

# Murphy Display & Diagnostic Module with MODBUS® Installation and Operations Manual



Please read the following information before installing. A visual inspection of this product for damage during shipping is recommended before mounting. It is your responsibility to have a qualified person install this unit and make sure it conforms to NEC and local codes.

## GENERAL INFORMATION

# WARNING

**BEFORE BEGINNING INSTALLATION OF THIS MURPHY PRODUCT**

- ✓ Disconnect all electrical power to the machine.
- ✓ Make sure the machine cannot operate during installation.
- ✓ Follow all safety warnings of the machine manufacturer.
- ✓ Read and follow all installation instructions.



### Description

The Murphy Display and Diagnostic Module or MDDM is the keystone in a line of components manufactured by Enovation Controls as part of its J1939 MurphyLink® System. The J1939 MurphyLink System has been developed to meet the needs for instrumentation and control on electronically controlled engines communicating using the SAE J1939 Controller Area Network (CAN).

The MDDM-MOD is an additional model of the MDDM series. The MDDM-MOD can translate SAE J1939 to Modbus®† RTU registers for remote monitoring via satellite, land lines and cell phones or other controller and computer systems. This powerful unit is an easy to use multifunction tool that enables the operator to view many different engine parameters and engine service codes.

The MDDM-MOD includes a two line by eight character backlit LCD display. The top line displays data labels, i.e., OilPress. The bottom line displays appropriate units information, i.e., 80 psi for oil pressure.

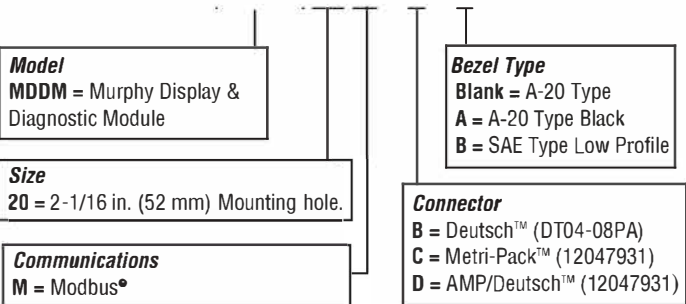
The UP and DOWN push buttons located on the front of the MDDM-MOD are used for scrolling through the parameters and viewing the menu list. Two LEDs (amber and red) are used to annunciate active fault messages received by the MDDM-MOD.

Modbus®† devices can be connected to the MDDM-MOD by an RS485 twisted pair cable up to 1,000 meters. The MDDM-MOD can be powered by 12 or 24\* volt systems, is back lit using LEDs and is environmentally sealed.

### How to Order

To order the MDDM use the model number designation diagram below:

#### MDDM 20 M – B – B



### Engine Parameters

The following are typical engine parameters displayed and made available via MODBUS®† by the MDDM-MOD in English and Metric units:

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. Set the Units for display.
14. View the Engine Configuration Parameters (n/a MODBUS®†).

### Specifications

- Bezel:** Stainless Steel (Black Optional).
- Membrane Switch:** Polyester.
- Case/Clamp:** Nickel Plated Steel, Aluminum Killed, QQ-S-698.
- Maximum Panel Thickness:** 0.30 inch. (8 mm).
- Mounting Hole:** 2.062 inch (52 mm) in diameter.
- Dial:** White on Black.
- Reversed Polarity:** Withstands reversed battery terminal polarity indefinitely within operating temperatures.
- CAN BUS:** SAE J1939 Compliant.
- Communication:** One (1) RS485 serial port, MODBUS RTU slave, baud rate 9.6 or 19.2 kbaud, N, 8, 1 or 2, half duplex.
- Operating Voltage:** 8 VDC Minimum to 32 VDC Maximum.
- Operating Temperature:** -4 to 158°F (-20 to 70°C).
- Storage Temperature:** -40 to 185°F (-40 to 85°C).

† MODBUS® is a registered trademark of AEG Schneider Automation Inc.  
 Function code supported 03 MODBUS® 16-bit integer holding registers.  
 \* A voltage converter is required for 24 volts systems for the back light.

# Typical Mounting Dimensions



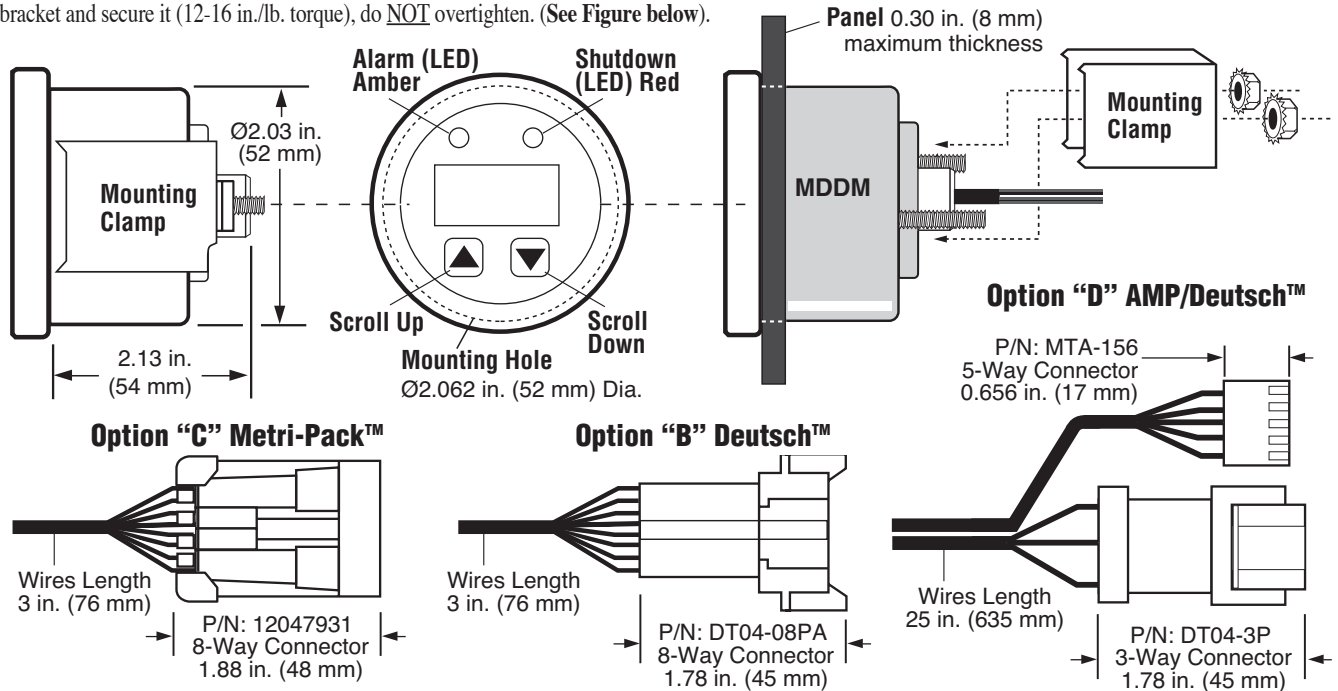
**WARNING:** Disconnect negative battery cable before mounting.



**IMPORTANT:** The MDDM display is best viewed either straight on or at the 6 o'clock position

## Panel Mounting

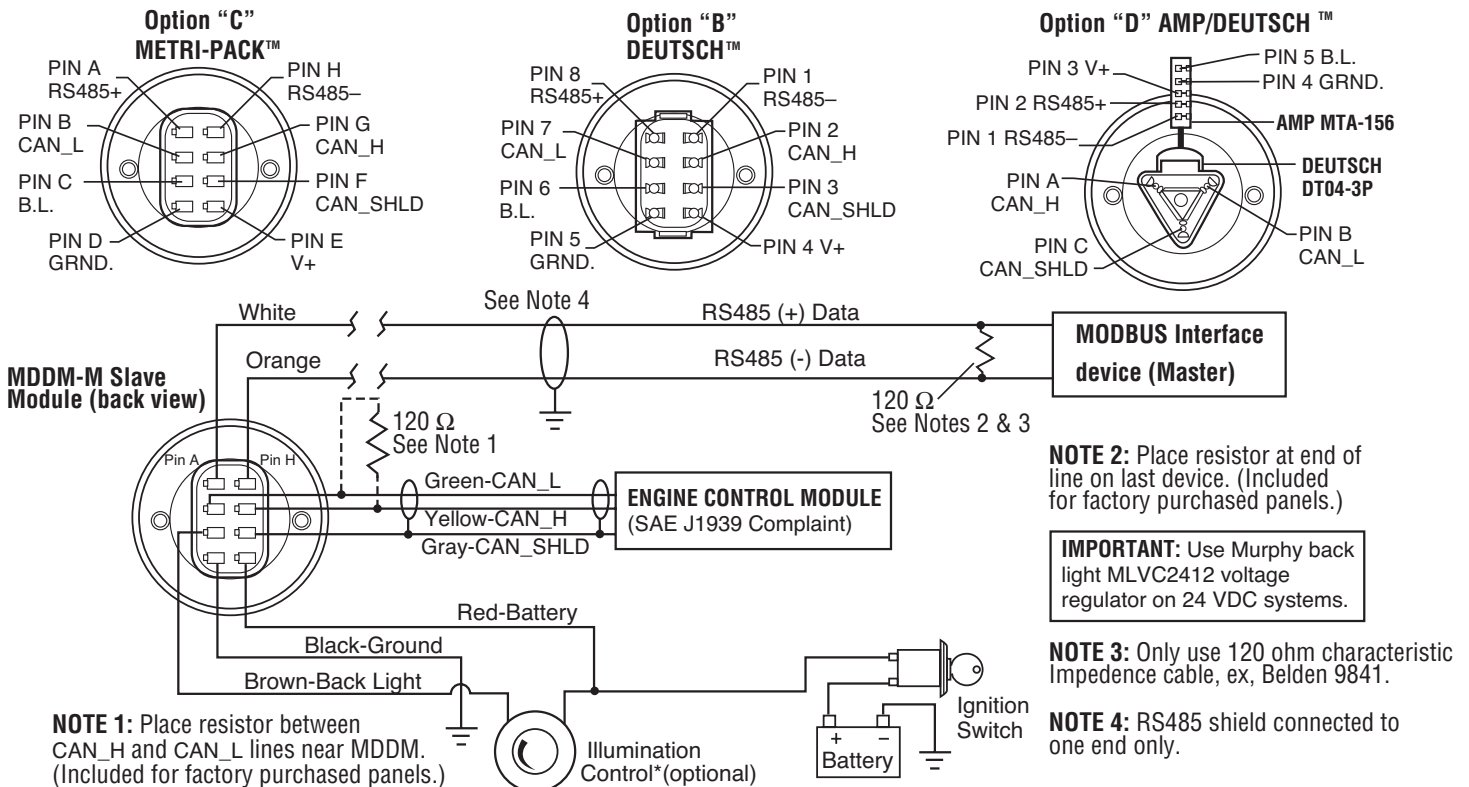
Remove the mounting bracket and insert the gage from the front side of the panel. Replace bracket and secure it (12-16 in./lb. torque), do **NOT** overtighten. (See Figure below).



## MDDM-MOD Typical Wiring Diagram



**IMPORTANT:** To eliminate external interference: RS485(+) and RS485(-) should be twisted pair cable or twist wires together, one twist per inch minimum. CAN\_L, CAN\_H and CAN Shield should be approved J1939 CAN bus cable or twist wires, one twist per inch min.



## Operating Instructions

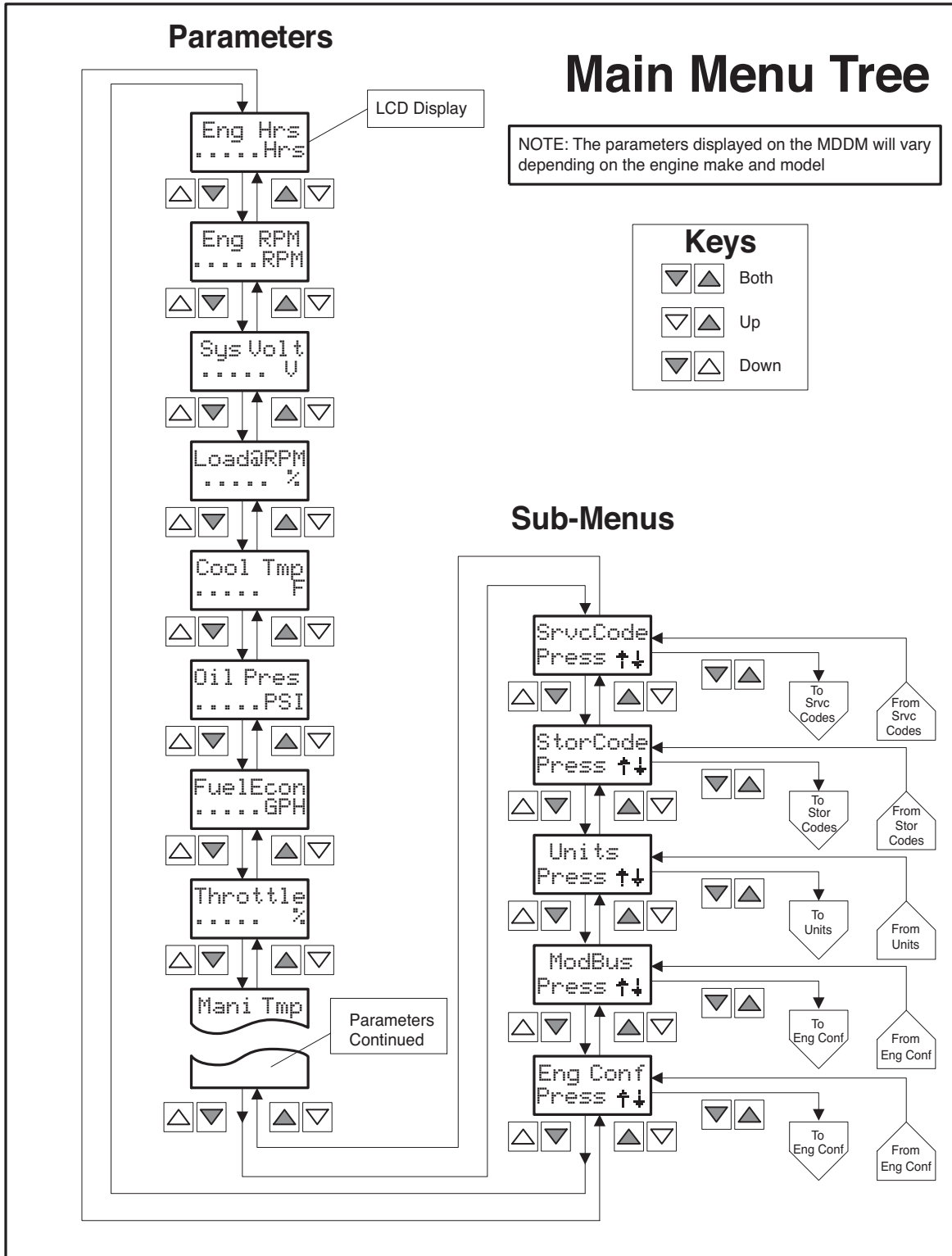
The MDDM is simple to use and allows quick and easy navigation through the menu structure to find the information needed.

The MDDM Main Menu Tree (below) first displays engine data parameters, followed by the sub-menu entry points.

**NOTE:** When first powered up some unused parameters may be displayed by the MDDM. These parameters will be automatically removed from the display after the initialization cycle is complete.

The following two rules are used for accessing the various items on the main menus:

1. To scroll through the parameter list, press either the UP or Down push buttons.
2. To select or exit a sub-menu SIMULTANEOUSLY press the UP and DOWN push buttons.



## Selecting 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 Sub-Menus

Press either the UP or DOWN button until the top line of the display shows the label of the desired Sub-Menu. Then press BOTH the UP and DOWN buttons SIMULTANEOUSLY. This action will select the Sub-Menu and the next screen on the display will list the Sub-Menu items.

## Changing Units of Measure

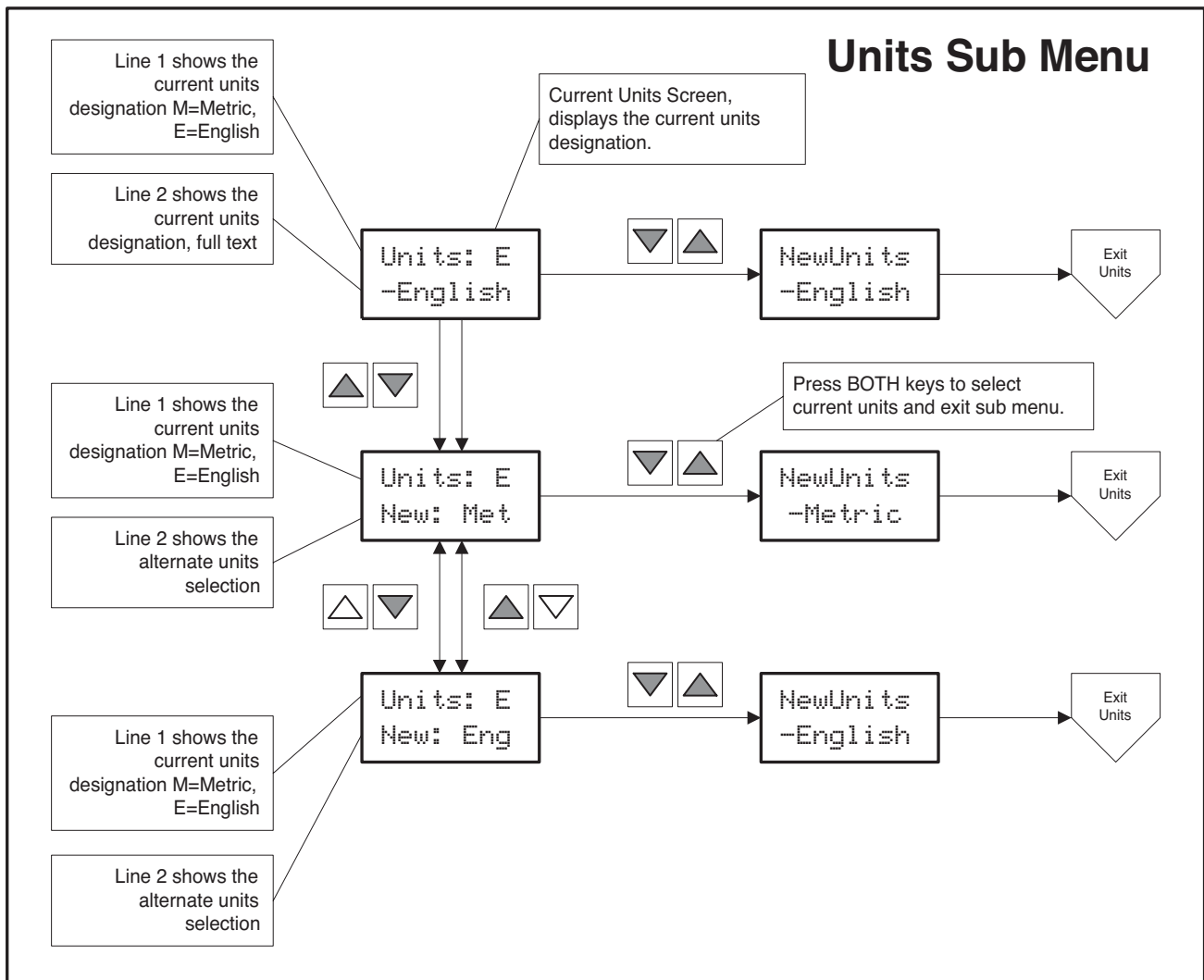
The MDDM can display engine data in either English or Metric units. To

select English or Metric, the Units Sub-Menu must be selected. To select the Units Sub-Menu, press the UP or DOWN button until the display shows the following label:



Press BOTH the UP and DOWN buttons SIMULTANEOUSLY to select the Units Sub-Menu. The Units Sub-Menu Figure (below) shows the steps for selecting the desired units of measure. Two options are available:

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



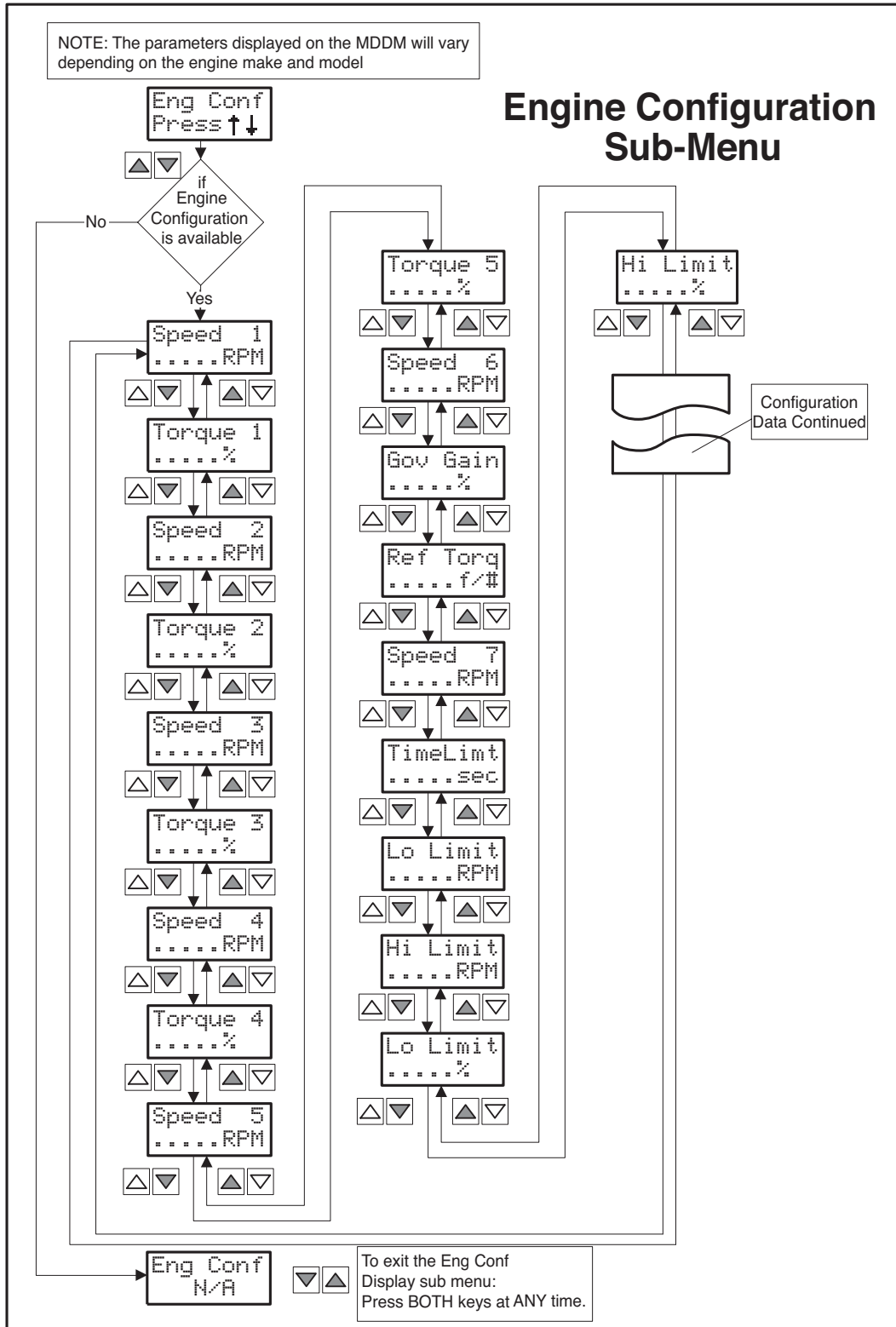
## Viewing Engine Configuration Data

The MDDM can display the engine configuration data stored in the engine ECM. To select the Engine Configuration Sub-Menu (shown below), press the UP or DOWN button until the display shows the following label.

Eng Conf  
Press ↑↓

Press **BOTH** the UP and DOWN buttons **SIMULTANEOUSLY** to select the Engine Configuration Sub-Menu. The MDDM will display the engine configuration data as shown in Engine Configuration Sub-Menu. If the Engine Configuration is not available, the display will show:

Eng Conf  
No Data



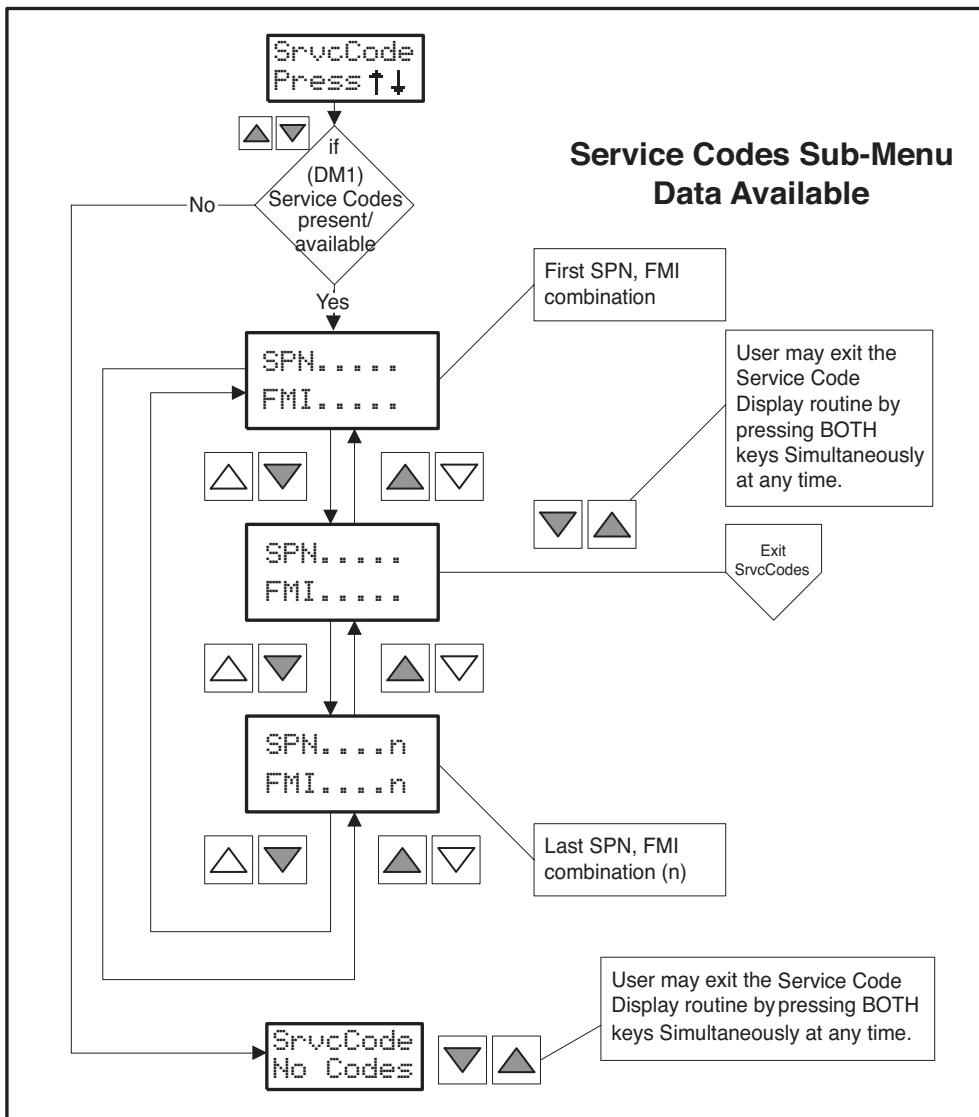
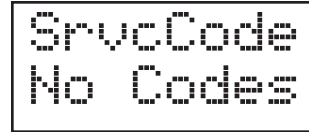
### Viewing Active Engine Service Codes

The MDDM continuously monitors all messages broadcast over the SAE J1939 Control Area Network (CAN) and displays all Active Service Codes at the time the message is broadcast. When a fault occurs the display will show the message "SrvcCode" every five seconds interrupting the currently displayed parameter. In addition, the amber LED will be illuminated during Active Service Code warning faults, and the red LED will be illuminated during shut-down faults. These warnings will continue until the fault clears.

To view the Active Service Codes select the Service Code Sub-Menu by pressing the UP or DOWN button until the display shows the following label:



Press both the UP and DOWN buttons SIMULTANEOUSLY to select the Service Code Sub-Menu. The MDDM will display all Active Service Codes as shown in the Service Codes Menu schematic (below). If Service Codes are not available, the display will show the following:



### Explanation of SPN & FMI Diagnostic Codes

SPN refers to Suspect Parameter Number and FMI refers to Failure Mode Identifier. Both the SPN and FMI are used in the J1939 standard for identification of faults and conditions.

## Viewing Service Codes in The Engine Control Module (ECM)

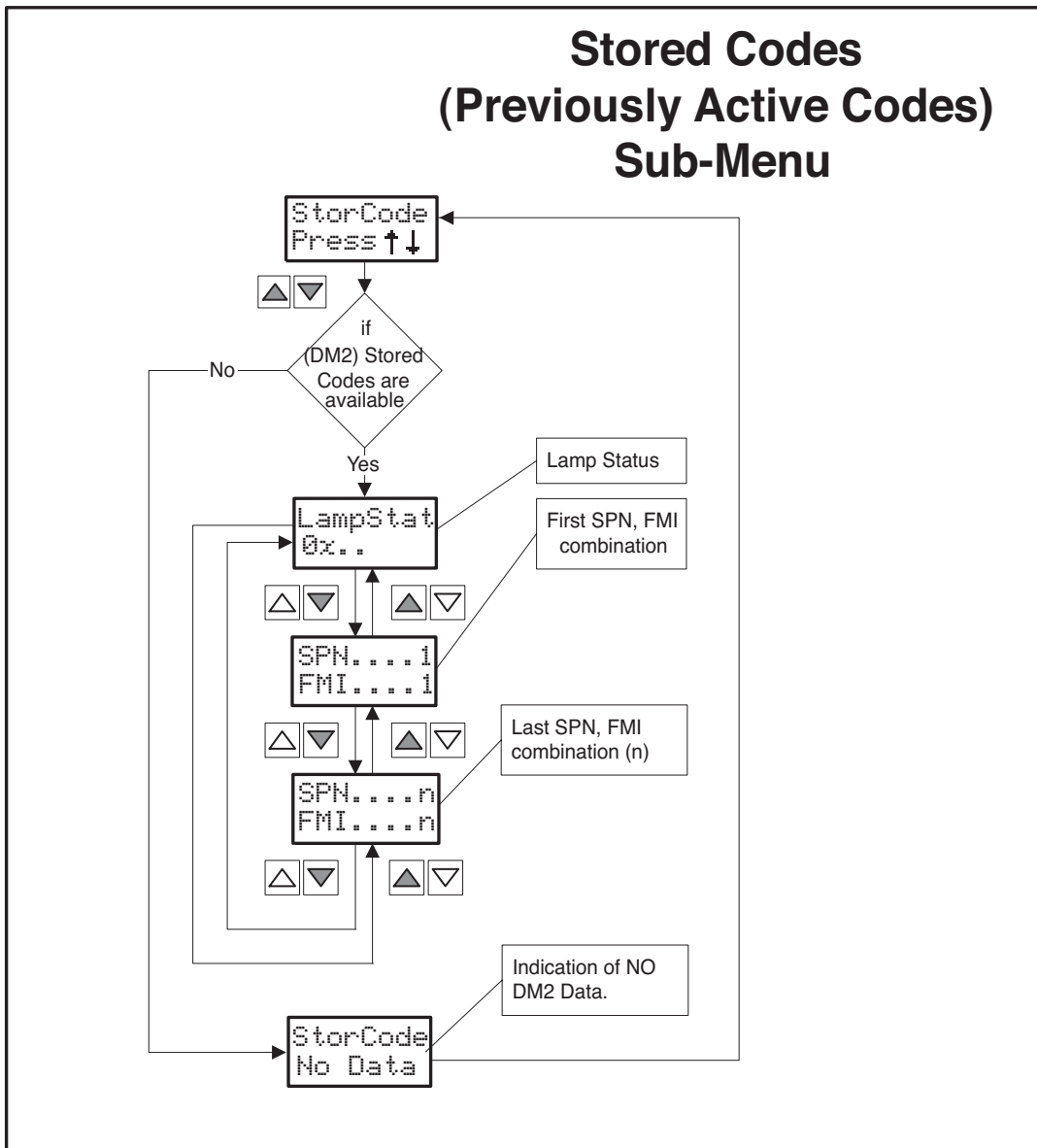
The MDDM can request Stored Service Codes (DM2) from the engine. The Stored Service Codes may be used for diagnostic and service needs. To view the Stored Service Codes it is necessary to select the StorCode Sub-Menu by pressing the UP or DOWN button until the display shows the following label.

```
StorCode
Press ↑↓
```

Press both the UP and DOWN buttons SIMULTANEOUSLY to select the StorCodes Sub-Menu. The MDDM will display the Stored Service Codes according to the menus shown in the schematic below.

If Stored Service Codes are not available, the display will show:

```
StorCode
No Data
```



### Selecting MODBUS Parameters

The MODBUS master device retrieving data from the MDDM-MOD via RS485 will require the MDDM-MOD to have a specific address, communication speed, and stop bit of 1 or 2. The MDDM-MOD address, communication speed (Baud rate), and stop bit can be adjusted through the ModBus Setup Sub-Menu.

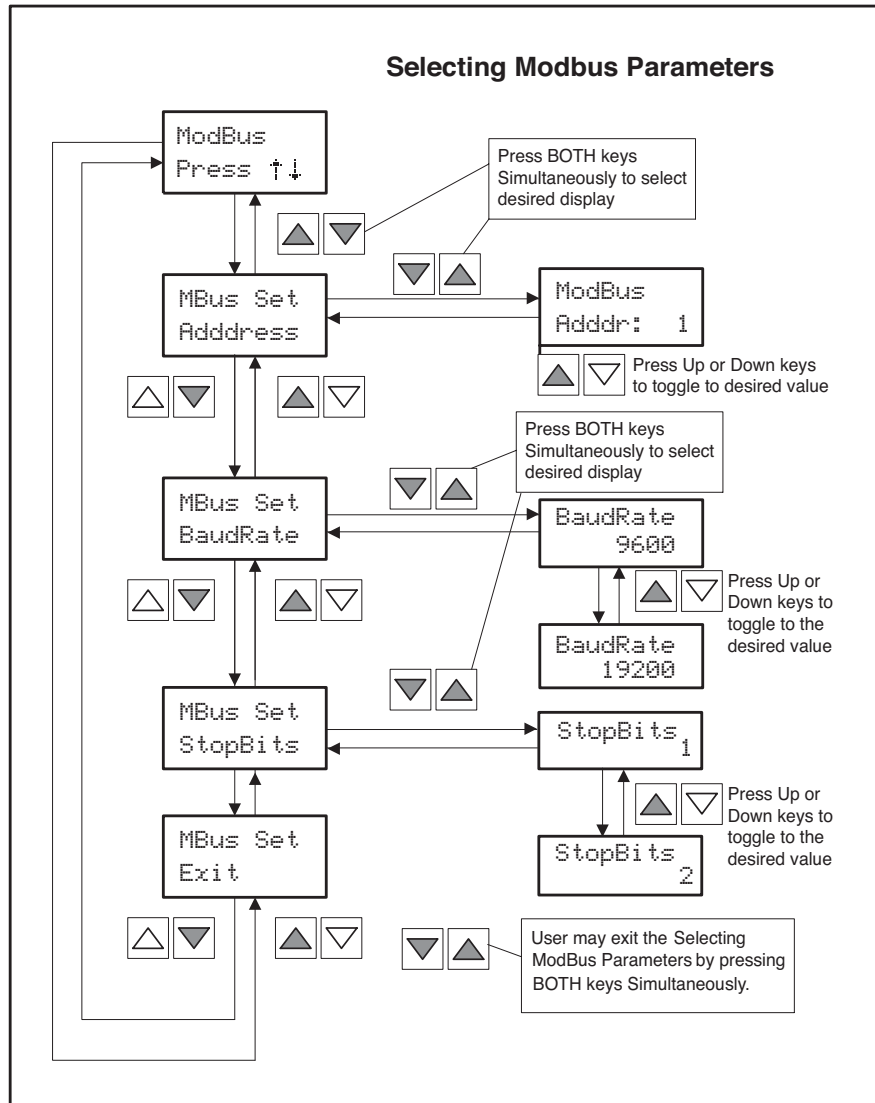
To select the ModBus Setup Menu (shown below). Press the UP or DOWN keys until the display shows the following label:



Press Both the UP and DOWN keys simultaneously to select the ModBus Setup Menu. This action will select the ModBus Setup Menu and the next screens on the display will list the Sub-Menu items.

The ModBus Setup Sub-Menus figure (below) shows the steps for selecting the desired units for the ModBus address, communication speed (Baud Rate), and stop bit.

1. Press Both keys to retain the current value.
2. Press either UP or DOWN keys to toggle the value selection, then press both keys to select the desired value.



### Communication Specifications:

RS485—MODBUS RTU Slave; 9600 or 19200 baud; Half-Duplex; N, 8, 1 or 2, MODBUS 16-bit integer holding registers, Function code supported 03; Maximum number of registers allowed to be polled is 100. Maximum poll rate is once every 1/2 second.



## MODBUS Registers for MDDM-MOD

Register	Description	Decimal Places	Units	Range	Resolution per bit	Value for data not available
40001	Percent Load at Current Speed	0	Per Cent	0 - 255	1 Per Cent	FFFFh, -1d
40002	Actual Engine Per Cent Torque	0	Per Cent	-125 - 130	1 Per Cent	7FFFh, 32767d
40003	Engine Speed	0	RPM	0 - 8000	1 RPM	FFFFh, -1d
40004	Total Engine Hours Fraction	1	HRS	0.0 - 999.9	0.1 HRS	FFFFh, -1d
40005	Total Engine Thousands of Hours	x1000	HRS	0 - 65535	1000 HRS	FFFFh, -1d
40006	Electric Potential	1	VDC	0.0 - 3276.7	0.1 VDC	FFFFh, -1d
40007	Battery Potential Voltage (switched)	1	VDC	0.0 - 3276.7	0.1 VDC	FFFFh, -1d
40008	Engine Oil Level	1	Per Cent	0.0 - 102.0	0.1 Per Cent	FFFFh, -1d
40009	Coolant Level	1	Per Cent	0.0 - 102.0	0.1 Per Cent	FFFFh, -1d
40010	Fan Speed	0	Per Cent	0 - 100	1 Per Cent	FFFFh, -1d
40011	Total Fuel Used Fraction	1	Liters	0.0 - 999.9	0.1 Liters	FFFFh, -1d
40012	Total Fuel Used 1000's of Liters	x1000	Liters	0 - 65535	1000 Liters	FFFFh, -1d
40013	Engine Coolant Temperature	0	deg. C	-40 - 215	1 deg. C	7FFFh, 32767d
40014	Fuel Temperature	0	deg. C	-40 - 215	1 deg. C	7FFFh, 32767d
40015	Engine Oil Temperature	0	deg. C	-273 - 2007	1 deg. C	7FFFh, 32767d
40016	Engine Intercooler Temperature	0	deg. C	-40 - 215	1 deg. C	7FFFh, 32767d
40017	Fuel Delivery Pressure	0	Kpa	0 - 1020	1 Kpa	FFFFh, -1d
40018	Engine Oil Pressure	0	KPa	0 - 1020	1 KPa	FFFFh, -1d
40019	Coolant Pressure	0	KPa	0 - 2040	1 KPa	FFFFh, -1d
40020	Fuel Rate	1	Liters / Hr	0.0 - 3276.7	0.1 Liters / Hr	FFFFh, -1d
40021	Barometric Pressure	1	KPa	0.0 - 102.0	0.1 KPa	FFFFh, -1d
40022	Air Inlet Temperature	0	deg. C	-40 - 215	1 deg. C	7FFFh, 32767d
40023	Boost Pressure	0	KPa	0 - 510	1 KPa	FFFFh, -1d
40024	Intake Manifold Temperature	0	deg. C	-40 - 215	1 deg. C	7FFFh, 32767d
40025	Air Filter Differential Pressure	1	KPa	0.0 - 127.5	0.1 KPa	FFFFh, -1d
40026	Exhaust Gas Temperature	0	deg. C	-273 - 2007	1 deg. C	7FFFh, 32767d
40027	Transmission Oil Pressure	0	KPa	0 - 4080	1 KPa	FFFFh, -1d
40028	Transmission Oil Temperature	0	deg. C	-273 - 2007	1 deg. C	7FFFh, 32767d
40029	Injector Metering Rail 1 Pressure	2	Mpa	0.00 - 327.67	0.01 Mpa	FFFFh, -1d
40030	Injector Metering Rail 2 Pressure	2	Mpa	0.00 - 327.67	0.01 Mpa	FFFFh, -1d
40031	Auxiliary Temperature 1	0	deg. C	-40 - 210	1 deg. C	7FFFh, 32767d
40032	Auxiliary Pressure 1	0	KPa	0 - 4000	1 KPa	FFFFh, -1d
40033	Malfunction Indicator Lamp Status			1 = On, 0 = Off		FFFFh, -1d
40034	Red Stop Lamp Status			1 = On, 0 = Off		FFFFh, -1d
40035	Amber Stop Lamp Status			1 = On, 0 = Off		FFFFh, -1d
40036	Protect Lamp Status			1 = On, 0 = Off		FFFFh, -1d
40037	Future Use					
40038	Future Use					
40039	Future Use					
40040	Future Use					
40041	Percent Load at Current Speed	0	Per Cent	0 - 255	1 Per Cent	FFFFh, -1d
40042	Actual Engine Per Cent Torque	0	Per Cent	-125 - 130	1 Per Cent	7FFFh, 32767d
40043	Engine Speed	0	RPM	0 - 8000	1 RPM	FFFFh, -1d
40044	Total Engine Hours Fraction	1	HRS	0.0 - 999.9	0.1 HRS	FFFFh, -1d
40045	Total Engine Thousands of Hours	x1000	HRS	0 - 65535	1000 HRS	FFFFh, -1d
40046	Electric Potential	1	VDC	0.0 - 3276.7	0.1 VDC	FFFFh, -1d
40047	Battery Potential Voltage (switched)	1	VDC	0.0 - 3276.7	0.1 VDC	FFFFh, -1d
40048	Engine Oil Level	1	Per Cent	0.0 - 102.0	0.1 Per Cent	FFFFh, -1d
40049	Coolant Level	1	Per Cent	0.0 - 102.0	0.1 Per Cent	FFFFh, -1d
40050	Fan Speed	0	Per Cent	0 - 100	1 Per Cent	FFFFh, -1d
40051	Total Fuel Used Fraction	1	Gallons	0.0 - 999.9	0.1 Gallons	FFFFh, -1d
40052	Total Fuel Used 1000's of Gallons	x1000	Gallons	0 - 65535	1000 Gallons	FFFFh, -1d
40053	Engine Coolant Temperature	0	deg. F	-40 - 419	1 deg. F	7FFFh, 32767d
40054	Fuel Temperature	0	deg. F	-40 - 419	1 deg. F	7FFFh, 32767d
40055	Engine Oil Temperature	0	deg. F	-459 - 3645	1 deg. F	7FFFh, 32767d
40056	Engine Intercooler Temperature	0	deg. F	-40 - 419	1 deg. F	7FFFh, 32767d
40057	Fuel Delivery Pressure	0	PSI	0 - 147	1 PSI	FFFFh, -1d
40058	Engine Oil Pressure	0	PSI	0 - 147	1 PSI	FFFFh, -1d
40059	Coolant Pressure	0	PSI	0 - 295	1 PSI	FFFFh, -1d
40060	Fuel Rate	1	Gallons / Hr	0.0 - 3276.7	0.1 Gallons / Hr	FFFFh, -1d
40061	Barometric Pressure	1	PSI	0.0 - 14.7	0.1 PSI	FFFFh, -1d
40062	Air Inlet Temperature	0	deg. F	-40 - 419	1 deg. F	7FFFh, 32767d
40063	Boost Pressure	0	PSI	0 - 73	1 PSI	FFFFh, -1d
40064	Intake Manifold Temperature	0	deg. F	-40 - 419	1 deg. F	7FFFh, 32767d
40065	Air Filter Differential Pressure	1	PSI	0.0 - 18.5	0.1 PSI	FFFFh, -1d
40066	Exhaust Gas Temperature	0	deg. F	-459 - 3645	1 deg. F	7FFFh, 32767d
40067	Transmission Oil Pressure	0	PSI	0 - 591	1 PSI	FFFFh, -1d
40068	Transmission Oil Temperature	0	deg. F	-459 - 3645	1 deg. F	7FFFh, 32767d
40069	Injector Metering Rail 1 Pressure	0	PSI	0 - 32767	1 PSI	FFFFh, -1d
40070	Injector Metering Rail 2 Pressure	0	PSI	0 - 32767	1 PSI	FFFFh, -1d
40071	Auxiliary Temperature 1	0	deg. F	-40 - 410	1 deg. F	7FFFh, 32767d
40072	Auxiliary Pressure 1	0	PSI	0 - 580	1 PSI	FFFFh, -1d
40073	Malfunction Indicator Lamp Status			1 = On, 0 = Off		FFFFh, -1d
40074	Red Stop Lamp Status			1 = On, 0 = Off		FFFFh, -1d
40075	Amber Stop Lamp Status			1 = On, 0 = Off		FFFFh, -1d
40076	Protect Lamp Status			1 = On, 0 = Off		FFFFh, -1d
40077	Future Use					
40078	Future Use					
40079	Future Use					
40080	Future Use					
40081	Future Use					
40082	Future Use					
40083	Future Use					
40084	Future Use					
40085	Future Use					
40086	Future Use					
40087	Future Use					
40088	Future Use					
40089	Future Use					
40090	Future Use					
40091	Future Use					
40092	Future Use					
40093	Future Use					
40094	Future Use					
40095	Future Use					
40096	Future Use					
40097	Future Use					
40098	Future Use					
40099	Future Use					
40100	Future Use					

## DM1 Registers (Active Codes)

Register	Description	Decimal Places	Units	Range	Resolution per Bit	Value for data not available
40101	Number of Sets of Active Faults	0	NA	0 - 24	1	FFFFh, -1d
40102	Active SPN 1 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40103	Active SPN 1 (most significant word)					
40104	Active FMI 1	0	NA	0 - 31	1	FFFFh, -1d
40105	Active Occurrence Count 1	0	NA	0 - 127	1	FFFFh, -1d
40106	Active SPN 2 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40107	Active SPN 2 (most significant word)					
40108	Active FMI 2	0	NA	0 - 31	1	FFFFh, -1d
40109	Active Occurrence Count 2	0	NA	0 - 127	1	FFFFh, -1d
40110	Active SPN 3 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40111	Active SPN 3 (most significant word)					
40112	Active FMI 3	0	NA	0 - 31	1	FFFFh, -1d
40113	Active Occurrence Count 3	0	NA	0 - 127	1	FFFFh, -1d
40114	Active SPN 4 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40115	Active SPN 4 (most significant word)					
40116	Active FMI 4	0	NA	0 - 31	1	FFFFh, -1d
40117	Active Occurrence Count 4	0	NA	0 - 127	1	FFFFh, -1d
40118	Active SPN 5 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40119	Active SPN 5 (most significant word)					
40120	Active FMI 5	0	NA	0 - 31	1	FFFFh, -1d
40121	Active Occurrence Count 5	0	NA	0 - 127	1	FFFFh, -1d
40122	Active SPN 6 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40123	Active SPN 6 (most significant word)					
40124	Active FMI 6	0	NA	0 - 31	1	FFFFh, -1d
40125	Active Occurrence Count 6	0	NA	0 - 127	1	FFFFh, -1d
40126	Active SPN 7 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40127	Active SPN 7 (most significant word)					
40128	Active FMI 7	0	NA	0 - 31	1	FFFFh, -1d
40129	Active Occurrence Count 7	0	NA	0 - 127	1	FFFFh, -1d
40130	Active SPN 8 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40131	Active SPN 8 (most significant word)					
40132	Active FMI 8	0	NA	0 - 31	1	FFFFh, -1d
40133	Active Occurrence Count 8	0	NA	0 - 127	1	FFFFh, -1d
40134	Active SPN 9 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40135	Active SPN 9 (most significant word)					
40136	Active FMI 9	0	NA	0 - 31	1	FFFFh, -1d
40137	Active Occurrence Count 9	0	NA	0 - 127	1	FFFFh, -1d
40138	Active SPN 10 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40139	Active SPN 10 (most significant word)					
40140	Active FMI 10	0	NA	0 - 31	1	FFFFh, -1d
40141	Active Occurrence Count 10	0	NA	0 - 127	1	FFFFh, -1d
40142	Active SPN 11 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40143	Active SPN 11 (most significant word)					
40144	Active FMI 11	0	NA	0 - 31	1	FFFFh, -1d
40145	Active Occurrence Count 11	0	NA	0 - 127	1	FFFFh, -1d
40146	Active SPN 12 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40147	Active SPN 12 (most significant word)					
40148	Active FMI 12	0	NA	0 - 31	1	FFFFh, -1d
40149	Active Occurrence Count 12	0	NA	0 - 127	1	FFFFh, -1d
40150	Active SPN 13 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40151	Active SPN 13 (most significant word)					
40152	Active FMI 13	0	NA	0 - 31	1	FFFFh, -1d
40153	Active Occurrence Count 13	0	NA	0 - 127	1	FFFFh, -1d
40154	Active SPN 14 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40155	Active SPN 14 (most significant word)					
40156	Active FMI 14	0	NA	0 - 31	1	FFFFh, -1d
40157	Active Occurrence Count 14	0	NA	0 - 127	1	FFFFh, -1d
40158	Active SPN 15 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40159	Active SPN 15 (most significant word)					
40160	Active FMI 15	0	NA	0 - 31	1	FFFFh, -1d
40161	Active Occurrence Count 15	0	NA	0 - 127	1	FFFFh, -1d
40162	Active SPN 16 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40163	Active SPN 16 (most significant word)					
40164	Active FMI 16	0	NA	0 - 31	1	FFFFh, -1d
40165	Active Occurrence Count 16	0	NA	0 - 127	1	FFFFh, -1d
40166	Active SPN 17 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40167	Active SPN 17 (most significant word)					
40168	Active FMI 17	0	NA	0 - 31	1	FFFFh, -1d
40169	Active Occurrence Count 17	0	NA	0 - 127	1	FFFFh, -1d
40170	Active SPN 18 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40171	Active SPN 18 (most significant word)					
40172	Active FMI 18	0	NA	0 - 31	1	FFFFh, -1d
40173	Active Occurrence Count 18	0	NA	0 - 127	1	FFFFh, -1d
40174	Active SPN 19 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40175	Active SPN 19 (most significant word)					
40176	Active FMI 19	0	NA	0 - 31	1	FFFFh, -1d
40177	Active Occurrence Count 19	0	NA	0 - 127	1	FFFFh, -1d
40178	Active SPN 20 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40179	Active SPN 20 (most significant word)					
40180	Active FMI 20	0	NA	0 - 31	1	FFFFh, -1d
40181	Active Occurrence Count 20	0	NA	0 - 127	1	FFFFh, -1d
40182	Active SPN 21 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40183	Active SPN 21 (most significant word)					
40184	Active FMI 21	0	NA	0 - 31	1	FFFFh, -1d
40185	Active Occurrence Count 21	0	NA	0 - 127	1	FFFFh, -1d
40186	Active SPN 22 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40187	Active SPN 22 (most significant word)					
40188	Active FMI 22	0	NA	0 - 31	1	FFFFh, -1d
40189	Active Occurrence Count 22	0	NA	0 - 127	1	FFFFh, -1d
40190	Active SPN 23 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40191	Active SPN 23 (most significant word)					
40192	Active FMI 23	0	NA	0 - 31	1	FFFFh, -1d
40193	Active Occurrence Count 23	0	NA	0 - 127	1	FFFFh, -1d
40194	Active SPN 24 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40195	Active SPN 24 (most significant word)					
40196	Active FMI 24	0	NA	0 - 31	1	FFFFh, -1d
40197	Active Occurrence Count 24	0	NA	0 - 127	1	FFFFh, -1d
40198	Future Use					
40199	Future Use					
40200	Future Use					

## DM2 Registers (Stored Codes)

Register	Description	Decimal Places	Units	Range	Resolution per Bit	Value for data not available
40201	Number of Sets of Stored Faults	0	NA	0 - 24	1	FFFFh, -1d
40202	Stored SPN 1 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40203	Stored SPN 1 (most significant word)					
40204	Stored FMI 1	0	NA	0 - 31	1	FFFFh, -1d
40205	Stored Occurrence Count 1	0	NA	0 - 127	1	FFFFh, -1d
40206	Stored SPN 2 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40207	Stored SPN 2 (most significant word)					
40208	Stored FMI 2	0	NA	0 - 31	1	FFFFh, -1d
40209	Stored Occurrence Count 2	0	NA	0 - 127	1	FFFFh, -1d
40210	Stored SPN 3 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40211	Stored SPN 3 (most significant word)					
40212	Stored FMI 3	0	NA	0 - 31	1	FFFFh, -1d
40213	Stored Occurrence Count 3	0	NA	0 - 127	1	FFFFh, -1d
40214	Stored SPN 4 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40215	Stored SPN 4 (most significant word)					
40216	Stored FMI 4	0	NA	0 - 31	1	FFFFh, -1d
40217	Stored Occurrence Count 4	0	NA	0 - 127	1	FFFFh, -1d
40218	Stored SPN 5 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40219	Stored SPN 5 (most significant word)					
40220	Stored FMI 5	0	NA	0 - 31	1	FFFFh, -1d
40221	Stored Occurrence Count 5	0	NA	0 - 127	1	FFFFh, -1d
40222	Stored SPN 6 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40223	Stored SPN 6 (most significant word)					
40224	Stored FMI 6	0	NA	0 - 31	1	FFFFh, -1d
40225	Stored Occurrence Count 6	0	NA	0 - 127	1	FFFFh, -1d
40226	Stored SPN 7 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40227	Stored SPN 7 (most significant word)					
40228	Stored FMI 7	0	NA	0 - 31	1	FFFFh, -1d
40229	Stored Occurrence Count 7	0	NA	0 - 127	1	FFFFh, -1d
40230	Stored SPN 8 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40231	Stored SPN 8 (most significant word)					
40232	Stored FMI 8	0	NA	0 - 31	1	FFFFh, -1d
40233	Stored Occurrence Count 8	0	NA	0 - 127	1	FFFFh, -1d
40234	Stored SPN 9 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40235	Stored SPN 9 (most significant word)					
40236	Stored FMI 9	0	NA	0 - 31	1	FFFFh, -1d
40237	Stored Occurrence Count 9	0	NA	0 - 127	1	FFFFh, -1d
40238	Stored SPN 10 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40239	Stored SPN 10 (most significant word)					
40240	Stored FMI 10	0	NA	0 - 31	1	FFFFh, -1d
40241	Stored Occurrence Count 10	0	NA	0 - 127	1	FFFFh, -1d
40242	Stored SPN 11 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40243	Stored SPN 11 (most significant word)					
40244	Stored FMI 11	0	NA	0 - 31	1	FFFFh, -1d
40245	Stored Occurrence Count 11	0	NA	0 - 127	1	FFFFh, -1d
40246	Stored SPN 12 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40247	Stored SPN 12 (most significant word)					
40248	Stored FMI 12	0	NA	0 - 31	1	FFFFh, -1d
40249	Stored Occurrence Count 12	0	NA	0 - 127	1	FFFFh, -1d
40250	Stored SPN 13 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40251	Stored SPN 13 (most significant word)					
40252	Stored FMI 13	0	NA	0 - 31	1	FFFFh, -1d
40253	Stored Occurrence Count 13	0	NA	0 - 127	1	FFFFh, -1d
40254	Stored SPN 14 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40255	Stored SPN 14 (most significant word)					
40256	Stored FMI 14	0	NA	0 - 31	1	FFFFh, -1d
40257	Stored Occurrence Count 14	0	NA	0 - 127	1	FFFFh, -1d
40258	Stored SPN 15 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40259	Stored SPN 15 (most significant word)					
40260	Stored FMI 15	0	NA	0 - 31	1	FFFFh, -1d
40261	Stored Occurrence Count 15	0	NA	0 - 127	1	FFFFh, -1d
40262	Stored SPN 16 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40263	Stored SPN 16 (most significant word)					
40264	Stored FMI 16	0	NA	0 - 31	1	FFFFh, -1d
40265	Stored Occurrence Count 16	0	NA	0 - 127	1	FFFFh, -1d
40266	Stored SPN 17 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40267	Stored SPN 17 (most significant word)					
40268	Stored FMI 17	0	NA	0 - 31	1	FFFFh, -1d
40269	Stored Occurrence Count 17	0	NA	0 - 127	1	FFFFh, -1d
40270	Stored SPN 18 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40271	Stored SPN 18 (most significant word)					
40272	Stored FMI 18	0	NA	0 - 31	1	FFFFh, -1d
40273	Stored Occurrence Count 18	0	NA	0 - 127	1	FFFFh, -1d
40274	Stored SPN 19 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40275	Stored SPN 19 (most significant word)					
40276	Stored FMI 19	0	NA	0 - 31	1	FFFFh, -1d
40277	Stored Occurrence Count 19	0	NA	0 - 127	1	FFFFh, -1d
40278	Stored SPN 20 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40279	Stored SPN 20 (most significant word)					
40280	Stored FMI 20	0	NA	0 - 31	1	FFFFh, -1d
40281	Stored Occurrence Count 20	0	NA	0 - 127	1	FFFFh, -1d
40282	Stored SPN 21 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40283	Stored SPN 21 (most significant word)					
40284	Stored FMI 21	0	NA	0 - 31	1	FFFFh, -1d
40285	Stored Occurrence Count 21	0	NA	0 - 127	1	FFFFh, -1d
40286	Stored SPN 22 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40287	Stored SPN 22 (most significant word)					
40288	Stored FMI 22	0	NA	0 - 31	1	FFFFh, -1d
40289	Stored Occurrence Count 22	0	NA	0 - 127	1	FFFFh, -1d
40290	Stored SPN 23 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40291	Stored SPN 23 (most significant word)					
40292	Stored FMI 23	0	NA	0 - 31	1	FFFFh, -1d
40293	Stored Occurrence Count 23	0	NA	0 - 127	1	FFFFh, -1d
40294	Stored SPN 24 (least significant word)	0	NA	0 - 524287	1	FFFFFFFFh, -1d
40295	Stored SPN 24 (most significant word)					
40296	Stored FMI 24	0	NA	0 - 31	1	FFFFh, -1d
40297	Stored Occurrence Count 24	0	NA	0 - 127	1	FFFFh, -1d
40298	Future Use					
40299	Future Use					
40300	Future Use					

## SAE J1939 MurphyLink System Implementation of J1939 Parameters

Source: SAEJ1939-71 Surface Vehicle Recommended Practice

SAE J1939 Section	Description	PGN	Parameter	Display Value
5.3.6	Elec Eng Cont #2 - EEC2	61443	Accelerator Pedal Position	Throttle
			Percent Load at Current RPM	Load@RPM
5.3.7	Elec Eng Cont #1 - EEC1	61444	Actual engine % torque	Eng_Torg
			Engine Speed	Eng RPM
5.3.14	Vehicle Distance	65248	Trip Distance	TripDist
			Total Vehicle Distance	Veh Dist
5.3.19	Engine hours, Revolutions	65253	Total Engine Hours	Eng Hrs
5.3.23	Fuel Consumption	65257	Trip Fuel	TripFuel
			Total Fuel Used	FuelUsed
5.3.28	Engine Temperature	65262	Engine Coolant Temp	Cool Tmp
			Fuel Temperature	Fuel Tmp
			Engine Oil Temperature	Oil Tmp
			Engine Intercooler Temperature	Intc Tmp
5.3.29	Engine Fluid Level/Pressure	65263	Fuel Delivery Pressure	FuelPres
			Engine Oil Level	Oil Lvl
			Engine Oil Pressure	Oil Pres
			Coolant Pressure	CoolPres
			Coolant Level	Cool Lvl
5.3.31	Cruise Control /Vehicle Speed	65265	Wheel Based Vehicle Speed	Veh Spd
5.3.32	Fuel Economy	65266	Fuel Rate	FuelRate
			Instantaneous Fuel Economy	FuelEcon
			Average Fuel Economy	Avg Econ
5.3.35	Ambient Conditions	65269	Barometric Pressure	BaroPres
			Air Inlet Temperature	AirInTmp
5.3.36	Inlet/Exhaust Conditions	65270	Boost Pressure	Bst Pres
			Intake Manifold Temp	Mani Tmp
			Air Filter Differential Pressure	AirDifPr
			Exhaust Gas Temperature	Exh Tmp
5.3.37	Vehicle Electrical Power	65271	Electrical Potential (Voltage)	Sys Volt
			Battery Pot. Voltage (Switched)	Bat Volt
5.3.38	Transmission Fluids	65272	Transmission Oil Pressure	TranPres
			Transmission Oil Temperature	Tran Tmp
5.3.46	Engine Fluid Level/Pressure #2	65243	Injector Metering Rail 1 Pres	InjPres1
			Injector Metering Rail 2 Pres	InjPres2
5.3.58	Fan Drive	65213		Fan Spd
5.3.17	Diagnostic Messages	65226	DM1 - Active Diagnostic	SrvcCode
		65227	DM2 - Previously Act Diag Codes	StorCode
		65228	DM3 - Diagnostic Clear	
5.3.17	Engine Conf.	65251	Engine Configuration	Eng Conf

**Warranty** - A limited warranty on materials and workmanship is given with this Murphy product.  
A copy of the warranty may be viewed or printed by going to [www.murphybynovationcontrols.com/warranty](http://www.murphybynovationcontrols.com/warranty)

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