MURPHY®

by ENOVATION CONTROLS

CE*

PowerView® PV380-R2
Mechanical Configuration

Operations Manual

*Products covered in this document comply with European Council electromagnetic compatibility directive 2004/108/EC and electrical safety directive 2006/95/EC.

00-02-1017
Section 78
2017-06-05

In order to consistently bring you the highest quality, full-featured products, we reserve the right to change our specifications and designs at any time. The latest version of this manual can be found at www.murphybyenovationcontrols.com.

Warranty - A limited warranty on materials and workmanship is given with this Murphy product.
A copy of the warranty may be viewed or printed by going to www.murphybyenovationcontrols.com/warranty

Table of Contents

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Introduction

Congratulations on purchasing the PowerView® Model PV380-R2 Mechanical. This advanced display provides monitoring and shutdown outputs for mechanical engines replacing the need of mechanical Swichgages and a magnetic switch. The PV380 monitors multiple analog/digital parameters and provides basic engine alarm/shut-down information to the operator.

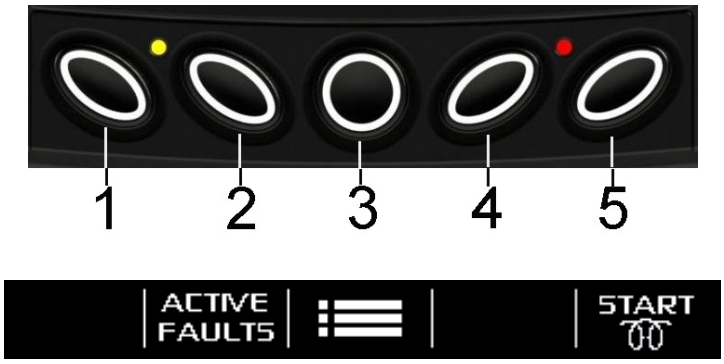
This manual was developed to help you become familiar with the PV380 display, identify navigation basics and recognize useful options and features. The clear 3.8-inch monochrome screen makes it easy to see parameters in the display, especially in bright sunlight.

Engine Parameters

The following are the engine parameters that can be displayed in standard units.

- Engine Speed
- Engine Temperature
- Engine Oil Pressure
- Total Engine/Machine Hours
- Battery Voltage
- Engine Fuel Level

Navigation and Keypad Functions



(Main page buttons)

When directed to press a symbol within the procedural steps, it is referring to the button below the displayed symbol. Each display button is contextual and may have alternating functions within the configuration. The following table shows some of the functions each button may represent.

Key 1	Function
	Moves highlight up when in certain Menu selections
—	Decreases the number when in various screens

Key 2	Function
ACTIVE FAULTS	Displays Diagnostic Messages (Faults) and Stored Codes
	Moves highlight down when in certain Menu selections
+	Increases the number for various selections

Key 3	Function
	Menu - Displays the Main Menu entrance point
	Back - Serves as the Escape/Return to Previous Menu button

Key 4	Function
—	Decreases various settings
	Moves the cursor one slot at a time to the right
	Moves the cursor one slot at a time to the left

Key 5	Function
START	Starts preheat timer if enabled in System Settings
ACK	Acknowledges and hides fault popup on screen for active faults or a fault that occurred since powering on the unit
↵	Serves as the Enter key for menu selections
+	Increases various settings
⇨	Moves the cursor one slot at a time to the right and displays alternate menu choices/screens

First-Time Startup

Powering on the Display

When power is applied to the PV380, the **Warning** and **Shutdown** LEDs illuminate and the Murphy logo displays.

Once the engine is running (> 500 RPM), the engine information will display on the gauge screen if the splash screen has not timed out.

Quick Setup

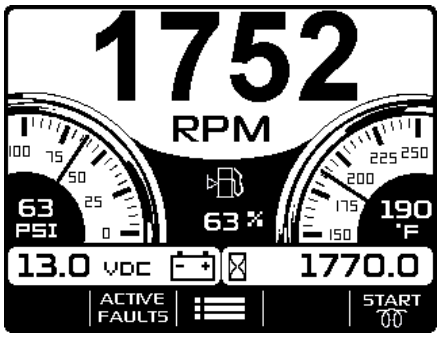
This section will provide a brief description of settings a manufacturer or user is required to change in order to use the PV380 Mechanical display with minimal time. Any additional features and settings are explained throughout the remainder of this manual.

1. **Speed Calibration of the Frequency Input**
    a. Go to System Settings and by pressing the menu key and inputting 3482 passcode when prompted.
    b. Go into Engine Setup and arrow down to Speed CAL to change the pulses/revolution of the frequency input. This will either be the pulses of the engine alternator if used as the frequency input or the flywheel tooth count if using a magnetic pickup.
    c. Press the Back key to go back to System Settings and move onto Input Setup.
2. **Input Setup**
    a. Go into the inputs menu to configure the inputs as needed.
    b. Resistive input #1 function is predefined for Engine Oil Pressure. The sensor manufacturer can be chosen if not using Murphy sensors as well as the desired warning and shutdown setpoints along with the this input's bypass timer.
    c. Resistive input #2 function is predefined for Engine Temperature. The sensor manufacturer can be chosen if not using Murphy sensors as well as the desired warning and shutdown setpoints along with the this input's bypass timer.
    d. Resistive input #3 is function is defaulted to Fuel Level. If not using a resistive fuel level sensor either disable the input or disable the warning. This input can be used as an auxiliary digital input for a low fuel level, low lube level, low coolant level, or aux 1 warning or shutdown if the resistive fuel level is not used.
    e. Resistive input #4 can be used as an auxiliary digital input for a low fuel level, low lube level, low coolant level, or aux 2 warning or shutdown if the resistive fuel level is not used.

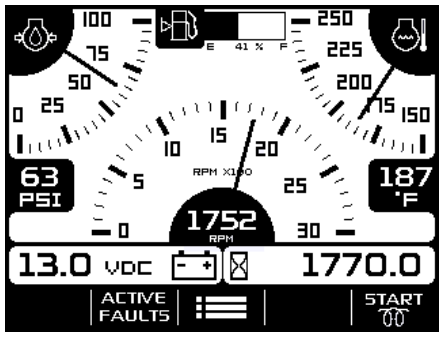
Screen View Descriptions

The PV380-R2 Mechanical incorporates 3 main screen views. This provides the ability to choose from one of the 3 shown and described in this section.

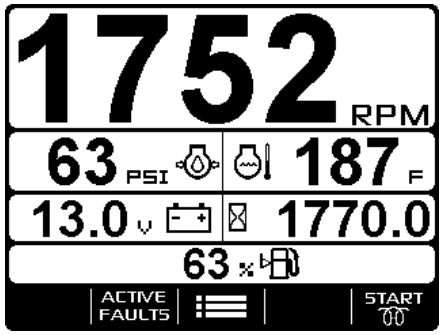
View 1
(Default)



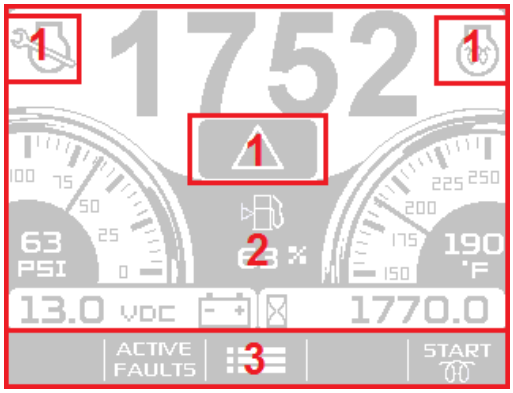
View 2



View 3



View 1



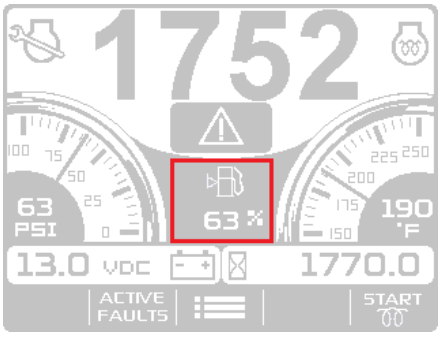
1) Alert and Warning Icon Area
2) Parameter Area
3) Button Selection Display

1. **Alert and Warning Icon Area:** 4 symbols can be shown in the icon area to represent functions to faults. The following symbols can be shown in this area:

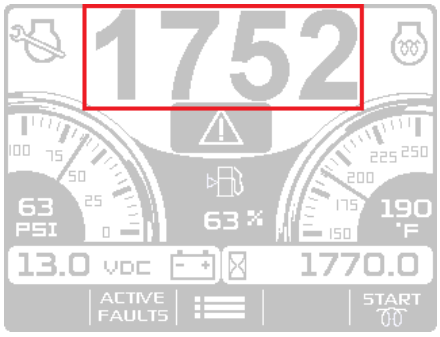
Icon(s)	Function(s)
	Shutdown indicator. This symbol is shown when an active shutdown fault is present. Disappears when fault is acknowledged and no longer active.
	Warning indicator. This symbol is shown when an active warning fault is present. Disappears when fault is acknowledged and no longer active.
	Maintenance service indicator. This symbol is shown in the area when a service reminder has expired when enabled.
	Preheat indicator. This symbol is shown in the area when an active preheat is started via the operator when enabled.

2. **Parameter Area:**

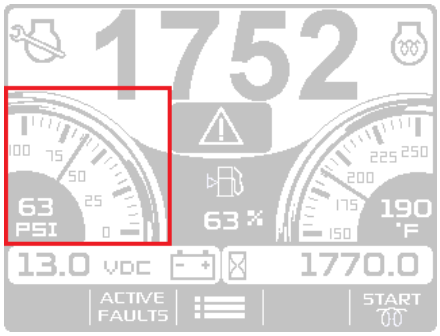
   A. Fuel Level – A digital gauge displays the fuel level in the lower section of the screen if Fuel enabled as resistive input 3 in System Settings.



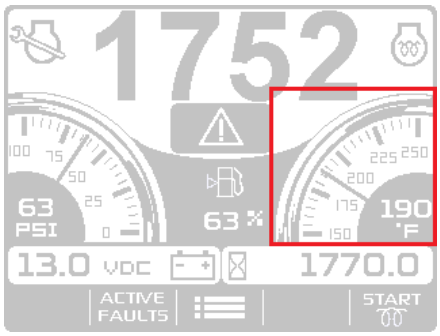
B. Engine Speed – A digital tachometer gauge displays the current engine speed.



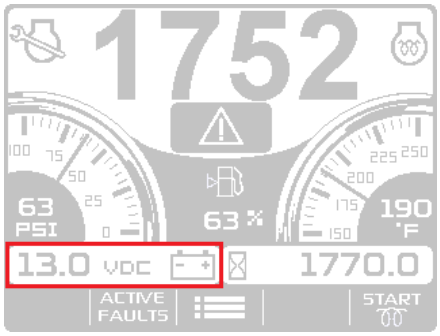
C. Engine Oil Pressure - An analog pressure gauge displays the current oil pressure with options to change to display units in User Settings. A digital readout of the Oil Pressure is also present in the hub of the analog gauge.



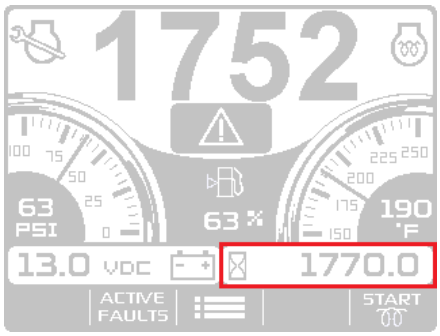
D. Engine Temperature - An analog temperature gauge displays the current engine temperature with options to change to display units in User Settings. A digital readout of the Engine Temperature is also present in the hub of the analog gauge.



E. Battery Voltage – A digital battery voltage gauge displays the current battery voltage at the PV380. (NOTE: This reading may differ from actual battery voltage due to voltage drop over distance.)

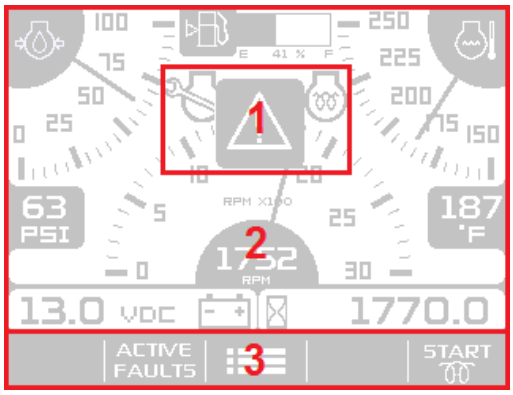


F. Engine/Machine Hours – A digital hourmeter displays the accrued run hours when the engine is above 400 RPM. The hourglass symbol will flash when the engine is above 400 RPM to symbolize to the operator the hours are counting.



3. Button Selection Display: The button functions can change depending on the screen displayed. (See Navigation and Keypad Functions section for details.)

View 2



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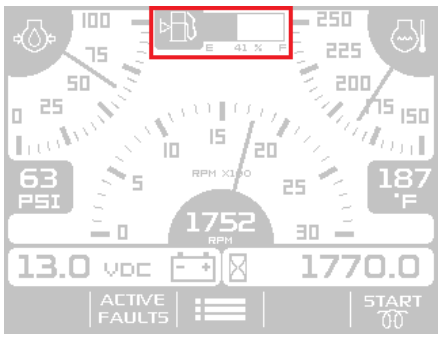
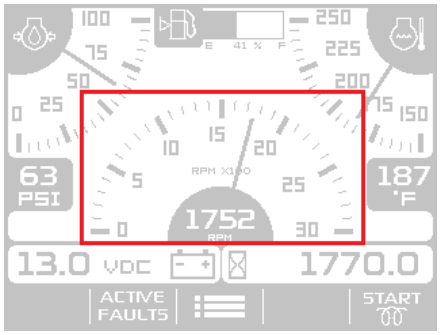
	Preheat indicator. This symbol is shown in the area when an active preheat is started via the operator when enabled.

2. **Parameter Area:**

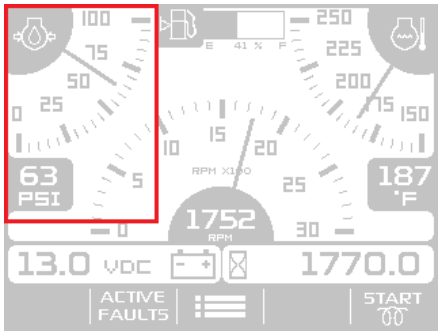
A. Fuel Level – A bar gauge and digital gauge displays the current fuel level at the top of the screen if Fuel enabled in System Settings.



B. Engine Speed – An analog tachometer gauge displays the current engine speed with an option to choose a 3000, 4000 or 6000 RPM dial. A digital readout is also present in the hub of the analog gauge. (See Display Setup for more information).



C. Engine Oil Pressure - An analog pressure gauge displays the current oil pressure with options to change to display units in User Settings. A digital readout of the Oil Pressure is also present below the analog gauge.



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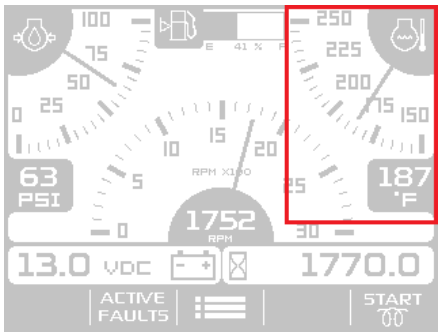

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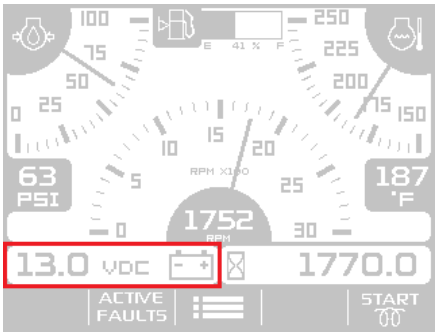

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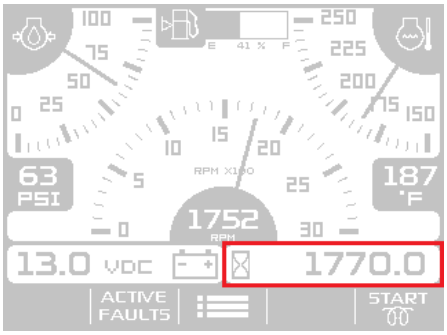

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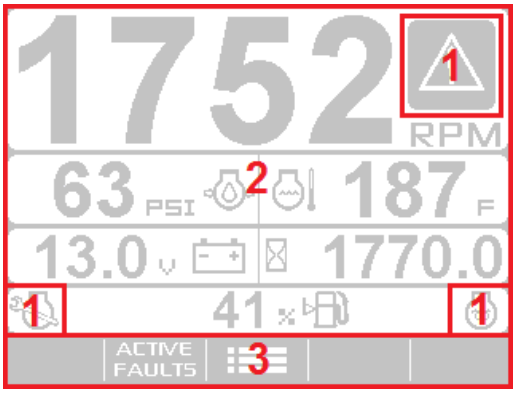
View 3



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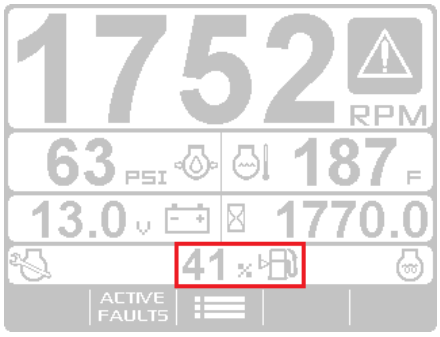

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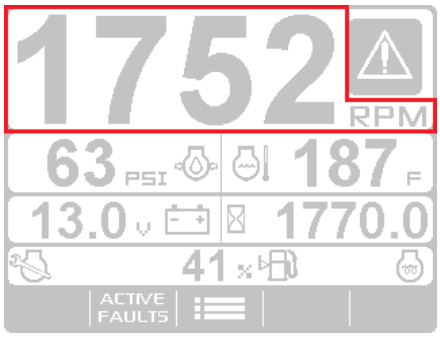
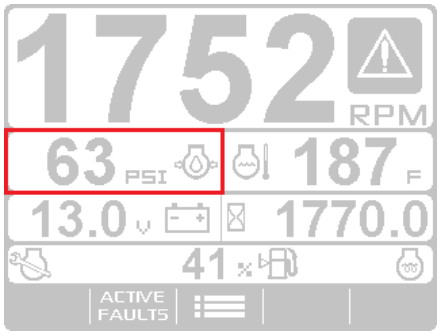


C. Engine Oil Pressure – A digital gauge displays the current oil pressure with options to change to display units in User Settings.



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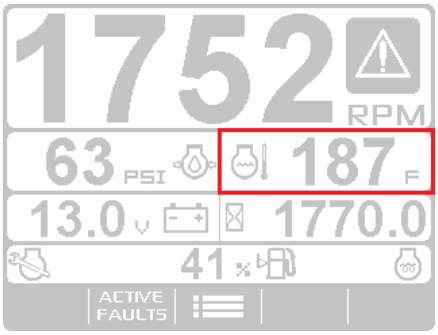

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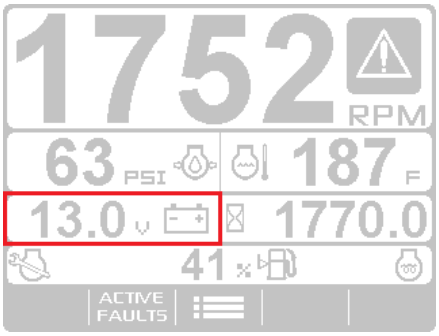

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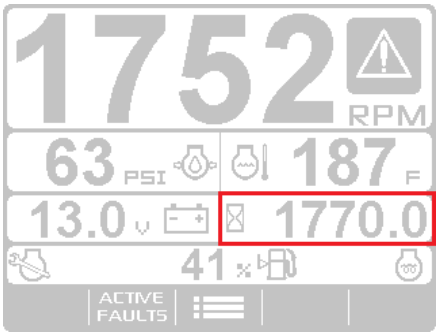


3. **Button Selection Display:** The button functions can change depending on the screen displayed. (See Navigation and Keypad Functions section for details.)

Adjusting Menu Selections

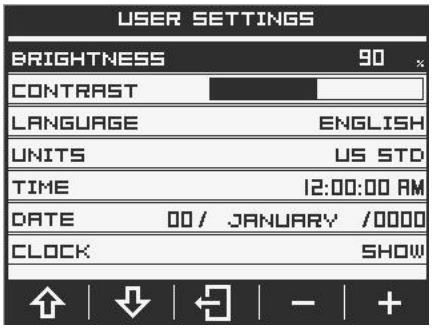
NOTE: Once parameters are changed, back out of all menus and initiate a power cycle for changes to take effect.

User Settings

Brightness and Contrast

Follow these steps to adjust the Brightness and Contrast:

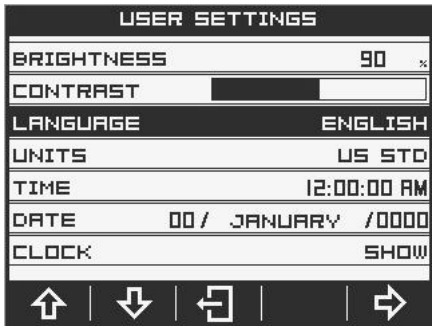
1. Press ☰ to display the Menu.
2. Arrow to **USER SETTINGS.** Press ↵ and arrow to the desired selection.
3. Press + and − to adjust the selection.
4. Press ⎋ to save and exit the menu.



Language

Follow these steps to change the Language:

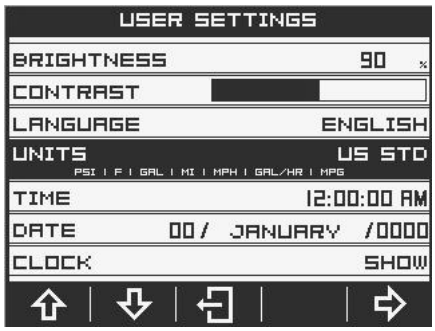
1. Press ☰ to display the Menu.
2. Arrow to **USER SETTINGS** and then press ↵ to enter, then arrow to **LANGUAGE**.
3. Press ⇨ to cycle through the available languages (English, French, German, Spanish and Italian).
4. Press ⎋ to save and exit the menu.



Units

Follow these steps to adjust the Units:

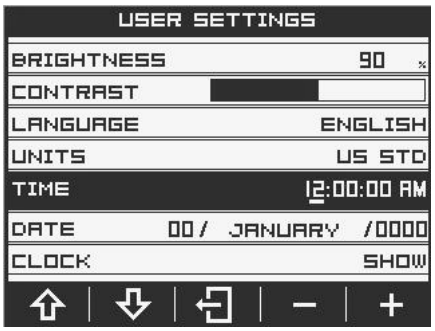
1. Press ☰ to display the Menu.
2. Arrow to **USER SETTINGS.** Press ↵ and then arrow to **UNITS**.
3. Press ⇨ to choose US STD, Metric KPA or Metric BAR.
4. Press ⏎ to save and exit the menu.



Time

Follow these steps to adjust the Time:

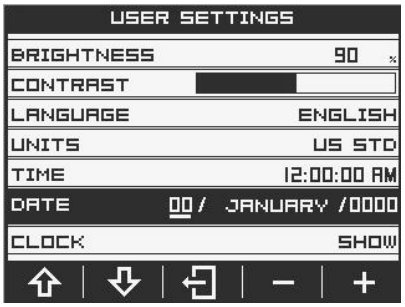
1. Press ☰ to display the Menu.
2. Arrow to **USER SETTINGS.** Press ↵ and then arrow to **TIME**. The cursor will be beneath the hour.
3. Press + and − to adjust the selection.
4. To adjust the minutes, press ⇩, and the cursor will move to the right.
5. Repeat steps 3 and 4 to adjust the minutes and seconds.
6. Press ⏎ to save and exit the menu.



Date

Follow these steps to adjust the Date:

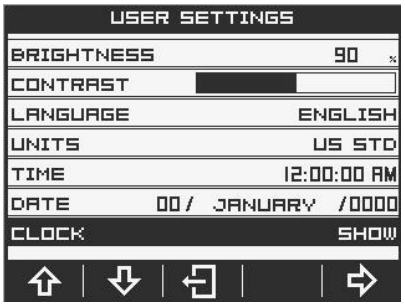
1. Press ☰ to display the Menu.
2. Arrow to **USER SETTINGS.** Press ↵ and then arrow to **DATE**.
3. Press + and − to adjust the day.
4. Press ⇩, and the cursor will move to the month.
5. Repeat steps 3 and 4 to adjust the month and year.
6. Press ⇦ to save and exit the menu.



Clock

Follow these steps to display or hide the Clock:

1. Press ☰ to display the Menu.
2. Arrow to **USER SETTINGS.** Press ↵ and then arrow to **CLOCK**.
3. Press ⇨ to alternate between **SHOW** and **HIDE**.
4. Press ⇦ to save and exit the menu.



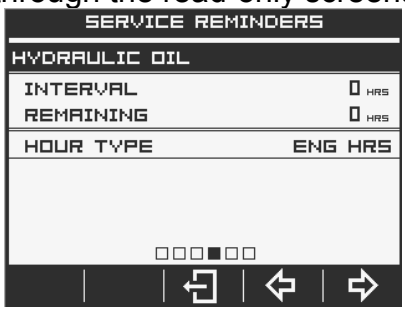
Service Reminders

Available service reminders: Engine Oil, Fuel Filter, Engine Air Filter, Hydraulic Oil, Service Engine and Service Machine.

Press ☰ to display the Menu.

1. Press ⇩ to Service Reminders. Press ↵ to enter.

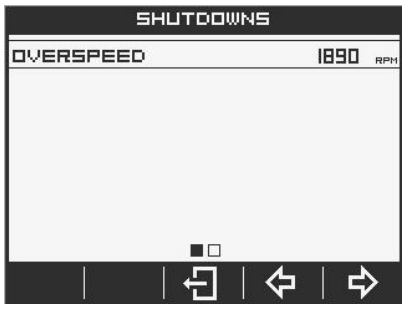
2. Press ⇨ or ⇦ to scroll through the read-only screens.



Set Points

Follow these steps to view the Set Points:

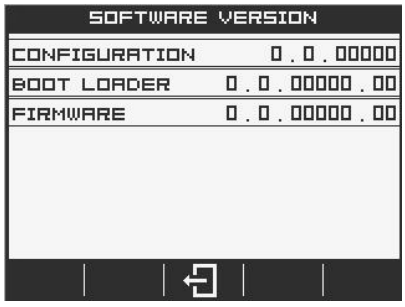
1. Press ☰ to display the Menu.
2. Press ⇩ to Set Points. Press ↵ to enter.
3. The first screen will display configured Shutdowns and the specified criteria. Press ⇨ to view the second screen listing Warnings and the specified limits.



Software Version

To display the software version information (useful for Enovation Controls' personnel to identify which configuration the customer is using), follow these steps:

1. Press ☰ to display the Menu.
2. Arrow to **Software Version** and press ↵. The following screen will appear:

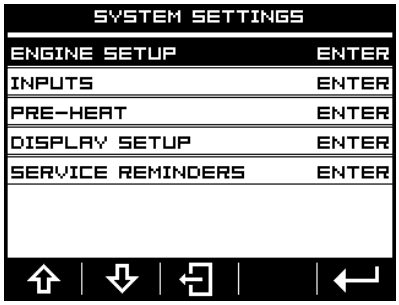


3. Press ⏎ to exit the Menu.

System Settings

Follow these steps to enter System Settings:

1. Press ☰ to display the Menu.
2. Press ⇩ to System Settings. Press ↵ to enter.
3. Utilize keys 1, 2 and 3 to input the password (3482) and press ↵ to enter the category.



Engine Setup

Use the following table to configure engine settings.

Parameters	Functions

Overspeed	• Type
	  ○ Disabled
	  ○ Shutdown
	  ○ Warning
	• Fault at Defined Speed

Speed Calibration	• Set to correct engine alternator pulses or engine flywheel tooth count for accurate speed sensing of engine RPM.
Machine Hours	• Set Machine Hours • Clear Machine Hours

Inputs

Use the following table to configure input settings.

Input Parameters	Settings and Descriptions

Resistive Input 1	• Function (Predefined for Engine Oil Pressure)
	• Sender
	  ○ Murphy 100 (Default)
	  ○ Murphy 200
	  ○ VDO 5

	○ VDO 7 ○ Datcon • Warning ○ Disabled ○ Enabled (Default) ▪ Setpoint (15psi) • Shutdown ○ Disabled ○ Enabled (Default) ▪ Setpoint (10psi) • Bypass Timer (20 sec) Set to 0 for immediate fault otherwise bypass begins counting after engine starts.
Resistive Input 2	• Function (Predefined for Engine Temperature) • Sender ○ Murphy (Default) ○ VDO ○ Datcon • Warning ○ Disabled ○ Enabled (Default) ▪ Setpoint (210°F) • Shutdown ○ Disabled ○ Enabled (Default) ▪ Setpoint (225°F) • Bypass Timer (15 sec) Set to 0 for immediate fault otherwise bypass begins counting after engine starts.
Resistive Input 3	• Function ○ Fuel Level (Default) ▪ Sender • Murphy (Default) • VDO • Datcon ▪ Warning • Disabled • Enabled (Default) ○ Setpoint (15%) ▪ Shutdown • Disabled (Default) • Enabled ▪ Bypass Timer (15 sec) Set to 0 for immediate fault otherwise bypass begins counting after engine starts.

	○ Aux 1 ▪ Sender (Digital Ground Faults) • Low Fuel Level • Low Lube Level • Low Coolant Level • Aux 1 ▪ Fault • Disabled • Warning • Shutdown ▪ Bypass Timer (15 sec) Set to 0 for immediate fault otherwise bypass begins counting after engine starts.
Resistive Input 4	• Function (Predefined as Aux 2) ○ Sender (Digital Ground Faults) ▪ Low Fuel Level ▪ Low Lube Level ▪ Low Coolant Level ▪ Aux 2 ○ Fault ▪ Disabled ▪ Warning ▪ Shutdown ○ Bypass Timer (15 sec) Set to 0 for immediate fault otherwise bypass begins counting after engine starts.

Pre-heat

The pre-heat function uses output #2 of the PV380 to allow a pre-heat relay to be used for a specified out of time in order to pre-heat the engine with glow plugs. This output will turn off if the engine is started and engine speed is greater than 400 RPM if time remains in the counter.

Use the following table to configure pre-heat settings.

Parameters	Functions
Pre-heat	• Disabled (Default) • Enabled ○ Timer (5 sec)

Display Setup

The display setup menu allows the setting of gauge screen view of choice, analog tachometer range, auto acknowledgement of faults, and performing a factory reset of the display.

Use the following table to configure pre-heat settings.

Parameters	Functions
Gauge Screen	• View 1 (Default) • View 2 • View 3
Gauge Setup (View 2 Only)	• Engine Speed Dial ○ 3000 RPM ○ 4000 RPM ○ 6000 RPM
Auto Ack Fault	• Disabled (Default) • Enabled (Acknowledges faults and hides popup)
Factory Reset	• Enter (Pressing enter initiates a factory reset and the display will reboot itself after two seconds.)

Service Reminders

Follow these steps to view, set, and reset Service Reminders:

1. Press ☰ to display the Menu.
2. Press ⇩ to System Settings. Press ↵ to enter.
3. Utilize keys 1, 2 and 3 to input the password (3482) and ↵ to enter.
4. Arrow to highlight Service Reminders. Press ↵ to enter.
5. Service Reminders exist for Engine Oil, Fuel Filter, Engine Air Filter, Hydraulic Oil, Service Engine and Service Machine. Press ⇦ or ⇨ to view each one.
6. To change the Interval time, highlight the selection with ⇧ or ⇩ and press − or + to adjust the hours. Each press of the button will decrement or increment the hours by 10.
7. To simply reset the hours, highlight Reset and press ↵ (OK).
8. Press ⮌ to be returned to the System Settings menu.

Outputs

The outputs of the PV380 Mechanical are preset for specific functions and not configurable from the front UI. The following details the functions of Output 1 and Output 2.

Output #1 – This output is dedicated to switch on a relay for the fuel solenoid. This output turns on at power up and remains on until either the operator turns off the display or a shutdown fault occurs. In the instance of a shutdown fault occurring, the output will remain off to the fuel solenoid until the PV380 display receives a power cycle.

Output #2 – This output is dedicated to switch on a relay for pre-heat. When pre-heat is enabled in the menu the output turns on when the Start Pre-heat key is pressed and remains on until the set timer counts down to zero or until the engine is started.

Diagnostics and Service

LED Indicators

The PV380 features amber (Warning) and red (Shutdown) colored LEDs on the front keypad. These are illuminated when a warning or shutdown fault is present in the display.

Specifications

Electrical

Display	3.8” (9.65 cm) QVGA (320x240 pixels); monochrome transflective LCD with heater, MTFB 50,000 hours
Resolution	QVGA, 320 x 240 pixels
Backlighting	White LED
Communications	(1) CAN 2.0B (J1939 protocol and proprietary messaging), (1) RS-485 serial (Modbus)
Protocols	J1939, NMEA 2000
Connection	Deutsch DT Series 6- and 12- pin
Keyboard	5 tactile buttons
Input	(4) resistive analog/digital low (3) analog; 0-5V / 4-20 mA (Not Programmed in this variant) (1) frequency; 20-10,000Hz, 3.6-120VAC
Output	(2) 500mA; switched low-side
Voltage	6-36 VDC; reverse polarity protected

Environmental

Operating Temperature	-40º C to +85º C (-40° F to +185° F)
Storage Temperature	-40º C to +85º C (-40° F to +185° F)
Protection	IP66 and 67 (IEC/EN 60529)

Standards Compliance	Electrical Safety: 2006/95/EC
	Electromagnetic Compatibility:
	• 2004/108/EC:
	  • EN 61000-6-4:2001 (emission)
	  • EN 61000-6-2:2001 (immunity)
	  • EN 50121-3-2 and EN 12895
	• SAE J1113/2, 4, 11, 12, 21, 24, 26 and 41

Vibration	7.86g random vibe (5-2,000Hz)
Shock	±50g shock in 3 axes

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