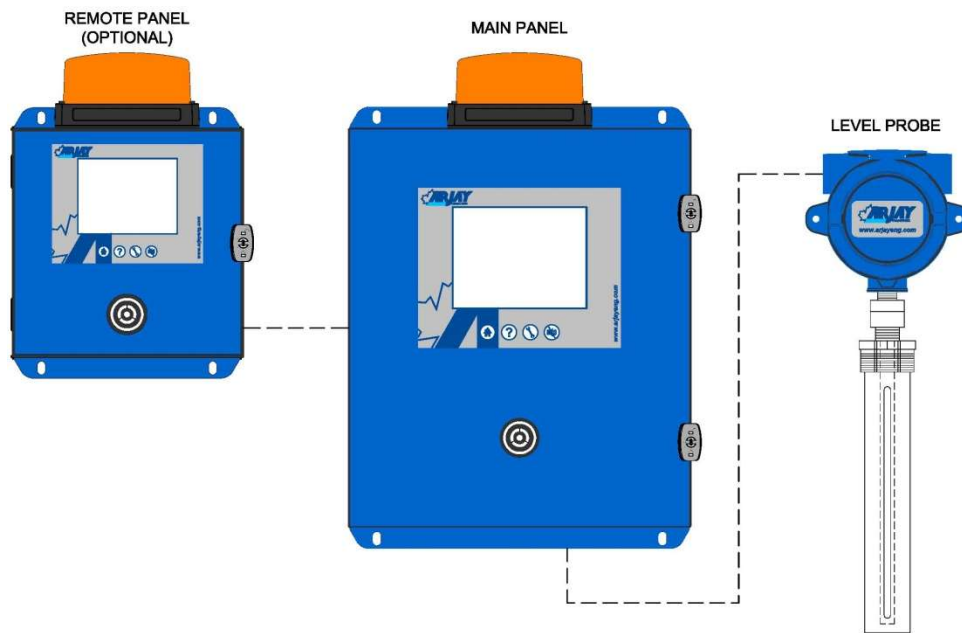




MODELS:
4100-OWS
OIL/WATER SEPARATOR LEVEL MONITOR



USER MANUAL (REV: 1.6)

| ARJAY ENGINEERING | | |
|--|---|--|
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1.0 INSTRUMENT OVERVIEW

The Arjay Model 4100-OWS is a capacitance based interface monitor used for the measurement and control of separated oil within an oil/water separator. The oil level in the Oil/Water Separator is monitored by the 4100-OWS by measuring the total picofarad (pF) reading within a concentrically shielded Arjay capacitance probe. As the oil displaces the water in the vessel, the measured capacitance of the level probe decreases linearly and can be used to display a % oil level.

It is important that the overall liquid level (oil and water) should be a constant i.e. the only variable is the oil / water interface level and not the total liquid level.

The main panel receives an input from the Arjay PMC card installed in the level probe junction box. Through a site calibration, the unit displays the oil depth and provides proportional outputs and relay controls.

The monitoring system is comprised of one main control panel, the PMC card at the Probe and the level probe.

Optional Remote alarm panels can also be added that will display and provide audio/visual alarms.

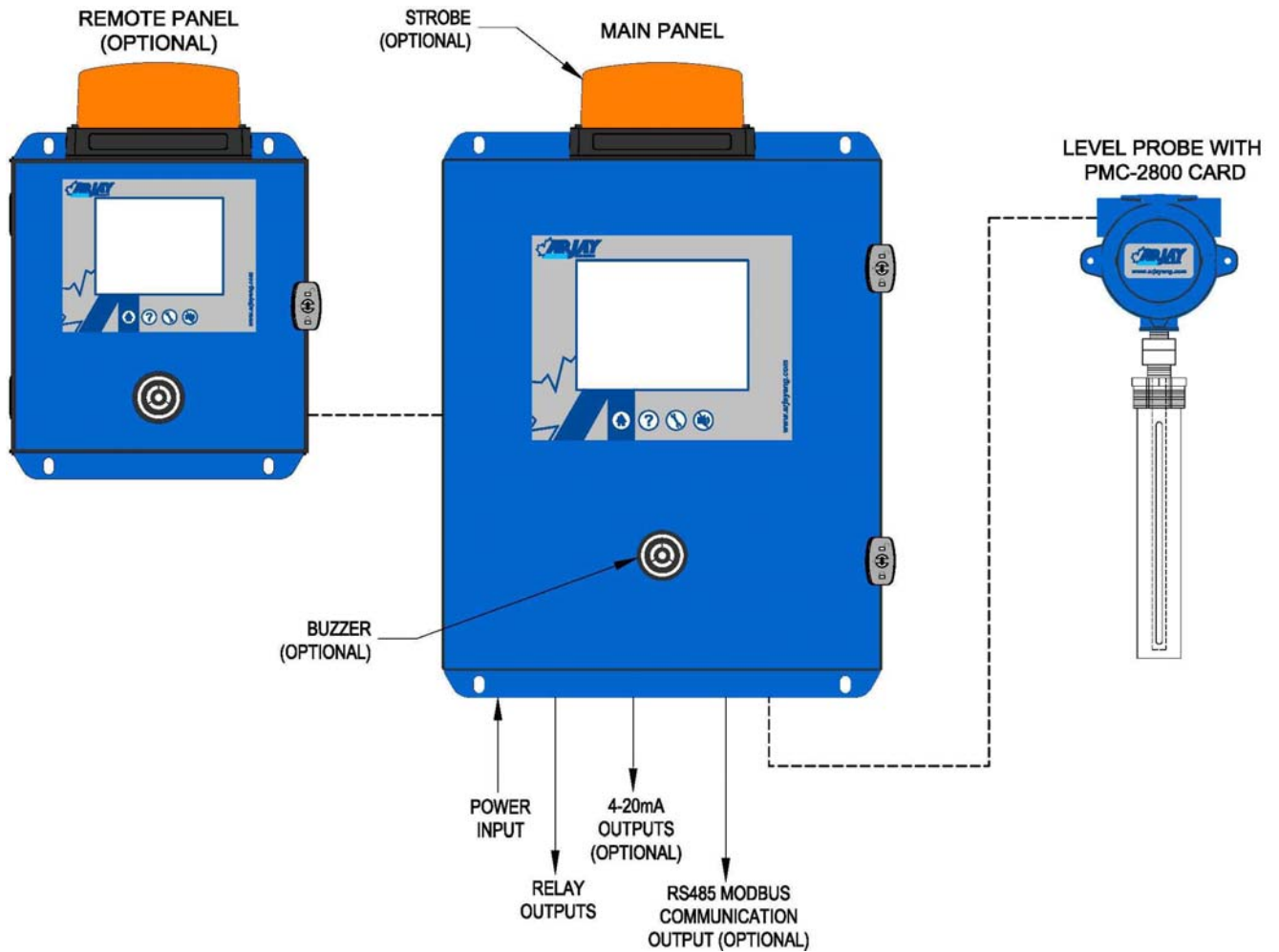


Figure 1 – Instrument System Overview

Main Panel

The main panel is a wall mounted touch screen monitor to be installed in a general purpose (non-hazardous) location that is accessible for set-up and observation of the display and alarms.

Four relays are available. Relay 1 & 2 can be field set to alarm at any depth of oil within the range of the probe. Relay 3 is factory set as a system fault relay. Relay 4 is a Pump Run relay with a timed and auto shut-off feature. Relay 3 and 4 can also be selected to act as normal alarm relays. See section 4.1 for instruction to change alarm setup.

A 4-20 mA non-isolated output and Modbus RS-485 are optional. The power input at the main panel serves the HMI, PLC, PMC and probe requirements.

An optional buzzer and strobe (beacon) are available.

The level probe is approved for Class 1 Group C&D hazardous locations and can also be made Intrinsically Safe for Hazardous Classified locations through the installation of an IS Barrier in the main panel.

The main panel screen provides additional user interface menus for diagnostics, analog output, calibration, set-up and general help information. Diagnostic Menus can be accessed for viewing at any time but a password entry is required to make setup changes.

Remote Panel

Remote panels are available to mimic the screen and audio/visual alarms of the main panel. All access to the touch screen menus are password protected on the remote panels.

Remote PMC and Sensing Probe

An Arjay PMC card is installed in the level probe junction box. This converts the capacitance reading of the oil depth into a frequency pulse for transmission to the main panel. This unique approach eliminates any operator interface requirements at the probe. All diagnostics and calibration is done at the main panel.

1.1 Features

- Touch Screen interface with passcode protection
- Microprocessor based Controller
- Oil Display in % and engineering units
- Diagnostic, Set-up and Help menus on all screens
- Four alarm relays
- Optional analog outputs and RS-485 communication
- Arjay PMC Card input

1.2 Model Numbers

4100-OWS - a - b c d e f g - h

| a - Power Input |
|-----------------|
| 1 - 100-240 VAC |
| 2 - n/a |
| 3 - n/a |
| 4 - 24 VDC |

| b - Enclosure |
|-----------------------|
| 0 - No |
| 1 - Type 4/IP65 Steel |
| 2 - Type 4X/IP65 Poly |
| 3 - Type 4X/IP65 SS |
| 9 - Custom |

| h - Custom vs. Standard |
|-------------------------|
| x - Custom** |
| z - Standard |

| c - Strobe Beacon |
|-------------------|
| 0 - No |
| 1 - Yes |

| d - Buzzer |
|------------|
| 0 - No |
| 1 - Yes |

| e - 4-20mA Output |
|-------------------|
| 0 - No |
| 1 - Yes |

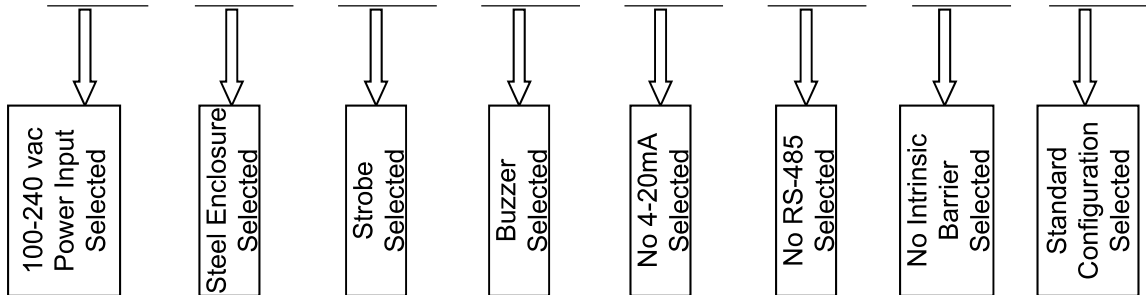
| f - RS-485 Modbus Communication |
|---------------------------------|
| 0 - No |
| 1 - Yes |

| g - Intrinsic Barrier |
|-----------------------|
| 0 - No |
| 1 - Yes |

| x - Custom Description | |
|------------------------|--|
|------------------------|--|

Example:

4100-OWS - 1 - 1 1 1 0 0 0 - z



1.3 Specifications

| | |
|----------------------------------|---|
| Power Input: | 100-240 VAC +/- 10%, 50/60 Hz, (1.22A → 0.66A) 1.6A fuse 24 VDC, 2.5A Max. (Optional) |
| User Interface: | |
| Touch Screen | Full Color 7" display on Main Panel 4" on Remote Panel |
| Outputs: | |
| Alarm Relay Output | DPDT relay, 8 A @ 250 VAC dry contacts Selectable failsafe or non-failsafe Programmable time delay: 0 – 60 minutes ON and OFF Two relays for setpoint alarms One relay for system fault alarm (Selectable) (No XMTR signal or 0% Oil offset alarm) |
| Pump Relay | DPDT relay, 8 A @ 250 VAC dry contacts (Selectable) Programmable pump run time |
| Analog (Optional) | 0/4-20 mA non-isolated, 600 ohms Self-powered |
| Communication (Optional) | RS-485 Modbus |
| Probe Input: | Capacitance Probe with PMC input |
| Accuracy: | 0.04% of full-scale pF |
| Resolution: | 0.007% (0.07pF at 1000pF) |
| Environmental: | |
| Ambient Temperature | Controller 0 to +55 °C PMC -60°C to +55 °C Level Probe -60°C to +260 °C |
| Process Pressure | 103 bar / 10342 kPA /1500 psi |
| Relative humidity | 0 to 95% (non-condensing) |
| Installation Category | II |
| Pollution Degree | 2 |
| Mechanical Specification: | Refer to dimensional drawing |

2.0 INSTALLATION

NOTE: If any damage to the instrument is found, please notify an Arjay Engineering representative as soon as possible prior to installation.

2.1 Main and Remote Panel Installation

Choose a mounting location in accordance with good instrument practice. Extremes of ambient temperature and vibration should be avoided (see specifications and installation drawing).

Remote mimic panels can be mounted up to 300 meters away from the main panel.

The PMC and level probe can be mounted up to 1 km away from the main panel.

Important Note: The controller can be set in a Failsafe mode. This means that the relays are in an energized state during normal operation. The N.O. relay contact will be held closed and the N.C. relay contact will be held open during a normal condition. This will allow the relay to return to its non-energized (shelf) state during an alarm, fault or power failure condition. If using the Relay 4 as Pump Run relay, non-**failsafe** mode is used. Wire accordingly.

2.2 Probe Installation

The PMC junction box is mounted directly onto the level probe. The probe length is customer specified based on the tank connections and determined oil depth.

The standard probe used for Oil Water Separator (OWS) applications includes a 2-inch NPT concentric shield. Flanges are available as options. The entrance configuration may vary depending on the application requirements.

TO SCREW IN PROBE (THREADED ENTRY) USE WRENCH ON LOWER 2 INCH HEX BUSHING. The probe fittings are compression type with Teflon ferrules assembled by applying torque between the two hex sections. The fittings are sealed at the factory to provide a compression seal capable of withstanding high pressures. Once opened they cannot be reassembled without new ferrules.

The probe should be mounted vertically into the separator. The following points are important when installing the probe:

1- Reference ground: For OWS applications, a concentrically shielded probe is used to provide a reference ground. This factory supplied shield also accommodates the single point calibration.

2- The measurement accuracy can be affected by the temperature change of the material in the tank. The amount of measurement error depends on the material. If the temperature change is excessive, accuracy may be affected.

NOTE: The PMC junction box must be mounted above any possible flood level and sealed from condensation in the conduit.

NOTE: To ensure proper operation and electrical safety, make sure the controller and PMC junction box are electrically grounded.

1. Remove probe junction enclosure cover.
2. If PMC 2800 is not already installed, mount onto the standoffs in the base of the probe junction enclosure.
3. Remove the mating connector and wire it as shown.
4. Make sure junction box is electrical grounded.

NOTE A:
SHIELD LEFT UNCONNECTED AND TAPED AT PMC 2800 END.

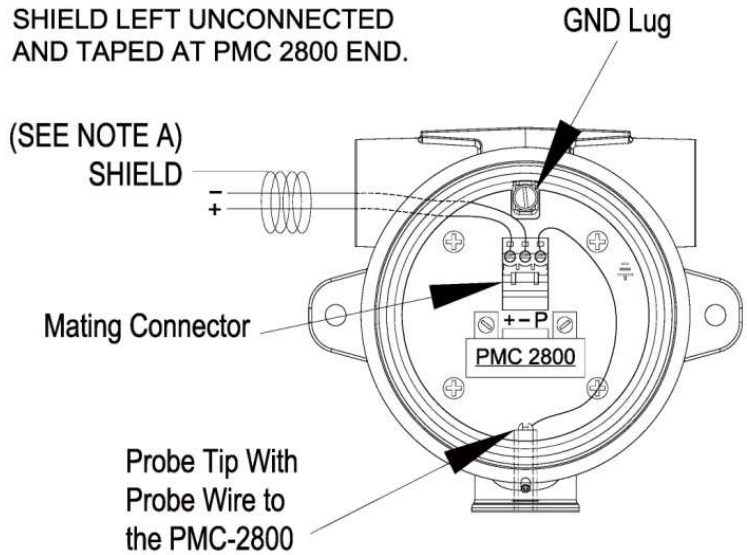


Figure 2 – PMC Installation Overview

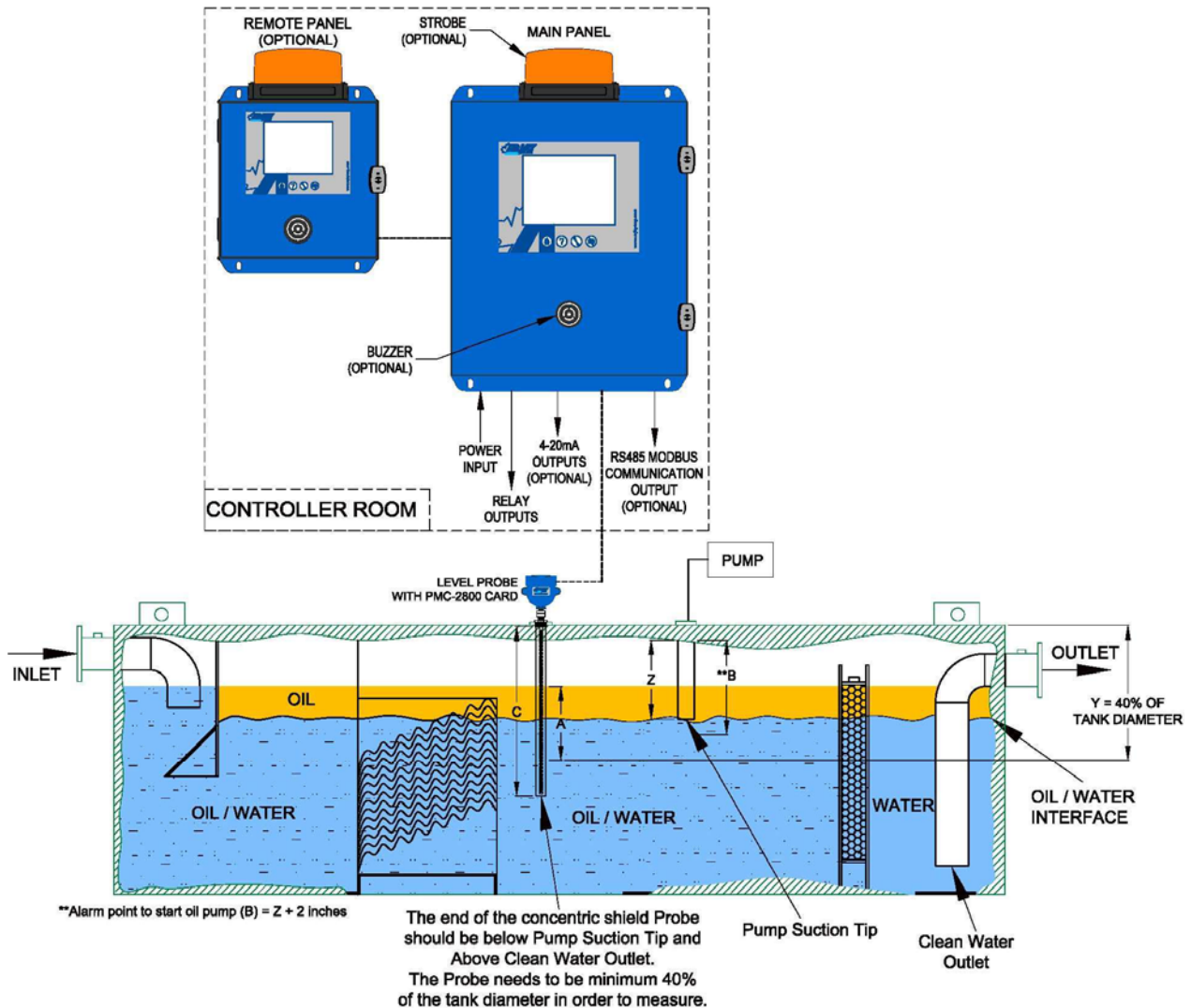


Figure 3 – Typical Oil/Water Separator Application Overview

Figure 3 shows a typical Oil/Water Separator application. Length (C) is the physical length of probe sized for the separator. The probe length may vary depending on manway requirements, etc. (A) is the depth of oil on the probe corresponding to the maximum anticipated oil level. (Y) is typically 40% of the tank diameter and the maximum point of oil accumulation. (B) is representative of the depth of oil needed prior to initiating a pump. (Z) is the tank depth of oil pump-out pipe.

It is important that the overall liquid level (oil and water) should be a constant i.e. the only variable is the oil / water interface level and not the total liquid level.

2.3 Electrical Installation

Refer to the drawings provided by the contractual engineer for your project and the drawings included with this manual.

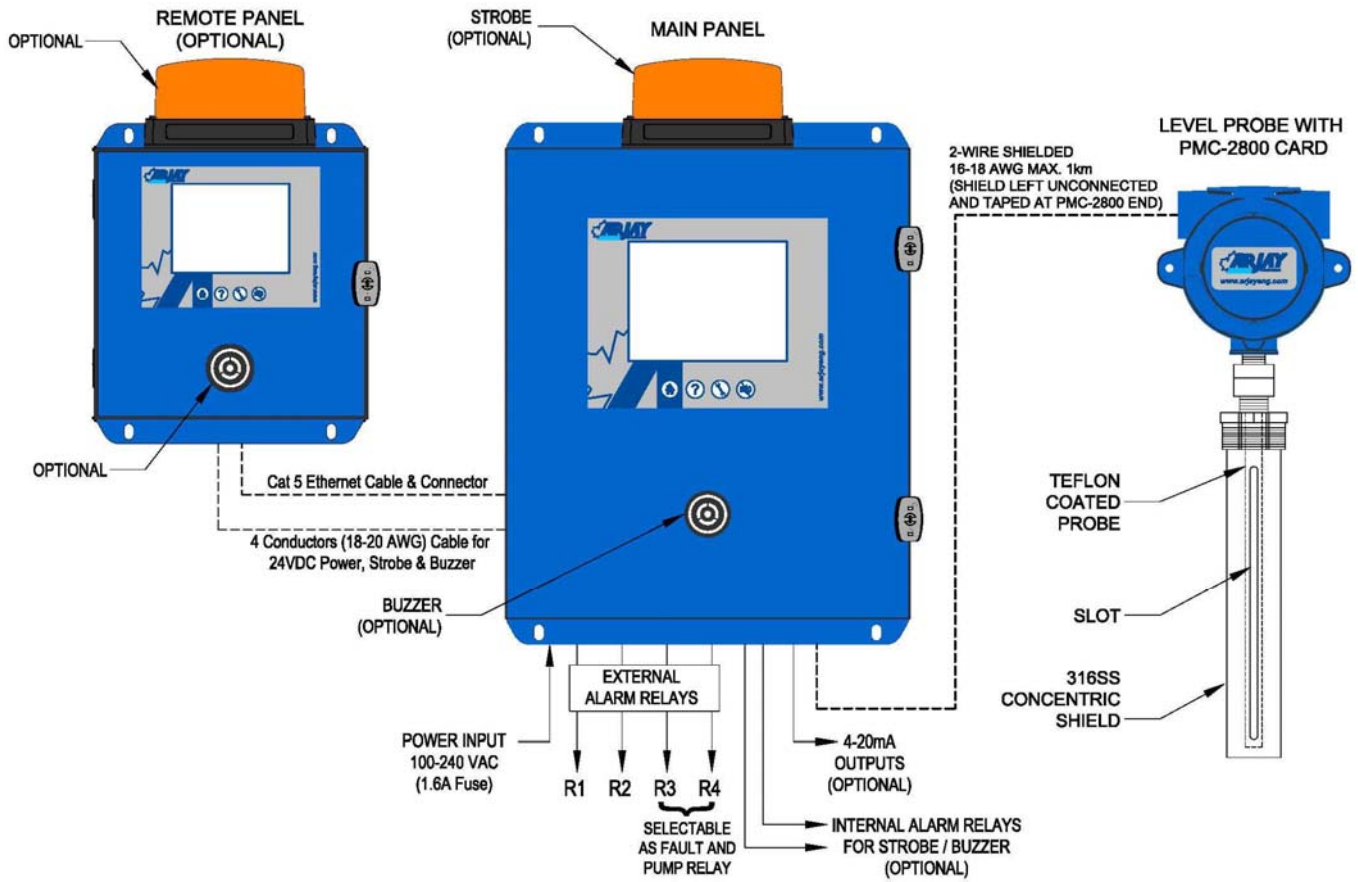


Figure 4 – Electrical Installation Overview

Wiring

The main control panel supplies a 24 VDC power signal to the PMC at the probe. When the PMC is connected, the voltage is 8 -10 VDC.

The PMC card drops a frequency pulse onto the power wiring for a return signal to the main control unit. Required wiring between the PMC and the main control unit is two conductor shielded hook-up cable.



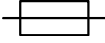
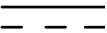




A typical wiring type is 18AWG two conductor shielded (Belden #8760 or equivalent).

*Shielded wire is required on all installations.

Maximum wire length is 1km between controller & PMC junction box.

Refer to the detailed electrical drawings included at the back of this manual.

2.4 Glossary of Symbols

| | | | |
|---|---|---|--|
|  | Attention, consult accompanying documents Attention, veuillez consulter les documents ci-joints. | | |
|  | Protective Earth Terre de protection |  | Fuse Coupe-circuit; fusible |
|  | Direct Current (DC) Courant continu |  | Normally open relay contacts Contacts travail |
|  | Normally closed relay contacts Contacts Repos |  | Power off Arrô (mise hors tension) |
|  | Power on Marche (mise sous tension) | L | Live Sous tension |
| N | Neutral Neutre | G | Ground Terre |

3.0 POWER UP INTRODUCTION

3.1 Power Up

Check that the power wiring and connections to the main panel, remote panel, PMC card at the Probe and interfaced equipment are wired in accordance with the electrical installation drawings.

Power On the unit.

The main screen will light up and run through initialization. After any power interruption, the system will run through this same 30 second initialization.

The main and remote panels are set to factory defaults or customer specifications. **After the initial installation, the alarm and output functions must be set by the customer and a process calibration is required.** These entries are retained in the CPU memory and are not required after any further power disruption.

Confirm the screen reads similar to the following.

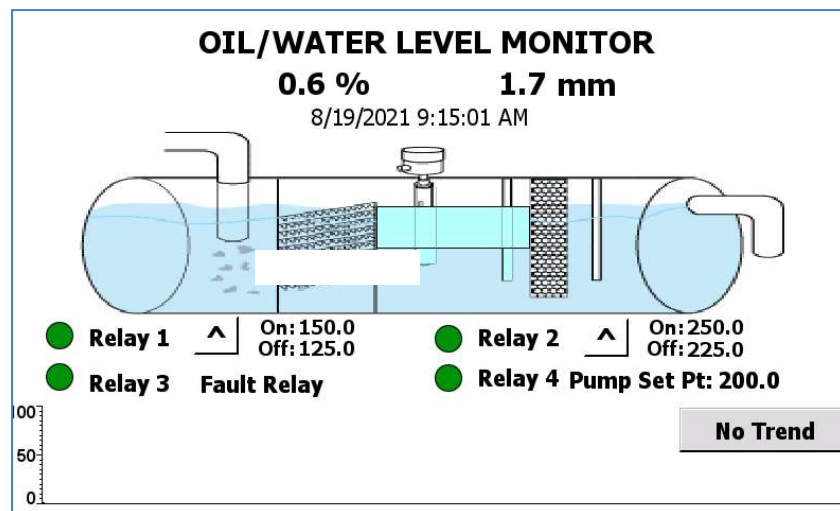


Figure 5 – Main Screen View

3.2 Screen Menu Background Information

****A screen saver is available thru the Control Panel setup during initial Start-up.**

The Trend View logs and provides a graphic display of the oil level readings during the past 10 days. This view can be hidden. (Press "No Trend" icon).

In addition to the standard % display, the screen will display in any engineering units entered. Note that the engineering units must be directly proportional to the % level for the reading to be accurate. For example, a volume in liters will be proportional to an oil level in a vertical straight walled tank but will not be proportional to a level in a cylindrical tank. The full-scale value of units, such as liters or mm at the determined 100% maximum oil level will be required to be entered during calibration.

3.2.1 Keypad Main Menu Entry

Below the touch screen are 4 touch keys.



At any time, you can press the Home Key to return directly to the Home Screen



This provides serial number information and an overview of the system operation and components. Contact details for technical help are included at the end of the text.



Access this section to view or configure the screen and control settings, view diagnostics and perform a calibration



During an alarm condition the audio can be silenced. Silencing at any panel will silence all panels. The audio alarm will automatically re-set when the alarm clears.

3.2.2 Password

This model has a touchscreen display. Tap the icon that you wish to change. A keyboard will display for your changes. Press the Return Key to complete.

Accessing any screen that allows parameters to be changed will require a password. The factory password is 2000. Touch within the Password box, a keyboard will display. After the password is entered, press the Return key ← to complete. Then press OK in Logon screen. Menus can then be accessed.

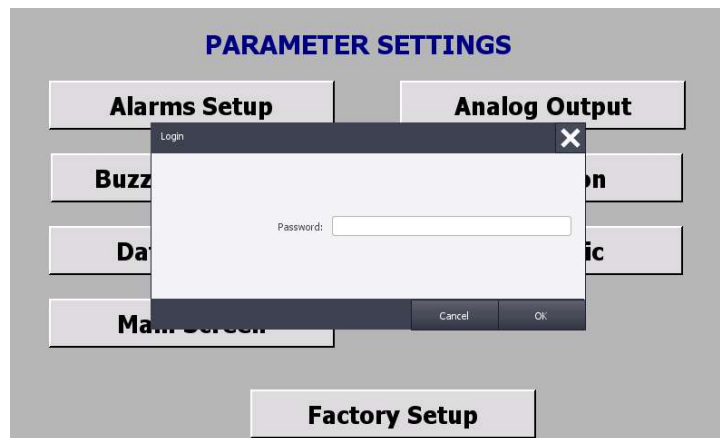


Figure 6 – Password Screen View

4.0 SETUP AND CALIBRATION (PARAMETER SETTINGS)

This section describes the screen, alarm and interface features accessed through the Main Panel. See Controller Setting Sheet (Section 6.0) in back of manual for Factory Default values.

Press “  “

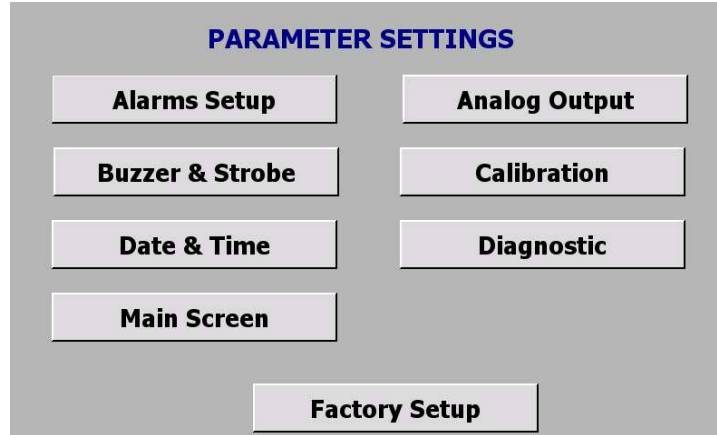


Figure 7 – Parameter Settings Screen View

Enter into the following menu items to configure your monitor.

4.1 Configure Main Screen View

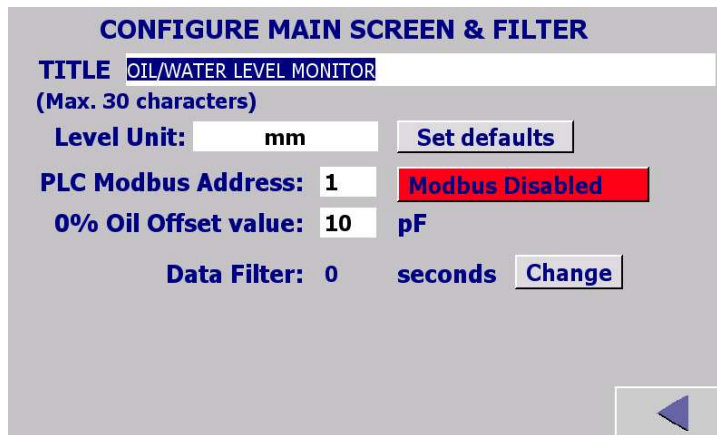


Figure 8 – Configure Main Screen View

The Password 2000 will be required to make changes in this section.

Title: You can personalize the main screen title to your application or tag # (ie, Separator #6 - LT-4505). Touch the TITLE block and type in your description. The factory default is OIL/WATER SEPARATOR MONITOR.

Level Unit: This is the engineering unit that will displayed for the level of oil. This is factory defaulted to millimeters (mm). You can change this to any units of your choice by touching the Level Unit icon and entering your desired units. Note: Any change in units will require a conversion to the slope used in calibration.

0% Oil offset value: This value is used to set a fault condition when the capacitance rises greater than the initial calibrated offset value (0% Oil). This may occur due to an obstruction in the discharge pipe, which would raise the overall level in the separator. Example: A value of 10pf with slope of 0.157pF/mm is 63.69mm change in level. This feature is only a precautionary alarm used when the tank is at a 100% water condition.

Filtering

Filtering is used to suppress rapid spikes by adding time delay to the response rate. For example, a sudden change of 40% could cause a valve to move too quickly and upset the process conditions. Adding 10 seconds of delay will dampen the display measurement and mA output so that it approaches the 40% change over a period of 10 seconds. If the level returns to a lower point, the mA will follow the new path with the same dampening affect.

4.2 Alarms

The Password 2000 will be required to make changes in this section.

There are two Alarm setpoint relays, one Pump run control relay (factory default) and one fault relay (Factory default). Relay 3 and Relay 4 can also be used as general purpose relays. To set relay 3 & 4 as normal general purpose relays, press **“Enabled Relay 4 as pump relay”** and **“Enabled Relay 3 as fault relay”** on the screen to disable the factory default relay setting.

Relays 1 and 2 are for general purpose use for alarms, valve control, etc..

Relay 3 is set as a Fault relay (factory default). This relay is triggered by a “No XMTR Signal” from the pulse card OR a “0% Oil offset error” due to possible obstruction in the discharge pipe.

Relay 4 is set as a Pump Run relay (factory default) that initiates a pump at a prescribed % level of oil and then runs for a determined amount of time. The relay will deactivate the pump after the run time. The purpose of the run time feature is to allow a pump to run based on a desired volume evacuation of oil without running dry or pumping water out.

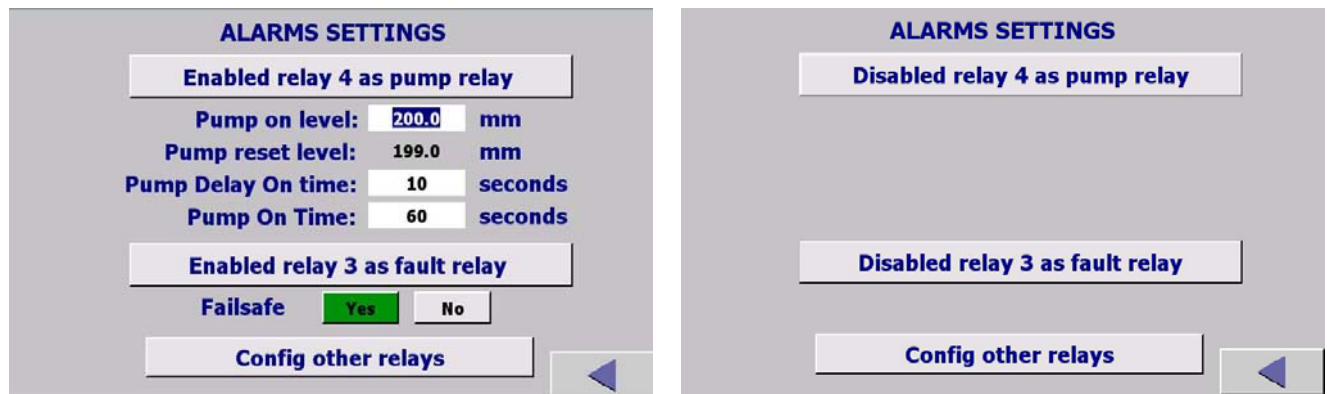


Figure 9 – Alarm Setting Screen View (Disabled Relay 3 & 4)

To set up Relays 1, 2, 3** and/or 4**, Enter the **“Config other relays”** icon. If the icon beside each Relay indicates Enabled, the relay is functional. Pressing the Enabled icon to display Disabled will render the relay Disabled and will remove that relay from the main screen display. It will disable the relay from functioning. If it presently reads Disabled, touch the icon to Enable the relay.

****If selected as general purpose only.**

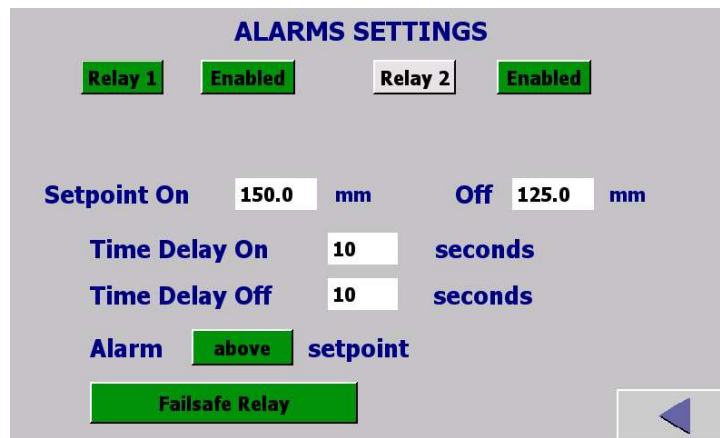


Figure 10 – Alarm Setup Screen View

Touch Relay 1 icon so that it is green. Enter the values of parameters described below.

Setpoint ON

This will determine the setpoint level in engineering units at which the alarm relay activates.

Setpoint Off

This will determine the setpoint level in engineering units at which the alarm relay will turn off. This differential feature is used to suppress chattering of alarms if the level is hovering at the setpoint or can be used to control the differential on/off of a pump or valve.

Time Delay

Delay ON. This is the time, in seconds, that the relay will delay before activating when the alarm setpoint has been reached. Delay ON is used to suppress a nuisance alarm that may be caused by a spurious or momentary alarm condition.

Delay OFF. The time, in seconds, that the relays will stay on after the level has returned to a normal condition. Delay OFF is used to keep controls activated after the alarm has cleared to ensure a stable normal condition has been reached.

Alarm Above or Below Setpoint

This function is to guide the controller on how to control the failsafe and LED indications on the screen.

Select ABOVE if the requirement is for the relay to alarm when the % rises above the setpoint.

Select BELOW if the requirement is for the relay to alarm if the % drops below a setpoint.

The parameters are now set for relay 1. Repeat the above steps for the rest of the Enabled relays.

Failsafe

Failsafe will determine if the relays are energized or de-energized during a normal operating state (no alarm condition).

If Failsafe is YES, the relay will be energized during a normal operating condition. An alarm or power failure will de-energize the relay to the alarm state.

When in Failsafe mode and during a normal condition, the N.O. contact is closed and the N.C. contact is open. WIRE ACCORDINGLY.

Relay 4

If the Relay 4 is kept as Pump Run relay, follow these steps **To setup the Pump Relay 4**

Note: Failsafe for pump relay is non-selectable. Pump relay is “Normally de-energized” when not in alarm (non-failsafe). In the event of a power failure to the 4100-OWS, the pump will remain off.

Pump On Level: Enter level of oil at which the pump is to turn on.

Pump Reset Level: This is a factory set level of oil at which the pump will reset after pump ON timing feature.

Pump Delay On Time: Enter the time in seconds that the pump should be delayed before coming on after the alarm setpoint has been reached. Adding time delay will suppress the relay from activating due to a spurious alarm condition caused by an intermittent surge, etc.

Pump On Time: This is the time that the pump will run after it has been activated. The time should be limited so that the oil does not drop below the suction intake tube of the pump, which would cause the pump to run dry. The flow rate of the pump and volume vs. level of the separator will be needed to determine this accurately.

4.3 Analog Output

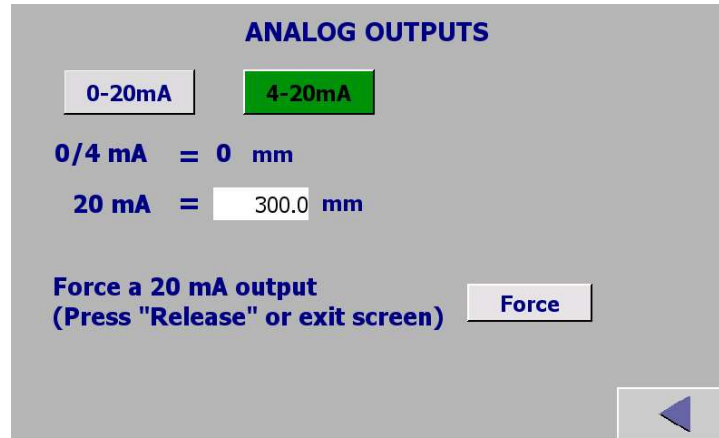


Figure 11 – Analog Output Screen View

The Passcode 2000 will be required to make changes in this section.

0-20mA vs 4-20mA


Select the mA output range for your application. The green icon will confirm which range is selected.

0/4 mA = 0 and 20 mA = xx (Engineering Unit)

The 0 or 4 mA is factory defaulted to 0 oil level. The 20 mA may be offset to suit your control requirements and is entered in engineering units. Typically 20 mA is set to the engineering unit value for 100% depth of Oil. For maintenance purposes to check external equipment and alarms or the analog output, the mA output can be forced by pressing the “Force” icon beside “Force a 20mA output”.

4.4 Buzzer and Strobe Beacon (Optional)

If a Buzzer or Strobe Beacon is ordered, they are factory wired to internal relays. They can be set in the same way as the Alarm relays. See section 4.1.

The buzzer can be silenced by the keystroke button “  on the main screen”. It will automatically reset.

The strobe can be selected to latch. If latch is chosen, an icon will display after an alarm to clear.

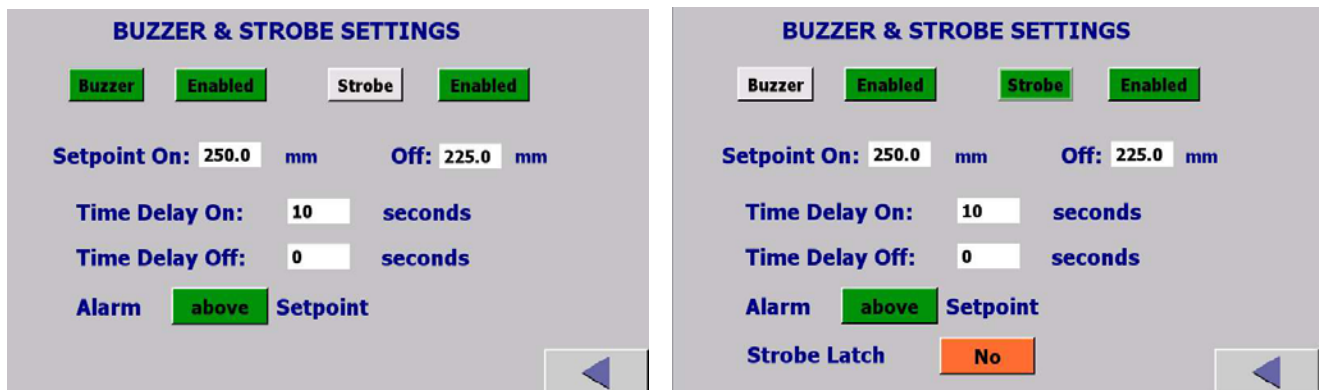


Figure 12 – Buzzer & Strobe Setting Screen View

4.5 Calibration

After the above setup parameters have been entered for the application, a Pulse Card set up is required. Confirm the current A, K and C values shown on the screen match with the values provided on the label of the PMC card installed in Junction box. If the values are different, Press the “Change” button on the screen. Enter the A, K and C values and press “Enter”. The screen will indicate “Entered”.

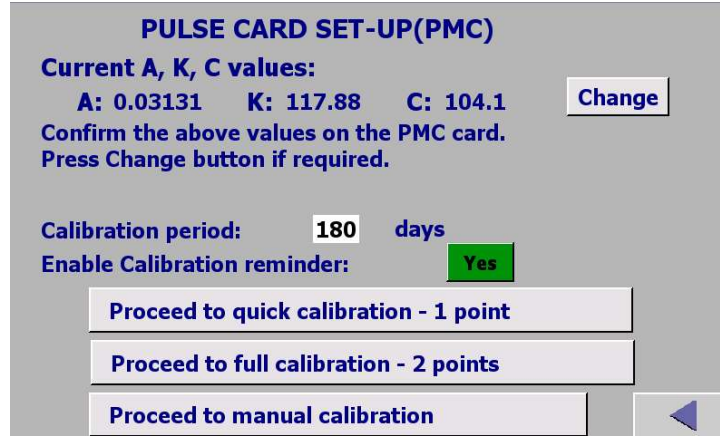


Figure 13 – Pulse Card Set-up Screen View

Once the PMC set-up is completed, a process calibration is required. The level probe must be in place within the oil/water separator to perform the calibration. The separator must be filled to the normal operating level of liquid.

Calibration Reminder

The 4100-OWS has a real time clock. After calibration, the calibration date is recorded in the diagnostics. A calibration reminder for up to 999 days. This is enabled by pressing the “CAL REMINDER” icon. This icon will appear again on the main screen after the preset number of days is reached. If a calibration can be done, Press the “Recalibration” icon.

If a calibration cannot be performed at the time of the reminder, this can be reset to a later date by entering the number of days until the next reminder is desired. Press “Enter” icon to activate the Reminder countdown.



Figure 14 – Calibration Reminder Screen View

This unit allows for three types of calibration.

4.5.1 Quick Calibration

This would be the most typical calibration and uses a factory defaulted slope to allow for a single entry calibration point. This method requires use of the 2" concentric shielded probe. The slope (pF/level) is based on typical oils.

Display Units

Choose the engineering units you want on the display, such as inches, mm, cm, liters, etc. (Factory default is mm)

After entering each value for the following parameters, Press "Enter" to confirm. The screen will change to "Entered" if accepted.

Present Depth of surface oil

Enter the present thickness of surface oil on the water. Enter this in your chosen display units. If no oil is present, enter 0.0.

Depth of oil for 100%

For the chosen engineering units, enter the total oil depth on the probe that will represent 100% oil accumulation. See depth (A) on figure 3.0 for typical oil/water separator applications.

Slope

This is factory preset. The factory default is in pF/mm. If the display engineering units have been changed (ie. to inches), the slope must be mathematically corrected and re-entered.

0.157 pF/mm would be 4.0 pF/inch (2" concentric shielded)

0.151 pF/mm would be 3.8 pF/inch (1.5" concentric shielded / 2" 150# flange or less)

Capture Once the above information has been entered, Press "Capture". The screen should indicate "Captured". If all values have been entered and captured then a "Calibrate" button will appear at the bottom of the screen. Press "Calibrate". A successful calibration will show a "Calibration OK" icon.

Press the Home Key  to return to the main screen.

The Arjay 4100-OWS is now set up, calibrated and operating to your process conditions.

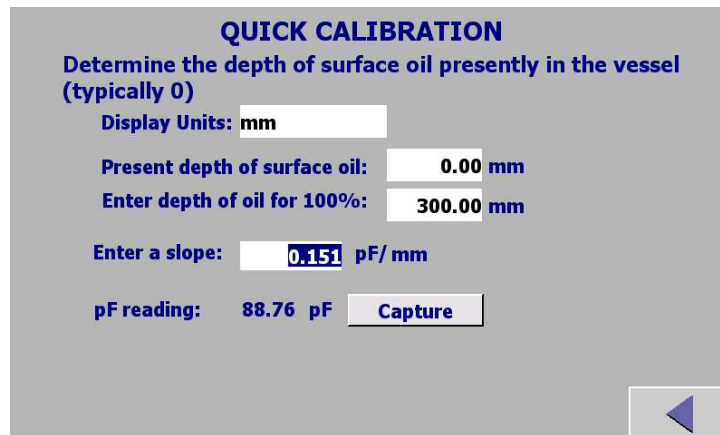


Figure 15 – Quick Calibration Set-up Screen View

4.5.2 Full Calibration

This will enhance the factory defaulted slope value to your specific oil type but will require an accumulated level change of oil. Proceed with the same calibration procedure as Quick Calibration (Section 4.4.1); for the 2nd point, an oil level change is required.

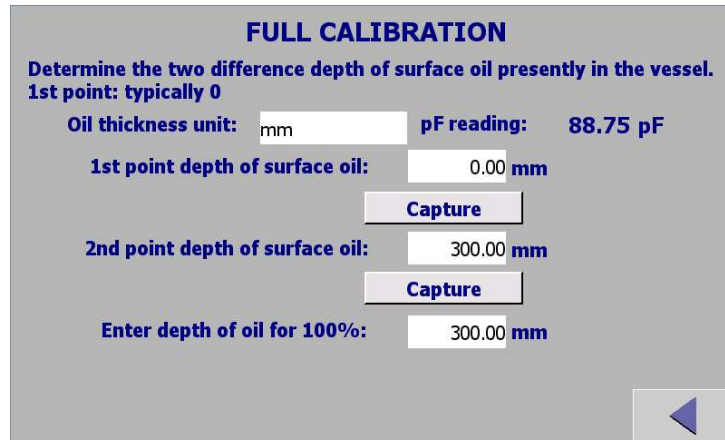


Figure 16 – Full Calibration Set-up Screen View

4.5.3 Manual Calibration

This allows a user to override any of the previous calibration values and enter predetermined or observed calibration values. Press “Update” and previous calibration points from the Quick or Full calibration will be shown. For the Quick calibration the second cal. point was automatically determined from the slope and depth of oil for 100%.

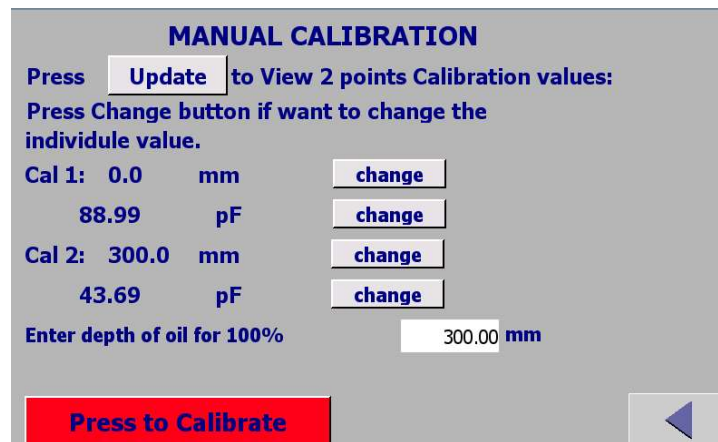


Figure 17 – Manual Calibration Set-up Screen View

4.6 Diagnostic Information

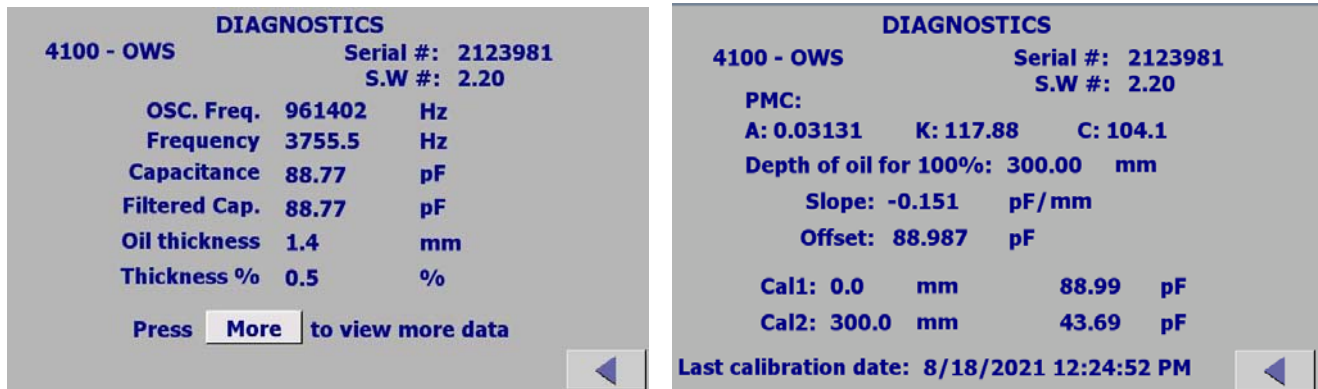


Figure 18 – Diagnostic Information Screen View

These are only View Only screens. They provide various diagnostic information that is communicating between the probe and the controller or has been entered during a calibration. This is a real-time display and is a valuable tool to observe process data such as product stability and change. If technical assistance is required during the setup or operation of the instrument, record or photograph these screens prior to contacting Arjay.

Oscillation Frequency: This is the frequency at which the probe is tuning itself as the product level changes. The frequency change is inverse to level. 0 Hz indicates there is no frequency to the pulse card and the probe may be disconnected.

Frequency: For stability and transmission to the main controller, the oscillation frequency of the probe is divided and linearized to a lower frequency in the PMC card. This response is also inverse to level.

Capacitance: This is the total probe, oil, water and tank capacitance reading in picofarads. At 0% oil level there will be an offset capacitance due to the length of probe and type of liquid. If the probe wire is not connected to the PMC card properly, this will be near or at 0.0 pF.

Filtered Capacitance: During the screen set-up, there will be an opportunity to filter the output to dampen spikes. If filtering has been entered, this reading will respond slower than the true process capacitance.

Oil Thickness: If a calibration has been done, the engineering unit values are available here.

Thickness %: If a calibration has been done, the % oil thickness of span is available here.

Press “More” to view more data:

PMC: During calibration, the operator is required to enter the A,K, C values that are labeled on the PMC card as well as in the back of the manual under controller settings (Section 6.0). These 3 values are unique to each PMC card and enhance the response, accuracy and linearity of the tank capacitance for optimum performance.

Depth of Oil for 100%: During calibration, the operator will be required to enter a value that represents 100% oil. This is the value that was entered with the selected engineering units.

Slope: A slope of pF vs oil level has been factory set for this model to aide in automatic calibration. This is set as pF/mm. It is important to convert this value when changing engineering units. e.g. Inches would be converted from 0.157 pF/mm to 4.0 pF/inches.

Offset: The offset is the capacitance of the Probe in the vessel under a 0% oil condition.

Calibration Points: These are the calibration values recorded after the last successful calibration.

Last Calibrated: During a successful calibration, the calibration date will be recorded.

4.7 Date and Time

The 4100 series has a real time clock to remind users of impending calibration duties.

To change date and time Press “Date and Time” button on a Parameter setting screen (see Figure 7). Press “Change” button on first screen as shown below and enter values in second screen and then Press the Enter.

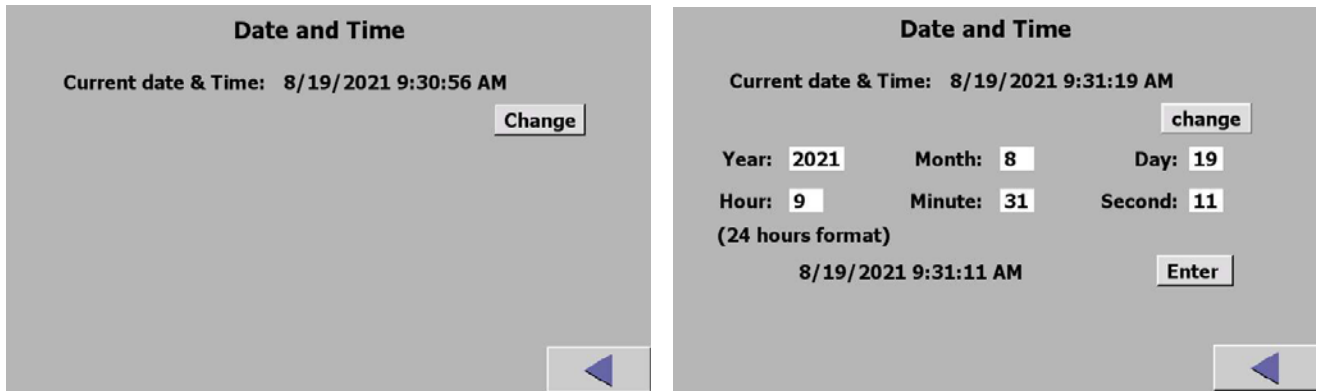

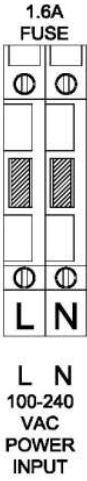
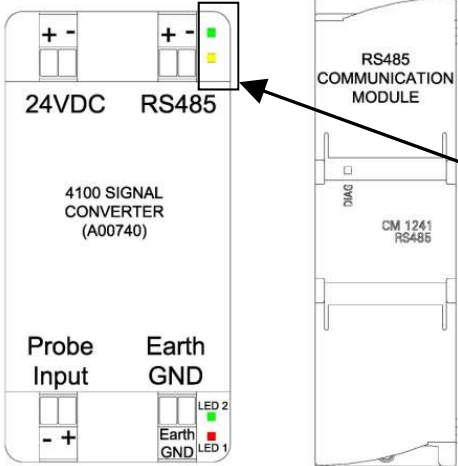


Figure 19 – Date and Time Screen View

5.0 TROUBLESHOOTING

Main Panel

Press “” for some troubleshooting tips.

| | |
|---|---|
|  | <p>Condition: Power Supply Status</p> <ul style="list-style-type: none"> • Confirm the Power Supply LED is active (Green). |
|  | <p>Condition: Power Input Status</p> <ul style="list-style-type: none"> • Confirm the Power input is 100-240 VAC using a meter. • Confirm if input fuse has blown. |
|  | <p>Condition: Communication Error</p> <ul style="list-style-type: none"> • Means no communication between 4100 Signal Converter (A00740) and RS485 Communication Module. • Under normal operating conditions, both LED's should be Lit and Flashing continuously. • Check wiring between 4100 Signal Converter (A00740) and RS485 Communication Module. • Confirm 24VDC power to 4100 Signal Converter (A00740). |

| | |
|--|--|
| | <p>Condition: No Transmitter Signal (Status LED is Red)</p> <ul style="list-style-type: none"> • Under normal operating conditions, LED 2 should be Green. If there is an error, LED 1 goes Red. • Make sure the PMC-2800 is installed. • Make sure the PMC-2800 wiring is correct and there are no breaks in the wiring. At the PMC-2800, measure across the + and - terminals with a DC meter. Make sure “Common” lead of meter is on ‘-’ terminal. It should read (+) 8 to (+)10 VDC with the PMC-2800 connected and approximately 21-24 VDC with the PMC-2800 terminal disconnected from pulse card. • Replace PMC-2800 if suspect water damage OR possible power outage may have damaged the pulse card. |
| | <p>Condition: 0% Oil Offset Error</p> <ul style="list-style-type: none"> • Check for obstruction in discharge pipe in oil/water separator. • Confirm that oil/water separator was full of water at time of calibration. |
| | <p>Condition: PLC Error</p> <ul style="list-style-type: none"> • If LCD display shows “##”, check the condition of Ethernet wire connected between HMI display and PLC unit for no breaks. • Make sure the Ethernet wire is not lose from PLC or HMI terminal. |

6.0 CONTROLLER SETTINGS SHEET

| | |
|---------------|--|
| Checked by | |
| Model Number | |
| Serial Number | |
| Software Rev. | |

| PARAMETER | DESCRIPTION | FACTORY SETTING | USER SETTING |
|-------------------------|--|--|---------------------------|
| PMC A value | PMC-2800 setup parameters | | |
| PMC K value | PMC-2800 setup parameters | | |
| PMC C value | PMC-2800 setup parameters | | |
| Engineering Unit | Chosen engineering units for depth of oil | mm | |
| Slope | Factory installed value of capacitance per level change of oil or diesel fuel | 0.157pF / mm 0.151pF / mm | |
| Offset | Result of a successful Calibration: Calculated capacitance for 0% oil. | | |
| 0% Oil offset value | Fault condition if level rises due to obstruction at discharge pipe | 10pF | |
| Depth of Oil for 100% | The total oil thickness that will represent 100% Oil. | 300mm | |
| Zero | Zero Level value for mA output (in chosen engineering units). | 0 mm | |
| Span | Full Scale Oil thickness value for mA output (in chosen engineering units). | 300 mm | |
| mA Range | 0-20mA OR 4-20mA | 4-20mA | |
| Pump Hi Set (Relay 4) | Pump (Relay 4) high alarm: pump (relay 4) turned on for a selectable time when oil level exceeds this value. The pump will not turn on again until the level drops below the reset level or pump timer is complete. Note: alarm value in chosen engineering units. | 200 mm | |
| Pump Reset Level | Oil level that pump will reset. | 199 mm | *No change allowed |
| Pump On Delay | Amount of time the oil level must be above the Pump High Setpoint before the pump relay is energized | 10 sec | |
| Pump On time (Relay 4) | The time in seconds for which the pump is turned on when the oil level first exceeds the PUMP HI SET value (Relay 4 Hi Set). | 60 sec | |
| Pump Failsafe (Relay 4) | This relay is forced to be normally de-energized (Failsafe = OFF) since it controls a pump which should be OFF if power to the 4100OWS is removed. | OFF | No change allowed |
| Relay 3 Hi Set | This relay indicates Instrument Failure. It can also be selected as an Alarm Relay. | Fault | |
| Relay 3 Failsafe | This relay is factory default to be normally energized (no alarm) and de-energized in an alarm condition or power failure. | ON | |

| | | | |
|----------------------------------|---|---------------|--|
| Relay 2 Hi Set | Alarm Relay 2 high alarm: alarm condition if level is above this value (value in chosen engineering units). | 250 mm | |
| Relay 2 off | Alarm relay 2 differential off value | 225 mm | |
| Relay 2 Failsafe | Failsafe ON sets the relay as normally energized (no alarm) and de-energized in an alarm condition. | ON | |
| Relay 2 Alarm Action | Alarm action above OR below alarm level | Above | |
| Relay 2 Alarm Delay (on) | Amount of time the level must be in an alarm condition (based on Relay 2 alarm value and Action settings) before the relay trips to the alarm condition (condition set by Relay 2 Failsafe setting). | 10 sec | |
| Relay 2 Alarm Delay (off) | Amount of time the level must stay in an alarm condition (based on Relay 2 alarm value and Action settings) before the relay trips to the normal condition (condition set by Relay 2 Failsafe setting). | 10 sec | |
| Relay 1 Hi Set | Alarm Relay 1 high alarm: alarm condition if level is above this value (value in chosen engineering units). | 200 mm | |
| Relay 1 off | Alarm relay 1 differential off value | 125 mm | |
| Relay 1 Failsafe | Failsafe ON sets the relay as normally energized (no alarm) and de-energized in an alarm condition. | ON | |
| Relay 1 Alarm Action | Alarm action above OR below alarm level | Above | |
| Relay 1 Alarm Delay (on & off) | Amount of time the level must be in an alarm condition (based on Relay 1 alarm value and Action settings) before the relay trips to the alarm condition (condition set by Relay 1 Failsafe setting). | 10 sec | |
| Relay 2 Alarm Delay (off) | Amount of time the level must stay in an alarm condition (based on Relay 2 alarm value and Action settings) before the relay trips to the normal condition (condition set by Relay 2 Failsafe setting). | 10 sec | |
| Optional Buzzer / Strobe Setting | Alarm condition if level is above this value (value in chosen engineering units). | 250 mm | |
| Optional Buzzer / Strobe Setting | Differential off value | 225 mm | |
| Optional Buzzer / Strobe Setting | Alarm action above OR below alarm level | Above | |
| Optional Buzzer / Strobe Setting | Amount of time the level must be in an alarm condition (based on alarm value and Action settings) before the relay trips to the alarm condition | 10 sec | |
| Optional Buzzer / Strobe Setting | Amount of time the level must stay in an alarm condition (based on Relay 2 alarm value and Action settings) before the relay trips to the normal condition | 0 sec | |
| Filter | Digital Filter response time in seconds. Used to smooth out level fluctuations caused by splashing etc. | 0 sec | |
| Tag Number (Optional) | For network applications only. All Arjay 4100 series controllers connected to a network must have a unique Tag Number between 1 and 100 | 1 | |

*Can be changed at the factory.

7.0 DETAILED ELECTRICAL AND DIMENSIONAL DRAWINGS

Drawings are included in this section that are specific to your model ordered.

If drawings are not included here, record the serial number on the left outside wall of the main panel and contact:

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