Kawasaki KE175

Service Repair Manual

1979 - 1983

Decimal Equivalents

INCH					MM INCH
1/64				.015625	
	1/32			.3125	1 mm= .03937 inch
3/64				.046875	
		1/16		.0625	
5/64				.078125	2 mm= .07874 inch
	3/32			.09375	
7/64				.109375	
			1/8	.125	3 mm= .11811 inch
9/64				.140625	
	5/32			.15625	4 mm= .15748 inch
11/64				.171875	
		3/16		.1875	5 mm= .19685 inch
13/64				.203125	
	7/32			.21875	6 mm= .23622 inch
15/64				.234375	
			1/4	.25	7 mm= .27559 inch
17/64				.265625	
	9/32			.28125	
19/64				.296875	8 mm= .31496 inch
		5/16		.3125	
21/64				.328125	9 mm= .35433 inch
	11/32			.34375	
23/64				.359375	
			3/8	.375	10 mm= .39370 inch
25/64				.390625	
	13/32			.40625	11 mm= .43307 inch
27/64				.421875	
		7/16		.4375	12 mm= .47244 inch
29/64				.453125	
	15/32			.46875	13 mm= .51181 inch
31/64				.484375	
			1/2	.5	

INCH					MM INCH
33/64				.515625	
	17/32			.53125	14 mm= .55118 inch
35/64				.546875	
		9/16		.5625	
37/64				.578125	15 mm= .59055 inch
	19/32			.59375	
39/64				.609375	
			5/8	.625	16 mm= .62992 inch
41/64				.640625	
	21/32			.65625	17 mm= .66929 inch
43/64				.671875	
		11/16		.6875	
45/64				.703125	18 mm= .70866 inch
	23/32			.71875	
47/64				.734375	19 mm= .74803 inch
			3/4	.75	
49/64				.765625	
	25/32			.78125	20 mm= .78740 inch
51/64				.796875	
		13/16		.8125	
53/64				.828125	21 mm= .82677 inch
	27/32			.84375	
55/64				.859375	22 mm= .86614 inch
			7/8	.875	
57/64				.890625	
	29/32			.90625	23 mm= .90551 inch
59/64				.921875	
		15/16		.9375	24 mm= .94488 inch
61/64				.953125	
	31/32			.96875	
63/64				.984375	25 mm= .98425 inch
			1	1.	

Unit Conversion Table

cc	x	.0610	=	cu in
cc	x	.02816	=	oz (imp)
cc	x	.03381	=	oz (US)
cu in	x	16.39	=	cc
ft-lbs	x	12	=	in lbs
ft-lbs	x	.1383	=	kg-m
gal (imp)	x	4.546	=	litres
gal (imp)	x	1.201	=	gal (US)
gal (US)	x	3.7853	=	liters
gal (US)	x	.8326	=	gal (Imp)
grams	x	.03527	=	oz
in	x	25.40	=	mm
in lbs	x	.0833	=	ft-lbs
in lbs	x	.0115	=	kg-m
kg	x	2.2046	=	lbs
kg	x	35.274	=	oz
kg-m	x	7.233	=	ft-lbs
kg-m	x	86.796	=	in-lbs
kg/cm²	x	14.22	=	lbs/in²
km	x	.6214	=	mile
lb	x	.4536	=	kg
lb/in²	x	.0703	=	kg/cm²
litre	x	28.16	=	oz (imp)
litre	x	33.81	=	oz (US)
litre	x	.8799	=	qt (imp)
litre	x	1.0567	=	qt (US)
metre	x	3.281	=	ft
mile	x	1.6093	=	km
mm	x	.03937	=	in
oz (imp)	x	35.51	=	cc
oz (US)	x	29.57	=	cc
oz (weight)	x	28.35	=	grams
qt (imp)	x	1.1365	=	litre
qt (imp)	x	1.201	=	qt (US)
qt (US)	x	.9463	=	litre
qt (US)	x	.8326	=	qt (imp)
kg/cm²	x	98.07	=	kPa
lbs/in²	x	6.896	=	kPa
kPa	x	.1450	=	lbs/in²

$$°C \rightarrow °F: \frac{9\,(°C + 40)}{5} - 40 = °F$$

$$°F \rightarrow °C: \frac{5\,(°F + 40)}{9} - 40 = °C$$

List of Abbreviations

ABDC	after bottom dead center
ATDC	after top dead center
BBDC	before bottom dead center
BDC	bottom dead center
BTDC	before top dead center
cc	cubic centimeters
cu in	cubic inches
ft	foot, feet
ft-lbs	foot-pounds
gal	gallon, gallons
hp	horsepower
in	inch, inches
in-lb	inch-pounds
kg	kilogram, kilograms
kg/cm²	kilograms per square centimeter
kg-m	kilogram meters
km	kilometer
kph	kilometers per hour
lb, lbs	pound, pounds
lbs/in²	pounds per square inch
ltr	liter, litre
m	meter, meters
mi	mile, miles
	millimeters
mph	miles per hour
oz	ounce, ounces
psi	pounds per square inch
qt	quart, quarts
rpm	revolutions per minute
sec	second, seconds
SS	standing start
TDC	top dead center
"	inch, inches
r/min	revolutions per minute
ℓ	liter, litre
kPa	kilo-Pascals

Kawasaki

KE175

Motorcycle
Service Manual

EMISSION CONTROL INFORMATION

DESCRIPTION OF EMISSION CONTROL SYSTEM

To protect the environment in which we all live, Kawasaki has incorporated into your motorcycle an emission control system in compliance with the applicable regulations of the United States Environmental Protection Agency.

This system reduces the amount of pollutants discharged into the atmosphere by the exhaust of your motorcycle. The fuel system and cylinder of your motorcycle have been carefully designed and constructed to ensure an efficient engine with low exhaust pollutant levels.

The Clean Air Act, which is the Federal law covering motor vehicle pollution, contains what is commonly referred to as the Act's "tampering provisions".

"Sec. 203(a) The following acts and the causing thereof are prohibited...

(3)(A) for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultimate purchaser, or for any manufacturer or dealer knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser.

(3)(B) for any person engaged in the business of repairing, servicing, selling, leasing, or trading motor vehicles or motor vehicle engines, or who operates a fleet of motor vehicles knowingly to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title following its sale and delivery to the ultimate purchaser..."

Note: The phrase "remove or render inoperative any device or element of design" has been generally interpreted as follows:

1. Tampering does not include the temporary removal or rendering inoperative of devices or elements of design in order to perform maintenance.
2. Tampering could include:
   a. Maladjustment of vehicle components such that the emission standards are exceeded.

EMISSION CONTROL INFORMATION (CONT.)

b. Use of replacement parts or accessories which adversely affect the performance or durability of the motorcycle.

c. Addition of components or accessories that result in the vehicle exceeding the standards.

d. Permanently removing, disconnecting, or rendering inoperative any component or element of design of the emission control systems.

WE RECOMMEND THAT ALL DEALERS OBSERVE THESE PROVISIONS OF FEDERAL LAW, THE VIOLATION OF WHICH IS PUNISHABLE BY CIVIL PENALTIES NOT EXCEEDING $10,000 PER VIOLATION.

This warning may apply to any of the following components or any assembly containing one or more of these components:–

Brake Shoes or Pads
Clutch Friction Material
Gaskets
Insulators

SAFETY INSTRUCTIONS

- Operate if possible out of doors or in a well ventilated place.
- Preferably use hand tools or low speed tools equipped, if necessary, with an appropriate dust extraction facility. If high speed tools are used, they should always be so equipped.
- If possible, dampen before cutting or drilling.
- Dampen dust and place it in properly closed receptacle and dispose of it safely.

Model Identification

KE175-D1

Specifications

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6 SPECIFICATIONS

SPECIFICATIONS (KE175-D1)

Dimensions		
Overall length		2,160 mm
Overall width		880 mm
Overall height		1,135 mm
Wheelbase		1,360 mm, Ⓒ 1,365 mm
Road clearance		245 mm, Ⓒ 215 mm
Dry weight		104 kg, Ⓒ 106 kg
Fuel tank capacity		9.6 ℓ
Oil tank capacity		1.3 ℓ
Performance		
Climbing ability		49°, Ⓐ and Ⓒ 40°
Braking distance		12.5 m from 50 kph
Minimum turning radius		1.95 m
Engine		
Type		2-stroke, single cylinder, piston reed valve "This engine licensed under one or more of Eyvind Boyesen's Patent Nos: 3,905,340, 3,905,341, Re. 30425, 4,062,331, 4,161,163, 4,202,298 and 4,202,299."
Bore and stroke		62.5 x 57 mm
Displacement		174 cc
Compression ratio		6.5
Maximum horsepower		17 HP @7,500 rpm, Ⓐ and Ⓒ 16 HP @7,500 rpm
Maximum torque		1.7 kg-m @7,000 rpm
Port timing		
Intake	Open	121° BTDC
	Close	121° ATDC
Scavenging	Open	54° BBDC
	Close	54° ABDC
Exhaust	Open	84° BBDC
	Close	84° ABDC
Carburetor type		Mikuni VM26SS
Lubrication system		Superlube (oil injection)
Engine oil		2-stroke oil for air cooled engines
Starting system		Primary kick
Ignition system		Electronic CDI
Ignition timing		23° (2.83 mm) BTDC @4,000 rpm
Spark plug		NGK B9ES, gap 0.7 ~ 0.8 mm
Transmission		
Type		5-speed, constant mesh, return shift
Clutch		Wet, multi disc
Gear ratios:	1st	2.67 (32/12)
	2nd	1.65 (28/17)
	3rd	1.22 (22/18)
	4th	0.95 (19/20)
	5th	0.80 (20/25)

Primary reduction ratio		3.13 (75/24)
Final reduction ratio		3.43 (48/14), Ⓐ and Ⓒ 3.00 (45/15)
Overall drive ratio		8.57 (Top gear), Ⓐ and Ⓒ 7.50 (Top gear)
Transmission oil	Capacity	0.7 ℓ
	Type	SE class SAE 10W30 or SAE 10W40

Electrical equipment

Flywheel magneto	Kokusan FP4380
Regulator/Rectifier	Kokusan RS2145
Ignition coil	Kokusan IG4189
CDI unit	Kokusan CU1182
Battery	Furukawa FB 6N6-1C (6V 6AH)
Headlight type	Semi sealed
Headlight	6V 35/35W
Tail/Brake light	6V 5.3/25W, Ⓒ 6V 5/21W
Speedometer light	6V 3W
Tachometer light	6V 3W
Neutral indicator light	6V 3W
High beam indicator light	6V 1.7W
Turn signal lights	6V 17W, Ⓔ 6V 21W
Turn signal indicator light	6V 1.7W
Horn	6V 1.5A, Ⓒ and Ⓑ 6V 3.0A

Frame

Type		Tubular, single down tube
Steering angle		47° to either side
Castor		29°
Trail		116 mm
Tire size	Front	2.75-21 4PR
	Rear	3.50-18 4PR
Suspension	Front	Telescopic fork
	Rear	Swing arm
Suspension stroke	Front	185 mm
	Rear	100 mm
Front fork oil capacity (each fork)		195 ~ 200 cc
Front fork oil		SAE 5W20

Brake

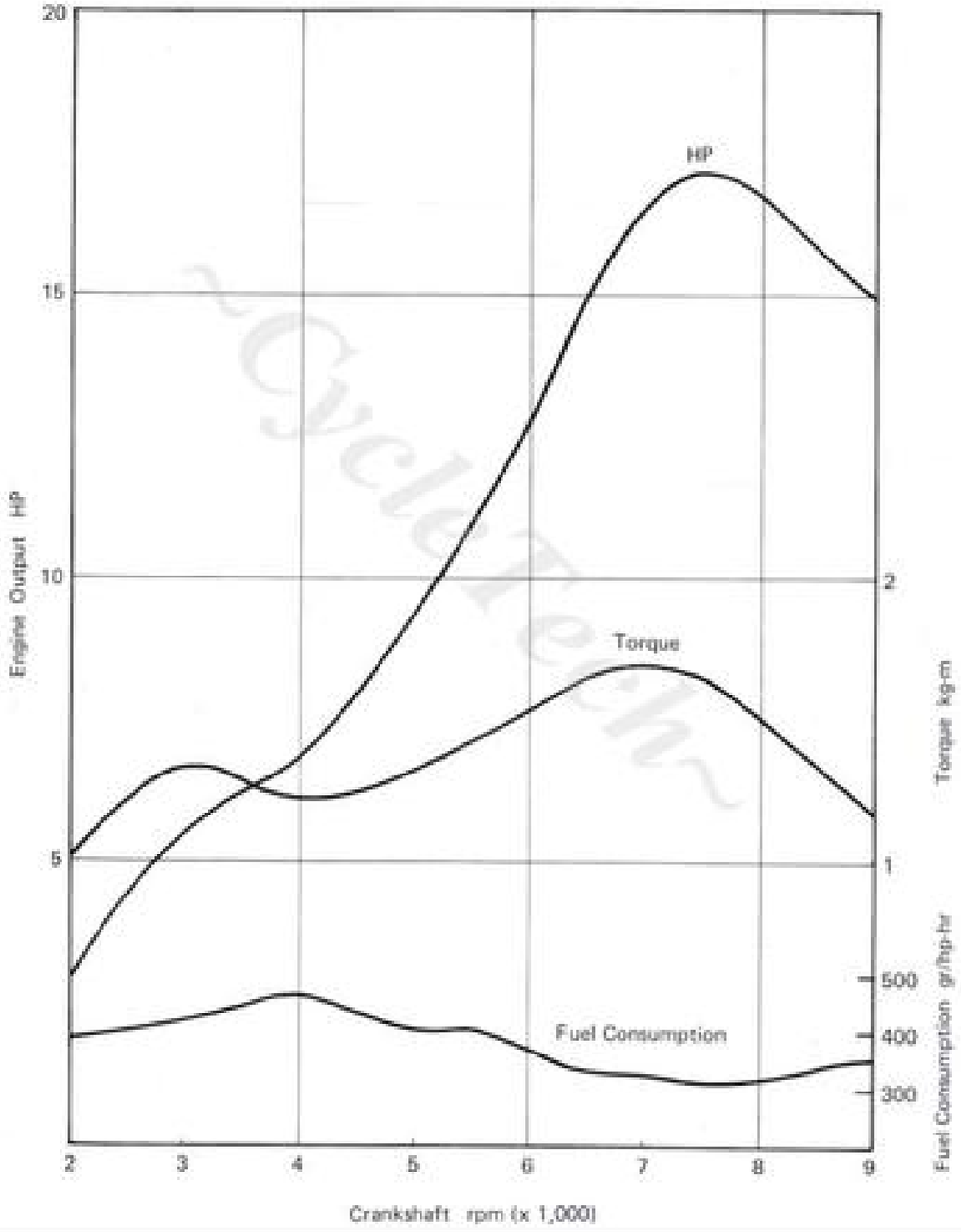
Type		Internal expansion, leading-trailing
Inside diameter and width	Front	120 x 28 mm
	Rear	120 x 35 mm

Ⓐ : Australian model Ⓑ : U.K. model Ⓒ : West German model

Specifications subject to change without notice, and may not apply to every country.

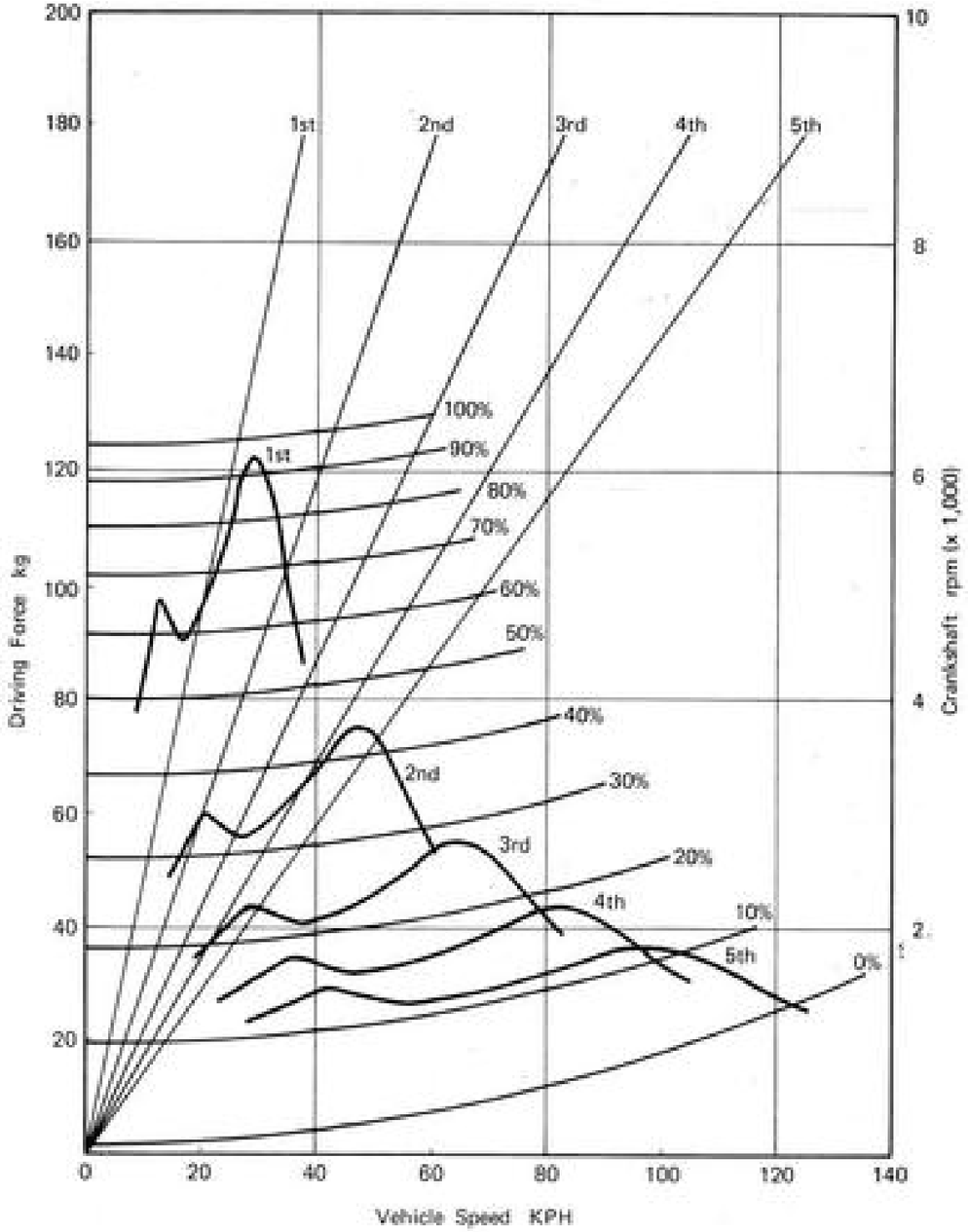
ENGINE PERFORMANCE CURVES

KE175-D1



RUNNING PERFORMANCE CURVES

KE175-D1



PERIODIC MAINTENANCE CHART

The maintenance and adjustment must be done in accordance with this chart to keep the motorcycle in good running condition. **The initial maintenance is vitally important and must not be neglected.**

OPERATION \ FREQUENCY	Whichever comes first ➡ Every	ODOMETER READING* 800 km	4,000 km	8,000 km	12,000 km	16,000 km	20,000 km	24,000 km	See Page
Battery electrolyte level — check †	month	•	•	•	•	•	•	•	128
Brake adjustment — check †		•	•	•	•	•	•	•	21
Brake wear — check †			•	•	•	•	•	•	122
Clutch — check †		•	•	•	•	•	•	•	15
Carburetor — adjust		•	•	•	•	•	•	•	12
Throttle control cable — adjust		•	•	•	•	•	•	•	13
Steering play — check †		•	•	•	•	•	•	•	23
Spoke tightness and rim runout — check †		•	•	•	•	•	•	•	118
Drive chain wear — check †			•	•	•	•	•	•	120
Front fork — inspect/clean		•	•	•	•	•	•	•	123
Rear shock absorbers — inspect		•	•	•	•	•	•	•	—
Nuts, Bolts, Fasteners — check and torque		•		•		•		•	29 ~ 31
Spark plug — clean and gap †		•	•	•	•	•	•	•	12
Air cleaner element — clean			•		•		•		100
Air cleaner element — replace	5 cleanings			•		•		•	100
Fuel system — clean		•	•	•	•	•	•	•	17
Tire tread wear — check †			•	•	•	•	•	•	118
Transmission oil — change	year	•		•		•		•	16
General lubrication — perform			•	•	•	•	•	•	25
Front fork oil — change				•		•		•	123
Swing arm — lubricate				•		•		•	125
Wheel bearings — grease	2 years					•			119
Speedometer gear pinion — grease	2 years					•			119
Brake camshaft — grease	2 years					•			123
Steering stem bearings — grease	2 years					•			123
Drive chain — lubricate	Every 300 km								120
Drive chain — adjust	Every 800 km								20

*For higher odometer readings, repeat at the frequency interval established here.
† Replace, add or adjust if necessary.

Adjustment–Engine

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B

SPARK PLUG

Neglecting the spark plug eventually leads to difficult starting and poor performance. If the spark plug is used for a long period, the electrodes gradually burn away and carbon builds up inside. See the Periodic Maintenance Chart (Pg. 10) for spark plug inspection, cleaning, and resetting of the electrode gap.

- Remove the spark plug using a spark plug wrench.
- Clean the spark plug preferably in a sand-blasting device, and then clean off any abrasive particles. The plug may also be cleaned using a high flash-point solvent and a wire brush or other suitable tool. If the spark plug electrodes are corroded or damaged, or if the insulator is cracked, replace the plug. Use the standard spark plug or its equivalent.
- Measure the gap with a wire-type thickness gauge. If the gap is incorrect, carefully bend the outer electrode, with a suitable tool to obtain the correct gap.

Spark Plug Gap (B1)

Table B1 Spark Plug

Plug	NGK BR8S
Gap	0.7 ~ 0.8 mm
Tightening Torque	2.8 kg-m (20 ft-lbs)

- Tighten the spark plug in the cylinder head to the specified torque.

NOTE: Refer to the electrical maintenance section, Pg. 136, for detailed spark plug information.

CARBURETOR

For internal carburetor maintenance and adjustment of parts, see the maintenance section (Pg. 100) of this manual. The following procedure covers the idling adjustment, which should be inspected during periodic maintenance or whenever the idling setting has been disturbed.

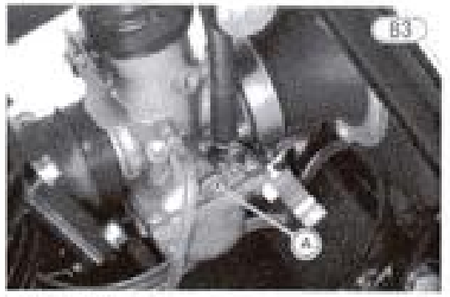
When the idle speed is too low, the engine may stall. When the idle speed is too high, fuel consumption will be excessive, and the resulting lack of engine braking may make the motorcycle difficult to control.

Idling Adjustment

- Turn in the air screw until it seats fully but not tightly, and then back it out 1½ turns. This sets the low speed mixture.

A. Air Screw

- Start the engine, and warm it up thoroughly.
- Adjust idle speed to 1,200 ~ 1,400 rpm by turning the idle adjusting screw. Turning the idle adjusting screw clockwise raises engine speed, while turning it counterclockwise lowers it.



A. Idle Adjusting Screw

NOTE: If the idle speed cannot be lowered by turning the idle adjusting screw, there may be no play in the carburetor cable. Loosen the locknut on the carburetor cap, and turn the cable adjuster into the cap as necessary (Fig. B7). Tighten the locknut. In this case, be sure to adjust the throttle control cable later.

•Open and close the throttle a few times to make sure that the idle speed does not change. Readjust if necessary.

NOTE: With the engine idling, turn the handlebar to either side. If handlebar movement changes idle speed, the throttle cables may be improperly adjusted or incorrectly routed, or they may be damaged.

WARNING **Operation with improperly adjusted, incorrectly routed, or damaged cables could result in an unsafe riding condition.**

•Adjust the throttle control cable (Pg. 13).

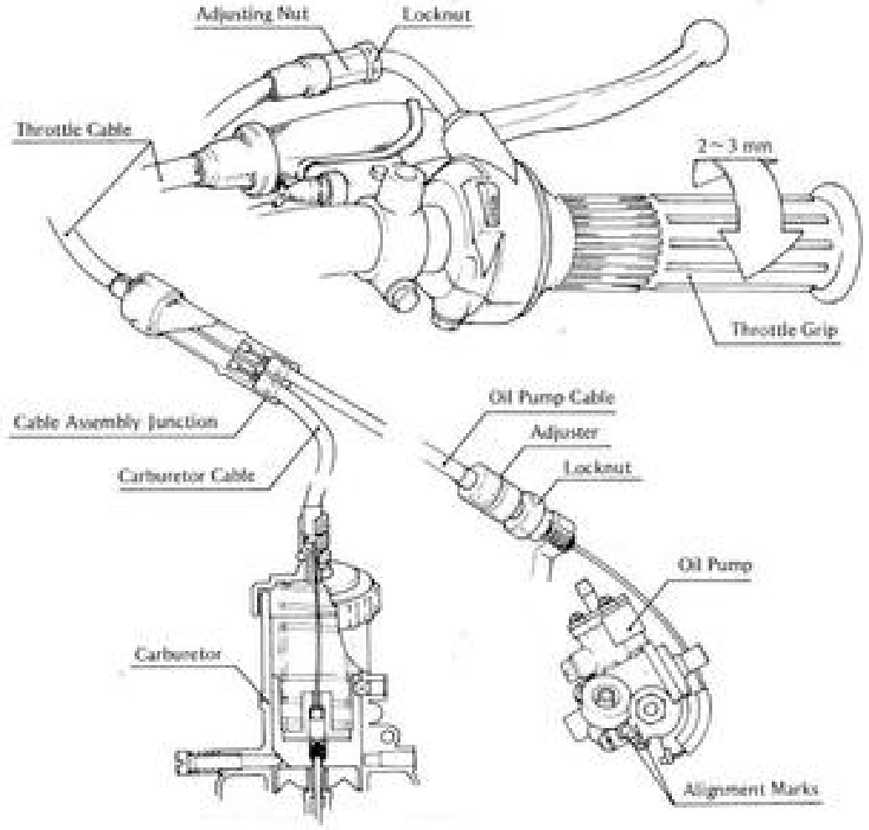
NOTE: If proper idle speed cannot be obtained by this adjustment alone, first check the following and correct as necessary.

- Transmission Oil (Pg. 16)
- Spark Plug (Pg. 12)
- Ignition Timing (Pg. 133)
- Throttle Control Cables (Pg. 13)
- Cylinder Compression (Pg. 104)
- Air Cleaner Element (Pg. 100)
- Air Cleaner Duct and Carburetor Holder Leakage
- Reed Valve (Pg.113)

THROTTLE CONTROL CABLE

The throttle control cable is actually an assembly of three cables: the throttle cable, the carburetor cable, and the oil pump cable. The throttle cable runs from the throttle grip to the cable assembly junction where it connects to both the carburetor cable which leads to the carburetor, and the oil pump cable which leads to the oil pump.

Throttle Control Cable (84)



The throttle cable, connecting to the carburetor cable and the oil pump cable, controls both the carburetor throttle valve and the oil pump lever simultaneously. If there is too much play in the cable, neither the carburetor nor the oil pump will respond immediately when the grip is turned. Most of this excess play must be adjusted out. However, a small amount has to be left so that the steering movement will have no effect on the throttle valve or oil pump lever.

It is important that oil pump lever opening synchronize with the carburetor throttle valve opening so that the oil and fuel/air mixture reach the engine in the correct proportion at all throttle openings. If the oil pump synchronization is out of adjustment, the oil supply to the engine will become too low or too high, resulting in piston seizure from underlubrication or poor performance and spark plug trouble from overlubrication.

Cable stretch will cause delayed engine response and upset the oil pump synchronization, necessitating periodic adjustment. To compensate for cable stretch, adjust the throttle cable and the oil pump cable in accordance with Periodic Maintenance Chart (Pg. 10).

Throttle Cable

To check the throttle cable:

- Warm up the engine, and check the engine idling.
- Check to see that the outer cable end of the carburetor cable is fully seated in each cable adjuster or adjusting nut. Also check that the safety clip at the lower end of the carburetor cable is in place. These checks are necessary to perform following procedures properly.
- Check the throttle cable play. When lightly turning the throttle grip back and forth, the grip should have 2 ~ 3 mm of play.

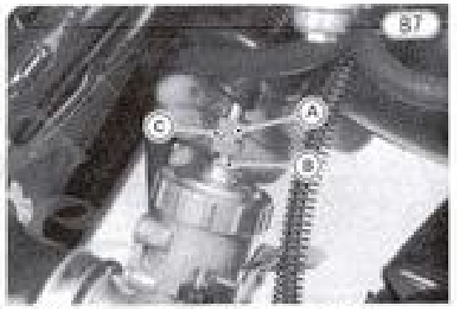
- If the throttle cable has improper play, adjust it as follows.

To adjust the throttle cable:

- Loosen the locknut for the throttle cable adjusting nut, and turn the adjusting nut until the proper amount of throttle grip play is obtained. Tighten the locknut.

A. Locknut B. Adjusting Nut

NOTE: If the throttle grip play cannot be adjusted with the adjusting nut at the upper end of the throttle cable, use the carburetor cable adjusting at the carburetor. After completion of the adjustment, tighten the locknut. In this case, be sure to adjust synchronization between the carburetor and the oil pump. See the next paragraph, "Oil Pump Cable".



A. Adjuster B. Locknut C. Clip

- Turn the handlebar from side to side while idling the engine. If idle speed varies, the throttle control cable assembly may be poorly routed or it may be damaged.

WARNING **Operation with improperly adjusted, incorrectly routed, or damaged cables could result in an unsafe riding condition.**

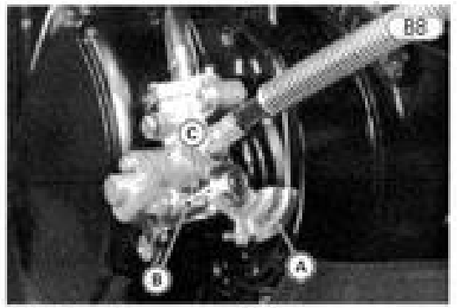
- Check the carburetor and oil pump synchronization.
- Slide back the dust cover at the carburetor top if it is out of place.

Oil Pump Cable

To check the oil pump cable:

- Warm up the engine, and check the engine idling.
- Remove the oil pump cover, and check to see that the outer cable end of the oil pump cable is fully seated in the cable adjuster. Make sure the tab on the oil pump lever is bent to hold the oil pump cable securely. These checks are necessary to perform following procedures properly.

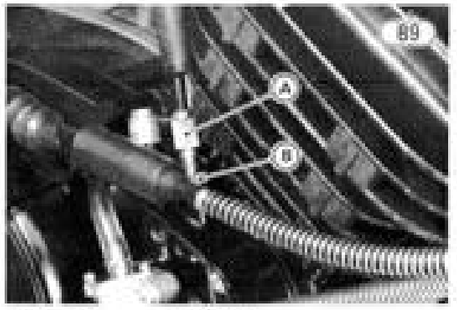
•Check the synchronization between the carburetor and the oil pump while idling the engine. Listening to exhaust noise, gradually open the throttle grip, and stop turning the grip at the point where the engine speed just begins to increase from the idle speed.
•Without changing the position of the throttle grip, check whether or not the mark on the oil pump lever lines up with the mark on the lever stop.



A. Oil Pump Lever
B. Lever Stop
C. Marks

•If the oil pump does not synchronize with the carburetor, adjust it as follows:

To adjust the oil pump cable:
•Start the engine.
•Slide the dust cover out of place.
•Loosen the locknut at the oil pump cable adjuster, and turn the adjuster so that the marks on the pump lever and the lever stop line up when the idle speed is at the point of increasing.



A. Adjuster
B. Locknut

•Tighten the locknut.
•Check that the throttle grip has the proper amount of play.
•Install the oil pump cover.
•Slide back the dust cover.

CLUTCH

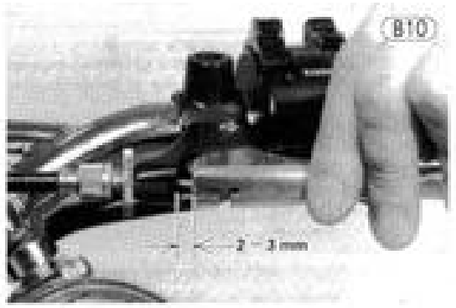
Clutch cable stretch causes the clutch lever to develop excessive play. Too much play will prevent the lever from fully disengaging the clutch and will result in shifting difficulty and possible clutch or transmission damage. Most of the play must be adjusted out, but a small amount has to be left to ensure that the clutch will engage fully without slipping.

Clutch plate wear causes the play between the spring plate pusher and the clutch release rack to gradually diminish until the pusher touches the rack. When this play is lost, the clutch will not engage fully, causing it to slip.

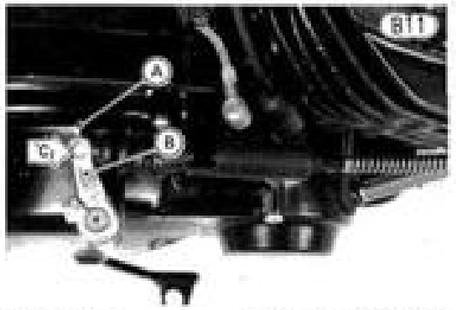
The adjustment procedure which follows compensates for both cable stretch and plate wear.

NOTE: Even though the proper amount of play exists at the clutch lever, clutch lever play alone cannot be used to determine whether or not the clutch requires adjustment.

To check the clutch:
•To determine whether or not the clutch requires adjustment, first check that the clutch lever has 2 ~ 3 mm of play as shown in the figure.



•While pushing the clutch release lever end forward, check that the center of the clutch lever end is aligned with the projection on the right engine cover.



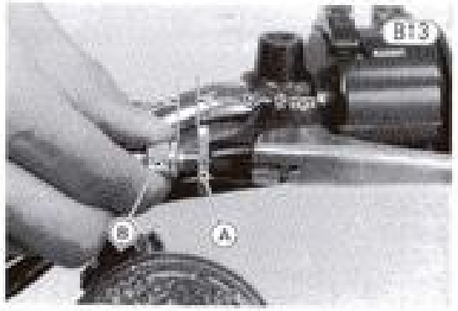
A. Projection
B. Clutch Release Lever
C. Push the lever forward.

•If any one of the above checks reveals improper adjustment, adjust the clutch as follows:

To adjust the clutch:
•Slide the dust cover at the clutch cable lower end out of place.
•Loosen the locknut, and turn in the adjuster at the lower end of the clutch cable to give the cable plenty of play.

A. Locknut **B. Adjuster**

•If the clutch release lever is located at the improper position, remount the release lever at a new position on the shaft to obtain the proper angle.
•Slide the clutch lever dust cover out of place.
•Loosen the knurled locknut at the clutch lever just enough so that the adjuster will turn freely, and then turn the adjuster to make a 5 ~ 6 mm gap between the adjuster and locknut.



A. Locknut **B. Adjuster**

•Take up all the cable play with the adjuster at the lower end of the cable, and then tighten the locknut.

WARNING **Be sure the outer cable ends are fully seated in the adjusters at the clutch lever and the right engine cover, or it could slip into place later, creating enough cable play to prevent clutch disengagement.**

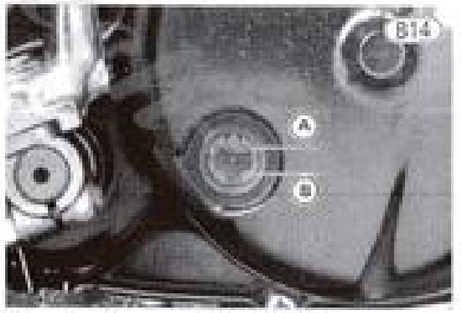
•Turn the adjuster at the clutch lever so that the clutch lever will have 2 ~ 3 mm of play, and tighten the knurled locknut.
•Slide back the dust covers.

TRANSMISSION OIL

In order for the transmission and clutch to function properly, always maintain the transmission oil at the proper level and change the oil in accordance with the Periodic Maintenance Chart (Pg. 10). Motorcycle operation with insufficient, deteriorated, or contaminated transmission oil will cause accelerated wear and may result in transmission seizure.

Oil Level

•If the motorcycle has just been used, wait several minutes for all the oil to drain down.
•If the oil has been poured in since the motorcycle was last used, kick the engine over 3 or 4 times with the ignition switch left in the "OFF" position. This ensures that the oil will "settle".
•Situate the motorcycle so that it is perpendicular to the ground.
•Check the engine oil level through the oil level gauge in the right engine cover. With the motorcycle held level, the oil level should come up between the upper and lower levels.



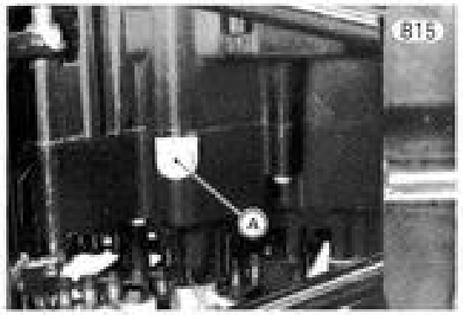
A. Upper Level **B. Lower Level**

•If the oil level is too high, remove the excess oil, using a syringe or some other suitable device.
•If the amount of oil is insufficient, add the same type and make of oil that already is in the engine through the oil filler opening.

Oil Change

•Warm up the engine thoroughly, and then stop the engine.

•Place an oil pan beneath the engine, and unscrew the engine drain plug.



A. Engine Drain Plug

•After the oil has completely drained, install the drain plug and gasket, using a new gasket if the old one is damaged. Proper torque for the drain plug is 2.0 kg-m (14.5 ft-lbs).
•Fill the engine up to the upper oil level with SE class SAE 10W30 or 10W40 motor oil. It will take about 0.7 liter.

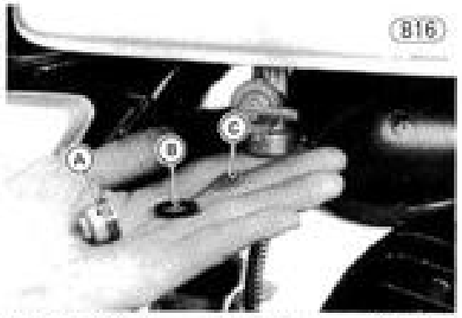
FUEL SYSTEM

Water or dirt anywhere in the fuel system can cause starting difficulty, poor running, and lack of power. Clean out the fuel system as follows:

WARNING

1. Clean the fuel tap in a well-ventilated area, and take ample care that there are no sparks or flame near the working area.
2. Never clean out the fuel tank or tap when the engine is still warm.
3. Wipe any fuel off the engine before starting it.

•Turn the fuel tap to the "OFF" position. Unscrew the sediment cup at the bottom of the tap, remove the gasket and filter, and clean any water and dirt out of them.



A. Sediment Cup B. Gasket C. Filter

•If there was water inside the sediment cup, there may also be some in the fuel tank. Holding a container under the fuel tap, turn the tap to the "RES" position to drain the tank until only gasoline comes out, and then close the tap.
•Install the gasket, filter, and sediment cup. Make sure that the gasket is in the tap and that the filter is not damaged during installation.
•Remove the drain plug from the bottom of the carburetor float bowl to drain the bowl.

A. Drain Plug

•Install the O ring and drain plug on the float bowl. Use a new O ring if the old one is damaged.

Adjustment—Chassis

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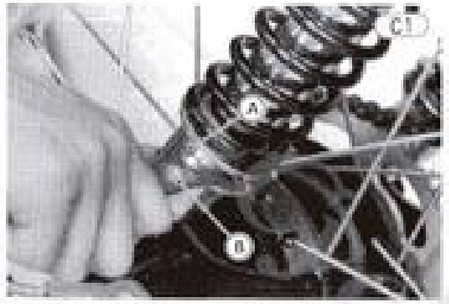
REAR SHOCK ABSORBERS

The rear shock absorbers can be adjusted to one of five positions to suit riding conditions. They can be left soft for average riding but should be adjusted harder for high speed riding, or riding with a passenger. Shock absorbers adjusted either too soft or too hard adversely affect riding comfort and stability.

To adjust the rear shock absorbers:

•Turn the adjusting sleeve on each shock absorber to the desired position with a hook wrench. The higher the adjusting sleeve is positioned, the stronger the spring tension, and the harder the ride.



A. Adjusting Sleeve **B. Hook Wrench**

•Check to see that both adjusting sleeves are turned to the same relative position.

WARNING **If the shock absorber sleeves are not adjusted to the same position, an unsafe riding condition may result.**

DRIVE CHAIN

Chain and sprocket wear causes the chain to stretch, which results in power loss, accelerated chain and sprocket wear, and increased noise. A chain that has been adjusted too loose may be thrown off the sprockets. A chain that has been adjusted too tight will wear excessively and possibly break.

To check the drive chain slack:

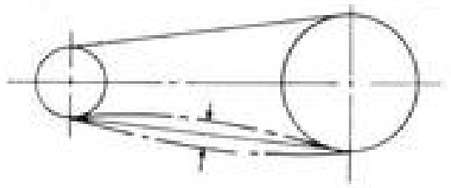
•Check to see if the drive chain wear is past the service limit (Pg. 120). A chain worn past the service limit must be replaced with a new one.

WARNING **A chain worn past the service limit must be replaced. Such wear cannot be adequately compensated for by adjustment.**

•Stand the motorcycle with its side stand.

•Rotate the rear wheel to find the position where the chain is tightest, and measure the vertical movement midway between the sprockets.

Chain Slack C2



•If there is less than 35 mm, or more than 45 mm slack, adjust the chain so that the vertical movement will be within the standard range.

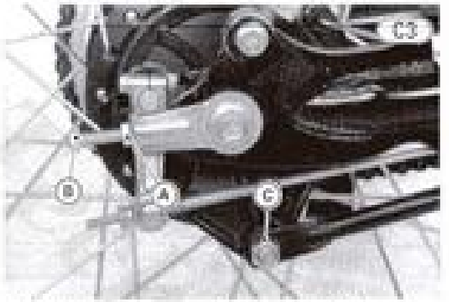
Table C1 Drive Chain Slack

Standard
35 ~ 40 mm

To adjust the drive chain:

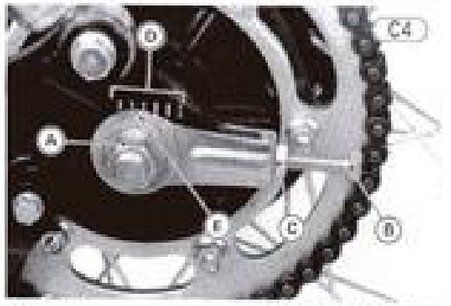
•Loosen the nut at the rear end of the torque link.

CAUTION **If you don't loosen the torque link nut, it may lead to brake panel fracture when the chain adjusters are set.**



A. Locknut **C. Torque Link Nut**
B. Adjusting Bolt

•Loosen the axle nut.



A. Axle Nut **D. Alignment Marks**
B. Adjusting Bolt **E. Notch Mark**
C. Adjusting Bolt Locknut

•Loosen the left and right chain adjusting bolt locknuts.
•If the chain is too tight, back out the left and right chain adjusting bolts evenly, and kick the wheel forward until the chain is too loose.
•Turn in the right and left chain adjusting bolts evenly until the chain has the correct amount of slack. To keep the chain and the wheel aligned, the notch mark on the left chain adjuster must align with the same swing arm mark as that with which the right chain adjuster mark aligns.

NOTE: Wheel alignment can also be checked using the straightedge or string method.

WARNING **Misalignment of the wheel will result in abnormal wear, and may result in an unsafe riding condition.**

•Tighten both chain adjusting bolt locknuts. (Make sure the axle stays aligned.)
•Center the brake panel assembly in the brake drum. This is done by tightening the axle lightly, spinning the wheel, and depressing the brake pedal forcefully. The partially tightened axle allows the brake panel assembly to center itself within the brake drum.

NOTE: This procedure can prevent a soft, or "spongy feeling" brake.

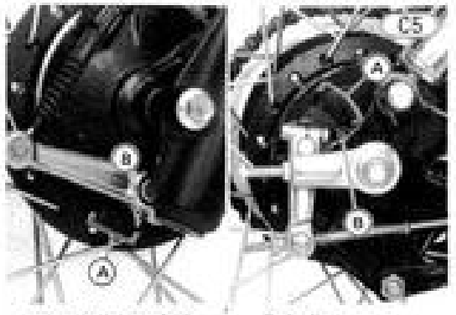
•Tighten the axle nut to 9.0 kg-m (65 ft-lbs) of torque.
•Rotate the wheel, measure the amount of slack, and readjust if necessary.
•Tighten the torque link rear nut to 3.0 kg-m (22 ft-lbs) of torque.
•Check the rear brake and rear brake light switch, and adjust them if necessary (Pgs. 21 ~ 23).

BRAKES

Brake lining and drum wear, and cable stretch cause the brakes to go out of adjustment, increasing lever and pedal play and decreasing braking effectiveness. Brake adjustment to compensate for this actually consists of correcting the cam lever angle, and adjusting the front brake lever and rear brake pedal travel.

If brake drag is detected during brake adjustment, disassemble the brake (Pg. 73 or 77), and inspect for wear or damage (Pg. 122). Also, if the brake lever or pedal does not return to its rest position quickly upon release, inspect the brake for wear or damage. If the brake has a soft, or "spongy feeling", make sure the brake panel is properly centered.

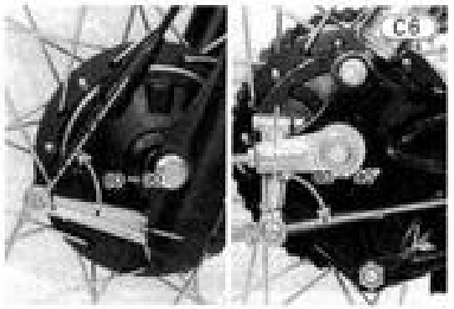
On the outside of each the front and rear brake panels there is a brake lining wear indicator. Whenever the indicator has gone past USABLE RANGE, the brake shoes must be immediately replaced and the other brake parts examined. Adjustment alone cannot compensate for the wear of a brake worn past USABLE RANGE.



A. "USABLE RANGE" B. Indicator

Front and Rear Brake Cam Lever Angle

•When the brake is fully applied, the brake cam lever should come to an 80 ~ 90° angle with the brake cable or rod. If it does not, remove the cam lever, and then remount it at a new position on the cam shaft for the proper angle.

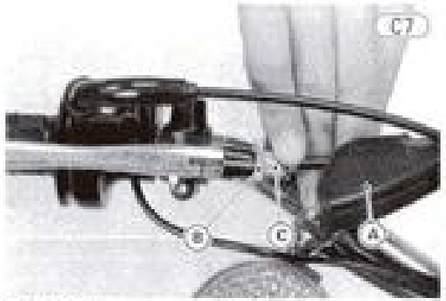


WARNING **Since a cam lever angle greater than 90° reduces braking effectiveness, this adjustment should not be neglected. When remounting the cam, be sure that the position of the indicator on the serrated shaft is not altered. See Pgs. 75 and 78 for detailed information on the position of the wear indicator when the cam lever is not on the shaft. A change in cam lever angle is caused by wear of internal brake parts. Whenever the cam lever angle is adjusted, also check for drag and proper pedal or lever operation, taking particular note of the brake lining wear indicator position. In case of doubt as to braking effectiveness, disassemble and inspect all internal brake parts. Worn parts could cause the brake to lock or fail.**

•Rotate the wheel to check for brake drag.
•Operate the brake lever or pedal a few times to see that it returns to its rest position immediately upon release.
•Adjust the front brake lever and rear brake pedal travel.

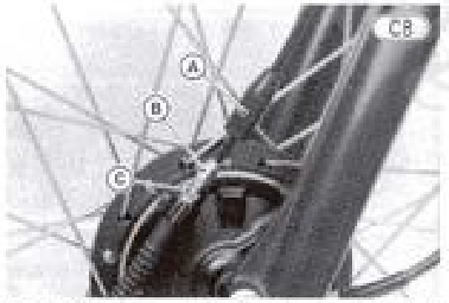
Front Brake Lever

•Slide the front brake lever dust cover out of place.



A. Dust Cover
B. Knurled Locknut
C. Adjuster

•Loosen the knurled locknut at the front brake lever, turn the adjuster fully in, and tighten the locknut.
•Slide up the dust cover, and loosen the locknut at the lower end of the brake cable.



A. Dust Cover
B. Adjuster
C. Locknut

•Turn the adjuster on the lower end of the front brake cable so that the brake lever will have 4~5 mm of play as shown in the figure, and tighten the locknut.

•If sufficient adjustment cannot be made with the adjuster at the lower end of the brake cable, complete the adjustment with the adjuster at the brake lever, and then tighten both locknuts.
•Check for brake drag.
•Operate the lever a few times to see that it returns to its rest position immediately upon release.
•Slide back the dust covers.
•For minor corrections, use the adjuster at the front brake lever.

Rear Brake Pedal Position

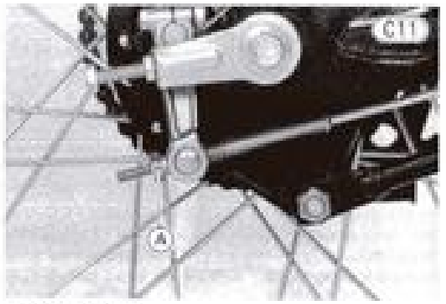
•When the brake pedal is in its rest position, it should be 20~30 mm lower than the top of the footpeg. If it is too high, turn out the adjusting nut at the end of the brake rod to give the brake pedal plenty of play.

A. Locknut
B. Adjusting Bolt

•Loosen the brake pedal adjusting bolt locknut, turn the adjusting bolt to obtain the correct pedal position, and tighten the locknut.
•Check the brake pedal travel (Pg. 22).
•Check the rear brake light switch operation (Pg. 23).

Rear Brake Pedal Travel

•Turn the adjusting nut on the end of the brake rod so that the brake pedal has 20~30 mm of travel from the rest position to the fully applied position when the brake pedal is pushed down lightly by hand.



A. Adjusting Nut

•Rotate the rear wheel to check for brake drag.
•Operate the pedal a few times to see that it returns to its rest position immediately upon release.
•Check the rear brake light switch operation.

A. Adjusting Nut
B. Lights sooner
C. Lights later

CAUTION **To avoid damaging the electrical connections inside the switch, do not turn the switch body during adjustment.**

BRAKE LIGHT SWITCH

The front brake light switch mounted on the front brake lever holder, is operated by simple electrical contact and should not need adjustment. However, the rear brake light switch, activated by a spring attached to the brake pedal, requires periodic adjustment to compensate for any change in spring tension or brake adjustment.

To check the brake light switch:
•With the ignition switch on, depress the brake pedal and note the brake pedal travel until the brake light goes on. The brake light should go on after 15 mm of pedal travel.

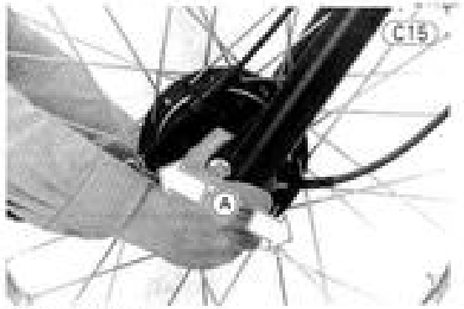
To adjust the brake light switch:
•Turn the adjusting nut on the brake light switch body so that the brake light will go on after the proper amount of brake pedal travel. Raising the switch will make the light go on after less travel; lowering it will require more travel.

STEERING

For safety, the steering should always be kept adjusted so that the handlebar will turn freely but have no play.

If the steering is too tight, it will be difficult to turn the handlebar quickly, the motorcycle may pull to one side, and the steering stem bearings may become damaged. If the steering is too loose, the handlebar will vibrate and the motorcycle will be unstable and difficult to steer in a straight line.

To check the steering adjustment:
•Raise the front wheel off the ground.
•Push the handlebar lightly to either side; if it continues moving under its own momentum, the steering is not too tight.
•Squatting in front of the motorcycle, grasp the lower ends of the front fork at the axle, and push and pull the fork end back and forth; if play is felt, the steering is too loose.

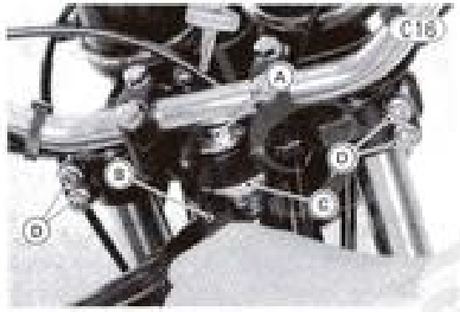


A. Push and pull.

To adjust the steering:

- Remove the fuel tank (Pg. 35) to avoid damaging the painted surface.
- Loosen the front fork upper clamp nuts (4) to free the fork tubes from the steering stem head during adjustment.
- Loosen the steering stem head bolt and back out the steering stem locknut using the stem nut wrench (special tool) 1 or 2 turns until it turns without drag.

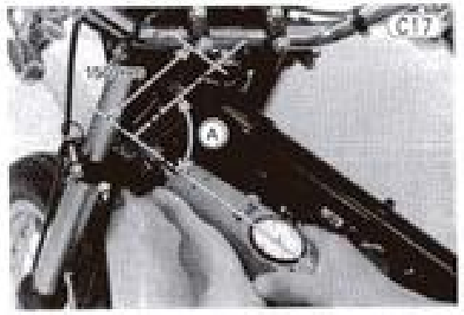
NOTE: Do not back out the steering stem locknut more than a couple of turns. If the locknut is backed off too far, the bearing balls in the steering stem may fall out of place. This will necessitate steering stem removal and installation.



A. Stem Head Bolt
B. Stem Nut Wrench (57001-320)
C. Stem Locknut
D. Upper Clamp Nuts

- Tighten the stem locknut to 2.0 kg-m (14.5 in-lbs) of torque.

NOTE: To tighten the locknut to the specified torque, firstly make a notch on the stem nut wrench at the distance of 150 mm from the locknut center, secondary hook the wrench on the locknut, and then push the wrench at the notch by 8.7 kg force.



A. Right Angle

- Tighten the steering stem head bolt to 4.0 kg-m (29 ft-lbs) of torque.
- Tighten the front fork upper clamp nuts (4) to 1.4 kg-m (10.0 ft-lbs) of torque.
- Check the steering again. If the steering is too tight or too loose in spite of correct adjustment, inspect the steering stem parts according to the maintenance section (Pg. 123).
- Remount the fuel tank (Pg. 35).

HEADLIGHT

The headlight beam is adjustable vertically. If adjusted too low vertically, neither low nor high beam will illuminate the road far enough ahead. If adjusted too high vertically, high beam will fail to illuminate the road close ahead, and low beam will blind oncoming drivers.

Vertical Adjustment:

- Remove the headlight unit (Pg. 85).
- Loosen the headlight housing mounting nuts, and adjust the headlight vertically.

A. Mounting Nut

NOTE: On high beam, the brightest point should be slightly below horizontal. Adjust the headlight to the proper angle according to local regulations.

Vertical Adjustment (C19)

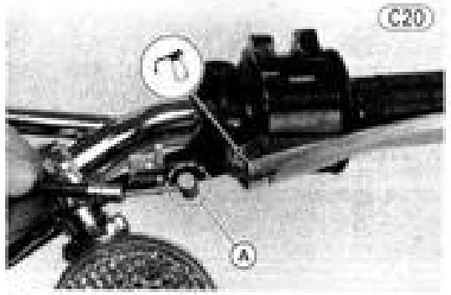
•Tighten the headlight mounting nuts, and remount the headlight unit.

LUBRICATION

Lubricate exposed parts which are subject to rust, with either motor oil or regular grease whenever the vehicle has been operated under wet or rainy conditions, and especially after using a high-pressure spray washer. Before lubricating each part, clean off any rusty spots with rust remover and wipe off any grease, oil, dirt, or grime.

Clutch and Brake Levers

(C20)

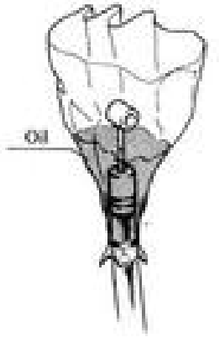


A. Grease.

Clutch, Throttle Control, and Brake Cables

Lubricate the clutch cable, throttle control cable, and brake cable as shown in the figure.

Cable Lubrication (C21)



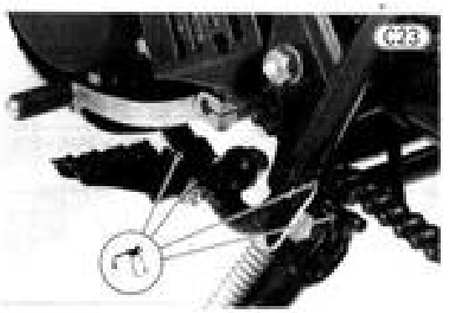
Throttle Grip

Apply a light coat of grease to the exposed portion of the throttle grip inner cable and the catch in the throttle grip.

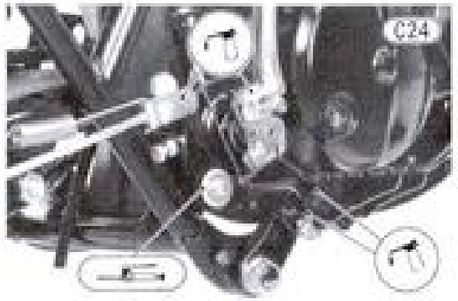
(C22)

Left Footpeg, Side Stand

(C23)

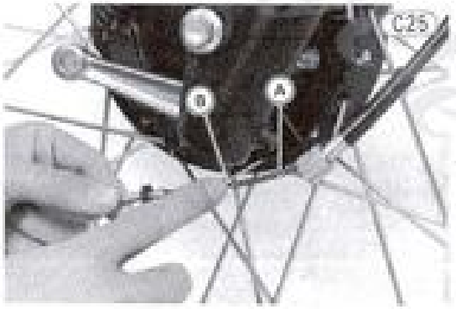


Kickstarter Pedal, Right Footpeg, Brake Pedal, Clevis Pin



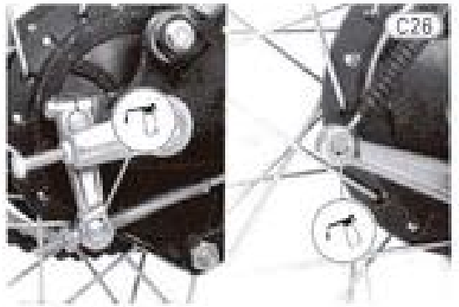
Speedometer and Tachometer Cables

Apply grease sparingly to inner cables.



A. Speedometer Cable B. Grease.

Brake Cable and Rod Joints



Others

Lubricate the drive chain, wheel bearings, speedometer gear, swing arm, and steering stem bearings as explained in the Maintenance Section.

NOTE: A few drops of oil are effective to keep bolts and nuts from rusting and sticking. This makes removal easier. Badly rusted nuts, bolt, etc. should be replaced with new ones.

Disassembly–Introduction

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INTRODUCTION TO DISASSEMBLY

Detail has not been spared in this section in order that the motorcycle can not only be taken apart but also put back together properly as well. Photographs, diagrams, notes, cautions, warnings, and detailed descriptions have been included wherever necessary. Nevertheless, even a detailed account has limitations; a certain amount of basic knowledge is also required for successful work.

Especially note the following:

(1) Edges
Watch for sharp edges, especially during major engine disassembly and assembly. Protect your hands with gloves or a piece of thick cloth when lifting the engine or turning it over.

(2) Dirt
Before removal and disassembly, clean the motorcycle. Any dirt entering the engine, carburetor or other parts will work as an abrasive and shorten the life of the motorcycle. For the same reason, before installing a new part, clean off any dust or metal fillings.

(3) Tightening Sequence
Where there is a tightening sequence indication in this Service Manual; the bolts, nuts, or screws must be tightened in the order and method indicated. When installing a part with several bolts, nuts, or screws; they should all be started in their holes and tightened to a snug fit. Then tighten them evenly, according to the tightening sequence, to the specified torque. This is to avoid distortion of the part and/or causing gas or oil leakage. Conversely when loosening the bolts, nuts, or screws; loosen all of them about a quarter of turn and then remove them.

(4) Torque
The torque values given in this Service Manual should always be adhered to. Either too little or too much torque may lead to serious damage. Use a good quality, reliable torque wrench.

(5) Force
Common sense should dictate how much force is necessary in assembly and disassembly. If a part seems especially difficult to remove or install, stop and examine what may be causing the problem. Whenever tapping is necessary, tap lightly using a wooden or plastic-faced mallet. Use an impact driver for screws (particularly for the removal of screws held by a locking agent) in order to avoid damaging the screw heads.

(6) Lubricant
Don't use just any oil or grease. Some oils and greases in particular should be used only in certain applications and may be harmful if used in an application for which they are not intended.

(7) Engine Rotation
When turning the crankshaft by hand, always turn it in the direction of normal rotation; which is counterclockwise, viewed from the left side of the engine. This will ensure proper adjustments.

(8) Lubrication
Engine wear is generally at its maximum while the engine is warming up and before all the rubbing surfaces have an adequate lubricative film. During assembly, oil or grease (whichever is more suitable) should be applied to any rubbing surface which has lost its lubricative film. Old grease and dirty oil should be cleaned off. Deteriorated grease has lost its lubricative quality and may contain abrasive foreign particles.

(9) Press
A part installed using a press or driver, such as a wheel bearing, should first be coated with oil on its outer or inner circumference so that it will go into place smoothly.

(10) Oil Seal, Grease Seal
Replace any oil or grease seals that were removed with new ones, as removal generally damages seals. A seal guide is required for certain oil or grease seals during installation to avoid damage to the seal lips. Before a shaft passes through a seal, apply a little oil, preferably high temperature grease on the lips to reduce rubber to metal friction.

(11) Gasket, O Ring
When in doubt as to the condition of a gasket or O ring, replace it with a new one. The mating surfaces around the gasket should be free of foreign matter and perfectly smooth to avoid oil or compression leaks.

(12) Liquid Gasket, Non-permanent Locking Agent
Follow manufacturer's directions for cleaning and preparing surfaces where these compounds will be used. Apply sparingly. Excessive amounts may block engine oil passages and cause serious damage. An example of a non-permanent locking agent commonly available in North American is Lock'n Seal (Blue).

(13) Ball Bearing, Oil Seal, Grease Seal Installation
When installing a ball bearing, the bearing race which is affected by friction should be pushed by a suitable driver. This prevents severe stress on the balls and races, and prevents races and balls from being dented. Press a ball bearing until it stops at the stop in the hole or on the shaft. Seals should be pressed into place using a suitable driver, which contacts evenly with the side of the seal until the face of the seal is even with the end of the hole.

(14) Circlip, Retaining Ring
Replace any circlips and retaining rings that were removed with new ones, as removal weakens and deforms them. When installing circlips and retaining rings, take care to compress or expand them only enough to install them and no more.

(15) High Flash-point Solvent
A high flash-point solvent is recommended to reduce fire danger. A commercial solvent commonly available in

North America is Stoddard solvent (generic name). Always follow manufacturer and container directions regarding the use of any solvent.

(16) **Molybdenum Disulfide (MoS_2) Grease**
This manual makes reference to molybdenum disulfide grease in the assembly of certain engine and chassis parts. Always check manufacturer recommendations before using such special lubricants.

(17) **Electrical Leads**
All the electrical leads are either single-color or two-color and, with only a few exceptions, must be connected to leads of the same color. On any of the two-color leads there is a greater amount of one color and a lesser amount of a second color, so a two-color lead is identified by first the primary color and then the secondary color. For example, a yellow wire with thin red stripes is referred to as a "yellow/red" wire; it would be a "red/yellow" wire if the colors were reversed to make red the main color.

TORQUE AND LOCKING AGENT

Tighten all bolts and nuts to the proper torque using an accurate torque wrench. If insufficiently tightened, a bolt or nut may become damaged or fall off, possibly resulting in damage to the motorcycle and injury to the rider. A bolt or nut which is overtightened may become damaged, strip an internal thread, or break and then fall out. The following table lists the tightening torque for the major bolts and nuts, and the parts requiring use of a non-permanent locking agent.

Parts marked with an asterisk (*) must be retorqued according to the Periodic Maintenance Chart (Pg. 10). One at a time, loosen each bolt or nut ½ turn, then tighten it to the specified torque. Follow the sequence if specified. For engine fasteners, retorque them when the engine is cold (at room temperature).

Engine Parts	Locking Agent (•) Required	Quantity	Metric (kg-m)	English (ft-lbs)	See Pg.
Clutch hub bolt φ16 P1.5	–	1	4.2	30	49
Clutch spring bolts φ5 P0.8	–	6	0.40	35 in-lbs	49
Crankshaft bearing holder screws φ6 P1.0	•	4	–	–	69
Cylinder base bolts φ8 P1.25	–	4	2.2	16.0	42
*Cylinder head nuts φ8 P1.25	–	4	2.7	19.5	42
Engine drain plug φ10 P1.50	–	1	2.0	14.5	17
*Engine mounting bolts					
front φ8 P1.25	–	2	1.8	13.0	59
rear φ10 P1.25	–	2	3.0	22	59
Engine mounting bracket bolts φ8 P1.25	–	2	1.8	13.0	59
Engine sprocket nut φ12 P1.0	–	1	6.0	43	44
Magneto flywheel nut φ14 P1.5	–	1	10.0	72	44
*Muffler mounting bolts φ8 P1.25	–	5	–	–	–
Oil line banjo bolts φ6 P1.0	–	2	0.45	39 in-lbs	42
Primary gear nut φ18 P1.5	–	1	8.0	58	53
Ratchet gear arm stop screws φ6 P1.0	•	2	–	–	52
Release shaft guide bolt φ6 P1.0	–	1	0.45	39 in-lbs	–
Shift lever return spring pin φ8 P1.25	•	1	–	–	–
*Shift pedal bolt φ6 P1.0	–	1	–	–	–
Spark plug φ14 P1.25	–	1	2.8	20	12

Chassis Parts	Locking Agent (•) Liquid Gasket (•) Required	Quantity	Metric (kg-m)	English (ft-lbs)	See Pg
*Brake cam lever bolts ø6 P1.0	–	2	–	–	–
*Brake pedal screw ø6 P1.0	–	1	–	–	–
*Clutch lever holder bolt ø6 P1.0	–	1	–	–	–
*Exhaust pipe holder nuts ø8 P1.25	–	2	–	–	–
*Footpeg mounting nuts ø14 P1.5	–	2	–	–	–
*Front axle nut ø12 P1.25	–	1	7.0	51	73
*Front fender mounting bolts ø6 P1.0	–	4	–	–	–
Front fork bottom Allen bolts ø8 P1.0	•, •	2	1.8	13.0	95
*Front fork clamp nuts					
lower ø8 P1.25	–	4	1.8	13.0	93
upper ø8 P1.25	–	4	1.4	10.0	93
*Handlebar clamp bolts ø8 P1.25	–	4	1.8	13.0	90
*Kick pedal bolt ø8 P1.25	–	1	–	–	–
*Rear axle nut ø14 P1.5	–	1	9.0	65	21
*Rear shock absorber mounting					
bolts ø10 P1.25	–	2	3.0	22	–
nuts ø8 P1.25	–	2	2.0	14.5	–
Rear sprocket nuts ø8 P1.25	–	6	2.0	14.5	79
*Spokes	–	72	0.30	26 in-lbs	118
*Steering stem head bolt ø14 P1.5	–	1	4.0	29	24
Steering stem locknut ø25 P1.0	–	1	2.0	14.5	24
*Swing arm pivot shaft nut ø12 P1.25	–	1	5.0	36	96
*Torque link nuts ø10 P1.25	–	2	3.0	22	97

The table below, relating tightening torque to thread diameter and pitch, lists the basic torque for the bolts and nuts used on Kawasaki Motorcycles. However, the actual torque that is necessary may vary among bolts and nuts with the same thread diameter and pitch. The bolts and nuts listed on Pgs. 29 ~ 30 vary to a greater or lesser extent from what is given in this table. Refer to this table for only the bolts and nuts not included in the table on Pgs. 29~30. All of the values are for use with dry solvent-cleaned threads.

Coarse threads

dia (mm)	pitch (mm)	kg-m	ft-lbs
5	0.80	0.35~0.50	2.5~3.5
6	1.00	0.6~0.9	4.5~6.5
8	1.25	1.6~2.2	11.5~16.0
10	1.50	3.1~4.2	22~30
12	1.75	5.4~7.5	39~54
14	2.00	8.3~11.5	60~83
16	2.00	13~18	94~130
18	2.50	18~25	130~181
20	2.50	26~35	188~253

Fine threads

dia (mm)	pitch (mm)	kg-m	ft-lbs
5	0.50	0.35~0.50	2.5~3.5
6	0.75	0.6~0.8	4.5~5.5
8	1.00	1.4~1.9	10.0~13.5
10	1.25	2.6~3.5	19.0~25
12	1.50	4.5~6.2	33~45
14	1.50	7.4~10.2	54~74
16	1.50	11.5~16	83~116
18	1.50	17~23	123~166
20	1.50	23~33	166~239

Disassembly–Engine Installed

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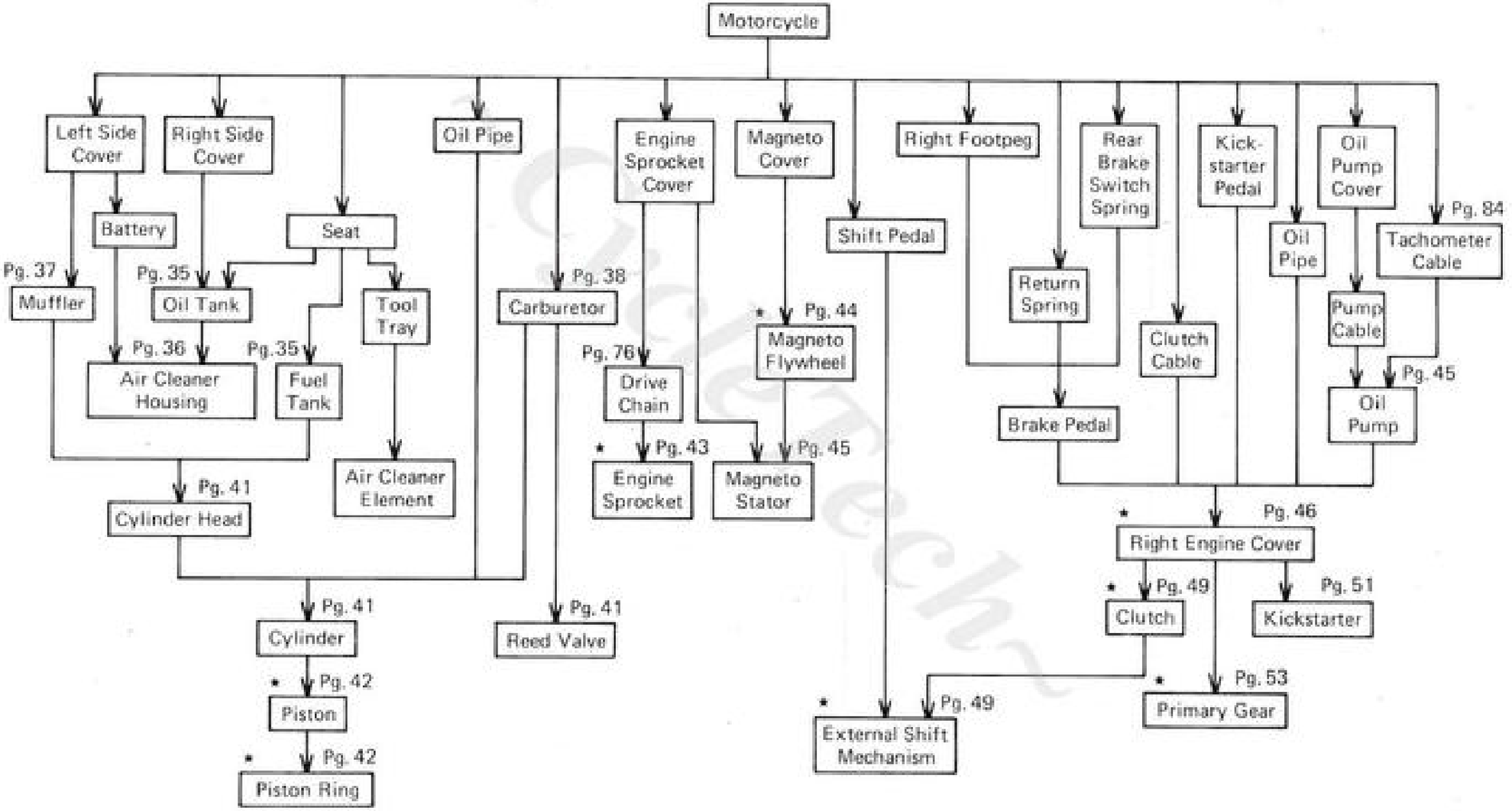
E

FLOW CHART
Disassembly – Engine Installed

This chart is intended to be aids to proper removal. Select the component you wish to remove, and follow the arrows to that point on the chart.



NOTE: Action with a mark (*) requires special tool(s) for removal, installation, disassembly, or assembly.

FUEL TANK

Removal:

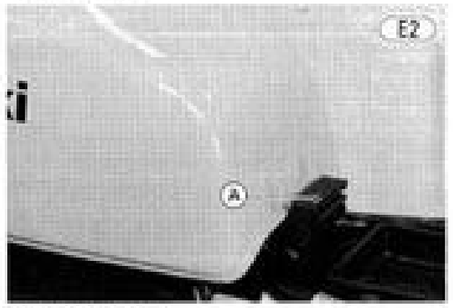
•Pulling the seat catches, remove the seat.

A. Seat Catch

•Pull the fuel tank cap breather hose out of the stem head.

•Turn the fuel tap to the "OFF" position, slide the hose clamp down, and pull the fuel hose off the tap.

•Remove the rubber retainer, and pull the fuel tank off toward the rear.



A. Rubber Retainer

Installation:

•Install the fuel tank, and fit the rubber retainer.

•Fit the fuel hose back onto the fuel tap, and slide the hose clamp back into place.

•Fit the breather hose back into the stem head.

A. Breather Hose

•Push the seat back into place.

ENGINE OIL TANK, OIL LEVEL SENSOR

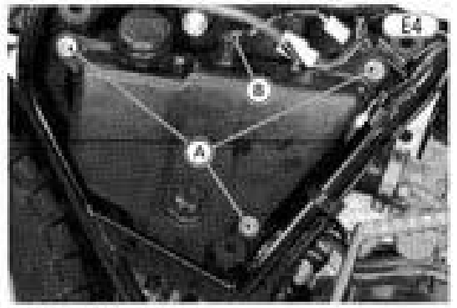
Removal:

•Pulling the seat catches, remove the seat (Fig. E1).

•Take off the right side cover.

•Disconnect the 3-pin connector of the engine oil level sensor.

•Remove the engine oil tank mounting screws, flat-washers, and rubber dampers (3 ea), and slip the oil and its breather tube out of the frame.



A. Oil Tank Mounting Screws
B. Oil Level Sensor

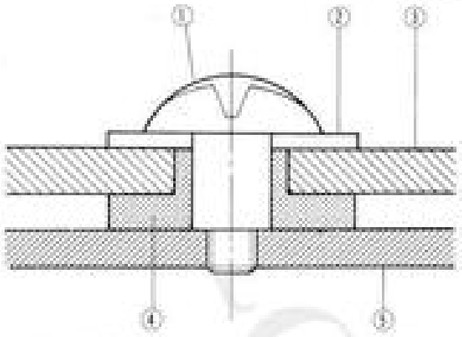
•With the tank upside down and the breather tube elevated, slide the clamp out of place and pull off the oil pump inlet hose. Screw one of the mounting screws into the inlet hose to keep the oil from flowing out, and push the end of the breather tube onto the o" tank outlet.

A. Breather Tube **B. Tank Outlet**

•Pull the engine oil level sensor off the oil tank.

Installation Notes:
1. Install the oil tank as shown in the figure.

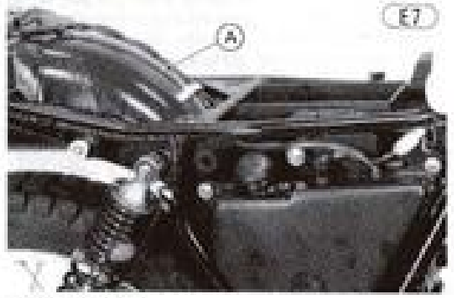
Oil Tank Installation E6



1. Mounting Screw
2. Flat Washers
3. Oil Tank Bracket
4. Rubber Damper
5. Frame Bracket

2. Route the oil tank breather tube, being sure that the tube does not get pinched or twisted.

CAUTION Always keep the oil tank breather tube free of obstruction, and make sure it does not get pinched, crimped, or bent sharply. If the breather tube is obstructed, engine oil flow to the oil pump will be hindered and serious engine damage will occur.



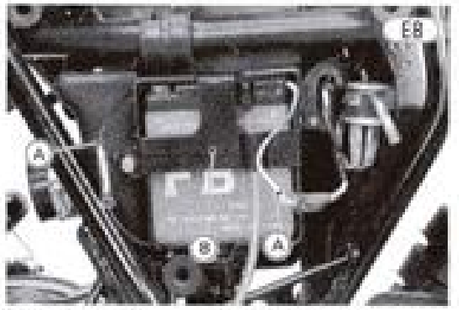
A. Breather Tube

3. If any air has gotten trapped in the oil pump inlet hose, bleed the oil pump (Pg. 115).

CAUTION To avoid serious engine damage, air in the oil pump line must be removed by bleeding.

AIR CLEANER HOUSING

Removal:
- Remove the engine oil tank (Pg. 35).
- Take off the left side cover.
- Disconnect the battery leads.



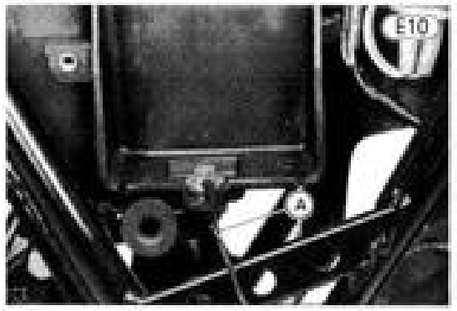
A. Battery Leads B. Battery Holder

- Remove the screw with a lockwasher and a flat washer, and take off the battery holder and battery.
- Remove the screws and flat washers (4 ea), and take off the tool tray and air cleaner intake duct.

A. Air Cleaner Intake Duct

- Loosen the air cleaner duct clamp bolt, and take off the duct.
- Remove the rear fender mounting bolts (3) with a flat washer and a lockwasher, and remove the front part of the rear fender.
- Remove the air cleaner housing mounting bolts (2) with a lockwasher, and take the housing off the right side of frame.

Installation Notes:
1. The left mounting bolt of air cleaner housing must be tightened with the ground lead.



A. Battery Ground Lead

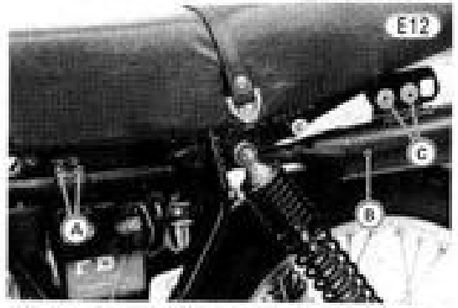
2. When installing the air cleaner duct, fit the notch in the duct with the ridge on the air cleaner housing.

A. Notch

MUFFLER

Removal:

- Remove the left side cover.
- Loosen the spark arrester connector clamp screws (2).

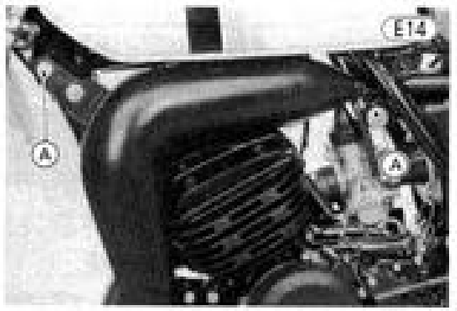


A. Clamps B. Spark Arrester C. Bolts

- Remove the spark arrester mounting bolts, lockwashers, and flat washers (2 ea), and pull the spark arrester off towards the rear.
- Remove the exhaust pipe holder nuts (2), and take the holder off the studs along with the pipe holder insert.

A. Holder B. Insert

- Remove the muffler mounting bolts, lockwashers, and flat washers (2 ea), and pull the muffler off toward the front. Remove the exhaust port gasket.

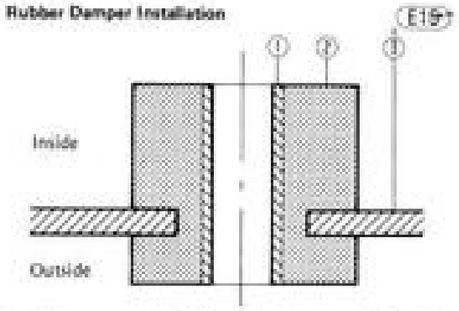


A. Muffler Mounting Bolts

Installation Notes:

1. Install the rubber dampers for muffler rear mounting and spark arrester mountings as shown in the figure.

Rubber Damper Installation



1. Collar 2. Damper 3. Bracket

2. Use a new exhaust port gasket.
3. Lightly tighten the exhaust pipe holder nuts (2) and muffler mounting bolts (2), and then tighten securely the nuts and bolts in this order.

CARBURETOR

Removal:

•Turn the fuel tap to the "OFF" position, slide the hose clamp down, and pull the fuel hose off the tap.
•Loosen the carburetor holder clamp and the air cleaner duct clamp.

A. Carburetor Holder Clamp
B. Air Cleaner Duct Clamp

•Slip the air cleaner duct clamp out of place.
•Slip the carburetor out of place.
•Free the carburetor overflow tube and air vent tube off their clamp.
•Slide up the rubber cap (1) out of place.

A. Rubber Cap B. Carburetor Cap

•Unscrew the carburetor cap (2), and pull out the throttle valve assembly.

CAUTION

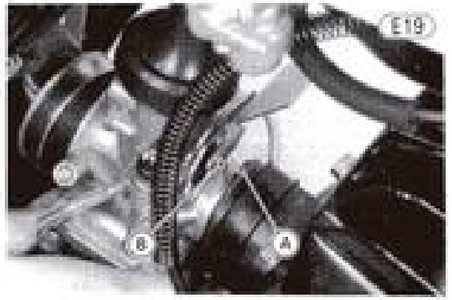
1. If the throttle valve is not removed from the cable, wrap a clean cloth around the throttle valve to avoid damage to it.
2. Stuff a piece of clean cloth into the carburetor holder to keep dirt out of the engine.

Installation:

•Being careful not to bend or otherwise damage the jet needle, align the groove on the side of the throttle valve with the guide pin in the carburetor body. Check to see that the throttle valve goes all the way down into the carburetor body, and slides smoothly.

A. Guide Pin B. Groove

•Tighten the carburetor cap.
•Check that the carburetor holder clamp and air cleaner duct clamp are in place.
•Remove the cloth from the carburetor holder.
•Fit the carburetor in place.
•Slide the air cleaner duct and clamp into position.
•Hold the carburetor fully perpendicular to the ground by fitting the ridge of the carburetor into the notch in the carburetor holder.

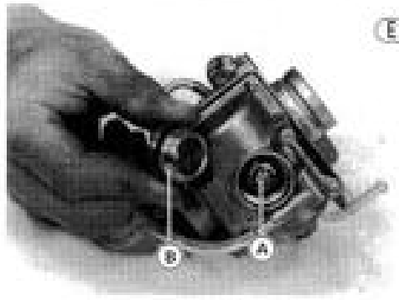


A. Notch B. Ridge

- Tighten the carburetor holder clamp and the air cleaner duct clamp.
- Run the carburetor overflow tube and air vent tube through their clamp.
- Fit the fuel hose back onto the fuel tap, and slide the hose clamp back into place.
- Adjust the carburetor (Pg. 12).
- Adjust the throttle control cable (Pg. 13).

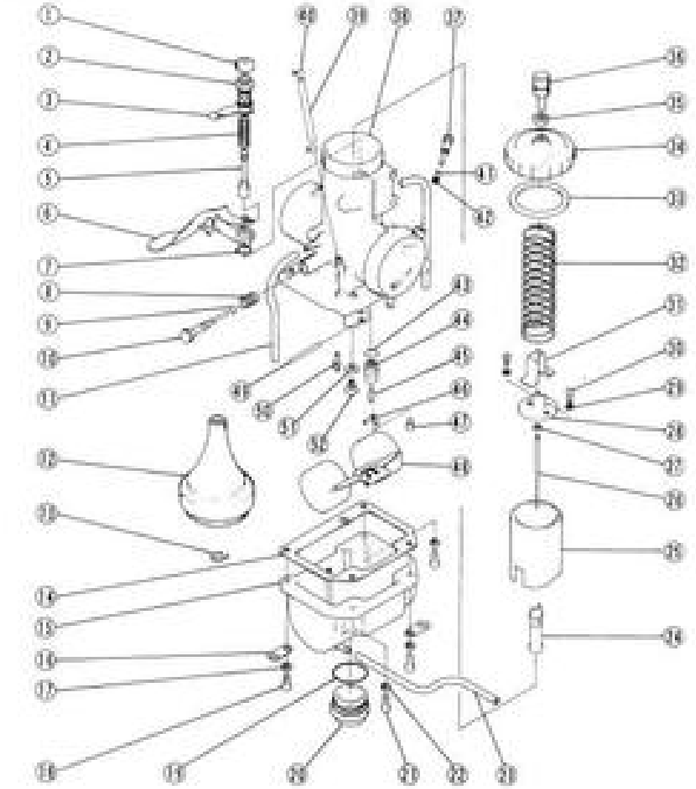
Main Jet Removal:

- Remove the carburetor (Pg. 38).
- Remove the drain plug (B) and O ring (), and remove the main jet (A) and washer ().



A. Main Jet B. Drain Plug

Carburetor



1. Dust Seal
2. Plunger Cap
3. Spring
4. Spring
5. Starter Plunger
6. Choke Lever
7. O Ring
8. Spring
9. O Ring
10. Idle Adjusting Screw
11. Vent Hose
12. Rubber Cap
13. Clip
14. Gasket
15. Float Bowl
16. Hose Guide
17. Lockwasher
18. Screw
19. O Ring
20. Drain Plug
21. Screw
22. Lockwasher
23. Drain Hose
24. Needle Jet
25. Throttle Valve
26. Jet Needle
27. Clip
28. Cable Hook
29. Lockwasher
30. Screw
31. Cable Retainer
32. Spring
33. Gasket
34. Carburetor Cap
35. Locknut
36. Adjuster
37. Air Screw
38. Carburetor Body
39. Fuel Hose
40. Clamp
41. O Ring
42. Spring
43. O Ring
44. Valve Seat
45. Valve Needle
46. Holding Plate
47. Screw
48. Float
49. Pin
50. Pilot Jet
51. Washer
52. Main Jet

Main Jet Installation Notes:

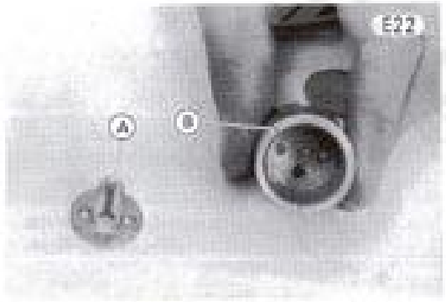
1. Check that the needle jet is installed in the carburetor, aligning the groove on the bottom of the needle jet with the guide pin (Fig. E18).
2. Replace the damaged **O** ring with a new one.
3. Check the throttle control cable adjustment (Pg. 13).

Throttle Valve, Jet Needle Removal:

•Unscrew the carburetor cap ⑧, and pull out the throttle valve assembly.
•To remove the throttle valve ⑨ from the cable, pull the spring ⑩ up from where its seat in the valve so that the cable retainer ⑪ will fall out of place, and slip the tip of the cable from the cable hook ⑫.
•Remove the screws ⑬ and lockwashers ⑭ (2 ea), and take the cable hook ⑫ and jet needle ⑮ out of the throttle valve.

Assembly Note:

1. When installing the cable hook, align its holes with the holes in the throttle valve.



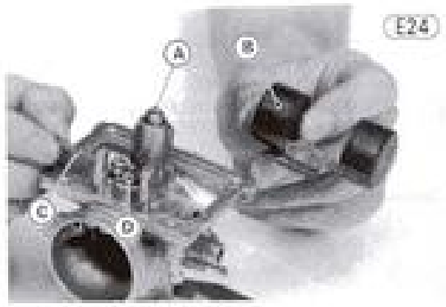
A. Cable Hook B. Throttle Valve

Carburetor Body Disassembly:

•Remove the idle adjusting screw ① and spring ②.

A. Idle Adjusting Screw B. Air Screw

•Unscrew the air screw and spring ⑤.
•Remove the screws ⑥ and lockwashers ⑦ (4 ea), and take off the float bowl ⑧ and gasket ⑨. Two screws have vent hose guides ⑥.
•The main jet ⑩, needle jet ⑪, and pilot jet ⑫ can now be removed. The needle jet will fall out the top of the carburetor.

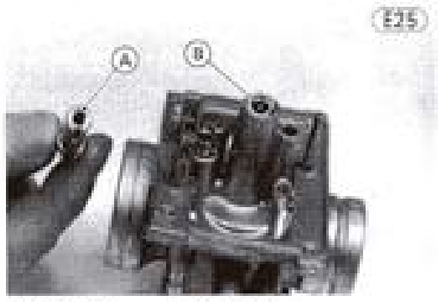


A. Main Jet C. Float Pin
B. Float D. Float Valve

•To remove the float valve seat ⑭, first push out the float pin ⑬, remove the float ⑭, and pull out the float valve needle ⑯.
•Unscrew the screw and holding plate ⑰, and pull out the float valve seat ⑱ and **O** ring ⑲.
•To remove the starter plunger ⑳, unscrew the plunger cap ㉑, and pull out the unit.

Assembly Notes:

1. Replace any **O** ring and gasket that are damaged or deteriorated.
2. Install the drain plug ③ securely if it was removed.
3. The needle jet is installed through the top of the needle jet bore. Align the groove on the bottom of the needle jet with the guide pin.

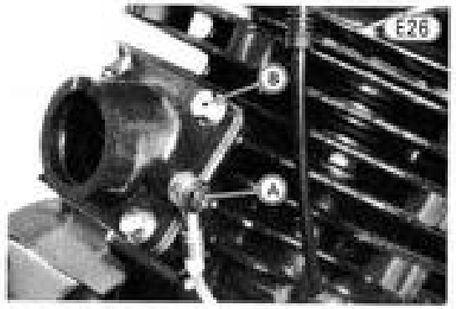


A. Needle Jet B. Guide Pin

REED VALVE

Removal:

- Remove the carburetor (Pg. 38). The throttle valve need not be removed from the carburetor.
- Cover the carburetor with a clean cloth, and set it on the frame or workbench to avoid damaging the carburetor and cable.
- Remove the upper banjo bolt of the oil pipe.



A. Banjo Bolt
B. Carburetor Holder Mounting Bolt

- Remove the carburetor holder mounting bolts, lockwashers, and flat washers (4 ea), and take off the carburetor holder, reed valve assembly, and gasket.
- Stuff a piece of clean cloth into the cylinder intake port to keep dirt out of the engine.

Installation Notes:

1. Tighten the oil pipe banjo bolt to 0.45 kg-m (39 in-lb) of torque.
2. Check the throttle control cable, and adjust if necessary (Pg. 13).
3. Bleed the air from the engine oil line (Pg. 115).

CYLINDER HEAD, CYLINDER

Removal:

- Remove the fuel tank (Pg. 35).
- Remove the muffler (Pg. 37).
- Remove the carburetor (Pg. 38). The throttle valve need not be removed from the carburetor.

NOTES: 1. Stuff a piece of clean cloth into the carburetor holder to keep dirt out of the engine.
2. Cover the carburetor with a clean cloth, and set it on the frame or workbench to avoid damaging the carburetor and cable.

- Remove the spark plug cap from the spark plug, and remove the spark plug.
- Remove the cylinder head nuts (4), and remove the cylinder head and gasket.
- Remove the oil pipe banjo bolts (2) from the cylinder and remove the oil pipe.

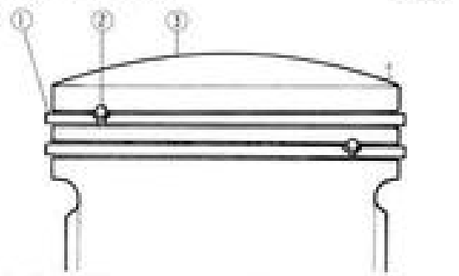
A. Oil Pipe **B. Banjo Bolts**

- Remove the cylinder base bolts (4).
- Lift off the cylinder, and remove the cylinder base gasket. If necessary, tap lightly around the base of the cylinder with a plastic mallet, taking care not to damage the cooling fins. Before the cylinder is off the piston, cover the cylinder base hole with a clean cloth to prevent dirt or moisture from entering.

Installation Notes:

1. If the cylinder is replaced with a new one, piston-to-cylinder clearance must be checked against the specified value (Pg.106).
2. Apply a little liquid gasket to the cylinder base gasket to keep the gasket in proper position while installing the cylinder.
3. Check to see that the pin in each piston ring groove is between the ends of the piston ring.

Piston Ring Position E28



1. Piston Ring 2. Pin 3. Piston

4. Apply a little two-stroke oil to the piston rings and the inside surface of the cylinder.

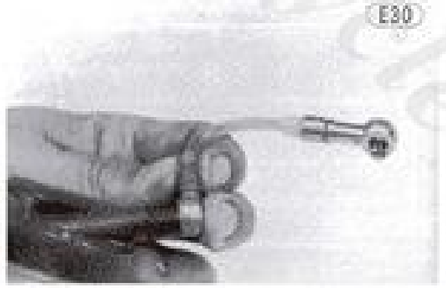
5. Using compressed air, blow out any particles which may obstruct the oil passage in the banjo bolt.

E29

A. Banjo Bolt

6. Tighten the cylinder base bolts (4) to 2.2 kg-m (16.0 ft-lbs) of torque.
7. Fill the oil pipe with a two-stroke engine oil before installation.

E30



8. Fit new aluminum washers on each side of the oil pipe connectors, and tighten the banjo bolts to 0.45 kg-m (39 in-lbs) of torque.
9. Tighten the cylinder head nuts (4) to 2.7 kg-m (19.5 ft-lbs) of torque.
10. Bleed the air from the engine oil line (Pg. 115).

PISTON, PISTON RINGS

Removal:

- Remove the muffler (Pg. 37).
- Remove the carburetor (Pg. 38).
- Remove the cylinder head and cylinder (Pg. 41).
- Wrap a clean cloth around the base of the piston to secure it in position for removal and so that no parts fall into the crankcase.
- Remove one of the piston pin snap rings.

E31

A. Snap Ring

- Using the piston pin puller and adaptor "B" (special tools), remove the piston pin from the side the snap ring was removed.

E32

A. Piston Pin Puller (57001-910)
B. Adapter (57001-913)

- Remove the piston and the connecting rod small end needle bearing.
- Remove both piston rings with the piston ring pliers (special tool). If the special tool is not available, carefully spread the ring opening with your thumbs and then push up on the opposite side of the ring to remove it.

E33

A. Piston Ring Pliers (57001-115)

E34

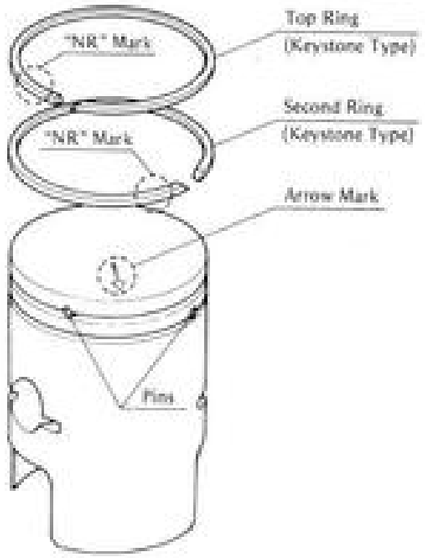
Installation:

NOTE: If the piston is replaced with a new one, check that piston to cylinder clearance has the specified value (Pg. 106). Also, when a new piston or piston pin is installed, check that the piston to pin clearance has the specified value (Pg. 106).

- Install the piston rings so that the correct side (marked "NR") faces up. The top ring and the second ring are identical. When installing the piston rings by hand, first fit one end of the piston ring against the pin in the ring groove, spread the ring opening with the other hand, and then slip the ring into the groove.

Piston Ring Installation

E35



- Apply a little 2-stroke oil to the connecting rod needle bearing, and fit it into the connecting rod.
- Apply a little 2-stroke oil to the piston pin, and install the piston and piston pin. The arrow on the top of the piston must point towards the front.
- Fit a new piston pin snap ring into the side of the piston, taking care to compress it only enough to install it and no more. Check that the other snap ring is in place.

CAUTION **Do not reuse snap rings, as removal weakens and deforms the snap ring. It could fall out and score the cylinder wall.**

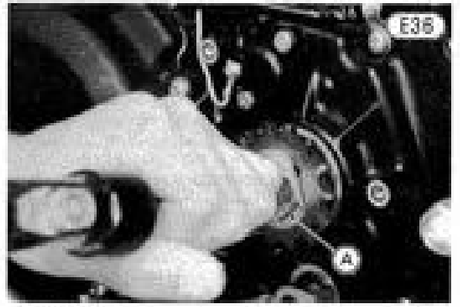
- Check to see that the pin in each piston ring groove is between the ends of the piston ring (Fig. E28).
- Install the cylinder and cylinder head (Pg. 41).
- Install the carburetor (Pg. 38).
- Install the muffler (Pg. 37).
- Install the fuel tank (Pg. 35).

ENGINE SPROCKET

Removal:

- Remove the engine sprocket cover.
- Remove the drive chain (Pg. 76).
- Straighten the side of the splined washer that is bent over the side of the engine sprocket nut.

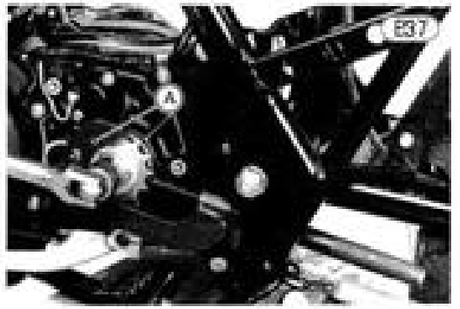
E36



A. Splined Washer

- Hold the engine sprocket steady using the engine sprocket holder (special tool), and remove the nut and splined washer.

E37



A. Engine Sprocket Holder (57001-307)

•Pull off the engine sprocket.

Installation Notes:

1. Before installing the engine sprocket, remove the collar and check if the oil seal and O ring are damaged.

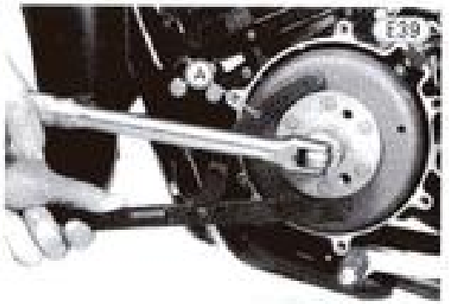
A. Collar B. Oil Seal C. "O" Ring

2. Tighten the engine sprocket nut to 6.0 kg-m (43 ft-lbs) of torque while using the engine sprocket holder to hold the sprocket steady.
3. Bend one side of the splined washer over the side of the nut.

MAGNETO FLYWHEEL

Removal:

•Remove the magneto cover screws (6), and take off the cover and gasket.
•Using a magneto flywheel holder (special tool) to hold the magneto flywheel stationary, remove the magneto flywheel nut, and take off the lockwasher and flat washer.



A. Magneto Flywheel Holder (57001-306)

•Remove the magneto flywheel with the magneto flywheel puller and rotor puller (special tools).

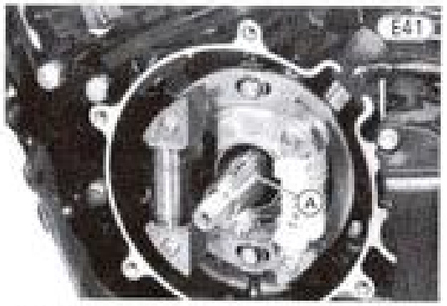
A. Magneto Flywheel Puller (57001-259)
B. Rotor Puller (57001-1016)

CAUTION

1. Do not use the bolts longer than 35 mm of length to prevent the bolts from damaging the stator coil.
2. If the flywheel is difficult to remove and a hammer is used to tap the flywheel puller, be careful not to strike the flywheel itself. Striking the flywheel can cause the magnets to lose their magnetism.

Installation:

•Clean off any oil or dirt that may be on the crankshaft taper or magneto flywheel hub.
•See that the key is fitted in its place on the crankshaft properly, and then fit the flywheel in place so that the key fits in the groove in the hub of the flywheel.



A. Woodruff Key

•Once the flywheel is all the way back in place, install the flat washer and lockwasher, and tighten the magneto flywheel nut while holding the flywheel steady with the magneto flywheel holder (special tool). Tightening torque for the magneto flywheel nut is 10.0 kg-m (72 ft-lbs).
•Check the ignition timing (Pg. 133).
•Install the magneto cover.

MAGNETO STATOR

Removal:

- Remove the fuel tank (Pg. 35).
- Remove the magneto flywheel (Pg. 44).
- Remove the screws (3) and engine sprocket cover.
- Disconnect the 3-pin and 2-pin connectors and lead from the magneto stator at the frame top tube. Loosen the neutral switch lead mounting screw.

A. Neutral Switch Lead
B. Magneto Stator Mounting Screws

- Remove the stator mounting screws (2) and take out the stator.

Installation Notes:

1. Install the stator so that its mark and the crankcase mark are aligned.

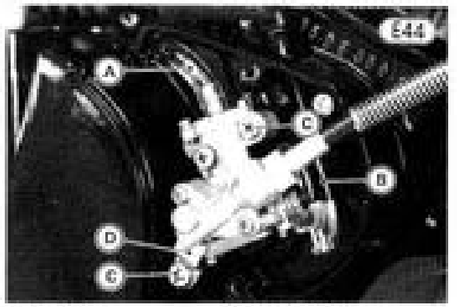
A. Timing Marks

2. Before installing the magneto cover, check the ignition timing (Pg. 133).

OIL PUMP

Removal:

- Remove the screws (2), and remove the oil pump cover.
- Bend out the tab on the oil pump lever and free the end of the oil pump cable from the oil pump lever.

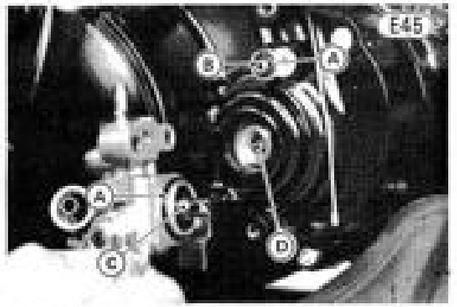


A. Inelt Hose
B. Oil Pump Cable
C. Mounting Screws
D. Holding Plate

- Slide up the hose clamp, and pull off the oil pump inlet hose. Use one of the oil pump cover screws to plug the hose and keep oil from leaking out.
- Remove the screws (2) and holding plate which hold the oil pump onto the right engine cover, unscrew the tachometer cable, and remove the oil pump. The O rings (2) may fall loose from the right engine cover and oil pump.

Installation:

- Screw the tachometer cable on the oil pump.
- See that the oil passage pipe and O rings (2) are in place.



A. "O" Rings
B. Oil Passage Pipe
C. Oil Pump Shaft
D. Pin

- When mounting the oil pump, note the position of the pin in the crankshaft, and then turn the oil pump shaft so that it will fit onto the pin.
- Put the oil pump back into place, and tighten the mounting screws (2). The large screw has a holding plate.
- Connect the oil pump inlet hose back onto the oil pump, and slide the hose clamp into place.
- Attach the oil pump inner cable to the oil pump lever, and bend the tab back over the end of the cable.

CAUTION **Make sure the tab on the oil pump lever is bent to hold the cable nipple securely. If loose, the cable may slip out, resulting in piston seizure.**

A. Tab B. Inner Cable

- Adjust the oil pump cable (Pg. 15).
- Bleed the oil pump (Pg. 115).

Disassembly:

NOTE: The pump must not be disassembled during warranty, or the warranty will be voided.

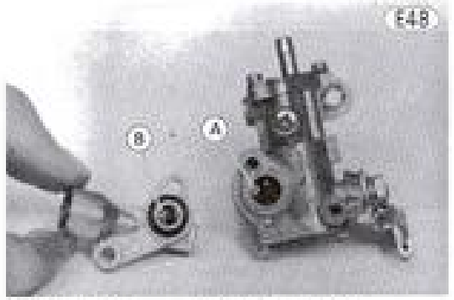
- Remove the screws (2) ① and lockwashers (2) ②, and remove the tachometer gear housing ③.

A. Tachometer Gear Housing

- Pull the tachometer pinion ④ and gear ⑤ off the housing, and remove the **O** ring ⑥.
- Remove the bleed valve ⑦ and gasket ⑧.
- Remove the **O** ring ⑨.
- Remove the control lever nut ⑩ and lockwasher ⑪ while holding the lever not to turn, and take off the lever ⑫, flat washer ⑬, and spring ⑭.
- Remove the screws (2) ⑮ and lockwashers (2) ⑯, and remove the control camshaft cap ⑰ and **O** ring ⑱.
- Pushing the cam follower into the pump body, pull off the control camshaft ⑲ with its **V** ring ⑳.
- Remove the plunger ㉑, spring ㉒, and spring seat ㉓.
- Pull off the oil pump shaft ㉔.
- Remove the screws (2) ㉕ and lockwashers (2) ㉖, and remove the plunger follower cap ㉗ and **O** ring ㉘.
- Push out the plunger follower ㉙ and spacer ㉚.
- The oil seal ㉛, if worn or damaged, can be removed for replacement with a small hook.

Assembly Notes:

1. When replacing the oil seal with a new one, apply oil to it.
2. Apply oil to the **O** and **V** rings, plunger follower, and plunger before assembly.
3. When installing the tachometer gear housing, note the notch on the tachometer cable drive shaft, and then turn the oil pump shaft so that it will fit into the notch.

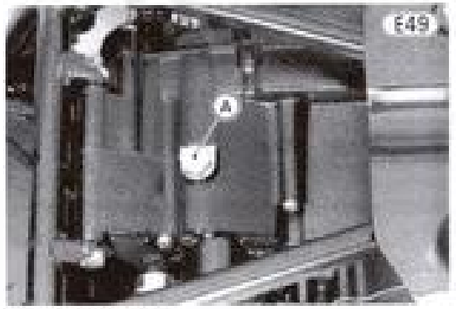


A. Pump Shaft B. Cable Drive Shaft

RIGHT ENGINE COVER

Removal:

- With the motorcycle fully perpendicular to the ground, place an oil pan beneath the engine, and remove the engine drain plug so that all the transmission oil drains out. While draining the transmission oil, continue with the following procedures.

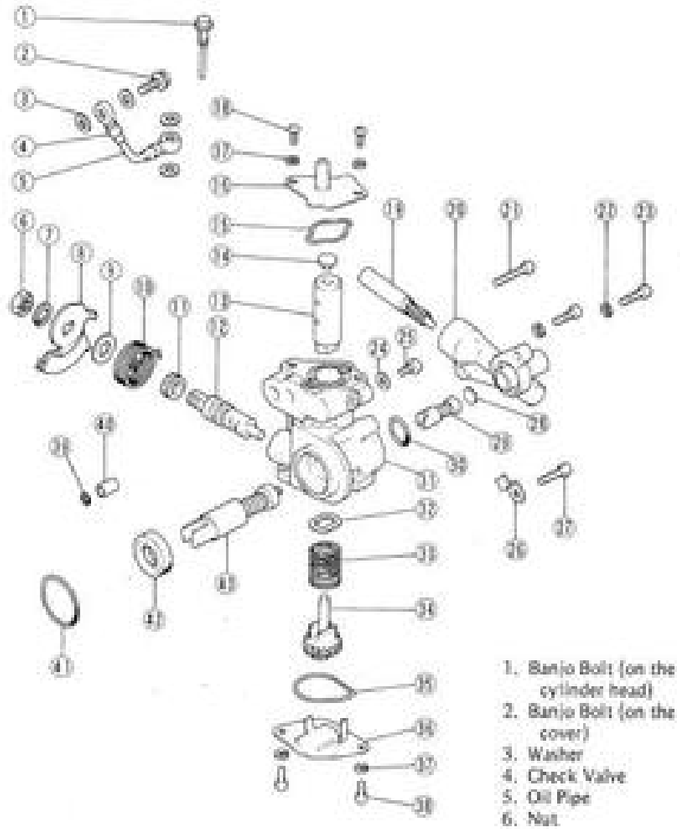


A. Engine Drain Plug

- Remove the oil pump cover.
- Remove the oil pump (Pg. 45).
- Slide the dust cover on the clutch lever out of place. Loosen the knurled locknut on the clutch lever, and turn in the adjuster.

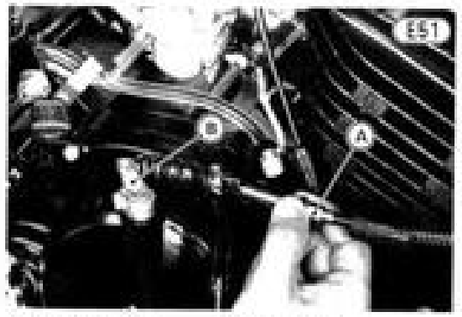
Oil Pump

E50



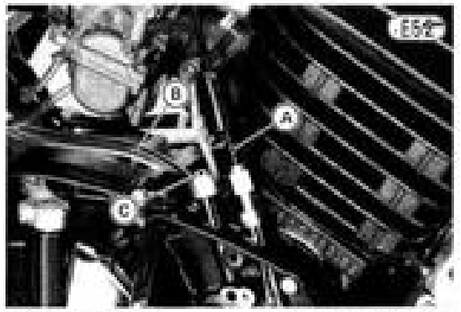
1. Banjo Bolt (on the cylinder head)
2. Banjo Bolt (on the cover)
3. Washer
4. Check Valve
5. Oil Pipe
6. Nut
7. Lockwasher
8. Control Lever
9. Washer
10. Return Spring
11. V Ring
12. Control Camshaft
13. Plunger Follower
14. Spacer
15. O Ring
16. Follower Cap
17. Lockwasher
18. Screw
19. Pinion
20. Gear Housing
21. Mounting Screw
22. Lockwasher
23. Screw
24. Gasket
25. Bleed Valve
26. Plate
27. Mounting Screw
28. Washer
29. Gear
30. O Ring
31. Body
32. Spring Seat
33. Spring
34. Plunger
35. O Ring
36. Camshaft Cap
37. Lockwasher
38. Screw
39. O Ring
40. Pipe
41. O Ring
42. Oil Seal
43. Pump Shaft

•Line up the slots in the clutch lever, knurled locknut and adjuster, and then free the cable from the lever.
•Slide the dust cover at the clutch cable lower end out of place, remove the cable adjuster, and free the inner cable from the clutch release lever.



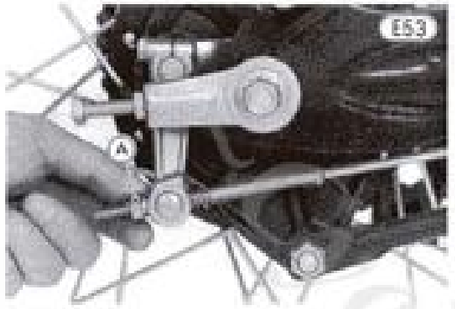
A. Cable Adjuster B. Release Lever

•Slide the dust cover out of the oil pump cable lower end, loosen the locknut at the oil pump cable adjuster, and unscrew the adjuster.



A. Oil Pump Cable
B. Oil Pump Inlet Hose
C. Oil Pipe Banjo Bolt

•Pull the oil pump inlet hose off the right engine cover.
•Remove the oil pipe banjo bolt from the right engine cover. The banjo bolt has two aluminum washers.
•Remove the right footpeg mounting nut and lockwasher, and remove the right footpeg.
•Being careful not to bend or otherwise damage the rear brake light switch spring, remove the spring from the brake pedal.
•Remove the adjusting nut from the end of the brake rod, and then free the rod from the cam lever by depressing the brake pedal. Remove the brake rod spring and joint.



A. Adjusting Nut

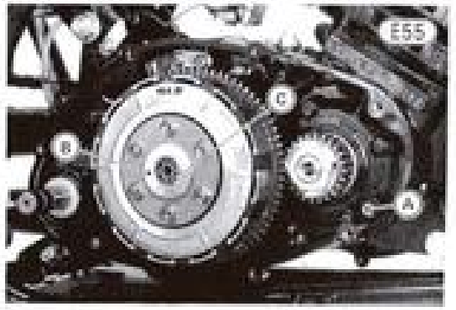
•Take out the rear brake pedal retaining screw. A lockwasher, flat washer, and O ring come off with the screw.
•Pull off the brake pedal and O ring, and free the brake pedal return spring.
•Pushing the lock tabs on the rear brake light switch, pull the rear brake light switch from the bracket.

A. Rear Brake Light Switch

•Mark the position of the kick pedal on the shaft so that it can be returned to the same position later.
•Remove the kick pedal bolt, slightly widen the gap in the kick pedal with a screwdriver, and then pull off the kick pedal.
•Remove the right engine cover screws (8), and take off the right engine cover and gasket.

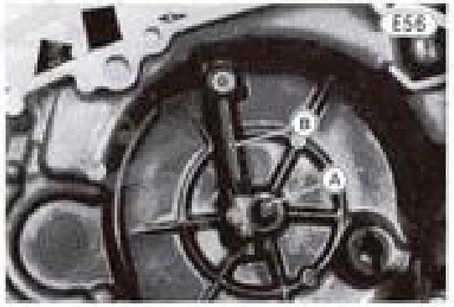
Installation Notes:

1. Check that the knock pin (2), clutch spring plate pusher, and ball bearing are in place on the crankcase.



A. Knock Pin **C. Ball Bearing**
B. Clutch Spring Plate Pusher

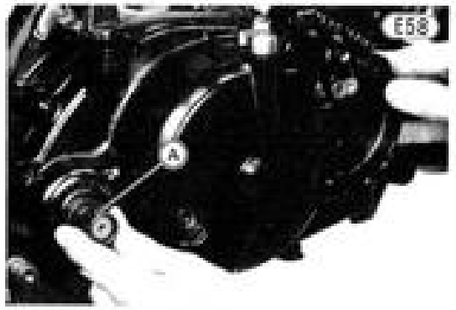
2. Use a new right engine cover gasket.
3. Check and see that the clutch release assembly is installed on the right engine cover with proper angle as shown in Fig. E57, when the clutch release lever is fully turned counterclockwise.



A. Clutch Release Rack
B. Clutch Release Shaft and Pinion

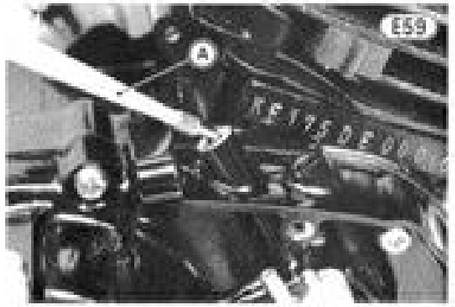
4. When installing the right engine cover, insert an oil seal guide (special tool) into the cover to prevent the kick shaft oil seal from being damaged.

CAUTION **Do not attempt to install the cover with the oil pump installed, or the pump may be broken.**



A. Oil Seal Guide (57001-283)

5. Fill the oil passage in the right engine cover with 2-stroke oil. This shortens air bleeding time.



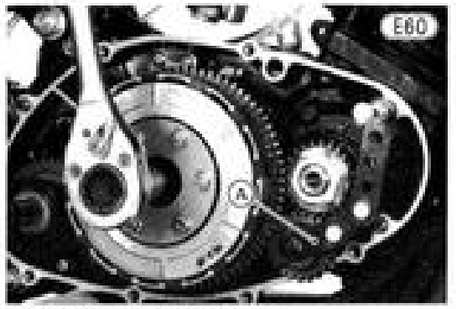
A. Apply a 2-stroke oil.

6. Tighten the oil pipe banjo bolt to 0.45 kg-m (39 in-lbs) of torque. There is one aluminum washer on each side of the fitting. New washers must be always used when they are removed.
7. Lubricate the brake pedal pivot with grease, and then install it. The brake pedal has an O ring on each side of pivot portion.
8. Tighten the drain plug with a new aluminum washer to 2.0 kg-m (14.5 ft-lbs) of torque.
9. Fill the transmission oil (Pg. 16).
10. Adjust the oil pump cable (Pg. 15), clutch cable (Pg. 15), rear brake (Pg. 21), and rear brake light switch (Pg. 23).
11. Bleed the oil pump (Pg. 115).

CLUTCH

Removal:

- Remove the oil pump (Pg. 45).
- Remove the right engine cover (Pg. 46).
- Remove the spring plate pusher and ball bearing.
- Using the gear holder (special tool), hold the clutch gear to keep it from turning, and then remove the clutch hub bolt, lockwasher, and flat washer.



A. Gear Holder (57001-1015)

- Pull the clutch housing, clutch plate, and clutch hub off the drive shaft. The sleeve ⑪, drive shaft idle gear ⑫, and thrust washer ⑬ may come out together with the clutch housing.
- Unscrew the clutch spring bolts ⑨ (6) evenly while the clutch plates are in the clutch housing, and remove the spring plate ① and springs ② (6).
- Remove the clutch wheel ④, friction plates ⑤ (5), steel plates ⑥, clutch hub ⑦, and thrust washer ⑧ (4) from the clutch housing ⑩.

Clutch Installation Notes:

1. Install the clutch plates. The sequence is friction plate, steel plate, friction plate, etc. finishing with a friction plate.

CAUTION **If new dry steel plates and friction plates are installed, apply transmission oil to the surfaces of each plate to avoid clutch plate seizure.**

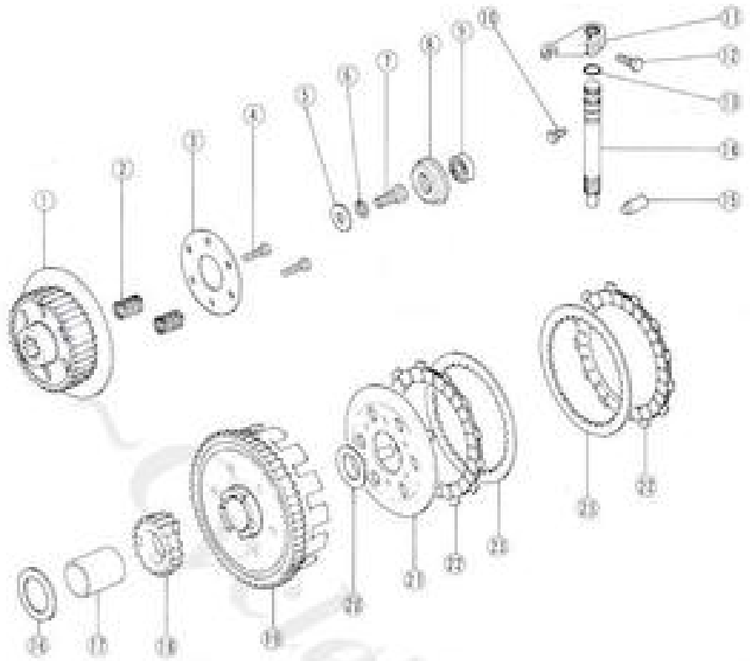
2. Tightening torque for the clutch spring bolts (6) is 0.40 kg-m (35 in-lbs).
3. Tightening torque for the clutch hub bolt is 4.2 kg-m (30 ft-lbs).
4. Adjust the clutch (Pg. 15).

EXTERNAL SHIFT MECHANISM

Removal:

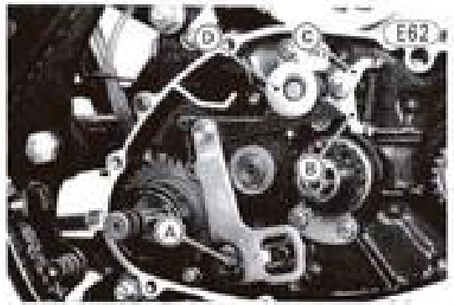
- Remove the shift pedal.
- Remove the oil pump (Pg. 45).
- Remove the right engine cover (Pg. 46).

Clutch



1. Clutch Hub
2. Spring
3. Plate
4. Bolt
5. Flat Washer
6. Lockwasher
7. Bolt
8. Pusher
9. Bearing
10. Guide Bolt
11. Rear Lever
12. Bolt
13. O Ring
14. Release Shaft and Pinion
15. Release Rack
16. Washer
17. Sleeve
18. Idle Gear
19. Clutch Housing
20. Washer
21. Clutch Wheel
22. Friction Plate
23. Steel Plate

•Remove the clutch (Pg. 49).
•Remove the shift shaft ① with its springs.



A. Shift Shaft
B. Gear Set Lever
C. Neutral Set Lever
D. Shift Drum

•Unscrew the screw, and remove the gear set lever ⑧ and neutral set lever ⑦ with the washer ⑨ and spring ⑩.

•Remove the screw, and remove the pin plate ③ and pins ② (5).

Installation Notes:

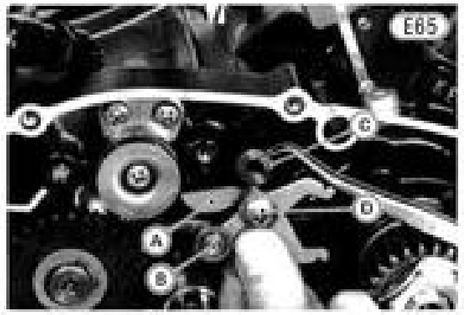
1. Place the pins ② (5) on the shift drum as shown in the figure.

A. Pin
B. Shift Drum

External Shift Mechanism

1. Shift Drum
2. Pin
3. Pin Plate
4. Screw
5. Washer
6. Spring
7. Neutral Set Lever
8. Gear Set Lever
9. Screw
10. Shift Pedal
11. Shift Shaft
12. Pin
13. Spring
14. Sleeve
15. Guide Plate
16. Screw
17. Spring
18. Rubber
19. Bolt

2. Install the gear set lever ③, neutral set lever ⑦, and washer with the mounting screw.



A. Gear Set Lever
B. Neutral Set Lever
C. Washer
D. Mounting Screw

3. For the installation of the shift shaft, use the oil seal guide (special tool) to keep the shift shaft oil seal from being damaged.

A. Oil Seal Guide (57001-264)

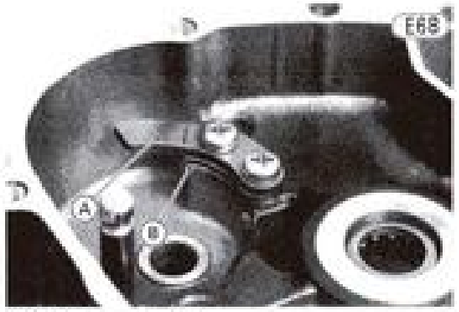
KICKSTARTER

Removal:

- Remove the oil pump (Pg. 45).
- Remove the right engine cover (Pg. 46).
- Remove the clutch (Pg. 49).
- Remove the shift shaft (Pg. 49).
- With needle nose pliers, remove the end of the kick spring ⑲ from its stop.

A. Kickstarter Assembly
B. Kick Spring
C. Stop
D. Drive Shaft Idle Gear
E. Output Shaft Idle Gear

- Turn the kickshaft counterclockwise, and pull out the kickstarter assembly. There is a thrust washer ① where the kick shaft ⑱ fits into the crankcase.
- Unscrew the screws (2), and remove the ratchet gear arm stop and guide (Fig. E68).



A. Guide B. Stop

•Pull off the clutch sleeve, drive shaft idle gear, and thrust washer.
•Remove the circlip, thrust washer, output shaft idle gear, and then another thrust washer.

Installation Notes:

1. Apply a non-permanent locking agent to the threads of ratchet gear arm stop and guide mounting screws (2), and install them as shown in Fig. E68.
2. Put the thrust washer ① on the crankcase end of the kick shaft, and push the kickstarter assembly back into place.

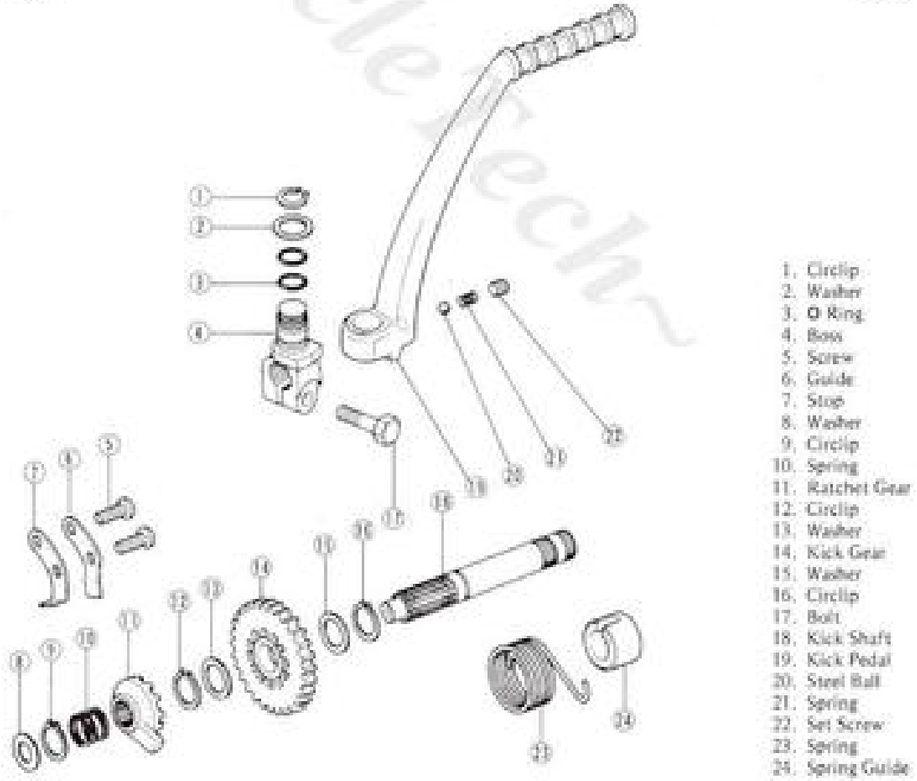
A. Thrust Washer

Disassembly:

•Remove the washer ①.
•Remove the spring guide ⑲ and return spring ⑳.
•Remove the circlip ⑨, spring ⑩, and ratchet gear ⑪.

Kickstarter

E70



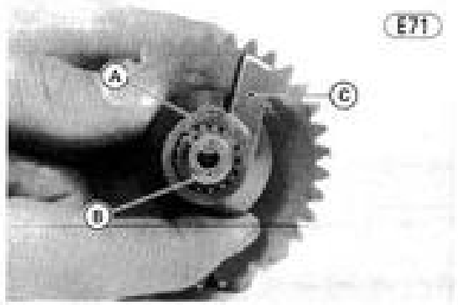
1. Circlip
2. Washer
3. O Ring
4. Boss
5. Screw
6. Guide
7. Stop
8. Washer
9. Circlip
10. Spring
11. Ratchet Gear
12. Circlip
13. Washer
14. Kick Gear
15. Washer
16. Circlip
17. Bolt
18. Kick Shaft
19. Kick Pedal
20. Steel Ball
21. Spring
22. Set Screw
23. Spring
24. Spring Guide

•Remove the circlip ①, and pull off the washer ①, kick gear ①, and another washer ①.
•Remove the circlip ①.

Assembly Notes:

1. Apply a little transmission oil to the inside of the kick gear and ratchet lever before installation.
2. When installing the ratchet gear, align the ratchet gear punch mark with the punch mark on the kick shaft.

CAUTION **Misalignment of the ratchet gear changes the kick spring preload. If the kick spring preload is too light, partial mesh of the kick lever and the ratchet gear could cause kick mechanism noise. If the kick spring preload is too heavy, the kick spring could weaken or break.**



A. Align the marks. **C. Ratchet Gear**
B. Kick Shaft

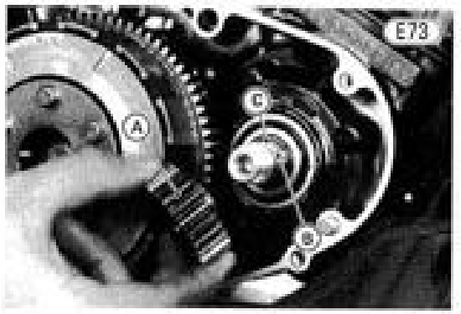
PRIMARY GEAR

Removal:

•Remove the oil pump (Pg. 45).
•Remove the right engine cover (Pg. 46).
•Straighten the toothed washer, unscrew the primary gear nut holding the primary gear with the gear holder (special tool), and remove the toothed washer and oil pump drive pin.

A. Gear Holder (57001-1015)

•Remove the primary gear, woodruff key, and O ring.



A. Primary Gear **C. "O" Ring**
B. Woodruff Key

Installation Notes:

1. Check if the O ring is not damaged.
2. Tighten the primary gear to 8.0 kg-m (58 ft-lbs) of torque.

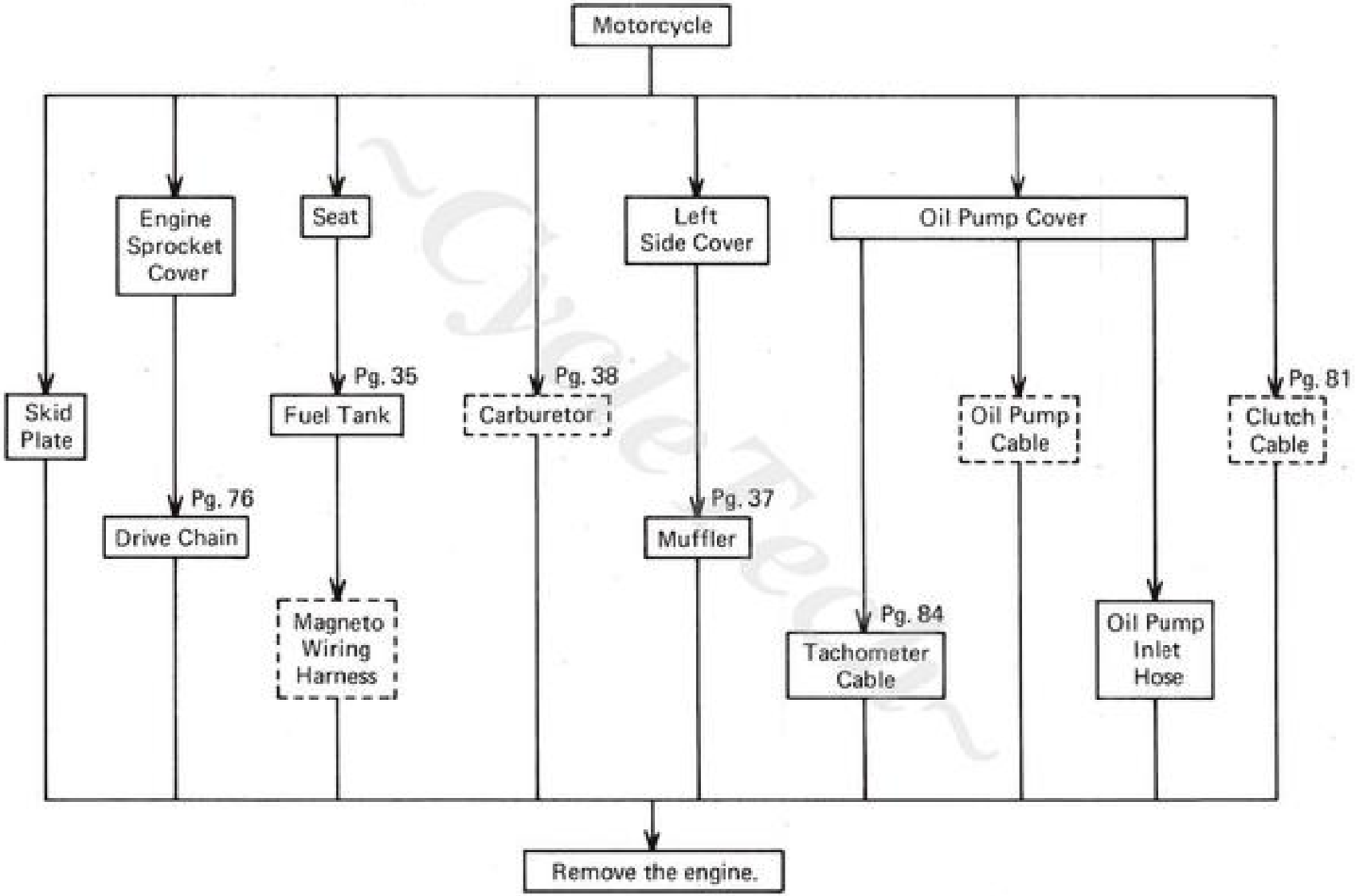
Disassembly–Engine Removed

Table of Contents

F

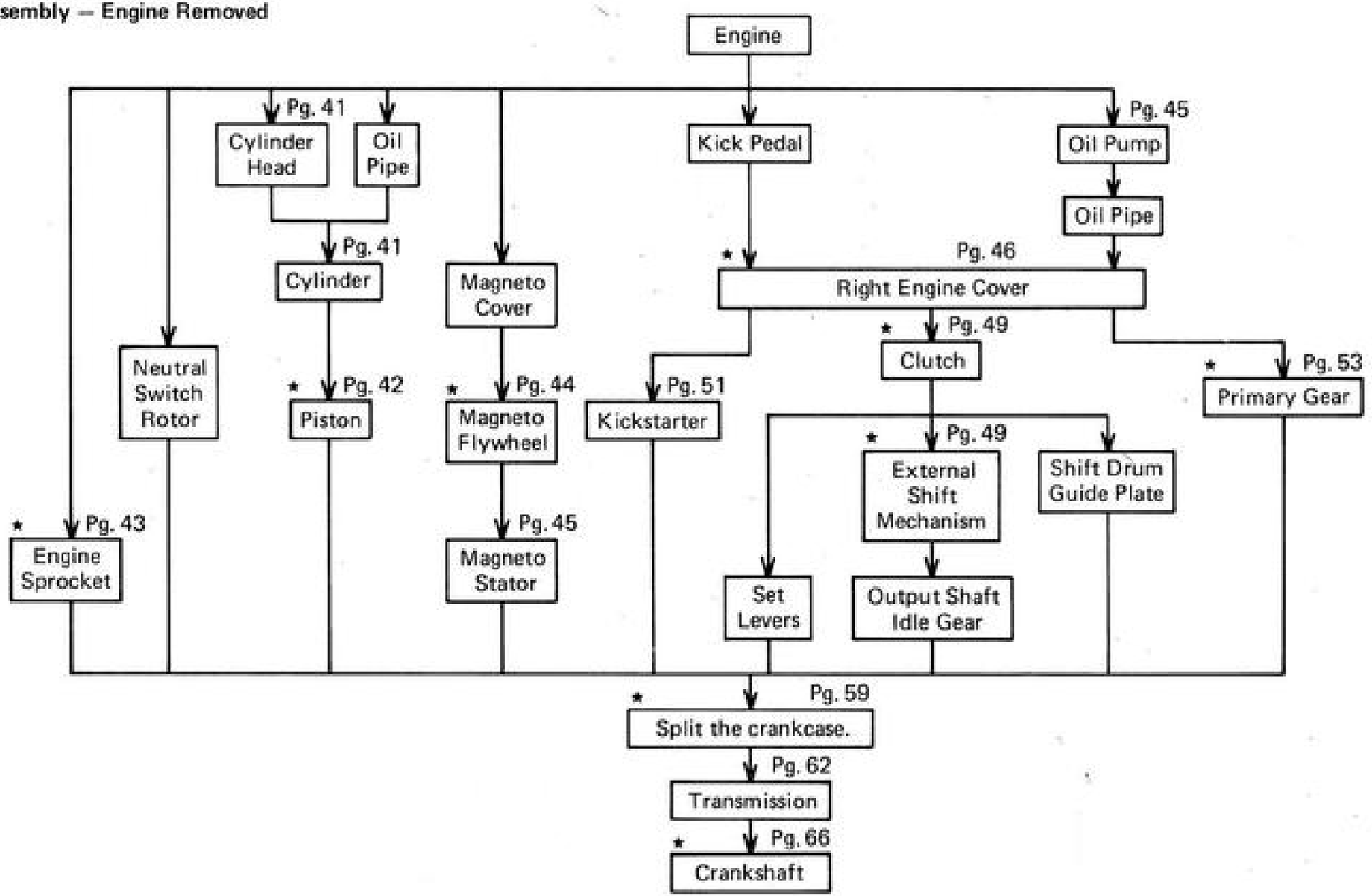
FLOW CHART
Engine Removal

The following charts are intended to be aids to proper removal. Select the component you wish to remove, and follow the arrows to that point on the chart.



NOTE: Parts in the broken line are required to remove its mounting fasteners, but not necessary its complete removal for engine removal.

FLOW CHART
Disassembly — Engine Removed

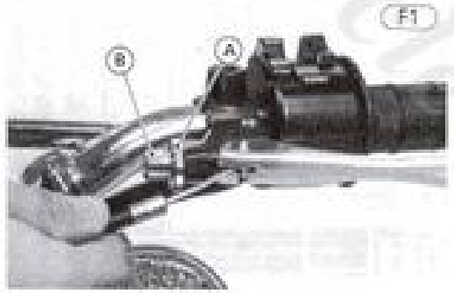


NOTES: 1. Action that has been already done in the engine removal procedure is omitted. Action that is not necessarily required for engine disassembly off the motorcycle is also omitted.
2. Action with a mark (★) requires special tool(s) for removal, installation, disassembly, or assembly.

ENGINE REMOVAL

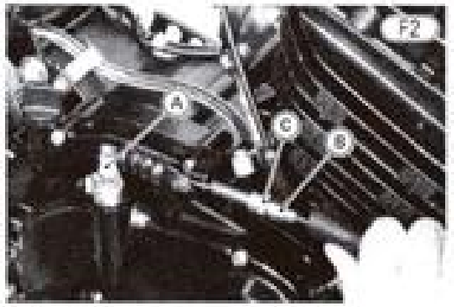
Removal:

•With the motorcycle held vertically, place an oil pan beneath the engine, and remove the engine drain plug to drain the transmission oil. While draining the transmission oil, continue with the following procedures.
•Remove the fuel tank (Pg. 35).
•Pull the spark plug lead off the spark plug, and remove the spark plug.
•Remove the muffler (Pg. 37).
•Remove the drive chain (Pg. 76).
•Remove the shift pedal bolt and take off the shift pedal.
•Remove the carburetor as explained in the carburetor removal section (Pg. 38). The throttle valve need not be removed from the carburetor.
•Cover the carburetor with a clean cloth, and set it on the workbench or frame to avoid damaging the carburetor and cable.
•Slide the clutch lever dust cover out of place.
•Loosen the locknut on the clutch lever, and turn in the adjuster.
•Line up the slots in the clutch lever, knurled locknut, and adjuster, and then free the clutch cable from the clutch lever.



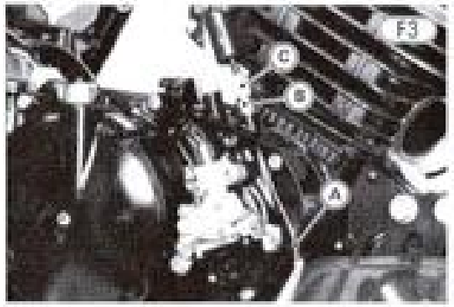
A. Knurled Locknut **B. Adjuster**

•Slide the dust cover out of place.
•Turn out the adjuster from the right engine cover, and free the tip of the clutch inner cable from the clutch release.



A. Release Lever **C. Locknut**
B. Adjuster

•Remove the oil pump cover screws (2), and take off the cover.
•Remove the tachometer cable.
•Bend out the tab on the oil pump lever, and free the end of the oil pump inner cable.

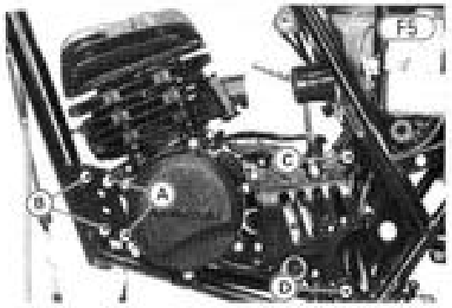


A. Oil Pump Inner Cable **C. Adjuster**
B. Locknut

•Slide the rubber cap up out of the way, loosen the locknut, and unscrew the adjuster at the lower end of the oil pump outer cable.
•Slide up the oil pump inlet hose clamp, and pull the hose off the engine. Use one of the oil pump cover screws to plug the hose and keep the oil from leaking out.
•Remove the magneto wiring harness straps (3).

A. Straps **B. Magneto Wiring Harness**

•Disconnect the magneto wiring harness 3-pin connector, 2-pin connector, and lead.
•Remove the skid plate mounting bolts with the flat washers and lockwashers (4 ea), and take out the skid plate.
•Remove the rear brake switch return spring.
•Jack or lever the engine up slightly to take the weight off the mounting bolts.
•Remove the self-locking nuts (6) off the engine mounting bolts and front mounting bracket bolts.



A. Front Mounting Bolts
B. Front Mounting Bracket Bolts
C. Rear Upper Mounting Bolt
D. Rear Lower Mounting Bolt

- Pull out the engine mounting bolts (4), and take off the brackets (2) and bracket bolts (2). Be careful not to damage the threads upon removal.
- Make sure that the following parts are free, and properly positioned on the engine and frame so that they will not be damaged during engine removal: clutch cable, oil pump cable, carburetor and carburetor cable, magneto wiring, spark plug lead, and oil pump inlet hose.
- Remove the engine from the frame to the right side.

Installation Notes:

1. Tighten the front mounting bracket bolt nuts and front mounting bolt nuts (2 ea) to 1.8 kg-m (13.0 ft-lbs) of torque, and tighten the rear upper and lower mounting bolt nuts to 3.0 kg-m (22 ft-lbs) of torque.
2. Install the drain plug with a new aluminum gasket, and tighten the plug to 2.0 kg-m (14.5 in-lbs) of torque. Fill the engine with oil to the proper level (Pg. 16).
3. Bleed the oil pump (Pg. 115).

CAUTION **Make sure the tab on the oil pump lever is bent to hold the cable nipple securely. If loose, the cable may slip out, resulting in piston seizure (Fig. E46).**

4. Adjust the throttle control cable (Pg. 13).
5. Adjust the rear brake light switch (Pg. 23).
6. Adjust the drive chain (Pg. 20).
7. Adjust the clutch cable (Pg. 15).
8. Check the ignition timing (Pg. 133).
9. Adjust the carburetor (Pg. 12).

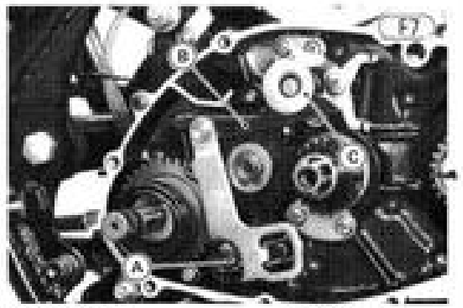
CRANKCASE SPLIT

Disassembly:

- Remove the engine (Pg. 58).
- Set the engine on a clean surface.
- Remove the cylinder head and cylinder (Pg. 41).
- Remove the piston (Pg. 42).
- Remove the engine sprocket (Pg. 43), output shaft collar, and O-ring.
- Unscrew the neutral switch cover mounting screws (2), remove the cover, and then remove the neutral switch rotor.

A. Neutral Switch Rotor **B. Neutral Switch Cover**

- Remove the magneto flywheel (Pg. 44).
- Remove the magneto stator (Pg. 45).
- Remove the kick pedal bolt and pull off the kick pedal.
- Remove the oil pump (Pg. 45).
- Remove the right engine cover (Pg. 46).
- Remove the clutch (Pg. 49).
- Remove the primary gear, woodruff key, oil pump drive pin, and O-ring (Pg. 53).
- Move the external shift mechanism arm out of the groove on the shift drum, and pull the shift shaft out of the crankcase.



A. Shift Shaft **C. Shift Drum**
B. Shift Mechanism Arm

- Remove the shift shaft (Pg. 49).
- Remove the kickstarter assembly, drive shaft idle gear, and output shaft idle gear (Pg. 51).
- Remove the crankcase screws (12) and magneto wiring harness clamp.

•Screw the crankcase splitting tool adapters (special tools) into the left side of the crankcase. Be certain to screw the adapters in all the way.

F8

A. Crankcase Splitting Tool (57001-153)
B. Adapter (57001-151)

•Tighten the bolt on the crankcase splitting tool to split the crankcase. Constantly check the alignment of the two halves. The front and rear of the crankcase must be pulled apart evenly; if necessary gently tap the rear of the left crankcase half with a mallet.

F9

Assembly:

•Check to see that both crankcase halves are fully assembled (Pgs. 68 and 69).
•Check to see that the shift drum, drive shaft, and output shaft assemblies are properly assembled (Pgs. 64 and 65).
•Use a high flash-point solvent to clean the crankcase and all the transmission, shift drum and crankshaft parts.
•Apply transmission oil to the transmission gears and shift drum where they turn in the crankcase and on the drive and output shafts.
•Apply a little two-stroke oil to both crankshaft ball bearings.
•Fit the drive shaft and output shaft assemblies together, and then install them in the right crankcase half. Be sure that the shift forks are fitted into their gear grooves.

F10

A. Forward
B. Shift Fork with Short Fingers
C. Shift Forks with Long Fingers

•Install the shift drum guide plate, and tighten the screws (2).
•Install the washer, neutral set lever, and gear set lever, and tighten the screw (Fig. E65 on Pg. 51).
•Hook the spring between the levers.
•Turn the shift drum so that the roller on the neutral set lever fits into the detent in the shift drum.

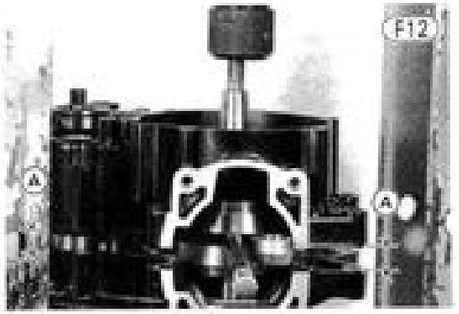
F11

A. Neutral Set Lever Roller
B. Detent in the Shift Drum

•Install the breather hose and grommet.
•Apply a high temperature grease to the lips of the crankshaft left oil seal in the left crankcase half.
•Clean the mating surfaces of the crankcase halves with a high flash-point solvent and wipe dry.
•Apply liquid gasket to the mating surface of the left crankcase half.
•Install the crankcase knock pins (2) if they were removed.

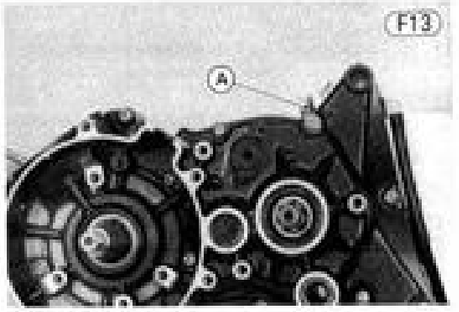
•Fit the crankcase halves together using a press and a chisel or wedge inserted between the flywheels opposite the connecting rod big end.

NOTE: Constantly check the alignment of the two halves, and the position of the transmission shafts, and shift drum. The front and rear of crankcase must be pushed together evenly.



A. Even

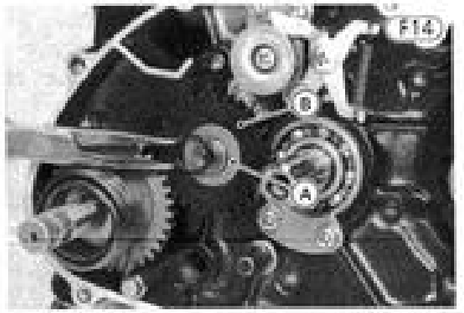
•After the crankcase halves are fitted together, tighten the crankcase screws (12). Be sure to install the magneto wiring harness clamp with the correct crankcase screw.



A. Clamp

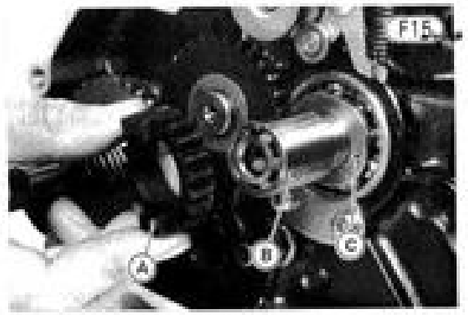
•Wipe off the excess liquid gasket that flows out of the mating surfaces.
•Wrap a clean cloth around the connecting rod so that no parts or dirt will fall into the crankcase.
•Check to see that the crankshaft, drive shaft, and output shaft all turn freely (in the neutral position). If the crankshaft will not turn, probably the crankshaft is not centered; tap the appropriate end of the crankshaft with a mallet to reposition it.
•Spinning the output shaft, shift the transmission through all the gears to make certain there is no binding and that all the gears shift properly.

•Install the rotor of the neutral indicator switch fitting its tab into the hole in the shift drum, and install the neutral indicator switch and gasket.
•Apply a high temperature grease to the lip of the output shaft collar oil seal.
•Install the **O** ring and collar on the output shaft, and install the engine sprocket (Pg. 44).
•Install the magneto stator so that the mark on the stator is aligned with the crankcase mark, and install the magneto flywheel (Pg. 44).
•Put the thrust washer on the crankcase end of the kick shaft, and install the kickstarter assembly (Pg. 52).
•Put the thrust washer, idle gear, and thrust washer onto the output shaft.
•Install the circlip on the end of the output shaft.



A. Thrust Washer B. Idle Gear

•Using the shift shaft oil seal guide (special tool) in the crankcase shift shaft oil seal, insert the shaft back through the crankcase, and fit the shift mechanism arm back onto the end of the shift drum (Pg. 51).
•Install the thrust washer (this thrust washer is identical to another between the clutch housing and the clutch hub), and sleeve on the drive shaft.
•Apply transmission oil to the outside of the sleeve.
•Install the drive shaft idle gear with its dogged side facing outward.

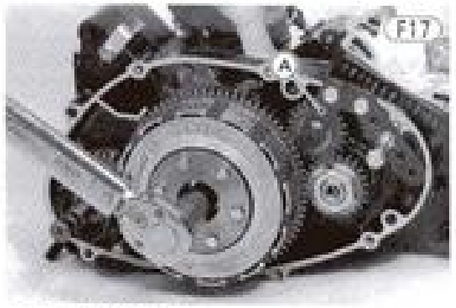


A. Idle Gear
B. Sleeve
C. Thrust Washer

•Install the clutch (Pg. 49). Clutch hub bolt can be tightened after the primary gear is installed.
•Install the collar and **O** ring on the right side of the crankshaft.

A. Collar B. "O" Ring

•Install the primary gear (Pg. 53).
•Tighten the primary gear nut and clutch hub bolt securely while holding the gear steady with the gear holder (special tool). The tightening torque for the primary gear nut is 8.0 kg-m (58 ft-lbs), and the torque for the clutch hub bolt is 4.2 kg-m (30 ft-lbs).



A. Holder (57001-1015)

•Bend one side of the toothed washer over the side of the primary gear nut.
•Install the clutch spring plate pusher and bearing into the clutch spring plate.
•Check that the knock pins (2) are in place, and install the right engine cover using a new cover gasket (Pg. 48).
•Install the oil passage pipe and **O** ring on the right engine cover, put the **O** ring on the oil pump, and install the oil pump (Pg. 45).
•Install the kickstarter pedal in the position marked during disassembly, and tighten the bolt.
•Apply a little two-stroke engine oil to the connecting rod needle bearing, piston pin, and piston rings, and install the piston (Pg. 43).
•Install the cylinder using a new cylinder base gasket (Pg. 41).
•Fill the oil passage in the right engine cover and oil pipe with a two-stroke engine oil (Pgs. 42 and 49).
•Fit a new aluminum washer on each side of the check valve and the oil pipe fitting. Install the check valve on the cylinder, and install the oil pipe fitting on the right engine cover with the banjo bolts tightened to 0.45 kg-m (39 in-lbs) of torque.
•Install the cylinder head using a new gasket (Pg. 41).
•Install the engine (Pg. 59).
•Fill the engine with oil, check the oil level (Pg. 16), and add more if necessary.
•Carry out the adjustment procedures listed at the end of the engine installation section (Pg. 59).

TRANSMISSION

Removal:

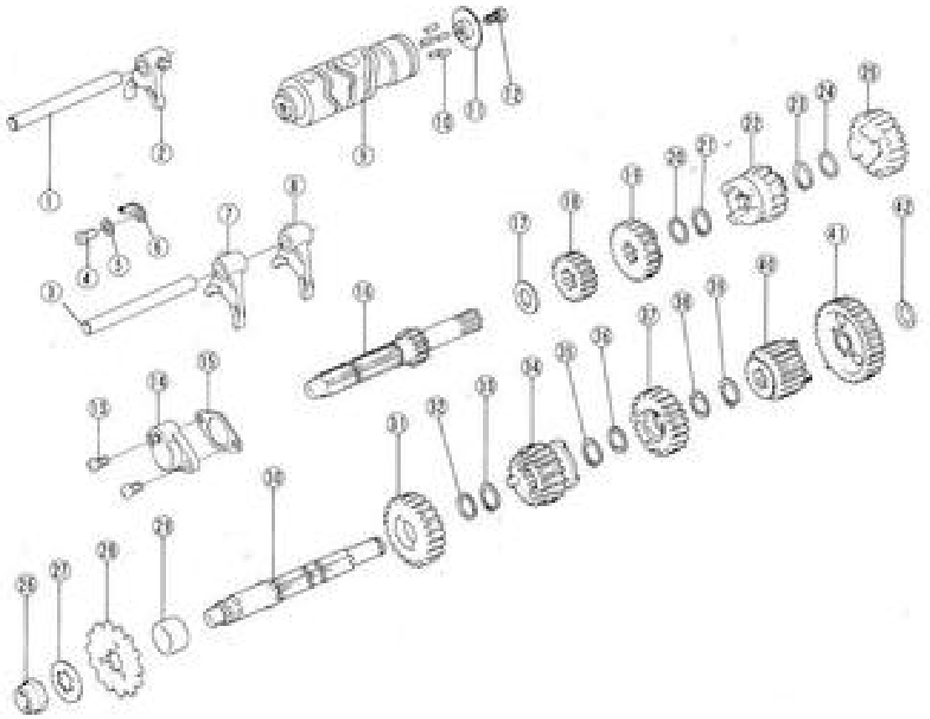
•Remove the engine (Pg. 58).
•Split the crankcase (Pg. 59).
•Remove the neutral set lever and gear set lever.

A. Neutral Set Lever
B. Gear Set Lever
C. Spring
D. Shift Drum Guide Plate

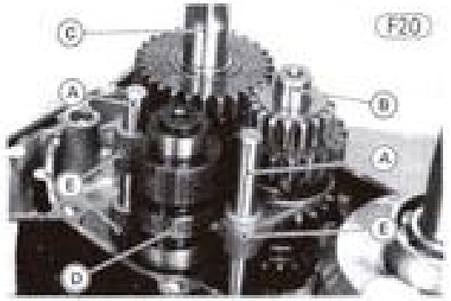
•Unscrew the screws (2), and remove the shift drum guide plate.
•Pull out the shift rods ① and ② in the right crankcase half, and take out the drive shaft assembly, output shaft assembly, shift drum, and shift forks ③, ④, and ⑤.

Shift Drum, Drive Shaft, Output Shaft

F19



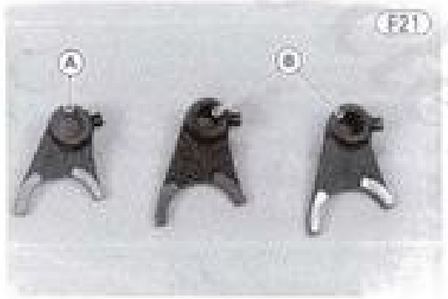
1. Shift Rod
2. Shift Fork (4th/5th)
3. Shift Rod
4. Screw
5. Lockwasher
6. Rotor
7. Shift Fork (2nd/3rd)
8. Shift Fork (1st)
9. Shift Drum
10. Pin
11. Pin Plate
12. Screw
13. Screw
14. Neutral Switch Cover
15. Gasket
16. Drive Shaft
17. Washer
18. 2nd Gear
19. 4th Gear
20. Washer
21. Circlip
22. 3rd Gear
23. Circlip
24. Washer
25. 5th Gear
26. Nut
27. Splined Washer
28. Sprocket
29. Collar
30. Output Shaft
31. 2nd Gear
32. Washer
33. Circlip
34. 4th Gear
35. Circlip
36. Splined Washer
37. 3rd Gear
38. Splined Washer
39. Circlip
40. 5th Gear
41. 1st Gear
42. Washer



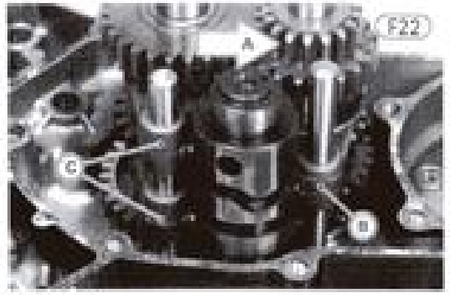
A. Shift Rods
B. Drive Shaft
C. Output Shaft
D. Shift Drum
E. Shift Forks

Installation Notes:

1. Install the shift fork with short fingers on the front shift rod, and install the forks (2) with long fingers on the rear shift rod.



A. Shift Fork with Short Fingers
B. Shift Forks with Long Fingers



A. Forward
B. Shift Fork with Short Fingers
C. Shift Forks with Long Fingers

2. Check if the washers on drive shaft assembly and output shaft assembly are in place.

A. Washers

Drive Shaft

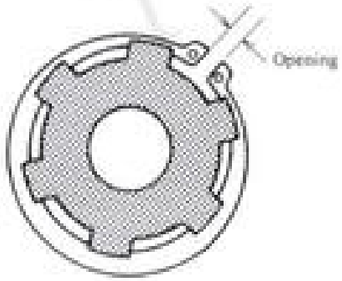
Disassembly:

- Pull off the washer (1), 2nd gear (3), 4th gear (4), and washer (5).
- Remove the circlip (7), and pull off the 3rd gear (6).
- Remove the circlip (8), and pull off the washer (9) and 5th gear (2).

Assembly Notes:

1. Replace any circlips that were removed with new ones. Install the circlip so that the opening coincides with one of the splined grooves in the drive shaft.

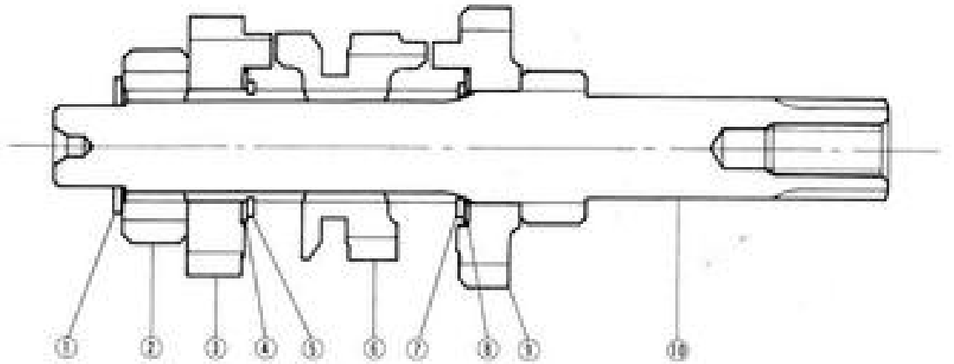
Circlip Installation F24



2. The drive shaft gears can be recognized by size, the gear with the smallest diameter is 1st gear and the largest one, 5th gear.
3. Be sure that all parts are put back in the correct sequence, and facing the proper direction (Fig. F23).

Drive Shaft Assembly

F25



1. Washer
2. 2nd Gear
3. 4th Gear
4. Washer
5. Circlip
6. 3rd Gear
7. Circlip
8. Washer
9. 5th Gear
10. Drive Shaft

Output Shaft
Disassembly:

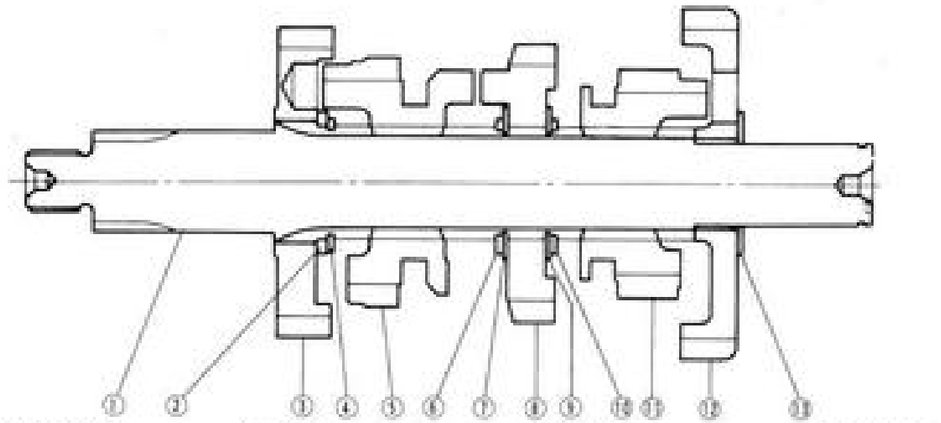
- Remove the 2nd gear ② and flat washer ① from the left end.
- Remove the washer ⑧, 1st gear ⑦, and 5th gear ⑨.
- Remove the circlip ⑤, and pull off the splined washer ④, 3rd gear ⑥, and splined washer ⑧.
- Remove the circlip ③, and pull off the 4th gear ⑭.
- Remove the circlip ⑬.

Assembly Notes:

1. Replace any circlips that were removed with new ones. Install the circlip so that the opening coincides with one of the splined grooves in the output shaft (Fig. F24).

Output Shaft Assembly

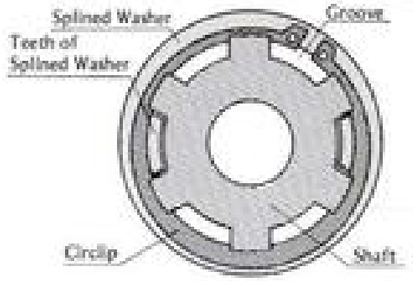
F26



1. Output Shaft
2. Washer
3. 2nd Gear
4. Circlip
5. 4th Gear
6. Circlip
7. Splined Washer
8. 3rd Gear
9. Splined Washer
10. Circlip
11. 5th Gear
12. 1st Gear
13. Washer

2. Install the splined washer so that its teeth do not coincide with the circlip opening.

Circlip, Splined Washer Installation (F27)

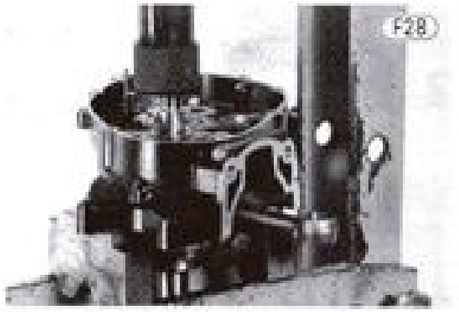


3. The output shaft gear sizes are opposite from those of the drive shaft gears; the largest is 1st gear and the smallest, 5th gear.
4. Be sure that all parts are put back in the correct sequence, and facing the proper direction (Fig. F26).

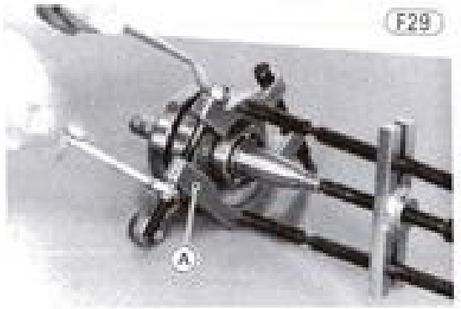
CRANKSHAFT

Removal:

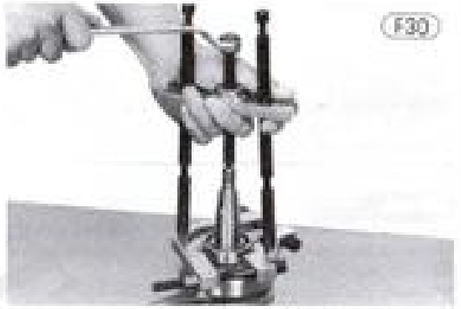
- Remove the engine (Pg. 58).
- Split the crankcase (Pg. 59).
- Remove the transmission (Pg. 62).
- Using the press, remove the crankshaft from the right crankcase half.



- Remove the crankshaft collar from the right crankcase half, and remove the **O** ring on the crankshaft right end.
- To remove the crankshaft ball bearing on the crankshaft, first fit the bearing puller (special tool) into place, and tighten the nuts evenly to create a space between the bearing and the crankshaft flywheel. Then remove the bearing by turning the bolt on the bearing puller.



A. Bearing Puller (57001-158)



Installation:

- Install the left crankshaft bearing in the left crankcase half as explained in the left crankcase half assembly note (Pg. 68).
- Install the crankshaft in the left crankcase half using a press with a chisel or wedge inserted between the flywheels opposite the connecting rod big end.

A. Chisel or Wedge

- Assemble the crankcase halves (Pg. 60).
- Install the engine (Pg. 59).

•Fill the engine with oil to the proper level (Pg. 16).
•Carry out the adjustment procedures listed at the end of the engine installation section (Pg. 59).

Disassembly:

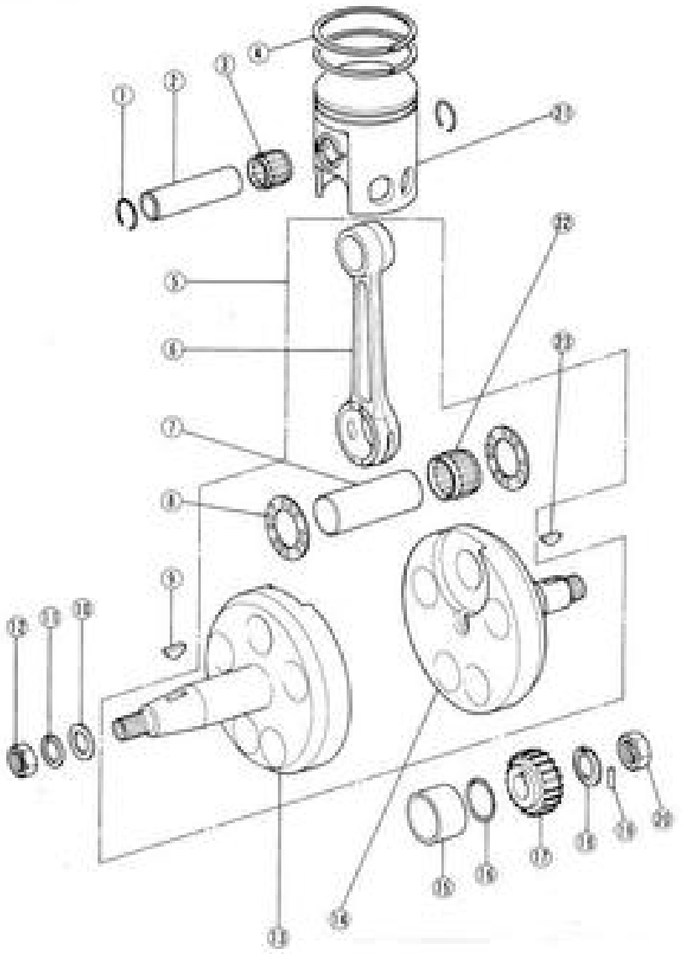
•If it should be necessary to disassemble the crankshaft ①, use a press to remove the crankpin ⑦. Removal of the crankpin separates the flywheels ⑬, ⑭, connecting rod ⑥, big end needle bearing ⑬, crankpin, and connecting rod side washers ⑧.

Assembly Notes:

Since assembly of the crankshaft demand exacting tolerances, the disassembly and reassembly of the crankshaft can only be done by a shop having the necessary tools and equipment. The following information gives the tolerance that are necessary for a properly equipped shop to reassemble the crankshaft.

1. The flywheels and crankpin are cold-fitted to a tolerance of 0.058 ~ 0.077 mm.
2. Select a crankpin, needle bearing, and connecting rod such that the radial clearance will be 0.011 ~ 0.027 mm.
3. Press with a thickness gauge inserted between the connecting rod and one of the flywheels so that the side clearance will be 0.35 ~ 0.40 mm.
4. Supporting both ends of the crankshaft, check the crankshaft runout using a dial gauge. The flywheels must be aligned so that the runout is under 0.03 mm total indicated reading.

Crankshaft (F32)



1. Snap Ring
2. Piston Pin
3. Small End Bearing
4. Piston Ring
5. Crankshaft Assembly
6. Connecting Rod
7. Crankpin
8. Side Washer
9. Woodruff Key
10. Flat Washer
11. Lockwasher
12. Nut
13. Left Flywheel
14. Right Flywheel
15. Collar
16. O Ring
17. Primary Gear
18. Toothed Washer
19. Pin
20. Nut
21. Piston
22. Big End Bearing
23. Woodruff Key

CRANKCASE

NOTE: All following references to crankcase bearing removal and installation require the use of a press, bearing driver, and/or bearing driver holder. In the absence of the above mentioned tools, satisfactory results may be obtained by quickly heating the case (in the area immediately surrounding the bearing) to approximately 93°C (200°F) max, and tapping the bearing in or out.

CAUTION **Do not heat the case with a torch. This will warp the case. Soak the case in oil and heat the oil.**

Disassembly (left crankcase half):

- Remove the engine (Pg. 58).
- Split the crankcase (Pg. 59).
- Using a hook, pull out the shift shaft oil seal, crankshaft oil seal, and output shaft oil seal.

A. Shift Shaft Oil Seal **C. Output Shaft Oil Seal**
B. Crankshaft Oil Seal **D. Drive Shaft Plug**

- Push out the drive shaft plug, using a suitable rod.
- Using a bearing driver holder (special tool), remove the output shaft ball bearing out the right side.

A. Bearing Driver Holder (57001-138)

- Insert the metal rod from the left side, and remove the drive shaft needle bearing by tapping evenly around the bearing.
- If the crankshaft ball bearing remained in the left crankcase half, take it out the right side using a bearing driver holder (special tool: P/N 57001-139).

Assembly Notes (left crankcase half):

1. Inspect the bearings, and replace if necessary (Pg. 114).
2. With compressed air, blow out the oil passage for the left crankshaft main bearing to remove dirt or particles which may block the passage.

A. Oil Passage

3. Install the output shaft ball bearing and crankshaft ball bearing using the bearing driver and bearing driver holder (special tools). Drive each bearing in until it stops at the bottom of the hole.

Table F1 Bearing Driver Necessary for Left Crankcase Half Assembly

	Part Number
Output Shaft	57001-290
Crankshaft	57001-289

A. Bearing Driver Holder (57001-139)
B. Bearing Driver (57001-289)

4. Install the drive shaft needle bearing from the right side of the crankcase using a suitable driver. Press it into place until the bearing face is level with the surface of the left crankcase half. The marked side of the needle bearing faces the right.
5. Replace the oil seals with new ones. Using suitable tools, press the seals in so that the face of each seal is level with the surface of the left crankcase half.

6. Replace the plug with a new one. Using a suitable tool, press the plug in so that the face of the plug is level with the surface of the left crankcase half.

Disassembly (right crankcase half):

- Remove the engine (Pg. 58).
- Split the crankcase (Pg. 59).
- Remove the transmission (Pg. 62).
- Remove the crankshaft (Pg. 66).
- Remove the right crankshaft oil seal with a hook.
- Remove the crankshaft ball bearing holder screws (4), and take off the holder.
- Remove the crankshaft ball bearing using the bearing driver holder (special tool: P/N 57001-139).
- Remove the drive shaft ball bearing holder screws (2), and take off the holder.

A. Bearing Holder

- Remove the drive shaft ball bearing, using the bearing driver holder (special tool: P/N 57001-139).
- Insert a metal rod from the right side, and remove the needle bearing by tapping evenly around the bearing.
- Remove the screws (2), and remove the ratchet lever stop and guide.
- Remove the return spring pin.

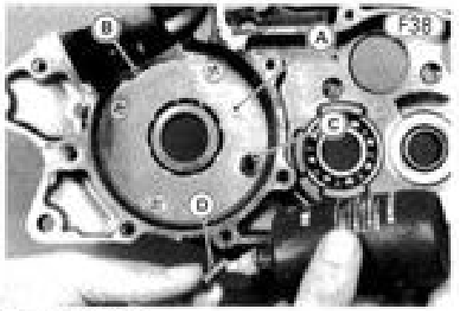
Assembly Notes (right crankcase half):

1. Inspect the bearings, and replace if necessary (Pg. 114).
2. With compressed air, blow out the oil passage for the right crankshaft main bearing to remove dirt or particles which may block the passage.
3. Install the drive shaft ball bearing and crankshaft ball bearing using the bearing driver holder (special tool: P/N 57001-139) and bearing drivers (special tools). Drive each bearing in until it stops at the bottom of the hole.

Table F2 Bearing Driver Necessary for Right Crankcase Half Assembly

	Part Number
Drive shaft	57001-290
Crankshaft	57001-296

4. Install the output shaft needle bearing from the right side of the crankcase using a suitable driver. Press it into place until the bearing face is level with the right side surface of the right crankcase half. The marked side of the needle bearing faces the right.
5. Install the crankshaft bearing holder so that its notch matches the scavenge port. Face the chamfers on the screw holes upward so that the screw heads will countersink into the holder. Apply a non-permanent locking agent to the threads of screws.



A. Bearing Holder
B. Notch
C. Chamfers
D. Apply a non-permanent locking agent.

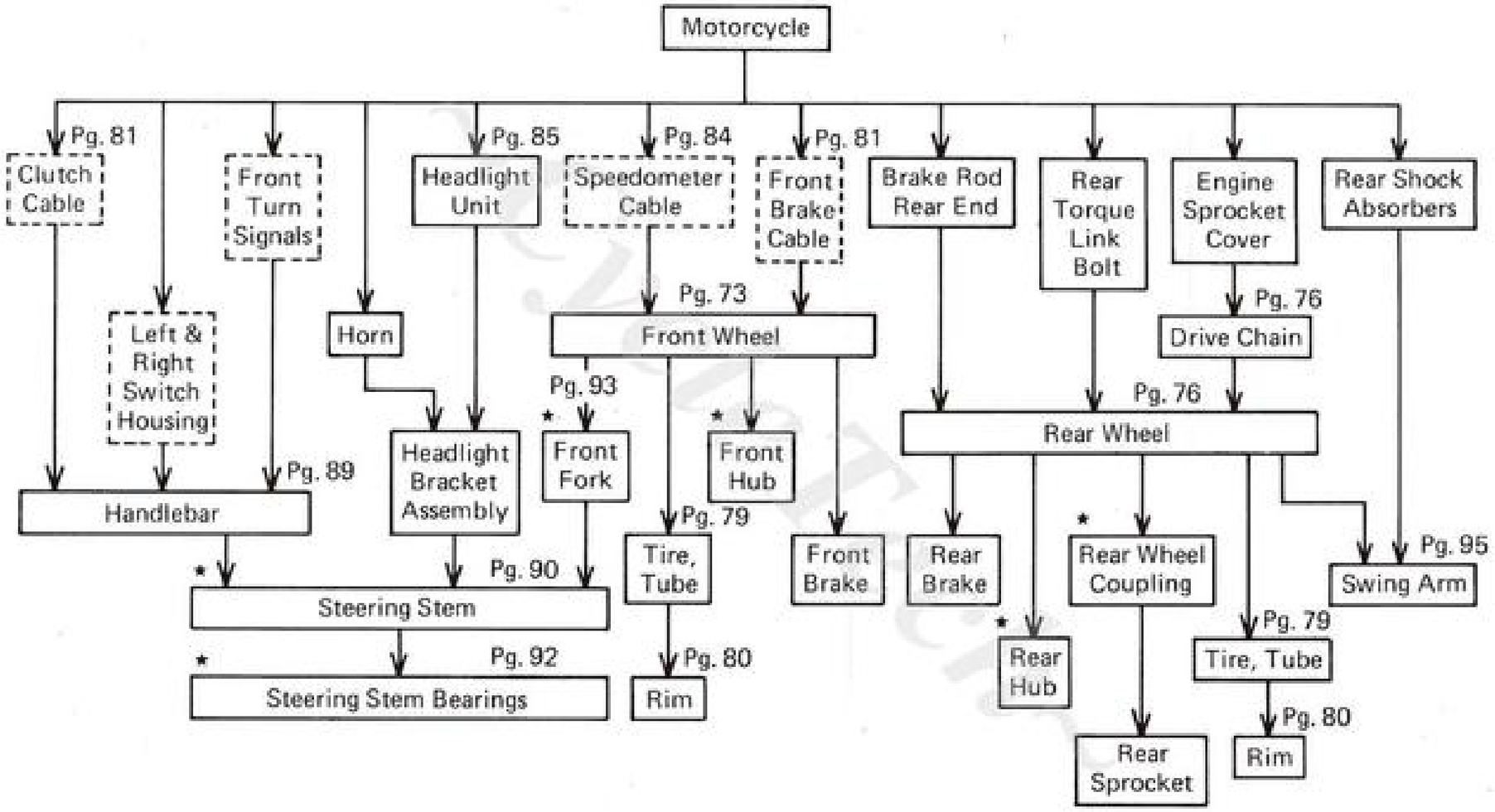
6. Install the ratchet gear arm stop and guide in the direction as shown in Fig. E69 on Pg. 52.
7. Apply a non-permanent locking agent to the thread of the return spring pin.

Disassembly–Chassis

Table of Contents

FLOW CHART
Disassembly — Chassis

This chart is intended to be aids to proper removal. Select the component you wish to remove, and follow the arrows to that point on the chart.



NOTES: 1. Action with a mark (*) requires special tool(s) for removal, installation, disassembly, or assembly.
2. Parts in the broken line are required to remove its mounting fasteners, but not necessary its complete removal for part removal next to it.

FRONT WHEEL, FRONT BRAKE

Removal:

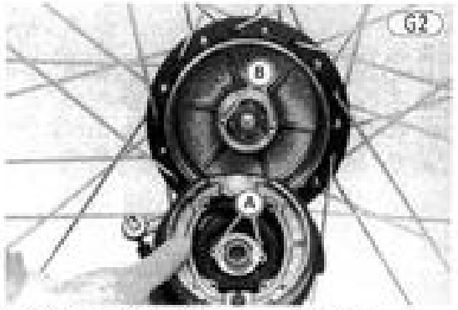
•Use a jack under the engine or other suitable means to lift the front of the motorcycle.
•Disconnect the lower end of the speedometer cable with pliers.

A. Speedometer Cable
B. Front Brake Cable
C. Adjuster
D. Locknut

•Remove the lower end of the front brake cable from the brake cam lever (Pg. 81).
•Remove the front axle nut.
•Hold the wheel up to facilitate axle removal, pull out the axle, and then remove the wheel from the motorcycle.

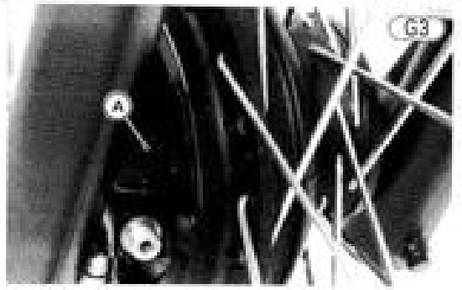
Installation Notes:

1. Install the brake panel so that the speedometer gear drive fits in the front hub notches.



A. Speedometer Gear Drive
B. Notches

2. Hold the front wheel in its place between the front fork tubes with the left torque tongue fitted into the brake panel groove, and insert the axle from the left.



A. Torque Tongue

3. Center the brake panel assembly in the brake drum. This is done by tightening the axle lightly, spinning the wheel, and pulling the brake lever forcefully. The partially tightened axle allows the brake panel assembly to center itself within the brake drum.

NOTE: This procedure can prevent a soft, or "spongy feeling" brake.

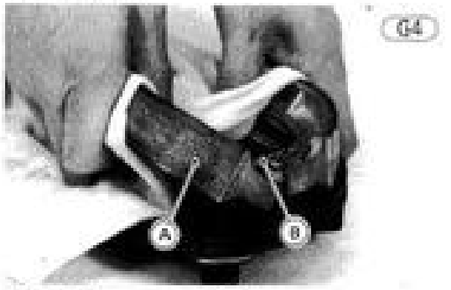
4. Tighten the front axle nut to 7.0 kg-m (51 ft-lbs) of torque.
5. Insert the speedometer inner cable into the brake panel while turning the wheel so that the slot in the end of the cable will seat on the tongue of the speedometer pinion. Tighten the cable nut with pliers (Fig. G45).
6. Adjust the front brake (Pg. 21).

Front Brake Disassembly:

WARNING **Brake linings contain asbestos fiber. Inhalation of asbestos may cause serious scarring of the lungs and may promote other internal injury and illness, including cancer. Observe the following precautions when handling brake linings:**

1. Never blow brake lining dust with compressed air.
2. If any components are to be cleaned, wash with detergent, then immediately discard the cleaning solution and wash your hands.
3. Do not grind any brake lining material unless a ventilation hood is available and properly used.

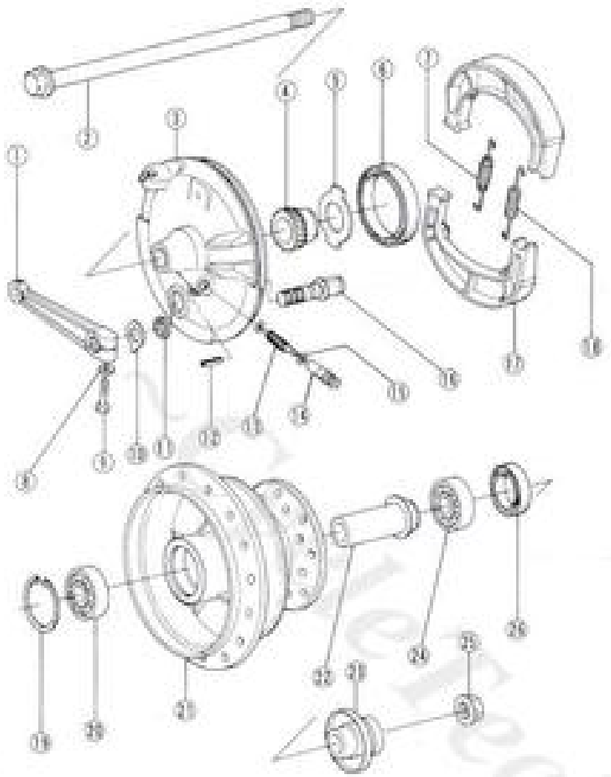
•Remove the brake panel ① from the wheel.
•Using a clean cloth around the linings to prevent grease or oil from getting on them, remove the brake shoes ② by pulling up on the center of the linings as shown in the figure.



A. Brake Shoes
B. Springs

Front Hub

G5



1. Cam Lever
2. Axle
3. Brake Panel
4. Speedometer Gear
5. Gear Drive
6. Grease Seal
7. Long Spring
8. Washer
9. Bolt
10. Wear Indicator
11. Dust Seal
12. Pin
13. Pinion
14. Bushing
15. Washer
16. Camshaft
17. Brake Shoe
18. Short Spring
19. Circlip
20. Ball Bearing
21. Hub
22. Distance Collar
23. Cap
24. Ball Bearing
25. Nut
26. Grease Seal

•Remove the long spring ⑦ and short spring ⑱ to separate the two brake shoes.
•Mark the position of the cam lever ① so that it can be installed later in the same position.
•Unbolt and remove the cam lever, brake lining wear indicator ⑩, dust seal ⑪, and camshaft ⑯.

G6

A. Long Spring
B. Short Spring
C. Brake Camshaft
D. Anchor Pin

Front Brake Assembly Notes:

1. Clean the old grease from the camshaft, and regrease using regular cup grease. Apply grease to the center of the shaft and on the cam surfaces. Do not overgrease.
2. Fit the long spring and short spring onto the brake shoes as shown, and wrapping a clean cloth around the linings to prevent grease or oil from getting on them, install the shoes on the brake panel.
3. Fit the dust seal and the indicator on the serration so that it points to the extreme right of the USABLE RANGE.

A. Indicator B. USABLE RANGE

Speedometer Gear and Pinion Disassembly:

- Disassemble the front brake (Pg. 73).
- Pull out the grease seal ① using a hook.
- Pull out the speedometer gear and gear drive ②.
- If the speedometer cable bushing ③ or speedometer pinion ④ needs to be removed, first drill the panel through the pin ⑤ using a 1.5 mm drill bit. And then, drill the panel through the 1.5 mm drill hole from inside using a 3 mm drill bit. Using a suitable tool, tap out the pin, and then pull out the speedometer cable bushing, thrust washer ⑥, pinion, and thrust washer ⑦.

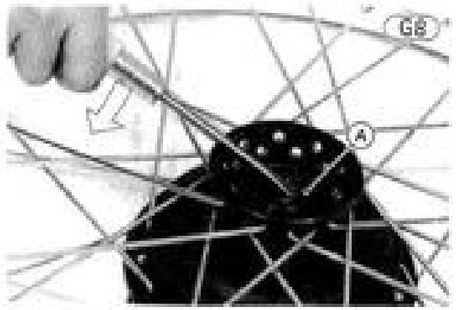
NOTE: It is recommended that the assembly be replaced rather than attempting to repair the components.

Speedometer Gear and Pinion Assembly Notes:

1. Replace the grease seal with a new one. Apply a little grease to the seal. Install it using the driver and holder (special tools: P/N 57001-298 and 57001-139) so that the face of the seal is level with the surface of the panel.
2. After inserting a new pin, stake the panel hole to secure the pin in place.
3. Regrease the speedometer gear, gear drive, and pinion.

Front Hub Disassembly:

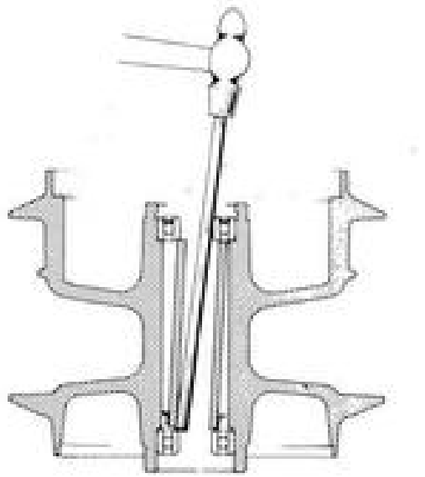
- Pull the brake panel ① and cap ② off the front hub.
- Pull off the grease seal ③ on the cap side using a hook.



A. Grease Seal

- Insert a metal rod into the hub from the panel side, and remove the bearing ④ by tapping evenly around its inner race. The distance collar ⑤ will come out with the bearing.

Bearing Removal



- Remove the circlip ⑥.
- Insert a metal rod into the hub from the cap side, and remove the bearing ⑦ on the panel side by tapping evenly around its inner race.

Front Hub Assembly Notes:

1. Inspect the bearings and replace them if necessary (Pg. 119).
2. Lubricate the ball bearings (Pg. 119).
3. Before installing the wheel bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.
4. Install the ball bearings using the wheel bearing driver and bearing driver holder (special tools). Press the bearing in until it stops at the bottom of the hole.

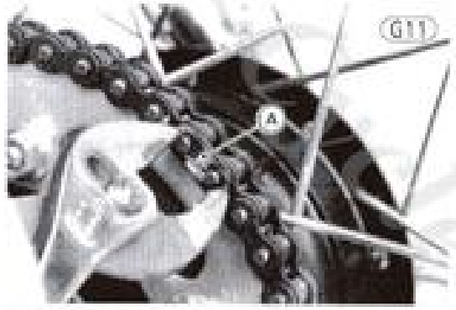
A. Bearing Driver Holder (57001-139)
B. Bearing Driver (57001-284)

5. Install a new grease seal on the cap side using the bearing driver and bearing driver holder (special tools: P/N 57001-288 and 57001-139). Press the seal so that the face of the seal is level with the surface of the front hub.

DRIVE CHAIN

Removal:

•Check that the transmission is in neutral.
•Remove the engine sprocket cover screws (3), and take off the cover.
•Remove the clip from the drive chain master link using pliers, and remove the master link.



A. Master Link Clip

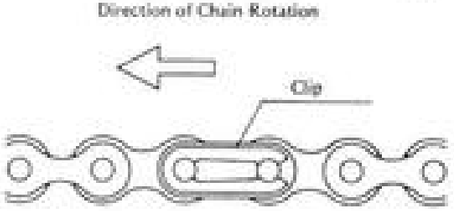
•Free the drive chain from the sprockets, being careful that the chain does not get dirty from contact with the ground.

Installation Notes:

1. The direction of the master link clip must be as shown.

WARNING **Incorrect installation of the master link clip can allow it to catch on an adjacent part. If the clip dislodges, the chain could come apart, and this could result in rear wheel lockup and loss of control.**

Master Link Clip Installation G12

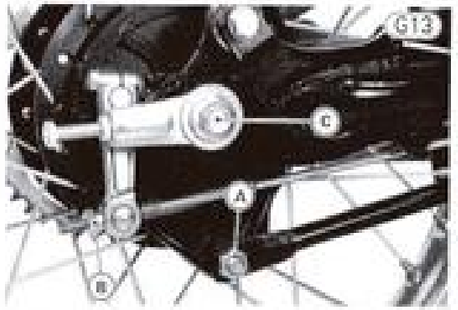


2. Adjust the drive chain (Pg. 20).

REAR WHEEL, REAR BRAKE

Removal:

•Raise the rear wheel off the ground.
•Remove the drive chain from the rear sprocket as explained in drive chain removal (Pg. 76).
•Remove the nut, and take off the bolt at the rear end of the torque link.



A. Torque Link Nut
B. Adjusting Nut
C. Rear Axle

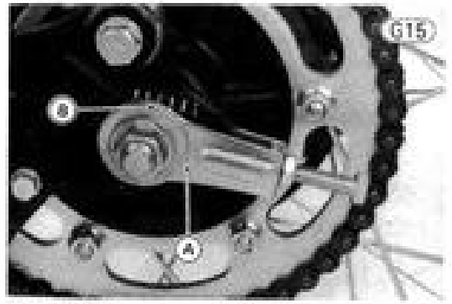
•Remove the adjusting nut from the end of the brake rod, and free the rod from the cam lever.
•Remove the spring from the brake rod, and remove the brake rod joint from the brake cam lever.
•Remove the rear axle nut.
•Holding the wheel to facilitate axle removal, pull out the axle, and then remove the wheel from the motorcycle. The drive chain adjusters and spacer will drop out.

Installation Notes:

1. Apply a little grease to the inside surface of the hole in the coupling where the rear hub fits.

A. Grease

2. Install the chain adjuster on each side of the swing arm. The chain adjusters should be installed with the notch mark side facing out.



A. Chain Adjuster B. Notch Mark

3. When installing the drive chain master link clip, the direction of the clip should be as shown in Fig. G12.
4. Adjust the drive chain (Pg. 20) and rear brake (Pg. 21).
5. Check the rear brake light switch and adjust if necessary (Pg. 23).

Rear Brake Disassembly:

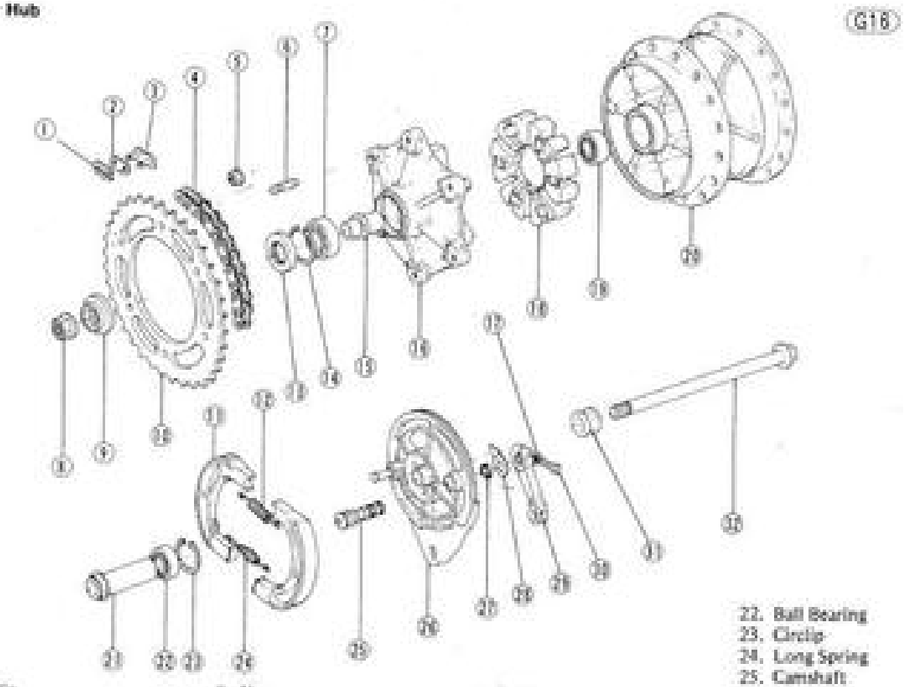
NOTE: Refer to the warning on Pg. 73 for general brake information.

- Remove the brake panel ⑯ from the wheel.
- Using a clean cloth around the linings to prevent grease or oil from getting on them, remove the brake shoes ⑪ by pulling up on the center of the linings as shown in Fig. G4.
- Remove the long spring ㉔ and short spring ⑫ to separate the two brake shoes.
- Mark the position of the cam lever ㉙ so that it can be installed later in the same position.
- Unbolt and remove the cam lever, brake lining wear indicator ㉘, dust seal ㉗, and camshaft ㉕.

Rear Brake Assembly Notes:

1. Clean the old grease from the camshaft, and regrease using regular cup grease. Apply grease to the center of the shaft and to the cam surfaces. Do not overgrease.

Rear Hub



1. Clip
2. Plate
3. Master Link
4. Chain
5. Nut
6. Stud
7. Ball Bearing
8. Nut
9. Collar
10. Sprocket
11. Brake Shoe
12. Short Spring
13. Grease Seal
14. Circlip
15. Sleeve
16. Coupling
17. Washer
18. Damper
19. Ball Bearing
20. Rear Hub
21. Distance Collar
22. Ball Bearing
23. Circlip
24. Long Spring
25. Camshaft
26. Brake Panel
27. Dust Seal
28. Wear Indicator
29. Cam Lever
30. Bolt
31. Spacer
32. Axle

2. The camshaft must be installed so that the triangular mark on the cam surface points to the center of the panel. Improper installation will cause ineffective braking.

G17

A. Triangular Mark

3. Fit the long spring and short spring onto the brake shoes as shown, and wrapping a clean cloth around the linings to prevent grease or oil from getting on them, install the shoes on the brake panel.

G18

A. Long Spring B. Short Spring

4. Fit the dust seal and the indicator on the serration so that it points to the extreme left of the USABLE RANGE.

G19

A. Indicator

Wheel Coupling Disassembly:

•Remove the rear sprocket nuts ① (6) to separate the rear sprocket ② and wheel coupling ③.

G20

A. Sprocket Nut

•Remove the coupling and rubber damper ④ from the wheel.
•Pull out the coupling collar ⑤ from the left, and the coupling sleeve ⑥ from the right.
•Using a hook, pull off the grease seal ⑦.

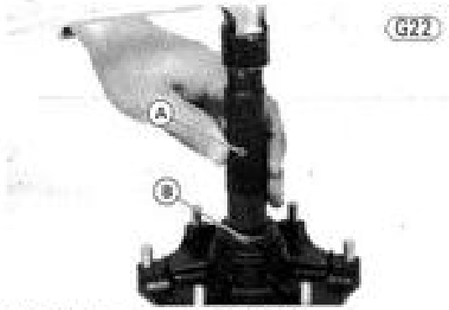
G21

A. Grease Seal

•Remove the circlip ⑧, and press the bearing ⑨ out toward the sprocket side.

Wheel Coupling Assembly Notes:

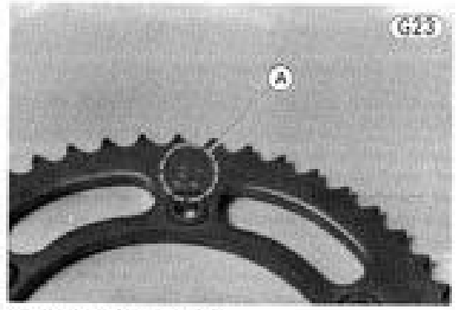
1. Inspect the bearing, and replace if necessary (Pg. 119).
2. Lubricate it (Pg. 119), and install it using a bearing driver and bearing driver holder (special tools). Drive the bearing in until it stops at the bottom of the hole.



A. Bearing Driver Holder (57001-138)
B. Bearing Driver (57001-288)

3. Replace the grease seal with a new one using the bearing driver and bearing driver holder (special tools: P/N 57001-296 and 57001-138). Drive in the seal until the face of the seal is level with the end of the grease seal hole.
4. Install the rear sprocket facing the tooth number marking outward, and tighten the nuts to 2.0 kg-m (14.5 ft-lbs) of torque.

WARNING **By installing the sprocket this way, the chamfered hole side of the rear sprocket facing toward the coupling. If not, the sprocket will not seat on the coupling evenly, causing the drive chain to be thrown off by excessive sprocket runout during operation. This can result in rear wheel lockup and loss of control.**



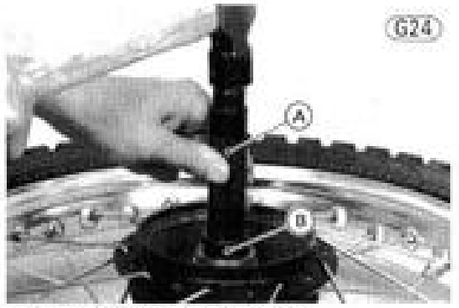
A. Tooth Number Marking

Rear Hub Disassembly:

- Remove the wheel coupling (1), rear brake panel (5), and rubber damper (3) from the wheel.
- Remove the circlip (2).
- Insert a metal rod into the hub from the brake panel side, and remove the left side bearing (3) by tapping evenly around the bearing inner race. The distance collar (1) will come out with the bearing. Refer to Fig. G9.
- Insert the metal rod into the hub from the other side, and tap out the remaining bearing (3).

Rear Hub Assembly Notes:

1. Inspect the bearings and replace them if necessary (Pg. 119).
2. Lubricate the ball bearing (Pg. 119).
3. Before installing the wheel bearings, blow any dirt or foreign particles out of the hub with compressed air to prevent contamination of the bearings.
4. Install the brake panel side ball bearing facing the shield outward with a wheel bearing driver and the bearing driver holder (special tools). Press the bearing in until it stops at the bottom of the hole.



A. Bearing Driver Holder (57001-139)
B. Bearing Driver (57001-284)

5. Install the coupling side bearing. Press the bearing in until it stops at the bottom of the hole using the same special tools used for the other bearing installation.

TIRE, TUBE

Removal:

- Remove the wheel (Pg. 73 or 76).
- Mark the valve stem position on the tire with chalk so that the tire can be reinstalled in the same position to maintain wheel balance.
- Take out the valve core to let out the air.
- Remove the valve stem nut.

A. Valve Stem Nut **B. Valve Core**

•Use a rubber mallet to break the tire beads away from both sides of the rim.
•Step on the side of the tire opposite the valve stem, and start prying the tire off the rim near the valve stem with tire irons. Take care not to insert the tire irons so deeply that the tube gets damaged.

•Remove the tube when one side of the tire is pried off.
•Pry the other side of the tire off the rim, and free the tire from the rim.

Installation:

•Put just enough air in the tube to keep it from getting caught between the tire and rim. Too much air makes fitting difficult, and too little will make the tube more liable to be pinched by the irons. Dust the tube and inside the tire with talcum powder, and insert the tube into the tire now, even if the tire was completely removed from the rim. Insert the valve stem into the rim, and screw the nut on loosely.
•Lubricate the tire beads and rim flanges with a soap and water solution or liquid soap to help seat the tire beads in the rim while inflating the tire.
•If the tire was completely removed, pry one side back onto the rim.

NOTE: If a new tire is installed, the yellow paint mark on the tire should be aligned with the valve stem for best balancing results.

G27

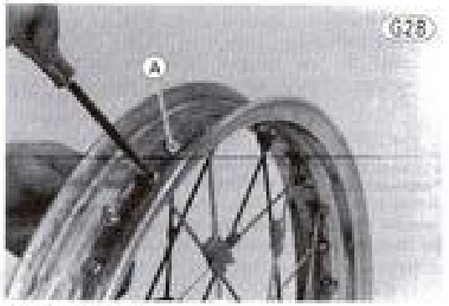
A. Valve Stem

•Pry the other side of the tire onto the rim, starting at the side opposite the valve. Take care not to insert the tire irons so deeply that the tube gets damaged.
•Check that the tube is not pinched between the tire and rim, and then inflate to the specified pressure (Pg. 118).
•Tighten the valve stem nut, and put on the valve cap.
•Mount the wheel on the motorcycle (Pg. 73 or 76).
•Adjust the drive chain (Pg. 20), and the rear brake (Pg. 21).

RIM

Removal:

•Remove the wheel from the motorcycle (Pg. 73 or 76).
•Take the tire and tube off the rim (Pg. 79).
•Remove the rim band.
•Tape or wire all the spoke intersections so that the spokes don't get mixed up, and unscrew the nipples from all the spokes with a screwdriver.



A. Spoke Nipple

Installation:

•Fit all the spokes through the holes, and screw all the nipples onto the spokes tightening them partially.

CAUTION **When assembling the front wheel, be sure to assemble the rim and hub so that the arrow marking on the rim coincides with the direction of wheel rotation. This ensures perfect nipple seating on the rim, and prevents excessive stress to the spokes and nipples, and successive breakage of the spokes and nipples.**

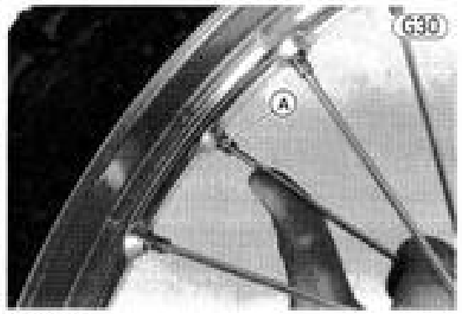
A. Arrow Marking

•Suspend the wheel by the axle, and set up a dial gauge to measure rim runout. Fix the axle in place if necessary to prevent horizontal movement (Pg. 118).
•Tighten the spokes evenly so that the radial (out from the axle) runout is less than 0.8 mm and the axial (side to side) runout is less than 0.5 mm.
•Make sure that the spokes are tightened evenly. Standard torque is 0.30 kg-m (26 in-lbs).
•Mount the tube and tire (Pg. 80).
•Mount the wheel on the motorcycle (Pg. 73 or 76).
•Adjust the drive chain (Pg. 20), and the rear brake (Pg. 21).

SPOKE

Breakage Replacement:

•Reduce the tire air pressure by a small amount.
•Insert the new spoke through the hub, and bend it to meet the nipple.



A. Nipple

•Tighten with a spoke wrench. Standard torque is 0.30 kgm (26 in-lbs).
•Inflate the tire to standard pressure (Pg. 118).

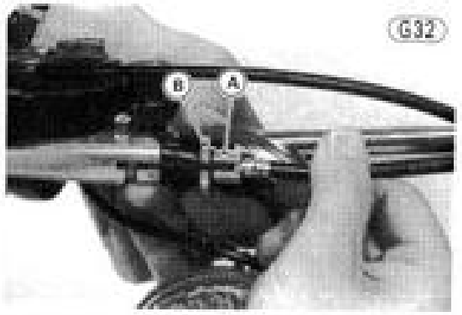
FRONT BRAKE CABLE

Removal:

•Slide up the dust cover, and loosen the locknut on the front brake cable adjuster on the front brake panel, and turn in the adjuster to give the cable plenty of play.

A. Adjuster B. Locknut

•Slide the front brake lever dust cover out of place.
•Loosen the knurled locknut on the front brake lever, and turn in the adjuster.
•Line up the slots on the brake lever, knurled locknut, and adjuster, and free the front brake cable from the brake lever.



A. Adjuster B. Knurled Locknut

•Screw out the cable adjuster on the front brake panel, unhook the cable lower end from the brake cam lever, and free the cable from the motorcycle.

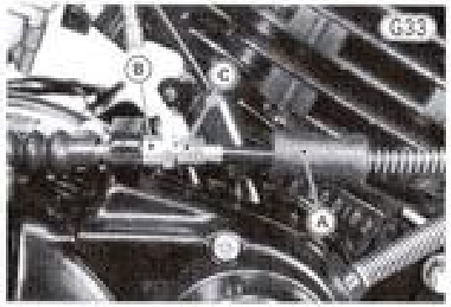
Installation Notes:

1. Before installing the brake cable, lubricate it (Pg. 25).
2. Run the cable through the guides. Route the cable with a minimum of bending so that the inner cable will slide smoothly.
3. Adjust the front brake (Pg. 21).

CLUTCH CABLE

Removal:

•Slide the dust cover at the clutch cable lower end out of place, loosen the locknut, and screw in the cable adjuster fully.



A. Dust Cover
B. Locknut
C. Adjuster

- Slide the clutch lever dust cover out of place.
- Loosen the locknut on the clutch lever, and turn in the adjuster.
- Line up the slots in the clutch lever, locknut, and adjuster, and free the cable from the lever.

A. Locknut
B. Adjuster

- Unscrew the lower end cable adjuster, and free the cable from the clutch release lever.

Installation Notes:

1. Before installing the clutch cable, lubricate it (Pg. 25).
2. Run the upper end of the clutch cable through the cable guide at the right side of the frame down tube, between the right front fork tube and the head pipe, and to the clutch lever.

A. Clutch Cable
B. Cable Guide

3. Adjust the clutch (Pg. 15).

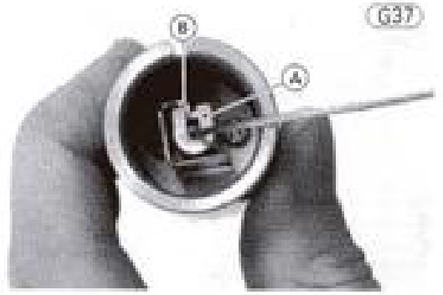
THROTTLE CONTROL CABLE (Throttle, Carburetor, and Oil Pump Cables)

Removal:

- Loosen the carburetor holder and air cleaner duct clamp screws (2), and cock the carburetor so that the throttle valve assembly can be removed easily.
- Loosen the locknut, and turn in the adjuster on the control cable to give the cable a plenty of play.
- Slide the carburetor dust cover out of place.

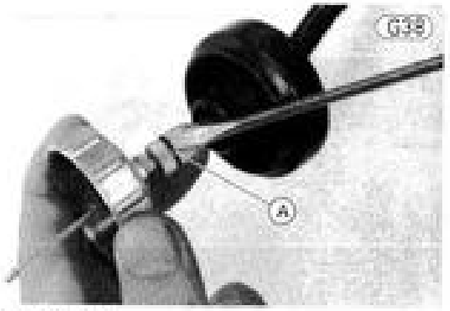
A. Dust Cover
B. Carburetor Cap

- Unscrew the carburetor cap, and pull out the throttle valve assembly.
- Cover up the carburetor with a piece of clean cloth to keep dirt out of it.
- To remove the throttle valve from the cable, pull the spring up from where it seats in the throttle valve so that the cable retainer will fall out of place, and free the tip of the carburetor cable from the cable hook.



A. Cable Hook
B. Cable Retainer

•Open the safety clip slightly with a screwdriver, and pull the carburetor cable off the carburetor cap.



A. Safety Clip

•Remove the carburetor dust cover from the cable.
•Remove the oil pump cover screws (2), and take off the cover.
•Bend out the tap on the oil pump lever, and free the end of the oil pump cable from the lever (Fig. E46 on Pg. 46).
•Loosen the locknut, turn out the adjuster, and free the oil pump cable from the engine.
•Remove the throttle cable retainer.

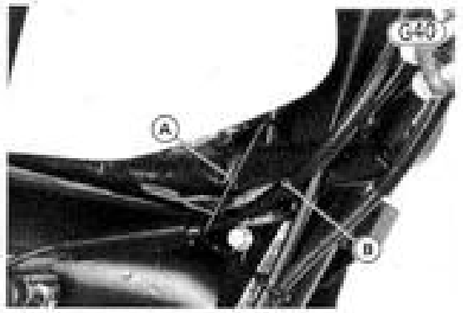
A. Throttle Cable Retainer

•Remove the right switch housing screws (2), and open the housing.
•Slip the throttle cable tip from its catch in the throttle grip, and free the cable from the housing.
•Pull the throttle control cable free of the motorcycle.

NOTE: The throttle, carburetor, and oil pump cables are not made to be separated.

Installation Notes:

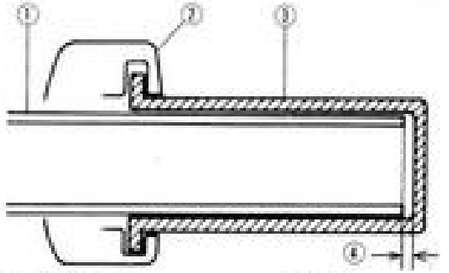
1. Before installing the throttle control cable, lubricate the cable.
2. Run the throttle cable through its guide at the frame down tube, between the right fork leg and the head pipe, and to the right switch housing.



A. Cable Guide B. Throttle Control Cable

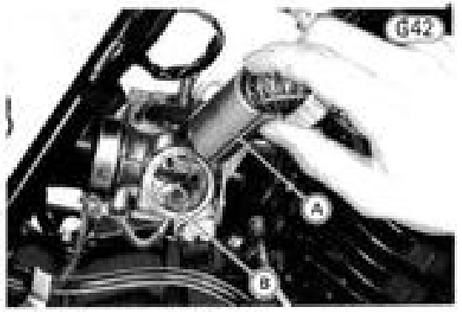
WARNING **Do not push the right switch housing so far onto the handlebar that the inside of the grip contacts the end of the handlebar. This can interfere with throttle action and could result in loss of control.**

Throttle Grip Installation G41



1. Handlebar
2. Right Switch Housing
3. Grip
4. Make clearance.

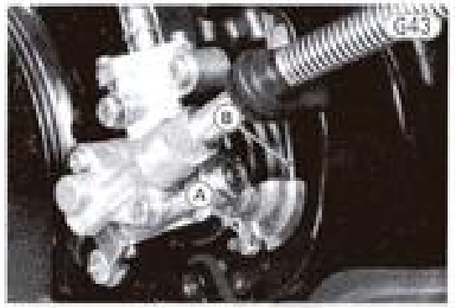
3. To keep the cable tip in place, position the cable retainer on the cable hook with its tab in the slot (Fig. G37).
4. Matching the groove on the side of the throttle valve with the guide pin in the carburetor body, fit the throttle valve back into the carburetor.



A. Groove B. Guide Pin

5. Check to see that the throttle valve goes all the way down into the carburetor body, and slides smoothly.

CAUTION **Make sure the tang on the oil pump lever is bent to hold the oil pump cable securely. If loose, the cable may slip out, resulting in piston seizure.**



A. Tab **B. Inner Cable**

6. Set the carburetor fully perpendicular to the ground fitting the ridge of the carburetor into the notch in the carburetor holder (Fig. E19 on Pg. 38).
7. Check the idle speed, and adjust if necessary (Pg. 12).
8. Adjust the throttle control cable (Pg. 13).

SPEEDOMETER CABLE

Removal:

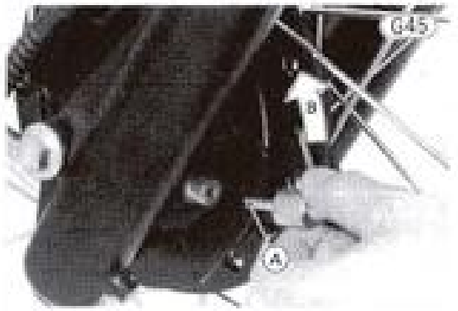
•Disconnect the upper and lower ends of the speedometer cable with pliers.

A. Speedometer Cable

•Pull the cable free of the motorcycle.

Installation Notes:

1. Before installing the speedometer cable, lubricate it (Pg. 26).
2. Insert the speedometer inner cable into the speedometer gear housing while turning the wheel so that the tongue of the speedometer pinion will seat in the slot in the end of the cable. Tighten the cable nut with pliers.



A. Slot **B. Turn the wheel.**

TACHOMETER CABLE

Removal:

•Disconnect the upper end of the tachometer cable from the tachometer with pliers.
•Remove the oil pump cover screws (2), and take off the cover.
•Take off the tachometer cable grommet.

A. Tachometer Cable Grommet
B. Tachometer Cable

•Disconnect the lower end of the tachometer cable from the oil pump with pliers.
•Pull the cable free of the motorcycle.

Installation Note:

1. Before installing the tachometer cable, lubricate it (Pg. 26).

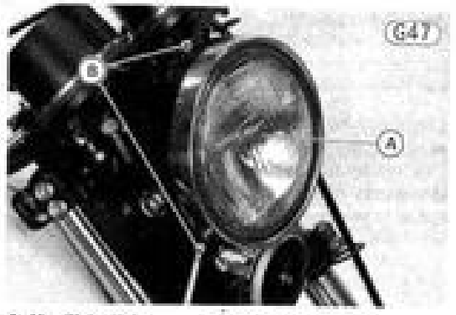
HEADLIGHT UNIT

Removal:

- Take out the retaining screws ⑱, lockwashers ⑲, and collars ⑰ (3 ea), and swing the headlight unit ① out of the housing ⑰.
- Disconnect the three headlight leads and two city light leads from the main wiring harness.

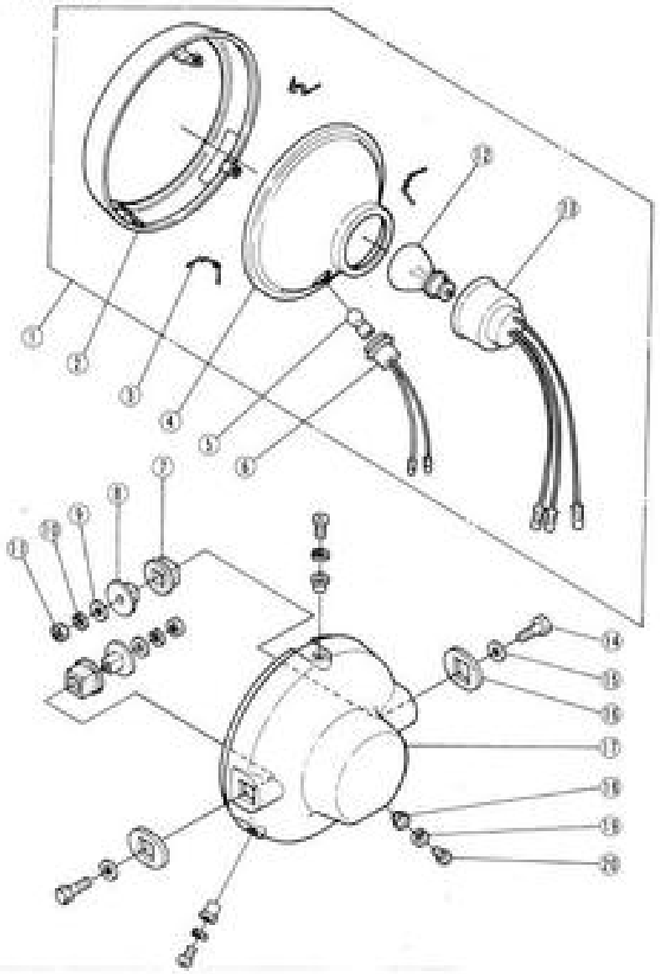
Installation Note:

1. Carry out headlight beam adjustment after installation (Pg. 24).



A. Headlight Unit B. Retaining Screws

Headlight Unit



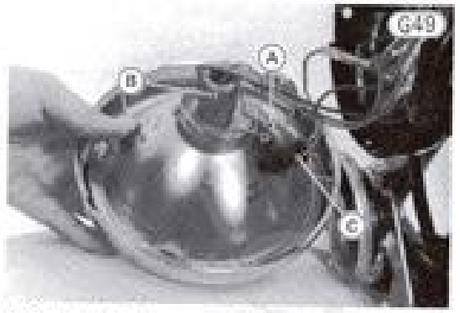
1. Headlight Unit
2. Rim
3. Spring
4. Reflector and Lens Unit
5. City Light Bulb
6. Socket
7. Damper
8. Collar
9. Flat Washer
10. Lockwasher
11. Nut
12. Headlight Bulb
13. Socket
14. Bolt
15. Flat Washer
16. Damper
17. Housing
18. Collar
19. Lockwasher
20. Screw

Installation Note:

•Before installing the tachometer cable, lubricate it (Pg. 26).

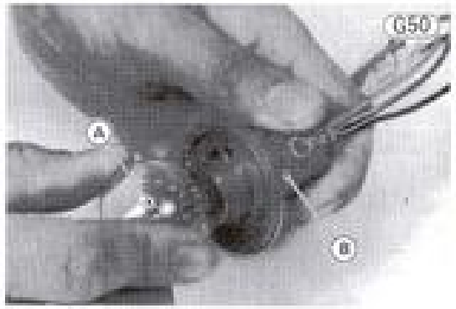
Disassembly:

•Unhook the bulb retaining spring, and take out the bulb socket together with the bulb.



A. Retaining Spring
B. Headlight Bulb Socket
C. City Light Bulb Socket

•Press the bulb ① inward, twist it counterclockwise, and pull it out.



A. Bulb
B. Socket

•Slide back the dust cover, press the city light bulb socket inward, twist it counterclockwise, and pull it out.
•Press the city light bulb ① inward, twist it counterclockwise, and pull it out.
•Hold one thumb on one end of the springs ① (3) to keep it from flying off while removing the spring, and unhook the other end from the rim.

WARNING **The headlight clamp springs are under spring tension. Wear eye and face protector when removing the springs. The springs can fly out during removal or installation, causing eye injury or other harm.**

A. Springs

•Remove the other springs in the same way, and separate the reflector and lens unit ④ from the rim ③.

Assembly Notes:

1. Fit the ridge on the headlight bulb socket into the notch in the reflector.

A. Fit the ridge into the notch.

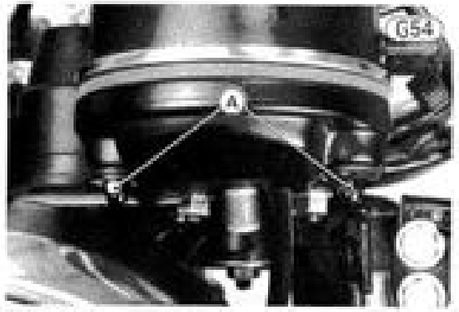
2. Place the reflector into the rim, fitting the raised portion into its holder on the rim. This ensures that the part of the sealed beam unit marked "TOP" will be on top after the headlight unit is mounted in the headlight housing.

A. Raised Portion
B. Holder

SPEEDOMETER, METER LIGHT

Removal:

- Disconnect the upper end of the speedometer cable with pliers.
- Remove the cap nuts, flat washers, dampers (2 ea) from the bottom of the meter holder.



A. Cap Nuts

- Pull up the speedometer, pull the meter light out of the speedometer base, and remove the speedometer.

A. Meter Light

- To remove the meter light bulb, first press the bulb inward, then holding the bulb in this position, twist it to the left and pull it out.

CAUTION **Place the meter so that the correct side of the meter is up. If a meter is left upside down or sideways for any length of time it will malfunction.**

Installation Note:

- Use 6V 3W bulb for meter light replacement.

TACHOMETER, METER LIGHT, INDICATOR LIGHTS (Neutral, High Beam, Turn Signal)

Removal:

- Disconnect the upper end of the tachometer cable with pliers.
- Remove the cap nuts, flat washers, dampers (2 ea) from the bottom of the meter holder.
- Pull up the tachometer, and pull the meter light and indicator lights (4) out of the tachometer base, and remove the tachometer.
- To remove the meter and indicator bulbs, first press the bulb inward, then holding the bulb in this position, twist it to the left and pull it out.

CAUTION **Place the meter so that the correct side of the meter is up. If a meter is left upside down or sideways for any length of time it will malfunction.**

Installation Notes:

1. Use 6V 3W bulb for meter light replacement.
2. Use the bulbs shown in Table G1 for indicator light replacement. Also, refer to the table for light location by lead color.

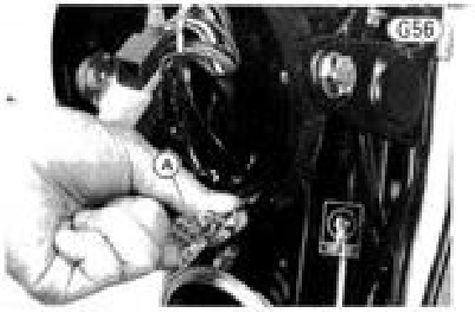
Table G1 Indicator Lights

Bulb Wattage	Indicator Lights	Lead Color
6V 1.7W	High Beam	Red/Black, Black/Yellow
	Turn Signal	Gray, Green
	Oil Level	Brown, Blue/Red
6V 3W	Neutral	Light Green, Brown
	Tachometer	Red, Black/Yellow

IGNITION SWITCH

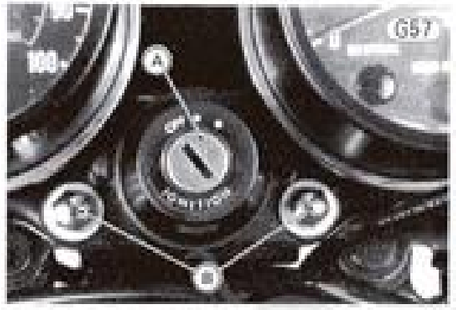
Removal:

- Remove the headlight unit (Pg. 85).
- Disconnect the red 6-pin connector and leads from the ignition switch.



A. Red 6-pin Connector

•Remove the ignition switch mounting bolts (2) and washers (2), and free the ignition switch and wiring harness from the motorcycle. The rubber damper between the switch body and the mounting plate may fall off.



A. Ignition Switch B. Mounting Bolts

Installation Note:

•Adjust the headlight (Pg. 24).

FRONT BRAKE LIGHT SWITCH

Removal:

•Disconnect the brown and the blue/red front brake switch lead connections under the fuel tank.

A. Brake Light Switch Leads

•Remove the strap on the right side of the handlebar, and free the front brake switch leads.

•Slide the front brake lever dust cover out of place.

•Using a thin-bladed screwdriver or some other suitable tool, press in the front brake light switch tab which catches in the hole in the underside of the front brake lever holder, and then remove the switch.

A. Front Brake Light Switch B. Press in the tab.

Installation Note:

•Check the front brake light switch operation.

REAR BRAKE LIGHT SWITCH

Removal:

•Remove the rear brake light switch spring.

•Disconnect the blue and the brown rear brake light switch connections, and unfasten the straps that hold the leads to the frame.

A. Brake Light Switch Leads

•Pressing inward on the locking tabs of the adjusting nut, pull the switch out of its bracket.

A. Brake Light Switch B. Press the locking tab.

Installation Note:

- Adjust the rear brake light switch after installation (Pg. 23).

HANDLEBAR

Removal:

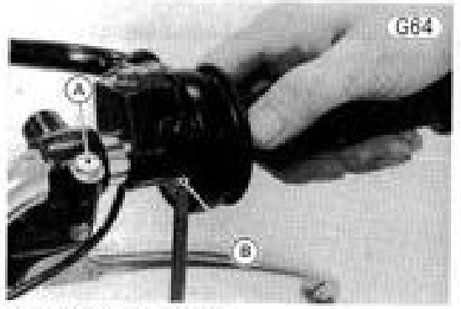
- Take off the rear view mirrors.
- Remove the fuel tank (Pg. 35) or cover the fuel tank with a thick cloth to avoid damaging the painted surface.
- Free the clutch cable from the clutch lever (Pg. 81).
- Remove the front turn signal clamp bolts, lockwashers, and flat washers (4 ea), remove the clamps (2), and free the front turn signals and rubber dampers (2 ea) from the handlebar.

A. Clamp B. Rubber Damper

- Take out the left switch housing screws (2), and remove the housing from the handlebar. If necessary, loosen the clutch lever holder bolt, and slide the clutch lever to the right.

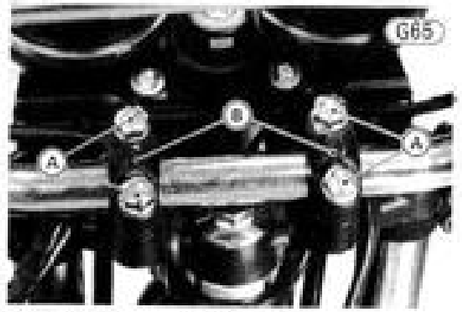
A. Left Switch Housing B. Housing Screws

- Loosen the front brake lever holder bolt.
- Loosen the right switch housing screws (2).



A. Brake Lever Holder Bolt
B. Right Switch Housing Screws

- Remove the handlebar clamp bolts and lockwashers (4 ea), remove the clamps (2), and slide the handlebar out of both the right switch housing/throttle grip assembly, and the front brake lever holder.



A. Clamp Bolts B. Clamps

- To remove the clutch lever, loosen the clutch lever holder bolt, cut off the left handlegrip, which is bonded to the handlebar, and slide off the clutch lever.

Installation Notes:

1. Mount the handlebar, and install the handlebar clamps, lockwashers, and clamp bolts, matching the angle of the handlebar with the angle of the front fork as shown. Tighten the clamp bolts to 1.8 kgm (13.0 ft-lbs) of torque.

A. Match the angle.

2. Install the front turn signals so that each signal is as close to the end of the crossbar as possible, and that the signals point straight ahead.

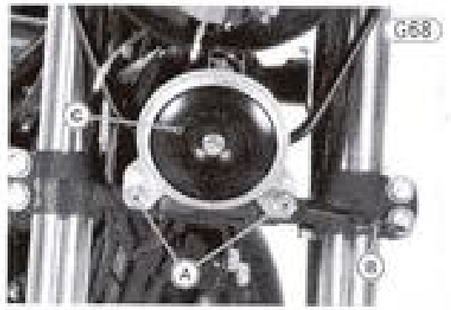
Front Turn Signal Installation G67

3. Adjust the front brake (Pg. 21).
4. Check the throttle control cable (Pg. 13).
5. Adjust the clutch (Pg. 15).

STEERING STEM

Removal:

- Remove the fuel tank (Pg. 35).
- Remove the front wheel (Pg. 73).
- Remove the front fender mounting bolts, lockwashers, and flat washers (4 ea), and take off the front fender. The rubber dampers, collars, and other rubber dampers (4 ea) may fall off from the fender.
- Remove the headlight unit (Pg. 85).
- Disconnect all the leads and connectors in the headlight housing, and take them all out of the housing.
- Disconnect the horn leads from the horn.



A. Mounting Bolts C. Horn
B. Cable Guide

- Remove the upper end of the tachometer cable from the tachometer with pliers.
- Remove the horn bracket mounting bolts, lockwashers, and flat washers (2 ea), and take off the horn. The front brake cable guide comes off with the bolt.
- Remove the headlight bracket assembly lower mounting bolt, lockwasher and flat washer, remove the bracket assembly upper mounting nuts and flat washers (2 ea), and then take off the bracket assembly with the speedometer cable.

CAUTION **Place the bracket assembly so that the correct side of the meter is up. If a meter is left upside down or sideways for any length of time, it will malfunction.**

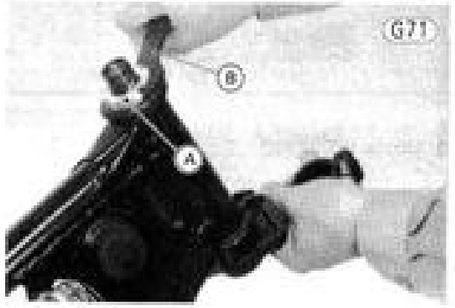
A. Mounting Bolt B. Mounting Nut

- Remove the handlebar (Pg. 89). The front turn signals and left switch housing need not be removed from the handlebar.

•Loosen the front fork upper clamp nuts (2), and remove the stem head bolt.
•Tap lightly on the bottom of the stem head with a mallet, and remove the steering stem head.

A. Stem Head

•Loosen the lower clamp nuts, and pull out each fork leg with a twisting motion.
•Push up on the stem base, and remove the steering stem locknut with the stem nut wrench (special tool); then remove the steering stem and stem base (single unit). As the stem is removed, some of the steel balls will drop out of the lower outer race. Remove the rest. There are 19 steel balls in the lower outer race.



A. Stem Locknut
B. Stem Nut Wrench (57001-320)

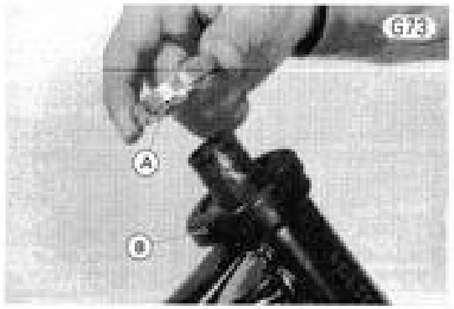
•Remove the steering stem cap, upper inner race, and upper steel balls (23).

Installation Notes:

1. Apply grease to the upper and lower outer races in the head pipe so that the steel balls will stick in place during stem insertion. Install the upper steel balls (23) and lower steel balls (19). The lower steel balls are larger than the uppers in diameter.

A. Steel Balls

2. Put on the upper inner race and steering stem cap. Insert the steering stem into the head pipe, and finger tighten the steering stem locknut. The notched side of the stem locknut must face down.



A. Notch B. Cap

3. Run the inner tube of each front fork leg up through its clamps in the stem base and stem head, and align the upper end of the front fork inner tube with the upper surface of the stem head (Fig. G81).
4. Tighten the front fork upper clamp nuts to 1.9 kg-m (10.0 ft-lbs) of torque.
5. Tighten the stem head bolt to 4.0 kg-m (29 ft-lbs) of torque.
6. Tighten the front fork lower clamp nuts to 1.8 kg-m (13.0 ft-lbs) of torque.
7. Install the bracket assembly running the speedometer cable through its guides at the rear of the stem base and left fork leg. Be sure the throttle control and clutch cables go between the head pipe and right fork leg, and run between the stem head and the bracket assembly.
8. Check the steering, and adjust it if necessary (Pg. 23).
9. Check the throttle control cable, and adjust it if necessary (Pg. 13).

10. Adjust the front brake (Pg. 21), clutch cable (Pg. 15), and headlight (Pg. 24).

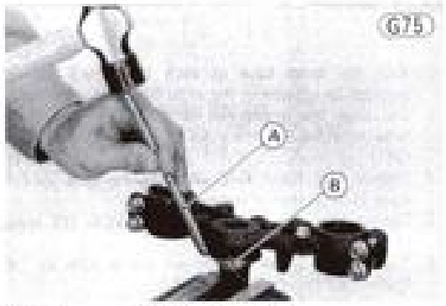
STEERING STEM BEARINGS

Removal:

- Remove the steering stem (Pg. 90).
- To remove the outer races pressed into the head pipe, insert a bar into the head pipe, and hammer evenly around the circumference of the opposite race to drive it out.

Bearing Race Removal

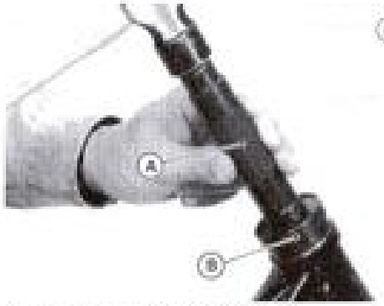
- Remove the grease seal under the lower inner race.
- To remove the lower inner race, which is pressed onto the steering stem, grip the stem in a vise, and use a metal rod and hammer as shown in the figure.



A. Rod B. Lower Inner Race

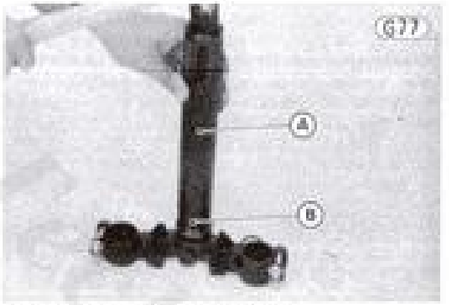
Installation:

- Apply oil to the outer races, and then drive them into the head pipe using a stem cup driver and a bearing driver holder (special tools). Be sure to press them in until they stop at the stepped portion in the head pipe.



A. Bearing Driver Holder (57001-139)
B. Stem Cup Driver (57001-293)

- Apply oil to the lower inner race, and then drive it onto the steering stem using a stem bearing driver and adapter (special tools). Be sure to press it on until it stops at the stem base.



A. Stem Bearing Driver (57001-137)
B. Adapter (57001-292)

- Install the grease seal under the lower inner race with correct side facing up.

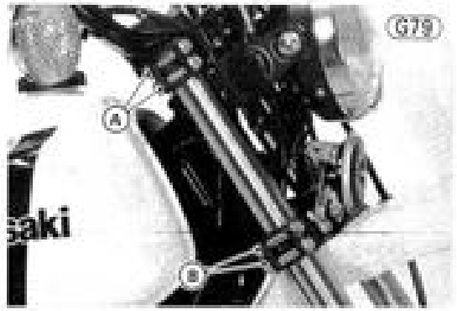
A. Grease Seal

•Install the steering stem (Pg. 91).

FRONT FORK

Removal (each fork leg):

•Remove the front wheel (Pg. 73).
•In order to remove the left fork leg, pull the speedometer and front brake cables free of the cable guides at the left fork leg.
•Loosen the fork leg upper and lower clamp nuts.

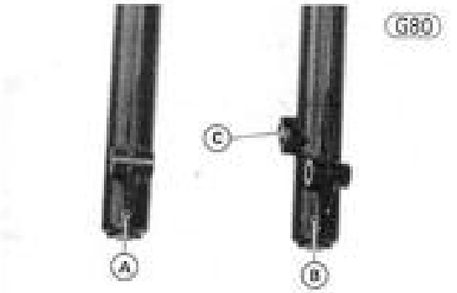


A. Upper Clamp Nuts B. Lower Clamp Nuts

•With a twisting motion, work the fork leg down and out.

Installation Notes (each fork leg):

1. Note that the left fork leg has the torque tongue.



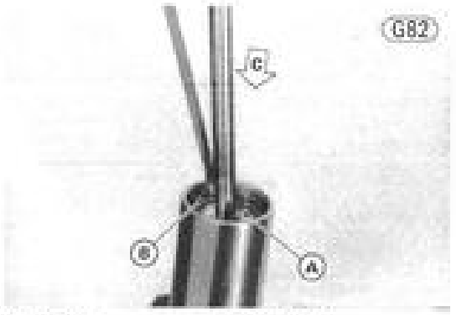
A. Right Fork Leg
B. Left Fork Leg
C. Torque Tongue

2. Slide the fork leg up through the lower and upper clamps until the upper end of the front fork inner tube is even with the upper surface of the stem head. Tighten the upper clamp nuts to 1.4 kg-m (10.0 ft-lbs) of torque and the lower clamp nuts to 1.8 kg-m (13.0 ft-lbs) of torque.

A. Stem Head B. Fork Tube

Disassembly:

•Remove the cap ① from the inner tube.
•Press the top plug ③ to remove the top plug retaining ring ⑦, and then remove the top plug, collar ②, long spring ⑤, spring seat ④, and short spring ⑥.

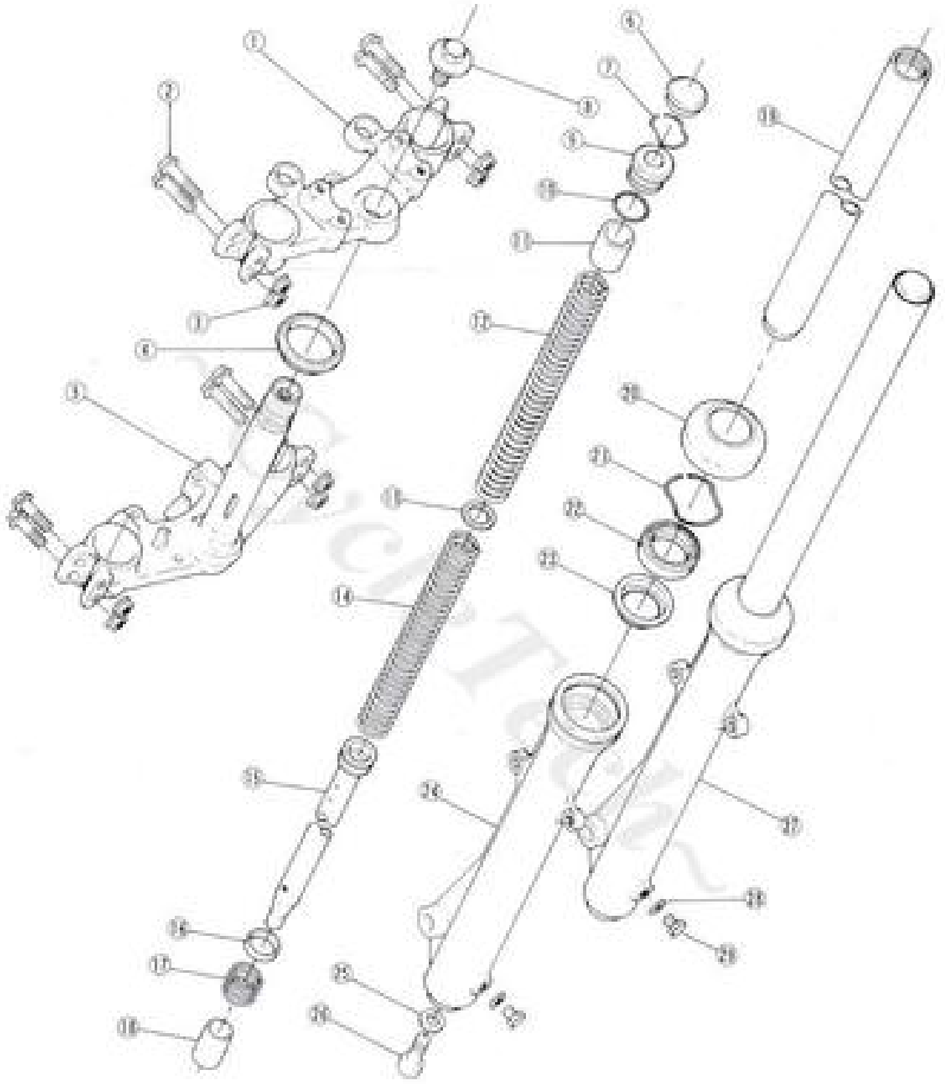


A. Top Plug
B. Retaining Ring
C. Press down.

•Pour the oil into a suitable container, pumping the fork as necessary to empty out all the oil.
•Temporarily install the fork leg on the motorcycle, insert the front axle through the fork legs to keep the outer tube from turning, and loosen the front fork bottom Allen bolt.

Front Fork

G84

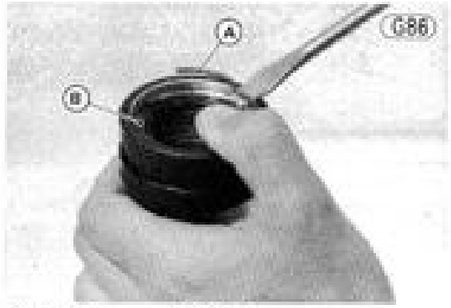


1. Stem Head
2. Bolt
3. Nut
4. Grease Seal
5. Stem and Base
6. Cap
7. Retaining Ring
8. Head Bolt
9. Top Plug
10. O Ring
11. Collar
12. Long Spring
13. Spring Seat
14. Short Spring
15. Cylinder
16. Piston Ring
17. Spring
18. Cylinder Base
19. Inner Tube
20. Dust Seal
21. Retainer
22. Oil Seal
23. Spacer
24. Left Outer Tube
25. Gasket
26. Allen Bolt
27. Right Outer Tube
28. Gasket
29. Drain Bolt

•Stop the cylinder ① from turning by using the front fork cylinder holder handle and adapter (special tools). Unscrew the Allen bolt ② and gasket ③ from the bottom of the outer tube ④ or ⑤, and then pull the inner tube out of the outer tube.

A. Front Fork Cylinder Holder Handle and Adapter (57001-183, 57001-1011)
B. Allen Wrench

•Slide or push the cylinder ① and its spring ⑥ out the top of the inner tube.
•Remove the dust seal ⑦ from the outer tube.
•Remove the cylinder base ⑧ out the top of outer tube.
•Hold one finger on the oil seal retainer ⑨ to keep it from flying off while prying the retainer to remove it.

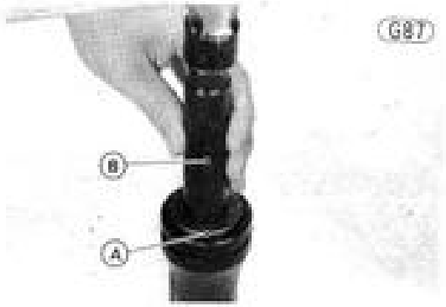


A. Retainer **B. Oil Seal**

•Pull out the oil seal ⑩ and spacer ⑪. It may be necessary to heat the outer tube around the oil seal before pulling it out.

Assembly Notes:

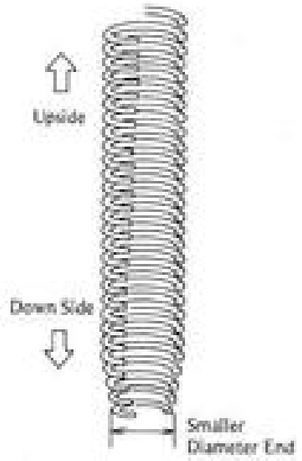
1. Apply liquid gasket to both sides of the gasket ③, apply a non-permanent locking agent to the threads of Allen bolt, and tighten it using the front fork cylinder holder handle and adapter (special tools: P/N 57001-183 and 57001-1011) to stop the cylinder from turning. The torque for the Allen bolt is 1.8 kgm (13.0 ft·lbs).
2. Replace the oil seal with a new one, apply oil to the outside, and install it with the driver and holder (special tools).



A. Driver (57001-141) **B. Holder (57001-139)**

3. First install the short spring ⑥ with the smaller diameter end down, then put the spring seat, long spring, and collar in this order into the fork inner tube.

Short Spring Installation



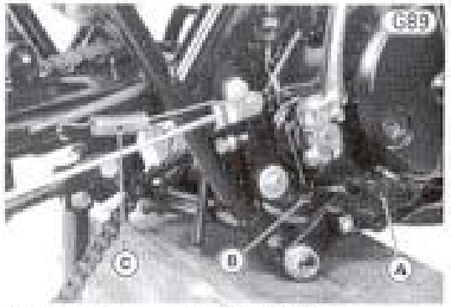
4. Refill with 195 ~ 205 cc of fresh SAE 5W20 oil.

SWING ARM

Removal:

•Raise the engine so that the rear wheel is off the ground.

•Remove the drive chain (Pg. 76).
•Remove the rear wheel (Pg. 76).
•Remove the right footpeg, rear brake pedal, and pedal return spring.



A. Footpeg
B. Brake Pedal
C. Return Spring

•Remove the mounting bolt from the bottom of each shock absorber. Each mounting bolt has a lockwasher.
•Move the swing arm up and down to check for abnormal friction.
•Remove the pivot shaft nut and washer, and pull out the pivot shaft.

A. Pivot Shaft Nut

•Pull back the swing arm. A cap on each side of the pivot will drop off.

Installation Notes:

1. Lubricate the swing arm pivot (Pg.125).
2. Tighten the pivot shaft nut to 5.0 kg-m (36 ft-lbs) of torque, and rear shock absorber lower mounting bolt to 3.0 kg-m (22 ft-lbs) of torque.
3. Grease the brake pedal pivot shaft, and put the **O** ring on both side of the pedal pivot hole.
4. Adjust the drive chain (Pg. 20) and rear brake (Pg. 21).
5. Check the rear brake light switch, and adjust it if necessary (Pg. 23).

Disassembly:

NOTE: As swing arm bushing will be damaged upon removal, be sure to have new ones on hand prior to disassembly.

•Remove the caps ① (2).
•Pull out the swing arm sleeve ②.
•Take out the nut and bolt, and remove the torque link from the swing arm ③.
•Remove the chain case mounting screws (2), and take off the chain case. Each screw has a lockwasher.
•Remove the chain guard mounting bolts (2), and take off the chain guard ④.
•Pry the plastic swing arm guard off the swing arm.

A. Plastic Guard

•Remove the both rear footpegs.
•Insert a bar into one side, hammering on it lightly to knock out the bushing ⑤ on the opposite side.

•Use the bar again to knock out the other bushing.

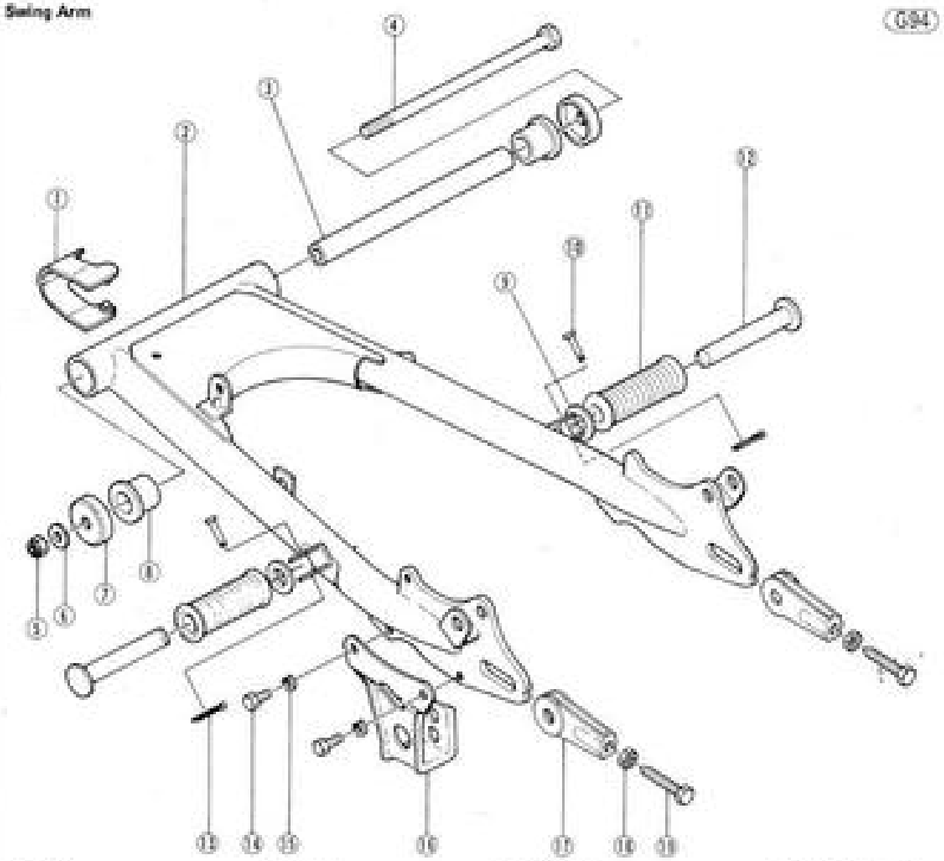
Assembly Notes:

1. Replace the bushings with new ones if either one has worn past the service limit (Pg. 125) or has been removed. Apply oil to the bushings before installing them with a press.
2. Wipe the old grease off the swing arm sleeve, and inspect the swing arm sleeve (Pg. 125). Apply a molybdenum disulfide grease for frame assembly, especially in each sleeve groove.
3. Install the torque link facing the welded-bracket-side of the link outside, and tighten the torque link nut to 3.0 kgm (22 ft-lb) of torque.

A. Welded Bracket

Swing Arm

G94



1. Guard
2. Swing Arm
3. Sleeve
4. Pivot Shaft
5. Nut
6. Washer
7. Cap
8. Bushing
9. Washer
10. Pin
11. Rubber
12. Footpeg
13. Cotter Pin
14. Bolt
15. Lockwasher
16. Chain Guard
17. Chain Adjuster
18. Locknut
19. Adjusting Bolt

Maintenance–Engine

Table of Contents

AIR CLEANER

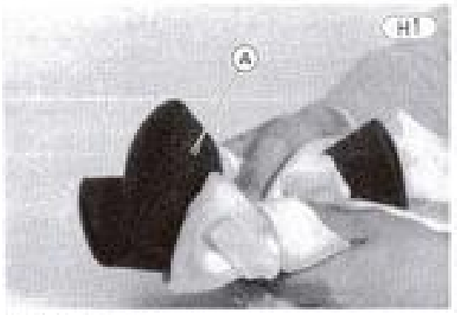
A properly maintained air cleaner ensures that only clean, filtered air is supplied through the carburetor into the engine. If the air is supplied directly without filtering, not only will dirt and dust from the air plug up carburetor passages causing the engine to run poorly, but also the dust that enters the engine will act like grinding compound wearing down the cylinder, piston, and rings. If the air cleaner element is damaged, the results will be the same as if no element were used.

An air cleaner element clogged with dirt chokes the air supply to the engine, resulting in an overly rich fuel/air mixture and inefficient combustion. This in turn causes overheating from carbon build-up, resulting in reduced engine power.

Cleaning and replacement

The air cleaner element must be cleaned periodically (Pg. 10). In extremely dry, dusty areas, the element will need to be cleaned more often. After riding through rain or on muddy roads, the element should be cleaned immediately.

- Remove the air cleaner element, and remove the sponge filter from the wire frame.
- Clean the element in a bath of a high flash-point solvent, and squeeze it dry.
- After cleaning, saturate the element with SE class SAE 30 oil, squeeze out the excess, then wrap it in a clean rag and squeeze it dry as possible. Be careful not to tear the element.



A. Sponge Filter

WARNING

1. Clean the element in a well-ventilated area, and take ample care that there are no sparks or flame anywhere near the working area.

2. Because of the danger of highly flammable liquids, do not use gasoline or a low flash-point solvent to clean the element.

Since repeated cleaning opens the pores of the element, replace it with a new one in accordance with the Periodic Maintenance Chart (Pg. 10). Also, if there is a break in the element material or any other damage to the element, replace the element with a new one.

FUEL TANK, FUEL TAP

Inspection and cleaning

If fuel leaks from the cap or from around the fuel tap, the cap gasket or tap O-ring may be damaged. Visually inspect these parts, and replace them if necessary.

Examine the air vent in the cap to see if it is obstructed. Use compressed air to clear an obstructed vent.

Periodically inspect and clean the fuel tap filter and the sediment cup, using a high flash-point solvent and a fine brush (Pg. 17). If the filter is damaged, it must be replaced. If the sediment cup contains much water or dirt, the fuel tank and the carburetor may also need to be cleaned.

To clean out the fuel tank, disconnect the fuel hose, remove the fuel tap, and flush out the tank with a high flash-point solvent.

To drain the carburetor float bowl, remove the plug at the bottom of the carburetor. For thorough cleaning, remove and disassemble the carburetor.

CARBURETOR

The carburetor performs the function of mixing the fuel and air in the proportions necessary for good engine performance at varying speeds and loads. In order for it to function satisfactorily, it must be kept well adjusted maintained. The idle speed adjustment and the synchronization with the oil pump are covered in the Adjustment Section. The discussion here concerns the fuel level adjustment, and the cleaning and replacement of carburetor parts.

The carburetor specifications (Tables H2 and H3) have been chosen for best all around performance.

Carburetor trouble can be caused by dirt, wear, maladjustment, or improper fuel level in the float chamber. A dirty or damaged air cleaner can also alter the fuel-to-air ratio.

Table H1 Mixture Trouble Symptoms

Poor running
Overheating
Exhaust smokes excessively

Cleaning

The following explanation covers the cleaning and inspection of the carburetor.

CAUTION

1. Remove the fuel hose and over flow grommet from the carburetor before cleaning the carburetor with a cleaning solution. This will prevent damage or deterioration of them.

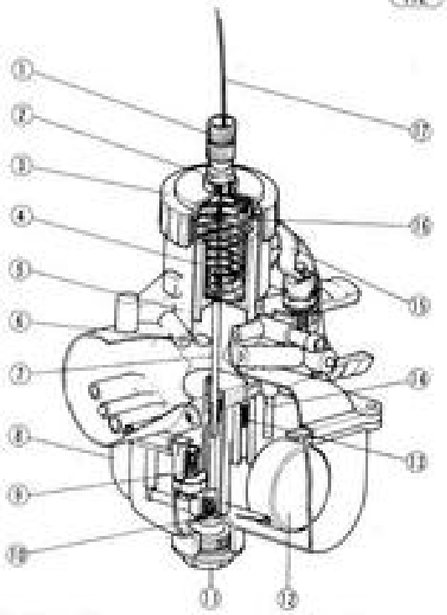
2. Do not use wire for cleaning as this could damage the jets.

Table H2 Carburetor Specifications

Type	Main Jet	Needle Jet	Jet Needle	Pilot Jet	Throttle Valve Cutaway	Air Screw	Service Fuel Level
VM26SS	105R	P-0/4	5CJ27-2	25	2.0	1½ turns out	2.5~4.5 mm

3. To prevent damage to the float, remove the float bowl and the float when blowing the carburetor clean with compressed air.

Carburetor Construction (H2)



1. Cable Adjuster
2. Locknut
3. Carburetor Cap
4. Throttle Valve
5. Carburetor Body
6. Idle Adjusting Screw
7. Jet Needle
8. Float Bowl
9. Float Valve
10. Main Jet
11. Drain Plug
12. Float
13. Pilot Jet
14. Starter Pipe
15. Choke Lever
16. Spring
17. Carburetor Cable

Disassemble the carburetors. Wash the disassembled parts, and air and fuel passages with a high flash-point solvent then blow them clean with compressed air. If necessary, use a bath of automotive type carburetor cleaner.

Inspection

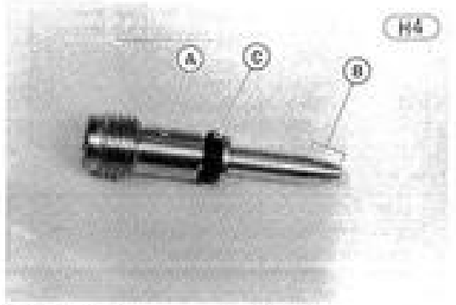
Examine the float, and replace it if damaged. If the needle is worn as shown in the diagram, replace the valve needle and valve seat as a set.

Valve Needle (H3)

Good Bad

Remove the air screw, and check that the tapered portion is not worn or otherwise deformed. If it is, replace the air screw. If the O ring on the air screw is damaged, replace the O ring.

(H4)



A. Air Screw **C. "O" Ring**
B. Tapered Portion

Check the jet needle and needle jet. A worn needle jet and jet needle should be replaced.

Service fuel level measurement and adjustment

If the motorcycle exhibits symptoms of "improper" fuel mixture, measure the service fuel level.

- Remove the carburetor, and secure it in a true vertical position on a stand.

WARNING **Check the fuel level in a well-ventilated area, and take ample care that there are no sparks or flame anywhere near the working area.**

- Remove the drain plug from the bottom of the float bowl, and install the fuel level gauge (special tool).
- Keeping the calibrated plastic pipe of the gauge higher than the float bowl, supply fuel for the carburetor by some means (such as a tube from a small fuel container). Wait until the fuel level in the tube settles.
- Keeping the calibrated plastic tube vertical, slowly lower the calibrated plastic tube until the "0" line is even with the bottom edge of the carburetor body.

NOTE: Do not lower the "0" line below the bottom edge of the carburetor body. If the calibrated plastic tube is moved upward, the fuel level measurement must be repeated from the beginning.

●Read the service fuel level in the plastic pipe.

Fuel Level Measurement (H5)

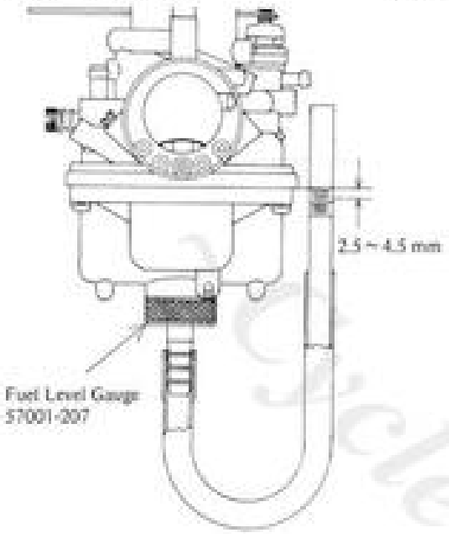
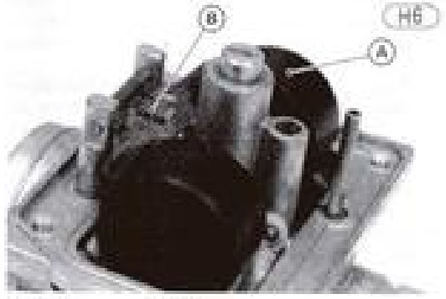


Table H3 Service Fuel Level

Standard
2.5 ~ 4.5 mm below from the bottom edge of the carburetor body to the fuel level

If the fuel level is incorrect, remove the float bowl and float. Bend the tang on the float a very slight amount to change the fuel level. Bending it down closes the valve sooner and lowers the fuel level; bending it up raises the level (Fig. H6).

After adjustment, measure the service fuel level again, and readjust if necessary.



(H6)

A. Float **B. Tang**

NOTE: The last number of the jet needle number ("2" of 5CJ27-2 for example) is not stamped on the needle, but is the number of the groove in which the clip **must** be installed. The groove numbers are counted from the topmost groove, 5 being the lowest groove.

CAUTION **If the clip is put in any but the specified groove, exhaust emission will be increased, and the engine may suffer serious damage which could result in a crash.**

Jet Needle (H7)

CYLINDER HEAD

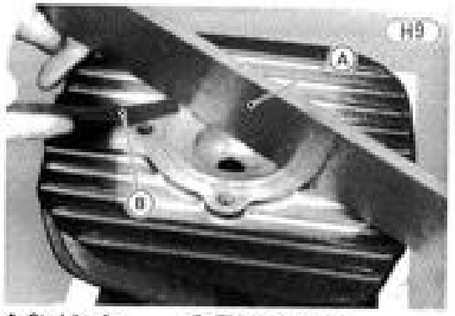
Cleaning

Remove the cylinder head. Scrape out any carbon, using a suitable tool, and clean the head with a high flash-point solvent.


(H8)

Inspection

Lay a straightedge across the mating surface of the head at several different points, and measure warp by inserting a thickness gauge between the straightedge and the head. Light damage of the lower surface is repairable.



A. Straightedge B. Thickness Gauge

Table H4 Cylinder Head Warp

Service Limit
0.05 mm

If warp exceeds the service limit, replace the cylinder head. Repair light damage by rubbing the mating surface on emery cloth (first #200, then #400) secured to a surface plate. After smoothing the cylinder head mating surface, coat it with machinist's bluing and rub it over the cylinder head mating surface. Severe damage to either of the mating surfaces necessitates replacement.

NOTE: Use only the proper gasket for the cylinder head. The use of a gasket of incorrect thickness will change the compression.

A. Emery Cloth

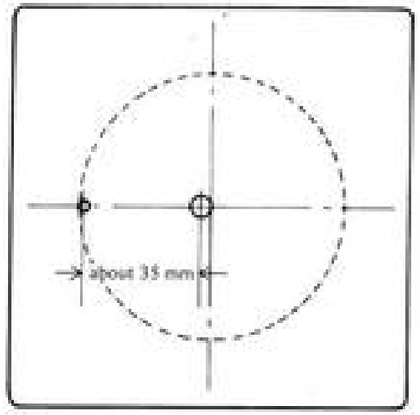
Combustion chamber volume measurement

The combustion chamber volume should be measured anytime that compression measurement results in compression pressures well below or above the standard (Fig. 104).

NOTES: 1. One more person will be needed to help expel air bubbles out of the cylinder head combustion chamber.

2. Prepare a piece of transparent plastic plate which has a flat surface and has two holes about 35 mm apart in its center portion. One is a large hole (about 6 mm in diameter), the other is small hole (about 3 mm in diameter). This plate must be oil resistant, about 120 mm square, and at least 3 mm thick.

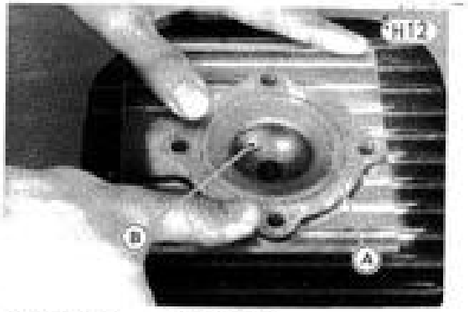
Plastic Measuring Plate (H11)



3. Obtain a burette or sytinge which is calibrated at one-cc or smaller graduations. Fill it with thin oil.

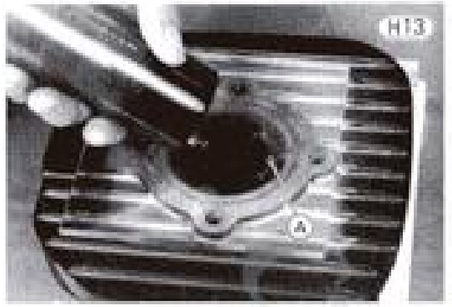
Prior to the combustion chamber volume measurement, clean off any carbon on the combustion chamber, and remove any dirt on the cylinder head mating surface. The standard spark plug should be installed in the chamber to be measured.

- Apply a thin coat of grease to the cylinder head mating surface and place the plastic plate over the cylinder head combustion chamber, fitting its small hole within the circumference of the combustion chamber.



A. Small Hole B. Large Hole

•Place the cylinder head on a level surface. Through the large hole, fill the combustion chamber with light oil until the chamber is completely filled but not overflowing. Tilt the cylinder head slightly so that air bubbles come out through the small hole. The oil should just rise to the bottom edge of the holes in the plate. The amount of oil used to fill the chamber is the combustion chamber volume.



A. Expel air bubbles

Table H5 Combustion Chamber Volume

Standard
23.2 ~ 23.8 cc

If the combustion chamber volume is too small, it is possible that the cylinder head was modified for higher compression. Make sure that all carbon deposits have been cleaned out of the chamber, also make sure that the spark plug is the standard type and that it is fully tightened.

CYLINDER, PISTON

Compression measurement

A compression test is very useful as an aid in determining the condition of the engine. Low compression may be due to cylinder wear; worn piston ring grooves; worn, broken, or sticking piston rings; cylinder head leaks; damaged crankshaft oil seals; or damage to the engine, such as piston seizure. Excessive compression may be due to carbon build-up on the piston head and cylinder head.

Before measuring compression, check that the cylinder head nuts and cylinder base nuts are tightened down to the specified torque (Pg. 29), and then thoroughly warm up the engine so that engine oil between the piston and cylinder wall will help seal compression as it does during normal running. While the engine is running, check that there is no gas leakage from around the spark plug or the cylinder head gasket.

Stop the engine, remove the spark plug, and fit the compression gauge (special tool) securely into the spark plug hole so that there will be no leakage. With the throttle fully open so that air can flow freely to the engine, turn the engine over sharply with the kickstarter five times until the compression gauge stops rising. The compression is the highest reading obtainable.

A. Compression Gauge (57001-123)

Table H6 Cylinder Compression*

Usable Range	7.0 ~ 11.0 kg/cm² (100 ~ 156 psi)

*Engine hot, throttle fully opened, kicking the engine 5 times.

If cylinder compression is higher than the usable range, check the following:

1. Carbon build-up on the piston head and cylinder head – Clean off any carbon on the piston head and cylinder head.
2. Cylinder head gasket, cylinder base gasket – Use only the proper gaskets for the cylinder head and base. The use of gaskets of the incorrect thickness will change the compression.
3. Cylinder head volume (Pg. 104).

If cylinder compression is lower than the usable range, check the following:

1. Gas leakage around the cylinder head – Replace the damaged gasket and check the cylinder head for warp (Pg. 103).
2. Gas leakage from the crank chamber – Check the crankshaft oil seal and reed valve (Pg. 114), and check the joint between the crankcase halves.
3. Piston/cylinder clearance, piston seizure.
4. Piston ring, piston ring groove wear.

Cylinder, piston decarbonization

CAUTION **1. When removing carbon, take ample care not to scratch the cylinder wall, the side of the piston, or the piston ring grooves.**

2. Never clean the piston head with the engine assembled. If the carbon is scraped from the piston head with the cylinder left in place, carbon particles will unavoidably drop between the piston and cylinder onto the rings and eventually find their way into the crank chamber. Carbon particles, which are very abrasive, drastically shorten the life of the rings, piston, cylinder, crankshaft bearings, and oil seals.

Carbon readily accumulates around the cylinder exhaust port, which reduces exhaust efficiency. To remove the carbon, take off the cylinder, remove the reed valve from the cylinder, and scrape out the carbon from the exhaust port carefully. At this time, the muffler should also be inspected, and cleaned out if necessary.


(H15)

Built-up carbon on the piston head reduces the cooling capability of the piston and raises compression, leading to overheating which could possibly even melt the top of the piston. To decarbonize the piston head, remove the piston, scrape off the carbon, and then lightly polish the piston with fine emery cloth.


(H16)

A. Emery Cloth

Carbon, accumulated in the piston ring grooves, can cause the rings to stick. Note the piston ring free gap before removing the rings from the piston, and then remove the rings, and clean out any carbon deposits using an end of a broken piston ring or some other suitable tool.


(H17)

Cylinder, piston wear

Inspect the inside of the cylinder for scratches and abnormal wear. If the cylinder is damaged or badly worn, replace it with a new one.

Since there is a difference in cylinder wear in different directions, take a side-to-side and a front-to-back measurement at each of the 3 locations (total of 6 measurements) shown in Fig. H18. If any of the cylinder inside diameter measurements exceeds the service limit, the cylinder will have to be bored to oversize and then honed. However, if the amount of boring necessary would make the inside diameter greater than 63.5 mm, the cylinder block must be replaced.

NOTE: Whenever the piston or cylinder has been replaced with a new one, the motorcycle must be broken-in the same as with a new machine.

Cylinder Inside Diameter Measurement (H18)

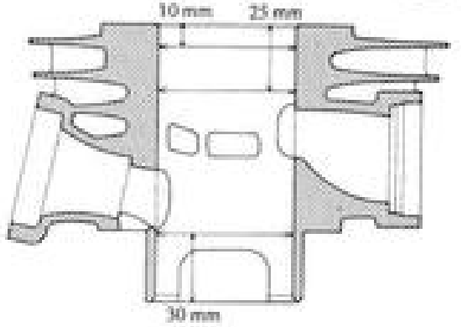


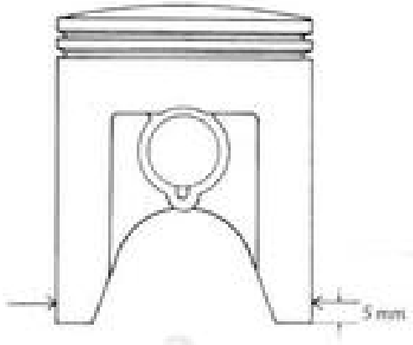
Table H7 Cylinder Inside Diameter

Service Limit
62.6 mm, or more than 0.05 mm difference between any two measurements

Measure the outside diameter of each piston 5 mm up from the bottom of the piston at a right angle to the direction of the piston pin. If the measurement is under the service limit, replace the piston.

NOTE: Abnormal wear such as a marked diagonal pattern across the piston skirt may mean a bent connecting rod or crankshaft.

Piston Diameter Measurement



H19

Table H8 Piston Diameter

Service Limit	62.27 mm

Piston/cylinder clearance

The piston-to-cylinder clearance is measured whenever the piston or cylinder is replaced with a new one. The standard piston-to-cylinder clearance must be adhered to whenever the cylinder is replaced. However, if only the piston is replaced, the clearance may exceed the standard slightly, but it must not be less than the minimum in order to avoid piston seizure.

The most accurate way to find the piston clearance is by making separate piston and cylinder diameter measurements and then computing the difference between the two values. Measure the piston diameter as just described, and subtract this piston diameter value from the smallest value of the previously measured front-to-back cylinder diameters. The difference is the piston clearance.

Table H9 Piston/Cylinder Clearance

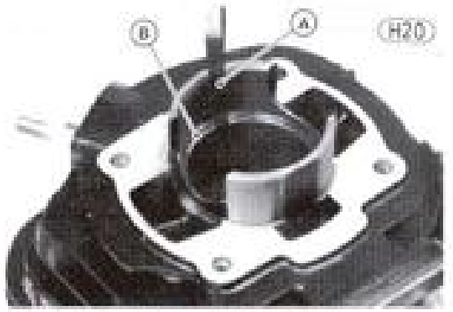
Standard	0.079~0.089 mm

Piston/cylinder seizure

Remove the cylinder and piston to check the damage. If there is only slight damage, the piston may be smoothed with #400 emery cloth, and any aluminum deposits removed from the cylinder with either #400 emery cloth or light honing.

Piston ring end gap

Place the piston ring being checked inside the cylinder using the piston to locate the ring squarely in place. Set it close to the bottom of the cylinder, where cylinder wear is low. Measure the gap between the ends of the ring with a thickness gauge. If the gap is wider than the service limit, the ring is overworn and must be replaced.



H20

A. Thickness Gauge B. Piston Ring

Table H10 Ring End Gap

	Service Limit
Top and 2nd	0.65 mm

Piston, piston pin, connecting rod wear

Measure the diameter of the piston pin with a micrometer, and measure the inside diameter of both piston pin holes in the piston. If the piston pin diameter is less than the service limit at any point, replace the piston pin. If either piston pin hole diameter exceeds the service limit, replace the piston.

Measure the inside diameter of the connecting rod small end. If the diameter exceeds the service limit, replace the connecting rod.

H21

A. Piston Pin B. Pin Hole C. Small End

Table H11 Piston Pin, Piston Pin Hole, Small End Diameter

	Pin	Pin Hole	Small End
Service Limit	15.96 mm	16.06 mm	20.05 mm

NOTE: When a new piston or pin is used, check that piston to pin clearance is less than 0.065 mm.

Small end needle bearing wear

The rollers in the needle bearings wear so little that the wear is difficult to measure. Instead, inspect the needle bearing for abrasions, color change, or other damage. If there is any doubt as to its condition, replace the needle bearing.

CRANKSHAFT, CONNECTING ROD

Connecting rod bending, twisting

On a surface plate set the crankshaft in a flywheel alignment jig or on V blocks so that the connecting rod is perpendicular to the surface plate. Select an arbor of the same diameter as the piston pin and of optional length, and insert it through the small end of the connecting rod.

Using a height gauge or dial gauge, measure the difference in the height of the rod above the surface plate over a 100 mm length to determine the amount the connecting rod is bent.

Connecting Rod Bend (H22)

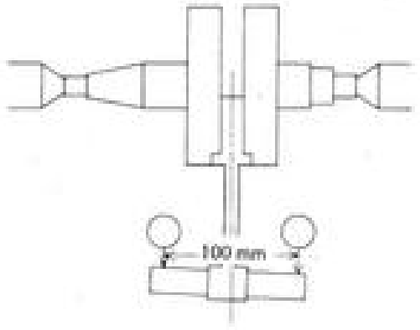


Table H12 Connecting Rod Bend/100 mm

Service Limit	0.20 mm

Swing the connecting rod 90° to one side and support it parallel to the surface plate as shown in the figure. Measure the difference in the height of the small end arbor above the surface plate over a 100 mm length to determine the amount the connecting rod is twisted.

Connecting Rod Twist (H23)

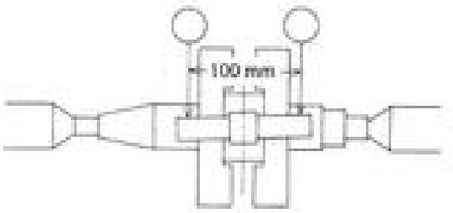


Table H13 Connecting Rod Twist/100 mm

Service Limit	0.20 mm

If either of the above measurements exceeds the service limit, the connecting rod or the crankshaft assembly must be replaced.

Connecting rod big end radial clearance

Set the crankshaft in a flywheel alignment jig or on V blocks, and place a dial gauge against the big end of the connecting rod. Push the connecting rod first towards the gauge and then in the opposite direction. The difference between the two gauge readings is the radial clearance.

If the radial clearance exceeds the service limit, the crankshaft should be either replaced or disassembled and the crankpin, needle bearing, and connecting rod big end examined for wear.

Connecting Rod Big End Radial Clearance (H24)

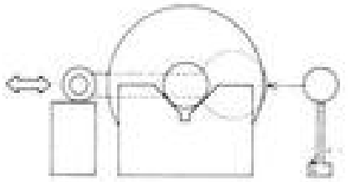


Table H14 Connecting Rod Big End Radial Clearance

Service Limit	0.07 mm

Connecting rod side clearance

Measure the side clearance of the connecting rod with a thickness gauge as shown in the figure. If the measured value exceeds the service limit, the crankshaft should be either replaced or disassembled and the side washers examined for wear.

Connecting Rod Big End Side Clearance (H25)

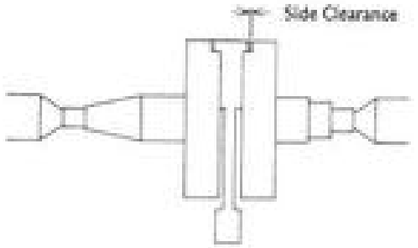


Table H15 Connecting Rod Big End Side Clearance

Service Limit	0.6 mm

Crankshaft runout

Set the crankshaft in a flywheel alignment jig, and place a dial gauge to the points indicated. Turn the crankshaft slowly. The maximum difference in gauge readings is the crankshaft runout.

Crankshaft Runout (H26)

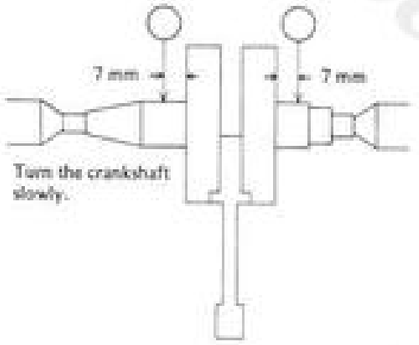


Table H16 Crankshaft Runout

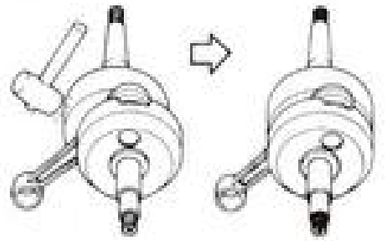
Service Limit	0.08 mm

If the runout at either point exceeds the service limit, align the flywheels so that the runout falls within the service limit. As shown in Figs. H27, H28, there are three types of flywheel misalignment. In the case of horizontal misalignment, which is the most common, strike the projecting rim of the flywheel with a plastic, soft lead, or brass hammer as indicated in the figure. Recheck the runout with a dial gauge, repeating the process until the runout falls within the service limit. Vertical misalignment is corrected either by driving a wedge in between the flywheels or by squeezing the flywheel rims in a vise, depending on the nature of the misalignment. In both cases of horizontal and vertical misalignment, correct the horizontal misalignment first.

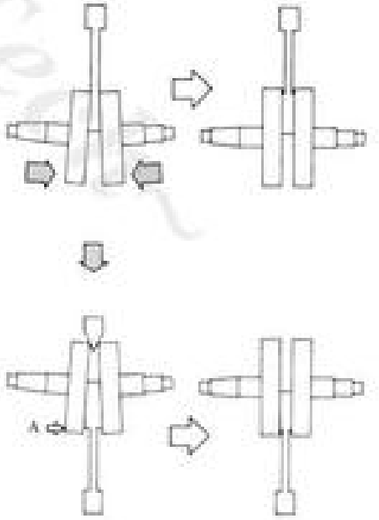
If flywheel misalignment cannot be corrected by the above method, replace the crankpin or the crankshaft itself.

CAUTION **Don't hammer the flywheel at part "A".**

Flywheel Horizontal Misalignment (H27)



Flywheel Vertical Misalignment (H28)



Big end seizure

In case of serious seizure with damaged flywheels, the crankshaft must be replaced. In case of less serious damage, disassemble the crankshaft and replace the

crankpin, needle bearing, side washers, and connecting rod.

CLUTCH

Spring tension

Remove the clutch springs, and set them, one at a time, on a spring tension testing device. Compress the spring, and read the tension at the test length. If the spring tension at the specified length is weaker than the service limit, replace the spring.

Spring Tension Measurement (H29)

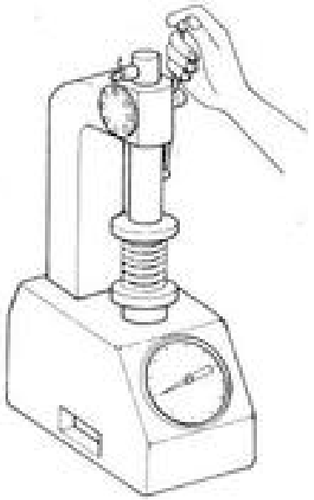


Table H17 Clutch Spring Tension

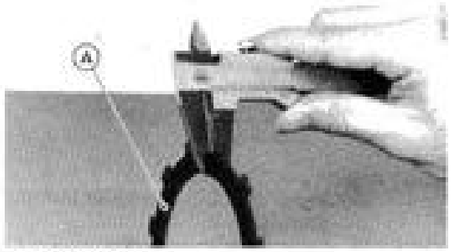
Test Length	Service Limit
20.1 mm	11.5 kg

Friction plate wear, damage

Visually inspect the friction plates to see whether or not they show any signs of seizure, overheating, or uneven wear. Measure the thickness of the plates with vernier calipers.

If any plates show signs of damage, or if they have worn past the service limit, replace them with new ones.

(H30)



A. Friction Plate

Table H18 Friction Plate Thickness

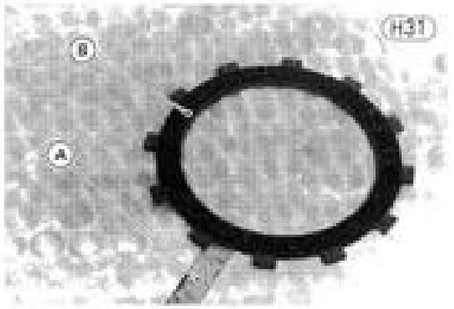
Service Limit	2.7 mm

Clutch plate warp

Place each clutch plate on a surface plate, and measure the gap between each clutch plate and the surface plate. This gap is the amount of clutch plate warp.

Replace any plates warped over the service limit.

(H31)



A. Thickness Gauge **B. Clutch Plate**

Table H19 Clutch Plate Warp

Service Limit	0.3 mm

Friction plate/clutch housing clearance

Measure the clearance between the tangs on the friction plates and the fingers of the clutch housing. If this clearance is excessive, the clutch will be noisy.

If the clearance exceeds the service limit, replace the friction plates. Also, inspect the fingers of the housing where the tangs of the friction plates hit them. If they are badly worn or if there are grooves cut where the tangs hit, replace the clutch housing.

Friction Plate/Clutch Housing Clearance (H32)

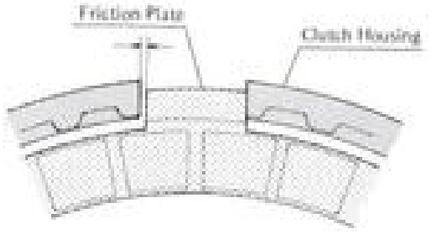


Table H20 Friction Plate/Clutch Housing Clearance

Service Limit	0.7 mm

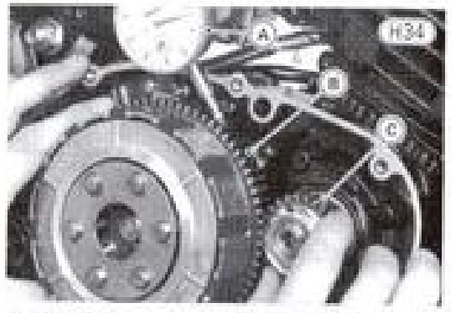
Clutch housing gear damage

Inspect the teeth on the clutch housing gear. Any light damage can be corrected with an oilstone, but the clutch housing must be replaced if the teeth are badly damaged. Damaged teeth on the clutch housing gear indicate that the primary gear, by which it is driven, may also be damaged. At the same time that the clutch housing gear is repaired or replaced, the primary gear should be inspected. If damaged, the primary gear must be replaced.

A. Oilstone **B. Clutch Housing Gear**

Clutch housing/primary gear backlash

Measure the backlash between the clutch housing gear and the primary gear with a dial gauge. Set the dial gauge against a tooth on the clutch housing gear, and rotate the clutch housing gear back and forth while keeping the primary gear stationary. The difference between the highest and lowest dial reading is the amount of backlash. If the amount of backlash exceeds the service limit, replace both the clutch housing and the primary gear.



A. Dial Gauge **C. Primary Gear**
B. Clutch Housing Gear

Table H21 Clutch Housing/Primary Gear Backlash

Service Limit	0.17 mm

Clutch housing/drive shaft sleeve clearance

Measure the diameter of the drive shaft sleeve with a micrometer, and measure the inside diameter of the clutch housing. Find the difference between the two readings to determine the clearance. Replace the sleeve if the clearance exceeds the service limit.

A. Drive Shaft Sleeve **B. Clutch Housing**

Table H22 Clutch Housing/Drive Shaft Sleeve Clearance

Service Limit	0.15 mm

Clutch hub damage

Inspect where the teeth on the steel plates wear against the splines of the clutch hub. If there are notches worn into the splines, replace the clutch hub.

Clutch release rack and pinion wear

Visually inspect the clutch release rack and pinion for damage or excessive wear. If there is any damage

or excessive wear, replace the rack and shaft as a set.

Fit the rack and shaft into the clutch cover, and turn the shaft back and forth while holding the rack steady to check rack and pinion movement. If there is excessive play, replace the rack and shaft as a set.

TRANSMISSION

NOTE: For simplicity, the drive shaft gears in the following explanation are referred to as "D" (e.g., D1 = drive shaft 1st gear) and the output shaft gears as "O".

External shift mechanism inspection

Inspect the shift pawl spring, gear set lever spring, shift pawls, and return spring. Replace any broken or otherwise damaged parts.

Measure the free length of the shift pawl spring and gear set lever spring. If it exceeds the service limit, replace it with a new one.

Spring Free Length (H36)

Table H23 Spring Free Length

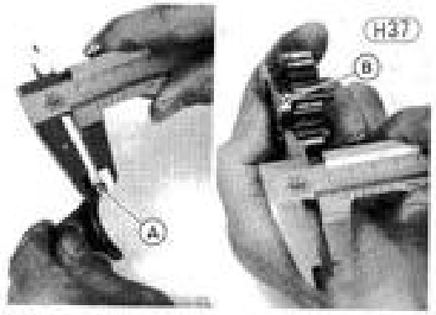
	Service Limit
Pawl Spring	22.6 mm
Set Lever Spring	36.8 mm

Shift fork bending

Visually inspect the shift forks, and replace any fork that is bent. A bent fork could cause difficulty in shifting or allow the transmission when under power to jump out of gear.

Shift fork/gear groove wear

Measure the thickness of the fingers of each shift forks, and measure the width of the groove on gears O3, O4, and O5. If the thickness of a shift fork finger is under the service limit, the shift fork must be replaced. If a gear shift fork groove is worn over the service limit, the gear must be replaced.



A. Shift Fork Finger **B. Gear Groove**

Table H24 Shift Fork Thickness

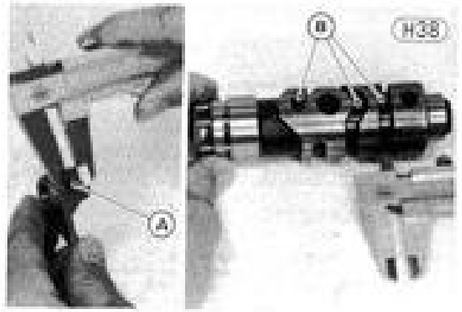
Service Limit	4.8 mm

Table H25 Gear Shift Fork Groove Width

Service Limit	5.25 mm

Shift fork guide pin/shift drum groove wear

Measure the diameter of each shift fork guide pin, and measure the width of each shift drum groove. Replace the guide pin which has worn past the service limit. If a shift drum groove is worn past the service limit, replace the shift drum.



A. Guide Pin **B. Shift Drum Grooves**

Table H26 Shift Fork Guide Pin Diameter

Service Limit	5.85 mm

Table H27 Shift Drum Groove Width

Service Limit	6.00 mm

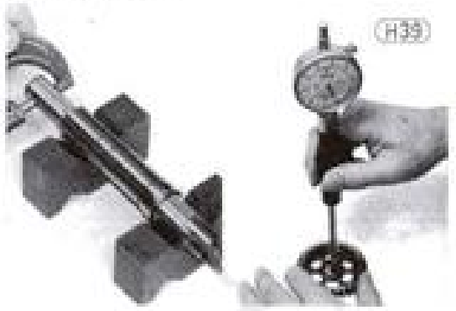
Gear dog, gear dog hole, gear dog recess damage

Visually inspect the gear dogs, gear dog holes, and gear dog recesses. Replace any gears that have damaged or unevenly or excessively worn dogs, dog holes, or dog recesses.

Gear/shaft clearance

Measure the diameters (Fig. H40) of each shaft with a micrometer. If any diameters exceed the service limit, replace the shaft with a new one.

Measure the inside diameter of each gear listed below. If each diameter exceeds the service limit, replace the gear with a new one.



Shaft Diameter Measurement

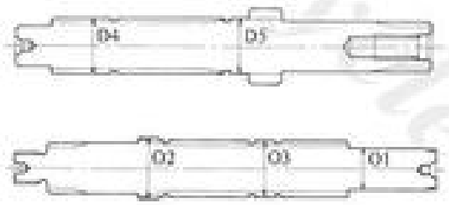


Table H28 Shaft Diameter

	Service Limit
For D4, D5, and O3 Gears	21.92 mm
For O1 Gear	15.95 mm
For O2 Gear	23.92 mm

Table H29 Gear Inside Diameters

	Service Limit
D4 and O3 Gears	22.06 mm
D5 Gear	22.07 mm
O1 Gear	16.07 mm
O2 Gear	24.07 mm

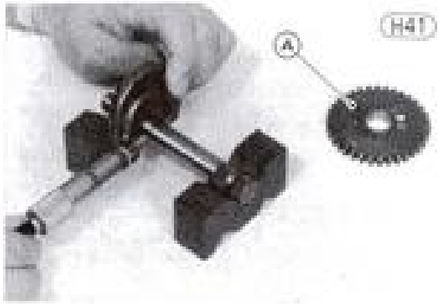
KICKSTARTER

Kick gear, shaft wear

Measure the inside diameter of the kick gear, and replace the gear if the diameter is over the service limit.

Visually inspect the ratchet portion of the kick gear. If there is any kind of damage, replace the kick gear.

Measure the kick shaft diameter at the kick gear, and replace it if it is under the service limit.



A. Ratchet

Table H30 Kick Gear Inside Diameter

Service Limit	16.08 mm

Table H31 Kick Shaft Diameter

Service Limit	15.95 mm

Drive shaft idle gear/sleeve clearance

Measure the inside diameter of the drive shaft idle gear with a cylinder gauge, and measure the outside diameter of the drive shaft sleeve with a micrometer. Find the difference between the two readings to figure the clearance. Replace the gear and sleeve if the clearance exceeds the service limit.

Table H32 Drive Shaft Idle Gear/Sleeve Clearance

Service Limit	0.17 mm

Output shaft idle gear/shaft clearance

Measure the inside diameter of the output shaft idle gear with a cylinder gauge. If the inside diameter exceeds the service limit, replace the gear with a new one.

Measure the diameter of the output shaft with a micrometer. If the diameter exceeds the service limit, replace it with a new one.

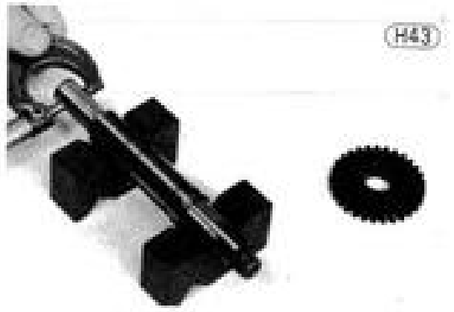


Table H33 Output Shaft Idle Gear Inside Diameter

Service Limit	16.07 mm

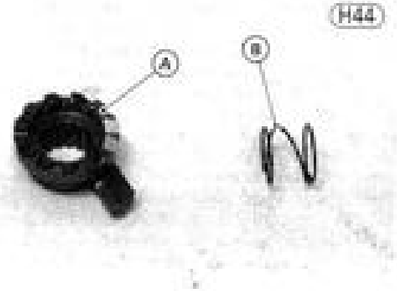
Table H34 Output Shaft Diameter

Service Limit	15.95 mm

Ratchet, spring damage

Visually inspect the ratchet portion of the ratchet lever. If there is any kind of damage, replace the ratchet lever.

Visually inspect the spring. If the spring is damaged, replace the spring.

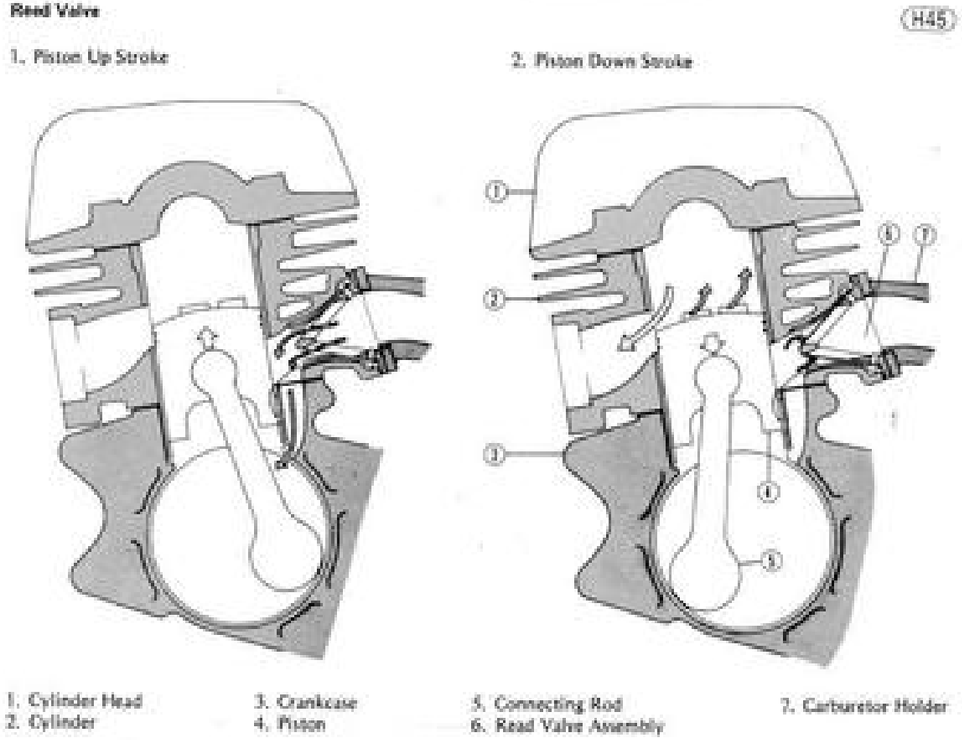


A. Ratchet **B. Spring**

REED VALVE

The reed valve, which is fitted in the intake port, consists of a rubber-coated valve holder, flexible valve reeds, and valve stops. The reed valve is essentially a check valve which allows fuel/air mixture to flow only from the carburetor into the crank chamber below the piston. Any mixture that has passed the reed valve is prevented from returning.

Reed Valve



1. Cylinder Head
2. Cylinder
3. Crankcase
4. Piston
5. Connecting Rod
6. Read Valve Assembly
7. Carburetor Holder

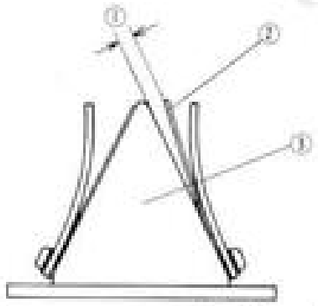
The reed valve opens whenever the pressure in the crank chamber is below atmospheric or whenever the inertia force of mixture flow pushes the valve reeds. It contrasts with the method whereby an intake port in the cylinder is opened and closed by the piston as it moves up and down inside the cylinder. The reed valve system is not dependant on the piston for port timing, where the timing is symmetrical about BDC. Instead, the effective timing, which should vary with engine speed and load, is controlled by engine demand itself. Thus higher intake efficiency, elimination of gas blow-back, fuel economy, easy starting, and increased engine torque at low speed can be achieved.

To stop the returning flow of mixture through the reed valve, the reed valve must be forced tightly against the valve holder by the gas pressure. Therefore a valve reed should be flat or warped only slightly on one side, and the portions of the valve holder where the valve reeds seat must be even and smooth. The valve stop limits the movement of the reed.

Reed inspection

Check reed warp by measuring the clearance between each reed and the valve holder. If any one of the clearance measurements exceeds the service limit, replace the reed valve assembly with a new one.

Reed Valve/Holder Clearance Measurement (H46)



1. Clearance
2. Reed
3. Reed Valve Holder

Table H35 Reed Warp

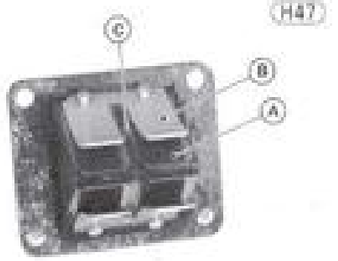
Service Limit	0.2 mm

Visually inspect the reeds for cracks, folds, or other damage. If there is any doubt as to the condition of a reed, replace the reed valve assembly. If a reed becomes wavy, replace the reed valve assembly with a new one even if its warp is less than the service limit.

Valve holder inspection

Check the reed contact areas of the valve holder for grooves, scratches, or other damage. Check that the rubber coating on the valve holder does not show any signs of separation from the holder. If there is any doubt as to the condition of the rubber coating, replace the reed valve assembly with a new one.

(H47)



A. Reed **B. Stop** **C. Rubber Coating**

Valve stop inspection

Check the valve stops for deformation, cracks, or other damage. If there is any doubt as to the condition of a stop, replace the reed valve assembly with a new one.

ENGINE BEARINGS, OIL SEALS

Ball bearing wear, damage

Since the ball bearings are made to extremely close tolerances, the clearance cannot normally be measured. Therefore, the condition of the bearings must be judged by feel. Wash each bearing with a high flash-point solvent, dry it (**do not spin it while it is dry**), and oil it. Spin it by hand to check its condition. If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced. Before reinstalling the bearing, replace its oil seal with a new one. Press in the bearing until it stops at the stop in the hole.

Needle bearing wear, damage

The rollers in the needle bearings wear so little that the wear is difficult to measure. Instead, inspect the bearings for abrasions, color change, or other damage. If there is any doubt as to the condition of either bearing, replace it.

Oil seal damage

Inspect the oil seals, and replace any if the lips are misshapen, discolored (indicating the rubber has deteriorated), hardened, or otherwise damaged. Since an oil seal is nearly always damaged on removal, any removed oil seals must be replaced. When pressing in an oil seal which is marked, press in with the mark facing out. Press the oil seal so that the face of the seal is level with the surface of its hole.

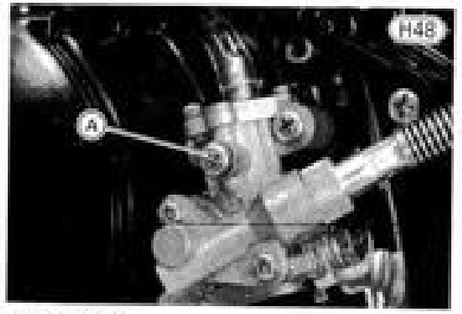
ENGINE LUBRICATION SYSTEM

Bleeding the oil pump

When either of the oil pump hoses has been removed, air may become trapped inside, which will obstruct oil flow.

- First check that there is plenty of engine oil in the oil tank.
- Bleed the air from the oil pump inlet hose and oil pump body by backing out the bleed valve on the oil pump body a couple of turns. Leave it until the oil flows out of the bleed valve, and tighten the valve securely. Check that the banjo bolts are tight, and wipe off the spilled oil.

CAUTION **To avoid possible engine damage, make sure the oil flows steadily without any air bubbles.**



A. Bleed Valve

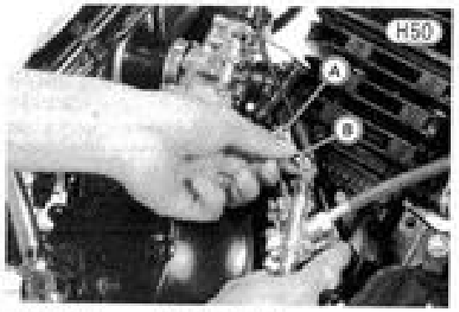
Bleed the air from the oil pipe by idling the engine (below 2,000 rpm) while pushing up on the oil pump lever as shown in the figure in order to maximize the plunger stroke. Keep the engine idling until the air is completely pumped out. If air bubbles continue to appear in the oil pipe, check the oil hose connections at the pump and tank.

A. Oil Pump Lever **B. Oil Pipe**

Oil pump performance test

If a drop in oil pump performance is suspected, check the rate that the oil is being pumped.

- Remove the oil pump cover.
- Remove the clutch cable from the clutch release lever.
- Remove the oil pipe that connects the right engine cover with the cylinder inlet port, and re-install the oil tube so that the check valve end leads into a container.



A. Oil Tube **B. Check Valve**

- Start the engine, and keep it at 2,000 rpm.

CAUTION **1. Use a 20:1 mixture of gasoline to oil in the fuel tank in place of the gasoline normally used.**
2. Make sure the work area is well ventilated.

- Pushing up on the oil pump lever as shown in Fig. H49, collect the oil that is being pumped for 3 minutes. If the quantity of oil collected corresponds with the table, the oil pump is operating properly.

Table H36 Pump Output

Standard	5.0 ~ 6.0 cc for 3 minutes at 2,000 rpm of engine speed

- If the oil pump output is subnormal, inspect the oil pump for damage.
- Install the oil pipe in the normal direction using a new washer on each side of the fittings.
- Tighten the banjo bolts to 0.45 kg-m (39 in-lbs) of torque.
- Install the oil pump cover.
- Install the clutch cable and adjust the clutch.

Oil pump damage

Pump repair is limited to replacement of the **O** rings and the shaft oil seal, since these are the only parts that may be expected to deteriorate. Other moving parts are well lubricated by the oil in the pump, and wear very little.

If the **O** rings or oil seals deteriorate or are damaged, the pump will lose compression, pump output will drop, and oil may leak from the pump. When pump trouble is suspected, inspect the **O** rings and replace any defective ones. If the trouble is with parts other than the **O** rings, replace the oil pump as an assembly. The pump

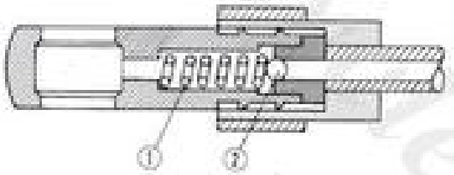
is precision made with no allowance for replacement of individual parts.

Check valve

The check valve opens when oil pressure is in the direction of the arrow, and allow oil flow in that one direction only. When the engine is stopped – and therefore the oil pump is also stopped – the check valve stops oil flow, and any oil that has passed a check valve is prevented from returning.

If oil will not pass through the check valve, clean the valve out by using a high flash-point solvent in a squirt can or syringe. If the check valve does not work properly after being clean out, either allowing oil to pass in both directions or not allowing oil to pass at all, replace the check valve.

Check Valve (H51)



1. Spring 2. Steel Ball

CAUTION **Do not use compressed air on the valve since doing so would damage the valve spring.**

Maintenance—Chassis

Table of Contents

WHEELS

Tires

Tires, air pressure

The maximum recommended load in addition to vehicle weight is 150 kg.

To ensure safe handling and stability, use only the recommended standard tires for replacement, inflating them to the standard pressure. However, a certain variation from the standard pressure may be desired depending on road surface conditions (rain, ice, rough surface, etc).

Table J1 Tires, Air Pressure (measured when cold)

	Air Pressure		Size	Make, Type
Front	1.5 kg/cm² (21 psi)		2.75-21 4PR	Yokohama Y-963C
Rear	Up to 97.5 kg	1.5 kg/cm² (21 psi)	3.50-18 4PR	Yokohama Y-963C
	97.5 ~ 150 kg	2.0 kg/cm² (28 psi)		

Tire wear, damage

Tires must not be used if they are getting bald, or if they are cut or otherwise damaged. As the tire tread wears down, the tire becomes more susceptible to puncture and failure. 90% of tire failures occur during the last 10% of tire life.

Visually inspect the tire for cracks and cuts, replacing the tire in case of bad damage. Remove any imbedded stones or other foreign particles from the tread. Swelling or high spots indicate internal damage, requiring tire replacement unless the damage to the fabric is very minor.

Measure the depth of the tread with a depth gauge, and replace the tire if tread depth is less than the service limit.

A. Depth Gauge

Table J2 Tire Tread Depth (Front and Rear)

Service Limit	2 mm

Rims, Spokes

Spoke breakage

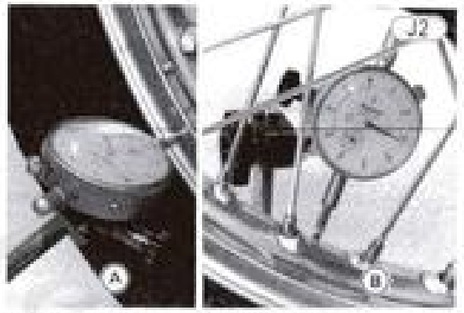
If any spoke breaks, it should be replaced immediately. A missing spoke places an additional load on the other spokes, which will eventually cause other spokes to break.

Periodically check that all the spokes are tightened evenly since they stretch a certain amount during use. Standard spoke tightening torque is 0.30 kg-m (26 in-lbs). Over or under-tightening may cause breakage.

Rim runout

Set a dial gauge against the side of the rim, and rotate the wheel to measure axial runout. The difference between the highest and lowest dial readings is the amount of runout.

Set the dial gauge to the inner circumference of the rim, and rotate the wheel to measure radial runout. The difference between the highest and lowest dial readings is the amount of runout.



A. Axial Runout B. Radial Runout

A certain amount of rim warp (runout) can be corrected by recentering the rim. Loosen some spokes and tighten others to change the position of different parts of the rim. If the rim is badly bent, however, it should be replaced.

Table J3 Rim Runout

	Service Limit
Axial	2.0 mm
Radial	2.0 mm

Axles

Axle runout

To measure axle runout, remove the axle, place it in V blocks that are 100 mm apart, and set a dial gauge to the axle at a point halfway between the blocks. Turn the axle to measure the runout. The amount of runout is the amount of dial variation.

If runout exceeds the usable range, straighten the axle or replace it. If the axle cannot be straightened to within the usable range, or if runout exceeds the service limit, replace the axle.

Axle Runout

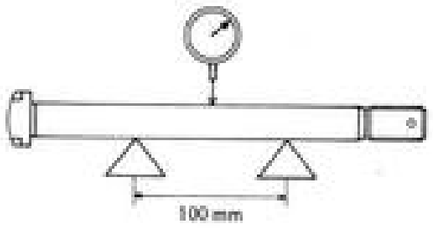


Table J4 Axle Runout/100 mm

	Usable Range	Service Limit
Front and Rear	under 0.2 mm	0.7 mm

Grease Seals, Wheel Bearings

Inspection and lubrication

If the grease seals are examined without removing the seals themselves, look for discoloration (indicating the rubber has deteriorated), hardening, damage to the internal ribbing, or other damage. If the seal or internal ribbing has hardened, the clearance between the seal and the axle sleeve will not be taken up, which will allow dirt and moisture to enter and reach the bearing. If in doubt as to its condition and whenever the seal is removed for greasing the bearing, the seal should be replaced. The seals are generally damaged upon removal.

Since the wheel bearings are made to extremely close tolerances, the clearance cannot normally be measured. Wash the bearing with a high flash-point solvent, dry it (**do not spin it while it is dry**), and oil it. Spin it by hand to check its condition. If it is noisy, does not spin smoothly, or has any rough spots, it must be replaced. If the same bearing is to be used again, re-wash it with a high flash-point solvent, dry it, and pack it with good quality bearing grease before installation. Turn the bearing around by hand a few times to make sure the grease is distributed uniformly inside the bearing, and wipe the old grease out of the hub before bearing installation. Clean and grease the wheel bearings and the front hub gear housing (speedometer gear) in accordance with the Periodic Maintenance Chart (Pg. 10).

A. Grease

Rear Wheel Coupling

Damper inspection

Remove the rear wheel coupling, and inspect the rubber damper.

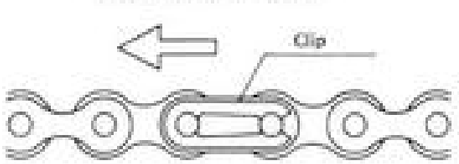
Replace the damper if it appears damaged or deteriorated.

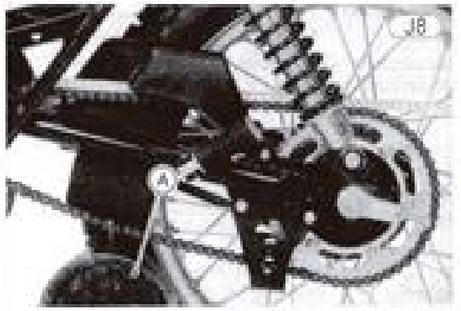
A. Rubber Damper

DRIVE CHAIN

The chain of this model is provided with a master link to facilitate removal and replacement. To minimize any chance of the master link dislodging, the master link is fitted with the closed end of the "U" pointed in the direction of chain rotation (Fig. J7).

Master Link Clip Installation J7





A. Weight

Table J5 Drive Chain

	Link	Make and Type
Australian and West German Models	116 link	Enuma EK428SH-PG
Models other than above	118 link	

Table J6 Drive Chain 20-link Length

Service Limit	259 mm

Wear

When the chain has worn so much that it is more than 2% longer than when new, it is no longer safe for use and should be replaced. Whenever the chain is replaced, inspect both the engine and rear sprockets, and replace them if necessary. Overworn sprockets will cause a new chain to wear quickly. See Page 121 ("sprockets" section).

Since it is impractical to measure the entire length of the chain, determine the degree of wear by measuring a 20-link length of the chain. Stretch the chain taut either by using the chain adjuster, or by hanging a 10 kg weight on the chain. Measure the length of 20 links on a straight part of the chain from pin center of the 1st pin to pin center of the 21st pin. Since the chain may wear unevenly, take measurements at several places. If any measurements exceed the service limit, the chain should be replaced.

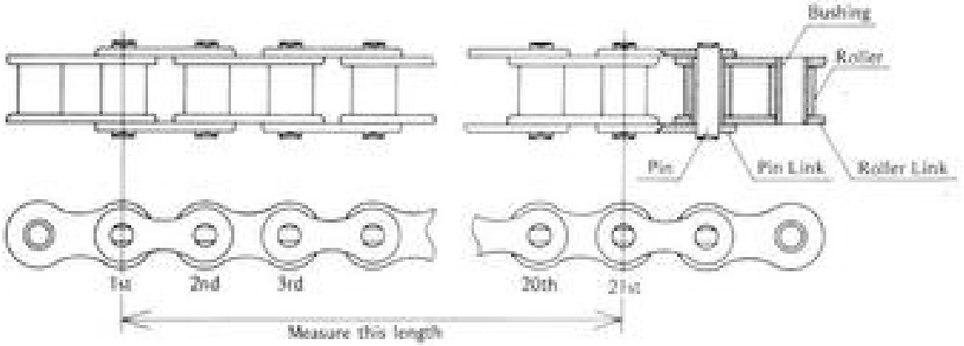
NOTE: The drive system was designed for use with the standard chain. For maximum strength and safety, the standard chain must be used for replacement.

Lubrication

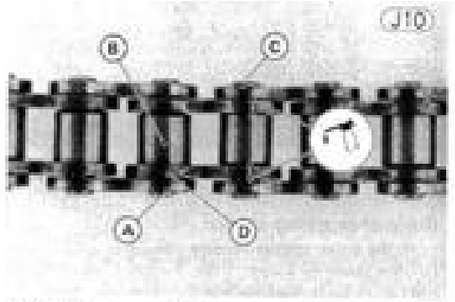
In order for the chain to function safely and wear slowly, it should be properly lubricated in accordance with the Periodic Maintenance Chart (Pg. 10). Lubrication is also necessary after riding through rain or on wet roads, or any time that the chain appears dry. Anytime that the motorcycle has been washed, the chain should be adequately lubricated on the spot in order to avoid rust.

The chain should be lubricated with a lubricant which will both prevent the exterior from rusting and also absorb shock and reduce friction in the interior of the chain. An effective, good quality lubricant specially formulated for chains is best for regular chain lubrication. If a special lubricant is not available, a heavy oil such as SAE 90 is preferred to a lighter oil because it will stay on the chain longer and provide better lubrication. Apply the oil to the sides of the rollers and between the side plates of the links so that oil will penetrate to the pins and bushings where most wear takes place. Wipe off any excess oil.

Drive Chain Measurement J9



Dirt will cling to the oil and act as an abrasive, accelerating chain wear. Whenever the chain becomes particularly dirty, it must be cleaned in kerosene and then soaked in a heavy oil. Shake the chain while it is in the oil so that oil will penetrate to the inside of the rollers.



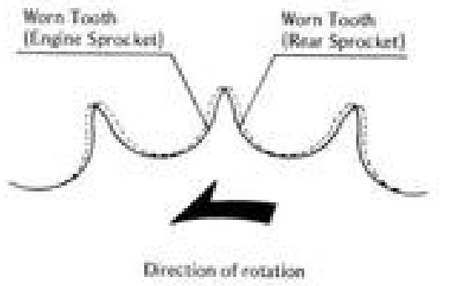
A. Pin Link
B. Roller
C. Pin
D. Roller Link

SPROCKETS

Sprocket wear

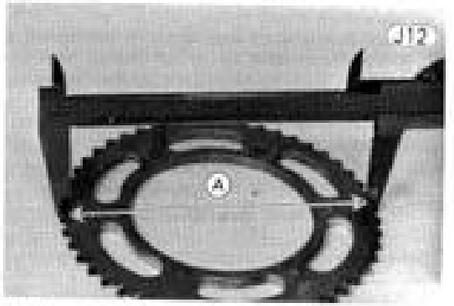
Visually inspect the sprocket teeth. If they are worn as illustrated, replace the sprocket.

Sprocket Teeth Wear J11



Measure the diameter of the sprocket at the base of the teeth. If the sprocket is worn down to less than the service limit, replace the sprocket.

NOTE: If a sprocket requires replacement, the chain is probably worn also. Upon replacing a sprocket, inspect the chain.



A. Diameter

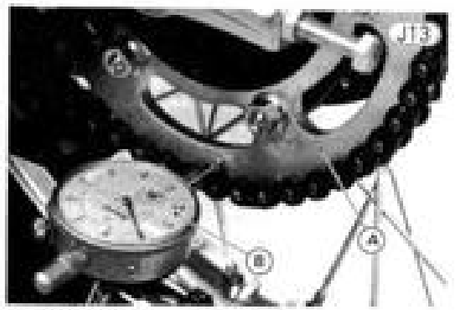
Table J7 Sprocket Diameter

	Service Limit	
	Engine	Rear
Australian and West German Models	51.4 mm	173.1 mm
Models other than above	47.7 mm	183.4 mm

Rear sprocket warp

Elevate the rear wheel so that it will turn freely, and set a dial gauge against the rear sprocket near the teeth as shown in the figure. Rotate the rear wheel. The difference between the highest and lowest dial gauge readings is the amount of runout (warp).

If the runout exceeds the service limit, replace the rear sprocket.



A. Rear Sprocket
B. Dial Gauge

Table J8 Rear Sprocket Warp

Service Limit	0.5 mm

BRAKES

WARNING **Brake linings contain asbestos fiber. Inhalation of asbestos may cause serious scarring of the lungs and may promote other internal injury and illness, including cancer. Observe the following precautions when handling brake linings:**

1. **Never blow brake linings dust with compressed air.**
2. **If any components are to be cleaned, wash with detergent, then immediately discard the cleaning solution and wash your hands.**
3. **Do not grind any brake lining material unless a ventilation hood is available and properly used.**

Brake drum wear

Measure the inside diameter of the brake drum with calipers to determine wear. Since uneven drum wear will decrease braking effectiveness, take measurements at a minimum of two places. If the drum is worn unevenly or if it is scored, turn the drum down on a brake drum lathe or replace the hub. (Do not turn it down to the service limit, and do not turn it down if any diameter measurement exceeds the service limit). If any diameter measurement exceeds the service limit, replace the hub.

Table J9 Brake Drum Inside Diameter

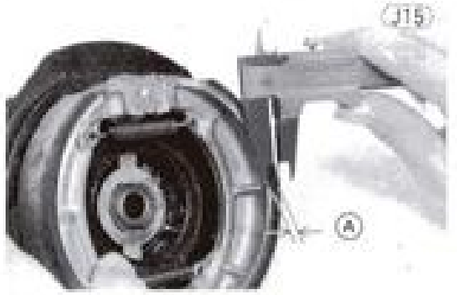
	Service Limit
Front	120.75 mm
Rear	

Brake shoe lining wear

Check the thickness of the brake linings, and replace both shoes as a set if the thickness at any point is less than the service limit. If the thickness of the brake linings is sufficient, check the linings for uneven wear, and file or sand down any high spots. With a wire brush, remove any foreign particles imbedded in the lining surface. Wash off any oil or grease with a high flash-point solvent. Do not use one which will leave an oily residue. In case the linings are damaged or the surface cannot be restored by sanding and cleaning, the shoes must be replaced.

Table J10 Brake Lining Thickness

	Service Limit
Front and Rear	2 mm



A. Lining Thickness

Brake shoe spring tension

If the brake springs become stretched, they will not pull the shoes back away from the drum after the brake lever or pedal is released, and the shoes will drag on the drum. Remove the springs, and check their free length with vernier calipers. If either is stretched beyond the service limit, replace both springs.

Brake Spring Free Length J16

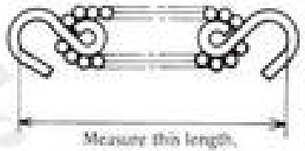


Table J11 Brake Spring Free Length

	Short	Long
Service Limit	32.8 mm	47.3 mm

Camshaft, shaft hole wear

Excessive shaft to hole clearance will increase camshaft play and reduce braking efficiency.

Measure the shaft diameter with a micrometer, and replace it if it is worn down to less than the service limit.

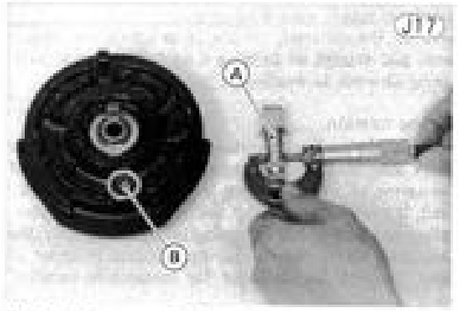
Measure the inside diameter of the camshaft hole, and replace the brake panel if the hole is worn past the service limit.

Table J12 Brake Camshaft Diameter

	Service Limit
Front and Rear	14.85 mm

Table J13 Camshaft Hole Diameter

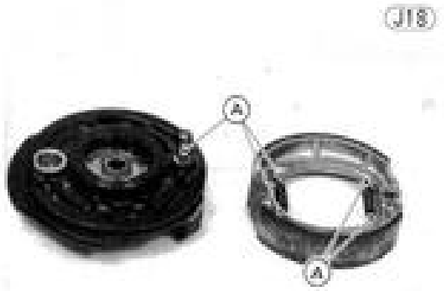
	Service Limit
Front and Rear	15.16 mm



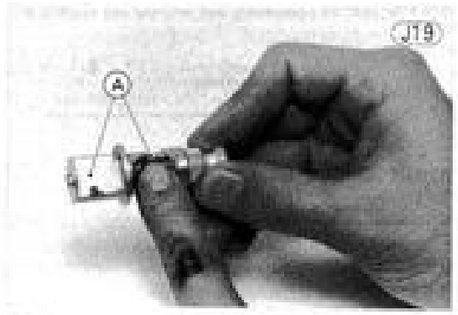
A. Camshaft B. Camshaft Hole

Lubrication

Every time that the brake is disassembled, and in accordance with the Periodic Maintenance Chart (Pg. 10), wipe out the old grease, and re-grease the brake pivot points. Apply grease to the brake shoe anchor pin, spring ends, and cam surface of the camshaft, and fill the camshaft groove with grease. Do not get any grease on the brake shoe linings, and wipe off any excess grease so that it will not get on the linings or drum after brake assembly.



A. Grease



A. Grease

STEERING STEM

Steering stem warp

Examine the steering stem, and replace it if it is bent.

Bearing wear, damage

Wipe the bearing clean of grease and dirt, and examine the races and balls. If the balls or races are worn, or if either race is dented, replace both races and all the balls for the bearing as a set.

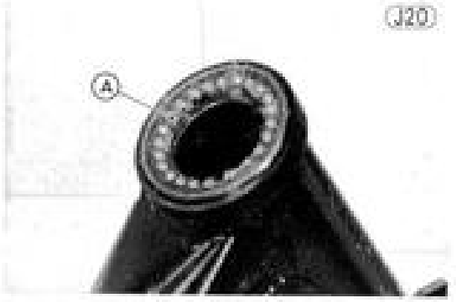
Table J14 Bearing Ball Specification

	Size	Quantity
Upper	3/16"	23
Lower	1/4"	19

Bearing lubrication

In accordance with the Periodic Maintenance Chart (Pg. 10), and whenever the steering stem is disassembled, the steering stem bearings should be relubricated.

Wipe all the old grease off the races and balls, washing them in a high flash-point solvent if necessary. Replace the bearing parts if they show wear or damaged. Apply grease liberally to the upper and lower races, and stick the bearing balls in place with grease.



A. Bearing Balls

Grease seal deterioration, damage

Inspect the grease seal under the lower inner race for any signs of deterioration or damage, and replace it if it is damaged.

FRONT FORK

Fork oil change

To drain out the old oil, remove the drain bolt and gasket from the lower end of the outer tube. With the front wheel on the ground and the front brake fully applied push down on the handlebar a few times to pump out the oil. Install the drain bolt and gasket,

remove the top plug from the inner tube, and pour in the type and amount of oil specified in the table. Then check the oil level. If the oil is below the specified level, add oil and re-check the oil level.

NOTE: After the front fork oil is changed, before checking the oil level, pump the front fork several times to expel air from the upper and lower chambers.

A. Drain Bolt

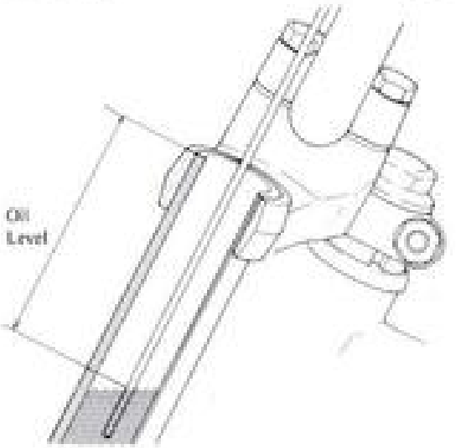
Table J15 Fork Oil

Filling fork oil capacity			
Type	When changing oil	After disassembly and completely dry	Oil level
SAE 5W20	about 160 cc	195~205 cc	550 mm from top of inner tube with springs removed

Fork oil level

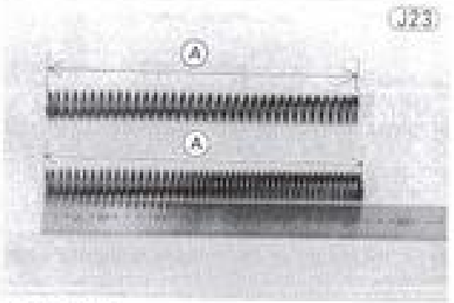
To check the fork oil level, first place a jack or stand under the engine so that the front wheel is raised off the ground. Remove the top plug, springs, and spring seat from the inner tube. Invert a rod down into the tube, and measure the distance from the top of the stem head to the oil level. If the oil is below the correct level, add enough oil to bring it up to the proper level, taking care not to overfill.

Fork Oil Level J22



Spring tension

Since the springs becomes shorter as they weaken, check their free length to determine their condition. If the spring of either fork leg is shorter than the service limit, it must be replaced. If the length of a replacement spring and that of the remaining spring vary greatly, the remaining spring should also be replaced in order to keep the fork leg balanced for motorcycle stability.



A. Free Length

Table J16 Fork Spring Free Length

	Service Limit
Upper Spring	266 mm
Lower Spring	261 mm

Inner tube damage

Visually inspect the inner tube. If the inner tube is damaged, replace the inner tube. Since damage to the inner tube damages the oil seal, replace the oil seal whenever the inner tube is repaired or replaced. Temporarily assemble the inner and outer tubes, and pump them back and forth manually to check for smooth operation.

CAUTION **If the inner tube is bent or badly creased, replace it. Excessive bending, followed by subsequent straightening, can weaken the inner tube.**

SWING ARM

Pivot shaft

To measure the pivot shaft runout, set the pivot shaft on V blocks at the ends of the shaft, and set a dial gauge to the shaft halfway between the blocks. Turn the shaft to measure the runout. The amount of runout is the amount of dial variation. If the shaft runout exceeds the usable range, straighten it. If it cannot be straightened,

or if the runout exceeds the service limit, replace the shaft.

Pivot Shaft Runout (J24)

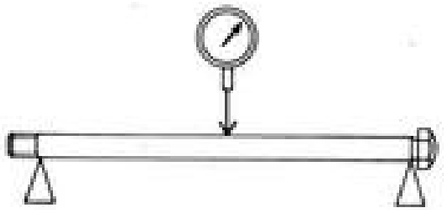
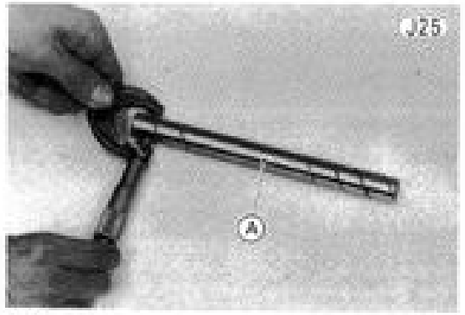


Table J17 Pivot Shaft Runout

Usable Range	Service Limit
under 0.14 mm	0.7 mm

Sleeve, bushing wear

Measure the outside diameter of the swing arm sleeve at both ends with a micrometer. Replace a swing arm sleeve if the diameter is less than the service limit or if it shows visible damage.



A. Sleeve

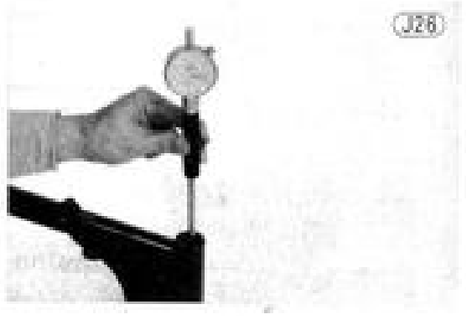
Table J18 Swing Arm Sleeve Diameter

Service Limit	18.95 mm

Measure the inside diameter of each bushing with a cylinder gauge. Replace both bushings if the diameter of either exceeds the service limit. Also, replace both bushings if either shows visible damage.

Table J19 Swing Arm Bushing Diameter

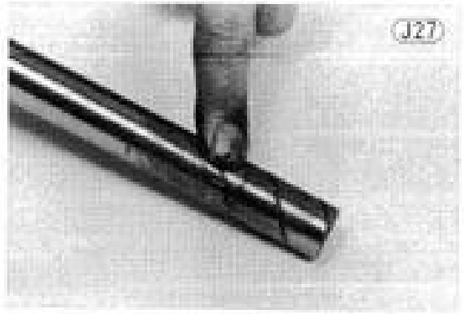
Service Limit	19.24 mm



Swing arm lubrication

Lubricate the swing arm with a molybdenum disulfide grease for chassis parts in accordance with the Periodic Maintenance Chart (Pg. 10).

Pull out the pivot shaft and sleeve, wipe the old grease off the sleeve, and apply fresh grease, especially in each sleeve groove.



Maintenance–Electrical

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BATTERY

The battery serves as a back-up source of power to operate the electrical equipment whenever the engine is turning over too slowly for the magneto to supply sufficient power.

With proper care, the battery can be expected to last several years, but it may be completely ruined long before that if it is mistreated. Following a few simple rules will greatly extend the life of the battery.

1. **When the level of the electrolyte in the battery is low, add only distilled water to each cell, until the level is at the upper level line marked on the outside of the battery. Ordinary tap water is not a substitute for distilled water and will shorten the life of the battery.**
2. **Never add sulphuric acid solution to the battery. This will make the electrolyte solution too strong and will ruin the battery within a very short time.**
3. **Avoid quick-charging the battery. A quick-charge will damage the battery plates.**
4. **Never let a good battery stand for more than 30 days without giving it a supplemental charge, and never let a discharged battery stand without charging it. If a battery stands for any length of time, it slowly self-discharges. Once it is discharged, the plates sulphate (turn white), and the battery will no longer take a charge.**
5. **Keep the battery well charged during cold weather so that the electrolyte does not freeze and crack open the battery. The more discharged the battery becomes, the more easily it freezes.**
6. **Always keep the battery vent hose free of obstruction, and make sure it does not get pinched, crimped, or melted shut by contact with the hot muffler. If battery gases cannot escape through this hose, they will explode the battery.**
7. **DON'T INSTALL THE BATTERY BACKWARDS. The negative side is grounded.**

Electrolyte

The electrolyte is dilute sulphuric acid. The standard specific gravity of the electrolyte used in warm climates in a fully charged battery is 1.260 at 20°C (68°F). (In particularly cold regions, a solution with a standard specific gravity of 1.280 is used.) The water in this solution changes to a gaseous mixture due to chemical action in the battery and escapes, which concentrates the acid in a charged battery. Consequently, when the level of the electrolyte becomes low, only distilled water should be added. If sulphuric acid is added, the solution will become too strong for proper chemical action and will damage the plates. Metal from the damaged plates collects in the bottom of the battery. This sediment will eventually cause an internal short circuit.

The specific gravity of the electrolyte is measured with a hydrometer and is the most accurate indication of the condition of the battery. When using the hydrometer, read the electrolyte level at the bottom of the meniscus (curved surface of the fluid). Fig. K2 shows the relationship between the specific gravity of the solution at 20°C (68°F) and the percentage of battery charge. Since specific gravity varies with temperature, and since the temperature of the solution being checked is likely to be other than 20°C (68°F); the formula given below should be used to compute the equivalent specific gravity for any temperature. When the temperature goes up, the specific gravity goes down, and vice versa.

°Celsius

$$S_{20} = S_t + [0.0007\ (t - 20)]$$

°Fahrenheit

$$S_{68} = S_t + [0.0004\ (t - 68)]$$

S_t = specific gravity at the present temperature

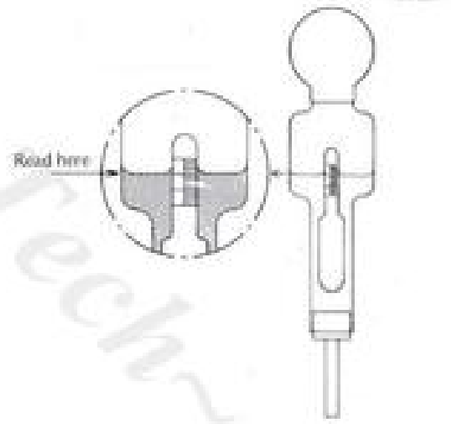
S_{20} = specific gravity at 20°C

S_{68} = specific gravity at 68°F

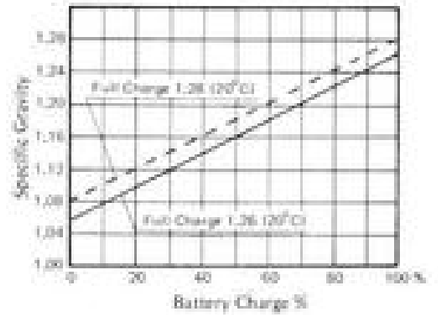
t = present temperature of solution

Generally speaking, a battery should be charged if a specific gravity reading shows it to be discharged to 50% or less of full charge.

Hydrometer (K1)



Specific Gravity/Battery Charge Relationship (K2)



Initial charge

New batteries for Kawasaki motorcycles are dry charged and can be used directly after adding the electrolyte. However, the effect of the dry charge deteriorates somewhat during storage, especially if any air has entered the battery from imperfect sealing. Therefore, it is best to give the battery an initial charge before using it in order to ensure long battery life.

WARNING **Because the battery gives off an explosive gas mixture of hydrogen and oxygen, keep any sparks or open flame away from the battery during charging.**

- Pour a 1.260 (specific gravity at 20°C or 68°F) sulphuric acid solution into each cell of the battery up to the upper level line.
- Let the battery stand for 30 minutes, adding more acid if the level drops during this time.

NOTES: 1. If the temperature of the solution is over 30°C (85°F) cool the solution before pouring it into the battery.

2. After pouring the acid into the battery, start charging the battery within 12 hours.

- Leaving the caps off the cells, connect the battery to a charger, set the charging rate at 1/10 the battery capacity, and charge it for 10 hours. For example, if the battery is rated at 6AH, the charging rate would be 0.6 ampere. If a constant voltage charger is used, the voltage must be adjusted periodically to keep the current at a constant value.

CAUTION **If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to bring down the temperature, and increase the charging time proportionately.**

- After charging, check the electrolyte level in each cell. If the level has dropped, add distilled water to bring it back up to the upper level line.
- Check the results of charging by measuring the specific gravity of each cell and by measuring battery voltage. Battery voltage of a 6 volt battery directly after the completion of charging should be 7.5 to 8 volts.

Ordinary charge

WARNING **Because the battery gives off an explosive gas mixture of hydrogen and oxygen, keep any sparks or open flame away from the battery during charging.**

- Clean off the battery using a solution of baking soda and water. Make especially sure that the terminals are clean.
- If the electrolyte level is low in any cell, fill to over the lower level line but not up to the upper level line since the level rises during charging. Figure the charging rate to be between 1/10 and 3/10 of battery capacity. For example, the maximum charging rate for a 6AH battery would be 3/10 x 6 which equals 1.8 amperes.

CAUTION **Charging the battery at a rate higher than specified above could ruin the battery. Charging at a higher rate causes excess heat, which can warp the plates and cause internal shorting. Higher than normal charging rates also cause the plates to shed active material. Deposits will accumulate, and can cause internal shorting.**

- Measure the specific gravity of the electrolyte, and use the graph, Fig. K2, to determine the percentage of discharge. Multiply the capacity of the battery by the percentage of discharge to find the amount of discharge in ampere-hours. Use this figure in the formula below to compute charging time.

$$\text{Charging time (hours)} = \frac{\text{Amount of discharge (AH)}}{\text{charging current (A)}} \times 1.2 \sim 1.5$$

- Remove the caps from all the cells, and begin charging the battery at the rate just calculated. If a constant voltage charger is used, the voltage will have to be adjusted periodically to maintain charging current at a constant value.

CAUTION **If the temperature of the electrolyte rises above 45°C (115°F) during charging, reduce the charging rate to bring down the temperature, and increase charging time proportionately.**

- After charging, check the electrolyte level in each cell. If the level has dropped, add distilled water to bring it back up to the upper level line.
- Check charging results by measuring the specific gravity of each cell and by measuring battery voltage. Battery voltage of a 6 volt battery directly after the completion of charging should be 7.5 to 8 volts and the specific gravity of the electrolyte should be more than 1.250. If the voltage is lower than this, the battery is not completely charged or can no longer take a full charge. If the specific gravity of any one cell is lower than 1.250, there may be damage in the cell.

Test charging

When the battery is suspected of being defective, first inspect the points noted in the Table below. The battery can be restored by charging it with the ordinary charge.

Table K1 Battery Troubleshooting Guide

	Good Battery	Suspect Battery	Action
Plates	(+) chocolate color (−) gray	white (sulphated); + plates broken or corroded	Replace
Sediment	none, or small amount	sediment up to plates, causing short	Replace
Voltage	above 6 volts	below 6 volts	Test charge
Electrolyte Level	above plates	below top of plates	Fill and test charge
Specific Gravity	above 1.200 in all cells; no two cells more than 0.020 different	below 1.100, or difference of more than 0.020 between two cells	Test charge

If it will take a charge so that the voltage and specific gravity come up to normal, it may be considered good except in the following case:

- If the voltage suddenly jumps to over 7 volts just after the start of charging, the plates are probably sulphated. A good battery will rise to 6 volts immediately and then gradually go up to 6.3 ~ 6.5 volts in about 30 to 60 minutes after charging is started.
- If one cell produces no gas bubbles, or has a very low specific gravity, it is probably shorted.
- If there does not appear to be enough sediment to short the plates, but one cell has a low specific gravity after the battery is fully charged, the trouble may be just that there is insufficient acid in that cell. In this instance only, sulphuric acid solution may be added to correct the specific gravity.
- If a fully charged battery not in use loses its charge after 2 to 7 days, or if the specific gravity drops markedly, the battery is defective. The self-discharge rate of a good battery is only about 1% per day.

CHARGING SYSTEM

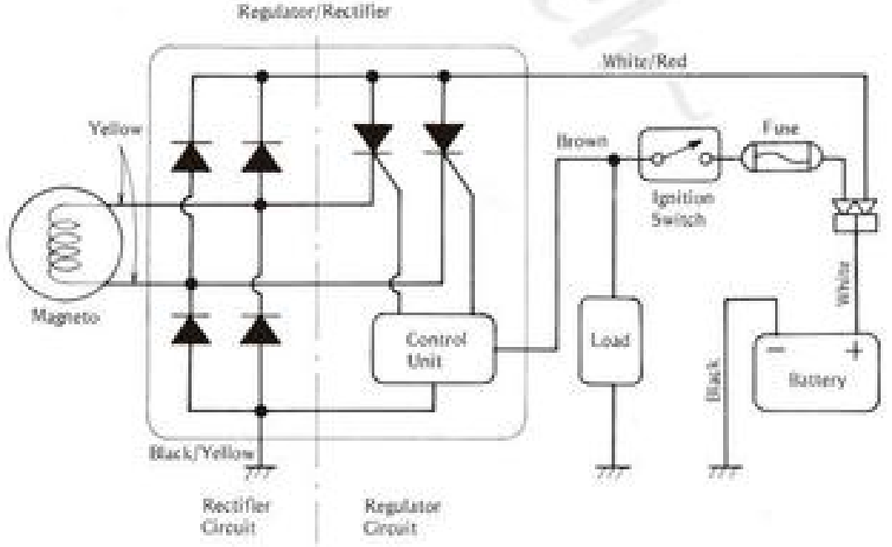
The charging system consists of a magneto and regulator/rectifier.

The magneto, basically a single phase alternating current (AC) generator, is divided into a moving part called the flywheel, and stationary part called the stator located inside the flywheel. The flywheel has 4 permanent magnets evenly spaced in its circumference to generate an alternating current with 2 cycles per flywheel revolution. The stator consists of an aluminum plate on which are mounted a lighting/charging coil, an exciter coil, and a signal coil. The lighting/charging coil generates the current required by the electrical circuits. The generated current is a single phase alternating current (AC), which is changed to direct current (DC) and controlled by a solid-state regulator/rectifier to supply an even voltage to the circuit components. The exciter coil and signal coil operate the CDI (Capacitor Discharge Ignition) unit to fire the spark plug.

Fig. K4 shows the basic circuit of the charging system. The control unit in the regulator/rectifier checks on the voltage level, and triggers the thyristors when the voltage exceeds the predetermined level.

A. Lighting/Charging Coil **C. Signal Coil**
B. Exciter Coil

Charging System Circuit (K4)



Since the solid-state regulator/rectifier contains no contacts or other moving parts, it does not wear out and never needs to be adjusted. It is therefore manufactured as a sealed unit, and must be replaced as a unit should it become defective.

There are a number of important precautions that are musts when servicing the charging system. Cautions that are applied to the individual parts are listed below. Failure to observe these rules can result in serious system damage. Learn and observe all the rules below.

CAUTION **When handling the regulator/rectifier, observe the following to avoid damage to the regulator/rectifier:**

1. **Do not reverse the battery lead connections. This will burn out the diodes.**
2. **For the regulator/rectifier to function properly, the battery must be charged to near capacity. If the battery is badly discharged, charge it before installing it in the motorcycle.**

When handling the magneto flywheel:

3. **Do not allow the flywheel to suffer sharp impacts such as striking it with a hammer or letting it fall on a hard surface. Such a shock to the flywheel can cause the magneto to lose their magnetism.**

Charging System Inspection

Initial Inspection

If there are any problem indications in the charging system, give the system a quick initial inspection or check before starting a series of time consuming tests, or worse yet, removing parts for repair or replacement. Such a check will often turn up the source of the trouble.

Make sure all connectors in the circuit are clean and tight. Examine wires for signs of burning, fraying, etc. Poor wires and bad connections will affect electrical system operation. Check the magneto and regulator/rectifier for evidence of physical damage.

A worn out or badly sulphated battery will produce numerous problems that cannot be corrected until the battery is replaced. **ALWAYS CHECK BATTERY CONDITION BEFORE CONDEMNING OTHER PARTS OF THE SYSTEM. A FULLY CHARGED BATTERY IS A MUST FOR CONDUCTING ACCURATE CHARGING SYSTEM TESTS.**

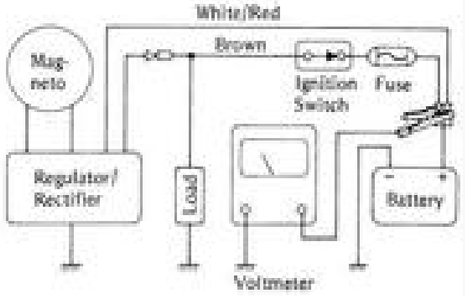
Charging system malfunctions can be traced to either the battery, magneto, regulator/rectifier, or the wiring. Troubles may involve one unit or in some cases, all units. Never replace a defective unit without determining what **CAUSED** the failure. If the failure was brought on by some other unit or units, they too must be repaired or replaced, or the new replacement will soon fail.

Operational inspection of charging system

- Warm up the engine to obtain actual magneto operating conditions.
- Remove the left side cover, check that the ignition switch is turned off, and connect the multimeter as shown in Table K2 to test the regulator/rectifier output voltage.

A. Battery + Lead B. Battery – Lead

Regulator/Rectifier Output Voltage Measurement (K6)



- Start the engine, and note the voltage readings at various engine speeds with the headlight turned on and then turned off. The readings should show nearly battery voltage when the engine speed is low, and, as the engine speed rises, the readings should also rise. But they must be kept under the specified voltage (Table K2).
- Turn off the ignition switch to stop the engine, and disconnect the multimeter.

If the regulator/rectifier output voltage are kept between the values given in Table K2, the charging system is considered to be working normally.

If the output voltage is much higher than the values specified in the table, the regulator/rectifier is defective or the regulator/rectifier leads are loose or open.

If the battery voltage does not rise as the engine speed increases, then the regulator/rectifier is defective or the magneto output is insufficient for the loads. Check the magneto and regulator/rectifier to determine which part is defective.

Magneto Inspection

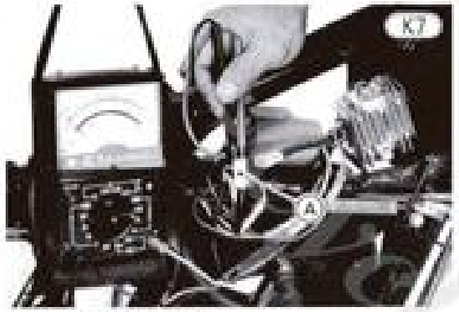
There are three types of magneto failures: short, open (wire burned out), or loss in flywheel magnetism. A short or open in the lighting/charging coil will result in either a low output, or no output at all. A loss in flywheel magnetism, which may be caused by dropping

Table K2 Regulator Output Voltage

Meter Range	Connections	Reading
25V DC	Meter (+) → Battery + Lead	Battery Voltage ~ 8V
	Meter (–) → Battery – Lead	

or hitting the flywheel, leaving it near an electromagnetic field, or just by aging, will result in low output.

- Remove the fuel tank, and disconnect the two yellow leads from the magneto.
- Connect the multimeter as shown in Table K3 to check the magneto output voltage with no electrical loads.



A. Magneto Yellow Leads

Table K3 Magneto Output Voltage

Meter Range	Connections	Reading @4,000 rpm
250V AC	One meter lead → One yellow lead	about 25 V
	The other meter lead → The other yellow lead	

- Start the engine, run it at the rpm given in Table K3, and note the voltage reading.

If the output voltage shows the value in Table K3, the magneto operates properly and the regulator/rectifier is damaged. A much lower reading than that given in the table indicates that the magneto is defective. Check the lighting/charging coil resistance as follows:

- Stop the engine, set the multimeter to the x 1 Ω range, and measure for continuity between the yellow leads.

Table K4 Lighting/Charging Coil Resistance

Meter Range	Connections	Reading *
x 1 Ω	One meter lead → One yellow lead	0.12 ~ 0.18 Ω
	The other meter lead → The other yellow lead	

* Measured when the coil is cold (room or atmospheric temperature).

If there is more resistance than shown in Table K4, or no meter reading, the lighting/charging has an open and must be replaced.

- Using the highest resistance range of the multimeter, measure the resistance between each of the yellow leads and chassis ground. Any meter reading less than infinity (∞) indicates a short, necessitating lighting/charging coil replacement.

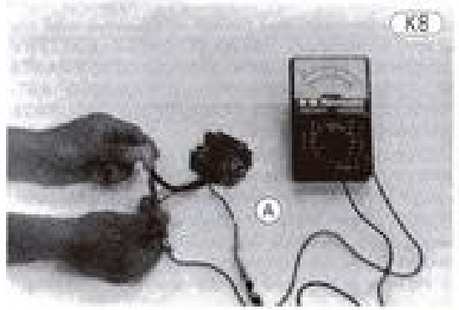
If the lighting/charging windings have normal resistance, but the voltage check showed the magneto to be defective; then the flywheel magnets have probably weakened, and the flywheel must be replaced.

Regulator/Rectifier

Rectifier circuit inspection

- With the ignition switch turned off, remove the fuel tank, and disconnect the 3-pin connector and three leads from the regulator/rectifier.
- Using the x 10 or x 100 Ω range, check the resistance in both directions between the white/red lead and each yellow lead, and between the black/yellow lead and each yellow lead. There is a total of 8 measurements. The resistance should be low in one direction and more than ten times as much in the other direction. If any two leads are low or high in both directions, the rectifier is defective and must be replaced.

NOTE: The actual meter reading varies with the meter used and the individual rectifier, but, generally speaking, the lower reading should be from zero to the first 1/3 of the scale.



A. Check the resistance in both directions.

Regulator circuit inspection

To test the regulator out of circuit, use three 6 volt batteries (or two 6 volt batteries and a 12 volt battery) and a test light made from a 6V 3~6W bulb in a socket with leads.

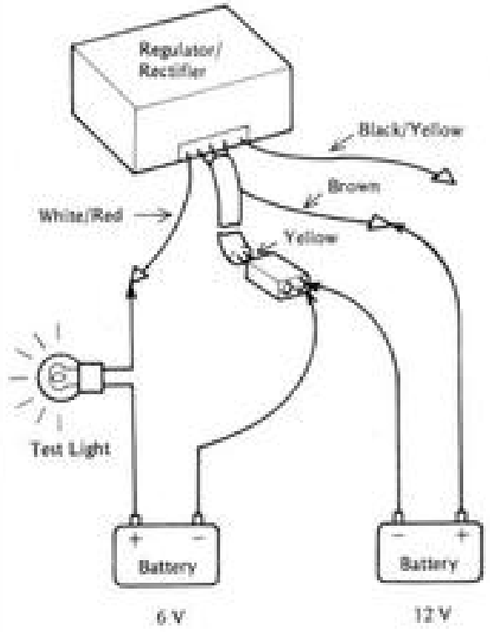
- Remove the regulator/rectifier from the frame.

•Using auxiliary leads, connect one of the yellow leads to the 6 volt battery (–) terminal, and connect the test light between the white/red lead and the 6 volt battery (+) terminal. At this time the bulb should not be lit.

CAUTION **The test light works as an indicator and also as a current limiter to protect the regulator/rectifier from excessive current. Do not use an ammeter instead of a test light.**

•To apply 6 volts to the regulator/rectifier brown lead, connect the brown lead to the other 6 volt battery (+) terminal and connect the yellow lead, which is connected to the other battery (–) terminal, to the 6 volt battery (–) terminal momentarily. At this time the bulb should not be lit.

Regulator Test (K9)



•To apply 12 volts to the brown lead, disconnect the battery from the brown lead and the yellow lead, connect two 6 volt batteries (connected in series) or a 12 volt battery in the same way. The bulb should now light and stay on until the bulb circuit is opened.

CAUTION **Do not apply more than 12 volts. If more than 12 volts is applied, the regulator/rectifier may be damaged. Do not apply 12 volts more than a few seconds. If 12 volts is applied for more than a few seconds, the regulator/rectifier may be damaged.**

•Repeat the above three steps for the other yellow lead.

•Replace the regulator/rectifier if the bulb does not light as described above.

IGNITION SYSTEM

The ignition system of this vehicle consists of a spark plug, an ignition coil, a Capacitor Discharge Ignition (CDI) unit, an exciter coil, a signal coil, and an engine stop switch.

Since the CDI system has no mechanical parts such as a cam or contact breakers, there are no parts to wear out and no periodic maintenance is required. So, unless there is circuit failure or the magneto stator plate is incorrectly installed during engine assembly, there is never any need to readjust the timing once it has been set correctly. However, if there is any doubt as to correct timing, inspect and adjust as follows.

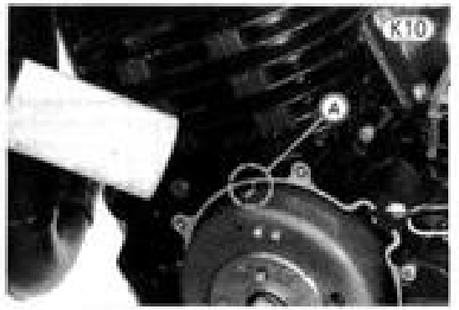
Ignition timing test

•Remove the magneto cover.

•Connect a strobe light in the manner prescribed by the manufacturer in order to check the ignition timing under operating conditions.

WARNING **Make sure that no tools, clothes, or leads never touch the spinning flywheel. Touching the flywheel of a running engine could cause an injury.**

•Start the engine, run the engine at 4,000 rpm, and direct the light at the timing marks on the flywheel and crankcase. The marks should align at 4,000 rpm.



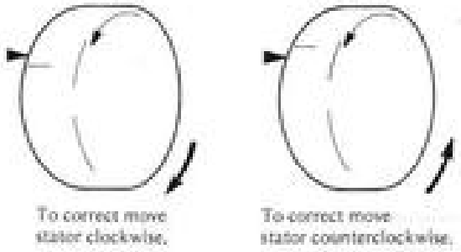
A. Timing Marks

•If they do not, stop the engine.

•Remove the magneto flywheel (Pg. 44).

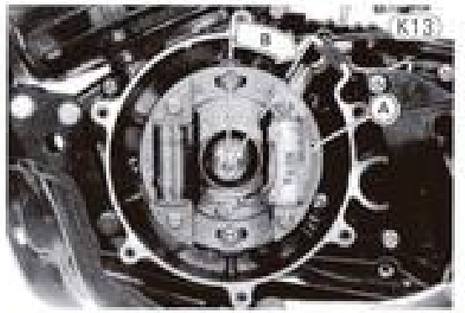
•Loosen the magneto stator plate screws (3), and turn the magneto stator to adjust the timing; clockwise rotation advances the timing and counterclockwise retards it.

Dynamic Ignition Timing (K11)



Example (when retarded):
If flywheel mark is retarded 5° for example as shown in Fig. K12, stator must be advanced by the same amount (5°) to set timing correctly as shown in Fig. K13. (Angles shown are exaggerated for emphasis.)

A. Retarded 5°



A. Stator B. Turn the stator clockwise 5°.

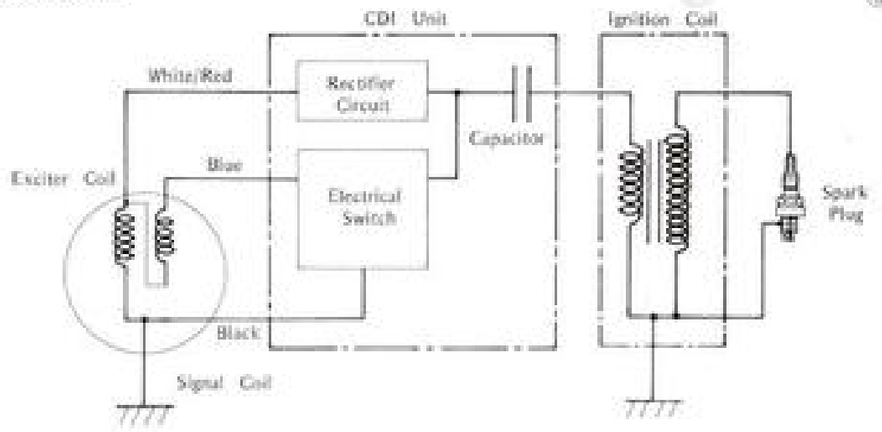
- After adjusting, tighten the stator plate screws securely, and reinstall the magneto flywheel (Pg. 44).
- Recheck the timing with strobe light, and readjust if necessary.
- Install the magneto cover and gasket.

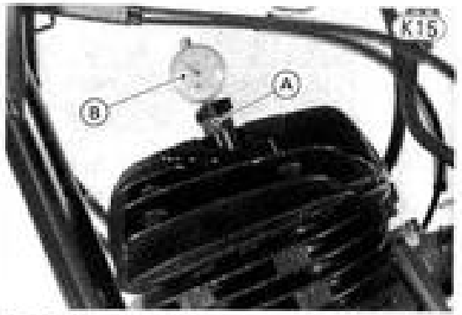
Verification of timing marks

The accuracy of the timing marks can be checked with a dial gauge and TDC finder (special tool).

- Remove the magneto cover, and turn the magneto flywheel until the position of the piston is close to the top.
- Remove the muffler (Pg. 37).
- Pull off the spark plug cap, and unscrew the spark plug.
- Install the TDC finder "A" (special tool) in the plug hole, and mount the dial gauge on the TDC finder.

CD Ignition System (K14)





A. TDC Finder "A" (57001-402) B. Dial Gauge

•Turn the flywheel to set the piston at exact TDC (top dead center), and set the dial to zero.
•Turn the flywheel clockwise until the dial gauge reads about 3.0 mm and then counterclockwise until the dial gauge reads 2.83 mm.
•The timing mark on the flywheel should align with the timing projection on the crankcase at this point. If it does not, set the piston at 2.83 mm BTDC (before top dead center) and make a new timing mark on the flywheel just under the projection.
•Install the muffler (Pg. 37).
•Check the ignition timing.

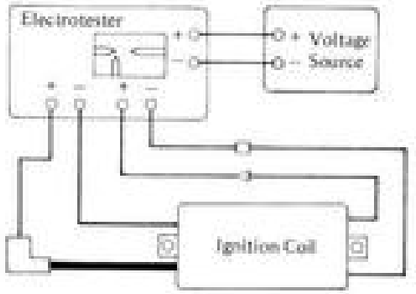
NOTE: When inspecting ignition timing after verifying the timing marks with a dial gauge, use your new timing mark.

Ignition coil inspection

The most accurate test for determining the condition of the ignition coil is made by measuring arcing distance with the Kawasaki Electrotester. Since a tester other than the Kawasaki Electrotester may produce a different arcing distance, the Kawasaki Electrotester is recommended for reliable results.

•Remove the ignition coil.
•Connect the ignition coil to the Kawasaki Electrotester as shown in the figure.

Ignition Coil Test (K16)



•Turn on the tester switches.

WARNING **To avoid extremely high voltage shocks, do not touch the coil or leads.**

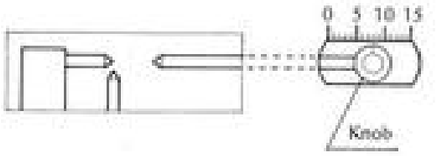
•Gradually slide the arcing distance adjusting knob from left to right (small distance to large distance) carefully checking the arcing.
•Stop moving the knob at the point where the arcing begins to fluctuate, and note the knob position in mm. The reading should show the value in Table K5.

Table K5 Arcing Distance*

Standard	6 mm or more

* Measure with the Kawasaki Electrotester.

Arcing Distance Measurement (K17)



If the distance reading is less than the value shown in the table, the ignition coil or spark plug cap is defective. To determine which part is defective, measure the arcing distance again with the spark plug cap removed from the ignition coil. If the arcing distance is subnormal as before, the trouble is with the ignition coil itself. If the arcing distance is now normal, the trouble is with the spark plug cap.

If an Electrotester is not available, the coil can be checked for a broken or badly shorted winding with an ohmmeter. However, an ohmmeter cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.

To measure the ignition coil resistance:

•Remove the fuel tank.
•Disconnect the green/white ignition coil lead, pull the spark plug cap off the spark plug, and test the windings as shown in Table K6. For measurement of secondary winding resistance, remove the spark plug cap from the spark plug lead.

Table K6 Ignition Coil Resistance

Winding	Meter	Connections	Reading*
Primary	× 1 Ω	Ground ↔ Green/White	0.050 ~ 0.076 Ω
Secondary	× 1 kΩ	Ground ↔ Spark Plug Lead	1.38 ~ 2.07 kΩ

* Measured when the coil is cold (room or atmospheric temperature).

A. Green/White Lead

A. Spark Plug Lead

If the coil does not produce an adequate spark, or if either the primary or secondary winding does not have the correct resistance, replace the ignition coil. Also, replace the ignition coil if the spark plug lead shows visible damage.

Exciter, Signal Coils

Coil inspection

If the spark is weak or absent after the spark plug, ignition coil, and CDI unit are found to be all functioning properly, and if the wiring is all in good condition and properly connected, the cause may be a short or open in the exciter coil or signal coil, or a loss of magnetism in the flywheel magnets.

*Remove the fuel tank.

*Use an ohmmeter, and measure the resistance between the leads shown in Table K7.

Table K7 Resistance of Exciter and Signal Coils

Coil	Meter	Connections	Reading*
Exciter	x 10 Ω	White/Red ↔ Black	126~190 Ω
Signal	x 10 Ω	White/Red ↔ Blue	24.9~37.3 Ω

* Measured when coils are cold (room or atmospheric temperature).

A. 3-pin Connector

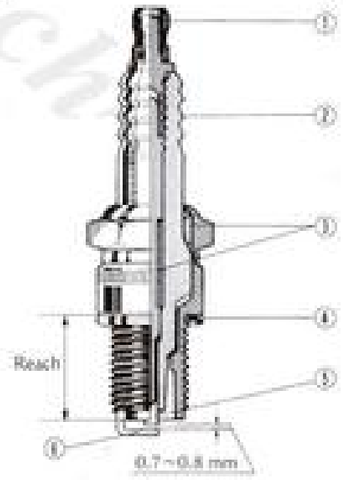
If the resistance in this test is found to be less than the proper value, there is a short in the exciter coil and/or signal coil. No reading (∞) indicates an open circuit. In either case, replace both the exciter and signal coils. If, however, the coil checks out good, the cause is probably a loss of magnetism in the flywheel, necessitating flywheel replacement.

NOTE: If, after checking all these items, there is still ignition trouble, warm the machine up thoroughly and check the stator coils while they are hot.

Spark Plug

The spark plug ignites the fuel/air mixture in the combustion chamber. To do this effectively and at the proper time, the correct spark plug must be used, and the spark plug must be kept clean and adjusted (Pg. 12).

Spark Plug K21



1. Terminal
2. Insulator
3. Cement
4. Gasket
5. Center Electrode
6. Side Electrode

Table K8 Spring Plug Threads

Diameter	14 mm
Pitch	1.25 mm
Reach	19.0 mm

If a plug of the wrong heat range is used, the electrodes may not hot enough to keep all the carbon burned off, but cool enough to keep from damaging the engine and the plug itself – about 400~800°C (750~1,450°F).

CAUTION **The carbon on the electrodes conducts electricity, and can short the center electrode to ground by either coating the ceramic insulator or bridging across the gap. Such a short will prevent an effective spark. Carbon build-up on the plug can also cause other troubles. It can heat up red-hot and cause preignition and knocking, which may eventually burn a hole in the top of the piston. The heat range of the spark plug functions like a thermostat for the engine. Using the wrong type of spark plug can make the engine run too hot (resulting in engine damage) or too cold (with poor performance, misfiring, and stalling). The standard plug has been selected to match the normal usage of this motorcycle in combined street and highway riding.**

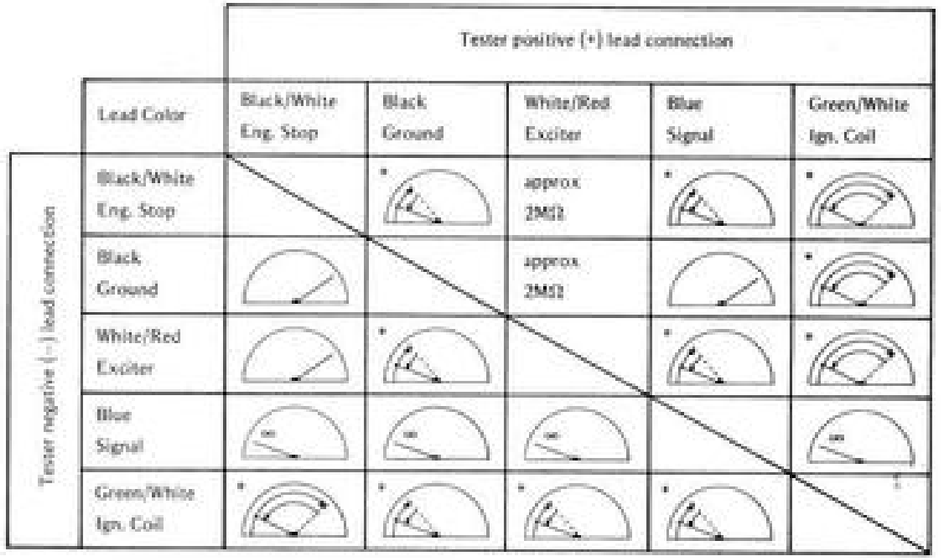
CDI Unit

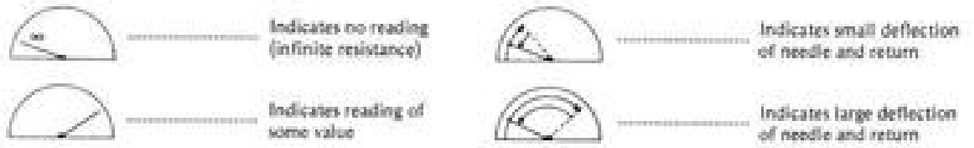
CDI unit inspection

If a Kawasaki electrotester is not available, the unit can be tested with a multimeter (small radio repair type). Set the meter to the highest resistance range available (megohms), and connect the meter leads as shown in Table K9. If the readings correspond to the table, the CDI unit is good. "Zero" the meter before using it.

CAUTION **Use only a small portable type of multimeter for this test. If a megger or a meter with a large-capacity battery is used, the CDI unit will be damaged.**

Table K9 CDI Unit Test Using a Multimeter



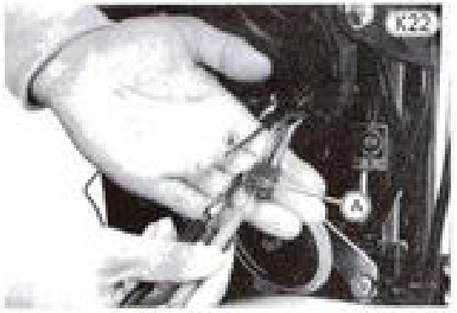


*Before checking connections indicated with an asterisk, short the green/white and black/white leads together to discharge any residual voltage in the capacitor, and short the black and black/white leads together too.

Engine Stop Switch

Switch inspection

- Disconnect the black/white lead from the engine stop switch in the headlight housing.
- Connect one ohmmeter lead to the black/white lead from the switch, and ground the other ohmmeter lead to the chassis.
- The switch should show continuity when the switch is in "OFF" position, and discontinuity when in "RUN" position.



A. Red 6-pin Connector

IGNITION SWITCH

Testing the switch

Table K10 shows the internal connections of the ignition switch for each switch position. To check the switch, remove the headlight unit, and disconnect the red 6-pin connector and lead(s) from the switch. Then use an ohmmeter to verify that all the connections listed in the table are making contact (zero ohms between those wires), and that no other wires are connected. If the switch has an open or short, it can be disassembled for repair. The contact surfaces may be cleaned, but no internal parts are available for replacement. If any parts are not repairable, the switch must be replaced as a unit.

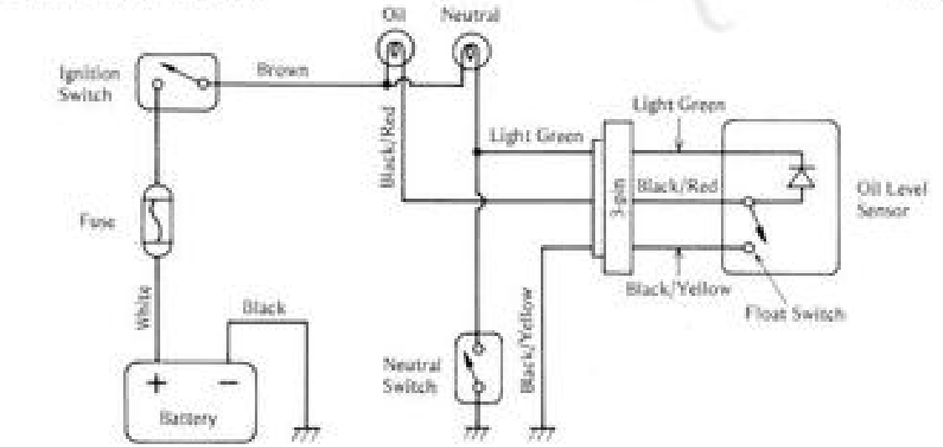
ENGINE OIL LEVEL WARNING SYSTEM

This system warns the rider when there is only about 0.33 liters of engine oil remaining in the tank by lighting the low engine oil warning light. It consists of an engine oil level sensor inside the tank, warning light, battery, and neutral indicator circuit to check the bulb for burnout.

Table K10 Ignition Switch Connections

Lead Color	Black/ White	Black/ Yellow	White	Brown	White/ Blue	Blue	Red/ White	Red
OFF	●	●						
ON			●	●	●	●	●	●
PARK	●	●			●	●	●	

Engine Oil Level Warning Circuit K23



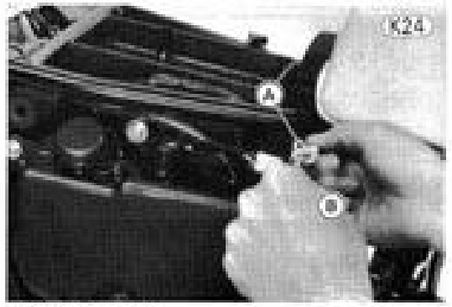
It works as follows: with the transmission in any but neutral position, the warning light stays on continuously until engine oil is added if the engine oil level is low. While the transmission is in neutral position, the warning light also goes on (even if sufficient engine oil is in the tank). This is to show if the bulb of the warning light has burned out.

If the warning system does not function properly, inspect the system as follows.

NOTE: Before inspecting the warning system, make sure that the neutral indicator circuit works properly. By disconnecting the 3-pin connector of the engine oil level sensor in the right side cover, the neutral indicator circuit becomes independent of the warning system, and easy to check. If the neutral circuit does not work properly, repair the circuit.

Warning system circuit check

- Remove the right side cover, and disconnect the 3-pin connector which connects the engine oil level sensor to the main wiring harness.
- Turn on the ignition switch, and short together the black/red and black/yellow leads on the main wiring harness side of the 3-pin connector. At this time the warning light should light. If it does not, the trouble is with one of the following: the warning light bulb, the black/red lead, or the black/yellow lead which is grounded to the chassis.



A. 3-pin Connector
B. Short together Bk/R and Bk/Y Leads.

- Using a multimeter, measure the voltage and continuity at the 3-pin connector as shown in Table K11. If the meter reading shows an improper value, the wiring is damaged.

Sensor check

- Remove the engine oil level sensor from the oil tank, and stuff a piece of clean cloth into the opening to keep dirt from contaminating the engine oil in the tank.
- Check that the float moves up and down smoothly without binding. It should go down under its own weight. If the float does not move smoothly or if the sensor has visual damage, replace the sensor.
- Set an ohmmeter to the x 1 Ω range, and connect the ohmmeter leads to the black/red and black/yellow leads to check the switching operation of the float.
- The ohmmeter should show continuity when the float is at the bottom. If it does not, replace the sensor.

A. Float

- Setting an ohmmeter to the x 10 Ω or x 100 Ω range, check the resistance between black/red lead and the light green lead. The resistance should be low in one direction and more than ten times as much in the other direction. If the meter reads low or high in both directions, the diode in the sensor is defective and the sensor must be replaced.

NOTE: The actual meter reading varies with the meter used and the individual rectifier, but, generally speaking, the lower reading should be within 1/3 scale of zero ohms.

LIGHTING SYSTEM

Headlight Circuit

Headlight Inspection

If the headlight does not light with the ignition switch turned on, check to see if the bulb has burned

Table K11 Wiring Check

Meter Range	Connections	Ignition Switch	Reading
10V DC	Meter (+) → Black/Red Meter (−) → Ground	On	Battery voltage
x 10 Ω or x 1 Ω	One meter lead → Black/Yellow The other meter lead → Ground	Off	Continuity (close to zero ohms)

out or the fuse has blown. If the bulb has burned out or if the fuse has blown, they must be replaced.

If the bulb and fuse are good, check the headlight and dimmer switches. Table K12 shows the connections in the headlight switch, and Table K13 shows the connections in the dimmer switch for both high and low beam. Open the headlight housing and disconnect the white 6-pin connector and red (or blue) lead from the left switch housing. Use an ohmmeter to see that only the connections shown in the table have continuity (zero ohms).

Table K12 Headlight Switch Connections

Switch Position	Blue	Red	Red/Yellow or Red/Black*
OFF			
PO	●	●	
ON	●	●	●

* Depends on dimmer switch position.

Table K13 Dimmer Switch Connections

Switch Position	Red/Black	Blue	Red/Yellow
HI	●	●	
LO		●	●

If the switch has an open or a short, it can be disassembled for repair. The contact surfaces may be cleaned, but no internal parts are available for replacement. If any parts are not repairable, the switch must be replaced as a unit. If the procedure above does not remedy the problem, check the ignition switch and the wiring.

If the headlight lights but does not light brightly, the trouble may be that the headlight is of the improper wattage or that the magneto is not putting out sufficient current. However, the trouble may also be caused by a short or component drawing too much current in some other part of the electrical system.

Tail light inspection

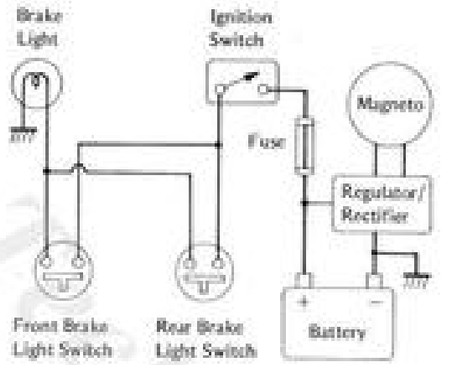
If the tail light does not go on when the circuit is closed, the filament is probably burned out. However, if the bulb is good, check the fuse, wiring, ignition switch, and battery.

Brake Light Circuit

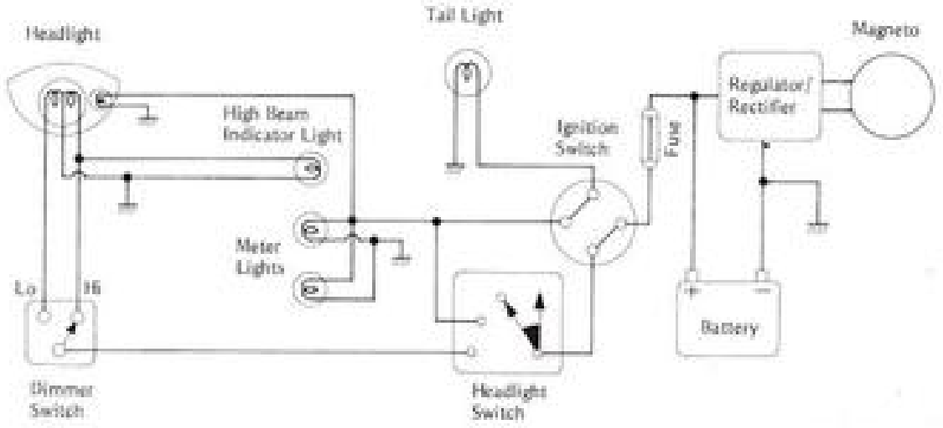
Brake light switch inspection

If the ignition switch is in the **ON** position, and the brake light does not go on when either the front or rear brake is applied, first push the horn button and flip the

Brake Light Circuit (K26)



Headlight and Tail Light Circuit (K27)



turn signal switch to see if the fuse, ignition switch, or battery may be defective. If the turn signals and horn work, check for a burned out brake light filament. If the bulb is good, the trouble is either the wiring or the brake light switches.

To check the front brake light switch:

- Disconnect the brown and the blue/red switch leads under the fuel tank.
- Connect an ohmmeter to the switch leads, and pull the front brake lever. The ohmmeter should read zero ohms. If it does not, replace the switch. If the switch checks out okay but the brake light does not light, check the wiring.

A. Brake Light Switch Leads

To check the rear brake light switch:

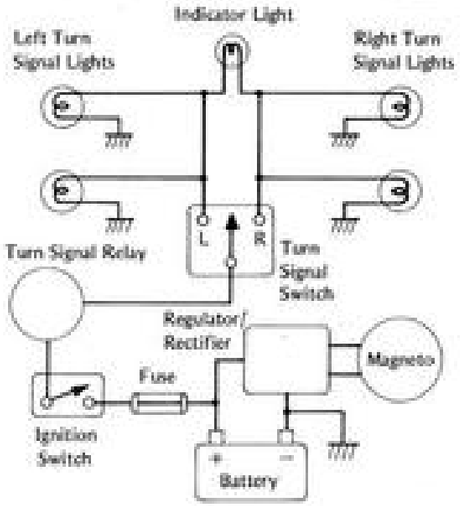
- Disconnect the brown and the blue/red switch leads.
- Connect an ohmmeter to the switch leads, and pull the switch plunger. The ohmmeter should read zero ohms. If it does not, replace the switch.

A. Switch Leads

Turn Signal Circuit

Since the turn signal relay is designed to operate correctly only when two turn signals (one front and one rear) and the turn signal indicator light are properly connected in the circuit, trouble may result from a burned out bulb, a bulb of incorrect wattage, loose wiring, as well as from a defect in the relay itself. In general, if the trouble with the circuit is common to both right and left turn signals, it is probably caused by a defective turn signal relay, although it may be due to a bad switch, wiring, or battery. If the trouble is with only one side — either right or left — then the relay is not at fault since the same relay is used for both sides.

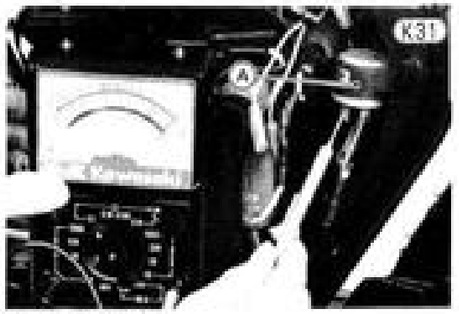
Turn Signal Circuit (K30)



Turn signal inspection

(1) Neither right nor left turn signals come on at all:

- Check that battery voltage is normal.
- Remove the left side cover.
- Unplug the relay leads and use an ohmmeter to check that there is continuity (close to zero ohms) between the relay terminals. If there is not ohmmeter reading, or if there is several ohms resistance replace the relay with a new one.



A. Turn Signal Relay

•Turn the meter to the 10V DC range, connect the + meter lead to the brown lead that was disconnected from the relay, and connect the – meter lead to the orange lead. With the ignition switch on, first switch the turn signal switch to the R and then to the L position. The meter should register battery voltage at either position. If it does not, the fuse, ignition switch, or wiring is at fault. If battery voltage is read on the meter but the turn signal still will not work when the relay is reconnected, then recheck all wiring connections.

A. Leads from Main Wiring Harness

(2) Both right or both left turn signals come on and stay on or flash too slowly:
•Check that battery voltage is normal.
•Check that all wiring connections are good.
•Check that the turn signal bulbs and indicator bulb are of the correct wattage.
•If all of the above check good, replace the relay.

(3) A single light on one side comes on and stays on:
•Either the light that does not come on is burned out or of the incorrect wattage, or the wiring is broken or improperly connected.

(4) Neither light on one side comes on:
•Unless both lights for that side are burned out, the trouble is with the turn signal switch.

(5) Flashing rate is too fast:
•If this occurs on both the right and left sides, check that the battery is not being overcharged (indicating a defective regulator/rectifier). If the magneto and the battery voltage are normal, replace the turn signal relay.
•If this occurs on only one side, one or both of the turn signal bulbs are of too high a wattage.

HORN CIRCUIT

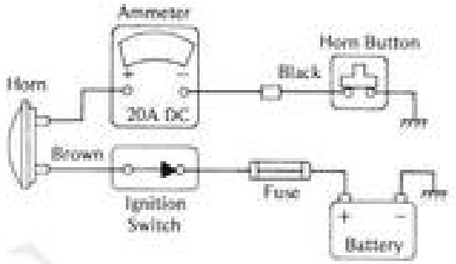
The horn contacts wear down after long use and may need to be adjusted from time to time. Turning in the adjusting screw compensates for contact wear. If satisfactory horn performance cannot be obtained by this adjustment when the rest of the electrical system is functioning properly, the horn must be replaced. It cannot be disassembled.

Adjustment

CAUTION **Do not turn the adjusting screw in too far, since doing so will increase horn current with the possibility of burning out the horn coil.**

•Disconnect the black horn lead, and connect an ammeter in series to the horn circuit. The + ammeter lead goes to the horn terminal and the – ammeter lead to the black lead.

Horn Current Measurement (K33)



•Turn on the ignition key, and keep the horn button pressed while turning the horn adjusting screw. Adjust for the best horn sound while keeping the current under 1.5 amperes (3 amperes for U.K. and West German models).

NOTE: The horn will not sound properly if it is mounted incorrectly or if any cable or other part is touching it.

A. Adjusting Screw **B. Locknut**

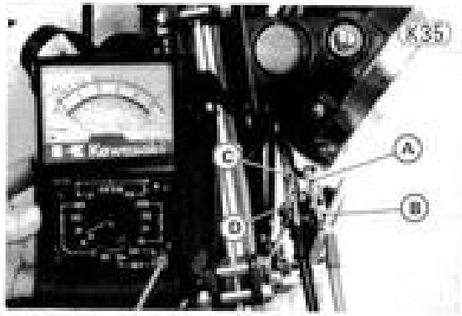
•Apply a drop of non-permanent locking agent to the adjusting screw.

Horn circuit inspection

•Check that battery voltage is normal.

•Set the multimeter to the 10V DC range, and connect the meter to the leads that were disconnected from the horn. The + meter lead goes to the brown lead, and the – meter lead goes to the black lead.

•With the ignition switch on, press the horn button. The meter should register battery voltage. If it does not, the fuse, ignition switch, horn button, or the wiring is at fault.



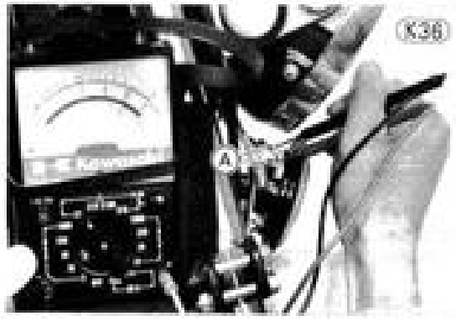
A. Brown Lead
B. + Meter Lead
C. Black Lead
D. – Meter Lead

•If the meter does show battery voltage, indicating that the horn trouble lies within the horn itself, and adjustment fails to correct the trouble, replace the horn.

CAUTION **Do not loosen the armature mounting since doing so would alter the armature position such that the horn probably have to be replaced.**

Horn inspection

•Disconnect the leads to the horn, and connect to the horn terminals a multimeter set to the x 1 Ω range to check for continuity (about 1 ohm). If the reading is several ohms or if there is no reading at all, replace the horn.



A. Horn Terminals

Troubleshooting—Guide

Engine Doesn't Start; Starting Difficulty

Engine won't turn over
- Cylinder, piston seizure
- Connecting rod small end seizure
- Connecting rod big end seizure
- Transmission gear or crankcase bearing seizure
- Kickstarter return spring broken
- Kick ratchet gear not engaging

No fuel flow
- No fuel in tank
- Fuel tap turned off
- Tank cap air vent obstructed
- Fuel tap clogged
- Fuel line clogged
- Float valve clogged

Engine flooded
- Float level too high
- Float valve worn or stuck open
- Starting technique faulty
- (When flooded, kick with the throttle fully open to allow more air to reach the engine.)

No spark; spark weak
- Ignition switch not on
- Engine stop switch turned off
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- CDI unit damaged
- Signal coil and/or exciter coil open or shorted
- Ignition coil damaged
- Flywheel magneto damaged
- Ignition coil damaged
- Ignition or engine stop switch shorted
- Wiring shorted or open

Fuel/air mixture incorrect
- Air screw and/or idle adjusting screw maladjusted
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter jet clogged

Compression low
- Cylinder, piston worn
- Piston rings bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Cylinder head hole plug loose
- Reed valve damaged

Poor Running at Low Speed

Spark weak
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- CDI unit damaged
- Signal coil and/or exciter coil shorted or open
- Ignition coil damaged
- Flywheel magneto damaged

Fuel/air mixture incorrect
- Air screw and/or idle adjusting screw maladjusted
- Pilot jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter plunger stuck open
- Float level too high or too low
- Fuel tank air vent obstructed

Compression low
- Cylinder, piston worn
- Piston rings bad (worn, weak, broken or sticking)
- Piston ring/land clearance excessive
- Cylinder head or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Cylinder head hole plug loose
- Reed valve damaged

Poor Running or No Power at High Speed

Firing incorrect
- Spark plug dirty, damaged, or maladjusted
- Spark plug cap or high tension wiring damaged
- Spark plug cap shorted or not in good contact
- Signal coil and/or exciter coil shorted or open
- CDI unit damaged
- Ignition coil damaged
- Ignition timing maladjusted

Fuel/air mixture incorrect
- Main jet clogged or wrong size
- Jet needle or needle jet worn
- Jet needle clip in wrong position
- Float level too high or too low
- Air jet or air passage clogged
- Air cleaner clogged, poorly sealed, or missing
- Starter plunger stuck open
- Fuel to carburetor insufficient
- Water or foreign matter in fuel
- Fuel tank air vent obstructed

Compression low
- Cylinder, piston worn
- Piston rings bad (worn, weak, broken, or sticking)
- Piston ring/land clearance excessive
- Cylinder head or base gasket damaged
- Cylinder head not sufficiently tightened down
- Cylinder head warped
- Spark plug loose
- Crankshaft oil seal deteriorated or damaged
- Cylinder head hole plug loose
- Reed valve damaged

Oil and fuel/air mixture incorrect
- Throttle control cable maladjusted
- Crankshaft oil seal deteriorated or damaged
- Oil passage pipe O ring damaged
- Oil pump damaged
- Oil line or check valve clogged
- Air in oil pump or oil line

Engine rpm will not rise properly
- Starter plunger stuck open
- Float level too high or too low

Main jet clogged
Throttle valve does not fully open
Air cleaner clogged
Muffler clogged
Water or foreign matter in fuel
Cylinder exhaust port clogged
Brake dragging
Clutch slipping
Overheating
Transmission oil level too high
Transmission oil viscosity too high
Crankshaft bearing worn or damaged

Knocking
Ignition timing maladjusted
Carbon built up in combustion chamber
Fuel poor quality or incorrect

Miscellaneous
Throttle valve won't fully open
Muffler clogged
Cylinder exhaust port clogged
Brakes dragging
Clutch slipping
Overheating
Transmission oil level too high
Transmission oil viscosity too high
Crankshaft bearing worn or damaged

Overheating

Firing incorrect
Spark plug dirty, damaged, or maladjusted
Ignition timing maladjusted

Fuel/air mixture incorrect
Main jet clogged
Float level too low
Air cleaner clogged

Oil and fuel/air mixture incorrect
Throttle control cable maladjusted
Oil pump damaged
Oil line or check valve clogged
Air in oil pump or oil line

Compression high
Carbon built up in combustion chamber

Engine load faulty
Clutch slipping
Transmission oil level too high
Brakes dragging

Fuel and Oil Consumption Excessive

Idling too fast
Idle adjusting screw maladjusted
Throttle control cable catching or poorly adjusted

Fuel/air mixture too rich
Air screw too large
Jet needle or needle jet worn
Starter plunger stuck open
Float level too high
Air cleaner clogged

Compression low
Cylinder, piston worn
Piston rings bad (worn, weak, broken, or sticking)
Piston ring/land clearance excessive
Cylinder head or base gasket damaged
Cylinder head not sufficiently tightened down
Cylinder head warped
Spark plug loose
Crankshaft oil seal deteriorated or damaged
Cylinder head hole plug loose
Reed valve damaged

Exhaust obstructed
Muffler clogged
Cylinder exhaust port clogged

Engine load faulty
Clutch slipping
Transmission oil level too high
Brakes dragging

Clutch Operation Faulty

Clutch slipping
No clutch lever play
Friction plates worn or warped
Steel plates worn or warped
Clutch springs weak
Clutch cable maladjusted
Clutch inner cable catching
Clutch release mechanism damaged
Clutch hub or housing unevenly worn

Clutch not disengaging properly
Clutch lever play excessive
Clutch plates warped or too rough
Clutch spring tension uneven
Transmission oil deteriorated
Transmission oil viscosity too high
Clutch housing frozen on drive shaft
Clutch release mechanism damaged

Gear Shifting Faulty

Doesn't go into gear; shift pedal doesn't return
Clutch not disengaging
Shift fork(s) bent or seized
Shift return spring weak or broken
Shift lever broken
Shift return spring pin loose
Shift pawl spring broken
Set levers binding on pivot screw
External shift mechanism arm pawl worn

Jumps out of gear
Shift fork(s) worn
Gear groove(s) worn
Gear dogs, holes, and/or recesses worn
Shift drum groove(s) worn
Shift drum set lever spring weak or broken
Shift fork pin(s) worn
Drive shaft, output shaft, and/or gear splines worn

Overshifts
Shift drum set lever spring weak or broken

Abnormal Engine Noise

Knocking
Ignition timing maladjusted
Carbon built up in combustion chamber
Fuel poor quality or incorrect
Overheating

Piston slap
- Cylinder/piston clearance excessive
- Cylinder, piston worn
- Connecting rod bent
- Piston pin, piston pin holes worn

Other noise
- Connecting rod small end clearance excessive
- Connecting rod big end clearance excessive
- Piston ring(s) worn broken or stuck
- Piston seizure damage
- Cylinder head gasket leaking
- Exhaust pipe leaking at cylinder connection
- Crankshaft runout excessive
- Engine mounts loose
- Crankshaft bearing worn

Abnormal Drive Train Noise

Clutch noise
- Clutch rubber damper deteriorated
- Clutch housing/friction plate clearance excessive
- Clutch housing gear/primary gear backlash excessive
- Metal chips jammed in clutch housing gear teeth

Transmission noise
- Crankcase bearings worn
- Transmission gears worn or chipped
- Metal chips jammed in gear teeth
- Transmission oil insufficient or too thin
- Kick ratchet gear not properly disengaging from kick gear
- Oil pump gear/output shaft idle gear worn or chipped

Drive chain noise
- Chain worn
- Rear and/or engine sprocket(s) worn
- Chain lubrication insufficient
- Rear wheel misaligned

Abnormal Frame Noise

Front fork noise
- Oil insufficient or too thin
- Spring weak or broken

Rear shock absorber noise
- Shock absorber defective

Brake noise
- Brake linings overworn or worn unevenly
- Drum worn unevenly or scored
- Brake spring(s) weak or broken
- Foreign matter in hub
- Brake not properly adjusted

Other noise
- Brackets, nuts, bolts, etc. not properly mounted or tightened

Exhaust Smoke

Excessive white smoke
- Throttle control cable maladjusted
- Oil poor quality or incorrect
- Crankshaft oil seal damaged
- Oil passage pipe O ring deteriorated or damaged

Brownish smoke
- Air cleaner clogged
- Main jet too large or fallen off
- Starter plunger stuck open
- Float level too high

Handling and/or Stability Unsatisfactory

Handlebar hard to turn
- Steering stem locknut too tight
- Bearing balls damaged
- Race(s) dented or worn
- Steering stem lubrication inadequate
- Steering stem bent
- Tire air pressure too low

Handlebar shakes or excessively vibrates
- Tire(s) worn
- Swing arm bushing damaged
- Rim(s) warped
- Front, rear axle runout excessive
- Spokes loose
- Wheel bearing(s) worn
- Handlebar clamps loose

Handlebar pulls to one side
- Frame bent
- Wheel misalignment
- Swing arm bent or twisted
- Swing arm pivot shaft runout excessive
- Steering stem bent
- Front fork leg(s) bent
- Right/left front fork oil level uneven
- Right/left rear shock absorbers unbalanced

Shock absorption unsatisfactory

Too hard:
- Front fork oil excessive
- Front fork oil viscosity too high
- Tire air pressure too high
- Rear suspension maladjusted

Too soft:
- Front fork oil insufficient and/or leaking
- Front fork oil viscosity too low
- Front fork, rear shock absorber spring(s) weak

Brake Doesn't Hold

- Brake not properly adjusted
- Linings overworn or worn unevenly
- Drum worn unevenly or scored
- Cam, camshaft, shaft hole worn
- Oil, grease on lining and drum
- Dirt, water between lining and drum
- Overheated

Battery Discharged

- Battery faulty (e.g., plates sulphated, shorted through sedimentation, electrolyte level too low)
- Battery leads making poor contact
- Regulator/rectifier damaged
- Ignition switch damaged
- Load excessive (e.g., bulb of excessive wattage)
- Flywheel magneto damaged

Battery Overcharged

Regulator/rectifier damaged
Battery damaged

NOTE: This is not an exhaustive list, giving every possible cause for each problem listed. It is meant simply as a rough guide to assist the troubleshooting for some of the more common difficulties. Electrical troubleshooting is not covered here due to its complexity. For electrical problems, refer to the appropriate heading in the Maintenance Section.

Appendix

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ADDITIONAL CONSIDERATIONS FOR RACING

This motorcycle has been manufactured for use in a reasonable and prudent manner and as a vehicle only. However, some may wish to subject this motorcycle to abnormal operation, such as would be experienced under racing condition. KAWASAKI STRONGLY RECOMMENDS THAT ALL RIDERS RIDE SAFELY AND OBEY ALL LAWS AND REGULATIONS CONCERNING THEIR MOTORCYCLE AND ITS OPERATION.

Racing should be done under supervised conditions, and recognized sanctioning bodies should be contacted for further details. For those who desire to participate in competitive racing or related use, the following technical information may prove useful. However, please note the following important points.

- *You are entirely responsible for the use of your motorcycle under abnormal conditions such as racing, and Kawasaki shall not be liable for any damages which might arise from such use.
- *Kawasaki's Limited Motorcycle Warranty and Limited Emission Control Systems Warranty specifically exclude motorcycles which are used in competitive or related uses. Please read the warranty carefully.
- *Motorcycle racing is a very sophisticated sport, subject to many variables. The following information is theoretical only, and Kawasaki shall not be liable for any damages which might arise from alterations utilizing this information.
- *When the motorcycle is operated on public roads, it **must** be in its original state in order to ensure safety and compliance with applicable emission regulations.

Carburetor

Sometimes an alteration may be desirable for improved performance under special conditions when proper mixture is not obtained after the carburetor has been properly adjusted, and all parts cleaned and found to be functioning properly.

A certain amount of adjustment can be made by changing the position of the needle. There are five grooves at the top of the needle. Changing the position of the clip to a groove closer to the bottom raises the needle, which makes the mixture richer at a given position of the throttle valve.

Jet Needle (M1)

NOTES: 1. There are five grooves at the top of the needle. Changing the position of the clip to a groove closer to the top lowers the needle, which makes the mixture leaner at a given position of the throttle valve.
2. The last number of the jet needle number ("2" of 5CJ27-2, see Table H2) is not stamped on the needle, but is the number of the standard groove in which the clip is set. The groove numbers are ocounted from the top of the needle, 1 being the topmost groove, and 5 being the lower groove.
3. If the engine still exhibits symptoms of overly rich or lean carburetion after all maintenance and adjustments are correctly performed, the main jet can be replaced with a smaller or larger one. A smaller numbered jet gives a leaner mixture and a larger numbered jet a richer mixture. Many jets are available, but it is recommended that any change be limited to one jet size (2.5) difference from the standard jet.

Spark Plug

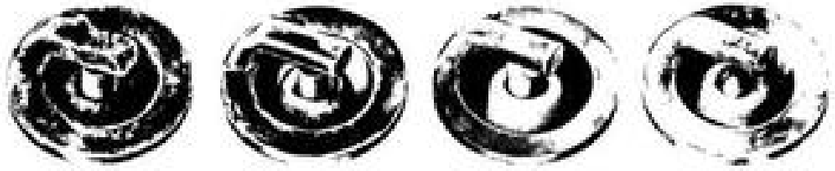
The spark plug ignites the fuel/air mixture in the combustion chamber. To do this effectively and at the proper time, the correct spark plug must be used, and the spark plug must be kept clean and adjusted.

Test have shown the plug listed in Table B1 on Pg. 12 to be the best plug for general use. But since spark plug requirements change with the ignition and carburetion adjustments and with riding conditions, this plug may have to be replaced with one of the next lower heat range. Whether or not a spark plug of a correct heat range is used should be determined by removing and inspecting the plug.

Spark Plug (M2)

1. Terminal
2. Insulator
3. Cement
4. Gasket
5. Center Electrode
6. Side Electrode

Spark Plug Condition (M3)



Carbon Fouling | Oil Fouling | Normal Operation | Overheating

When a plug of the correct heat range is being used, the electrodes will stay hot enough to keep all the carbon burned off, but cool enough to keep from damaging the engine and the plug itself. This temperature is about 400 ~ 800°C (750 ~ 1,450°F) and can be judged by noting the condition and color of the ceramic insulator around the center electrode. If the ceramic is clean and of a light brown color, the plug is operating at the right temperature.

The carbon on the electrodes conducts electricity, and can short the center electrode to ground by either coating the ceramic insulator or bridging across the gap. Such a short will prevent an effective spark. Carbon build-up on the plug can also cause other troubles. It can heat up red-hot and cause preignition and knocking, which may eventually burn a hole in the top of the piston.

A spark plug of the lower heat range is used when engine temperature is comparatively low such as for slow speed trail riding. Such a plug is designed to hold the heat and thus is often referred to as a "hotter" plug. If a "hot" plug is used for racing or other high speed use, the plug will run too hot, causing engine overheating, preignition and knocking, which may burn a hole in the piston.

To inspect the spark plug:

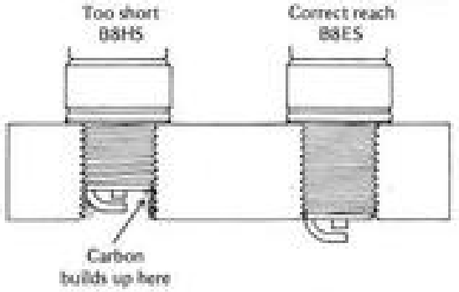
Remove the plug and inspect the ceramic insulator. Whether or not the right temperature plug is being used can be ascertained by noting the condition of the ceramic insulator around the electrode. A light brown color indicates the correct plug is being used.

CAUTION **If the spark plug are replaced with a type other than those mentioned below, make certain the replacement burn have the same thread pitch and reach (length of threaded portion) as the standard plug.**

Table M1 Spark Plug Specifications

Type		NGK B9ES
Spark Gap		0.7 ~ 0.8 mm
Plug Threads	Diameter	14 mm
	Pitch	1.25 mm
	Reach	19.0 mm

Plug Reach (M4)



If the plug reach is too short, carbon will build up on the plug hole threads in the cylinder head, causing overheating and making it very difficult to insert the correct spark plug later.

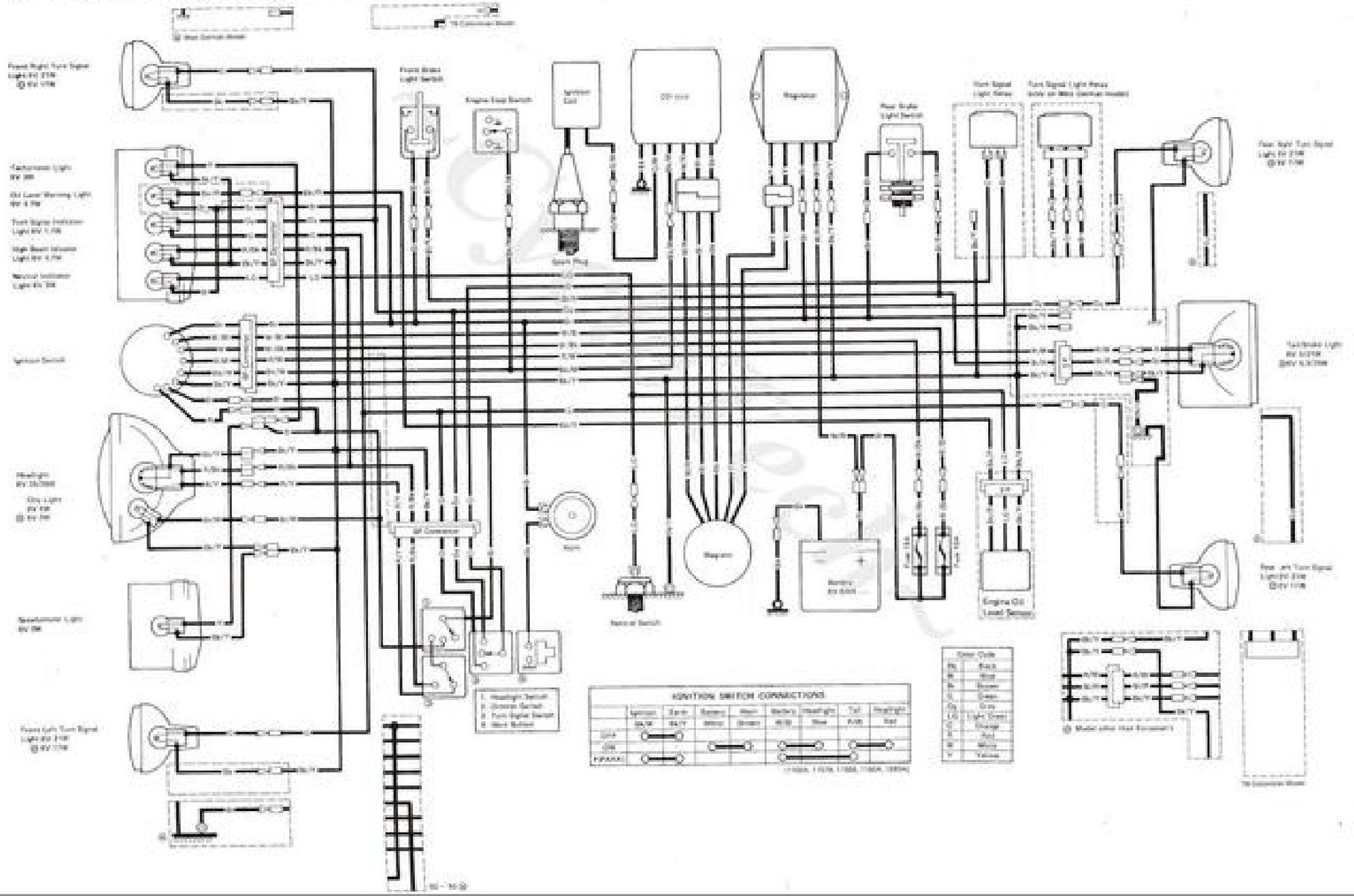
If the reach is too long, carbon will build up on the exposed spark plug threads causing overheating, preignition, and possibly burning a hole in the piston top. In addition, it may be impossible to remove the plug without damaging the cylinder head.

SPECIAL TOOLS

REF. NO.	PART NO.	DESCRIPTION	Q'TY
1	57001-115	PISTON RING PLIERS	1
2	57001-123	COMPRESSION GAUGE	1
3	57001-137	STEM BEARING DRIVER	1
4	57001-292	STEM BEARING DRIVER ADAPTER	1
5	57001-139	BEARING DRIVER HOLDER	1
6	57001-141	FRONT FORK OIL SEAL DRIVER	1
7	57001-143	INSIDE CIRCLIP PLIERS	1
8	57001-144	OUTSIDE CIRCLIP PLIERS	1
9	57001-151	CRANKCASE SPLITTING TOOL ADAPTER	2
10	57001-153	CRANKCASE SPLITTING TOOL	1
11	57001-158 (or P/No. 57001-135)	BEARING PULLER	1
12	57001-183	FRONT FORK CYLINDER HOLDER HANDLE	1
13	57001-1011	FRONT FORK CYLINDER HOLDER HANDLE ADAPTER	1
14	57001-207	FUEL LEVEL GAUGE	1
15	57001-259	MAGNETO PULLER	1
16	57001-1016	ROTOR PULLER	1

REF. NO.	PART NO.	DESCRIPTION	Q'TY
17	57001-263	OIL SEAL GUIDE	1
18	57001-264	OIL SEAL GUIDE	1
19	57001-284	BEARING DRIVER	1
20	57001-288	BEARING DRIVER	1
21	57001-289	BEARING DRIVER	1
22	57001-290	BEARING DRIVER	1
23	57001-293	BEARING DRIVER	1
24	57001-296	BEARING DRIVER	1
25	57001-298	BEARING DRIVER	1
26	57001-306	FLYWHEEL HOLDER	1
27	57001-307	ENGINE SPROCKET HOLDER	1
28	57001-320	STEM NUT WRENCH	1
29	57001-402	T.D.C. FINDER	1
30	57001-910	PISTON PIN PULLER	1
31	57001-913	PISTON PIN PULLER ADAPTER "B"	1
32	57001-980	ELECTROTESTER	1
33	57001-983	HAND TESTER	1
34	57001-1015	GEAR HOLDER	1

KE175D Wiring Diagram (Other than US and Canada)



Supplement

This Supplement is designed to be used in conjunction with the front part of this manual (up to Pg. 154). The maintenance and repair procedures described in this Supplement are only those that are unique to later year units since the first publication of this Service Manual. Complete and proper servicing of later year units therefore requires mechanics to read both this Supplement and the text in front of the Supplement.

This Supplement is divided into few sections. Each section is annually added to the preceding section, and explains procedures per one year unit that are unique to the latest year unit. Complete and proper servicing of later year units therefore requires mechanics to read (1) the section corresponding to the year unit they work at, (2) the previous section(s), and (3) the text in front of this Supplement.

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Supplement for 1980 Model

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Model Identification

KE175-D2

Specifications

SPECIFICATIONS (KE175-D2)

Dimensions		
Overall length		2,130 mm
Overall width		890 mm
Overall height		1,125 mm
Wheelbase		1,360 mm
Road clearance		245 mm
Dry weight		102 kg
Fuel tank capacity		9.6 ℓ
Oil tank capacity		1.3 ℓ
Performance		
Climbing ability		36°
Braking distance		12.5 m from 50 kph
Minimum turning radius		1.95 m
Engine		
Type		2-stroke, single cylinder, piston reed valve "This engine licensed under one or more of Eyvind Boyesen's Patent Nos: 3,905,340, 3,906,341, Re. 30425, 4,062,331, 4,161,163, 4,202,298 and 4,202,299."
Bore and stroke		62.5 x 57.0 mm
Displacement		174 cc
Compression ratio		6.5, Ⓒ 7.0
Maximum horsepower		16 HP @6,500 rpm, Ⓒ 18 HP @7,500 rpm
Maximum torque		1.9 kg-m @5,500 rpm, Ⓒ 1.8 kg-m @7,000 rpm
Port timing		
Intake	Open	121° BTDC
	Close	121° ATDC
Scavenging	Open	54° BBDC
	Close	54° ABDC
Exhaust	Open	80° BBDC, Ⓒ 84° BBDC
	Close	80° ABDC, Ⓒ 84° ABDC
Carburetor type		Mikuni VM26SS
Lubrication system		Superlube (oil injection)
Engine oil		2-stroke oil for air-cooled engines
Starting system		Primary kick
Ignition system		Electronic CDI
Ignition timing		23° (2.83 mm) BTDC @4,000 rpm, Ⓒ 20° (2.15 mm) BTDC @4,000 rpm
Spark plug		NGK B7ES, gap 0.7 – 0.8 mm, Ⓒ NGK B9ES
Transmission		
Type		5-speed, constant mesh, return shift
Clutch		Wet, multi disc
Gear ratios:	1st	2.67 (32/12)
	2nd	1.65 (28/17)

	3rd	1.22 (22/18)
	4th	0.95 (19/20)
	5th	0.80 (20/25)
Primary reduction ratio		3.13 (75/24)
Final reduction ratio		3.14 (44/14), Ⓒ 3.43 (48/14)
Overall drive ratio		7.86 (Top gear), Ⓒ 8.57 (Top gear)
Transmission oil	Capacity	0.7 ℓ
	Type	SE class SAE 10W30 or SAE 10W40

Electrical Equipment

Flywheel magneto	Kokusan FP4396, Ⓓ FP4380
Regulator/Rectifier	Kokusan RS2145
Ignition coil	Kokusan IG4189
CDI unit	Kokusan CU1182
Battery	Furukawa FB6N6-1C (6V 6AH)
Headlight type	Sealed beam, Ⓓ Semi-sealed beam
Headlight	6V 35/35W
City light	6V 3W, Ⓔ 6V 4W
Tail/Brake light	6V 5.3/25W, Ⓔ 6V 5/21W
Speedometer light	6V 3W
Tachometer light	6V 3W
Neutral indicator light	6V 3W
High beam indicator light	6V 1.7W
Turn signal lights	6V 17W, Ⓔ 6V 21W
Turn signal indicator light	6V 1.7W
Horn	6V 1.5A, Ⓓ 6V 3.0A

Frame

Type		Tubular, single down tube
Steering angle		47° to either side
Castor		29°
Trail		116 mm
Tire size	Front	2.75-21 4PR
	Rear	3.50-18 4PR
Suspension	Front	Telescopic fork
	Rear	Swing arm
Suspension stroke	Front	200 mm
	Rear	145 mm
Front fork oil capacity (each fork)		195 ~ 200 cc
Front fork oil		SAE 5W20

Brake

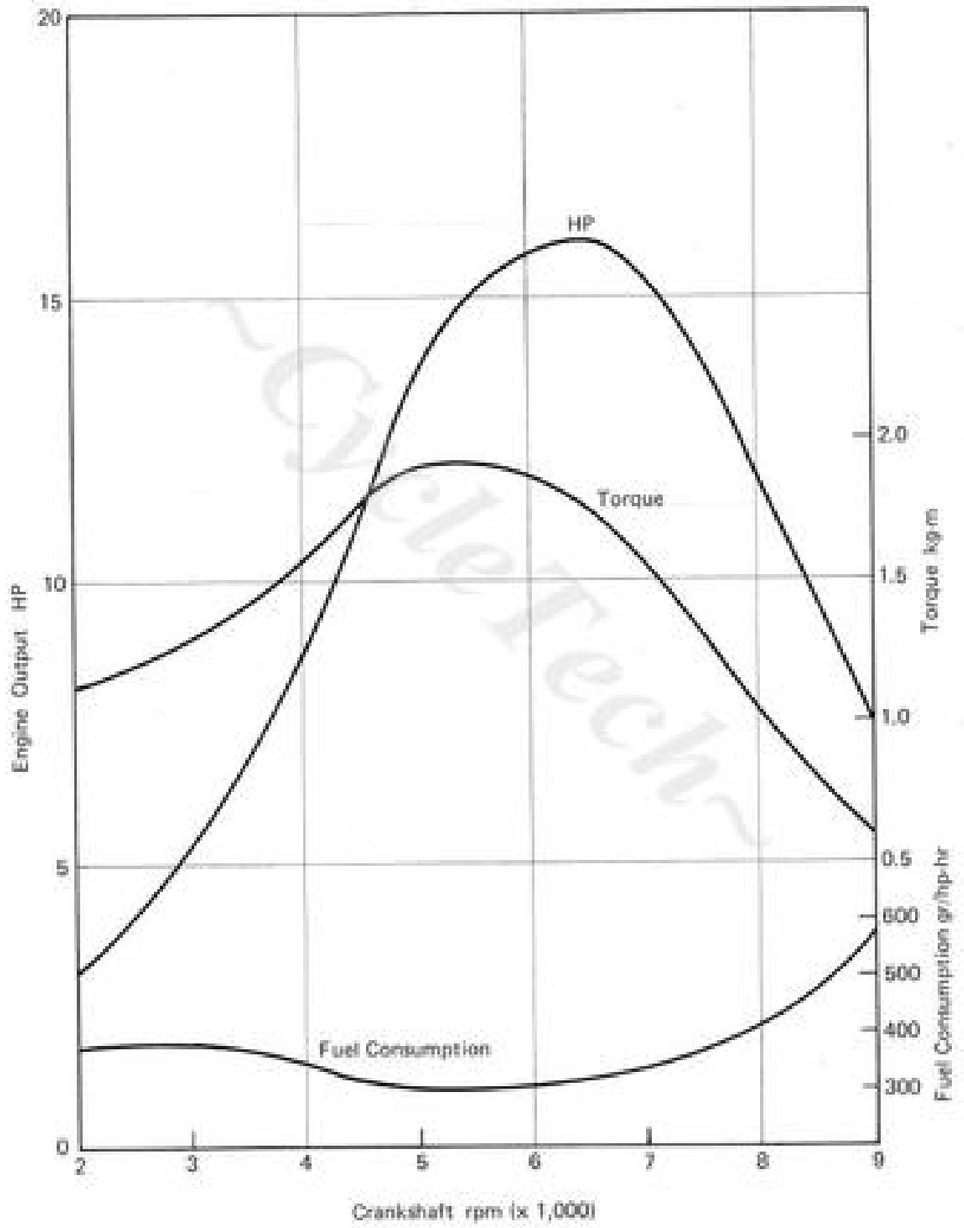
Type		Internal expansion, leading-trailing
Inside diameter and width	Front	120 x 28 mm
	Rear	120 x 35 mm

Ⓒ : Colombian model Ⓔ : European model Ⓓ : Other than US and Canadian models

Specifications subject to change without notice, and may not apply to every country.

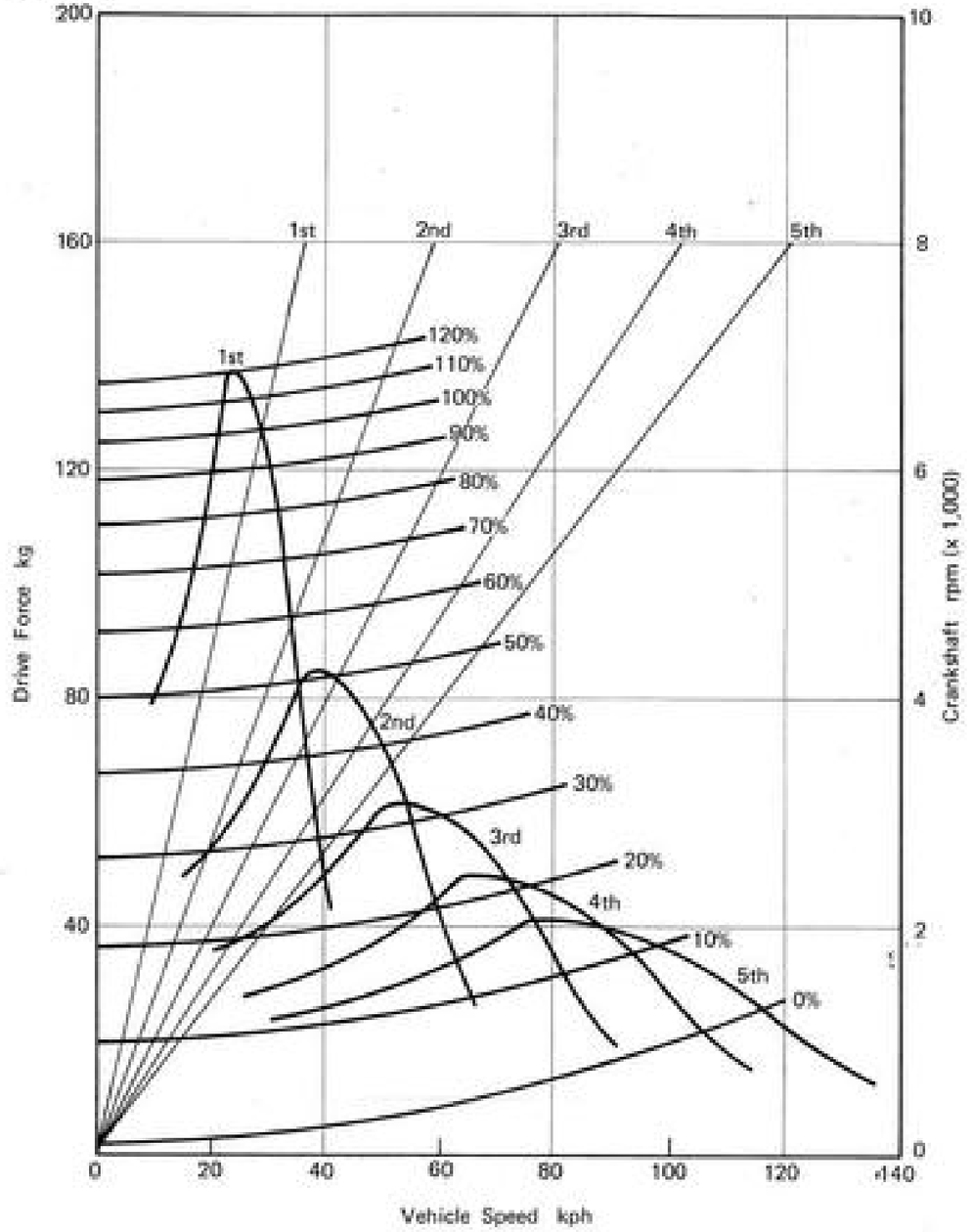
ENGINE PERFORMANCE CURVES

KE175-D2



RUNNING PERFORMANCE CURVES

KE175-D2



PERIODIC MAINTENANCE CHART

The maintenance and adjustment must be done in accordance with this chart to keep the motorcycle in good running condition. **The initial maintenance is vitally important and must not be neglected.**

FREQUENCY / OPERATION	Whichever comes first — Every	ODOMETER READING* 800 km	4,000 km	8,000 km	12,000 km	16,000 km	20,000 km	24,000 km	See Page
Battery electrolyte level – check †	month	•	•	•	•	•	•	•	128
Brake adjustment – check †		•	•	•	•	•	•	•	21
Brake wear – check †			•	•	•	•	•	•	122
Clutch – check †		•	•	•	•	•	•	•	15
Carburetor – adjust		•	•	•	•	•	•	•	12,163
Throttle control cable – adjust		•	•	•	•	•	•	•	13
Steering play – check †		•	•	•	•	•	•	•	23
Spoke tightness and rim runout – check †		•	•	•	•	•	•	•	118
Drive chain wear – check †			•	•	•	•	•	•	120
Front fork – inspect/clean		•	•	•	•	•	•	•	123
Rear shock absorbers – inspect		•	•	•	•	•	•	•	–
Nuts, Bolts, Fasteners – check and torque		•		•		•		•	29~31
Spark plug – clean and gap †		•	•	•	•	•	•	•	12
Air cleaner element – clean			•		•		•		100
Air cleaner element – replace	5 cleanings			•		•		•	100
Fuel system – clean		•	•	•	•	•	•	•	17
Tire tread wear – check †			•	•	•	•	•	•	118
Transmission oil – change	year	•		•		•		•	16
General lubrication – perform			•	•	•	•	•	•	25
Front fork oil – change				•		•		•	123
Swing arm – lubricate				•		•		•	125
Wheel bearings – grease	2 years					•			119
Speedometer gear pinion – grease	2 years					•			119
Brake camshaft – grease	2 years					•			123
Steering stem bearings – grease	2 years					•			123
Drive chain – lubricate	Every 300 km								120
Drive chain – adjust	Every 800 km								20

*For higher odometer readings, repeat at the frequency interval established here.
†Replace, add or adjust if necessary.

Adjustment

SPARK PLUG (other than Colombian model)

Refer to Pg. 12, noting the following:
The spark plug is changed as shown in Table N1.

Table N1 Spark Plug

Plug	NGK B7ES
Gap	0.7 ~ 0.8 mm
Tightening Torque	2.8 kg-m (20 ft-lbs)

CARBURETOR (US and Canadian model)

Refer to Pgs. 12 ~ 13, noting that the air screw is deleted.

Disassembly

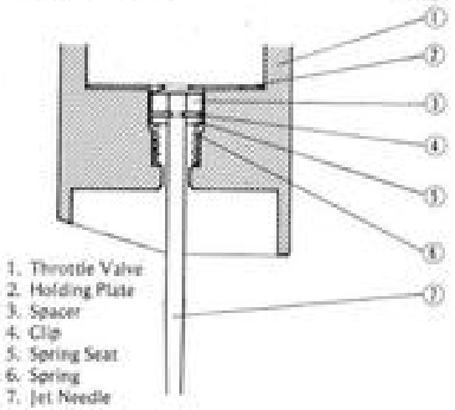
CARBURETOR (US and Canadian models)

Refer to Pgs. 38 ~ 40, noting the following:
1. The air screw is deleted.
2. Install the jet needle as following procedure.

Jet Needle Assembly Note:

•Install the jet needle holding plate so that the projection on the plate faces the spacer.

Jet Needle Installation N1

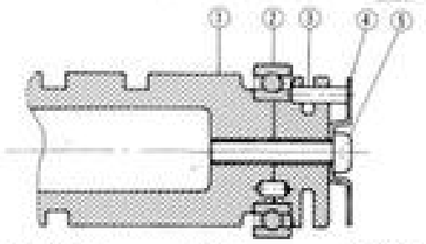


1. Throttle Valve
2. Holding Plate
3. Spacer
4. Clip
5. Spring Seat
6. Spring
7. Jet Needle

TRANSMISSION

Refer to Pg. 62, noting the following:
The shift drum has a ball bearing ② as shown in Fig. N2.

Shift Drum Ball Bearing N2



1. Shift Drum
2. Ball Bearing
3. Pin
4. Pin Plate
5. Screw

Installation Note:

•Apply a non-permanent locking agent to the threads of the screw ① to install the ball bearing.

Maintenance

CARBURETOR

Refer to Pgs. 100 ~ 102, noting the following:
1. The carburetor specifications are shown in Table N2.
2. On US and Canadian models, the air screw is deleted.
3. On US and Canadian models, the jet needle has only one groove that the jet needle clip is fitted.

CYLINDER, PISTON (other than Colombian model):

The ELECTRO FUSE cylinder is used on '80 model, so refer to Pgs. 104 ~ 107, noting the following:

Cylinder, piston wear

Inspect the inside of the cylinder for scratches and abnormal wear. If the cylinder is damaged or badly worn, replace it with a new one.

Table N2 Carburetor Specifications

	Main Jet	Needle Jet	Jet Needle	Pilot Jet	Throttle Valve Cutaway	Air Screw	Service Fuel Level
US, Canadian models	102.5R	O-6	5CJ34	22.5	2.0		2.5 ~ 4.5 mm
Australian model	102.5R	O-8	5CJ27-3	25	2.0	1½ turns out	2.5 ~ 4.5 mm
other models	102.5R	O-8	5CJ27-3	22.5	2.0	1¾ turns out	2.5 ~ 4.5 mm

Take a front-to-back measurement at the location shown in Fig. H55 to check cylinder wear. If the cylinder inside diameter measurement exceeds the service limit, the cylinder must be replaced with a new one since the ELECTRO FUSE cylinder cannot be bored or honed.
NOTE: Whenever a piston or cylinder has been replaced with a new one, the motorcycle must be broken-in the same as with a new machine.

Table N3 Cylinder Inside Diameter

Service Limit	62.60 mm at the location shown in the figure

Table N4 Piston Diameter

Service Limit	62.31 mm

Piston/cylinder clearance

Table N5 Piston/Cylinder Clearance

Standard	0.039 ~ 0.049 mm

WHEELS

On '80 US model and Frame No. KE175D-002600~ on other models, the tire type is modified as shown in Table N6.

Table N6 Tires

	Front	Rear
Make, Type	Yokohama Y-965	Yokohama Y-962

DRIVE CHAIN

The drive chain on '80 model is modified as shown in Table N7.

Table N7 Drive Chain

Make	Type	Link
Enuma	EK428SH-PG	116 link

SPROCKETS (other than Colombian model)

The engine sprocket and rear sprocket are modified as shown in Table N8.

Table N8 Sprocket Diameter

	Service Limit
Engine Sprocket (14T)	47.7 mm
Rear Sprocket (44T)	169.2 mm

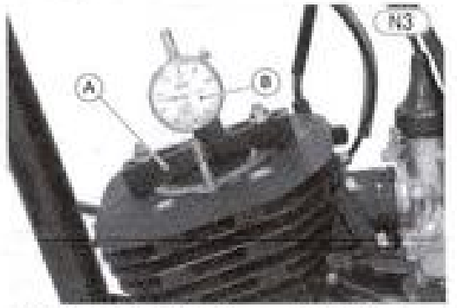
IGNITION SYSTEM

The cylinder head is modified on '80 model, so refer to Pgs. 133~138, noting the following:

Verification of timing mark

The accuracy of timing marks can be checked with a dial gauge and TDC finder (special tool).

- Remove the magneto cover, and turn the magneto flywheel until the position of the piston is close to the top.
- Remove the muffler (Pg. 37).
- Remove the spark plug cap from the spark plug.
- Remove the cylinder head nuts (4), and remove the cylinder head and gasket.
- Install the TDC finder (special tool) on the cylinder with the cylinder head nuts.



A. TDC Finder (57001-160) **B. Dial Gauge**

- Turn the flywheel to set the piston at exact TDC (top dead center), and set the dial to zero.
- Turn the flywheel clockwise until the dial gauge reads about 3.0 mm and then counterclockwise until the dial gauge reads 2.83 mm (2.15 mm for Colombian model).
- The timing mark on the flywheel should align with the timing projection on the crankcase at this point. If it does not, set the piston at 2.83 mm BTDC (2.15 mm BTDC for Colombian model) and make a new timing mark on the flywheel just under the projection.
- Install the cylinder head and gasket, and tighten the cylinder head nuts (4) to 2.7 kg-m (19.5 ft-lbs) of torque.
- Install the spark plug cap.
- Install the muffler (Pg. 37).
- Check the ignition timing.

NOTE: When inspecting ignition timing after verifying the timing marks with a dial gauge, use your new timing mark.

LIGHTING SYSTEM
(US and Canadian models)
Headlight Circuit

Refer to Pgs. 139~140, noting the following:

There is no headlight switch on US and Canadian models, so the headlight circuit is completed when the ignition switch is turned on. High and low beam can be selected by the dimmer switch.

Appendix

SPECIAL TOOL

Use the TDC finder referring to Pg. 164.

(N4)

A. TDC Finder (57001-160)

HIGH ALTITUDE PERFORMANCE ADJUSTMENT (US model only)

To improve the EMISSION CONTROL PERFORMANCE of vehicles operated above 4,000 feet, Kawasaki recommends the following Environmental Protection Agency (EPA) approved modification.

"NOTE"

When properly performed, these specified modifications only, are not considered to be emission system "tampering" and vehicle performance is generally unchanged as a result.

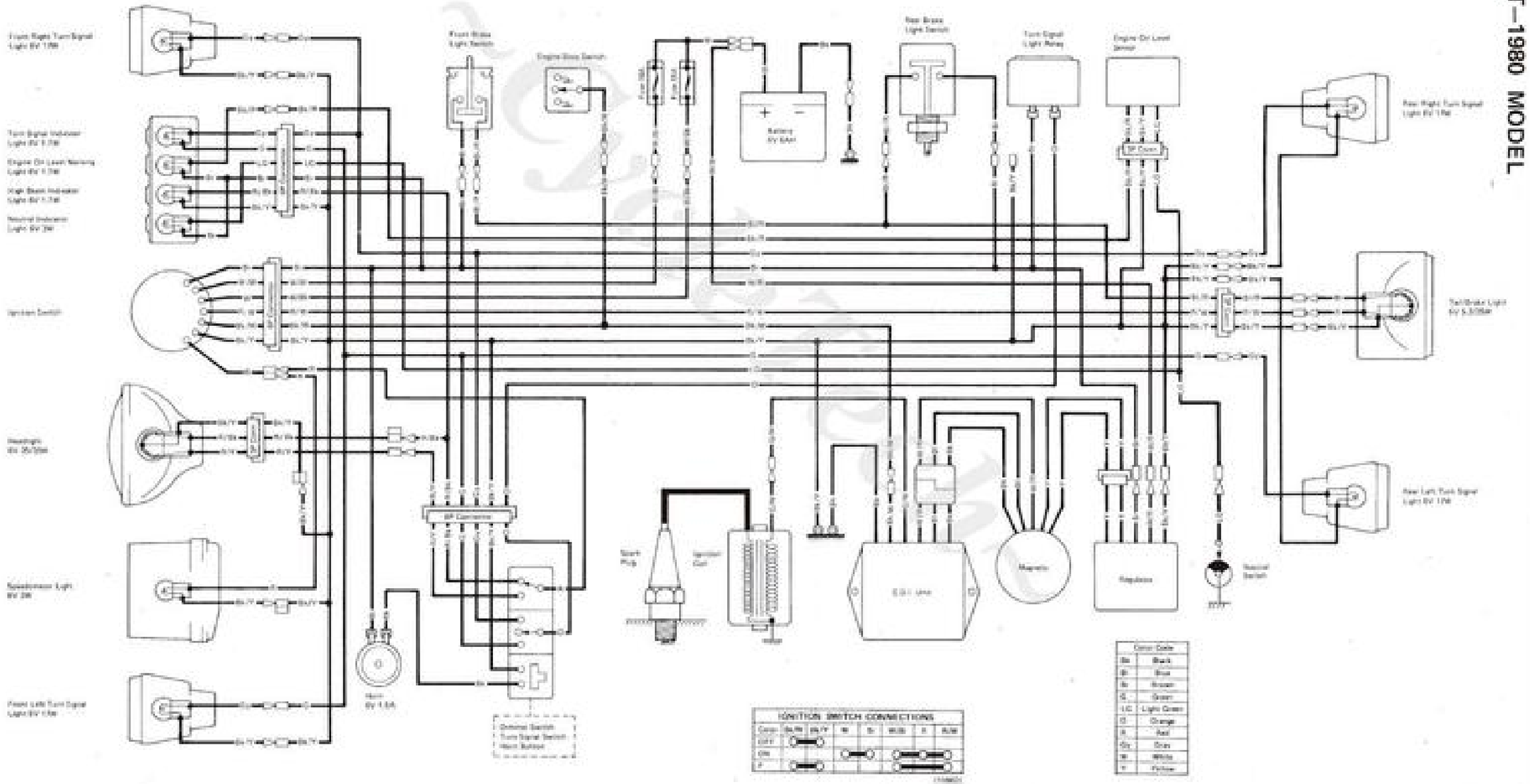
High Altitude Performance Adjustment

High altitude adjustment requires replacement of the main and pilot jets.

Table N9 High Altitude Carburetor Specifications

Main Jet:	#100
Pilot Jet:	#20

KE175D Wiring Diagram (US and Canada)



Supplement for 1981·1982·1983 Model

Adjustment

THROTTLE CONTROL CABLE

Oil Pump Cable

Refer to Pgs. 13~15, noting the following:

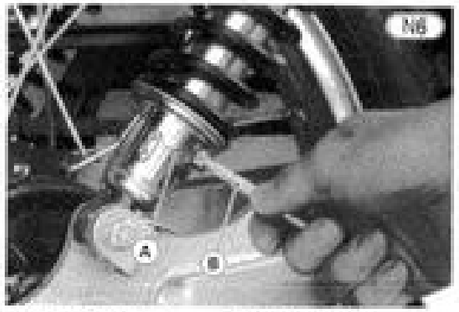
1. A line mark has been added to the oil pump lever. So there are total of two line marks on the lever. The upper mark is designed to line up with the mark on the lever stop when the throttle grip is fully open. It may be used to check whether or not the throttle grip is opening fully.

A. Mark for synchronization
B. Mark for full throttle

REAR SHOCK ABSORBERS

Refer to Pg. 20, noting the following:

1. With a screwdriver bit, turn the adjusting sleeve on each shock absorber to the desired position.



A. Adjusting Sleeve B. Screwdriver Bit

Maintenance

INTERCHANGEABLE TIRES

For the 1981 ~ 1983 European models, the following Dunlop tires have been approved as standard tires in addition to the original Yokohama tires.

Table N10 Interchangeable Tires

Front	Rear
Dunlop TU 2.75-21 4PR	Dunlop TUH 3.50-18 4PR

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