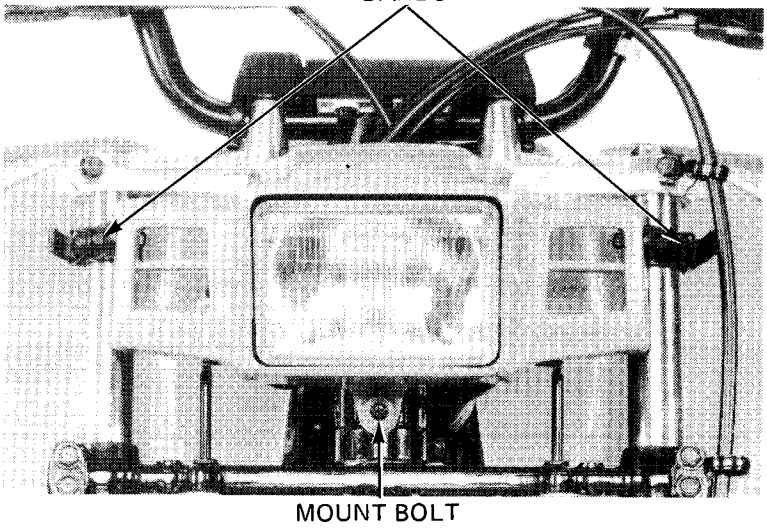
Headlight beams do not shift when hi-lo switch is operated

1. Faulty dimmer switch
2. Bulb burned out
3. Wiring to that component has open circuit

HEADLIGHT

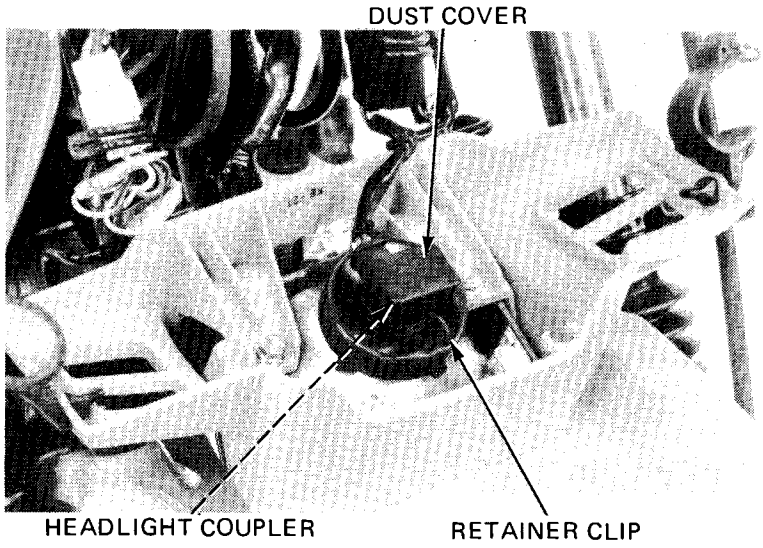
BULB REPLACEMENT

Remove the headlight case mount bolt and bands.



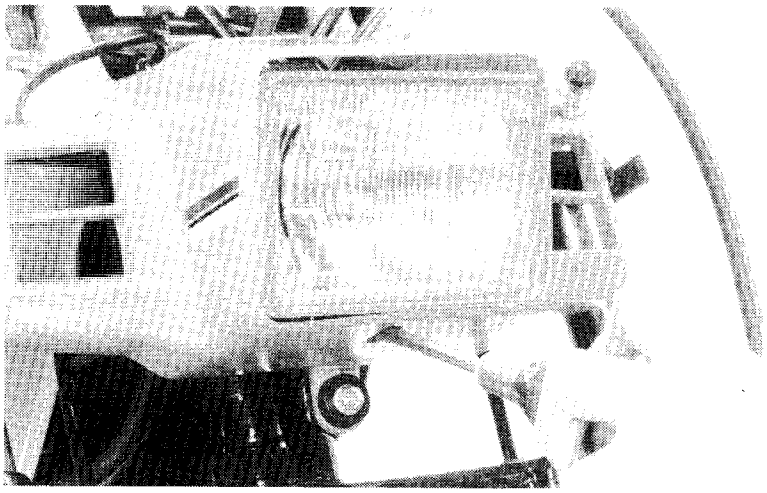
Disconnect the headlight coupler.
Remove the dust cover from the headlight.
Remove the retainer clip and replace the headlight bulb with a new one.

Install in the reverse order of removal.



HEADLIGHT AND ADJUSTMENT

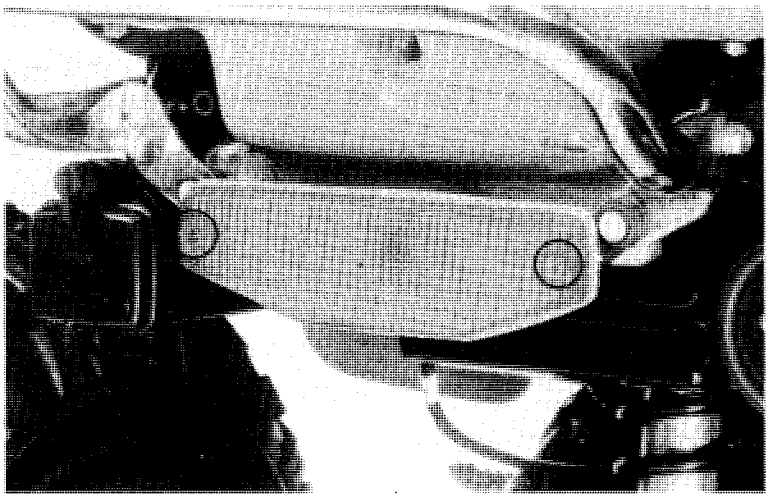
Turn the headlight adjusting screw to make a vertical beam adjustment.



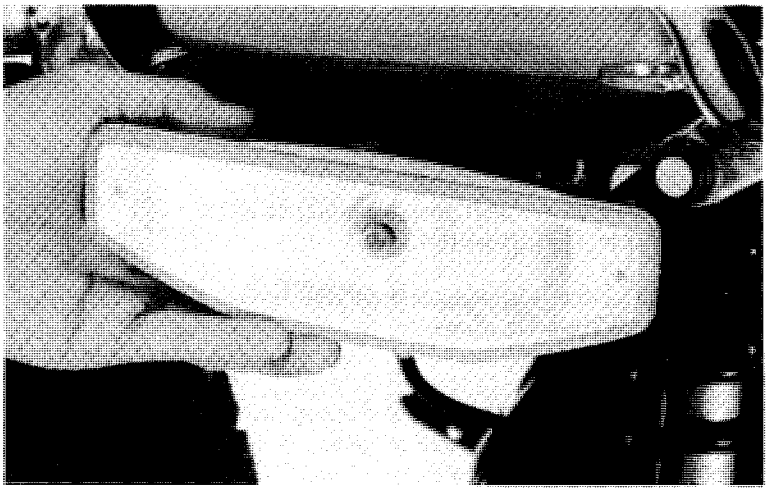
TAILLIGHT

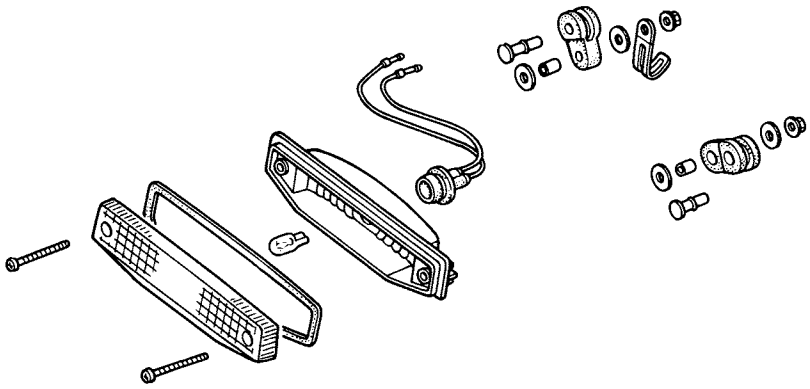
BULB REPLACEMENT

Remove the taillight lens screws.



Replace the taillight bulb.
Make sure that the lens seal rubber is correctly installed, then install the lens and secure it with screws.

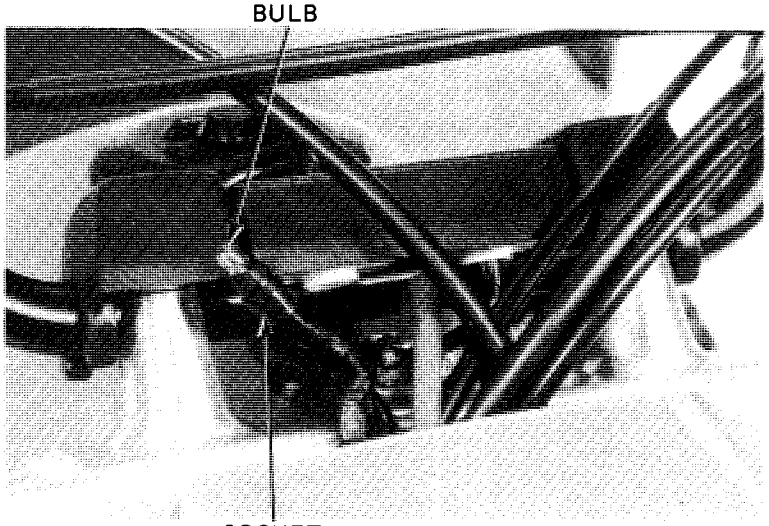




INDICATOR LAMP

BULB REPLACEMENT

Pull the bulb socket out of the indicator light housing.
Remove the bulb by pulling it out.
Install a new bulb and push the socket into the housing.



NEUTRAL SWITCH/REVERSE SWITCH

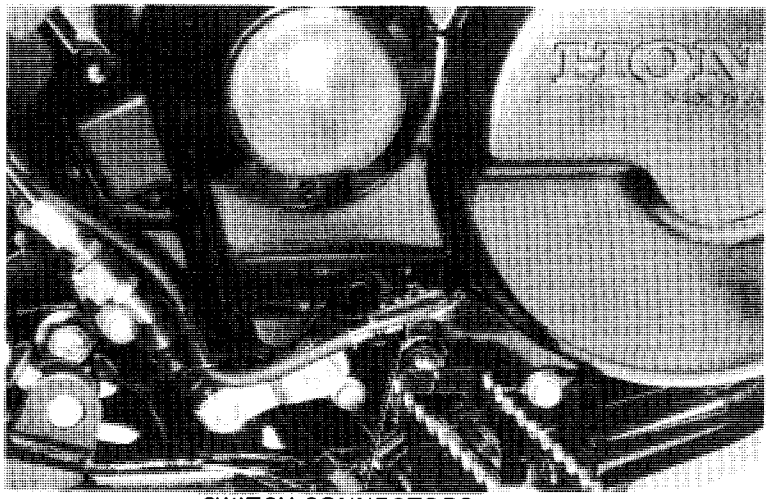
Remove the switch connectors from the switches. Check the continuity between the switch terminal and ground.

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

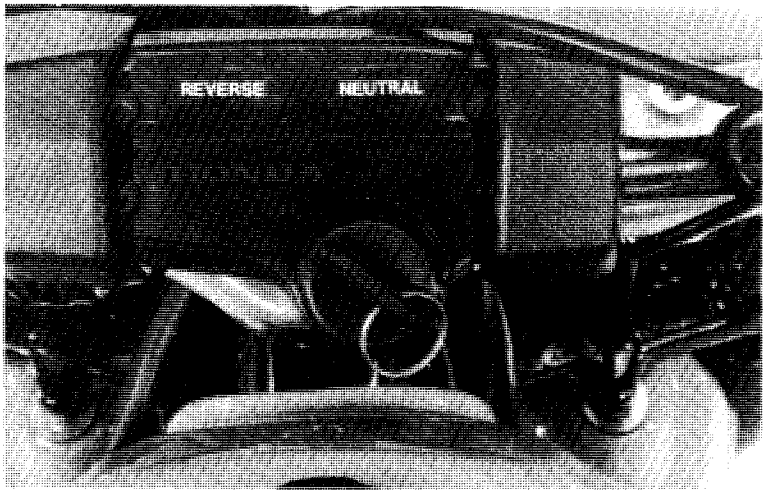
Connect the neutral (Light green/red) and reverse (Green) switch wires properly. If the switch wire connections are interchanged, the neutral indicator comes on in the transmission in reverse and the ATC will reverse suddenly.


SWITCH CONNECTORS

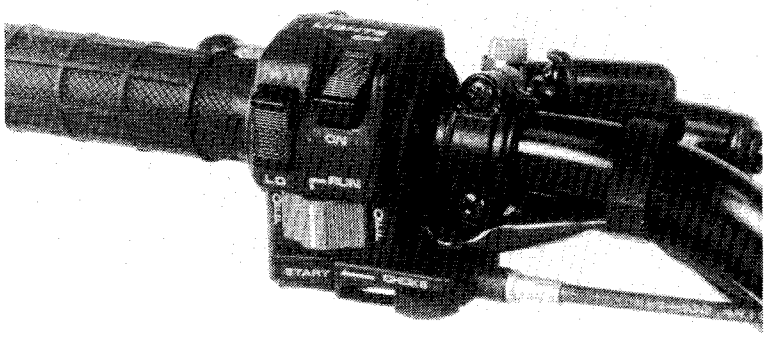
IGNITION SWITCH

Remove the headlight.
Disconnect the ignition switch wire coupler and connectors.
Check the switch for continuity between the black/white and green wires with the switch "OFF", and the red and black with the switch "ON".

	IG	E	BAT	HO
OFF	○—○			
ON			○—○	
COLOR	BI/W	G	R	BI



HANDLEBAR SWITCH



LIGHT/DIMMER SWITCH

Remove the headlight.
Check the switch for continuity between the terminals shown in the table for each switch position.

TERMINAL	TL	C	LO	HI
OFF				
LOW	○	○	○	
(N)	○	○	○	○
HIGH	○	○		○
COLOR	Br	Bl/Br	W	Bu

The switch is normal if there is continuity between the circuits marked "○–○".

ENGINE STOP SWITCH

Remove the headlight.
Check the switch for continuity between the black/white and green terminals with the switch "OFF". The switch is normal if there is continuity between the terminals.

TERMINAL	E	IG
OFF	○	○
RUN		
COLOR	G	Bl/W

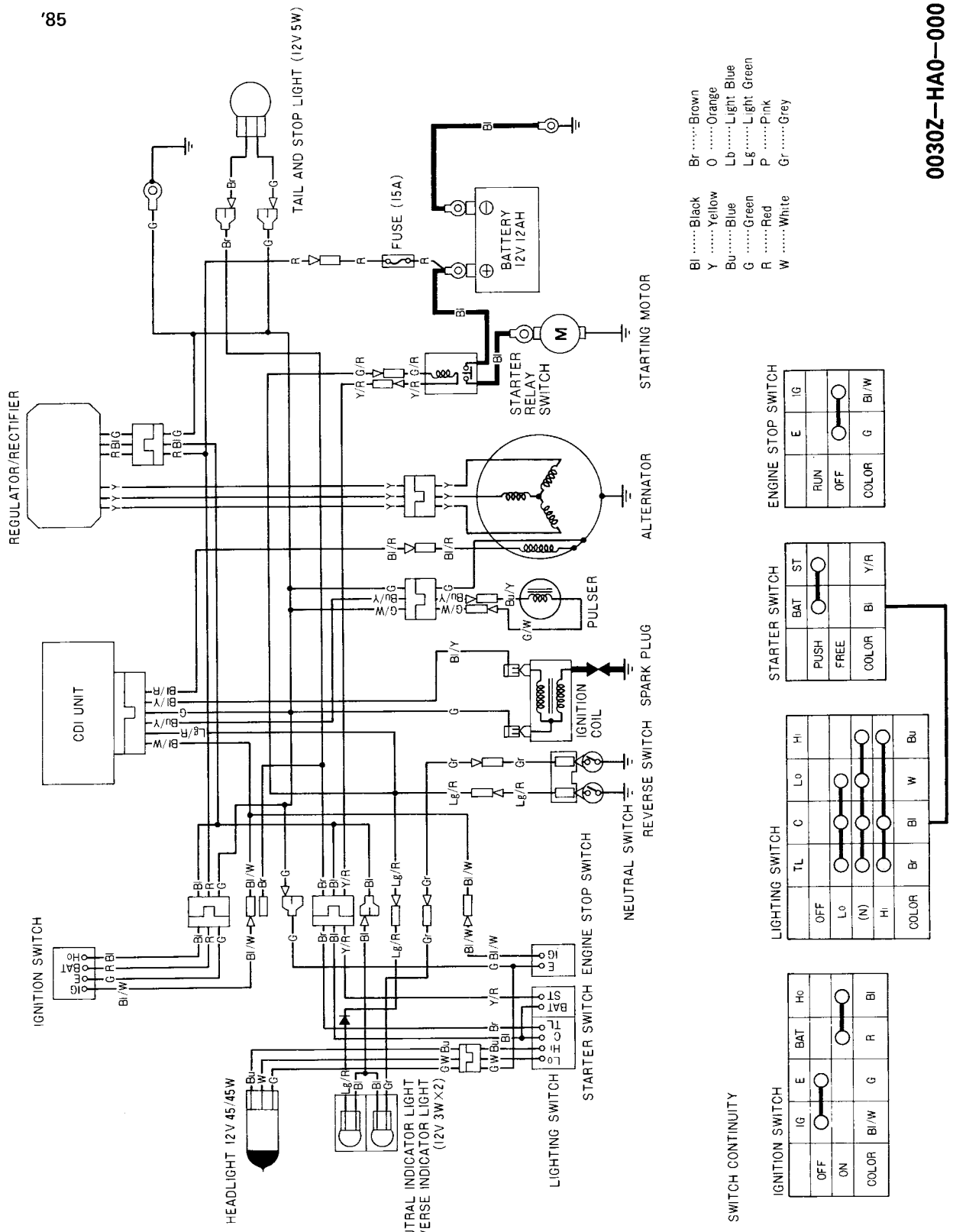
STARTER SWITCH

Remove the headlight.
Check the switch for continuity between the Yellow/Red and Black/Brown wires while pushing the starter buttom.

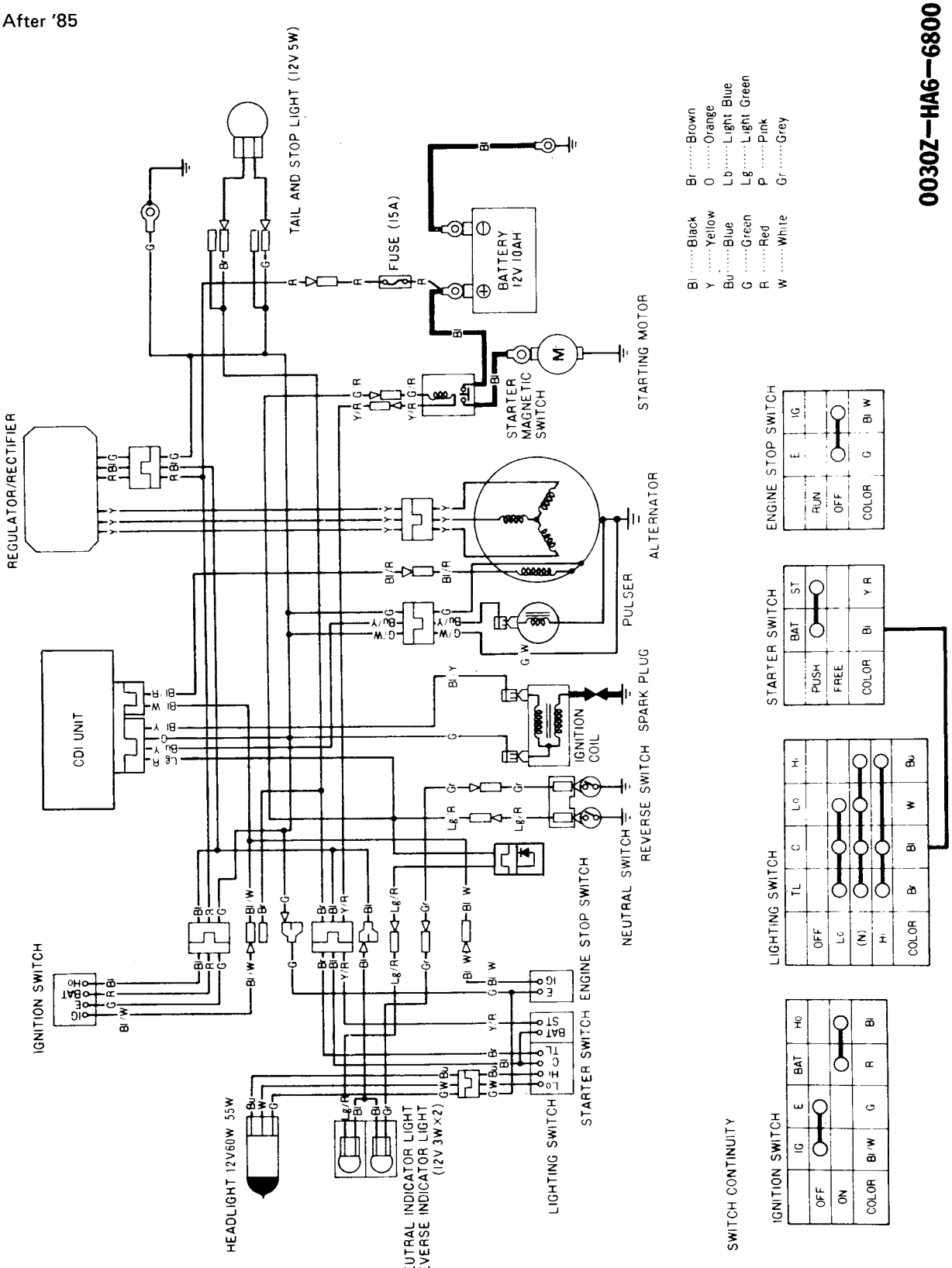
TERMINAL	ST	E
RELEASED		
PUSHED	○	○
COLOR	Y/R	Bl

MEMO

WIRING DIAGRAM



After '85


0030Z-HA6-6800
TAIL AND STOP LIGHT (12V 5W)
FUSE (15A)
BATTERY 12V 10AH
STARTER MAGNETIC SWITCH
STARTING MOTOR
REGULATOR/RECTIFIER
ALTERNATOR
PULSER
CDI UNIT
IGNITION COIL
SPARK PLUG
NEUTRAL SWITCH
REVERSE SWITCH
IGNITION SWITCH
ENGINE STOP SWITCH
STARTER SWITCH
LIGHTING SWITCH
HEADLIGHT 12V60W 55W
NEUTRAL INDICATOR LIGHT
REVERSE INDICATOR LIGHT
(12V 3W×2)
Bl ·····Black
Y ·····Yellow
Bu·····Blue
G ·····Green
R ·····Red
W ·····White
Br ·····Brown
O ·····Orange
Lb·····Light Blue
Lg·····Light Green
P ·····Pink
Gr·····Grey
ENGINE STOP SWITCH
STARTER SWITCH
LIGHTING SWITCH
IGNITION SWITCH
SWITCH CONTINUITY

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 piston 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 the 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 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	OIL LEVEL INCORRECT →	(1) Oil level too high (2) Oil level too low (3) Contaminated oil
CORRECT ↓		
11. Remove cylinder head cover and inspect lubrication	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage (2) Clogged oil pipe
VALVE TRAIN LUBRICATED PROPERLY ↓		
12. Check if engine overheats	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
NOT OVERHEATED ↓		
13. Accelerate or run at high speed	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)
ENGINE DOES NOT KNOCK		

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		Probable Cause
1. Check ignition timing and valve clearance	INCORRECT →	(1) Improper valve clearance (2) Improper ignition timing (Faulty CDI unit or pulse generator)
CORRECT ↓		
2. Check carburetor pilot screw adjustment	INCORRECT →	(1) Fuel-air mixture too lean (2) Fuel-air mixture too rich
CORRECT ↓		
3. Check if air is leaking past carburetor insulator	LEAKING →	(1) Deteriorated insulator O-ring (2) Loose carburetor
NOT LEAKING ↓		
4. Try spark test	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
GOOD SPARK		

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 swining arm
3. If the ATC pulls to one side →	(1) Tire air pressure incorrect (2) Bent front fork