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Installation / User Manual

MN10088-00

MBW-Technologies, LLC (2 – Year) Limited Warranty

MBW Technologies, LLC (“MBW”) warrants its Electronic Module, Display products, Electrical Cable and Electrical Connector products to be free from defects in materials and workmanship for a period of two (2) years from the date of shipment by MBW. Within this period, MBW will, at its sole option, repair or replace any Electronic Module or Display that fails in normal use and is returned to MBW (freight prepaid) within the warranty period. MBW is not responsible for charges connected with the removal of such product or reinstallation of replacement or repaired parts. This warranty does not cover failures due to abuse, misuse, accident, faulty installation or unauthorized alteration or repairs.

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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.

Index

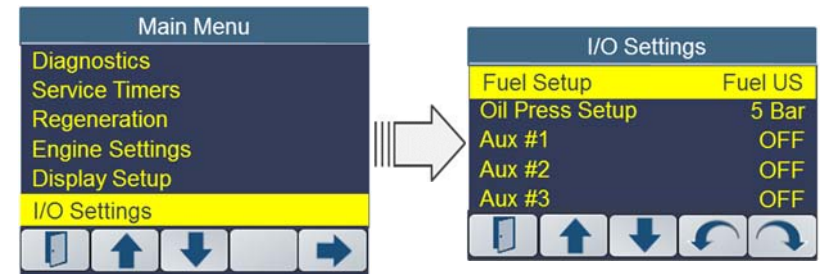
About	52	Quad Displays	34
Active Alarm Indication	10	Regeneration Modes	
Automatic Regeneration	54	Automatic or Reset	54
Auxiliary Input Priority	42	Manual	54, 56
Auxiliary Inputs	41	Recovery	54, 62
Bar Graph Setup	9, 33, 65	Stationary	54, 59
Changing a Numeric Value	17	Reset to Defaults	50
Changing a Selection	16	SCR ICONs	65, 67
Changing Data Display	11	SCR System Status	
Configuring Analog Inputs	39	Inducement 1	66
Controlling Engine Speed	7	Inducement 2	67
DB Viewer	18	Warning	66
DEF Status		Serial Number	52
Inducement 1	68	Service Timer Alert	21
Inducement 2	68	Service Timer Intervals	22
Warning	67	Service Timer Reset	21
Diagnostic Menu	18	Setting Key Tone	36
Display Setup	32	Setting Pressure Units	36
DPF ICONs	53, 54, 55, 60	Setting Temperature Units	37
Droop/Iso Setup	27	Setting Volume Units	38
DTC Alarm Shutdown	46	Single Display Format	8
Enable/Disable	47	Single Displays	33
Setting FMI Code	48	Softkey Definitions	14
SPN Number	48	Software Version Number	52
Engine Connector	70, 71	Stored Alarms	11
Engine Data	76	System Fault Log	12
Engine Type	25	System Indicators	9
Factory Defaults	75	Technical Specifications	70
Fuel Level	39	Throttle Setup	
Fuel Setup	39	4-Step	29
I/O Connector	72	Disable	29
I/O Status	19	Ramp	29
Keypad Backlight	35	Two State	29
Language Selection	32	Throttle Source Setup	28, 30
LCD Backlight	35	Unkown Alarm	10
Main Menu Navigation	14	User Alarm Log	12
Max Engine Speed	26	User Defined Alarms	44
Menu Navigation	18	Alarm Setpoint	46
Min Engine Speed	26	Engine Shutdown	44
Network Status	20	Function	45
Oil Pressure	40	Type	45
Password	16, 51	Volume Units Setup	38
Quad Display Format	8		

Table of Contents

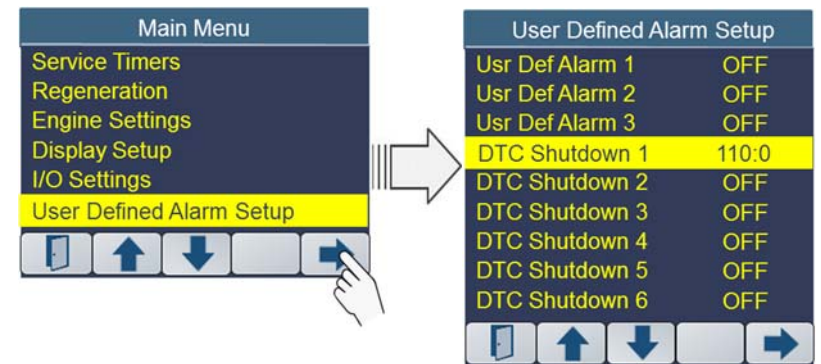
System Startup	7
Powering the System	7
Starting the Engine	7
Controlling Engine Speed	7
Viewing Engine Data	7
Single Display Format	8
Quad Display Format	8
Bar Graph Display	9
System Indicators	9
Fault Codes	10
Changing Display Screens	11
System Fault Log	12
User Alarm Log	12
Menu Navigation	14
Softkey Definitions	14
Accessing the Main Menu	15
Password	16
Changing a Selection	16
Changing a Numeric Value	17
Main Menu	18
Diagnostic Menu	18
DB Viewer	18
I/O Status	19
Network Status	20
Service Timers	21
Service Timer Alert	21
Resetting the Service Timer	21
Setting Timer Intervals	22
Regeneration	23
Regeneration Inhibit	23
Regeneration Start	24
Engine Settings	25
Engine Type	25
Setting Minimum and Maximum RPM	26
Droop/ISO	27
Setting Throttle Source	28
Setting Throttle Type	28
RPM Alarm	30

Speed 1, 2, 3 Setting.....	30
Display Setup.....	32
Language	32
Bar Graph	33
Single Display	33
Quad Display	34
LCD Backlight	35
Keypad Backlight.....	35
Key Tone Setting	36
Pressure Units Setting.....	36
Temperature Units Setting.....	37
Volume Units Setting.....	38
I/O Settings	39
Configuring Analog Inputs	39
Auxiliary Inputs.....	41
User Defined Alarms	44
Engine Shutdown Setup	44
Alarm Type	45
Alarm Function.....	45
Alarm Setpoint.....	46
DTC Shutdown Alarms	46
System.....	50
Reset to Defaults	50
Set Password	51
About.....	52
DPF Aftertreatment	53
DPF Aftertreatment Indicators.....	53
Regeneration Modes	54
Automatic or Reset Regeneration	54
Manual Regeneration.....	56
Stationary Regeneration.....	59
Recovery Regeneration.....	62
SCR After Treatment Operation	65
SCR Aftertreatment Indicators	65
DEF Monitoring.....	65
SCR System Status.....	66
DEF System Status	67
Installing the System	69
Technical Specifications.....	70
One Connector Installation.....	70

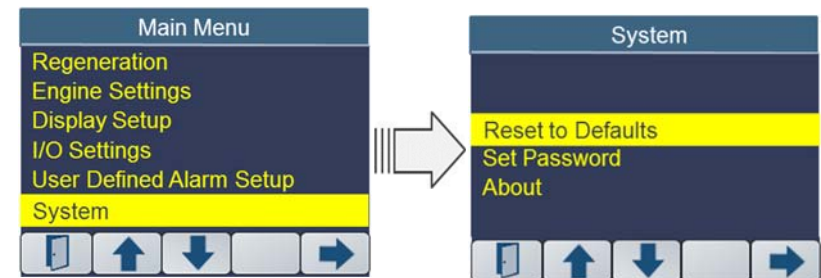
I/O Settings



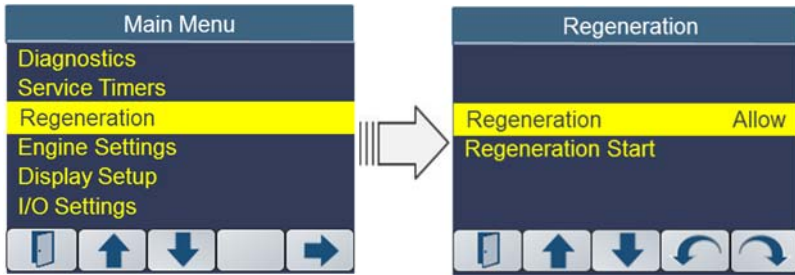
User Defined Alarms



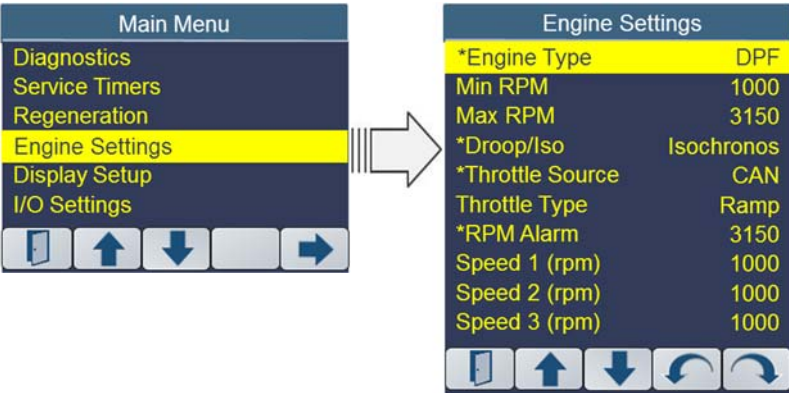
System



Regeneration

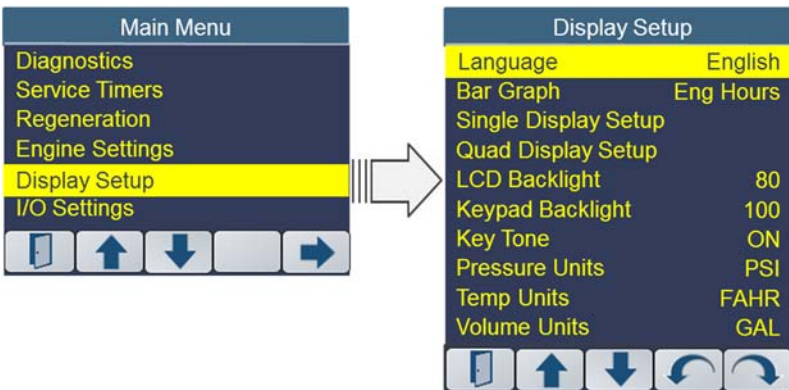


Engine Settings



*Parameter may not be available for certain engine types

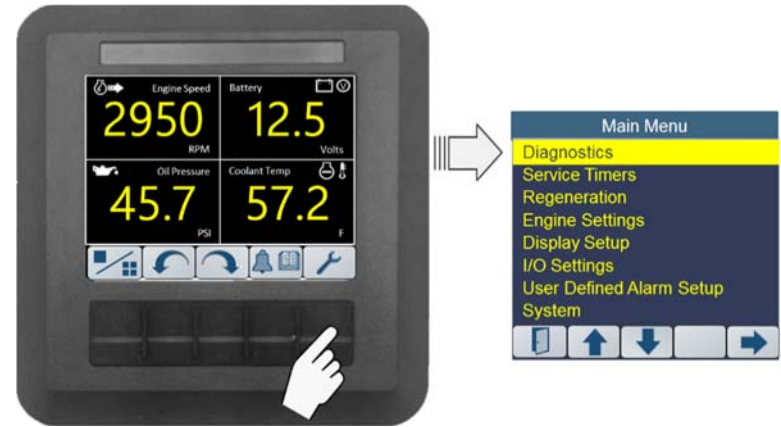
Display Setup



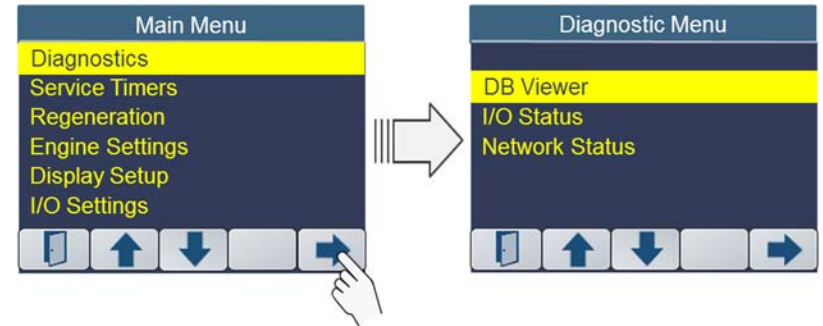
Two Connector Installation.....	71
Wiring Diagram.....	73
Environmental Specifications	74
Factory Defaults.....	75
Displayed Engine Data	76
Troubleshooting Guide.....	77
Appendix A – Menu Overview	79
Accessing the Main Menu.....	79
Diagnostics.....	79
Service Timers.....	79
Regeneration	80
Engine Settings	80
Display Setup.....	80
I/O Settings	81
User Defined Alarms	81
System.....	81

Appendix A – Menu Overview

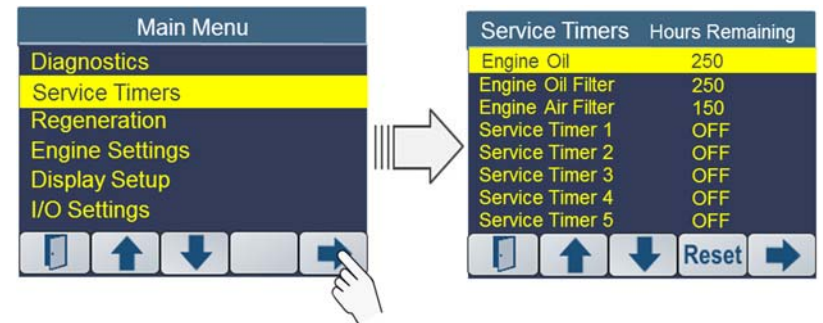
Accessing the Main Menu



Diagnostics

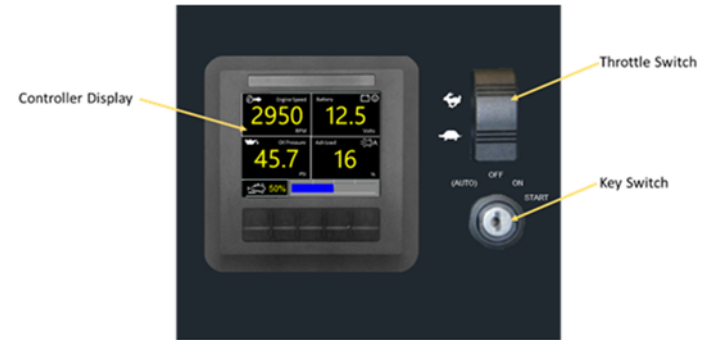


Service Timers



<p>Oil Pressure not working.</p>	<ul style="list-style-type: none"> ▪ Check engine harness connection Pin P. ▪ Oil Pressure not configured. Check I/O Settings Menu ▪ Oil Pressure configured for wrong sender range. Check I/O Settings Menu.
<p>Analog Inputs not Working.</p>	<ul style="list-style-type: none"> ▪ Check engine harness connections. ▪ Go to controller I/O Status Screen and check input level for proper value.

System Startup



Powering the System

The Control Panel is powered from the engine battery connection via the engine harness connector. Make sure the engine harness is connected to the controller before proceeding. See Section “Installing the System” 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. The controller will display a Splash Screen.

Starting the Engine

The controller disables the engine from starting while the Splash Screen is displayed. Once the data screen is present and no fault codes are present, turn the key switch clockwise to the “Start” position to start the engine.

Controlling Engine Speed

When the engine is started, the control panel will set the engine speed to the minimum rpm 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 rpm speed setting or above the maximum rpm speed setting. See section Configuring Min/Max Engine Speeds for more details.

Viewing Engine Data

The Engine data may be displayed in two different formats: Single Data Format or Quad Data Format.

To switch between single data display and quad data display toggle the display softkey.



Single Display Format



Quad Display Format



Troubleshooting Guide

Symptom	Action
Key "ON"; No display	<ul style="list-style-type: none"> Verify Battery is connected and battery switch, if installed, is in "ON" position. Check engine fuse. If fuse is blown check engine wiring. Check engine harness connections at control panel. Reset circuit breaker.
Key "ON"; Data is not displayed "----" (dashes) shown on display	<ul style="list-style-type: none"> No CANBus Communications. Check engine harness connector pins U and V. Check for active alarms Check Diagnostic Trouble Codes.
Key "ON"; Alarm Popup Screen Present	<ul style="list-style-type: none"> Check Controller Fault Log for engine faults. Correct faults before starting engine.
Key "START"; Engine will not start.	<ul style="list-style-type: none"> No ignition. Check engine harness connection Pin G. External shutdown active. Check engine harness connection Pin X. If installed, Check Shutdown Alarm configuration for active shutdown alarm.
Throttle switch does not change engine speed.	<ul style="list-style-type: none"> Engine Fault. Check Fault Log. Throttle has been disabled. Check Engine Settings Menu. Ensure engine setting has not exceeded rpm settings. Check Engine Settings Menu.
Engine Speed will not ramp.	<ul style="list-style-type: none"> Check Engine Settings Menu to ensure throttle type is set to "Ramp".
Engine will not enter Regeneration Mode.	<ul style="list-style-type: none"> Regeneration is inhibited. Exhaust Temperature too Low Interlocks not set Engine RPM too high.
Fuel Level not working.	<ul style="list-style-type: none"> Check engine harness connection Pin N. Fuel Level not configured. Check I/O Settings Menu Fuel Level configured for wrong sender range. Check I/O Settings Menu.

Displayed Engine Data

Engine Parameter	Units	Engine Type
Ambient Air Temp	PSI	ECO/DPF/SCR
Ash Load	%	DPF/SCR
Barometric Pressure	PSI	ECO/DPF/SCR
Battery Switched	Volts	ECO/DPF/SCR
Coolant Temp	degF	ECO/DPF/SCR
DEF Level	%	SCR
DEF Tank Temp	degF	SCR
DOC Inlet Temp	degF	DPF/SCR
DOC Outlet Temp	degF	DPF/SCR
Engine Hours	Hrs	ECO/DPF/SCR
Engine Load	%	ECO/DPF/SCR
Engine Speed	RPM	ECO/DPF/SCR
Exhaust Manifold Temp	degF	DPF/SCR
Fuel Rate	GPH	ECO/DPF/SCR
Fuel Rail 1	PSI	ECO/DPF/SCR
Fuel Temp	degF	ECO/DPF/SCR
*Maintenance Hours	HRS	ECO/DPF/SCR
Intake Manifold Press	PSI	ECO/DPF/SCR
Intake Manifold Temp	degF	ECO/DPF/SCR
Oil Pressure	PSI	Analog
Requested RPM	RPM	ECO/DPF/SCR
Soot Load	%	DPF/SCR
Throttle Percent	%	ECO/DPF/SCR

*M154LC Models only

Bar Graph Display

The Single and Quad display formats allow a bar graph to be displayed across the bottom of the screen. The user can select which bar graph is displayed or turn off the bar graph display. See section for display setup.

Fuel Level Bar Graph



Refer to the Display Setup section for selecting the desired Bar Graph.

System Indicators

The controller provides constant monitoring of all system inputs and indicates the status of these inputs on the controller display. The controller uses a series of standard graphical icons to indicate the status of these conditions. Some of the inputs monitored include; Engine DTCs (Active alarms & Stored alarms), Engine shutdown alarms and Engine aftertreatment status.

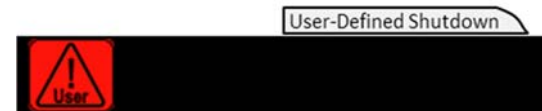
These indicators will be displayed along the bottom of the display.



Active Engine Alarm
Active Engine Warning
Auxiliary Input Engine Stop



DEF Level
Regeneration Needed
Regeneration Inhibits



User Defined Alarm Shutdown

Fault Codes

The controller has an advanced alarm system which can display active alarms being reported by the engine. It also has the capability of displaying alarms that have been stored by the engine ECU.

The controller will indicate an active alarm condition by generating an alarm popup window. This popup window will continue to be displayed until the operator acknowledges this condition.

Active Alarm Indication

During normal operation, the Engine ECU may detect a problem and communicate this condition (i.e., DM1 message) to the control panel via the CANBus communications network.

When a fault is active the controller activates a popup Fault Display containing

- A check engine ICON
- Fault severity text based on fault lamp activation (Engine symbol = “Warning”; Engine symbol with “!” = “Stop”)
- A description of the active fault
- Fault and the code(s) associated with the active fault



The operator must acknowledge this popup by selecting the “ ” key. See illustration above.

Should the control panel indicate an active alarm condition DO NOT START the engine. Review the fault condition and proceed to correct the condition before starting the engine. See Fault Codes section of this manual for details on system faults.

Unknown Alarm

Should the controller encounter an active alarm that is not identified by the manufacturers fault code list, the controller activates a popup Fault Display containing the following data:

- SPN Number
- FMI code
- Fault Description



The operator must acknowledge this popup to continue.

Factory Defaults

PARAMETER	DEFAULT VALUE
Regeneration	Allow
Engine Settings	
Engine Type	DPF
Minimum Engine RPM	1000 RPM
Maximum Engine RPM	3150 RPM
DROOP/ISO	ISO
Throttle Type	RAMP Mode
Throttle Source	CAN
*Service Timers	OFF
*Speed 1, 2 and 3	1000 RPM
Display Settings	
Language	English
Display Mode	Quad
Bar Graph	Fuel Level
Single Display Setup	All Parameters
Quad Display Setup	All Parameters
Display Backlight	80%
Keypad Backlight	100%
Key Tone	ON
Pressure Units	PSI
Temperature Units	Fahrenheit
Volume Units	Gallons
I/O Settings	All OFF
Passcode	OEM Specified and enabled
TSC1 Source Address	0x28

The system settings may be returned to factory defaults at any time by selecting “Reset to Defaults” in the System screen.

***Not available on M154LC models.**

Environmental Specifications

Display Type	a-Si TFT LCD 3.5"
Display Resolution	320 (H) x 240 (V)
Active Area	70.08mm x 52.66mm
Operating Voltage	5-32V DC
Brightness	750 NIT – Sunlight readable
Viewing Angle	130/110 degrees from 6 o’Clock
Power Consumption – Backlight OFF	150ma
Power Consumption – Backlight 100%	200ma
Communication	J1939 CAN 2.0B
Communication	(1) USB
Operating Temperature	-20C to +70C
Storage Temperature	-30C to +80C
Reverse Polarity Protection	Yes
Electromagnetic Emission	EN60945 (Para 9.2 Table 5)
EMC Class C	J1113/11
Degree of Protection - Display	IP66 (front) and IP67 (back)
Degree of Protection – P00 Series	IP66 (front) and IP67 (back)
Degree of Protection – P10 Series	IP66 (front) and IP67 (back)
Degree of Protection – P20 Series	IP67 (front) and IP67 (back)

Stored Alarm Indication

See Fault Code section of this manual for details on Stored Alarms (Engine DTC).

Changing Display Screens


The controller will display the default screens defined in either the “Single Display Setup” or the “Quad Display Setup” found in the “Display Setup” section.

To switch between single and quad display formats press the  button.

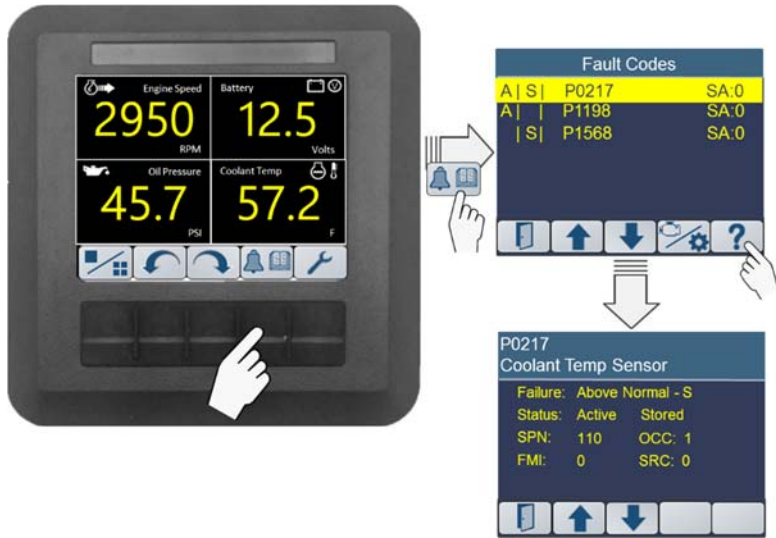
Press the change “⤴” or “⤵” softkeys to access the next data display available.




System Fault Log

Press the keypad button below the “System Fault Log” softkey  to view the Stored and Active Faults.


When selected the controller will send a request to the engine ECU for any faults the ECU may have stored. Should any faults exist the controller will provide a summary list of the active and stored faults.



Press the  softkey for a detailed description: J1939 SPN, FMI, Source Address and number of Occurrences.

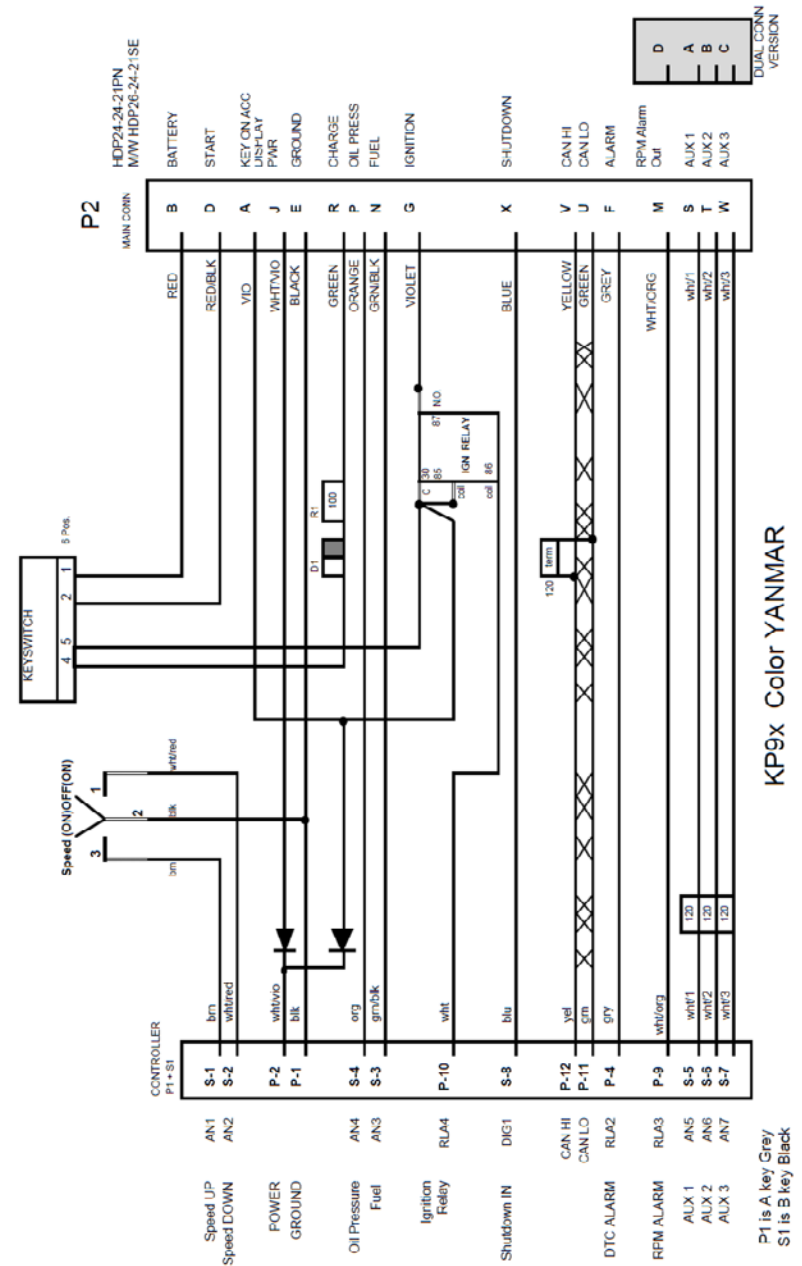
Use the “↓” and “↑” softkeys to view detailed information on the next and previous fault in the log.

User Alarm Log

To access the User Alarm Log display, enter the Fault Codes display as show above. When in the Fault Codes display select the Engine/User button  to toggle to the User Alarm Log screen.



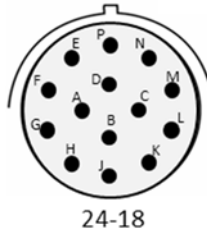
Wiring Diagram



I/O Connector

The 2-connector solution provides a connector for the engine interface and a separate connector for the panel I/O connections.

The I/O connector is dedicated connector for making connections to the Auxiliary Inputs and the RPM Alarm output. The table below describes the engine harness connections, associated connector pin number and wire color.

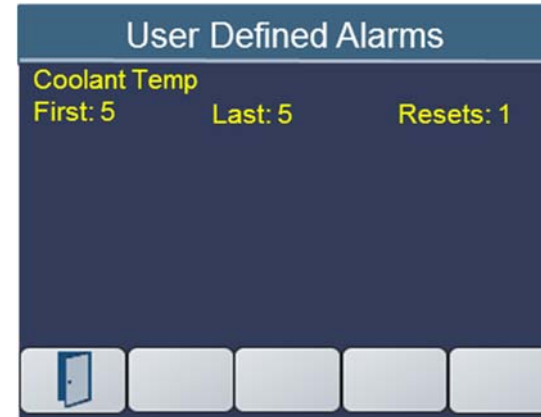


Connector Specification: HDP24-18-14PE
 Mate Specification: HDP26-18-14SE

Pin Number	Description	Contact Size	Wire Color
A	Aux Input #1	16	White/Black
B	Aux Input #2	16	White/Brown
C	Aux Input #3	16	White/Blue
D	*RPM Alarm Output	16	White/Orange

*Not available in all applications

The User Alarm Log Display will show indicate the alarm type, engine hours of first alarm, engine hours of last time alarm occurred and the number of times the operator reset the alarm condition.
















Note: To reset the User Defined Alarm data, contact your factory representative.

Menu Navigation

The controller has a five button, navigation keypad which is dynamically configured using popup softkeys. The softkeys are used to navigate between displays, select menu items and change data. Pressing any of the five buttons will display the softkey menu associated with each button.



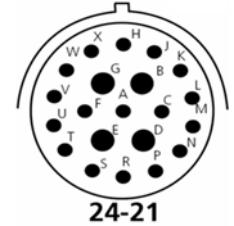
Softkey Definitions

-  Select Quad or Single Display
-  Select System Fault Log
-  Select Tools: Main Menu
-   Change Left or Right
-   Scroll Up or Down
-   Increment or Decrement Value
-  Select Menu Item
-  Exit: Save and Return to Previous Menu
-  Acknowledge
-  More Information

Two Connector Installation

Engine Connector

The control panel has one round connector with 21 contacts. This connector is a HDP24 Deutsch connector and provides the connection to the engine harness connector.



Verify the engine harness connector pinout matches the controller pinout defined in the Interface Connector section of this manual. If they do not match, an adapter harness will be required. Contact MBW Technical Support Team for details.

Note: When connecting panel to Yanmar ECO-GOV engine conversion harness Yanmar PN: KPH20 or MBW PN: KPH20-MBW is required.

Connector Specification: HDP24-24-21PE
 Mate Specification: HDP26-24-21SE

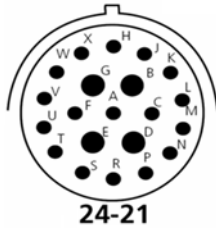
Pin Number	Description	Contact Size	Wire Color
A	Key On Accessory Output	16	Violet
B	Battery+ (10A)	12	Red
D	Starter	12	Red/Black
E	Ground	12	Black
F	Alarm Output	16	Grey
G	ECU Power (Ignition)	12	Violet
J	*Display Power / Accessory	16	Violet/ White
N	Fuel	16	Green/Black
P	Oil Pressure	16	Orange
R	Charge Lamp	16	Dark Green
U	CAN Low (Twisted Pair)	16	Light Green
V	CAN High (Twisted Pair)	16	Yellow
X	Shutdown	16	Blue

*Not available in all applications

Technical Specifications

One Connector Installation

The control panel has one round connector with 21 contacts. This connector is a HDP24 Deutsch connector and provides the connection to the engine harness connector.



Verify the engine harness connector pinout matches the controller pinout defined in the Interface Connector section of this manual. If they do not match, an adapter harness will be required. Contact MBW Technical Support Team for details.

Note: When connecting panel to Yanmar ECO-GOV engine conversion harness Yanmar PN: KPH20 or MBW PN: KPH20-MBW is required.

Connector Specification: HDP24-24-21PE
 Mate Specification: HDP26-24-21SE

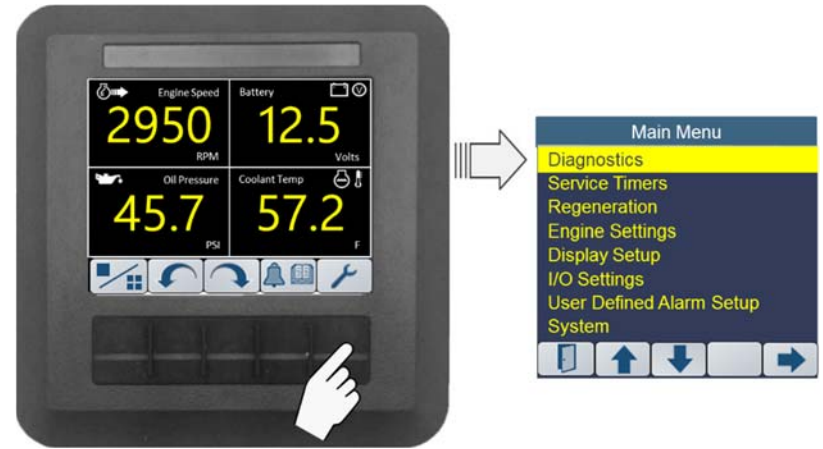
Pin Number	Description	Contact Size	Wire Color
A	Key On Accessory Output	16	Violet
B	Battery+ (10A)	12	Red
D	Starter	12	Red/Black
E	Ground	12	Black
F	Alarm Output	16	Grey
G	ECU Power (Ignition)	12	Violet
J	*Display Power / Accessory	16	White/Violet
M	*RPM Alarm Output	16	White/Orange
N	Fuel	16	Green/Black
P	Oil Pressure	16	Orange
R	Charge Lamp	16	Dark Green
S	Auxiliary #1	16	White/Black
T	Auxiliary #2	16	White/Brown
W	Auxiliary #3	16	White/Blue
U	CAN Low (Twisted Pair)	16	Light Green
V	CAN High (Twisted Pair)	16	Yellow
X	Shutdown Input	16	Blue

*Not available in all applications

Accessing the Main Menu

Press the keypad button below the “Main Menu Settings” softkey to access the main menu. The main menu is where the controller is set up and configured. Most operators will not need to enter the Main Menu. setup screens.

Note: Main menu may vary based on engine type and application.



Navigating the Main menu follows a three, step process:

1. Selecting a Menu Item from main menu
 - use the “↓” and “↑” softkeys to highlight the desired menu item
 - press the “→” key to select the menu item and view its setup menu.
2. Change the value or mode for the parameters
 - use the “↓” and “↑” softkeys to highlight the desired setup item
 - press the “+ / -” or the “⏪” or “⏩” softkeys to select value or mode
3. Exiting a menu item
 - press the door “⏪” softkey to save the setting and return to the previous display.

Password

When the operator tries to access protected menus such as Engine Settings, I/O Settings or Reset to Defaults, the user will be prompted for the password. Entering the correct password will unlock the menu and changes may be made. The protected menus will relock when the main menu is exited.



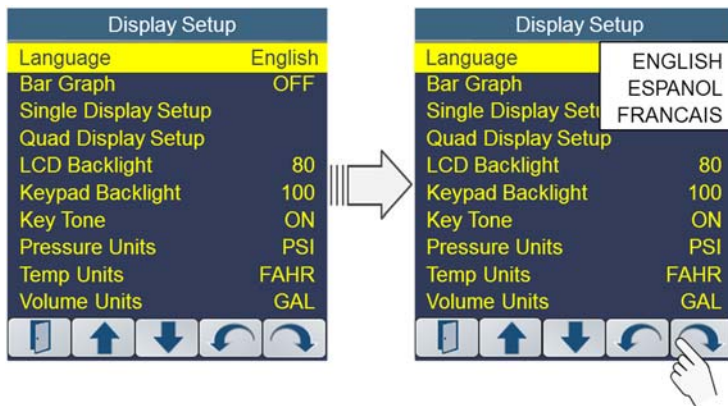
Entering Password

The password consists of four entries via the five-button keypad and can be any combination of numbers 1 thru 5. These numbers correspond to the softkey numbering. Assume the password is 1111. To enter the password, press key #1 four times.

Changing a Selection

Setting the throttle type is an example of toggling through a selection of predetermined choices. To change the throttle type, access the throttle type menu from the engine settings menu. Navigate to the throttle type setting using the “↓” and “↑” softkeys.

Use keypad buttons below the change “↺” or “↻” softkeys to toggle through the available throttle type settings. Pressing the “☐” softkey (i.e., Door) will automatically save your selection and return you to the previous screen.



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.

The supply power MUST be OFF when interconnecting the system.

Note: When connecting panel to Yanmar ECO-GOV engine interface harness Yanmar PN: KPH20 is required. MBW also provides this interface harness as PN: KPH20-MBW.

Recommended order:

1. Verify the battery / battery switch connections to engine per engine manufacture's wiring 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. Prepare openings and mounting requirements.
4. Install controller.
5. Connect engine harness connector to mating control panel connector (HDP24-21 connector).
6. Connect battery.

Starting the Engine

7. Turn ignition key to "ON" position.
8. Ensure digital display is active. If display is not active;
 - Verify the controller splash screen appears.
 - Verify the quad data displays appears after the splash screen.
 - Verify data values are being displayed and not "----"
9. Turn the ignition key to "START" position.
 - The engine should start.

Note: You will not be able to start the engine until the quad data screen is viewable.
10. Verify the Input/Output devices are working properly by pressing any button on the 5 button keypad and then pressing the “↺” or “↻” softkeys to cycle through the display screens to view the data from those devices.

DEF Tank Inducement 1

If the DEF Tank Warning is not corrected and the DEF Level continues to drop the system will progress to the Inducement Stage 1. This stage will put the engine into 50% power limit mode. The operator must acknowledge this condition to allow the controller to go back to the data displays.



Once acknowledged, the controller will return to the data displays and the DEF Tank icon will flash along the bottom of the screen.



DEF Tank Inducement 2

If the DEF Tank Inducement 1 warning is not corrected and the DEF Level continues to drop the system will progress to Inducement Stage 2. This stage will continue to power limit engine operation. The operator must acknowledge this condition.

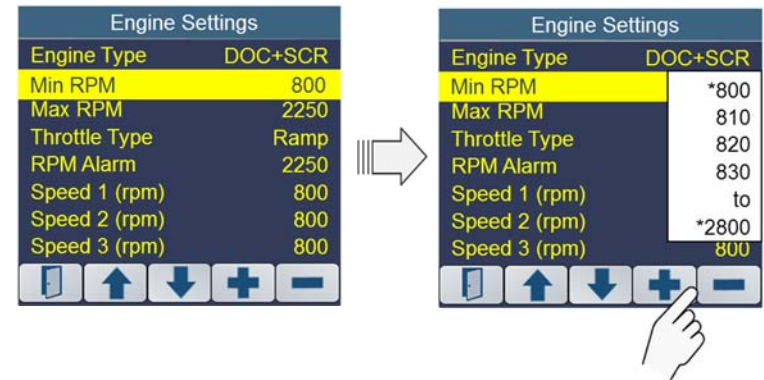


Once acknowledged, the controller will return to the data displays and the DEF Tank icon will flash along the bottom of the screen.



Changing a Numeric Value

The Min RPM engine setting is an example of a numeric value that can be configured. Changing the minimum rpm setting is accomplished by entering the engine settings menu, navigating to the Min RPM. Use keypad buttons below the “+/-” softkey popup to increment and decrement the rpm value. Pressing the door “☰” softkey will save your selection and return you to the previous screen.

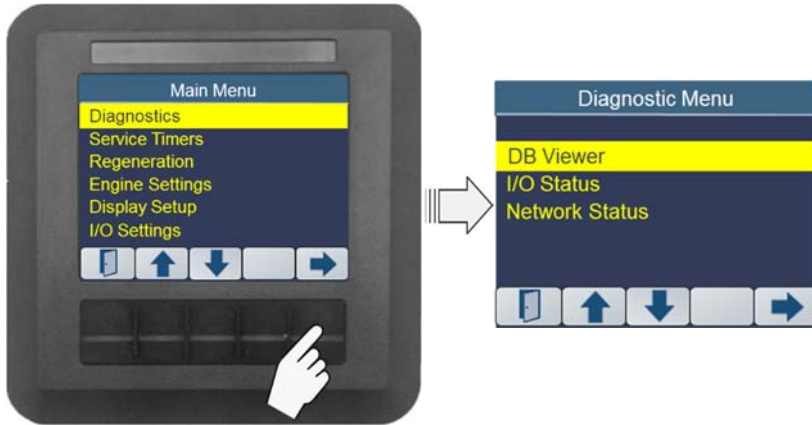


*Range of numeric values vary based on engine type

Main Menu

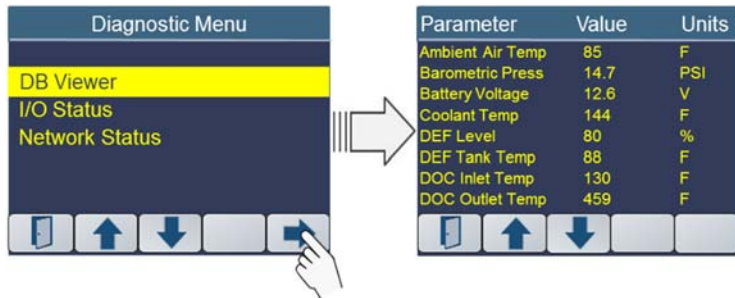
Diagnostic Menu

To access the Diagnostics screen, enter the Main Menu and then scroll to the “Diagnostics” entry using the “↓” and “↑” softkeys. Press the “→” softkey to select the Diagnostics menu item.



DB Viewer

The DB Viewer menu selection provides a listing of all data supported by the controller. To access the DB Viewer enter to the Main Menu. Navigate to the “DB Viewer” menu item using the “↓” and “↑” softkeys. Select DB Viewer using the “→” softkey.



The display will present a listing of the data in alphabetical order and provide a real-time update of the data values. Any data parameter that cannot be read, will show dashes “---” in the data value field. Use the softkey “←” to return to the previous display.

Note: Data shown will vary based on engine type.

SCR System Inducement 2

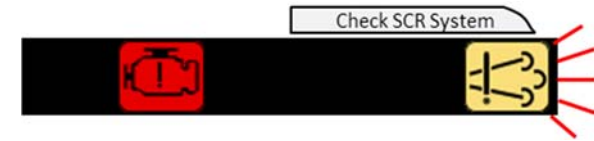
If the SCR System Inducement 1 is not corrected within the designated time, the aftertreatment system will progress to “SCR Inducement 2” Level. The operator must acknowledge this condition.



Once acknowledged, the operator will be informed the engine power has been reduced 50% and the Engine Speed set to Low Idle. This message must be acknowledged by the operator.



Once acknowledged, the Check Engine Alarm and SCR System Icon will be displayed along the bottom of the screen. The SCR System icon will be flashed.



DEF System Status

DEF Tank Warning

When the SCR Aftertreatment System detects a low DEF Tank Level, the SCR System will send a Warning to the control panel indicating the DEF Tank Level is low. This warning must be acknowledged by the operator.



Once acknowledged, the DEF Tank Level icon will be displayed along the bottom of the screen.



SCR System Status

SCR System Warning

When the Engine ECU detects a problem with the SCR System, ECU will send a Warning to the controller that must be acknowledged by the operator.



Once acknowledged, the operator will be informed of the time to when the engine performance will be de-rated. This too must be acknowledged by the operator. The “Time to De-rate” message will be reposted every 15 minutes.



Once acknowledged, the Check Engine Alarm and SCR System icon will be displayed along the bottom of the screen.



SCR System Inducement 1

If the SCR System Warning is not corrected within the designated time, the aftertreatment system will progress to “SCR Inducement 1” Level. The operator must acknowledge this condition.



Once acknowledged, the operator will be informed the engine power has been reduced 50%. This message must be acknowledged by the operator.

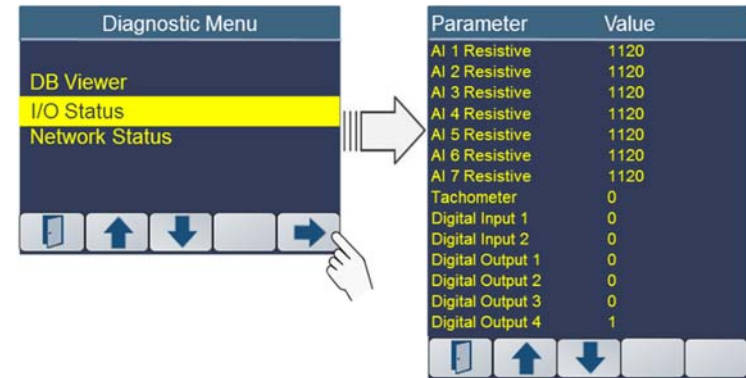


Once acknowledged, the Check Engine Alarm and SCR System icon will be displayed along the bottom of the screen.



I/O Status

The I/O Status display provides the measurement value (Resistance) for the Analog Inputs (AI1 through AI7), the status of the 2 Digital Inputs (DI1 and DI2) and the status of the 4 Digital Outputs (DO1 through DO4).



Use the “↓” and “↑” softkeys to navigate to I/O Status menu. Use the EXIT “⏏” softkey to return to the previous display.

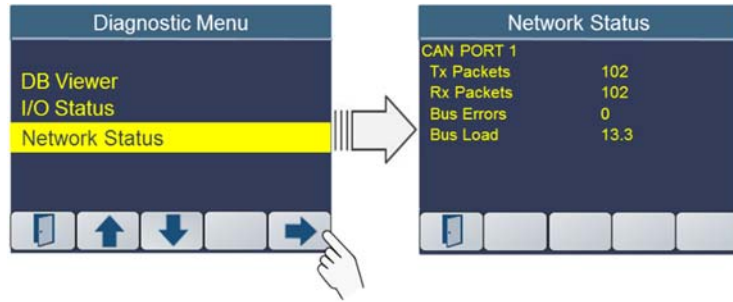
I/O Status Definition

Parameter	Description	Value Inactive	Value Active
AI1 Resistive	Throttle Up	1102	1
AI2 Resistive	Throttle Down	1102	1
AI3 Resistive	Oil Pressure	Sender Value	
AI4 Resistive	Fuel Level	Sender Value	
AI5 Resistive	Auxiliary #1	1102	120
AI6 Resistive	Auxiliary #2	1102	120
AI7 Resistive	Auxiliary #3	1102	120
Tachometer	Not Used		
Digital Input 1	External Shutdown	0	1
Digital Input 2	*Custom Input		
Digital Output 1			
Digital Output 2	Alarm Output	0	1
Digital Output 3	*RPM Alarm Output	0	1
Digital Output 4	Ignition Relay	0	1

*Not available in all installations

Network Status

Network Status is a diagnostic screen which provides information about the CAN bus communication. This information is used for troubleshooting in the field. Use the “↓” and “↑” softkeys to navigate to Network Status menu entry, then press the “→” softkey.



The Network Status display provides the Tx Packets, the Rx Packets, the number of bus errors and the bus loading for CAN Bus 1.

Use the EXIT “⏏” softkey to return to the previous display.

SCR After Treatment Operation

The Selective Catalytic Reduction (SCR) System delivers Diesel Exhaust Fluid (DEF) to the engine. There are two types of warnings:

1. SCR System Error
2. DEF Level Low

If the operator does not address the warning in a timely fashion, the engine performance will be de-rated.

SCR Aftertreatment Indicators



= SCR System Error. This icon is activated when the engine sends a CANBus message to the control panel indicating the SCR System has an error.



= DEF Level Low. This icon is activated when the engine sends a CANBus message to the control panel indicating DEF Tank Level is less than 10% full.

DEF Monitoring

Whether a Single or Quad display format, a bar graph will be displayed across the bottom of the screen. The user can select which bar graph is displayed:

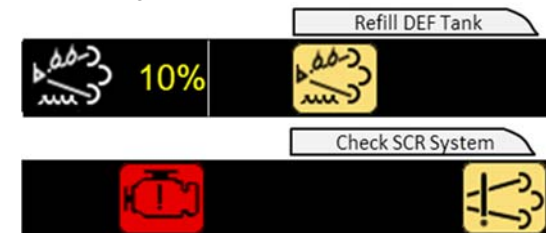
For T4F with DPF and SCR: Ash Load, DEF Level, Engine Hours, Fuel Level and Soot Load are available.

DEF Tank Level Bar Graph



Refer to the Display Setup section for selecting the desired Bar Graph.

The bar graph area of the display is also used to provide feedback on the SCR System Warnings.



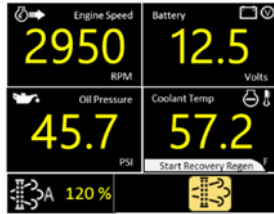
Recovery Complete:

When recovery regeneration is complete the control system will provide a prompt indicating completion. The engine will return to the minimum engine rpm value and be ready to return to normal operation. The operator must acknowledge the prompt by momentarily pressing the “✓” softkey.



Delaying:

Delaying the recovery regeneration process should only occur when the equipment must be prepared before for the process can begin. This delay is utilized in situations where a machine needs to be moved to a more suitable location to complete the regeneration process. The engine will remain in limp home mode until the regeneration process can be completed.



When ready, the operator may press any of the five buttons activate the softkey pop-up window. Then press the left most key “Regen” to start the Stationary Regen.

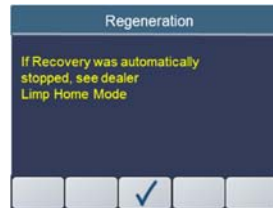
Conditions Not Met:

If either condition engine rpm not lowered to the “slow” rpm setting or the interlock mechanism not set the engine will not enter the regeneration process. The control system will prompt the operator if this condition exists. The operator must acknowledge this display. When acknowledged the control system will cycle back to the start of this sequence.



Aborting or Recovery unable to complete:

Should the operator need to abort the recovery regeneration process while it is active the control system allows the operator to enter the regeneration menu and select regeneration inhibit. The operator may also toggle the throttle switch to abort the process. When the engine has recognized the abort command, the control system will display the warning prompt shown. The operator must acknowledge this screen to return to run-time system operation.



Service Timers

The M154P panel has 10 service timers used to inform the operator when to perform preventative maintenance. Press the keypad button below the “➔” softkey to view the Service Timers.



Service Timers	Hours Remaining
Engine Oil	250
Engine Oil Filter	250
Engine Air Filter	150
Service Timer 1	OFF
Service Timer 2	OFF
Service Timer 3	OFF
Service Timer 4	OFF
Service Timer 5	OFF

The Service timer screen lists each maintenance activity and the number of hours remaining before service is required.

Service Timer Alert

When a Service Timer expires, the control panel will popup alert windows for each timer.




The operator must acknowledge this popup. Acknowledging the “Warning Maintenance Required” does not reset the timer so the alert popup will reinitiate for every 5 minutes.

Resetting the Service Timer

When the maintenance has been performed, the Service Timer must be reset.

On the Service Timer screen:

- Use the “↓” and “↑” softkeys to highlight the desired Service Timer
- Press the button under the “Reset” softkey  to reset the timer.

The panel will respond with a confirmation screen “Reset Timer?”, requiring the operator to answer “Yes” or “No”.

The panel will record the “Number of Resets” and the “Engine Hrs at Reset” of the last reset. This information may be viewed on the Service Timer interval screen.

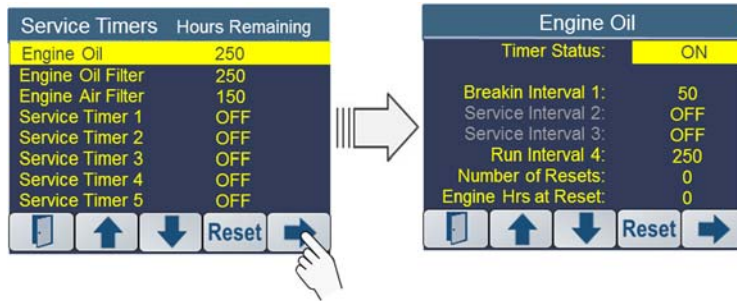
Setting Timer Intervals

To set the timer interval,

Select a Menu Item from the main menu

- use the “↓” and “↑” softkeys. to highlight the desired Service Timer.
- press the “→” key to select the menu item and view its setup menu.

Timer Status is used to enable (ON) and disable (OFF) the service timer.



Each Service Timer may be configured with up to 4 intervals:

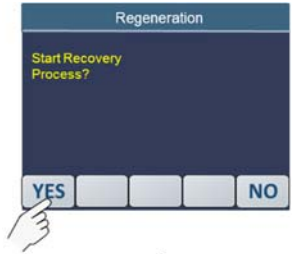
1. Breakin Interval 1
2. Service Interval 2
3. Service Interval 3
4. Run Interval 4

For example: Engine Oil service may be required after a “break in” period of 50 hours after which it will only require servicing every 250 hours.

NOTE: If a service has just one service interval, enter that duration into the Run Interval 4.

Confirming:

The operator will be prompted by the control system to begin the regeneration process. This is a final confirmation by the operator that regeneration is requested. The operator has the choice to begin regeneration by selecting the “Yes” softkey or exiting the regeneration request by selecting the “No” softkey.



If all conditions are met the control system will command the engine to the “initiate regeneration rpm value”. This value is configured within the ECU and cannot be changed. This value may vary by engine model. For most models this value is 800 rpm. Should conditions not be met the control system will display a checklist of items for the operator to review. See “Conditions not Met”.

Continuing by Selecting “YES”:

to the regeneration request will command the engine to enter regeneration mode. The control system will display a waiting prompt until the engine acknowledges the recovery regeneration state is active. Should all conditions not be met the control system will display a checklist of items for the operator to review.



Recovery Active:

When the recovery regeneration state is active the control system will display a timer showing the progress of the manual regeneration process. The time to complete stationary regeneration will vary based on the level of cleaning process that is needed. The maximum time is 3 hours. Stationary regeneration can be stopped at any time by entering the regeneration menu and selecting regeneration inhibit.



Caution: The regeneration process increases engine rpm. The throttle switch will not control rpm during this time. Care should be taken to ensure all safety measures are met before proceeding to the regeneration process.

Recovery Regeneration

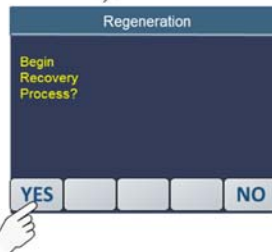
Recovery Regeneration is required when stationary regeneration is unable to be completed or has been inhibited for an extended period-of-time. The recovery regeneration state causes the engine to enter limp home mode preventing normal engine operation. This is the most serious regeneration condition and requires immediate operator intervention to initiate the regeneration process. Failure to initiate recovery regeneration could result in required DPF system service by an authorized engine technician.

Initiating Recovery Regeneration:

The control system will alert the operator that recovery regeneration is required by displaying an alert display indicating ‘Limp Home Mode Recovery Required’. This alert will activate even if regeneration has been inhibited. The operator must acknowledge this alert to continue. Acknowledgement of this alert is completed by momentarily pressing the “✓” softkey.

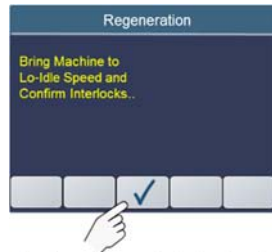


The operator will then be prompted to begin the recovery process or continue to delay the regeneration process. Selecting the “Yes” softkey will proceed with the recovery regeneration process. Selecting the “No” softkey will delay the recovery regeneration process.



Proceeding Or Initiating from delay:

The first display prompts the operator to reduce the engine throttle speed to the minimum rpm value. To return the engine to the minimum rpm value use the throttle switch “Turtle” position and adjust the engine speed to the programmed min rpm setting. (See engine menu for details on configuring min engine speed.)



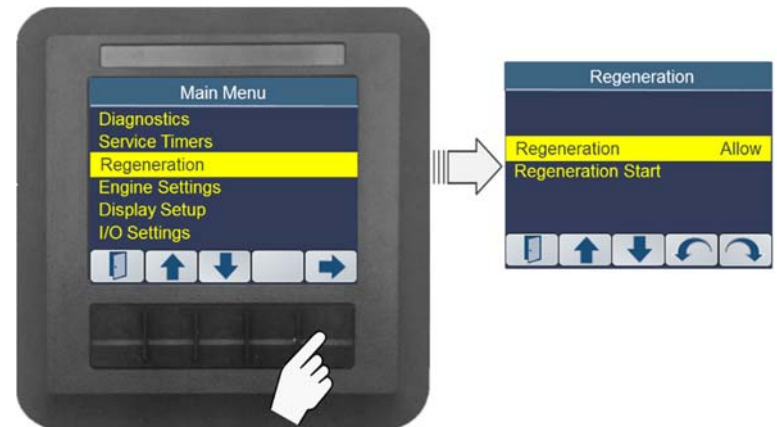
The prompt also reminds the operator to confirm that all interlocks have been set. (Note: Interlocks are application specific, are hardwired into the engine harness and are not controlled by the control panel.) The operator must acknowledge this prompt by momentarily pressing the “✓” softkey.

Regeneration

This menu item allows the operator to inhibit the regeneration process and manually start the regeneration process.

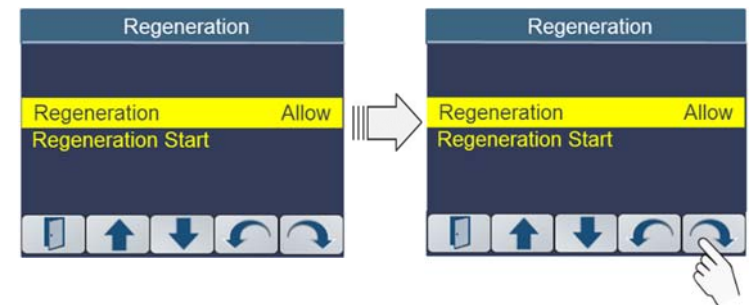
To access the Regeneration Menu, enter the Main Menu and use the “↓” and “↑” softkeys to navigate to the “Regeneration” menu item. When highlighted enter the “Regeneration” menu by selecting the button below the “→” softkey.

Note: This menu item is available when the selected Engine Type has aftertreatment capabilities. These would include aftertreatment systems for Diesel Particulate Filter (DPF) or Selective Catalytic Reduction (SCR) which require regeneration control.



Regeneration Inhibit

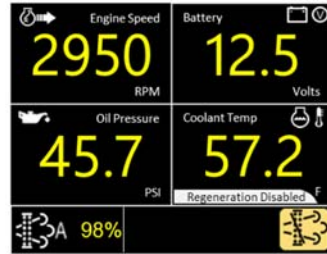
To access the Regeneration Menu, Allow/Inhibit setting, navigate through the “Regeneration” menu using “↓” and “↑” softkeys until the “Regeneration” entry is highlighted.



Choose the desired setting by cycling through the list of choices using the “Change” “U” or “O” softkeys.

Setting the Inhibit status will prevent any regeneration from occurring. This display will indicate inhibit is active by displaying the regeneration inhibit ICON in the icon window.

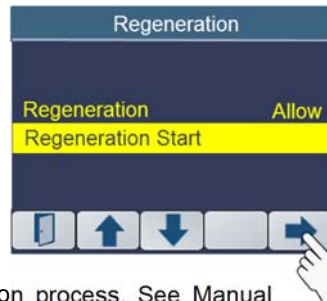
Note: Inhibiting regeneration for extended periods can cause the engine to enter various levels of de-rate inducements.



Regeneration Start

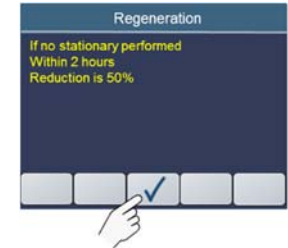
The “Regeneration Start” menu selection allows the operator to perform an aftertreatment regeneration when it is convenient to park the machine and perform the process.

This operation is typically performed if Reset Regeneration was unable to be completed and the operator has been informed that regeneration is needed but the operator has delayed the regeneration process. See Manual Regeneration section of this document for more details.



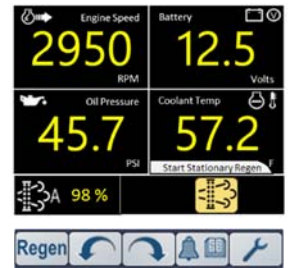
Delaying Stationary:

Delaying stationary regeneration is accomplished by selecting “No” to any of the prompts that ask the operator to continue with the regeneration process. Short delays of stationary regeneration are acceptable. This delay is utilized in situations where a machine needs to be moved to a more suitable location for the regeneration process.



Note: A system alert will occur informing the operator that engine power reduction will occur within 2 hours if stationary regeneration is not completed.

When the operator acknowledges the Power Reduce prompt the control panel returns to normal operation. The system will continue to remind the operator that stationary regeneration needs to be started.



When ready, the operator may press any of the five buttons activate the softkey pop-up window. Then press the left most key “Regen” to start the Stationary Regen.

Conditions Not Met:

If either condition, engine rpm not lowered to the “slow” rpm setting or the interlock mechanism not set the engine will not enter the regeneration process. The control system will prompt the operator if this condition exists. The operator must acknowledge this display. When acknowledged the control system will cycle back to the start of this sequence.



Aborting Stationary:

Aborting the stationary regeneration process while it is active is accomplished by entering the regeneration menu and selecting inhibit or toggling the throttle switch. Each of these actions will abort the process. When the engine has recognized the abort command the control system will display “Stationary Interrupted”. The operator must acknowledge this screen to return to normal operation.

Confirming:

The operator will be prompted by the control system to begin the regeneration process. This is a final confirmation by the operator that regeneration is requested. The operator has the choice to begin regeneration by selecting the “Yes” softkey or exiting the regeneration request by selecting the “No” softkey.



If all conditions are met the control system will command the engine to the “initiate regeneration rpm value”. This value is configured within the ECU and cannot be changed. This value may vary by engine model. For most models this value is 800 rpm.

Continuing by Selecting “YES”:

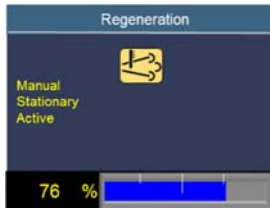
to the Regeneration request will command the engine to enter regeneration mode. The control system will display a waiting prompt until the engine acknowledges the stationary regeneration request and enters the regeneration state. Should all conditions not be met the control system will display a checklist of items for the operator to review. See conditions not met.



Stationary “Active”:

When the stationary regeneration state has been activated the control system will display a timer showing the progress of the stationary regeneration state. The time to complete stationary regeneration will vary based on the level of cleaning process that is needed. The maximum time is 30 minutes.

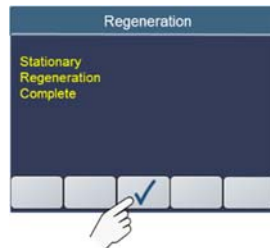
(Note: Stationary regeneration can be stopped at any time by entering the regeneration menu and selecting regeneration inhibit or by toggling the throttle switch.)



Caution: The regeneration process increases engine rpm. The throttle switch will not control rpm during this time. Care should be taken to ensure all safety measures are met before proceeding to the regeneration process.

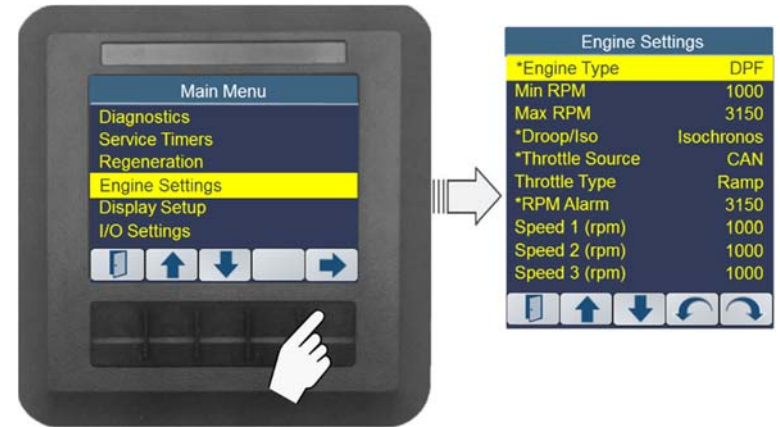
Regeneration “Complete”:

When stationary regeneration is complete the control system will provide a prompt indicating completion. The engine will return to the minimum engine rpm value and be ready to return to normal operation. The operator must acknowledge the prompt by momentarily pressing the “✓” softkey.



Engine Settings

To access the “Engine Settings” menu, enter the Main Menu and use the “↓” and “↑” softkeys to navigate to the “Engine Settings” menu item. When highlighted enter the “Engine Settings” menu by selecting the button below the “→” softkey.

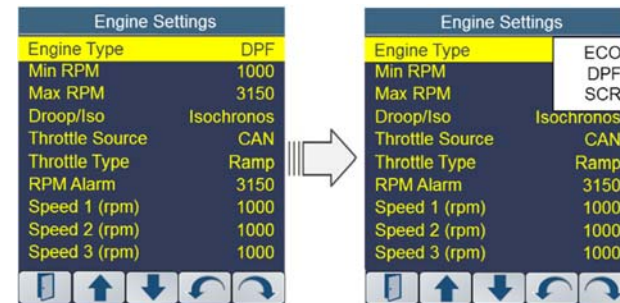


The Engine settings allows the operator to setup engine specific parameters such as Minimum RPM, Maximum RPM and Throttle Type (Ramp, 2-State or Disable).


**Items listed may not be available in all applications*

Engine Type

The controller allows the user to select the engine type: ECO or Tier 4F with DPF and Tier 4F with SCR.



Navigate through the “Engine Settings” menu using “↓” and “↑” softkeys until the “Engine Type” entry is highlighted. Press the “Change” “↻” or “↺” softkeys to switch between the ECO or DPF or SCR settings.


Use the EXIT “


Note: The Engine Type cannot be changed when the engine is running.

Setting Minimum and Maximum RPM


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

Min Engine Speed

To access the “Min RPM” setting, navigate through the “Engine Settings” menu using “

Use the **+ / -** softkeys to set the minimum engine rpm value. Use the EXIT “

Max Engine Speed


To access the “Max RPM” setting, navigate through the “Engine Settings” menu using “

Stationary Regeneration

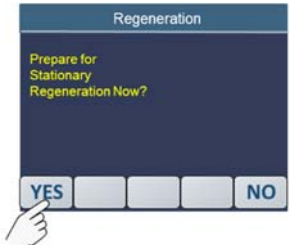
When conditions are met (i.e., Engine Hot Enough), T4F Engines with after-treatment will perform Regenerations automatically. However, if conditions are not acceptable or the ECU needs to perform a regeneration but the operator has Inhibited Regeneration, the ECU will “Request a Regeneration” to be performed by the operator. This is called “Stationary Regeneration”.

Stationary Regeneration is required when normal operation of the engine has prevented automatic regeneration to occur. This condition can occur due insufficient engine loading or operator intervention by inhibiting the regeneration process. This is a more serious condition and requires operator intervention to initiate the regeneration process.

Initiating Stationary Regeneration:

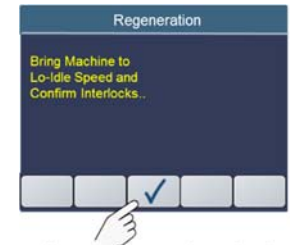
The control system will alert the operator that stationary regeneration is needed by displaying an alert display indicating ‘Stationary Regeneration Required’. This alert will activate even if regeneration has been inhibited. The operator must acknowledge this alert to continue. Acknowledgement of this alert is completed by pressing the “


The operator will then be prompted to “Prepare for Stationary Regeneration” or continue to delay the regeneration process. Selecting the “Yes” softkey will proceed with the stationary regeneration process with the control system guiding the operator through a series of interactive prompts.



Proceeding or Initiating from Delay:

The first display prompts the operator to reduce the engine throttle speed to the minimum rpm value. To return the engine to the minimum rpm value use the throttle switch “Turtle” position and adjust the engine speed to the programmed min rpm setting. (See engine menu for details on configuring min engine speed.)

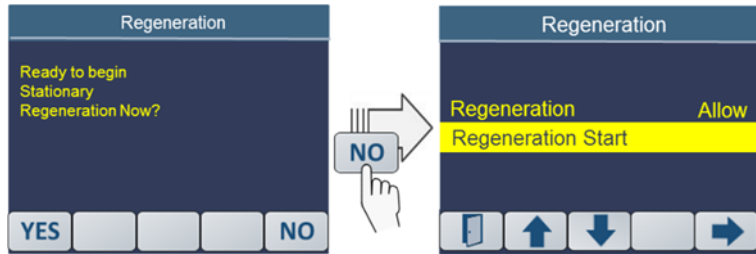


The prompt also reminds the operator confirm that all interlocks have been set. (Note: Interlocks are application specific, are hardwired into the engine harness and are not controlled by the control panel.) The operator must acknowledge this prompt by momentarily pressing the “

26

Exiting Manual:

Manual regeneration request can be canceled by selecting “No” will take the operator back to the regeneration menu. At that time the operator can re-enter the regeneration start sequence or exit the menu and proceed to normal operation.



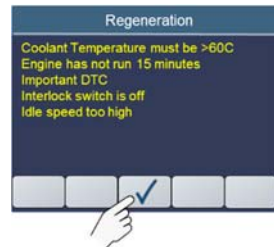
Not 50hrs Since Last Regen:

Manual regen will not be allowed if less than 50hrs of engine operation has occurred since the last regeneration cycle. Should this condition exist the control system will prompt the operator of this condition. The operator must acknowledge this request to continue to data displays.



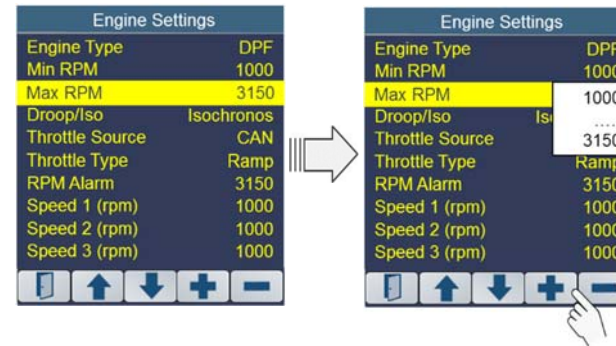
Conditions Not Met:

If either condition engine rpm not lowered to the “slow” rpm setting or the interlock mechanism not set, the engine will not enter the regeneration process. The control system will prompt the operator if this condition exists. The operator must acknowledge this display. When acknowledged the control system will cycle back to the start of this sequence.



Aborting Manual:

Aborting the manual regeneration process while it is active is accomplished by entering the regeneration menu and selecting inhibit or toggling the throttle switch.

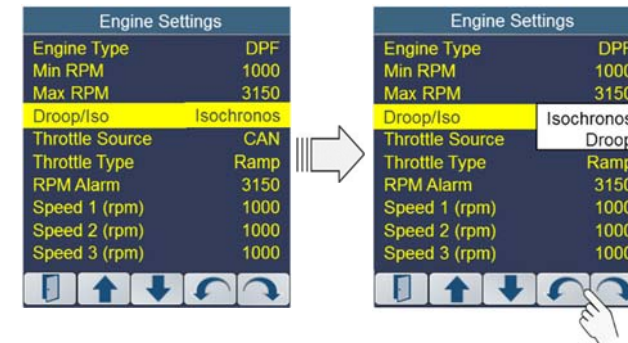


Use the +/- softkeys to set the maximum engine rpm value. Use the EXIT “ ” softkey to save the selection and return to the previous display.

Droop/ISO

The controller allows the user to select Droop or Isochronous operational mode.

To access the “Droop” setting, navigate through the “Engine Settings” menu using “ ” and “ ” softkeys until the “Droop/Iso” entry is highlighted.



Press the “Change” “ ” or “ ” softkeys to select the Droop or Isochronous setting.

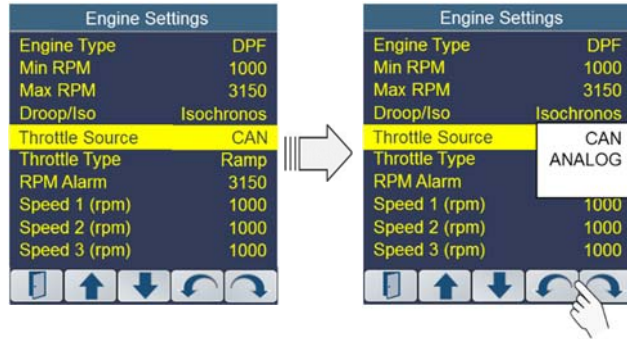
Note: Droop / Isochronous setting not available for all engines.

Use the EXIT “ ” softkey to save the selection and return to the previous display.

Setting Throttle Source

The controller allows the user to select either CAN or Analog Throttle Source.

To change the throttle source, access the “Throttle Type”. Navigate through the “Engine Settings” menu entry using “↓” and “↑” softkeys. When highlighted enter the Engine Settings menu by selecting the “→” softkey.



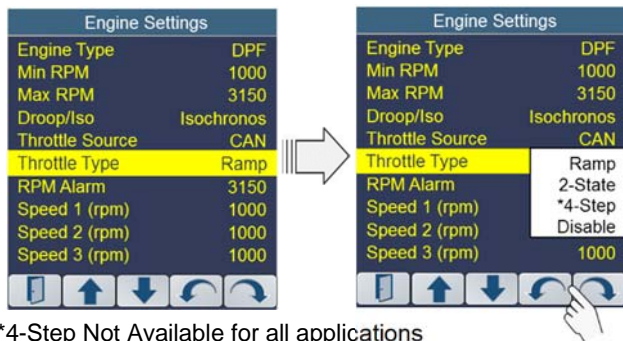
Choose the desired parameter setting by cycling through the list of choices using the “Change” “↺” or “↻” softkeys.

Note: Throttle Source setting not available for all engines.

Setting Throttle Type

The controller allows the user to configure three modes of throttle operation; Ramp, 2-State, 4-State and Disabled.

To change the throttle type operation, access the “Throttle Type”. Navigate through the “Engine Settings” menu entry using “↓” and “↑” softkeys. When highlighted enter the Engine Settings menu by selecting the “→” softkey.



*4-Step Not Available for all applications

If all conditions are met the control system will command the engine to the “initiate regeneration rpm value”. This value is configured within the ECU, cannot be changed and may vary from model to model. For most models this value is 800 rpm.

Confirming or Initiating from Delay:

The control system proceeds to prompt the operator with a regeneration confirmation screen. This is a final confirmation by the operator that regeneration is requested. The operator has the choice to begin regeneration by selecting the “Yes” softkey or exiting the regeneration request by selecting the “No” softkey (See “Exiting” section).



Continuing by Selecting “YES”:

to the regeneration request will command the engine to enter regeneration mode. The control system will display a waiting prompt until the engine acknowledges the manual regeneration state.



Manual “Active”:

When the manual regeneration state is active the control system will display a timer showing the progress of the manual regeneration state. The time to complete manual regeneration will vary based on the level of cleaning process that is needed. The maximum time is 30 minutes.

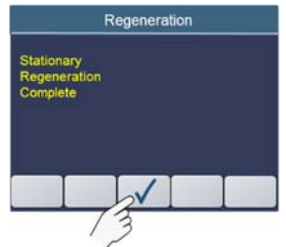
(Note: Manual regeneration can be stopped at any time by entering the regeneration menu and selecting regeneration inhibit or toggling the throttle switch.)



Caution: The regeneration process increases engine rpm. The throttle switch will not control rpm during this time. Care should be taken to ensure all safety measures are met before proceeding to the regeneration process.

Manual “Complete”:

When manual regeneration is complete, the control system will provide a prompt indicating completion. The engine will return to the minimum engine rpm value and be ready to return to normal operation. The operator must acknowledge the prompt by momentarily pressing the “✓” softkey.

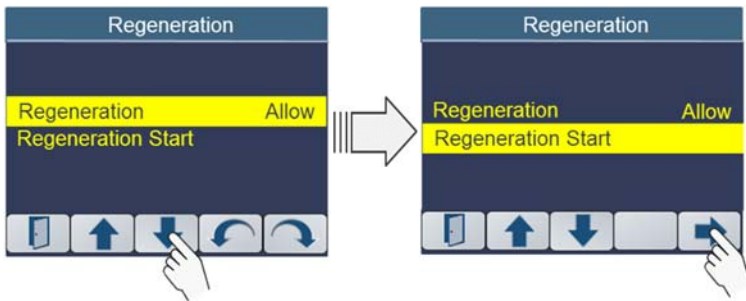


Note: Continuing to delay regeneration will cause the engine controller to eventually proceed to a more immediate regeneration state (“Stationary Regeneration”). When in this mode the engine must be parked and normal operation will not be allowed.

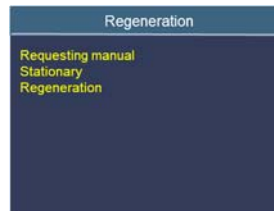
Manual Regeneration

Manual Regeneration allows the operator to decide when and where to take the equipment out of service to perform the regeneration process.

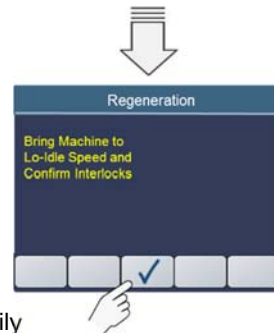
Initiating: The control system provides a menu selection to initiate this process. Enter the Main Menu and select Regeneration. Then cursor down to Regeneration Start and press the “**→**” softkey to start Manual Regeneration.



Requesting: When manual regeneration has been initiated by selecting “Regeneration Start”, the control system will provide a prompt indicating that it is requesting the engine to enter manual regeneration mode.



Proceeding: The operator will be guided through a series of display prompts before engine regeneration has been activated. The first prompt will ask the operator to reduce the engine throttle speed to the minimum rpm value. To set the minimum rpm value set the throttle switch to the slow setting. The operator will also be asked to confirm all interlocks have been set. Interlock settings are prewired from the factory and no additional input is needed from the operator for this setting. The operator must acknowledge this prompt by momentarily pressing the “**✓**” softkey.



Choose the desired parameter setting by cycling through the list of choices using the “**Change**” “**↶**” or “**↷**” softkeys.

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.*

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.

4-Step Throttle Operation

4-step throttle operation allows the operator to choose between four predetermined engine speeds at the single touch of the throttle control. The four predetermined engine speeds are defined by the rpm value configured in the Engine Settings menu for “Min RPM” speed “Speed 1 RPM”, “Speed 2 RPM” and “Speed 3 RPM” speed. Subsequent presses of the throttle control in the “Rabbit” position incrementally sets the engine rpm to the configured rpm speed setting. Pressing the throttle control in the “Turtle” position subsequently returns the engine rpm to the configured “Min RPM” speed setting by cycling down through the Speed 3 to Speed 1 settings.

Disabled Throttle Operation

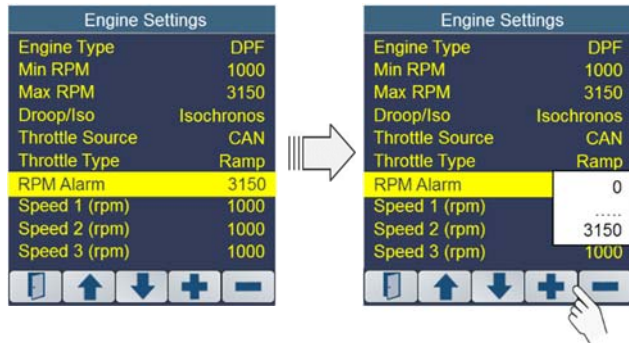
To use the panel as a monitor, the operator can set the throttle type to “Disable” which prevents the panel from sending the J1939 TSC1 message to the engine.

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 values should be done with engine not running.

RPM Alarm

The controller allows the user to activate an alarm output based on an RPM setting. The controller constantly monitors engine speed and set the alarm output if the engine speed exceeds the alarm value. Maximum rpm alarm value setting is based on “Max RPM” value configured in the Engine Settings menu.

To change the throttle source, access the “Throttle Type”. Navigate through the “Engine Settings” menu entry using “↓” and “↑” softkeys. When highlighted enter the Engine Settings menu by selecting the “→” softkey.



Use the + / - softkeys to set the RPM Alarm value. Setting the RPM value to 0 will turn off the alarm. Please see Technical Specifications section of this manual for RPM Alarm Output connection.

Use the EXIT “⏏” softkey to save the selection and return to the previous display.

Note: RPM Alarm feature not available for all installations.

Speed 1, 2, 3 Setting

The controller allows the user to configure RPM values for three speed settings. These speed settings can be assigned to various I/O configurations to control the engine.

To access the “Speed 1 thru 3” settings, navigate through the “Engine Settings” menu using “↓” and “↑” softkeys until the desired “Speed” entry is highlighted. Press the “→” softkey to select the RPM value entry setting.

Regeneration Inhibited due to Low Exhaust Temp:

Should regeneration be required but the DOC Temperature is too low the control system will generate a display showing regeneration is requested. This condition is typically a result of insufficient engine loading. The control system indicates to the operator that engine load should be increased.



Regeneration Needed but Inhibited:

When an Automatic or Reset Regeneration is required but the operator has inhibited regeneration, the controller will prompt the user to perform a regeneration.

Since this is an unexpected event and unfamiliar to the operator, the M154P will provide a series of prompts to walk the operator through the process.



If the operator is not ready and presses “Delay” the controller will display “Regen Requested” text and ICON.

The operator will be reminded on a periodic basis to perform the regeneration process.



When ready, the operator may press any button to pop-up the Regen Softkeys.



if the operator is ready and presses “Allow”, the Automatic Regeneration will begin. The data display will indicate this status using ICONS and text indicators.

Regeneration Modes

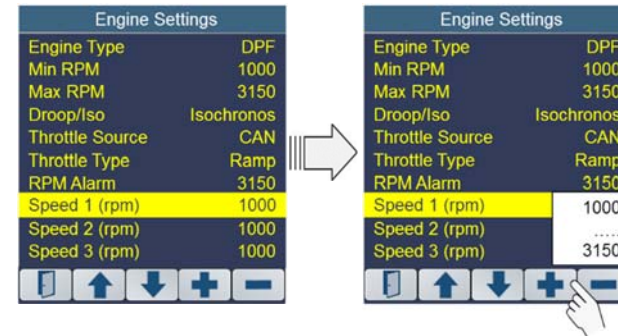
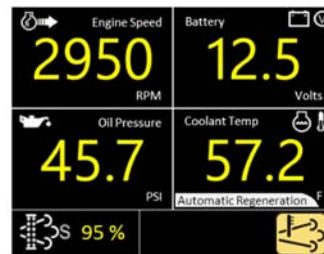
The Yanmar Tier 4F engine has 4 regeneration states.

- **Automatic or Reset** – This is the most common regeneration state and occurs without operator intervention.
- **Manual** – This regeneration state is initiated by the operator through the control panel menu. Manual regeneration can be initiated by the operator at any time as long as the engine has run at least 50 hours since the last regeneration cycle.
- **Stationary** – This regeneration state is more serious. Continued engine operation with this request active will ultimately cause the engine to enter a recovery state and enter limp home mode. This state will be entered should the operator continue to operate the engine with regeneration inhibited while ignoring the control system requests for regeneration.
- **Recovery** – Recovery regeneration is entered when the engine cannot perform regeneration. When in this mode the engine will enter a limp home mode limiting engine operation. It is recommended that the operator perform regeneration immediately.


The operator will be notified when an Automatic or Reset Regen is being performed and no operator intervention required. However, operation interaction is required for Manual, Stationary and Recovery Regeneration modes. For these modes, the operator will be given user friendly, step-by-step instructions on how to perform the regeneration properly.

Automatic or Reset Regeneration

Active: Automatic or Reset Regeneration is performed when normal engine operation provides sufficient exhaust temperatures AND regeneration is not inhibited by the operator. During this process a “High Exhaust Temperature” icon will be displayed warning the operator that high exhaust temperatures are present.

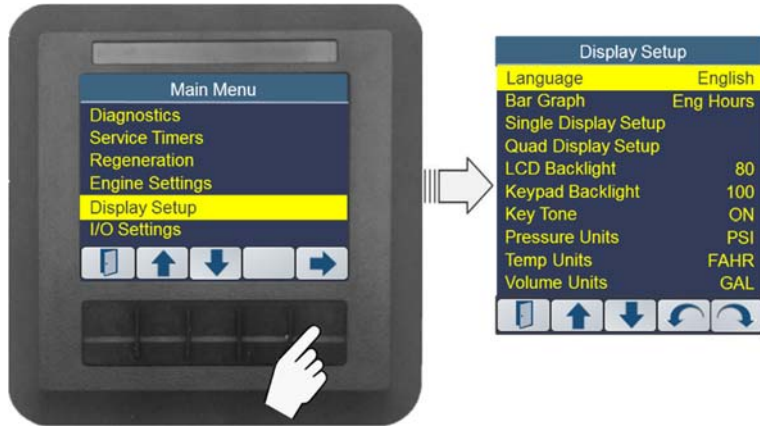


Use the **+/ -** softkeys to set the desired rpm value for the chosen speed setting. The settable rpm range for each speed setting is restricted to the values contained in the “Min RPM” and “Max RPM”.

Use the EXIT “” softkey to save the selection and return to the previous display.

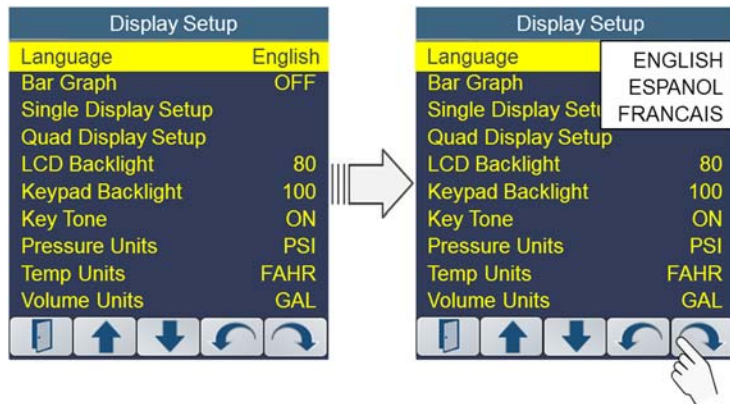
Display Setup

To access the Display Setup, enter the Main Menu and use the “↓” and “↑” softkeys to navigate to the “Display Setup” menu item. When highlighted enter the “Display Setup” menu by selecting the button below the “→” softkey.



Language

The controller provides a language selection via the Display Setup menu. To set the language, navigate to the Language selection in the Display Setup menu and use the “U” or “O” softkeys to set the language.






Use the “EXIT” softkey to save the selection and return to the previous display.

DPF Aftertreatment

DPF Aftertreatment (Diesel Particulate Filter) is used to filter particulates from the exhaust of diesel engines. Overtime the unburned soot in the exhaust begins to clog this filter. When this occurs, the engine ECU will automatically perform a DPF Regeneration. The regeneration cycle uses the high temperature of the exhaust to burn the excess particulate matter to return the engine to its optimum performance.

DPF Aftertreatment Indicators

-  = Regeneration Needed Lamp. This icon is activated when the engine sends a CANBus message to the control panel indicating the DPF has become restricted.
-  = Regeneration Inhibited Lamp. This icon is activated when the engine sends a CANBus message to the control panel indicating DPF regeneration is inhibited.
-  = HEST Lamp. DPF Regeneration Active This icon is activated when the engine detects High Exhaust Temperature due to regeneration.

DPF Bar Graph Display

Whether a Single or Quad display format, a bar graph will be displayed across the bottom of the screen. The user can select which bar graph is displayed:

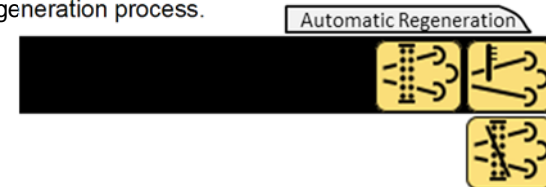
For T4F with DPF: Ash Load, Engine Hours, Engine Load, Fuel Level or Soot Load.

Soot Load Bar Graph



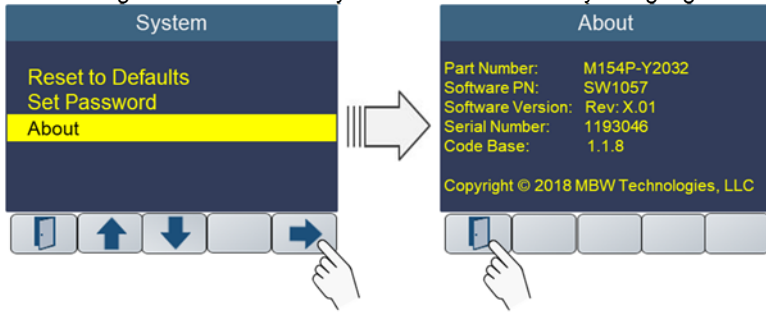
Refer to the Display Setup section for selecting the desired Bar Graph.

The bar graph area of the display is also used to provide feedback on the DPF Regeneration process.



About

The About screen contains information on SW Version and product serial number. To view this information, navigate through the “System Menu” menu using “↓” and “↑” softkeys until the “About” entry is highlighted.

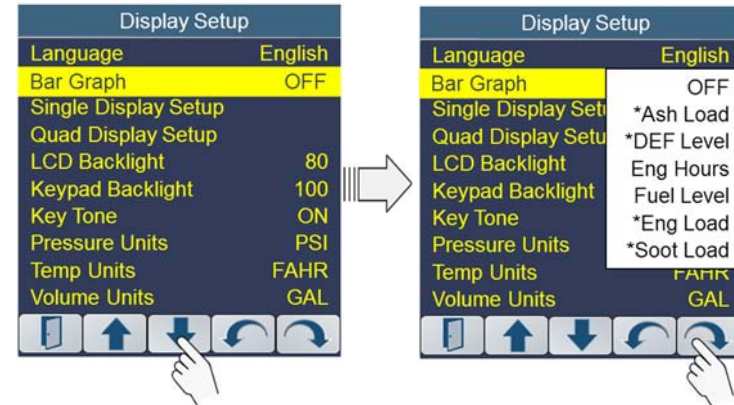


Use the “EXIT” softkey to save the selection and return to the previous display.

Bar Graph

The controller can display a bar graph along the bottom of the screen. There are up to seven bar graph choices: Engine Hours, Engine Load, Fuel Level, Ash Load, Soot Load, DEF Level and Off.

To access the bar graph setting, navigate through the “Display Setup” menu using “↓” and “↑” softkeys until the “Display Mode” entry is highlighted.



Choose the desired bar graph setting by cycling through the list of choices using the “Change” “↻” or “↺” softkeys.

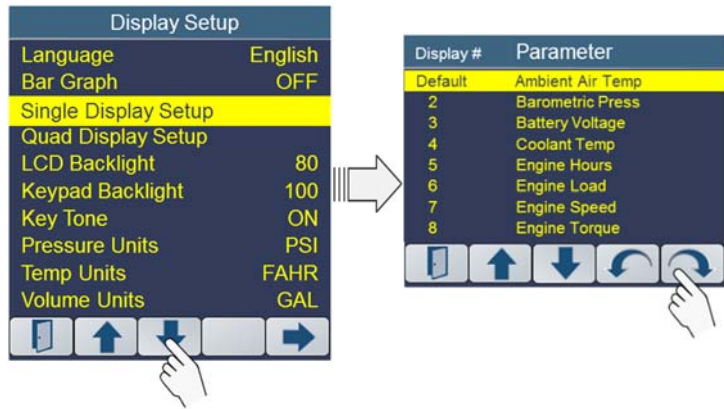
***Note: The selection list dynamically changes for the engine type selected under Engine Settings.**

Use the “EXIT” softkey to save the selection and return to the previous display.

Single Display

The Single Display menu item allows the operator to define which data parameters and their order in which they will appear as the operator cycles through the main rotation list.

To select the Single Display Setup, navigate through the Display Setup menu using “↓” and “↑” softkeys until the “Single Display Setup” entry is highlighted then press the button below “↻” softkey.



Next, use the “↓” and “↑” softkeys to highlight the display # where you would like to change the parameter. Use the “Change” “↻” or “↺” softkeys to cycle through the Master Parameter list until the desired parameter is reached. Continue to the next Display # to be changed and repeat.

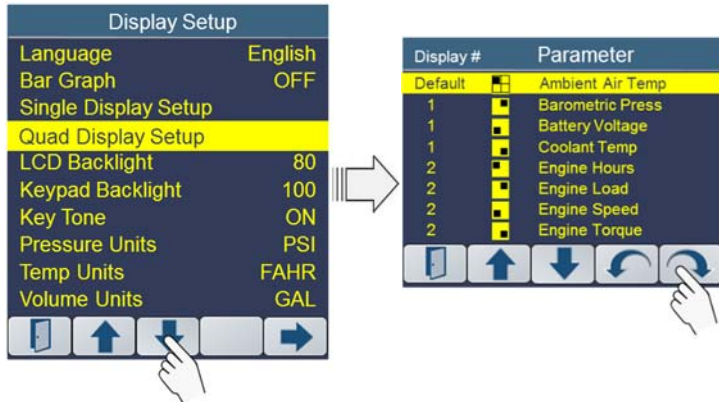
The display of any specific parameter can be removed from the runtime display list by selecting “Off”. The default display parameter can not be set to “Off”.

Use the “EXIT” softkey to save the selection and return to the previous display.

Quad Display

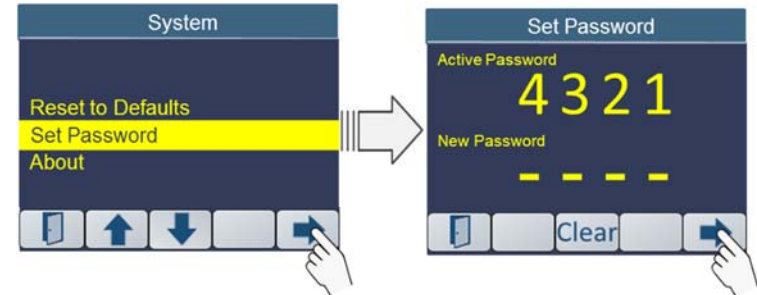
The Quad Display menu item allows the operator to define which data parameters will be displayed in which quadrant and the order in which quad screens will appear as the operator cycles through the quad screens.

To select the Quad Display Setup, navigate through the Display Setup menu using “↓” and “↑” softkeys until the “Quad Display Setup” entry is highlighted then press the button below “→” softkey.

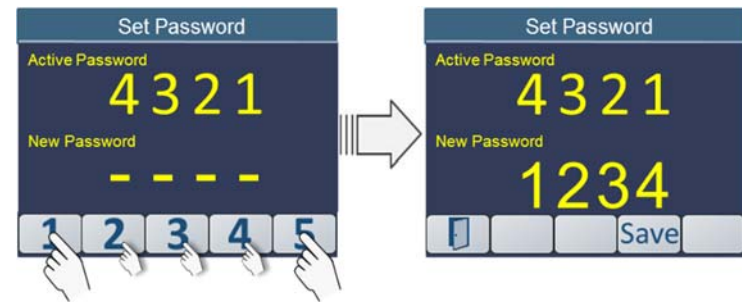


Set Password

The “Set Password” screen allows the operator to define a unique password for the controller. To set the password, navigate through the “System Menu” menu using “↓” and “↑” softkeys until the “Set Password” entry is highlighted. Press the button below the “→” softkey to set/change the password. Pressing the “Clear” button will set the password to all “0s”. (i.e., Clear). Press the “Save” button to disable the password.



To enter a new password, press the keypad button below the “→”.

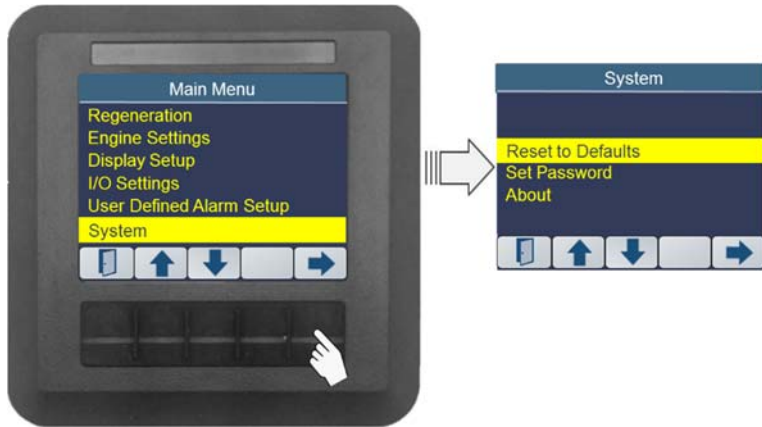


Use the numeric keys, 1 through 5 to enter a new password. When the buttons have been pressed four times, the “Save” button will appear. Pressing “Save” will enable the new password. To cancel the entry, press the “EXIT” softkey.

System

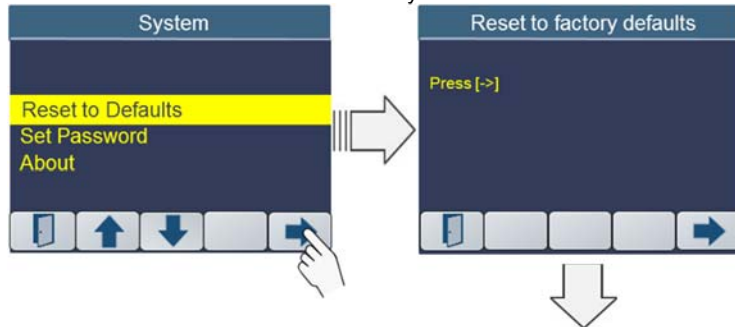
To access the “System” setting, navigate through the Main Menu using the and “↓” and “↑” softkeys until the “System” entry is highlighted.

Press the button below the “→” softkey to enter the System Menu screen.

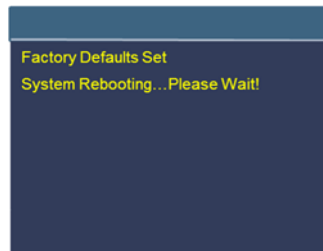


Reset to Defaults

Press the button below the “→” softkey to select “Reset to Defaults”.



Press the button below the “→” softkey to return the unit to factory defaults. The system will reboot.



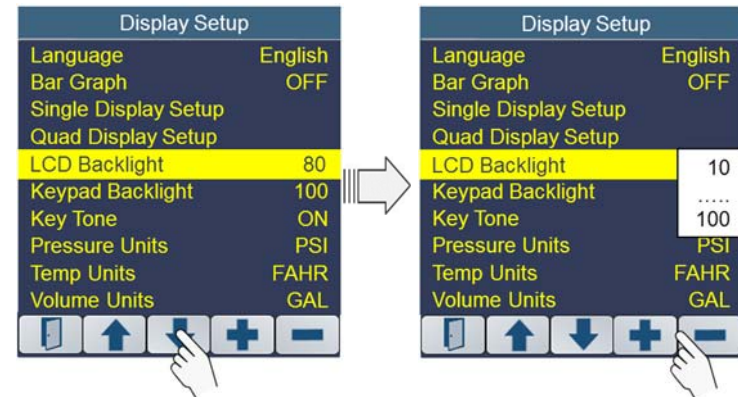
Next, use the “↓” and “↑” softkeys to highlight the display # where you would like to change the parameter. Use the “Change” “↺” or “↻” softkeys to cycle through the Master Parameter list until the desired parameter is reached. Continue to the next Display # to be changed and repeat.

The display of any specific parameter can be removed from the runtime display list by selecting “Off”. The default display parameter cannot be set to “Off”.

Use the “EXIT” softkey to save the selection and return to the previous display.

LCD Backlight

The LCD backlight is adjustable from 10% to 100%. Navigate through the “Display Setup” menu using “↓” and “↑” softkeys until the “LCD Backlight” entry is highlighted.

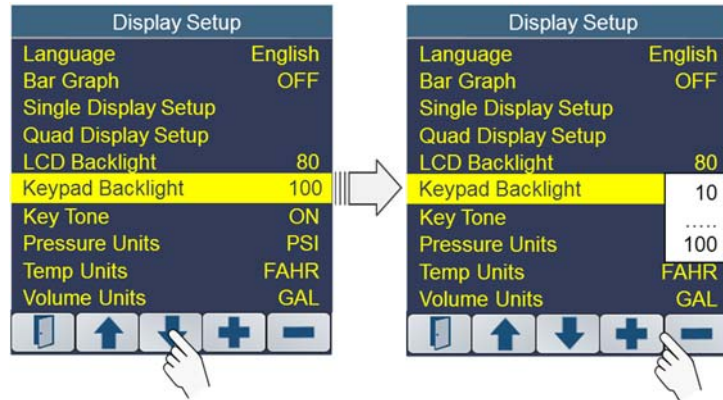


Use the “+ / -” softkeys to set the backlight value. Use the “EXIT” softkey to save the selection and return to the previous display.

Keypad Backlight

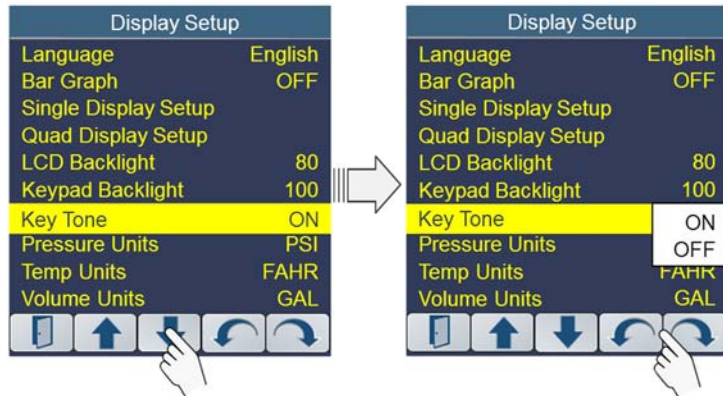
The keypad backlight is adjustable from 10% to 100%. Navigate through the “Display Setup” menu using “↓” and “↑” softkey until the “Keypad Backlight” entry is highlighted.

Use the “+/-” softkeys to set the keypad backlight value. Use the “EXIT” softkey to save the selection and return to the previous display.



Key Tone Setting

The Key Tone can be turned Off and On. Navigate through the “Display Setup” menu using “↓” and “↑” softkeys until the “Key Tone” entry is highlighted.



Use the “Change” “U” or “O” softkeys to switch between On and Off. Use the “EXIT” softkey to save the selection and return to the previous display.

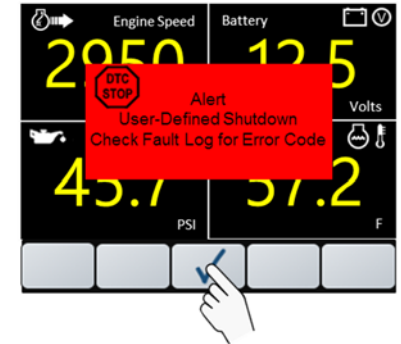
Pressure Units Setting

The Pressure Units menu item is used to set the display units to PSI, BAR or kPA. To change the Pressure Units, navigate through the “Display Setup” menu using “↓” and “↑” softkeys until the “Pressure Units” entry is highlighted.

Use the “Change” “U” or “O” softkeys to switch between PSI, BAR or kPA. Use the “EXIT” softkey to save the selection and return to the previous display.

DTC Shutdown NOT Acknowledged

The operator is required to acknowledge a DTC Shutdown. Therefore, if a DTC Shutdown occurs but the alarm is NOT acknowledged before turning off the engine, the alarm will be reposted when the engine is restarted.



It is possible when the engine is restarted, the condition is no longer present.

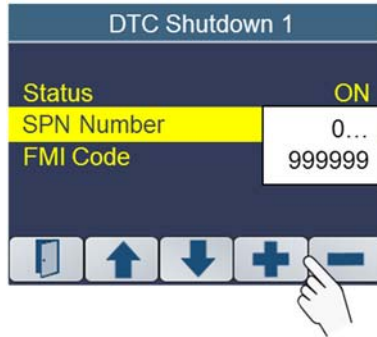
For example: High Coolant Temp alarm shuts down the engine; however, once the engine is turned off, the engine cools off and the alarm goes away. When this occurs, the panel will post the alarm to check the fault log for the error code.

Set DTC SPN Number

To set the SPN Number for the Alarm Shutdown condition, use the “↓” and “↑” softkeys to navigate to “SPN Number” then use the “+” or “-” softkeys to increment and decrement the SPN Number from 0 to 999999.

Commonly used SPNs are:
 SPN 100 Oil Pressure
 SPN 110 Coolant Temperature

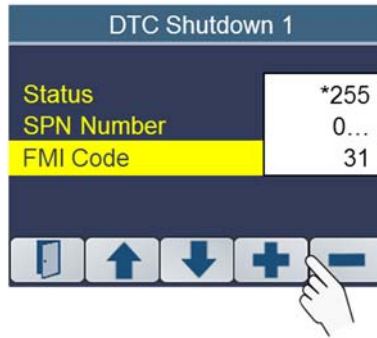
Commonly used FMI Codes are:
 0: Above Normal - Severe
 1: Below Normal - Severe



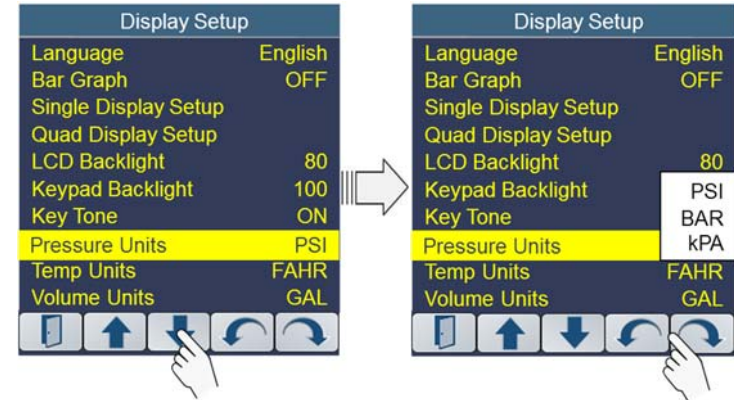
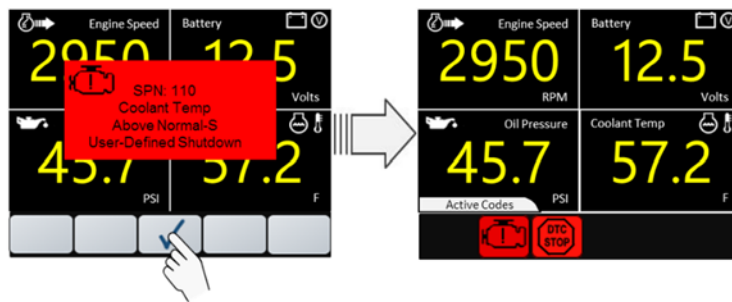
Set DTC FMI Code

To set the FMI Code for the Alarm Shutdown condition, use the “↓” and “↑” softkeys to navigate to “FMI Code” then use the “+” or “-” softkeys to increment and decrement the SPN Number from 0 to 31.

**Note: Setting the FMI Code to “255”, allows the engine to be stopped on any FMI associated with the SPN entered.*

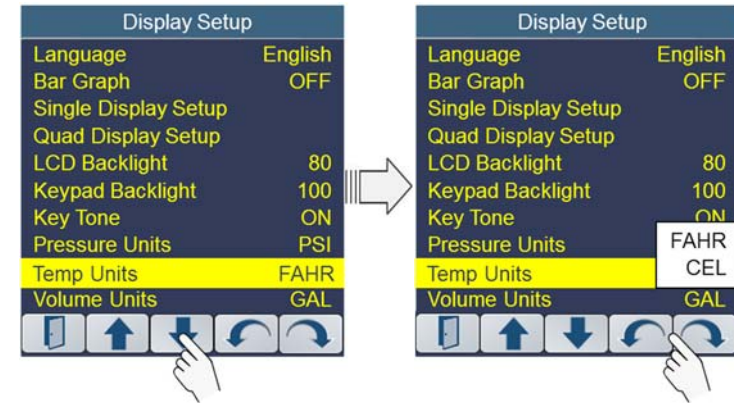


In the event the DTC Alarm occurs, a popup warning will be displayed and the engine will be shutdown. When the alarm has been acknowledged, the DTC Alarm Stop icon will be displayed along the bottom of the screen.



Temperature Units Setting

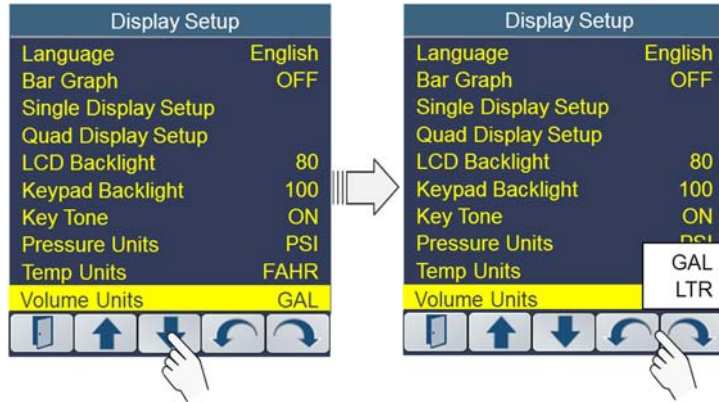
The Temperature Units menu item is used to set the display units to Fahrenheit and Celsius. To change the Temperature Units, navigate through the “Display Setup” menu using “↓” and “↑” softkeys until the “Temperature Units” entry is highlighted.



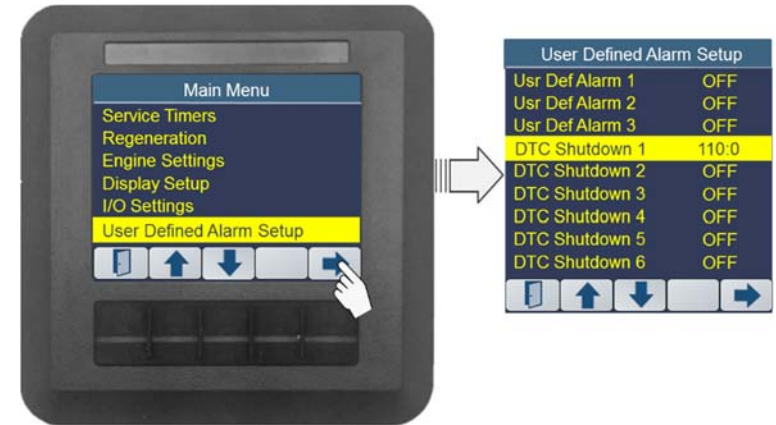
Use the “Change” “↻” or “↺” softkeys to switch between FAHR or CEL. Use the “EXIT” softkey to save the selection and return to the previous display.

Volume Units Setting

The Volume Units menu item is used to set the display units to Gallons and Liters. To change the Volume Units, navigate through the “Display Setup” menu using “↓” and “↑” softkeys until the “Volume Units” entry is highlighted.



Use the “Change” “U” or “O” softkeys to switch between GAL or LTR. Use the “EXIT” softkey to save the selection and return to the previous display.



User Defined Alarm Setup	
Usr Def Alarm 1	OFF
Usr Def Alarm 2	OFF
Usr Def Alarm 3	OFF
DTC Shutdown 1	110:0
DTC Shutdown 2	OFF
DTC Shutdown 3	OFF
DTC Shutdown 4	OFF
DTC Shutdown 5	OFF
DTC Shutdown 6	OFF

To access the Alarm Shutdown, enter the Engine Settings menu and use the “↓” and “↑” softkeys to navigate to the “Alarm Shutdown” menu item. When the “Alarm Shutdown” is highlighted, press the button below the “▶” softkey to enter the “Alarm Shutdown Setup” menu.

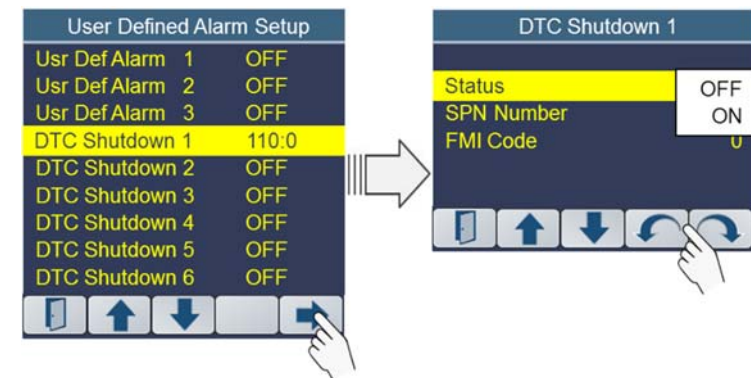
To setup a DTC alarm shutdown, the operator must set three conditions:

1. Enable the Alarm
2. Set the SPN Number
3. Set the FMI Code

When the SPN/FMI is reported by the Engine ECU, the controller will stop the engine by opening the ignition or by sending a stop command to the engine depending on the Engine Type.

Enable DTC Alarm (Status)


To enable the Alarm Shutdown condition, use the “↓” and “↑” softkeys to navigate to the desired alarm (i.e., 1 through 6) then press the button below the “▶” softkey. Use the “Change” “U” or “O” softkeys. Toggle between Disable and Enable selections.



DTC Shutdown 1	
Status	OFF
SPN Number	ON
FMI Code	U

Alarm Setpoint

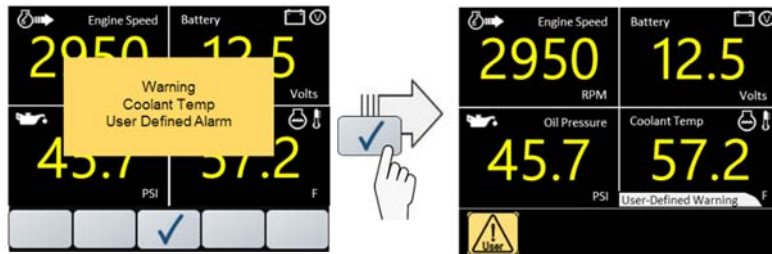
Use the **+** / **-** softkeys to set the Alarm setpoint. The units for the Alarm Setpoint are the same as those used in the units setup in the Display Setup screen.

Use the EXIT “

User Defined Alarm example:

- Alarm Type: Coolant Temp
- Alarm Function: High
- Alarm Setpoint: 220 F

If the engine Coolant Temperature increases beyond the 220 F setpoint, a popup alarm will occur and announce an alarm tone for 30 seconds.



When the alarm has been acknowledged, the User Alarm Warning icon will be displayed along the bottom of the screen.

DTC Shutdown Alarms

The controller allows the operator to setup DTC (Diagnostic Trouble Code) Alarms that will shutdown the engine when they occur.

The controller supports 6 DTC Shutdown Alarms. These alarms are configured by defining specific SPN Number and FMI Numbers. These parameters are defined by the J1939 CANbus Standard and in some cases proprietary parameters are defined by the specific engine manufacturer.

I/O Settings

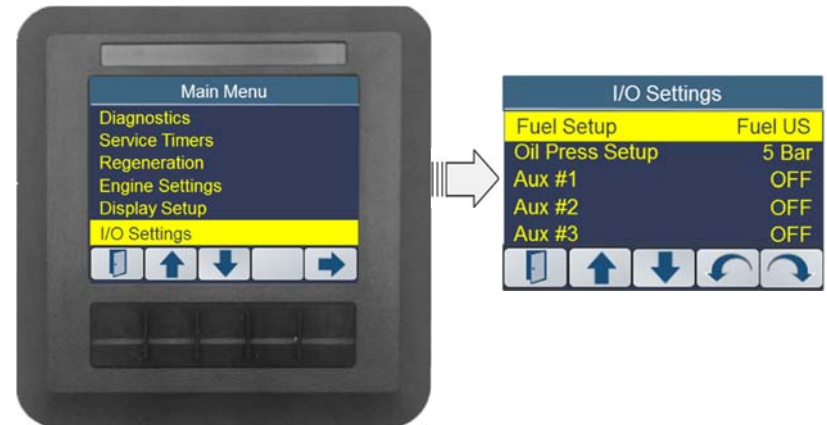
I/O Settings allows the operator to configure the controller I/O. Analog and digital input settings for items such as Fuel Level, Oil Pressure, Engine Stop, Speed settings and Start Inhibit are configured in this menu.

Note: Not all configurations of software and hardware provide external I/O capability.



Configuring Analog Inputs

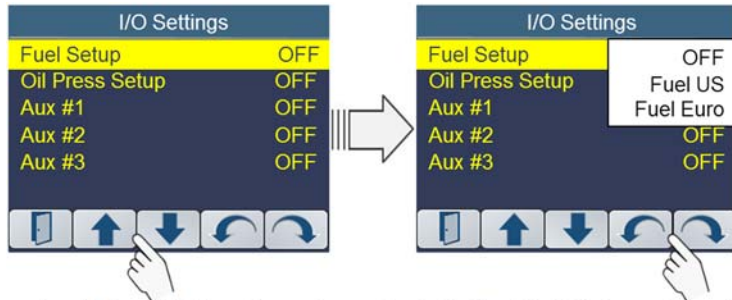
To configure measurement of Fuel Level or Oil Pressure enter the Main Menu and select the “I/O Settings” menu.



Fuel Level

The fuel setup input can be configured as follows;

- “Off” Input is disabled
- “Fuel US” 240 to 33 ohms sender
- “Fuel Euro” 10 to 180 ohms sender



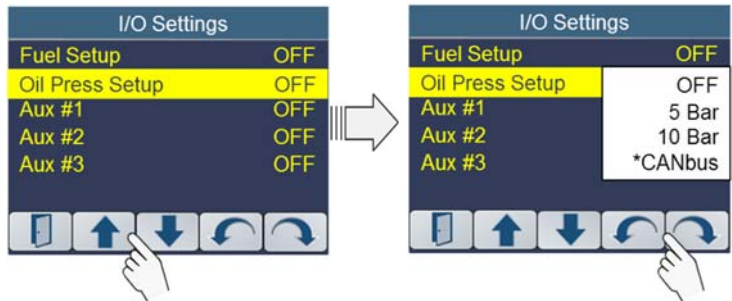
Use the “↓” and “↑” softkeys to navigate to the Fuel Setup option, then press the “O” or “U” softkeys to switch between the choices shown above. Stop when the desired mode is displayed.

Use the EXIT “⏏” softkey to save the selection and return to the previous display. See I/O Connector specification for specific input assignments.

Oil Pressure

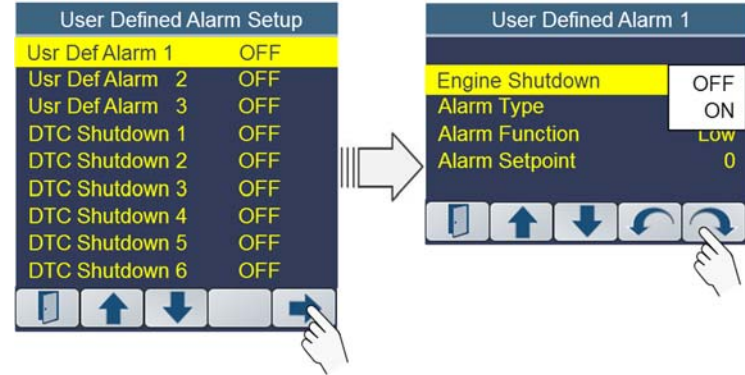
The oil pressure input can be configured as follows;

- “Off” Input is disabled
- “5 Bar” 10 to 180 ohms sender w/5 Bar range
- “10 Bar” 10 to 180 ohms sender w/10 Bar range
- “CANbus” Oil Pressure read from CANbus (J1939 format)



Use the “↓” and “↑” softkeys to navigate to the Oil Pressure option, then press the “O” or “U” softkeys to switch between the choices shown above. Stop when the desired mode is displayed.

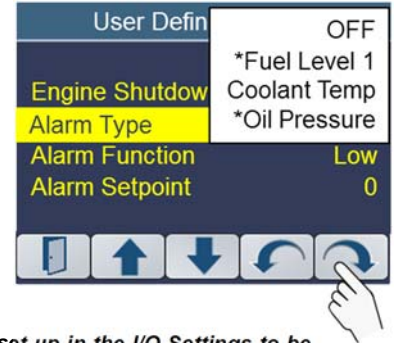
Use the EXIT “⏏” softkey to save the selection and return to the previous display. See I/O Connector specification for specific input assignments.



Alarm Type

The controller allows the operator to set alarms for three parameter types: Coolant Temp, Oil Pressure and Fuel Level 1. The default is OFF.

Use the “O” or “U” softkeys to cycle through to one of the three alarm types: Oil Pressure, Coolant Temp and Fuel Level 1. Press the “↓” to move to the next setup parameter.

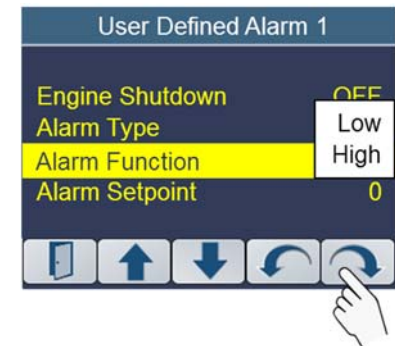


**Oil Pressure and Fuel Level must be set up in the I/O Settings to be displayed in the Alarm list.*

Alarm Function

Use the “O” or “U” softkeys to select whether the Alarm Type is a High alarm or a Low alarm.

Press the “↓” to move to the next setup parameter.



User Defined Alarms

The M154P Series Controller incorporates an advanced alarm subsystem to provide the operator with a wide range of system warnings and engine shutdown alarm configurations.

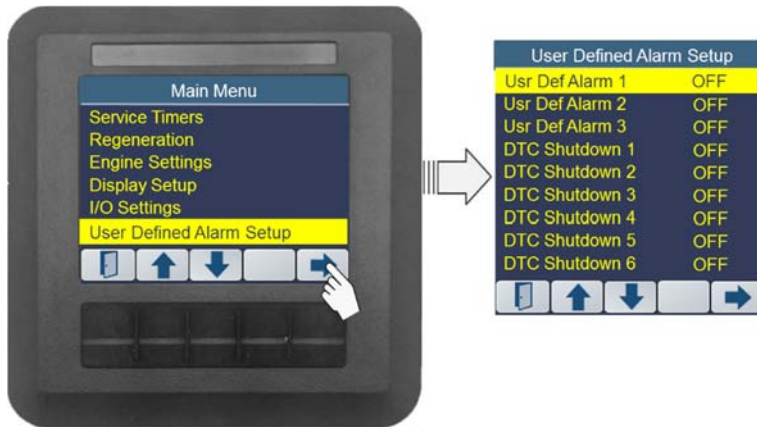
Two types of alarms are available.

1. User Def Alarms can be assigned to fuel level, oil pressure or coolant temperature values.
2. Diagnostic Trouble Code (DTCs) Alarms can be assigned to actual fault code conditions reported by the engine.

The controller supports 3 User Def Alarms. Each of these alarms can be enabled to shutdown the engine. If engine shutdown is not enabled the alarm will provide a warning to the operator when the alarm condition exists.

CAUTION!!! To avoid erroneous alarm conditions, this menu selection is disabled (Not Visible in main menu) when the engine is running.

To access the User Defined Alarms, enter the Main Menu and use the “↓” and “↑” softkeys to navigate to the “User Defined Alarms” menu item. When highlighted enter the “User Defined Alarms” menu by selecting the button below the “→” softkey.



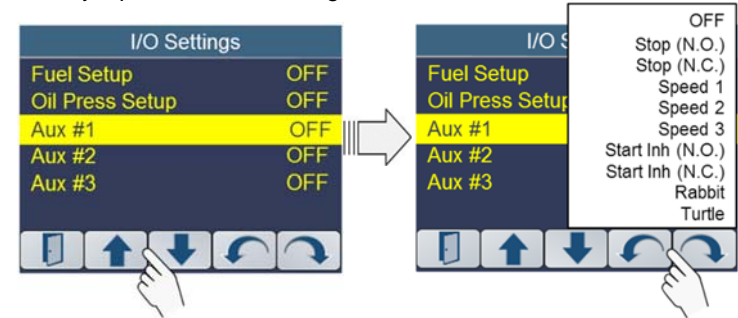
Engine Shutdown Setup

Navigate to one of the three User Defined Alarms using the “↓” and “↑” softkeys. Press the “→” softkey to select the “User Defined Alarm”.

To enable the Engine Shutdown condition when the User Defined Alarm occurs, use the “Change” “⌂” or “⌂” softkeys. Toggle between OFF and ON selections.

Auxiliary Inputs

Three Auxiliary Inputs are provided. Each input is operator configurable to provide a variety of remote input functions. These inputs provide the user with flexibility to match their specific application. The active state of all auxiliary inputs is a closure to ground.



Use the “↓” and “↑” softkeys to navigate to the desired Auxiliary Input option, then press the “⌂” or “⌂” softkeys to switch between the choices shown above. Stop when the desired mode is displayed.


Use the EXIT “⏏” softkey to save the selection and return to the previous display. See I/O Connector specification for specific input assignments.

The following table describes the remote functions.

<p>Stop (N.O.): When configured to “Stop Normally Open”, the Aux Input will allow the engine to run when the stop signal is inactive (input is “open”; not connected to ground). The engine will be prevented from starting or will be stopped when the stop signal is activated (input is “closed”; connected to ground).</p> <p>If engine is running when the “Stop” signal is activated the ignition will be removed stopping the engine. Ignition will be reapplied after 5 seconds.</p> <p>If the “Stop” signal is active when ignition is applied (key “On”) the engine start signal will be disabled preventing the engine from cranking.</p>
<p>Stop (N.C.): When configured to “Stop Normally Closed”, the Aux Input will allow the engine to run when the stop signal is active (input is “closed”; connected to ground). The engine will be prevented from starting or will be stopped when the stop signal is inactive (input is “open”; not connected to ground).</p> <p>If engine is running when the “Stop” signal goes inactive the ignition will be removed stopping the engine. Ignition will be reapplied after 5 seconds.</p> <p>If the “Stop” signal is inactive when ignition is applied (key “On”) the engine start signal will be disabled preventing the engine from cranking.</p>

<p>Start Inh (N.O.): When configured to “Start Inhibit Normally Open”, the Aux Input will allow the engine to start when the start inhibit signal is inactive (input is “open”; not connected to ground). Engine will be prevented from starting when the start inhibit signal is activated (input is “closed”; connected to ground).</p> <p><i>Note: Setting this input active (connected to ground) while the engine is running has no effect on engine operation.</i></p>
<p>Start Inh (N.C.): When configured to “Start Inhibit Normally Closed”, the Aux Input will allow the engine to start when the start inhibit signal is active; (input is “closed”; connected to ground). Engine will be prevented from starting when the start inhibit signal is inactive (input is “open”; not connected to ground).</p> <p><i>Note: Setting this input inactive (input open) while the engine is running has no effect on engine operation.</i></p>
<p>Speed 1: When configured to “Speed 1”, the digital input (when active) will ramp the engine to the Speed 1 setting. If this input is active during an engine start the engine will ramp to this setting immediately upon starting.</p>
<p>Speed 2: When configured to “Speed 2”, the digital input (when active) will ramp the engine to the Speed 2 setting. If this input is active during an engine start the engine will ramp to this setting immediately upon starting.</p>
<p>Speed 3: When configured to “Speed 3”, the digital input (when active) will ramp the engine to the Speed 3 setting. If this input is active during an engine start the engine will ramp to this setting immediately upon starting.</p>
<p>Rabbit: When configured to “Rabbit”, the digital input (when active) will increment the Engine Speed.</p>
<p>Turtle: When configured to “Turtle”, the digital input (when active) will decrement the Engine Speed.</p>
<p>Off: Disables the input.</p>

Note: when selecting Speed 1, 2 or 3, you must also set the RPM Values for Speed 1, 2 and 3 in the Engine Settings menus.

Use the EXIT “” softkey to save the selection and return to the previous display.

Auxiliary Input Priority

- Priority 1: Engine Stop and Start Inhibit functions
- Priority 2: Rabbit / Turtle functions.
- Priority 3: Auxiliary Input #3
- Priority 4: Auxiliary Input #2
- Priority 5: Auxiliary Input #1

Example;

Assume the following configuration:

- Aux Input #1: Stop (N.C.)
- Aux Input #2: Speed 1 = 1250 RPM
- Aux Input #3: Speed 2 = 2250 RPM

Truth Table:

Panel State	Aux #1	Aux #2	Aux #3
Engine Stopped	Active	Inactive	Inactive
Engine Stopped	Active	Inactive	Active
Engine Stopped	Active	Active	Active
Engine Speed = 2250	Inactive	Inactive	Active
Engine Speed = 2250	Inactive	Active	Active
Engine Speed = 1250	Inactive	Active	Inactive