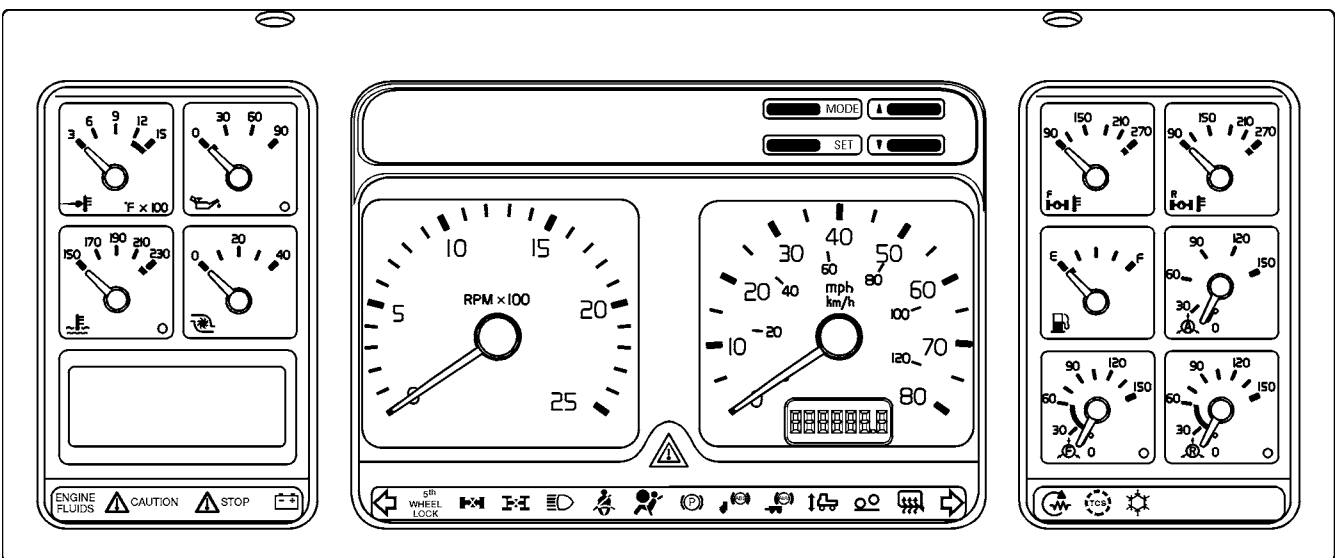


This Service Bulletin is a supplement to Service Manual, Group 38, Instrumentation, VNL, VNM. It provides important additional troubleshooting procedures.

Date	Group	Supp.	Page
8.97	<b>38</b>	<b>02</b>	1(9)

Instrumentation  
Gauge Accuracy & Troubleshooting  
VNL, VNM

## Gauge Accuracy and Troubleshooting



W3002304

(Effective from August 1997)

The following information is provided to help determine whether gauges in the instrument cluster are showing accurate readings. See ["Pro-link 9000" page 2](#) and ["Instrumentation, Gauge Troubleshooting" page 3](#).

# Tools

## Pro-link 9000

“Gauge Accuracy and Troubleshooting” page 1  
(this reference is for use in electronic media only)

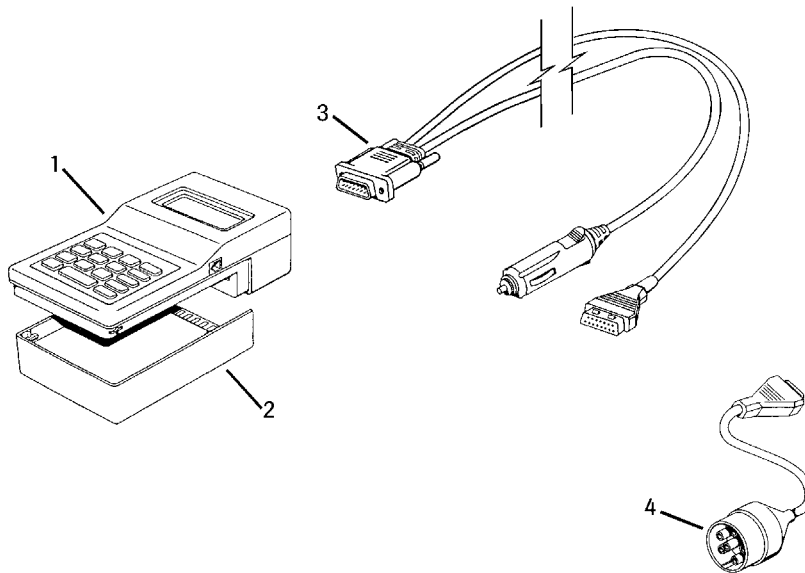


Fig. 1: Pro-link 9000

W3000752

The Pro-link 9000 with the Volvo 2.1 cartridge is available from Kent-Moore at 1-800-328-6657.

- 1 Pro-link 9000  
(Kent-Moore P/N J-38500-1)
- 2 Volvo Cartridge, version 2.1  
(Kent-Moore P/N J-38500-2000)
- 3 Power/Data Cable  
(Kent-Moore P/N J-38500-2)
- 4 Diagnostic Adaptor Cable  
(Kent-Moore P/N J-38500-60A)

# Troubleshooting

## Instrumentation, Gauge Troubleshooting

“Gauge Accuracy and Troubleshooting” page 1  
(this reference is for use in electronic media only)

### Troubleshooting Notes

#### For All Gauges:

The gauge pointer can appear to be stuck out of range, either in the right or left lower corner. This may be caused by loss of power when the gauge pointer is past the halfway mark (to the right of center).

If the gauge pointer is stuck in one of the lower corners, do the following:

Using the instrument cluster’s graphic display, select **Cluster Self-Test Mode**, then select **Gauge Test**.

The Gauge Test will drive all the data link gauges:

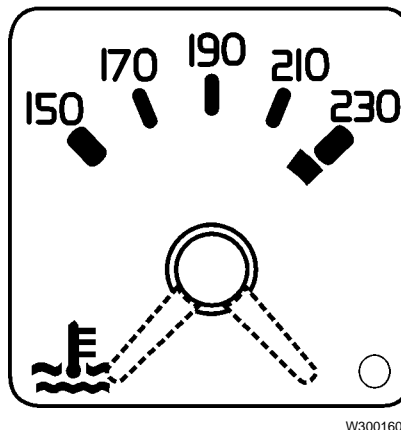
- coolant temperature
- oil pressure
- turbo
- speedometer
- tachometer

During the test, the pointer sweeps across the full range of the gauge, and back to the lowest point on the gauge. It should sweep the pointers 3 times.

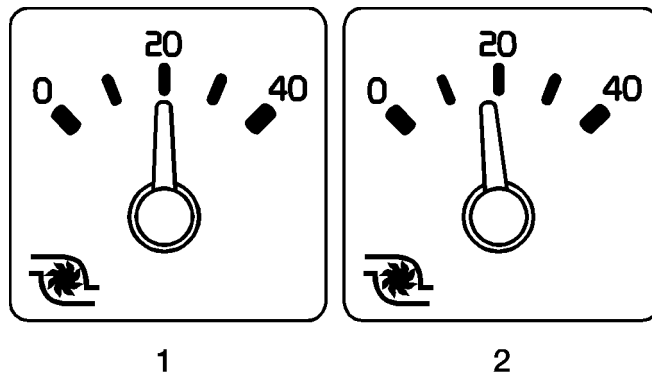
A gauge pointer which appears to be sticking should be returned to its normal position during the Gauge Test. If not, repeat the Gauge Test one more time.

**Important:** Pointer width should be taken into account for all accuracy checks. The width of the pointer, as well as the angle of viewing the pointer, can make the gauge appear to be inaccurate.

- Use the center line of the pointer-not the edge-as the reading.
- **ALWAYS** be directly in front of the gauge when checking accuracy. Looking at the gauge from the side will not provide a true reading (see accompanying figure).



Example of pointer out-of-range locations



W3002305

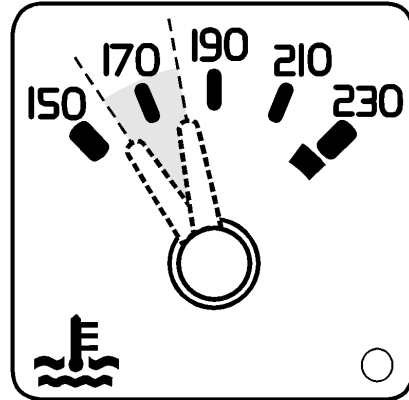
- 1 Reading of 20 from directly in front of the gauge
- 2 Reading of 20 from a side view

## Gauge Accuracy

### Coolant Temperature Gauge Accuracy Check

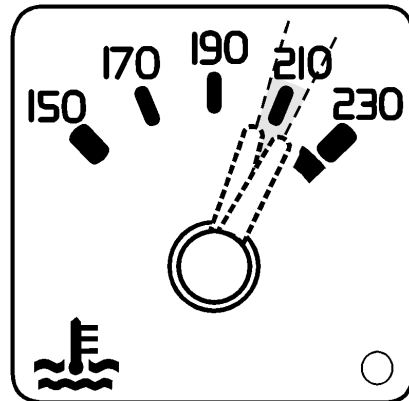
- 1 Using the Pro-link with the Volvo Cartridge, version 2.1, check accuracy with the signal value going up to 170° and coming down to 170°. With these input values the coolant temperature gauge should read  $\pm 10^\circ$  of the 170° mark. If the readings are NOT between 160° and 180°, the gauge is faulty.

**Note:** Pointer width should be taken into account for all accuracy checks. The width of the pointer, as well as the angle of viewing the pointer, can make the gauge appear to be inaccurate. Use the center line of the pointer—not the edge—as the measurement. And ALWAYS be directly in front of the gauge when checking accuracy. Looking at the gauge from the side will not provide a true reading.



W3001161

- 2 Using the Pro-link, check accuracy with the signal value going up to 210° and coming down to 210°. With these input values the gauge should read  $\pm 5^\circ$  of the 210° mark. If the readings are NOT between 205° and 215°, the gauge is faulty.



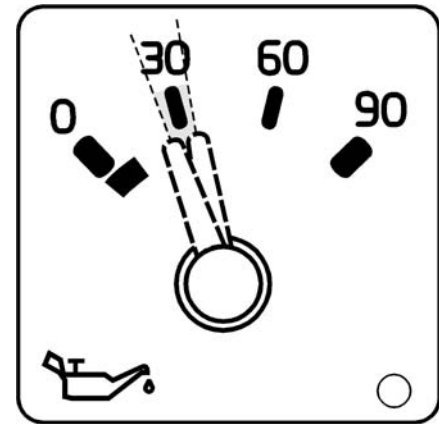
W3002016

## Oil Pressure Gauge

### Accuracy Check

Using the Pro-link, check accuracy as follows. Starting with a signal value of 60 psi, use the down arrow key to decrease to 30 psi. The gauge should read between 25 and 35 (see accompanying figure). If there is a reading outside the 25 and 35 markings, the gauge is faulty.

**Note:** Pointer width should be taken into account for all accuracy checks. The width of the pointer, as well as the angle of viewing the pointer, can make the gauge appear to be inaccurate. Use the center line of the pointer—not the edge—as the measurement. And ALWAYS be directly in front of the gauge when checking accuracy. Looking at the gauge from the side will not provide a true reading.



W3001055

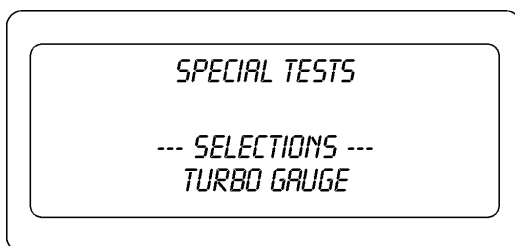
Acceptable range for input value of 30 psi

### Symptom: OIL PRESSURE GAUGE READS TOO LOW

**and there are NO sensor faults.** If the cluster does NOT have a Turbo PSI gauge, it is likely the OIL PSI gauge is configured to read Turbo pressure data. In this condition, the OIL PSI gauge will act like a Turbo gauge. This is a configuration error.

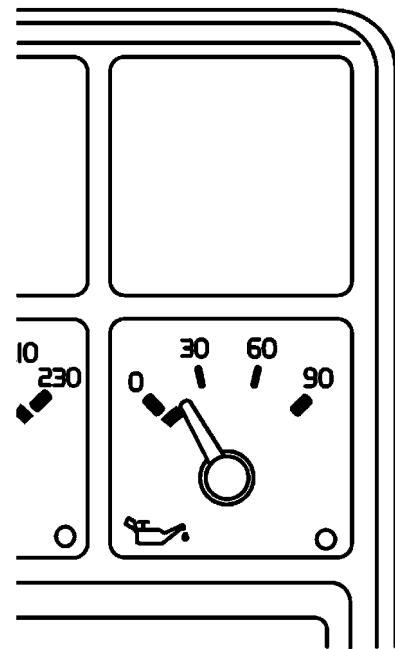
**Solution:** The Pro-Link with the Volvo Cartridge, version 2.1 (P/N J-38500-2000 available from Kent-Moore at 1-800-328-6657) can be used to check and correct configuration errors.

- 1 If the cluster does NOT have a Turbo gauge:
- 2 Using the Pro-Link, go to *Special Tests*, and select the Turbo Gauge test.



W3001056

- 3 Does the Engine Oil PSI gauge move during the test? If so, the Turbo gauge is enabled, and the Turbo signal is being displayed in the Oil PSI gauge.
- 4 Use the *Reprogram EEPROM* function to disable the Turbo gauge. When the Turbo gauge is disabled, the Oil PSI signal will be displayed in the correct gauge location.



W3002012

Oil pressure gauge shows readings too low when the vehicle is moving, and 0 psi when idling. Shows more oil pressure when climbing hills.

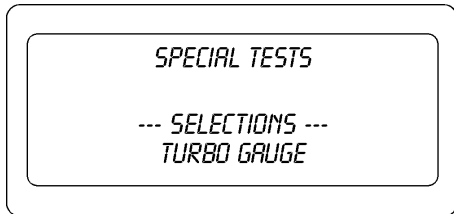
## Symptom: OIL PSI GAUGE NOT FUNCTIONING

**and Turbo gauge reads too high.** If the cluster has a Turbo gauge and the above symptoms, it is likely the Turbo gauge is reading OIL PSI gauge data. This is a configuration error.

**Important: Oil pressure gauge takes the place of the Turbo gauge when the Turbo gauge is not used.**

**Solution:** The Pro-Link with the Volvo Cartridge, version 2.1 (P/N J-38500-2000 available from Kent-Moore at 1-800-328-6657) can be used to check and correct configuration errors.

- 1 If the cluster DOES have a Turbo gauge:
- 2 Using the Pro-Link, go to *Special Tests*, and select the Turbo Gauge test.

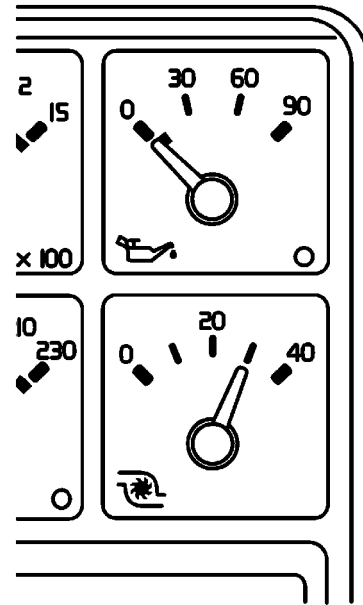


W3001056

- 3 If the following message is displayed, the Turbo Gauge is disabled:

CANNOT EXECUTE TEST  
GAUGE NOT AVAILABLE

- 4 If the Turbo gauge is disabled, the Engine Oil PSI signal is being displayed in the Turbo gauge. Use the *Reprogram EEPROM* function to enable the Turbo gauge. When the Turbo gauge is enabled, the Oil PSI signal moves to the Oil PSI gauge location (above the Turbo gauge), where it belongs.



W3002013

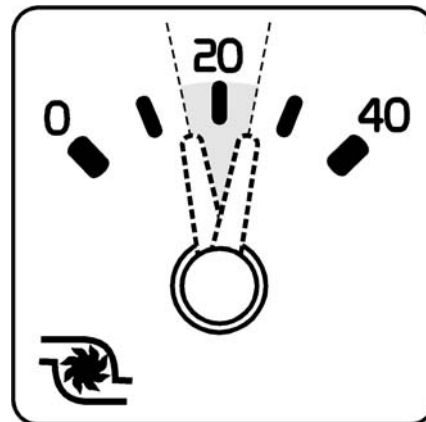
Oil pressure gauge shows no reading, and turbo gauge reads too high

## Turbo Gauge

### Accuracy Check

Using the Pro-link, check accuracy with the signal value going up to 20 psi. With this input value, the gauge should read between 15 and 25 psi (see accompanying figure). If there is a reading outside 15 and 25, the gauge is faulty.

**Note:** Pointer width should be taken into account for all accuracy checks. The width of the pointer, as well as the angle of viewing the pointer, can make the gauge appear to be inaccurate. Use the center line of the pointer-not the edge-as the measurement. And ALWAYS be directly in front of the gauge when checking accuracy. Looking at the gauge from the side will not provide a true reading.



W3001054

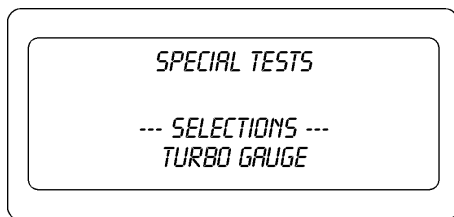
### Symptom: TURBO GAUGE READS TOO HIGH

and Oil PSI gauge not functioning. If the cluster has a Turbo gauge and the above symptoms, it is likely the Turbo gauge is reading OIL PSI gauge data. This is a configuration error.

**Important:** Oil pressure gauge takes the place of the Turbo gauge when the Turbo gauge is not used.

**Solution:** The Pro-Link with the Volvo Cartridge, version 2.1 (P/N J-38500-2000 available from Kent-Moore at 1-800-328-6657) can be used to check and correct configuration errors.

- 1 If the cluster DOES have a Turbo gauge:
- 2 Using the Pro-Link, go to *Special Tests*, and select the Turbo Gauge test.

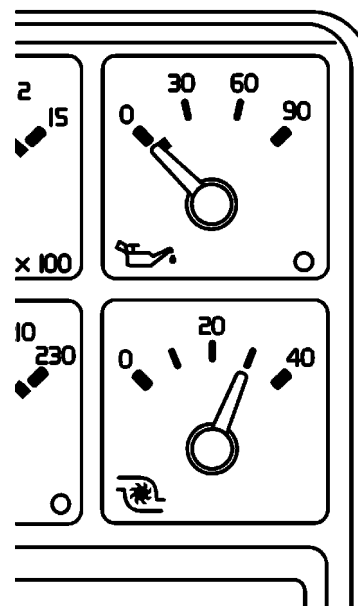


W3001056

- 3 If the following message is displayed, the Turbo Gauge is disabled:

CANNOT EXECUTE TEST  
 GAUGE NOT AVAILABLE

- 4 If the Turbo gauge is disabled, the Engine Oil PSI signal is being displayed in the Turbo gauge. Use the *Reprogram EEPROM* function to enable the Turbo gauge. When the Turbo gauge is enabled, the Oil PSI signal moves to the Oil PSI gauge location (above the Turbo gauge), where it belongs.

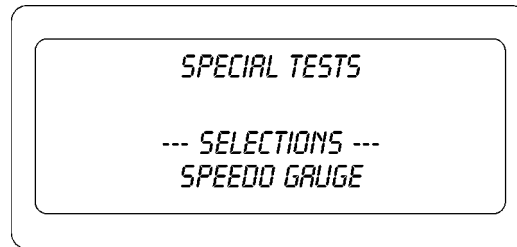


W3002013

Turbo gauge reads too high, and oil pressure gauge shows no reading

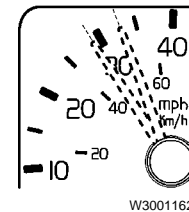
## Speedometer Accuracy Check

- Using the Pro-link 9000 and the Volvo cartridge (version 2.1 or higher) scroll to the instrument cluster menu.
- Press enter and scroll to *Special Tests*. Press enter and scroll to *Speedo Gauge*. Press enter again.



W3001203

- Using the Pro-link, check accuracy with the signal value going up to 30 mph. With an input value of 30 mph, the speedometer should read between 29 and 33 mph (see accompanying figure). If there is a reading outside 29 and 33 mph, the gauge is faulty.

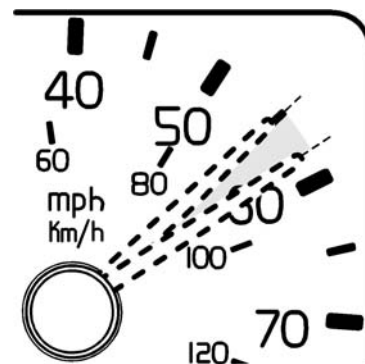


W3001162

**Note:** For some instrument clusters, with an input value of 30 mph, the gauge should read between 29 and 35 mph. These clusters have a stamp marked "STD" on the lower left side of the cluster (this stamp can only be seen when the cluster is out of the dash).

**Note:** Pointer width should be taken into account for all accuracy checks. The width of the pointer, as well as the angle of viewing the pointer, can make the gauge appear to be inaccurate. Use the center line of the pointer—not the edge—as the measurement. And ALWAYS be directly in front of the gauge when checking accuracy. Looking at the gauge from the side will not provide a true reading.

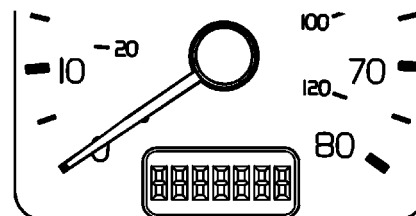
- Using the Pro-link, check accuracy with the signal value going up to 55 mph. With an input value of 55 mph the speedometer should read between the 55 and 58 mph marks (see accompanying figure). If there is a reading below 55 mph, or above 58 mph, the gauge is faulty.



W3002014

## Odometer

The odometer should be accurate to  $\pm 0.3\%$  of a *known measured* distance. Do not compare the odometer display to engine odometer data: the display receives its input from the data link, but the engine receives its input directly from the wheel speed sensors. Because these sources are different, the data received may be different also.



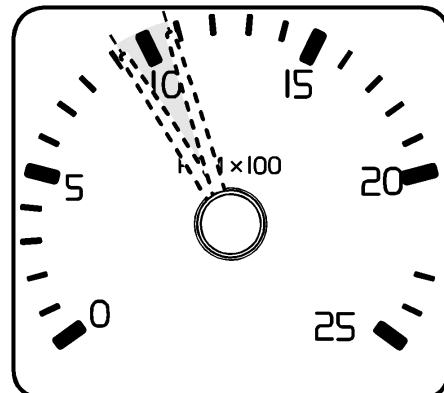
W3002314



## Tachometer Accuracy Check

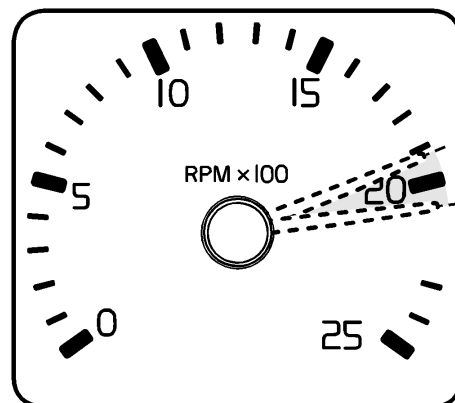
- 1 Using the Pro-link, check accuracy with the signal value going up to 1000 rpm. With this input the tachometer should read between 925 and 1075 rpm (see accompanying figure). If readings outside 925 and 1075 rpm are received, the gauge is faulty.

**Note:** Pointer width should be taken into account for all accuracy checks. The width of the pointer, as well as the angle of viewing the pointer, can make the gauge appear to be inaccurate. Use the center line of the pointer-not the edge-as the measurement. And ALWAYS be directly in front of the gauge when checking accuracy. Looking at the gauge from the side will not provide a true reading.



W3001163

- 2 Using the Pro-link, check accuracy with the signal value going up to 2000 rpm. With this input the tachometer should read between 1925 and 2075 rpm (see accompanying figure). If readings outside 1925 and 2075 rpm are received, the gauge is faulty.



W3002015