VOLVO
Volvo Trucks North America, Inc.
Greensboro, NC USA

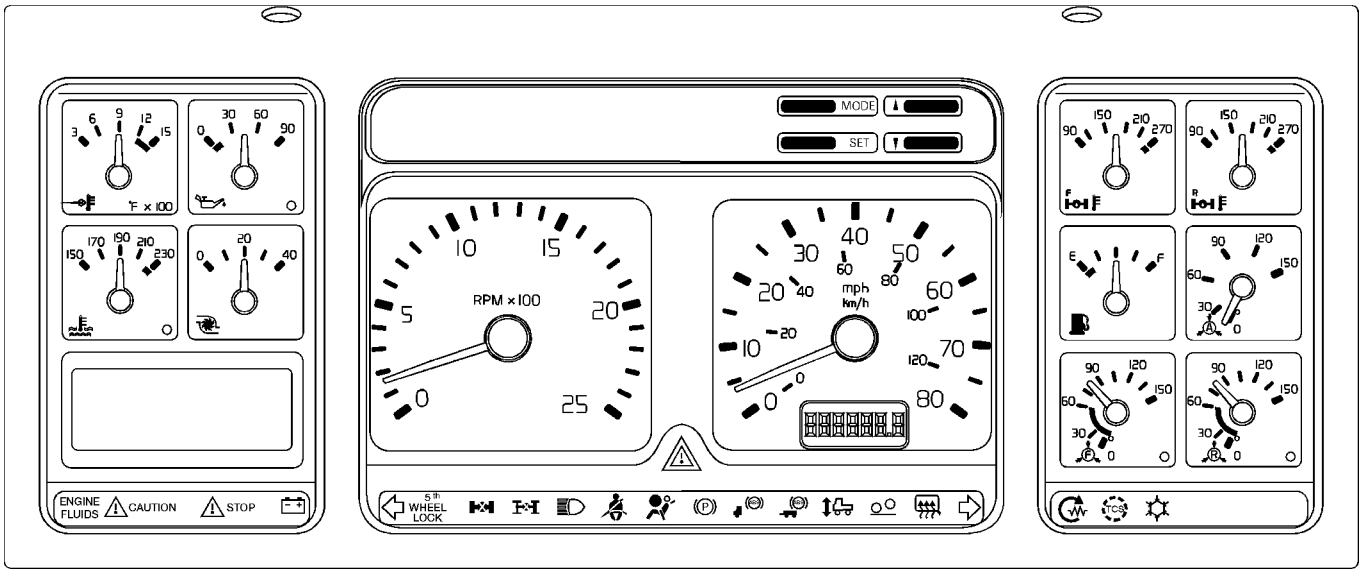
Service Bulletin Trucks

This Service Bulletin is a supplement to Service Manual, Group 38 Instrumentation VNL, VNM.

Date	Group	No.	Supp.	Page
7.98	**38**		**04**	1(12)

Instrumentation
Circuit Board Replacement
VNL, VNM

Instrument Cluster Circuit Board Replacement



W3000787

This service bulletin provides the latest information regarding replacement of the left and right side circuit boards on AMETEK/Dixson instrument clusters for the VNL, VNM Series.

These replacement procedures apply only to 1996 and 1996b VN Series instrument clusters that are no longer under warranty protection. Check the warranty agreement for the vehicle in question before replacing instrumentation components.

Attempts to remove and replace circuit boards during the warranty period will void the cluster warranty.

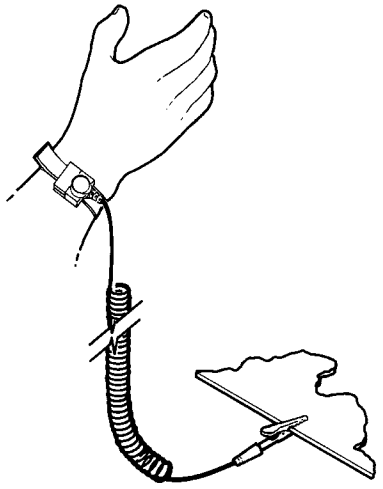
For additional information regarding VNL, VNM Instrumentation, refer to *Instrumentation VNL, VNM;* PV776–TSP23762/1; *Instrumentation — 1996B, VNL, VNM — from 1/98*, PV776–TSP106805/1, and to the service bulletins supporting these instrument clusters.

This bulletin contains the following information:

Tools

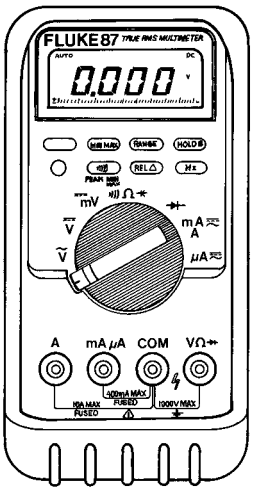
Special equipment

The following items are required for work on the instrument cluster. They can be ordered as shown below.



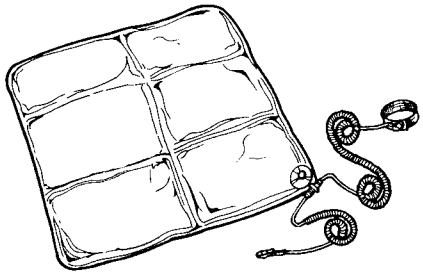
W3000572

ESD Wrist Strap
Use a wrist strap when servicing the instrument cluster inside the vehicle. Use a wrist strap and anti-static mat when working on the cluster at a workbench. Several different wrist straps are available from Kent-Moore at 1–800–328–6657.



W2001014

Fluke 87 Digital Multi-meter (DMM)
Available from Kent-Moore (P/N J-39200) at 1–800–328–6657.



W3000704

Type 8501 Static Dissipative Grounding Kit
Available from Kent–Moore (P/N J–42444) at 1–800–328–6657.
The kit shown includes both a wrist strap and anti-static mat. Use both when working on the instrument cluster at a workbench.

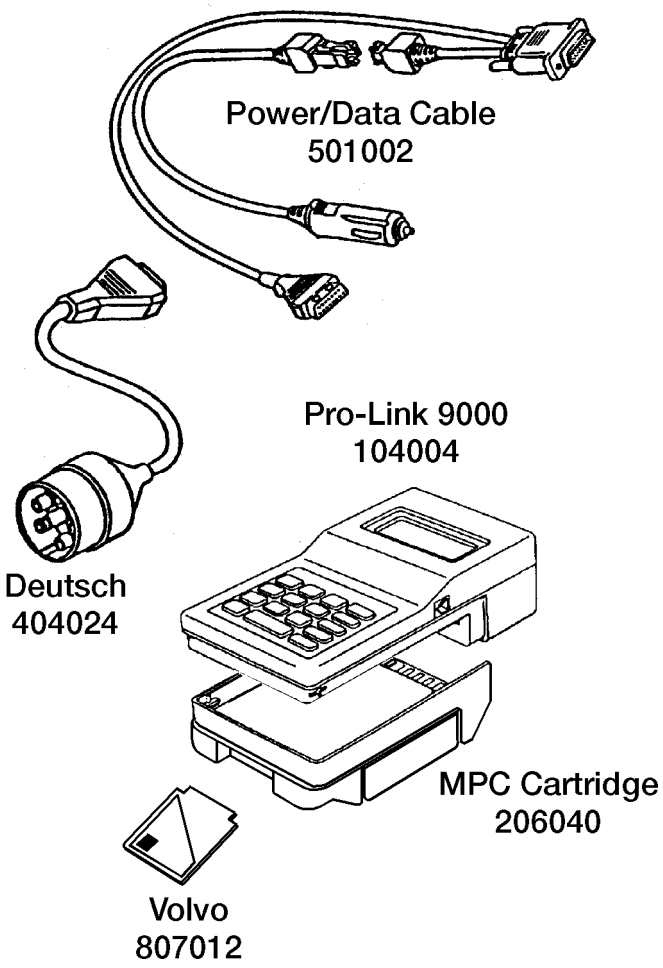
Volvo Application Card for Pro-Link 9000 [1]MPC Cartridge

The Volvo application card is part of a kit that contains the Pro-Link 9000, MPC Cartridge, and connectors. The kit is P/N MSI207040–4. Individual pieces can be ordered separately as listed. To order, call MPSI at 1–800–639–MPSI (6774).

Volvo application card:

- Volvo Vectro II Engine Management System.
- Volvo Vectro II Vehicle Electronic Control Unit.
- Volvo Instrument Cluster (96 and 96b).
- Volvo Data Link Lamp Driver Module.
- Volvo SRS (Airbag).

[1]Pro-Link is a registered trademark of MPSI.



W0001570

Service Procedures

General Precautions

Human skin can hold more than 1000 volts of static electricity. Although getting a static shock is annoying, it is not dangerous because there is so little energy stored by clothing. But when dealing with circuits designed to sense differences smaller than 1 volt, electrostatic discharge can be a subtle but destructive problem. Circuit boards mounted in the instrument cluster or in modules mounted elsewhere may not fail immediately after being hit with a static discharge. Rather they may work for a while, then fail for no apparent reason. The culprit then is often the normal warming up and cooling down process of the module, engine or cab interior.

Grounding straps and anti-static mats are available for minimal cost from electronic supply stores. Grounding straps consist of a wrist strap, a coiled extension wire and an alligator clip. Be sure to purchase one with a long enough extension wire to allow freedom of movement.

CAUTION

To prevent electrostatic discharge (ESD), which may damage the sensitive electronic components in the instrument cluster, a wrist grounding strap must be used when working on electronic equipment such as the instrument cluster. Failure to use a wrist strap may result in permanent damage to the printed circuit boards in the instrument cluster. To use the wrist strap in a vehicle, attach the alligator clip to the nearest electrical ground such as a metal mounting screw, a ground terminal or preferably a ground stud.

CAUTION

When servicing or troubleshooting, do not leave the cluster face down for more than 15 minutes, or damage to the gauges may occur. Gauge oil may run out of the front of the gauge faces and make the gauges inaccurate.

CAUTION

To prevent electrostatic discharge (ESD), which may damage the sensitive electronic components in the instrument cluster, make sure the workbench has an anti-static mat which is grounded to the nearest electrical outlet when working on the instrument cluster. Failure to use an anti-static mat may result in permanent damage to the printed circuit boards in the instrument cluster. When working at the anti-static workbench, always keep a wrist strap connected to the anti-static mat.

An anti-static wrist strap is available from Kent-Moore (see *Tools* section of this bulletin). Call 1-800-328-6657.

An anti-static mat is also available from Kent–Moore (see *Tools* section of this bulletin).

Instrument Cluster Circuit Board Replacement (Right Side)

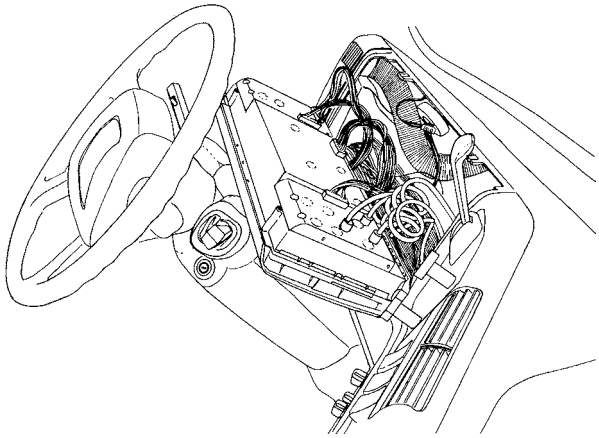
CAUTION

Before starting this procedure, see "General Precautions" page 4 when working with the instrument cluster. Failure to follow the safety precautions may result in instrument cluster damage.

Removal

1
Make certain the vehicle ignition is ***OFF*** before beginning this procedure.

2



W3000842

CAUTION

When servicing or troubleshooting, do not leave the cluster face-down for more than 15 minutes, or damage to the gauges may occur. Gauge oil can run out the front of the gauge faces and make the gauges inaccurate.

Adjust the steering column back where possible. Remove the two screws at the top of the instrument cluster and lay the cluster face-down on the steering column.

3
Cut the tie wraps fastening the wiring harness to the back of the cluster for stress relief on the connectors.

4

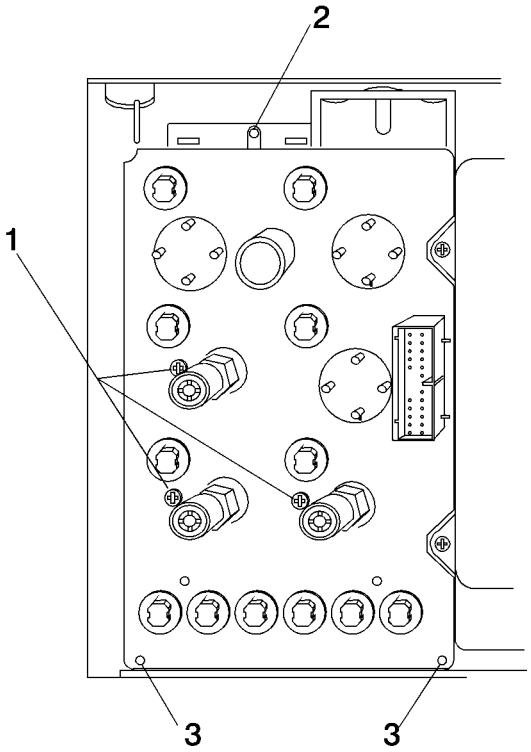
WARNING

Never disconnect an air system component unless all system pressure has been depleted. Failure to deplete system pressure before disconnecting hoses or components may result in them separating violently and causing serious bodily injury.

Bleed all pressure from the vehicle air system. Disconnect the electrical and air connectors from the back of the cluster, and remove the cluster from the vehicle.

5
Place cluster on anti-static mat. The anti-static mat must be grounded to the nearest electrical outlet. When working at the anti-static workbench, always keep a wrist strap connected to the anti-static mat.

6



Right printed circuit board (PCB) with cover removed

1) Gauge mounting screws — do not remove at this time
2) Top cover screw location
3) Bottom cover screw location

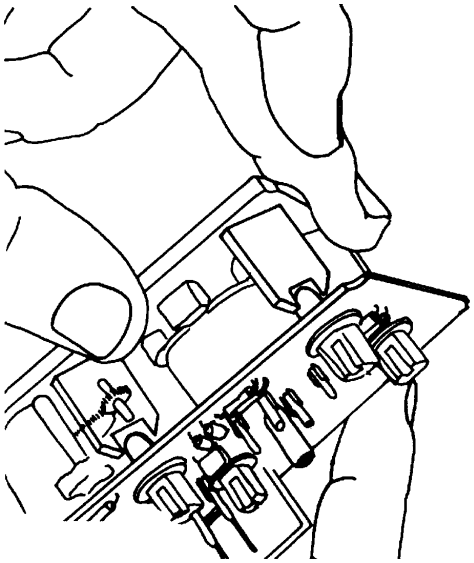
Remove the Phillips screw at the top of the right rear cover, and the two at the bottom, then lift off the cover.

Note: Do not remove any of the three Phillips screws in the board at this time. They secure the air pressure gauges to the board.

7

Lift out the Right Circuit Board assembly, with gauges.

8



⚠ CAUTION

To avoid damaging the gauge, do not push on the needle when removing the gauge. Pushing on the needle can make the gauge inaccurate.

Remove the right hand side circuit board gauges as follows: **Air pressure gauges only**: These are each secured by one Phillips screw. Remove the screw, pull the gauge out of the board and disconnect the 2-pin LED connector.

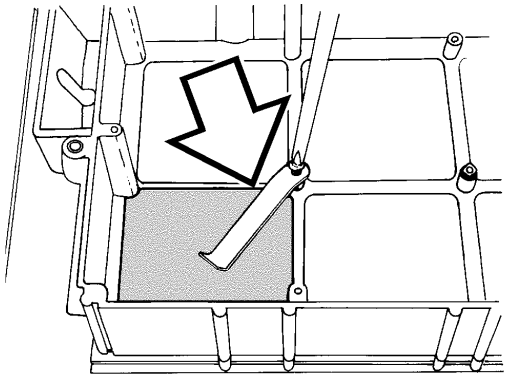
Other gauges: Gauges are held tightly by their pin sockets. To remove, grasp the side of the gauge face plate with your thumb; place your 2nd and 3rd fingers underneath the face plate (see illustration). Carefully rock the gauge from side to side while applying upward pressure until the gauge pins are free of the board sockets.

Gauge blanks: Remove the gauge blank by pulling the blank support upward until the pins are free of the board sockets, and lifting the blank from the face of the instrument cluster.

Note: Early production models may have gauge blanks held in place with a metal clip and a screw.

Removing a gauge blank

9



W3002511

Note: Early production models may have gauge blanks as shown in the illustration. If replacing any blank, use the newer gauge blank support assembly shown in the Installation procedure.

When adding a gauge blank, remove the gauge or gauge blank to be replaced.

Installation

1

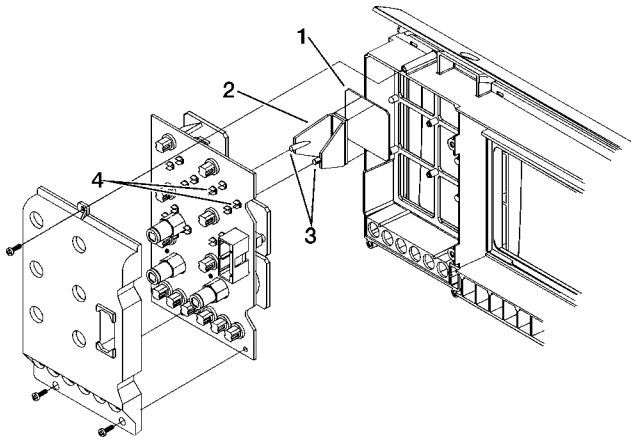
⚠ CAUTION

To avoid damaging the gauge, do not push on the needle when installing the gauge. Pushing on the needle can make the gauge inaccurate.

Re-install the right side circuit board gauges as follows: Install the replacement gauge by grasping the opposite corners of the gauge face plate and pushing the gauge pins into the socket onto the circuit board. Do not push on the needle. (For gauge blanks, see the following steps.) It is correctly installed when its face plate is flush with the other gauges' face plates.
Air pressure gauges only: Connect the 2-pin connector into the board (it is not polarity-sensitive, so it can go in either way) and secure the gauge to the board with a self-tapping Phillips screw.

Adding gauge blanks

2



W3000820

Note: If replacing any blank, use the newer gauge blank support assembly shown in the illustration.

1) Gauge Blank
2) Blank Support Assembly
3) Pins
4) Terminals

Install the new blank (1) into the cluster housing. Install the blank support (2) in the PC board into the terminals (4) where the gauge was removed.

3
If the right module contains one or more gauge blanks: Remove all gauges except the Front and Rear Air Pressure gauges. Place these gauges into their locations in the housing before replacing the Right Circuit Board assembly.

4
Place the Right Circuit Board assembly into the housing, making sure all gauge pins are lined up with their terminals on the circuit board.

5
Place the cover over the board assembly and secure with three machine screws.

6
Connect the electrical connectors and air lines at the back of the instrument cluster. For stress relief on the connectors, tie wrap the wiring to the back of the instrument cluster. Failure to tie wrap the wiring may cause intermittent electrical connections.

7
Install the instrument cluster in dash and tighten the 2 screws at the top of the cluster. Torque to 2 ± 0.3 Nm (17.5 ± 2.5 in-lb).

2 ± 0.3 Nm (17.5 ± 2.5 in-lb)

Instrument Cluster Circuit Board Replacement (Left Side)

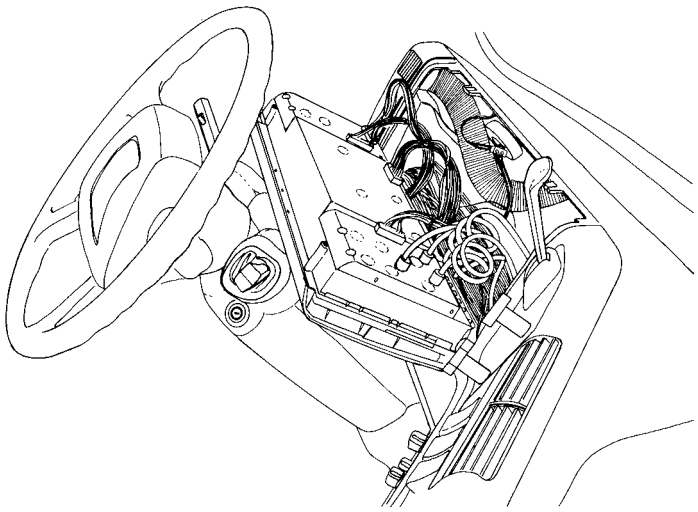
⚠ CAUTION

Before starting this procedure, see "General Precautions" page 4 when working with the instrument cluster. Failure to follow the safety precautions may result in instrument cluster damage.

Removal

1
Make certain the vehicle ignition is ***OFF*** before beginning this procedure.

2



W3000842

⚠ CAUTION

When servicing or troubleshooting, do not leave the cluster face-down for more than 15 minutes, or damage to the gauges may occur. Gauge oil can run out the front of the gauge faces and make the gauges inaccurate.

Adjust the steering column back where possible. Remove the two screws at the top of the instrument cluster and lay the cluster face-down on the steering column.

3
Cut the tie wraps fastening the wiring harness to the back of the cluster for stress relief on the connectors.

4

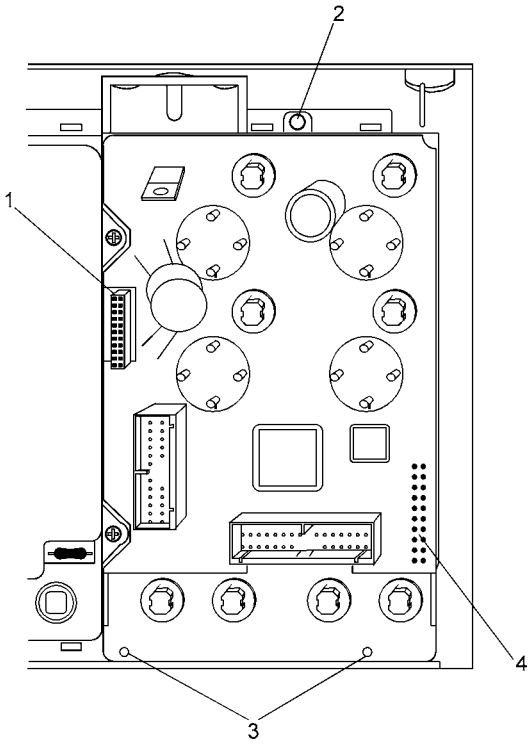
> **⚠ WARNING**
>
> Never disconnect an air system component unless all system pressure has been depleted. Failure to deplete system pressure before disconnecting hoses or components may result in them separating violently and causing serious bodily injury.

Bleed all pressure from the vehicle air system. Disconnect the electrical and air connectors from the back of the cluster, and remove the cluster from the vehicle.

5

Place cluster on an anti-static mat. The anti-static mat must be grounded to the nearest electrical outlet. When working at the anti-static workbench, always keep a wrist strap connected to the anti-static mat. Do not place the cluster on a metal table or any metal surface while servicing.

6



W3000734

1) Connector E2 (part of the center circuit board)
2) Top cover screw location
3) Bottom cover screw location
4) Connector E4 to Graphic Display board underneath

Remove the Phillips screw at the top of the left rear cover, and the two at the bottom, then lift off the cover.

Note: Connector E2 is part of the Center Circuit Board.

7

CAUTION

Do not bend the printed circuit board. Bending the board can result in damage to the board or components.

The Center Circuit Board connector E2 is holding the Left Circuit Board assembly in at this point, so you will have to remove the Center Module before continuing. Remove the four Phillips cover screws from the center cover.

8

Grasp the top and bottom of connector E1 (over the left circuit board) with your thumb and forefinger. Rock the Center Module from top to bottom while pulling up to unseat E1.

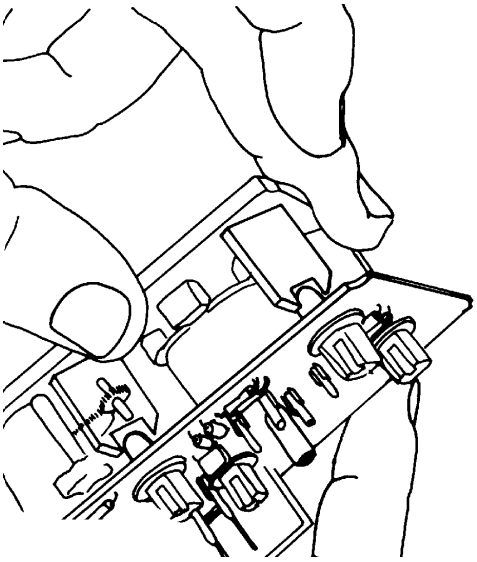
9

Remove the Center Module by lifting it off of the cluster.

10

Carefully lift out the Left Circuit Board assembly by lifting straight up. It is attached to the Graphic Display board below at connector E4.

11



W3000991

Fig. 1: Correct Gauge Removal

CAUTION

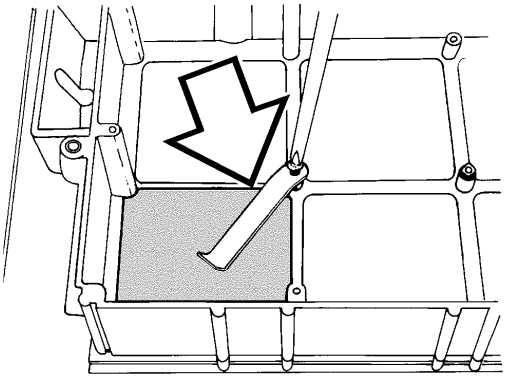
To avoid damaging the gauge, do not push on the needle when removing the gauge. Pushing on the needle can make the gauge inaccurate.

Remove the left circuit board gauges as follows: Gauges and gauge blanks are held tightly by their pin sockets. To remove, grasp the side of the gauge face plate with your thumb; place your 2nd and 3rd fingers underneath the face plate (see the illustration on Fig. 1: Correct Gauge Removal, page 10). Carefully rock the gauge from side to side while applying upward pressure until the gauge pins are free of the board sockets.

Note: Early production models may have gauge blanks held in place with a metal clip and a screw.

Removing a gauge blank

12



W3002511

Note: Early production models may have gauge blanks like the above. If replacing a blank, use the newer gauge blank support assembly shown in the Installation procedure.

When adding a gauge blank, remove the gauge or gauge blank to be replaced.

Installation

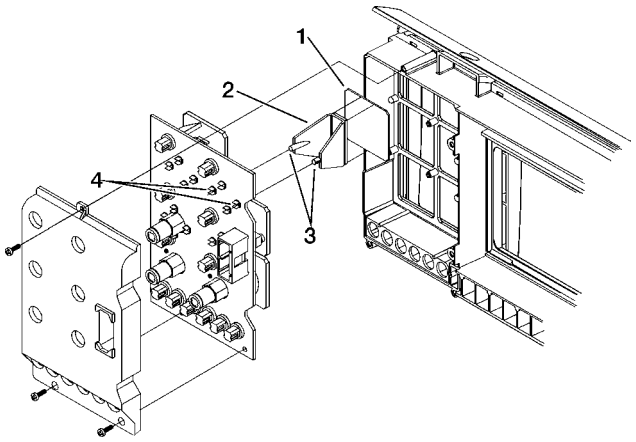
1

> **CAUTION**
>
> To avoid damaging the gauge, do not push on the needle when installing the gauge. Pushing on the needle can make the gauge inaccurate.

Replace the left circuit board gauges as follows: Install the replacement gauge by grasping the opposite corners of the gauge face plate and pushing the gauge pins into the socket onto the circuit board. Do not push on the needle. (For gauge blanks, see the following steps.) It is correctly installed when its face plate is flush with the other gauges' face plates.

Adding gauge blanks

2



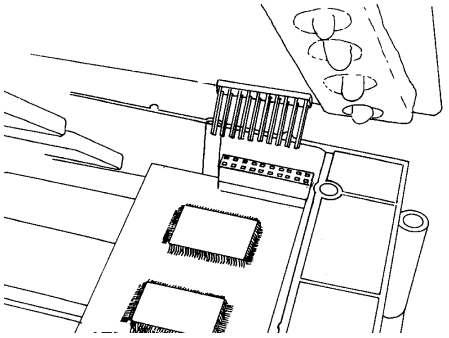
W3000820

Note: If replacing any blank, use the newer gauge blank support assembly shown in the illustration.

1) Gauge Blank
2) Blank Support Assembly
3) Pins
4) Terminals

Install the new blank (1) into the cluster housing. Install the blank support (2) in the PC board into the terminals (4) where the gauge was removed.

3



W3000750

Important! Before installing the Left Circuit Board assembly, check connector E4 pins and make sure they are all perfectly straight and parallel to each other.

4

If the left module contains one or more gauge blanks: Remove all gauges from the left module. Place these gauges into their locations in the housing before replacing the left module.

5

Place the Left Circuit Board assembly into the housing while lining up E4 pins into the Graphic Display connector.

6

To reinstall the Center Module, line up connector E1 pins with connector E2 holes on the Center Circuit Board, then carefully seat E2 while lowering the Center Module into the housing.

7

Verify that all E1 pins are in connector E2 holes, then use your thumb to fully seat E2 onto the Left Circuit Board. Reinstall the four Phillips screws securing the Center Module.

8

Install the left rear cover and secure it with three machine screws.

9
Connect electrical connectors and air lines at the back of the instrument cluster. For stress relief on the connectors, tie wrap the wiring to the back of the instrument cluster. Failure to tie wrap the wiring may cause intermittent electrical connections.

10
Install the instrument cluster in dash and tighten the 2 screws at the top of the cluster. Torque to 2 ± 0.3 Nm (17.5 ± 2.5 in-lb).

2 ± 0.3 Nm
(17.5 ± 2.5 in-lb)

11
Important: If the Left Circuit Board has been replaced, update the odometer and hourmeter values to reflect the vehicle's actual mileage and engine hours. This is done with the Pro-Link 9000.