

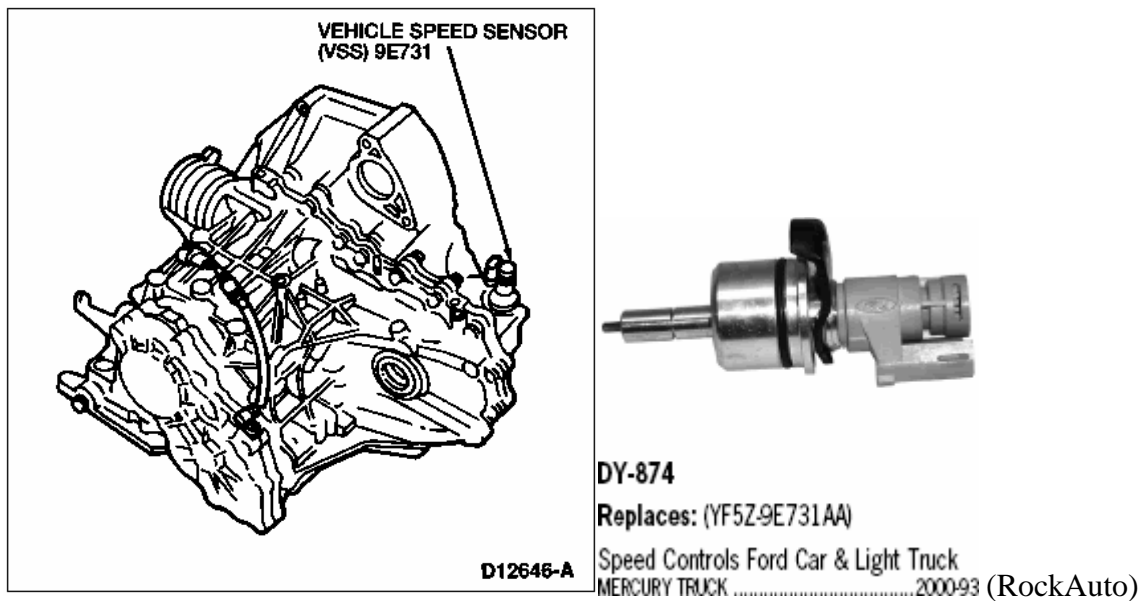
VSS & Speedometer 93-95 V&Q

10-04-05

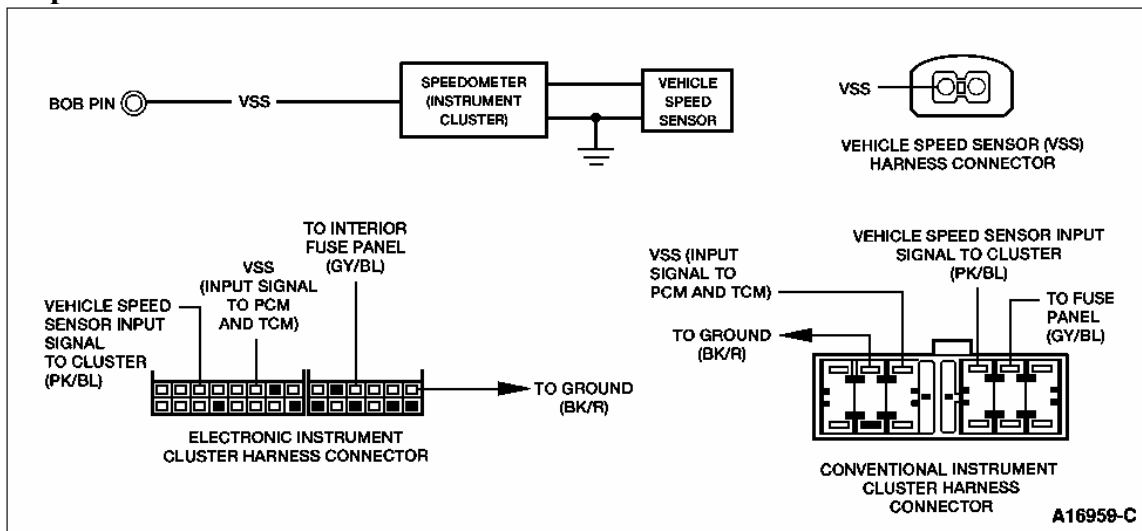
The V tests are for the electronic cluster. The H and J tests are for the conventional cluster.

Description

The Vehicle Speed Sensor (VSS), as it is turned by the speedometer pinion, generates an AC voltage that is sent to the speedometer. This AC voltage signal is developed into a DC digital voltage (0-5 volts when the vehicle is moving) and sent to the Powertrain Control Module (PCM).



Pinpoint Test Schematic



Speedometer

The speedometer is electronically driven by the Vehicle Speed Sensor (VSS), located on the rear of the transaxle case. The VSS creates eight pulses per rotation and generates an analog sine wave. A wiring harness transmits the analog sine wave signal from the VSS to an integrated converter circuit located in the Instrument Cluster. The converter circuit transforms the analog sine wave signal into a digital signal, which is sent to the Powertrain Control Module (PCM), the speed control module, and the speedometer.

Electronic Cluster Checks Vss-

VSS4 CHECK VSS SIGNAL TO INSTRUMENT CLUSTER

- Key OFF.
- Disconnect the instrument cluster connector.
- Disconnect the VSS connector.
- Measure the resistance of the "PK/BL" and the "BK/R" (GND) wires between the instrument cluster and VSS connector (resistances should be less than 5 ohms).
- Measure the resistance between the "PK/BL" wire and ground (resistance should be greater than 10,000 ohms).
- Are the resistance values OK?

Yes - GO to «VSS5».

No - SERVICE the wire(s) in question.

VSS5 CHECK VEHICLE SPEED SENSOR

- Key OFF.
- Remove the VSS.
- Turn the speedometer pinion quickly and measure the voltage between the "PK/BL" and the "BK/R" (GND) terminals at the vehicle speed sensor connector.
- Is the voltage reading approximately 0.5 volt?

Yes – VSS is OK.

No - REPLACE the VSS.

Conventional Instrument Cluster

H tests; Speedometer reads inaccurately;

J tests; Speedometer inoperative.

PINPOINT TEST H1: SPEEDOMETER/ODOMETER READS INACCURATELY

H1 CHECK VEHICLE SPEED SENSOR SIGNAL

- Key OFF.
- Connect a voltmeter between the S screw terminal and the G screw terminal on the speedometer (back of instrument cluster).
NOTE: The instrument cluster connector C2 must remain connected.
- Place the voltmeter in the AC volts position.
- Drive the vehicle at the speeds indicated below and verify their corresponding voltages.

Speed km/h	Approximate AC Voltage (volts)
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(mph)

0 (0)	0
8 (5)	0.5
16 (10)	1.0
24 (15)	1.6
32 (20)	2.0
40 (25)	2.4
48 (30)	2.8
56 (35)	3.1
64 (40)	3.4
72 (45)	3.6
80 (50)	3.9
88 (55)	4.2
96 (60)	4.4

- Are the voltages correct?

Yes - REPLACE the speedometer.

No - GO to «H2».

PINPOINT TEST H2: SPEEDOMETER/ODOMETER READS INACCURATELY

H2 CHECK INSTRUMENT CLUSTER PRINTED CIRCUIT

- Key OFF.
 - Verify that the 4 screws fastening the speedometer to the instrument cluster printed circuit are fastened securely.
 - Measure the resistance between the following:
 - Speedometer Instrument Cluster Connector C2
- | | |
|------------|----------|
| Terminal | Terminal |
| S-Terminal | 3B |
| G-Terminal | 5B |
| B-Terminal | 2B |
- Are the resistances less than 5 ohms?

Yes - GO to «H3».

No - REPLACE the instrument cluster printed circuit.

PINPOINT TEST H3: SPEEDOMETER/ODOMETER READS INACCURATELY

H3 CHECK WIRES BETWEEN VEHICLE SPEED SENSOR AND INSTRUMENT CLUSTER

- Key OFF.
- Remove the instrument cluster.
- Disconnect the instrument cluster connector C2 and the vehicle speed sensor connector.
- Measure the resistance of the "PK/BL" wire between the vehicle speed sensor connector and the instrument cluster connector C2.
- Measure the resistance of the "BK/R" wire between the instrument cluster connector C2 and the vehicle speed sensor connector.
- Measure the resistance of the "PK/BL" wire between the instrument cluster connector C2 and ground.
- Are the resistances less than 5 ohms between the instrument cluster and the vehicle speed sensor (VSS), and greater than 10,000 ohms between the "PK/BL" wire at the instrument cluster and ground?

Yes - REPLACE the vehicle speed sensor.

No - SERVICE the wire(s) in question.

PINPOINT TEST J1: SPEEDOMETER/ODOMETER INOPERATIVE

J1 CHECK VEHICLE SPEED SENSOR SIGNAL

- Key OFF.
 - Connect a voltmeter between the S screw terminal and the G screw terminal on the speedometer (back of instrument cluster).
- NOTE: The instrument cluster connector C2 must remain connected.
- Place the voltmeter in the AC volts position.
 - Drive the vehicle at the speeds indicated below and verify their corresponding voltages.
 - (See chart under H1)
 - Are the voltages correct?

Yes - REPLACE the speedometer.

No - GO to «J2».

PINPOINT TEST J2: SPEEDOMETER/ODOMETER INOPERATIVE

J2 CHECK INSTRUMENT CLUSTER PRINTED CIRCUIT

- Key OFF.
- Verify that the 4 screws fastening the speedometer to the instrument cluster printed circuit are fastened securely.
- Measure the resistance between the following:

Surprise! The replacement part is similar in design but has an additional collar that is crimped onto the connector housing. (See the picture at the beginning of this document.) An earlier picture that was in this file, incorrectly showed a gear instead of the picture above. This was apparently a FMC error as FMC is stamped on the part. Part cost from a secondary parts house is usually \$45 to \$55 dollars. When I tried to remove the additional collar from the tranny it was frozen into the tranny housing with rust. No attempt at prying, hammering, etc. would remove the collar. As it turned out, my problem was an intermittent connector terminal, so a little contact cleaning and I re-installed it. I followed up on the collar problem with AutoZone and a Mercury dealer mechanic. The story is that in our salt area the aluminum collar bonds to the tranny and requires a torch, much gunk and patience, to get the collar out. In other words this is a job for the dealer or a good mechanic.



The replacement parts have the collar crimped to the connector housing requiring that the collar be replaced with the part. It may be possible to grind off the crimp and replace just the VSS itself, but I was not ready to take a chance at wasting the money just spent. The collar also has 2 metal, half-moon vertical projections to help protect the connector. I broke these off while trying to remove the collar, but since they are non-function anyway, so what. Just glad the old one still works. The moral of this story is, if the VSS acts up, make sure it's not just the electrical terminals.

AutoZone- SU2119
RockAuto- DY-874
BorgWarner- S8378
OEM- YF5Z-9E731AA

The electrical checks above will serve the purpose of additional diagnostics if the replaced VSS does not fix the problem.