Display and Diagnostic Module Gauge Operation

Description

The Display and Diagnostic Module (DDM) Gauge is a malfunction detection tool that enables the operator or service personnel to view many different engine parameters and engine service codes.

The DDM gauge (see Figure 1) includes a two-line, eight-character backlit LCD display. The top line displays data labels, e.g., “OilPress,” while the bottom line displays appropriate units of measure, e.g., “80 psi” for oil pressure. Two push buttons (UP and DOWN) are used for scrolling through parameters and viewing menus. Two LEDs (amber and red) are used to announce active fault messages received by the DDM.

Engine Parameters

The following are some of the engine parameters displayed by the DDM in English or Metric units (when applicable):

1. Engine Hours
2. Engine RPM
3. System Voltage
4. % Engine Load at the current RPM
5. Coolant Temperature
6. Oil Pressure
7. Fuel Economy
8. Throttle Position
9. Manifold Air Temperature
10. Current Fuel Consumption
11. Active Service Codes
12. Stored Service Codes from the engine
13. Display Units (may be changed from English to Metric and vice versa at any time)
14. Engine Configuration Parameters

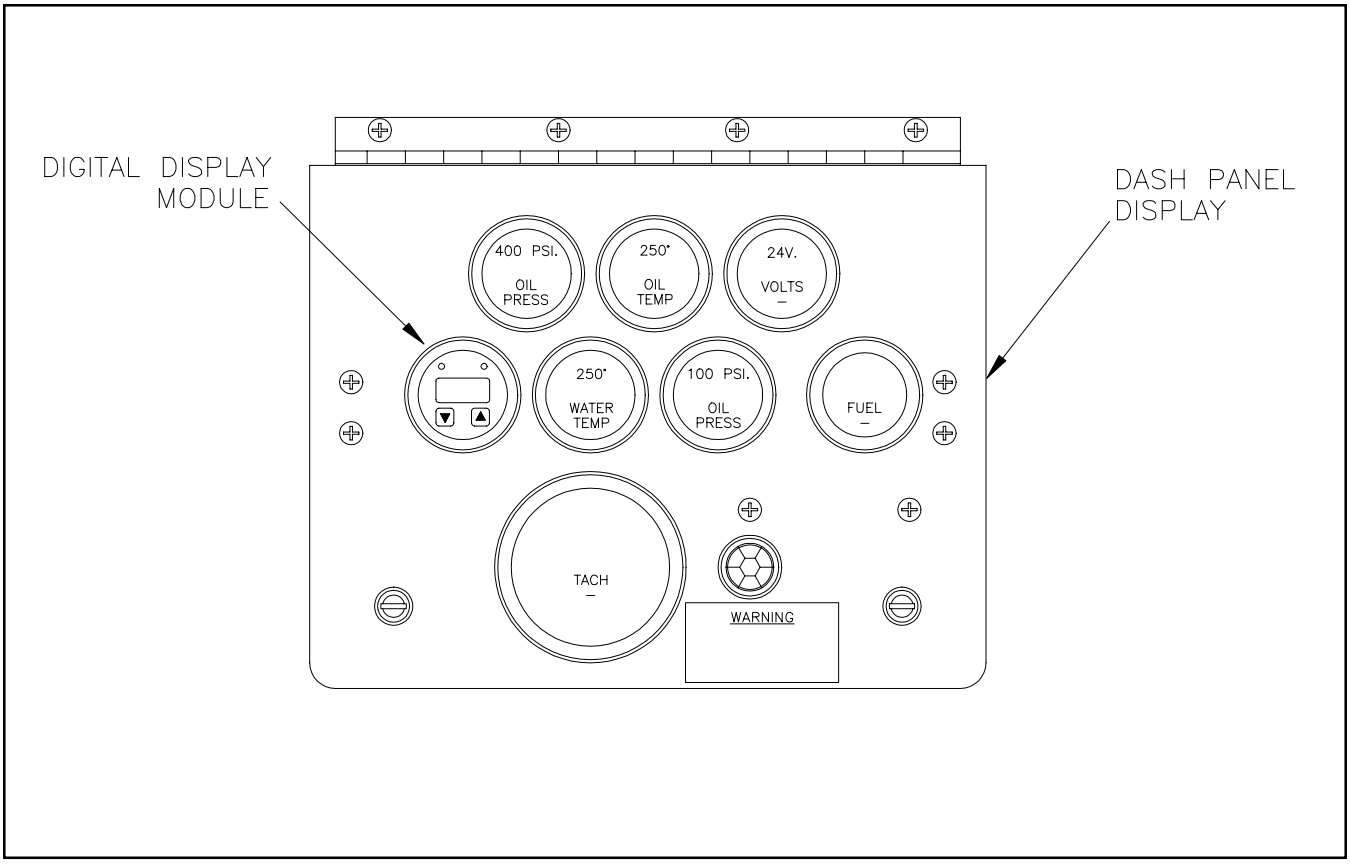


Figure 1: Digital Display Module and Dash Panel Display

DDM Operating Instructions

Operating Instructions

The DDM Main Menu Tree (see Figure 2) first displays engine data parameters, followed by menu entry points.

NOTE: WHEN FIRST POWERED UP, SOME UNUSED PARAMETERS MAY BE DISPLAYED BY THE DDM. THESE PARAMETERS WILL BE AUTOMATICALLY REMOVED FROM THE DISPLAY AFTER THE INITIALIZATION CYCLE IS COMPLETE.

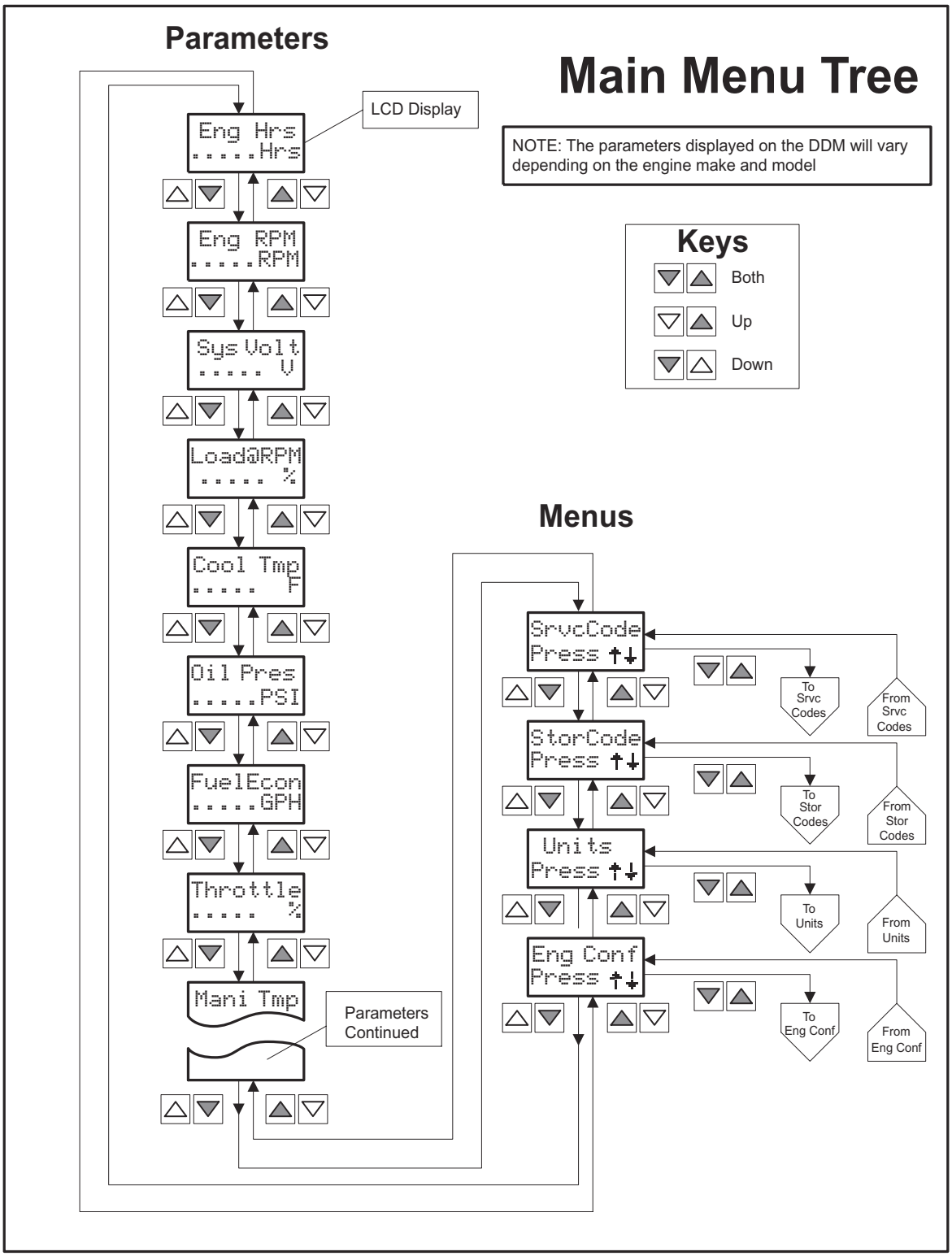


Figure 2: DDM Main Menu Tree

Viewing Engine Data Parameters

To read any of the engine parameters, press either the UP or DOWN button until the top line of the display shows the desired information.

Selecting & Exiting Menus

Press either the UP or DOWN button until the top line of the display shows the label of the desired menu. Then press the UP and DOWN buttons **simultaneously**. This action will select the menu and the next screen on the display will list the menu items.

Changing Units of Measure

The DDM can display engine data in either English or Metric units. To select English or Metric, the Units menu must be selected. To select the Units menu, press the UP or DOWN button until the display shows the following label:

Press the UP and DOWN buttons **simultaneously** to select the Units menu. Figure 3 shows the steps for selecting the desired units of measure. Two options are available:

1. Press **both** buttons to retain the current unit designation.
2. Press either the UP or DOWN button to toggle the unit selection, then press **both** buttons to select the desired unit of measure.

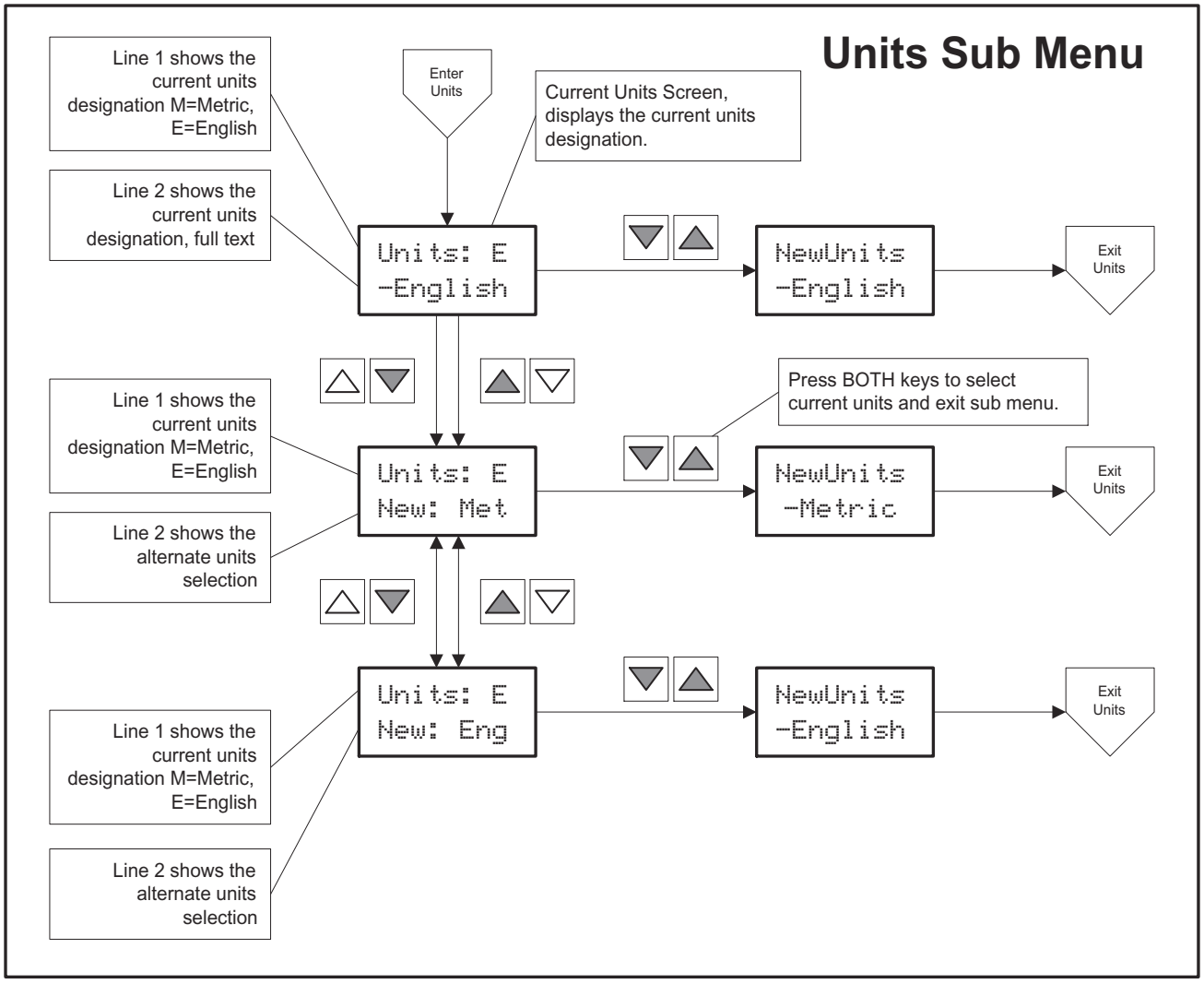
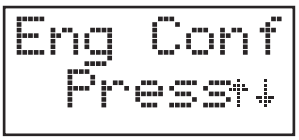


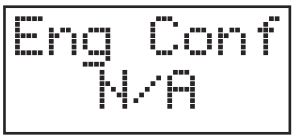
Figure 3: Setting Units of Measure

Viewing Engine Configuration Data

The DDM can display the engine configuration data stored in the engine ECM (electronic control module). To select the Engine Configuration Menu (see Figure 4), press the UP or DOWN button the the following label is displayed on the LCD:



Press the UP and DOWN buttons **simultaneously** to select the Engine Configuration menu. The DDM will display the engine configuration data as shown in Figure 4. If the Engine Configuration menu is unavailable, the LCD will display:



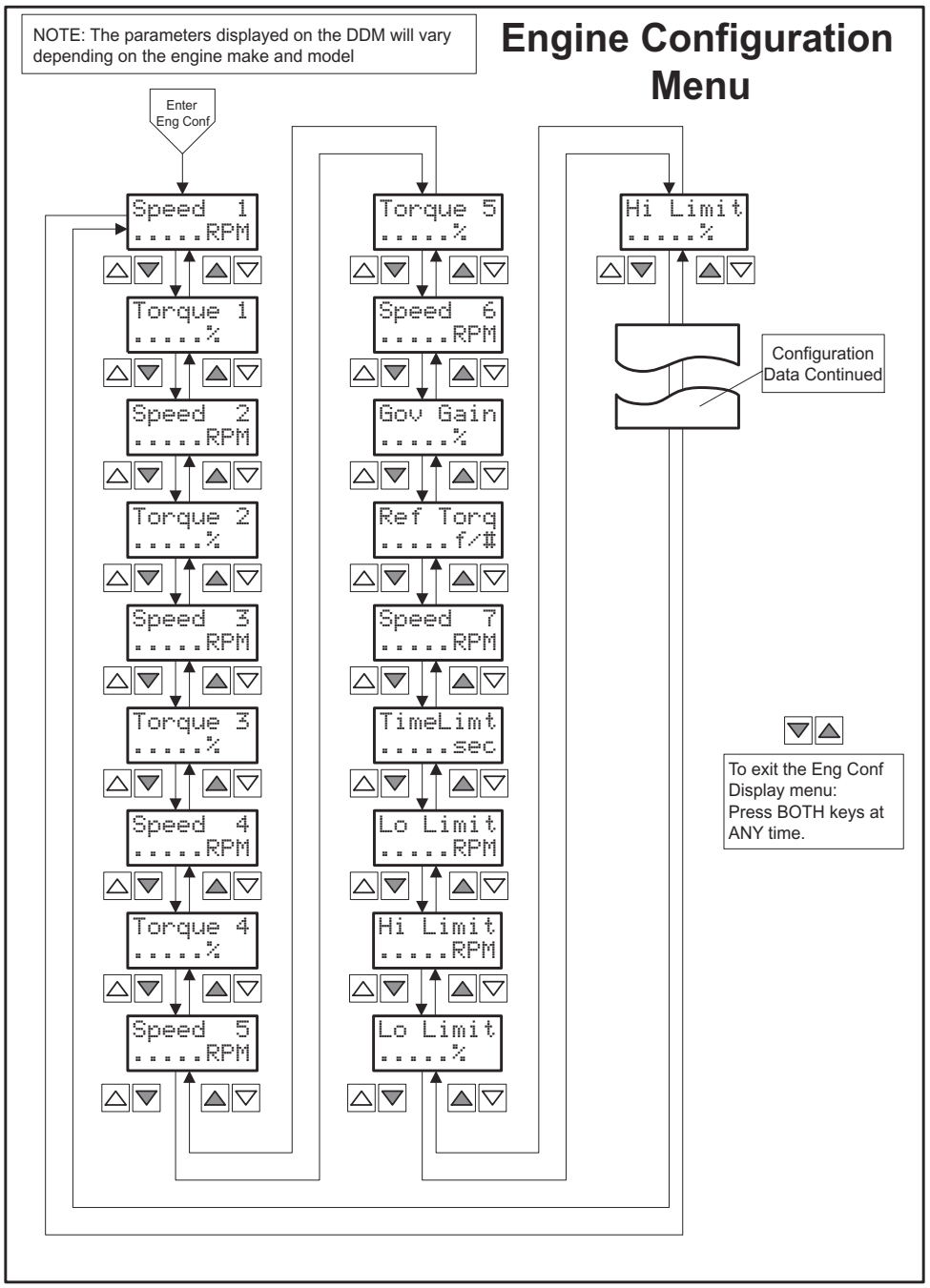


Figure 4: Engine Configuration Data

DDM Internal Error Codes

EEPROM Errors

The DDM performs a read/write test of the EEprom on power up. If this test fails, the error message “EE-Error” is displayed and the functions of the DDM are stopped at that point.

Address Claim Procedure Errors (ACP-Err)

As a part of the DDM’s boot up procedure, the DDM must claim a network address for its use. If an error occurs during this procedure an error code is displayed on the LCD.

Error Code 1:
Line 1: “ACP-Err”
Line 2: “No Addr”

This error occurs if the DDM is **not** able to claim an address, either the default address or one from its range of addresses (43-127).

Error Code 2:
Line 1: “ACP-Err”
Line 2: “Bus EP”

This error occurs if the DDM encounters a Controller Area Network (CAN) bus error. The “Bus EP” means the DDM is in an Error Passive (EP) mode. The Error Passive state is a result of the DDM not having a partner on the CAN bus, or the DDM is attached to the CAN bus with the CAN_HI and CAN_LO reversed.

Error Code 3:
Line 1: “ACP-Err”
Line 2: “BusError”

This error occurs if the DDM has transitioned through the Error Passive mode and has continued to encounter CAN bus errors. The “BusError” mode is a result of catastrophic errors on the CAN bus. Some possible causes include:

- CAN_HI or CAN_LO or both are shorted to electrical ground or to the battery voltage.
- One or more nodes on the CAN bus is transmitting at a non-standard baud rate.

This type of error is generally non-recoverable, and will require a skilled service person to help sort out the possible error causes.

Run Time Bus Errors

After the DDM has claimed a network address, it enters its run time mode of operation. If a bus error occurs during this mode, one of the following error codes will be displayed.

Error Code 1:
Line 1: “xxxxx EP”
Line 2: “No Data”

“EP” is Error Passive. For some reason, the DDM has lost contact with the network and no longer has a communications partner or partners. This may have been caused by a connector separating, or the network wires being severed.

Error Code 2:
Line 1: “xxxxx BO”
Line 2: “No Data”

“BO” means Bus Off. Please refer to ACP-Err Code #3.

Error Code 3:
Line 1: “xxxxx BR”
Line 2: “No Data”

“BR” means Bus Reset. This error code is similar to ACP-Err Code #3. The DDM has encountered CAN bus errors that have caused it to transition through EP (Error Passive) and BO (Bus Off). In this state, the DDM is resetting the CAN interface in an attempt to re-establish connection to the network.