

(1) ELECTRIC HORN:

6.1.1 Draw the layout of horn circuit with relay.

6.1.2 Write the troubles/faults and their causes arising in Electric Horn/Horn circuit.

Troubles:

- a) Horn does not sound

Causes:

- (a) Fuse blown off
- (b) Open / loose connection.
- (c) Faulty relays.
- (d) Defective horn coil.
- (e) Dirty contacts.
- (f) Improper adjustment.

- b) Horn Sounds continuously

Causes:

- (a) Relay points stuck.
- (b) Return wire earthed (wire from relay output circuit as shown in green. **Draw Fig**)

- c) Horn Sounds unsatisfactory

- (a) Faulty relay (replace relay)
- (b) Horn contacts burnt *I* dirty Replace burnt contacts. Clean dirty contacts

6.1.3 State adjustment procedure (Service) to get satisfactory sound.

- a) Remove back cover / shell
- b) Insert 0.007" gauge between adjusting and contact blade.
- c) *(Do not touch contact points)*
- d) Loosen lock nut. Turn adjusting nut down, until horn will not blow.
- e) Turn back adjusting nut $\frac{1}{4}$ " and tighten locknut.
(Check for blowing. if it does blow, back off adjusting nut and tighten locknut.
- f) Repeat until horn blows
- g) Remove gauge / replace cover **Fig**
(For adjustment of current draw, check current draw with Ammeter. Adjust by turning adjusting nut 1/10 of a turn each time.
- h) To replace contact points, after removing cover, contact points are easily accessible that can be removed out for replacement.
- i) To replace diaphragm and coil; Dismantle the Horn, replace defective part, clean, check and do the adjustment and assemble.

(2) ELECTRIC FUEL PUMP:

6.2.1 Write the symptoms of faulty fuel pump.

1. Whining Noise From the Fuel Tank
2. Difficulty Starting
3. Sudden engine Sputtering (making noise like misfire at high speed)
4. Stalling at High Temperatures
5. Loss of Power Under Stress
6. Car Surging (occasional excess fuel)
7. Low Gas Mileage
8. Car Will Not Star

6.2.2 State the Troubles, causes & remedied in electric fuel pump.

(1) TROUBLE: PUMP NOT WORKING

CAUSES: (a) Loose / poor contacts (b) Dirty contacts

REMEDIES: (a) Clean / tighten & replace (b) Clean the contact points

(2) TROUBLE: PUMP FAILS TO DELIVER PETROL

CAUSES: (a) Leaky valves. (b) Choked filter

REMEDIES: (a) Clean / replace (b) Clean filter

(3) TROUBLE: NOISY OPERATION

CAUSES: (a) leaky suction (b) No petrol in Tank

REMEDIES: (a) Identify and Repair the leakage at suction. (b) Fill petrol in tank if empty.

6.2.3 State the causes and remedies for troubles indicated by engine getting lean mixture and lacks power.

- Causes: Pump delivery pressure is low, rate of petrol delivery from the pump is low. If pump does not feed as fast as required by engine speed, power loss occurs.

6.2.4 State the procedure of testing of (a) fuel flow pressure; (b) Rate of fuel delivery. (c) Amperage draw test

For all the pumps mounted separately away from tank: After overhaul pump is tested with a flow meter. If flow meter is not available mount pump 3 feet (90 cm) above container of petrol. It should be able to operate with beat. The out put should change when pump should slow down and ideal regularly.

If outlet is completely blocked the pump should stop working in 15 seconds.

If it beats inlet valve is leaking.

In most modern cars pump is located in the tank.

Step 1: Locate the fuel pump some require the fuel tank to be lowered first. The pump itself will be in the fuel tank on most vehicles.

Step 2: Listen for buzzing from the pump. Listen for buzzing from the fuel pump by having an assistant turn the key to the run position.

This indicates that it is turning on.

*Note: If the pump does not turn on, proceed to Step 5.

Step 3: Place the amp clamp over the positive wire. Using your voltage meter, set on amperage, place the amp clamp over the positive wire going to the fuel pump.

Step 4: Record amperage reading. Start your vehicle and record the amperage reading on the meter.

*Note: This is an amperage draw test, telling you how hard the pump is working. The more amperage it is using, the harder it is working. Compare your reading to manufacturer's specifications and replace the pump if it is not within the specification.

Step 5: Remove electrical connector. If the pump did not turn on, then remove the electrical connector at the pump.

Step 6: Place meter leads on proper terminals. With your meter set on DC volts, place your meter leads on the appropriate terminal.

Place the positive meter lead on the terminal of the positive wire in the connector and your negative meter lead on the terminal of the negative wire in the connector.

Step 7: Monitor the voltage reading. Have an assistant turn the key to the run position and monitor the voltage reading. If there is no voltage, then further electrical tests must be done. If there is battery voltage, then the pump has failed and needs to be replaced.

Pressure test the fuel pump

Before pressure testing the pump, it is important to know what the manufacturer recommendation is for testing locations.

Keep following materials ready

- Flat-head screwdriver (small)
- Repair manuals.
- Fuel pressure gauge
- Rags
- Ratchet and sockets
- Wiring schematic

Step 1: Park your vehicle. Park your vehicle and apply the parking brake.

Step 2: Allow the engine to cool. Allowing the engine to cool will ensure that you don't get burned and the working area is safe.

Step 3: Locate the fuel pressure test port.

Most vehicles have a test port located on the fuel injector rail under the hood. If the vehicle is not equipped with a test port, then it may require that the fuel line be removed and a special adaptor be used for the tester.

Step 4: Prepare a rag near the port. Place a rag under the test port as fuel will be released when installing the pressure tester.

Step 5: Install the pressure tester. Install the pressure tester to the test port.

Step 6: Turn the key to run for a recording. Turn the ignition key to the run position and record the pressure reading.

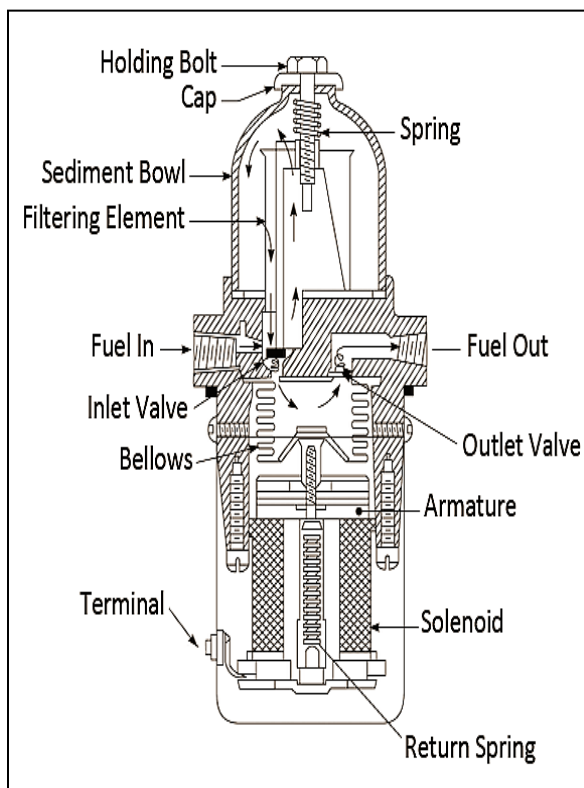
Step 7: Start the engine for a recording. Start the engine and record the pressure reading.

Step 8: Check for the appropriate pressure. If the fuel pump does not meet the required pressure then the fuel pump may be failing. A typical, port-injected vehicle will require between 30 and 80 PSI. Vehicle specific fuel pressure specifications can be found in the factory repair manual.

***Note:** Low pressure does not always condemn the fuel pump, as there are other parts that can affect pressure such as the fuel filter, the fuel pressure regulator, a fuel injector, and the fuel lines. Follow the manufacturer's recommendations on testing these other components.

6.2.4 State the parts supplied in a repair kit of fuel pump.

- (a) A diaphragm
- (b) Delivery spring
- (c) Set of valves
- (d) Set of contact point
- (e) Filter elements.



Fuel pumps in old cars



Fuel pumps in modern cars

(3) Wiper Motor:

6.3.1 State the symptoms of faulty windshield wiper motor.

1. The wipers don't move at all.
2. The wipers operate slower than they normally would.
3. The wipers operate at a single speed only.
4. The wipers work abnormally.
5. The wipers don't stop at their designated place or stop without returning to the resting point.

6.3.2 State causes for electric faults & for mechanical faults,

DEFECTS:

- (1) No current to motor of wiper.
- (2) Wiper motor over heats.
- (3) Mechanism fails to operate.

	CAUSES:	REMEDIES:
1	Disconnected / the broken lead.	Rectify replace.
2	Blown fuse.	Replace.
3	Dirty switch contacts.	Clean with emery.
4	Loose broken connection inside motor.	Tighten I replace.
5	Dirty commutator due to sparking.	Clean.
6	Armature bearing binding.	Lubricate.
7	Binding Wiper spindle.	Lubricate.
8	Defective gears linkage.	Replace.
9	Faulty worm wheel.	Replace.
10	Spindle loose or worn out.	Replace.
11	Drive cable broken.	Replace.

6.3.2 write the steps to trouble shoot a faulty windshield wiper.

Step 1

Make sure the battery has a strong charge and is in good condition. Use a voltmeter to get a reading if necessary.

Step 2

Connect a jumper wire between ground and the wiper motor. Turn the key on but don't start the engine. Turn the wiper switch on. If the motor works, check for a corroded or loose ground connection.

Step 3

Turn on the car key but don't start the engine. Turn on the wipers. Check for voltage at the wiper motor with your voltmeter. If you get a good voltage reading, turn the key off and disconnect the motor from the wiper linkage.

Step 4

Move the wiper arms by hand. If they are stuck, you have found the problem. If the wiper arms move freely by hand, go to step 5. If voltage is not reaching the motor go to step 6.

Step 5

Remove the wiper motor by disconnecting the plug and removing the bolts using a wrench or ratchet. Use a pair of jumper wires to connect the wiper motor directly to the battery. If the motor does not work, replace it.

Step 6

Turn on the key but don't start the engine. Get a voltage reading across the wiper switch. If there is voltage, use a jumper wire to bypass the switch, if the motor works now, replace the switch, otherwise go to step 7. If there is no voltage at the switch, go to step 8.

Step 7

Check for continuity at the wire between the switch and the motor. The wire could be loose or disconnected.

Check the wire coming from the fuse panel to the wiper switch. It could be disconnected or loose.

Tips

- Before beginning any troubleshooting test on any car electrical system, always make sure that the particular circuit's fuse or breaker is in operating condition.
- It is a good idea to have the wiper motor wiring diagram on hand for your particular vehicle whenever you are troubleshooting its circuit. Items you will need
- Voltmeter
- Wrench set or ratchet
- 2 Jumper wires 1- to 2-foot-long

6.3.3 State the mechanical problems / transmission mechanism (linkage) in windshield wiper.

- 1) The wiper arm shaft seizes up inside the linkage.
- 2) One of the links separates.
- 3) The nut that holds one of the wiper arms comes loose.
- 4) Both wipers work, but stop in the wrong position .

For details refer:

<https://www.yourmechanic.com/article/symptoms-of-a-bad-or-failing-fuel-pump>

<https://www.samarins.com/glossary/wiper-motor.html>