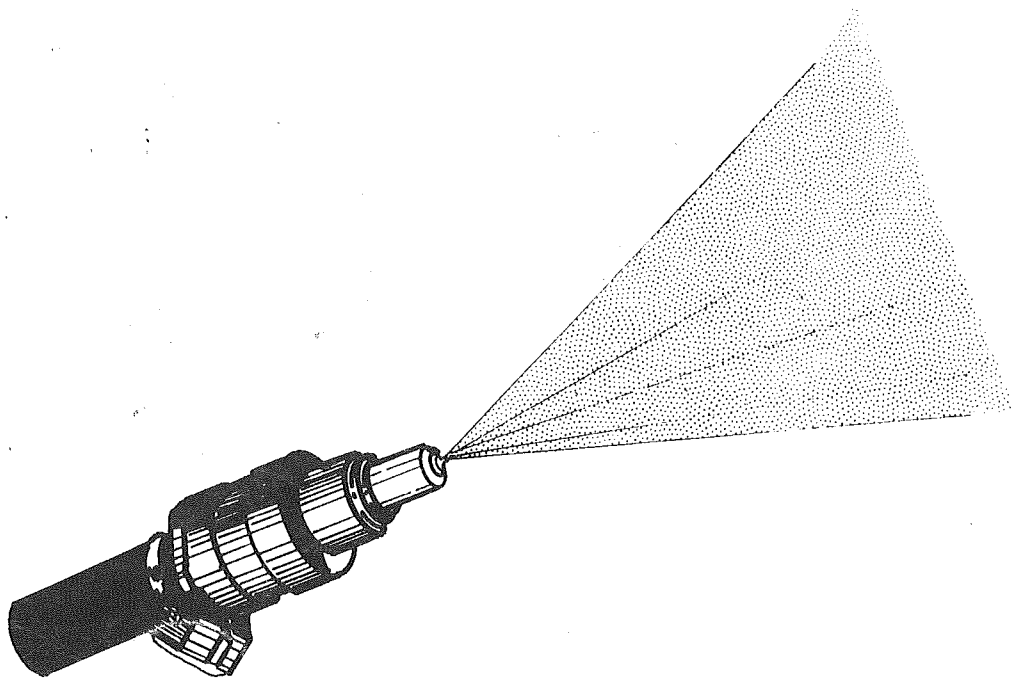
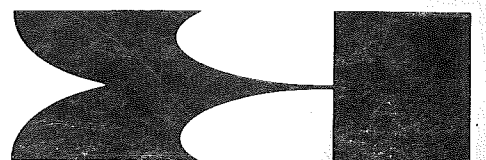


TRUBLESHOOTING MANUAL



**ELECTRONIC
FUEL INJECTION**

Kawasaki



FOREWORD

This manual covers the recommended troubleshooting procedures for Kawasaki Electronic Fuel Injection. It contains no disassembly and assembly, repair, or other maintenance information and is designed to be used in conjunction with the service manual covering the model being worked on.

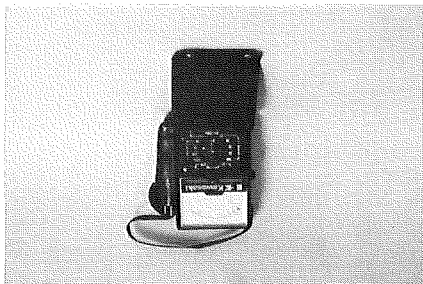
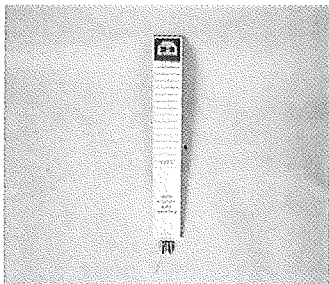
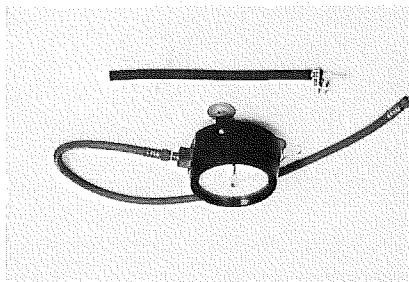
Remember that the operation of the Electronic Fuel Injection system is directly related to exhaust emissions and that the system must not be altered in any way.

READ THE EMISSIONS INFORMATION ON THE FRONT OF THE SERVICE MANUAL FOR THE MODEL BEING WORKED ON!

Before troubleshooting the Kawasaki Electronic Fuel Injection system, check the following, and replace, add, adjust, or repair if necessary.

- There is sufficient fuel in the tank.
 - Correct amount of specified engine oil is in the engine.
 - Fuses are not blown out.
 - The engine is cranked normally with the starter motor.
 - Cylinder compression, spark plugs, valve clearance are normal, and items other than fuel-injection-system related items are normal.
- NOTE:** Measure the cylinder compression in the same way as for a carburetor model with the following exception. To stop fuel injector operation during the compression test, disconnect the white/red lead which connects the battery positive terminal to the fuel injection system harness under the left side cover.
- The oil filler cap, breather hose, and surge tank drain plug are installed correctly.
 - All electrical connectors are clean and tight.
 - The ignition system is normal.
 - There is no external damage.

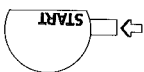
These are the special tools and instruments needed for troubleshooting the Kawasaki Electronic Fuel Injection system.



These symbols appear in the text.



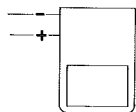
means ignition switch "OFF"



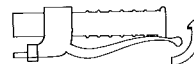
means starter button is pushed



means ignition switch "ON"



means multimeter is connected as shown and switched to setting printed in meter symbol.



means clutch lever pulled (to activate starter switch)

NOTE: For best results, start with TEST 1 and follow the instructions to the letter. This manual was designed to guide you through the Kawasaki Electronic Fuel Injection system in a careful and thorough examination of all its component parts.

ELECTRONIC FUEL INJECTION

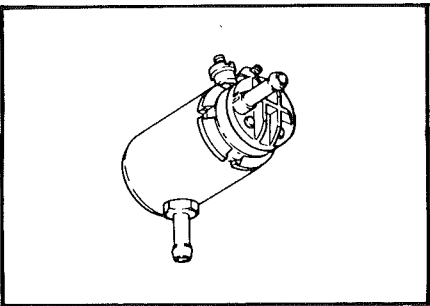
TROUBLESHOOTING MANUAL

All information contained in this Supplement is based on the latest product information available at the time of publication. The right is reserved to make changes at any time without prior notice and without incurring an obligation to make such changes to products manufactured previously. Published by Product Services, KMC.

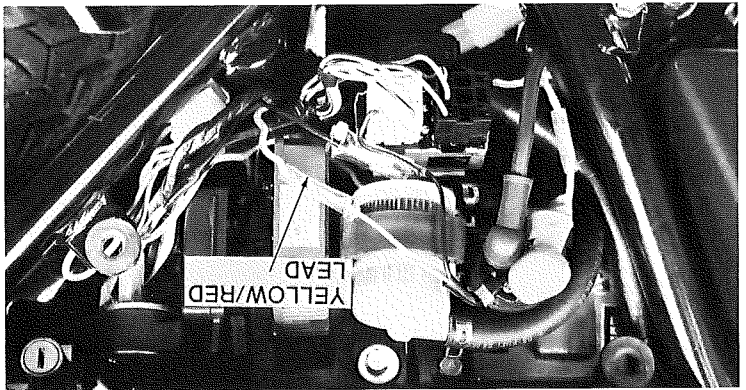
Copyright Kawasaki Motors Corp., USA 1980 Printed in USA First Issue: May 1980

FUEL PUMP IN-CIRCUIT INSPECTION

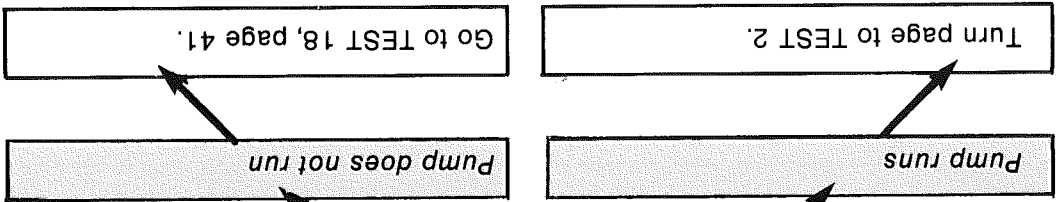
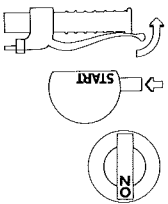
TEST 1



- Turn ignition switch "OFF".
- Disconnect the yellow/red lead of the starter motor relay under the left side cover. This is to prevent the starter motor from working during this inspection.

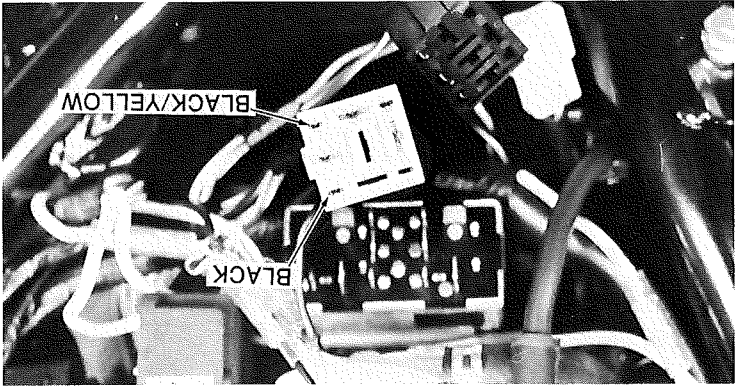


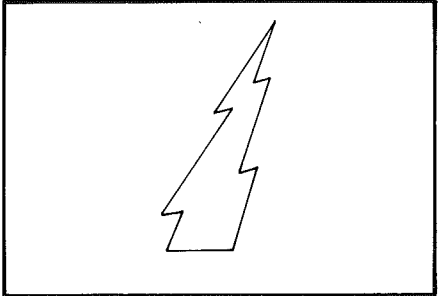
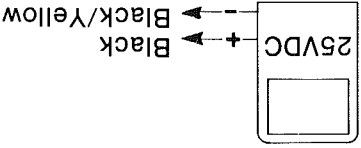
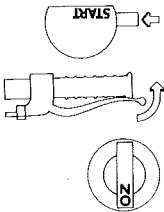
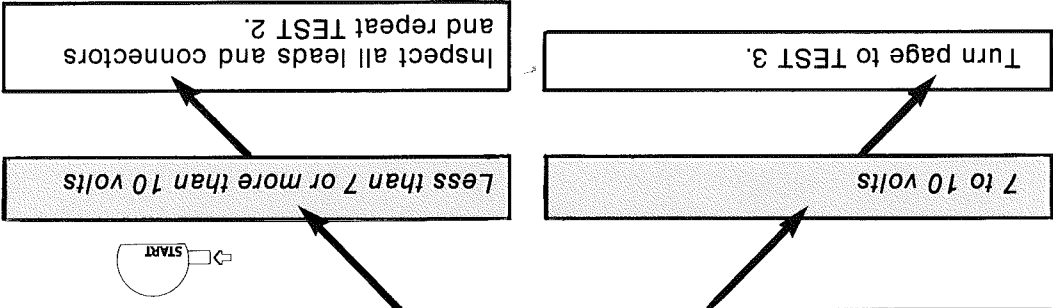
- Turn "ON" the ignition switch.
- Push the starter button.
- Pull in the clutch lever, and listen to the fuel pump.



START SIGNAL INSPECTION

- Turn off the ignition switch.
- Disconnect the black and white 9-pin connectors from the relay under the left side cover, and connect a voltmeter to the connector to check the start signal.





TEST 2

RELAY INSPECTION

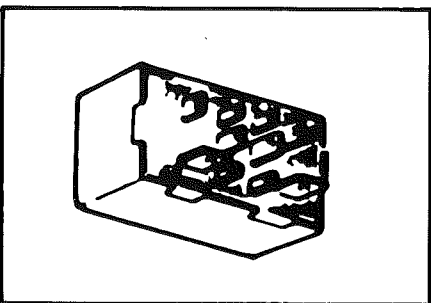
To save time, substitute a good relay for the suspected problem relay. If a good relay is not available, use TEST 23, page 50, to troubleshoot the suspect relay.

New relay does not cure problem

Replace original relay and turn
page to TEST 4.

New relay cures problems

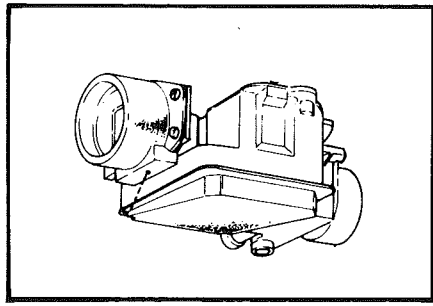
Discard original relay.



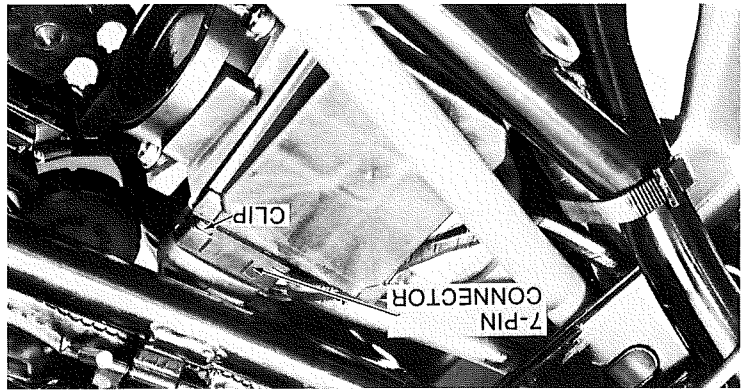
TEST 3

FUEL PUMP CONTACT INSPECTION

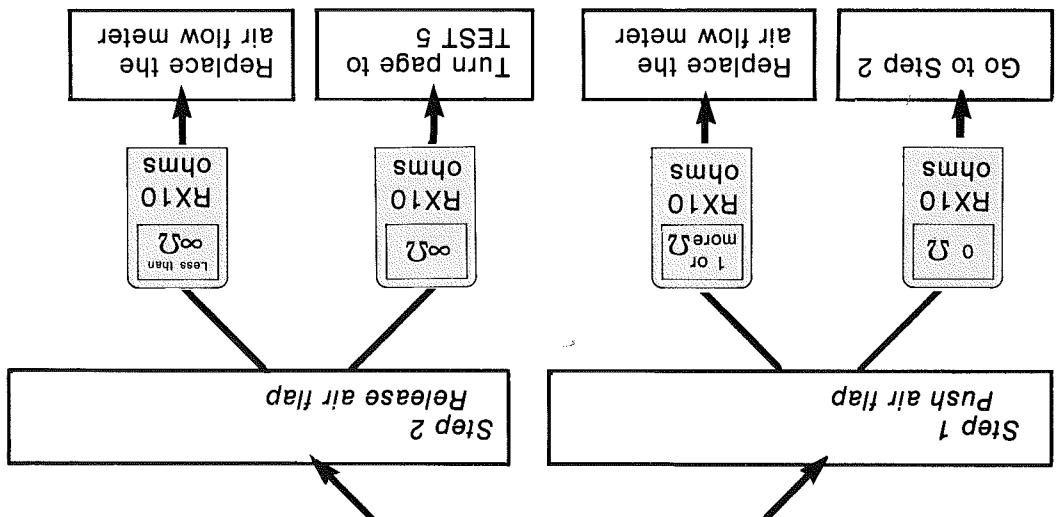
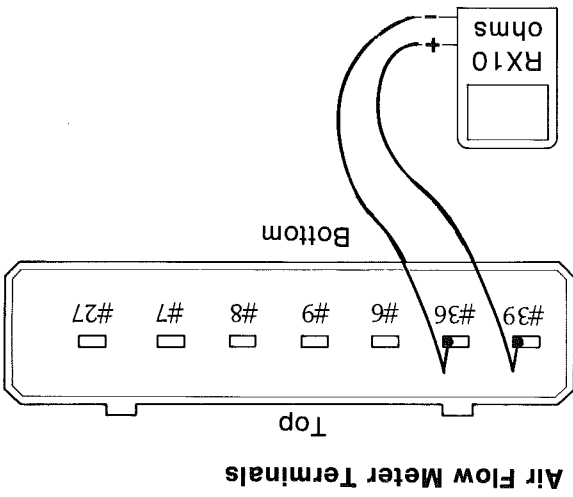
TEST 4



- Remove the air cleaner element.
- Pull off the right side cover.
- Turn off the ignition switch, and disconnect the 7-pin connector from the air flow meter.

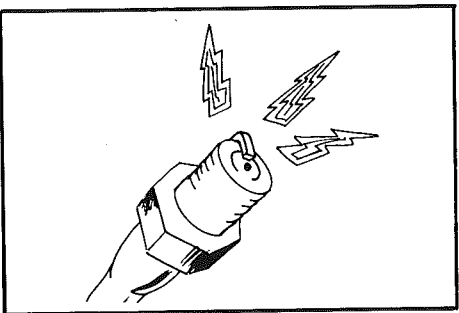


- Connect an ohmmeter to the air flow meter terminals, as shown.



IGNITION SIGNAL INSPECTION

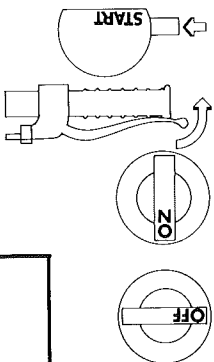
TEST 5



- Remove the fuel tank.
- Turn off the ignition switch.
- Disconnect the Electronic Control Unit.

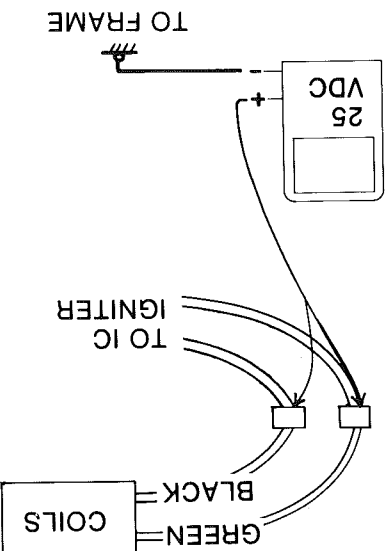
STEP 1:

- Attach a voltmeter to the green coil primary lead, and then to the black.
- Turn on the ignition and activate the starter.



Meter shows zero volts on one or both wires

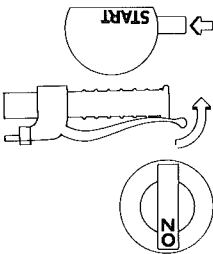
Troubleshoot Ignition System according to the Service Manual.



Meter shows battery voltage and flickers regularly on both wires

STEP 2:

- Attach a voltmeter to the green wire and then the black in the ECU connector.
- Turn on the ignition and activate the starter.

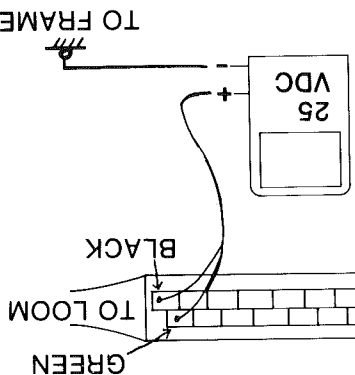


Meter shows zero volts on one or both wires

Check the wiring to the IC Igniter from the ECU and troubleshoot the Ignition System according to the Service Manual.

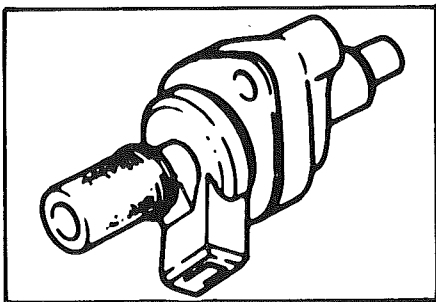
Meter shows battery voltage and flickers regularly on both wires.

Turn page to TEST 6.



FUEL INJECTOR SOUND INSPECTION

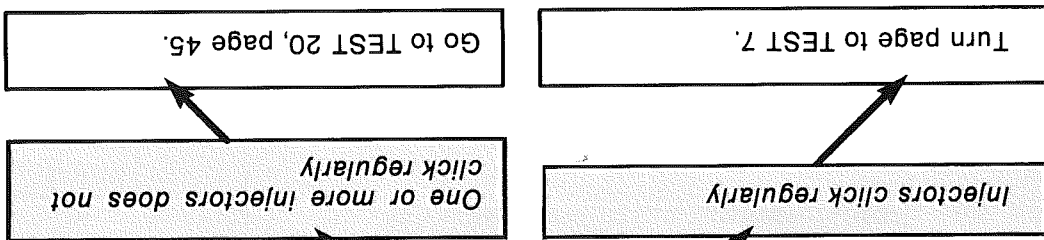
TEST 6



Sound Inspection

- Start the engine.
- Place the tip of a screwdriver against one of the injectors. Put your ear on the grip end and listen to check whether the injector is clicking or not.
- Do the same for the other injectors.

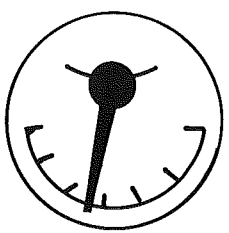
1. Fuel Injector 2. Screw Driver



NOTE: 1. The interval between clicking sounds becomes shorter as the engine speed rises.
2. If the engine does not start, perform this inspection while cranking the engine with the starter motor.

FUEL PRESSURE INSPECTION

TEST 7



AVERAGE READING

PRESSURE GAUGE

P/N 57001-1089

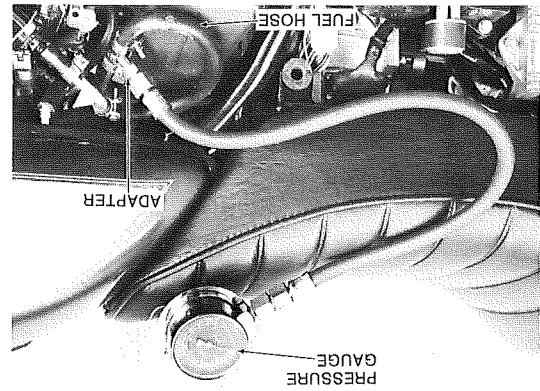
PUMP

TO INJECTORS

- Pull the right side cover off, and disconnect the high-pressure fuel hose from the fuel pump outlet.

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



- Install the fuel tank.

WARNING Do not attempt to start the engine while the fuel hoses are disconnected.

- Start the engine, and read the gauge.

Engine idling, gauge reads 2.2 to 2.4 kg/cm² (31 to 34 psi)

The moment the throttle is fully opened, the gauge reads 2.4 to 2.6 kg/cm² (34 to 37 psi)

If engine will not start, remove air cleaner and push air flap. Pressure gauge reads 2.4 to 2.6 kg/cm² (34 to 37 psi)

Pressure is too low or too high.

Go to TEST 21, page 47.

Turn page to TEST 8.

FUEL SYSTEM LEAK INSPECTION

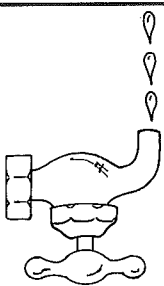
Inspect the connections between the parts shown below for leaks.

No leaks

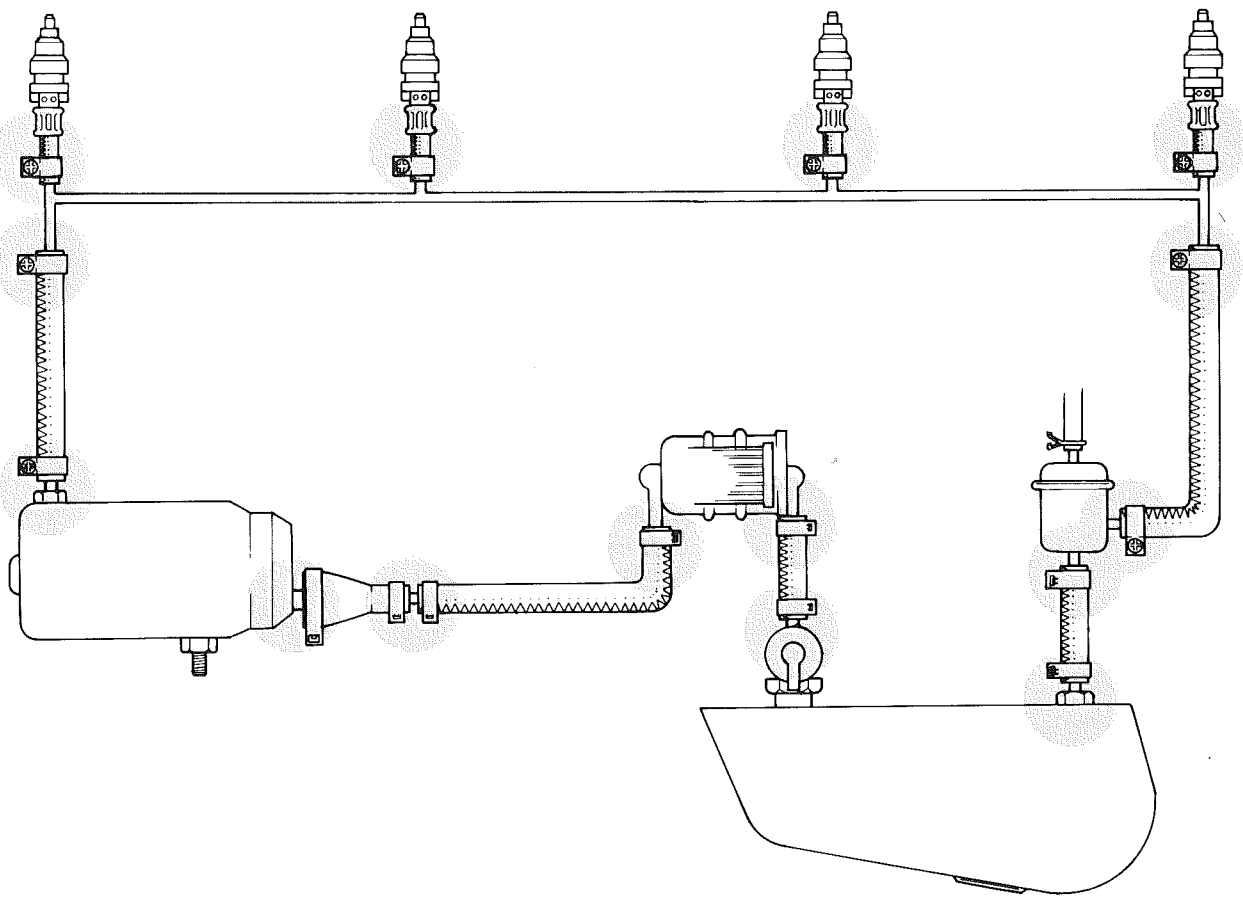
Turn page to TEST 9.

Leaks

Repair leaks. NOTE: Use genuine Kawasaki parts or equivalent.

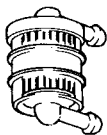


TEST 8



FUEL FILTER INSPECTION AND FUEL SYSTEM CLEANING

TEST 9



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

WARNING

Inspect the fuel filter for proper installation, water, debris, and damage.

No water, debris, or damage. Properly installed.

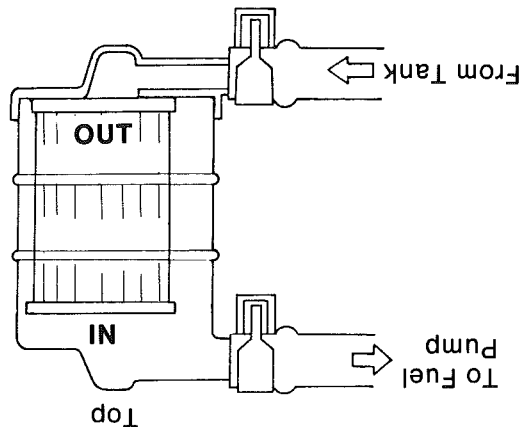
Water or debris in filter or filter damaged.

Turn page to TEST 10.

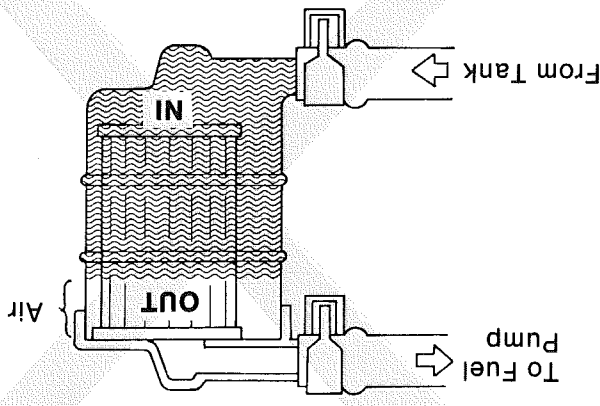
- Remove the fuel tank and drain it.
- Remove the fuel tap from the tank, and clean the fuel tap filter with a high flash-point solvent.
- Flush out the fuel tank with a high flash-point solvent.
- Clear the air vent in the tank cap with compressed air.
- Remove the fuel pump, fuel injectors, fuel distributing 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 motor-cycle. Use new hose clamps.

Fuel Filter Installation

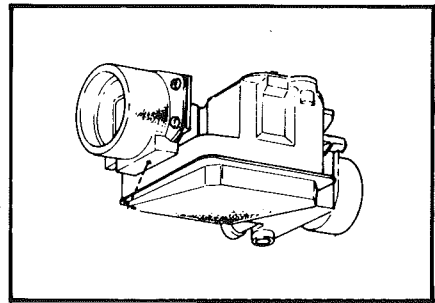
(1) Good



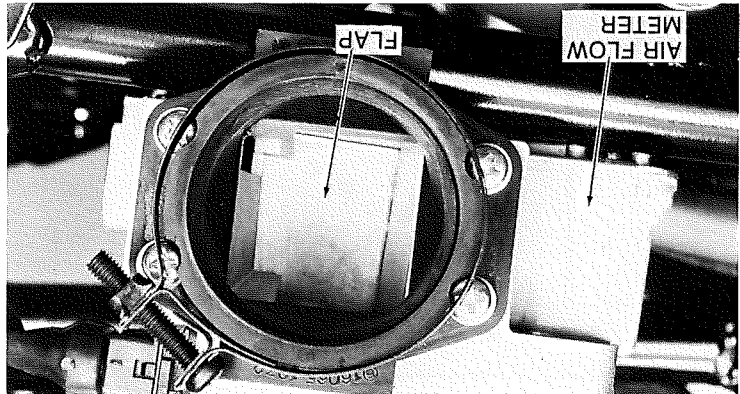
(2) Wrong



AIR FLOW METER FLAP INSPECTION



- Remove the air flow meter.
- Check the air flap movement by pushing it from the air cleaner side.



Flap swings smoothly without binding, returns to rest position by itself.

Flap does not move smoothly, or does not return to the closed position by itself.

Turn page to TEST 11.

Replace Air Flow Meter.

AIR FLOW METER POTENTIOMETER INSPECTION

- Turn off the ignition switch.
- Disconnect the 7-pin connector from the air flow meter.

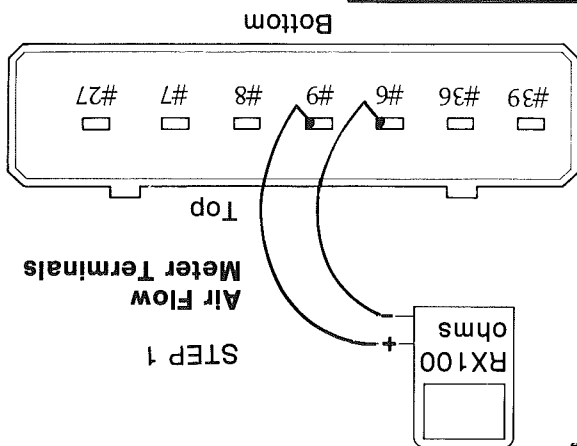


STEP 1. Make the connections shown at right.

350 to 400Ω

Less than 350 or more than 400Ω

Replace air flow meter.



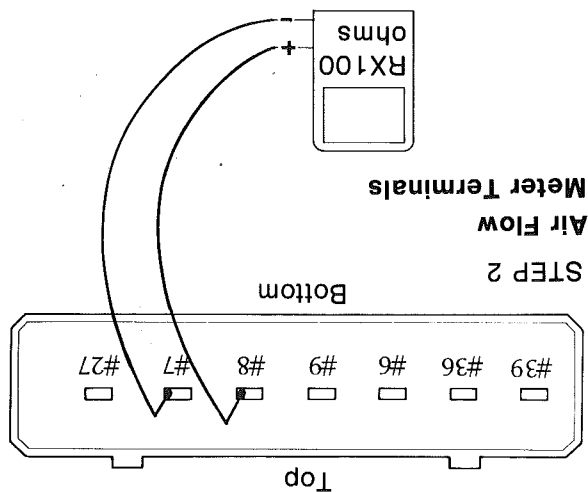
STEP 2. Make the connections shown at right.

Any values other than 0 or ∞Ω with flap in any position.

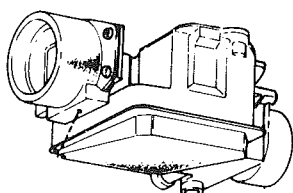
Turn page to TEST 12.

0 or ∞Ω flap in any position.

Replace air flow meter.

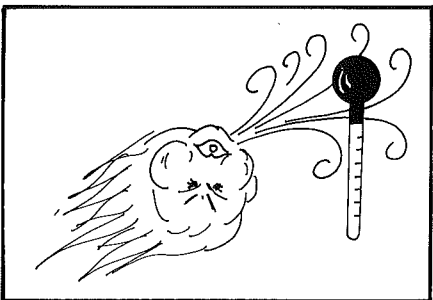


TEST 11

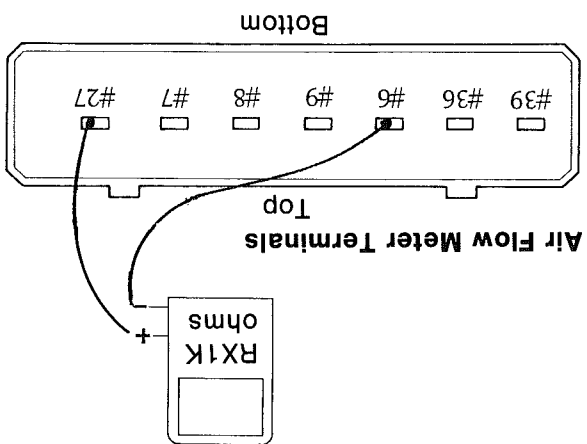
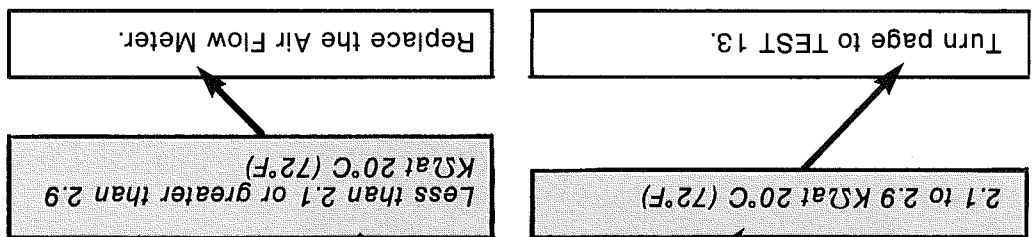


AIR TEMPERATURE SENSOR INSPECTION

TEST 12

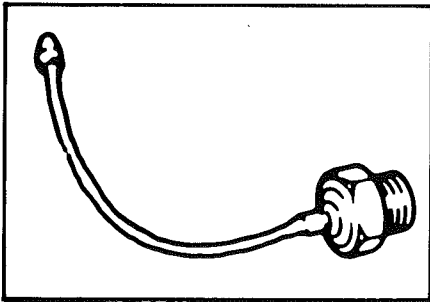


- Turn off the ignition switch, and disconnect the 7-pin connector from the air flow meter.
- Connect an ohmmeter to the air flow meter terminals as shown at right.

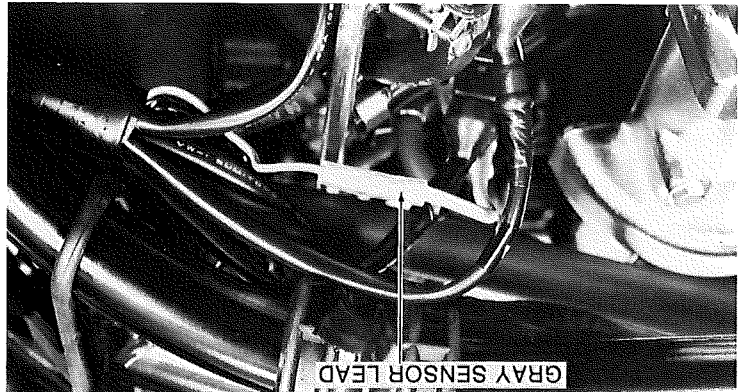


TEST 13

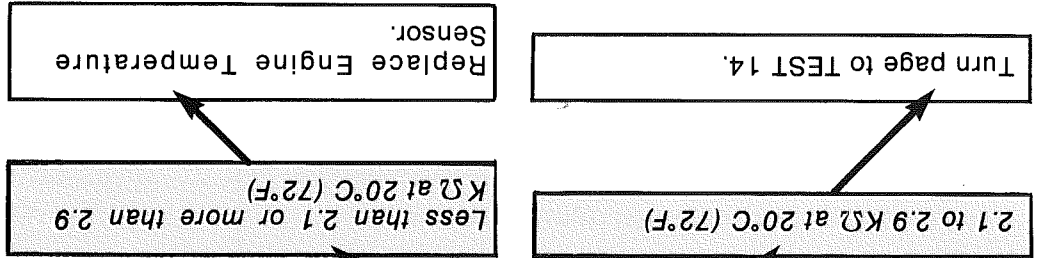
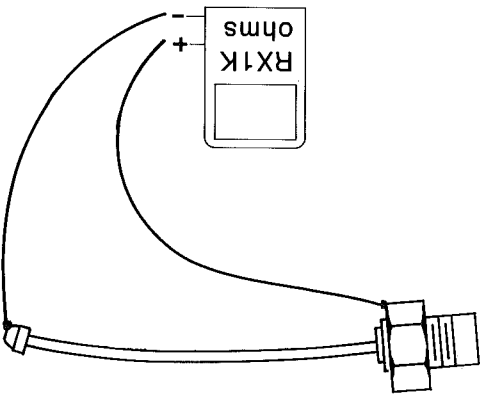
ENGINE TEMPERATURE SENSOR INSPECTION



- Remove the fuel tank.
- Turn off the ignition switch, and disconnect the lead of the engine temperature sensor.



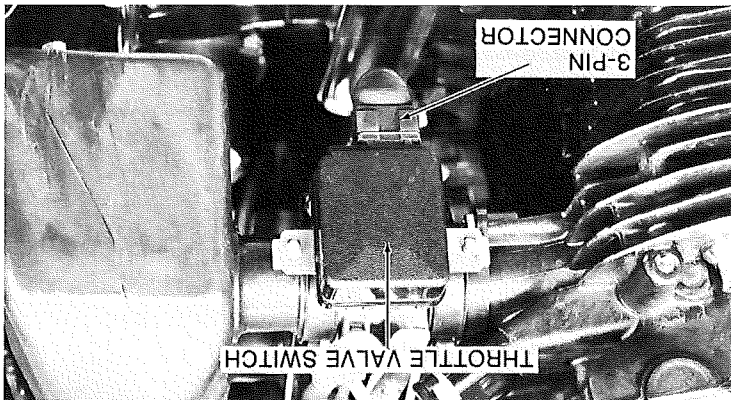
- Measure the resistance of the sensor with an ohmmeter. Make the connections as shown at right.



THROTTLE VALVE SWITCH INSPECTION



- Turn off the ignition switch, and disconnect the 3-pin connector from the throttle valve switch.



- Connect an ohmmeter to the throttle valve switch as shown at right.

STEP 1
Make connections shown at right. Move throttle.

Throttle Released = $0\ \Omega$
Throttle fully open = $\infty\ \Omega$

Go to STEP 2.

Throttle Released = greater than $0\ \Omega$
Throttle fully open = less than $\infty\ \Omega$

Replace Throttle Valve Switch.

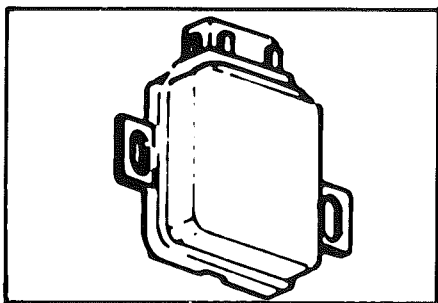
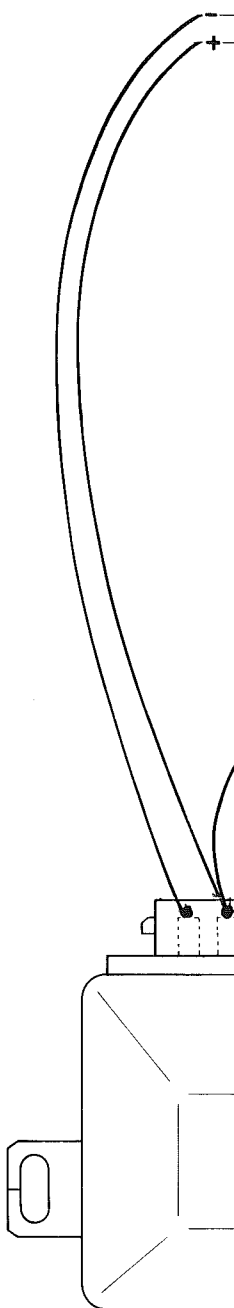
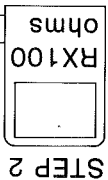
STEP 2.
Make connections shown at right. Move throttle.

Throttle released = $\infty\ \Omega$
Throttle fully open = $0\ \Omega$

Turn page to TEST 15.

Throttle released = less than $\infty\ \Omega$
Throttle fully open = greater than $0\ \Omega$

Replace Throttle Valve Switch.

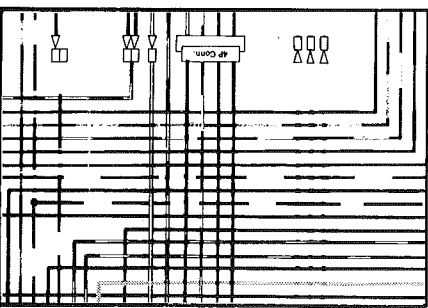
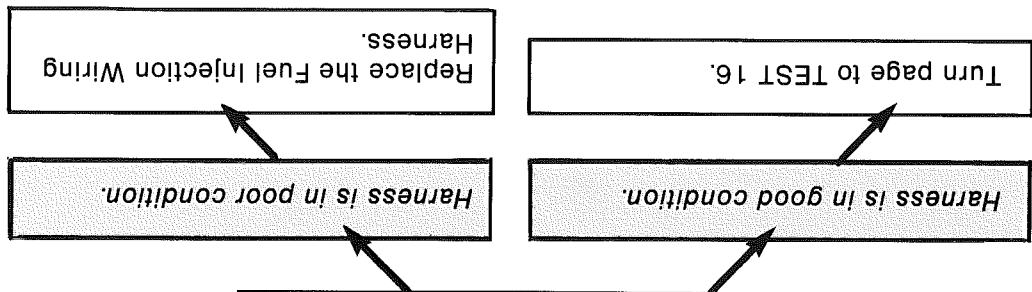


TEST 14

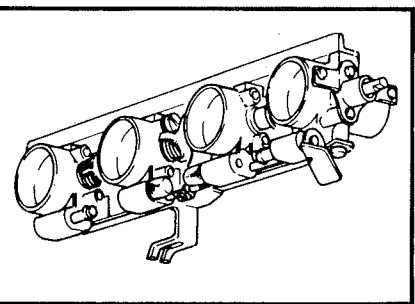
HARNES INSPECTION

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

- Remove the harness.
- Make sure all connectors are clean and tight.
- 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.

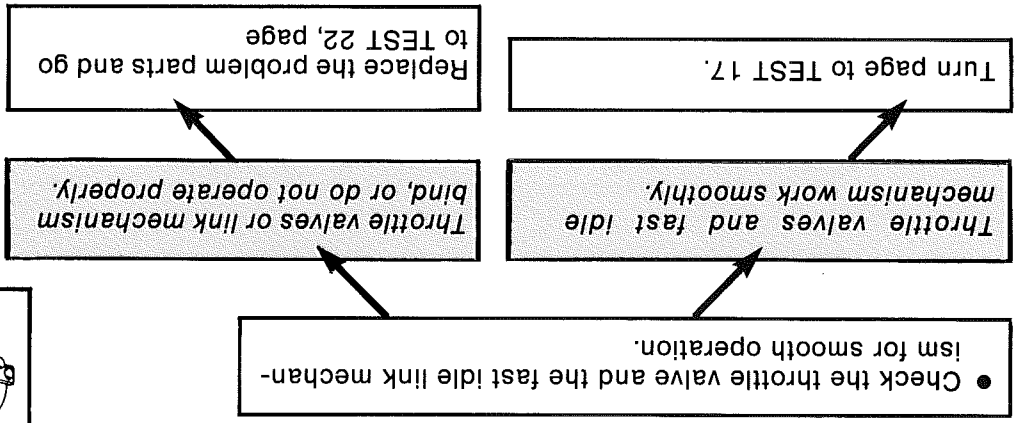


TEST 15

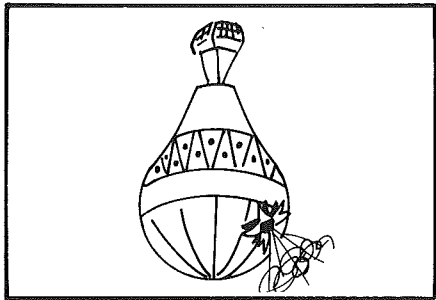


TEST 16

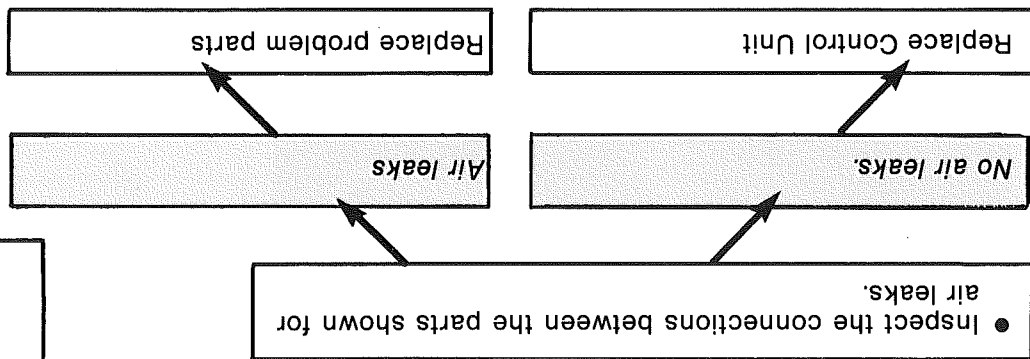
THROTTLE VALVES LINK MECHANISM INSPECTION



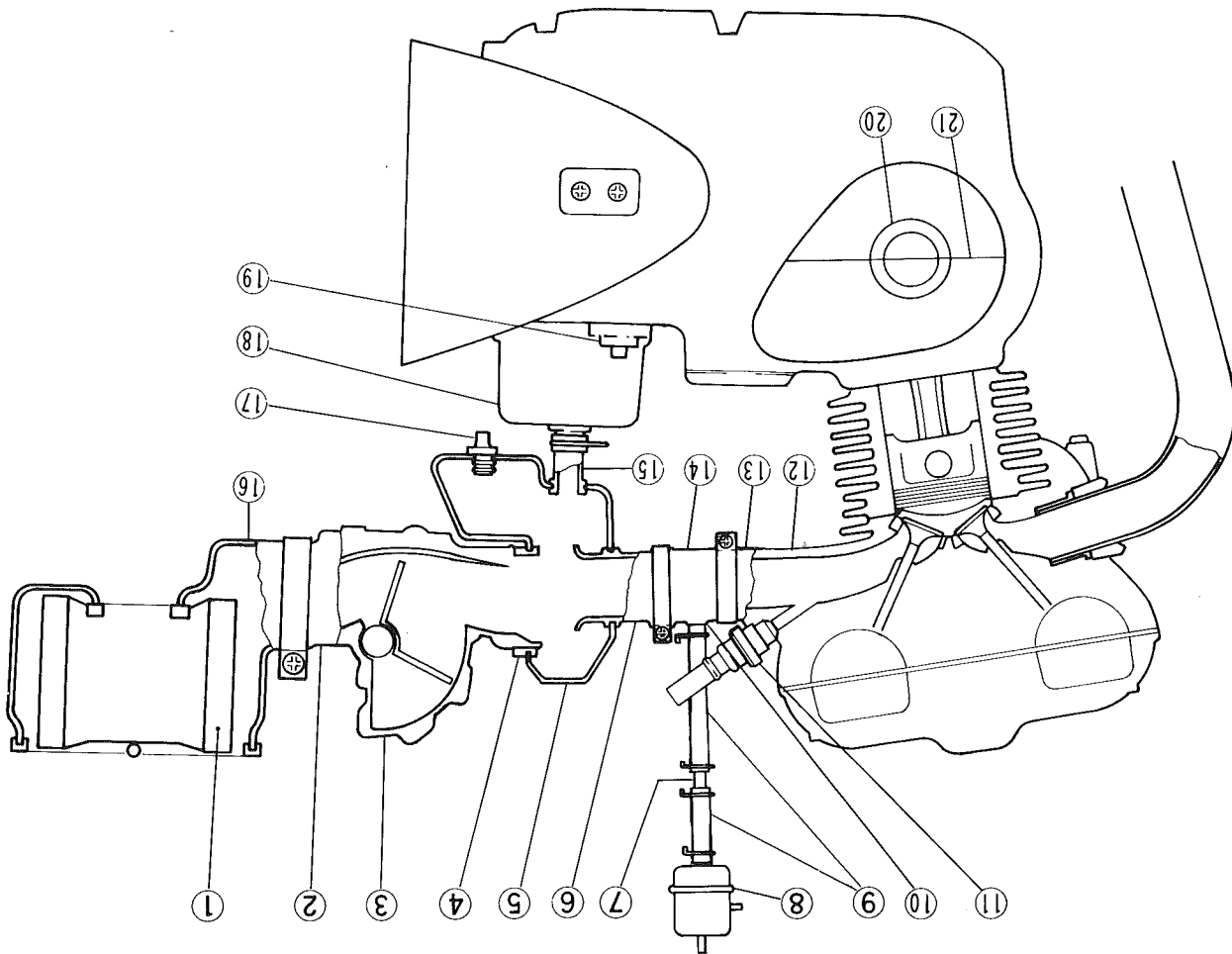
TEST 17



AIR LEAK INSPECTION



Air Leak Inspection



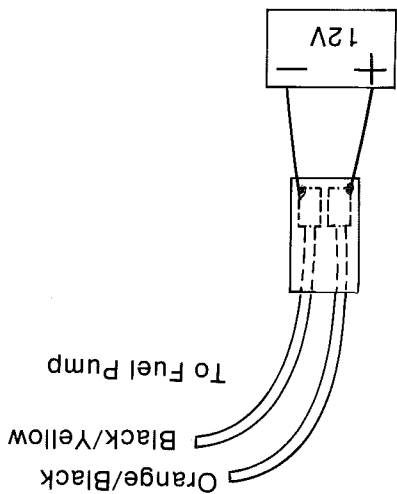
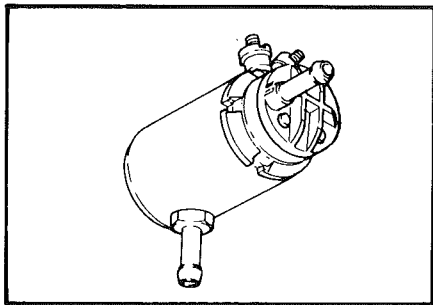
1. Air Cleaner Element
2. Rubber Fitting
3. Air Flow Meter
4. Rubber Seal
5. Surge Tank
6. Air Ducts
7. 3-Way Joint

8. Pressure Regulator
9. Vacuum Hoses
10. Rubber Caps (on hose fittings)
11. Fuel Injectors
12. Cylinder Head
13. Throttle Valve Holders
14. Throttle Valves

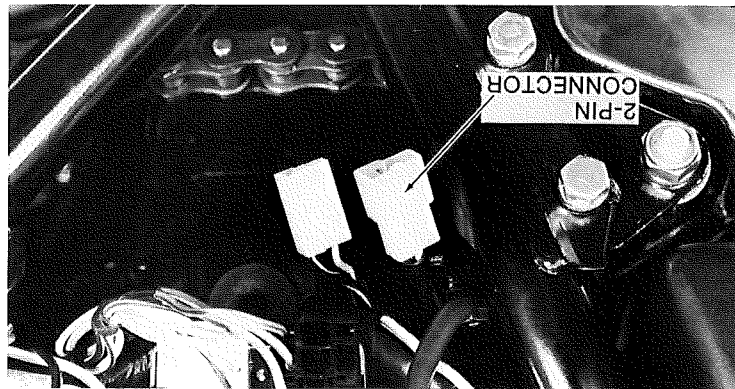
15. Breather Hose
16. Air Cleaner Housing
17. Drain Plug
18. Breather Cover
19. Oil Filler Cap
20. Oil Seal (on crankshaft right end)
21. Others (mating surfaces, etc.)

OUT-OF-CIRCUIT FUEL PUMP INSPECTION

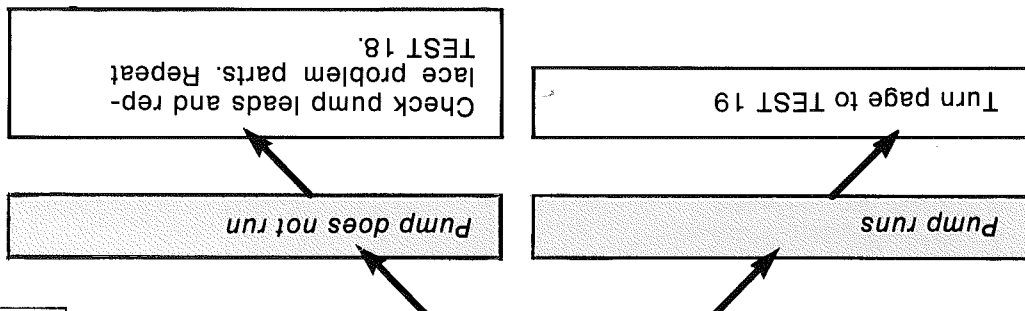
TEST 18



- Disconnect the 2-pin connector of the fuel pump under the left side cover.

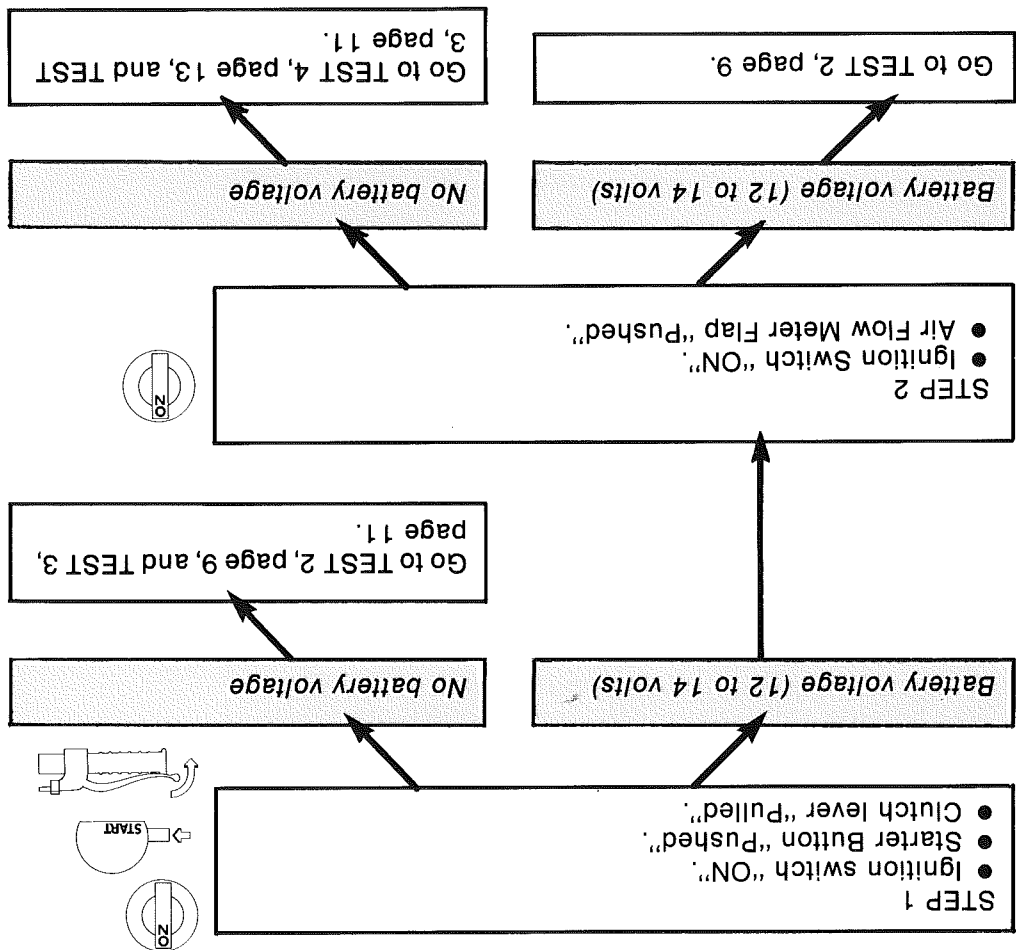
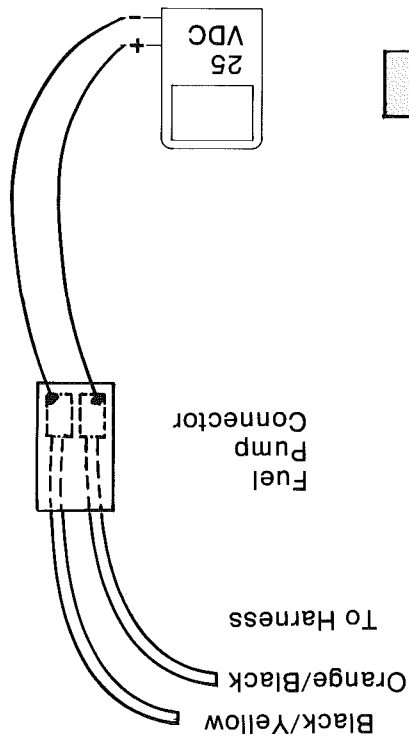
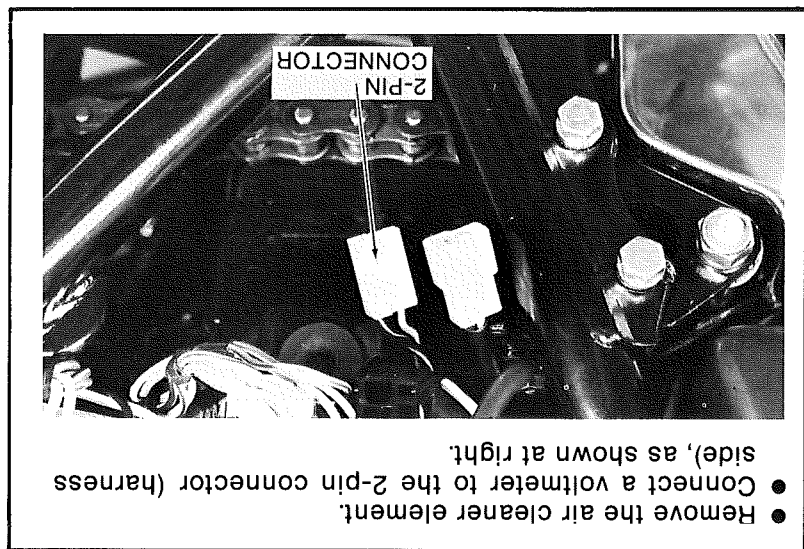
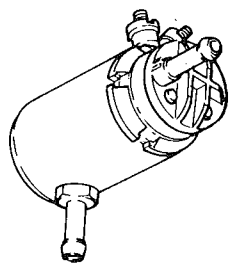


- Connect a 12-volt battery to the 2-pin connector (pump side), and check whether the pump operates.

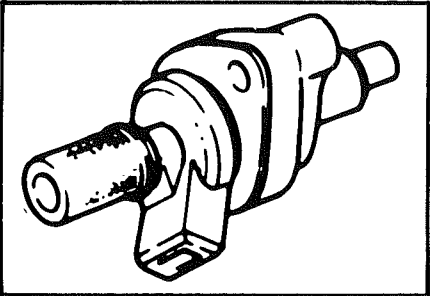


FUEL PUMP CIRCUIT INSPECTION

TEST 19



TEST 20

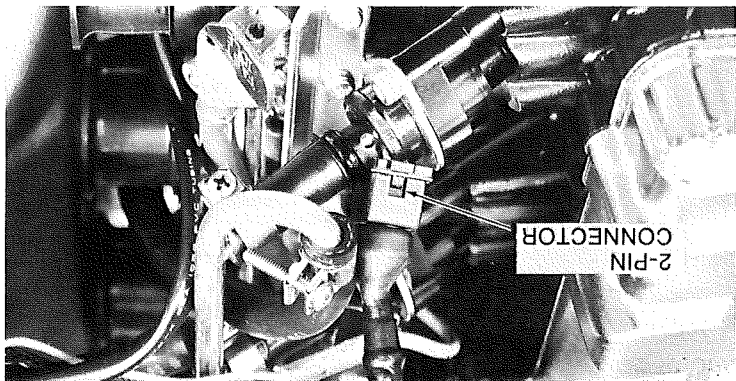


FUEL INJECTOR SIGNAL INSPECTION

WARNING

Do not attempt to start the engine while the fuel hoses are disconnected. fuel will spout from the fuel line if you attempt to start the engine with the fuel hoses disconnected.

- Remove the fuel tank and disconnect all of the 2-pin connectors from all the injectors.

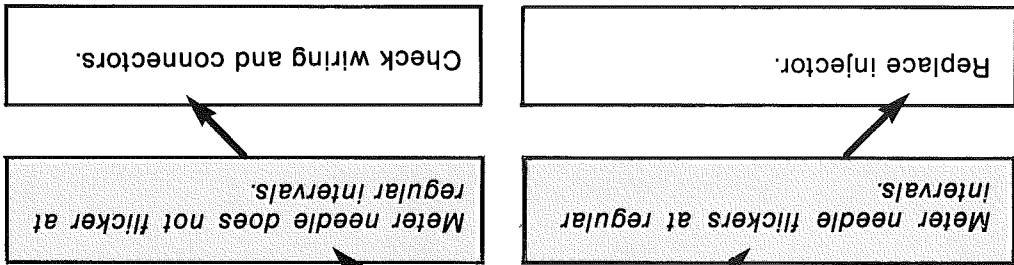


- Install the fuel tank, and connect the fuel hoses to the tank.
- Make the connections shown at right.

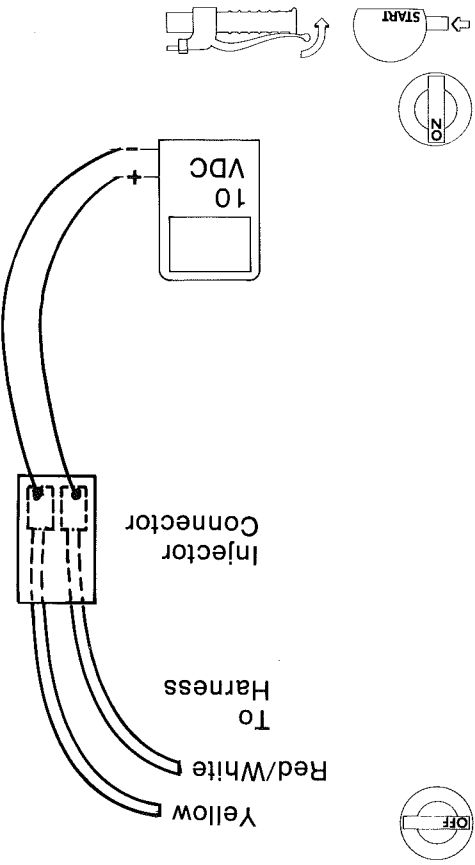
CAUTION

The white/red leads in the 2-pin connectors are connected directly to the battery positive (+) terminal even when the ignition switch is off, so take care not to short the test leads to the chassis ground.

- Crank the engine with the starter motor and watch meter needle.

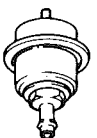


REPEAT TEST FOR ALL INJECTORS!



PRESSURE REGULATOR INSPECTION

TEST 21



Pressure too high — start here.

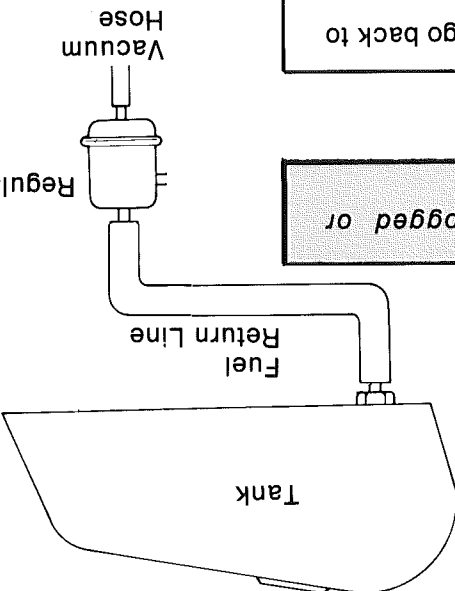
- Check the fuel return line for obstructions.
- Check the vacuum hose for air leaks.

Fuel Return Line open and no air leaks

Replace pressure Regulator and go back to TEST 7, page 19.

Fuel Return Line clogged or Vacuum Hose leaking

Replace bad parts and go back to TEST 7, page 19.



Pressure too low — start here.

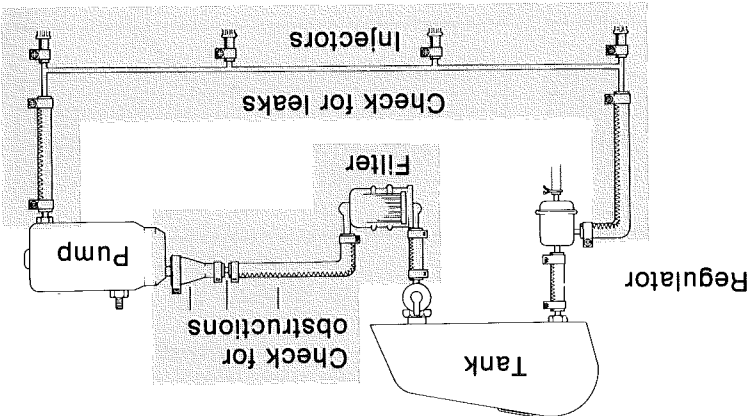
- Check fuel hose from fuel tap to pump inlet for obstructions.
- Check high pressure fuel lines for leaks.

No leaks or obstructions

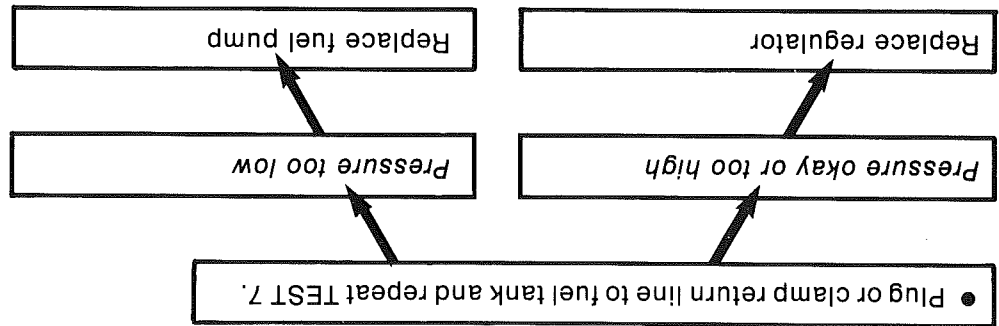
Go to top of page 47.

Leaks or obstructions

Replace problem parts and go back to TEST 7, page 19.



Pressure too low — continued.



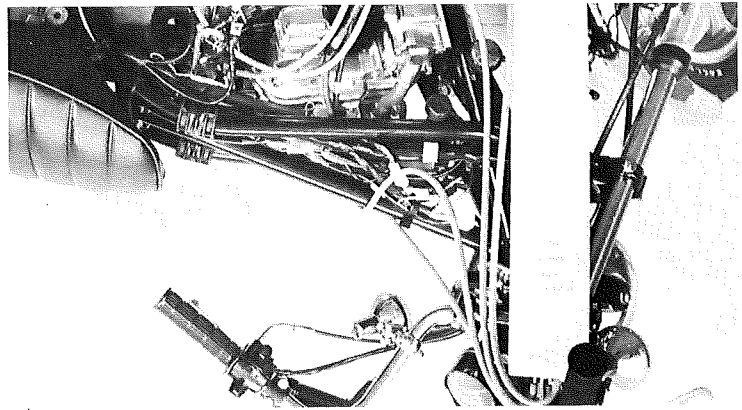
THROTTLE VALVE SYNCHRONIZATION INSPECTION

TEST 22

If one of the throttle valves is replaced, or if combustion varies from cylinder to cylinder, synchronize the throttle valves. These procedures are explained on the assumption that the intake and exhaust systems of the engine are in good condition.

Checking engine vacuum:

- Warm up the engine thoroughly.
- Remove the fuel tank and put it on the work bench near the motorcycle on the same level as the original position.
- Pull off the two vacuum hoses for the pressure regulator and the two rubber caps from the fittings on the throttle valves.
- Attach the vacuum gauge (special tool) to the fittings.



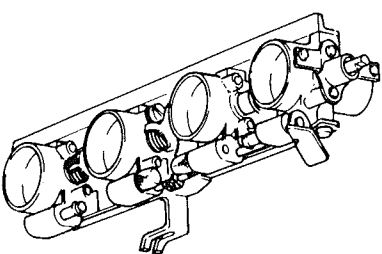
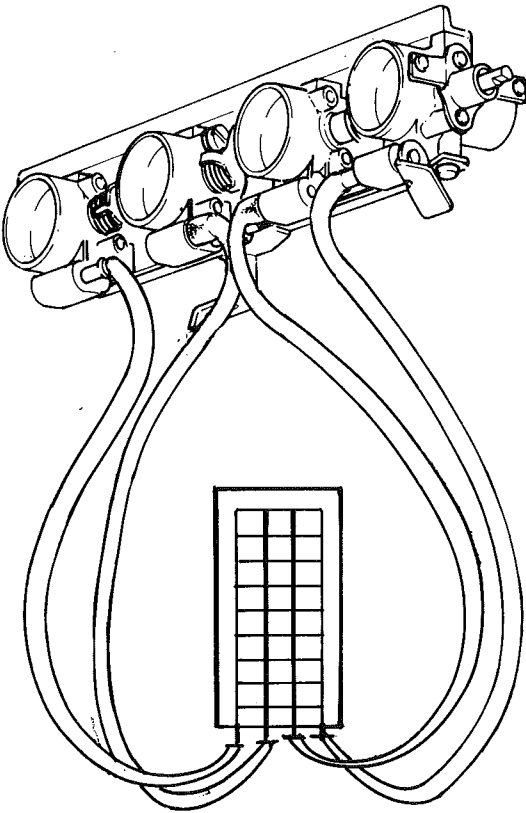
- Using suitable hoses, connect the fuel tap to the fuel filter, and the check valve to the pressure regulator.
- Start the engine, and let it idle.
- Adjust the idle speed.
- Note the gauge readings.

All cylinders are within 3 cm Hg of each other.

Throttles are synchronized.

One or more cylinders are more than 3 cm Hg away from the others.

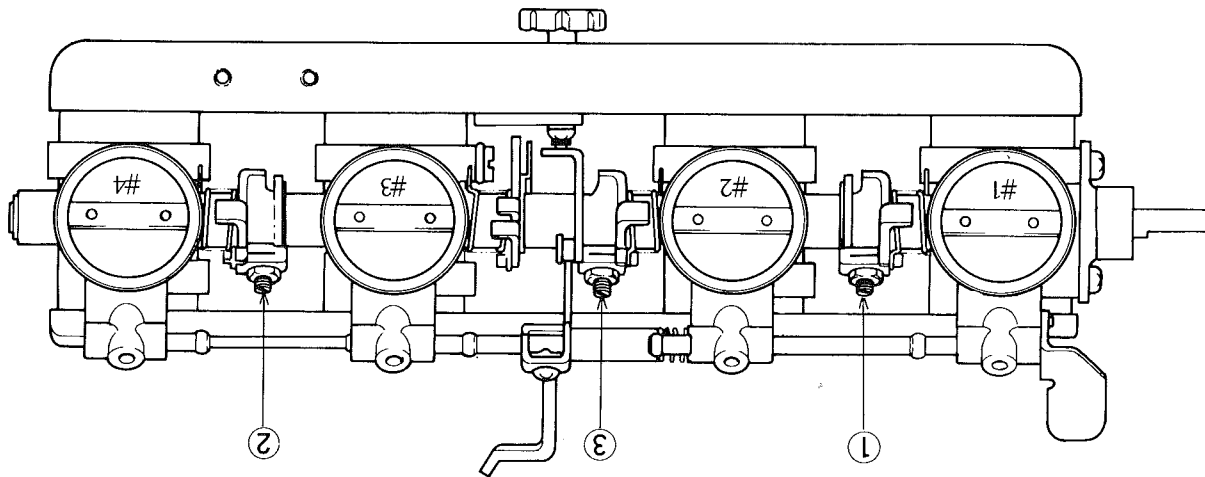
Synchronize throttles, page 49.



THROTTLE VALVE SYNCHRONIZATION PROCEDURE

- Stop the engine.
- To change the vacuum, open the throttle, loosen the locknut, and turn the balance adjusting screw.
- NOTE: 1. Loosen the locknut with the throttle valves opened.
- NOTE: 2. First synchronize the left two or right two cylinders by means of the adjusting screw ① or ② between No. 1 and No. 2 cylinders, or No. 3 and No. 4 cylinders. Then synchronize the left two cylinders and the right two cylinders using the center adjusting screw ③. Adjust the idle speed as necessary.
- Tighten the locknuts.
- Open and close the throttle a few times to make sure that the throttle valves are synchronized. Readjust if necessary.
- Install all parts previously removed, and adjust the idle speed.

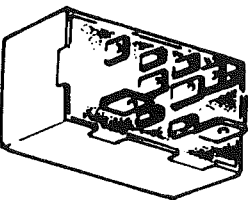
Adjusting Screw for Synchronization



1. Left Adjusting Screw:
Turn this screw clockwise to lower No. 1 cylinder vacuum.
2. Right Adjusting Screw:
Turn this screw clockwise to lower No. 4 cylinder vacuum.
3. Center Adjusting Screw:
Turn this screw clockwise to lower No. 1 and No. 2 cylinder vacuum simultaneously.

RELAY INSPECTION

The relay is divided into two parts: the main relay and the fuel pump relay. The two parts are tested in eight separate steps. Before starting the inspection procedure, prepare a twelve volt battery with auxiliary leads, and remove the relay.



TEST 23

