



# WARNING



## **CALIFORNIA – Proposition 65 Warning**

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to  
[www.P65warnings.ca.gov/diesel](http://www.P65warnings.ca.gov/diesel).

### **CALIFORNIA Proposition 65 Warning**

**Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

# CONTROL PANEL O&M MANUAL

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## Prior to Starting Engine

Prior to starting the engine, fully complete the Parameter Configuration menu, select the required START/STOP and THROTTLE settings. Reference the tables below to determine the appropriate operating modes. Details on each setting are provided on the following pages.

## Parameter Configuration

Critical features to pump operation are to be selected and configured in this menu. These items include **Fuel Level, Voltage Source, Hour meter, Transducer Settings (Application, Inlet Pressure and Outlet Pressure) and Flow Rate.** Choose the parameter to be configured by pressing the enter button (placing brackets) and using the up and down arrow buttons. Once the correct parameter appears, press enter to select. Press the up arrow keys to configure the chosen parameter.

## Manual Operation Settings

Start/Stop Mode Available
Manual Key Start

Throttle Mode Available	Throttle Description
TSC Vernier	UP and DOWN via panel buttons (set min and max speeds)
Multistate	UP and DOWN via panel buttons (up to four separate operating speeds)

## Automatic Operation Settings (Key in Auto Position)

Start/Stop Mode Available
Floats (single or dual)
Transducer

Throttle Mode Available	Throttle Description
Single Speed	Select warm up, prime, operating and cool down speeds
Linear	Engine speed adjusts between selected min and max speeds in relation to selected min and max level or pressures
Target	Engine speed adjusts to maintain selected level or pressure

A fail safe float backup option is available for pressure and level modes should the pressure or level transducer fail to operate.

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## Fail Safe Float Start/Stop

An optional fail safe float can also be used as a backup to the transducer. To enable the failsafe float:

In the **Auto Operations Menu**:

- 1) set **Failsafe Float** to “ON”
- 2) set the **Failsafe Speed** to “Desired engine speed if fail safe float is tripped”
- 3) set the **Failsafe Float Time Delay** for “the minimum amount of time the engine runs if the failsafe float is tripped”

## Dual Float Back-up Operation

An optional dual float back-up operation is available when utilizing the application transducer for the pump start/stop. To enable this function:

In the **Auto Operations Menu**

- 1) set **Start/Stop Input** to “Transducer & Floats”
- 2) set the **Dual Float Speed** to “Desired engine speed if dual float is tripped”

In this mode, when the level reaches the dual float trip point, indicating transducer failure, the pump will continue to run in a single speed mode under standard dual float operation.

## Manual Throttle Settings

The following **bolded** settings are required for manual throttle operation in the **Throttle Configuration menu**.

### Vernier Throttle (Default)

Vernier throttle is standard up and down throttle between the minimum and maximum selections. The ramp rate is the rate of acceleration in RPM's per second. The control panel uses J1939 throttle, also called “torque speed control” or TSC1.

Throttle Configuration Menu	Throttle Type - Throttle Type Selection (Default = Vernier)
	TSC Mode Selection (Default=Primary)
	<b>TSC Min Speed Selection</b> (Preset by pump specification)
	<b>TSC Max Speed Selection</b> (Preset by pump specification)
	<b>TSC Bump Speed</b> (Default = 20 rpm)
	<b>TSC Ramp Rate Selection</b> (Default = 100 rpm/sec)
	Throttle Curve Selection
	Multistate Speed 1 Selection
	Multistate Speed 2 Selection
	Multistate Speed 3 Selection
	Multistate Speed 4 Selection
	TSC Absolute Minimum Speed (Preset to pump specification)
	TSC Absolute Maximum Speed (Preset by pump specification)

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## Multistate Throttle

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

Throttle Configuration Menu	Throttle Type - Throttle Type Selection (Select Multistate)
	E-Throttle Mode Selection
	TSC Mode Selection
	TSC Min Speed Selection (Preset by pump specification)
	TSC Max Speed Selection (Preset by pump specification)
	TSC Ramp Rate Selection (Default = 100 rpm/sec)
	Throttle Curve Selection
	<b>Multistate Speed 1 Selection</b>
	<b>Multistate Speed 2 Selection</b>
	<b>Multistate Speed 3 Selection</b>
	<b>Multistate Speed 4 Selection</b>

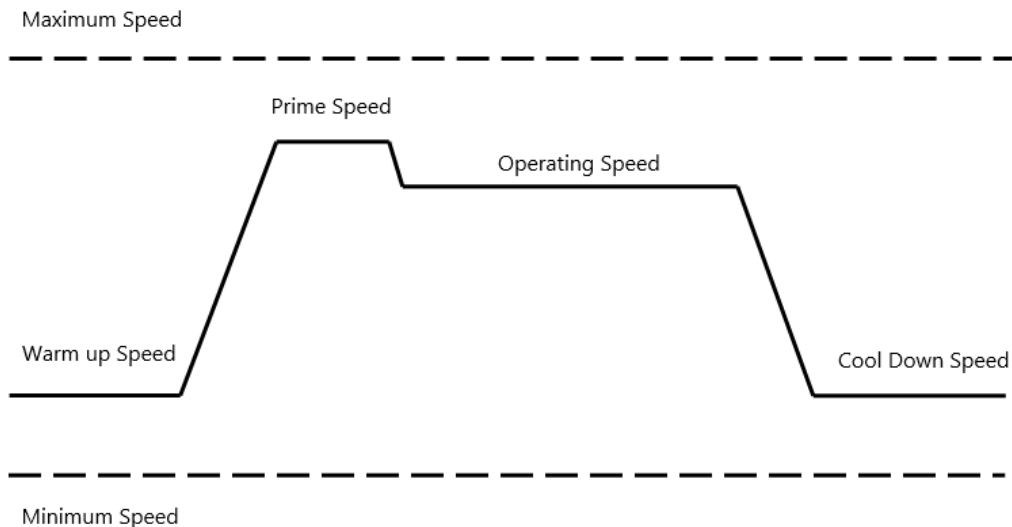
## Automatic Throttle Settings

The following auto start/stop throttle options are available for when the key is placed in the AUTO position:

### Single Speed (Profile) Throttle

Single speed allows the engine to run according to a predetermined speed profile. Select the desired engine speed for the following:

- 1) Warm Up Speed
- 2) Prime Speed (Optional)
- 3) Operating Speed
- 4) Cool Down Speed



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For single speed operation, the highlighted menu settings are required.

<b>Auto Operation Settings Menu</b>	Start/Stop Input ( <b>Floats</b> , Transducer)
	Throttle Mode ( <b>Single Speed</b> , Linear, Target)
	Operate Speed ( <b>Select Operating Speed</b> )

<b>Auto Start Configuration Menu</b>	Auto Start Delay (Default = 10 seconds)
	Pre Heat Time (Default = 0 seconds)
	Crank Time (Default = 10 seconds)
	Crank Rest Time (Default = 10 seconds)
	<b>Warm Up Speed (Default = 800 rpm)</b>
	<b>Warm Up Time (Default = 10 seconds)</b>
	Prime Speed (Default = 800 rpm)
	Prime Time (Default = 0 seconds)
	<b>Cool Down Speed (Default = 800 rpm)</b>
	<b>Cool Down Time (Default = 10 seconds)</b>
	Crank Cycles (Default = 5)
	Fault Bypass Period (Default = 10 seconds)
	Crank Hold Delay (Default = 0)
	Crank Release Speed (Default = 400 rpm)

If any auto start configuration settings are not required (such as warm up speed), set the time to 0:00 seconds for that parameter.

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## Linear Throttle

With linear throttle, the minimum and maximum engine speeds and the corresponding minimum and maximum level or pressures are selected. Engine speed adjusts according to the linear relationship as shown below.

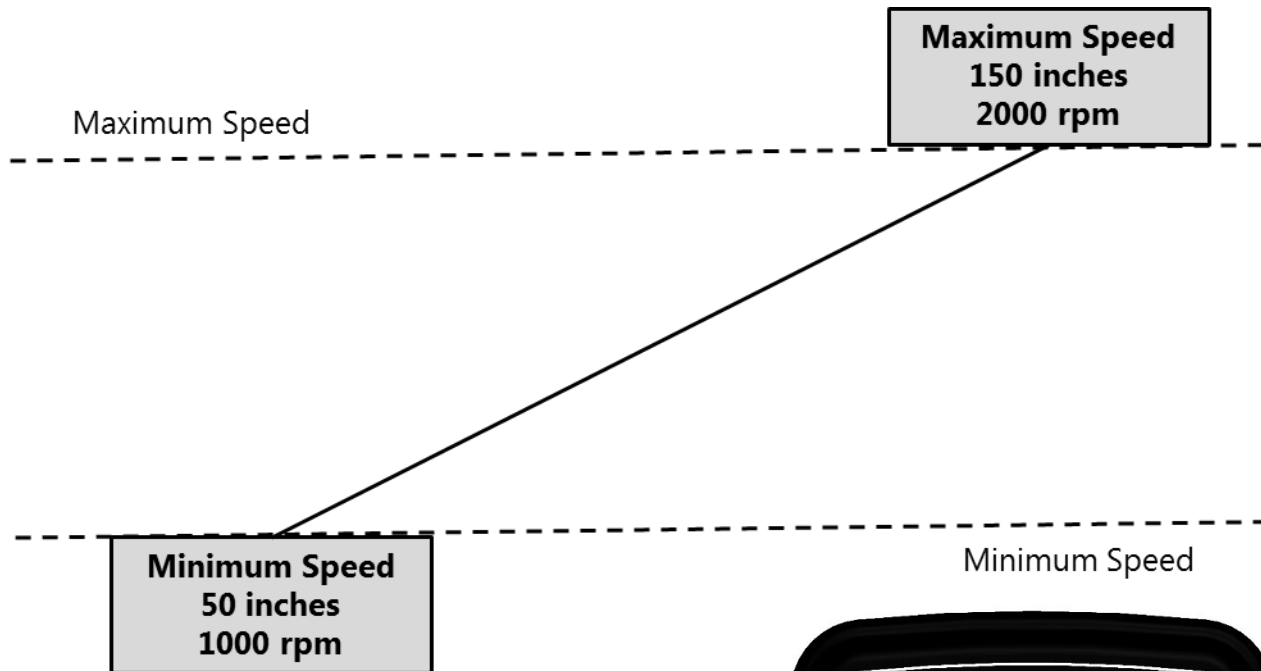
Example: Level Transducer (0 to 200-inch range)

Minimum Speed = 1000 rpm

Maximum Speed = 2000 rpm

Minimum Speed Level = 50 inches

Maximum Speed Level = 150 inches



### Operation

If level = 50 inches, engine speed = 1000 rpm

If level = 100 inches, engine speed = 1500 rpm

If level = 150 inches, engine speed = 2000 rpm



Linear throttle can be combined with any of the automatic engine start/stop modes. If any automatic speeds settings are not required (such as warm up), set the time delay to 0:00 seconds for that parameter.



# CONTROL PANEL O&M MANUAL

For linear throttle operation, the highlighted menu settings are required.

<b>Auto Operation Settings Menu</b>	Start/Stop Input (Floats, <b>Transducer</b> )
	Fail Safe Float (On, Off)
	Fail Safe Speed (Default = 2400 rpm)
	Fail Safe Off Delay (Default = 0:00 seconds)

<b>Auto Start Configuration Menu</b>	Auto Start Delay (Default = 10 seconds)
	Pre Heat Time (Default = 0 seconds)
	Crank Time (Default = 10 seconds)
	Crank Rest Time (Default = 10 seconds)
	<b>Warm Up Speed (Default = 800 rpm)</b>
	<b>Warm Up Time (Default = 10 seconds)</b>
	Prime Speed (Default = 800 rpm)
	Prime Time (Default = 0 seconds)
	<b>Cool Down Speed (Default = 650 rpm)</b>
	<b>Cool Down Time (Default = 10 seconds)</b>
	Crank Cycles (Default = 5)
	Fault Bypass Period (Default = 10 seconds)
	Crank Hold Delay (Default = 0)

If any auto start configuration settings are not required (such as warm up speed), set the time to 0:00 seconds for that parameter.

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## Level/Pressure Maintain Throttle

With level or pressure maintain throttle, engine speed adjusts to maintain the selected level or pressure.

Example: Pressure Transducer (0 to 50 psi range)

Target Pressure = 30 psi

Minimum Speed = 1000 rpm

Maximum Speed = 2000 rpm

### Operation

If pressure = 20 psi, engine speed increases up to 2000 rpm until 30 psi is reached

If pressure = 40 psi, engine speed decreases down to 1000 rpm until 30 psi is reached

If pressure = 30 psi, engine speed holds



The throttle response time can be increased or decreased by adjusting the “Gain Trim Setting” in the **Auto Operations Settings menu**.

Level or pressure maintain throttle can be combined with any of the automatic engine start/stop modes. If any automatic speeds settings are not required (such as warm up), set the time delay to 0:00 seconds for that parameter.

For level/pressure maintain operation, the highlighted menu settings are required.

Auto Operations Settings Menu	
	Start/Stop Input (Floats, <b>Transducer</b> )
	Fail Safe Float (On, Off)
	Fail Safe Speed (Default = 2400 rpm)
	Fail Safe Off Delay (Default = 0:00 seconds)

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<b>Auto Start Configuration Menu</b>	Auto Start Delay (Default = 10 seconds)
	Pre Heat Time (Default = 0 seconds)
	Crank Time (Default = 10 seconds)
	Crank Rest Time (Default = 10 seconds)
	<b>Warm Up Speed (Default = 800 rpm)</b>
	<b>Warm Up Time (Default = 10 seconds)</b>
	Prime Speed (Default = 800 rpm)
	Prime Time (Default = 0 seconds)

If any auto start configuration settings are not required (such as warm up speed), set the time to 0:00 seconds for that parameter.

## Panel Operation

### Manual Operation

- 1) Engine Start - Turn key to CRANK position
- 2) Engine Stop - Turn key to OFF position
- 3) Engine Throttle - Push up and down buttons

Throttle operation based on manual throttle settings.

*Note: If your engine is equipped with a Diesel Exhaust Fluid (DEF) tank and the engine's ECU is broadcasting the level, the control module will display the % DEF Fluid by alternating the value with in the Engine Hours location (Lower Right) on the display.*



Engine Running  
Six-Up Display  
(Typical)



Engine Running  
Six-Up Display with DEF  
Level when present

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## Auto Start/Stop Operation

- 1) Engine Start - Turn key to AUTO position

Engine start/stop based on auto start/stop settings. Panel display shows “Auto Start ARMED” message.

- 2) Engine Throttle

Throttle operation based on auto throttle settings.



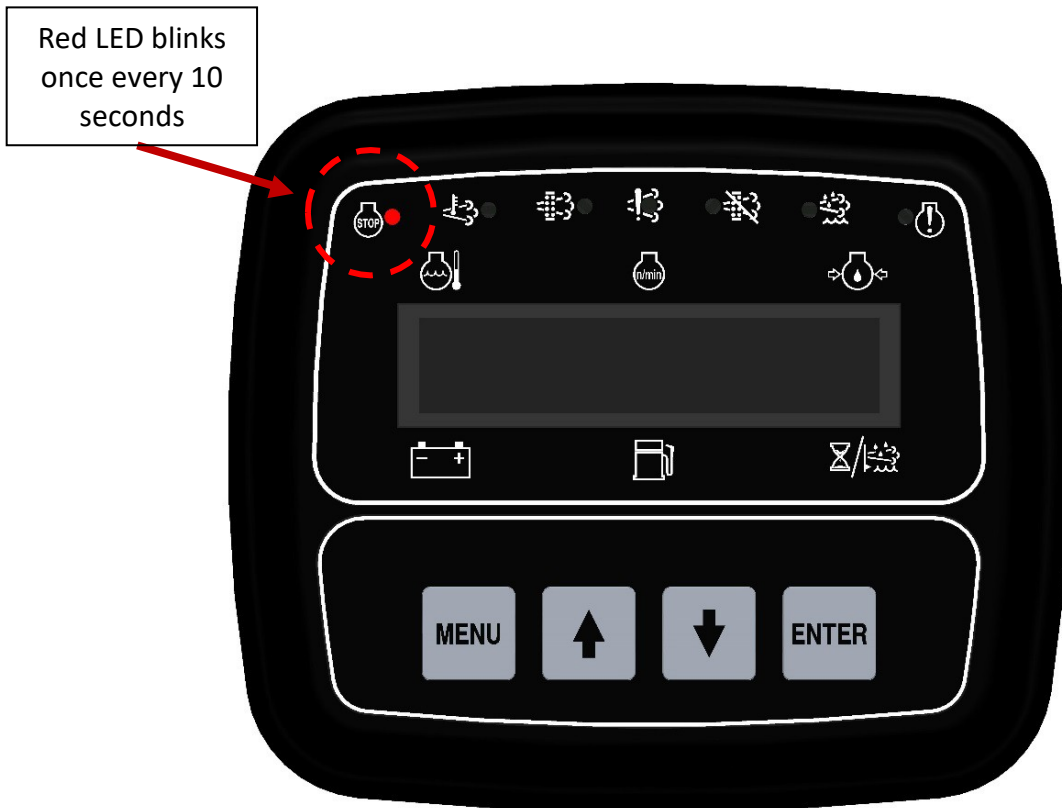
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## Sleep Mode

To minimize current draw, the panel goes into a sleep mode two minutes after being set in auto mode. In sleep mode, the display goes blank and the red lamp blinks once every ten seconds. The engine ECU is also turned off.

Upon receiving a signal from a float or transducer, the panel wakes up, the display turns back on and normal operation commences.

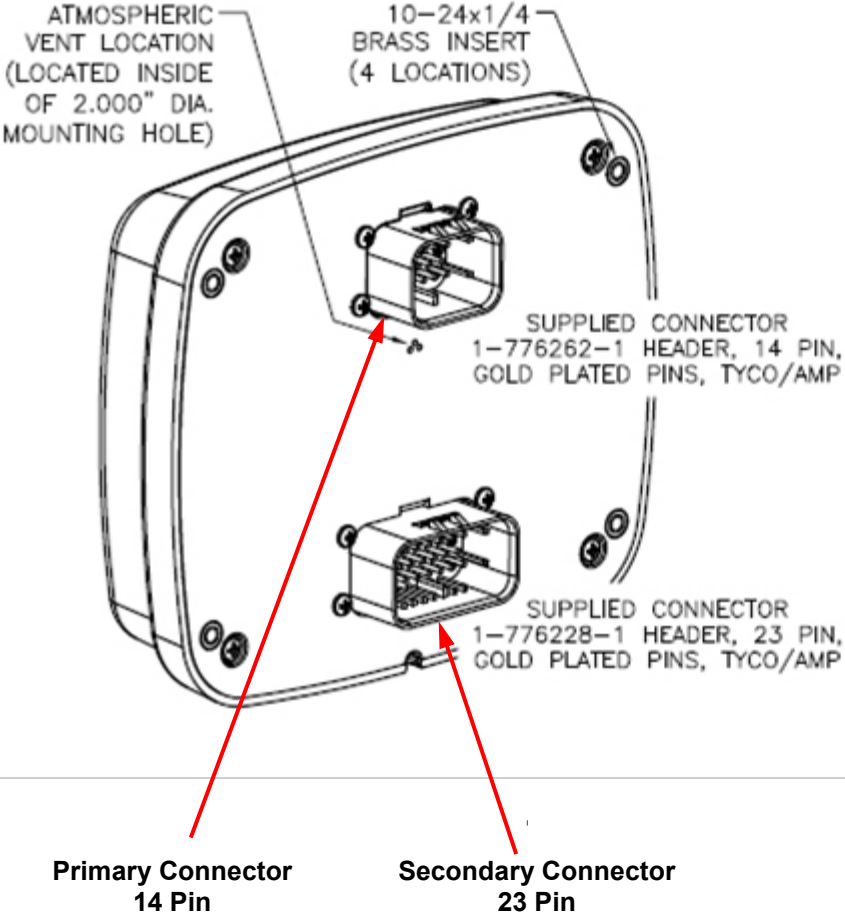
Pushing any of the four buttons wakes up the panel and turns the display on. It will return to sleep mode after a two-minute period.



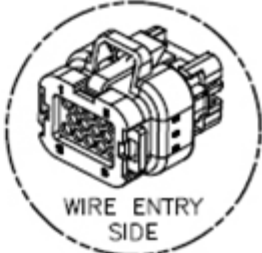
For service purposes, to keep engine ECU powered, access the menu system. The engine ECU remains on when the menu system is active.

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## Module Connectors



MATING CONNECTOR DETAIL (TOP)



- 776273-1 PLUG, TYCO/AMP (BLACK)
- 770854-1 SOCKET (TIN PLATED)
- 770854-3 SOCKET (GOLD PLATED)

MATING CONNECTOR DETAIL (BOTTOM)



- 770680-1 PLUG, TYCO/AMP (BLACK)
- 770854-1 SOCKET (TIN PLATED)
- 770854-3 SOCKET (GOLD PLATED)

### Primary Connector (14 Pin)

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Pin	Function	Pin	Function
1	Fuel Solenoid/ECU Signal	8	J1939 Low
2	Start & Alarm Signal	9	Battery Positive
3	Alarm	10	Key Auto Detect
4	Battery Positive	11	Battery Positive
5	Crank Signal	12	Battery Negative
6	Battery Positive	13	Fuel Level Sender Input
7	J1939 High	14	High Float Input

**CAUTION:**

Maximum current draw for signal circuits is 5 amps

## Secondary Connector (23 Pin)

Pin	Function	Pin	Function	Pin	Function
1	Output Relay #5 N/O	9	Relays # 5 & 6 Common	16	Output Relay #6 N/O
2		10		17	DI #2 Low Float
3	APP Transducer Input	11	Inlet Pressure Input	18	Digital Input #3
4	Outlet Pressure Input	12	Flow Rate Input	19	Digital Input #4
5		13	MODBUS	20	Digital Input #5
6	Digital Input #8	14	MODBUS	21	Digital Input #6
7	Digital Input #9	15	Relays # 7 & 8 Common	22	Digital Input #7
8	Output Relay #7 N/O			23	Output Relay #8 N/O

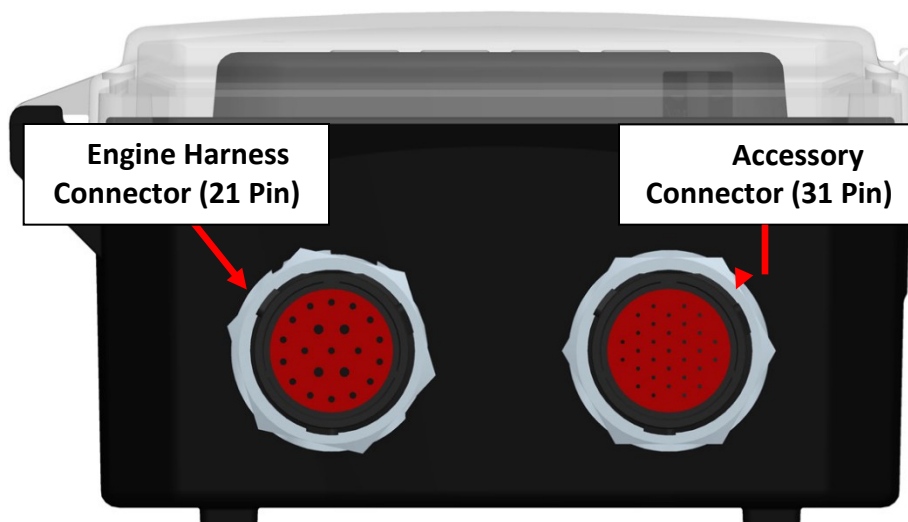
**CAUTION:**

Maximum current draw relay output circuits is 5 amps

# CONTROL PANEL O&M MANUAL

## Panel Connectors

1. Engine Harness Connector –Deutsch 21 pin(HDP24-24-21PE)
2. Accessory Connector – Deutsch 31 pin(HDP-24-24-31PE)



Pin	21 Pin Engine Harness Connector Function
<b>B</b>	Battery Positive
<b>E</b>	Battery Negative
<b>G</b>	Key On Power
<b>D</b>	Crank Signal
<b>V</b>	J1939 High
<b>U</b>	J1939 Low
<b>J</b>	Alternator Excite
<b>L</b>	Analog Throttle Emulator
<b>M</b>	Analog Throttle Emulator
<b>C</b>	Analog Throttle Emulator
<b>R</b>	Digital Throttle Emulator
<b>S</b>	Digital Throttle Emulator

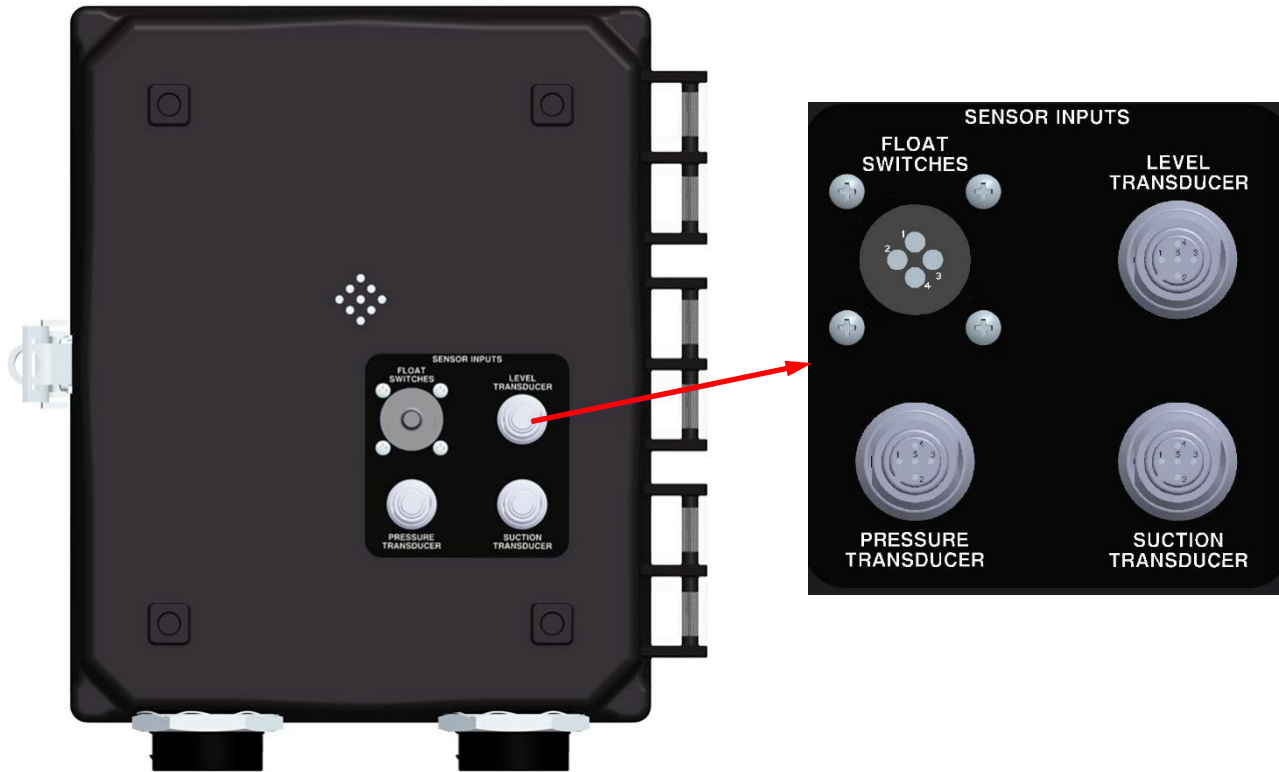
Pin	31 Pin Accessory Connector Function
<b>1</b>	High Water Alarm
<b>7</b>	Common Alarm
<b>8</b>	Over Crank Output (Fail to Start)
<b>9</b>	Common for Pins 1 & 16 (RY 5 & 6)
<b>12</b>	Flow Rate Input
<b>13</b>	Modbus A
<b>14</b>	Modbus B
<b>15</b>	Common for Pins 8 & 23 (RY 7 & 8)
<b>16</b>	Unit in Auto Output
<b>17</b>	Start Alarm Output
<b>18</b>	High Water Alarm Input
<b>19</b>	Auto Start Inhibit Input
<b>20</b>	Fuel Leak Input
<b>21</b>	Low Fuel Input
<b>22</b>	Digital Input #7
<b>23</b>	Engine Run Output
<b>25</b>	Fuel Level Sender Input
<b>30</b>	Battery Positive (Switched B+)
<b>31</b>	Battery Negative

**CAUTION:**  
Maximum current draw for relay output circuits is 5 amps



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## Sensor Inputs



4-Pin Float Connector	
Pin	Function
1	High Float Input
2	Low Float Input
3	High Float Common
4	Low Float Common

4-Pin Level Transducer	
Pin	Function
1	4-20 mA Signal
2	Battery Positive
3	Battery Negative
4	N/A

4-Pin Pressure Transducer	
Pin	Function
1	High Float Input
2	Low Float Input
3	High Float Common
4	Low Float Common

4-Pin Suction Transducer	
Pin	Function
1	4-20 mA Signal
2	Battery Positive
3	Battery Negative
4	N/A

# CONTROL PANEL O&M MANUAL

## Pump Monitoring and Safety

The following menus must be configured prior to the utilization of suction and discharge pressures for pump monitoring:

<b>Pump Safety Configuration</b>	<b>Inlet Pressure Check (Off, Always, Run)</b>
	<b>Low Inlet Pressure Pre Alarm</b>
	<b>Low Inlet Pressure Alarm</b>
	<b>High Inlet Pressure Pre Alarm</b>
	<b>High Inlet Pressure Alarm</b>
	Inlet Pressure Delay
	Inlet Pressure Hysteresis
	<b>Outlet Pressure Check (Off, Always, Run)</b>
	<b>Low Outlet Pressure Pre Alarm</b>
	<b>Low Outlet Pressure Alarm</b>
	<b>High Outlet Pressure Pre Alarm</b>
	<b>High Outlet Pressure Alarm</b>
	Outlet Pressure Delay
	Outlet Pressure Hysteresis

*For Display of Inlet and outlet pressures, enter the Module Configuration Menu and turn on Suction/Discharge.*

# CONTROL PANEL O&M MANUAL

## Engine Alarms, Codes and Messages

### Engine ECU Alarms/De-Rate/Shut Downs

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

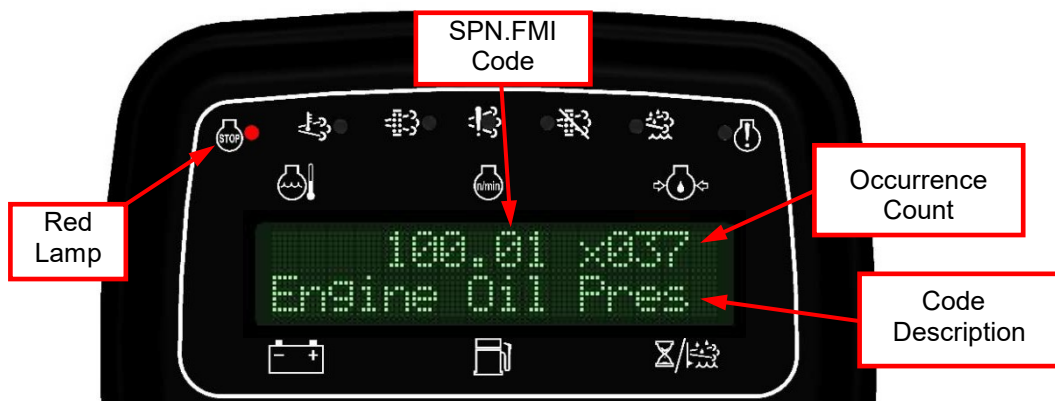
- 1) Broadcast a trouble code
- 2) Broadcast a red or yellow lamp
- 3) De-rate the engine
- 4) Shut down the engine
- 5) Turn on alarm horn

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

### Panel Alarm Annunciation and Code Reader

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

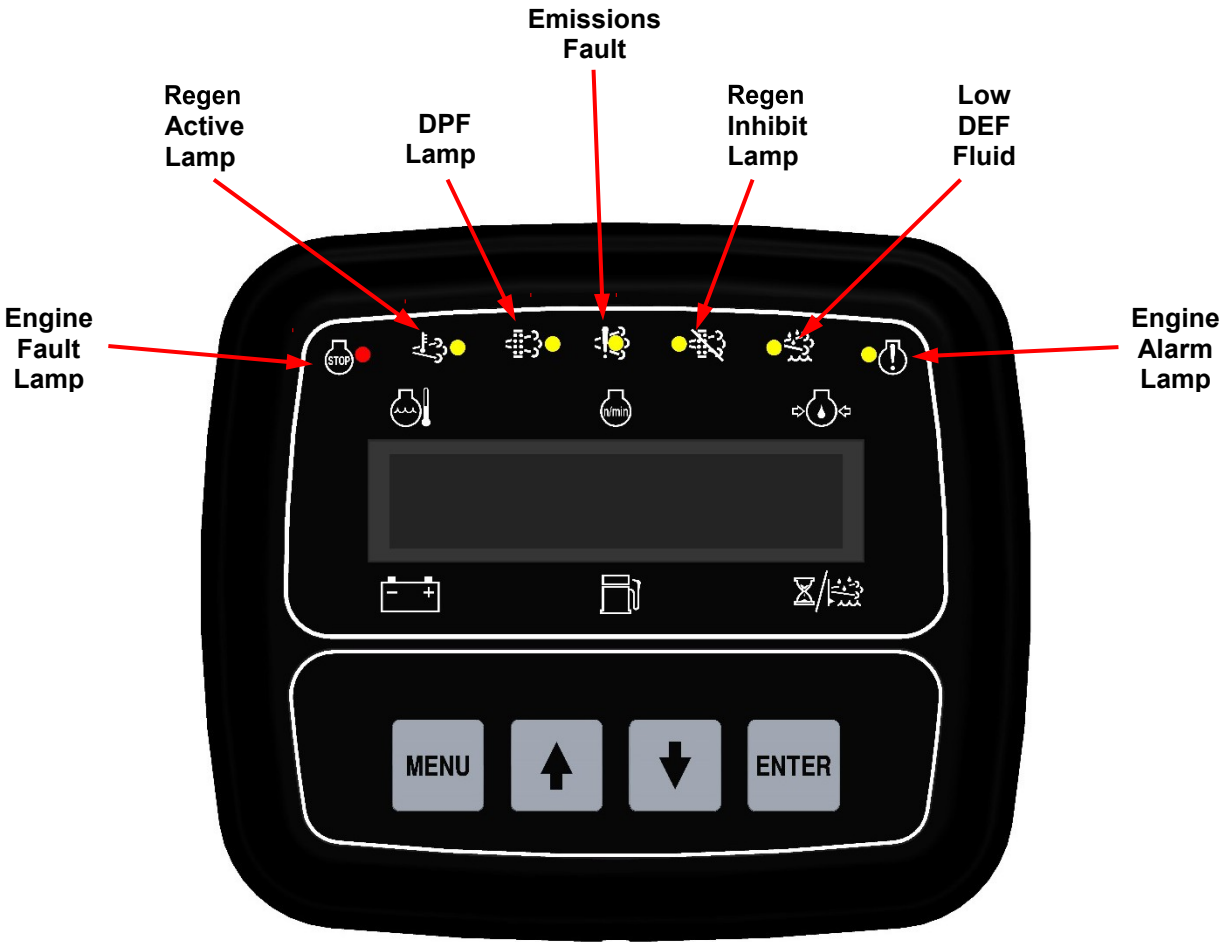
- 1) Illuminates the appropriate LED indicator lamp
  - a. Yellow Lamp = Alarm
  - b. Red Lamp = Engine ShutDown
- 2) Displays the trouble code (standard SPN.FMI code)
- 3) Displays a code description on the LCD screen
- 4) Displays the occurrence count of the code



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## Indication Lamps

The panel has six lamp indicators.



## Active and Stored Engine ECU Codes

The panel also provides the ability to check the engine ECU for all ACTIVE and STORED engine ECU codes. These codes can be viewed via the Active Codes and Stored Codes menus. In addition, the control panel has its own Alarm Event Log menu that shows the last 16 engine ECU alarms as well as any control panel specific alarms.

# CONTROL PANEL O&M MANUAL

## Control Panel Specific Alarms and Shut Downs

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

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

Heading	Default	Range	Units
Sender Check Bypass	0:10	0:05 – 1:00	Min:Sec
Fuel Level Check	Off	Off / Always / Run	
Low Fuel Pre Alarm	20	0 - 100	%
Low Fuel Alarm	1	0 - 100	%
Fuel Alarm Delay	0:05	0:01 – 1:40	Sec
Oil Pressure Check	Run	Off / Always / Run	
Low Oil Press Pre Alarm	6	0 - 100	PSI
Low Oil Press Alarm	5	0 - 100	PSI
Oil Press Alarm Delay	0:10	0:01 – 1:40	Sec
Temperature Check	Run	Off / Always / Run	
Low Temp Pre Alarm	0	0 - 300	Deg F
Low Temp Alarm	0	0 - 300	Deg F
High Temp Pre Alarm	244	150 - 300	Deg F
High Temp Alarm	245	150 - 300	Deg F
Temp Alarm Delay	0:10	0:01 – 1:40	Min:Sec
Battery Volts Check	Off	Off / Always / Run	
Low Battery Pre Alarm	12.0	0.0 – 40.0	Volts
Hi Battery Pre Alarm	15.0	0.0 – 40.0	Volts
Over Speed Check	Off	Off / Always / Run	
Over Speed Alarm	3000	650 - 5000	RPM
Over Speed Alarm Delay	0:05	0:01 – 1:40	Min:Sec

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

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## Control Panel Analog and Digital Inputs

The panel provides the analog and digital inputs defined below located in the **Input Configuration menu**. The panel is shipped from the factory with the **inputs in bold** enabled in the panel. Inputs not highlighted need to be enabled/configured in the menu system to be used.

<b>Input</b>	<b>Options</b>	<b>Default Setting</b>	<b>Connector</b>	<b>Pin</b>
<b>Analog 1</b>	Pre Set	Fuel Level	31 Pin Accessory Connector	25
<b>Analog 2</b>	Application Transducer Input	Level	4 Pin Level Connector	1
<b>Analog 3</b>	Pre Set	Discharge Pressure	4-Pin Pressure Connector	1
<b>Analog 4</b>	Pre Set	Suction Pressure	4-Pin Suction Connector	1
<b>Digital 1</b>	Open/Closed	Open	4-Pin Float Connector	1
	Function	Remote Start/ High Float		
	Message	None		
	Check	Always		
<b>Digital 2</b>	Open/Closed	Open	4-Pin Float Connector	2
	Function	Low Float		
	Message	None		
	Check	Off		
<b>Digital 3</b>	Open/Closed	Open	31 Pin Accessory Connector	18
	Function	Alarm		
	Message	None		
	Check	Off		
<b>Digital 4</b>	Open/Closed	Open	31 Pin Accessory Connector	19
	Function	Auto Start Inhibit		
	Message	None		
	Check	Off		
<b>Digital 5</b>	Open/Closed	Open	31 Pin Accessory Connector	20
	Function	Pre Alarm		
	Message	None		
	Check	Off		
Digital 6	Open/Closed	Open	31 Pin Accessory Connector	21
	Function	None		
	Message	None		
	Check	Off		
Digitals 7, 8 and 9 available				

# CONTROL PANEL O&M MANUAL

## Analog #1 Input Functions

- 1) Fuel Level 0-90 ohm – Fuel amount, in percentage, can be measured and displayed on the module using a scale sender of 0 ohms – 90 ohms. 0 = Empty and 90 = Full. Sender ground must be common with battery negative. Standard Stewart Warner and VDO are available.

## Digital Functions

The digital inputs can be configured for different uses depending on the application. These include the following:

- 1) None – Set to None when no functionality is required.
- 2) Pre Alarm – Warning message will be displayed along with a yellow lamp when active.
- 3) Alarm – Engine shutdown when active with display message as assigned. A red lamp will also be illuminated.
- 4) Auto Start – Use this selection if a single switch is going to be used to operate the auto start operation.
- 5) Throttle Up – When the digital input is closed the engine will throttle up.
- 6) Throttle Down – When the digital input is closed the engine will throttle down.
- 7) Return to Idle – Engine will return to the idle speed preprogrammed in the configuration menu.
- 8) Return to Operating Speed – Engine will return to the operating speed preprogrammed in the configuration menu.
- 9) High Float – For auto start applications where a single or dual float system is desired. Note, Digital 1 Action must be configured for Auto Start.
- 10) Low Float – For auto start applications where a dual float system is desired. Note, Digital 1 Action must be configured for AutoStart.
- 11) Auto Start Inhibit - When this input is taken to ground, the Auto-Start sequence will not initiate.
- 12) Shutdown Override – Use this selection to override all controller enabled shutdowns with the exception of E-Stop.
- 13) Regen Request – If a switch is desired to request a regen, you can assign a digital input to this function.
- 14) Regen Inhibit - If a switch is desired to inhibit a regen, you can assign a digital input to this function.

## Digital Function Monitoring

Off / Always / Run – Describes when the parameter will be monitored for alarm conditions. Run refers to when the engine is running. Off disables the alarm conditions. Always enables the alarm constantly regardless of engine state.

# CONTROL PANEL O&M MANUAL

## Digital Function Messages

A comprehensive list of common industry messages can be associated with the digital inputs to identify what is connected to any particular input. For example, if you connected a Low Water level switch to digital input 5, you can assign a message to digital input 5 of Low Water Level. This message will be displayed when the input is active. If you need a label or message that is not preloaded, there are four custom labels that can be created using the CI Station.

Custom 1	Custom 2	Custom 3	Custom 4
Low Water	Low Oil	Low Engine Oil	High Temperature
Low Pressure	Ext Shutdown	E-Stop	Remote E-Stop
High Pump Temp	Low Pump Oil	Low Fuel Level	Override Active
Polish Filter	Low Hydraulic Fluid	Vacuum High	High Hydraulic Temp
In Pressure Loss	Pipe Pressure Alarm	Low Coolant Level	Air Filter
Shutdown Override	High Wet Well	High Water Level	Fuel Leak

## Digital Function Delays

Alarm Delay – The time period after Sender Check Bypass, that the parameter must be on the alarm condition before the alarm becomes latched.



# CONTROL PANEL O&M MANUAL

## Control Panel Relay Outputs

The panel provides relay outputs defined below located in the **Output Configuration menu**. The relays are rated at 5 amps.

The panel is shipped from the factory with the **highlighted** outputs enabled and pre-wired in the panel.

Relay	Heading	Default	Connector	Pin
Relay 1	Function	<b>Start &amp; Alarm Horn</b>	31 Pin Connector	17
	Polarity	Positive		
	Initial State	Off		
<b>Relay 2</b>	<b>Function</b>	<b>Fuel/Run</b>	21 Pin Connector	<b>G</b>
	<b>Polarity</b>	Positive		
	<b>Initial State</b>	On		
Relay 3	Function	<b>Alarm</b>	31 Pin Connector	3
	Polarity	Positive		
	Initial State	Off		
<b>Relay 4</b>	<b>Function</b>	<b>Crank</b>	21 Pin Connector	<b>D</b>
	<b>Polarity</b>	Positive		
	<b>Initial State</b>	Off		
Relay 5	Function	<b>High Level Alarm</b>	31 Pin Connector	1
	Polarity	Positive		
	Initial State	Off		
Relay 6	Function	<b>Unit in Auto</b>	31 Pin Connector	16
	Polarity	Positive		
	Initial State	On		
Relay 7	Function	<b>Over Crank (Fail to Start)</b>	31 Pin Connector	8
	Polarity	Positive		
	Initial State	Off		
Relay 8	Function	<b>Engine Run</b>	31 Pin Connector	23
	Polarity	Positive		
	Initial State	Off		

# CONTROL PANEL O&M MANUAL

## Relay Functions

Available relays can be assigned for different uses:

- a. None - Assign to "none" when not used.
- b. Pre Alarm - Relay will be active when there is a pre alarm condition. Typically used to drive an alarm horn or lamp. Also can be used to send a signal to a monitoring station.
- c. Alarm - Relay will be active when there is an alarm condition. Typically used to drive an alarm horn or lamp. Also can be used to send a signal to a monitoring station.
- d. Pre Alarm & Alarm - Energizes an external audible alarm when a pre alarm or alarm condition is present. Pressing the ENTER button will silence.
- e. Alarm Horn - Energizes an external audible alarm when an alarm condition is present. Pressing the ENTER button will silence.
- f. Engine Run - Relay will be active when engine RPM is greater than 600. Typically used to drive an auxiliary circuit such as louvers or send a signal to a monitoring station.
- g. Low Oil Press Alarm - Relay closes if a low oil pressure shutdown is detected.
- h. High Coolant Temp Alarm - Relay closes if a high engine temperature shutdown is detected.
- i. Over Speed Alarm - Relay closes if an over speed shutdown is detected.
- j. Over Crank Alarm - Relay closes if an over crank alarm is detected.
- k. Low Fuel Level Alarm - Relay closes if a low fuel level shutdown is detected.
- l. Low Fuel Prealarm - Relay closes when the fuel tank prealarm level is reached.
- m. Low Battery Prealarm - Relay closes when the battery voltage prealarm level is reached.
- n. Fuel / Run - Relay will be active during an engine start request and while the engine is running. Used to drive the engine's ECU circuit. Also active when requesting active and stored J1939 codes.
- o. High Water Level - Close when a High Water prealarm occurs.
- p. Preheat - Relay will be active during programmed preheat period. Used to drive a preheat relay.
- q. Crank - Relay will be active during auto crank period. Used to drive a starter relay.
- r. Start Warning - Closes during the countdown to engine start when operating in the auto start mode.
- s. Start & Alarm Horn - Relay will be active during auto start delay period. Typically used to drive the low side of an alarm horn or light.
- t. Unit in Auto - Closes when the controller is in the Auto Start mode

- continued -

# **CONTROL PANEL O&M MANUAL**

- u. Unit in Manual – Closes when in the Manual Start mode.
- v. Clutch 1 – Closes if the criteria for Clutch 1 is met. See Clutch Configuration.
- w. Clutch 2 – Closes if the criteria for Clutch 2 is met. See Clutch Configuration.
- x. Pull In – Used to energize the pull circuit on a three wire fuel solenoid. Is used with a time delay and typically requires a slave relay to be installed on the engine to drive the load.
- y. Throttle Hi-Lo – Used to operate a High/low fuel solenoid.
- z. Throttle Up – Contact closure used to drive an actuator to increase the speed of the engine.
- aa. Throttle Down – Contact closure used to drive an actuator to decrease the speed of the engine.
- bb. Regen Active – Contact closure used to identify when a regen is active.
- cc. Low DEF Level (Diesel Exhaust Fluid) – Contact closure when the DEF fluid low level prealarm is active.

## **Relay Polarity**

- a. Positive - Relay acts as a normally open contact.
- b. Invert - Relay acts as a normally closed contact.

## **Relay Initial State**

- a. On -Relay is activated upon power up.
- b. Off - Relay is not activated upon power up.

## **Allow Power Down**

- a. On – The relay will de energize when the Sleep Mode
- b. Off - The relay will stay energized if it is energized when Sleep Mode becomes active.

# CONTROL PANEL O&M MANUAL

## Panel to Engine ECU Communications

Communication between the panel and the engine ECU occurs over the two wire CAN bus (CAN High wire and CAN Low wire). It is necessary that the panel and engine ECU settings be the same for the following parameters:

- 1) Source Address**  
The source address is where the engine sends display and alarm data.
- 2) TSC1 Address**  
The TSC1 address is the address from which the engine ECU receives throttle commands from the panel. If the panel and engine ECU do not have the same TSC1 address, the engine will not throttle up or down.
- 3) Engine Type**  
The engine type is important for T4 operation. Selections are available for John Deere, Caterpillar and Cummins engines. For other engines, select "Standard".

The communication settings are available in the **CAN Configuration menu** shown below.

CAN Configuration Menu	
	Engine Type (Default = Cummins)
	TSC1 Address (Default = 3)
	Source Address (Default = 44)
	Engine Address (Default = 0) Available 0, 1, 2
	Speed Transmit (Default = Off)
	Temperature Transmit (Default = Off)
	Oil Pressure Transmit (Default = Off)
	Fuel Level Transmit (Default = On)
	Voltage Transmit (Default = Off)
	Hours Transmit (Default = Off)
	Pump Parameters (Default = On)
	Fault Transmit (Default = Active Only)
	JDLINK Auto Accept (Default = Off)

# CONTROL PANEL O&M MANUAL

## Battery Recharge Monitor

A battery recharge monitoring system is available to start and run the engine to keep the battery system charged. The battery recharge settings are available in the Battery **Recharge Configuration** menu. The highlighted selections are required.

<b>Battery Recharge Configuration</b>	<b>Recharge Monitor (Default = Off)</b>
	<b>Recharge Voltage Selection (Default = 11.9 VDC)</b>
	<b>Recharge Delay Selection (Default = 60 Sec)</b>
	<b>Recharge Run Time Selection (Default = 15 Min)</b>
	<b>Next Recharge Time Interval Selection (Default = 45 Min)</b>

## Modbus Configuration

MODBUS (RS 485) can be used to communicate with a data collection system. Engine and Pump information can be accessed through registers. Engine Start, Stop and Speed commands can also be sent to the control panel by writing to coils and registers. Contact Cummins for more information.

<b>MODBUS Configuration</b>	<b>MODBUS Mode (Default=Off) Slave</b>
	<b>Baud Rate (9600) 19200, 38400</b>
	<b>Parity (Odd) Even</b>
	<b>Stop Bits (1) 2</b>
	<b>Slave Address (1) 0-254</b>
	<b>Communication Time Out (0:00)</b>

# CONTROL PANEL O&M MANUAL

## Clutch Configuration

The Clutch Configuration menu can be used to program two relays to open or close based on a variety of criteria. You can mix and match Engage and Disengage criteria. If you select to engage on Speed, you will need to set the actual speed you want it to close the relay upon reaching. Don't forget to assign a relay to Clutch 1 for the logic to run.

Heading	Default	Range
#1 Engage Trip	None	Engine Stopped/Engine Started/Speed Above/Speed Below/Speed Crosses Above/Speed Crosses Below/Load Above/Load Below/Coolant Temp Above/Coolant Temp Below/Begin Prime/Begin Warmup/Begin Ramp Up/Begin Operate/Begin Ramp Down/Begin Cooldown/End of Cooldown
#1 Engage Speed	1200 RPM	Min-Max Speeds
#1 Engage Load	0%	0-100%
#1 Engage Coolant Temp	150 degrees F	0-300 degrees F
#1 Engage Delay	0:00	0:00-5:00 minutes
#1 Engage Interval	0:00	0:00-5:00 minutes
#1 Release Trip	None	Same as Engage Trip 1
#1 Release Speed	800 RPM	Min-Max Speeds
#1 Release Load	0%	0-100%
#1 Release Coolant Temp	150 degrees F	0-300 degrees F
#1 Release Delay	0:00	0:00-5:00 minutes
#1 Release Interval	0:00	0:00-5:00 minutes
#2 Engage Trip	None	Same as Engage Trip 1
#2 Engage Speed	1200 RPM	Min-Max Speeds
#2 Engage Load	0%	0-100%
#2 Engage Coolant Temp	150 degrees F	0-300 degrees F
#2 Engage Delay	0:00	0:00-5:00 minutes
#2 Engage Interval	0:00	0:00-5:00 minutes
#2 Release Trip	None	Same as Engage Trip 1
#2 Release Speed	800 RPM	Min-Max Speeds
#2 Release Load	0%	0-100%
#2 Release Coolant Temp	150 degrees F	0-300 degrees F
#2 Release Delay	0:00	0:00-5:00 minutes
#2 Release Interval	0:00	0:00-5:00 minutes

# CONTROL PANEL O&M MANUAL

## Clock Setup

The Clock Setup menu provide the ability to manually set the current date and time in your location. If using the CI Station PC application to program, the CI station will set the controllers clock to match you PC date and time.

Heading	Default	Range
Current Date and Time	Actual	
Display Format	12 Hour	12 or 24 Hour
Time	2:56 PM	0:00-23:59
Month	February	January - December
Day	29	1-31
Year	2016	2000-2099
Day of Week	Mon	Sunday-Saturday

# CONTROL PANEL O&M MANUAL

## Emission Monitoring

### Emissions Information

The panel provides lamp indications, display messages and other emission related information. This information is broadcast from the engine ECU and is captured and displayed by the panel. The panel includes an **Emissions Parameters viewing menu** that allows the operator to view the following emissions related information.

Heading	Default	Range
DPF Soot Load	View Only	0 – 200%
DPF Ash Load	View Only	0 – 200%
Time Since Regeneration	View Only	# of Hours Since Last Regeneration
Regeneration Process	Current Status	Active or Not Active





# CONTROL PANEL O&M MANUAL

## Regeneration Process

The regeneration process is controlled by the engine ECU. The engine ECU monitors emissions parameters such as soot level and ash level.

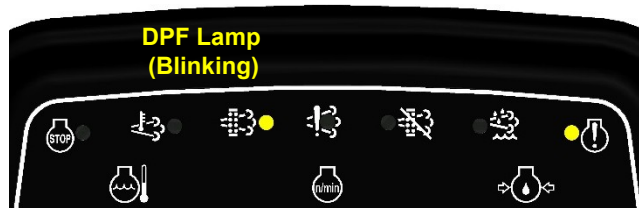


When the engine ECU initiates a regeneration, the yellow DPF (Diesel Particulate Filter) lamp will illuminate with the display message shown above. The operator can press the ENTER button (for Yes) to allow the regeneration to initiate or the MENU button (for No) to delay the regeneration process to a later time. Answering “No” only delays the regeneration process. The regeneration lamp stays illuminated and regen request prompts continue as long as the engine ECU determines a regeneration is required.

Over time, the engine ECU increases the level of severity through both lamp indications and display messages.

### Levels of severity:

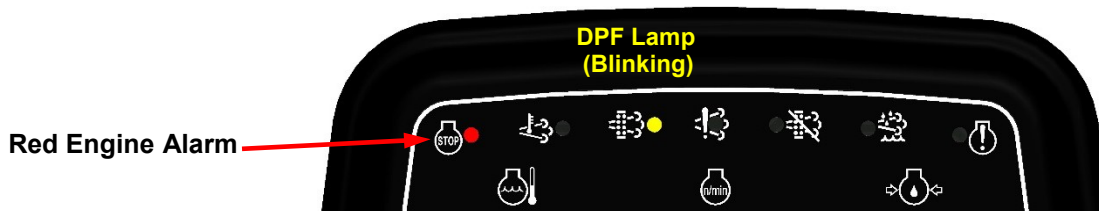
- 1) Lowest Level
- 2) Moderate Level
- 3) High Level
- 4) Warning Level
- 5) Service Regen Level



At the lowest level, the DPF lamp illuminates. As the levels increase, the DPF lamp begins to blink. As the levels continue to increase, the yellow alarm lamp illuminates.



At the most severe level, the DPF lamp blinks and the red engine alarm lamp illuminates.



# CONTROL PANEL O&M MANUAL

## Active Regeneration

If the operator selects ENTER for yes, the panel will show the “RPM May Increase” message and ask the operator to respond by pressing the MENU button for “no” or the ENTER button for “yes”.



This interlock question is asked to make sure the operator is aware that the engine ECU may increase engine speed per the regeneration requirements.



Regen Active Lamp

DPF Lamp



The regeneration active lamp illuminates during the regeneration process. The DPF lamp stays illuminated until the engine ECU determines that a regeneration is no longer required.

# CONTROL PANEL O&M MANUAL

## Service Regeneration Level

For engines, the most severe level is the service regen level. At this level, the DPF lamp is blinking and the red alarm lamp illuminates. When the service level is reached, the engine ECU has determined that the situation is severe and a service regeneration is necessary. At the service regen level, the engine ECU may de-rate the engine or prevent it from starting and the message shown below appears on the display.



## Regen Inhibit

The panel provides two methods for “inhibiting” a regeneration process. The first method is to answer “No” to the Regen Request message when it appears on the display. The second method is to select “Inhibit Regen” in the **Emissions Configuration Menu** (under Regen Options). The two available settings are “Auto” and “Inhibit Regen”.

The “Auto” setting allows the engine ECU to initiate and control the regeneration process. The “Inhibit Regen” setting delays the regeneration process. The “Inhibit Regen” setting only delays the regeneration process until higher levels of severity are reached. At higher levels of severity, the engine ECU no longer accepts the “Inhibit Regen” message from the panel.

When the “Inhibit Regen” setting is selected, the inhibit lamp illuminates.



# CONTROL PANEL O&M MANUAL

## Scheduler Setup

### Setting the Real Time Clock

Each module is shipped with the clock set for Eastern Standard Time. To adjust reset the clock to your time zone, or in the event the clock has lost its factory time from power exhaustion, you can reset the clock with these simple steps.

- 1) Locate the Clock Setup menu in the Controller Setup area of the menu system.



- 2) Press the up arrow key to see the current date and time programmed.



- 3) Press the up arrow key to see and/or change the Display Format.



- 4) Press the up arrow key to see and/or change the current Time. To change the time, press the Enter key, use the up or down arrows to set, and press the Enter key again to save.



- 5) Press the up arrow key to see and/or change the current Month. To change the month, press the Enter key, use the up or down arrows to set, and press the Enter key again to save.



- continued -

## CONTROL PANEL O&M MANUAL

- 6) Press the uparrow key to see and/or change the current Date. To change the date, press the Enter key, use the up or down arrows to set, and press the Enter key again to save.



- 7) Press the up arrow key to see and/or change the current Year. To change the year, press the Enter key, use the up or down arrows to set, and press the Enter key again to save.



- 8) Press the up arrow key to see and/or change the Day of Week. To change the day, press the Enter key, use the up or down arrows to set, and press the Enter key again to save.



# CONTROL PANEL O&M MANUAL

## Displaying Date and Time in Auto Mode

When the module is placed in the Auto mode, the day and time will be displayed on the lower line of the Auto Start Armed screen, alternating with the traditional Battery, Fuel Level and Engine Hours display. If a scheduled event is programmed, the display will also alternate to show the next scheduled event. The Auto Start Armed mode will eventually power down to a low power mode, turning the display off entirely. Pressing any key will manually wake the unit up.

### AUTO START ARMED SCREEN



### CURRENT DATE AND TIME SCREEN



### NEXT RUN EVENT SCREEN



# CONTROL PANEL O&M MANUAL

## Setting Up the Weekly Scheduler

The Scheduler can be programmed to start and stop the engine based on time of day and the day of week. Up to 24 events can be set. Each event is programmed in the Scheduler Configuration menu. A single event can be an engine run that starts the engine on Monday at 12:00 PM and stops it at 12:30 PM. A single event can also be a daily run, where it starts the engine at 12:00 PM, stops it at 12:15 PM every day of the week. Cycle power to the module after changing or setting up events.

- 1) Locate the Scheduler Configuration menu in the Controller Setup are of the menu.



- 2) Press the up arrow key to access the Clear All Events page. Press Enter and the Up arrow to change the No to a Yes if desired. Press the Enter key to confirm the clear command.



- 3) Press the up arrow key to select the event you wish to modify. Always use events in numerical order to avoid forgotten events.



- 4) Press the up arrow key to see and/or change the event Start Time. To change the start time, press the Enter key, use the up or down arrows to set, and press the Enter key again to save.



- 5) Press the up arrow key to see and/or change the event Stop Time. To change the stop time, press the Enter key, use the up or down arrows to set, and press the Enter key again to save.



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# CONTROL PANEL O&M MANUAL

- 6) Press the up arrow key to see and/or change the Day of Week the event will run. You can select, [Off], [All], [Alternate], or an individual day (ie [Mon], [Tue], etc.). To change the selection, press the Enter key, use the up or down arrows to set, and press the Enter key again to save.



- 7) To set up the next event, press the Down arrow key until you reach the Scheduled Event screen. Change the event number to the next number and then program the corresponding start time, stop time and day of week options.

## Running on the Weekly Scheduler

When the module is placed in the Auto mode, and the day and time matches a scheduled engine run event, the module will auto start the engine and run for the programmed period. While the engine is running, the display will alternate between the typical engine vitals screen and the event screen, allowing the operator to understand when the engine started, the current time and when the engine will be stopped.

### TYPICAL RUN SCREEN



### SCHEDULED RUN SCREEN





# **CONTROL PANEL O&M MANUAL**

## **Menu System**

### **To Enter Menu System**

Hold MENU button and press ENTER button.

### **Menu Navigation**

Press MENU button to scroll menu options.

Press UP arrow button to enter menu.

Press DOWN arrow button to reverse.

### **Exit Menu System**

Hold MENU button and press ENTER button.

### **To Change a Setting**

Press ENTER button to bring up brackets [ ].

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

Press ENTER button to make selection, brackets disappear.

**Recycle key to the OFF position after changing a setting.**

# CONTROL PANEL O&M MANUAL

## Main Menus

### Viewing Menus

<b>Active Engine Fault Codes</b>	View/Scroll Active Fault Codes
<b>Stored Engine Fault Codes</b>	View/Scroll Active Fault Codes
<b>Engine Parameters Menu</b>	View ECU Engine Information (% Load, Torque, Oil Temp, etc.)
<b>Emissions Parameters</b>	Regen Options DEF Level DPF Soot Load View DPF Ash Load View Time Since Last Regen View Regen Active/Not Active View Regen Inhibited/Not Inhibited View
<b>Pump Parameters</b>	Application Level Application Pressure Current Inlet Pressure Current Outlet Pressure Current Flow Rate
<b>Operation Event Log</b>	View Last 32 Events (Start, Stop, Alarms)
<b>Alarms Event Log</b>	View last 32 ECU and Controller Alarms
<b>Engine Identification Menu</b>	Engine Model # View Engine Serial # View
<b>Module Information Menu</b>	Control Unit Part# View Control Unit Software Version View

# CONTROL PANEL O&M MANUAL

## Configuration Menus (1<sup>st</sup> Level)

<b>Controller Setup Menus</b> (Password Protected)	Quick Setup	(1)
	Engine Parameter Configuration	(2)
	Pump Parameter Configuration	(3)
	Scheduler Configuration	(4)
	Input Configuration	(5)
	Output Configuration	(6)
	Throttle Configuration	(7)
	Engine Safety Configuration	(8)
	Pump Safety Configuration	(9)
	Module Configuration	(10)
	Display Configuration	(11)
	CAN Configuration	(12)
	Auto Operation Configuration	(13)
	Auto Start Configuration	(14)
	Battery Recharge Configuration	(15)
	Maintenance Configuration	(16)
	Emissions Configuration	(17)
	Modbus Configuration	(18)
	Clutch Configuration	(19)
	Clock Set-up	(20)

# CONTROL PANEL O&M MANUAL

## Configuration Menus (2<sup>nd</sup> Level)

(1)	<b>Quick Setup</b>	<b>NOT TO BE USED FOR THIS CONTROLLER</b>
(2)	<b>Engine Parameter Configuration</b>	<b>Engine Type (Leave as Electronic, DO NOT CHANGE)</b> Parameter Selection (Speed, Coolant Temp., Oil Pressure, Fuel Level, Voltage, Hour Meter) Parameter Setup (Varies based on parameter)
(3)	<b>Pump Parameter Configuration</b>	Parameter Selection (Transducer, Inlet, Outlet Pressure, Flow Rate) Parameter Setup (Varies based on parameter)
(4)	<b>Scheduler Configuration</b>	Clear Events (Yes, No) Schedule Event (1-8) Start Time Stop Time Day of Week (Off, All, Alternate, Mon, Tue, Wed, Thu, Fri, Sat, Sun)
(5)	<b>Input Configuration</b>	Configure Selection (Default = Channels, optional Custom Message) Digital Input Selection 1-9 Digital Action Selection Digital Message Selection Digital Delay Digital Polarity (NO, NC)
(6)	<b>Output Configuration</b>	Output Relay Selection 1-8 Relay Function Selection Relay Polarity (Positive, Invert) Relay Initial State Relay Allow Power Down
(7)	<b>Throttle Configuration</b>	Throttle Type - Throttle Type Selection TSC Mode Selection TSC Min Speed Selection TSC Max Speed Selection TSC Bump Speed Selection TSC Ramp Rate Selection Throttle Curve Selection

# CONTROL PANEL O&M MANUAL

Multistate Speed 1-4 Selection

(8)	<b>Engine Safety Configuration</b>	Sender Check Bypass Time Period Selection
		Fuel Level Check On/Off Selection
		Low Fuel Level Pre Alarm % Selection
		Low Fuel Level Alarm % Selection
		Fuel Level Alarm Delay Time Selection
		Oil Pressure Check On/Off Selection
		Low Oil Pressure Pre Alarm % Selection
		Low Oil Pressure Alarm % Selection
		Oil Pressure Alarm Time Delay Selection
		Engine Temperature Check On/Off
		Engine Temperature Pre Alarm Selection
		Engine Temperature Alarm Selection
		Engine Temperature Alarm Time Delay Selection
		Battery Volt Check On/Off
		Low Battery Volt Pre Alarm Selection
		High Battery Volt Pre Alarm Selection
		Battery Volt Trim Setting
		Over Speed Alarm On/Off
		Over Speed Alarm RPM Setting
		Over Speed Alarm Time Delay Selection

(9)	<b>Pump Safety Configuration</b>	Inlet Pressure Check (Default = Off)
		Low Inlet Pressure Pre Alarm (Default = -14.7 psi)
		Low Inlet Pressure Alarm (Default = -14.7 psi)
		High Inlet Pressure Pre Alarm (Default = (25 psi)
		High Inlet Pressure Alarm (Default = 25 psi)
		Inlet Pressure Alarm Delay (Default = 0:05)
		Inlet Pressure Hysteresis (Default = 5.0 psi)
		Outlet Pressure Check (Default = Off)
		Low Outlet Pressure Pre Alarm (Default = 0 psi)
		Low Outlet Pressure Alarm (Default = 0 psi)
		High Outlet Pressure Pre Alarm (Default = (300 psi)
		High Outlet Pressure Alarm (Default = 300 psi)
		Outlet Pressure Alarm Delay (Default = 0:05)
		Outlet Pressure Hysteresis (Default = 5 psi)

# CONTROL PANEL O&M MANUAL

(10)	<b>Module Configuration</b>	Low Power Mode (Default = Auto Only)
		Pre Alarms Displayed (Default = 3)
		Clear Operation Log Yes/No
		Clear Alarm Log Yes/No
		Engine Run Criteria (Default = 400 rpm)
		Engine Stop Criteria (Default = 50 rpm)
(11)	<b>Display Configuration</b>	Pressure & Temperature Units (Default = English)
		Performance Display (Default = Off)
(12)	<b>CAN Configuration</b>	Engine Type (Default = Cummins)
		TSC1 Address (Default = 3)
		Source Address (Default = 44)
		Engine Address (Default = 0)
		Speed Transmit
		Temperature Transmit
		Oil Pressure Transmit
		Fuel Level Transmit
		Voltage Transmit
		Hours Transmit
		Pump Parameter Transmit
		Fault Transmit
		JDLINK Auto Accept (Default = Off)
(13)	<b>Auto Operation Settings</b>	Control Transducer (Default = Application)
		Start/Stop Input (Floats, Transducer)
		Menu options changed based on start/stop input selected

# CONTROL PANEL O&M MANUAL

<b>(14)</b>	<b>Auto Start Configuration</b>	Auto Start Delay (Default = 10 seconds)
	Pre Heat Time (Default = 0 seconds)	
	Crank Time (Default = 10 seconds)	
	Crank Rest Time (Default = 10 seconds)	
	Warm Up Speed (Default = 800 rpm)	
	Warm Up Time (Default = 10 seconds)	
	Prime Speed (Default = 1000 rpm)	
	Prime Time (Default = 10 seconds)	
	Cool Down Speed (Default = 800 rpm)	
	Cool Down Time (Default = 10 seconds)	
	Crank Cycles (Default = 5)	
	Fault Bypass Period (Default = 10 seconds)	
	Crank Hold Delay (Default = 0)	
	Crank Release Speed (Default = 400 rpm)	
Crank Hold Delay (Default = 0 TSec.)		
<b>(15)</b>	<b>Battery Recharge Configuration</b>	Cool Down Speed (Default = 800 rpm)
	Cool Down Time (Default = 10 seconds)	
	Crank Cycles (Default = 5)	
	Fault Bypass Period (Default = 10 seconds)	
	Crank Hold Delay (Default = 0)	
<b>(16)</b>	<b>Maintenance Configuration</b>	Service Messages (Default = No)
	Reset Interval Yes/No	
	Service Warning at: (Default = 0 Hrs.)	
	Service Requires At: (Default = 0 Hrs.)	
	Next Service Warning Interval (Default = 200 Hrs.)	
	Next Service Required Interval (Default = 250 Hrs.)	
	1 <sup>st</sup> Service Warning Interval (Default = 75 Hrs.)	
	1 <sup>st</sup> Service Required Interval (Default = 100 Hrs.)	
<b>(17)</b>	<b>Emissions Configuration</b>	DEF Level Check
	Low DEF Pre Alarm	
	Low DEF Alarm	
	DEF Alarm Delay	
	Allow Service Regen Yes/No (Deere Only)	
	Regen Interlock On/Off	
	TSC Transmit Yes/No (stop TSC to engine during regen)	
	DPF Inhibit Lamp Source	

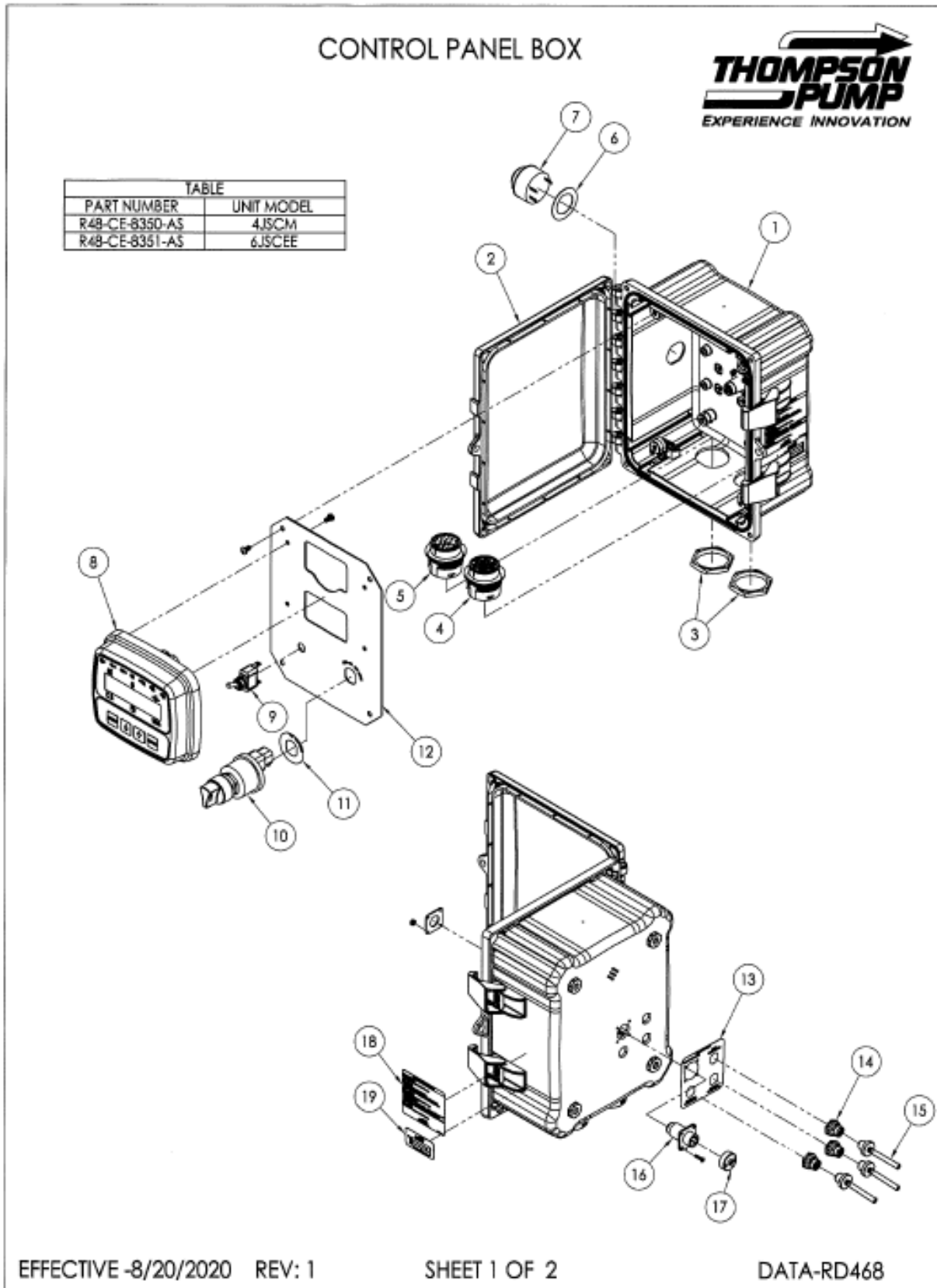
# CONTROL PANEL O&M MANUAL

<b>(18)</b>	<b>MODBUS Configuration</b>	MODBUS Mode (Default = Off)
		Baud Rate (9600, 19200, 38400)
		Parity (None, Even, Odd)
		Stop Bits (1, 2)
		Slave Address (1 – 247)
		Communication Timeout (Default = 0:00)
<b>(19)</b>	<b>Clutch Configuration</b>	#1 Engage Trip
		#1 Engage Speed
		#1 Engage Load
		#1 Engage Delay
		#1 Engage Interval
		#1 Release Trip
		#1 Release Speed
		#1 Release Load
		#1 Release Delay
		#1 Release Interval
		#2 Engage Trip
		#2 Engage Speed
		#2 Engage Load
		#2 Engage Delay
		#2 Engage Interval
		#2 Release Trip
		#2 Release Speed
		#2 Release Load
		#2 Release Delay
		#2 Release Interval
<b>(20)</b>	<b>Clock Set-up</b>	Current Date - Time
		Display Format (12 Hr., 24 Hr.)
		Time (00:01 – 23:59)
		Month (Jan – Dec)
		Day (1 – 31)
		Year (2013 – 2099)
		Day of Week (Mon – Sun)



# CONTROL PANEL O&M MANUAL

## Exploded View Drawing – Control Panel

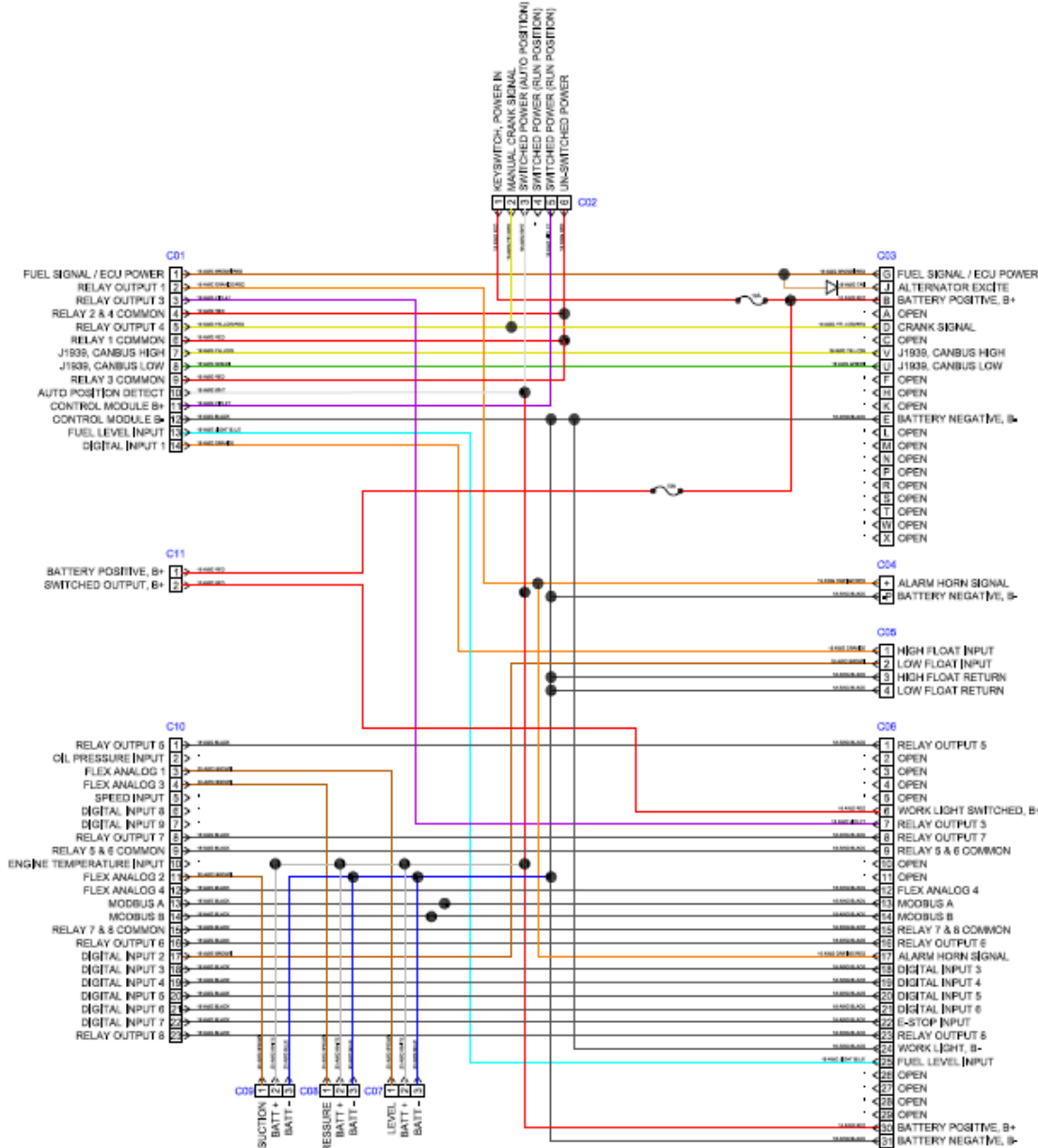


## CONTROL PANEL O&M MANUAL

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	R48-H10084HCLL-1134	ENCLOSURE, PANEL W/DOOR 10X8X4	1
2	R48-AH1084CLID	LID, ATTABOX DARK TINTED 10X8	1
3	R48-112263-90	NUT, SHELL 24 PNL	2
4	R48-HDP24-24-31PE	RECEPTACLE, 31 POS DEUTSCH	1
5	R48-HDP24-24-21PE	RECEPTACLE, 21 POS PLAS	1
6	R48-9-1017	GASKET, ALARM	1
7	R48-PW12D	ALARM, WARBLER 12VDC	1
8	R48-U-3530-AS	DISPLAY	1
9	R48-8530K9	SWITCH, LIGHT	1
10	R48-95060-23	SWITCH, KEY 4POS COLE HERSEE	1
11	R48-WF-0250X0120X03	WASHER, FLAT	1
12	8-1196	FACEPLATE	1
13	R48-2-1083	LABEL, AUX SENSOR INPUT	1
14	R48-FKFDW-4.5-0.5	RECEPTACLE, 5 PIN W/WIRES	3
15	R48-FSK-CC	CAP, CLOSE 12M-1 ML F/RECEP	3
16	R48-512-1150	RECEPTACLE, 4 PIN SQ FLG CPC	1
17	R48-512-1240	CAP, SEALING RECEPT W/STRAP	1

# CONTROL PANEL O&M MANUAL

## INTERNAL WIRING SCHEMATIC



CONNECTORS	
C01	778275-1
C02	D106-85
C03	HDP24-24-31PE
C04	1100240
C05	79005-3
C06	HDP24-24-31PE
C07	FK/DW-4-5-5-5
C08	FK/DW-4-5-5-5
C09	FK/DW-4-5-5-5
C10	770880-1
C11	85303

<b>DESCRIPTION</b> CE-83530-AS 8 X 10 W/ CLEAR LID (ATTABOX)		DRAWN BY: BEN DATE: 07/01/2020
THOMPSON PUMP EXPERIENCE INNOVATION		SHEET: 1 OF 1 REV: -
DRAWING NUMBER: CE-83530-AS_IWS		
DO NOT SCALE DRAWING		
REVISIONS		
REV	DATE	BY