DESCRIPTION & OPERATION

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all SERVICE PRECAUTIONS and DISABLING & ACTIVATING AIR BAG SYSTEM procedures in AIR BAG RESTRAINT SYSTEM article.

CRUISE CONTROL SYSTEM

Cruise control is a speed control system that maintains a desired vehicle speed under normal driving conditions. Steep grades may cause variations in selected speeds. System has capability to cruise, coast, resume speed, accelerate, and tap-up and tap-down. Cruise control system contains a low speed limit which will prevent system engagement when vehicle speed is less than about 25 MPH.

The main components of the cruise control system include the Throttle Actuator Control (TAC) module, functional control switches, Throttle Actuator Control (TAC) motor, Accelerator Pedal Position (APP) sensor, Throttle Position (TP) sensor, Powertrain Control Module (PCM), brake switch and clutch switch (M/T). See **COMPONENT LOCATIONS** .

CRUISE CONTROL FUNCTIONAL SWITCHES

NOTE: Multifunction lever may also be referred to as combination switch.

Functional control switches are located on the end of the multifunction lever, which also serves as a turn signal lever. Functional control switches include a SET button and a sliding main switch with OFF, ON and R/A positions.

OFF

System disengages when switch is turned off.

ON

System is ready to be set when switch is turned on.

SET (Set/Coast)

Spring-loaded SET button engages cruise. During engagement, if SET button is pressed and held, vehicle decelerates (cruise disengages) until button is released. When button is released, cruise engages and maintains new set speed. Also, by quickly pressing and releasing (tapping) this button, the set speed is "tapped" down in one MPH increments.

R/A (Resume/Accelerate)

Spring-loaded R/A switch will not initially set cruise speed, but when cruise has been disengaged by braking, momentarily sliding this switch to R/A position will cause cruise to resume previously set speed. This is the resume function. Accelerate function occurs when R/A switch is held in position for more than one second. This causes the vehicle to accelerate until switch is released. When released, system maintains new set speed. Also, by quickly pressing and releasing (tapping) this button, the set speed is "tapped" up in one MPH increments.

BRAKE SWITCH & CLUTCH SWITCH

Brake switch disengages cruise control operation electrically when brake pedal is depressed. This is done by activating the brake switch signal electrical circuit to TAC module. Manual transmission models also use a clutch switch located on clutch pedal bracket to stop cruise operation. Vehicle speed at brake actuation will be stored in system memory.

COMPONENT LOCATIONS

COMPONENT LOCATIONS

Application	Location
Accelerator Pedal Position	On Accelerator Pedal
(APP) Sensor	Bracket
Brake Switch	On Brake Pedal Bracket
Clutch Switch (M/T)	On Clutch Pedal Bracket
Cruise Control Functional Switches	On Combination Switch
Throttle Actuator Control (TAC) Module	Inside Right Front Fender, Attached To PCM
Throttle Actuator Control (TAC) Motor	On Left Side Of Throttle Body
Throttle Position (TP) Sensor	On Right Side Of Throttle Body

ADJUSTMENTS

BRAKE SWITCH ADJUSTMENT

Brake booster pushrod must be assembled to brake pedal before brake switch can be adjusted. With brake pedal released, switch plunger should be fully depressed against pedal shank. To adjust, depress pedal and push switch until switch body is fully seated on retainer. Pull pedal toward rear of vehicle, against pedal stop (until clicking sound cannot be heard while pulling pedal). Switch will adjust to proper position in retainer.

CLUTCH SWITCH ADJUSTMENT (M/T)

With clutch pedal released, switch plunger should be fully depressed against pedal shank. To adjust, depress pedal and push switch until switch body is fully seated on retainer. Pull pedal toward rear of vehicle, against pedal stop (until clicking sound cannot be heard while pulling pedal). Switch will adjust to proper position in retainer.

TROUBLE SHOOTING

1. PCM will disable cruise control if any of the following conditions are detected:
   - Engine is off.
   - Automatic transmission is in Park or Neutral.
   - Manual transmission is in Neutral.
   - Engine speed is too high.
   - Vehicle speed is too high.
   - Diagnostic Trouble Codes (DTCs) are set.
2. Check fuses, and replace as necessary. Visually inspect for broken or open wires. Check for a broken or partially broken wire inside insulation which could cause system malfunction but prove good in a continuity/voltage check with system disconnected.
3. Check for Diagnostic Trouble Codes (DTCs). If any codes are present, see **TESTS W/CODES** article in ENGINE PERFORMANCE section.

TESTING

NOTE: Tests are written specifically for General Motor's Tech 1 scan tool. A generic scan tool may not be capable of performing all necessary test functions.

SYSTEM TEST

1. Drive vehicle at a speed greater than 25 MPH. Move cruise control main switch to ON position. Press SET button once and release. Remove foot from accelerator pedal. Vehicle should maintain set speed.
2. Hold slider switch in R/A position until vehicle speed increases 4-5 MPH. Vehicle should accelerate and maintain new set speed. Press SET button until vehicle speed decreases 4-5 MPH. Vehicle should decelerate and maintain new set speed.
3. Depress brake pedal slightly. Cruise control system should disengage. Press slider switch to R/A position once and release. Vehicle should accelerate and maintain previously set speed. Tap-up R/A switch. Vehicle speed should increase one MPH. Tap-down SET button. Vehicle speed should decrease one MPH.
4. Move main switch to OFF position. Cruise control system should disengage, and set speed should be erased from memory.
5. Turn ignition switch to OFF position. Connect scan tool to Data Link Connector (DLC). Turn ignition switch to RUN position. Using scan tool, check for Diagnostic Trouble Codes (DTCs). If any codes are present, see **TESTS W/CODES** article in ENGINE PERFORMANCE section.

CRUISE CONTROL WILL NOT RESUME, ACCELERATE, TAP-UP OR TAP-DOWN

1. Perform System Test. See **SYSTEM TEST** . After performing system test, go to next step.
2. Check CR CONT fuse (10-amp). If fuse is blown, go to step 4). If fuse is okay, go to next step.
3. Turn ignition switch to RUN position. Using a DVOM, measure voltage between multifunction lever (cruise control switch) connector (harness side) terminal "B" (Pink wire) and ground. See **WIRING DIAGRAMS** . If voltage is 10-14 volts, go to step 13). If voltage is not 10-14 volts, go to step 5).

4. Remove blown CR CONT fuse (10-amp) from instrument panel electrical center located in right footwell, under carpet. Disconnect multifunction lever (cruise control switch) connector. Disconnect Daytime Running Lights (DRL) control module connector located behind instrument cluster. Using a DVOM, measure resistance between multifunction lever (cruise control switch) connector (harness side) terminal "B" (Pink wire) and ground. See **WIRING DIAGRAMS** . If resistance is infinite, go to step 9). If resistance is not infinite, go to step 6).
5. Repair open in Pink wire between multifunction lever (cruise control switch) and instrument panel electrical center located in right footwell, under carpet.
6. Disconnect Throttle Actuator Control (TAC) module connector. Using a DVOM, measure resistance between multifunction lever (cruise control switch) connector (harness side) terminal "A" (Gray wire) and ground. See **WIRING DIAGRAMS** . If resistance is infinite, go to step 10). If resistance is not infinite, go to next step.
7. Using a DVOM, measure resistance between multifunction lever (cruise control switch) connector (harness side) terminal "C" (Dark Blue wire) and ground. See **WIRING DIAGRAMS** . If resistance is infinite, go to step 11). If resistance is not infinite, go to next step.
8. Using a DVOM, measure resistance between multifunction lever (cruise control switch) connector (harness side) terminal "D" (Gray/Black wire) and ground. See **WIRING DIAGRAMS** . If resistance is infinite, go to step 12). If resistance is not infinite, go to step 22).
9. Repair short to ground in Pink wire between multifunction lever (cruise control switch) and instrument panel electrical center located in right footwell, under carpet.
10. Repair short to ground in Gray wire between multifunction lever (cruise control switch) and underhood electrical center located in right side of engine compartment.
11. Repair short to ground in Dark Blue wire between multifunction lever (cruise control switch) and underhood electrical center located in right side of engine compartment.
12. Repair short to ground in Gray/Black wire between multifunction lever (cruise control switch) and underhood electrical center located in right side of engine compartment.
13. Turn ignition switch to RUN position. Turn cruise control switch to ON position. Using a DVOM, backprobe measuring voltage between multifunction lever (cruise control switch) connector (harness side) terminal "A" (Gray wire) and ground. See **WIRING DIAGRAMS** . If voltage is 10-14 volts, go to next step. If voltage is not 10-14 volts, go to step 22).
14. Turn ignition switch to RUN position. Turn cruise control switch to ON position. Using a DVOM, backprobe measuring voltage between multifunction lever (cruise control switch) connector (harness side) terminal "C" (Dark Blue wire) and ground. See **WIRING DIAGRAMS** . While observing DVOM, press and hold cruise control switch in SET position. If voltage is 10-14 volts, go to next step. If voltage is not 10-14 volts, go to step 22).
15. Turn ignition switch to RUN position. Turn cruise control switch to ON position. Using a DVOM, backprobe measuring voltage between multifunction lever (cruise control switch) connector (harness side) terminal "D" (Gray/Black wire) and ground. See **WIRING DIAGRAMS** . While observing DVOM, press and hold cruise control switch in R/A position. If voltage is 10-14 volts, go to next step. If voltage is not 10-14 volts, go to step 22).
16. Disconnect Throttle Actuator Control (TAC) module connector. Turn ignition switch to RUN position. Turn cruise control switch to ON position. Using a DVOM, measure voltage between TAC module connector (harness side) terminal No. 14 (Gray wire) and ground. See **WIRING DIAGRAMS** . If voltage is 10-14 volts, go to next step. If voltage is not 10-14 volts, go to step 19).

17. Turn ignition switch to RUN position. Turn cruise control switch to ON position. Using a DVOM, measure voltage between TAC module connector (harness side) terminal No. 4 (Dark Blue wire) and ground. See **WIRING DIAGRAMS** . While observing DVOM, press and hold cruise control switch in SET position. If voltage is 10-14 volts, go to next step. If voltage is not 10-14 volts, go to step 20).
18. Turn ignition switch to RUN position. Turn cruise control switch to ON position. Using a DVOM, measure voltage between TAC module connector (harness side) terminal No. 5 (Gray/Black wire) and ground. See **WIRING DIAGRAMS** . While observing DVOM, press and hold cruise control switch in R/A position. If voltage is 10-14 volts, go to step 23). If voltage is not 10-14 volts, go to step 21).
19. Repair open in Gray wire between TAC module and underhood electrical center located in right side of engine compartment.
20. Repair open in Dark Blue wire between TAC module and underhood electrical center located in right side of engine compartment.
21. Repair open in Gray/Black wire between TAC module and underhood electrical center located in right side of engine compartment.
22. Replace multifunction lever (cruise control switch). See **STEERING COLUMN SWITCHES** article.
23. Replace Throttle Actuator Control (TAC) module. See **THROTTLE ACTUATOR CONTROL (TAC) MODULE** under REMOVAL & INSTALLATION.

REMOVAL & INSTALLATION

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION section before disconnecting battery.

CRUISE CONTROL FUNCTIONAL SWITCHES

Functional control switches are located on the end of the multifunction lever, which also serves as a turn signal lever. Switches are not serviceable and must be replaced with multifunction lever as an assembly. See **STEERING COLUMN SWITCHES** article.

BRAKE SWITCH & CLUTCH SWITCH

Removal & Installation

Disconnect negative battery cable. Remove left instrument panel sound insulator. Disconnect electrical connector from switch. Remove switch from retainer. To install, reverse removal procedure. Adjust both switches. See procedures in **BRAKE SWITCH ADJUSTMENT** and **CLUTCH SWITCH ADJUSTMENT (M/T)** .

THROTTLE ACTUATOR CONTROL (TAC) MODULE

Removal & Installation

1. Disconnect negative battery cable. Raise and support vehicle. Remove right front wheel.
2. Remove wheelhouse filler panel. Remove screws retaining Throttle Actuator Control (TAC) module to PCM bracket. See **Fig. 1** . Disconnect TAC module electrical connector. Remove TAC module.
3. To install, reverse removal procedure. Tighten TAC module retaining screws to 17 INCH lbs. (2 N.m). Tighten negative battery cable bolt to 11 ft. lbs. (15 N.m).

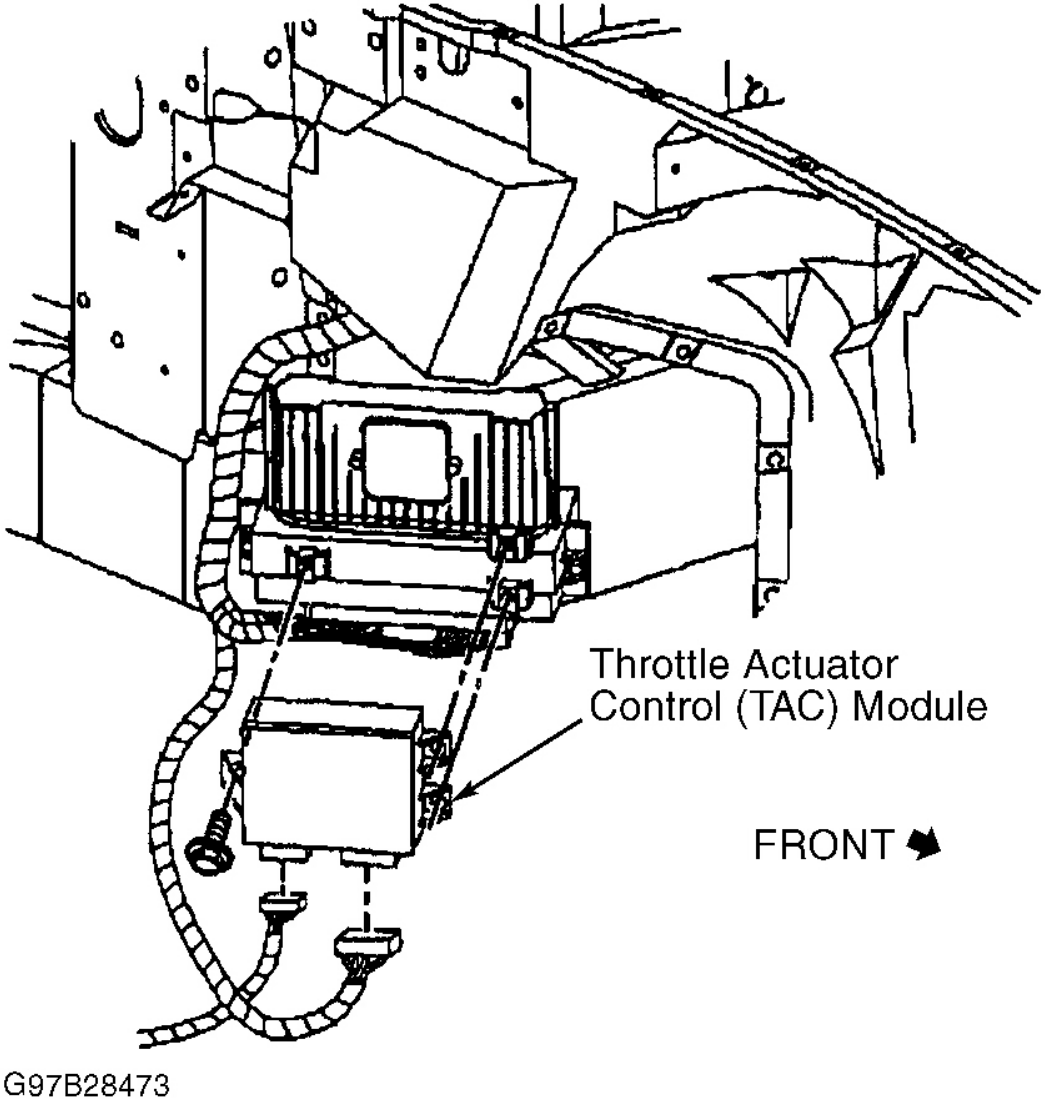

Fig. 1: Removing Throttle Actuator Control (TAC) Module
Courtesy of GENERAL MOTORS CORP.

ACCELERATOR PEDAL POSITION (APP) SENSOR

Removal & Installation

1. Turn ignition off. Remove lower left insulator panel. Disconnect electrical connector from APP sensor. Remove accelerator pedal mounting bolts and remove accelerator pedal.
2. To install, reverse removal procedure. Tighten accelerator pedal mounting bolts to 15 ft. lbs. (20 N.m). Using a scan tool, monitor throttle angles and ensure throttle completely opens and closes. Accelerator pedal should operate freely without binding between full closed throttle position and wide open throttle position.

THROTTLE POSITION (TP) SENSOR

Removal & Installation

Turn ignition off. Disconnect electrical connector from TP sensor. Remove TP sensor retaining screws. Remove TP sensor from throttle body. With throttle valve in closed position, install TP sensor on throttle body. Ensure TP sensor lever engages with drive lever on throttle shaft. Install retaining screws and electrical connector. TP sensor is self-zeroing and is not adjustable.

WIRING DIAGRAMS

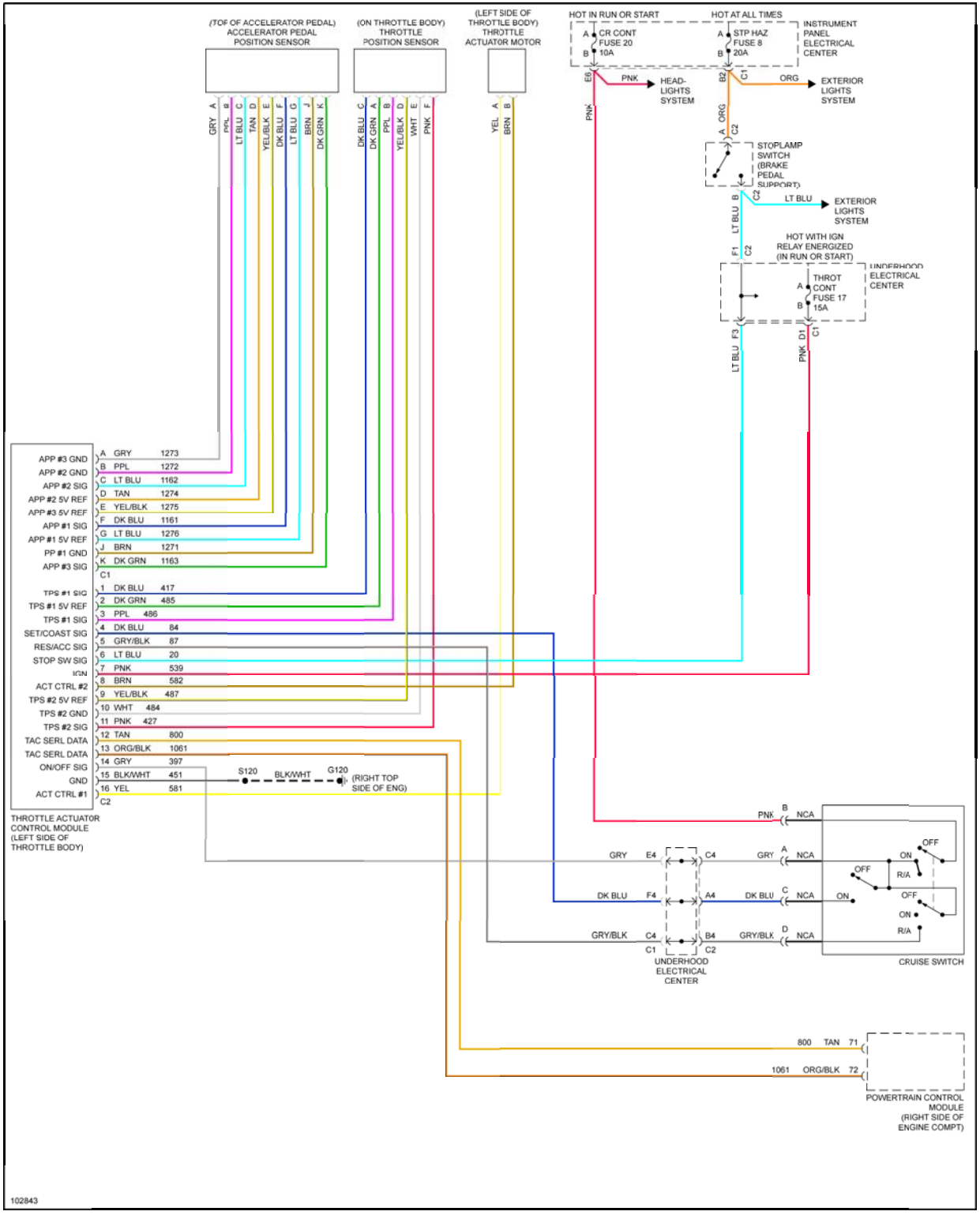
(TOP OF ACCELERATOR PEDAL) ACCELERATOR PEDAL POSITION SENSOR
(ON THROTTLE BODY) THROTTLE POSITION SENSOR
(LEFT SIDE OF THROTTLE BODY) THROTTLE ACTUATOR MOTOR
HOT IN RUN OR START
HOT AT ALL TIMES
INSTRUMENT PANEL ELECTRICAL CENTER
CR CONT FUSE 20 10A
STP HAZ FUSE 8 20A
HEAD-LIGHTS SYSTEM
EXTERIOR LIGHTS SYSTEM
STOPLAMP SWITCH (BRAKE PEDAL SUPPORT)
HOT WITH IGN RELAY ENERGIZED (IN RUN OR START)
UNDERHOOD ELECTRICAL CENTER
THROT CONT FUSE 17 15A
APP #3 GND
APP #2 GND
APP #2 SIG
APP #2 5V REF
APP #3 5V REF
APP #1 SIG
APP #1 5V REF
PP #1 GND
APP #3 SIG
TPS #1 SIG
TPS #1 5V REF
TPS #1 SIG
SET/COAST SIG
RES/ACC SIG
STOP SW SIG
IGN
ACT CTRL #2
TPS #2 5V REF
TPS #2 GND
TPS #2 SIG
TAC SERL DATA
TAC SERL DATA
ON/OFF SIG
GND
ACT CTRL #1
S120
BLK/WHT
G120
(RIGHT TOP SIDE OF ENG)
THROTTLE ACTUATOR CONTROL MODULE (LEFT SIDE OF THROTTLE BODY)
CRUISE SWITCH
UNDERHOOD ELECTRICAL CENTER
POWERTRAIN CONTROL MODULE (RIGHT SIDE OF ENGINE COMPT)
102843

Fig. 2: Cruise Control System Wiring Diagram