

Product News**Marine Analog Power Display
(MAPD)**

Market	Marine Propulsion
Application	Electronic Marine Engines
Description	The new Caterpillar Marine Analog Power Display (MAPD) is a monitoring system of data link driven analog gauges. The gauges are supported by the J1939 data link connected to a control module that transmits information through a proprietary gauge data link to individual gauges. Each control module can support up to twelve gauges.
Features/Benefits	Cat Marine Analog Power Display combines the accuracy and dependability of electronics with the simplicity and visual clarity of conventional analog gauges. The MAPD system and Cat wiring are designed for “plug and play” installation in vessels powered by Cat electronically controlled marine engines.
Pricing Information	Contact Caterpillar dealer for prices.
Availability	Orders: May 19, 2003 Shipments: 3 to 5 weeks after receipt of order

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Marine Analog Power Display (MAPD) Features



Various sizes and types of gauges are available to configure in any arrangement to complement the vessel's control stations. Two and three inch diameter gauges can be installed in a display specifically designed by the operator.

The three inch diameter tachometer gauges have an LCD window to display engine hours and diagnostic codes based on J1939 SPN-FMI. Two inch diameter gauges have warning lamps for fault conditions such as high coolant temperature or low oil pressure.

All of the gauges are LED backlit and automatically calibrated. The gauges are supported by the J1939 data link connected to a control module that transmits information through a proprietary gauge data link to individual gauges. Each control module can support as many as twelve gauges. A maximum of eight MAPD configurations (display stations) can be installed on one engine data link.

Marine Analog Power Display (MAPD) Benefits

- Operator specific design of gauge configuration
- Easy to install
- Constructed to withstand harsh marine environment
- Replaces EMS and conventional analog gauges for Cat electronically controlled engines
- Automatically calibrated for accurate, trouble-free operation
- Warning lamps on individual gauges help quickly warn operator of abnormal conditions
- LED backlit for easy viewing
- English and metric units shown on each gauge

MAPD Components

Basic Package (Feature Code MAPDBP1)

- 210-4309 Control Module
- 212-8255 “Y” Harness Assembly
- 212-8259 Adapter Harness Assembly
- 174-3016 Termination Resistor (qty 2)
- 221-0777 Termination Harness Assembly

3 Inch (76.2 mm) Diameter Gauges

All gauge feature codes include a 212-8255 “Y” Harness. Refer to OFFBOARD price list for engine compatibility.

Gauge	Feature Code	Range	Part Number
Tachometer	GIPAT03	0 to 4000 rpm	207-2825
Tachometer	GIPAT01	0 to 3600 rpm	211-0743
Tachometer	GIPAT02	0 to 3000 rpm	211-0742
Coolant Temperature	GIPACT3	0 to 250°F	222-9899
Inlet Manifold Temperature	GIPAMT3	0 to 250°F	222-9906
Oil Pressure	GIPAOP3	0 to 100 psi	222-9907
Transmission Oil Pressure	GIPATP3	0 to 500 psi	222-9915
Transmission Oil Temperature	GIPATT3	0 to 250°F	222-9916
Volt	GIPAVT3	9 to 32 VDC	222-9917
Boost Pressure	GIPABP3	0 to 50 psi	222-9895
Fuel Pressure	GIPAFP3	0 to 125 psi	222-9901
Fuel Rate	GIPAFR3	0 to 200 gph	222-9904
Fuel Temperature	GIPAFT3	0 to 250°F	222-9905
Oil Temperature	GIPAOT3	0 to 250°F	222-9908
Percent Load	GIPAPL3	0 to 100%	222-9909
Speed Gauge	GIPASG3	0 to 60 knots	222-9910

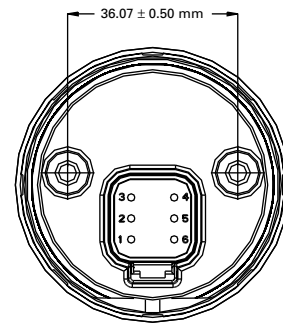
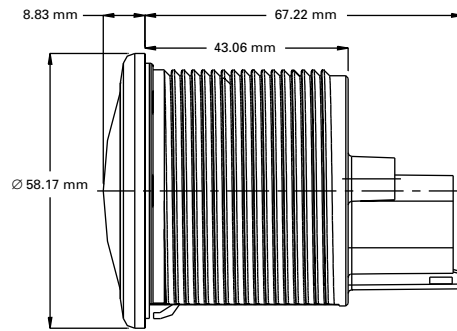
2 Inch (76.2 mm) Diameter Gauges

All gauge feature codes include a 212-8255 “Y” Harness. Refer to OFFBOARD price list for engine compatibility.

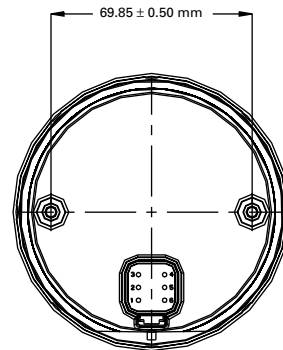
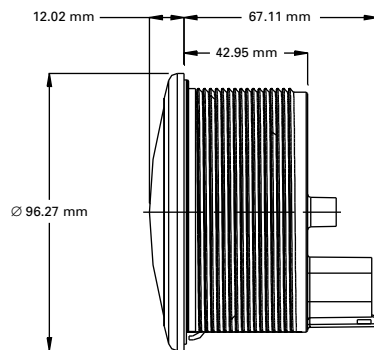
Gauge	Feature Code	Range	Part Number
Coolant Temperature	GIPACT2	0 to 250°F	207-2823
Inlet Manifold Temperature	GIPAMT2	0 to 250°F	211-0748
Oil Pressure	GIPAOP2	0 to 100 psi	207-2824
Transmission Oil Pressure	GIPATP2	0 to 500 psi	207-2826
Transmission Oil Temperature	GIPATT2	0 to 250°F	207-2827
Volt	GIPAVT2	9 to 32 VDC	207-2822
Volt	GIPAVT1	0 to 16 VDC	211-0707
Boost Pressure	GIPABP2	0 to 50 psi	211-0740
Fuel Level	GIPAFL2	0 to 4/4 quarters	211-0744
Fuel Pressure	GIPAFP2	0 to 125 psi	211-0745
Fuel Rate	GIPAFR1	0 to 50 gph	222-9902
Fuel Rate	GIPAFR0	0 to 80 gph	211-0746
Fuel Rate	GIPAFR2	0 to 200 gph	222-9903
Fuel Temperature	GIPAFT2	0 to 250°F	211-0747
Oil Temperature	GIPAOT2	0 to 250°F	211-0741

MAPD Specifications

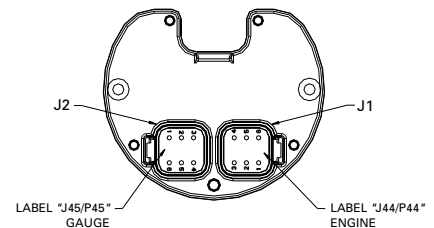
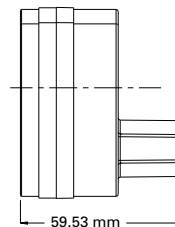
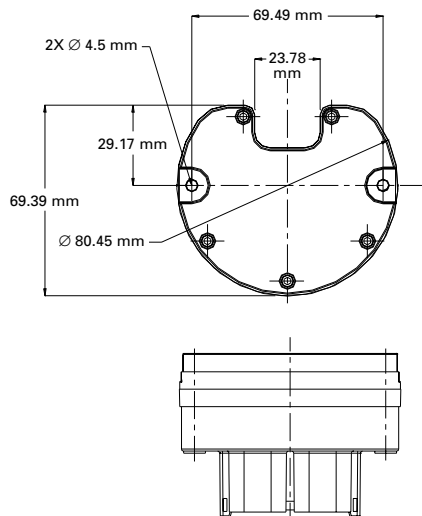
2 Inch Gauge



3 Inch Gauge



Control Module



Data Link

The MAPD control module is connected by CAN (SAE J1939) data link to the engine ECM. The connection between the control module and gauges (up to 12) is a separate gauge communication link.

Operating Range

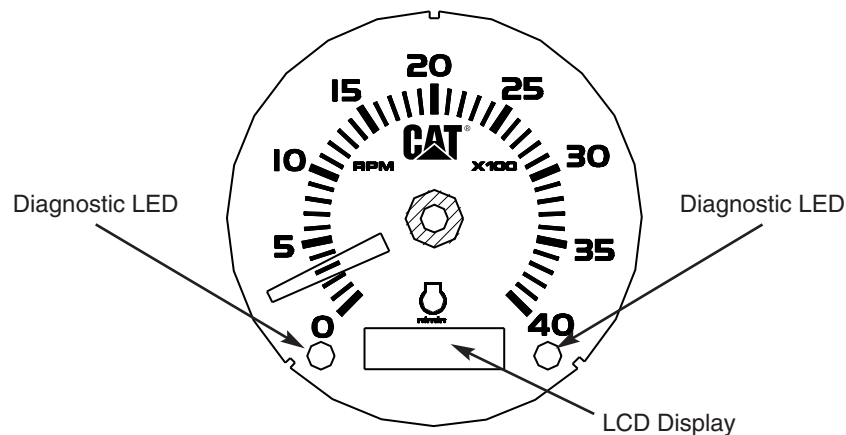
Control module power supply range must be 9 to 32 VDC. Gauge operating power supply range must be 9 to 16 VDC (supplied by the control module).

MAPD Gauge Operation

Tachometer Gauge Functions

The tachometer displays engine speed in rpm and is equipped with a Liquid Crystal Display (LCD) that will display actual engine hours or diagnostic information (SPN-FMI). Under normal operating conditions the LCD will display actual engine hours. When an engine event

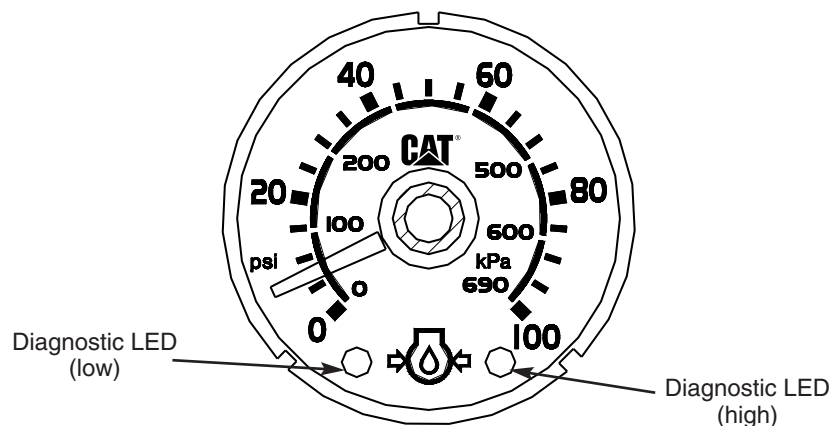
becomes active, the LCD will switch between the engine hours and the active SPN-FMI. The LED on the associated gauge will come on. Refer to the engine troubleshooting guide for SPM-FMI meanings.



Pressure Gauge Functions

Gauges are available to display engine oil pressure, transmission oil pressure, boost pressure, and fuel pressure. Pressure gauge availability and pressure ranges vary by engine model. Each gauge has two LEDs to indicate a high pressure warning or a low pressure warning, even though one LED may only be used for a specific engine parameter. The engine oil pressure

gauge will indicate a low oil pressure warning and a loss of data link signal. The transmission oil pressure gauge will indicate a high pressure warning and a loss of data link signal. The boost pressure gauge will indicate a loss of data link signal. The fuel pressure gauge will indicate a low pressure warning and a loss of data link signal.

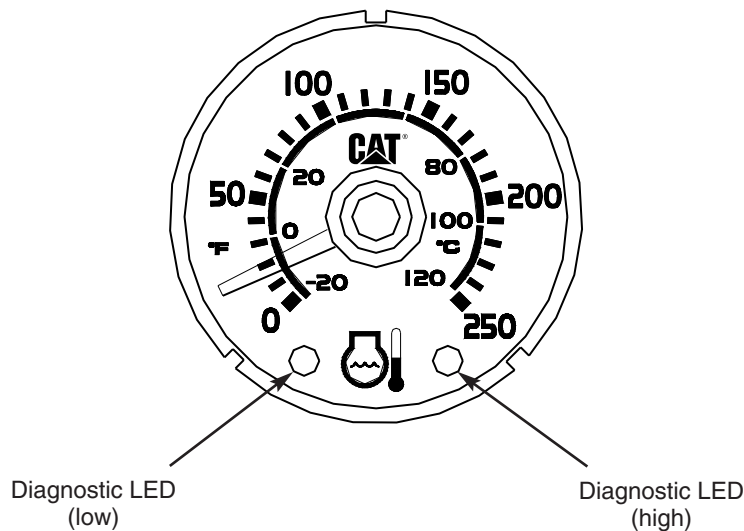


MAPD Gauge Operation

Temperature Gauge Functions

Gauges are available to display coolant temperature, inlet manifold temperature, transmission oil temperature, exhaust temperature, fuel temperature, and engine oil temperature. Temperature gauge availability and temperature ranges vary by engine model. Each gauge has two LEDs to indicate a high temperature warning or a low temperature warning, even though one LED may only be used for a specific engine parameter. The coolant temperature gauge will indicate a high coolant temperature warning and a loss of data link signal. The inlet manifold

temperature gauge will indicate a high temperature warning and a loss of data link signal. The transmission oil temperature gauge will indicate a high temperature warning and loss of data link signal. The exhaust temperature gauge will indicate a high temperature warning and a loss of data link signal. The fuel temperature gauge will indicate a high temperature warning and a loss of data link signal. The engine oil temperature gauge will indicate a high temperature warning and a loss of data link signal.



Illumination

Six different illumination levels are available on the two and three inch gauges. Actuate the OEM installed backlight switch to scroll through the six lamp intensities.

If MAPD is installed in a vessel with MSCS, momentarily press the station active button

to cause the ICH or button panel and the MAPD gauges to scroll through the six lamp intensities. These devices will dim simultaneously. The OEM installed backlight switch for MAPD does not need to be installed in this situation.

MAPD Gauge LED Function

<p>One LED Flashing</p> 	<p>Warning Event – One LED will flash on the gauge that is related to the warning.</p> <p>Left LED – Low Pressure/Voltage Event</p> <p>Right LED – High Pressure/Temperature/Voltage/Speed Event</p>
<p>One LED on Continuously</p>	<p>Engine Derate – One LED will be on continuously on the gauge that is related to the derate.</p> <p>Left LED – Low Pressure Derate</p> <p>Right LED – High Pressure/Temperature Derate</p>
<p>Both LEDs on Continuously</p>	<p>Engine Shutdown – Both LEDs will be on continuously on the gauge that is related to the shutdown.</p>
<p>Both LEDs Flashing</p>	<p>Loss of J1939 Communications</p>

Future Software Enhancements

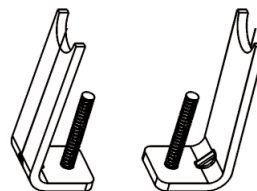
The MAPD control module can be upgraded with new software versions using the flash programming feature of the Cat ET service tool.

References

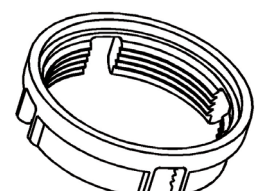
Refer to service publication SENR5002 for installation and troubleshooting information.

Mounting System

The gauges can be secured to the helm station panel using the U bracket or the mounting nut. Refer to SENR5002-04 or newer revision for installation instructions.



U Bracket



Mounting Nut