SMCM-1A

1984 AC CUSTOM CRUISE III SYSTEMS SERVICE MANUAL

AC Spark Plug

GM

1984 AC Custom Cruise III Systems Service Manual

Foreword

AC Spark Plug Division, General Motors Corporation has prepared this service manual to help answer questions about operation and service of the 1984 AC Custom Cruise III cruise control system. This system is offered in two versions, AC Custom Cruise III and AC Integrated Custom Cruise III. It is also referred to as Tri-mode, 3-Mode Cruise or the K-34 Cruise Option.

AC Custom Cruise III was introduced on 1983 Chevrolet and GMC trucks. All 1984 applications, except full-size Cadillac use the AC Custom III system. The Integrated Custom Cruise III system is used on 1984 Corvette and the Pontiac Fiero "P" car.

Custom Cruise III has electronic circuitry incorporated in a controller which is located under the dash. The speed signal is derived from the Vehicle Speed Sensor (VSS) speedometer buffer amplifier or a permanent magnet (PM) generator. Integrated Custom Cruise III has the electronic circuitry incorporated in the instrument cluster. The speed signal is obtained from a VSS, vehicle speed sensor speedometer and/or a transmission driven permanent magnet (PM) generator.

Although the 1984 cruise function operates similarly in all applications, there are system design differences which are explained in this service manual.

This service manual is intended to be a quick, easy-to-use reference for servicing the 1984 Custom Cruise III system. It has been organized into four major sections . . .

1. HOW TO USE CUSTOM CRUISE III
2. COMPONENTS IN THE SYSTEM
3. HOW THE SYSTEM OPERATES
4. DIAGNOSTIC PROCEDURES

Important Safety Notice

To reduce the chance of personal injury and/or property damage, the following instructions must be carefully observed:

Proper service and repair are important to the safety of the service technician and the safe, reliable operation of all motor vehicles. If part replacement is necessary, the part must be replaced with one of the same part number or with an equivalent part. Do not use a replacement part of lesser quality.

The service procedures recommended and described in this service manual are effective methods of performing service and repair. Some of these procedures require the use of tools specially designed for the purpose.

Accordingly, anyone who intends to use a replacement part, service procedure or tool, which is not recommended by the vehicle manufacturer, must first determine that neither his safety or safe operation of the vehicle will be jeopardized by the replacement part, service procedure or tool selected.

It is important to note that this manual contains various 'cautions' and 'notices' that must be carefully observed in order to reduce the risk of personal injury during service or repair, or the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these 'cautions' and 'notices' are not exhaustive, because it is impossible to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

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List of Illustrations

1. How to Use Custom Cruise III

Introduction

The 1984 AC Custom Cruise III system is an extension of the cruise control system that AC Spark Plug Division has designed and produced since the 1977 vehicle model year. The Custom Cruise III system has been adapted to accommodate the lower manifold vacuum levels of smaller, fuel efficient vehicles.

AC Custom Cruise III places at the driver's command the cruise control functions of cruise, coast, resume speed, "tap-up," "tap-down" and accelerate. All functions, except for 1984 Chevrolet Berlinetta, are built-in the turn-signal lever (figure 1-1). The 1984 Chevrolet Berlinetta has cruise control functions built in the steering wheel "T" spoke . . the ON-OFF switch is on the floor console (figure1-2).

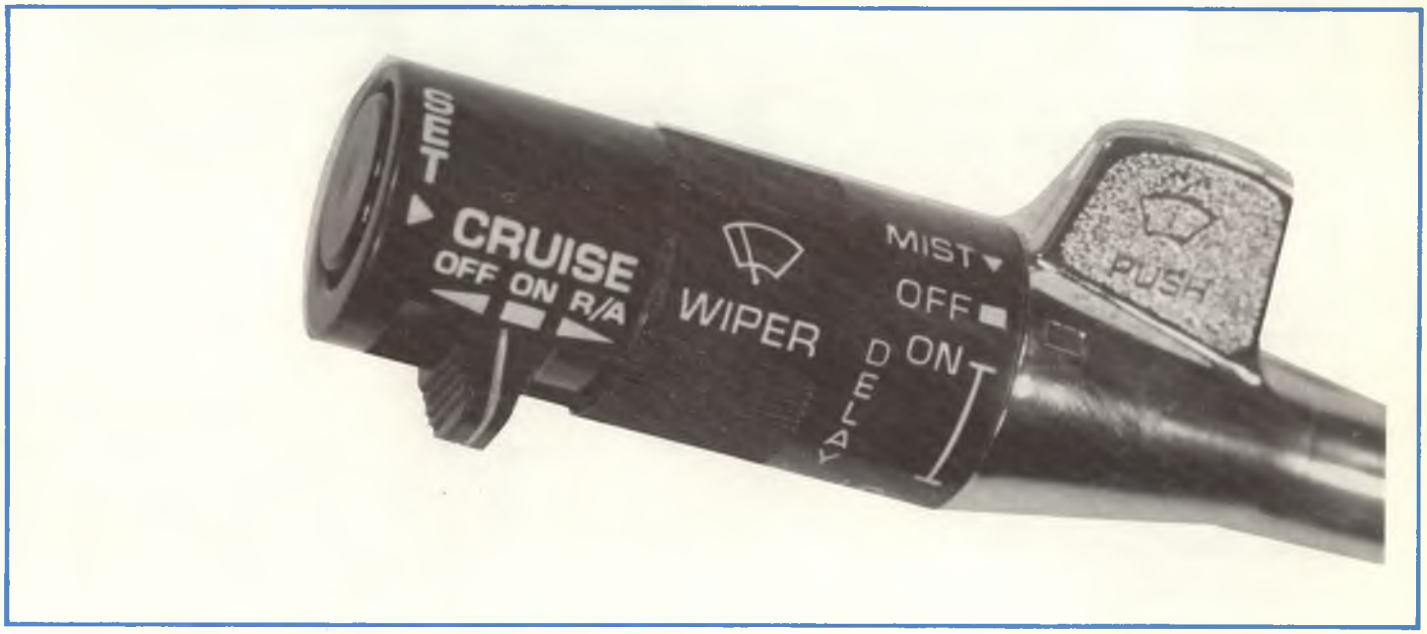


Figure 1-1, Mode Control Switches on Turn Signal Lever.

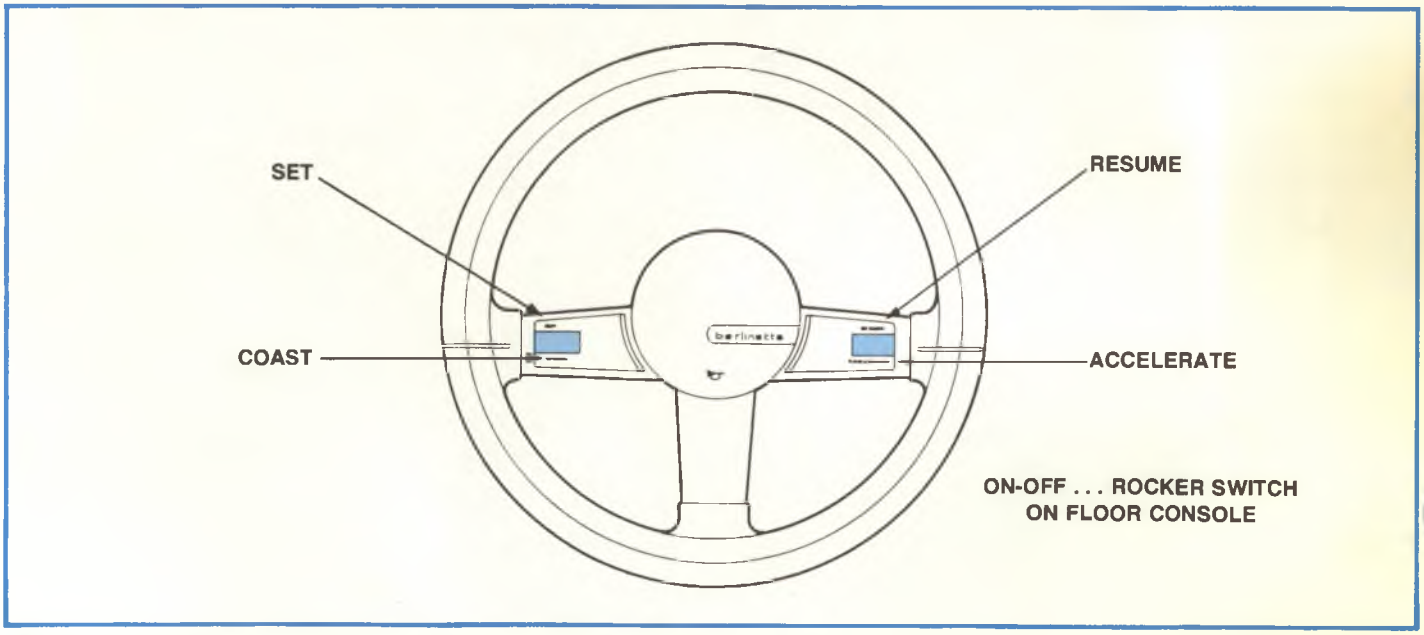


Figure 1-2, Mode Control, 1984 Chevrolet Berlinetta.

Operation, 1984 Vehicles

Mode Control on Turn Signal Lever

To engage the cruise mode, the slide lever must be moved from the *"off"* to the *"on"* position and the *"set"* push button (located in the end of the turn signal lever) must be depressed and released. The cruise set speed will be the vehicle speed at the particular time when the *"set"* push button is released. However, there is no cruise engagement below 25 *mph*. This is a low speed inhibit feature. The system may be disengaged by moving the mode control switch to the *"off"* position or by depressing the vehicle brake pedal or clutch pedal on manual transmission vehicles.

If the brake pedal is momentarily depressed to disengage cruise operation, the cruise set speed will be retained in the system "memory." To return the vehicle to the previously set cruise speed, MOMENTARILY move the slider to the R/A (Resume/Accel) position.

DO NOT HOLD THE SLIDER IN THE R/A POSITION . . . RELEASE IT IMMEDIATELY.

If the slider is held in the R/A position for more than one second, the system reverts to the ACCEL mode. When the slider is released, the speed the vehicle accelerated to becomes the new cruise speed. The vehicle operator may erroneously interpret this as an inoperative resume function.

The vehicle will automatically accelerate to the previously set speed at a controlled rate. The controller "remembers" the last cruise speed unless "cleared" by an *on-off* of the ignition switch or the slider switch on the turn signal lever.

If the slider is moved to the "R/A" position while in cruise and held, the vehicle will accelerate at a controlled rate until the slider is released. When the slider is released, the vehicle will continue to cruise at that speed. Reducing "set" speed can be accomplished by depressing and holding the SET/COAST button on the end of the turn signal lever until the vehicle "coasts down" to the desired speed. Vehicle speed at the moment of SET/COAST button release is the new set cruise speed. The accelerate function can be operated in either the cruise or non-cruise modes. Momentary slider switch movement to the R/A position after an on-off cycle will appear as a *"set"* cruise speed function.

"Tap-up," "Tap-down" Feature

On all 1984 applications, except Corvette and Pontiac Fiero "P" car, the Custom Cruise III system has a "tap-up," "tap-down" speed adjustment feature.

Tap-up results in a one-mile per hour speed increase by merely "tapping" the RESUME/ACCEL slider for less than one second. Tap-up may be repeated, but speed increase is limited to 10 miles per hour above vehicle speed.

Tap-down results in a one-mile per hour speed decrease by merely "tapping" the SET/COAST button for less than 0.4 of a second. Each tap decreases speed and may be accumulated . . . it is limited to a minimum cruising speed of 25 miles per hour.

— NOTE —

If both the SET/COAST and R/A slider are operated at the same time, cruise becomes inoperative and the system "memory" is erased.

Mode Control, 1984 Chevrolet Berlinetta

Figure 1-3 describes operation of the 1984 Chevrolet Berlinetta Electronic Cruise Control.

The accelerator may be depressed at any time to override the cruise system. Release of the accelerator will return the vehicle to the previous set cruise speed.

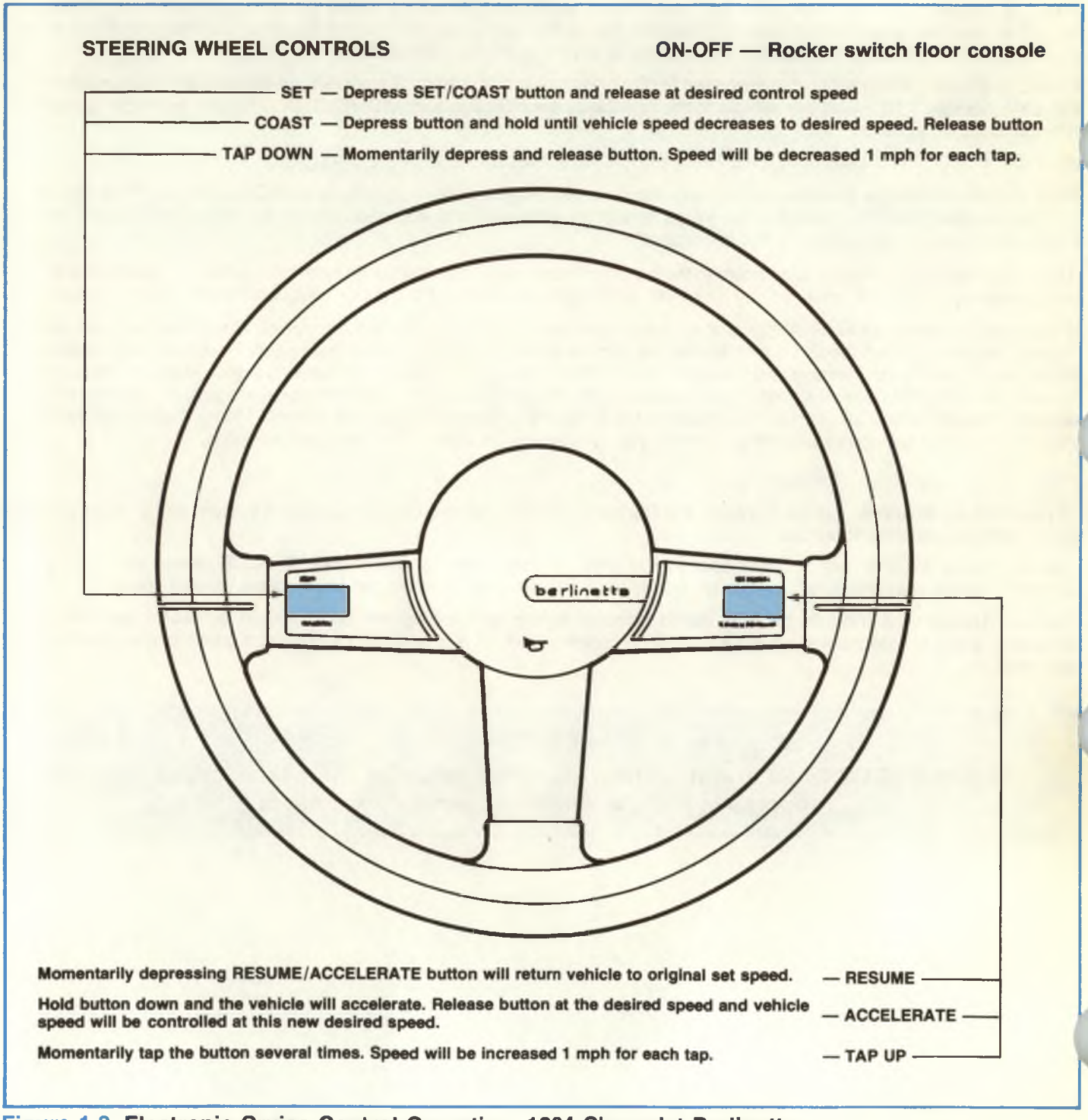


Figure 1-3, Electronic Cruise Control Operation, 1984 Chevrolet Berlinetta.

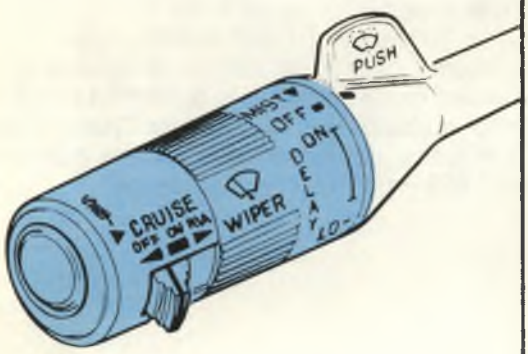
2. Components in the System

Component Functions

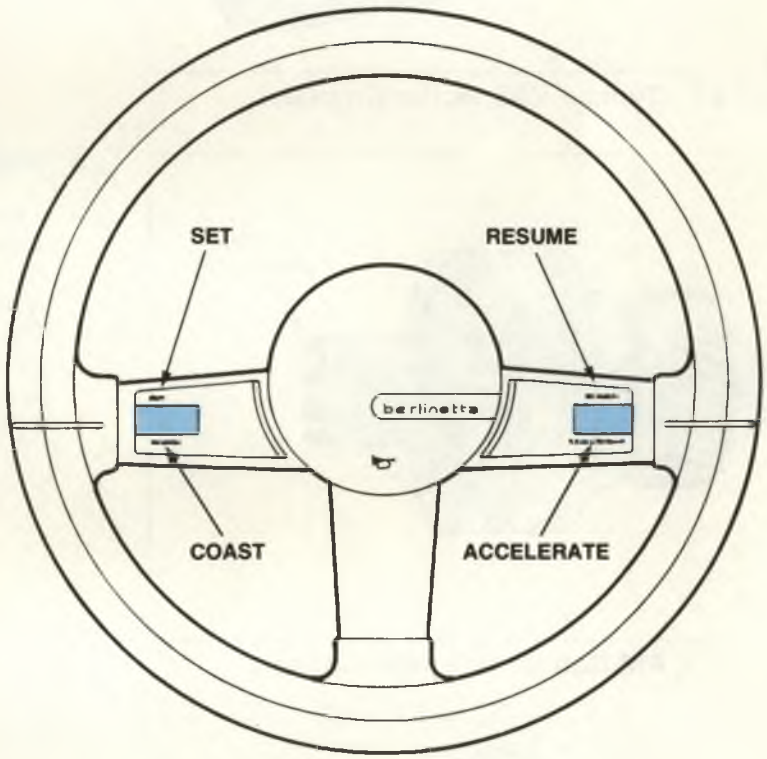
Mode Control Switches

Turn Signal Lever — The various operating modes of the Custom Cruise III system are controlled by means of the Mode Control Switches normally located on the turn signal lever (figure 2-1).

Steering Wheel — Custom Cruise III operating modes are controlled by Mode Control Switches built-into the steering wheel on 1984 Chevrolet Berlinetta (figure 2-1) . . . ON-OFF is a rocker switch on the floor console.



MODE CONTROL, TURN SIGNAL LEVER



MODE CONTROL, STEERING WHEEL AND ON-OFF ROCKER SWITCH, FLOOR CONSOLE, CHEVROLET BERLINETTA

Figure 2-1, Mode Control Switches.

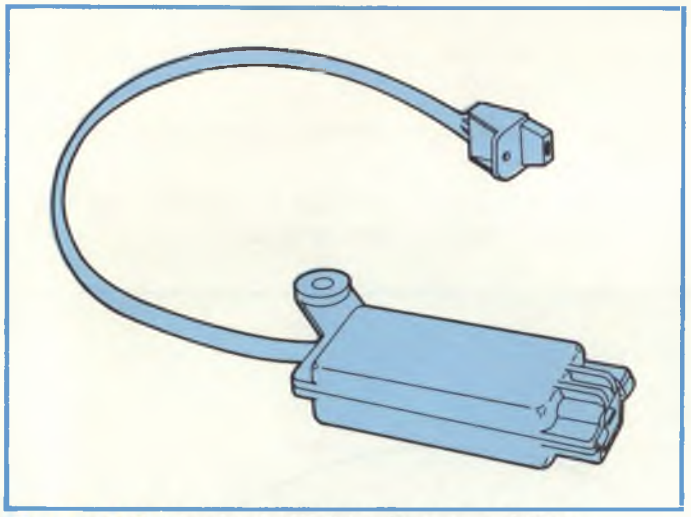


Figure 2-2, Typical VSS Buffer Amplifier.

• VSS Buffer Amplifier

Vehicle speed information is "transmitted" to the Electronic Controller by a speed sensor, (a Vehicle Speed Sensor (VSS) Buffer Amplifier). See figure 2-2. The output of the VSS Buffer Amplifier is a frequency proportional to vehicle speed. The signal is a square wave with a frequency of 0.556 Hz/MPH.

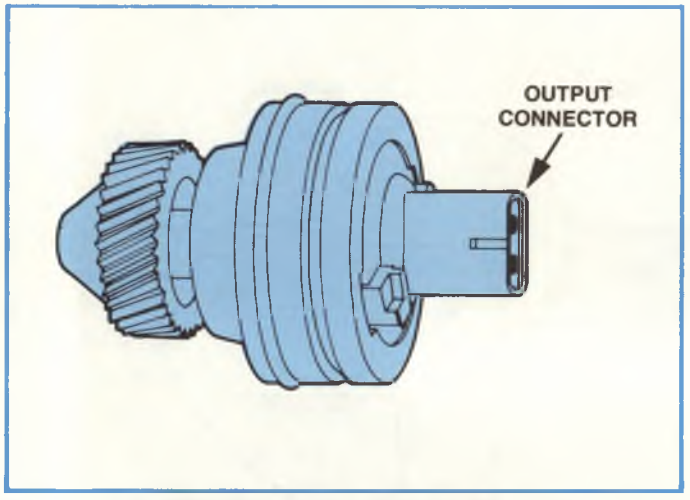


Figure 2-3, PM Generator Speed Sensor.

• PM Generator Speed Sensor

The PM generator speed sensor (figure 2-3) generates vehicle speed information in the form of a sine wave with a frequency of 1.112 Hz/MPH. On Integrated Custom Cruise III, this signal is fed directly to the instrument cluster where it is converted to 0.556 Hz/MPH for cruise usage. On Custom Cruise III K34 option, it is fed to a buffer amplifier, where it is converted to 0.556 Hz/MPH for cruise usage.

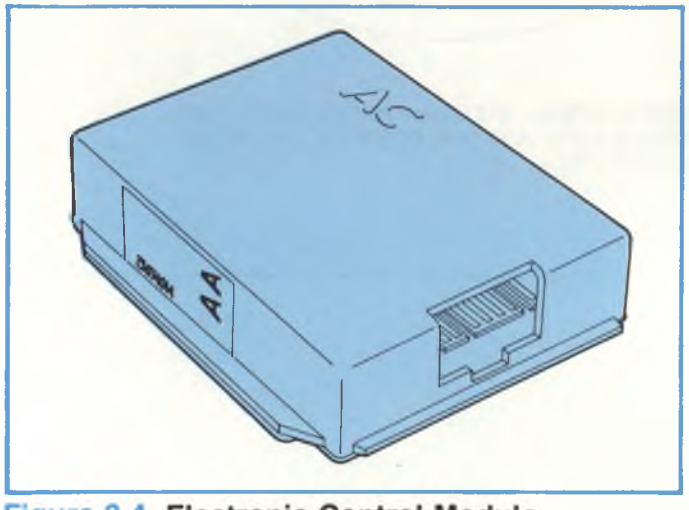


Figure 2-4, Electronic Control Module.

• Electronic Control Module

The Electronic Controller (figure 2-4) contains a digital integrated circuit and supporting analog circuits. The controller interprets the position of the servo unit, the position of the mode control switches and the output of the speed sensor. In response to these inputs, the controller electrically signals the opening or closing of the vent and vacuum solenoid valves in the servo unit (see figure 2-11).

In Custom Cruise III applications, the Electronic Controller shown in figure 2-4 is usually mounted on some structural component under the dash. On Integrated Custom Cruise III, introduced on 1984 Corvette, and Pontiac Fiero "P" car, the electronic circuitry is built-in the instrument panel.

• Combination Vacuum Release Valve/ Converter Clutch Switch

Vehicles equipped with a lock-up torque converter (locking clutch) transmission use a Combination Vacuum Release Valve/Converter Clutch Switch (figure 2-5). The Vacuum Release Valve provides an additional vent for the servo unit to the atmosphere when the brake pedal is held in a depressed position. This "venting" action is spring actuated when the brake pedal is depressed and occurs within the "free-travel" of the brake pedal arm. At the same time, the contacts in the Converter Clutch Switch open, which disengages the locking clutch mechanism in the transmission.

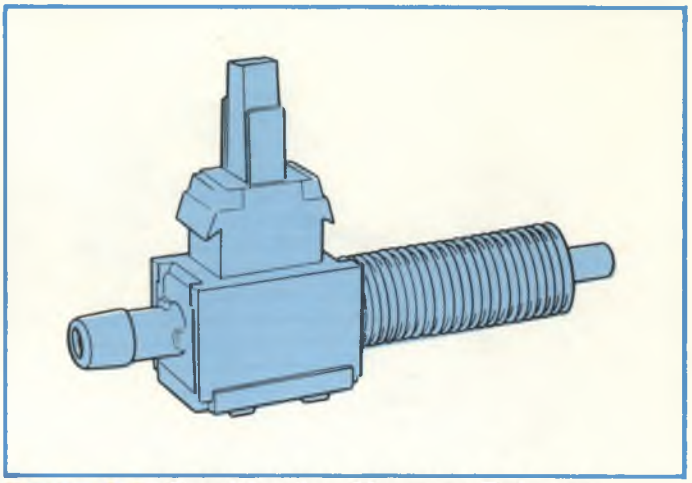


Figure 2-5, Combination Vacuum Release Valve/Converter Clutch Switch.

• Vacuum Release Valve

Vehicles without a lock-up torque converter clutch transmission use a Vacuum Release Valve (figure 2-6). It provides an additional vent for the servo unit to the atmosphere when the brake pedal is held in a depressed position. This "venting" action is spring actuated when the brake pedal is depressed and occurs within the "free-travel" of the brake pedal arm.

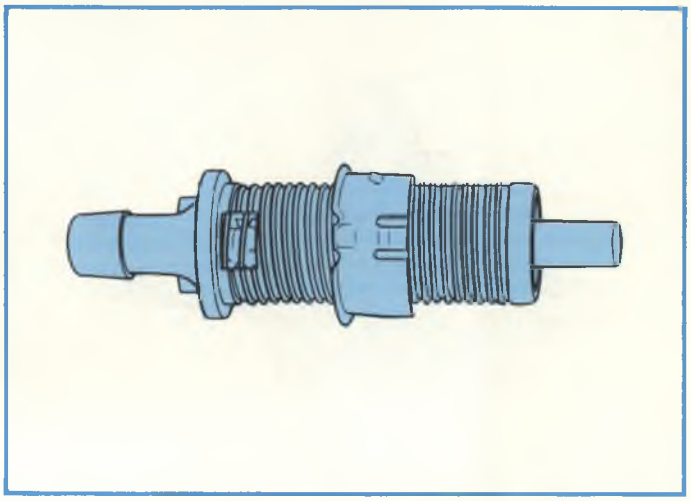


Figure 2-6, Vacuum Release Valve.

• Combination Vacuum Release Switch

A combination vacuum release switch is located in the brake pedal bracket in the Pontiac Fiero "P" car (figure 2-7). When the brake is applied, the vacuum release switch de-energizes an electric vacuum release valve (see figure 2-8).

Figure 2-7 shows a brake pedal operated combination vacuum release/torque converter clutch switch used with automatic transmissions. On manual transmission cars, a similar switch arrangement is used on the brake and clutch pedal brackets.

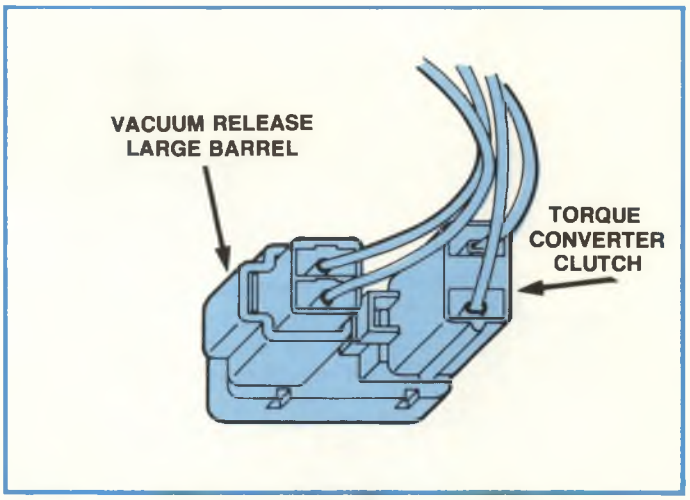


Figure 2-7, Combination Vacuum Release Switch, Pontiac Fiero.

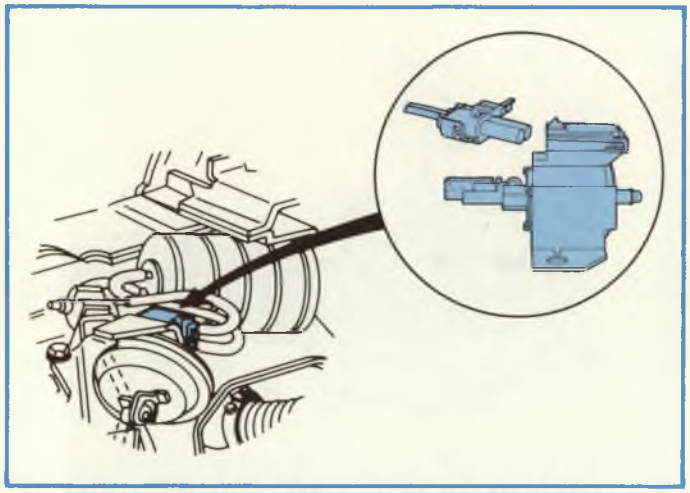


Figure 2-8, **Electric Vacuum Release Valve, Pontiac Fiero.**

• Electric Vacuum Release Valve

The electric vacuum release valve is used in the 1984 Pontiac Fiero "P" car (figure 2-8). The solenoid in the valve is powered by vehicle ignition. When the brake pedal is NOT depressed, the solenoid is energized and the vacuum valve is closed. When the brake is applied, the solenoid de-energizes and the vacuum valve and servo vent to the atmosphere . . . the cruise function disengages. (See Vacuum Release Switch, Figure 2-7).

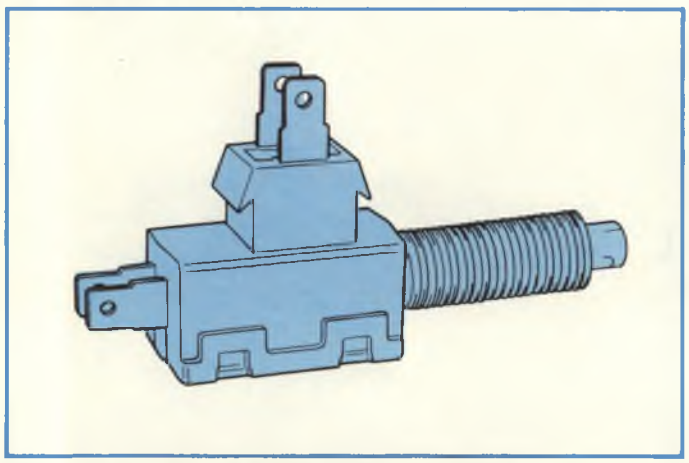


Figure 2-9, **Combination Cruise/Stop Light Switch.**

• Combination Cruise/Stop Light Switch

The Combination Cruise/Stop Light Switch (figure 2-9) is used with a separately mounted vacuum release valve. When the brake pedal is depressed, the switch illuminates the stop lights and disengages the cruise. One set of electrical contacts operate the stop light . . . the other set operates the cruise disengage function.

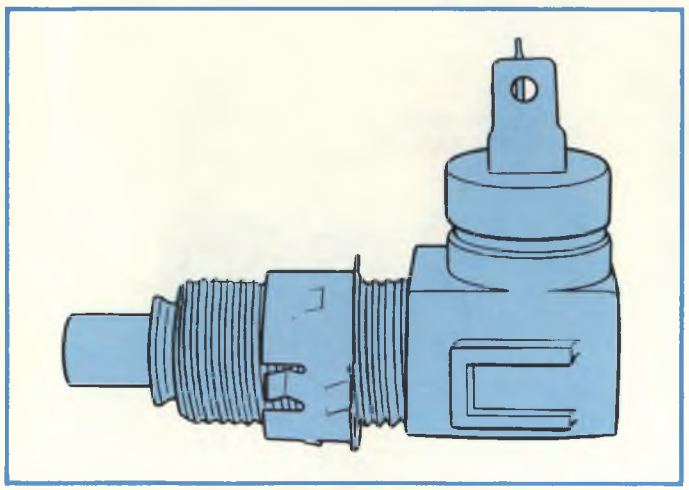


Figure 2-10, **Typical Clutch Switch.**

• Clutch Switch

On vehicles with manual transmissions, an electric Clutch Switch (figure 2-10) is used. Depressing the clutch for up or downshifting a manual transmission disengages the cruise function. The cruise function remains disengaged after the clutch pedal is released.

• Servo Unit

The Servo (figure 2-11) consists of a vacuum operated diaphragm, a normally open solenoid valve to vent the diaphragm chamber to atmosphere, a normally closed solenoid valve to connect the diaphragm chamber to the vacuum source, and a variable inductance position sensor. The servo operates the throttle in response to signals from the electronic controller as follows:

Steady State Cruise Function — Both vacuum and vent valves are closed or sealed. The servo has a constant vacuum on the diaphragm and places no-flow requirements on the vacuum source.

Vehicle Losing Speed — The controller energizes the vacuum solenoid to open the vacuum valve to the vacuum source. This increases the vacuum level in the servo to increase the throttle angle . . . the vent valve remains closed.

Vehicle Gaining Speed — The controller de-energizes the vent solenoid to open the vent valve to the atmosphere which reduces vacuum in the servo and allows the throttle return spring to decrease the throttle angle . . . the vacuum valve remains closed.

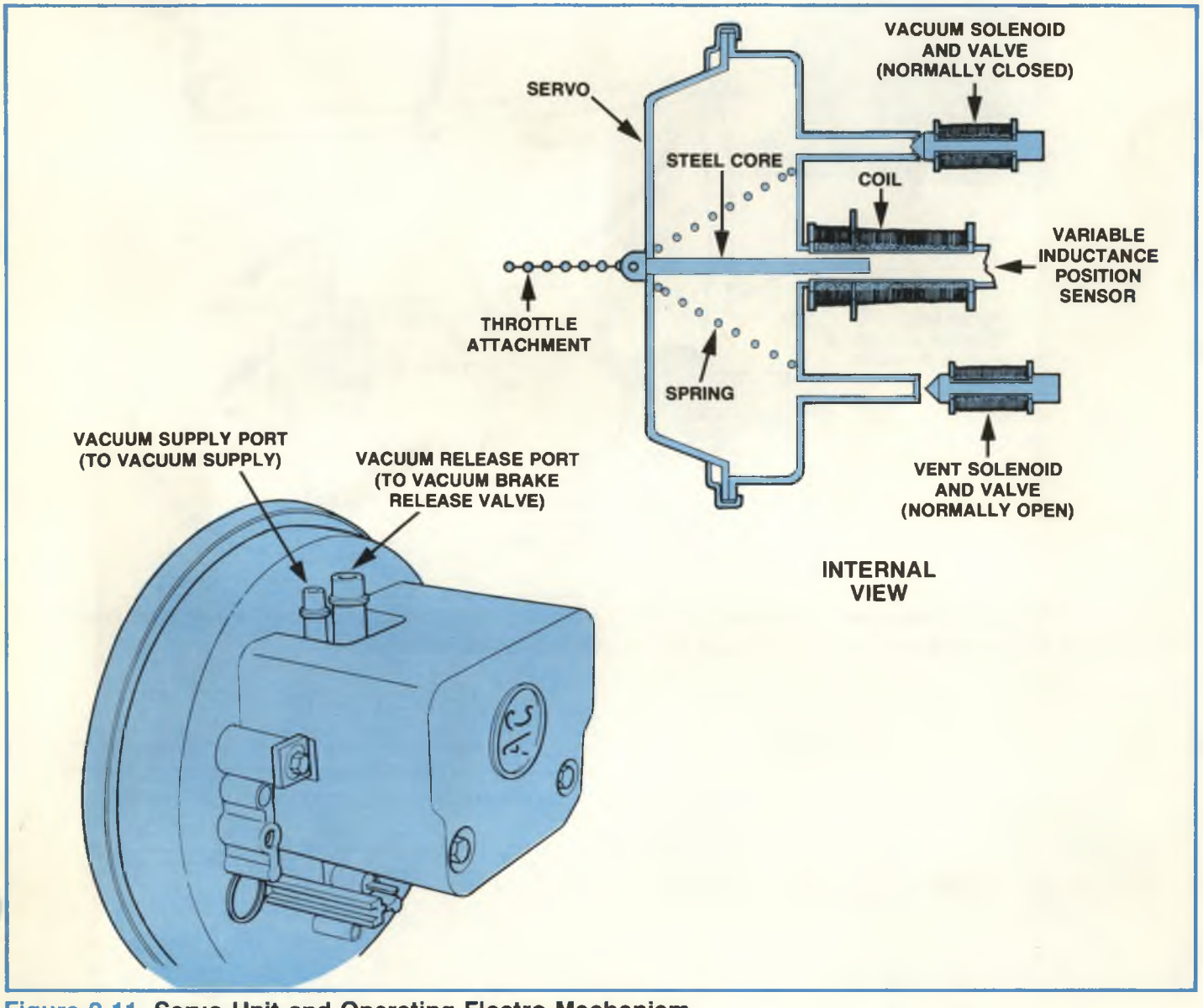


Figure 2-11, Servo Unit and Operating Electro-Mechanism.

• Vacuum Accumulator

For acceptable cruise performance in vehicles with low manifold vacuum at road load, a Vacuum Accumulator (figure 2-12) is used. The Accumulator is attached to the intake manifold through a check valve and "stores" the high vacuum level that is available during periods of low engine loading. The system operates on accumulator vacuum, when higher than manifold vacuum.

The Vacuum Accumulator or check valve is not used with diesel engines.

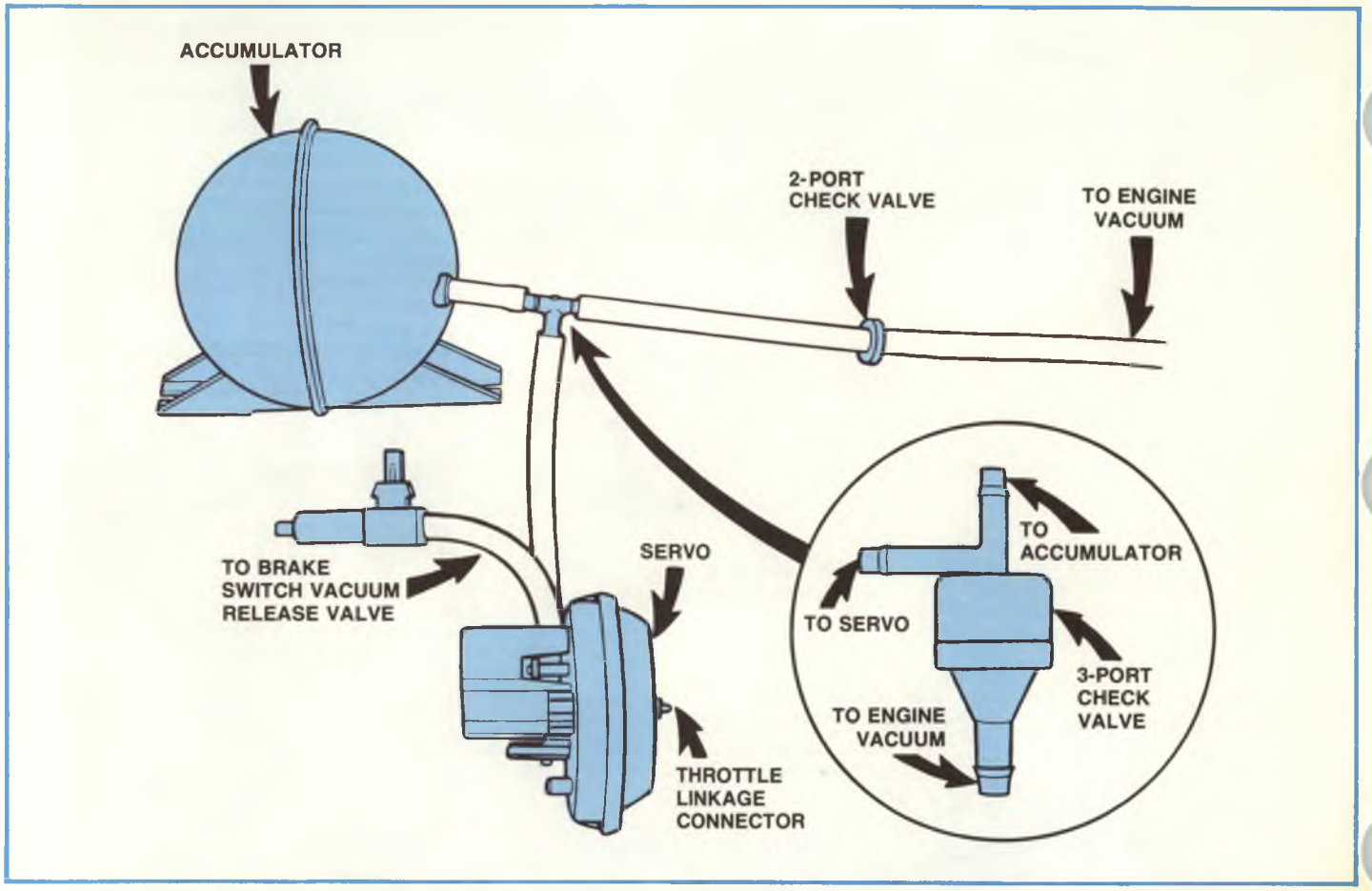


Figure 2-12, Typical Pneumatic System including Vacuum Accumulator, Check Valve and Related Hoses. Some systems use a 3-port check valve instead of a 2-port valve.

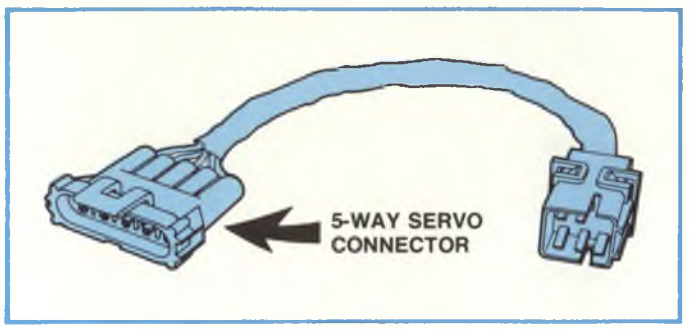


Figure 2-13, Harness Adapter.

• Harness Adapter

The Harness Adapter (figure 2-13) is used on some Custom Cruise III applications to connect the Harness Assembly to the Servo Unit.

3. How the System Operates

Electrical/Vacuum System Operation

Figure 3-1 is a block diagram illustrating component relationships in the AC Custom Cruise III system.

The servo vent solenoid valve and servo vacuum solenoid valve control the vacuum level in the servo in response to information from the electronic controller. The servo, in turn, controls the throttle position.

The electronic controller receives input signals from the mode control switches, brake release switch, speedometer buffer amplifier and a feedback signal from the servo position sensor.

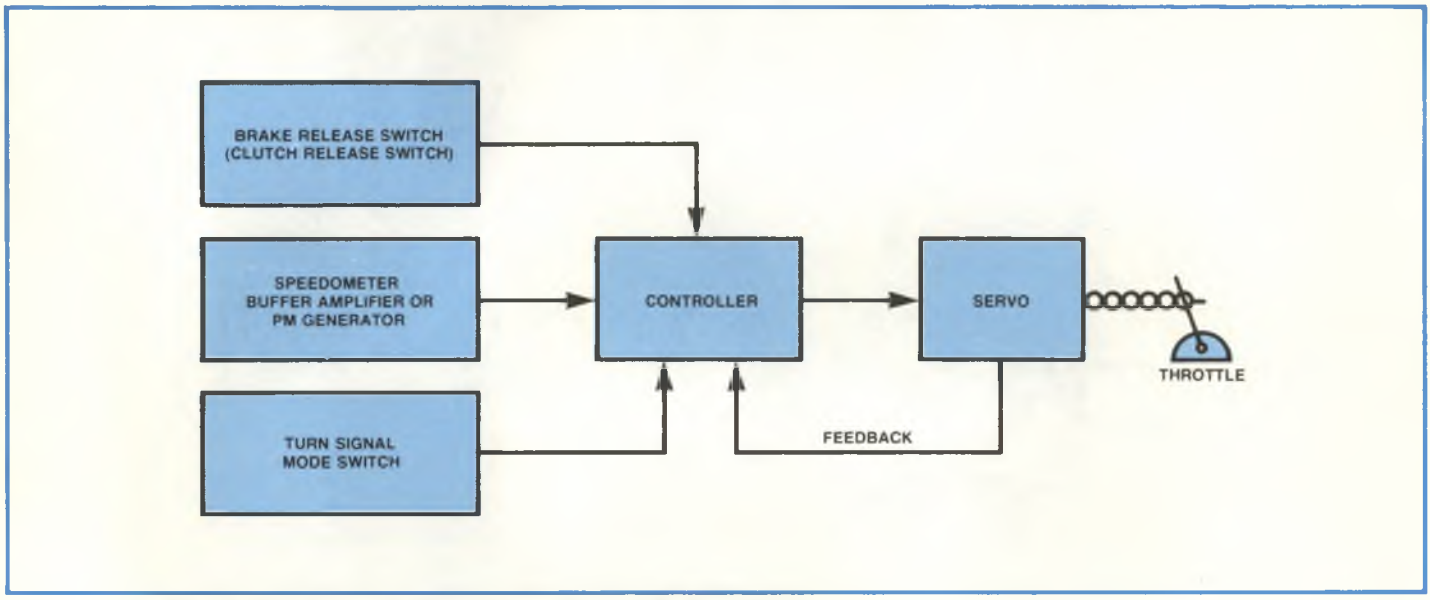


Figure 3-1, Block Diagram, AC Custom Cruise III System.

Figure 3-2 shows the same block diagram (as figure 3-1) except that the speed sensor is a PM generator which supplies a speed signal of 1.112 Hz per MPH to a buffer amplifier. The buffer in turn divides the signal by two to provide a frequency of 0.556 Hz per MPH to the electronic control module for cruise operation.

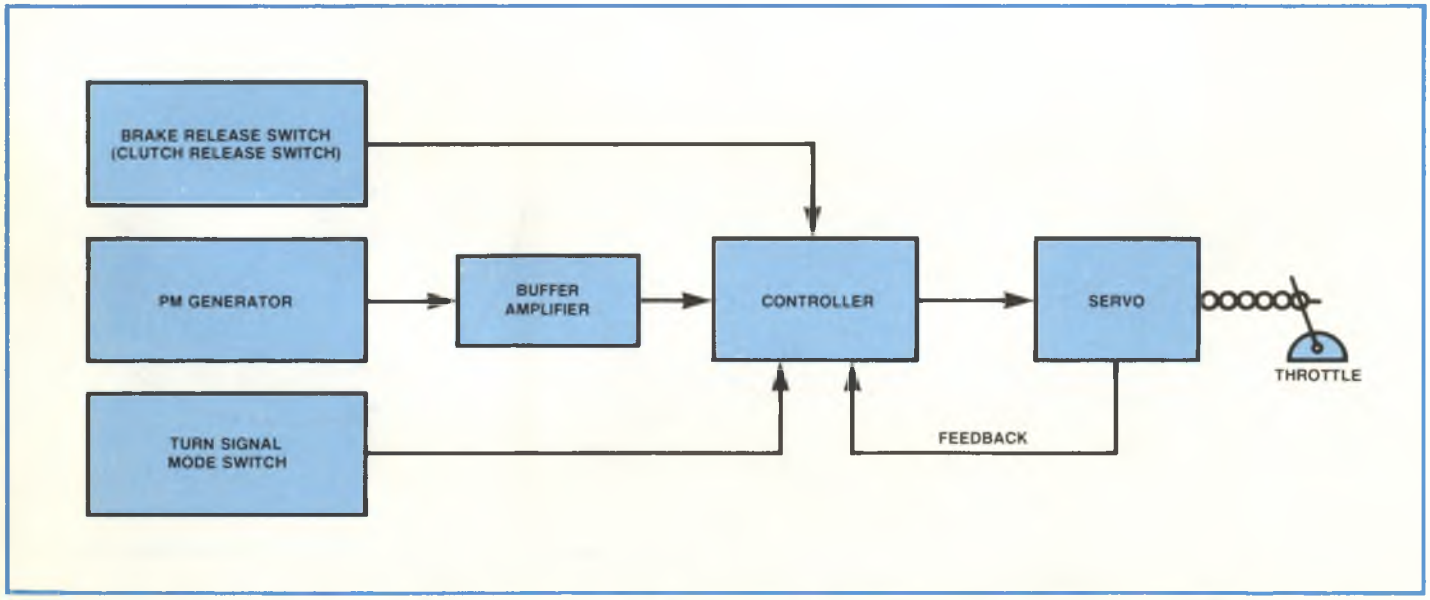


Figure 3-2, Block Diagram, AC Custom Cruise III System with Buffer Amplifier and PM Generator.

System Configurations

Figure 3-3 shows a typical AC Custom Cruise III (K-34) system installation.

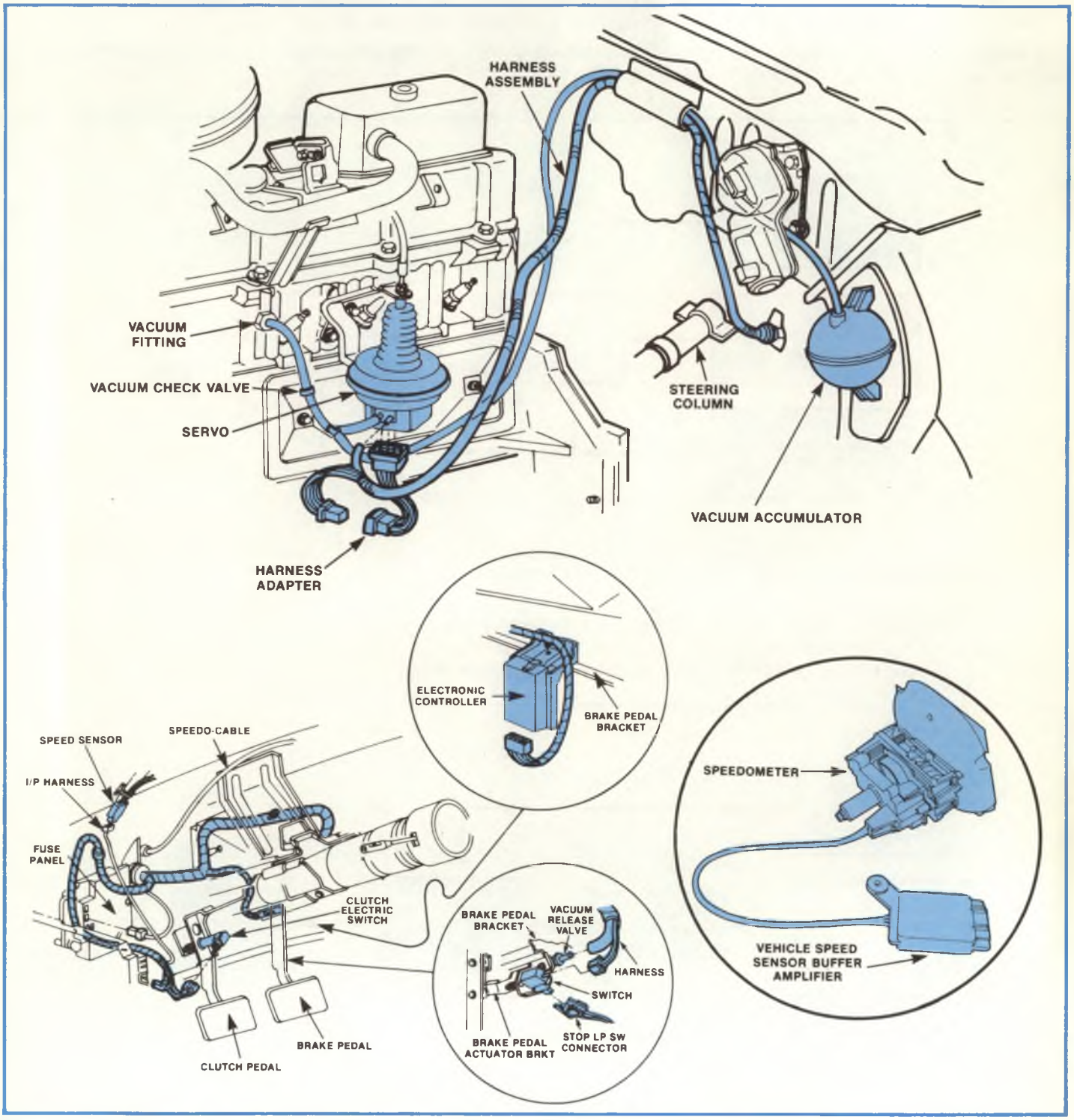


Figure 3-3, Typical Installation, AC Custom Cruise III System, K-34 Application.

Figure 3-4 illustrates a typical AC Integrated Custom Cruise III System installation. Note that the electronic circuitry is located in the instrument display. The speed sensor, a PM Generator, is driven by the transmission.

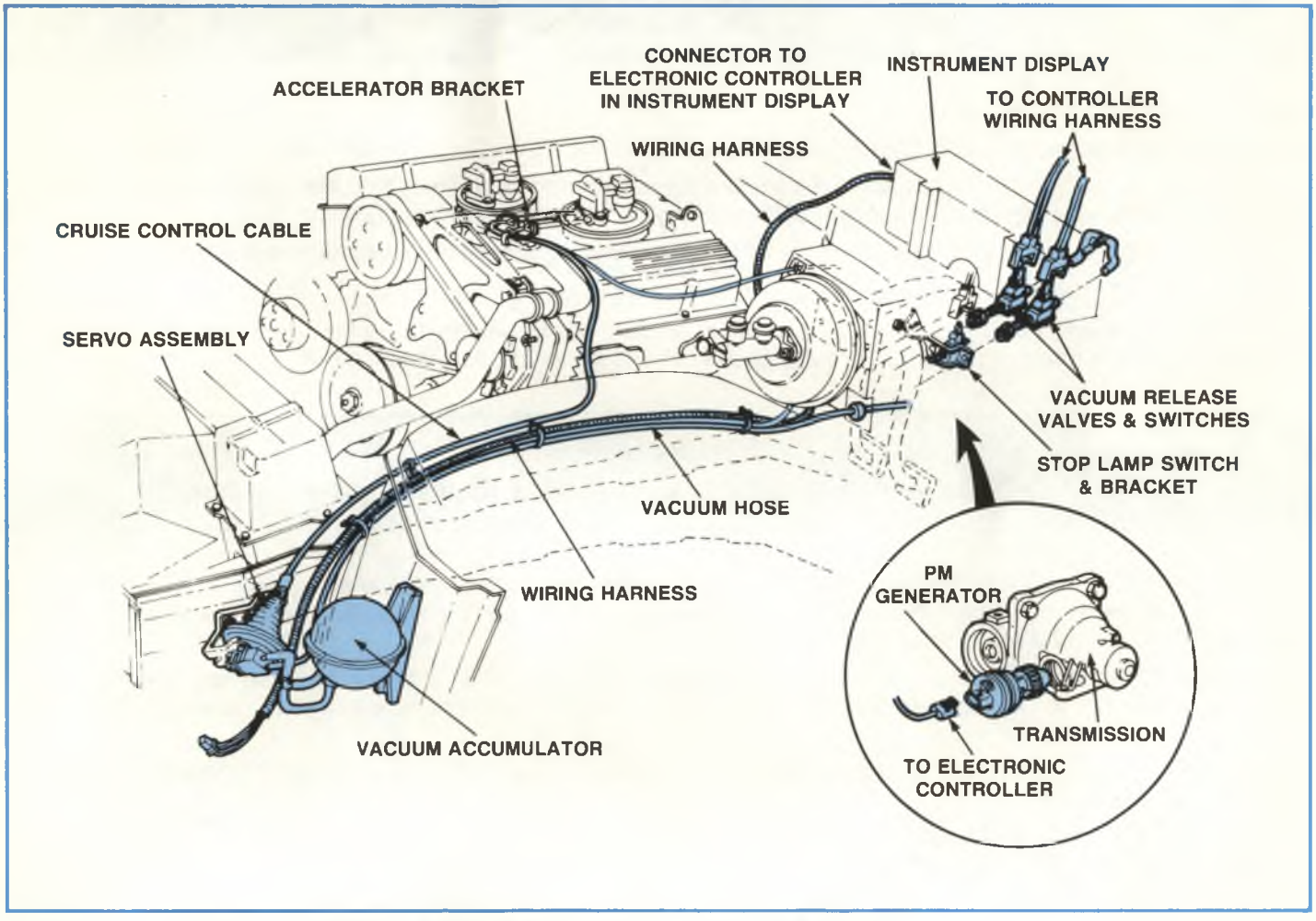


Figure 3-4, Typical Installation. Integrated Custom Cruise III System.

Circuit Schematics

The AC Custom Cruise III circuit schematic shown in figure 3-5 applies to all 1984 model "A", "F", "J" and "X" cars except Buick and Oldsmobile "J" cars and the Berlinetta "F" car.

Figure 3-6 is the circuit schematic for 1984 model "A" and "C" cars . . . figure 3-7 is the 1984 Corvette schematic . . . figure 3-8 is for the 1984 Pontiac Fiero "P" car.

—NOTE—

All schematic drawings have connector voltage and resistance valves shown to aid in circuit tracing and electrical testing.

Refer to figure 3-5 and figure 3-6 . . .

- When the ignition switch is ON, battery voltage is applied to the Mode Control Switch and Buffer Amplifiers.
- When the slider switch is in the ON position, battery voltage is applied to terminal "A" of the Control Module Connector. If the brake and/or clutch are not applied, battery voltage is present at terminal "G".
- When the R/A, Resume/Accel slider is in the ON position, battery voltage is applied to terminal "M".
- When the SET/COAST button is depressed, battery voltage is applied to terminal "L".
- The controller sends a vent valve signal, it flows from terminal "C" to terminal "A" at the servo unit, then through the servo vent coil to servo terminal "C", then to Cruise Ground at the I.P., instrument panel.

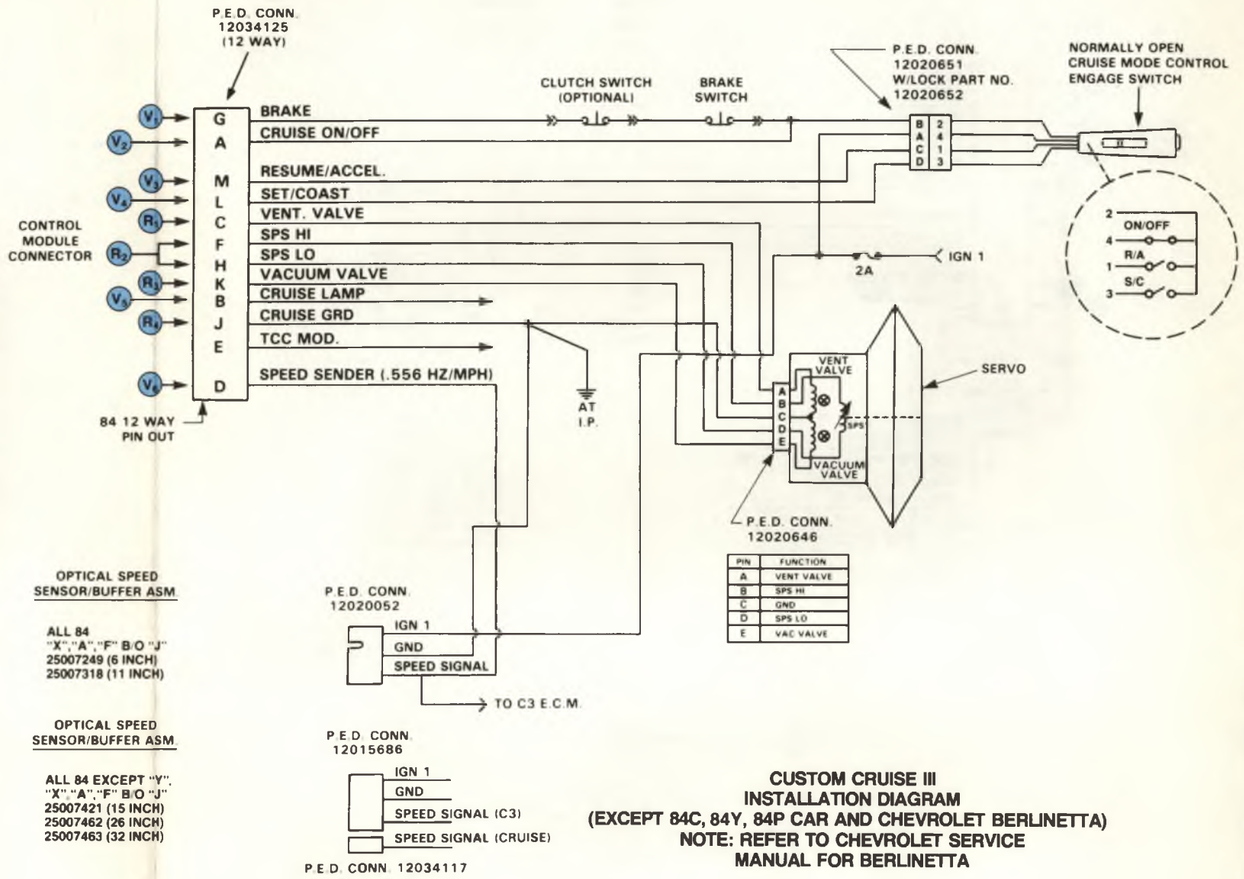
—NOTE—

On some 1984 vehicles, the cruise ground is located under the hood.

- Servo terminals "B" and "D" complete the SPS, servo position circuit. The servo position circuit originates at terminal "F", control module connector, flows through servo terminal "B", through the SPS coil to servo terminal "D", then to terminal "H" at the control module connector.
- The controller sends a vacuum valve signal which originates at terminal "K" and flows to servo terminal "E", through the servo vacuum coil to servo terminal "C", then to control module connector terminal "J" . . . cruise ground at the I.P., instrument panel.
- A Cruise Lamp is used on some 1984 applications. The control module connector terminal "B" (figure 3-6) is used to ground the cruise lamp.
- Control module connector terminal "J" is Cruise Ground. On 1984 Corvette (figure 3-7) Cruise Ground is on terminal "D-3". On Pontiac Fiero "P" car (figure 3-8), Cruise Ground is on controller terminal "P"
- Control module connector terminal "D" (figure 3-5) is the speed sender terminal. In operation, voltage will oscillate between a high of 4 to 12 volts and a low of near ground, depending on other uses of this signal.
- Control module connector terminal "E" is intended for an optional TCC signal (figures 3-5 and 3-6).
- The "C" car circuit shown in figure 3-6 is very similar to the circuit shown in figure 3-5.
    1. Terminal identification at the controller is identified by name . . . i.e."BRAKE", "CRUISE ON-OFF", etc.
    2. The Buffer Amplifier, located between the PM Generator and Control Module Connector has a variable signal output . . . 1.112 Hz for the speedo speed signal, 0.556 Hz for the cruise signal.

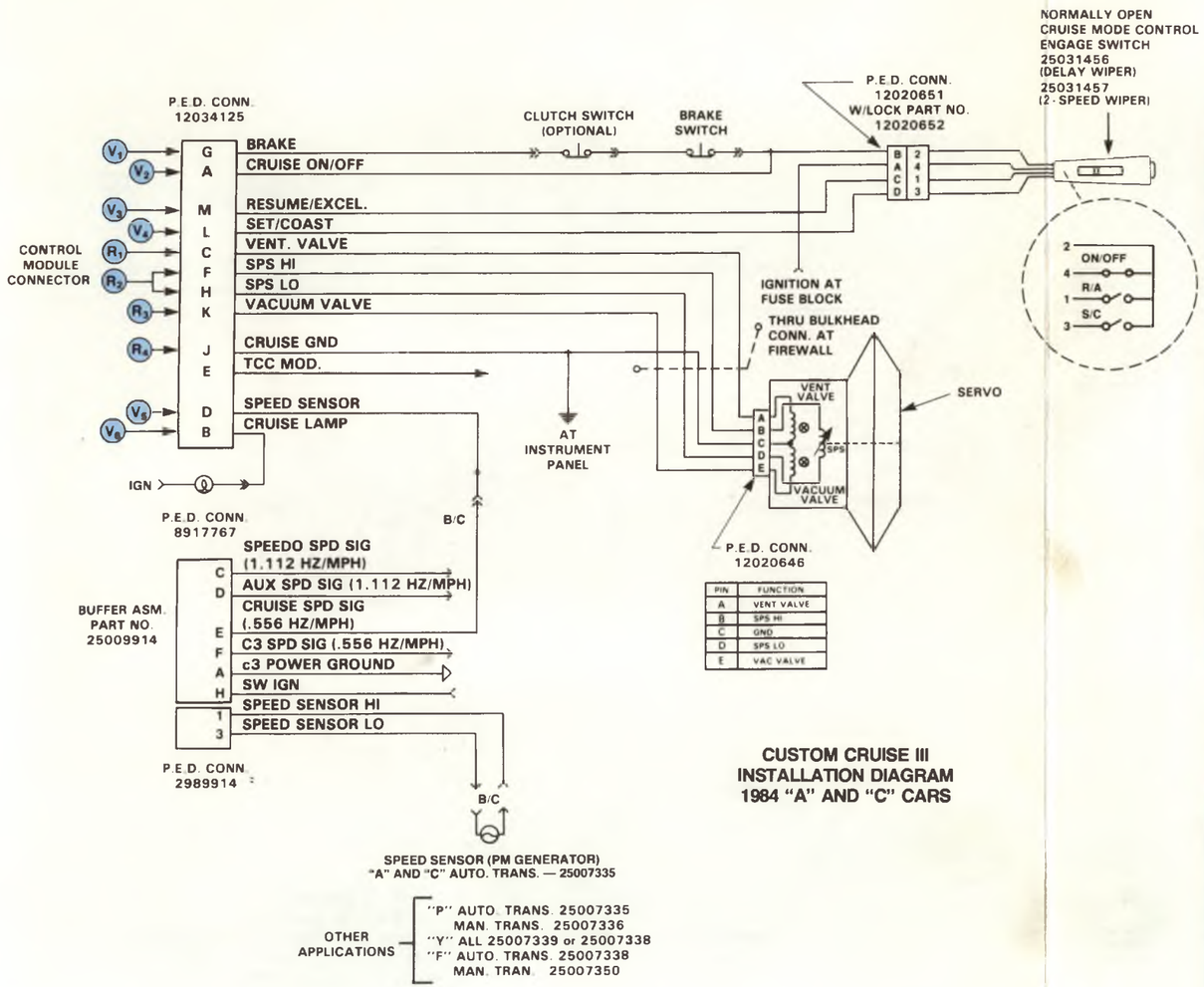
3. How the System Operates

VOLTAGE CHECK — MODULE CONNECTED				
TEST	**TERMINAL**	**FUNCTION**	**SPECIFIED VOLTAGE TO GROUND**	**CONDITIONS**
V_1	G	BRAKE INPUT	12V 0V	BRAKE/CLUTCH NOT APPLIED BRAKE/CLUTCH APPLIED
V_2	A	CRUISE ON-OFF INPUT	12V 0V	SLIDER SWITCH ON SLIDER SWITCH OFF, SET/COAST DEPRESSED OR NORMAL
V_3	M	RESUME/ACCEL INPUT	12V ..... 0V 0V	SLIDER SWITCH IN R/A POSITION SLIDER SWITCH ON, SET/COAST DEPRESSED OR NORMAL SLIDER SWITCH OFF, SET/COAST DEPRESSED OR NORMAL
V_4	L	SET/COAST INPUT	12V ..... 0V 0V	SLIDER SWITCH ON, SET/COAST DEPRESSED SLIDER SWITCH ON, SET/COAST NORMAL SLIDER SWITCH OFF, SET/COAST NORMAL
V_5	B	CRUISE LAMP	12V	CRUISE ENGAGED
V_6	D	SPEED SIGNAL	GREATER THAN 4V HIGH, NEAR 0V LOW	DRIVE WHEELS ROTATING ON APPLICATIONS LISTED, FIGURE 3-5
RESISTANCE CHECK — MODULE DISCONNECTED				
TEST	**TERMINAL**	**FUNCTION**	**SPECIFIED RESISTANCE**	**CONDITIONS**
R_1	C TO GROUND	VENT VALVE CONTROL	30-55Ω ..... OPEN CIRCUIT ...	MEASURED TO GROUND, SERVO CONNECTED MEASURED TO GROUND, SERVO DISCONNECTED
R_2	F TO H F TO GROUND H TO GROUND	SPS HIGH, SPS LOW	15-25Ω ..... OPEN CIRCUIT ...	MEASURED F TO H, SERVO CONNECTED MEASURED F AND H TO GROUND, SERVO DISCONNECTED
R_3	K TO GROUND	VACUUM VALVE CONTROL	30-55Ω ..... OPEN CIRCUIT ...	MEASURED TO GROUND, SERVO CONNECTED MEASURED TO GROUND, SERVO DISCONNECTED
R_4	J TO GROUND	GROUND	0Ω	MEASURED TO VEHICLE GROUND



CUSTOM CRUISE III INSTALLATION DIAGRAM (EXCEPT 84C, 84Y, 84P CAR AND CHEVROLET BERLINETTA) NOTE: REFER TO CHEVROLET SERVICE MANUAL FOR BERLINETTA

Figure 3-5, 1984 Custom Cruise III System Schematic — Optical Speed Sensor Buffer Assembly Identifies Vehicle Applications.



CUSTOM CRUISE III INSTALLATION DIAGRAM 1984 "A" AND "C" CARS

Figure 3-6, 1984 Custom Cruise III System Schematic, "A" and "C" cars — Speed Sensor PM Generator identifies other Vehicle Applications.

VOLTAGE CHECK — MODULE CONNECTED

TEST	TERMINAL	FUNCTION	SPECIFIED VOLTAGE TO GROUND	CONDITIONS
V_1	G	BRAKE INPUT	12V 0V	BRAKE/CLUTCH NOT APPLIED BRAKE/CLUTCH APPLIED
V_2	A	CRUISE ON-OFF INPUT	12V 0V	SLIDER SWITCH ON SLIDER SWITCH OFF, SET/COAST DEPRESSED OR NORMAL
V_3	M	RESUME/ACCEL INPUT	12V ..... 0V 0V	SLIDER SWITCH IN R/A POSITION SLIDER SWITCH ON, SET/COAST DEPRESSED OR NORMAL SLIDER SWITCH OFF, SET/COAST DEPRESSED OR NORMAL
V_4	L	SET/COAST INPUT	12V ..... 0V 0V	SLIDER SWITCH ON, SET/COAST DEPRESSED SLIDER SWITCH ON, SET/COAST NORMAL SLIDER SWITCH OFF, SET/COAST NORMAL
V_5	D	SPEED SENSOR	GREATER THAN 4V HIGH, NEAR 0V LOW	DRIVE WHEELS ROTATING
V_6	B	CRUISE LAMP	12V	CRUISE ENGAGED

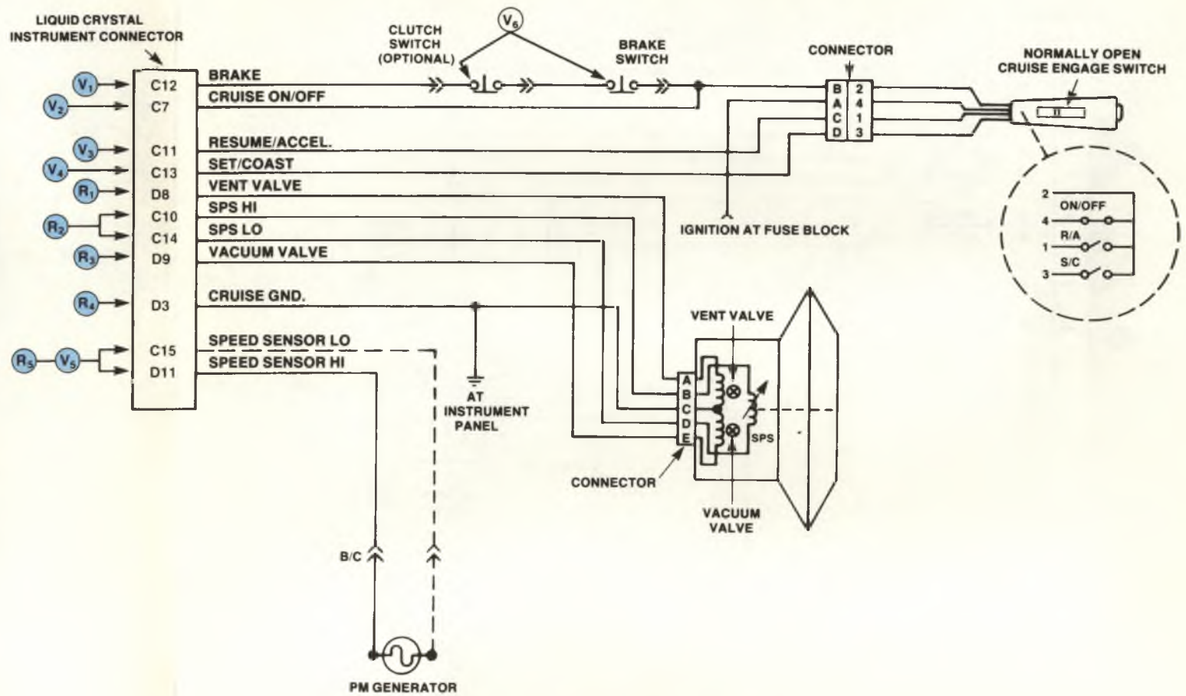
RESISTANCE CHECK — MODULE DISCONNECTED

TEST	TERMINAL	FUNCTION	SPECIFIED RESISTANCE	CONDITIONS
R_1	C to GROUND	VENT VALVE CONTROL	30-55Ω ..... OPEN CIRCUIT ...	MEASURED TO GROUND, SERVO CONNECTED MEASURED TO GROUND, SERVO DISCONNECTED
R_2	F TO H F TO GROUND H TO GROUND	SPS HIGH, SPS LOW	15-25Ω ..... OPEN CIRCUIT ...	MEASURED F TO H, SERVO CONNECTED MEASURED F AND H TO GROUND, SERVO DISCONNECTED
R_3	K to GROUND	VACUUM VALVE CONTROL	30-55Ω ..... OPEN CIRCUIT ...	MEASURED TO GROUND, SERVO CONNECTED MEASURED TO GROUND, SERVO DISCONNECTED
R_4	J to GROUND	GROUND	0Ω	MEASURED TO VEHICLE GROUND

3. How the System Operates

VOLTAGE CHECK AT CLUSTER — MODULE CONNECTED				
TEST	**TERMINAL**	**FUNCTION**	**SPECIFIED VOLTS TO GROUND**	**CONDITIONS**
V_1	C12	BRAKE INPUT	12V 0V	BRAKE/CLUTCH NOT APPLIED BRAKE/CLUTCH APPLIED
V_2	C7	CRUISE ON-OFF	12V 0V	SLIDER SWITCH ON SLIDER SWITCH OFF, SET/COAST DEPRESSED OR NORMAL
V_3	C11	RESUME/ACCEL INPUT	12V ..... 0V 0V	SLIDER SWITCH IN R/A POSITION SLIDER SWITCH ON, SET/COAST DEPRESSED OR NORMAL SLIDER SWITCH OFF, SET/COAST DEPRESSED OR NORMAL
V_4	C13	SET/COAST INPUT	12V ..... 0V 0V	SLIDER SWITCH ON, SET/COAST DEPRESSED SLIDER SWITCH ON, SET/COAST NORMAL SLIDER SWITCH OFF, SET/COAST NORMAL
V_5	C15 and D11	SPEED SENSOR INPUT	1.8 to 2.5 VAC (APPROXIMATE)	MEASURED BETWEEN A15 AND B11, VEHICLE SPEED 10 MPH
V_6	SEE SCHEMATIC	CLUTCH AND BRAKE INPUT	12V 0V	BRAKE/CLUTCH NOT APPLIED BRAKE/CLUTCH APPLIED

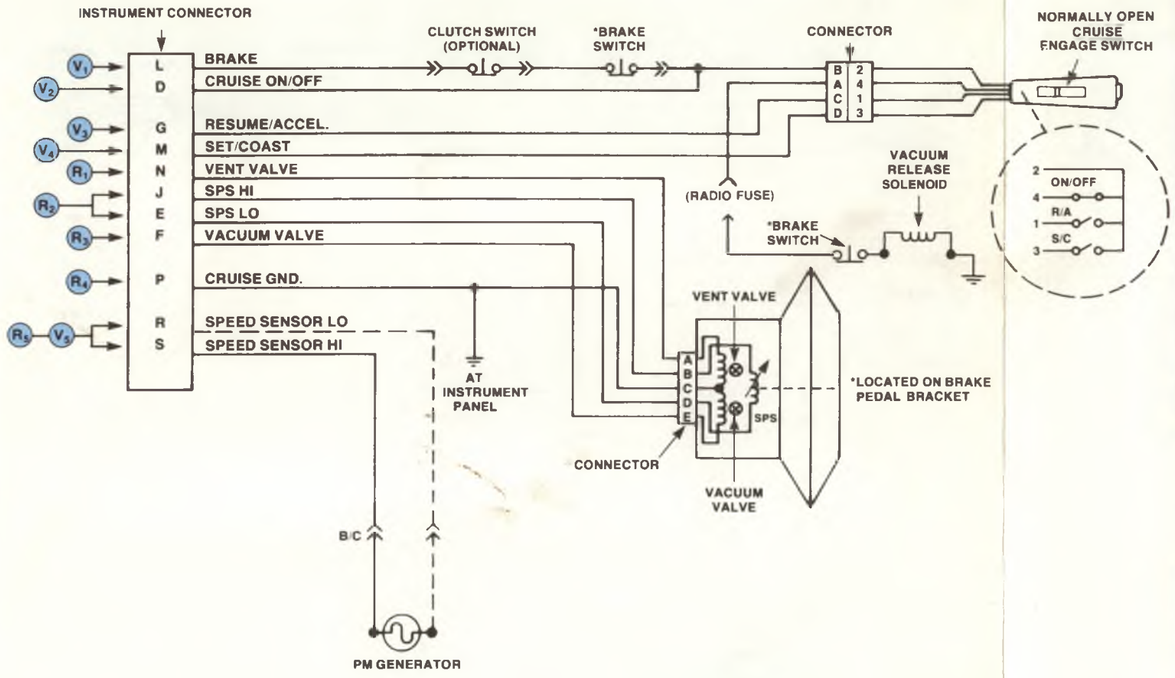
RESISTANCE CHECK — MODULE DISCONNECTED				
TEST	**TERMINAL**	**FUNCTION**	**SPECIFIED RESISTANCE**	**CONDITIONS**
R_1	D8 TO GROUND	VENT VALVE CONTROL	30-55Ω ..... OPEN CIRCUIT ..	MEASURED TO GROUND, SERVO CONNECTED MEASURED TO GROUND, SERVO DISCONNECTED
R_2	C10 to C14	SPS HIGH AND SPS LOW	15-25Ω ..... OPEN CIRCUIT ..	MEASURED BETWEEN C10 and C14; SERVO CONNECTED MEASURED BETWEEN C10 AND GROUND AND C14 AND GROUND, SERVO DISCONNECTED
R_3	D9 TO GROUND	VACUUM VALVE CONTROL	30-55Ω ..... OPEN CIRCUIT ..	MEASURED TO GROUND, SERVO CONNECTED MEASURED TO GROUND, SERVO DISCONNECTED
R_4	D3	CRUISE GROUND	0Ω	MEASURED TO VEHICLE GROUND
R_5	C15 to D11	PM GENERATOR CIRCUIT	346 to 493Ω	MEASURED BETWEEN C15 AND D11



1984 CORVETTE CUSTOM CRUISE III INSTALLATION DIAGRAM

Figure 3-7, AC Integrated Custom Cruise III System Schematic, 1984 Corvette.

3. How the System Operates



1984 PONTIAC FIERO "P" CAR CUSTOM CRUISE III INSTALLATION DIAGRAM

VOLTAGE CHECK AT CLUSTER — MODULE CONNECTED

TEST	TERMINAL	FUNCTION	SPECIFIED VOLTS TO GROUND	CONDITIONS
V_1	L	BRAKE INPUT	12V 0V	BRAKE/CLUTCH NOT APPLIED BRAKE/CLUTCH APPLIED
V_2	D	CRUISE ON-OFF	12V 0V	SLIDER SWITCH ON SLIDER SWITCH OFF, SET/COAST DEPRESSED OR NORMAL
V_3	G	RESUME/ACCEL INPUT	12V ..... 0V 0V	SLIDER SWITCH IN R/A POSITION SLIDER SWITCH ON, SET/COAST DEPRESSED OR NORMAL SLIDER SWITCH OFF, SET/COAST DEPRESSED OR NORMAL
V_4	M	SET/COAST INPUT	12V ..... 0V 0V	SLIDER SWITCH ON, SET/COAST DEPRESSED SLIDER SWITCH ON, SET/COAST NORMAL SLIDER SWITCH OFF, SET/COAST NORMAL
V_5	R and S	SPEED SENSOR INPUT	1.8 to 2.5 VAC (APPROXIMATE)	MEASURED BETWEEN R AND S, VEHICLE SPEED 10 MPH

RESISTANCE CHECK — MODULE DISCONNECTED

TEST	TERMINAL	FUNCTION	SPECIFIED RESISTANCE	CONDITIONS
R_1	N TO GROUND	VENT VALVE CONTROL	30-55Ω ..... OPEN CIRCUIT ..	MEASURED TO GROUND, SERVO CONNECTED MEASURED TO GROUND, SERVO DISCONNECTED
R_2	J to E	SPS HIGH and SPS LOW	15-25Ω ..... OPEN CIRCUIT ..	MEASURED BETWEEN J AND E; SERVO CONNECTED MEASURED BETWEEN J AND GROUND AND E AND GROUND, SERVO DISCONNECTED
R_3	F TO GROUND	VACUUM VALVE CONTROL	30-55Ω ..... OPEN CIRCUIT ..	MEASURED TO GROUND, SERVO CONNECTED MEASURED TO GROUND, SERVO DISCONNECTED
R_4	P	CRUISE GROUND	0Ω	MEASURED TO VEHICLE GROUND
R_5	R to S	PM GENERATOR CIRCUIT	346 to 493Ω	MEASURED BETWEEN R AND S

Figure 3-8, AC Custom Cruise III Schematic, 1984 Pontiac Fiero "P" Car.

4. Diagnostic Procedures

Preliminary Inspection

An undesirable cruise control performance symptom can be mechanical, vacuum, electrical or a combination of the three. In all cases perform a visual inspection of all components in the cruise system. Things to check are . . .

- Disconnected or damaged wiring
- Pinched, cracked or disconnected vacuum hoses
- Cracked or broken vacuum fittings at the servo or accumulator
- Correct positioning of the check valve in the servo and accumulator vacuum line (see figure 2-12).
- Damaged components

—NOTE—

To avoid breaking vacuum ports, care must be exercised in removing vacuum hoses from fittings. If necessary cut hose.

Inspection Notes

Test Procedures

Cruise System Inoperative

The following procedure applies to all Custom Cruise III systems except 1984 Corvette (for Corvette see page 4- 5).

Step 1 Perform the voltage and resistance checks for the particular cruise system installation (see figures 3-5, 3-6 or 3-8 as appropriate).

- Servo resistance measurement (vent valve control or vacuum valve control) can be made at the servo as shown in figure 4-1.

• SERVO CONNECTOR DISCONNECTED • MEASURE AT SERVO PINS

PIN	FUNCTION	RESISTANCE	CONDITIONS
D to B	SPS	15-25 Ω	MEASURED BETWEEN PINS D AND B (IF MEASURED RESISTANCE IS NOT STATED VALUE, REPLACE SERVO)
A to C	VENT VALVE	30-55 Ω	MEASURED BETWEEN PINS A AND C (IF MEASURED RESISTANCE IS NOT STATED VALUE, REPLACE SERVO)
E to C	VACUUM VALVE	30-55 Ω	MEASURED BETWEEN PINS E AND C (IF MEASURED RESISTANCE IS NOT STATED VALUE, REPLACE SERVO)

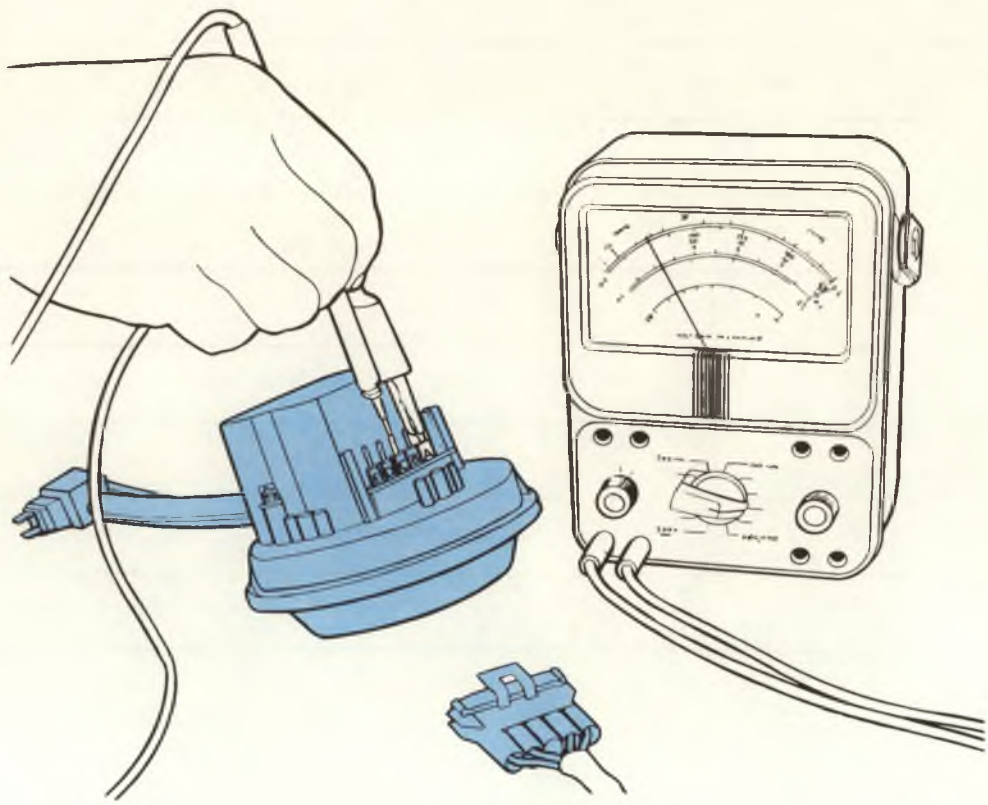


Figure 4-1, Servo Resistance Measurement.

Step 2 Except for 1984 Pontiac Fiero "P" car, perform the following vacuum checks:

—NOTE —

For Pontiac Fiero, plug the vacuum release port on the servo (figure 2-11) and perform vacuum servo tests 1 and 2, test table 4-1.

Vacuum Servo Tests

- Perform Preliminary Inspection (see page 4-1).
- Disconnect the bead chain, cable (or rod) and electrical connector at the servo.
- Start the engine . . . or apply vacuum to the servo vacuum port.
- Proceed to Test Table 4-1, Vacuum Servo Tests.

Test	Action	Reaction
1	Apply 12 volts to A and E, then ground C (A-C closes the normally open vent valve — E-C opens the normally closed vacuum valve)	Servo should full stroke. If not, check vacuum hoses to the vacuum supply.
2	Remove voltage from E	The servo should hold a full stroke. If not, go to the next step. On Pontiac Fiero, replace the servo. If servo holds, go to step 4.
3	Disconnect the vacuum brake release at the servo and plug the servo. Momentarily apply 12 volts to E to allow the servo to full stroke.	If the servo holds its position, adjust the brake vacuum release valve or replace the valve.
4	• Turn Ignition "ON" • Turn Ignition "OFF" and disconnect vacuum valve connector at the valve. Turn Ign. "ON"	• Vacuum release valve should engage. • With a properly adjusted brake switch, battery voltage should be present across the (2) connector terminals (figures 2-8 and 3-8). No battery voltage indicates an open circuit (see figure 3-8).

Test Table 4-1, Vacuum Servo Tests.

Step 3 Check electrical operation of the mode control switches by replacing the switch with a known "good" switch, or perform the tests listed in Table 4-2, Mode Control Switch Test.

For Chevrolet Berlinetta perform the tests listed in Table 4-3, Mode Control Test, Chevrolet Berlinetta.

SET/COAST (S/C) SW	POSITION SLIDER	1-2 C-B	1-3 C-D	1-4 C-A	2-3 B-D	2-4 B-A	3-4 D-A
Normal	Off	O	O	O	O	O	O
Normal	On	O	O	O	O	C	O
Normal	R/A	C	O	C	O	C	O
Depressed	Off	O	O	O	C	O	O
Depressed	On	O	O	O	C	C	C
Depressed	R/A	C	C	C	C	C	C

C — Closed

O — Open

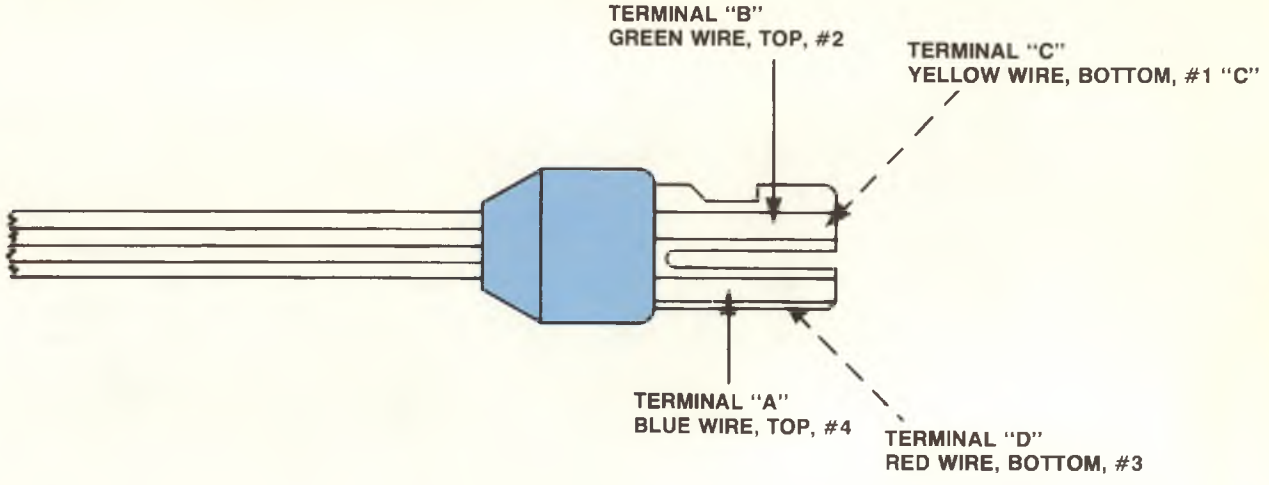


Table 4-2, Mode Control Switch Test.

PERFORM WITH IGNITION AND CONSOLE ON-OFF SWITCHES ON					
Set/Coast	**Resume/ Accelerator**	**Volts at Cruise Power**	**Volts at Set/Coast**	**Volts at Resume/Accelerator**	**Volts at Brake Switch**
Normal	Normal	Battery	O	O	*Battery
Depressed	Normal	Battery	Battery	O	*Battery
Normal	Normal	Battery	O	O	*Battery
Normal	Depressed	Battery	O	Battery	*Battery

*With the console switch in the OFF position, O-volts should be indicated.

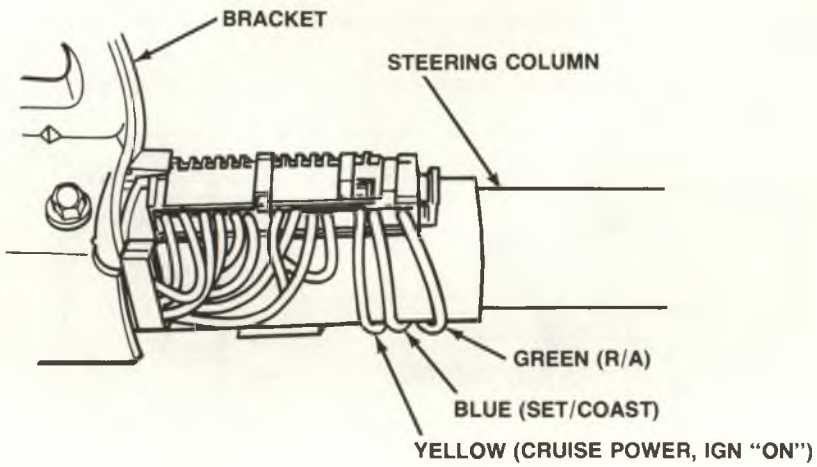


Table 4-3, Mode Control Test, Chevrolet Berlinetta.

Applicable to 1984 Corvette Only

Step 1 Refer to schematic, figure 3-7. At test point V6 check for 12 volts, clutch and brake not applied.

Step 2 Check vacuum release valve operation (figure 2-6).

Step 3 Inspect vacuum hose, and fittings for restrictions and loose connections.

Step 4 Make sure electrical connections are not loose or defective.

Step 5 Perform servo electrical tests described in figure 4-1.

Step 6 Check mode control switch per Diagnostic Procedures, step 4, table 4-2.

Step 7 Check servo vacuum, per Diagnostic Procedures, step 2, table 4-1.

Step 8 Use speedometer Signal Generator J-33431 (figure 4-2) to perform the following functional check:

8a. Turn off the ignition switch . . . then disconnect the body harness connector from the PM Generator at the transmission.

8b. Disconnect the servo throttle linkage at the servo unit.

8c. Connect Speedometer Signal Generator, J-33431, to the PM Generator harness connector. Use the connectors provided with signal generator.

8d. Set the tester to the 54 MPH position.

—NOTE—

Speedometer Signal Generator J-33431 features other test capabilities. Use the signal generator only as described in Steps 8a, b, c and d.

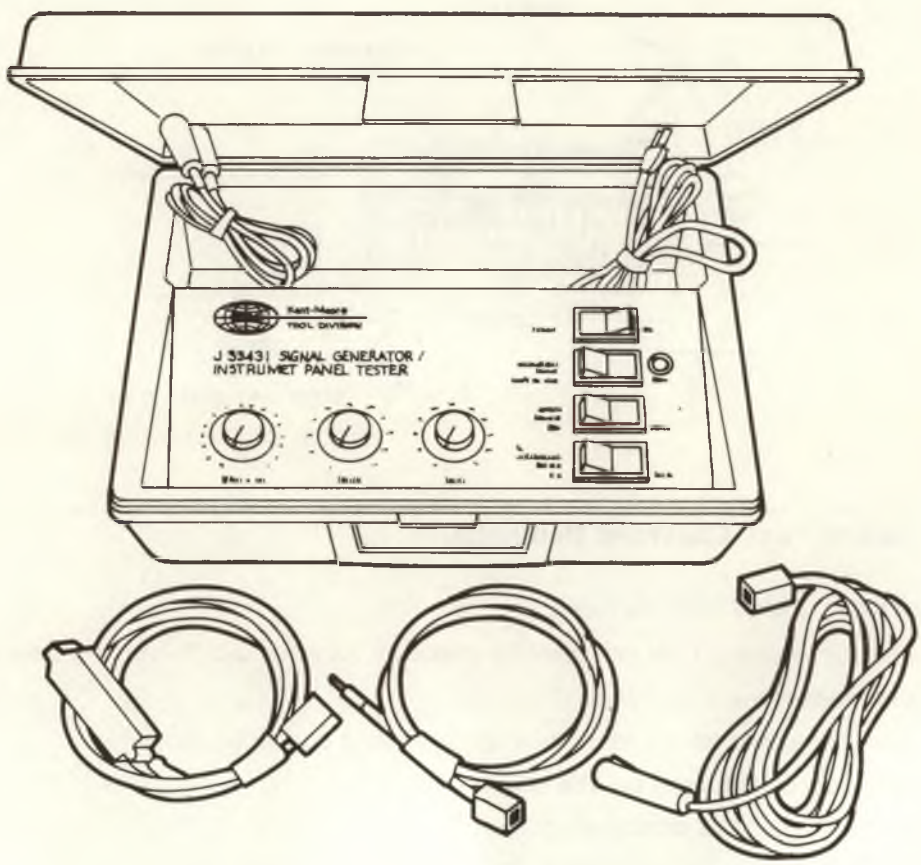


Figure 4-2, Speedometer Signal Generator J-33431.

Step 9 Start the engine . . . set the Mode Switch Slider to the ON position. Go to Steps 9a, b, c and d.

Step	Action	Reaction
9a	Depress and release set coast switch (S/C).	Servo will pull to approximately 28 to 42% of servo position travel and hold.
9b	Move cruise lever slider to Resume /Accelerate (R/A) and hold for 3 seconds. Release slider.	Servo will pull to the full stroke travel position and hold. After releasing slider from the R/A position, the servo will return to 28 to 42% of the travel position.
9c	Depress brake and/or clutch pedal.	Servo will move to the closed throttle position.
9d	Momentarily move cruise lever slider to Resume/Accelerate (R/A) position.	Servo will pull to the 28 to 42% position of travel and hold.

Step 10 If the tests performed in steps 9a, b, c and d did not meet specifications, perform vacuum servo tests (test table 4-1). If OK remove the cluster trim to expose the cluster and cluster connector.

10a Perform voltage and resistance checks by back probing at the connector (see figure 3-7, voltage and resistance specifications).

10b If no defect is found, replace the cluster assembly.

Performance Symptoms and Correction (All Cruise Systems)

Cruise System Surges

Step 1 The servo and throttle linkage should operate freely and smoothly. This linkage should be adjusted as described by the vehicle service manual. Hoses should be properly routed with no restrictions or leaks.

Step 2 Check the servo as per procedures described in figure 4-1, electrical check, page 4-2 . . . step 9, electrical vacuum check, above . . . and Table 4-1, Vacuum Servo Test, page 4-3. Replace the servo if required.

Step 3 If no system defect is noted, replace the electronic controller or liquid crystal display.

Cruise Set Speed High or Low

Step 1 Check module for correct part number (see figures 3-5, 3-6, 3-7 or 3-8 as appropriate).

Step 2 Check servo linkage for excess slack and adjust.

Step 3 Insure correct electronic controller P/N has been installed.

Step 4 Replace the electronic controller or instrument display.

Excessive Cruise Speed Loss on Hills

Step 1 Check hoses for vacuum leaks.

Step 2 Determine if check valve is functional.

Step 3 Check vacuum hose routing as shown on the under-hood decal, service manual or applicable technical publication. Correct as necessary.

Slow Engage/Resume Response

Step 1 Check for vacuum hose restrictions

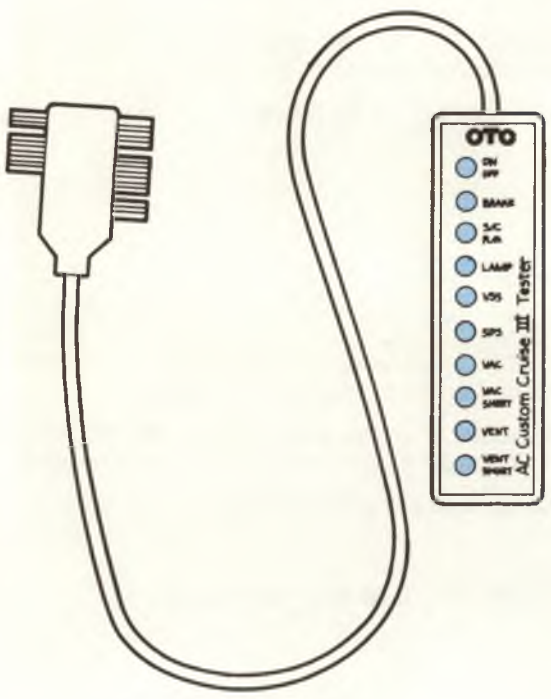
Step 2 Check for leaks in the vacuum system.

Step 3 Perform vacuum hose/device repairs as necessary.

Step 4 Insure correct electronic controller P/N has been installed.

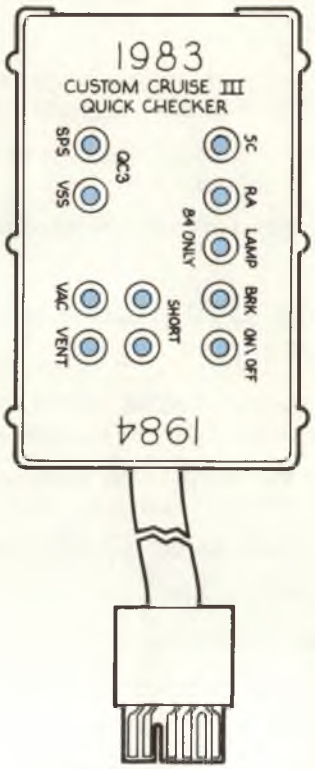
Custom Cruise III System "Quick Checker"

Three AC Custom Cruise III System "Quick Checker" test units are available . . see figures 4-3, 4-4 and 4-5.



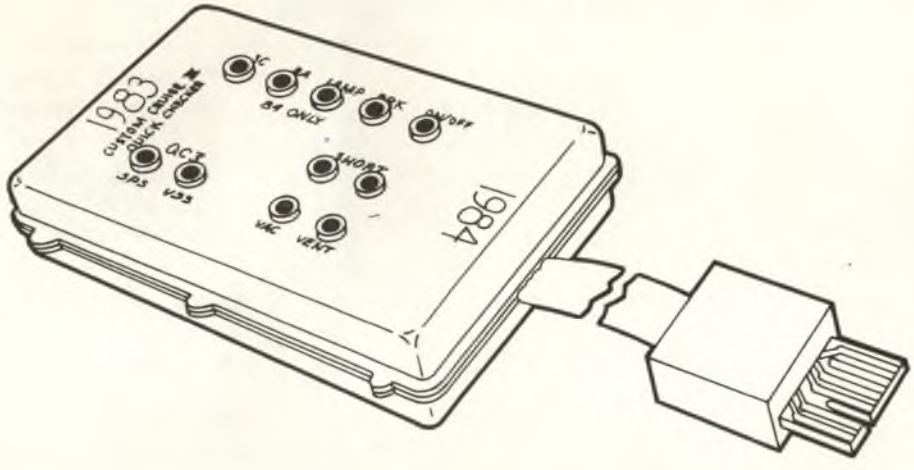
AVAILABILITY:
Owatonna Tool Co.
144 Wimbleton Dr.
Birmingham, MI 48008
313-642-7766

Figure 4-3, Quick Checker Model No. ET-3475.



AVAILABILITY:
Kent-Moore Tool Co.
28635 Mound Rd.
Warren, MI 48092
313-539-5330

Figure 4-4, Quick Checker Model No. J-34185.



AVAILABILITY:
SPECMO Enterprises
2344 N. Woodward Ave.
Royal Oak, MI 48073
313-399-5645

Figure 4-5, Quick Checker Model No. QC111.

Quick Checker Test Procedure

Preparation . . .

1. Remove kick pad to gain access to module (controller) if applicable.
2. Depress harness connector locking tub and remove connector from module.
3. Connect tester to harness connector. Note: 12 terminal edgeboard connectors mate to 1984 applications, while 18 terminal connectors mate to 1983 applications.
4. Perform Steps 1-8, Table 4-4, Test Sequence.

Pontiac Fiero "P" Car Preparation

1. Disconnect: edgeboard connector at instrument panel.
2. Observing key slots, connect optional Pontiac "P" Car adapter (figure 4-6) to Custom Cruise III Quick Checker.
3. Observing the key slots in the male end of the optional adapter, fit male end to the female connector just removed from the instrument cluster.
4. Perform tests as outlined for the Quick Checker, except for step 4.
5. To check the PM generator and the wiring to the cluster, proceed as follows:
   — Roll drive wheels at an estimated 8 to 10 MPH. The LED molded into the lower end of the optional adapter should turn ON and OFF.

—CAUTION—

If this test is being performed free running, support rear axle on jack stand.

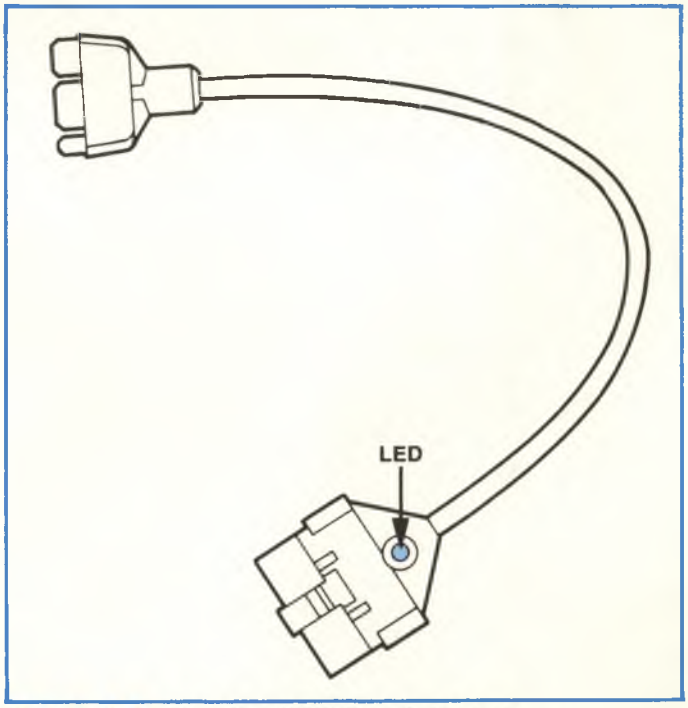


Figure 4-6, Pontiac "P" Car Adapter.

QUICK CHECKER TEST SEQUENCE			
Step	**Test and Condition**	**Correct Response**	**Trouble Shooting for Incorrect Response**
1	**System Not in Use** Ign. ON, engine OFF mode control switch OFF.	No lights.	Check for shorted mode control switch and/or related wiring.
2	**Correct Power Source** Mode control slider in ON position, ign. ON, engine OFF.	ON/OFF and brake lights ON. (Note: vent, vac SPS also light).	**Brake light OFF** — Check clutch and brake switches and related wiring. **ON/OFF OFF** — Check for opens from fuse to Pin K of module.
3	**System Continuity** Ign. ON, engine OFF and slider in ON position	All lights on except R/A and S/C.	**Vent, Vac, or SPS lights OFF** — Check these solenoids or related wiring for continuity. Replace bad servo.
4	**Vehicle Speed Sensor Performance** Ign. ON, engine running slider in ON position, vehicle moving at, or a simulated 5-10 MPH.	VSS light should blink.	Check sender wiring VSS wiring and connections. Replace buffer amplifier or sender.
5	**Mode Control Switch Function** Ing. ON, engine OFF and S/C depressed.	S/C light lights, Vac light goes out. Vac "short" light does not light.	Mode control switch, servo, or related wiring bad. Immediately check wiring between vac terminal at controller and vac terminal at servo for short to ground.
6	**Mode Control Switch Function** Ign. ON, engine OFF and slider in R/A position.	R/A light lights, Vent light goes out. Vent "short" light does not light.	Mode control switch or related circuitry bad. Immediately check wiring between vent terminal at controller and vent terminal at servo for short to ground.

Table 4-4, Quick Checker Test Sequence.

—NOTE—

Do not depress S/C or R/A with engine running. If depressed, wide open throttle will occur.

QUICK CHECKER TEST SEQUENCE (continued)

Step	Test and Condition	Correct Response	Trouble Shooting for Incorrect Response
7	**Vacuum System Check** Start and run engine for 1 minute to charge accumulator. **Turn Engine OFF.** Ign. ON. Depress S/C and R/A together. Then release S/C.	S/C and R/A lights, Vent and Vac lights go out; Servo will full stroke and hold. Vacuum should hold at full stroke servo position.	Check for restricted or leaking vacuum source. Plug vacuum release port (figure 2-11) and proceed to step 8.
8	**Vacuum System Check** Start and run engine for 1 minute to charge accumulator. **Turn Engine OFF.** Ign. ON. Depress S/C and R/A together. Then release S/C.	Vacuum should hold at full stroke servo position.	If it does, replace or service vacuum release valve, figure 2-6 (or figure 2-8 Pontiac Fiero electric vacuum release valve) and/or related hoses. If it does not, replace servo.

REFER TO QUICK CHECKER DEALER SERVICE MANUAL FOR ADDITIONAL INFORMATION

AC Spark Plug Division
General Motors Corporation
1300 N. Dort Highway
Flint, Michigan 48556
U.S.A.

Printed in U.S.A.

SMCM-1A Litho in U.S.A. 8/83