# RESUME CRUISE CONTROL CONVERSION
# FOR THE GMC MOTORHOME

This project was undertaken as a 'brainstorm' addition to Allan Creates' telescopic column conversion. I started out changing the dimmer switch from floor to column mounted and then decided to 'go for it'.

For parts, you will need to gather up a good resume-type transducer, a control switch (turn signal lever) from an 81-83 full-size Chevy (possibly some Buicks), and a piece of two-conductor wire. The Chevy control switch is needed for its' built-in on - off switch, but is no longer available new. Be sure to check the operation of a junkyard switch.

The control lever plugged right into my 81 Eldorado column. For using the original GMC column, cut the original lever leaving a 2 1/2 inch stub. Then drill the stub to 15/64. Grind the locking tang off the new lever and insert it into the stub. Install the modified switch back into your column.

The transducer mounts the same as the original. Attach vacuum hose from the motor to the open port of the solenoid valve. Attach a ground wire to the upper terminal. Notice that there is a diode inside the solenoid valve wired parallel to the coil. If this is wired wrong the current will bypass the coil and fry your 23.5 ohm resistance. BELIEVE ME !!!!!

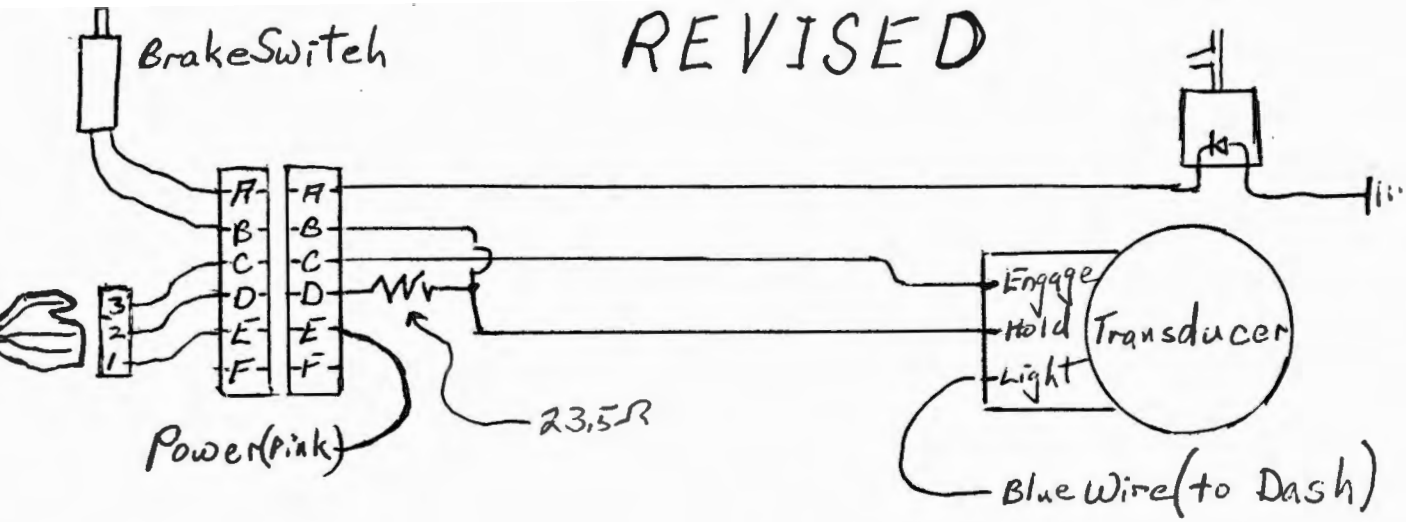
At the 6-terminal connector under the dash, remove the brown jumper wire from terminal E and exchange it with the pink wire in terminal B. You now have the brown jumper in terminals A & B. Cut it in the middle and attach it to the new two-conductor wire you are adding. Route these two wires back to the transducer. I went through the firewall and followed the stuff around the left side of the engine compartment. Attach the wire from terminal A to the other terminal on the solenoid. The wire from terminal B goes to the HOLD terminal of the transducer. Discard the existing wire on the HOLD terminal.

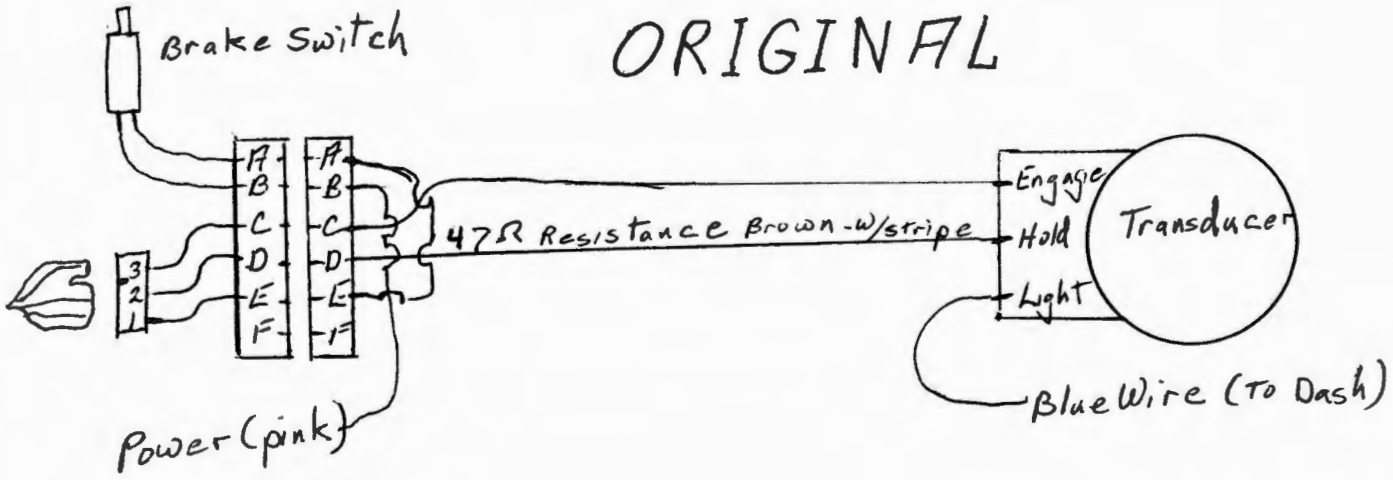
For removing those miserable #%$* little terminals, I used a piece of 1/16 stainless welding rod ground to a chisel-point.

Terminal D of the same connector was originally routed through a 47-ohm nichrome resistance wire back to the HOLD terminal of the transducer. We can't stand this much resistance and we can't practically get to this wire to cut it in half. Cut this wire close enough to terminal D to eliminate the resistance wire. If the wire stub is too short, it might be easier to rob a terminal and wire from a car in the junkyard. Attach the new resistance to this wire.

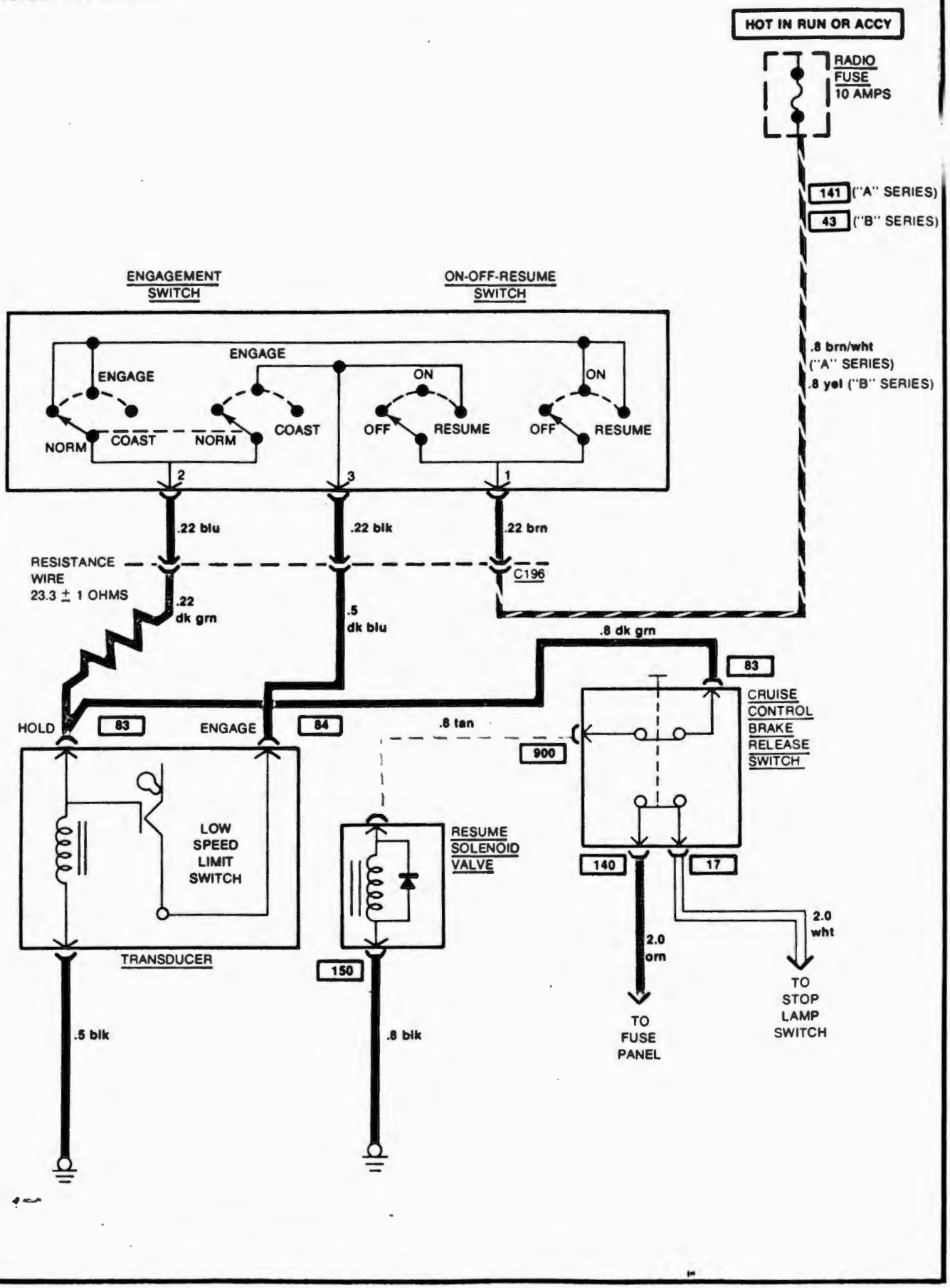
To get 23.3-ohms capacity, I used two 47-ohm resisters(Radio Shack # 271-009) <u>in parallel</u>. Tie their output into the new wire going from terminal B to transducer HOLD terminal. Be very careful where these two resisters hang as they get <u>very, very, warm</u>. My electronics consultant suggested superglueing them to a quarter for a heat-sink, but in over two years use I haven't had any problems.

Most of the reconditioned transducers have the dash indicator light. However, if you acquire a used unit without it, you can operate as is, or transfer the parts from your old unit.


REVISED
BrakeSwitch
A
B
C
D
E
F
3
2
1
Power(Pink)
23.5Ω
Engage
Hold
Light
Transducer
Blue Wire(to Dash)


ORIGINAL
Brake Switch
A
B
C
D
E
F
3
2
1
Power (pink)
47Ω Resistance Brown-w/stripe
Engage
Hold
Light
Transducer
Blue Wire (To Dash)

## CRUISE CONTROL



## CIRCUIT OPERATION

### On-Off-Resume Switch

The **On-Off-Resume Switch** (located on the side of the turn signal lever) has three positions — "Off", "On" and "Resume". This switch turns the cruise control system on or off and returns cruise control operation to the last speed setting.

### Engagement Switch

The **cruise control engagement switch** (located in the end of the turn signal lever) has three positions — **"Normal," "Engage"** and **"Coast."**

1. The **"Engage"** Position — With the switch partially depressed, full voltage is applied to the transducer coil and resume solenoid [car speed must exceed the low speed limit point, 30 mph (50 km/h)] engaging the cruise system. Car cruise speed will be within −0.5 to +2 mph of the actual speed at engagement.

2. The **"Normal"** (release) Position — In the Normal position, the switch continuously passes current through a 23.3 ± 1 ohms **resistance wire** to a solenoid in the **transducer** and the **resume solenoid valve.** The current is too small to engage the transducer, but once the transducer has been engaged, the current is enough to hold the solenoid engaged until the brake pedal is depressed and the system is electrically open. Therefore, the normal switch position serves two purposes.

a. System Not Engaged — System function is not affected although a small current is present at both solenoids through the 23.3 ± 1 ohms **resistance wire.**

b. System Engaged — With the system engaged, the small current through the **resistance wire** holds both solenoids in the engaged position. The solenoids will remain in the **engage** position until either the **on-off-resume switch** is moved to off, the ignition switch is turned off, and/or the **engagement switch** is fully depressed to the **coast** position. Pushing the brake pedal releases the resume solenoid.

3. The **"Coast"** Position — With the switch fully depressed, the circuit is electrically open and the transducer is disengaged. This position can be used by the driver to raise or lower his control speed. To increase control speed, the driver would accelerate to a new speed, fully depress the switch (transducer releases previously set speed) and release the button. Upon releasing the button, the switch passes through the **engage** position where the transducer solenoid is engaged, and the **normal** position where hold-in current is provided to the solenoid. To decrease cruise speed, the switch is held in the **coast** position, disengaging the cruise system, and allowing the throttle to return to the idle position. When the car has slowed to the desired lower cruise speed, release the switch and the system will re-engage. If the switch is released from the **coast** position too fast, it is possible the system will not re-engage. This is normal and can be avoided by a slower release of the switch. The accelerator may be depressed at any time to override the cruise system. Release of the accelerator will return the car to the previously set cruise speed.

### Brake Release Switches

The cruise control is disengaged (electrical and vacuum) by depressing the brake pedal and utilizing two separate brake releases. When the brake pedal is depressed, the electrical **brake release switch** opens and releases the **resume solenoid** valve to cut off vacuum to the **transducer.** The **transducer** is disengaged but retains in memory the previous speed setting and requires **resume switch** operation to re-engage. A vacuum release valve is also operated whenever the brake pedal is depressed, venting system vacuum to air. This valve enables the servo unit to rapidly bleed its vacuum and return the throttle to the idle position.

### Transducer

The **transducer** is electrically engaged and disengaged through operation of the **engagement switch, on-off-resume switch** and **brake release switch.** The transducer has three sections: the speed sensing assembly, the solenoid and clutch housing assembly and resume solenoid assembly.

The speed sensing assembly is used to sense car speed and drive the speedometer.

The solenoid and clutch housing assembly contains a solenoid actuated vacuum valve and a vacuum bleed valve. The vacuum bleed valve is used as a vacuum metering device.

### Servo Unit

The **servo unit** is a vacuum driven variable position diaphragm assembly that operates the throttle when the system is activated. It is driven by controlled vacuum from the transducer and operates the throttle linkage via a bead chain or pull-rod. When controlled vacuum is applied to the port, atmospheric pressure moves the diaphragm and pulls the bead chain or pull-rod opening the throttle.

Proper servo linkage adjustment is made with carburetor off fast idle and throttle at slow idle. Adjust length of servo rod for .020" - .040" clearance between stud on carburetor lever and end of slot on servo rod.

# TROUBLESHOOTING

## PRELIMINARY CHECKS

— Check servo chain or rod adjustment. Must have minimum slack.
— Check vacuum hoses. They must be in good condition, no restrictions or leaks.
— Check drive cable routings for kinks or sharp bends.
— Check throttle linkage or cable for binding.
— Check adjustment of **brake release switch** and **vacuum release valve.**
— Check **engagement switch** operation.
— Check for visible damage to system components.
— Check for working speedometer.
— If these steps do not solve the problem, continue with diagnosis.

## VEHICLE SURGES

— Perform preliminary checks.
— Check for bent speedo cable tip.
— Check for too long speedo cable assembly.
— Check for bent, kinked, or misrouted cable and casing assembly.
— Check for binding throttle linkage or cruise control bead chain or bowden cable.
— Perform **transducer** check.

## EXCESSIVE SPEED DOWNHILL

— Perform preliminary checks.
— Check for plugged **transducer** filter.
— Check for weak throttle return spring.
— Check for binding throttle linkage or cruise control bead chain or bowden cable.
— Repair as required and road test.

## VEHICLE CRUISES OVER SET SPEED

— Perform preliminary checks.
— If ok, adjust **transducer** regulated air bleed orifice tube inward 1/4 of a turn at a time.
— Recheck at 55 mph.

**NOTE: 1/4 of a turn equals approximately 1 mph.**

## VEHICLE CRUISES UNDER SET SPEED

— Perform preliminary checks.
— Check for vacuum leaks at all hoses, power unit, brake release valve.
— Check for too much play in throttle linkage or cruise control bead chain or bowden cable.
— If ok adjust **transducer** regulated air bleed orifice tube outward 1/4 of a turn at a time.
— Recheck at 55 mph.

**NOTE: 1/4 of a turn equals approximately 1 mph.**

## CRUISE CONTROL INOPERATIVE

— Check fuse. If blown, check wiring for short circuit.
— If fuse and preliminary checks ok, turn **ignition switch** to **run** position and **on-off-resume** cruise control switch on.
— Disconnect 2 wire connector at **transducer.**
— Connect 12 volt test light to ground and to **engage** wire in connector. Push engagement button in part way.
— Repeat test on **hold** wire in connector.
— If test light doesn't light at one wire only —
  • Check wire continuity.
  • Perform **engagement switch** check.
— If test light **on** at both wires (**Hold** wire light may be dim) —
  • Check transducer ground.
  • Perform **transducer** check.
— If test light **off** at both wires —
  • Check for open circuit in wires (**dk grn** and **tan**) to **brake release switch.**
  • Check **brake release switch** should have voltage on both terminals (circuits 83 and 900) with ignition switch in **run** and **on-off-resume switch** in **on.**
  • Check wire between **fuse panel** and **on-off-resume switch** for open.
  • Perform **engagement switch** check.

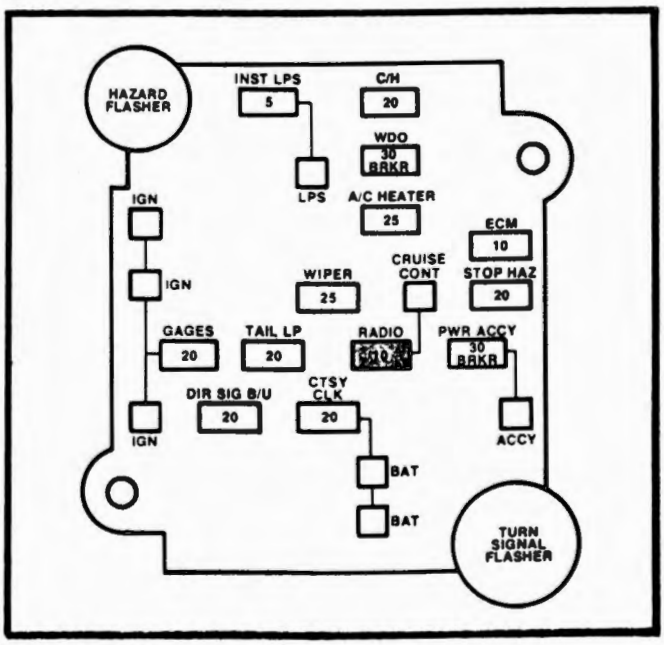



Fig. 8A-89 — Fuse Panel

## ENGAGEMENT SWITCH CHECK

— Disconnect connector **C196** at **engagement switch/on-off-resume switch.**
— Check continuity between terminals 1-2, 1-3, 2-3 as shown for each combination of switch positions as shown in table below.

| SWITCH POSITIONS | | TERMINALS | | |
|---|---|---|---|---|
| ENGAGEMENT SWITCH BUTTON | ON-OFF RESUME SWITCH | 1 to 2 | 1 to 3 | 2 to 3 |
| Released | on | closed | open | open |
| Fully Depressed | on | open | open | closed |
| Partially Released | on | closed | closed | closed |
| Released | resume | closed | closed | closed |
| Released | off | open | open | open |

## TRANSDUCER CHECK

— With connector **C196** disconnected, check resistance between **dk grn** wire and ground. Should read between 29 and 36 ohms.
— If reading is not within limits, disconnect connector at **transducer** and check **dk grn** wire resistance — should be 23.3 $\pm$ 1 ohms.
— If resistance wire (**dk grn**) ok, check for 5-6 ohms between **hold** terminal on **transducer** and ground.
— If not within 5-6 ohms, replace **transducer.**
— Check continuity of **dk blu** wire between connector at **transducer** and connector **C196.**

## SERVO AND VACUUM SYSTEM CHECK

— Check all vacuum components with 15 inches of vacuum using external vacuum source. The vacuum should not leak down more than 5 inches in one minute.

## COMPONENT LOCATION

| | | Figure |
|---|---|---|
| Cruise Release Switch | Brake switch on brake pedal mounting bracket | 8A-91 |
| Engage Switch | Cruise control lever in steering column | |
| Regulator (Transducer) | Left front fender | 8A-90 |
| Resistance Wire C123 | Steering column | |
| Cruise Control Ground | Left front fender | 8A-90 |

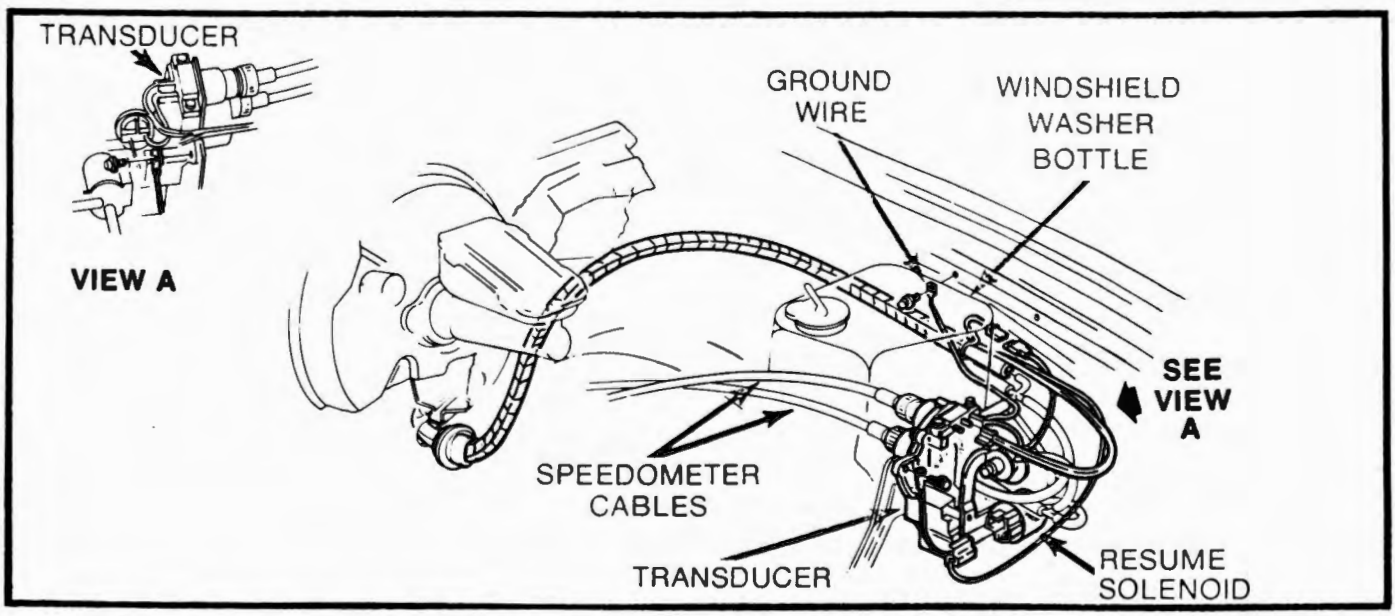



Fig. 8A-90 — LH Front Fenderwall — "A" Series Shown "B" Series Similar