HONDA GOLDWING

About This Manual

The GL1100 Service Manual is divided into 19 sections. The first (index) page of each section is marked with a black tab that lines up with the tabs on this page. The section symbols printed on the tabs also appear at the top of each right page. Furthermore, the section titles appear at the top of each left page so you can quickly get to where you want to be in the manual.

Section index pages list the contents of each section and give specific page references. Except for the Specifications and General Information sections, "Service Information" follows each index; be sure to read those few lines before you start any procedure to avoid any difficulty once you're in the middle of a job. In most cases a torque reference drawing will be in Service Information. Beginning with this manual, torque values are given in the metric standard newton-meters (N·m) and foot-pounds (ft-lb). (See page 1-5 for a specific explanation of the use of metric equivalents). A system troubleshooting list follows the torque reference drawing, and then the service procedures begin.

All service procedures are based on the standard GL1100. In those few isntances where the Interstate and Aspencade models differ, the variations will be called out in the text or a note. Variations between the different model years are also called out.

Sections 1 - 3 apply to the whole motorcycle, while sections 4 - 18 describe parts of the GL1100 grouped according to location. Section 19, "Accessories", covers torque specifications and removal/installation of accessories. Be sure to refer to the Maintenance Schedule (Section 3) whenever a motorcycle is brought in for service. Use the schedule to know what the vehicle needs to stay in peak condition and within EPA-established emission standards. The first schedule maintenance is especially important since it compensates for the initial wear that occurs during the break-in period.

All information, illustrations, directions and specifications included in this publication are based on the latest product information available at the time of approval for printing. Honda Motor Co., Ltd. reserves the right to make changes at any time without notice and without incurring any obligation whatever.

General Information

General Information

Service Safety

Pay special attention to statements preceded by these symbols:

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.

WARNING:

- **When the engine must be running for service make sure the area is well ventilated. Never run the engine in a closed area; the exhaust contains poisonous carbon monoxide gas.**
- **Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.**
- **The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and call a doctor if your eyes were exposed.**
- **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.**

IMPORTANT SAFETY NOTICE

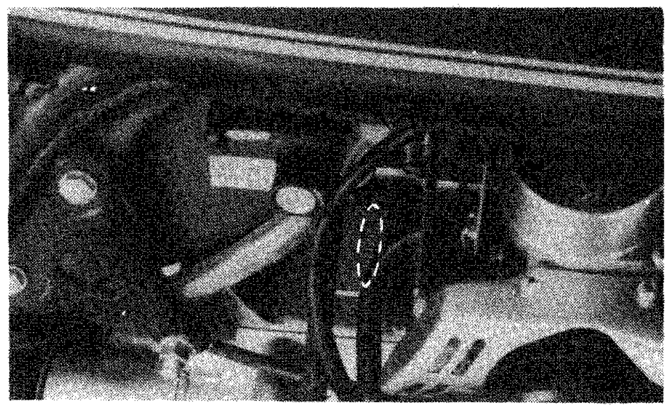
Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains some warnings and cautions against some specific service methods which could cause PERSONAL INJURY to service personnel or could damage a 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 possible 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.

Model Identification

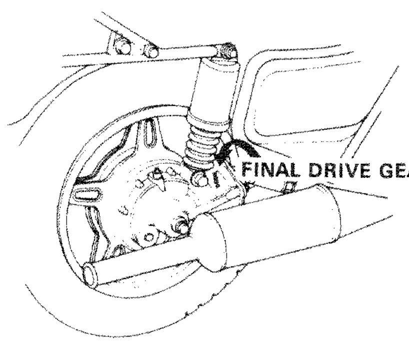
The frame serial number is stamped on the right side of the steering head.

The Vehicle Identification Number (VIN) is on the safety certification label on the left side of the steering head.

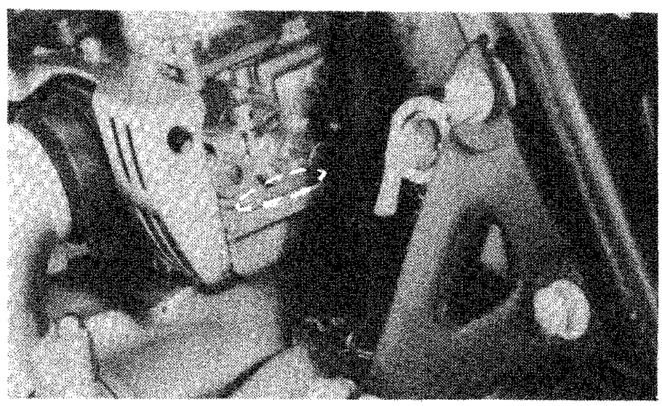
The engine serial number is stamped on the top right side of the crankcase.



The final drive serial number is on the left side of the case near the pinion flange.



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



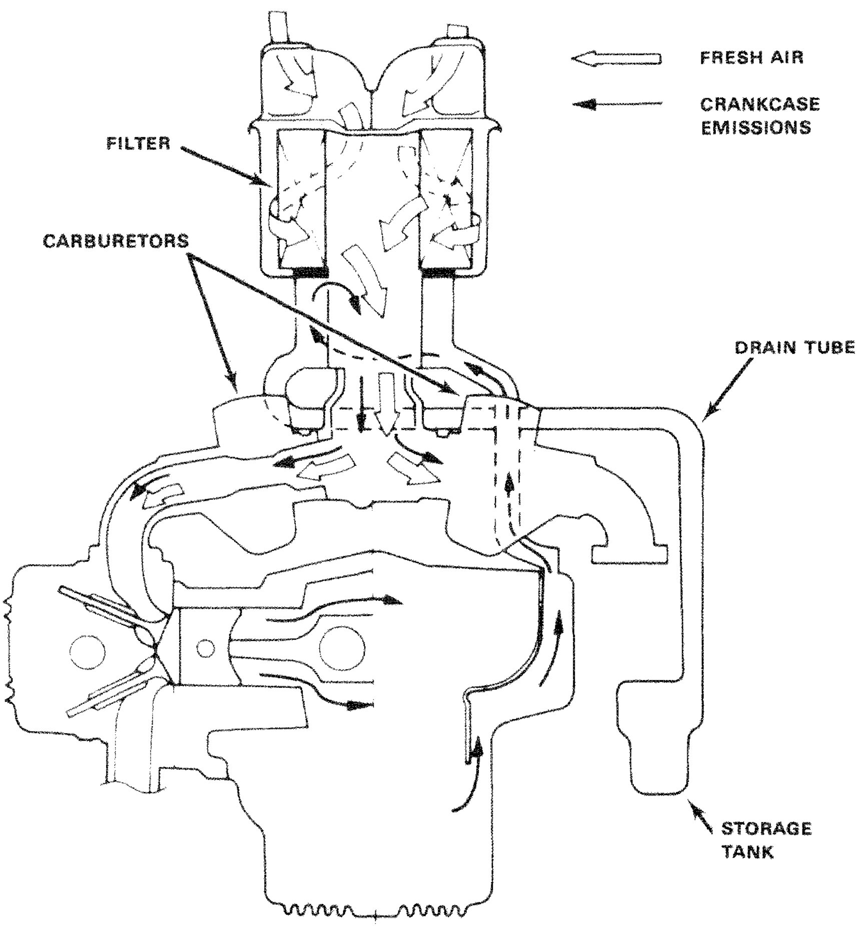
General Information

Exhaust and Noise Emission Control Systems

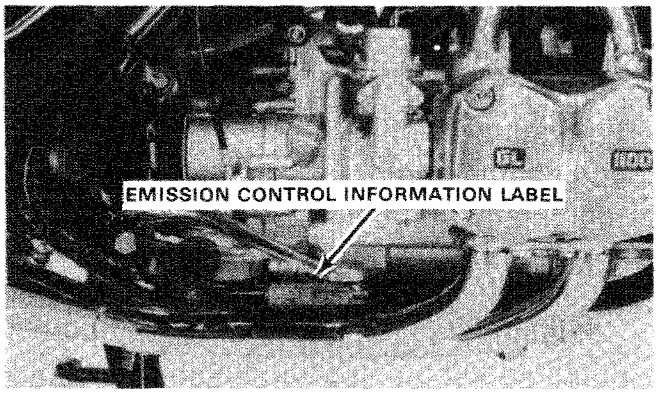
The U.S Environmental Protection Agency requires manufacturers to certify that motorcycles built after December 31, 1977, will comply with applicable emission standards during their useful life when operated and maintained according to the instructions provided, and that motorcycles built after January 1, 1983, will comply with applicable noise emission standards for one year or 6,000 km (3,730 miles) after the time of sale to the ultimate purchaser, when operated and maintained according to the instructions provided. Compliance with the terms of the Distributer's Warranties for Honda Motorcycle Emission Control Systems is necessary in order to keep the emission control system warranty in effect.

Exhaust Emission Control System

The GL1100 is equipped with a crankcase emission control system which routes crankcase emissions through the air filter and into the combustion chamber. Condensed crankcase vapors are accumulated in a storage tank which must be emptied periodically. See the Maintenance Schedule in Section 3.



The Emission Control Information label located on the frame tube below the rear brake pedal carries tune up specifications for the motorcycle.



Noise Emission Control System

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 pipes 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.

General Information

Metric Conversions

If it is necessary to convert from metric to English equivalents, use the following conversion factors:

Given		Multiply By	To Obtain
Torque:			
Newton-meters (N·m)		.723	Foot pounds (ft-lb)
Foot pounds (ft-lb)		1.383	Newton-meters (N·m)
Length:			
Meter (m)		3.281	Feet (ft)
Millimeter (mm)		0.03937	Inches (in)
Feet (ft)		0.3048	Meter (m)
Inches (in)		25.40	Millimeter (mm)
Kilometer (km)		0.6214	Mile (mi)
Mile (mi)		1.609	Kilometer (km)
Pressure:			
Kilogram/Sq. centimeter (kg/cm^2)		14.22	Pounds/Sq. inch (psi)
Pounds/Sq. inch (psi)		0.0703	Kilogram/Sq. centimeter (kg/cm^2)
Temperature:			
Centigrade (C°)	(C° x 1.8) + 32		Fahrenheit (F°)
Fahrenheit (F°)	(F° − 32) ÷ 1.8		Centigrade (C°)
Capacity:			
Liter (l)		0.2642	Gallon (gal)
Liter (l)		1.0568	Quart (qt)
Quart (qt)		0.9463	Liter (l)
Gallon (gal)		3.785	Liter (l)
Volume:			
Cubic centimeter (cc)		0.061	Cubic inches (cu in)
Cubic inches (cu in)		16.39	Cubic centimeters (cc)
Weight:			
Kilogram (kg)		2.205	Pounds (lb)
Gram (g)		0.03527	Ounces (oz)
Pounds (lb)		0.4536	Kilogram (kg)
Ounces (oz)		28.3495	Gram (g)
Speed:			
Kilometer/hour (km/hr)		0.6214	Miles/hour (mph)
Miles/hour (mph)		1.609	Kilometer/hour (km/hr)

N.P.S. Part Numbers

Honda N.P.S. numbers contain significant information about the parts they represent. The following examples illustrate the three basic types of N.P.S. numbers.

Standard Numbers (Common items)

6 x 42 Hex Bolt	**92120-060420Z**
Function Number	92
Method of Manufacture	1
Length of thread	20-
Normal Diameter	06
Length under the head	042
Material	0
Surface Treatment	Z

Semi-Standard Numbers (seals, o-rings, bearings, etc.)

Front Wheel Dust Seal	**91251-300-003**
Function	91
Type	2
Detail Number	51-
Product Number (where first used)	300-
Classification	00
Manufacturer	3

Special Numbers (Non-interchangeable parts)

Left Side Cover	**83700-371-305ZA**
Function	83
Component	700-
Product	371-
Classification	305
Color Code	ZA

General Information

Tools

Tools available from Honda are listed in order of the section they are used in. Some tools may be listed in more than one section.

Maintenance

Honda Code	Part Number	Description
0583690	A973-041-XXXXX	Vacuum hand pump
0262501	07908-3230000	Valve adjustment wrench
0479782	M937B-021-XXXXX	Vacuum gauge kit
0400747	M982X-350-XXXXX	Kit adaptor (6 inch), 2 required
0400754	M983X-350-XXXXX	Kit adaptor (2 inch), 2 required
0719575	07908-4220100	Carburetor adjustment wrench
0630681	07999-3710001	Timing inspection plug

Fuel System

0238923	07401-0010000	Float level gauge

Engine Removal/Installation

0413021	07914-5670100	Snap ring pliers (internal)

Cylinder Head

0413070	07925-3710200	Timing pulley holder
0688150	07757-0010000	Valve spring compressor
0724906	07942-6570100	Valve guide driver, 6.6 mm
or	or	
0487215	07942-6110000	
0724898	07984-6570100	Valve guide reamer
or	or	
0487264	07984-6110000	

Transmission

Honda Code	Part Number	Description
0413070	07925-3710200	Timing pulley holder
0413310	07964-3710000	Spring compressor
0413179	07945-3710200	Driver (mainshaft bearing)
0484295	07936-3710600	Bearing remover (output shaft bearing)
0413112	07936-3710100	Handle (for 07936-3710600)
0413120	07936-3710200	Weight (for 07936-3710600)
0413211	07946-3710200	Attachment (output shaft bearing installation)
0933242	07749-0010000	Driver
or	or	
0298240	07949-6110000	
0413294	07958-3710000	Piston base

Final Drive

0413013	07910-3710000	Final gear retainer wrench
0413054	07924-3710000	Preload inspection tool
0413328	07965-3710100	Dis/Assembly tool A
0933242	07749-0010000	Driver
or	or	
0298240	07949-6110000	
0312413	07945-3330100	Attachment
0941260	07910-4630100	Pinion gear retainer wrench
0941286	07973-4630200	O-ring guide
0941278	07973-4630100	Oil seal guide
1375179	07935-MB00000	Pinion gear dis/assembly tool
0753483	07746-0010400	Attachment

Frame/Suspension

0960005	07947-4630100	Fork seal driver
1174002	07716-0020203	Locknut wrench
1093608	KS-HBA-08-469	Locknut wrench adapter
0647651	07916-3710100	Steering stem socket wrench
1418219	07946-MB00000	Bearing race remover/driver
0647669	07946-3710500	Bearing race remover
1210988	07946-3710701	Bearing driver attachment
0933242	07749-0010000	Bearing driver handle
or	or	
0298240	07949-6110000	
0753491	07746-0010200	Attachment, 37 x 40 mm
0413021	07914-5670100	Snap ring pliers (internal)
1044312	07947-3710101	Fork seal driver
1065531	07953-4250002	Steering race remover
0413112	07936-3710100	Remover handle
0413120	07936-3710200	Remover weight
1099373	07936-8890300	Bearing remover, 30 mm

(cont'd)

Tools (cont'd.)

Brakes

Honda Code	Part Number	Description
0418236	07914-3230001	Snap ring pliers

Crankshaft/Piston

Honda Code	Part Number	Description
0413070	07925-3710200	Timing pulley holder
0413294	07958-3710000	Piston base
1065549	07973-6570002	Piston pin tool set
0412916	07347-0010100	Vee blocks

Clutch

Honda Code	Part Number	Description
0956995 or 0413047	07923-4610000 or 07923-3710000	Clutch center holder
1174002	07716-0020203	Locknut socket wrench
0478834	07945-3710101	Clutch outer driver

Wheels/Tires

Honda Code	Part Number	Description
0915629	07710-0010200	Retainer wrench attachment (front)
0809707	07710-0010100	Retainer wrench attachment (rear)
0907352	07710-0010401	Retainer wrench
0933242	07749-0010000	Driver
0813113	07746-0010300	Attachment, 42 x 47 mm
0753483	07746-0010400	Attachment, 52 x 55 mm
0959882	07746-0040300	Pilot, 15 mm
0823302	07772-0020201	Rim protectors
0701193	07772-0020100	Tire lever

Ignition

Honda Code	Part Number	Description
1230382 0583690	ST-AH-260-MC7 or A973X-041-XXXXX	Vacuum hand pump

Charging

Honda Code	Part Number	Description
0413062	07925-3710100	Rotor holder
0413096	07934-3710200	Rotor puller
0413310	07964-3710000	Spring compressor set
0418236	07914-3230001	Circlip pliers
0942284	M989X-268-94228	Hydrometer
		Torx T-40 bit or socket, refer to General Service Tool Newsletter No. 3 for sources.

Lights/Switches/Instruments

0665455 or 0610766	07920-6710001 or 07920-6710000	Lock wrench, 50 mm

Local Source Tools

Tools in this catagory are not available from Honda and should be purchased locally. Items listed here are those that are used for more than one service procedure.

Tool	Used In Sections:
Feeler gauges, blade and wire types	4, 7, 8, 9, 10, 12
Torque wrench, 0 - 140 N·m (0 - 100 ft-lb)	4, 6, 7, 8, 9, 10, 12, 13, 16, 17, 19
Floor or scissors-type jack	3, 6, 12
Air pressure gauge	3, 12, 14, 18
Dial indicator	3, 13, 14
Compression tester	3, 7
Vernier calipers	7, 9, 10, 12, 13, 17
Spring scale	3, 12, 16, 17
Inside micrometer or bore gauge	7, 8, 12, 13
Outside micrometers, 0 - 25 mm, 25 - 50 mm, 50 - 75 mm, 75 - 100 mm	7, 8, 10, 12, 13, 16
Ball gauge, straightedge, plastigage	7, 8
Piston ring compressor	8, 10
Oil pressure gauge	3, 18
Thermometer, −30° to +120°C (−22°F to +248°F), pan and hot plate or burner	5, 18
Tread depth gauge	3, 14
Multimeter	15, 16, 17, 18

Specifications

Specifications

General

	Items		GL1100	GL1100 I	ASPENCADE
Dimensions	Overall length	1980-1981	2,345 mm (92.3 in)	2,405 mm (94.7 in)	
		1982	2,340 mm (92.1 in)	2,400 mm (94.5 in)	2,430 mm (95.7 in)
		1983—		2,460 mm (96.9 in)	2,460 mm (96.9 in)
	Overall width		920 mm (36.2 in)		
	Overall height				
		1980-1981	1,195 mm (47.0 in)	1,500 mm (59.1 in)	
		1982—	1,190 mm (46.9 in)	1,495 mm (58.9 in)	
	Wheelbase		1,605 mm (63.2 in)		
	Seat height				
		1980-1981	795 mm (31.3 in)		
		1982—	790 mm (31.1 in)		
	Foot peg height				
		1980-1981	295 mm (11.6 in)		
		1982—	290 mm (11.4 in)		
	Ground clearance				
		1980-1981	145 mm (5.7 in)		
		1982—	140 mm (5.5 in)		
	Dry weight				
		1980-1981	267 kg (589 lbs)	305 kg (673 lbs)	
		1982	270 kg (595 lbs)	308 kg (679 lbs)	318 kg (702 lbs)
		1983—	272 kg (600 lbs)	311 kg (686 lbs)	321 kg (708 lbs)
	Curb weight (Wet)				
		1980-1981	290 kg (639 lbs)	328 kg (723 lbs)	
		1982	293 kg (646 lbs)	331 kg (729 lbs)	341 kg (753 lbs)
		1983—	294 kg (648 lbs)	334 kg (737 lbs)	345 kg (760 lbs)
Frame	Type		Double cradle		
	F. suspension, travel and air pressure	1980-1982	Telescopic, 147 mm (5.8 in), 100 – 150 kPa (1.0 – 1.5 kg/cm², 14 – 21 psi)		
		1983—	Telescopic, 140 mm (5.5 in), 100 – 150 kPa (1.0 – 1.5 kg/cm², 14 – 21 psi)		
	R. suspension, travel and air pressure				
		1980	Swingarm, 80 mm (3.1 in), 200 – 300 kPa (2.0 – 3.0 kg/cm², 28 – 42 psi)		
		1981-1982 (All); 1983— Aspencade	Swingarm, 80 mm (3.1 in), 200 – 400 kPa (2.0 – 4.0 kg/cm², 28 – 57 psi)		
		1983—STD, Interstate	Swingarm, 80 mm (3.1 in), 0 – 400 kPa (0 – 4.0 kg/cm², 0 – 57 psi)		
	F. tire size and air pressure				
		1980-1981	110/90 – 19 62H, 225 kPa (2.25 kg/cm², 32 psi)		
		1982—	120/90 – 18 65H, M120/90 – 18, 225 kPa (2.25 kg/cm², 32 psi)		
	R. tire size and air pressure				
		1980-1981	130/90 – 17 68H, 225 kPa (2.25 kg/cm², 32 psi) up to 200 lb load; 280 kPa (2.80 kg/cm², 40 psi) up to vehicle load capacity		
		1982—	140/90 – 16 71H, M140/90 – 16; 225 kPa (2.25 kg/cm², 32 psi) up to 200 lb load; 280 kPa (2.80 kg/cm², 40 psi) up to vehicle load capacity		

General (cont'd)

	Items	GL1100	GL1100 I	ASPENCADE
Frame (cont'd)	F. brake and lining swept area			
	1980-1981	Double disc brake, 1,200 cm^2 (186 sq in)		
	1982	Double disc brake, 948 cm^2 (147 sq in)		
	1983—	Double disc brake, 952 cm^2 (148 sq in)		1032 cm^2 (160 sq in)
	R. brake and lining swept area			
	1980-1981	Disc brake, 653 cm^2 (101 sq in)		
	1982	Disc brake, 503 cm^2 (78 sq in)		516 cm^2 (80 sq in)
	1983—	Disc brake, 516 cm^2 (80 sq in)		
	Fuel capacity	20 lit. (5.3 US gal, 4.4 Imp gal)		
	Fuel reserve capacity	4 lit. (1.1 US gal, 0.9 Imp gal)		
	Caster angle	60°50'		
	Trail length			
	1980-1981	134 mm (5.3 in)		
	1982—	132 mm (5.2 in)		
	Front fork oil capacity			
	1980-1981	220 cc (7.4 oz) ATF after draining 240 cc (8.0 oz) ATF after disassembly		
	1982—	270 cc (9.1 oz) ATF after draining 290 cc (9.8 oz) ATF after disassembly		
	Rear shock oil capacity	365 cc (12.5 oz) ATF		
Engine	Type, cylinder arrangement	Water cooled, 4-stroke O.H.C., Opposed four		
	Engine weight	108 kg (238 lb)		
	Bore and stroke	75 x 61.4 mm (2.953 x 2.417 in)		
	Displacement	1,085 cc (66.2 cu-in)		
	Compression ratio	9.2:1		
	Cylinder compression	1,200 kPa (12 kg/cm^2, 171 psi)		
	Valve train	Belt driven overhead camshaft		
	Oil capacity	4.0 lit. (4.2 US qt, 3.5 Imp qt) at disassembly 3.2 lit. (3.4 US qt, 2.8 Imp qt) after draining		
	Oil type	SAE 10W–40 SE or SF, Honda 4-Stroke oil or equivalent		
	Lubrication system and oil pressure	Forced pressure and wet sump Cold: 60 psi at 900 rpm 64 psi at 5000 rpm Hot: 12 psi at 900 rpm 60 psi at 5000 rpm		
	Air filtration system	Dry paper element		
	Cooling system capacity	3.4 lit. (3.6 US qt, 3.0 Imp qt)		
	Radiator cap relief pressure	0.75 – 1.05 kg/cm^2 (10.7 – 14.9 psi)		
	Camshaft (at 1 mm lift)			
	Intake valve Opens	5° (BTDC)		
	Closes	43° (ABDC)		
	Exhaust valve Opens	45° (BBDC)		
	Closes	5° (ATDC)		
	Valve clearance IN	0.10 mm (0.004 in)		
	(cold) EX	0.13 mm (0.005 in)		
	Idle speed	950 ± 100 rpm		
	Fast idle speed	2500 – 3000 rpm		
Carburetion	Carburetor type	VB, 30 mm (1.18 in) venturi bore		
	Identification number 1980-1981	VB48A		
	1982—	VB48C		
	Pilot screw	Refer to page 4-14		
	Float level	15.5 mm (0.61 in)		
	Carburetor vacuum	All cylinders within 50 mm (2 in) Hg of each other		

(cont'd)

Specifications

General (cont'd)

	Items			
Drive Train	Clutch	Wet, multi-plate type		
	Clutch free play	10 – 20 mm (3/8 – 3/4 in)		
	Transmission	5-speed, constant mesh		
	Primary reduction ratio	1.708 (41/24)		
	Secondary reduction ratio			
	1980-1982	0.973 (36/37)		
	1983—	0.897 (35/39)		
		1980-1981	1982	1983
	Gear ratio 1st	2.500 (40/16)	2.500 (40/16)	2.642 (37/14)
	Gear ratio 2nd	1.667 (40/24)	1.667 (40/24)	
	Gear ratio 3rd	1.286 (36/28)	1.250 (35/28)	
	Gear ratio 4th	1.065 (33/31)	1.000 (32/32)	
	Gear ratio 5th	0.909 (30/33)	0.829 (29/35)	
	Final reduction ratio	3.091 (34/11)	3.100 (31/10)	
	Gear shift pattern	Left foot operated return system, 1 – N – 2 – 3 – 4 – 5		
	Final gear oil capacity	140 – 160 cc (4.73 – 5.41 oz) Hypoid gear oil, API GL-5 SAE 90 above 5°C (41°F) SAE 80 below 5°C (41°F)		
Electrical	Ignition	Transistorized		
	Ignition timing "F" mark			
	1980-1981	13° (BTDC) at 950 rpm		
	1982—	10° (BTDC) at 950 rpm		
	Full advance	38.5° (BTDC) at 3,000 rpm		
	Starting System	Starting motor		
	Alternator	A.C. generator, 12V 300W/5,000 rpm		
	Battery capacity	12V-20AH		
	Spark plug	NGK	ND	
	Standard			
	1980	D8EA	X24ES – U	
	1981 (optional for 1980)	DR8ES – L	X24 ESR – U	
	1982—	DPR8EA – 9	X24EPR – U9	
	For cold climate (below 5°C, 41°F)			
	1980	D7EA	X22ES – U	
	1981 (optional for 1980)	DR7ES	X22ESR – U	
	1982—	DPR7EA-9	X22EPR-U9	
	For extended high speed riding			
	1980	D9EA	X27ES – U	
	1981 (optional for 1980)	DR8ES	X27ESR – U	
	1982—	DPR9EA – 9	X27EPR – U9	
	Spark plug gap			
	1980-1981	0.6 – 0.7 mm (0.024 – 0.028 in)		
	1982	0.8 – 0.9 mm (0.031 – 0.035 in)		
	Firing order	1 – 3 – 2 – 4		
	Fuses 1980-1982; 1983—STD	5A, 10A, 15A, and 30A (main fuse)		
	1983—Interstate	1A, 2A, 5A, 10A, 15A, and 30A (main fuse)		
	1983—Aspencade	0.2A, 1A, 2A, 5A, 10A, 15A, and 30A (main fuse)		
Lights	Headlight	12V-55/60 W H4 bulb (Phillips 12342/99, or equivalent)		
	Tail/stoplight	12V – 3/32 cp No. 1157		
	Turn signal light (Front/position light)	12V – 3/32 cp No. 1034		
	(Rear)	12V – 3/32 cp No. 1073		

General (cont'd)

	Items	
Lights (cont'd)	Meter light	12V – 2 cp No. 57
	Neutral indicator	12V – 2 cp No. 57
	Turn signal indicator	12V – 2 cp No. 57
	High beam indicator	12V – 2 cp No. 57
	Oil pressure warning light	12V – 2 cp No. 57
	Rear suspension warning light	12V – 2 cp No. 57
	Overdrive indicator light (1983—)	12V – 1 cp

Electrical

Ignition	Timing marks:	F-1: Indicator for cylinders 1 and 2 F-2: Indicator for cylinders 3 and 4
	Ignition timing:	F mark (for static or idle speed timing)
	1980-1981	13° BTDC at 950 rpm
	1982—	10° BTDC at 950 rpm Full advance: 38.5° BTDC Advance starts: 950 rpm Maximum advance: 3000 rpm
Charging	Generator drive	damper spring:
	Free length:	26 mm (1.02 in)
	Force:	155 – 175 kg at 20 mm (342 – 386 lb at 0.787 in)
Cooling Fan	Motor type: 12V DC Speed (without blade): 2800 rpm Current (without blade): 1.4 A (maximum) Blade rotation: Clockwise from rider's position Rated (loaded) current and speed: 4.6 ± 0.5 A/2,500 ± 300 rpm Switch rating: 7A	
Starter	Brush length:	12 – 13 mm (0.47 – 0.51 in)
	Service limit:	5.5 mm (0.22 in)
	Brush spring tension:	560 – 680 gr (19.7 – 24.0 oz)
	Service limit:	400 gr (14.0 oz)
Lights, Switches, Instruments	Oil pressure warning light:	Light on below 0.2 kg/cm² (3 psi) Light out at 0.2 – 0.4 kg/cm² (3 to 6 psi)
	Thermostatic fan switch:	Fan comes on at 98 – 102°C (208 – 216°F) Fan goes off at 93 – 97°C (199 – 207°F)
	Temperature sensor resistances:	Ohms — Test Temperature 104 — 60°C (140°F) 44 — 85°C (185°F) 20 — 110°C (230°F) 16 — 120°C (248°F)
	Fuel gauge sensor resistance:	75 – 80 ohms at bottom of float travel 6 – 10 ohms at top of float travel

Specifications

Standards/Service Limits

Fuel System

Unit: mm (in)

	Measurement	Standard	Service Limit
Fuel Pump	Pressure	0.17 kg/cm² (2.4 psi) at cranking speed	—
		0.16 kg/cm² (2.3 psi) at 1100 rpm	—
		0.14 kg/cm² (2.0 psi) at 5000 rpm	—

Cylinder Head

Cylinder Head	Warpage	—	0.10 (0.004)
Camshaft	Intake lobe height	37.0 (1.46)	36.8 (1.45)
	Exhaust lobe height	36.8 (1.45)	36.6 (1.44)
	Camshaft ends		
	Journal O.D.	26.95 – 26.97 (1.061 – 1.062)	26.91 (1.059)
	Bearing I.D.	27.00 – 27.02 (1.063 – 1.064)	27.05 (1.065)
	Bearing clearance	0.030 – 0.067 (0.0011 – 0.0026)	0.140 (0.0055)
	Camshaft center		
	Journal O.D.	24.934 – 24.950 (0.9817 – 0.09823)	24.91 (0.980)
	Bearing I.D.	25.00 – 25.02 (0.984 – 0.985)	25.05 (0.986)
	Bearing clearance	0.050 – 0.087 (0.0019 – 0.0034)	0.140 (0.0055)
Compression		12 kg/cm² (171 psi)	10 kg/cm² (142 psi) or more than 1.0 kg/cm² (15 psi) variation between cylinders
Rocker Arms And Shafts	Rocker arm I.D.	14.00 – 14.02 (0.551 – 0.552)	14.05 (0.553)
	Rocker shaft O.D.	13.97 – 13.98 (0.549 – 0.550)	13.94 (0.548)
	Camshaft holder, rocker shaft hole O.D.	14.00 – 14.02 (0.551 – 0.552)	14.05 (0.553)
Valve Springs	Outer free length	43.8 (1.72)	42.5 (1.67)
	Inner free length	40.2 (1.58)	39.0 (1.54)
	Spring force at compressed length:	Outer 51.5 ± 3.6 kg at 28 mm (113.5 ± 7.9 lb at 1.1 in) Inner 28.8 ± 2.0 kg at 26 mm (63.5 ± 4.5 lb at 1.0 in)	
Valves And Guides	Valve stem O.D.		
	Intake	6.58 – 6.59 (0.259 – 0.260)	—
	Exhaust	6.55 – 6.56 (0.2579 – 0.2583)	—
	Valve guide I.D.		
	Intake and Exhaust	6.60 – 6.62 (0.260 – 0.261)	6.64 (0.261)
	Valve-to-guide clearance:		
	Intake	0.010 – 0.040 (0.0004 – 0.0016)	0.08 (0.003)
	Exhaust	0.05 – 0.07 (0.002 – 0.003)	0.10 (0.004)
	Valve head diameter:		
	Intake	38.00 (1.496)	—
	Exhaust	32.00 (1.260)	—
	Valve seat width:	1.4 (0.06)	

Crankshaft/Piston

Unit: mm (in)

	Measurement	Standard	Service Limit
Cylinder	Inside diameter	75.000 – 75.015 (2.9528 – 2.9533)	75.100 (2.9567)
	Out-of-round	—	0.15 (0.006)
	Taper	—	0.05 (0.002)
	Warp across top of cylinders	—	0.10 (0.004)
Piston	O.D. at skirt	74.950 – 74.980 (2.9508 – 2.9520)	74.850 (2.9468)
	Piston-to-cylinder clearance	0.020 – 0.065 (0.0008 – 0.0026)	0.15 (0.006)
	Ring end gap (top & second)	0.1 – 0.3 (0.004 – 0.012)	0.6 (0.02)
	Ring end gap (oil ring side rail)	0.2 – 0.9 (0.008 – 0.035)	1.1 (0.04)
	Ring groove width (top & second)	1.205 – 1.220 (0.0475 – 0.0480)	1.300 (0.0512)
	Ring groove width (oil ring)	2.505 – 2.520 (0.0986 – 0.0992)	2.600 (0.1024)
	Ring-to-land clearance (top & second)	0.015 – 0.045 (0.0006 – 0.0018)	0.120 (0.0047)
Crankshaft	Main bearing oil clearance	0.020 – 0.044 (0.0008 – 0.0017)	0.080 (0.0031)
	Connecting rod bearing oil clearance	0.020 – 0.044 (0.0008 – 0.0017)	0.080 (0.0031)
	Connecting rod side clearance	0.15 – 0.30 (0.006 – 0.012)	0.40 (0.016)
	Crankpin and main journal taper	—	0.004 (0.0002)
	Crankpin and main journal out-of-round	—	0.008 (0.0003)
	Run-out	—	0.050 (0.0019)
Oil Pumps	Pump tip clearance	0.15 (0.006)	0.35 (0.014)
	Pump body clearance	0.15 – 0.21 (0.006 – 0.008)	0.41 (0.016)
	Pump side clearance		
	Main pump:	0.02 – 0.07 (0.001 – 0.003)	0.12 (0.005)
	Scavenge pump:	0.02 – 0.10 (0.001 – 0.004)	0.12 (0.005)

Clutch

Plates	Warpage	—	0.3 (0.012)
Discs	Thickness	3.42 – 3.58 (0.135 – 0.141)	3.20 (0.126)
Springs	Free length	35.5 (1.40)	34.2 (1.35)
	Force	23.8 kg at 23 mm (52.4 lb at 0.905 in)	21.8 kg at 23 mm (48 lb at 0.905 in)

Transmission

Mainshaft And Countershaft	C1 gear I.D.	31.000 – 31.025 (1.2205 – 1.2215)	31.050 (1.2224)
	C1 gear bushing O.D.	30.950 – 30.975 (1.2185 – 1.2195)	30.900 (1.2165)
	C1 gear-to-bushing clearance	0.025 – 0.075 (0.0001 – 0.0030)	0.150 (0.0059)
	C2 gear I.D.	28.000 – 28.033 (1.1024 – 1.1037)	28.060 (1.1047)
	C2 gear bushing O.D.	27.959 – 27.990 (1.1007 – 1.1020)	27.900 (1.0984)
	C2 gear-to-bushing clearance	0.010 – 0.074 (0.0004 – 0.0029)	0.160 (0.0063)
	C3 gear I.D.	31.000 – 31.033 (1.2205 – 1.2218)	31.060 (1.2228)
	C3 gear bushing O.D.	30.950 – 30.975 (1.2185 – 1.2195)	30.900 (1.2165)
	C3 gear-to-bushing clearance	0.025 – 0.083 (0.0001 – 0.0033)	0.160 (0.0063)
	M4 gear I.D.	25.020 – 25.041 (0.9850 – 0.9859)	25.060 (0.9866)
	M4 gear-to-mainshaft clearance	0.040 – 0.082 (0.0016 – 0.0032)	0.150 (0.0059)
	M5 gear I.D.	28.020 – 28.041 (1.1031 – 1.1040)	28.060 (1.1047)
	M5 gear bushing O.D.	27.959 – 27.980 (1.1007 – 1.1016)	27.900 (1.0984)
	M5 gear-to-bushing clearance	0.040 – 0.082 (0.0016 – 0.0032)	0.160 (0.0063)
	Backlash (1st gear)	0.032 – 0.115 (0.0013 – 0.0045)	0.200 (0.0097)
	Backlash (2nd, 3rd, 4th, and 5th gears)	0.024 – 0.072 (0.0009 – 0.0028)	0.120 (0.0047)

(cont'd)

Specifications

Standards/Service Limits

Transmission (cont'd)

Unit: mm (in)

	Measurement	Standard	Service Limit
Shift Fork	Inside diameter, left and center: right: Shaft O.D. End thickness	13.00 – 13.02 (0.5120 – 0.5125) 13.00 – 13.03 (0.5120 – 0.5130) 12.966 – 12.984 (0.5104 – 0.5112) 6.4 – 6.5 (0.25 – 0.26)	13.04 (0.5133) 13.05 (0.5138) 12.90 (0.508) 6.1 (0.24)
Shift drum	Major diameter Minor diameter Groove width	35.96 – 35.98 (1.416 – 1.417) 11.966 – 11.984 (0.4711 – 0.4718) 7.05 – 7.15 (0.278 – 0.282)	35.92 (1.414) 11.95 (0.470) —
Gear Backlash	1st gear 2nd gear 3rd, 4th and 5th gears	0.044 – 0.121 (0.0017 – 0.0048) 0.044 – 0.088 (0.0017 – 0.0035) 0.046 – 0.094 (0.0018 – 0.0037)	0.2 (0.008) 0.17 (0.007) 0.17 (0.007)
Output Shaft	Damping spring	Free length: 110.9 (4.37) Installed length: 84.5 (3.33)	

Final Drive

Gear	Backlash Assembly preload Pinion preload	0.08 – 0.18 (0.003 – 0.007) 9 – 11.5 kg-cm (7.8 – 10.0 in-lb) 5 – 6 kg-cm (4.3 – 5.2 in-lb)	0.3 (0.012) — —

Suspension

Front fork	Air pressure Fluid capacity (after draining) 1980-1981 1982— Fluid capacity (after disassembly) 1980-1981 1982— Spring free length (Spring A) Spring free length (Spring B) 1980-1982 1983— Slider I.D. Tube O.D. Guide bushing I.D.	1.0 – 1.5 kg/cm² (14 – 21 psi) 220 cc (7.0 oz) 270 cc (9.1 oz) 240 cc (8.0 oz) 290 cc (9.8 oz) 111.7 (4.40) 466.2 (18.35) 472.2 (18.59) 40.040 – 40.080 (1.5764 – 1.5779) 38.950 – 38.975 (1.5335 – 1.5344) 39.02 – 39.11 (1.536 – 1.540)	— — — — — 106.0 (4.17) 442.0 (17.40) 462.8 (18.22) 40.130 (1.5799) 38.900 (1.5315) 39.16 (1.542)
Rear shock	Air Pressure 1980 1981-1982 (All); 1983—Aspencade 1983—STD, Interstate Fluid capacity	 2.0 – 3.0 kg/cm² (28 – 43 psi) 2.0 – 4.0 kg/cm² (28 – 57 psi) 0 – 4.0 kg/cm² (0 – 57 psi) 365 cc (12.5 oz) ATF	 — — —
Side stand	Retracting force	2 – 3 kg (4.4 – 6.6 lb)	—

Standards/Service Limits (cont'd)

Brakes

Unit: mm (in)

	Measurement	Standard	Service Limit
Front Brake	Master cylinder I.D.	15.870 – 15.913 (0.6248 – 0.6265)	15.925 (0.6270)
	Master cylinder piston O.D.	15.827 – 15.854 (0.6231 – 0.6242)	15.815 (0.6226)
	Caliper I.D.		
	1980-1981	42.85 – 42.90 (1.687 – 1.689)	42.92 (1.690)
	1982—	30.23 – 30.28 (1.190 – 1.192)	30.29 (1.193)
	Caliper piston O.D.		
	1980-1981	42.772 – 42.822 (1.6839 – 1.6859)	42.765 (1.6837)
	1982—	30.148 – 30.198 (1.187 – 1.189)	30.140 (1.866)
	Disc thickness		
	1980—Standard and Interstate	4.9 – 5.1 (0.19 – 0.20)	4.0 (0.16)
	1982—Aspencade	9.9 – 10.1 (0.39 – 0.40)	9.0 (0.35)
	Disc runout	—	0.3 (0.01)
	Pad thickness	6.9 – 7.1 (0.27 – 0.28)	—
Rear Brake	Master cylinder I.D.		
	1980-1982	14.000 – 14.043 (0.5512 – 0.5529)	14.055 (0.5533)
	1983—	15.870 – 15.913 (0.6248 – 0.6265)	15.925 (0.6270)
	Master cylinder piston O.D.		
	1980-1982	13.957 – 13.984 (0.5495 – 0.5506)	13.940 (0.5488)
	1983—	15.827 – 15.854 (0.6231 – 0.6242)	15.815 (0.6226)
	Caliper I.D.		
	1980-1981	42.85 – 42.90 (1.687 – 1.689)	42.92 (1.690)
	1982—	30.23 – 30.28 (1.190 – 1.192)	30.29 (1.193)
	Caliper piston O.D.		
	1980-1981	42.772 – 42.822 (1.6839 – 1.6859)	42.765 (1.6837)
	1982—	30.148 – 30.198 (1.187 – 1.189)	30.140 (1.866)
	Disc thickness		
	1980—Standard and Interstate	6.9 – 7.1 (0.27 – 0.28)	4.0 (0.16)
	1982—Aspencade	9.9 – 10.1 (0.39 – 0.40)	9.0 (0.35)
	Disc runout	—	0.3 (0.01)
	Pad thickness	7.9 – 8.1 (0.31 – 0.32)	—

Wheels/Tires

Axle	Runout	0 – 0.05 (0 – 0.002)	0.2 (0.008)
Wheel	Runout	—	2.0 (0.08)
Tires	Tread depth		
	Front	—	1.5 (1/16)
	Rear	—	2.0 (3/32)

Maintenance

Maintenance

Service Information

- Some maintenance procedures require the engine to be cold (room temperature below 35°C, 95°F) and others require a warm engine. Perform the procedures for scheduled maintenance items in the order they are presented by the maintenance schedule. This will ensure that those procedures requiring a cold engine will be done first.

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

Specifications

Brake fluid:	DOT 3
Carburetor vacuum:	All carburetors within 50 mm (2 in) Hg
Clutch free play:	10 – 20 mm (⅜ – ¾ in)
Compression pressure (cold):	12 kg/cm^2 (171 psi)
Standard:	10 kg/cm^2 (142) psi
Service Limit:	1.0 kg/cm^2 (15 psi) difference between cylinders
Coolant:	50% ethylene glycol base antifreeze 50% water
Cooling system capacity:	3.4 (3.6 US qt)
Drive shaft joint grease:	NLGI-2 lithium based multipurpose grease with molybdenum disulphide additive
Engine firing order:	1 – 3 – 2 – 4
Final drive lubricant:	Hypoid gear oil API GL-5 – Over 5°C (41°F) SAE 90 – Below 5°C (41°F) SAE 80 – Quantity: 140 – 160 cc (4.7 – 5.4 oz)
Idle speed:	950 ± 100 rpm
Ignition timing:	F mark (for statis or idle speed timing)
1980 - 1981:	13° BTDC at 950 rpm
1982— :	10° BTDC at 950 rpm Full Advance: 38.5° BTDC Advance starts: 950 rpm
marks:	F-1: indicator for cylinders 1 and 2 F-2: indicator for cylinders 3 and 4
Oil pressure: cold	60 psi at 900 rpm 64 psi at 5000 rpm
hot	12 psi at 900 rpm 60 psi at 5000 rpm

Spark plug gap:

1980-1981:	0.6 – 0.7 mm (0.024 – 0.028 in)
1982– :	0.8 – 0.9 mm (0.031 – 0.035 in)

Spark plugs: NOTE: 1981 spark plugs are optional for 1980

Usage \ Manufacturer	NGK	ND
Standard:	1980: D8ES 1981: DR8ES 1982— : DPR8EA – 9	X24ES – U X24ESR – U X24EPR – U9
Extended high speed riding:	1980: D9ES 1981: DR9ES 1982— : DPR9EA – 9	X27ES – U X27ESR – U X27EPR – U9
Cold climate (below 5°C, 41°F):	1980: D7ES 1981: DR7ES 1982— : DPR7EA – 9	X22ES – U X22ESR – U X22EPR – U9

Suspension

Recommended air pressure:	Front:	1.0 – 1.5 kg/cm^2	(14 – 21 psi)
	Rear, 1980:	2.0 – 3.0 kg/cm^2	(28 – 42 psi)
	1981-1982 (all); 1983–Aspencade:	2.0 – 4.0 kg/cm^2	(28 – 57 psi)
	1983–STD, Interstate:	0 – 4.0 kg/cm^2	(0 – 57 psi)

Tire pressure

Front:	2.25 kg/cm^2 (32 psi) up to 200 lb load
Rear:	2.25 kg/cm^2 (32 psi)
	2.8 kg/cm^2 (40 psi) up to vehicle capacity load

Valve clearance (cold, below 35°C, 95°F):

Intake	0.10 mm (0.004 in)
Exhaust	0.13 mm (0.005 in)

(cont'd)

Service Information (cont'd)

Torque Values

Engine

Item	N·m	ft-lb
Generator cover cap	12	9
Oil drain bolt	38	28
Oil filter bolt	30	22
Spark plugs	16	12
Timing mark cap	14	10
Valve adjusting lock nut	14	10

Frame

Item	N·m	ft-lb
Handlebar upper holder socket bolt	22	16
Fork upper pinch bolt	22	16
Top bridge bolt/nut	11	8
Fork lower pinch bolt	35	25
Air hose connector	6	4
Air valve	6	4
Fork joint hose (10 mm)	18	13
Fork joint hose (8 mm)	6	4
Front axle holder		
1980–1982	35	25
1983–	22	16
Front axle nut	58	42
Front brake disc bolt/nut	30	22
Front caliper mount bolt		
1980-1982	35	25
1983—(Upper)	40	29
(Lower)	23	17
Front caliper bolt		
1980–1981	18	13
1982–	23	17
Caliper pivot bolt		
1983–	28	20
Front master cylinder holder bolt	10	7
Brake hose bolt	30	22
Brake hose 2-way joint bolt	12	9
Rear wheel axle nut		
1980-1982	90	65
1983—	95	69
Rear brake disc bolt/nut	30	22
Rear caliper torque link	22	16
Rear master cylinder bolt	27	20
Brake fluid reservoir bolt	12	9
Rear brake hose oil bolt	30	22
Metal brake line nuts		
1983–	9	6
Brake rod joint lock nut	18	13
Rear caliper bolt	18	13
Rear axle pinch bolt	27	20
Final gear case attaching nut	40	29

Frame (cont'd)

Item	N·m	ft-lb
Swingarm pivot bolt (right)	100	72
Swingarm pivot bolt (left)	18	13
Swingarm pivot lock nut	100	72
Final case filler cap	12	9
Final gear case drain bolt	12	9
Rear shock absorber bolt/nut	35	25
Air hose connector (3-way joint)	10	7
Air hose joint (right)	6	4
Air hose joint (left)	18	13
Air pressure sensor	10	7
Air hose joint (10 mm) (Aspencade only)	6	4
Air hose joint (12 mm) (Aspencade only)	11	8
Air hose joint bolt (6 mm) (Aspencade only)	10	7
Air hose joint bolt (10 mm) (Aspencade only)	10	7
Connector (Aspencade only)	6	4
Lock nut (Aspencade only)	14	10
Engine mount bolt (8 mm)	22	16
Engine mount bolt (10 mm)	35	25
Exhaust pipe nut	18	13
Footpeg bracket bolt/nut	60	43
Rear footpeg bolt	40	29
Muffler mount bolt	40	29
Gearshift pedal bolt	10	7
Rear fender mount bolt	14	10
Headlight case mount bolt	22	16
Side stand pivot bolt	22	16
Center stand pivot bolt	22	16
Exhaust muffler joint bolt	22	16

Troubleshooting

Engine Will Not Crank
- Battery or charging system faulty.
- Starter or starter system faulty.
- Engine seized.
- Switches or accessory faulty.

Engine Cranks But Will Not Start
- Out of fuel or incorrect fuel.
- Engine Stop Switch OFF.
- Ignition system faulty.
- Fuel filter clogged.
- Fuel cap vent clogged.

Engine Cranks But Will Not Start–Cold Weather
- Choke setting too lean.
- Ice in fuel lines, carburetors, fuel tank, or fuel filter.
- Battery weak due to low temperature.
- Incorrect engine oil.
- Water pump iced (incorrect antifreeze ratio).

Engine Cranks But Will Not Start–Engine Hot
- Fuel flow stopped by boiling (vapor lock) in lines, carburetor, or fuel pump.
- Incorrect starting procedure.

Run-On (Continues To Run With Ignition Off)
- Excessive carbon build-up in engine.
- Intake pipe leak.
- Old or incorrect fuel.

Lack Of Power Or High Speed Performance
- Alternator voltage low or battery low.
- Ignition system faulty.
- Intake pipe leaks.
- Not enough fuel.
- Valve springs weak or broken.
- Cylinder head gasket blown.

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

Mid-Range Performance Poor
- Incorrect spark plug heat range.
- Faulty spark plugs.
- Ignition system faulty.
- Low engine compression.
- Low fuel pump pressure.
- Improperly adjusted throttle linkage.
- Incorrect valve adjustment.

Backfires, Explosions In Muffler
- Ignition system faulty.
- Retarded ignition timing.
- Valve timing faulty.
- Lean mixture (often due to dirt or water in fuel or intake air leak).
- Leaky or sticking intake valve or weak or broken intake valve spring.
- Tight exhaust valve(s).
- Weak or broken exhaust valve spring(s).
- Burnt exhaust valve(s).

Pre-Ignition (Mixture Ignites Before Spark Plug Fires)
- Hot spot in combustion chamber (carbon particle).
- Overheated valve (sticking in guide, improperly adjusted)
- Overheated engine.

Maintenance Schedule

Perform Pre-Ride Inspection in the Owner's Manual at each scheduled maintenance period.

I: Inspect and Clean, Adjust, Lubricate or Replace if necessary.
C: Clean R: Replace A: Adjust L: Lubricate

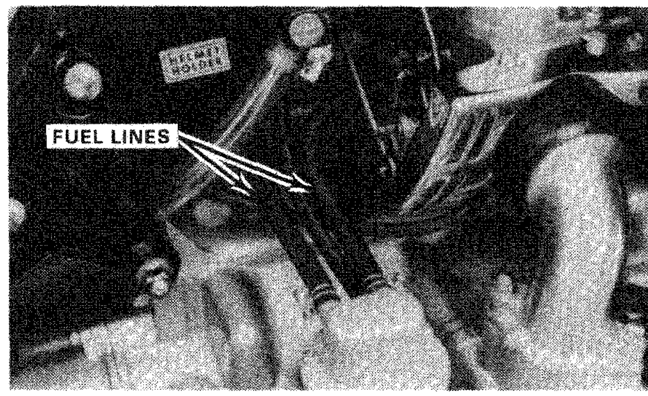
		Item / Frequency	Whichever Comes First ⇨ / ⇩ Every	Odometer Reading (Note 3): 600 mi (1,000 km)	4,000 mi (6,400 km)	8,000 mi (12,800 km)	12,000 mi (19,200 km)	16,000 mi (25,600 km)	20,000 mi (32,000 km)	24,000 mi (38,400 km)	Refer to page
Emission Related Items	*	Fuel Lines				I		I		I	3-8
	*	Fuel Filter								R	3-8
	*	Throttle Operation		I		I		I		I	3-9
	*	Carburetor-Choke				I		I		I	3-10
		Air Cleaner	Note 1			R		R		R	3-11
		Crankcase Breather	Note 2		C	C	C	C	C	C	3-11
		Spark Plugs			R	R	R	R	R	R	3-12
	*	Valve Clearance		I		I		I		I	3-13
		Engine Oil	Year	R		R		R		R	3-14
		Engine Oil Filter	Year	R		R		R		R	3-14
	*	Carburetor-Synchronize		I		I		I		I	3-16
	*	Carburetor-Idle Speed		I	I	I	I	I	I	I	3-17
		Radiator Coolant				I		I		*R	3-17
	*	Radiator Core				I		I		I	3-17
	*	Cooling System Hoses/ Connections		I		I		I		I	3-17
Non-Emission Related Items	*	Drive Shaft Joint				L		L		L	3-18
		Final Drive Lubricant				I		I		I	3-19
	*	Final Driven Flange	Tire change			L		L		L	11-14,14-12
		Battery	Month	I	I	I	I	I	I	I	3-20
		Brake Fluid	Month I 2 Years *R	I	I	I	I	I	*R	I	3-20
		Brake Pad Wear			I	I	I	I	I	I	3-21
		Brake System		I		I		I		I	3-21
	*	Brake Light Switch		I		I		I		I	3-22
	*	Headlight Aim		I		I		I		I	3-23
		Clutch		I	I	I	I	I	I	I	3-23
		Side Stand				I		I		I	3-24
	*	Suspension		I		I		I		I	3-25
		Air Pump Element					C			C	3-32
	*	Air Drier		I		I		I		I	3-32
	*	Nuts, Bolts, Fasteners		I		I		I		I	3-31
	**	Wheels/Tires		I		I		I		I	3-27
	**	Steering Head Bearings		I		I		I		I	3-25

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

NOTES (1) Service more frequently when riding in dusty areas.
(2) Service more frequently when riding in rain or at full throttle.
(3) For higher odometer readings, repeat at the frequency interval established here.

Fuel Lines

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

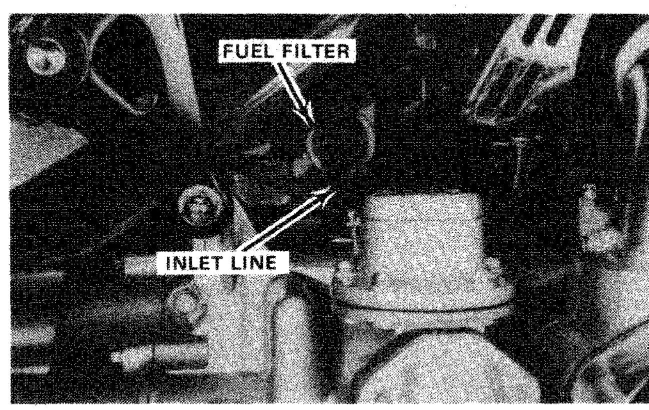


Fuel Filter

Turn the fuel valve OFF.

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

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



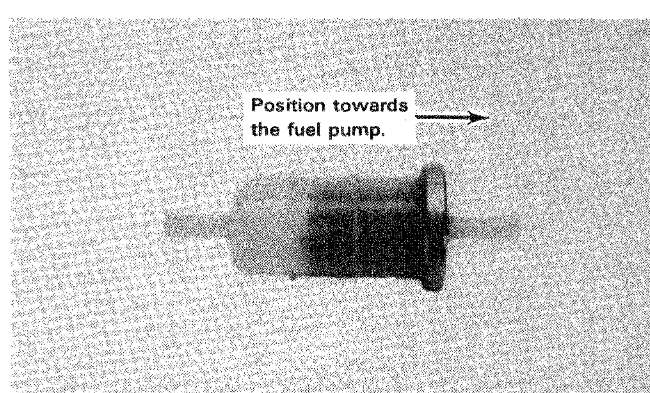
Remove the fuel filter bracket and loosen the hose clamps at each end of the filter.

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

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

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

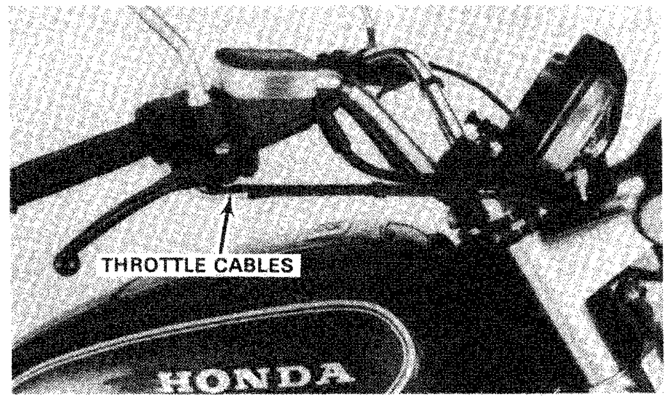
Position the filter bracket on the gas tank and install the nut, then tighten the hose clamp at the fuel pump.



Throttle Operation

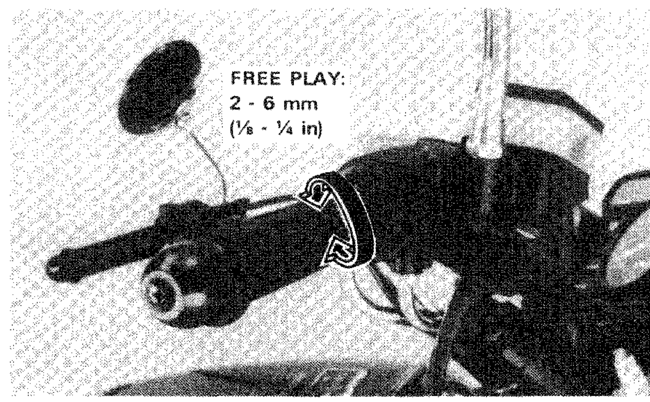
Check for smooth throttle grip full opening and automatic full closing in all steering positions.

Make sure there is no deterioration, damage or kinking in the throttle cables. Replace any damaged parts.



If throttle operation is not smooth, lubricate the throttle cables.

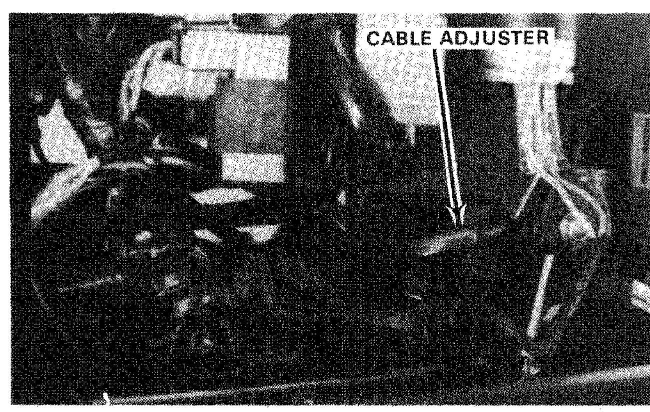
Make sure throttle grip free play is 2 – 6 mm (1/8–1/4 in) at the throttle grip flange.



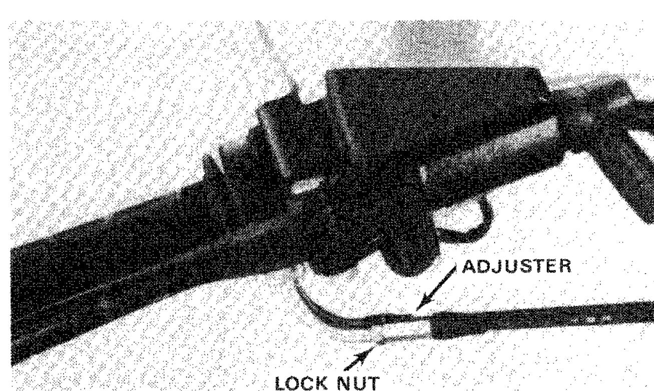
Make minor adjustments with the adjuster at the throttle grip.

Make major throttle grip free play adjustments with the middle cable adjuster after removing the top compartment.

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



Recheck throttle operation and install all removed parts.

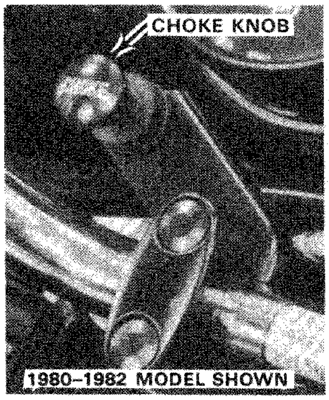


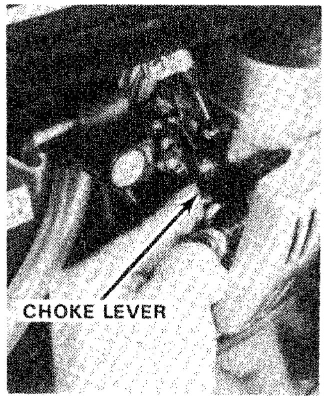
Maintenance

Carburetor - Choke

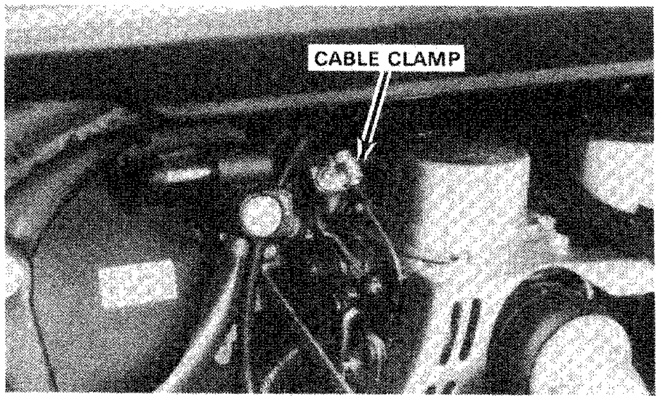
Check for smooth choke knob operation. If operation is not smooth, lubricate the choke cable.

Pull the choke knob (1980–1982) all the way up or the choke lever on the handlebar (1983—) all the way to the left. Make sure the choke valve is closed by moving the choke lever on the carburetor.



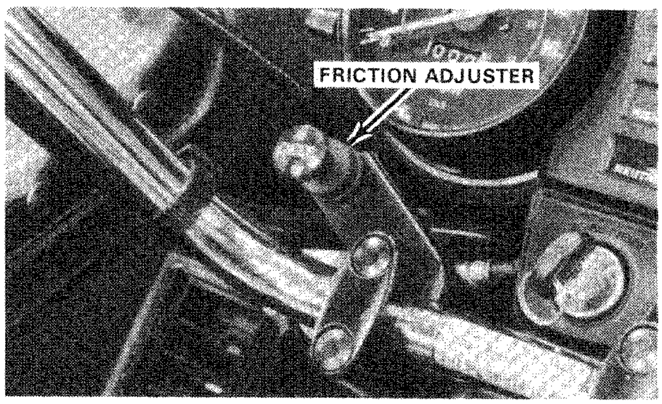


Adjust if necessary by loosening the choke cable clamp on the carburetor and moving the cable so the choke lever is fully closed. Tighten the clamp.



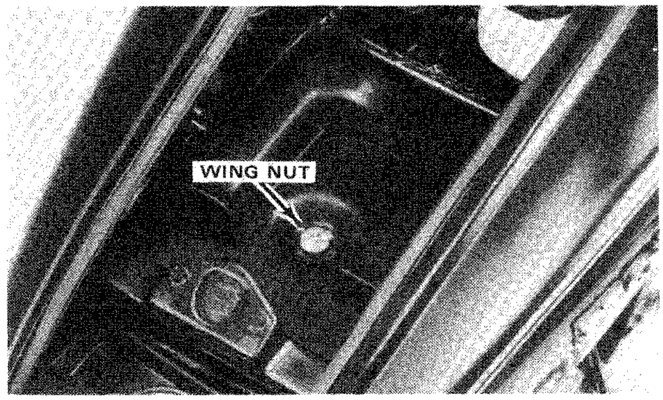
Push the choke knob all the way down or the choke lever on the handlebar all the way to the right. Make sure the choke valve is fully open by checking for free play in the cable between the lever and cable casing.

1980-1982:
The choke knob must move smoothly and stay where positioned. Adjust operation friction by lifting the rubber cover and turning the friction adjuster.



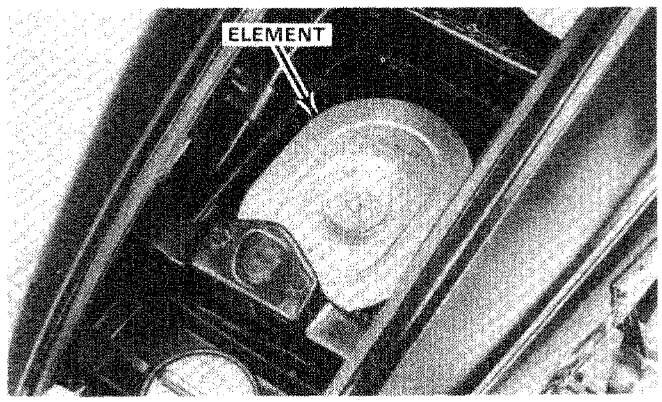
Air Cleaner

Open the top compartment cover and lift out the tool tray. Remove the wing nut and air cleaner cover. Pull out the air cleaner element and discard it.



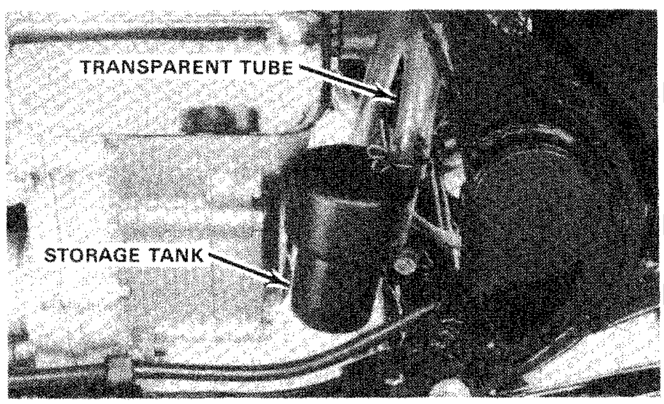
Install a new air cleaner element. Install the air cleaner cover and wing nut.

Install the tool tray and close the top compartment cover.



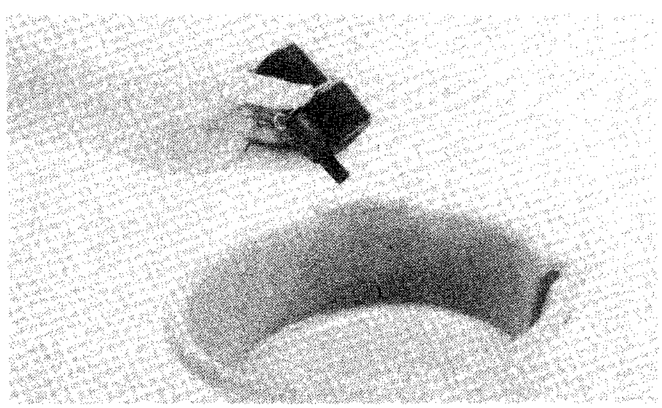
Crankcase Breather

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



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

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.



Maintenance

Spark Plugs

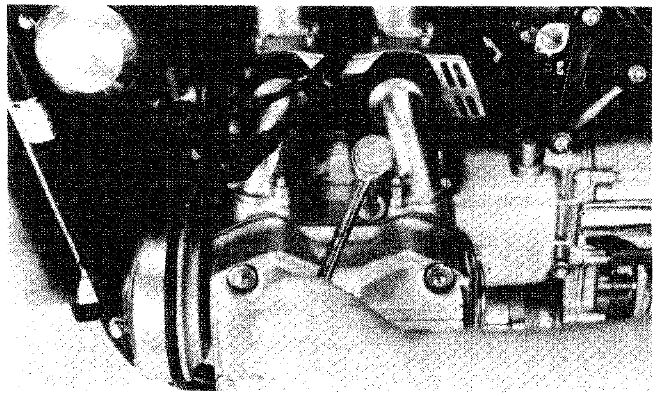
Remove dirt from around the spark plug bases.

Disconnect the spark plug caps. Remove the spark plugs and discard them.

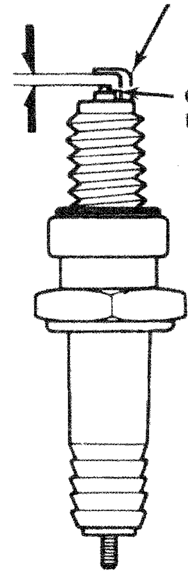
Measure the electrode gap of the new spark plugs with a wire-type gauge.

Spark plug gap:

1980-1981: 0.6 – 0.7 mm (0.024 – 0.028 in)
1982— : 0.8 – 0.9 mm (0.031 – 0.035 in)



If necessary, adjust the gap by carefully bending the side electrode.



Install the washers on the plugs and thread them into the cylinder heads by hand to avoid crossthreading. Tighten them by hand, then tighten them an additional 1/2 turn with a spark plug wrench to compress the washers.

Connect the spark plug caps.

Recommended Spark Plugs:

Manufacturer \ Usage		Standard	For Cold Climate (below 5° C, 41° F)	For Extended High Speed Riding
NGK	1980	D8EA	D7EA	D9EA
	1981*	DR8ES–L	DR7ES	DR8ES
	1982—	DPR8EA–9	DPR7EA–9	DPR9EA–9
ND	1980	X24ES–U	X22ES–U	X27ES–U
	1981*	X24ESR–U	X22ESR–U	X27ESR–U
	1982—	X24EPR–U9	X22EPR–U9	X27EPR–U9

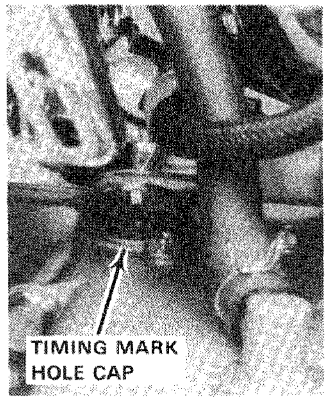
*Optional for 1980.

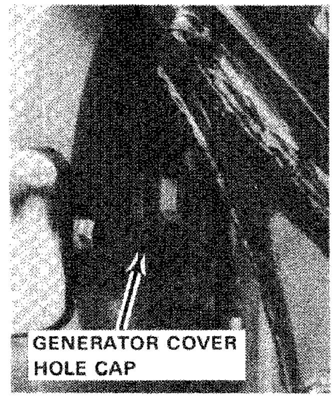
Valve Clearance

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

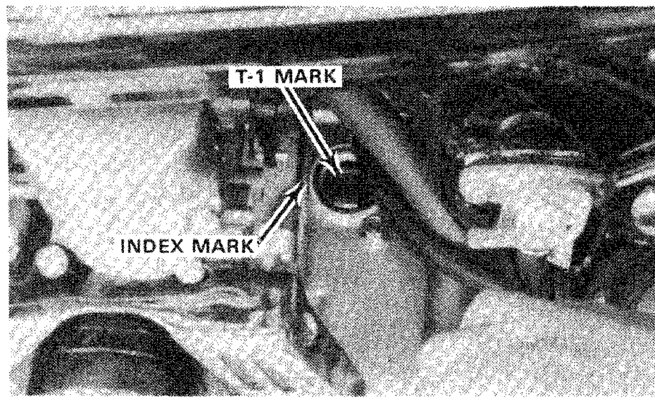
Remove the timing mark hole cap and generator cover hole cap.

Remove the cylinder head covers.

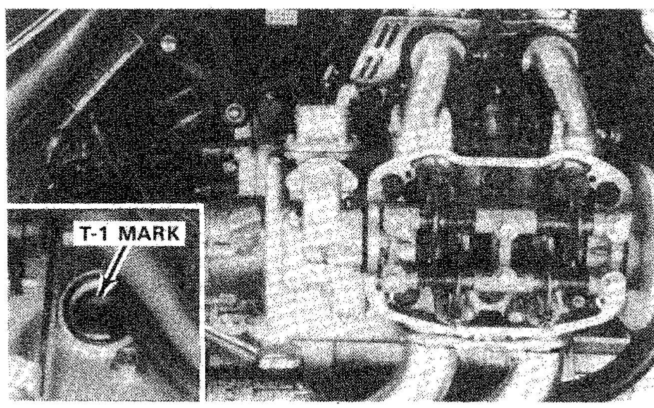




Rotate the generator rotor clockwise to align the T-1 mark on the flywheel with index mark on the edge of the timing mark hole.



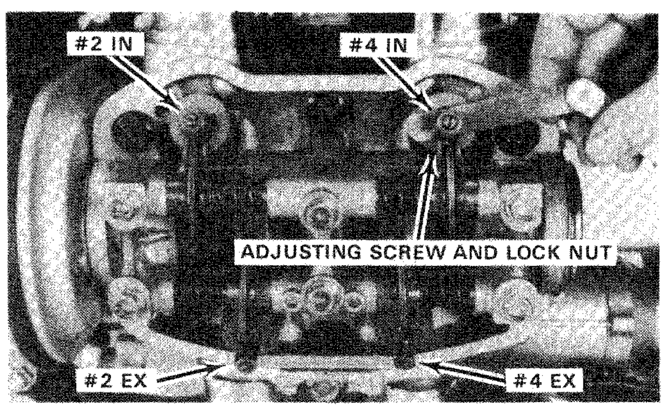
Make sure the No. 1 piston is at TDC (Top Dead Center) on the compression stroke by moving the rocker arms. If they do not move, rotate the generator rotor clockwise one complete turn and realign the T-1 mark with the index mark. The rocker arms should now move, indicating that the No. 1 piston is on the compression stroke.



Check valve clearance for these valves:

Cyl. No. 1 - Intake
Cyl. No. 1 - Exhaust
Cyl. No. 3 - Exhaust
Cyl. No. 4 - Intake

Valve Clearance (cold):
Intake: 0.10 mm (0.004 in)
Exhaust: 0.13 mm (0.005 in)



(cont'd)

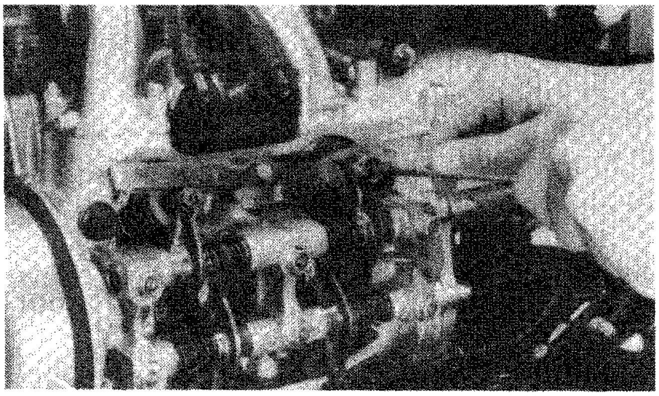
Valve Clearance (cont'd)

Insert the proper thickness feeler gauge between the valve stem and adjusting screw.

Adjust clearance 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 valve clearance.

Valve adjustment wrench:
H/C 026250, P/N 07908-3230000

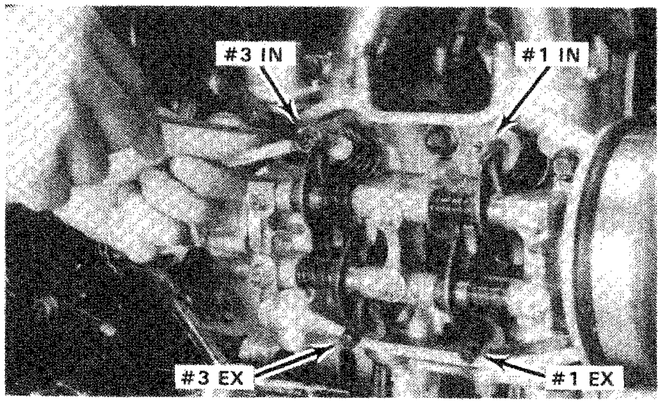


Rotate the generator rotor clockwise one complete turn (360°) and align the T-1 mark with the index mark. Make sure the No. 2 piston is at TDC on the compression stroke.

Check valve clearance for these valves:

Cyl. No. 2 - Intake
Cyl. No. 2 - Exhaust
Cyl. No. 3 - Intake
Cyl. No. 4 - Exhaust

Install the cylinder head covers, timing mark hole cap and generator cover hole cap.

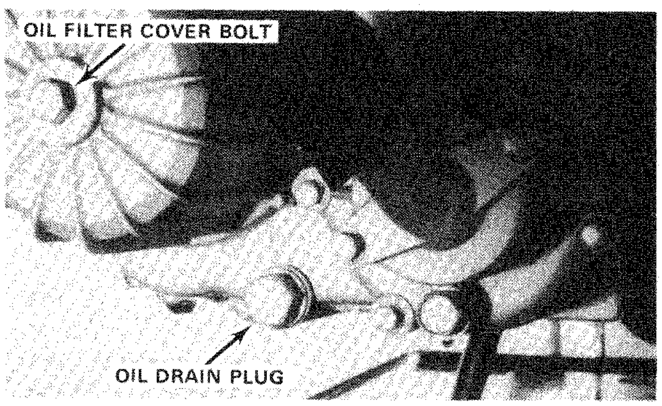


Engine Oil and Filter Change

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

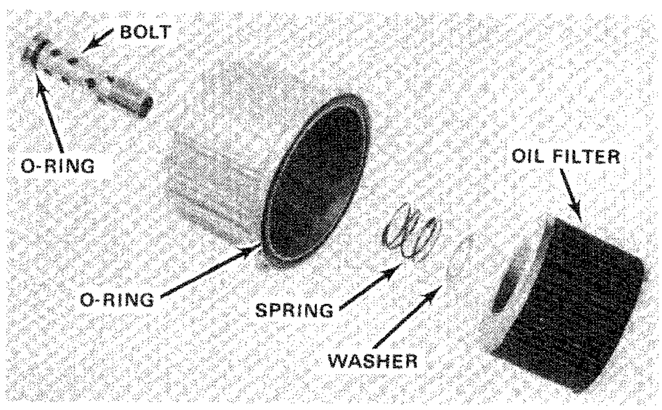
Stop the engine.

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

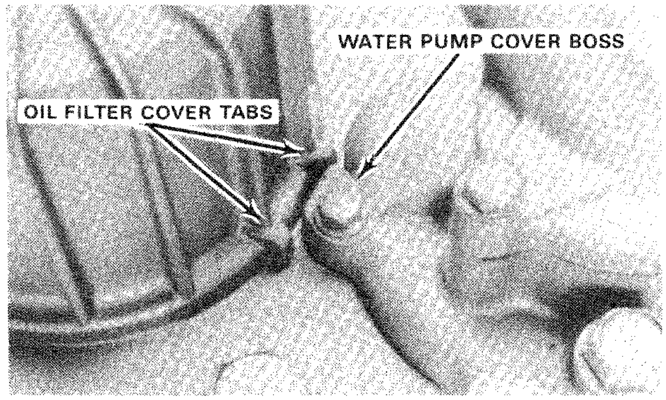


After draining the oil completely, check that the drain plug sealing washer is in good condition and install the plug.

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



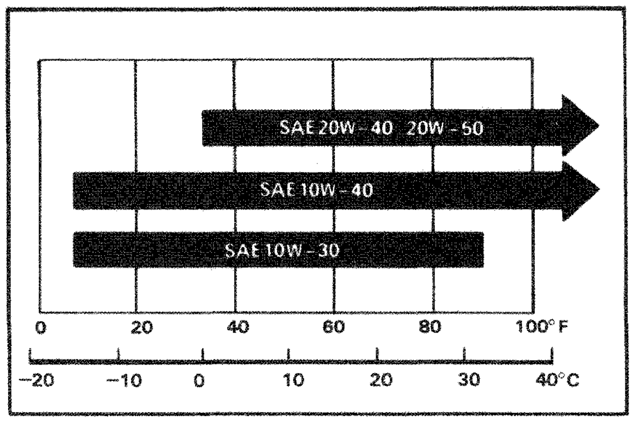
Install the filter cover, with the boss on the water pump cover between the two cover tabs.



Fill the crankcase with approximately 3.2 liters (3.4 U.S. quarts) of the recommended grade oil and install the oil filler cap.

Recommended Oil:
Honda 4-Stroke Oil or
Equivalent API Service Classification—
SE or SF General All Temperature
SAE 10W–40

Other viscosities shown in the chart may be used when the average temperature is within the indicated range.

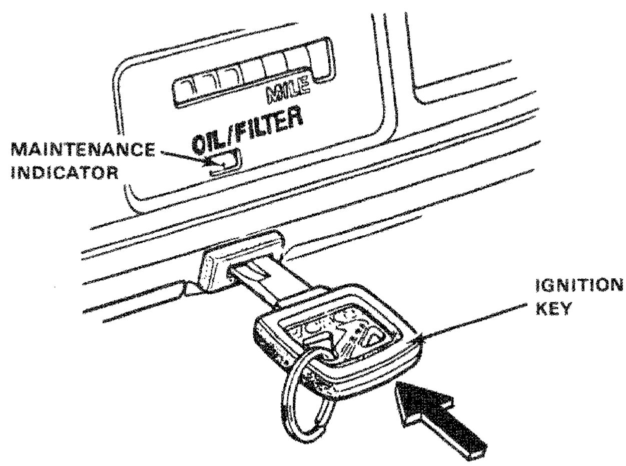


Start the engine and let it idle for a few minutes. Stop the engine and make sure the oil level is at the upper level mark of the oil inspection window. Wipe the window, if necessary.

Check that there are no oil leaks.

1983— Aspencade:

The odometer is electrically driven, but the display is mechanical. At the regular scheduled oil/filter change interval (8,000 miles), the odometer changes a maintenance indicator from green to yellow. Be sure to reset the indicator after each oil/filter change by inserting the ignition key in the slot below the indicator.



NOTE: The indicator changes from yellow to red after the regular scheduled oil/filter change interval has been exceeded by 1,000 miles.

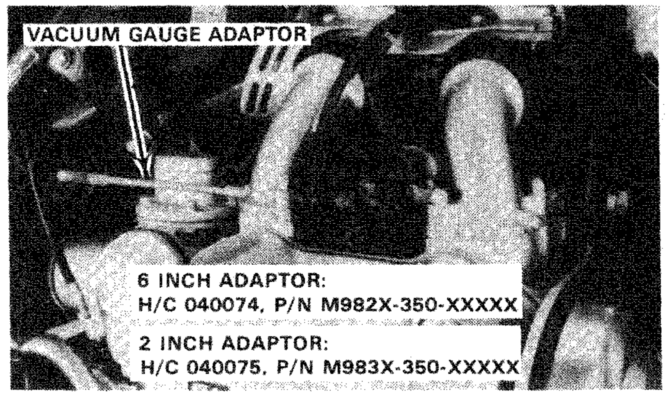
(cont'd)

Maintenance

Carburetor - Synchronize

NOTE: Perform carburetor synchronization with the engine at normal operating temperature, transmission in neutral, and the motorcycle on the center stand.

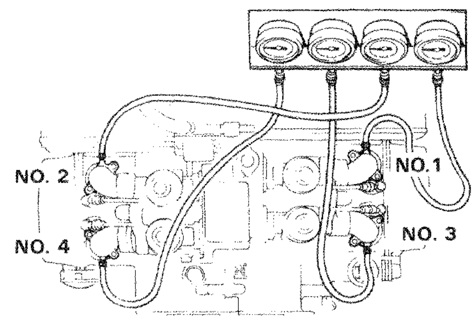
Remove the plugs from the carburetor intake pipes and install the vacuum gauge adaptors. Connect the vacuum gauges.



Start the engine and adjust the idle speed to 950 ± 100rpm.

Check that the difference in vacuum gauge readings is 50 mm (2.0 in) Hg or less.

VACUUM GAUGES:
H/C 047978, P/N M937B-921-XXXXX



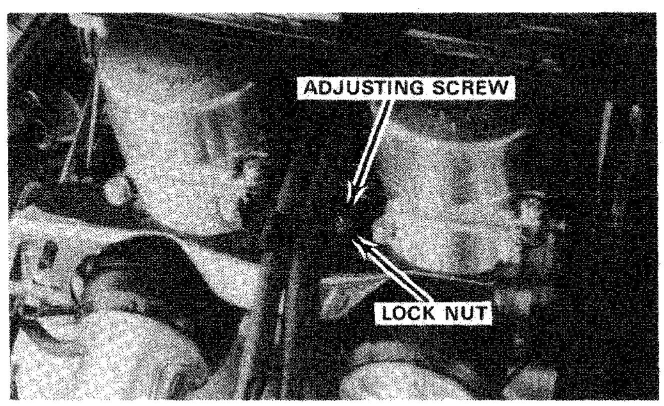
If adjustment is necessary, loosen the lock nuts and turn the adjusting screws with the adjustment wrench (H/C 071957, P/N 07908-4220100) until the vacuum gauge readings are within specification.

NOTE: The No. 3 carburetor cannot be adjusted. It is the base.

Hold the adjusting screws and tighten the lock nuts.

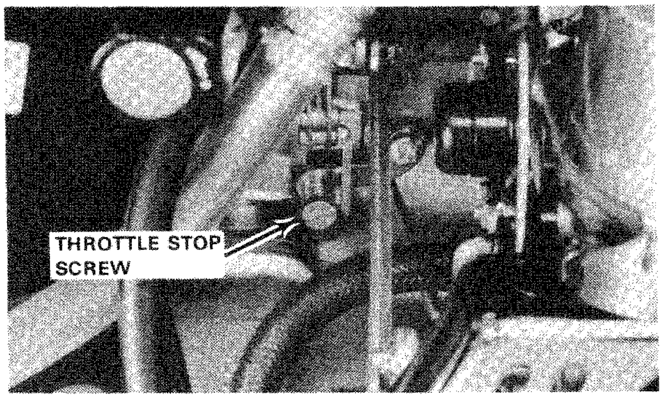
Recheck the synchronization and idle speed.

Stop the engine and install the removed parts.



Carburetor - Idle Speed

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



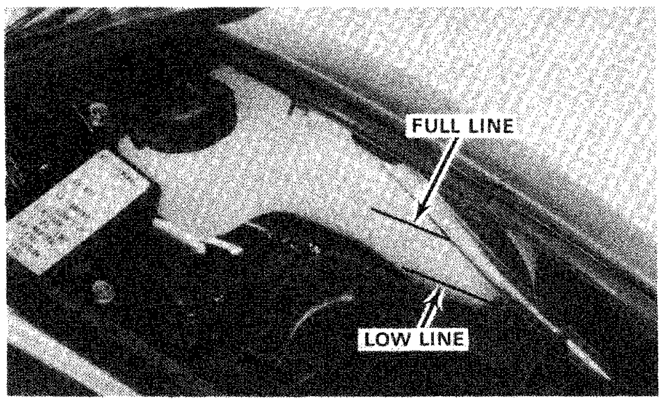
Warm up the engine, shift to neutral, and place the motorcycle on its center stand.

Adjust idle speed with the throttle stop screw.

Idle speed: 950 ± 100 rpm.

Radiator-Coolant, Hoses, and Core

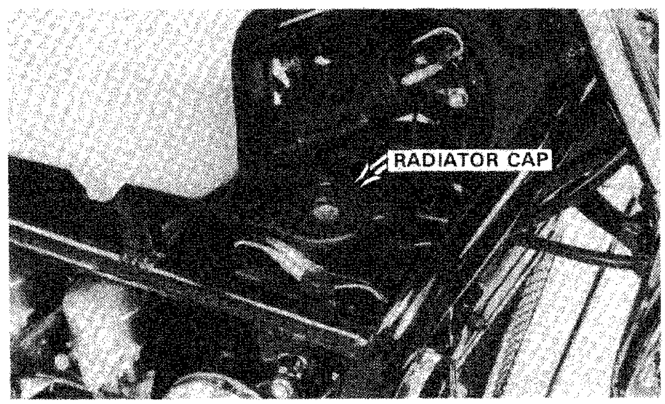
Open the top compartment cover and remove the tool tray.



Check the coolant level in the reserve tank with the engine running at normal operating temperature. It should be between the FULL and LOW level lines.

If necessary, remove the reserve tank cap and fill to the FULL level line.

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



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

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

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

Re-install the top compartment cover.

(cont'd)

Maintenance

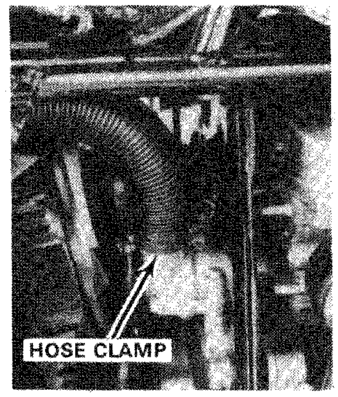
Radiator - Coolant, Hoses, and Core (cont'd)

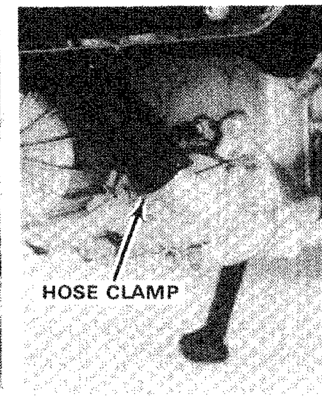
Remove insects and other obstructions from the radiator fins by directing low pressure compressed air or water through the fins from the back side.

If any of the fins are bent, remove the front screen and use tweezers to straighten them. Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.

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

Refer to Section 5 for coolant replacement.





Drive Shaft Joint

Lubricate the drive shaft joint by pumping the recommended grease through the grease fitting at the final drive gear case flange.

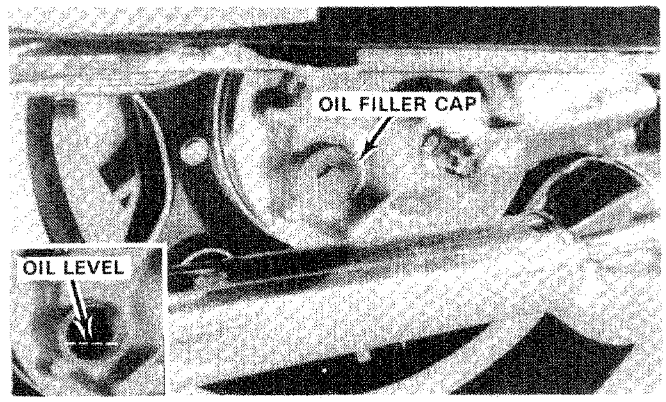
Recommended grease:
NLGI-2 or equivalent lithium-based multipurpose grease with molybdenum disulfide additive.

Final Drive Lubricant

Inspection

With the motorcycle on the center stand on a level surface, remove the oil filler cap. The oil lever should reach the filler hole threads.

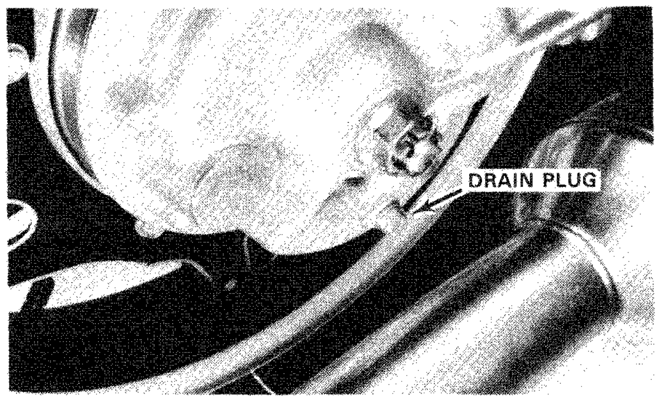
If the level is low, add the recommended gear oil (below) until it reaches the filler hole threads. Install the filler cap.



Draining

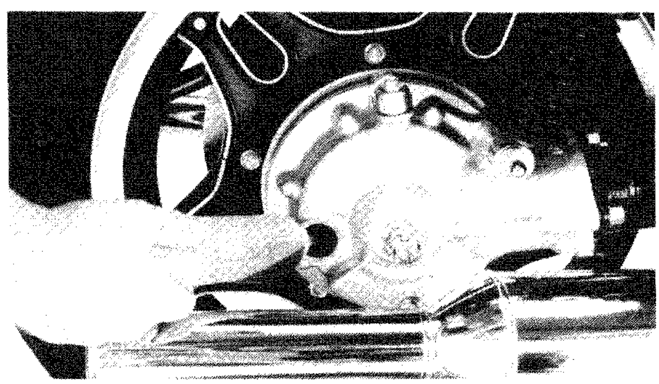
With the motorcycle on its center stand, put a pan under the final drive. Remove the filler cap and drain plug.

Rotate the wheel by hand to drain any residual oil.



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

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



Recommended Gear Oil: Hypoid gear oil API GL-5
Over 5° C, SAE 90
Below 5° C, SAE 80

Quantity: 140 - 160 cc (4.7 - 5.4 oz)

Maintenance

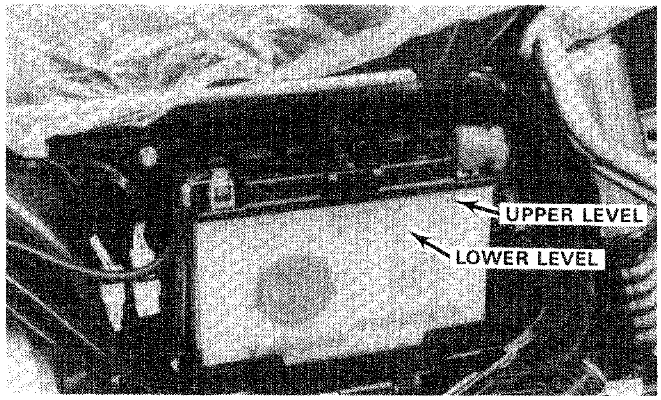
Battery

Remove the left side cover.

Inspect the battery fluid level.

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

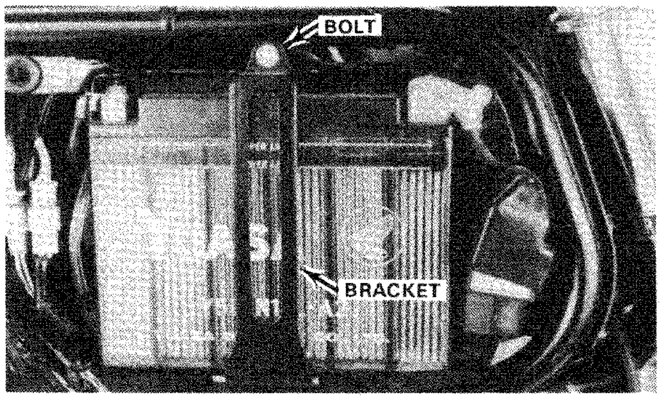
NOTE: Add only distilled water. Tap water will shorten the service life of the battery.



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

To remove the battery, remove the bolt and swing down the holding bracket. Disconnect the battery breather tube at the battery vent. Disconnect the negative cable first, then the positive cable.

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

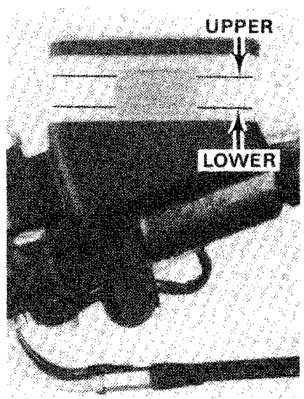


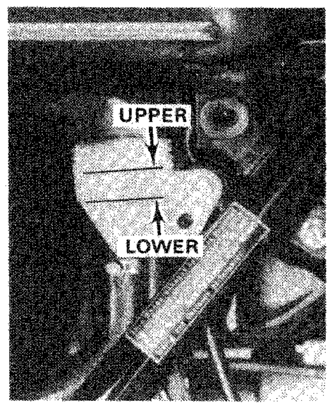
Brake Fluid

Check that the front and rear brake fluid reservoirs are filled to the upper level mark.

If the level nears the lower level mark, fill the reservoir with DOT-3 brake fluid to the upper level mark.

Be sure to check the entire system for leaks, if the fluid level is low.



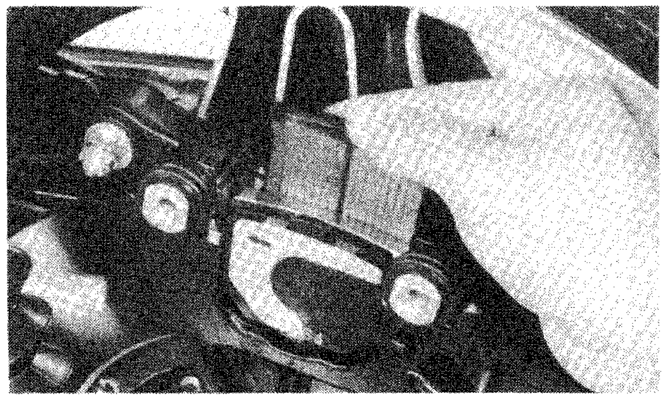


Refer to Section 13 for the brake bleeding procedure.

CAUTION:
- **Do not mix different types of fluid as they may not be compatible.**
- **Do not remove the front reservoir cap until the handlebar is positioned straight ahead and the reservoir is level.**
- **Do not operate the brake lever or pedal with the reservoir cap removed or brake fluid may squirt out. Brake fluid will damage painted surfaces and some plastics.**

Brake Pad Wear

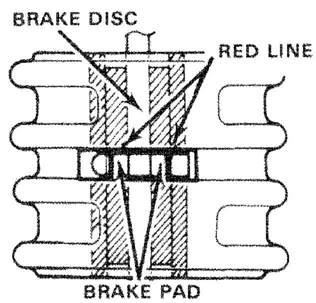
Remove the cap from the caliper and check for brake pad wear.



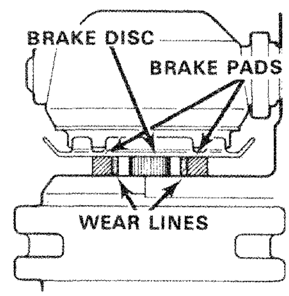
Replace both brake pads if the red line on the top of either pad reaches the edge of the brake disc.

CAUTION: Always replace the brake pads in pairs to assure even disc pressure.

Refer to Section 13 for brake pad replacement.



1980 – 1981



1982–

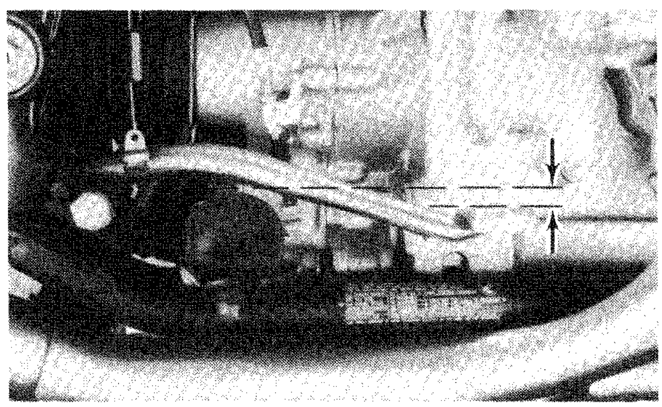
Brake System

Brake Pedal Height

Adjust brake pedal height so the pedal is the specified distance below the upper surface of the footpeg.

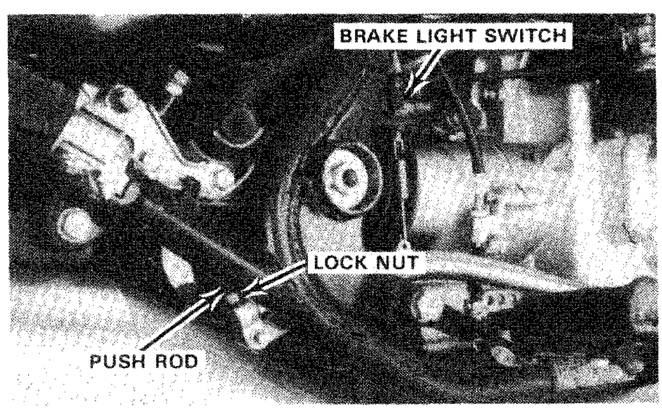
Brake pedal height:
1980-1982: 7 mm
1983— : 10 mm

CAUTION: Incorrect brake pedal height can cause brake drag.



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

NOTE: Adjust the brake light switch (next page) after adjusting pedal height.



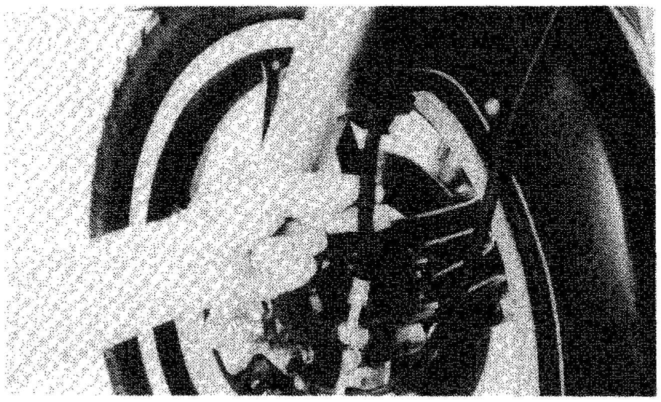
(cont'd)

Maintenance

Brake System (cont'd)

General Inspection

Inspect the brake hoses and fittings for deterioration, cracks, and signs of leakage. Tighten any loose fittings. Replace hoses and fittings, as required.

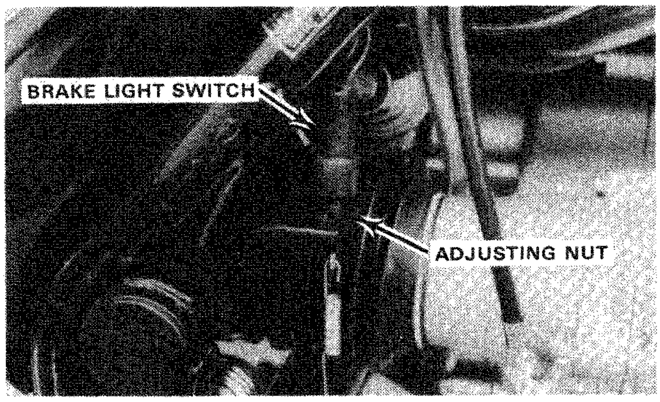


Brake Light Switch

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

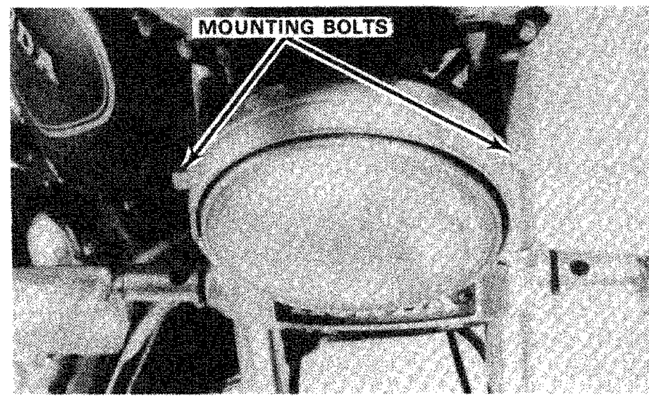
Adjust by holding the switch body and turning the adjusting nut. Do not turn the switch body.

NOTE: The front brake light switch does not require adjustment.



Headlight Aim

To adjust the headlight vertically, remove the reflectors on each side of the headlight case. Loosen the headlight case mounting bolts and rotate the case. Tighten the mounting bolts and install the reflectors.

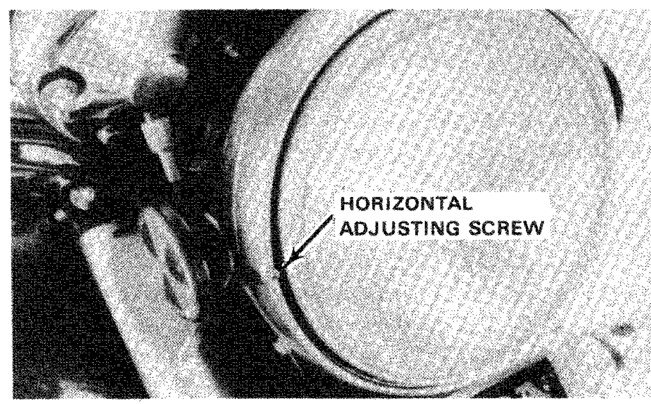


Adjust horizontally by turning the adjusting screw on the headlight rim. Turn the adjusting screw clockwise to move the beam toward the rider's left.

NOTE: Adjust the headlight beam as specified by local laws and regulation.

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

Make sure all lights function properly.

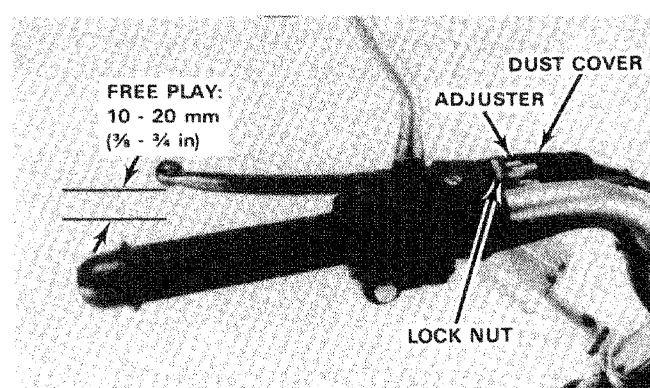


Clutch

Normal clutch lever free play is 10–20 mm (3/8–3/4 in) measured at the end of the lever.

Make minor adjustments with the adjuster at the clutch lever. Pull back the dust cover, loosen the lock nut, and turn the adjuster. Tighten the lock nut and reinstall the dust cover.

NOTE: Do not expose more than 8 mm (5/16 in) of adjuster threads beyond the lever holder.



Check the clutch cable for kinks or signs of wear that could cause sticking or failure. Replace, if necessary.

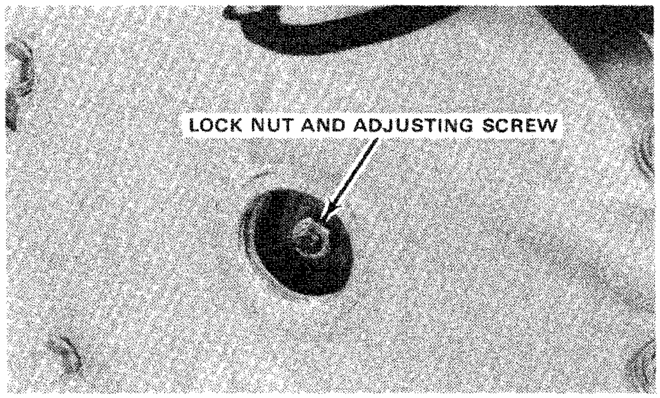
Lubricate the clutch cable with a commercially available cable lubricant to prevent premature wear and corrosion.

(cont'd)

Maintenance

Clutch (cont'd)

At the scheduled maintenance intervals perform clutch adjustment at all adjusting points.

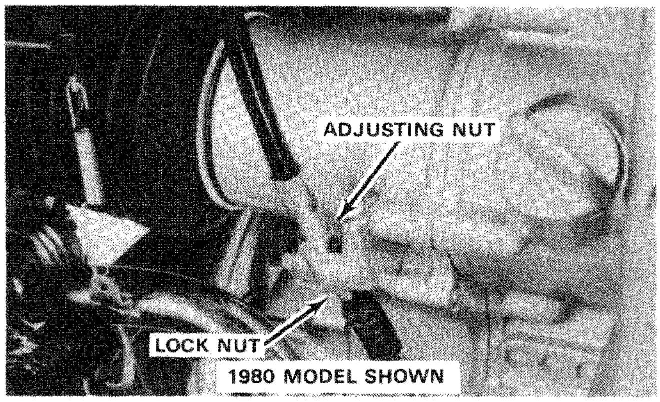


1980-1981:
Loosen the lock nut at the clutch lever and turn the adjuster in completely.

Remove the clutch lifter cap.

Loosen the clutch lifter lock nut and turn the adjusting screw in until a slight resistance is felt. From this position, turn the adjusting screw counter-clockwise 1 turn and tighten the lock nut.

Install the clutch lifter cap.



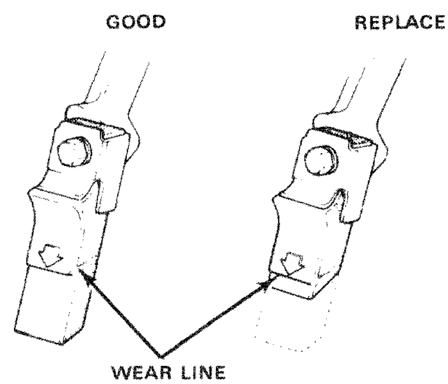
All Models, All Years:
At the lower end of the clutch cable on the engine, loosen the lock nut. Turn the adjusting nut to obtain 15 mm (5/8 in) free play at the lower clutch lever. Tighten the lock nut.

Make the final adjustment with the adjuster at the clutch hand lever.

After adjustment, be sure all lock nuts are tightened securely. Test ride the motorcycle and make sure the clutch disengages completely, engages smoothly and does not slip.

Side Stand

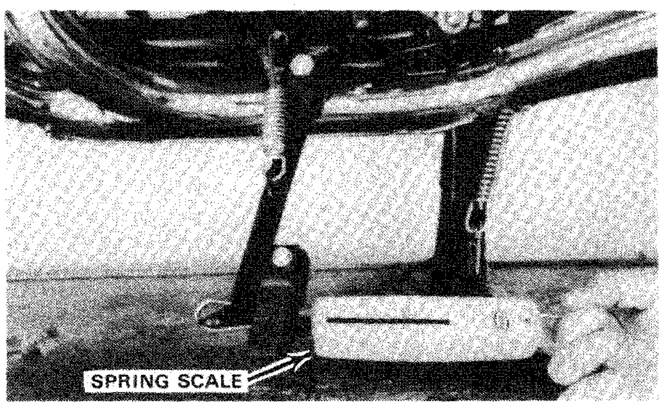
Check the rubber pad for deterioration or wear. If wear extends to the wear line, replace with a pad marked "Over 260 lbs Only".



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

Make sure the force required to fold up the side stand is within 1.5 - 2.5 kg (3.3 - 5.5 lb) when pulling with a spring scale as shown.

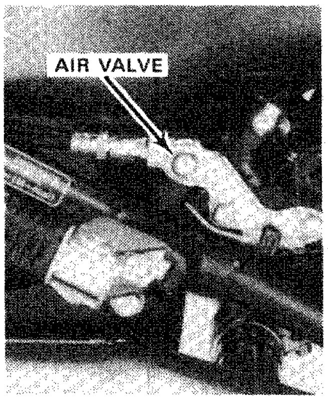
Lubricate the side stand pivot.

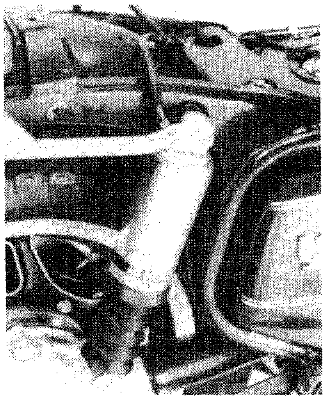


Suspension/Steering Head Bearings

The GL1100 uses air-assisted front and rear suspension systems. Adjustment of air pressure changes preload to provide the desired ride under various rider/cargo weights and driving conditions. The rear shock absorbers (1980-1982 models) have an air pressure warning system which alerts the rider if the air pressure is too low.

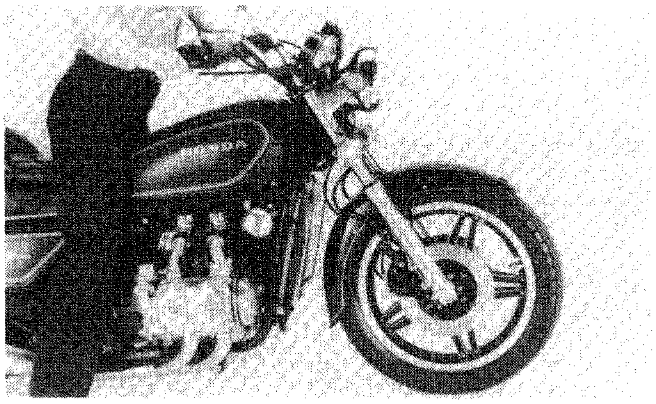
WARNING: Do not ride a vehicle with faulty suspension components. Loose, worn or damaged parts impair vehicle stability and control.





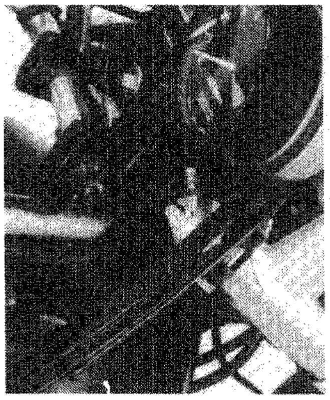
Front

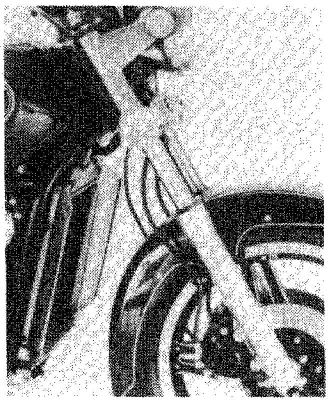
Check front fork action by locking the front brake and compressing the forks several times. The suspension should function smoothly.



Check the entire fork assembly for damage and signs of leakage. Inspect the air hoses for deterioration and cracks. Replace parts as required.

Tighten all nuts and bolts.

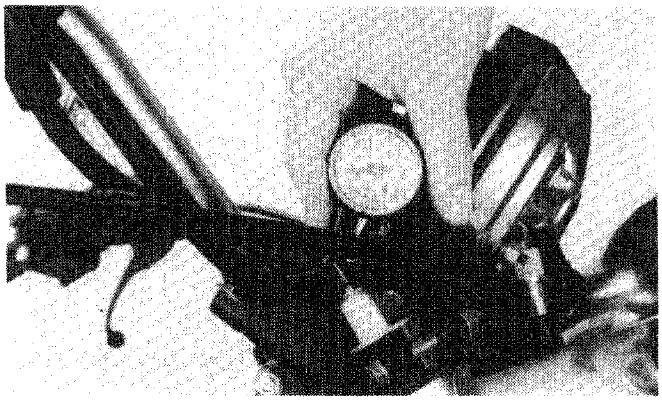




Place the motorcycle on its center stand.

Remove the front fork air valve cap and make sure air pressure is within 1.0 - 1.5 kg/cm^2 (14 - 21 psi).

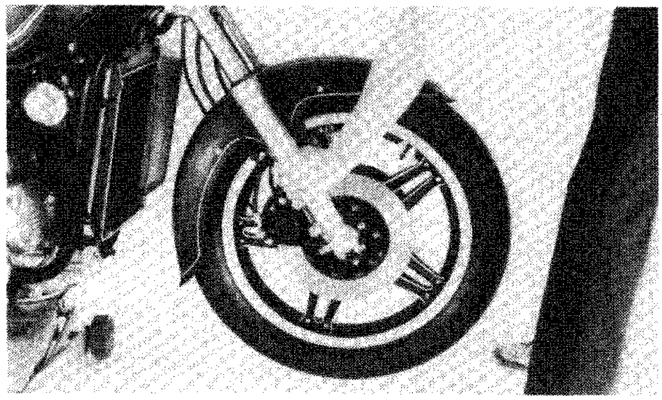
Install the cap.



Maintenance

Suspension/Steering Head Bearings (cont'd)

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



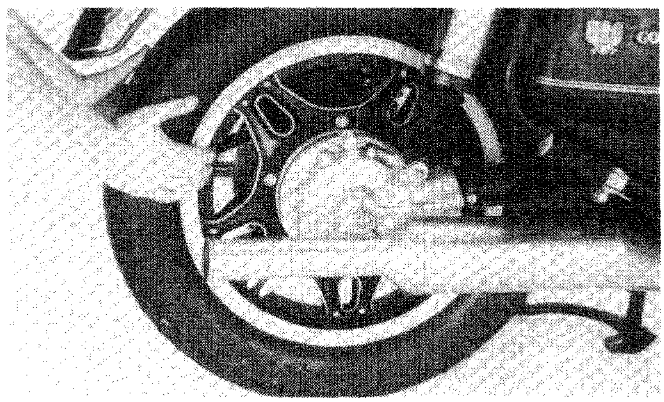
While holding the fork sliders, check that the front wheel turns freely and smoothly from full left to full right. Push and pull on the sliders and check that there is no free play or looseness.

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

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

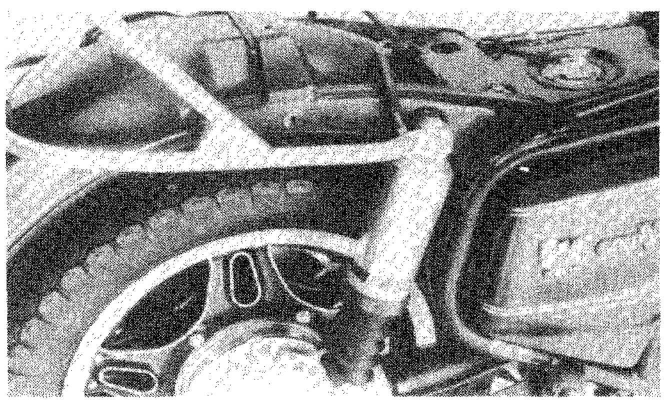
Rear

Place the motorcycle on the center stand.



Vigorously push and pull the rear wheel from side to side. If there is any free play or looseness, inspect the swingarm bearings for damage and proper adjustment.

Check the swingarm for damage.



Check the shock absorbers for damage and signs of leakage.

Inspect the air hoses for deterioration and cracks.

Replace parts as required.

Tighten all nuts and bolts.

Remove the air valve cap and make sure air pressure is within specifications.

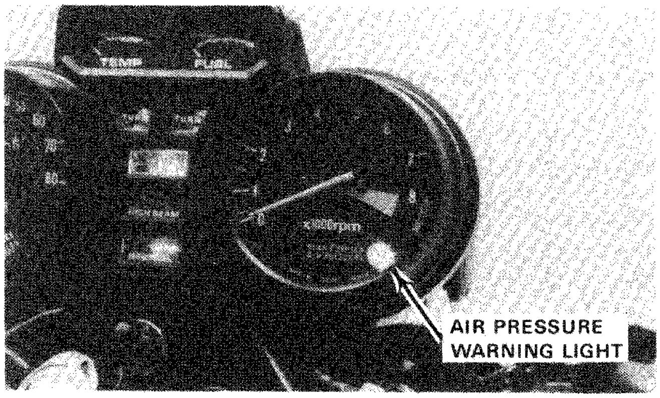
Shock Air Pressure:

1980:	2.0 – 3.0 kg/cm^2 (28 – 42 psi)
1981-1982 (All),	
1983— Aspencade:	2.0 – 4.0 kg/cm^2 (28 – 57 psi)
1983— STD, Interstate:	0 – 4.0 kg/cm^2 (0 – 57 psi)

Test ride the motorcycle as a final suspension check.

1980-1982:
The rear suspension air pressure warning light in the tachometer should come on for 5 seconds after turning the ignition switch on, then go out. If the light dos not come on or comes on and does not go out, there is a problem in the pressure warning system. If the light comes on and stays on while riding over 10 mph, recheck the rear suspension air pressure and condition.

NOTE: 1983– models are not equipped with the rear suspension air pressure warning system.

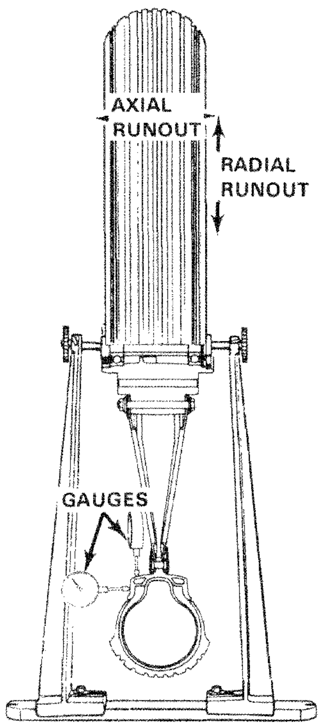


Wheels/Tires

Check the wheel rim for visible damage. ComStar™ and cast wheels must be replaced if damaged or deformed.

Using a dial indicator, measure both radial and axial runout while slowly rotating the wheel. If either runout measurement is beyond the service limit, replace the wheel.

Wheel Rim Runout (axial and radial)
Service Limit: 2.0 mm (0.08 in)

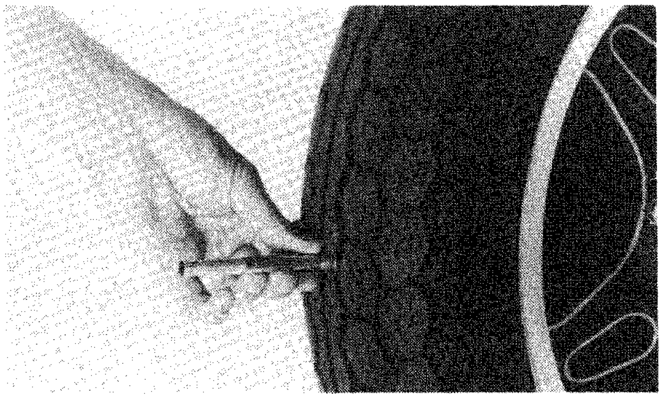


(cont'd)

Maintenance

Wheels/Tires (cont'd)

Check the tires for cuts, imbedded nails or other sharp objects and repair or replace as required. Always replace the tire if the sidewall is punctured or damaged.



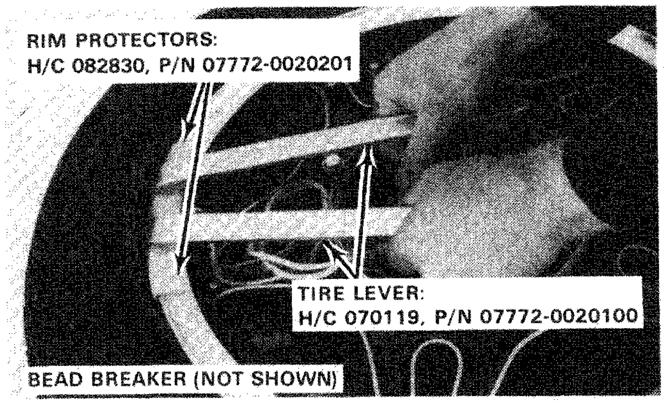
Replace the tires before tread depth at the center of the tire reaches the following limit:

Minimum Tread Depth:
Front: 1.5 mm (1/16 in)
Rear: 2.0 mm (3/32 in)

WARNING:

- **The use of tires other than those listed on the tire information label may adversely affect handling.**
- **Do not install tube-type tires on tubeless rims. The beads may not seat and the tires could slip on the rims, causing tire deflation.**

CAUTION: Do not try to remove tubeless tires without special tools and rim protectors. You may damage the rim sealing surface or disfigure the rim.

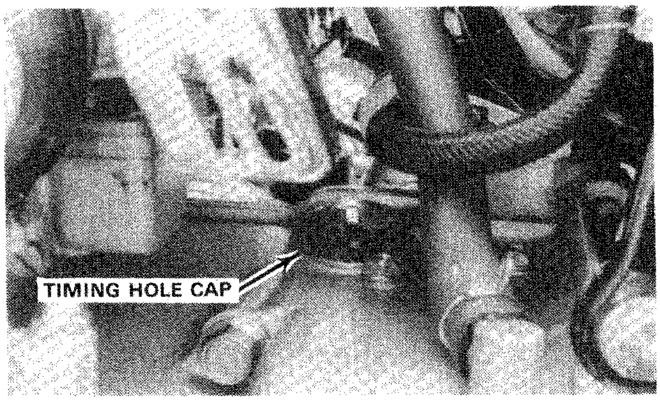


Check tire pressure when the tires are cold.

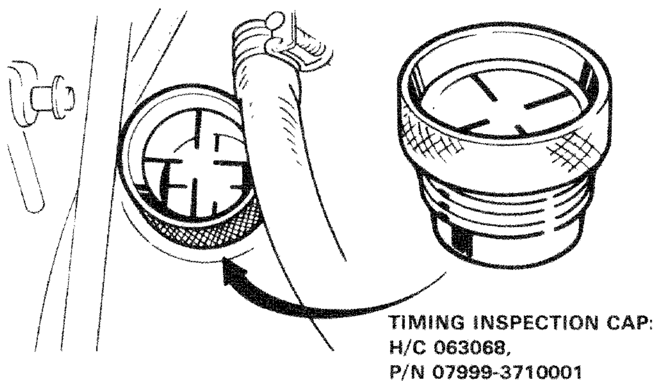
		Front	Rear
Tire Size	**1980-1981**	110/90-19 62H	130/90-17 68H
	1982—	120/90-18 65H M120/90-18	140/90-16 71H, M140/90-16
Cold tire pressure kPa (kg/cm², psi)	Up to 90 kg (200 lbs) load	225 (2.25, 32)	225 (2.25, 32)
	90 kg (200 lbs) and up to vehicle capacity load	225 (2.25, 32)	280 (2.8, 40)
Tire Brand (Tubeless only)	**1980-1981** **Bridgestone** **Dunlop**	S703 F11	G504 K127
	1982— **Bridgestone** **Dunlop**	L303 F11	G508 K127

Ignition Timing Check

Warm up the engine and then turn if off. Remove the timing mark hole cap and install the timing inspection cap, H/C 063068, P/N 07999-3710001.



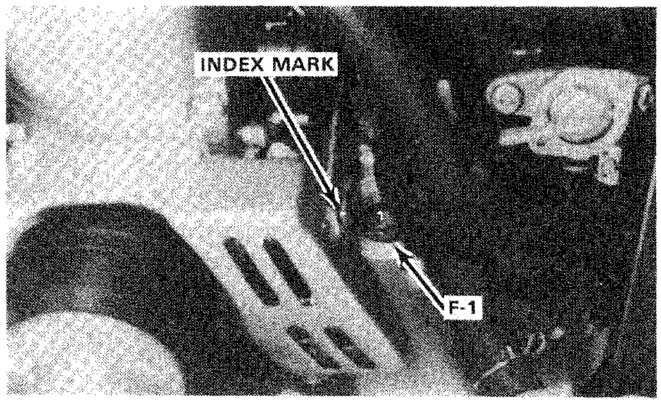
NOTE: For photographic clarity of the timing marks, the timing inspection cap was omitted from the next two photographs.



Connect a stroboscopic timing light to the No. 1 or No. 2 cylinder spark plug lead.

Start the engine.

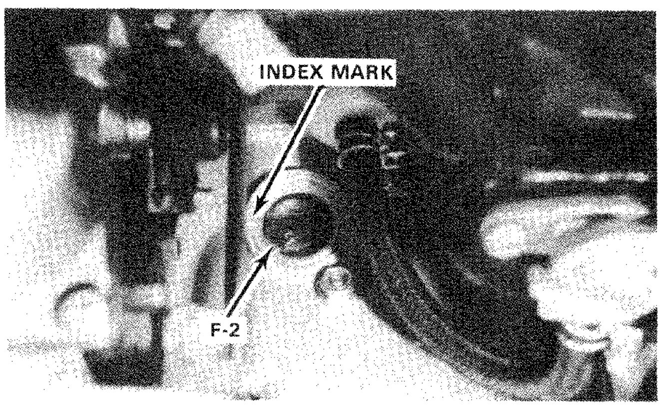
With the engine running at idle speed (950 ± 100 rpm) the "F-1" timing mark on the flywheel should align with the index mark on the edge of the timing mark hole.



Connect a stroboscopic timing light to the No. 3 or No. 4 cylinder spark plug lead.

With the engine running at idle speed, the "F-2" timing mark should align with the index mark.

NOTE: No ignition timing adjustment is possible. If the timing marks do not align, refer to section 15 for ignition system component inspection.



Maintenance

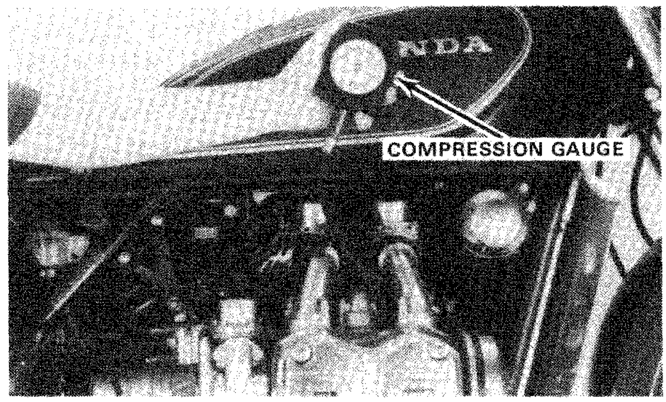
Compression Test

Disconnect the spark plug caps and remove all four spark plugs.

Install a compression gauge in the No. 1 cylinder spark plug hole.

Turn the engine stop switch OFF and push the choke knob (1980–1982) all the way down or the choke lever (1983–) all the way to the right.

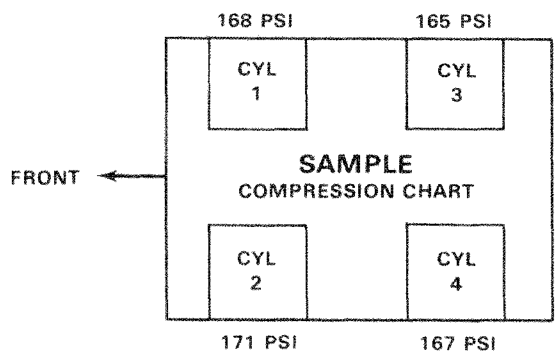
Open the throttle completely and crank the engine until the gauge reading stops rising.



Record the compression pressure for the No. 1 cylinder.

Repeat the compression test for the remaining three cylinders and record the results.

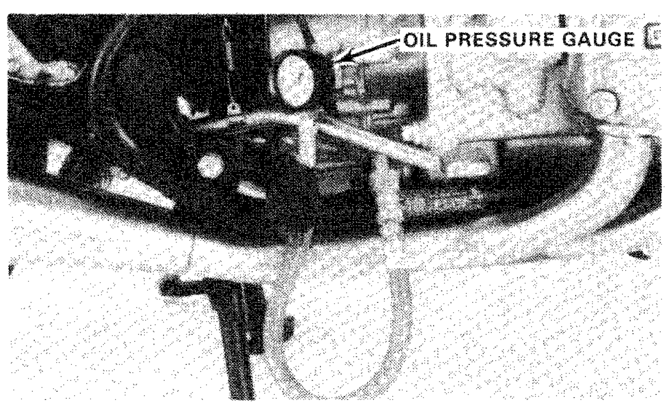
Normal compression pressure is 12 kg/cm^2 (171 psi). If compression pressure is below 10 kg/cm^2 (142 psi) or if there is a 1.0 kg/cm^2 (14 psi) variation between cylinders there is leakage at the valves, piston rings, or cylinder head gasket.



Oil Pressure Test

Remove the rear oil galley plug and install an oil pressure gauge.

Oil Pressure (psi)	Cranking	900 rpm	5000 rpm
Cold	18	60	64
Hot	5	12	60



Check oil pressure while the engine temperature is below 35° C (95° F) for cold pressure readings and compare with the chart.

Check hot pressures after the engine reaches normal operating temperatures.

Refer to page 8-24 for oil pump removal and inspection.

Oil Contamination

Inspect the valve train area for dark gummy deposits indicating coolant leakage into the engine oil. If contamination is evident, remove the camshafts and valve train (Section 7) for access to the casting core plugs.

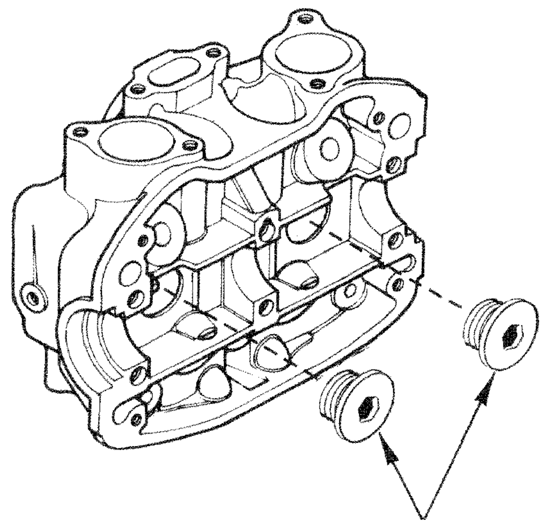
If evidence of coolant leakage is found around the core plugs, drain the coolant and remove the core plugs.

Apply Permatex gasket sealer or silicone to seal the threads and re-install the core plugs.

NOTE: If no evidence of coolant leakage is found at the core plugs, remove the cylinder heads and inspect the head gaskets (Section 7).

When oil contamination is present commercial gum and sludge remover can be used to purge engine of contaminants.

WARNING: Do not breathe sludge remover fumes. Provide adequate ventilation while the engine is running. Observe the manufacturer's instructions regarding use of gum and sludge remover.



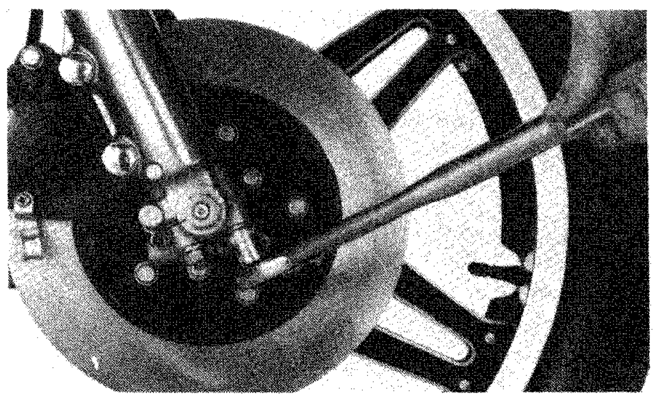
CASTING CORE PLUGS
TORQUE TO: 5 - 6 kg-m
(36 - 43 ft-lb)

Change oil and filter.

Nuts, Bolts, Fasteners

Check that all chassis nuts and bolts are tightened to correct torque values (page 3-4).

Check all cotter pins, hose clamps, and cable stays.



Maintenance

On-Board Air Compressor System

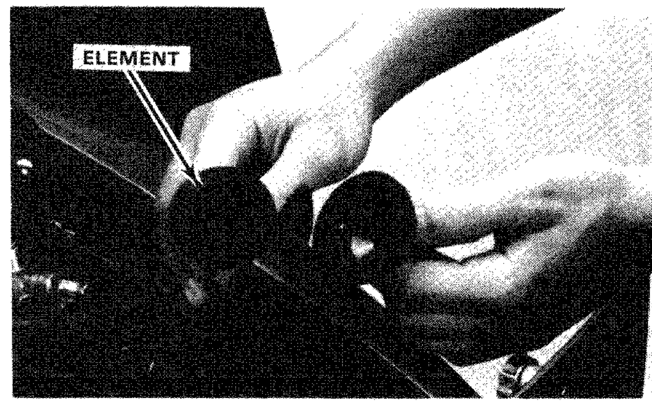
Air Pump Filter Element Cleaning

Open the top compartment cover and remove the air pump filter.

Separate the filter housing and remove the element.

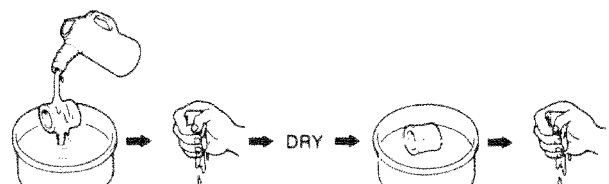
Wash the element in clean non-flammable cleaning solvent and allow it to dry thoroughly.

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



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

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

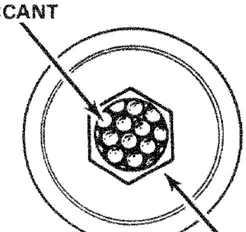


Air Drier Inspection and Service

Open the top compartment cover and pull off the drier cover.

Remove the drier and inspect the desiccant color in the glass window. The desiccant should be blue.

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



Remove the three screws and then remove the drier cover, cap, spring seat, spring, retainer plate, and packing.

Remove the desiccant and bake it until it is blue or replace it if necessary.

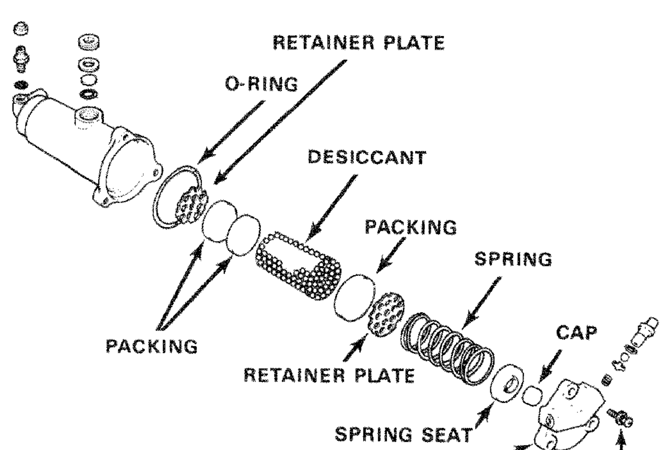
Remove the other packings and retainer plate.

Clean the inside of the drier body with a clean cloth and then install the retainer plate and packings.

Pack the desiccant and then install the packing, retainer plate, spring, spring seat, cap, cover and screws.

Install the drier (page 12 -45).

Close the top compartment cover.



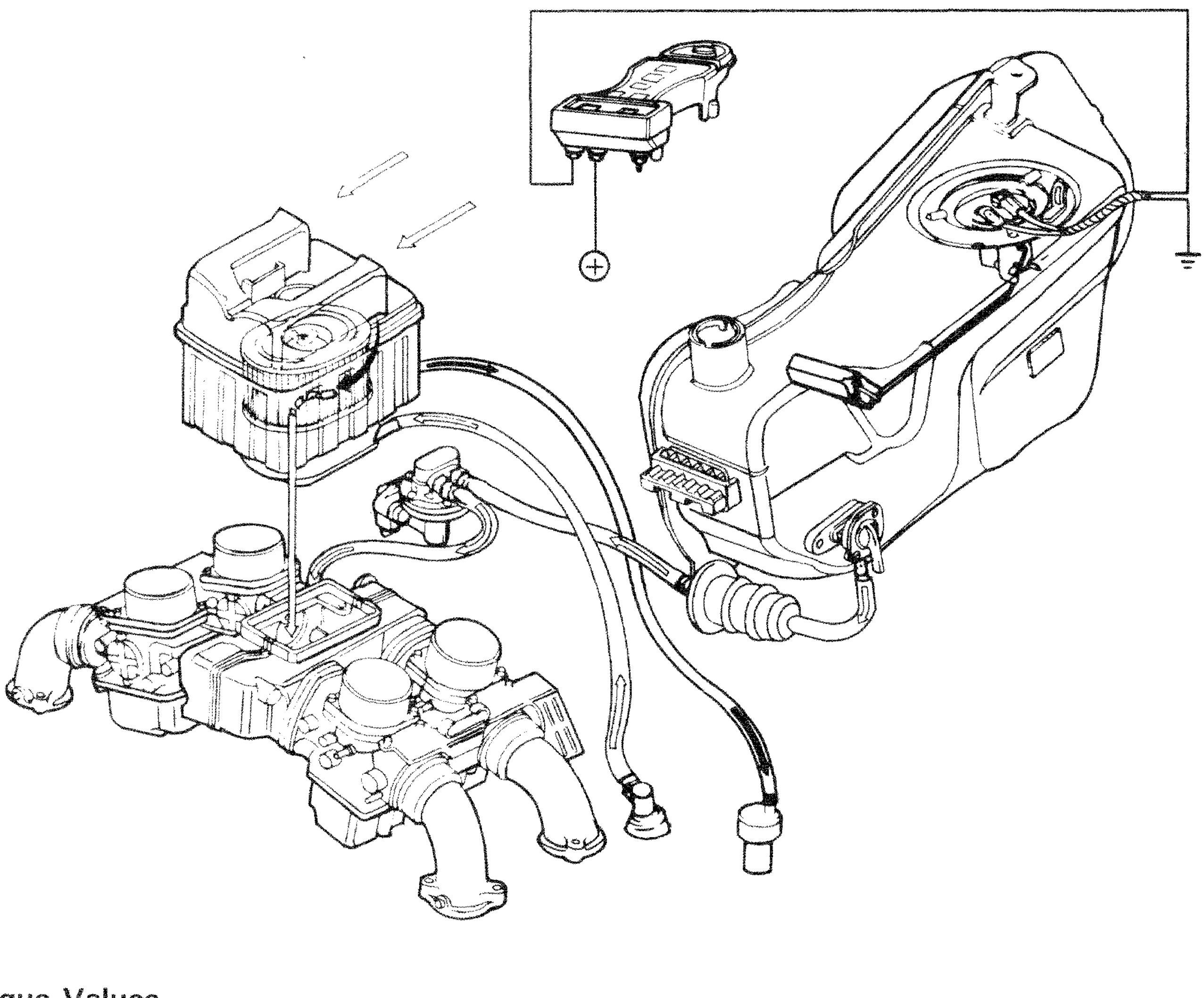
Fuel System

Fuel System

Service Information

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

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



Torque Values

Fuel pump bolt	20 N·m (15 ft-lb)
Fuel pump cover bolt	12 N·m (9 ft-lb)
Carburetor-to-air chamber screws	5 N·m (4 ft-lb)
Stay plate screws	4 N·m (3 ft-lb)
Air chamber screws	5 N·m (4 ft-lb)
Throttle linkage center bolt	5 N·m (4 ft-lb)
Throttle link-to-carburetor nuts	5 N·m (4 ft-lb)
Rear master cylinder mounting bolts	27 N·m (20 ft-lb)
Rear fender mounting bolt	14 N·m (10 ft-lb)

Troubleshooting

Engine Cranks But Won't Start
- No fuel in tank.
- No fuel getting to cylinders.
- Engine flooded.
- No spark at plugs - ignition malfunction.

Engine Idles Roughly, Stalls, or Runs Poorly
- Idle speed incorrect.
- Ignition malfunction.
- Low compression.
- Rich mixture.
- Lean mixture.
- Air cleaner clogged.
- Intake air leak.
- Fuel contaminated.
- Carburetors not synchronized.

Lean Mixture: Insufficient Fuel To The Cylinders
- Carburetor fuel jets clogged.
- Vacuum piston stuck.
- Faulty fuel pump or fuel pump cam lobe.
- Fuel cap vent blocked.
- Fuel filter clogged.
- Fuel line kinked or restricted.
- Fuel line blocked.
- Carburetor fuel inlet filter screen clogged.
- Carburetor needle and seat stuck closed.
- Float level too low.
- Air intake lock.

Rich Mixture: Excessive Fuel To The Cylinders
- Choke stuck closed.
- Float level set too high or float sticking.
- Needle and seat faulty or worn.
- Carburetor air jets clogged.
- Air cleaner clogged.

Misfiring During Acceleration
- Ignition malfunction.
- Faulty air cutoff valve or accelerator pump.

Backfiring
- Ignition malfunction.
- Carburetor malfunction.
- Faulty air cutoff valve or accelerator pump.

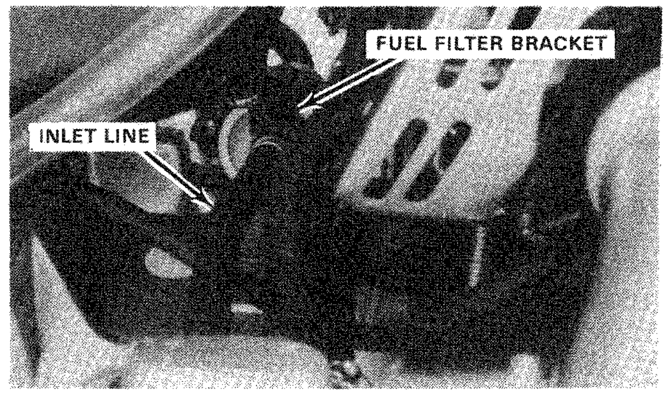
Poor Performance (Driveability) And Poor Fuel Economy
- Air cleaner clogged.
- Ignition malfunction.
- Faulty accelerator pump.

Fuel System

Fuel Filter

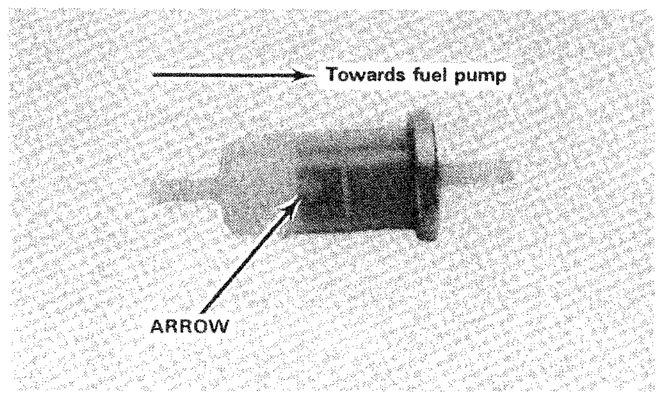
Turn the fuel valve OFF. Loosen the hose clamp and pull the fuel pump inlet line off the fuel pump. Remove the nut holding the fuel filter bracket to the fuel tank. Pull the inlet line and filter out of the left side.

Remove the fuel filter bracket and loosen the hose clamps at each end of the filter. Pull the fuel lines off the filter and install a new filter. Tighten the hose clamps.



NOTE: Install the fuel filter with the arrow on the filter body pointing toward the fuel pump.

Install the fuel filter bracket on the filter and tighten securely. Route the fuel line under the fuel tank and connect it to the fuel pump. Position the filter bracket on the fuel tank and install the nut. Tighten the hose clamp at the fuel pump.

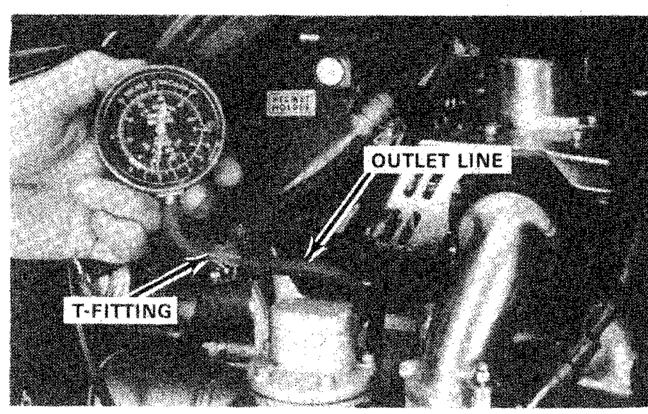


Fuel Pump

Pressure Test

Connect a fuel pressure gauge to the fuel pump outlet line with a T-fitting. Start the engine and measure the fuel pump output pressure.

0.17 kg/cm² (2.4 psi) at cranking speed.
0.16 kg/cm² (2.3 psi) at 1100 rpm.
0.14 kg/cm² (2.0 psi) at 5000 rpm.

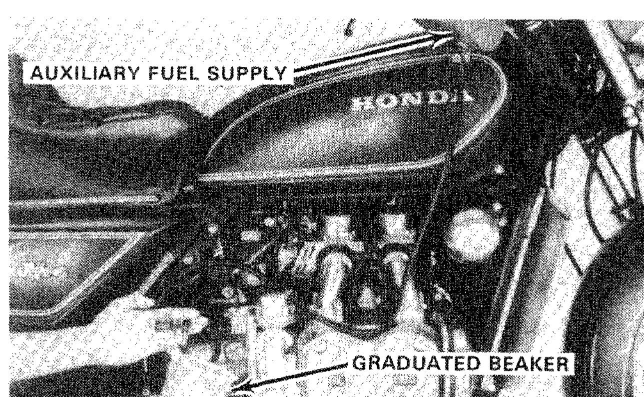


Volume Test

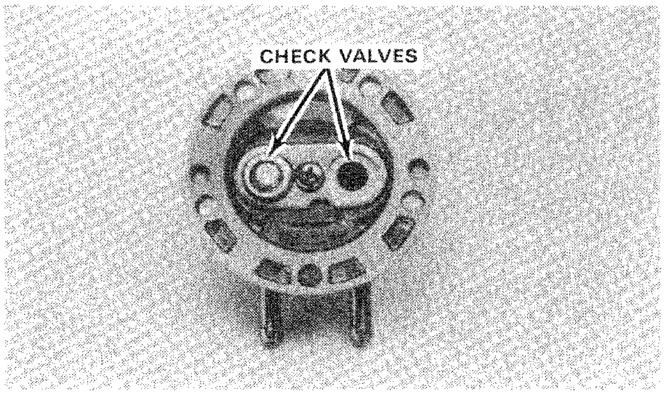
Disconnect the fuel pump outlet line at the fuel pump. Connect an auxiliary fuel supply to the outlet line.

Connect a piece of fuel line to the fuel pump and run it to a graduated breaker.

Start the engine and run it at 3000 rpm. Fuel pump output should be 450 ml (15 oz) per minute at 3000 rpm.

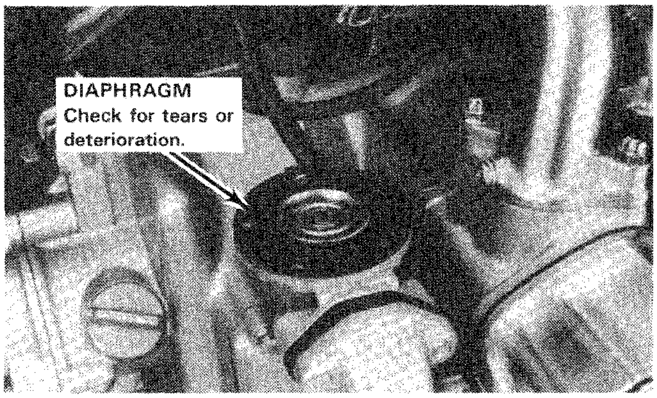


If the fuel pump does not meet specifications, remove the body cover and check the valves and ports for blockage.



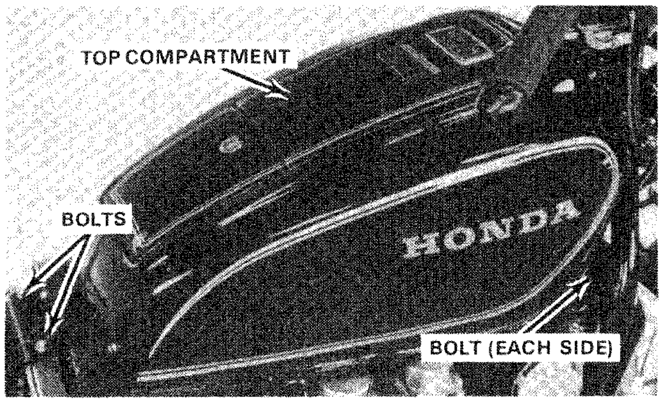
Check the diaphragm for tears or deterioration. The complete pump assembly must be replaced, if the diaphragm is faulty.

See page 7-6 for fuel pump removal.

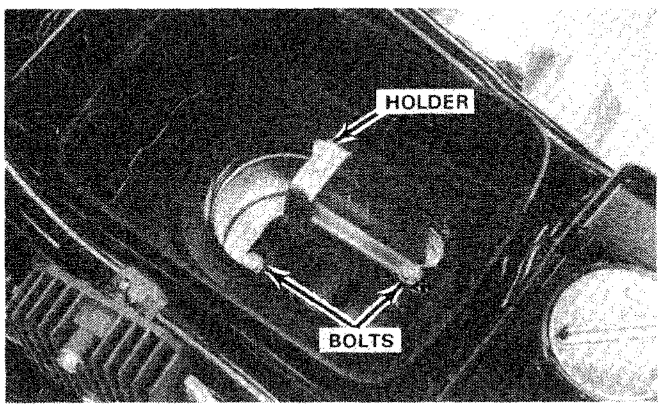


Carburetors/Air Chamber System Removal

Remove the top compartment, tool box and air cleaner cover.



Remove the air cleaner element. Remove the two bolts and the air cleaner case holder.

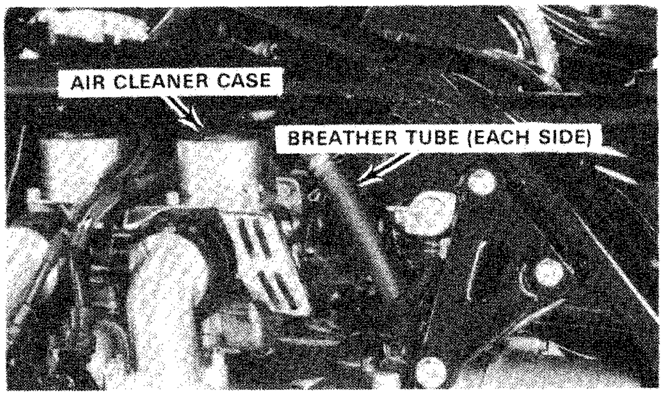


(cont'd)

Fuel System

Carburetors/Air Chamber System Removal (cont'd)

Disconnect the two breather tubes from the air cleaner case and lift out the air cleaner case.



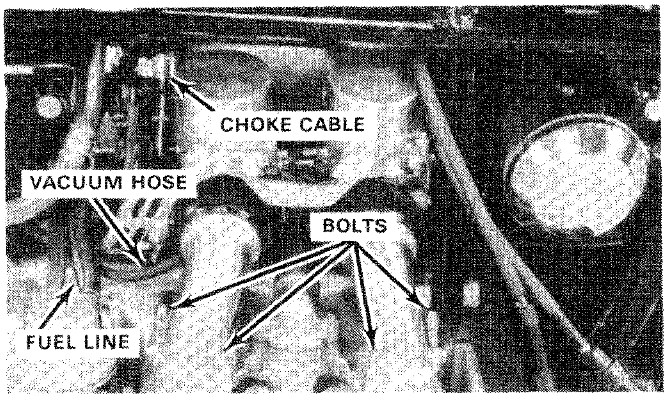
Disconnect the spark plug caps from the spark plugs and unhook the leads from the carburetor stay plate clip on each side.

Disconnect the choke cable from the carburetor linkage.

Disconnect the fuel pump outlet line at the fuel pump.

Disconnect the vacuum advance hose from the No. 3 carburetor.

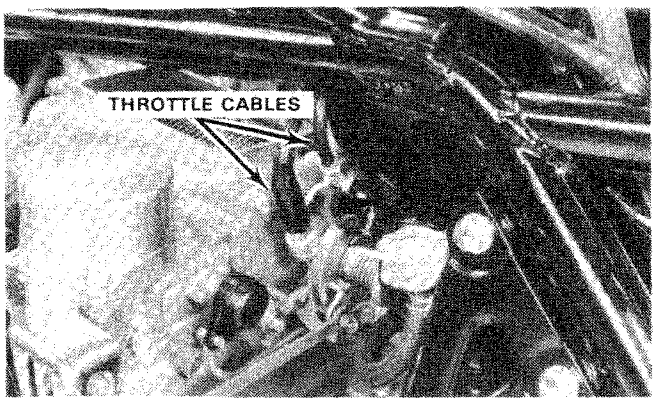
Remove the eight intake pipe-to-head bolts.



Remove the No. 1 and No. 3 carburetor vacuum chamber covers and place a shop towel over them.

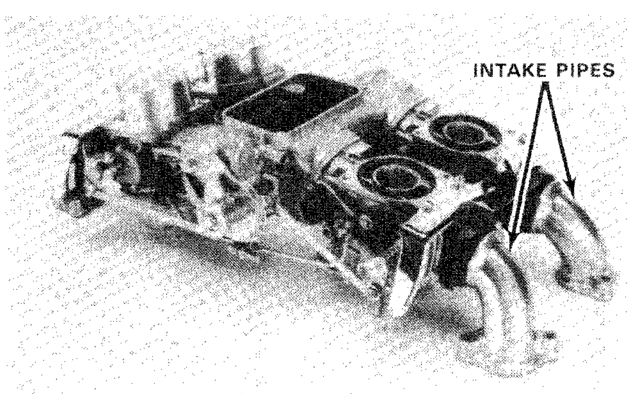
CAUTION:
- **Do not pry between the intake pipes and the head because this may damage the mounting surfaces.**
- **Do not interchange vacuum chamber covers and vacuum pistons between carburetors.**

Move the carburetors and air chambers as an assembly to the left side and disconnect the throttle cables.



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

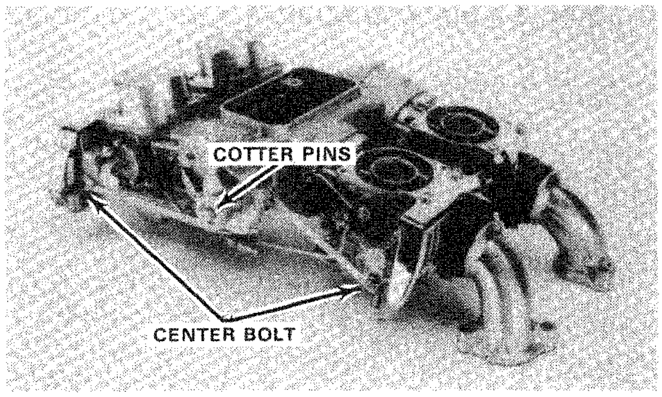
CAUTION: **Do not try to remove the rubber couplers from the intake pipes. They are bonded in place for precise alignment.**



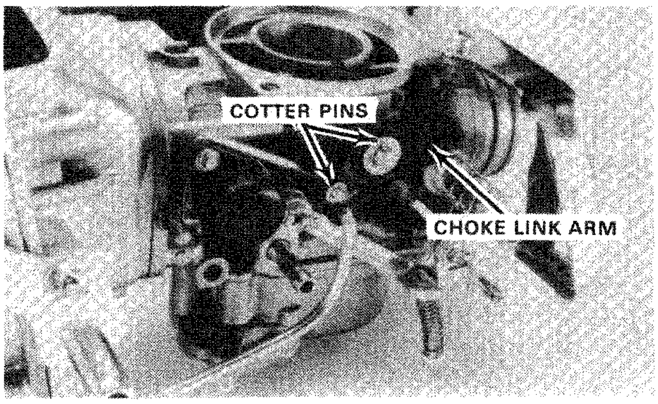
Remove the cotter pins and washers from the linkage at No. 3 and No. 4 carburetors.

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

Remove the linkage center bolt and lock washer. Remove the linkage as an assembly from the carburetors.



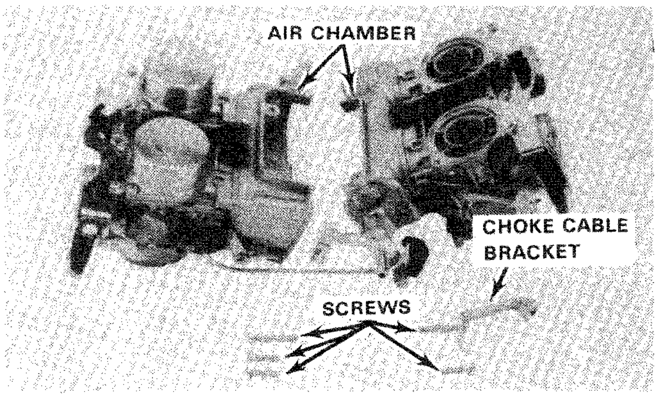
Disconnect the choke linkage arm at the No. 3 carburetor by removing the two cotter pins.



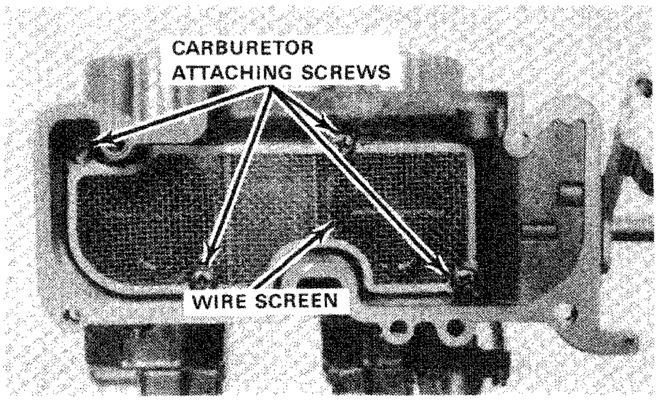
Remove the air chamber seal.

Remove the five screws holding the air chamber halves together. Separate the air chamber.

CAUTION: Do not pry the chamber halves apart or the O-ring and mating surfaces may be damaged.



Remove the two screws securing each carburetor to the air chamber half. Remove the wire screen from the air chamber.



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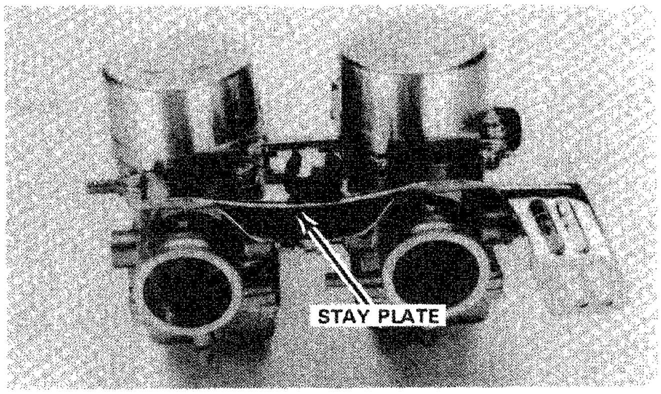
Fuel System

Carburetors/Air Chamber System Removal (cont'd)

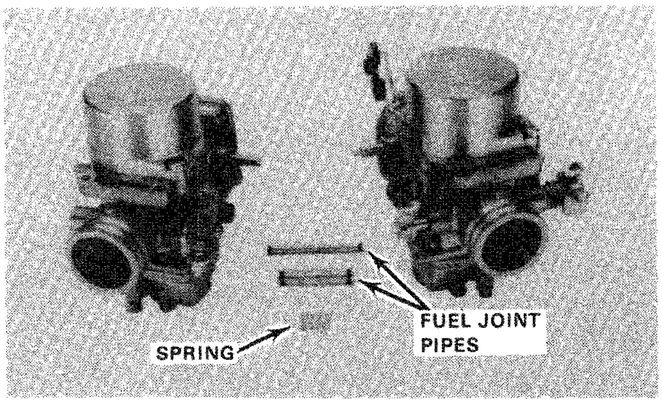
Remove the stay plate holding each pair of carburetors.



Carefully separate the individual carburetors.

CAUTION: The carburetor bores must stay parallel after removing the stay plate and during separation. If the carburetors are twisted, the fuel joint pipes may be bent resulting in fuel leakage.

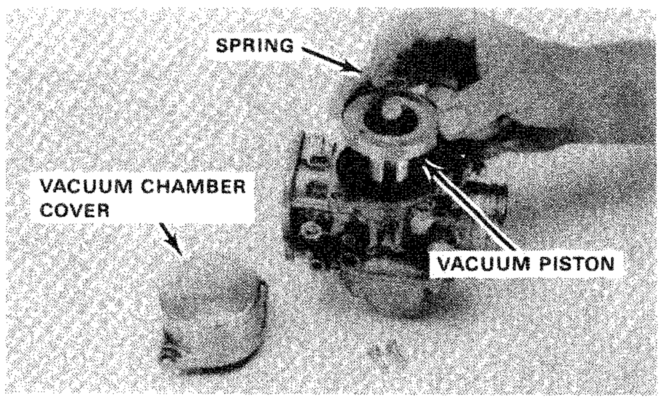
NOTE: Do not loosen the throttle linkage adjusting screw.



Carburetors

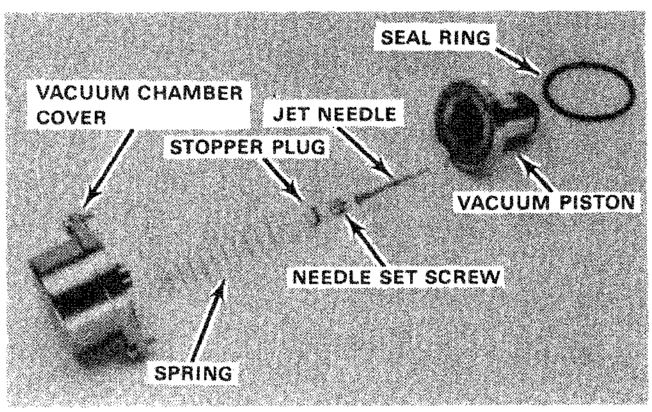
Remove the vacuum chamber cover. Carefully lift out the vacuum piston with its needle and spring.

CAUTION: Do not interchange vacuum chamber covers and vacuum pistons between carburetors.

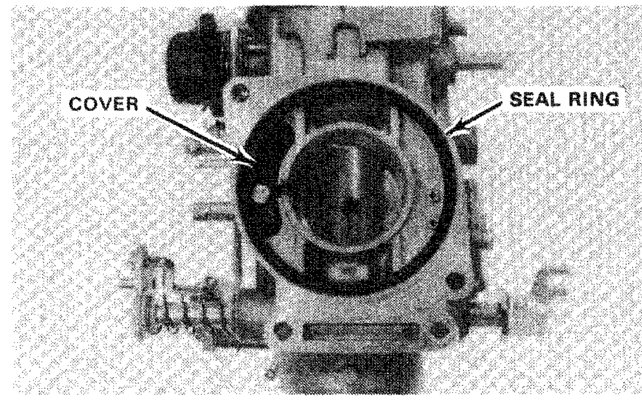


Remove the stopper plug from the vacuum piston. Insert a narrow screwdriver into the vacuum piston center hole and remove the screw that secures the jet needle.

Inspect the vacuum piston and vacuum chamber cover for signs of wear, nicks, scratches or other damage. Make sure the piston moves up and down freely in the vacuum chamber cover.



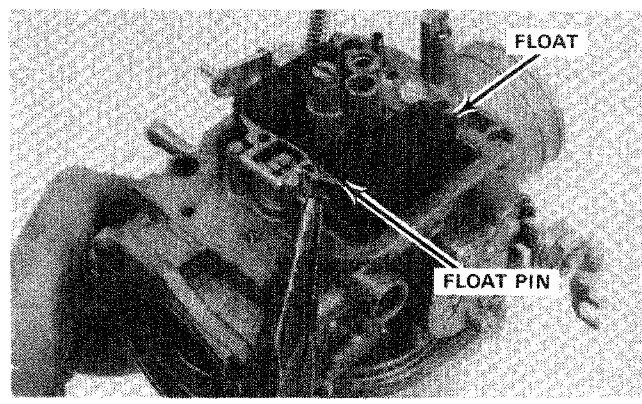
Remove the seal ring and air jet cover.



Remove the float chamber body.

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

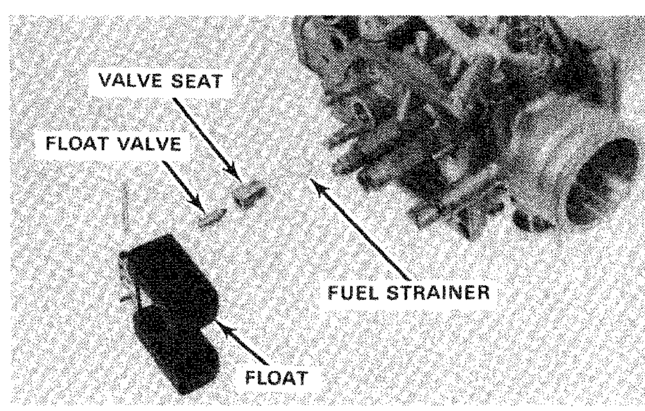
Remove the float and float valve.



Remove the float valve seat from the carburetor body.

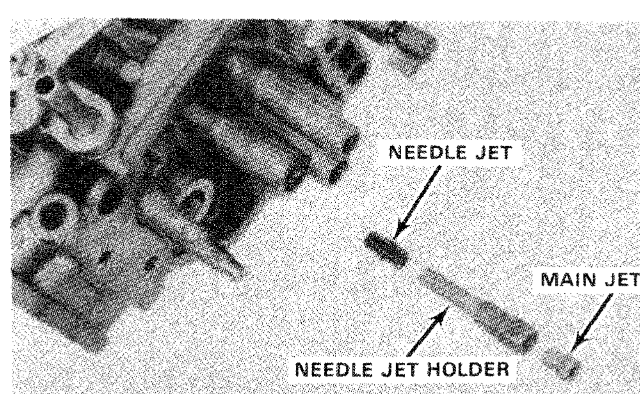
Clean the strainer with clean solvent. Inspect the float valve for grooves, nicks or deposits.

Inspect the float for damage. Replace if necessary.



Remove the main jet and needle jet holder. Tilt the carburetor to remove the needle jet.

NOTE: If the needle jet is difficult to remove, carefully press it out from the cylinder side.



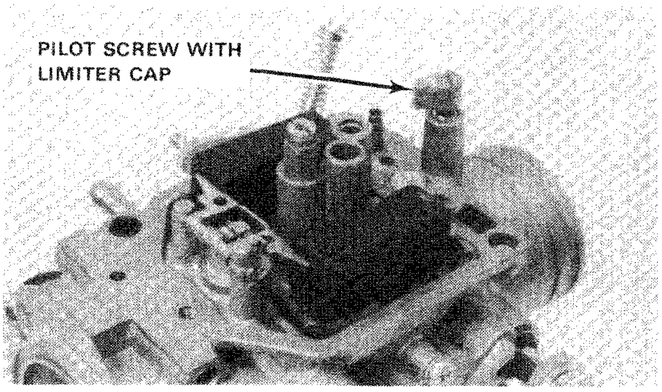
(cont'd)

Fuel System

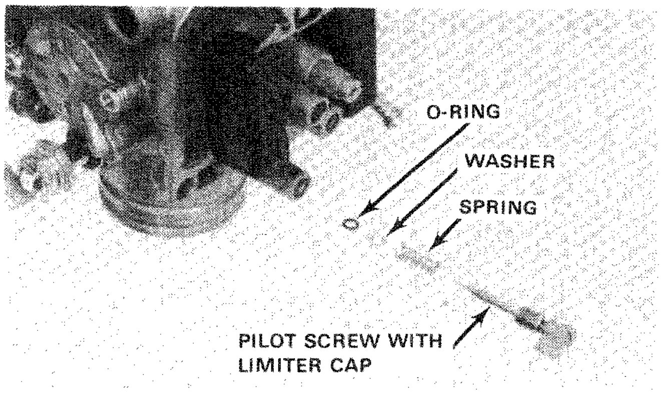
Carburetors (cont'd)

If the pilot screw is to be reused, turn the pilot screw in until it seats and note the number of turns to ensure original positioning.

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



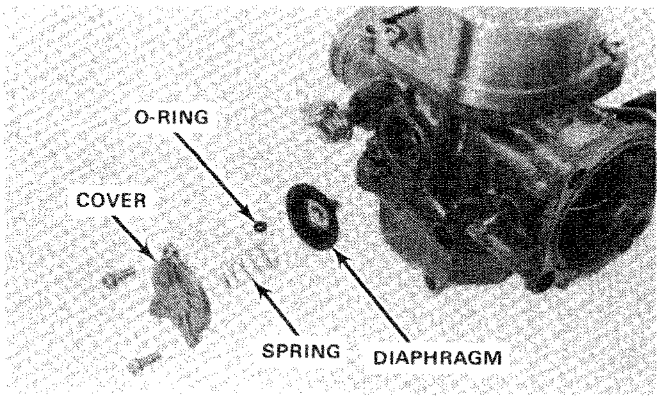
Unscrew the pilot screw with the limiter cap. Remove the pilot screw and spring. Tilt the carburetor to remove the plain washer and O-ring.



Remove the air cutoff valve cover and spring.

Remove the diaphragm and O-ring.

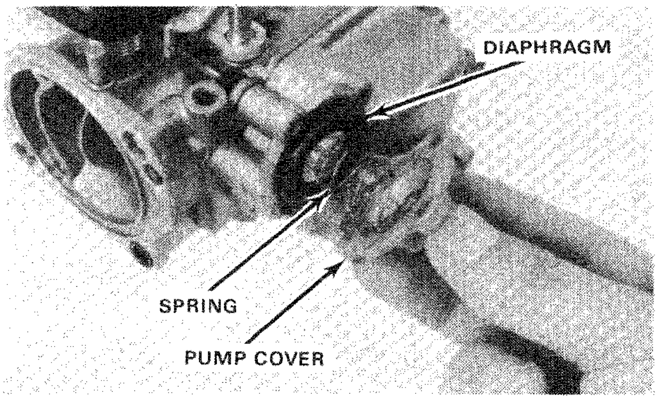
Inspect the diaphragm and valve for cracks and brittleness.



Remove the accelerator pump cover and spring.

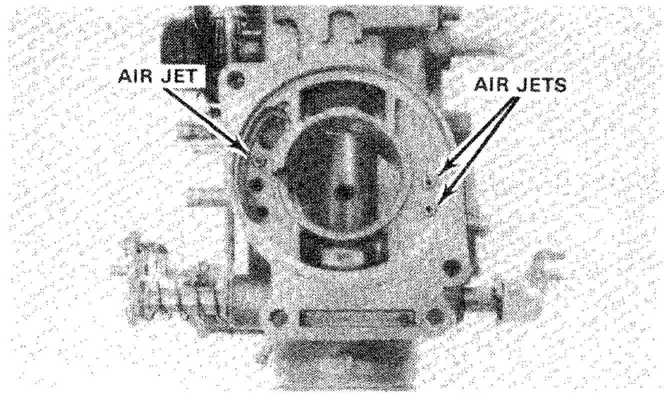
Remove the diaphragm.

Inspect the diaphragm for cracks and brittleness. Be sure the accelerator pump rod is not bent.



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

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

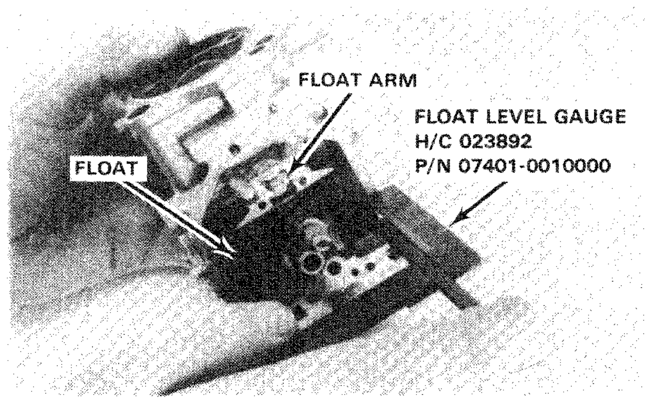


Assemble the carburetor in the reverse order of disassembly.

NOTES:
- Do not pinch the air cutoff valve diaphragm or the accelerator pump diaphragm.
- When installing the air cutoff valve O-ring, make sure the flat surface is against the carburetor body.
- Do not overtighten the needle jet holder and float valve seat.
- Check the float level and adjust, if necessary.

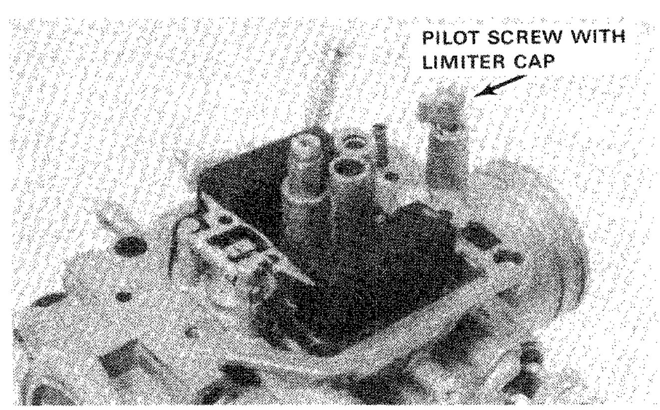
With the float valve seated and the float arm just touching the valve, measure the float level with the float level gauge. Adjust if necessary by bending the float arm carefully.

Float level: 15.5 mm (0.61 in)



Inspect the pilot screw for wear and replace it if necessary. If you are reinstalling the original pilot screw, turn it to its original position as noted during removal before installing the float chamber.

NOTE: The original pilot screw is factory pre-set and no adjustment is necessary unless the pilot screw is replaced.



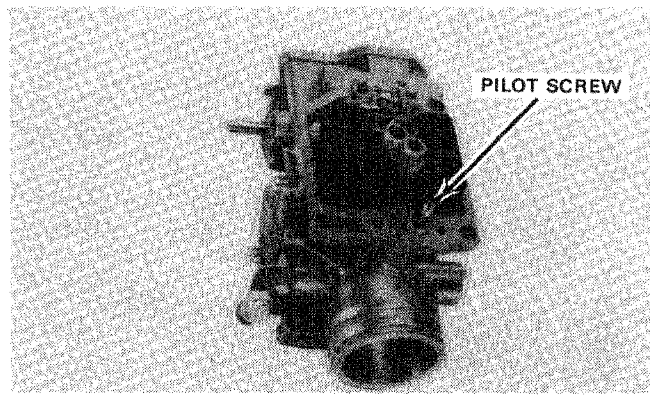
(cont'd)

Carburetors (cont'd)

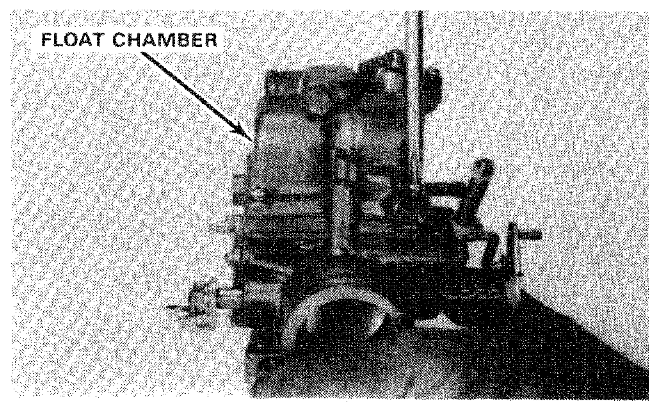
If you install a new pilot screw, turn it 1¼ turns out from the lightly seated position. This is an initial setting prior to final pilot screw adjustment (page 4-14). Do not install the limiter cap until final adjustment is completed.

Initial pilot screw opening: 1¼ turns

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



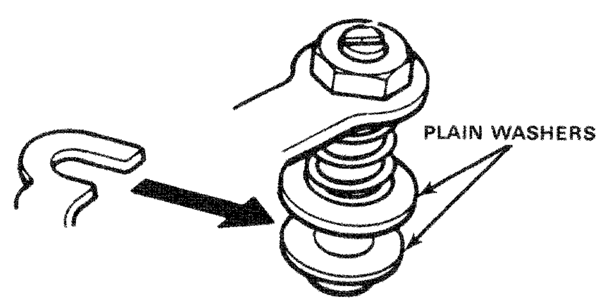
Install the float chamber.



The reassembly sequence is essentially the reverse of disassembly.

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

NOTE: Insert the throttle linkage between the plain washers as shown.

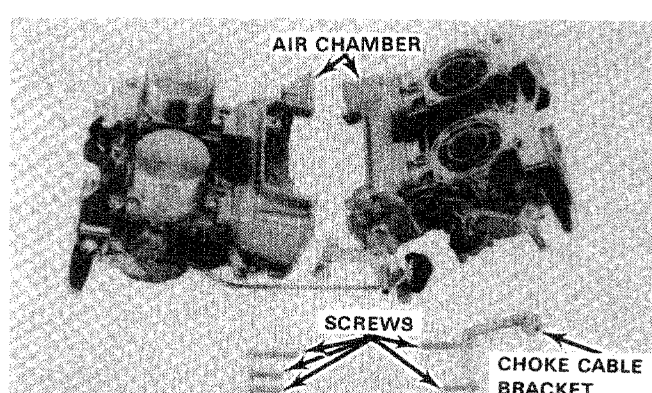


Install the stay plates and attach the carburetor pairs to the air chamber halves. Be sure to install the wire screens in the air chamber halves.

Assemble the air chamber halves and install the five screws securely.

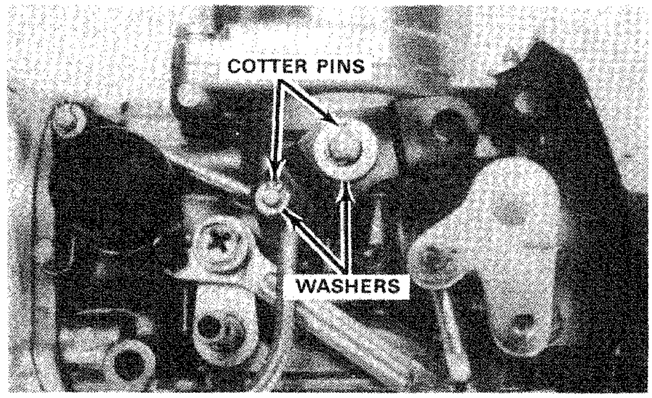
Install the air chamber seal and No. 2 and No. 4 vacuum chamber tops.

Do not install the No. 1 or No. 3 vacuum chamber tops.



Connect the choke link arm to the No. 3 carburetor and install the two washers with new cotter pins.

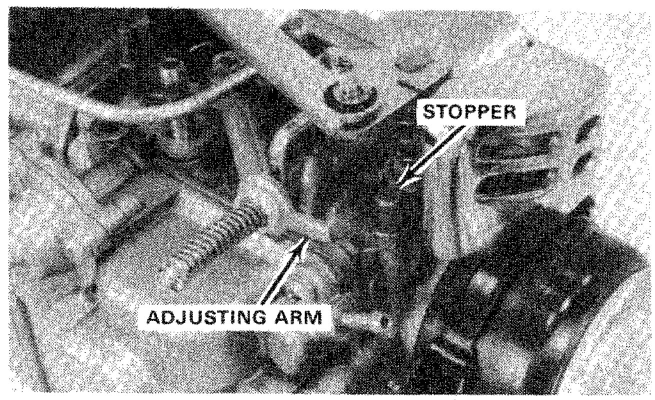
Install the throttle linkage.



Adjust the accelerator pump before installing the carburetors on the motorcycle. Measure the clearance between the adjusting arm and stopper on the carburetor body.

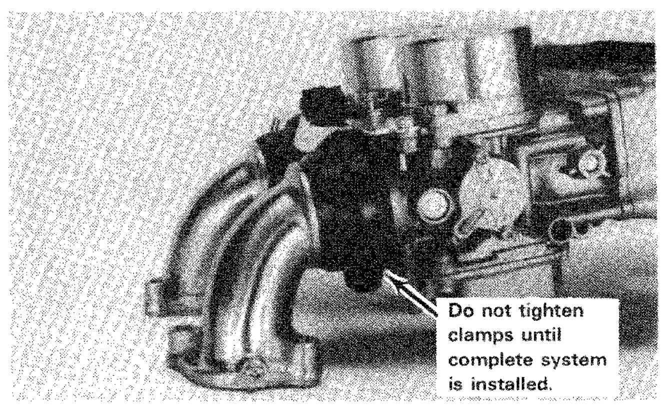
Specified clearance: 10 mm (0.4 in)

Adjust by bending the adjusting arm.



Carburetors/Air Chamber System Installation

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

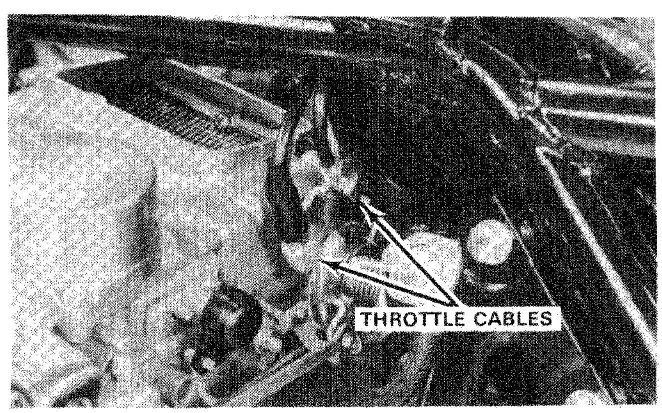


Install the carburetor/air chamber system on the engine from the left side. Reconnect the throttle cables while the linkage is accessible before final positioning is made.

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

Install the No. 1 and No. 3 vacuum chamber tops.

Synchronize the carburetors (page 3-16).



Fuel System

Pilot Screw Adjustment

Idle Drop Procedure

If you installed new pilot screws, use this idle drop adjustment procedure.

NOTE:

- The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced (see page 4-10).
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

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

   Initial opening: 1980-1981 1¼ turns out
   1982 3 turns out

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

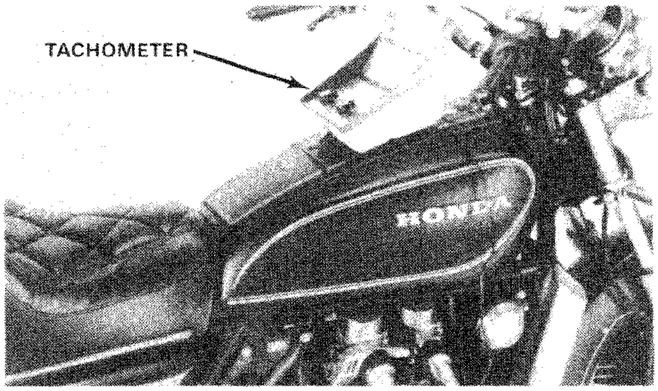
2. Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.
3. Connect a tachometer according to the manufacturer's instructions.

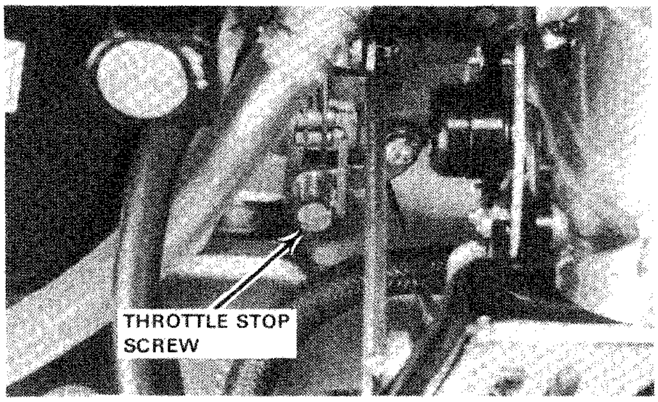
   NOTE: Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate changes of 50 rpm.

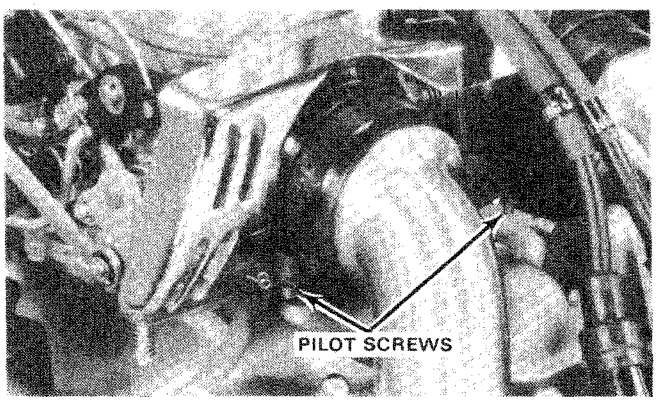
4. Adjust the idle speed with the throttle stop screw.

   Idle speed: 950 rpm

5. Turn each pilot screw ½ turn out from the intial setting position.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out ½ turn at a time until engine speed drops by 50 rpm or less.
7. Adjust the idle speed with the throttle stop screw.
8. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 rpm.
9. Turn the No. 1 carburetor pilot screw 1 turn out from the position obtained in Step 8.
10. Adjust the idle speed with the throttle stop screw.
11. Perform Steps 8, 9 and 10 for the No. 2, 3 and 4 carburetor pilot screws.

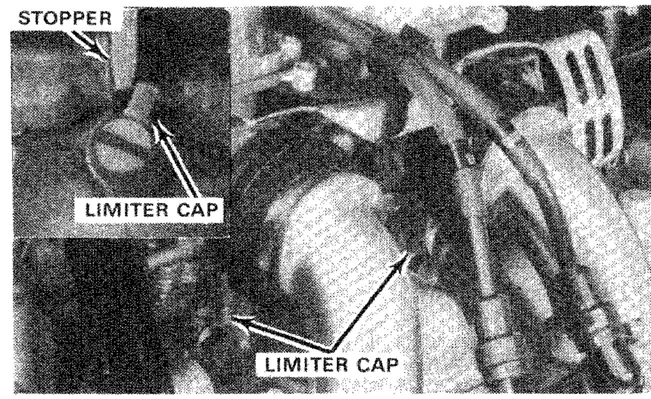






12. After adjustment, cement the limiter caps over the pilot screws using Loctite® 601 or equivalent. The limiter caps should be placed against the stops so they can be turned clockwise only. This will prevent adjustment in the counterclockwise direction which enriches the fuel mixture.

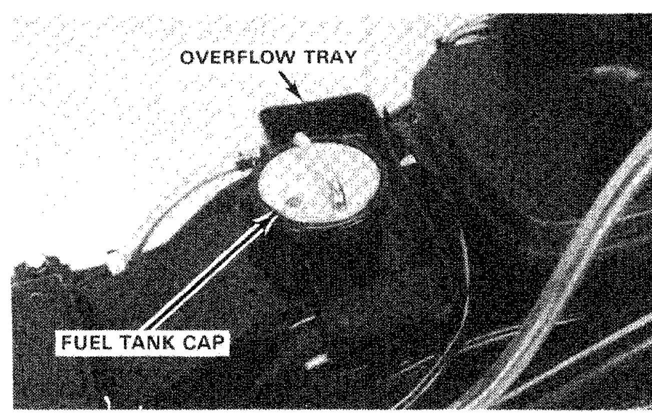
NOTE:
- Do not turn the pilot screws when installing the limiter caps.
- You must install pilot screw limiter caps to prevent misadjustment that could cause poor performance and increase exhaust emissions.



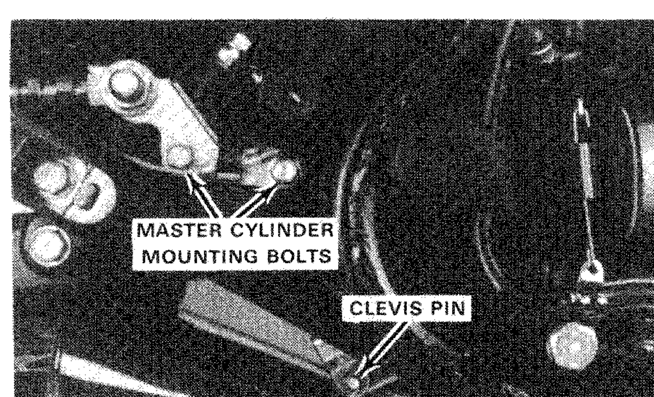
Fuel Tank

Remove the seat and the top compartment.

Remove the fuel tank cap and overflow tray.



Remove the right side cover. Remove the rear master cylinder mounting bolts and push rod clevis pin. Do not disconnect any brake hoses or rear suspension air hoses.



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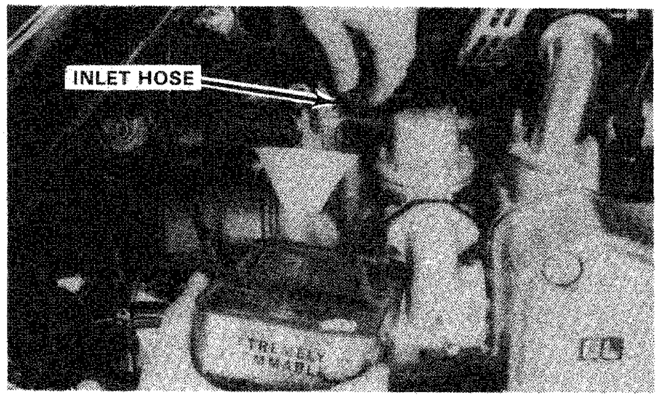
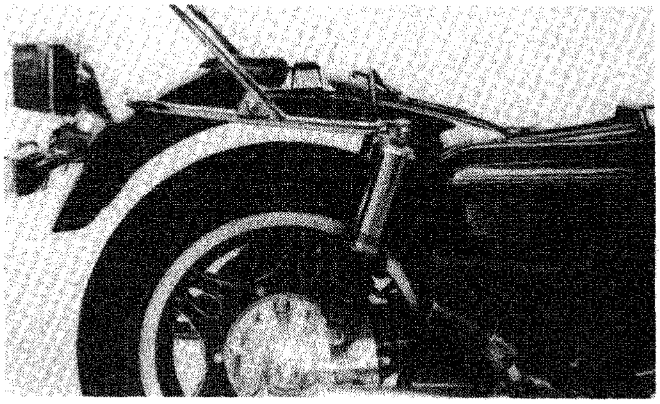
Turn the fuel valve off. Remove the inlet hose from the fuel pump. Turn the fuel valve to RES to drain the fuel tank.

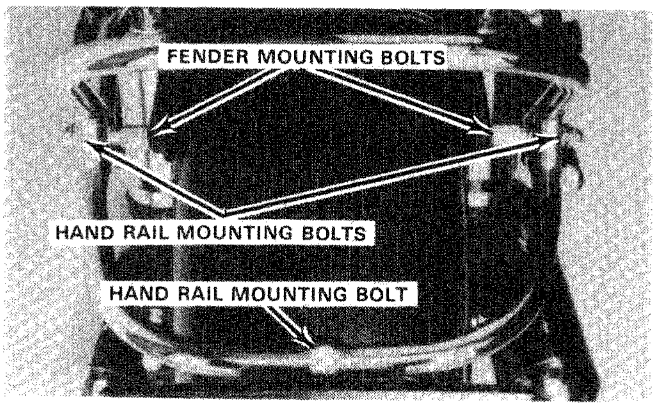


Remove the rear wheel and shock absorbers. Refer to section 14.

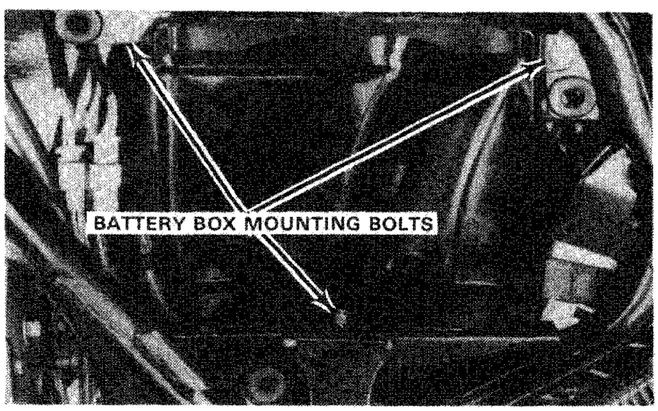
CAUTION: Be sure to support the swingarm so it does not drop and possibly damage the final drive gear case or brake hose.



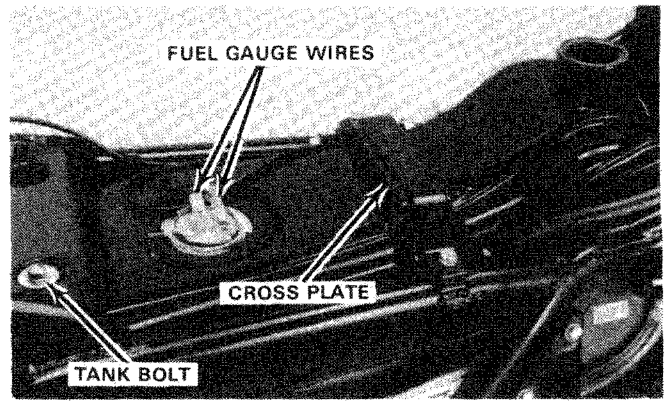
Disconnect the tail light and turn signal wires. Remove the hand rail and both sections of the rear fender.



Remove the left side cover. Remove the battery and the battery box. Remove the left side engine mount plate and remove the fuel valve.

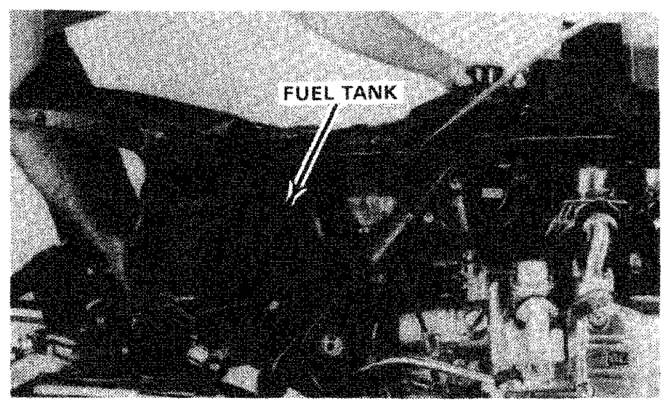


Disconnect the fuel gauge wires. Remove the tank bolt and cross plate.



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

To reinstall the fuel tank, reverse the removal procedure.

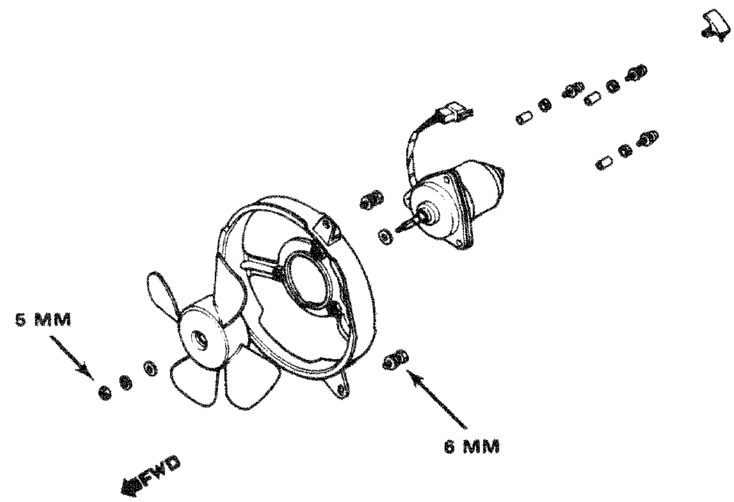


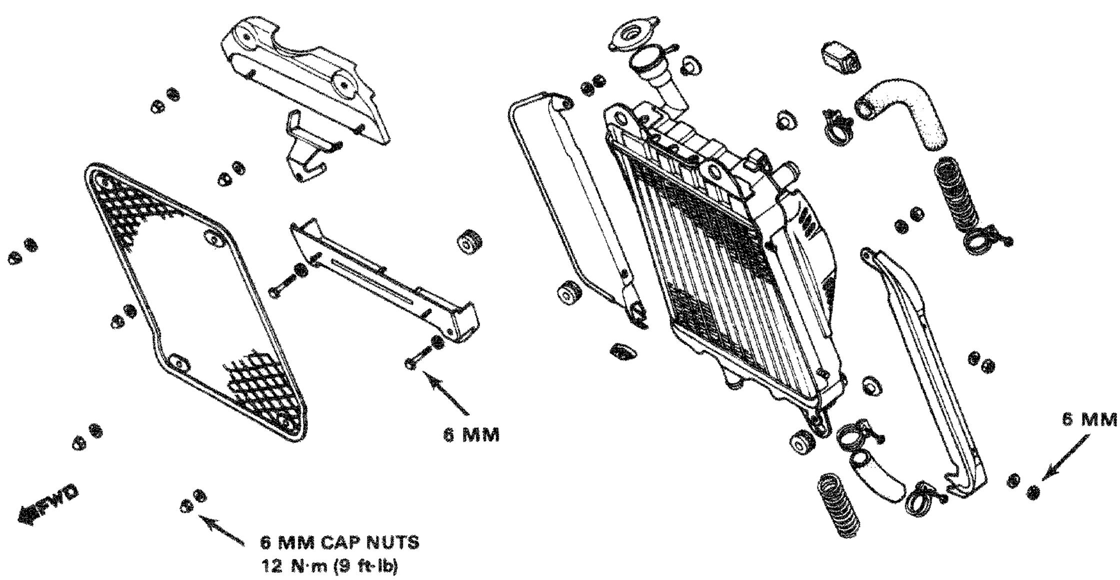
Cooling System

Cooling System

Service Information

- Use new gaskets and O-rings when reinstalling or replacing cooling system parts.
- Use only distilled water and ethylene glycol in the cooling system. A 50/50 mixture is recommended for maximum corrosion protection. Do not use alcohol-based anti-freeze.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- Replace coolant every 24,000 miles (38,400 kilometers) or whenever there is evidence of lime, scale or rust in the radiator.





Torque Values

Thermostat cover bolts: 23 N·m (17 ft-lb)
Water pump body bolts: 10 N·m (7 ft-lb)

Troubleshooting

Engine Temperature Too Low

- Faulty temperature gauge.
- Faulty temperature gauge sensor.
- Thermostat stuck open.
- Low ambient temperature.

Engine Temperature Too High

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

Insufficient Coolant

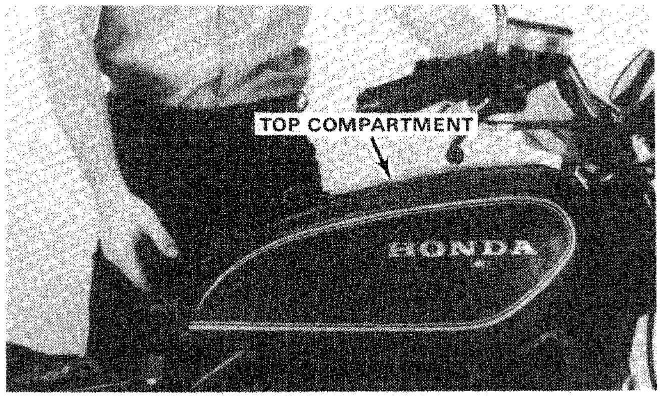
- External leaks in radiator, hoses or water jacket.
- Radiator cap not holding pressure.
- Coolant leaking into oil.
- Faulty head gasket allowing coolant into cylinders.
- Air leak or kink in hose from reserve tank to radiator.

Cooling System

Coolant Replacement

WARNING: To avoid the chance of scalding yourself, replace coolant only when the engine is cool. Never remove the radiator cap when the engine is hot; the coolant is under pressure.

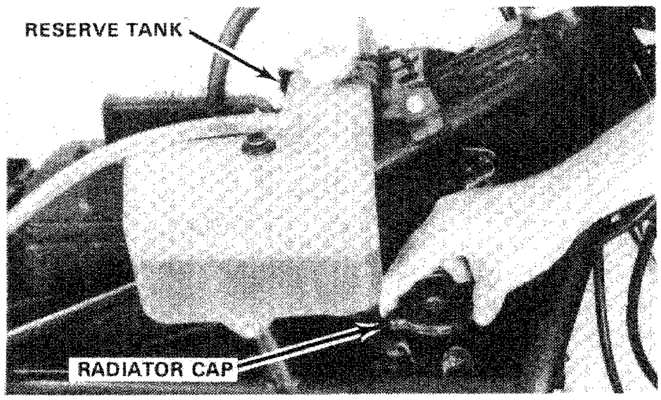
Remove the seat, top compartment and tool tray.



Remove the reserve tank filler cap and pull out the siphon tube.

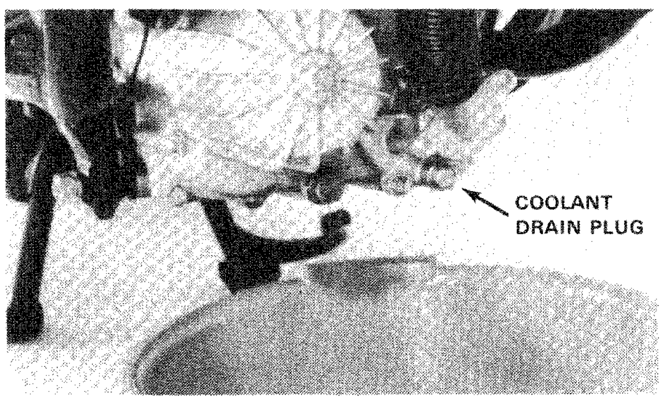
NOTE: If the tube is left in place coolant will siphon down over the engine.

Slowly twist the radiator cap counterclockwise to release pressure, then press down and twist to remove the cap.

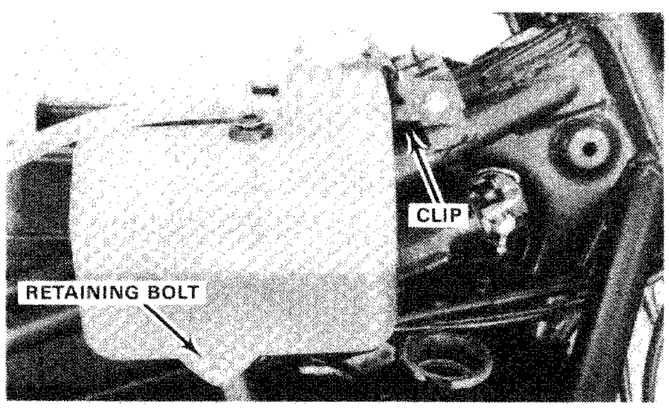


Put a pan under the engine and remove the coolant drain plug.

After the coolant has been completely drained, reinstall and tighten the plug.



Remove the retaining bolt at the bottom of the reserve tank, and pull the tank from its clip. Empty and rinse the tank, then reinstall it. Connect the siphon tube.

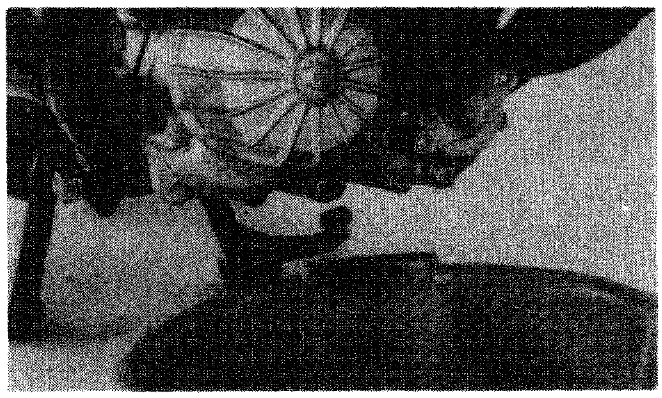


WARNING: Flushing compounds are usually highly toxic and corrosive. Follow the manufacturer's instructions carefully and observe all precautions.

Fill the radiator with a flushing compound for aluminum engines. Install the radiator cap, start the engine, and let it run for 10 minutes. Drain the radiator following the original steps.

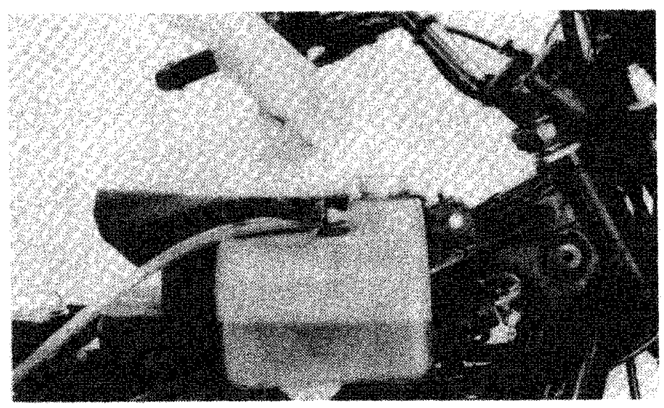
Fill the radiator with plain water. Run the engine, then drain it following the original steps. Do this twice to ensure that all flushing compound is rinsed out of the system.

Fill the radiator with a 50-50 mixture of water and ethylene glycol antifreeze. Run the engine without the radiator cap until the coolant level stabilizes; add more coolant as necessary.



Fill the reserve tank to the FULL line while the engine is running at normal operating temperature. Install the reserve tank and radiator caps.

Check for leaks.

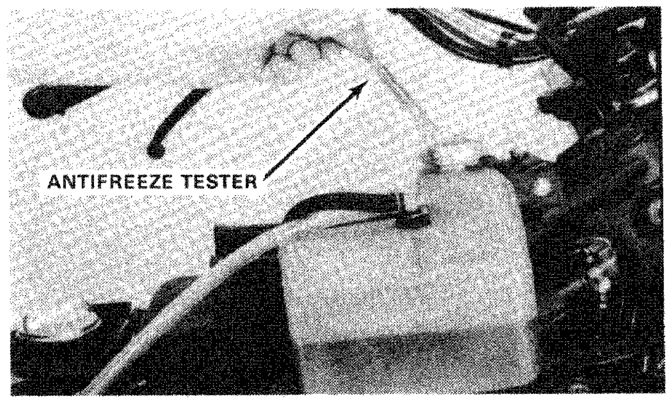


Cooling System

System Testing

Coolant

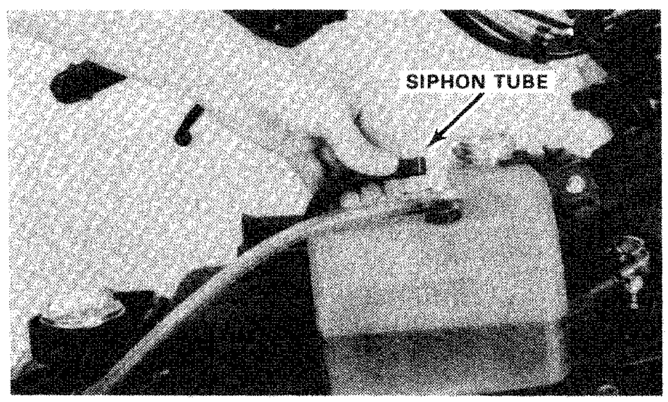
Test the coolant mixture using an antifreeze tester and adjust the water or antifreeze quantity as required.



Radiator Cap

CAUTION: Do not loosen or remove the radiator cap while the engine is hot. Scalding hot coolant may be released.

NOTE: If there is coolant in the reserve tank, remove the siphon tube before removing the radiator cap. Coolant will siphon down over the engine if the tube is left in place.

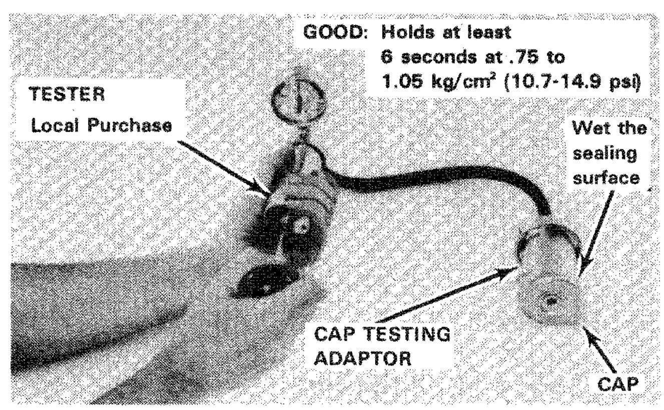


Remove the radiator cap, wet its sealing surface and pressure test it as shown.

The cap should hold the specified pressure for 6 seconds.

Relief Pressure: 0.75-1.05 kg/cm^2 (10.7 -14.9 psi)

If it does not hold pressure, or if relief pressure is too high or too low, replace the cap.

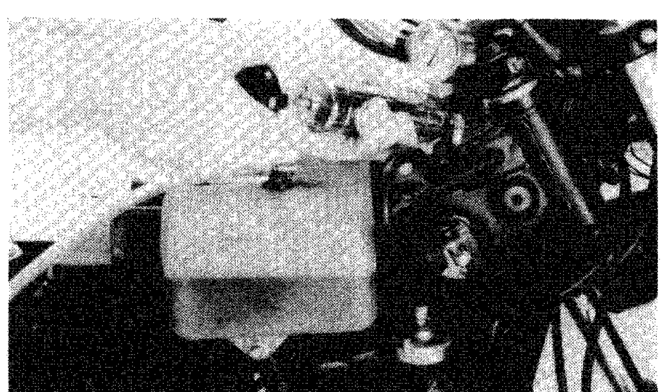


System Pressure

CAUTION: Excessive pressure can damage the radiator. Do not let system pressure exceed 1.12 kg/cm^2 (15.9 psi) during these tests.

Connect the tester to the radiator and pressurize the system to 1.05 kg/cm^2 (14.9 psi). This pressure should be held for 6 seconds.

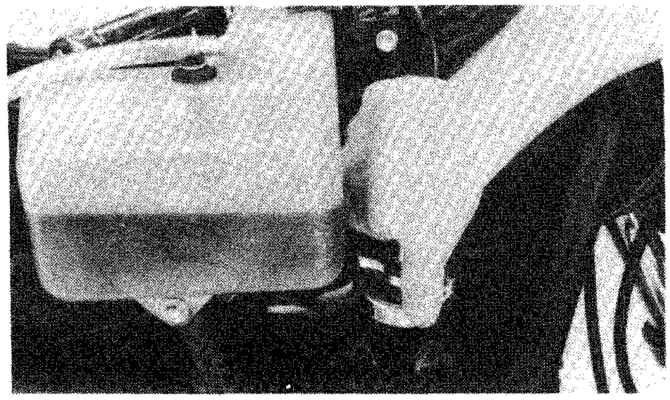
If pressure drops too soon, check for cracked or deteriorated hoses and tighten all hose clamps. Repair or replace parts as necessary. Then retest system pressure and check for leaks.



Warm up the engine and release tester pressure by pressing the stem to one side.

Start the engine and allow it to run until it reaches operating temperature.

Watch the pressure build-up on the gauge. A rapid build-up usually means a leaking cylinder head gasket. Stop the engine immediately and replace the gasket.



If pressure is rising slowly, pump it up to 0.9-1.05 kg/cm^2 (12.8-14.9 psi). Watch the gauge needle:

Needle Vibrates and/or Fluctuates
Leaking cylinder: Short out each spark plug in turn. Vibration will decrease or stop when the leaking cylinder's plug is shorted.

Needle Drops Rapidly
Major leakage: Replace the radiator.

Needle Drops Slowly
Small leaks/seepage: Repair as necessary.

Needle Holds Steady For 2 Minutes
Radiator is good.

NOTE: If the radiator hose swells excessively during these tests it is weak and should be replaced.

Removal/Inspection

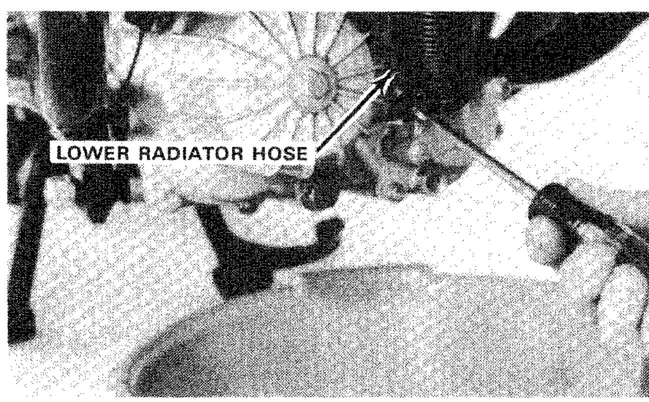
Radiator And Fan

Disconnect the fan motor wires and drain the radiator.

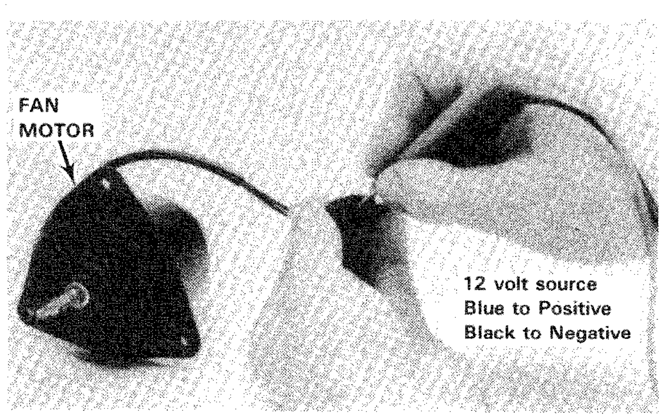
Disconnect the radiator hoses and the reserve tank hose.

Remove the radiator and shrouds, fan and fan motor as an assembly.

Check the radiator core and service as required (page 3-17).



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



(cont'd)

Cooling System

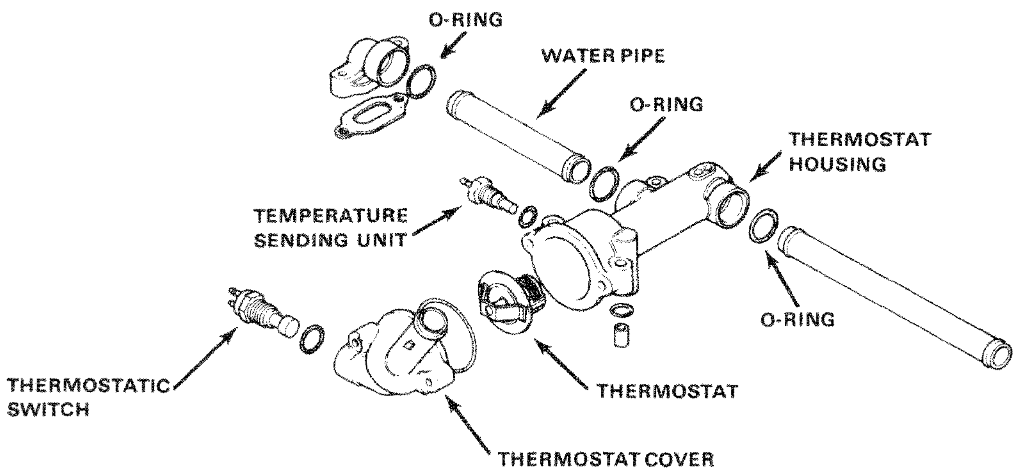
Removal/Inspection (cont'd)

Thermostat

Drain the cooling system and remove the radiator and fan.

Disconnect the thermostat switch wires. Remove the thermostat cover and the thermostat.

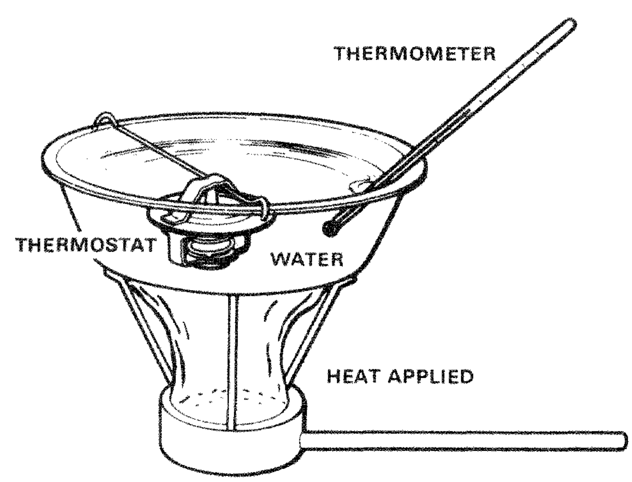
Visually inspect the thermostat for damage; replace as necessary.



Suspend the thermostat in heated water and watch for valve opening and closing. Be sure the thermostat does not touch the bottom or sides of the container.

Replace the thermostat if the valve responds to temperatures other than those shown in illustration, or if it stays open at room temperature.

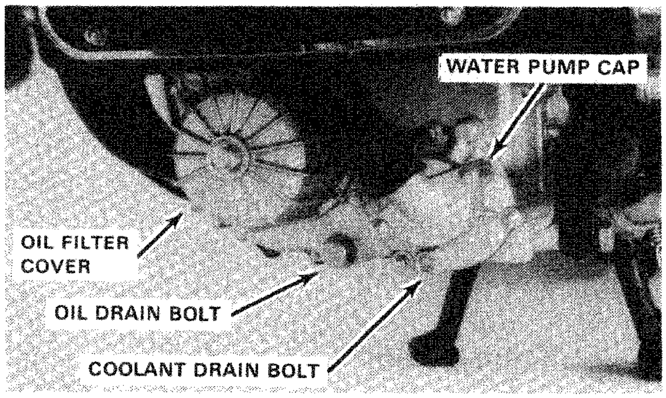
START TO OPEN: 80°-84° C (176°-190° F)
FULLY OPEN: 95° C (194° F)



VALVE LIFT: 8 MM (0.32 IN) MINIMUM WHEN HEATED TO 97° C (201° F) FOR FIVE MINUTES.

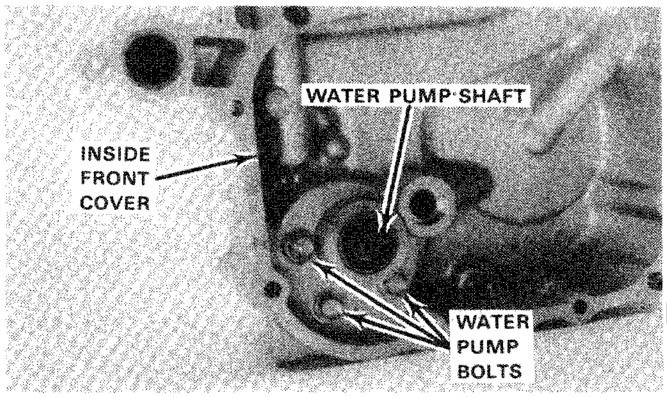
Water Pump

Drain the oil and coolant. Remove the radiator and fan. Remove the oil filter and the water pump cap.



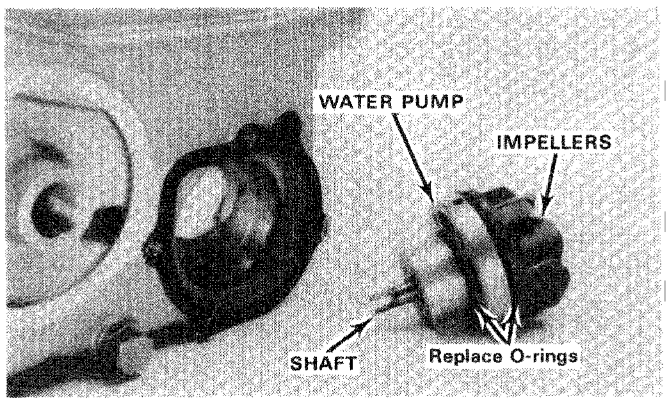
Remove the front engine cover, and the three water pump retaining bolts.

Note the location of all O-rings, collars and dowel pins.



Remove the water pump cover, then remove the pump. Inspect the pump for worn bearings, loose shaft, or damaged impeller.

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



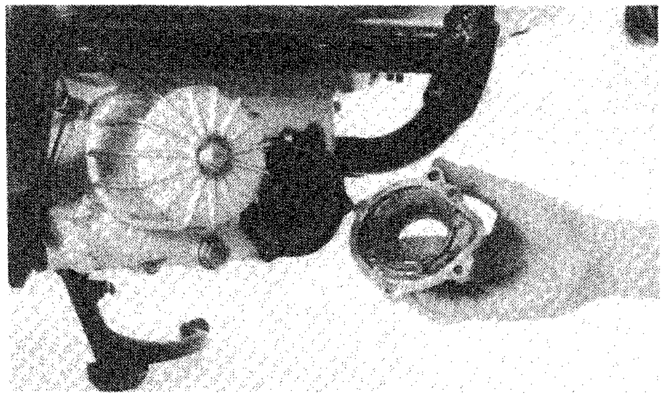
Cooling System

Reinstallation

Reinstall the water pump with new O-rings.

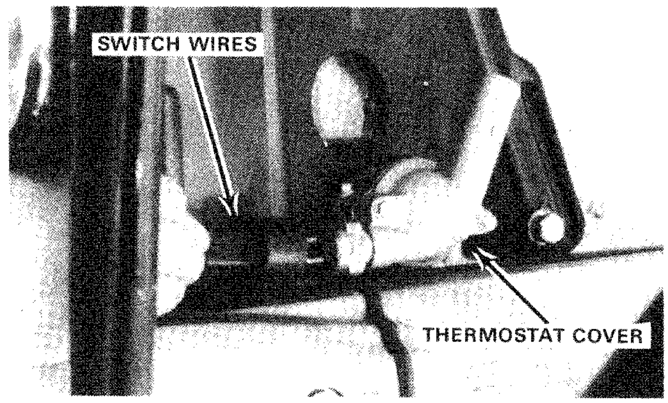
Reinstall the front engine cover and the water pump cover; use a new gasket for the pump cover.

Reinstall the cap with a new O-ring.

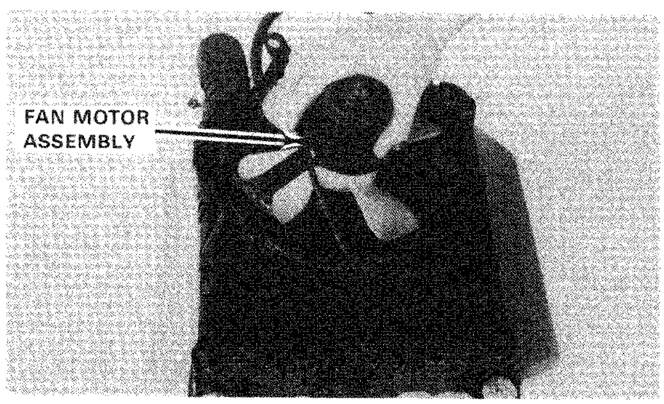


Reinstall the thermostat and its cover. Use a new O-ring in the cover. Reconnect the switch wires.

NOTE: Use thread sealant on the thermostatic switch and temperature sending unit if they were removed.



Reinstall the fan on the motor and secure the assembly to the radiator.

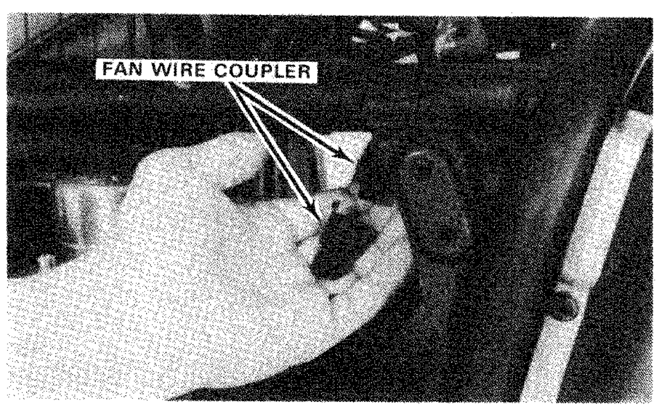


Install the radiator in the frame. Connect the upper and lower hoses. Install the reserve tank.

Connect the fan wire coupler.

Reinstall the oil filter and filter cover.

Fill the crankcase with approximately 3.2 liters (3.4 U.S. qts) of the recommended grade oil and install the oil filler cap.



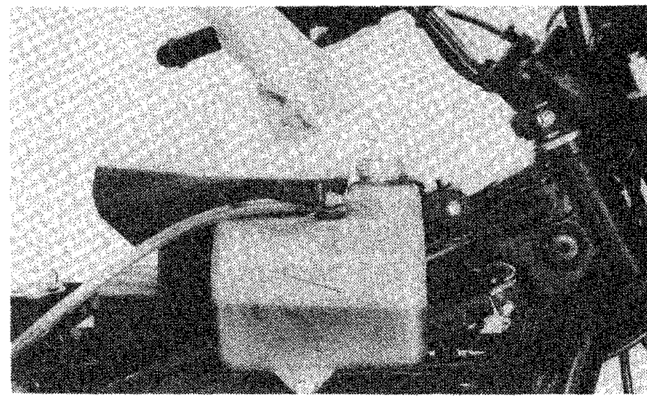
Fill the radiator with a 50-50 mixture of water and ethylene glycol antifreeze. Run the engine without the radiator cap until the coolant level stabilizes; add more coolant as necessary.

Reinstall the radiator cap.

Fill the reserve tank to the FULL line while the engine is running.

Cap the tank and install the siphon tube.

Install the top compartment, tool tray and seat.

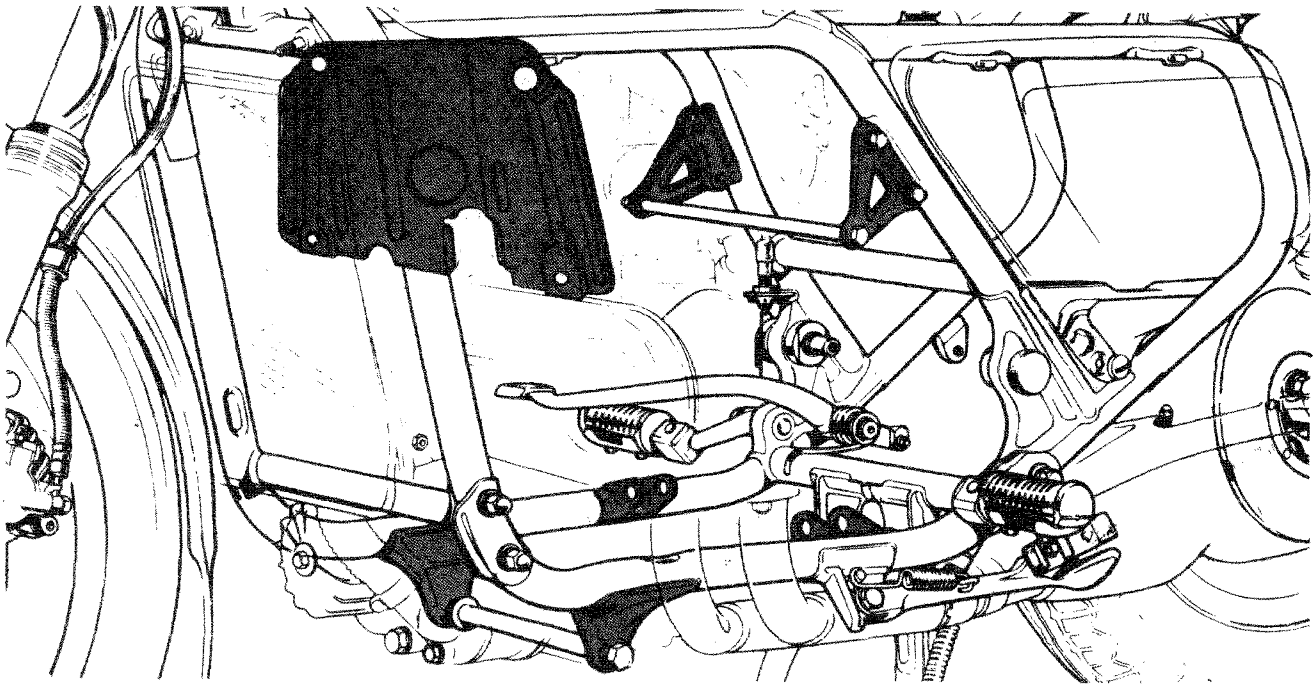


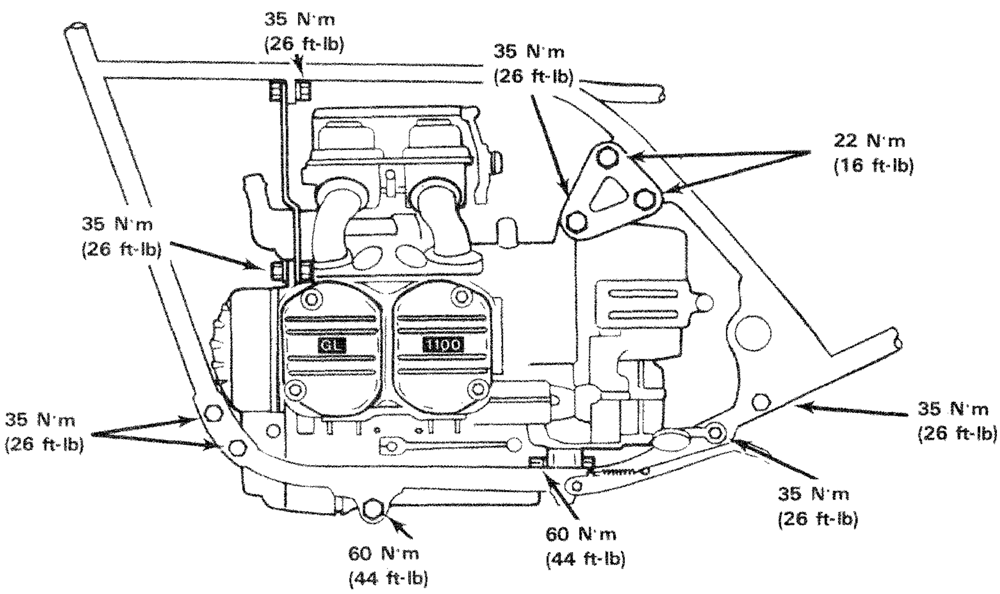
Engine Removal/Installation

Engine Removal/Installation

Service Information

- A floor jack or other adjustable support is required to support and manuever the engine.
- The lower left frame tube (sub-frame) is removable to facilitate engine removal.
- In these procedures, the carburetor assembly is separated and left in the frame to speed engine removal.
- Always clean the oil pick-up screen when the engine is removed. Access to the screen is through the lower right-hand side of the crankcase.





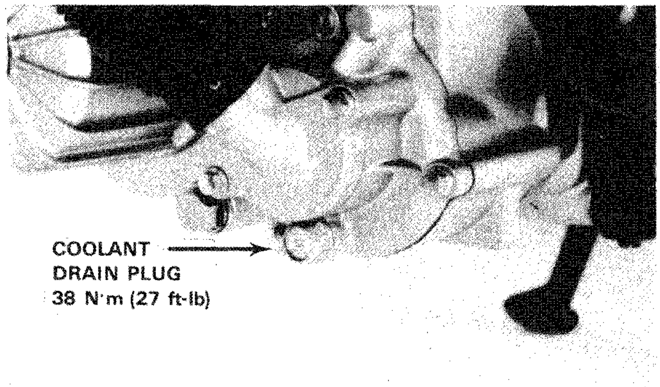
Torque Values

6 mm bolts:	12 N·m (9 ft-lb)	Radiator drain plug:	38 N·m (27 ft-lb)
8 mm bolts:	22 N·m (16 ft-lb)	Oil drain plug:	38 N·m (27 ft-lb)
10 mm bolts:	35 N·m (26 ft-lb)	Oil filter center bolt:	30 N·m (22 ft-lb)

Removal

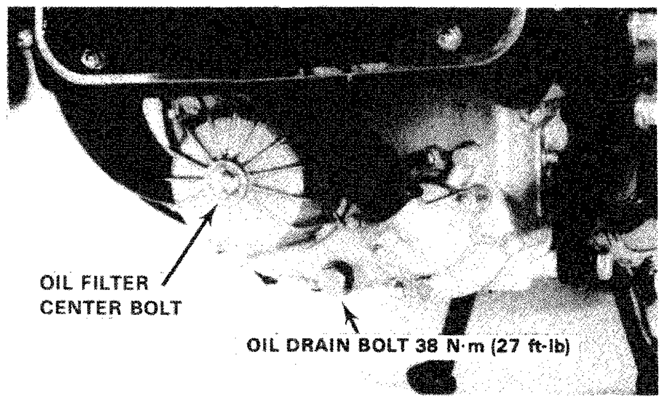
Remove the seat and top compartment.

Drain the radiator, (page 5-4) then reinstall the drain plug.



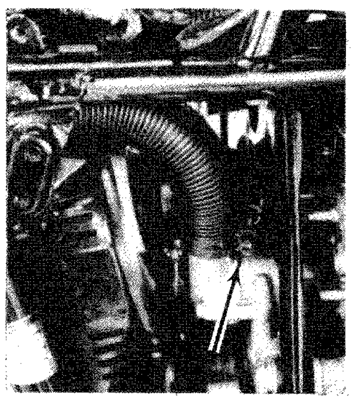
Drain the engine oil (page 3-14) and remove the oil filter cover.

Reinstall the drain bolt.

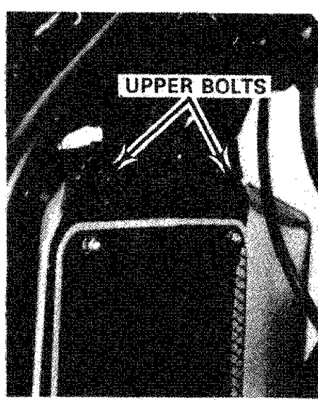


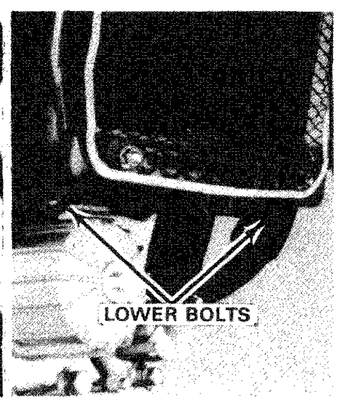
Remove the left horn.

Disconnect the upper and lower radiator hoses and the fan motor connector.




Remove the radiator.





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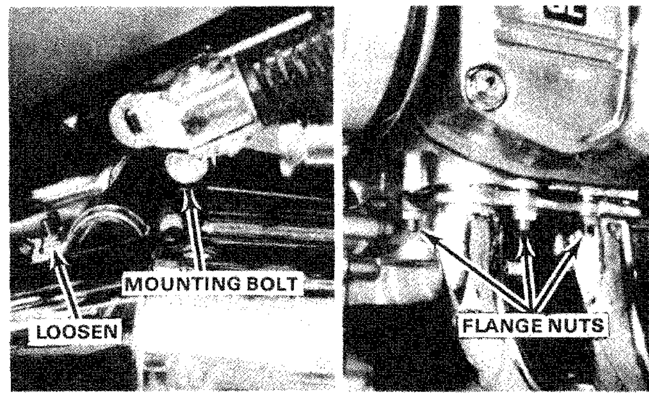
Engine Removal/Installation

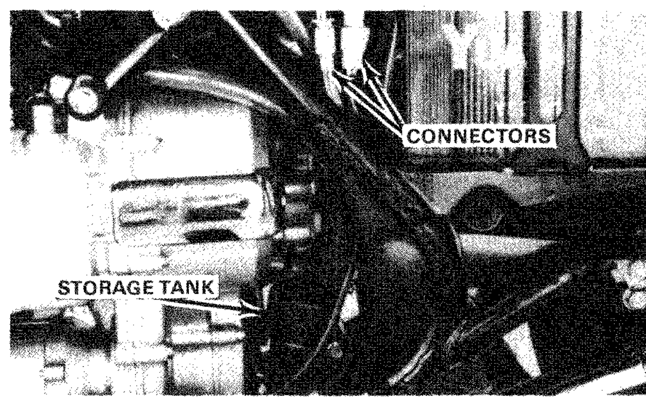
Removal (cont'd)

Loosen the clamp connecting the left and right mufflers. Remove the exhaust flange nuts and the left and right muffler mounting bolts. Separate and remove the mufflers.



Remove the crankcase breather storage tank.

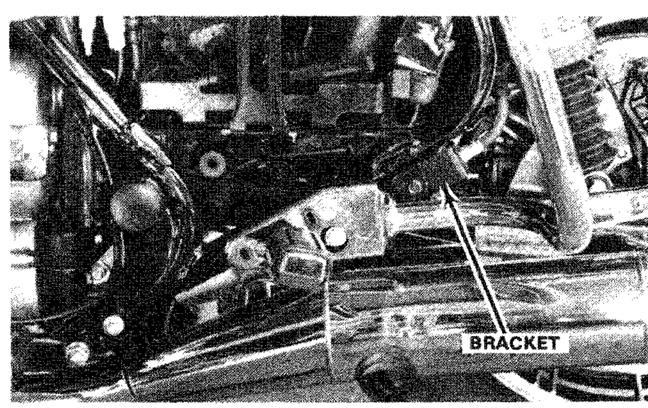
Unplug the stator and pulse generator connectors.



1983— :

CAUTION: When removing/installing the engine, a section of the metal brake lines has to be moved to keep them from being hit by the vacuum controller.

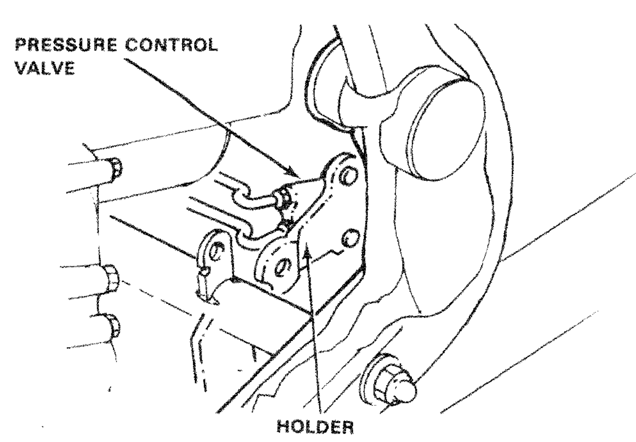
Loosen the bracket where the metal and rubber brake lines join.



1983— :

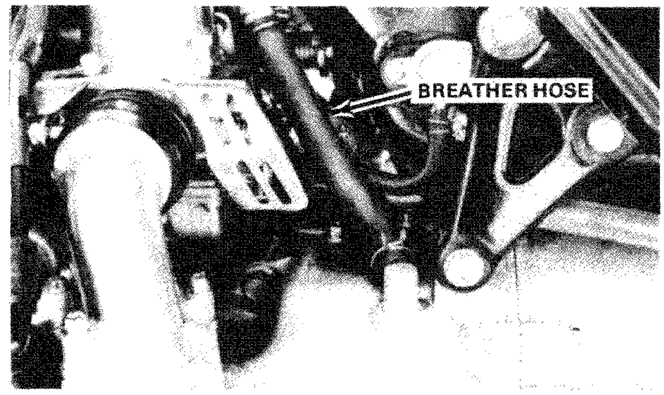
Carefully prop the pressure control valve holder bracket on the frame cross-member as shown, and continue with engine removal.

Be sure to reinstall the holder bracket and retighten the rear bracket during engine reinstallation.



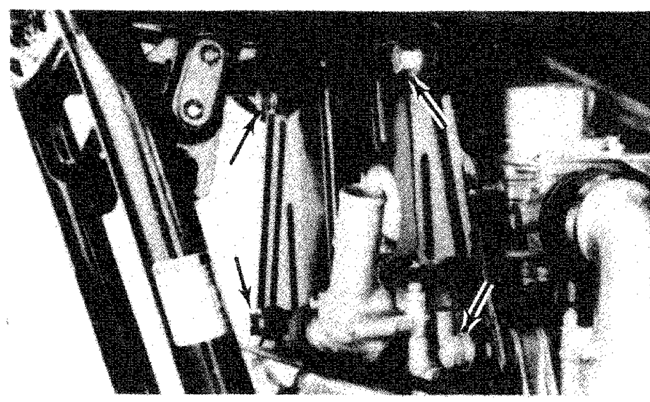
Pull off the spark plug caps and disconnect the breather hose from the engine case.

Detach the high tension wires from the clips on the carburetor assembly.

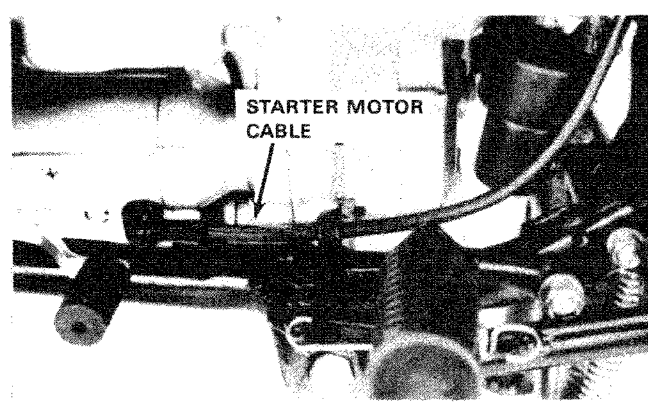


Free the wire harness from the clips on back of the fan shroud and remove the shroud.

Disconnect the engine sensors connector (oil pressure sensor, temperature sensor, neutral switch). These are on the back of the shroud.

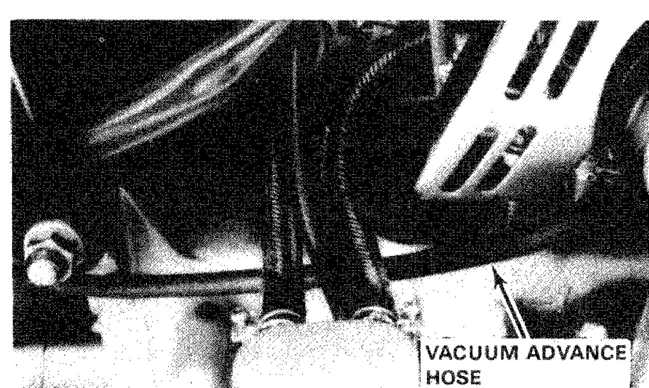


Remove the starter motor cable from the motor.



Check that the fuel valve is OFF and disconnect the fuel lines at the fuel pump.

Disconnect the vacuum advance hose at the No. 3 carburetor.



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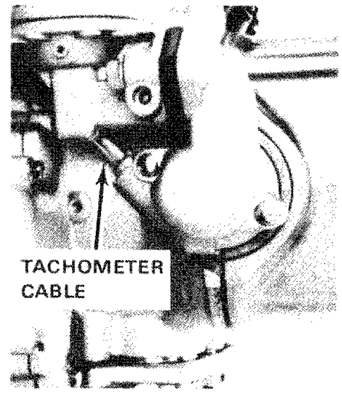
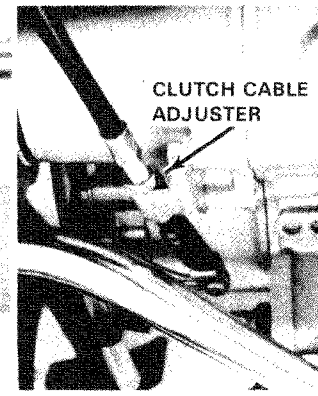
Engine Removal/Installation

Removal (cont'd)

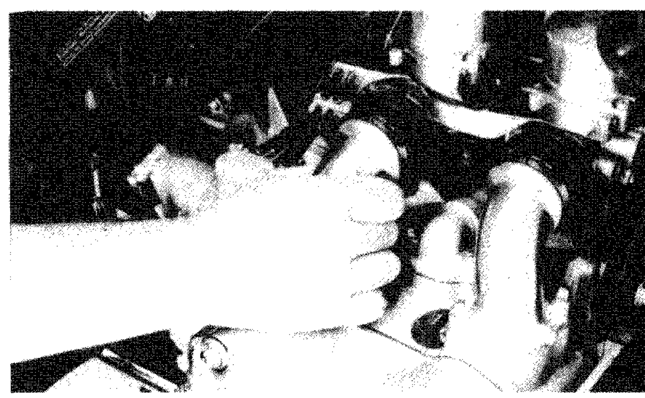
Remove the tachometer cable from the right cylinder head (except Aspencade 1983—).

Loosen the clutch cable adjuster and remove the clutch cable.

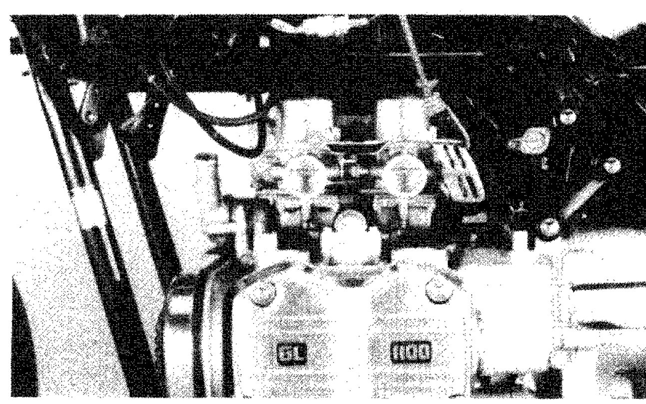




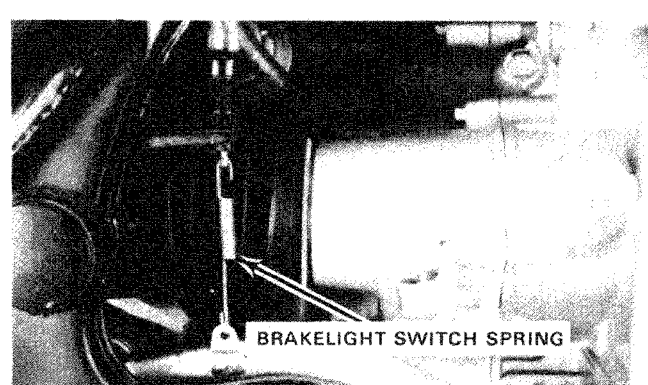
Remove the carburetor inlet pipe cap bolts and loosen the clamps. Mark the pipes for the proper cylinder and carefully pull them straight off the carburetors. Do not twist the rubber sleeves.



Hook bunji cords under the carburetor stays and up to the handlebars to hold the carburetors clear of the engine.

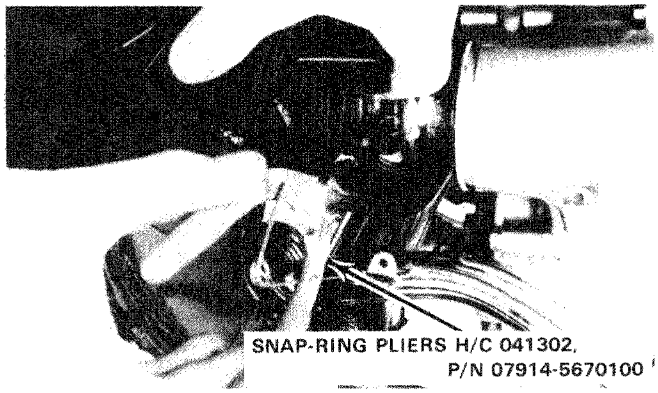


Remove the rear brakelight switch spring.



Move the rubber boot on the driveshaft to expose the U-joint, and remove the snap ring. Push the U-joint rearward.

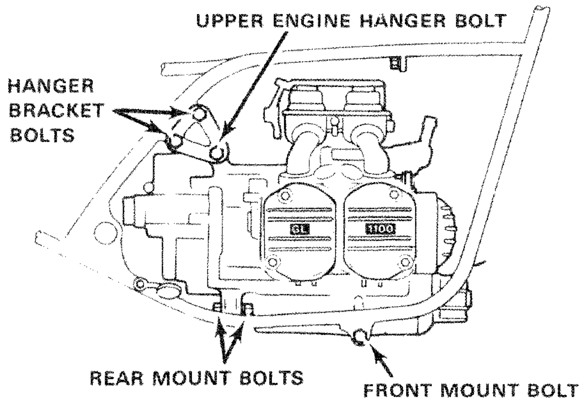
NOTE: The output shaft will disconnect when the engine is removed.



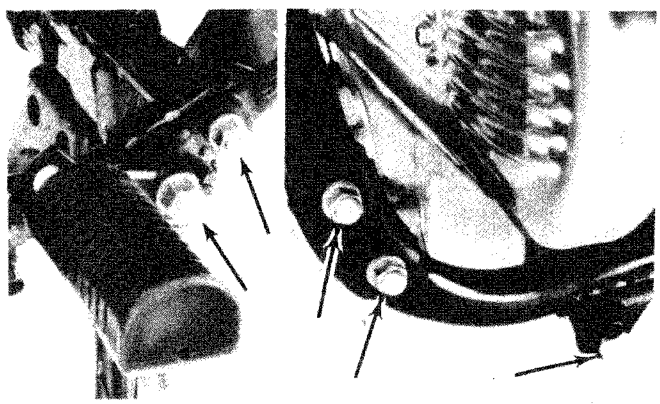
Place a floor jack or other adjustable support under the engine.

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

Remove the right and left hanger bolts and brackets, the front mount bolt, and the right and left rear mount bolts.



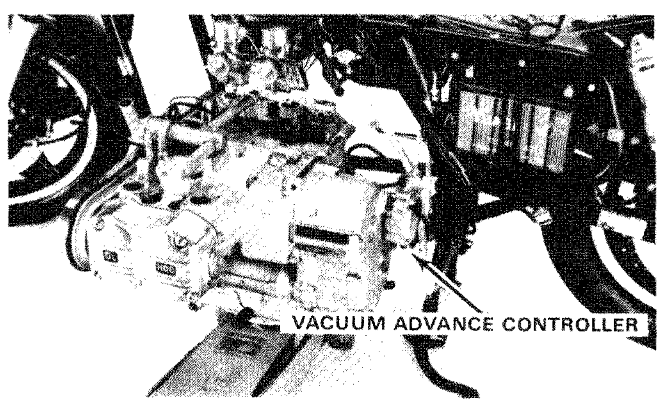
Remove the left footpeg and the other nuts holding the sub-frame, then remove the sub-frame.



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

Move the engine out of the frame.

CAUTION: Be very careful not to bang the vacuum advance controller during removal. If the shaft is bent the ignition timing will not advance, and the pulse generator will have to be replaced.



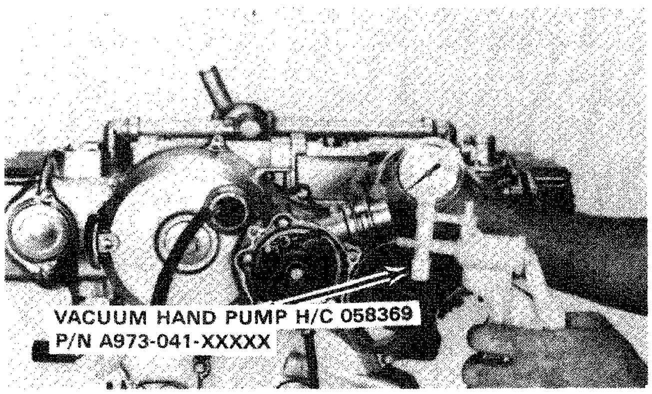
(cont'd)

Engine Removal/Installation

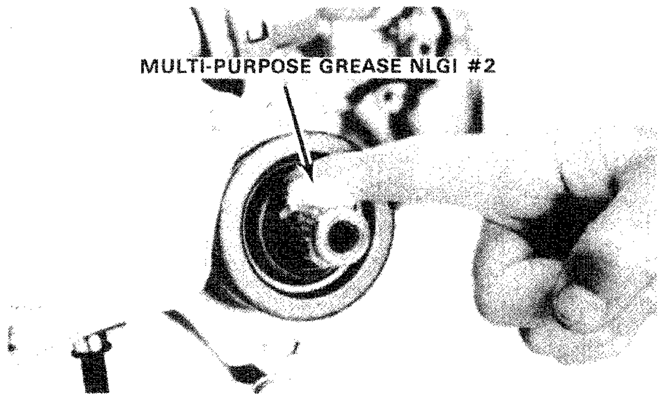
Installation

Before installing the engine check the vacuum controller for proper operation:
Remove the pulse generator cover. Attach a vacuum gauge to the vacuum tube and apply negative pressure. Advance begins at 40 mm Hg and reaches full at 100 mm Hg. Replace the pulse generator if controller does not operate correctly (page 15-7)

CAUTION: Be careful not to bang the vacuum advance controller during installation. If the shaft is bent the ignition timing will not advance, and the pulse generator assembly will have to be replaced. The engine has to be out of the frame to replace the pulse generator.



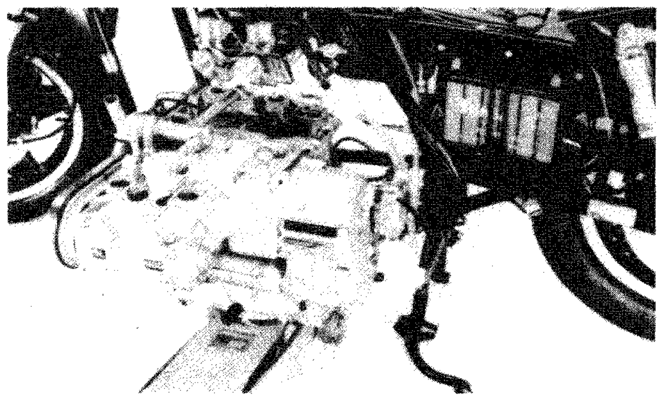
Grease the output shaft splines.



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

Check the vacuum advance controller often to be sure it isn't in danger of hitting the frame.

1983— :
CAUTION: Do not damage the metal brake lines.

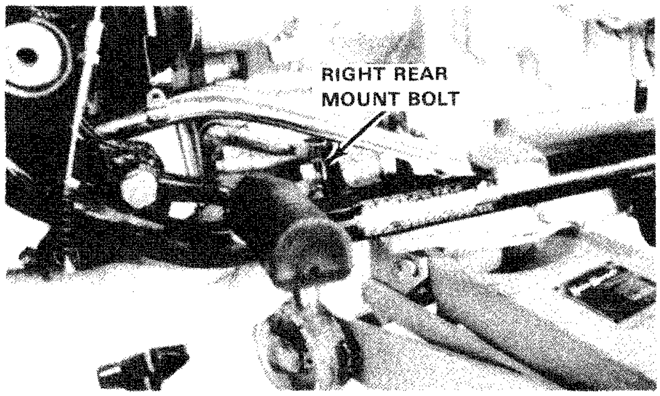


Slide the U-joint forward on the output shaft and install the snap ring.

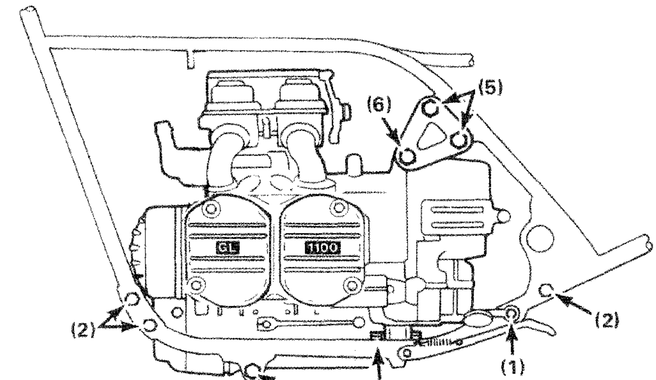
Cover the U-joint with the rubber boot.

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

Hand tighten mounting bolts and nuts (and install parts noted) in this order:
1. The left and then the right rear mount bolt.
2. The sub-frame, footpeg and sub-frame bolts.
3. The forward mount bolt.
4. The right and left hanger brackets and upper engine hanger bolts, including the battery ground with the left hanger.



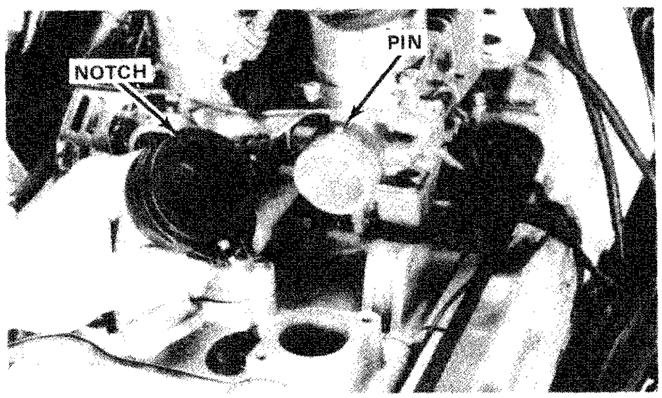
Remove the jack and torque the mounting bolts in the sequence shown:
1. 35 N·m (26 ft-lb), Left side only
2. 35 N·m (26 ft-lb), Left side only
3. 60 N·m (44 ft-lb)
4. 60 N·m (44 ft-lb)
5. 22 N·m (16 ft-lb)
6. 35 N·m (26 ft-lb)



LEFT SIDE VIEW

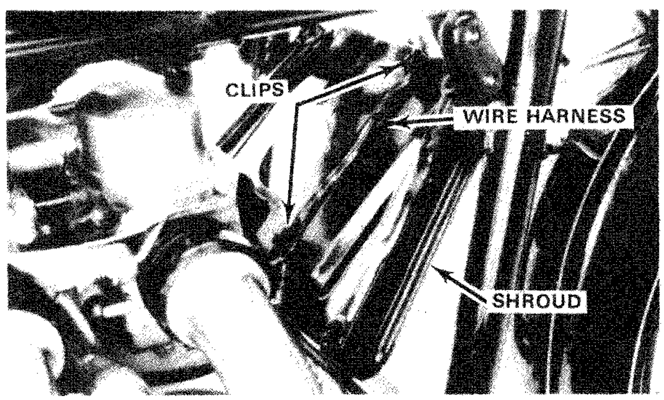
Align the notch in the rubber sleeves with the pins on the carburetors and reinstall the inlet pipes on the carburetors.

Remove the bungee cords. Check the rubber sleeves to make sure they are not twisted, then secure the pipes to the cylinder head. Tighten the clamps.



Run the temperature sensor, neutral switch and oil pressure sensor wire harness through the clips on back of the radiator shroud.

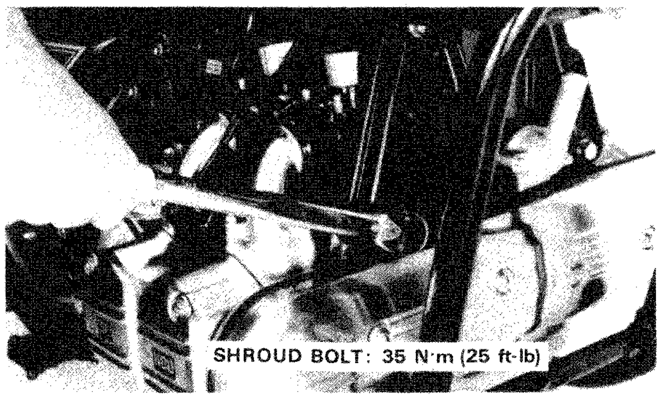
Bend the clips if necessary, and connect the coupler.



(cont'd)

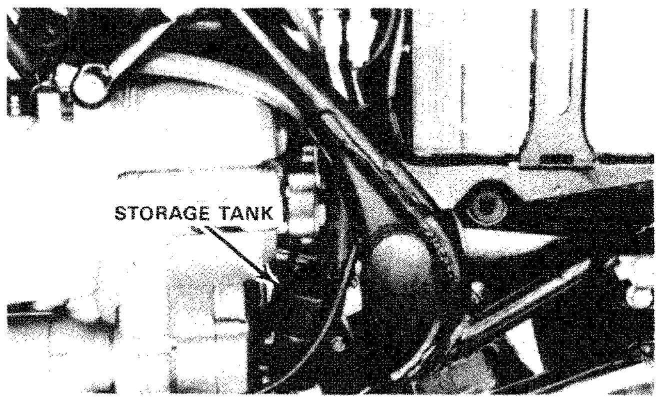
Installation (cont'd)

Install the shroud and nutplate; torque the bolts.

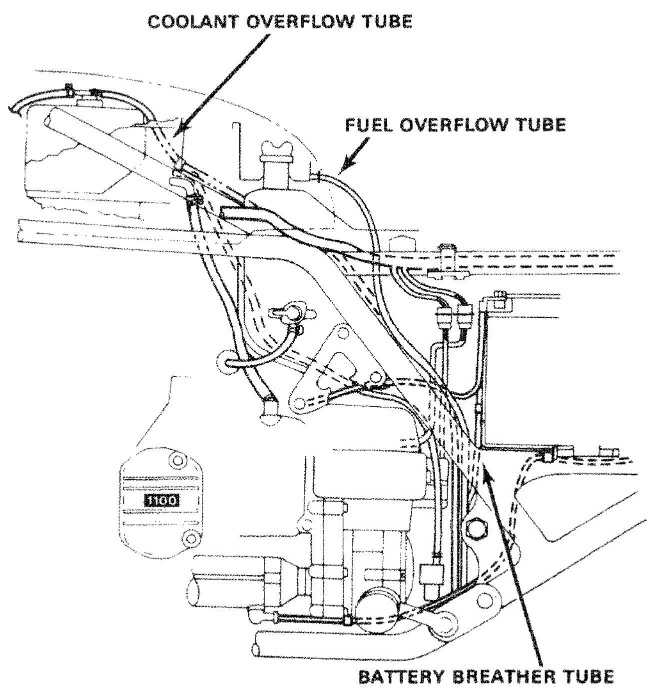


Install the:
starter motor cable
clutch cable
tachometer cable
fuel lines
crankcase breather hose
vacuum controller hose
spark plug caps

Connect the drain tube to the crankcase breather storage tank and install the tank.

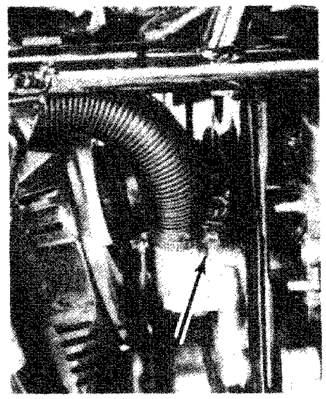


Route the fuel and coolant reserve overflow tubes and secure them in the clip on the centerstand and bracket (with the battery breather).

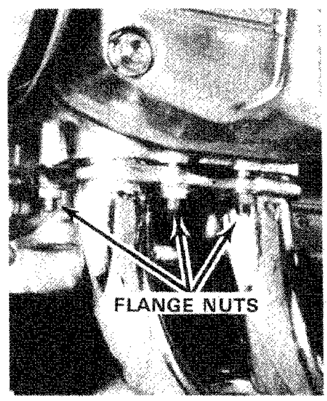


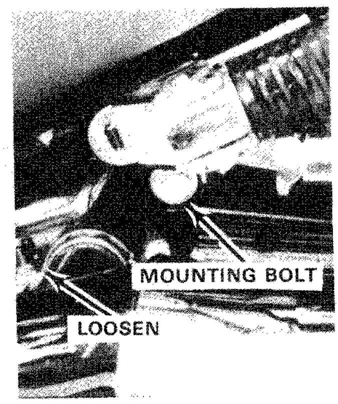
Install the radiator. Connect the fan coupler and radiator hoses.

Install the left horn.

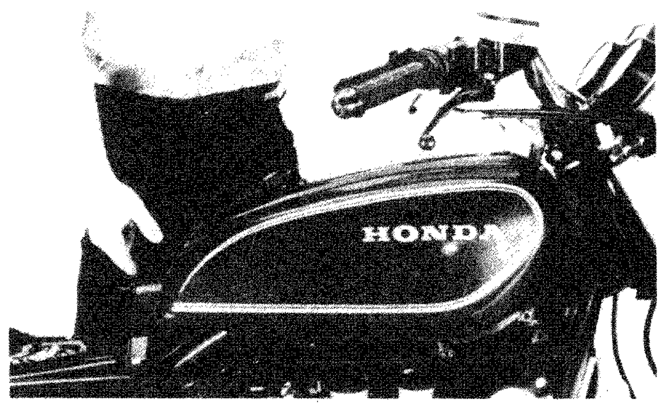


Install the exhaust pipes.





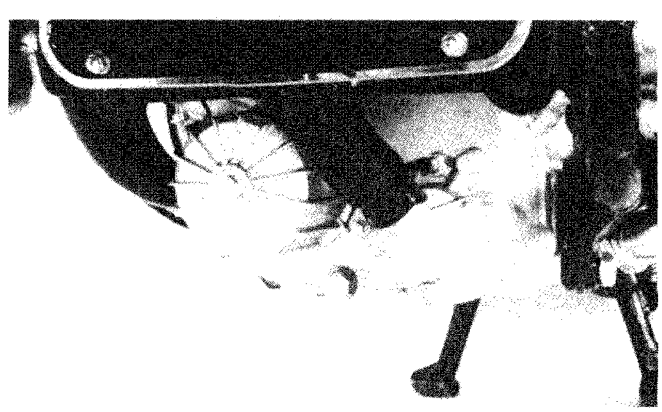
Fill the radiator (page 5-11), then install the top compartment and seat.



Install the oil filter and cover.

Add the specified type and quantity of engine oil.

Adjust the clutch (page 3-23) and throttle cable (page 3-9) free play.

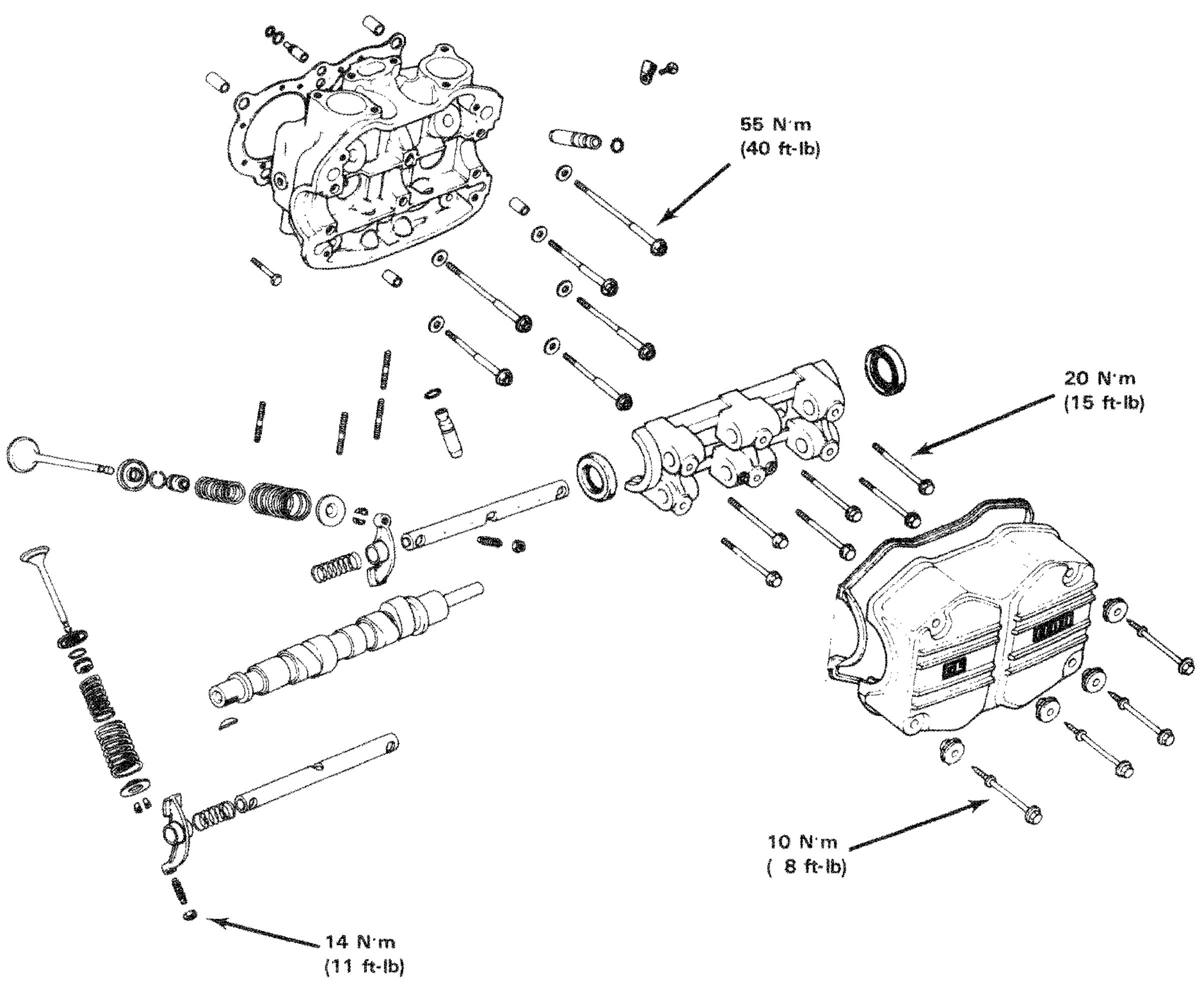


Cylinder Head

Cylinder Head

Service Information

- Cylinder head maintenance and inspection can be done with the engine in the frame.
- Camshaft lubricating oil is fed to each cylinder head through an oil control orifice located in the engine case. Be sure these orifices are not clogged and that the O-rings and dowel pins are in place before installing the cylinder heads.
- Care should be taken to prevent the camshaft drive belts from becoming contaminated with oil, which will cause the rubber to swell and affect the camshaft timing. Do not twist the belts, or bend to a radius of less than 25 mm, to avoid possible fracture of the fiberglass material.



Torque Values

Timing belt drive pulley:	75 N·m (55 ft-lb)
Timing belt driven pulley:	27 N·m (20 ft-lb)

Troubleshooting

Engine-top end problems can be diagnosed by a compression test, or if the top-end is noisy, the problem can be traced with a sounding rod or a stethoscope.

Low Compression Or Uneven Compression

- Valves
  Incorrect valve clearance.
  Burned or bent valves.
  Incorrect valve timing.
  Sticking valve.
  Broken valve spring.
- Cylinder Head
  Leaking or damaged head gasket.
  Warped or cracked cylinder head.
- Camshaft
  Worn or damaged timing belt.
  Loose pulley or drive key.
  Worn or damaged belt tensioner pulley.
- Engine lower end problems - See Section 8.

Compression Too High (Over 14 kg/ cm^2, 199 psi)

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

Excessive Noise

- Incorrect valve clearance.
- Sticking valve or broken valve spring.
- Damaged rocker arm or camshaft.
- Loose or damaged camshaft drive belt.
- Loose or damaged drive belt tensioners or drive pulleys.

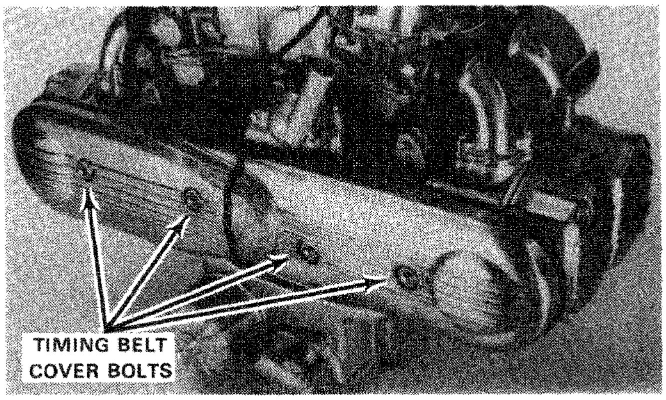
Contaminated Engine Oil Or Coolant

- Leaking or blown head gasket.
- Leaking core plugs - See page 3-31.
- Damaged or warped cylinder head.

Cylinder Head

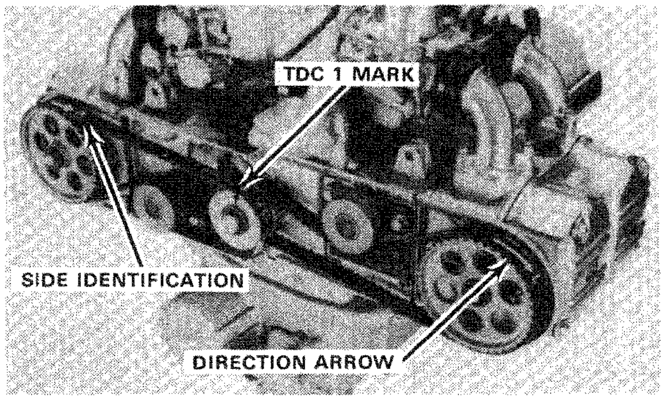
Timing Belt Removal

Remove the timing belt covers.



NOTE:
- The top end can be repaired with the engine and radiator in place.
- Loosen the radiator mounting bolts to facilitate removal of timing belt cover bolts.

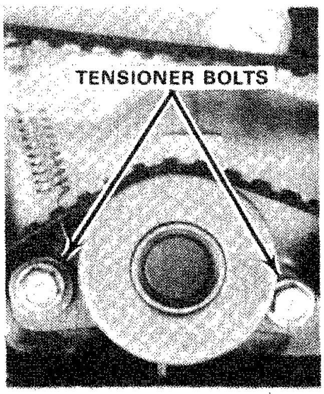
Turn the alternator rotor bolt clockwise until the T-1 mark on the flywheel lines up with the case index mark and the cam pulley arrows are aligned as shown.

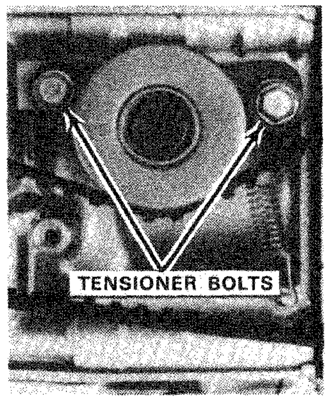


Identify each belt as left or right and also mark its direction of rotation.

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

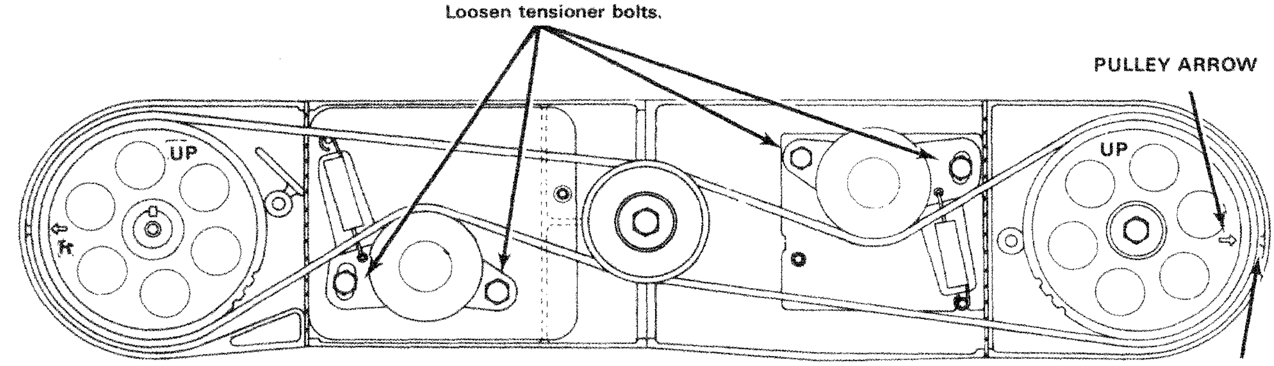
Loosen the tensioner bolts, then slip off the right and left belts, in that order.





NOTE: The timing belts can remain looped over the crank pulley.

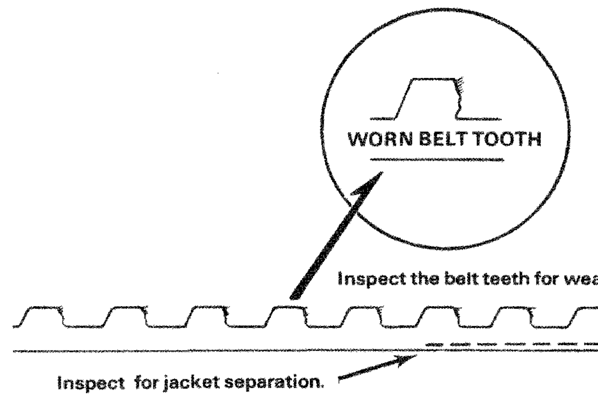
CAUTION:
- **To prevent belt damage, do not use sharp tools, such as a screwdriver, to pry off belts.**
- **Do not turn the camshaft after the timing belts have been removed, since it is possible to bend the valves.**



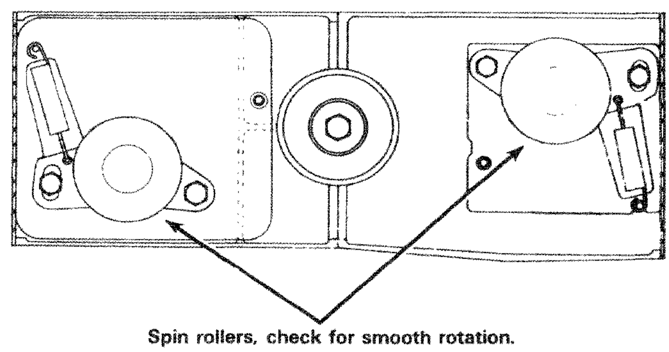
Move tensioner rollers away from belts and retighten bolts. **Remove the belts.**

Belt Inspection

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



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

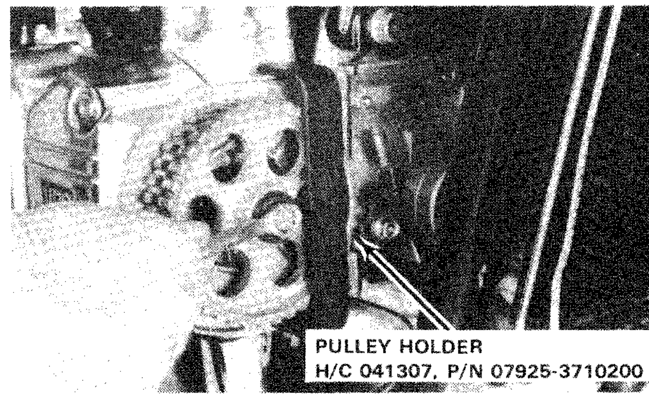


CAUTION: Do not lubricate the belt tensioners since oil will damage the timing belts. To protect the sealed tensioner bearings, do not use solvents or other cleaning agents inside the front timing cover.

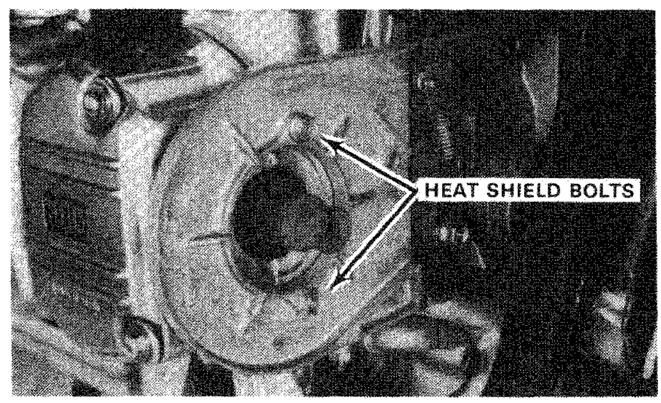
Cylinder Head

Camshaft/Rocker Arm Removal

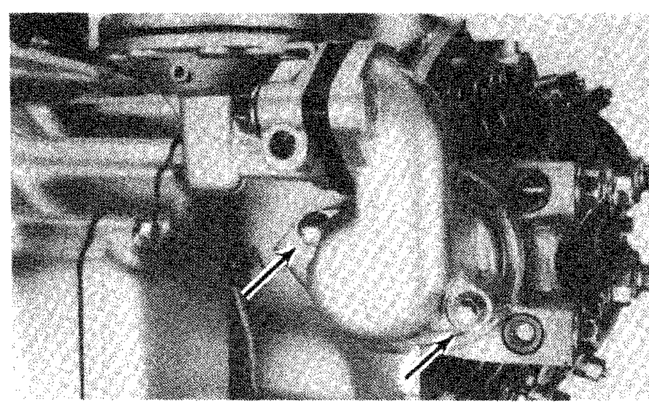
Install the Pulley Holder, then unscrew the cam pulley bolt and remove the pulley.



Remove the cylinder head heat shields and the cylinder head covers.



Remove the fuel pump/tachometer drive housing from the right cylinder head.

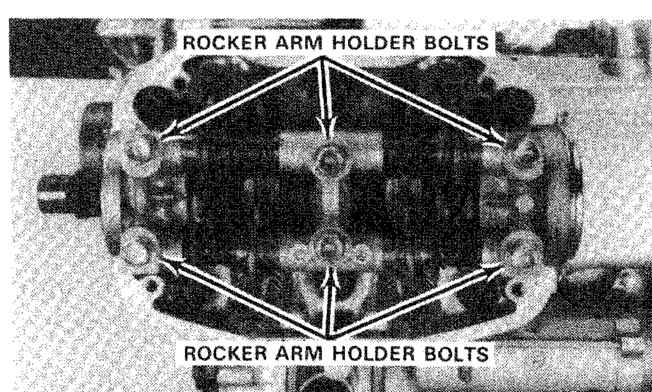


Loosen the valve adjuster screws to relieve valve spring pressure.

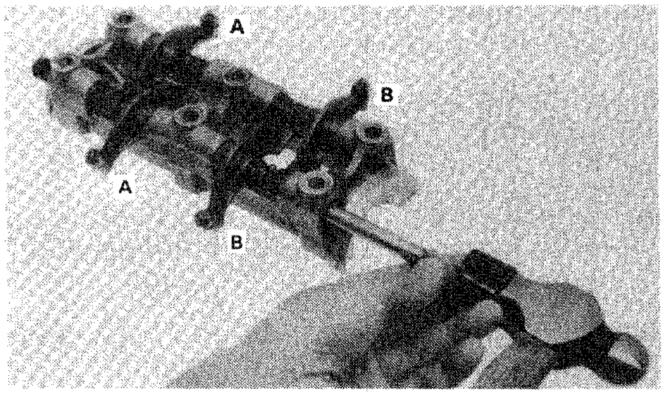
Remove the six rocker arm holder bolts, then remove the rocker arm assembly and camshaft. Mark each holder to identify what side it was on.

NOTE: To prevent cocking the rocker arm assembly, unscrew the rocker arm holder bolts in a crisscross pattern, two turns at a time.

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



Drive out the rocker arm shafts using a drift punch and hammer. Note the letters on the rocker arms and identify each for proper assembly.

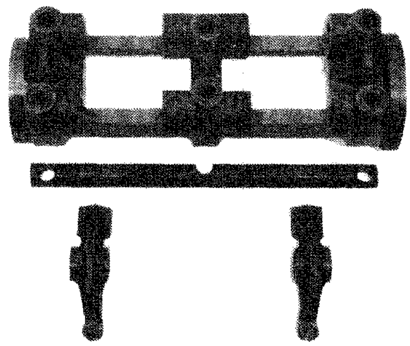


Rocker Arm Inspection

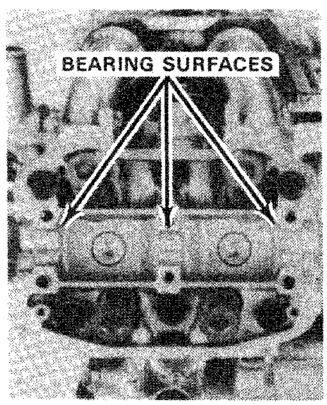
Inspect the rocker arm shafts, rocker arms and cam holders.

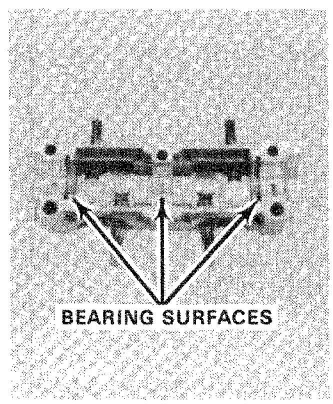
Shaft Hole Service Limit: 14.05 mm (0.553 in)
Rocker Shaft Service Limit: 13.94 mm (0.548 in)
Rocker Arm Service Limit: 14.05 mm (0.553 in)

NOTE: If any rocker arms require replacement, inspect the camshaft lobes for scoring, chipping, or flat spots.

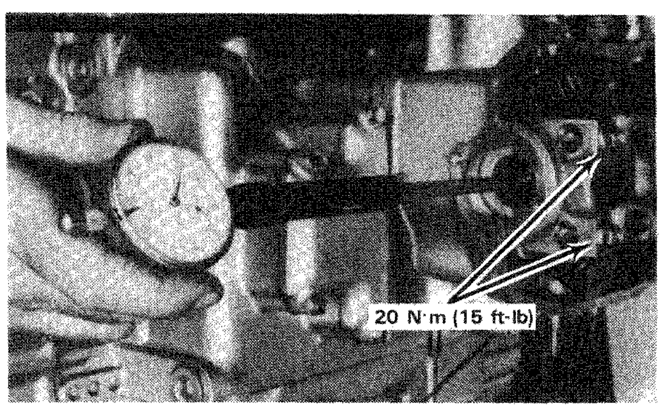


Inspect the cam bearing surfaces for scoring, scratching, or damage caused by insufficient lubrication. Check that the oil passages are clear.





Bolt the camshaft holder in place and torque the bolts. Measure and record the I.D. of each bearing.



(cont'd)

Cylinder Head

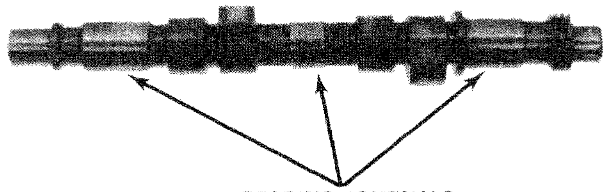
Camshaft/Rocker Arm Removal (cont'd)

Measure and record the O.D. of each camshaft bearing journal. Determine the end and center bearing clearance.

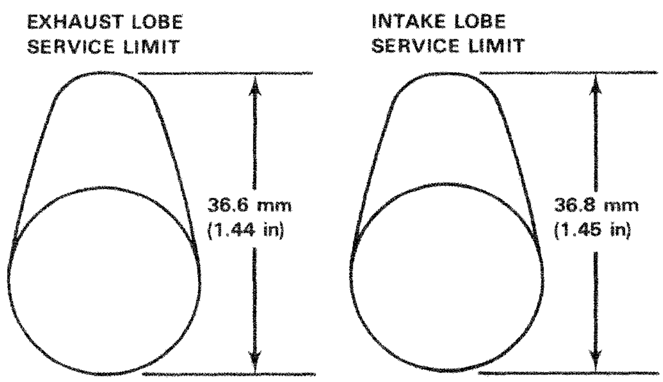
End and Center Bearing Clearance
Service Limit: 0.140 mm (0.0055 in)

NOTE:

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



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

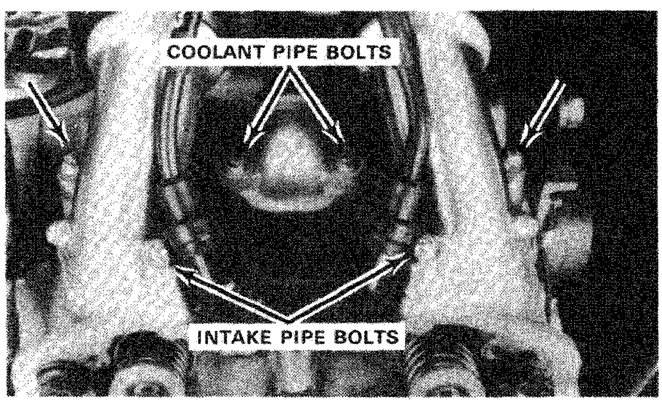


Cylinder Head Removal

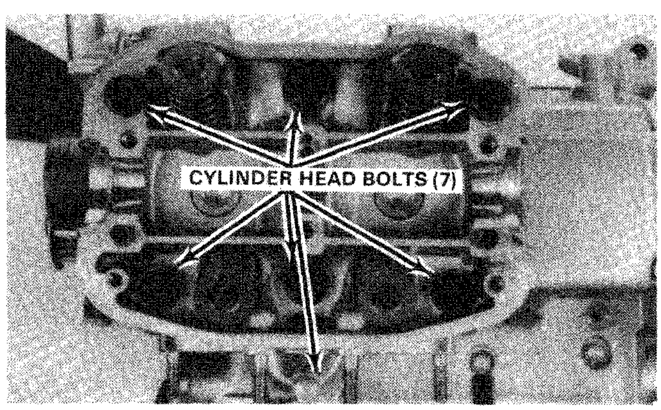
CAUTION: Before removing the cylinder heads, drain the coolant. See Section 5.

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

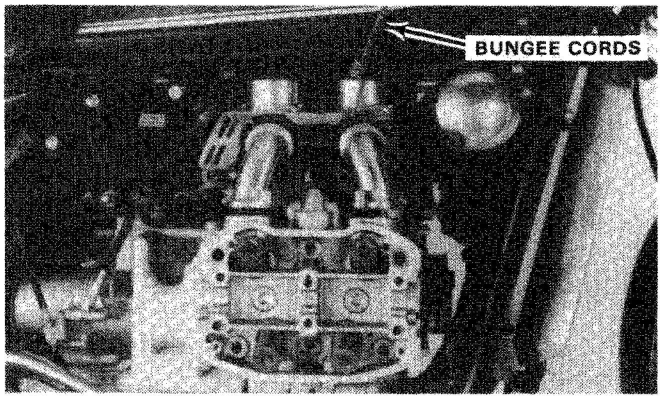
Remove the muffler rear mounting bolts and remove the exhaust system.



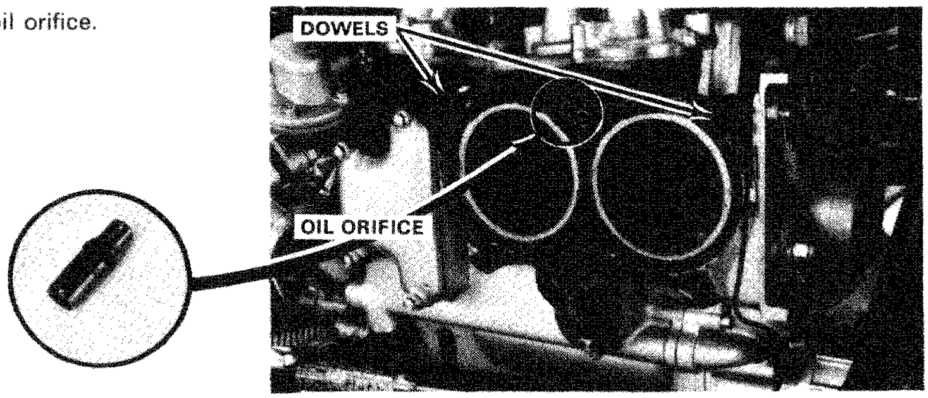
Remove the cylinder head bolts.



Support the intake pipes with bungee cords, then remove the cylinder head.



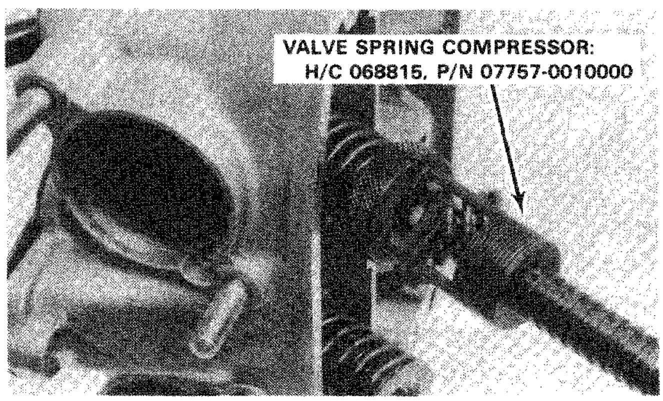
Remove the head gasket dowels and oil orifice.



Cylinder Head Disassembly

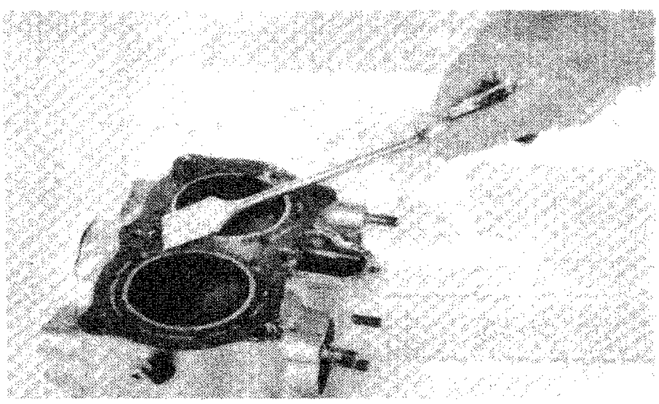
Using a valve spring compressor, compress the spring and remove its keepers. Remove retainers, springs, and valves.

NOTE: Keep valves and related parts in order.



Clean gasket material from the cylinder head.

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

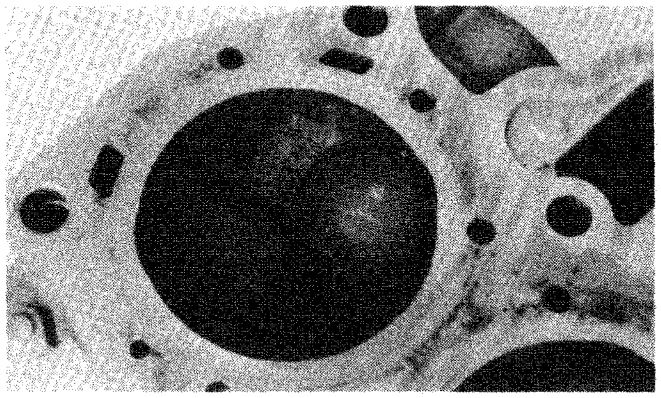


(cont'd)

Cylinder Head Removal (cont'd)

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

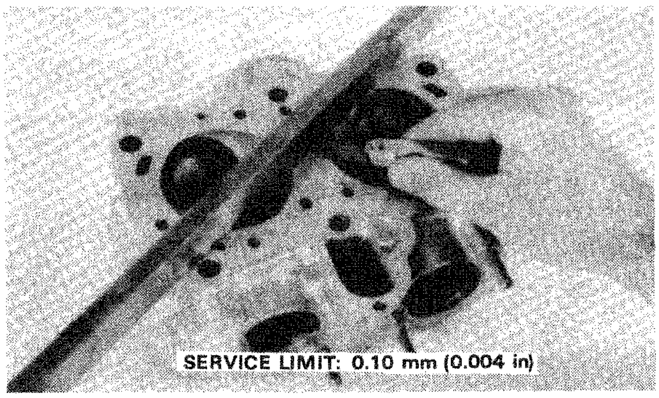
NOTE: Do not damage the valve seats.



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

Service Limit: 0.10 mm (0.004 in)

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

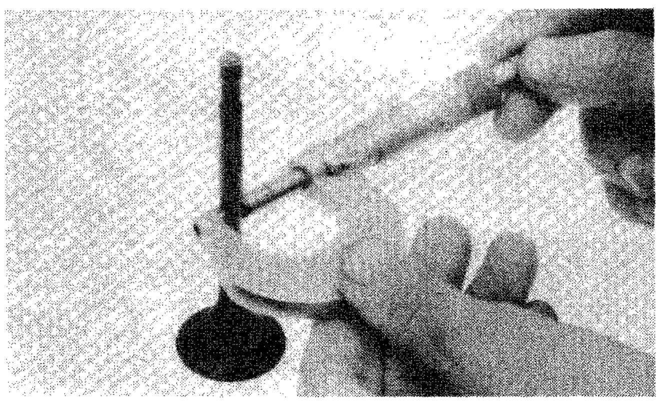


Valve And Guide Inspection

Clean valves and inspect.

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

Intake Valve: 6.58 - 6.59 mm (0.2591 - 0.2595 in)
Exhaust Valve: 6.55 - 6.56 mm (0.2579 - 0.2583 in)

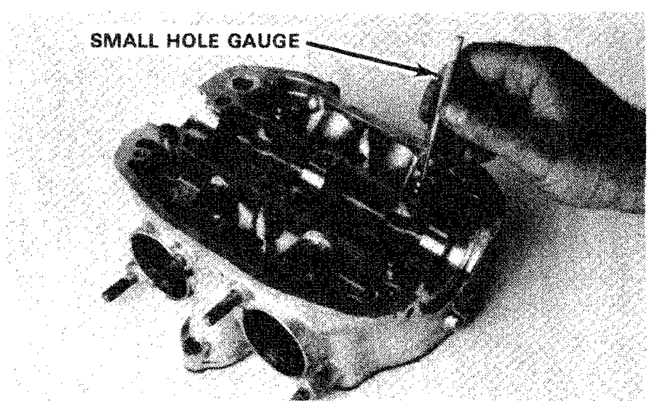


Run the proper reamer through the guides to remove carbon deposits.

Valve Guide Reamers:
H/C 072489, 07984-6570100
or
H/C 048726, 07984-6110000

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

Valve Guide Service Limit: 6.64 mm (0.261 in)



NOTE: Measure the valve guide wear on the thrust side. Subtract the valve stem O.D. from the valve guide I.D. to determine the clearance.

Valve Stem-To-Guide Clearance Service Limit:
Intake: **0.08 mm (0.003 in)**
Exhaust: **0.10 mm (0.004 in)**

If the clearance is over the service limit, replace the guides (below) and remeasure.

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

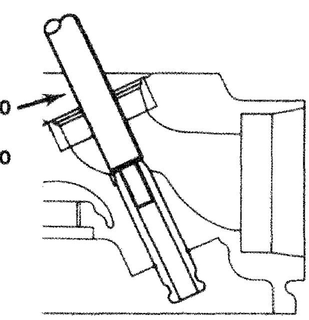
Valve Guide Replacement

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

CAUTION:

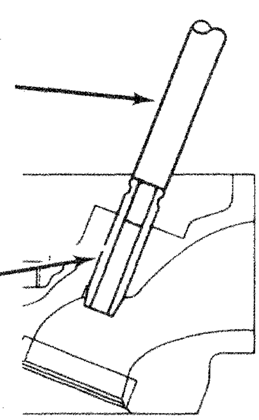
- **Do not use a torch to heat the cylinder; it may cause warping.**
- **To avoid burns, wear heavy gloves when handling the heated cylinder head.**

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



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

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



(cont'd)

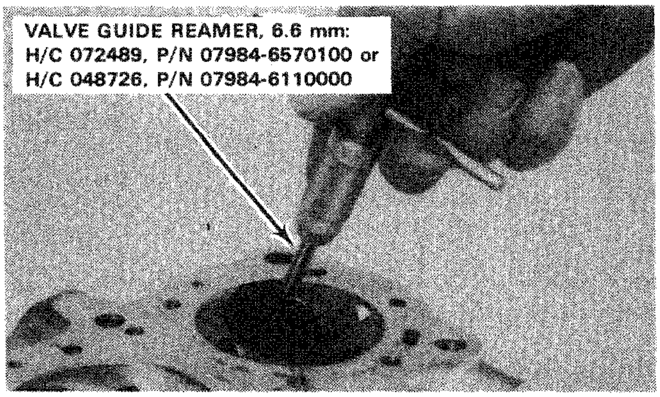
Cylinder Head

Valve Guide Replacement (cont'd)

Ream the new guides to finished size using a reamer.

NOTE: Use cutting oil on reamer during this procedure.

Clean all cutting residue out of the valve guides.

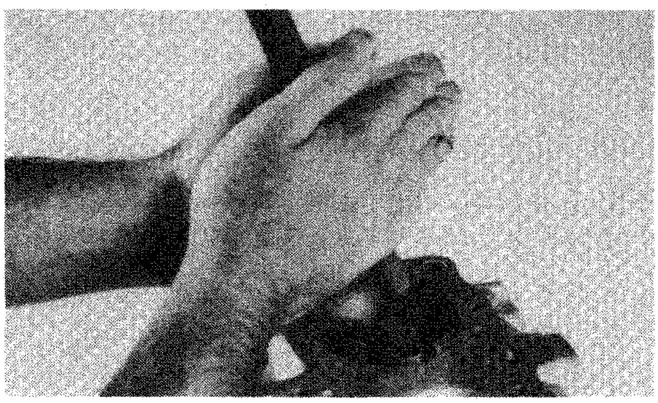


Valve Seat Inspection/Refacing

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

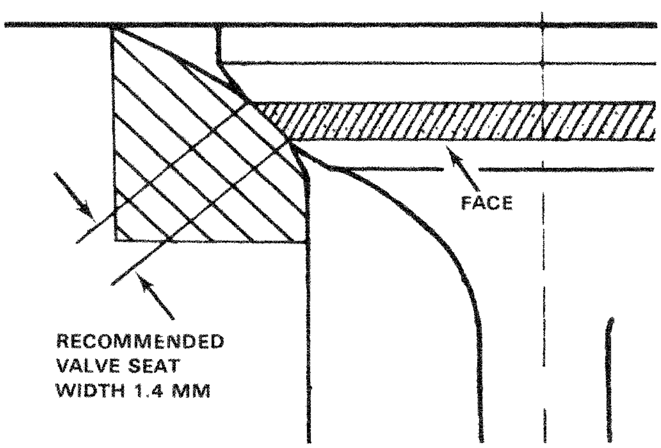
Apply a light coating of valve lapping compound to each valve face. Lap each valve and seat using a rubber hose or other hand-lapping tool.

CAUTION: Do not allow lapping compound to enter the valve guide. After lapping, wash out the compound completely and coat the valve face and seat with engine oil.

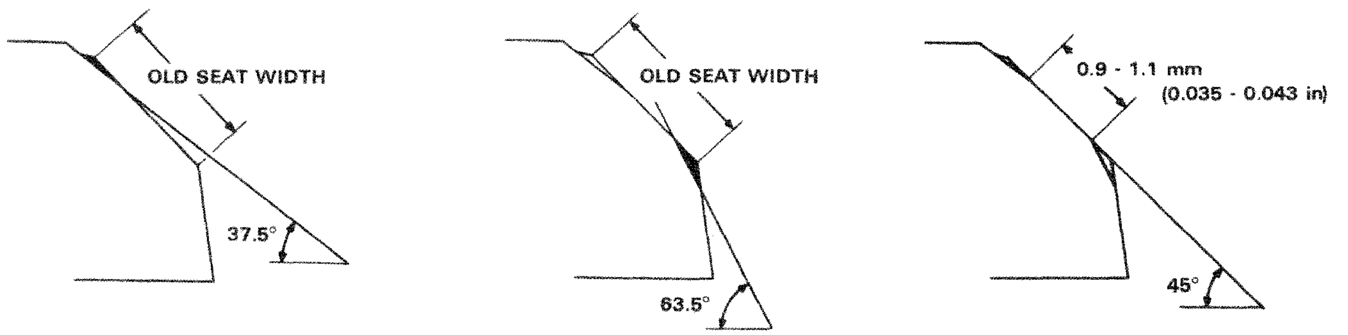


Remove the valve and inspect the face.

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



Inspect the valve seat. An even matt finish around the seat indicates good valve contact. If the seat is too wide, too narrow, or has low spots, the seat must be refaced.

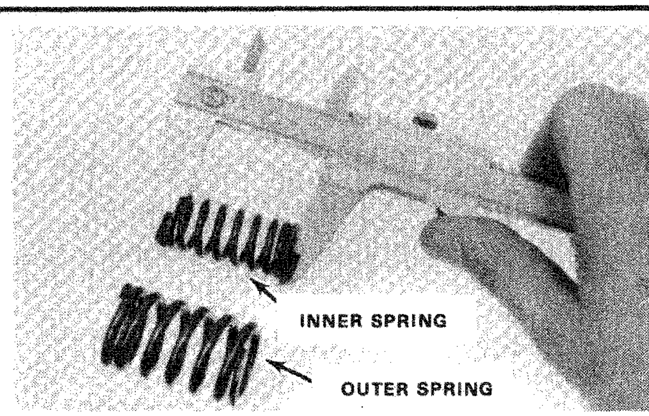


After refacing the seat, apply lapping compound to valve face, and lap the valve using light pressure. After lapping, wash any residual compound off the cylinder head and valve. Check valve seat area for complete contact.

Cylinder Head Reassembly

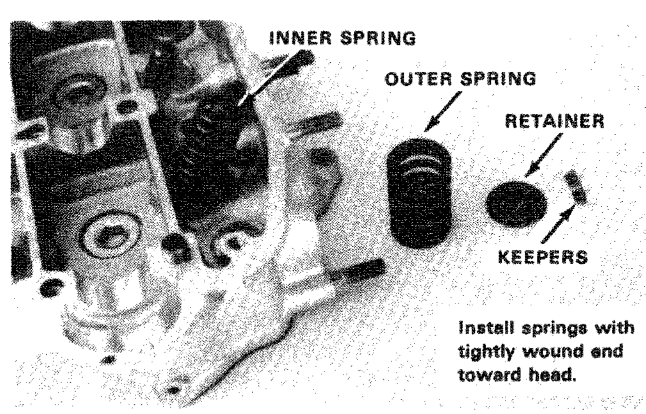
Measure the free length of the inner and outer valve springs.

Inner Spring Standard:	**40.2 mm**	**(1.58 in)**
Service Limit:	**39.0 mm**	**(1.54 in)**
Outer Spring Standard:	**43.8 mm**	**(1.72 in)**
Service Limit:	**42.5 mm**	**(1.67 in)**



Install the new valve seals on the valve guides.

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



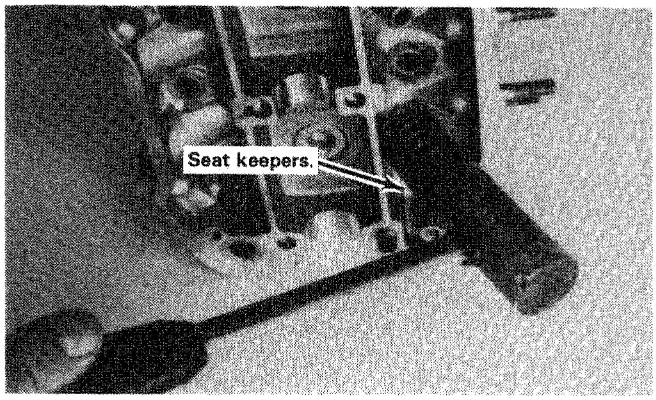
(cont'd)

Cylinder Head

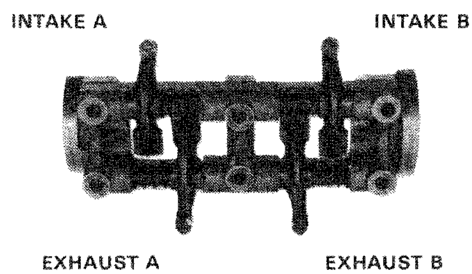
Cylinder Head Reassembly (cont'd)

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

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



Assemble the rocker arms, springs and shafts. Be sure that the rocker arms are located correctly and the cam holders are on the correct side.

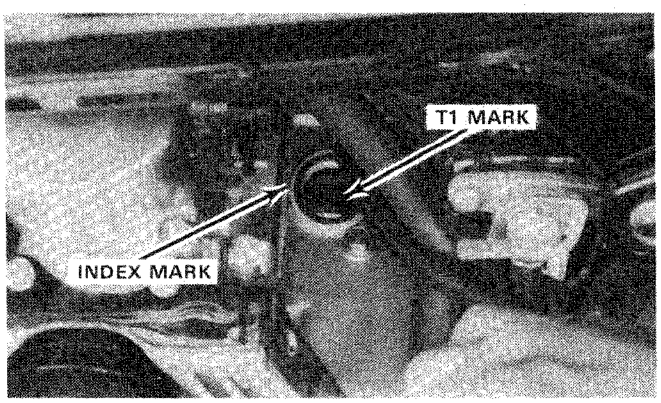


Cylinder Head Installation

Check that the timing mark is on No. 1 cylinder TDC (page 7-4).

Mark the crankshaft pulley (page 7-4), then rotate the crankshaft 90° clockwise.

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



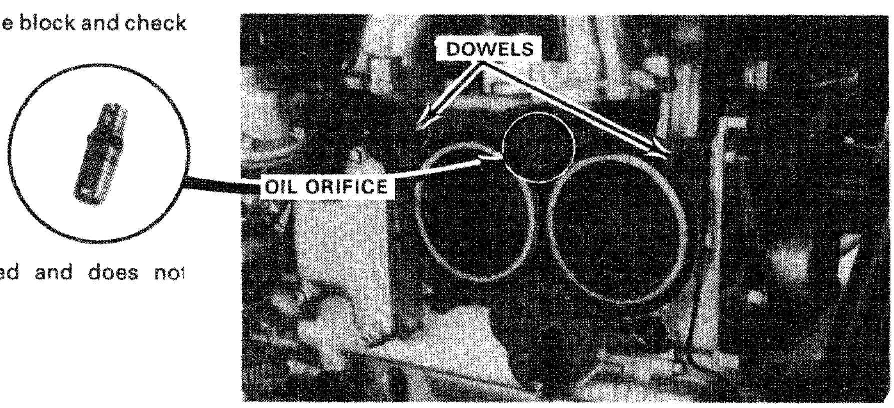
Clean the head gasket residue from the engine block and check that all oil and water passages are clear.

Install the oil orifice with new O-rings.

Install the head gasket dowels.

Install the head gasket.

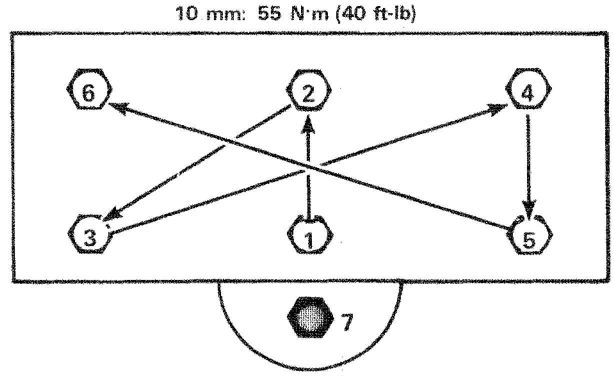
NOTE: The head gasket is graphite-coated and does not require any sealant.



Install the cylinder head and the head bolts.

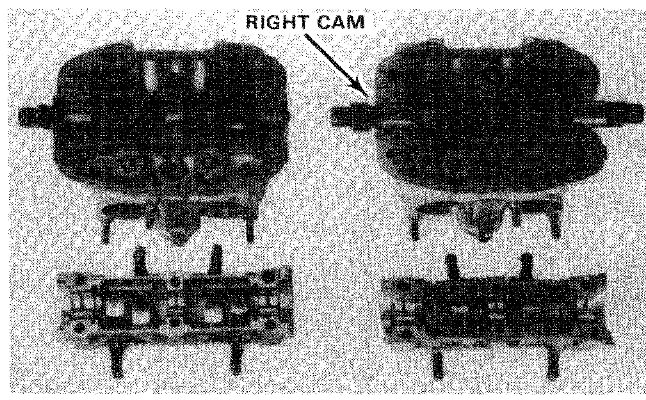
NOTE: Coat the head bolt threads and the underside of the bolt heads with molybdenum disulfide grease.

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



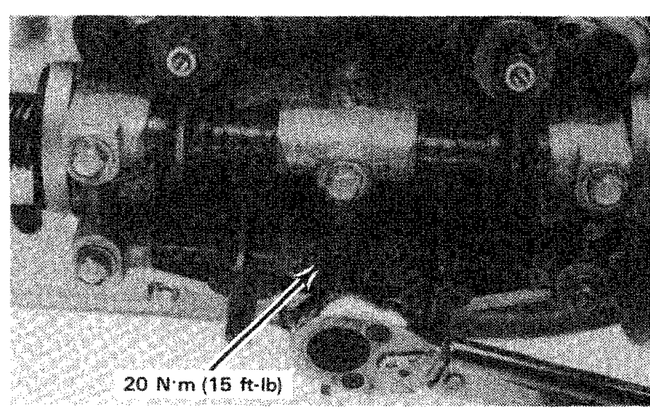
Slip new seals over the camshaft ends, then lubricate the camshaft bearing and lobes and install the camshaft into the cylinder head.

NOTE: The right camshaft has the tachometer drive gear.



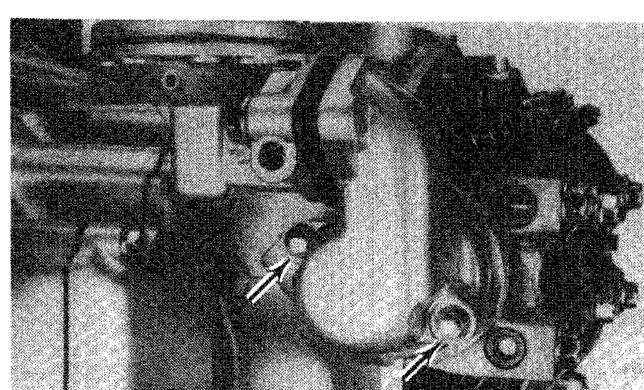
Apply some sealer to the cam holder mounting surfaces, then install and torque in a crisscross pattern.

CAUTION: Excessive sealant may clog oil passages; clean away excess sealant.



Install the tachometer/fuel pump drive assembly on the right cylinder head.

CAUTION: To prevent damaging the pump, turn the drive assembly until the fuel pump shaft clears the cam drive lobe and the assembly will seat into the head.

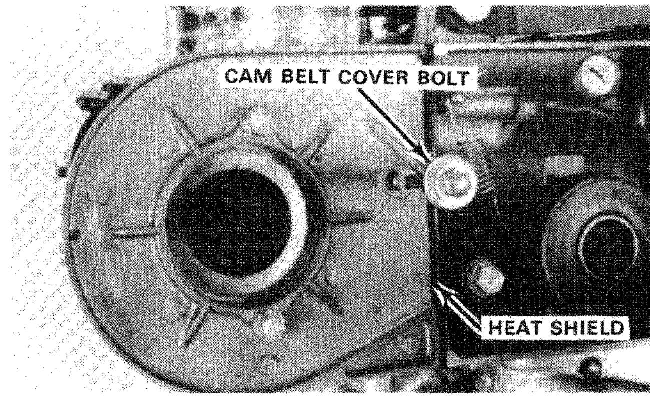


(cont'd)

Cylinder Head Reinstallation (cont'd)

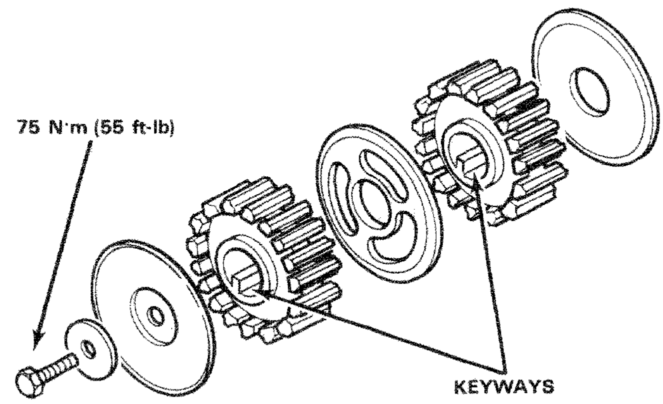
Check that the neutral switch wire is routed correctly, then install both heat shields.

NOTE: To ensure proper alignment, run a bolt into the cam belt cover hole before torquing the heat shield bolts.



Check that both timing belt drive pulleys are tight.

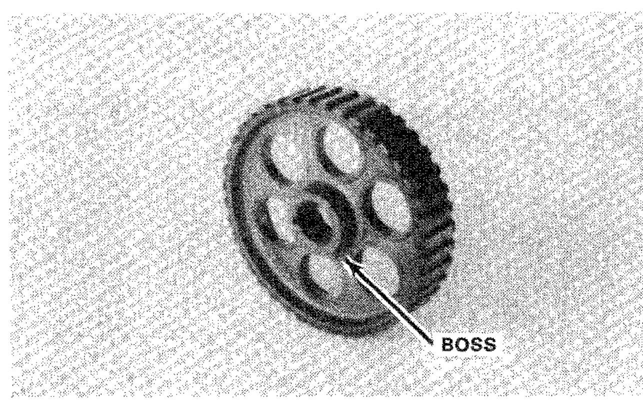
NOTE: If the bolt is properly torqued and one or both of the pulleys is loose, disassemble and inspect pulley keyways for wear.



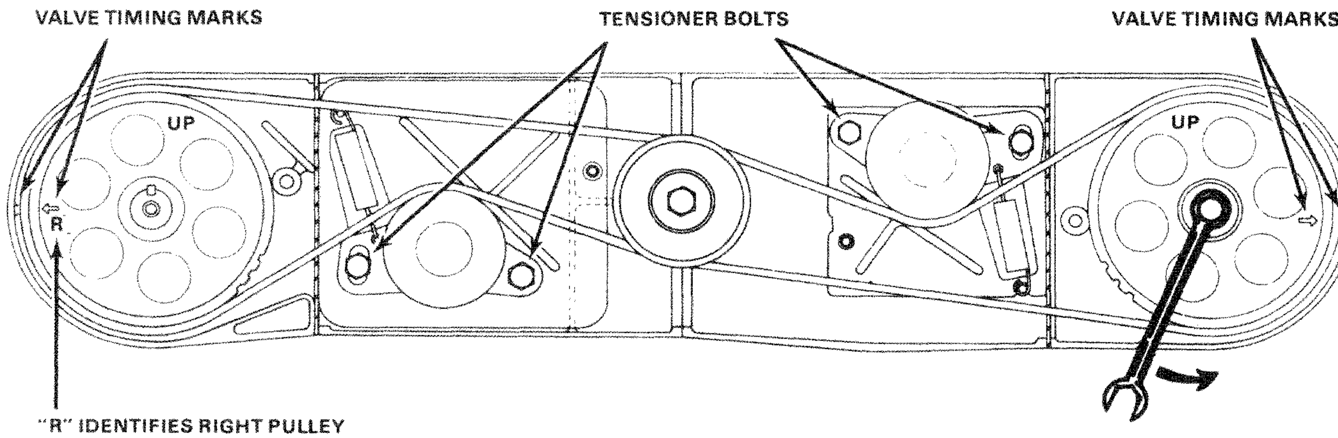
Install the camshaft pulleys. Torque the pulley bolts to 27 N·m (20 ft-lb).

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

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



Rotate the cam pulleys to align the valve timing marks. Return the crankshaft to TDC so the T-1 mark is centered. Loosen the tensioner bolts and install the timing belts.



Apply pressure counterclockwise on the camshaft pulley so the belt will be slack at the tensioner. The tensioner is positioned by spring pressure with the bolts loosened.

Tighten the tensioner bolts and recheck the valve timing.

Adjust the valves (page 3-13).

Crankshaft/Piston

Crankshaft/Piston

Service Information

- Refer to Section 6 for engine removal and installation procedures.
- If you will not be removing the right side pistons (cylinder No. 1 and 3), it is not necessary to remove the right cylinder head. However, refer to Section 10 for engine case disassembly. Certain steps are required to prevent valve damage when separating the engine cases without first removing the right cylinder head.
- Whenever the crankcase is disassembled, remove all gasket material from oil passages and water jackets.

Troubleshooting

Excessive Noise

- Crankshaft
  Worn main bearing.
  Worn rod bearing.

- Piston and Connecting Rod
  Worn piston or cylinder.
  Worn piston pin or pin hole.
  Worn rod small end.

Low Compression or Uneven Compression

- Worn cylinder or piston ring.

Excessive Smoke

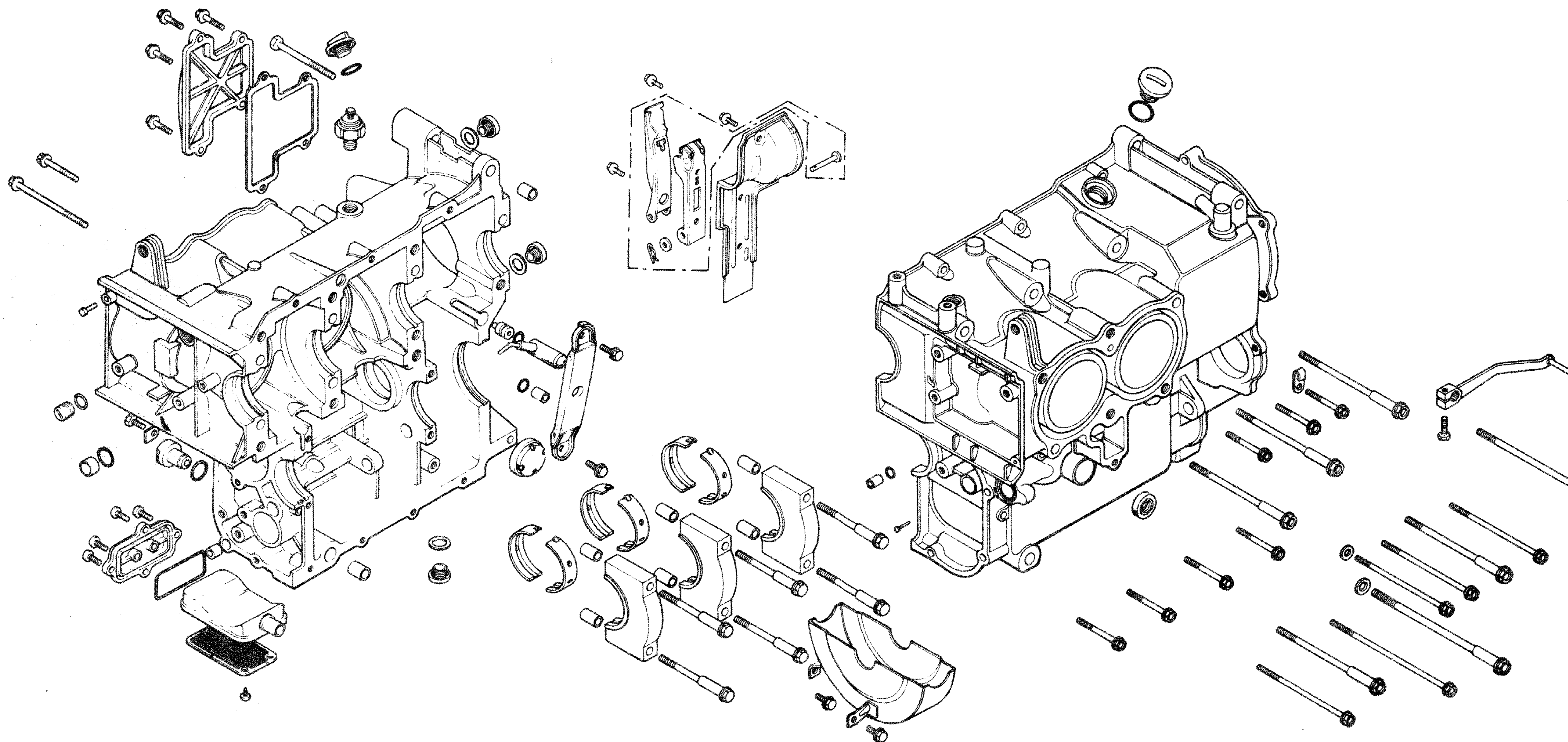
- Worn cylinder, piston or piston rings.
- Improperly installed piston rings.
- Damaged piston or cylinder.

Overheating

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

Knocking or Abnormal Noise

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



Torque Values

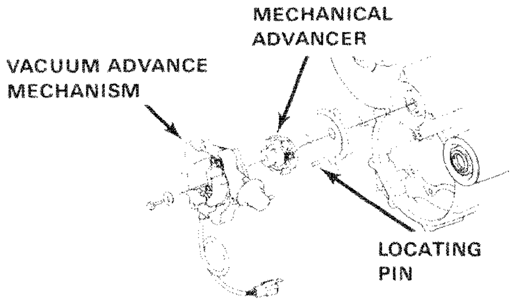
Engine case bolts:	
10 mm	35 N·m (25 ft-lb)
8 mm	27 N·m (20 ft-lb)
6 mm	12 N·m (9 ft-lb)
Connecting rod nuts:	32 N·m (23 ft-lb)
Center main bearing cap bolts:	70 N·m (51 ft-lb)
No. 1 and 3 main bearing cap bolts:	50 N·m (36 ft-lb)
Vacuum advance mounting bolts:	10 N·m (7 ft-lb)

Crankshaft/Piston

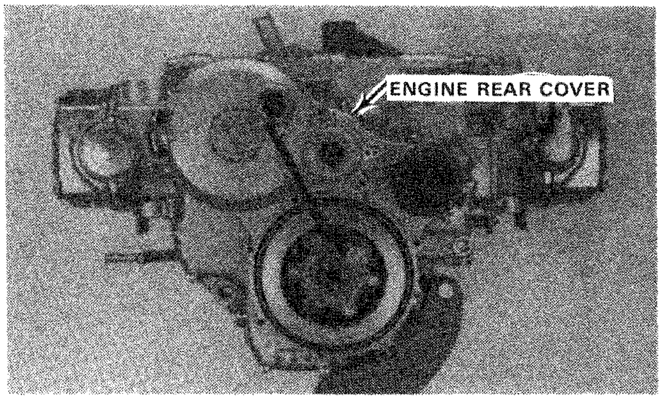
Engine Case Disassembly

Remove the engine from the frame. Refer to Section 6.

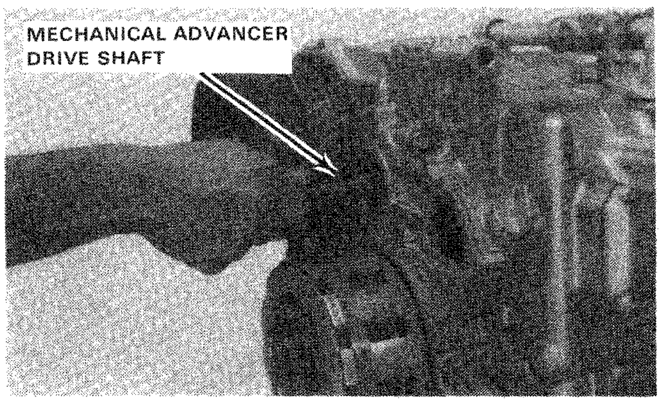
Remove the vacuum advance mechanism. Remove the mechanical advancer and locating pin from the advancer base.



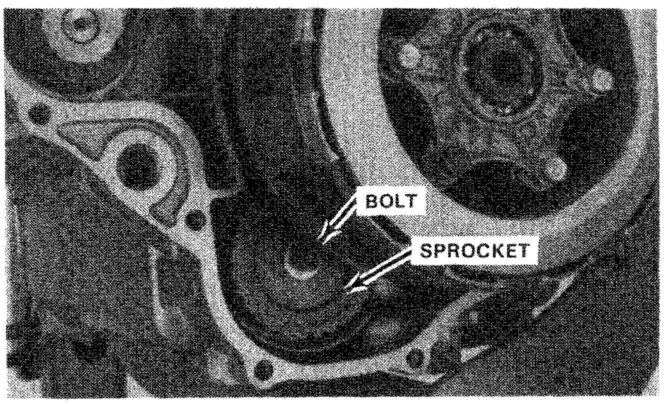
Remove the engine rear cover.



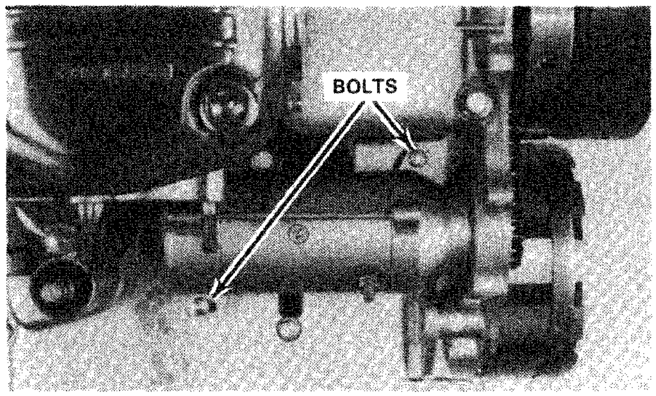
Remove the mechanical advancer drive shaft.



Remove the scavenge pump bolt and sprocket.



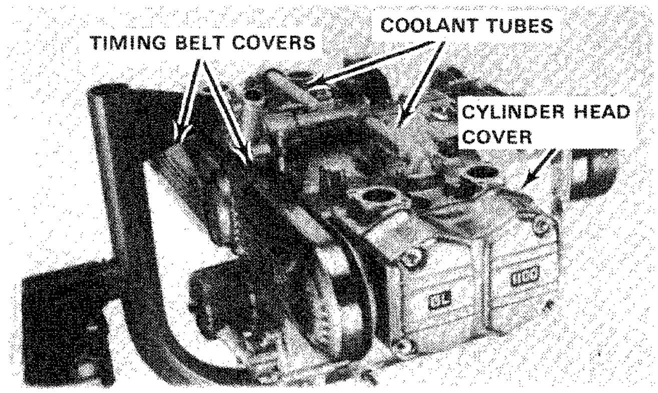
Remove the starter motor.



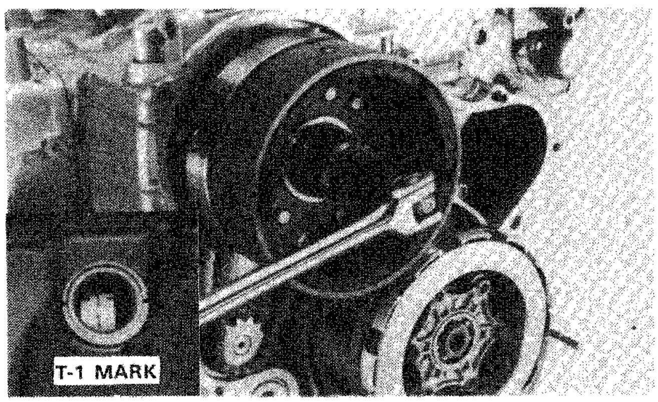
Remove the coolant tubes.

Remove the cylinder head covers.

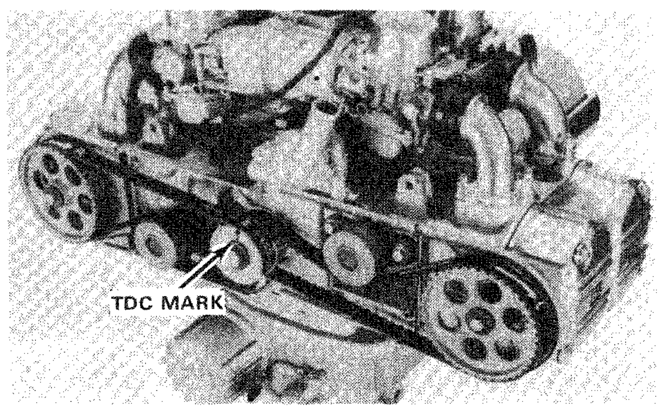
Remove the timing belt covers.



Turn the alternator clockwise until the T-1 mark on the flywheel aligns with the index mark on the edge of the timing inspection hole. Check that the No. 1 piston is at TDC (Top Dead Center) on the compression stroke. If it is not on compression, rotate the crankshaft one complete turn and again align the T-1 mark with the index mark.



Mark each belt with an arrow to indicate direction of rotation and a letter to indicate right or left side. Mark the crankshaft pulley to indicate TDC compression on the No. 1 cylinder.



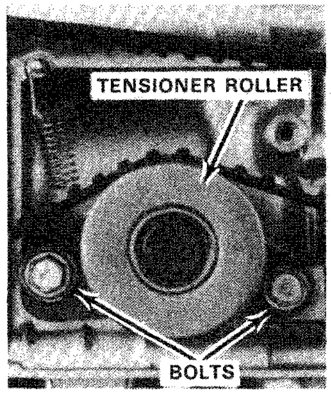
Crankshaft/Piston

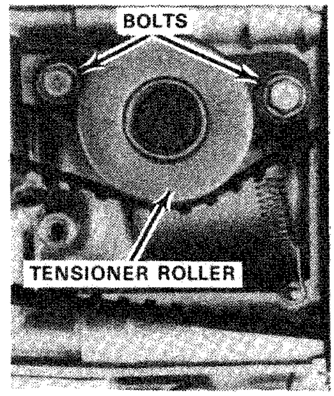
Engine Case Disassembly (cont'd)

Loosen the belt tensioner bolts. Move the tensioner rollers away from the belts and retighten the bolts.

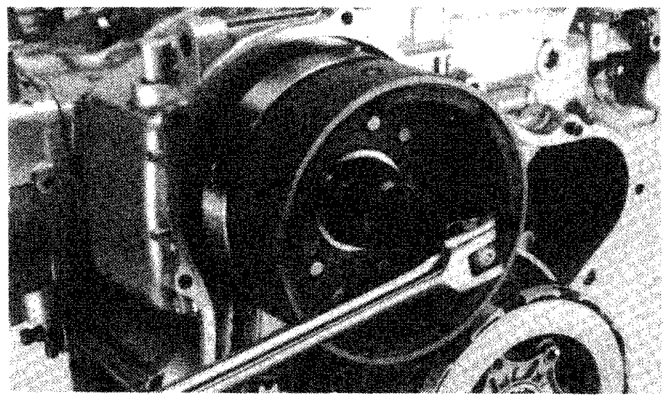
Remove the belts.

CAUTION: Do not let oil get on the belts. Oil contamination will cause swelling and deterioration.

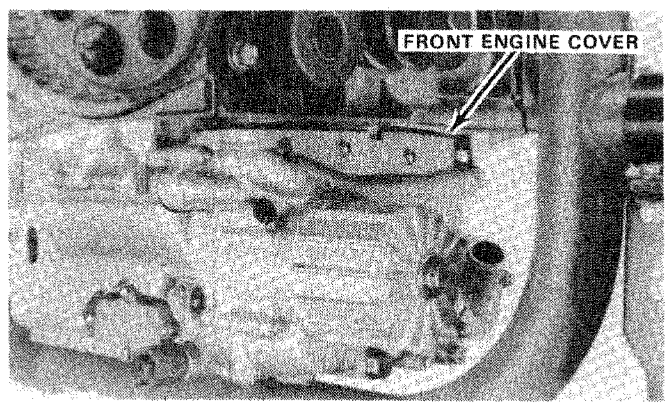




Rotate the crankshaft 90° in either direction from your TDC mark on the pulley. This will position all four pistons midway in their cylinders and allow you to rotate the camshafts without driving a valve into a piston.

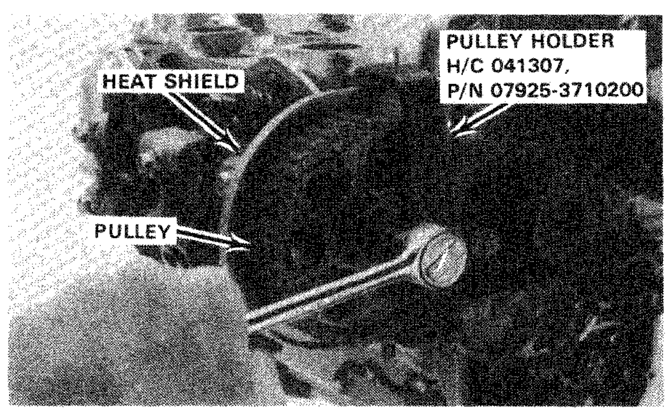


Remove the front engine cover.



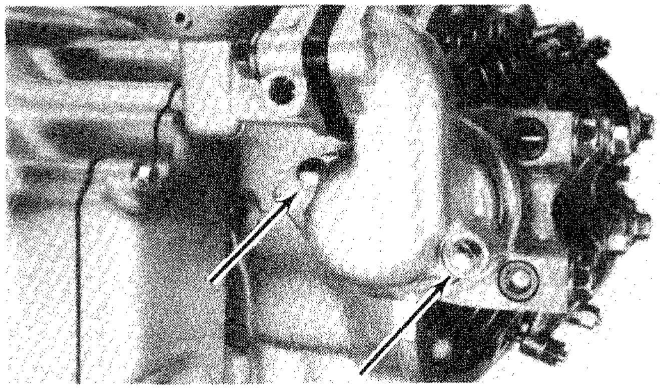
Remove the left and right camshaft pulleys.

Remove the left and right cylinder head heat shields.

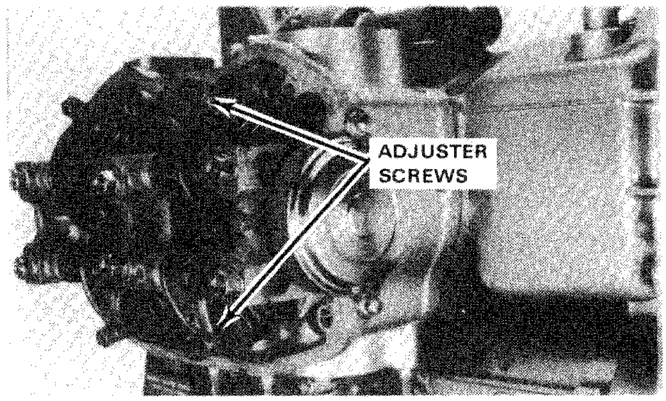


Remove the plate from the rear of the left cylinder head.

Remove the fuel pump from the rear of the right cylinder head.



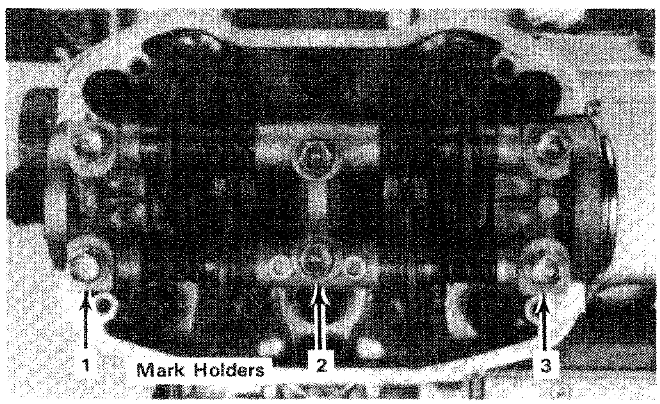
Loosen the valve adjuster screws on all rocker arms to relieve valve spring pressure from the camshafts.



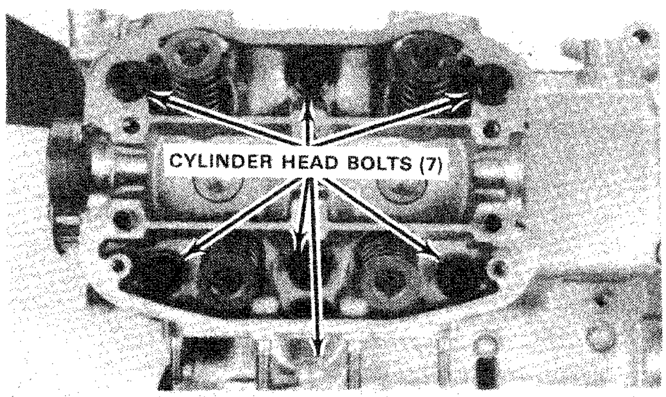
Remove the six camshaft holder bolts on each cylinder head.

Remove the camshaft, holders, rocker arms and shafts as a unit.

NOTE: Mark each holder to identify its position.



Remove the cylinder head bolts and the cylinder heads.



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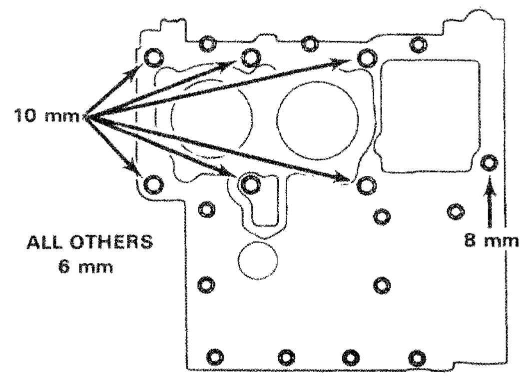
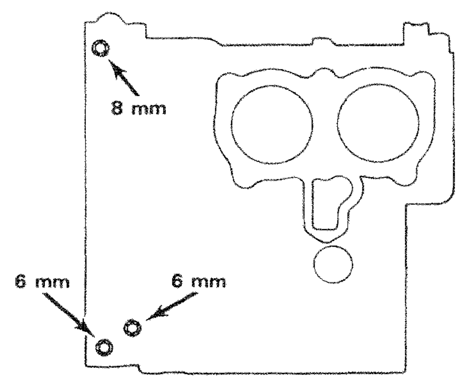
Engine Case Disassembly (cont'd)

Remove the 19 bolts from the left engine case.



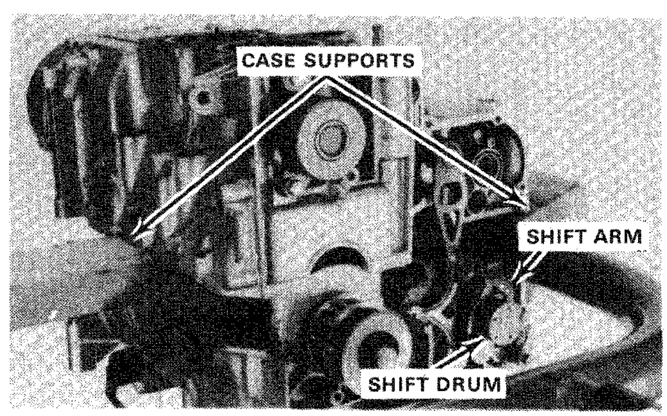
Remove the three bolts from the right engine case.



Rotate the engine stand adaptor so the left engine case is up.

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

Lift off the left engine case.

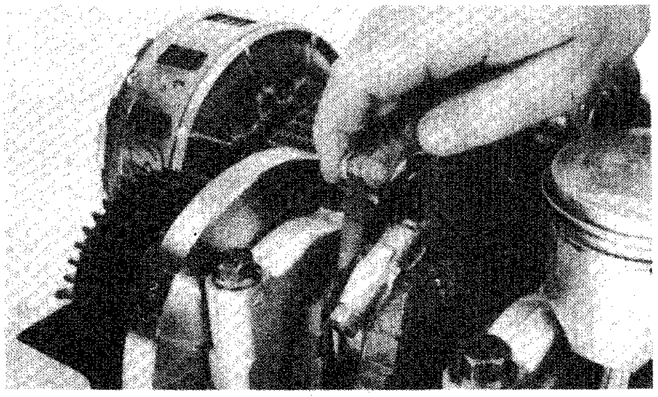


Piston and Rod Removal

Check connecting rod side clearance.

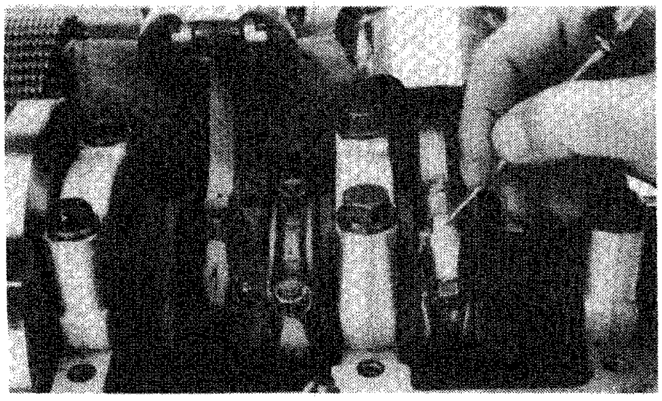
If clearance exceeds the service limit, replace the rod. Recheck and if still out of limit, replace the crankshaft. Inspect the crankshaft for rough spots or damage.

Connecting Rod Side Clearance:
Standard: 0.15 – 0.30 mm (0.006 – 0.012 in)
Service Limit: 0.40 mm (0.016 in)

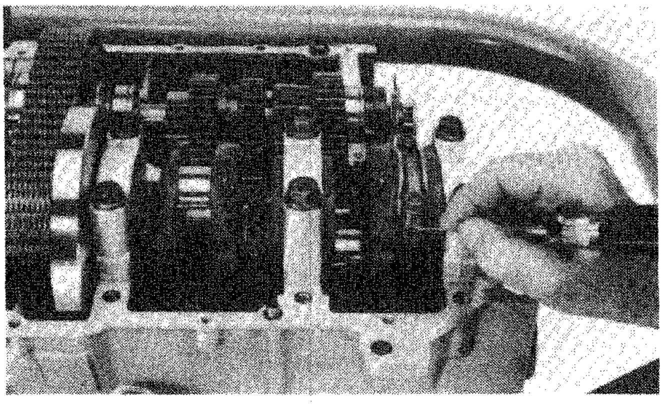


Remove the left side rods and pistons. Mark them to indicate the correct cylinder (No. 2 and 4) and position on the crankpins.

NOTE: The left side rod bearing inserts are drilled and align with the rod oil holes to provide lubrication to the cylinder walls.

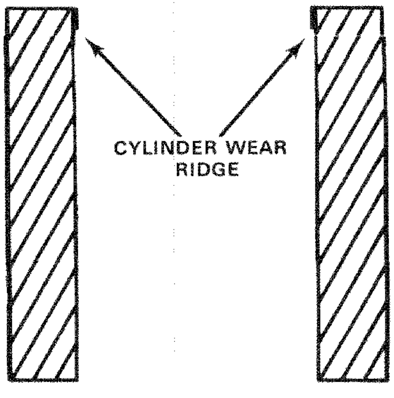


Remove the right side rods and pistons. Mark them to indicate the correct cylinder (No. 1 and 3) and position on the crankpins.



CAUTION: On engines with high mileage, inspect the cylinders for a ridge just above the highest point of ring travel. Any ridge must be removed with an automotive type ridge reamer before removing the right side pistons to allow the pistons and rings to pass through the cylinder.

NOTE: The right side rod inserts are not drilled. Normal splash provides adequate lubrication to the right side cylinder walls.



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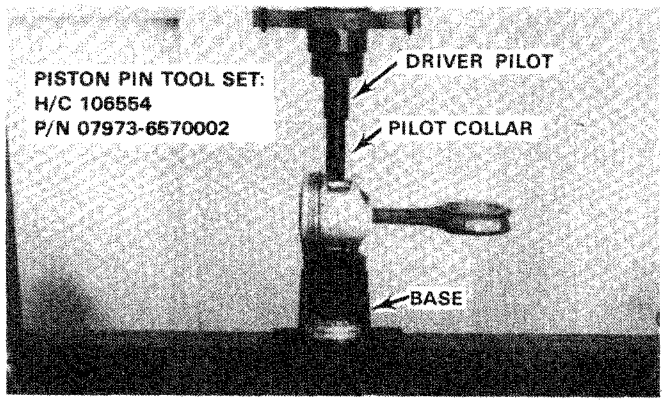
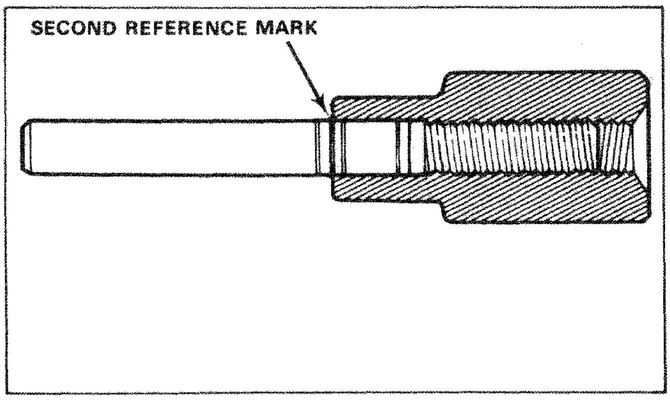
Piston and Rod Removal (cont'd)

Place the piston and rod assembly on the tool base with the offset on the tool base tabs towards the piston top.

CAUTION: Failure to align the piston correctly could result in piston damage.



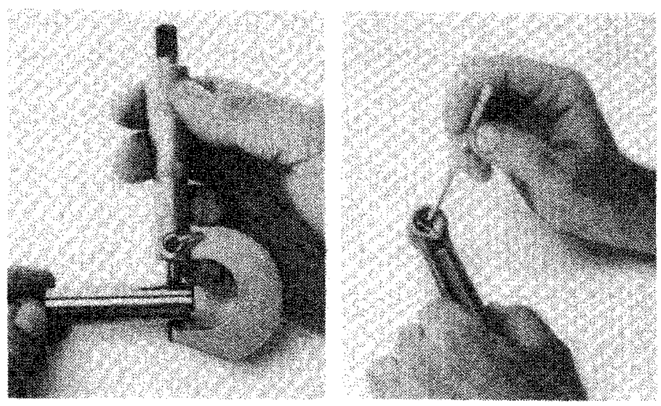
Adjust the driver pilot to the second reference mark. Slip the pilot into the collar, then align over piston pin and press the pin free of the piston.



Piston, Piston Rings, and Rod Inspection

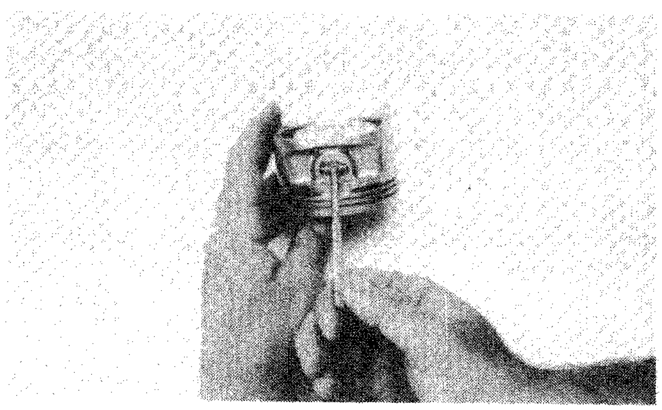
Measure the piston pin bore in the connecting rod and the piston pin O.D. Replace the connecting rod or piston pin, if necessary.

Piston Pin-To-Connecting Rod Interference:
Standard: 0.018 - 0.042 mm (0.0007 - 0.0017 in)



Measure the piston for pin clearance.

Piston Pin-To-Piston Clearance:
Service Limit: 0.050 mm (0.0008 in)



Remove the piston rings.

Clean the piston top and ring grooves. Inspect for evidence of pitting or deterioration.

CAUTION: Do not use a wire brush to clean ring grooves and lands; a wire brush can damage these areas.

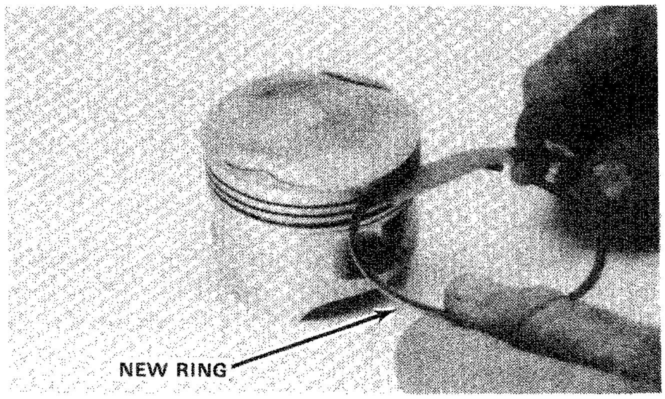
Inspect the ring lands for abnormal wear and piston thrust faces for scratches.

Inspect the pistons for cracks or other damage.

Inspect the piston ring-to-ring land clearance using new piston rings.

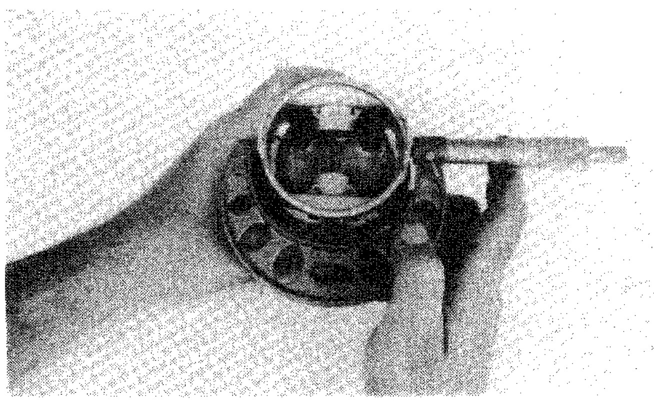
Ring-To-Ring Land Clearance:
Standard: 0.02 - 0.05 mm (0.001 - 0.002 in)
Service Limit: 0.12 mm (0.005 in)

Check ring end gap (page 8-19).



Measure piston diameter at the skirt, 90° to the piston pin. If the pistons show wear beyond the service limit,replacement is required.

Piston O.D.:
Standard: 74.950 - 74.980 mm (2.9508 - 2.9520 in)
Service Limit: 74.850 (2.9468 in)



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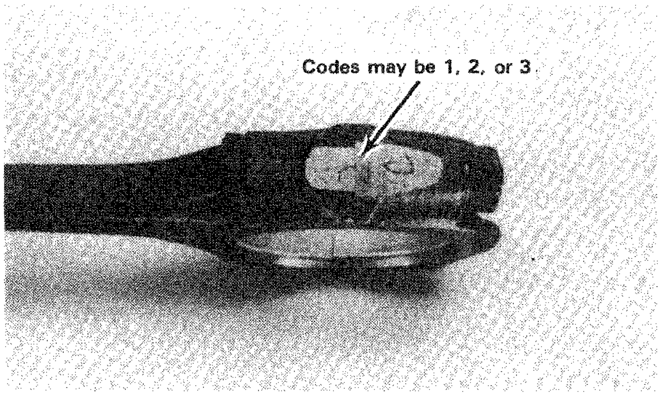
Crankshaft/Piston

Piston and Rod Inspection (cont'd)

When replacing a connecting rod, be sure to use a new rod having the same weight code.

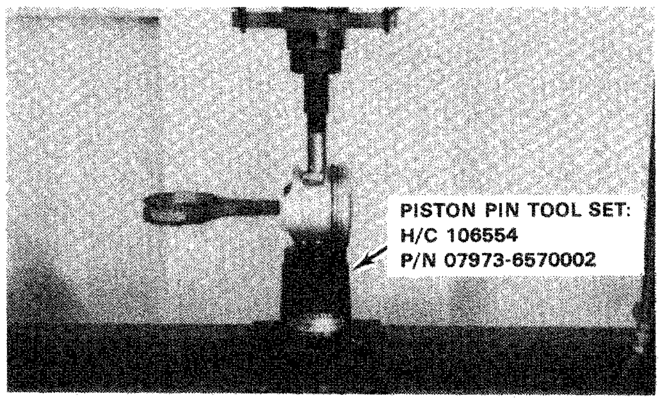
Before installing the piston pin into the piston and connecting rod, lubricate all mating surfaces with hypoid gear oil.



To install the pin, insert the pilot collar inside the piston and connecting rod. Place the piston and rod assembly on the tool base so that the offset on the tool base tabs is towards the piston top.

CAUTION: Failure to align the piston correctly could result in piston damage.

Adjust the driver pilot to the second reference mark (page 8-10). Slip the pin into the pilot, place into the piston pin bore, then press pin into the piston and connecting rod.



Cylinder Inspection

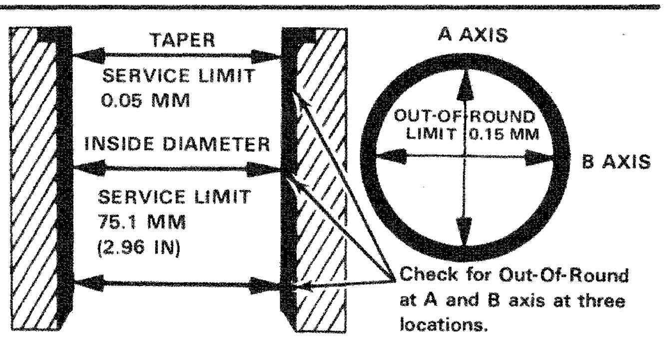
Inspect the cylinder walls for scratches and wear.

Measure the cylinder bores for out-of-round and taper.

If the cylinders do not require reboring, deglaze them.

Measure piston-to-cylinder clearance:

Standard: **0.020 - 0.065 mm (0.0008 - 0.0026 in)**
Service Limit: **0.15 mm (0.006 in)**

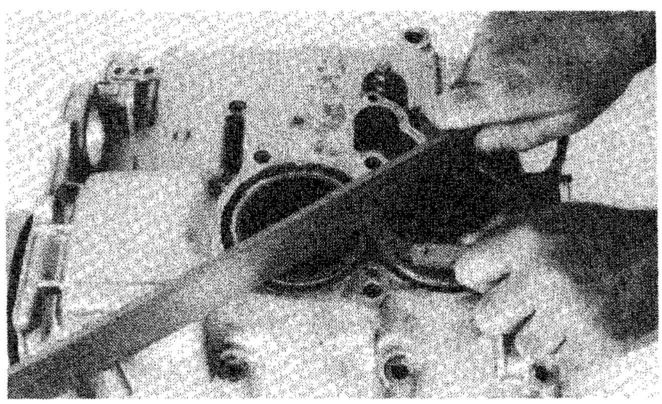


Check for Out-Of-Round at A and B axis at three locations.

Maximum diameter variation between cylinders is 0.10 mm.

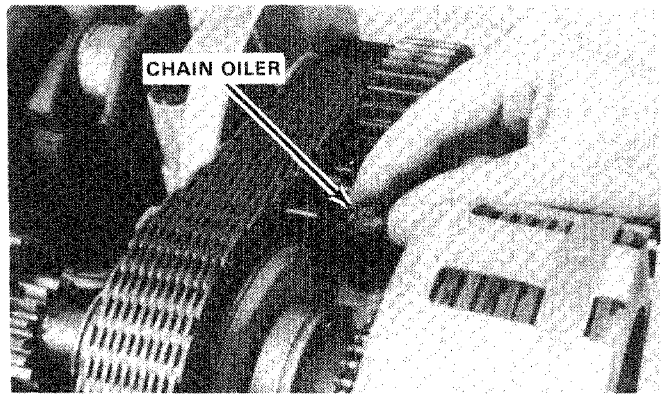
Inspect the tops of the cylinders for warpage. Check in a crisscross pattern.

Warpage Service Limit: 0.10 mm (0.004 in)

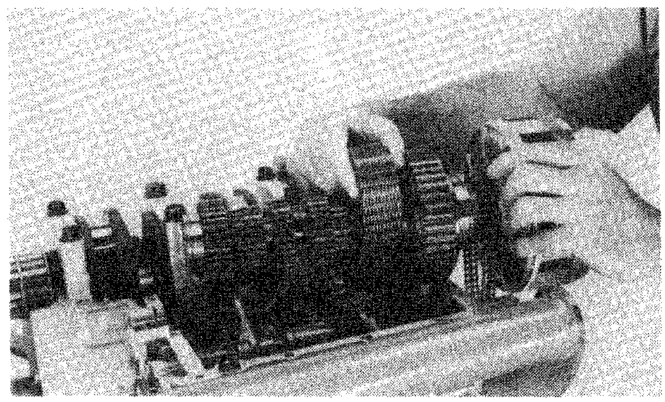


Crankshaft Removal and Inspection

Remove the primary chain oiler.

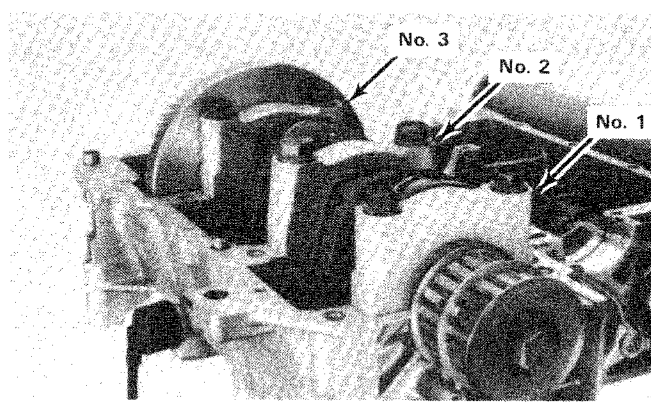


Lift up the mainshaft with the primary driven gear and clutch assembly, and slip it out through the primary chain.



Remove the crankshaft main bearing caps and lift the crankshaft from the case.

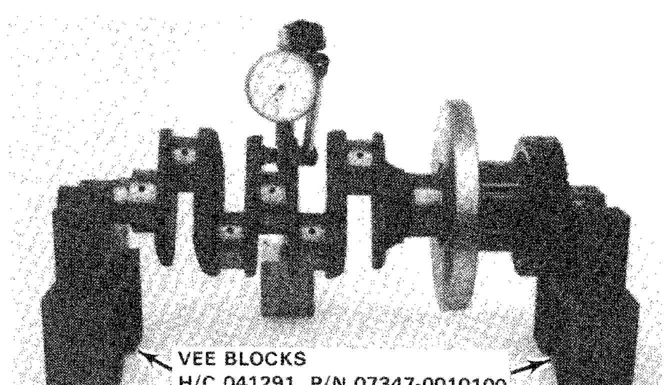
NOTE: Before removing the main bearing caps, note that the arrow on each cap points toward the top of the engine. The No. 1 cap is at the front of the engine and the No. 3 cap is at the rear. The center cap takes the two larger bolts.



Set the crankshaft on a stand or vee blocks. Set a dial indicator on the center main bearing journal.

Rotate the crankshaft and determine the amount of runout.

Crankshaft Runout:
Service Limit: 0.050 mm (0.0019 in)



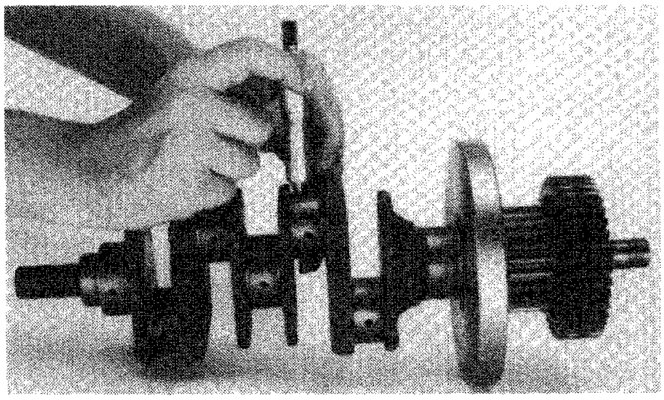
(cont'd)

Crankshaft Removal and Inspection (cont'd)

Measure the crankshaft main bearing journals and crankpins with a micrometer for out-of-round and taper.

Service Limit:
Taper: 0.004 mm (0.0002 in)
Out-Of-Round: 0.008 mm (0.0003 in)

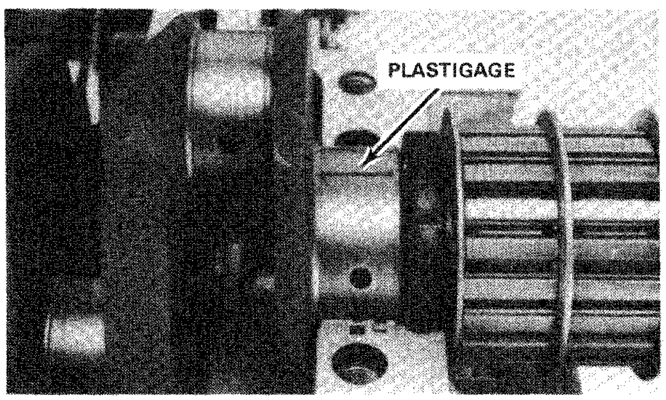
NOTE: The crankshaft cannot be repaired. Replace if the journals or crankpins are burnt, cracked, or out of tolerance; or if the runout is beyond limits.



Bearing Inspection and Selection

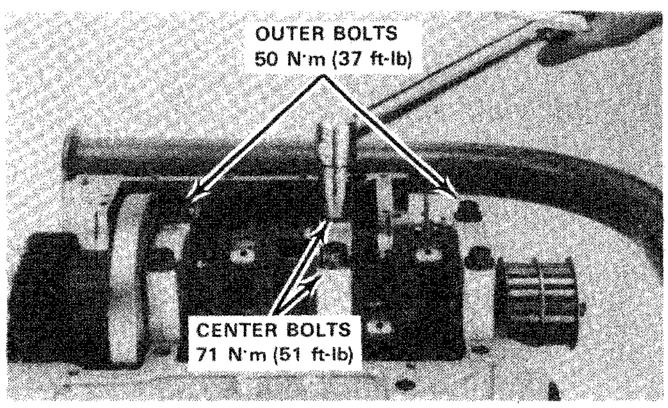
With the right engine case bearing inserts in place, install the crankshaft. Put a piece of plastigage across each main bearing journal.

NOTE: Do not place the plastigage over oil holes.



Install the main bearing caps with bearing inserts on the correct journals and tighten them evenly to the specified torque.

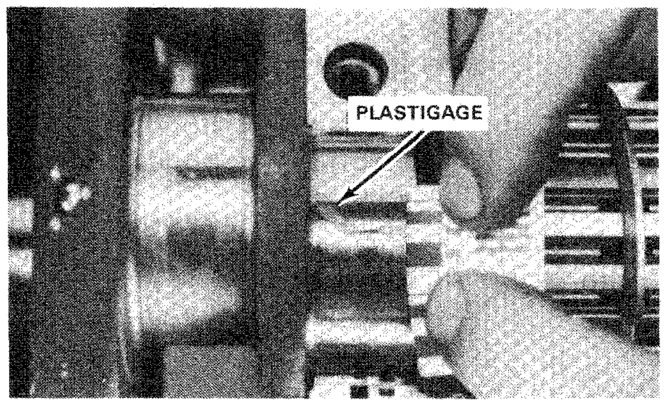
NOTE: Do not rotate the crankshaft during this inspection.



Remove the bearing caps and measure the width of the compressed plastigage on each journal.

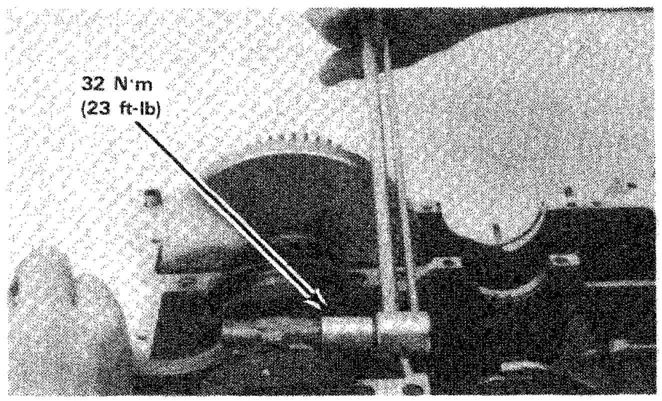
If the bearing clearance is beyond the service limit, select the correct replacement bearings (page 8-16).

Main Bearing Clearance:
Standard: 0.020 - 0.044 mm (0.0008 - 0.0017 in)
Service Limit: 0.080 mm (0.0031 in)



Place a plastigage strip across each crankpin. With the bearing inserts in place, install each connecting rod on its crankpin and tighten the nuts to the specified torque.

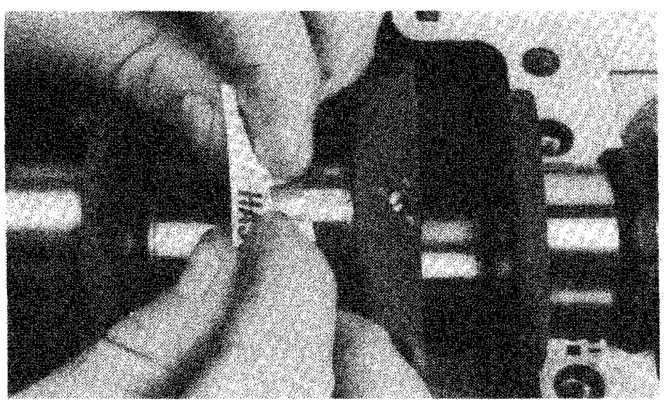
NOTE:
- Do not place the plastigage over oil holes.
- Do not allow the connecting rods to move on the crankshaft during this inspection.



Remove the connecting rod caps and measure the width of the compressed plastigage on each crankpin.

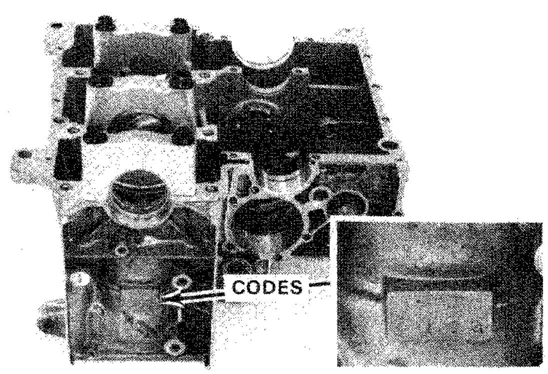
If the bearing clearance is beyond the service limit, select the correct replacement bearings (page 8-17).

Bearing Clearance:
Standard: 0.020 - 0.044 mm (0.0008 - 0.0017 in)
Service Limit: 0.08 mm (0.0031 in)



If main bearing clearance is beyond the service limit, use the following procedure to select replacement bearings:

Record the corresponding crankshaft main journal O.D. code number. Codes may be 1, 2, or 3.

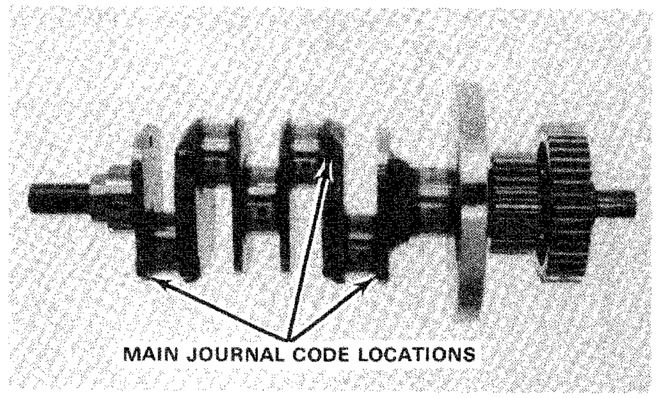


(cont'd)

Crankshaft/Piston

Bearing Inspection and Selection (cont'd)

Record the engine crankcase bearing support codes from the pad on the right side engine case. Codes may be I, II, or III.



Cross reference the bearing support and journal codes to determine the correct replacement bearing color.

Bearing Insert Thickness, mm (in):

Blue	2.010 – 2.014	(0.0791 - 0.0793)
Black	2.006 – 2.010	(0.0790 - 0.0791)
Brown	2.002 – 2.006	(0.0788 - 0.0790)
Green	1.998 – 2.002	(0.0787 - 0.0788)
Yellow	1.994 – 1.998	(0.0785 - 0.0787)

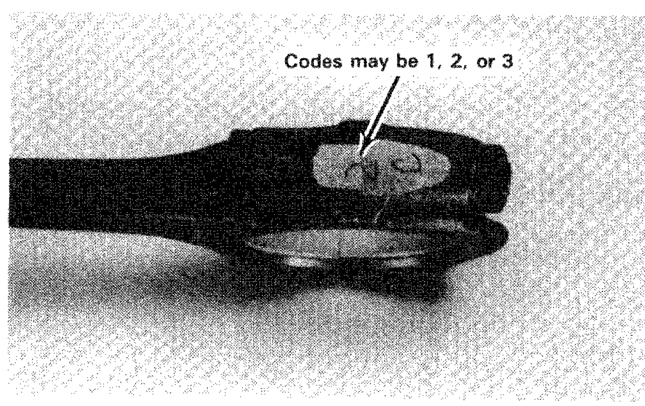
CAUTION: After selecting new bearings, recheck clearance with plastigage. Incorrect clearance can cause major engine damage.

Main Bearing Selection

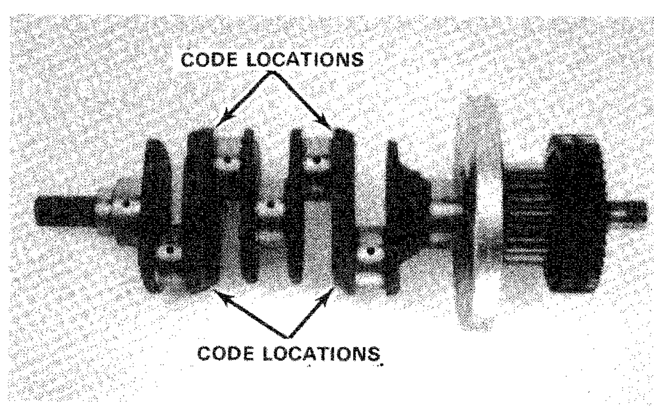
Crankcase Bearing Support Size Codes		Crankcase Main Journal Size Codes: 1	2	3
	III	Brown	Black	Blue
	II	Green	Brown	Black
	I	Yellow	Green	Brown

If connecting rod clearance is beyond the service limit, use the following procedure to select replacement bearings:

Record each connecting rod I.D. code number. Codes may be 1, 2, or 3.



Record the corresponding crankpin O.D. code letter. Codes may be A, B, or C.



Cross reference the connecting rod and crankshaft codes to determine the correct replacement bearing color.

Bearing Insert Thickness, mm (in):

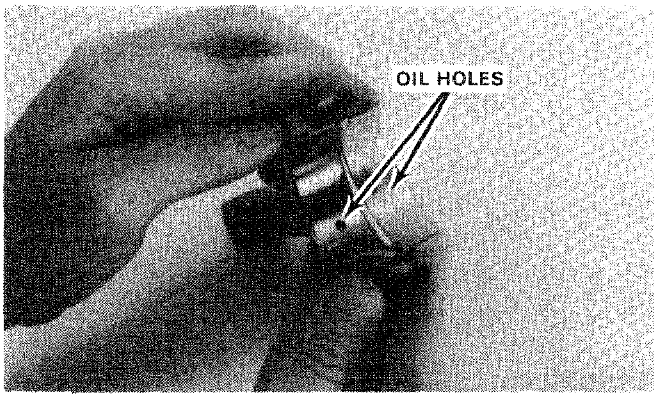
Blue	1.507 – 1.511	(0.0593 - 0.0595)
Black	1.503 – 1.507	(0.0592 - 0.0593)
Brown	1.499 – 1.503	(0.0590 - 0.0592)
Green	1.495 – 1.499	(0.0589 - 0.0590)
Yellow	1.491 – 1.495	(0.0587 - 0.0589)

Rod Bearing Selection

Connecting Rod Size Codes	3	Brown	Black	Blue
	2	Green	Brown	Black
	1	Yellow	Green	Brown
		A	B	C
		Crankshaft Connecting Rod Journal Size Codes		

CAUTION:

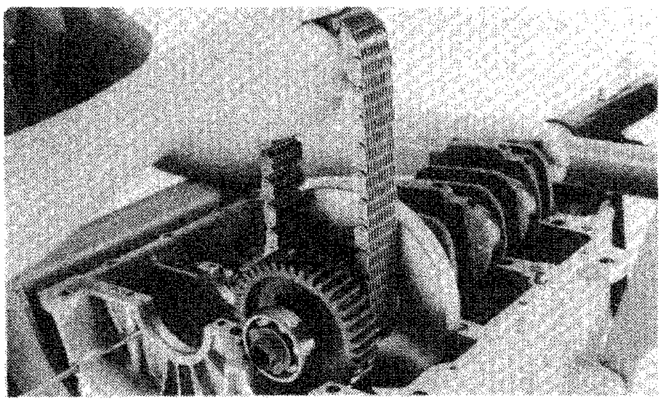
- **After selecting new bearings, recheck clearance with plastigage. Incorrect clearance can cause major engine damage.**
- **Be sure the connecting rod bearing oil holes align with the oil holes in the No. 2 and 4 cylinder connecting rods.**



Crankshaft Installation

Install main bearing halves in engine case.

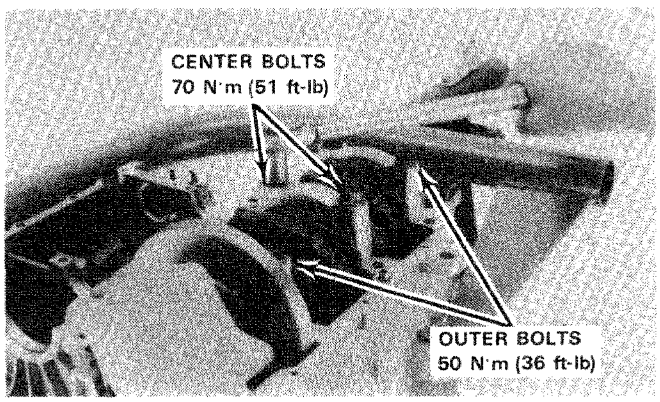
Apply a coat of oil to crankshaft main journals, then lay the crankshaft and primary chain carefully in place in the right side engine case.



Install the main bearing caps and bearing halves in their correct locations; the arrow on the bearing cap should point to the top of the engine.

CAUTION: The bearing caps must be installed in their correct locations or the bearing clearance may not be correct causing engine damage.

Lubricate the bolt threads and underside of the heads with molybdenum disulfide grease, then install and tighten them to the specified torque.



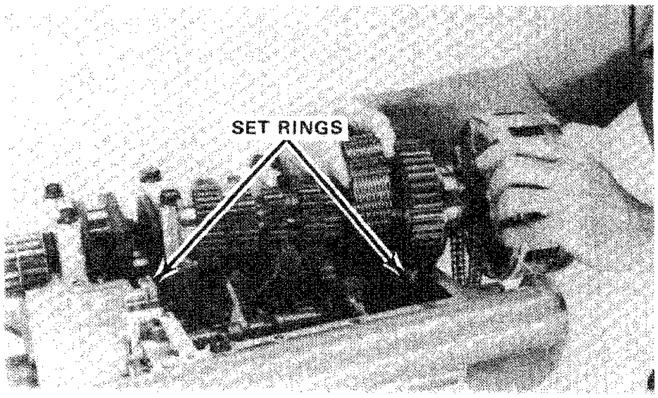
(cont'd)

Crankshaft/Piston

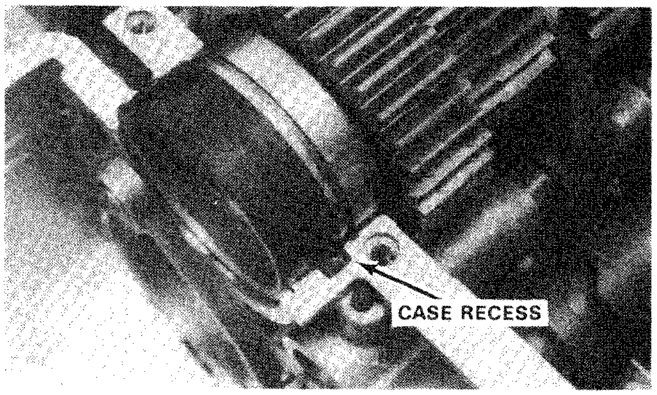
Crankshaft Installation (cont'd)

Install the transmission mainshaft with the primary driven gear and clutch assembly through the primary chain.

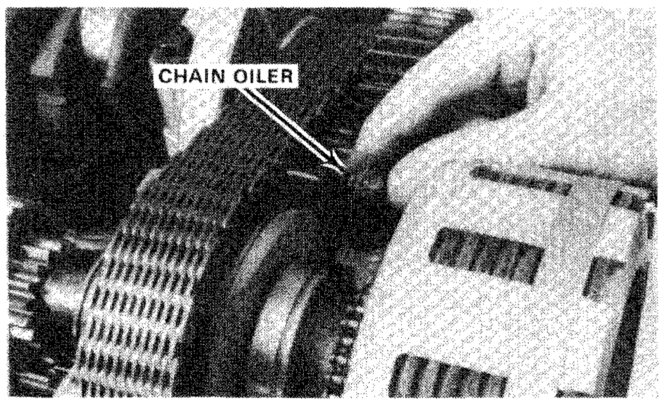
Be sure the set rings fit in the bearing outer races and engine case.



Install the mainshaft end cap in its original position with the locator tab in the case recess.

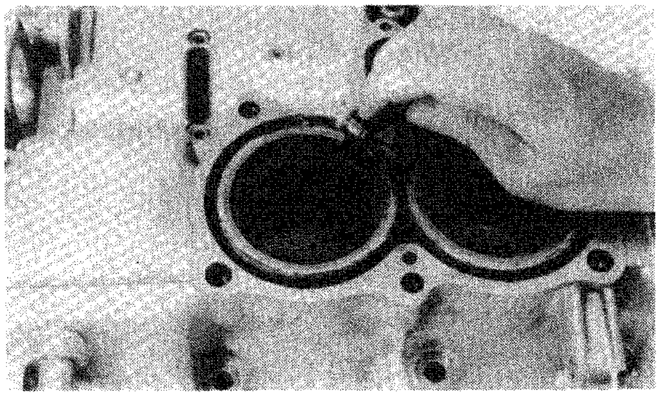


Install the primary chain oiler.



Piston and Rod Installation

Using a piston, push the ring into the cylinder.



Inspect the end gap.

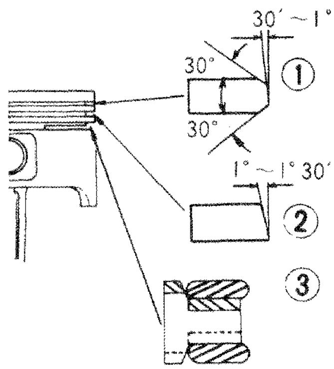
- If gap is too small, select a new ring to obtain specified gap.
- If gap is too large, recheck cylinder bore diameter and ring selection.

Top and Second Ring End Gap:
Standard: 0.1 - 0.3 mm (0.004 - 0.012 in)
Service Limit: 0.6 mm (0.02 in)

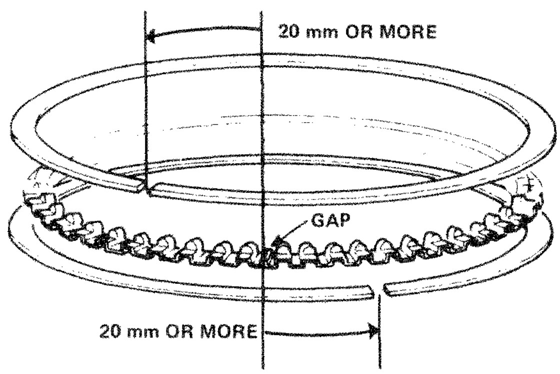
Oil Ring Side Rail End Gap:
Standard: 0.2 - 0.9 mm (0.008 - 0.035 in)
Service Limit: 1.1 mm (0.04 in)

Carefully install the piston rings onto the piston.

NOTE: All rings should be installed with the markings toward the top of the piston. After installation they should be free to rotate in the piston ring grooves.



Stagger the oil ring end gaps as shown.



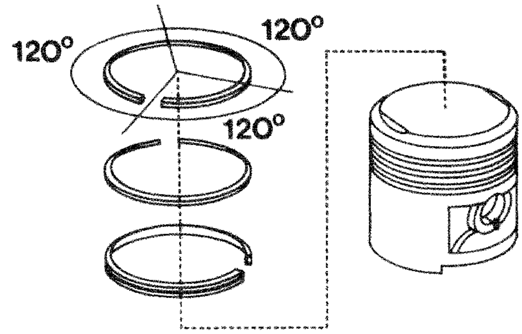
(cont'd)

Crankshaft/Piston

Piston and Rod Installation (cont'd)

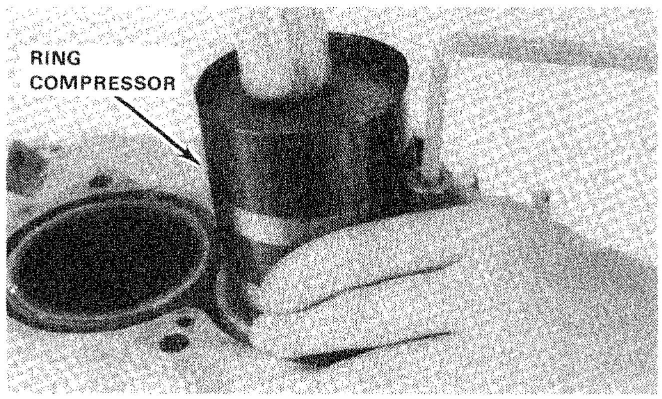
Stagger the piston ring end gaps 120° apart.

NOTE: Before installing pistons, apply a coat of oil to ring grooves, cylinder bores, and rod bearings.

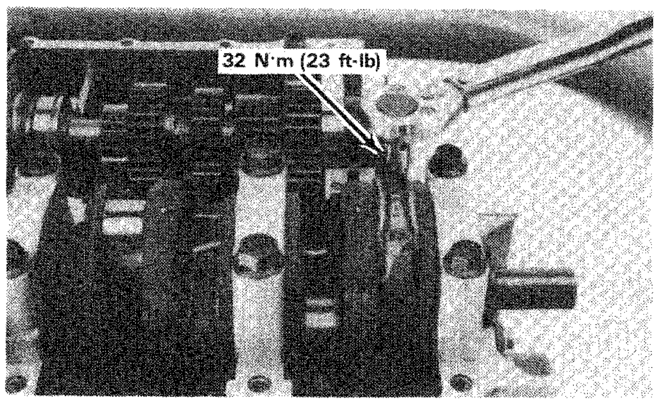


Install the right side rod assemblies into cylinders No. 1 and 3 in their original positions as marked before removal.

NOTE:
- To prevent damaging crankshaft, slip short sections of rubber hose over the rod bolts before installation.
- Install the pistons so that the "IN" mark on the piston top is towards the top of the engine.

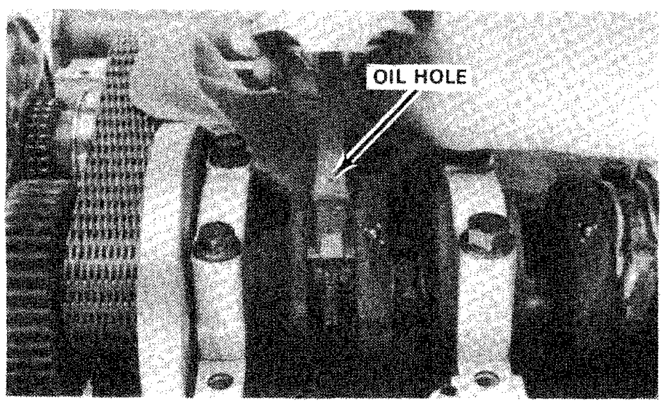


Install the rod caps. Install the nuts and torque them to specification.

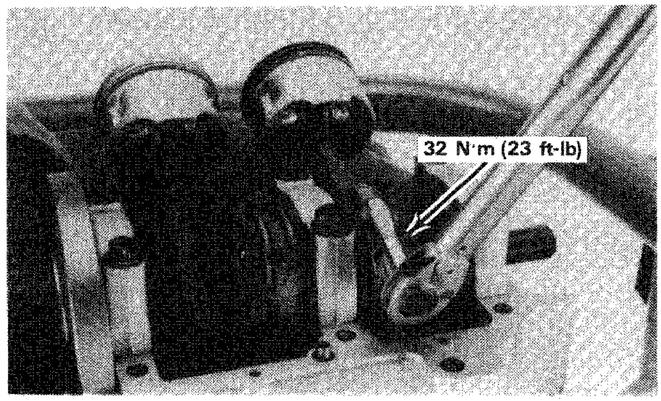


Install the left side rod assemblies for cylinders No. 2 and 4 in their original positions as marked.

CAUTION: Be sure the rod oil holes face towards the top of the engine and the rod bearing insert holes align with the holes, or the left side cylinders will not be lubricated properly.



Install the rod caps. Install the nuts and torque them to specification.

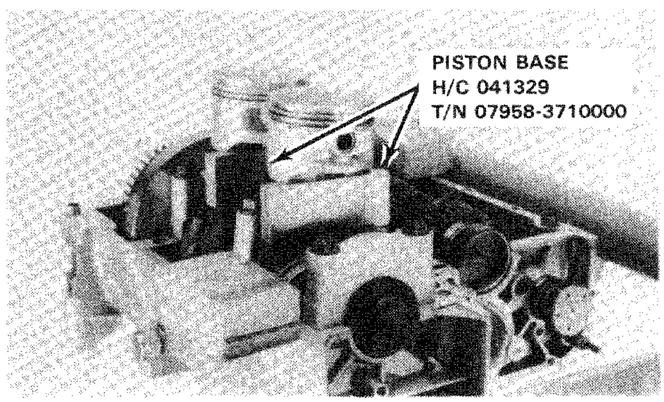


Engine Case Reassembly

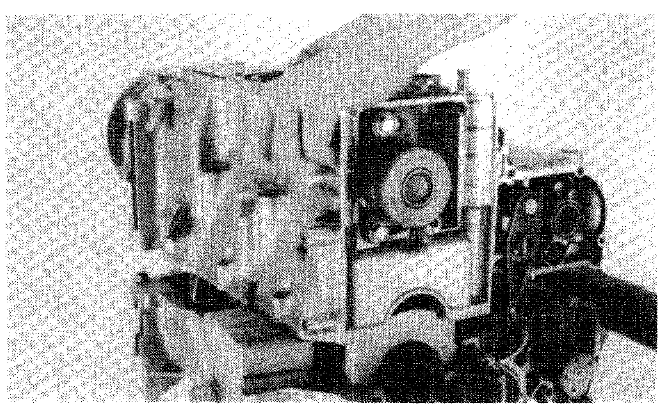
Align the tops of the left side pistons and install the piston bases with the concave edges downward.

NOTE: Be sure the piston ring end gaps are 120° apart.

Place the two crankcase supports opposite each other on the crankcase mating surface.



Lubricate the cylinder walls with engine oil and lower the left case until it rests on the supports. Engage the shift arm with the shift drum.



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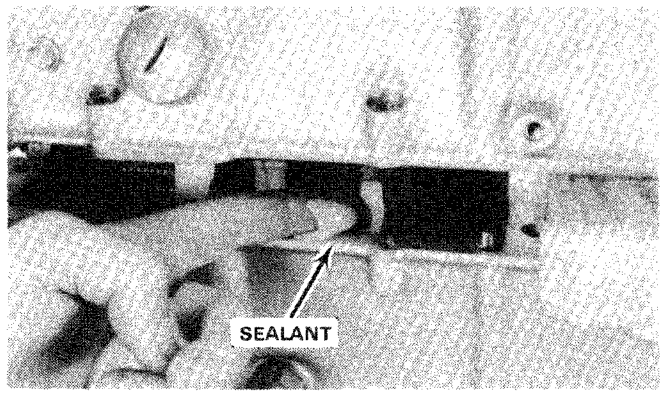
Engine Case Reassembly (cont'd)

Remove the piston bases and crankcase supports.

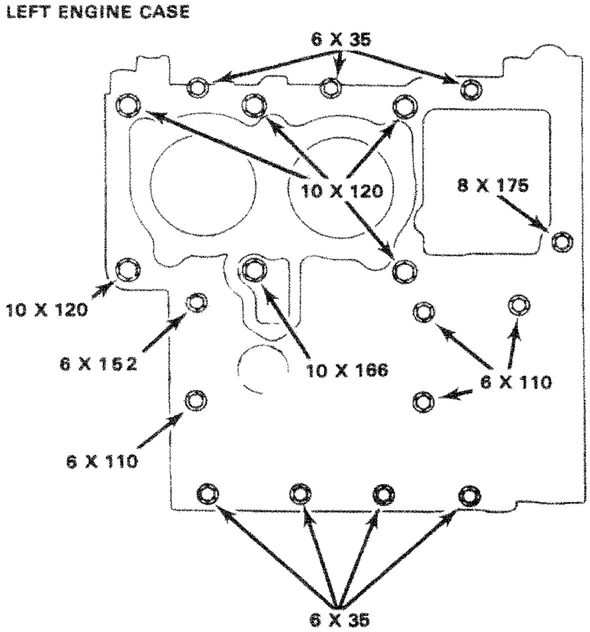
Apply sealant to the engine case mating surfaces and seat the cases.



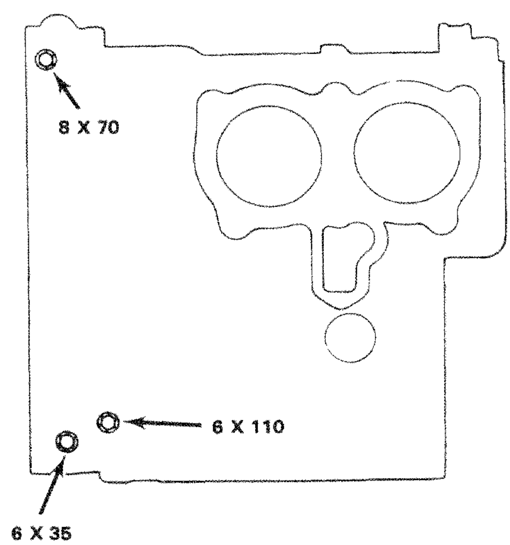
Coat all 10 mm case bolts (threads and under heads) with molybdenum disulfide grease. Tighten the case bolts to the specified torque. Use a crisscross pattern sequence when tightening the 10 mm bolts.

Torque:
10 mm: 35 N·m (25 ft-lb)
8 mm: 27 N·m (20 ft-lb)
6 mm: 12 N·m (9 ft-lb)

LEFT ENGINE CASE



RIGHT ENGINE CASE



Install the cylinder heads and timing belts (Section 5).

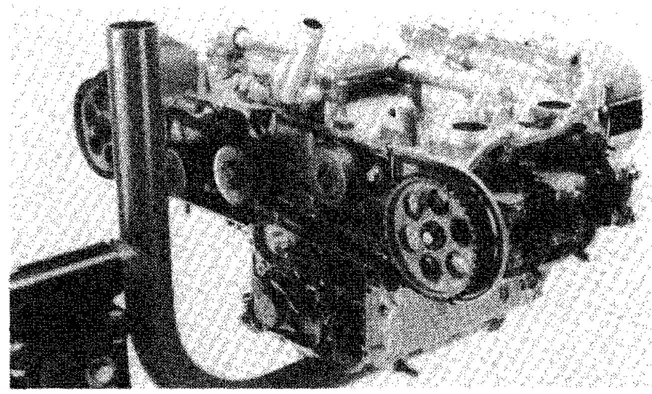
Install the coolant tubes.

Install the starter motor.

Install the scavenge pump sprocket and tighten the bolt securely.

Install the alternator drive assembly, if it was removed, and adjust the backlash. Refer to page 16-11.

Install the mechanical advancer drive shaft and install the engine rear cover.

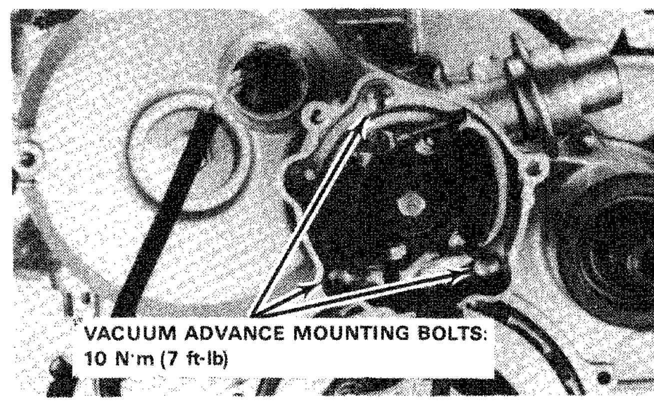


Insert the locating pin in the shaft and install the mechanical advancer.

Install the vacuum advance mechanism and torque the mounting bolts to the specification.

CAUTION: Overtightening the vacuum advance mechanism mounting bolts may distort the case and cause faulty operation.

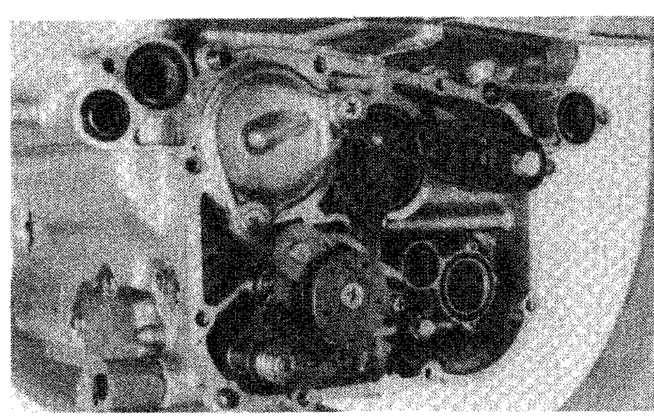
Be sure the pulse air gap is within 0.50 - 0.70 mm (0.020 - 0.028 in).



Be sure the O-rings and knock pins are in their correct locations, then install the front engine cover.

NOTE: If the cover does not seat against the engine case, rotate the water pump shaft until it engages.

Install the engine into the frame. Refer to Section 6.



Oil Pumps, Removal and Inspection

Main Oil Pump

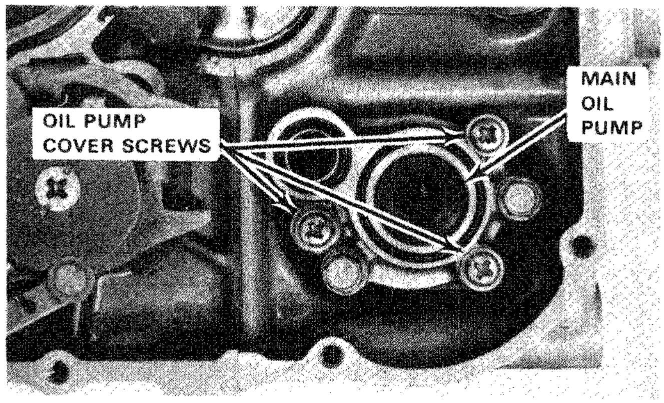
Drain the cooling system.

Remove the radiator as described in Section 5.

Drain the oil system and remove the filter.

Remove the front engine cover.

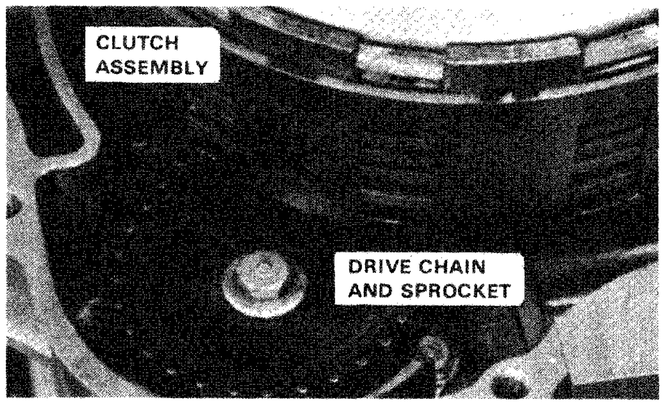
Disassemble the main oil pump.



Scavenge Pump

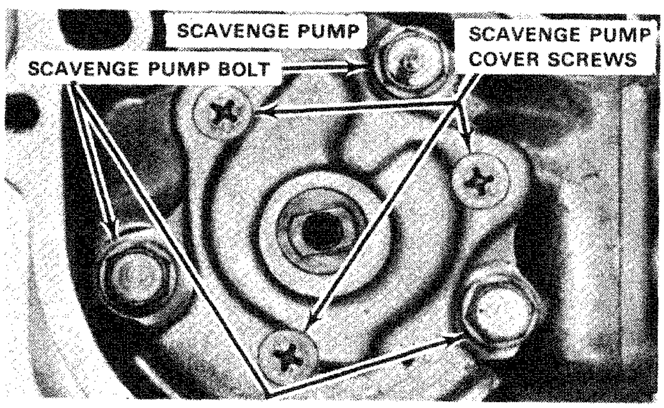
Remove the engine as described in Section 6.

Remove the rear engine cover, clutch assembly, scavenge pump drive chain and sprocket as described in Section 9.



Remove the three scavenge pump bolts.

Remove the scavenge pump.



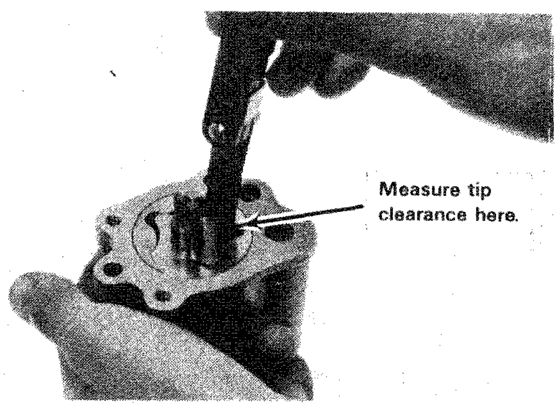
Remove the pump covers.

Inspect the pumps for damage and wear.

Measure pump tip clearance.

Clearance Between Inner and Outer Rotor Tips:

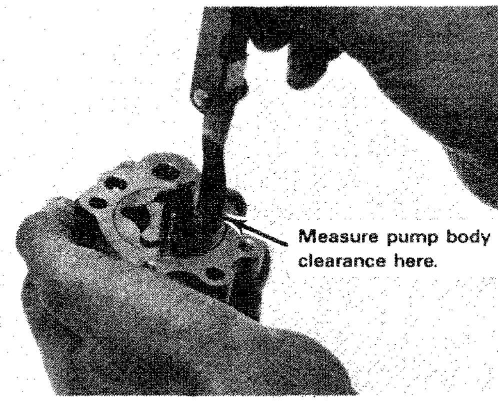
Standard: 0.15 mm (0.006 in)
Service Limit: 0.35 mm (0.014 in)



Measure pump body clearance.

Clearance Between Outer Rotor and Pump Body:

Standard: 0.15 - 0.21 mm (0.006 - 0.008 in)
Service Limit: 0.41 mm (0.016 in)

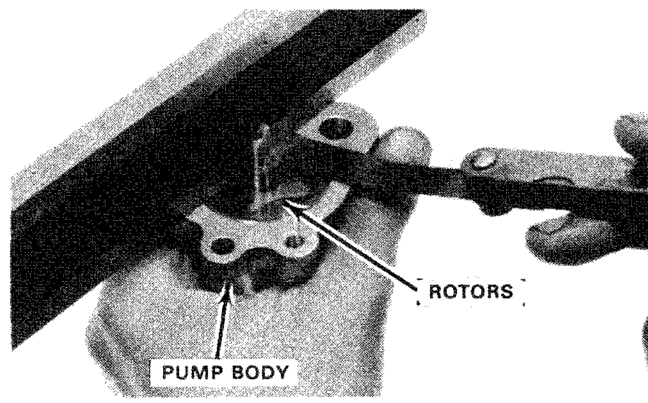


Measure pump end clearance.

Lay straight edge on pump body.

Clearance Between Straight Edge and Rotors:

Main Pump: 0.02 - 0.07 mm (0.001 - 0.003 in)
Scavenge Pump: 0.02 - 0.10 mm (0.001 - 0.004 in)
Service Limit (Both): 0.12 mm (0.202 in)

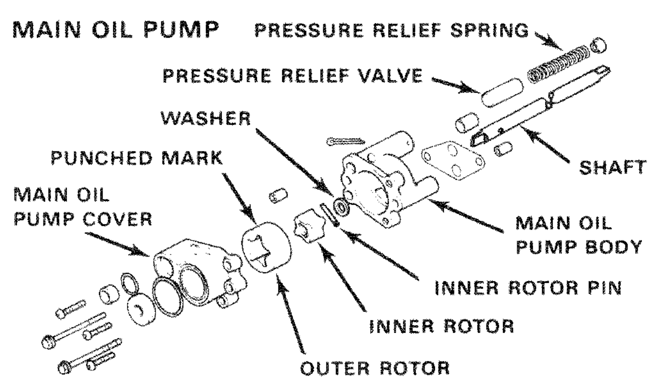


Oil Pumps, Assembly and Installation

Disassemble, clean, dry and relubricate the pumps.

CAUTION: Be sure that the pressure relief valve in the main oil pump moves freely.

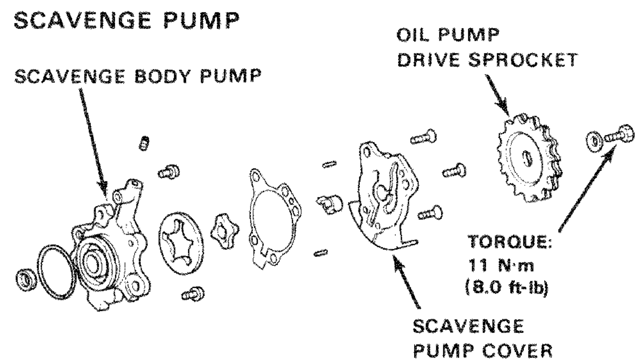
Slide the pump body over the pump shaft and reassemble:
- washer
- drive pin
- outer rotor
- inner rotor



CAUTION: The punch marks on the main oil pump outer rotor's must be facing out when the rotors are installed in the pump body.

Install the following:
- pump cover
- drive chain and sprockets
- clutch assembly
- engine covers

Use new O-rings and gaskets.



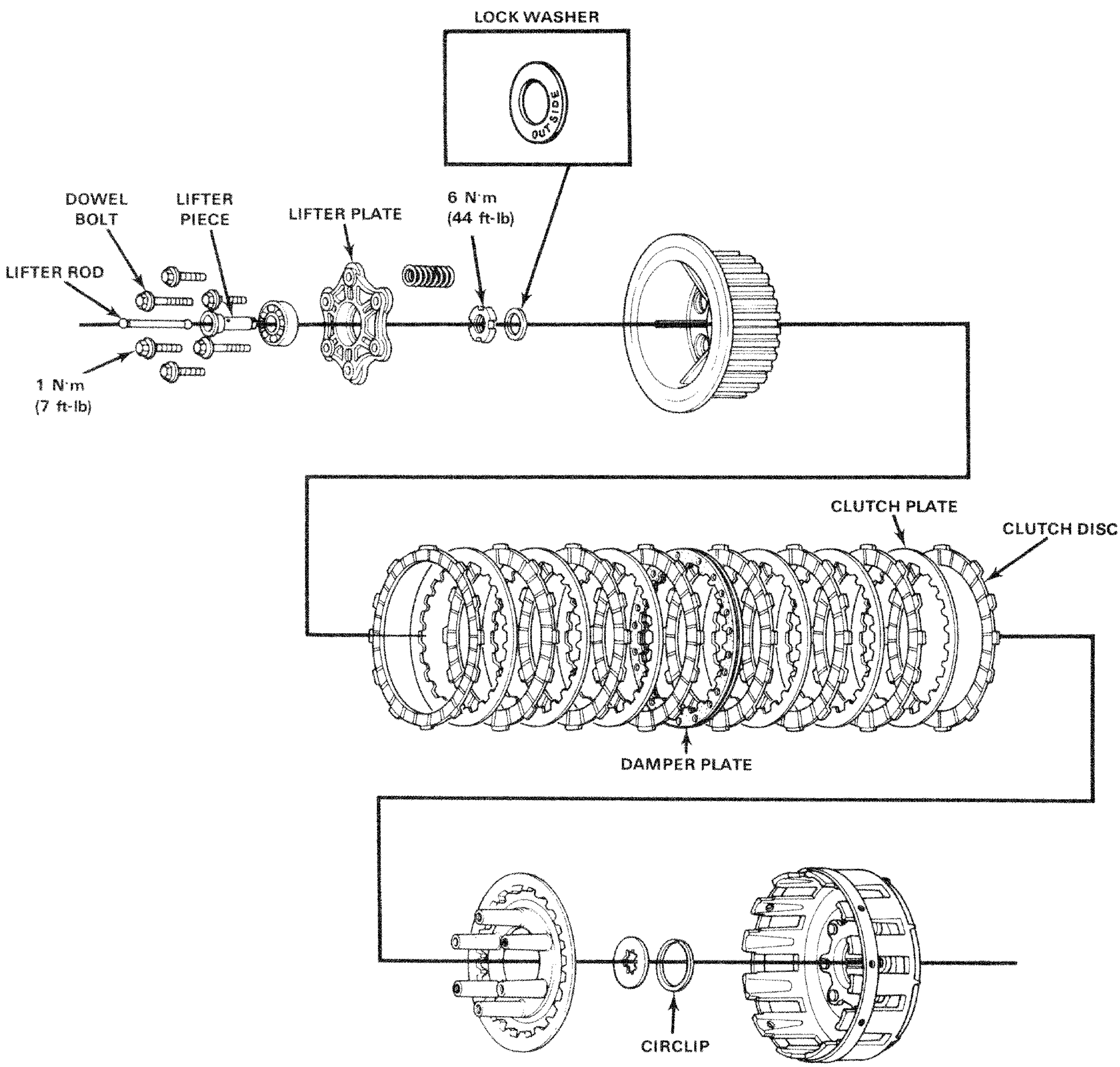
NOTE: Oil pump drive sprocket bolt torque: 11 N·m (8.0 ft-lb).

Clutch

Clutch

Service Information

- All clutch repair procedures except clutch outer drum replacement can be done with the engine in the frame. Refer to Section 6 for engine removal procedures; if the outer drum must be replaced.



Torque Value

Vacuum advance mounting bolts 10 N·m (7 ft-lb)

Troubleshooting

Clutch Slips When Accelerating
- No free play.
- Discs worn.
- Springs weak.

Clutch Will Not Disengage
- Too much free play.
- Plates warped.

Motorcycle Creeps With Clutch Disengaged
- Too much free play.
- Plates warped.

Excessive Lever Pressure
- Clutch cable kinked, damaged or dirty.
- Lifter mechanism damaged.

Clutch Operation Feels Rough
- Outer drum slots rough.

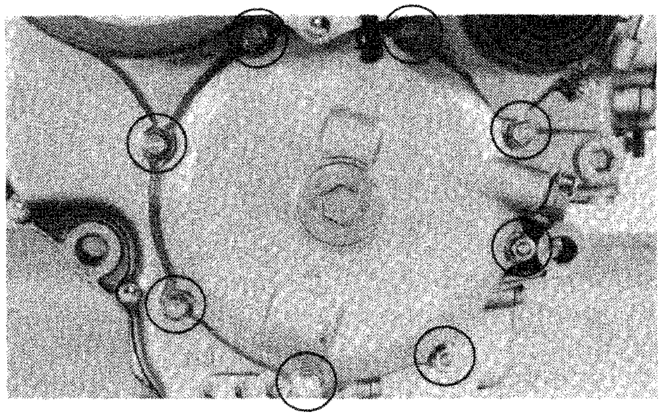
Clutch

Clutch Cover and Lifter

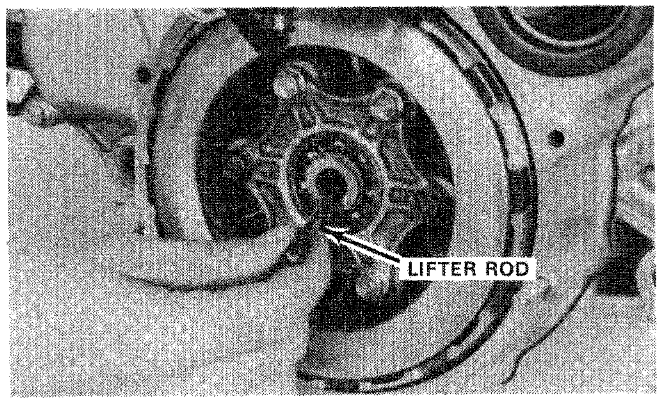
Remove the rear wheel. Refer to Section 14.

Disconnect the clutch cable from the clutch lever.

Remove the clutch cover attaching bolts and nuts. Remove the cover.



Remove the clutch lifter rod.



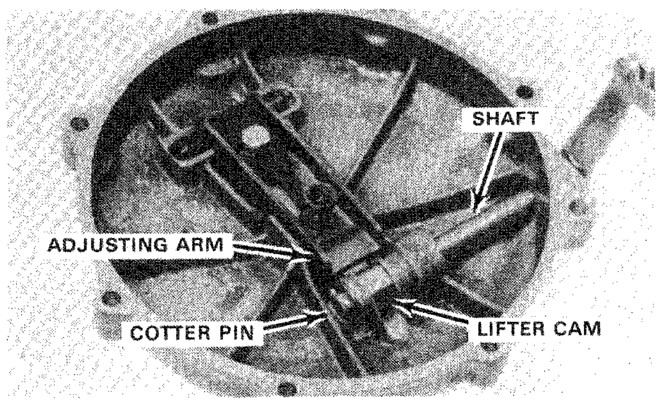
1980-1981:
Remove the cotter pin and pull the lifter shaft out of the cover. Remove the adjusting arm.

Inspect the lifter cam for wear or damage.

Apply grease to the contact points of the adjusting arm, lifter cam and lifter shaft before installing them into the clutch cover. Install a new cotter pin in the lifter shaft.

Install the lifter rod. Install the clutch cover and cable.

Adjust clutch free play. Refer to Section 3.

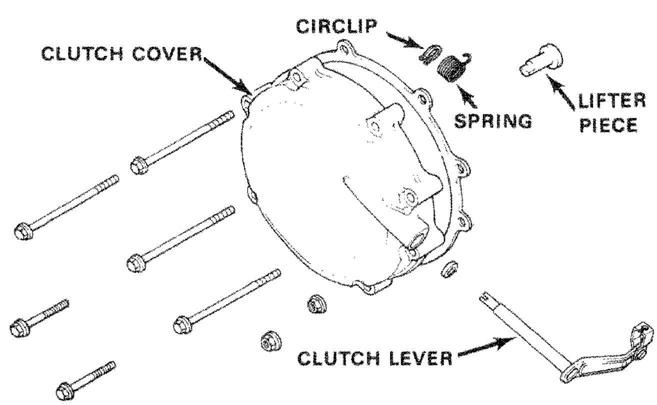


1982— :
Remove the lifter piece.

Remove the circlip and spring, then remove the clutch lever.

Inspect the lifter piece for wear or damage.

Reverse the removal procedure to assemble and install the clutch cover.



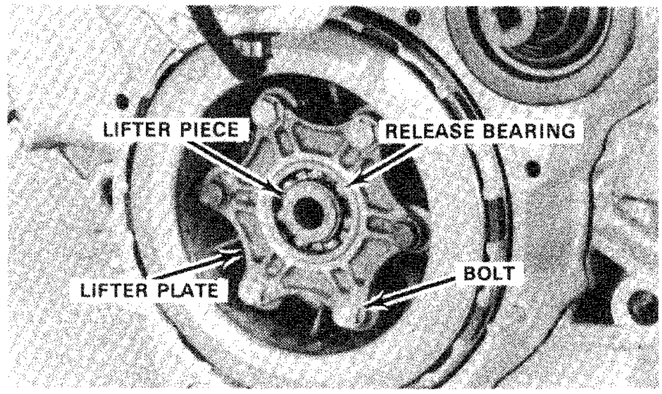
Lifter Plate

Remove the lifter plate bolts in two or more steps using a crisscross pattern to avoid distorting or breaking the plate.

Remove the lifter plate and 6 clutch springs.

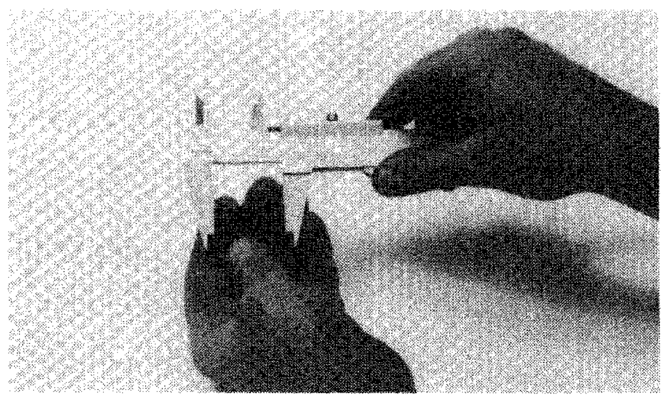
Check the release bearing for wear and damage.

Check the lifter piece for wear and damage.



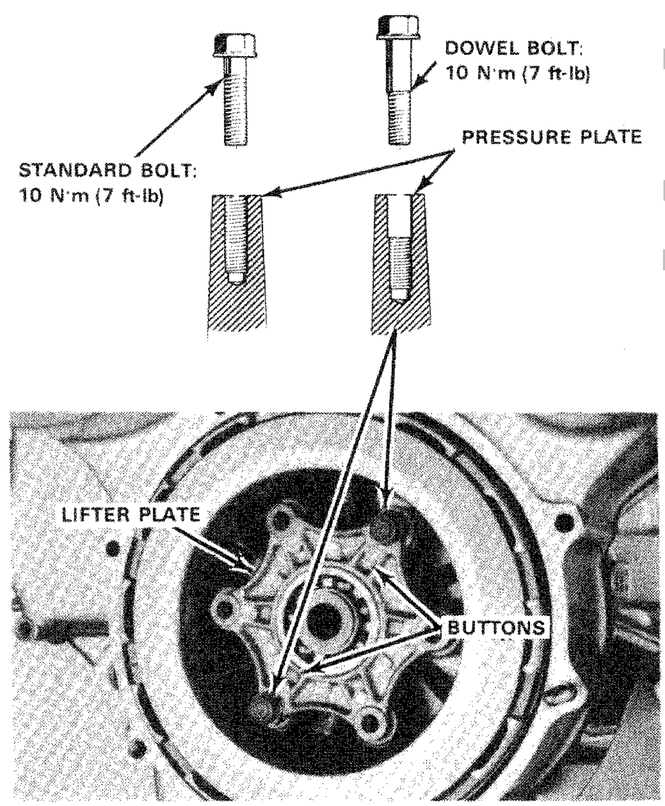
Check the springs for damage and measure free length.

Standard: 35.5 mm (1.40 in)
Service Limit: 34.2 mm (1.35 in)



NOTE: When reinstalling the lifter plate, insert the two dowel bolts through the two lifter holes marked with small cast-in buttons.

Install the lifter plate on the pressure plate by installing the dowel bolts into the two pressure plate holes with recessed threads. Then loosely install the four standard bolts and tighten all six bolts in two or more steps, using a crisscross pattern.



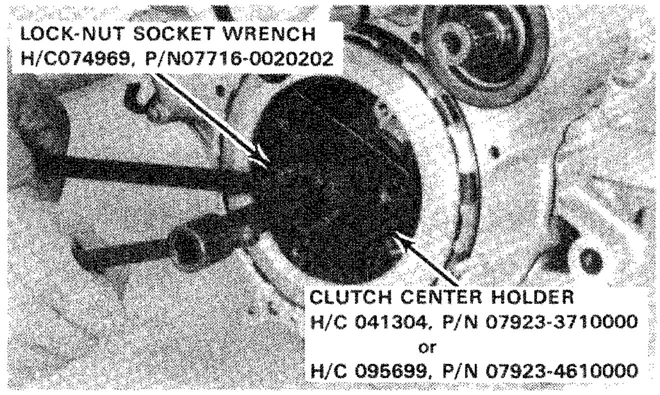
Clutch Center

Remove the clutch nut using the special tools as shown.

Remove the lock washer.

Pull out the clutch center. Inspect it for cracks or excessive wear on the splines.

When reinstalling the clutch nut, attach a torque wrench to the special socket wrench and torque the nut to 60 N·m (44 ft-lb).

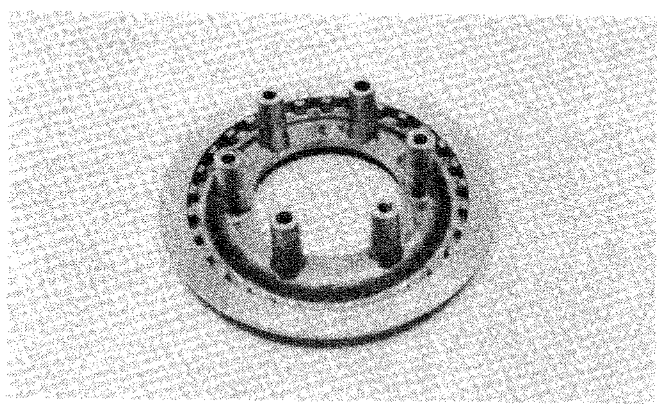


Clutch Plates and Discs

Remove the clutch plates, discs, and the pressure plate.

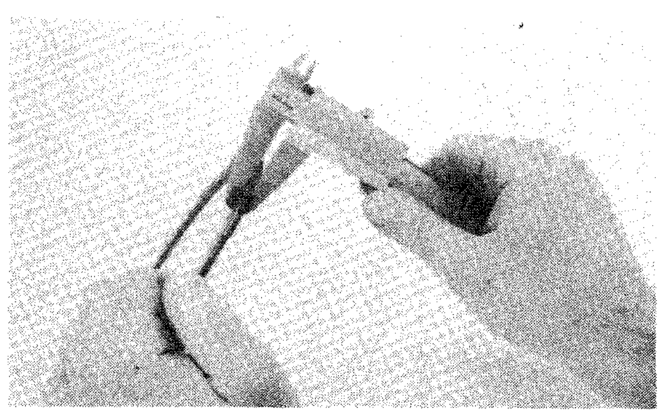
Inspect the pressure plate for damage.

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



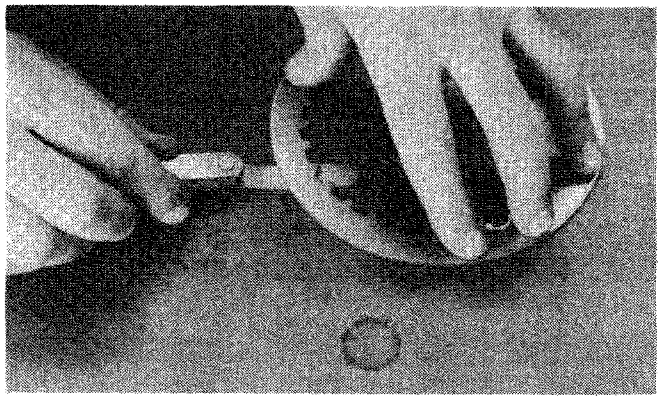
Measure disc thickness.

Standard: 3.42 - 3.58 mm (0.135 - 0.141 in)
Service Limit: 3.20 mm (0.126 in)



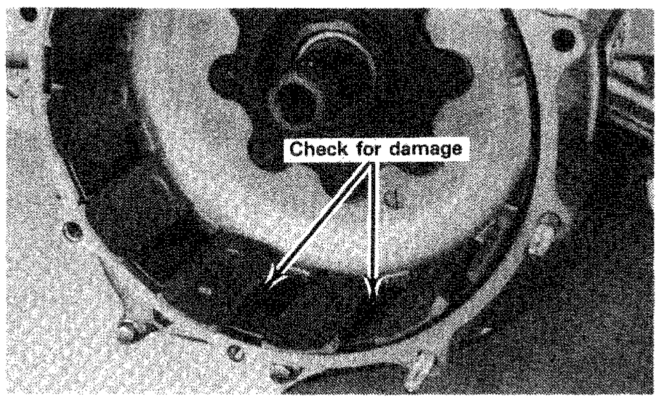
Check for plate warpage on a surface plate, using a feeler gauge.

Service Limit: 0.3 mm (0.01 in)



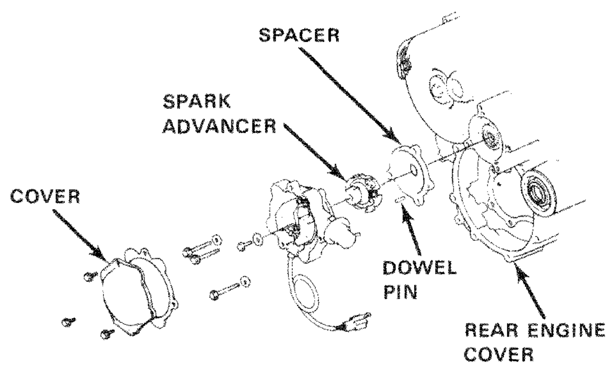
Clutch Outer Drum

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



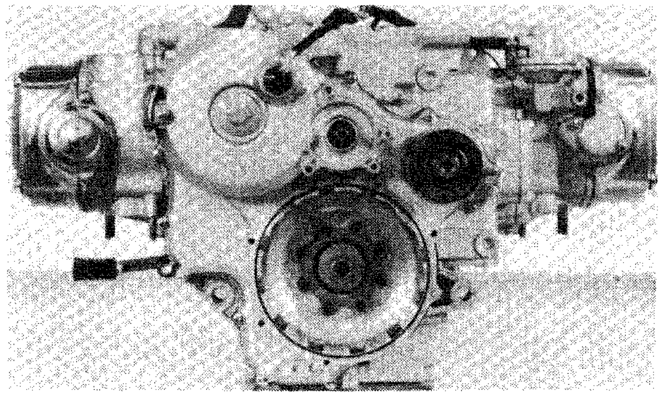
NOTE: The clutch outer drum cannot be removed with the engine in the frame. Refer to Section 6 for engine removal.

Remove the vacuum advance mechanism. Remove the mechanical advancer and locating pin from the shaft.

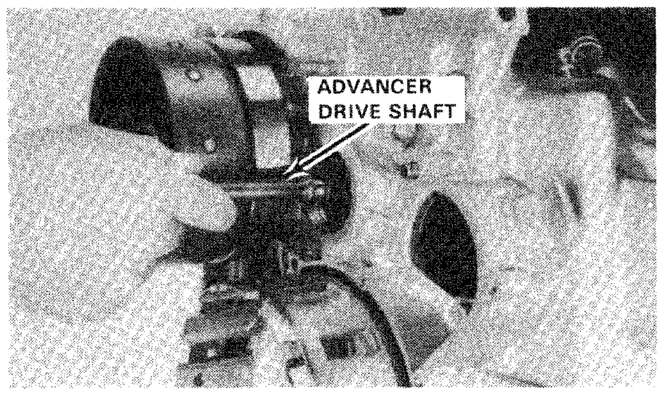


Clutch Outer Drum (cont'd)

Remove the engine rear cover (page 10-6).

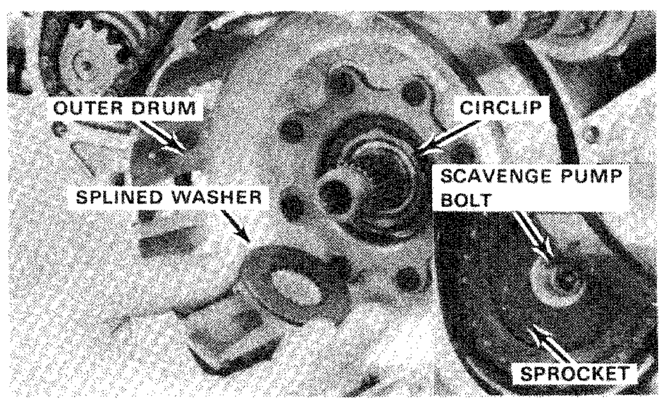


Remove the mechanical advancer drive shaft.



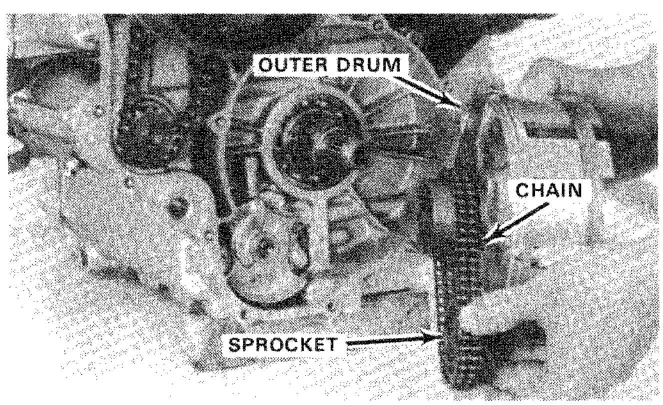
Remove the scavenge pump bolt and sprocket.

Remove the splined washer and 40 mm circlip located on the mainshaft in the center of the outer drum.



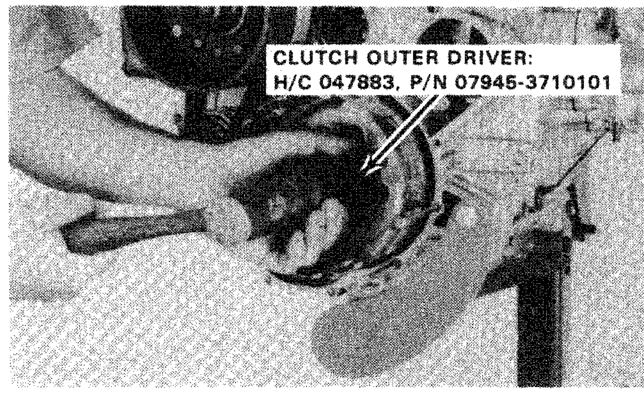
Remove the clutch outer drum.

NOTE: The scavenge pump chain and sprocket are removed with the outer drum.



Examine the scavenge pump chain and sprockets for wear and replace if necessary.

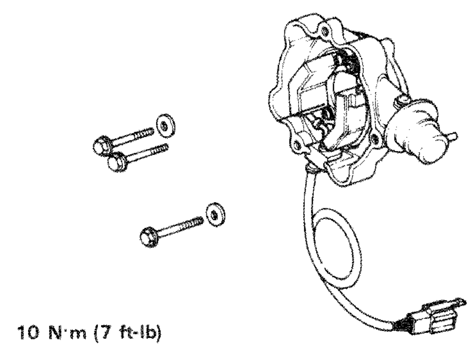
Install the outer drum onto the mainshaft, use the special driver, if necessary. Assemble all parts in the reverse order of removal.



CAUTION: Overtightening the vacuum advance mechanism mounting bolts may distort the case and cause faulty vacuum controller operation.

Be sure to adjust clutch free play after assembly (page 3-23).

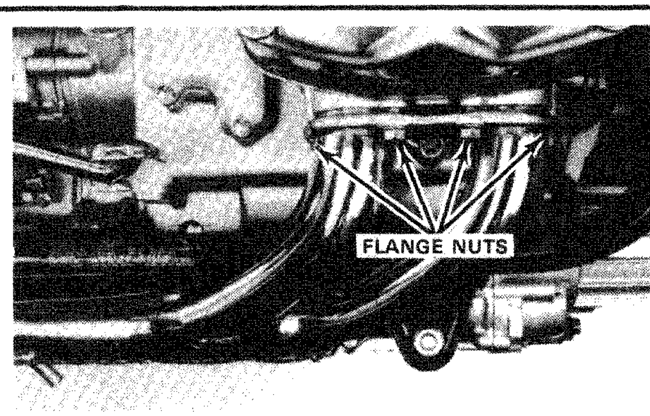
Check that the pulse air gap is 0.50 - 0.70 mm (0.020 - 0.028 in).



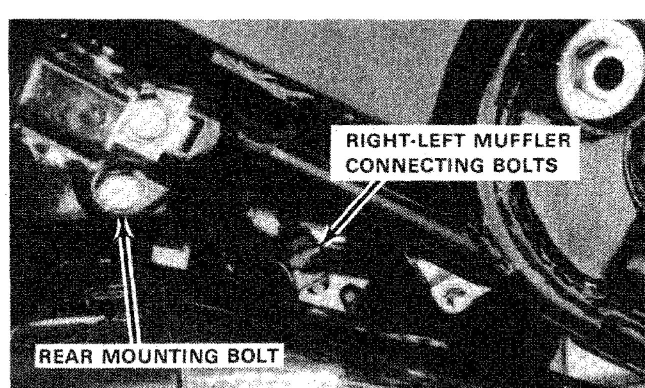
Engine Flushing Procedure

CAUTION: If any of the clutch friction discs have disintegrated, the engine must be cleaned and flushed of any debris by the following procedure. This procedure only applies when the engine is still in the frame.

1. Clean the clutch outer drum with a lint free solvent soaked rag.
2. Drain the engine oil.
3. Remove the right muffler flange nuts.



4. Remove the right rear mounting bolt. Loosen the right-left muffler connecting bolts and remove the right muffler.

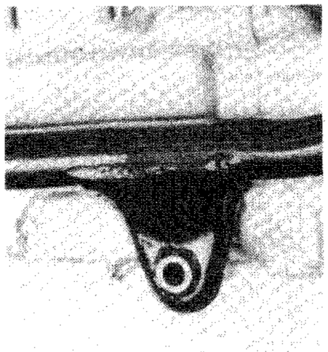


(cont'd)

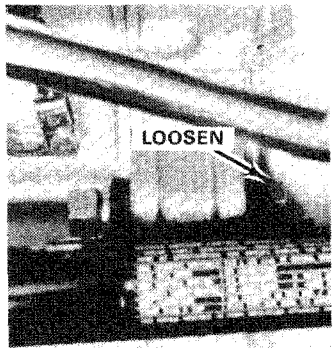
Engine Flushing Procedure (cont'd)

5. Remove the bottom front engine bolt nut on the right side. Push the bolt out of the right frame tube. Loosen the right bottom engine mounting bolt.

6. Remove three oil screen cover bolts, loosen the fourth until it touches the frame.



FRONT

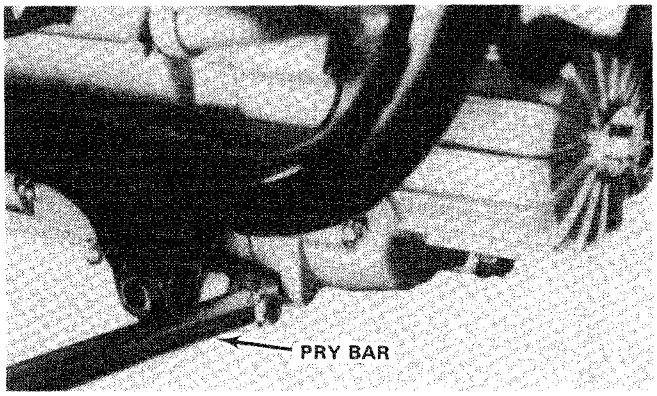


REAR

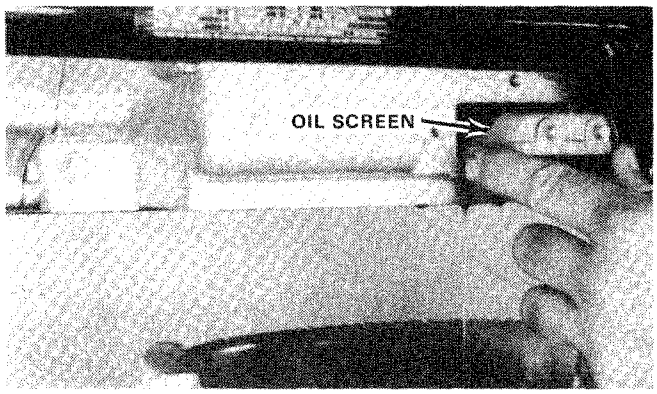
7. Carefully flex the frame and wedge a prybar between the frame and engine. Remove the fourth bolt and oil screen cover.

   CAUTION: Do not flex the frame more than necessary to prevent frame damage. Also, be careful not to damage the engine case.

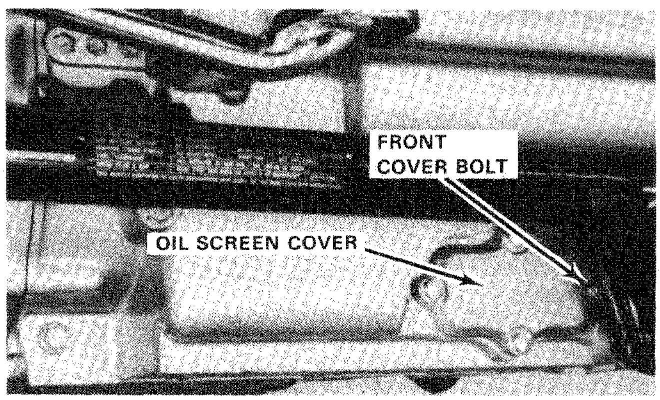
   NOTE: Loosen the left engine mount bolts if the frame cannot be flexed enough.



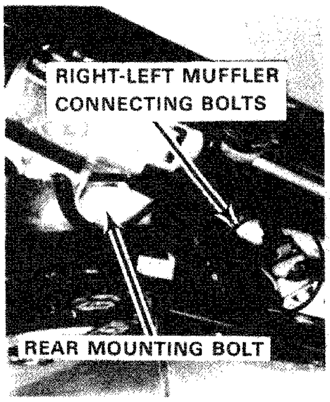
8. Remove the oil screen.
9. Slowly pour 1 quart of clean oil through the oil filler to flush any clutch particles toward the oil screen.
10. Reach into the oil screen cavity and remove any loose particles as the oil is being poured into the engine.
11. Reassemble and adjust the clutch.
12. Install and tighten the oil drain plug.

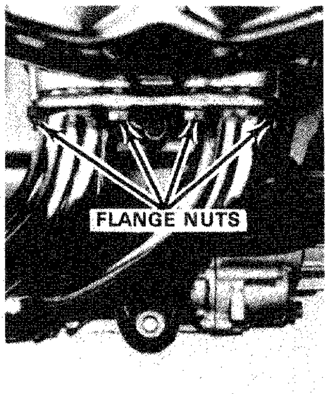


13. Clean and install the oil screen.
14. Install the oil screen cover. Replace the original front oil screen cover bolt with one about 3 mm shorter and the frame will not have to be flexed for future removal.
15. Remove the prybar, push the bottom front engine bolt back into place and install nut.
16. Torque the lower rear and front engine mount bolts to 60 N·m (44 ft-lb).



17. Install the right muffler.





18. Fill the crankcase with the recommended oil (page 3-15).

19. Run the engine for 5 minutes.

20. Repeat steps 2 to 19, excluding step 11.

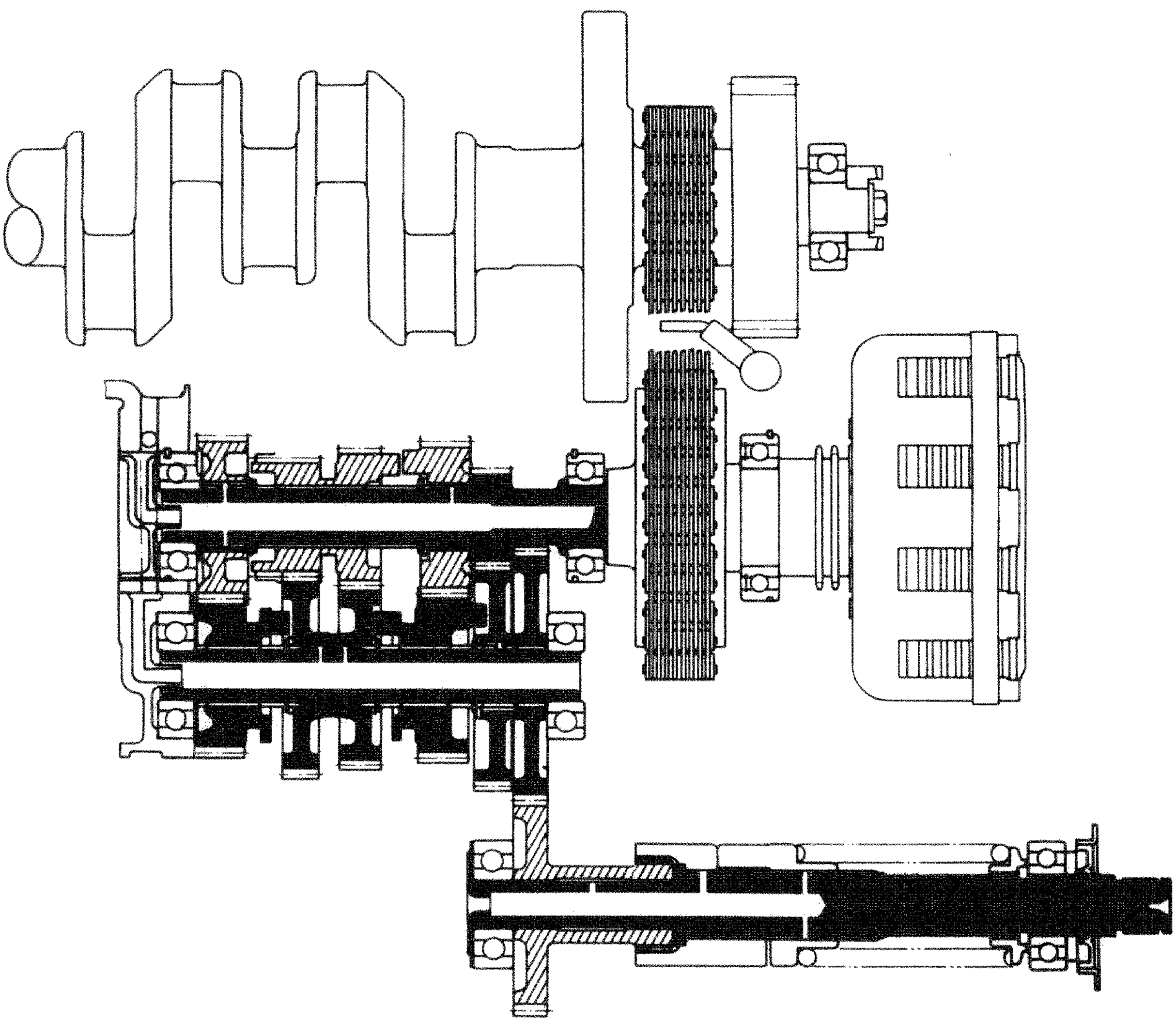
    NOTE: The clutch does not have to be disassembled again.

Transmission

Transmission

Service Information

- The gear shift mechanism can be inspected with the engine in the frame by removing the front engine cover.
- The output shaft can be inspected by removing the engine from the frame and separating the engine cases.
- The engine case separation procedure in this section is designed to get you into the transmission as easily and quickly as possible. Refer to the separation procedure in Section 8 if you intend to remove the pistons or crankcase for inspection.



Torque Values

Crankcase bolts:	10 mm	35 N·m (25 ft-lb)
	8 mm	27 N·m (20 ft-lb)
	6 mm	12 N·m (9 ft-lb)
Vacuum advance mounting bolts:		10 N·m (7 ft-lb)

Troubleshooting

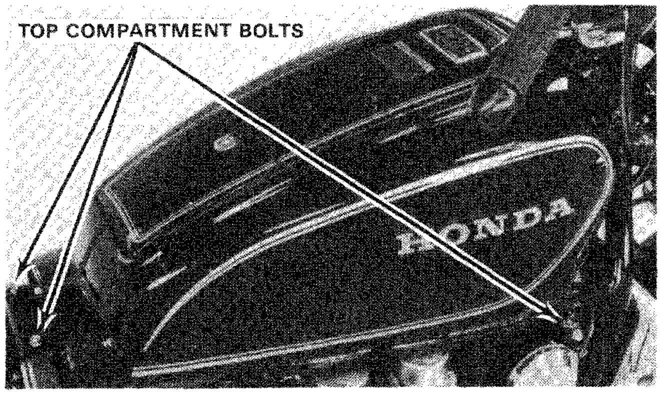
Hard to Shift Into Gear
- Improper clutch adjustment:
  Too much free play.
- Shift forks bent.
- Shift shaft bent.
- Shift claw bent.
- Shift spindle bolt loose.
- Shift drum stopper bent.
- Shift drum cam grooves damaged.

Transmission Jumps Out Of Gear
- Gear dogs worn.
- Shift shaft bent.
- Shift drum stopper broken.
- Shift forks bent.

Transmission

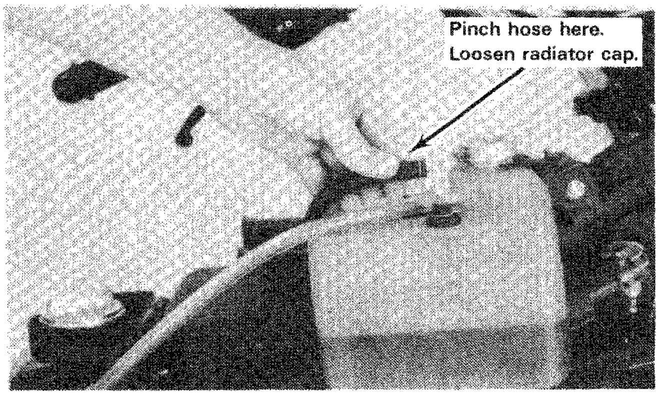
Gear Shift Mechanism

Remove the top compartment.

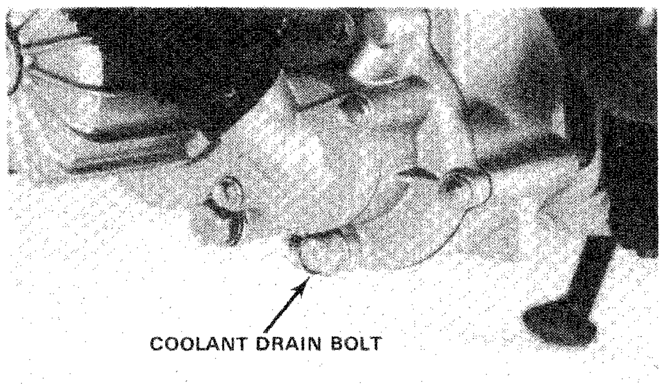


Pull the siphon tube out of the coolant reserve tank and loosen the radiator cap.

NOTE: If the tube is left in place, coolant will siphon down over the engine.

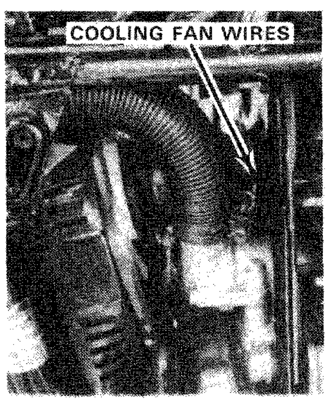


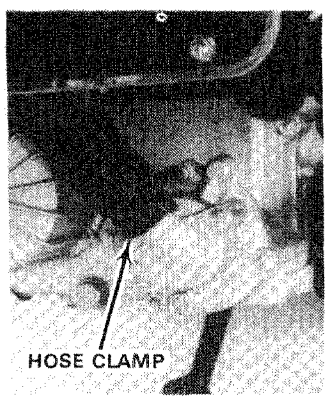
Remove the coolant drain bolt from beneath the water pump and drain the coolant into a clean container. The coolant can be reused.



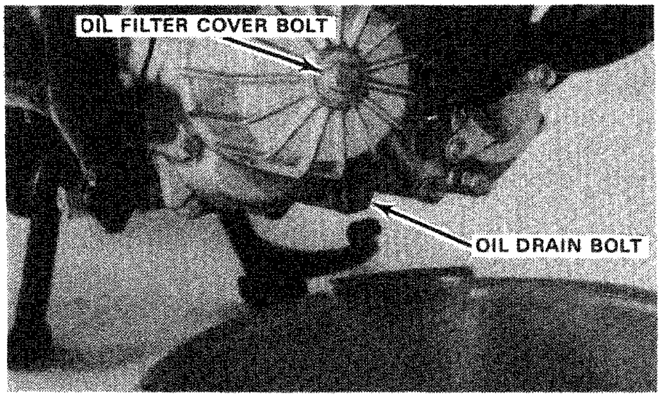
Reinstall the coolant drain bolt.

Disconnect the cooling fan wires and the radiator hoses. Remove the radiator.

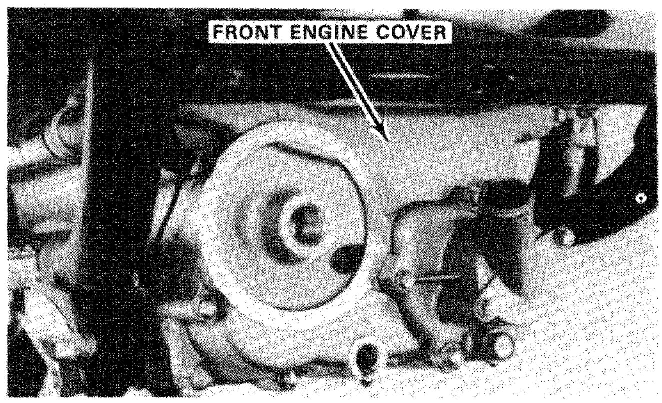




Place a suitable container under the oil drain bolt, and remove the oil drain bolt and the oil filter cover.



Remove the front engine cover.



1980-1981:

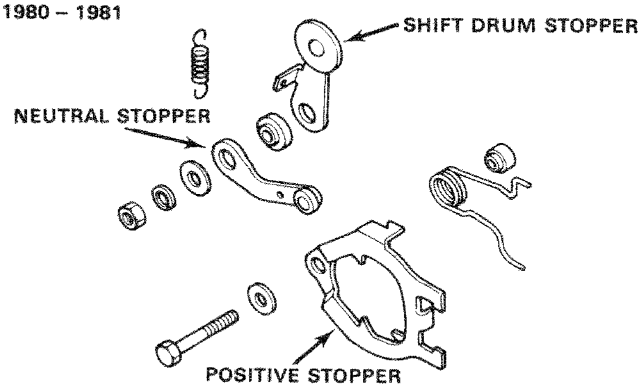
Remove the neutral stopper and shift drum stopper.

Remove the positive stopper.

Inspect all shift mechanism components for wear and damage.

NOTE: If more extensive transmission repair is required, the engine must be removed from the frame and the engine cases separated. Refer to Section 6 for engine removal.

1980 – 1981



1982— :

Remove the shift drum joint.

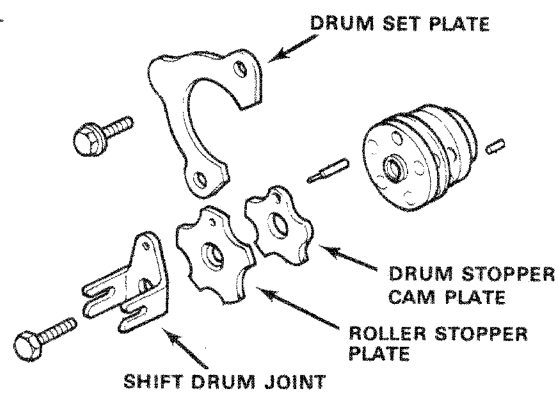
Remove the drum set plate.

Remove the roller stopper plate and the drum stopper cam plate.

Inspect all shift mechanism components for wear and damage.

NOTE: If more extensive transmission repair is required, the engine must be removed from the frame and the engine cases separated. Refer to section 6 for engine removal.

1982—



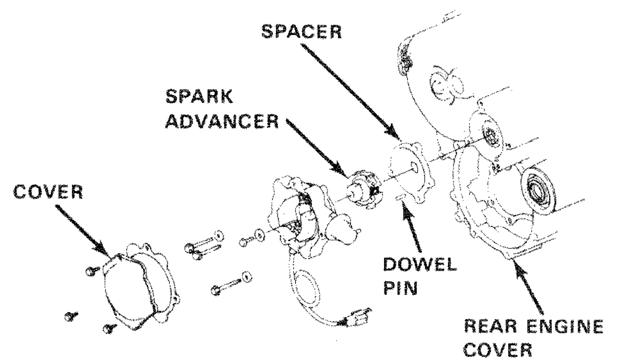
Transmission

Engine Case Separation

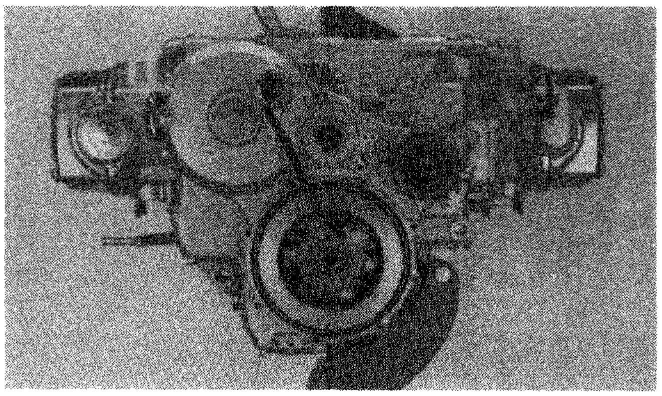
Place the engine in an engine stand.

Remove the vacuum advance mechanism.

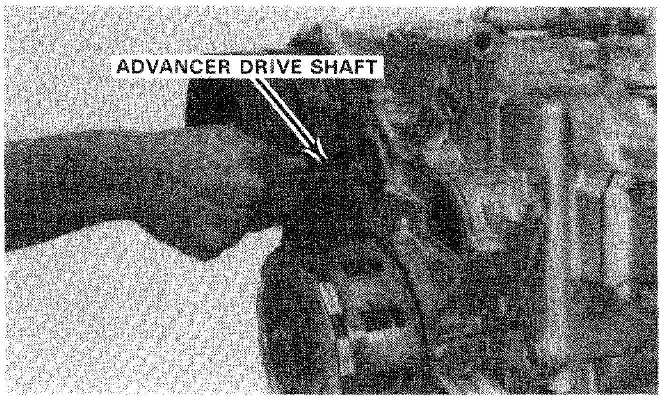
Remove the mechanical advancer and locating pin from the shaft.



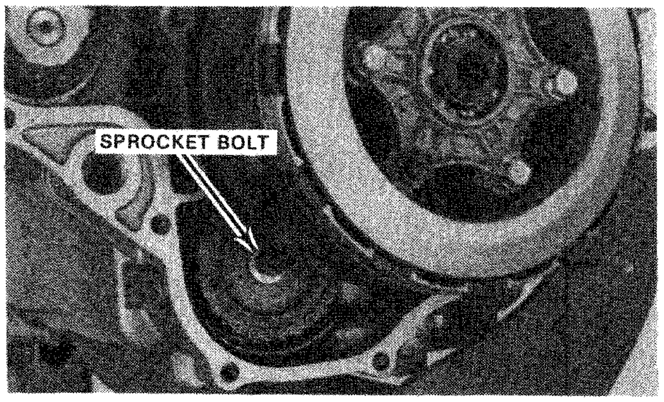
Remove the engine rear cover.



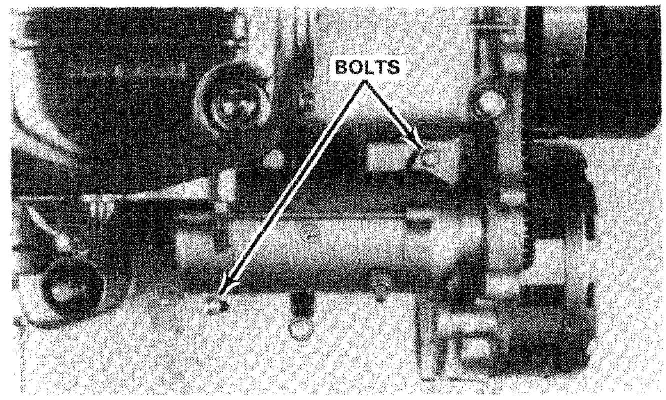
Remove the mechanical advancer drive shaft.



Remove the scavenge pump bolt and sprocket.



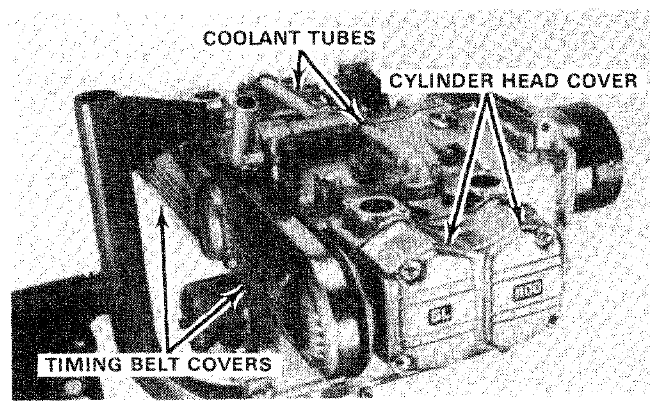
Remove the starter motor.



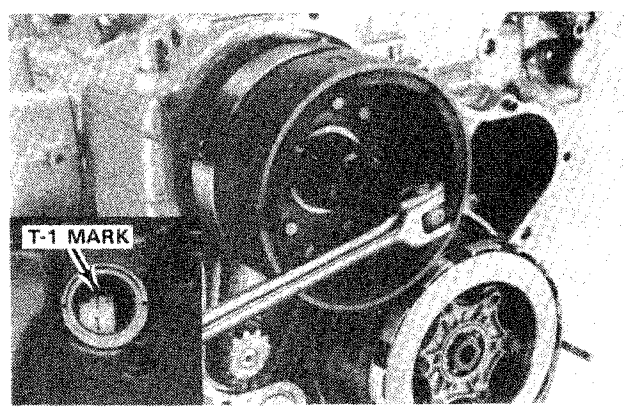
Remove the coolant tubes.

Remove the cylinder head covers.

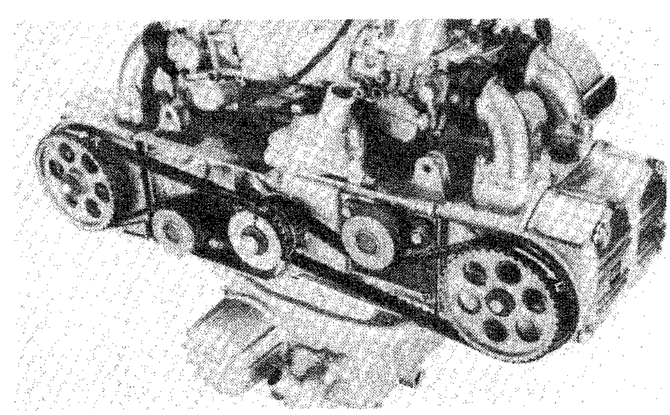
Remove the timing belt covers.



Turn the alternator rotor bolt clockwise until the T-1 mark on the flywheel aligns with the index mark on the edge of the timing inspection hole. Check that the cylinder No. 1 piston is at TDC (Top Dead Center) on the compression stroke. If it is not on compression, rotate the crankshaft one complete turn and again align the T-1 mark with the index mark.



Mark each belt with an arrow to indicate direction of rotation and a letter to indicate right or left side. Mark the crankshaft pulley to indicate TDC compression on the No. 1 cylinder.



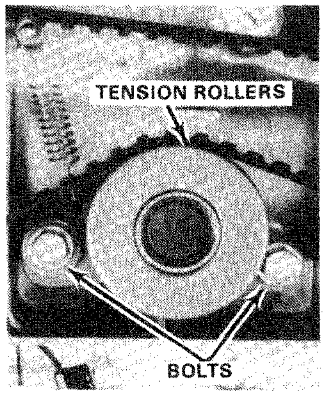
(cont'd)

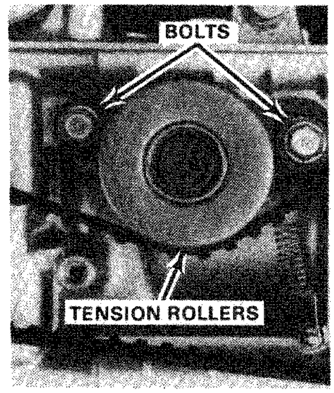
Engine Case Separation (cont'd)

Loosen the belt tensioner bolts. Move the tensioner rollers away from the belts and retighten the bolts.

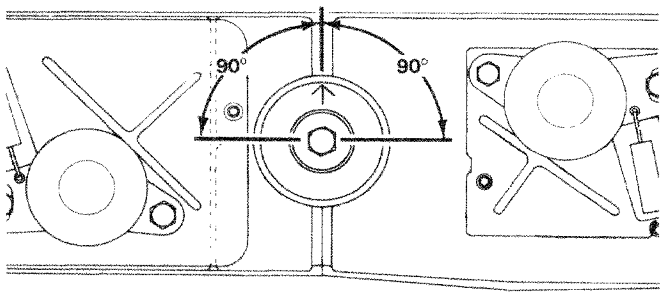
Remove the belts.

CAUTION: Do not let oil get on the belts. Oil contamination will cause swelling and deterioration.



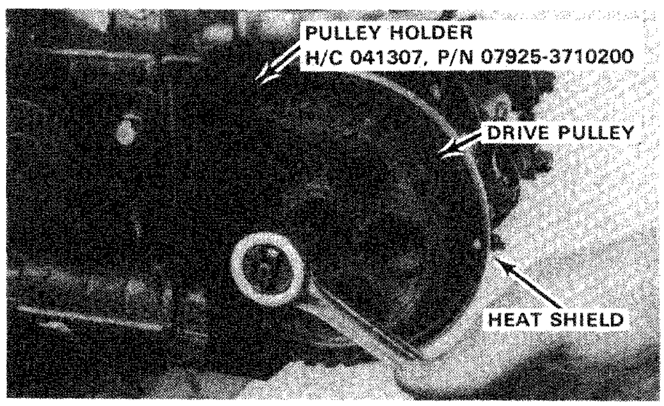


Rotate the crankshaft 90° in either direction from your TDC mark on the pulley. This will position all four pistons midway in their cylinders and allow you to rotate either camshaft without driving a valve into a piston.



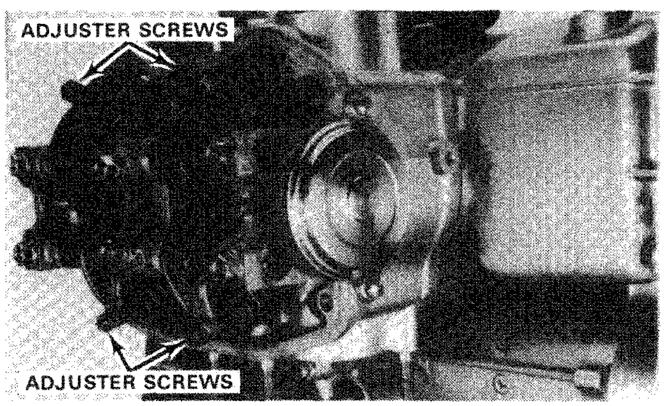
Remove the left camshaft drive pulley.

Remove the left cylinder head heat shield.



Remove the plate at the rear of the left cylinder head.

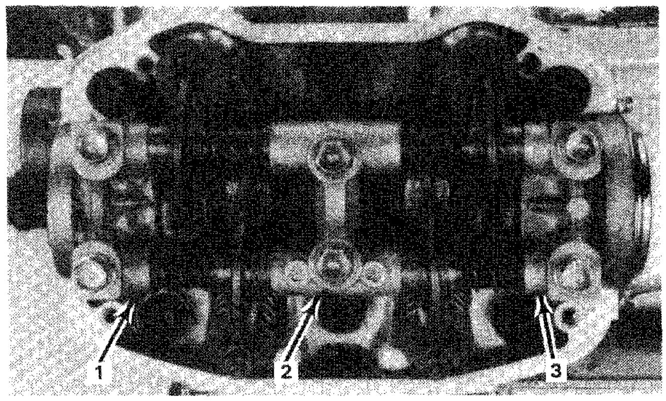
Loosen the valve adjuster screws to relieve valve spring pressure from the camshaft.



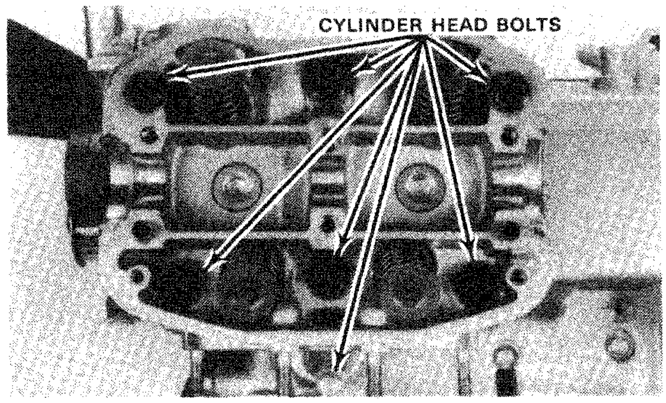
Remove the six camshaft holder bolts.

Remove the camshaft, holder, rocker arms and shafts as a unit.

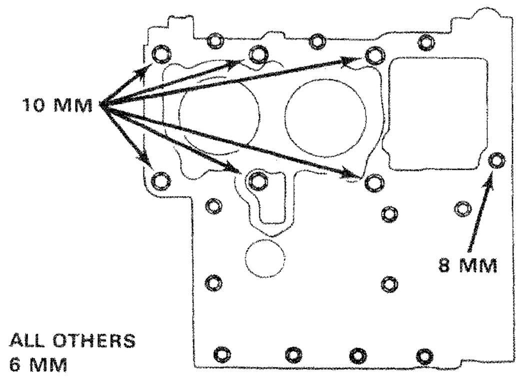
NOTE: Mark each holder to identify its position.



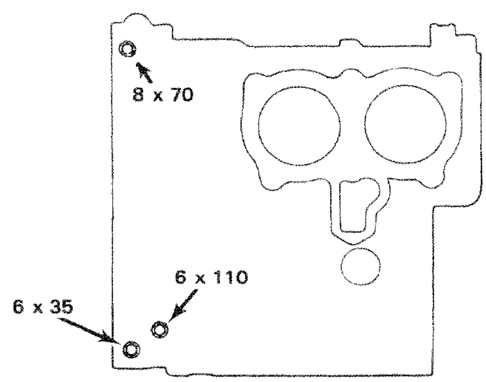
Remove the cylinder head bolts and the cylinder head.



Remove the 19 left engine case bolts.



Remove the three right engine case bolts.



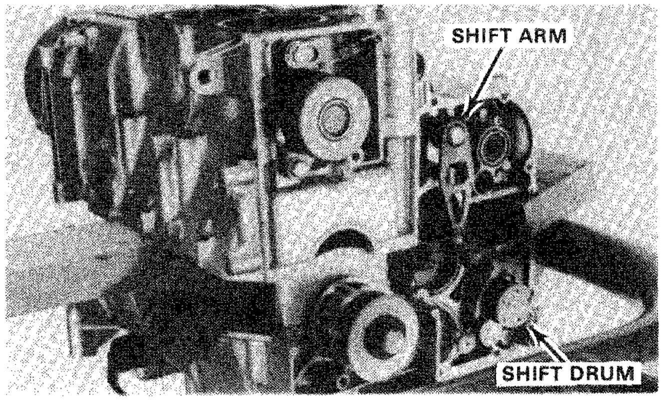
(cont'd)

Transmission

Engine Case Separation (cont'd)

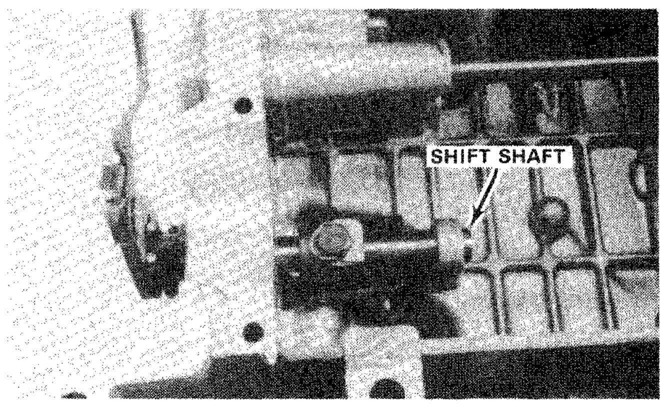
Rotate the engine stand adaptor so the left engine case is up.

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



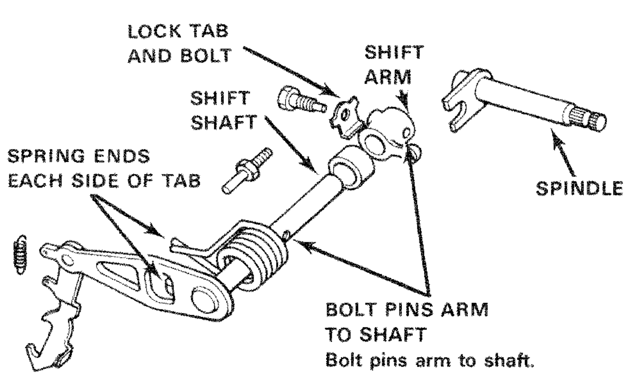
Shift Shaft

Remove the shift shaft from the left engine case.



Inspect the shift shaft, shift arm, and spindle for wear or damage. If there is excessive shift lever movement before the shaft starts to rotate, replace the shift arm or spindle.

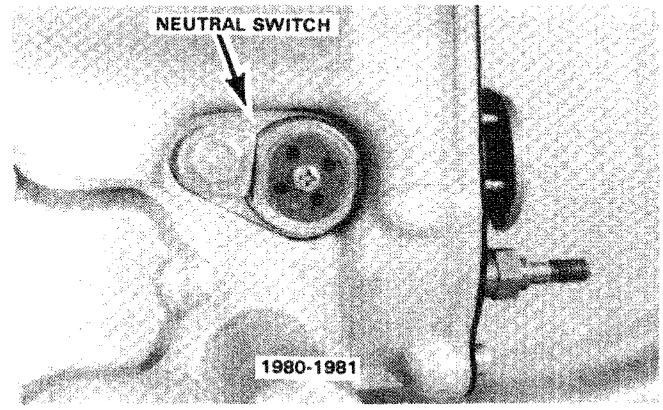
Reinstall the shift shaft.



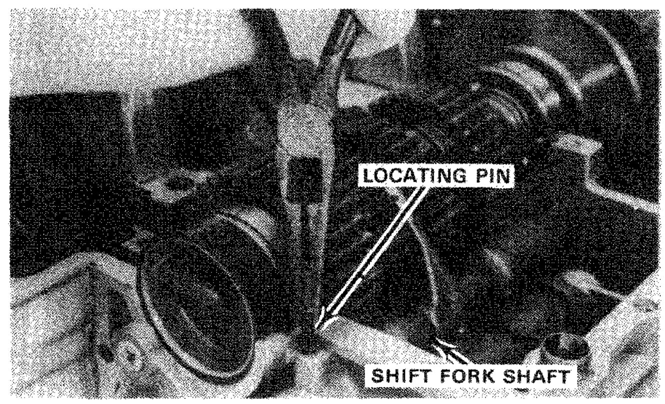
Bolt pins arm to shaft.

Shift Forks and Drum

1980-1981:
Remove bolt and pull the neutral switch out of the case.

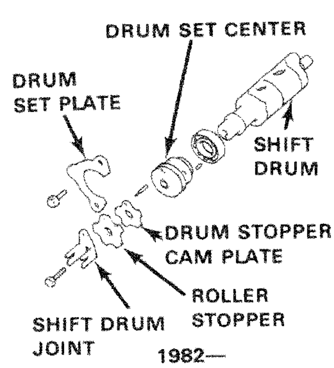


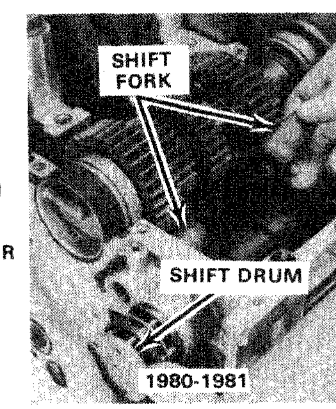
Remove the locating pin and slide the shift fork shaft out of the case.



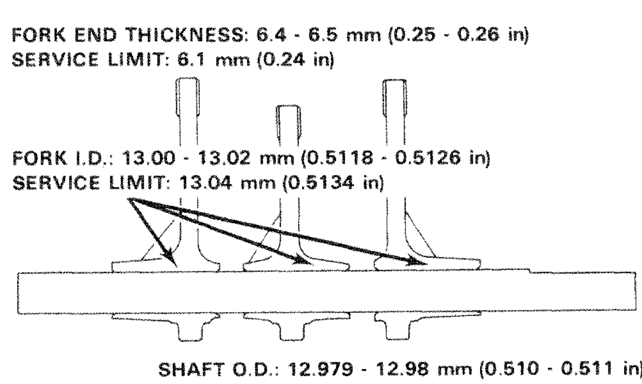
1982— :
Remove the shift drum set plate and slide the shift fork shaft out of the case.

ALL MODELS:
Remove the shift drum and shift forks.





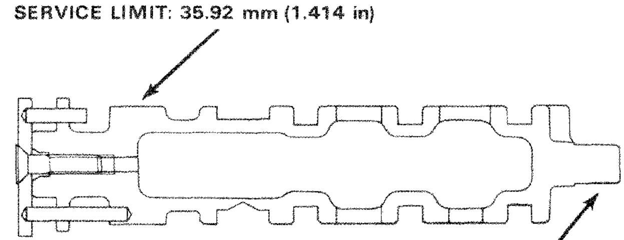
Check the forks for burned ends or other evidence of abnormal contact. If damaged, inspect the gears.



(cont'd)

Shift Forks and Drum (cont'd)

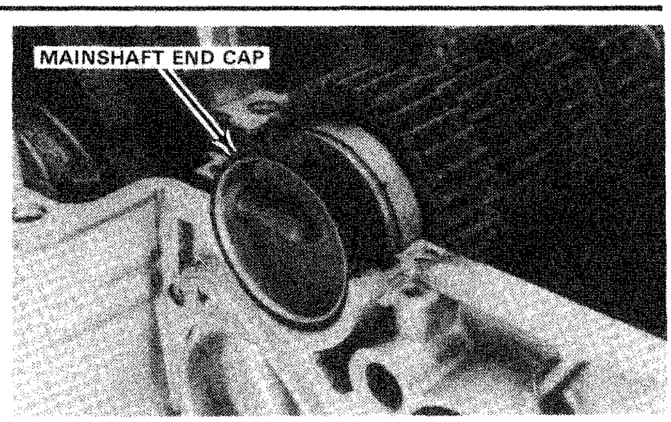
Inspect the shift drum grooves. They should be smooth and free of chips and burrs. Check dimensions.



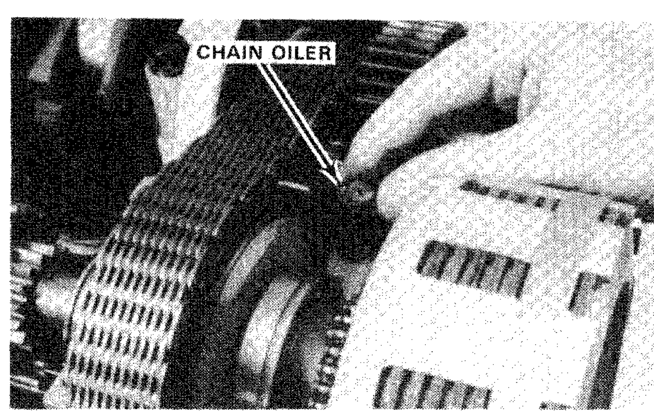
Mainshaft

Remove the mainshaft end cap.

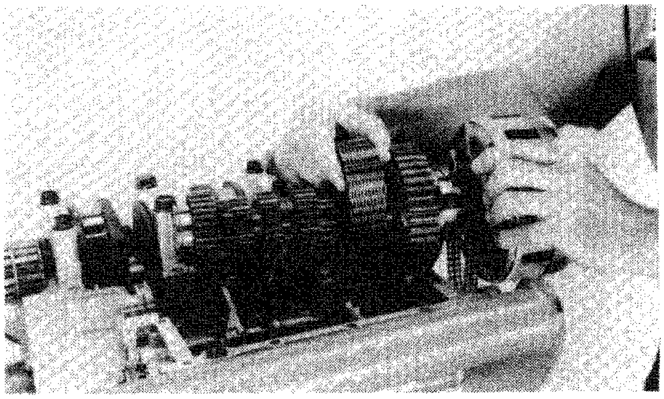
NOTE: The cap catches oil as it drains into the sump and directs it into the center of the mainshaft. Be sure to reinstall the cap in its original position or transmission lubrication will be impaired.



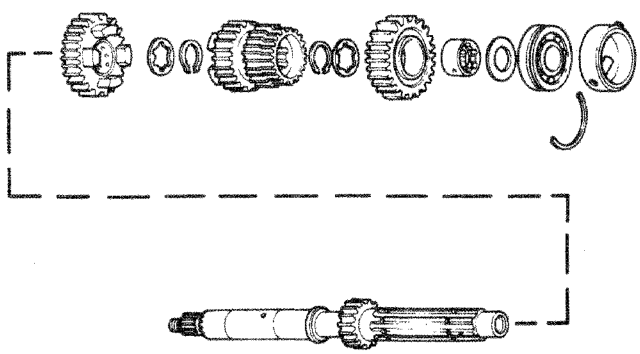
Remove the primary chain oiler.



Lift the mainshaft with the primary driven gear and clutch assembly; and slip it out through the primary chain.



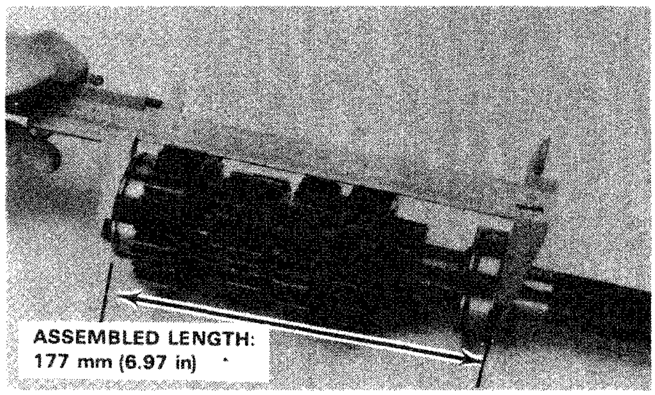
Disassemble the mainshaft. Refer to Section 9 for clutch disassembly. Refer to Section 1 for tool information.



Check the gears for freedom of movement or rotation on the shaft. Examine the gear dogs for evidence of abnormal wear. Note the alignment of the bushing and shaft oil holes.

Check the ball bearings for smooth rotation, damage, and wear.

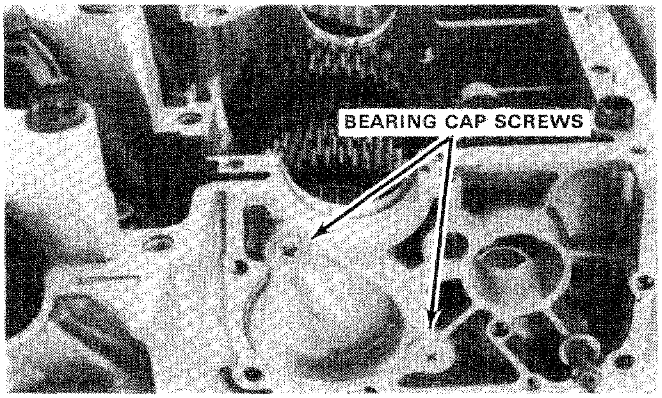
After reassembling the mainshaft, measure the assembled length to ensure proper alignment with the case bearing set rings.



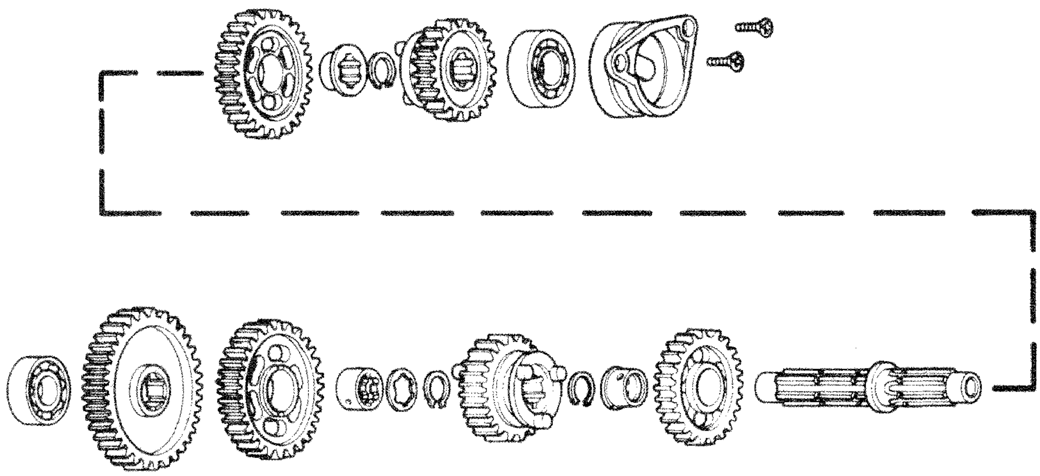
Transmission

Countershaft

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

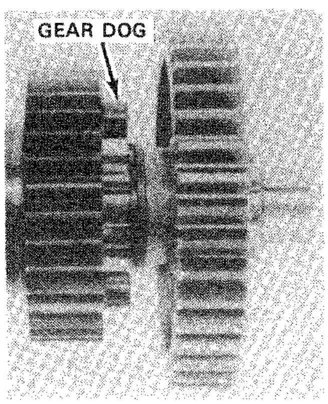


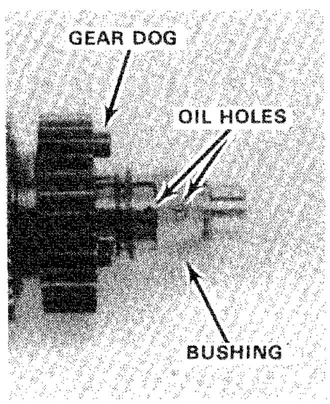
Disassemble the countershaft. Refer to Section 1 for tool information.



Check the gears for freedom of movement or rotation on the shaft. Examine the gear dogs and slots for evidence of abnormal wear. Note the alignment of the bushing and shaft oil holes.

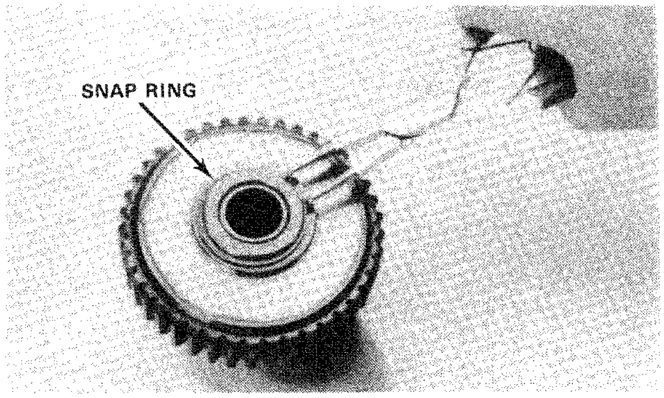
Check the ball bearings for smooth rotation, damage, and wear.





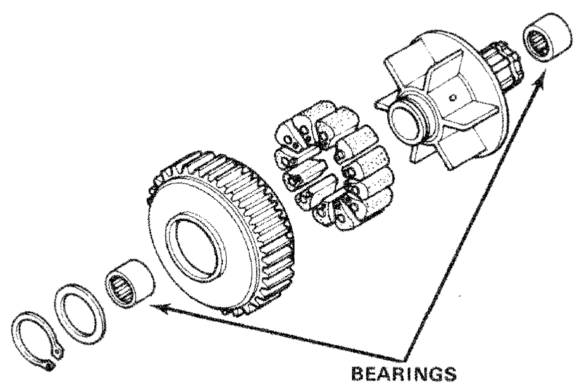
Primary Driven Gear

Remove the snap ring and disassemble the primary driven gear.



Inspect the bearings for wear and damage.

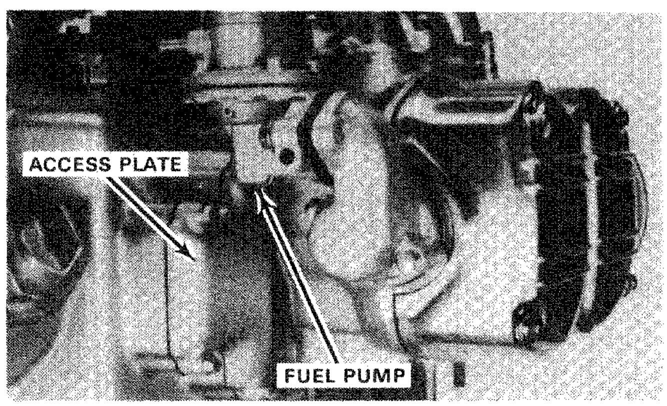
Inspect the dampers for deterioration and damage.



Output Shaft

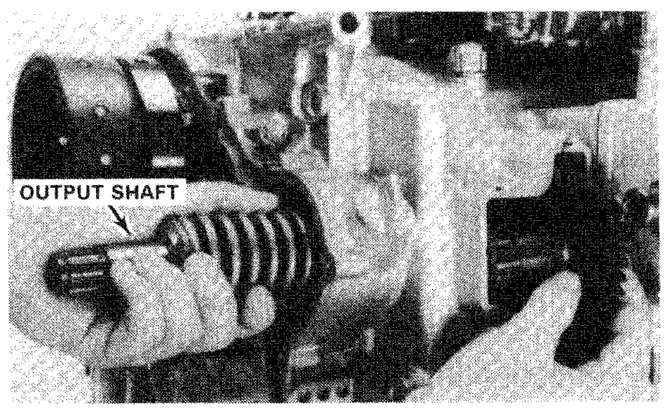
NOTE:
- To remove the output shaft and gear, you must remove the engine from the frame (Section 6) and remove the engine rear cover (page 10-6). It is not necessary to separate the engine case halves.
- Refer to Section 1 for tool information.

Remove the fuel pump and access plate.



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

Remove the gear through the access hole.



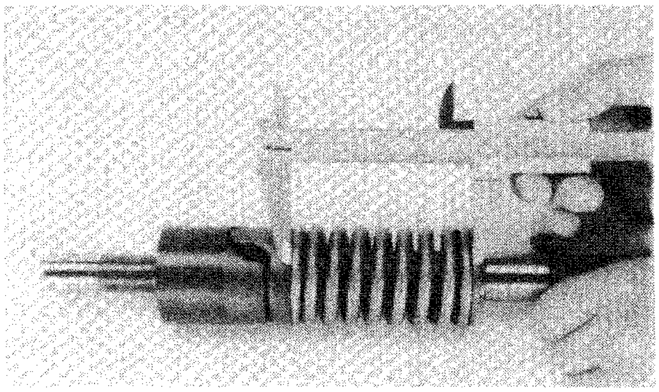
(cont'd)

Transmission

Output Shaft (cont'd)

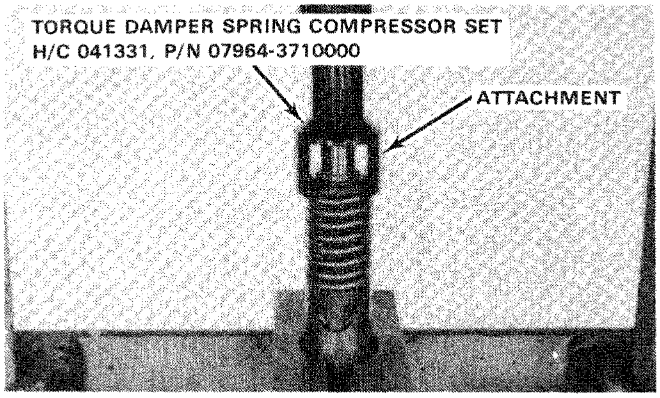
Measure the assembled length of the spring:

Assembled Length: 84.5 mm (3.33 in)



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

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



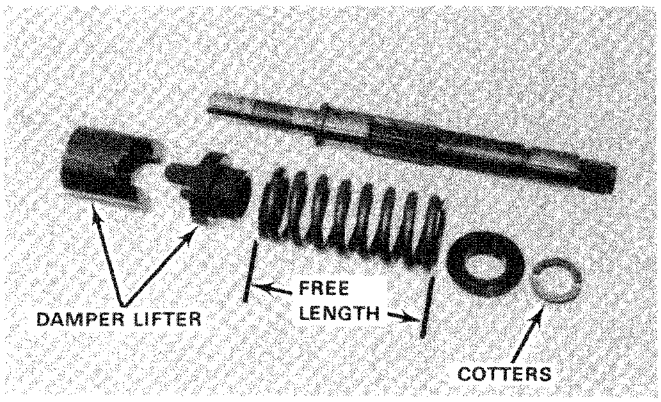
Inspect the damper lifter for abnormal wear, especially if the assembled spring length is longer than specified. Check the shaft splines for damage.

Measure the spring free length.

Standard:	**110.9 mm (4.37 in)**
Service Limit:	**100 mm (3.90 in)**

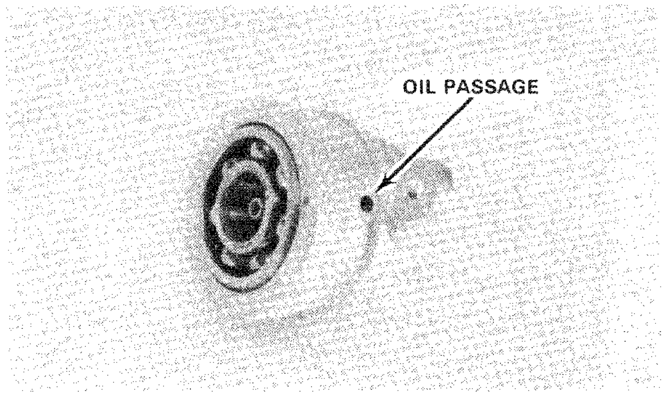
Reassemble the shaft.

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

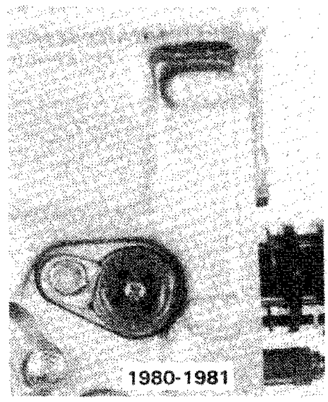


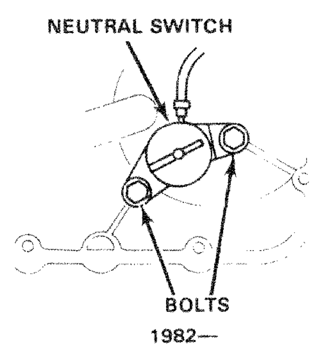
Engine Case Reassembly

Install the countershaft in the case. Be sure the oil passage in the bearing cap is clean and push it into position by hand. Tighten the screws securely.

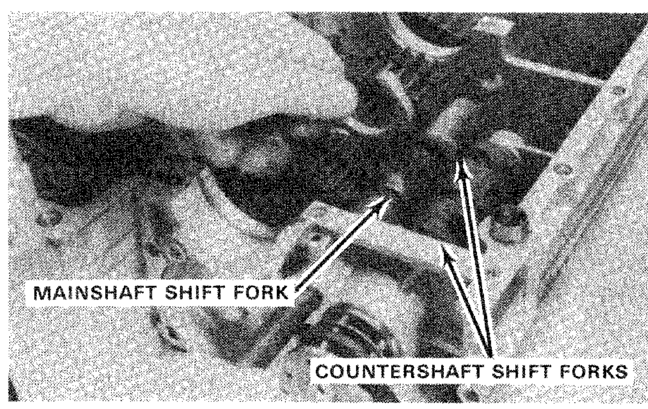


Install the shift drum and neutral switch. Tighten the securing bolt(s). Install the switch wire.

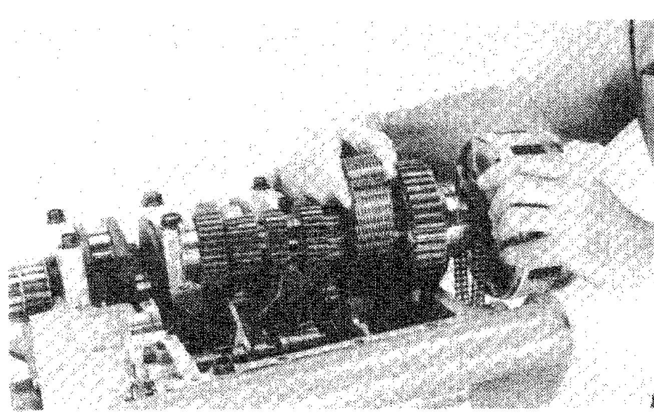




Install the two countershaft shift forks and the mainshaft shift fork. Insert the shift fork shaft into the case. Align the hole in the shaft with the hole in the case and insert the locating pin.

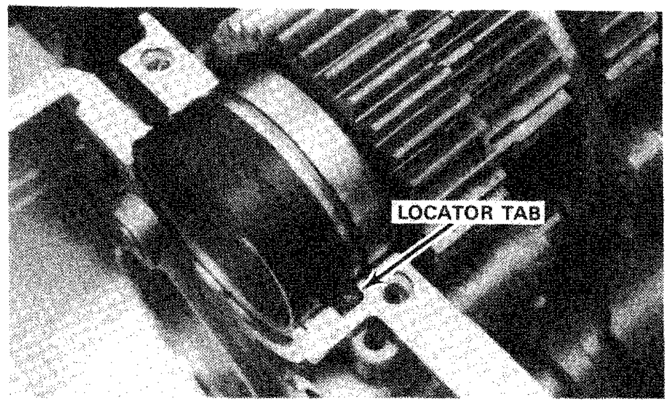


Install the mainshaft by slipping it through the primary chain. Engage the shift fork with the M2/M3 gearset and the bearings with the set rings in the case.

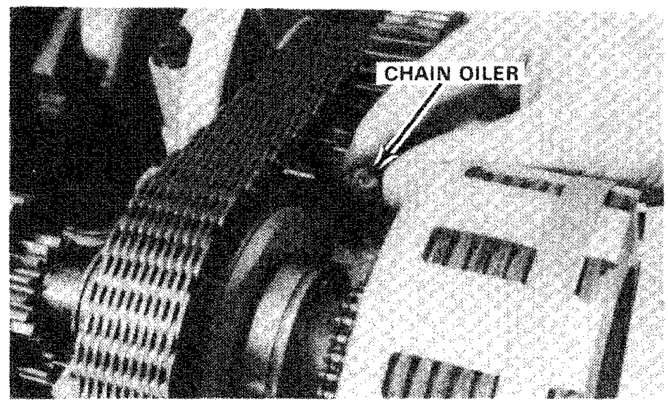


Engine Case Reassembly (cont'd)

Install the mainshaft end cap in its original position with the locator tab in the case recess.



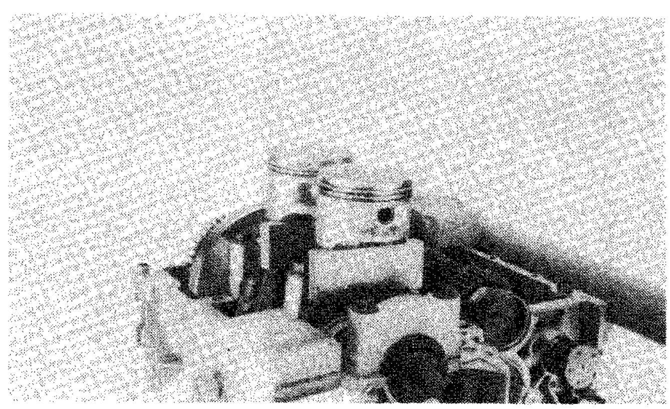
Install the primary chain oiler.



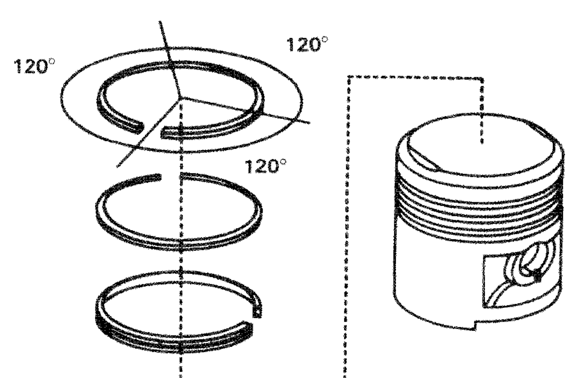
Align the tops of the pistons and install the piston bases with the concave edges downward.

CAUTION: Do not rotate the crankshaft further than is required to align the tops of the pistons or the right side pistons may strike open valves.

NOTE: The tops of the pistons should already be aligned because you rotated the crankshaft 90° after removing the timing belts (page 10-8).

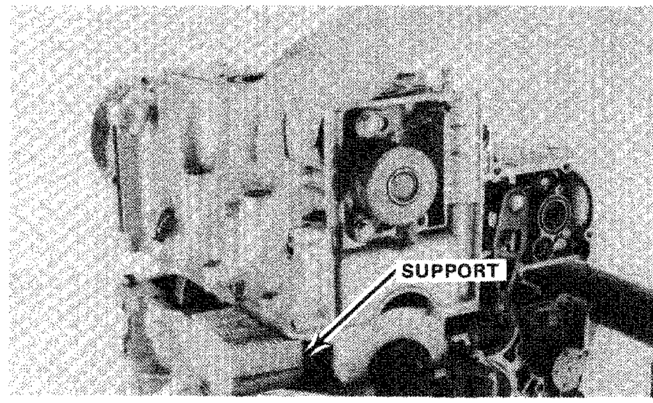


Make sure the piston ring end gaps are staggered as shown.



Place two crankcase supports opposite each other on the crankcase mating surface.

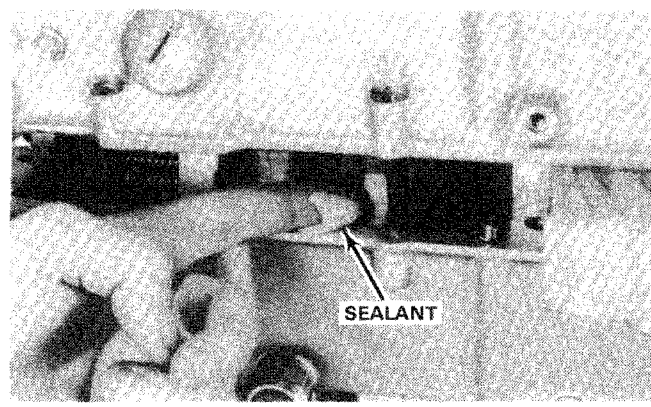
Lubricate the cylinder walls with engine oil and lower the left case until it rests on the supports. Engage the shift arm with the shift drum.



Apply sealant to the engine case mating surfaces.

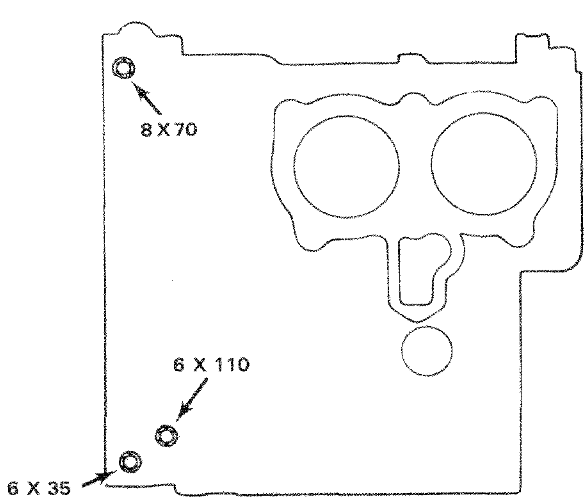
Remove the piston bases and crankcase supports and seat the cases.

NOTE: Be sure to apply sealant to where the crankcase supports were.

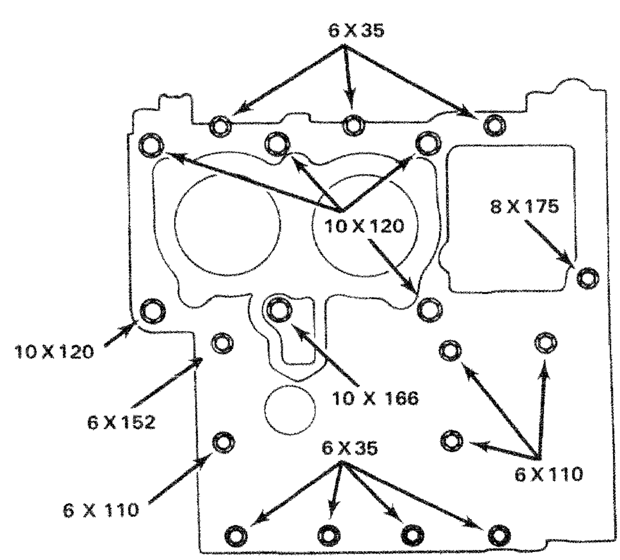


Coat all case bolts (threads and under heads) with molybdenum disulfide grease. Tighten the case bolts to the specified torque. Use a crisscross pattern sequence when tightening the 10 mm bolts.

Torque:
10 mm 35 N·m (25 ft-lb)
8 mm 27 N·m (20 ft-lb)
6 mm 12 N·m (9 ft-lb)



RIGHT ENGINE CASE



LEFT ENGINE CASE

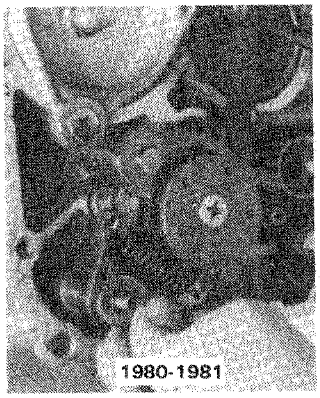
(cont'd)

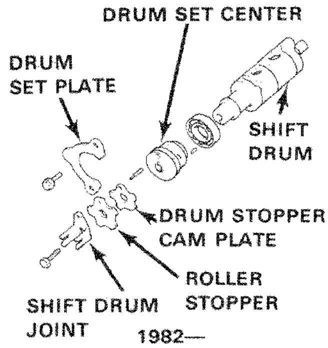
Transmission

Engine Case Reassembly (cont'd)

Install the positive stopper, shift drum stopper, and neutral stopper.

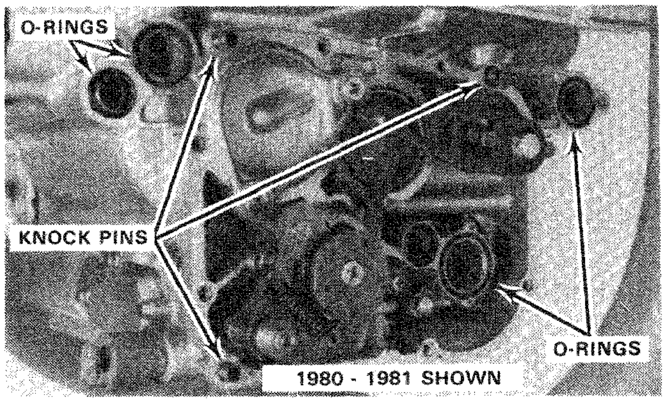
Shift the transmission to be sure it engages in all the gears.





Be sure the O-rings and knock pins are in their correct locations and install the front engine cover.

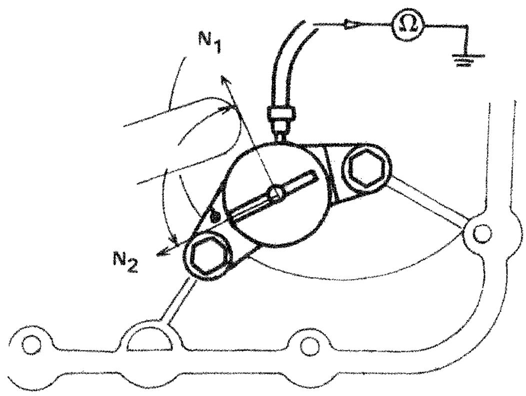
NOTE: If the cover does not seat against the engine case, rotate the water pump shaft until it engages.



1982— :
CAUTION: The neutral switch must be in the proper position before installing the front engine cover. Check for continuity between the switch wire and the front engine cover with an ohmmeter.

1982— : Black wire.
1983— : Light green /Red wire.

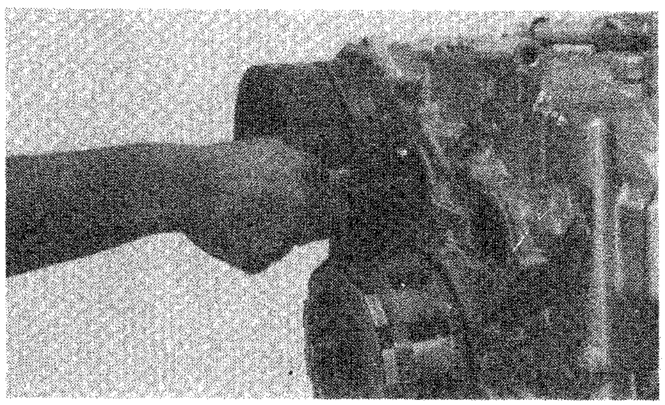
Move the spring pin in a 90° range between N1 and N2. If the needle of the ohmmeter moves, the switch is in the proper position. If the needle does not move, rotate the spring pin 180° and re-check for continuity.



Install the scavenge pump sprocket and tighten the bolt securely.

Install the mechanical advancer drive shaft and install the engine rear cover.

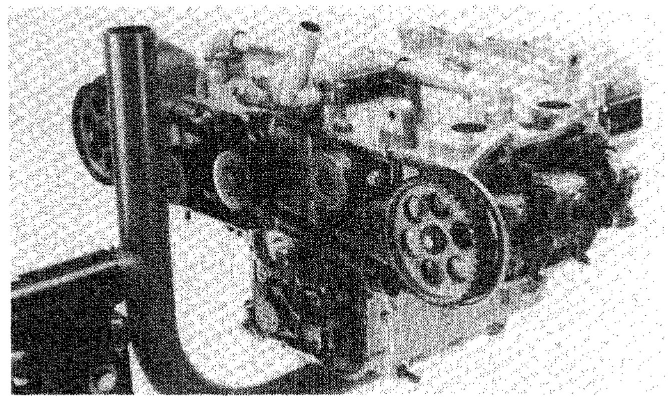
Install the alternator drive assembly, if it was removed, and adjust the backlash. Refer to page 16-11.

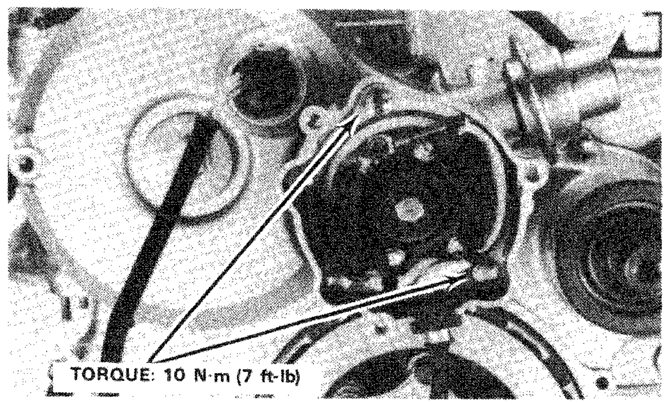


Install the cylinder head and timing belts. Refer to Section 7.

Install the coolant tubes.

Install the starter motor.





Insert the locating pin in the shaft and install the mechanical advancer.

Install the vacuum advance mechanism and tighten the mounting bolts to the specified torque.

CAUTION: Overtightening the vacuum advance mechanism mounting bolts may distort the case and cause faulty vacuum controller operation.

Be sure the pulse air gap is 0.50 - 0.70 mm (0.020 - 0.028 in).

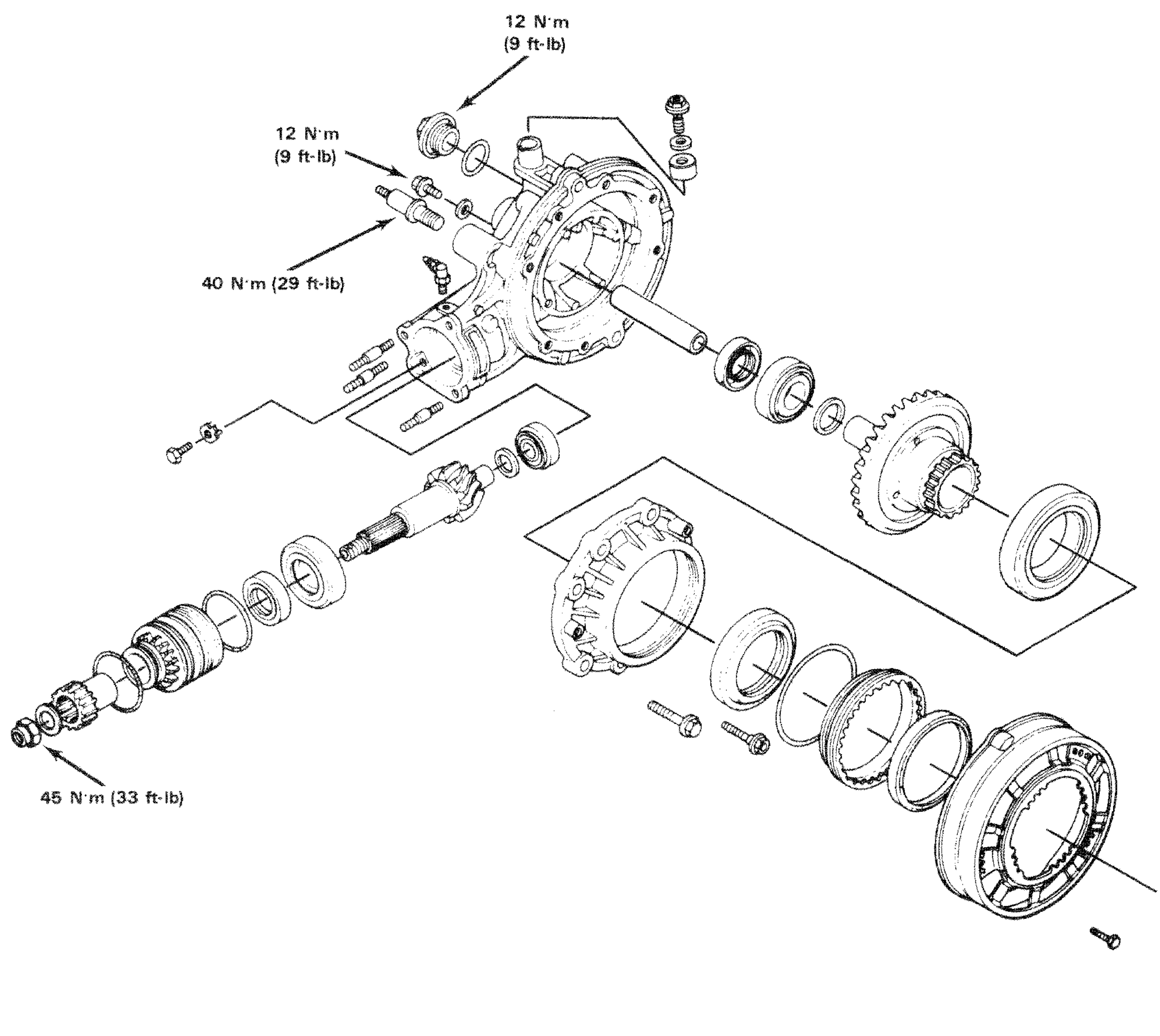
Install the engine into the frame. Refer to Section 6.

Final Drive

Final Drive

Service Information

- The final drive gear assembly must be removed for:
  Backlash inspection.
  Oil seal and O-ring replacement.
- Replace all oil seals and O-rings whenever the final drive gear assembly is disassembled.
- Refer to Section 3 for final drive gear oil check/replacement.



Torque Values

Gear case cover bolts	8 mm:	26 N·m (19 ft-lb)
	10 mm:	40 N·m (29 ft-lb)
Rear axle nut		90 N·m (65 ft-lb)
Axle pinch bolt		27 N·m (20 ft-lb)
Shock absorbers		35 N·m (25 ft-lb)

Troubleshooting

Rear Wheel Will Not Rotate Freely
- Rear brake dragging.
- Rear axle bent.
- Bent swingarm.
- Damaged wheel bearing.
- Excessive final gear assembly preload.
- Damaged ring and pinion gear bearings.

Excessive Noise
- Low oil level.
- Damaged driven flange and wheel hub.
- Excessive pinion and ring gear backlash.
- Damaged drive spline.
- Worn or damaged ring gear shaft and driven flange.
- Worn pinion and ring gears.

Oil Leak
- Oil level too high.
- Clogged hub breather.
- Seals damaged.

Final Drive

Final Gear Case Removal

Place the motorcycle on its center stand.

Loosen final gear case attaching nuts.

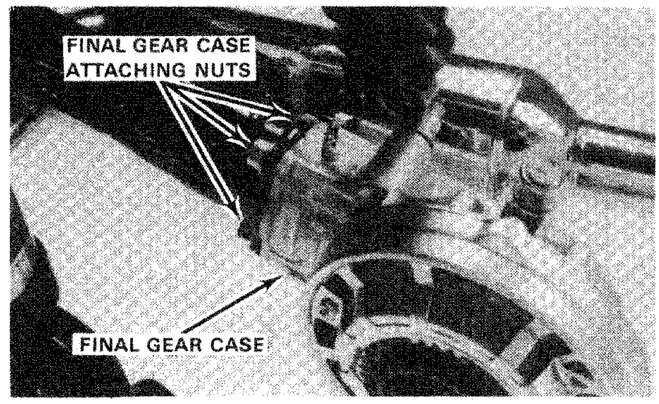
Remove the rear wheel (page 14-5).

Remove the gear case attaching nuts.

Disconnect the shock absorber from the case.

Remove the final gear case from the swingarm.

Drain the final gear case oil if disassembling the gear case.



Backlash Inspection

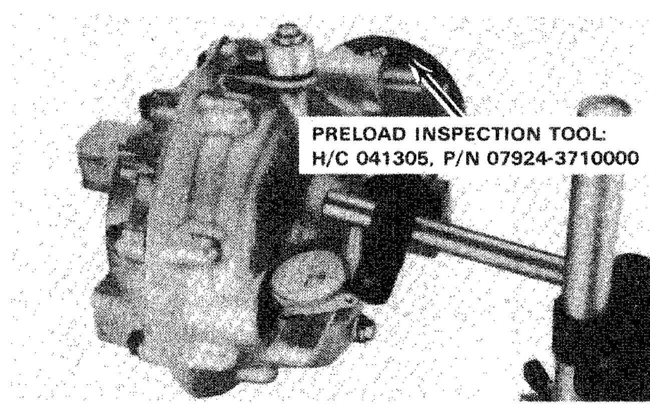
Remove the oil filler cap.

Set a horizontal type dial indicator on the ring gear, through the oil filler hole.

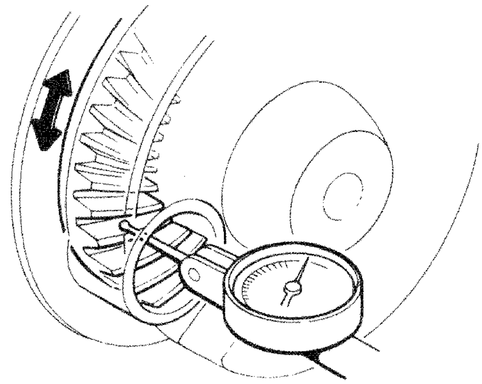
Install the preload inspection tool, then rotate the ring gear until slack is taken up.

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 (0.012 in)**



Remove the preload inspection tool and dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more. Compare the difference of the three measurements.

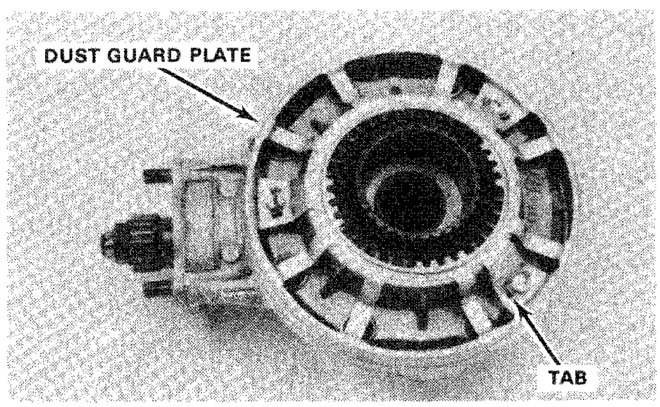


Difference of Measurement
Service Limit: 0.10 mm (0.004 in)

If backlash is excessive, check the pinion gear and ring and pinion preload (pages 11-11, 11-12). If preload is correct, the final drive assembly must be replaced (page 11-14).

Oil Seal Removal/Installation

NOTE: Replace all final gear case oil seals and O-rings whenever the case is disassembled.



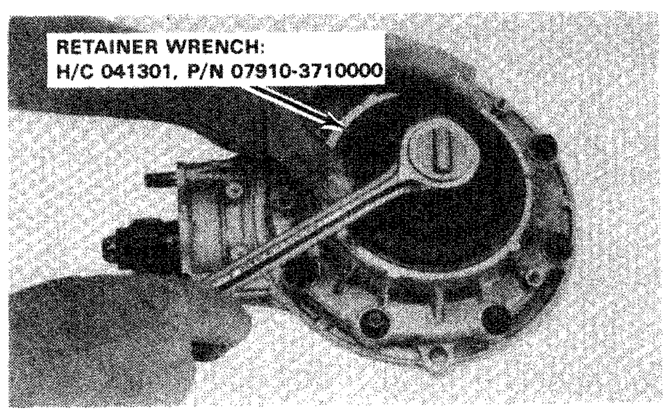
Ring Gear Bearing Retainer

Remove the final gear case assembly from the motorcycle (page 11-4).

Remove the distance collar.

Straighten the dust guard plate lock washer tabs and remove the dust guard plate.

Remove the ring gear bearing retainer with the retainer wrench.



Remove the O-ring.

(cont'd)

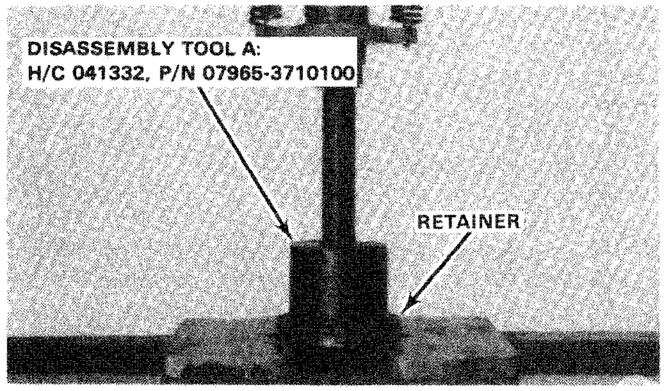
Final Drive

Oil Seal Removal/Installation (cont'd)

Remove the dust and oil seals from the retainer with a press and special tools.

Coat the outer edges of both seals with gear oil.

Press the new seals into the retainer.

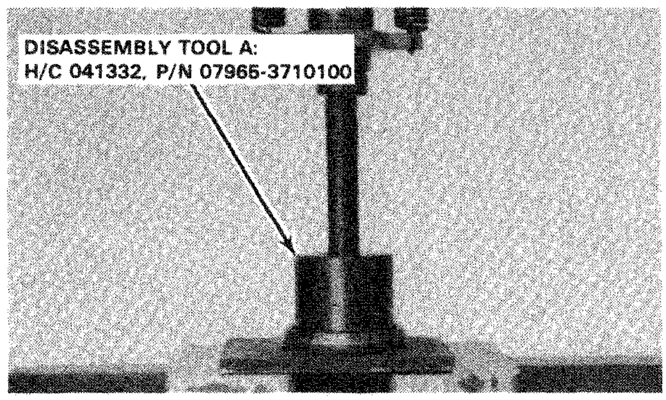


Coat the new O-ring with gear oil and install it.

Install the ring gear bearing retainer being careful not to fold or damage the oil seal lips.

NOTE: After installing the ring gear bearing preload retainer, do the following:

- Final gear assembly preload check (page 11-12).
- Backlash inspection (page 11-4).

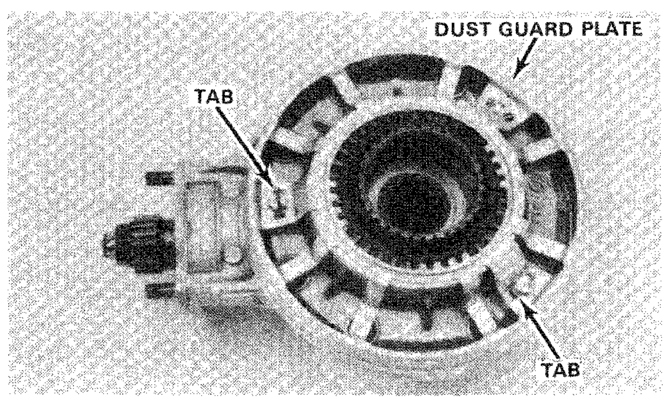


Gear Case

Remove the final gear case assembly from the motorcycle (page 11-4).

Remove the distance collar.

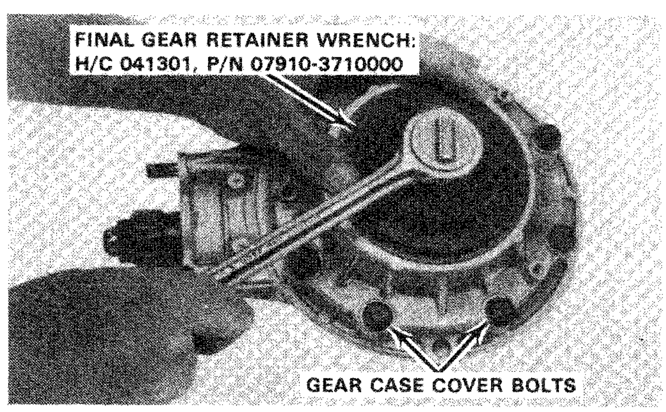
Straighten the dust guard plate lock washer tabs and remove the dust guard plate.



Loosen the ring gear bearing preload retainer 5 notches with the retainer wrench.

Remove the eight gear case bolts.

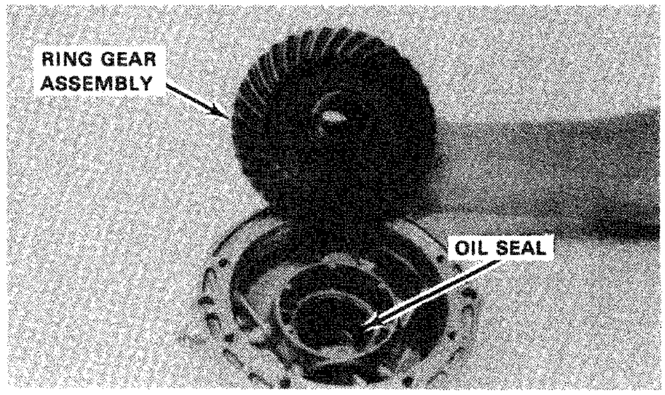
Lift the gear case cover from the gear case.



Remove the ring gear assembly.

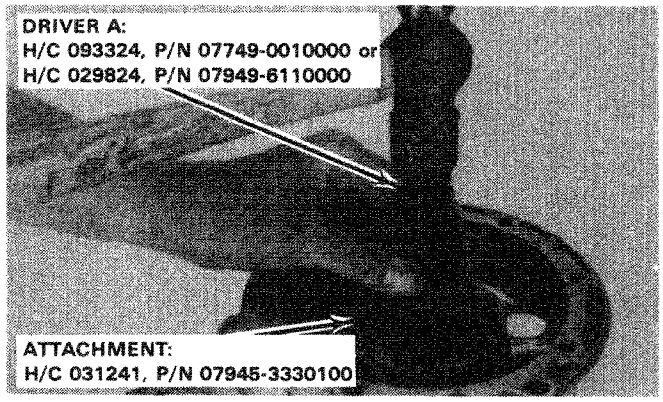
Remove the gear case oil seal.

CAUTION: Be careful not to damage the case during seal removal.



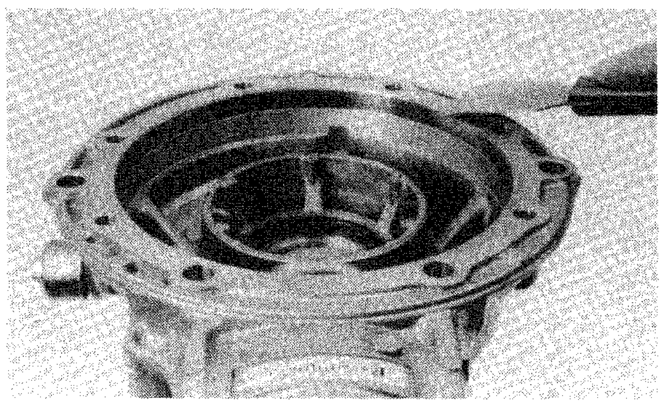
Coat the new oil seal with gear oil.

Install the oil seal squarely into the case being careful not to damage the bearing race.

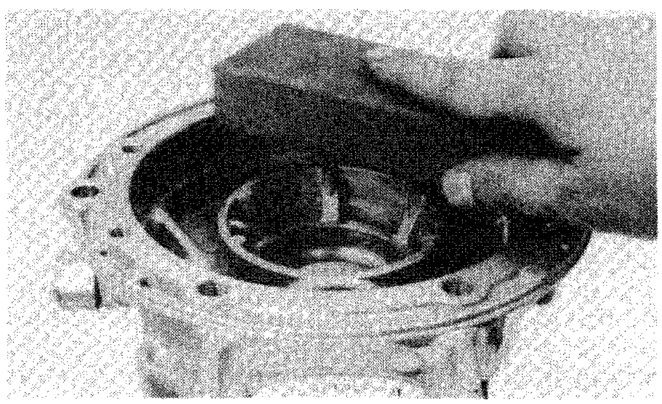


Remove the old sealant from the gear case and cover surfaces.

NOTE:
- Keep the gear case clean.
- Be careful not to damage the gear case and cover mating surfaces.



Clean the gear case and cover mating surfaces with an oil stone.

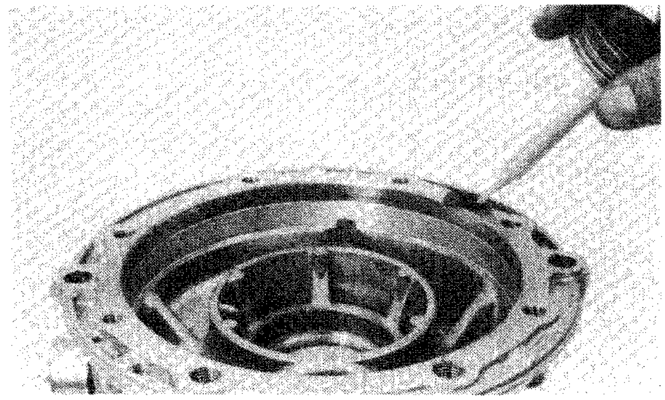


(cont'd)

Final Drive

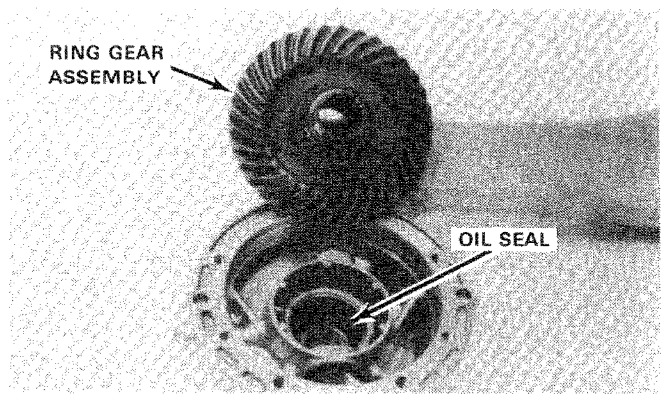
Oil Seal Removal/Installation (cont'd)

Apply a liquid sealant to the gear case and cover mating surfaces.



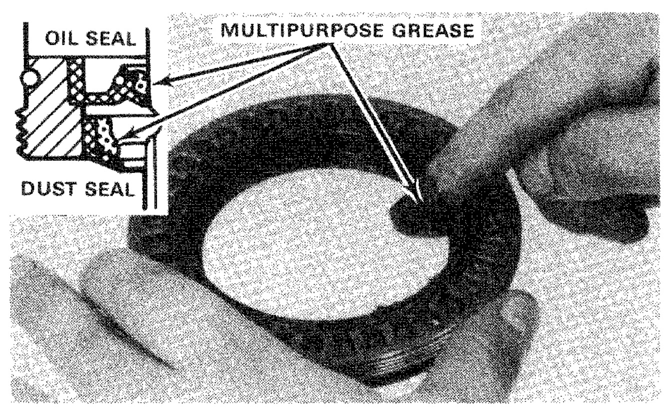
Coat the oil seal lips with multipurpose grease.

Install the ring gear assembly, being careful not to damage or fold the oil seal lips.

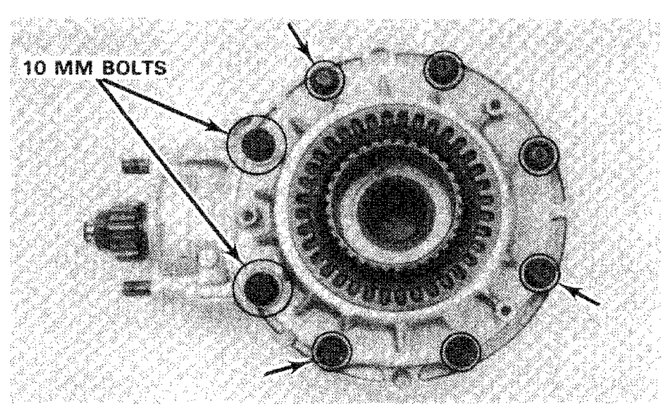


Fill the ring gear bearing retainer oil and dust seals with multipurpose NLGI No. 2 grease (MOS2 - additive).

Place the gear case cover onto the final gear case.



Insert the gear case cover bolts, positioning the three bolts with the symbol "→" on the photo at the locations shown. Alternately tighten these bolts until the case cover touches the gear case. Then tighten all eight bolts in a crisscross pattern.



Torque:
8 mm bolts: 26 N·m (19 ft-lb)
10 mm bolts: 40 N·m (29 ft-lb)

NOTE: After installing the gear case cover, do the following:
- Final gear assembly preload check (page 11-12).
- Backlash inspection (page 11-4).

Pinion Gear Retainer

Remove the final gear case assembly from the motorcycle (page 11-4).

Remove the distance collar.

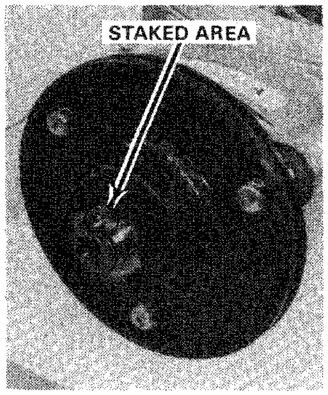
Install the preload inspection tool onto the pinion shaft.

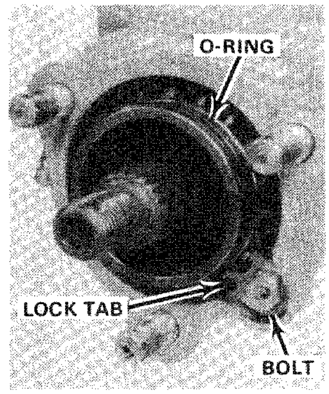
Preload Inspection Tool
H/C 041305
P/N 07924-3710000

Remove the pinion shaft nut and washer.

NOTE: The nut can be removed without grinding off the staked area.

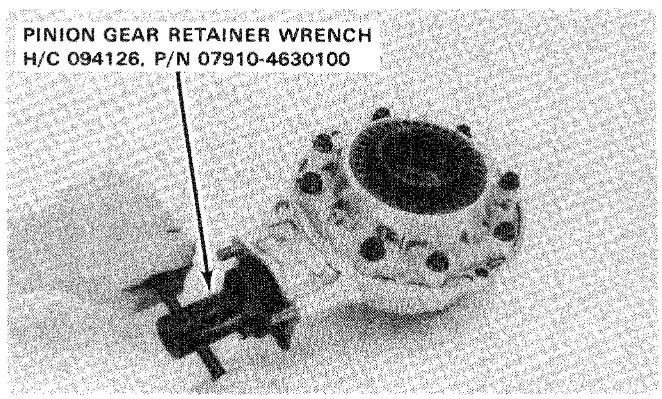
Remove the retainer special O-ring and retainer lock tab.





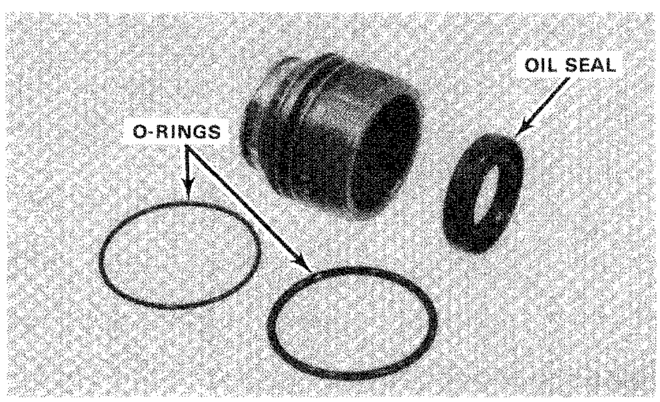
Remove the inspection tool and pinion joint.

Remove the pinion retainer with the pinion gear retainer wrench.



Remove the retainer oil seal and O-rings.

Coat the new O-rings with lithium based multipurpose NLGI No. 2 grease and install them onto the retainer.

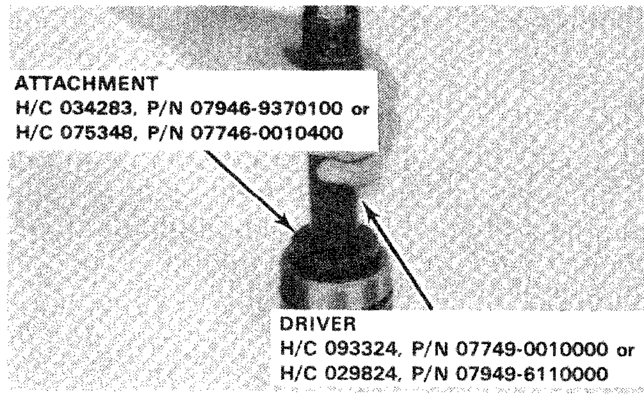


(cont'd)

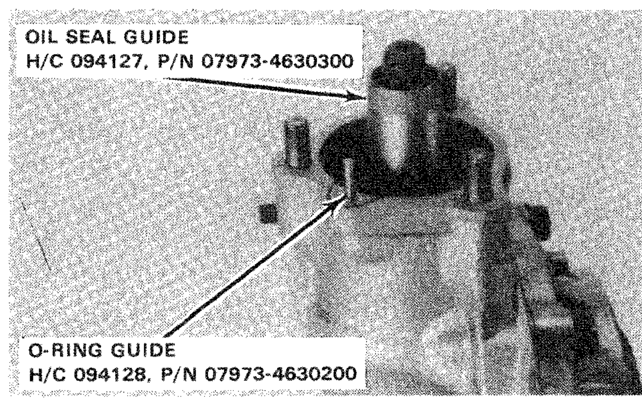
Final Drive

Oil Seal Removal/Installation (cont'd)

Fill the new oil seal groove with lithium based multipurpose NLGI No. 2 grease. Install the oil seal into the retainer with the driver attachment.



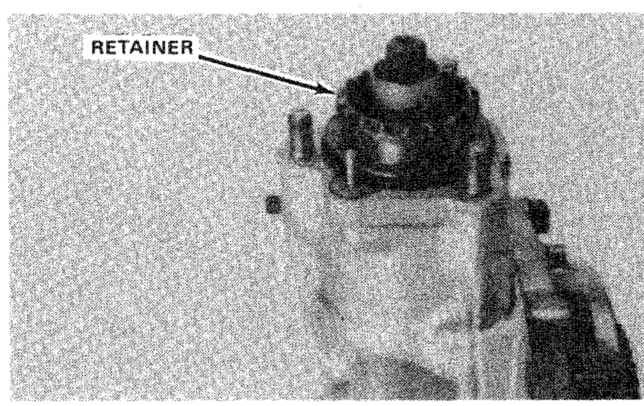
Set the O-ring guide into the gear case cutout, and oil seal guide over the pinion shaft.



Push the retainer into place with the retainer wrench until the oil seal guide is contacted.

CAUTION:
- **Be careful not to damage the O-rings.**
- **The retainer has very fine threads, so be careful not to cross-thread it.**

Remove the oil seal guide.

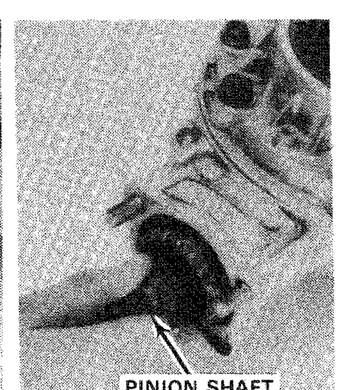


Thread the retainer into the case by hand. Turn the pinion shaft intermittently. Stop tightening the retainer when pinion shaft rotating resistance is felt. Do not overtighten the retainer.

Remove the O-ring guide.

NOTE:
- If the retainer is overtightened, it will cause excessive preload.
- A high amount of drag is normal because of the O-rings.

Check the pinion gear preload (page 11-11).



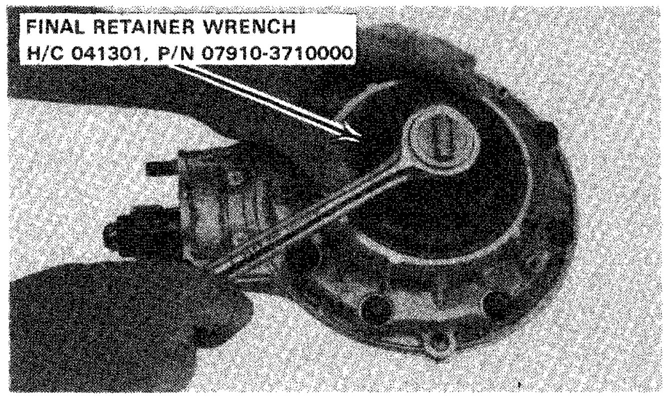
Preload Adjustment

NOTE: Use this procedure whenever the pinion gear retainer is removed.

Remove the dust guard plate, bearing retainer, and gear case cover.

Remove the ring gear assembly.

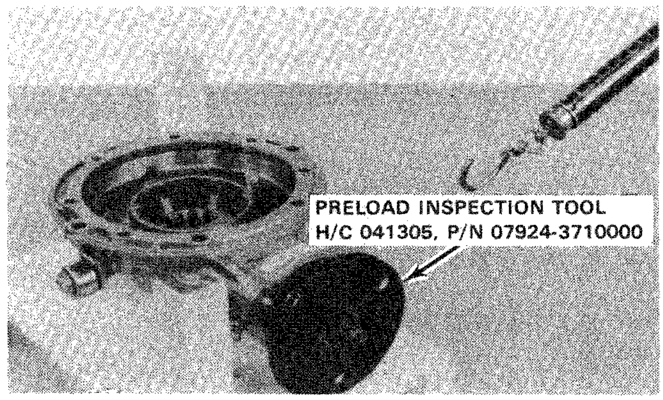
Slip the preload inspection tool onto the pinion gear shaft.



Wrap the wire around the tool groove and attach a spring scale. Measure the preload force needed to turn the pinion shaft in the normal direction of rotation.

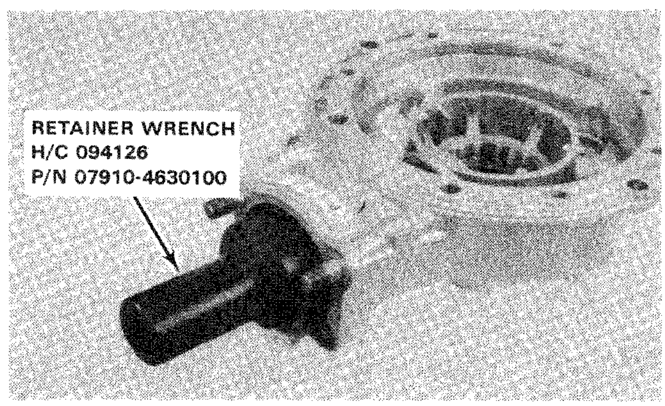
Pinion Gear Preload:
1,000 - 1,200 g (2.2 - 2.7 lb)
5.0 - 6.0 kg-cm (4.3 - 5.2 in-lb)

NOTE:
- If measurements are not consistant, rotate the pinion gear 50 - 60 turns, then check preload.
- Force required to begin movement may exceed preload specifications.



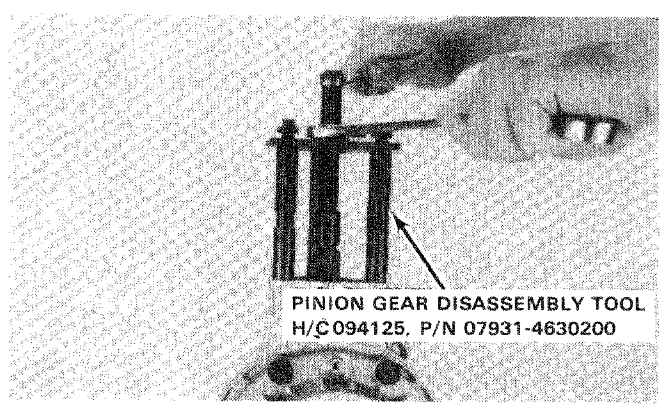
If preload is insufficient, remove the preload inspection tool, then install pinion gear retainer wrench and tighten retainer.

Recheck the pinion gear preload.



If preload is excessive, remove the preload inspection tool, then install the pinion gear retainer wrench and loosen retainer.

Pull up on pinion shaft with special tool, then recheck pinion preload.



(cont'd)

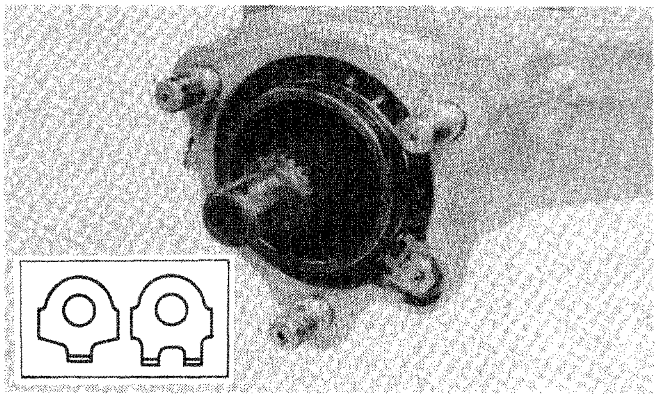
Final Drive

Preload Adjustment (cont'd)

After pinion preload adjustment, install the proper retainer lock tab. There are two types.

Install the ring gear assembly (page 11-8).

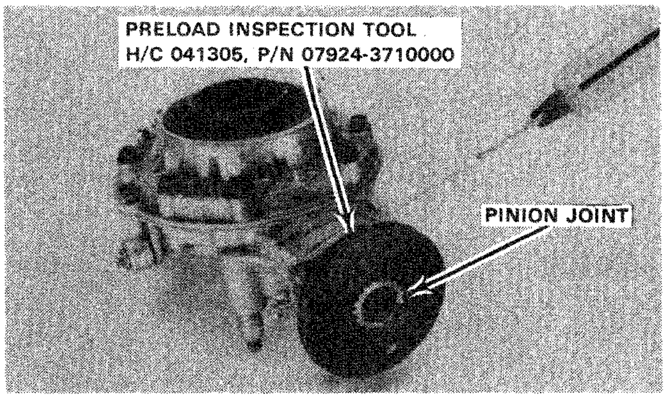
Install the ring gear assembly, gear case cover, and bearing retainer.



NOTE: Use this procedure whenever the ring gear bearing retainer is removed, or if final gear assembly preload is being checked.

Slip the preload inspection tool onto the pinion gear shaft.

Wrap the wire around the tool groove and attach a spring scale. Measure the preload force needed to turn the pinion shaft in the normal direction of rotation.



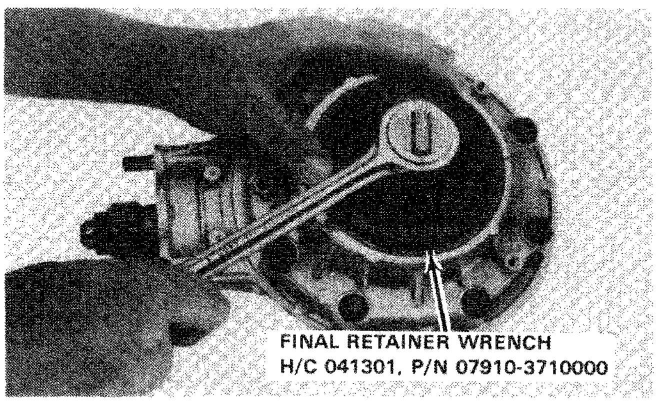
Ring and Pinion Preload:

1,800 - 2,300 g (4 - 5 lb)
9.0 - 11.5 kg-cm (7.8 - 10.0 in-lb)

NOTE: Force required to begin movement may exceed preload specifications.

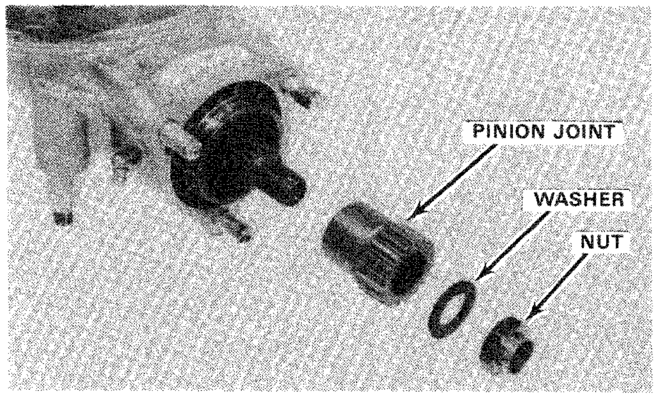
Tighten or loosen the ring gear retainer as required to obtain the correct preload.

Recheck gear preload.



Apply lithium based multipurpose NLGI No. 2 grease (MOS2 - additive) to the pinion shaft and inside of the pinion joint.

Install the pinion joint, washer and 16 mm nut.

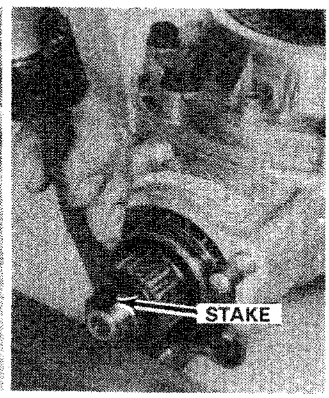


Install the preload inspection tool to hold the pinion shaft, and tighten the nut.

Torque: 45 N·m (33 ft-lb)

Stake the nut to a minimum depth of 1 mm (0.04 in) at the two locations.

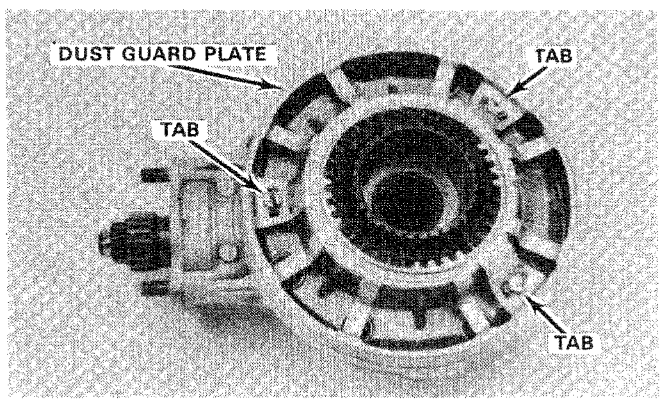
CAUTION: Be careful not to damage the pinion shaft threads.



Install the dust guard plate and bend the three lock tabs up.

Bend one of the bearing retainer lock tabs as shown.

Install the distance collar.



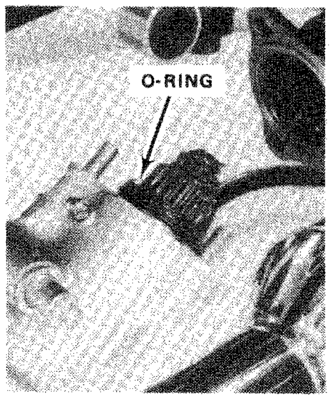
Final Drive

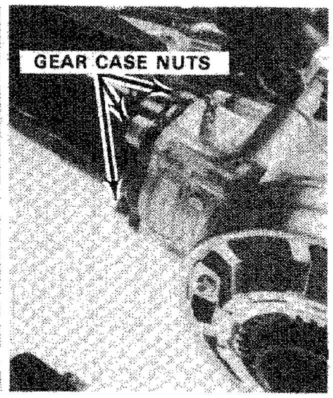
Final Gear Installation

Apply lithium based multipurpose NLGI No. 2 (MOS2 - additive) grease to the drive and pinion shaft splines.

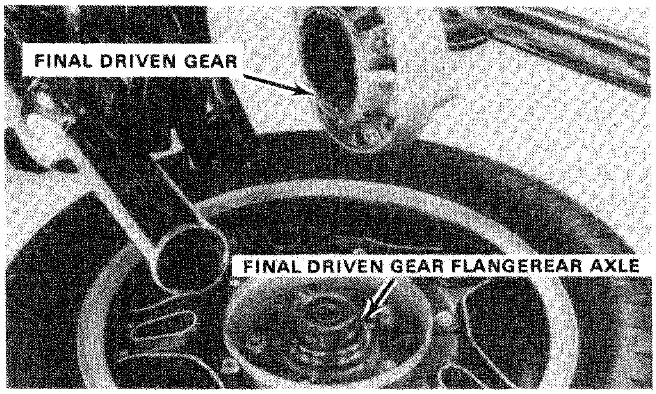
Be sure the special O-ring is on the pinion gear retainer and install the gear case on the swingarm loosely.

NOTE: To ease axle installation, do not tighten the gear case nuts until after the axle and axle nut have been installed and properly torqued.

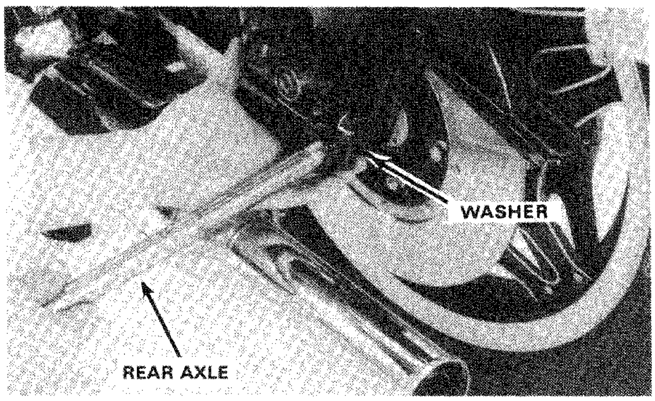




Apply lithium based multipurpose NLGI No. 2 (MOS2 - additive) grease to the damper pins, final driven gear's inner surface and splines, and to the final driven gear flange splines.



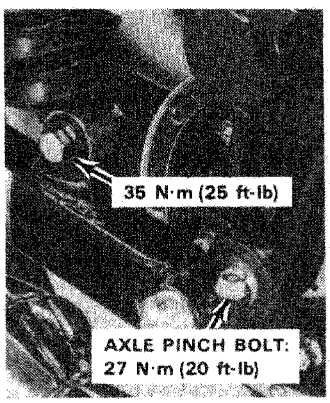
Coat the rear axle with lithium based multipurpose grease and install the rear wheel (page 14-12).

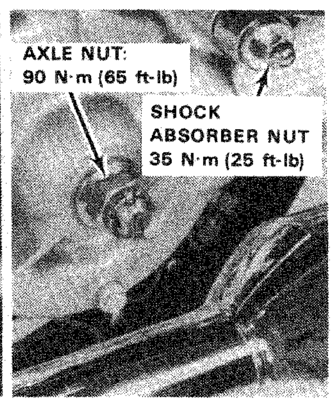


Torque the rear axle nut to 90 N·m (65 ft-lb) and install a new cotter pin.
Torque the gear case nuts to 40 N·m (29 ft-lb).

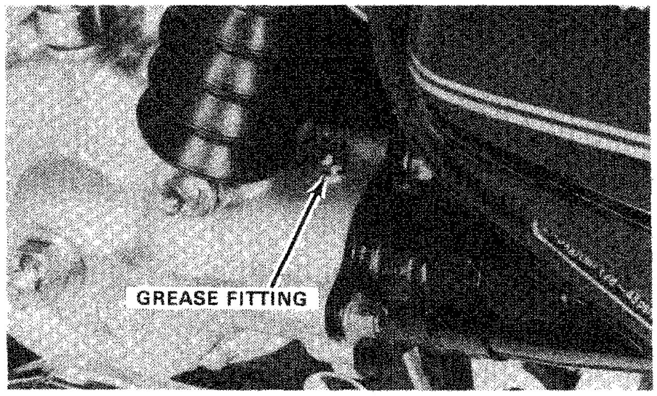
Torque the axle pinch bolt.

Install the rear shock absorbers.





Pump lithium based multipurpose NLGI No. 2 (MOS2 - additive) grease into the driveshaft joint grease fitting.

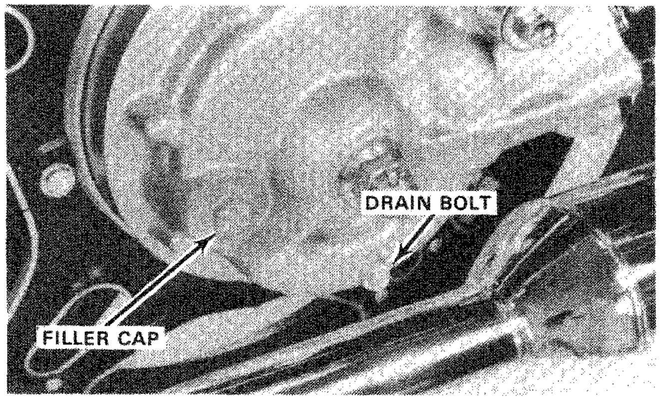


Make sure the final drive drain bolt is tight.

Remove the oil filler cap.

Add the recommended lubricant until it reaches the filler neck threads.

Recommended Lubricant:	**Hypoid Gear Oil, API, GL-5**
	SAE 90 above 5°C (41°F)
	SAE 80 below 5°C (41°F)
Capacity:	**140 - 160 cc**
	(4.7 - 5.4 oz)

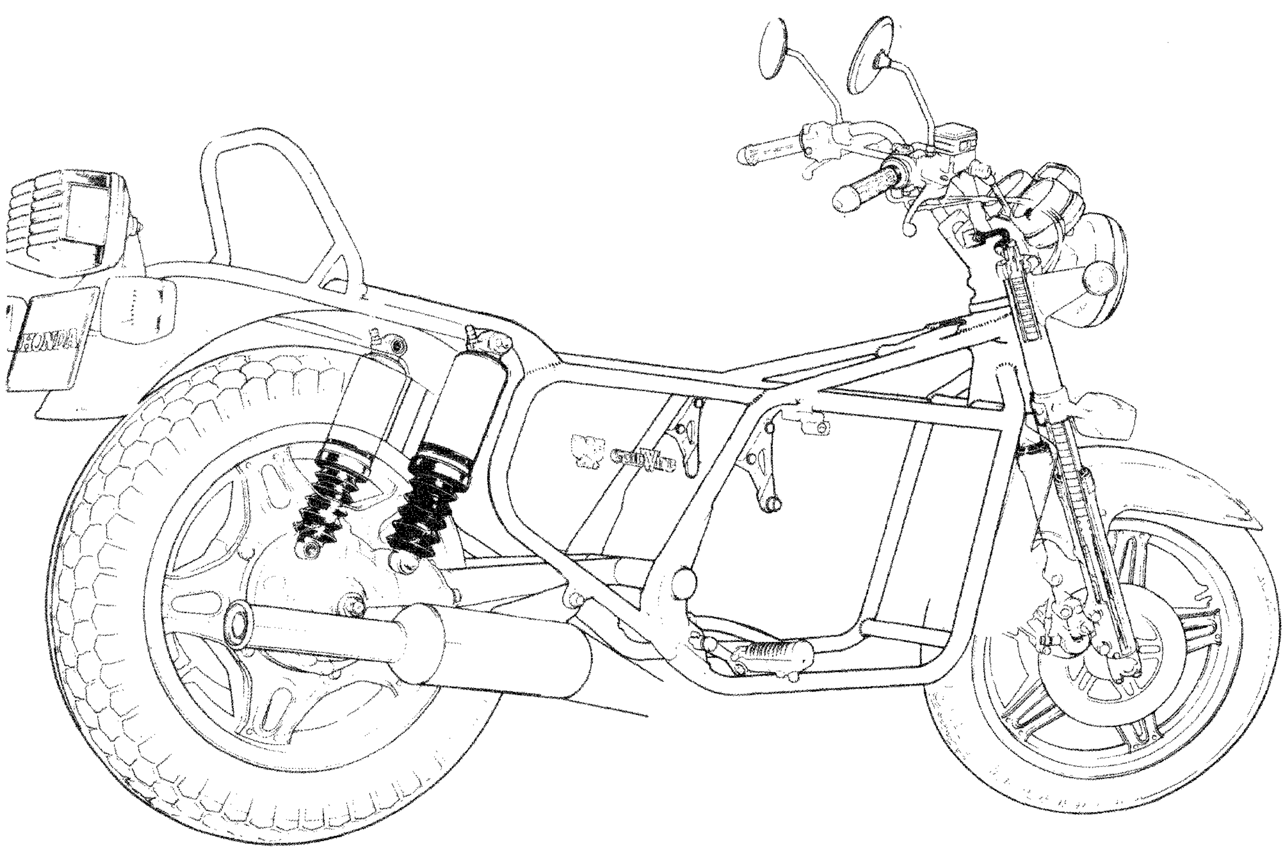


Frame and Suspension

Frame and Suspension

Service Information

- Refer to Section 3, Maintenance, for suspension inspection procedures.
- Removal and installation of the instruments, fork top bridge, headlight housing, and headlight brackets are included in the steering stem removal and installation procedure.
- Muffler removal and installation is included in "Center Stand Inspection and Replacement".
- If the motorcycle has been involved in an accident, the frame should be inspected very carefully at the steering head and at the engine mounts, as these are the areas that are most likely to suffer damage.
- Always replace a bent handlebar or bent forks; straightening them will weaken the material.



Torque Values

Item	Thread Dia. (mm)	N·m	ft-lb
Steering head bearing adjust nut	26	15	11
Steering head top thread (B)	26	0	0
Steering stem nut	24	100	72
Handlebar upper holder socket bolt	8	22	16
Fork upper pinch bolt	8	22	16
Top bridge pinch bolt/nut	7	11	8
Fork lower pinch bolt	8	35	25
Fork cap	34	23	17
Air hose fitting	8	6	4
Air valve	8	6	4
Fork joint hose (Lt. end)	10	18	13
Fork hose joint (Rt. end)	8	6	4
Front axle holder			
1980-1982	10	35	25
1983—	8	22	16
Front axle nut	12	58	42
Fork piston socket bolt	8	20	14
Front caliper bracket mount bolt			
1980-1982	10	35	25
1983— Upper/lower		40/23	29/17
Front caliper bolt			
1980-1981	8	18	13
1982—	8	23	17
Caliper pivot bolt 1983—		28	20
Front master cylinder holder bolt	6	10	7
Brake hose oil bolt	10	30	22
Brake hose 2-way joint bolt	6	12	9
Rear wheel axle nut	18	90	65
Rear caliper torque link	8	22	16
Rear master cylinder attaching bolt	8	27	20
Brake fluid reservoir attaching bolt	6	12	9
Rear brake hose oil bolt	10	30	22
Metal brake line nuts 1983—		9	6
Brake rod joint lock nut	8	18	13
Rear caliper bolt	8	18	13
Rear axle pinch bolt	8	27	20
Final gear case attaching nut	10	40	29
Swingarm pivot bolt (right)	30	100	72
Swingarm pivot bolt (left)	30	18	13
Swingarm pivot lock nut	30	100	72
Rear shock absorber bolt and nut	10	35	25
Air hose connector (to 3-way joint)	8	10	7
Air hose joint	10	18	13
Air hose joint	8	6	4
Air pressure sensor	—	10	7
Air hose joint	10	6	4
Air hose joint (Aspencade	12	11	8
Air hose joint bolt on-board air	6	10	7
Air hose joint bolt compressor system)	10	10	7
Connector	10	6	4
Lock nut	12	14	10

(cont'd)

Service Information (cont'd)

Torque Values (cont'd)

Item	Thread Dia. (mm)	N·m	ft-lb
Engine mount bolt	12	60	43
Engine mount bolt	10	35	25
Engine mount bolt	8	22	16
Exhaust pipe nut	8	18	13
Footpeg bracket bolt and nut	12	60	43
Passenger footpeg bolt	10	40	29
Muffler mount bolt	10	40	29
Rear fender mounting bolt	8	14	10
Headlight case mount bolt	10	22	16
Side stand pivot bolt	10	22	16
Center stand pinch bolt/nut	8	22	16
Exhaust muffler joint band	8	22	16

Troubleshooting

Wobble or Vibration
- Loose axle (front or rear).
- Loose wheel bearings.
- Loose steering stem nut or bearings.
- Loose lock nut(s) on swingarm pivot bolt(s).
- Unbalanced tire and wheel.
- Bent wheel.
- Excessive lateral runout in wheel.
- Bent forks.
- Bent swingarm.
- Bent or cracked frame.
- Loose engine mounts.

Hard Steering
- Low tire pressure.
- Steering stem nut too tight.
- Faulty steering stem bearings.
- Insufficient lubrication in steering stem bearings.
- Steering stem bent.
- Cables or harness interfere with steering.

Steers to One Side or Does Not Track Straight
- Bent forks.
- Bent frame.
- Forks installed incorrectly.
- Axle installed incorrectly.
- Bent swingarm.
- Wheel installed incorrectly.

Hard Suspension
- Incorrect weight fluid in front forks.
- Clogged fork hydraulic passages.
- Fork sliders binding on fork legs.
- Swingarm binding.
- Rear shock rods bent or binding.
- Faulty rear shocks.
- Too much air pressure.
- Clogged anti-dive orifice 1983—.

Soft Suspension
- Incorrect weight fluid in front forks.
- Too much clearance inside forks.
- Borken fork spring(s).
- Broken rear spring(s).
- Faulty rear shocks.
- Insufficient air pressure.

Suspension Noise
- Incorrect fluid level in forks.
- Broken parts in forks.
- Steering stem nut too loose.
- Loose axle (front or rear).
- Faulty rear shocks or springs.
- Swingarm binding.

Front Forks Leaking
- Faulty fork seals.
- Too much fluid in forks.
- Incorrect weight fluid in forks.
- Too much clearance between seals and fork legs.
- Too much air pressure.

Frame and Suspension

Troubleshooting (cont'd)

On-Board Air Compressor System

Air Not Pumped to Suspension

- Check for air at the main valve.
  - **OK** → • Faulty main valve • Clogged hose (main valve-to-suspension)
  - **No** ↓
- Check for air at the three-way joint beneath the pressure gauge.
  - **OK** → Clogged hose (drier-to-main valve)
  - **No** ↓
- Check for air at the drier from the pump.
  - **OK** → • Clogged drier • Clogged hose (drier-to-three-way joint)
  - **No** ↓
- Check the pump operation.
  - **OK** → • Clogged hose (pump-to-drier) • Faulty one-way valve
  - **No** → • Faulty pump • Faulty pump switch • Faulty pump motor

Pump Does Not Operate

- Check the pump fuse (10A).
  - ↓
- Check for voltage at the pump fuse terminals with the ignition switch turned to the:
  "P" position - 1982
  "ON" position - 1983–
  - **No Voltage** → • Blown main fuse. • Broken wire harness • Faulty ignition switch
  - **OK** ↓
- Check the pump switch.
  Replace if necessary.
  - ↓
- Check for voltage at the pump terminals with ignition switch at:
  1982 "P" and pump switch depressed.
  1983– "ON" with Front/Rear selector button and pump switch depressed.
  - **No Voltage** → • Broken sub-harness • Faulty pump motor • Faulty pump relay • Faulty display selector switch • Faulty LCD unit
  - **OK** → Faulty pump

(cont'd)

Frame and Suspension

Troubleshooting (cont'd)

Gauge Needle Does Not Move (1982)

- Check for air pressure.
  - OK → Faulty gauge
  - No → Check the pump for proper operation.
    - No → Faulty pump
    - OK → Faulty gauge

NOTE: Refer to page 18-17 for 1983–LCD Air Pressure Gauge troubleshooting.

Air Will Not Release

- Check the relief valve operation.
  - Incorrect → Faulty relief valve
  - OK → Check the main valve.
    - Incorrect → Faulty main valve
    - Correct →
      - Clogged drier
      - Clogged air-hose (suspension-to-main valve, main valve-to-drier, drier-to-relief valve)
      - Clogged hose joint
      - Clogged three-way joint

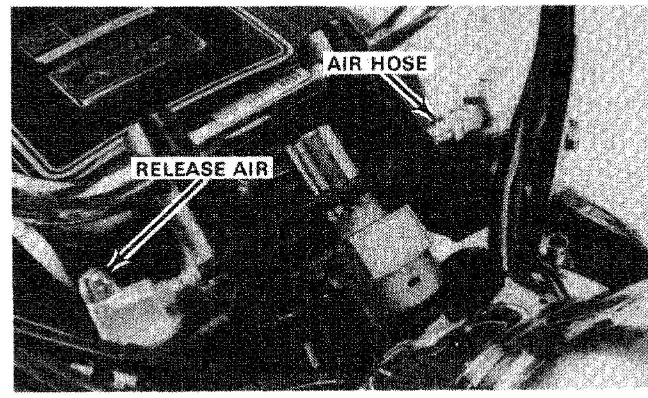
Front Fork Oil Replacement

Release front fork air pressure.

CAUTION: Be sure to release front fork air pressure before disassembling to prevent parts from becoming projectiles.

On Aspencade, depress the Suspension Selector (Front) button. Depress and hold the Air Pressure Decrease button until air pressure is completely released.

Disconnect the air hose from the left fork cap, then remove it from the right cap.



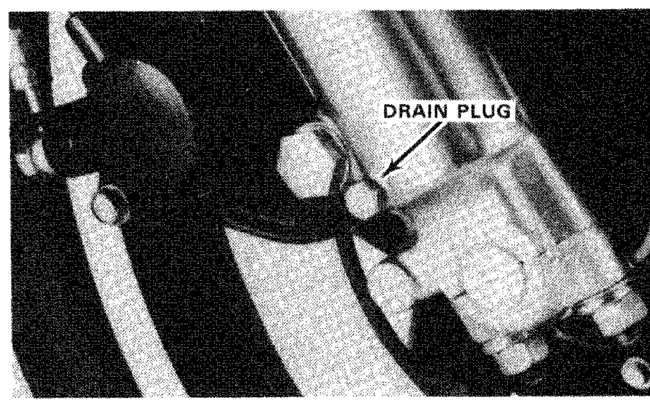
Place a drain pan below the fork and remove the drain plug.

NOTE: Drain and refill one fork at a time.

Work the suspension up and down to completely drain the fork.

Reinstall the drain plug.

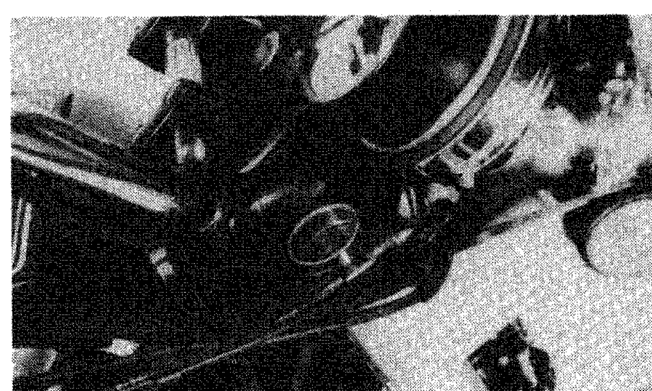
Raise the front wheel off the ground by placing a block under the engine.



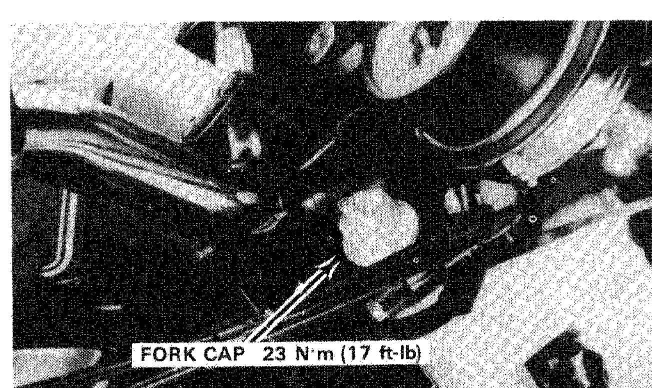
Remove the fork cap. Refill the fork with the specified amount of ATF.

NOTE: Removing the top fork spring will facilitate refilling the fork.

ATF Capacity (after draining):
1980–1981: 220 cc (7.4 oz)
1982— : 270 cc (9.1 oz)



Reinstall the cap and tighten to the specified torque.



(cont'd)

Frame and Suspension

Front Fork Oil Replacement (cont'd)

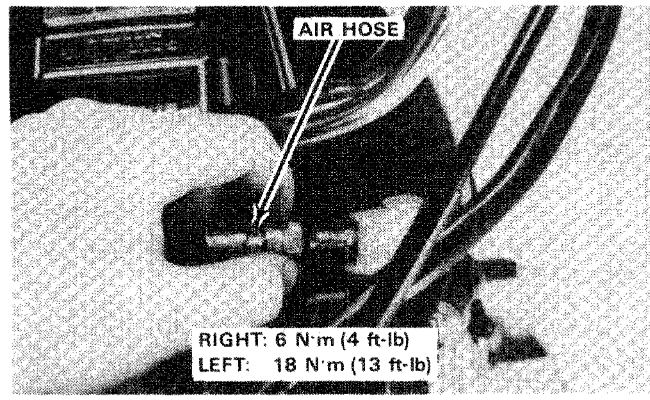
After draining and refilling both forks, install the air hose in the right fork cap. Tighten to the specified torque.

NOTE: Always replace used O-rings with new ones.

Install the air hose on the left fork cap fitting. Tighten to the specified torque.

Refill the forks with air.

Recommended Pressure: 1.0 – 1.5 kg/cm² (14 – 21 psi)



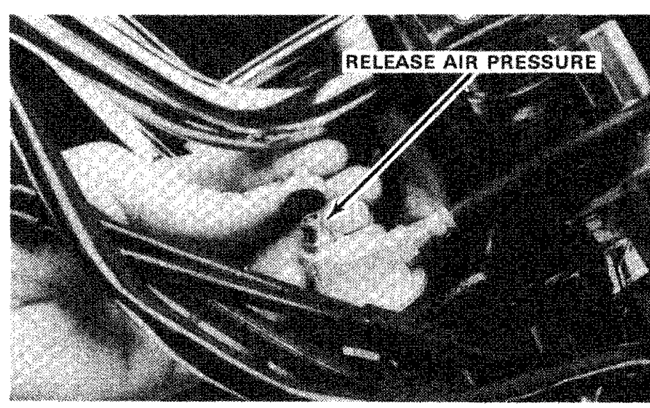
Front Fork Removal/Disassembly

Removal

Release front fork air pressure through the air valve located on the right fork cap on 1980-1982 models or on the left fork cap on 1983— models.

On Aspencade, depress the Suspension Selector (Front) button. Depress and hold the Air Pressure Decrease button until air pressure is completely released.

CAUTION: Be sure to release front fork air pressure before disassemblying to prevent parts from becoming projectiles.

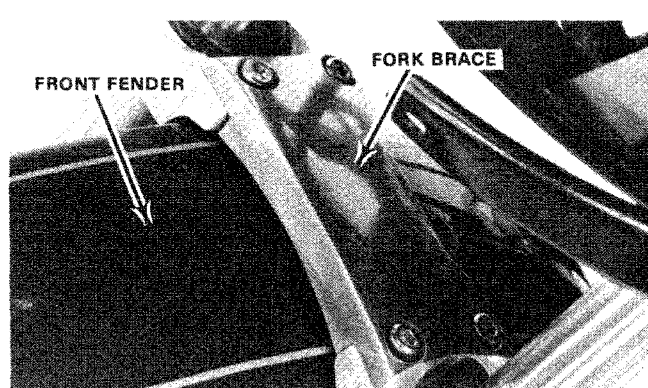


Remove the front wheel (page 14-4).

Remove the front brake calipers and front fender.

1983— :
Remove the fork brace.

Interstate and Aspencade:
Remove the steering weight.

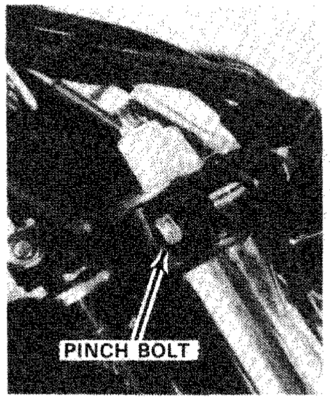


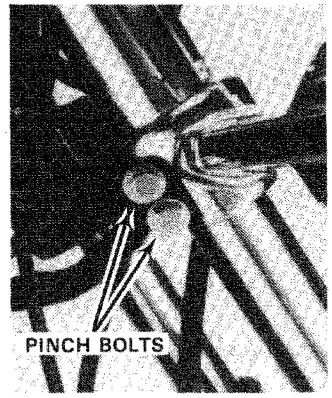
1980-1982:
Disconnect the air hose from the left fork cap, then remove it from the right cap. Remove the air hose fitting from the left fork cap.

1983— :
Disconnect the air hose from the right fork cap, then remove it from the left cap. Remove the air hose fitting from the right fork cap.

Interstate and Aspencade:
Remove the steering weight right and left side bracket bolts.

Loosen the top and bottom fork pinch bolts and slide the fork tubes out of the fork bridge.



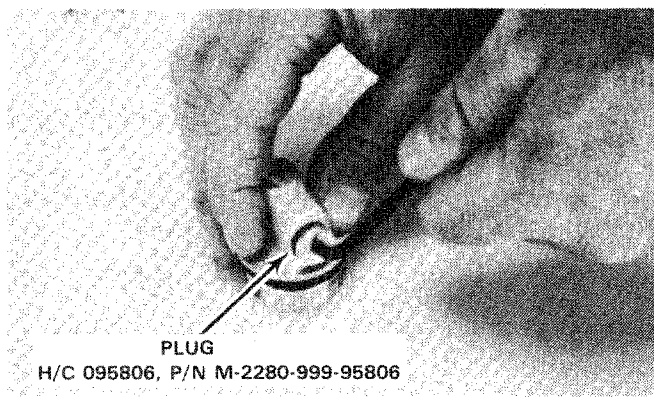


Disassembly

Seal Removal

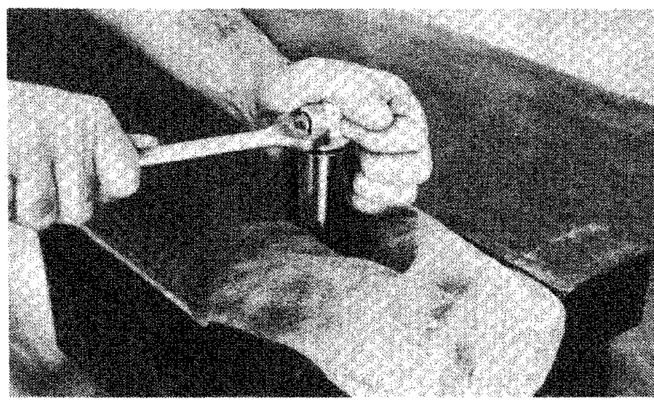
WARNING: The fork tube caps are under air and spring pressure. Front fork air pressure must be relieved and care used when removing the fork tube caps to prevent them from becoming projectiles. Wear eye and face protection.

1980-1982:
NOTE:
- Fork seal replacement does not require fork tube and slider separation.
- This procedure is for air-assisted forks only.



ALL MODELS:
Release air pressure and remove valve stem and hose connector (if applicable). Install the special plugs into the cap.

Place the fork tube into a vise with soft jaws or shop towel and loosen the fork tube cap, then remove it.



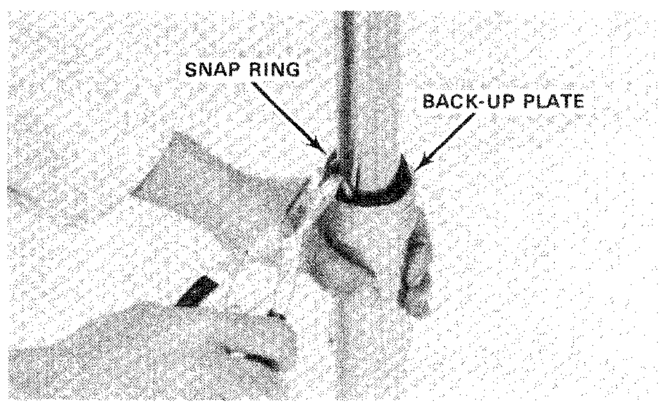
CAUTION: Do not damage the sliding surface.

1983— :
Seal removal is accomplished during fork separation. Therefore, refer to Fork Separation on page 12-10 for further front fork disassembly.

1980-1982:
Remove the oil seal dust cover and snap ring.

Remove the back-up plate with a magnet.

Extend the fork tube up all the way. Pour ATF into the fork tube up to the bottom of the cap threads and install the fork tube cap.



(cont'd)

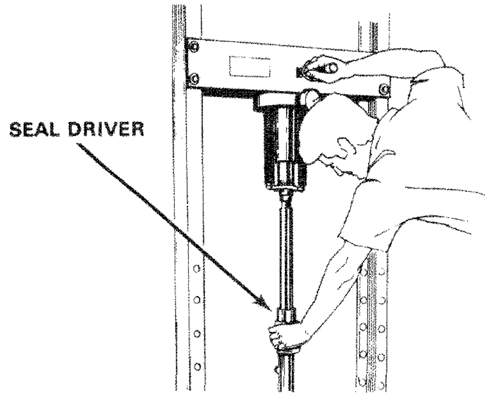
1980-1982:
Place the seal driver (H/C 096000, P/N 07947-4630100) over the fork tube. Wrap a shop towel around the seal area.

Compress the fork tube with a hydraulic press until the fork seal is forced out. Hold the driver against the seal during removal to keep it from tilting.

Remove the cap tool and seal and pour the ATF out.

NOTE: For seal installation see page 12-16.

Remove the back-up ring with a magnet.



Fork Separation

Remove the fork springs and spacer.

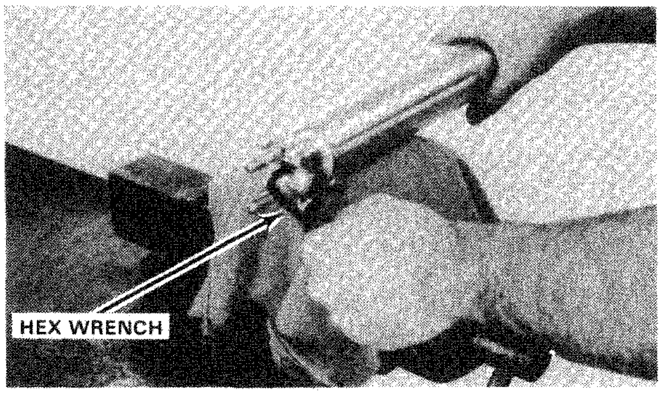
Pour out the fork fluid by pumping the fork up and down several times.

Place the fork slider in a vise with soft jaws or a shop towel. Clamp onto the brake caliper mounting bosses.

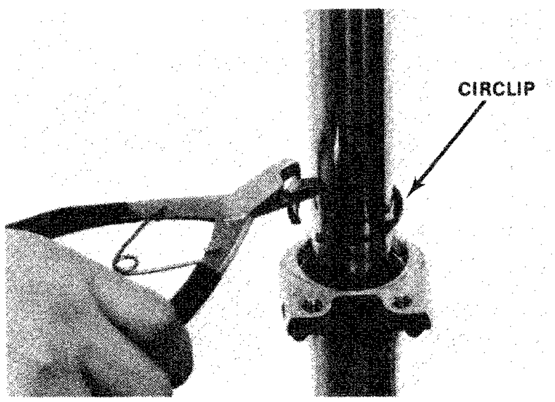
CAUTION: Do not distort the slider in the vise.

Remove the socket bolt with a hex wrench and pump the remaining ATF out through the socket bolt hole.

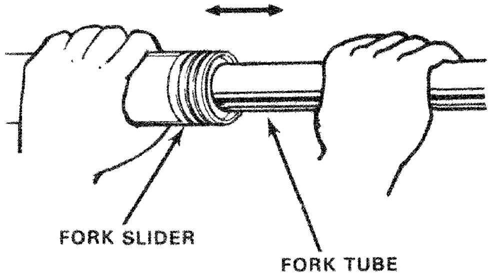
NOTE: Temporarily install the springs and fork cap if difficulty is encountered in removing the bolt.



1983— :
Remove the dust cover, foam washer, plastic washer and circlip.



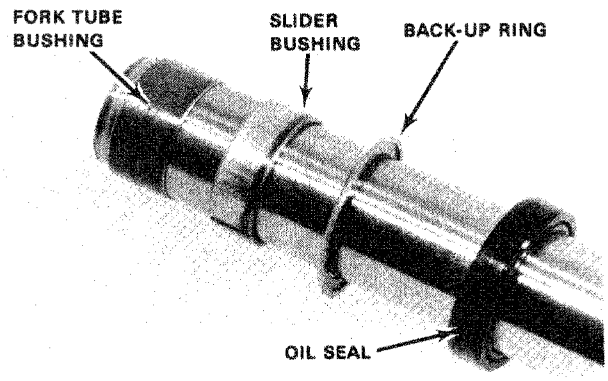
Pull the fork tube out until resistance from the slider bushing is felt. Then move it in and out, tapping the bushing lightly until the fork tube separates from the slider. The slider bushing will be forced out by the fork tube bushing.



Remove the oil seal and back-up ring from the fork tube if not already removed.

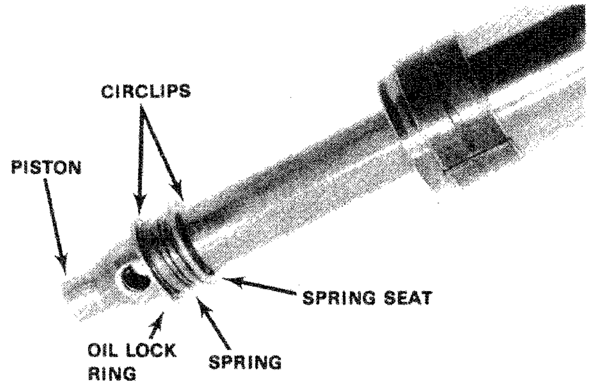
Remove the slider bushing from the fork tube.

NOTE: Do not remove the fork tube bushing unless it is necessary to replace it with a new one. If necessary to replace it, spread the ends of the bushing and remove it from the tube.

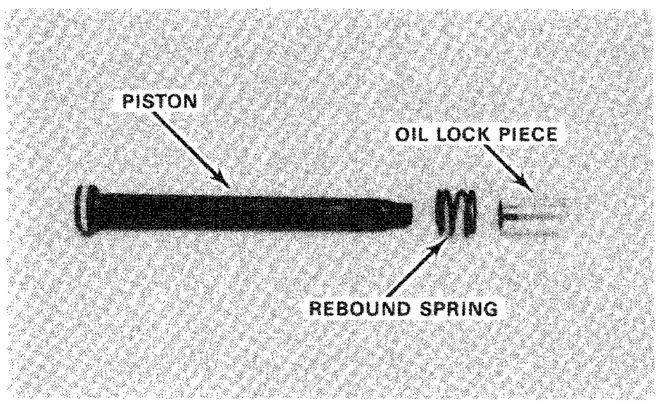


1983— :
Remove the circlips, oil lock ring, spring and spring seat from the piston.

ALL MODELS:
Remove the piston and rebound spring from the fork tube.



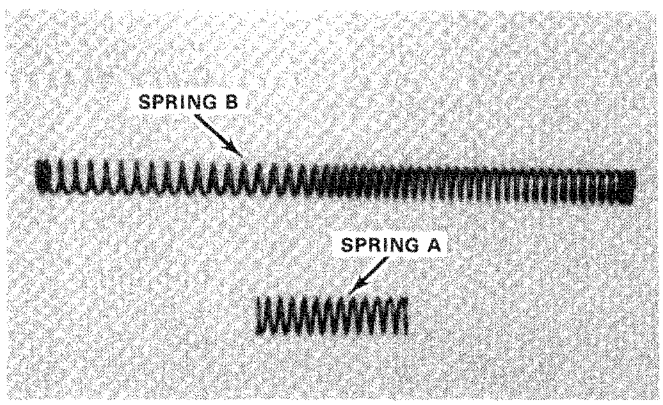
Remove the oil lock piece from inside the slider.



Inspection

Check the fork spring free lengths and replace the springs if shorter than the service limit.

	Spring A	Spring B
Standard		
1980–1982	111.7 mm (4.40 in)	466.2 mm (18.35 in)
1983— :	111.7 mm (4.40 in)	472.2 mm (18.59 in)
Service Limit		
1980–1982	106.0 mm (4.17 in)	442.0 mm (17.40 in)
1983— :	106.0 mm (4.17 in)	462.8 mm (18.22 in)

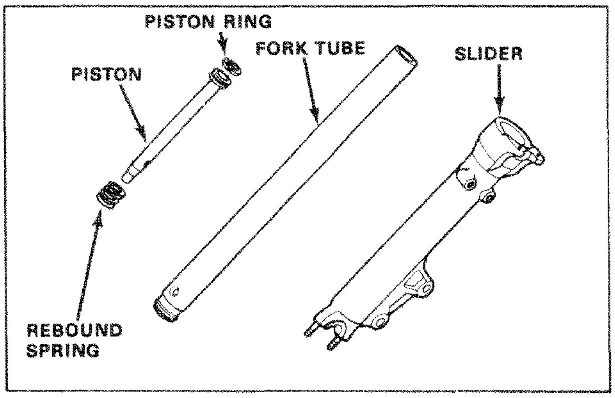


Front Fork Removal/Disassembly (cont'd)

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

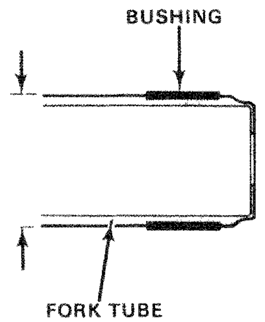
Check the fork piston ring for wear or damage.

Check the rebound spring for fatigue or damage.



Measure the fork tube O.D.

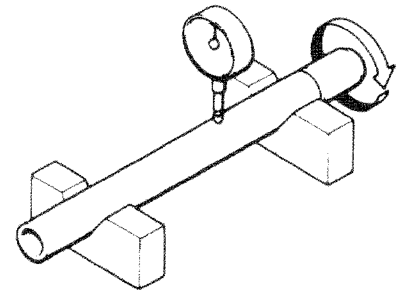
Standard: 38.95 — 38.98 mm (1.533 — 1.534 in)
Service Limit: 38.90 mm (1.532 in)



Set the fork tube in V-blocks and read the runout. Take ½ of total indicated reading to determine the actual runout.

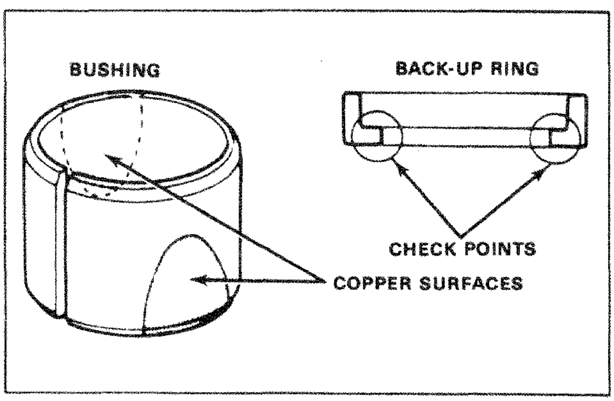
Runout Service Limit: 0.2 mm (0.01 in)

Inspect the fork tube, slider and piston ring for excessive wear and replace if necessary.



Visually inspect the slider and fork tube bushings. Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

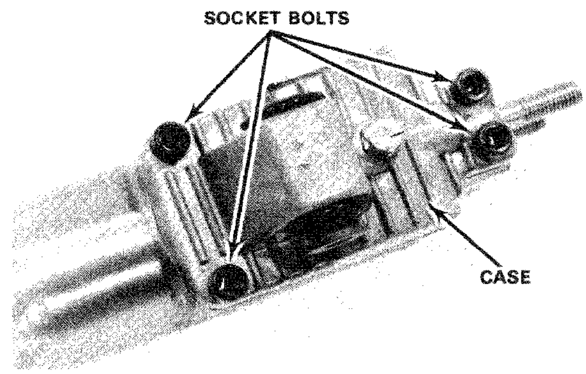
Check the back-up ring; replace it if there is any distortion at the points shown.



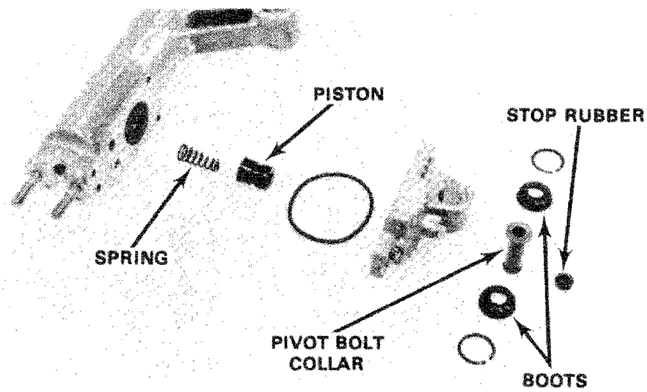
1983— :

Anti-Dive Case

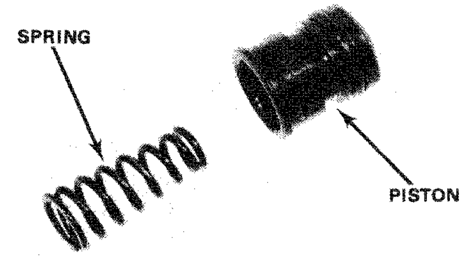
Remove the four socket bolts and anti-dive case.



Remove the piston and spring.
Remove the boots, pivot bolt collar and stop rubber from the anti-dive case.



Check the spring and piston for wear or damage. Replace if necessary.

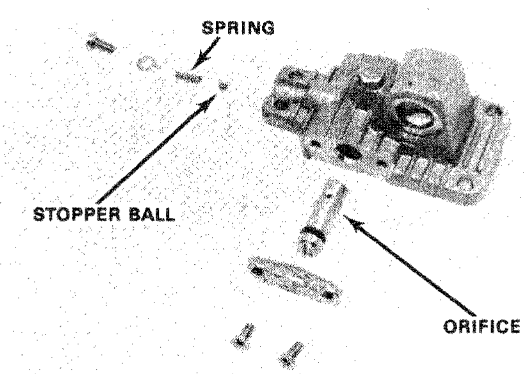


Remove the stopper ball screw, spring and stopper ball.
Remove the orifice plate screw, plate and orifice.

Check the orifice for clogging by applying compressed air.

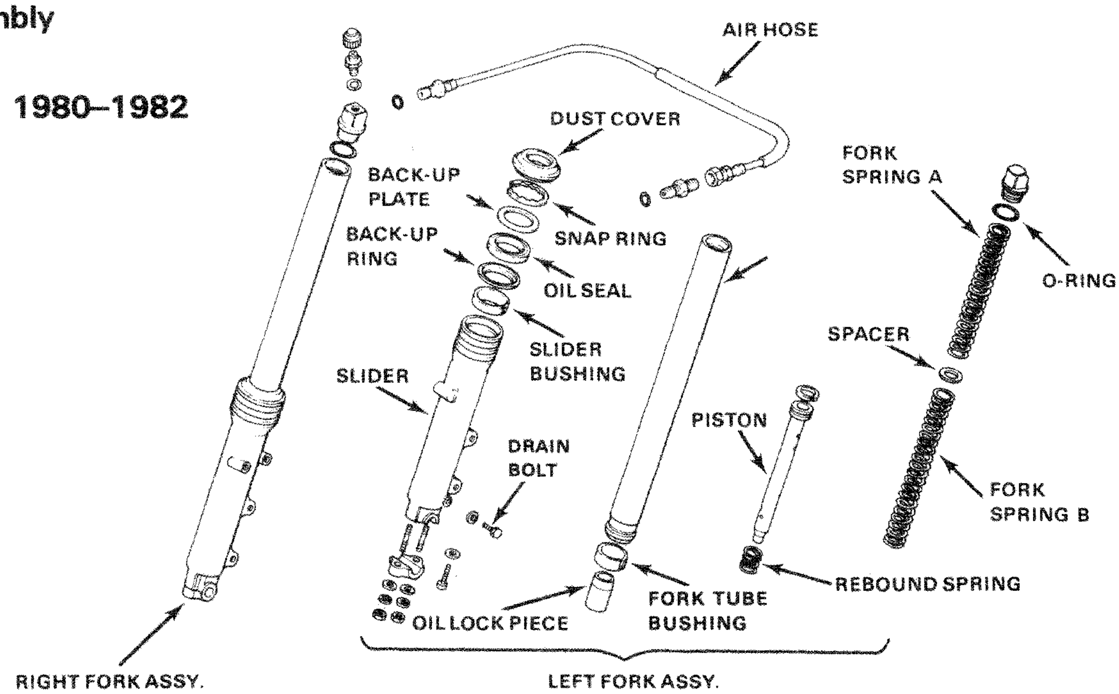
WARNING: Wear appropriate eye protection when using compressed air.

Also check the orifice for damage and replace if necessary.

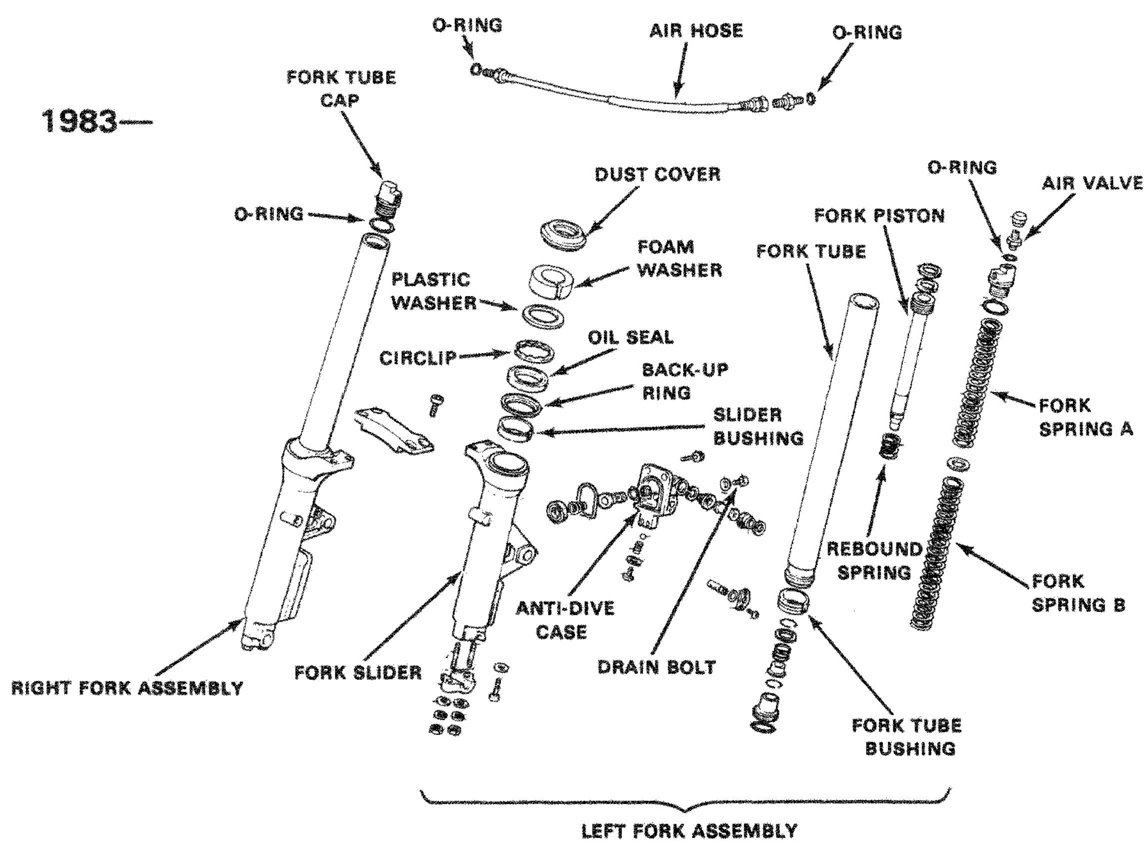


Assembly

1980–1982



1983—

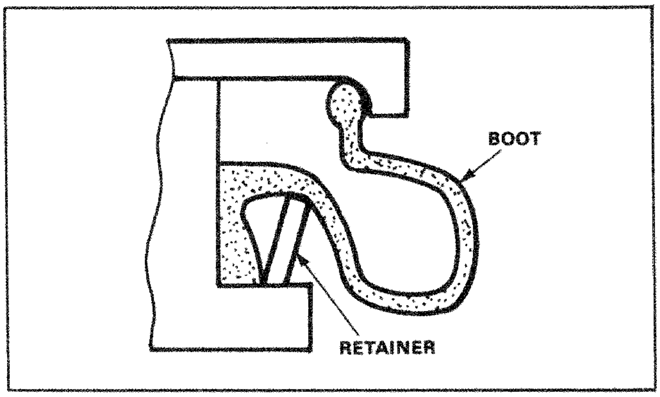


1983— :

Anti-Dive Case

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

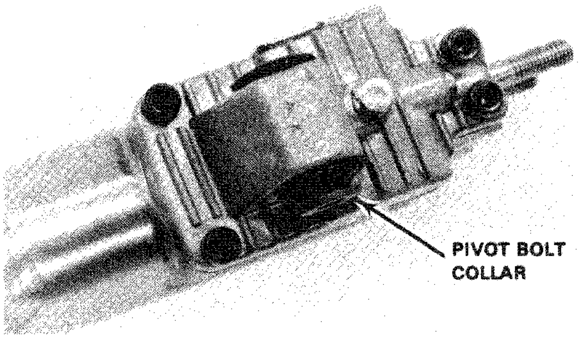
Install the pivot bolt collar boot retainer as shown.



NOTE:
- Apply ATF to the piston and piston O-ring.
- Apply silicone grease to the pivot bolt collar.
- Apply a thread lock agent to the threads of the screws and
- socket bolts.

Torque the socket bolts to 6 – 9 N·m (4.3 – 6.5 ft-lb).

Check the operation of the collar and piston.



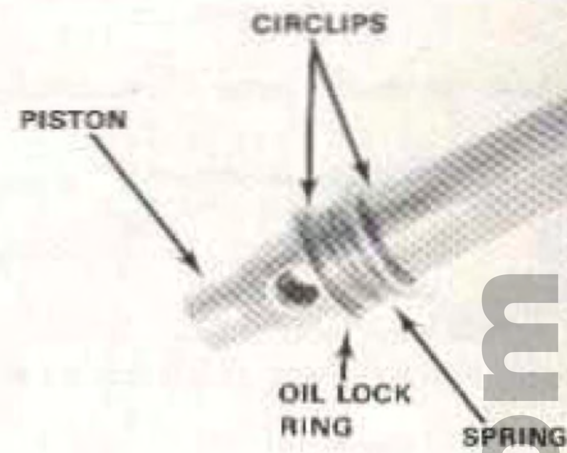
Frame and Suspension

Front Fork Assembly/Installation (cont'd)

Clean all disassembled parts.

Install a new bushing on the fork tube if it was removed.

Insert the rebound spring and piston into the fork tube.



1983— :
Install the spring seat, spring, oil lock ring and circlips on the piston.

Install the fork springs with the narrow coils toward the top and spacer between the two springs. Install the fork tube cap loosely.

Fit the oil lock piece on the end of the piston, then 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 hex wrench.

CAUTION: Do not distort the slider in the vise.

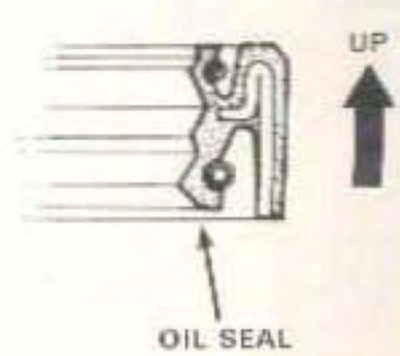
1980-1982:
Place a new slider bushing over the fork tube and rest it on the slider. Put the back-up ring and old bushing on top of the new bushing. Drive the new bushing into place with the seal driver. Discard the old bushing.

1983— :
Place the slider bushing over the fork tube and rest it on the slider. Put the back-up ring and oil seal on the slider bushing. Drive the bushing and oil seal into place with the seal driver.

Seal Installation

Coat a new oil seal with ATF and install it with the seal markings facing up.

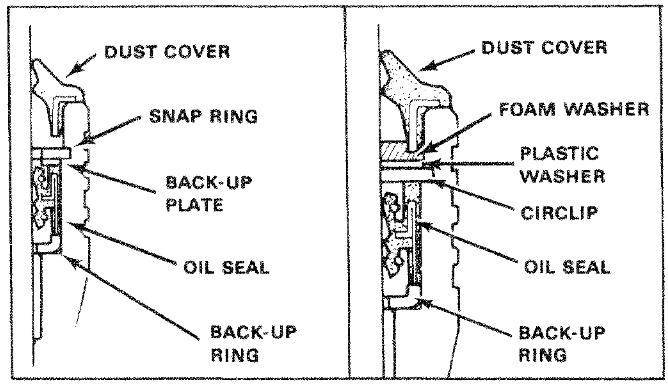
Drive the seal in with the seal driver until the tool bottoms against the slider.



1980-1982:
Install the back-up plate, snap ring and dust cover.

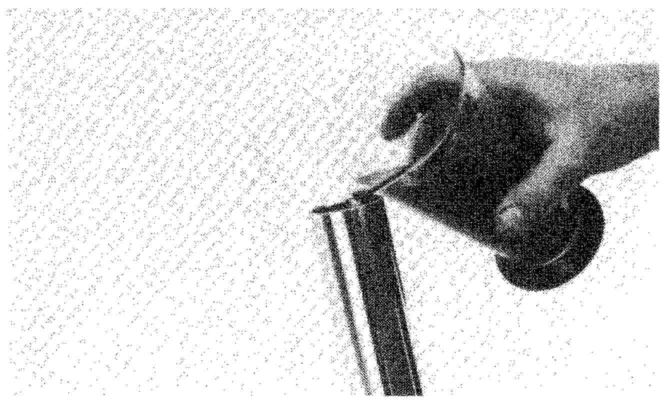
1983— :
Install the circlip, plastic washer, foam washer and dust cover.

NOTE: Install the snap ring with its radiused edge facing down.

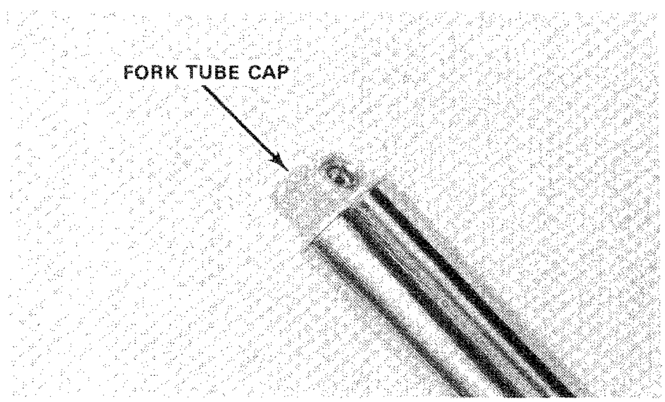


Remove the fork tube cap and pour the specified amount of ATF into the fork tube.

Capacity: 1980-1981:
240 cc (8.0 oz)
1982— :
290 cc (9.8 oz)



Install the fork tube cap.

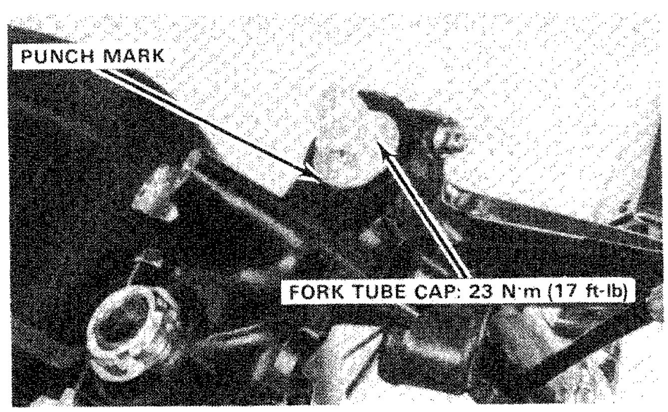


Installation

Slide the front forks into the fork bridge with the air fitting holes facing toward the punch marks.

Hand tighten the top pinch bolt, then torque the fork tube cap.

Check that air fittings are still facing punch marks. If not, loosen upper pinch bolt and align.

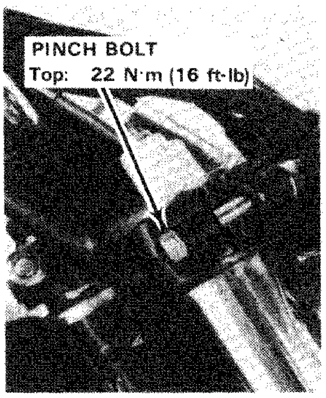


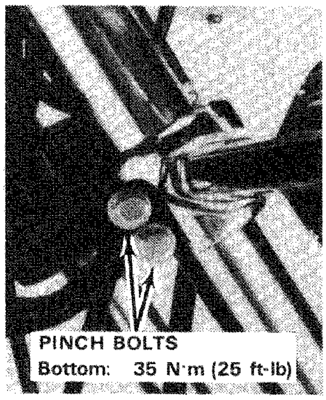
(cont'd)

Front Fork Assembly/Installation (cont'd)

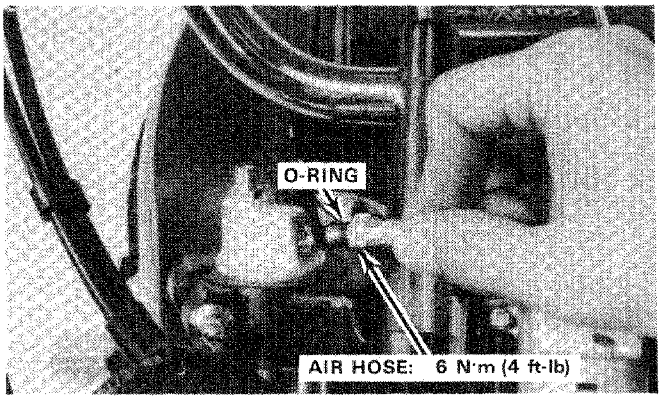
Tighten the top and bottom fork pinch bolts to the specified torque.

Install the valve stem and connector.



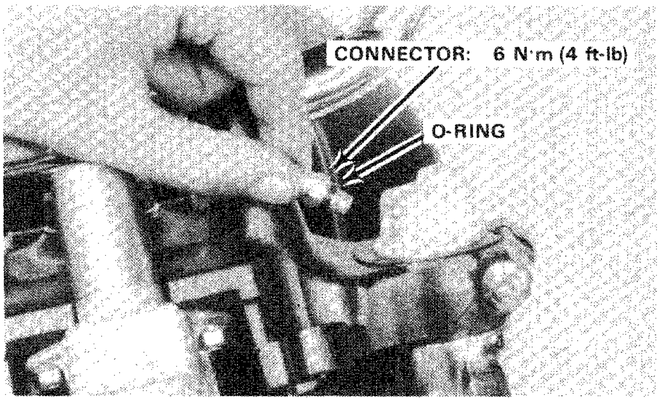


Apply grease to a new O-ring and install the air hose into the fork cap.

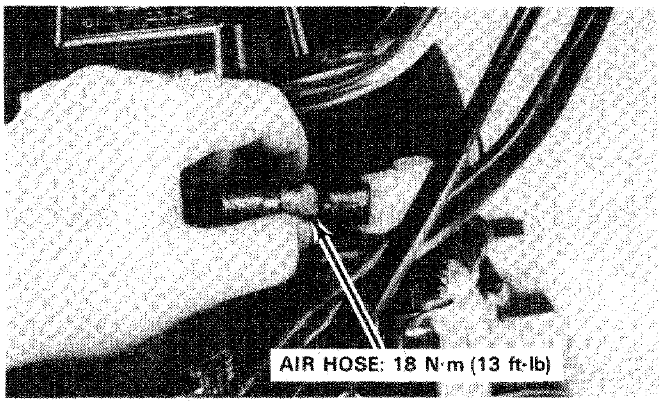


Apply grease to a new O-ring and install the connector into the fork cap:

1980-1982: Left fork cap.
1983— : Right fork cap.



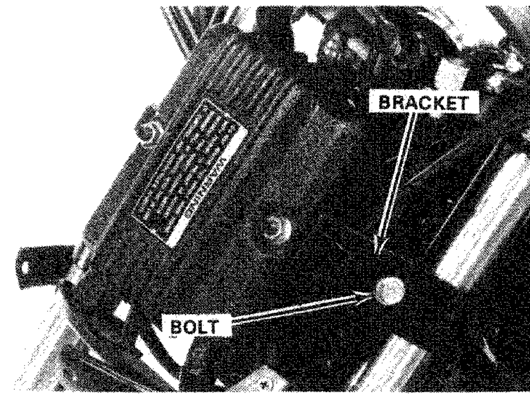
Attach the air hose to the connector and tighten to the specified torque.



Interstate and Aspencade:
Install the steering weight bracket bolts.

1983— :
Install the fork brace.

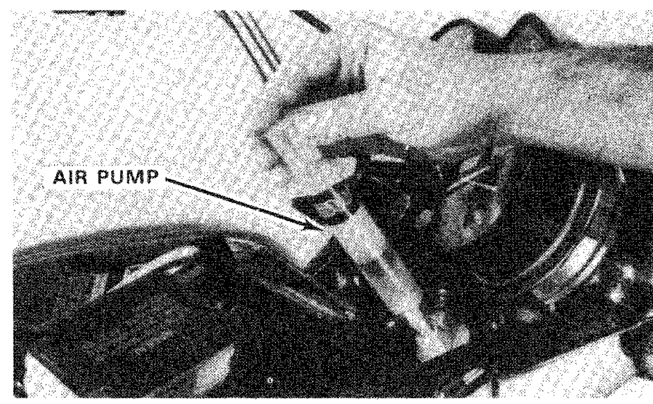
Install the front fender, brake calipers and wheel.



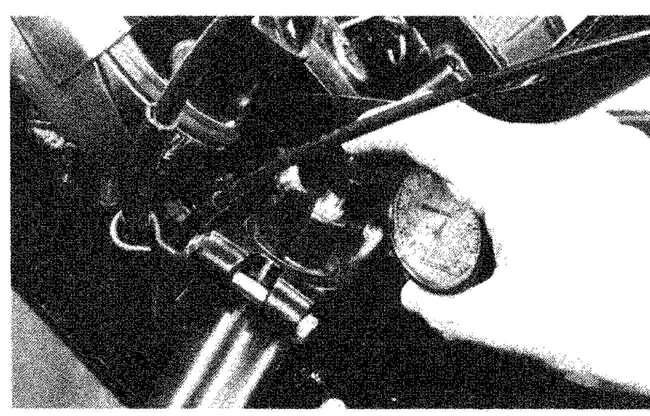
Refill the forks with air manually (all except Aspencade).

Recommended Pressure: 1.0 – 1.5 kg/cm² (14 – 21 psi)

CAUTION:
- **Use only a hand operated air pump to fill the fork tubes.**
- **Do not use compressed air.**
- **Maximum pressure is 300 kPa (3 kg/cm², 43 psi). Do not exceed this or fork tube component damage may occur.**



With the front brake applied, pump the front forks up and down several times. Place the motorcycle on its center stand. Check the air pressure and adjust if necessary.

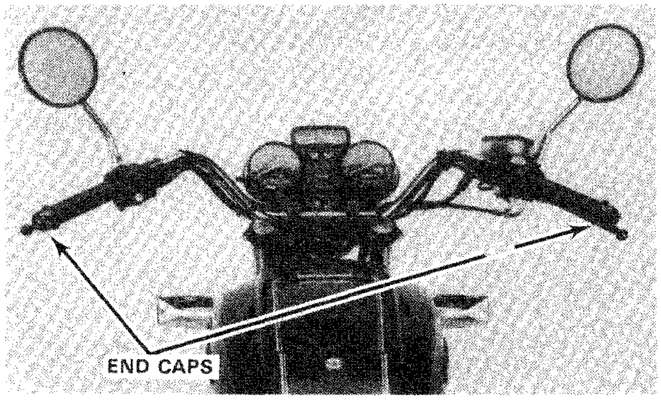


(cont'd)

Frame and Suspension

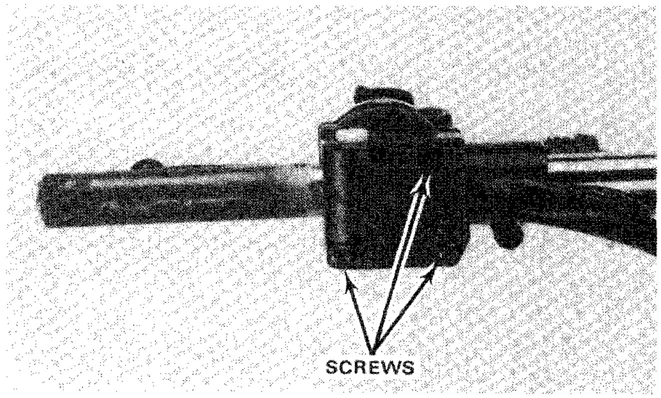
Handlebar Replacement

Remove the end caps, wire harness bands, left grip and mirrors from the handlebar.



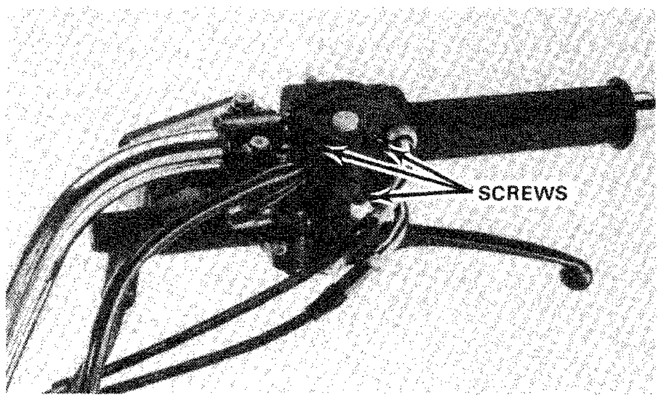
Remove the three screws from the left switch assembly and remove it.

Loosen the bolt in clutch lever holder.

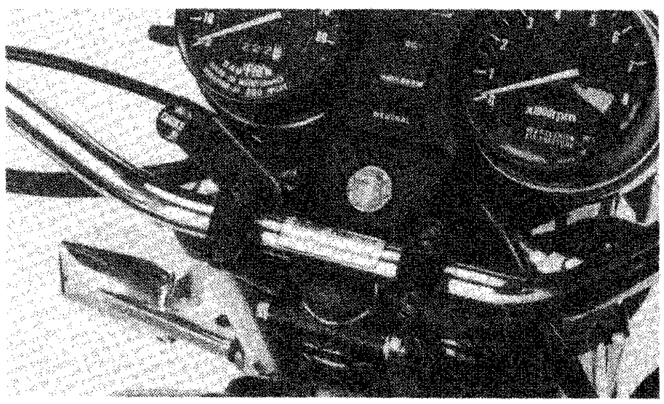


Remove the two bolts from the master cylinder assembly and support it so it does not hang by the brake hose.

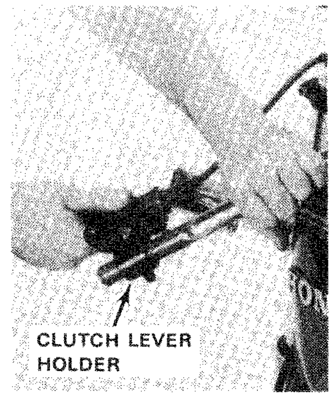
Remove the three screws from the right switch assembly.

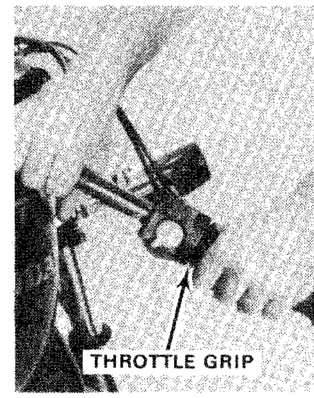


Remove the caps and socket bolts from each handlebar upper holder while supporting the handlebar and remove the upper holders.



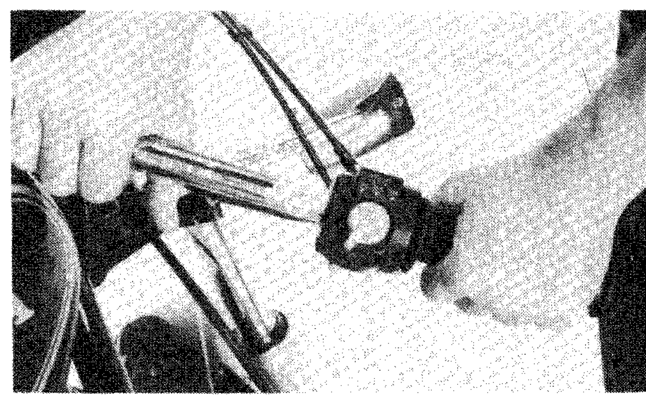
Now slide the clutch lever holder and throttle grip off the handlebar.



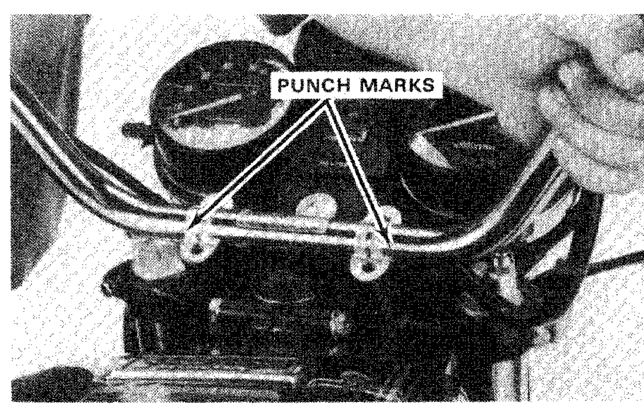


When installing a new handlebar, apply grease to the right handlebar end, then slip on the throttle grip. Check that the throttle cables are not twisted.

Slide the clutch lever holder onto the left handlebar end.

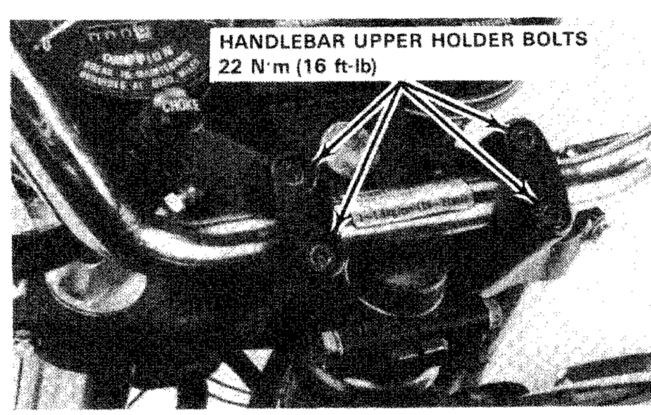


Position the handlebar on the lower holders with the serrations aligned with the holders and the punch marks aligned with the tops of the holders.



Position the handlebar's upper holders on the handlebar with the punch marks on the holders forward. Position the choke knob bracket between the forward ends of the left holder. Loosely install the four socket bolts.

Tighten the forward bolts to the specified torque first, then tighten the rear bolts to the same torque. Install the four caps into the socket bolts.

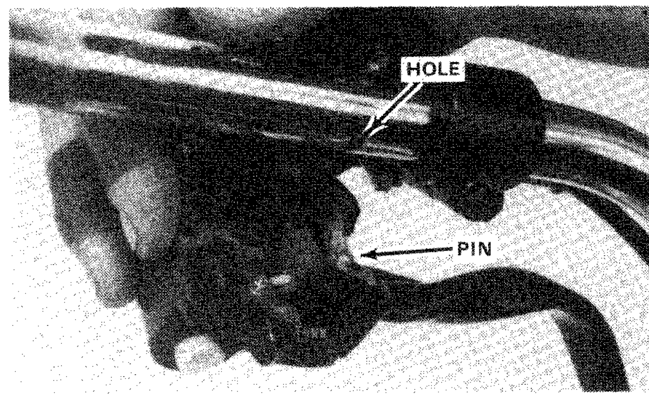


(cont'd)

Handlebar Replacement (cont'd)

Insert the pin on the bottom half of each switch assembly into the hole in the handlebar. Then assemble each switch and tighten the screws securely.

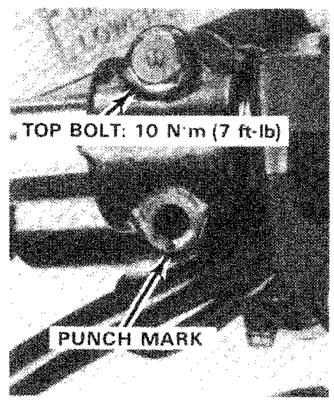
CAUTION: Make sure the wire harness is not pinched between the switch assembly and the handlebar.

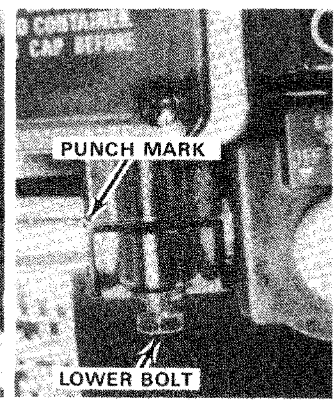


Position the master cylinder on the handlebar. Loosely install the holder with the punch mark down using the two bolts.

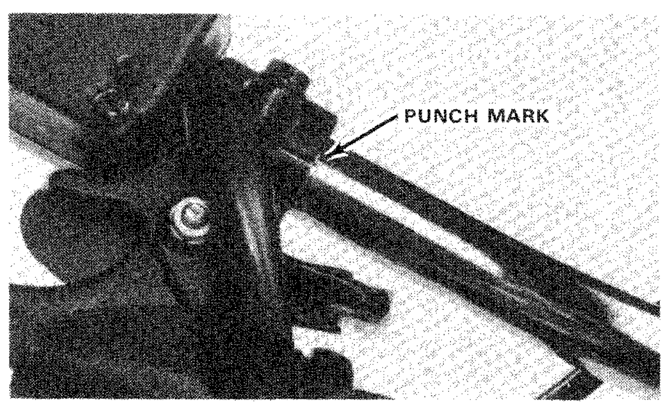
Align the gap between the holder and master cylinder with the punch mark on the handlebar.

Tighten the top bolt to the specified torque first, then tighten the lower bolt to the same torque.



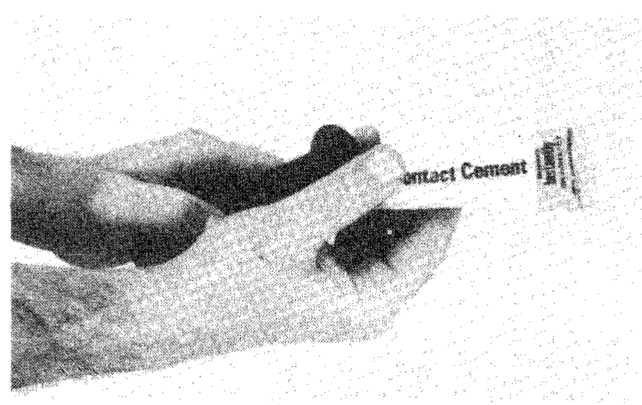


Position the clutch lever holder so the gap aligns with the punch mark on the handlebar and tighten the bolt securely.



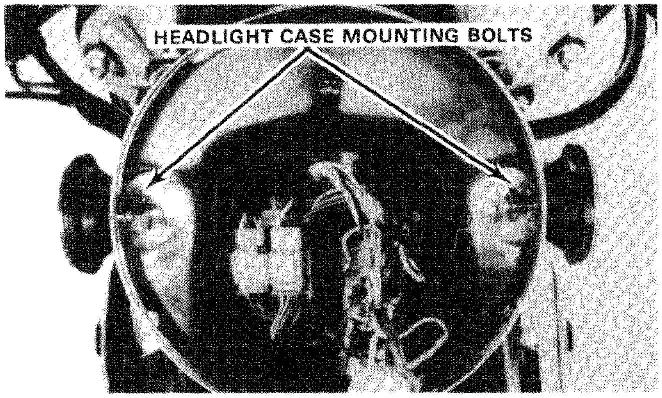
Apply contact cement to the left handlebar grip and push it into place.

Install the handlebar end caps, wire harness bands, and mirrors.



Steering Stem Removal

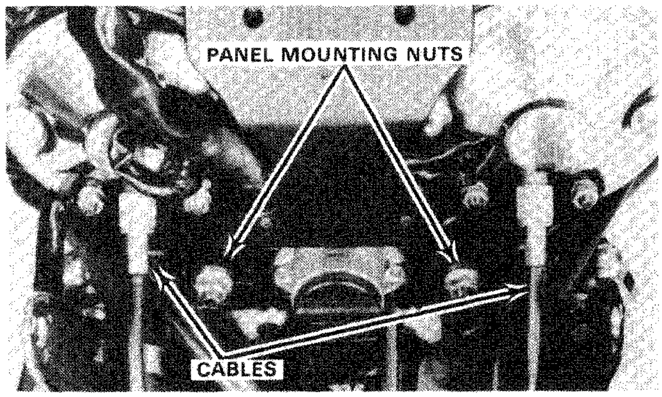
Remove the headlight and disconnect the wire connectors in the headlight case. Remove the headlight case.



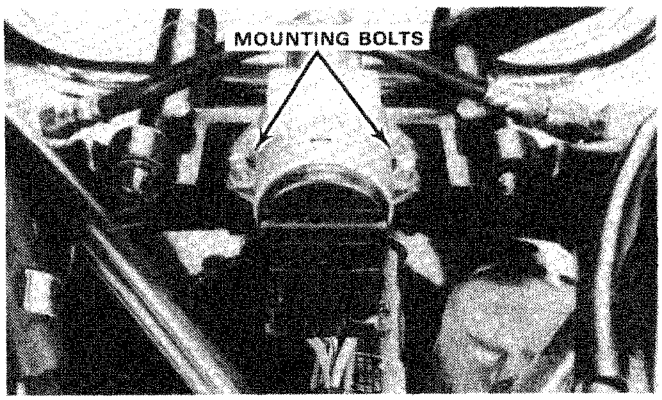
Disconnect the tachometer and speedometer cables from the instruments.

Remove the two nuts and lift off the instruments and indicator/warning light panel as an assembly.

Aspencade 1983— :
Refer to page 18-27 for instrument panel removal.

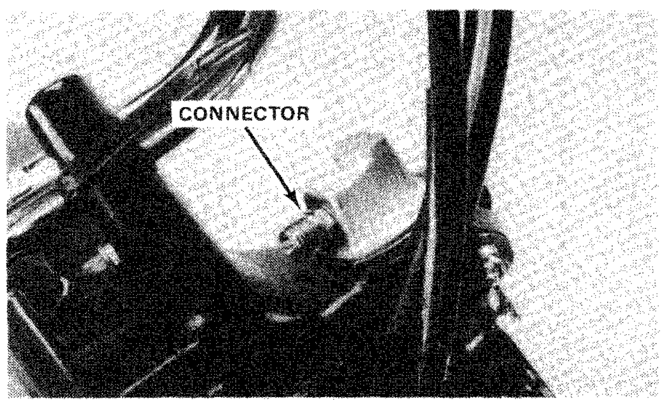


Remove the two ignition switch mounting bolts and remove the ignition switch.



Release the front fork air pressure.

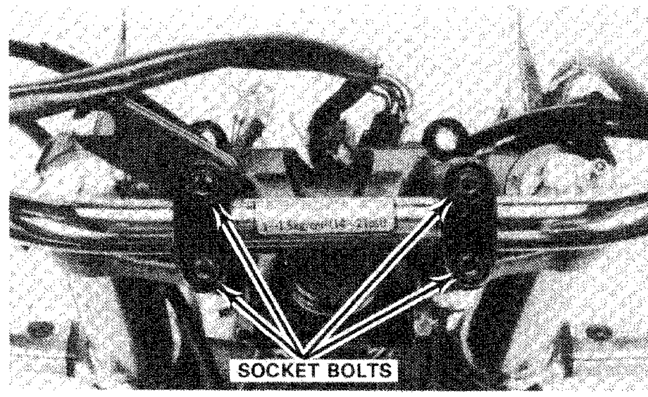
Disconnect the air hose from the left fork cap, then remove it from the right cap. Remove the air hose connector from the left fork cap.



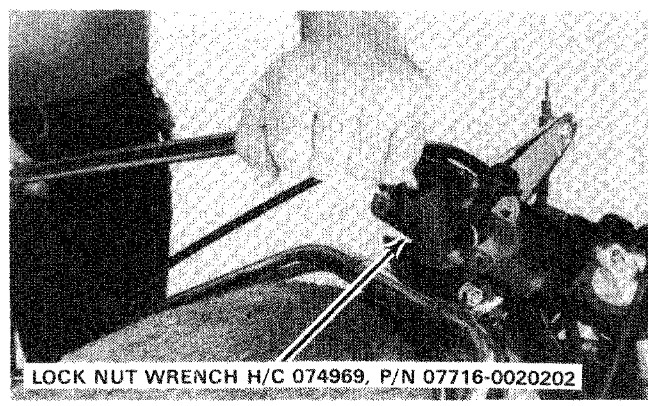
(cont'd)

Steering Stem Removal (cont'd)

Remove the caps and socket bolts from each handlebar upper holder while supporting the handlebar and remove the upper holders. Place a shop towel on the top compartment and lay the handlebar back on the towel.



Remove the rubber cap, steering stem nut, and washer. Use the lock nut wrench, 26 x 30 mm with the extension bar to remove the nut.

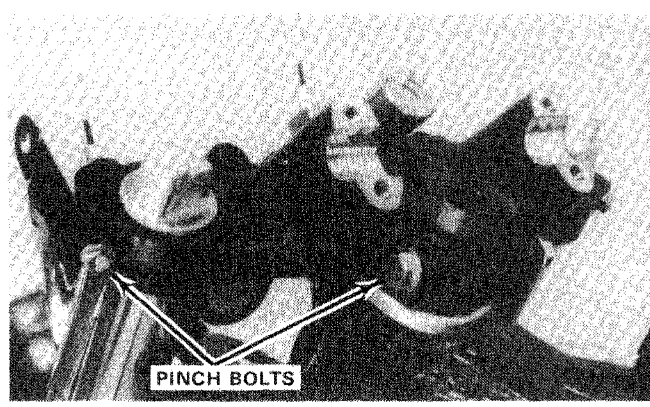


Loosen the fork tube pinch bolts and the bridge clamp bolt. Lift the fork bridge off the steering stem and fork tubes.

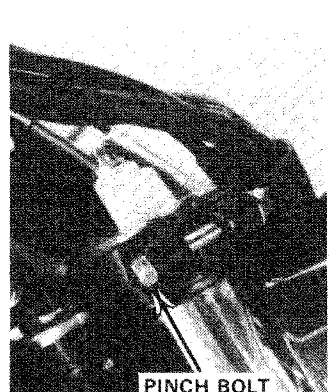
Remove the front wheel (page 14-4).

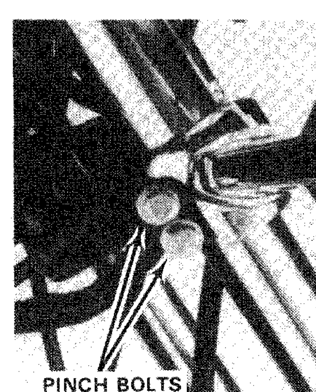
Remove the front brake calipers and front fender.

Interstate and Aspencade:
Remove the steering weight.



Loosen the fork pinch bolts and slide the fork tubes out of the steering stem. Set the headlight case brackets and turn signals aside.

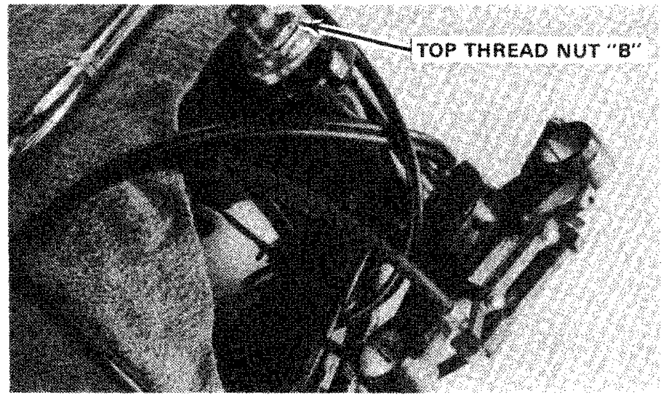




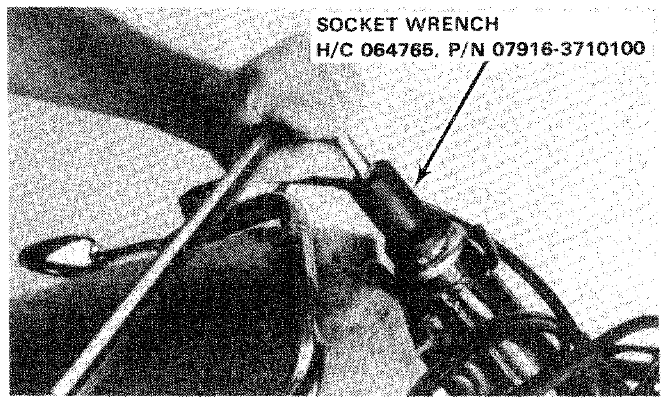
Remove the front brake two-way joint.

Straighten the lock washer tab.

Remove the top thread nut "B" and lock washer.



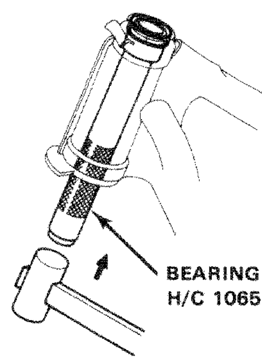
Remove the bearing adjustment nut with the steering stem socket wrench. Remove the steering stem.



Steering Head Bearing Replacement

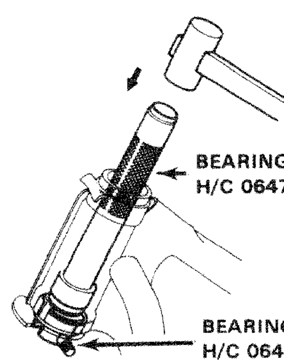
CAUTION: Steering head bearings and races are supplied in matched sets to ensure a precision fit. Remove and install complete sets; do not mix replacement bearings or races with original parts.

Remove the upper bearing outer race from the steering head.



Remove the lower bearing outer race from the steering head.

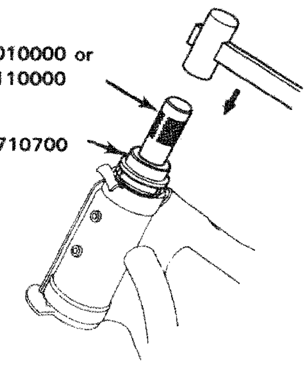
NOTE: If the steering head bearings are being replaced due to collision damage, inspect the steering head for cracks, deformation, and misalignment before installing replacement bearings.



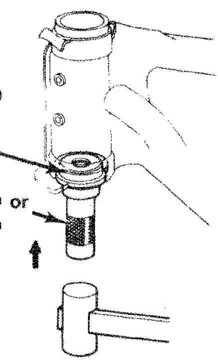
(cont'd)

Steering Head Bearing Replacement (cont'd)

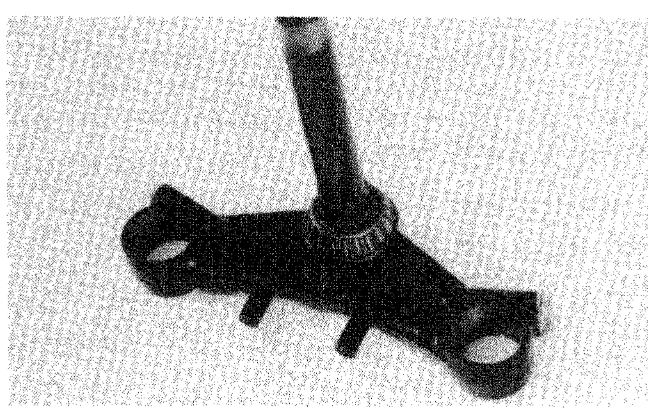
Install the upper bearing outer race.



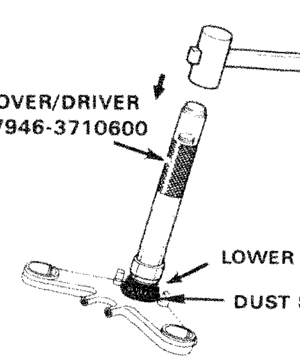
Install the lower bearing outer race.



Remove the lower bearing and dust seal from the steering stem.



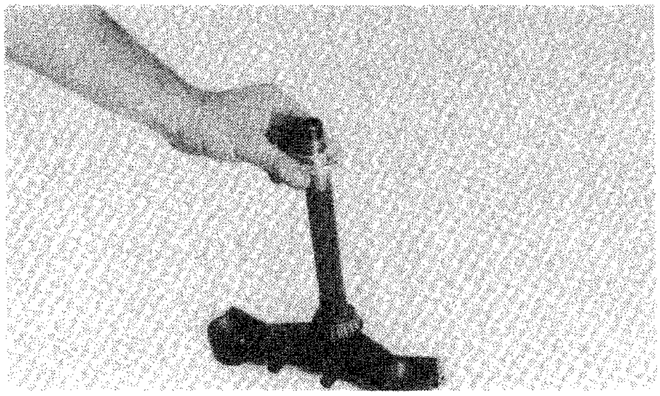
Place the dust seal on the steering stem and install the lower bearing.



Steering Stem Installation

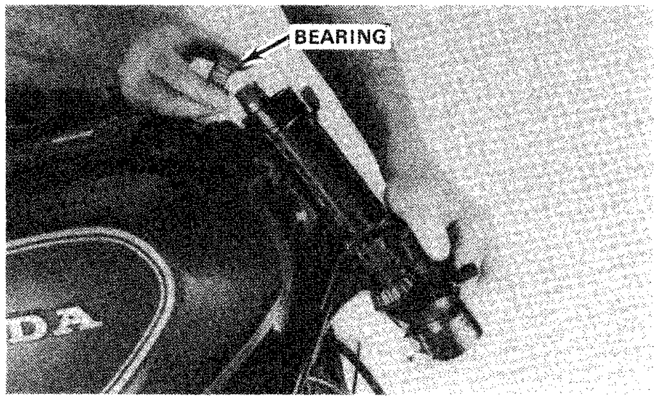
Thread the bearing adjustment nut and top thread nut "B" onto the steering stem to make sure that they turn smoothly and do not bind. Remove the nuts and thoroughly clean the threads.

Pack all bearing cavities with bearing grease.



Insert the steering stem into the steering head.

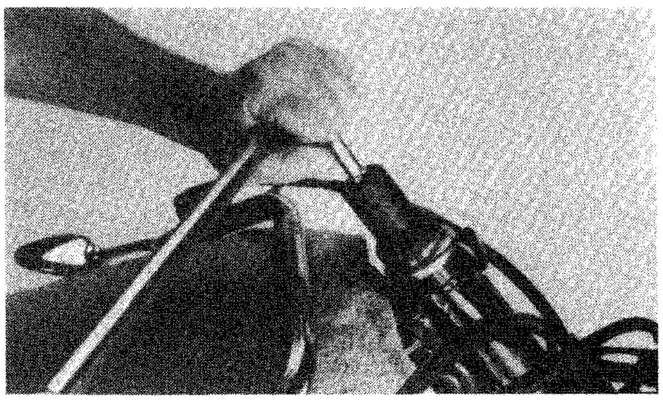
Install the upper bearing holder and bearing.



Apply grease to the adjustment nut threads. Install and tighten the nut to the specified torque.

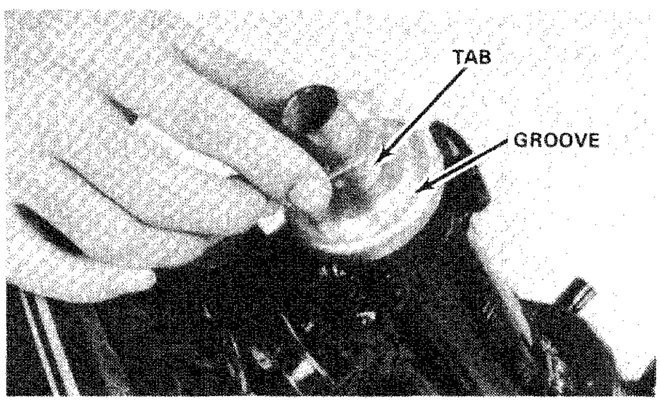
Turn the steering stem lock-to-lock five times to seat the bearings. Repeat the bearing tightening and steering stem turning sequence twice more.

NOTE: After each tightening and turning sequence, you should be able to turn nut slightly before reaching the specified torque.



Install a new bearing adjustment nut lock washer aligning the tabs with the nut grooves.

NOTE: Always replace a used lock washer with a new one.



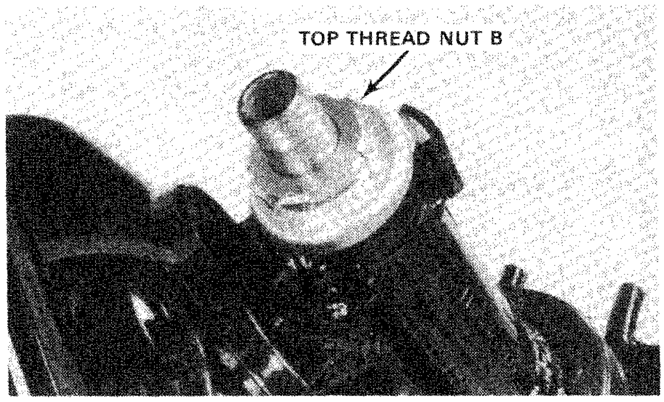
(cont'd)

Steering Stem Installation (cont'd)

Hand tighten the top thread nut "B". Then while holding the adjustment nut, tighten the top thread nut "B" until its grooves align with the lock washer tabs.

NOTE: If the top thread nut "B" grooves cannot easily be aligned with the lock washer tabs, remove the nut, turn it over and reinstall it.

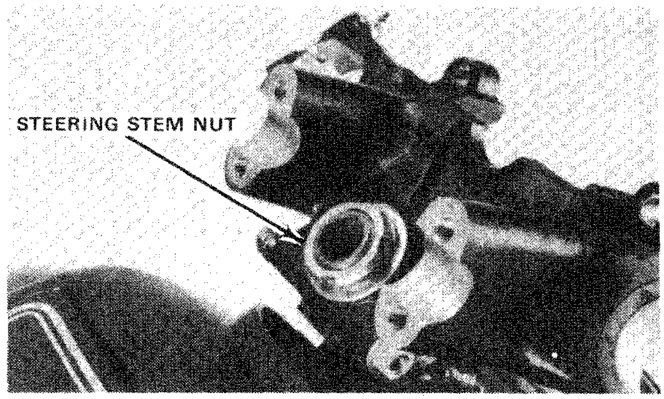
Bend two lock washer tabs up into the top thread nut "B" grooves.



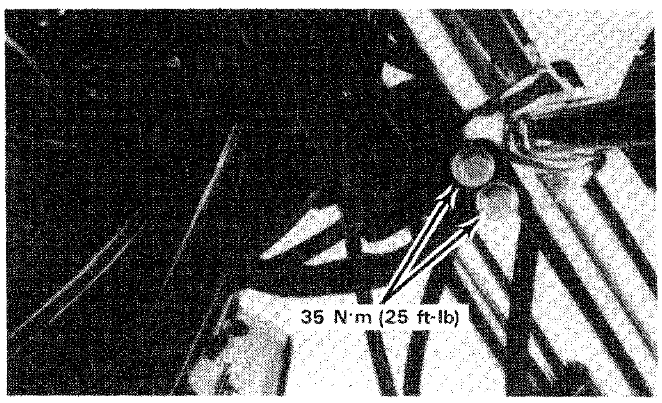
Install the fork bridge and washer on the steering stem. Then loosely install the steering stem nut.

Install the front forks into the steering stem and fork bridge.

NOTE: Be sure the holes in the caps face towards the punch marks in the fork bridge.

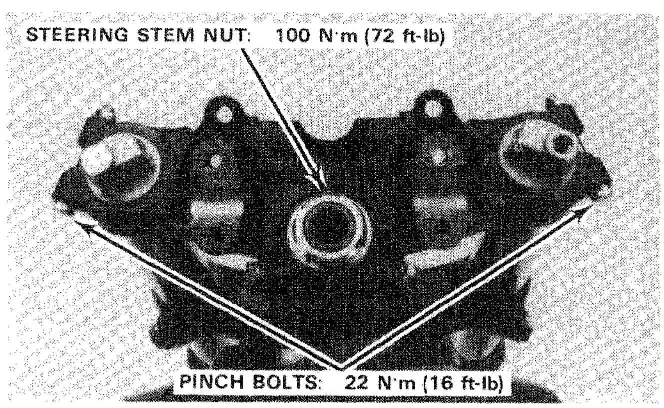


Install and tighten the fork tube pinch bolts in the steering stem to the specified torque.



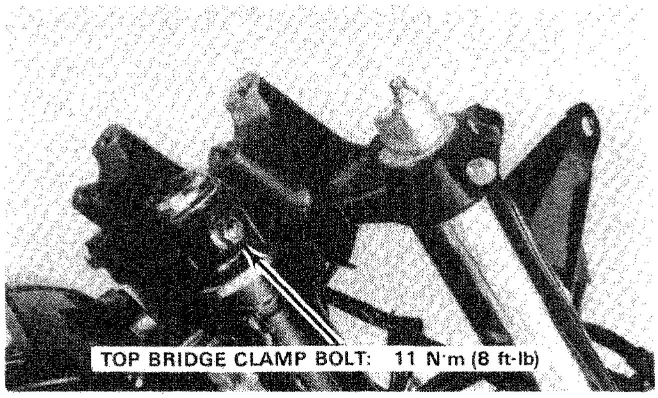
Tighten the steering stem nut to the specified torque. Then install the rubber cap.

Tighten the fork tube pinch bolts in the fork bridge to the specified torque.



Tighten the top bridge clamp bolt to the specified torque.

Install all remaining parts in the reverse order of removal. Refer to front fork installation(page 12-17) and handlebar replacement (page 12-20).



Rear Shock Absorber
Removal

NOTE: Place the motorcycle on the center stand and remove one shock absorber at a time to facilitate removal and installation.

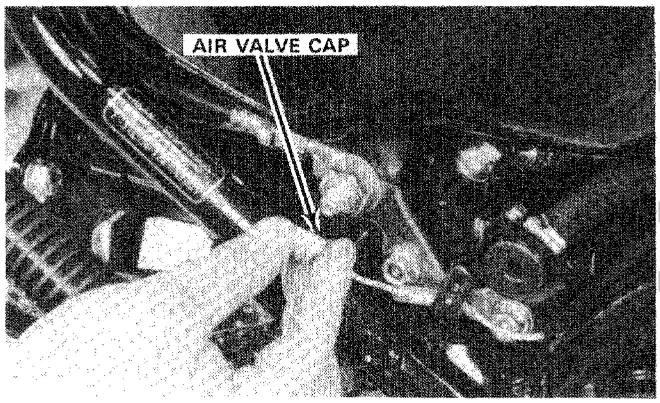
Remove the seat and right side cover.

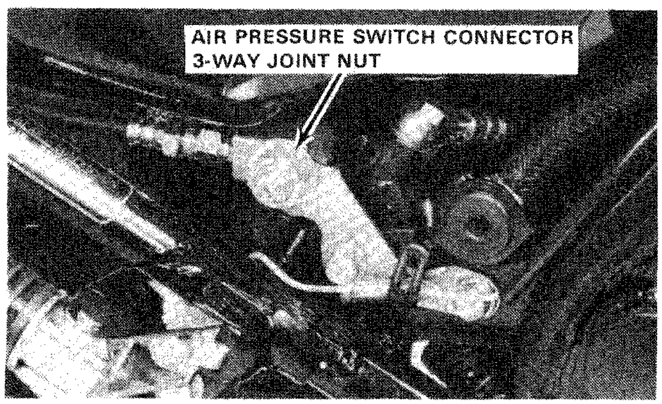
Remove the air valve cap and release air pressure (except Aspencade).

On Aspencade, depress the Suspension Selector (Rear) button. Depress and hold the Air Pressure Decrease button until air pressure is completely released.

Disconnect the air pressure switch wire connector.

Remove the 3-way joint nut and remove the joint.





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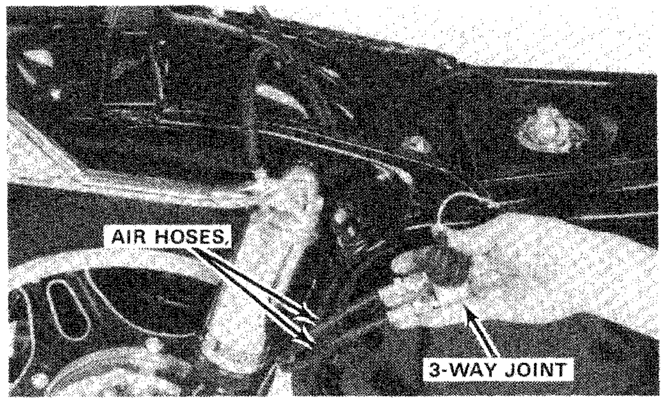
Rear Shock Absorber (cont'd)

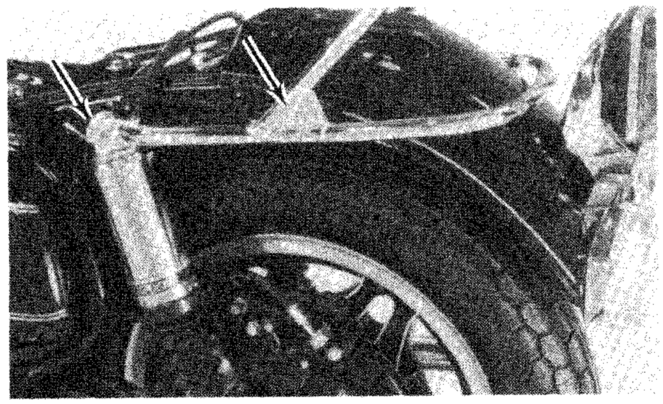
Disconnect the air hoses from the 3-way joint.



Remove the cap nut from the top shock absorber mounting stud on both sides. Remove the three bolts and the hand rail.

Remove the lower shock absorber mounting bolt (left side) or nut (right side) and remove the shock absorber.

NOTE: Do not lay the shock absorber over on its side or the fluid will run out the air hose.



Disassembly

Disconnect the air hose.

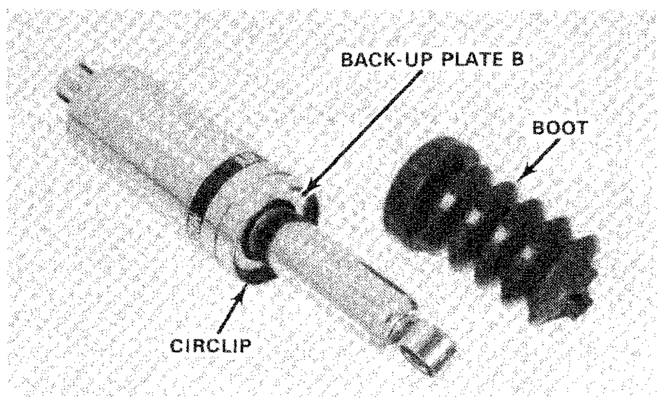
Remove the boot.

Remove the circlip and back-up plate "B".

Turn the shock upside down and drain the shock oil.

Reinstall the shock boot.

Install a schrader valve into the air hose connector hole.

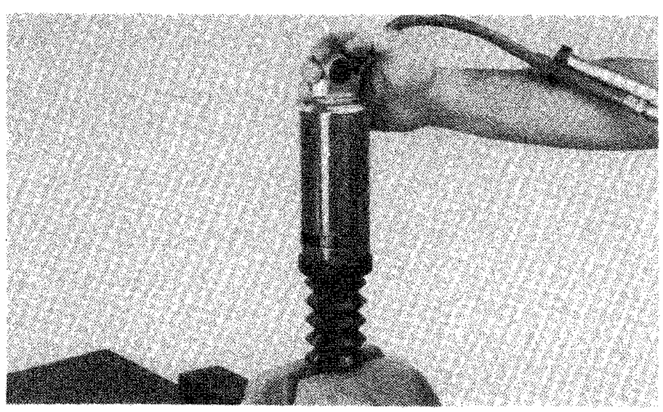


Place the shock lower mount in a vise with soft jaws.

Wrap a shop towel around the seal area to prevent oil splashing.

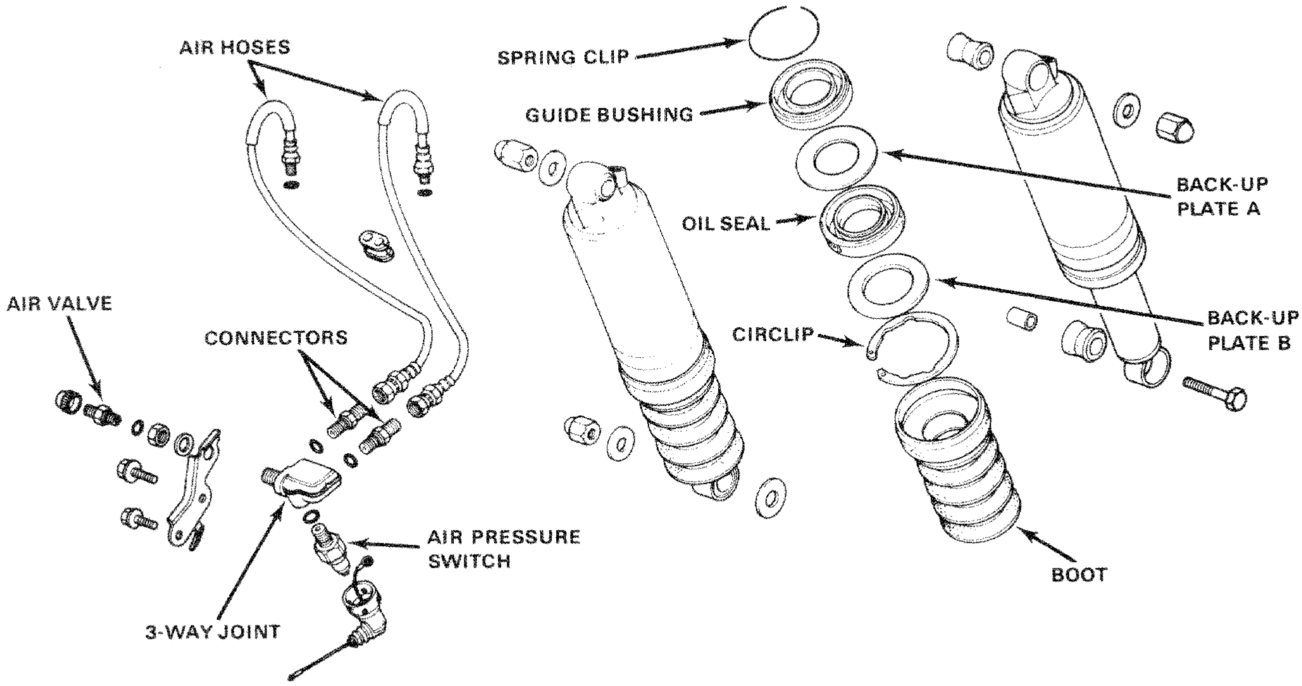
WARNING: Do not hold the shock below the shock body. The seal, back-up plate "A" and bushing are removed with air pressure. Wear eye and face protection.

Apply short bursts of compressed air into the shock body until the seal is forced out of the shock. The back-up plate "A" and bushing will also be forced out.



Remove the shock from the vise and remove the boot, seal, back-up plate "A" and guide bushing.

Check the bushing for wear and replace if necessary.

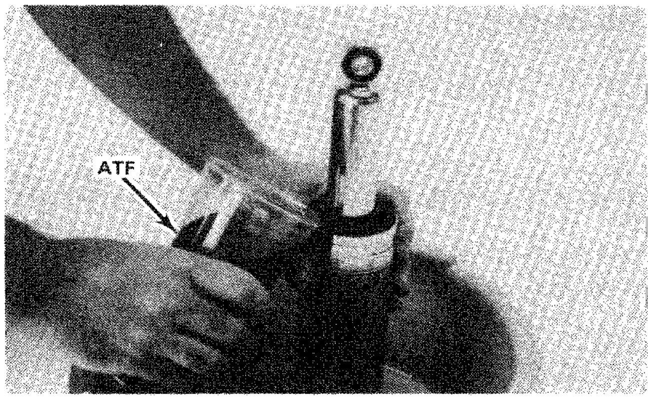


Assembly

Plug the air hose hole in the top of the shock absorber. Turn the shock absorber upside-down.

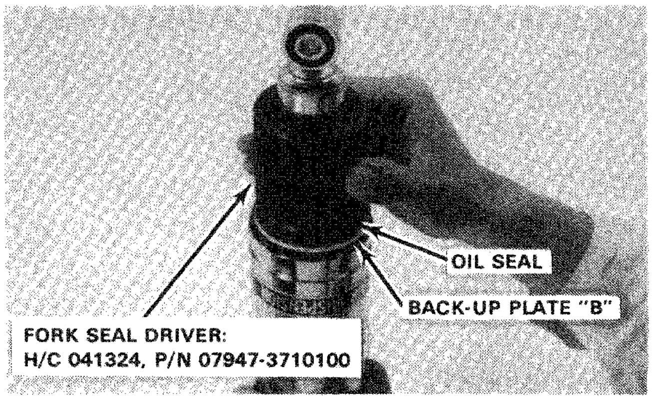
Fill the shock absorber with the specified amount of ATF.

Capacity: 365 cc (12.5 oz)



Install the guide bushing and back-up plate "A".

Dip a new oil seal in ATF and install it into the shock absorber.



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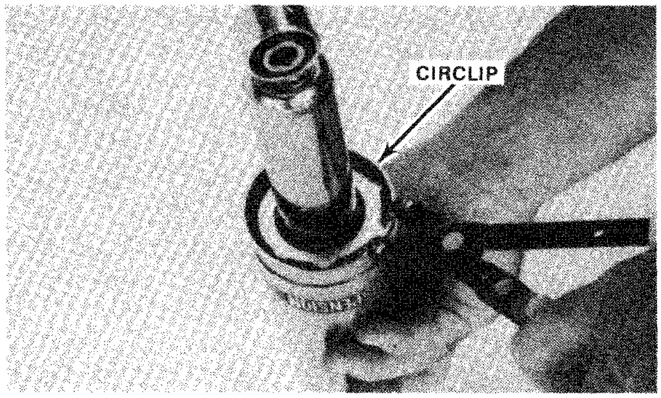
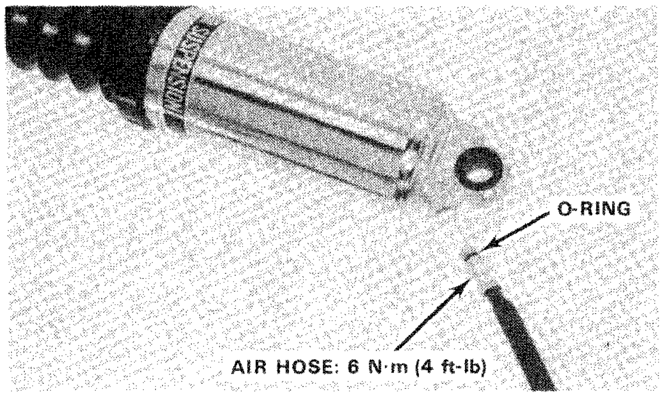
Frame and Suspension

Install the back-up plate "B".

Install the circlip and boot.



Apply grease to a new O-ring and install the air hose. Tighten to the specified torque.



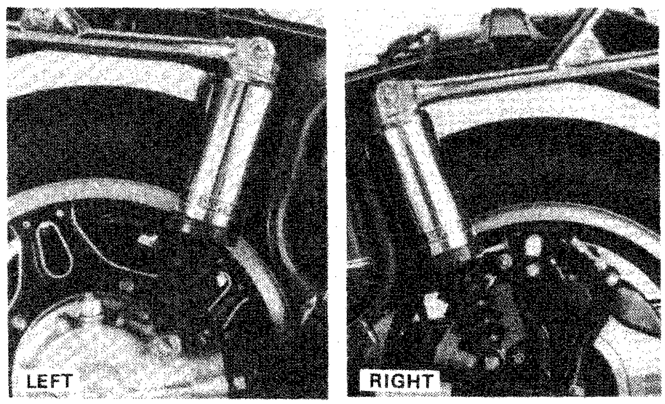
Installation

Push the right side shock absorber onto the two mounting studs.

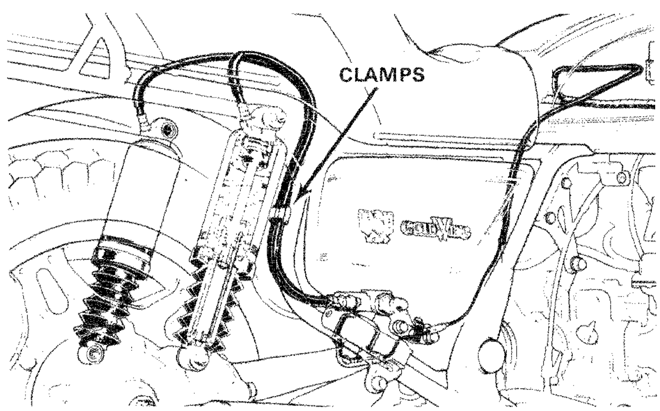
Push the left side shock absorber onto the mounting stud at the top and install the mounting bolt at the bottom.

Position the handrail on the motorcycle and install the three mounting bolts.

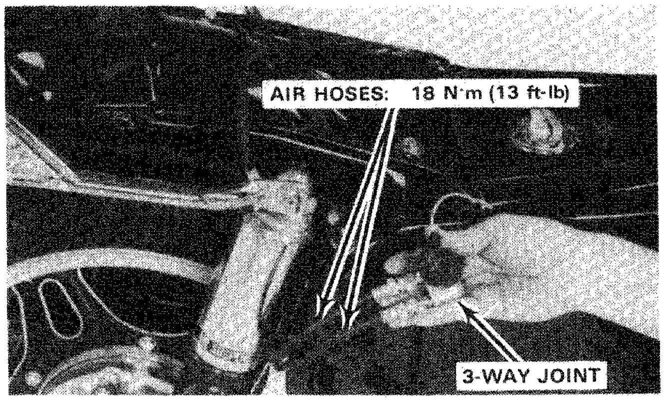
Install the cap nuts on the three mounting studs. Tighten the nuts/bolt to the specified torque.



Route the air hoses through the clamp on the rear fender and fuel tank.



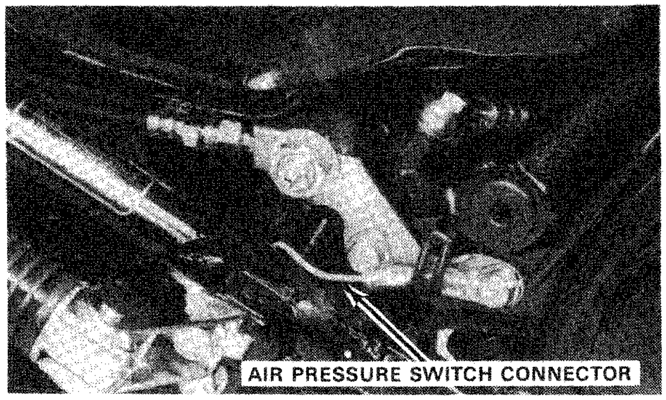
Connect the air hoses to the 3-way joint and tighten to the specified torque.



Fit the 3-way joint on the bracket and install the nut.

Connect the air pressure switch wire connector.

With the motorcycle on the center stand fill the shock absorbers with air.



Recommended Pressure:

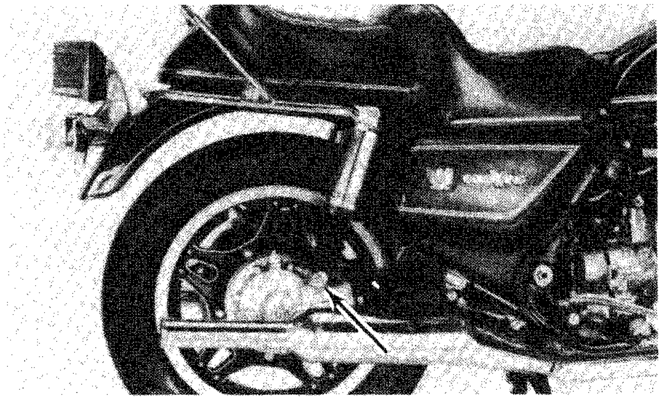
1980:	**2.0 – 3.0 kg/cm² (28 – 43 psi)**
1980-1982 (All), 1983— Aspencade:	**2.0 – 4.0 kg/cm² (28 – 57 psi)**
1983— STD, Interstate:	**0 – 4.0 kg/cm² (0 – 57 psi)**

NOTE: Some pressure will be lost when removing the gauge from the valve. Determine the amount of loss and compensate accordingly.

Install the right side cover and seat.

Swingarm

Removal



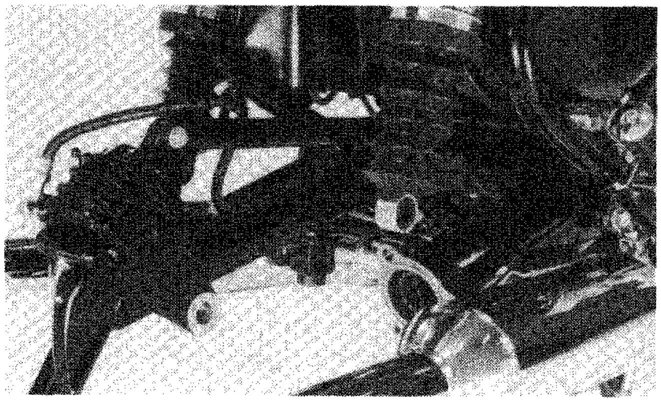
Place the motorcycle on the center stand on a level surface.

Loosen the final gear case nuts, then remove the rear wheel.

Disconnect the drive shaft from the engine (page 11-4).

Disconnect the shock absorber from the final drive gear case and remove the case (page 11-4).

NOTE: Do not lay the final drive case over on its side. The gear oil may flow out of the breather.

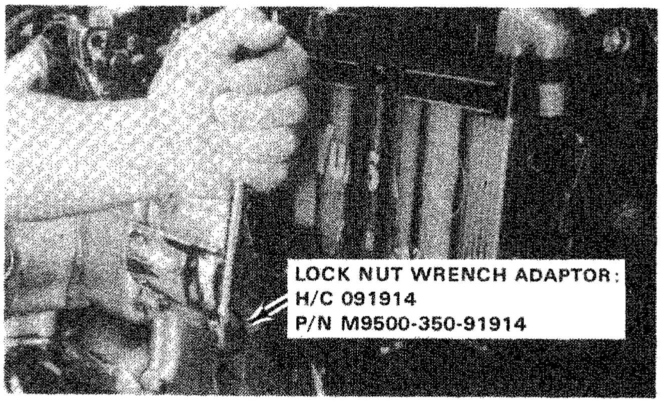


Remove the brake hose from the swingarm and torque arm hose clamps.

Remove the brake caliper.

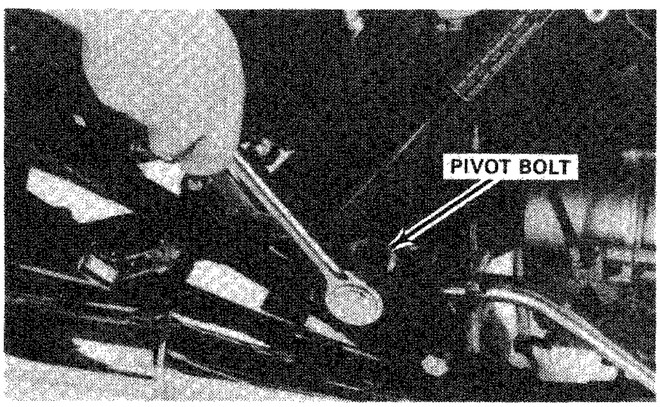
CAUTION: Do not let the caliper hang by the brake hose.

Disconnect the left shock absorber from the swingarm.



Remove the right and left pivot caps.

Loosen the lock nut on the left side with the lock nut wrench adaptor and remove the pivot bolt.



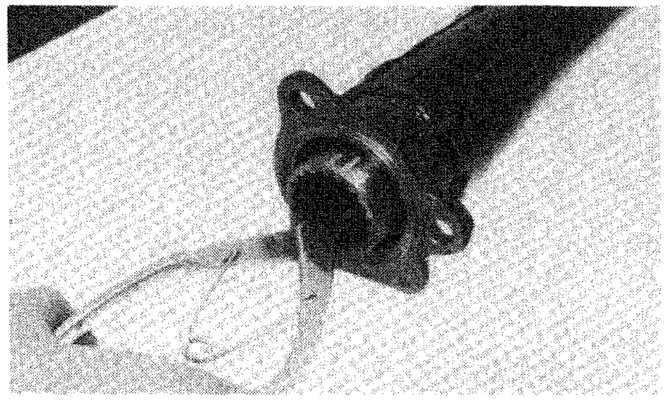
Remove the right pivot bolt.

Remove the swingarm from the motorcycle.

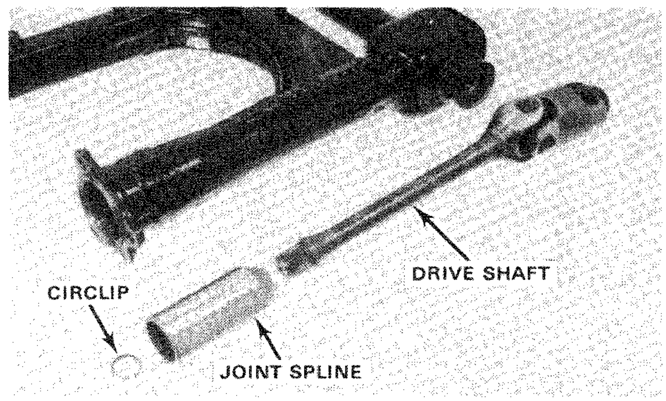
Disassembly/Assembly

Remove the circlip in the drive shaft joint and remove the joint.

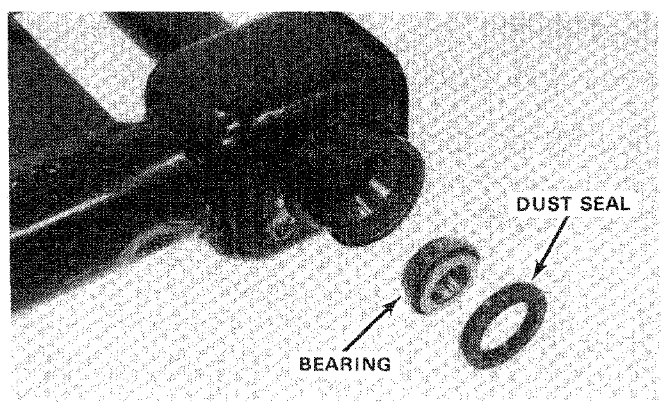
Remove the boot.



Remove the drive shaft.



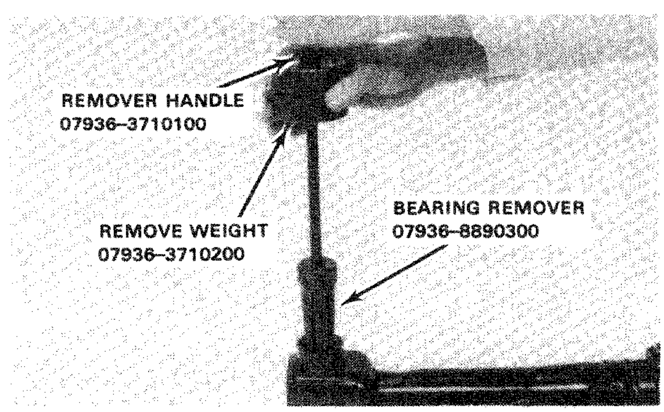
Remove the dust seals and pivot bearings.



Inspect the tapered roller bearings and races for damage and wear.

If bearing replacement is required, remove the outer races from the swingarm.

NOTE: Always replace pivot bearings in pairs.



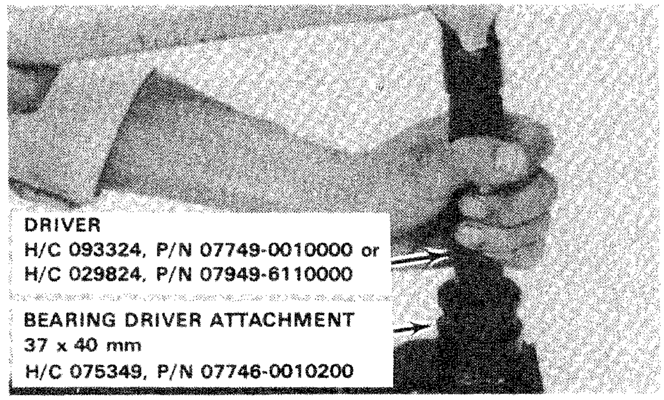
(cont'd)

Frame and Suspension

Swingarm (cont'd)

Install new bearing outer races into the swingarm

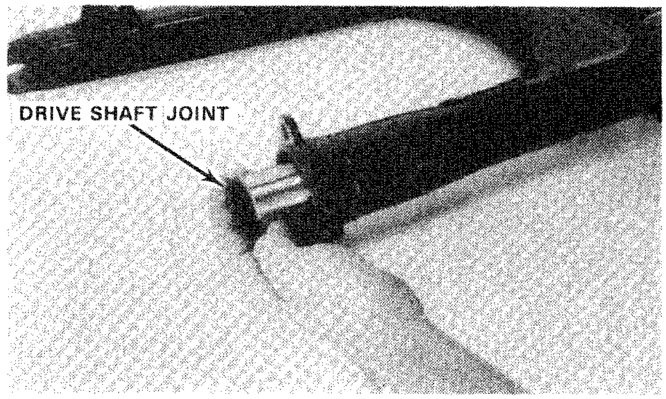
CAUTION: Be sure to drive the races in squarely.



Apply grease to the bearings, races, and dust seals. Install the bearings and dust seals into the swingarm.

Apply grease to the drive shaft joint and drive shaft splines and reinstall into the swingarm. Install the circlip.

Install the boot.

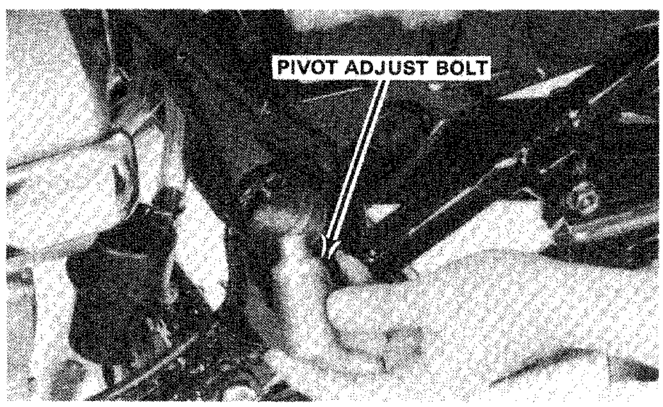


Installation

Apply grease to the tip of each pivot bolt.

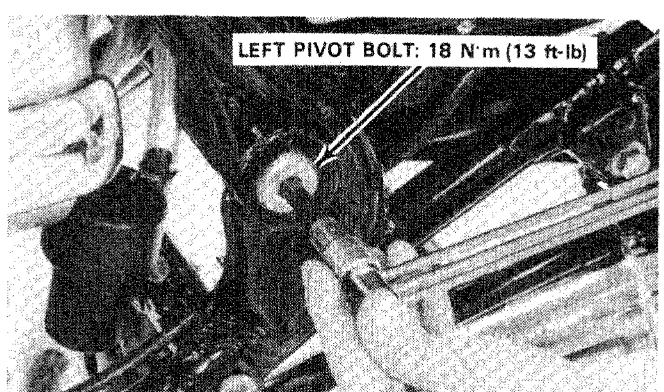
Position the swingarm in the frame and loosely install the pivot bolts.

Tighten the right pivot bolt to 100 N·m (72 ft-lb).

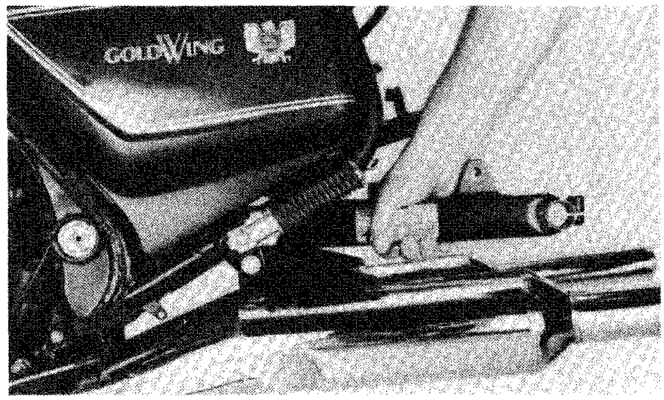


Tighten the left pivot bolt to the specified torque.

Install the pivot lock nut to the left pivot bolt.

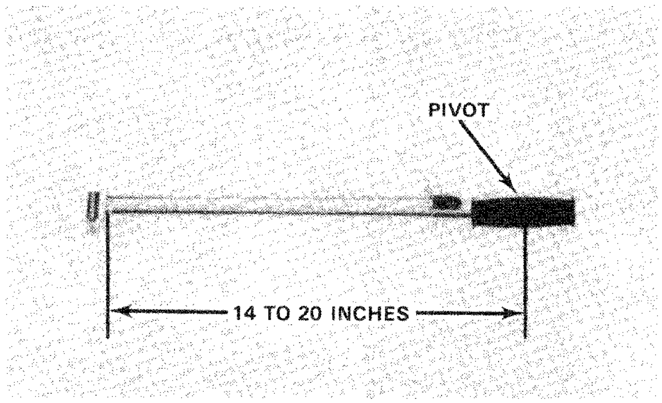


Move the swingarm up and down several times and retorque the left pivot bolt.



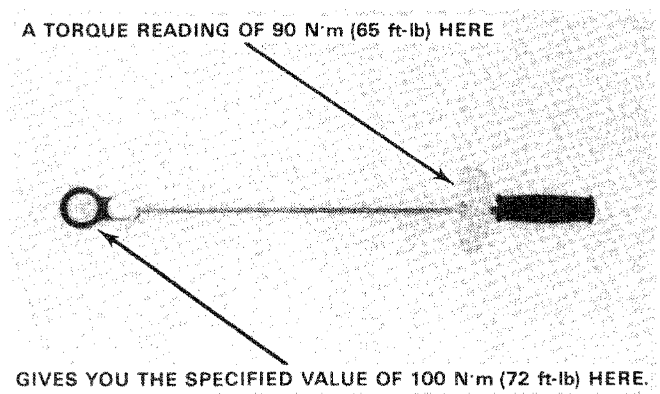
Use the lock nut wrench adaptor to torque the lock nut while holding the left pivot collar to keep it from turning.

NOTE: Use a deflecting beam type torque wrench 14 to 20 inches long.



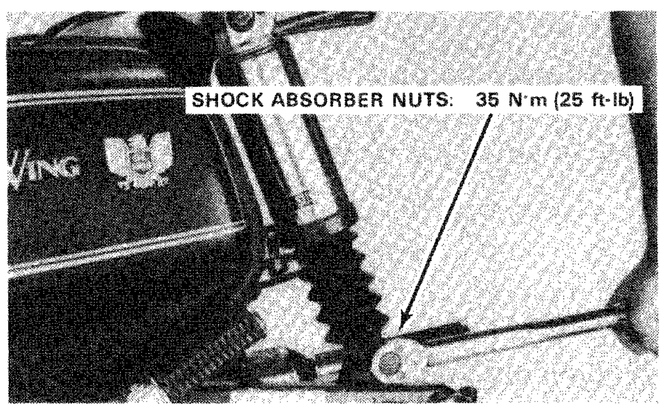
Torque the lock nut to 100 N·m (72 ft-lb) which will be 90 N·m (65 ft-lb) on the wrench.

NOTE: The lock nut wrench adaptor increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The torque 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 adaptor.



Install the pivot caps.

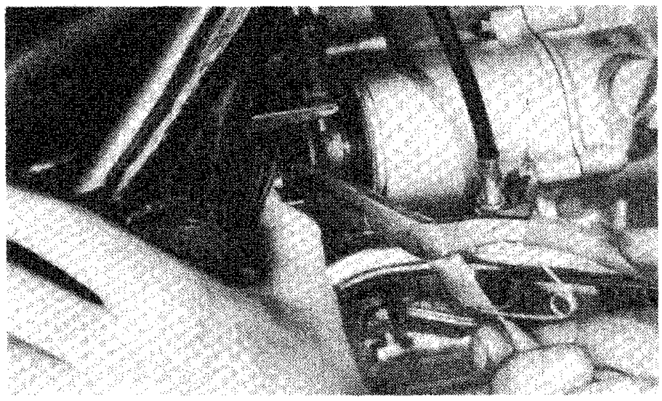
Reinstall the left shock absorber on the swingarm and tighten the bolt to the specified torque.



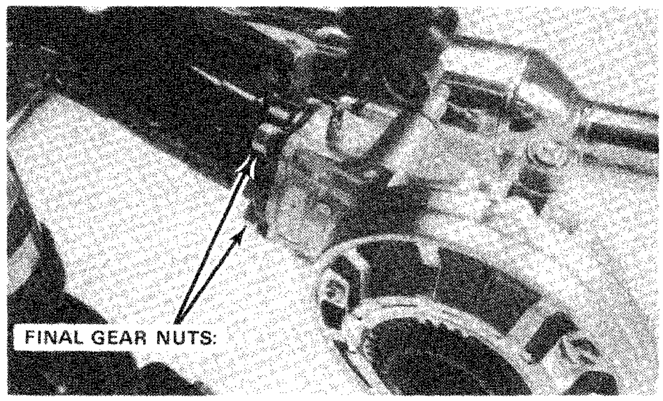
(cont'd)

Swing Arm (cont'd)

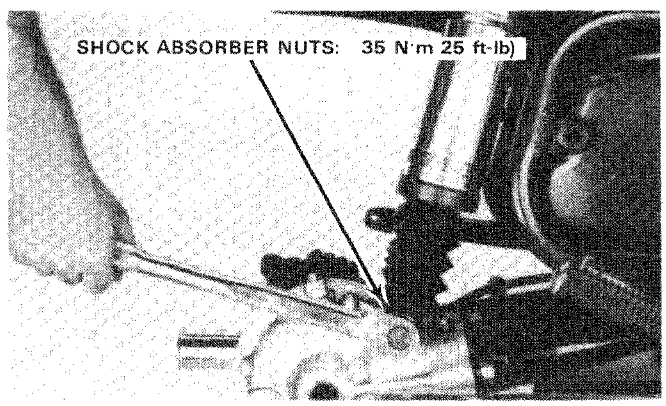
Connect the drive shaft to the engine and reinstall the boot (page 11-14).



Install the final drive gear case and loosely install nuts.



Install the right shock absorber onto the final drive gear case and tighten the nut to the specified torque.

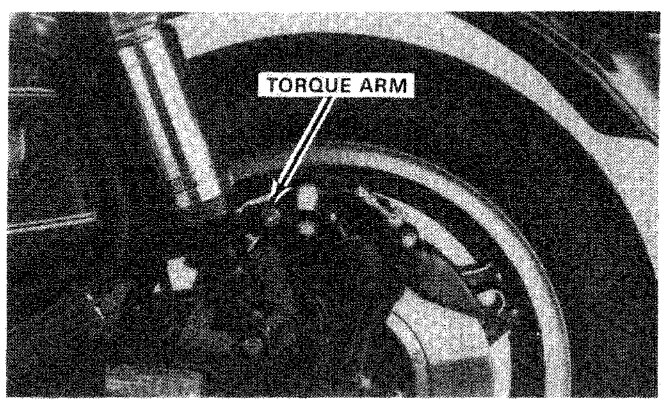


Reinstall the brake caliper on the torque arm.

Push the brake hose grommet back into the swingarm and torque the arm hose clamps.

Install rear wheel (page 14-12).

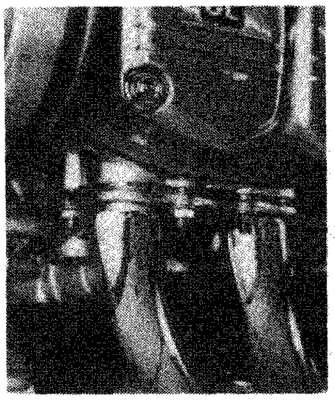
Torque final gear case nuts to 40 N·m (29 ft-lb).

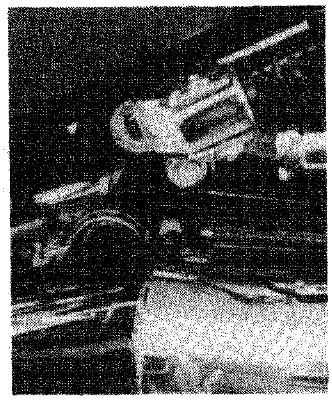


Center Stand Inspection and Replacement

If the center stand is cracked or bent, replace it.

Remove the muffler mounting bolt below the left passsenger footpeg. Loosen the two crossover pipe clamp bolts. Remove the cylinder head exhaust flange nuts and remove the left muffler.

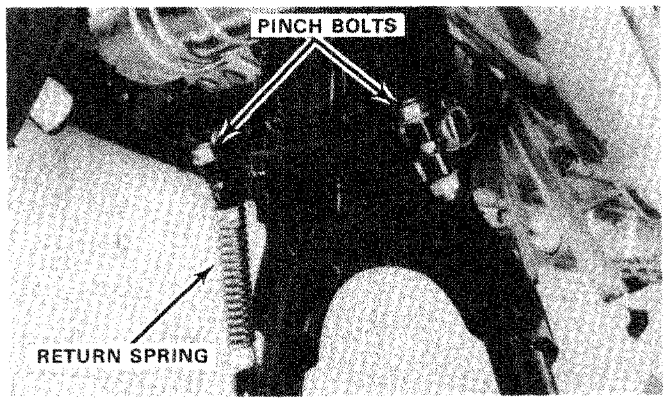




Loosen the pinch bolts and remove the cotter pin.

Disconnect the return spring.

Drive out the pivot shaft and remove the center stand.

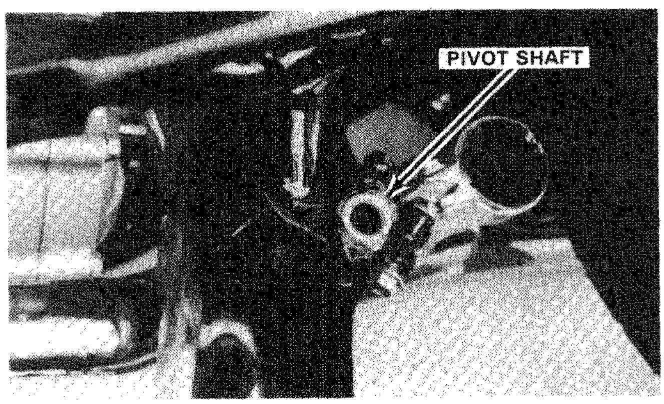


When installing the center stand, be sure to grease the pivot shaft.

Installation is the reverse of removal. Be sure to tighten all fasteners to the specified torque.

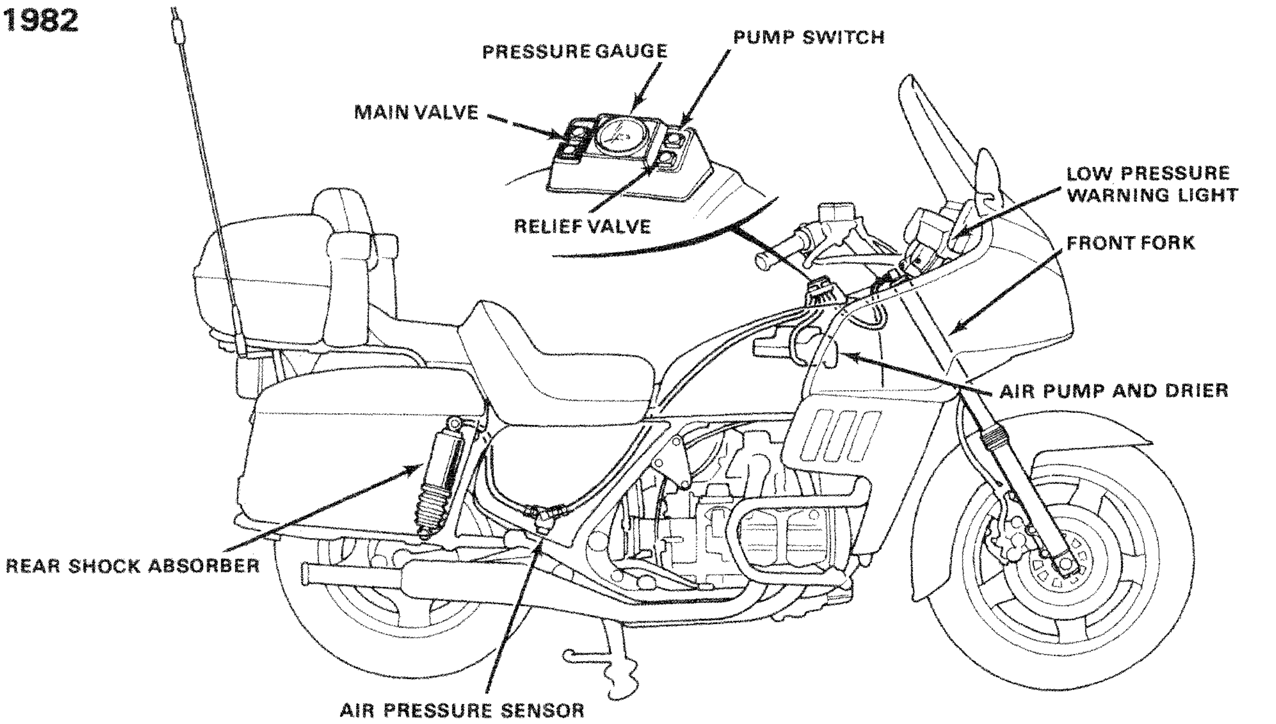
Torque Values:

Muffler mounting bolt:	40 N·m (29 ft-lb)
Crossover pipe clamp bolts:	22 N·m (16 ft-lb)
Exhaust flange nuts:	18 N·m (13 ft-lb)
Center stand pinch bolt/nut:	22 N·m (16 ft-lb)

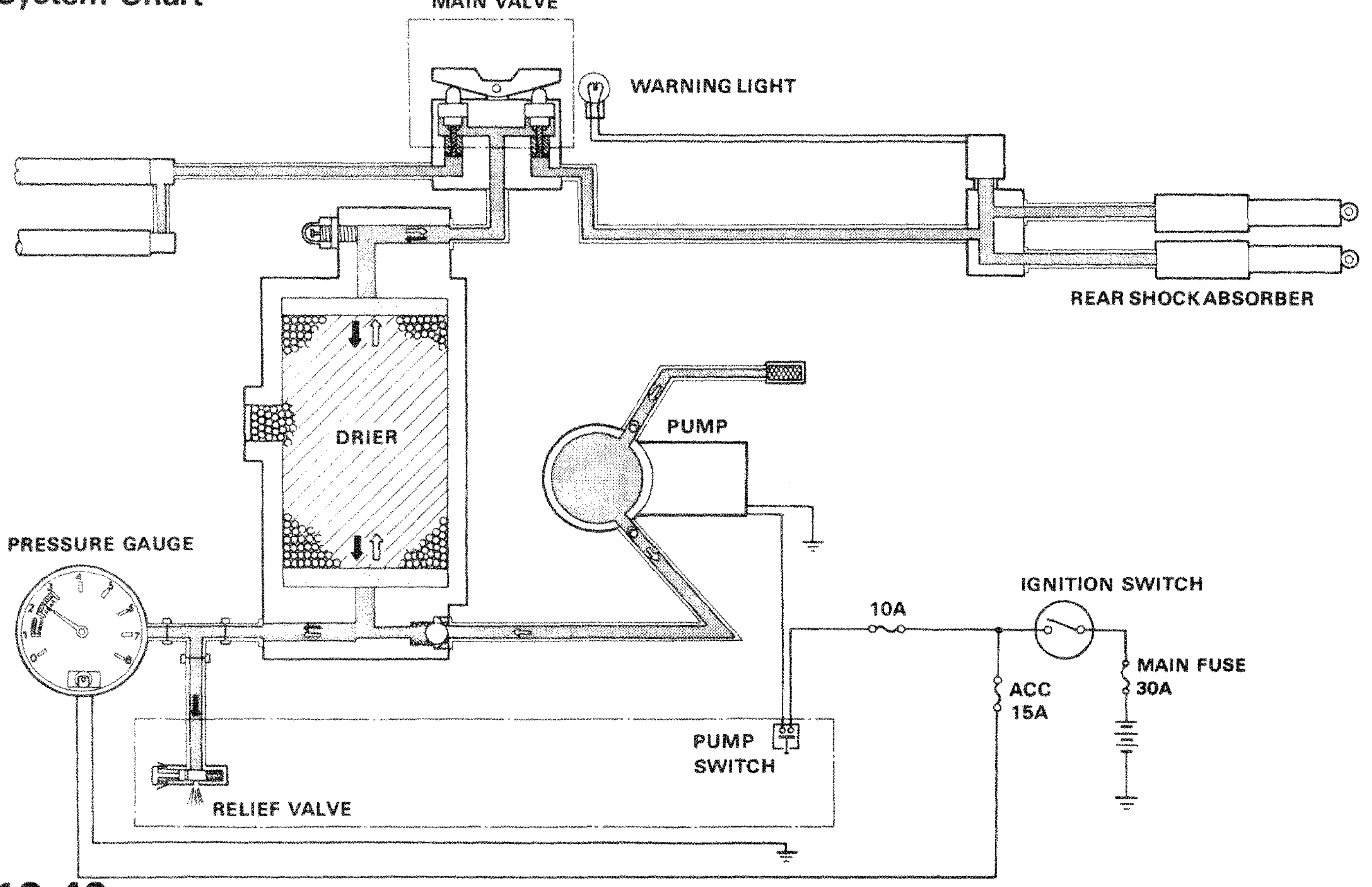


On-Board Air Compressor System

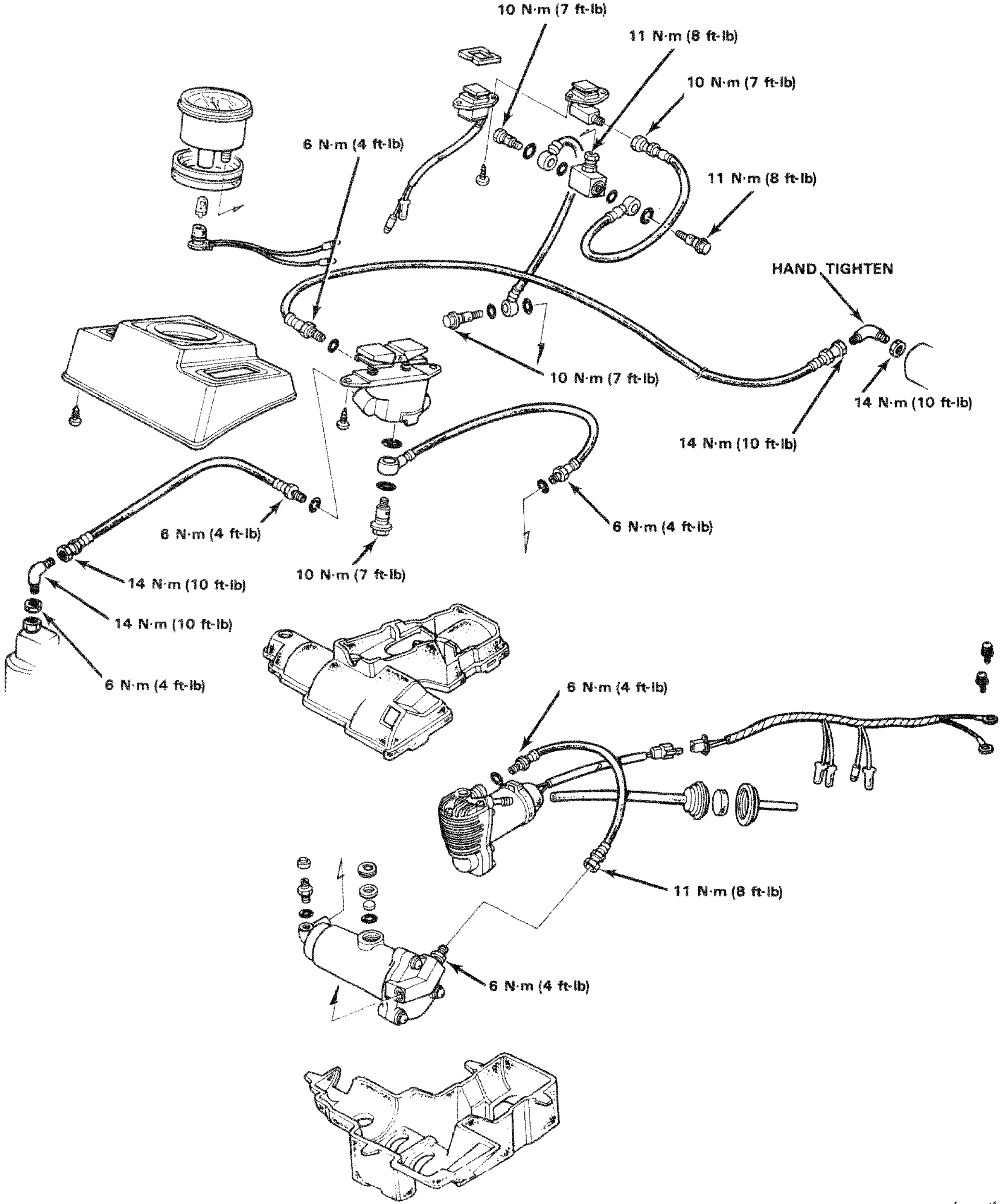
Aspencade
1982



System Chart



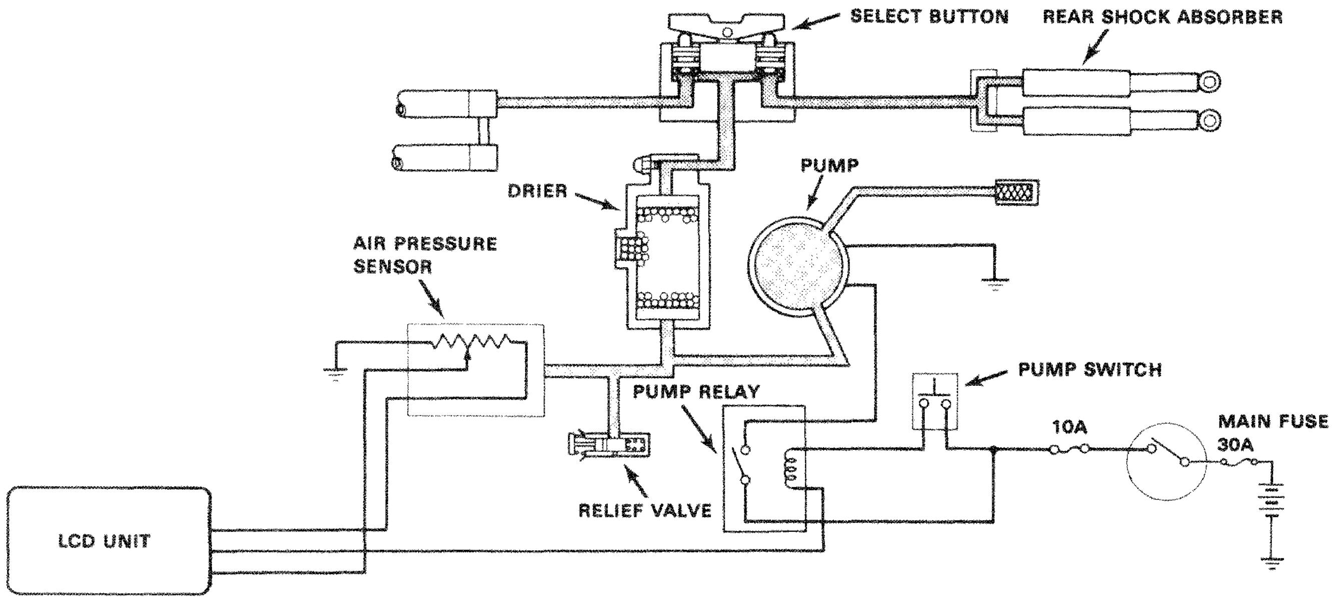
1982

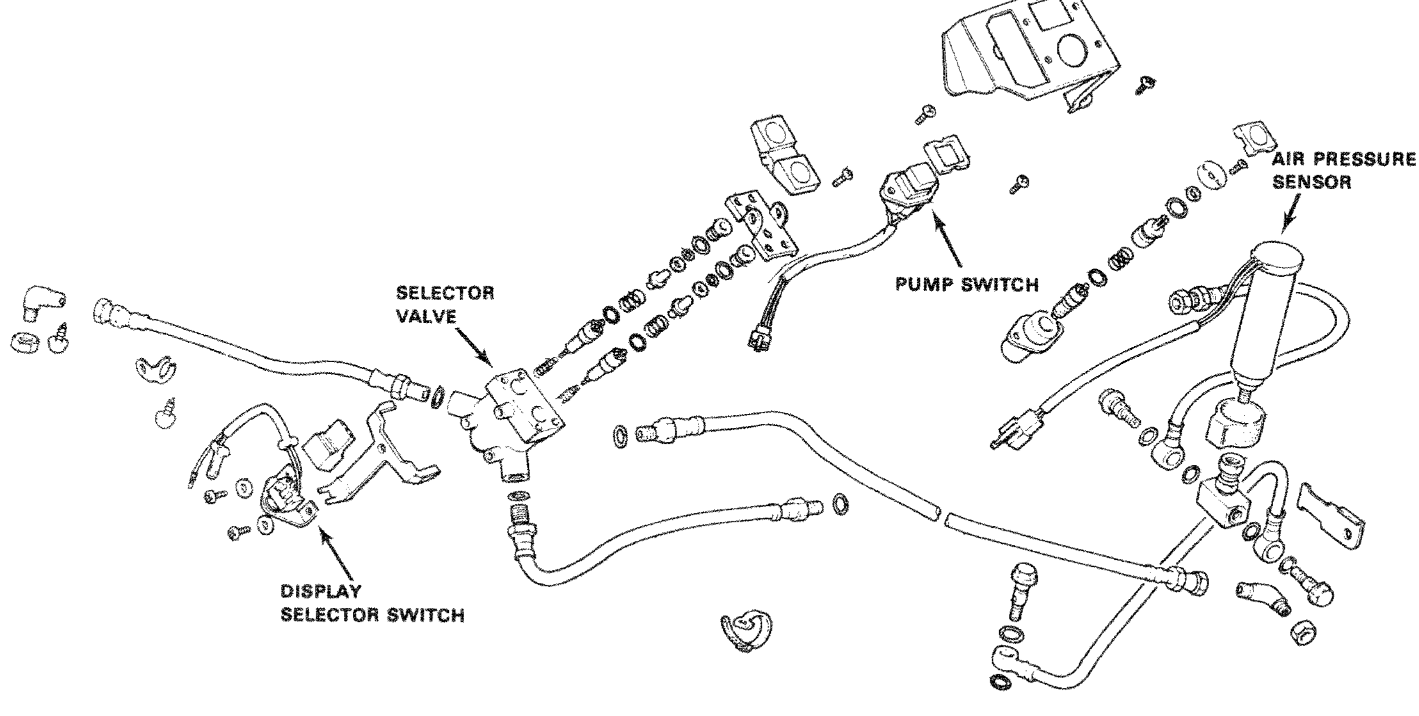


10 N·m (7 ft-lb)
11 N·m (8 ft-lb)
10 N·m (7 ft-lb)
6 N·m (4 ft-lb)
11 N·m (8 ft-lb)
HAND TIGHTEN
10 N·m (7 ft-lb)
14 N·m (10 ft-lb)
14 N·m (10 ft-lb)
6 N·m (4 ft-lb)
6 N·m (4 ft-lb)
14 N·m (10 ft-lb)
10 N·m (7 ft-lb)
14 N·m (10 ft-lb)
6 N·m (4 ft-lb)
6 N·m (4 ft-lb)
11 N·m (8 ft-lb)
6 N·m (4 ft-lb)

(cont'd)

Aspencade
1983—





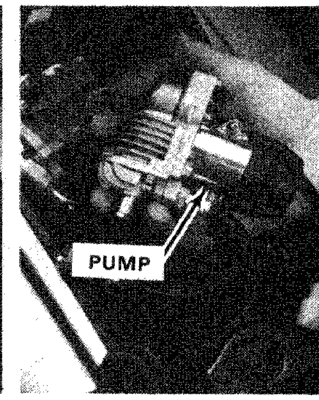
Pump Removal

Open the top compartment cover and pull off the pump cover.

Disconnect the pump wire connector.

Disconnect the air hose at the drier and remove the pump assembly.

Remove the air hose from the pump body.



Pump Installation

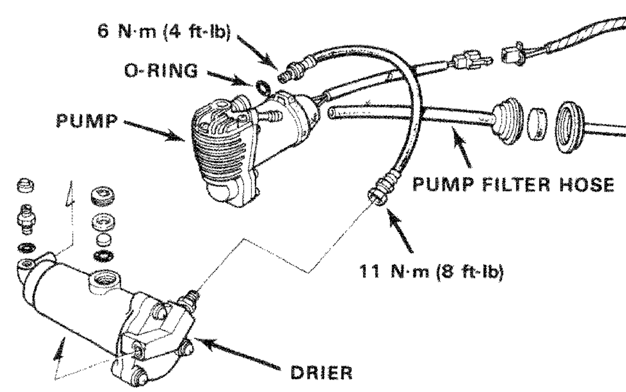
Apply clean ATF to the new O-ring and install it onto the hose connector.

Connect the air hose to the motor and tighten it to the specified torque.

Install the pump filter hose.

Connect the hose to the drier and tighten it to the specified torque.

Install the pump in the reverse order of removal.



Drier Removal/Disassembly

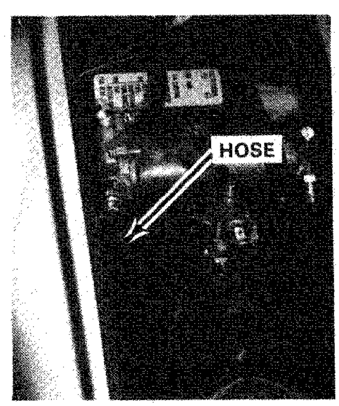
Open the top compartment cover and remove the motor.

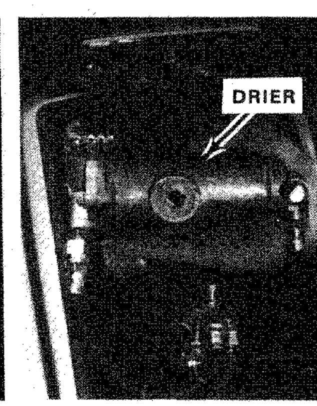
Disconnect the air hose from the gauge by removing the joint bolt.

Loosen the air hose at the drier side, then disconnect the hose by turning the drier while holding the hose to prevent it from turning.

CAUTION: Do not turn the air hose more than one turn.

Remove the drier.





(cont'd)

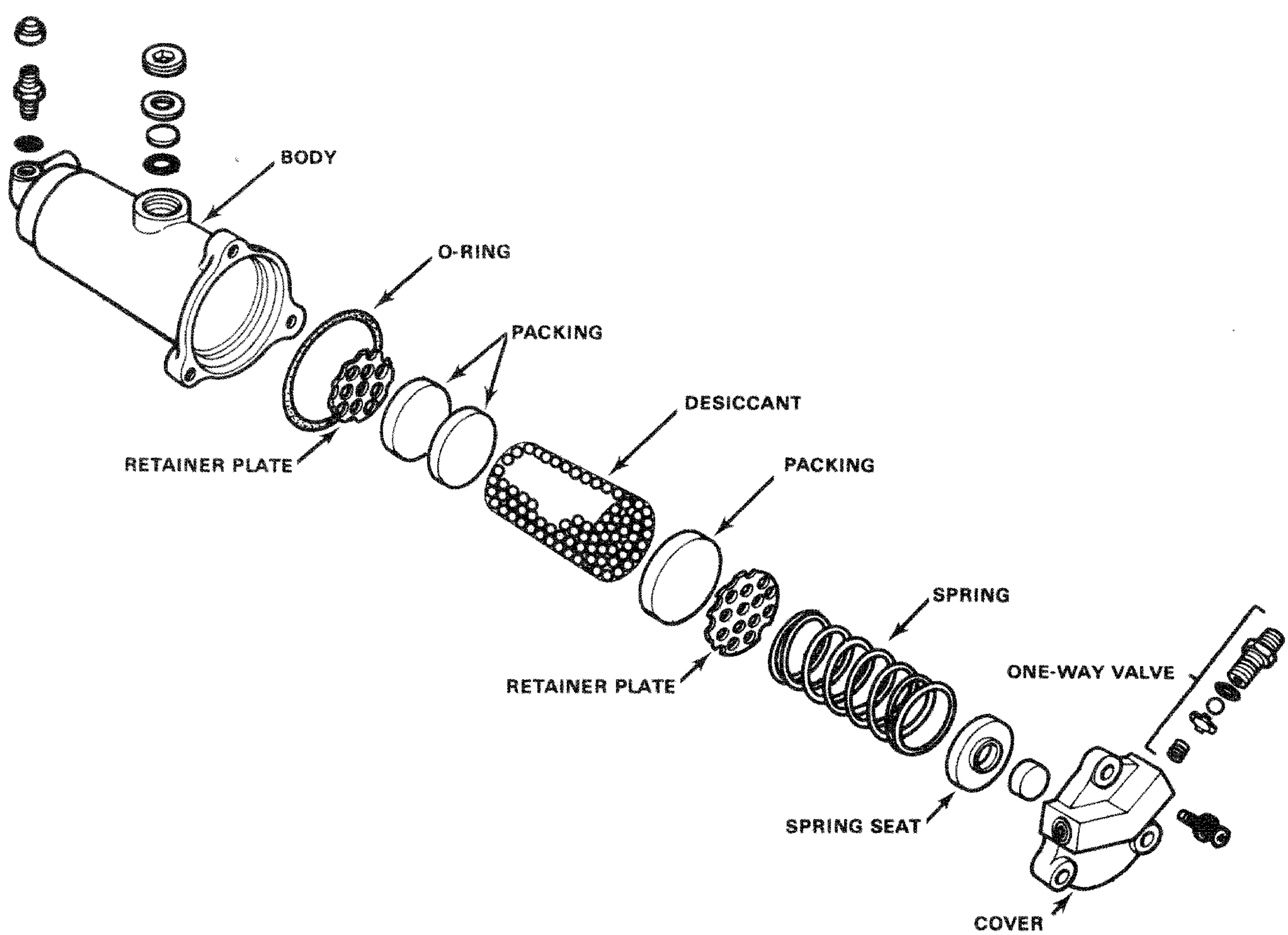
On-Board Air Compressor System (cont'd)

Remove the screws, then disassemble the drier as shown, if necessary.

Check the color of the desiccant. It should be blue. If not, bake the desiccant until it is blue, or replace, if necessary.

Check the packings for dirt or moisture and replace, if necessary.

Clean the inside of the body and the cover openings with compressed air.



Drier Assembly/ Installation

Assemble the drier in the reverse order of disassembly.

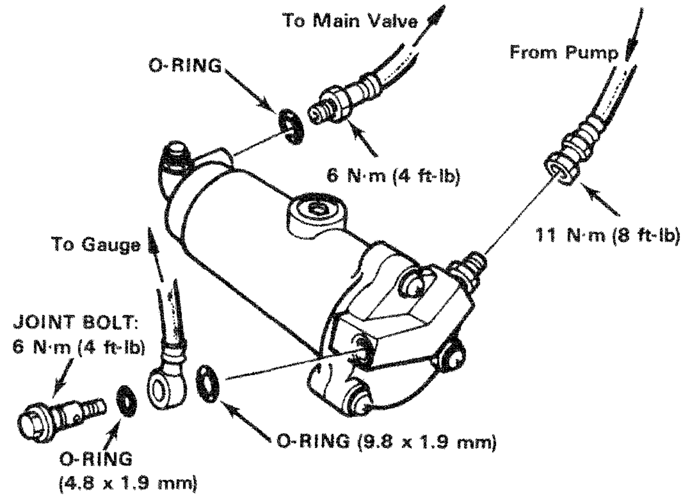
Apply Clean ATF to the new O-rings.

Install the O-ring on the air hose (from the main valve) and connect to the drier by turning the drier until the hose is hand tight.

Install the 4.8 x 1.9 mm O-ring onto the joint bolt and put the 9.8 x 1.9 mm O-ring onto the drier.

Connect the air hose (from the gauge) to the drier.

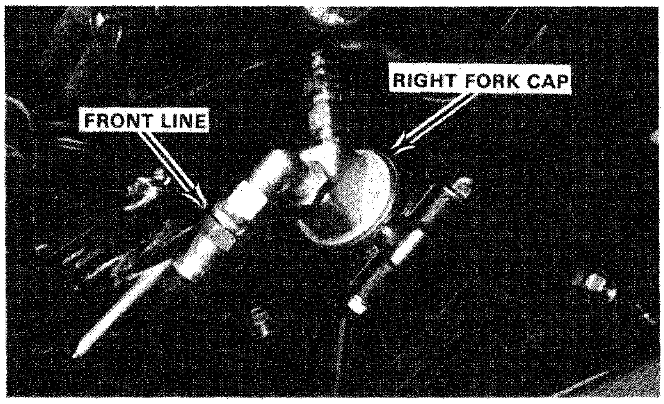
Tighten the hoses and joint bolt to the specified torque values.



Gauge Cluster Removal/Disassembly

NOTE: The following procedure pertains to the 1982 Aspencade only. The 1983– air gauge is contained in the LCD instrument panel. Refer to page 18-27 for 1983– instrument panel removal/disassembly.

Disconnect the front line at the right fork cap.

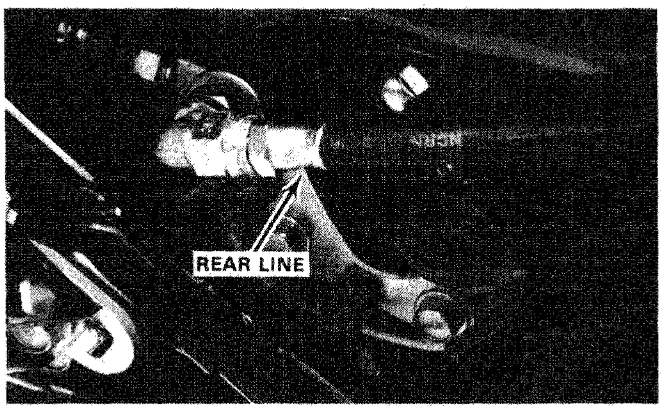


Remove the right side cover.

Disconnect the rear line.

Disconnect the pump sub-harness.

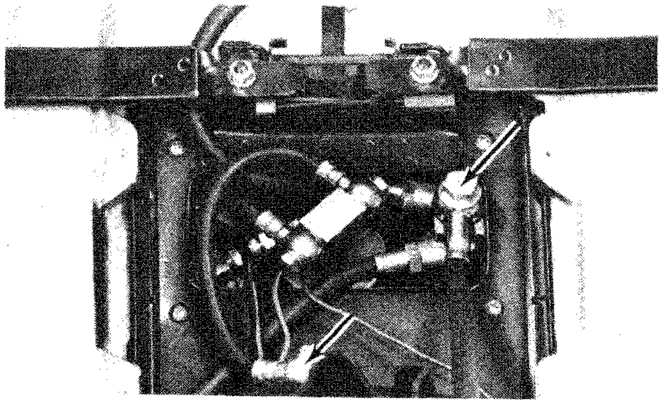
Remove the top compartment.



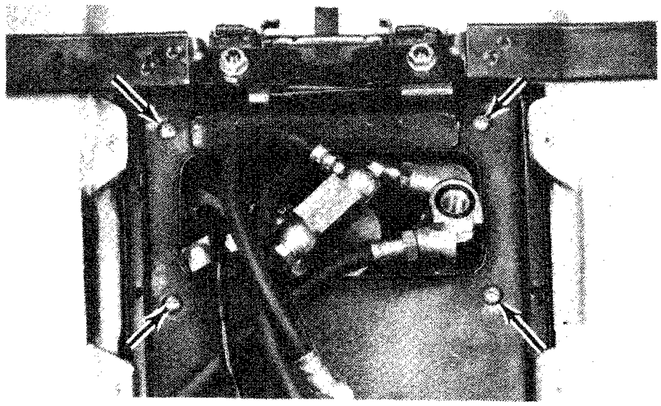
(cont'd)

On-Board Air Compressor System (cont'd)

Disconnect the air hoses from the drier.

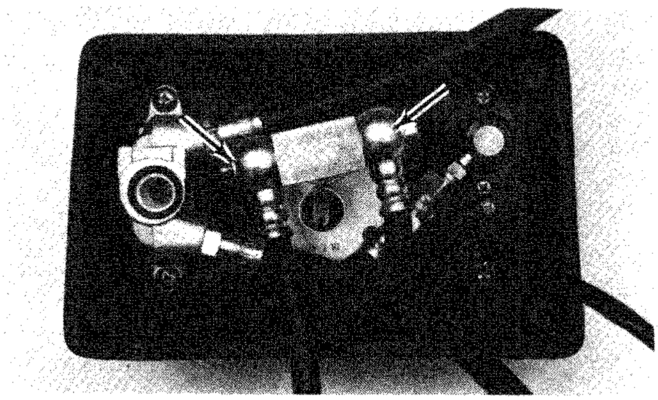


Remove the four screws and remove the gauge cluster.



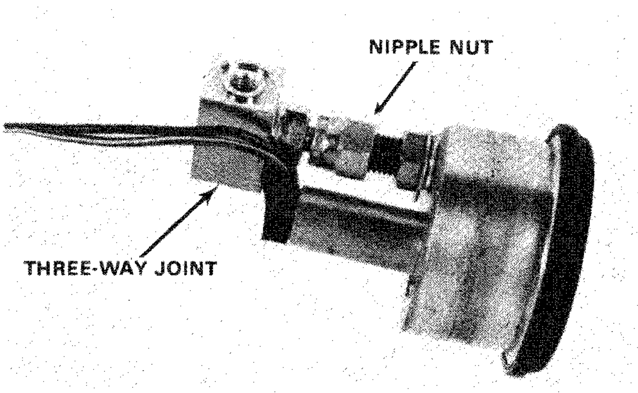
Remove the joint bolts and disconnect the wire harness connectors.

Remove the gauge by pushing it out from the back side of the cluster.



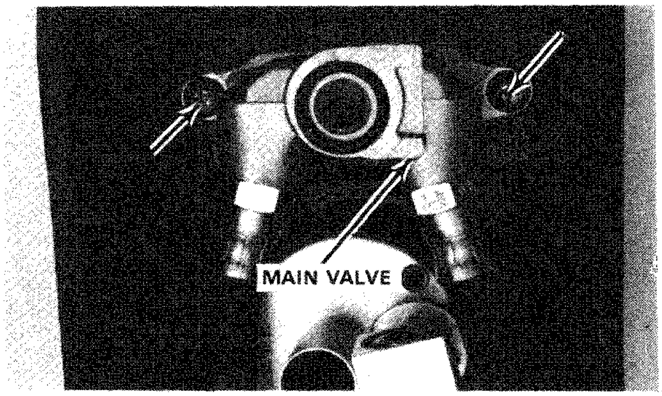
Remove the three-way joint from the gauge.

CAUTION: Turn the nipple nut by holding the three-way joint body. Don't turn the three-way joint body.



Remove the main valve by removing the screws.

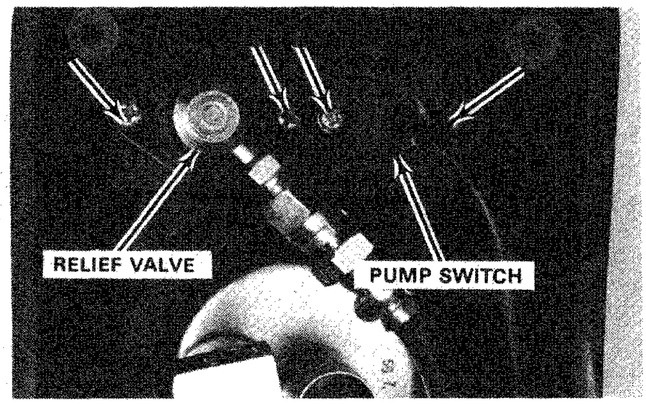
Disconnect the air hoses.



Remove the pump switch and relief valve by removing the screws.

Disconnect the air hose from the relief valve.

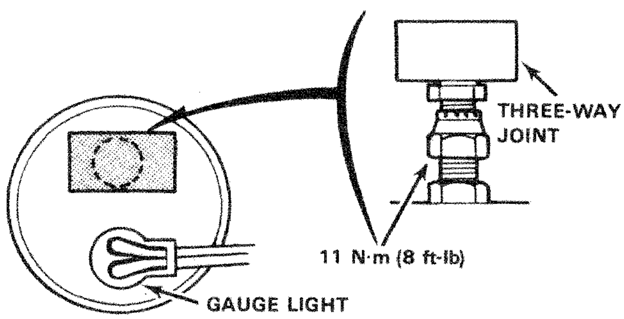
CAUTION: Hold the hose and turn the nipple nut using two wrenches.



Gauge Cluster Assembly

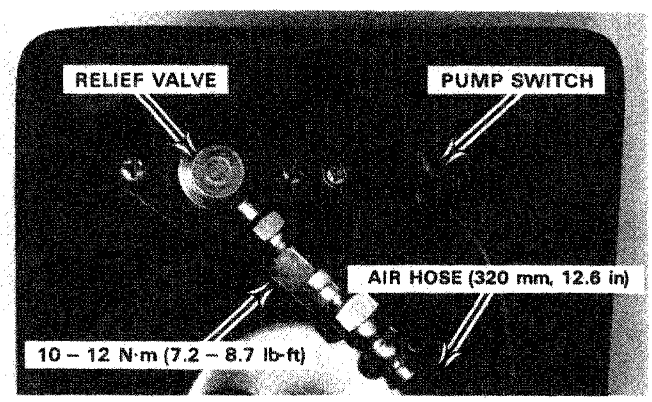
1982:
Install the three-way joint on the gauge as shown.
Tighten to the specified torque.

Push the gauge into the cluster.



Connect the air hose to the relief valve and tighten to the specified torque.

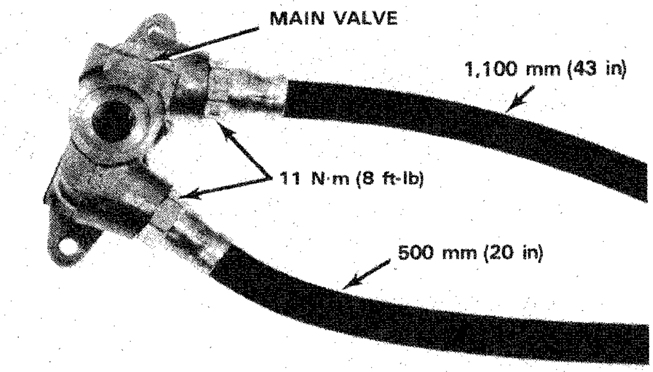
Install the relief valve and pump switch.



(cont'd)

Apply clean ATF to the new O-ring and install it on the hose.

Attach the air hoses to the main valve and tighten to the specified torque.



Apply clean ATF to the O-rings.

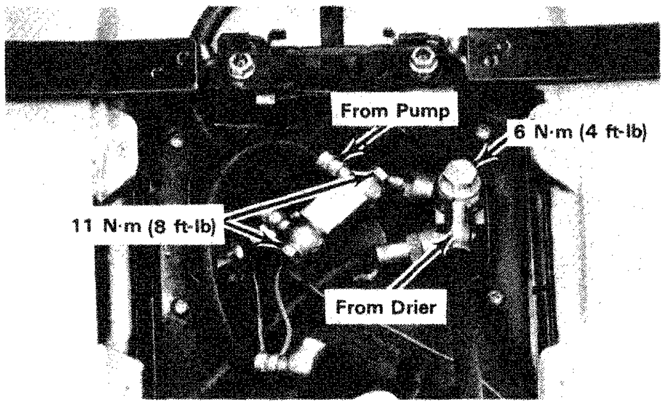
Connect the air hoses to the three-way joint with joint bolts and O-rings. Tighten to the specified torque.

Install the gauge cluster assembly onto the top compartment.

Apply clean ATF to new O-rings and install the O-ring on the joint bolt and main valve.

Connect the air hose from the drier and tighten the joint bolt to the specified torque.

Install the top compartment on the frame and connect the air hoses to the front and rear suspension.



Main Valve Disassembly/Assembly

Pry the valve button off with a screwdriver.

Remove the screws and remove the valve holder plate.

Remove the valve and springs.

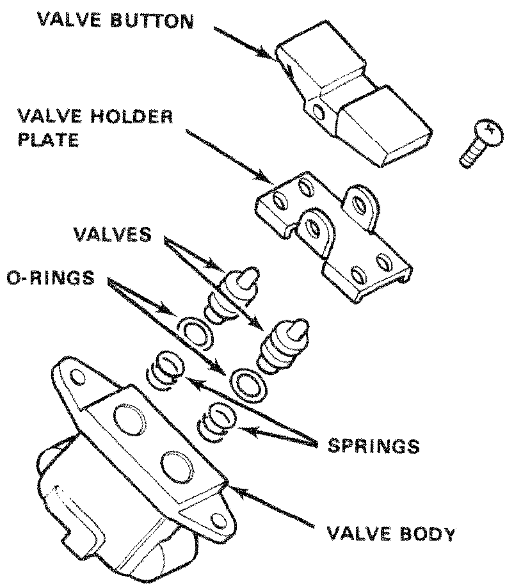
Clean the main valve body with compressed air and install the springs into the valve body.

Apply clean ATF to the valves and O-rings.

Install the O-rings onto the valves and install them into the valve body.

Install the valve holder plate and tighten the screws.

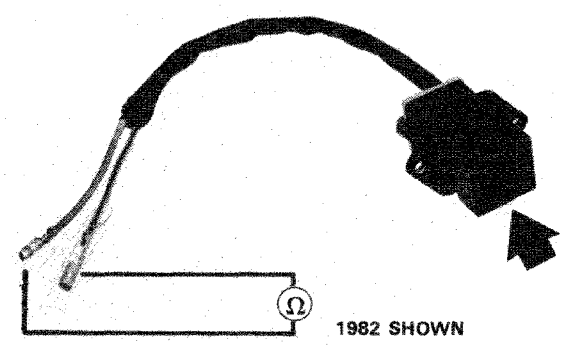
Snap the valve button onto the holder plate.



Pump Switch Inspection

Connect an ohmmeter to the switch terminals and check for continuity.

There should be continuity when the switch button is depressed. Replace if necessary.

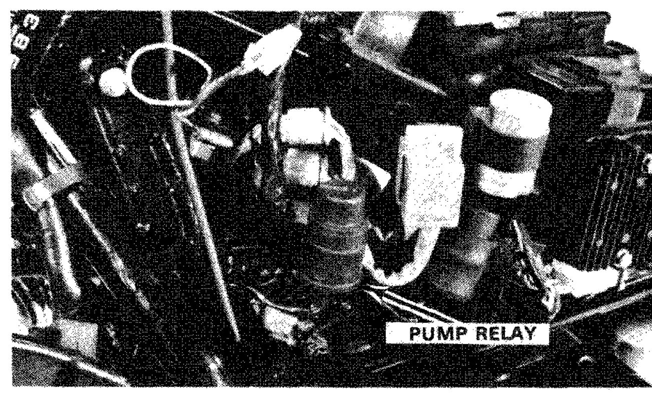

1982 SHOWN

1983— :

Pump Relay Inspection

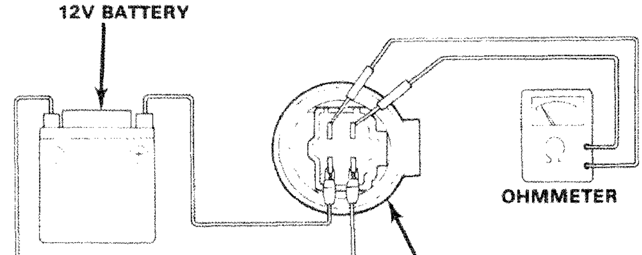
Remove the fairing (page 19-4).

Remove the seat and top compartment. Unplug the pump relay and remove it from it's holder.



Connect a fully charged 12V battery and an ohmmeter to the pump relay terminals as shown.

The relay is normal if there is continuity when voltage is applied.



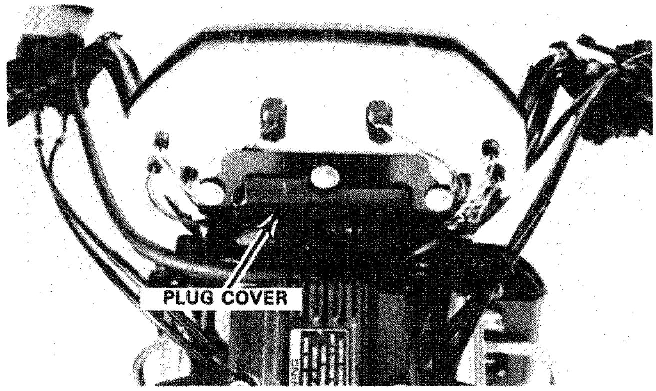
(cont'd)

1983–
Display Selector Switch Inspection

Remove the fairing (page 19-4).

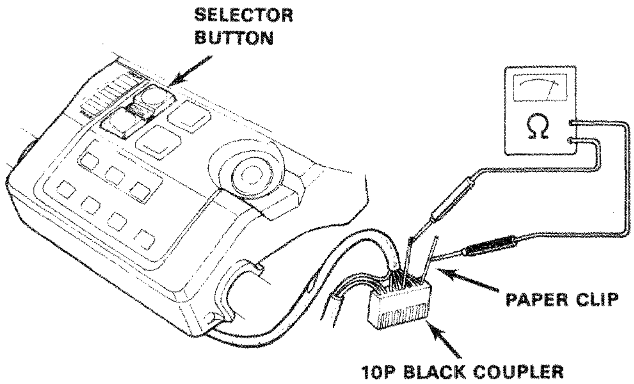
Remove the instrument panel cover.

Remove the plug cover and unplug the 10-P black coupler.



Insert paper clips into the rear of the coupler as shown and check for continuity with the selector button in the "Front" and "Rear" positions.

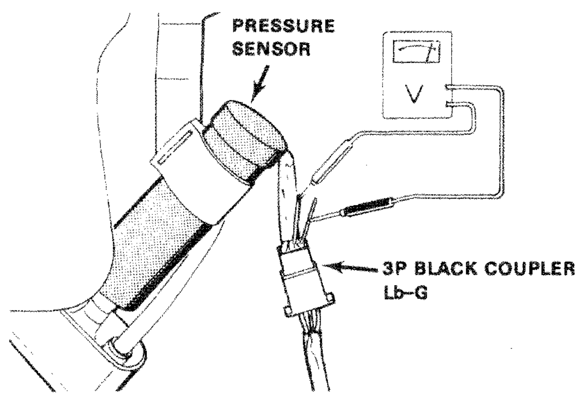
Color code / Switch position	G/Bl	Bu/Y	Bu/O
REAR	○—	—○	
FRONT	○—	—	—○



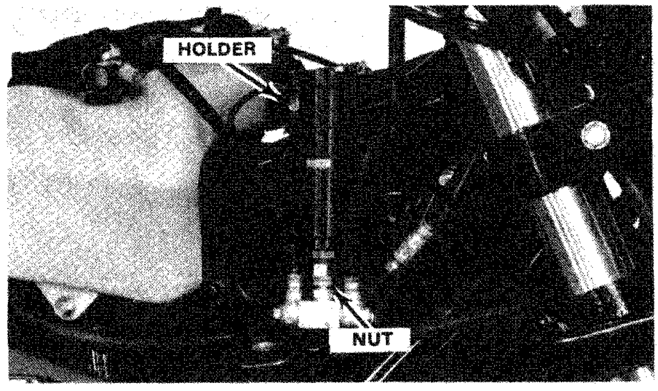
Air Pressure Sensor Inspection

Remove the fairing, seat and top compartment.

Locate the 3-P black coupler at the sensor which is mounted just in front of the coolant reserve tank. With the coupler connected and the ignition ON, measure the voltage between the Light Blue and Green wires. It should be 0 at zero air pressure, and it should increase smoothly to a maximum of 3 volts at 8.1 kg/cm² (115 psi).



To remove the air pressure sensor, bleed all air pressure from both the front and rear suspension. Disconnect the black 3-P coupler. Loosen the nut and remove the sensor from its holder.



Brakes

Brakes

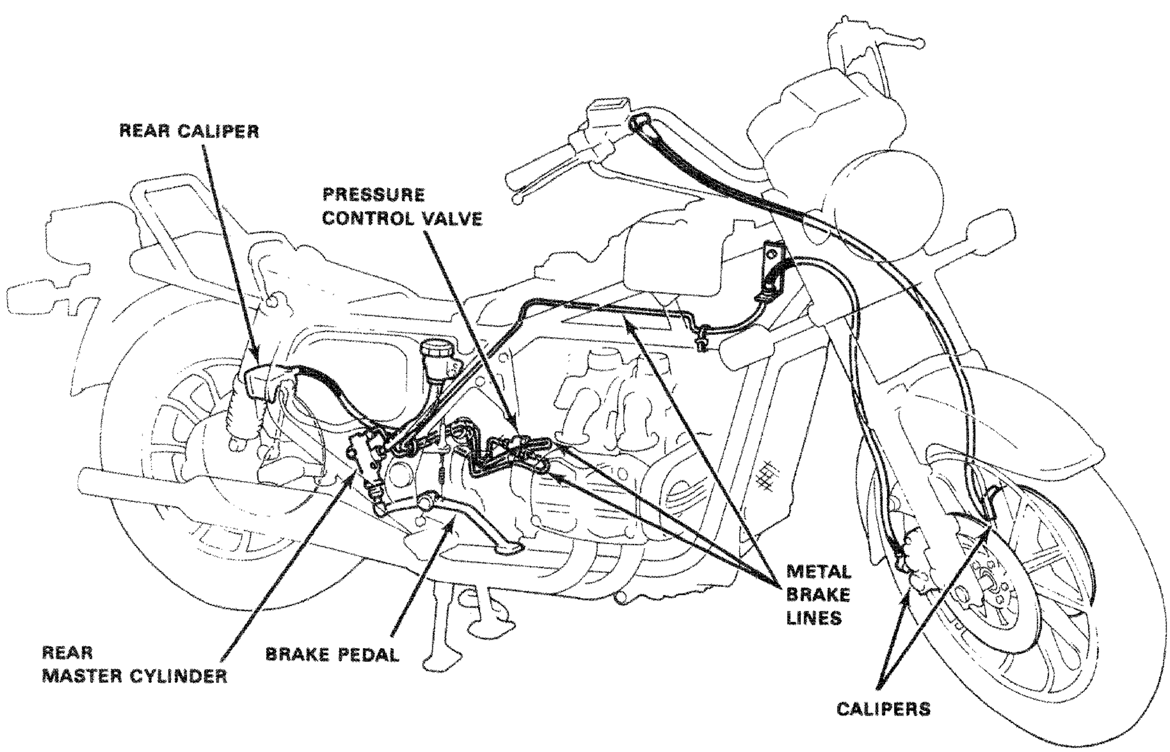
Service Information

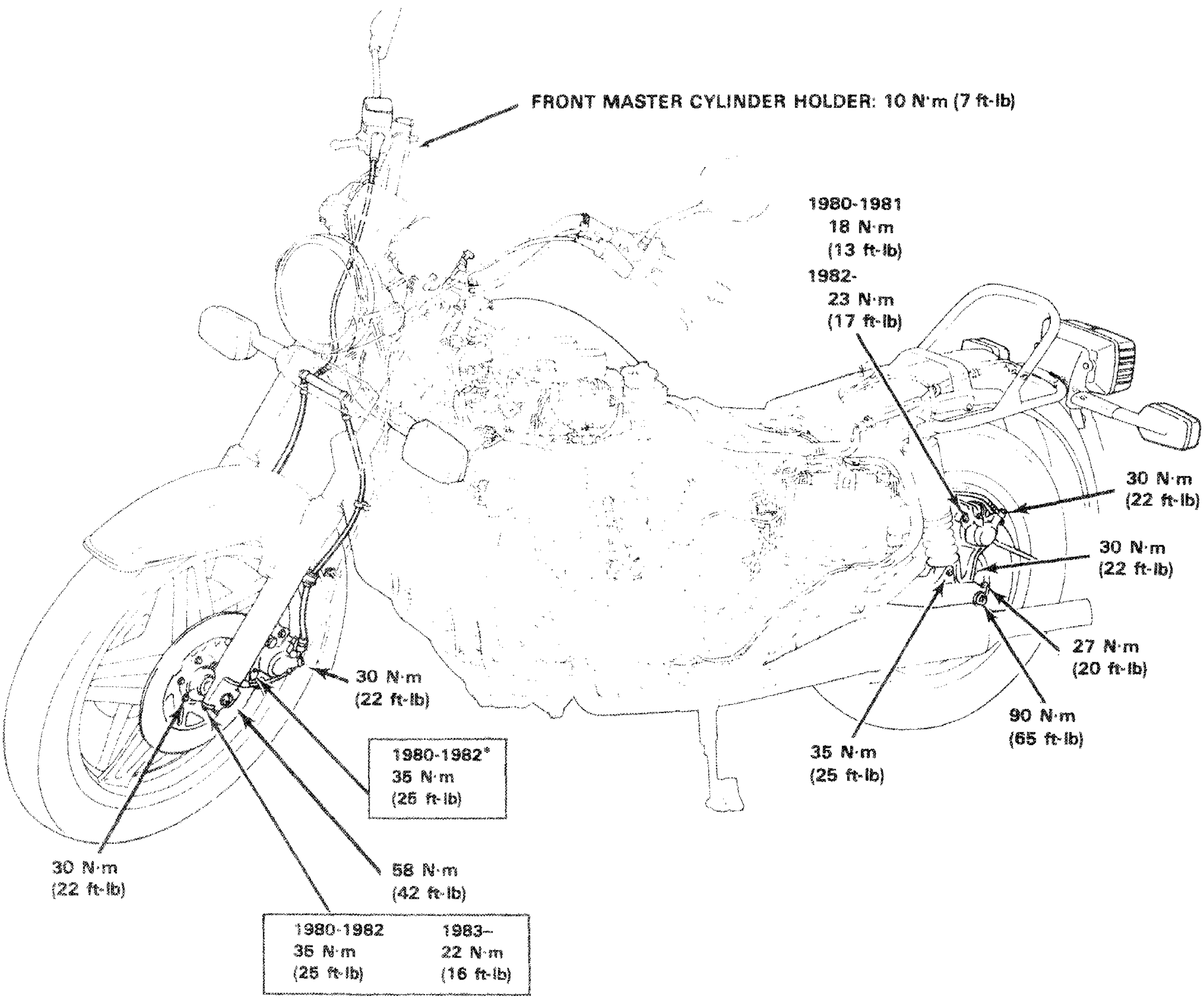
- Both the front and rear brakes can be removed without disconnecting the hydraulic system. Once either system is opened, or whenever the brakes feel spongy, the system must be bled.
- Be very careful whenever you remove the reservoir cap: Make sure the front reservoir is horizontal first. Never allow contaminants (dirt, water, etc.) to get into an open reservoir.
- Always use fresh DOT 3 brake fluid from a sealed container when servicing the system.
- The brake fluid replacement and bleeding procedures for the front and rear brakes are the same.

  CAUTION: Spilled brake fluid will severely damage instrument lenses and painted surfaces.

The 1983 GL1100's are equipped with a unified brake system which provides simultaneous braking action of the right front and rear disc brakes through application of the foot operated brake pedal. The hand operated brake lever activates the left front disc brake which is independent of the unified system.

- The pressure control valve is not serviceable. It must be replaced if it is suspected to be faulty.





Torque Values

*Front caliper mount bolt 1983–	
Upper	40 N·m (29 ft-lb)
Lower	23 N·m (17 ft-lb)
Front caliper bolt	
1980-1981	18 N·m (13 ft-lb)
1982–	23 N·m (17 ft-lb)
Caliper pivot bolt 1983–	27 N·m (20 ft-lb)
Metal brake line nut	9 N·m (6 ft-lb)
Brake rod joint lock nut	18 N·m (13 ft-lb)
Rear reservoir mounting bolt	12 N·m (9 ft-lb)
Rear master cylinder mounting bolt	27 N·m (20 ft-lb)
Rear caliper torque link	22 N·m (16 ft-lb)
Hose 2-way joint bolt	12 N·m (9 ft-lb)

Brakes

Troubleshooting

Brake Lever/Pedal Soft Or Spongy
- Air bubbles in hydraulic system.
- Insufficient fluid in hydraulic system.
- External leak in hydraulic system.
- Internal leak in hydraulic system.

Brakes Drag
- Hydraulic system sticking.
- Incorrect adjustment of lever or pedal.
- Frozen piston(s).

Brake Lever/Pedal Too Hard
- Frozen piston(s).
- Clogged hydraulic system.
- Pads glazed or worn excessively.

Brakes Grab Or Pull To One Side
- Pads contaminated.
- One side of front braking system faulty.
- Disc or wheel misaligned.

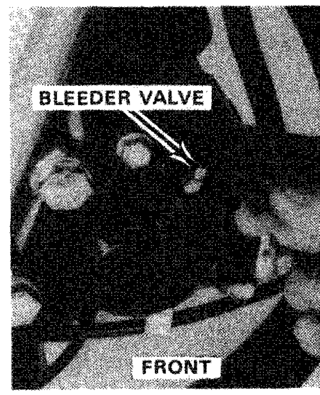
Brakes Chatter Or Squeal
- Pads contaminated.
- Excessive runout on disc(s).
- Caliper installed incorrectly.
- Disc or wheel misaligned.

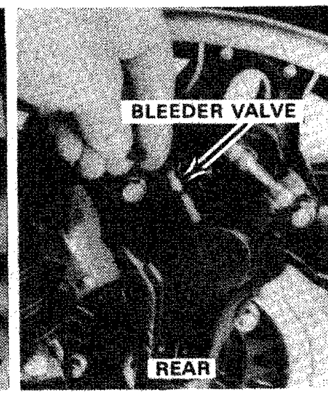
Brake Fluid Replacement

WARNING: Do not get brake fluid on the discs or pads; stopping power will be greatly reduced. Replace contaminated pads. Clean contaminated discs immediately with a degreasing agent.

Remove the bleeder valve dust cap. Connect one end of the bleeder hose to the valve and put the other end in a container.

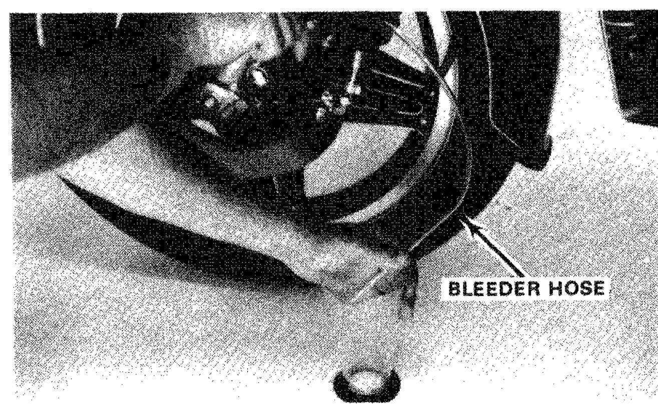
NOTE: 1980-1981 model shown.





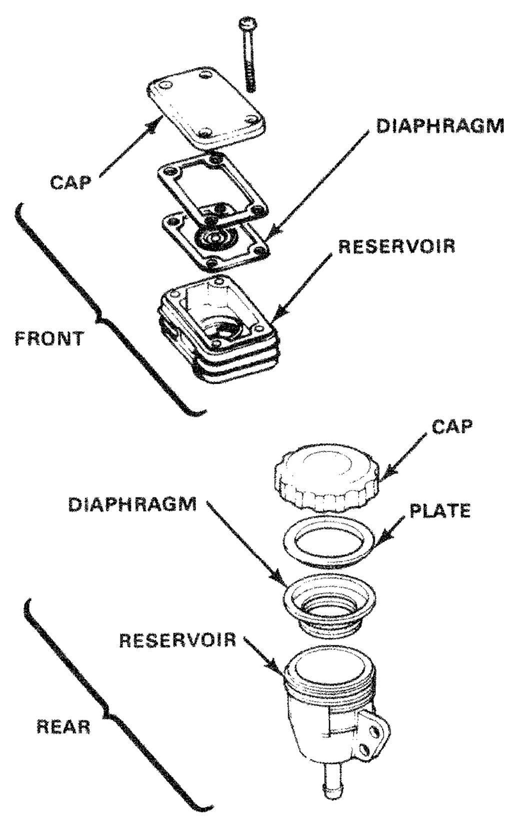
Loosen the valve and squeeze the lever (pump the pedal) until no more fluid flows out. Close the valve.

1983— :
NOTE: Loosen the bleeder valves on the rear caliper and right front caliper and then pump until no more fluid fluid flows out.



Remove the reservoir cap and diaphragm (and the washer from the rear reservoir), and fill the reservoir.

Reinstall the diaphragm (and washer), then bleed the system (page 13-6).



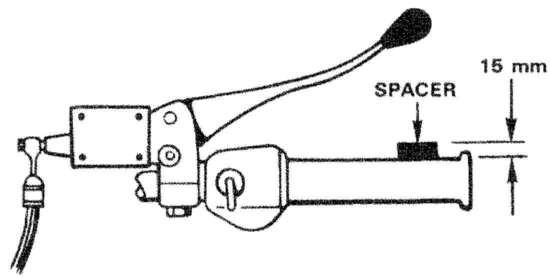
Brakes

Brake Bleeding

CAUTION:

- **Make sure the diaphragm is in place before beginning. The diaphragm prevents fluid from squirting out of the reservoir when system pressure is pumped up.**
- **To prevent piston overtravel and fluid seepage, do not pull the lever all the way back to the handlebar grip. Attach a 15 mm spacer to the grip before bleeding the front system.**

NOTE: Check the fluid level often while bleeding the brakes to prevent air from being pumped into the system.

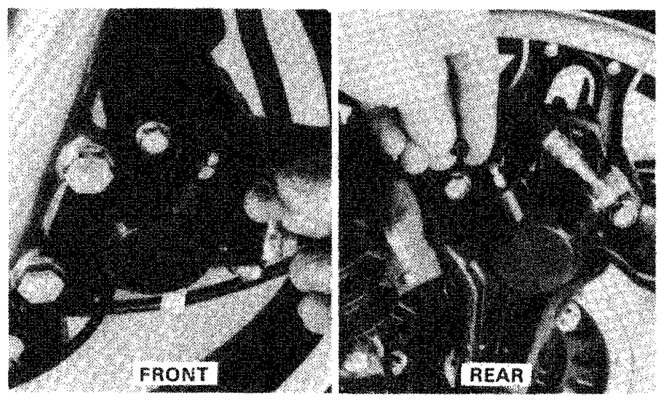


15 mm prevents overtravel during the bleeding procedure.

Remove the bleed valve dust cap. Connect a bleed hose to the valve and put the other end in a clean container.

1983— :

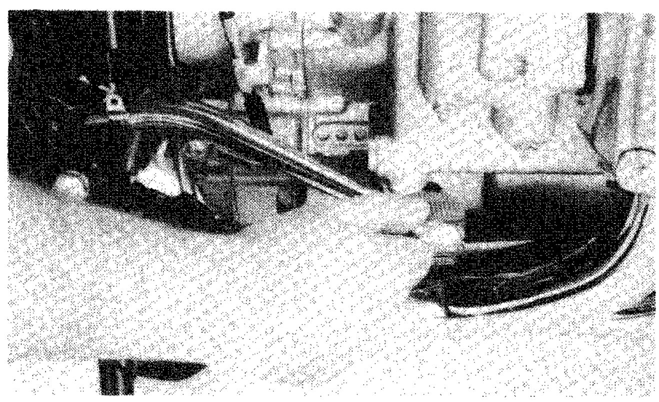
When bleeding the unified brake system, bleed the right front caliper first and then the rear caliper using the same procedures described below.



Pump up the system pressure with the lever/pedal until it becomes hard and open the bleed valve.

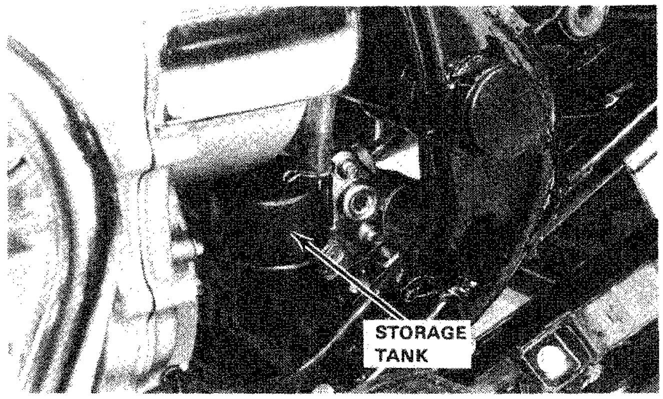
Close the valve just before the lever or pedal reaches the end of its travel. Repeat this procedure until air bubbles cease to appear in the fluid at the end of the hose.

NOTE: If air has gotten into the system the lever/pedal will feel spongy instead of solid.

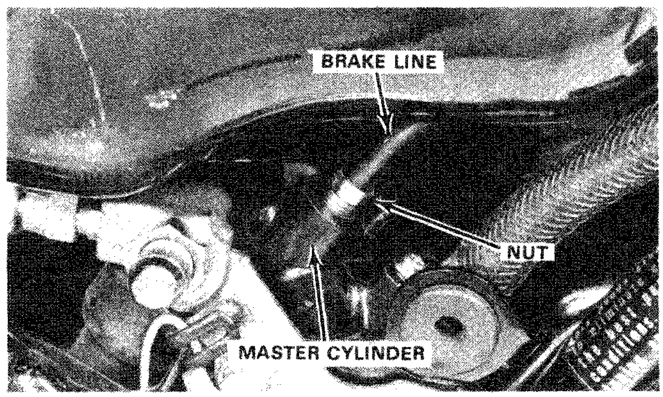


Metal Brake Lines Replacement

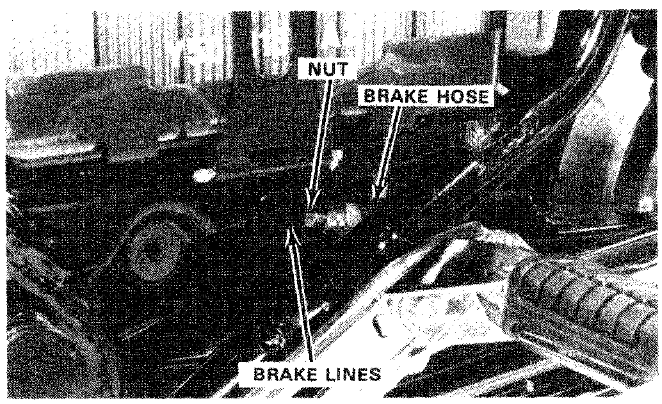
Remove the storage tank and the nuts securing the metal lines to the pressure control valve.



Loosen the nut and disconnect the line at the rear master cylinder.



Loosen the nut and disconnect the line connected to the rear brake hose.



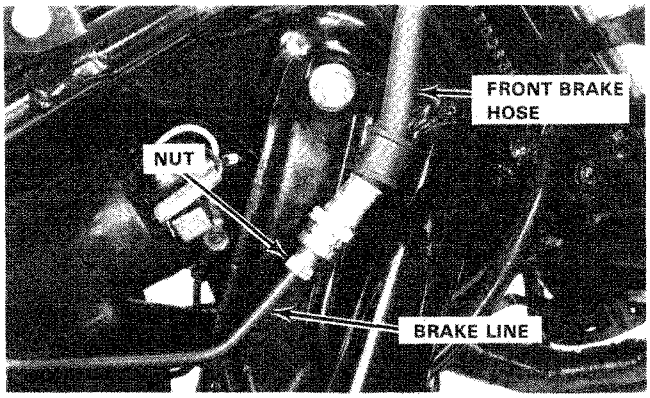
(cont'd)

Brakes

Metal Brake Lines Replacement (cont'd)

Remove the seat, top compartment and fuel tank (page 4-15).

Loosen the nut and disconnect the line connected to the front brake hose.

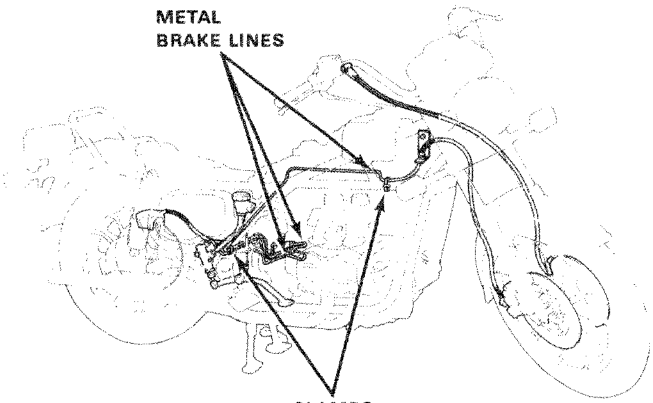


Remove the clamps.

After installing the new lines, tighten the nuts. Be careful not to twist the metal lines when tightening.

Torque: 7–10 N·m (5–7 ft-lb)

Secure the lines with clamps as before. Bleed the system (page 13-6).

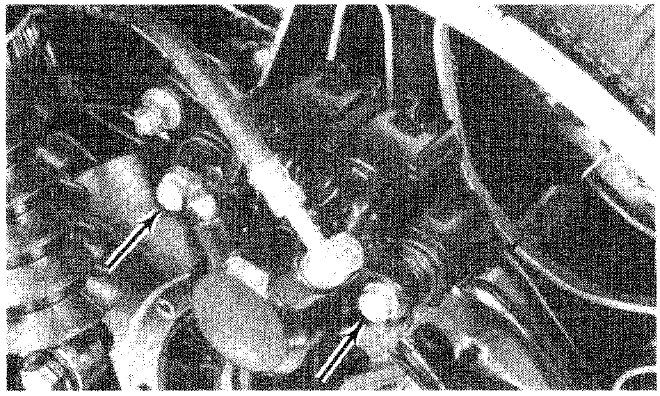


Brake Pad Replacement

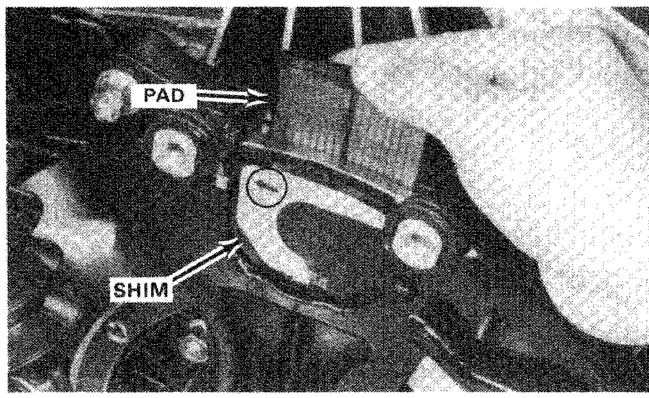
NOTE:
- Always replace pads in pairs to assure even disc pressure. Always check both pairs of pads on the front system.
- Caliper removal and reinstallation procedures are the same for both front and rear brakes.

1980-1981:

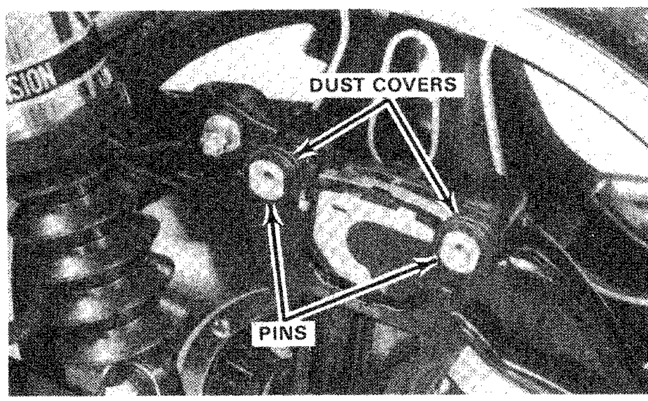
Remove the two caliper bolts and lift off the caliper. Then remove both pads and the shim.



Install the new pads with the shim on the outside pad. The arrow on the shim points in the direction of wheel rotation.

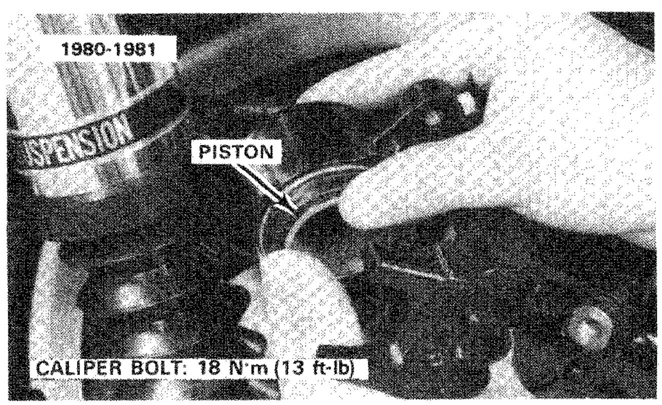


Inspect the caliper pins for wear and dust covers for deterioration; replace if necessary.



Inspect the piston seal and boot for deterioration; replace if necessary.

Press the piston back into the caliper, install the caliper and torque the bolts.



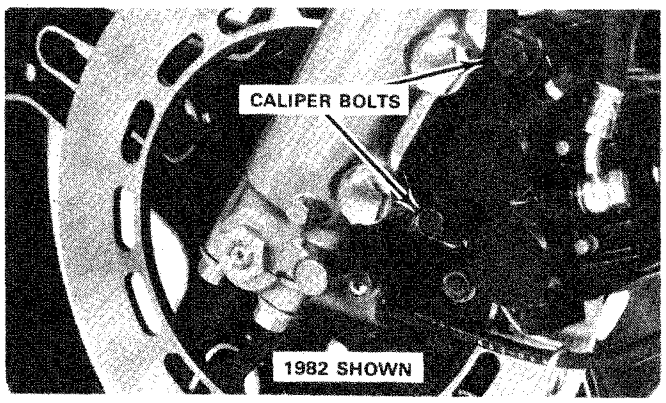
(cont'd)

Brake Pad Replacement (cont'd)

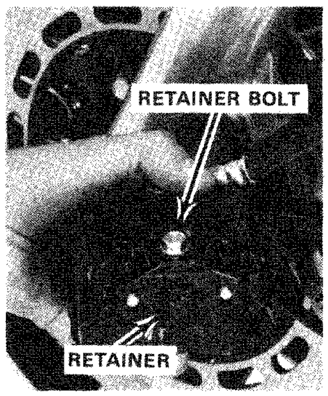
1982— :
Front Brake: Remove the two caliper bolts and lift off the caliper.

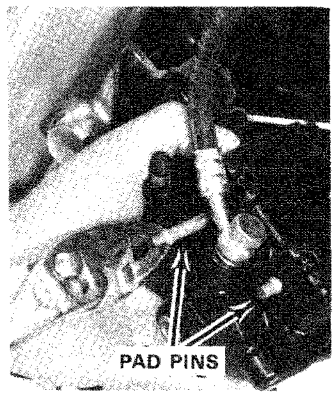
Rear Brake: First remove the dust cover, then both caliper mounting bolts.

1983— :
Remove the caliper bolt and caliper pivot bolt and lift off the caliper (page 13-11).

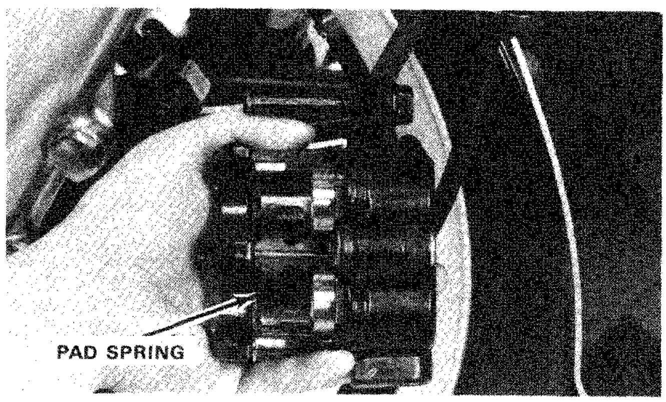


Remove the retainer bolt, and the pad pin retainer. Pull the pad pins out of the caliper and remove the brake pads.

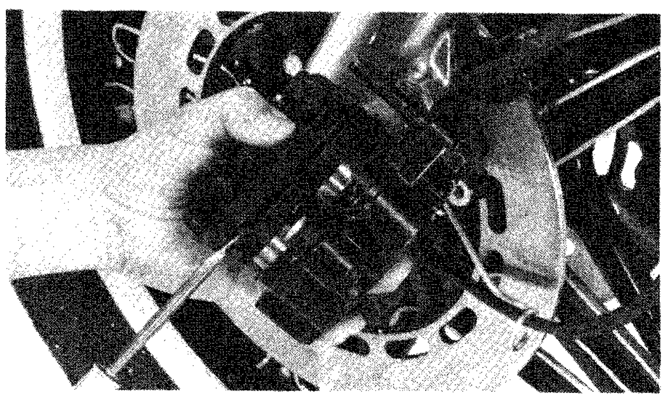




Position the pad spring in the caliper as shown.



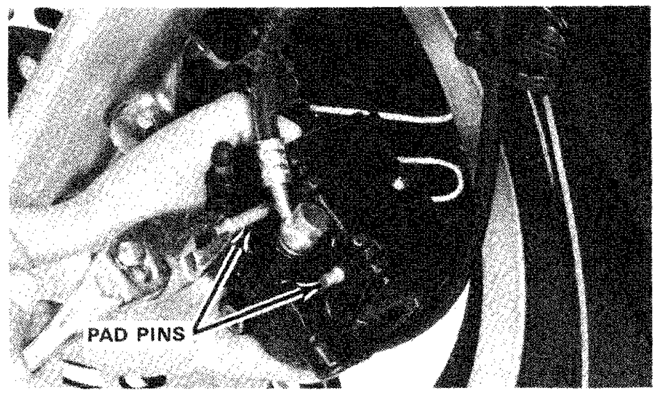
Push the piston all the way in to allow installation of new brake pads.



Install the new pads in the caliper.

1983— :
Use pads which are marked JBCM-GG or A65-FF. When replacing pads, make sure that all pads on the motorcycle have the same mark. Do not mix JBCM-GG and A65-FF marked pads.

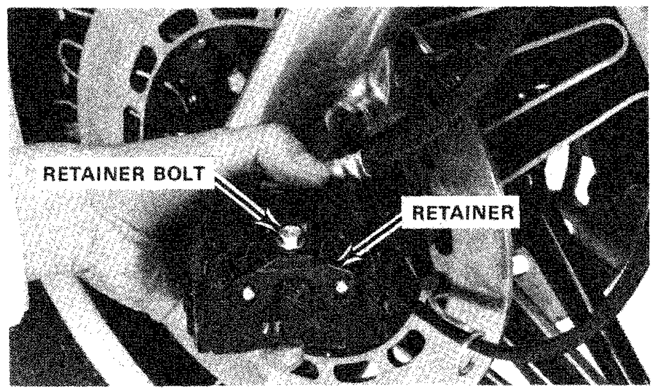
Install the pad pins; install one pad pin, then install the other pin by pushing the pads against the caliper to depress the pad spring.



Slide the pad pin retainer over the pad pins through the larger side of the slots in the retainer. Then slide the retainer toward the caliper to secure the pad pins.

Install the pad pin retainer bolt.

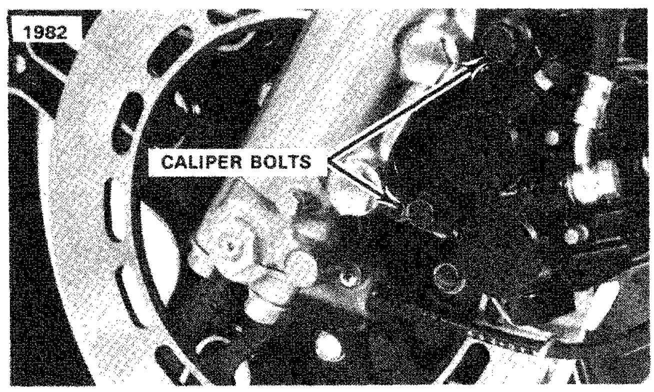
NOTE: Check the brake fluid level in the brake master cylinder reservoir as this operation causes the level to rise.



Install the caliper so the brake disc is positioned between the pads, being careful not to damage the pads.

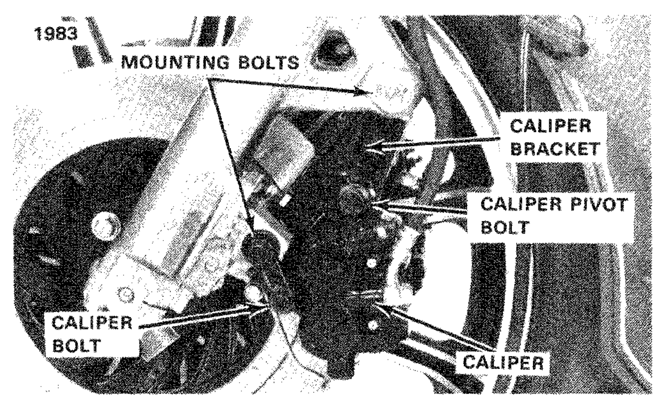
Install and torque the caliper bolts to the correct value.

Install the dust cover on the rear brake.



TORQUE:

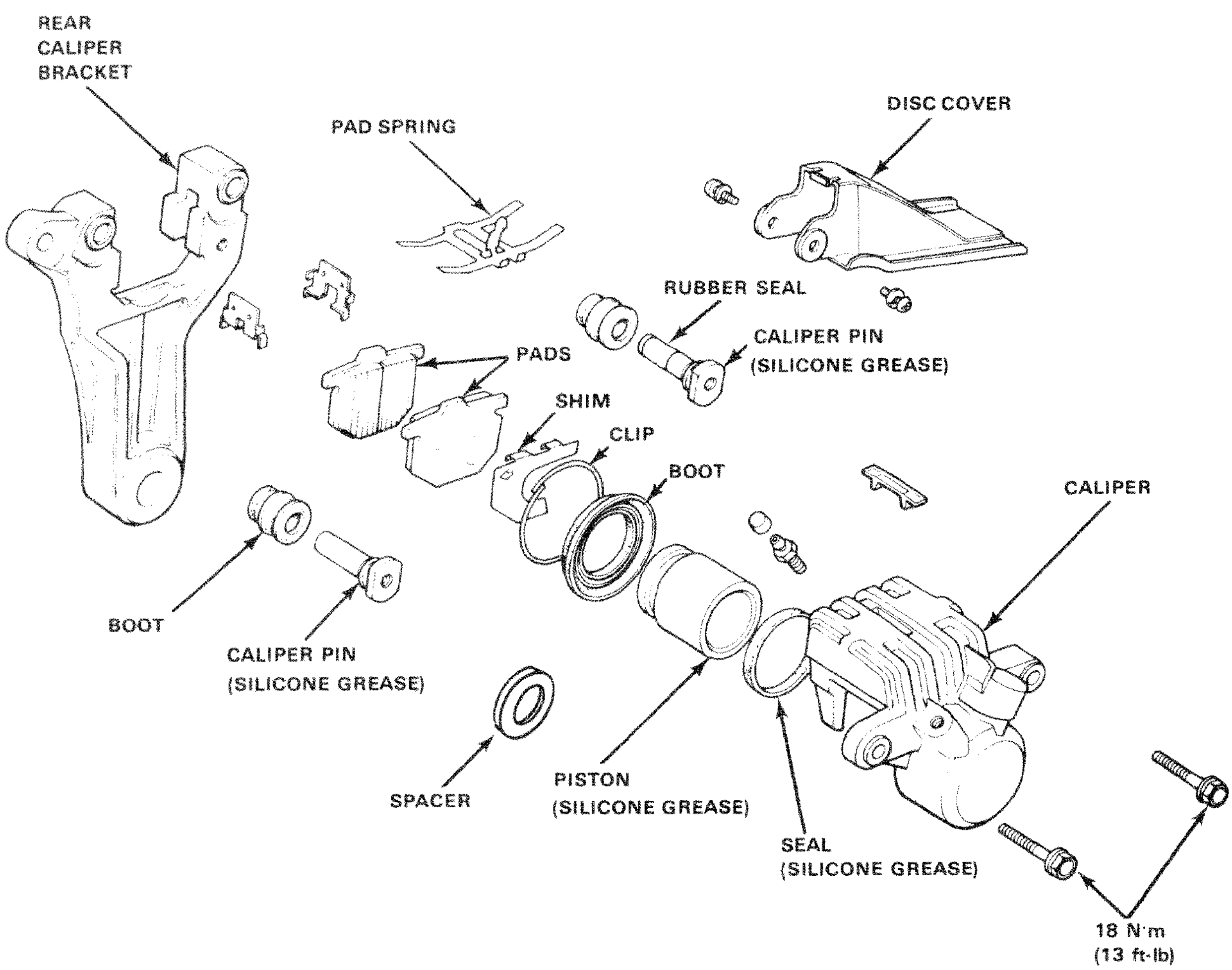
Caliper Bolts 1982:	**23 N·m (17 ft-lb)**
Caliper Bolt 1983— :	**23 N·m (17 ft-lb)**
Caliper Pivot Bolt 1983— :	**27 N·m (20 ft-lb)**
Caliper Mounting Bolts 1983— :	**Upper: 40 N·m (29 ft-lb)** **Lower: 23 N·m (17 ft-lb)**



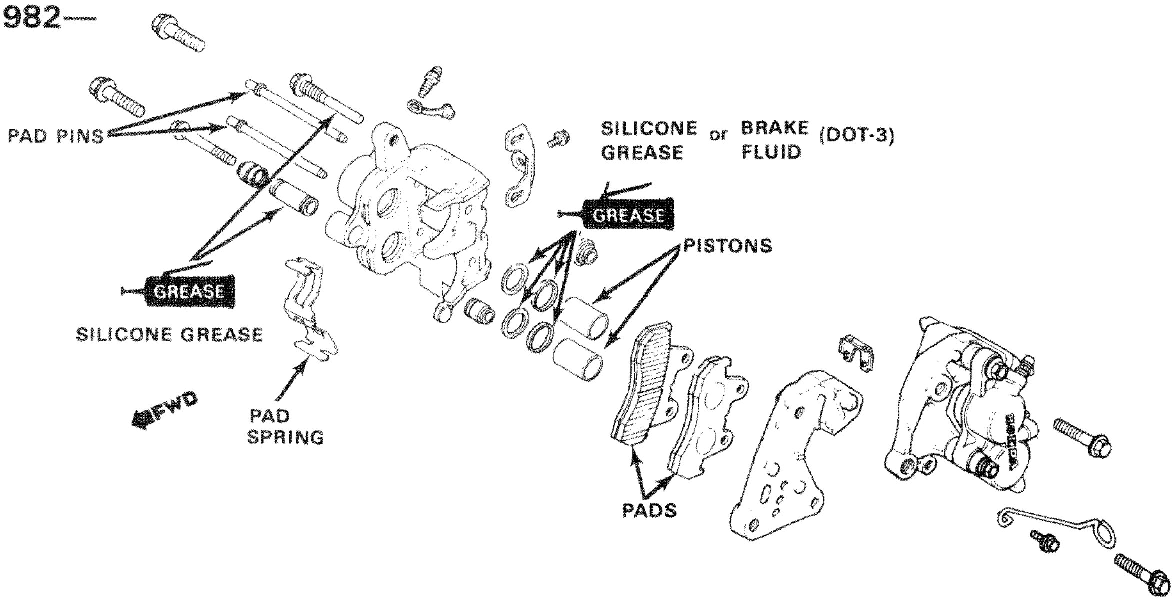
Brakes

Caliper

1980-1981

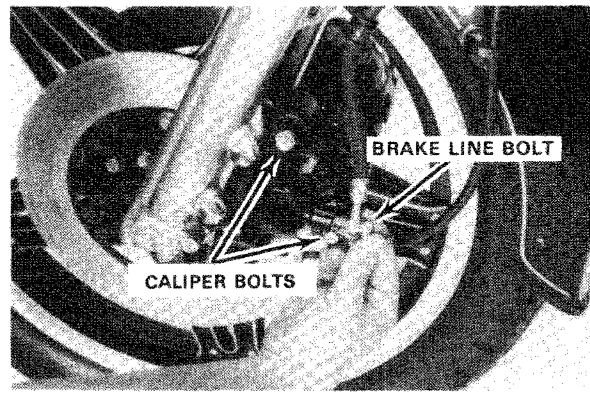


1982—



Removal/Disassembly

- Caliper removal, disassembly, inspection and installation procedures are the same for both front and rear brakes.



Put a pan under the caliper and remove the brake line bolt. Discard the brake fluid that drains.

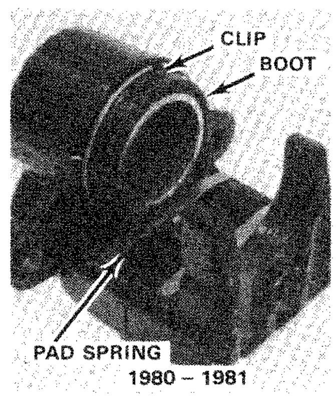
CAUTION: Keep brake fluid off painted surfaces.

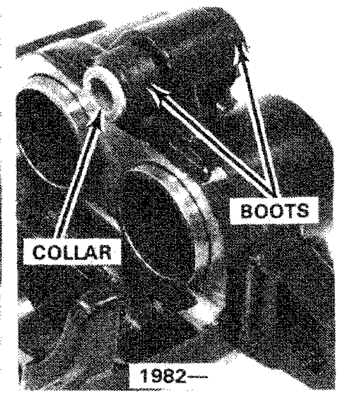
Remove the dust cover from the rear caliper on models equipped with two piston calipers.

Remove the caliper bolts and lift off the caliper.

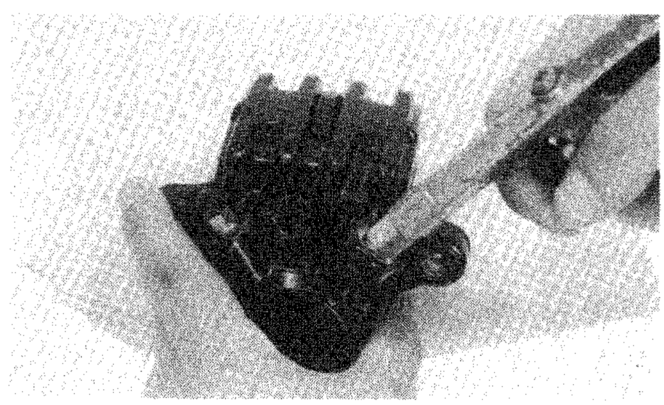
Remove the pads, pad spring, boot clip (1980 - 1981), boot and piston.

Remove the pivot collar and boots (1982–).





If necessary, apply short spurts of compressed air to the caliper fluid inlet to get the piston out. Place a shop rag under the caliper to cushion the piston when it is expelled. Use the air in short spurts.



Remove and discard the piston seal. Be careful not to scratch the bore.

(cont'd)

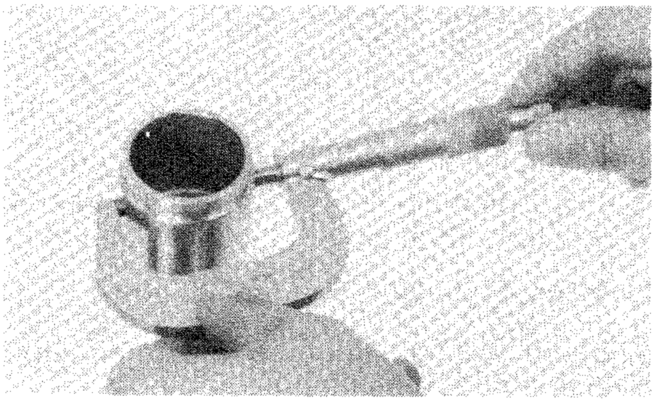
Brakes

Caliper (cont'd)

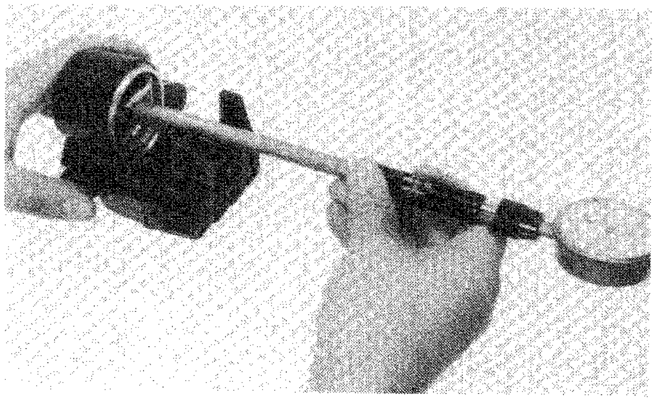
Inspection/Reassembly

Measure the piston O.D. and the caliper bore I.D.

1980 - 1981	Standard	Service Limit
Piston O.D.	42.772 – 42.822 mm (1.6839 – 1.6859 in)	42.765 mm (1.6837 in)
Caliper Bore I.D.	42.85 – 42.90 mm (1.687 – 1.689 in)	42.92 mm (1.690 in)
1982– Piston O.D.	30.148 – 30.198 mm (1.187 – 1.189 in)	30.140 mm (1.866 in)
Caliper Bore I.D.	30.23 – 30.28 mm (1.190 – 1.192 in)	30.29 mm (1.193 in)



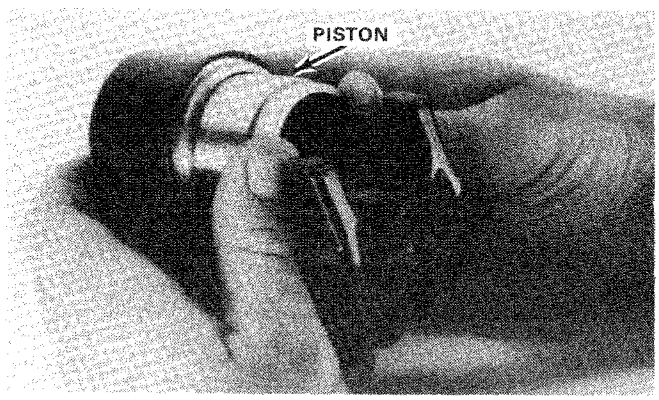
Replace the parts if they are worn beyond the limits, or if they're scored or scratched.



The piston seals must be replaced whenever the caliper is disassembled.

Lubricate the piston and new seals with a medium grade high temperature silicone grease.

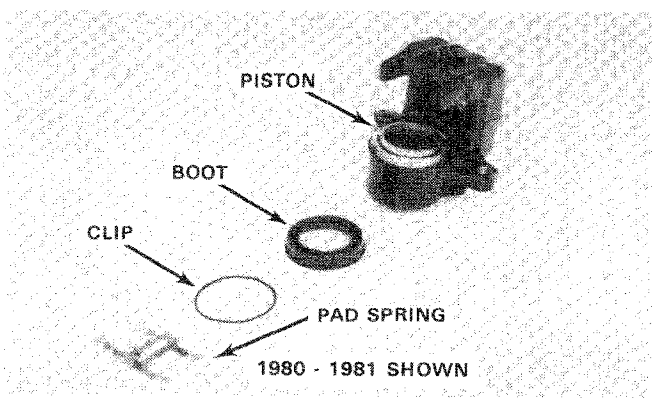
Seat the seal in the caliper bore groove and then install the piston.



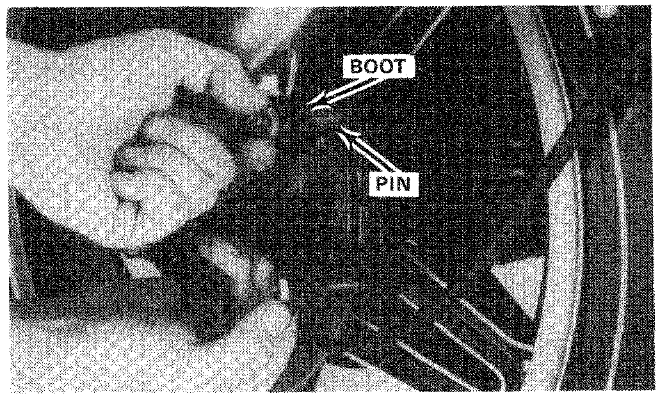
Inspect the piston boot. Replace it if it is hardened or deteriorated.

Place the boot on the piston and fit the clip (1980 - 1981) around the boot. Reinstall the pad spring.

NOTE: Refer to page 13-12 for illustration of disassembled 1982— caliper.



Check the condition of the caliper pin boots. Replace them if they're hardened or deteriorated. Lubricate the pins with medium grade high temperature silicone grease and install the boots. Place the pins in the bracket and make sure they move freely in and out of the holes.



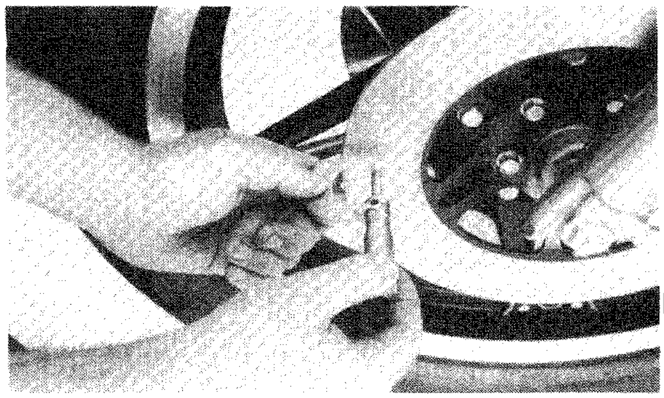
Measure disc thickness at the middle of the disc before remounting the caliper.

Standard and Interstate:

Front:	**Standard:**	**4.8 – 5.2 mm (0.19 – 0.20 in)**
	Service Limit:	**4.0 mm (0.16 mm)**
Rear:	**Standard:**	**6.9 – 7.1 mm (0.27 – 0.28 in)**
	Service Limit:	**6.0 mm (0.24 in)**

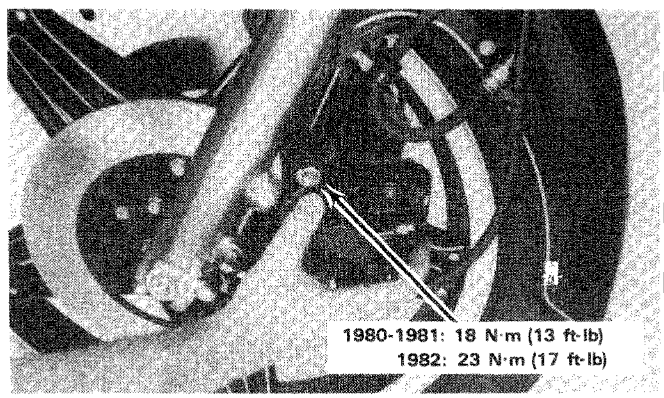
Aspencade:

Front and Rear:	**Standard:**	**9.9 — 10.1 mm (0.39 – 0.40 in)**
	Service Limit:	**9.0 mm (0.35 in)**

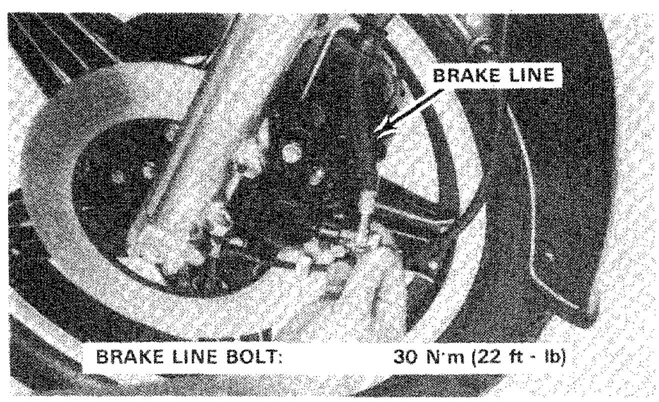


Install the caliper on the mounting bracket and torque the bolts.

NOTE: See page 13-11 for 1983— caliper bolt torque specifications.



Connect the brake line to the caliper, fill the reservoir with fresh DOT 3 brake fluid and bleed the system (page 13-6).



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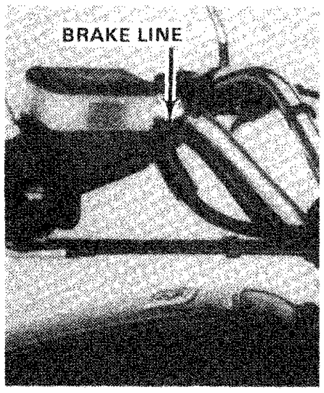
Brakes

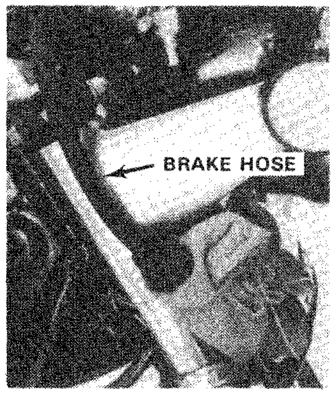
Front Master Cylinder

Removal/Disassembly

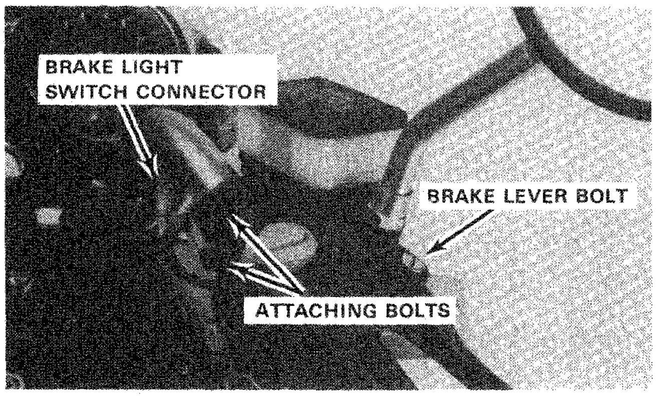
Follow the bleeding procedure to drain the master cylinder.

Remove the brake line bolt and cover the end of the hose to prevent contamination. Secure the hose to the fork.

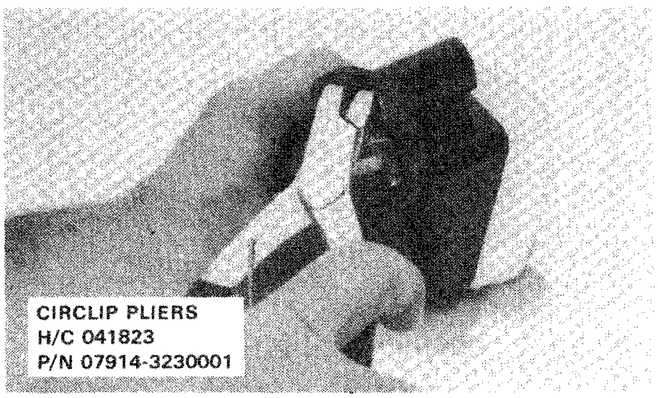




Remove the mirror, brake lever, and attaching bolts.
Remove the brake light switch connector and master cylinder.

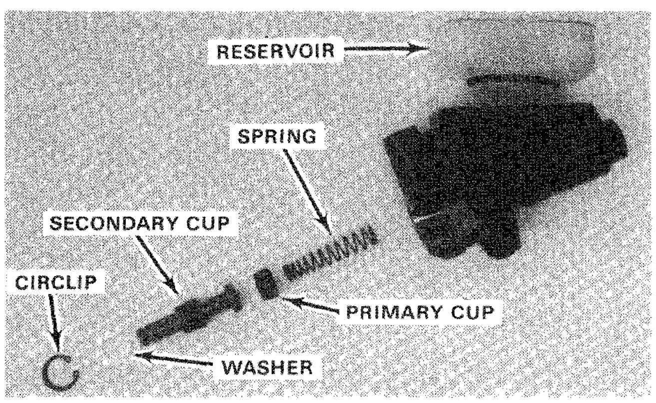


Remove the boot from the cylinder body. Then remove the circlip using circlip pliers.



Remove the washer, piston and secondary cup, primary cup and spring. Remove the reservoir screws and pull off the reservoir.

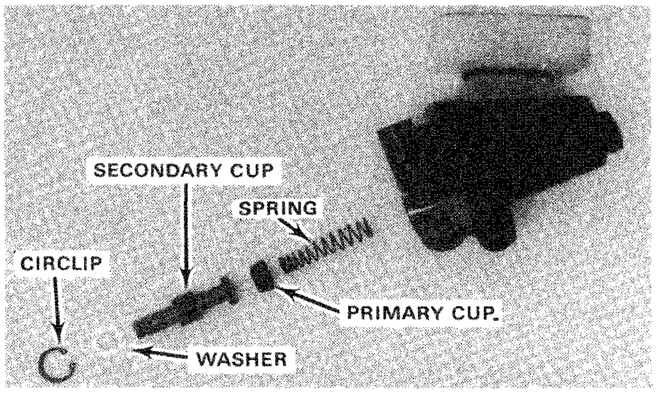
NOTE: It may be necessary to apply low pressure air at the cylinder outlet to remove the piston and primary cup.



Inspection/Reassembly

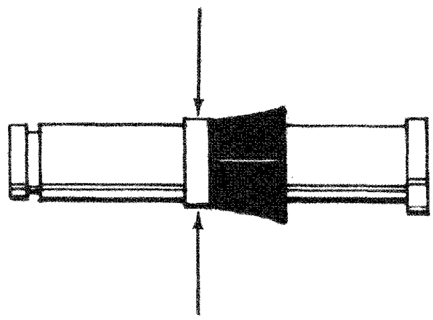
Check the condition of the O-ring and the primary and secondary cups. Replace any part that is deteriorated.

Measure the master cylinder I.D. and piston O.D.



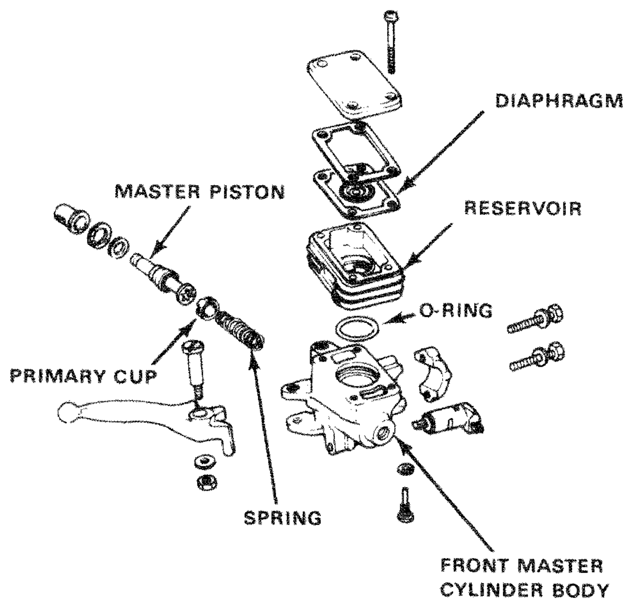
	Standard	Service Limit
Cylinder I.D.	15.870 – 15.913 mm (0.6248 – 0.6265 in)	15.925 mm (0.6270 in)
Piston O.D.	15.827 – 15.854 mm (0.6231 – 0.6242 in)	15.815 mm (0.6226 in)

Replace any part that is worn beyond its service limit.



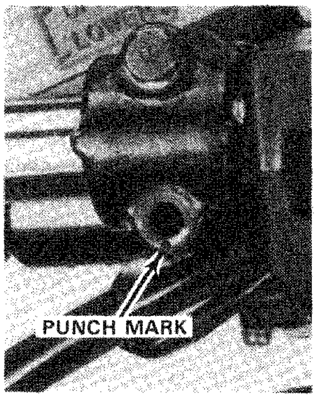
Coat all parts with clean brake fluid and install the cylinder set in the master cylinder. Be careful that the lips don't turn inside out when the cups are installed. Make sure the circlip is firmly seated in its groove.

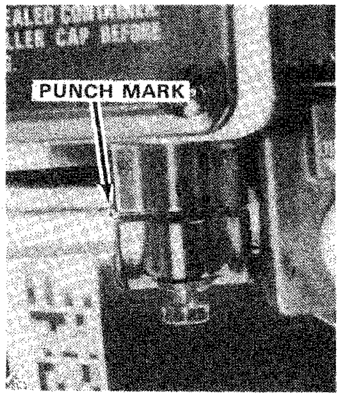
With the O-ring in place, reinstall the reservoir on the master cylinder base.



(cont'd)

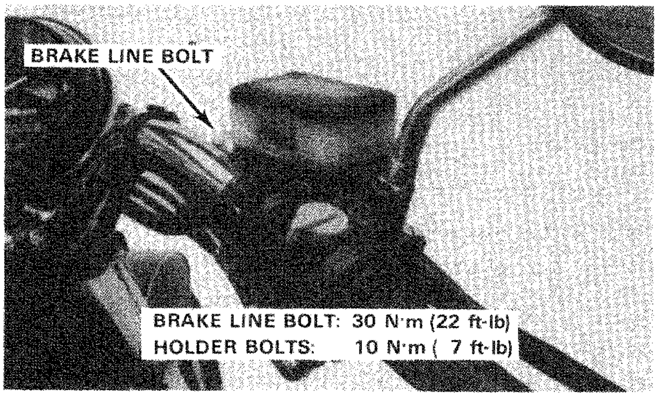
Position the master cylinder bracket on the handlebar with the punch mark down. Then mate the master cylinder to the bracket right above the punch mark on the handlebar.



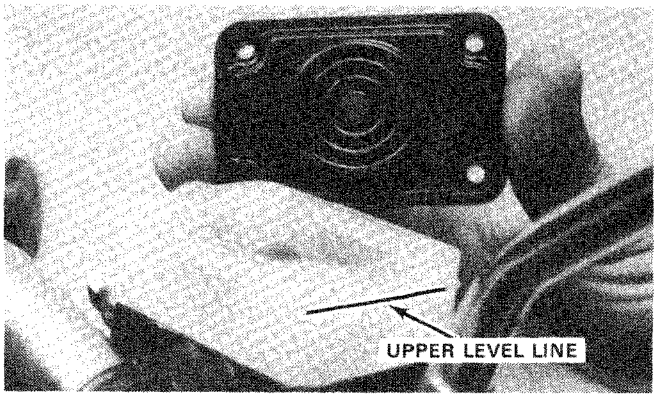


Torque the upper holder bolt first, then the lower bolt.

Install and torque the brake line bolt with washers, and pull on the dust cover. Reinstall the brake lever and rear view mirror. Connect the brake light switch wires.



Fill the reservoir to the upper level with fresh DOT 3 brake fluid, bleed the system, then refill.



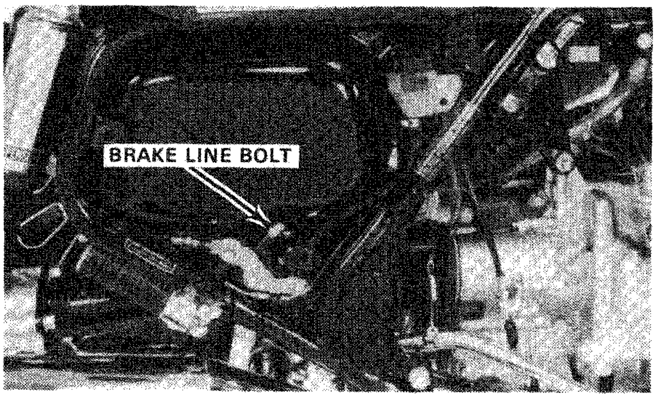
Rear Master Cylinder

Removal/Disassembly

Remove the right side cover and place a pan under the brake line. Disconnect the line from the top of the master cylinder.

Remove the rod eye pin and the two mounting bolts.

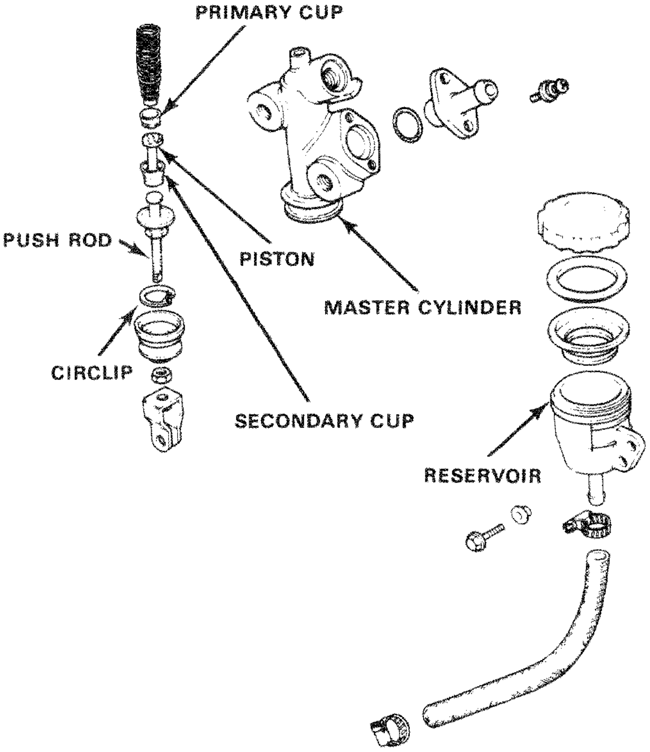
Remove the reservoir mounting bolt, then remove the reservoir and the master cylinder from the frame.



Disconnect the reservoir and its hose.

Remove the rod eye, boot, circlip and pushrod. Remove the piston, primary cup and spring.

NOTE: You may need to apply a small amount of air pressure to the fluid outlet to get the piston and primary cup out.

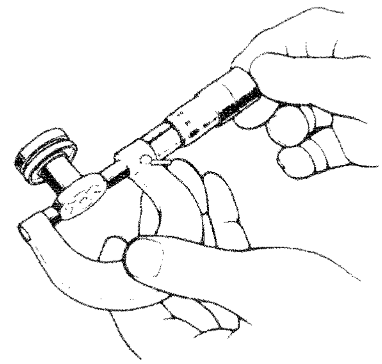


(cont'd)

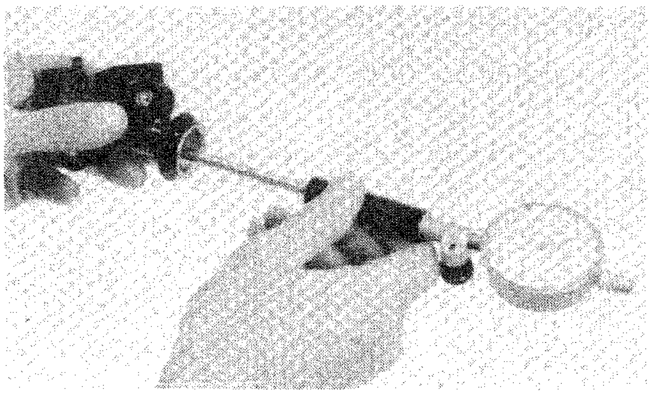
Rear Master Cylinder (cont'd)

Inspection/Reassembly

Measure the piston O.D. and the cylinder bore I.D.



	Standard	Service Limit
Cylinder Bore I.D.	1980–1982 14.00 – 14.043 mm (0.5512 – 0.5529 in)	14.055 mm (0.5533 in)
	1983— 15.870 – 15.913 mm (0.6248 – 0.6265 in)	15.925 mm (0.6270 in)
Piston O.D.	1980–1982 13.957 – 13.984 mm (0.5495 – 0.5506 in)	13.940 mm (0.5488 in)
	1983— 15.827 – 15.854 mm (0.6231 – 0.6242 in)	15.815 mm (0.6226 in)



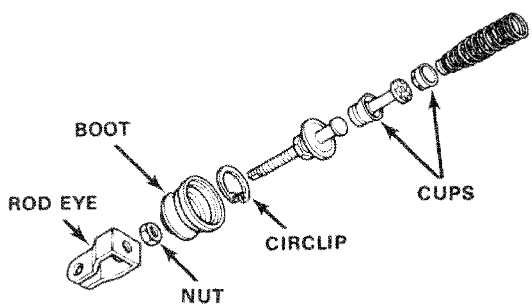
Replace any part that is worn beyond its service limit.

Check the cylinder bore for scores, scratches or nicks; replace as necessary.

Check the primary and secondary cups for damage or deterioration; replace as necessary.

Coat all parts with clean brake fluid and reassemble them in the cylinder body. Be careful that the lips don't turn out when the cups are installed. And make sure the circlip is firmly seated in its groove.

Install the boot, nut and rod eye.

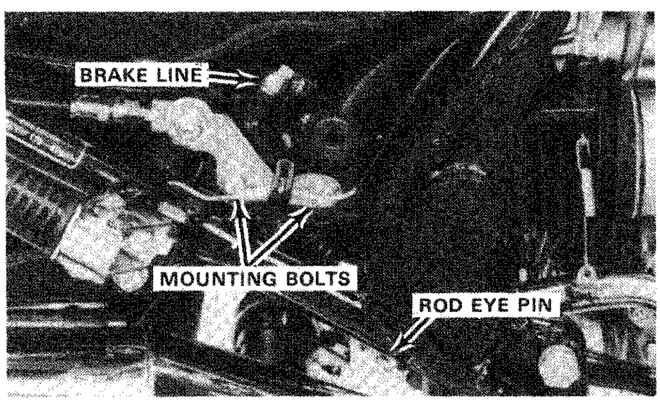


Place the master cylinder in position and install the mounting bolts, rod eye pin and brake line.

Reinstall the reservoir and connect the hose to the master cylinder and reservoir.

Adjust brake pedal height.

Fill the reservoir to the upper level with fresh DOT 3 brake fluid, bleed the system and refill.



Wheels/Tires

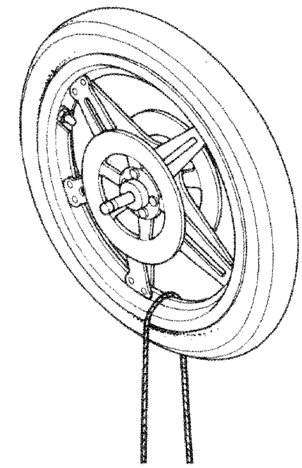
Wheels/Tires

Service Information

- Wheel bearings must not be re-used after they have been removed; always use new bearings.
- ComStar™ wheels and cast wheels are not serviceable. If either the spokes, rim or hub is damaged, the entire wheel must be replaced.
- Tubeless tire removal, repair and remounting procedures are covered in the Tubeless Tire Manual, H/C 068216.

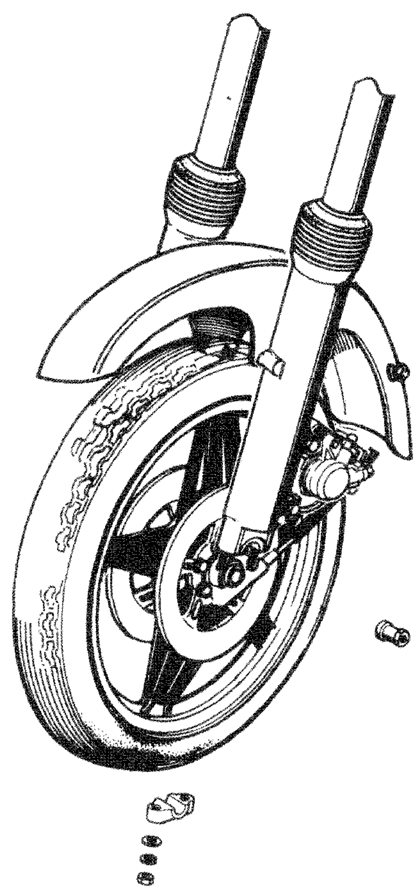
Caution:

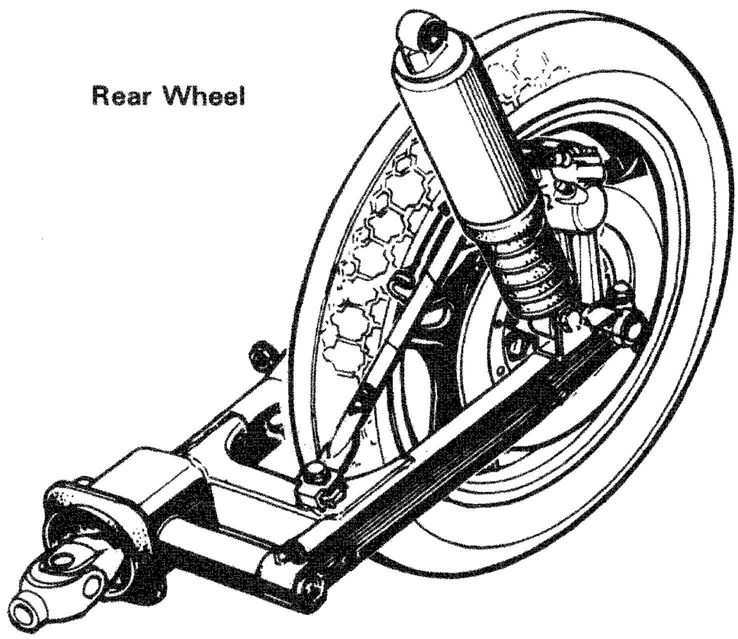
- Improperly balanced or misaligned wheels will cause irregular tire wear and steering problems. Check for abnormal tire wear and loose spokes at each regular service period.
- To prevent spoke damage, do not apply force to the spokes. If the motor cycle is transported, tie down the wheels on the rim as shown. If the spokes are used as tie-down points they may be bent, resulting in excessive wheel runout.



Correct Wheel Tie Down

Front Wheel





Torque Values

Front axle nut:	58 N·m (42 ft-lb)
Front axle holder nut:	
1980-1982	35 N·m (25 ft-lb)
1983—	22 N·m (16 ft-lb)
Front caliper mount bolt:	
1980-1982	35 N·m (25 ft-lb)
1983— Upper	40 N·m (29 ft-lb)
Lower	23 N·m (17 ft-lb)
Front caliper bolt:	
1980-1981	18 N·m (13 ft-lb)
1982—	23 N·m (17 ft-lb)
Front caliper pivot bolt:	
1983—	27 N·m (20 ft-lb)
Rear shock mount bolt:	35 N·m (25 ft-lb)
Rear axle pinch bolt:	26 N·m (19 ft-lb)
Rear axle nut:	
1980-1982	90 N·m (65 ft-lb)
1983—	95 N·m (69 ft-lb)

Wheels/Tires

Front Wheel Removal/Disassembly

Disconnect the speedometer cable.

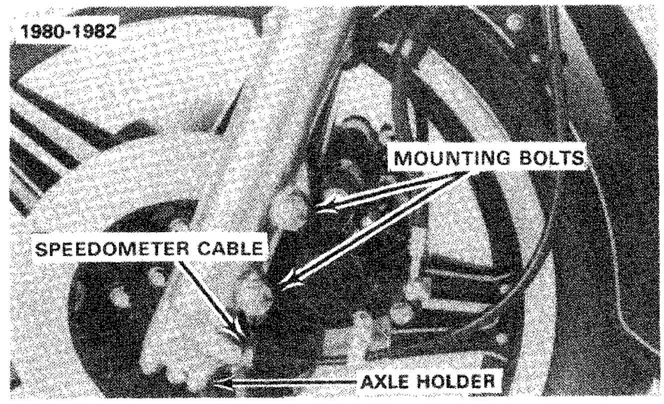
1983— :

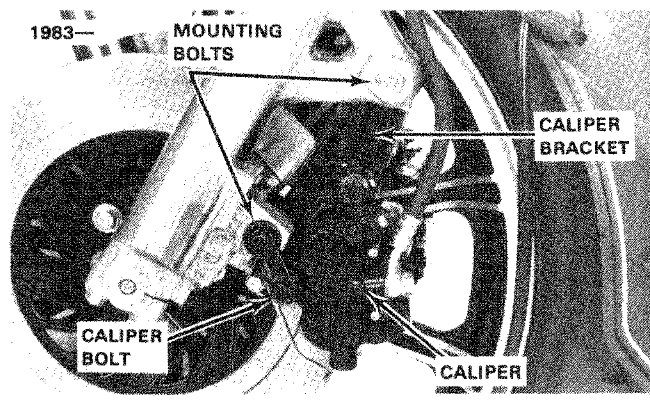
The 1983—Aspencade is equipped with an electrical speed sensor. Remove the speed sensor from the wheel assembly.

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

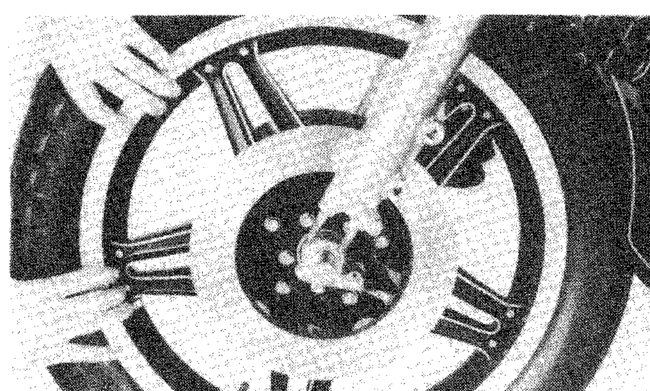
NOTE: Do not operate the brake lever after the caliper has been removed.

Remove the right and left front axle holders.





Jack up the bike until the fork legs lift free of the axle and remove the front wheel.

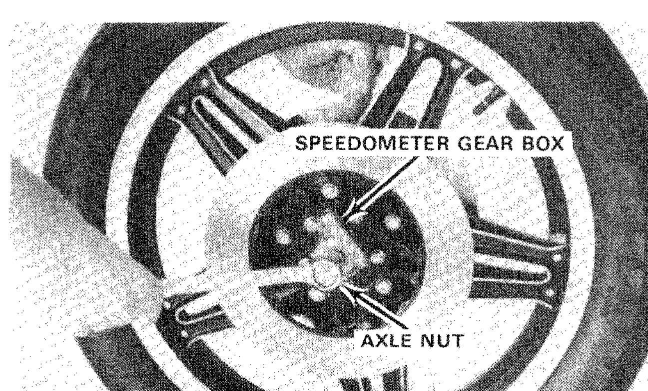


Remove the axle nut, speedometer gear box, axle and collar. Remove the disc bolts, discs and dust seal.

Remove the bearing retainer, bearing and distance collar from the hub.

Retainer wrench:
H/C 091562, P/N 07710-0010200

Retainer wrench body:
H/C 090735, P/N 07710-0010401

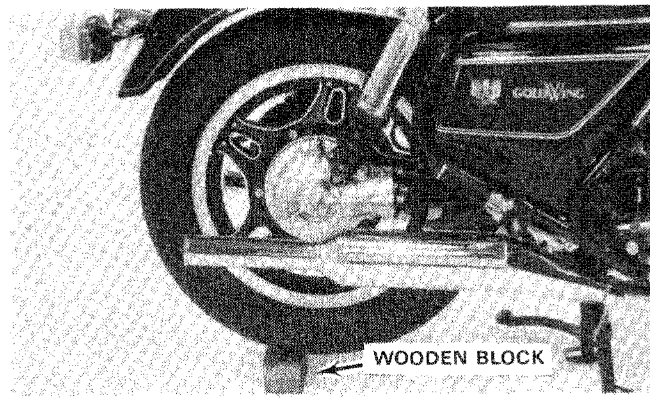


Rear Wheel Removal/Disassembly

Put the motorcycle on its center stand.

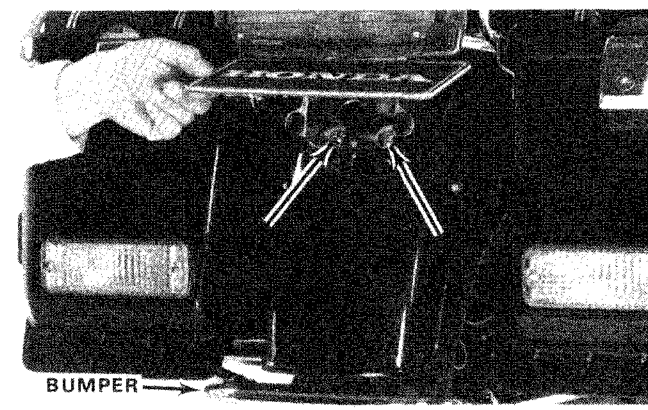
Remove the shock absorber lower mounting bolts and nuts.

Raise the rear wheel with a block large enough that the axle clears the muffler.



1982— Interstate:
Lift the license plate. Remove the three bolts and remove the sub rear fender.

Remove the rear bumper by removing the four bolts.

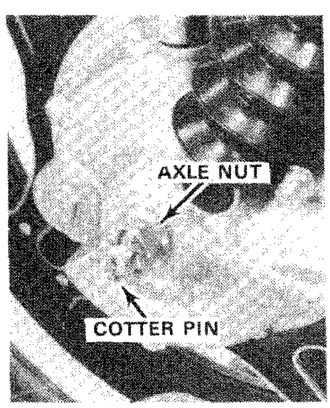


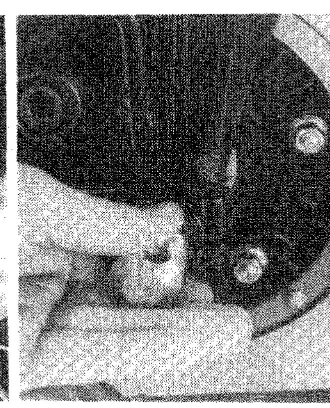
1980— :
Remove the cotter pin, axle nut and axle pinch bolts. Loosen the three nuts for the final drive assembly.

Use a wooden block to apply inward pressure to the left side of the swingarm, then remove the axle.

CAUTION: If you do not support the left side of the swingarm, you may bend it when driving out the axle.

Pull out the axle the rest of the way.

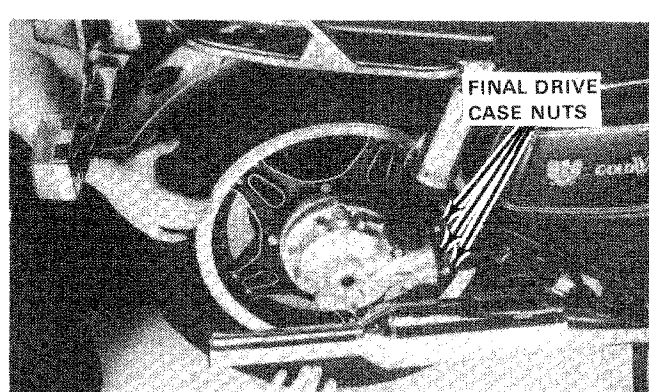




Reinstall the shock absorber lower mounts, then raise the brake caliper. Pull the wheel to disengage the final driven flange from the final drive case and remove the wheel.

1980-1981 Interstate:
After raising the caliper, remove the three final drive case nuts and pull the wheel backwards, then remove the case. While someone tilts the motorcycle to the right, remove the wheel from the left.

CAUTION: Do not lay the final drive case over. The gear oil may flow out of the breather.



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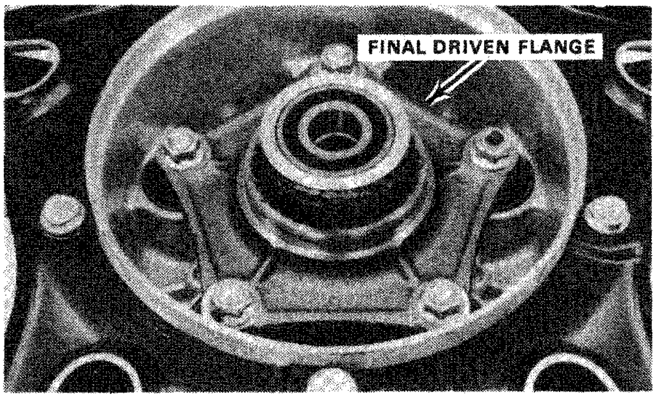
Wheels/Tires

Rear Wheel Removal/Disassembly (cont'd)

Remove the final driven flange and the disc. Remove the bearing retainer, dust seal, bearings and distance collar.

Retainer wrench:
H/C 080970, P/N 07710-0010100

Retainer wrench body:
H/C 090735, P/N 07710-0010401



Inspection

Wheels

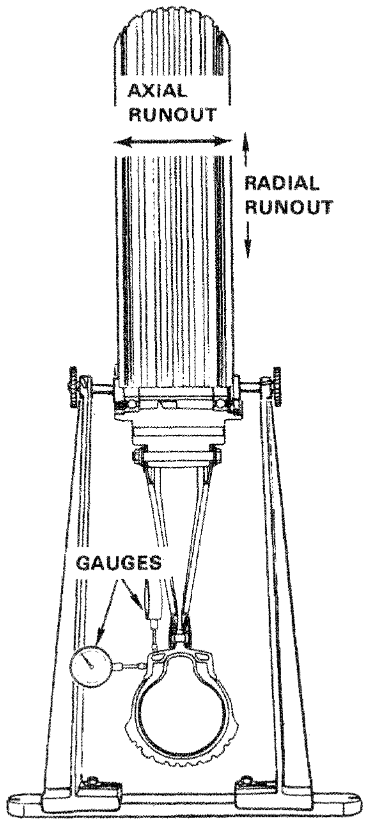
Inspect the rim; replace the wheel if the rim is visibly damaged or deformed.

Mount the wheel in an inspection stand. Use a dial indicator to measure axial and radial runout while turning the wheel slowly.

If either front or rear runout exceeds 2.0 mm (0.08 in), replace the wheel.

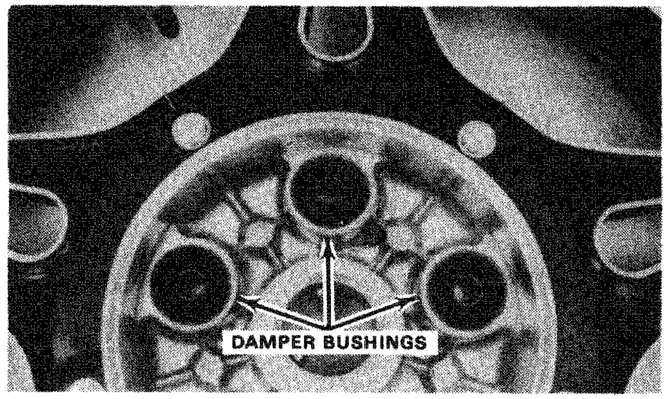
If the tire is removed from the wheel for repair, check the rim for roughness or corrosion of the flange. Clean the flange and smooth it with sandpaper if necessary.

Replace the wheel if the rim has a scratch 0.5 mm (0.02 in) or deeper extending across the bead seating surface.



Inspect the rear wheel damper bushings and replace them if they are visibly worn.

CAUTION: Worn bushings will cause excessive drive system backlash.



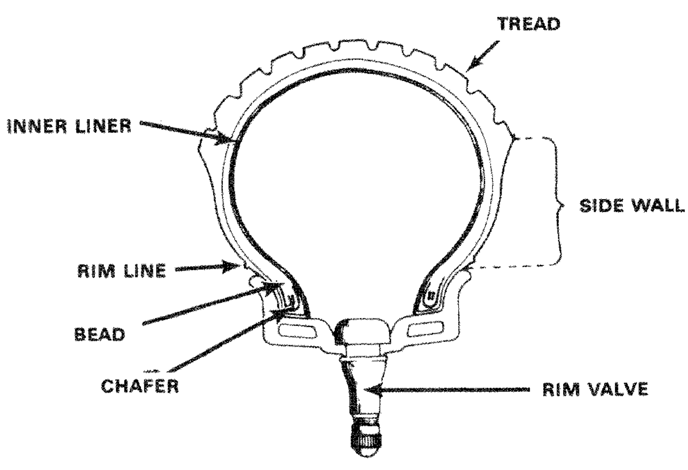
Tires

WARNING: A tubeless tire is unsafe and must be replaced if it has:

- **Excessive tread wear (minimum tread depth at middle of tire): 1.5 mm (1/16 in) front, 2.0 mm (3/32 in) rear**
- **Puncture or tear larger than 6.0 mm (0.236 in) in diameter**
- **Separated ply**
- **Separated tread**
- **Cracked carcass**
- **Broken cord**

If the tire is removed from the rim for repair, check for these abnormalities. Replace, do not repair the tire if it has:

- Rim bruise (broken cord in the rim area caused by a severe blow)
- Faulty inner liner
- Damaged chafer
- Broken bead wire or damaged bead



If the tire can be repaired, refer to the Honda Tubeless Tire Manual, H/C 068216 for the approved repair procedure.

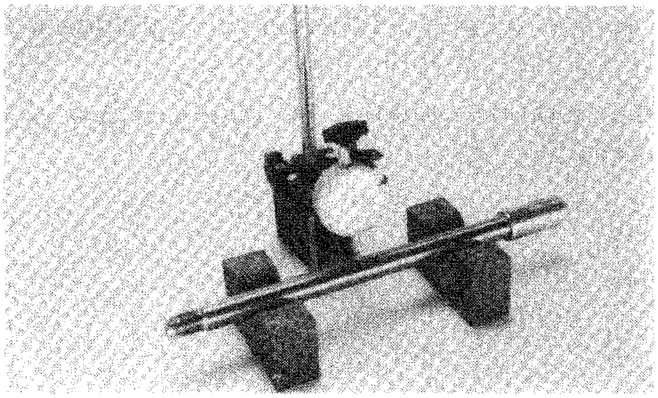
Wheels/Tires

Inspection (cont'd)

Axle

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

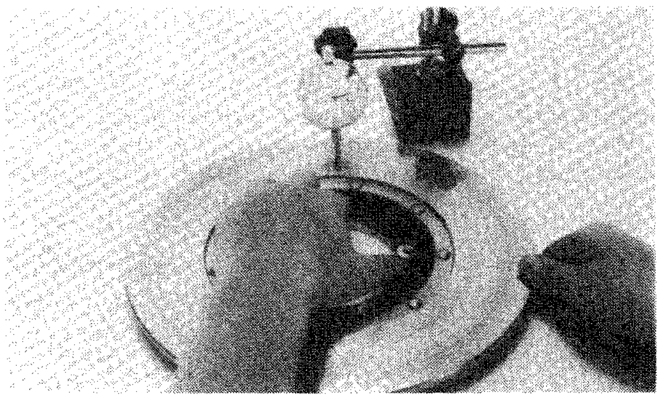
Axle runout (Front and Rear)
Standard: 0 - 0.05 mm (0 - 0.002 in)
Service Limit: 0.2 mm (0.008 in)



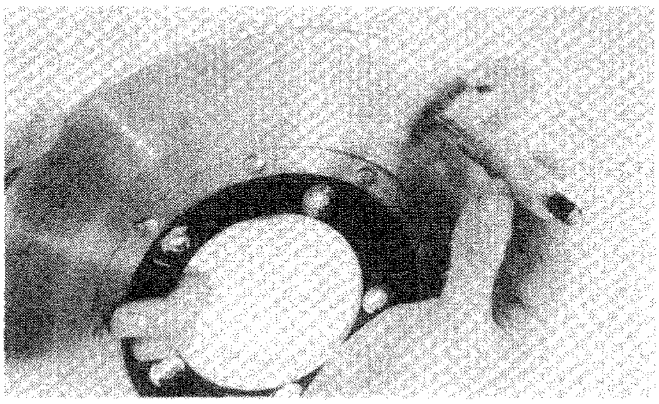
Disc

Hold the disc on a surface plate, set a dial indicator needle on the contact surface and rotate the disc.

If either front or rear runout exceeds 0.3 mm (0.01 in), replace the disc.



Use a micrometer to measure disc thickness at the middle of the disc.



Standard and Interstate:

	Front	Rear
Standard:	4.9 – 5.1 mm (0.19 – 0.20 in)	6.9 –7.1 mm (0.27 – 0.28 in)
Service Limit:	4.0 mm (0.16 in)	6.0 mm (0.24 in)

Aspencade:

	Front	Rear
Standard:	9.9 – 10.1 mm (0.39 – 0.40 in)	9.9 – 10.1 mm (0.39 – 0.40 in)
Service Limit:	9.0 mm (0.35 in)	9.0 mm (0.35 in)

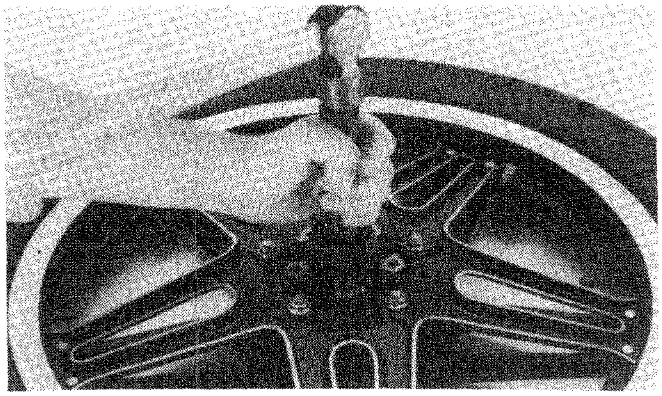
Front Wheel Assembly/Installation

Position the distance collar in the hub. Drive in the new bearing with the closed end facing out. Use special tools:

Driver:	H/C 093324, P/N 07749-0010000
Attach., 42 x 47 mm:	H/C 081311, P/N 07746-0010300
Pilot, 15 mm:	H/C 095988, P/N 07746-0040300

Inspect the bearing retainer; replace it if the threads are damaged. Use special tools:

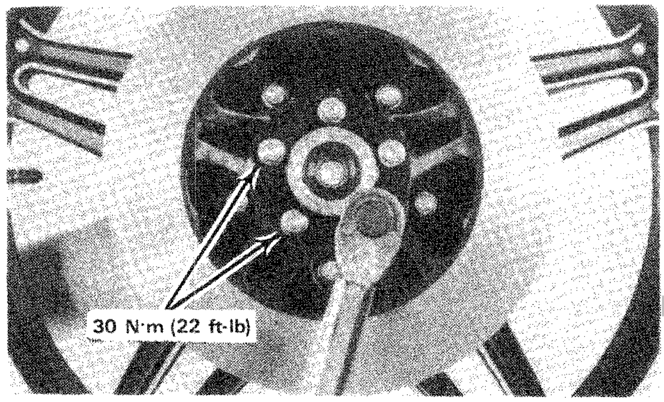
Retainer wrench:	H/C 090735, P/N 07710-0010401
Attachment:	H/C 091562, P/N 07710-0010200



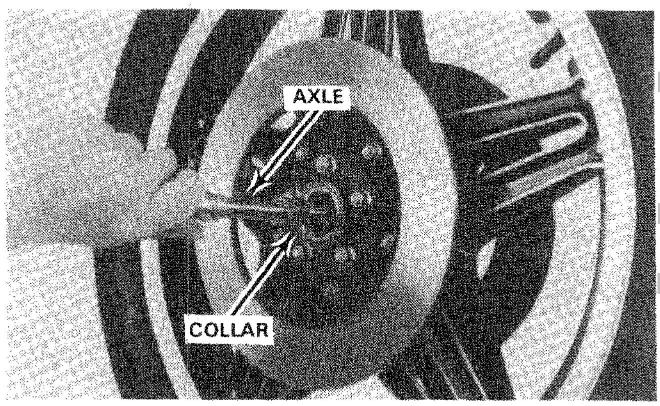
Install the seal and the retainer, and peen the edge of the retainer.

Install the bearing retainer, then peen the retainer to the hub.

Install the speedometer gear box retainer and dust seal, then the left disc and disc bolts. Install the right disc and tighten the disc nuts.

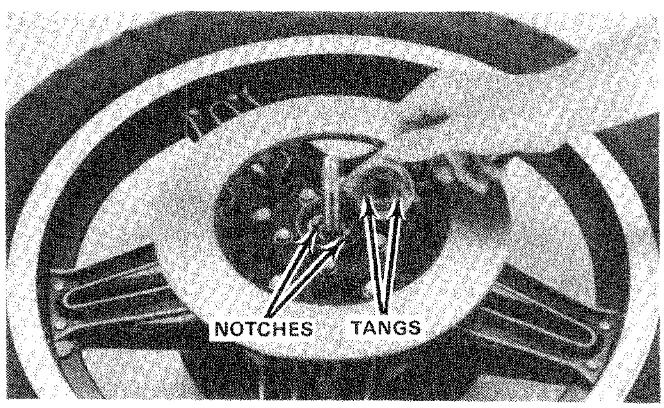


Install the collar and axle.



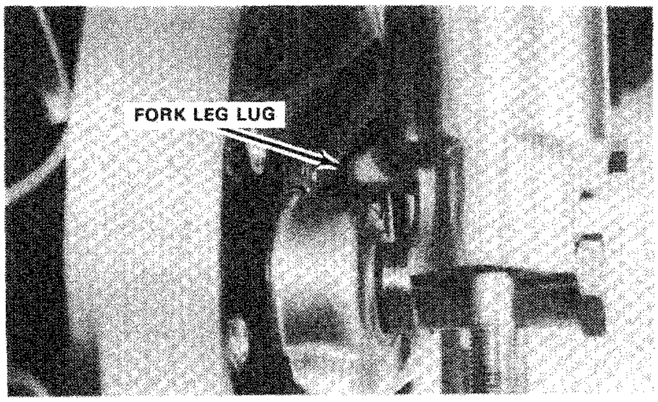
Lubricate the speedometer gear box with multipurpose grease NLGI-2 No. 2. Align the gear box tangs with the notches in the retainer, then install and torque the axle nut to 58 N·m (42 ft-lb).

Check wheel balance (page 14-14).



Front Wheel Assembly/Installation (cont'd)

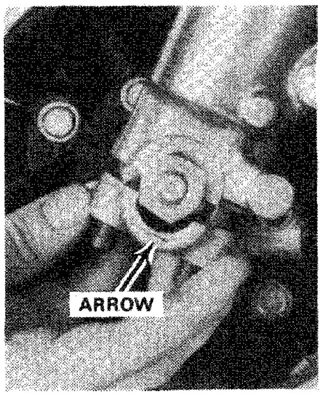
Fit the brake disc carefully between the pads of the caliper already in place and lower the forks on the axle. Be sure that the lug on the speedometer gear box is behind the left fork leg lug.

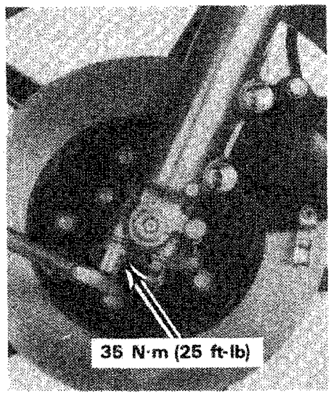


1980-1982:
Install the axle holders with the arrow pointing forward and finger-tighten the nuts.

Install the second caliper carefully to avoid pad damage, then torque the caliper mounting bolts.

Torque the left axle holder nuts starting with the forward nut.

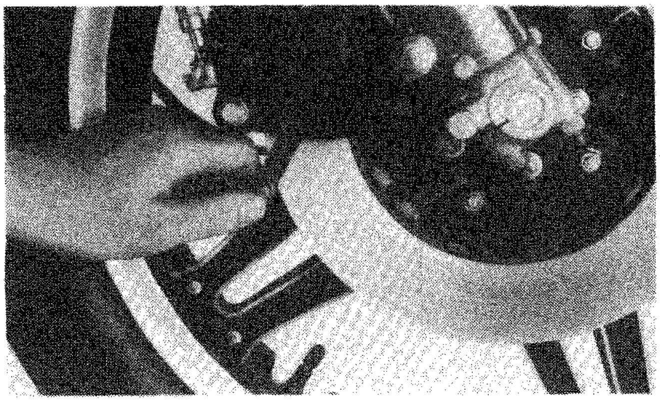




On the right side, measure the clearance between the outside surface of the disc and the rear of the caliper holder with a 0.7 mm (0.028 in) feeler gauge.

If the gauge inserts easily, torque the right axle holder nuts beginning with the forward nut.

If the gauge will not fit easily, pull the fork leg outward until the gauge can be inserted, and torque the forward nut. Then torque the rear nut and remove the gauge.

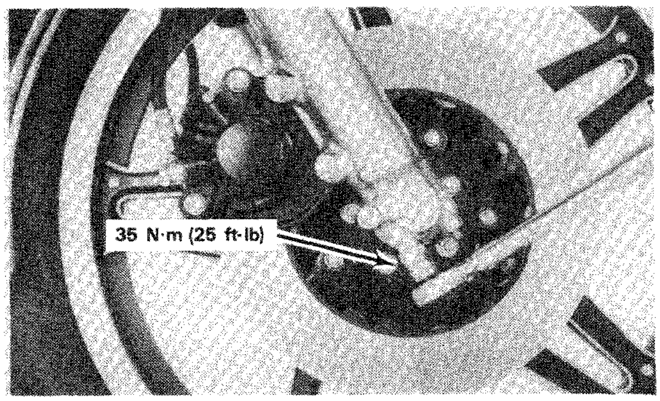


Check for 0.7 mm (0.028 in) clearance at the other three corners of the caliper holder.

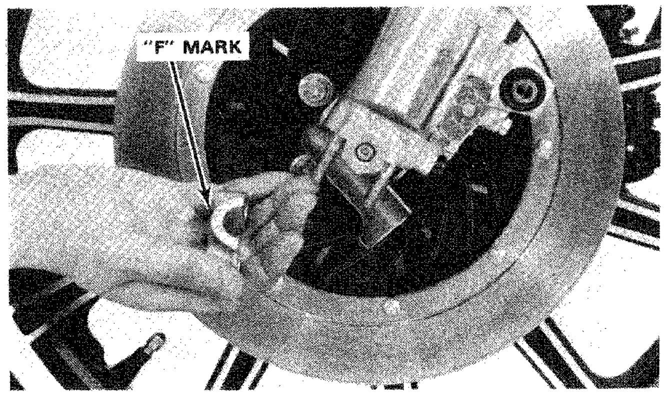
Apply the brakes several times and check for free wheel rotation each time the brake is released.

WARNING: Inadequate disc-to-caliper holder clearance may damage the brake disc and impair braking efficiency.

Install the speedometer cable.

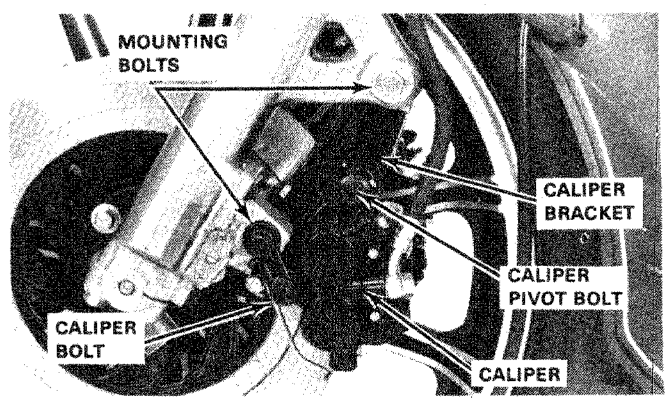


1983— :
Install the axle holders with the "F" arrow forward and hand-tighten the nuts.



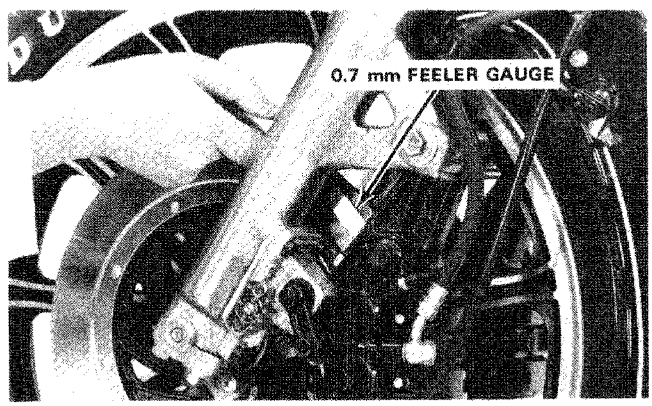
Fit the removed caliper and caliper bracket over the disc carefully to prevent damaging the brake pads.

Install and tighten all the brake caliper bolts to the specified torque.



TORQUE:
Mount Bolt (Upper):
35—45 N·m (3.5—4.5 kg-m, 25—33 ft-lb)
Mount bolt (Lower):
20—25 N·m (2.0—2.5 kg-m, 14—18 ft-lb)
Caliper Pivot Bolt
25—30 N·m (2.5—3.0 kg-m, 18—22 ft-lb)
Caliper Bolt:
20—25 N·m (2.0—2.5 kg-m, 14—18 ft-lb)

Measure the clearance between the brake disc and the caliper/bracket assembly on both the inside and outside surfaces of the left and right discs.



If the guage fits, tighten the axle holder forward nuts to the specified torque first, then tighten the rear nuts to the same torque.

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

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

CAUTION: After installing the wheel, apply the brakes several times and recheck the clearance on both sides. Failure to provide the proper clearance will damage the brake discs and affect braking efficiency.

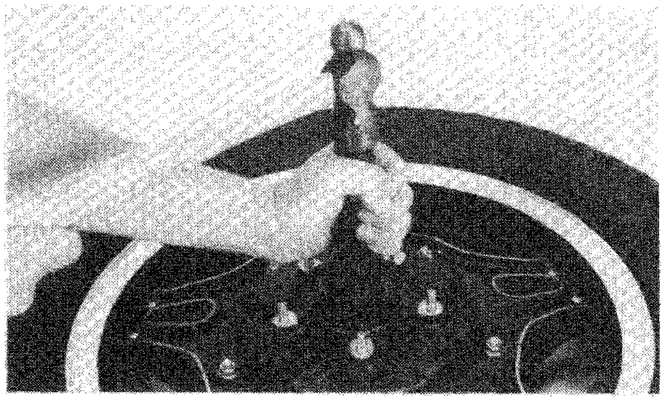
Standard and Interstate:
Connect the speedometer cable to the speedometer gearbox; tighten set screw.

Aspencade:
Install the speed sensor.

Rear Wheel Assembly/Installation

Position the distance collar in the hub and drive in the new bearing with the closed end facing out. Use special tools:

Driver:	H/C 093324, P/N 07749-0010000
Attach., 42 x 47 mm:	H/C 081311, P/N 07746-0010300
Attach., 52 x 55 mm:	H/C 075348, P/N 07746-0010400



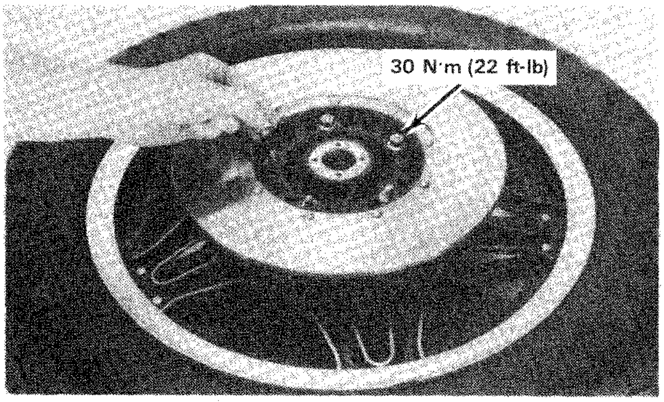
Check the condition of the bearing retainer; replace it if the threads are damaged. Use special tools:

Retainer wrench:	H/C 090735, P/N 07710-0010401
Attachment:	H/C 080970, P/N 07710-0010100

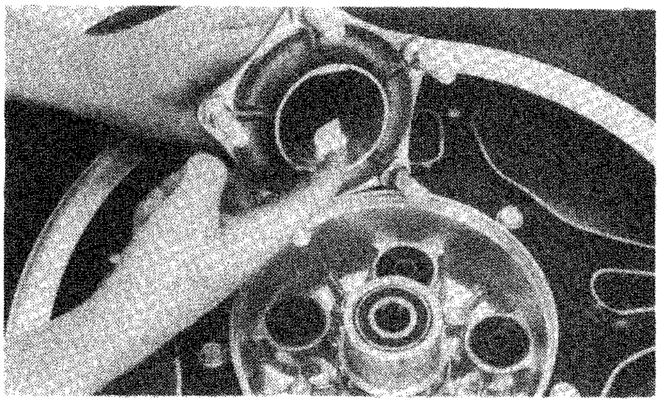
Install the bearing retainer, then peen the retainer to the hub.

Install the brake disc and nuts.

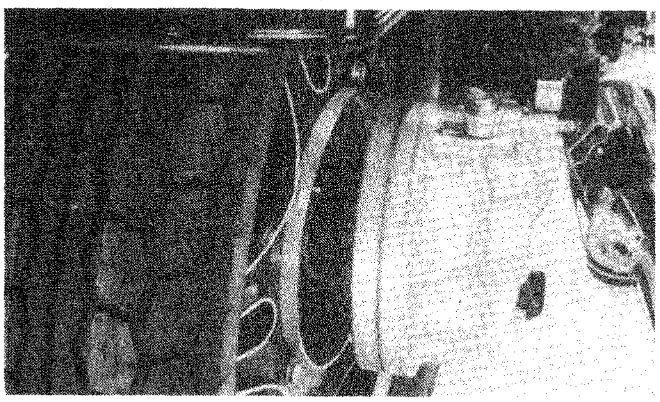
Check wheel balance (page 14-14).



Apply a lithium based multipurpose NLGI No. 2 (MOS2 additive) grease to the damper pins, the final drive splines, and inside the final driven flange.



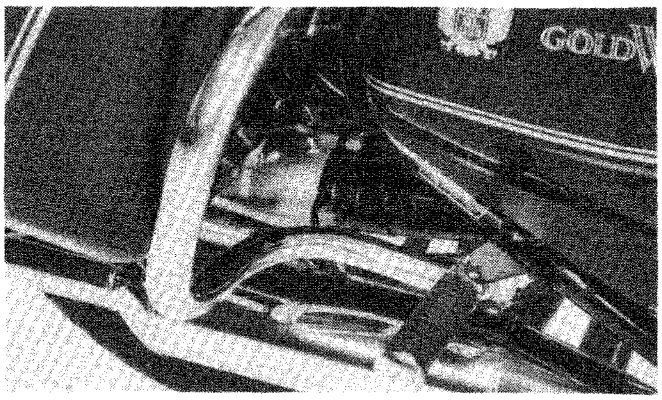
Position the wheel in the frame and engage the wheel and the final drive case. Be sure the splines are correctly aligned.



Fit the final drive case splines into the driveshaft end and loosely install the gear case nuts.

Lower the brake caliper.

Wedge a flat screwdriver tip into the pinch bolt slot and install the axle. Turn the axle and check that it rotates freely, then hand tighten the axle nut.



Hold a screwdriver tip or drift in the hole on the left side of the axle to keep it from turning.

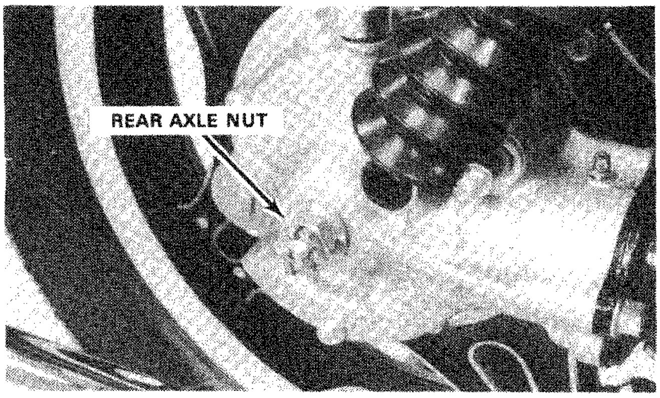
Torque the axle nut and install a new cotter pin.

REAR AXLE NUT TORQUE

1980-1982:	**90 N·m (65 ft-lb)**
1983— :	**95 N·m (69 ft-lb)**

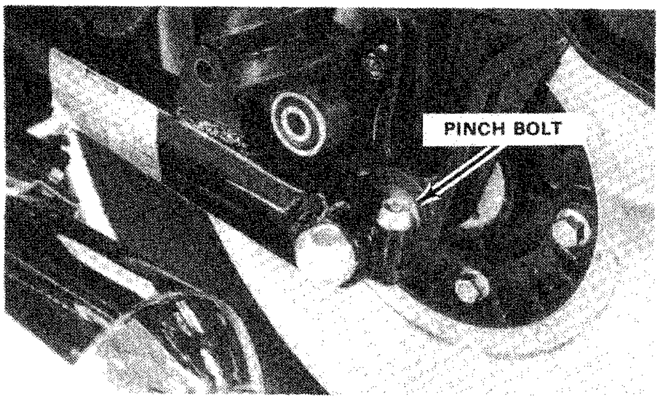
Torque the gear case nuts to 40 N·m (29 ft-lb).

Remove the wedge from the pinch bolt slot and screwdriver from the hole in the axle.



Install and torque the pinch bolt to 26 N·m (19 ft-lb).

Install and torque the shock absorber nut and bolt to 35 N·m (25 ft-lb).

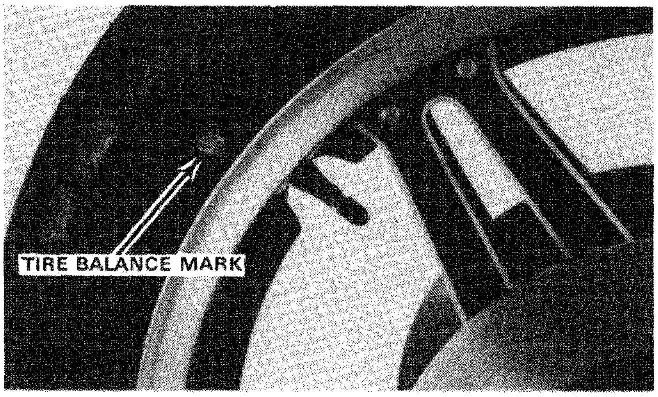


Wheels/Tires

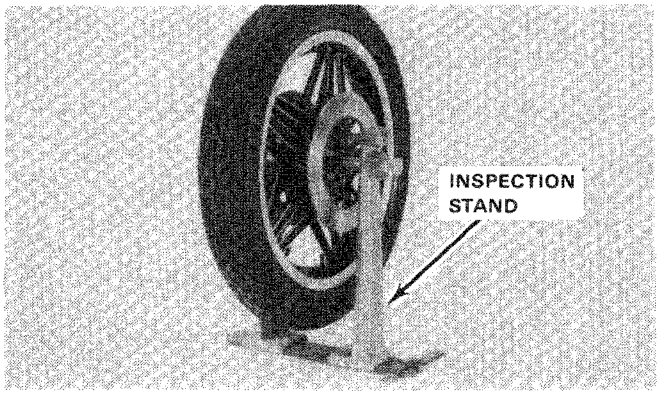
Wheel Balancing

CAUTION: Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the rim.

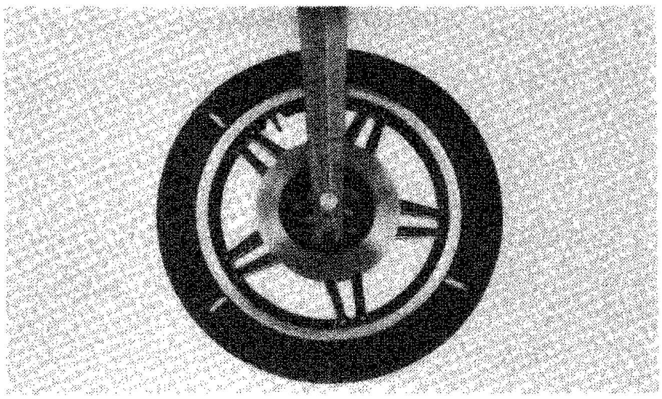
NOTE: For optimum balance, the tire balance mark (a paint dot on the sidewall) must be located next to the valve stem. Remount the tire if necessary.



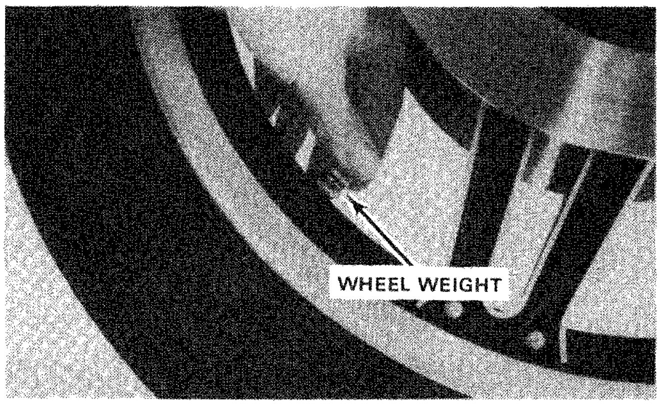
Mount the wheel, tire and brake disc assembly in an inspection stand. (If a stand is not available, mount the wheel on its axle and clamp the axle in a vise.)



Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk. Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.



To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it's spun. Do not add more than 60 grams.

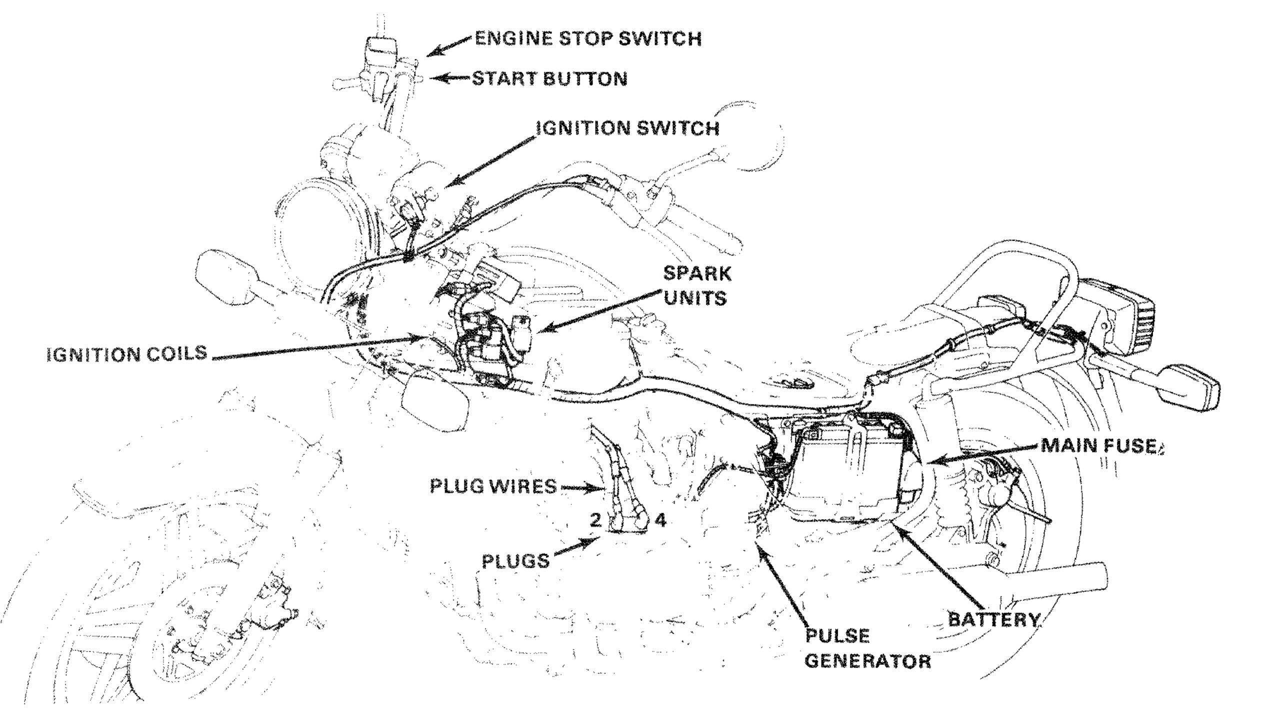


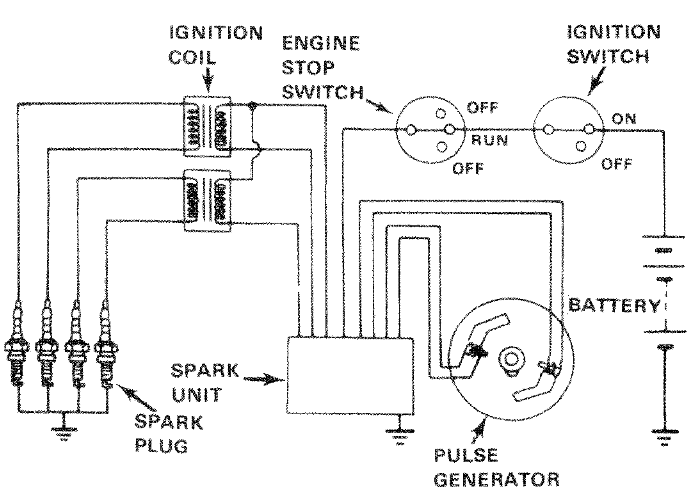
Ignition

Ignition

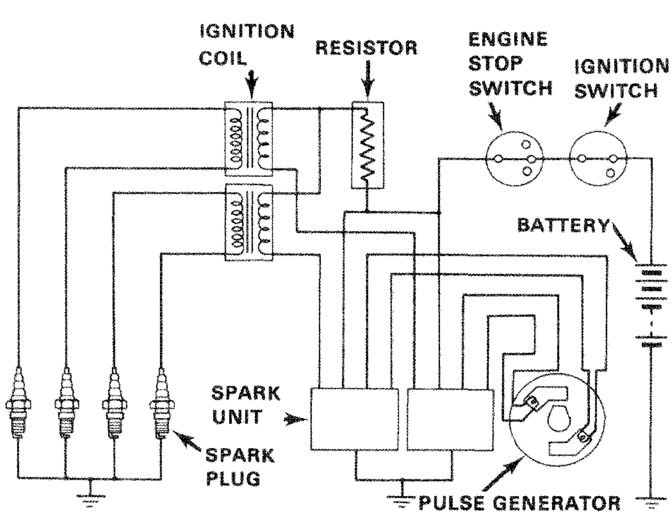
Service Information

- All electrical components can be inspected on the motorcycle.
- Be sure the battery is fully charged before diagnosing the ignition system.
- There is one pulse generator and transistorized spark unit for each pair of cylinders.
- Current is sent through the ignition coil primary circuit by the spark unit as the pulse generator rotor tooth approaches the generator tooth. When the rotor tooth just passes the generator tooth the primary circuit is broken causing the primary coil flux field to collapse and secondary coil voltage rapidly rises, firing the spark plugs. Dwell time is just 0.2 - 0.4 milliseconds.
- A mechanical advance and a vacuum advance diaphragm move the pulser generators to control ignition timing. Ignition timing is adjusted for engine speed and load.





IGNITION SYSTEM (1980-1981)



IGNITION SYSTEM (1982—)

Troubleshooting

NOTE: Before beginning be sure that:

- The battery is fully charged and all wires and cables are connected properly.
- Each pair of plugs (1-2, 3-4) has its own ignition circuit.

Engine Does Not Start

Check for spark at plugs.
Disconnect leads, hold next to plugs and crank engine.

Spark OK → Check spark plugs, ignition timing, ignition coil performance, fuel system.

No Spark

Check spark plug caps for wear and resistance. Should be 5K ± 10% Ohms.

No → Cap is faulty. Replace cap.

Yes

Measure cranking voltage.
Connect DC Voltmeter (+) lead to ignition coil B/W wire, (−) lead to ground.
Crank engine and measure. Should be 9V or above.

No → Trace power from main fuse through ignition and engine stop switch. Repair as necessary.

Yes

Measure voltage drop at coil.
Connect meter to coil primary terminals, (+) to B/W, (−) to other terminal.
Crank engine and measure voltage. Should be more than 1V fluctuating.

No → Problem in primary circuit, see next page.

Yes

Problem in secondary circuit.
Disconnect spark plug leads. Measure resistance through cables and coil. Should have 22K ± 5K Ohms.

No → Check each cable then coil for continuity. Replace faulty parts.

Yes

Measure resistance between chassis ground and each cable. Should be infinite resistance.

No → Check each cable then coil for a short to ground. Replace faulty parts.

Yes

Measure coil output.
Remove spark plug cap from cable.
Crank engine and measure spark. Should be 6 mm or more.

No → Coil is faulty. Replace coil.

Yes

If everything checks out to this point, the problem may be caused by heat or vibration. Substitute parts that have checked good and recheck system.

(cont'd)

Ignition

Troubleshooting (cont'd)

Begin primary circuit check here.

Check	Result	Action
Check pulse coil resistance as shown on page 15-5. Should have 530 Ohms ± 50 Ohms.	**No**	Repair wiring or replace pulse generator.
Yes ↓		
Check pulse generator for short to ground. Measure resistance between each wire and ground. Should be infinite resistance.	**No**	Repair wiring or replace pulse generator.
Yes ↓		
Check for battery voltage at spark unit B/W wire. Should be approximately 12V.	**No**	Trace power from ignition switch. Repair wiring or replace parts as necessary.
Yes ↓		
Check spark unit by following procedures on page 15-5.	**If Faulty**	Replace spark unit.
OK ↓		
Check that pulse generator rotor bolt is tight, and that rotor is not damaged.	**No**	Tighten rotor bolt to specified torque or replace rotor, if necessary.
Yes ↓		
If everything checks out to this point, the problem may be caused by heat or vibration. Substitute parts that have checked good and recheck system.	**If Still Faulty**	Check secondary unit.

Component Testing

Coil

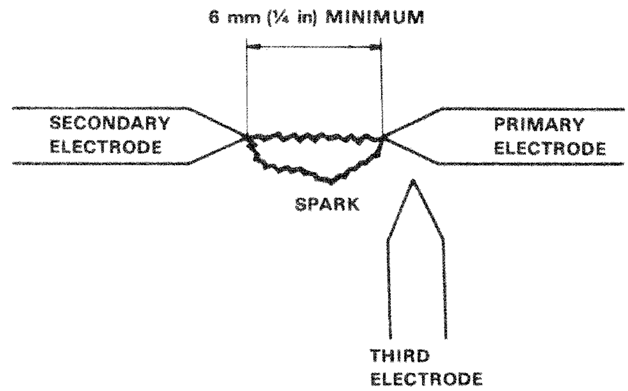
Perform the 3-point spark test with a coil tester.

Service Limit: 6 mm (¼ in) minimum.

NOTE: Follow coil tester manufacturer's instructions.

Measure the primary and secondary resistance of the coils with an Ohmmeter.

Primary resistance:	**0.4 ± 0.04 Ohms**
Secondary resistance:	
1980 - 1981	**22K ± 5K Ohms**
1982—	**16.7K ± 1.67K Ohms**

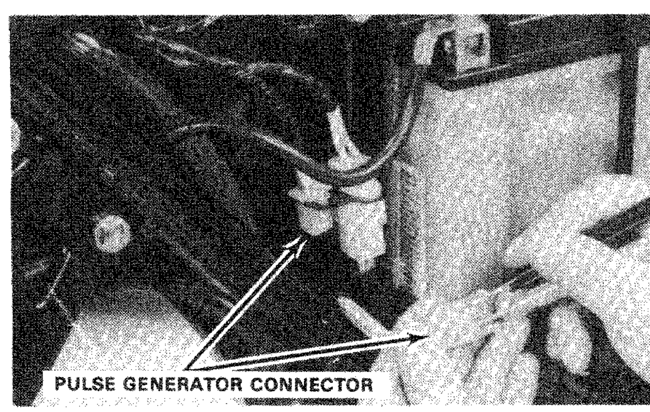


Pulse Generator

Measure these resistances:

White and yellow leads (1-2 cylinders)
White/blue and blue leads (3-4 cylinders)

Service Limit: 530 ± 50 Ohms at 20°C, 68°F.



Spark Unit

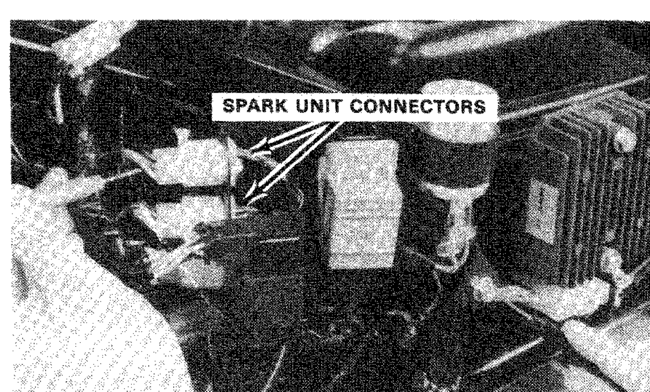
Attach the positive probe of a voltmeter to the blue/yellow wire terminal of the upper 6-pin connector (3-4 cylinders).

Attach the negative probe to any convenient ground.

Turn the ignition switch on.

Disconnect the 4-pin pulse generator connector and ground the white/blue terminal (3 - 4 cylinders) intermittently.

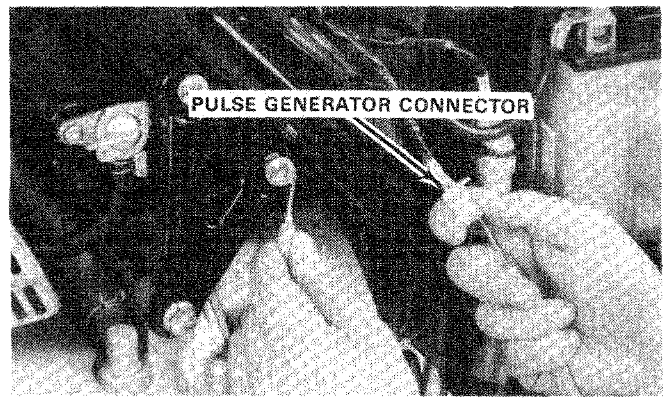
The spark unit is normal if the voltage drops from 12V to less than 2V when the white/blue terminal is grounded.



Component Testing (cont'd)

Repeat the test using the yellow wire terminal of the lower 6-pin spark unit connector (1 – 2 cylinder) and ground the white terminal of the 4-pin pulse generator connector intermittently.

The spark unit is normal if the voltage drops from 12V to less than 2V when the yellow terminal is grounded.

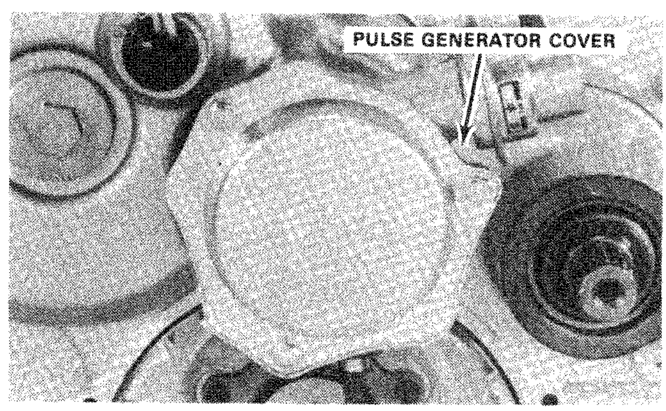


Vacuum Spark Advance

Remove the rear wheel and swingarm (page 14-5 and 12-34).

Remove the pulse generator cover.

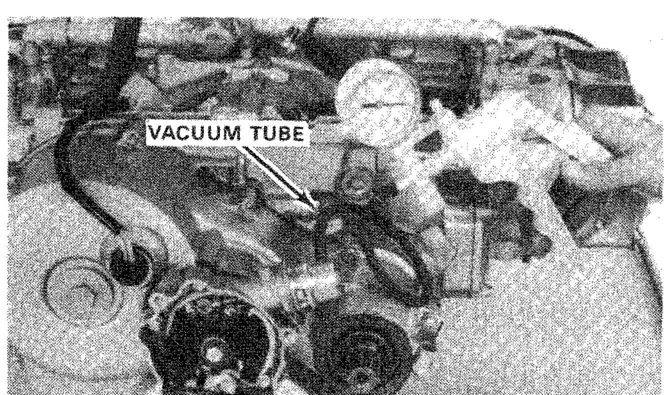
Disconnect the vacuum advancer tube from the carburetors.



Attach a vacuum pump H/C 058369, P/N A973X-041-XXXXX to the end of the vacuum advancer tube and check that the advancer operates properly by applying vacuum.

1980: **Operation should start at 40 mm/Hg (1.6 in/Hg)**
Operation should cease at 100 mm/Hg (3.9 in/Hg)

1981— : **Operation should start at 40 mm/Hg (1.6 in/Hg)**
Operation should cease at 80 mm/Hg (3.2 in/Hg)



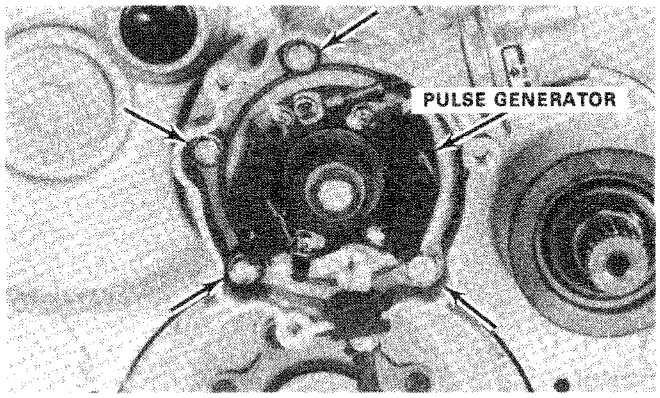
Pulse Generator

Remove the rear wheel and swingarm (page 14-5 and 12-34).

Remove the pulse generator cover.

Disconnect the vacuum tube and pulse connector.

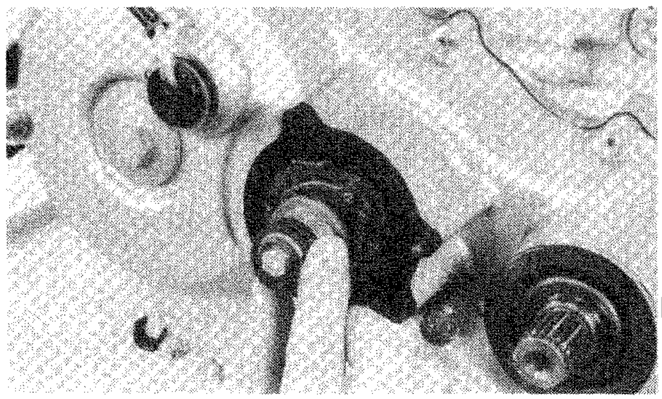
Remove the pulse generator attaching bolts and generator.



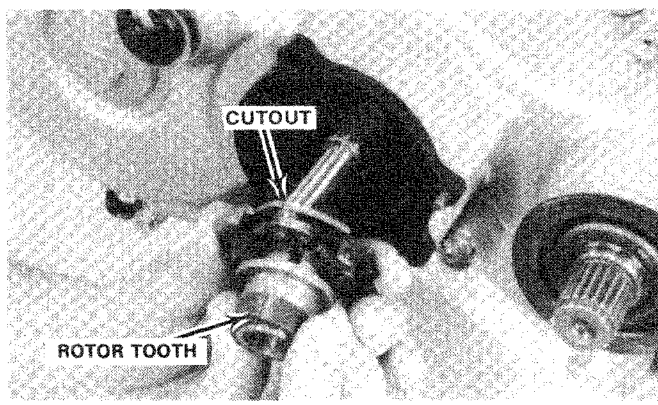
Mechanical Spark Advance

Check that the mechanical spark advancer cam is not sticking.

Lubricate the sliding surfaces, and check the spring for loss of tension and the advancer pin for wear.



Align the rotor tooth with the advancer cutout when assembling.



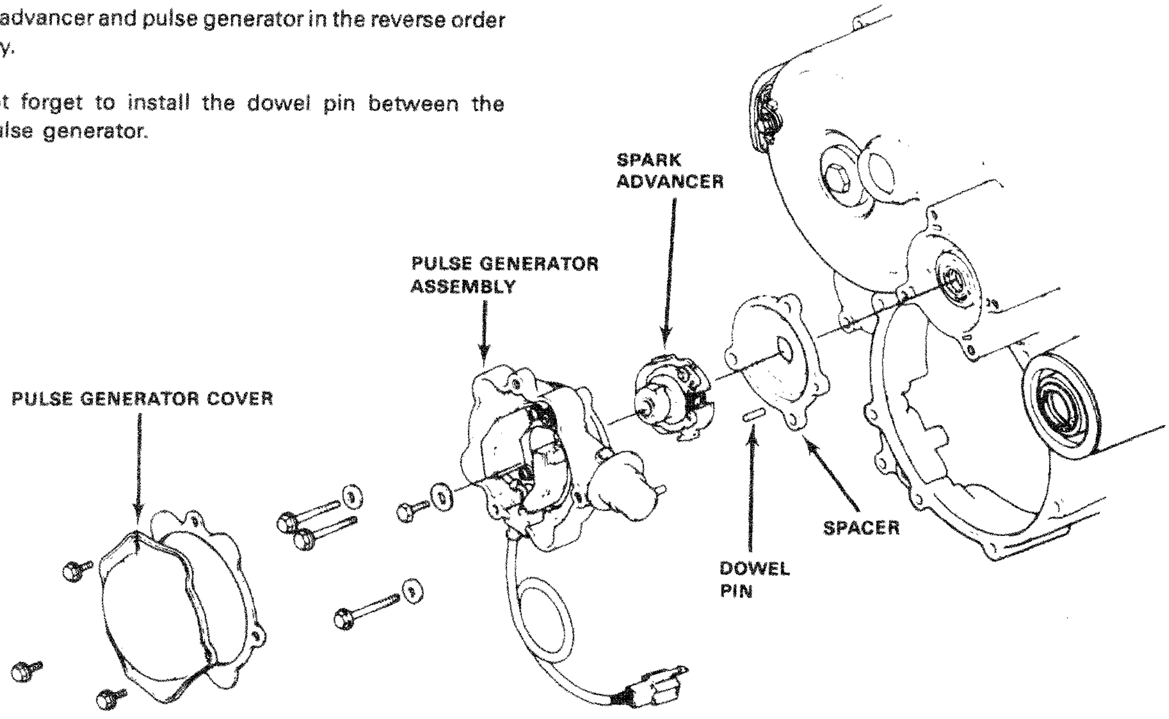
(cont'd)

Ignition

Component Testing (cont'd)

Assemble the advancer and pulse generator in the reverse order of disassembly.

NOTE: Do not forget to install the dowel pin between the spacer and pulse generator.



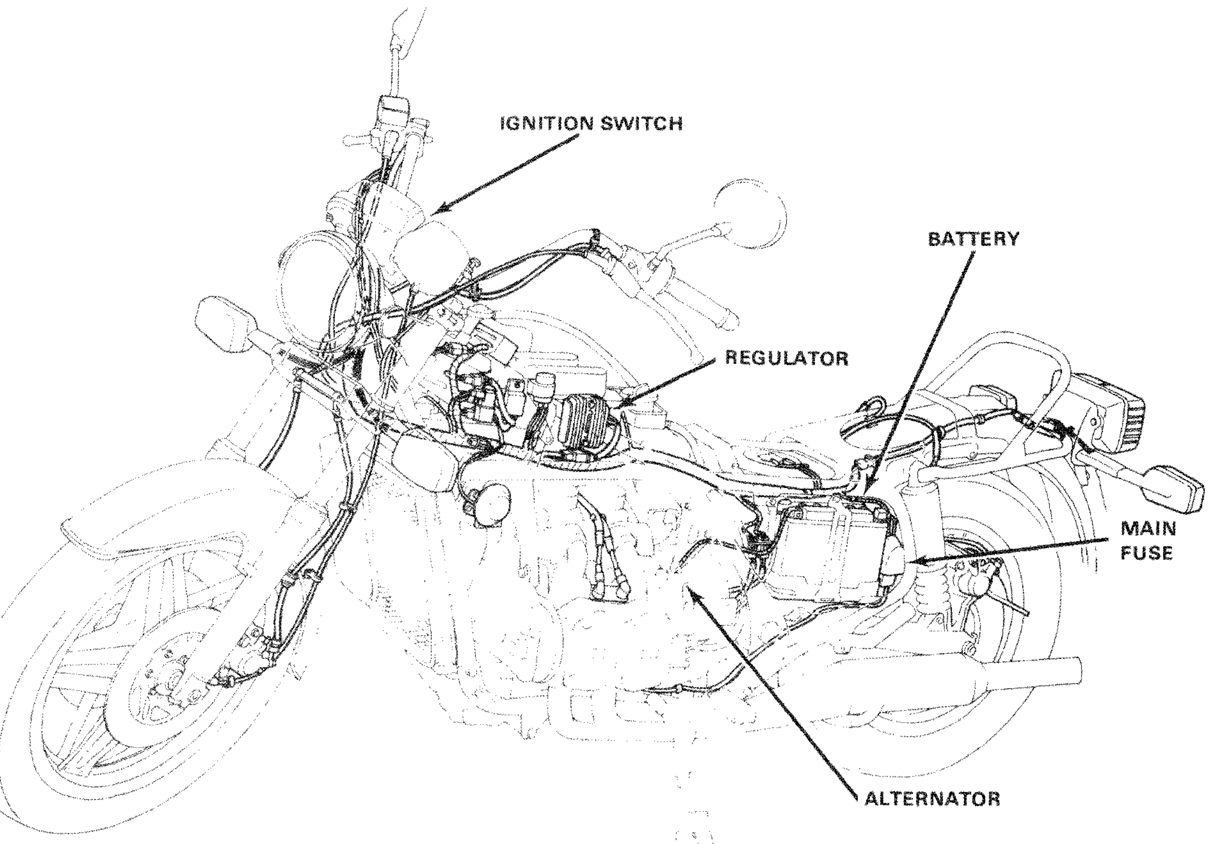
Charging

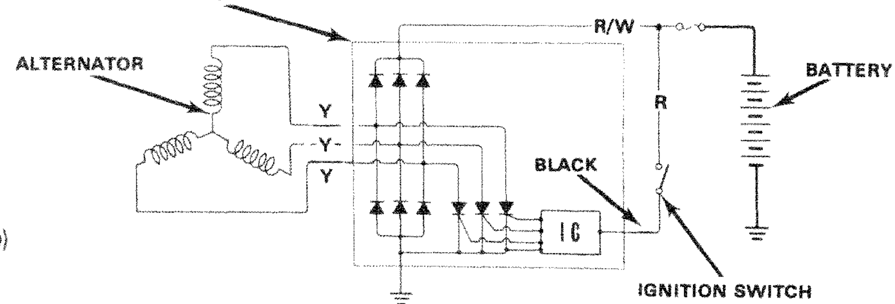
Charging

Service Information

- Battery acid level should be checked regularly and filled with distilled water when necessary.
- The battery must be fully charged when inspecting the charging system. Always slow charge a battery; a quick charge may damage the battery.
- All charging system components can be tested on the motorcycle, but to service the alternator the engine must be removed from the frame.
- Remove the battery from the motorcycle for charging. If the battery must be charged on the motorcycle, disconnect the battery cables.

CAUTION: Keep sparks away from a charging battery because batteries produce explosive gases.





Torque Values

6 mm case bolts:	12 N·m (9 ft-lb)
12 mm washer head bolt for generator rotor:	85 N·m (62 ft-lb)

Troubleshooting

Battery Discharging

↓

Battery Test
Inspect the battery using guidelines on page 16-4. Substitute a fully charged battery if necessary.

↓

Perform charge rate test procedures on page 16-5. Should be 3A, 14-15 V DC at 3000 rpm.

- **Yes** → 3A, 14 - 15 V DC → System OK Charge/replace battery.
- **No** → Below 3A, 14 V → Rectifier Test (below)
- **No** → Above 3A, 15 V → Check for battery voltage on black lead at regulator rectifier plug in connector.
  - **Yes** → Replace regulator rectifier. → Re-test Charge Rate
  - **No** → Repair faulty wiring. → Re-test Charge Rate

Rectifier Test
6 diodes. Resistance check both directions = 12 readings page 16-6.
- Six ohmmeter readings should show 5 - 40 Ohms.
- Six ohmmeter readings should show 6000 Ohms more

No → Replace Regulator/rectifier Recheck charge rate.

Yes ↓

Stator Test
3 windings - 2 tests = 6 readings, page 16-7.
- Three ohmmeter readings, measured between yellow output wire pairs should show continuity.
- Three ohmmeter readings, measured between each yellow wire and ground should show no continuity.

No → Replace stator Recheck charge rate.

Yes ↓

Regulator Test
If the alternator and rectifier are OK, but charge rate is still low, check regulator using procedure on page 16-6. If proper test equipment is not available, substitute a new regulator/rectifier and recheck charge rate.

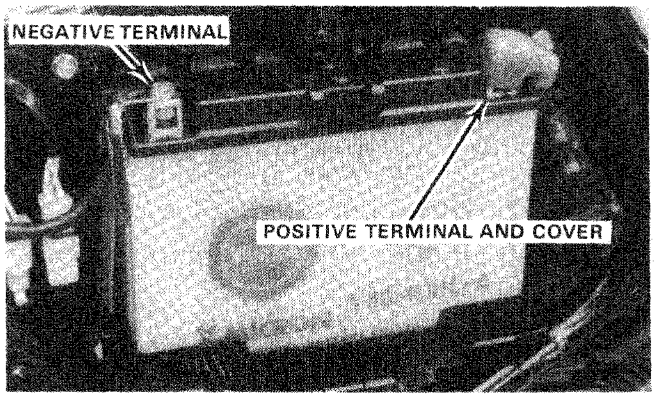
Charging

Battery Removal/Inspection

Disconnect the negative cable first, then the positive cable. On installation, reconnect the negative cable last.

Remove the battery from the motorcycle for charging whenever possible. If the battery must be charged on the motorcycle, disconnect the battery cables.

CAUTION: Make sure the positive cable is not forced against any metal parts, otherwise a short may occur.

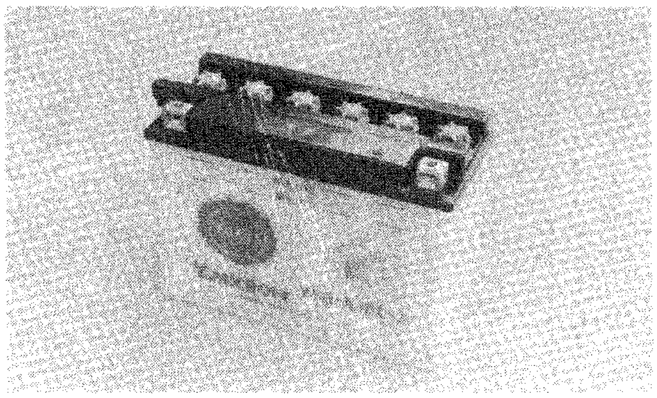


Check for cracked or broken case or plates. Check the plates for sulphation.

Replace the battery if damaged or sulphated.

Check electrolyte level in cells. If low, add distilled water to bring the level to the upper mark.

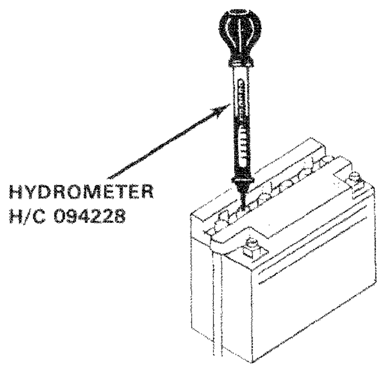
NOTE: In order to obtain accurate test readings when checking the charging system, the battery must be fully charged and in good condition. Perform the following inspections and tests before attempting to troubleshoot charging system problems.



Specific Gravity

The specific gravity must be checked with a hydrometer. Test each cell by drawing electrolyte into the hydrometer.

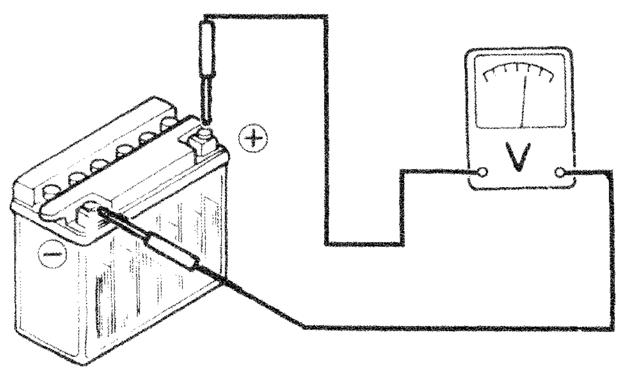
Fully Charged:	1.280 @ 20° C (68° F)
Normal Reading:	1.260 @ 20° C (68° F)
Needs Charging:	1.200 @ 20° (68° F)



Voltage

Set meter to the DCV-Scale. Connect the Red lead to the battery (+) terminal and the Black lead to the (−) terminal.

Fully Charged:	12 - 13 volts
Normal Reading:	11 - 12 volts
Needs Charging:	Below 11 volts



Battery Charging

When the specific gravity reading is low, the battery must be recharged. Slow-charge the battery; do not quick charge it.

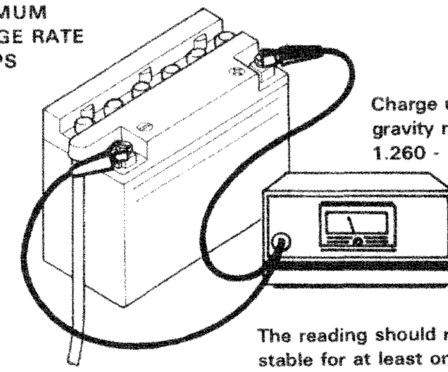
Check electrolyte level periodically.

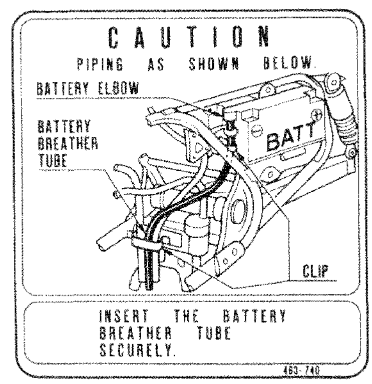
After charging, wash the battery with water. After installation coat the terminals with petroleum jelly.

WARNING:

- **Batteries produce explosive gases. Keep sparks and flames away.**
- **Ventilate when charging in an enclosed area.**
- **The battery contains sulphuric acid; avoid contact with skin, eyes, or clothing. Always shield eyes when working with batteries.**
- **Antidote: Eyes – Flush with water and get prompt medical attention. Skin – Flush with water. Internal – Drink large quantities of water or milk. Follow with milk of magnesia, beaten egg or vegetable oil. Call physician immediately.**

CAUTION: Be sure to route the breather tube as shown on the battery caution label.





Charging Rate Inspection

Run the engine for five minutes before taking readings.

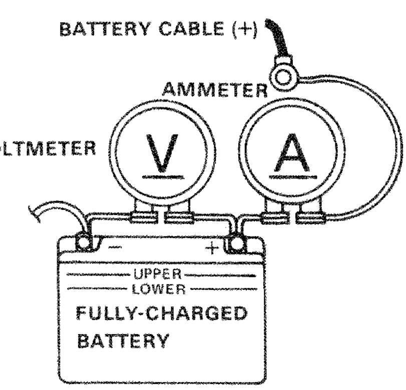
Disconnect the regulator/rectifier black wire.

Connect a 0 - 20V voltmeter and a 0 - 10 amp ammeter to check the output of the charging system.

Slowly increase engine speed and check that charging begins at 1800 rpm.

Make this test with a fully charged battery, dimmer switch on high, fan motor off, and engine speed at 3000 rpm.

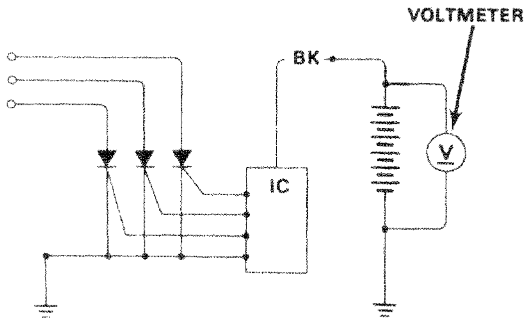
The voltmeter should read at least 12.5 V (1980 - 1981) or 14.5 V (1982—), and the ammeter 5 amps (1980 - 1981) or 3 amps (1982—).



Charging

Voltage Regulator/Rectifier Inspection

Regulator



Overcharging

Connect a voltmeter across the battery as shown.

With the engine running the regulator must divert the DC charging current to ground when the battery voltage reaches 14.0—15.0 DC. If the voltage exceeds 15.0 VDC, replace the regulator/rectifier.

Undercharging

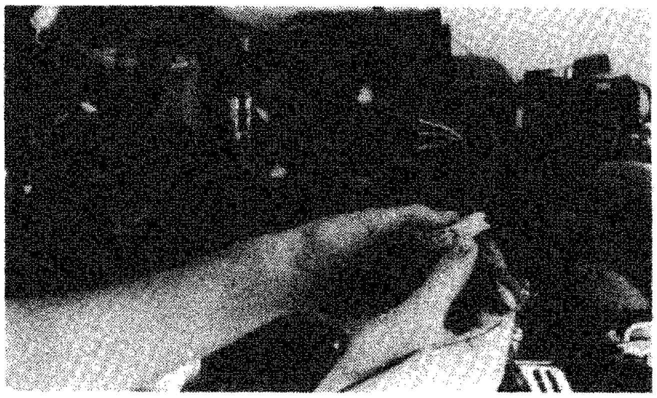
If the battery voltage doesn't reach 14.0—15.0 VDC attach the voltmeter as before. With the engine running disconnect the black wire at the regulator.

If the charging rate increases, replace the regulator/rectifier.

If there's still no increase, perform a stator check (page 16-7). If the stator tests OK, either the regulator/rectifier is faulty or the entire system is overloaded (more current is required than the system was designed to produce).

Check the current requirements of all the accessories installed to be sure their total current draw is less than the maximum output of the system. If not, replace the regulator/rectifier.

Rectifier



Disconnect the 8-pin connector and check the resistance between leads with an ohmmeter.

Reverse Direction: Over 6,000 Ohms

	Positive (+) probe	Negative (−) probe
I	Yellow (3 checks)	Green
II	Red/White	Yellow (3 checks)

Normal Direction: 5 - 40 Ohms

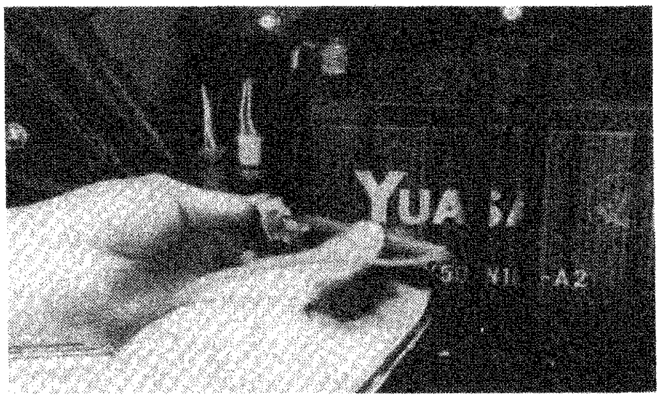
	Positive (+) probe	Negative (−) probe
I	Green	Yellow (3 checks)
II	Yellow (3 checks)	Red/White

Alternator

Stator Inspection

Check the yellow leads to the stator for continuity with each other.

Also check for shorts between any yellow lead and ground. Replace the stator if any yellow lead is not continuous with the others, or if any lead had continuity to ground.

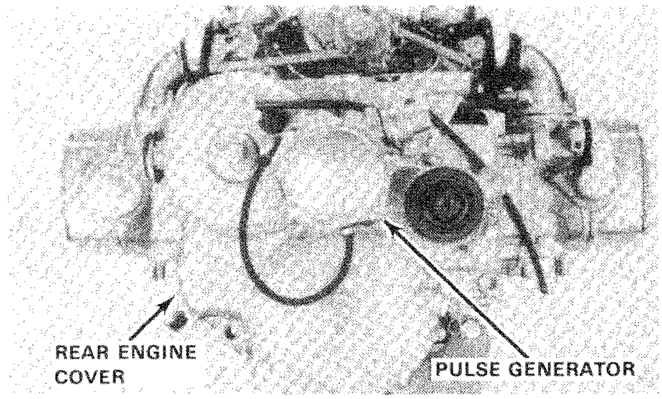


Removal

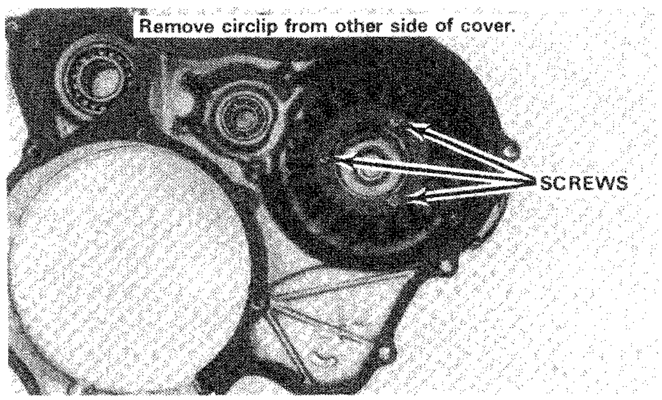
The engine must be removed from the frame before the alternator can be removed. Remove the engine as described in Section 6.

Remove the pulse generator (page 10-6).

Remove the clutch cover and rear engine cover.



The stator coils will remain attached inside the rear engine cover when it is removed from the engine. Remove the circlip and three screws to remove the stator coils.



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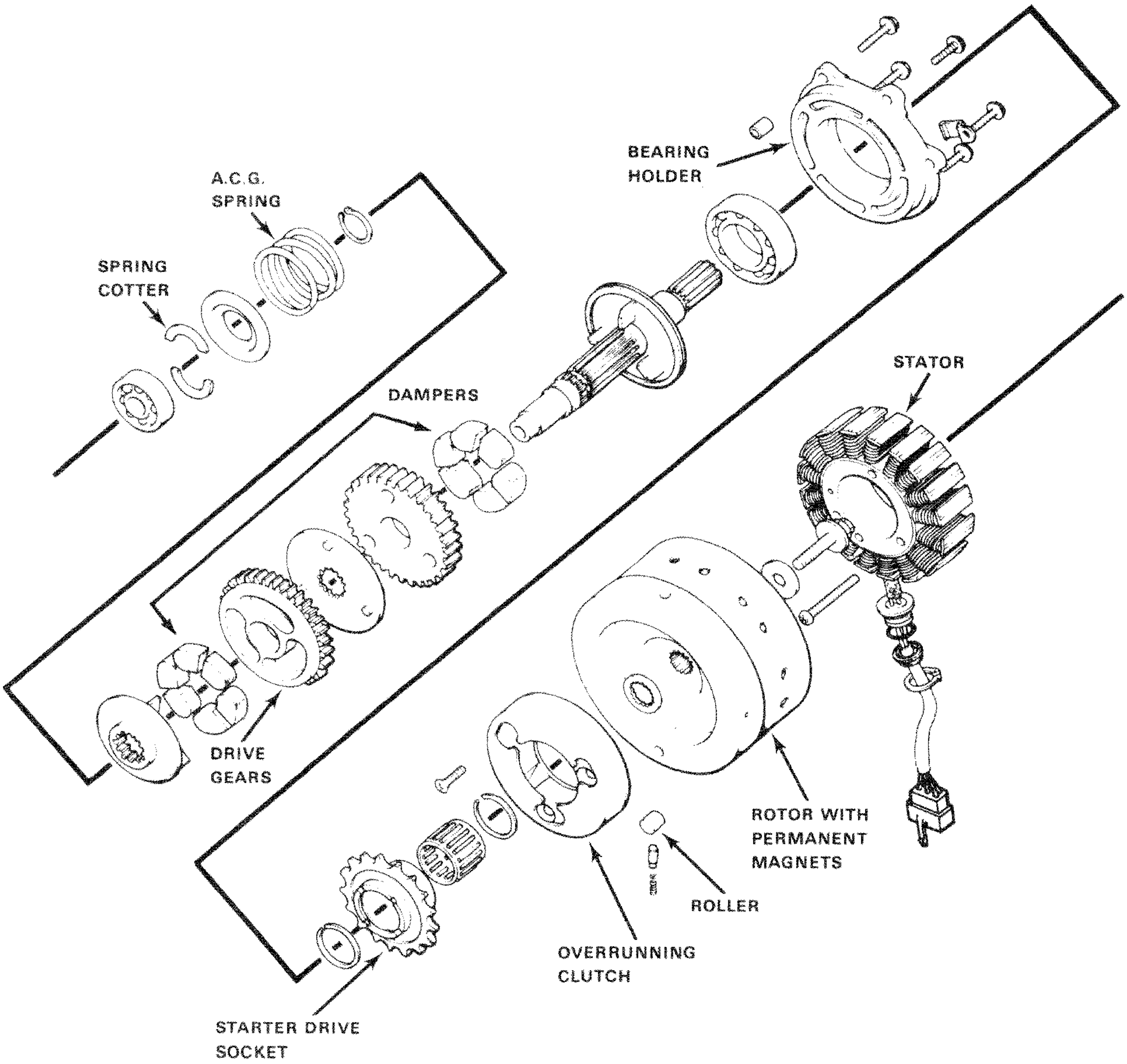
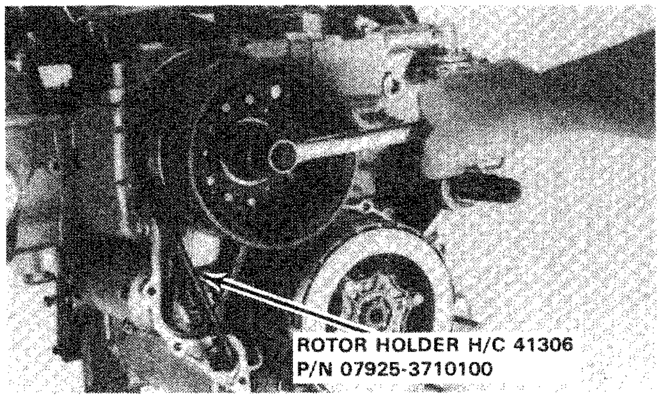


BEARING HOLDER
A.C.G. SPRING
SPRING COTTER
DAMPERS
STATOR
DRIVE GEARS
ROTOR WITH PERMANENT MAGNETS
ROLLER
OVERRUNNING CLUTCH
STARTER DRIVE SOCKET

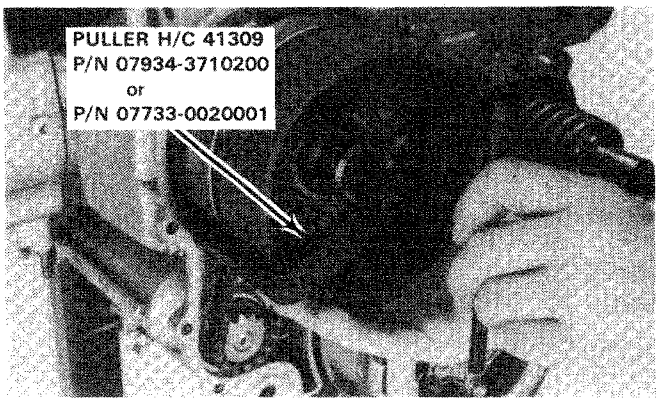
Install the rotor holder, then remove the rotor bolt.



Remove the rotor.

CAUTION: The rotor weighs nine pounds. Be prepared to support it when it comes off the shaft.

NOTE: The small rollers and springs that are part of the starter over-running clutch assembly may fall out when the rotor is removed.

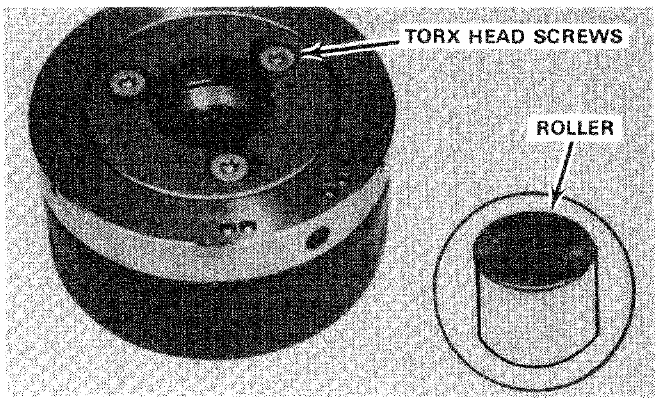


Starter Clutch Disassembly

Remove the three rollers from the assembly and inspect them for flat spots. See that they move freely up and down their ramps.

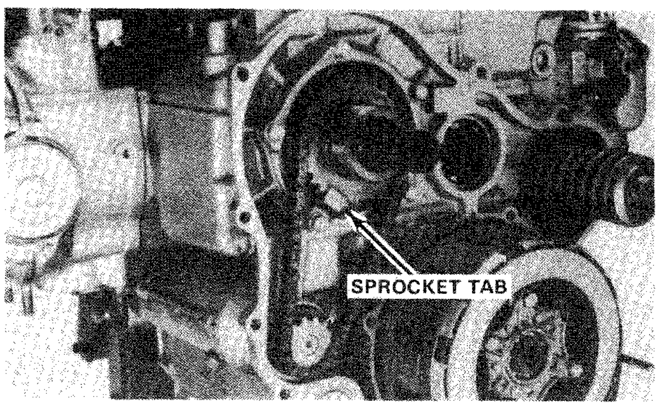
Remove the springs and caps and inspect them for wear. Replace if necessary.

NOTE: Worn or corroded springs, caps, or rollers will often cause the starter to spin without rotating the engine or will emit a loud screeching noise as the engine is being rotated.



Starter Drive Removal

Remove the sprocket tab and starter drive sprocket from the shaft.



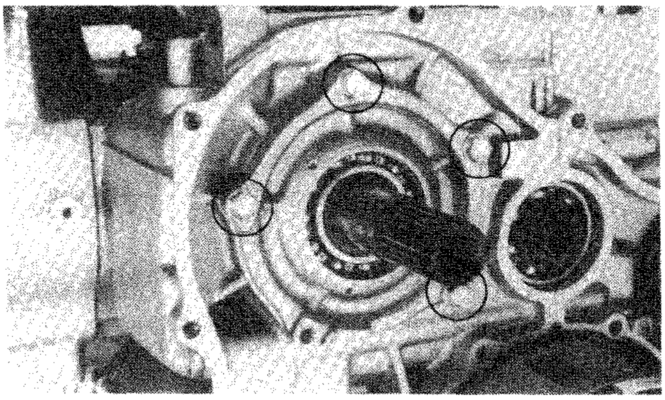
(cont'd)

Charging

Alternator (cont'd)

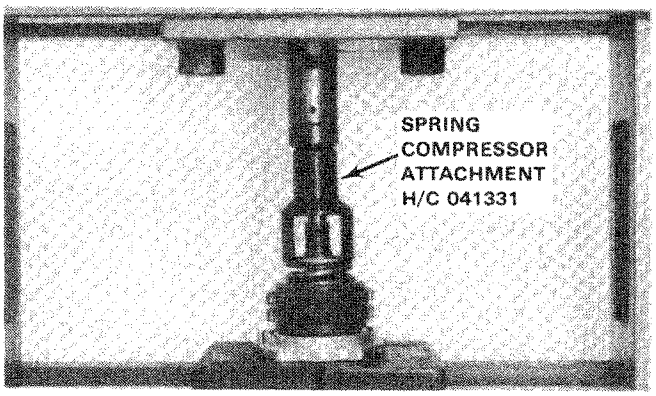
Alternator Drive Removal

Remove the bearing holder bolts and slide the generator drive assembly free of the case.

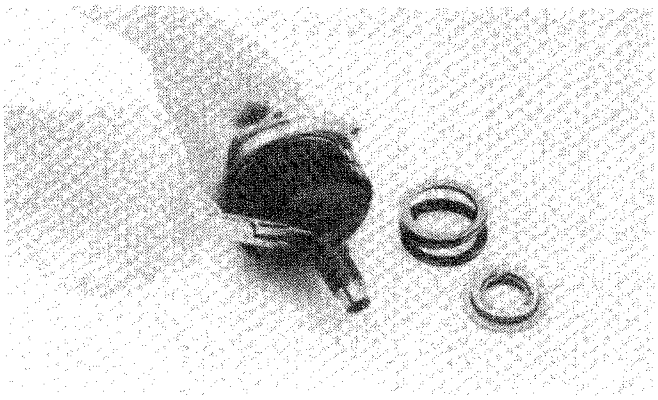


Set the assembly into a press. Compress the spring and remove the cotters.

NOTE: Do not compress the spring more than necessary to remove the cotters.

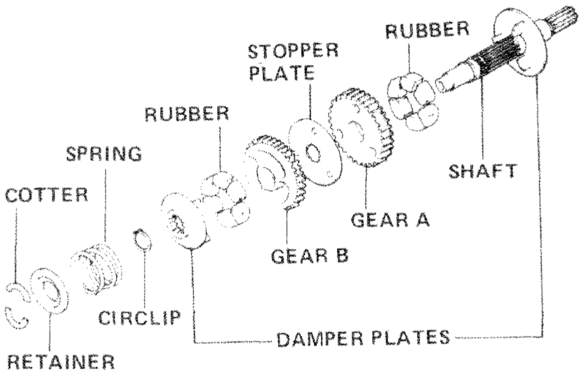


Remove the circlip, gears and damper.



Alternator Drive Inspection

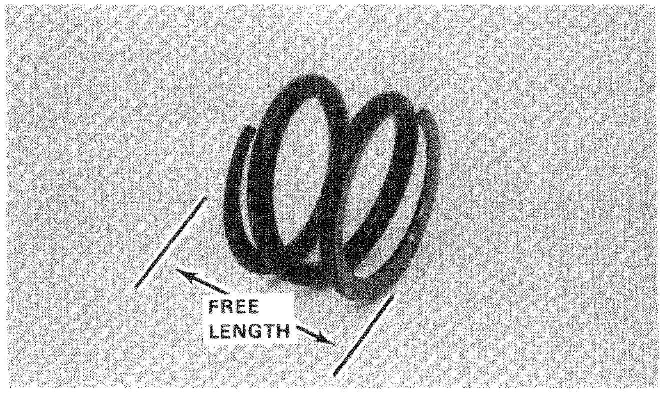
Inspect the damper rubbers, damper plates, and stopper plate for wear. Replace if necessary.



Measure the free length of the spring. With a spring pressure tester, measure the spring tension at the specified compressed length.

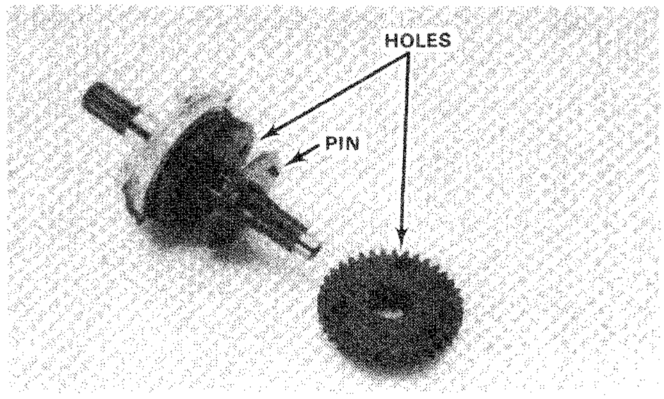
Free Length:
Standard: 26 mm (1.023 in)

Spring Tension at 20 mm
Standard: 155 - 175 kg (342 - 386 lb)



Reassemble the drive assembly gears, damper plates, damper rubbers, bearing, and bearing holder.

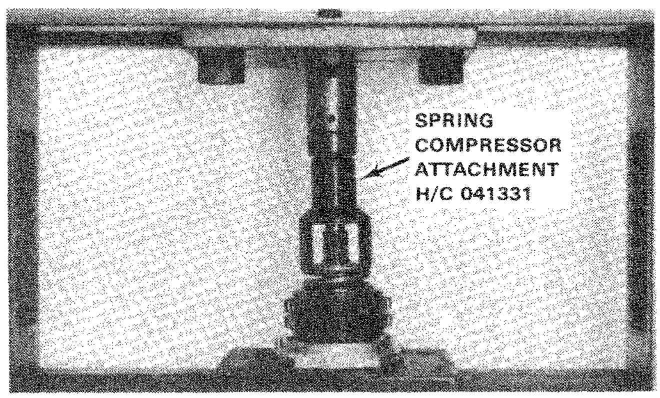
Be sure to align the pins in the plate with the holes in the gears.



Reassembly

Place the assembly in a press and install the damper spring, damper spring retainer, and cotters. Be certain that the cotters are fully seated in their grooves.

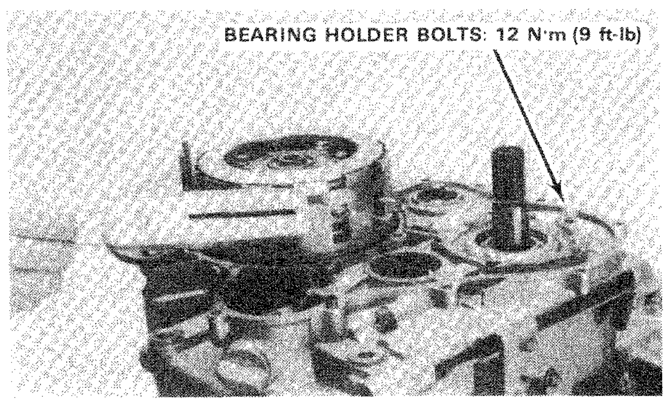
NOTE:
- Do not compress the spring more than necessary to install the cotters.
- The spring compressor can be used without a hydraulic press.



Turn the engine so that the clutch faces up.

Slip the alternator drive assembly into place, then install four of the five bearing holder bolts loosely. Do not install the sprocket tab bolt at this time.

Adjust the backlash to zero by hooking a spring scale to the ACG shaft and pulling with a 1.0 + 0.5 kg force while torquing the four 6 mm bearing cover bolts.



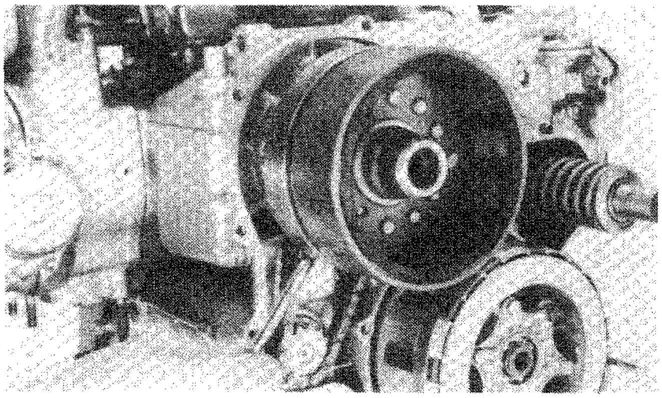
(cont'd)

Charging

Alternator (cont'd)

Slip the driven gear into the starter clutch. Install the rotor, sprocket and chain as an assembly, but do not push it on all the way. Leave about 20 mm space between the rotor and engine; this will allow enough space to install the sprocket tab.

Install the sprocket tab and torque it's bolt to 12 N·m (9 ft-lb).



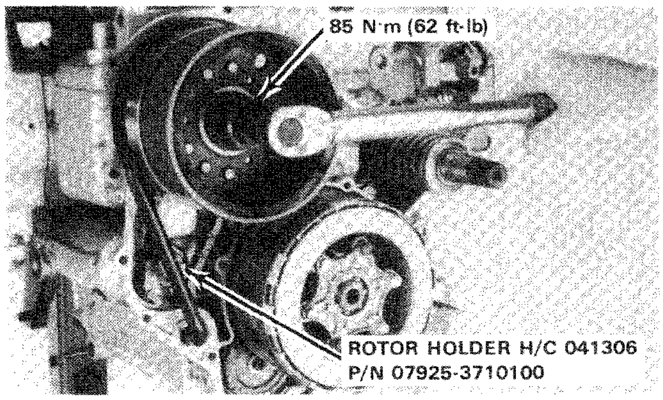
Now, push on the rotor until it bottoms, then torque the rotor nut.

Install the stator coils in the rear engine cover.

Install the rear engine cover and the clutch cover.

Install the pulse generator and check that the pulse air gap is 0.50–0.70 mm (0.020–0.028 in)

Reinstall the engine (Section 6).

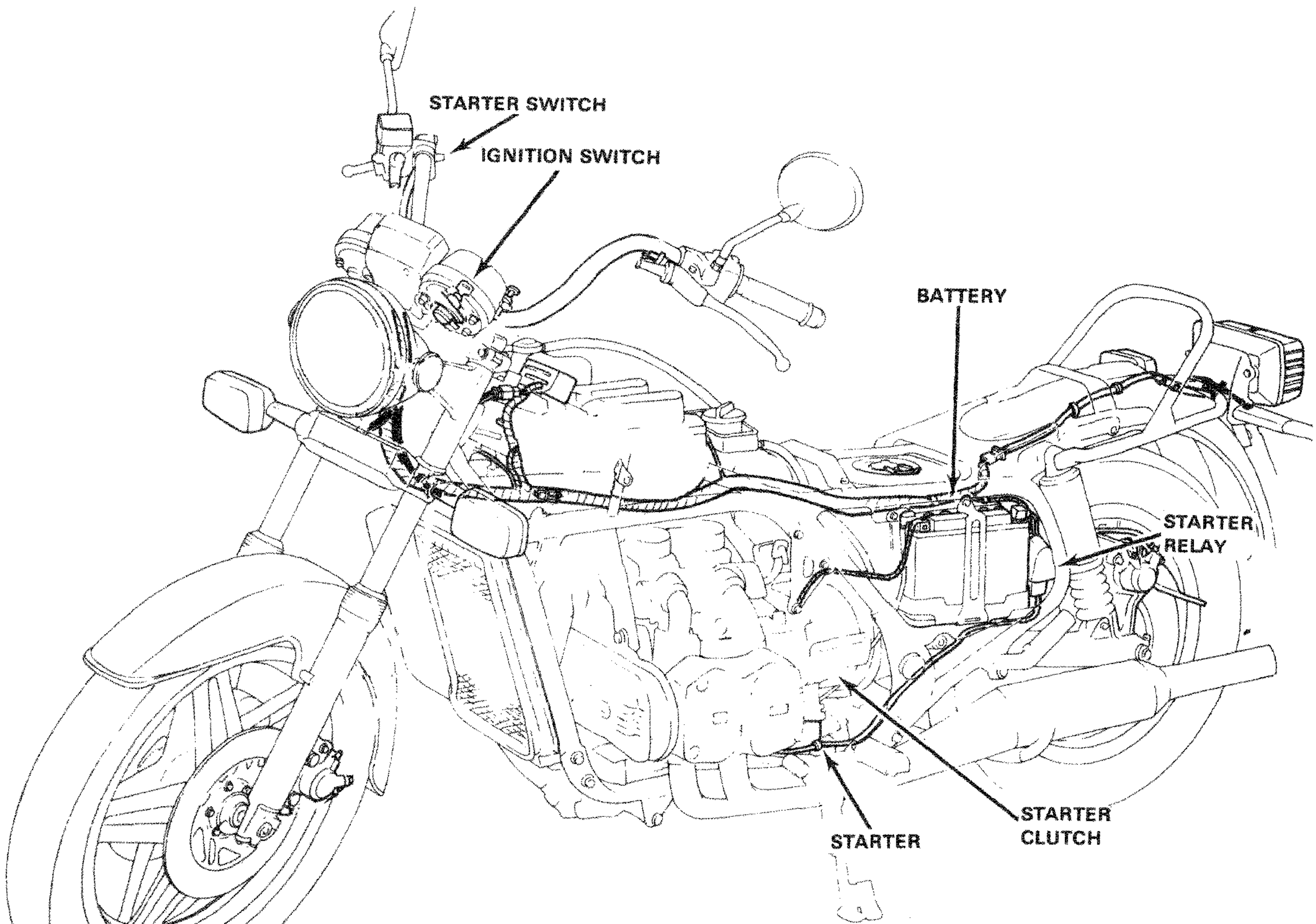


Starter

Starter

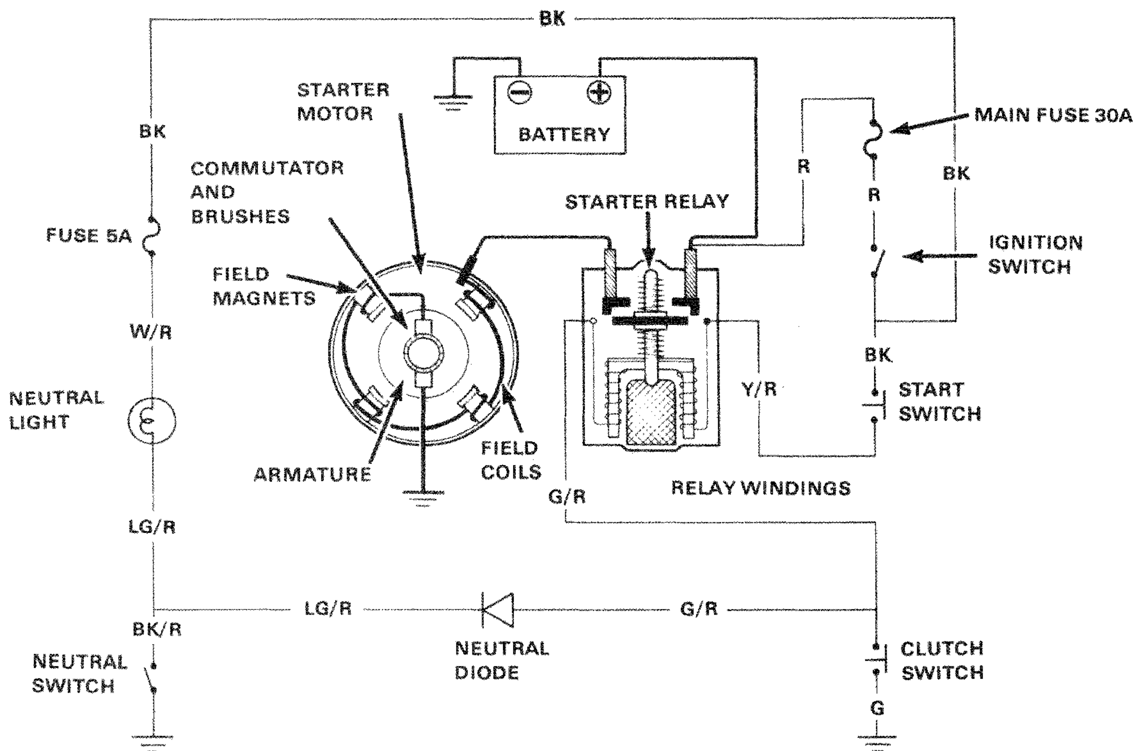
Service Information

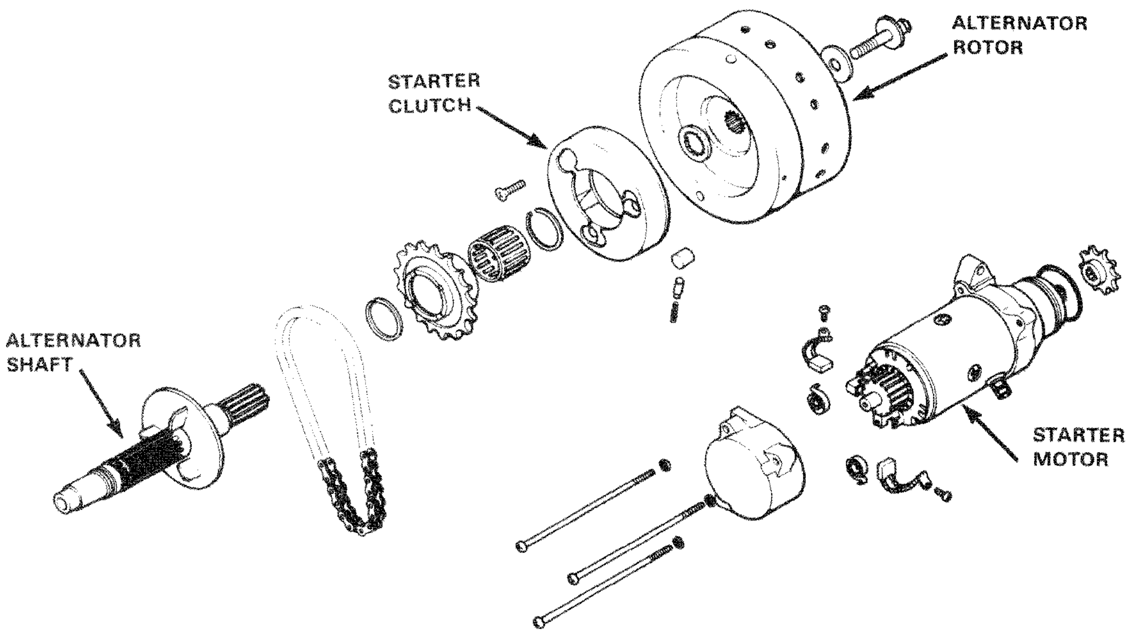
- To service the starter motor and starter clutch, the engine must be removed from the frame.
- For starter clutch inspection, see page 17-8.
- Starter motor engagement is controlled by an electromagnetic relay which is energized by pushing the starter switch. This closes a contact to provide battery voltage to the starter. A starter or "overrunning" clutch is used to prevent damage to the starter armature due to "overspeed" when the engine starts. The starter remains engaged until the starter button is released.



Torque Values

6 mm case bolts:	12 N·m (9 ft-lb)
6 mm washer head bolts for generator bearing holder:	12 N·m (9 ft-lb)


BK
STARTER
MOTOR
BATTERY
MAIN FUSE 30A
BK
COMMUTATOR
AND
BRUSHES
R
BK
R
STARTER RELAY
FUSE 5A
FIELD
MAGNETS
IGNITION
SWITCH
W/R
BK
NEUTRAL
LIGHT
Y/R
START
SWITCH
FIELD
COILS
ARMATURE
G/R
RELAY WINDINGS
LG/R
LG/R
G/R
BK/R
NEUTRAL
SWITCH
NEUTRAL
DIODE
CLUTCH
SWITCH
G


ALTERNATOR
ROTOR
STARTER
CLUTCH
ALTERNATOR
SHAFT
STARTER
MOTOR

Starter

Troubleshooting

NOTE: Be sure the battery is fully charged and is in good condition before troubleshooting the starter system.

Engine Won't Start

Starter turns engine slowly.

→ Check battery terminal connections for corrosion and looseness.

→ Check starter using test on page 17-8.

→ Check chain, sprockets, and starter clutch for sticking or binding.

Starter will not turn.

→ Check battery terminal connections for corrosion and looseness.

→ Inspect starter motor, page 17-6.

→ Test starter relay.

→ Disconnect starter lead from relay. Connect DC Voltmeter positive (+) probe to relay primary terminal and the negative (−) probe to ground. Press starter button. Should be battery V.

- **Yes** → Test neutral and clutch switches, pages 18-14, -17.
- **No** → Test ignition and start switches, pages 18-15, -16.

Starter turns but engine doesn't.

→ Check starter drive gears, chain, sprockets and starter clutch, page 16-9.

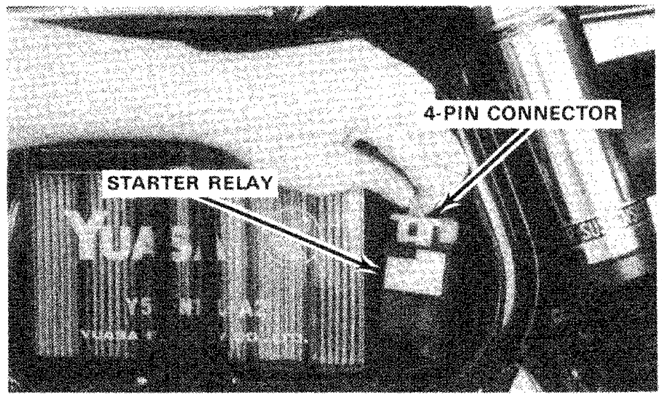
Starter Relay Removal/Inspection

CAUTION: Before removing the starter relay, disconnect the negative cable from the battery.

NOTE: Inspection can be done without removing the relay.

Unplug the 4-pin connector at the relay.

Remove the two nuts and the large leads from the relay secondary terminals, and slide the relay OFF the battery holder.

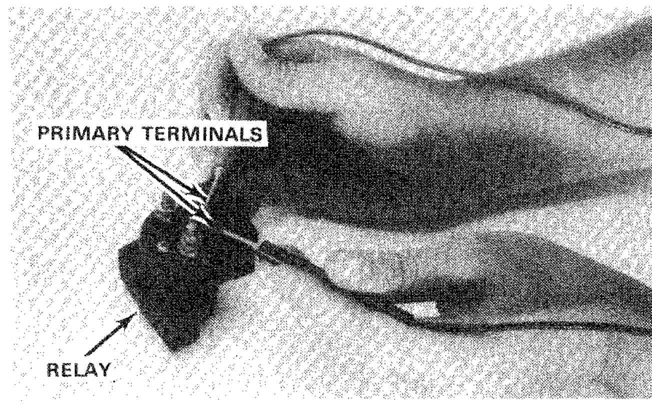


With an ohmmeter, test the primary coil for correct resistance.

Specified Resistance: 3.4 ± 10% Ohms

Also test for shorts from either primary lead to the relay case.

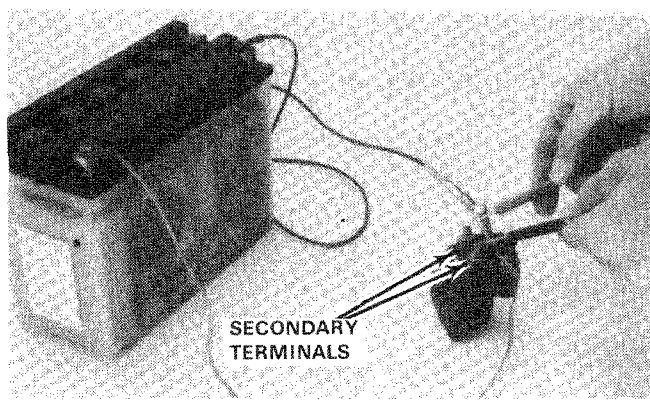
Replace the relay if the primary coil has an open circuit, or is shorted to the case.



Connect a 12 volt battery across the primary leads. The relay should make an audible click as the switch closes.

With the relay energized, test for continuity across the secondary terminals.

If there is no continuity, the relay must be replaced.

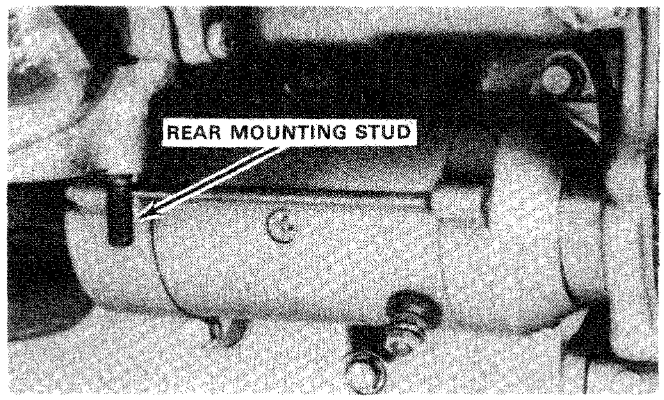


Starter

Starter Motor Disassembly/Inspection

Remove the engine (page 6-3).

Remove the two starter mounting bolts and pull the motor out of the engine case.



Brushes

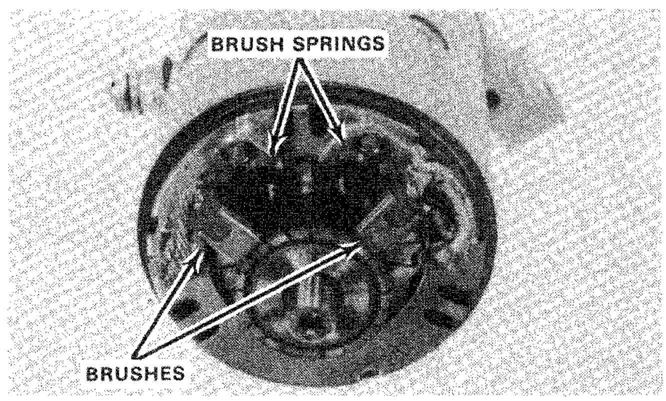
Remove the starter motor case screws and the brush cover.

Inspect the brushes, and measure brush length.

Standard: 12 - 13 mm (0.472 - 0.511 in)
Service Limit: 5.5 mm (0.217 in)

Measure brush spring tension with a spring scale.

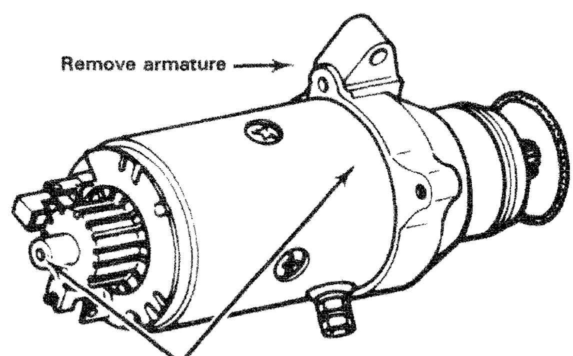
Standard: 560 - 680 grams
Service Limit: 400 grams



Armature

Remove the armature from the gear end of the motor case.

NOTE: Check for spacers on the armature shaft ends. On reassembly, replace the spacers in the correct locations.



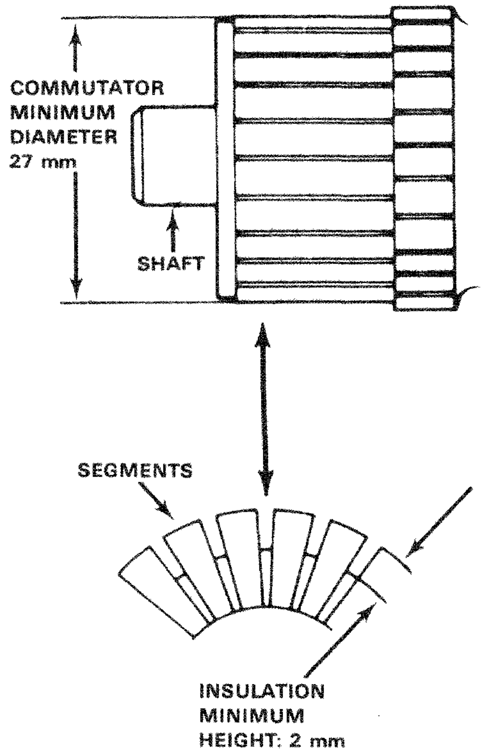
Measure the diameter of the commutator and height of the segments above the insulation.

If the insulation is less than minimum distance below the surface, it can be undercut with a thin hacksaw blade.

Inspect the commutator bars for discoloration. Edge discoloration indicates high resistance.

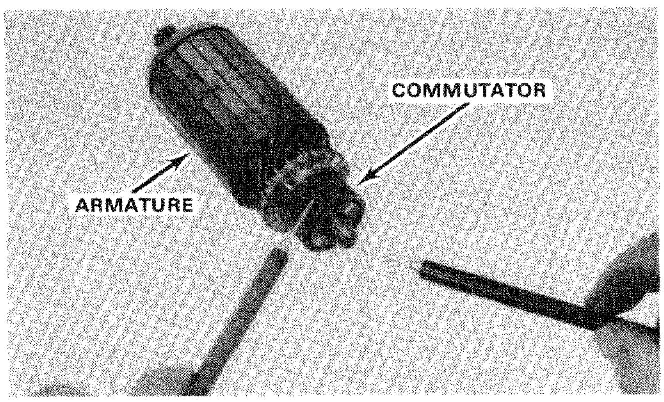
Bars discolored in pairs indicate grounded or open armature coils.

CAUTION: Do not use emory or sandpaper on the commutator since this will cause the brushes to wear quickly.



Check for continuity between pairs of commutator bars, and also between commutator bars and armature shaft.

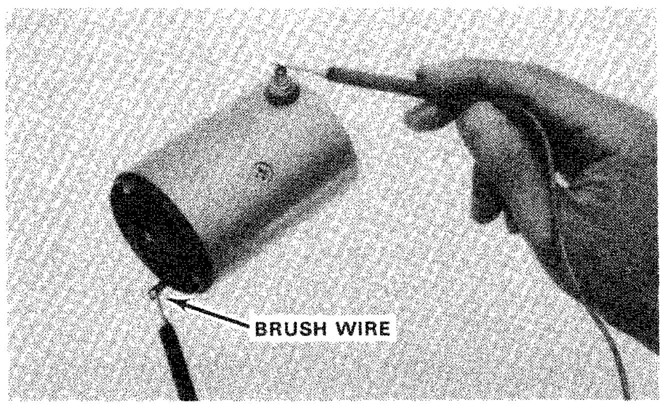
Replace the starter motor if armature coils are open, or shorted to the armature shaft.



Field Coil

Check for continuity from the cable terminal to the motor case and from the cable terminal to the brush wire.

Replace the starter motor if the field coil does not show continuity, or if it is shorted to the motor case.



(cont'd)

Starter

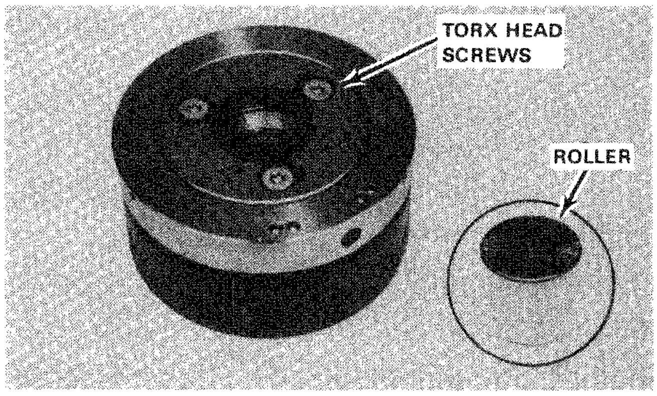
Starter Motor Disassembly/Inspection (cont'd)

Starter Clutch

To inspect or service the starter clutch, the alternator must be removed after the engine has been removed from the frame (section 6).

Remove the three rollers from the assembly and inspect them for flat spots. See that they move freely up and down their ramps (section 16).

NOTE: Worn or corroded rollers will often cause starter to spin without rotating the engine, or emit a loud screeching noise as the engine is being rotated.

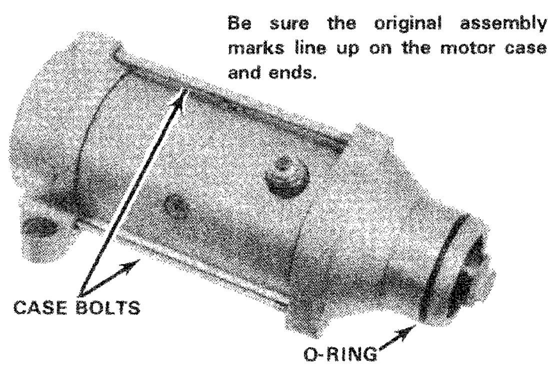


Starter Motor Reassembly/Installation

Install the armature in the case, being careful not to damage the brushes. Install the commutator cover and the case bolts.

Replace the O-ring.

Remove the rear engine cover (page 8-4).

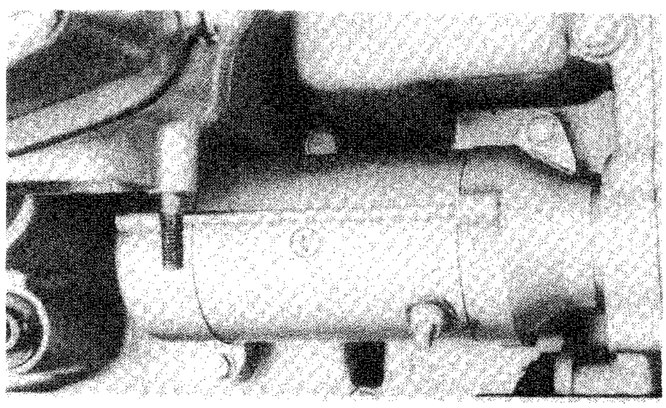


Install the starter motor into the engine, sliding the drive splines into the splines of the sprocket, then install the mounting bolts.

Install the rear engine cover.

Install the engine.

Reconnect the battery cable at both ends. With the engine stop switch off, test the starter for proper operation.



Lights/Switches/Instruments/Wiring

Lights/Switches/Instruments/Wiring

Service Information

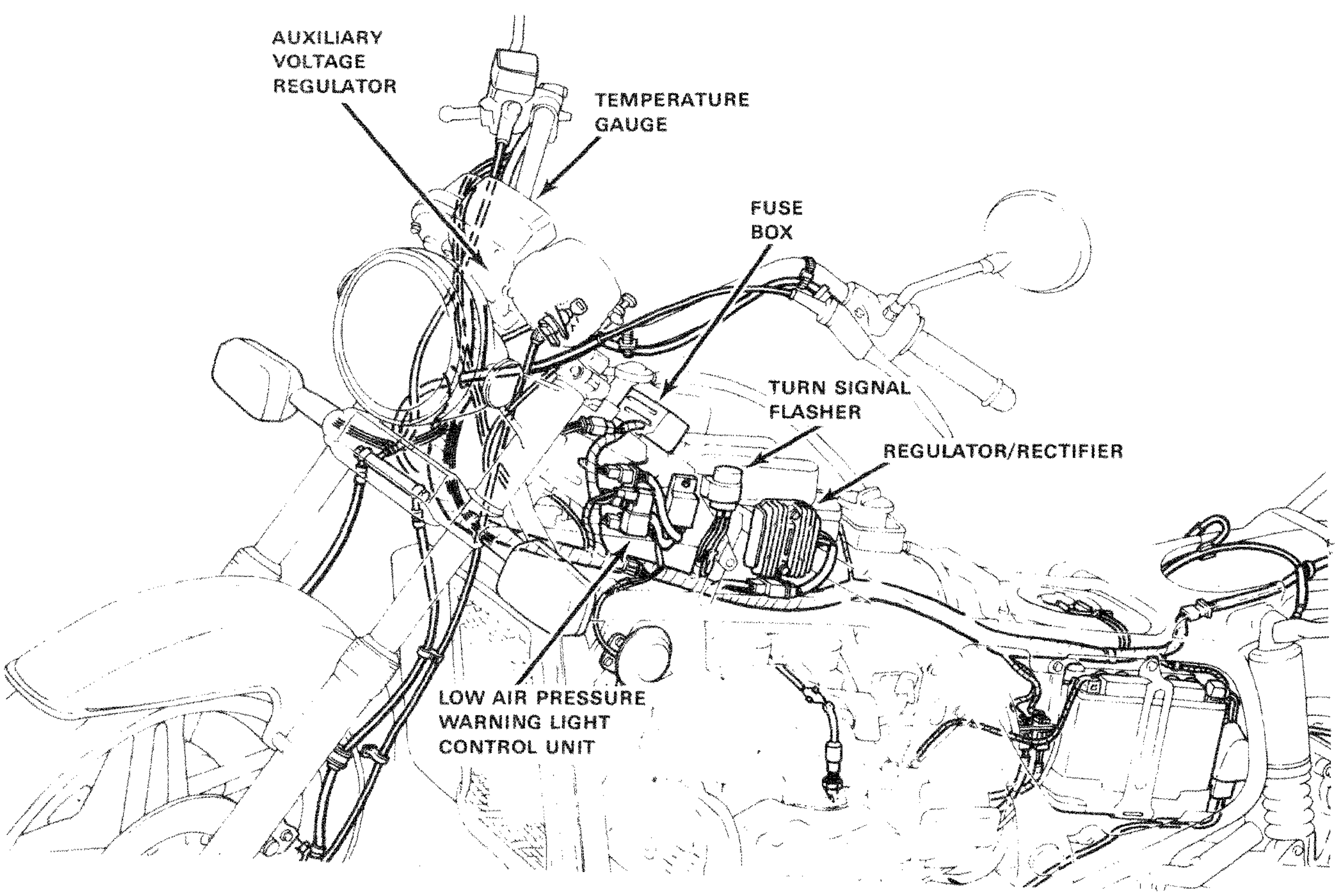
- All electrical wires and connectors are color-coded. When two or more different colored wires are connected, a colored tube that matches the major color of the other wire appears on the wire near the connector. Observe the color codes before disconnecting any wires. All plastic plugs have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.

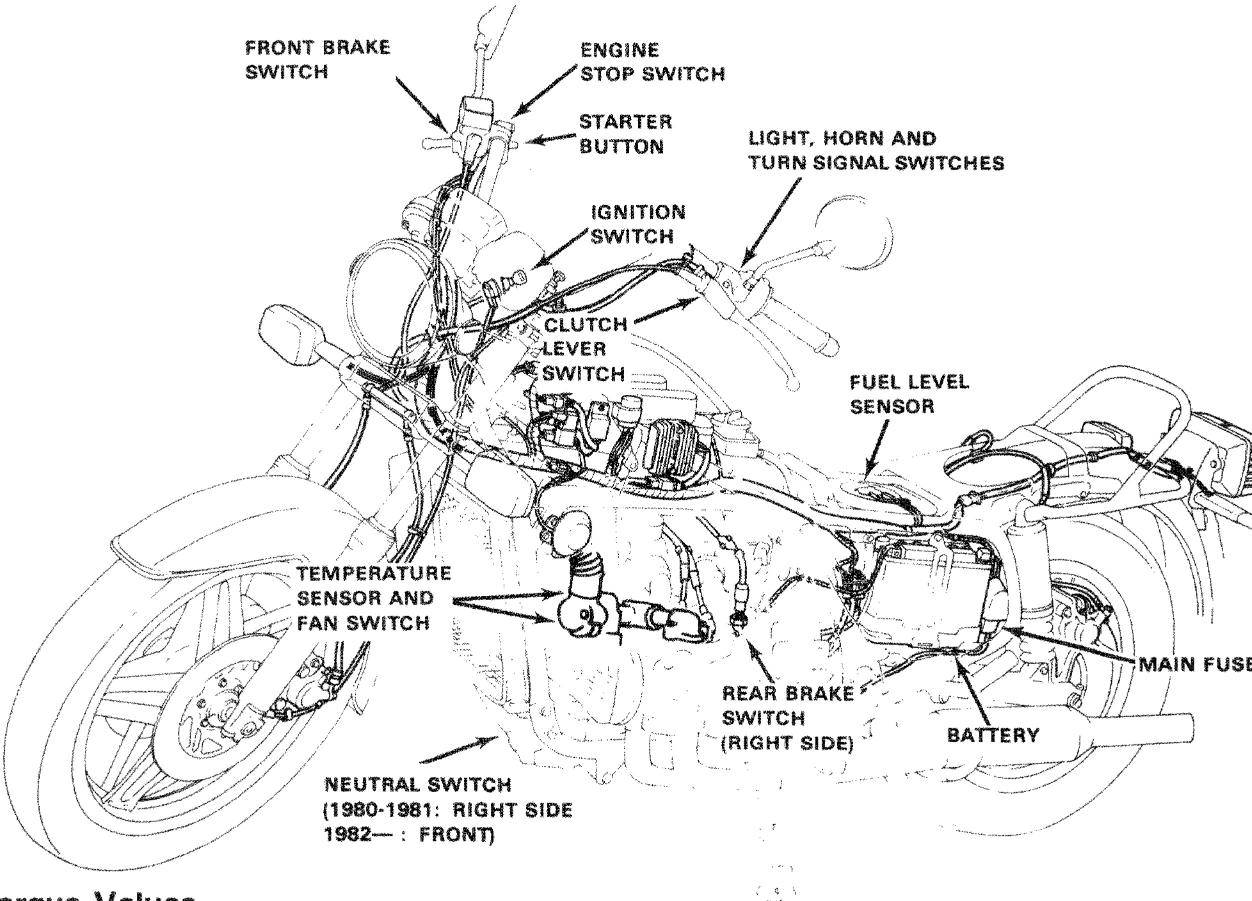
- The color codes used on the motorcycle are indicated throughout this section and on the wiring diagram by the following abbreviations:

B = Blue	LG = Light Green
BK = Black	O = Orange
BR = Brown	P = Pink
G = Green	R = Red
GR = Grey	W = White
LB = Light Blue	Y = Yellow

- In order to isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle by simply disconnecting the wires and connecting a continuity tester or volt-ohmmeter to the terminals or connections.

- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. If the quality of the circuit is important, as when there is a specific coil resistance involved, or when checking for high resistance caused by corroded connections, an ohmmeter is needed. Many ohmmeters also have voltmeter circuits built into the same case.

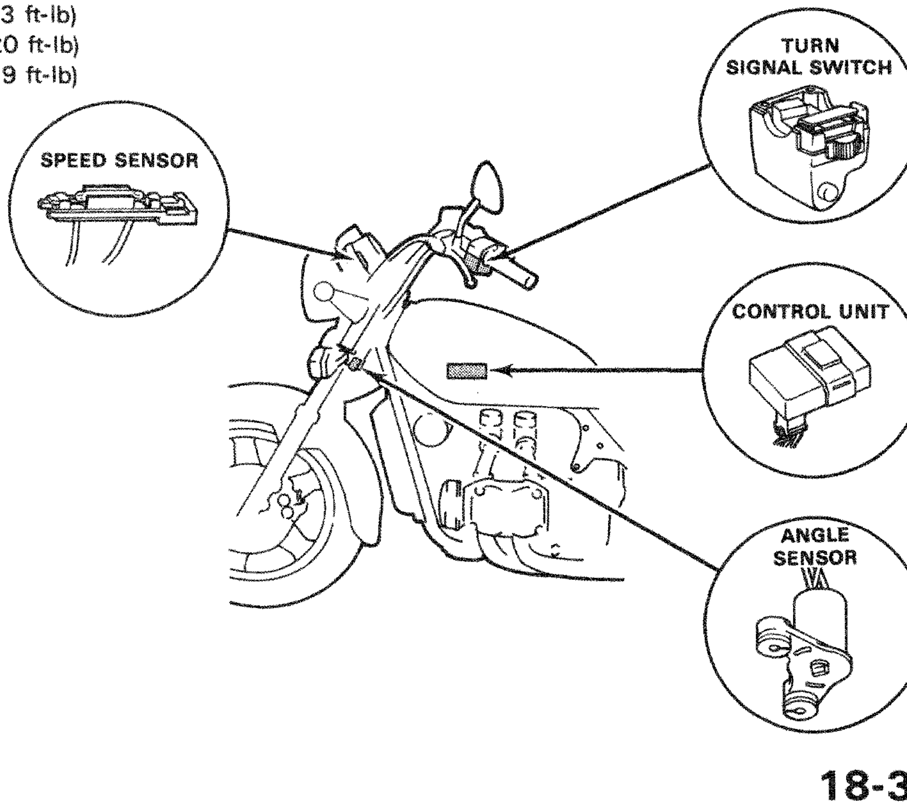




Torque Values

Oil pressure warning switch:	18 N·m (13 ft-lb)
Thermostatic fan switch:	28 N·m (20 ft-lb)
Temperature sensor:	12 N·m (9 ft-lb)

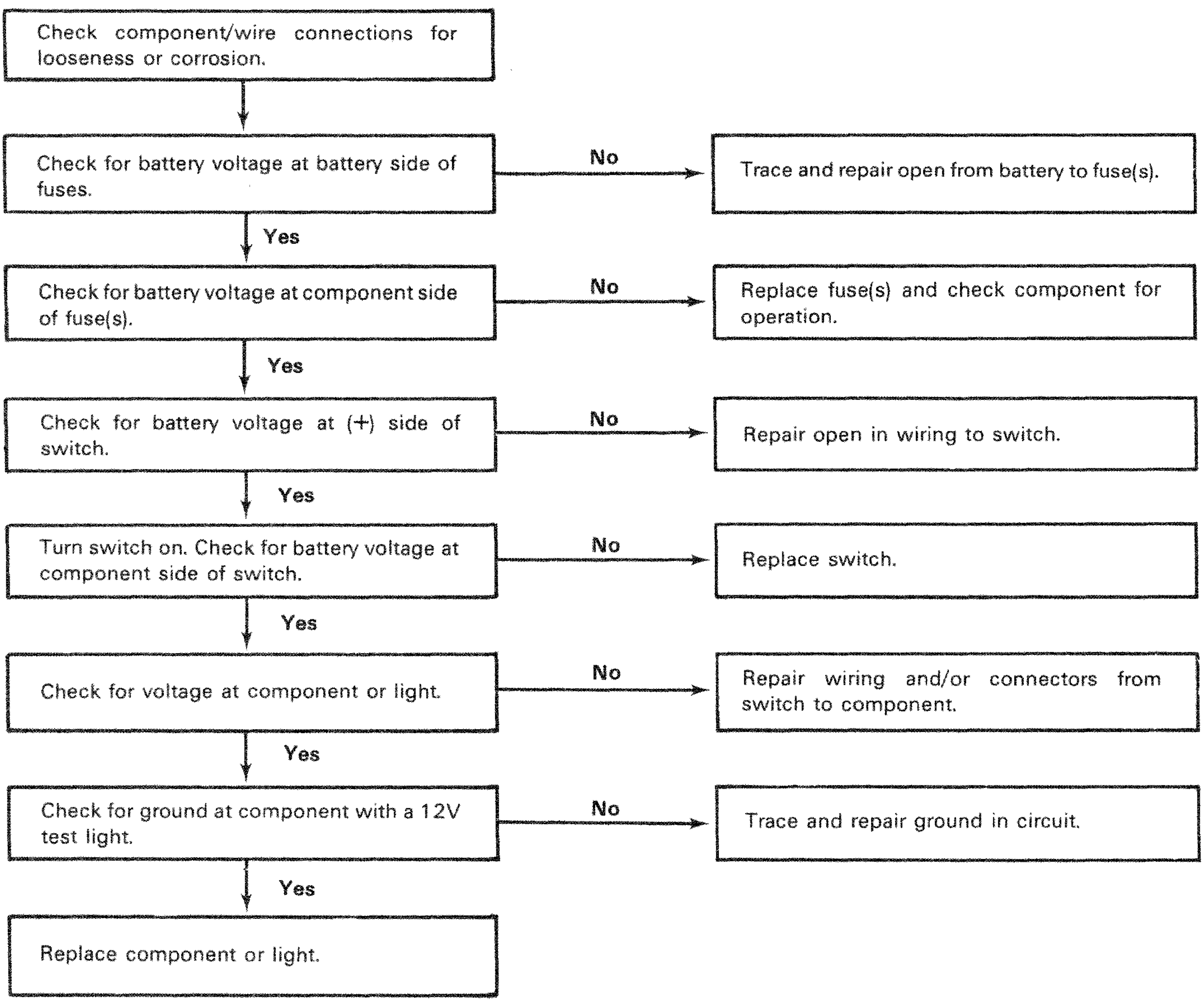
Self-Cancelling Turn Signal System Components (1982—).



Troubleshooting

NOTE: Before performing any work on electrical components, be sure battery is fully charged.

Lights go on but are dim; engine starts but components or lights don't work.



No lights or power with ignition switch on.

Check for battery voltage at battery side of main fuse.

No → Trace and repair open from battery to main fuse.

Yes ↓

Check for battery voltage at component side of main fuse.

No → Replace main fuse. Check components for operation.

Yes ↓

Check for battery voltage at ignition switch.

No → Trace and repair open from main fuse to ignition switch.

Yes ↓

With ignition switch on, check for battery voltage at component side of ignition switch.

No → Check switch (page 18-21).

Yes ↓

Check wiring and connectors for opens and shorts. Refer to above chart for trouble-shooting components.

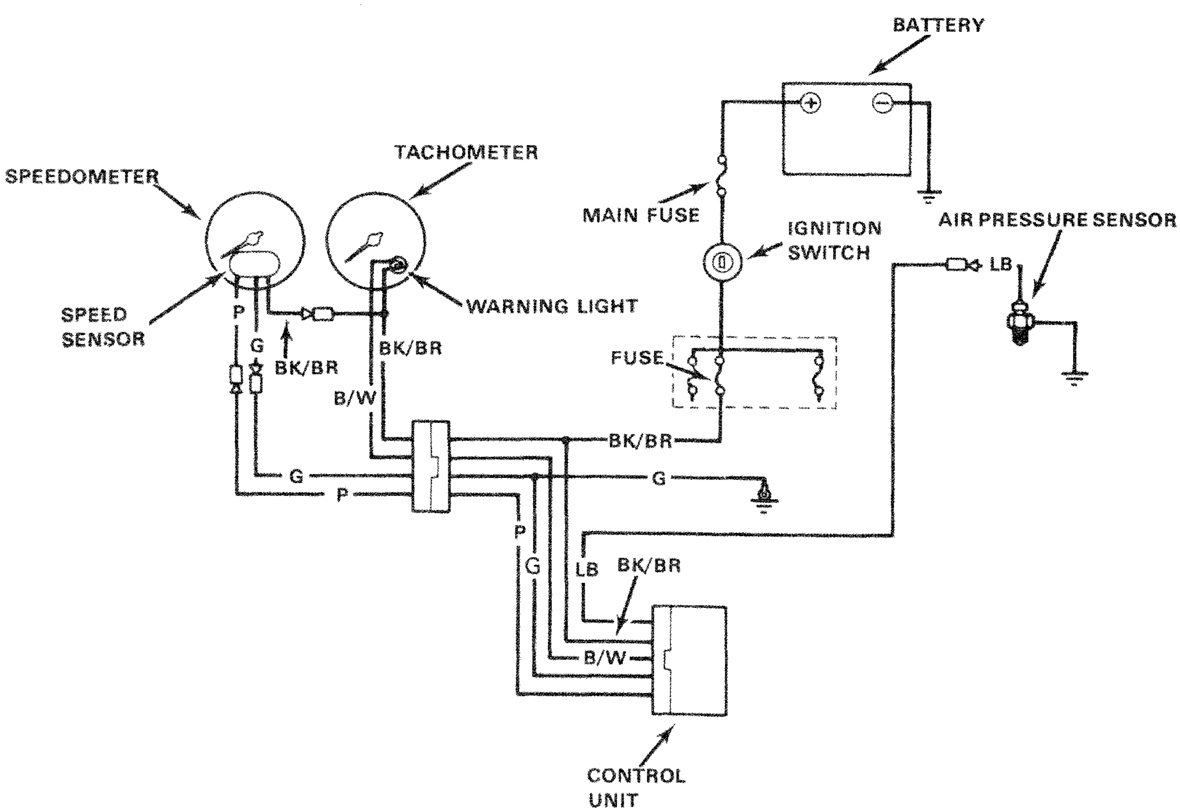
(cont'd)

1980-1982:

The rear suspension pressure warning system incorporates a warning lamp which goes on when:

- The ignition switch is turned on. The lamp will then go out after about 5 seconds.
- The speed of the motorcycle exceeds 10 mph (15 km/h) with the suspension air pressure below the value for which the system is designed.

When the lamp remains on determine the cause and take necessary steps to correct. See Troubleshooting on next page.



P: PINK
G: GREEN
BR: BROWN
W: WHITE
BK: BLACK
B: BLUE
LB: LIGHT BLUE

1980-1982:

A rear suspension air pressure warning light is used to indicate a problem. The light is located in the tachometer. To locate a problem, follow the instructions given below.

Before troubleshooting the system, check shock absorber air pressure and adjust if necessary.

Stop and support the motorcycle on its side stand and turn ignition switch OFF.
Turn ignition switch ON to see if warning light comes ON.

→
- If light stays on, go to page 18-9.
- If light comes ON and goes out after 3 - 7 seconds but comes on after 13 mph, go to page 18-8 .
- If light comes ON, but goes out within 3 seconds, replace the control unit.

Light still remains OFF.

Disconnect control unit coupler and connect "B/W" terminal to battery negative (—) terminal with a ground cable. Light should come ON.

No →
- Blown bulb
- Blown fuse
- Loose or damaged connector
- Open circuit in wire harness (between coupler and bulb, and fuse and bulb)

Yes

Check continuity between terminal "G" and battery negative (—) terminal.

No →
- Loose or damaged connector
- Open circuit in wire harness between terminal "G" and battery negative (—) terminal

Yes

Connect coupler to control unit and check voltage between terminal "G" and "BK/BR".

Over 8 V → Replace control unit.

Below 8 V →
- Loose or damaged connector
- Open circuit in wire harness between BK/BR and fuse

(cont'd)

Troubleshooting (cont'd)

1980-1982:

Shock absorber air pressure warning light goes OUT after 3 - 7 seconds, but comes ON after 13 mph.

↓

Recheck air pressure.

→ **Pressure is low** →
- Leaky air hoses or connectors
- Faulty shock absorber

↓ **OK**

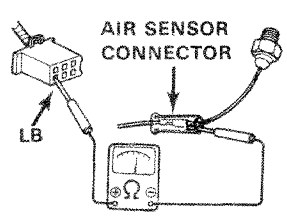
Disconnect air sensor connector, adjust air pressure and check switch operation with an ohmmeter.
Switch continuity:
Above 2.6 kg/cm² (37 psi) – Continuity
Below 2.0 kg/cm² (28 psi) – No continuity

→ **Incorrect operation** → Replace air sensor.

↓ **OK**

Disconnect coupler from control unit and check for continuity between terminal "LB" and air sensor terminal. There should be continuity.

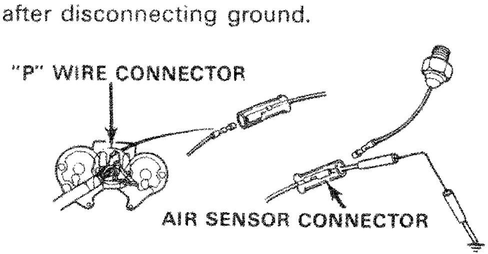
CONTROL UNIT COUPLER



→ **No** →
- Loose or damaged connector
- Open circuit in wire harness between terminal "LB" and air sensor

↓ **Yes**

Disconnect "P" wire connector at back of speedometer. Disconnect air sensor "LB" terminal wire. Ground "LB" terminal wire to frame ground.
Measure time required for light to come on after disconnecting ground.



→ **Comes ON within 4 seconds** → Replace control unit.

→ **Comes ON after 4 - 8 seconds** → Replace air sensor.

1980-1982:

Shock absorber air pressure warning light does not go out.

↓

Connect control unit coupler "P" and "G" terminals with a jumper cable. Light should go out within 8 seconds.

No →

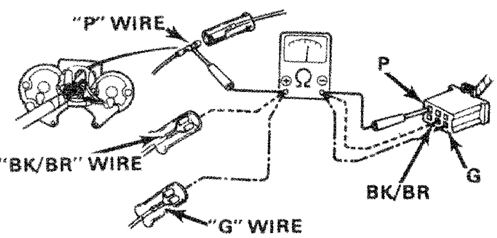
Disconnect control unit coupler.

- **Light OFF** → Replace control unit.
- **Light ON** →
  - Open circuit in wire harness between light and "B/W" terminal

Yes ↓

Remove cover from back of meter cluster and disconnect "P", "BK/BR" and "G" wire connectors from speedometer, and check for continuity between terminals:

- Control unit coupler "P" terminal and meter harness "P" terminal.
- Control unit coupler "BK/BR" terminal and meter harness "BK/BR" terminal.
- Control unit coupler "G" terminal and meter harness "G" terminal.



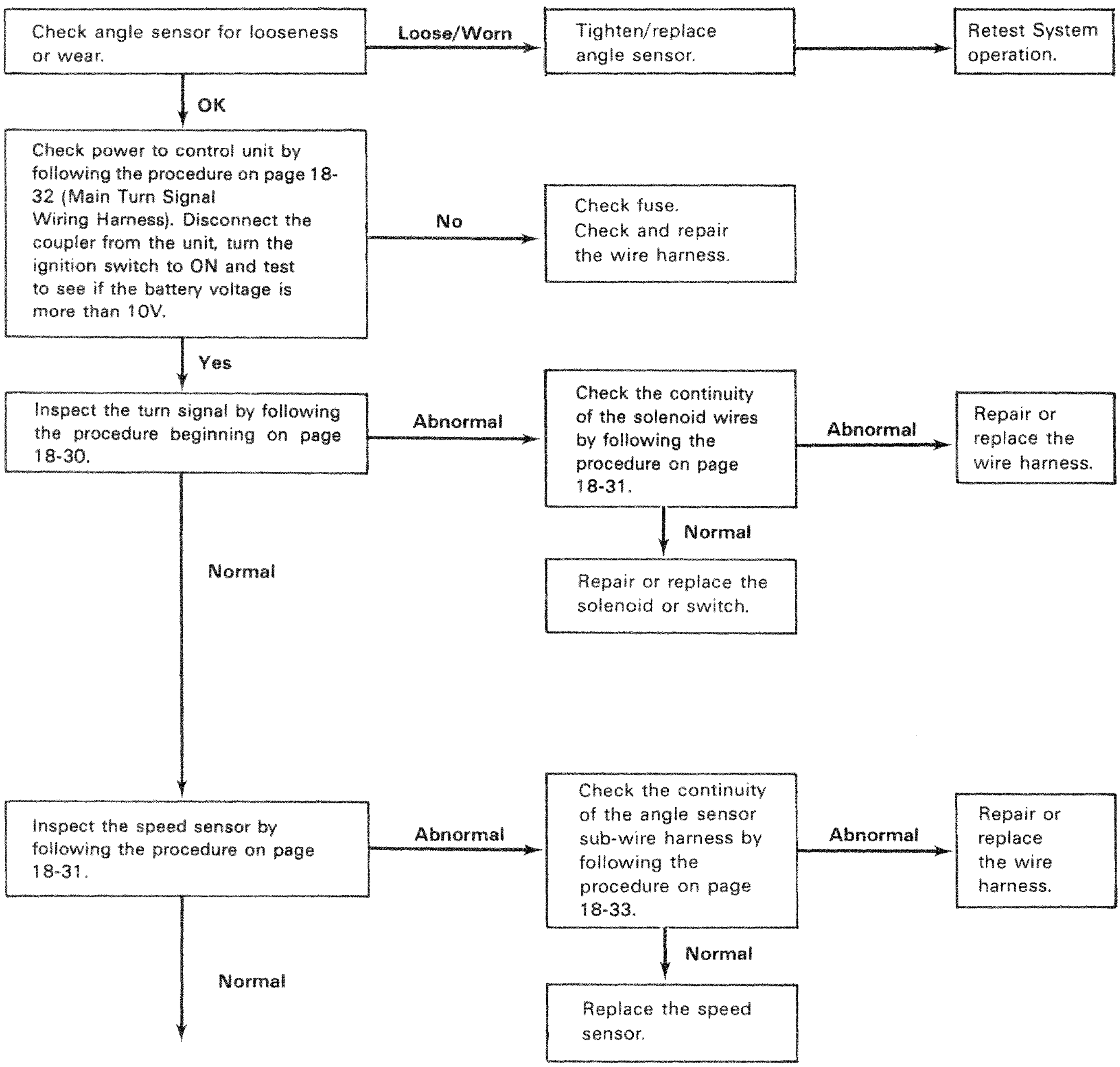
- **Continuity** → Replace speedometer.
- **No continuity** →
  - Loose or damaged
  - Open circuit

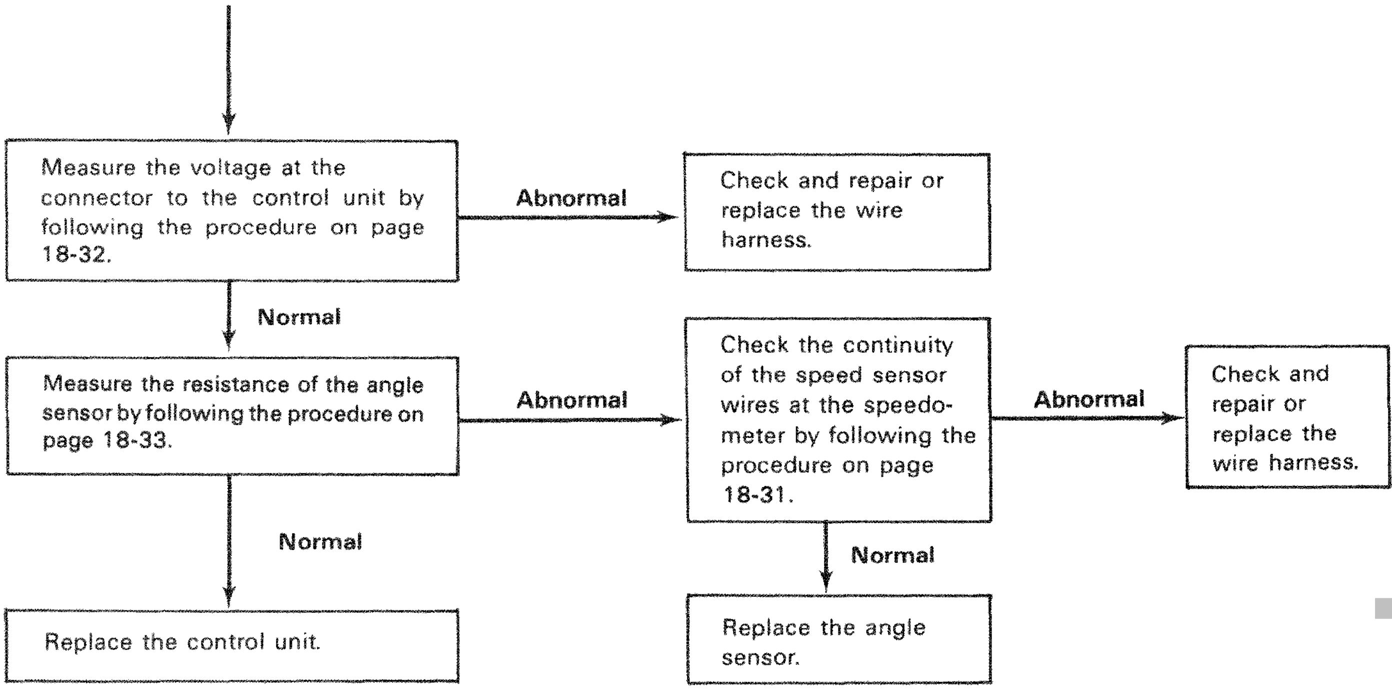
(cont'd)

Troubleshooting (cont'd)

Self-Cancelling Turn Signal System

System does not cancel in both right and left positions.




Measure the voltage at the connector to the control unit by following the procedure on page 18-32.
Abnormal
Check and repair or replace the wire harness.
Normal
Measure the resistance of the angle sensor by following the procedure on page 18-33.
Abnormal
Check the continuity of the speed sensor wires at the speedo-meter by following the procedure on page 18-31.
Abnormal
Check and repair or replace the wire harness.
Normal
Replace the control unit.
Normal
Replace the angle sensor.

(cont'd)

System does not cancel in One Position (Left or Right)

1. Inspect the turn signal switch by following the procedure on page 18-30.
   - **Abnormal** → Repair or replace the solenoid or switch.
   - **Normal** ↓
2. Measure the voltage at the connector to the control unit by following the procedure on page 18-32.
   - **Abnormal** → Check and repair or replace the wire harness.
   - **Normal** ↓
3. Check the continuity of the angle sensor harness at the connector to the control unit by following the procedure on page 18-32.
   - **Abnormal** → Check and repair or replace the wire harness.
   - **Normal** ↓
4. Measure the resistance of the angle sensor by following the procedure on page 18-33.
   - **Abnormal** → Check the continuity of the angle sensor sub-wire harness by following the procedure on page 18-33.
     - **Abnormal** → Check and repair or replace the wire harness.
     - **Normal** → Replace the angle sensor.
   - **Normal** → Replace the control unit.

Hand switch does not lock.

Turn the ignition switch to OFF and check the switch in both RIGHT and LEFT positions.

Does Not Lock → Repair or replace the switch and/or solenoid.

Locks ↓

Turn the ignition switch to ON and check the switch in both RIGHT and LEFT positions.

Does Not Lock → Turn ignition switch to OFF and check resistance between Blue/Black and Brown/White contacts in main connector to control unit.

- **0 Resistance (abnormal)** → Repair or replace wire harness.
- **∞ (normal)** ↓ Repair or replace the switch and/or solenoid.

Locks ↓

Check the switch in both RIGHT and LEFT positions with the coupler disconnected from the control unit.

Does Not Lock → Repair or replace the wire harness.

Locks ↓

Replace the control unit.

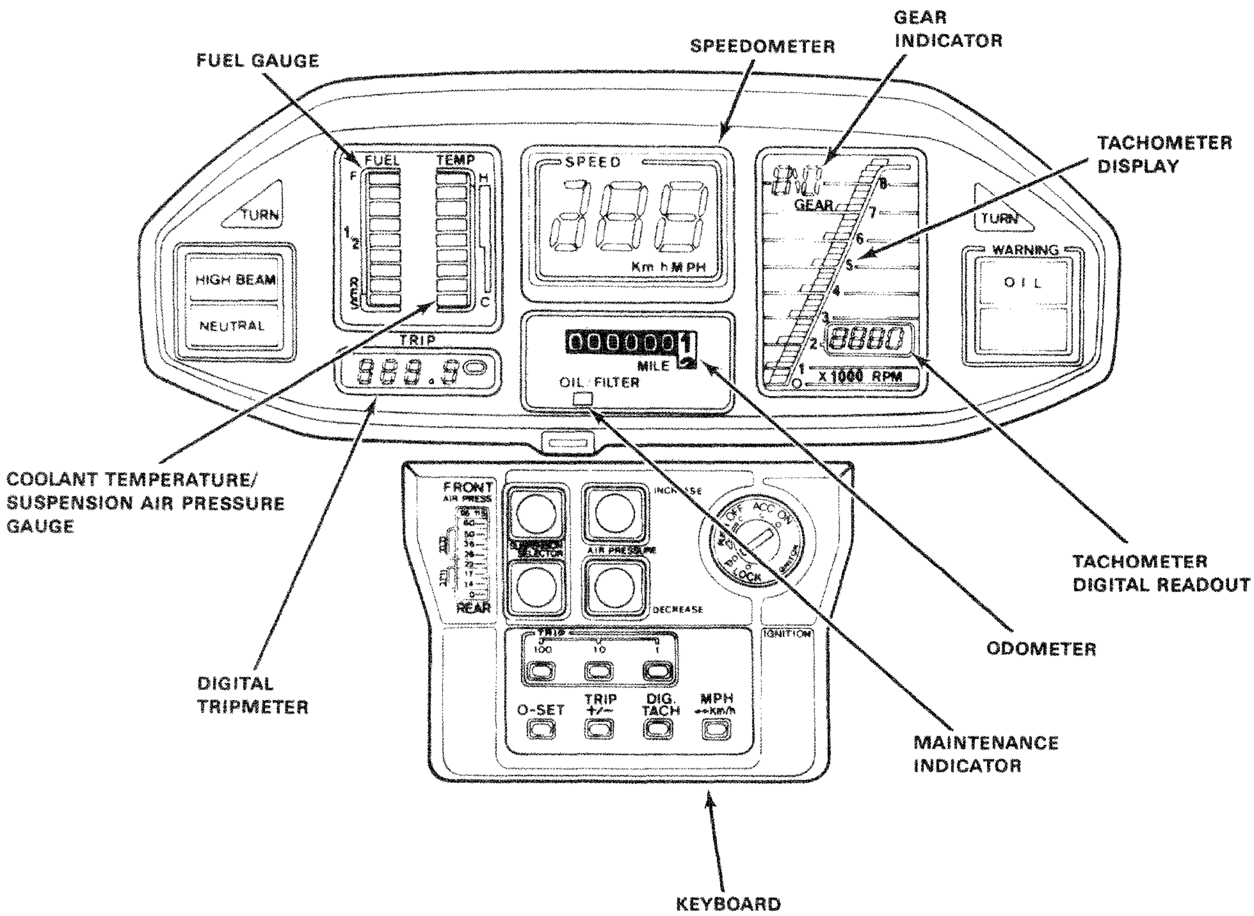
(cont'd)

Troubleshooting (cont'd)

1983— :

Aspencade Instrument Panel

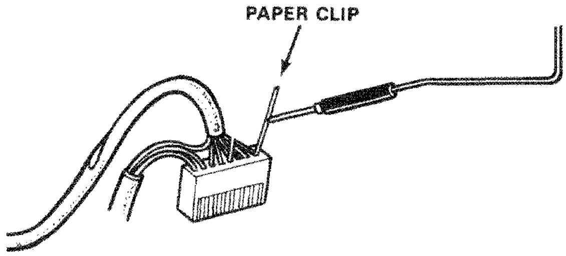
The Liquid Crystal Diode (LCD) instrument panel has digital displays for the speedometer, tachometer, gear position indicator, tripmeter, fuel level, and coolant temperature/suspension air pressure. The odometer is electrically driven and the display is mechanical.



NOTES:

A) When checking wire continuity at the instrument panel couplers, insert a paper clip through the *rear* side of the coupler, where the wire goes in.

B) Before replacing the LCD unit, disconnect and reconnect the couplers at the instrument panel. Make sure the couplers are secure and locked.



Speedometer Failure

- Disconnect white 3-P coupler behind steering counterweight. Ignition switch ON. Voltage between "G/Bl" and "Bl/Br" wire sockets should be about 10V.
  - Abnormal → Check continuity of "G/Bl", "Bl/Y" and "Bl/Br" wires between white 3-P coupler sockets and brown 10-P coupler inside instrument panel. See NOTE A.
    - No continuity → Repair wires.
    - Continuity → Replace LCD unit. See NOTE B.
  - Normal → Inspect speed sensor; see page 18-22
    - Abnormal → Replace speed sensor.
    - Normal → Replace LCD unit. See NOTE B.

Odometer Failure

- Does speedometer work?
  - No → See "Speedometer failure."
  - Yes → Check that grey 6-P odometer/LCD unit coupler is secure.
    - Abnormal → Clean/secure coupler.
    - Normal → Install known good odometer to see if problem is solved.
      - Abnormal → Replace LCD unit.
      - Normal → Replace odometer.

(cont'd)

Troubleshooting (cont'd)

Tripmeter Failure

Does speedometer work?

- No → See "Speedometer failure," page 18-15.
- Yes → Replace LCD unit. See NOTE B.

Tachometer Failure

- Disconnect white 4-P coupler behind steering counterweight.
- Ignition and stop switch ON.
- Check voltage between white 4-P coupler sockets and chassis ground while cranking engine.
  "Y/Bu" to Ground
  "Y/G" to Ground

ØV → Check wires for continuity from white 4-P coupler sockets to white 4-P coupler pins at ignition coil. Repair open circuit.
"Y/Bu" to "Bu/W"
"Y/G" to "Y"

Steady Battery Voltage → Ignition system faulty. See "Ignition Troubleshooting."

Fluctuating Voltage (normal) → Check continuity of "Y/Bu" and "Y/G" wires from white 4-P coupler pins to brown 10-P coupler at instrument panel. See NOTE A.

- No Continuity → Repair open circuit.
- Continuity → Replace LCD unit. See NOTE B.

Fuel Gauge Failure

NOTE: The fuel gauge may not work if there is less than 7 liters of fuel in the tank. Fill the tank before troubleshooting.

Inspect fuel gauge sensor resistance; see page 18-25.

- Abnormal → Replace fuel gauge sensor.
- Normal → Disconnect black 10-P coupler at instrument panel. Check "Y/W" wire for continuity from fuel gauge sensor through green 6-P coupler behind steering weight, to black 10-P coupler at instrument panel. See NOTE A.
  - No Continuity → Repair open circuit.
  - Continuity → Replace LCD unit. See NOTE B.

Temperature Gauge Failure

- Disconnect green 6-P coupler behind steering counterweight.
- Measure resistance between "G/Bu" wire and "G/Bl" wire sockets.
  Cold engine — over 10 Ω
  Hot engine — below 300 Ω

Abnormal →
- Check "G/Bu" wire for open circuit (gauge "cold") or short circuit (gauge "hot") to temperature sensor. Repair wire.
- Replace sensor if "G/Bu" is ok.

↓ Normal

- Check "G/Bu" wire for open (gauge stays "cold") or short circuit (gauge "hot") from green 6-P coupler pin to brown 5-P coupler at instrument panel. See NOTE A.

Short or open circuit → Repair wire.

↓ Wire ok

Replace LCD unit. See NOTE B.

Air Pressure Gauge Failure

Inspect display selector switch; see page 12-48.

Abnormal → Replace switch.

↓ Normal

Inspect air pressure sensor; see page 12-48.

Abnormal → Replace sensor.

↓ Normal

Check "Lb" wire for short or open circuit from black 3-P socket at sensor, through green 6-P coupler behind steering weight, to brown 5-P coupler at instrument panel. See NOTE A.

Short or open circuit → Repair wire.

↓ Wire ok

Replace LCD unit. See NOTE B.

Keyboard Switch Failure

Inspect applicable keyboard switch; see page 18-24.

Abnormal → Replace keyboard.

↓ Normal

Replace LCD unit. See NOTE B.

Gear Indicator Failure

Inspect gear change switch; see page 18-19.

Abnormal → Replace switch.

↓ Normal

Check for short or open circuit in wires between black 6-P coupler sockets at right downtube and black 5-P coupler at instrument panel. See NOTE A.

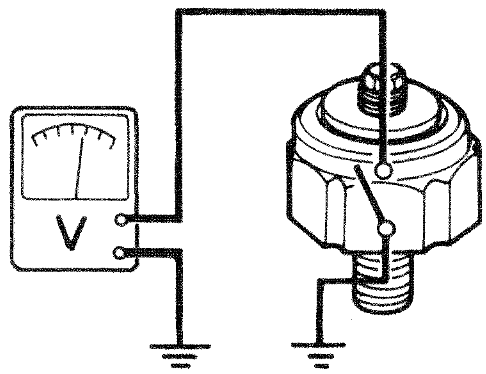
Short or open circuit → Repair wire.

↓ Wires ok

Replace LCD unit. See NOTE B.

Inspection

Oil Pressure Warning Switch



Install an oil pressure gauge.

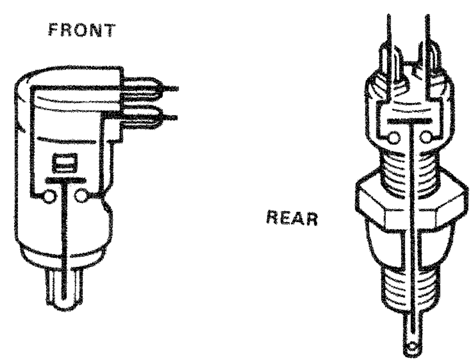
Check for continuity while applying pressure to switch, by running engine.

Continuity Below: **0.196 kg/cm² (2.8 psi)**
No Continuity Above: **0.196 - 0.392 kg/cm² (2.8 - 5.6 psi)**

Replace switch if necessary.

NOTE: Apply sealant to the switch thread before installing.

Brake Switches



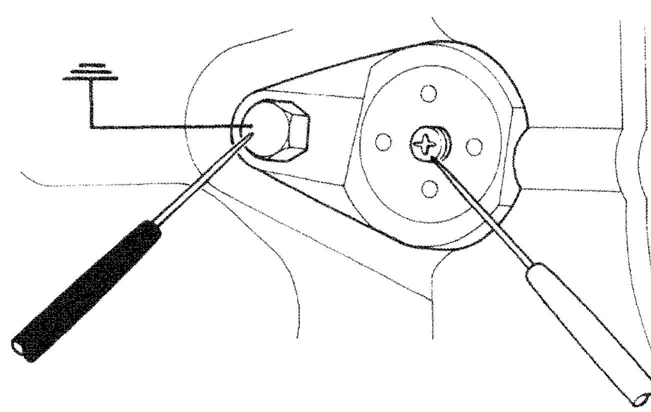
Check rear brake stop switch for continuity with rear brake applied.

Check front brake stop switch for continuity with front brake applied.

Brake Applied: **Continuity**
Brake Not Applied: **No Continuity**

Replace switches if necessary.

Neutral Switch



1980-1981:
Check switch for continuity between switch terminal (wire removed) and ground with transmission in neutral and with transmission in any gear.

In Neutral: **Continuity**
In Any Gear: **No Continuity**

NOTE: To replace the neutral switch remove the right-hand exhaust pipe, oil screen cover, lower engine mounting bolt and neutral switch retainer bolt. Flex the frame as described on page 9-10 and remove the neutral switch.

1982:
Check the neutral switch for continuity between the switch wire and ground with the transmission in neutral and with the transmission in any gear.

In Neutral: Continuity
In Any Gear: No Continuity

NOTE: To replace the neutral switch drain the coolant and engine oil and then remove the engine front cover (page 10-4 and 10-5). Remove and replace the switch. Refer to page 10-20 for engine front cover installation.

1983— Standard and Interstate:

Check the neutral switch for continuity between the switch wires and ground with the transmission in neutral and all other gear positions.

To replace the neutral switch, follow the same procedures described to replace the 1982 switch.

Continuity Check / Position	Lg/R to Ground	G/O to Ground
Neutral	Continuity	No Continuity
1st, 2nd, 3rd, 4th	No Continuity	No Continuity
Overdrive	No Continuity	Continuity

1983— Aspencade:

Gear Change Switch

The rotary gear change switch is inside the front engine cover. To inspect the switch, disconnect the 6-P black coupler along the right down tube. Check for continuity between each coupler pin and chassis ground in the proper gear.

Color Code / Position	Y	G	W	Bu	R	Bl	GROUND
1st	○						○
N		○					○
2nd			○				○
3rd				○			○
4th					○		○
OD						○	○

(cont'd)

Lights/Switches/Instruments/Wiring

Inspection (cont'd)

Handlebar Switches

Continuity should exist between color coded wires indicated by interconnected circles on each chart.

The right and left handlebar cluster switches can only be replaced as assemblies.

Headlight Hi-Lo switch

Hi: BR/W to B/W to B
Middle (N): BR/W to B/W to B to W
Lo: BR/W to B/W to W

DIMMER SWITCH

	HL	LO	HI
LO	O	O	
(N)	O	O	O
HI	O		O
COLOR	B/W	W	B

Left 2: (Buzzer-Flasher)
GR to BR/G to O
BR/W to LB/W

Left 1: (Flasher only)
GR to O
BR/W to LB/W

Off: BR/W to O/W to LB/W

Right 1: (Flasher only)
GR to LB
BR/W to O/W

Right 2: (Buzzer-Flasher)
GR to BR/G to LB
BR/W to O/W

TURN SIGNAL SWITCH

	W	R	L	TLI	PR	PL
R	O	O		O		O
(N)				O	O	O
L	O		O	O	O	
COLOR	GR	LB	O	BR/W	LB/W	O/W

Start button

BK to BK/R with button released
BK to Y/R with button depressed

STARTER SWITCH

	IG	ST	HL1	HL2
FREE			O	O
PUSH	O	O		
COLOR	BK	Y/R	BK/R	B/W

Engine stop switch

Run: BK/BR to BK/W
Off: No continuity

ENGINE STOP SWITCH

	KB	KW
OFF		
RUN	O	O
OFF		
COLOR	BK	BK/W

Horn button

LG to ground with button depressed
No continuity with button released

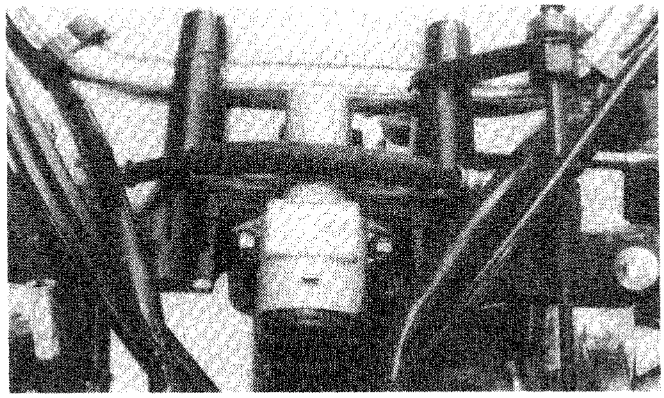
HORN SWITCH

	HO	E
FREE		
PUSH	O	O
COLOR	LG	G

Ignition Switch

To remove the ignition switch, remove the instrument cluster, disconnect the plug, remove the mounting bolts, and the switch.

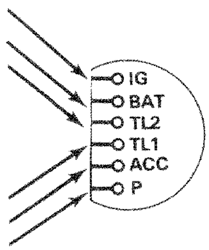
NOTE: Identify the wire colors at the connector; there are no colors on the switch.



Check continuity of terminals on ignition switch in each switch position.

Switch Position

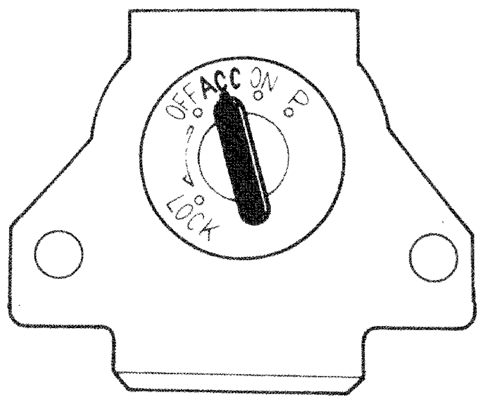
Lock:	No continuity
Off:	No continuity
On:	R to BK
	BR/W to BR/B
Park:	R to BR/G



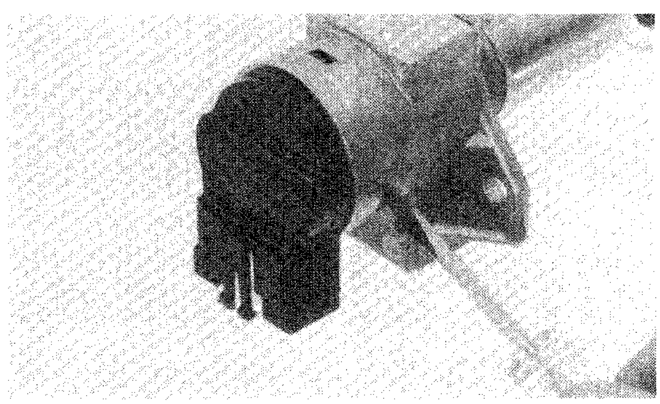
	BAT	IG	ACC	TL1	TL2	P
LOCK						
OFF						
ACC	○		○			
ON	○	○	○	○	○	
P	○		○			○
COLOR	R	BK	LG/BK	BR/W	BR/W	BR

Replacement

Insert the ignition key in the ignition switch and turn the key to the "ACC" position.



Push the lugs out of the slots with a screwdriver.



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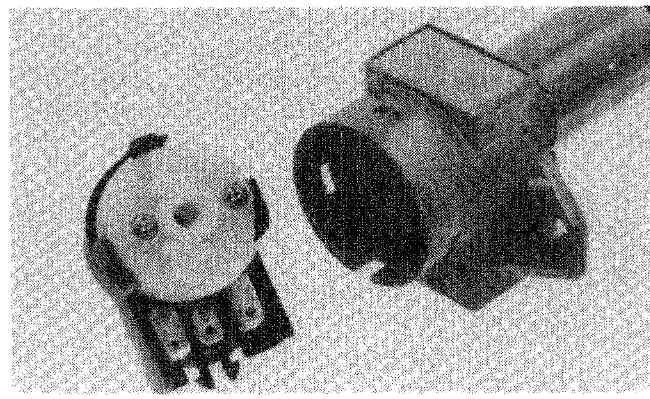
Inspection (cont'd)

Remove the contact base from the ignition switch.

Assemble and install the ignition switch.



1983— Aspencade:

Keyboard Switches

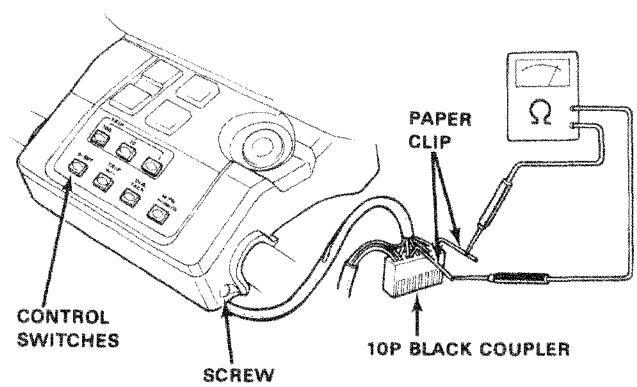
Remove the fairing (page 19-4).

Remove the instrument panel cover and the instrument plug cover.

Unplug the 10-P black coupler from the back of the instrument panel and insert paper clips into the rear side of the coupler as shown.

Check for continuity as each button is pushed.

To replace the keyboard, remove the instrument panel (page 18-27) and then remove the screws on both sides of the keyboard.



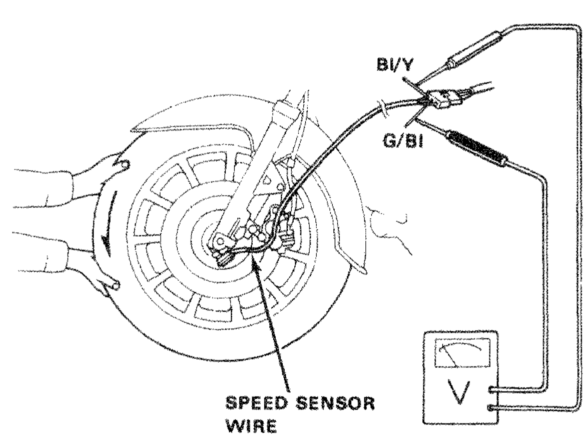
Color Code / Button	Y/W	Y/Bl	Y/G	G/Bl	R/G	R/Y	Lg/Y	Bu/Bl
TRIP 100	O			O				
TRIP 10		O		O				
TRIP 1			O	O				
0-SET				O	O			
TRIP ±				O		O		
DIG. TACH				O			O	
MPH Km/h				O				O

1983— Aspencade:

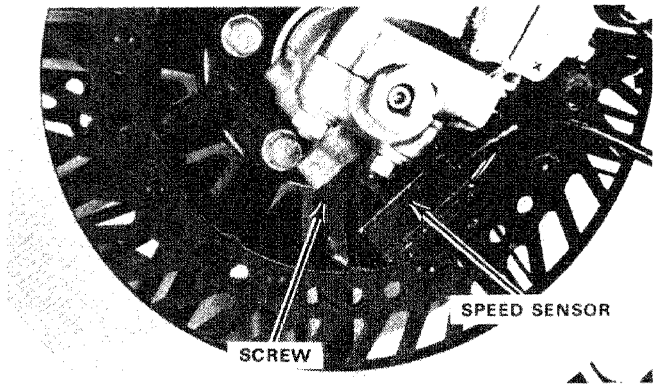
Speed Sensor (Speedometer)

Remove the fairing and steering weight, and locate the 3-P white coupler from the sensor. With the coupler connected and the ignition switch ON, measure the voltage between the Black/Brown and Green/Black wires. Voltage should be about 10V.

Also check the voltage between the Black/Yellow and Green/Black wires while slowly rotating the front wheel. Voltage should change from 0 to about 10V twenty two times per revolution.



To replace the speed sensor, remove the mounting screw. Unplug the wire coupler and remove the sensor wire guide clips from the brake hose.

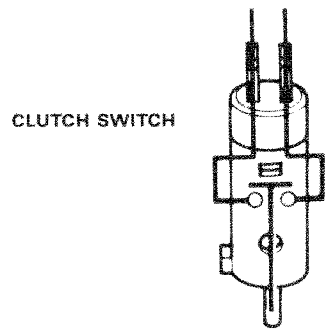


Clutch Switch

Check continuity of clutch lever (safety) switch with clutch released and applied.

CLUTCH APPLIED: CONTINUITY
CLUTCH RELEASED: NO CONTINUITY

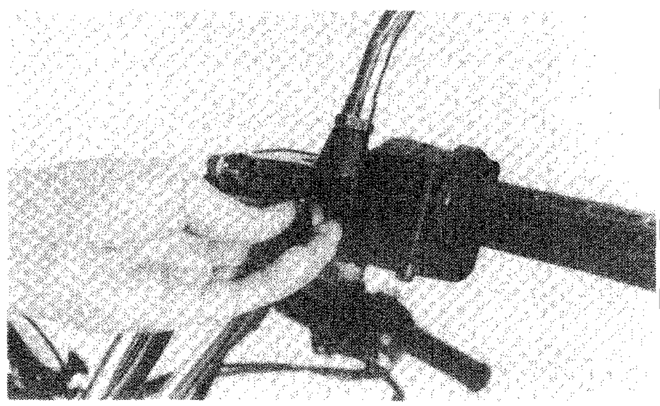
Replace if necessary.



Removal

Unplug the wires. Remove the clutch lever and cable. Pry the switch out.

NOTE: The switch case has a small protrusion that must point toward the clutch cable when installed.



Inspection (cont'd)

Temperature Sensor Resistance

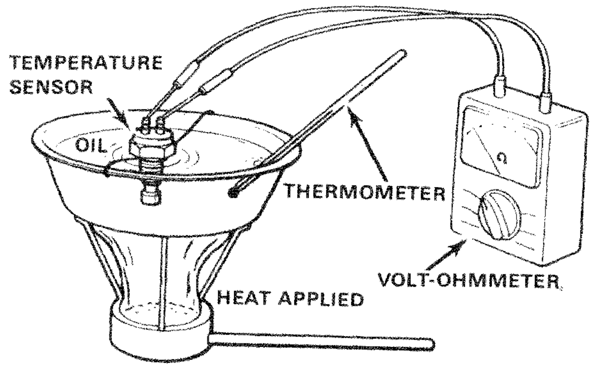
Inspect the sensor for damage.

Suspend the sensor in a pan of oil, and check the resistance through the sensor as the oil heats.

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

WARNING: Wear gloves and eye protection.

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



Resistance Should Be:

104.0 Ohms @ 60° C (140° F)
43.9 Ohms @ 85° C (185° F)
20.3 Ohms @ 110° C (232° F)
16.1 Ohms @ 120° C (250° F)

Temperature Gauge Function

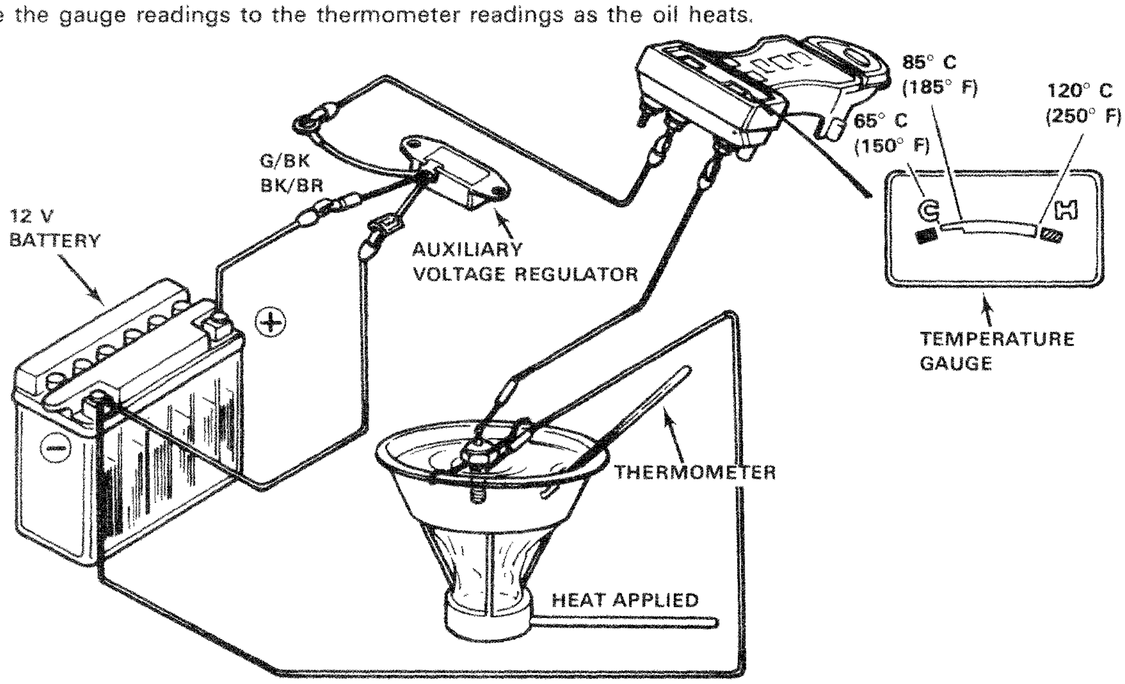
Connect a tested sensor and auxiliary voltage regulator as shown to the gauge to be tested.

CAUTION: The temperature gauge operates on 7 volts. Do not apply 12 volts directly to the gauge; apply the voltage to the auxiliary voltage regulator.

Suspend the sensor in a pan of oil as in the test above.

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

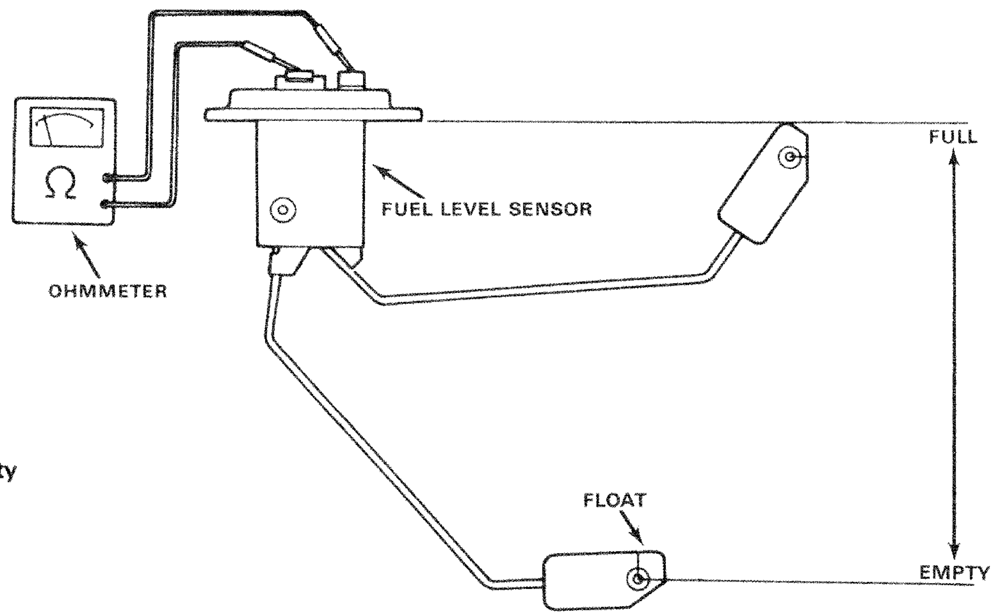
Compare the gauge readings to the thermometer readings as the oil heats.



Fuel Gauge Sensor Resistance

Check the resistance of the fuel level sensor with an ohmmeter.

NOTE: A special 50 mm wrench (H/C 006106) is needed to remove the sensor from the tank.



Resistance Should Be:

75 - 80 Ohms @ empty
6 - 10 Ohms @ full

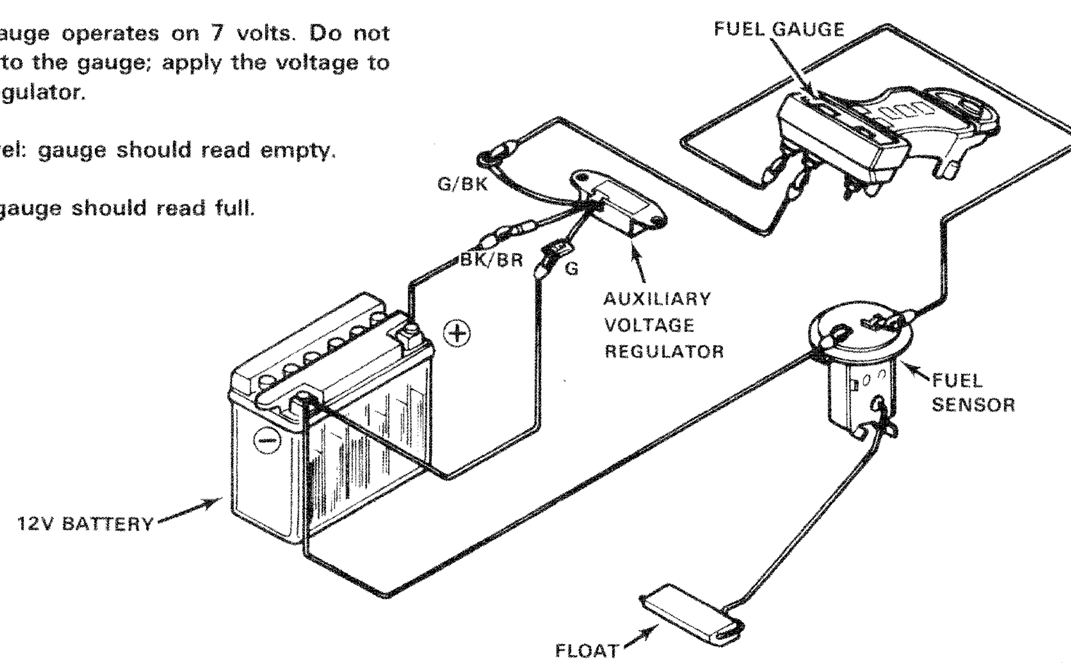
Fuel Gauge Function Test

Test the operation of the fuel gauge with a tested sensor and auxiliary voltage regulator as shown.

CAUTION: The fuel gauge operates on 7 volts. Do not apply 12 volts directly to the gauge; apply the voltage to the auxiliary voltage regulator.

Float at bottom of travel: gauge should read empty.

Float at top of travel: gauge should read full.



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Inspection (cont'd)

Thermostatic Fan Switch

Inspect the switch for damage.

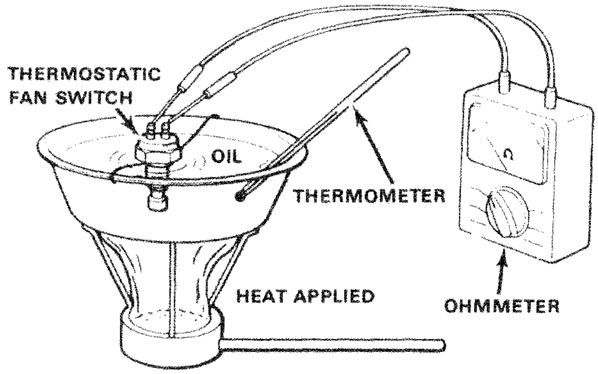
Suspend the switch in a pan of oil and check the temperatures at which the switch opens and closes.

Switch Open (No Continuity):
Below 93 - 97° C (199 - 207° F)

Switch Closed (Continuity):
98 - 102° C (208 - 215° F)

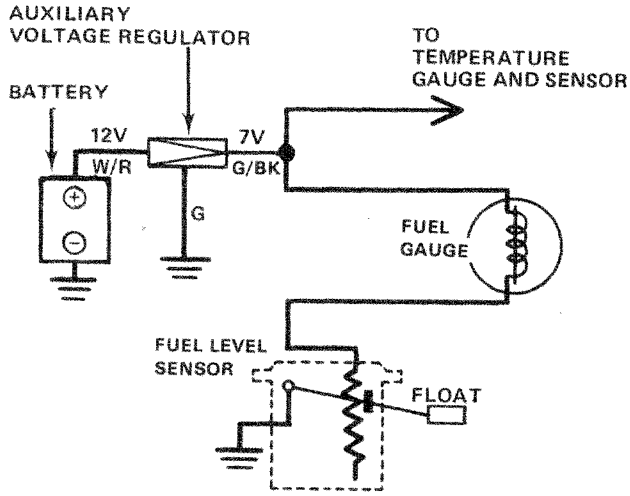
WARNING: Wear gloves and eye protection.

NOTE:
- Oil must be used as the heated liquid to check operation above 100° C (212° F).
- Do not let the thermometer or switch touch the pan as it will give a false reading.



Auxiliary Voltage Regulator

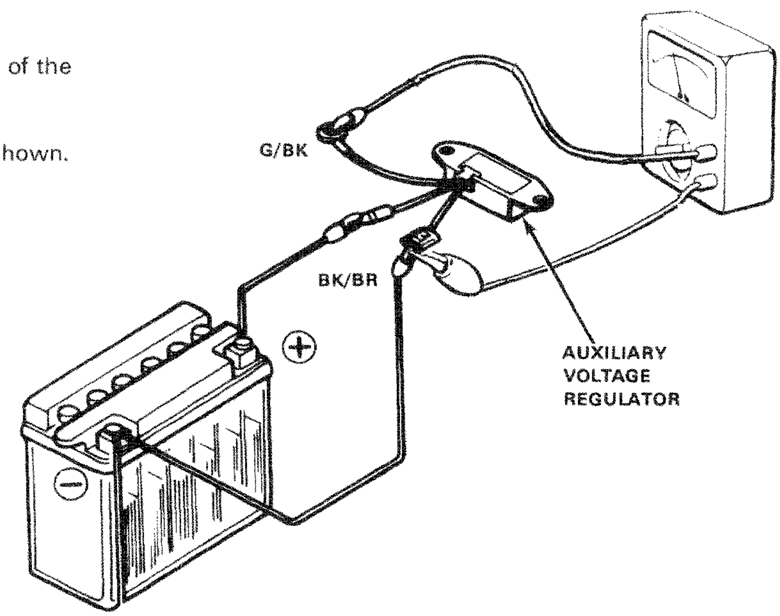
The fuel and temperature gauge circuit includes an auxiliary voltage regulator that reduces voltage from 12V to 7 V.



Remove the auxiliary voltage regulator from the rear of the fuel and temperature gauge housing.

Test the regulator with a battery and voltmeter as shown.

Regulator Output Voltage Should Be 7 Volts



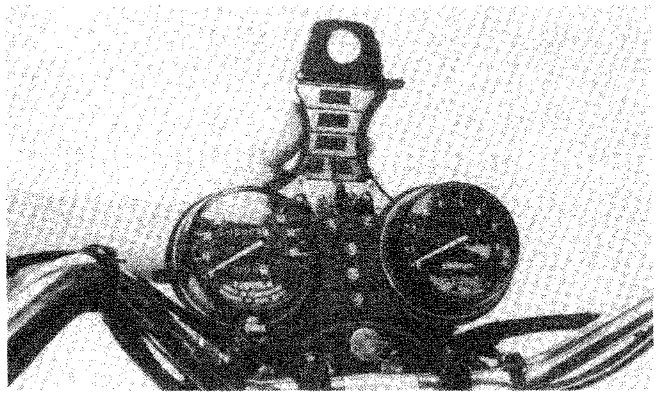
Instrument Panel Lights

1980-1982,
1983— Standard and Interstate:

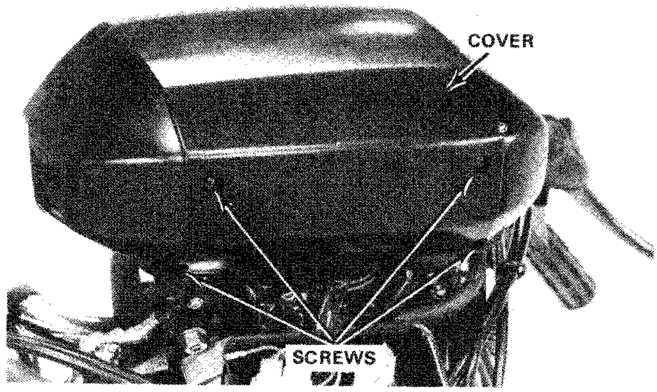
Indicator bulbs can be removed after removing the indicator panel cover.

Remove the headlight mounting bolts. Move the headlight case to one side and remove the top 2 rear attaching screws. Remove the 2 front screws and lift the panel away from the bulb assembly.

To remove the instrument light bulb, remove the cable and the meter set ring screws. Pull the meter out and pry out the rubber bulb sockets, and remove the bulbs.



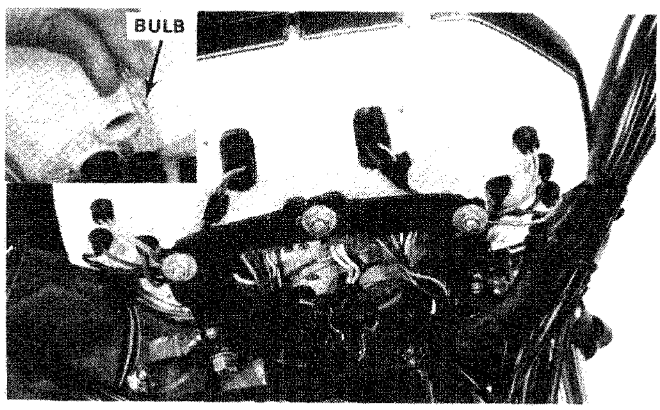
1983— Aspencade:
Remove the fairing (page 19-4).
Remove the four cover mounting screws and the cover.



Pull the rubber bulb sockets out of the instrument housing.

Replace any burned out bulbs.

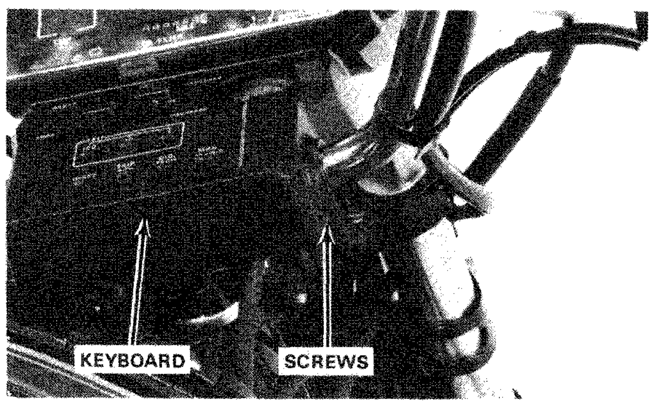
After installing a new bulb, test it. If the bulb does not light, inspect the wiring for an open or short circuit.



Instrument Panel Removal

1983— Aspencade:
Remove the fairing and steering weight.

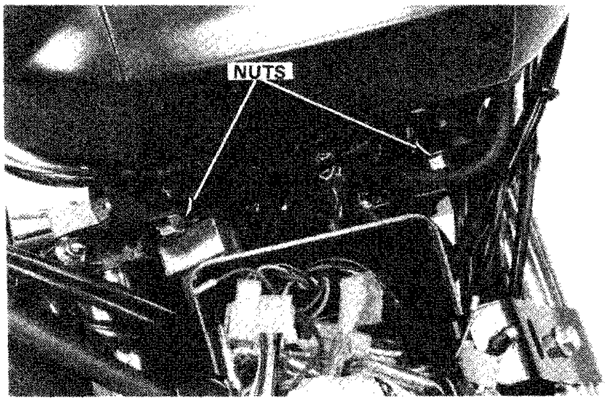
Remove the keyboard mounting screws on both sides of the keyboard.



(cont'd)

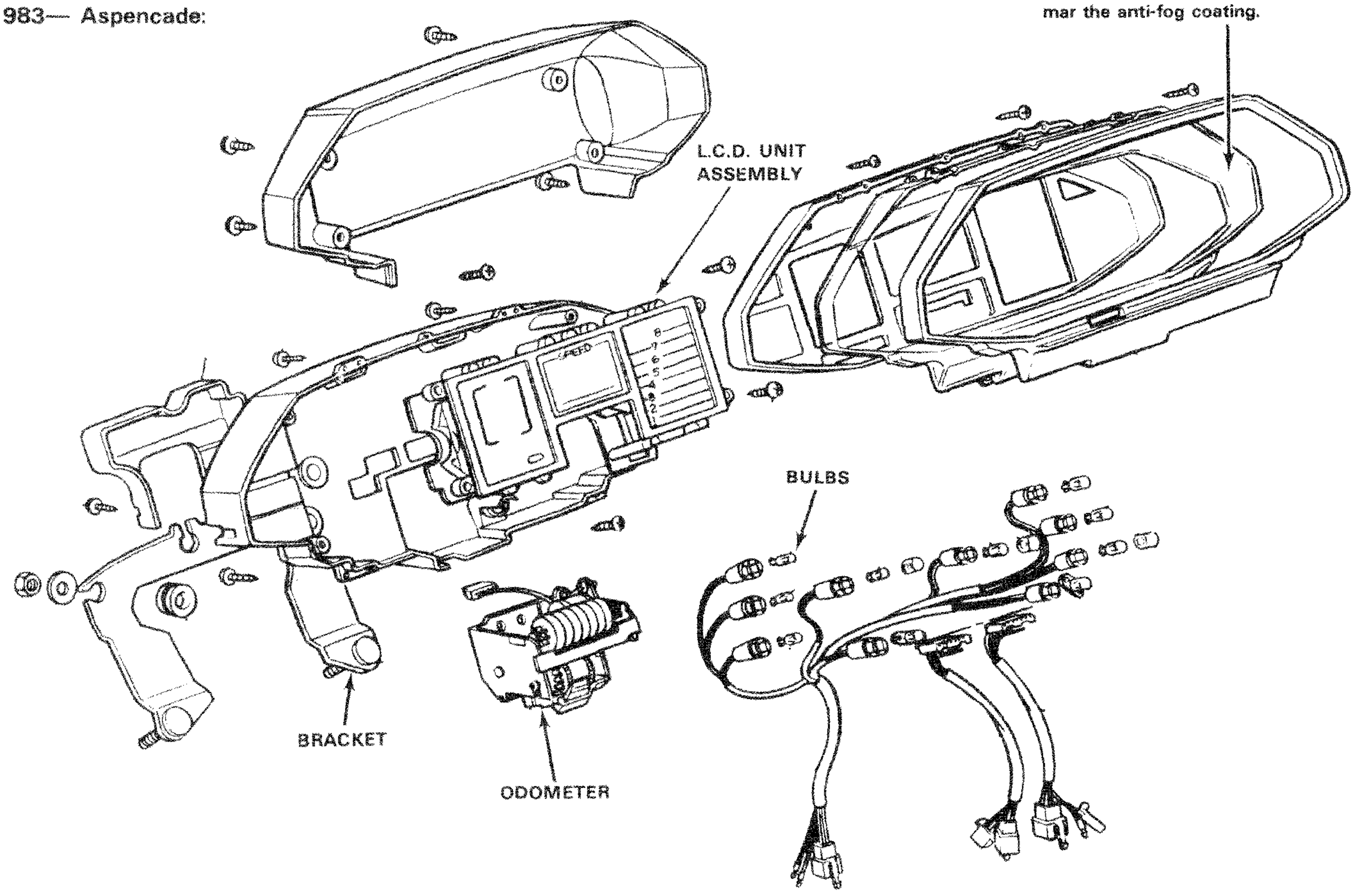
Inspection (cont'd)

Remove the two instrument mounting nuts, disconnect the connectors, and remove the instrument panel.



Instrument Panel Disassembly

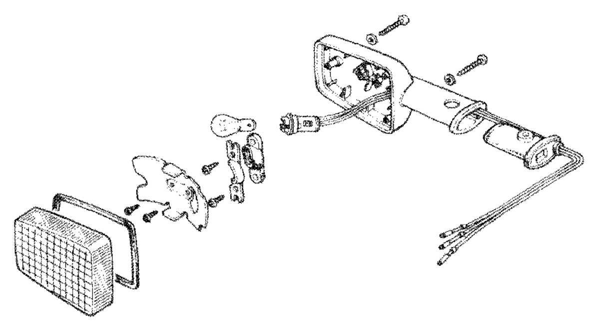
1983— Aspencade:



Turn Signals

Remove the lens to remove the bulb.

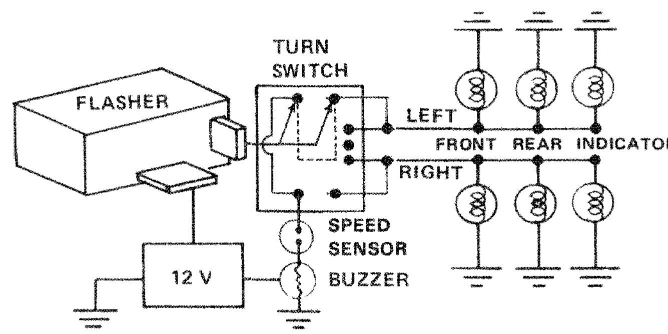
CAUTION: Do not overtighten the lens mounting screws.



Turn Signal Flasher and Buzzer

Flasher should flash 60 to 120 times per minute when ambient temperature is 18.4° – 19.4°C (64° – 66°F).

NOTE: Up to 40 mph, the buzzer only clicks; above 40 mph, it makes a buzzing sound.
If flasher does not work or flasher frequency is incorrect, check the components and connections shown before replacing flasher.
If flasher does not work or flasher frequency is incorrect, check the components and connections shown before replacing flasher.

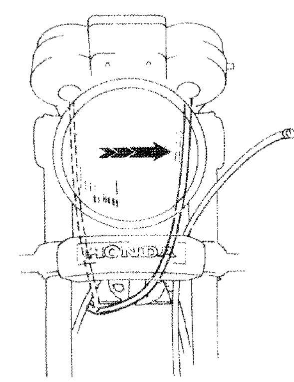


Self-Cancelling Turn Signal System

System Test

Disconnect the drive cables from the speedometer and the tachometer and connect the tachometer cable to the speedometer.

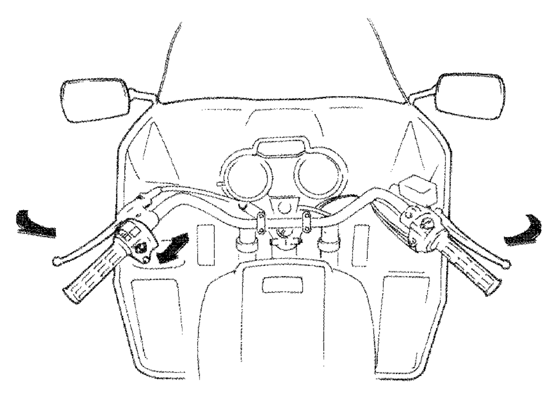
Start the engine and allow it to idle. Idle speed is equivalent to 10 km/h (6mph).



Push the turn signal switch to the RIGHT lock position and turn the front wheel to the right. Hold the wheel in this position for 5 seconds, then return it to center. The signal should cancel in about 1 second.

Check the left signal in the same way.

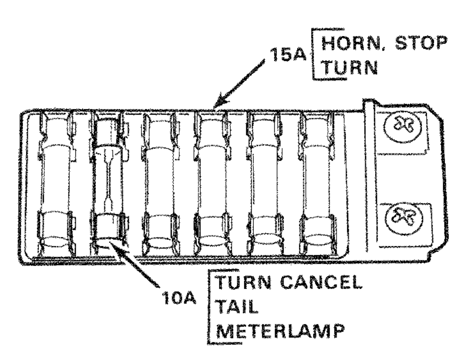
If either signal cancels before the front wheel is returned to center, or does not cancel after the wheel is returned to center, proceed to check the individual components to isolate the trouble.



Check the fuse in the cancel circuit.

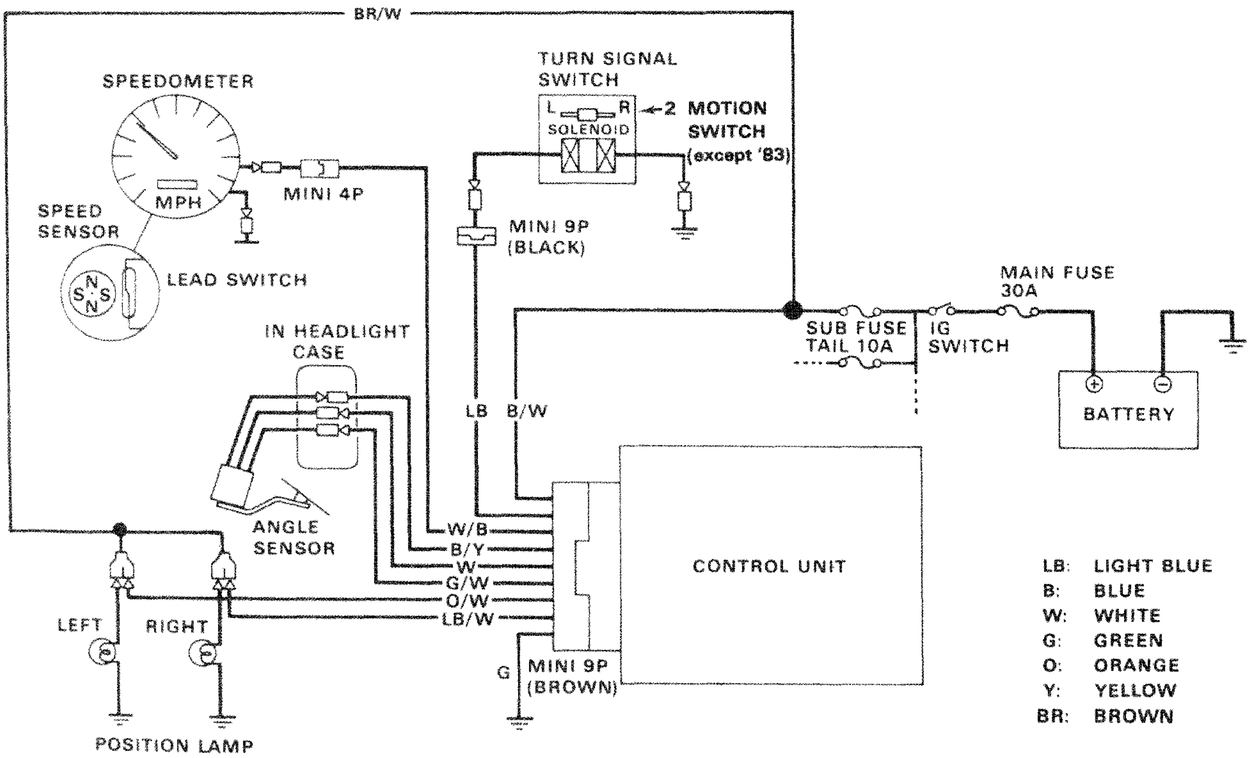
Check the battery voltage as described in Section 16. The battery must be fully charged.

NOTE: During troubleshooting, check all connections involved to make sure they are clean, dry and tight.



(cont'd)

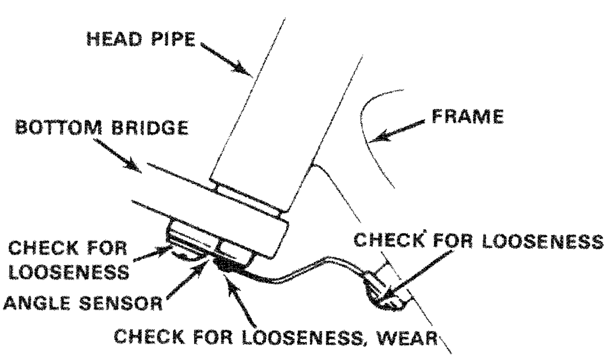
Inspection (cont'd)



Angle Sensor

Turn the front wheel from right to left and check the angle sensor for wear or looseness.

If the sensor is worn, replace, and if it is loose, tighten the mounting bolt.



Turn Signal Switch

Remove the seat and the upper compartment. Disconnect the main connector from the control unit.

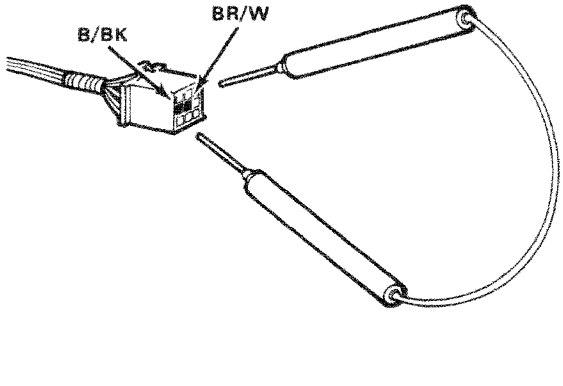
Turn the ignition switch to ON and push the directional switch to LEFT lock.

Connect the Blue/Black and Brown/White terminals in the connector with a jumper wire.

If the switch returns to neutral (cancels) it is normal.

Check the switch in the RIGHT position in the same way.

Also check to see if the switch operates smoothly.



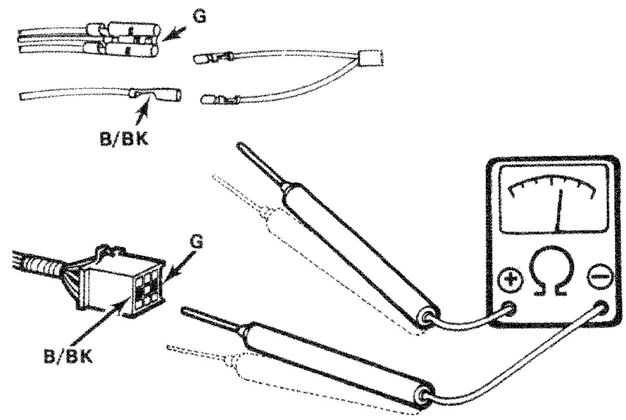
Solenoid Wire Harness

Disconnect the Blue/Black and Green wires inside the headlamp housing (Standard) or (Interstate).

Check resistance with an ohmmeter.

Specified Resistance:

Green to Green:	**0 Ohms**
Blue/Black to Blue/Black:	**0 Ohms**
Green to Blue/Black:	**∞**



Speed Sensor

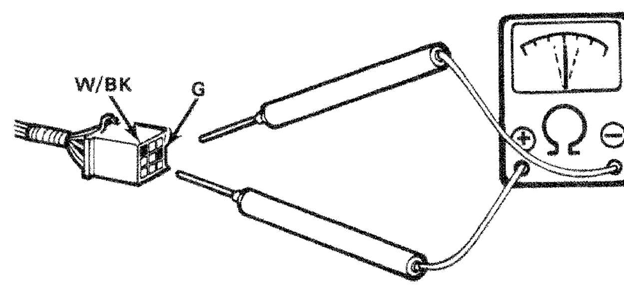
Disconnect the drive cables from the speedometer and tachometer and connect the tachometer cable to the speedometer.

Connect an ohmmeter between the White/Black and Green terminals in the control unit coupler.

NOTE: Polarity and resistance scale are not important.

Start the engine and allow it to idle.

The ohmmeter needle should fluctuate rapidly in the middle of the scale.



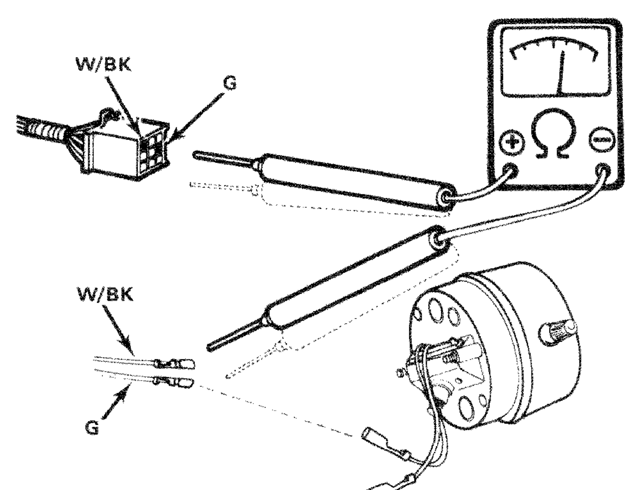
Speed Sensor Wire Harness

Disconnect the speed sensor wires at the speedometer.

Check the resistance.

Measured Resistance:

A—	**White/Black and White/Black:**	**0 Ohms**
	White/Black and Green:	**∞**
B—	**Green and Green:**	**0 Ohms**
	Green and White/Black:	**∞**



(cont'd)

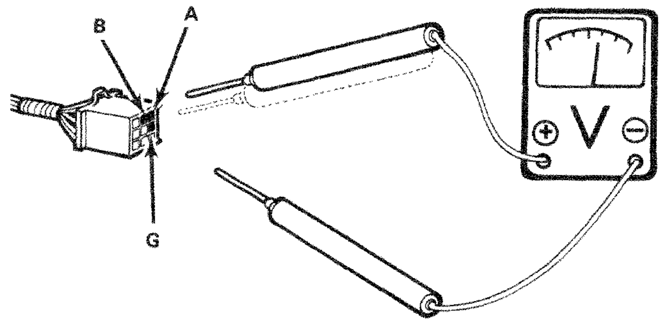
Inspection (cont'd)

Main Turn Signal Wiring Harness

Disconnect the main harness connector from the control unit.

Turn the ignition switch to ON.

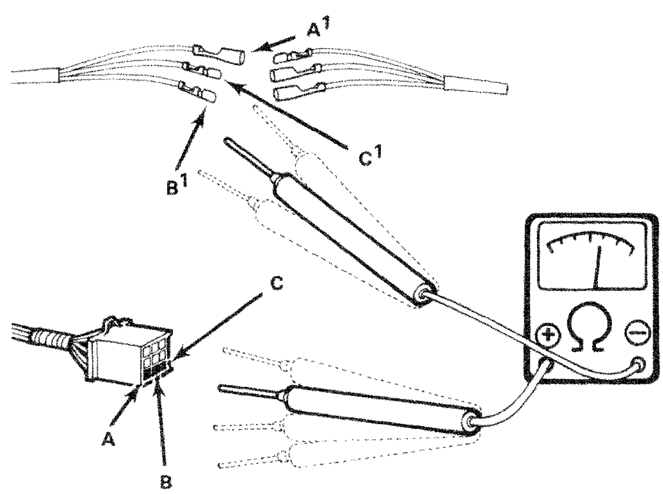
Measure the current between the Green and Blue/White and Green and Orange/White connector contacts with the directional switch in each position.



Position	A (Blue/White)	B (Orange/White)
NEUTRAL	Minimum 10V	Minimum 10V
RIGHT	0V	Minimum 10V
LEFT	Minimum 10V	0V

Angle Sensor Harness

Measure the resistance of the Black/Yellow, White, and Green/White wires of the angle sensor harness, located inside the headlamp housing (Standard) or in the housing behind the steering counterweight (Interstate and Aspencade).



– \ +	A (Black/Yellow)	B (Green/White)	C (White)	To Ground
A^1 (Blk/Yel)	0 Ohms	∞	∞	∞
B^1 (Grn/Wht)	∞	0 Ohms	∞	∞
C^1 (White)	∞	∞	0 Ohms	∞

Angle Sensor Resistance

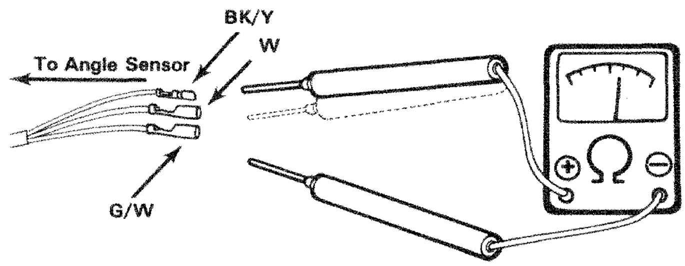
Disconnect the angle sensor wires from the sub-wire harness at the bottom of the steering head.

Measure the resistance of the angle sensor.

Specified Resistance:

Black/Yellow and Green/White: 10 - 19K Ohms

White and Green/White:
Resistance should increase steadily when front wheel is turned slowly from left to right (resistance should not change suddenly).

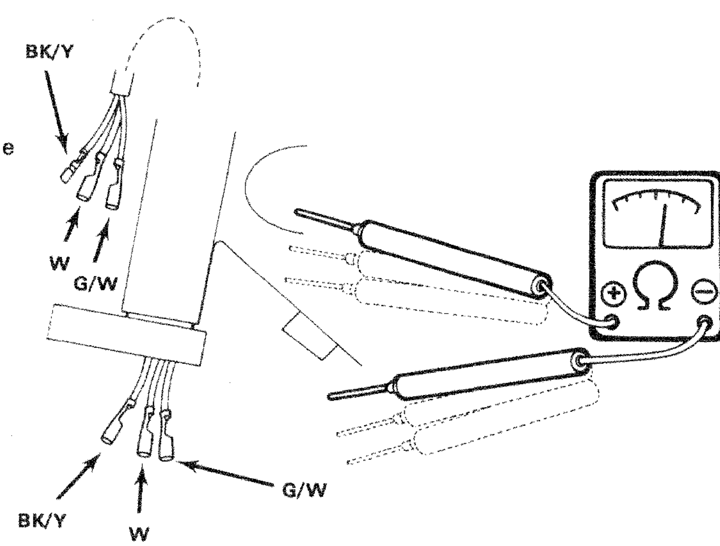


Angle Sensor Sub-Wire Harness

Disconnect the angle sensor sub-wire harness from the main harness.

Check the continuity, end to end, of each wire.

Specified Resistance:
Between same colors: 0 Ohms
Between different colors: ∞



(cont'd)

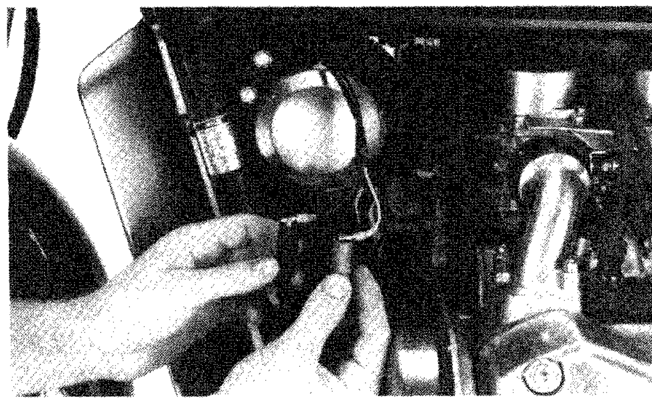
Lights/Switches/Instruments/Wiring

Inspection (cont'd)

Horn

The horn can be tested by applying 12 volts directly to the black wire and grounding the green wire.

Check for continuity between horn wires (page 18-37).



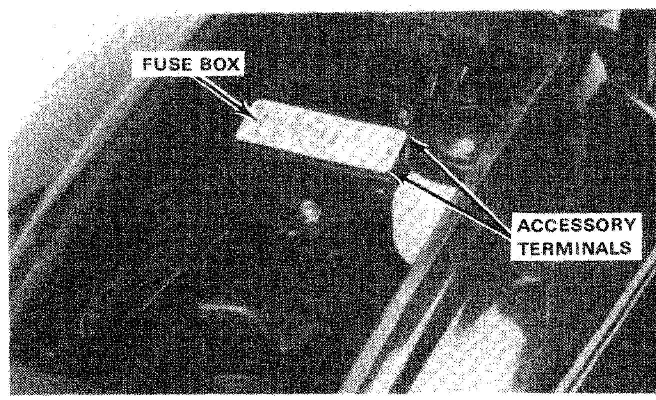
Fuse Box/Accessory Terminal

The fuse box is located under the top compartment storage tray.

Pop the plastic cover up for access to the fuses and replace burned out fuses as necessary. Spare fuses are located in the fuse box cover.

NOTE: Make sure the new fuse is the same as the old one. Always make sure the cause of a burned out fuse has been corrected before the fuse is replaced.

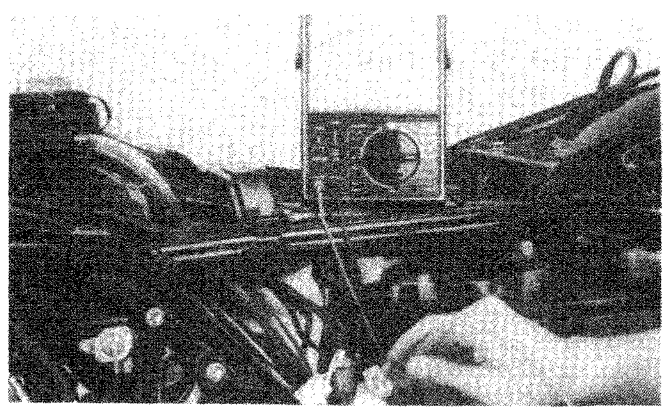
Terminals are provided to power 12V D.C. accessories not exceeding 60 watts (5 amps). Higher current demands may blow the fuse or discharge the battery.



Wiring

If electrical problems persist after components or switches have been found good or have been replaced, test the wiring to the switch or component for continuity. Replace wire or connector as necessary.

If the ohmmeter indicates very high resistance through the connector, pull on the wire to see if the resistance changes. This indicates the connector is not making good contact and it must be cleaned, repaired, or replaced.



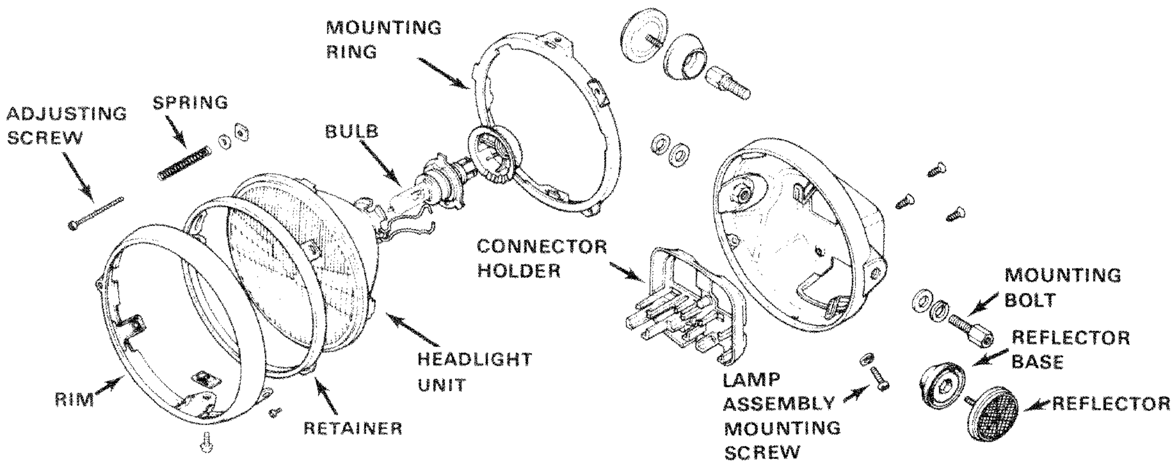
Headlight/Taillight

Headlight Bulb Replacement

Remove the three mounting screws from the headlight case, pull the lamp assembly from the headlight case, and remove the socket from the bulb.

Unfasten the bulb retaining clip and remove the bulb. Reassemble in reverse order of disassembly.

NOTE: Do not leave fingerprints on the headlight bulb; they may create hot spots on the bulb.



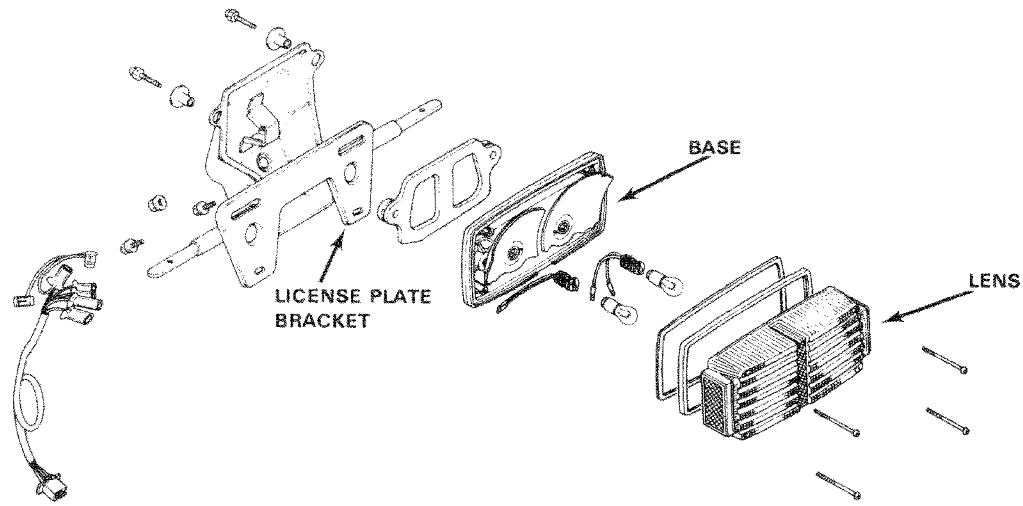
(cont'd)

Headlight/Taillight (cont'd)

Taillight

To replace the bulb or any part of the taillight, remove the lens and then remove the part.

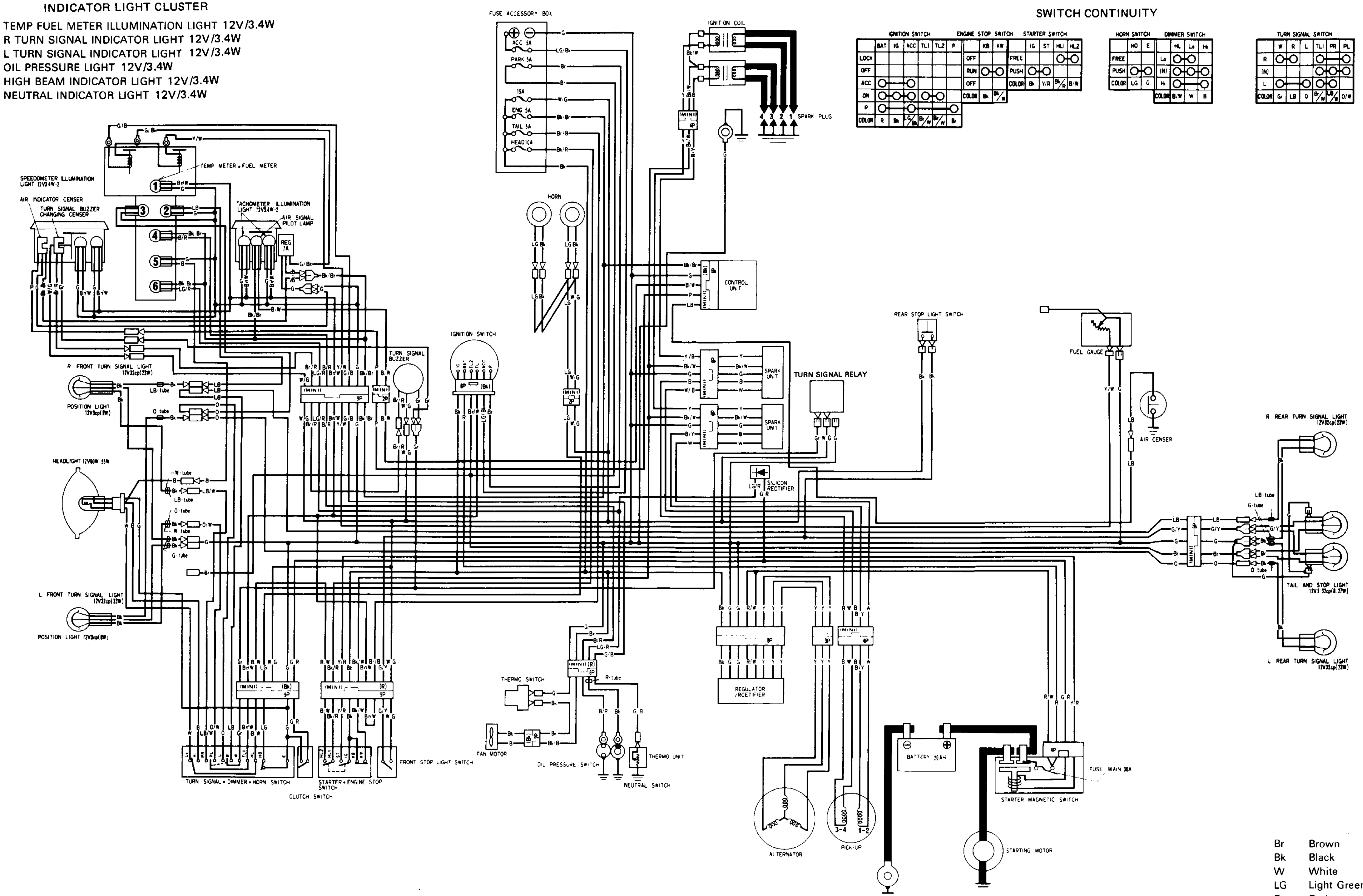
CAUTION: **Do not overtighten the lens mounting screws.**



1980 Standard Wiring Diagram

INDICATOR LIGHT CLUSTER

1 TEMP FUEL METER ILLUMINATION LIGHT 12V/3.4W
2 R TURN SIGNAL INDICATOR LIGHT 12V/3.4W
3 L TURN SIGNAL INDICATOR LIGHT 12V/3.4W
4 OIL PRESSURE LIGHT 12V/3.4W
5 HIGH BEAM INDICATOR LIGHT 12V/3.4W
6 NEUTRAL INDICATOR LIGHT 12V/3.4W



Br	Brown	Y	Yellow
Bk	Black	B	Blue
W	White	Gr	Grey
LG	Light Green	LB	Light Blue
R	Red	O	Orange
G	Green	P	Pink

Lights/Switches/Instruments/Wiring

1980 Interstate Wiring Diagram

INDICATOR LIGHT CLUSTER

1 R TURN SIGNAL INDICATOR LIGHT 12V/3.4W
2 L TURN SIGNAL INDICATOR LIGHT 12V/3.4W
3 OIL PRESSURE LIGHT 12V/3.4W
4 HIGH BEAM INDICATOR LIGHT 12V/3.4W
5 NEUTRAL INDICATOR LIGHT 12V/3.4W

SWITCH CONTINUITY

IGNITION SWITCH

	BAT	IG	ACC	TL1	TL2	P
LOCK						
OFF						
ACC	O		O			
ON	O	O	O	O	O	
P	O		O			O
COLOR	R	Bk	LG/Bk	Br/W	Br/W	Br

ENGINE STOP SWITCH

	KB	KW
OFF		
RUN	O	O
OFF		
COLOR	Bk	Bk/W

STARTER SWITCH

	IG	ST	HL1	HL2
FREE			O	O
PUSH	O	O		
COLOR	Bk	Y/R	Bk/R	B/W

HORN SWITCH

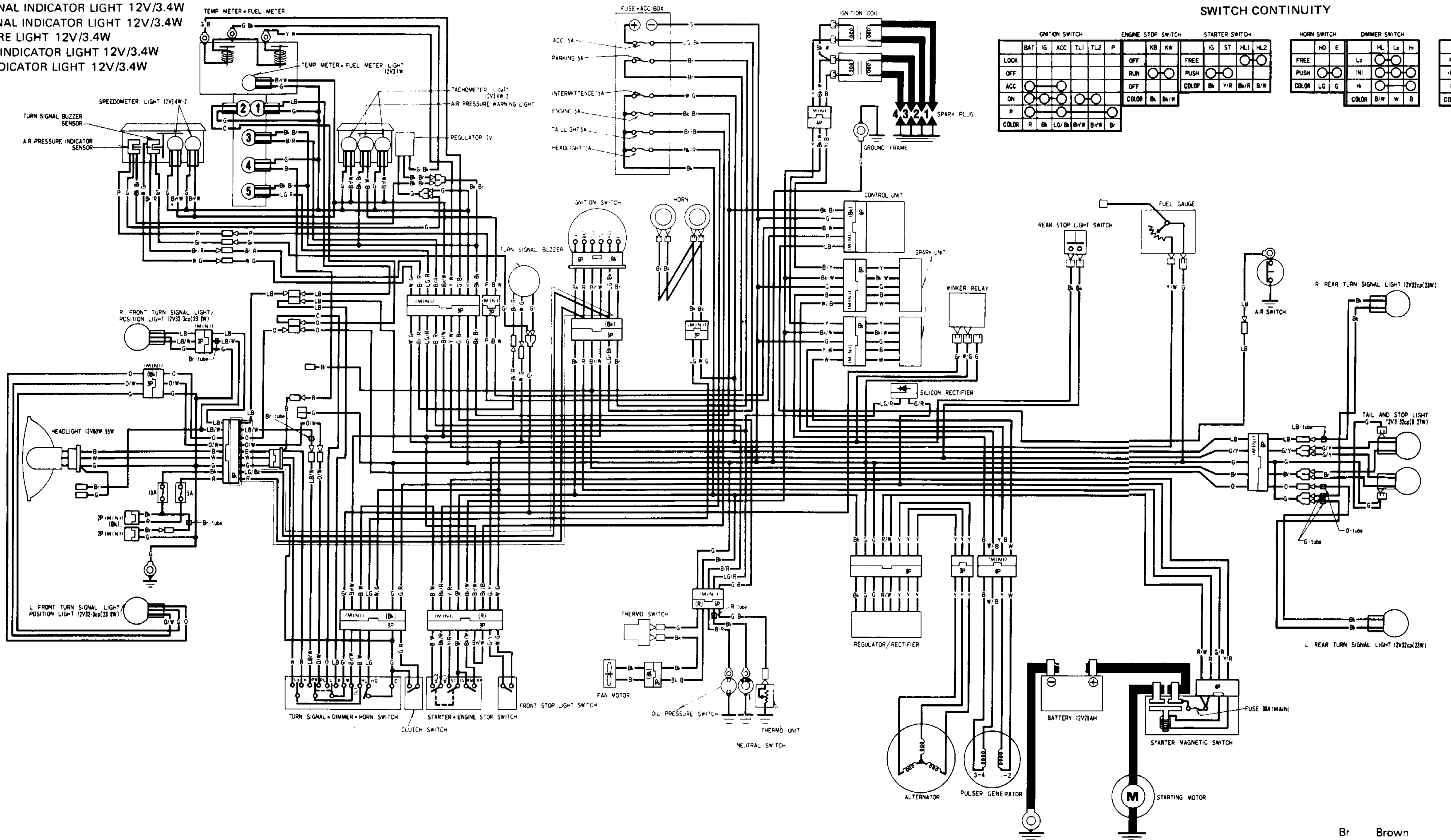
	HO	E
FREE		
PUSH	O	O
COLOR	LG	G

DIMMER SWITCH

	HL	Lo	Hi
Lo	O	O	
(N)	O	O	O
Hi	O		O
COLOR	B/W	W	B

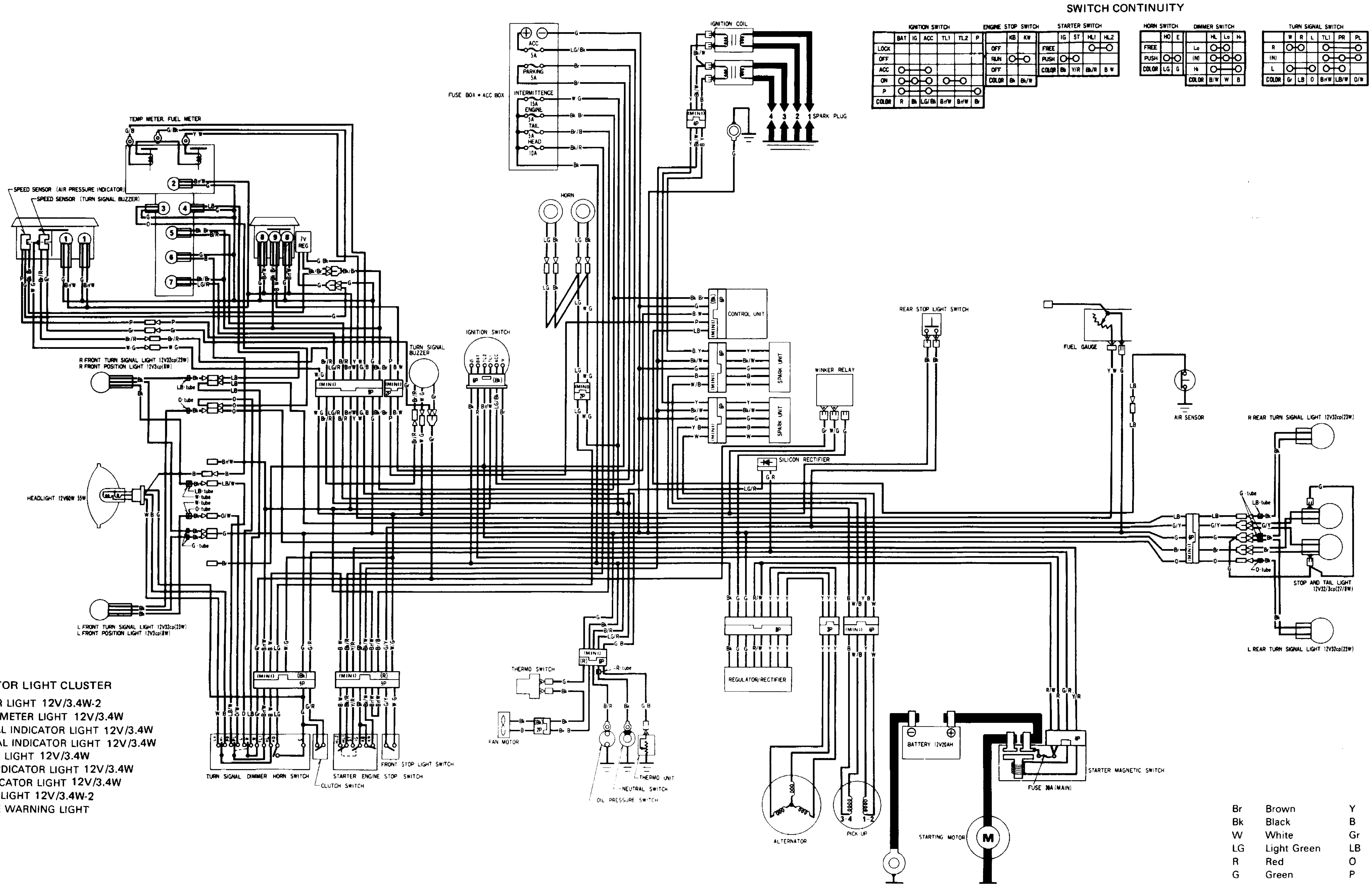
TURN SIGNAL SWITCH

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



Br	Brown	Y	Yellow
Bk	Black	B	Blue
W	White	Gr	Grey
LG	Light Green	LB	Light Bl
R	Red	O	Orange
G	Green	P	Pink

1981 Standard Wiring Diagram



INDICATOR LIGHT CLUSTER

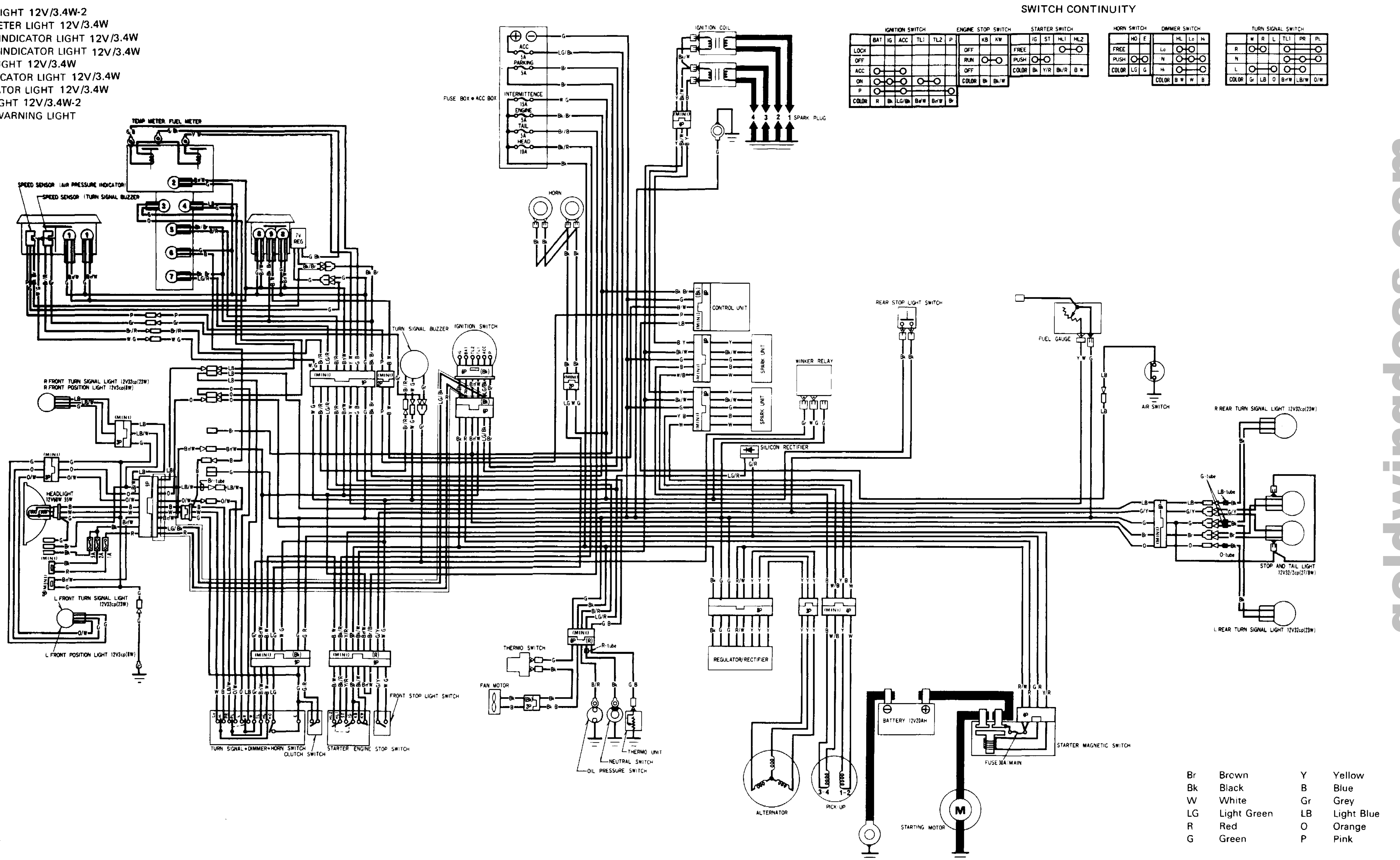
1 SPEEDOMETER LIGHT 12V/3.4W-2
2 TEMP & FUEL METER LIGHT 12V/3.4W
3 L TURN SIGNAL INDICATOR LIGHT 12V/3.4W
4 R TURN SIGNAL INDICATOR LIGHT 12V/3.4W
5 OIL PRESSURE LIGHT 12V/3.4W
6 HIGH BEAM INDICATOR LIGHT 12V/3.4W
7 NEUTRAL INDICATOR LIGHT 12V/3.4W
8 TACHOMETER LIGHT 12V/3.4W-2
9 AIR PRESSURE WARNING LIGHT

Br	Brown	Y	Yellow
Bk	Black	B	Blue
W	White	Gr	Grey
LG	Light Green	LB	Light Blue
R	Red	O	Orange
G	Green	P	Pink

1981 Interstate Wiring Diagram

INDICATOR LIGHT CLUSTER

1. SPEEDOMETER LIGHT 12V/3.4W-2
2. TEMP & FUEL METER LIGHT 12V/3.4W
3. L TURN SIGNAL INDICATOR LIGHT 12V/3.4W
4. R TURN SIGNAL INDICATOR LIGHT 12V/3.4W
5. OIL PRESSURE LIGHT 12V/3.4W
6. HIGH BEAM INDICATOR LIGHT 12V/3.4W
7. NEUTRAL INDICATOR LIGHT 12V/3.4W
8. TACHOMETER LIGHT 12V/3.4W-2
9. AIR PRESSURE WARNING LIGHT



Br	Brown	Y	Yellow
Bk	Black	B	Blue
W	White	Gr	Grey
LG	Light Green	LB	Light Blue
R	Red	O	Orange
G	Green	P	Pink

INDICATOR LIGHT CLUSTER
1 R TURN SIGNAL INDICATOR 12V/3.4W
2 L TURN SIGNAL INDICATOR 12V/3.4W
3 OIL PRESSURE LIGHT 12V/3.4W
4 HIGH BEAM INDICATOR 12V/3.4W
5 NEUTRAL INDICATOR 12V/3.4W

SWITCH CONTINUITY

IGNITION SWITCH

	BAT	IG	ACC	TL1	TL2	P
LOCK						
OFF						
ACC	O	—	O			
ON	O	O	O	O	O	
P	O	—	O	—	—	O
COLOR	R	B	Lg/B	Br/W	Br/W	Br

ENGINE STOP SWITCH

	KB	KW
OFF		
RUN	O	O
OFF		
COLOR	B	B/W

STARTER SWITCH

	IG	ST	HL1	HL2
FREE			O	O
PUSH	O	O		
COLOR	B	Y/R	B/R	L/W

HORN SWITCH

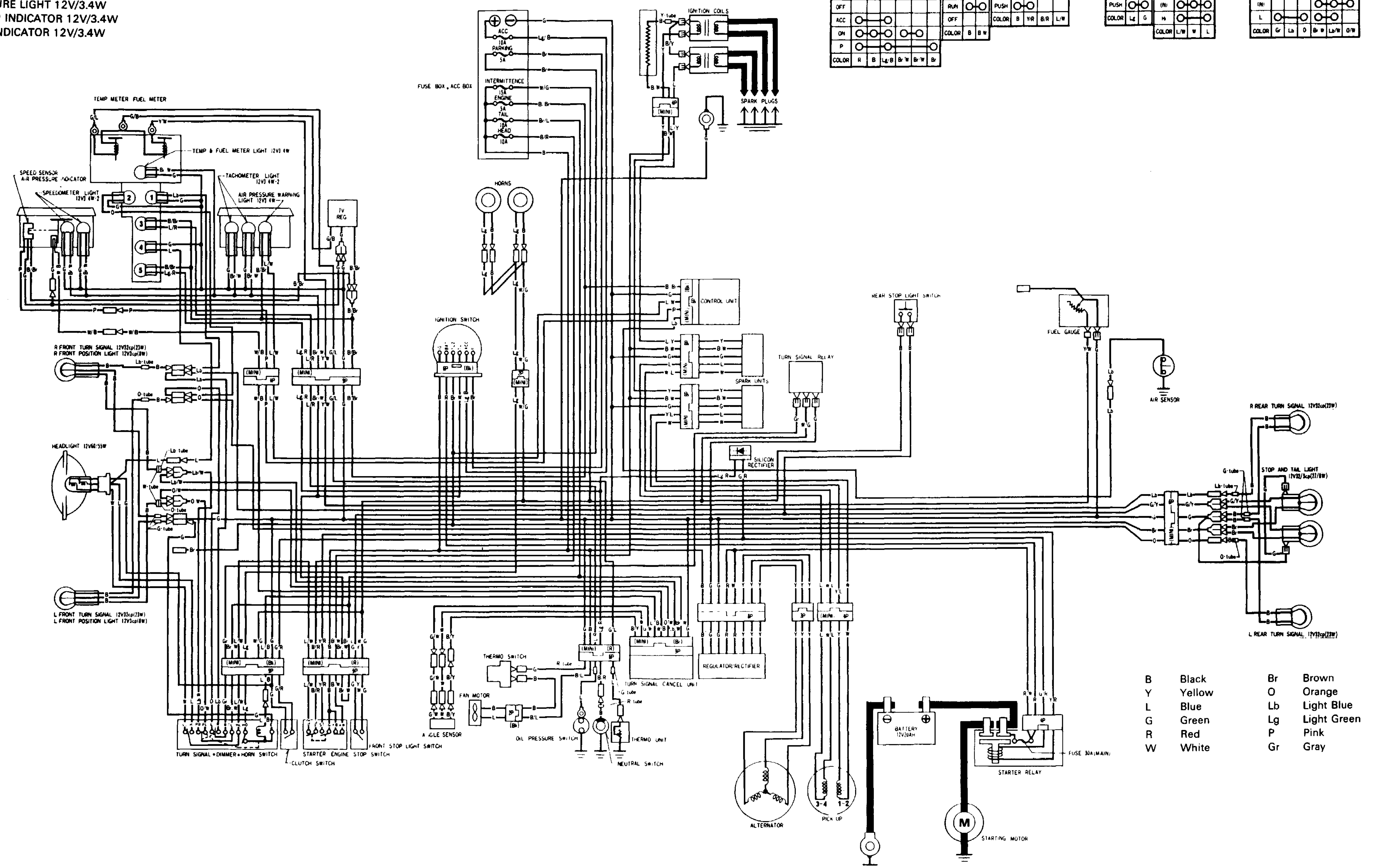
	HO	E
FREE		
PUSH	O	O
COLOR	Lg	G

DIMMER SWITCH

	HL	Lo	Hi
Lo	O	O	
(N)	O	O	O
Hi	O	—	O
COLOR	L/W	W	L

TURN SIGNAL SWITCH

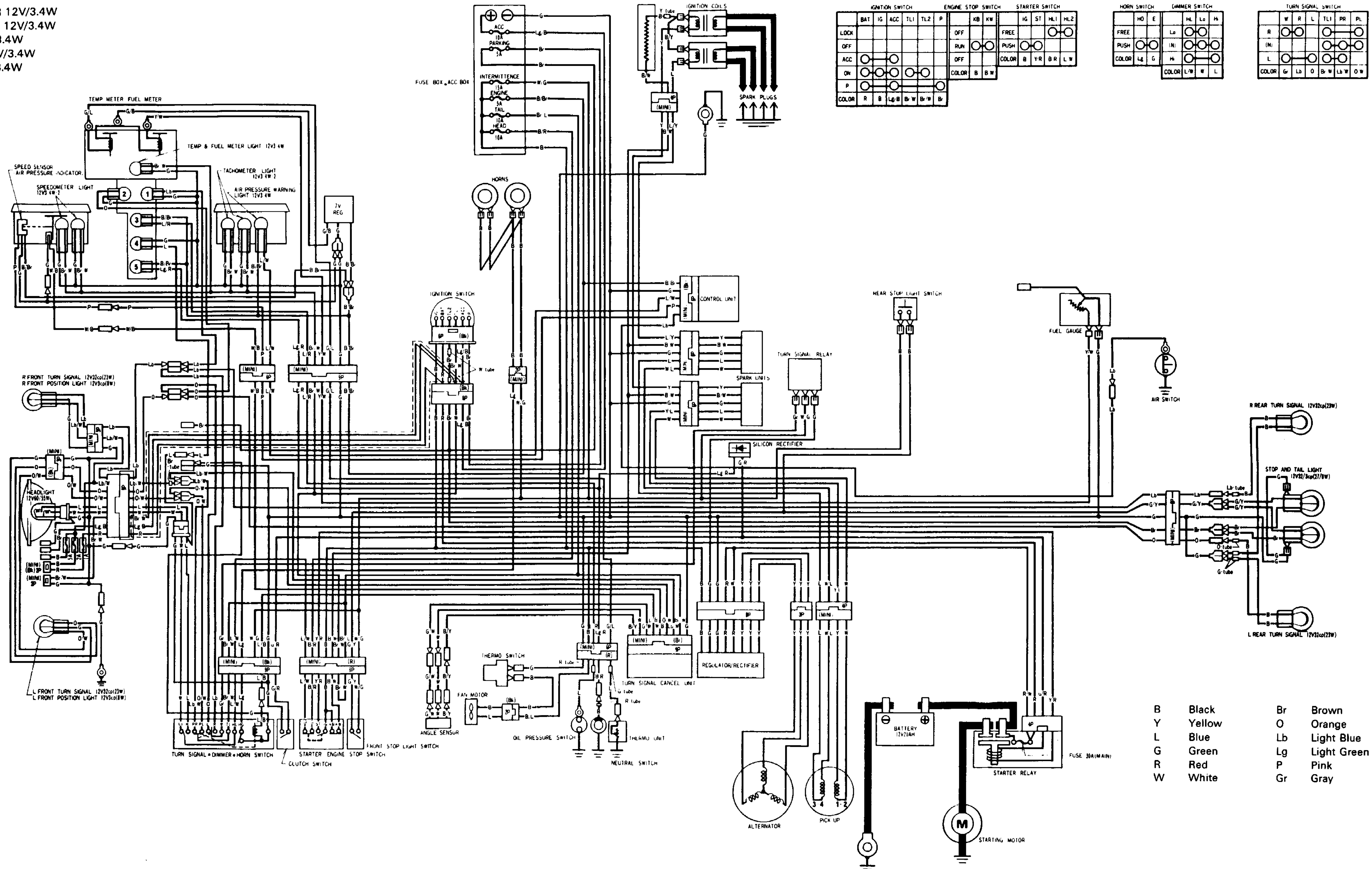
	W	R	L	TL1	PR	PL
R	O	O		O	—	O
(N)				O	O	O
L	O	—	O	O	O	
COLOR	Gr	Lb	O	Br/W	Lb/W	O/W



B	Black	Br	Brown
Y	Yellow	O	Orange
L	Blue	Lb	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

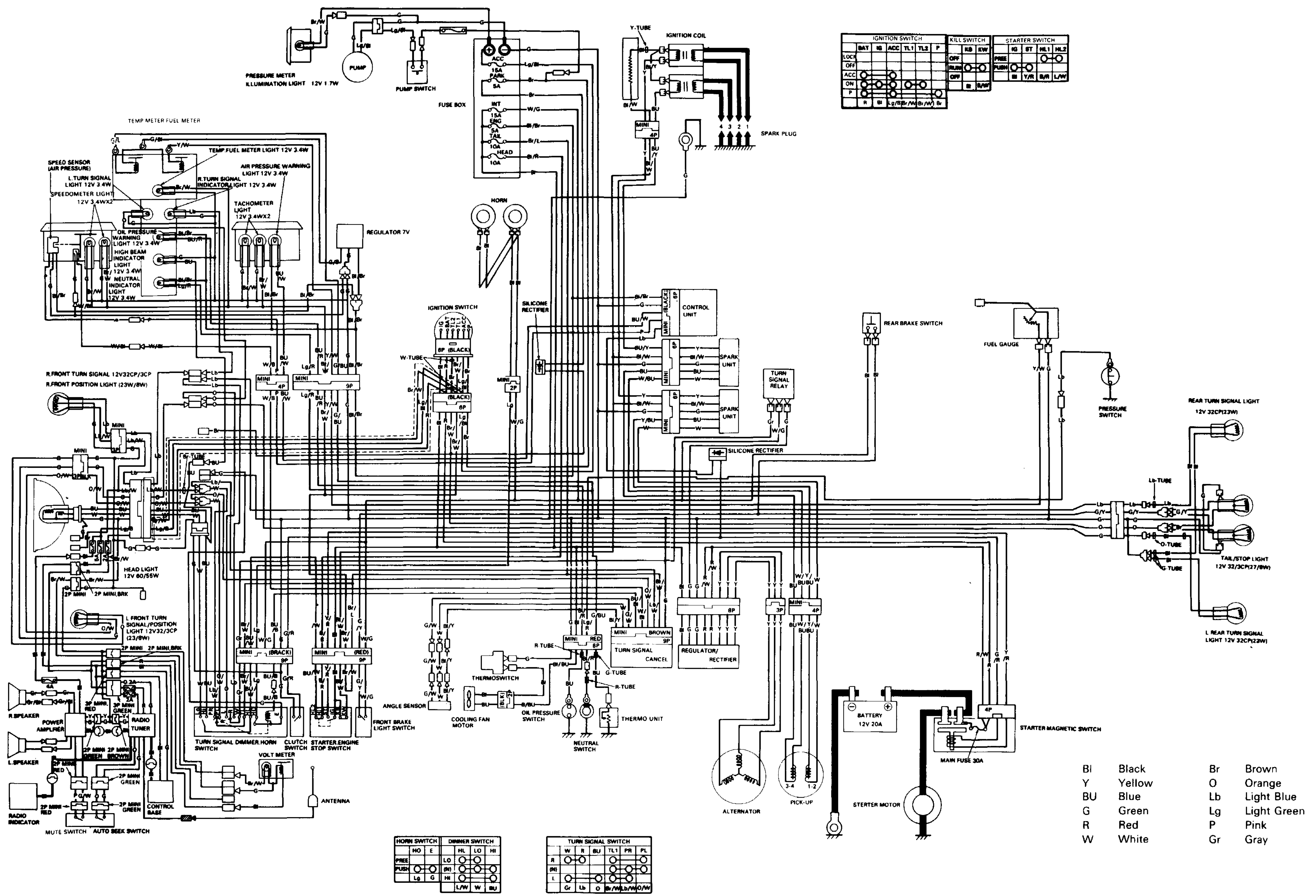
1982 Interstate Wiring Diagram

1 R TURN SIGNAL INDICATOR 12V/3.4W
2 L TURN SIGNAL INDICATOR 12V/3.4W
3 OIL PRESSURE LIGHT 12V/3.4W
4 HIGH BEAM INDICATOR 12V/3.4W
5 NEUTRAL INDICATOR 12V/3.4W



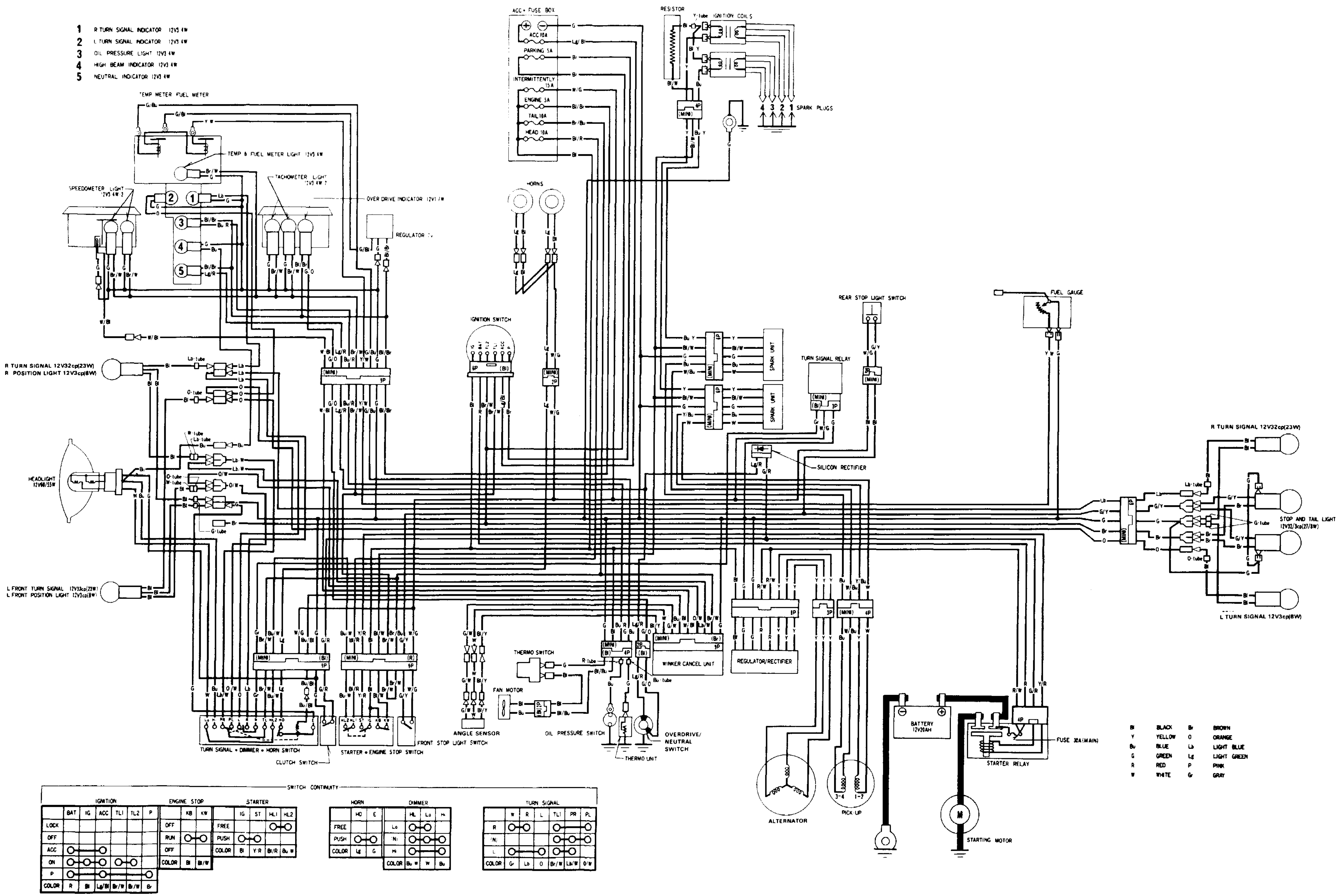
B	Black	Br	Brown
Y	Yellow	O	Orange
L	Blue	Lb	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

82 Aspencade Wiring Diagram

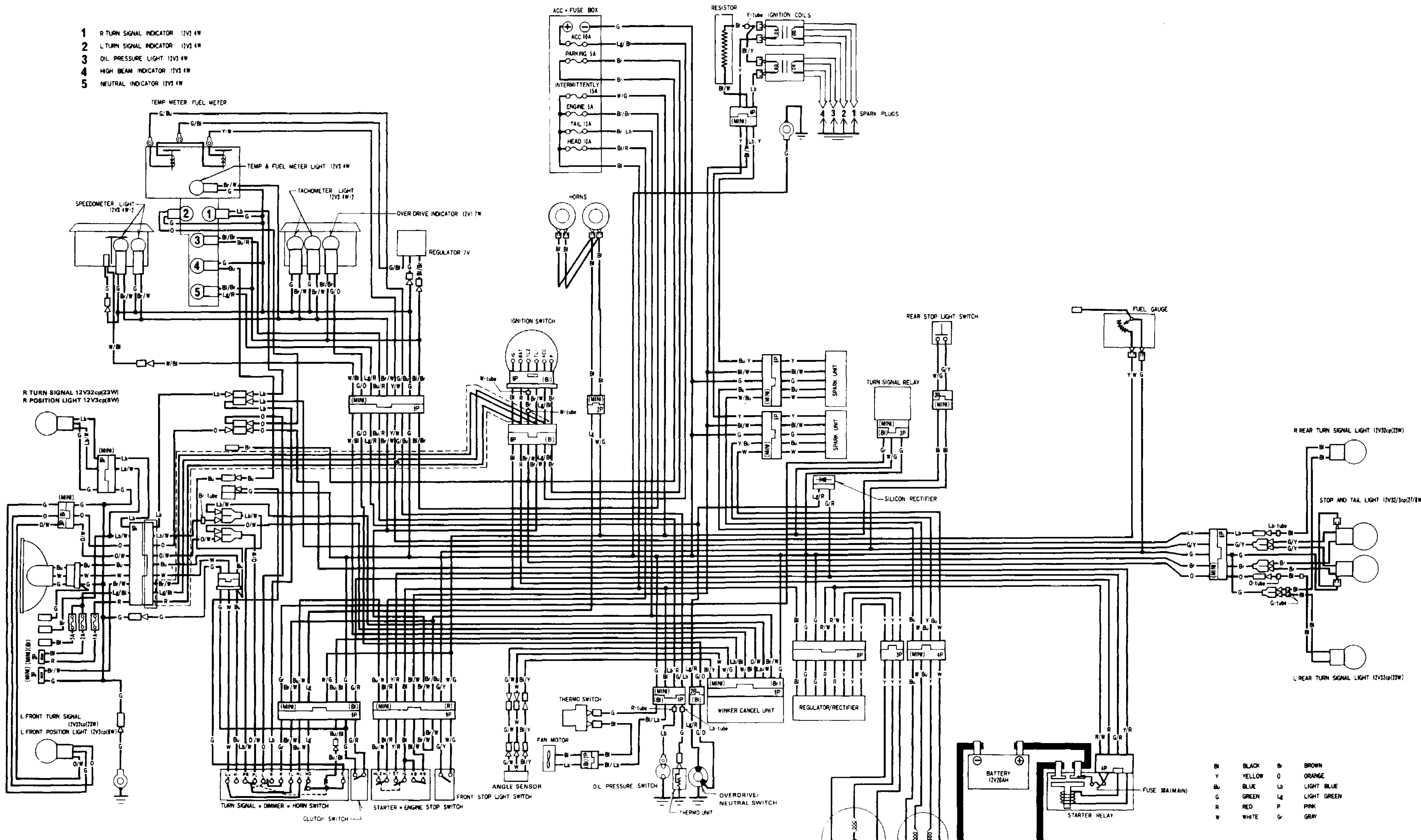


Bl	Black	Br	Brown
Y	Yellow	O	Orange
BU	Blue	Lb	Light Blue
G	Green	Lg	Light Green
R	Red	P	Pink
W	White	Gr	Gray

1983 Standard Wiring Diagram



1983 Interstate Wiring Diagram



Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY

SWITCH CONTINUITY

IGNITION

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

ENGINE STOP

	KB	KW
OFF		
RUN	○	○
OFF		
COLOR	Bl	Bl/W

STARTER

	IG	ST	HL1	HL2
FREE			○	○
PUSH	○	○		
COLOR	Bl	Y/R	Bl/R	Bu/W

HORN

	HO	E
FREE		
PUSH	○	○
COLOR	Lg	G

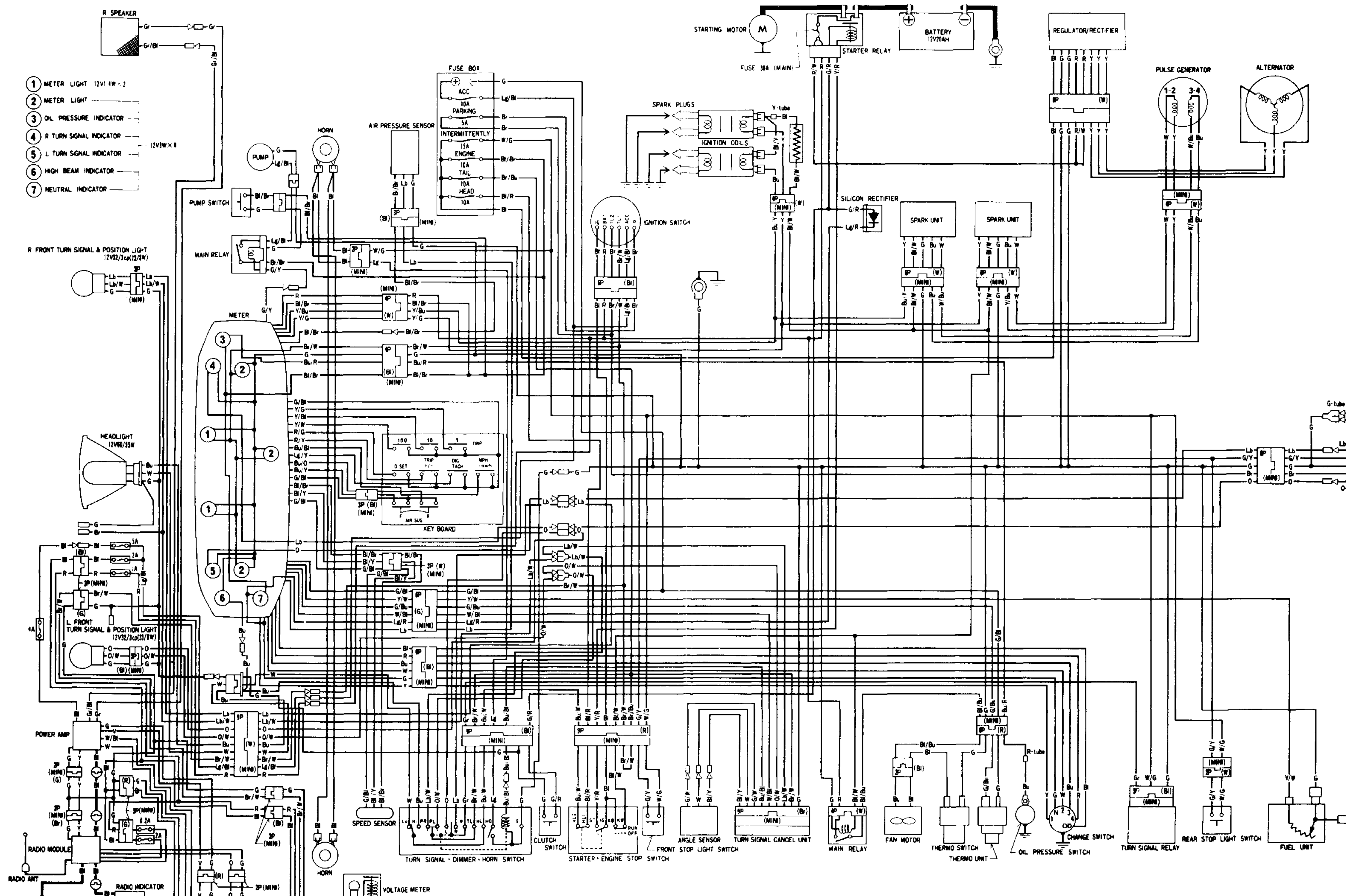
DIMMER

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

TURN SIGNAL

	W	R	L	TL1	PR	PL
R	○	○		○	—	○
N				○	○	○
L	○	—	○	○	○	
COLOR	Gr	Lb	O	Br/W	Lb/W	O/W

1983 Aspencade Wiring Diagram



SWITCH CONTINUITY

IGNITION SWITCH

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

ENGINE STOP SWITCH

	KB	KW
OFF		
RUN	O	O
OFF		
COLOR	Bl	Bl/W

STARTER SWITCH

	IG	ST	HL1	HL2
FREE			O	O
PUSH	O	O		
COLOR	Bl	Y/R	Bl/R	Bu/W

HORN SWITCH

	HO	E
FREE		
PUSH	O	O
COLOR	Lg	G

DIMMER SWITCH

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

TURN SIGNAL SWITCH

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

Bl	BLACK	Br	BROWN
Y	YELLOW	O	ORANGE
Bu	BLUE	Lb	LIGHT BLUE
G	GREEN	Lg	LIGHT GREEN
R	RED	P	PINK
W	WHITE	Gr	GRAY
V	VIOLET		

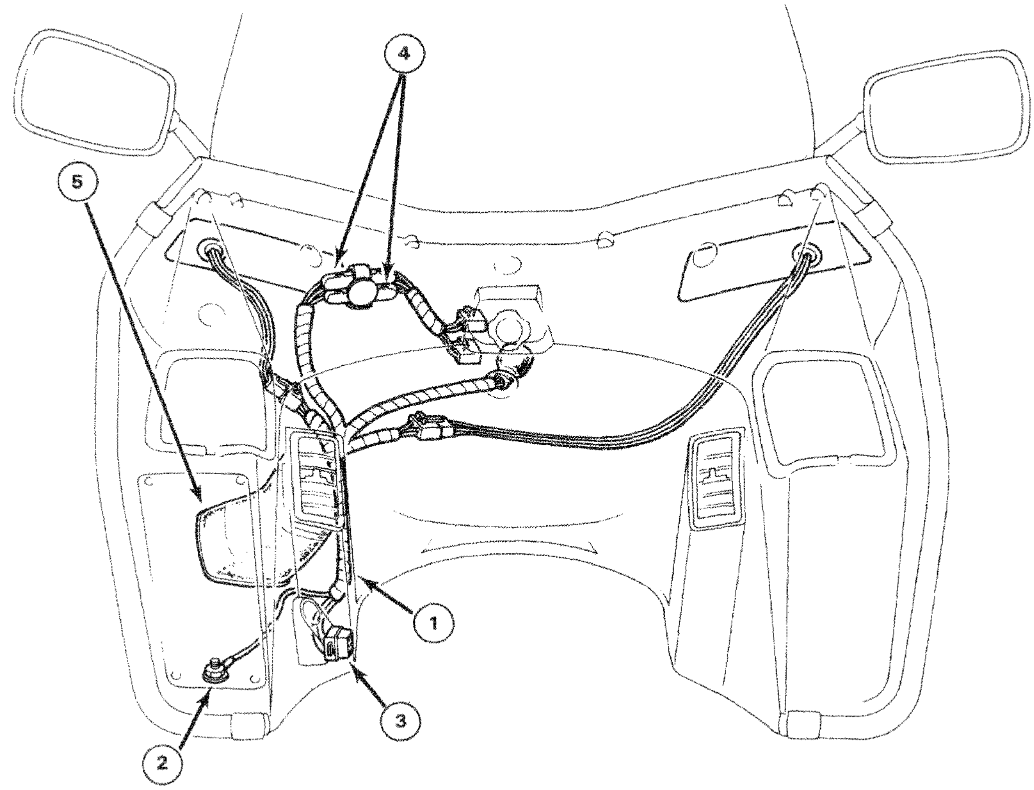
Accessories

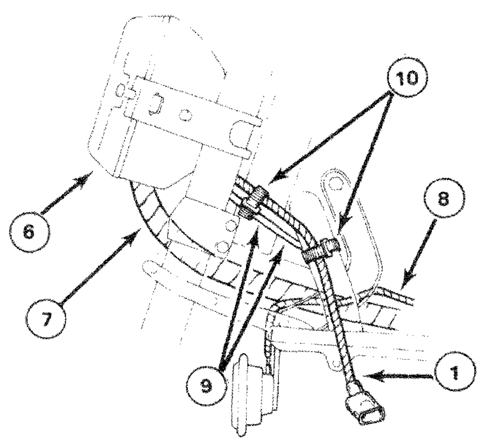
Accessories

Service Information

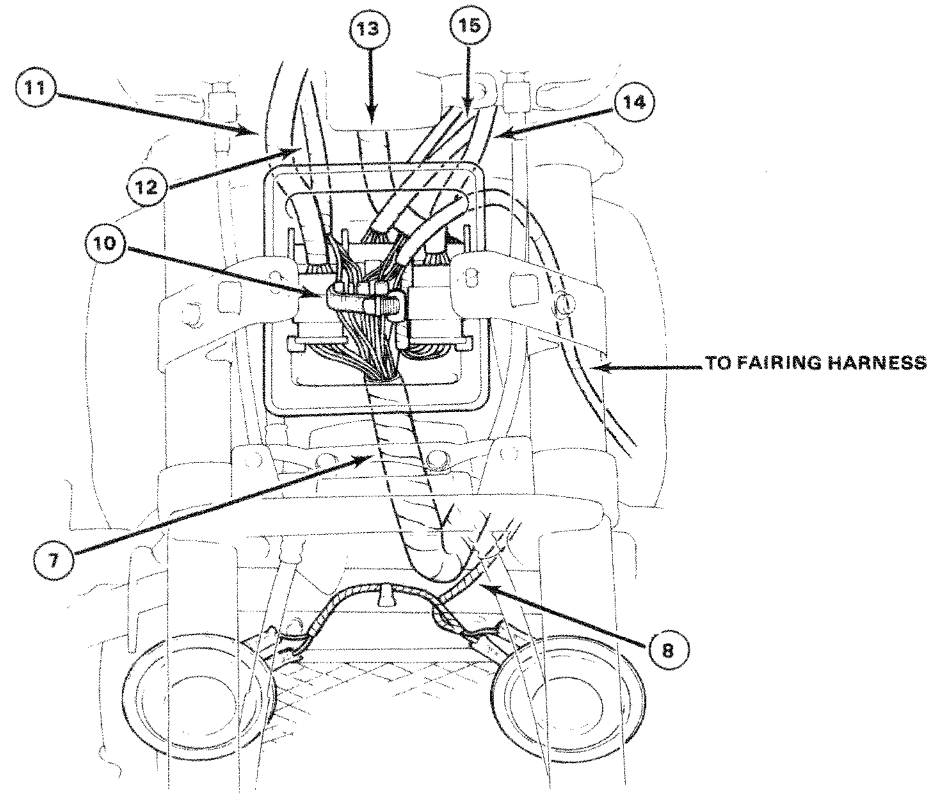
This chapter is designed to give you basic information about the removal and installation of the Interstate accessories, the only items which differentiate that model from the standard GL1100. All maintenance and service procedures are the same for both models; refer to the appropriate section.

Cable and Harness Routing

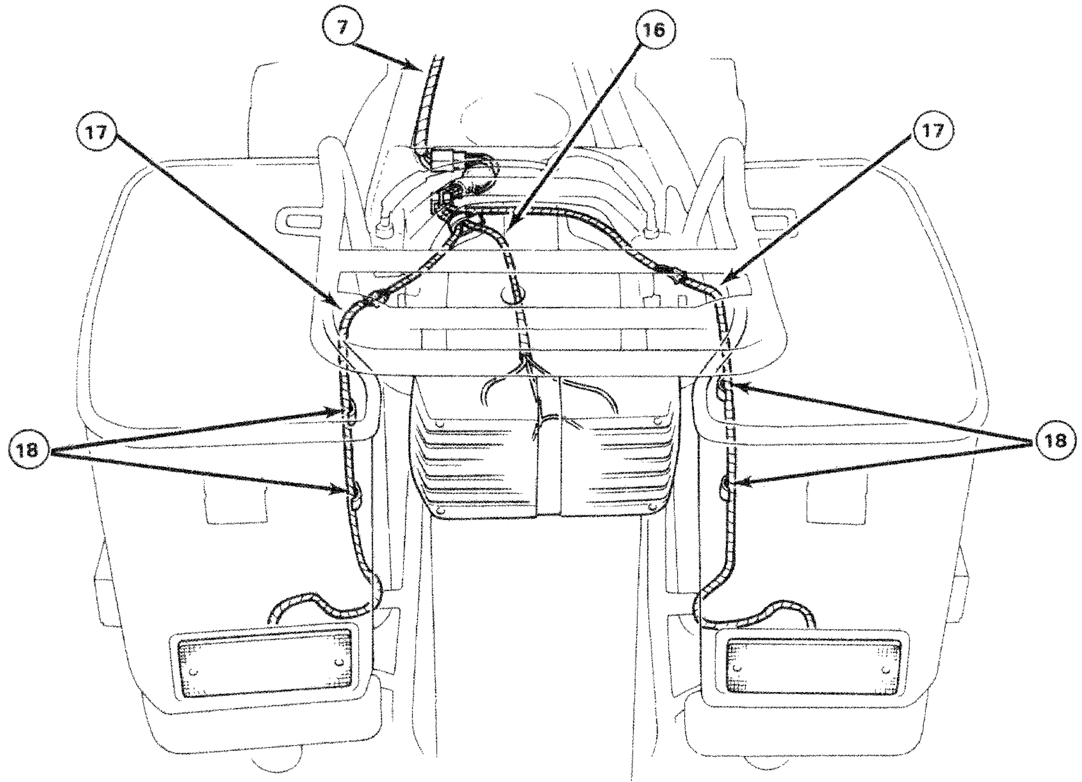




1. Fairing harness
2. Ground terminal
3. 9-pin connector
4. Fuse cases
5. Air duct
6. Counterweight
7. Main wire harness
8. Horn wire
9. Throttle cables
10. Wire band
11. Right side switch
12. Instrument wire harness
13. Ignition switch wire
14. Turn signal buzzer wire
15. Left side switch
16. Taillight wire
17. Rear turn signal wire
18. Clamp



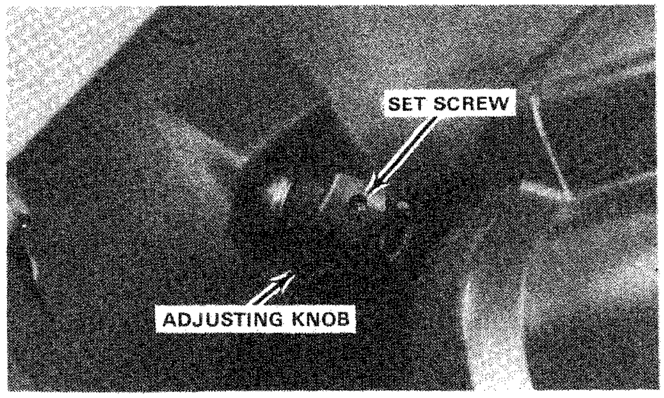
11
12
13
15
14
10
TO FAIRING HARNESS
7
8



7
16
17
17
18
18

Headlight Removal/Installation

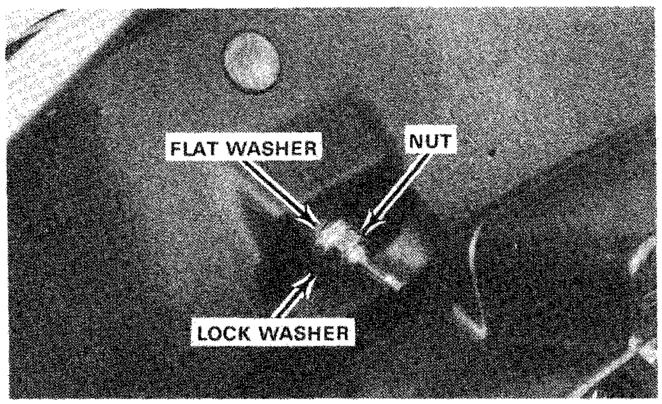
Loosen the headlight adjusting knob set screw and remove the knob.



Remove the nut, lockwasher and flat washer and pull off the headlight.

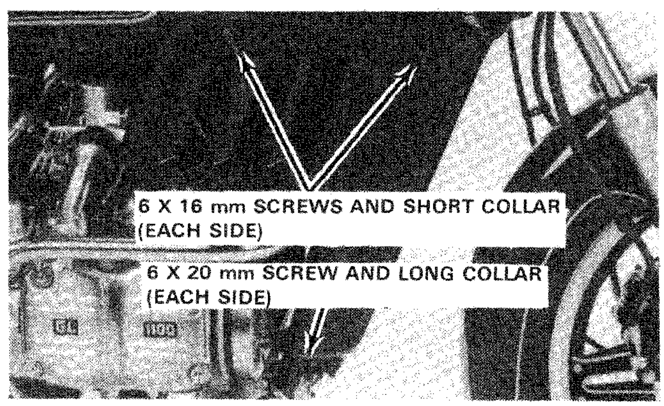
Install in reverse order of removal.

CAUTION: If bulb is being replaced, take care not to touch the new bulb with your fingers; the fingerprints may cause hot spots on the bulb.

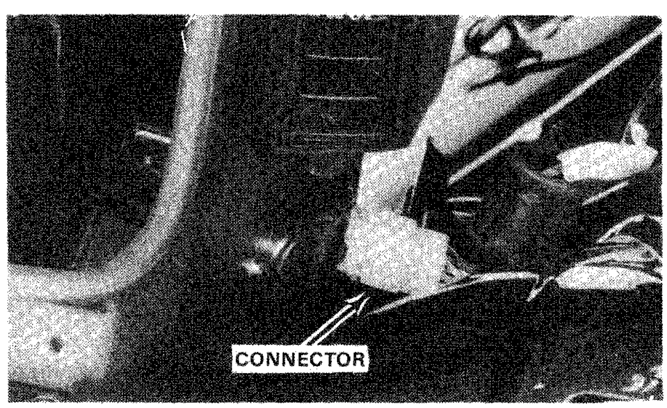


Fairing and Bracket Removal

Remove the three screws and collars (each side) and remove the right and left lower fairing panels.

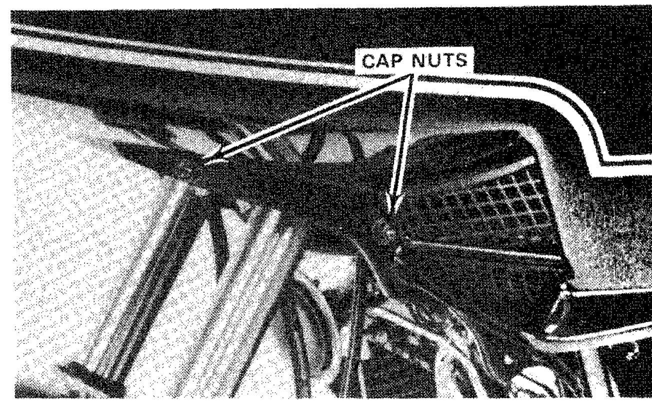


Disconnect the fairing wire harness from the main harness at the 9-pin connector on the left side of the fairing.



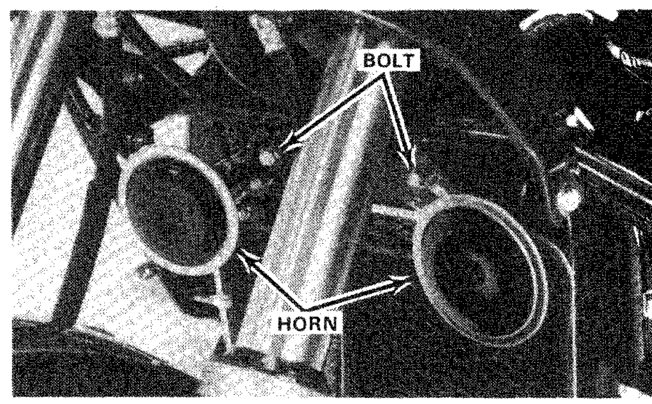
Remove the four cap nuts, flat washers, lock washers and flange bolts.

Remove the fairing.



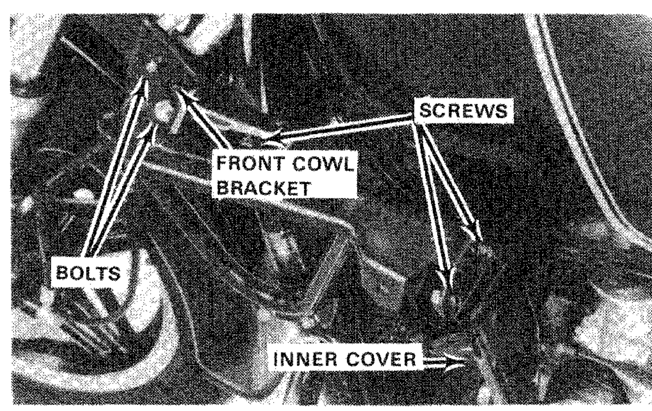
Remove the seat and shelter.

Disconnect the horn wires, remove the retaining bolts and remove the horns from the bracket.



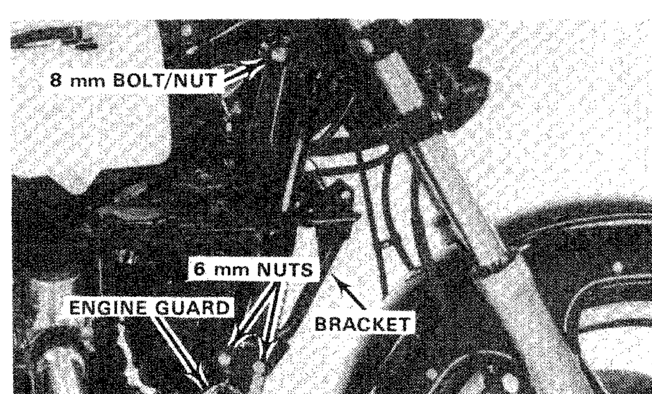
Remove two 6 x 14 mm flange bolts from the right and left cowl brackets and remove the brackets.

Remove the right and left inner cover screws and remove the covers from the main bracket.



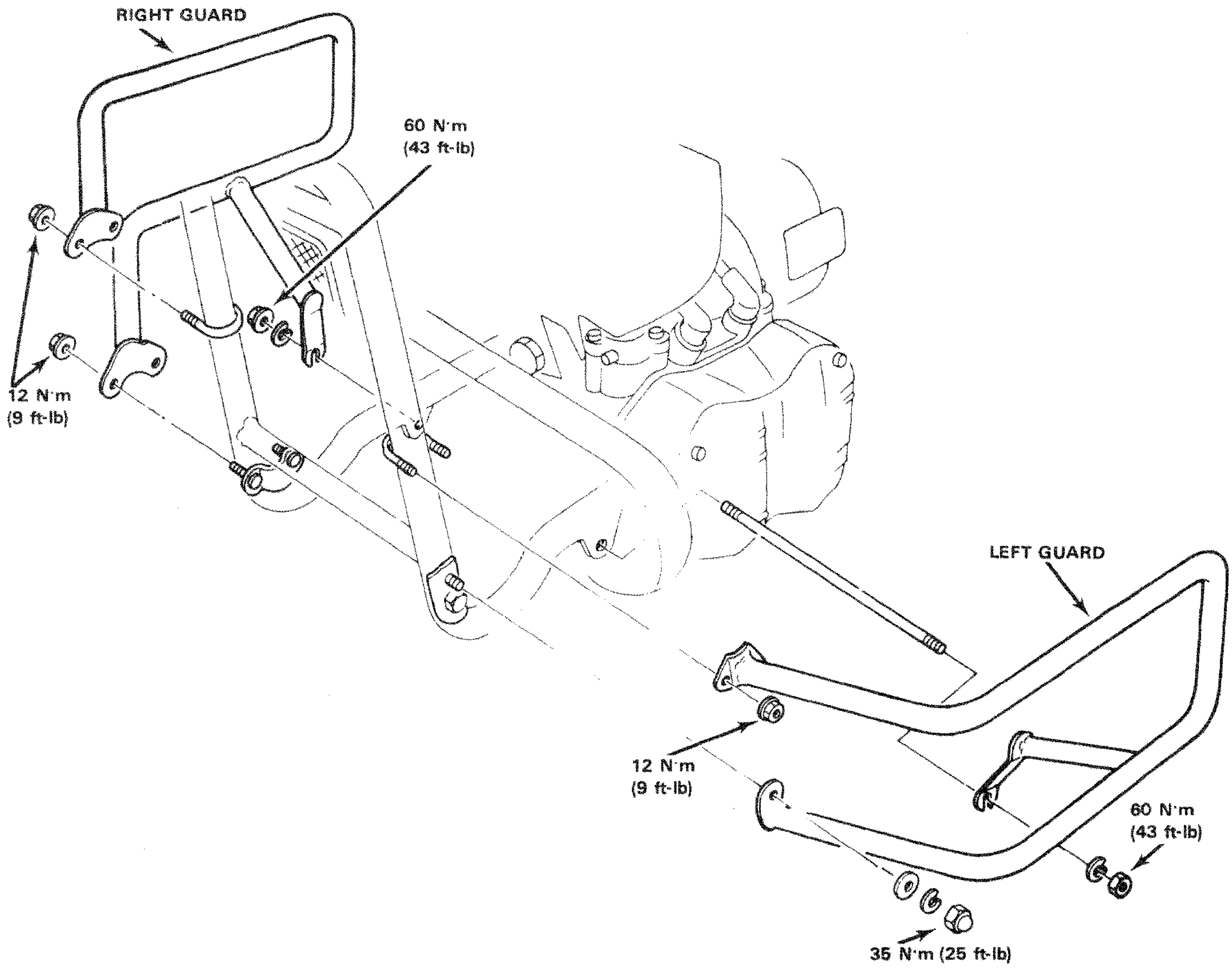
Remove the engine guards.

Remove the 8 x 80 mm bolt and four 6 mm nuts and carefully work the bracket out of the frame.

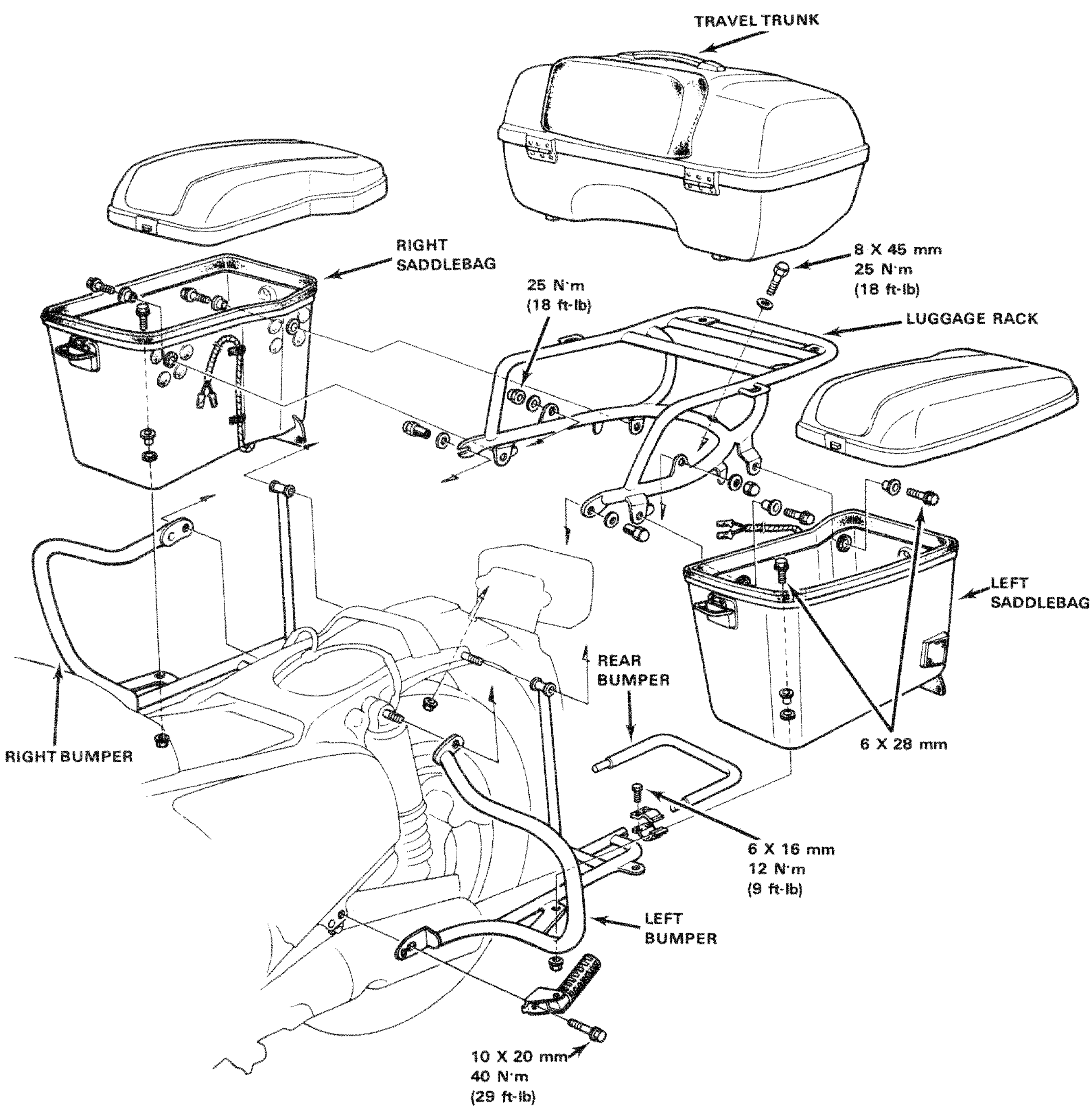


Accessories

Engine Guard Index



Saddlebags, Travel Trunk and Bumper Index

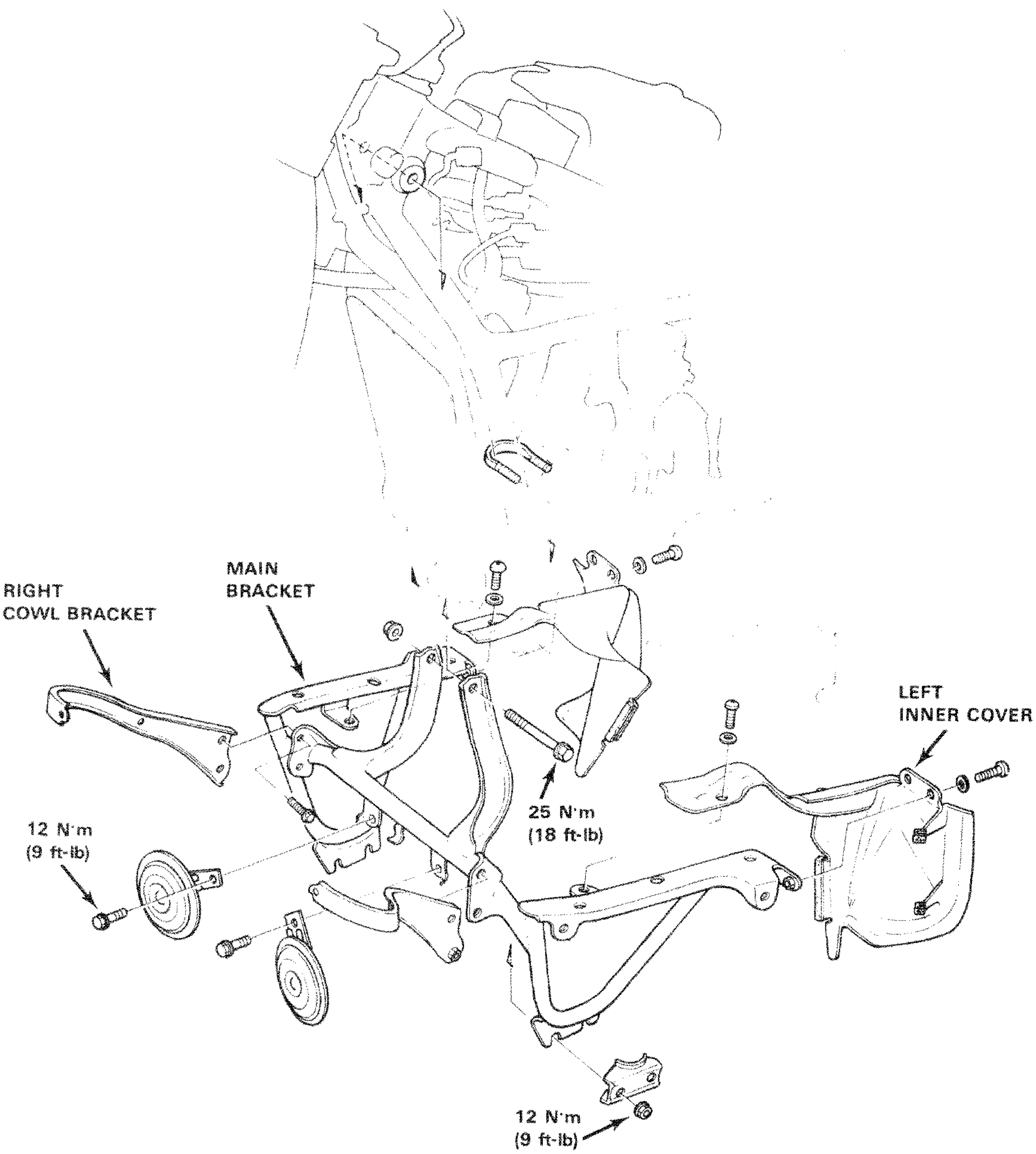


Accessories

Fairing and Bracket Installation

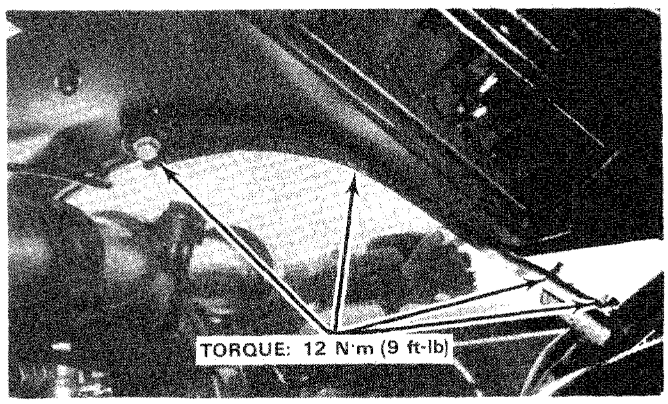
Reinstall the main bracket, the inner covers and the left and right cowl brackets. Torque the 8 mm bolt and the 6 mm nuts as shown, and tighten all screws.

Install the horns and connect the wires.



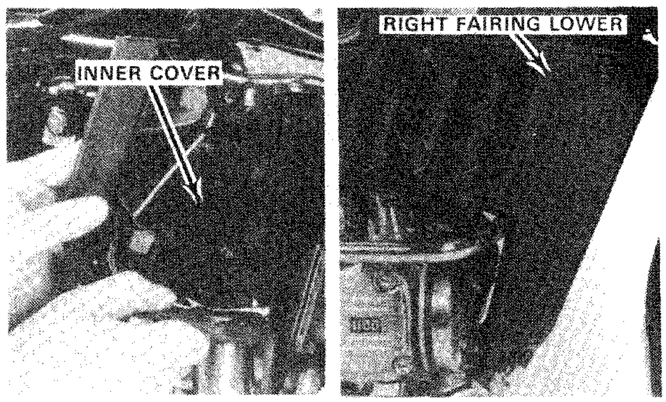
Place the fairing on the bracket and insert the flange bolts through the cowl bracket and fairing holes.

Install the washers and cap nuts, then torque the bolts.

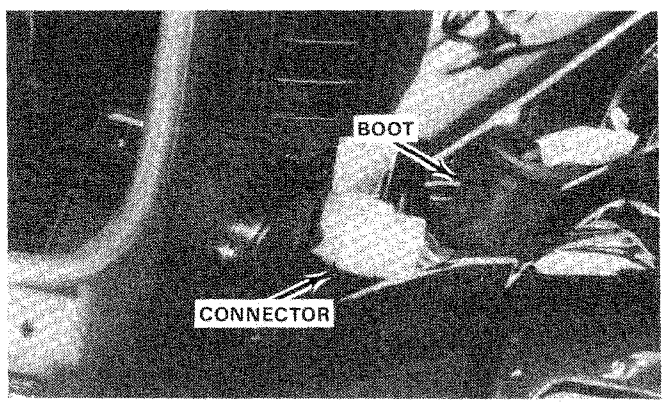


Install the right and left inner covers.

Fit the right and left fairing lowers over the inner cover hooks. Install the collars and tighten the screws.



Connect the fairing harness to the main harness and pull the boot over the coupler.



Accessories

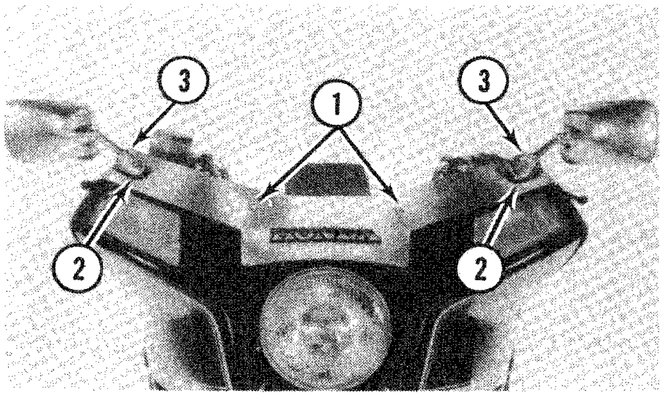
Adjustments

Windshield

The windshield height can be adjusted one-inch in either direction.

To adjust height, loosen the rearview mirror and trim screws in the order shown.

After adjusting, tighten the screws in the reverse order.

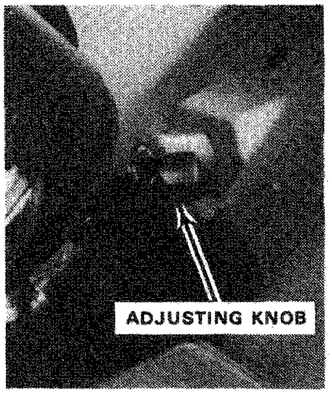


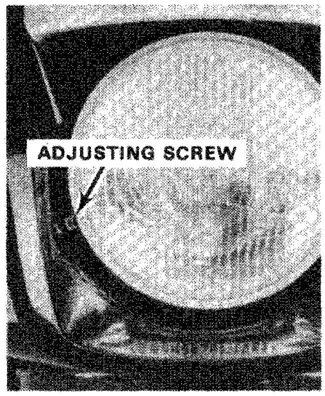
Headlight

Vertical adjustments can be made with the beam adjusting knob. Horizontal adjustments are made by turning the adjustment screw located on the right side of the headlight.

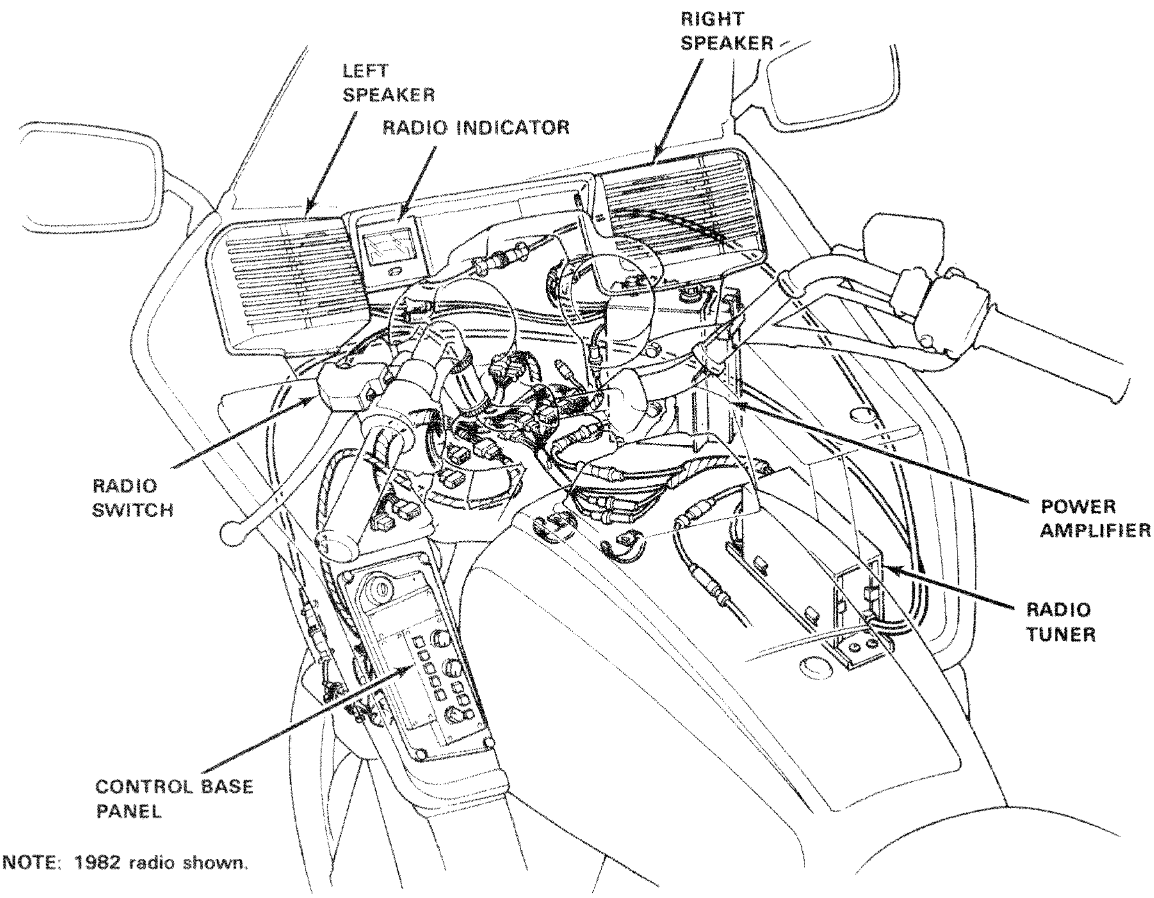
WARNING: An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.

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

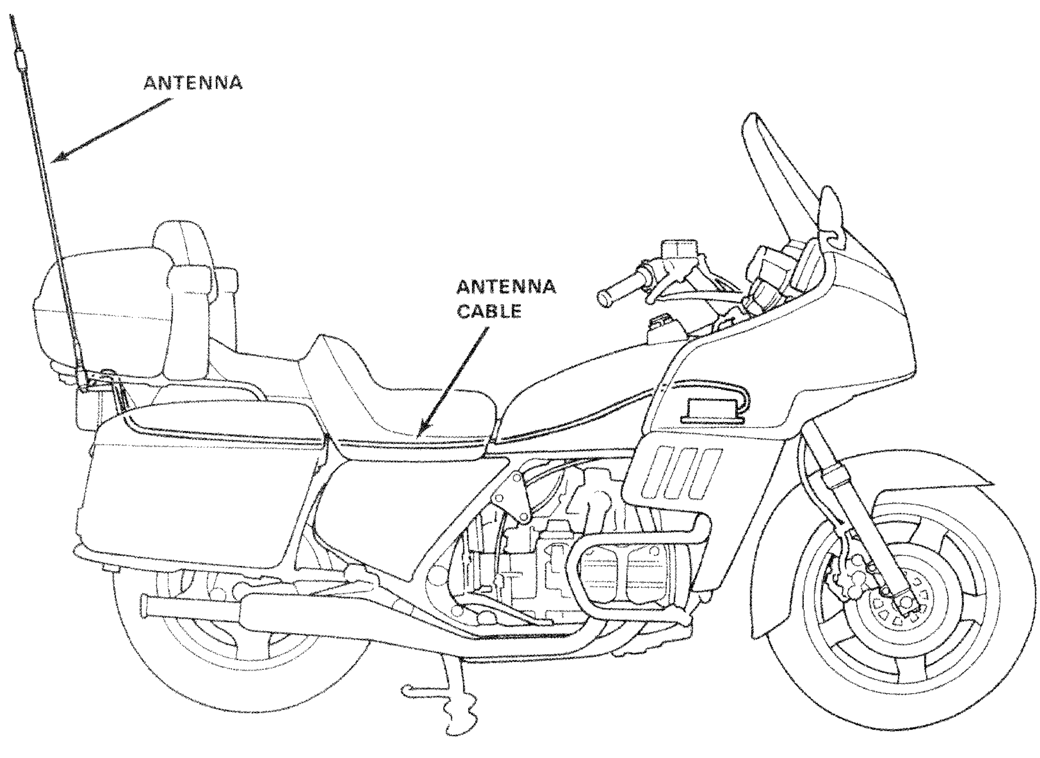




Audio System



NOTE: 1982 radio shown.



Audio System

Troubleshooting

No Power to Radio

- Blown fuse.
- Faulty harness.
- Faulty radio tuner.
- Faulty power switch.

Radio Operates But Indicator Does Not Light

- Faulty radio tuner
- Faulty radio tuner.
- Faulty harness.
- Blown fuse.
- Faulty indicator.

No Sound

- Blown fuse.
- Faulty harness.
- Faulty radio tuner.

Poor Sensitivity

- Faulty antenna cable.
- Faulty antenna cable connector.
- Faulty antenna.
- Faulty radio tuner.

Auto-Seek Switch Does Not Work

- Faulty connector or poor connection.
- Faulty auto-seek switch.
- Faulty radio tuner.

Distortion

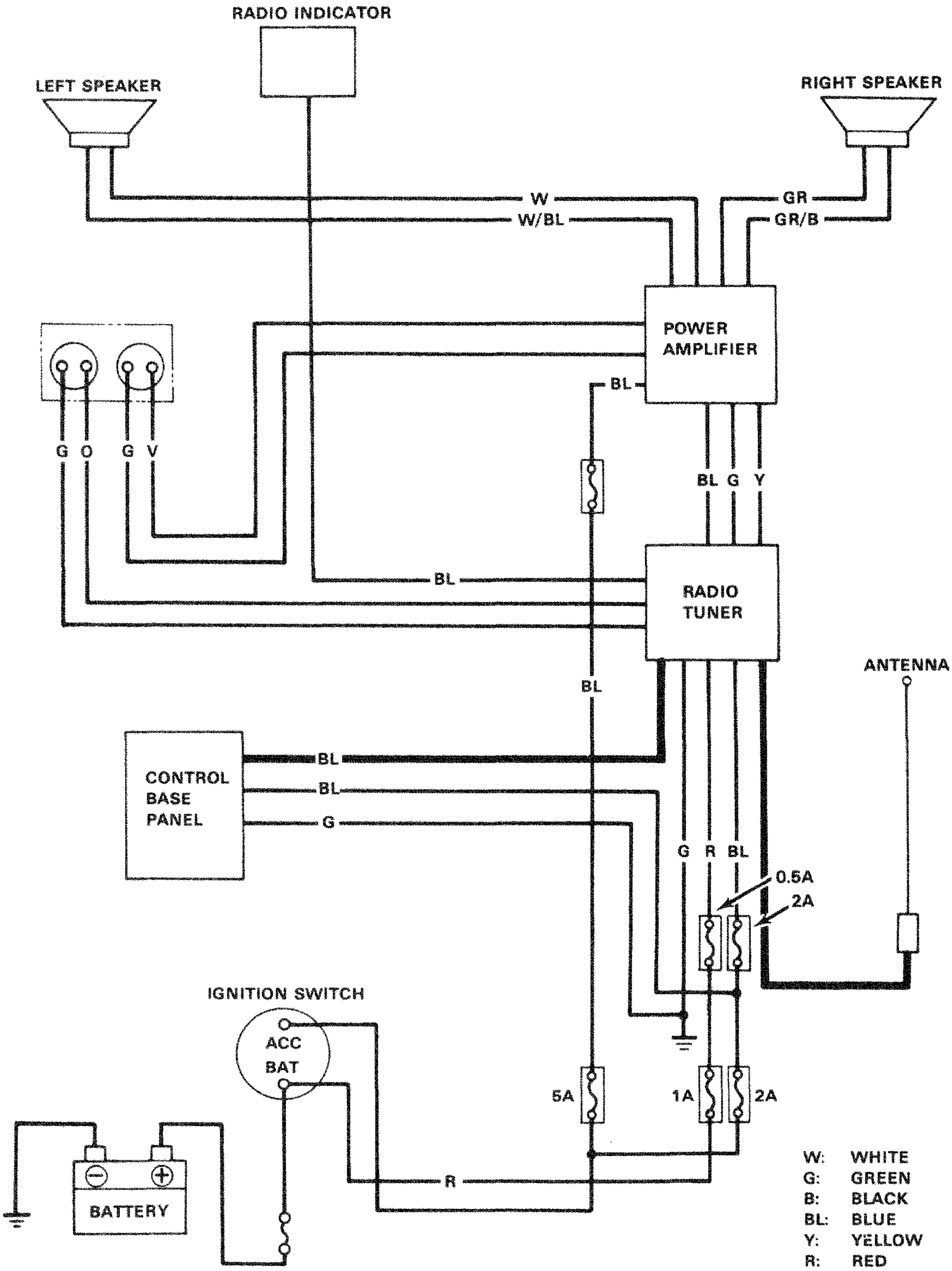
- Faulty radio tuner.
- Faulty antenna.

Low Sound

- Faulty antenna.
- Faulty radio tuner.
- Faulty mute switch.

Audio System

Wiring Diagram

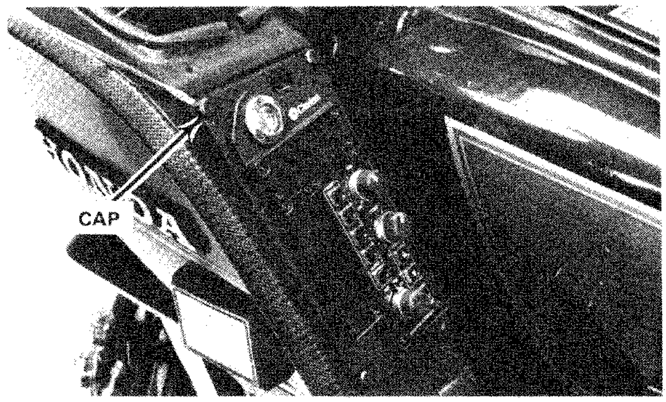


W: WHITE
G: GREEN
B: BLACK
BL: BLUE
Y: YELLOW
R: RED
GR: GRAY
O: ORANGE
V: VIOLET

Accessories

System Removal/Installation

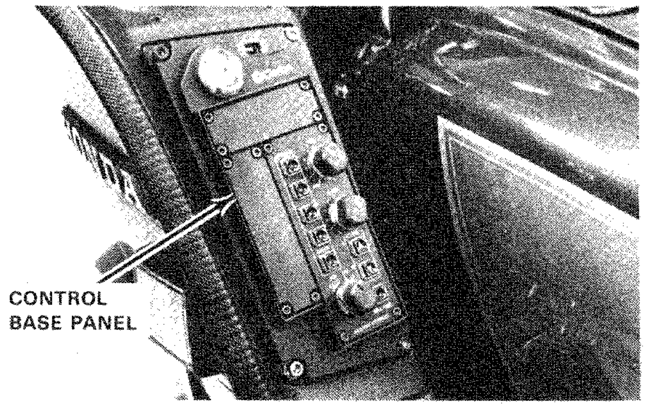
Pry the bolt caps off with a screwdriver.



Remove the socket bolts.

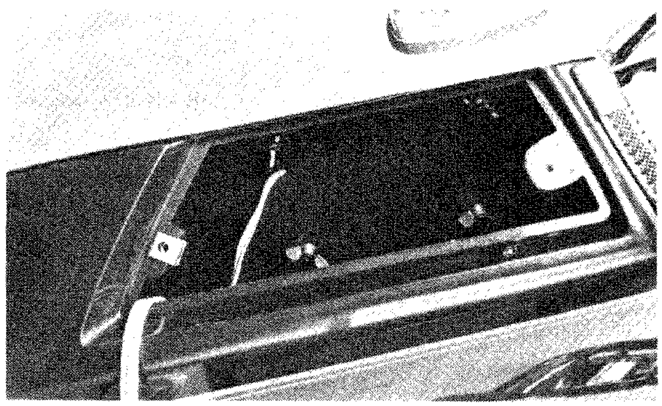
Pull the radio control base panel out from the fairing.

Disconnect the wire connectors, then remove the control base panel.



Remove the right and left turn signals by removing the screws.

Disconnect the speaker wire connectors. Remove the four wing nuts and pull the speaker out.

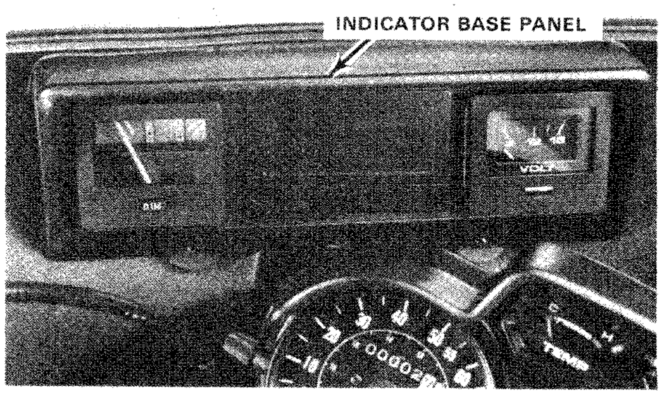


Remove the left fairing pocket by removing the four screws.

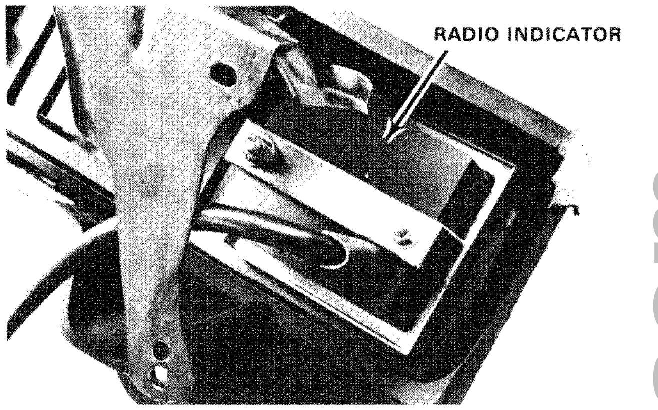
Remove the wing nut from the back of the indicator base panel.

Remove the indicator base panel from the fairing.

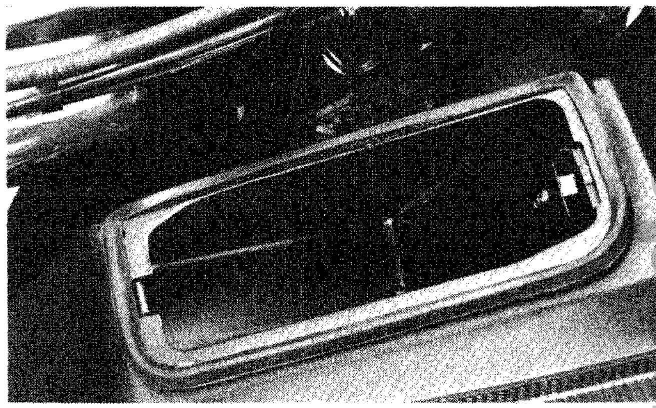
Disconnect the wire connectors and remove the base panel.



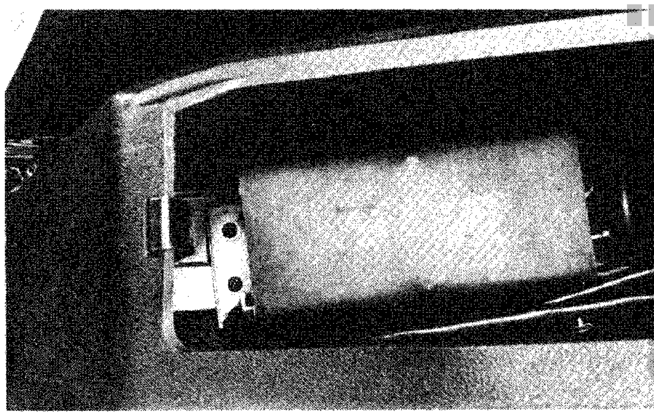
Remove the two nuts then push the radio indicator out from the indicator base panel.



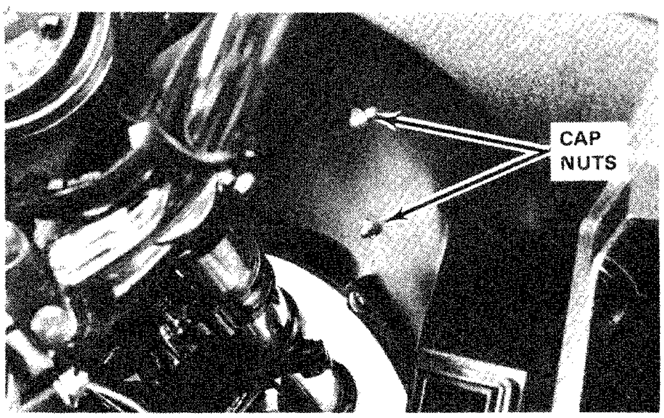
Remove the right fairing pocket.



Disconnect the wire connector, remove the screws and pull the radio tuner out of the fairing.



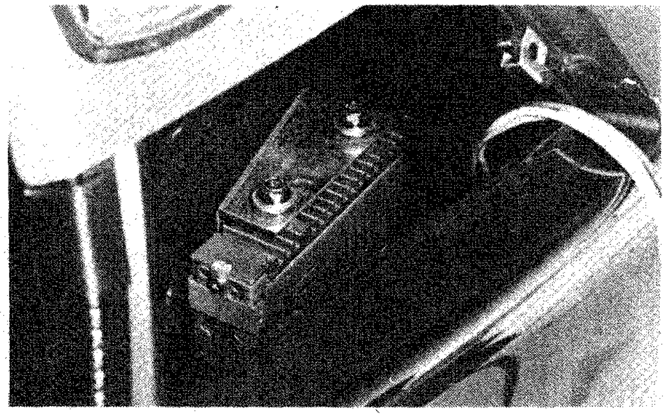
Remove the cap nuts, and pull the power amplifier out far enough to disconnect the wire connectors.



(cont'd)

System Removal/Installation (cont'd)

Remove the power amplifier from the fairing.



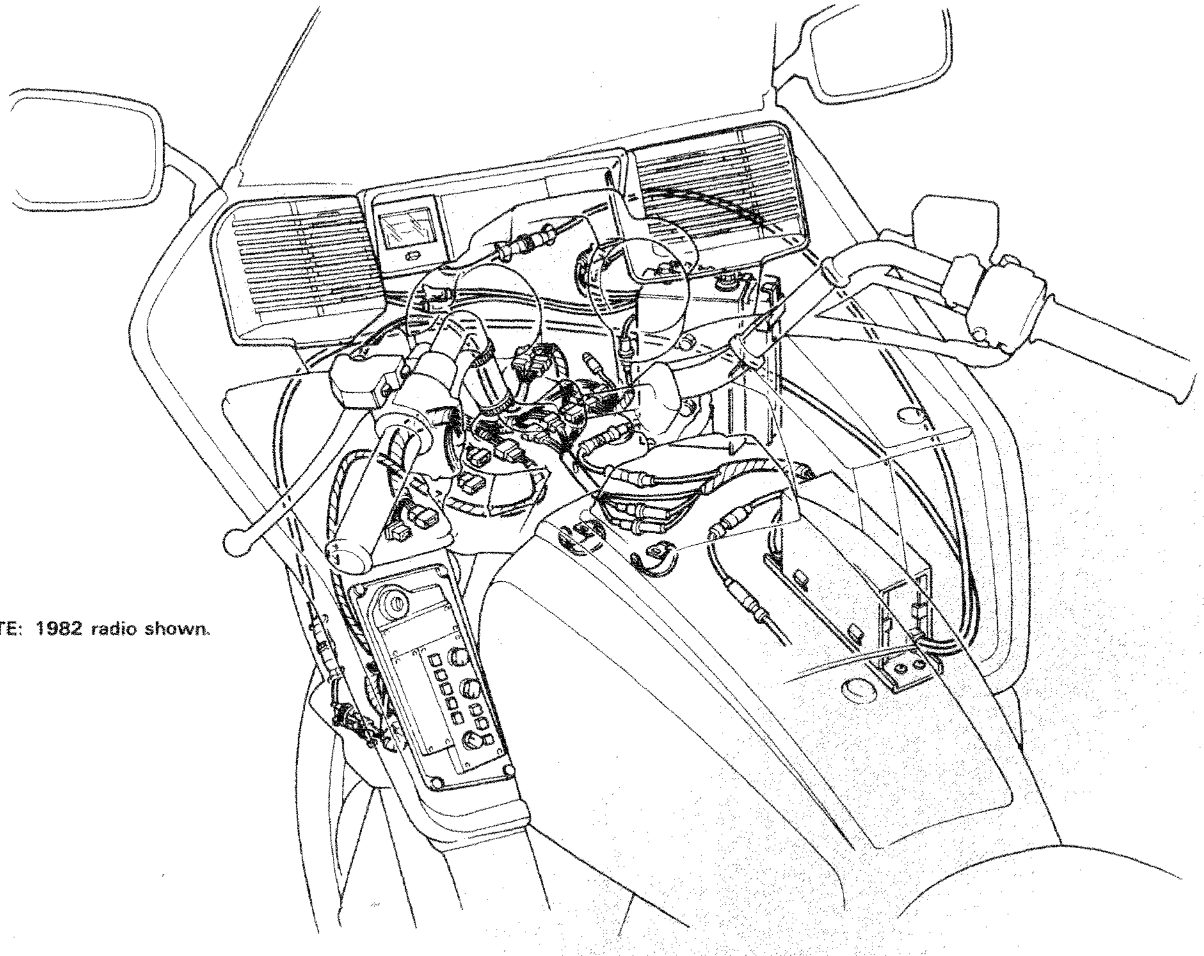
Remove the fairing lower left cover.

Remove the wire bands and disconnect the antenna cable.

Remove the top compartment, seat and antenna cable.

Remove the antenna from the antenna bracket.

Installation is the reverse order of removal.



NOTE: 1982 radio shown.