

Product Manual

Engine Display & Control Panel J1939 Engines



Part Number: MVP-A3133
Revision: 1.0

TABLE OF CONTENTS

INSTALLATION INFORMATION.....2

MVP CONNECTOR INFORMATION.....3

PANEL CONNECTOR INFORMATION.....4

MENU SYSTEM.....5

 MENU ACCESS, EXIT AND NAVIGATION

 MENUS TO VIEW INFORMATION

 MENUS TO CONFIGURE MODULE SETTINGS

ENGINE ALARMS, CODES AND MESSAGES.....9

 ENGINE ECU ALARMS/DE-RATE/SHUT DOWNS

 ALARM ANNUNCIATION AND CODE READER

 PANEL INDICATION LAMPS

 ACTIVE AND STORED ENGINE ECU CODES

ENGINE PARAMETERS.....11

CONTROL PANEL DIGITAL INPUTS.....12

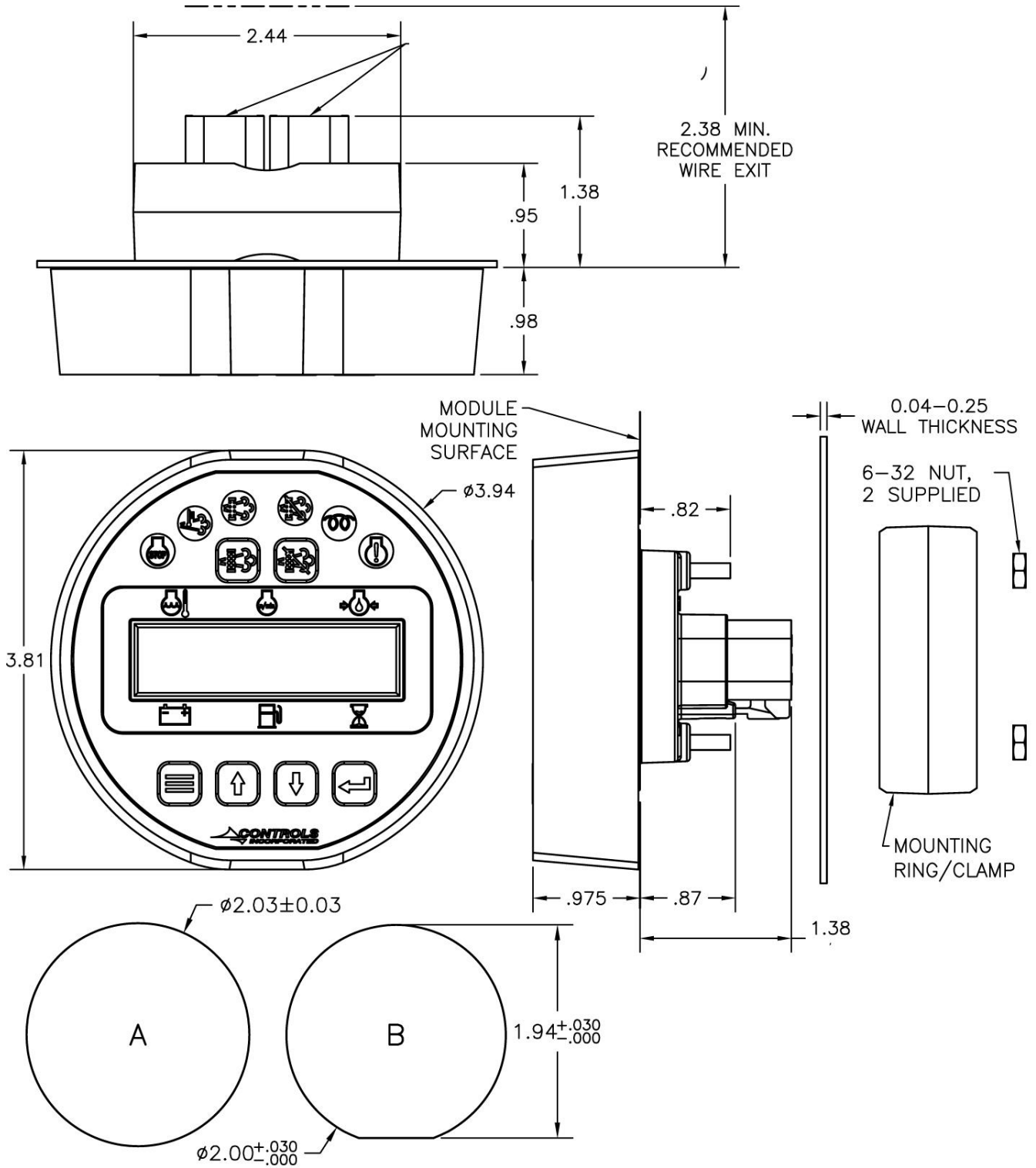
PRIOR TO ENGINE START.....14

 THROTTLE SETTINGS

CONTROL PANEL SPECIFIC ALARMS AND SHUT DOWNS.....15

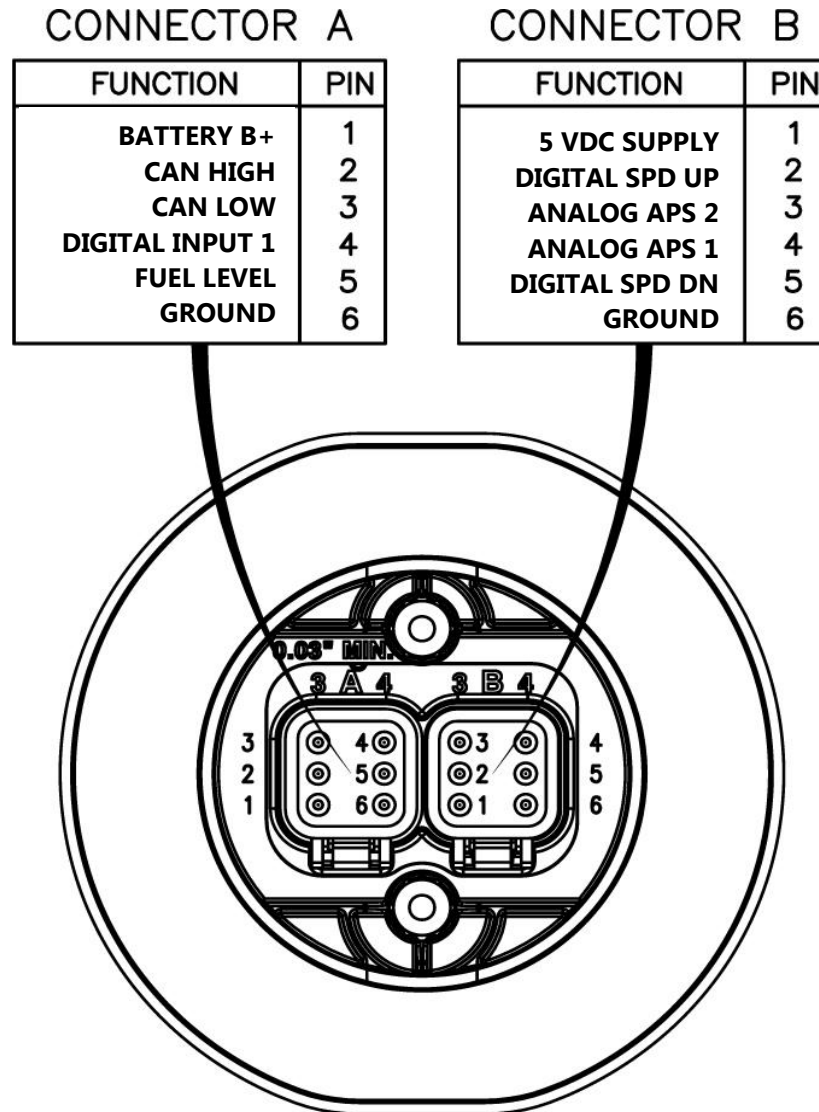
 CONTROL PANEL SPECIFIC SAFETY ALARMS

INSTALLATION INFORMATION



MOUNTING HOLE REQUIREMENTS (A OR B)

CONNECTOR INFORMATION

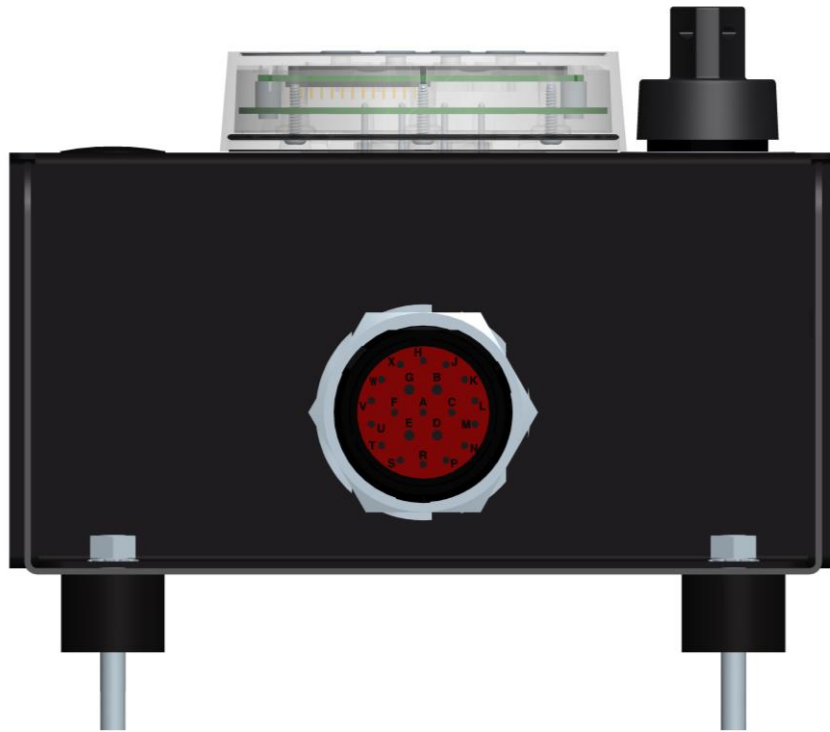


Connector B provides inputs for external throttle options:

- Digital Momentary Increase & Decrease (Turtle/Hare Switch)
 - Pin 2 (Momentary Speed Increase, Close to Ground)
 - Pin 5 (Momentary Speed Decrease, Close to Ground)
- External APS Throttle Knob/Pedal (0.5VDC to 4.5 VDC)

<u>APS1</u>	<u>APS2</u>
▪ 5VDC Supply.....Pin 1	Pin 1
▪ Input Signal.....Pin 4	Pin 3
▪ Ground.....Pin 6	Pin 6

ENGINE HARNESS CONNECTOR INFORMATION



21 Pin Connector

Pin	Function
B	Battery Positive
E	Battery Negative
G	Key On Power
D	Crank Signal
V	J1939 High
U	J1939 Low
J	Alternator Excite
L	Analog Throttle Emulator
C	Analog Throttle Emulator
M	Analog Throttle Emulator
R	Digital Throttle Emulator
S	Digital Throttle Emulator

To Enter Menu System

Hold MENU button and press ENTER button.

Menu Navigation

Press MENU button to scroll menu options.

Press UP arrow button to enter menu.

Press DOWN arrow button to reverse.

Exit Menu System

Hold MENU button and press ENTER button.

To Change a Setting

Press ENTER button to bring up brackets [].

Press UP arrow button and DOWN arrow button to change setting.

Press ENTER button to make selection, brackets disappear.

Recycle key to the OFF position after changing a setting.

Main Menu

Main Menu	Sub Menu
Active Engine Fault Codes	View/Scroll Active Fault Codes
Stored Engine Fault Codes	View/Scroll Stored Fault Codes
Operation Event Log	View Last 32 Events (Start, Stop, Alarms)
Alarm Event Log	View Last 32 ECU and Controller Alarms
Engine Parameters (View)	Total Hours
	Requested TSC
	Load at RPM
	Engine Torque
	Coolant Temp
	Fuel Rate
	Manifold Temperature
	Potential Voltage
Engine Identification	Engine Model # View
	Engine Serial # View
Module Information	Control Unit Part# View
	Control Unit Software Version View

Viewing Menu

Controller Setup (PASSWORD PROTECTED)	Parameter Configuration	(1)
	Input Configuration	(2)
	Throttle Configuration	(3)
	Engine Safety Configuration	(4)
	Module Configuration	(5)

Configuration Menu

To access the controller setup menus, a password is required.

Configuration Menus

(1) Parameter Configuration	Fuel Level	Sender Type (S-W, VDO)	Default = S-W
		Fuel Channel	Plug A Pin 5
	Voltage	Source (Internal, J1939)	Default = Electronic-J1939
	Hour Meter	Source (Internal, Engine ECU)	Default = Engine ECU
	APS1	OOR Pre Alarm (Always, Run, Off)	Default = Off
		Minimum (0.5 – 4.5)	Default = 0.5 Volts
		Maximum (0.5 – 4.5)	Default = 4.5 Volts
		Reading	Actual
		Learned Minimum	Actual
		Op. Range Tolerance	Default = 20%
	APS2	Learned Reset	Default = No
		Validation (On, Off)	Default = On
		Validation Tolerance	Default = 20%
		OOR Pre Alarm (On, Always, Off)	Default = Off
		Minimum Voltage (0.5 – 4.5)	Default = 0.5 Volts
		Maximum Voltage (0.5 – 4.5)	Default = 4.5 Volts
		Reading	Actual
		Op. Range Tolerance	Default = 20%

(2) Input Configuration	Digital A4 Set-Up (NO/NC, Action, Message, Check)
	Digital B2 Action (Default = Throttle Up)
	Digital B5 Action (Default = Throttle Down)

(3) Throttle Configuration	Throttle Type (Default = TSC Vernier)
	TSC Minimum Speed (Default = 1000 RPM)
	TSC Maximum Speed (Default = 3600 RPM)
	TSC Bump Speed (Default = 100 RPM)
	TSC Ramp Rate (Default = 1000 RPM/Sec.)
	Throttle Curve (Default = Linear)
	Multi-state Speed #1 (Default = 1000 RPM)
	Multi-state Speed #2 (Default = 1000 RPM)
	Multi-state Speed #3 (Default = 1000 RPM)
	Multi-state Speed #4 (Default = 1000 RPM)

(4) Engine Safety Configuration	Sender Check By-Pass (Default = 0:10)
	Oil Pressure Check (Default = Run)
	Oil Pressure Alarm Action (Default = Shutdown)
	Oil Pressure Alarm Delay (Default = 0:05)
	Temperature Check (Default = Run)
	Low Temperature Pre-Alarm (Default = 0 Deg.)
	Low Temperature Alarm (Default = 0 Deg.)
	High Temperature Pre-Alarm (Default = 240 Deg.)
	High Temperature Alarm (Default = 240 Deg.)
	Coolant Temperature Action (Default = Shutdown)
	Temperature Alarm Delay (Default = 0:05)
	Intake Temperature Check (Default = Run)
	Low Intake Temperature Pre-Alarm (Default = 0 Deg.)
	Low Intake Temperature Alarm (Default = 0 Deg.)
	High Intake Temperature Pre-Alarm (Default = 180 Deg.)
	High Intake Temperature Alarm (Default = 180 Deg.)
	Intake Alarm Action (Default = Shutdown)
	Intake Alarm Delay (Default = 0:05)
	Speed Limit (Default = 1600 RPM)
	Torque Derate Limit (Default = 50%)
Low Oil Pressure Pre-Alarm (Default = 0 PSI)	
Low Oil Pressure Alarm (Default = 1 PSI)	
(5) Module Configuration	Display Units (Default = English)
	Pre-Alarms Displayed (Default = 3)
	Clear Operation Log (Default = No)
	Clear Alarm Log (Default = No)

ENGINE ALARMS, CODES AND MESSAGES

Engine ECU Alarm/De-Rate/Shut Downs

It is important to understand panel operation with respect to engine safety protections, alarms, and fault codes. The panel operates with J1939 engines. These engines have an ECU (engine control unit) which is essentially a computer that runs the engine. When engine parameters are out of normal operating ranges, the ECU takes specific actions which can include the following:

- 1) Broadcast a trouble code
- 2) Broadcast a red or yellow lamp
- 3) De-rate the engine
- 4) Shut down the engine
- 5) Turn on alarm horn

It is the engine ECU that de-rates or shuts down the engine when it is not operating within normal parameters. This includes more common shut downs like high engine temperature and low oil pressure but can encompass a large range of parameters depending on the ECU.

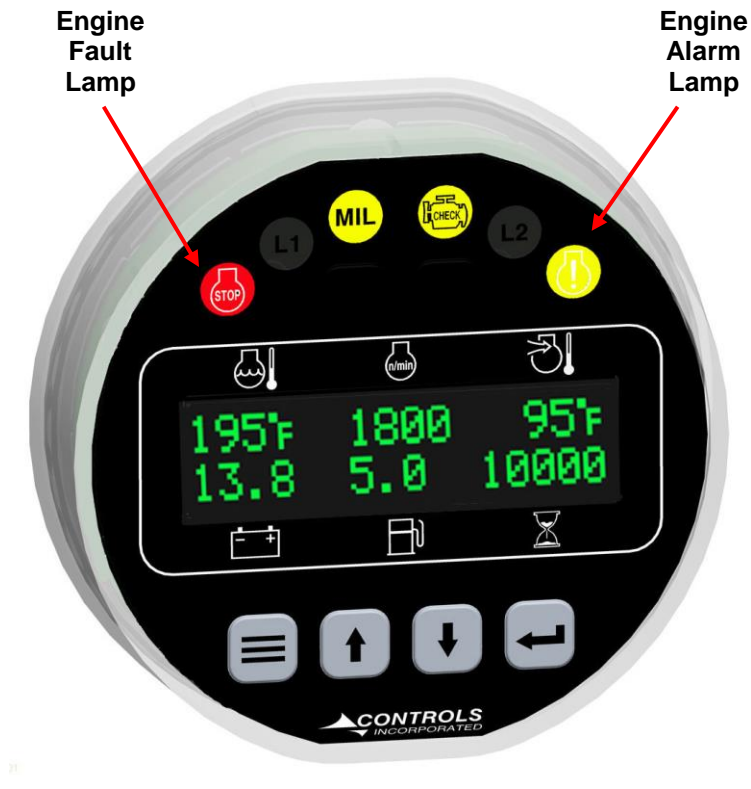
Alarm Annunciation and Code Reader

This panel is configured to operate with standard J1939 engines where engine de-rate and shutdowns are managed by the engine ECU. The panel communicates with the engine ECU and serves as a trouble code reader. When the engine ECU broadcasts a trouble code (called an SPN.FMI code) the panel does the following:

- 1) Illuminate the appropriate LED indicator lamp
 - a. Yellow Lamp = Alarm
 - b. Red Lamp = Engine Shut Down
- 2) Displays the trouble code (standard SPN.FMI code)
- 3) Displays a code description on the LCD screen
- 4) Displays the occurrence count of the code



Indicator Lamps



Active and Stored Engine ECU Codes

The panel also provides the ability to check the engine ECU for all ACTIVE and STORED engine ECU codes. These codes can be viewed via the Active Codes and Stored Codes menus.

ENGINE PARAMETERS

CAN Bus Communication

This module communicates to the engine ECU via the J1939 CAN Bus network. This is a two wire connection to the engine ECU. Engine information and alarm codes are broadcast over the CAN bus from the engine ECU to the controller display. And, the controller communicates throttle commands to the engine ECU over the CAN bus.

Engine Parameter Viewing

The module has an Engine Parameters viewing menu where the operator may observe the current conditions of the engine as reported by the engine ECU. The available parameters are listed below and can be found in the viewing menus.

Engine Parameters	
	Total Hours
	Requested TSC
	Load at RPM
	Engine Torque
	Coolant Temp
	Fuel Rate
	Manifold Temperature
	Potential Voltage

CONTROL PANEL DIGITAL INPUTS

The panel has three digital inputs with one available to monitor other components, senders or signals. This input can be used for a number of purposes including alarms and shut downs.

Input	Heading	Default	Options	Connector	Pin
Digital A4	Normally	Open	Open / Closed	A	4
	Action	None	See Note 1		
	Message	None	See Note 1		
	Check	Always	Off / Always / Run		
Digital B2	Action	Throttle Up	None	B	2
Digital B5	Action	Throttle Down	None	B	5

Note 1:

Message options available for Digital A4:

- | | |
|----------------------|--------------------------------|
| 1) None | 12) Low Pump Oil |
| 2) Custom | 13) Low Fuel Level |
| 3) Low Water | 14) Override Active |
| 4) Low Oil | 15) Polish Filter |
| 5) Low Engine Oil | 16) Low Hydraulic Fluid |
| 6) Hi Temperature | 17) Vacuum High |
| 7) Low Pressure | 18) High Hydraulic Temperature |
| 8) External Shutdown | 19) Inlet Pressure Loss |
| 9) E-Stop | 20) Pipe Pressure Alarm |
| 10) Remote E-Stop | 21) Low Coolant Level |
| 11) High Pump Temp | 22) Air Filter |

Action options available for Digital A4:

- 1) Alarm – Engine shutdown when active with display message as assigned. A red lamp will also be illuminated.
- 2) Pre Alarm – Warning message will be displayed along with a yellow lamp when active.
- 3) Soft Alarm – Recoverable Alarm. Engine will shut down as soon as this input is tripped, but will recover to running if the condition is cleared quickly enough.
- 4) None – Set to “None” when no functionality is required.

Digital Input Function Activation

- 1) Off / Always / Run – Describes when the parameter will be monitored for alarm conditions. Run refers to when the engine is running. Off disables the alarm conditions. Always enables the alarm constantly regardless of engine state.
- 2) Alarm Delay – The time period, after Sender Check Bypass, that the parameter must be on the alarm condition before the alarm becomes latched.

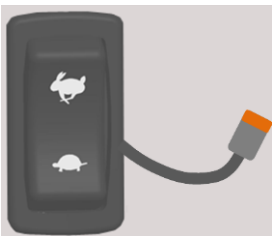
Note: Activation of the digital function requires a ground signal to Connector A, Pin-4.

Digital B Port Options

- 1) B2 – Used to attach an external switch for throttle control. Default is Throttle Up
- 2) B4 – Used to attach an external switch for throttle control. Default is Throttle Down

A Turtle/Hare rocker switch and harness is included on this panel. This switch and harness is specifically made to plug into port B of the MVP Module for external throttle control.

Part Number 70-0402-1



Prior to starting the engine, select the proper throttle control mode and parameters required for application.

Throttle Settings

The following **bolded** settings are required for manual (and automatic) operation in the Throttle Configuration menu.

Throttle Configuration	Throttle Type Selection
	TSC Minimum Speed
	TSC Maximum Speed
	TSC Bump Speed
	TSC Ramp Rate
	Throttle Curve Selection
	Multistate Speeds

Manual Throttle Options

1) Vernier Throttle

Vernier throttle is standard up and down throttle between the minimum and maximum selections. The ramp rate is the rate of acceleration in rpm's per second. The control panel uses J1939 throttle, also called "torque speed control" or TSC1. *This is the most commonly used throttle option.*

2) Multistate Throttle

Multistate throttle provides for one, two, three or four specific operating speeds. Pressing the up and down buttons adjusts engine speed between the selected multistate speed selections.

3) High/Low

Engine accelerates to the Max speed setting with the UP button is pressed. When the UP button is released, the engine goes back to idle speed.

4) Analog Position Sensor

This throttle type requires the MVP to be connected to an aftermarket Analog Position Sensor via plug B pins 3 and 4. The APS Input #1 to pin 4 provides throttle control while APS Input #2, pin 3 provides throttle verification when used. The maximum voltage range for the APS sensor is 0.5 – 4.5v for APS1 and APS2 inputs.

CONTROL PANEL SPECIFIC ALARMS AND SHUT DOWNS

The panel has its own engine safety alarms and shut downs that can be enabled. These alarms and shut downs are managed by the control panel independent from the engine ECU. The available options are listed below and can be accessed via the Engine Safety Configuration menu.

Each alarm must be enabled in the Engine Safety Configuration menu to activate.

Heading	Default	Range	Units
Sender Check Bypass	0:10	0:05 – 1:00	Min:Sec
Oil Pressure Check	Run	Off / Always / Run	
Oil Pressure Alarm Action	Shutdown	See Note #3	
Oil Press Alarm Delay	0:05	0:01 – 1:40	Sec
Temperature Check	Run	Off / Always / Run	
Low Temp Pre Alarm	0	0 - 240	Deg F
Low Temp Alarm	0	0 - 240	Deg F
High Temp Pre Alarm	220	0 - 240	Deg F
High Temp Alarm	230	0 - 240	Deg F
Coolant Temperature Action	Shutdown	See Note #3	
Temp Alarm Delay	0:05	0:01 – 1:40	Min:Sec
Intake Temp Check	Run	Off / Always / Run	
Low Intake Temp Pre Alarm	0	0 - 240	Deg F
Low Intake Temp Alarm	0	0 - 240	Deg F
High Intake Temp Pre Alarm	180	0 - 240	Deg F
High Intake Temp Alarm	180	0 - 240	Deg F
Intake Alarm Action	Shutdown	See Note #3	
Intake Alarm Delay	0:05	0:01 – 1:40	Sec
Speed Limit	1600	650-4000	RPM
Torque Derate	50	0 - 100	%
Low Oil Pressure Pre-Alarm	0	0 - 100	PSI
Low Oil Pressure Alarm	1	0 - 100	PSI

NOTES:

- 1) Off / Always / Run – Describes when the parameter will be monitored for alarm conditions. Run refers to when the engine is running. Off disables the alarm conditions. Always enables the alarm constantly regardless of engine state.
- 2) Alarm Delay – The time period, after Sender Check Bypass, that the parameter must be on the alarm condition before the alarm becomes latched.
- 3) Alarm Action – The disposition of the engine once the alarm has been activated and the delay period has expired. Available options are:
 - A) Shutdown
 - B) Force to Idle
 - C) Speed Limit
 - D) Torque Derate
 - E) Disabled