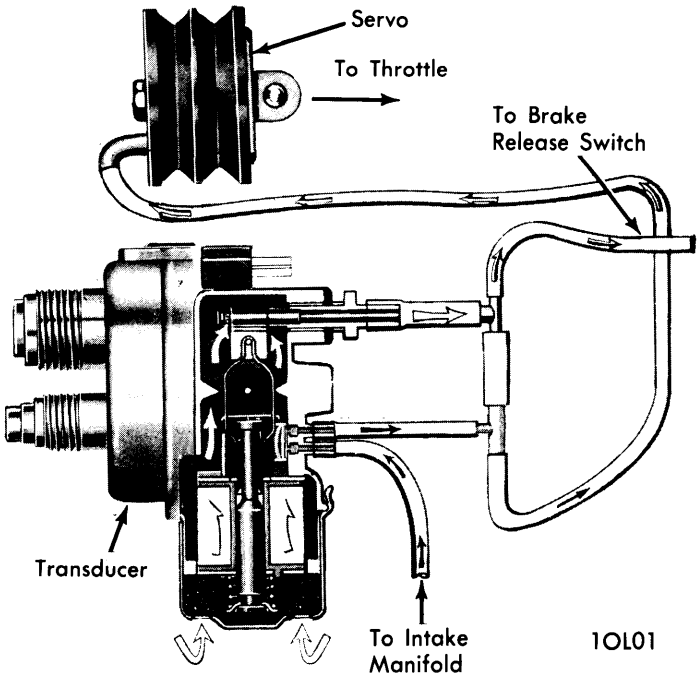
1969-74 GENERAL MOTORS CRUISE CONTROL

Buick
Cadillac
Chevrolet
Oldsmobile

DESCRIPTION

System uses manifold vacuum to power a throttle servo unit. When speed adjustment is necessary, servo moves the throttle by receiving a varying amount of controlled vacuum from a transducer unit. Speedometer cable (from transmission) drives transducer, and a cable from transducer drives speedometer. Transducer is activated by a three-position switch located at end of turn signal lever. In addition, Cadillac and Oldsmobile models have an ON-OFF switch on dashboard (to completely shut system off).



VACUUM CIRCUIT OPERATION

ON-OFF Switch (Cadillac & Oldsmobile only) – Switch is located on instrument panel along with an indicator light. This switch completely controls electrical current to system.

Engagement Switch – Switch has three positions and is located in turn signal lever. To operate system, driver accelerates to desired speed and presses engagement switch in to first detent position. *NOTE – On Cadillac and Oldsmobile models, ON-OFF switch on instrument panel must be in "ON" position.* Full voltage is then supplied to transducer solenoid which sets transducer to maintain cars speed at time of engagement. Releasing switch to full out position reduces current (via a resistance wire) to solenoid. This current is sufficient to hold solenoid in activated position, but is not sufficient to activate solenoid. To increase or decrease set speed, driver must depress engagement switch to second (full in) detent position, which stops all current to solenoid and disengages system. Driver then either slows or accelerates to new speed desired and releases switch to full out. Button passes through first detent (activating solenoid at new speed) and moves to full out position where it maintains solenoid in activated position. At speeds below 30-35 MPH, switch in transducer opens circuit to solenoid, deactivating system. Cruise Control will not operate at speeds below 30-35 MPH. Driver may, however, accelerate to speeds higher than set speed by depressing accelerator pedal, and upon release of accelerator pedal, car will resume set speed.

Brake Release Switches – All models use two methods of disengaging system once it has been activated. An electric switch mounted at brake pedal cuts off voltage to transducer unit and disengages it whenever brake pedal is depressed. Operation of engagement switch is required to re-activate system. A vacuum release valve (also mounted at brake pedal) operates simultaneously with or directly after the electric switch to vent vacuum in transducer to atmosphere, which will also disengage system should electric switch fail.

Servo Unit – A vacuum actuated, variable position diaphragm assembly which operates carburetor throttle when system is in operation. It is powered by controlled vacuum from transducer and operates throttle linkage by means of a chain or rod.

Transducer – Transducer has twp primary functions. First, it is a vacuum switch which, when engaged by driver, supplys vacuum to a "tee" fitting. Second, it meters a small variable quantity of air to the "tee" fitting where it blends with vacuum, thus providing servo unit with controlled vacuum which will maintain the selected speed. Transducer is driven by a cable from the speedometer gear in transmission and mixes the controlled vacuum supply according to changes it senses in car speed. Transducer also drives a second cable to speedometer.

PRELIMINARY CHECKS

ELECTRICAL SYSTEM CHECK OUT

1) Check fuse and connector. Unplug electric brake switch connector at switch. Connect ohmmeter at the two terminals on brake switch. The ohmmeter must indicate infinity when the brake pedal is depressed, and continuity when the pedal is released. Replace switch if necessary.

2) Unplug engagement switch connector at electrical wiring harness connector and perform the following tests *(wire colors are the same in all models):*

a) Connect ohmmeter between terminal No. 1 (brown wire) and terminal No. 2 (blue wire). Continuity should be maintained until switch is pressed all the way in.

b) Connect ohmmeter between terminal No. 1 (brown wire) and terminal No. 3 (black wire). No continuity should be shown, however; when the button is depressed halfway, ohmmeter should show continuity. When the button is pressed all the way down, no continuity should be shown.

1969-74 GENERAL MOTORS CRUISE CONTROL (Cont.)

Cadillac – Install bead chain with second ball on inboard slot of throttle plate clip.

Chevrolet – Adjust bead chain so that it is as tight as possible without holding throttle open when carburetor is set at its lowest idle throttle position. When connecting bead chain (engine stopped), manually set fast idle cam at its lowest step and connect the chain so it does not hold the idle screw off the cam.

Oldsmobile (1969-70) – No adjustment should be necessary if proper chain is installed.

Oldsmobile (1971) – Adjust servo rod length so that bellcrank clearance is .020-.040" when carburetor is at slow idle.

TRANSDUCER

NOTE – No adjustments should be made to the transducer until the following items have been checked: 1) *All hoses in good condition, properly attached, not leaking, not pinched or kinked.* 2) *Electric and vacuum release brake switches properly adjusted (see above).*

If the cruising speed is **lower** than the engagement speed, loosen the orifice tube locknut and turn the tube **outward.** If cruising speed is **higher** than engagement speed, turn the orifice tube **inward.** Each ¼ turn will alter the engagement-cruising speed difference ONE MPH. Tighten the locknut after adjustment and check the system operation at 60 MPH.

TROUBLE SHOOTING & DIAGNOSIS

WILL NOT ENGAGE – SYSTEM INOPERATIVE

ON-OFF switch (if used) is OFF. Brake switch circuit open. Fuse blown. Defective engagement switch. Vacuum leak in Servo and/or brake switch and connecting lines. Vacuum hose not connected to vacuum switch. Vacuum release switch misadjusted (always open). Crossed hose at regulator. Open in wiring harness. Pinched or plugged hose supplying servo. Defective regulator.

DOES NOT CRUISE AT ENGAGEMENT SPEED

Orifice tube misadjusted.

SYSTEM HUNTS, PULSES OR SURGES

Bead chain loose. Kinked or deteriorated hoses (air leak). Defective and/or improperly positioned drive cables and/or casing assemblies. Defective transducer.

SYSTEM DOES NOT DISENGAGE WITH BRAKE PEDAL

Brake switches misadjusted or defective.

SYSTEM ACCELERATES OR APPLIES FULL THROTTLE WHEN ENGAGED

Manifold vacuum connected directly to servo. Defective transducer.

CANNOT ADJUST SPEED DOWNWARD WITH ENGAGE BUTTON

Defective engagement switch or wiring.

SYSTEM CAN BE ENGAGED AT IDLE BY DEPRESSING SWITCH, BUT DROPS OUT WHEN SWITCH IS RELEASED

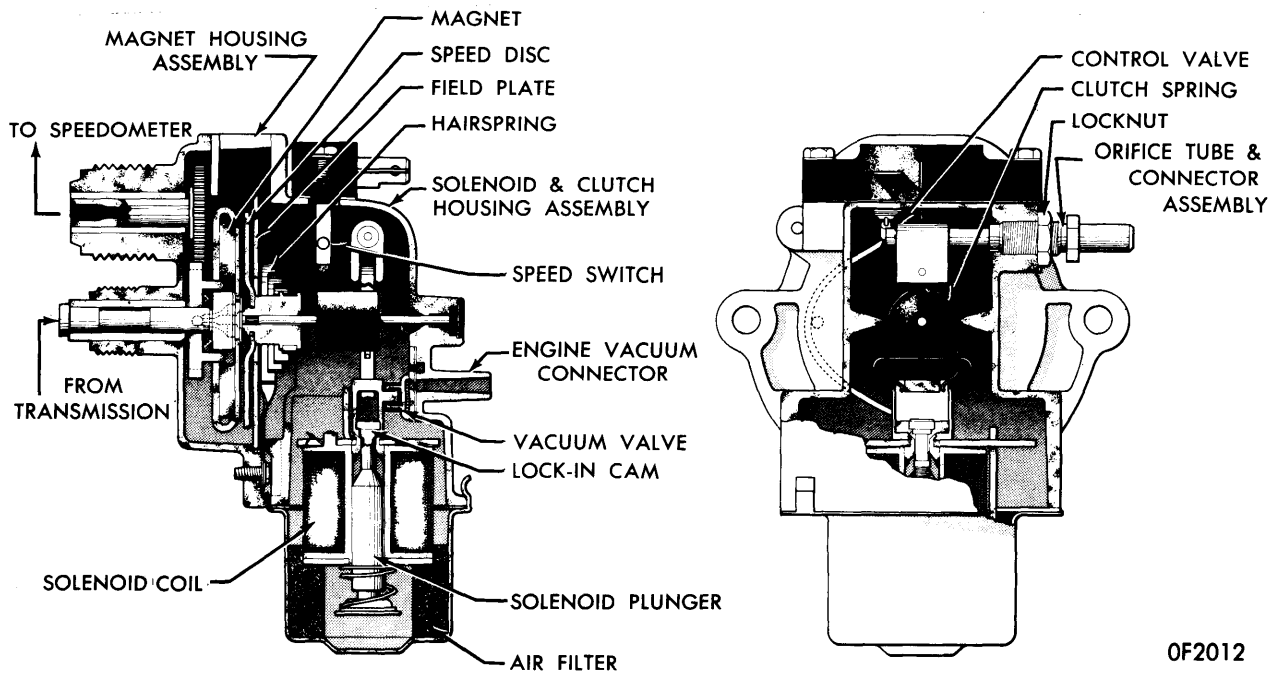
Wires reversed at transducer.

SYSTEM OPERATES CORRECTLY, BUT VACUUM BLEEDS OFF WHEN SYSTEM DISENGAGED

Crossed vacuum hoses at transducer.

DOES NOT ENGAGE OR ENGAGES AT SPEEDS LOWER THAN 30 MPH

Defective transducer.

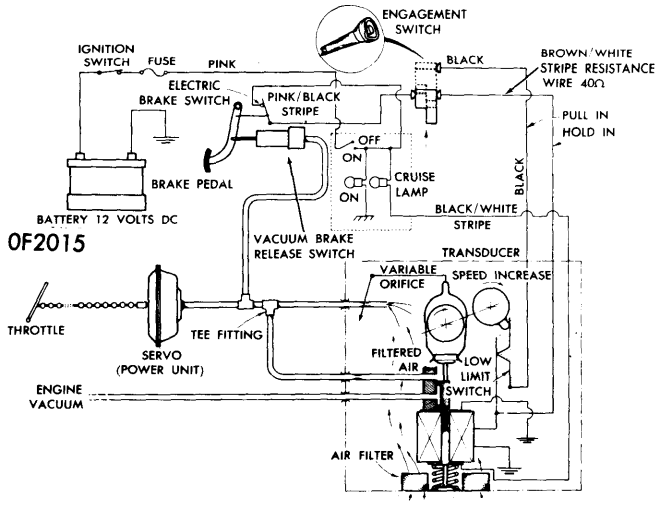


SIDE VIEW SECTION **END VIEW SECTION**

CROSS SECTION OF TRANSDUCER (ALL MODELS)

1969-74 GENERAL MOTORS CRUISE CONTROL (Cont.)

c) Connect ohmmeter between terminal No. 2 (blue wire) and terminal 3 (black wire). With the button released, no continuity should be shown; however, when the button is depressed partially and fully, continuity should be shown.



CADILLAC VACUUM & ELECTRICAL DIAGRAM (ALL OTHER MODELS SIMILAR)

3) Disconnect engagement switch wiring harness from main harness connector. *NOTE – When disconnecting or reconnecting the main wiring harness connector to the engagement switch, transducer and other elements of the Cruise Control System, exercise caution so as not to bend or damage the blade connectors or the wiring harness.* Connect ohmmeter between brown-white striped wire in main wiring harness and ground. Make sure the transducer is well grounded to the chasis. The ohmmeter should read between 42 and 49 ohms. If a resistance either above or below this value is shown, disconnect the connector from the transducer and measure the resistance of the brown-white striped wire. It should measure 40 ohms ±2 ohms. If not, replace the main wiring harness.

4) Measure the solenoid coil circuit resistance between the hold terminal and ground. The ideal ohmic resistance should be between 5 and 6 ohms. A reading of less than 4 ohms indicates shorting of the coil circuit, and a reading of more than 7 ohms indicates excessive coil circuit resistance. Either extremity indicates replacement of the transducer assembly. The black main harness wiring (white on Chevrolet) from the switch to the transducer should also be checked for continuity.

5) To check the cruise light circuit, first check bulb. Turn ignition switch and Cruise Control instrument panel switch on (if equipped). Connect a voltmeter between light terminal connector on transducer and ground. If battery voltage is present at this test point, transducer replacement is indicated.

SERVO & VACUUM CHECK OUT

To determine the condition of the diaphragm, remove hose from the servo unit and apply 14 inches of vacuum to the tube opening and hold in for one minute. The vacuum should not leak down more than five inches of vacuum in one minute. If leakage is detected, replace servo. To utilize the engine as a vacuum source, proceed as follows: 1) DISCONNECT SERVO BEAD CHAIN and hose from servo unit, connect engine vacuum directly to the servo fitting.

2) Note position of servo diaphragm. Start engine: The diaphragm should pull in. Clamp off engine vacuum supply line and check for leakage.

VACUUM BRAKE SWITCH

The Cruise Control vacuum operated release brake switch and connecting hoses can be checked with the aid of a vacuum pump.

ADJUSTMENTS

NOTE – The components of the Vacuum Cruise Control System are designed to be replaced should they become inoperative. However, the following adjustments may be made to correct speed drop or increase, or misalignment of the brake switch.

BRAKE RELEASE SWITCHES

Electric – Use a test light at switch terminal. Brake switch must break electrical contact when pedal is depressed 1/4" (Buick); .38"-.64" (Chevrolet); 1/8"-1/2" (Cadillac & Oldsmobile). In any case, it must be adjusted to disengage the system before the vacuum brake switch, or a hiss will be heard inside the car.

Vacuum – The brake switch should vent the vacuum system when the pedal is depressed 5/16" (Chevrolet). On other models, the vacuum switch should be pushed all the way into the retaining clip, and the brake pedal pulled up to the stop. This will automatically adjust the valve.

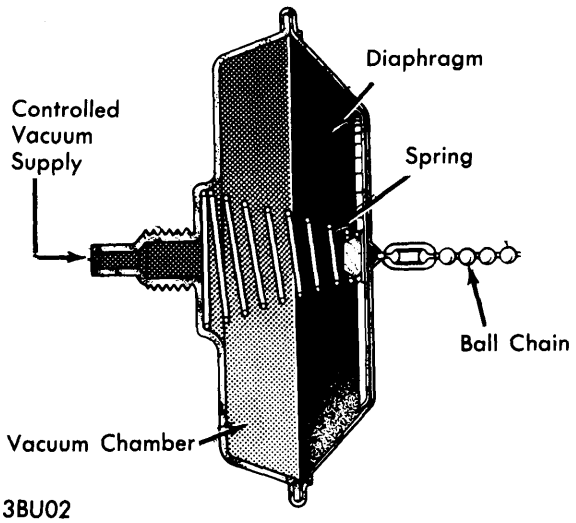
ENGAGEMENT SWITCH

The engagement switch is serviced only by replacement.

SERVO UNIT

NOTE – DO NOT lubricate servo unit or its bead chain.

Buick – Adjust engine hot idle speed and mixture, then shut off engine. Check bead chain slack by unsnapping swivel from ball stud and holding chain taut at ball stud; center of swivel should extend 1/8" beyond center of ball stud. Adjust slack, if necessary, by sliding sleeve back on chain and removing loose rivet. Move swivel on ball chain until slack is correct, reinstall rivet and again slide sleeve over rivet.



SERVO UNIT CROSS SECTION