

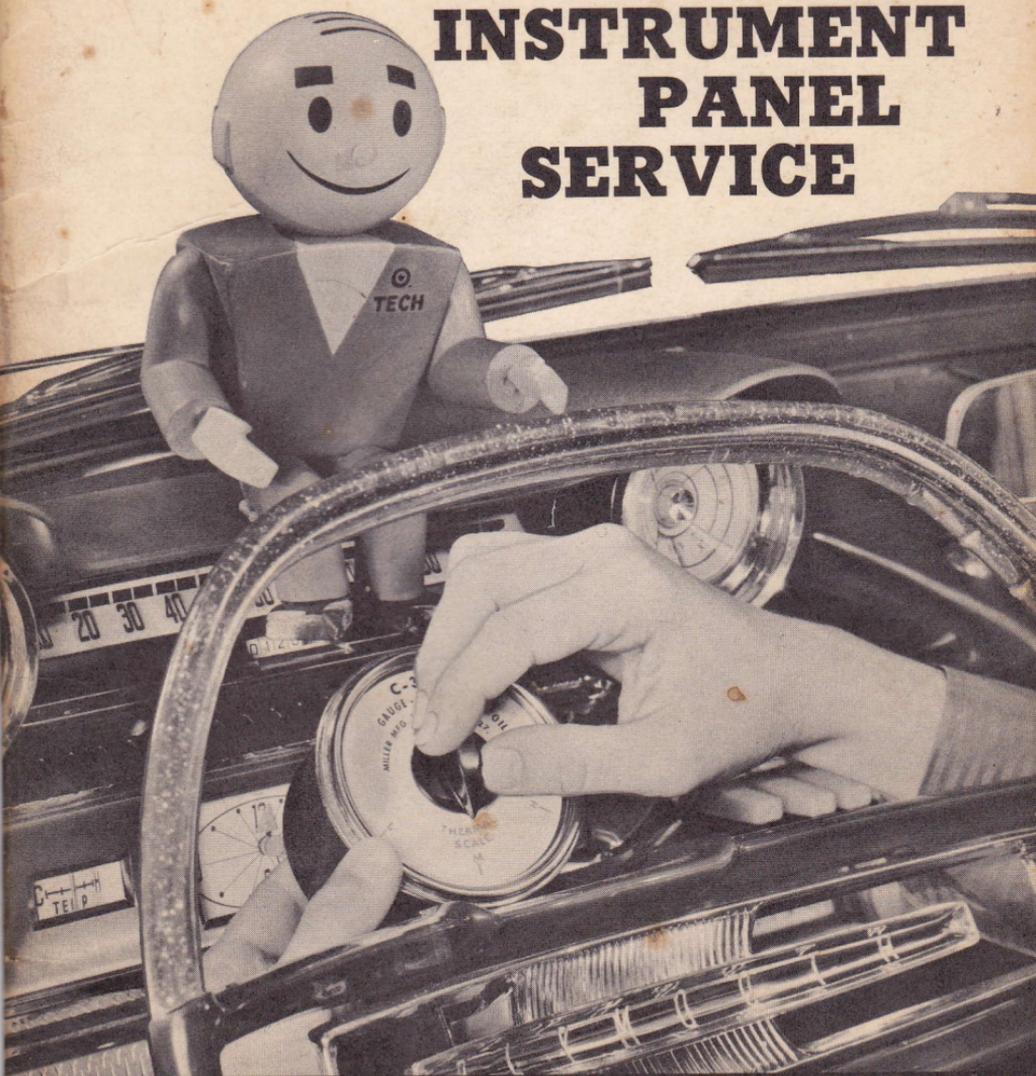
SERVICE REFERENCE BOOK

of the MASTER TECHNICIANS SERVICE CONFERENCE

session no.

155

INSTRUMENT PANEL SERVICE



PREPARED BY CHRYSLER CORPORATION

Dodge • Plymouth-De Soto-Valiant • Chrysler and Imperial Divisions



TECH SEZ:

"There's a new look up front"

The instrument panels on the new '61 models are not only attractive, but functional as well. Owners appreciate the fine appearance, but they want the gauges and instruments to keep them informed at all times. Seeing that gauges keep doing the job they are intended to do is our job.

Servicing gauges is now a cinch. This reference book gives the complete story on testing the gauges, using the new thermal-type gauge tester. It also has removal and installation information.

Here's how the information is arranged for your convenience:

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INSTRUMENT PANEL SERVICE

General

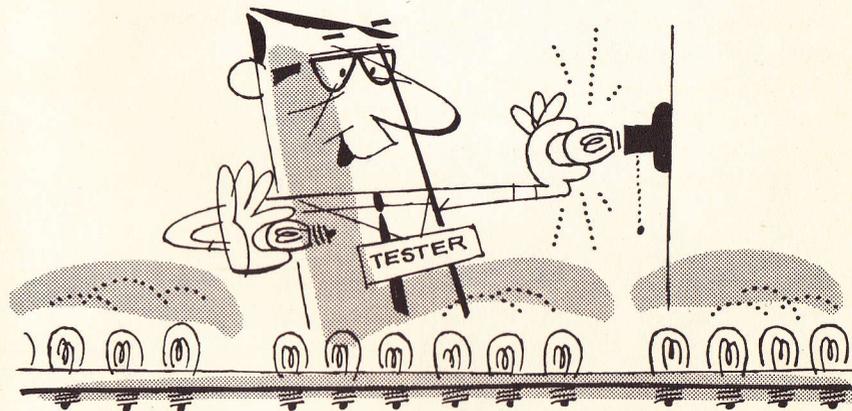
Servicing the car's instruments and gauges has been simplified to the point where service technicians should have no hesitation in handling this type of work. In some past models it was not always easy to gain access to the instruments to remove and install them, due to the cramped working space. Further, the only manner in which the gauges could be tested was to temporarily install a new gauge that was known to be in good operating condition, and compare its operation to the original gauge.

That has all been changed in the 1961 models—from Valiant to Imperial—to eliminate guesswork and the extra expense that goes along with it. A new thermal-type Gauge Tester, C-3826, has been developed to test the sending units, the wiring and the gauges. The



task of testing gauges in the instrument panel cluster and replacing faulty gauges has also been made easier.

The Gauge Tester C-3826, pictured here, has a scale to indicate the low (L), medium (M) and high (H) pointer positions. It is also provided with two clamp-type leads. This tester will enable the service technician to test the oil pressure, engine temperature and fuel gauges. It can also be used to test the oil pressure indicator light on models that use it.



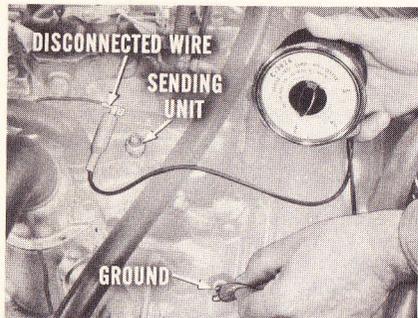
All U. S.-built models use the alternator and an ammeter. Canadian-built cars use a generator, but also use an ammeter. The ammeter, of course, can be tested with a regular "Volts-Ampere" tester.

GAUGE TESTING PROCEDURES

Using the Tester

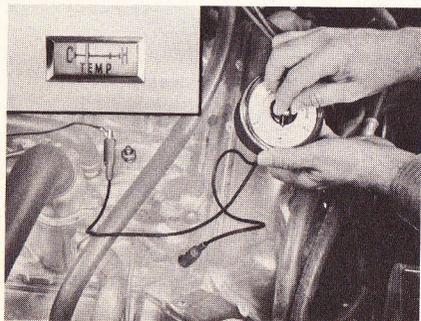
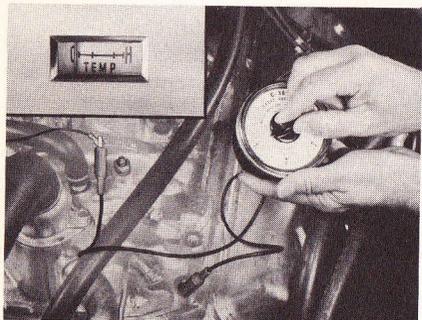
When testing gauges and the oil pressure indicator light, start by first testing the sending unit. Follow up with testing the gauge and then the wiring. When testing at the sending unit, the tester actually takes the place of the sending unit. Here's how the tester is used.

Testing the Temperature Gauge Sending Unit—First disconnect the



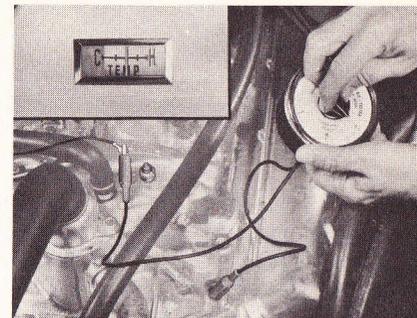
wire from the sending unit. Then, connect one lead of the tester to that wire. Connect the other tester lead to a good ground. This removes the sending unit from the circuit and the tester takes its place.

Set the pointer on the tester on "L". Turn the ignition key "ON" and the gauge needle should be at the "C" or cold position. If the needle varies less than $\frac{1}{8}$ inch either way from the "C" position, the gauge can be considered to be functioning satisfactorily. If the variation is greater than $\frac{1}{8}$ inch, the gauge is inaccurate and should be replaced.



Next, turn the pointer to "M" and the gauge needle should slowly move to the middle of the scale. Here, again, the $\frac{1}{8}$ -inch tolerance either side of the mid-position of the scale is in order.

Finally, turn the pointer on the tester to "H" and the gauge needle should move to the "H" or hot end of the scale. If the gauge responds to the positions of the pointer on the tester within the tolerances, although it had not registered when the car came in, it can be assumed the sending unit is at fault and should be replaced.



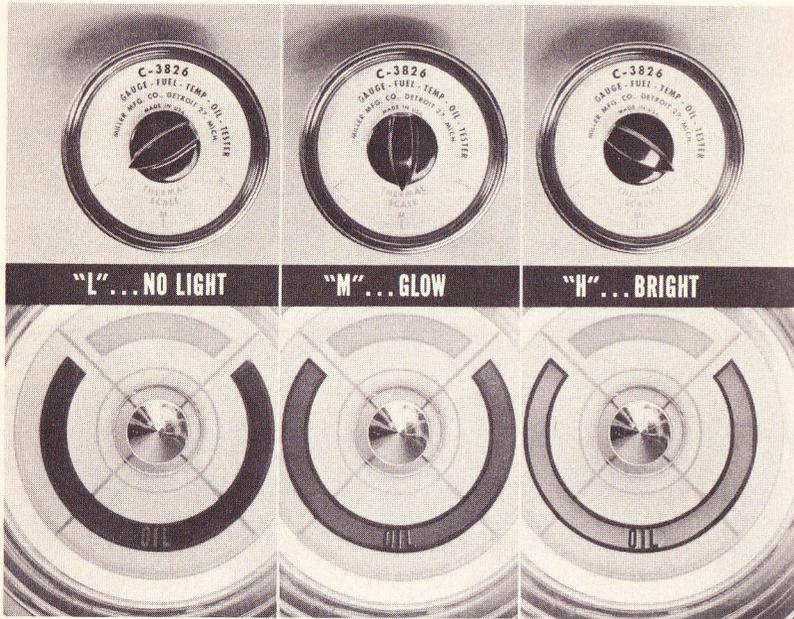
However, if the gauge does not register, it can be assumed the sending unit is all right, but there may be difficulty in the wiring or the gauge. The wiring should be traced out for chafed and grounded areas, poor connections, or breaks in the wire.

Testing the gauge involves removing the cluster on some models. Before getting into that procedure, however, we will go through the procedure of testing the oil pressure sending unit and the fuel gauge sending unit.

Testing the Oil Pressure Sending Unit—On six-cylinder engines, the sending unit is mounted on the rear face of the oil filter adapter. On eight-cylinder engines it is mounted on the rear of the engine, behind the intake manifold. The instrument panel unit, in this case, is an indicating light.

The sending unit is taken out of the circuit, as explained before, by disconnecting the wire and attaching it to one lead of the tester. The other lead of the tester is connected to a good ground. This test, in addition to testing the sending unit, will also show up any trouble in the wiring.

With the tester pointer in the "L" position and the ignition turned "ON", the indicating light should not come on. With the pointer in the "M" position, the light should show a faint glow. In the final test, the pointer should be moved to the "H" position. This should cause

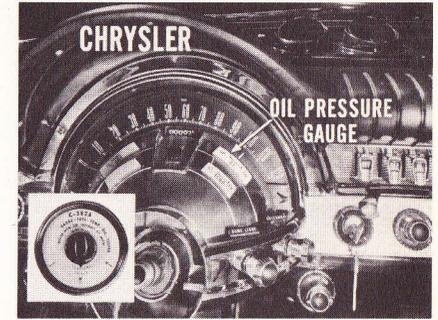


the light to glow in full brilliance. A dim light with the pointer at "H" would mean there is resistance in the wiring.



If the light does not respond to the tests outlined, it indicates possible loose connections, a broken wire or a burned out bulb.

When testing the oil pressure gauge on Chrysler and Imperial models, with the tester pointer positioned at "L", the gauge needle should register at "LO". With the pointer advanced to "M", the needle on the gauge should slowly move to the half-way position on the gauge. And finally, when the tester pointer is advanced to "H", the gauge needle should advance slowly to the "HI" position. If the needle is within $\frac{3}{32}$ inch either side of the specified position, the gauge is registering correctly.

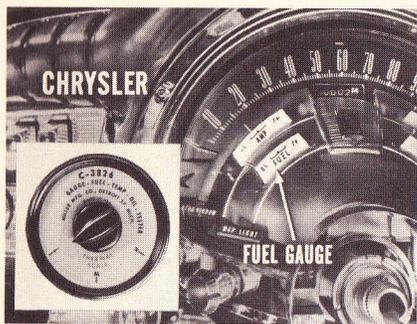


If the gauge does not register, or registers improperly, it can be assumed that the sending unit is okay, and the wiring from the sending unit to the gauge, or the gauge itself, is at fault. Further tests should be made at the gauge.

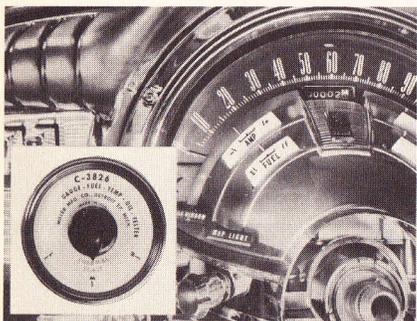
Testing the Fuel Gauge Sending Unit—To test the fuel gauge sending unit, remove the lead wire from the snap terminal at the unit. This is reached from underneath the car.

Connect one of the tester leads to the wire leading to the gauge and the other lead to a good ground.

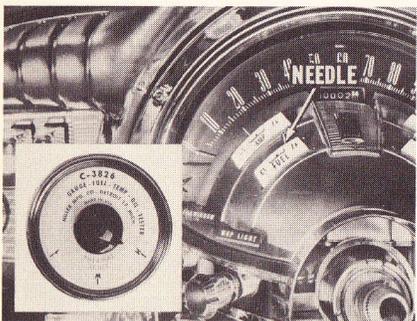




Start the test by first turning the ignition "ON". Then, move the tester pointer to the "L" position and the gauge needle should stay at the "E" position on the scale, or within $\frac{3}{32}$ inch either side of it. This tolerance permits a small reserve of fuel in the tank when the needle is at the "E" position.



In the second test, move the pointer to the "M" position and the needle should slowly move to the halfway position on the gauge, or within $\frac{1}{16}$ inch either side of it.



The last test is to move the pointer to the "H" position on the tester. The gauge needle should register at the "F" position, or within $\frac{3}{32}$ inch either side of it.

If the gauge responds to these tests, but did not register properly before, it is possible that the wire from the sending unit to the gauge is damaged or was not properly connected. It is also possible that

the gauge sending unit is not properly grounded. These possibilities should be looked into before condemning the gauge.

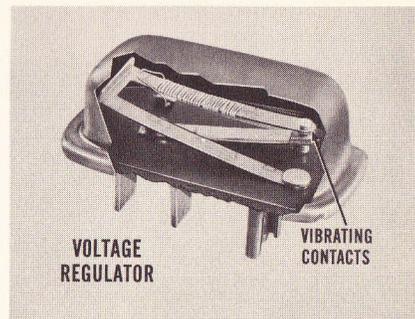
Should the gauge fail to respond to these tests, indications are that there is a possible loose connection, a broken wire, or the instrument panel gauge unit is faulty. Further tests should be made at the gauge on the instrument panel.

Testing the Gauges—Plymouth and Chrysler—The gauges in the instrument panels of Plymouth and Chrysler models can be tested without removing the cluster from the panel. On Plymouth models there is sufficient clearance behind the gauge cluster to permit testing and removing the gauges.

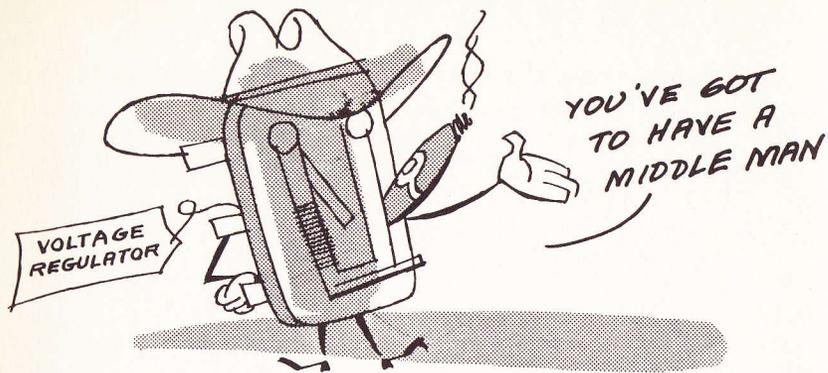
On Chrysler models, all that is required to gain access to the gauges is to remove the jacket tube cover from the underside of the jacket tube. Details on this procedure are explained under "Cluster Removal".

GAUGE VOLTAGE REGULATORS

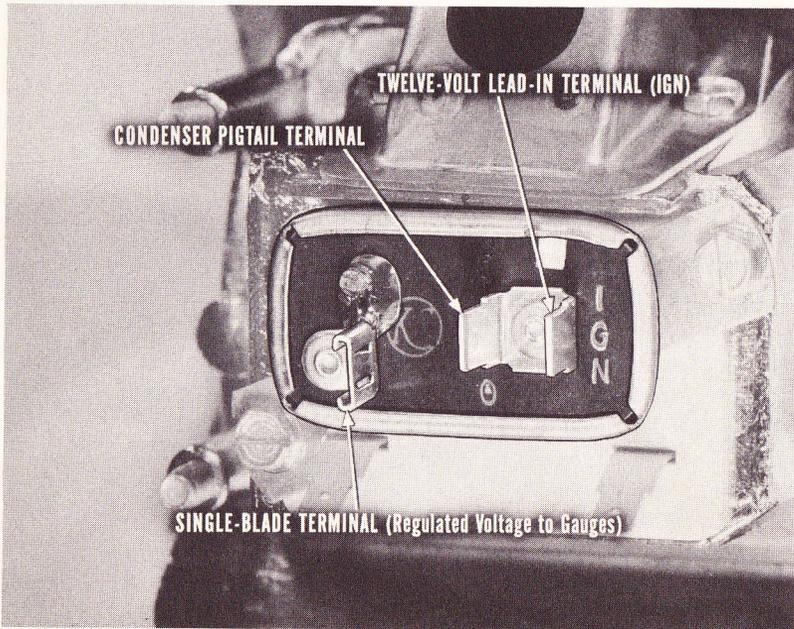
The thermal-type gauges operate on regulated voltage, controlled by a special voltage regulator connected in the gauge circuit. The voltage is regulated by a set of two vibrating contacts contained within the unit. These contacts open and close the circuit. They are non-adjustable, and the regulator is serviced as a complete assembly.



When testing at the gauge, extreme care must be taken not to connect twelve volts directly from the battery to the gauges. The twelve-volt battery voltage must be connected through the regulator.

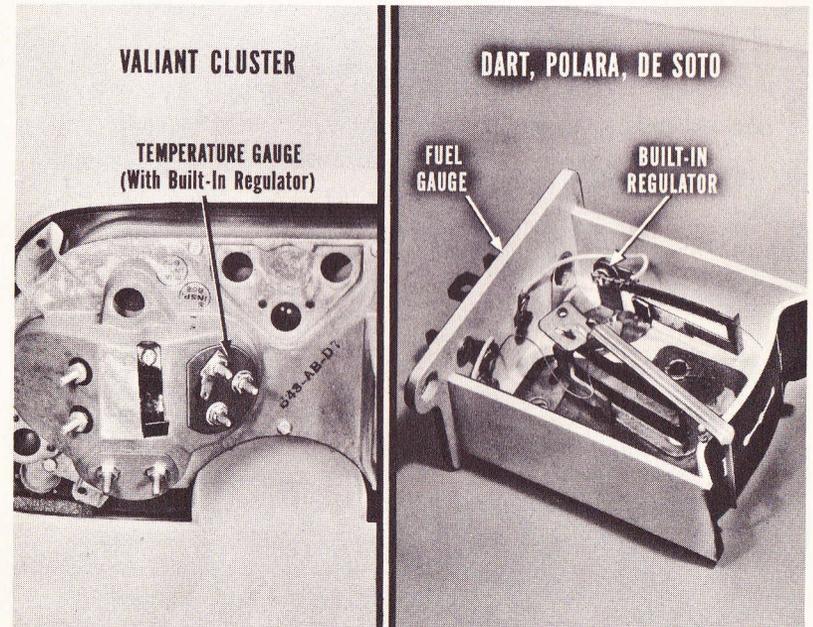


External-Type Voltage Regulator—There are two types of voltage regulators used. One is an external type and the other is an internal or built-in type. The external type, illustrated here on a Plymouth cluster is also used on Lancer models. It is mounted on the back of the instrument cluster, adjacent to the fuel gauge. In addition to the two internal contacts, the regulator has one set of double-blade termi-



nals and a single-blade terminal mounted on its base. The twelve-volt lead-in is connected to one of the double-blade terminals marked "IGN". The other blade carries the condenser pigtail. The condenser is connected in the circuit to eliminate noise in the radio that might be set up by the vibrating contacts in the regulator. The single-blade terminal is for the wires which carry the regulated voltage to the various gauges.

Internal-Type Voltage Regulator—The internal, or built-in type regulator, is used on all other models—Valiant, Dart, Polara, De Soto, Chrysler and Imperial. On the Valiant cluster, illustrated here, and



on Imperial models, the regulator is built into the temperature gauge. On Dart, Polara and De Soto models, the regulator is built into the fuel gauge. On Chrysler models, it is built into the oil pressure gauge.

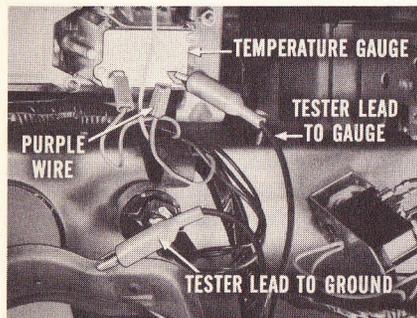
Gauges with the built-in regulator have three threaded terminals. In addition, the Valiant temperature gauge has an extra terminal

(blade-type) for the condenser pigtail. Chrysler and Imperial models have a condenser built into the gauge, so no external connector is required. Dart, Polara and De Soto models have the condenser connected to a pigtail which branches off the wiring harness "I" terminal lead.

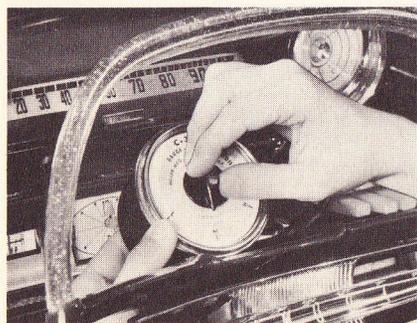
The terminal marked "I" or "IGN" is for the twelve-volt lead-in. The terminal marked "A" is the connection for the wires carrying the regulated voltage to the various other gauges. The terminal marked "S" is for the lead to the sending unit of that gauge. The terminal marked "L" on Chrysler and Imperial clusters only is for the panel-
escent lighting used on these two models.

TESTING PANEL GAUGES

Testing Procedure—Plymouth. Disconnect the battery ground cable



before connecting the tester. Reach up under the instrument panel and disconnect the purple wire from the terminal on the temperature gauge. Connect one lead of the tester to the terminal from which the wire was disconnected. Then, connect the other tester lead to a good ground.

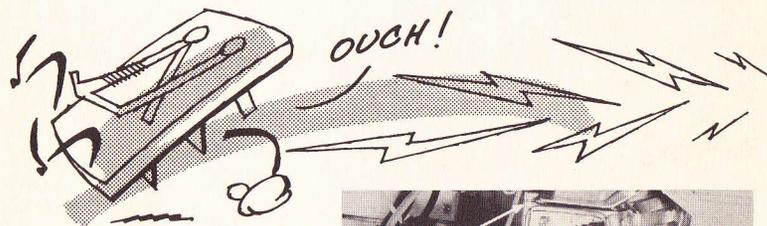


Connect the battery cable. With the ignition turned "ON", turn the tester pointer first to "L", next to "M" and then to "H". The gauge should read, in succession, at the low end, the middle, and then the high end of the scale.

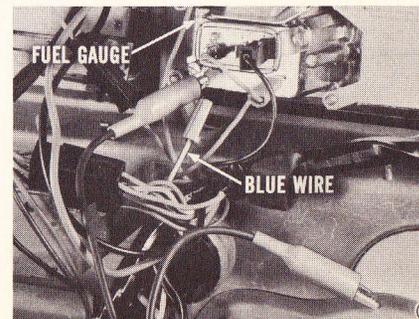
If the gauge does not register properly it could be that the regulator, the wire from the regulator to the gauge, or the gauge itself is at fault. Then, by following a process of elimination, the source of the trouble can be located. For example, if the other gauges work satisfactorily, the regulator is all right. The wire connected between the regulator and gauge can be tested by connecting a jumper wire between these two terminals. If there is an improvement in the operation of the gauge, the trouble is due to a poor connection in the wiring. If, however, there is no improvement in the operation of the gauge, it is obvious the gauge is faulty and should be replaced. If the gauge registered all right, but did not register when the tester was first connected in the circuit in place of the sending unit, the trouble would be in the sending unit wire and it should be repaired or replaced.

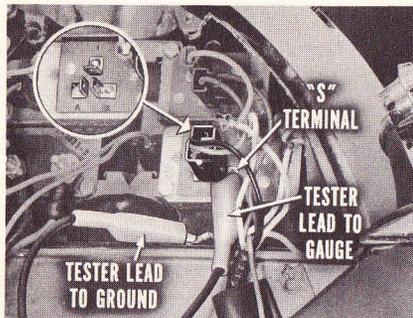
On Plymouth models, the gauge can be replaced from behind the panel by using a short screwdriver to remove the attaching screws.

Caution: Be sure the battery negative ground cable is disconnected while working on the cluster. Don't take chances on causing a short and damaging the gauges.



The fuel gauge on Plymouth models can be tested in the same manner as just described. However, the gauge lead-in wire to be disconnected is blue instead of purple.





Testing Procedure—Chrysler. First, remove the jacket tube cover as outlined in “Cluster Removal”. Then, disconnect the wire from the terminal of the oil pressure gauge marked “S”. Connect one tester lead to this terminal. Connect the other tester lead to a good ground.



Place the pointer on the tester in the “L” position, and turn the ignition “ON”. The oil pressure gauge needle should show at the “LO” position on the scale.

Then, set the gauge tester pointer to the “M” position and the oil gauge needle should slowly move to the one-half position on the dial. Next, move the tester pointer to the “H” position and the gauge needle should advance to the “HI” position on the scale.

If the gauge fails to respond to these tests, the gauge is faulty and should be replaced.

If the gauge now registers all right, but did not register when the tester was first connected in the circuit in place of the sending unit, the trouble would be in the wire from the sending unit to the gauge, and should be repaired or replaced. *Caution: Before removing the gauge, disconnect the battery negative ground cable.* The gauge can then be removed by removing the two attaching screws and carefully withdrawing the gauge from the housing. Care should be taken when installing the new gauge not to scratch the needle against the opening in the housing.

Testing Procedure—All Other Models. The gauge testing procedure on Valiant, Lancer, Dart, Polara, De Soto and Imperial models differs from the procedures on Plymouth and Chrysler models in that the instrument cluster is removed from the panel for greater convenience.

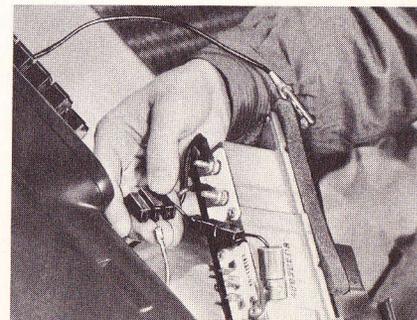
Before testing the gauges on these models, *disconnect the battery negative ground cable* to avoid the possibility of causing a short that will damage the gauges. Next, remove the cluster as outlined under “Cluster Removal”.

The procedure which follows is typical of that for the fuel and temperature gauges on Valiant, Lancer, Dart, Polara, De Soto and Imperial models and for the oil pressure gauge on Imperial models.

The instrument cluster illustrated here is that of a Dart. The gauge being tested is the fuel gauge with the built-in voltage regulator. First, connect the battery negative ground cable. Then, connect a jumper wire between the cluster and the instrument panel so you won't burn out the gauges.



Next, disconnect the sending unit wire from the “S” terminal on the gauge. Connect one of the tester leads to the “S” terminal and the other to a good ground on the cluster.





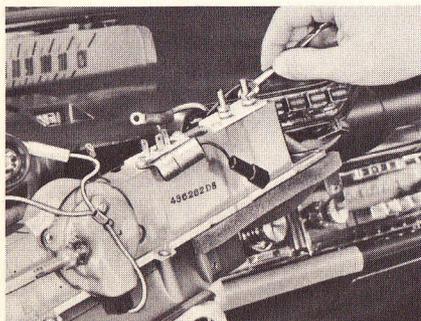
Turn the ignition "ON". Then, move the pointer on the tester to the "L" position and the needle on the gauge should show "E". Continue the test by moving the pointer to "M", and the gauge needle should slowly move to the halfway position on the dial.

Make the final test with the pointer in the "H" position. The gauge needle should now register "F" for full. If the gauge does not register properly, the gauge is faulty and should be replaced.

If the gauge now registers properly, but did not register properly when it was originally tested at the sending unit, the trouble is in the sending unit wire or the regulator.

When testing gauges with the built-in voltage regulator, and none of the gauges registers properly, it is possible that the regulator is at fault. In this case, most likely only the gauge with the built-in regulator need be replaced.

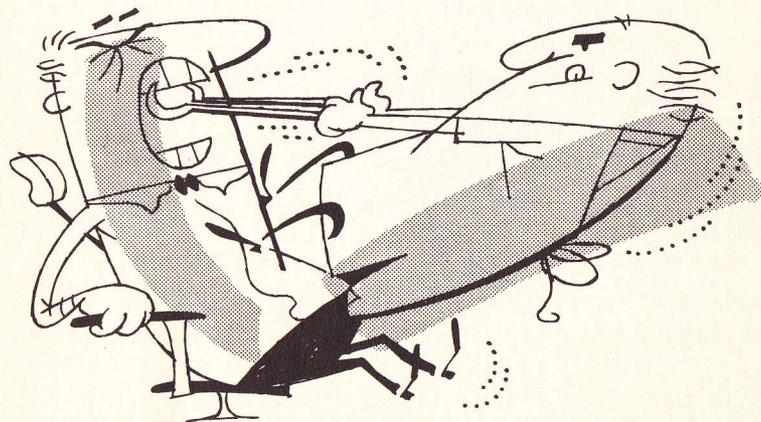
Removal of Gauges from Cluster—To remove the gauges, disconnect the wiring from all gauges and separate the lamp bulb sockets from the cluster. Then, place the cluster on a padded or otherwise protected area of the workbench to guard against scratching it. The gauge can then be removed from the cluster by removing the two attaching screws.



CLUSTER REMOVAL

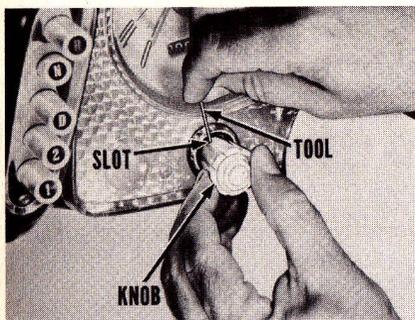
Caution: Before removing an instrument cluster or speedometer, disconnect the battery negative ground cable to avoid causing a short which will damage the gauges and possibly the electrical system.

Valiant—The gauges, speedometer head and switches on this model are grouped in a single cluster and the assembly must be removed to service any part of it. For greater convenience in removing the cluster, the steering wheel must first be removed. Before removing the wheel, turn the car wheels in the straight-ahead position and center the steering wheel. Remove the nut from the steering shaft and scribe an aligning mark across the steering wheel hub and the steering shaft. This precaution will facilitate reassembly of the wheel in the correct position. Use Steering Wheel Puller C-3428 to remove the wheel.



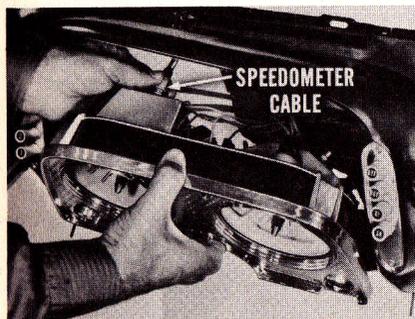
To protect the steering column against scratches, apply masking tape or wrap the column with cloths.

Reach up under the instrument panel and press the retaining spring button on the lighting switch to release the switch shaft, and withdraw the knob and shaft from the switch.



Next, turn the windshield wiper knob to the full-on position to bring the slot in the underside of the knob to the top. Then, insert a small pointed tool in the slot in the knob and apply pressure on the retaining spring. At the same time, pull the knob from the shaft.

Next, remove the four attaching screws from the front face of the cluster. Bend back the wiring harness clip on the back of the cluster. Tilt the cluster outward, and at the same time work the speedometer cable up through the dash panel until the cluster can be tilted out far enough to permit disengaging the speedometer cable from the head. Disconnect the speedometer cable. Place a cloth along the lower edge of the instrument panel cluster opening to insulate the cluster, and lay the cluster against the steering column to test the gauges.



Next, remove the four attaching screws from the front face of the cluster. Bend back the wiring harness clip on the back of the cluster. Tilt the cluster outward, and at the same time work the speedometer cable up through the dash panel until the cluster can be tilted out far enough to permit disengaging the speedometer cable from the head. Disconnect the speedometer cable. Place a cloth along the lower edge of the instrument panel cluster opening to insulate the cluster, and lay the cluster against the steering column to test the gauges.

If the tests indicate the gauge or gauges to be faulty, they can be removed by removing the screws that secure the housing to the bezel.

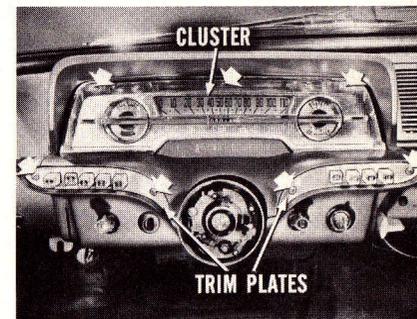
When reinstalling the cluster, extreme care should be exercised to work the speedometer cable back through the dash panel to avoid kinking the outer casing. Also, be careful not to pinch the wires between the cluster and the instrument panel. Be sure to position the wiring harness in the clip on the back of the cluster.

Lancer—The gauges and the speedometer head on this model are contained in a single cluster, and the assembly must be removed to service any part of it.

For greater convenience in removing the cluster, the steering wheel must first be removed. Before removing the steering wheel, turn the car wheels in the straight-ahead position and center the steering wheel. Remove the nut from the steering shaft and scribe an aligning mark across the steering wheel hub and the steering shaft. This precaution will facilitate reassembly of the wheel in the correct position. Use Steering Wheel Puller C-3428 to remove the wheel.

To protect the steering column against scratching, apply masking tape or wrap the column with cloths.

First, remove the two screws from the heater pushbutton switch trim plate, and also the transmission pushbutton trim plate if the car is equipped with automatic transmission. Next, remove the three screws from the top edge of the face of the cluster.



Then, work the speedometer cable up through the dash panel. At the same time, tilt the cluster outward from the panel. Tilt the cluster sufficiently to provide enough clearance to permit the speedometer cable to be disconnected from the head. Disconnect the cable.

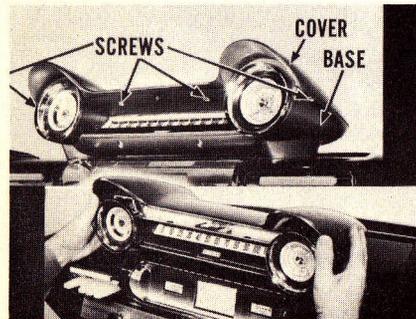
If the tests indicate the gauge to be faulty, it can be removed by removing the screws which secure the housing to the bezel.

Plymouth—The gauges and speedometer head on this model are grouped in two clusters. The upper cluster, mounted on top of the instrument panel, contains the speedometer, oil pressure indicator, headlight beam indicator, turn signal indicator and the ammeter. The lower cluster contains the fuel and temperature gauges. The speedometer head and gauges may be serviced independently of each other.

The steering wheel need not be removed when servicing the cluster on this model. *Note:* The steering wheel was removed in the accompanying illustrations to make it easier to photograph the operations.

Since the fuel and temperature gauges on Plymouth models can be tested and replaced from behind the instrument panel, it is not necessary to remove the gauge cluster. However, if there is a need to remove the cluster, it can be removed as follows: Working from behind the instrument panel, disconnect all wires and bulb sockets from the cluster. Then, remove the four screws and washers which attach the cluster to the panel, and remove the cluster. Gauges can then be removed.

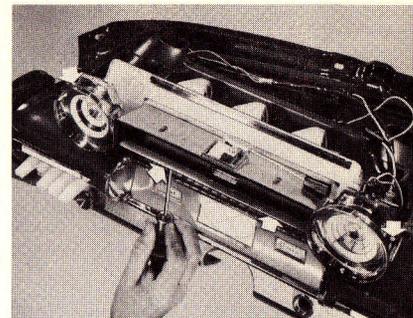
To replace the oil pressure indicator, turn signal indicator, headlight beam indicator, ammeter and speedometer head, it is necessary to remove the upper cluster.



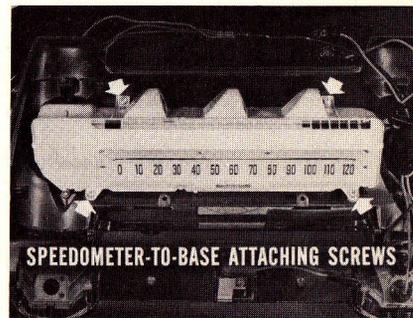
To remove the cluster, first remove the four screws from the upper edge of the speedometer cover base which secure the cover to the base. Due to the limited space between the windshield and the left end of the cover base, an offset Phillips screwdriver should be used to remove the screws. Then, slightly elevate the cover and slide it toward the windshield to release the securing clips, and then lift off the cover.

The light bulbs can be pulled from their sockets in the cluster and replaced as required.

To remove the speedometer, remove the two screws which attach the bezel on the inside of the cluster. Then, remove the two cluster screws which attach the upper cluster.



Next, remove the four speedometer-to-base attaching screws and raise the speedometer head, being careful not to damage the cable. Then, disconnect the cable from the speedometer head.

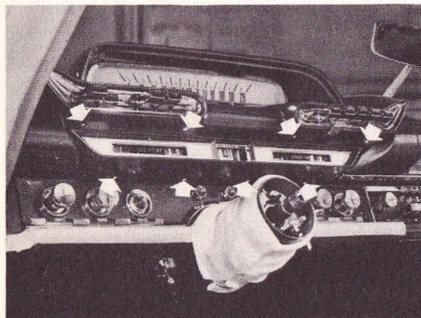


Extreme care should be exercised when installing the speedometer head not to kink the outer casing of the speedometer cable which might cause noise.

Dart, Polara and De Soto—The gauges and speedometer head on these models are divided into two separate clusters. The gauge cluster may be serviced independently of the speedometer head and the heater and automatic transmission pushbutton switches. To remove the speedometer head cluster, it is first necessary to remove the gauge cluster. The switches may be serviced independently.

The procedure for removing the instrument clusters on these models is identical. It is not necessary to remove the steering wheel to perform this operation.

Note: The steering wheel was removed in the accompanying pictures for purposes of illustration.



From the underside of the front face of the instrument cluster, remove the two rows of four attaching screws. Next, reach under the instrument panel and loosen the five wiring harness clips to provide more flexibility for the harness.

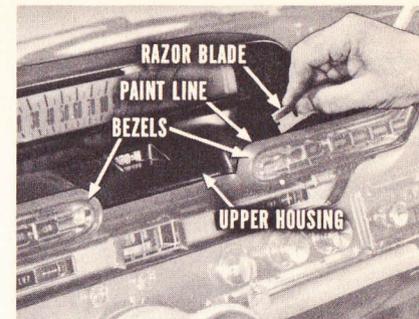
If the car is equipped with a clock, disconnect the reset knob and cable at the lower edge of the instrument panel.



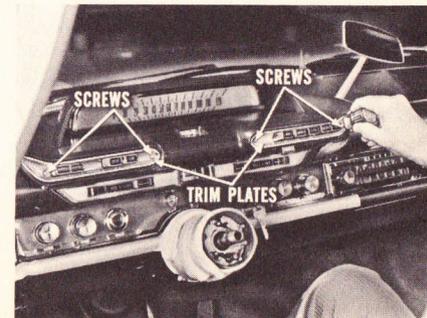
Then, tilt the cluster down and disengage the overlap at the center of the cluster. Carefully pull the cluster from the panel and rest it on the protected steering column to test the gauges.

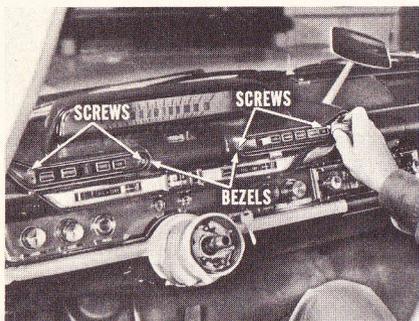
Note: If difficulty is encountered in removing the cluster by the foregoing procedure, due to interference at the overlap at the front edge of the upper and lower speedometer housings, the pushbutton trim plates and bezels must be removed.

First, run the sharp edge of a razor blade along the paint line of the speedometer housings and pushbutton bezels to prevent chipping the finish.



Then, remove the two screws from each of the two pushbutton trim plates, and remove the plates.

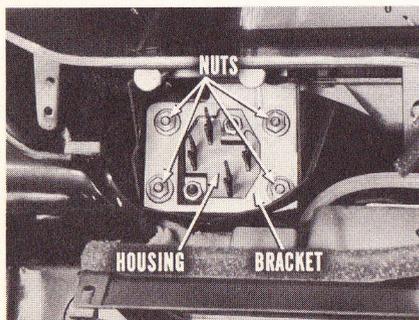




Remove the two screws from each of the two pushbutton bezels and carefully remove the bezels to avoid chipping the finish. Then, carefully remove the cluster.

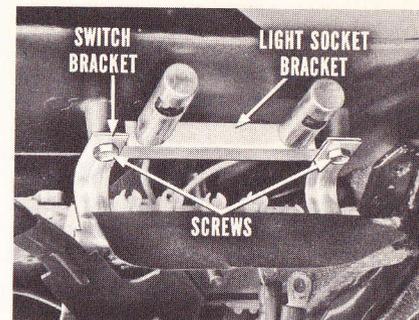
If it is necessary to replace a gauge from the cluster, remove the two gauge retaining screws on the back of the cluster and lift out the gauge.

To remove the speedometer head, which follows the removal of the instrument cluster, remove the two screws from each of the pushbutton trim plates and remove the trim plates. Then, remove the two screws which secure the pushbutton bezels, and remove the bezels from the housings. Remove the pushbuttons by pulling them from their respective switches.

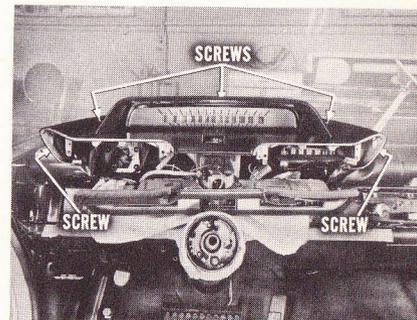


Working through the cluster opening in the housings, remove the four nuts which secure the pushbutton selector housing to the mounting bracket. Then, move the selector housing back away from the bracket.

Again working through the cluster opening, remove the two screws which attach the heater pushbutton switch bracket and light socket bracket to the panel, and remove the brackets.



Next, remove the five screws along the outer edge of the speedometer housing which secure the upper and lower housings. Then, disconnect the speedometer cable and lamp bulbs.

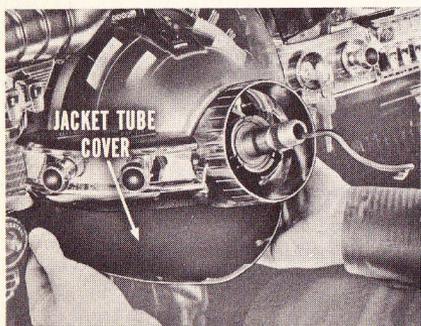


Raise the upper speedometer housing, speedometer head, and the two bezels (if attached) as a unit until it clears the lower housing.

Remove the speedometer head from the housing by removing the four attaching screws.

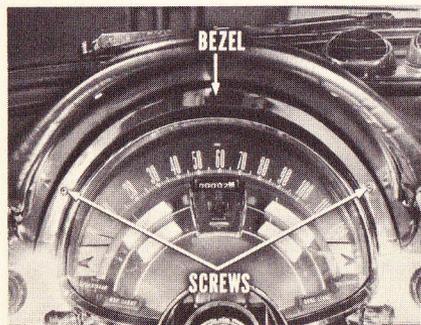


Chrysler—The gauges and speedometer head on these models are contained in a single cluster. The gauge cluster must be removed before the speedometer head can be removed. The steering wheel must be removed to remove the gauge cluster or the speedometer head.



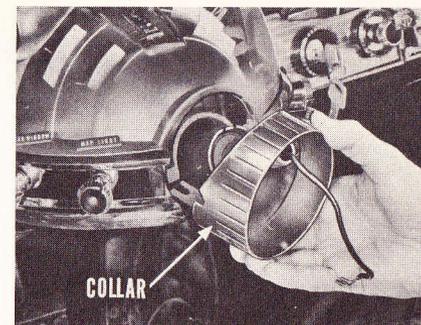
Working from under the steering column, remove the six screws which attach the cover to the underside of the steering gear jacket tube, and remove the cover.

Then, reach up under the cluster and disconnect all wires and the speedometer bulb socket from the cluster. Also, disconnect the cluster ground wire.

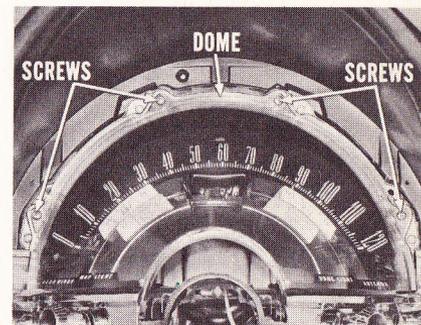


Remove the two screws which secure the bezel to the instrument panel, and remove the bezel.

From underneath the cluster, disconnect the speedometer cable from the speedometer head. Also remove the two screws which attach the steering tube collar, and remove the collar.

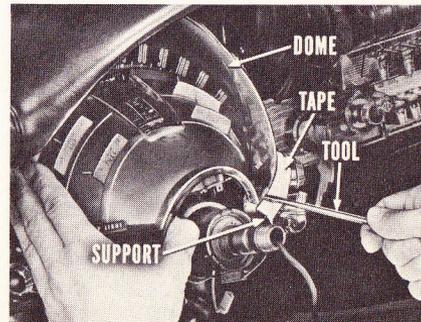


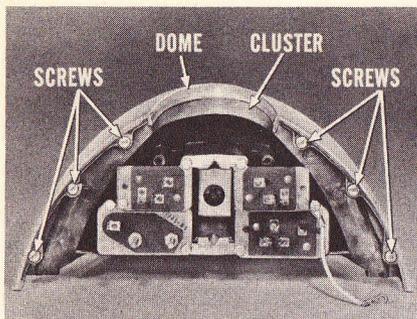
Reach up under the instrument panel and remove the two long screws and spacers which attach the cluster to the support. These screws are located just behind the steering tube collar attaching screws.



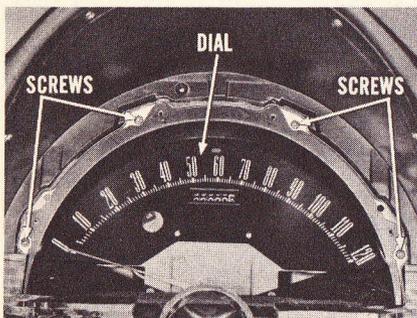
From the front of the cluster, remove the four screws which attach the plastic dome to the instrument panel.

Apply a piece of masking tape to the edge of the cluster support to prevent scratching it. Then, using a thin, pointed instrument or screwdriver, carefully pry the dome and cluster assembly up out of the support. Carefully move the cluster from the opening and place it upon a padded section of the workbench.





The plastic dome is held to the cluster by six screws, but it is not necessary to remove the dome in order to remove any of the gauges.

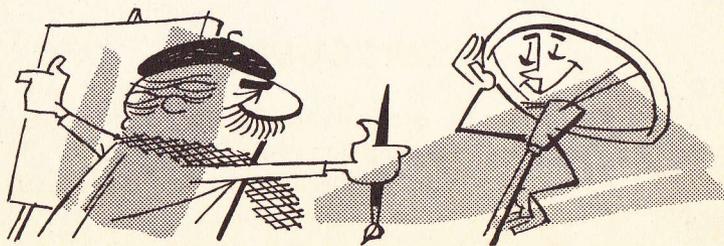


The speedometer head may be removed from the instrument panel by removing the four attaching screws from the front of the speedometer dial.

Imperial—The gauges and the speedometer head on this model are contained in a single cluster. The cluster must be removed to service either the gauges or the speedometer head.

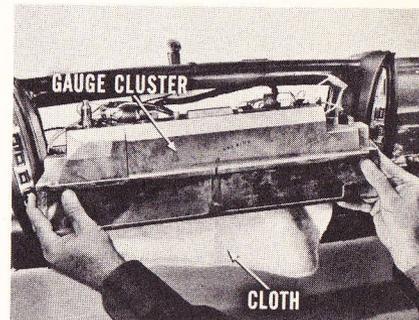
It is not necessary to remove the steering wheel to remove the cluster from the panel.

Note: The steering wheel was removed for purposes of illustration.



Before doing any work on the instrument panel, the panel should be protected with a cloth or some other suitable protection to avoid damage by scratching.

Next, remove the defroster hose from the defroster tube. Then, disconnect the speedometer cable from the speedometer head. From under the panel, disconnect the odometer reset cable at the cluster.



From the front face of the cluster, remove the five screws which attach the cluster to the panel. Then, tilt the lower edge of the cluster outward and remove the cluster from the panel.

Caution: Care should be exercised not to remove the bezel and dial from the cluster housing. The panelescent lighting, composed of a number of small panelescent lamps, should not be disturbed. Special fixtures are required to assemble the lamps and, therefore, the speedometer head and housing should be serviced as an assembly only by the speedometer manufacturers' service dealer.

Faulty gauges may be replaced individually, by removing the attaching screws and withdrawing the gauges from the housing.

CONCLUSION

Testing and servicing the gauges in the instrument panel is a job any technician can do—it doesn't require an electrical expert. The new Gauge Tester simplifies the testing job, and the new cluster design simplifies the replacement procedures.