GENERAL DESCRIPTION

CRUISE CONTROL

The automatic lock-in Cruise Control is a driver-operated speed regulating device that may be used either as a speed reminder or as an automatic speed control for any car speed between 25 mph and 85 mph. It is available as optional equipment on all 1967 Cadillac cars.

The major components of the automatic lock-in Cruise Control are: the power unit, mounted on the left front fender dustshield on all but 693 series; and the selector control assembly, located on the left side of instrument panel bezel. On 693 styles the power unit is mounted on a bracket at the rear of the engine.

The power unit is driven by a flexible drive cable from the transmission, Fig. 15-8. The drive cable also drives the speedometer cable that runs from the power unit to the speedometer. The selector control assembly is connected to the power unit by means of a bowden cable. Mechanical linkage connects the power unit to the accelerator and carburetor throttle rod.

The selector control assembly is shown in Fig. 15-9. Speed settings are secured by use of a calibrated thumb wheel. The selector dial is numbered with speed markings from 30 mph to 80 mph, and increments of 5 mph from 25 mph to 85 mph. An arrow on the selector control assembly indicates the speed on the selector dial for which the unit is set when in the ON or AUTO position. The numbers on the dial are illuminated whenever the parking lights or headlights are lit.

The switch lever located on the right side of the selector dial turns the unit off and on, and activates the unit for automatic control. The switch lever is in the OFF position when rotated rearward against its stop; ON position when the lever is at the top just at the point where spring tension is felt; and AUTO position when rotated forward to the limit of its travel against spring tension.

A green indicator light, located in the top left corner of the instrument panel cluster and marked CRUISE glows whenever the unit is set for automatic control.

When the switch lever is in the OFF position, the unit has no effect at any car speed. Once the switch lever has been moved to the ON position, the unit is on and accelerator back pressure will be felt as a warning at the speed for which the selector dial is set. Moving the switch lever momentarily to the AUTO position activates an automatic relay switch in the power unit and the green indicator light in the instrument panel will glow, indicating the unit is set for automatic control. The switch, which is spring loaded, will return to the ON position. Once the unit is set for automatic control the unit will lock-in automatically whenever back pressure is felt on the accelerator pedal at the selected speed.

A reversible electric motor in the power unit actuates the mechanical linkage between the power unit and the carburetor. Motor feed points for forward and reverse energizing of the motor are closed and opened by a governor, under control of a governor spring that is compressed or relaxed

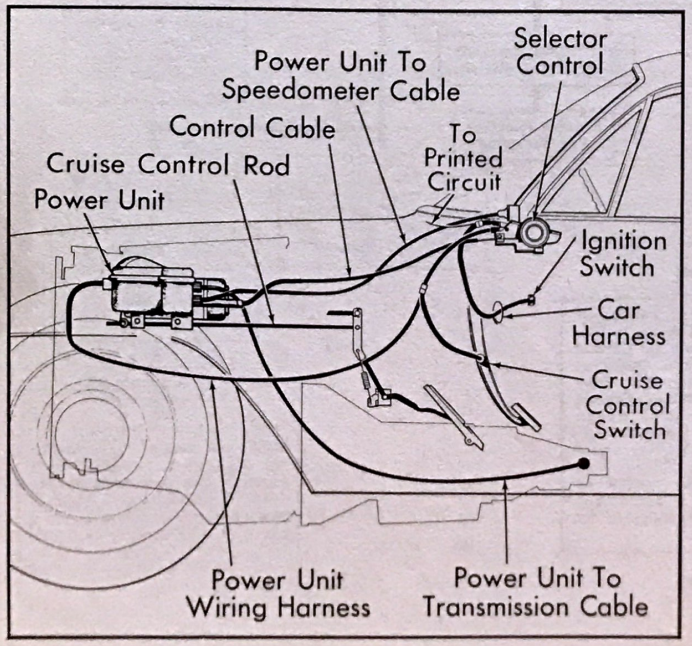


Fig. 15-8 Cruise Control Installation

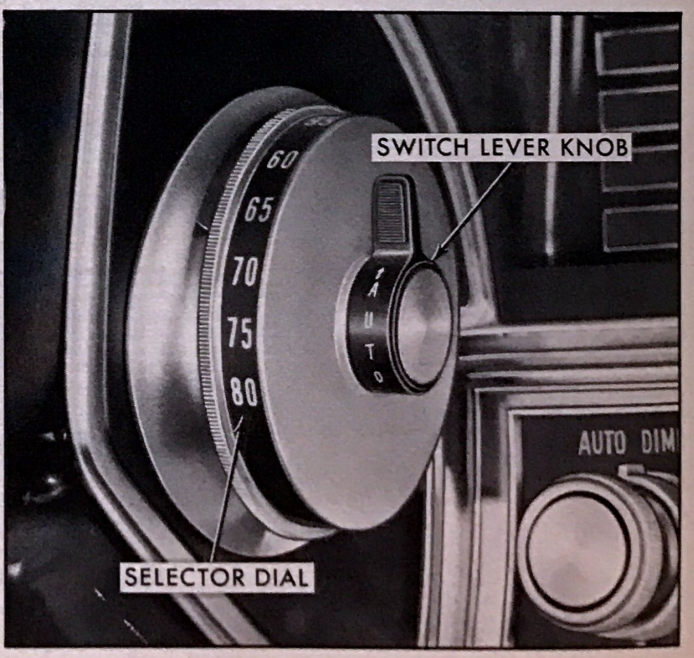


Fig. 15-9 Selector Control Assembly

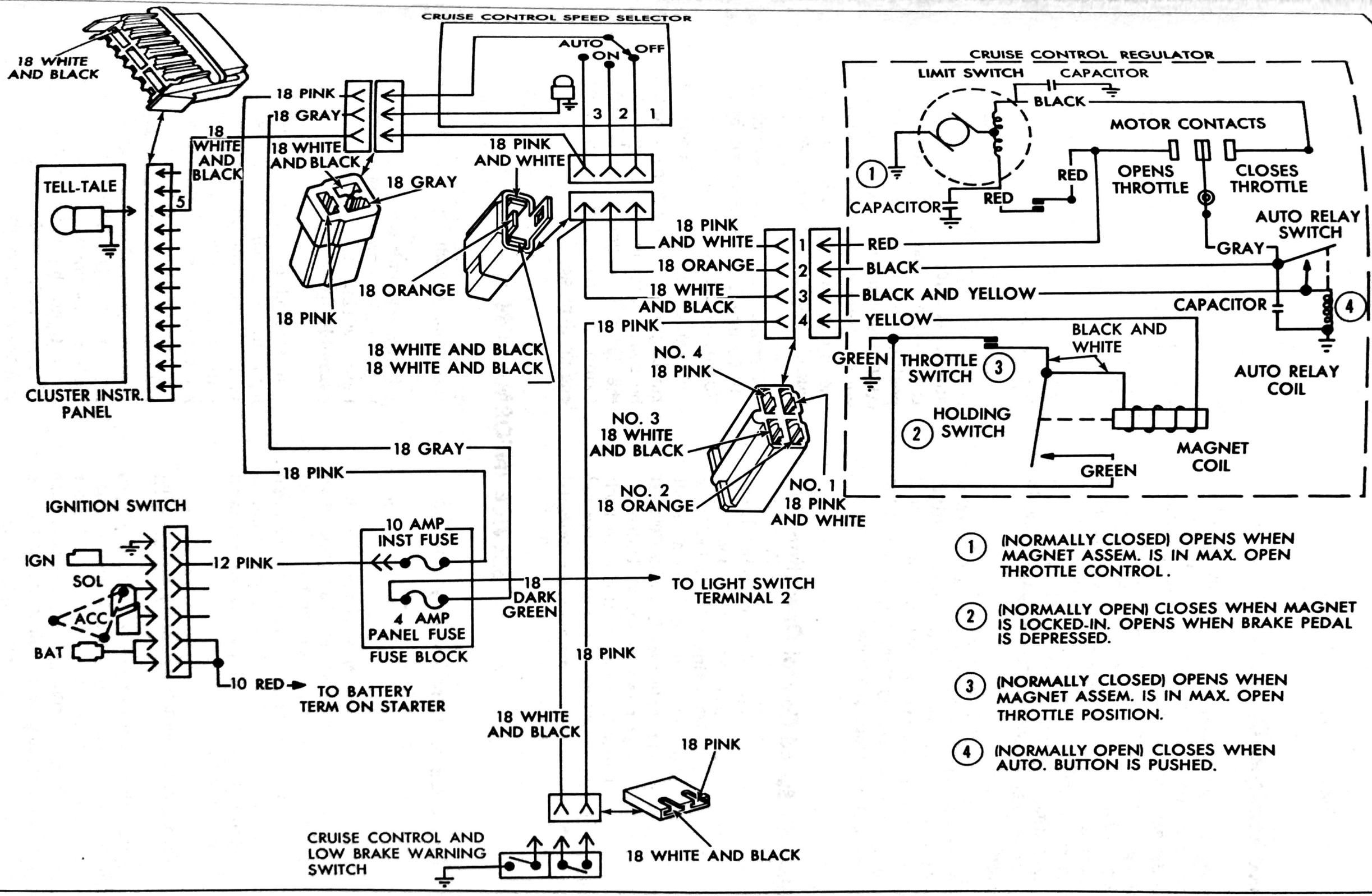


Fig. 15-10 Cruise Control Circuit Diagram

to calibrated positions, corresponding to selected speeds, by the bowden cable leading to the selector control. The complete electrical circuit for the Cruise Control is shown in Fig. 15-10.

Speed Reminder Operation

Move the switch lever to "ON" top position just to the point where spring tension is felt and rotate the selector dial to the desired speed setting, with speed setting lined up with arrow on selector control assembly. The Cruise Control will then function as a speed reminder by exerting back pressure on the accelerator pedal whenever the speed setting is reached. The unit will function in the same way whenever the speed setting is changed.

Cruise Control does not interfere with normal acceleration up to the selected speed setting. Further acceleration may be obtained above that speed by pressing the accelerator pedal past the warning back pressure position.

Automatic Speed Control Operation

For automatic speed control, move switch lever forward momentarily past spring tension to its stop, which is the AUTO position. Green indicator light marked "CRUISE" in the instrument panel will glow. Then rotate selector dial to the desired speed setting. The unit is now set for automatic control and will lock-in automatically when back pressure is felt on the accelerator at the selected speed. The car will now maintain the selected speed automatically and the driver may remove his foot from the accelerator pedal if desired. Selected speed will be maintained regardless of road terrain, within limits of engine performance.

When the unit is in automatic control, car speed can be changed by slowly rotating the selector dial forward to increase speed or rearward to decrease speed. Also, car speed can be increased at any time by pushing the accelerator pedal through the back pressure. When the accelerator is released, the car will return automatically to the selected speed.

CAUTION: When using selector dial to increase car speed during automatic control, always rotate dial slowly, to prevent sudden acceleration.

Automatic control is disengaged when the brake pedal is depressed. It can be re-engaged by simply accelerating until back pressure is felt. It is not necessary to push switch lever to AUTO position to re-engage automatic control. The AUTO setting can be cancelled by moving the switch lever to the OFF position, without touching the speed setting. This will unlock the unit and cancel speed reminder and automatic control.

Turning the ignition switch off will cancel all Cruise Control functions by stopping current flow at the ignition switch.

Turning the ignition switch off with engine running and unit in automatic control should never be done except in emergency conditions as turning the ignition switch off at 25 mph, the minimum Cruise Control setting, may cause permanent engine damage.

SERVICE INFORMATION

15. Cruise Control Preliminary Checks

It is not always necessary to remove and disassemble the power unit in cases of an inoperative Cruise Control. The following checks should be performed as part of your diagnosis to determine the cause and correction of the Cruise Control trouble and to eliminate unnecessary service work on the power unit.

1. Turn ignition switch on. Do not start engine.

2. Push slide switch to AUTO position. Green "Cruise" light (automatic indicator light) in instrument panel should light and stay lit after lever returns to ON (center position). If bulb does not light, check condition of instrument fuse in fuse panel.

3. Disconnect multiple connector at Cruise Control power unit.

4. Push switch lever to OFF position.

5. Ground one test lamp lead to terminal No. 1, Fig. 15-11. Lamp should light. If it does not light, wiring in selector control assembly or assembly is defective.

6. Ground one test lamp lead and touch other lead to terminal No. 2, Fig. 15-11, and push switch lever to ON (center) position. If lamp fails to light, check for defective wiring in selector control assembly.

7. Ground one test lamp lead and touch other lead to terminal No. 3, Fig. 15-11. Push switch lever to AUTO position and allow switch to come back to ON position. Test lamp and green indicator light should light when slide switch reaches AUTO position and then go out when slide switch returns to ON position. If test lamp fails to operate as described above, check for defective wiring in selector control assembly. Checks for indicator light will be covered later.

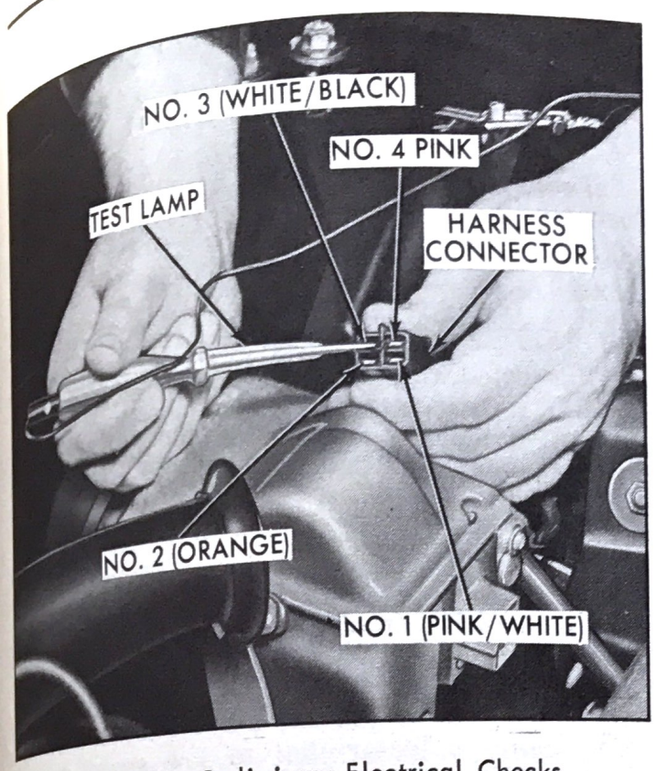


Fig. 15-11 Preliminary Electrical Checks

8. Ground one test lamp lead and touch other lead to terminal No. 4, Fig. 15-11. Push switch lever to AUTO position and manually hold switch lever in AUTO position. Depress brake pedal. Test lamp should go out and then come on when brake pedal is released. If lamp fails to operate as described above, check for improperly adjusted Cruise Control switch (see Note 20) or defective wiring in selector control assembly. Allow switch lever to return to ON position.

9. Connect multiple connector to power unit.

10. Ground one test lamp lead and touch other lead to terminal No. 3 (white with black stripe wire) at power unit. Push switch lever to AUTO position and allow switch to come back to ON position. Test lamp should light when switch lever reaches AUTO position, and remain lit when slide switch returns to ON position. If test lamp fails to operate as described above, check for loose connections at relay switch or a defective relay switch.

11. Remove test lamp and turn ignition switch off.

12. Remove four screws securing power unit cover to power unit and remove cover.

13. Turn ignition switch on and momentarily move slide switch to AUTO position to set unit for automatic control. Do not start engine.

14. Move locking arm against magnet and move contact arm against motor feed point on locking arm side of magnet. Unit should lock-in when throttle switch closes and magnet is moved to low speed position. Move slide switch to OFF position. Unit should disengage and magnet will move to wide open throttle position, opening the throttle switch.

15. If unit fails to operate as described above in step 14, check for improperly adjusted throttle switch points, defective wiring in magnet coil circuit, or a defective magnet coil.

16. Turn ignition switch off and move slide switch to OFF position.

17. Install cover on power unit and secure with four screws.

18. If green indicator light fails to glow when switch lever is moved to AUTO position, perform the following checks:

a. Check condition of indicator bulb as described in Section 12, Note 17, part a.

b. Check condition of Cruise Control automatic indicator light feed circuit as described in Section 12, Note 17, part b.

c. Check printed circuit as outlined in Section 12, Note 17, part e.

d. Check selector control assembly to see that a good contact is made at the ON terminal when switch lever is returning from AUTO to the ON (center) position.

19. If the above electrical checks fail to correct the Cruise Control trouble, check the following adjustments before removing the power unit for service work.

a. Selector dial adjustment, Note 16.

b. Selector control cable check, Note 17.

c. Accelerator linkage adjustment, Note 18.

d. Motor feed points adjustment, Note 21.

e. Limit switch and throttle switch points adjustment, Note 22.

16. Selector Dial Adjustment

1. Rotate selector dial forward to high speed position against its stop.

2. Push switch lever to ON position.

3. Operate car at a steady speed of 50 mph, as indicated on speedometer.

CAUTION: This adjustment must be performed on highway. Do not perform on hoist or jack stands in shop area.

4. Rotate selector dial rearward until back pressure is felt on accelerator pedal, then lock

in Cruise Control by momentarily pushing switch lever to AUTO position.

5. With car speed at 50 mph, as indicated on speedometer, the numeral 50 on selector dial should be lined up with arrow on selector control assembly. Observe reading on dial, then move switch lever knob to OFF position. Do not rotate selector dial.

6. If reading on selector dial agrees with reading on speedometer, selector dial is properly adjusted.

7. If readings do not agree, adjust selector dial as follows:

a. With switch lever in OFF position, rotate selector dial either forward (if dial reading is on the low side) or rearward (if dial reading is on the high side) against its stop. Then rotate dial by hand beyond its stop the necessary amount of travel as observed in step 5 to correct the selector dial setting.

b. Repeat adjustment procedure until reading on selector dial agrees with reading on speedometer.

17. Control Cable Check

1. Release retainer spring from dustshield by rotating 90 degrees and slide it back on control cable. Pull control cable to release from adjustable coupling.

2. Rotate selector dial to low speed position until it is positioned against its stop, but do not force beyond its stop.

3. Position control cable in identical position as that shown in Fig. 15-12 on all but 693 style or Fig. 15-13 on 693 style, using No. 3 slot of Control Cable Gage, J-22650. End of hook should just touch stop on gage and legs of gage should bottom on ferrule. If adjustment is more than .005" off, adjust control cable as described in Note 18.

NOTE: Control cable must be positioned as illustrated, otherwise check will not be accurate as the relationship of the inner cable to the outer cable varies according to control cable location.

4. Rotate speed selector to high speed setting and install cable into dust shield until ferrule stops against dustshield. Hold in this position and rotate retainer spring on dust shield until it is positioned into slots.

5. Rotate selector dial to low speed stop to secure control cable into adjustable coupling.

CAUTION: This step must be performed or unit will control in "ON" position or lock-in in "AUTO" position at low speed regardless of selected setting.

18. Control Cable Adjustment

NOTE: The control cable is pre-set at the factory and normally should not require adjustment unless a new cable is installed. This adjustment must be performed off car. First check control cable as described in Note 17 and, if necessary, adjust as follows:

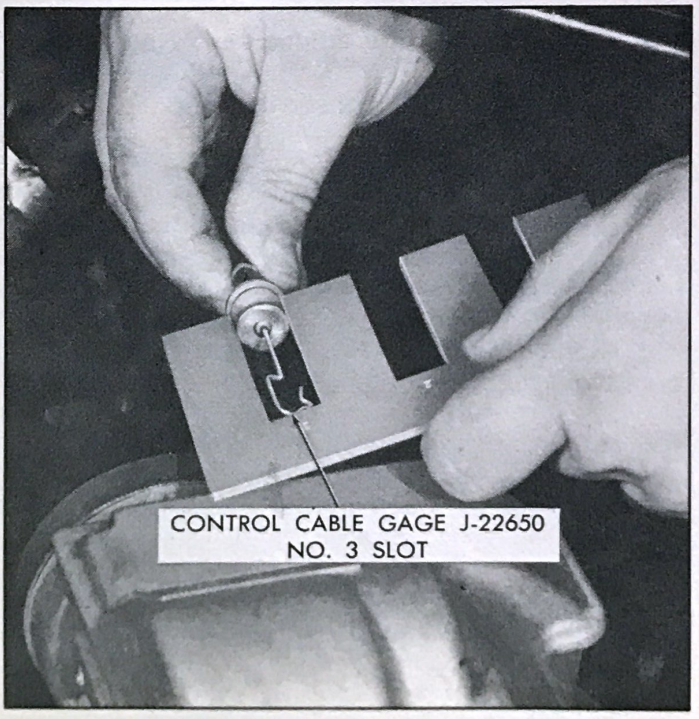


Fig. 15-12 Control Cable Check (All Except 693 Styles)

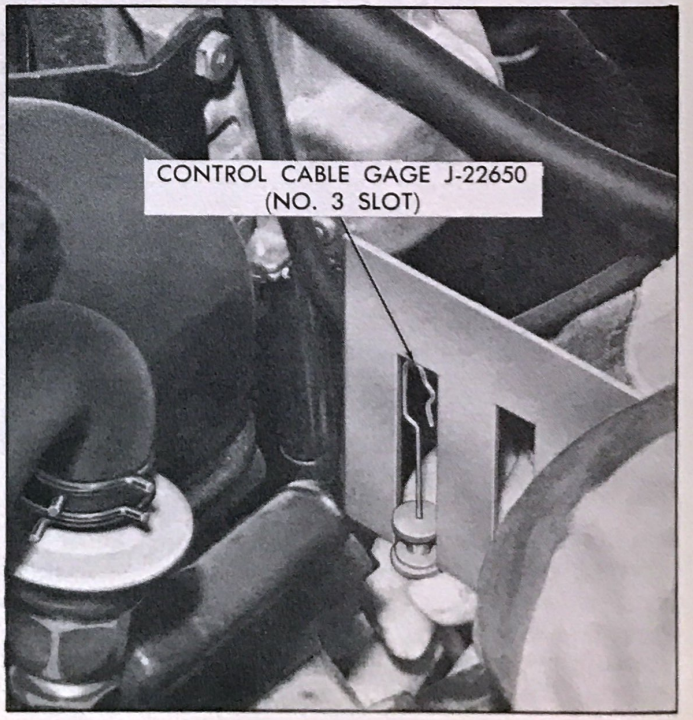


Fig. 15-13 Control Cable Check (693 Styles)

1. Remove Cruise Control Selector Assembly as outlined in Section 12, Note 65a.

2. Rotate selector dial to low speed position until it is positioned against its stop, but do not force beyond its stop.

3. Position assembly flat on workbench and make certain there are no kinks in cable.

4. Loosen hex head set screw at control cable clamp on selector control just enough so that outer bowden cable casing may be threaded in and out of clamp by turning dust shield.

5. On all but 693 style, thread control cable housing until it is approximately half-way out of control cable clamp. Position No. 2 center slot of Control Cable Gage, J-22650, so that end of hook touches stop on gage. Hold hook and gage in this position and thread toward selector control assembly until gage bottoms on ferrule of control cable. While holding in this position, tighten hex head set screw at control cable clamp, Fig. 15-14.

NOTE: Threading the outer casing will provide a more accurate adjustment and help retain the inner cable in the white plastic retainer.

6. On 693 style, thread control cable housing until it is approximately half-way out of control cable clamp. Position No. 1 slot of Control Cable Gage, J-22650, so that end of hook touches stop on gage. Hold hook and gage in this position and thread toward selector control assembly until gage bottoms on ferrule of control cable. While holding in this position, tighten hex head set screw at control cable clamp, Fig. 15-15.

NOTE: Threading the outer casing will provide a more accurate adjustment and help retain the inner cable in the white plastic retainer.

7. Install Cruise Control Selector assembly as outlined in Section 12, Note 65b.

19. Linkage Adjustment

1. Adjust throttle rod as described in Section 6, Note 94, on all but 693 style or Note 95 on 693 style.

2. Turn Automatic Climate Control off, if car is so equipped.

3. Start engine and operate at slow idle with transmission lever in "Park."

4. Remove cotter pin securing accelerator linkage to exterior arm, then remove washer and separate linkage from exterior arm.

5. Adjust trunnion so that, when installed through exterior arm, hole in power unit housing will be aligned with locating hole and throttle valves will be closed.

NOTE: Due to the angle at which the trunnion enters this hole, it is necessary to move Cruise Control rod when inserting the trunnion. Repeat this operation until proper alignment is obtained. Be careful not to turn trunnion on Cruise Control rod too far forward on all but 693 style or rearward on 693 style, or throttle valves will unseat, causing an incorrect adjustment.

6. Insert 1/8" drill into hole of exterior arm and power unit housing to check alignment, Fig. 15-16.

7. Install washer on trunnion and secure trunnion to exterior arm with cotter pin.

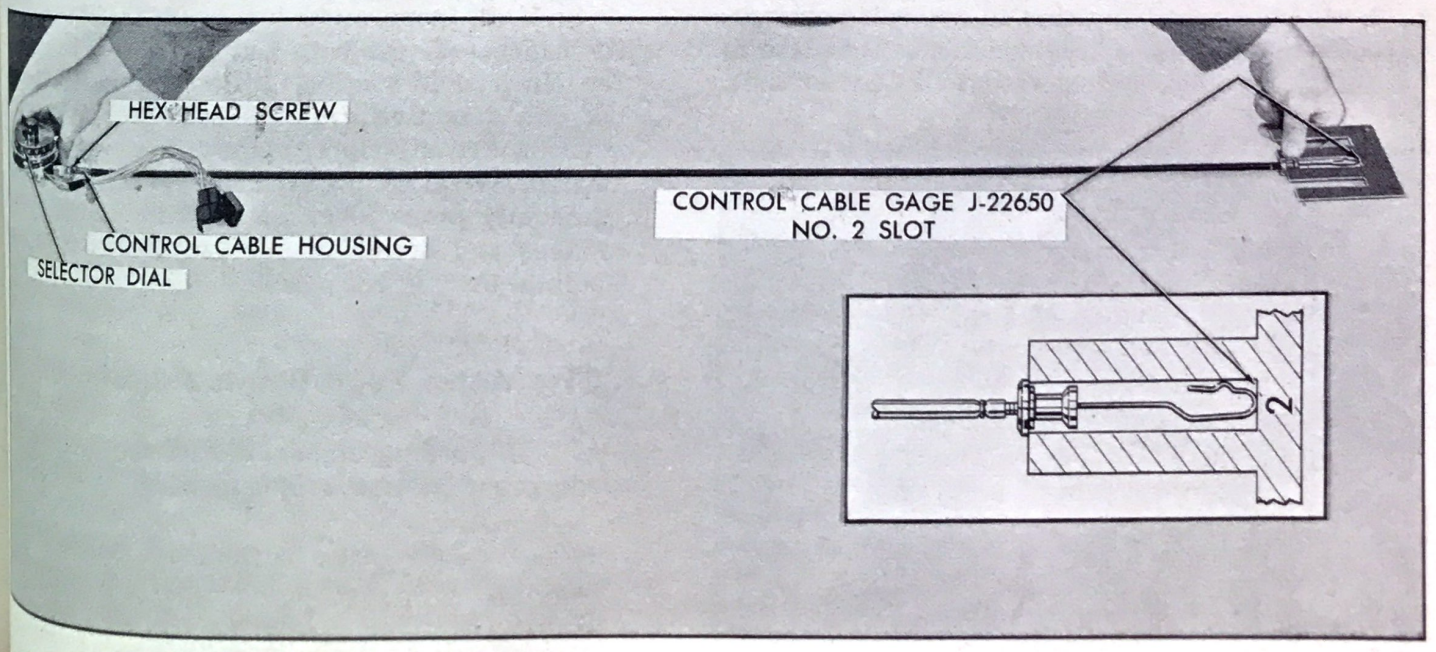


Fig. 15-14 Control Cable Adjustment (All Except 693 Styles)

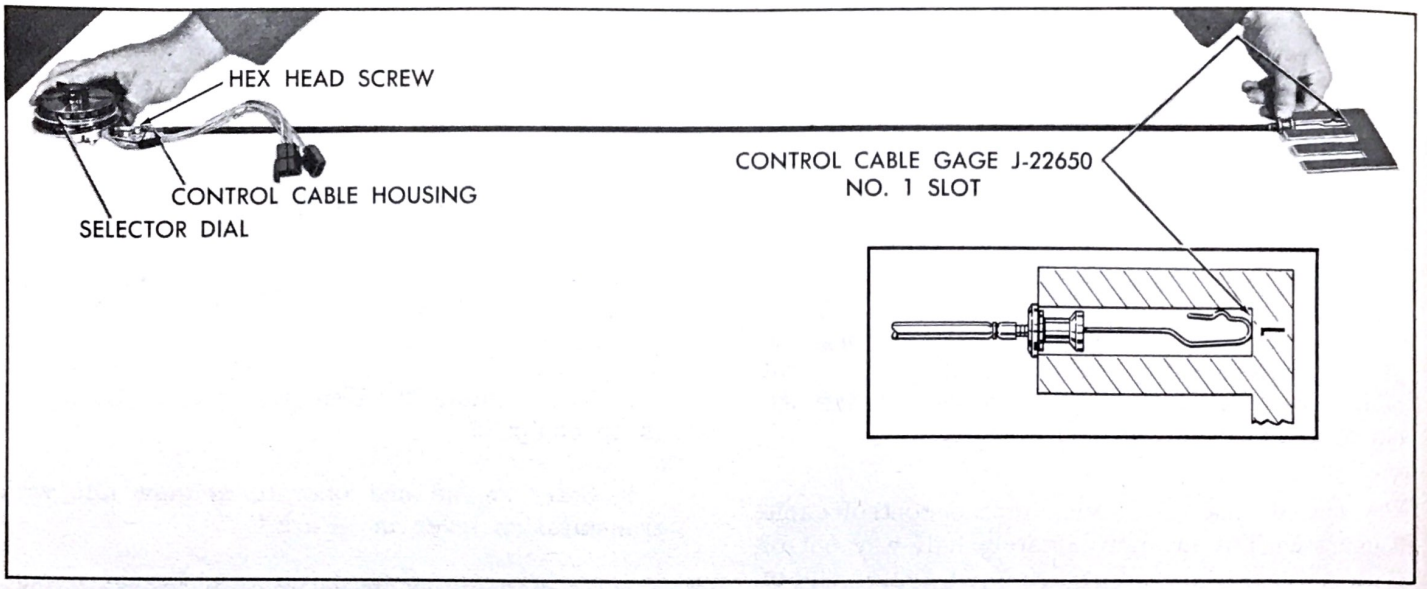


Fig. 15-15 Control Cable Adjustment (693 Styles)

20. Cruise Control and Low Brake Indicator Switch Adjustment

NOTE: The low brake indicator switch and Cruise Control switch are combined on all cars, even if the car is not equipped with Cruise Control. Once the Cruise Control portion of the switch is adjusted, as described below, the low brake indicator switch will be adjusted. The only exception to this design is on 693 style equipped with disc brakes. The low brake indicator switch in these cars is in line with the brake line and cannot be adjusted. If inoperative, it must be replaced.

1. Turn ignition on. Do not start engine.

2. Momentarily move selector control assembly switch lever knob to AUTO position until green indicator light in instrument panel glows.

3. Using a test lamp that is not self-powered, ground one test lamp lead and touch other lead to terminal #4 (pink harness wire) at power unit.

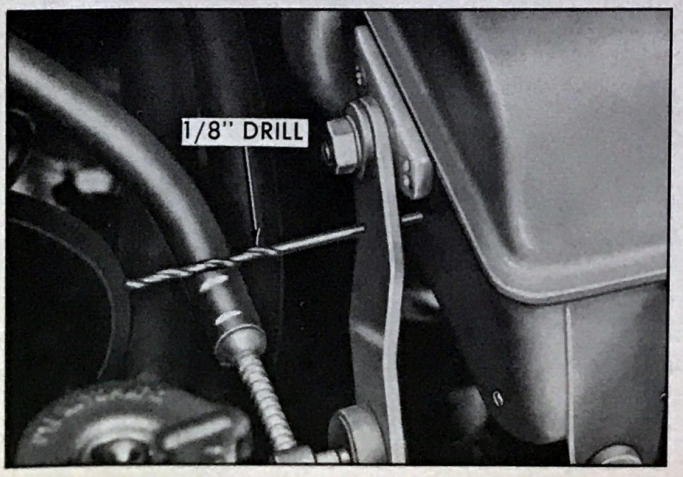


Fig. 15-16 Accelerator Linkage Adjustment

4. Loosen mounting screw securing switch to brake pedal mounting bracket.

5. Adjust switch so that lamp will light when brake pedal is fully released and will go out when brake pedal is depressed approximately 1/2 inch. Tighten switch mounting screw.

NOTE: When the Cruise Control switch is properly adjusted, the low brake indicator switch is properly adjusted.

6. If switch cannot be adjusted, it is defective and should be replaced.

7. If necessary to install new switch, repeat step 5.

8. Remove test lamp, turn ignition switch off and switch lever knob off.

9. If an inoperative low brake indicator circuit is suspected, the bulb and wiring may be checked as outlined in Section 12, Note 17, parts a through e. If a defective switch is suspected and all other checks are all right, remove low brake indicator switch. With wiring attached and switch grounded, manually move lever on switch to see that switch makes and breaks circuit as indicated by tell-tale bulb in instrument panel.

21. Motor Feed Points Adjustment

1. If working on car, disconnect terminal board connector at power unit housing.

2. Remove three screws that secure cover to housing.

3. Connect negative lead of a 12-volt power source to housing.

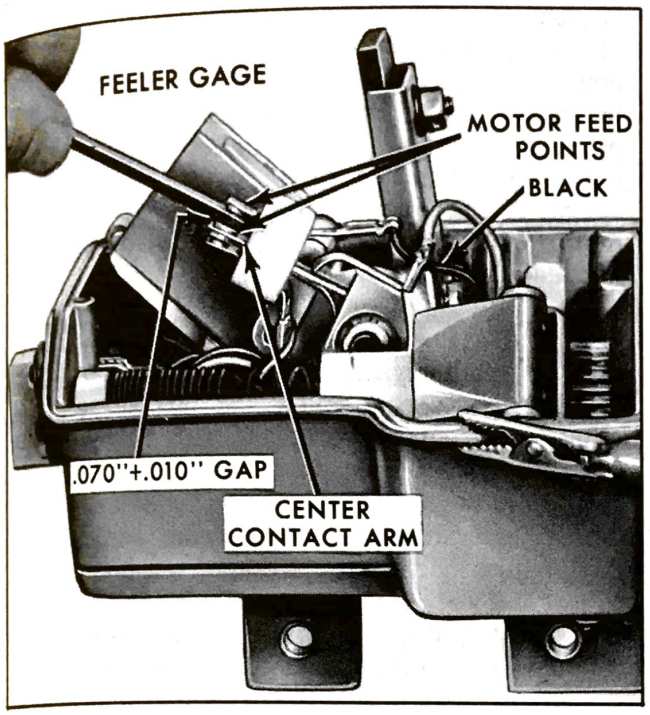


Fig. 15-17 Motor Feed Points Adjustment (Full Gap)

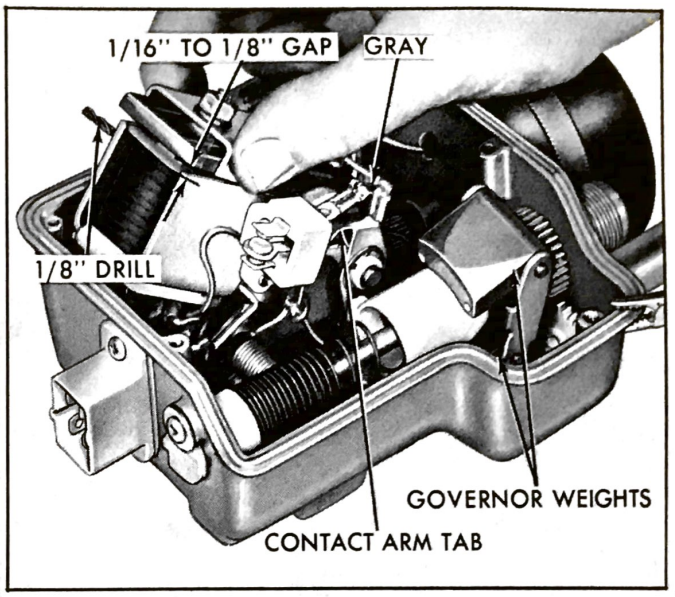


Fig. 15-18 Motor Feed Points Adjustment (Magnet to Locking Arm Gap)

4. Connect positive lead to close throttle motor feed point (black wire). Magnet assembly will move to close throttle position. Disconnect positive lead.

5. Measure gap between either motor feed point and center contact arm. This gap should be .070" ± .010", Fig. 15-17. Bend either motor feed point to adjust and recheck gap.

NOTE: A blackened condition of motor feed points does not mean they should be replaced. Points usually do not need replacement unless broken.

6. Touch positive lead to open throttle motor feed point (red wire). This will run magnet assembly to wide open throttle position. Disconnect positive lead.

7. Insert a 1/8" drill into exterior arm hole and hole in housing.

8. Spread governor weights to the limits of their travel with fingers.

9. Touch positive lead to center contact arm terminal (gray wire). Magnet assembly will move toward close throttle position. Disconnect positive lead when magnet assembly stops moving. There should be 1/16" to 1/8" between locking arm and outer casting of magnet assembly when locking arm is pulled upward, Fig. 15-18.

10. If magnet assembly is less than 1/16" from locking arm, adjust contact arm by bending curved contact arm tab down, slightly. If magnet assembly is more than 1/8" from locking arm, bend tab upward slightly. After each bend, check magnet assembly to locking arm gap by repeating steps 6, 8 and 9.

11. Remove power source leads.

12. Remove 1/8" drill from exterior arm and hole in housing.

13. Install cover on housing and secure with three screws.

14. If working on car, connect terminal board connector at housing.

22. Limit Switch and Throttle Switch Points Adjustment

NOTE: Adjusting the limit switch points will also adjust the throttle switch points.

1. If working on car, turn ignition switch to ON position but do not start engine.

2. Remove three screws that secure cover to housing and remove cover.

3. If working off car, connect the negative lead of a 12-volt power source to the power unit housing and connect the positive lead to the No. 1 terminal at the terminal board.

NOTE: Terminal board is numbered on inside with respective terminal numbers.

4. Loosen screw securing striker to housing and move striker up if motor is not running. Then slowly move striker down until motor just stops running and tighten screw. Measure distance from housing to top of striker, Fig. 15-19, using a "T" scale. Increase measurement 1/32" on "T" scale.

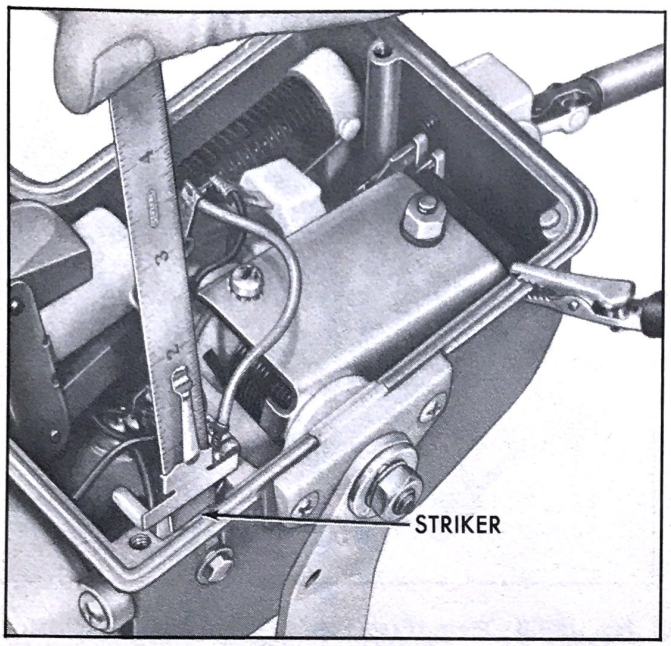


Fig. 15-19 Limit Switch and Throttle Switch Adjustment

Loosen screw securing striker to housing and adjust striker by placing "T" scale on housing and at top of striker, maintaining new dimension. Tighten screw.

5. If working off car, remove leads.

6. Install cover on housing and secure with three screws.

7. If working on car, turn ignition switch off.

23. Checking Motor Operation

1. Remove three screws securing power unit cover and remove cover.

2. Check accelerator linkage adjustment, as described in Note 19.

3. Turn ignition switch ON. Do not start engine.

4. Momentarily move switch lever to AUTO position to set unit for automatic control.

5. Move locking arm against magnet, simulating automatic control.

6. Move contact arm to touch motor feed point on locking arm side of magnet. Motor should rotate drive screw and close the throttle through the accelerator linkage. Motor should move magnet to wide open throttle position when contact arm is released.

7. If motor will not open or close throttle through accelerator linkage, motor may be binding. Check alignment of motor with housing. To check motor for binding, loosen motor from housing without disconnecting motor leads and disengage motor shaft from drive screw. Move contact arm against motor feed point on wide open throttle side of magnet assembly to check reverse operation, and against motor feed point on locking arm side of magnet assembly to check forward operation. If motor does not run free, replace motor. If motor does run free, stall test motor as described in Note 24.

8. The drive screw or carburetor linkage may also be binding. After making certain motor runs free, check drive screw for binding by turning plastic gear on drive screw with finger to check for free rotation. If drive screw does not rotate freely, it is defective and should be replaced. If motor and drive screw operate satisfactorily, then adjust carburetor linkage.

9. Turn ignition switch OFF, move switch lever to OFF position, and replace power unit cover.

24. Motor Stall Test

1. Disconnect multiple electric connector at power unit.

2. Remove three screws securing power unit cover to housing and remove cover.

3. Connect positive (red) lead of an ammeter tester to positive battery terminal.

4. Insert 1/8" drill into hole of power unit housing to limit travel of locking arm and prevent rotation of drive screw.

5. Connect negative black lead of tester to terminal No. 2 on front of power unit.

6. Hold contact arm against motor feed point on locking arm side of magnet, and observe reading on ammeter. If reading on ammeter indicates more than 7 amps, motor is drawing too much current and should be replaced.

7. Disconnect tester leads, remove drill, install cover, and connect multiple connector.

25. Checking for Damaged Cables and Gears

1. Remove three screws that secure power unit cover to housing and remove cover.

2. Raise rear end of car and place on jack stands on all but 693 style. On 693 style raise front end of car and place on jack stands.

3. Start engine and move switch lever knob to off position or rearward.

4. Move transmission shift lever to either "Drive" range.

5. Remove speedometer cable at power unit and check to see if nylon speedometer gear is turning. This will determine if cable from transmission to power unit is turning and if gear is operating.

6. If nylon speedometer gear is turning, cable to speedometer is broken or speedometer is inoperative.

7. If nylon speedometer gear is not turning, disconnect transmission cable at power unit.

8. If cable is turning, gears are stripped inside power unit.

9. If cable is not turning, check for a broken cable or stripped transmission speedometer drive gear.

10. Shut engine off and lower car.

11. Replace parts as required.

12. Install cover on housing and secure with three screws.

26. Selector Control Assembly

For removal and installation of the selector control assembly, refer to Section 12, Note 65.

27. Selector Control Assembly Disassembly and Assembly

a. Disassembly (Fig. 15-20)

1. Loosen set screw with 5/64 inch Allen wrench and remove switch lever knob.

2. Remove nut, lock washer, flat washer and wave washer and selector dial.

3. Remove two screws securing two spring clamps to escutcheon and remove clamps.

4. Remove two screws that secure escutcheon to speed selector assembly and remove escutcheon.

5. Loosen screw that secures control cable to speed selector assembly.

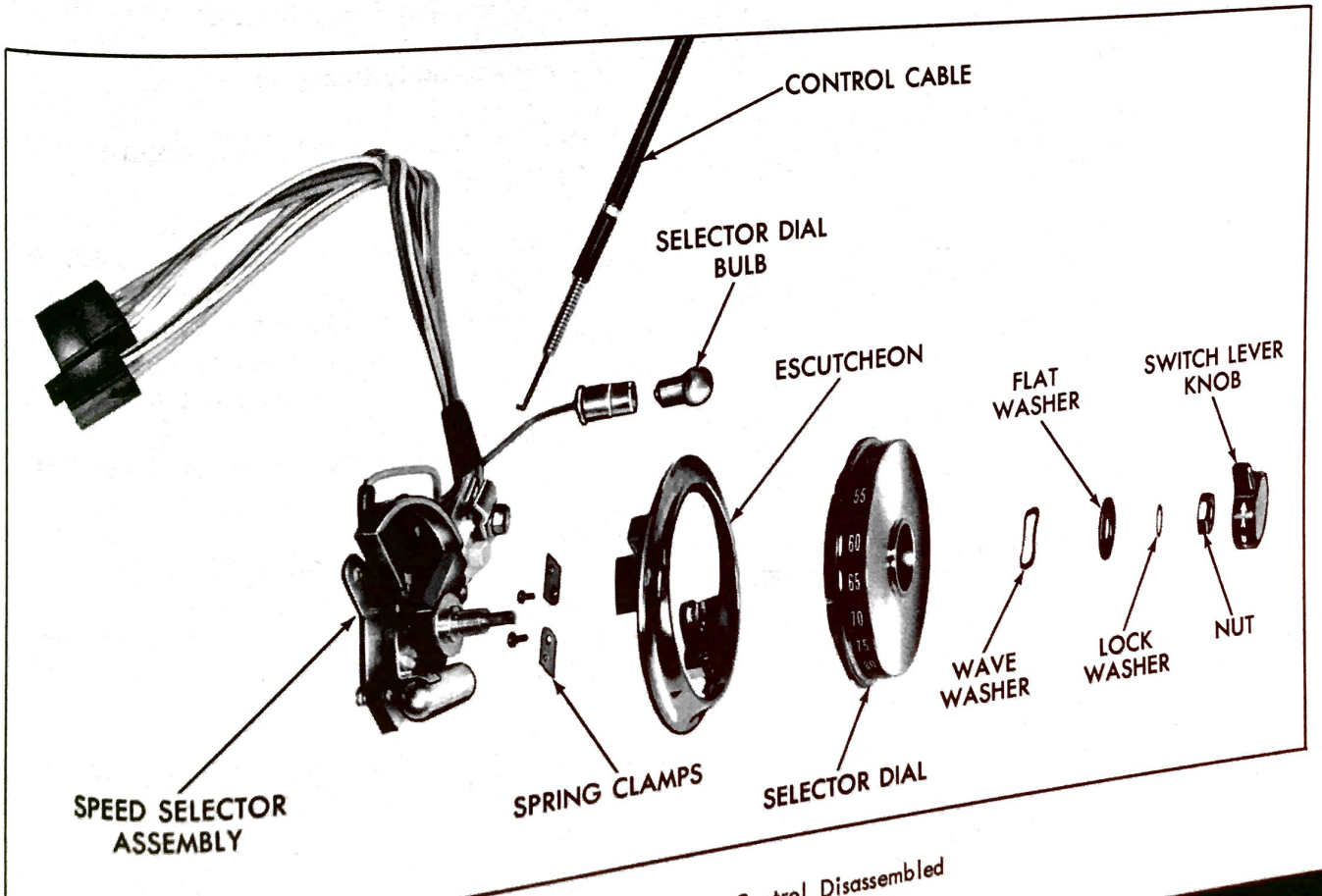
6. Disconnect end of control cable from white plastic cable retainer and remove control cable.

CAUTION: Hold white plastic cable retainer when removing cable from retainer.

b. Assembly (Fig. 15-20)

1. Position escutcheon on speed selector assembly, being careful not to pinch gray wire, and secure with two screws.

2. Install two spring clamps on escutcheon and secure with two screws so that round corners face wiring.



trol Disassembled

3. Install selector dial, wave washer, flat washer, lock washer and nut.

4. Install switch lever knob so that flat on knob aligns with flat on shaft and tighten set screw with 5/64 inch Allen wrench.

5. Rotate selector dial rearward against its stop position.

6. Insert end of control cable into locating hole in white cable carrier and secure cable to cable carrier retaining tangs by holding back of cable retainer and pressing wire down until secured in cable tangs.

7. Tighten screw that secures control cable to speed selector assembly until it is snug.

8. Adjust control cable as outlined in Note 18.

28. Power Unit

Whenever a power unit is removed, the car can be driven with the speedometer operating by removing the power unit cables from the speedometer and transmission, and installing a standard speedometer cable and housing assembly between the transmission and speedometer.

a. Removal

1. Disconnect multiple electric connector at power unit.

2. Disconnect drive cable and speedometer cable at power unit.

3. Rotate retainer spring and slide it back on control cable. Pull control cable to remove from power unit.

4. Remove cotter pin at exterior arm and separate Cruise Control rod and washer from exterior arm.

5. On all but 693 style, work inside left front wheel housing and remove four screws securing power unit mounting bracket to dustshield and remove power unit with bracket attached. Remove two screws securing bracket to power unit.

6. On 693 style, remove two screws and washers securing power unit to mounting bracket.

b. Installation

1. On all but 693 style, secure power unit to mounting bracket with two screws. Position power unit and bracket on left fender dustshield, working inside left front wheel housing, and secure with four screws.

2. On 693 style, secure power unit to mounting bracket with two screws and washers.

3. Install Cruise Control rod and washer at exterior arm and secure with cotter pin.

4. Rotate speed selector to high speed setting.

5. Push control cable into dust shield and secure with retainer spring.

6. Rotate selector dial to low speed stop to secure control cable into adjustable coupling.

CAUTION: This step must be performed or unit will control in "ON" position or lock in "AUTO" position at low speed regardless of selected setting.

7. Connect drive cable and speedometer cable to power unit.

8. Connect multiple electric connector at power unit.

29. Power Unit Disassembly and Assembly (Fig. 15-21)

It is not necessary to disassemble and assemble the complete power unit to service individual components. Instructions on how to service the five following basic components are given: the magnet assembly, the motor, the drive screw assembly, the governor assembly and speedometer gear, and the compressor rod and dust shield.

a. Magnet Assembly Removal

1. Remove three screws that secure cover to housing and remove cover.

2. Using a 12-volt power source, attach negative lead to housing. Manually move contact arm to close throttle position and touch positive lead to terminal #2 on terminal board. This will move magnet assembly to close throttle position.

NOTE: Board is numbered inside by respective terminals.

3. Remove power source leads.

4. Remove red motor wire at lower inboard terminal of auto relay switch (capacitor side), Fig. 15-22.

5. Disconnect black motor wire at close throttle motor feed point, Fig. 15-22, and free wire.

6. Unhook compressor rod helper spring.

7. Remove nut, starwasher and exterior arm from pintle shaft.

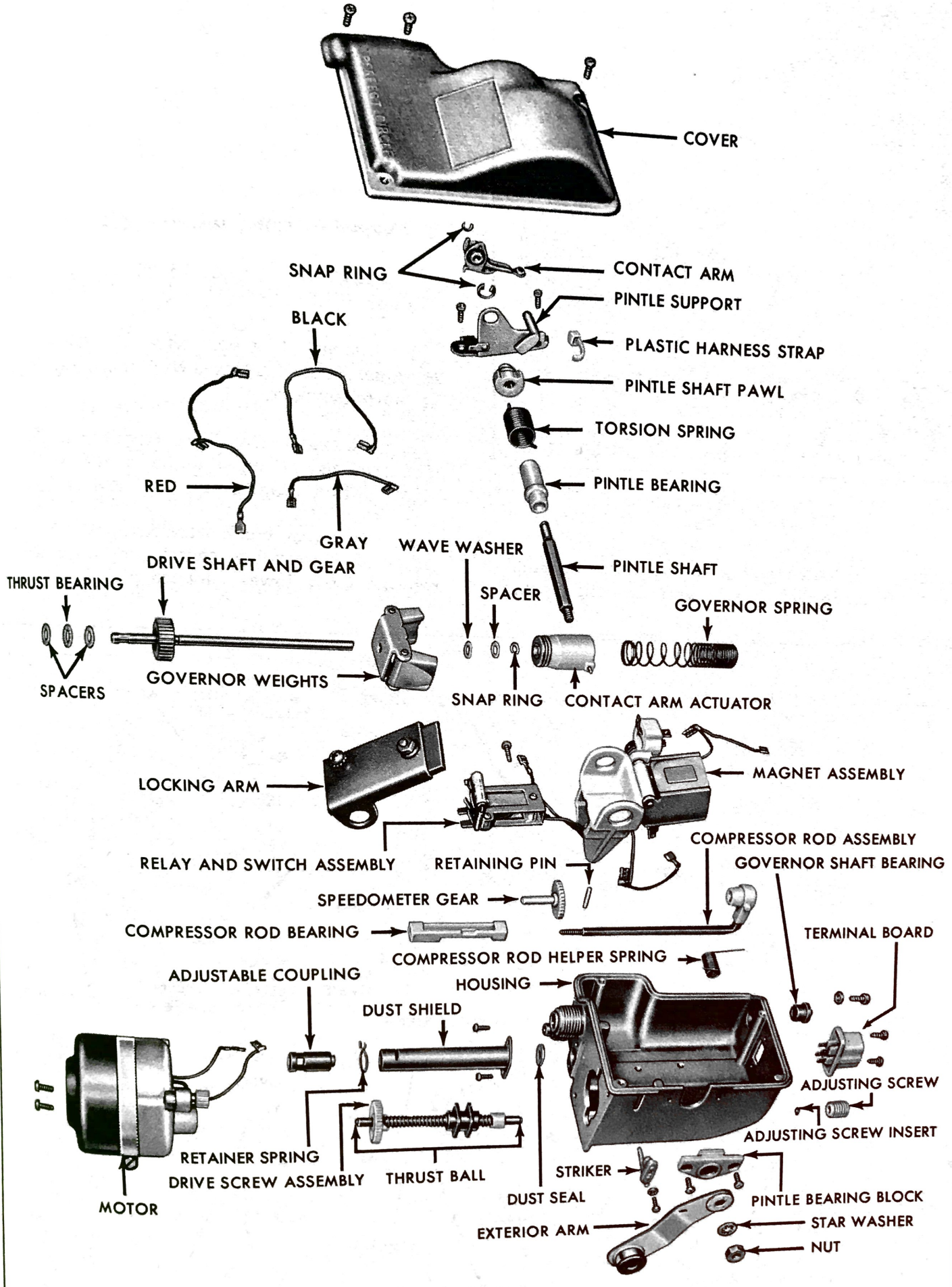


Fig. 15-21 Power Unit Disassembled

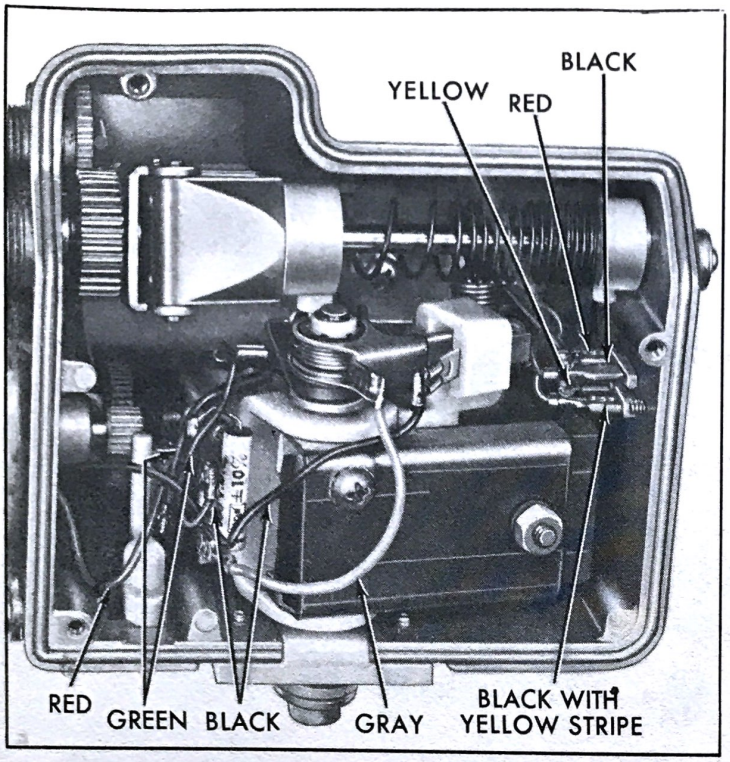


Fig. 15-22 Power Unit

8. Remove two screws securing pintle bearing block to housing and remove pintle bearing block.

9. Remove two screws holding pintle support to housing.

10. Swing assembly counterclockwise, as viewed from motor side, and free pin of contact arm actuator from contact arm.

11. Disconnect red, black, black with yellow stripe and yellow wires from terminal board and remove assembly, Fig. 15-22.

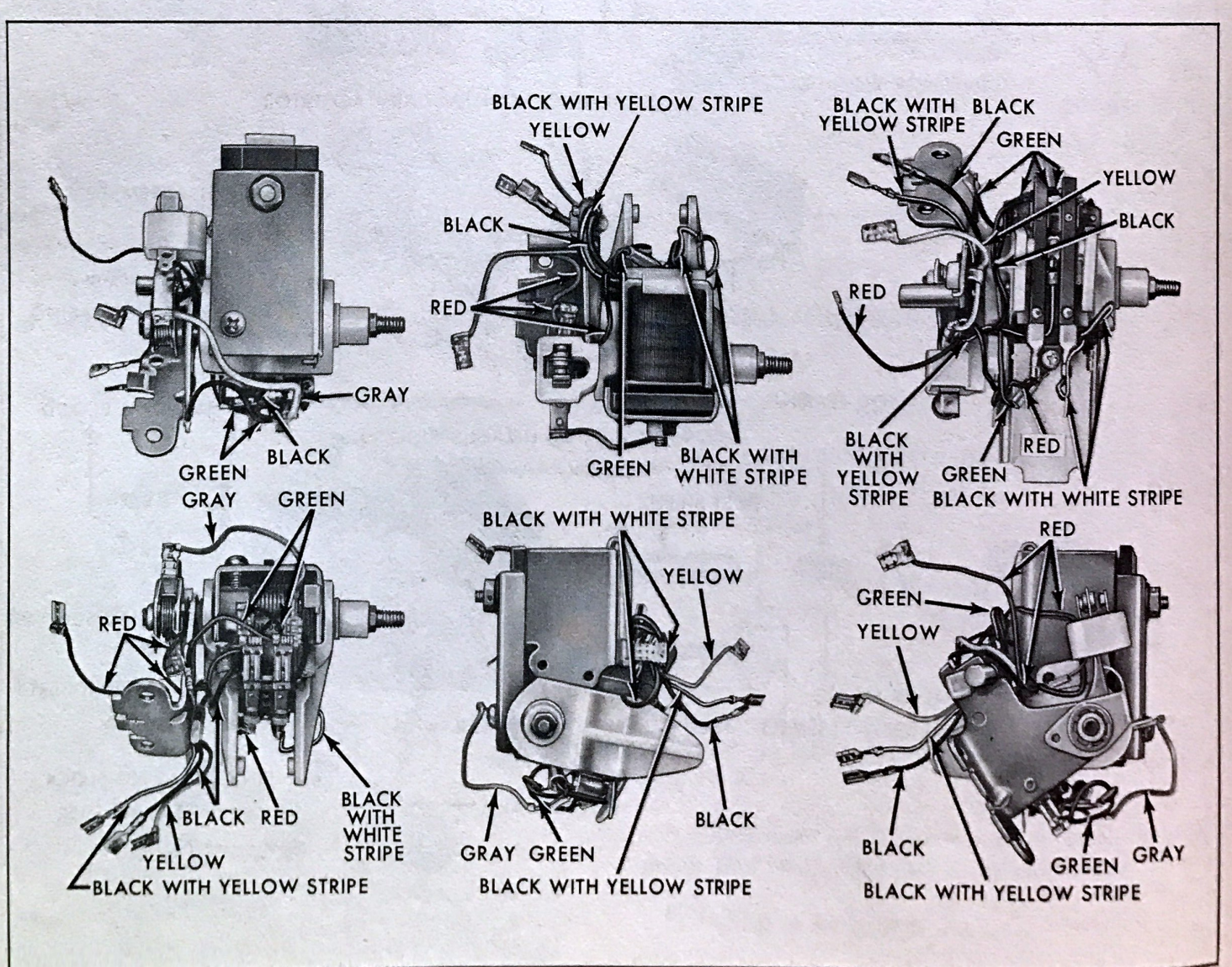
b. Magnet Assembly Disassembly

NOTE: See Fig. 15-23 when performing steps 1 - 5.

1. Disconnect green wire at lower outboard terminal of auto relay switch (capacitor side) and at pintle support.

2. Disconnect gray wire from terminal on contact arm and at upper outboard terminal of auto relay switch (capacitor side) and remove wire.

3. Disconnect black wire at upper inboard terminal of auto relay switch (capacitor side) and remove from lower slot on pintle bracket. Cut



plastic harness strap at pintle support. Remove black wire.

4. Disconnect red wire from inboard terminal of auto relay switch (magnet side) and at open throttle motor feed point and remove wire.

5. Disconnect black with white stripe wire at outboard terminal of auto relay switch (magnet side) and at holding switch.

6. Remove screw securing auto relay switch to magnet assembly and slide auto relay switch from pintle bracket.

7. Remove small snap ring from end of pintle shaft.

8. Remove larger snap ring from pintle shaft.

9. Mount magnet assembly in a vise. Position exterior arm on pintle shaft and take up torsion spring tension, Fig. 15-24. Hold in this position and loosen screw at locking arm until screw clears pintle shaft pawl. Slowly release and then remove exterior arm.

10. Loosen set screw on pintle shaft pawl with an Allen wrench.

11. Remove pintle shaft from magnet assembly, and catch contact arm. Remove pintle support.

12. Remove pintle bearing and torsion spring from magnet assembly.

13. Remove pintle shaft pawl and locking arm from magnet assembly.

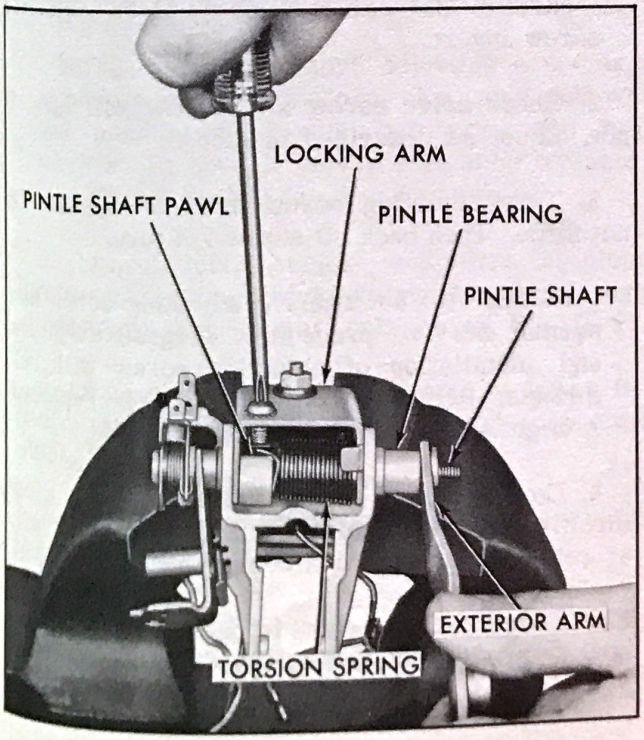


Fig. 15-24 Pawl to Screw Engagement

c. Magnet Assembly Assembly

1. Position locking arm on pintle bracket and insert pintle shaft pawl so that set screw in pawl is visible. Position torsion spring and pintle bearing, Fig. 15-25.

2. Install pintle support on pintle shaft pawl, Fig. 15-25.

3. Position contact arm between points and insert pintle shaft into assembly.

4. Install large snap ring on inner groove of pintle shaft between contact arm and pintle shaft pawl.

5. Install small snap ring on end of pintle shaft.

6. Push contact arm side of pintle shaft toward magnet assembly and tighten set screw with an Allen wrench.

7. Mount magnet assembly in a vise. Position exterior arm on pintle shaft and rotate exterior arm clockwise until screw in locking arm can engage notch in pintle shaft pawl. Tighten screw, Fig. 15-24.

8. Slide auto relay switch on magnet assembly and secure with one screw.

NOTE: See Fig. 15-23 when performing steps 9-14. Wires must be routed exactly as illustrated.

9. Connect black with white stripe single lead at outboard terminal of auto relay switch (magnet side) and double lead at holding switch.

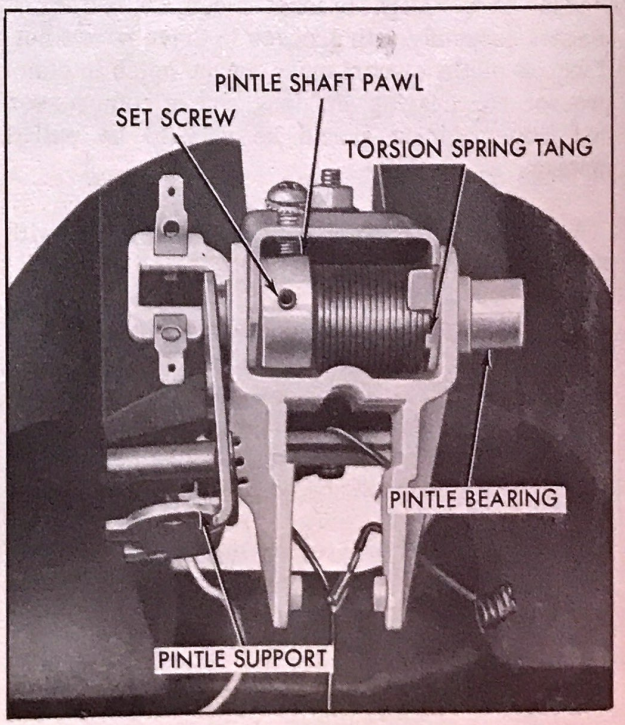


Fig. 15-25 Assembling Magnet Assembly

10. Connect long single lead red wire at inboard terminal of auto relay switch (magnet side) and connect double lead at open throttle motor feed point so that red wire is routed between pintle support and open throttle motor feed point.

11. Connect black wire at upper inboard terminal of auto relay switch (capacitor side) and position wire in lower slot on pintle bracket.

12. Position black with yellow stripe wire under red wire terminal connector. Secure black with yellow stripe, yellow and black wires at pintle support with new plastic harness strap. Position wires so there is approximately 2-1/8" extending from strap. Cut off excess strap.

13. Connect gray wire at terminal on contact arm and at upper outboard terminal of auto relay switch (capacitor side).

14. Route green wire from holding switch over red wire and black with yellow stripe, yellow and black wires and position in center slot of pintle bracket. Then route green wire over black wire and connect double lead to lower outboard terminal of auto relay switch (capacitor side) and single lead to pintle support.

d. Magnet Assembly Installation

1. Position compressor rod helper spring with shorter end positioned against tang of pintle support.

2. Install magnet assembly into housing, engaging pin of contact arm actuator with hole in contact arm. Align bracket tangs on bottom of magnet assembly with grooves in drive screw nut. Tang on pintle support must engage notch in compressor rod bearing and long end of compressor rod helper spring should be able to be pulled upward.

3. Install pintle bearing block and secure with two screws.

4. Install two screws that secure pintle support to housing.

5. Using a pair of needle nose pliers, hook compressor rod helper spring under tab on plastic compressor rod cap.

6. Install exterior arm so that when on pintle shaft, the hole in the exterior arm can be aligned with hole in housing. Secure with starwasher and nut.

7. Connect black motor wire at close throttle motor feed point routing under black wire at relay and gray wire at contact arm, Fig. 15-22.

8. Connect red motor wire at lower inboard terminal of auto relay switch (capacitor side), Fig. 15-22.

9. Connect red, black, black with yellow stripe and yellow wires at terminal board, Fig. 15-22, routing red wire under helper spring.

10. Perform limit switch and throttle switch points adjustment as outlined in Note 22.

11. Perform motor feed points adjustment as outlined in Note 21.

e. Motor Removal

1. Remove three screws that secure cover to housing and remove cover.

2. Disconnect red motor wire at lower inboard terminal of auto relay switch (capacitor side), Fig. 15-22.

3. Disconnect black motor wire at close throttle motor feed point and free wire, Fig. 15-22.

4. Remove two screws that secure motor to housing and remove motor.

f. Motor Installation

1. Position motor on housing and secure with two screws guiding red and black wires through housing. Make certain that bracket tangs on bottom of magnet assembly align with grooves in drive screw nut and drive shaft screw aligns with hole in adjusting screw and hole in motor.

NOTE: Be careful not to lose adjusting screw insert.

2. Check drive screw to see if it will turn. If not, adjust as described in step 3.

3. Turn adjusting screw until it is tight. Do not force. Then back off screw 1/4 turn.

NOTE: Do not remove adjusting screw as a normal service procedure. Repeated removal and installation of adjusting screw will ruin threads. Remove it only if it is to be replaced. A slight adjustment is all that is needed.

4. Connect black motor feed wire at close throttle motor feed point, routing under black wire at relay and gray wire at contact arm, Fig. 15-22.

5. Connect red motor feed wire at lower inboard terminal of auto relay switch (capacitor side), Fig. 15-22.

6. Install cover on housing and secure with three screws.

g. Drive Screw Assembly Removal

1. Remove three screws that secure cover to housing and remove cover.

2. Disconnect red motor wire at lower inboard terminal of auto relay switch (capacitor side), Fig. 15-22.

3. Disconnect black motor wire at close throttle motor feed point and free wire, Fig. 15-22.

4. Remove two screws that secure motor to housing and remove motor.

5. Remove drive screw assembly by tilting upward and removing from housing.

h. Drive Screw Assembly Installation

1. Lubricate drive screw assembly sparingly with cam and bearing lubricant.

2. Install drive screw in housing. Tilt screw upward at motor end and install so that bracket tangs on bottom of magnet assembly align with grooves in drive screw nut. Align drive shaft screw with hole in adjusting screw and hole in motor. Install two screws that secure motor to housing, guiding red and black wires through housing.

NOTE: Be careful not to lose adjusting screw insert.

3. Check drive screw to see if it will turn. If not, adjust as described in step 4.

4. Turn adjusting screw until it is tight. Do not force. Then back off screw 1/4 turn.

NOTE: Do not remove adjusting screw as a normal service procedure. Repeated removal and installation of adjusting screw will ruin threads. Remove it only if it is to be replaced. A slight adjustment is all that is needed.

5. Connect black motor feed wire at close throttle motor feed point routing under black wire at relay and gray wire at contact arm, Fig. 15-22.

6. Connect red motor feed wire at lower inboard terminal of auto relay switch (capacitor side), Fig. 15-22.

7. Install cover on housing and secure with three screws.

i. Governor Assembly, Removal, Disassembly and Speedometer Gear Removal

1. Remove three screws that secure cover to housing and remove cover.

2. Using a 12-volt power source, attach negative lead to housing. Manually move center contact arm to close throttle position and touch positive lead to terminal number 2 on terminal board.

NOTE: Terminal board is numbered on inside with respective terminal numbers.

3. Remove screw and flatwasher securing governor shaft bearing and remove bearing.

4. Disconnect pin on contact arm actuator from contact arm by inserting a screwdriver and carefully prying free.

5. Turn governor weights so they are parallel with sides of housing. Push weights toward governor spring until gear end of governor drive shaft and gear is free of governor shaft bushing.

6. Raise governor weights and pull governor assembly from housing.

NOTE: Do not lose two spacers and thrust bearing from gear end of governor drive shaft and gear.

7. Remove two spacers and thrust bearing.

8. Remove governor spring from governor drive shaft and gear.

NOTE: Do not stretch or damage spring.

9. Remove contact arm actuator from governor drive shaft and gear.

10. Remove snap ring, spacer and wave washer and governor weights from governor drive shaft and gear.

11. Drive out retaining pin from inside of housing and remove speedometer gear.

NOTE: Same pin will be used upon installation.

j. Speedometer Gear Installation, Governor Assembly and Installation

1. Lubricate speedometer gear with cam and bearing lubricant, and install speedometer gear in speedometer gear bushing. Retain by driving in speedometer retainer pin from outside of housing.

2. Slide governor weights, wave washer, spacer on governor drive shaft and gear and secure with snap ring.

3. Install contact arm actuator and governor spring on governor drive shaft and gear.

NOTE: Governor spring must be installed so that wide coil spacing is toward contact arm actuator.

4. Install spacer, thrust bearing and second spacer on gear end of governor drive shaft and gear.

5. With governor weights parallel with sides of housing, install governor assembly into housing by inserting spring end of governor drive shaft and gear into compressor rod plastic cap and hole in housing. Then install gear end of governor drive shaft and gear into governor shaft bushing, engaging speedometer gear.

6. Insert pin on contact arm actuator into hole in contact arm by prying against contact arm with a screwdriver.

7. Install governor shaft bearing and secure with flatwasher and screw. Flatwasher must not ride on center ridge of bearing.

8. Perform motor feed points adjustment as outlined in Note 21.

k. Compressor Rod and Dust Shield Removal

1. Remove three screws that secure cover to housing and remove cover.

2. Using a 12-volt power source, attach negative lead to housing. Manually move center contact arm to close throttle position and touch positive lead to terminal number 2 on terminal board.

NOTE: Terminal board is numbered on inside with respective terminal numbers.

3. Remove screw and flatwasher securing governor shaft bearing and remove bearing.

4. Disconnect pin on contact arm actuator from contact arm by inserting a screwdriver and carefully prying free.

5. Turn governor weights so they are parallel with sides of housing. Push weights toward governor spring until gear end of governor drive shaft and gear is free of governor shaft bushing.

6. Raise governor weights and pull governor assembly from housing.

NOTE: Do not lose two spacers and thrust bearing from gear end of governor drive shaft and gear.

7. Remove compressor rod helper spring.

8. Pull up compressor rod against its stop and measure gap between compressor rod plastic cap and housing using a feeler gage. Record measurement, Fig. 15-26.

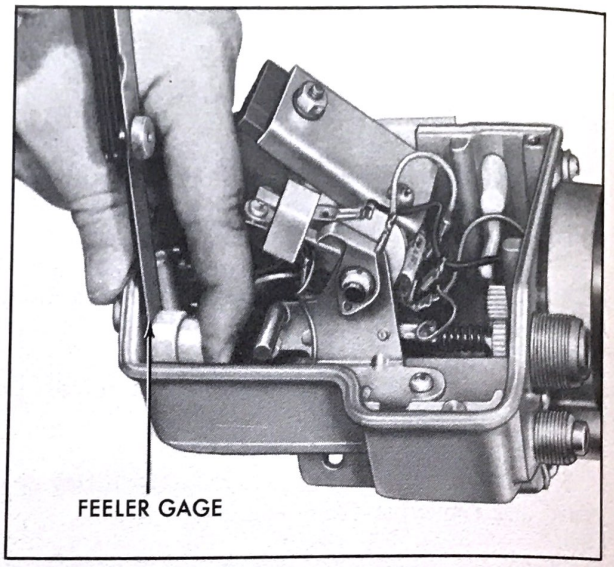


Fig. 15-26 Compressor Rod Adjustment

NOTE: This measurement is necessary for installation purposes.

9. Push compressor rod down and remove adjustable coupling with a screwdriver.

10. Remove two screws that secure dust shield to housing and remove dust shield and felt dust seal.

11. Loosen two screws that secure pintle bearing block to housing and two screws that secure pintle support to housing enough to free compressor rod bearing.

12. Remove compressor rod assembly from housing and slide off compressor rod bearing, Fig. 15-27.

l. Compressor Rod and Dust Shield Installation

1. Lubricate compressor rod with cam and bearing lubricant and slide compressor rod bearing on compressor rod with notch on inboard side, Fig. 15-27.

2. Install compressor rod in housing so that notch in compressor rod bearing is under tang on pintle support. Tighten two screws that secure pintle support to housing.

3. Tighten two screws that secure pintle bearing block to housing.

4. Position compressor rod in housing so that a portion of rod extends from housing. Install dust seal on rod so that square hole in dust seal aligns with square compressor rod, and position dust seal in housing.

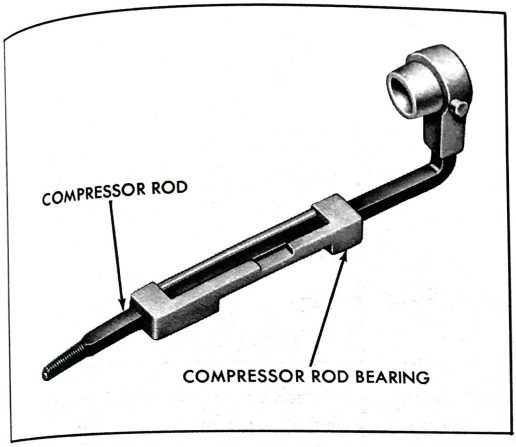


Fig. 15-27 Compressor Rod to Bearing Alignment

5. With dust seal correctly positioned, install dust shield with two screws.

6. Insert adjustable coupling into dust shield and screw onto compressor rod.

7. Using a feeler gage, position compressor rod plastic cap with same gap between housing and cap as during removal and screw adjustable coupling on rod until same gap is obtained, Fig. 15-26.

8. Install compressor rod helper spring with shorter end against tang on pintle support and hook longer end under tab on plastic compressor rod cap.

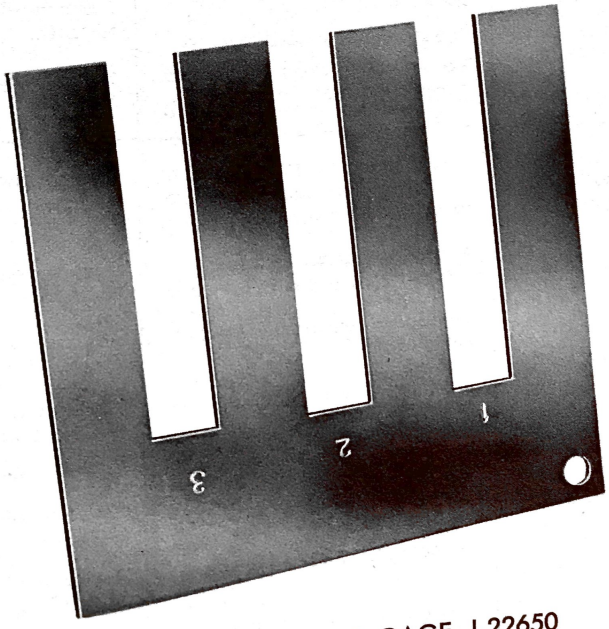
9. With governor weights parallel with sides of housing, install governor assembly into housing by inserting spring end of governor drive shaft and gear into compressor rod plastic cap and hole in housing. Then install gear end of governor drive shaft and gear into governor shaft bushing engaging speedometer gear.

10. Insert pin on contact arm actuator into hole in contact arm by prying against contact arm with a screwdriver.

11. Install governor shaft bearing and secure with flatwasher and screw. Flatwasher must not ride on center ridge of bearing.

12. Perform motor feed points adjustment as outlined in Note 21.

13. Perform limit and throttle switch points adjustment as described in Note 22.



CONTROL CABLE GAGE J-22650

Fig. 15-28 Special Tool - Cruise Control

CRUISE CONTROL DIAGNOSIS CHART

CONDITION	CAUSE	REMEDY
Speedometer noise	Cables bent or kinked.	Straighten or replace cables. See Note 25.
	Lack of cable lubrication.	Lubricate.
	Noisy speedometer head assembly.	Repair.
Blowing fuses	Short or ground in wiring circuit.	Perform electrical checks. See Note 15.
	Defective motor.	Check operation of motor. See Notes 23 and 24.
	Locked drive screw.	Check drive screw for binding. See Note 23.
No Cruise Control response	Accelerator linkage broken or disconnected.	Connect or replace linkage and adjust, see Note 19.
	Drive cables broken or disconnected.	Connect or replace cables. See Note 25.
	Blown fuse.	Perform electrical checks. See Note 15.
	Loose connections or broken wires (internal or external).	Perform electrical checks. See Note 15.
No Automatic Control when unit is set for automatic lock-in	Driver riding the brake pedal or driver does not accelerate to selected speed.	Instruct owner.
	No current at #2 terminal.	Perform electrical checks. See Note 15.
	Improper throttle switch adjustment.	Adjust limit and throttle switch. See Note 22.
	Improper Cruise Control switch adjustment.	Adjust Cruise Control switch. See Note 20.
Constant pressure on accelerator pedal regardless of dial setting.	Blown fuse.	Perform electrical checks. See Note 15.
	No current at #1 terminal.	Perform electrical checks. See Note 15.
	Control cable improperly adjusted.	Adjust control cable. See Note 18.
	Control cable defective.	Replace selector control cable.

CRUISE CONTROL DIAGNOSIS CHART (Cont'd.)

CONDITION	CAUSE	REMEDY
Constant pressure on accelerator pedal regardless of dial setting. (Cont'd.)	Inoperative motor or locked drive screw.	Check operation of motor and/or drive screw. See Note 23.
	Improper limit switch adjustment.	Adjust limit switch and throttle switch. See Note 22.
Automatic control engages at selected speed without unit set for automatic lock-in.	Shorted automatic relay switch (green indicator light on instrument panel will be on).	Perform electrical checks. See Note 15.
Automatic control remains engaged when brake pedal is depressed.	Improper Cruise Control switch adjustment or defective switch.	Adjust Cruise Control switch. See Note 20.
Unit remains operative in the "OFF" position.	Limit switch not properly adjusted.	Adjust limit switch and throttle switch. See Note 22.
Pulsating accelerator pedal.	Speedometer cable or drive cable kinked or lack of lubrication.	Lubricate or replace cables if necessary. See Note 25.
	Improper accelerator linkage adjustment.	Adjust accelerator linkage. See Note 19.
	Improper motor feed points adjustment.	Adjust motor feed points. See Note 21.
Carburetor does not return to normal idle.	Improper carburetor or accelerator linkage adjustment.	Adjust throttle control rod and accelerator linkage. See Note 19.
	Weak or disconnected throttle return spring.	Connect or replace spring.
Unit does not control at selected speed.	Improper control cable adjustment.	Adjust control cable. See Note 18.
	Improper selector dial adjustment.	Adjust selector dial. See Note 16.
	Improper accelerator linkage adjustment.	Adjust accelerator linkage. See Note 19.
Unit controls in "ON" position or locks in "AUTO" position at low speed regardless of selected setting.	Control cable not secured to adjustable coupling.	Rotate selector dial to low speed stop to secure.

CRUISE CONTROL DIAGNOSIS CHART (Cont'd.)

CONDITION	CAUSE	REMEDY
Speedometer does not register.	Speedometer drive gear in transmission defective.	Replace gear.
	Broken drive cable from transmission to power unit.	Replace driven cable.
	Damaged drive gear or nylon gear in power unit.	Replace nylon gear or drive shaft and gear assembly.
	Broken speedometer cable.	Replace speedometer cable.

block to housing and remove pintle bearing block.

remove from lower slot on pintle bracket. Cut

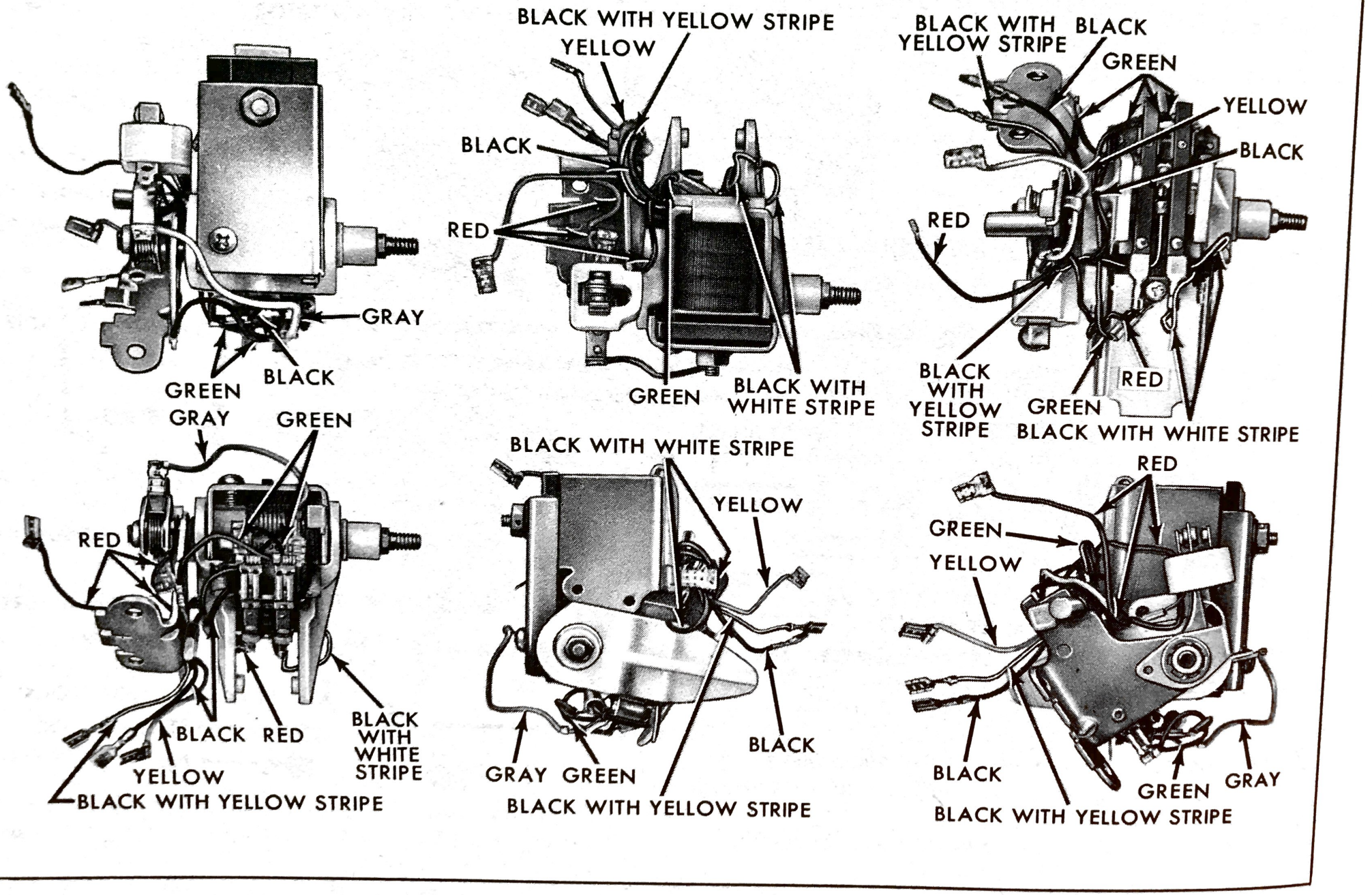


Fig. 15-23 Magnet Assembly

13. Remove pintle shaft pawl and locking arm from magnet assembly.

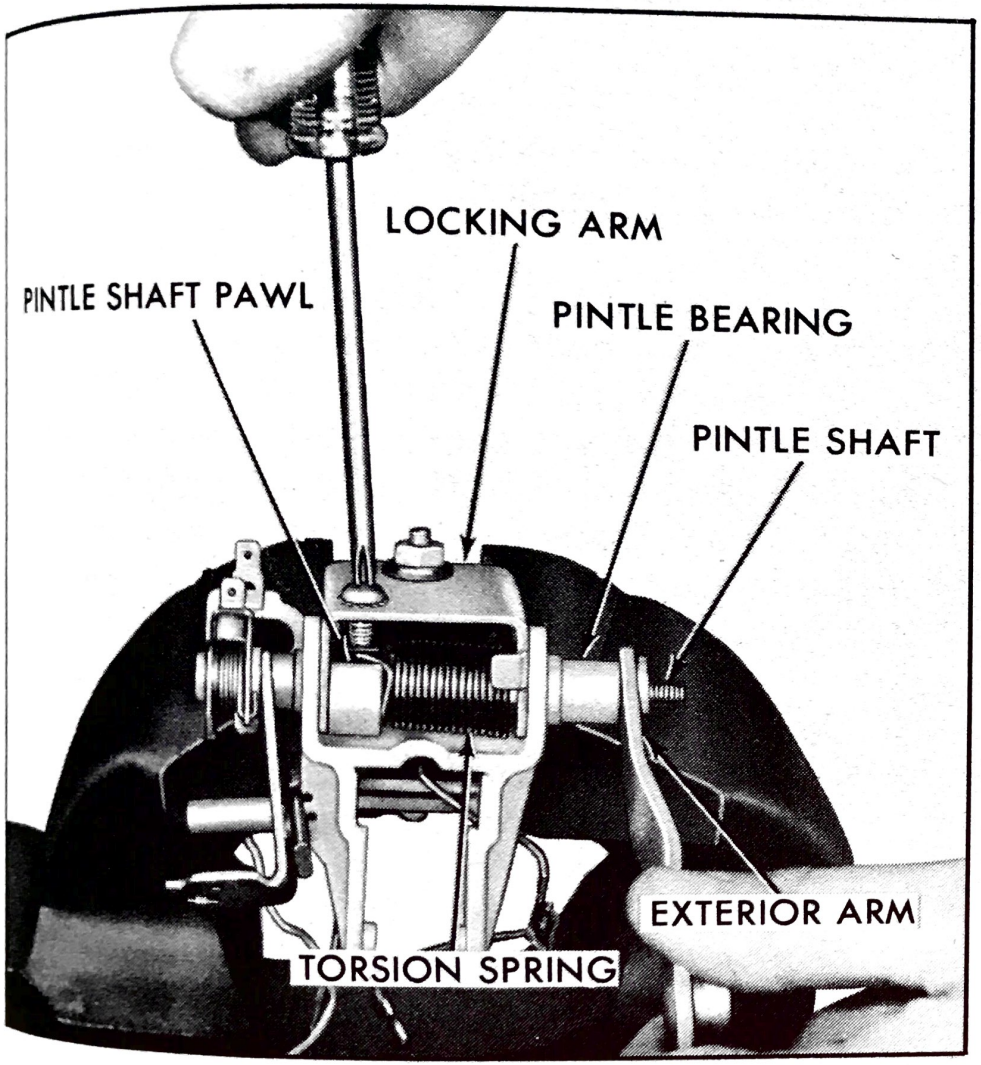


Fig. 15-24 Pawl to Screw Engagement

9. Connect black with white stripe single lead at outboard terminal of auto relay switch (magnet side) and double lead at holding switch.

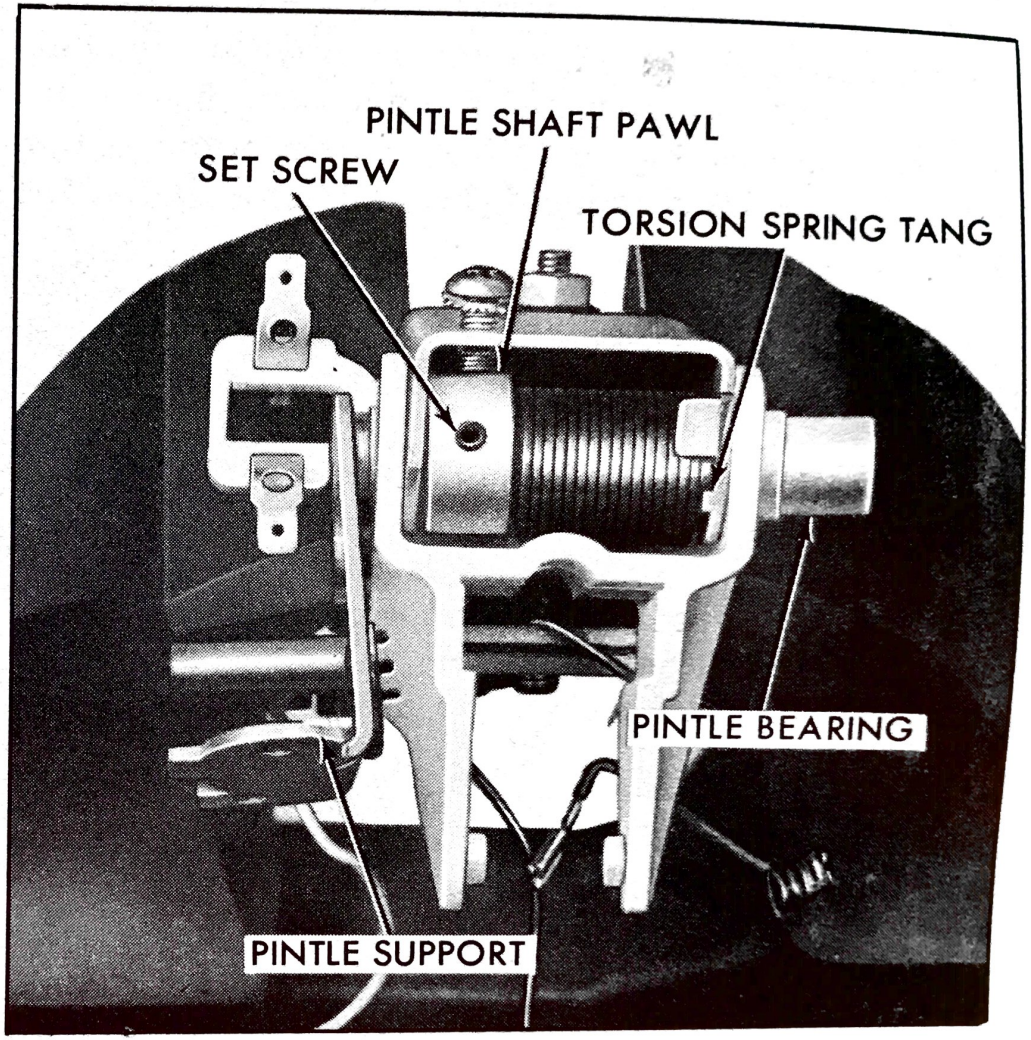


Fig. 15-25 Assembling Magnet Assembly

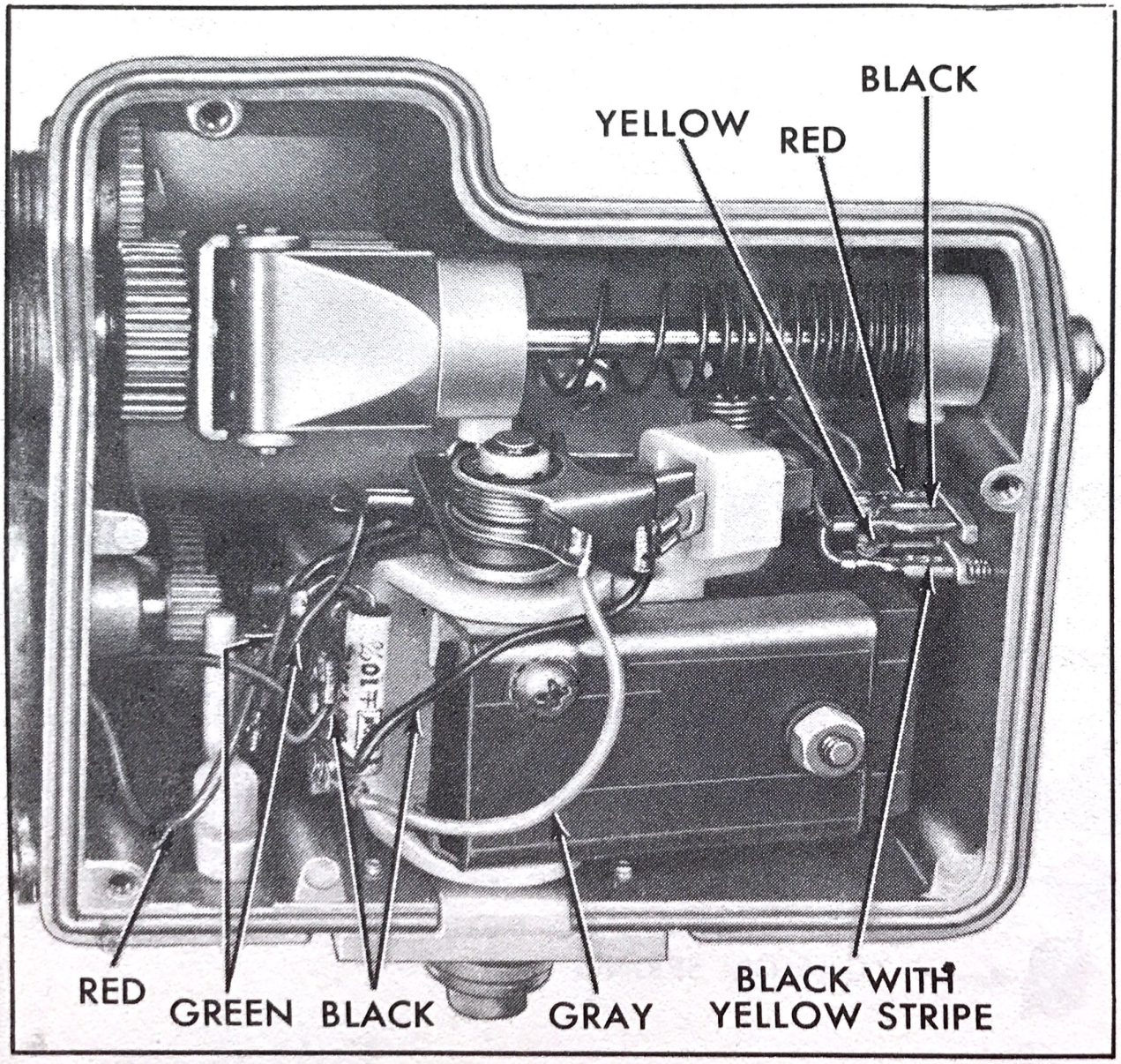


Fig. 15-22 Power Unit

9. Remove two s
housing.

10. Swing assemb
from motor side,
actuator from cont

11. Disconnect r
stripe and yellow w
remove assembly,

b. Magnet Assembly

NOTE: See F
steps 1 - 5.

1. Disconnect gr
terminal of auto re
at pintle support.

2. Disconnect gra
tact arm and at upp
relay switch (capac

3. Disconnect bla