

# General Information

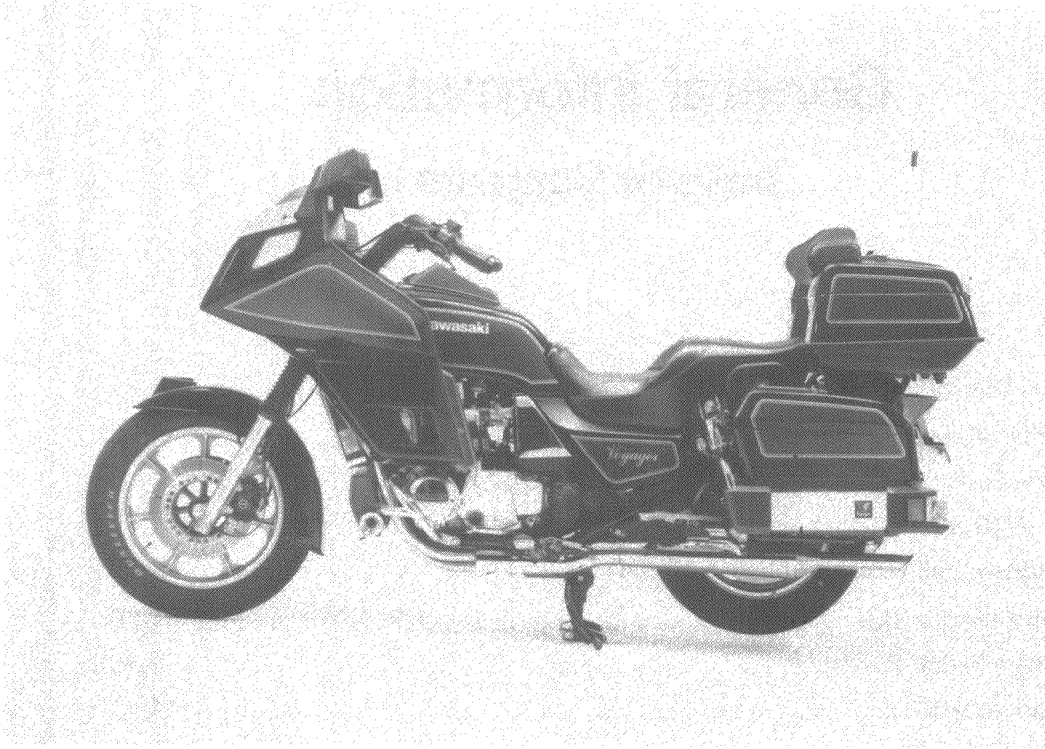
**1**

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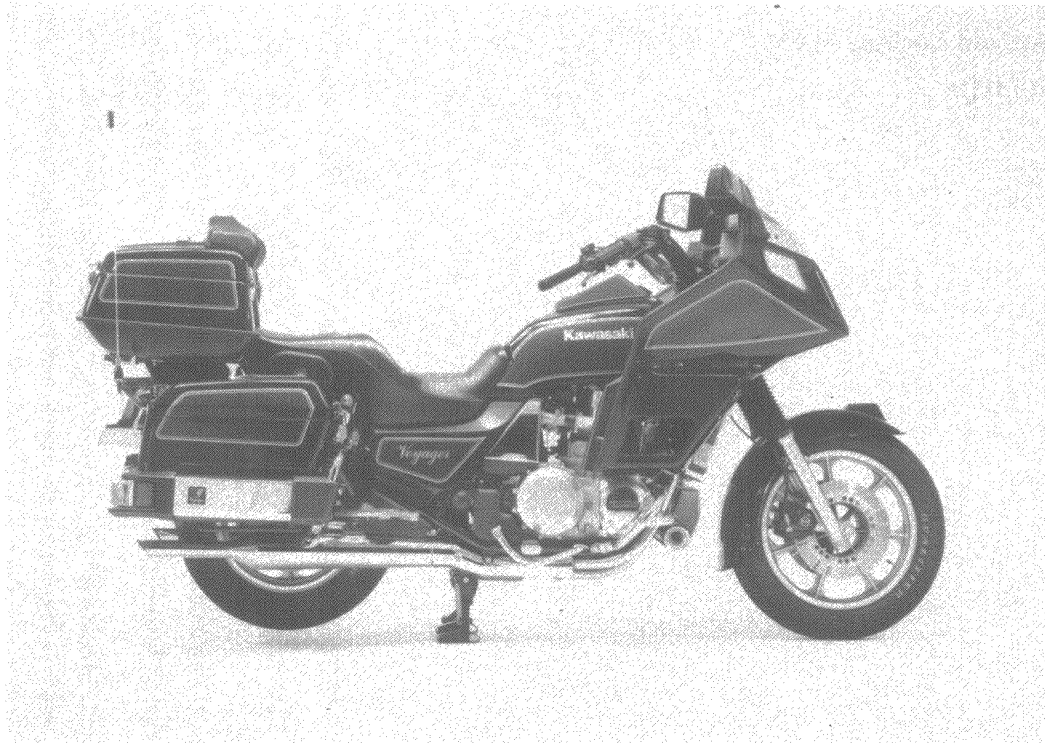
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Model Identification  
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**ZN1300-A1 Left Side View:**



**ZN1300-A2 Right Side View:**





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**Specifications**  
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Items	ZN1300-A1/A2
<b>Dimensions:</b>	
Overall length	2,595 mm
Overall width	960 mm
Overall height	1,580 mm
Wheelbase	1,645 mm
Road clearance	130 mm
Seat height	745 mm
Dry weight	3,736 N (381 kg)
Curb weight: Front	1,775 N (181 kg)
Rear	2,256 N (230 kg)
Fuel tank capacity	27.0 L
<b>Performance:</b>	
Climbing ability	—
Braking distance	12.5 m from 50 km/h
Minimum turning radius	3.3 m
<b>Engine:</b>	
Type	4-stroke, DOHC, 6-cylinder
Cooling system	Liquid-cooled
Bore and stroke	62.0 x 71.0 mm
Displacement	1,286 mL
Compression ratio	9.3
Carburetion system	DFI (Digital Fuel Injection)
Starting system	Electric starter
Ignition system	Battery and coil (transistorized)
Timing advance	Electronically advanced
Ignition timing	From 5° BTDC @900 r/min (rpm)
Spark plug	NGK BPR6ES or ND W20EPR-U
Cylinder numbering method	Left to right, 1-2-3-4-5-6
Firing order	1-5-3-6-2-4
Valve timing:	
Inlet	Open 35° BTDC
	Close 45° ABDC
	Duration 260°
Exhaust	Open 55° BBDC
	Close 25° ATDC
	Duration 260°

Items	ZN1300-A1/A2
Lubrication system Engine oil: Grade Viscosity Capacity	Forced lubrication (wet sump)  SE class SAE10W40, 10W50, 20W40, or 20W50 5.9 L
<b>Drive Train:</b> Primary reduction system: Type Reduction ratio Clutch type Transmission: Type Gear ratios: 1st 2nd 3rd 4th 5th Final drive system: Type Reduction ratio Overall drive ratio Final gear case oil: Type  Capacity	Chain 1.841 (32/24 x 29/21) Wet multi disc  5-speed, constant mesh, return shift 2.562 (41/16) 1.800 (36/20) 1.375 (33/24) 1.111 (30/27) 0.931 (27/29)  Shaft drive 2.484 (19/26 x 34/10) 4.259 @Top gear  API GL-5 Hypoid gear oil SAE90 (above 5°C) SAE80 (below 5°C)  265 mL
<b>Frame:</b> Type Caster (rake angle) Trail Front Tire: Type Size Rear Tire: Type Size Front suspension: Type Wheel travel Rear suspension: Type Wheel travel	Tubular, double cradle 29.5° 140 mm  Tubeless MR90-18  Tubeless MU90-16  Telescopic fork (pneumatic) 160 mm  Swing arm 100 mm

Items	ZN1300-A1/A2
Brake type: Front Rear	Dual disc Single disc
<b>Electrical Equipment:</b> Battery Headlight: Type Bulb Tail/brake light Alternator: Type Rated output	12 V 26 AH @20 Hours Semi-Sealed beam 12 V 60/55 W (quartz-halogen) 12 V 8 W x 4/27 W x 2 Three-phase AC 45.5 A @8,000 r/min (rpm), 14 V

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**Before Servicing**  
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Before starting to service a motorcycle, careful reading of the applicable section is recommended to eliminate unnecessary work. Photographs, diagrams, notes, cautions, warnings, and detailed descriptions have been included wherever necessary. Nevertheless, even a detail account has limitations, a certain amount of basic knowledge is also required for successful work.

**Especially note the following:**

(1) Dirt

Before removal and disassembly, clean the motorcycle. Any dirt entering the engine 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.

(2) Battery Ground

Remove the ground (—) lead from the battery before performing any disassembly operations on the motorcycle. This prevents:

- (a) the possibility of accidentally turning the engine over while partially disassembled.
- (b) sparks at electrical connections which will occur when they are disconnected.
- (c) damage to electrical parts.

(3) Tightening Sequence

Generally, 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 in a cross pattern. This is to avoid distortion of the part and/or causing gas or oil leakage. Conversely when loosening the bolts, nuts, or screws, first loosen all of them by about a quarter of turn and then remove them.

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.

(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) 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.

(7) 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.

(8) Gasket, O-ring

Do not reuse a gasket or O-ring once it has been in service. The mating surfaces around the gasket should be free of foreign matter and perfectly smooth to avoid oil or compression leaks.

(9) 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 America is Loctite Lock'n Seal (Blue).

(10) 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.

(11) Ball Bearing

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.

(12) Oil Seal and Grease Seal

Replace any oil or grease seals that were removed with new ones, as removal generally damages seals.

When pressing in a seal which has manufacturer's marks, press it in with the marks facing out. Seals should be pressed into place using a suitable driver, which contacts evenly with the side of seal, until the face of the seal is even with the end of the hole.

(13) Seal Guide

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.

(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) 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.

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. This manual makes reference to molybdenum disulfide grease (MoS<sub>2</sub>) in the assembly of certain engine and chassis parts. Always check manufacturer recommendations before using such special lubricants.

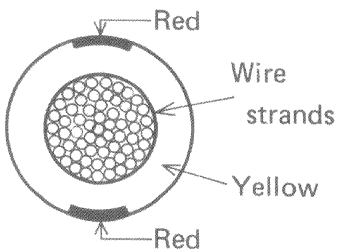
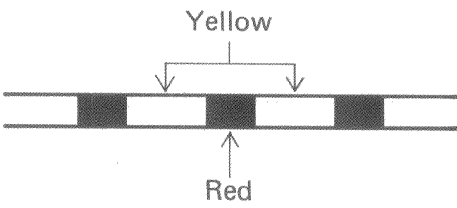
(16) Electrical Wires

All the electrical wires are either single-color or two-color and, with only a few exceptions, must be connected to wires of the same color. On any of the two-color wires there is a greater amount of one color and a lesser amount of a second color, so a two-color wire 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.

(17) Replacement Parts

When there is a replacement instruction, replace these parts with new ones every time they are removed. These replacement parts will be damaged or lose their original function once removed.

Table 1-1 Two-color Wire Identification

Wire (cross-section)	Name of Wire Color	Picture in Wiring Diagram
	<p>Yellow/red</p>	

(18) Inspection

When parts have been disassembled, visually inspect these parts for the following conditions or other damage. If there is any doubt as to their condition, replace them with new ones.

- |              |               |           |      |
|--------------|---------------|-----------|------|
| Abrasion     | Crack         | Hardening | Warp |
| Bent         | Dent          | Scratch   | Wear |
| Color change | Deterioration | Seizure   |      |

## (19) Service Data

Numbers of service data in this text have following meanings:

"Standards": Show dimensions or performances which brand-new parts or systems have.

"Service Limits": Indicate the usable limits. If the measurement shows excessive wear or deteriorated performance, replace the damaged parts.

## (20) DFI (Digital Fuel Injection) System

There are a number of important precautions that must be observed when servicing the Kawasaki DFI system. Failure to observe these precautions can result in serious system damage. Learn and observe all the rules listed below.

**Electrical System:**

- Do not disconnect the battery leads or any other electrical connections when the ignition switch is on, or while the engine is running. This is to prevent control unit damage.

**"NOTE"**

○ *Whenever electrical connections are to be disconnected, first turn off the ignition switch, disconnect the DFI positive (+) lead from the battery positive terminal, and then disconnect the required connections. There are other white/red leads which are connected to the battery positive terminal, but these leads can be left connected.*

- Conversely, make sure that all electrical connections are firmly reconnected before starting the engine. Especially, do not forget to connect the DFI negative lead to the battery negative (–) terminal.
- The Kawasaki electronic fuel injection system is designed to be used with a 12-volt battery as its power source. Do not use anything other than a 12-volt battery as a power source.

**"NOTE"**

○ *Do not directly connect a 12-volt battery to a fuel injector. Insert a resistor, which has a resistance of 5 – 7  $\Omega$ , in series between the battery and the injector, or use a 3-volt dry battery.*

- Always disconnect the battery positive and negative leads from the terminals, and remove the battery from the motorcycle for charging. This is to prevent the DFI control unit from being damaged by excessive peak voltage.
- Avoid spraying water with any great force on the electrical components, connectors, leads, and wiring harness of the DFI system.
- Keep the DFI system wiring harness at least 100 mm from all other system leads (especially high tension leads of the ignition system). This to prevent the DFI control unit from malfunctioning due to external electrical noises.
- If a transceiver is installed on the motorcycle, make sure that the operation of the fuel injection system is not influenced by electric wave radiated from the antenna. Check operation of the system with the engine at idle.

**"NOTE"**

○ *Locate the antenna as far as possible from the control unit. The interference from radio waves can be reduced by grounding the unit control box to the motorcycle.*

- Important throttle sensor information for Kawasaki DFI system.

**"NOTE"**

- *Engine performance is sensitive to throttle sensor position.*
- *The throttle sensor does not require any periodic maintenance.*
- *Do not alter or adjust sensor position unless otherwise the sensor position has been obviously upset.*
- *Sensor position is the last cause to be suspected in troubleshooting the DFI system.*

**Fuel System:**

- Do not operate the fuel pump if the inside of the pump is completely dry. This is to prevent the pump from running without lubricant at the friction surfaces.
- Blow the fuel system clean with compressed air before removing the parts.
- Any hose clamps on the high-pressure fuel line must be replaced with new ones once they are loosened.

**"NOTE"**

- Install the hose clamps in the position shown in the Disassembly Chapter and securely tighten the clamp screws. Check the fuel system for leaks.
- To prevent corrosion and deposits in the fuel system, do not add any antifreeze chemicals in fuel.

**WARNING**

- When any fuel hose is disconnected, do not turn on the ignition switch. The fuel pump will operate and fuel will spout from the fuel hose if you turn on the switch while the hose is disconnected.

**Air System:**

- In order to maintain the correct fuel/air mixture, there must be no air leaks in the air system. Be sure to install the oil filler cap securely after adding engine oil.

**High Altitude Performance  
Adjustment Information (US Model)**

To improve the EMISSION CONTROL PERFORMANCE of vehicles operated above 4,000 feet an Environmental Protection Agency (EPA) approved modification may be required for some models. However, any kind of modification is not necessary for the 1983 model ZN1300A.

**Setting Before Ride**

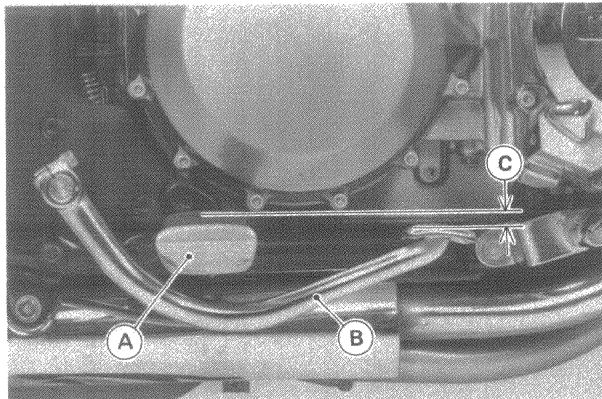
Before using this motorcycle, check and/or adjust the following to ensure safe and comfortable riding conditions.

**Brake Pedal:**

Brake pedal position is an important factor for safe and comfortable riding.

**Inspection of Brake Pedal Position**

- Measure the height difference between the tops of the footpeg and the pedal.
- ★ If the pedal position is not within the limit, adjust it.



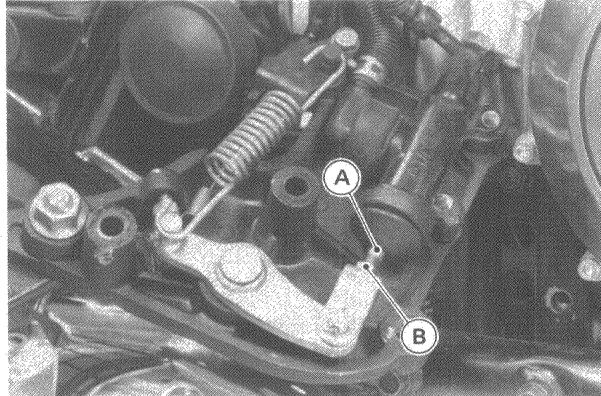
A. Footpeg                      C. Pedal Position  
B. Brake Pedal

**Brake Pedal Position**

35 mm below top of footpeg

**Adjustment of Brake Pedal Position**

- Loosen the locknut, and turn the push rod of the rear brake master cylinder to adjust the pedal position.
- Be sure to tighten the locknut after adjustment.
- Check operation of the rear brake and the brake light switch.



A. Push Rod                      B. Locknut

**"NOTE"**

*If the brake pedal position cannot be adjusted by turning the push rod, the brake pedal may be deformed or incorrectly installed.*

**Tires:**

Failure to maintain proper inflation pressures or observe payload limits for your tires may adversely affect handling and performance of your motorcycle and can result in loss of control.

**Inspection of Tire Air Pressure**

- Measure the tire pressure when the tires are cold (that is, when the motorcycle has not been ridden more than a mile during the past 3 hours).
- Tire pressure is affected by changes in ambient temperature and altitude, and so the tire pressure should be checked and adjusted when your riding involves wide variations in temperature or altitude.

**Tire Air Pressure (US and Canada)**

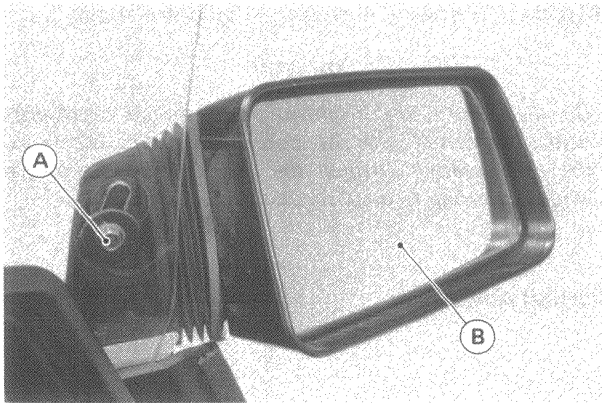
	Load	Pressure
Front	—————	221 kPa (2.25 kg/cm <sup>2</sup> , 32 psi)
Rear	Up to 956 N (97.5 kg)	245 kPa (2.50 kg/cm <sup>2</sup> , 36 psi)
	956 – 1,648 N (97.5 – 168 kg)	275 kPa (2.80 kg/cm <sup>2</sup> , 40 psi)

**Windshield:**

The windshield height can be adjusted to suit the rider.

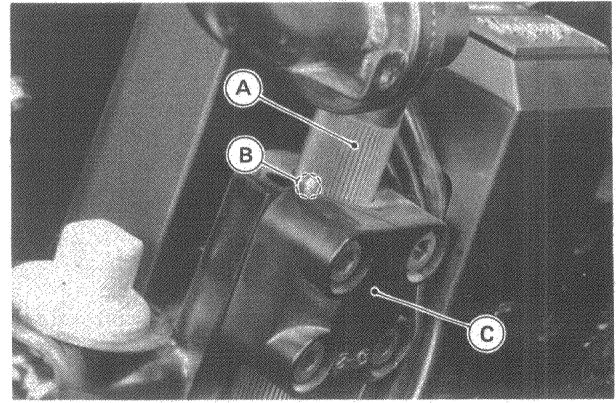
- Remove the left and right rear view mirror mounting bolts.





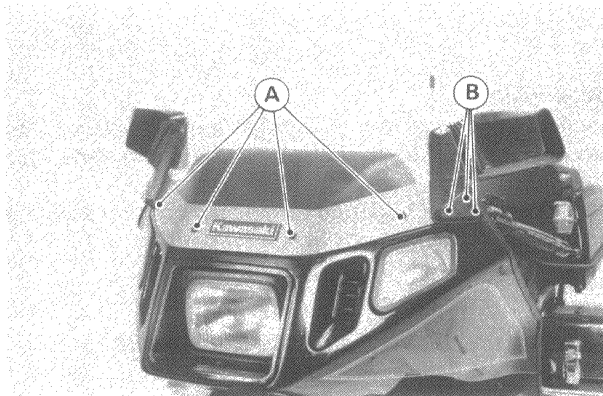
A. Mounting Bolt      B. Rear View Mirror

- Loosen the mirror mounting Allen bolts, and windshield mounting screws.

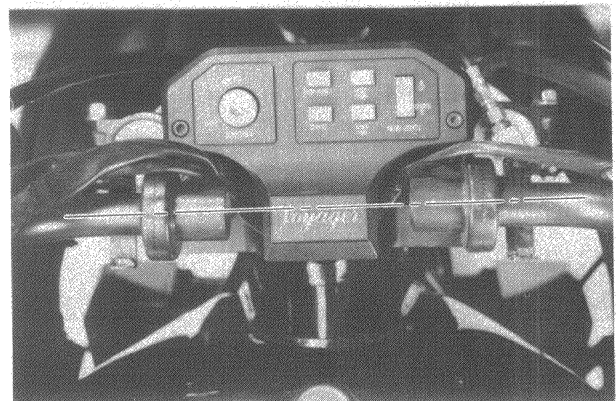


A. Handlebar Holder      C. Handlebar Clamp  
B. Mark

- The right and left handlebars should be in a straight line when viewed from above.



A. Mounting Screws      B. Mounting Allen Bolts



- When tightening the handlebar in the handlebar holder, align the punch marks.

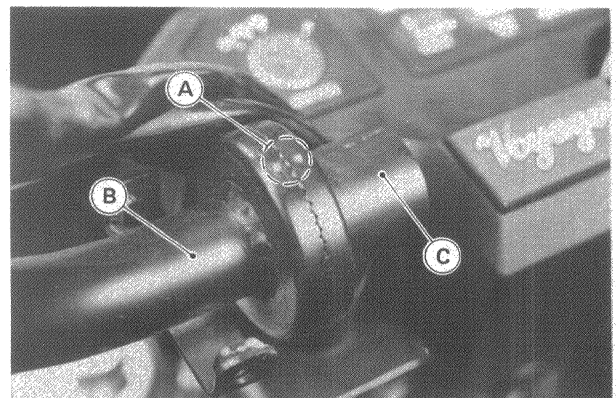
- Slide the windshield up or down, and tighten the bolts and nut securely.

**Handlebars:**

Refer to p. 7-7 of the disassembly section noting the following exception.

The right and left handlebars are separate and each handlebar can be installed independently. Handlebar position can be adjusted or change height, to be inclined forwards and backwards, and to be bent inwards and outwards. The standard handlebar position is set in the following procedure.

- To set handlebar height, position the handlebar holder in the handlebar clamp so that the punch mark on the handlebar holder is at the same level as the handlebar clamp.



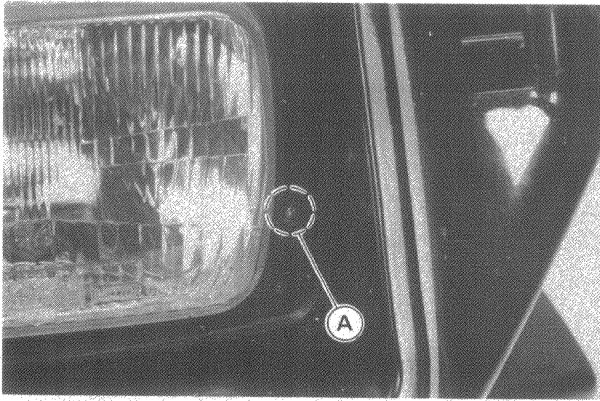
A. Marks      C. Holder  
B. Handlebar

**WARNING**

- When adjusting handlebar position out of the standard, always check that the handlebars don't contact the fairing or windshield, by turning the handlebars to either side. If the handlebars contact anything, the handlebar position must be adjusted again.

**Headlight:**

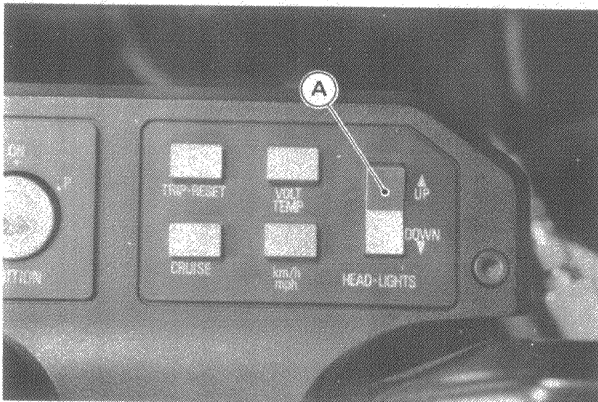
The headlight beam is adjustable both horizontally and vertically. The vertical movement can be adjusted by remote control switch to suite various load conditions. Headlight aiming must be correctly adjusted for your safe riding as well as for oncoming drivers. In most areas it is illegal to ride with improperly adjusted headlights.

*Horizontal Adjustment*

A. Adjusting Screw for Horizontal Adjustment

*Vertical Adjustment*

- Load the trunk and saddle bags as needed, and sit on the motorcycle.
- Turn on the ignition switch.
- To raise the headlight beam push the "HEADLIGHT" switch up, and hold it there.

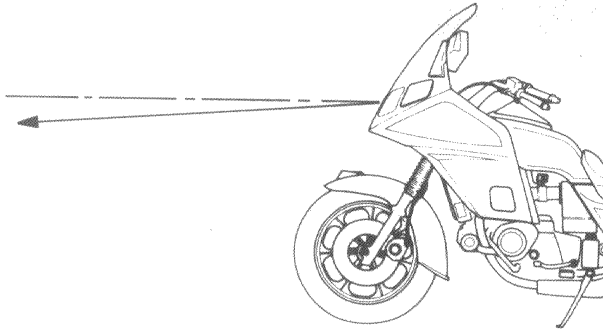


A. HEADLIGHT Switch

- To lower the beam, push the switch down and hold it.

**"NOTE"**

- On high beam, the brightest point should be slightly below horizontal with the motorcycle on its wheels and the rider seated. Adjust the headlight to the proper angle according to local regulations.

**Vertical Adjustment****Suspension:**

The front and rear suspension can be adjusted by remote control switch to suit various riding and load conditions.

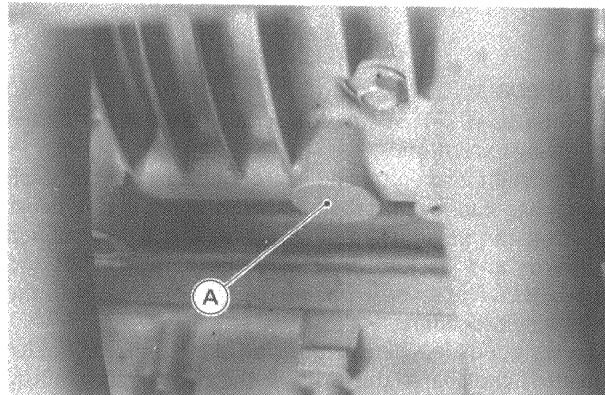
The system will operate only if the ignition switch is on and the transmission is in neutral-position.

*Air Pressure Inspection and Adjustment*

- Put the motorcycle up on its center stand.

**Front Fork**

- Raise the front wheel off the ground by using a jack at the specified location. All weight must be off the front wheel.



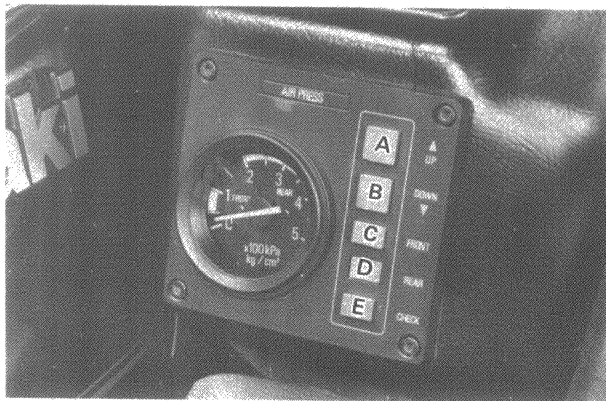
A. Place the jack at this location

- Make certain the transmission is in neutral.
- Start the engine, and let it idle.
- Check air pressure of front fork by pushing the FRONT button of the suspension switch, then pushing the CHECK button. The gauge shows the air pressure in the front fork.
- To add air to the front fork, push the FRONT button, then push the UP button until the proper air pressure is indicated on the pressure gauge.
- To release air, push the FRONT button, then push the DOWN button.

**Rear Shock Absorbers**

The procedure is the same as that for the front suspension with the following exception.

- Push the REAR button instead of FRONT button to check, add, or release air.



- A. UP (increase) button
- B. DOWN (decrease) button
- C. FRONT button
- D. REAR button
- E. CHECK button

Recommended air pressures are as follows with no accessories, for an average-build rider of 667 N (68 kg, 150 lbs).

**Recommended Air Pressure**

	Front	Rear
Standard:	59 kPa (0.6 kg/cm <sup>2</sup> , 8.5 psi)	245 kPa (2.5 kg/cm <sup>2</sup> , 36 psi)

**“NOTE”**

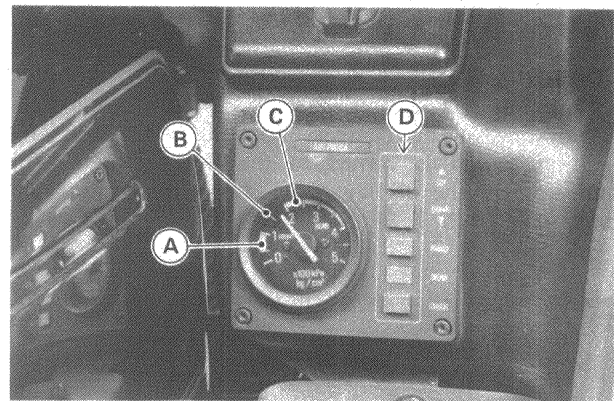
- Check the air pressure when the front fork is cold (room temperature).
- Do not use the side stand when the air pressure is checked.
- Once a desired air pressure setting is achieved, the pressure shouldn't be checked too often constant checking of suspension pressure will eventually equalize pressures in the front and rear suspension.

To suit various riding conditions, suspension air pressure can be adjusted within the usable range given below. Lower air pressure is for comfortable riding, but it should be increased for high speed riding, or riding on bad roads.

**Usable Range of Air Pressure**

Usable range kPa (kg/cm <sup>2</sup> , psi)		Setting	Load	Road
Front	Rear			
49 (0.5, 7.1)	196 (2.0, 28)	Soft	Light	Good
↕	↕	↕	↕	↕
98 (1.0, 14)	390 (4.0, 57)	Hard	Heavy	Bad

The usable range for front suspension is within the orange band and the usable range for the rear suspension is within the white band.



- A. Orange Band
- B. Air Pressure Gauge
- C. White Band
- D. Suspension Switch

**CAUTION**

- Air Pressure exceeding the following value may damage the oil seals.
  - Front fork: 250 kPa (2.5 kg/cm<sup>2</sup>, 36 psi)
  - Rear shock absorber: 490 kPa (5 kg/cm<sup>2</sup>, 71 psi)
- To prevent battery discharge and suspension system malfunction:
  1. Work the suspension system with the engine idling.
  2. While operating the system, do not use the radio or other electrical accessories.
  3. Do not push on the suspension switch continuously for more than 4 minutes.

After excessive use, the pump may stop by thermostatic switch operation to prevent overheating.

Wait several minutes and let it cool. When cooled, the pump will operate normally again.

**"NOTE"**

○The thermostatic switch works when the pump motor temperature reaches 60 – 65°C.

**WARNING**

- Be sure to adjust the air pressure within the usable range. Pressure too high or too low can produce a hazardous riding condition.
- While riding, never check or change air pressure. Keep both hands on the handlebars.

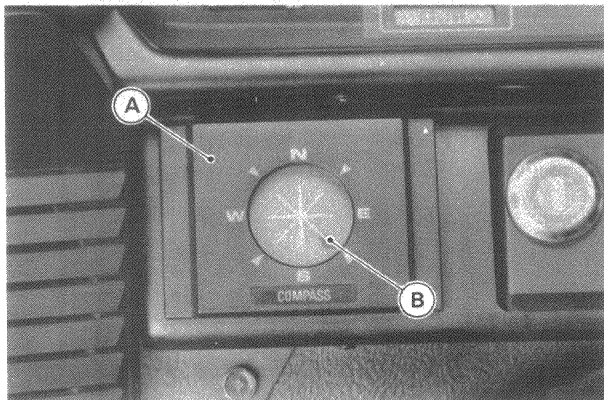
**Damping Adjustment of Rear Suspension**

- The rear shock damping force can be adjusted in the same way as before (Refer to p. 307 of the Base Manual).
- The recommended damper adjuster position is as follows with no accessories, for an average-build rider.

Recommended position of damper adjuster: 2

**Compass:**

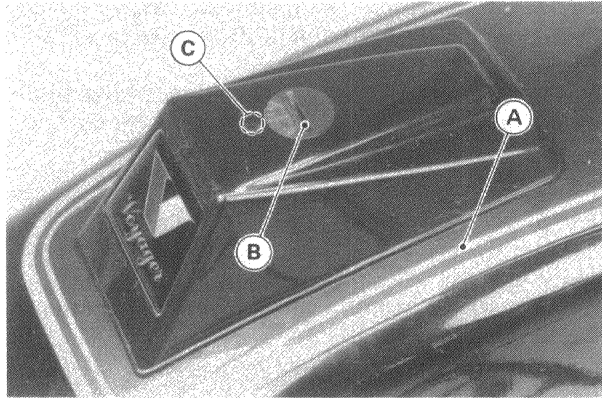
The compass indicates which direction the motorcycle is pointing. The compass operates only when the ignition switch is turned to the ON position. An indicator on the display panel shows the motorcycle direction (N, NE, E, SE, S, SW, W, NW).



A. Compass      B. Indicator

A compass indicates geomagnetic direction rather than geographic direction. The difference between geomagnetic direction and geographic direction varies, depending on where the compass is located in relation to the north and south poles. Adjustment is required to compensate for this phenomenon. Adjust the compass

using a known geographic direction (refer to a road map or compass variation charts). The adjuster has six position marks at 16° intervals, and can be turned 48° each way from center.



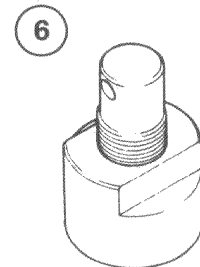
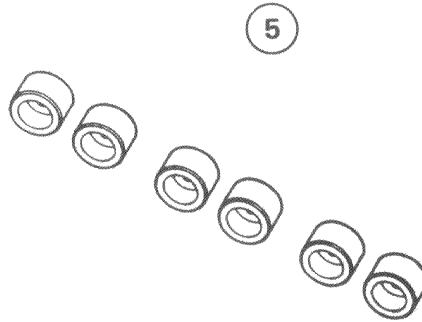
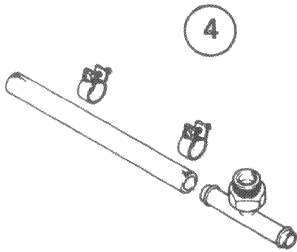
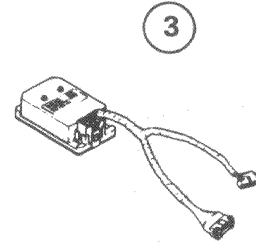
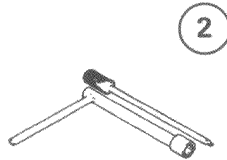
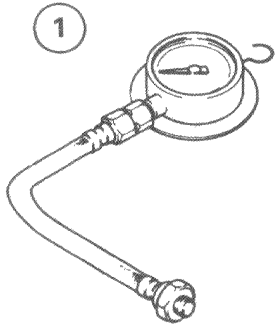
A. Front Fender      C. Marks  
B. Adjuster



Special Tools

Refer to pp. 272 through 277, 331, 332, and 362 of the Base Manual noting the following exception.

Ref. No.	Part No.	Discription	Quantity
1	57001-125	Oil Pressure Gauge	1
2	57001-351	Balance Adjuster	1
3	57001-1003	Throttle Sensor Positioning Checker	1
4	57001-1089	Adapter	1
5	57001-1178	Jig Adapter	1
6	57001-1181	Clutch Pusher	1



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**Torque and Locking Agent**


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The following tables list the tightening torque for the major fasteners requiring use of a non-permanent locking agent or liquid gasket.

Letters used in the "Remarks" column mean:

A : Apply a non-permanent locking agent to the threads.

G : Apply a liquid gasket to the threads or washers.

S : Tighten the fasteners following the specified sequence.

St : Stake the fasteners to prevent loosening.

Engine Parts	Threads Dia. (mm)	Quantity	Torque			Remarks
			N-m	kg-m	ft-lb	
<b>DFI System Parts:</b>						
Engine temperature sensor	10	1	13	1.3	9.5	—
Fuel injector mounting bolts	5	8	4.9	0.50	43 in-lb	—
<b>Engine Mounting:</b>						
Engine mounting bolts	10	4	39	4.0	29	—
Engine mounting bracket bolts	10	8	25	2.6	19.0	—
<b>Top End:</b>						
Air suction valve cover bolts (US model)	6	12	8.8	0.90	78 in-lb	—
Cylinder head cover bolts	6	32	15	1.5	11.0	—
Cylinder head bolts	6	4	9.8	1.0	87 in-lb	—
Spark plugs	14	6	27	2.8	2.0	—
Camshaft bearing cap bolts	6	16	12	1.2	8.5	—
Camshaft chain tensioner bolts	6	2	8.8	0.90	78 in-lb	—
Crankcase studs	10	16	—	—	—	A
Throttle valve holder bolts	6	9	—	—	—	A
Thermostat cover Allen bolts	6	2	9.8	1.0	87 in-lb	—
Cylinder bolts	6	4	9.8	1.0	87 in-lb	—
Camshaft chain guide screw	6	1	—	—	—	A
<b>Left Side:</b>						
Sub alternator rotor bolt	12	1	125	13.0	94	—
Sub alternator stator Allen bolts	5	3	7.8	0.80	69 in-lb	A
Shift pedal return spring pin	6	1	20	2.0	14.5	A
Starter motor clutch Allen bolts	8	3	38	3.9	28	—
Baffle plate mounting screws	6	2	9.8	1.0	87 in-lb	A
Shift drum bearing holder bolts	6	2	9.8	1.0	87 in-lb	A
Over shift limiter bolt	8	1	25	2.5	18.0	—
Neutral positioning pin bolt	16	1	34	3.5	25	—



Engine Parts	Threads Dia. (mm)	Quantity	Torque			Remarks
			N-m	kg-m	ft-lb	
<b>Right Side:</b>						
Alternator rotor bolt	12	1	125	13.0	94	—
Alternator stator Allen bolts	6	3	9.8	1.0	87 in-lb	—
Baffle plate screws	6	2	—	—	—	A
Clutch hub nut	20	1	120	12.0	87	—
Clutch spring bolts	6	5	8.8	0.9	78 in-lb	—
<b>Bottom Side:</b>						
Engine drain plug	20	1	23	2.3	16.5	—
Oil filter mounting bolt	20	1	20	2.0	14.5	—
Crankcase bolts (Upper)	6	10	9.8	1.0	87 in-lb	—
Crankcase bolts (Lower)	6	17	9.8	1.0	87 in-lb	—
	8	19	25	2.5	18.0	—
Output shaft bearing cap bolts	6	4	12	1.2	8.5	A
<b>Internal Parts:</b>						
Connecting rod big end cap bolts	8	6	29	3.0	22	—
Connecting rod big end cap nuts	8	6	29	3.0	22	—
Driven shaft bevel gear nuts	24	1	120	12.0	87	A
Output shaft bevel gear nuts	20	1	120	12.0	87	A
Relief valve	12	1	—	—	—	A
Oil level switch screw	4	1	—	—	—	A
Oil filter housing screw	6	1	—	—	—	A
Water pump bevel gear nut	8	1	20	2.0	14.5	—
Oil pump drive shaft bolts	8	2	20	2.0	14.5	—

Chassis Parts	Threads Dia. (mm)	Quantity	Torque			Remarks
			N-m	kg-m	ft-lb	
<b>Wheels:</b>						
Front axle nut	16	1	78	8.0	58	—
Tire air valve nuts	8	2	1.5	0.15	13 in-lb	—
Rear axle nut	18	1	98	10.0	72	—
<b>Drive Train:</b>						
Final gear case parts:						
Case mounting nuts	10	4	29	3.0	22	—
Case mounting studs	10	4	—	—	—	A
Cover bolts	10	1	34	3.5	25	A
	8	7	24	2.4	17.5	—
Drain plug	8	1	—	—	—	—
Pinion gear nut	16	1	120	12.0	87	—
Rear shock absorber mounting stud	10	1	—	—	—	A

Chassis Parts	Threads Dia. (mm)	Quantity	Torque			Remarks
			N-m	kg-m	ft-lb	
<b>Brakes:</b>						
Bleed valve	7	3	7.8	0.80	69 in-lb	—
Brake hose banjo bolts	10	7	29	3.0	22	—
Brake lever pivot bolt locknut	6	1	5.9	0.60	52 in-lb	—
Caliper mounting bolts	10		34	3.5	25	—
Disc mounting bolts	8	21	23	2.3	16.5	—
Front brake light switch mounting screw	4	1	—	—	—	—
Front master cylinder clamp bolts	6	2	8.8	0.90	78 in-lb	—
Torque link nuts	12	2	30	3.1	22	—
<b>Steering:</b>						
Handlebar clamp bolts	8	8	23	2.3	16.5	—
Handlebar mounting bolts	12	2	44	4.5	33	—
Steering stem head bolt	16	1	39	4.0	29	—
<b>Suspension:</b>						
Front fork bottom Allen bolts	12	2	36	3.7	27	A,G
Front fork clamp bolts						
Upper	8	2	21	2.1	15.0	—
Lower	10	6	27	2.8	10	—
Front fork drain screws	4	2	1.5	0.15	13 in-lb	A
Front fork top plugs	16	2	23	2.3	16.5	—
Rear shock absorber						
mounting nuts						
Upper	12	2	30	3.1	22	—
Lower	10	2	30	3.1	22	—
Rear shock absorber connecting hose:						
Fitting	8	11	13	1.3	9.5	—
Male pipe	8	5	—	—	—	—
Swivel nut	8	5	13	1.3	9.5	—
Swing arm pivot shaft nuts	14	2	13	1.3	9.5	—



The table below, relating tightening torque to thread diameter, 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. Tightening torque listed in the preceding tables varies to a greater or lesser extent from what is given in the table below. Refer to this table for only the bolts and nuts not included in the tables on the previous pages. All of the values are for use with dry solvent-cleaned threads.

## General Fasteners:

Threads dia. (mm)	Torque		
	N-m	kg-m	ft-lb
5	3.4 – 4.9	0.35 – 0.50	30 – 43 in-lb
6	5.9 – 7.8	0.60 – 0.80	52 – 69 in-lb
8	14 – 19	1.4 – 1.9	10.0 – 13.5
10	25 – 39	2.6 – 3.5	19 – 25
12	44 – 61	4.5 – 6.2	33 – 45
14	73 – 98	7.4 – 10.0	54 – 72
16	115 – 155	11.5 – 16.0	83 – 115
18	165 – 225	17 – 23	125 – 165
20	225 – 325	23 – 33	165 – 240

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**Service Data**


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The following tables list the service data which show criteria for servicing major parts. Although reliable measurements can only be obtained by using the proper instruments and following the procedures explained in this text, detail has not been explained in this section. See each section for a detailed account.

**Engine:**

Item	Standard	Service Limit
<b>Throttle Grip:</b> Grip play	2 – 3 mm	— — —
<b>Throttle Valves:</b> Idle speed Synchronization	900 ±50 r/min (rpm) Under 2.7 kPa (2 cmHg) difference	— — — — — —
<b>Camshafts:</b> Cam Height: In. and Ex. Journal/Camshaft Cap Clearance Journal Diameter Camshaft Bearing Inside Diameter Camshaft Runout	36.25 – 36.35 mm 0.090 – 0.131 mm 24.45 – 24.47 mm 24.560 – 24.581 mm Under 0.02 mm	36.15 mm 0.22 mm 24.42 mm 24.64 mm 0.1 mm
<b>Camshaft Chain, Chain Guides:</b>	Refer to p. 172 of the Base Manual.	
<b>Cylinder Head, Valves:</b> Valve Clearance: In. Ex. Cylinder Head Warp Combustion Chamber Volume Valve Head Thickness: Inlet Valve Exhaust Valve Valve Stem Diameter: Inlet Valve Exhaust Valve Valve Guide Inside Diameter Valve/Valve Guide Clearance (Wobble Method): Inlet Exhaust	0.08 – 0.12 mm 0.17 – 0.21 mm — — — 30.9 – 31.7 mL 0.85 – 1.15 mm 0.8 – 1.2 mm 6.965 – 6.980 mm 6.95 – 6.97 mm 7.000 – 7.015 mm 0.05 – 0.12 mm 0.07 – 0.16 mm	— — — — — — 0.05 mm — — — 0.5 mm 0.7 mm 6.95 mm 6.94 mm 7.08 mm 0.23 mm 0.27 mm

## Engine (Con't)

Item	Standard	Service Limit
<b>Valve Seating Surface:</b>		
Outside Diameter: In.	34.9 – 35.1 mm	---
Ex.	28.9 – 29.1 mm	---
Width: In. and Ex.	0.5 – 1.0 mm	---
<b>Valve Spring Free Length</b>		
Inner Spring	36 mm	35.1 mm
Outer Spring	39.3 mm	38.4 mm
<b>Clean Air System (US Model):</b>	Refer to p. 180 of the Base Manual.	
<b>Cylinder Block, Pistons:</b>		
Cylinder Compression	See p. 3-3	---
Cylinder Inside Diameter	61.994 – 62.006 mm, and less than 0.01 mm difference between any two measurements	62.10 mm or more than 0.05 mm difference between any two measurements
Piston Diameter	61.963 – 61.948 mm	61.85 mm
Piston/Cylinder Clearance	0.031 – 0.058 mm	---
Piston Ring/Groove Clearance:		
Top Ring	0.03 – 0.07 mm	0.17 mm
2nd Ring	0.02 – 0.06 mm	0.16 mm
Piston Ring End Gap:		
Top and 2nd	0.2 – 0.4 mm	0.7 mm
Piston Pin Diameter	14.994 – 14.998 mm	14.96 mm
Piston Pin Hole Diameter	15.004 – 15.009 mm	15.08 mm
Con-Rod Small End Diameter	15.003 – 15.014 mm	15.05 mm
<b>Crankshaft, Connecting Rods:</b>	Refer to pp. 186, 316 of the Base Manual.	
<b>Clutch:</b>		
Clutch Lever Play	2 – 3 mm	---
Release Adjusting Screw Position	¼ turn out	---
Clutch Spring Free Length	33.6 mm	32.6 mm
Friction Plate Thickness	3.3 – 3.5 mm	3.2 mm
Friction, Steel Plate Warp	Under 0.2 mm	0.3 mm
<b>Transmission, Shift Mechanism:</b>	Refer to pp. 194, 352 of the Base Manual.	
<b>Engine Lubrication System:</b>	Refer to p. 198 of the Base Manual.	

## Chassis:

Item	Standard	Service Limit
<b>Wheels:</b>		
Tire Tread Depth:	See p. 1-10	
Standard Tire: Front	MR90-18 TUBELESS DUNLOP F11	---
Rear	MU90-16 TUBELESS DUNLOP K427M	---
Tire Air Pressure:	See pp. 1-10 and 4-2	
Rim Runout: Axial	---	0.8 mm
Radial	---	0.5 mm
<b>Brakes:</b>		
Pad Lining Thickness:		
Front and Rear	3.35 mm	1 mm
Brake Fluid Grade	D.O.T. 4	---
Brake Light Switch: Front	Non-adjustable	---
Rear	On after 35 mm pedal travel	---
Brake Pedal Position:	35 mm below from top of footpeg	
Disc Runout: Front and Rear	Under 0.1 mm	0.3 mm
Disc Thickness: Front	4.8 – 5.1 mm	4.5 mm
Rear	6.8 – 7.1 mm	6.0 mm
<b>Front Fork:</b>		
Oil Type	SAE 10W20	---
Oil Capacity	422 ±4 mL (approx. 360 mL at oil change)	---
Oil Level	357 ±2 mm	---
Air Pressure	49 – 98 kPa (0.5 – 1.0 kg/cm <sup>2</sup> , 7.1 – 14 psi)	---
Fork Spring Free Length	598.5 mm	587 mm
<b>Rear Shock Absorber:</b>		
Air Pressure	196 – 390 kPa (2.0 – 4.0 kg/cm <sup>2</sup> , 28 – 57 psi)	---
Oil Type	SAE 5W	---
Oil Capacity	265 mL	---

## Electrical:

Item	Standard	Service Limit
<b>Charging System:</b>		
Regulator/Rectifier:		
Output Voltage	Battery voltage – 15 V	— — —
Alternator Output Voltage		
@4,000 r/min (rpm), no loads	See p. 354	— — —
Stator Coil Resistance	See p. 354	— — —
<b>Ignition System:</b>		
Spark Plugs	NGK BP6ES or ND W20EPR-U	— — —
Plug Leads Resistance		
#1	3.4 – 6.1 k $\Omega$	
#2	2.1 – 3.9 k $\Omega$	
#3	1.9 – 3.5 k $\Omega$	— — —
#4	1.5 – 2.7 k $\Omega$	
#5	2.8 – 5.1 k $\Omega$	
#6	3.4 – 6.1 k $\Omega$	
Plug Gap	0.7 – 0.8 mm	— — —
Ignition Coils:		
Arcing Distance (3-Needle Method)	7 mm or more	— — —
Primary Winding Resistance	1.8 – 2.8 $\Omega$	— — —
Secondary Winding Resistance	10.4 – 15.6 k $\Omega$	— — —
Pickup Coil Resistance	See p. 360	— — —
Igniter Resistance	See p. 361	— — —
<b>Electric Starter System:</b>		
Starter Motor:		
Brush Length	12.0 – 13.0 mm	6 mm
Brush Spring Tension	5.49 – 6.67 N (560 – 680 grams)	— — —
<b>Fuel Gauge:</b>		
Resistance of Fuel Level Sender:		
Full	0.5 – 5.5 $\Omega$	— — —
Empty	102 – 108 $\Omega$	— — —
<b>Final Gear Case:</b>		
Bevel Gear Backlash	0.13 – 0.18 mm	— — —
Bearing Preload	0.6 – 1.0 N-m (0.06 – 0.10 kg-m, 5.2 – 8.7 in-lb)	— — —
Oil:		
Grade	API GL-5 hypoid gear oil	— — —
Amount	0.25 L	— — —
Viscosity	SAE 90 (above 5°C, 41°F) or SAE 80 (below 5°C, 41°F)	— — —

# Scheduled Maintenance

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## Periodic Maintenance Chart

The scheduled maintenance 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	*ODOMETER READING							See Page	
		Whichever comes first Every	800 km	5,000 km	10,000 km	15,000 km	20,000 km	25,000 km		30,000 km
Spark plug – clean		•	•	•	•	•	•	•	•	12
Spark plug – check †		•	•	•	•	•	•	•	•	12
Valve clearance – check †		•	•	•	•	•	•	•	•	341
Air suction valve – check † (US Model)			•	•	•	•	•	•	•	180
Air cleaner element – clean			•		•		•			164
Air cleaner element – replace	5 cleanings			•		•		•		—
Throttle grip play – check †		•	•	•	•	•	•	•	•	2-3
Idle speed – check †		•	•	•	•	•	•	•	•	2-4
Idle speed – adjust		•	•	•	•	•	•	•	•	2-4
Engine vacuum synchronization – check †		•	•	•	•	•	•	•	•	2-5
Cylinder head bolt tightness – check †		•		•		•		•		1-16
Cylinder head nut tightness – check †		•		•		•		•		1-16
Evaporative emission control system – check † (for © model)		•	•	•	•	•	•	•	•	2-6
Coolant – change	2 years							•		23
Engine oil – change	year	•	•	•	•	•	•	•	•	2-3
Oil filter – replace		•		•		•		•		2-3
Radiator hoses, connections – check †	year	•		•		•		•		—
Final gear case oil level – check †				•		•		•		31
Final gear case oil – change		•						•		31
Propeller shaft joint – lubricate				•				•		2-7
Fuel filter – replace			•		•		•			2-6
Low-pressure fuel hose – replace	4 years									2-6
High-pressure fuel hose – replace	2 years									2-6
Clutch – adjust		•	•	•	•	•	•	•	•	20
Brake lining wear – check †			•	•	•	•	•	•	•	2-7
Brake fluid level – check †	month	•	•	•	•	•	•	•	•	2-7
Brake fluid – change	year			•		•		•		2-8
Brake hose – replace	4 years									—
Master cylinder cup and dust seal – replace	2 years									2-8
Caliper piston seal and dust seal – replace	2 years									2-8
Brake play – check †		•	•	•	•	•	•	•	•	27
Brake light switch – check †		•	•	•	•	•	•	•	•	2-8
Steering – check †		•	•	•	•	•	•	•	•	2-8
Steering stem bearing – lubricate	2 years					•				2-9
Front fork oil – change				•		•		•		2-10
Air suspension – drain	month		•	•	•	•	•	•	•	2-10
Tire wear – check †			•	•	•	•	•	•	•	2-10
Wheel bearing – lubricate	2 years					•				2-10
Swing arm pivot – lubricate				•		•		•		228
Battery electrolyte level – check †	month	•	•	•	•	•	•	•	•	230
General lubrication – perform			•	•	•	•	•	•	•	32
Nut, bolt, and fastener tightness – check †		•		•		•		•		2-11

\* : For higher odometer readings, repeat at the frequency interval established here.

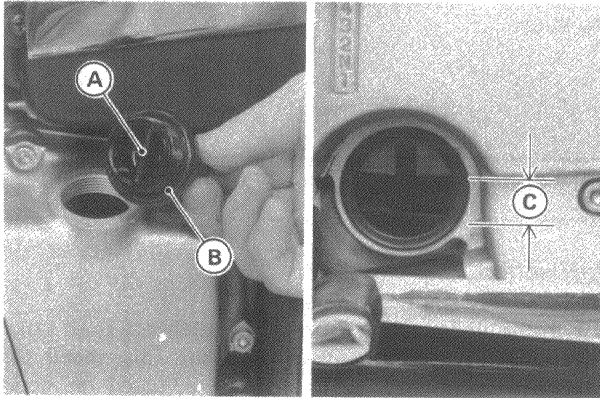
† : Replace, add, adjust, clean, or torque if necessary.

© : California Vehicle

**Engine Oil  
Oil Filter**

Refer to pp. 21 and 306 of the Base Manual noting the following exception.

- When replacing the engine oil, check the O-ring of the filler cap for damage and deterioration, and replace it with a new one if it is damaged. Tighten the cap securely. An air leak can cause the fuel injection system to malfunction.



A. Oil Filter Cap      C. Proper Level Range  
B. O-Ring

**“NOTE”**

- After the oil has completely drained out, install the engine drain plug with its gasket. Proper torque for the plug is shown in the table.

**Tightening Torque**

Engine Drain Plug	23 N-m (2.3 kg-m, 16.5 ft-lb)
Oil Filter Mounting Bolt	20 N-m (2.0 kg-m, 14.5 ft-lb)

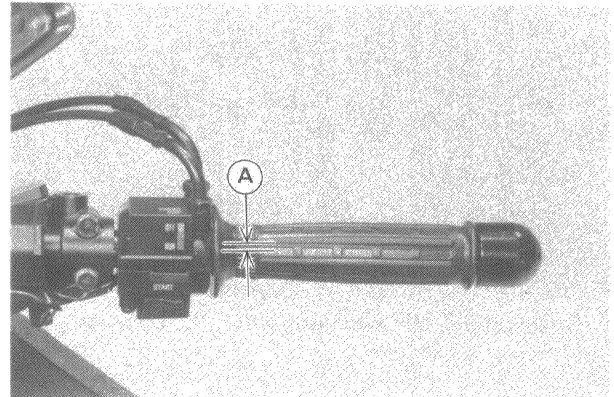
**Throttle Grip**

There are two throttle cables: an accelerator cable for opening the throttle valves, and a decelerator cable for closing them. If the cables are too loose due to cable stretch or maladjustment, the excessive play in the throttle grip will cause a delay in throttle response,

which will be especially noticeable at low rpm. Also, the butterfly valves may not open fully at full throttle. On the other hand, if the cables are too tight, the throttle will be hard to control, and the idle speed will be erratic.

**Inspection**

- Check that there is 2 – 3 mm throttle grip play.

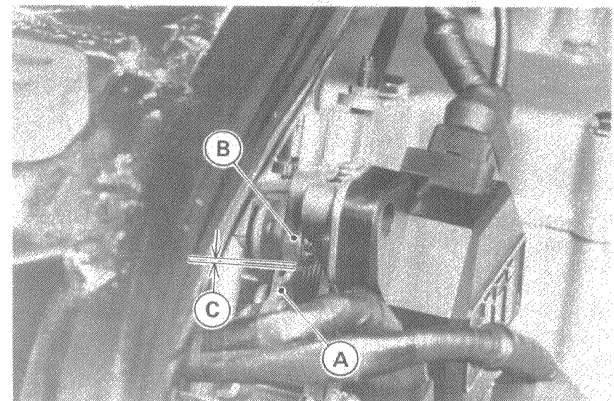


A. 2 – 3 mm

- Push the throttle grip completely closed. At this time there should be no clearance between the cable bracket and the stop.

**“NOTE”**

- This assures that the stress of throttle grip return will be taken by the pulley, protecting the throttle valve linkage mechanism.



A. Cable Bracket      C. No Clearance  
B. Stop

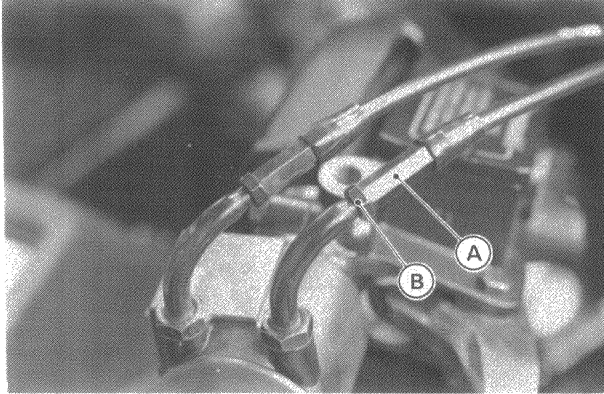
**Adjustment**

If any one of the above checks shows improper adjustment, adjust the throttle cables as follows:

- Loosen the locknuts, and screw both throttle cable adjusting nuts in fully at the upper end of the throttle cables so as to give the throttle grip plenty of play.

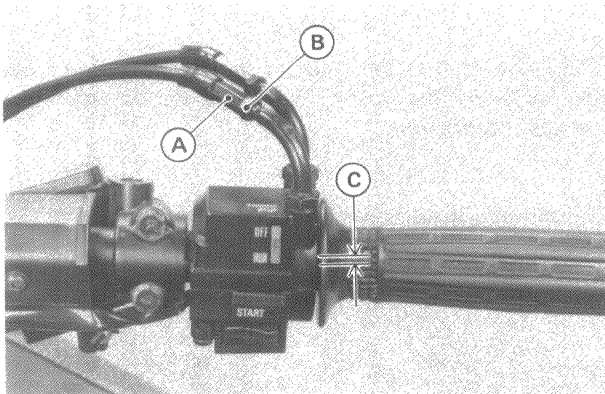


- Turn out the decelerator cable adjusting nut until there is no clearance between the cable bracket and the stop when the throttle grip is completely closed. Tighten the locknut.



A. Decelerator Cable Adjusting Nut    B. Locknut

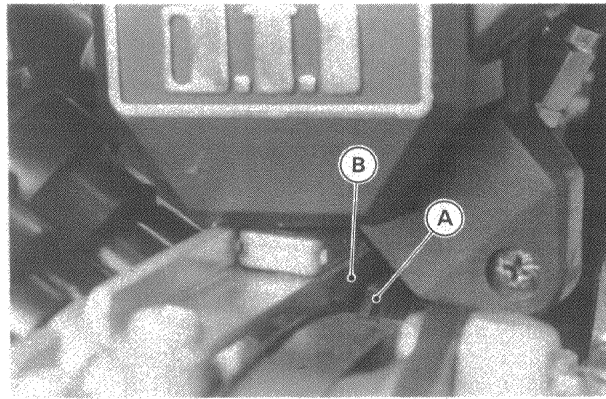
- Turn the accelerator cable adjusting nut until 2 – 3 mm of throttle grip play is obtained. Tighten the locknut.



A. Accelerator Cable Adjusting Nut    B. Locknut    C. 2 – 3 mm

**“NOTE”**

- If the throttle cables cannot be adjusted by using the cable adjusting nuts at the upper end of the throttle cables, use the cable adjuster at the lower end of the accelerator cable. Do not forget to securely tighten the adjuster mounting nuts.
- If grip play is adjusted too large, the butterfly valves may not open fully at full throttle. To check this, check to see that the pulley stops against the stop on the throttle body when the throttle grip is fully turned.



A. Pulley    B. Stop

**Idle Speed**

*Inspection*

- Thoroughly warm up the engine.
- With the engine idling, turn the handlebar to both sides.
- ★ If handlebar movement changes the idle speed the throttle cable may be improperly adjusted or incorrectly routed, or a damaged cable could result in an unsafe riding condition.

**WARNING**

○ Operation with improperly adjusted, incorrectly routed, or a damaged cable could result in an unsafe riding condition.

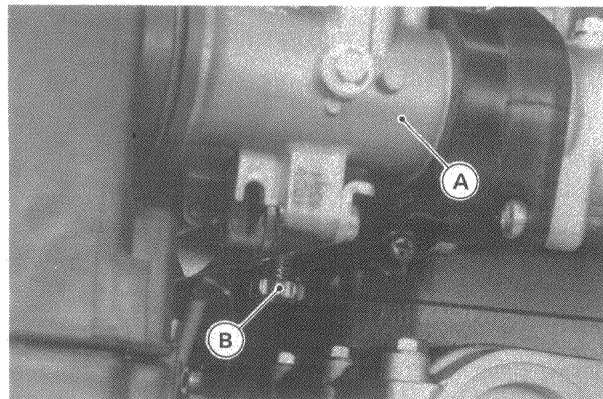
- Check that the idle speed is within the specified range.
- ★ If the idle speed is out of the specified range, adjust it.

**Idle Speed**

850 – 950 r/min (rpm)

*Adjustment*

- Turn the idle adjusting screw to adjust the idle speed.



A. Throttle Valve    B. Idle Adjusting Screw

- Open and close the throttle a few times to make sure that the idle speed is within the specified range. Readjust if necessary.

**"NOTE"**

- In case of unstable or rough engine idling, check the following regarding the electronic fuel injection system as well as the engine itself.
- Electrical system: Make sure that all connectors in the circuit are clean and tight.
- Fuel system: Make sure that all fuel and vacuum hoses are correctly routed connected.
- Air system: Make sure that there are no air leaks at the engine oil filler cap and the breather hose connections.

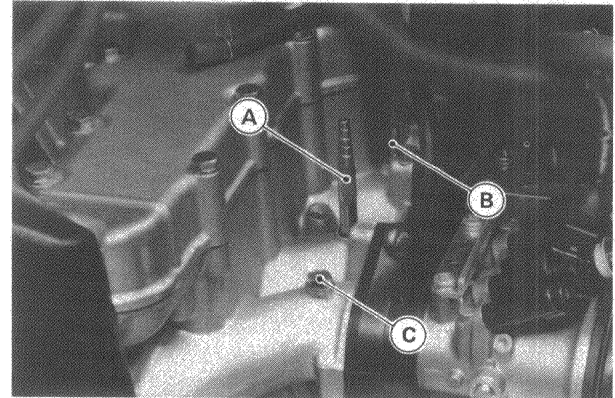
- Using suitable hoses connect the fuel tap to the fuel filter, and the check valve to the pressure regulator.
- For US model, unscrew the vacuum plugs (4) from the #1, #2, #5, and #6 manifolds, and pull off the vacuum hoses (2) from the #3 and #4 manifolds sliding the hose clamps out of position.
- Except for US model, unscrew the vacuum plugs (6) from each manifold.
- Screw the vacuum gauge adapter (special tool) into each vacuum plug hole, and connect the vacuum gauge hoses to the adapters (6, 4 for US model) and vacuum hose fittings (2 only for US model).

**Engine Vacuum Synchronization**

Poor engine intake vacuum synchronization will cause unstable idling, sluggish throttle response, and reduced engine power and performance. Carry out inspection and adjustment procedures on the engine vacuum synchronization in accordance with the "Engine Vacuum Synchronizing Procedure" chart (p. 2-6).

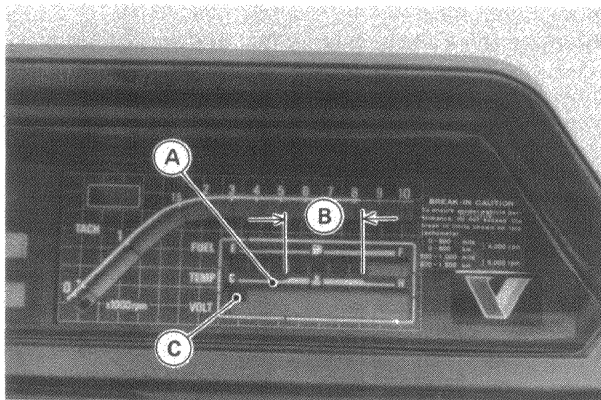
**Inspection**

- Start the engine, and warm it up until the water temperature gauge segments appear in the usable range.

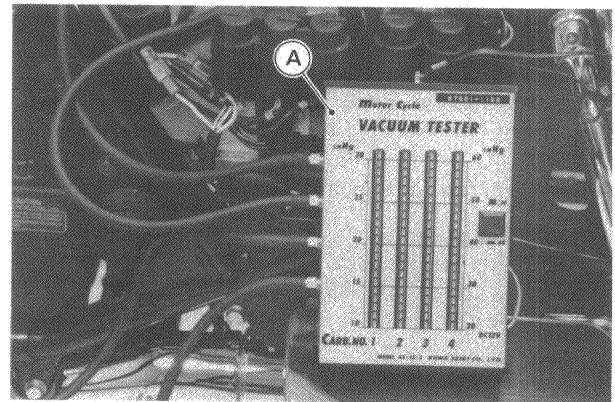


A. Vacuum Gauge Adapter: 57001-401  
 B. Fitting  
 C. Vacuum Plug

- Attach the vacuum gauge (special tool) to the fittings.



A. Temperature Gauge      C. Segment  
 B. Usable Range



A. Vacuum Gauge: 57001-1152

- Perform the idling adjustment (p. 2-4).
- Stop the engine.
- Remove the fuel tank, and put it on the work bench near the motorcycle on the same level as the original position.

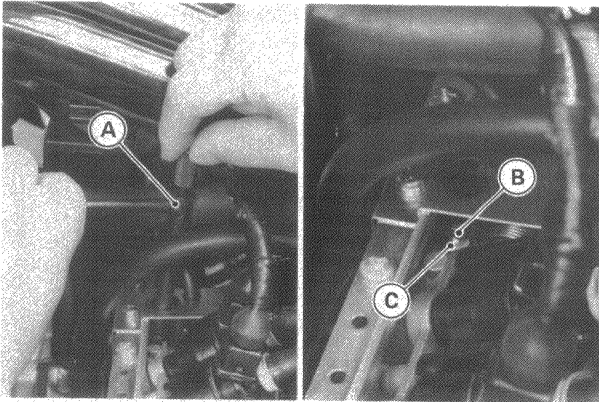
- Let the engine idle and measure the engine intake vacuum.
- Calculate three averages of each two manifolds, i.e., #1 and #2, #3 and #4, and #5 and #6.
- ★If there is a difference of more than the specified value between any two averages, synchronize the engine vacuum.

**Engine Vacuum**

Difference between any two averages	Less than 2 cm Hg
-------------------------------------	-------------------

**Synchronizing Engine Vacuum**

- Stop the engine.
- To change the vacuum, loosen the locknut, and turn the balance adjusting screw.



A. Throttle valve adjuster: 57001-351  
 B. Adjusting Nut  
 C. Locknut

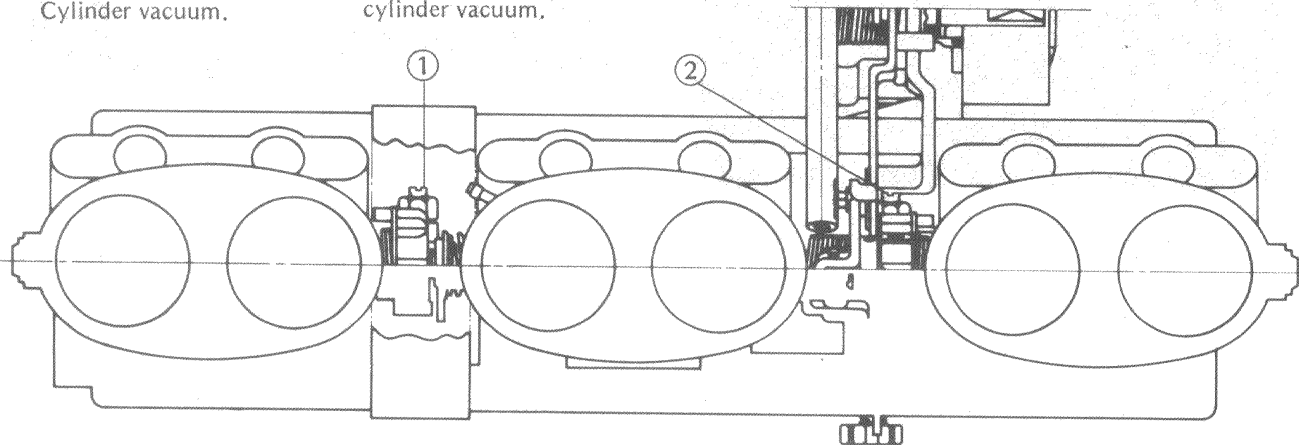
**“NOTE”**

- Loosen the locknut with the throttle valves opened.
- First synchronize the left two or center two manifolds by means of the adjusting screw ①. Then synchronize the left and center four manifolds with the right two manifolds using the right adjusting screw ②. Adjust the idle speed as necessary.

- Tighten the locknuts without changing the position of the adjusting screws.
- Open and close the throttle a few times to make sure that the throttle valves are synchronized. Readjust if necessary.

**Adjusting Screw for Synchronization**

1. Left Adjusting Screw: Turn this screw clockwise to lower #1, #2 Cylinder vacuum.
2. Right Adjusting Screw: Turn this screw clockwise to lower #5, #6 cylinder vacuum.



**Fuel System**

**Fuel Filter Replacement**

Replace the fuel filter in accordance with the Periodic Maintenance Chart. Refer to p. 6-4 for the procedure.

**Fuel Hose Replacement**

Replace the fuel hoses in accordance with the Periodic Maintenance Chart. Refer to p. 6-3 for instructions. High-pressure hoses:

- Hose between fuel pump and fuel distributing pipe.
- Hose between fuel distributing pipe and pressure regulator.

Low-pressure hoses:

- Hose between fuel tap and fuel filter.
- Hose between fuel filter and fuel pump.
- Hose between pressure regulator and check valve.

**Evaporative Emission Control System (California Vehicle)**

The Evaporative Emission Control System routes fuel vapors from the fuel system into the running engine or stores the vapors in a canister when the engine is stopped. Although no adjustments are required, a thorough visual inspection must be made at the intervals specified by the Periodic Maintenance Chart.

**Scheduled Maintenance:**

**Inspection**

- Check that the hoses are securely connected.
- Replace any kinked, deteriorated or damaged hoses.

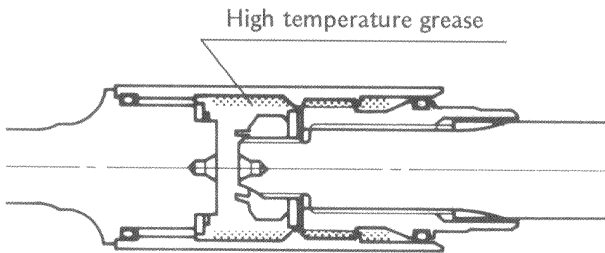
**Propeller Shaft Joint**

Usually the center of the swing arm pivot does not coincide with the center of the propeller shaft universal joint. As the rear wheel moves up and down, the distance between the front bevel driven gear and the final pinion gear will change to some extent. To allow the propeller shaft to adjust to these variations in length, a sliding joint is used at the rear end of the propeller shaft.

**Lubrication**

- Remove the final gear case and propeller shaft.
- Wipe off the old grease from the propeller shaft sliding joint and pinion gear joint.
- Pack the propeller shaft sliding joint with the specified amount of grease.

**Propeller Shaft Joint Lubrication**



**Grease for Sliding Joint Lubrication:**

Type	High temperature grease
Amount	20 mL (16 grams)

**Brakes**

**Brake Adjustment:**

Refer to pp.27, 219 and 295 of the Base Manual.

**WARNING**

- If the brake lever or pedal has a soft or "spongy feeling" when it is applied, there might be air in the brake lines or the brake may be defective. Since it is dangerous to operate the motorcycle under such conditions, bleed the air from the brake line immediately.

**Brake Wear:**

In accordance with the periodic Maintenance Chart, inspect the front and rear brakes for wear.

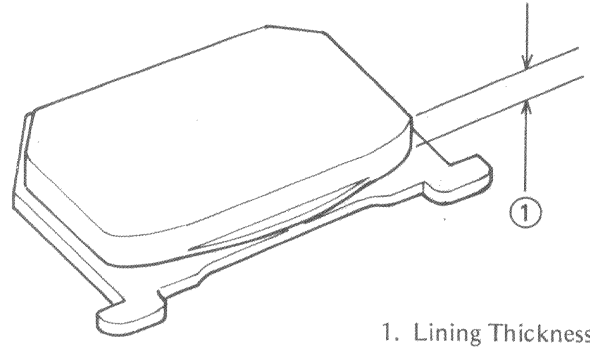
**Inspection**

- Check the lining thickness of the pads in each caliper.
- ★ If the lining thickness of either pad is less than the service limit, replace both pads in the caliper as a set.

**Pad Lining Thickness**

Standard	Service Limit
4.85 mm	1 mm

**Pad Lining Usable Range**



**Brake Fluid Level:**

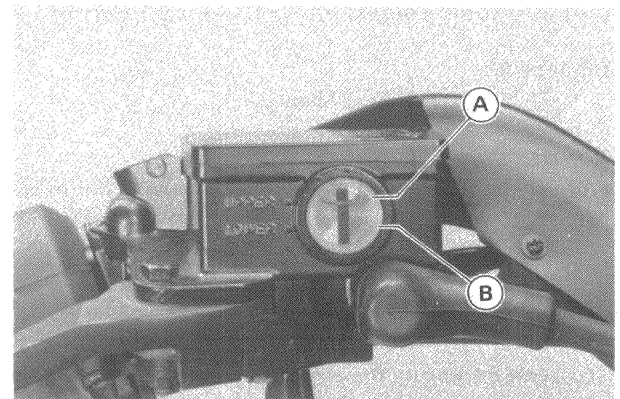
In accordance with the Periodic Maintenance Chart, inspect the brake fluid level in the front.

**Inspection**

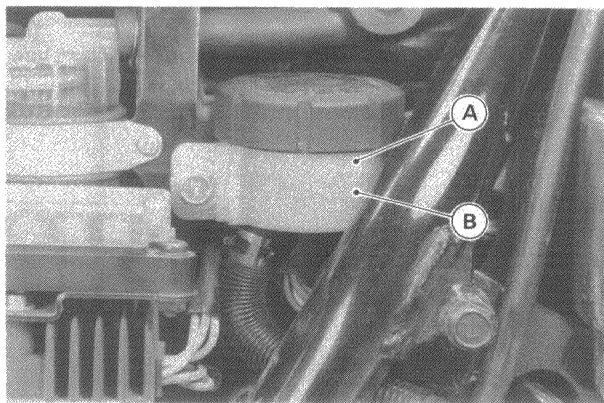
- Check the brake fluid level in the reservoir.

**"NOTE"**

- Hold the reservoir horizontal when checking brake fluid level.
- ★ The fluid level should be between the upper and lower level lines. If the fluid level is lower than the lower level line, fill the reservoir to the upper level line with the same type and brand of fluid that already is in the reservoir.



A. Upper Level Line      B. Lower Level Line



A. Upper Level Line      B. Lower Level Line

### Brake Fluid Change:

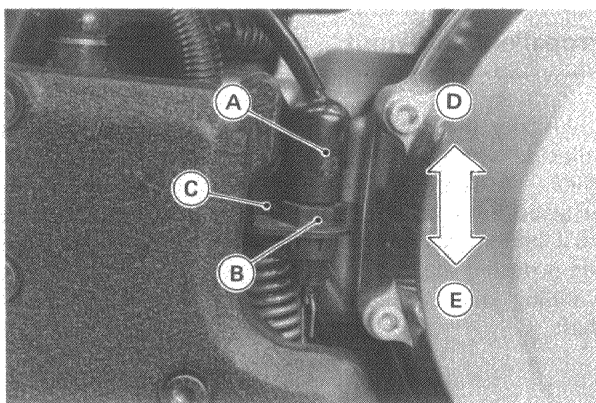
Refer to p. 220 of the Base Manual.

### Air Bleeding:

Refer to p. 221 of the Base Manual.

### Rubber Disc Brake Parts:

In accordance with the Periodic Maintenance Chart, replace the brake hoses, caliper and master cylinder rubber parts. The removal and installation, disassembly and assembly sequences which need special care are explained in the "Disassembly" chapter. Refer to pp. 221, 222 and 123 – 135 of the Base Manual.



A. Rear Brake Light Switch      D. Lights sooner  
B. Adjusting Nut                      E. Lights later  
C. Bracket

### Brake Light Switches

#### Inspection

Refer to p. 27 of Base Manual.

#### Adjustment

- Adjust the rear brake light switch by moving the switch up or down. To change the switch position, turn the adjusting nut.

**CAUTION**

- To avoid damaging the electrical connections inside the switch, be sure that the switch body does not turn during adjustment.

### 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 be 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.

#### Steering Inspection

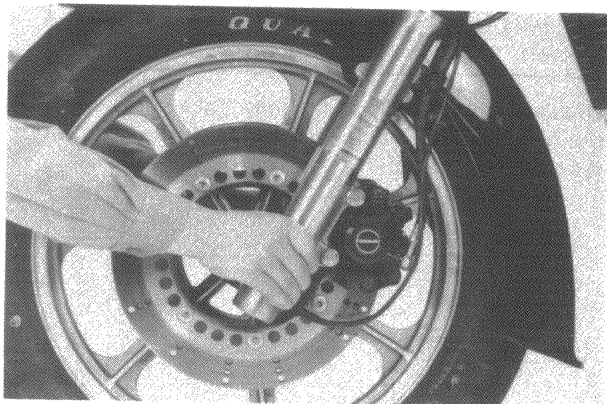
- Set the motorcycle on its center stand.
- Using a jack at the specified location under the engine, lift the front wheel off the ground (Refer to p. 121 photo G2 of Base Manual).
- Inspect steering tightness:
  - From the centered position, slowly push the handlebar to either side.
  - ★ If the handlebar begins to turn by the action of gravity and continues moving until the ridge on the stem base stops against the stop plate on the frame head pipe, the steering tightness is correct.
  - ★ If the handlebar does not begin to turn by the action of gravity, the steering is too tight necessitating adjustment.



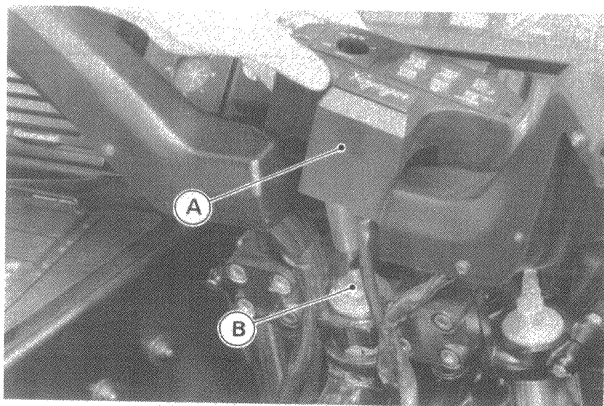
**"NOTE"**

○The handlebar may catch halfway by means of the cables and wiring harnesses. In this case, the steering couldn't be considered to be too tight.

- Inspect steering play:
- Push and pull the front fork lower end back and forth.
- ★If play is felt, adjust the steering.

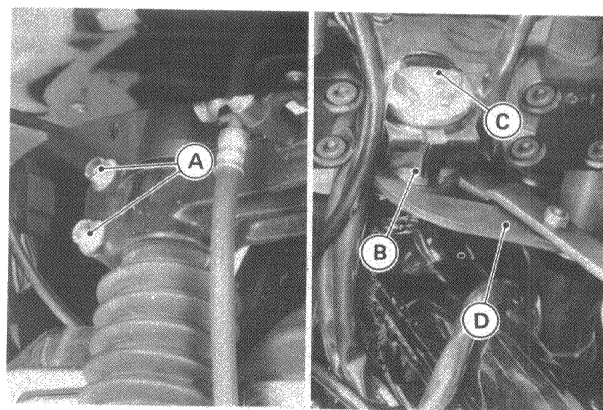
**Steering Adjustment****Preparation:**

- Remove the fuel tank to avoid damaging the painted surface.
- Remove the ignition switch cover.



A. Ignition Switch Cover      B. Stem Head Bolt

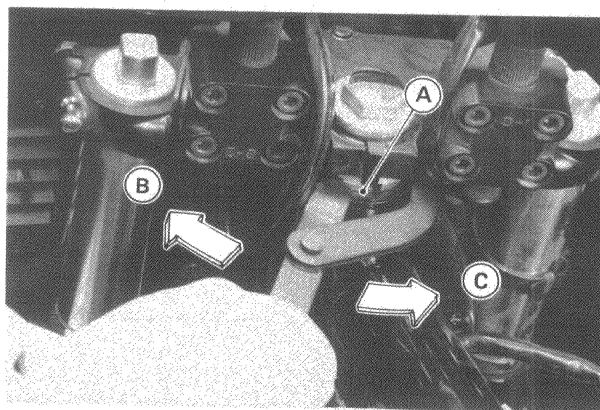
- Loosen the left and right front fork lower clamp bolts. This allows the fork inner tubes to slide in the steering stem base.
- Loosen the steering stem head bolt and upper steering stem locknut. Use the stem nut wrench (special tool) to turn the steering stem locknuts.



A. Fork Lower Clamp Bolts      C. Stem Head Bolt  
B. Upper Stem Locknut      D. Wrench: 57001-1100

**Adjustment:**

- Turn the lower stem locknut a little ( $1/8$  turn or so) at a time to adjust the steering.



A. Lower Stem Locknut  
B. Tighten the stem locknut when the steering has play.  
C. Loosen the stem locknut when the steering is too tight.

- Before re-checking the steering, tighten the following fasteners in this order.

- (a) Upper stem Locknut → without turning the position of the lower stem locknut, lightly tighten the upper stem locknut.
- (b) Stem head bolt → tighten to the specified torque.
- (c) Front fork lower clamp bolts → tighten to the specified torque.

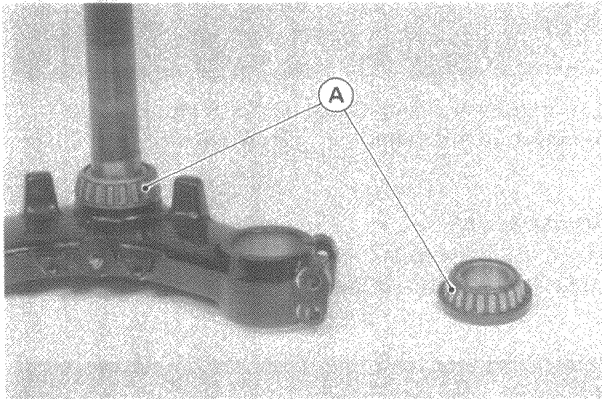
**Tightening torque:**

- Stem head bolt
- Fork lower clamp bolts

**Steering Stem Bearing Lubrication**

- Remove the steering stem.

- Using a high flash-point solvent, wash the upper and lower tapered roller bearing in the cages, and wipe the upper and lower outer races, which are press-fitted into the frame head pipe, clean of grease and dirt.
- Visually check the outer races and the rollers.
- ★Replace the bearing assembly if they show wear or damage.
- Pack the upper and lower tapered roller bearings in the cages with grease, and apply a light coat of grease to the upper and lower outer races.



A. Steering Bearings

---

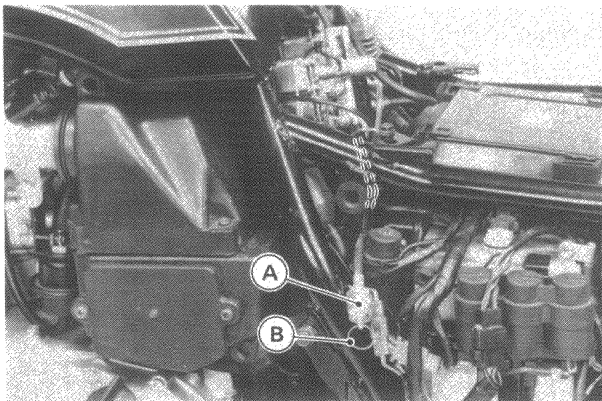
## Suspension

---

### Air Pump Drain Valve

Moisture accumulating in the suspension system can get into the front fork or rear shock absorbers, and cause suspension malfunction.

- Take out the drain valve and pull down the valve ring to drain any water from the suspension system in accordance with the Periodic Maintenance Chart.
- Put the drain valve back where it was and let it hang down for easy draining.



A. Drain Valve: installed behind the crankcase  
 B. Valve Ring

### Fork Oil Change

Refer to p. 226 of Base Manual noting the following exception.

- Before removing the forks, let all the air out by operating the suspension switch.

#### Fork Oil

Type:	SAE 10W20
Capacity	
At oil change:	about 360 mL
After Disassembly (Dry):	422 ±4 mL
Level:	* 357 ±2 mm

\*Distance from the top of the inner tube, measured with the fork tube fully extended and with the main spring removed.

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## Wheels

---

### Tires:

Refer to p. 212, p. 295 of the Base Manual noting the following exception.

#### Tire Tread Depth

Front:	
Standard	5.4 mm
Service Limit	1 mm
Rear:	
Standard	7.4 mm
Service Limit	2 mm (Up to 130 km/h) 3 mm (Over 130 km/h)

#### Standard Tire

Front:	MR90-18 TUBELESS DUNLOP F11
Rear:	MU90-16 TUBELESS DUNLOP K427M

### Wheel Bearings, Grease Seals:

Refer to p. 216 of the Base Manual.

### Rear Wheel Coupling:

Refer to p. 217 of the Base Manual.

---

## Bolts, Nuts, and Fasteners

---

### *Tightness Inspection*

- Check the tightness of the bolts and nuts listed here. Also, check to see that each cotter pin is in place and in good condition.

#### "NOTE"

○ For the engine fasteners, check tightness when the engine is cold (at room temperature).

★ If there are loose fasteners, retorque them to the specified tightening sequence. (See "Torque and Locking Agent" section p. 1-16). For each fastener first loosen it by ½ turn, then tighten it.

★ If cotter pins are damaged, replace them with new ones.

- Check the tightness of the following fasteners:

#### **Wheel:**

- Front axle nut
- Front axle clamp bolt
- Rear axle nut
- Rear axle cotter pin

#### **Brake:**

- Master cylinder clamp bolts
- Brake lever pivot nut
- Caliper mounting bolts (Front)
- Brake pedal bolt
- Rear master cylinder mounting bolts
- Caliper mounting bolts (Rear)
- Torque link nuts

#### **Suspension:**

- Front fork clamp bolts
- Rear shock absorber mounting nuts, bolt
- Swing arm pivot shaft locknuts

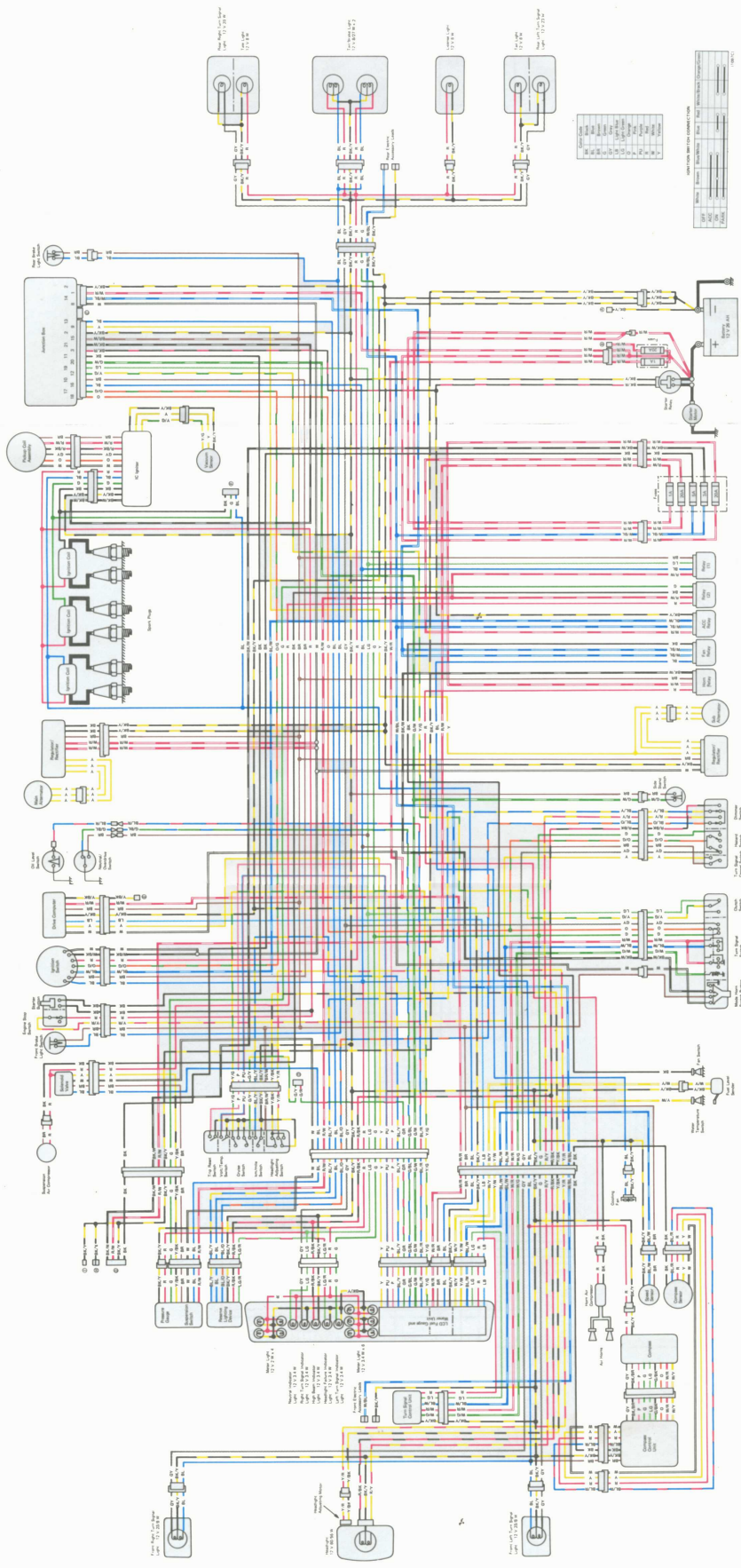
#### **Steering:**

- Handlebar holder clamp bolts
- Handlebar mounting bolts
- Steering stem head bolt
- Steering stem head clamp bolt

#### **Engine:**

- Cylinder head cover bolts
- Cylinder head nuts, bolts
- Exhaust pipe holder nuts
- Muffler mounting nuts, bolts
- Engine mounting nuts
- Engine mounting bracket bolts
- Shift pedal bolt





Wire No.	Color	From	To
1	Red	Battery (+)	Ignition Switch
2	Red	Battery (+)	Headlight Switch
3	Red	Battery (+)	Alternator (+)
4	Black	Battery (-)	Ground
5	Blue	Ignition Switch	Distributor
6	Green	Headlight Switch	Headlight
7	Yellow	Headlight Switch	Headlight
8	Orange	Headlight Switch	Headlight
9	Purple	Headlight Switch	Headlight

Wire No.	Color	From	To
10	Red	Battery (+)	Ignition Switch
11	Red	Battery (+)	Headlight Switch
12	Red	Battery (+)	Alternator (+)
13	Black	Battery (-)	Ground
14	Blue	Ignition Switch	Distributor
15	Green	Headlight Switch	Headlight
16	Yellow	Headlight Switch	Headlight
17	Orange	Headlight Switch	Headlight
18	Purple	Headlight Switch	Headlight

Wire No.	Color	From	To
19	Red	Battery (+)	Ignition Switch
20	Red	Battery (+)	Headlight Switch
21	Red	Battery (+)	Alternator (+)
22	Black	Battery (-)	Ground
23	Blue	Ignition Switch	Distributor
24	Green	Headlight Switch	Headlight
25	Yellow	Headlight Switch	Headlight
26	Orange	Headlight Switch	Headlight
27	Purple	Headlight Switch	Headlight

Wire No.	Color	From	To
28	Red	Battery (+)	Ignition Switch
29	Red	Battery (+)	Headlight Switch
30	Red	Battery (+)	Alternator (+)
31	Black	Battery (-)	Ground
32	Blue	Ignition Switch	Distributor
33	Green	Headlight Switch	Headlight
34	Yellow	Headlight Switch	Headlight
35	Orange	Headlight Switch	Headlight
36	Purple	Headlight Switch	Headlight

Wire No.	Color	From	To
37	Red	Battery (+)	Ignition Switch
38	Red	Battery (+)	Headlight Switch
39	Red	Battery (+)	Alternator (+)
40	Black	Battery (-)	Ground
41	Blue	Ignition Switch	Distributor
42	Green	Headlight Switch	Headlight
43	Yellow	Headlight Switch	Headlight
44	Orange	Headlight Switch	Headlight
45	Purple	Headlight Switch	Headlight

Wire No.	Color	From	To
46	Red	Battery (+)	Ignition Switch
47	Red	Battery (+)	Headlight Switch
48	Red	Battery (+)	Alternator (+)
49	Black	Battery (-)	Ground
50	Blue	Ignition Switch	Distributor
51	Green	Headlight Switch	Headlight
52	Yellow	Headlight Switch	Headlight
53	Orange	Headlight Switch	Headlight
54	Purple	Headlight Switch	Headlight

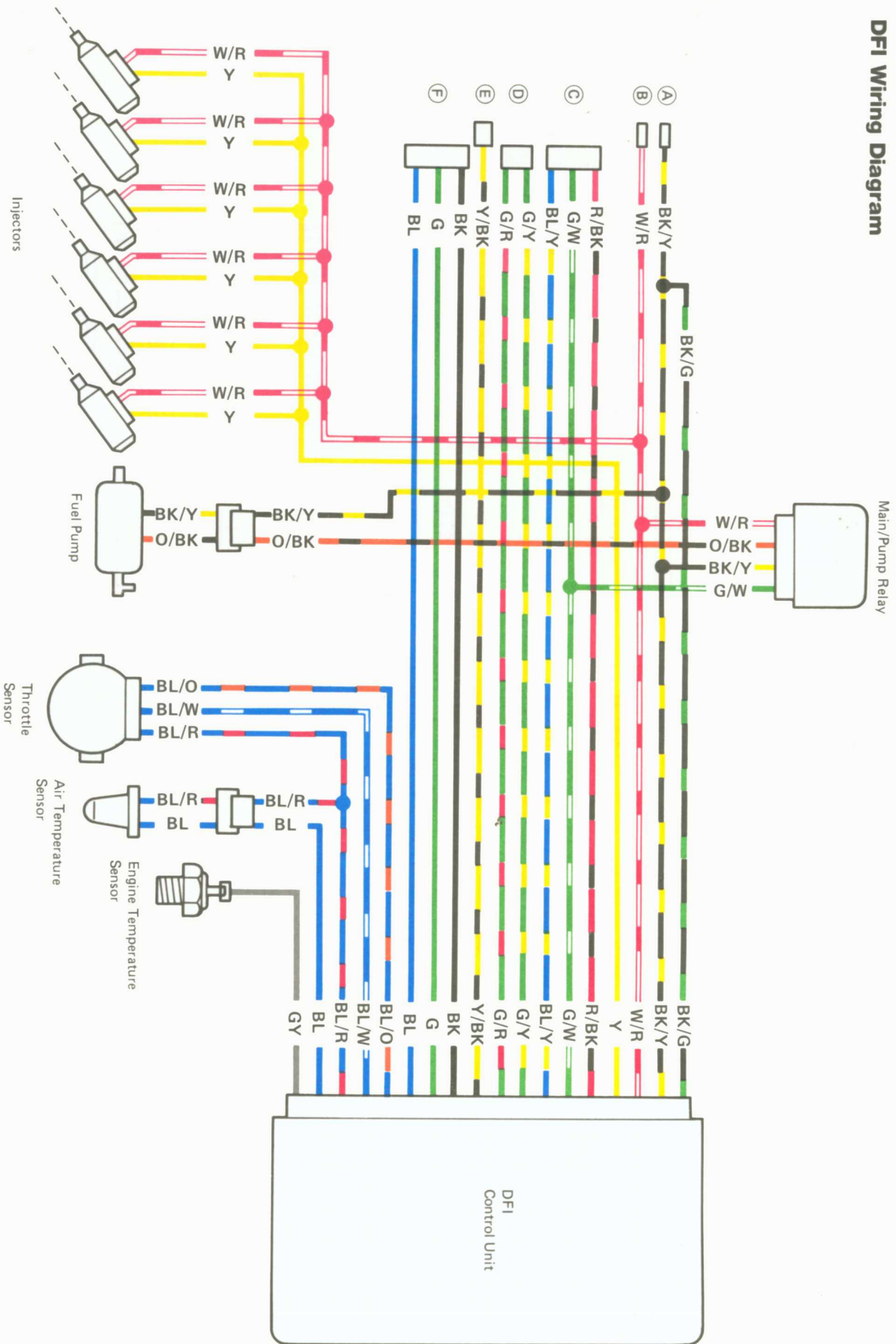
Wire No.	Color	From	To
55	Red	Battery (+)	Ignition Switch
56	Red	Battery (+)	Headlight Switch
57	Red	Battery (+)	Alternator (+)
58	Black	Battery (-)	Ground
59	Blue	Ignition Switch	Distributor
60	Green	Headlight Switch	Headlight
61	Yellow	Headlight Switch	Headlight
62	Orange	Headlight Switch	Headlight
63	Purple	Headlight Switch	Headlight

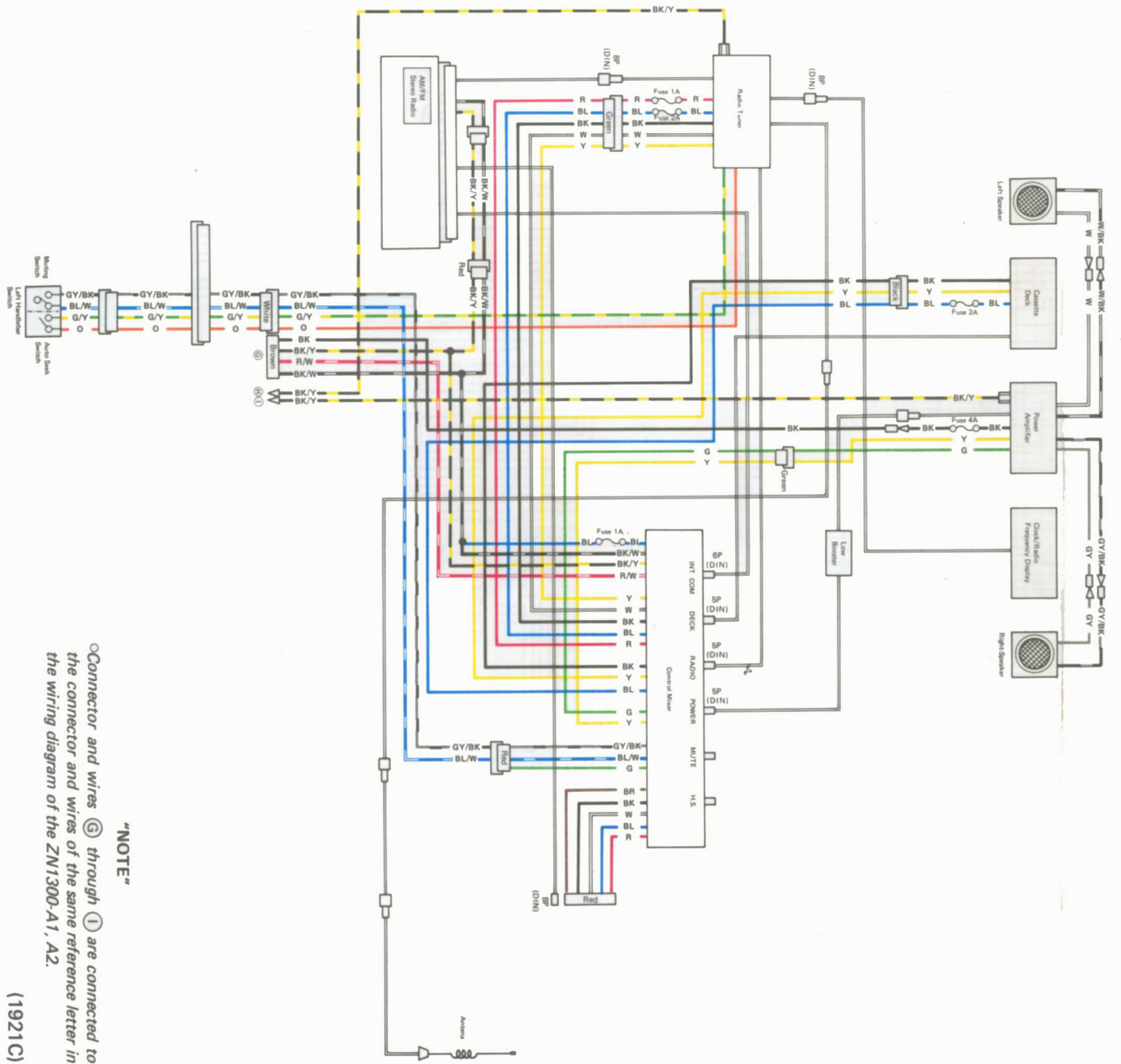
Wire No.	Color	From	To
64	Red	Battery (+)	Ignition Switch
65	Red	Battery (+)	Headlight Switch
66	Red	Battery (+)	Alternator (+)
67	Black	Battery (-)	Ground
68	Blue	Ignition Switch	Distributor
69	Green	Headlight Switch	Headlight
70	Yellow	Headlight Switch	Headlight
71	Orange	Headlight Switch	Headlight
72	Purple	Headlight Switch	Headlight

Wire No.	Color	From	To
73	Red	Battery (+)	Ignition Switch
74	Red	Battery (+)	Headlight Switch
75	Red	Battery (+)	Alternator (+)
76	Black	Battery (-)	Ground
77	Blue	Ignition Switch	Distributor
78	Green	Headlight Switch	Headlight
79	Yellow	Headlight Switch	Headlight
80	Orange	Headlight Switch	Headlight
81	Purple	Headlight Switch	Headlight

Wire No.	Color	From	To
82	Red	Battery (+)	Ignition Switch
83	Red	Battery (+)	Headlight Switch
84	Red	Battery (+)	Alternator (+)
85	Black	Battery (-)	Ground
86	Blue	Ignition Switch	Distributor
87	Green	Headlight Switch	Headlight
88	Yellow	Headlight Switch	Headlight
89	Orange	Headlight Switch	Headlight
90	Purple	Headlight Switch	Headlight

# DFI Wiring Diagram





**"NOTE"**

Connector and wires ⑤ through ① are connected to the connector and wires of the same reference letter in the wiring diagram of the ZN1300-A1, A2.

(1921C)

# Non-scheduled Maintenance – Engine

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## Camshafts

### Cam Wear

Refer to p. 171 of the Base Manual noting the following exception.

### Cam Height

Standard	36.25 – 36.35 mm
Service Limit	36.15 mm

### Camshaft Runout

Refer to p. 172 of the Base Manual.

### Camshaft Journal, Bearing Wear

Refer to p. 171 of the Base Manual noting the following exception.

### Camshaft Journal Diameter

Standard	24.45 – 24.47 mm
Service Limit	24.42 mm

### Camshaft Bearing Inside Diameter

Standard	24.560 – 24.581 mm
Service Limit	24.64 mm

## Cylinder Head, Valves

### Cylinder Head:

#### Cleaning

Refer to p. 173 of the Base Manual.

#### Cylinder Head Warp

Refer to p. 173 of the Base Manual.

### Combustion Chamber Volume Measurement

Refer to p. 174 of the Base Manual noting the following exception.

### Valve Installed Height

#### Valve Installed Height

Height (mm)		Probably Cause	Recommendation
Inlet	38.38 – 39.02	Normal/acceptable	●After assembling check and adjust valve valve clearance.
Exhaust	38.29 – 38.93		
Inlet	More than 39.02	Valve face or seat worn out, or ground excessively.	●Move valve to shallower cut seat. Remeasure. ●Replace valve. Remeasure. ●Replace cylinder head. Remeasure.
Exhaust	More than 38.93		

### Combustion Chamber Volume

30.9 – 31.7 mL

### Valve, Valve Guide, Valve Seat:

#### Valve Inspection

Refer to p. 175 of the Base Manual noting the following exception.

### Valve Head Thickness

	Standard	Service Limit
Inlet	0.85 – 1.15 mm	0.5 mm
Exhaust	0.8 – 1.2 mm	0.7 mm

### Valve Stem Bend

Standard	Under 0.01 mm
Service Limit	0.05 mm

### Valve Stem Diameter

	Standard	Service Limit
Inlet	6.965 – 6.98 mm	6.95 mm
Exhaust	6.95 – 6.97 mm	6.94 mm

### Valve Guide Inspection

#### Valve Guide Inside Diameter

Standard	7.000 – 7.015 mm
Service Limit	7.08 mm

### Valve/Valve Guide Clearance

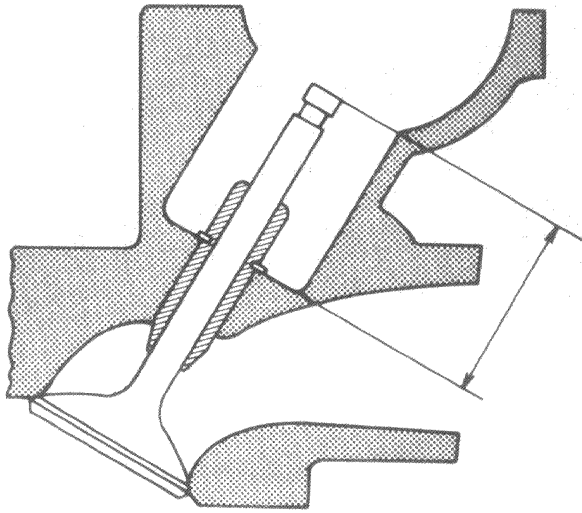
	Standard	Service Limit
Inlet	0.05 – 0.12 mm	0.23 mm
Exhaust	0.07 – 0.16 mm	0.27 mm

### Valve Seat Inspection

#### Valve Seating Surface

	Inlet	Exhaust
Outside Diameter	28.9 – 29.1 mm	34.9 – 35.1 mm
Width	0.5 – 1.0 mm	0.5 – 1.0 mm

**Valve Installed Height**



**Valve Springs:**

Refer to p. 178 of the Base Manual noting the following exception.

*Spring Tension*

**Valve Spring Free Length**

	Standard	Service Limit
Inner	36.0 mm	35.1 mm
Outer	39.3 mm	38.4 mm

.....  
**Cylinder Block, Pistons**  
 .....

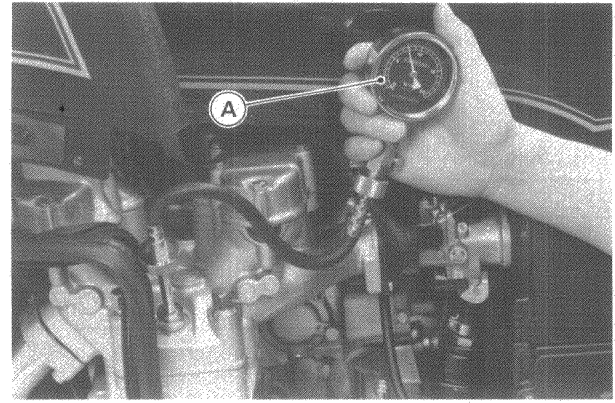
*Compression Measurement*

Refer to p. 182 of the Base Manual noting the following exception.

- To stop fuel injector operation during cylinder compression measurement, disconnect the white/red lead which connects the battery positive terminal to the fuel injection system harness.

**Cylinder Compression**

Standard	Usable Range
1,200 – 1,400 kPa, (12.0 – 14.0 kg/cm <sup>2</sup> , 170 – 199 psi)	910 – 1,400 kPa (9.1 – 14.0 kg/cm <sup>2</sup> , 129 – 199 psi) and less than 100 kPa (1 kg/cm <sup>2</sup> , 14 psi) difference between any two cylinders.



A. Compression Gauge: 57001-123

*Cylinder Diameter*

Refer to p. 182 of the Base Manual.

*Piston Diameter*

Refer to p. 182 of the Base Manual noting the following exception.

**Piston Diameter**

Standard	61.948 – 61.963 mm
Service Limit	61.85 mm

*Piston/Cylinder Clearance*

Refer to p. 182 of the Base Manual noting the following exception.

**Piston/Cylinder**

Standard	0.031 – 0.058 mm
----------	------------------

*Piston/Cylinder Seizure*

Refer to p. 183 of the Base Manual.

*Piston Cleaning*

Refer to p. 183 of the Base Manual.

*Piston Ring, Piston Ring Groove Wear*

Refer to p. 184 of the Base Manual noting the following exception.

**Piston Ring/Groove Clearance**

	Standard	Service Limit
Top	0.03 – 0.07 mm	0.17 mm
2nd	0.02 – 0.06 mm	0.16 mm

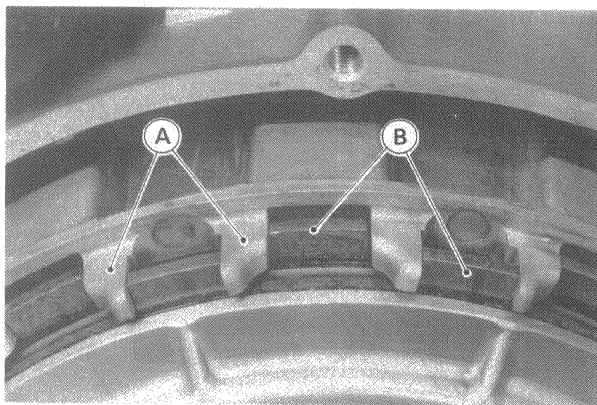


**Piston, Piston Pin, Connecting Rod Wear**

Refer to p. 184 of the Base Manual noting the following exception.

**Piston Pin, Piston Pinhole, Small End Diameter**

	Standard	Service Limit
Piston Pin	14.994 – 14.998 mm	14.96 mm
Pin Hole	15.004 – 15.009 mm	15.08 mm
Small End	15.003 – 15.014 mm	15.05 mm



A. Clutch Housing Finger

B. Friction Plate Tang

.....

## Clutch

.....

**Clutch Spring Free Length****Clutch Spring Free Length**

Standard	33.6 mm
Service Limit	32.6 mm

**Friction Plate Wear, Damage**

Refer to p. 193 of the Base Manual noting the following exception.

**Friction Plate Thickness**

Standard	3.3 – 3.5 mm
Service Limit	3.2 mm

**Clutch Plate Warp**

Refer to p. 193 of the Base Manual noting the following exception.

**Friction and Steel Plate Warp**

Standard	Under 0.2 mm
Service Limit	0.3 mm

**Clutch Housing Finger Inspection**

- Visually inspect the fingers of the clutch 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 housing. Also, replace the friction plates if their tangs are damaged.

**Clutch Hub Damage**

Refer to p. 194 of the Base Manual.

**Shock Damper Rubber**

Refer to p. 194 of the Base Manual.

**Clutch Mechanism**

Refer to p. 194 of the Base Manual.

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## DFI (Digital Fuel Injection) System

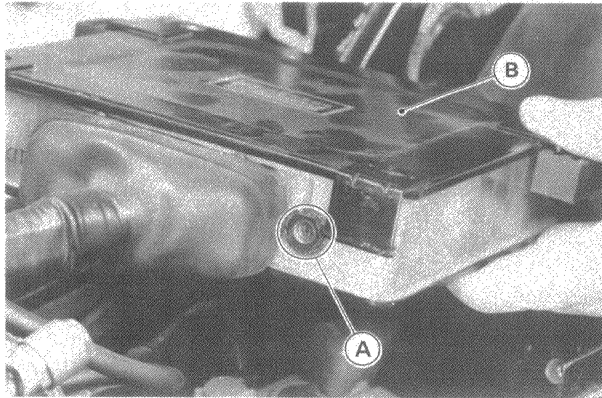
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**General Information:****Self-Diagnosis and Fail-Safe Function:**

The 1983 DFI control unit diagnoses the DFI system while the engine is running. If trouble occurs in the DFI system while riding, the DFI control unit takes the following measures:

- If it turns on, it sends a signal to the warning unit to notify the rider of the DFI system trouble.
- If it turns on the fail-safe system. By ignoring abnormal signals which are sent from damaged sensor(s) or through damaged wires and by using the fail-safe data, the DFI control unit computes the fuel amount to be injected. The fail-safe data are chosen to minimize the influence of system damage.

Until the ignition switch is turned off, the DFI control unit keeps the faults in its memory and continues to turn the green LED (Light Emitting Diode) on and off repeatedly to notify the mechanics of faults. This greatly helps them to troubleshoot the DFI system. Pulses of green light can be seen through the inspection hole in the control unit. Arrangement of long and short pulses express the trouble codes which correspond to the faults.

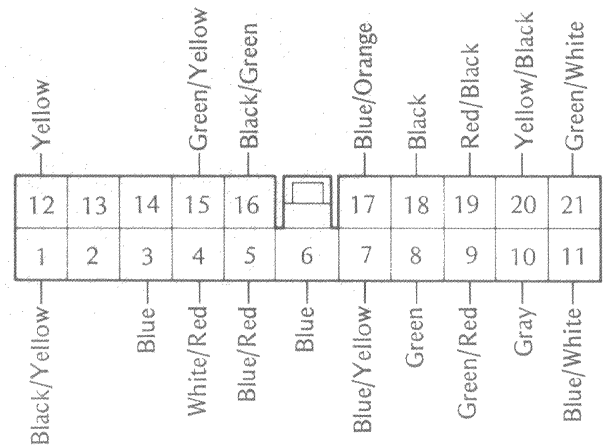


A. Trouble Code Inspection Hole  
B. DFI Control Unit

**"NOTE"**

○The DFI control unit keeps system troubles in its memory, even if they occur for time while the ignition switch is on. However, the control unit resets and clears the memory when the ignition switch is turned off.

**Pin Numbers and Wire Colors in Control Unit Connector (viewed from wire side)**



**Self-Diagnosis and Trouble Code**

382538

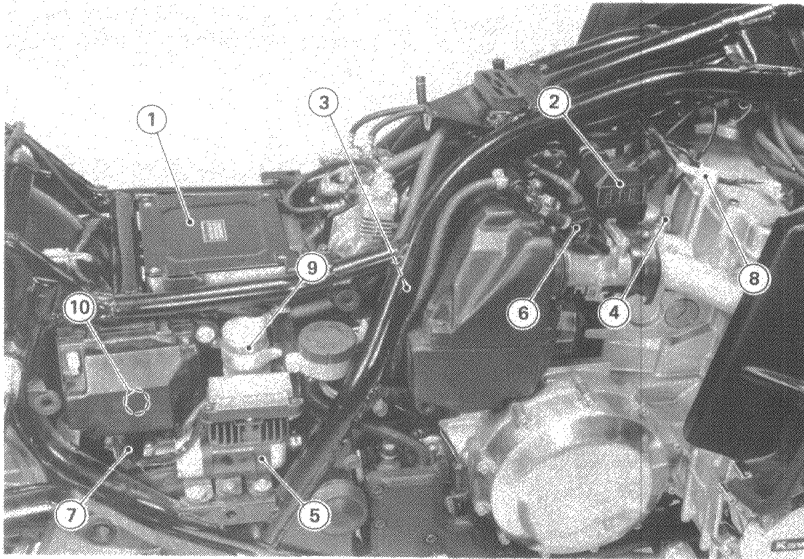
Items	Criteria	Trouble Codes	Arrangement of Pulses*	Action
Throttle Sensor	Open or Short	11	[Long pulse] [Short pulse]	Perform "Throttle Opening Angle Signal Test".
Air Temperature Sensor	Open or Short	12	[Long pulse] [Short pulse] [Short pulse]	Perform "Air Temperature Signal Test".
Engine Temperature Sensor	Open or Short	13	[Long pulse] [Short pulse] [Short pulse] [Short pulse]	Perform "Engine Temperature Signal Test".
Atmospheric Pressure Sensor	Open or Short	21	[Long pulse] [Long pulse] [Short pulse]	Replace control unit.
Starter Switch	Continues on after engine starts.	22	[Long pulse] [Long pulse] [Short pulse] [Short pulse]	Perform "Starter Signal Test", and inspect starter switch for damage.
Ignition Pulse	No ignition pulses are transmitted to control unit when cranking engine.	23	[Long pulse] [Long pulse] [Short pulse] [Short pulse] [Short pulse]	Perform "Engine Speed Signal Test", and inspect ignition system damage.
CPU** Memory	Memories in CPU do not operate properly.	31	[Long pulse] [Long pulse] [Long pulse] [Short pulse]	Replace control unit.

\* : [Long pulse] Long pulse, [Short pulse] Short pulse

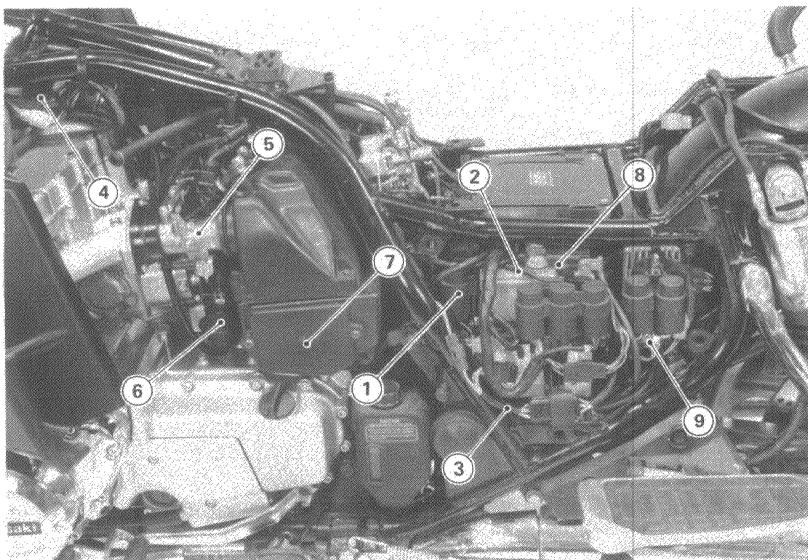
\*\* : Central Processing Unit



DIF System Location of Parts



- |                              |   |
|------------------------------|---|
| 1. Control Unit              | 7. Junction Box Connector (back side)           |
| 2. Throttle Sensor           | 8. Trip Computer Connector<br>(under fuel tank) |
| 3. Air Temperature Sensor    | 9. Fuel Filter                                  |
| 4. Engine Temperature Sensor | 10. Main Relay                                  |
| 5. Fuel Pump                 |   |
| 6. Fuel Injectors            |   |



- |                                    |                                   |
|------------------------------------|-----------------------------------|
| 1. Fuel Pump Relay                 | 6. Pressure Regulator             |
| 2. DFI Negative (-) Lead Connector | 7. Air Cleaner (under surge tank) |
| 3. DFI Positive (+) Lead Connector | 8. Battery                        |
| 4. Ignition Coil Connector         | 9. Starter Relay                  |
| 5. Throttle Valve                  |                                   |

## DFI System Inspection:

The section explains the diagnostic procedures for the Kawasaki DFI system. Before diagnosing the DFI system, check the items listed below, and replace, add, adjust, or repair if necessary.

- Check the motorcycle for evidence of physical damage.
- There is sufficient fuel in the tank.
- All electrical connectors are clean, tight, and correctly connected. Fuses are not blown out.
- The engine is in good condition. The periodic maintenance should be properly performed.
- The engine is cranked over normally with the starter motor.
- The ignition system operates normally.
- US model only: Kawasaki Clean Air System operates normally.

Tests in this section include the following:

1. Quick Initial Check
2. Electronic Control System Tests:
  - Injector Signal
  - Fuel Pump Power Supply
  - Pump Relay Wires
  - Injector Wires (Including Battery Voltage Signal)
  - Throttle Opening Angle Signal
  - Engine Speed Signal
  - Air Temperature Signal
  - Engine Temperature Signal
  - Starter Signal
  - Throttle Sensor
  - Throttle Sensor Position
  - Air Temperature Sensor
  - Engine Temperature Sensor
  - Main Relay
  - Pump Relay
  - Wires and Connectors
  - DFI Warning Function
3. Fuel System Tests:
  - Fuel Pump
  - Injector
  - Pressure Regulator
  - Fuel Leak
  - Fuel System Cleaning
  - Fuel Filter
4. Air System Tests:
  - Throttle Valves
  - Air Leak
  - Surge Tank Draining

### "NOTE"

○ If all above inspections prove good but the engine still operates poorly, the trouble may be caused by the engine itself. It may be necessary to overhaul the engine. Especially inspect the pistons and cylinders for wear and seizure, piston rings for sticking, and valve seats for any irregularity. Remove the carbon from the piston heads, piston ring grooves, cylinder head and valves.

### Test No. 1 Quick Initial Check:

Give the system a quick initial 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.

### Quick Initial Check

- Confirm the DFI system trouble by reading the trouble code emitted through the inspection hole in the control unit.
- Turn on the ignition switch and listen to the fuel pump. The pump should start running when the switch is turned on and stop after about 5 seconds.
- Turn off the switch.
- ★ If the pump does not operate as above, perform the following tests first which are explained in the "Test No. 2 Electronic Control System Tests" and "Test No.3 Fuel System tests."
  - Fuel Pump Power Supply
  - Pump Relay Wires
  - Main Relay Wires
  - Control Unit Power Supply (including Ignition ON Signal)
  - Fuel Pump
- ★ If the pump operates normally, proceed to the next check.
- Disconnect the 2-pin connector from the starter relay under the left side cover. This is to prevent the starter motor from working during this inspection.
- Turn on the ignition switch and wait until the pump stops.
- Turn on the starter switch (with the clutch lever pulled in), and listen to the fuel pump.
- ★ If the above check shows good pump operation, proceed to the next check.
- ★ If the pump does not run when the starter switch is on, perform the following test in the "Test No. 2 electronic Control System Tests.")
  - Pump Relay Wires
- ★ If the above check shows good pump operation, proceed to the next check.
- Reconnect the starter motor relay connector.
- Try starting the engine.
- Turn off the ignition switch.
- ★ If the engine won't start, perform the following tests in the "Test No. 2 Electronic Control System Tests."
  - Engine Speed Signal
  - Starter Signal
- ★ If the engine starts but runs poorly, fuel/air mixture trouble is suspected. Perform the following tests in the "Test No. 2 Electronic Control System Tests."
  - Air Temperature Signal
  - Air Temperature Sensor
  - Engine Temperature Signal
  - Engine Temperature Sensor
  - Throttle Sensor
  - Throttle Sensor Position

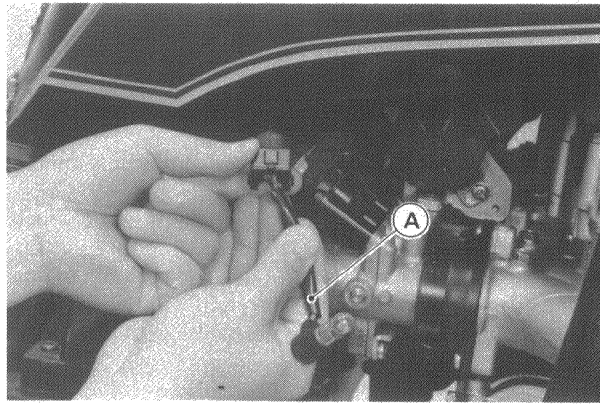
### Test No. 2 Electronic Control System Tests:

When performing each test, observe the following rules unless otherwise indicated:

- Set the Kawasaki multimeter to the 25 V DC range, and connect the meter negative (—) lead to the battery negative (—) terminal.
- Set the engine stop switch in the RUN position.
- Set the motorcycle up on its center stand and the gear in neutral. Kick up the side stand. This is to crank over the engine only by pushing the starter switch.
- Measure the voltages with all connectors left connected.

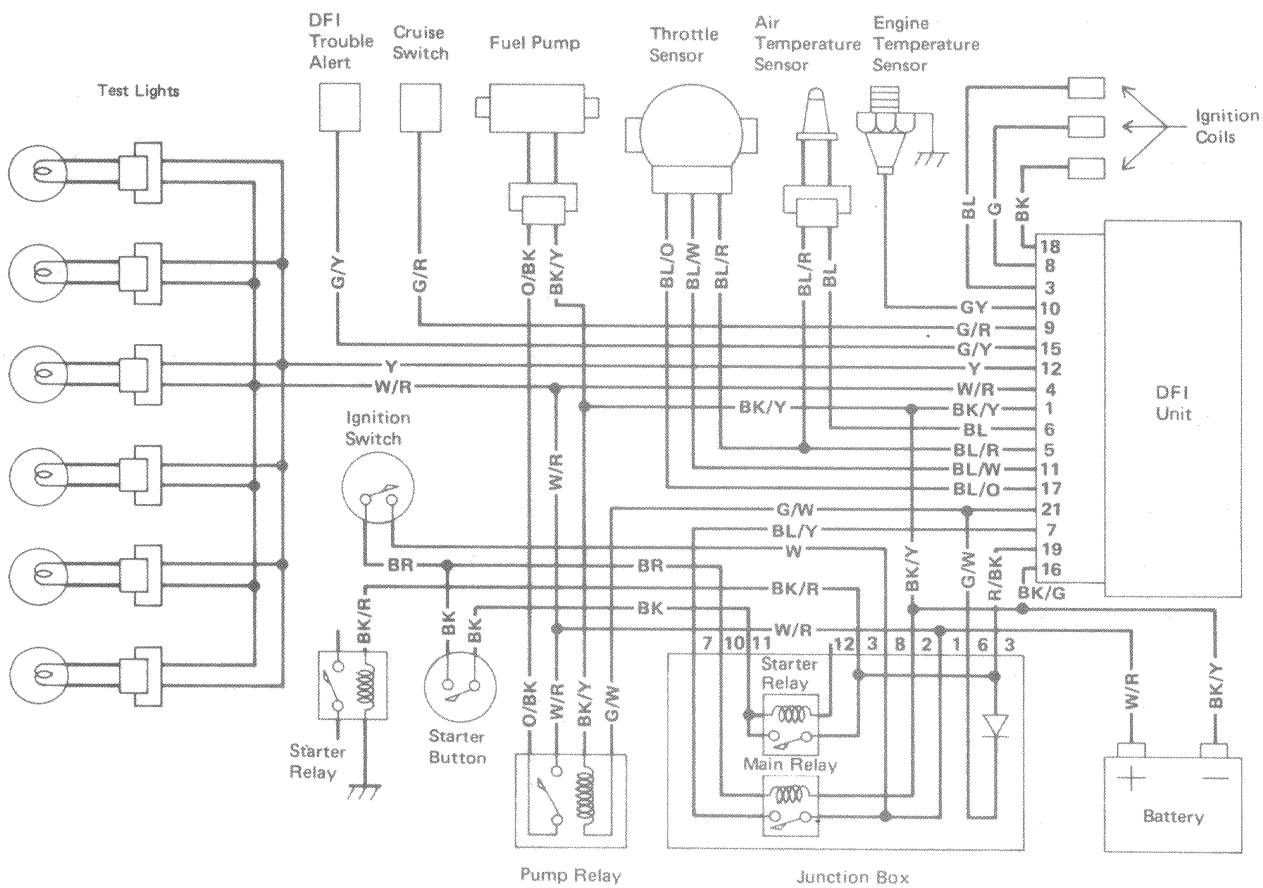
**WARNING**

While the fuel hoses are disconnected, do not turn on the ignition switch. The fuel pump will operate and fuel will spout from the fuel hose if you turn on the ignition switch with the fuel hoses disconnected.



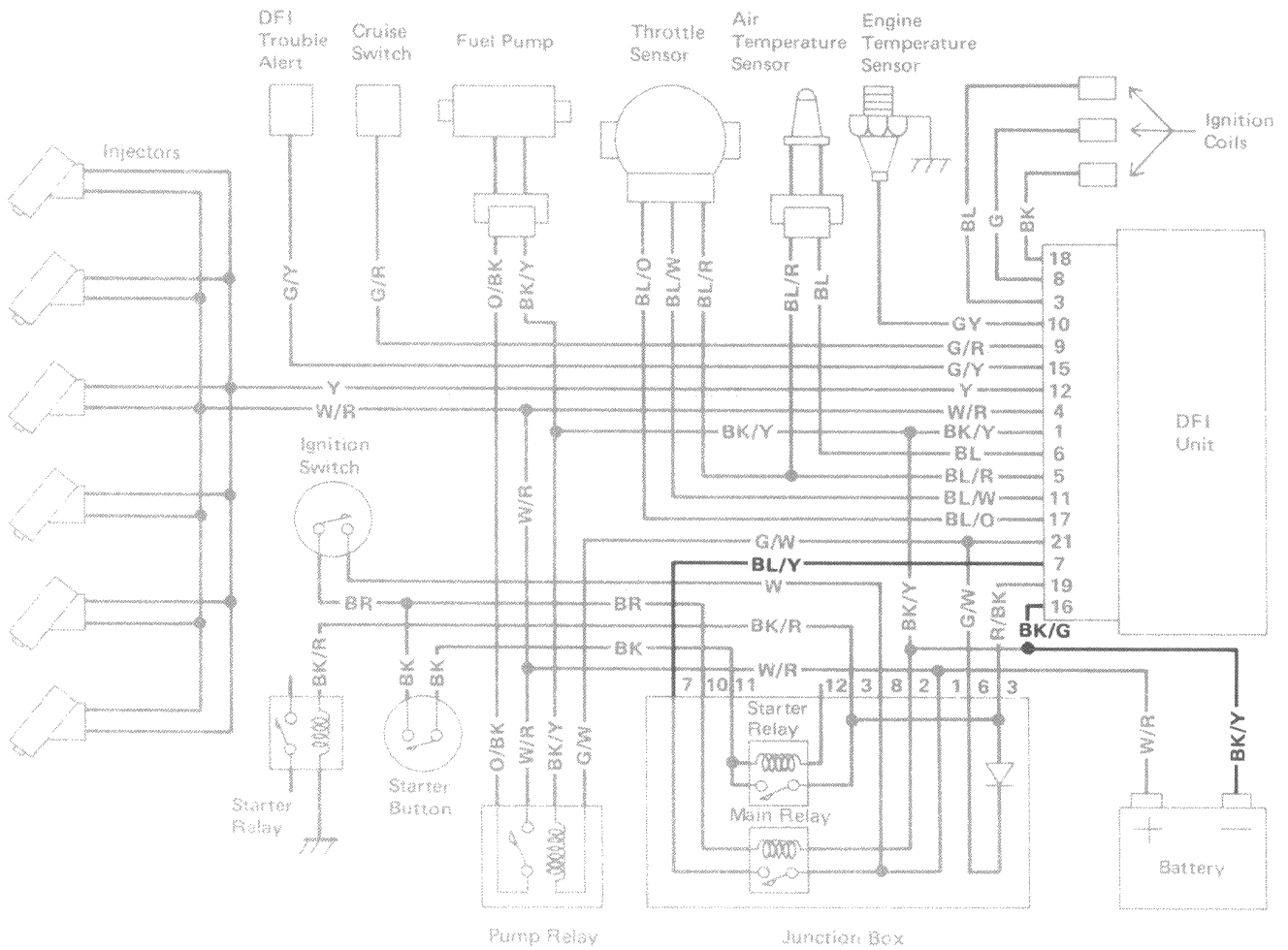
A. Injector Signal Test Light

*Injector Signal Test*



Wire Location	Connections	Criteria	Test Items when out of Criteria
<ul style="list-style-type: none"> <li>Injector connectors x 6</li> </ul>	<ul style="list-style-type: none"> <li>Turn off ignition switch.</li> <li>Remove fuel tank. See the WARNING below.</li> <li>Disconnect all injector connectors, and connect injector signal test lights to connectors.</li> <li>Install fuel tank and connect fuel hoses.</li> <li>Turn on ignition switch.</li> </ul>	<ul style="list-style-type: none"> <li>Test lights flicker at regular intervals while cranking engine with starter motor.</li> </ul>	<ul style="list-style-type: none"> <li>Control unit power supply</li> <li>Injector wires</li> <li>Engine speed signal</li> <li>Starter signal</li> <li>Main relay in junction box</li> <li>Replace control unit.</li> </ul>

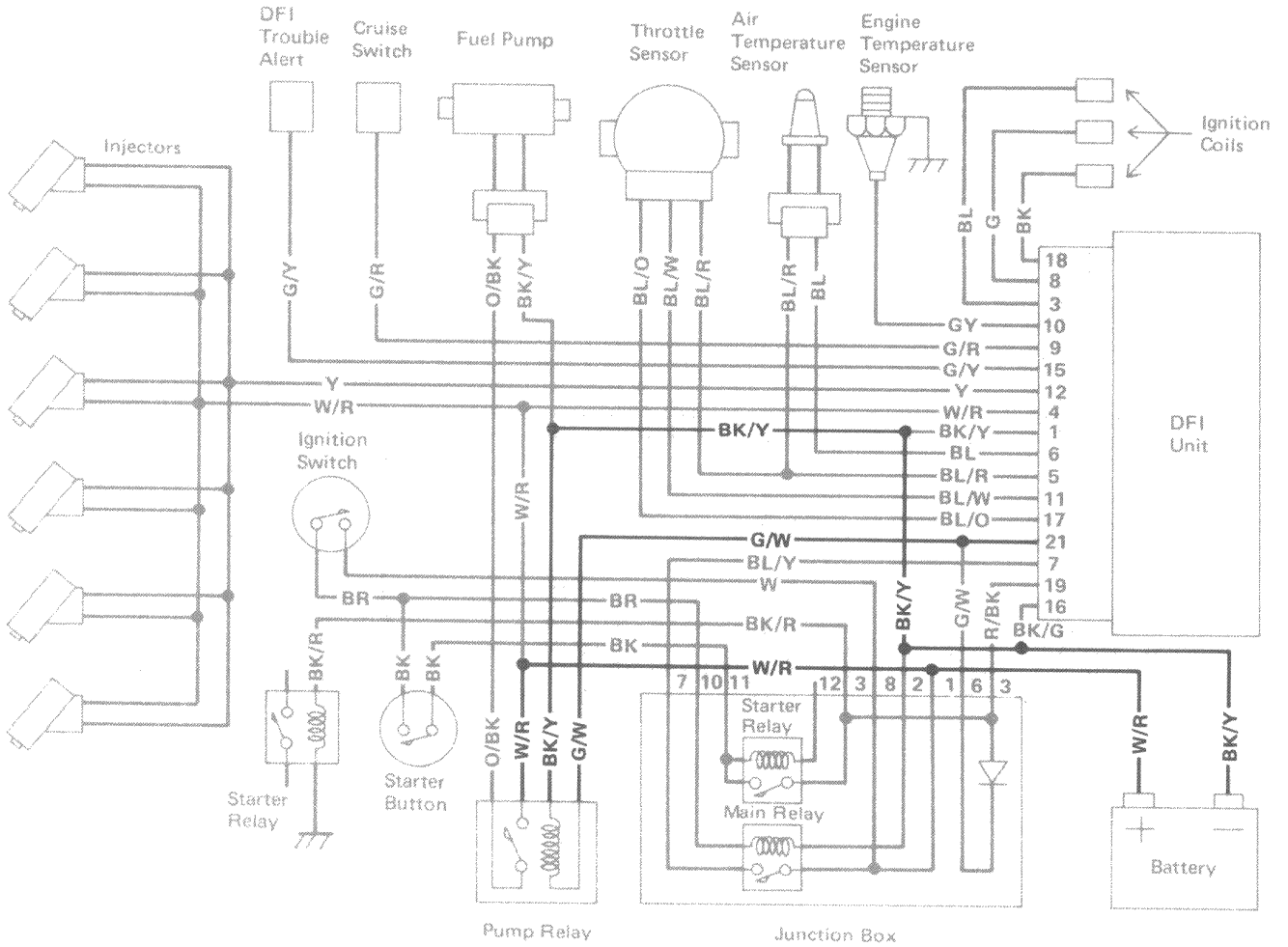
**Control Unit Power Supply Test**  
(including ignition on signal test)



Wire Location	Connections	Meter Reading (Criteria)	Test Items when out of Criteria
Control unit connector	○Meter (+) → No.16 pin (black/green wire)	○0 V regardless of ignition switch positions.	○Black/Green wire
	○Meter (+) → No.7 pin (blue/yellow wire)	○Battery voltage when ignition switch is on. ○0 V when ignition switch is off.	○Blue/yellow wire ○Main relay in junction box



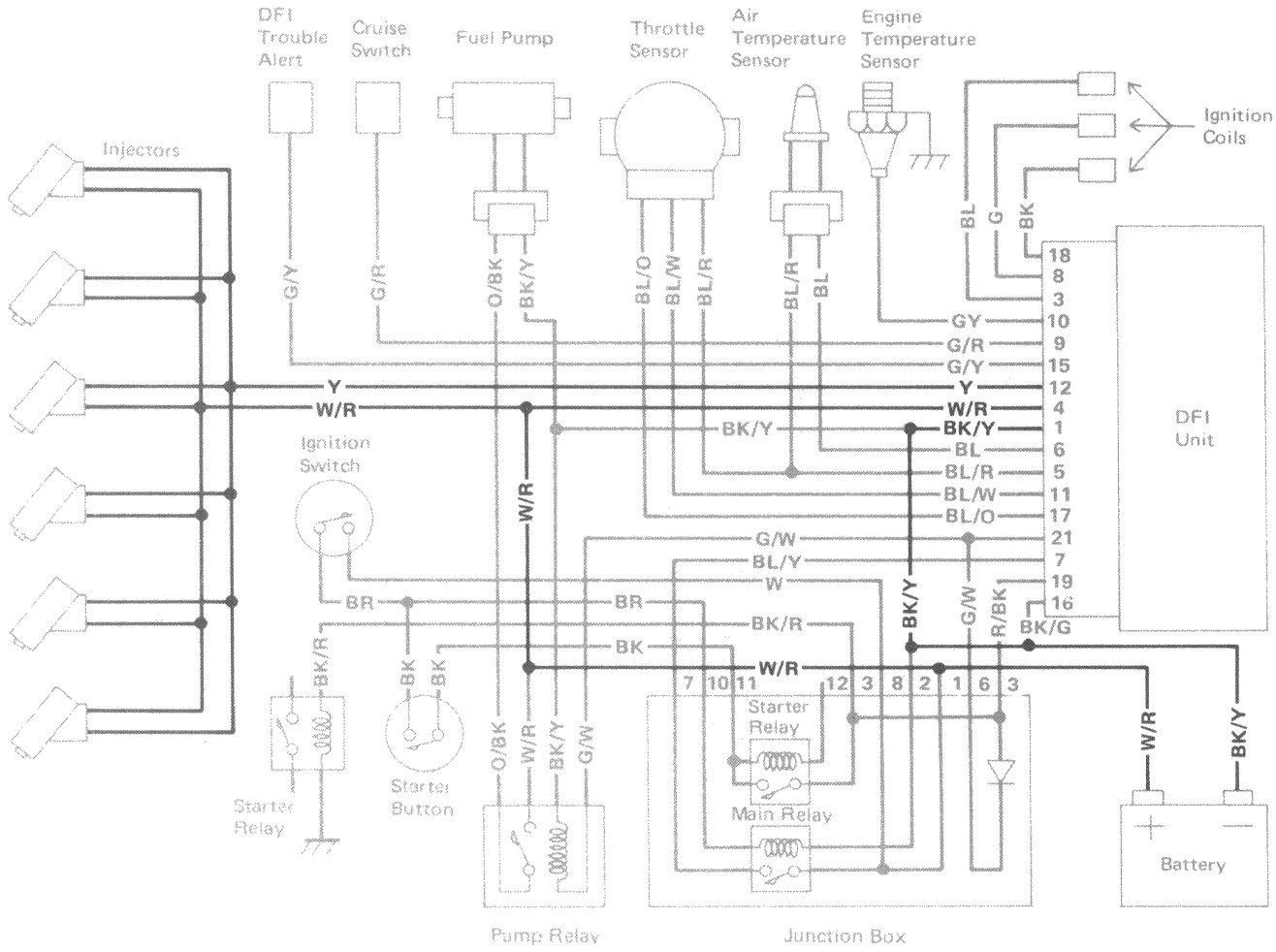
Pump Relay Wire Test



Wire Location	Connections	Meter Reading (Criteria)	Test Items when out of Criteria
○Pump relay connector	○Meter (+) → Black/yellow wire	○0 V regardless of ignition switch positions.	○Black/yellow wire
	○Meter (+) → Green/white	○Battery voltage for about 5 sec immediately after ignition switch is turned on, then 0 V. *○Battery voltage when engine speed signal is sent to control unit, and 0 V in about 1 sec after signal stops.	○Green/white wire ○Control unit power supply ○Replace control unit
	○Meter (+) → Black wire	○Battery voltage when starter switch is on. ○0 V when starter switch is off.	○Black wire
	○Meter (+) → White/red wire	○Battery voltage regardless of ignition switch position.	○White/red wire

\*Refer to previous page for how to send the engine speed signal to the control unit.

**Injector Wire Test**  
(including battery voltage signal test)

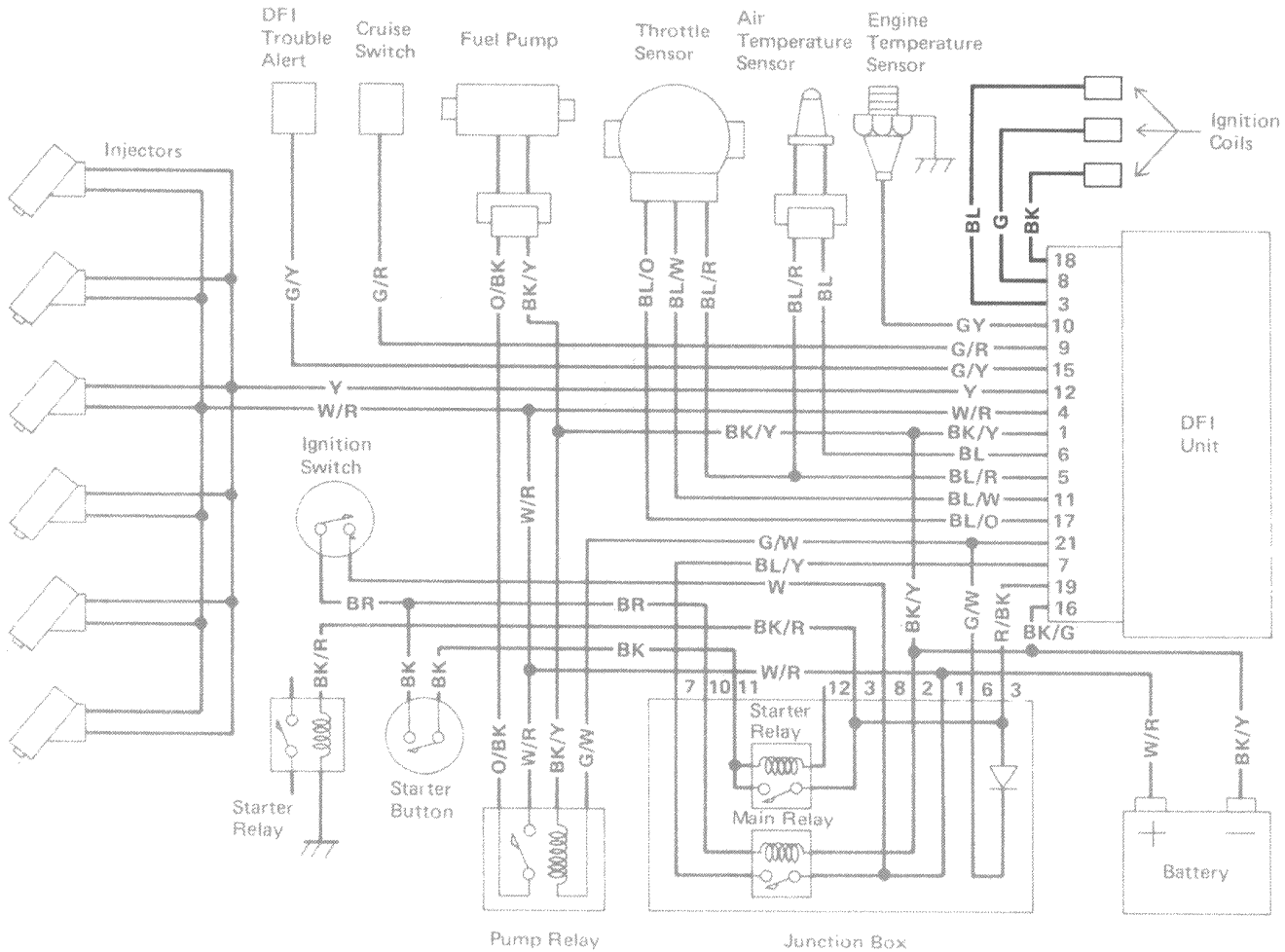


Wire Location	Connections	Meter Reading (Criteria)	Test Items when out of Criteria
Control unit connector	○Meter (+) → No. 12 (yellow wire)	○Battery voltage regardless of ignition switch positions.	○Yellow wire ○Injectors ○Injector connectors
	○Meter (+) → No. 4 pin (white/red wire)	○Battery voltage regardless of ignition switch positions.	○White/red wire
	○Meter (+) → No. 1 pin (black/yellow wire)	○0 V regardless of ignition switch positions.	○Black/yellow wire



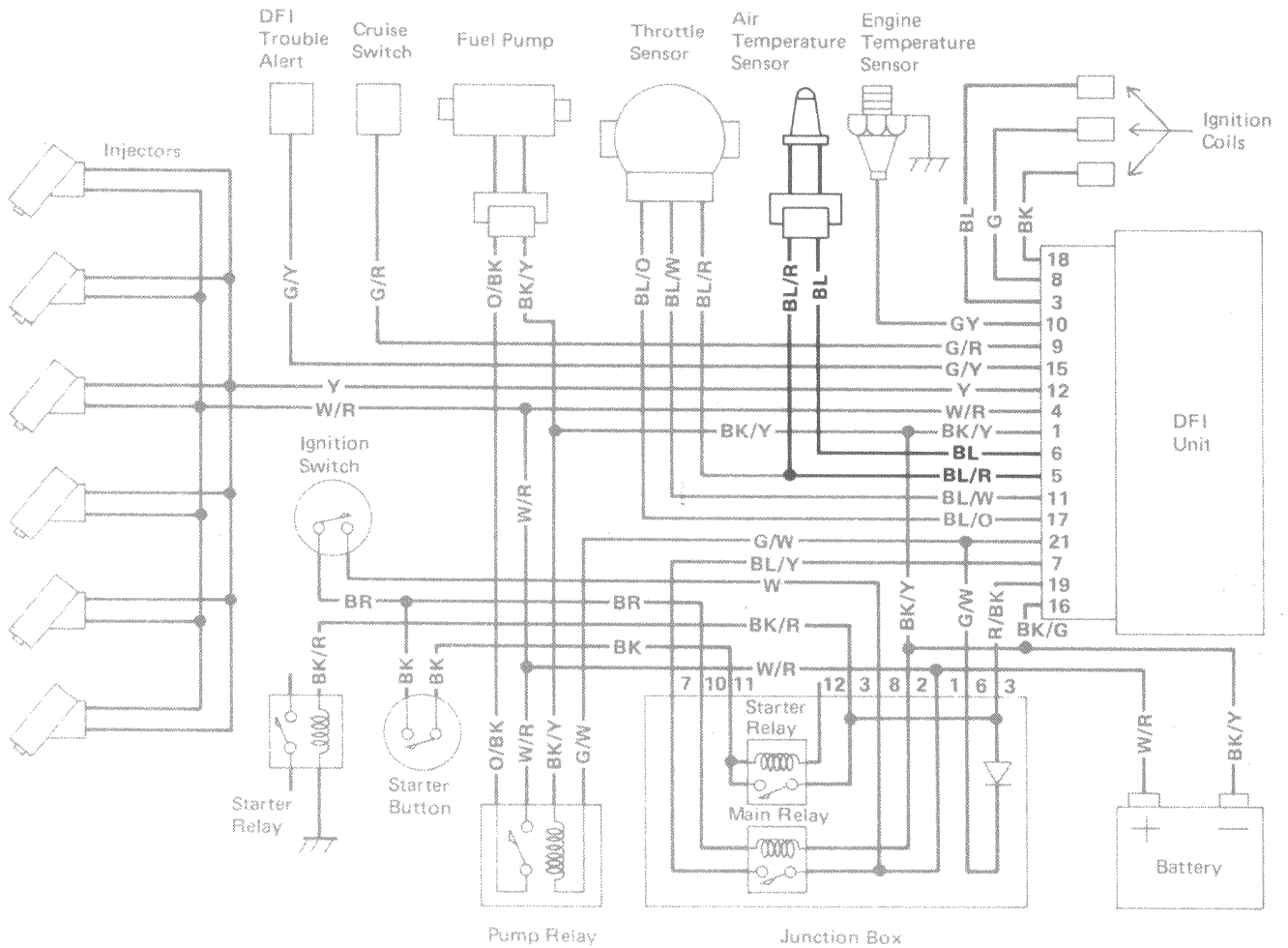


Engine Speed Signal Test



Wire Location	Connections	Meter Reading (Criteria)	Test Items when out of Criteria
Control unit connector	<ul style="list-style-type: none"> <li>○ Meter (+) → No. 8 pin (green wire), No. 18 pin (black wire), or No. 3 pin (blue wire).</li> </ul>	<ul style="list-style-type: none"> <li>○ 0 V when ignition switch off.</li> <li>○ Battery voltage when ignition switch is on.</li> </ul>	<ul style="list-style-type: none"> <li>○ Green wire</li> <li>○ Black wire</li> <li>○ Blue wire</li> </ul>

Air Temperature Signal Test

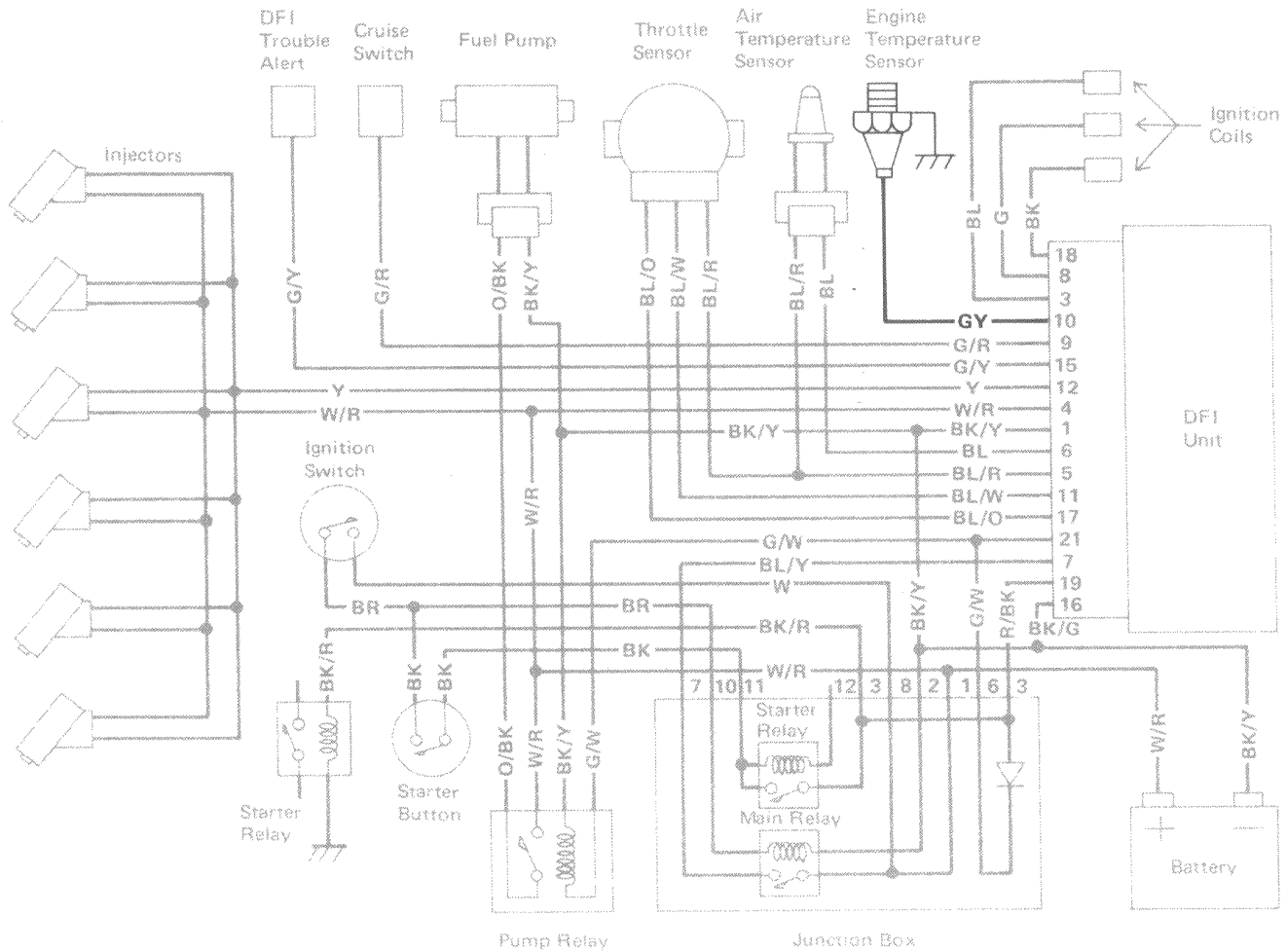


Wire Location	Connections	Meter Reading* (Criteria)	Test Items when out of Criteria
○Control unit connector	○Meter (+) → No.6 pin (blue wire)	○0V when ignition switch is off. **○2.0 – 3.1 V when ignition switch is on. ○3.4 – 4.6 V when temperature sensor 2-pin connector is disconnected and ignition switch is on.	○Blue wire ○Air temperature sensor ○Control unit power supply ○Replace control unit.
	○Meter (+) → No.5 pin (blue/red wire)	○0 V regardless of ignition switch positions.	○Blue/red wire ○Replace control unit.

\* Set the multimeter to the 10 V DC range for this test.

\*\* This is true when sensor temperature is 20°C (68°F), 2.6 – 3.8 V when 0°C (32°F), and 1.7 – 2.5 V when 30°C (86°F).

Engine Temperature Signal Test

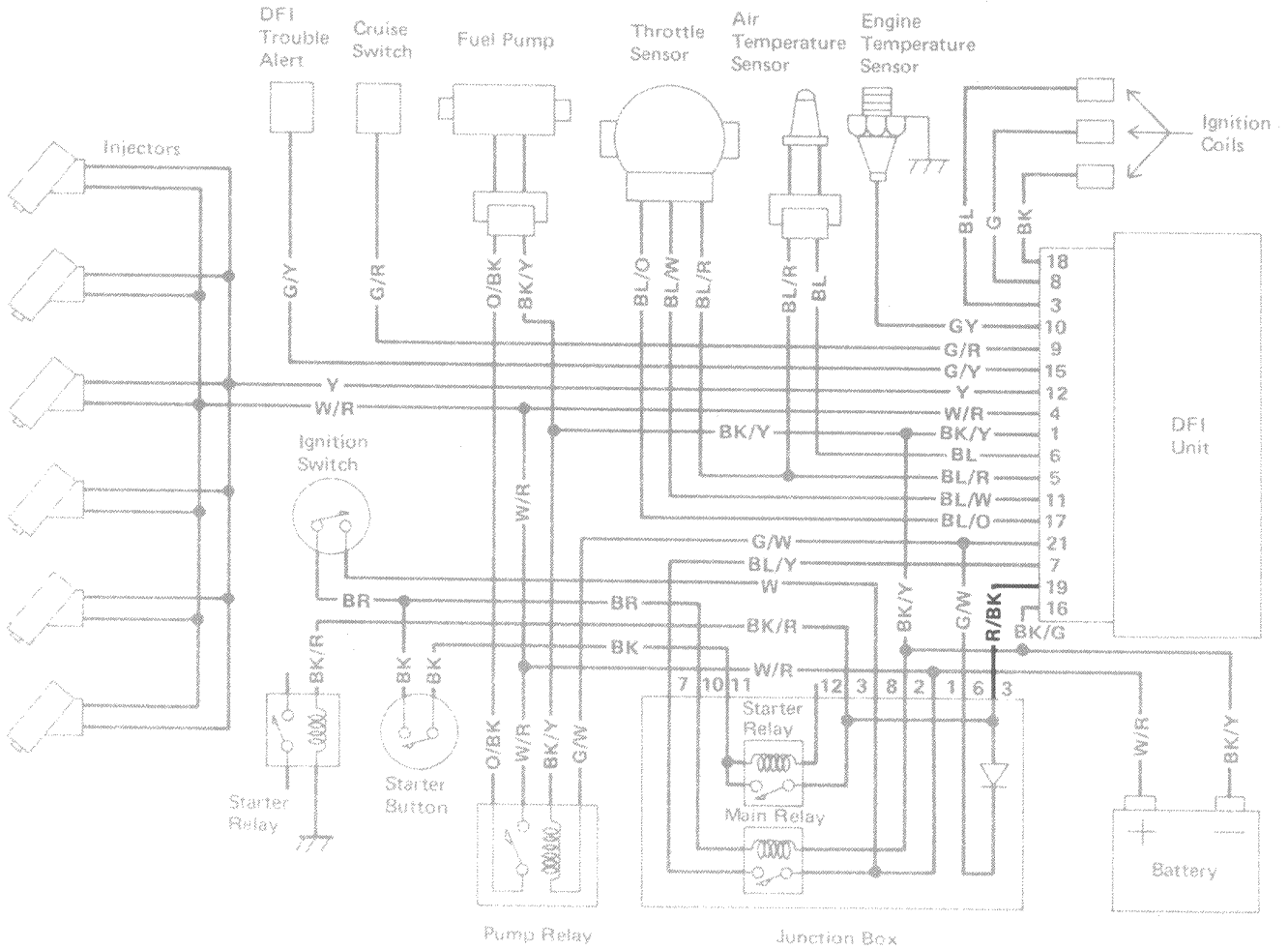


Wire Location	Connections	Meter Reading* (Criteria)	Test Items when out of Criteria
○Control unit connector	○Meter (+) → No.10 pin (gray wire)	○0 V when ignition switch is off. **○2.0 – 3.1 V when ignition switch is on. ○3.4 – 4.6 V when gray sensor lead is disconnected from the sensor and ignition switch is on.	○Gray wire ○Engine temperature sensor ○Control unit power supply ○Replace control unit.

\*Set the multimeter to the 10V DC scale for this test.

\*\*This is true when sensor temperature is 20°C (68°F), 2.6 – 3.8 V when 0°C (32°F), and 0.52 – 0.96V when 80°C (176°F).

Starter Signal Test



Wire Location	Connections	Meter Reading (Criteria)	Test Items when out of Criteria
Control unit connector	Meter (+) → No. 19 pin (red/black wire)	Battery voltage when starter switch is on.	Red/black wire Starter circuit relay in junction box

**Throttle Sensor Test**

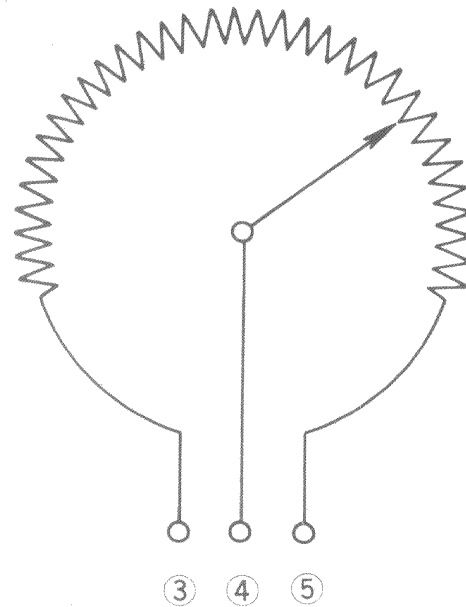
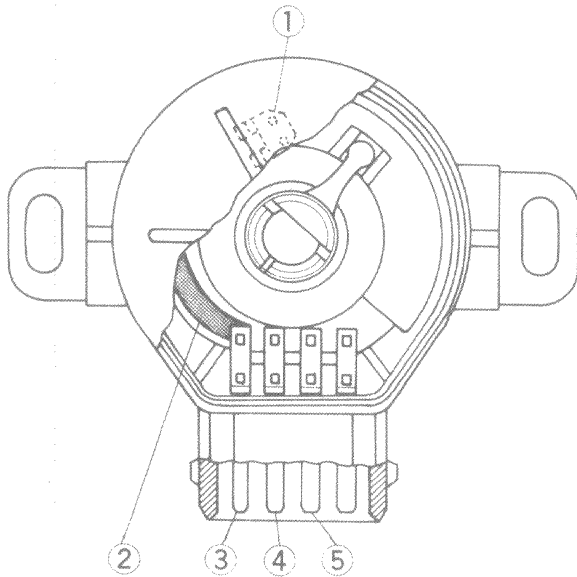
- Turn off the ignition switch.
- Disconnect the connector from the throttle sensor.
- Connect an ohmmeter to the sensor according to the following table, and measure the internal resistance.
- ★ If the meter shows the resistances specified in the table, the throttle sensor is good. If it does not, replace the throttle sensor.

**Throttle Sensor Resistance**

Meter Range	Connections	Throttle position	Reading
x 1 kΩ	○ One meter lead → Ground terminal ○ Other meter lead → Voltage source terminal	○ Any position from idle to full open.	○ 3.3 – 6.8 kΩ
	○ One meter lead → Ground terminal ○ Other meter lead → Output terminal	○ Idle position	○ 2.1 – 4.2 kΩ
		○ Fully opened	○ 0.35 – 0.71 kΩ

\*Reading should change smoothly as the throttle is turned.

**Throttle Sensor**



- 1. Brushes
- 2. Carbon Film Resistors

- 3. Ground Terminal
- 4. Output Terminal

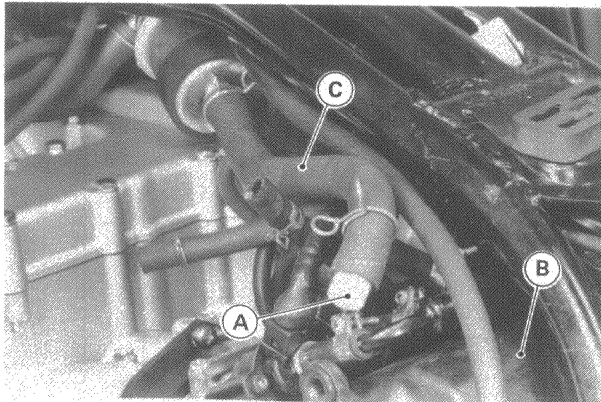
- 5. Voltage Source Terminal

**Throttle Sensor Position Inspection**

Engine performance is sensitive to the throttle sensor position. To obtain the best sensor position, you must use the throttle sensor position checker (special tool: P/No. 57001-1003) and the vacuum gauge following the inspection and adjustment chart on the next page.

Before and After Throttle Sensor Inspection:

- Check that the engine is maintained correctly according to the Periodic Maintenance Chart. Replace, add, adjust, clean, or torque if necessary.
- Warm up the engine thoroughly, and then stop it.
- Remove the fuel tank, and put it on a work bench somewhere near the motorcycle.
- Connect the fuel tank to the fuel hoses using suitable hoses.
- U.S. model only: Stop supplying the air suction valves with fresh air during throttle sensor position inspection and adjustment.
- At the surge tank disconnect the hose which connects the surge tank and the vacuum switch valve.
- Plug the hose fitting on the surge tank so that unfiltered air does not enter the surge tank through the hose fitting.
- Plug the disconnected hose end so that no air can flow to the air suction valves through the vacuum switch.



A. Plug hose end. C. Air Hose  
B. Surge Tank

- Set the engine idle speed to the value specified below during throttle sensor position inspection and adjustment.

**Engine Speed During Throttle Sensor Position Inspection and Adjustment**

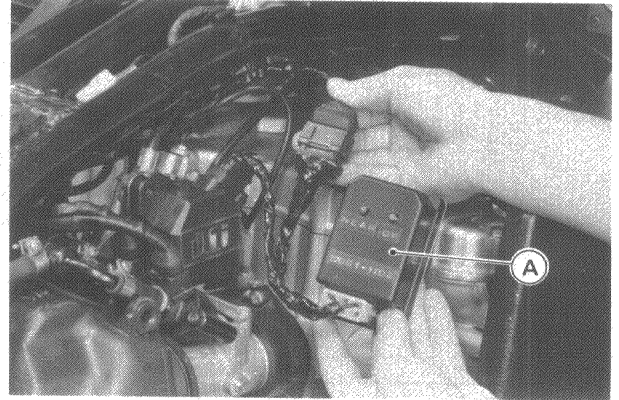
1,000 r/min (rpm)

**"NOTE"**

- U.S. model only: After inspection and adjustment, remove the plugs from the hose and hose fitting, and connect the hose to the air cleaner housing.
- After inspection and adjustment of the throttle sensor position, adjust the engine idle speed to the standard, r/min (rpm).

**How to Use Position Checker:**

- Turn off the ignition switch.
- Disconnect the connector from the throttle sensor.
- Connect the checker to the sensor and the disconnected connector.



A. Throttle Sensor Position Checker: 57001-1003

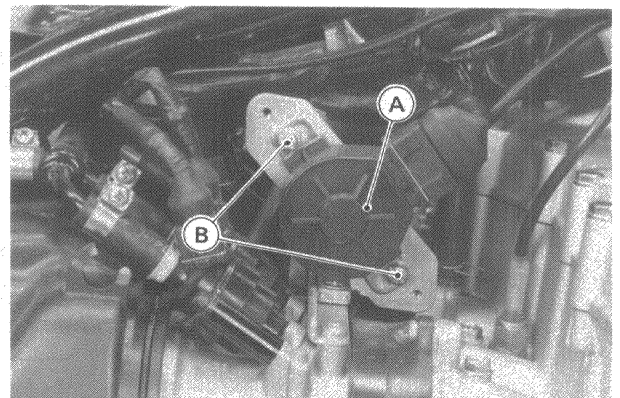
- Turn on the ignition switch to supply electricity to the sensor. Engine starting is not necessary.
- ★ Both indicators on the checker should go on when the throttle is at the idle position. If they do not, adjust the sensor position.

**How to Adjust Sensor Position:**

- Remove the throttle sensor cover. Refer to "Engine Disassembly Chapter" for cover removal of the US model.
- Loosen the sensor mounting screws (2) just enough to move.
- Turn the sensor so that both indicators go on.

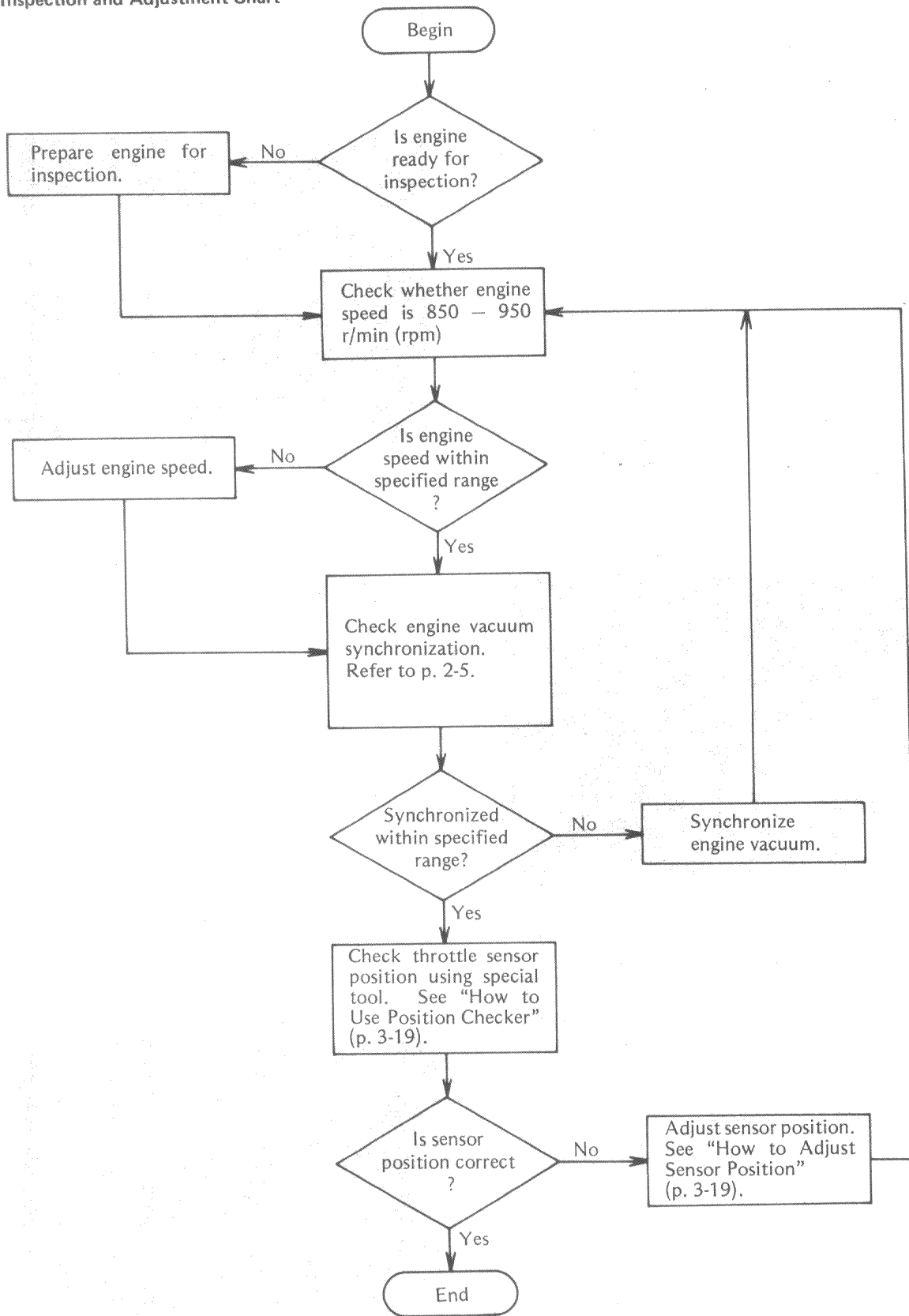
**"NOTE"**

- The position where only one indicator goes on is not far wide of the mark, but is not exact position.



A. Throttle Sensor B. Mounting Screws

### Throttle Sensor Position Inspection and Adjustment Chart



\*When checking idle speed following engine vacuum synchronization inspection, disconnect the vacuum gauge hoses from the throttle valves, and connect the hoses, which lead to the pressure regulator, to the fittings on the throttle valves.

- Tighten the mounting screws.
- Open the and close the throttle a few times to make sure both indicators go on. Readjust if necessary.
- Turn off the ignition switch.

After the sensor is fixed at the best position—

- Install the sensor cover. Refer to “Engine Disassembly Chapter” for cover installation of the US model.
- Remove the checker and reconnect the sensor connector to the sensor.

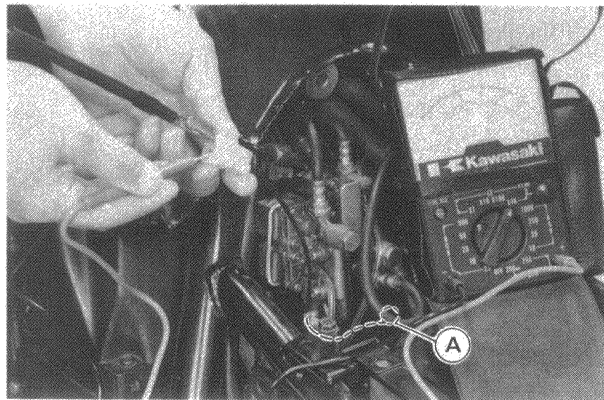
**Air Temperature Sensor Inspection**

- Turn off the ignition switch.
  - Disconnect the air temperature sensor 2-pin connector.
  - Connect an ohmmeter to the sensor connector (male, 2-pin) to measure the resistance of the air temperature sensor.
- ★If the meter shows the resistance shown in the table at the specified temperature, the sensor is good. If it does not, replace the sensor.

**Air Temperature Sensor Resistance**

Meter Range	Connections	Reading
x 1 kΩ	○One meter lead → One sensor lead ○Other meter lead → Othe sensor lead	*2.0 – 3.0 kΩ @20°C (68°F)

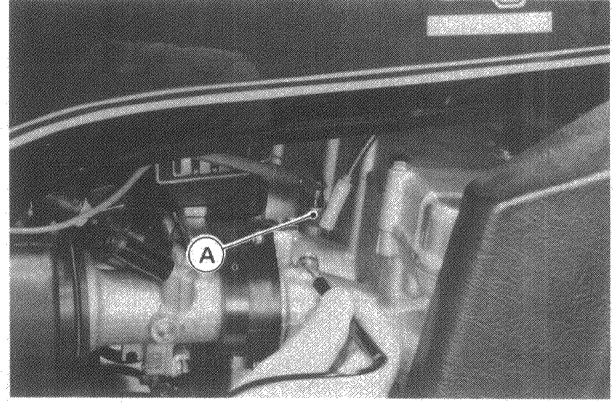
\*This reading is true when sensor temperature is 20°C (68°F), 4.7 – 7.6 kΩ when 0°C (32°F), and 1.4 – 2.2 kΩ when 30°C (86°F).



A. Air Temperature Sensor

**Engine Temperature Sensor Inspection**

- Turn off the ignition switch, and disconnect the lead from the engine temperature sensor.
  - Measure the resistance of the sensor with an ohmmeter.
- ★If the meter shows the resistance shown in the table at the specified temperature, the sensor is good.



A. Engine Temperature Sensor

**Engine Temperature Sensor Resistance**

Meter Range	Connections	Reading
x 1 kΩ	○One meter lead → Sensor terminal ○Other meter lead → Chassis ground	*2.0 – 3.0 kΩ @20°C (68°F)

\*This reading is true when sensor temperature is 20°C (68°F), 4.7 – 7.6 kΩ when 0°C (32°F), and 1.4 – 2.2 kΩ when 30°C (86°F).

**Fuel Pump Relay Inspection**

- Remove the relay.
  - Connect the ohmmeter and one 12-volt battery to the relay as shown.
- ★If the relay does not work as specified, the relay is defective.

**Relay Test**

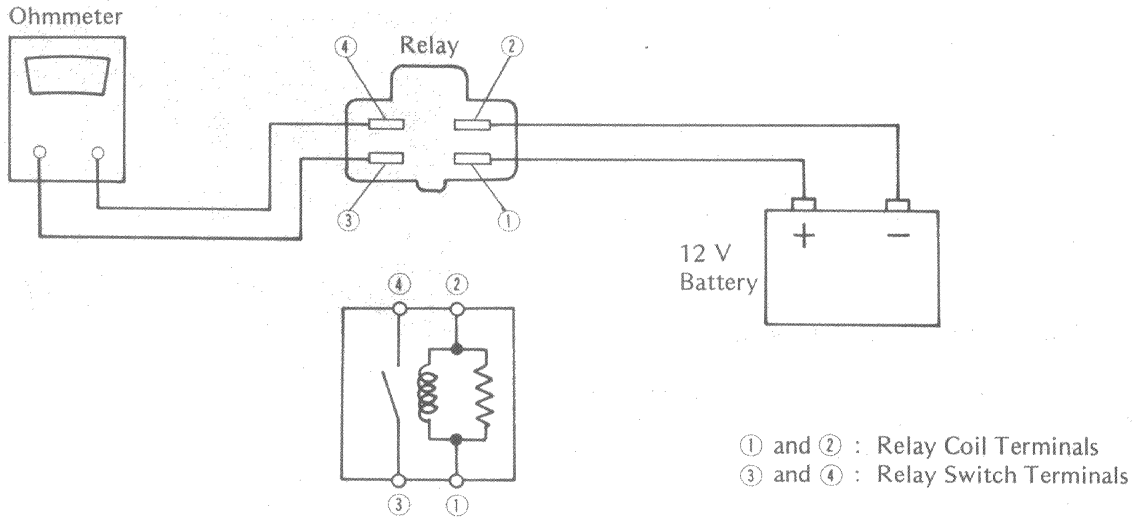
Meter range:	x 1 Ω range
Meter Reading:	When battery is connected → 0 Ω When battery is disconnected → ∞ Ω

If each component checks out good upon individual inspection, but the DFI system does not work well when they are connected together, inspect the harness for the electronic fuel injection system as follows:

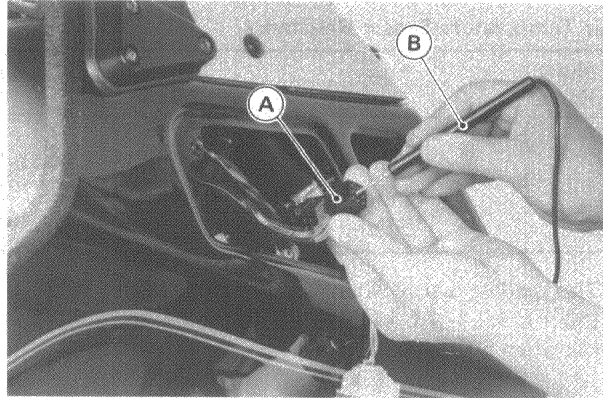
- Remove the DFI harness.
- Make sure all connectors are clean and tight, and none of the male pins in the connector have been displaced during the connection of the connector. Tug on the wires to see if any pins are loose. Push any loose pins all the way into the connector until you feel the small locking tang catch in place.



Testing Relay



- Examine wires for signs of burning, fraying, etc.
- Check conductivity of the wires in the harness. Both ends of the same color wire should conduct.
- Check the O-ring in the multi-pin connectors for damage, and check the retaining clip of the connector for deformation.
- ★If there are poor wires or bad connections, replace the harness.
- ★If there are open wires, replace the harness.
- ★If the O-rings or clips are damaged, replace them.



A. Warner Unit Connector (Main Harness Side)  
B. Black Probe

DFI Warning Function Test

- Remove the headlight unit to disconnect the 9-pin connector which carries the warning signal wire (green/red).
- Connect the ohmmeter to the wire shown in the table, and inspect the warning signal.
- ★If the meter does not read as specified in the table, check the green/red wire and its connectors for damage.
- ★If green/red wire and its connectors check out good, replace the DFI control unit.

Test No. 3 Fuel System Tests:

Fuel Pump Inspection

- Disconnect the pump 2-pin connector.
- Connect a 12-volt battery to the 2-pin connector (pump side), and check whether the pump operates.

DFI Warning Function Test

Meter Range	Connections*	Meter Reading
x 100Ω	○Meter Black (–) Probe → Green/red (Main harness side)  ○Meter Red (+) Probe → Chassis ground	○∞Ω with ignition switch turned on, and before the air temperature sensor leads are disconnected.  ○Shows continuity (less than 100 Ω) with ignition switch turned on, and after the air temperature sensor leads are disconnected.

\* : Do not reverse the ohmmeter connections as this gives different readings.

### Connecting Battery to Fuel Pump

Battery (+) → Orange/black lead

Battery (-) → Black/yellow lead

★If the pump does not operate, the trouble is with the pump or pump leads. Check the pump and leads, and replace them if necessary.

### Injector Inspection

- Turn off the ignition switch.
- Remove the fuel tank, and disconnect the connector from the injector.
- Set the multimeter to the ohmmeter range, and measure the injector resistance.

### Injector Resistance

Meter Range	Connections	Reading
$\times 1 \Omega$	<ul style="list-style-type: none"> <li>○One meter lead → One injector terminal</li> <li>○Other meter lead → Other injector terminal</li> </ul>	*1.8 – 3.0 $\Omega$ @20°C (68°F)

\*Measured when the injector is cold (room or ambient temperature).

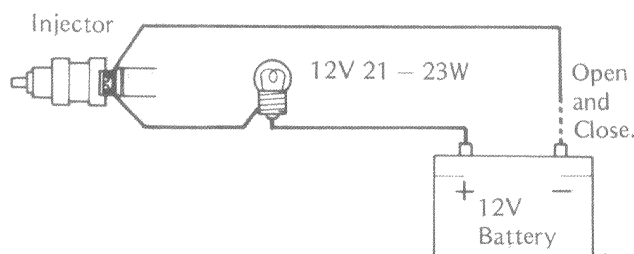
- ★If the meter shows conductivity as shown in the table, perform the test below.
- ★If the meter does not read as specified, replace the injector.
- Prepare an auxiliary lead, a 12 V 21 – 23 W rating bulb with leads, and 12-volt battery.
- Connect the bulb between the battery positive (+) terminal and one injector terminal.

### CAUTION

○The bulb works as a current limiter to protect the solenoid in the injector from excessive current.

- Connect one end of the auxiliary lead to the other injector terminal, and connect the other end of the lead repeatedly to the battery negative (-) terminal.
- ★The injector should click every time the lead contacts to the battery terminal. If the injector does not click, replace the injector.

### Injector Inspection



### Pressure Regulator Inspection

First measure the fuel pressure as follows:

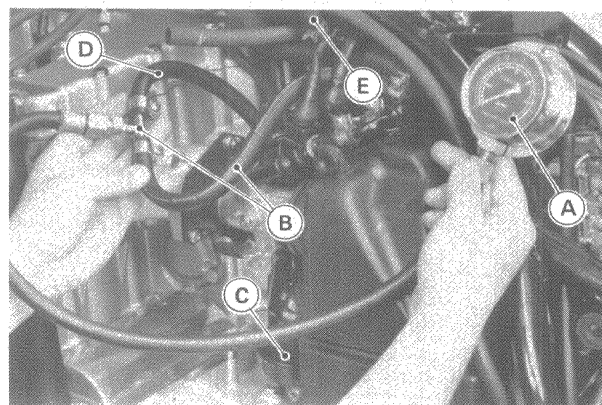
Case 1: If the engine will start—

- Disconnect the high pressure fuel hose from the pressure regulator.

### WARNING

○When the fuel hose is pulled off, a small amount of fuel may spout out because of residual pressure in the fuel line. Cover the hose connection with a clean cloth to prevent the fuel from flying about.

- Install the pressure gauge (special tool) between the pressure regulator and the hose disconnected using the adapter (special tool) and high-pressure fuel hose.
- Tighten the hose clamps in the correct position.



- A. Pressure Gauge: 57001-125
- B. Adapter: 57001-1089
- C. Pressure Regulator
- D. High Pressure Hose Fitting
- E. Low Pressure Hose Fitting

- Start the engine, and read the gauge.

### Fuel Pressure

Conditions	Reading*
Engine idling	about 226 kPa (2.3 kg/cm <sup>2</sup> , 33 psi)
The moment throttle is fully opened	about 245 kPa (2.5 kg/cm <sup>2</sup> , 36 psi)

\*The gauge needle will oscillate. Read the pressure at the average of the maximum and the minimum indications.

- ★If the gauge shows the pressure specified in the table, the fuel pressure is good.
- ★If the fuel pressure is abnormal, check the pressure regulator.

Case 2: If the engine will not start—

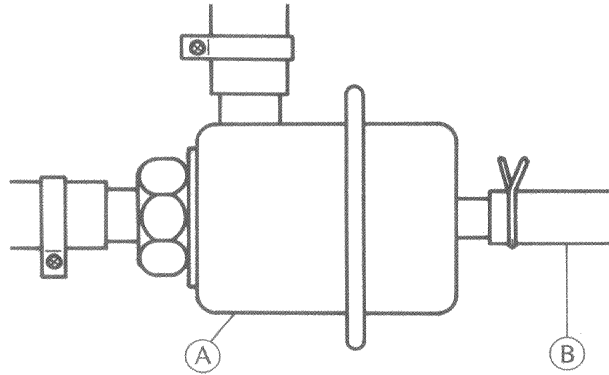
- Install the pressure gauge (special tool) in the fuel pressure line as explained in the “If the engine will start” paragraph.

- Turn on the ignition switch to run the fuel pump. Read the pressure gauge while the pump is running. The pump continues to run for 5 seconds after the ignition switch is turned on.
- ★ If the gauge reads about 245 kPa (2.5 kg/cm<sup>2</sup>, 36 psi), the fuel pressure is good.
- ★ If the fuel pressure is abnormal, check the pressure regulator.

Check the pressure regulator as follows:

- ★ If the fuel pressure is higher than the specified values, check the fuel return line (from the pressure regulator to the check valve in the tank) for obstructions, and the vacuum hose of the pressure regulator for air leaks. If they prove good, replace the pressure regulator.
- ★ If the fuel pressure is lower than the specified values, check the fuel line for obstructions (from the fuel tap to the pump inlet) and fuel leaks (in the high-pressure fuel line). If the line is good, replace the pressure regulator or fuel pump.

**Pressure Regulator**

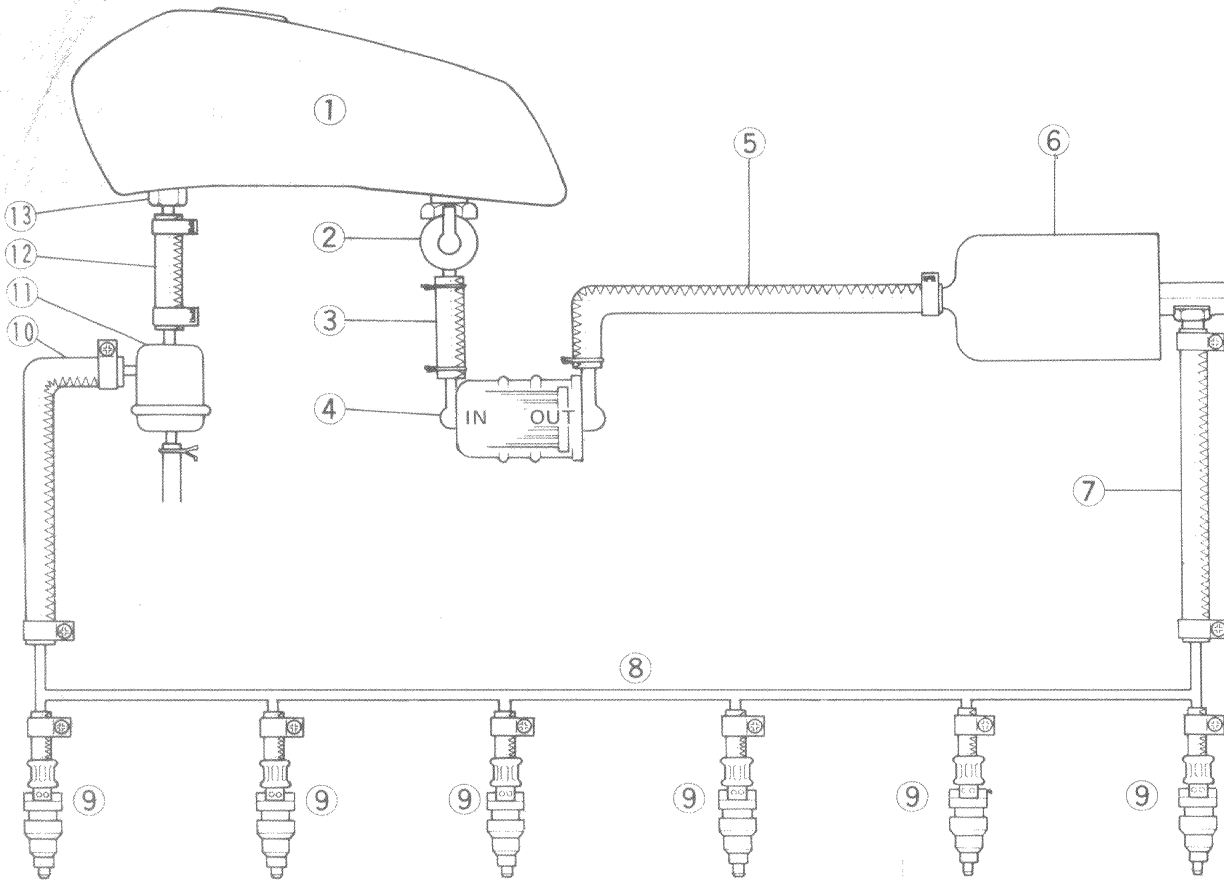


A. Pressure Regulator      B. Vacuum Hose

**Fuel Leak Inspection**

Inspect the connections between the parts shown in the figure for leaks.

**Fuel Leak Inspection**



- |                             |                              |                               |                              |
|-----------------------------|------------------------------|-------------------------------|------------------------------|
| 1. Fuel Tank                | 5. Fuel Hose (low pressure)  | 8. Fuel Distributing Pipe     | 11. Pressure Regulator       |
| 2. Fuel Tap                 | 6. Fuel Pump                 | 9. Fuel Injectors             | 12. Fuel Hose (low pressure) |
| 3. Fuel Hose (low pressure) | 7. Fuel Hose (high pressure) | 10. Fuel Hose (high pressure) | 13. Check Valve              |
| 4. Fuel Filter              |                              |                               |                              |

## Fuel System Cleaning

### WARNING

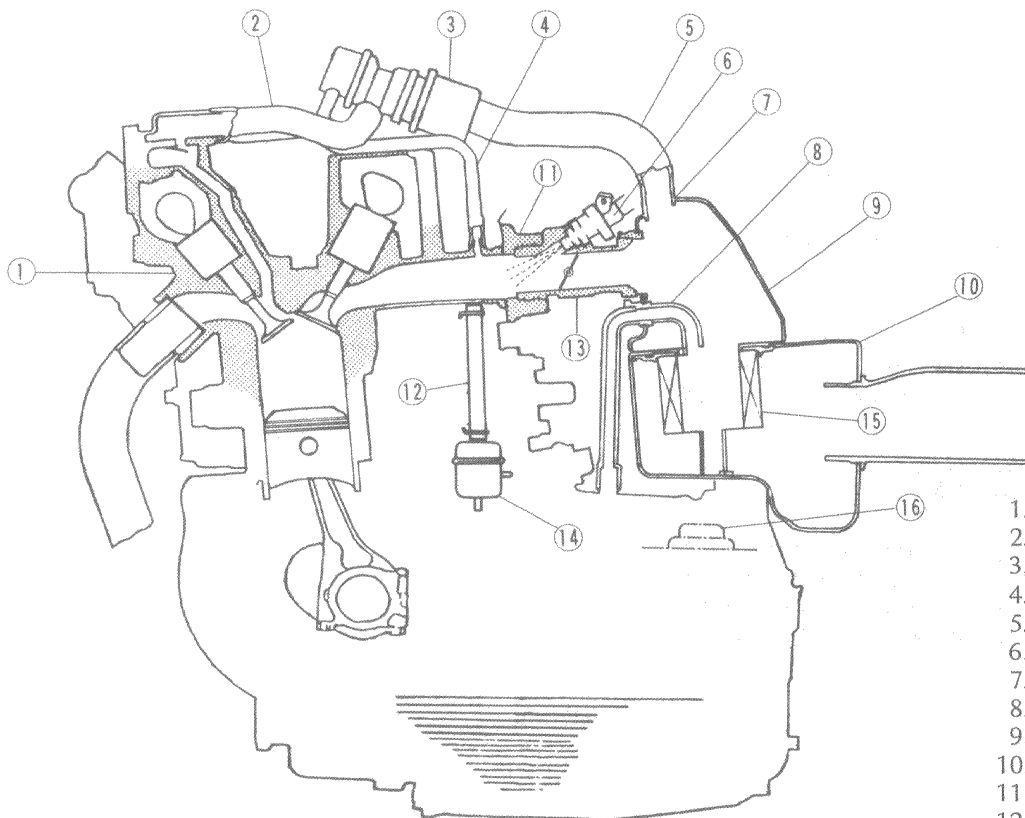
○Clean the fuel system in a well ventilated area, and take ample care there are no sparks or flame anywhere near the working area. Never clean out the fuel system when the engine is still warm. Wipe any fuel off the engine before starting it.

- Remove the fuel tank, and drain it.
- Remove the fuel tap from the tank, and clean the fuel tap filter with a high flash-point solvent.
- Flush out the fuel tank with a high flash-point solvent.
- Clean the air vent in the tank cap with compressed air.
- Remove the fuel pump, fuel injectors, fuel distributing pipe, and pressure regulator; and clean them using a high flash-point solvent.
- Replace the fuel filter and hoses with new ones.
- Install the parts on the motorcycle. Use new hose clamps.

### Fuel Filter Inspection

Regular replacement of the fuel filter is required, but replacement is not otherwise necessary unless the filter has been damaged.

### Air Leak Inspection



1. Cylinder Head
2. Air Hose
3. Vacuum Switch Valve
4. Vacuum Hose
5. Air Hose
6. Fuel Injectors
7. Rubber Seal
8. Breather Hose
9. Surge Tank
10. Air Cleaner Housing
11. Throttle Valve Holders
12. Vacuum Hose
13. Throttle Valve
14. Pressure Regulator
15. Air Cleaner Element
16. Oil Filler Cap

If water accumulates in the filter, clean the fuel system. See above.

### Test No. 4 Air System Inspection: Throttle Valve Inspection

- Check the engine vacuum synchronization.
- Check the throttle valve and the fast idle link mechanism for smooth operation.
- ★If there is any binding or other unusual operation in the link mechanism, repair it or replace the throttle valve.

### "NOTE"

○If any one of the throttle valves is replaced, synchronize the valves as explained below. If the whole throttle valve assembly is replaced, synchronization is not required.

### Air Leak Inspection

- Inspect the connections between the parts shown in the figure for air leaks.

.....  
**Evaporative Emission Control System  
 (California Vehicle)**  
 .....

**Non-scheduled Maintenance:****Liquid/Vapor Separator:***Separator Inspection*

- Disconnect the hoses from the liquid/vapor separator, and remove the separator from the motorcycle.
- Visually inspect the separator for cracks and other damage.
- ★ If the separator has any cracks or severe damage, replace it with a new one.

*Separator Test*

- Connect the hoses to the separator, and install the separator on the motorcycle.
- Disconnect one of the breather hoses from the separator, and inject about 20mL of gasoline into the separator through the hose fitting.
- Disconnect the fuel return hose from the fuel tank.
- Run the open end of the return hose into the container level with the tank top.
- Start the engine, and let it idle.
- ★ If the gasoline in the separator comes out of the hose, the separator works well. If it does not, replace the separator with a new one.

**Canister:***Canister Inspection*

- Remove the canister, and disconnect the hoses from the canister.
- Visually inspect the canister for cracks and other damage.
- ★ If the canister has any cracks or severe damage, replace it with a new one.

**“NOTE”**

- *The canister is designed to work well through out the motorcycle's life without any maintenance, if it is used under normal conditions.*

**CAUTION**

- If gasoline, solvent, water or any other liquid enters the canister, the canister's vapor absorbing capacity is greatly reduced, and there is no way to return it to the original level. In that case, replace the canister with a new one.

**Fuel Tank and Cap:***Cap Inspection*

- Visually inspect the gasket on the tank cap for any damage.
- ★ Replace the gasket if it is damaged.
- Blow the air vent in the tank cap free with compressed air.

*Tank Inspection*

- Remove the hoses from the fuel tank, and open the tank cap.
- Check to see if the breather and fuel return pipes in the tank are not clogged.
- ★ If they are clogged, blow them out with compressed air.

# Non-scheduled Maintenance – Chassis

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<b>Propeller Shaft, Final Gear Case</b> .....	4-2	Base Manual P. 218
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.....  
**Wheels**  
 .....

**Tires:**

Refer to p. 212 of the Base Manual noting the following exception.

**Tire, Air Pressure (when cold)**

Front	221 kPa (2.25 kg/cm <sup>2</sup> , 32 psi)	
Rear	Up to 956 N (97.5 kg, 215 lb) load	245 kPa (2.50 kg/cm <sup>2</sup> , 36 psi)
	956 – 1,650 N (97.5 – 168 kg, 215 – 370 lb) load	275 kPa (2.80 kg/cm <sup>2</sup> , 40 psi)

**Rims:**

**Rim Size**

Front	18 x MT2.15
Rear	16 x MT3.50

*Rim Runout Measurement*

Refer to p. 215 of the Base Manual.

*Wheel Balance*

Refer to p. 29 of the Base Manual.

**Axle:**

Refer to p. 216 of the Base Manual.

**Wheel Bearings, Grease Seals:**

Refer to p. 216 of the Base Manual.

**Rear Wheel Coupling:**

Refer to p. 217 of the Base Manual.

.....  
**Propeller Shaft, Final Gear Case**  
 .....

**Propeller Shaft:**

Refer to p. 218 of the Base Manual noting the following exception.

*Propeller Shaft Joint Lubrication*

Refer to p. 2-7 of the Scheduled Maintenance.

**Tapered Roller Bearings:**

Refer to p. 219 of the Base Manual.

**Bevel Gears:**

Refer to p. 219 of the Base Manual.

.....  
**Brakes**  
 .....

**Brake Fluid:**

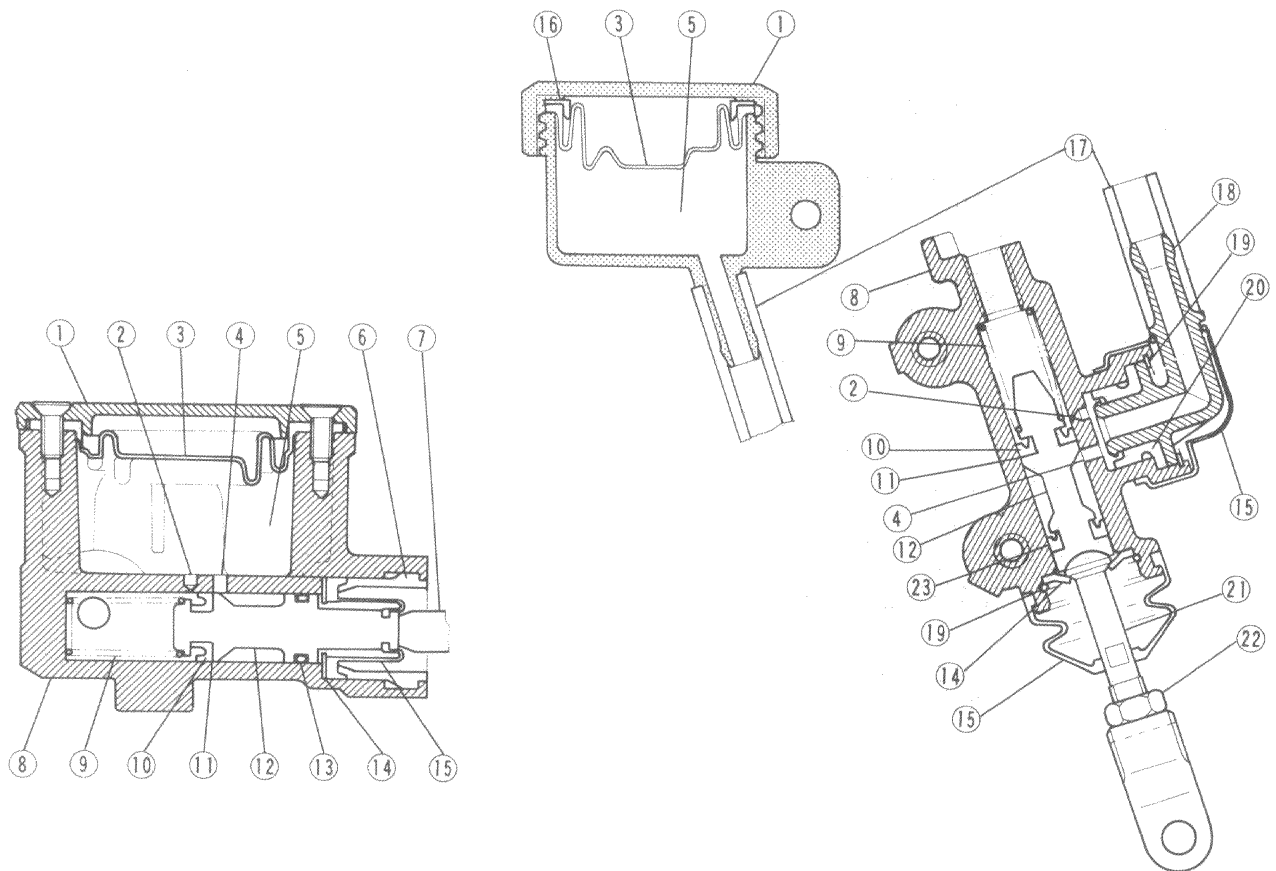
Refer to p. 295 of the Base Manual.

**Master Cylinders:**

*Visual Inspection*

- Disassemble the front and rear master cylinders.
- Check that there are no scratches, rust, or pitting on the inside of the master cylinder and on the outside of the piston.
- ★If the master cylinder or piston shows any damage, replace the master cylinder and piston.
- Inspect the primary cups, secondary cup, and O-ring on the pistons.
- ★If a cup or O-ring is worn, damaged, softened (rotted), or swollen, replace the piston assembly.
- ★If fluid leakage is noted at the brake lever, the piston assembly should be replaced to renew the cup(s) and O-ring.
- Check the dust covers for damage.
- ★If they are damaged, replace them.
- Check that the relief and supply ports are not plugged.
- ★If the small relief port becomes plugged, especially with a swollen or damaged primary cup, the brake pads will drag on the disc. Blow the ports clean with compressed air.
- Check the piston return springs for any damage.
- ★If the spring is damaged, replace the piston assembly.

## Front and Rear Master Cylinders



1. Reservoir Cap
2. Relief Port
3. Diaphragm
4. Supply Port
5. Reservoir
6. Liner
7. Brake Lever
8. Master Cylinder Body

9. Return Spring
10. Primary Cup
11. Non-return Valve
12. Piston
13. O-ring
14. Piston Stop
15. Dust Cover
16. Plate

17. Brake Fluid Hose
18. Hose Connector
19. Retainer
20. Grommet
21. Push Rod
22. Locknut
23. Secondary Cup

### Calipers:

#### Fluid Seal Damage

The fluid seal around the piston maintains the proper pad/disc clearance. If this seal is not satisfactory, pad wear will increase, and constant pad drag on the disc will raise brake and brake fluid temperature.

Replace the fluid seals under any of the following conditions: (a) fluid leakage around the pad; (b) brakes overheat; (c) there is a large difference in left and right pad wear; (d) the seal is stuck to the piston. If the fluid seal is replaced, replace the dust seal as well. Also, replace all seals every other time the pads are changed.

#### Dust Seal and Cover Damage

- Check that the dust seals and covers are not cracked, worn, swollen, or otherwise damaged.
- ★ If they show any damage, replace them.

#### Piston Cylinder Damage

- Visually inspect the piston and cylinder surfaces.
- ★ Replace the cylinder and piston if they are badly scored or rusty.

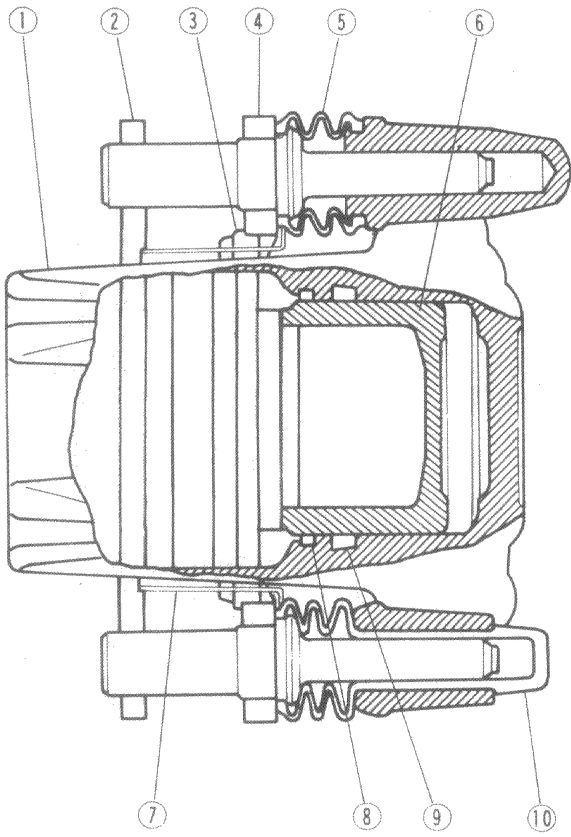
#### Caliper Holder Shaft Wear

The caliper body must slide smoothly on the caliper holder shafts. If the body does not slide smoothly, one pad will wear more than the other, pad wear will increase, and constant drag on the disc will raise brake and brake fluid temperature.

- Check to see if the caliper holder shafts are badly worn or stepped, or if the rubber friction boot is damaged.
- ★ If the shafts or rubber friction boot are damaged, replace the rubber friction boot, and the caliper holder.



**Caliper**



- |                   |                       |
|-------------------|-----------------------|
| 1. Caliper        | 6. Piston             |
| 2. Brake Pad      | 7. Anti-Rattle Spring |
| 3. Brake Pad      | 8. Dust Seal          |
| 4. Caliper Holder | 9. Fluid Seal         |
| 5. Dust Cover     | 10. Friction Boot     |

**Brake Discs:**

*Disc Warp*

Refer to p. 223 of the Base Manual.

*Disc Wear*

Refer to p. 223 of the Base Manual noting the following exception.

**Disc Thickness**

	Standard	Service Limit
Front	4.8 – 5.1 mm	4.5 mm
Rear	6.8 – 7.1 mm	6.0 mm

**Brake Hoses:**

*Brake line damage*

The high pressure inside the brake line can cause fluid to leak or the hose to burst if the line is not properly maintained.

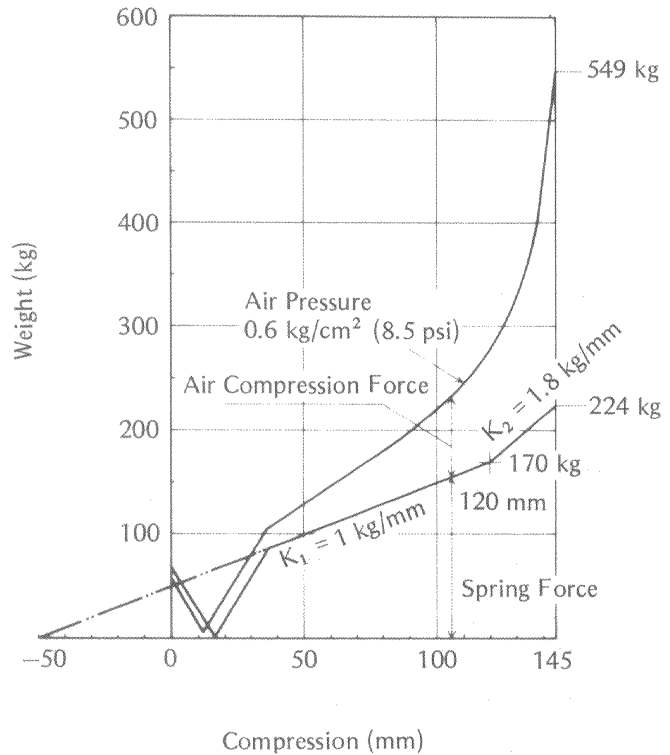
Bend and twist the rubber hose while examining it. Replace it if any cracks or bulges are noticed.

**Suspension**

**Front Fork:**

Refer to pp. 226 and 313 of the Base Manual noting the following exception.

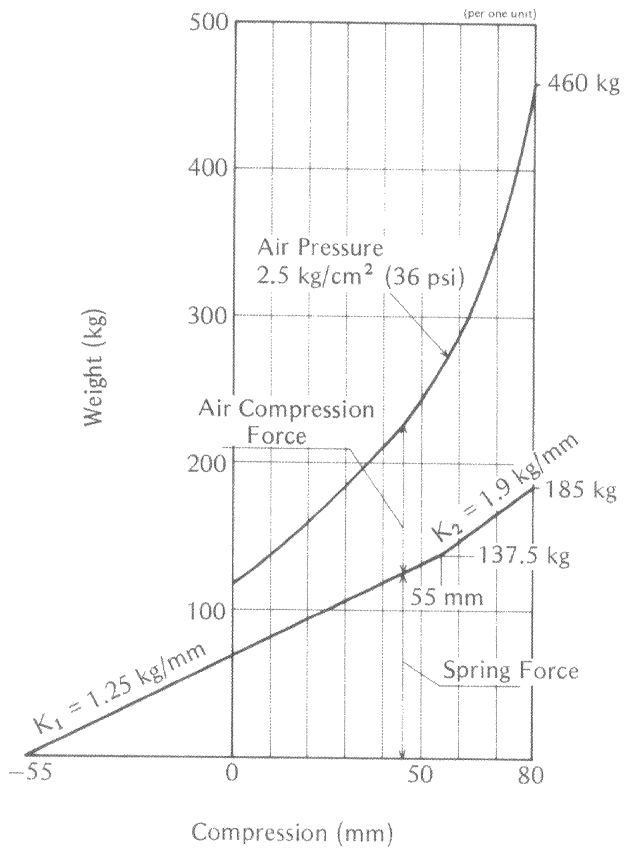
**Front Fork Load/Compression Stroke Relationship (per one unit)**



**Rear Shock Absorbers:**

Refer to p.322 of the Base Manual noting the following exception.

**Rear Shock Absorber  
Load/Compression Stroke Relationship**



**Adjusting of Rear Shock Absorber Oil Capacity**  
Adjust the oil capacity as follows.

**Specification**

Air Chamber Capacity	190 mL
Oil Viscosity	SAE 5W
Oil Capacity	265 mL

**Air Leak Inspection**

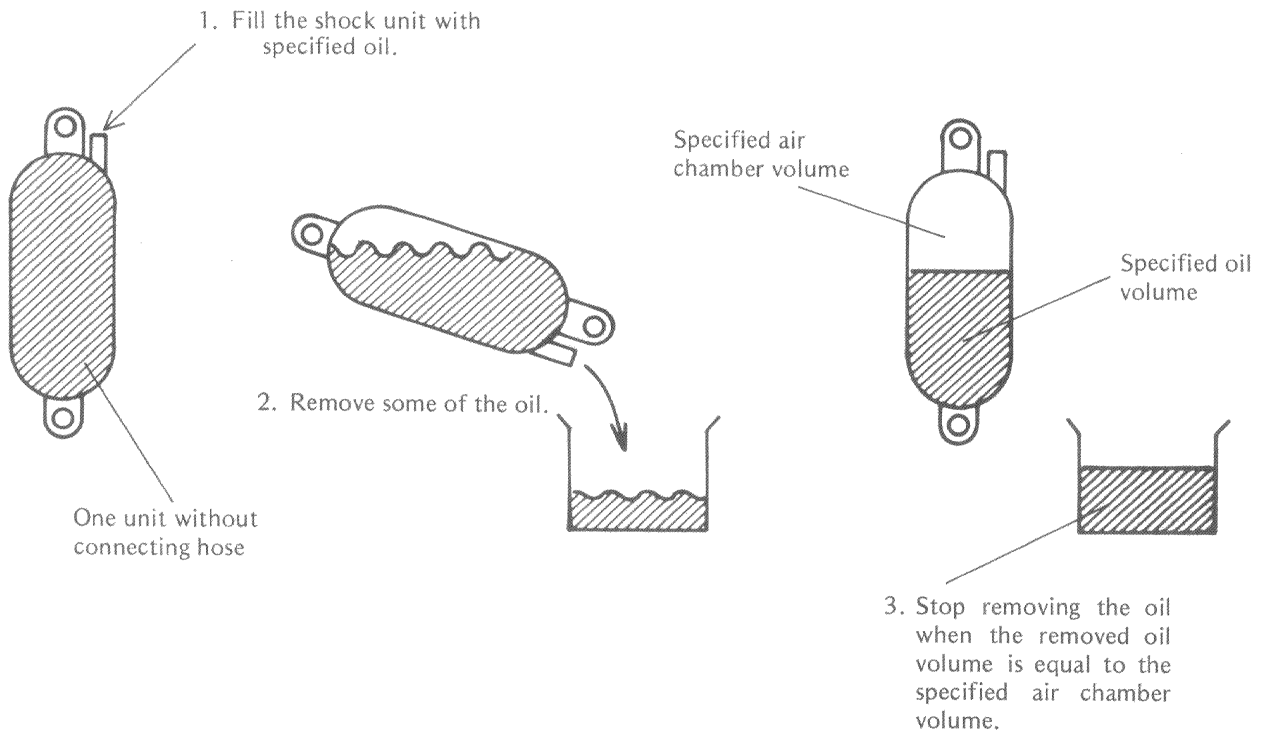
If the air pressure will not reach the specification, or if the pressure increase takes too long, check the system for air leaks.

- Remove the travel trunk, saddle bags, and seat to check the leveling system.
- Inspect the connections between the parts shown in Fig. on p. 4-8 for air leaks. One way to check for leaks is by soaping the surface of these parts.
- Replace the hose, if it is cracked, torn, or otherwise damaged.
- Tighten the fasteners to the specified torque as shown in the figure.

**Drain Valve Inspection**

★ If the drain valve leaks air within the pressure usable range (p. 4-7), or does not release air when the ring is pulled down, replace the valve as an unit.

**Procedures for Measuring Oil Capacity**



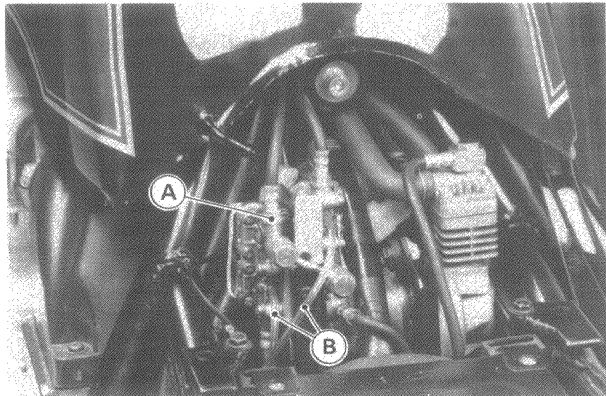
**CAUTION**

- The drain valve is adjusted to release air when the system pressure reaches 540 kPa (5.5 kg/cm<sup>2</sup> 78 psi) to prevent system damage. It should not be disassembled.

**Solenoid Valve Inspection**

If the air pressure cannot be lowered or its pressure release takes too long, check the solenoid valve for clogging.

- ★If any of the release tubes is obstructed, clean the tube or replace it.
- ★If the suspension system still retains the pressure, pull out the release tubes and check the valve release holes for clogging.
- ★If there is any obstruction to the air flow, remove it with a needle.



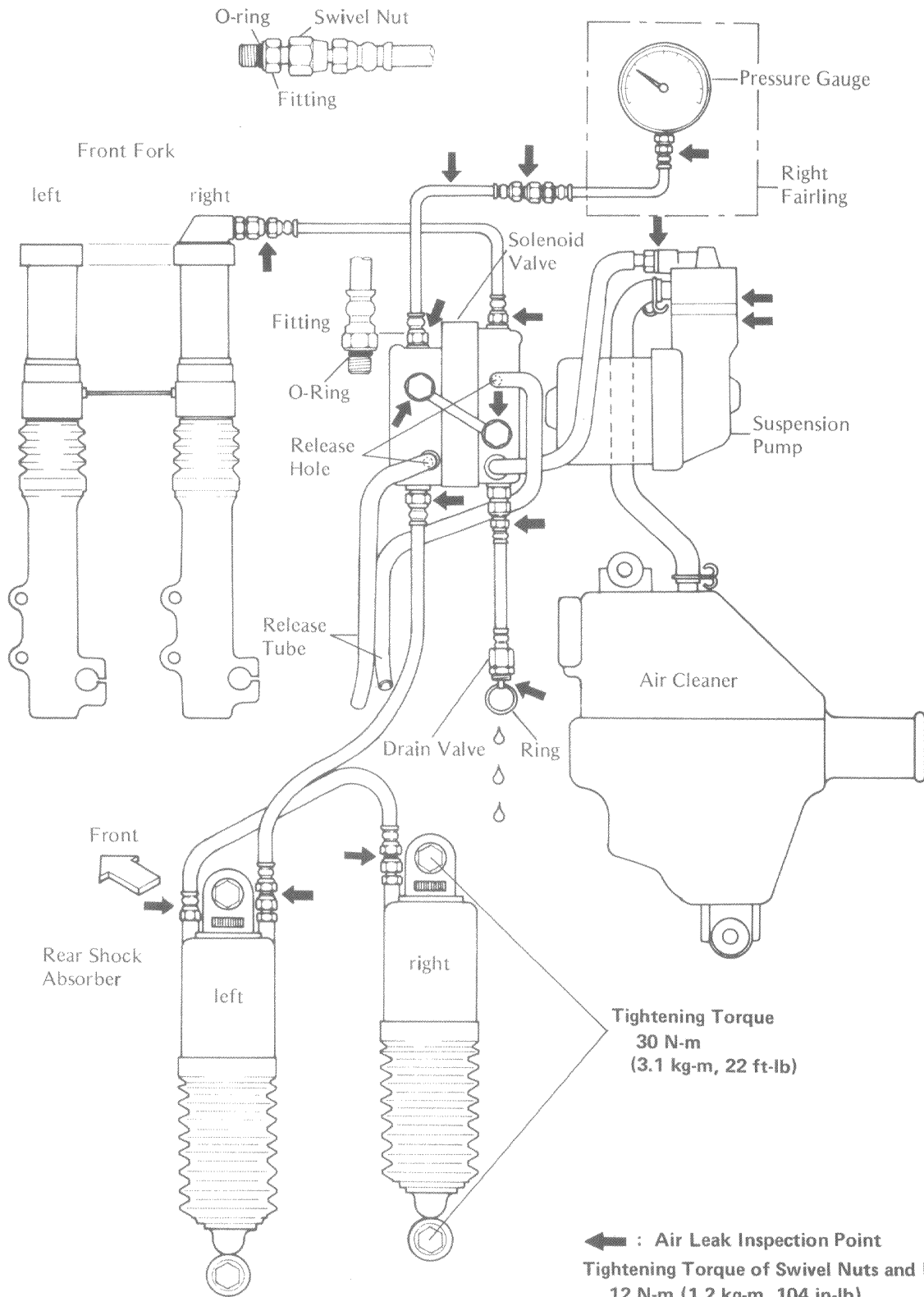
A. Solenoid Valve

B. Release Tube

- ★If the above inspections show no trouble, but the pressure does not fall, check the solenoid valve resistance and the suspension switch (pp. 5-14, 5-16).

### Air Suspension Leveling System:

#### Leveling System



# Non-scheduled Maintenance – Electrical

## Table of Contents

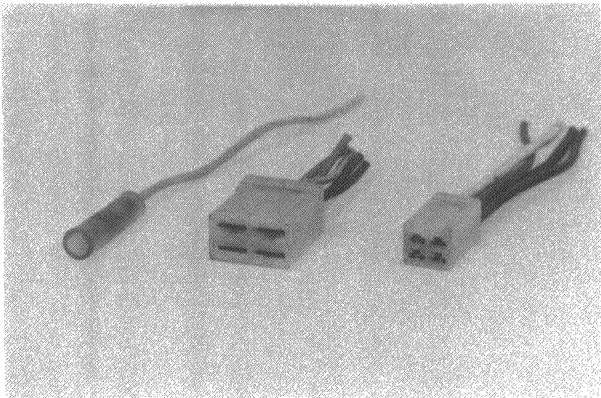
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## Precautions

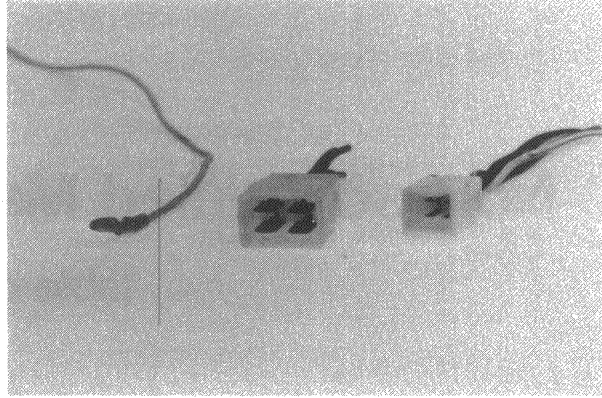
There are numbers of important precautions that are musts when servicing electrical systems. Though cautions that apply to the indications are listed below, failure to observe these rules can result in serious system damage. Learn and observe all the rules below.

- (a) Do not reverse the battery wire connections. This will burn out the diodes in the electrical parts.
- (b) Always check battery condition before condemning other parts of an electrical system. A fully charged battery is a must for conducting accurate electrical system tests.
- (c) The electrical parts should never be struck sharply, as with a hammer, or allowed to fall on a hard surface. Such a shock to the parts can damage them.
- (d) To prevent damage to electrical parts, unless otherwise there is instruction during a test, do not disconnect the battery wires or any other electrical connections when the ignition switch is on, or during the engine is running.
- (e) Because of the large amount of current, never keep the starter button pushed when the starter motor will not run over, or the current may burn out the starter motor windings.
- (f) Do not use a meter illumination bulb rated for other than voltage or wattage specified in the wiring diagram, as the meter or gauge panel could be warped by excessive heat radiated from the bulb.
- (g) Take care not to short the leads that are directly connected to the battery positive (+) terminal to the chassis ground.
- (h) Troubles may involve one or in some cases all items. Never replace a defective part without determining what CAUSED the failure. If the failure was brought on by some other item or items, they too must be repaired or replaced, or the new replacement will soon fail again.
- (i) Make sure all connectors in the circuit are clean and tight, and examine wires for signs of burning, fraying etc. Poor wires and bad connections will affect electrical system operation.
- (j) Electrical Connectors.

## Female Connectors



## Male Connectors



### (k) Color Codes:

BK	Black
BL	Blue
BR	Brown
CH	Chocolate
DG	Dark green
G	Green
GY	Gray
LB	Light blue
LG	Light green
O	Orange
P	Pink
PU	Purple
R	Red
W	White
Y	Yellow

- (l) Measure coil and winding resistance when the parts are (at room temperature).

## Battery

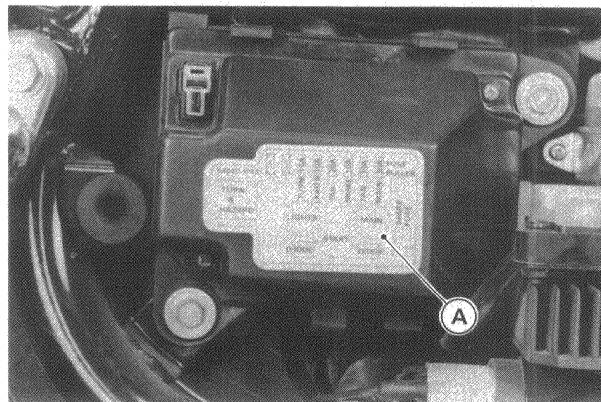
When the battery is suspected of being defective, first inspect the points noted in the table below. The battery can be restored by charging it with the ordinary charge. If it will take a charge so that the voltage and specific gravity come up to normal, it may be considered good except in the following case:

- (a) If the voltage suddenly jumps to over 13 V just after the start of charging, the plates are probably sulphated. A good battery will rise to 12 V immediately and then gradually go up 12.5 – 13 V in about 30 to 60 min after charging is started.
- (b) If one cell produces no gas bubbles, or has a very low specific gravity, it is probably shorted.

### 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 12 V	below 12 V	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

- (c) 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.
- (d) 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.



A. Junction Box

### Inspecting Diodes

- Disconnect the diode assembly from the junction box.
- Zero the ohmmeter, and connect it to each diode leads to check the resistance in both directions.
- ★ The resistance should be low in one direction and more than ten times as much in the other direction. If any diode shows low or high in both directions, the diode is defective and the diode assembly must be replaced.

### "NOTE"

- The actual meter reading varies with the meter used and the individual diode, but, generally speaking, the lower reading should be from zero to the first 1/2 of the scale.

### Junction Box

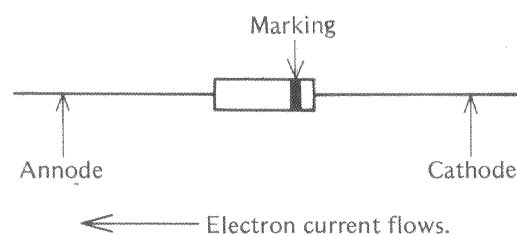
The junction box contains the following electrical components:

- Fuses
- Relays
- Diodes
- ACC 2-Pin Connector

### CAUTION

- Special care must be taken during removal and installation of the junction box electrical components. Refer to Disassembly-Chassis chapter.

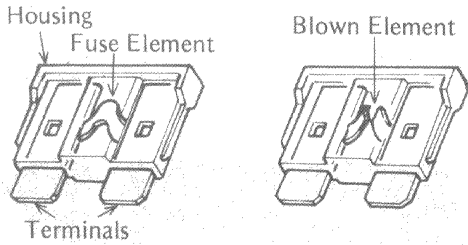
### Polarity of Diode



**Inspecting Fuses**

- Remove the fuse from the junction box.
- Inspect the fuse element for blowout.
- If it has been blown out, replace the fuse.

**Fuse**



**Testing Main, Starter Circuit, and Headlight Relays**

- Remove the relay from the junction box.
- Connect the ohmmeter and one 12-volt battery to the relay as shown.
- ★ If the relay does not work as specified, the relay is defective.

**Testing Relay**

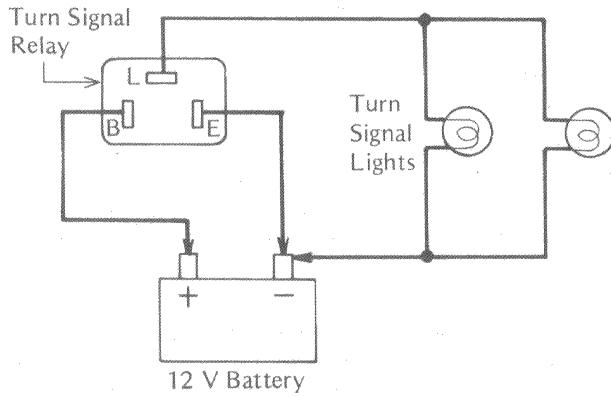
Meter range:	$\times 1 \Omega$ range
Meter Reading:	
When battery is connected $\rightarrow$	$0 \Omega$
When battery is disconnected $\rightarrow$	$\infty \Omega$

**Testing Turn Signal Relay**

- Remove the turn signal relay from the junction box.
- Connect one 12-volt battery and turn signal lights as indicated in the figure, and count how many times the lights flash in one minute.
- ★ If the lights do not flash as specified, replace the turn signal relay.

**Testing Turn Signal Relay**

(Example: Two lights are connected.)



**Testing Turn Signal Relay**

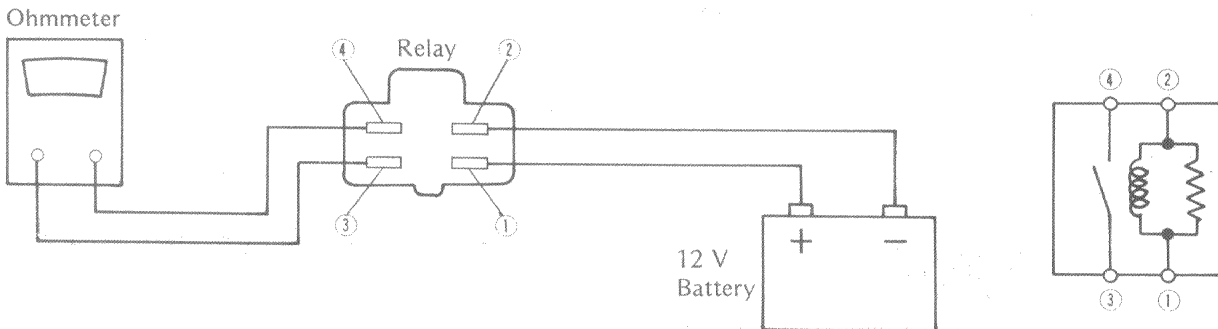
The Number of Turn Signal Lights	Load		Flashes per Minute
		Wattage (W)	
1		21 – 23	More than 150
2		42 – 46	75 – 95
3		63 – 69	
4		84 – 92	

\*: Cycle(s) per minute

**Inspecting Junction Box Internal Circuit**

- Remove the junction box from the motorcycle.
- Disconnect all the fuses, relays, diode assemblies, and connectors from the junction box.
- Make sure all connector terminals are clean and tight, and that none of them have been bent.
- ★ Clean any dirty terminals, and straightens lightly-bent terminals.
- Check the conductivity of the internal circuit. Both terminals of the same number should conduct, and the differently numbered terminals should not conduct.
- ★ If there are open or short circuits, replace the junction box.

**Testing Relay**



① and ② : Relay Coil Terminals  
 ③ and ④ : Relay Switch Terminals



## Ignition System

### Introduction:

This model employs a transistorized ignition system with a vacuum advance system. Since this ignition system has no moving mechanical parts to wear out, no maintenance is required. The vacuum advance system utilizes the vacuum in the intake manifold. Under part throttle operation, the intake manifold vacuum is high and, therefore, a smaller amount of mixture is drawn into the engine and compression pressure is relatively low. With low pressure, the mixture does not burn as rapidly, and to obtain maximum efficiency under such conditions, the spark should be more advanced. This additional advance is obtained by means of the vacuum advance system. The current for the ignition coil primary circuit is controlled by use of an electronic switch called a power transistor in the IC igniter. Each spark plug fires every time the piston rises. Although the spark jumps across the electrodes during the exhaust stroke, it has no effect on engine operation since there is no compression and no fuel to burn.

### Main Components:

#### Pickup Coil Assembly:

The pickup coil is a magnetic signal generator which consists of a permanent magnet and coil. Every time the projection on the alternator rotor passes under the pickup coil core, signals are generated and sent to the IC igniter.

#### IC Igniter:

The IC igniter has the following functions.

#### (1) Electronic Ignition Timing Advance

The timing control circuit is provided in the IC igniter, and the ignition timing is controlled electronically in order to obtain efficient operation throughout the range of engine speed and load (intake vacuum).

#### (2) Time-controlled Primary Current Cut Off

If the ignition switch is left turned on but the engine is not running, the primary current may continue to flow through a certain ignition coil (depending on the crankshaft position). If this condition continues, the battery will be discharged, and the ignition coil and the power transistor will be damaged by overheating. To prevent such problems, the primary current is automatically cut off a few seconds after the engine stops. However, once the engine is turned over and the first signal from the pickup coil arrives at the igniter, the primary current again flows.

#### (3) Dwell Angle Control

The dwell angle is electronically controlled by the dwell angle control circuit so that it increases as the engine speed increases. This is to save the electric power at low engine speed, and to produce a spark of sufficient strength at high engine speed.

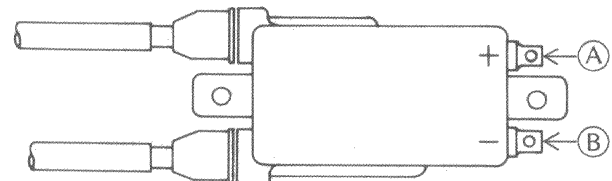
#### (4) Voltage Regulation

A voltage regulating circuit is incorporated in the circuitry. The voltage regulating circuit supplies an even voltage to the other circuits in the igniter despite variations in the battery voltage. As a result, stable operation of the igniter is ensured. Moreover, the voltage regulating circuit protects the circuitry from surge currents in the power lines.

#### Ignition Coil:

Every time both pistons rise, the ignition coil fires both spark plugs simultaneously which are connected in series. The polarity of the two spark plug leads are as shown in the figure when the primary wires are connected as indicated on the ignition coil body.

#### Polarity of Ignition Coil



- (A) : Connect Red Wire
- (B) : Connect Black, Blue or Green Wire

1. Spark Plug Lead
2. Ignition Coil
3. Marking
4. Primary + Terminal
5. Primary - Terminal

#### Vacuum Sensor:

The vacuum sensor detects intake vacuum from the engine and provides voltage to the IC igniter in proportion to the intake vacuum. The vacuum sensor consists of a semiconductor type pressure sensor and an output signal amplifier.

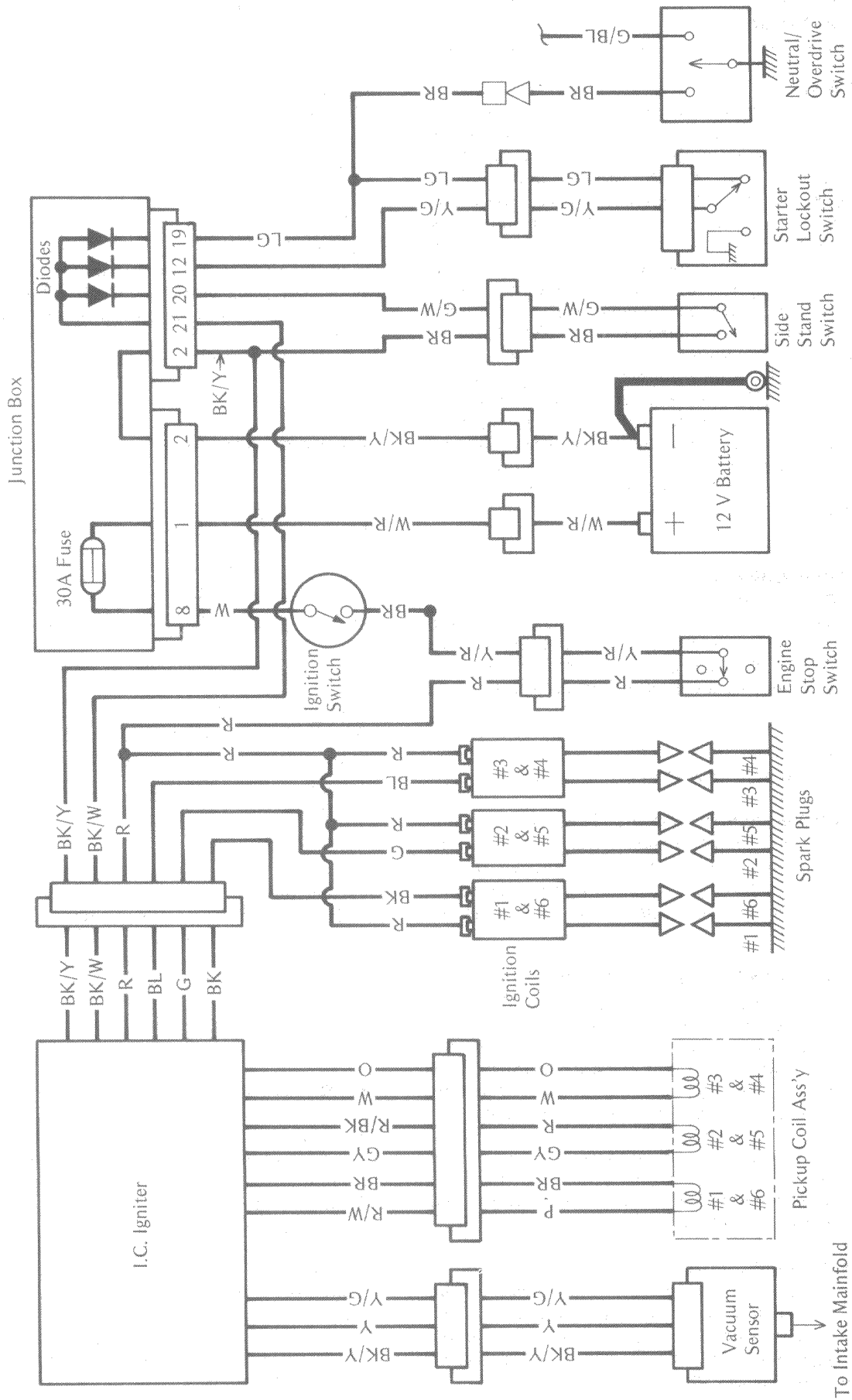
#### Safety Instructions:

There are a number of important precautions that must be observed when servicing the transistorized ignition system. Failure to observe these precautions can result in serious system damage. Learn and observe all the rules listed below.

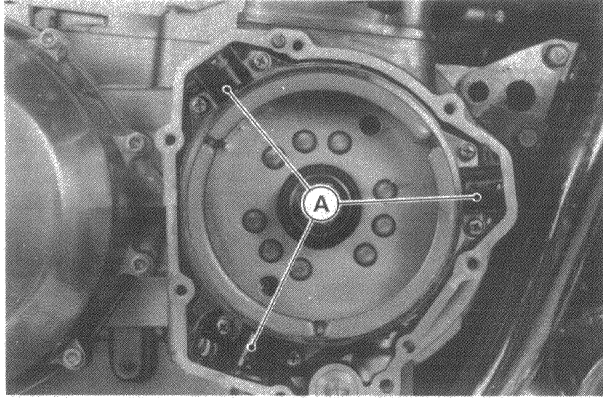
(1) Because of limited capacity of the voltage regulating circuit in the IC igniter, do not disconnect the battery leads or any other electrical connections when the ignition switch is in the "ON" or "ACC" position. This is to prevent IC igniter damage.

(2) Do not install the battery backwards. The negative side is grounded. This is to prevent damage to the diodes and IC igniter.

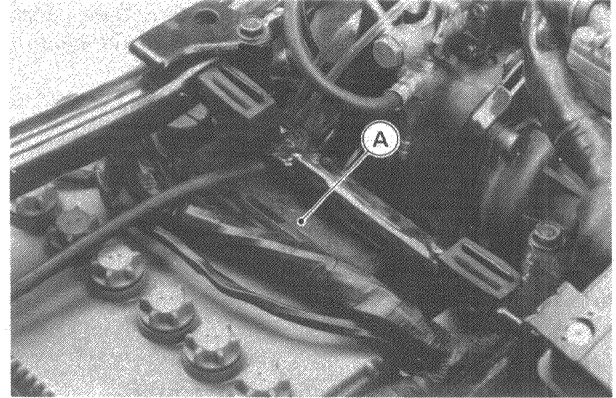
Ignition System Wiring Diagram



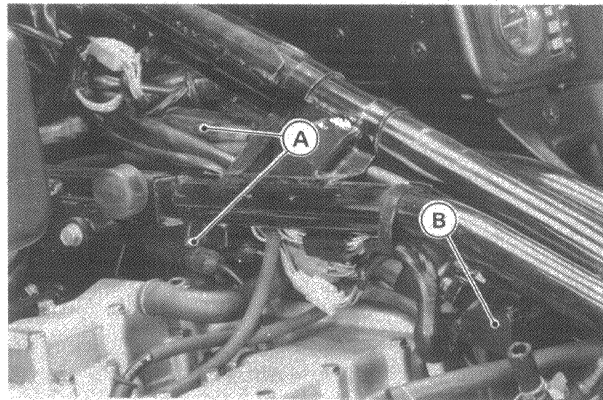
Parts Location:



A. Pickup Coil Assembly

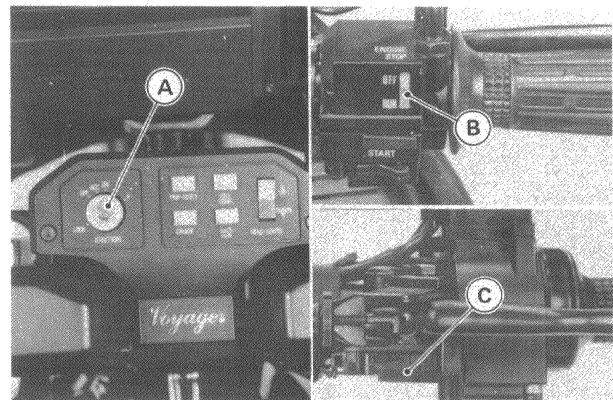


A. IC Igniter



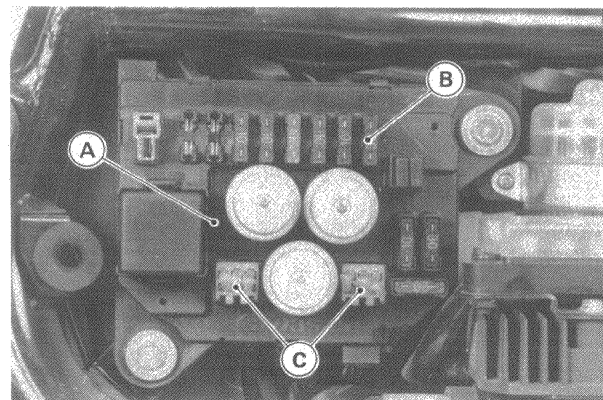
A. Ignition Coils

B. Vacuum Sensor



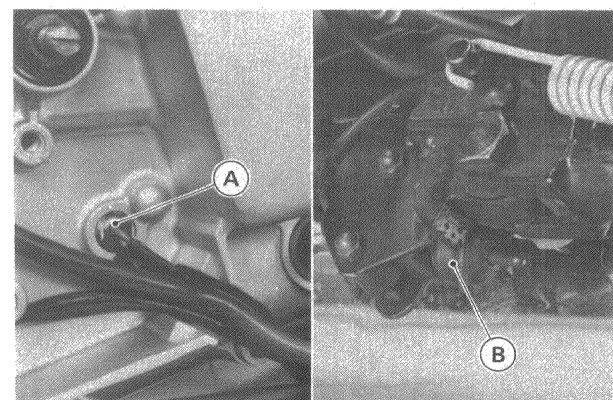
A. Ignition Switch  
B. Engine Stop Switch

C. Starter Lockout Switch



A. Junction Box  
B. 30 A Fuse

C. Diodes



A. Neutral/Overdrive Switch  
B. Side Stand Switch

### Ignition System Inspection:

If trouble is suspected in the ignition system, perform the following steps. Before performing these steps, make sure that all connectors and wires in the ignition system are clean, tight, and in good condition.

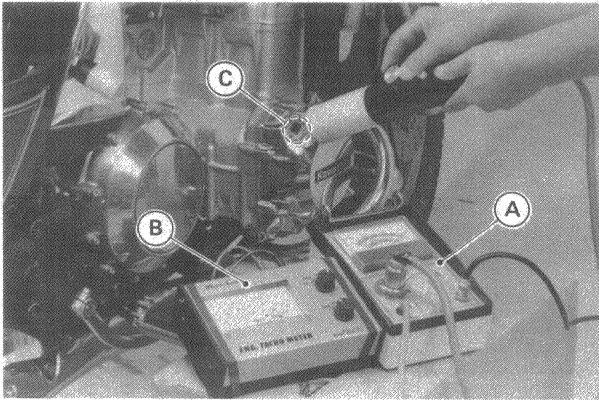
1. Dynamic Ignition Timing Inspection
2. Checking Power Supply to the IC Igniter
3. Ignition Coil Inspection
4. Pickup Coil Inspection
5. Switch Inspection
6. Junction Box Inspection
7. IC Igniter Replacement
8. Vacuum Sensor Replacement

### Description of Each Testing Procedure:

#### 1. Dynamic Ignition Timing Inspection

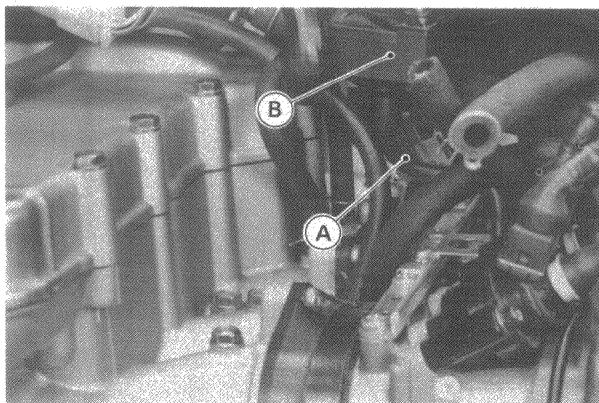
(a) Inspecting the ignition timing:

- Remove the inspection window cover on the alternator cover at the right side of the engine.
- Connect the timing advance tester and tachometer in the manner prescribed by the manufacturer in order to check the ignition timing under operating condition.



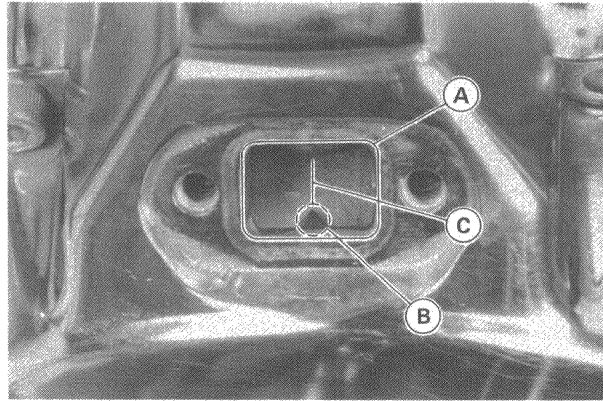
A. Timing Advance Tester    C. Inspection Window  
B. Tachometer

- Remove the vacuum hose from the vacuum sensor and plug the hose not to draw the air.



A. Vacuum Hose    B. Vacuum Sensor

- Turn on the ignition switch and start the engine.
- Adjust the engine speed to 2,000 r/min (rpm).
- Direct the strobe light at the marks through the inspection window. By turning the advance knob of the advance tester, align the "T" mark on the alternator rotor with the timing mark on the alternator cover.



A. Inspection Window    C. "T" Mark  
B. Timing Mark

- Read the timing advance tester. This reading is the ignition timing at 2,000 r/min (rpm) and atmospheric pressure.
- Read the specified ignition timing using the "Atmospheric pressure/Altitude Relationship" and "Ignition Timing/Pressure Relationship at 2,000 r/min (rpm)" charts.
- ★ Make sure that the reading of the timing advance tester is within the specified value obtained from the charts.

(b) Reading the specified ignition timing from the charts:

- Determine the altitude (elevation) above mean sea level for your location.
- In the "Atmospheric Pressure/Altitude Relationship" chart, read the atmospheric pressure for your location. (For example, the atmospheric pressure is 675 mmHg abs. at 1,000 m.)

#### "NOTE"

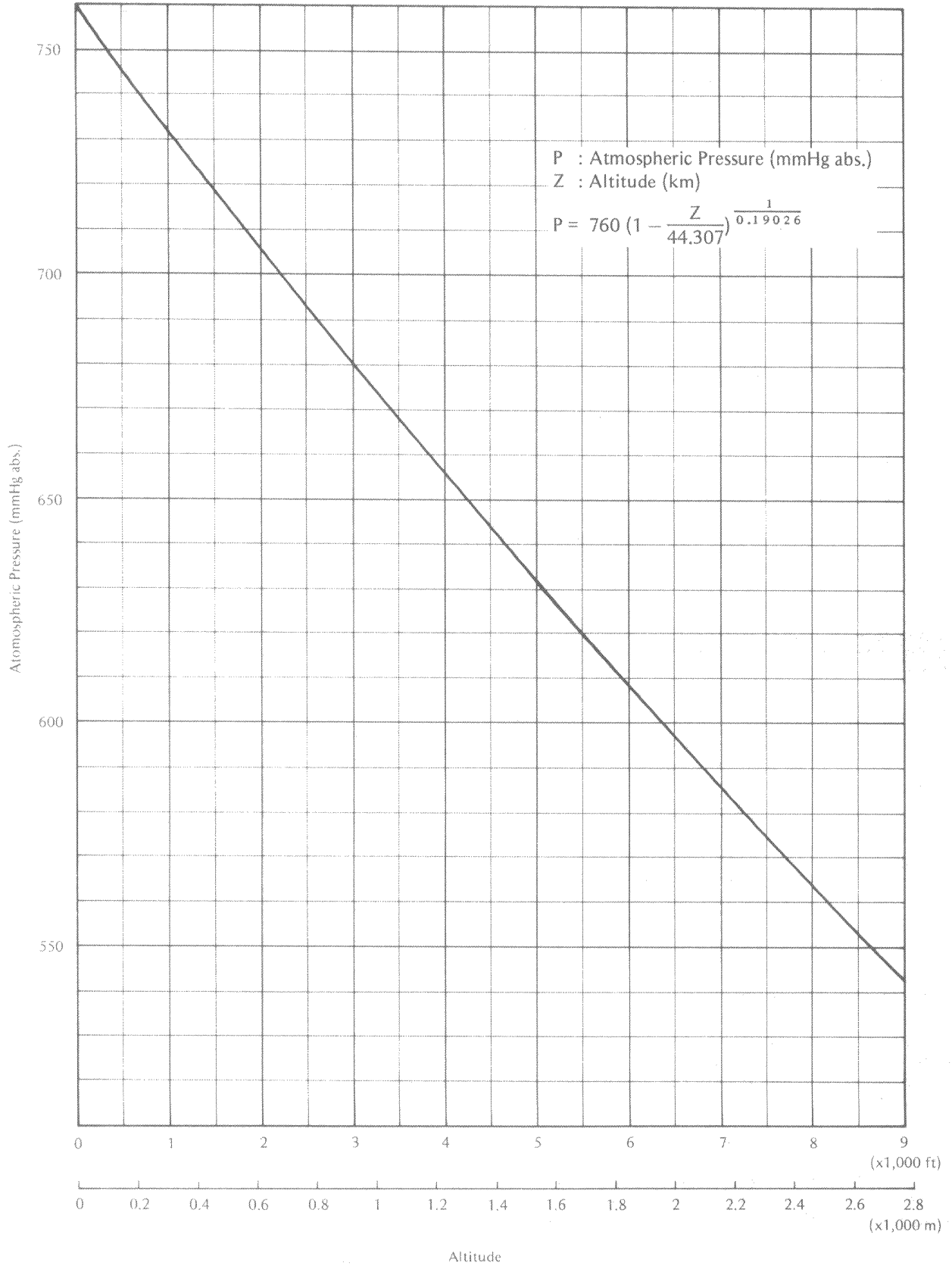
○ Atmospheric pressure can also be measured using a barometer.

- In the "Ignition Timing/Pressure Relationship at 2,000 r/min (rpm)" chart, read the specified ignition timing at 2,000 r/min (rpm) and atmospheric pressure. (For example, the specified ignition timing is 26° to 34.5° BTDC.)

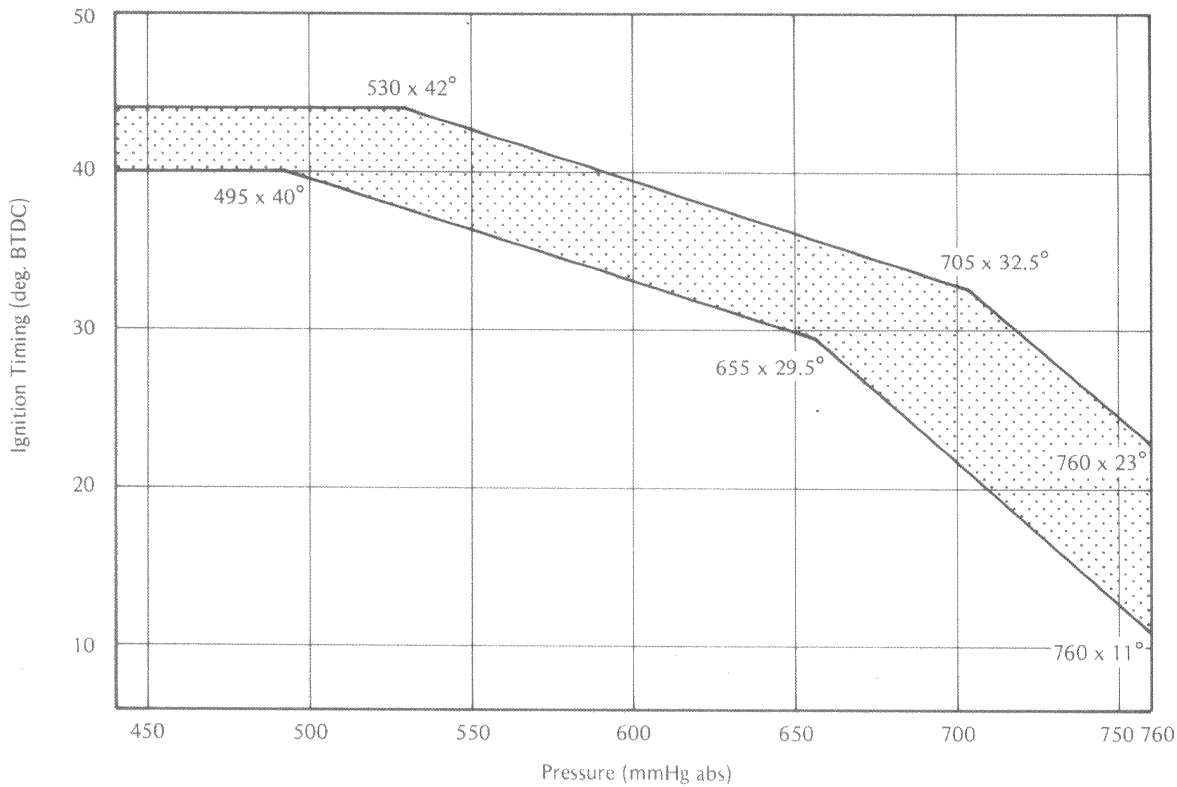
#### 2. Checking Power Supply to the IC Igniter

- Disconnect the IC igniter 6-pin connector.
- Using a voltmeter, check the voltage of the power supply wires.

Atmospheric Pressure/Altitude Relationship



Ignition Timing/Pressure Relationship at 2,000 r/min (rpm)



Checking Power Supply to IC Igniter

Switch Position:	Ignition Switch ON Engine Stop Switch RUN
Voltmeter Connection:	
Wire Location	Female IC Igniter 6-pin Connector
Meter Range	25 V DC
Meter (+)	Red Wire
Meter (-)	Black/Yellow Wire
Meter Reading:	Battery Voltage

★If the battery power does not reach the IC igniter, inspect the main harness wires, ignition switch, engine stop switch, and fuse for damage.

3. Ignition Coil Inspection

(a) Measuring Arcing Distance

The most accurate test for determining the condition of the ignition coil is made by measuring arcing distance with the Kawasaki electrotester, P/N. 57001-980.

“NOTE”

○Since a tester other than the Kawasaki electrotester may produce a different arcing distance, the Kawasaki electrotester is recommended for reliable results.

●Connect the ignition coil (with the spark plug cap assemblies left installed on the ignition coil) to the electrotester.

●Turn on the tester switches.

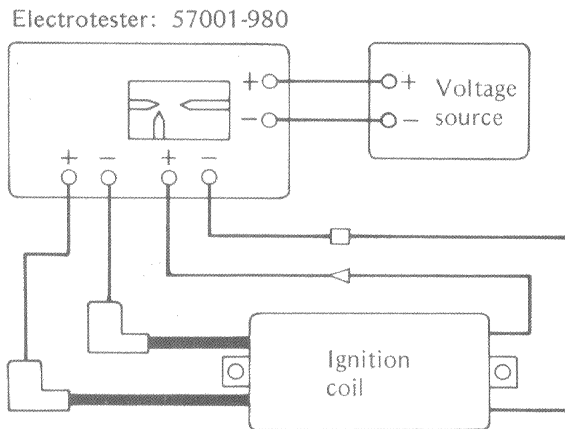
**WARNING**

○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.

Ignition Coil Test



Arcing Distance: 7 mm or more

**Arcing Distance**

Standard:	7 mm or more
-----------	--------------

★If the distance reading is less than the specified value, the ignition coil or spark plug cap assembly is defective. To determine which part is defective, measure the arcing distance again with the spark plug cap assemblies 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 assembly.

**(b) Measuring Coil Resistance**

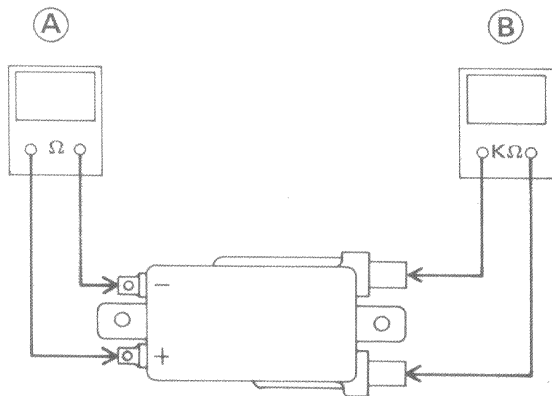
If an electrotester is not available, the coil can be checked for a broken or badly shorted winding with an ohmmeter. However, an ohmmeter cannot detect layer shorts and shorts resulting from insulation breakdown under high voltage.

- Remove the spark plug cap assemblies from the ignition coil.
- Zero the ohmmeter, and connect it to the ignition coil.

**Ignition Coil Resistance**

	Meter Range	Reading
Primary Winding	x 1 Ω	1.8 – 2.8 Ω
Secondary Winding	x 1 kΩ	10.4 – 15.6 kΩ

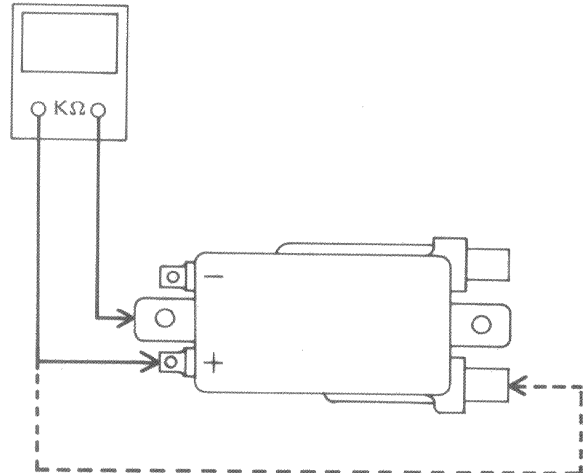
**Coil Winding Inspection:**



A. Measuring Primary Winding Resistance  
 B. Measuring Secondary Winding Resistance

- ★If either the primary or secondary winding does not have the correct resistance, replace the ignition coil.
- With the highest ohmmeter range, check for continuity between one primary winding terminal, and one secondary winding terminal and the coil core.
- ★If there is any reading, the coil is shorted and must be replaced. Also, replace the spark plug cap assembly if it shows visible damage.

**Coil Core Inspection:**



**4. Pickup Coil Inspection**

- Disconnect the pickup coil 6-pin connector which connects the pickup coils with the IC igniter.
- Zero the ohmmeter, and connect it to the pickup coil wires.
- ★If there is more resistance than the specified value, the coil has an open wire and must be replaced. Much less than this resistance means the coil is shorted, and must be replaced.

**Pickup Coil Resistance**

<b>Meter Connections:</b>	
Wire Location	Male Pickup Coil 6-pin Connector
Meter Range	x 100 Ω
Connections	#1 & #6 Pickup Coil; Pink ↔ Brown
	#2 & #5 Pickup Coil; Gray ↔ Red
	#3 & #4 Pickup Coil; White ↔ Orange
Meter Reading:	160 – 240 Ω

- Using the highest resistance range of the ohmmeter, measure the resistance between the pickup coil wires and chassis ground.
- ★ Any meter reading less than infinity (∞) indicates a short, necessitating replacement of the pickup coil assembly.
- Visually inspect the pickup coil assembly.
- ★ If it is damaged, replace the pickup coil assembly.

**5. Switch Inspection**

- Using the ohmmeter, check to see that only the connections shown in the table have continuity (about zero ohms).
- ★ If the switch has an open or a short circuit, repair or replace it with a new one.



**Engine Stop Switch Connections**

	Red	Yellow/Red
OFF		
RUN	●—————●	


**Ignition Switch Connections**

	White	Brown	Blue/White	Blue	Red	White/Black	Orange/Green
LOCK, OFF							
ACC	●—————●						
ON	●—————●			●—————●		●—————●	
P (PARK)	●—————●			●—————●		●—————●	●—————●


**Side Stand Switch Connections**

	Brown	Green/White
When the side stand is left up	●—————●	
When the side stand is left down		

**Starter Lockout Switch Connections**

	Light Green	Yellow/Green	
When the clutch lever is pulled in		●—————●	●—————●
When the clutch lever is released	●—————●	●—————●	

**Neutral/Overdrive Switch Connections**

	Brown		Green/Blue
When the transmission is in neutral	●—————●		
When the transmission is in overdrive (5th)		●—————●	●—————●
When the transmission is in other positions			

**6. Junction Box Inspection**

Refer to p. 5-3.

**Power Supply Inspection:**

<b>Switch Positions:</b>	
Ignition Switch	ON
Headlight Adjusting Switch	UP and DOWN
<b>Meter Connections:</b>	
Wire location	Headlight adjuster 2 pin connector
Meter range	25 VDC
Meter (+)	Y/BK (UP) Y/R (DOWN)
Meter (-)	Ground

**Headlight Adjusting System**

**Checking Power Supply to Headlight Adjuster**

- Using a voltmeter, check the voltage of the power supply wires.
- ★If the battery power does not reach the adjuster, inspect the main relay, headlight adjusting switch, and ignition switch for damage.
- ★If the battery power reaches the adjuster, inspect the headlight adjuster.

**Main Relay Inspection**

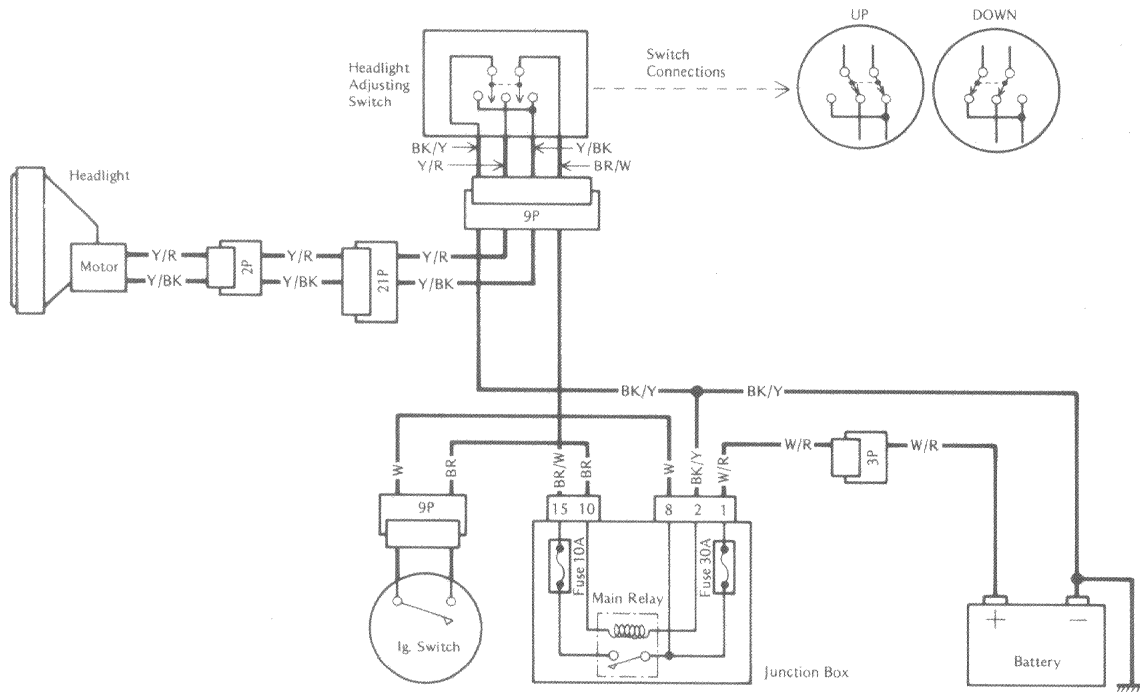
Refer to p. 5-4.

**Headlight Adjusting Switch Inspection**

- Remove the fuel tank, and disconnect the headlight adjusting switch connector.
- Zero the ohmmeter, and connect it to the wires from the headlight adjusting switch.



Headlight Adjuster Circuit



Headlight Adjusting Switch Operation:

Ignition Switch Position:		OFF			
Meter Connections:		Female headlight adjusting switch connector (disconnected)			
Wire location		x 1 Ω			
Meter range					
Headlight Adjusting Switch Position:		UP			
One meter wire →		BK/W	Y/R	BK/W	Y/BK
Other meter wire →		Y/BK	BK/Y	Y/R	BK/Y
Meter Reading:		0 Ω	0 Ω	∞ Ω	∞ Ω
Headlight Adjusting Switch Position:		DOWN			
One meter wire →		BK/W	Y/BK	BK/W	Y/R
Other meter wire →		Y/R	BK/Y	Y/BK	BK/Y
Meter Reading:		0 Ω	0 Ω	∞ Ω	∞ Ω

Ignition Switch Inspection

- Turn off the ignition switch, and disconnect the ignition switch 9-pin connector.
- Zero the ohmmeter, and measure the resistance between any two leads.

Ignition Switch Inspection:

Meter Connections:		Male ignition switch connector (disconnected)	
Lead location		x 1 Ω	
Meter range		White	
One meter lead →		Brown	
Other meter lead →			
Meter Reading:			
Ignition switch off →		0 Ω	
Ignition switch on →		∞ Ω	

**Headlight Adjuster Inspection**

- Remove the headlight assembly, and disconnect the connector.
- Connect the 12-volt battery and headlight adjuster motor leads as shown.
- ★ If the adjuster does not operate, the motor is defective and must be replaced.

**Headlight Adjuster Inspection:**

Wire Connections:		Headlight Adjuster 2-pin connector
Wire location		Headlight Beam
Battery (+) → Y/BK wire	Battery (-) → Y/R wire	UP
Battery (+) → Y/R wire	Battery (-) → Y/BK wire	DOWN

**Neutral/Overdrive Switch:**

Gear position	Brown switch lead	Green/blue switch lead	Chassis ground
Neutral	●	●	●
1st through 4th gear			
Overdrive		●	●

**Air Suspension Leveling System**

Check the circuit of the following parts, if the trouble is suspected in the system operation. Before inspecting, make sure that all connectors and wires in the system are clean, tight and in good condition.

- Suspension Switch
- Suspension Pump
- Solenoid Valve

**Testing the Suspension Switch**

- Remove the switch body from the right fairing.
- Pull out the 6-pin connector.
- Use an ohmmeter to verify that all the connections listed in the table are making contact (zero ohms between these wires).
- ★ If the reading shows an open or short, replace the switch as a unit.

**Suspension Switch Connections**

Button		Lead Color					
		R/W	BK	Y/B	BR	W	BL
UP	FRONT	●	●	●			
	REAR	●	●			●	
DOWN	FRONT	●		●	●		
	REAR	●				●	●
CHECK	FRONT	●		●			
	REAR	●				●	

**In-Circuit Inspection of Suspension Pump**

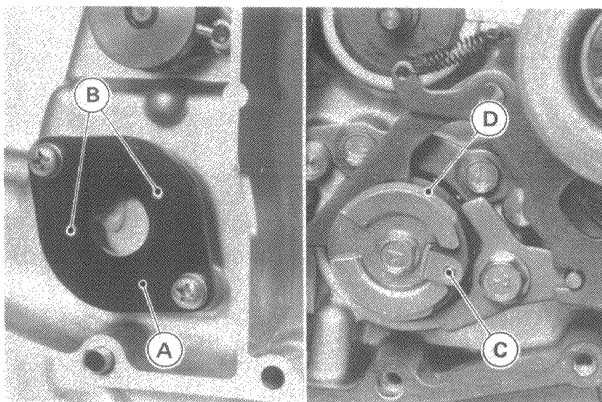
- Make certain the transmission is in neutral, and turn the ignition switch ON.
- Push the UP button of the suspension switch and listen to the pump.
- ★ If the pump motor runs at this time, the pump and its circuit are considered to be operating properly.
- ★ If the above inspection shows failure, proceed to Out of Circuit Inspection.

**Neutral and Overdrive Switch**

The overdrive switch is combined with the neutral switch. This component is installed in the external shift mechanism cover, consists of two contact points.

**Neutral and Overdrive Switch Inspection**

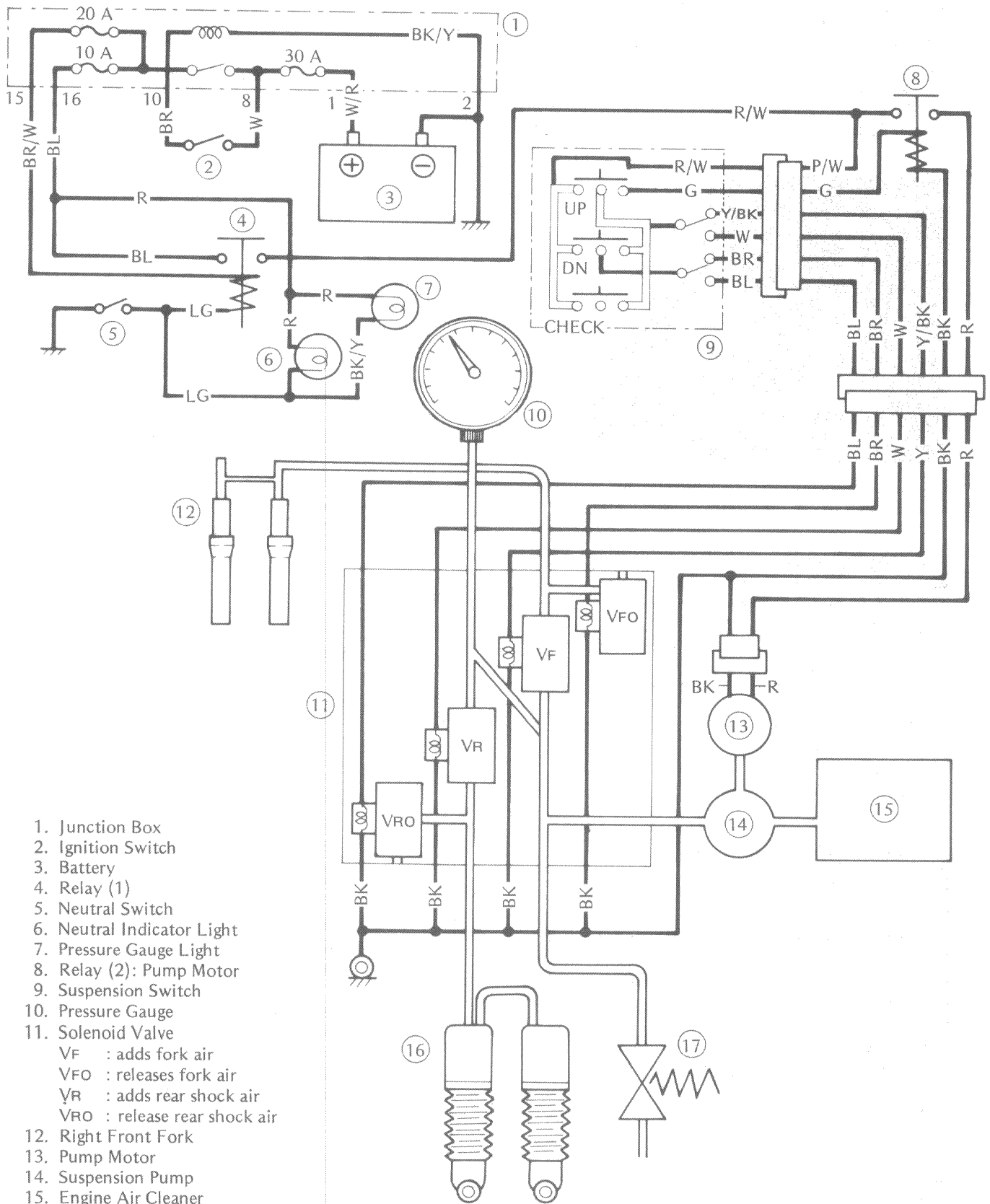
- Disconnect the neutral and overdrive switch connectors.
- Using the ohmmeter, check to see that the connections shown in the table have continuity (about zero ohms).
- ★ If the switch will not close, it can be removed for repair. The contact surfaces may be cleaned, but if any contacts are not repairable, the switch and shift drum contact must be replaced.



A. Neutral and Overdrive Switch  
B. Contacts

C. Contact  
D. Shift Drum

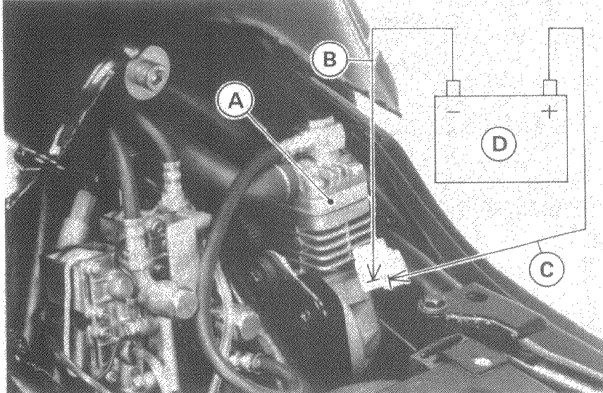
Air Suspension Leveling System Circuit



- 1. Junction Box
- 2. Ignition Switch
- 3. Battery
- 4. Relay (1)
- 5. Neutral Switch
- 6. Neutral Indicator Light
- 7. Pressure Gauge Light
- 8. Relay (2): Pump Motor
- 9. Suspension Switch
- 10. Pressure Gauge
- 11. Solenoid Valve
  - VF : adds fork air
  - VFO : releases fork air
  - VR : adds rear shock air
  - VRO : release rear shock air
- 12. Right Front Fork
- 13. Pump Motor
- 14. Suspension Pump
- 15. Engine Air Cleaner
- 16. Left Rear Shock Absorber
- 17. Drain Valve

**Out-of-Circuit Inspection of Suspension Pump**

- Disconnect the 2-pin connector of the pump.
- Connect a 12 V battery to the 2-pin connector (pump side), and check whether the pump operates.
- ★If the pump does not operate, the trouble is with the pump or pump leads. Check the pump and leads, and replace them if necessary.
- ★If the pump operates normally, proceed to *suspension Power Supply Inspection*.



A. Suspension Pump      C. To Red Lead (+)  
 B. To Black Lead (-)      D. Battery

**Checking Power Supply to the Suspension Pump**

- Disconnect the 2-pin connector of the pump.
  - Using the voltmeter, check the voltage of the power supply wires.
  - ★If the meter does not show the specified voltage, check the suspension switch, main harness wires, the neutral indicator circuit, relays, or the ignition switch for damage.
- Suspension Switch Inspection . . . . . (P. xxxx)  
 Neutral Switch Inspection . . . . . (P. xxxx)  
 Relay Inspection . . . . . (P. xxxx)  
 Ignition Switch Inspection . . . . . (P. xxxx)

**Checking Power Supply to Suspension Pump**

Gear Position:	Neutral
Ignition Switch:	<b>ON</b>
Suspension Switch:	hold <b>UP</b> button
Voltmeter Connections:	(2-pin connector)
(x 25 V DC)	
Meter (+) →	Red lead
Meter (-) →	Black lead
Meter Reading:	Battery Voltage

**Solenoid Valve Inspection**

- Turn off the ignition switch.
- Disconnect the solenoid valve 6-pin connector.
- Connect an ohmmeter to the connector (female) and measure the solenoid valve resistance.
- If the meter does not show the specifications, replace the solenoid valve.

**Solenoid Valve Resistance**

Meter Range:	x 1 Ω
Connections:	BL – Ground lead (BK) BR – Ground lead (BK) W – Ground lead (BK) Y – Ground lead (BK)
Reading:	7 – 8.5 Ω (all)

**Air Horn**

**CAUTION**

- Do not push the horn button for more than ten seconds, as the air pump could overheat and seize.

**“NOTE”**

- When the motorcycle is washed, cover the horns and air pump with the pouch of the vinyl to prevent the water inroaded.

**Horn Trouble:**

If the air horn does not function properly, first check that the air compressor is powered by the battery and then inspect the horn relay and main relay.

**Checking Power Supply to Air Horn**

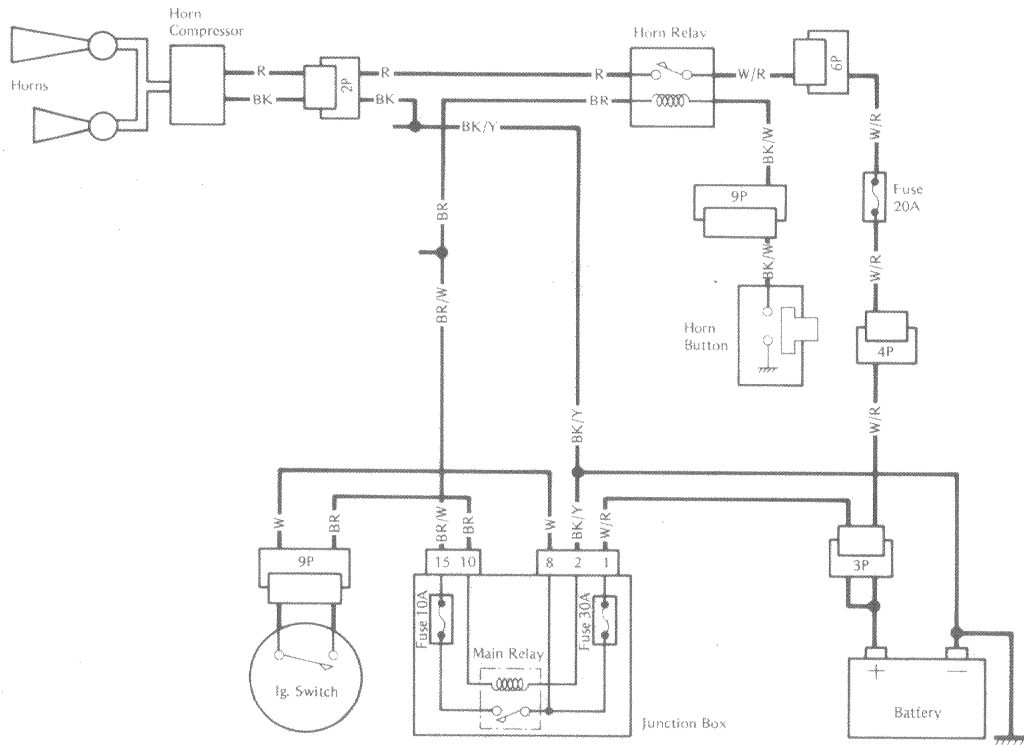
- Using a voltmeter, check the voltage of the power supply wires.
- ★If the battery power does not reach the 2-pin connector, inspect the main relay, horn relay, and ignition switch for damage.

**Power Supply Inspection:**

Switch Positions:	
Ignition Switch	ON
Horn Button	ON
Meter Connections:	
Wire location	Horn Compressor 2-Pin Connector
Meter range	25 VDC
Meter (+)	Red Wire
Meter (-)	Black wire
Meter Reading:	Battery voltage

- ★If the battery power reaches the 2-pin connector, inspect the horn compressor with the battery.
- Apply 12 volts to the compressor wires.
- ★If the horn does not sound, the horn compressor is defective and must be replaced. It cannot be disassembled.

**Air Horn Circuit**



**Power Supply to Air Horn:**

<b>Wire Connections:</b>	
Wire location	Horn compressor 2-pin connector
Battery (+)	Red wire
Battery (-)	Black wire

**Main Relay Inspection**

Refer to p. 5-4.

**Horn Relay Inspection**

Refer to p. 5-4 of Testing Relays section at junction box.

**Ignition Switch Inspection**

- Turn off the ignition switch, and disconnect the ignition switch 9-pin connector.
- Zero the ohmmeter, and measure the resistance between any two leads.

**Ignition Switch Inspection:**

<b>Meter Connections:</b>	
Lead location	Male ignition switch connector (disconnected)
Meter range	x 1 Ω
One meter lead →	White
Other meter lead →	Brown
<b>Meter Reading:</b>	
Ignition switch off →	0 Ω
Ignition Switch on →	∞ Ω

**LCD Instrument System**

**LCD Instrument System Troubleshooting:**

If trouble is suspected in the LCD instrument system, check the system by the following "Troubleshooting Guide" table and the test charts. The "Troubleshooting Guide" shows the relationship between various kinds of symptoms of LCD instrument system trouble and the test chart by which the system should be inspected. Each test procedure is explained individually on the pages before the charts.

**"NOTE"**

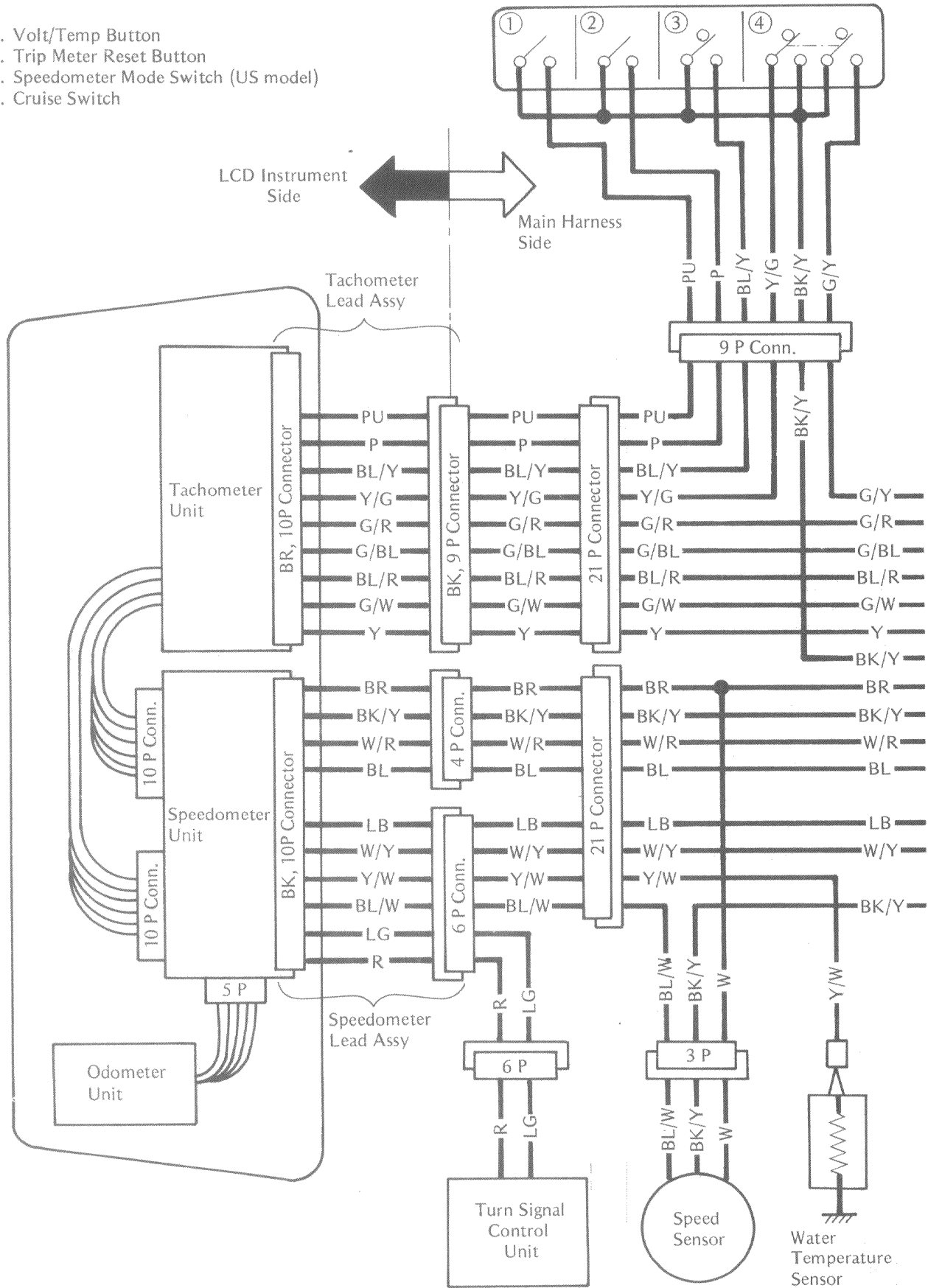
- If all the tests prove that the LCD instrument system is good, but the system still shows trouble while riding; test the system with the engine running. Trouble may result from engine vibration.
- The trip meter keeps the data in its memory, even if the ignition switch is turned off. However, the meter clears the memory when the connections that connect the meter directly to the battery are disconnected.  
White/red wire in 4-pin connector → Battery (+)  
Black/yellow wire in 4-pin connector → Battery (-)
- Check the "Ignition ON Signal Test" before checking each signal test and function test.

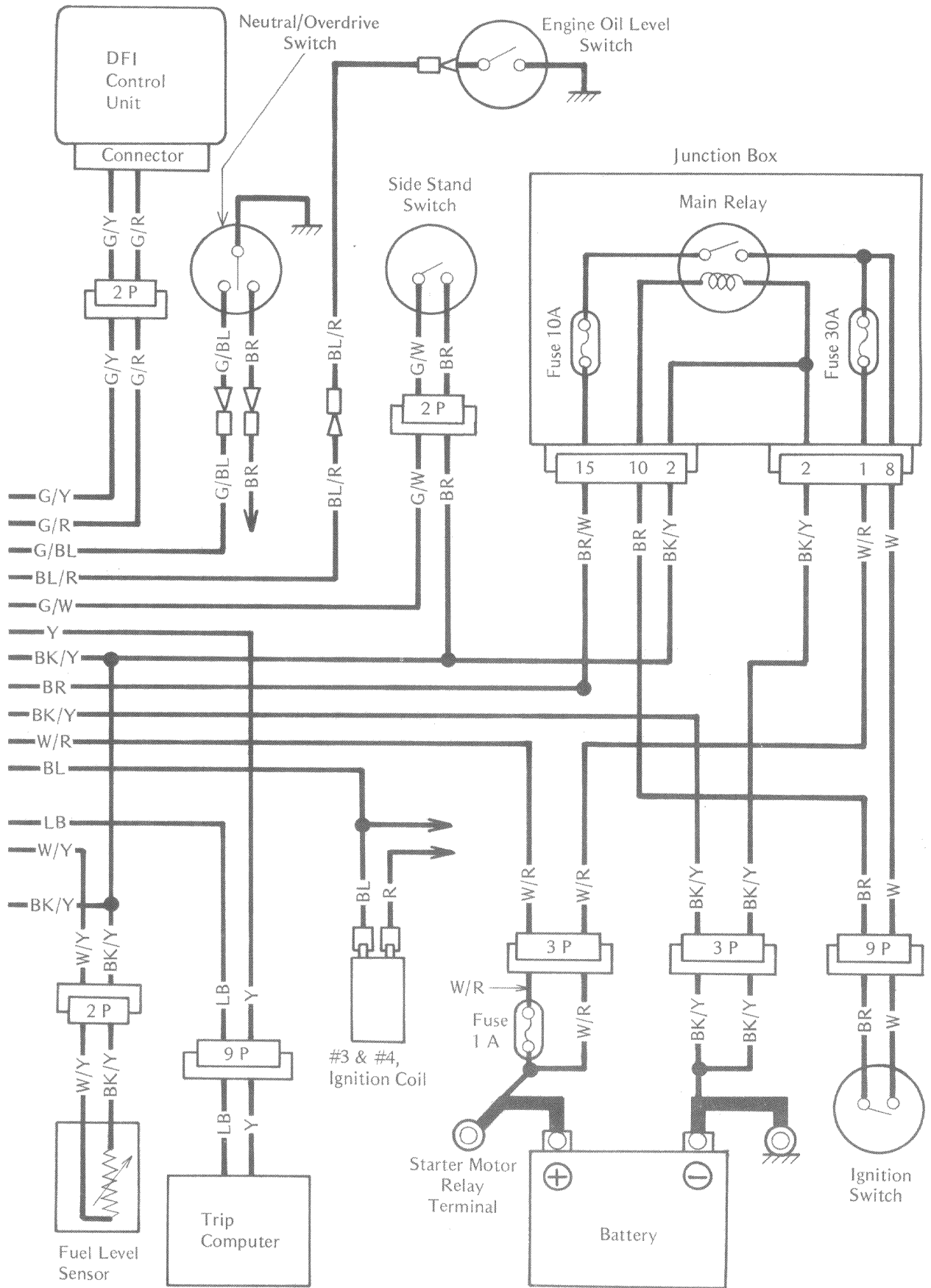
**CAUTION**

- To prevent damage to LCD instrument parts, do not disconnect the battery leads or any other instrument connections when the ignition switch is on, or during the engine is running.

LCD Instrument System Wiring Diagram

1. Volt/Temp Button
2. Trip Meter Reset Button
3. Speedometer Mode Switch (US model)
4. Cruise Switch





**Troubleshooting Guide**

Test Chart No.	Symptoms
1	LCD instrument does not display at all and odometer does not operate.
2	Speedometer, odometer, and/or trip meter do not operate correctly.
3	Tachometer, fuel gauge, and/or water temperature gauge do not operate correctly.
4	Voltmeter does not operate correctly.
5	Trip meter reset, speedometer mode switchover, DFI warner, side stand warner, engine oil level warner, and/or cruise indicator do not operate correctly.
6	Temp/volt switchover and/or overdrive indicator do not operate correctly.
7	LED warning does not operate correctly.
8	Distance signal does not reach turn signal control unit.
9	Fuel full signal does not reach trip computer.
10	Distance signal does not reach trip computer.

**Description of Each Test Procedure:**

*Battery Power Supply Test*

Meter Connections:	
Wire location	Female, 4-pin connector (disconnected) or Female, brown, 10-pin connector (disconnected)
Meter range	25 V DC
Meter (+) →	White/red wire
Meter (-) →	Black/yellow wire
Meter Reading:	Battery voltage regardless of ignition switch positions.

*Signal Test*

**Ignition ON Signal:**

Meter Connections:	
Wire location	Female, 4-pin connector (disconnected) or Female, brown, 10pin connector (disconnected)
Meter range	25 V DC
Meter (+) →	Brown wire
Meter (-) →	Black/yellow wire
Meter Reading:	Battery voltage when ignition switch is on. 0 V when ignition switch is off.

**Speed Sensor Signal (1)**

Ignition Switch Position: ON	
Wire location	Male, 6-pin connector (disconnected) or speedometer unit terminal (disconnected)
Meter range	10 V DC
Meter (+) →	Blue/white wire
Meter (-) →	Chassis ground
Meter Reading:	5 – 8 V

**Speed Sensor Signal (2)**

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

Ignition Switch Position: ON	
Meter Connections:	
Wire location	6-pin connector (connected)
Meter range	10 V DC
Meter (+) →	Blue/white wire
Meter (-) →	Chassis ground
Meter Reading:	Pointer should oscillate 23 times per wheel revolution between 5 – 8 V and less than 1 V.

**Engine Speed Signal:**

Ignition Switch Position: ON	
Meter Connections:	
Wire location	Female 6-pin connector (disconnected) or Female, brown, 10-pin connector (disconnected)
Meter range	10 V DC
Meter (+) →	Blue wire
Meter (-) →	Chassis ground
Meter Reading:	5 – 8 V when engine is running.

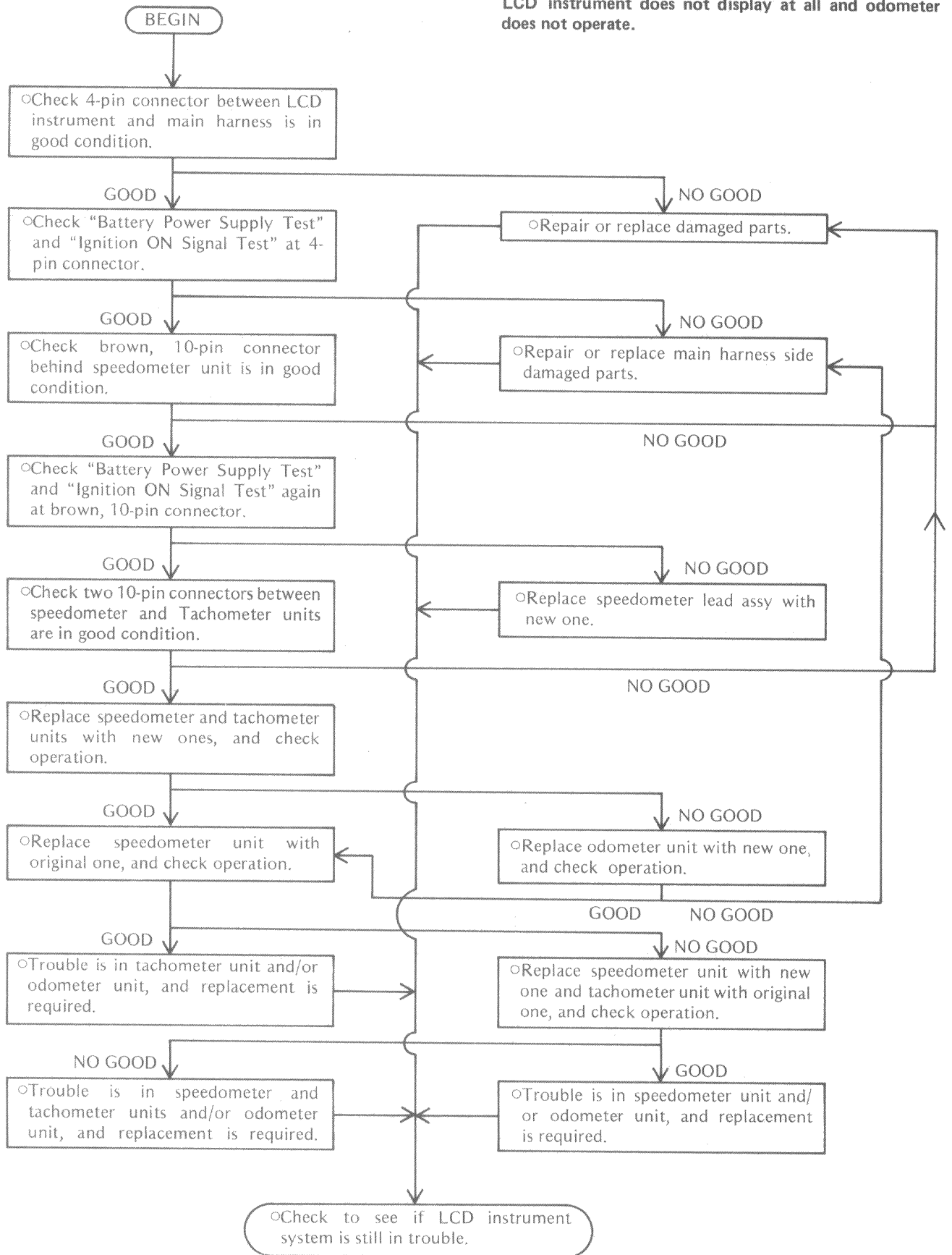
**Fuel Sensor Signal:**

Ignition Switch Position: OFF	
Meter Connections:	
Wire location	Female 6-pin connector (disconnected) or Female, brown, 10-pin connector (disconnected)
Meter range	x 10 Ω
One meter lead →	White/yellow wire
Other meter lead →	Chassis ground
Meter Reading:	0.5 – 118 Ω



No. 1 Test Chart

LCD instrument does not display at all and odometer does not operate.

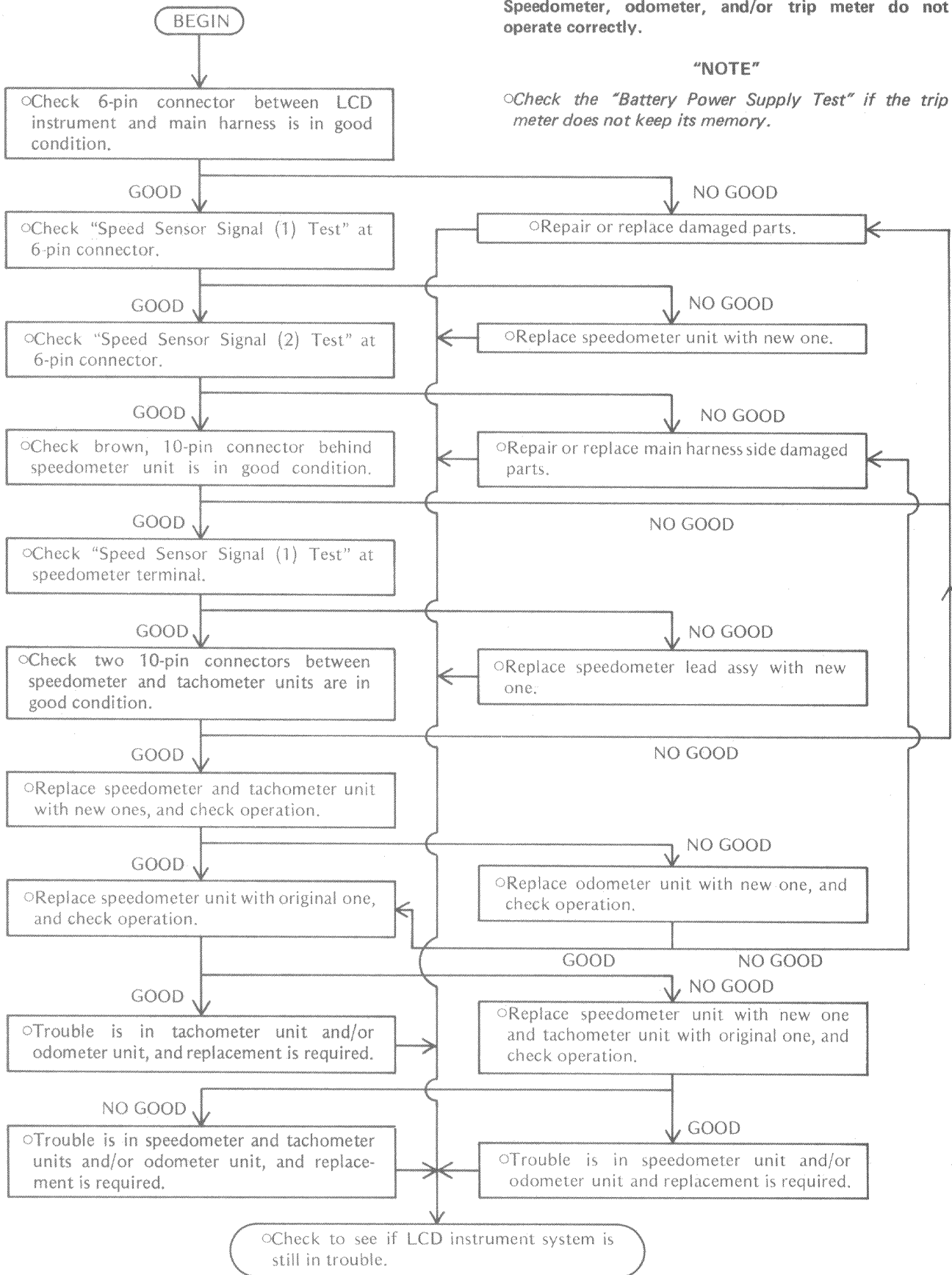


No. 2 Test Chart

Speedometer, odometer, and/or trip meter do not operate correctly.

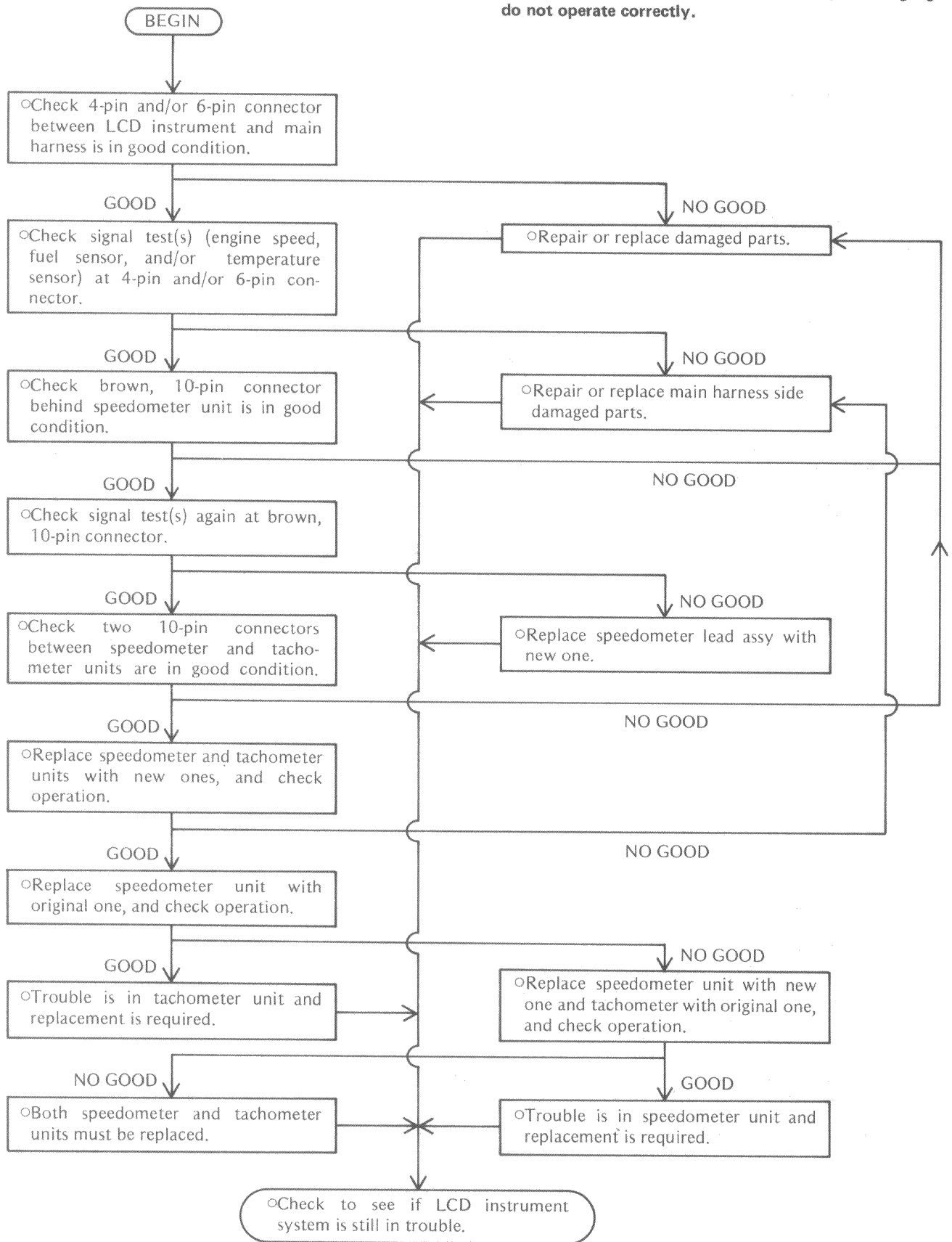
**"NOTE"**

○Check the "Battery Power Supply Test" if the trip meter does not keep its memory.



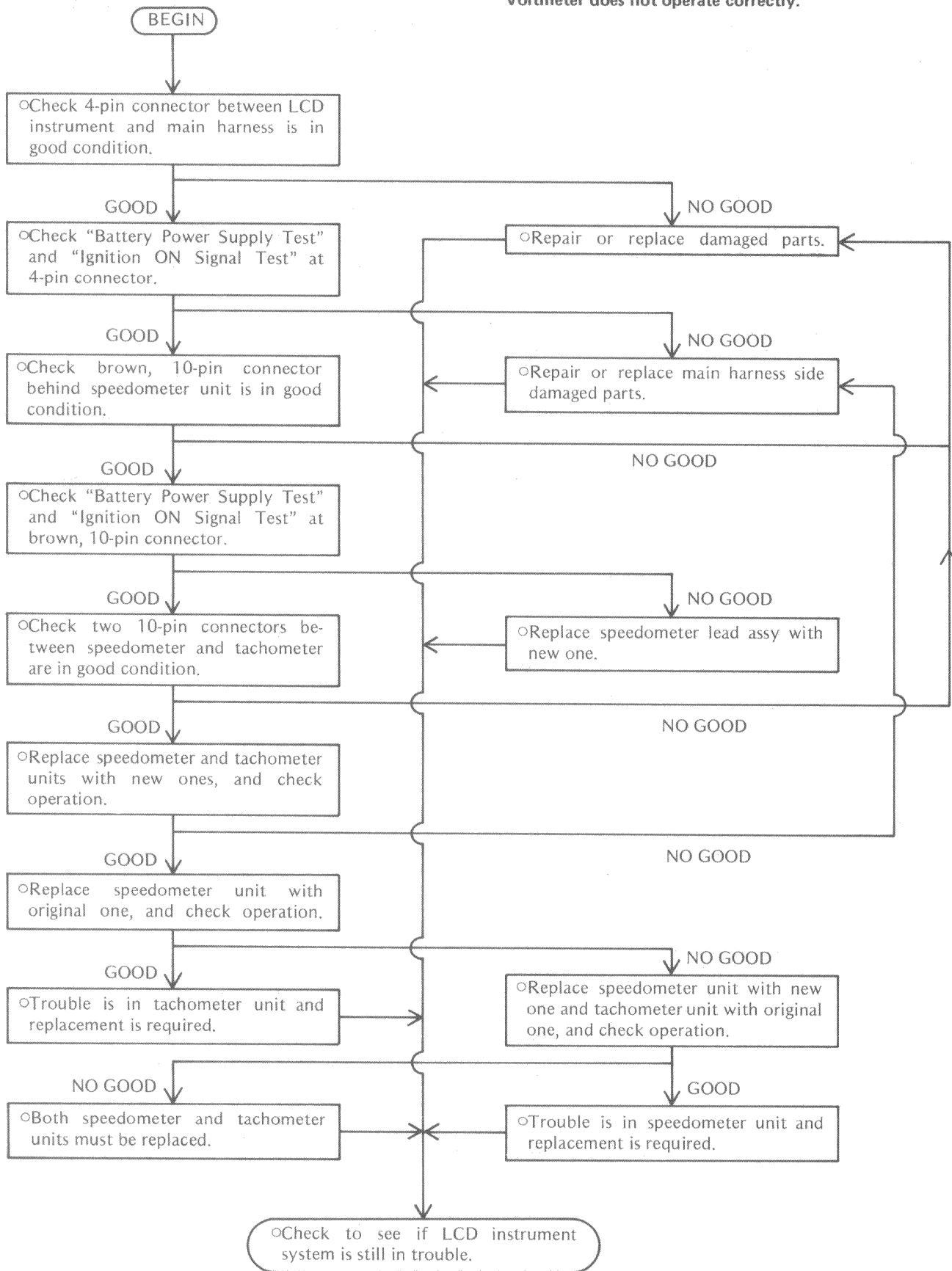
No. 3 Test Chart

Tachometer, fuel gauge, and/or water temperature gauge do not operate correctly.



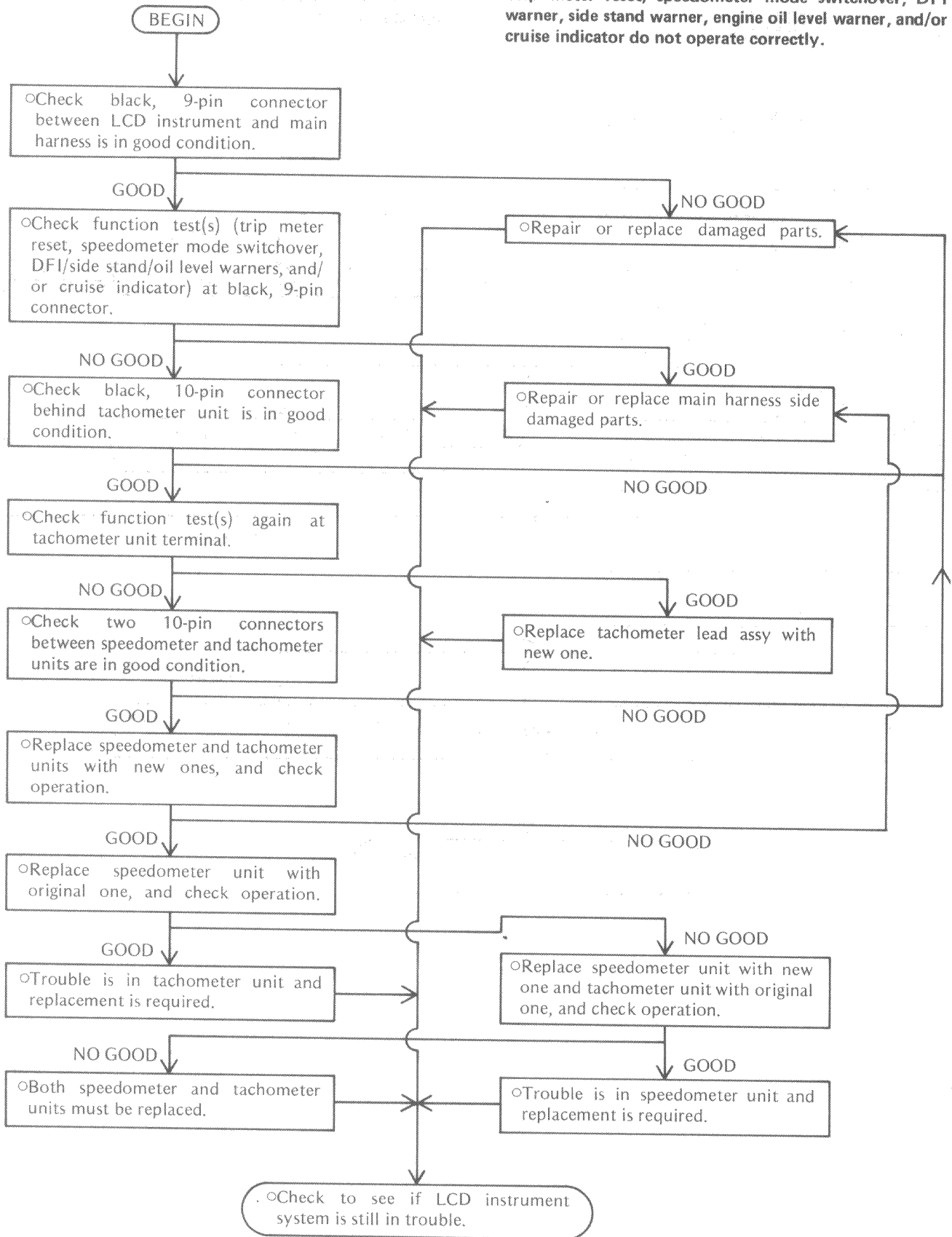
No. 4 Test Chart

Voltmeter does not operate correctly.



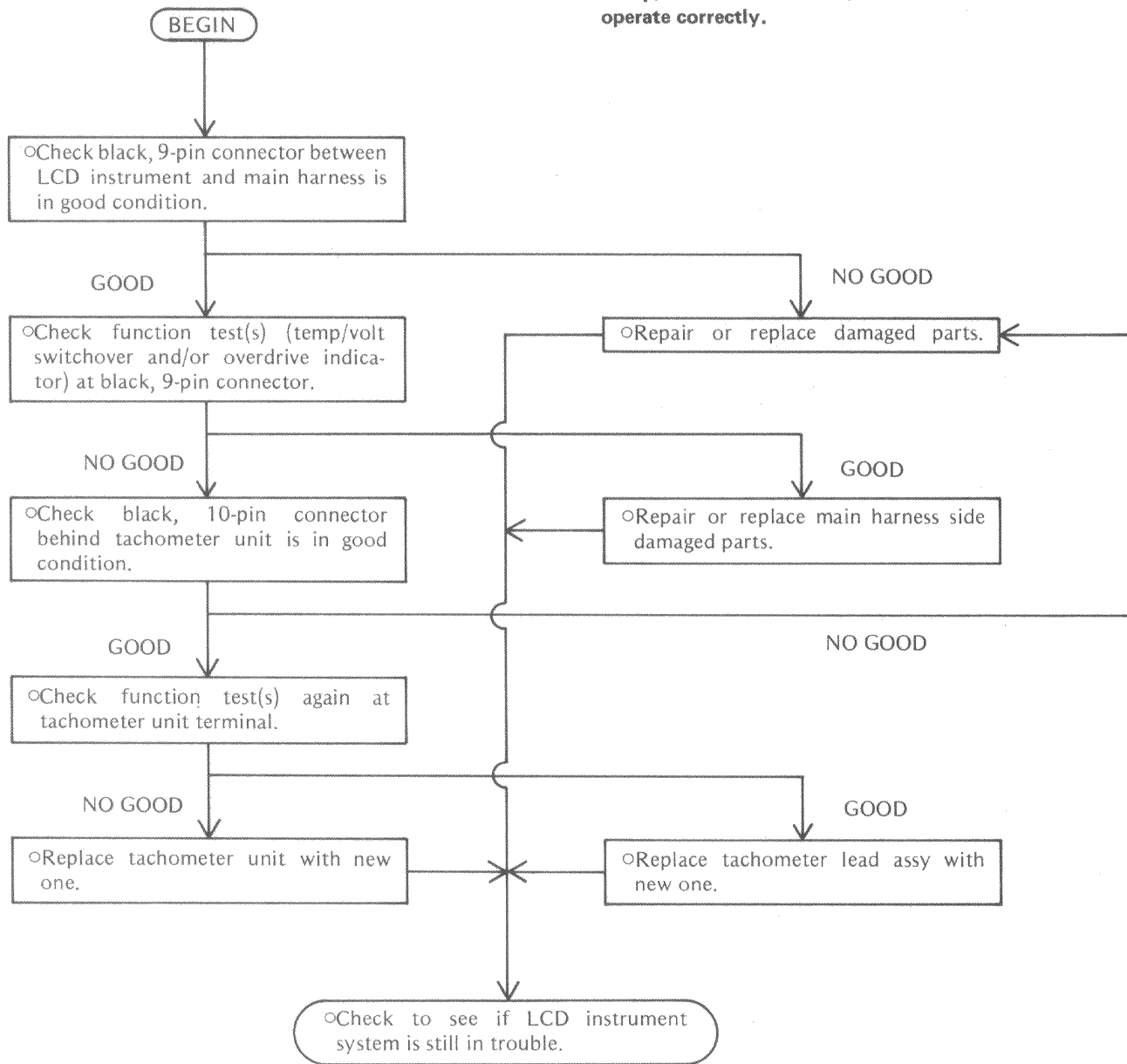
No. 5 Test Chart

Trip meter reset, speedometer mode switchover, DFI warner, side stand warner, engine oil level warner, and/or cruise indicator do not operate correctly.



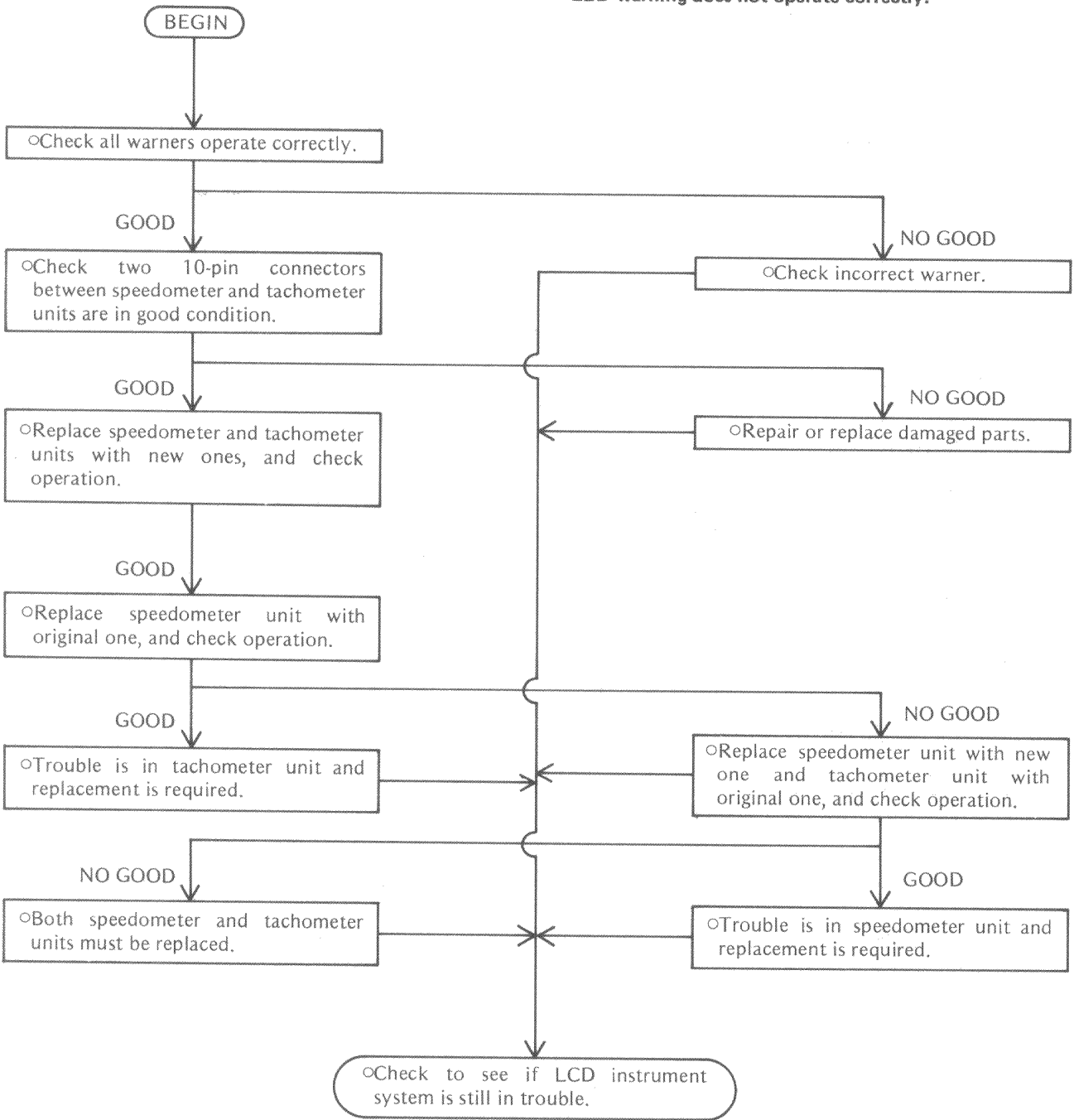
No. 6 Test Chart

Temp/volt switchover and/or overdrive indicator do not operate correctly.



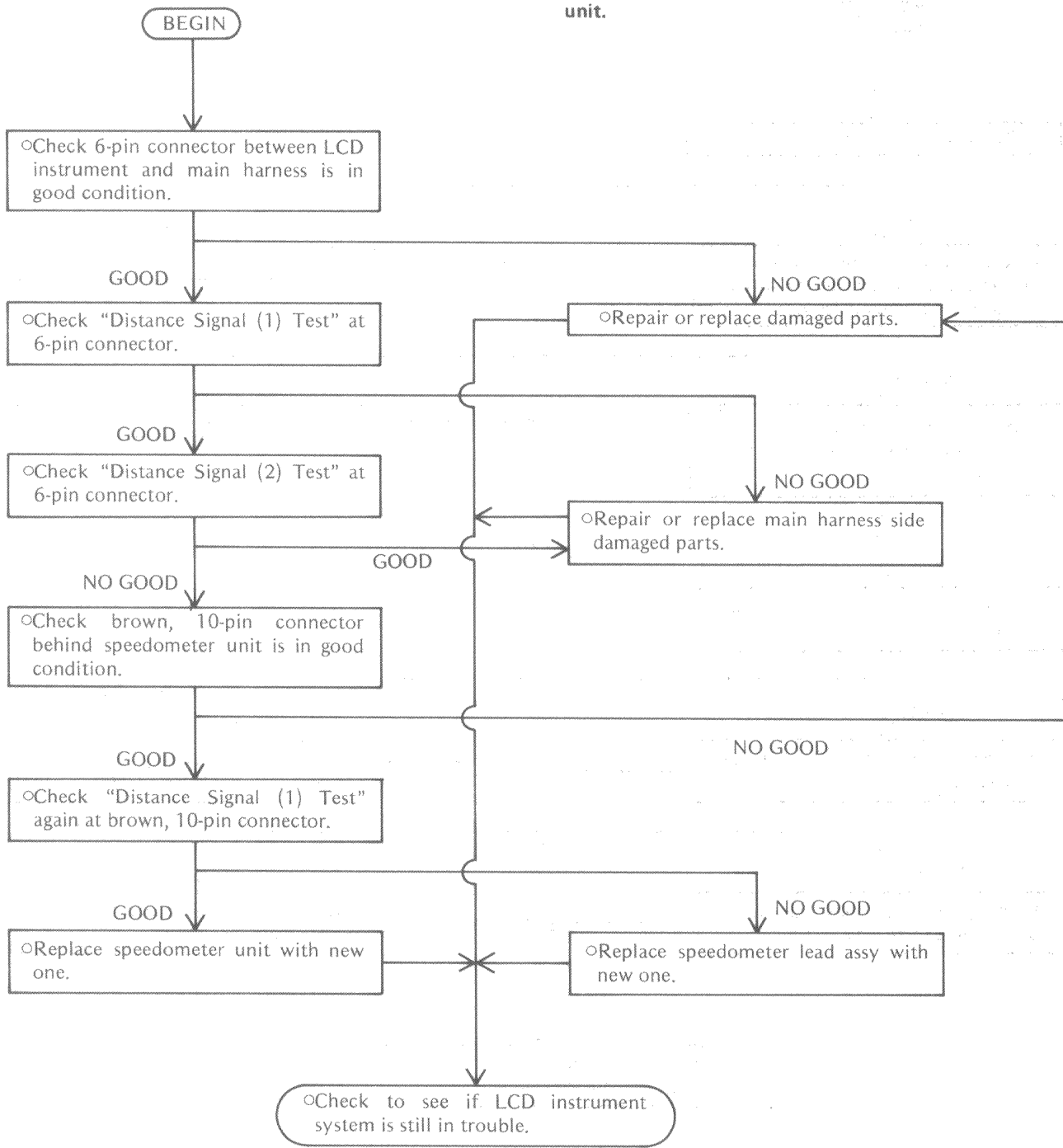
No. 7 Test Chart

LED warning does not operate correctly.



No. 8 Test Chart

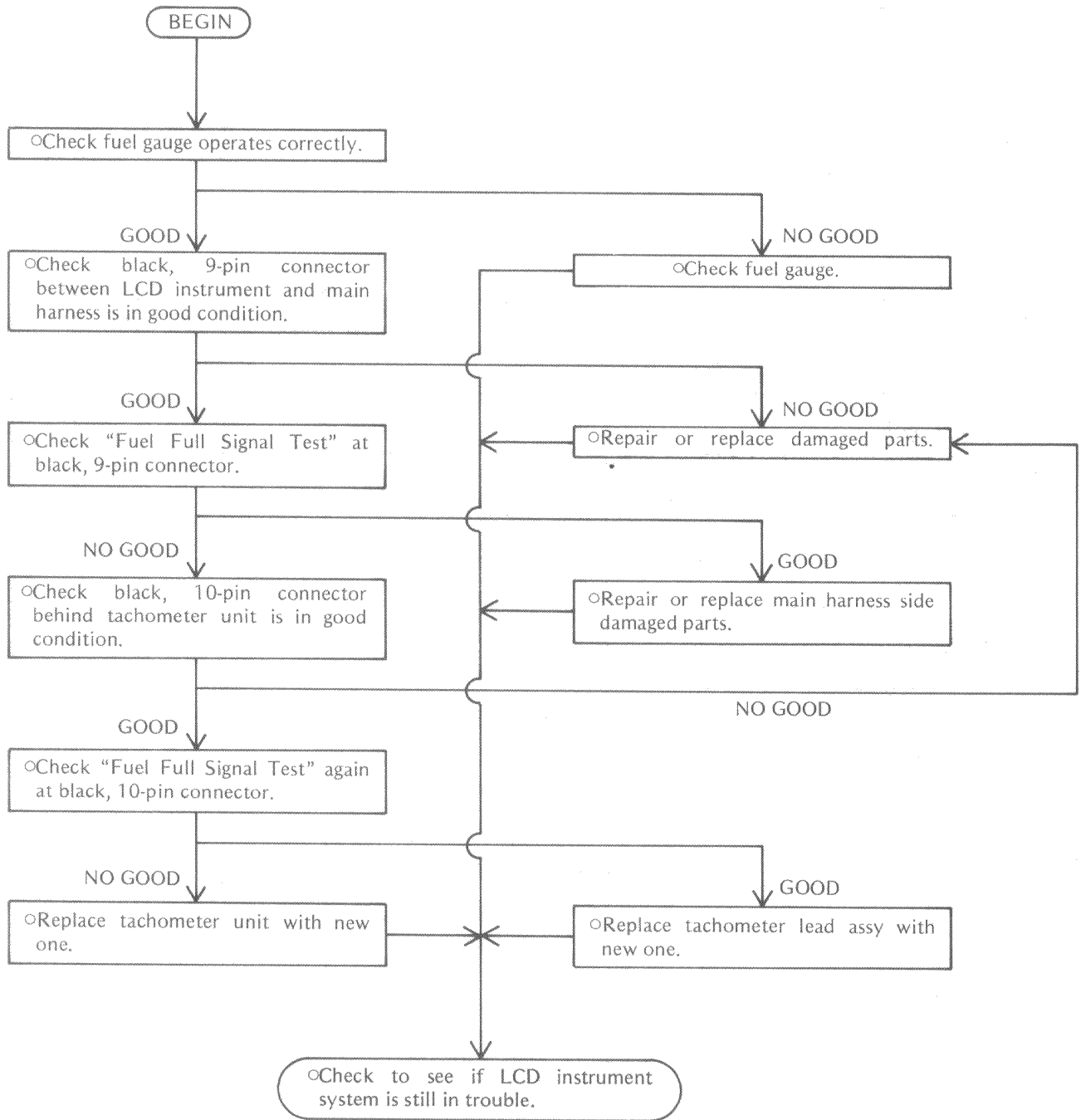
Distance signal does not reach the turn signal control unit.





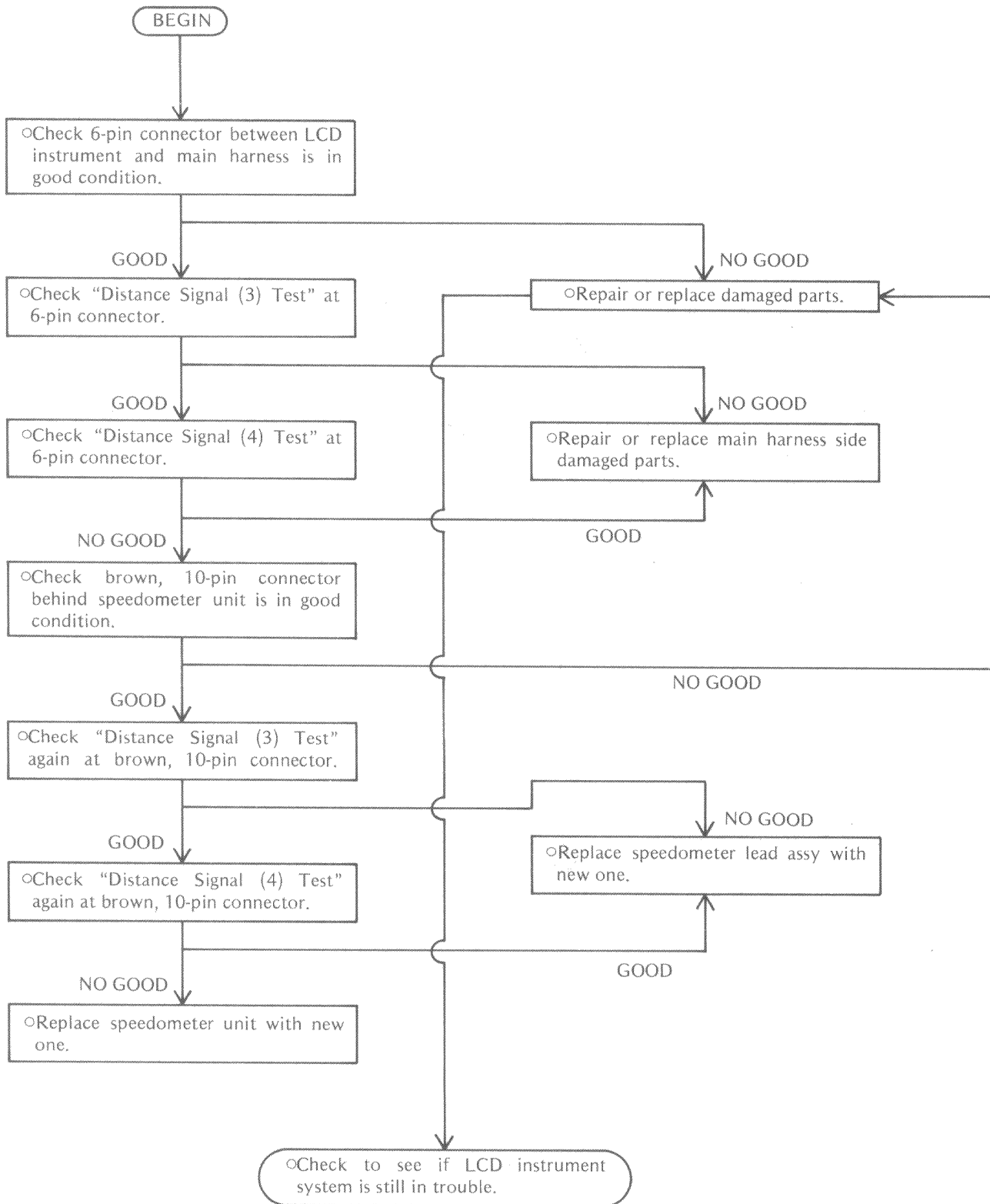
No. 9 Test Chart

Fuel full signal does not reach the trip computer.



No. 10 Test Chart

Distance signal does not reach the trip computer.



**Water Temperature Sensor Signal:**

- Check the test with the engine is running.

Meter Connections:	
Wire location	Female 6-pin connector (disconnected) or Female, brown, 10-pin connector (disconnected)
Meter range	x 1 Ω
One meter lead →	Yellow/white wire
Other meter lead →	Chassis ground
*Meter Reading:	Reading should decrease as the engine is warmed up.

\*47 – 57 Ω when temperature sensor is 80° C (176°F), and 26 – 30 Ω when 100° C (212°F).

**Distance Signal (1) (for turn signal control unit):**

Ignition Switch Position: ON	
Meter Connections:	
Wire location	Female, 6-pin connector (disconnected) or Female, brown, 10-pin connector (disconnected)
Meter range	10 V DC
Meter (+) →	Red wire
Meter (–) →	Chassis ground
Meter Reading:	6 – 8 V

**Distance Signal (2) (for turn signal control unit):**

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

Ignition Switch Position: ON	
Meter Connections:	
Wire location	6-pin connector (connected)
Meter range	10 V DC
Meter (+) →	Red wire
Meter (–) →	Light green wire
Meter Reading:	Pointer should oscillate 23 times every two revolutions, between 6 – 8 V and less than 0.5 V.

**Distance Signal (3) (for trip computer):**

Ignition Switch Position: ON	
Meter Connections:	
Wire location	Female 6-pin connector (disconnected) or Female, brown, 10-pin connector (disconnected)
Meter range	10 V DC
Meter (+) →	Light blue wire
Meter (–) →	Chassis ground
Meter Reading:	4 – 6 V

**Distance Signal (4) (for trip computer):**

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

Ignition Switch Position: ON	
Meter Connections:	
Wire location	6-pin connector (connected) or brown, 10-pin connector (connected)
Meter range	10 V DC
Meter (+) →	Light blue wire
Meter (–) →	Chassis ground
Meter Reading:	Pointer should oscillate 23 times each revolution, between 4 – 6 V and less than 0.2 V.

**Fuel Full Signal**

Ignition Switch Position: ON	
Meter Connections:	
Wire location:	Black, 9-pin connector (connected) or Tachometer unit terminal (disconnected)
Meter range	10 V DC
Meter (+) →	Yellow wire
Meter (–) →	Chassis ground
Meter Reading:	Less than 0.2 V when all nine segments of fuel gauge appear. 4 – 5 V when eight or less than eight segments of fuel gauge appear.

**"NOTE"**

○ A time delay circuit is provided in the fuel and temperature gauge circuits to stabilize the gauge display. It takes 3 to 12 sec for each segment to disappear or appear.

**Function Test****Trip Meter Reset Function:**

- Prepare an auxiliary wire, and connect one end of the wire to chassis ground.

Ignition Switch Position: ON	
Wire Location:	Male, black, 9-pin connector (disconnected)
Results:	Rese to zero after pink wire is shorted to chassis ground for about 1 sec.

**Switchover Function of Speedometer Mode:**

- Prepare an auxiliary wire, and connect one end of it to chassis ground.

Ignition Switch Position:	ON
Wire Location:	Male, black, 9-pin connector (disconnected)
Results:	<ul style="list-style-type: none"> <li>○ When blue/yellow wire is shorted to chassis ground → km/h</li> <li>○ When blue/yellow wire is opened → mph</li> </ul>

**DFI Warner Function Test**

- Prepare an auxiliary wire, and connect one end of it to chassis ground.

Ignition Switch Position:	ON
Wire Location:	Male, black, 9-pin connector (disconnected)
Results:	Left and right segments of DFI warner appear and flash alternately when green/red wire is shorted to chassis ground, and disappear when opened.

**Side Stand Warner Function:**

- Prepare an auxiliary wire, and connect one end of it to chassis ground.

Ignition Switch Position:	ON
Wire Location:	Male, black, 9-pin connector (disconnected)
Results:	Left and right segments of side stand warner disappear when green/white wire is shorted to chassis ground, and appear and flash alternately when opened.

**Engine Oil Level Warner Function:**

- Prepare an auxiliary wire, and connect one end of it to chassis ground.

Ignition Switch Position:	ON
Wire Location:	Male, black, 9-pin connector (disconnected)
Results:	Left and right segments of engine oil level warner do not appear when blue/red wire is shorted to chassis ground, and appear and flash alternately when opened.

**"NOTE"**

- Ignition switch should be turned on after the blue/red wire is shorted to ground.
- Engine oil level warner does not appear and flash alternately only when the blue/red wire is opened. First open the blue/red wire, and turn off the ignition switch. Wait more than 2 min, and then turn on the ignition switch again.

**Cruise Indicator Function:**

- Prepare an auxiliary wire, and connect one end of it to chassis ground.

Ignition Switch Position:	ON
Wire Location:	Male, black, 9-pin connector (disconnected)
Results:	"CRUISE" display does not appear when yellow/green wire is shorted to chassis ground, and appears when opened.

**Switchover Function of Temperature Gauge/Voltmeter:**

- Prepare an auxiliary wire.

Ignition Switch Position:	ON
Wire Location:	Male, black, 9-pin connector (disconnected)
Results:	Works as voltmeter when purple wire is shorted to chassis ground. Works as temperature gauge when purple wire is opened.

**Overdrive Indicator Function:**

- Prepare an auxiliary wire, and connect one end of it to chassis ground.

Ignition Switch Position:	ON
Wire Location:	Male, black, 9-pin connector (disconnected)
Results:	"O/D" display appears when green/blue wire is shorted to chassis ground, and disappears when opened.

**Main Harness Side Troubleshooting:****Wiring and Connector Test**

- Inspect the related wire(s) and connector(s), and repair or replace the damaged part(s).

★If the wire(s) and connector(s) prove good, proceed to the "Button, Switch, and Sensor Test".

**"NOTE"**

○Refer to the "Junction Box" section for junction box, relay, and fuses inspection.

○Check the following items referring to the related system inspections:

Engine speed signal → Ignition System on p. xxx.

DFI warning → FI system on p. xxx.

Distance signal for turn signal control unit → Automatic turn signal canceling system on p. xxx.

Distance signal and fuel full signal for trip computer → Trip computer on p. xxx.

**Button, Switch, and Sensor Test**

**Trip Meter Reset Button:**

Meter Connections:	
Wire location	Male, 9-pin connector (disconnected)
Meter range	x 1 $\Omega$
One meter lead →	Pink wire
Other meter lead →	Black/yellow wire
Meter Reading:	0 $\Omega$ when trip reset button is pushed on. $\infty \Omega$ when trip reset button is released.

**Volt/Temp Button:**

Meter Connections:	
Wire location	Male, 9-pin connector (disconnected)
Meter range	x 1 $\Omega$
One meter lead →	Purple wire
Other meter lead →	Black/yellow wire
Meter Reading:	0 $\Omega$ when volt/temp button is pushed on. $\infty \Omega$ when volt/temp button is released.

**Ignition Switch:**

Refer to the "Ignition Switch Inspection" on p. xxx.

**Speedometer Mode Switch:**

Meter Connections:	
Wire location	Male, 9-pin connector (disconnected)
Meter range	x 1 $\Omega$
One meter lead →	Blue/yellow wire
Other meter lead →	Black/yellow wire
Meter Reading:	0 $\Omega$ (or $\infty \Omega$ ) when speed mode switch is pushed once, and $\infty \Omega$ (or 0 $\Omega$ ) when switch is pushed once more.

**Side Stand Switch:**

Meter Connections:	
Wire location	Switch leads (disconnected)
Meter range	x 1 $\Omega$
One meter lead →	Brown switch lead
Other meter lead →	Green/white switch lead
Meter Reading:	0 $\Omega$ when side stand is up. $\infty \Omega$ when side stand is down.

**Cruise Switch:**

Meter Connections:	
Wire location	Male, 9-pin connector (disconnected)
Meter range	x 1 $\Omega$
One meter lead →	Yellow/green wire (or Green/yellow wire)
Other meter lead →	Black/yellow wire
Meter Reading:	0 $\Omega$ (or $\infty \Omega$ ) when cruise switch is pushed once, and $\infty$ (or 0 $\Omega$ ) when switch is pushed once more.

**Overdrive Switch:**

Refer to the "Neutral/overdrive Switch Inspection" on p. x-xx.

**Speed Sensor:**

●Check that the speed sensor is powered by the battery, using a multimeter.

★If the meter does not show the specified reading, check the power supply wiring.

★If the meter shows the specified reading, the speed sensor is damaged. Replace the sensor.

**Speed Sensor Power Supply**

Ignition Switch Position:	ON
Meter Connections:	
Wire location	Sensor, male, 3-pin connector (disconnected)
Meter range	25 V DC
Meter (+) →	White wire
Meter (−) →	Black/yellow wire
Meter Reading:	Battery voltage

**Fuel Level Sensor:**

Refer to the "Fuel Level Sender Check" on p. 261 of the Base Manual.

**Water Temperature Sensor:**

Refer to the "Water Temperature Sender Check" on p. 262 – 263 of the Base Manual.

**Engine Oil Level Sensor:**

Refer to p. 320 – 321 of the Base Manual.

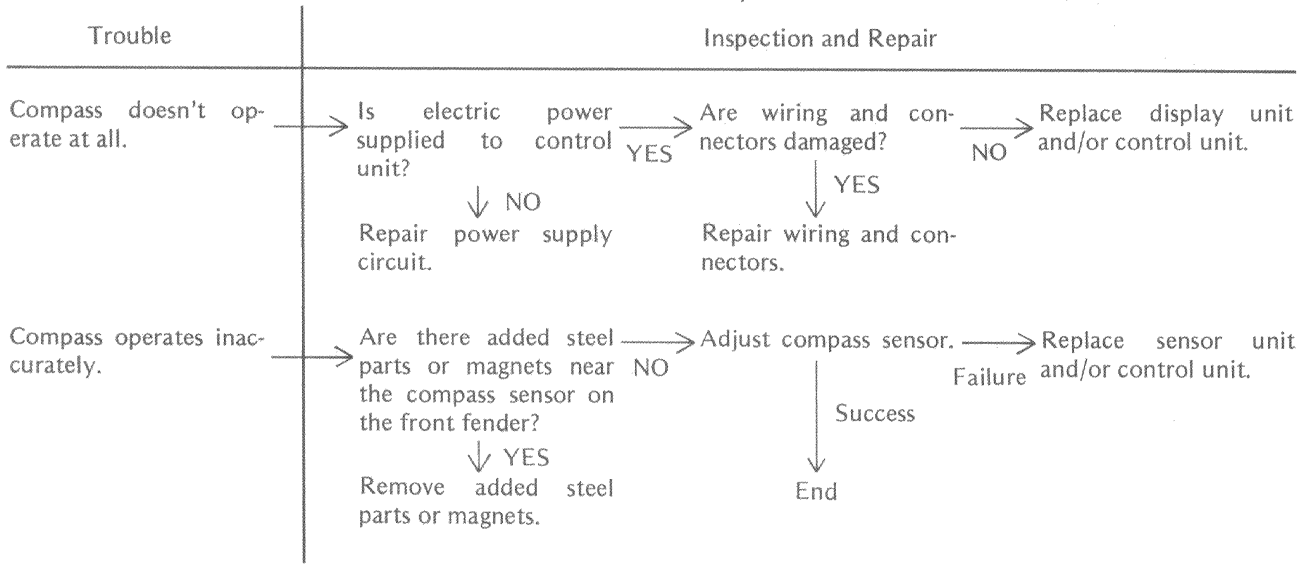


**Troubleshooting Guide:**

Choose a flow chart according to the trouble. Repair or replace a damaged part if it is apparently damaged.

**"NOTE"**

○The compass will be affected by large steel structures such as bridges. It may be affected in dense traffic by the presence of so much iron and steel.



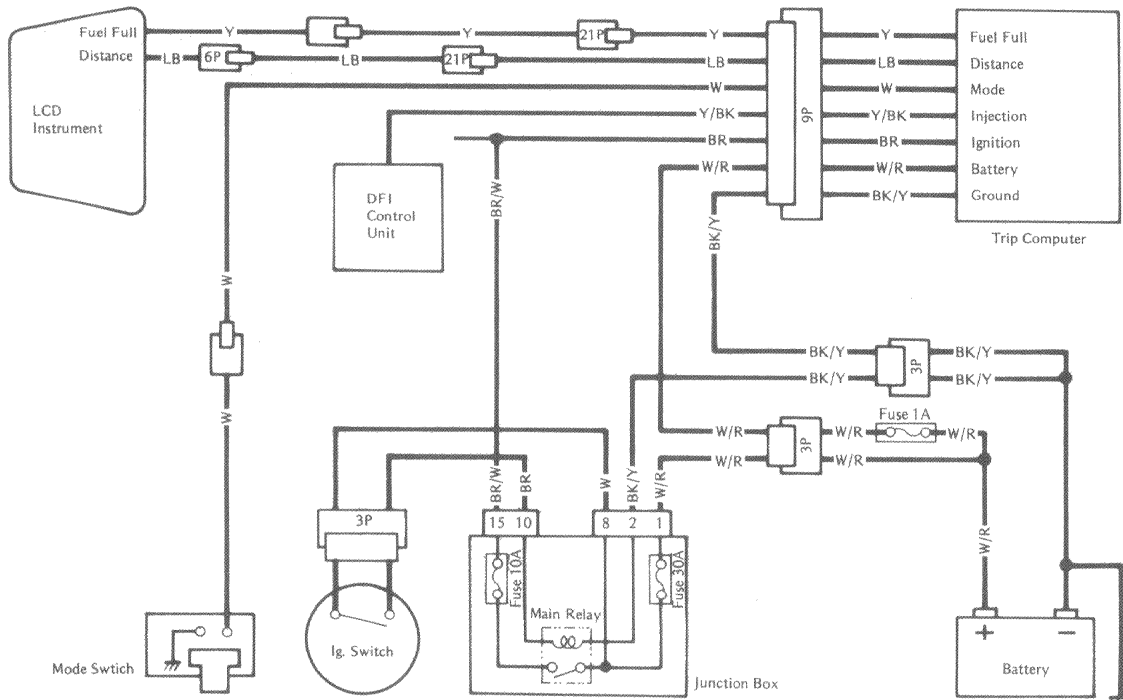
**Trip Computer System**

**Trip Computer System Troubleshooting:**

If there is something wrong with the trip computer, inspect the computer system according to the troubleshooting guide and the test charts. The troubleshooting

guide shows 7 typical symptoms of the computer trouble. Find the symptom applicable to your case and choose the chart number corresponding to the symptom. Follow the procedures in the charts and the cause of the trouble will be discovered.

**Trip Computer Circuit**

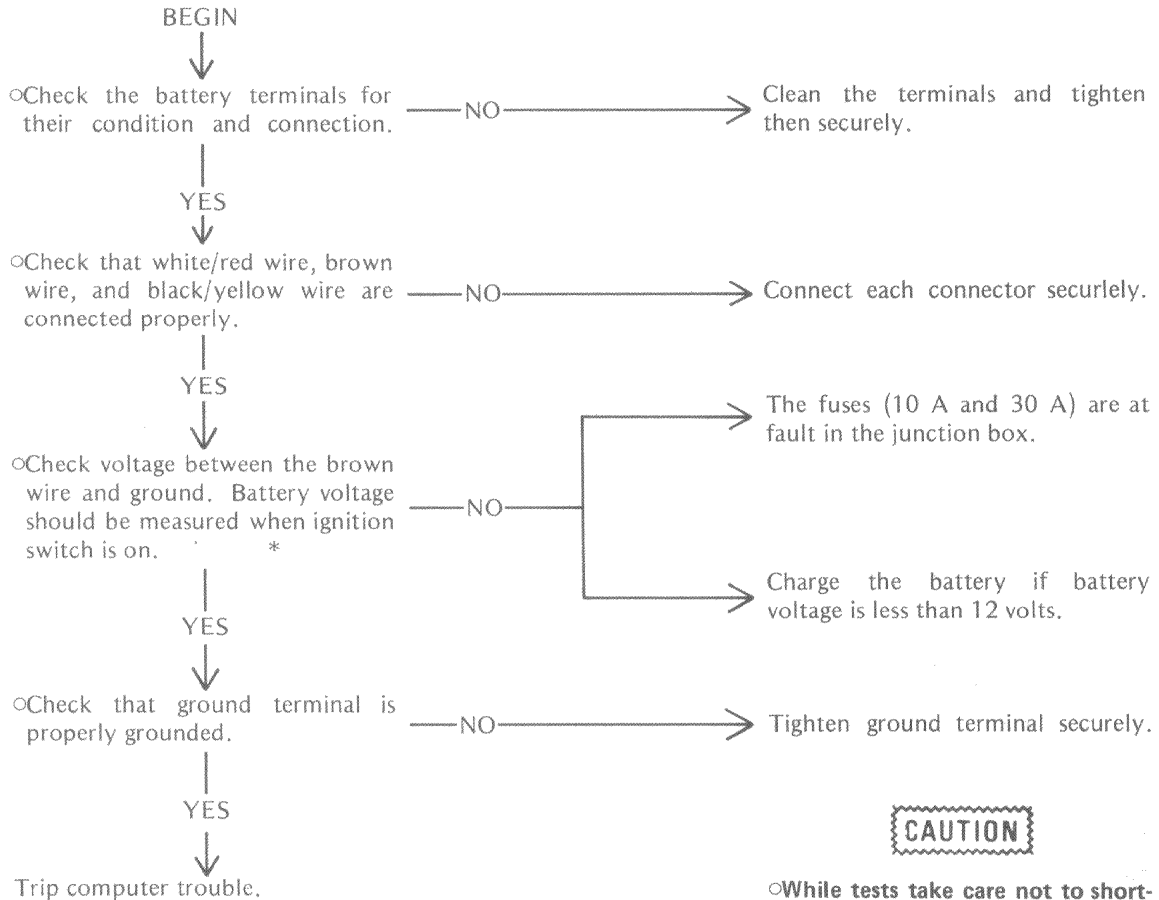


## Trip Computer System Troubleshooting Guide:

Test Chart No.	Symptoms	Causes
1	Ignition switch is turned on, but trip computer does not show the display.	Battery does not supply the power.
2	When ignition switch is turned on, there are one or more of the LCD which are not displayed on the panel within 3 seconds.	IC malfunction in the trip computer.
3	While engine is running, suddenly all LCD segments are turned on.	Ignition or power supply circuit contacts are bad, or battery voltage drop.
4	Reset switch is not turned off, but the display date goes out.	Improper contact of power supply or ground circuit, or battery voltage drop.
5	While riding, does not measure, or display the "TRIP MILEAGE". (At mode 1 – 5 or 7, 8, mode indicator does not turn on and off but remains on, and each measurement is not mode).	Speedometer, or speed sensor circuit trouble. Trip computer trouble or improper wiring connection between the trip computer and speedometer. Incorrect switch operation.
6	While motorcycle is running the "TTL FUEL CONSP" is not connected.	Trip computer trouble. Operation is misunderstood. Incorrect switch operation. Trouble in the fuel full signal circuit in the instrument. Trouble in the fuel injection signal circuit in the DFI control unit. Improper wiring connection between the trip computer and each unit, or trouble in the trip computer. Incorrect switch operation.
7	Manual switches don't operate.	Trip computer trouble. Operation is misunderstood. Incorrect switch operation.



**Test Chart No. 1**

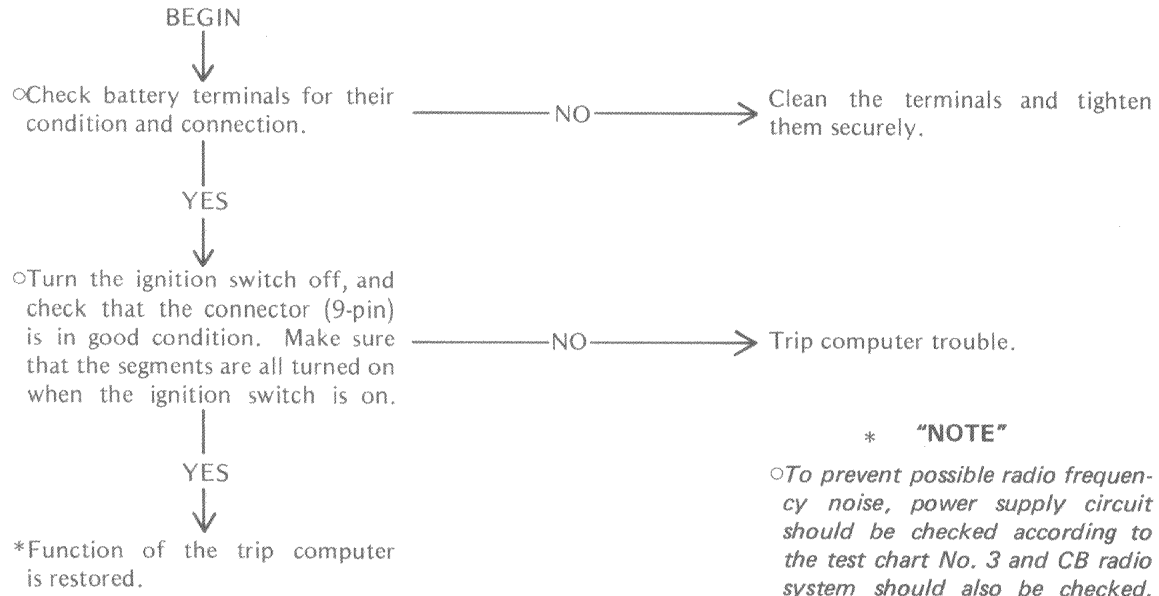


\*At this time battery voltage should be measured between the white/red wire and ground whether or not the ignition switch is on.

**CAUTION**

While tests take care not to short-circuit white/red and brown wires with yellow, light blue or yellow/black wires. Damage in trip computer, or instrument, or DFI control unit may result.

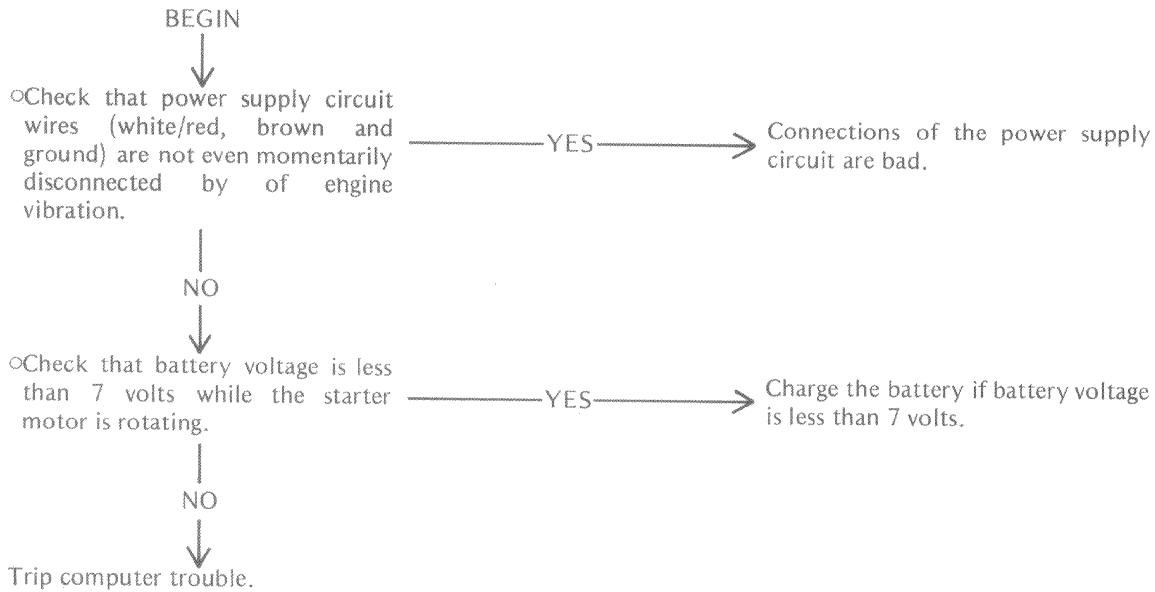
**Test Chart No. 2**



\* "NOTE"

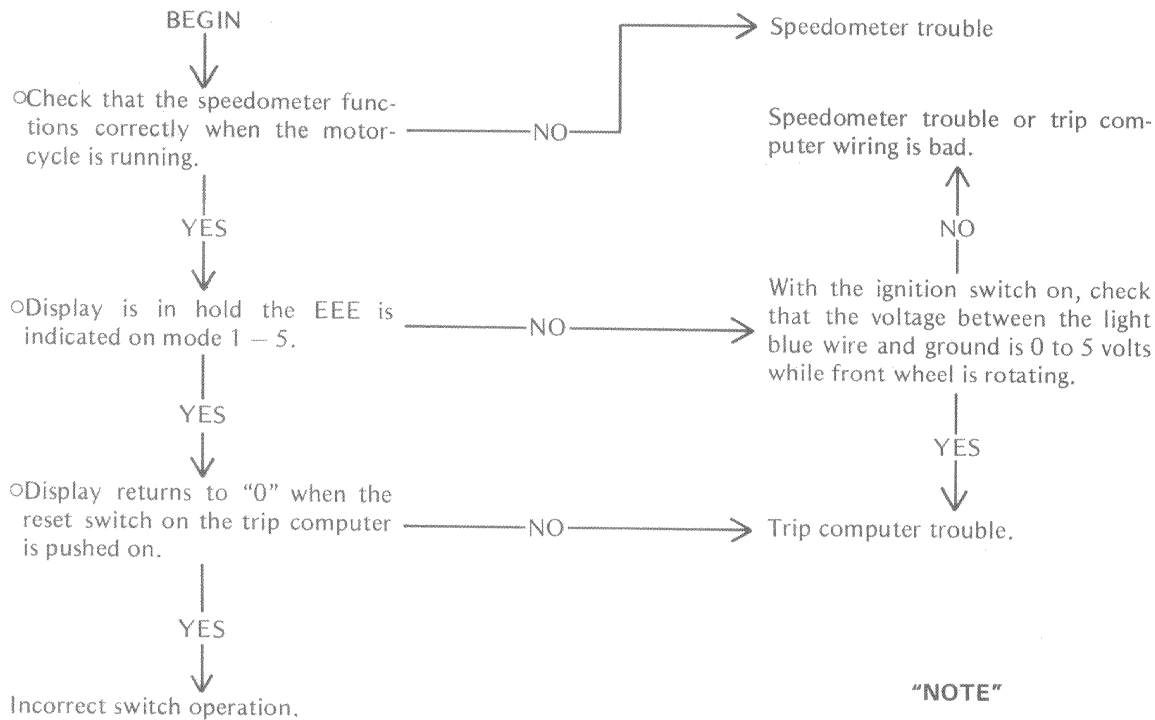
To prevent possible radio frequency noise, power supply circuit should be checked according to the test chart No. 3 and CB radio system should also be checked.

Test Chart No. 3, No. 4



\*Since the trip computers's memory may be erased by a power lapse of just a few hundred milliseconds, this circuit may need to be checked with an oscilloscope.

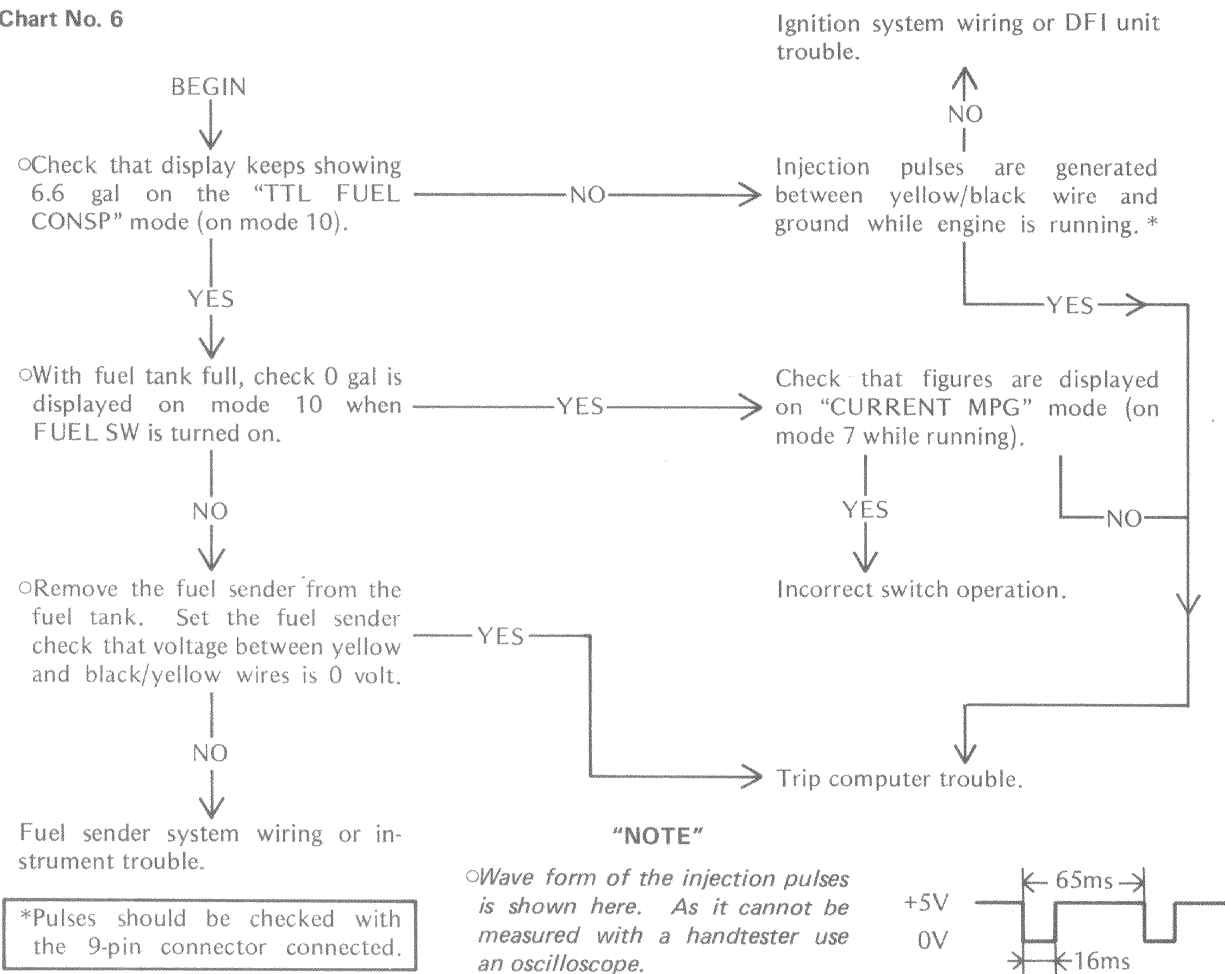
Test Chart No. 5



"NOTE"

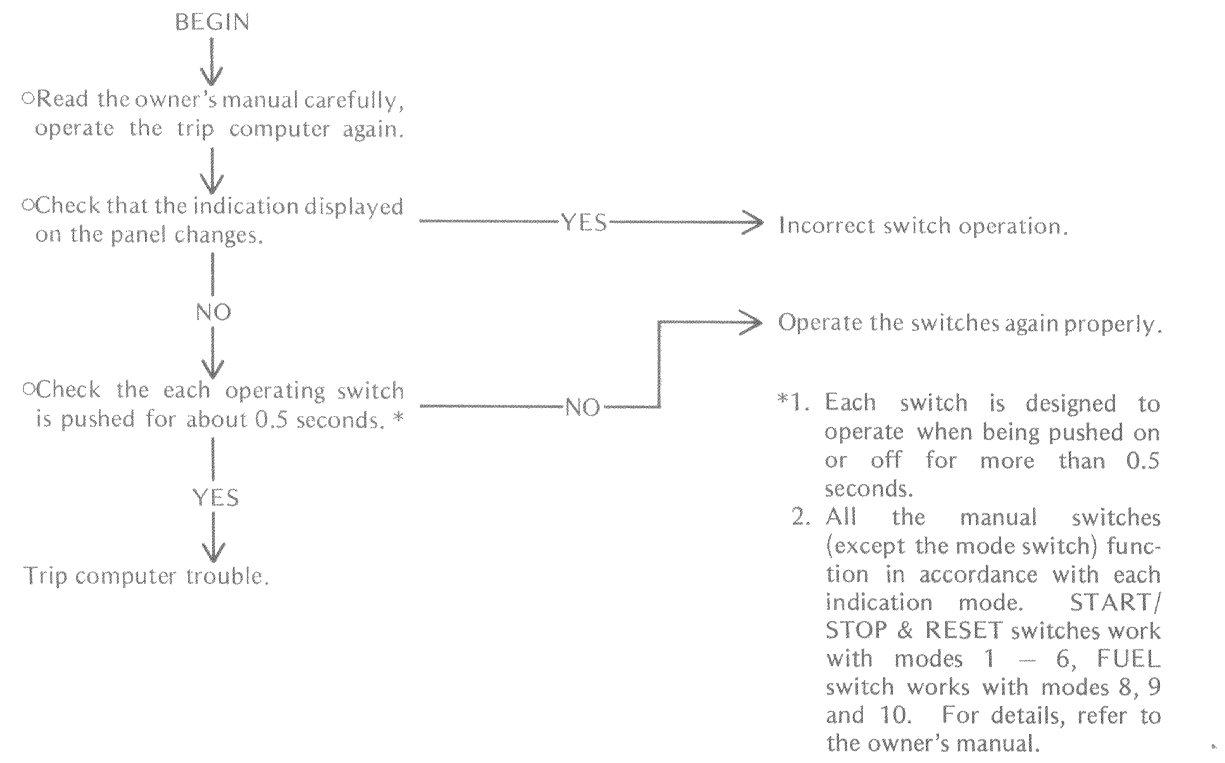
○Measure the voltage with the connector connected. In the 12 V DC range of the handtester, connect positive terminal to light blue terminal and negative to ground.

Test Chart No. 6



\*Pulses should be checked with the 9-pin connector connected.

Test Chart No. 7



# Disassembly – Engine

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## Precautions

- Set the motorcycle up on its center stand so that it is stable during removal and installation operations.
- An arrow mark is placed on some parts. The arrow shows either the orientation or the direction of rotation of a part.

If the arrow mark shows orientation, install the part so that the arrow points forward the front of the motorcycle when it is installed.

If the arrow mark shows direction of rotation, install the part so that the arrow mark coincides with the rotational direction.

- For later installation convenience, note and record how and where cables, wiring, and hoses are routed. They should not be allowed sharp bends, kinking or twisting.
- Install the gaskets in the correct position and direction so that they perfectly match with the mating surfaces where they are to be installed.
- Before assembling parts, wear an eye protector, and blow the oil passages in the parts clean with compressed air.

### WARNING

- When any fuel hose is disconnected, do not turn on the ignition switch. The fuel pump will operate and fuel will spout from the fuel hose if you turn on the ignition switch while the hose is disconnected.

## Fuel Hoses

### Removal:

#### Removal Point of Fuel Hoses

### WARNING

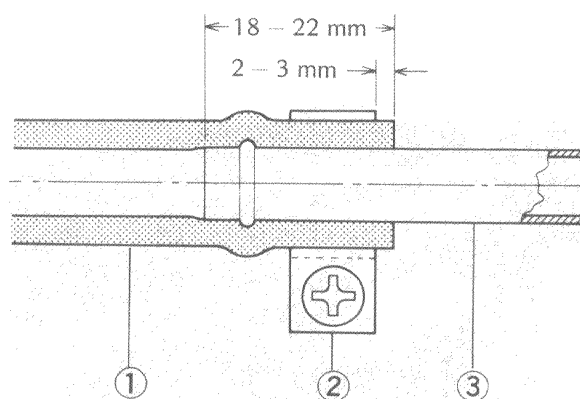
- When the fuel hoses are pulled off, a small amount of fuel may spout out because of residual pressure in the fuel line. Cover the hose connection with a clean cloth to prevent the fuel from flying about.

### Installation:

#### Installation Point of Fuel Hoses

- The inner surfaces of the high-pressure fuel hoses are coated with a special material. If this special layer is damaged, replace the hose with a new one. Also replace the hose if it is sharply bent or kinked.
- Discard the old hose clamps, and use new clamps when assembling the system.
- Route the fuel hoses with a minimum of bending so that the fuel flow will not be obstructed.
- Install the clamps for the high-pressure fuel hoses in the position indicated in the figure below.

#### Hose Clamp Installation



1. Fuel Hose

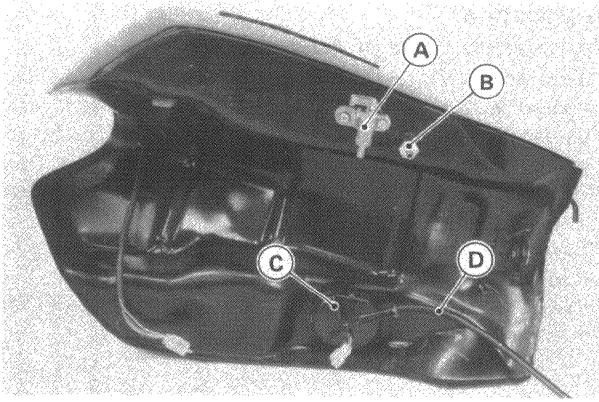
2. Clamp

3. Pipe of Fitting

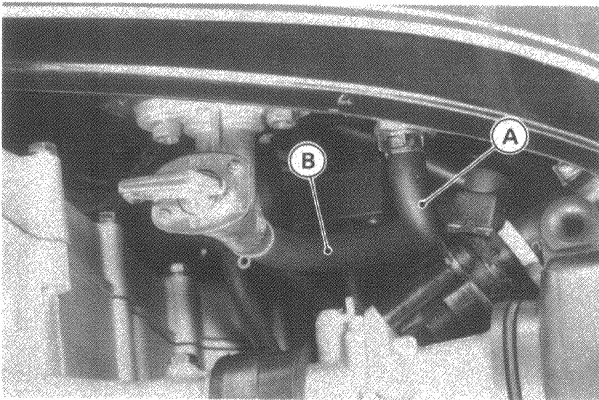
## Fuel Tank, Fuel Level Sensor

#### Installation Point of Fuel Tank

- Connect the fuel hose, which comes from the pressure regulator to the check valve; and connect the fuel hose, which comes from the fuel filter, to the fuel tap.



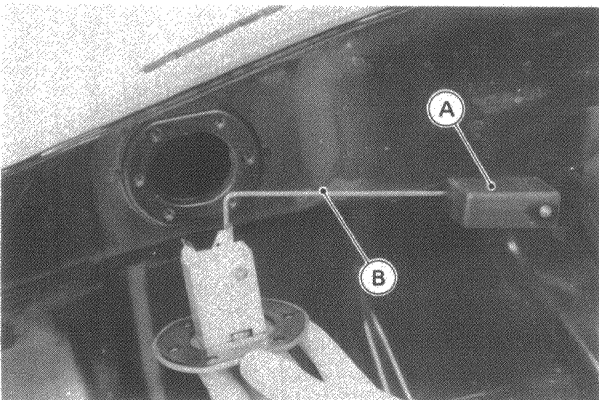
A. Fuel Tap (To Fuel Hose)  
 B. Check Valve (To Return Hose)  
 C. Fuel Sensor Lead  
 D. Drain Hose



A. Hose from pressure Regulator  
 B. Hose to Fuel Filter

**Fuel Level Sensor Removal**

- Remove the fuel level sensor cover and breather hose by prying the cover flange.
- Remove the bolts (5), and remove the sensor. Be careful not to bend the float arm.



A. Float  
 B. Arm

**Installation Point of Fuel Level Sensor**

- Match the bolt holes so that the float is positioned directly forward of the sensor body. Float movement will be hindered in any other position.
- Replace the O-ring with a new one if it is swollen or otherwise damaged.
- Check for fuel leaks after installing and filling the tank.

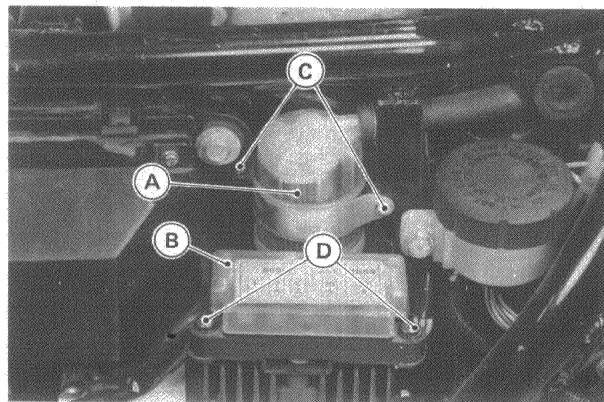
.....  
**Fuel Filter**  
 .....

**Removal Point**

- Remove the fuse box before fuel filter removal.

**WARNING**

- Perform procedures in a well ventilated area, and take care that there is no spark or flame anywhere near the working area.

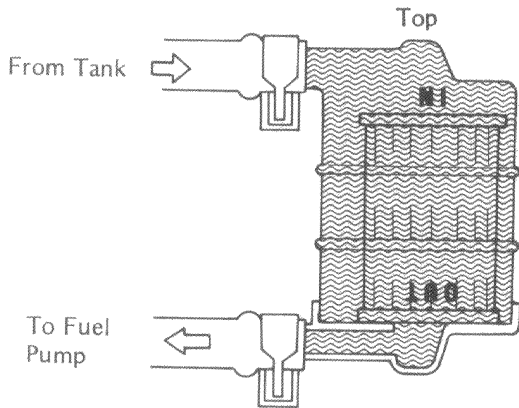


A. Fuel Filter  
 B. Fuse Box  
 C. Filter Mounting Screws  
 D. Fuse Box Mounting Screws

**Installation Point**

- In order to feed the fuel pump with fuel quickly after running out of fuel, observe the following:
  1. Install the filter so that the "IN" side is on top.
  2. Install the fuel hose to the fuel pump on the lower fitting (marked "OUT"), and the hose from the fuel tank on the upper fitting (marked "IN").

## Fuel Filter Installation




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## Throttle Valves Fuel Injectors Fuel Distributing Pipe

---

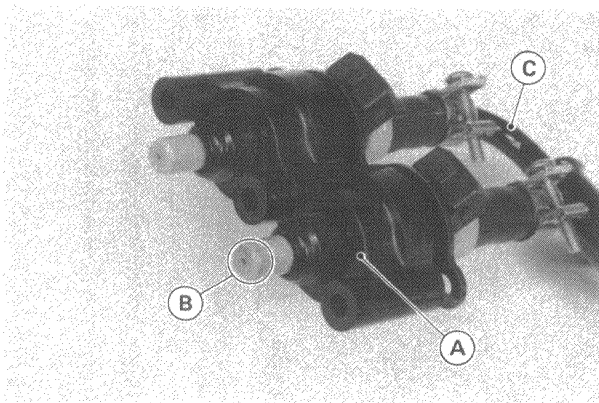
### Removal:

#### *Removal Point of Throttle Valves, Fuel Injectors, and Fuel Distributing Pipe*

- Remove the fuel tank and surge tank.
- Remove the throttle valves, fuel injectors, and fuel distributing pipe as an assembly, and then separate them.

### CAUTION

- Do not damage injector nozzles. A damaged nozzle will adversely affect the injector performance.



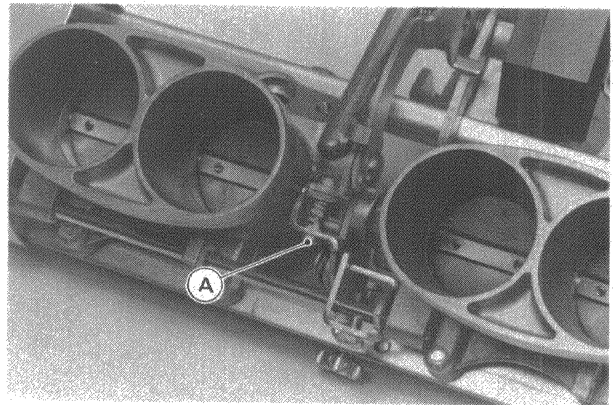
A. Injector  
B. Nozzle

C. Fuel Distributing Pipe

### Installation:

#### *Installation Point of Throttle Valves, Fuel Injectors, and Fuel Distributing Pipe*

- Check the seal and damper for deterioration or other damage, and replace them if necessary.
- Observe the "Fuel Hose Installation Point" (p. 6-3).
- Tighten the injector mounting bolt (9) to 4.9 N-m (0.50 kg-m, 43 in-lbs) of torque.
- Tighten the hose clamps after all injectors and fuel distributing pipe are correctly positioned in place.
- The six fuel injector 2-pin connectors differ in the length of their leads. The cylinder number is marked on the lead sheath.
- If the throttle sensor position is altered, adjust the sensor position using the position checker (special tool). See p. 3-19.
- If the throttle valve is replaced, synchronize the engine intake vacuum, and adjust the throttle sensor position using the position checker (special tool). See pp. 2-5 and 3-19.
- If a throttle valve or the whole assembly is replaced, adjust the fast idle engine speed after engine intake vacuum synchronization, and throttle sensor position adjustment. Engine speed should rise to about 3,000 r/min (rpm) when the fast idle lever is pulled up fully with the engine completely warmed up. If it does not, adjust fast idle speed by turning the adjusting screw.



A. Fast Idle Speed Adjusting Screw

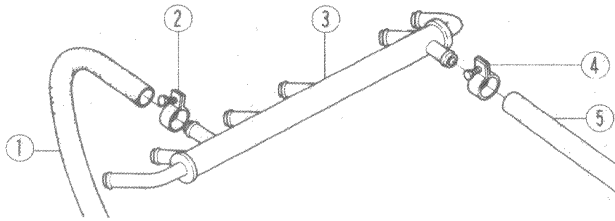
### Disassembly and Assembly:

#### *Assembly Point of Throttle Valves*

- To prevent air leaks in the throttle valve holders, all throttle valve bores must be on the same plane and their centers must be spaced correctly. Use the alignment jig and  $\phi 33$  adapters (special tools) when tightening the throttle valve mounting screws.
- Remove the  $\phi 32$  adapters from the alignment jig (special tool), and install the  $\phi 33$  adapters (special tools).



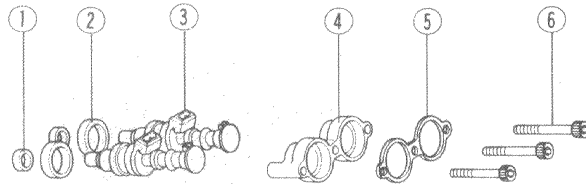
Fuel Distributing Pipe



- 1. Fuel Hose (Return)
- 2. Clamp
- 3. Distributing Pipe

- 4. Clamp
- 5. Fuel Hose

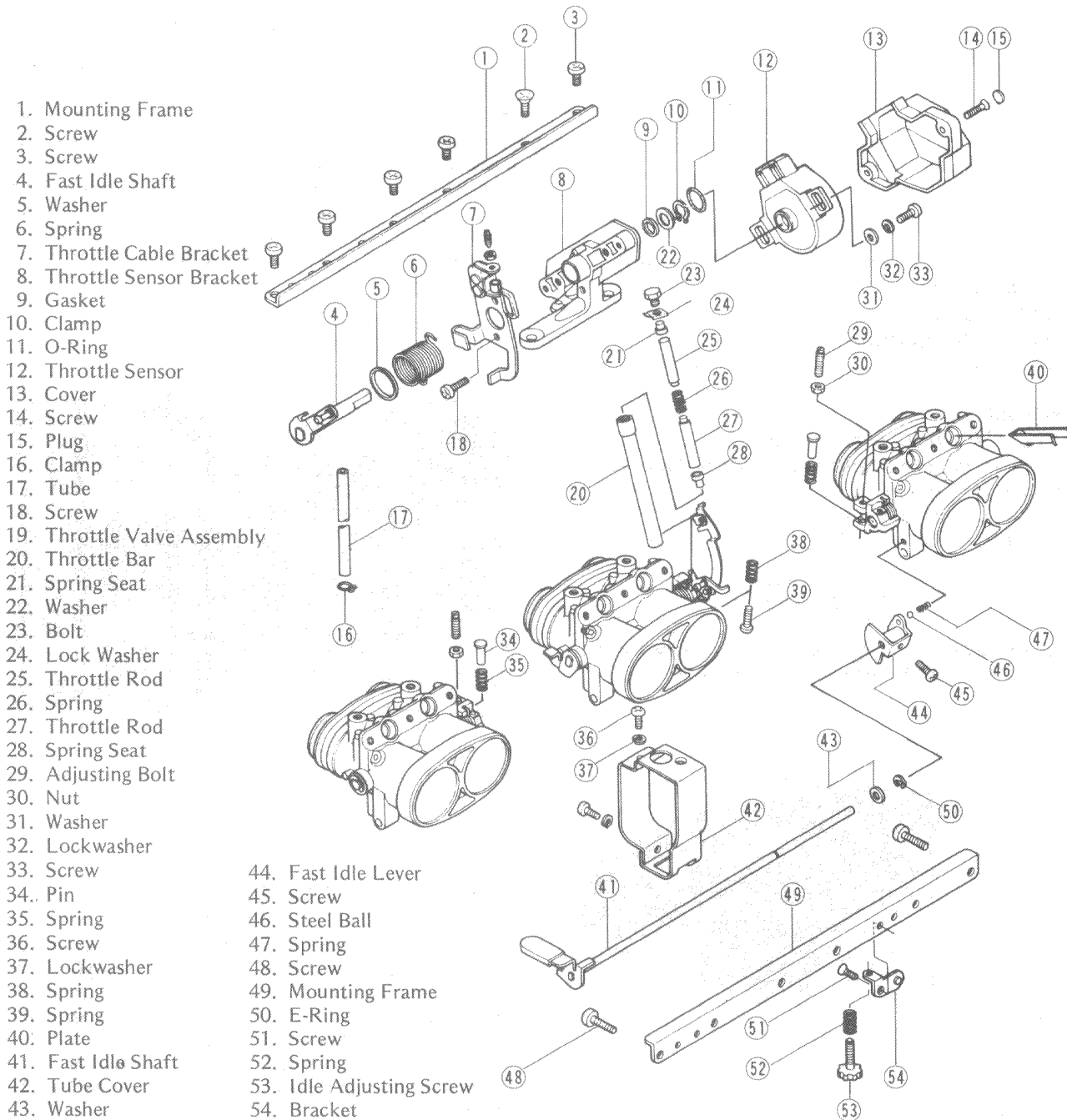
Fuel Injectors



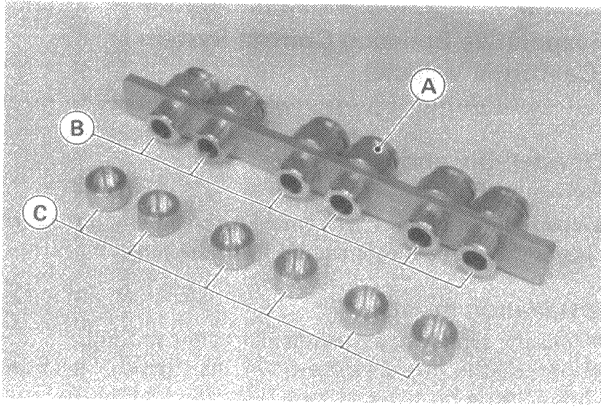
- 1. Seal
- 2. Damper
- 3. Injector

- 4. Injector Holder
- 5. Plate
- 6. Bolt

Throttle Valves

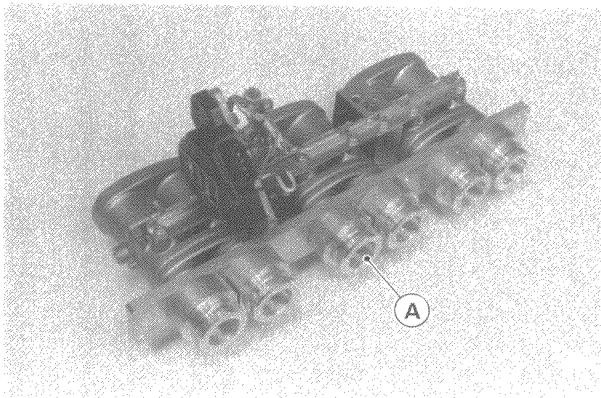


- 1. Mounting Frame
- 2. Screw
- 3. Screw
- 4. Fast Idle Shaft
- 5. Washer
- 6. Spring
- 7. Throttle Cable Bracket
- 8. Throttle Sensor Bracket
- 9. Gasket
- 10. Clamp
- 11. O-Ring
- 12. Throttle Sensor
- 13. Cover
- 14. Screw
- 15. Plug
- 16. Clamp
- 17. Tube
- 18. Screw
- 19. Throttle Valve Assembly
- 20. Throttle Bar
- 21. Spring Seat
- 22. Washer
- 23. Bolt
- 24. Lock Washer
- 25. Throttle Rod
- 26. Spring
- 27. Throttle Rod
- 28. Spring Seat
- 29. Adjusting Bolt
- 30. Nut
- 31. Washer
- 32. Lockwasher
- 33. Screw
- 34. Pin
- 35. Spring
- 36. Screw
- 37. Lockwasher
- 38. Spring
- 39. Spring
- 40. Plate
- 41. Fast Idle Shaft
- 42. Tube Cover
- 43. Washer
- 44. Fast Idle Lever
- 45. Screw
- 46. Steel Ball
- 47. Spring
- 48. Screw
- 49. Mounting Frame
- 50. E-Ring
- 51. Screw
- 52. Spring
- 53. Idle Adjusting Screw
- 54. Bracket

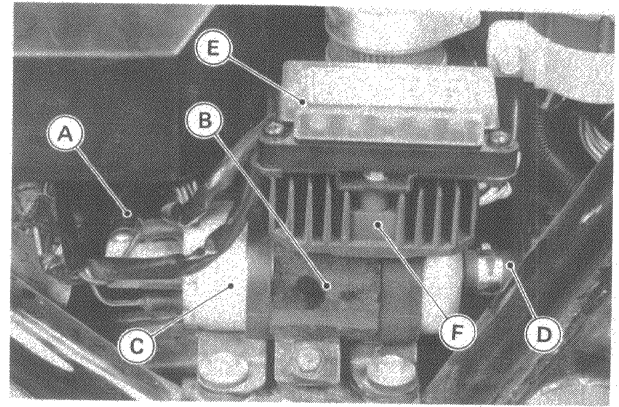


- A. Alignment Jig: 57001-1036
- B.  $\phi 32$  Adapters (included in 57001-1036)
- C.  $\phi 33$  Adapter: 57001-1178

- Assemble three throttle valves using mounting plates. Lightly tighten the mounting screws so that the throttle valves can change their position on the mounting plates.
- Fit the alignment jig into the throttle bores so that the bore centers are correctly positioned.
- Tighten the mounting screw securely.



A. Alignment Jig



- A. Hose (to fuel distributing pipe)
- B. Holding Pipe
- C. Fuel Pump
- D. Hose (from filter)
- E. Fuel Box
- F. Regulator/Rectifier

#### Installation:

##### *Installation Point of Fuel Pump*

- Observe the "Fuel Hose Installation Point" (p. 6-3).
- If a new fuel pump is installed, bleed the air in the fuel line before starting the engine.
- Check to see if the fuel tank is full. If not, top up the tank.
- Turn on the ignition switch to operate the fuel pump. When the fuel pump stops, turn off the switch and turn it on again.
- Repeat the previous step a few times.
- Turn off the switch.

---

## Fuel Pump

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#### Removal:

##### *Fuel Pump Removal*

- Disconnect the following connectors before fuel pump removal.
  - Fuse box connectors
  - Regulator rectifier connectors

---

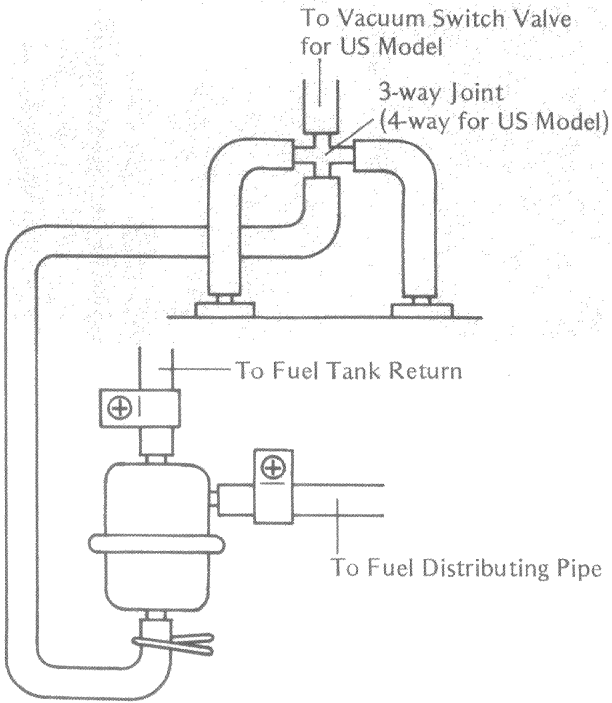
## Pressure Regulator

---

#### *Installation Point*

- Connect the fuel hose and vacuum hose to the pressure regulator as shown.

Hose Installation



Evaporative Emission Control System (California Vehicle)

Disassembly and Assembly:  
Removal Point

- When the fuel tank is removed, breather and return hoses should be disconnected from the tank.

Installation Points

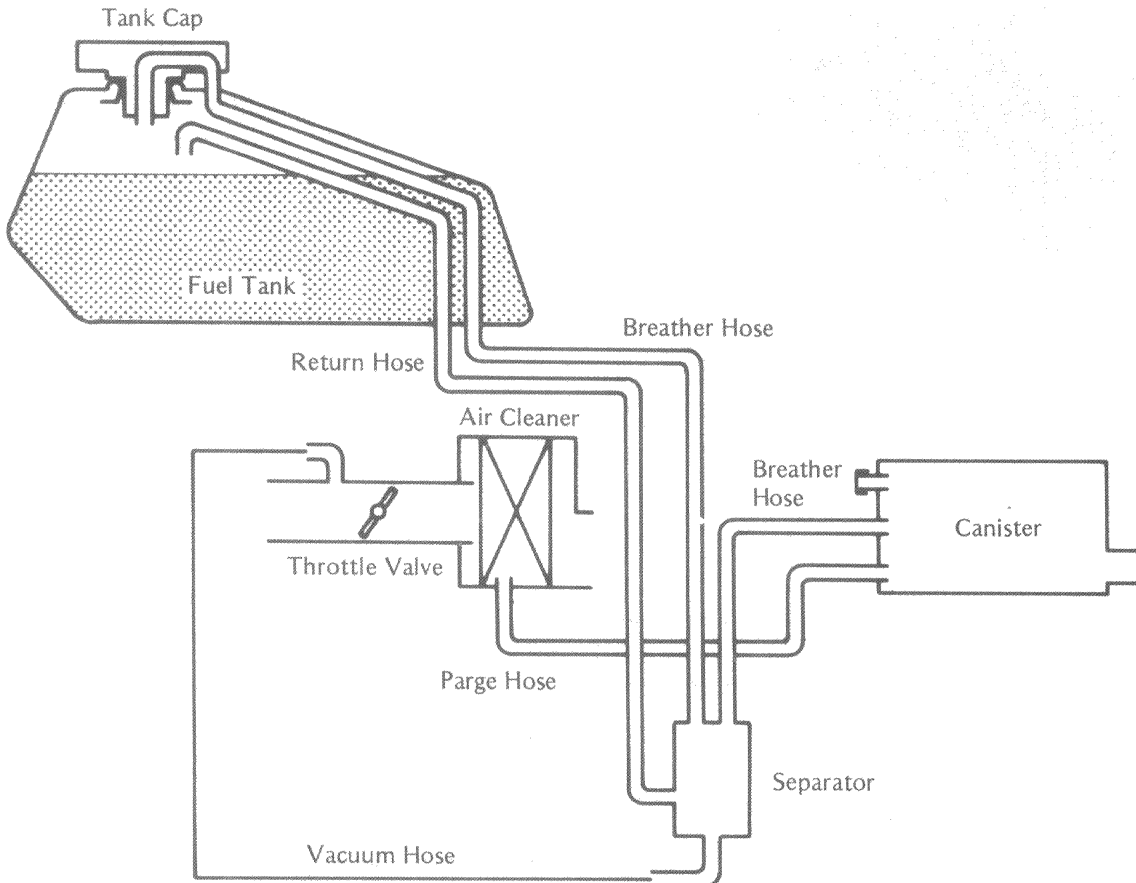
- Hold the separator perpendicular to the ground.
- Connect the hoses as shown in the figure. The front hose fitting on the fuel tank is for the fuel return hose, and the rear one is for the breather hose.

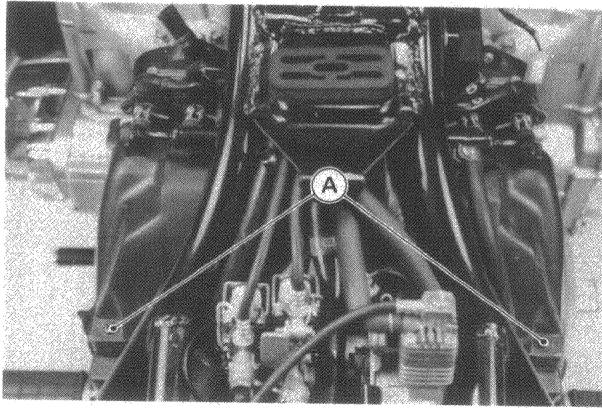
Surge Tank

Removal Point

- Unscrew the mounting screws on the left and right sides.
- Slide the surge tank rearward, and slip it sideways.

Evaporative Emission Control System

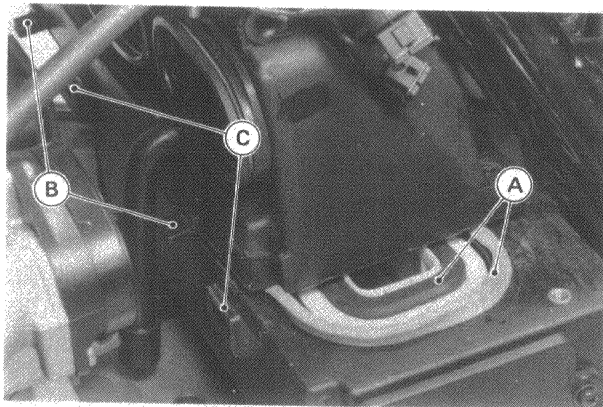




A. Mounting Screw

### Installation Point

- Hook the surge tank tabs into the air cleaner housing holes.
- Be sure to match the rubber seals of the air cleaner element and the air cleaner housing with the surge tank mating surface.



A. Rubber Seals

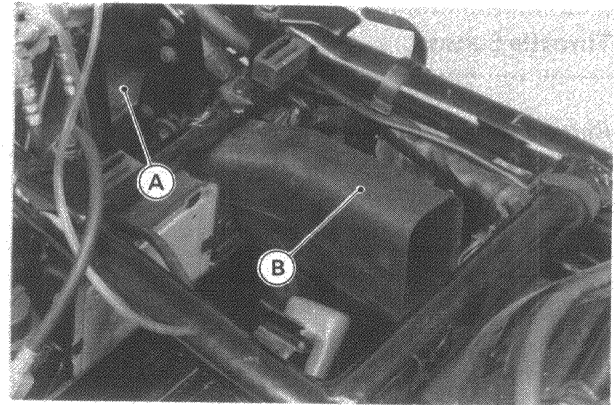
B. Tabs

C. Tab Holes

### Air Cleaner Housing

#### Removal:

- Remove the following Parts before air cleaner housing removal.
  - Surge tank
  - Fuel injector and throttle valve
  - Radiator sub tank
- Remove the air cleaner duct toward the rear.



A. Air Cleaner Housing

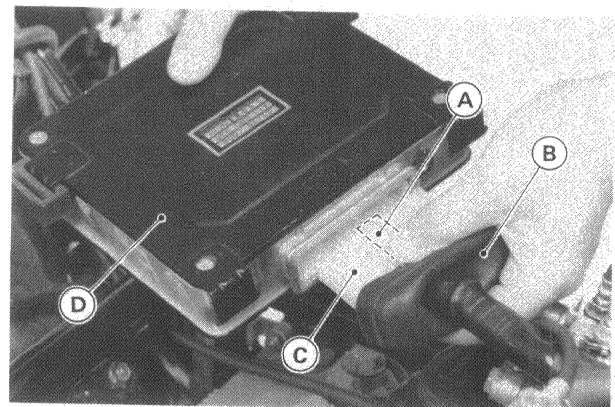
B. Air Cleaner Duct

- Lift the air cleaner housing, and pull out the left side.

### DFI Control Unit

#### Removal Point

- Turn off the ignition switch, and disconnect the white/red fuel injection system lead from the battery positive side.
- Remove the seat.
- Slide the rubber dust cover out of position, and pressing in the lock on the 21-pin connector, pull the connector straight off the control unit.



A. Lock

B. Dust Cover

C. 21-Pin Connector

D. Control Unit

#### Installation Point

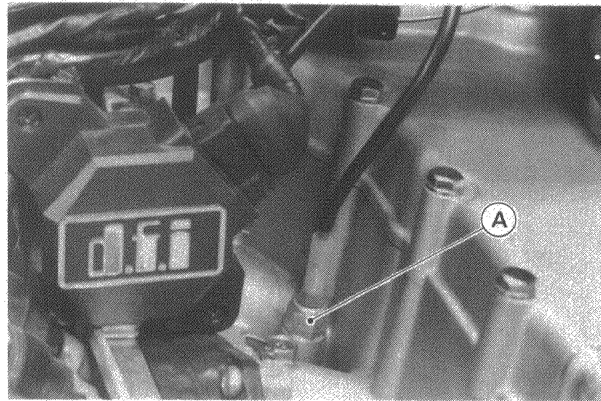
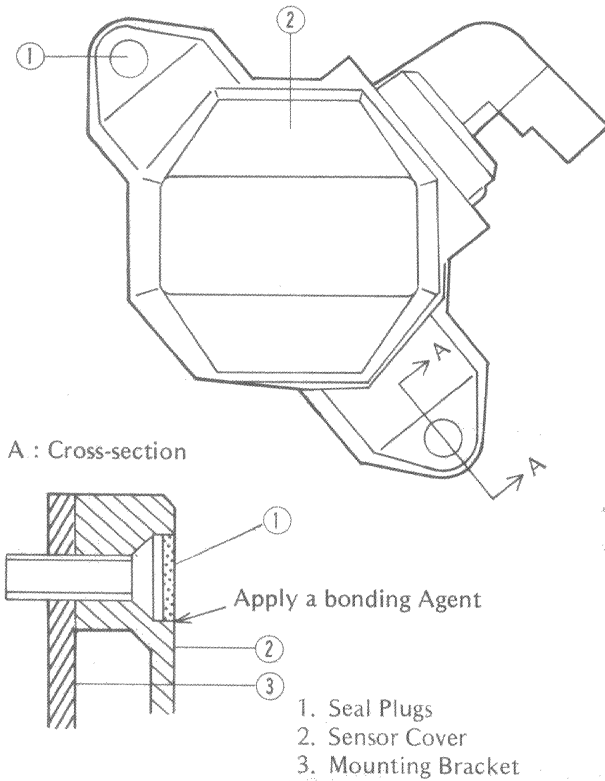
- Fit the dust cover properly on the control unit.

**Throttle Sensor**

**Removal and Installation Point**

- If the sensor position is altered for any reason, adjust the sensor position using the position checker (special tool). See p. 3-19.
- US model only: Each throttle-sensor-cover screw is sealed with a plastic plug. After the throttle sensor position is adjusted correctly, seal the screws with new plugs. Apply bonding agent to the circumference of each plug.

**Seal Plug Installation (US model)**

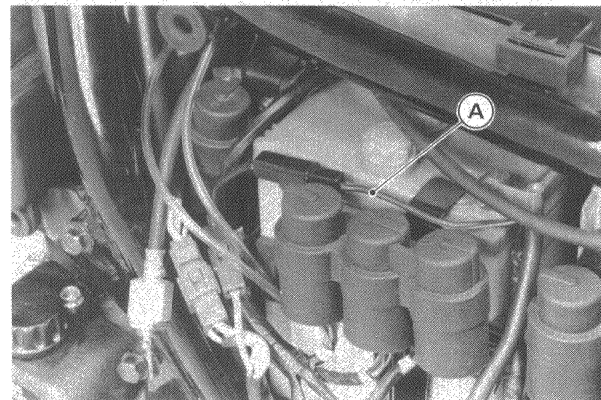


A. Engine Temperature Sensor

**Fuel Injection System Harness**

**Installation Point**

- Be sure to connect the two fuel injection system leads (black/green and black/yellow) to the battery negative side, and black lead to the starter relay.



A. DFI System Ground Leads

**Engine Temperature Sensor**

**Installation Point**

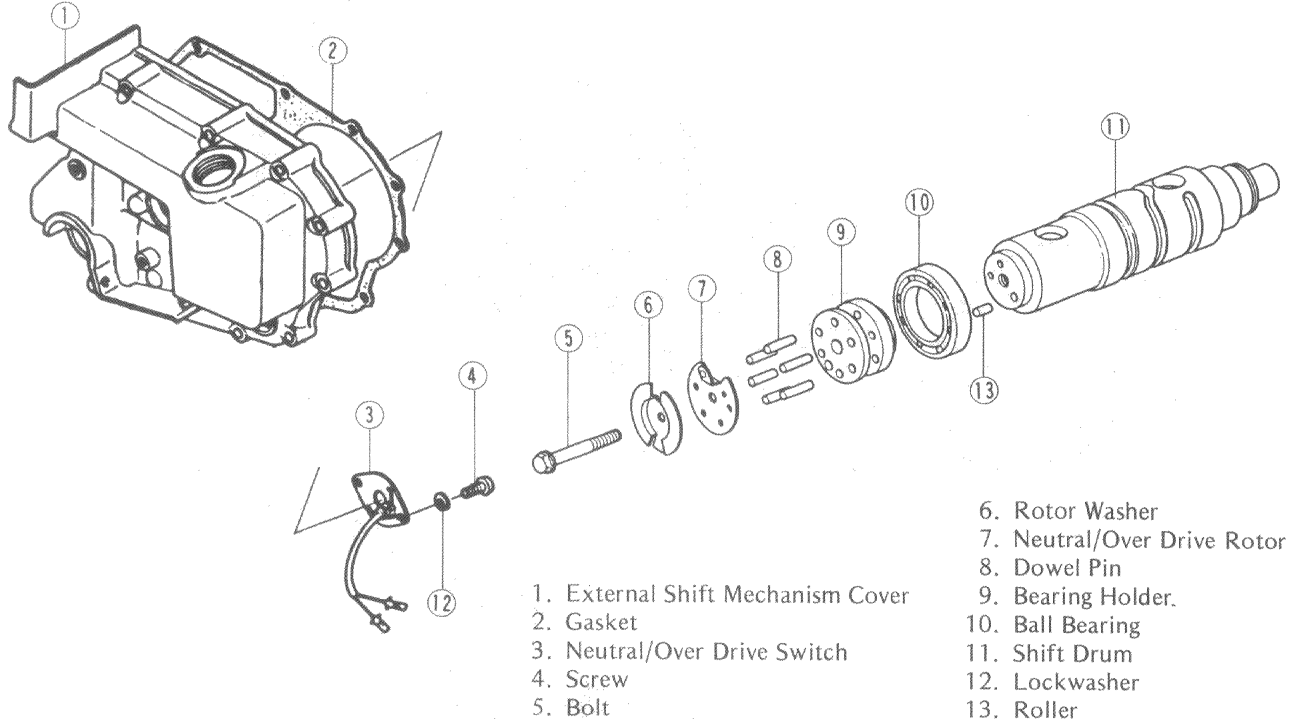
- Tighten the sensor to 13 N-m (1.3 kg-m, 9.5 ft-lbs) of torque.

**Neutral/Over Drive Switch**

**Removal and Installation:**

- The neutral/over drive switch is installed in the external shift mechanism cover.

**Neutral/Over Drive Switch**



- 1. External Shift Mechanism Cover
- 2. Gasket
- 3. Neutral/Over Drive Switch
- 4. Screw
- 5. Bolt
- 6. Rotor Washer
- 7. Neutral/Over Drive Rotor
- 8. Dowel Pin
- 9. Bearing Holder
- 10. Ball Bearing
- 11. Shift Drum
- 12. Lockwasher
- 13. Roller

**Installation Point of Neutral/Over Drive Switch**

- Match the protrusion of the rotor with the hole in the end of the shift drum.
- If the rotor has an excessive play, turn the rotor counterclockwise to remove the play and tighten the bolt.

**Clutch**

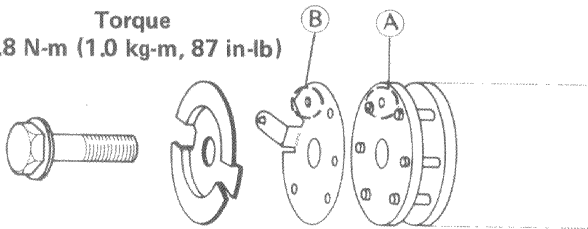
**Removal and Installation:  
Installation Point of Clutch**

- To install the clutch plates in the clutch hub, install the friction plates (8) and steel plates (7), starting with a friction plate and alternating them.

**"NOTE"**

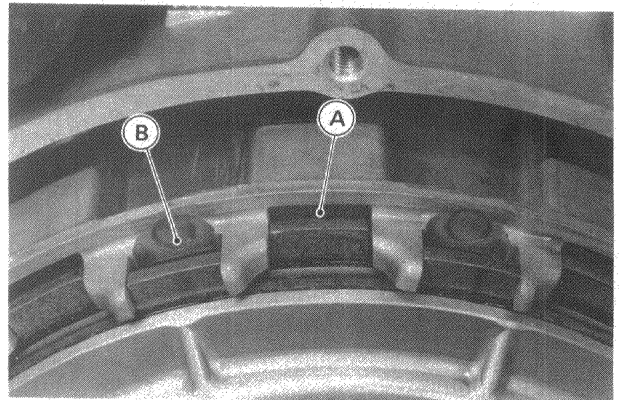
- First, install the seven friction plates fitting the tangs of plates in the grooves (A) in the clutch housing. And then, install the last one fitting the tangs in the grooves (B) in the housing.

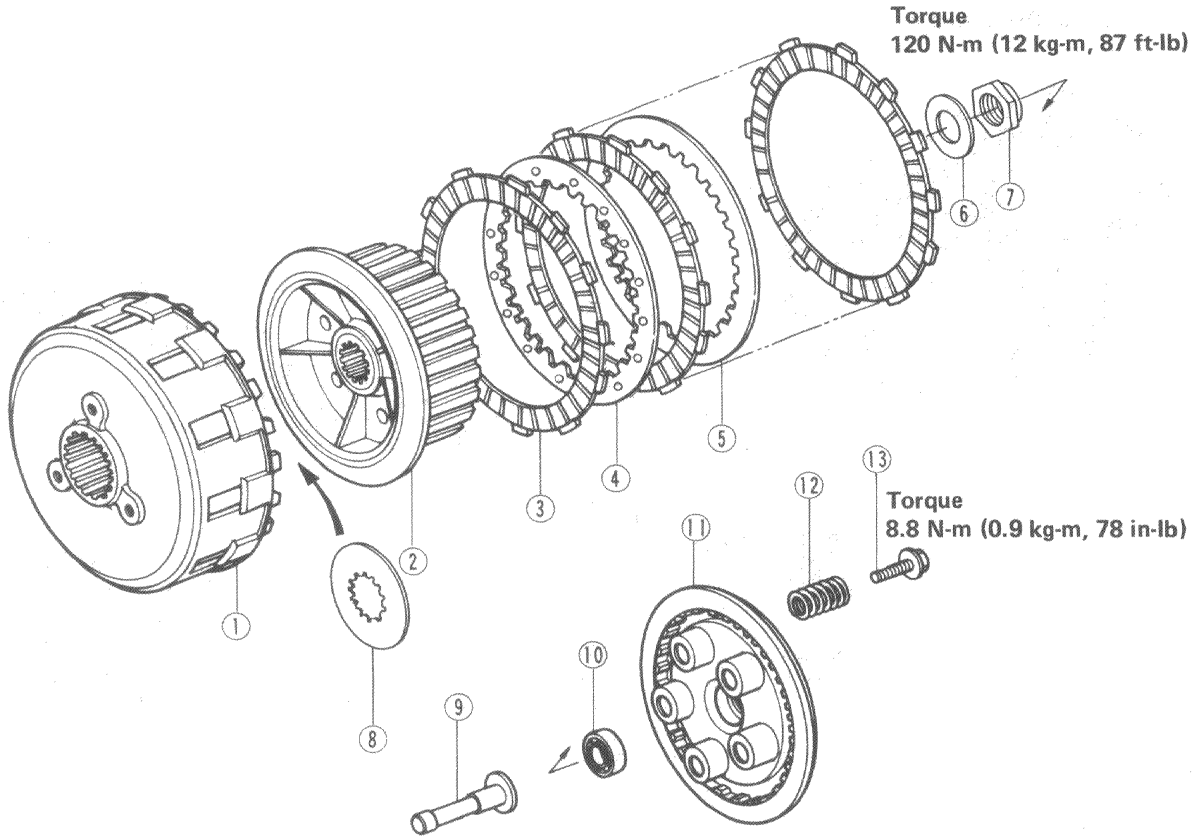
**Torque**  
9.8 N-m (1.0 kg-m, 87 in-lb)



A. Hole

B. Protrusion

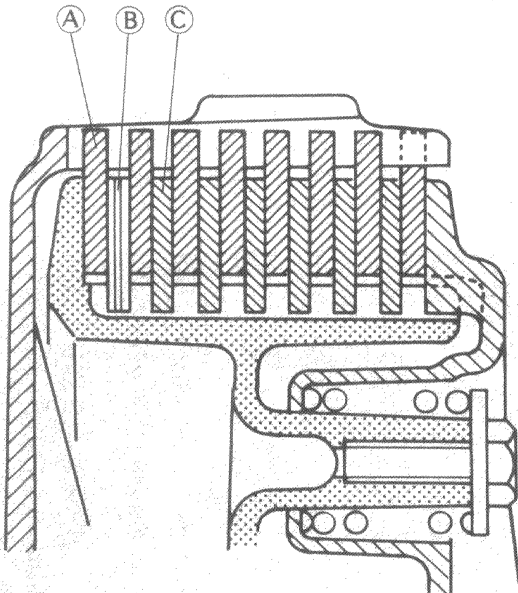




- |                                |                        |                        |
|--------------------------------|------------------------|------------------------|
| 1. Clutch Housing              | 6. Washer              | 10. Ball Bearing       |
| 2. Clutch Hub                  | 7. Clutch Hub Nut      | 11. Spring Plate       |
| 3. Friction Plate              | 8. Splined Washer      | 12. Spring             |
| 4. Steel Plate (Three-Layered) | 9. Spring Plate Pusher | 13. Clutch Spring Bolt |
| 5. Steel Plate                 |                        |                        |

○The steel plate which is laminated and thicker than the others should be installed after the 1st friction plate.

**Clutch Plate Installation**



- |   |                |
|---|----------------|
| A. 1st Friction Plate   | C. Steel Plate |
| B. Three-Layered Laminated Steel Plate<br>(Thicker than Others) |                |



# Disassembly – Chassis

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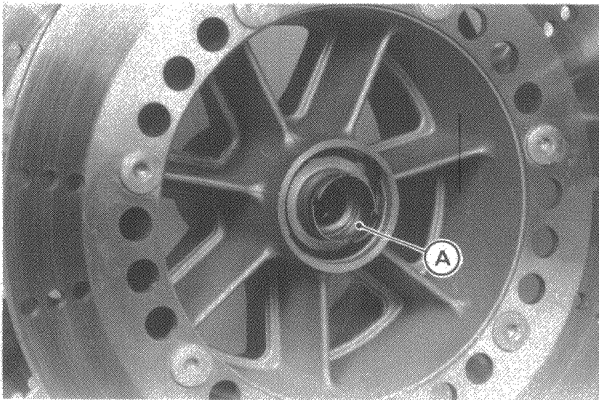
**Precautions**

- Set the motorcycle up on its-senter stand so that it is stable during removal and installation operations.
- For later installation convenience, note and record how and where cables, wiring, and hoses are routed. They should not be allowed sharp bends, kinking, or twisting.
- To lift the front wheel off the ground, use a jack under the engine.

**Speed Sensor**

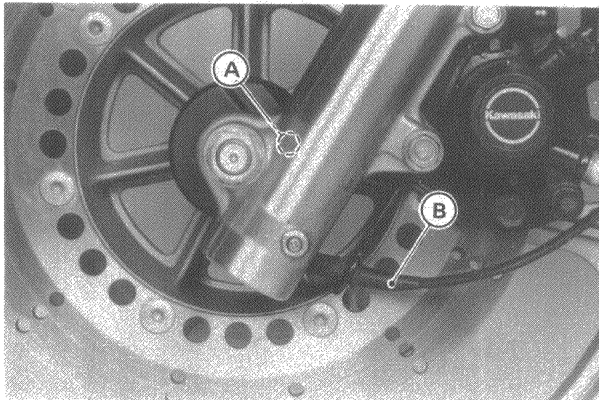
*Installation Point of Speed Sensor*

- Properly engage the drive sleeve with the speed sensor when installing the sensor on the wheel.



A. Drive Sleeve

- To properly route the speed sensor wiring harness, position the speed sensor as follows:
  - Turn the sensor so that it stops against the projection on the fork leg.

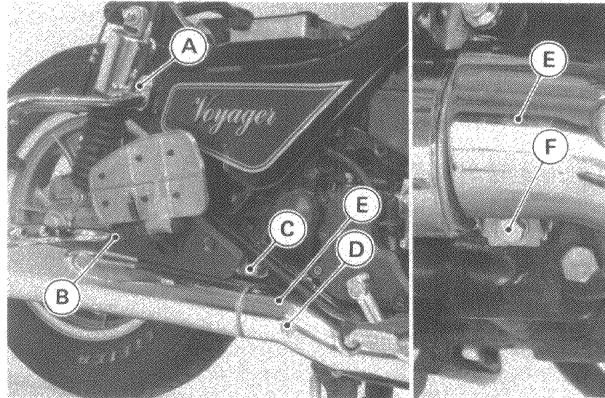


A. Projection (wheel side on leg)      B. Wiring Harness

**Rear Wheel**

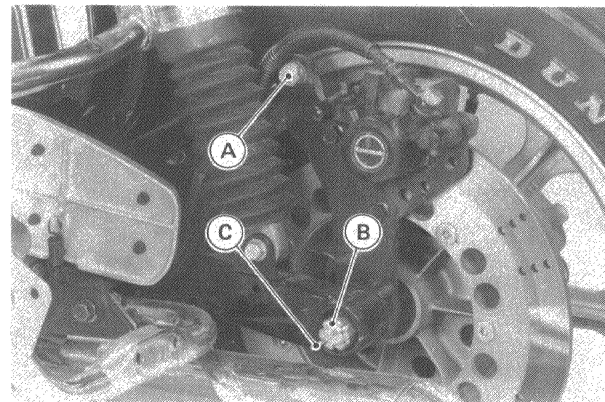
**Removal:**

- Remove the following parts from the chassis before rear wheel removal.
  - Saddlebags and trunk.
  - Rear bumper assembly.
- Remove the right side rear bumper stay mounting bolts, and remove the right side muffler cover screw, then loosen the muffler clamp bolt.



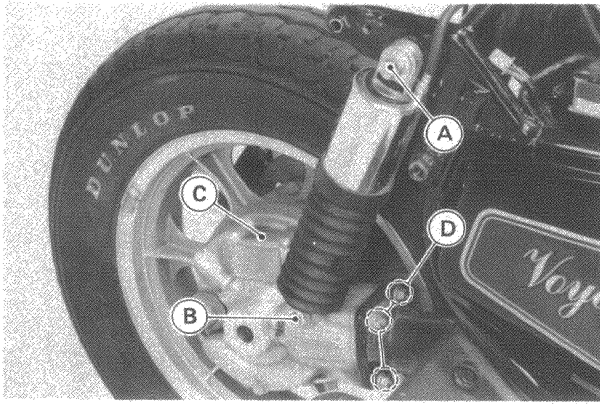
A. Bumper Stay Mounting Bolt      D. Muffler Cover Screw  
 B. Muffler Mounting Bolt          E. Muffler Cover  
 C. Bumper Stay Mounting Bolt      F. Muffler Clamp Bolt

- Remove the muffler mounting bolt and take off the right side muffler toward the rear.
- Remove the torque link nut, and lift the torque link end.
- Remove the cotter pin from the rear axle nut, then remove the axle nut.



A. Torque Link Nut                      C. Cotter Pin  
 B. Axle Nut

- Pull out the axle, rear caliper with holder, collar, and slide the wheel toward the left to disengage the wheel from the final gear case.
- Remove the final gear case mounting nuts (4).



A. Shock Absorber Upper Nut    C. Final Gear Case  
B. Shock Absorber Lower Nut    D. Nuts

- Remove the upper and lower mounting nuts, and take off the right shock absorber.
- Remove the final gear case toward the rear, then remove the rear wheel.

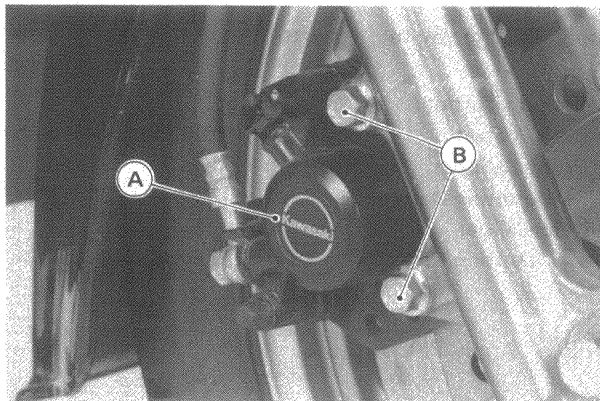
## Brake Pads Calipers

- In this section, parts of the front brake system are used for explanation. Unless otherwise noted, the points of the removal and installation procedures for the rear brake are the same as those for the front brake.
- Observe the **WARNING** on p. 2-7 for general disc brake information.

### Removal:

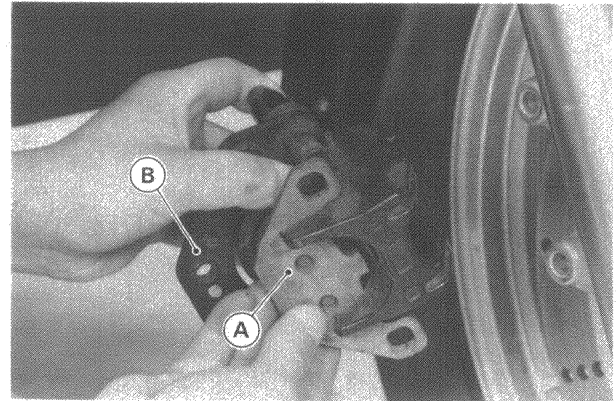
#### Removal Points of Pads

- Remove the caliper mounting bolts (2), and take off the caliper body with caliper holder.



A. Caliper Body    B. Caliper Mounting Bolts

- Push the caliper holder to the caliper, and then remove the pads from the caliper holder.



A. Pad    B. Caliper Holder

### Installation:

#### Installation Points of Pads

- Push the caliper piston in by hand as far as it will go.

### WARNING

- Do not attempt to drive the motorcycle until a full brake lever or pedal is obtained by pumping the brake lever or pedal until the pads are against the disc. The brake will not function on the first application of the lever or pedal if this is not done.

### Removal:

#### Removal Points of Calipers

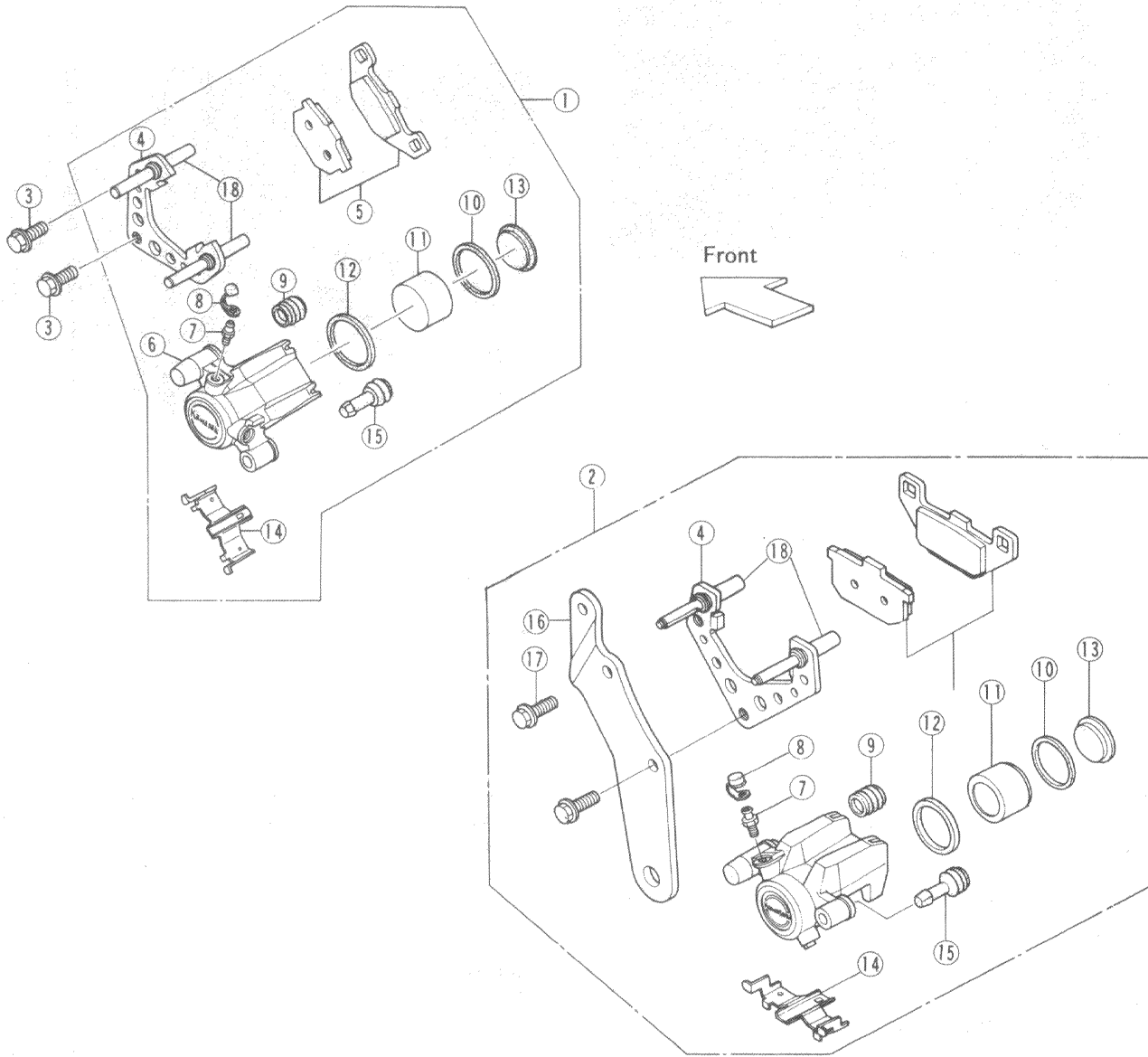
- If the caliper is to be disassembled after removal and if compressed air is not available, remove the piston using the following two steps before disconnecting the brake hose from the caliper.
  - Remove the pads.
  - Pump the brake lever or pedal to remove the caliper piston.
  - Immediately wipe up any brake fluid that spills.

### Installation:

#### Installation Points of Calipers

- Connect the brake hose to the caliper putting a new flat washer on each side of the brake hose fitting.
- Check the fluid level in the master cylinder, and bleed the brake line (p. 2-7).
- Check the brake for weak braking power, brake drag, and fluid leakage.

Front and Rear Calipers



- 1. Front Caliper Assembly
- 2. Rear Caliper Assembly
- 3. Front Caliper Mounting Bolt
- 4. Caliper Holder
- 5. Pads
- 6. Caliper Body
- 7. Bleed Valve
- 8. Rubber Cap
- 9. Boot
- 10. Dust Seal
- 11. Piston
- 12. Fluid Seal
- 13. Insulator
- 14. Anti-Rattle Spring
- 15. Friction Boot
- 16. Holder
- 17. Rear Caliper Mounting Bolts
- 18. Shafts

Apply PBC\* grease to: Shafts ⑳

Tightening Torque:

Bleed Valves ⑦	7.8 N-m (0.80 kg-m, 69 in-lb)
<b>Front Caliper</b>	
Mounting Bolts ③	32 N-m (3.3 kg-m, 24 ft-lb)
<b>Rear Caliper</b>	
Mounting Bolts ⑰	28 N-m (2.9 kg-m, 21 ft-lb)

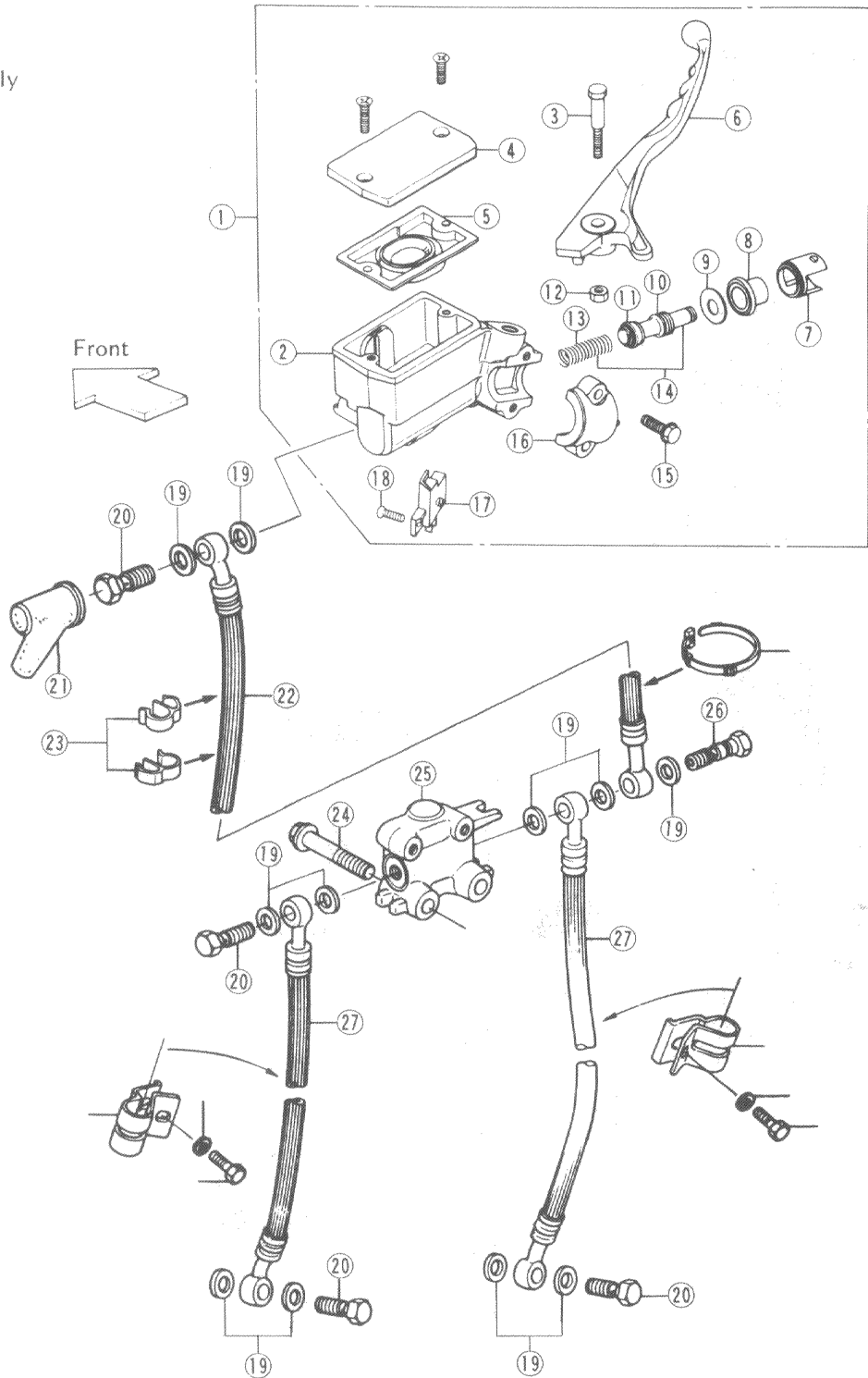
\*PBC: Apply PBC grease

PBC grease is a special, high temperature, water resistant grease.

**Front Master Cylinder**

782554

1. Master Cylinder Assembly
2. Master Cylinder Body
3. Brake Lever Pivot Bolt
4. Reservoir Cap
5. Diaphragm
6. Brake Lever
7. Liner
8. Dust Seal
9. Piston Stop
10. O-Ring
11. Primary Cup
12. Locknut
13. Piston Return Spring
14. Piston Assembly
15. Clamp Bolt
16. Clamp
17. Brake Light Switch
18. Switch Mounting Screw
19. Washer
20. Banjo Bolt Fitting
21. Dust Boot
22. Brake Hose
23. Clamp
24. Bolt
25. Junction Block
26. Banjo Bolt Fitting
27. Brake Hose



Apply Locking Agent to:

Brake Light Switch Mounting Screw (18)

Tightening Torque:

Brake Lever Pivot Bolt (3) 2.9 kg-m (0.30 kg-m, 26 in-lb)

Fitting Banjo

Bolts (20) and (26)

29 N-m (3.0 kg-m, 22 ft-lb)

Master Cylinder

Clamp Bolts (15)

8.8 N-m (0.90 kg-m, 78 in-lb)

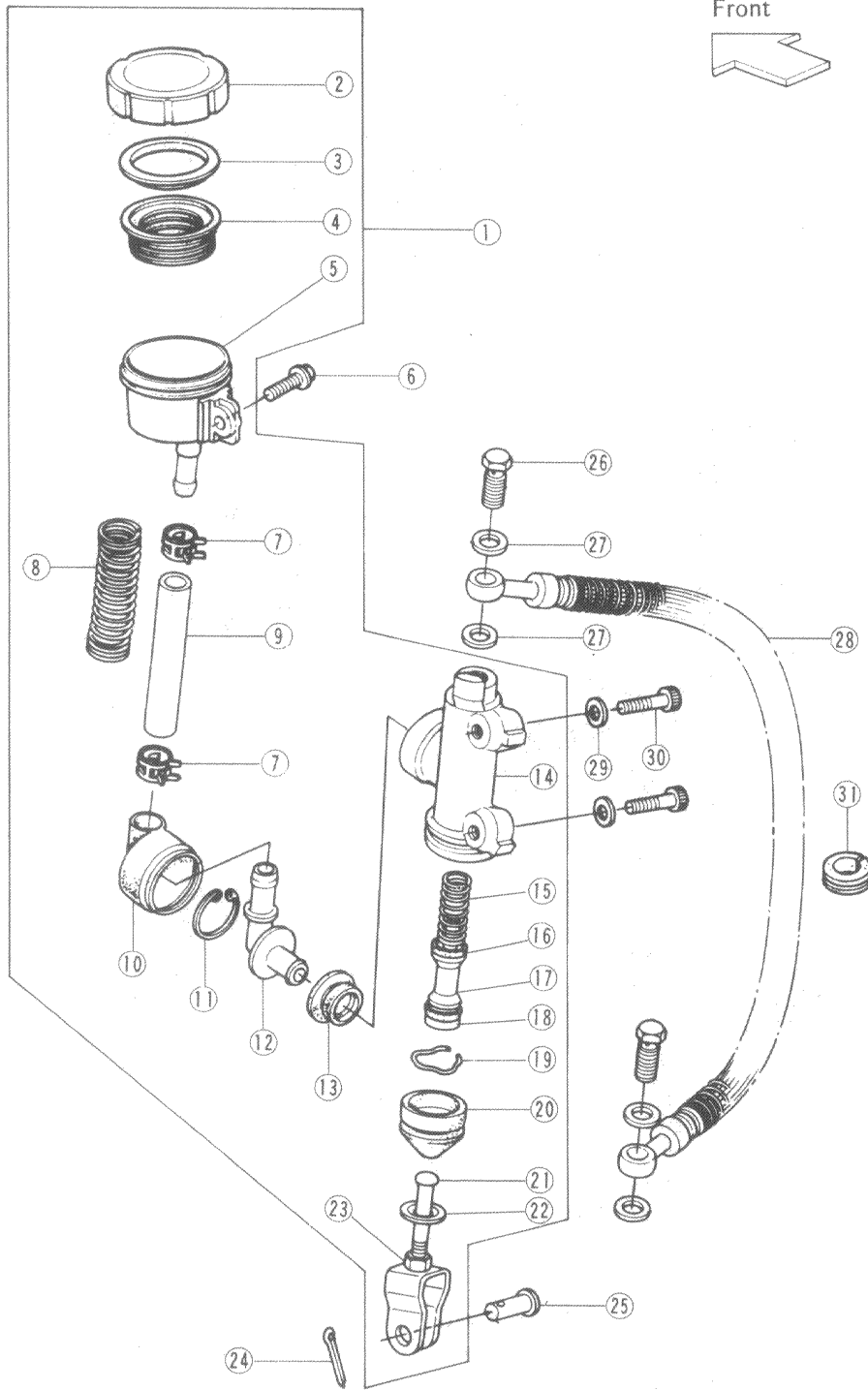
Pivot Bolt Locknut (12)

5.9 kg-m (0.60 kg-m, 52 in-lb)

Rear Master Cylinder

Tightening Torque:

Hose Fitting Banjo Bolts <sup>26</sup> 29 N-m (3.0 kg-m, 22 ft-lb)



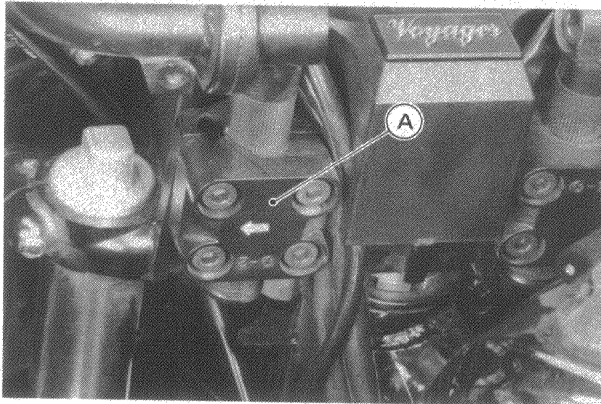
1. Rear Brake Master Cylinder Assembly
2. Reservoir Cap
3. Ring Plate
4. Diaphragm
5. Reservoir
6. Reservoir Mounting Bolt
7. Clamp
8. Hose Protector
9. Brake Hose
10. Dust Cover
11. Circlip
12. Hose Connector
13. Grommet
14. Master Cylinder Body
15. Piston Return Spring
16. Primary Cup
17. Piston
18. Secondary Cup
19. Retainer
20. Dust Cover
21. Push Rod
22. Piston Stop
23. Locknut
24. Cotter Pin
25. Clevis Pin
26. Fitting Banjo Bolt
27. Washer
28. Brake Hose
29. Washer
30. Master Cylinder Mounting Bolt
31. Grommet

## Handlebars

### Removal and Installation:

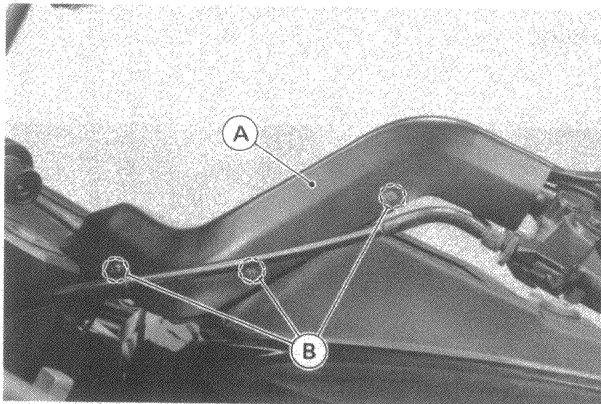
#### Removal Point of Left Handlebar

- Remove the following parts before handlebar removal.
  - Clutch cable
  - Starter locknut switch
  - Left switch housing (Open and hang it)
- Remove the handlebar clamp bolts (4), and remove the clamp.



A. Handlebar Clamp

- Remove the handlebar cover screws (3), and take off the cover from the handlebar.



A. Handlebar Cover  
B. Screws

#### Removal Point of Right Handlebar

- Remove the following parts before handlebar removal.
  - Brake light switch lead
  - Master Cylinder
  - Right switch hanging (Open up)
- Handlebar clamp

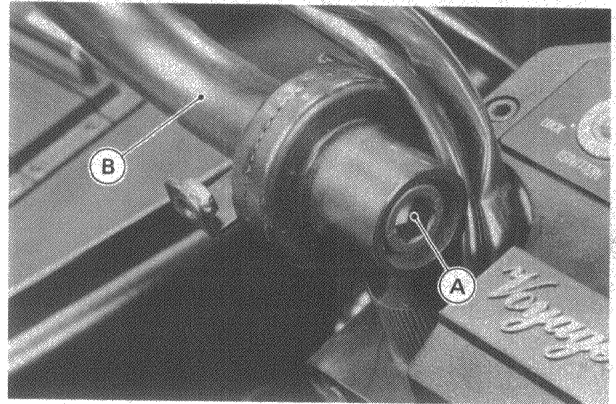
- Slide the handlebar out of the throttle grip, right switch housing and master cylinder.

#### Installation Point of Handlebar

- Install the handlebar clamps so that the arrow on the clamp points to that the outside.
- First tighten the outside handlebar clamp bolts and then the inside clamp bolts to 23 N-m (2.3 kg-m, 16.5 ft-lb) of torque. If the clamp is correctly installed, there will be no gap at the outside and an even gap at the inside after tightening.

#### "NOTE"

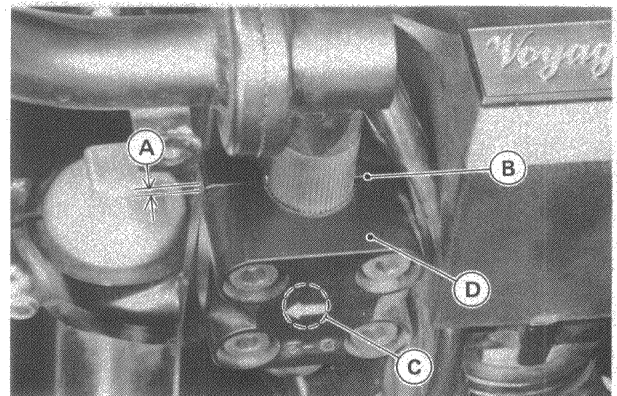
- Tightening torque for the handlebar mounting allen bolts is 44 N-m (4.5 kg-m, 33 ft-lbs).



A. Mounting Allen Bolt B. Handlebar

#### WARNING

- If the clamps are installed incorrectly or improperly tightened, the clamps and/or the bolts could fail, resulting in loss of control.



A. Even Gap  
B. No Gap  
C. Mark  
D. Clamp

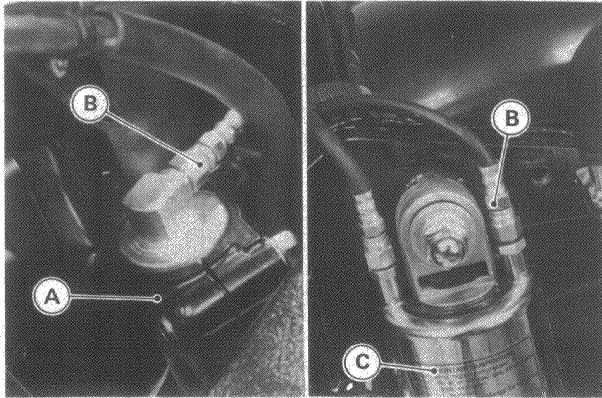


**Air Suspension Leveling System**

**Front Fork and Rear Shock Absorbers:  
Removal and Installation Points**

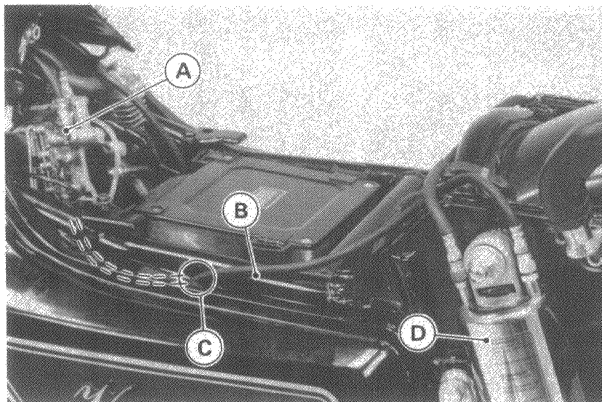
Refer to p.p. 313 – 314 of the Base Manual noting the following exceptions.

- Before removing the front fork or rear shock absorbers, do the following:
  - Release the air completely by operating the suspension switch (p. 1-13).
  - Disconnect the connecting hoses from the top of the right fork leg, and the left side rear shock absorber.



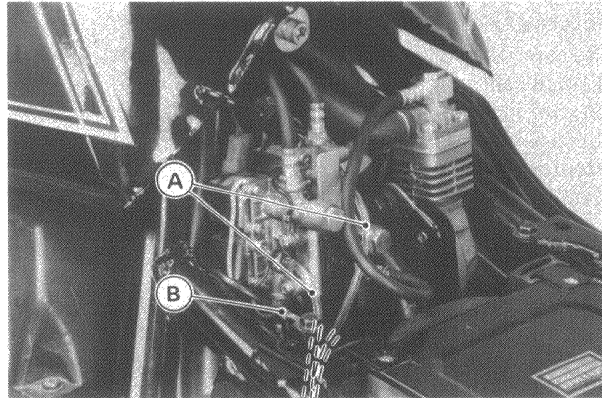
A. Right Fork Leg  
B. Connecting Hose  
C. Rear Shock Absorber

- Orient the shock absorbers and tighten the fasteners as shown in the figure (p. 4-7).
- Route the air hoses with a minimum of bending so that the air flow will not be obstructed.
- Run the shock absorber air hose so that it will not be pinched by the seat.



A. Solenoid Valve  
B. Air Hose  
C. Side Cover Notch  
D. Rear Shock Absorber

- Route the release tubes and connect the ground lead as shown. Hang the release tubes down for easy draining.



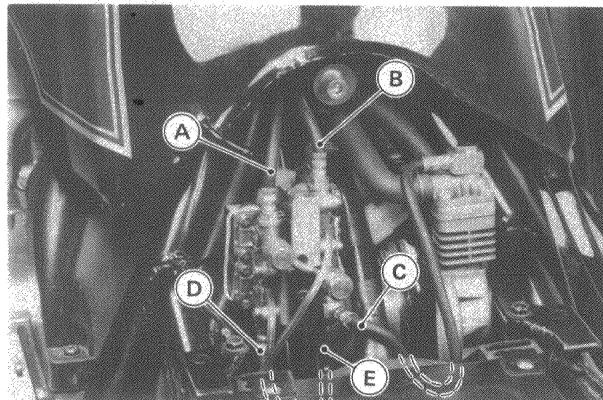
A. Release Tube: hang it down  
B. BK/Y Ground Lead (for Solenoid Valve)

**CAUTION**

- After removal, be careful not to spill the oil through the hoses.
- ★ If any oil flows into the hose; remove the hose and wash it with a high flash point solvent; then blow it clean with compressed air.

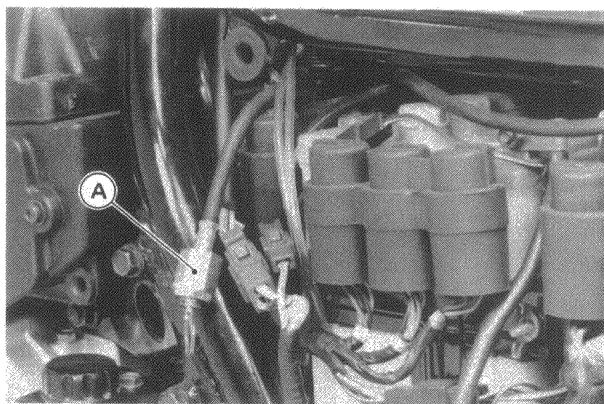
**Air Compressor and Valve:  
Installation Points**

- Connect the air hoses to the valve as shown in the figure.



A. To Air Pressure Gauge  
B. To Front Fork  
C. To Compressor  
D. To Rear Shock Absorber  
E. Drain Hose

- Route the drain hose as shown in the figure.



A. Drain Hose

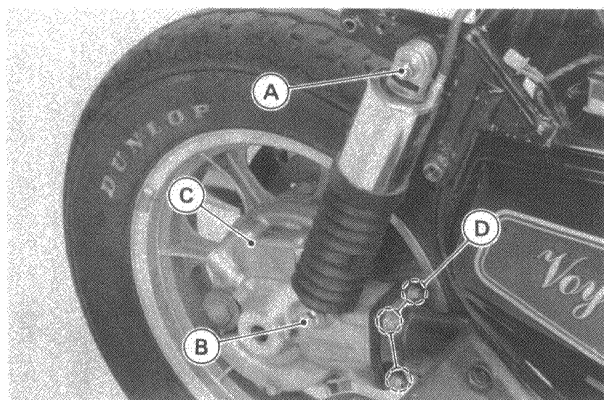
B. Drain Valve

## Final Gear Case

### Final Gear Case Removal Notes

Remove the following parts before removing the final gear case.

- Gear oil (If final gear case is to be disassembled.)
- Rear fender
- Rear bumper
- Rear caliper
- Disengage the rear wheel coupling by sliding the wheel to the left, and lower the wheel to the ground.
- Remove the final gear case mounting nuts (4).



A. Shock Absorber Upper Nut  
B. Shock Absorber Lower Nut

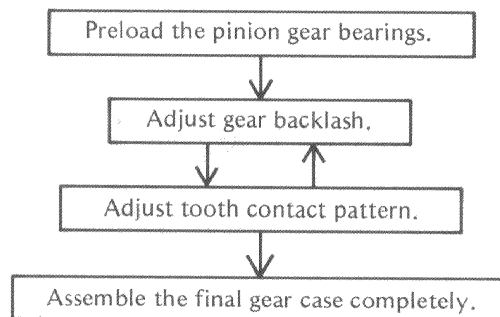
C. Final Gear Case  
D. Nuts

- Remove the upper and lower mounting nuts of the right rear shock absorber, and remove the final gear case toward the rear.

## Final Bevel Gear Adjustments

Refer to p. 350 of the Base Manual noting the following exception.

### Final Bevel Gear Adjustment Procedure



### Backlash:

Check and adjust the gear backlash when any of the parts listed below are replaced with a new one.

- Final gear case ⑳
- Bevel gears ⑬ and ⑳
- Tapered roller bearings ④, ⑧
- Bearing housing ⑫

### Backlash Measurement

- To measure the backlash, move the ring gear back and forth while holding the pinion gear steady. The difference between the highest and the lowest gauge reading is the amount of backlash.
- ★ If the backlash is not within the limit, replace the ring gear-shims.

### Final Bevel Gear Backlash

0.13 – 0.18 mm

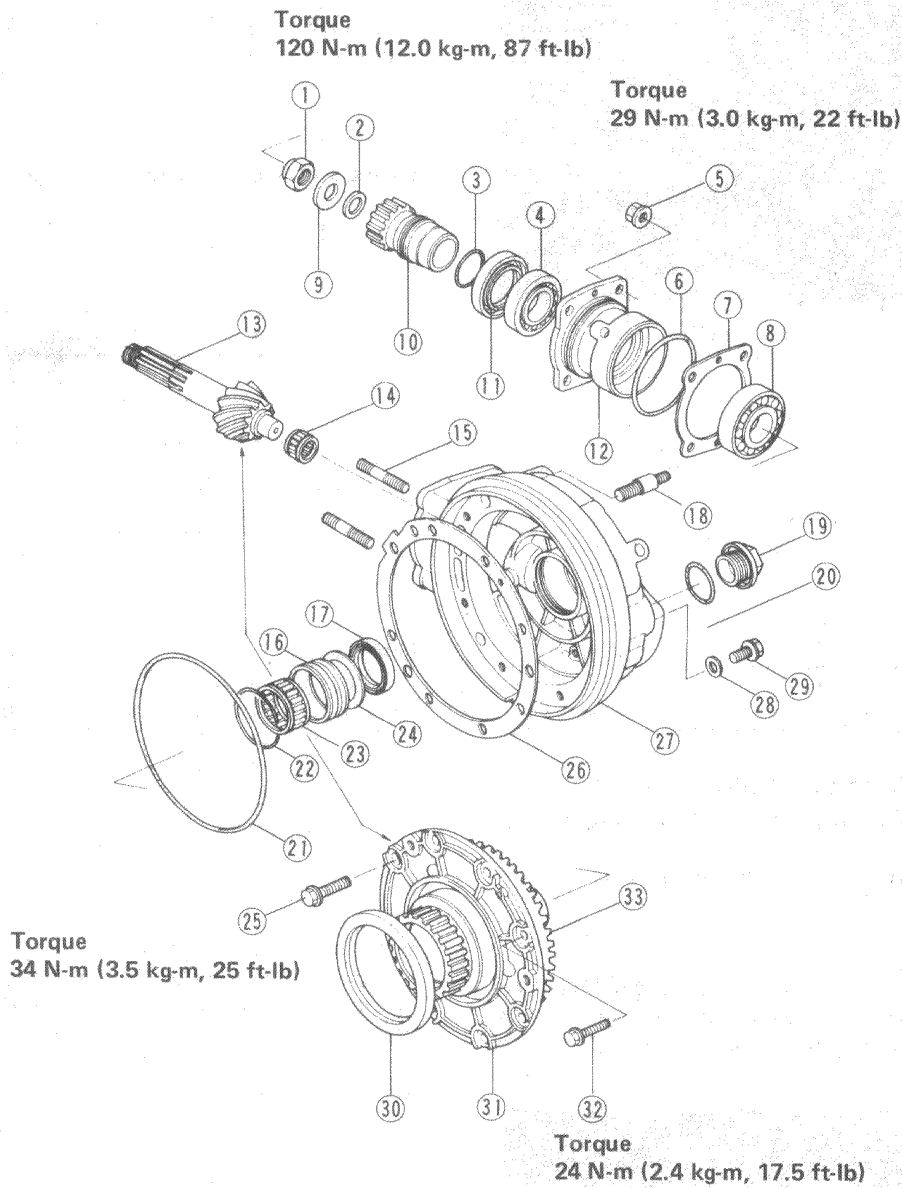
### Bearing Preload:

Check and adjust the bearing preload in the following cases:

- (a) When any of the parts listed below are replaced with new ones.
  - Tapered roller bearings ④, ⑧
  - Bevel gears ⑬ and ⑳
  - Bearing housing ⑫
  - Pinion gear joint ⑩
- (b) When the pinion gear nut is loosened; even if the purpose is not to replace the parts.



Final Gear Case



Replacement Part:

Pinion gear nut

Apply Locking Agent to:

Case mounting studs  
Shock absorber studs

Stake Following Part:

Pinion gear nut

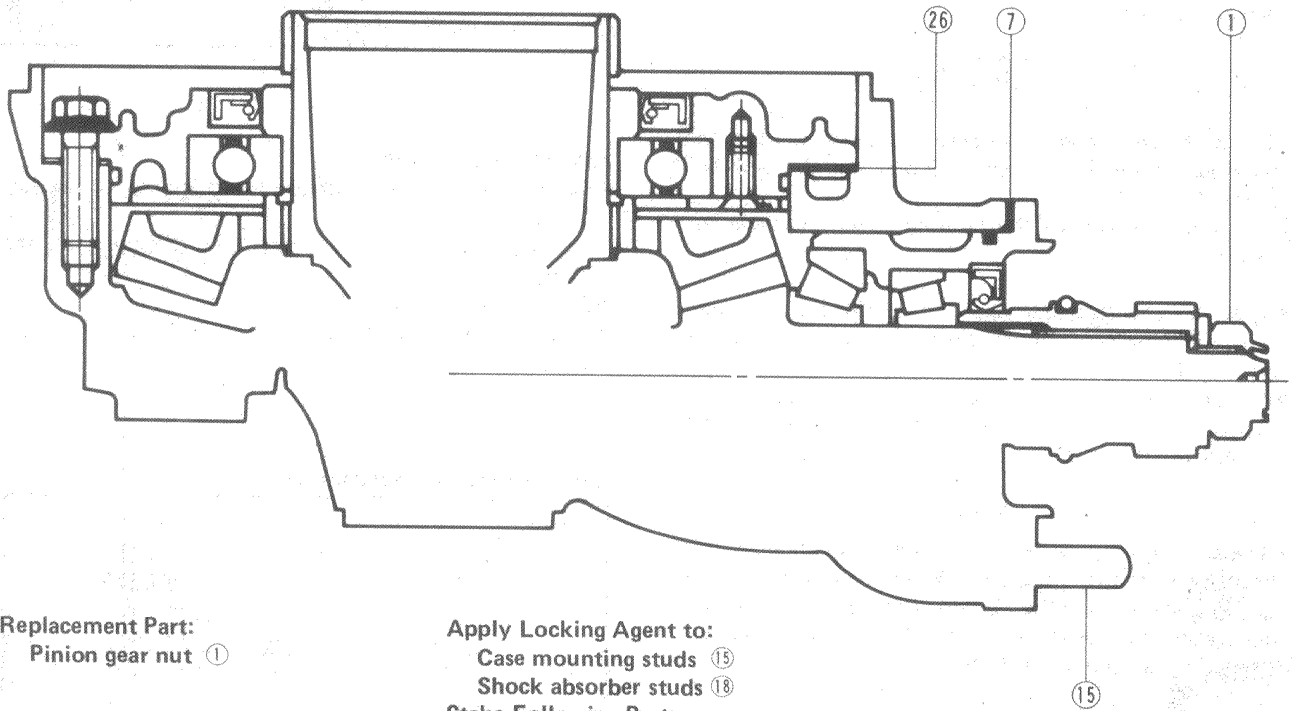
- 1. Pinion Gear Nut
- 2. Shim
- 3. O-ring
- 4. Roller Bearing
- 5. Nut
- 6. O-ring
- 7. Shim
- 8. Roller Bearing
- 9. Washer

- 10. Pinion Shaft Joint
- 11. Oil Seal
- 12. Bearing Housing
- 13. Pinion Gear
- 14. Needle Bearing
- 15. Stud
- 16. Race
- 17. Oil Seal
- 18. Stud

- 19. Plug
- 20. O-ring
- 21. O-ring
- 22. Snap Ring
- 23. Needle Bearing
- 24. Washer
- 25. Bolt
- 26. Shim
- 27. Final Gear Case

- 28. Washer
- 29. Bolt
- 30. Oil Seal
- 31. Final Gear Case Cover
- 32. Bolt
- 33. Ring Gear

Final Bevel Gear Adjustment



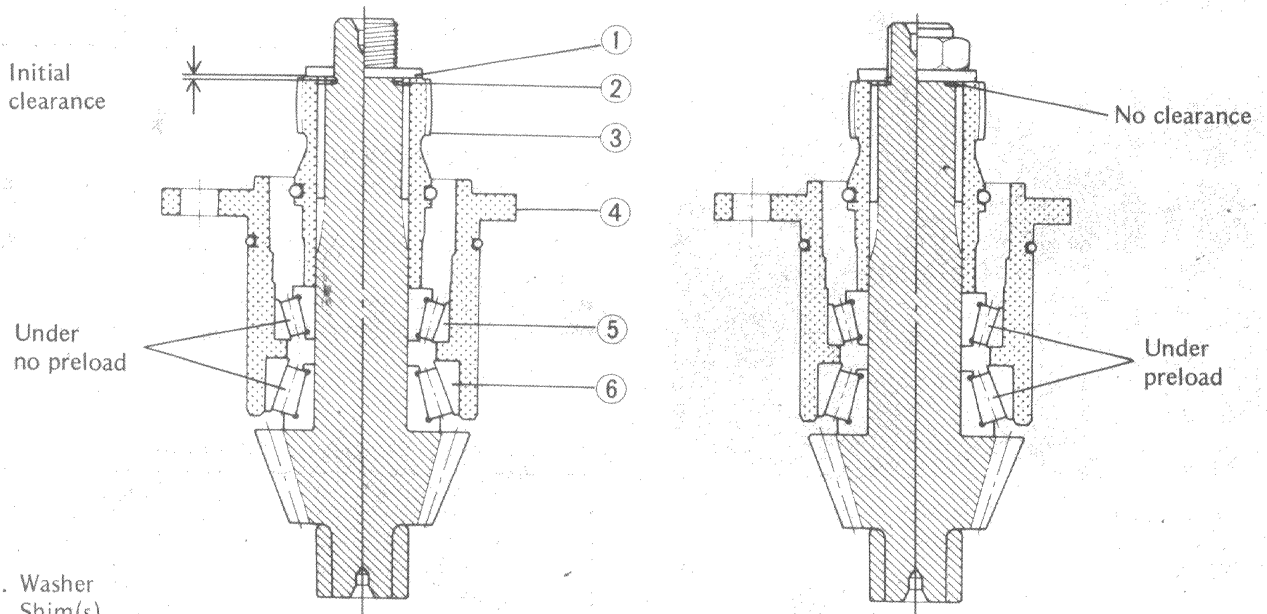
Replacement Part:  
Pinion gear nut ①

Apply Locking Agent to:  
Case mounting studs ⑮  
Shock absorber studs ⑰  
Stake Following Part:  
Pinion gear nut ①

Preloading Bearings

(A) Before tightening

(b) After tightening



- 1. Washer
- 2. Shim(s)
- 3. Pinion gear joint
- 4. Bearing housing
- 5. Tapered roller bearing
- 6. Tapered roller bearing

**Preload Measurement**

- Assemble the pinion gear bearing housing, and torque the pinion gear nut to the specification. Oil seal installation is not required until the correct bearing preload is obtained.

**CAUTION**

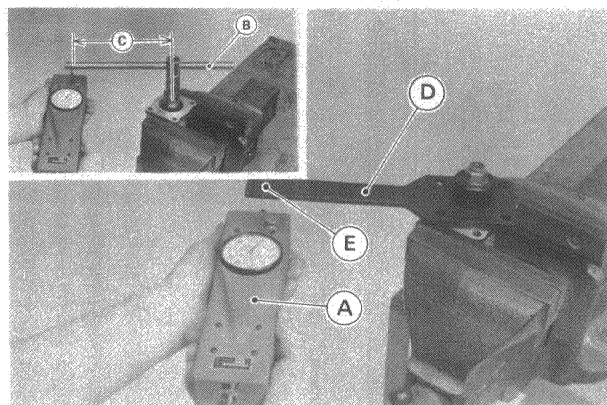
- To start with, choose a shim or shims so that the bearings are just SNUG with NO play but also with NO preload.
- Any over-preload on the bearings could damage the bearings.
- Apply a little final gear case oil to the bearings, and turn the gear shaft more than 5 turns to allow the bearings to seat.
- Measure the bearing preload. Bearing preload is defined as the force or torque which is needed to start the gear shaft turning.

**"NOTE"**

- Preload can be measured either with a spring scale or a beam-type torque wrench. When measured with a spring scale, the preload is designated by force (N, kg), and when measured with a torque wrench, it is designated by torque (N-m, kg-m, in-lb).

**Using Spring Scale:**

Hook the spring scale on the handle at the point 200 mm from the center of the gear shaft. Hold the bearing housing in a vise so that the gear shaft axis is vertical. Apply force to the handle horizontally and at a right angle to it.



- A. Spring Scale      D. Holder: 57001-1164  
 B. Handle of Wrench    E. Hole  
 C. 200 mm

- ★ If the preload is out of the specified range, replace the shims under the flat washer, and re-check the preload. Refer to the next paragraph to select suitable.

**Preload for Pinion Gear Bearings**

Using spring scale:

2.9 – 4.9 N (0.30 – 0.50 kg)

Using torque wrench:

0.6 – 1.0 N-m (0.06 – 0.10 kg-m, 5.2 – 8.7 in-lb)

**Preload Adjustment**

- To increase preload, decrease the thickness of the size of the shim(s).  
To decrease preload increase the thickness of the shim(s).
- Change the thickness a little at a time.
- Re-check the bearing preload, and re-adjust as necessary.

**Shims for Preload Adjustment**

Thickness (mm)	Part Number
0.1	92025-1219
0.2	92025-1220
0.3	92025-1221
0.5	92025-1222
0.6	92025-1223
0.7	92025-1224
0.8	92025-1225
0.9	92025-1226
1.0	92025-1227
1.30	92025-1214
1.32	92025-1215
1.34	92025-1216
1.36	92025-1217
1.38	92025-1218

**Backlash Adjustment**

- To increase backlash, increase the thickness of the shim(s).  
To decrease backlash, decrease the thickness of the shim(s).
- Change the thickness a little at a time.
- Re-check the backlash, and re-adjust as necessary.

**Ring Gear Shims for Backlash Adjustment**

Thickness (mm)	Part Number
0.10	92025-1388
0.15	92025-1389
0.2	92025-1390
0.3	92025-1391
0.6	92025-1392
0.9	92025-1393
1.2	92025-1394

**Tooth Contact Pattern:**

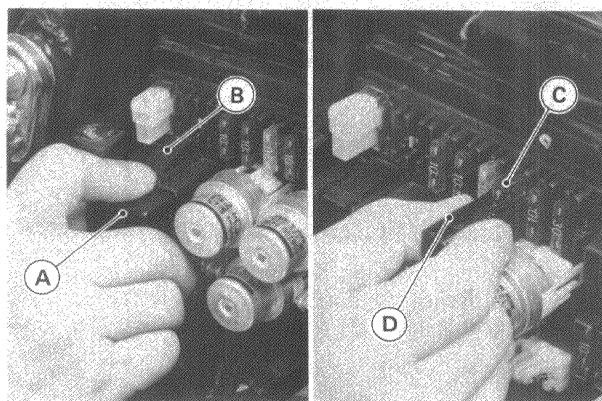
Inspect and adjust the tooth contact pattern when any of the parts listed below are replaced with a new one.

- Final gear case ⑳
- Bevel gears ㉓ and ㉔
- Tapered roller bearings ④, ⑧
- Bearing housing ㉒

**Pinion Gear Shims for Tooth Contact Adjustment**

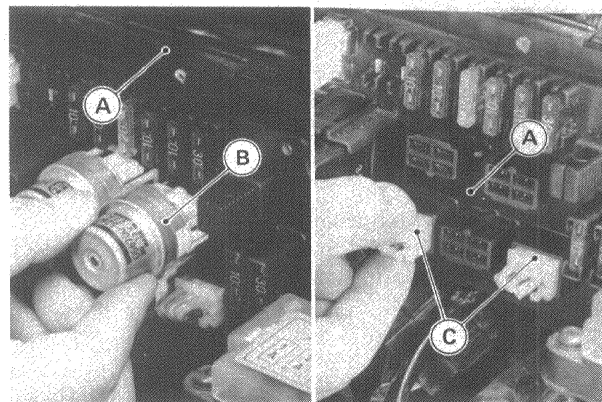
Thickness (mm)	Part Number
0.10	92025-1395
0.15	92025-1396
0.2	92025-1397
0.3	92025-1398
0.6	92025-1399
0.9	92025-1400
1.2	92025-1401

- To remove the turn signal relay, unlock the locking arms and pull out the relay.
- To remove the fuses, use the fuse puller.



A. Turn Signal Relay  
B. Locking Arm  
C. Fuse  
D. Fuse Puller

- To remove the relays, just pull them straight out.



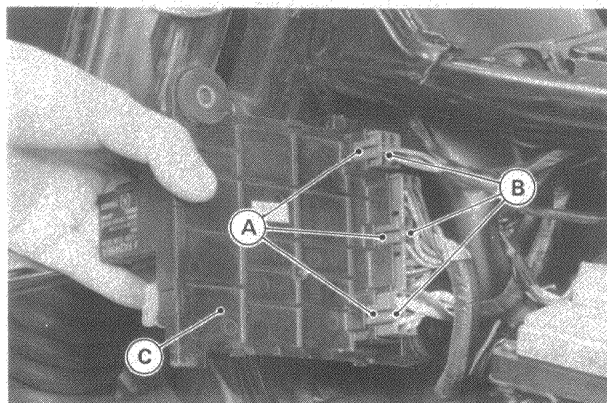
A. Junction Box  
B. Relay  
C. Diode Assembly

**Junction Box**

**Removal and Installation:**

*Removal Point of Junction Box Parts*

- Press in the locking arm on each connector, and pull the connectors(3) straight off the junction box.



A. Locking Arm  
B. Connector  
C. Junction Box

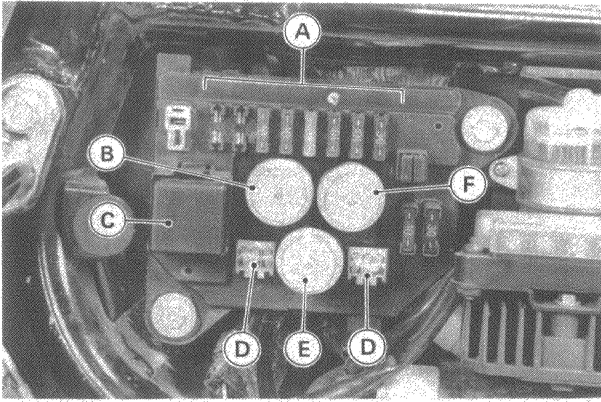
- To remove the diode assemblies, unlock the locking arm on each connector, and pull the diode assembly out of junction box.

**CAUTION**

- Do not pull on any wires as this could damage terminals and the wires themselves.

*Installation Point of Junction Box*

- Orient the relays and connectors correctly.
- Push the relays and connectors all the way in place until you feel a click.



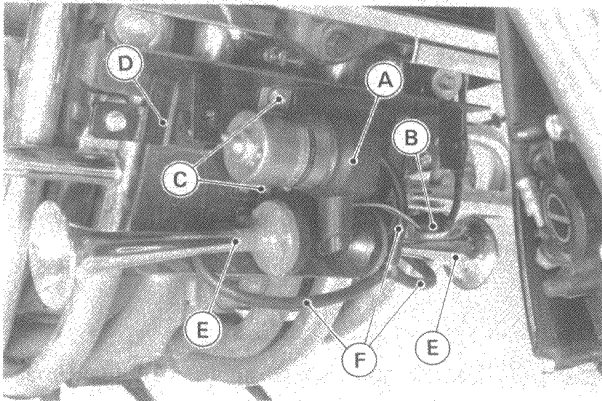
A. Fuses  
 B. Headlight Relay  
 C. Turn Signal Relay  
 D. Diode Assembly  
 E. Starter Circuit Relay  
 F. Main Relay

## Horn

### Removal and Installation:

#### Removal Point of Horn

- Remove or disconnect the following parts before horn removal.
  - Horn cover
  - 2-pin connector
  - Horn assembly with bracket
- Remove the bolts (2), and take off the compressor and horn with horn bracket toward the front.



A. Horn Compressor  
 B. 2-pin Connector  
 C. Compressor Mounting Bolts  
 D. Horn Bracket  
 E. Horn  
 F. Horn Mounting Bolts  
 G. Air Hoses

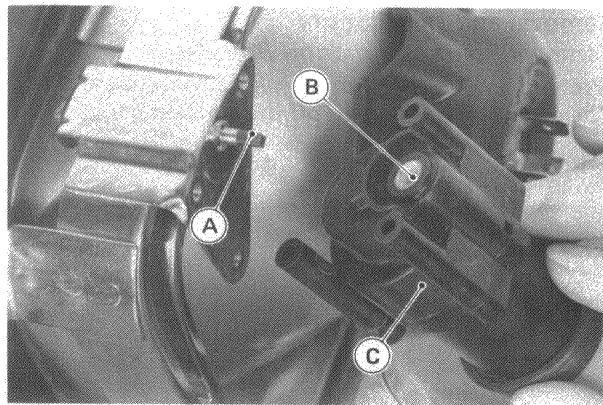
### Installation Point of Horn

- Do not pinch or bend the air hoses.
- Install the air compressor so that the air intake on the rubber boot is on the bottom side.
- When installing the horns on the horn bracket, the long horn must point to the right side and the short horn to the left.

## Headlight System

### Installation Points of Headlight

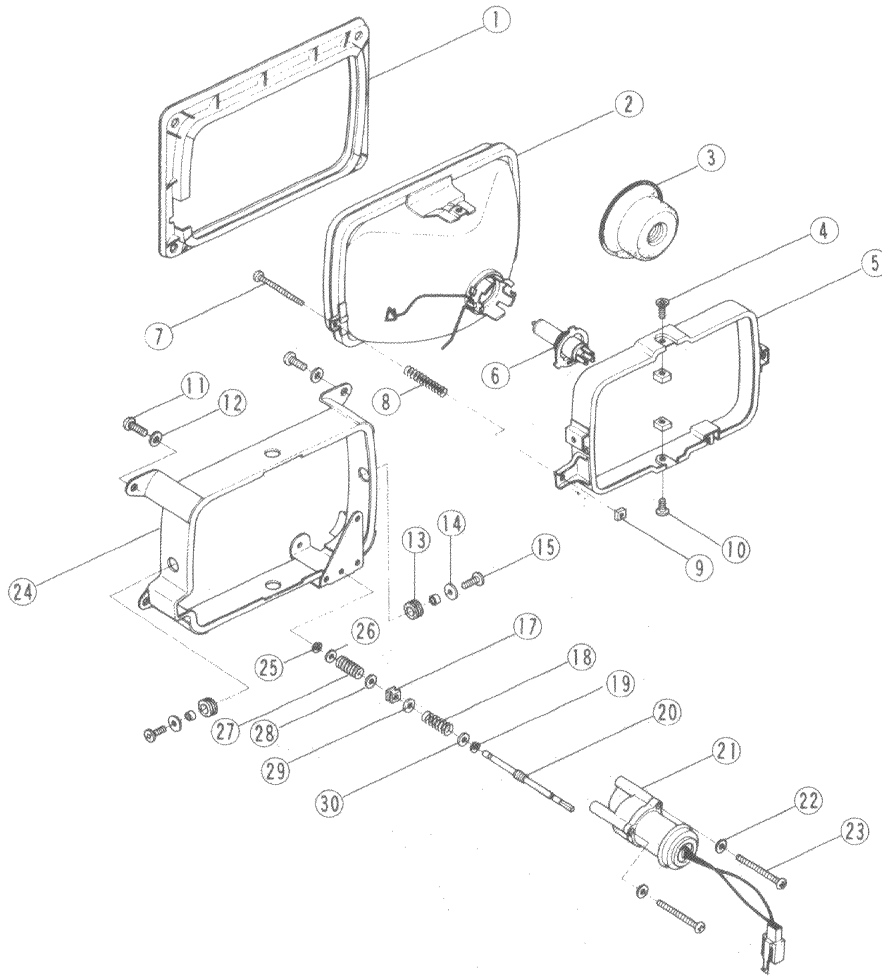
- Do not hang the headlight assembly at part of the adjuster or motor.
- When installing the motor on the headlight rim fit the end of the adjusting screw into the square hole in the motor.



A. Adjusting Screw  
 B. Square Hole  
 C. Motor

- When installing the headlight unit on the motorcycle, do not tap on the headlight.
- Check the headlight aim after installation (See the chapter 1.).

Headlight



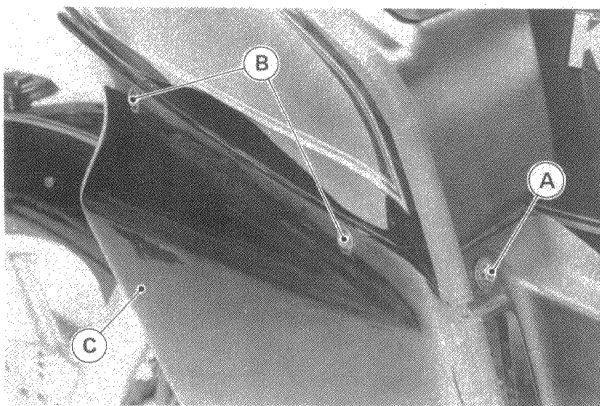
- 1. Lens Cover
- 2. Headlight
- 3. Headlight Cover
- 4. Screw
- 5. Headlight Holder
- 6. Bulb
- 7. Screw
- 8. Spring
- 9. Nut
- 10. Screw
- 11. Screw
- 12. Washer
- 13. Damper
- 14. Washer
- 15. Screw
- 16. Collar
- 17. Nut
- 18. Spring
- 19. E-Ring
- 20. Shaft
- 21. Motor
- 22. Washer
- 23. Screw
- 24. Headlight Body
- 25. E-Ring
- 26. Washer
- 27. Spring
- 28. Washer
- 29. Washer
- 30. Washer

Fairings

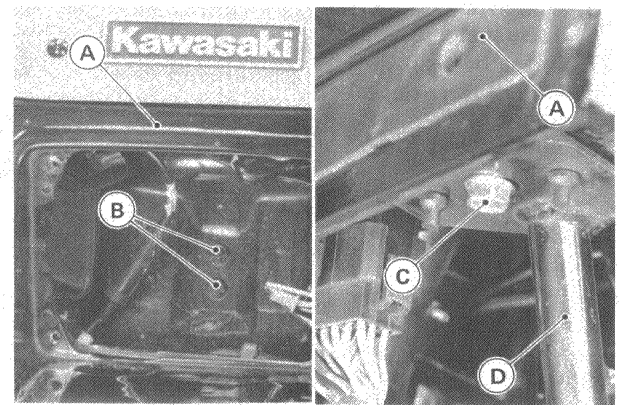
Removal Point of Firing

- Remove the following parts before fairing removal.
- Lower fairings

- Headlight
- Left and right turn signal unit
- All leads and connectors
- Instrument
- Remove the bolts (2) and nuts (2), and remove the fairing toward the front.



A. Bolt  
B. Screws  
C. Lower Fairing



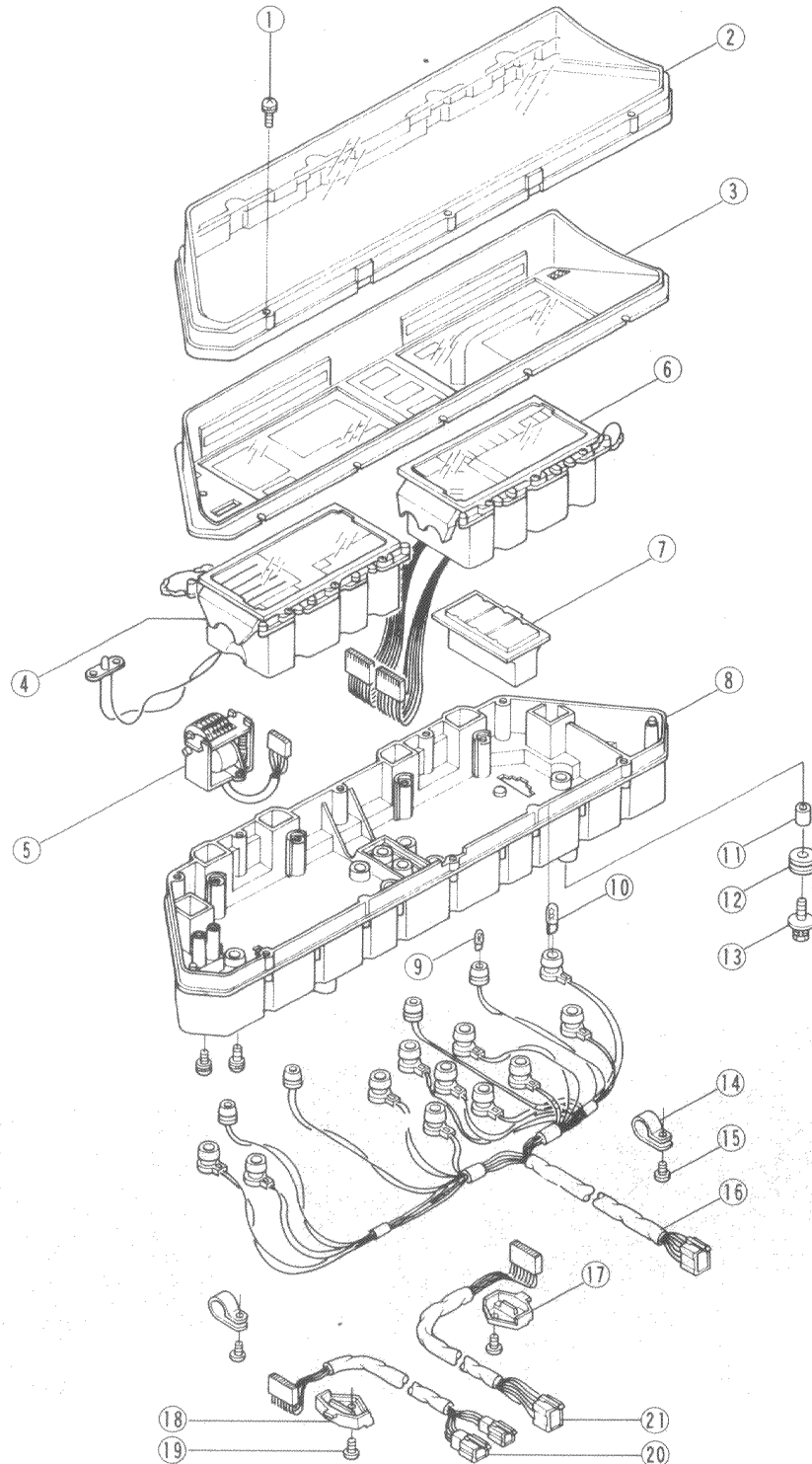
A. Fairing  
B. Bolts  
C. Bolt  
D. Fairing Stay

L.C.D. Instrument

Removal Points

- Remove the following parts before instrument removal.
- Windshield
- Headlight
- Instrument cover
- Instrument wiring connectors

Instrument



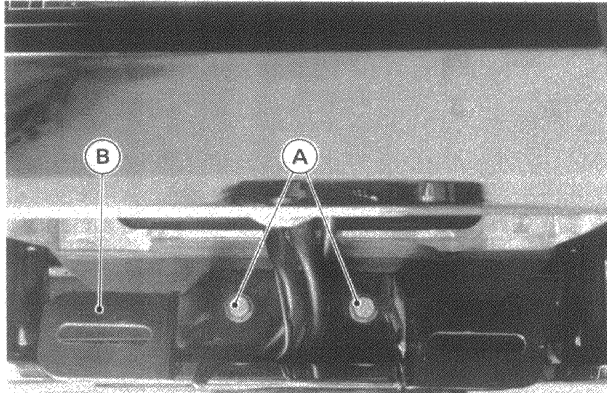
1. Screw
2. Meter Upper Cover
3. Meter Case Cover
4. Speedometer
5. Odometer
6. Tachometer
7. Indicator Light Cover
8. Meter Lower Cover
9. Bulb
10. Bulb
11. Collar
12. Damper
13. Bolt
14. Clamp
15. Screw
16. Meter Light Wiring
17. Clamp
18. Clamp
19. Screw
20. Speedometer Wiring
21. Tachometer Wiring



**Storage Case**

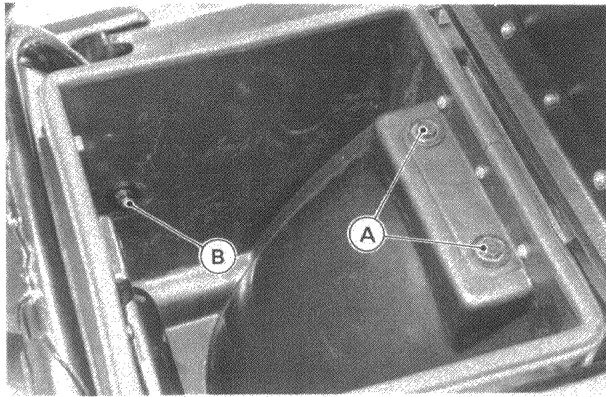
**Removal Point of Storage Case**

- Remove the tool container rear mounting bolts with license plate bracket.



A. Rear Mounting Bolts    B. License Plate Bracket

- Open the tool container lid, remove the front mounting bolts and side mounting bolts.



A. Front Mounting Bolts    B. Side Mounting Bolts

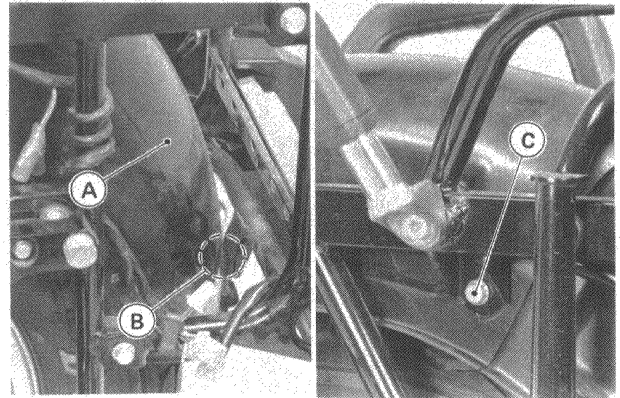
- Disconnect the tail light wire connectors (3).
- Take off the tool container and tail light assembly toward the rear.

**Rear Bumper**

**Removal Point of Rear Bumper**

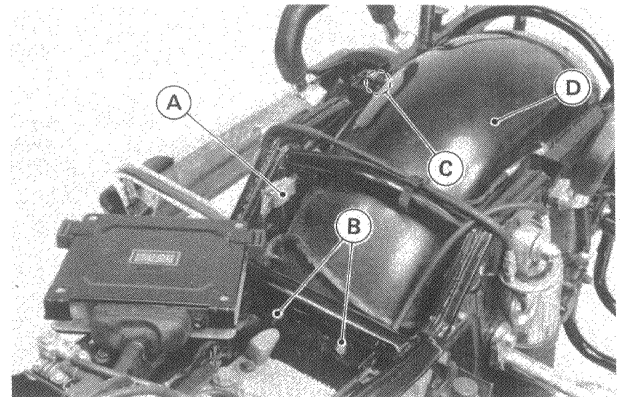
- Remove the following parts before rear bumper removal.
  - Saddlebags and travel trunk

- Seat
- Tool container
- Rear fender-rear



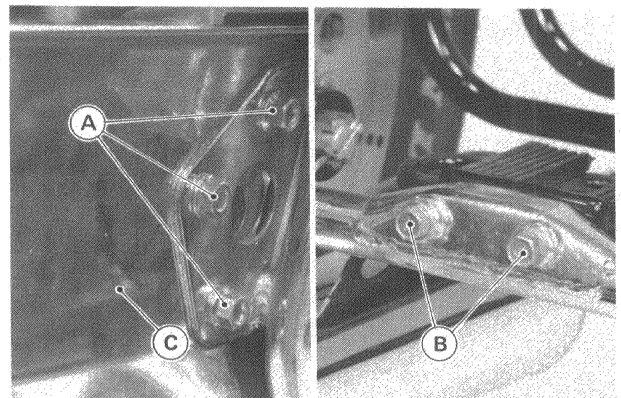
A. Rear Fender-Rear    C. Mounting Bolts  
B. Mounting Bolt

- Rear fender-front



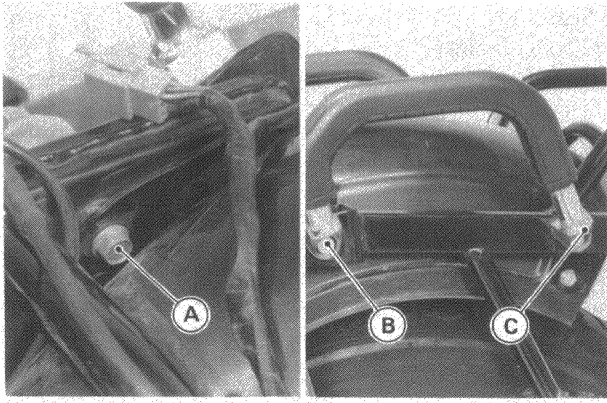
A. Connector    C. Connector  
B. Mounting Bolts    D. Rear Fender-Front

- Remove the straps, and disconnect the tail/brake light wire and antenna wire connectors.
- Remove the bolts and nuts as shown, remove the bumper assembly toward the rear.



A. Nuts    B. Nuts    C. Bumper





A. Bolt  
B. Bolt (Remove)

C. Bolt (Loosen)

# Appendix

## Table of Contents

Additional Considerations for Racing .....	8-2
Unit Conversions .....	8-4

## 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 conditions. **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.
- US model only: 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 regulations.

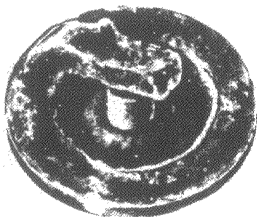
### Spark Plug:

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.

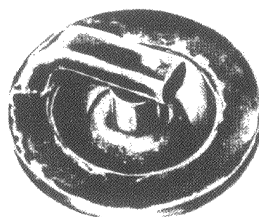
Test have shown the plug listed in the "Specifications" section in the chapter 1 to be the best plug for general use.

Since spark plug requirements change with the ignition and carburetion adjustments and with riding conditions, whether or not a spark plug of a correct heat range is used should be determined by removing and inspecting the plug.

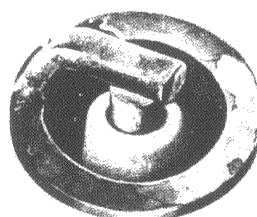
### Spark Plug Condition



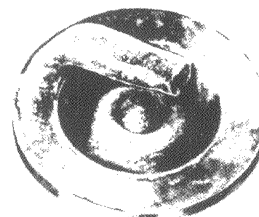
Carbon fouling



Oil fouling

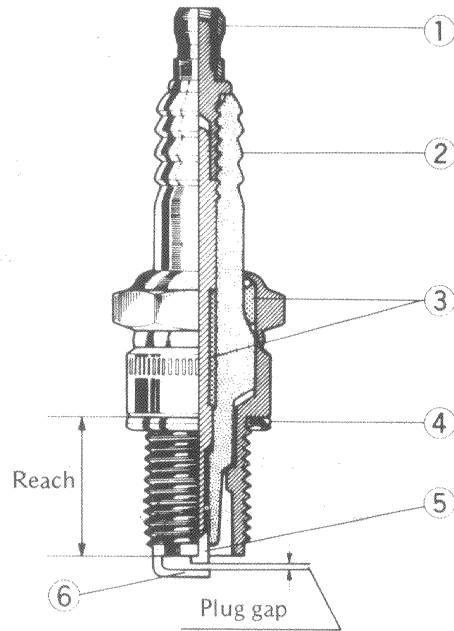


Normal operation



Overheating

### Spark Plug



- |              |                     |
|--------------|---------------------|
| 1. Terminal  | 4. Gasket           |
| 2. Insulator | 5. Center electrode |
| 3. Cement    | 6. Side electrode   |

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 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.

A spark plug for higher operating temperatures is used for racing. Such a plug is designed for better cooling efficiency so that it will not overheat and thus is often called a "colder" plug. If a spark plug with too high a heat range is used – that is, a "cold" plug that cools itself too well – the plug will stay too cool to burn off the carbon, and the carbon will collect on the electrodes and the ceramic insulator.

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.

### Spark Plug Inspection

- Remove the spark 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. If the ceramic is white, the plug is operating at too high a temperature and it should be replaced with the next colder type.

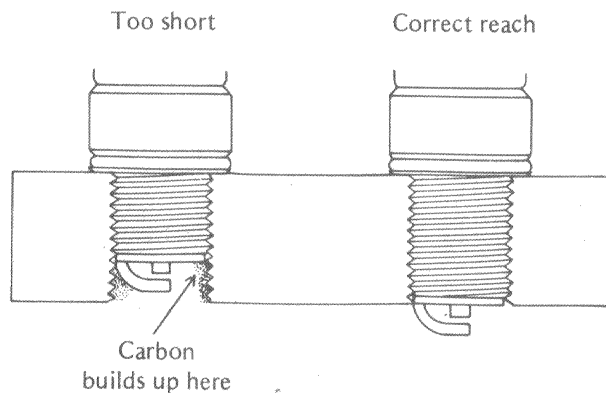
### Required Spark Plug for Racing

NGK BR9ES

### CAUTION

- If the spark plug is replaced with a type other than the standard plug, listed in the "Specifications" section, make certain the replacement plugs have the same thread pitch and reach (length of threaded portion) and the same insulator type (regular type or projected type) as the standard plug.
- 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.

### Plug Reach



### Standard Spark Plug Threads

Diameter:	12 mm
Pitch:	1.25 mm
Reach:	19.0 mm

### "NOTE"

- 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. Unusual riding conditions may require a different spark plug heat range. For racing, install the colder plug.