P/N: MN10069-00

M154L series — Kohler T4F Control Panel
for Electronically Governed Engines

Sealed Keyswitch

Throttle

L00 Series

L15 Series

L10 Series

L20 Series

Installation / User Manual
M154L Series Controls – Kohler T4F with No After Treatment

MBW Technologies, LLC

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Warranty Return Procedure:
To obtain warranty service, contact MBW Technologies, LLC Technical Support Department at (267) 932-8573 x341 or email support@mbwtech.com to describe problem and determine appropriate action.
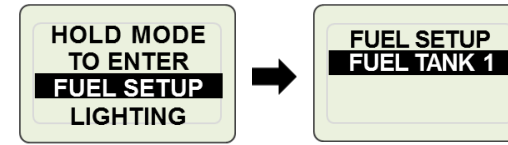
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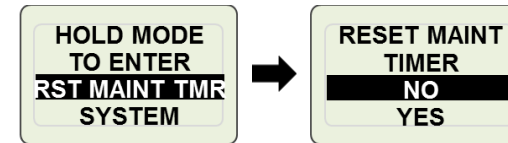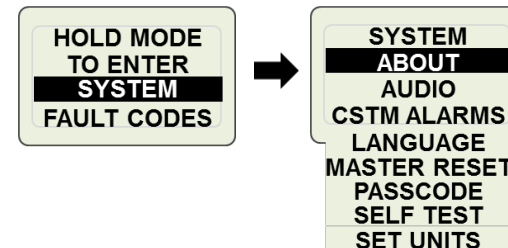
System

Appendix C - Menu Overview

Main Menu

```
COOLNT TMP        HOLD MODE
192 °F        ⟹    TO ENTER
                  FAULT CODES
                  CONTRAST
                  DISPLAY
                  ENGINE
                  FUEL SETUP
                  LIGHTING
                  RST MAINT TMR
                  M300DP MODULE
                  SYSTEM
```

Fault Codes

```
HOLD MODE          FAULT CODES
TO ENTER      ⟹    VIEW
FAULT CODES
CONTRAST
```

Contrast Menu

```
HOLD MODE          ADJUST
TO ENTER      ⟹    LCD
CONTRAST           CONTRAST
DISPLAY            PRESS ▼ OR ▲
```

Display Menu

```
HOLD MODE          DISPLAY
TO ENTER      ⟹    # OF SCREENS
DISPLAY            SCREEN SETUP
ENGINE             LINE 2 DATA
                   AUTO SCROLL
```

Engine Menu

```
HOLD MODE          ENGINE
TO ENTER      ⟹    THROTTLE TYPE
ENGINE             OIL PRESS SRC
LIGHTING           SET MIN RPM
                   SET MAX RPM
                   MAINT TIMER
                   SHUTDOWN
```

System Startup

RPM Gage
System ICONS
Throttle Increment Button
Controller Display
Throttle Decrement Button
Multi-Color Backlight Display
Keyswitch
Navigation Keypad
Expansion Slot

Powering the System

The M154L Control Panel is powered from the engine battery connection via the engine harness connector. Make sure the engine harness is connected to the Control Panel before proceeding. To power the system turn the key switch to the "ON" position. This will activate the control panel and apply power to the engine ECU.

When powered the control panel digital display will show an introductory splash screen showing product model number, system revision level and date. During this time a system self-check will be performed and the tachometer needle will complete a full sweep of the dial range. This will take approximately 5 seconds at which time the LCD display will present the default runtime data screen.

As shipped from the factory the default runtime display is configured to the Air Temperature. (See display bottom right).
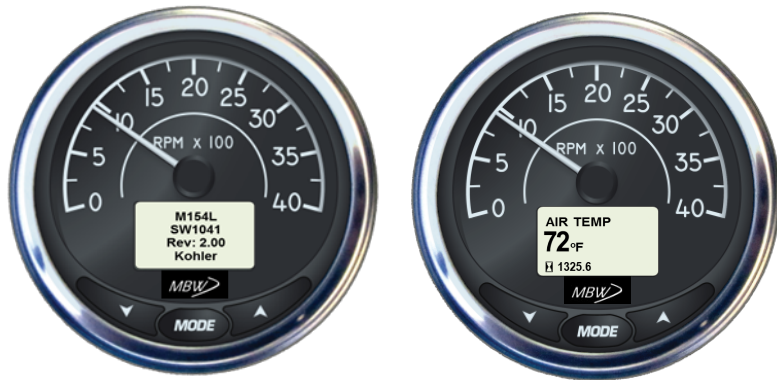
Should the control panel sound an audible alarm OR the digital display indicate a fault condition do not start the engine. Review the fault condition and proceed to correct the fault. See Fault section of this manual for details on system faults.

Starting the Engine

To start the engine, turn the key switch to the "Start" position. Should a fault condition exist the engine ECU may prevent the engine from starting. If the user has connected the external engine shutdown and the input is active this will also prevent the engine from starting. All fault conditions will be indicated by the digital display. The display will indicate the active fault(s) by presenting a pop-up graphic describing the fault condition.

Controlling Engine Speed

When the engine is started, the engine speed will be set to the engine minimum speed setting. To change the engine speed toggle the throttle control ("Fast-Rabbit / Slow-Turtle") switch to reach the desired speed setting. The engine speed cannot be commanded below the minimum setting or above the maximum speed setting. See section Min/Max Engine speeds for more details.

Engine Data

As shipped from the factory, the M154L contains a Default Viewing list which can be viewed by the operator by pressing the "▼" and "▲" buttons from the runtime menu. The Default Viewing list is in alphabetical order.

The Display Format section of this manual describes how to add and change displays in the Default Viewing list by selecting displays from the System Display list. See the Default Viewing list and the System Display list in Appendix B.
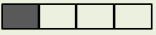
The Auto Scroll feature allows the LCD can be configured to rotate through all data parameters automatically.

System Display List

AIR TEMP 72°F	BAROMETER 29.9 INHG	BATTERY 12.4 V
Screen #1	Screen #2	Screen #3
BATTRY SW 12.2 V	COOLNT TMP 192 °F	ENGINE HRS 38.2 HRS
Screen #4	Screen #5	Screen #6
ENGINE LOAD 65 %	ENG TORQUE 130 %	FUEL RAIL 1 15100 PSI
Screen #7	Screen #8	Screen #9
FUEL RATE 3.1 GPH	FUEL TANK 1	FUEL TEMP 126 °F
Screen #10	Screen #11	Screen #12
INTAKE MFLD 22.0 PSI	MAINTNANCE 2.1 HRS	MNFLD TEMP 126 °F
Screen #13	Screen #14	Screen #15
OIL PRESS 65 PSI	REQ RPM 1000	RPM 1000 RPM
Screen #16	Screen #17	Screen #18

Appendix B – Display List

Default Viewing List

AIR TEMP	BAROMETER	BATTERY
72°F	**29.9**INHG	**12.4**V
Screen #1	Screen #2	Screen #3

BATTRY SW	COOLNT TMP	ENGINE HRS
12.2V	**192**°F	**38.2**HRS
Screen #4	Screen #5	Screen #6

ENGINE LOAD	ENG TORQUE	FUEL RAIL 1
65%	**130**%	**15100**PSI
Screen #7	Screen #8	Screen #9

FUEL RATE	FUEL TANK 1	FUEL TEMP
3.1GPH	▮☐☐☐	**126**°F
Screen #10	Screen #11	Screen #12

INTAKE MFLD	MAINTNANCE	MNFLD TEMP
22.0PSI	**2.1**HRS	**126**°F
Screen #13	Screen #14	Screen #15

OIL PRESS	REQ RPM	RPM
65PSI	**1000**	**1000**RPM
Screen #16	Screen #17	Screen #18

The panel round gauges provide constant viewing of important system parameters. The master control gauge provides engine speed data while oil pressure, coolant temperature, system voltage and fuel level are provided with the digital 2" gauges.

Default Startup Display

To configure a particular display as the default startup display, access the desired display from the viewing list and leave active for 5 minutes. The M154L system will automatically set this display as the default display.

AIR TEMP
72°F
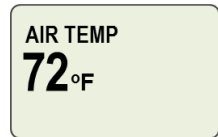
Alarm Functionality

All active system events (faults and warnings) are displayed on the LCD screen. Critical faults are backlight in Red. Warnings are backlight in Amber. Fault codes are accessed from the "Fault Codes" entry in the main menu. When a system fault occurs the display will activate a pop-up window describing the active fault condition and sound an audible tone. This pop-up will overlay on top of the currently active screen.

To acknowledge an active fault, press and hold the Mode button for greater than 1 second. This will remove the pop-up graphic and silence the audible fault indication.

System alarms (active and stored) can be viewed from the "FAULT CODES" menu. See Fault Codes Section for more detail.

System I/O Indicators

The M154L provides constant monitoring of critical system inputs and indicates the status of these inputs on the controller display. The presence of the ICON indicates the input is active.
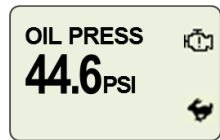
Position 1

🔧 Check Engine Alarm/Stop

🔧 Check Engine Warning

🛑 Engine Shutdown via
ECU External Input 1

🛑 Engine Shutdown via
ECU External Input 2

🔧 External Engine Shutdown

Position 2

🐇 Rabbit Throttle Status

🐢 Turtle Throttle Status

⏱ Wait to Start

🔋 Charge Status

💧 Water in Fuel

Note: Charge Indicator and Engine Shutdown inputs will not generate an alarm indication when engine is not running. However, ICONS will activate if input is active and engine is not running.

Menu Navigation

The Mode Button is multi-functional and is used as an escape and enter key. When the Mode key is pressed for less than 1 second it is considered an escape action. When pressed for greater than 1 second is considered an enter function. For example, to enter a menu selection or save an entered value the button must be pressed and held for greater than 1 second. When escaping a menu selection, momentary Mode Button presses are used. The only exception to these actions is entering the main menu. From any runtime data display screen a momentary press of the Mode Button will activate the main menu.

Main Menu

The Main Menu allows the user to access all areas of the M154L Control System. To access the Main Menu press the Mode button. To access menu items highlight the desired selection using the "▼" or "▲" keys and press & hold the Mode button for 1 second.

HOLD MODE
TO ENTER
FAULT CODES
CONTRAST
DISPLAY
ENGINE
FUEL SETUP
LIGHTING
RST MAINT TMR
M300DP MODULE
SYSTEM
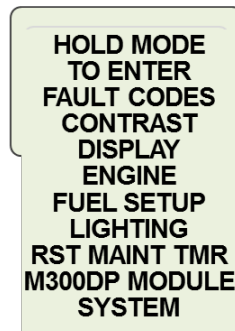
Appendix A – Data Supported

Description	Identifier	PGN	SPN
Active DTCs	DM1	65226	
Air Temp	AMB	65269	171
Barometer	AMB	65269	108
Battery	VEP	65271	168
Battery Potential Switched	VEP	65271	158
Coolant Temperature	ET1	65262	110
Engine Hours	HOURS	65253	247
Engine Load	EEC2	61443	92
Engine Torque	EEC1	61444	513
Fuel Level*	DD	65276	96
Fuel Rail #1 Pressure	EFL/P2	65243	157
Fuel Rate	LFE	65266	183
Fuel Temperature	ET1	65262	174
Intake Manifold Pressure	IC1	65270	102
Manifold Temp	IC1	65270	105
Oil Pressure*	EFL/P1	65263	100
Previously Active DTCs	DM2	65227	
RPM	EEC1	61444	190
Throttle Control	TSC1	0000	

* Also available via an analog input

Troubleshooting Guide

Symptom	Action
Key "ON"; No display or alarm sounded	▪ Verify Battery is connected and battery switch, if installed, is in "ON" position. ▪ Check engine fuse. If fuse blown check engine wiring. ▪ Check engine harness connection at control panel. ▪ Reset circuit breaker
Key "ON"; No display or alarm sounded; Tachometer backlight flashing; No throttle control.	▪ Check engine harness connection at control panel. Engine connector pin W is improperly wired. Pin W MUST be open.
Key "ON"; Alarm sounded but no display.	▪ Check display contrast/lighting level ▪ Replace tachometer gauge
Key "ON"; Display "ON"; Engine data is missing or intermittent.	▪ Check Engine harness connections. ▪ Check main fuse on engine. ▪ Check for active alarms. ▪ Check Fault Codes screen for engine Diagnostic Trouble Codes (DTC).
Key "ON"; Display active and showing data but Engine will not start	▪ Check for system alarms. ▪ Check Fault Codes screen for engine Diagnostic Trouble Codes (DTC). ▪ Check external engine shutdown input.
Key "ON"; Display active, no engine data, Engine will not start	▪ Check for system alarms. ▪ Check Fault Codes screen for engine Diagnostic Trouble Codes (DTC). ▪ Check remote engine shutdown input. ▪ Replace Control Panel.
Engine will Not Start; "External Engine Stop" Fault	▪ External Engine Stop input is active.
Throttle switch does not change engine speed.	▪ Engine Fault. Check Fault Code screen for specific engine failure DTC. ▪ Ensure Engine Speed settings do not exceed engine manufacturer recommendations.
Engine Speed will not ramp.	▪ Check User Setting menu. Throttle Type set for 2-State.

Note: The M300DP Module selection will only be present when the optional M300DP Auto Start Module has been installed.

System Operation

Audible Alerts

Audible alerts can be activated for several reasons;
1) Active Fault(s)
2) Acknowledged Active Fault reminder
3) Button Press
4) Setting Saved
5) Warning
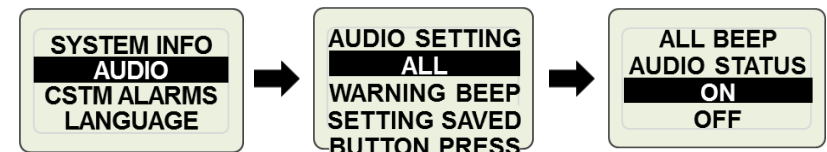
Audible alerts for button presses, setting saved and warning beeps are configurable and can be turned on or off from the System / Audio menu. To configure audio settings enter Main Menu then scroll to System entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to select System menu. Scroll to Audio entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to enter Audio Menu. Use "▼" or "▲"buttons to select audio menu entry to configure.

Contrast Menu

The Contrast Menu allows the user to adjust the display contrast settings. Enter Main Menu then scroll to the Contrast entry using "▼" or "▲"buttons. Select Contrast and adjust contrast using "▼" or "▲" buttons.
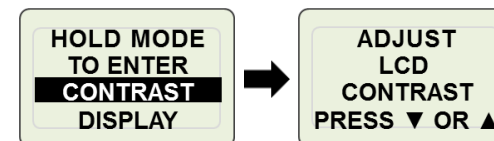
Custom Alarms

In addition to displaying engine faults on the run-time display (see Fault Codes Section), the M154L also allows the operator to enable warnings for several system parameters and set the value where the warning should occur. Below are the steps for configuring these warnings.

1. Select the System Menu
Enter the Main Menu then scroll to the System menu entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to select the System menu.

2. Select the Custom Alarm Menu Item
Scroll to the "CSTM ALARM" entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to enter custom alarm menu selection (fuel level or oil pressure).

3. Select the System Parameter
Use "▼" or "▲"buttons to select the desired alarm. Press & hold Mode button for > 1 second to enter the desired menu.

4. Change the Warning Status
The alarm can be activated or de-activated from the "Status" menu selection.

5. Adjust the Warning Set-point
The alarm set-point is set from the "Value" menu selection.

The diagram below shows the example for setting up a Custom Alarm for Fuel Level.
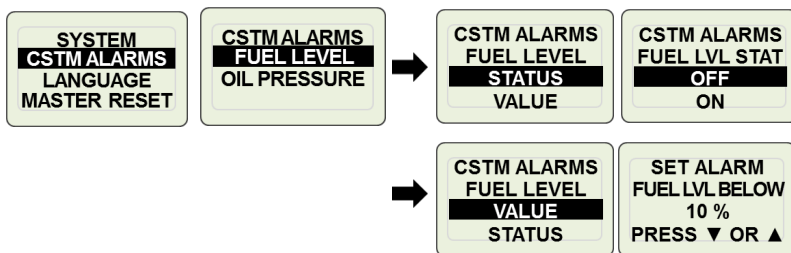
System Components

PART NUMBER	DESCRIPTION
1080004-05	Boot; Pushbutton, Blk
1080004-02	Breaker; 10A, w/o Boot
GE0171-R	Gauge; 2", Fuel Level, M154L Series
GE0172-R	Gauge; 2", 100 PSI Oil Press, M154L Series
GE0173-R	Gauge; 2", 250 Deg Wtr Temp, M154L Series
1080004-10	Relay; 12v, SPNO
HN0503	Harness; 2" Gauge to Gauge, Faria Bus
M154L00-L2004	Kit; Eng Ctrl, J1939, KOHLER T4F, 4"-4K
M154L00-L2005	Kit; Eng Ctrl, J1939, KOHLER T4F, 5"-4K
M154L01- L2004	CP; Eng Ctrl, J1939, KOHLER T4F, 4"-4K, 8x6, AL, PNL MNT
M154L01- L2005	CP; Eng Ctrl, J1939, KOHLER T4F, 5"-4K, 8x6, AL, PNL MNT
M154L10- L2004	CP; Eng Ctrl, J1939, KOHLER T4F, 4"-4K, 8x7 STEEL ENCL
M154L10- L2005	CP; Eng Ctrl, J1939, KOHLER T4F, 5"-4K, 8x7 STEEL ENCL
M154L15-L2004	CP; Eng Ctrl, KOHLER T4F, 4"-4K, 8x13 STEEL ENCL
M154L15-L2005	CP; Eng Ctrl, KOHLER T4F, 5"-4K, 8x13 STEEL ENCL
M154L15-L2004-/OP/T/V/F	CP; Eng Ctrl, KOHLER T4F, 4"-4K, 8x13 STEEL ENCL, /Oil Pressure/Temperature/Volts/Fuel
M154L15-L2005-/OP/T/V/F	CP; Eng Ctrl, KOHLER T4F, 5"-4K, 8x13 STEEL ENCL, /Oil Pressure/Temperature/Volts/Fuel
M154L20- L2004	CP; Eng Ctrl, J1939, KOHLER T4F, 4"-4K, NEMA 4X ENCL
DS110 -L2004	Controller; 4"-4K Tach, J1939 Ctrl
DS110 -L2005	Controller; 5"-4K Tach, J1939 Ctrl
MN10069-00	Manual; User/Install, M154L Series
MN10028-00	Manual; Mounting Template, M154L00 Series
PJ0036	Plug; Sealing, 4 Pin Packard
VE0028-R	Gauge; 2", Volt, M154L Series
1000017-23	Keyswitch; 4 pos, ACC-OFF-ON-START, common key
1000107-00	Switch; Rocker, (ON)-OFF-(ON)
1000116-00	Harness; Control, M154L
1000116-10	Harness; Control to Faria Bus, M154L
1000116-50	Harness; 1000116-00 and 1000116-10 assembly
1000130-00	Wire Set; OP/Fuel/Shutdown
1080002-01	Plug; Dome, 1/2" Dia, Blk
1080002-02	Plug; Dome, 3/4" Dia, Blk

NOTE: Contact MBW Sales to confirm all part numbers

Connecting a Switch Gauge

The M154L Series panel provides allows application specific switch gauges to be field installed. Switch gauges are commonly used to provide an external engine shutdown signal to the engine when the switch gauge setpoint is reached. The M154L provides a spare opening for mounting the switch gauge.

The M154L external engine shutdown requires a contact closure to ground to activate the engine shutdown signal.

Quick Connect Ground

Quick Connect on Pin 86 Engine Shutdown Relay

Circuit Breaker Connection

Engine Shutdown Relay

P2

P1

GND

P3

P4

Gauge

Throttle Switch

Harness PN:1000116-50
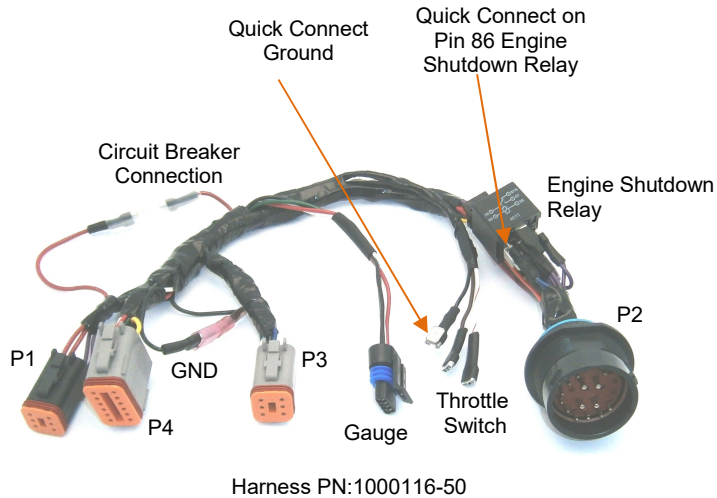
Connect the switch gauge contact (or lead terminal) to Pin 86 of the engine shutdown relay. The M154L provides a quick connect terminal on the Engine Shutdown Relay for easy installation. Connect the switch gauge ground (this is typically the gauge housing) to the M154L ground connection shown above.

Coolant Temperature

An engine high temperature warning will occur when the engine temperature exceeds the value configured for this setting. Should this message occur check engine coolant system for manufacturer recommended coolant level. When the coolant temperature drops below the value configured the warning message is automatically removed. This warning is generated by the control module and does not affect system operation in any way. This warning will be displayed anytime the coolant temperature exceeds value described above and the custom alarm has been enabled.

Note: The coolant temperature reading must be above the set-point value by .4% for > 10 seconds before alarm will sound. Coolant temperature reading must be below set-point value by 2% for > 10 seconds for the alarm to clear.

LOW FUEL TANK #1 WARNING !

Fuel Level Custom Alarm

This warning will occur when the system fuel level drops below the value configured for this setting. This is a preventative measure to warn the operator that the fuel level is getting low. Should this message occur check the fuel level to determine if sufficient fuel is available. When the fuel level exceeds the value configured the warning message is automatically removed. This warning is generated by the control module and does not affect system operation in any way. This warning will be displayed anytime the fuel level drops below the level described above.

Note: The fuel level reading must be below the set-point value by .4% for > 10 seconds before alarm will sound. Fuel level reading must be above set-point value by 2% for > 10 seconds for the alarm to clear.

ENGINE OIL PRESSURE WARNING !

Oil Pressure Custom Alarm

A low oil pressure warning will occur when the oil pressure drops below the value configured for this setting. Should this message occur check the oil level to determine if the engine has sufficient oil available. When the oil pressure exceeds the value configured the warning message is automatically removed. This warning is generated by the control module and does not affect system operation in any way. This warning will not be displayed until the operator starts the engine OR the oil pressure drops below the pressure described above, while the engine is running.

Note: The oil pressure reading must be below the set-point value by .4% for > 10 seconds before alarm will sound. Oil Pressure reading must be above set-point value by 2% for > 10 seconds for the alarm to clear.

ENGINE TEMPERATURE WARNING !

Acknowledging a Custom Alarm

When there is an active Custom Alarm, the digital display responds by overlaying a Warning pop-up graphic onto the currently active runtime display. This allows the operator to respond to the fault condition and provide the necessary actions. The display to the right represents an unacknowledged fault for an oil pressure low condition.

To acknowledge an active fault, press and hold the Mode button for greater than 1 second. This will remove the pop-up graphic and silence the audible fault indication.

If the Warning is not addressed within 5 minutes, the Warning pop-up be re-displayed.

Note: If the Warning is cleared the associated pop-up will automatically be removed. If the fault condition remains and the fault has been acknowledged, the audible fault indication will be re-activated every 5 minutes for 2 seconds and then silence. This feature is a continuous reminder to the operator that a fault is present.

Press & Hold Mode Button >1 second

PN: 1000116-10 Serial gauge Bus extension harness provides the ability to expand the system display capability. This is accomplished by adding parameter specific 2" gauges to the main controller. No configuration is necessary. Just plug the expansion gauge into the harness and the data will be available. To install the extension harness connect the gnd of the 116-10 harness to the mating gnd connector on the 116-00 harness. Insert the gauge bus communications and power pins into the P4 connector of the 116-00 harness. Using electrical tape, wrap the Serial Gauge bus harness wires to secure it to the 1000116-00 Control Harness.

To Connector P4 · GND · Gauge
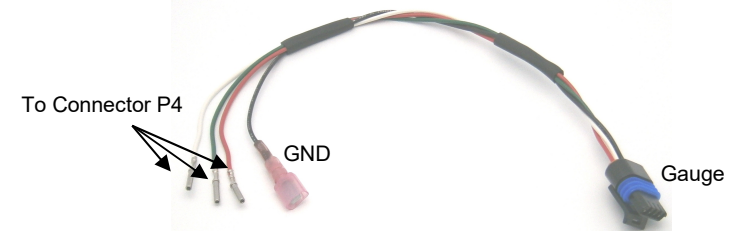
PN:1000116-10 Serial Gauge bus harness

Serial Gauge Bus Connector Details

Wire Color	Description	P4 Pin #
Red	Power	1
White	Serial Gauge Bus A	2
Green	Serial Gauge Bus B	3

Control Harness w/Gauge Bus Extension

PN 1000116-50 Control Harness may be purchased with the Gauge bus harness already installed.

Circuit Breaker Connection · Engine Shutdown · P1 · GND · P3 · P4 · Gauge · Throttle Switch · P2
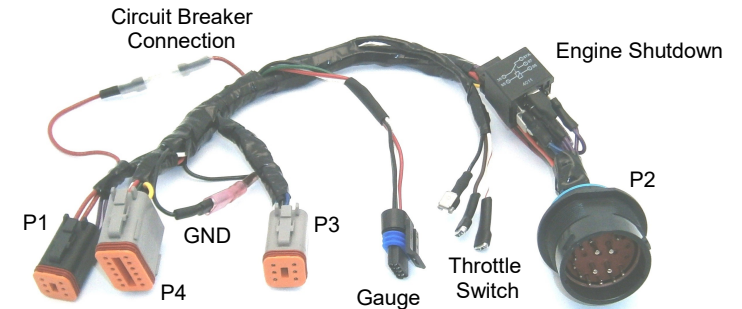
Harness PN:1000116-50

Connection Details

Control Harness

PN:1000116-00 The main control harness provides connections from the engine to the main controller (tachometer), throttle switch, key switch, circuit breaker and external engine shutdown.
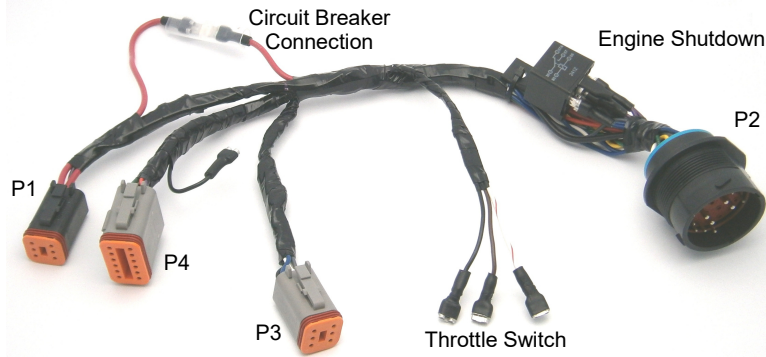
Control Harness PN:1000170-00

Control Harness Connector Details

Connector	Description
P1	6 Pin; connects to keyswitch, blk
P2	Engine connector
P3	6 Pin; connects to controller, gry
P4	12 Pin; connects to controller, gry
Black Quick Connect	Upper (rabbit) position of throttle switch
White/Red Quick Connect	Center position of throttle switch
Brown Quick Connect	Lower (turtle) position of throttle switch
Red Quick Connect	Battery; connection for resettable 10A breaker (resettable breaker not included in all models)

Wire Set – OP / Fuel Level / Engine Shutdown

PN:1000130-00   Engine connector (P2) wire set. Wire set allows connection of analog oil pressure sender, analog fuel level sender and external engine shutdown via connector P2.

Wire Color	Description	P2 Position
Orange	Oil Pressure	'P'
Blue	External Shutdown	'X'
Grn/Blk	Fuel Level	'N'
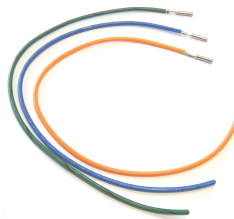
Display Format

Configuring Display View List

The M154L allows the user to configure a list of displays for viewing. The "Viewing List" is selected from the list of System Displays. Any display contained in the "System Display List" can be assigned to any screen location in the "Viewing List".

To access the Display View List setup, enter Main Menu then scroll to Display entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select the "Display" entry. Use the "▼" or "▲" buttons to select a particular viewing list entry.
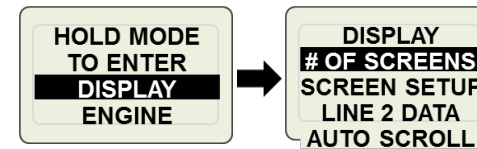
View List Screen Count

To configure the number of screens in the View List enter display menu then scroll to "# Of Screens" entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select. Set screen count using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to enter screen count number.
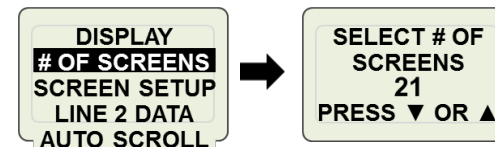
View List Screen Setup

To configure data displays for the viewing list, enter display menu then scroll to "Screen Setup" entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select. Select screen # to be configured using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select. Select data display using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to enter data display.
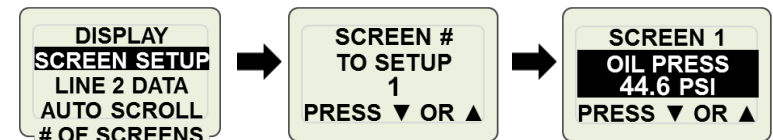
See Appendix B Display List for a complete list of available data displays.

Line 2 Data (Bar Graph)

The M154L has the ability to display select data parameters at the bottom of the LCD display. This display is in bar graph form. When activated this feature allows the user to simultaneously display, at the bottom of the screen, the selected data on all screens contained in the "Viewing List".

Example; Fuel Level Bar Graph Data.

To select the Line 2 Data display enter the display menu then scroll to "Line 2 Data" entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select. Select data to be viewed using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to enter data selection. Fuel level and engine load can be selected. Engine Hours is the default bar graph.

Select Bar Graph Data

```
HOLD MODE        DISPLAY
TO ENTER      LINE 2 DATA
DISPLAY       AUTO SCROLL
ENGINE        # OF SCREENS
```

Bar Graph Display Examples

```
OIL PRESS        OIL PRESS        OIL PRESS
44.6 PSI         44.6 PSI         44.6 PSI
FUEL ▮▮□□□       LOAD ▮▮▮□□       ⏱1325.6
```

Wiring Diagram
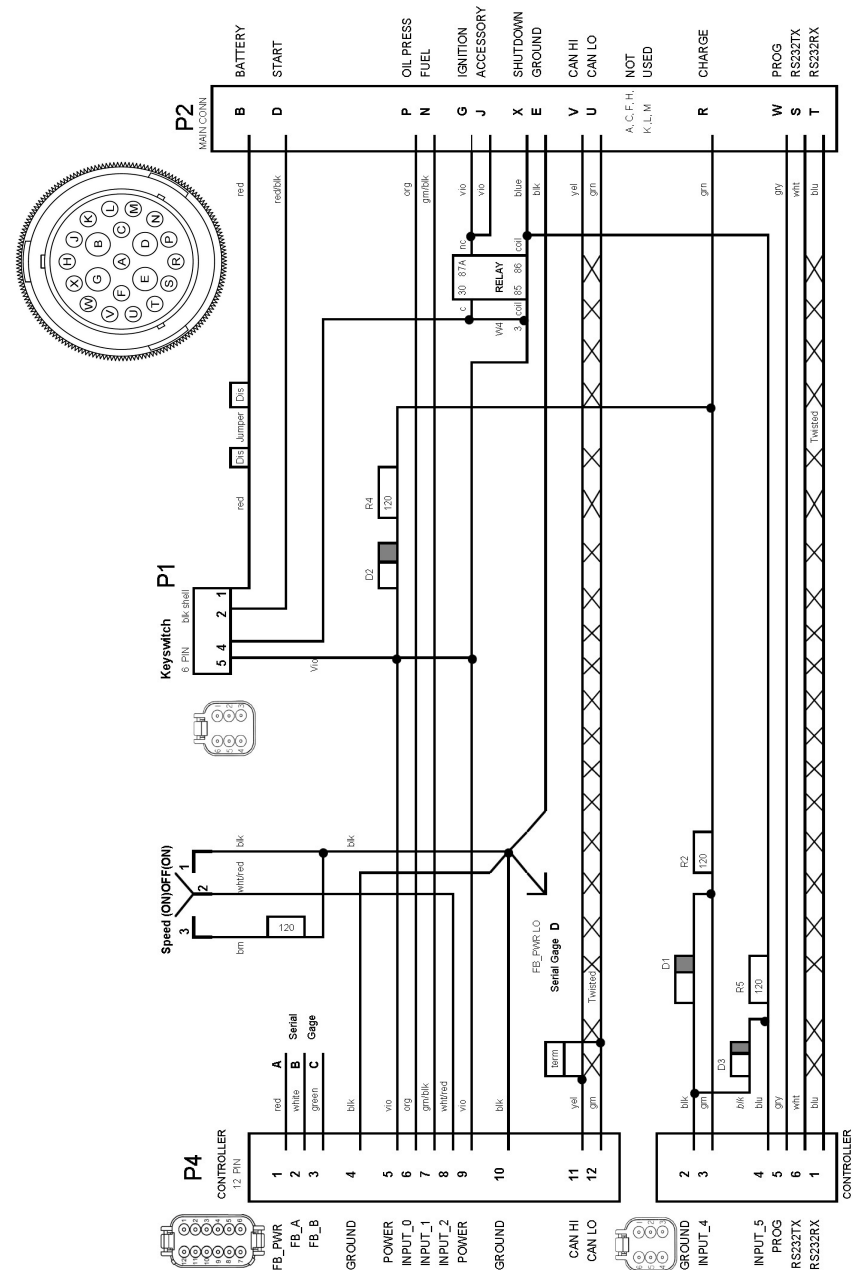
System Block Diagram
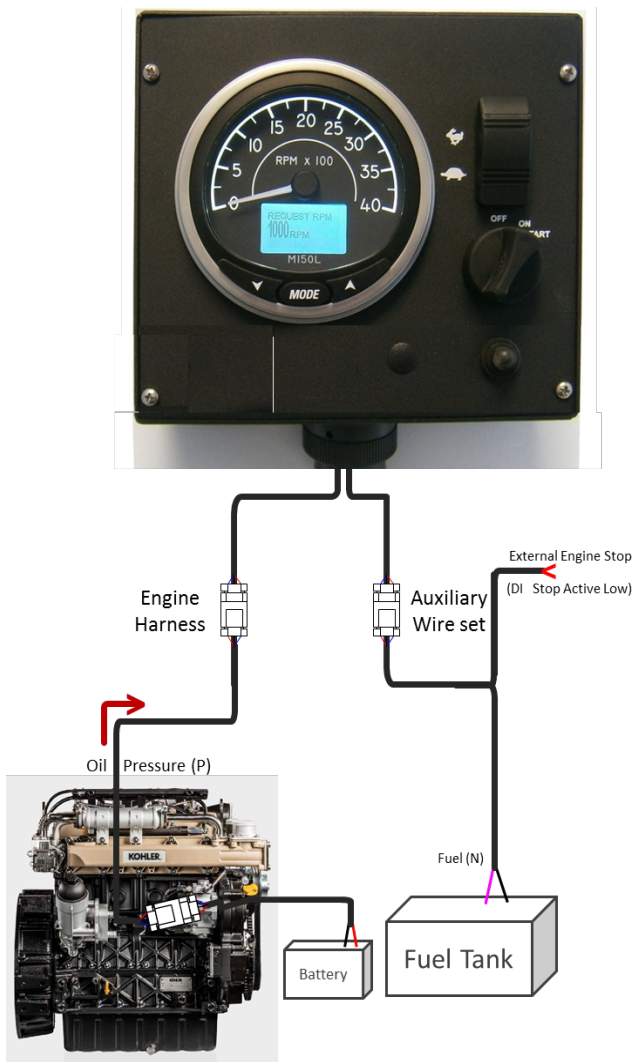
Engine Speed

The M154L allows the user to configure minimum and maximum engine rpm limits. The minimum engine rpm value is determined by the "Min" speed setting in the Engine menu. The maximum engine rpm value is determined by the "Max" speed setting in the Engine menu. Once configured the M154L prevents the user from throttling the engine above or below these values.

Min Engine Speed

To access the "Set Min RPM" setting, enter the Main Menu. Scroll to the "Engine" menu entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select the "Engine" menu entry. Scroll through the "Engine" menu using "▼" or "▲" buttons until the "Set Min RPM" entry is highlighted. Press & hold Mode button for > 1 second to select the idle speed entry. Use the "▼" or "▲" buttons to set the minimum engine rpm value. Press & hold Mode button for > 1 second to enter the Min RPM speed entry.
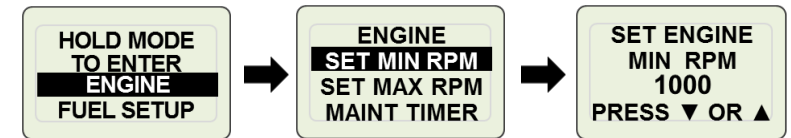
Max Engine Speed

To access the "Set Max RPM" setting, enter the Main Menu. Scroll to the "Engine" menu entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select the "Engine" menu entry. Scroll through the "Engine" menu using "▼" or "▲" buttons until "Set Max RPM" entry is highlighted. Press & hold Mode button for > 1 second to select the run speed entry. Use the "▼" or "▲" buttons to set the maximum engine rpm value. Press & hold Mode button for > 1 second to enter the Max RPM speed entry.
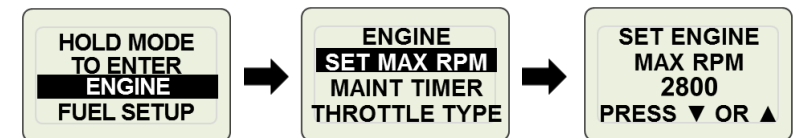
Engineering Units

Engineering units can be configured for the entire M154L System or individual unit categories.

To select engineering units enter the Main Menu and then scroll to the System entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to select System menu. Scroll to the "Set Units" entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to enter "Set Units" menu. Use "▼" or "▲"buttons to select the desired configuration. Press & hold Mode button for > 1 second to configure the selected entry. The M154L will immediately convert to the engineering units selected.
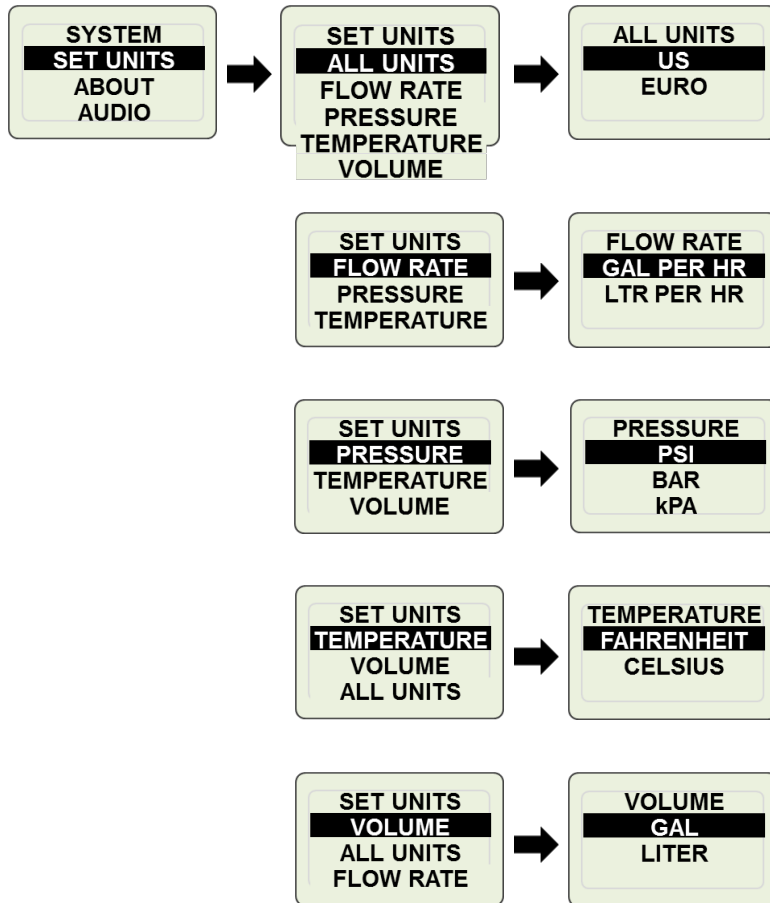
Technical Specifications

System

4" Gauge	
Pointer	4" 190º 4K Tachometer
Dimensions	3.375" Dia x 4.29"
5" Gauge	
Pointer	5" 210º 4K Tachometer
Dimensions	4.375" Dia x 4.18"
Display	Color LCD
Resolution	128 x 64 pixels
Operating Voltage	10.5 to 18VDC
Power Consumption – Tachometer	400 mA max
Power Consumption – Gauge Bus	90 mA max per gauge
Audible Alarm	4 KHZ Internal
External Engine Shutdown	Closure to Gnd
Communication	J1939
Operating Temperature	-20C to +70C (-4F to 158F)
Storage Temperature	-30C to +85C (-22F to 185F)
Reverse Polarity Protection	Yes
Salt Spray	IEC60068-2-52: 1996
EMC	IEC61000 and EN55022
System Protection	10A Resettable Circuit Breaker

Factory Settings

The following system settings will take affect when a master reset is applied.

PARAMETER	DEFAULT VALUE
Display Settings	
# of screens	21
Viewing List configuration	See Default Viewing List
Bar Graph	Engine Hours
Auto Scroll	Off
Engine Settings	
Engine Idle	800 RPM
Engine Run	2600 RPM
Throttle Type	Ramp
Oil Pressure Sender Source	0-5 Bar (Analog 10-180 Ohms)
Maintenance Timer	250 Hours
Fuel Setup	
Fuel Sender Source	240-33 ohm (USA Sender)
System	
Custom Alarms	Off
Language	English
Set Units	USA units
Passcode	Disabled

Oil Pressure Sender

To connect the oil pressure sender to the M154L install the Orange wire, supplied in wire set PN:1000130-00, in the 'P' terminal of the engine connector. Connect the oil pressure sender to this wire. See Engine Connector wiring table for wiring details. A small filtering algorithm is applied to the oil pressure measurement when an analog sender is used. The filtering removes momentary spikes in data as a result analog sender response times.

Oil Pressure Sender Specification

The M154L Control Panel interfaces with a VDO 10-180 ohm Oil Pressure Sender. The system can be configured for 0-5 Bar or 0-10 Bar operation.

Note: The M154L can be configured to measure analog senders or receive oil pressure data via Bus Data (i.e. CANBus). If Bus Data is the source for oil pressure choose "BUS DATA" as the oil pressure input. See Appendix A for definition of Oil Pressure message.

Configuring Oil Pressure Input

To configure the system to read an external oil pressure sender, enter the Main Menu. Scroll to the "ENGINE" menu entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select the "ENGINE" menu. Scroll through the "Engine" menu using "▼" or "▲" buttons to "Oil Pressure Src". Press & hold Mode button for > 1 second to select the oil pressure source menu. Use the "▼" or "▲" buttons to select the oil pressure sender.
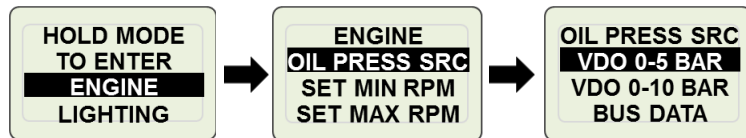
Should the sender not be installed or no connection made, the digital display will indicate "NO DATA" for the oil pressure value. Oil Pressure alarms are typically provided by the Engine ECU. The M154L can be configured to provide a Low Oil Pressure alarm. See Custom Alarms section for more details. The custom alarm for oil pressure will not be active if a sender input is not available.

Fault Codes

Engine fault codes, warnings and status indications are generated from the engine ECU and communicated to the control panel via the CANBus communications link. The control panel reports specific active faults, warnings and status information using popup displays containing descriptive text.

The engine ECU can generate additional fault codes and many engine manufacturers have engine specific codes. The control panel will present these additional codes as a "Check Engine" indication along with the SPN Number, FMI Code and fault count. Should a check engine fault be displayed the operator should access the Fault Code menu to determine the specific fault condition.

Active Fault Codes

All active system events (faults and warnings) are displayed on the LCD screen. Critical faults are backlight in Red. Warnings are backlight in Amber. Fault codes are accessed from the "Fault Codes" entry in the main menu. When a system fault occurs the display will activate a pop-up window describing the active fault condition and sound an audible tone. This pop-up will overlay on top of the currently active screen.

Check Engine

The "CHECK ENGINE" fault is a non-specific fault condition. This pop-up will occur when the engine generates any fault condition that is not specifically described in the fault section of this document. When a check engine fault occurs it is recommended that the operator go to the "Fault Codes" menu and review the detailed engine diagnostic data.

Check Engine Alarm Shutdown

The "CHECK ENGINE ALARM SHUTDOWN" fault is a non-specific fault condition. This pop-up will occur when the engine generates any fault condition that has been configured to shutdown the engine. When a "Check Engine   Alarm

**CHECK ENGINE
SPN: xxxx
FMI: xx   CNT: xx
ALM SHUTDOWN**

Shutdown" fault occurs it is recommended that the operator go to the "FAULT CODES" menu or "SHUTDOWN" menu in Engine Settings to review the detailed system information.

EGR Valve Fault

The "EGR VALVE FAULT" is generated by the engine ECU which reads EGR data and EGR Valve voltages. When an EGR Failure condition is determined by the ECU a fault message is transmitted by the engine ECU indicating that a

**EGR
VALVE
FAULT
!**

fault condition exists. Details about the EGR Fault condition can be viewed in the Fault Code menu.

Oil Pressure

The "OIL PRESSURE LOW" critical fault is typically generated by an oil pressure sender switch mounted on the engine. The engine ECU reads this switch and indicates an oil pressure fault OR oil pressure switch malfunction by

**ENGINE
OIL PRESSURE
LOW
!**

transmitting a fault message to the control panel. The fault message has multiple definitions and could indicate oil pressure below normal or oil pressure sensor shorted or open. This message is received by the control panel and processed to the fault display. The display fault popup screen will indicate "OIL PRESSURE LOW" when an active oil pressure fault message is received. Details about the exact oil pressure failure can be viewed from the "Fault Codes" menu.

Engine Rev Limit Exceeded

The "ENGINE REV LIMIT FAULT" is generated by the engine ECU. This fault is generated when the ECU determines an overspeed condition exists. The fault message is transmitted by the engine ECU indicating that an overspeed fault condition

**ENGINE
REV LIMIT
EXCEEDED
!**

exists. Details about the Rev Limit Fault condition can be viewed in the Fault Code menu.

External Engine Shutdown

To connect the external engine shutdown to the M154L install the engine shutdown (Blue) wire in the 'X' terminal of the engine connector. This is supplied with the external wire set PN:1000130-00. Connect the engine shutdown signal to this wire.

**REMOTE
ENGINE
SHUTDOWN
!**

This input requires a closure to ground. See Engine Connector wiring table for wiring details.

Fuel Sender

To connect the fuel level sender to the M154L install the Green/Black wire, supplied in wire set PN:1000130-00, in the 'N' terminal of the engine connector. Connect the fuel level sender to this wire. See Engine Connector wiring table for wiring details.

Note: The fuel level measurement algorithm is designed to provide enhanced filtering when the engine is running. When the engine is not running the algorithm filtering is reduced allowing for improved response when adding fuel to the tank.

Fuel Sender Specification

The M154L Control Panel interfaces with any standard 240-33 ohm US or 10-180 ohm Euro Sender. The system can be configured for operation with either sender or CANBus Data.

The M154L can be configured to measure analog senders or receive fuel data via Bus Data (i.e CANBus). If Bus Data is providing the source for fuel level data choose "BUS DATA" as the fuel setup input. See Appendix A for definition of Fuel Level message.

Configuring the Fuel Level Input

To configure the fuel sender, enter the Main Menu. Scroll to the "Fuel Setup" menu entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select "Fuel Setup". Scroll through the "Fuel Setup" menu using "▼" or "▲" buttons to select the desired fuel tank. Press & hold Mode button for > 1 second to select the desired fuel tank. Use the "▼" or "▲" buttons to select the fuel sender.
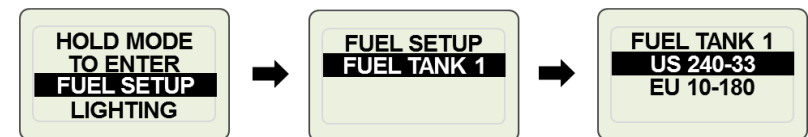
**HOLD MODE
TO ENTER
FUEL SETUP
LIGHTING** ➡ **FUEL SETUP
FUEL TANK 1** ➡ **FUEL TANK 1
US 240-33
EU 10-180**

Should the sender not be installed or no connection made, the digital display will indicate "NO DATA" for the fuel level measurement value.

Adding Additional Gauges

The M154L allows the user to enhance the data viewing capability of the system by simply adding Plug N' Play analog gauges to the main controller module. The installation is simple requiring an interconnect cable (PN: HN0503) and the data gauge of choice. To add an analog gauge to the system plug the first gauge into the main controller harness using (PN:1000116-10). Any remaining gauges to be added will be serially connected by using harness HN0503. It is recommended that the last gauge in the sequence plug the unused connector with a dummy plug (PN:PJ0036). See system components section for gauge types offered.

Engine Connector

The engine connector is labeled "Engine" and requires no additional wiring. This connector mates directly to the on-engine harness connector. The table below describes the engine harness connections, associated connector pin number and wire color.
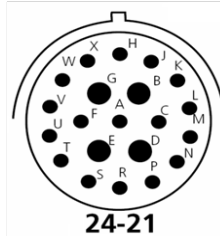
Desc	PIN Number	Engine Harness Connector – P2	Size	Wire Color
N/C	A		16 AWG	Tan
B+	B	Battery + (10A)	16 AWG	Red
N/C	C	Sensor Return	16 AWG	Black
Start	D	Starter (30)	16 AWG	Red/Black
Ground	E	Ground	16 AWG	Black
N/C	F			
Ignition Out	G	ECU Power (Ignition)	16 AWG	Violet
N/C	H			
Controller Power	J	ECU Key On	16 AWG	Purple
N/C	K			
N/C	L			
N/C	M			
Fuel	N	Fuel Sender	16 AWG	Green/Black
Oil Pressure	P	Oil Pressure Sender	16 AWG	Orange
Charge In	R	Charge Lamp	16 AWG	Dark Green
RS232Tx	S	Auxiliary input	16 AWG	White
RS232rx	T	Auxiliary input	16 AWG	Blue
CAN Lo	U	CAN Low (twisted pair)	16 AWG	Light Green
CAN Hi	V	CAN High (twisted pair)	16 AWG	Yellow
N/C	W		16 AWG	White/Blue
ESTOP	X	External Eng Shutdown	16 AWG	Blue

### Engine Over-Temperature

The "ENGINE TEMPERATURE HIGH" fault is generated by the engine ECU which reads a temperature sender located on the engine. When an over temperature condition is determined by the ECU a fault message is transmitted by the engine ECU indicating an engine temperature above normal exists.

Fuel System Fault

The "FUEL SYSTEM FAULT" is generated by the engine ECU. This fault is generated when the ECU determines the fuel pressure sensor or fuel pressure values are incorrect. The fault message is transmitted by the engine ECU indicating a fuel fault condition exists. Details about the Fuel Fault condition can be viewed in the Fault Code menu.

Remote Engine Shutdown

The "EXTERNAL ENGINE SHUTDOWN" popup will be generated when the control module has determined the "External Engine Shutdown" signal is active. When the external shutdown input is active (connected to gnd) the M154L Control System will shutdown the engine by disrupting the ignition voltage. This fault indication is software generated in the control system. If the external shutdown is active and the operator tries to start the engine a fault popup screen will activate indicating the condition exists. This condition will continue until the fault is removed.

System Charge Indicator

A "SYSTEM CHARGE INDICATOR" warning will be displayed when it is determined the system is discharging. The engine ECU detects the condition and transmits the fault condition to the M154L via a CANBus message.

Throttle Sensor Fault

The "THROTTLE SENSOR FAULT" is generated by the engine ECU. This fault is generated when the ECU determines the throttle sensor has excessive output or no output. The fault message is transmitted by the engine ECU indicating a throttle fault condition exists. Details about the Throttle Fault condition can be viewed in the Fault Code menu.

Wait to Start

The "Wait to Start" is generated by the engine ECU when the ECU determines the operator is trying to start the engine before the heaters have finished heating.

> WAIT TO
> START
> WARNING
> !

Water In Fuel

The "Water In Fuel" is generated when the ECU determines there is water in the fuel. May indicate the filter needs to be changed.

> WATER
> IN
> FUEL
> !

A Summary of Alarm Popup Displays is listed

ALARM (Red)	DEFINITION
CHECK ENGINE	[1]Engine Fault – Engine ECU generated
CHECK ENGINE ALARM SHUTDOWN	[3]Fault Configured to shutdown engine – Engine ECU or M154L Generated
EGR VALVE FAULT	[1,2]EGR Valve Fault – ECU generated
ENGINE OIL PRESSURE LOW	[1]Engine Oil Pressure Low – Engine ECU generated [2]Engine Oil Pressure Low – M154L Custom Alarm
ENGINE REV LIMIT EXCEEDED	[1]Engine RPM Limit Exceeded – ECU generated
ENGINE TEMPERATURE HIGH	[1]Engine Temperature High – Engine ECU generated
FUEL SYSTEM FAULT	[1]Fuel System Fault (pressure or sensor) – ECU generated
REMOTE ENGINE SHUTDOWN	External Engine Shutdown – User generated
SYSTEM CHARGE	[1,2]Alternator not charging – ECU or M154L generated
THROTTLE SENSOR FAULT	[1]Intake throttle sensor fault – Engine ECU generated
WAIT TO START	[1]Heaters are not finished – Engine ECU generated
WATER IN FUEL	[1]Water has been detected in the fuel-Engine ECU Generated

[1]Engine ECU may enter rpm limit mode or prevent engine from starting (this condition is controlled by engine ECU); fault may be generated without engine running.
[2] Engine continues to run – controlled by M154L control module; fault generated when engine started or engine is running.
[3] Engine shutdown – controlled by M154L control module; fault generated when engine started or engine is running.

Installing the System

> ⚠ **CAUTION**
>
> **The safety messages that follow have CAUTION level hazards.**
>
> ALWAYS ensure the power supply is OFF and battery cables are disconnected before you make any electrical connections.

Making the Connections

The control panel has one round connector with 21 contacts. This connector is an HDP24 Deutsch connector and provides the connection to the engine connector. (Note: Some engine may require an interface harness for this connection. Contact MBW Technical Support Team for details.) This connector also provides the user connections for fuel level, oil pressure and external engine shutdown. The supply power MUST be OFF when interconnecting the system.

Recommended order:
1. Verify the battery / battery switch connections to engine per the engine installation diagram. (Refer to engine manufacturer installation manual.) Verify engine is bonded to battery return (-). Verify engine block is connected to battery ground.
2. Disconnect battery.
3. Install control panel into housing. Attach engine connector to housing using supplied locknut and ring.
4. Fasten control panel to housing using #8 8-32 screws (not supplied).
5. Connect engine harness connector to mating control panel connector (HDP24-21 connector).
6. Connect battery.
7. Turn ignition key to "ON" position.
8. Ensure digital display is active. If display is not active;
   a. Check battery and power connections.
   b. Check the control panel resettable breaker.
   c. Check ignition switch is on position.
9. Ensure system is displaying data for engine speed, oil pressure and temperature.

2-State Throttle Operation

Two-state throttle operation allows the operator to choose between two predetermined engine speeds at the single touch of the throttle control. The two predetermined engine speeds are defined by the rpm value configured in the Engine Settings menu for "Min RPM" speed and "Max RPM" speed. Pressing the throttle control in the "Rabbit" position sets the engine rpm to the configured "Max RPM" speed setting. Pressing the throttle control in the "Turtle" position sets the engine rpm to the configured "Min RPM" speed setting.

CAUTION: Changes to settings in the "Engine" menu will take affect while the engine is running. Any change to throttle type setting or engine min/max settings will become active after the change is saved AND a throttle command is issued.

Disabled Throttle Operation

The M154L control allows the user to disable throttle commands. This is accomplished by selecting the "Disable" setting. When selected the transmission of the J1939 TSC1 message is suppressed.

Acknowledging Active Faults

When the control system receives a new fault, the digital display responds by overlaying a fault pop-up graphic onto the currently active runtime display. This allows the operator to respond to the fault condition and provide the necessary actions. The display to the right represents an unacknowledged fault for an oil pressure low condition.

Press & Hold Mode Button >1 second

To acknowledge an active fault, press and hold the Mode button for greater than 1 second. This will remove the pop-up graphic and silence the audible fault indication. The control system will continue to backlight the LCD display indicating an active fault or warning exists.

Should the fault condition persist and not be acknowledged, the M154L will "Auto" acknowledge the fault after 1 minute of continuous fault indication. An auto acknowledge produces the same result as the user performing an acknowledge.

Note: If the fault condition is cleared the associated pop-up will automatically be removed. If the fault condition remains and the fault has been acknowledged, the audible fault indication will be re-activated every 5 minutes for 2 seconds and then silence. This feature is a continuous reminder to the operator that a fault is present.

Stored Fault Codes

To access fault codes, enter the Main Menu and then scroll to the Fault Code entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select the "Fault Codes" entry. Select "View". If no fault codes exist the system will indicate no codes.
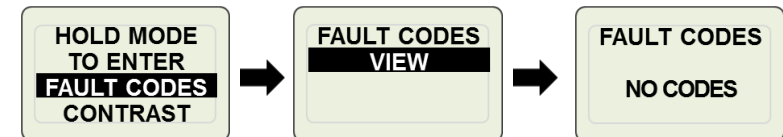
If codes exist the system will display the P Code Number and the status of the fault, Active or Stored. If multiple faults exist the system will allow the operator to scroll through the list using the "▼" or "▲" buttons.

The M154L Fault Code viewing menu provides a summary of the faults monitored by the control system. The system provides a combined list of "Active and Stored" faults. The viewing list is a summary containing the status of the fault (stored or active) and the designated P Code. To obtain

more detailed information about any of the faults shown, highlight the fault in question, press and hold the "Mode" key for > 1 sec. The control system will provide more detailed information about the fault.

```
┌─────────────────┐     ┌─────────────────┐     ┌─────────────────┐
│  FAULT CODES    │     │  FAULT CODES    │     │      P1198      │
│     VIEW        │  →  │   S    P1198    │  →  │  Low Oil Pressure│
│                 │     │   A    P0217    │     │   Status: Stored │
│                 │     │  PRESS ▼ OR ▲   │     │ SPN:100   OCC:5  │
│                 │     │                 │     │ FMI:1     SRC:0  │
└─────────────────┘     └─────────────────┘     └─────────────────┘
```
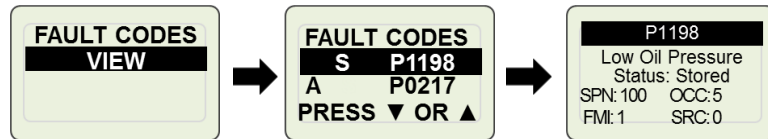
The detailed information presented is:
- Status (Active or Stored)
- SPN: J1939 SPN Number
- OCC: Number of occurrences
- FMI: Failure Mode Indicator
- SRC: Source address of device generating the fault

Lighting

In addition to the Contrast adjustment, the M154L allows the operator to independently adjust the light level of the LCD Display and the Dial or together.

```
┌─────────────────┐     ┌─────────────────┐
│   HOLD MODE     │     │    LIGHTING     │
│   TO ENTER      │  →  │  ADJUST LCD     │
│   LIGHTING      │     │  ADJUST DIAL    │
│   FAULT CODES   │     │  ADJUST SYSTM   │
└─────────────────┘     └─────────────────┘
```

Language

The M154L System provides the user with the ability to select one of 5 languages. The languages provided are English (default), French, German, Italian and Spanish.
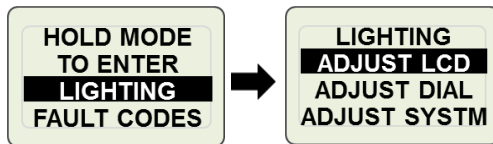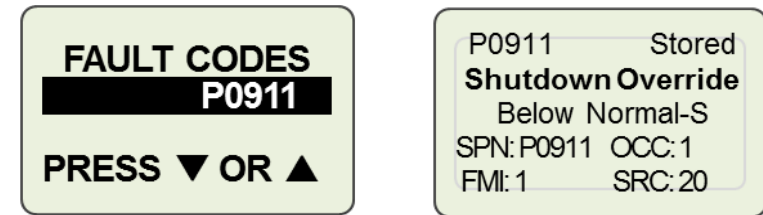
To select a language enter the Main Menu then scroll to the System menu entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to select System menu. Scroll to "Language" entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to enter Language selection menu. Use "▼" or "▲"buttons to select the desired language. Press & hold Mode button for > 1 second to enter selected language. M154L will immediately convert to the language selected.

```
┌─────────────────┐     ┌─────────────────┐     ┌─────────────────┐
│  SYSTEM INFO    │     │   LANGUAGE      │     │                 │
│   LANGUAGE      │  →  │   ENGLISH       │  →  │    SETTING      │
│  MASTER RESET   │     │   SPANISH       │     │    SAVED        │
│  PASSCODE       │     │   FRENCH        │     │                 │
└─────────────────┘     └─────────────────┘     └─────────────────┘
```

Override Event Log

The control panel stores each occurrence of the shutdown alarm override. This provides a history to determine how many times an override has been invoked.

```
┌─────────────────┐     ┌─────────────────┐
│  FAULT CODES    │     │ P0911    Stored │
│    P0911        │     │ Shutdown Override│
│                 │     │  Below Normal-S  │
│                 │     │ SPN:P0911  OCC:1 │
│  PRESS ▼ OR ▲   │     │ FMI:1     SRC:20 │
└─────────────────┘     └─────────────────┘
```
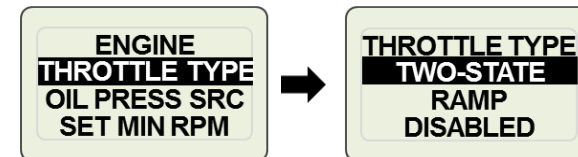
Throttle Switch Operation

The M154L allows the user to configure three modes of throttle operation; Ramp, 2-State and Disabled. These modes are configured in the Engine Settings Menu.

Configuring Throttle Switch Operation

To access the "Throttle Type" menu, enter the Main Menu. Scroll to the "Engine" menu entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select the "Engine" menu entry. Scroll through the "Engine" menu using "▼" or "▲" buttons until the "Throttle Type" entry is highlighted. Press & hold Mode button for > 1 second to select the Throttle Type. Use the "▼" or "▲" buttons to select either Two State, Ramp or Disabled. Press & hold Mode button for > 1 second to select the desired entry.

```
┌─────────────────┐     ┌─────────────────┐
│    ENGINE       │     │  THROTTLE TYPE  │
│  THROTTLE TYPE  │  →  │   TWO-STATE     │
│  OIL PRESS SRC  │     │   RAMP          │
│  SET MIN RPM    │     │   DISABLED      │
└─────────────────┘     └─────────────────┘
```

Ramp Throttle Operation

Ramp throttle operation allows the user to increment or decrement the desired engine RPM value by 10 RPM. To increment engine rpm simply press the throttle switch in the "Rabbit" position. Pressing the throttle switch in the "Turtle" direction will decrement the engine speed by 10 rpm. Holding the throttle switch in the "Rabbit" or "Turtle" position for > 2 seconds will cause the engine speed to increment or decrement at a rate of 50* RPM / second.

Note: The user cannot adjust the engine speed above or below the configured "Min" and "Max" engine speed settings. See section, Engine Speed Limits for more details.

shutdown alarm display and prevent the engine from starting. This will continue until the alarm is acknowledged.

Shutdown Alarm Display

When a shutdown alarm is activated the control panel will shutdown the engine and generate an alarm display. The display will be in the form of a popup window providing the SPN and FMI values associated with the alarm. The popup window will be displayed in Red and generate an audible alert until the alarm is acknowledged or removed.

```
CHECK ENGINE
SPN: 110
FMI: 0   CNT: 2
ALM SHUTDOWN
```
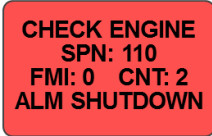
Shutdown Alarm Acknowledgement

When the alarm is acknowledged the control panel will remove the popup display and return to the normal engine data screens. The display will remain Red and the "Check Engine" and "Stop" icons will be active.

(Note: Acknowledging and active shutdown alarm will not allow the engine to start. The alarm condition must be corrected or….the operator must override the shutdown system to start the engine.)

Engine Start w/Active Shutdown Alarm

Starting the engine with an active shutdown alarm requires the operator to cycle the ignition key AND correct the alarm condition OR…cycle the ignition key AND activate the alarm override system.

```
REQUET RPM
1000 RPM
FUEL ▮▮▮▯▯
```
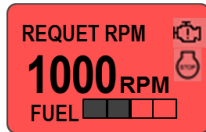
Override Shutdown Alarm

The shutdown alarm system provides the user with an override function. Should a shutdown alarm activate and remain active the operator can override the alarm condition and start the engine. The override condition is valid for the current key cycle. Should the ignition key by cycled off and then back on the override condition will be canceled. (Note: Overrides are logged and can be viewed using the "Fault Codes" menu.)

Press both keys simultaneously

Maintenance Timer

The M154L System provides an engine maintenance timer feature. The maintenance timer display indicates the amount of engine runtime since last maintenance. If the system is powered but the engine is not running no maintenance hours will be accumulated. When the maintenance timer exceeds the configured time, the system will activate an "Engine Maintenance Required" alert popup. If the timer is not reset the alert popup will reinitiate on each key "ON" cycle.

```
ENGINE
MAINTENANCE
REQUIRED
```
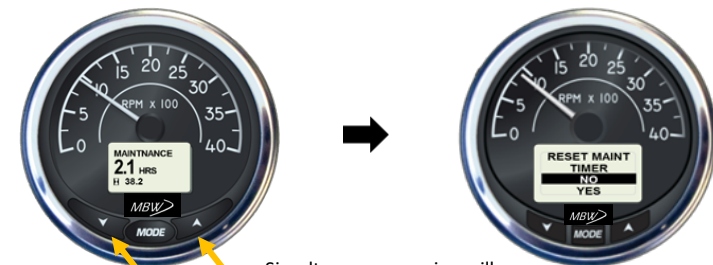
Acknowledging Maintenance Timer

When the maintenance timer expires the control system will provide an alert popup indicating the maintenance time has expired. The alert will be cleared (acknowledged) by pressing and holding the Mode button. See acknowledging active faults section for more details. Accessing the maintenance timer reset menu via the "Hot Key" will also acknowledge the maintenance timer alert.

Resetting Maintenance Timer

To reset the maintenance timer enter the Main Menu and then scroll to the "RST MAINT TIMER" entry using the "▼" or "▲"buttons. Press & hold Mode button for > 1 second to select reset maintenance timer menu. Using the "▼" or "▲"buttons select "YES" to reset the timer. Press & hold Mode button for > 1 second to enter the timer reset request.

Resetting the maintenance timer can also be accomplished using an M154L built-in "Hot Key". The "Hot Key" entry is accomplished by simultaneously pressing the "▼" or "▲"buttons.

Simultaneous pressing will cause Hot Key to activate
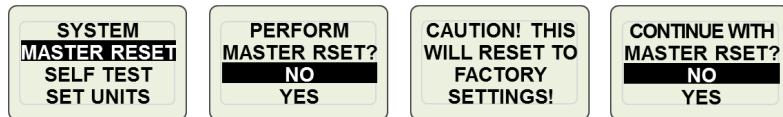
Setting Maintenance Timer

The maintenance timer is configurable and resettable by the operator. The timer will activate when set to a value > 0. To configure the maintenance timer enter the Main Menu and then scroll to the Engine entry using the "▼" or "▲"buttons. Press & hold Mode button for > 1 second to select the Engine menu. Scroll to the "MAINT TIMER" entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to enter Maintenance Timer Menu. Use "▼" or "▲"buttons to set maintenance timer hours. Press & hold Mode button for > 1 second to enter the maintenance interval time. The timer has a settable range of 1-9999 hours. A setting of 0 hours turns off the timer.

```
┌─────────────┐      ┌─────────────┐      ┌─────────────┐
│ HOLD MODE   │      │   ENGINE    │      │SELECT MAINT │
│ TO ENTER    │  ──▶ │ MAINT TIMER │  ──▶ │  INTERVAL   │
│  ENGINE     │      │ SHUTDOWN    │      │   250HRS    │
│ FUEL SETUP  │      │THROTTLE TYPE│      │ PRESS ▼ OR ▲│
└─────────────┘      └─────────────┘      └─────────────┘
```

Master Reset

A Master Reset allows the user to set the M154L back to factory default settings. Settings such as Maintenance Timer, Engineering Units and Audio settings will all be reset to their factory default settings when a master reset is completed.
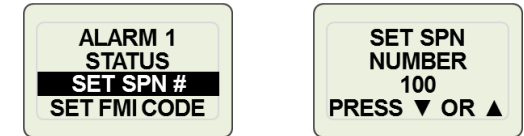
To select Master Reset enter the Main Menu and then scroll to the System entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to select System menu. Scroll to "Master Reset" entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to activate the master reset program. The M154L will require two user confirmations before proceeding with the master reset application.
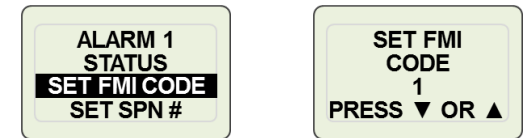
```
┌─────────────┐ ┌─────────────┐ ┌─────────────┐ ┌─────────────┐
│   SYSTEM    │ │  PERFORM    │ │CAUTION! THIS│ │CONTINUE WITH│
│MASTER RESET │ │ MASTER RSET?│ │WILL RESET TO│ │MASTER RSET? │
│ SELF TEST   │ │    NO       │ │  FACTORY    │ │    NO       │
│ SET UNITS   │ │    YES      │ │ SETTINGS!   │ │    YES      │
└─────────────┘ └─────────────┘ └─────────────┘ └─────────────┘
```

Note: Performing a master reset will NOT remove the Passcode. Should a passcode be active, the passcode must entered to perform a master reset. Once a passcode is entered it can only be changed by entering the current passcode and setting a new passcode.

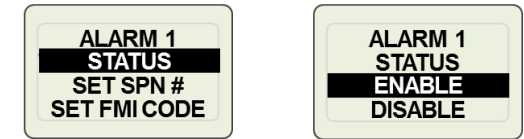engine manufacturer's J1939 communications documentation for the alarms supported.

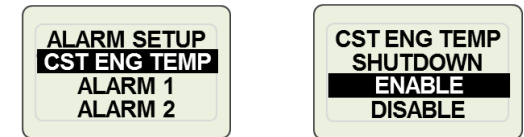Set the SPN identifier. This can be a number from 0 to 599,999.

```
┌─────────────┐      ┌─────────────┐
│  ALARM 1    │      │  SET SPN    │
│  STATUS     │      │  NUMBER     │
│ SET SPN #   │      │    100      │
│ SET FMI CODE│      │ PRESS ▼ OR ▲│
└─────────────┘      └─────────────┘
```

Set the FMI code. This is a number from 0 to 31. Note the control panel allows for a setting of "ANY". When set to ANY the control panel will generate the alarm based on SPN identifier only.

```
┌─────────────┐      ┌─────────────┐
│  ALARM 1    │      │  SET FMI    │
│  STATUS     │      │   CODE      │
│ SET FMI CODE│      │    1        │
│ SET SPN #   │      │ PRESS ▼ OR ▲│
└─────────────┘      └─────────────┘
```

Enable the selected alarm for engine shutdown. Note: The alarm must enabled for shutdown operation to function.

```
┌─────────────┐      ┌─────────────┐
│  ALARM 1    │      │  ALARM 1    │
│  STATUS     │      │  STATUS     │
│ SET SPN #   │      │  ENABLE     │
│ SET FMI CODE│      │  DISABLE    │
└─────────────┘      └─────────────┘
```

To configure a custom alarm for engine shutdown, select the desired alarm and then select Enable.

```
┌─────────────┐      ┌─────────────┐
│ ALARM SETUP │      │CST ENG TEMP │
│ CST ENG TEMP│      │ SHUTDOWN    │
│  ALARM 1    │      │  ENABLE     │
│  ALARM 2    │      │  DISABLE    │
└─────────────┘      └─────────────┘
```

Shutdown Alarm Operation

An active shutdown alarm will stop the engine and generate an alarm display. The alarm display will provide alarm information and stay active until it is acknowledged. The alarm will be logged for future reference via the Fault Codes menu. Cycling the ignition key with an acknowledged active alarm regenerates the alarm display and requires the operator to re-acknowledge the alarm.

Previously Active Shutdown Alarm

If an ignition key cycle occurs and a previously active unacknowledged shutdown alarm has been removed, the system will still generate the

Shutdown Alarms

When the M300DP Auto Start option has been installed, the M154L incorporates an advanced alarm configuration to allow the operator to shutdown the engine based on specific alarm conditions. This feature is contained within the control panel and must be configured by the operator. Two alarm subsystems can be used to shutdown the engine.

1. Alarms generated by the engine ECU.
2. Custom Alarms generated by the control panel.

As shipped from the factory all engine shutdown alarms are disabled.

Shutdown Alarm Configuration

To access the "Shutdown" menu, enter the Main Menu. Scroll to the "Engine" menu entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select the "Engine" menu entry. Scroll through the "Engine" menu using "▼" or "▲" buttons until the "Shutdown" entry is highlighted. Press & hold Mode button for > 1 second to select the shutdown menu. Use the "▼" or "▲" buttons to select either the number of shutdown alarms to install in the system OR select the alarm setup menu. Press & hold Mode button for > 1 second to select the desired entry.

Set the number of alarms to be configured for engine shutdown. Maximum allowable alarms is 6.

Select the alarm # to be configured.
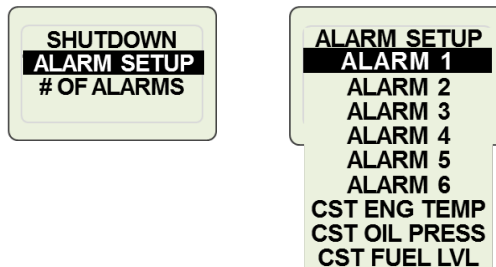
The alarm setup menu will show any custom alarms that are enabled. An enabled custom alarm can be enabled to shutdown the engine.

For alarm detection and engine shutdown to work properly the specific alarm SPN identifier and FMI code must be configured. Refer to your

Oil Pressure Source Operation

The M154L allows the user to configure the source for Oil Pressure; VDO 0-5 Bar, VDO 0-10 Bar or CAN BUS.

Configuring Throttle Switch Operation

To access the "Throttle Src" menu, enter the Main Menu. Scroll to the "Engine" menu entry using "▼" or "▲" buttons. Press & hold Mode button for > 1 second to select the "Engine" menu entry. Scroll through the "Engine" menu using "▼" or "▲" buttons until the "Oil Press Src" entry is highlighted. Press & hold Mode button for > 1 second to select the Oil Pressure Source. Use the "▼" or "▲" buttons to select either VDO 0-5 Bar, VDO 0-10 Bar or CAN BUS. Press & hold Mode button for > 1 second to select the desired entry
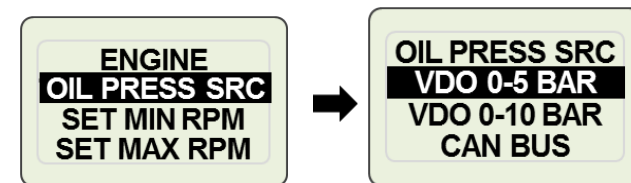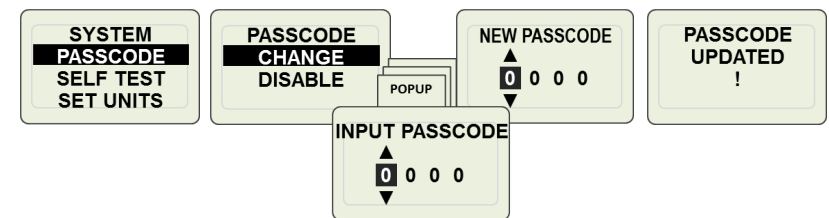
Passcode

The M154L allows the user to set a passcode which protects various parameters in the M154L database. Setting the passcode to 0000 will disable it. Any non-zero value for the passcode entry enables it and therefore protects critical data parameters.

To select Passcode enter the Main Menu then scroll to the System entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to select System menu. Scroll to "Passcode" entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second enter passcode menu. The passcode menu allows the user to Disable or Change the current passcode configuration.
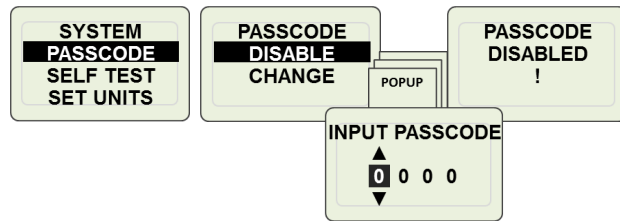
Changing the Passcode.

When the passcode protection is enabled the M154L will prevent changes to the following parameters;

Display Menu
# of Screens
Screen Setup
Line 2 Data
Auto Scroll
Engine Menu
Droop
Set Min RPM
Set Max RPM
Maintenance Timer
System Menu
Custom Alarms
Master Reset
Passcode

Disabling the Passcode.

| SYSTEM / **PASSCODE** / SELF TEST / SET UNITS	PASSCODE / **DISABLE** / CHANGE / POPUP	PASSCODE / DISABLED / !

INPUT PASSCODE
▲
0 0 0 0
▼

Note: When changing or Enabling the passcode, the changes will not go into effect until the system has seen a power cycle.

Enabling the Passcode.

SYSTEM / **PASSCODE** / SELF TEST / SET UNITS	PASSCODE / **CHANGE** / DISABLE	NEW PASSCODE / ▲ / **0** 0 0 0 / ▼	PASSCODE / UPDATED / !

Self-Test

The self-test program allows the user to verify several areas of system operation. The areas tested are; dial/pointer/LCD backlight intensity, LCD backlight color (red, green, blue, white) , alarm LEDs, pointer movement (full-scale, mid-scale, 0), non-volatile (NVM) memory, buzzer and communications channel (CAN).
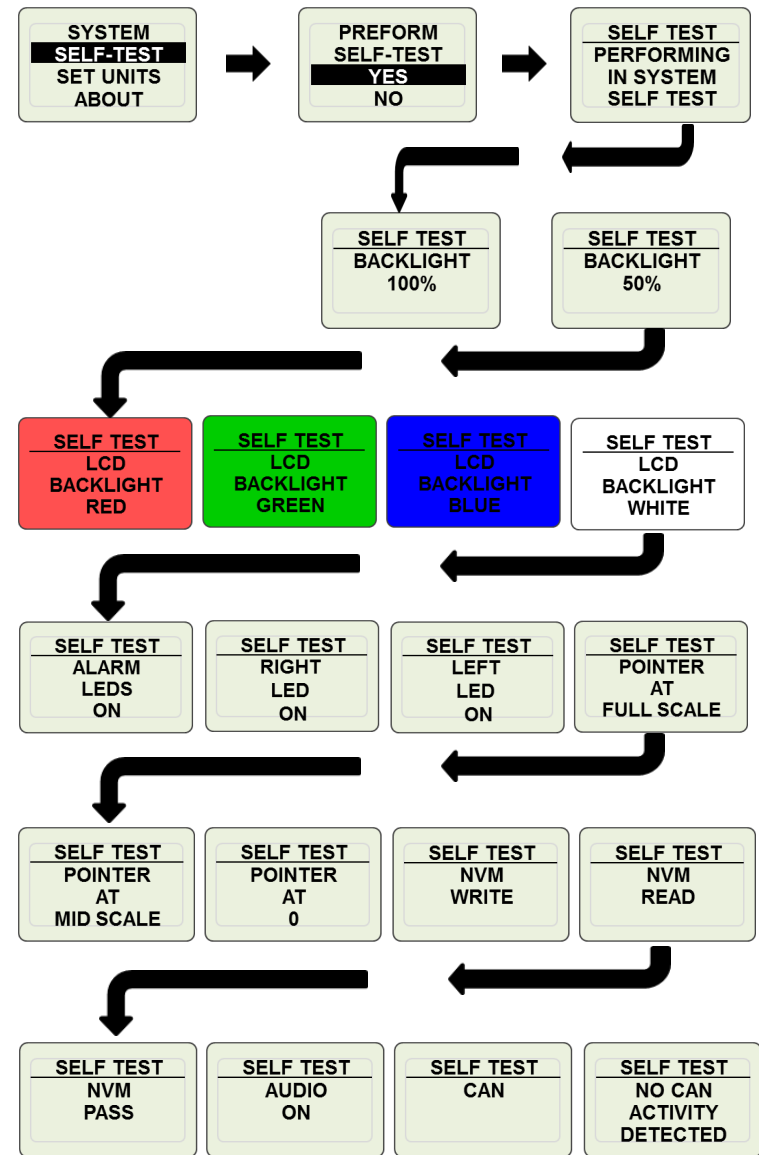
To select Self-Test enter the Main Menu and then scroll to the System entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to select System menu. Scroll to "Self-Test" entry using "▼" or "▲"buttons. Press & hold Mode button for > 1 second to activate the Self-Test program.