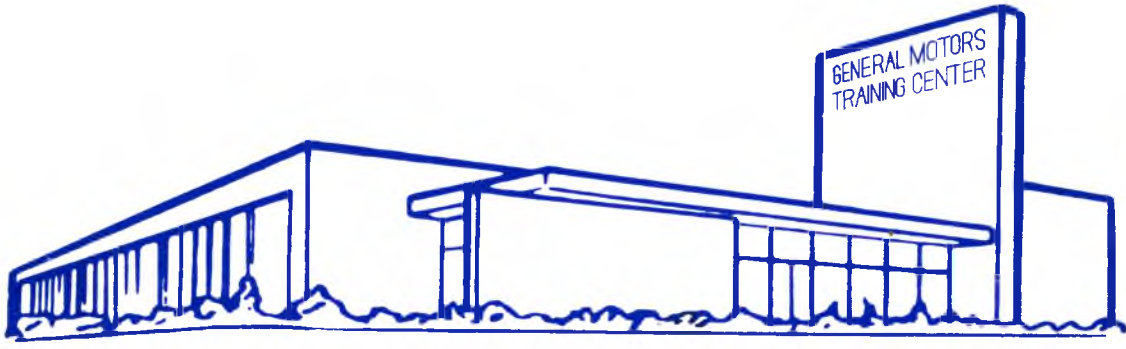


TRANSDUCER CRUISE SYSTEMS SOME ELE.
NON RESUME & RESUME

CRUISE CONTROL SYSTEMS



Product
Service
Training

MR. REED

CRUISE CONTROL SYSTEMS

Foreword

This booklet is supplied by GM Product Service Training to GM dealer service personnel upon their completion of the subject course conducted at GM Training Centers.

While this booklet will serve as an excellent review of the extensive program presented in the training center session, it is not intended to substitute for the various service manuals normally used on the job. The range of specifications and variation in procedures between carlines and models requires that the division service publications be referred to, as necessary, when performing these operations.

All information contained in this booklet has been furnished by AC Spark Plug Division and Cadillac Motor Car Division, General Motors Corporation. The information is based on the latest data available at the time of publication approval. The right is reserved to make product or publication changes, at any time, without notice. This booklet, or any portion thereof, may not be reproduced without written consent of GM Product Service Training, General Motors Corporation.

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DEALER: PLEASE ATTACH TO TURN SIGNAL LEVER

HOW TO BECOME ACQUAINTED WITH YOUR
CRUISEMASTER

OPERATION OF AUTOMATIC CONTROL

THIS FEATURE IS FOR YOUR COMFORT AND ECONOMY WHEN DRIVING ON TURNPIKES, EXPRESSWAYS AND NONCONGESTED HIGHWAYS.

1. THE AUTOMATIC CONTROL IS ENGAGED BY MERELY ACCELERATING THE CAR TO THE DESIRED SPEED AND PRESSING THE ACTIVATING BUTTON ON THE END OF THE TURN SIGNAL LEVER. THE CAR WILL IMMEDIATELY MAINTAIN CONSTANT SPEED WITHIN ± 2 MPH WHEN BUTTON IS RELEASED. THIS WILL ALLOW YOU TO REMOVE YOUR FOOT FROM THE ACCELERATOR PEDAL.
2. TO LOWER THE SPEED OF YOUR CAR, SIMPLY PRESS THE ACTIVATING BUTTON AND HOLD IN UNTIL CAR SLOWS TO DESIRED SPEED. WHEN BUTTON IS RELEASED THE CAR WILL AUTOMATICALLY MAINTAIN THE NEWLY SELECTED SPEED.
3. TO INCREASE THE SPEED OF YOUR CAR, SIMPLY PUSH ON THE ACCELERATOR PEDAL UNTIL CAR ATTAINS DESIRED SPEED AND PRESS ACTIVATING BUTTON. WHEN BUTTON IS RELEASED, THE CAR WILL AUTOMATICALLY MAINTAIN THE NEWLY SELECTED SPEED. (IF PRESSURE IS RELEASED FROM THE ACCELERATOR PEDAL WITHOUT PRESSING ACTIVATING BUTTON THE CAR WILL RETURN AUTOMATICALLY TO YOUR PREVIOUSLY SELECTED SPEED).
4. AUTOMATIC CONTROL IS INSTANTLY RELEASED BY LIGHTLY DEPRESSING THE BRAKE PEDAL.

I. Non-Resume Type Cruise Control (1968-1980 models)

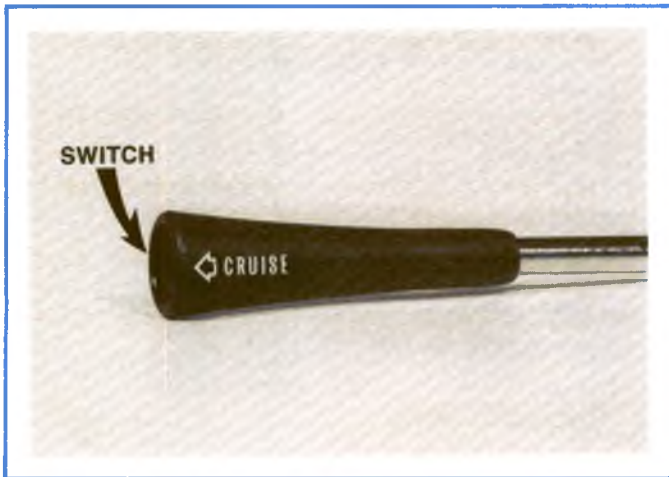


Figure 1-1, Non-Resume Type Cruise Control Turn Signal Handle and Switch.

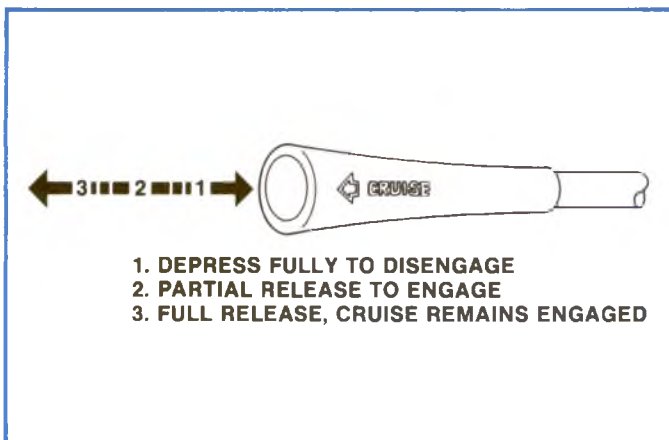


Figure 1-2, Operation Control Positions.

General Operation

The AC Cruisemaster System allows the driver to maintain a constant highway speed without having to apply continual foot pressure to the accelerator pedal. Selected cruise speeds are easily maintained. Speed changes may be accomplished at will and override features allow the vehicle to be accelerated, slowed or stopped.

To engage cruise control, the driver merely accelerates to the desired cruise speed above 30 mph and then fully depresses and slowly releases the control switch button. For ease of operation, the control switch button is located in the end of the turn signal lever or gear shift lever (figure 1-1).

When engaged the cruise system controls throttle position. Vehicle speed is maintained regardless of terrain changes. However, extremely steep hills, heavily loaded vehicles and significant changes in altitude may cause some variation in selected cruise speed.

Refer to figure 1-2. When the control switch button is held in the completely depressed position it will disengage the cruise control function. It will remain disengaged as long as held depressed. When the button is partially released, it engages cruise control. When the button is released the cruise control function remains engaged.

Some GM vehicles feature an "ON-OFF" switch. On these models, the cruise control function may be disengaged by placing the switch in the "OFF" position.

older systems had no ON-OFF sw.
 vacuum operated systems used a lot of vacuum
 some complaints of not holding speed on hills were really
 due to poor engine performance that had not much
 vacuum to begin with.
 some engines will not tolerate any vac. leak, thus
 the change to electronic cruise cont.
 diesels do not develop much manifold vacuum because there
 are no throttle plates to act as a restriction in the intake.
 separate vacuum pump develops too much vac. and requires
 a vac restriction valve. system should not have full vac.
 from the pump because air bleeds
 diesel transducers are blue - non resume (REGULATOR VALVE)
 black - resume

I. Non-Resume Type Cruise Control

The cruise control function is disengaged whenever the brake pedal is depressed (figure 1-3a). To re-engage the cruise function, the driver merely accelerates to a speed above 30 mph and then fully depresses and slowly releases the control switch button.

To cruise at a higher speed after cruise control has been engaged, the driver accelerates to the higher speed and then fully depresses and slowly releases the control switch button.

To cruise at a lower speed, fully depress the control switch button and hold it until the vehicle has decelerated to the desired lower speed. Slowly releasing the control switch button re-engages the cruise function.

When the cruise function is engaged, depressing the accelerator will override the system allowing vehicle speed to increase (figure 1-3b). Releasing the accelerator pedal allows speed to decrease until it reaches the previously selected lower cruise speed. The cruise system will then automatically maintain the previously selected speed.



Figure 1-3a, The Brake Disengages the System.

Figure 1-3b, The Accelerator Overrides the System.

I. Non-Resume Type Cruise Control

Cruise System Components

The major components of the AC Cruisemaster System are the engage switch, transducer assembly, servo and linkage, vacuum and electric cruise release switches, the upper and lower cable and casing assemblies, wiring harness and vacuum lines (figure 1-4).

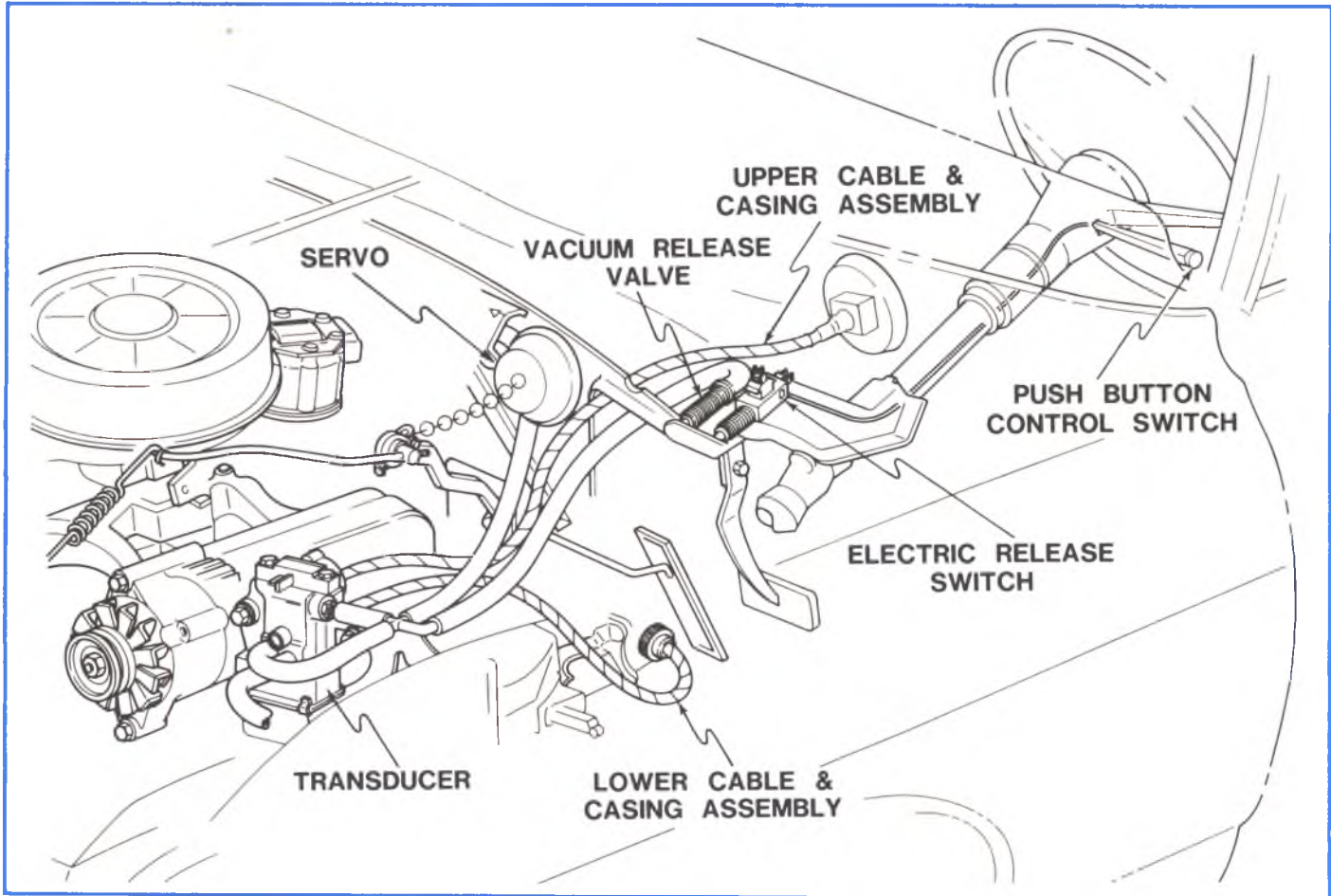


Figure 1-4, AC Cruisemaster System Components.



Figure 1-5, Cruise Control Lever with Engage Switch Button.

Component Functions

1. Cruise Control Switch (figure 1-5) . . .

This driver operated control is conveniently mounted on the end of the turn signal handle or the gear shift selector lever. The driver operated functions of the cruise control switch have been previously described in detail on page 1-1.

*low speed sw. can be changed
by rotating plate.
changes to speed engage point.*

I. Non-Resume Type Cruise Control

2. Transducer (figure 1-6) . . .

The transducer is a combination speed sensing device and control unit. It contains a low speed switch that prohibits cruise control operation at low speeds. This switch is calibrated at approximately 30 mph.

When the cruise control function is engaged, the transducer senses vehicle speed and controls the vacuum level to the servo to maintain the cruise speed selected.

a controlled vacuum leak.

*third terminal on some transducers
marked LIGHT for engagement
light on dash.*

*if you ever remove the speed. plate, write
the plate and transducer body. inside operates
like another speedometer with 1:1 drive*

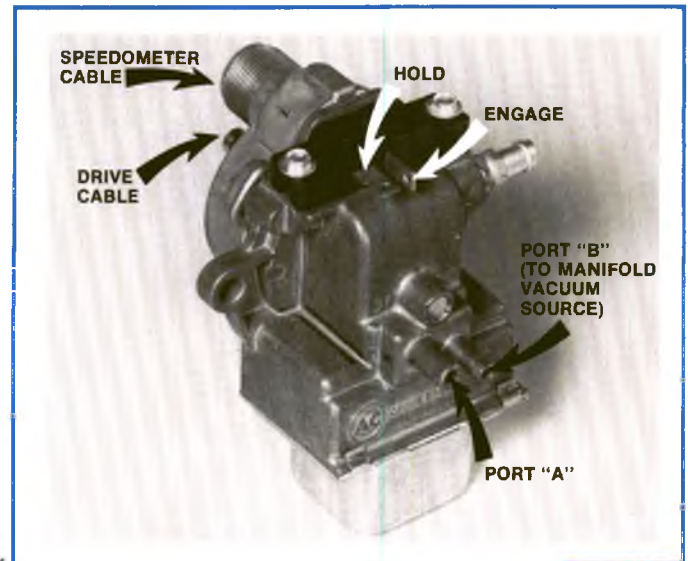


Figure 1-6, AC Cruisemaster (non-resume type) Transducer.

3. Servo, (figure 1-7) . . .

The servo unit is connected to the carburetor by a rod or linkage, a bead chain, or a Bowden cable or combination Bowden cable bead chain linkage. The servo unit maintains desired vehicle speed by receiving a controlled amount of vacuum from the transducer. This vacuum adjusts the tension on the rod, bead chain or other connection to the carburetor which controls throttle positioning.

*mechanical connection between
servo and throttle is still
critical. slack adjustment causes
hunting
too tight adjustment causes hunting
on throttle motor*



Figure 1-7, Servo unit.

4. Combination Cruise Release Electric Switch and Vacuum Release Valve (figure 1-8) . . .

Whenever the brake pedal is depressed the electric cruise release switch disengages the system. As an additional feature, the vacuum release valve also disengages the system when the brake pedal is pressed. Both of these controls are mounted on the brake pedal bracket.

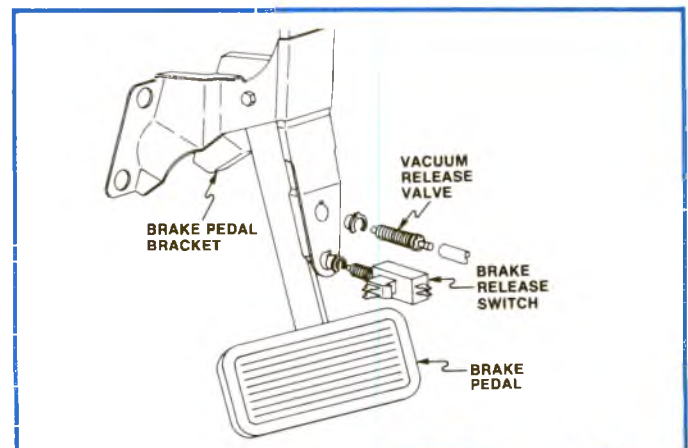


Figure 1-8, Brake Activated Electric and Vacuum Cruise Release Controls.

I. Non-Resume Type Cruise Control

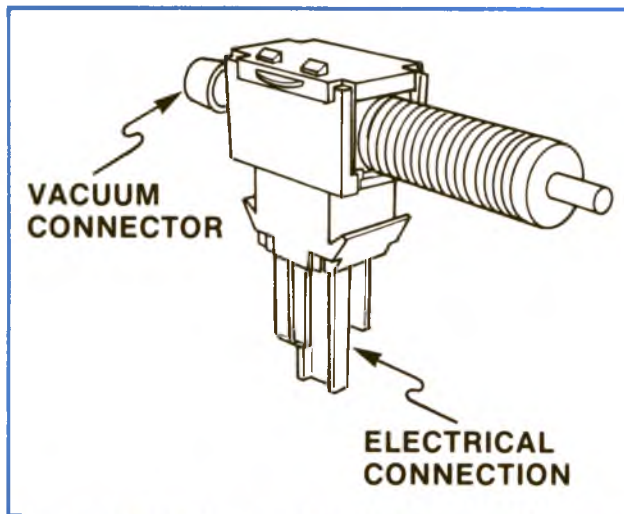


Figure 1-9, Valve and Switch Assembly on 1981 and Later Models Equipped with Lock-up Torque Converter Transmission.

5. Combination Vacuum Release Valve and Transmission Lock-up Torque Converter Clutch Switch, Resume System Only (figure 1-9) . . .

1981 and later model vehicles, equipped with a lock-up torque converter (locking clutch) transmission, use a combination vacuum release valve and cruise release electric switch assembly.

When the brake pedal is depressed, the vacuum release valve disengages the cruise function. At the same time the contacts in the electric switch open which disengages the locking clutch mechanism in the transmission. The locking clutch system will remain disengaged after the brake pedal is released. The system remains disengaged until the electronic control module signals re-engagement.

See figure 1-9. Whenever the vacuum release valve is adjusted it also adjusts the position of the lock-up torque converter clutch switch.

6. Upper and Lower Cable and Casing Assemblies (figure 1-10) . . .

The upper cable and casing assembly connects the transducer to the speedometer. The lower cable and casing assembly connects the transmission driven gear to the transducer.

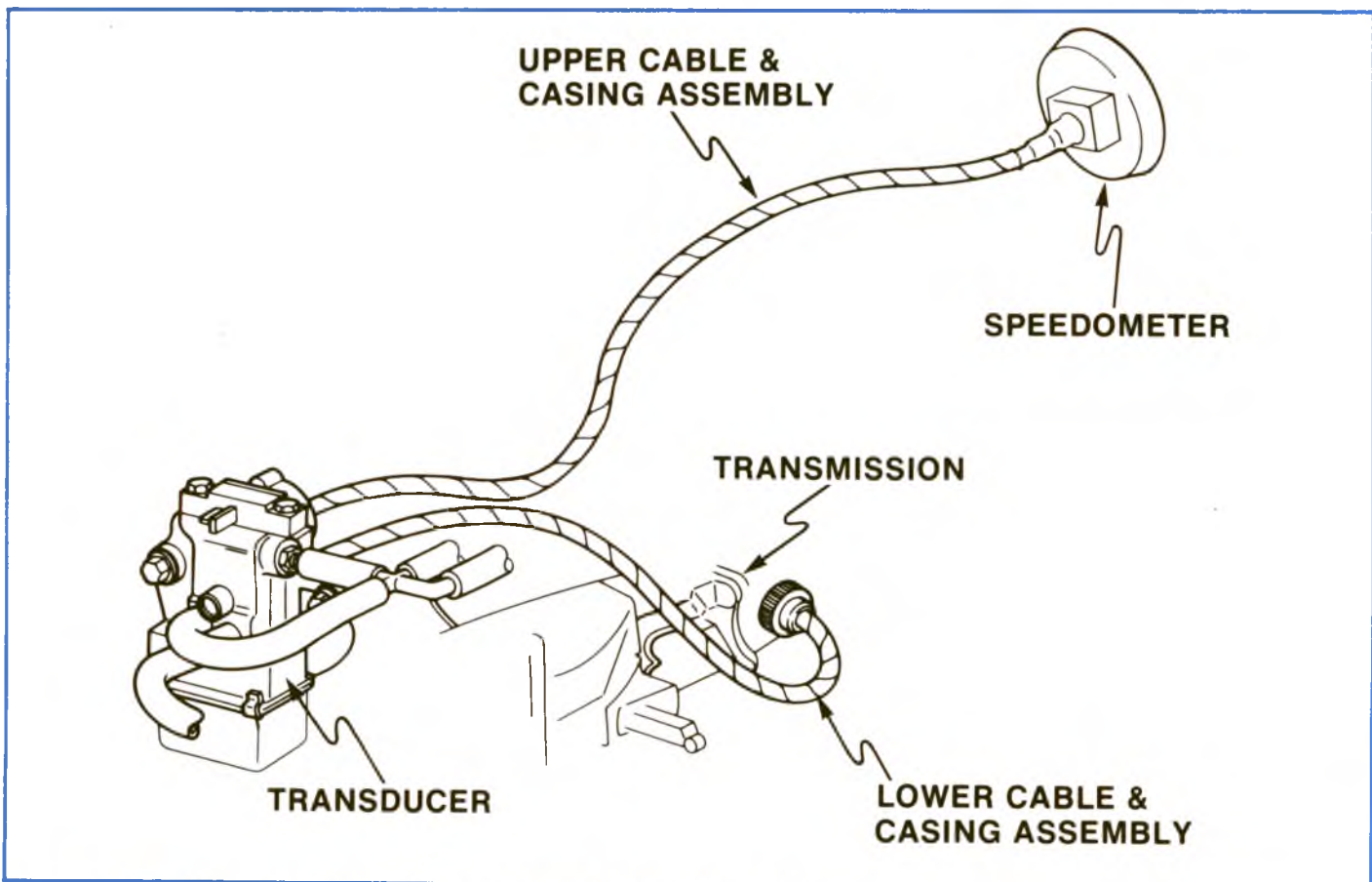


Figure 1-10, Upper and Lower Cable and Casing Assemblies.

Electrical and Vacuum Operation

Figure 1-27 is a combined electrical-vacuum system schematic of the non-resume type cruise control system. Figures 1-25 and 1-26 show the electrical and vacuum systems separately.

Electrical Operation

Open the fold-out page Electrical System Schematic, figure 1-25, page 1-15. The following paragraphs describe the electrical operation of the system. Trace and follow circuit operation on the schematic drawing.

Current from the positive side of the "BATTERY" (B+) flows through the "IGNITION SWITCH", "FUSE", closed "BRAKE RELEASE SWITCH" to the "CRUISE CONTROL SWITCH".

When the "CRUISE CONTROL SWITCH" is in the "AT REST" position, current flows through the switch, the "40 OHM RESISTANCE WIRE" and to the "HOLD" terminal on the "TRANSDUCER". The voltage at the "HOLD" terminal is now quite low due to the voltage drop across the 40 Ohm resistance. This voltage is also applied to the "SOLENOID COIL" in the transducer . . . but it is not sufficient to energize this coil.

Low Speed Switch Operation (figure 1-11) . . .

The transducer contains a rubber clutch with an operating arm. The clutch and arm rotate similar to a speedometer pointer needle. At speeds below approximately 30 MPH, the clutch arm holds the low speed switch contacts open.

If the cruise control switch is depressed at speeds under 30 MPH, the low speed switch contacts are held open by the clutch arm . . . cruise can not be engaged.

At speeds above about 30 MPH, the rubber clutch arm rotates which allows the low speed switch contacts to close (see dotted line, figure 1-11).

When the low speed switch contacts are closed, the cruise system can now be engaged. The coil engages with a distinct "thunk" sound.

Refer to the electrical schematic, figure 1-25. When the engagement switch button is released, current flow through the "40 OHM RESISTANCE WIRE" is sufficient to hold the "SOLENOID" in the engaged position.

Cruise Lamp . . .

Some models of the cruise system feature a "CRUISE LAMP" (figure 1-25). When the "SOLENOID" is engaged it provides a ground for the cruise lamp. Therefore, when cruise control is engaged the cruise lamp will illuminate.

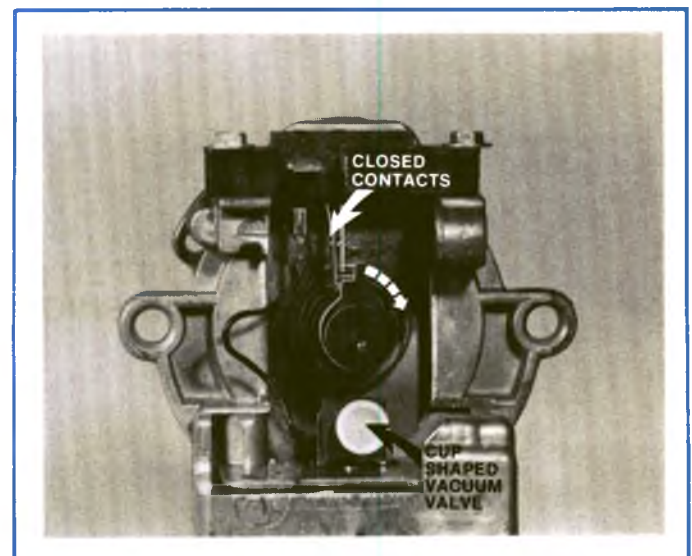


Figure 1-11, Low Speed Switch Operating Circuit.

I. Non-Resume Type Cruise Control

Vacuum Operation

Open the fold-out page, *Vacuum System Schematic, figure 1-26, page 1-18*. The following paragraphs describe the vacuum operation of the AC Cruisemaster system. Trace and follow the circuit operating description on the schematic drawing.

Assume the vehicle is operating at 50 MPH and the cruise control is not engaged. Vacuum from the engine manifold is blocked off at "PORT B" of the "TRANSDUCER" (figure 1-12 "VIEW A"). A cup shaped valve which is part of the "SOLENOID" assembly is positioned to block "PORT B" (also see figure 1-11).

When the cruise control is engaged, the solenoid energizes, moving the cup shaped valve upward to also cover "PORT A" (figure 1-12 "VIEW B"). With both ports covered, common vacuum is developed across "PORT A" and "PORT B".

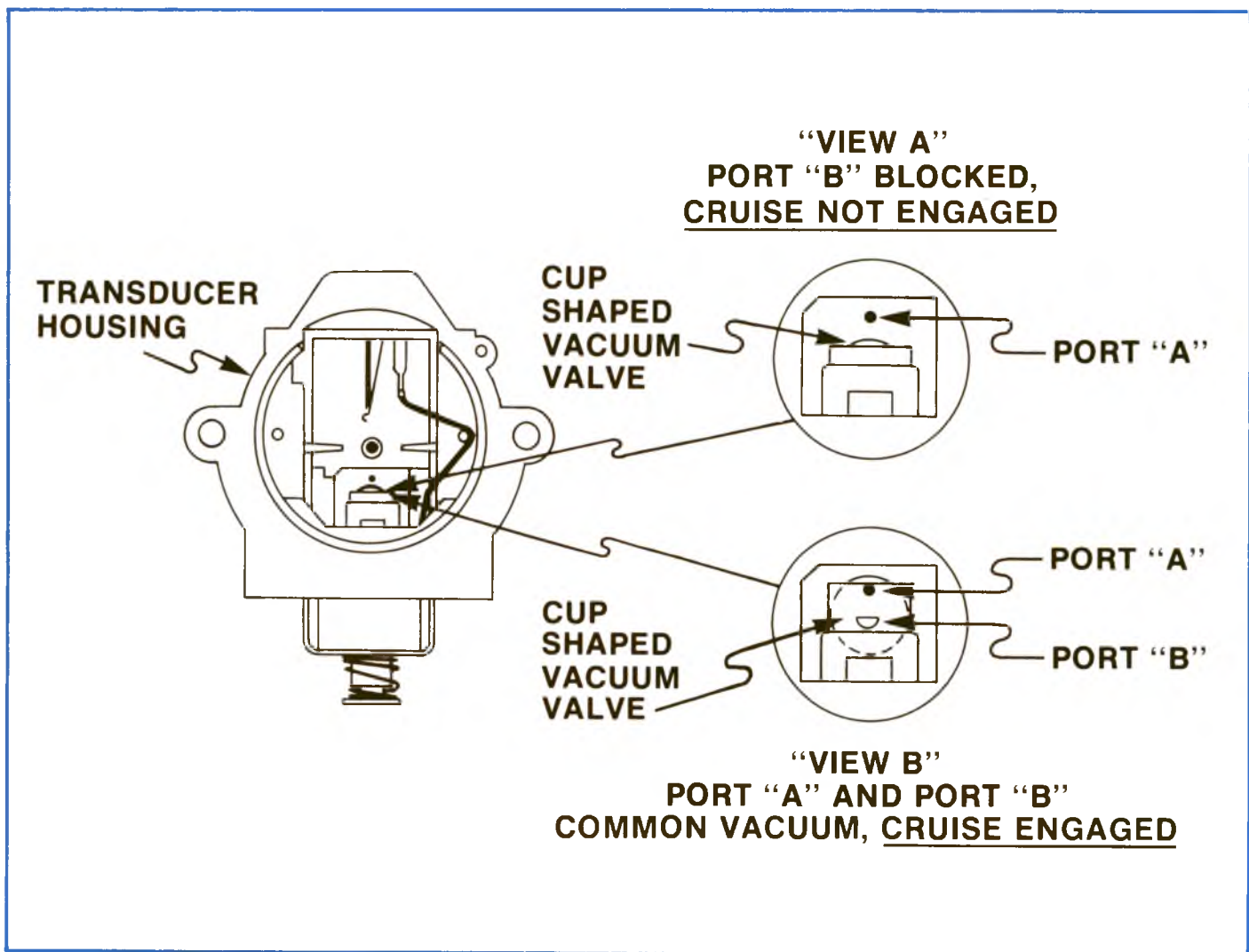


Figure 1-12, Cup Shaped Vacuum Valve Positioning

I. Non-Resume Type Cruise Control

When the solenoid is energized, engine vacuum appears at the "SERVO" and the "VACUUM BRAKE RELEASE VALVE". However, the amount of vacuum present must be precisely controlled. "PORT C" is a variable orifice and is the control mechanism that maintains or adjusts vacuum level in the system, including the "SERVO".

The variable orifice, "PORT C" consists of an orifice tube and valve assembly. It is essentially an air metering valve that consists of a sliding valve, orifice tube and a wishbone type clutch spring (figure 1-13).

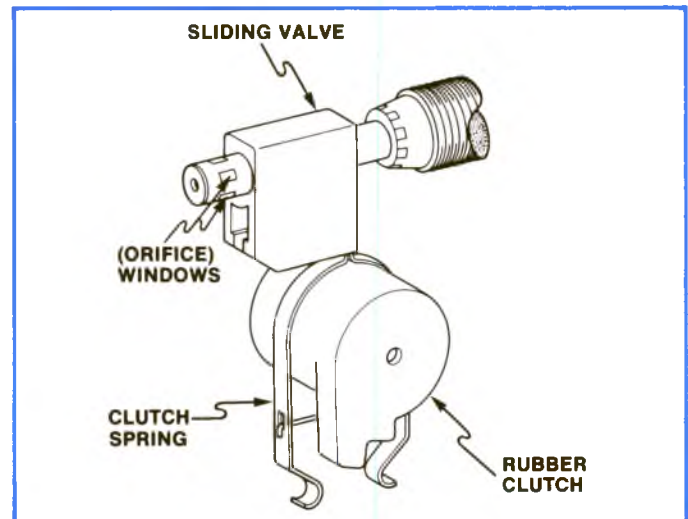


Figure 1-13, Variable Orifice (Orifice Tube and Valve Assembly).

A rubber clutch is secured to a spindle shaft (figure 1-13). When the system is not in use, a solenoid operated "CAM" mechanism (fold-out figure 1-26) spreads the wishbone shaped clutch spring which allows the rubber clutch to rotate within the clutch spring.

When cruise control operation is engaged, the "CAM" allows the wishbone shaped clutch spring to close and hold the rubber clutch. Essentially the rubber clutch works similar to a speedometer pointer. It rotates clockwise or counterclockwise in proportion to the speed of the rotating magnet.

The rubber clutch controls the motion of the "SLIDING VALVE" (figure 1-13) which changes the size of the opening in the "ORIFICE TUBE".

When the cruise control function is engaged, engine vacuum is applied to the "SERVO" through "PORT A" and "PORT B" of the "TRANSDUCER" (figure 1-26).

Air entering through the transducer "AIR FILTER" is metered through the preset window openings in the orifice tube. The resulting vacuum level establishes initial throttle positioning.

During initial engagement, the orifice tube windows are about half open (figure 1-14). This opening has been adjusted at the factory or by a repair station service technician.

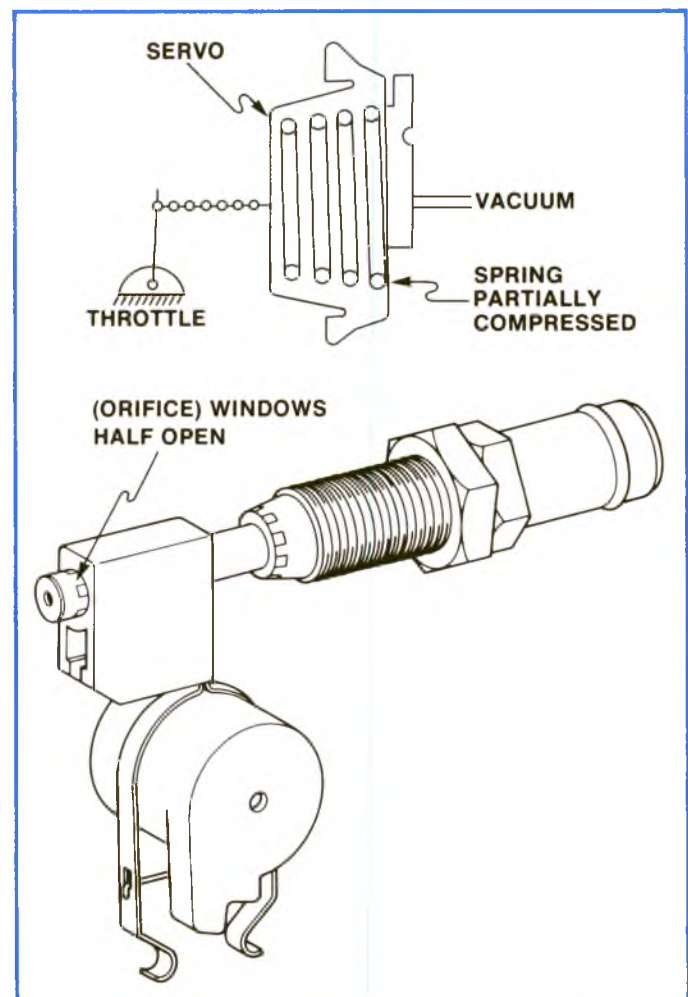


Figure 1-14, Initial Engagement Orifice Window Position, 1/2 Open.

I. Non-Resume Type Cruise Control

When vehicle speed drops, the valve moves and makes the orifice tube windows smaller or completely closes the windows (figure 1-15). This reduces or shuts off the amount of bleed air to the servo which increases the vacuum level in the servo. Increased vacuum draws-in the servo diaphragm which pulls the rod, bead chain or linkage. This increases the carburetor throttle opening to maintain the desired cruise speed.

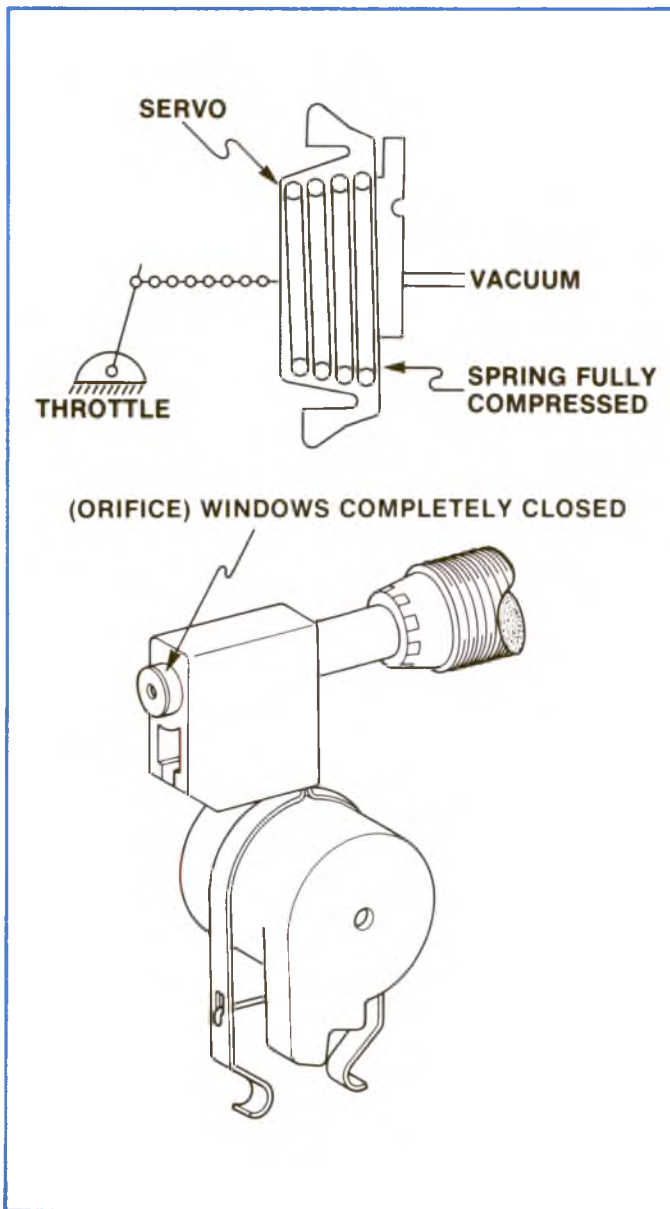


Figure 1-15, Orifice Window Closes to Compensate for Speed Reduction.

If vehicle speed tends to increase, such as on a downgrade, the valve moves to increase the size of the window openings in the orifice tube (figure 1-16). A larger volume of bleed air is admitted at the servo which reduces the vacuum level. The servo diaphragm relaxes the tension on the bead chain or linkage to reduce the carburetor throttle opening. In this way, cruise speed is maintained on a downgrade.

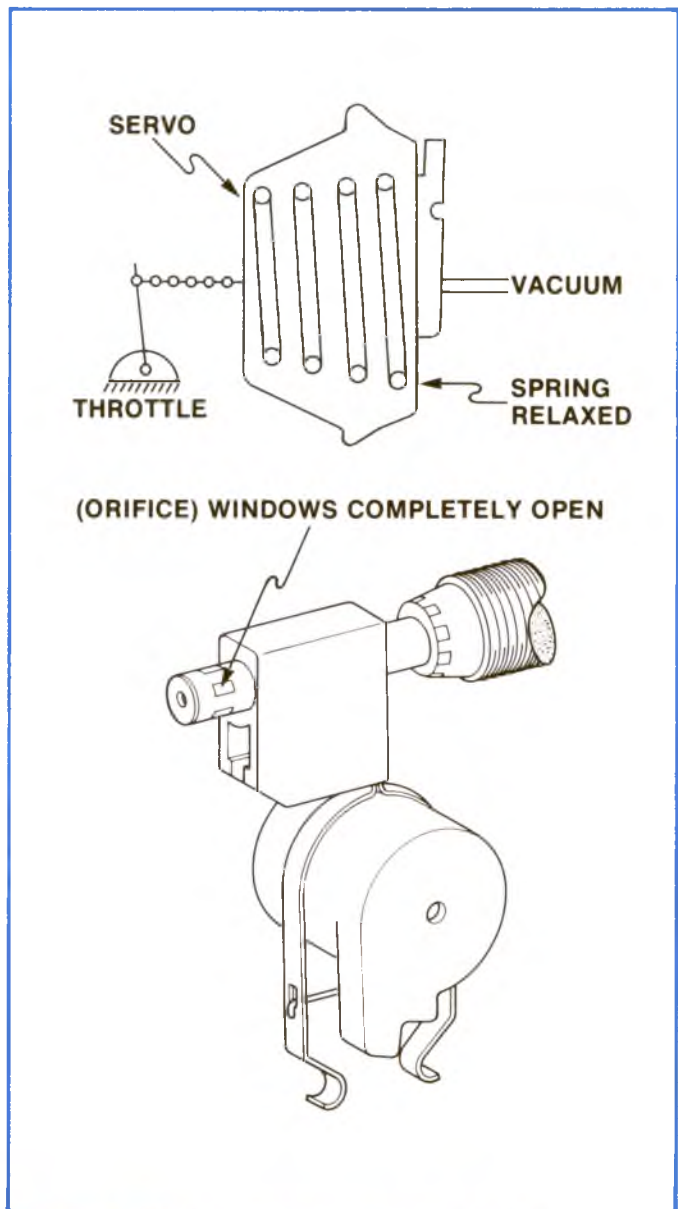


Figure 1-16, Orifice Window Opens to Compensate for Speed Increase.

System Diagnostics and Service

The symptoms requiring diagnosis and service are A. CRUISE SYSTEM INOPERATIVE, B. CRUISES OVER or UNDER SET SPEED and C. SURGING. The proper diagnosis and correction procedure for each of the three symptoms is described in the following paragraphs. However, reference to the vehicle model service manual procedure is also necessary.

The proper diagnosis and correction procedure for each of the three symptoms is described in the following paragraphs.

A. Cruise System Inoperative . . .

Step 1 Perform a physical inspection of the engine compartment. Look for disconnected or pinched vacuum hoses (figure 1-17) . . . hoses that could be pinched closed when the hood is down . . . cracked or spongy hoses, especially in high heat areas . . . a leaky servo . . . missing or disconnected components . . . be sure to check manifold fitting . . . check brake pedal vacuum release valve for proper operation.



Figure 1-17, Physical Inspection of the Vacuum System.

Step 2 Check the servo for leaks:

- Shut off the engine
- Disconnect the vacuum line at the servo
- Push the servo diaphragm fully inward and hold (figure 1-18a)
- Use a finger or thumb to tightly cover the servo vacuum fitting and release the diaphragm (figure 1-18b). The diaphragm should remain depressed. If it expands, a leak is present . . . replace the servo unit.



Figure 1-18a, Depress Servo Diaphragm.

Figure 1-18b, Cover Vacuum Port and Release Finger Pressure on Diaphragm.

I. Non-Resume Type Cruise Control

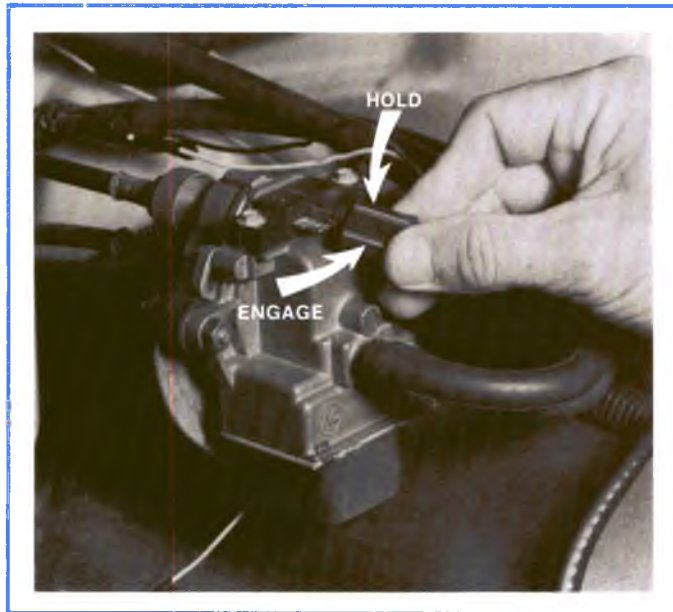


Figure 1-19, Reverse Electrical Connector Harness to Bypass Low Speed Switch.

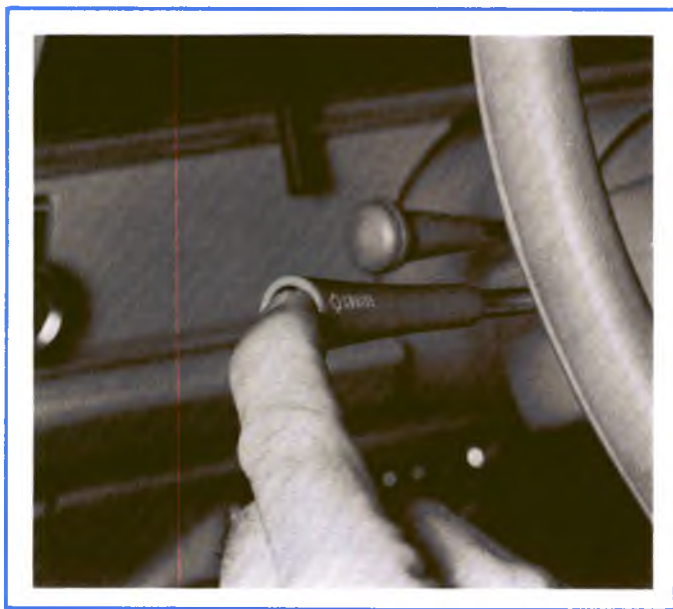


Figure 1-20, Pressing the Cruise Control Switch Button should Engage the Solenoid.

Step 3 Check for a blown fuse. If the fuse is good, go to Step 4.

Step 4 Remove the electrical connection at the transducer (figure 1-19). Reconnect so that the "ENGAGE" wire in the harness mates with the "HOLD" terminal on the transducer. This bypasses the low speed switch.

Step 5 Turn ignition switch "ON". *Do not start the engine.* Slowly depress and slowly release the cruise control switch. Listen for a solenoid engagement "thunk" "thunk" sound (figure 1-20). If the "thunk" is heard on engagement and release, the solenoid coil and related circuits are electrically good. If the "thunk" is erratic or not heard, go to Step 6.

Step 6 Check the brake activated electric release switch. A "hair-trigger" misadjustment could be the cause of the problem. Depress brake switch in $\frac{1}{8}$ -inch increments. At each point attempt system engagement with the cruise control switch until engagement is no longer possible. *Pedal travel for the engagement interval should be about $\frac{1}{4}$ -inch.* Adjust the brake switch as required. Note that the brake pedal can "hang-up". This must be considered whenever brake switch adjustment is performed.

If the transducer does not engage, perform the following basic electrical checks:

- 6a. Check to make sure all electrical connectors and terminals are free of grime and corrosion.
- 6b. See fold-out figure 1-25. Disconnect the harness at POINT A. Connect a voltmeter to the "hot" side at POINT A.

I. Non-Resume Type Cruise Control

- 6c. With the ignition on, battery voltage should be indicated on the voltmeter. If voltage is not shown go to 6d . . . If voltage is present, go to 6e.
- 6d. Use the voltmeter to measure the voltage at both sides of the BRAKE RELEASE SWITCH.
- If the voltage reading is the same, the switch is closed and requires no adjustment.
 - If no voltage is measured on either side of the switch, an open circuit exists between the switch and battery. Perform repairs as necessary.
 - If battery voltage is present on one side of the switch and not the other, the switch requires adjustment.
- 6e. Reconnect the connector at POINT A. Connect a voltmeter to the "hot" side of POINT B with a small probe. Go to 6f.
- 6f. Depress the engagement switch half way. Voltage should be present. If voltage is not shown replace the engagement switch with a *known* good switch and re-check. If no defect is found go to 6g.
- 6g. Disconnect the harness connector at the TRANSDUCER. Connect a voltmeter to the "hot" side of POINT C at the harness. Depress the engagement switch half way. Battery voltage should be present. If no voltage is shown, repair the harness between POINT B and POINT C. If no defect is found, go to Step 7.

Step 7

If the solenoid will not engage and voltage is present at point "C", disconnect the connector at the TRANSDUCER and measure for continuity between point "E" and ground with an Ohmmeter . . . resistance should read 5 to 6 Ohms. A lower resistance reading requires replacement of the transducer. If the resistance is higher than 6 Ohms, check the transducer casting to ground resistance. If the ground is electrically good and the resistance remains high, replace the transducer. Also check the 40 Ohm resistance wire from point "D" to point "E".

Step 8

If the electrical circuits have no defects, check the vacuum system. First, place the transmission in Park, set the hand brake and start the engine.

Step 9

Check for vacuum at PORT B (fold-out figure 1-26). Repair as necessary.

Step 10

After required repairs or adjustments, reconnect all electrical connectors and vacuum hoses. Then road test the vehicle. If the system remains inoperative, replace the transducer.

B. Cruises Over/Under Set Speed . . .

Step 1

Perform a general inspection of the cruise control system. Check for pinched or disconnected vacuum hoses and a loose or binding or tight throttle linkage (figure 1-21a and b). If the vehicle cruises consistently under the set speed, first look for a vacuum leak.



Figure 1-21a, Inspect Hoses.

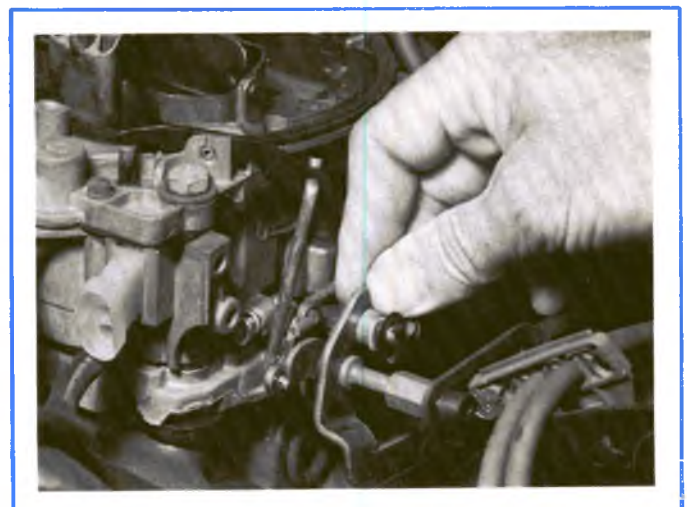


Figure 1-21b, Inspect Throttle Linkage.

I. Non-Resume Type Cruise Control

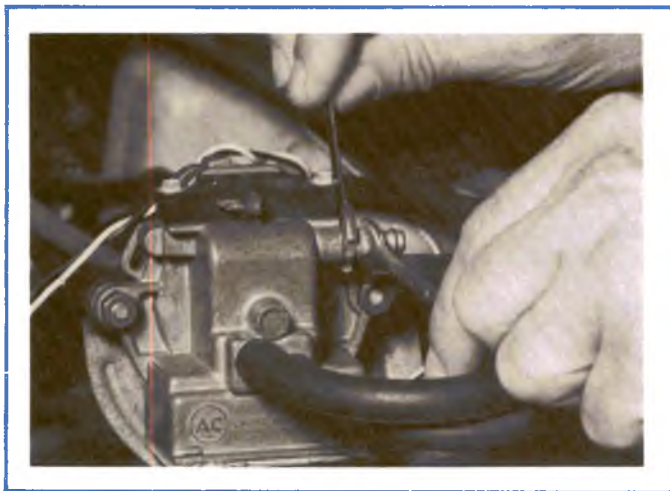


Figure 1-22, Adjusting the Orifice Tube Changes Cruise Speed.

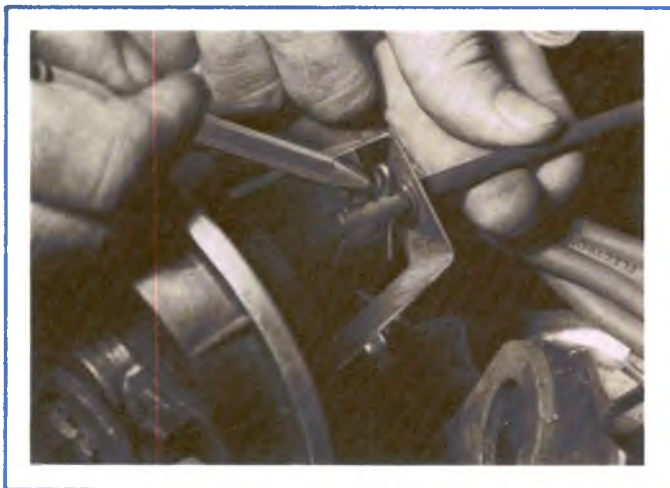


Figure 1-23a, Servo Rod (linkage).

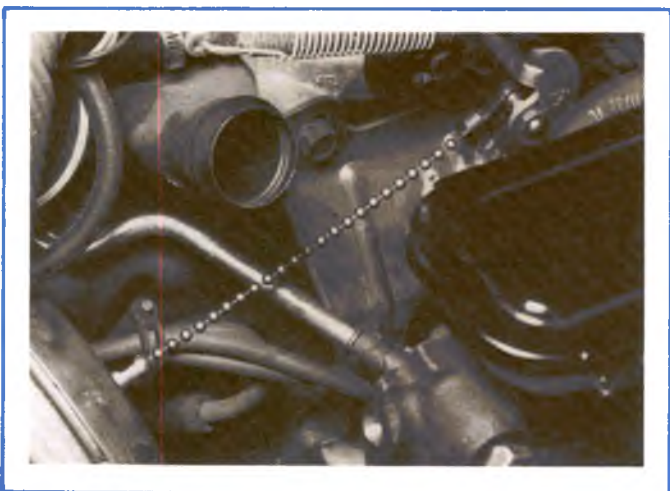


Figure 1-23b, Bead Chain.

Step 2 If no defect is found during Step 1, adjust the orifice tube (figure 1-22).

- If the vehicle cruises below the set speed, screw the orifice tube *outward*.
- If the vehicle cruises above the set speed, screw the orifice tube *inward*.

Each $\frac{1}{3}$ -inch turn of the orifice tube changes cruise speed about 1-mph. After adjustment make sure the lock nut is snug.

Step 3 Road test and check cruise control operation at 50 mph.

C. Surging . . .

Step 1 Perform a general inspection of the cruise control system . . . check for pinched or disconnected vacuum hoses and loose or binding throttle linkage (see figure 1-21a, 1-21b).

Step 2 Check the servo rod (figure 1-23a), bead chain (figure 1-23b), or Bowden wire combination Bowden cable bead chain (figure 1-23c) for excess slack. This connection should have a minimum slack but not be so tight as to affect hot curb idle.

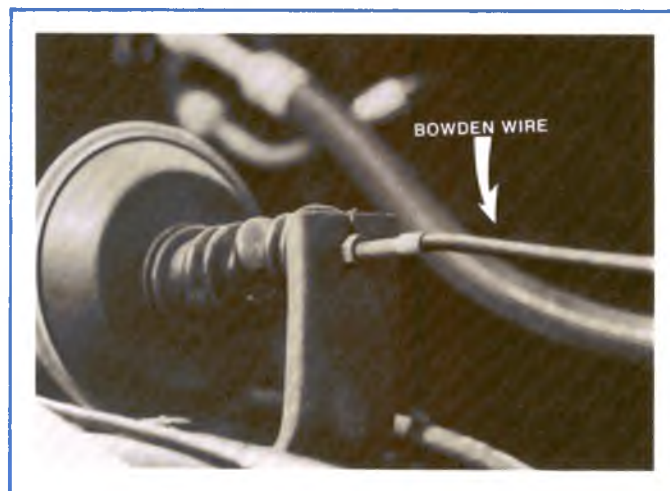


Figure 1-23c, Bowden Wire Combination Bowden Cable Bead Chain.

I. Non-Resume Type Cruise Control

- Step 3** Make sure the vehicle is equipped with the correct transducer and servo . . . check out the part number (figure 1-24).
- Step 4** If surging remains, the most probable cause is a restricted vacuum hose or fitting to PORT B on the TRANSDUCER.
- Step 5** If no defect is found, replace the transducer and road test the vehicle.

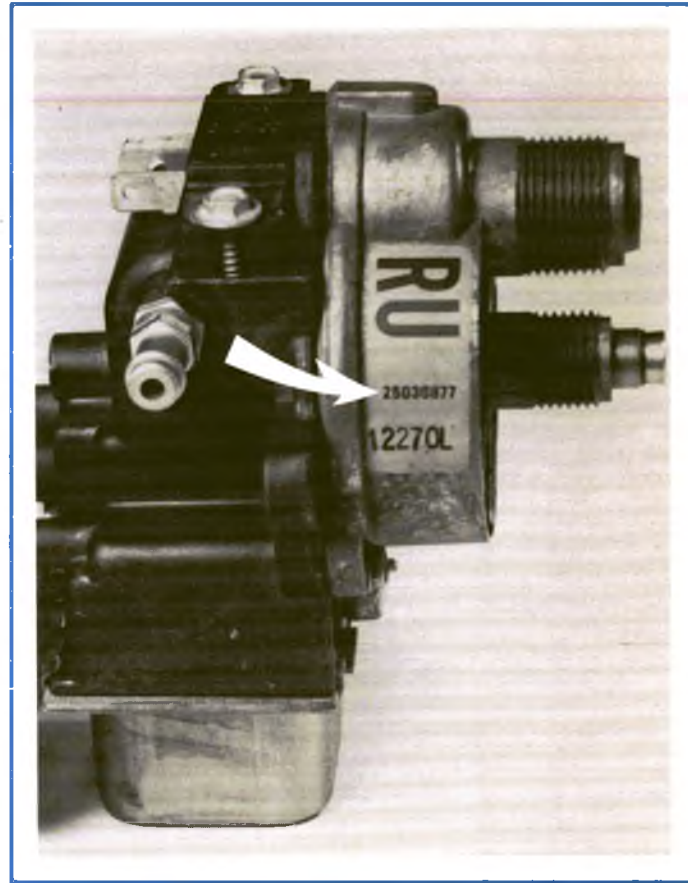


Figure 1-24, Check the Part Number for Vehicle Application.

— NOTE —

If transducer repair is required, it must be performed by an authorized transducer repair facility as listed in the applicable AC-Delco repair bulletins.

resistance wire is just the LENGTH of the wire, has extra length to provide 40 ohms is NOT A true resistance wire. extra wire in the harness apply 12v to "hold" term. on transducer, sel. should click.

I. Non-Resume Type Cruise Control

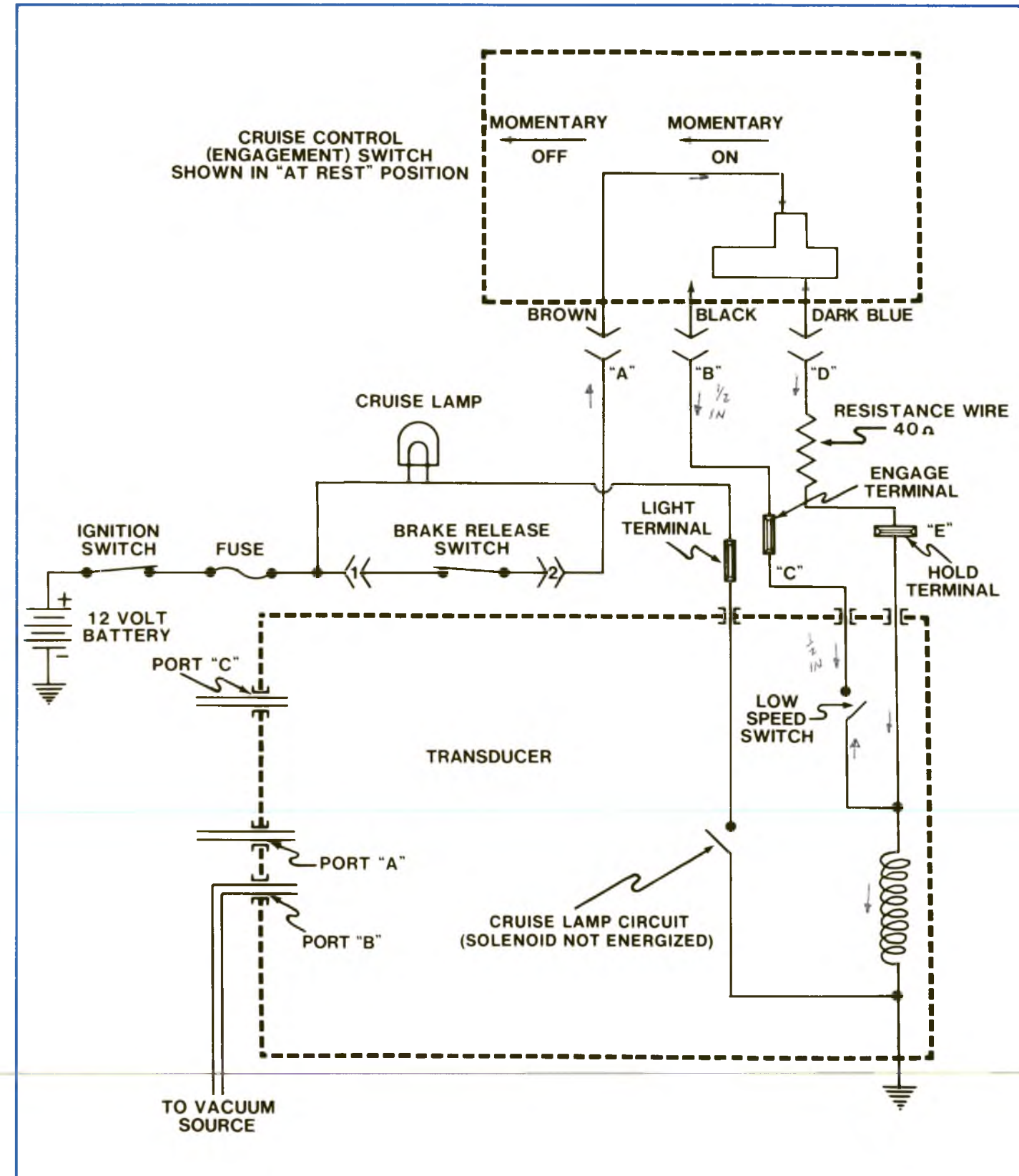


Figure 1-25, AC Cruisemaster system, Non-resume Type Electrical System Schematic.

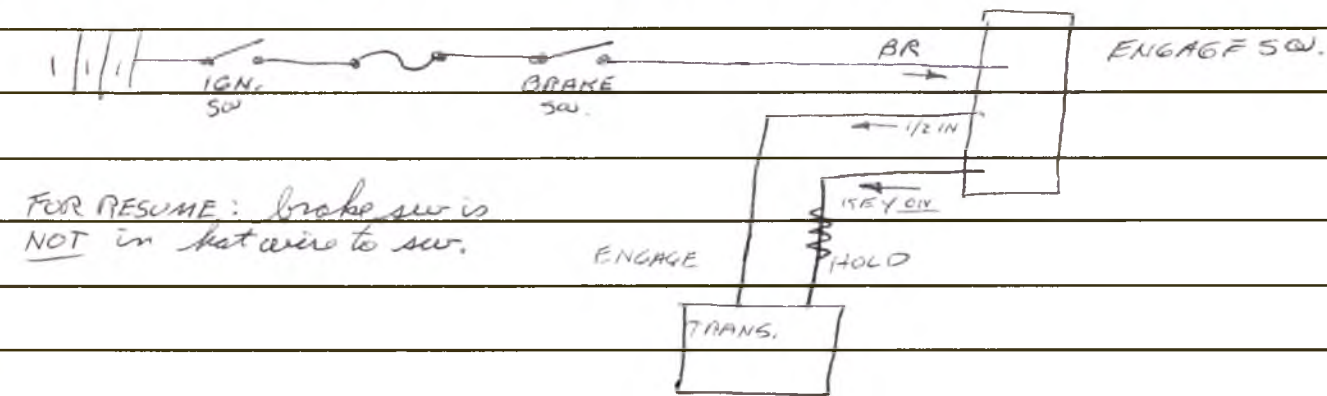
KEY ON (HOLD-IN)

I. Non-Resume Type Cruise Control

NOTES

*you can jump black wire to hold term. on transducer,
see if sol. clicks when button is 1/2 in.*

newer cars, there is a 2-3 second delay



*✓ w/ vac. gauges at different points
should some hoses have vac. when
engaged or not engaged.*

I. Non-Resume Type Cruise Control

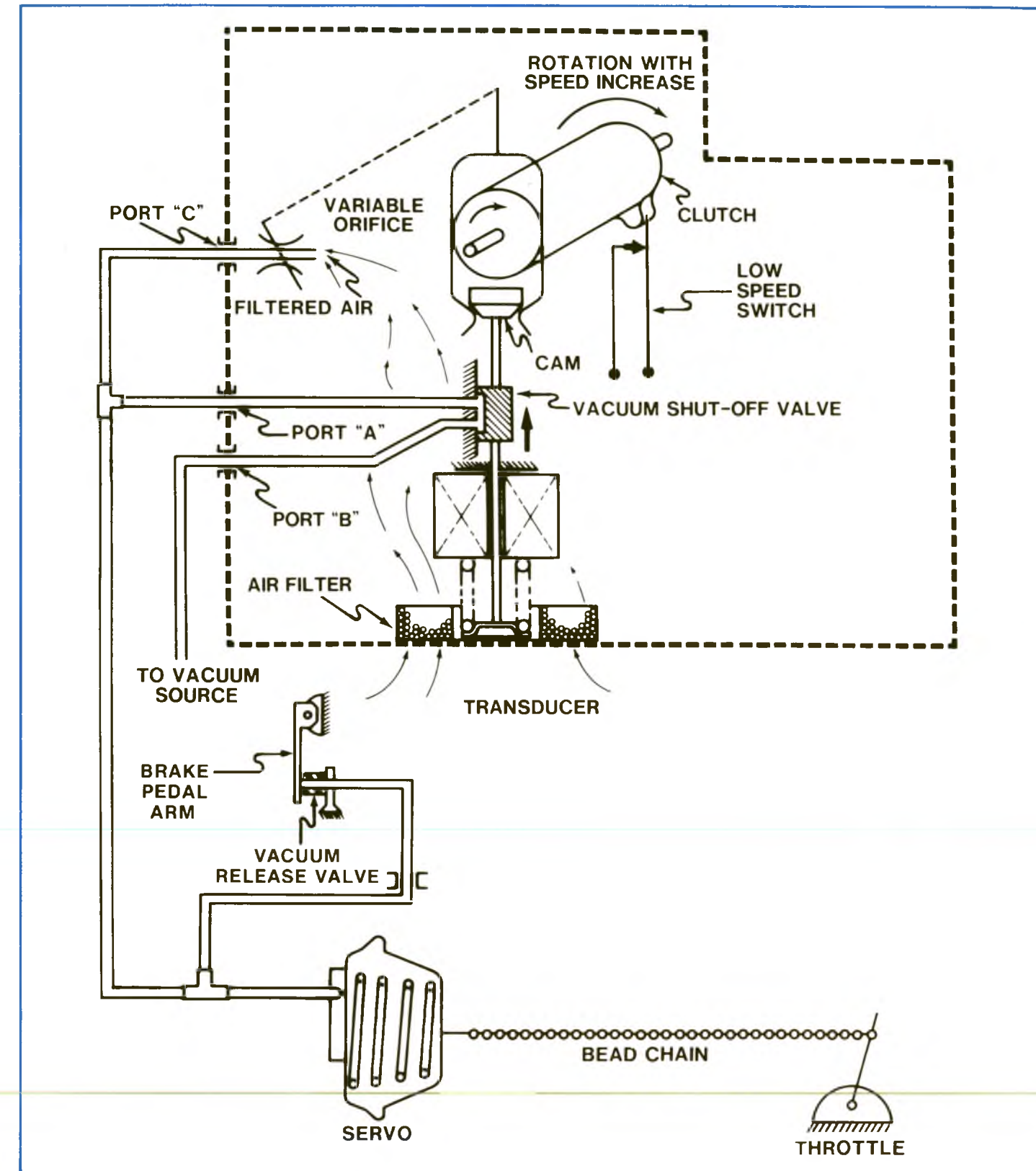


Figure 1-26, AC Cruisemaster System, Non-resume Type Vacuum System Schematic.

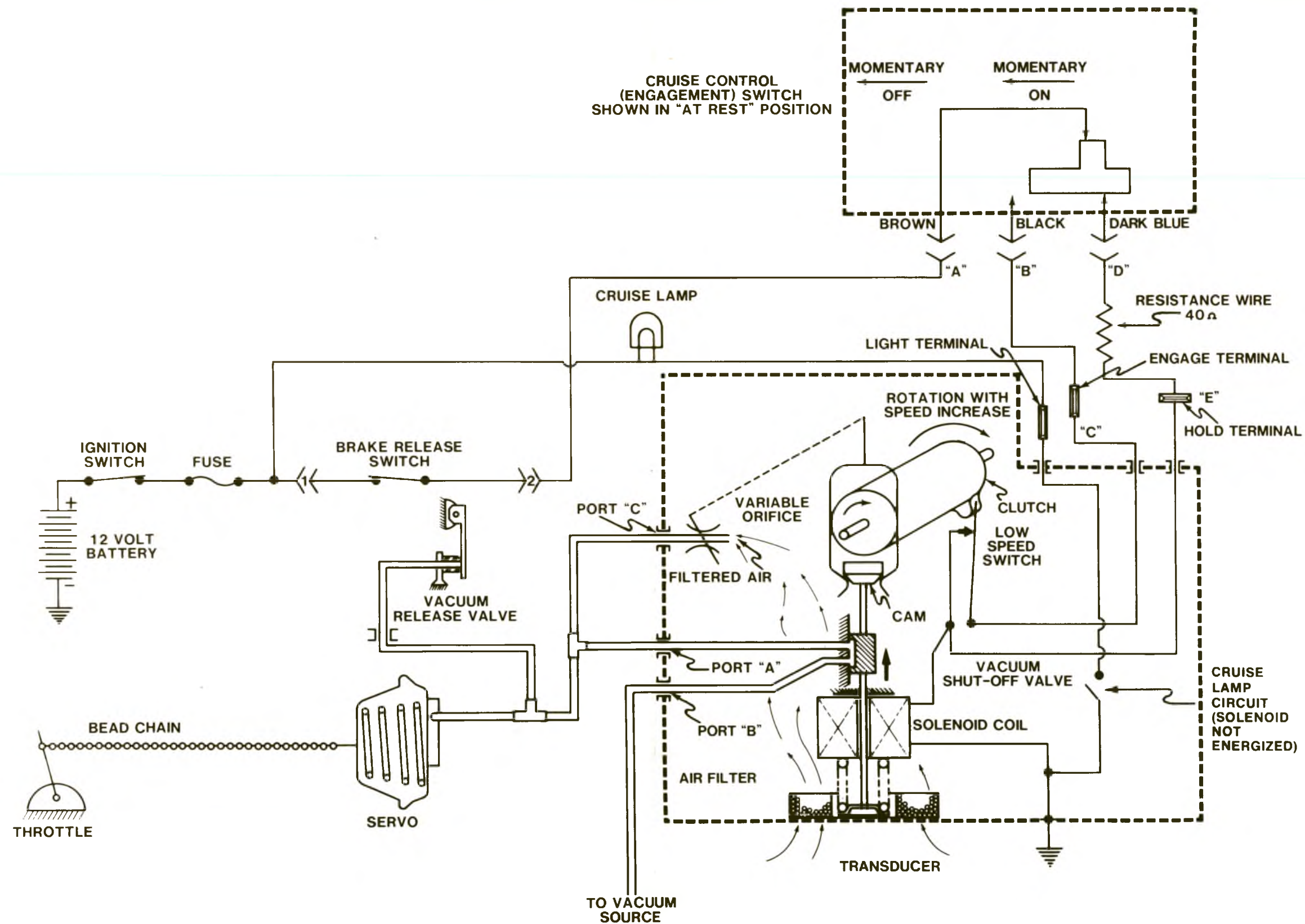


Figure 1-27, Combined Electrical-Vacuum System Schematic.

resume was just a way of dumping and renewing vacuum. Transducers just remembered its previous setting.

II. Resume Type Cruise Control

General Operation

The AC Cruisemaster resume system with "RESUME" operates somewhat similarly to the non-resume type system. The major difference is that with the resume feature, the driver may resume a pre-set speed after the system has been disengaged by braking. This is done by moving a slide switch on the cruise control lever momentarily to the "Resume" position (figure 2-1).

Note that the Off/On/Resume slider switch has three positions. The switch turns the cruise control system on and off. It also returns cruise control operation to the last speed setting when placed in the "Resume" position. When the slider switch is in the "Off" position, set speed memory is canceled.

The cruise switch button, located in the end of the multifunction lever, has three functions; 1. engage the cruise mode, 2. a coast position which allows the driver to decrease speed and 3. the normal or the fully released position.

— NOTE —

Low speed switch engagement ranges from 30 to 40 mph. Refer to applicable service manual or bulletins.

Cruise System Components . . .

Cruise system components, with the exception of the resume cruise control switch and transducer, are similar to the components discussed in Part I of this service manual.

Figure 2-2 is a resume type cruise control transducer. Unlike the non-resume transducer, it features a resume solenoid valve and a special clutch arrangement.

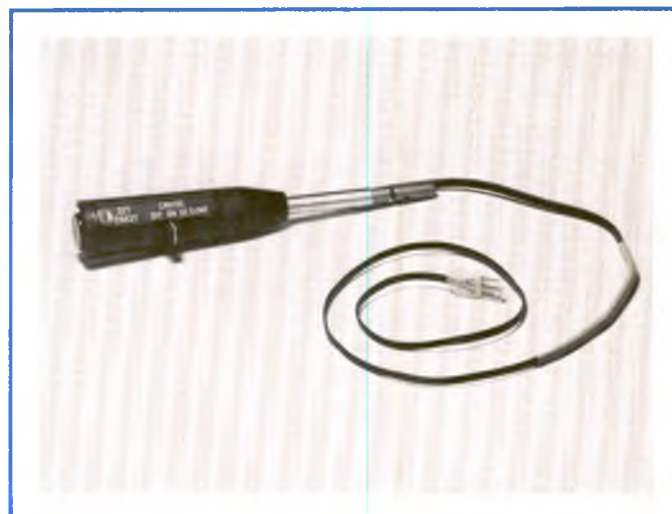


Figure 2-1, Resume Cruise Control Lever.

ON-OFF sw added

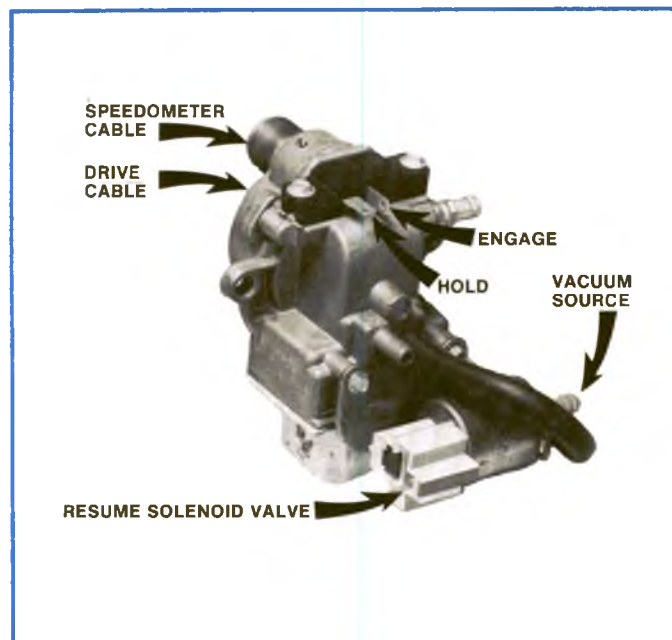


Figure 2-2, Resume Cruise Control Transducer.

II. Resume Type Cruise Control

Open the fold-out page 2-6, figure 2-9, AC CruiseMASTER System with Resume, Electro-Pneumatic Schematic.

The electro-pneumatic operation of the resume type system (figure 2-9) can be compared to the non-resume system for similarity (figure 1-27). However, the resume system components operate differently.

- When the brake pedal is depressed, the clutch solenoid within the transducer remains energized. The resume solenoid coil is not energized, which shuts off vacuum to the transducer.
- The transducer features a resume spindle assembly which allows it to retain a mechanical memory of the vehicle speed when the brake pedal was depressed (figure 2-3a). When the slider switch is moved to the resume position, the resume solenoid energizes and allows vacuum to enter the transducer. The mechanical memory then adjusts the clutch orifice tube and valve assembly (figure 2-3b) to a position that re-establishes vehicle speed when the brake was depressed (above the low speed switch setting).

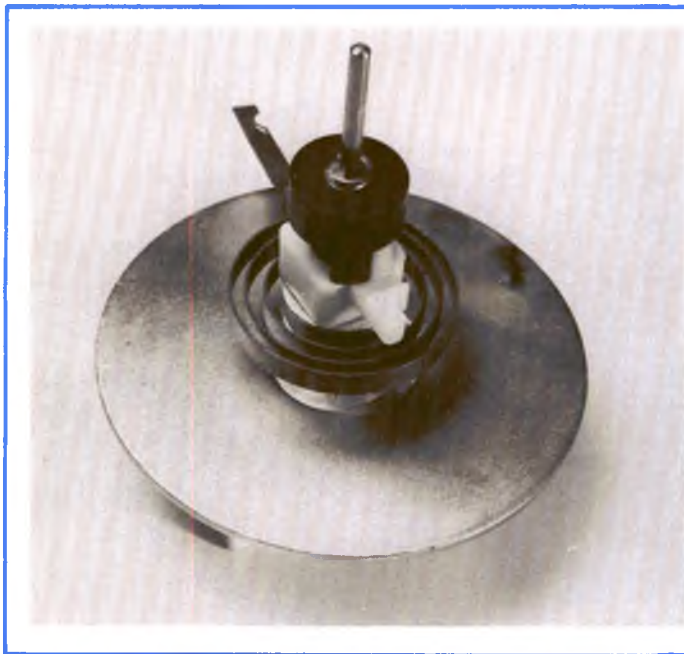


Figure 2-3a, Resume Type Transducer Spindle Assembly with Split Clutch.

Figure 2-3b, Orifice Tube and Valve Assembly.

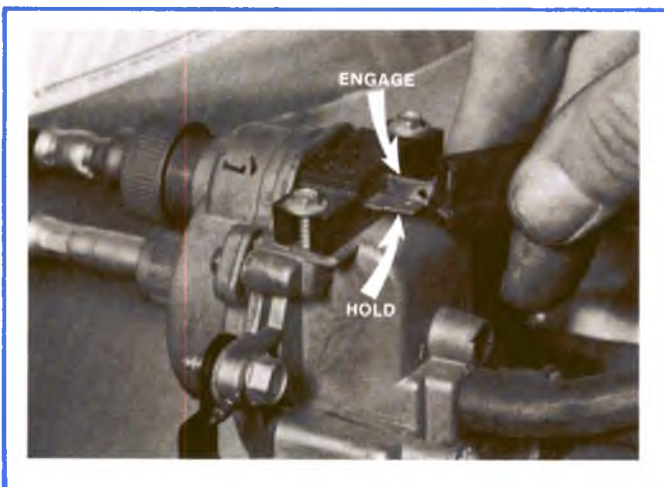


Figure 2-4, Reverse Two-Terminal Connection.

System Diagnostics and Service . . .

System problems such as surging, and cruise over/under set speed are diagnosed and serviced in the same way as the non-resume type system (see Part I). An inoperative system requires a different service technique. The following highlights the diagnostic and service procedure for an inoperative system:

- Step 1** Disconnect the two terminal connectors at the transducer and re-connect it so that the "ENGAGE" connector contacts the "HOLD" terminal (figure 2-4).

II. Resume Type Cruise Control

Step 2 Turn ignition switch "ON". *Do not start the engine.*

✓ **Step 3** Move the slider to the "RESUME" position, hold momentarily and release. If an engage "thunk" and release "thunk" are heard, this portion of the electrical system is good. Go to Step 4.

Step 4 Start the engine and check for vacuum at the hose connected to the manifold side of the RESUME VALVE. If vacuum is present, go to Step 5.

Step 5 Check the brake switch circuit:

- Disconnect the electrical connectors at the transducer and resume solenoid valve (figure 2-5).

- Connect a voltmeter to the "hot" side of harness connector at the RESUME SOL-ENOID VALVE (figure 2-6). With the ignition "on", the voltmeter should indicate a voltage reading.
- Depress the brake pedal in 1/8-inch increments to 1/4 inch. The voltage reading should drop to "0". If necessary, adjust the brake release switch. If no defect is found proceed to Step 6.

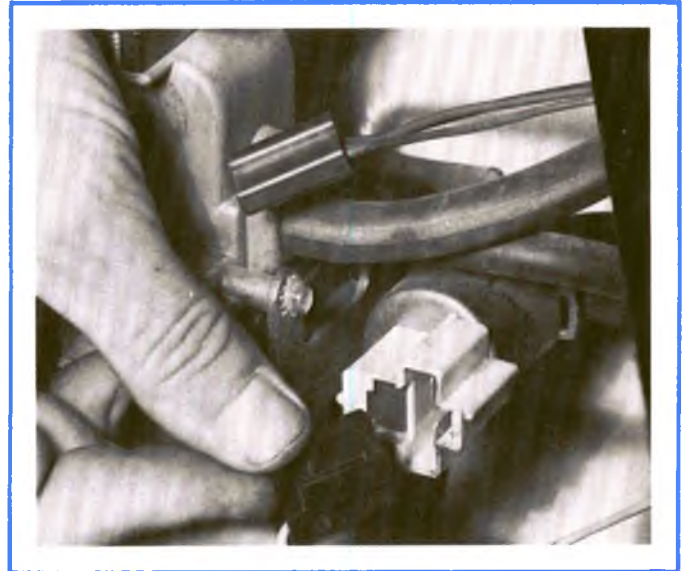


Figure 2-5, Disconnect Electrical Connectors at Transducer and Resume Solenoid Valve.



Figure 2-6, Check Resume Solenoid Valve Connector with Voltmeter.

II. Resume Type Cruise Control

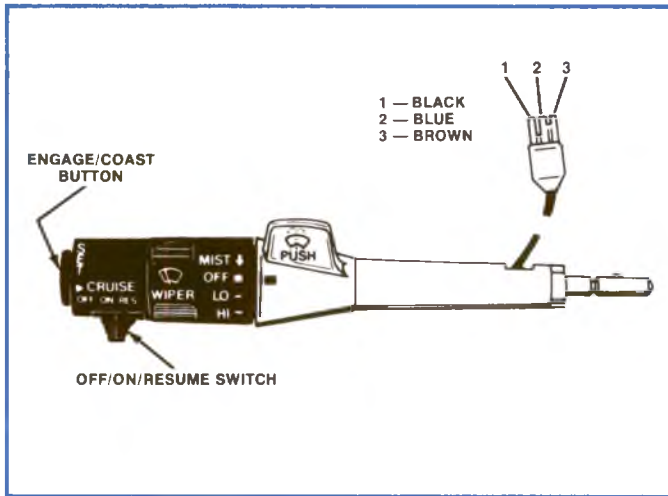


Figure 2-7, Typical Resume Engage Switch Wiring.

Step 6 Check the resume solenoid valve by applying 12-volts dc to the "hot" side of the valve ob-
serving polarity. The energized solenoid coil should emit an audible "click" and the valve should conduct vacuum. If no defect is found, proceed to Step 7.

Step 7 Check the electrical operation of the engagement switch (figure 2-7). Use the Switch Function Table or replace the engagement switch with a *known* good switch. If no defect is found proceed to Step 8.

Switch Function Table

Test Order	Function	Switch Condition		Terminal Connections		
		End Button	Slider	3-2	1-3	2-1
1	Off	Released	Off	O	O	O
	Resume	Released	Resume	C	C	C
	Cruise	Released	On	C	O	O
	Coast	Half Depressed	On	O	O	O
2	Coast	Fully Depressed	On	O	O	C
3	Set	Releasing	On	C	C	C

O = Open C = Continuity



Figure 2-8, Check Resistor Wire and Transducer Solenoid Coil with an Ohmmeter.

Step 8 Use an Ohmmeter and check the resistance wire and transducer solenoid coil (figure 2-8).

- The resistance wire should be between 20-25 Ohms.
- The transducer solenoid should be approximately 6 Ohms. Make sure the transducer has a good ground to the vehicle chassis.
- If no defect is found, replace the transducer.

— NOTE —

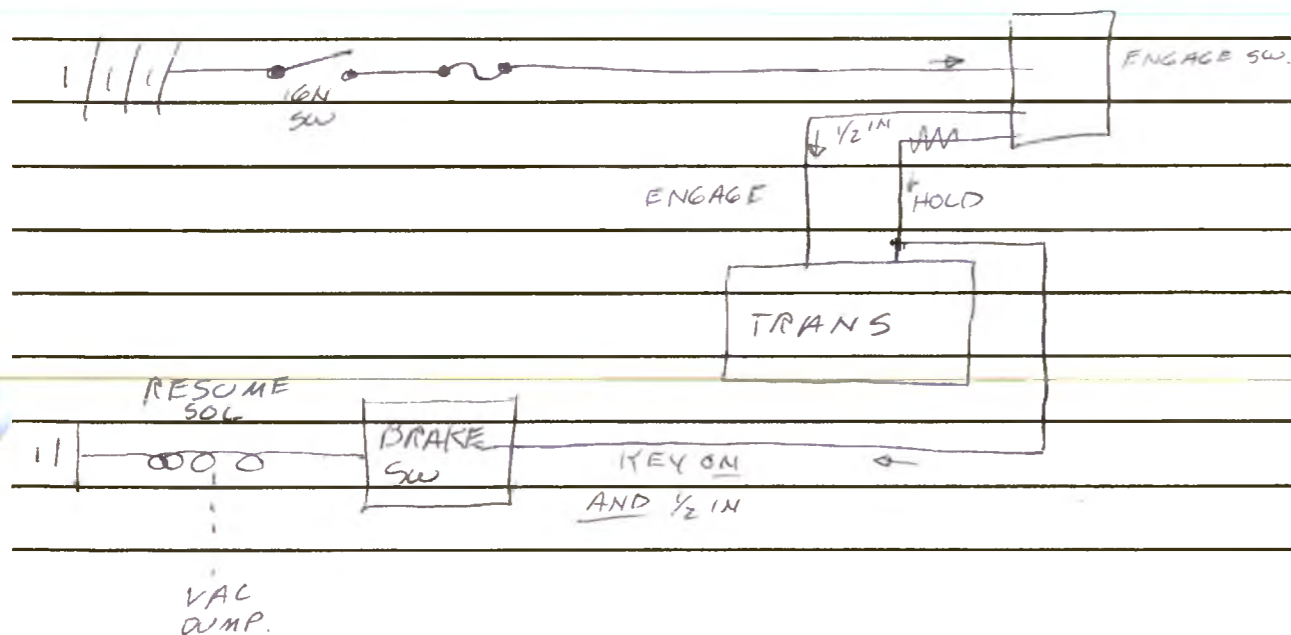
If transducer repair is required, it must be performed by an authorized transducer repair facility as listed in the applicable AC-Delco repair bulletins.

II. Resume Type Cruise Control

NOTES

- some resume did not resume at a controlled rate, resume would hit W.O.T.
- upon hitting brake pedal, transducer "remembers" the old speed. on older non-resume system after hitting brake, system had to be re-engaged.

W/ resume: the resume sol. is just a vac. dump. the electrical part of the system stays engaged and "remembers" the old set speed.



res. wire is different than on all non-resume, and some wiring is different so resume cannot be added to an older car.

II. Resume Type Cruise Control

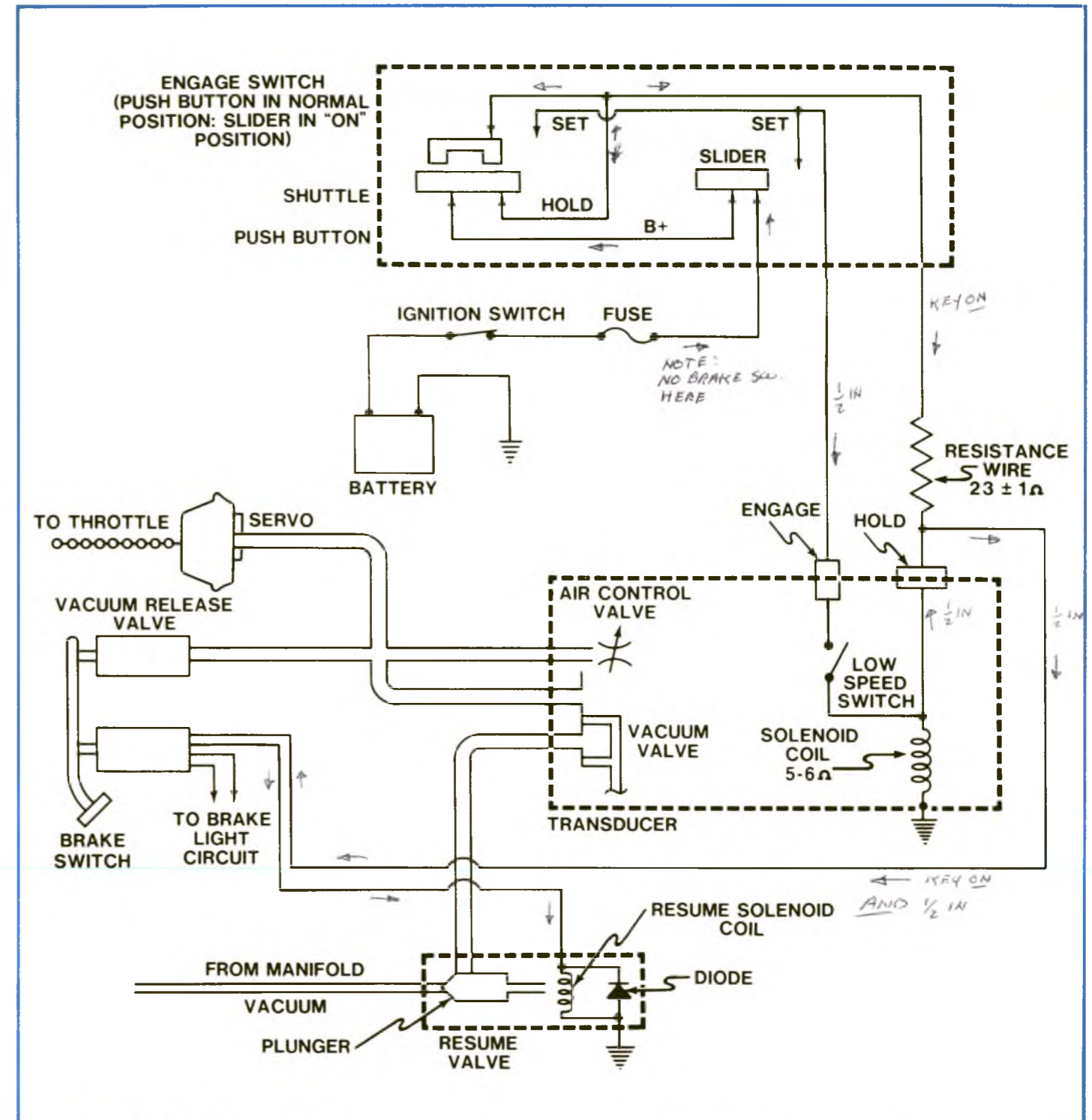


Figure 2-9, AC Cruisemaster System with Resume, Electro-pneumatic Schematic.

RESUME OPERATION:

brake pedal no longer "fills" feed to transducer, just the resume sol. which dumps vac., when resume is pressed, resume sol. reestablishes vac., transducer is still engaged at old setting and car returns to old setting

II. Resume Type Cruise Control

II. Resume Type Cruise Control

NOTES

w/ 12V on resume sol. resume valve should open and pass vac both ways.

resume sol voltage spike when turning off would momentarily ~~turn on~~ turn on \checkmark eng. light. should die right momentarily turn on \checkmark eng. light when brake pedal is pressed.

III. Aspirator Assisted Vacuum System ("J" Car)

General Operation . . .

The 1982 General Motors "J" cars feature an aspirator assisted vacuum system for cruise control operation. It is designed to supplement engine vacuum when the engine is under load such as traveling up a steep grade.

Open the fold-out page 3-4, figure 3-3, Aspirator Assisted Vacuum System Schematic, "J" Car.

The aspirator assisted vacuum system consists of an "ASPIRATOR", a "3-PORT CHECK VALVE", a "2-PORT CHECK VALVE", an "AIR PUMP" and an "AIR MANAGEMENT VALVE". Note that air for the "ASPIRATOR" is "T" connected to the same air line that connects the "AIR PUMP" to the "AIR MANAGEMENT VALVE". Also note that the bottom of the "3-PORT CHECK VALVE" leads to the cruise transducer "RESUME VALVE". Figure 3-1 shows an air pump and air management valve as installed in a typical "J" car.



Figure 3-1, Typical Air Pump, and Air Management Valve Installation.

Under normal vacuum conditions, air bleeds into the system in the direction shown by a single arrow (figure 3-3). It flows from the transducer "RESUME VALVE" to the "T" of the "3-PORT CHECK VALVE", to the "2-PORT CHECK VALVE" to the intake manifold.

As the "AIR PUMP" supplies air to the "AIR MANAGEMENT VALVE", a small amount of air is diverted through the "ASPIRATOR" to the atmosphere. Venturi action within the "ASPIRATOR" develops vacuum. It is this vacuum that provides the assistance needed under high load cruise conditions.

If manifold vacuum falls below "ASPIRATOR" vacuum, the "2-PORT CHECK VALVE" closes and the "3-PORT CHECK VALVE" opens. When the "3-PORT CHECK VALVE" opens a higher vacuum is available to the cruise system. This provides the vacuum needed to maintain the cruise function. The "Double Arrows" (figure 3-3) show direction of air flow during aspirator assist.

To eliminate possible installation errors, note that the check valves are arrow shaped and point in the direction of air flow (figure 3-3).

III. Aspirator Assisted Vacuum System

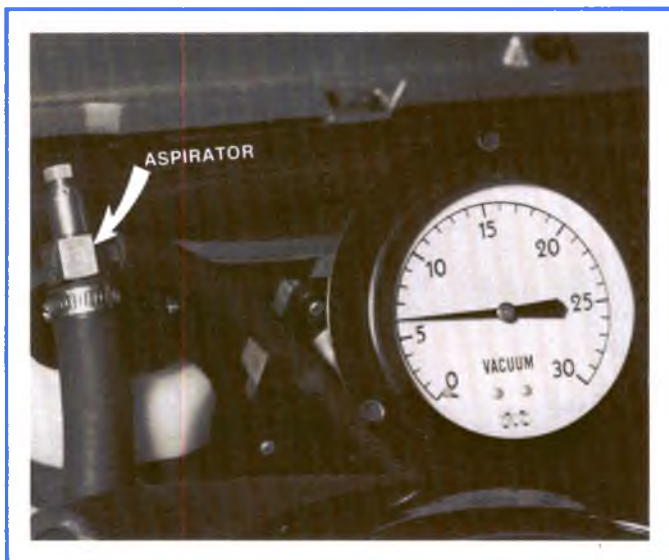


Figure 3-2, Connect a Vacuum Gauge to the Aspirator Output.

System Diagnostics . . .

The cruise control function in "J" cars is directly related to the proper operation of the aspirator system. For example, a plugged hose at POINT C (figure 3-3) can cause the cruise system to become inoperative; a plugged hose at POINT A causes cruise problems only when the engine is under heavy load. The following steps describe aspirator system diagnostics and service:

- Step 1** Insure that all hoses and connections are securely in-place. Make sure the check valve position (arrow shaped) is correct.
- Step 2** Connect a vacuum gauge to the "ASPIRATOR" output, POINT A (figure 3-2). Then start and run the engine at 2500 RPM, in a closed loop operation. (Check with a dwell meter). The vacuum gauge should read at least 5-inches Hg. If the vacuum is lower, remove and clean the aspirator with mineral spirits and re-check.
- Step 3** Check the "AIR PUMP" for output. If there is no output, service the air pump. If no defect is found, proceed to Step 4.
- Step 4** Disconnect the vacuum gauge at POINT A. Plug the "2-PORT CHECK VALVE" at POINT B. Then blow air into the "RESUME VALVE HOSE" at POINT C. *Do not use compressed air.* A proper free-flow condition is indicated if air exits at POINT A.
- Step 5** Remove the plug from the "ENGINE MANIFOLD VACUUM HOSE" at the manifold side of the "2-PORT CHECK VALVE", POINT B. Plug the hose at POINT A. Blow air into the "RESUME VALVE HOSE", POINT C. Air should exit at POINT B. This completes a system check in one direction. Proceed to Step 6.
- Step 6** Check system air flow in the opposite direction. Plug POINT B and blow air in at POINT A. Then plug POINT A and blow air in at POINT B. In either condition, air should not exit at POINT C.

III. Aspirator Assisted Vacuum System

III. Aspirator Assisted Vacuum System

NOTES

some big cars w/ 6 cyl eng. did not develop enough vac.

IV. Vacuum Assisted Systems

General Operation and Applications . . .

The 1981 Buick LeSabre, Buick Electra and Oldsmobile 88 and 98 with a 4.1 liter V6 engine, 4-speed transmission and a 5-liter engine with 4-speed transmission require vacuum assist for *heavy load* cruise operation.

Refer to figure 4-1. During the normal vacuum conditions of light to moderate load, air flows from PORT "A" to PORT "C" to the "INTAKE MANIFOLD". The single arrows in figure 4-1 show this air flow. A small amount of air also flows from PORT "A" to PORT "B" through the "CONNECTOR" and to the "VACUUM PUMP". The .035-inch restriction in the hose connector between PORT "B" and the "VACUUM PUMP" keeps the volume of air relatively small.

Whenever manifold vacuum at PORT "C" drops to a level lower than the vacuum at PORT "B" (pump output), the "3-PORT CHECK VALVE" closes PORT "C". The change in vacuum level and closing of PORT "C" is caused by heavy load operation. Under heavy load, the system will now operate off the vacuum pump. Air flow is shown by the double arrows in figure 4-1.

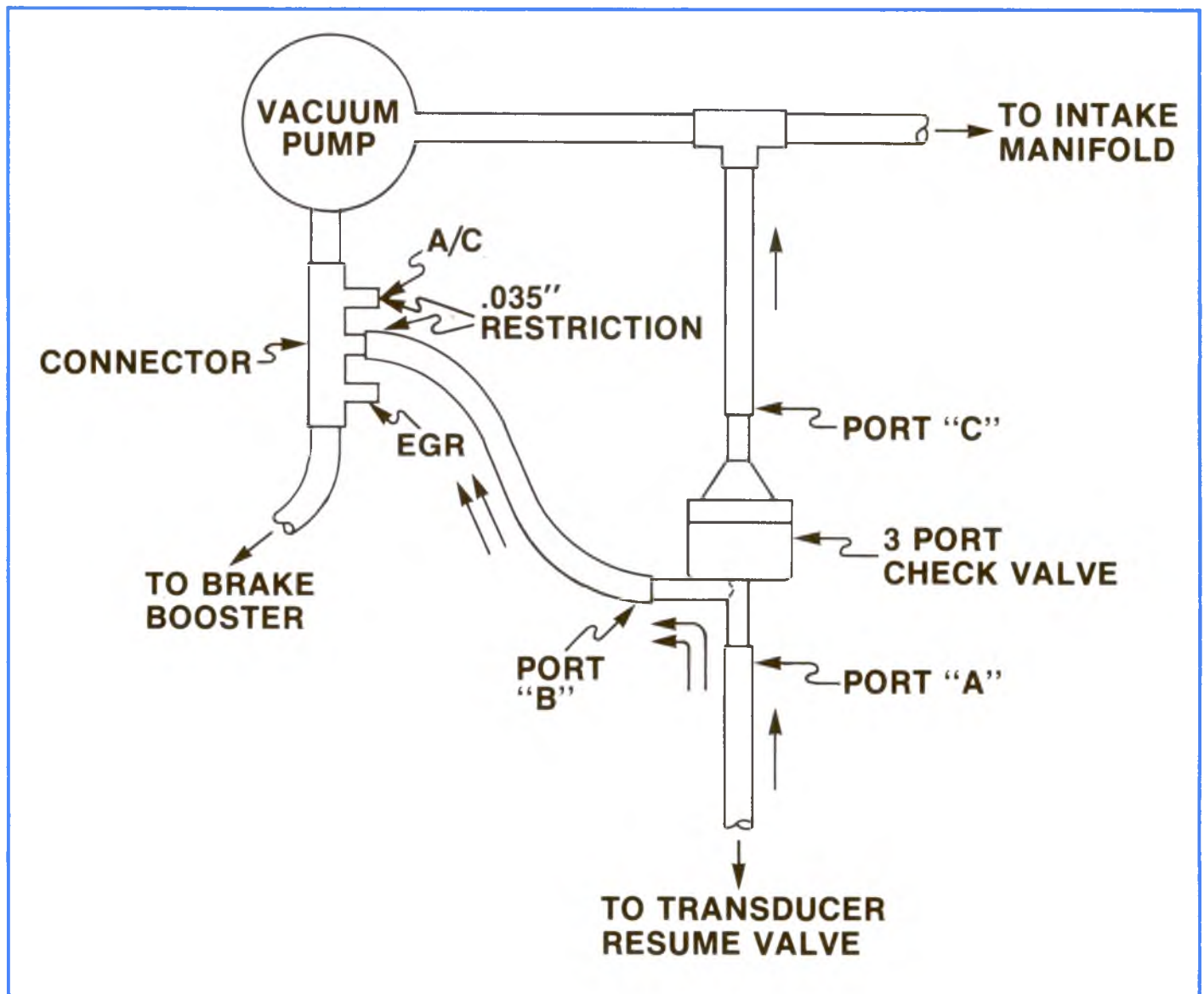


Figure 4-1, Vacuum Assisted System for Heavy Load Cruise Operation.

IV. Vacuum Assisted Systems

System Diagnostics . . .

The vacuum assisted system does not require periodic maintenance. However, the following diagnostic and service procedures are applicable:

- If the 3-port check valve is blocked closed or blocked open, the system will cruise below engagement speed or system surging will occur.
- If the 3-port check valve is incorrectly connected, the cruise system will either be inoperative or will cruise below engagement speed.

To correct cruise engagement or cruise operation below engagement speed complaints, clean the check valve and connections with mineral spirits. (See figure 4-2) . . . Recheck by blowing low pressure air into PORT "A" while PORT "B" is plugged and then into PORT "B" while PORT "A" is plugged. In both cases, air should exit out of PORT "C". To check flow in the other direction blow air into PORT "C" . . . no air should exit out of PORT "B" or PORT "A".

Check the 3-port valve for proper installation. Notice that the arrowhead shaped portion of the 3-port check valve must always point to the intake manifold (figure 4-2).

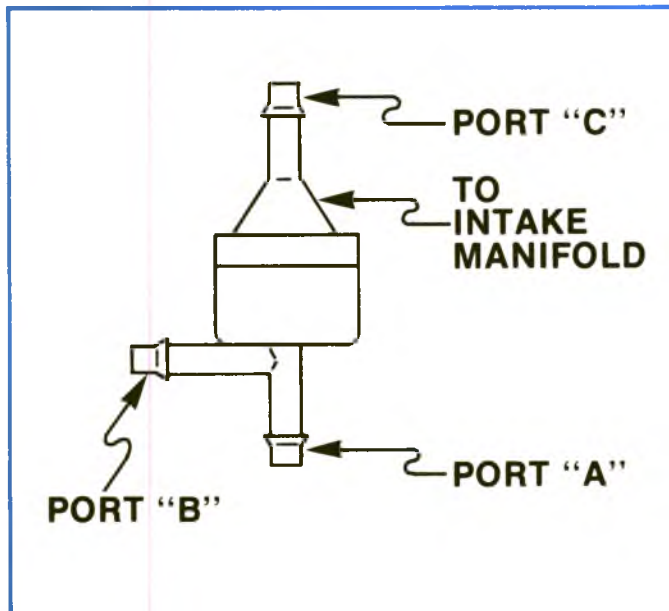


Figure 4-2, 3-Port Check Valve.

V. Diesel Transducer

GASOLINE ENG. HAD HORIZONTAL TERMINALS

VERTICAL TERMINALS

Identification . . .

AC diesel transducers for cruise control produced before 1980 1/2 are the non-resume type. Transducers produced for later models are the resume type.

The diesel transducer is similar in physical appearance to the gasoline transducer. To identify the units, the transducer clutch housing assembly of the diesel transducer is either "blue" or "black" in color (figure 5-1).

Another difference is the electrical blade terminal arrangement. Starting in 1979, the "HOLD" and "ENGAGE" blade terminals were changed from a "T" design to a parallel design.

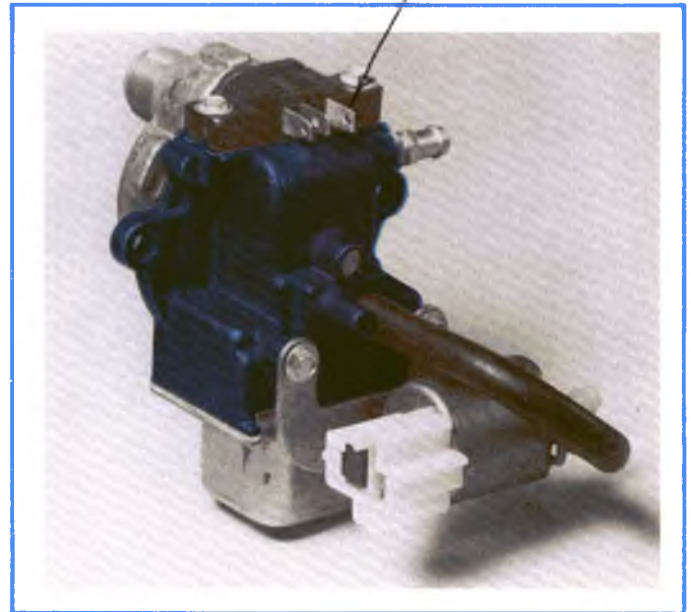


Figure 5-1, Diesel Transducers have a Blue or Black Colored Housing.

— CAUTION —

DIESEL TRANSDUCERS ARE NOT TO BE INTERCHANGED WITH GASOLINE TYPE TRANSDUCERS.

System Diagnostics . . .

The electrical and pneumatic circuits of diesel and gasoline transducers are similar. The diagnostic and service techniques presented in Part I and Part II should be followed. However, there are some special considerations in servicing diesel cruise control systems:

1. The diesel vacuum source is an engine driven vacuum pump (figure 5-2a), controlled by a vacuum regulator (figure 5-2b). Regulated vacuum output is a constant 6 to 7-inches Hg.

*FULL VAC TO CRUISE
= ERATIC OPERATION.*

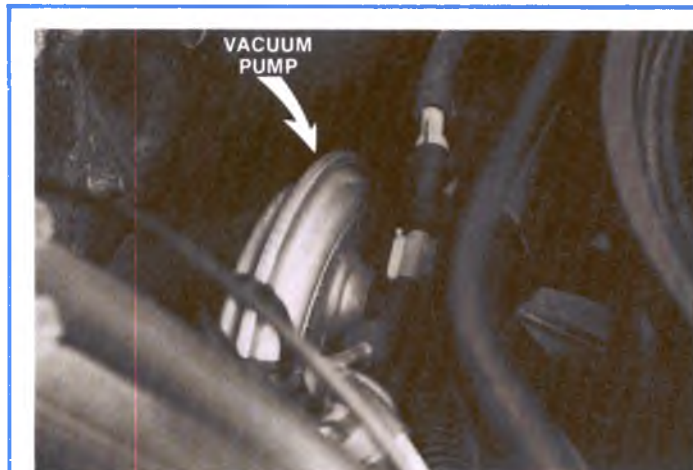
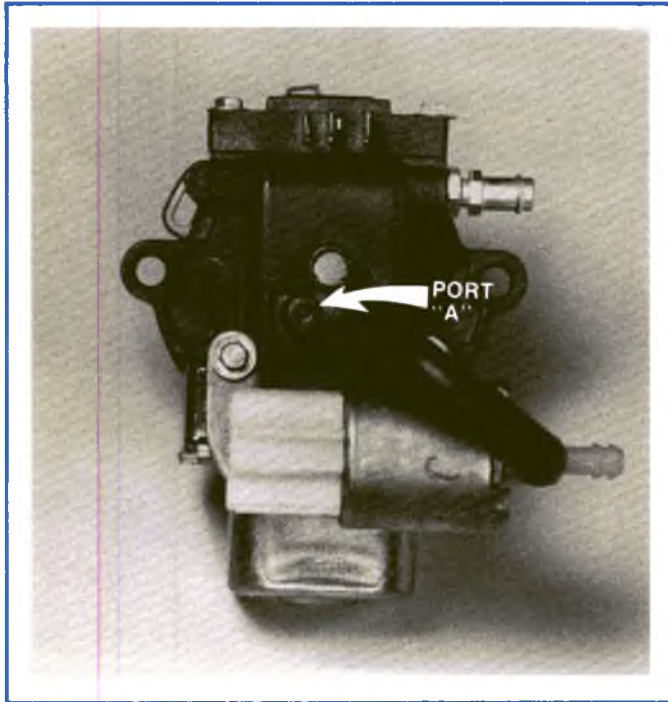


Figure 5-2a, Typical V-8 Diesel System Vacuum Pump.

Figure 5-2b, Vacuum Regulator.

V. Diesel Transducer, Non-resume and Resume Systems



2. All diesel transducers have an orifice cup in PORT "A" of the transducer clutch housing assembly (figure 5-3).

Figure 5-3, Orifice Cup in Diesel Transducer at PORT "A".

— NOTE —

If transducer repair is required, it must be performed by an authorized transducer repair facility as listed in the applicable AC-Delco repair bulletins.

VI. Electronic Cruise Control

*this car would resume when you didn't want it
like from a stop in the garage cad. had problems w/ their cruise up
until EFI*

Non-D.F.I. (Digital Fuel Injection) and Computer Integrated D.F.I., Cadillac

General Description

Figure 6-1 illustrates Electronic Cruise Control system components. Cruise Control is a speed control system that uses manifold vacuum or vacuum from a vacuum pump to actuate the throttle power unit, or servo. The servo unit moves the throttle when its diaphragm is subjected to varying amounts of vacuum. The amount of vacuum to the servo unit is controlled by a solenoid valve which constantly modulates vacuum to the servo unit in response to commands from the electronic controller or fuel ECM. The controller receives signals from the engagement and instrument panel switches, electric brake release switch and speed sensor. The speed sensor is located on the back of the speedometer cluster and provides signals representative of car speed to the control system. A wire harness connects the speed sensor to the electronic controller.

Input signals received from the sensor by the controller or ECM are used to control the servo unit solenoid valve which regulates the amount of vacuum to the servo unit to control the speed of the car.

A two or three position (off, on-auto or cruise) switch, located on the instrument panel, and an engagement switch, located at the end of the turn signal lever, control the operation of the system.

Two systems for brake release are provided:

1. An electric switch mounted on the brake pedal support cancels the controller signal by shutting off the system and venting the servo unit to atmosphere through the servo unit solenoid valve.
2. A vacuum release valve also is mounted on the brake pedal bracket and vents the servo diaphragm to atmosphere as a second disengagement system.

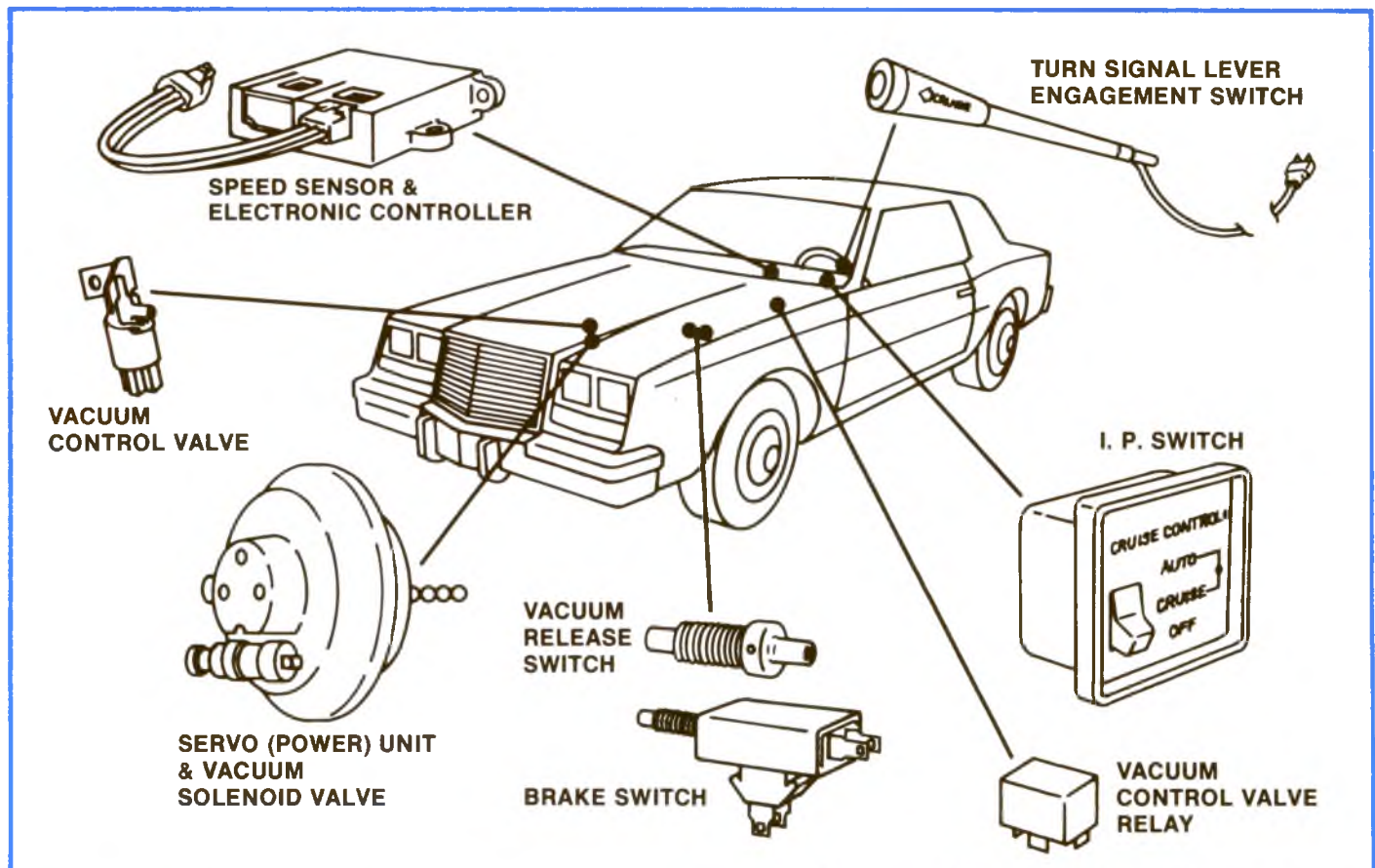


Figure 6-1, AC Electronic Cruise Control Components. *also worked by leaking vac. servo sol. valve pulsed vac. like the carb. sol.*

VI. Electronic Cruise Control

Component Operation

Electronic Controller

D.F.I. (Digital Fuel Injection) Only

Cruise Control operation is one of the many functions which the ECM controls. The ECM receives input signals from the Cruise Control engagement switches, the instrument panel switch, the brake release switch, the drive switch, and the speed sensor.

The ECM processes these Cruise Control inputs together with the DFI engine control information, and transmits command signals to the vacuum control solenoid valve to provide vacuum to the system and servo unit solenoid valve to control vehicle speed.

Non-D.F.I.

The electronic control module receives signals from the cruise engagement switch, instrument panel switch, electric brake release switch and speed sensor. It processes this information and transmits command signals to the vacuum control valve to provide vacuum to the system and servo unit solenoid valve to control vehicle speed.

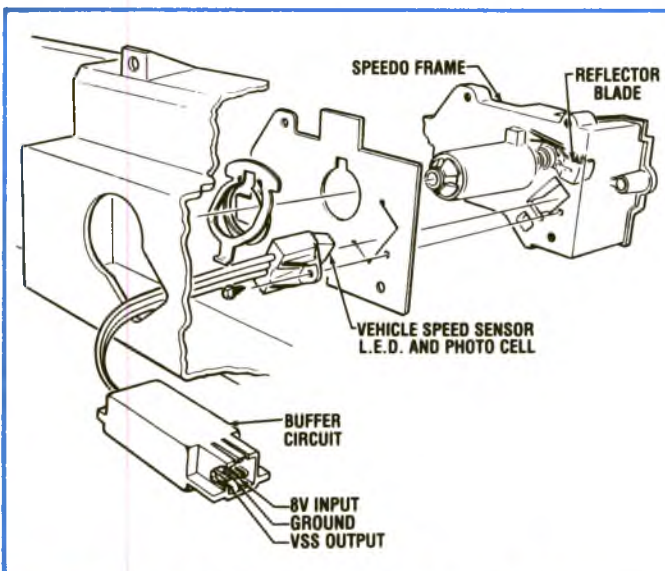


Figure 6-2, Vehicle Speed Sensor/Buffer Amplifier, D.F.I.

Speed Sensor Circuit

D.F.I. Only

The speed sensor consists of a light emitting diode and a photo transistor enclosed in one connector which attaches to the back of the speedometer cluster adjacent to the speedometer cable (figure 6-2). The photo transistor generates an electrical signal corresponding to vehicle speed when it is exposed to reflected light from the light emitting diode. The photo transistor is activated by reflected light from each passing bar of the rotating speedometer drive magnet. The surface of the drive magnet is highly reflective to enhance the reflection of light to the photo transistor, and the surface of the speed cup has a dull finish which inhibits erroneous reflections. The light from the light emitting diode is not visible to the human eye because it is part of the infrared spectrum of light.

The speed sensor produces a weak voltage signal and must be used for several speed inputs. Therefore, the buffer amplifier is placed between the speed sensor and the ECM to amplify and distribute the speed signal. The buffer amplifier also inverts this speed signal so the signal will be in a format which is understood by the ECM.

On DFI, the speed sensor is on all cars for ECM usage; cruise control uses buffer amplifier output.

VI. Electronic Cruise Control

Non-D.F.I.

On V-6 equipped cars with CCC, the speed sensor circuit is similar to DFI, except the speed signal is sent to an electronic controller, or control module, for cruise control purposes (figure 6-3). On diesel equipped cars with digital speedometer clusters, the cruise control circuit is the same as used on V-6; however, diesel equipped cars with mechanical speedometer clusters do not use a buffer amplifier in their speed sensor circuit.

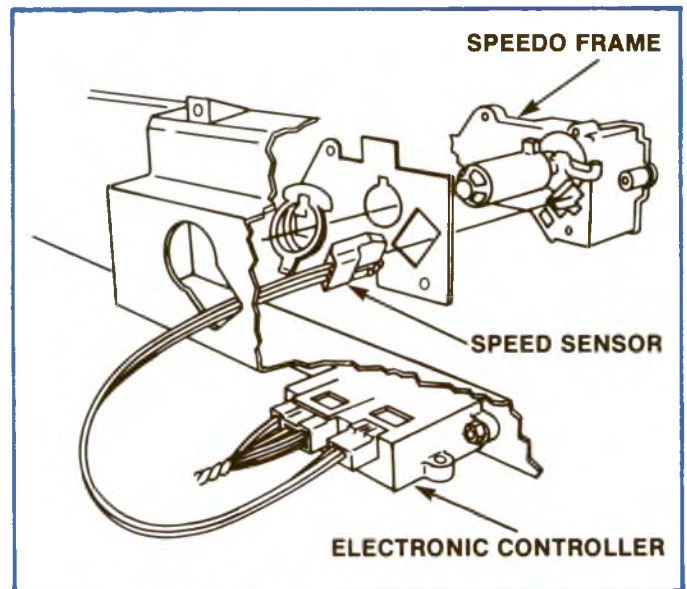


Figure 6-3, Vehicle Speed Sensor, Non-D.F.I.

Vacuum Control Valve

The vacuum control valve (figure 6-4) opens when the system is engaged and the green light on the instrument panel switch is illuminated. The valve operates in response to a signal from the ECM or the electronic controller. When the vacuum control valve is open, vacuum is available at the servo unit solenoid valve for control of the servo unit as described below. The vacuum control valve is closed when the system is off.

Servo Unit Solenoid Valve

The solenoid valve constantly modulates vacuum to the servo unit in response to commands from the electronic controller or ECM so that the throttle is in the proper position for the desired cruise speed (figure 6-4).

Servo Unit

The Servo Unit (figure 6-4) is a vacuum actuated variable position diaphragm assembly that positions the throttle when the system is in operation. It operates the throttle linkage via a bead chain actuator (4.1 liter V-6 "C" car), combination chain and cable actuator (4.1 liter V-8 "C" car) or rod actuator (all other models). When controlled vacuum is applied to evacuate the servo, atmospheric pressure applies a force to the diaphragm and moves the diaphragm inward, pulling on the actuator to open the throttle.

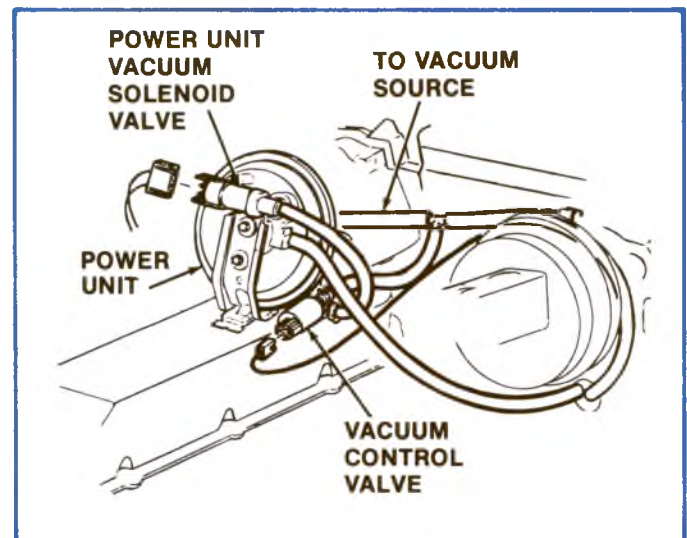


Figure 6-4, Vacuum Control Valve and Servo (Power) Unit.

VI. Electronic Cruise Control

Brake Release Switches

One electrical brake release switch and one vacuum release valve are employed in the Cruise Control system (figures 6-5A and 6-5B).

When the brake pedal is depressed, the electric release switch cuts off the voltage supplied through the instrument panel switch to the electronic controller. Engagement switch operation is required to return the electronic controller to operation. The vacuum release valve operates after the electric release switch disengages whenever the brake pedal is depressed. This switch serves as a backup release system and opens a port that vents the servo unit to atmospheric pressure, thereby allowing the throttle to return to the idle position.

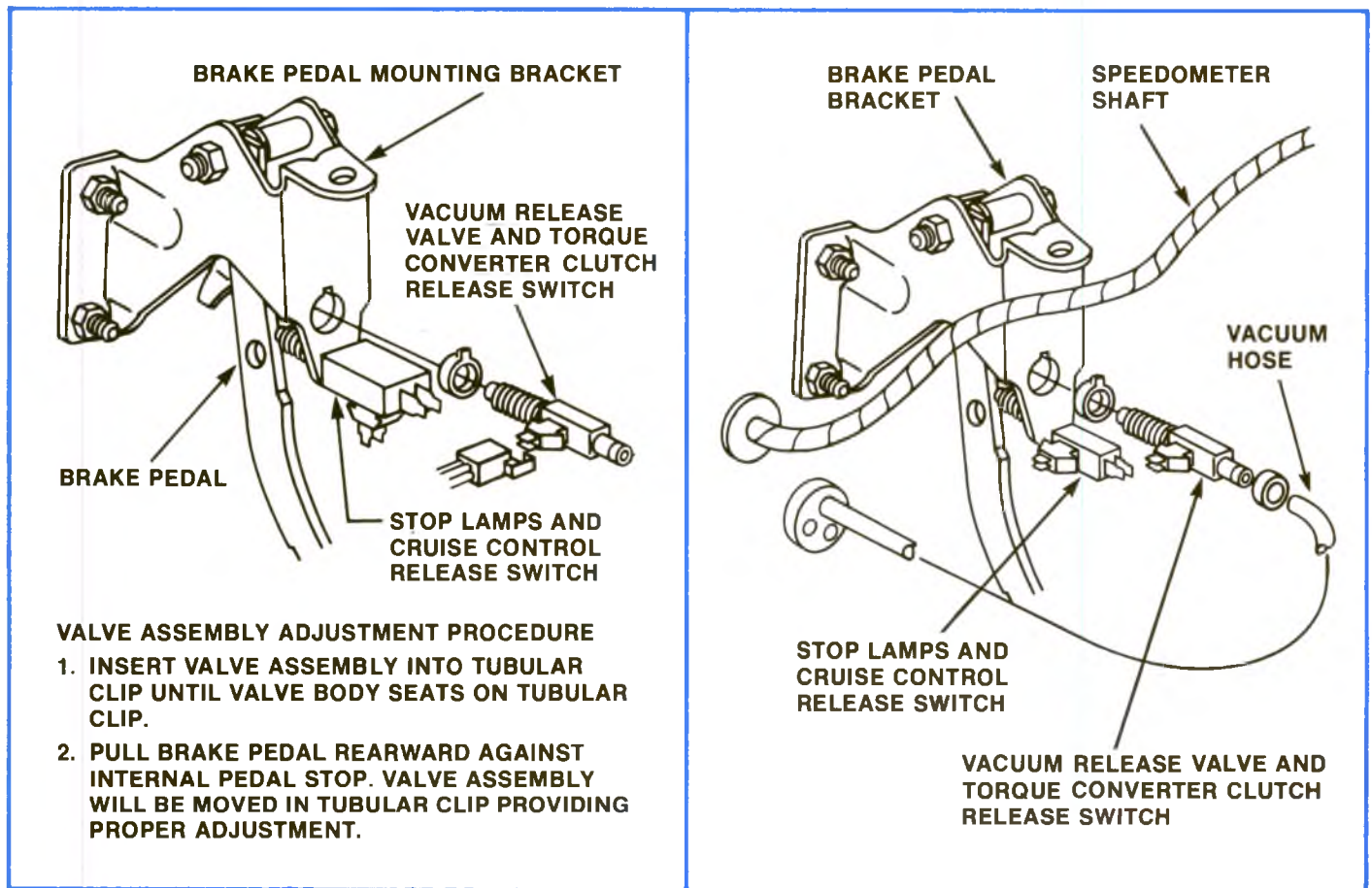


Figure 6-5A, Cruise Control Brake Valve and Release Switch, E and K.

Figure 6-5B, Cruise Control Brake Valve and Release Switch Except E and K.

VI. Electronic Cruise Control

Instrument Panel Switch, 1977 to 1979

This switch is located on the instrument panel to the left of the steering column adjacent to the headlamp switch. The three position toggle switch (figure 6-6) controls the electrical power to the cruise control system. When the switch is in the "OFF" position the system cannot be engaged. When the switch is in either "CRUISE" or "AUTO", the amber light to the right of the words "CRUISE CONTROL" is lit and the system may be engaged with the switch located in the turn signal lever at any speed above approximately 25 mph. When the system is engaged, a green light is illuminated adjacent to the words "AUTO" and "CRUISE".

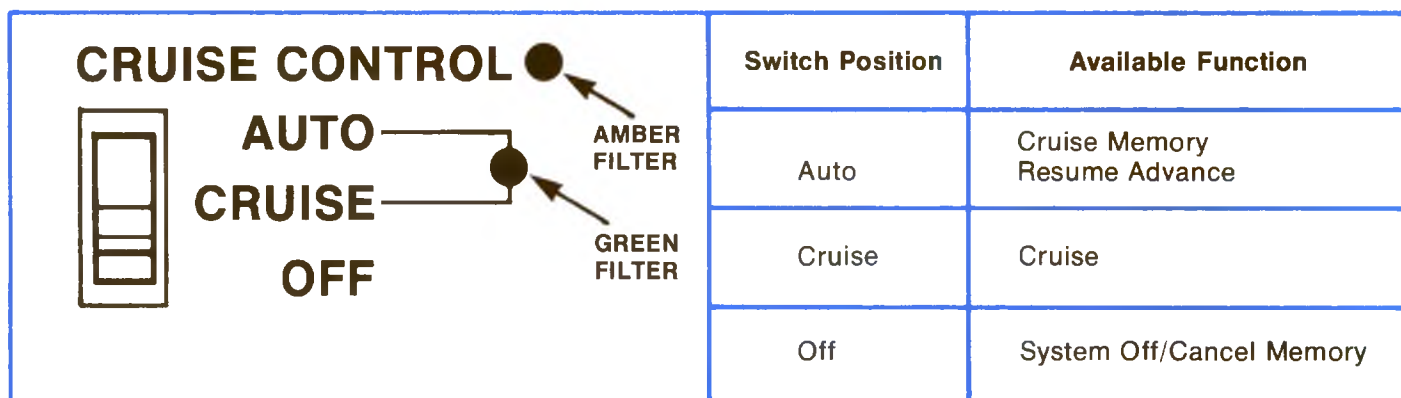


Figure 6-6, Instrument Panel Switch, 1977 to 1979.

Instrument Panel Switch, 1980 to 1983

This is a two-position toggle switch which controls power to the cruise control system. When the switch is in the "OFF" position the system cannot be engaged. When the switch is in the "ON-AUTO" position, the amber light next to the words "CRUISE CONTROL" is lit and the system may be engaged with the switch located in the turn signal lever at any speed above approximately 25 mph. When the system is engaged, a green light is illuminated adjacent to the word "AUTO".

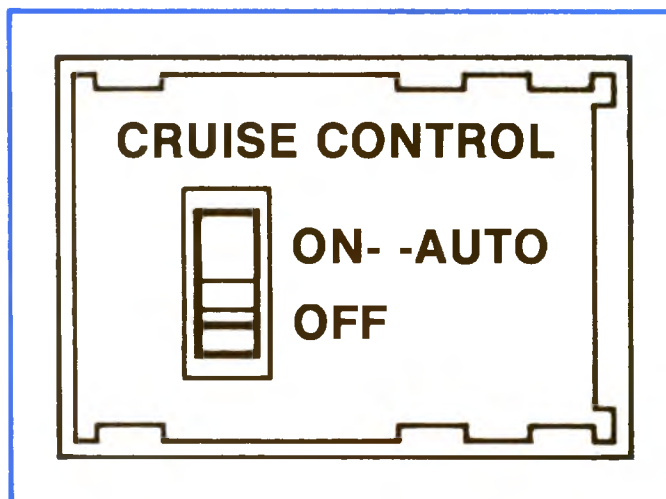


Figure 6-7, Instrument Panel Switch, 1980 to 1983.

VI. Electronic Cruise Control

Cruise Engagement Switch, 1979-1980

The engagement switch, located within the turn signal lever, has various modes of operation and is dependent upon the position of the instrument panel switch (figure 6-8).

With the instrument panel switch in the "OFF" position, the system will not operate. With the instrument panel switch in the "CRUISE" position, the engagement switch operates as follows:

a. Switch in Fully Released Position:

1. System not engaged: No function of the system will occur.
2. System has been previously engaged: Control voltage is being supplied to the servo unit solenoid valve from the electronic controller. The unit solenoid valve regulates vacuum to the servo unit which maintains throttle position for desired speed.

b. Switch Partially Depressed (Detent Position)

The electronic controller is activated and a control voltage is supplied to the servo unit solenoid valve. In turn, the servo unit solenoid valve regulates the vacuum supplied to the servo to initially set or reset the speed.

c. Fully Depressed

The electronic controller signals the power unit solenoid valve to vent the servo unit to atmosphere. This position is used by the driver when a decrease in speed is desired.

The driver may fully press the button with no pressure on the accelerator pedal. In this case, the throttle returns to idle and the car slows. When the button is released, the vehicle will cruise at the new lower speed.

With the instrument panel switch in the "AUTO" position, the engagement switch operates as follows:

a. Switch in Fully Released Position

Operation is the same as when the instrument panel switch is in the "CRUISE" position.

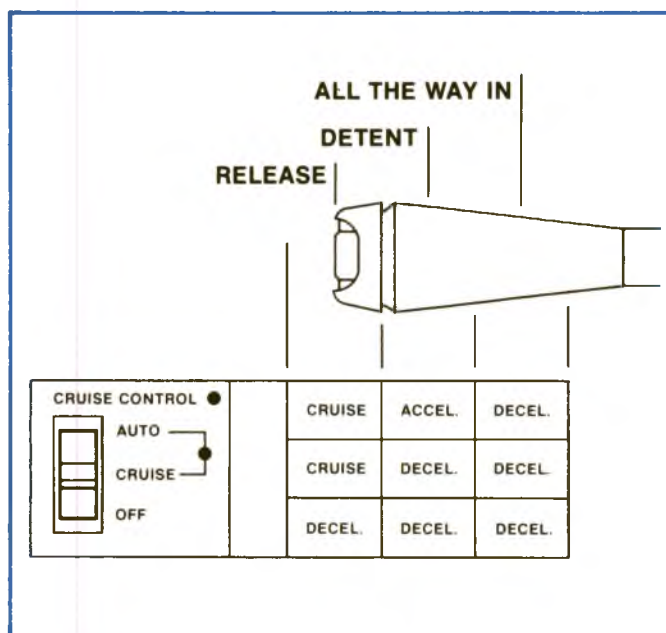


Figure 6-8, Cruise Engagement Switch, 1979-1980.

b. Switch Partially Depressed (Detent Position)

This position allows the driver to engage the system at a given speed, resume that speed after braking and accelerate from a previously set speed. After obtaining the desired speed using the accelerator pedal the driver can partially depress the engagement switch and the electronic controller will provide a control voltage to the servo unit solenoid valve and regulate the required vacuum to the servo unit to maintain the set speed. If the driver momentarily applies the brakes and wishes to resume the previously set speed, partially depressing and releasing the engagement switch (above approx. 25 mph), will accelerate the car at a controlled rate until the previously set speed is reached. If the driver wishes to advance the speed of the car from an initial set speed, partially depressing and holding the engagement switch will accelerate the car at a controlled rate until the push button is released. The car will now cruise at the new speed.

c. Fully Depressed

Operation is the same as when the instrument panel switch is in the "CRUISE" position.

Cruise Engagement Switch, 1980 and Later

The engagement switch, located within the turn signal lever, has various modes of operation (figure 6-9).

With the instrument panel switch in the "OFF" position, the system will not operate. With the instrument panel switch in the "ON-AUTO" position, the engagement switch operates as follows:

a. Switches in Fully Released Position:

1. System not engaged: No function of the system will occur.
2. System has been previously engaged: Control voltage is being supplied to the servo unit solenoid valve from the electronic controller. The servo unit solenoid valve regulates vacuum to the servo unit which maintains throttle position for desired speed.

b. Pushbutton Depressed and Held

After obtaining the desired speed by using the accelerator pedal, the driver can momentarily depress the pushbutton switch and the electronic controller will provide a control voltage to the servo unit solenoid valve and regulate the required vacuum to maintain the set speed. When a decrease in speed is desired, the driver may depress and hold the button with no pressure on the accelerator pedal. The electronic controller signals the servo unit solenoid valve to vent the servo unit to atmosphere. In this case, the throttle returns to idle and the car slows. When the button is released, the vehicle will cruise at the new lower speed.

c. Slide Lever Actuation

This switch allows the driver to resume a previously set cruise speed after braking and accelerate from a previously set speed. If the driver momentarily applies the brakes and wishes to resume the previously set speed, depressing and releasing the slide switch (above approx. 25 mph), will accelerate the car at a controlled rate until the previously set speed is reached. If the driver wishes to advance the speed of the car from an initial set speed, actuating and holding the slide switch will accelerate the car at a controlled rate until the slide switch is released. The car will now cruise at the new speed.

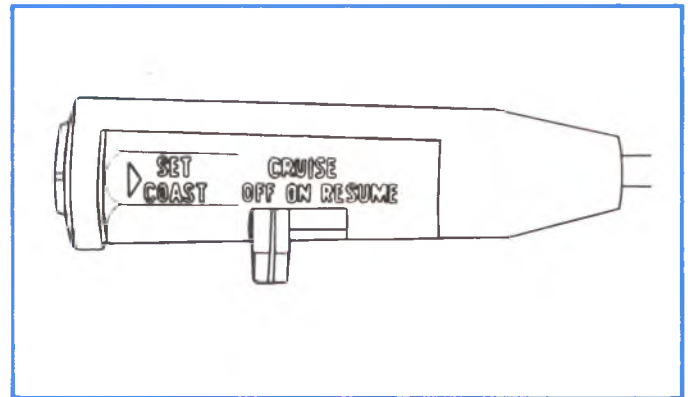


Figure 6-9, Cruise Engagement Switch, 1980 and Later.

VI. Electronic Cruise Control

Typical Circuit Operation, Non-D.F.I.

Refer to the Non-DFI schematic diagram on the fold-out page, figure 6-10.

With the IGNITION SWITCH in "Run," voltage is applied through the C/C FUSE to the CRUISE CONTROL SWITCH. With the control switch in "Auto-Cruise," current flows through the amber CRUISE-ON INDICATOR to ground. Voltage is now available through terminal D on the control switch and the BRAKE SWITCH and applied: 1) through the green CRUISE ENGAGE INDICATOR to terminal B of the CRUISE CONTROLLER; 2) to terminal H of the CRUISE CONTROLLER; and 3) through the ENGAGE SWITCH ASSEMBLY to terminal E or D of the CRUISE CONTROLLER.

The CRUISE SERVO SOLENOID controls the amount of vacuum applied to the CRUISE SERVO. This solenoid has no effect on the CRUISE SERVO, however, until the CRUISE VACUUM SOLENOID is open. The CRUISE VACUUM SOLENOID is open to let vacuum pass through only when the system is engaged.

The VEHICLE SPEED SENSOR sends a variable signal to the CRUISE CONTROLLER based on car speed. When car speed is over about 25 mph, the CRUISE CONTROL system can be engaged.

With the CRUISE CONTROL SWITCH in "Auto-Cruise," the system is engaged by briefly pressing the "Set/Coast" lock-in button. The CRUISE CONTROLLER then lets current flow through terminal C and the

CRUISE VACUUM SOLENOID to ground. This opens the CRUISE VACUUM SOLENOID, and vacuum is supplied to the CRUISE SERVO SOLENOID. The CRUISE SERVO SOLENOID is operated by current through CRUISE CONTROLLER terminal F. Signals from the VEHICLE SPEED SENSOR vary that current when car speed changes. These variations in current change the amount of vacuum the CRUISE SERVO SOLENOID applies to the CRUISE SERVO. The CRUISE SERVO keeps the set speed. The CRUISE CONTROLLER also applies ground to the green CRUISE-ENGAGE INDICATOR through terminal B. The indicator goes on.

Once the speed has been set, depressing the gas pedal will increase car speed. Releasing the gas pedal lets the car coast back down to the set speed. The Cruise Control set speed is not changed by speeding up unless the "Set/Coast" lock-in button is pressed.

Set speed can be reduced by pressing and holding the "Set/Coast" button. This breaks the circuit through controller terminal C. The CRUISE VACUUM SOLENOID closes, and the CRUISE SERVO no longer gets any vacuum. The car coasts to a lower speed. This speed becomes the new set speed when the button is released.

If the "Resume/Accel" slide switch is moved and held, the car will speed up. When it is released, a new set speed is established. If, after braking, the slide switch is moved and released, the car will resume the previously set speed (memory speed).

The BRAKE SWITCH will disengage the set speed but not the memory speed setting. You must turn off the control switch or the IGNITION SWITCH, or set another cruise speed using the "Resume/Accel" slide switch to erase the memory speed setting.

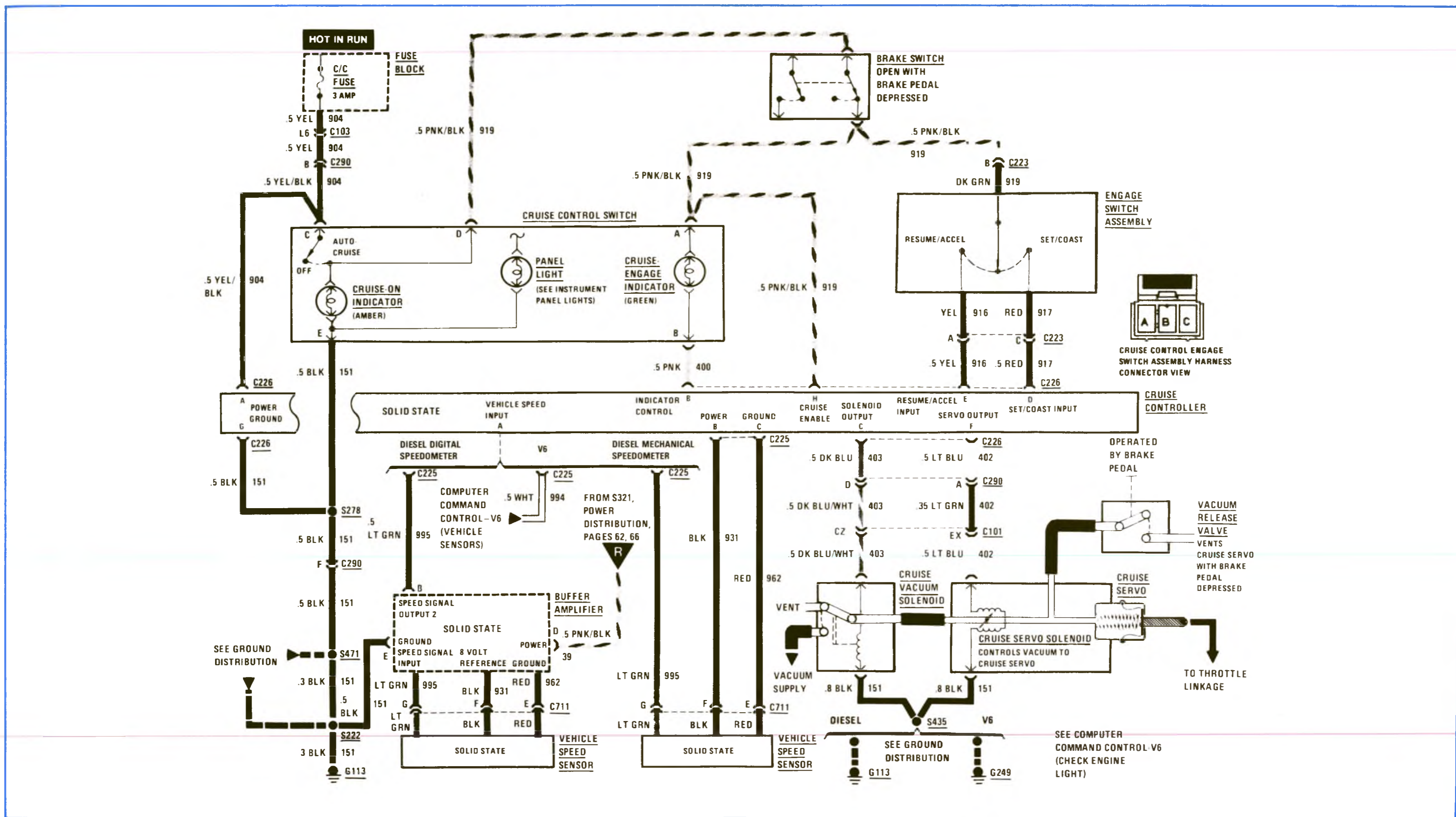


Figure 6-10, Non-D.F.I. Cruise Schematic Diagram.

VI. Electronic Cruise Control

VI. Electronic Cruise Control

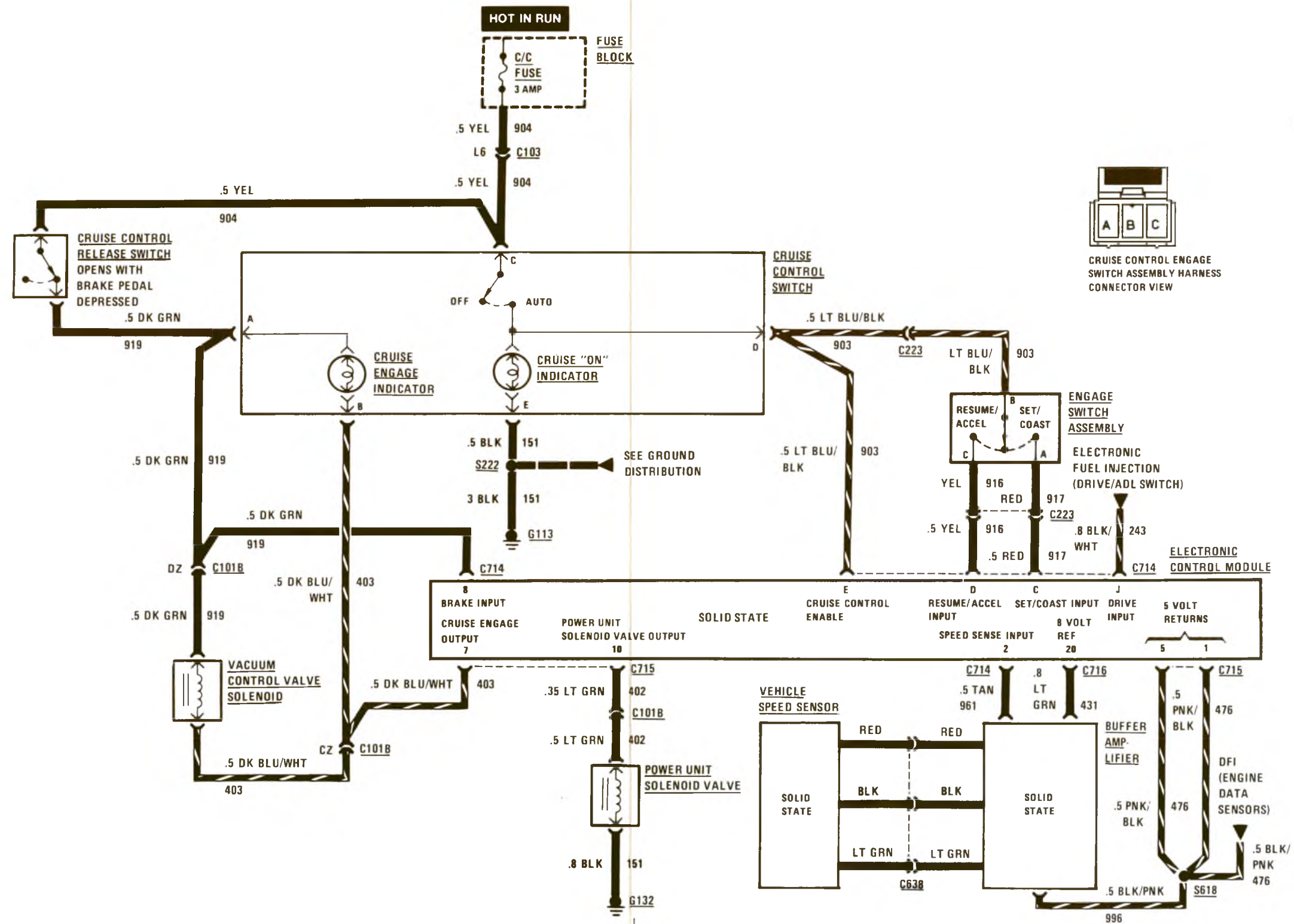


Figure 6-11, D.F.I. Cruise Schematic Diagram.

Typical Circuit Operation, D.F.I.

Refer to the D.F.I. cruise schematic diagram on the fold-out page, figure 6-11.

With the IGNITION SWITCH in "Run," voltage is applied through the C/C FUSE to the CRUISE CONTROL SWITCH and the CRUISE CONTROL RELEASE SWITCH. With the control switch in "On-Auto" current flows through the amber indicator bulb to ground. Current also flows through terminal D on the control switch and follows 2 paths: 1) to the ELECTRONIC CONTROL MODULE (ECM) as the Cruise Control Enable signal and 2) to the ENGAGE SWITCH ASSEMBLY.

Current flow from the CRUISE CONTROL RELEASE SWITCH follows 2 paths: 1) to the ECM as the Brake Input signal and 2) to the VACUUM CONTROL VALVE SOLENOID.

The VEHICLE SPEED SENSOR sends low voltage signal pulses which represents car speed to the BUFFER AMPLIFIER. The Amplifier modifies the pulses to put them in the right form for the ECM. One of the ECM Functions is to combine the Cruise Control input signals and the DIGITAL FUEL INJECTION (DFI) engine control information. It then sends command signals to the VACUUM CONTROL VALVE SOLENOID and POWER UNIT SOLENOID VALVE.

The CRUISE SERVO SOLENOID VALVE controls the amount of vacuum applied to the CRUISE SERVO. This has no effect on the CRUISE SERVO, however, until the VACUUM CONTROL VALVE is open. The VACUUM CONTROL VALVE is open (to let vacuum pass through to the power unit) only when the system is engaged.

When the control switch is in "Auto-On" and the vehicle speed is above 25 mph, the system can be engaged by depressing the Set/Coast button in the Engage Switch Assembly. Current will flow through the switch to the ECM as the Set/Coast Input signal. When the button is released the ECM sends a Cruise Engage signal to operate the VACUUM CONTROL

VALVE SOLENOID and CRUISE ENGAGE INDICATOR. The ECM will operate the CRUISE SERVO SOLENOID VALVE with the Power Unit Solenoid Valve input signal to maintain the selected speed.

Once the speed has been set, depressing the gas pedal will increase car speed. Releasing the gas pedal lets the car coast back down to the set speed. The Cruise Control set-speed does not change by speeding up unless the Set/Coast button is depressed. If the driver depresses the Set/Coast button and releases the gas pedal at the same time, then the throttle returns to an idle position and the car's speed decreases. The car will cruise at the speed of the car when the button is released.

The system can be disengaged four ways: 1) by Depressing the brake pedal (this opens the CRUISE CONTROL RELEASE SWITCH by removing the Brake Input signal to the ECM and vents the POWER UNIT vacuum to the atmosphere); 2) by Moving the shift lever out of the Drive range (this removes the Drive Input from the ECM); 3) by turning the CRUISE CONTROL SWITCH to "off"; 4) when the ECM sets any diagnostic code.

Turning the system "off" erases the speed in memory. To again use the system it must be turned back "on" and repeat the procedures for setting a desired speed.

If the system has been disengaged by any method (other than turning the system "off"), the system will resume operation when the cause of disengagement has been removed. To re-engage the system place the ENGAGE SWITCH in the "Resume/Acceleration" position and release it. The ECM receives the Resume/Accel input signal and operates the CRUISE SERVO SOLENOID VALVE to accelerate the vehicle at a controlled rate until the previous set-speed is reached again. If the driver wishes to advance the speed from the initial set-speed keeping the switch depressed will accelerate the car at a controlled rate until the switch is released. The car will not cruise at the new speed.

VI. Electronic Cruise Control

Diagnosis, Non-D.F.I.

Road Test

- Step 1** Put dash switch in "OFF" position. Drive car to 50 mph. Push engagement switch button on turn signal lever and release. System should remain inoperative.
- Step 2** Put dash switch in CRUISE (center) position on 1977-79 models. Amber light should come on. On 1980 and later models put dash switch in "ON-AUTO" position and Amber light should come on.
- Step 3** Engage system by momentarily pushing the turn signal engagement switch button and releasing at 50 mph; remove foot from accelerator. Green light should come on when button is released and system is engaged. Vehicle should maintain speed of 50 mph. Note amount, if any, by which car speed differs from the 50 mph speed when engaged. This is called "lock-in" error and can be corrected by the adjustment procedure.
- Step 4** Put dash switch in "AUTO" position on a 1977 thru 1979 model. The vehicle speed should not change.
- Step 5** Push engagement switch button in to the detent position and hold on a 1977 thru 1980 model, or push slide switch and hold on a 1981 or later model. Vehicle should accelerate at a controlled rate. Release slide or button to engage system at cruise speed or approximately 55 mph. System should now be set at a new speed and vehicle should maintain that speed.
- Step 6** Depress brake pedal an estimated 1/2 inch; green light should go out confirming action of electric brake release switch and vehicle should start to slow down. Allow vehicle to slow to approximately 45 mph, using brakes if desired.
- Step 7** Momentarily depress slide switch, on 1981 and later, or on 1977-1980 units depress engagement switch button to detent position, and release. Vehicle should accelerate at a controlled rate and resume previously set speed of 55 mph and maintain that speed. Green light should come on when slide or button is released.

Step 8 Push engagement switch button all the way in and hold. Green light should go out. Coast to 50 mph.

Step 9 Release button to engage system at 50 mph; green light should come on and vehicle should maintain that speed.

Preliminary Inspection

Make sure all test equipment such as test lights and voltmeters are in good working order prior to using them.

a. Electrical and Vacuum Inspection Fuse

Inspect Cruise Control fuse and replace as necessary.

b. Electric Brake Release Switch (Engine Off) On Car Check:

Step 1 Turn ignition ON and instrument panel switch to "ON-AUTO" or CRUISE position.

Step 2 Connect test light (or voltmeter) to ground.

Step 3 Probe: Feed wire at connector; lamp should light (12 volts on meter), indicating proper feed.

Step 4 Check switch adjustment with probe still at Feed wire depressing brake pedal — (1/8" - 1/2") should turn out light (no voltage on meter).

Step 5 If lamp in (3) did not light, probe wire in adjacent connector cavity. If probe lights (12 volts on meter) adjust or replace switch as necessary. If no light or 12 volts, wiring to switch is faulty, refer to wiring diagrams in this section.

c. Off Car Check:

Step 1 Use ohmmeter or self-powered test light.

Step 2 With switch plunger extended, meter should read infinity (open circuit). Test light OFF.

Step 3 With switch plunger fully depressed, meter should indicate continuity. Test light ON.

Instrument Panel Switch 1977 to 1979

a. On Car Check-Switch (Engine Off)

Step 1 Turn ignition ON.

Step 2 Connect test light on voltmeter to ground.

Step 3 Disconnect the 3 wire connector from the turn signal lever engage switch harness to the cruise harness connector.

- Step 4** Probe the three terminals of the cruise harness connector, first with the instrument panel switch in "OFF", then "CRUISE", and finally in the "AUTO" position. In either "Cruise" or "Auto" switch positions, the amber indicator should light. The checks should indicate the following:

Instrument Panel Switch On Car Test, 1977 to 1979			
Instrument Panel Switch Position	Test Light Indication at Terminal		
	No. 1 (Yellow)	No. 2 (Green)	No. 3 (Red)
Auto	Off	On	Off
Cruise	On	Off	Off
Off	Off	Off	Off

Instrument Panel Switch (Off Car) 1977 to 1979

- Step 1** Refer to Service Manual for removal and installation of the switches: Use ohmmeter or self powered test light.
- Step 2** Identify printed circuit terminals from letters A thru H on harness connector. Letters read from bottom to top A thru H on switch assembly.
- Step 3** The checks should indicate this following:

Instrument Panel Switch Off Car Test, 1977 to 1979			
Instrument Panel Switch Position	Indication Between Terminals		
	A to B	A to C	E to F
Auto	Closed	Open	Closed
Cruise	Open	Closed	Closed
Off	Open	Open	Open

Instrument Panel Switch

a. On Car Check-Switch (Engine Off) 1980 and Later

- Step 1** Turn ignition ON.
- Step 2** Connect test light or voltmeter to ground.
- Step 3** Disconnect the 3 wire connector from the turn signal lever engage switch harness to the cruise harness connector.
- Step 4** Probe the three terminals of the cruise harness connector, first with the instrument panel switch in "OFF", then in the "ON-AUTO" position. In "OFF" position, there should be no power to any of the three terminals. In the "On-Auto" position — center cavity (B), pink/black wire, test lamp should light (12 volts on meter) and outer cavities (A), yellow wire, and (C), red wire, should NOT light. In the "On-Auto" switch position, the amber indicator should light.

Engage Switch and Harness (On or Off Car) 1977 to 1979

The engage switch can be checked after disconnecting it from the harness and performing the following tests with an ohmmeter:

Engage Switch On or Off Car Test, 1970 to 1979			
Engage Switch	Indication Between Terminals		
	1 to 2 (Yellow-Green)	1 to 3 (Yellow-Red)	2 to 3 (Green-Red)
Released	Closed	Closed	Closed
Partially Depressed	Open	Open	Closed
Fully Depressed	Closed	Open	Open

VI. Electronic Cruise Control

Engage Switch and Harness (On or Off Car) 1980 and Later

The turn lever engage switch can be checked after disconnecting it from the harness and performing the following tests with an ohmmeter.

Engage Switch On or Off Car Test, 1980 and Later			
Engage Switch	Indication Between Terminals		
	1 to 2 (Yellow-Green)	1 to 3 (Yellow-Red)	2 to 3 (Green-Red)
Released	Open	Open	Open
Slide Depressed	Closed	Open	Open
Pushbutton Depressed	Open	Open	Closed

If incorrect indications occur, replace engagement switch and harness.

With one lead of ohmmeter connected to steering column mounting bracket, check each terminal. All should show open. If any indicate continuity, a short exists and lever and harness must be replaced. Move shift lever through full range when checking each wire.

Vacuum Control and Servo Unit Solenoid Valves

a. Resistance Test (Engine Off)

Step 1 Disconnect electrical connector at solenoid valve being tested.

Step 2 Connect ohmmeter to solenoid valve terminals.

Step 3 Measure resistance, it should be between 37 and 48 ohms on servo unit valve and between 23.5 and 27.5 ohms on vacuum control valve.

Step 4 If reading is outside of limits replace applicable valve.

b. Functional Test (Engine Off)

Step 1 Disconnect electrical connector at valve being tested.

Step 2 Connect a jumper wire from the positive terminal of the battery to one terminal of the valve being tested.

Step 3 Connect another jumper wire to ground.

Step 4 Brush the other end of the grounded jumper wire across the remaining terminal of the valve. You must hear the vacuum control valve or servo unit solenoid valve open and close as you make and break contact with the terminal. Both valves will click twice indicating that each respective valve is functioning properly.

c. Functional Test (Engine Operational)

Step 1 Prior to starting the engine, disconnect the bead chain, cable or rod actuator at the servo unit.

Step 2 Disconnect the electrical connectors at the vacuum control and servo unit valves.

Step 3 Start engine and let idle. Install jumper wires from battery positive terminal to one terminal on both vacuum control valve and servo unit solenoid valve. Ground second terminal on each valve. Servo diaphragm should fully retract, indicating both solenoid valves are functional.

Step 4 Remove battery jumper from servo solenoid; the diaphragm should return to full extension proving that no vacuum is reaching it. If it does not fully return, the servo unit solenoid valve is leaking and must be replaced.

Step 5 Reinstall battery jumper wire to servo solenoid and remove battery jumper from vacuum control valve. Diaphragm should return to full extension. If it does not, the vacuum control valve is leaking and must be replaced.

d. Controller Current Leakage Test at Servo Unit Solenoid Valve Connector (Engine Operational)

Step 1 Disconnect electrical connector at servo solenoid valve. I.P. switch in "On" position.

Step 2 With car running at idle, check D.C. voltage between connector terminals. Must be less than 1.0 volt D.C.

Step 3 Momentarily increase idle speed for several seconds. Voltmeter must indicate less than 1.0 volt D.C.

Step 4 Any indications above 1.0 volt D.C., replace controller.

e. Instrument Panel Switch (Amber "ON" Lamp Inoperative or Malfunctioning) (Engine Off)

Step 1 Turn ignition switch ON.

Step 2 Place instrument panel switch in "ON-AUTO", or CRUISE.

Step 3 If amber "ON" lamp is not illuminated, check for burned-out lamp, open ground wire, open connector, inoperative switch, blown fuse or printed circuit.

Step 4 Place instrument panel switch in "OFF" position.

Step 5 If amber "ON" lamp is illuminated, check for shorted leads or inoperative switch, or blown fuse.

f. Instrument Panel Switch (Green "Cruise" Lamp Circuit)

Step 1 If road test shows system controls speed and "green" indicator light is inoperative, check for burned out lamp or open in wiring between switch connector and controller connector (pink wire) and inoperative controller.

With I.P. switch in "ON-AUTO" (ignition on), ground cavity "B" in controller connector; green lamp should light. If it does but not during road test, replace controller.

Step 2 If green indicator remains "on" when system is not controlling speed, check for short in harness between switch and controller connector (pink wire). If OK, replace controller or ECM.

Step 3 Amber light should be on to confirm power supply.

Controller

There should be no attempt made to repair the electronic cruise controller. Check to make sure connectors are fully seated — Red (8) way and red (3) way speed sensor. If all other components have been checked and found to be functioning properly — then replace the controller.

Speed Sensor Check On (Engine Off)

Step 1 Turn ignition on and Cruise dash switch to "ON-AUTO" position.

Step 2 Refer to Service Manual for partial removal of the speedometer cluster for access to the speed sensor 3-way connector located on the electronic controller. Connect voltmeter between ground and No. 2 (black) terminal. Note and record this voltage reading. Should read voltage between 9 and 11 volts. This is less than full battery voltage because of the

internal circuitry of the electronic controller. If voltage is outside of limits replace the controller.

Step 3 Connect voltmeter between ground and No. 3 (red) terminal. Voltage should be 1 to 2 volts less than value in terminal No. 2. This is the voltage drop through the light emitting diode. If voltage is outside of limits, replace the speed sensor.

Step 4 Connect voltmeter between ground and No. 1 terminal (green wire). Roll car forward while checking voltage. Voltage should fluctuate at least 5 volts from low points to peaks (output of photo transistor) and each peak should be within 1 volt of reading at No. 2 terminal (black wire — Step 2 above). Also, two peaks should occur within six feet of car travel.

This check requires a high quality voltmeter (20,000 ohms per volt or greater).

Vacuum System Inspection (Engine Operational)

Step 1 Prior to starting the engine, disconnect the bead chain, cable or actuating rod at the servo unit.

Step 2 Disconnect the electrical connectors at the vacuum control and servo unit solenoid valves.

Step 3 Actuate both the vacuum control and servo unit solenoid valve with jumper wires. This is done by connecting jumper wires from the battery positive terminal to one terminal on each valve and grounding the remaining terminal on each valve with another set of jumper wires.

Step 4 Start the engine and let idle.

Step 5 With brake pedal in free position, diaphragm should pull in to full stroke. Have a helper depress the brake pedal down about 1½ inches and the diaphragm should relax to its free position proving that the vacuum release valve is working and its hose unobstructed.

Step 6 If system will not hold vacuum, remove brake release vent valve hose at servo unit and plug servo unit hole (manifold vacuum should be open).

Step 7 If servo unit draws down then problem condition exists in brake release vacuum vent system.

Step 8 If servo unit will not draw down, inspect diaphragm and connectors at valves for leaks.

VI. Electronic Cruise Control

D.F.I. (Digital Fuel Injection) Cruise Diagnosis

Figure 6-12 is the electrical schematic diagram for the D.F.I. cruise control circuit.

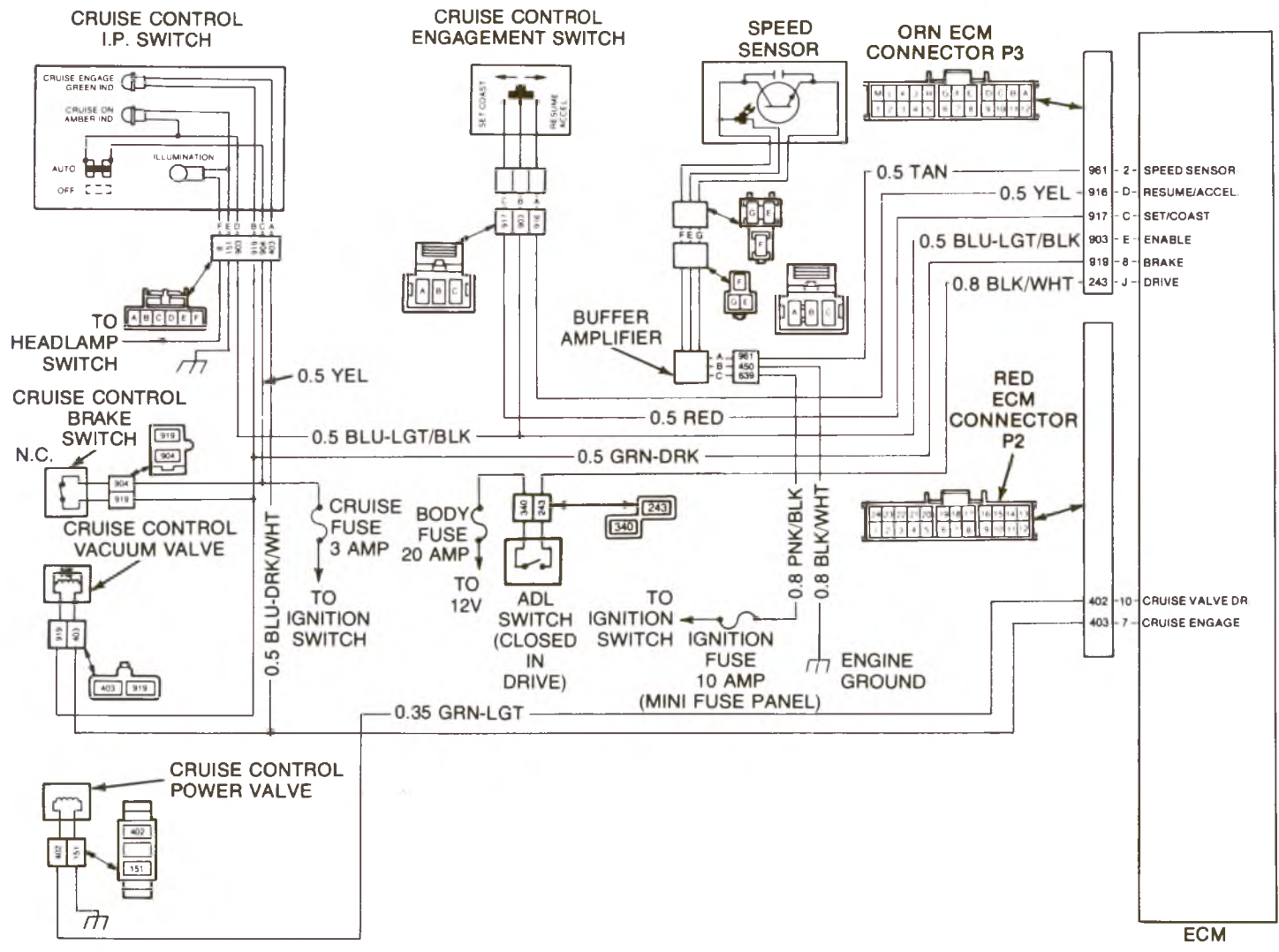


Figure 6-12, D.F.I. Cruise Control Circuit Diagram.

Code 60, Cruise Control Circuit, Transmission Not In Drive

Code 60 (figure 6-13) indicates that the transmission was not in drive when the Cruise Control was engaged. Whenever the condition which set Code 60 is present, the Cruise Control will disengage.

To begin the diagnosis, perform the switch tests. If Code 73 sets, refer to diagnostic chart 73. If Code 73 passes, then the DFI system is OK. Code 60 was caused by operator error or by an improperly adjusted transmission lever.

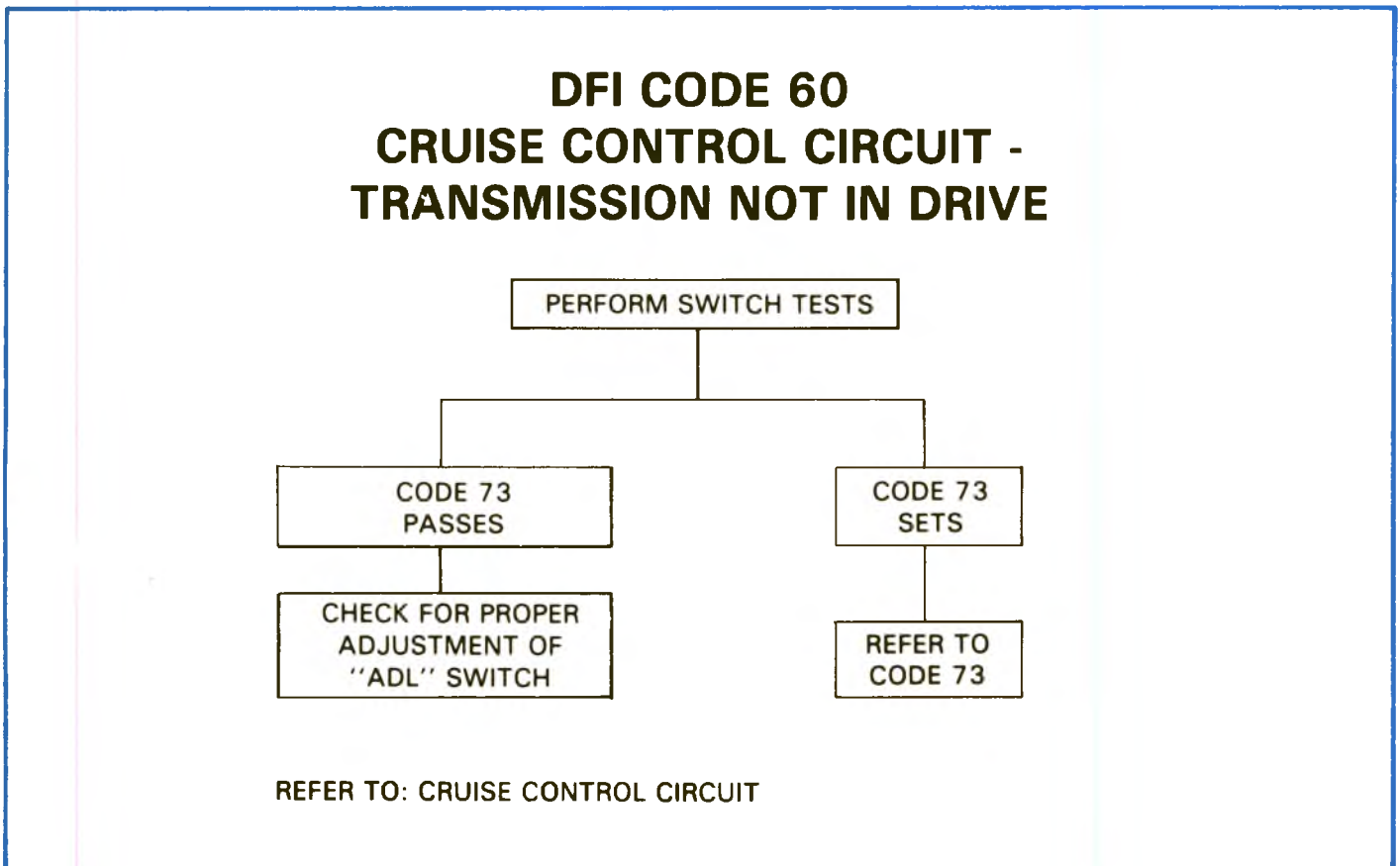
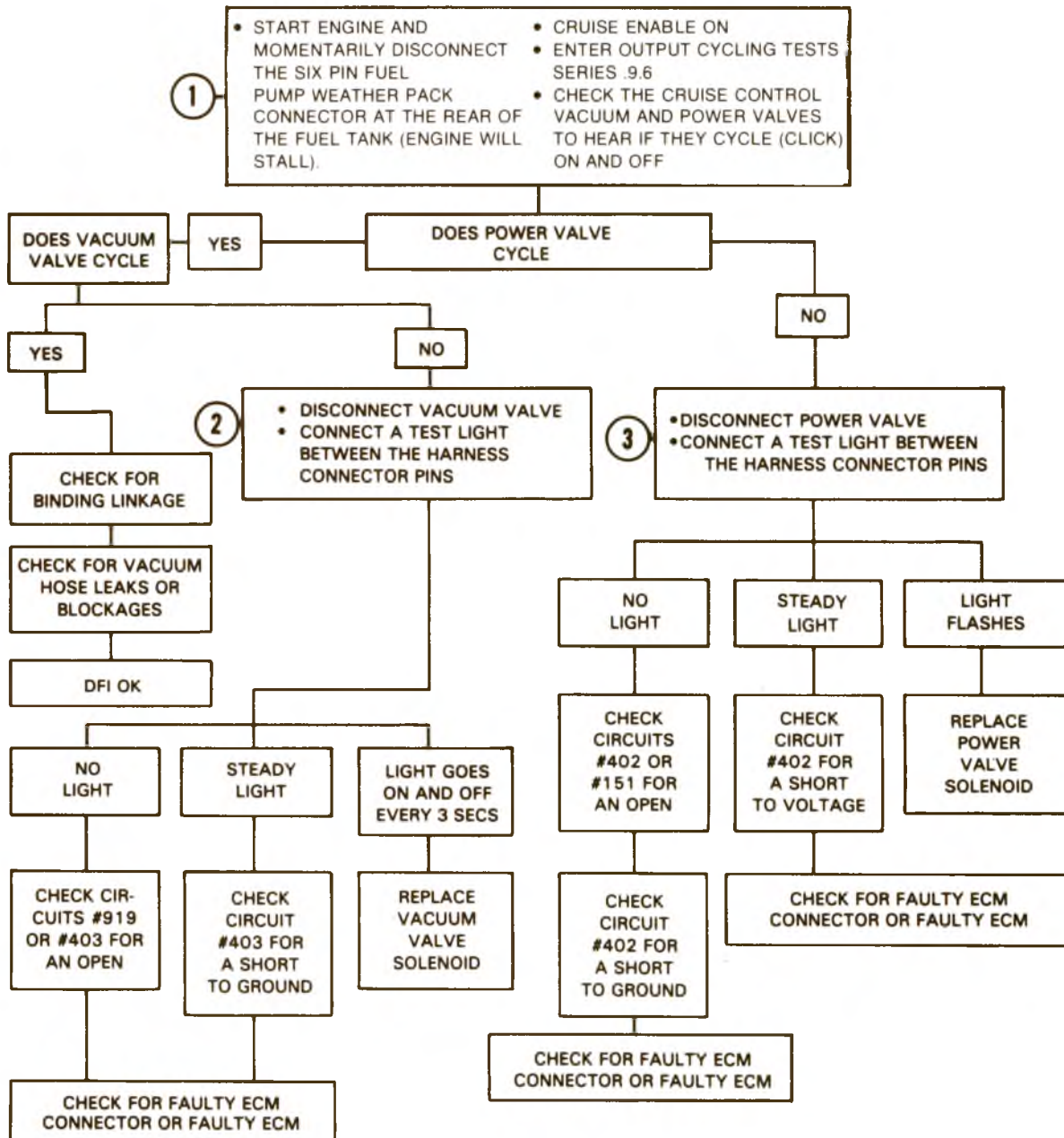


Figure 6-13, D.F.I. Code 60.

VI. Electronic Cruise Control

DFI CODE 63 CRUISE CONTROL CIRCUIT



REFER TO: CRUISE CONTROL CIRCUIT

WHEN ALL DIAGNOSIS AND REPAIRS ARE COMPLETED, CLEAR STORED CODES AND VERIFY PROPER OPERATION.

Figure 6-14, D.F.I. Code 63.

Code 63, Cruise Control Circuit, Car and Set Speed Tolerance Exceeded

Figure 6-14, Code 63 indicates that the Cruise Control was engaged at a certain set speed and the vehicle speed was more than 20 miles per hour above or below this set speed. Whenever the condition which set Code 63 is present, the Cruise Control will disengage.

a. Code 63 may result from operator error or a system malfunction. To diagnose a system malfunction, proceed as follows:

- Step 1** Start engine and momentarily disconnect 6-pin weatherpack connector at the rear of the fuel tank (engine will stall).
- Step 2** Turn cruise enable on.
- Step 3** Enter diagnostics and display .9.6 for output cycling. Check the cruise control vacuum and power valves to determine if they cycle (click) on and off.

If the vacuum and power valves are OK, check for binding linkage. If the linkage is not binding, check for vacuum leaks or blockages. If there are no vacuum problems, then the DFI system is OK.

- b. If the vacuum valve does not cycle, disconnect the vacuum valve connector and connect a test light between the harness connector pins while performing the output cycling tests. If there is no light, check circuit # 919 or # 403 for an open. If the wiring is OK, check for a faulty ECM connector or faulty ECM.
- c. If there is a steady light, check circuit # 403 for a short to ground. If the circuit is OK, check for a faulty ECM connector or faulty ECM.
- d. If the light is on for 3 seconds and off for 3 seconds, then the ECM and wiring harness are OK, replace the vacuum valve solenoid.

e. If the power valve does not cycle, disconnect the power valve connector and connect a test light between the harness connector pins while performing the output cycling tests. If there is no light, check circuits # 402 and # 151 for an open or circuit # 402 for a short to ground. If the circuits # 402 and # 151 are OK, check for a faulty ECM connector or faulty ECM.

f. If there is a steady light, check circuit # 402 for a short to voltage. If circuit # 402 is OK, check for a faulty ECM connector or faulty ECM.

g. If the light flashes continuously, then the ECM and the harness are working properly, replace the power valve solenoid.

Code 64, Cruise Control Circuit — Vehicle Acceleration Exceeds Maximum Limit

Code 64 indicates that the Cruise Control was engaged and the vehicle acceleration exceeded the pre-set rate which was programmed into the ECM. If the condition which set Code 64 is present, then the Cruise Control will disengage. Code 64 could be caused by icy or wet pavement.

VI. Electronic Cruise Control

Code 65, Cruise Control Circuit — Coolant Temperature Exceeds a Maximum Limit

Code 65 indicates that the Cruise Control was engaged and the coolant went overtemperature. If the condition which set Code 65 is present, then the Cruise Control will disengage. See Section 6B in the Service Manual, if the overtemperature condition persists.

Code 66, Cruise Control Circuit — Engine RPM Exceeds a Maximum Limit

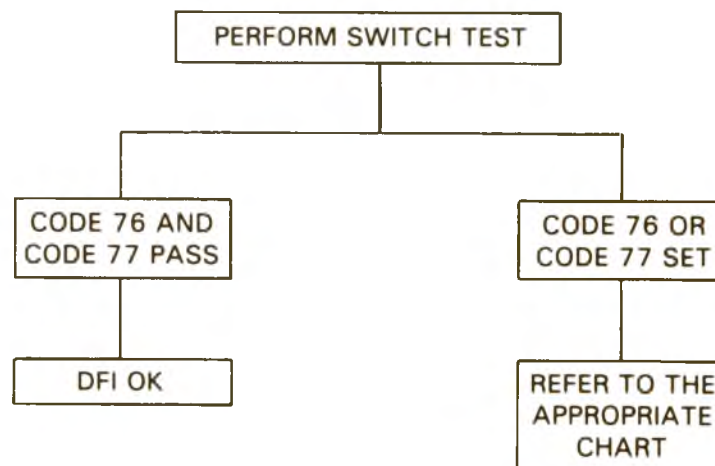
Code 66 indicates that the Cruise Control was engaged and the engine speed exceeded a maximum allowable limit. Whenever the condition which set Code 66 is present, the Cruise Control will disengage. Code 66 can be caused by removing the engine load (placing the gear selector in neutral) when the cruise control is engaged and operating.

Code 67, Cruise Control Circuit — Shorted Set or Resume Circuit

Figure 6-18, Code 67 indicates that the set/coast or resume/acceleration switches were improperly set when Cruise Control was engaged. Whenever the condition which set Code 67 is present, the Cruise Control will not operate during that ignition cycle.

To diagnose the system perform the switch tests. If codes 76 or 77 set refer to the appropriate diagnostic chart. If codes 76 and 77 of the switch tests pass, then the DFI system is OK. Code 67 was caused by a failure in the set/coast or resume/acceleration circuits which was present when the cruise instrument panel switch was turned on.

DFI CODE 67 CRUISE CONTROL SHORTED SET OR RESUME CIRCUIT



REFER TO: CRUISE CONTROL CIRCUIT

WHEN ALL DIAGNOSIS AND REPAIRS ARE COMPLETED, CLEAR STORED CODES AND VERIFY PROPER OPERATION.

Figure 6-15, D.F.I. Code 67.

VI. Electronic Cruise Control

Code 71, Cruise Control Brake Circuit

The Cruise Control brake circuit sends a 12 volt signal to the ECM except when the brake is depressed. When the brake is depressed, the switch is opened and the brake signal drops to 0 volts, see figure 6-16.

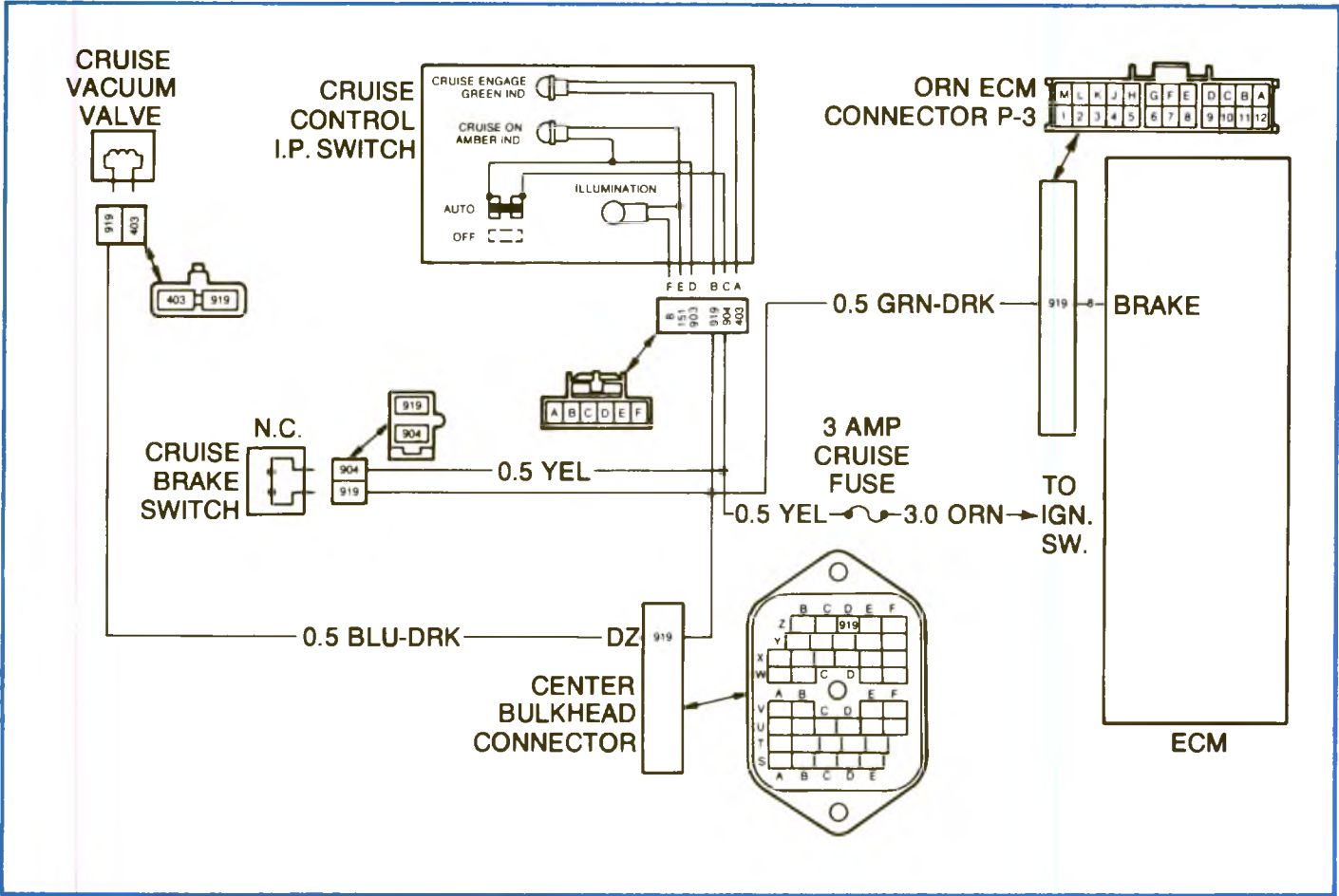


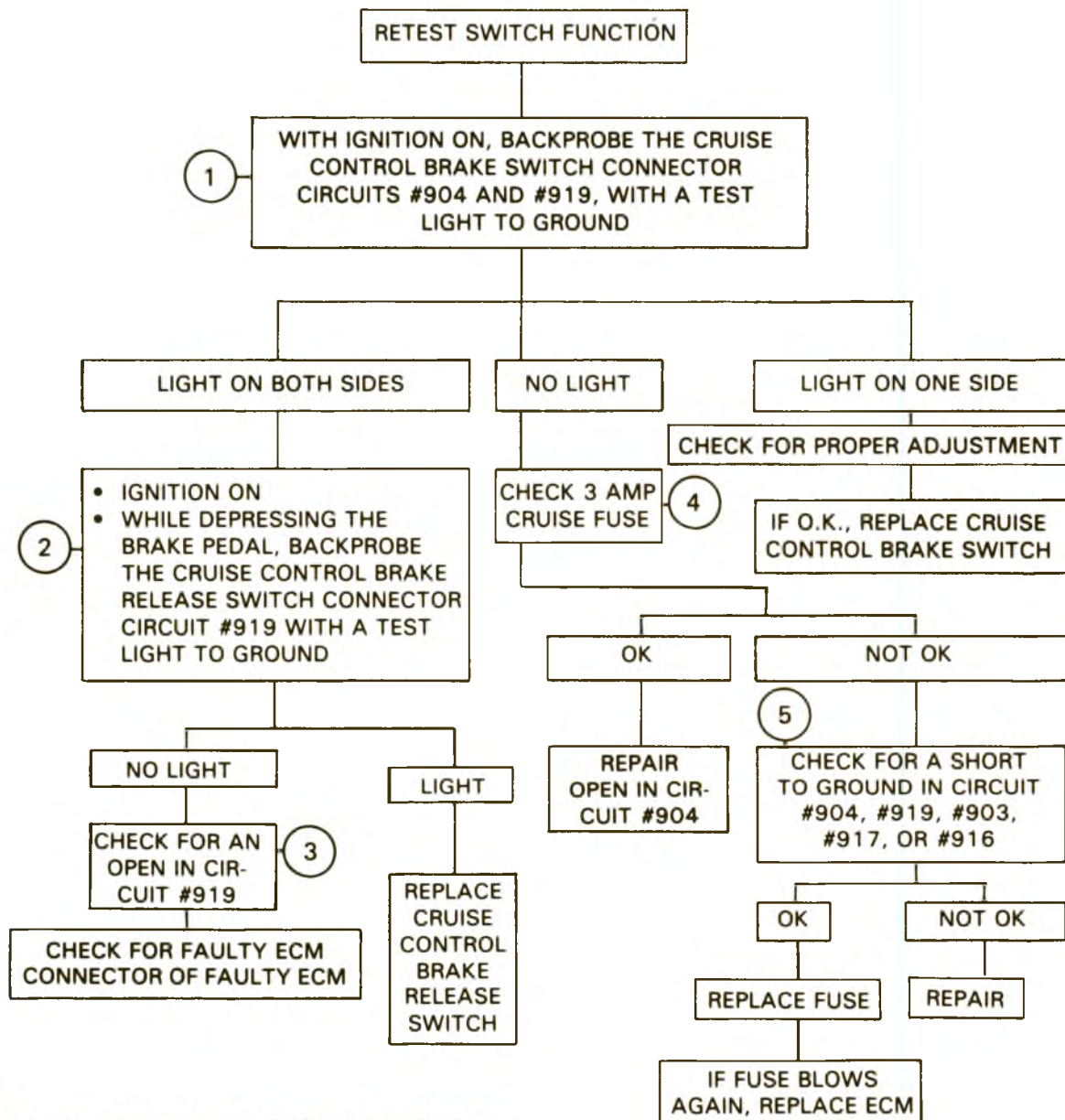
Figure 6-16, Cruise Control Brake Circuit.

- Code 71 (figure 6-17), indicates the brake signal doesn't switch from 12 volts to 0 volts when the brake is applied. With the ignition on, backprobe the Cruise Control brake switch connector circuits #904 and #919 with a test light connected to ground on each circuit. If the test light lights on only one side of the switch, then the Cruise Control brake switch does not have continuity and should be replaced if it is properly adjusted.
- If there is a light on both sides of the Cruise Control brake switch, then the switch has continuity. With the ignition on, depress the brake pedal and backprobe the Cruise Control brake switch circuit #919 with a test light to ground. If the test light continues to glow, replace the Cruise Control brake switch because it is shorted.

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- c. If the test light does not glow, then the switch is functioning properly. Check circuit #919 for an open. If circuit #919 is OK, check for a faulty ECM connector or faulty ECM because it is not processing a good brake release signal.
- d. Check the 3 amp cruise fuse. If it is OK, then repair an open in circuit #904.
- e. If the Cruise Control fuse is not OK, then there is a short circuit to ground in the wiring harness or the ECM. Check circuits #904 and #919 for a short to ground. Engaging the cruise instrument panel switch, the set/resume switch, or the resume/acceleration switch can blow the cruise fuse. This situation would occur if circuits #903, #916, or #917 have a short to ground on them. If the wiring harness is OK and the fuse blows again, check for a faulty ECM connector or faulty ECM because it is internally shorted.

DFI CODE 71 CRUISE CONTROL BRAKE CIRCUIT



REFER TO: CRUISE CONTROL BRAKE CIRCUIT

WHEN ALL DIAGNOSIS AND REPAIRS ARE COMPLETED, CLEAR STORED CODES AND VERIFY PROPER OPERATION.

Figure 6-17, D.F.I. Code 71.

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2 computers on big cars.

NOTES

engine computer and a body computer on big cars.

Brake is controlled by body computer

