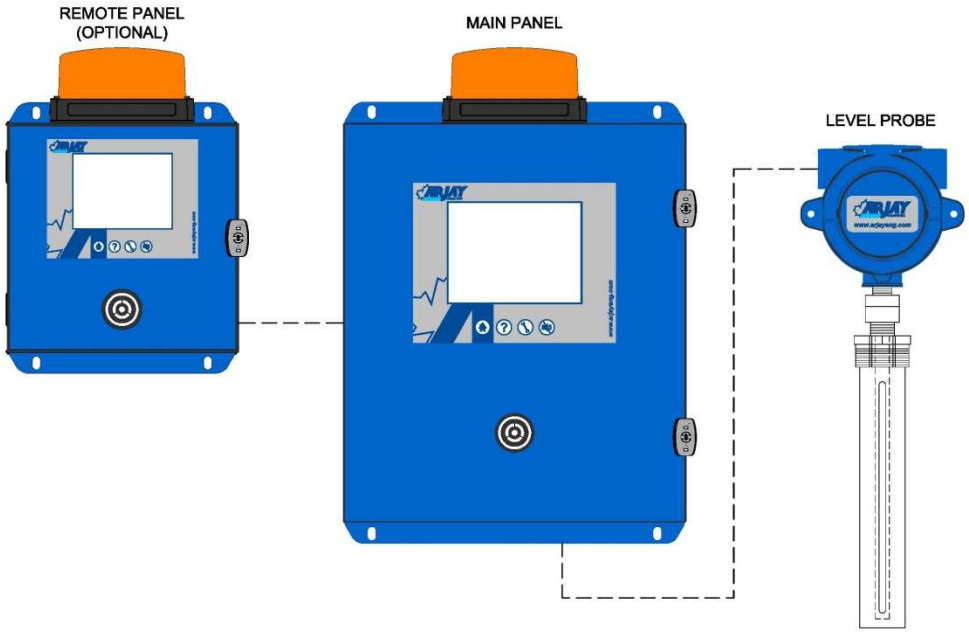
MODELS:

MODEL 4100-LEV

LEVEL MONITOR



USER MANUAL (REV: 1.1)

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1.0 INSTRUMENT OVERVIEW

The Arjay Model 4100-LEV is a capacitance-based level monitor used for the measurement and control of liquids or solids in a tank or vessel. The control panel receives an input from the Arjay PMC card installed at the sensing probe and, through a site calibration, displays the tank level and provides proportional outputs and relay control.

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.

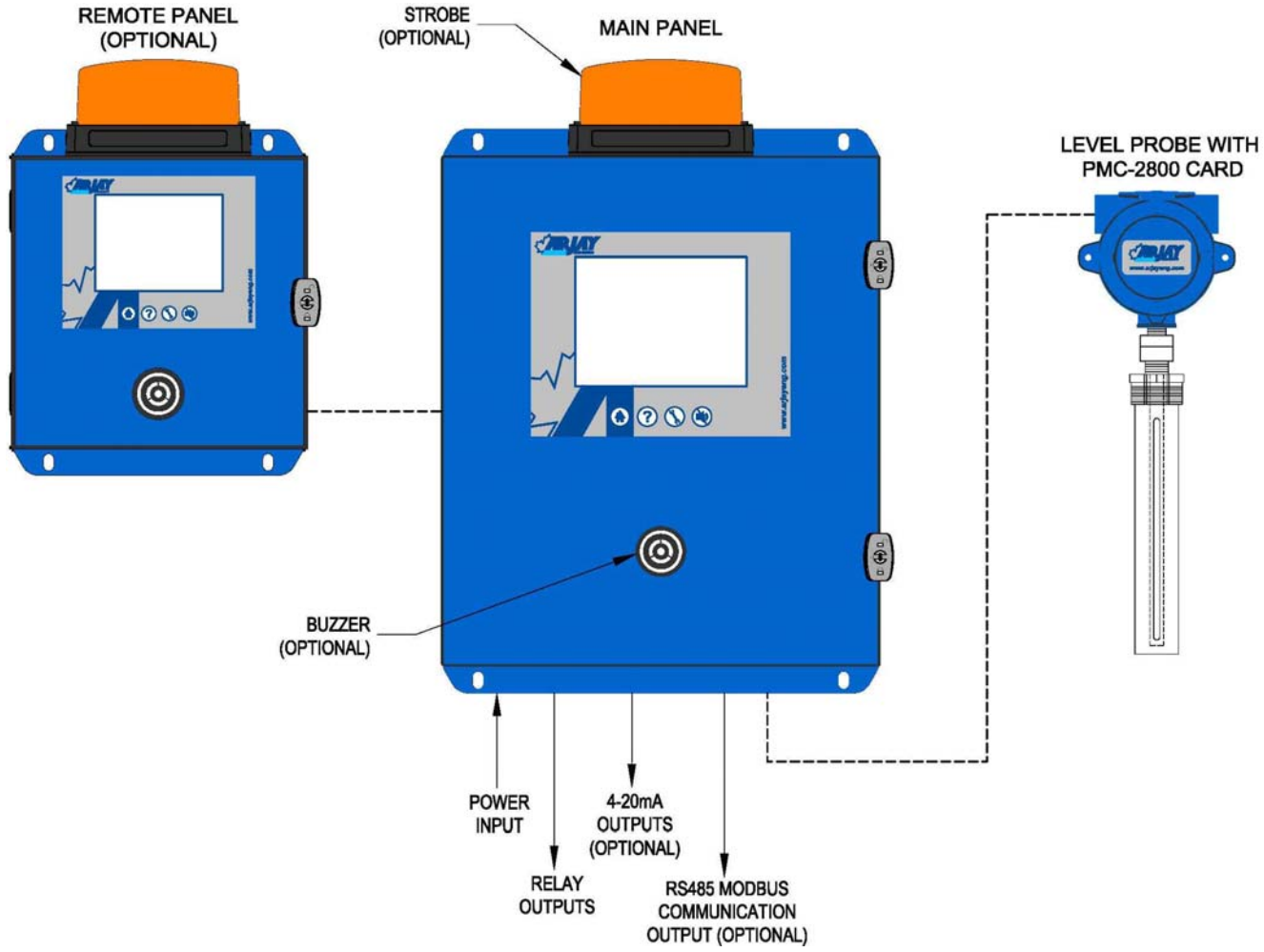


Figure 1 – Instrument System Overview

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 is set as a system fault relay. Relay 2, 3 & 4 can be field set to alarm at any % level within the range of the probe. See section 4.2 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 tank product 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 are done at the main panel.

1.1 Features

- Touch Screen interface with passcode protection
- Microprocessor based Controller
- Optional Strobe / Buzzer
- Level 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-LEV - 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

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

h – Custom vs. Standard
x – Custom**
z – Standard

**Fill in the custom requirement below.

x – Custom Description	

Example:

4100-LEV - 1 - 1 1 1 0 0 0 - z

- 1 → 100-240 vac Power Input Selected
- 1 → Steel Enclosure Selected
- 1 → Strobe Selected
- 1 → Buzzer Selected
- 0 → No 4-20mA Selected
- 0 → No RS-485 Selected
- 0 → No Intrinsic Barrier Selected
- z → Standard Configuration Selected

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” display 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 Three relays for setpoint alarms One relay for system fault alarm
Analog (Optional)	0/4-20 mA non-isolated, 600 ohms - Self-powered - Direct or Indirect
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 the 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.

2.2 Probe Installation

Capacitance probes may be selected from a variety of styles for use with liquids, liquid interfaces, and granular materials. The probe length is customer specified based on the tank dimensions and required depth into the material being measured. Usually Teflon coated probes are used.

Typical probe entry into a tank requires a 3/4” NPT opening (standard probes), 1” NPT opening (heavy duty probes), or 2” NPT (shielded probes). Flanges and concentric shields are available as options. The entrance configuration may vary depending on the application requirements. Use a wrench on only the lower half (tank side) of the probe fitting when installing or removing the probe from the tank or flange. The probe fittings are compression type with Teflon ferrules assembled by applying torque between the two fitting 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 and parallel to a reference ground surface for best accuracy. This is typically the vertical wall of the tank or a concentric shield around the probe. The following points are important when installing the probe:

1. **Reference ground**: This is important and is typically the metal walls of the tank. For non-metallic tanks, a concentrically shielded probe is required which provides its own Ground. IMPORTANT: For threaded entry and flange entry probes, make sure the threads are clean to ensure a good electrical ground connection between the tank, flange and fitting.

2. **The distance between the probe and the ground reference:** This only applies to probes without concentric shields. The closer the distance to the tank wall, the greater the sensitivity of measurement; too close and bridging problems may occur.

3. **The degree of parallelism between the probe and the reference ground:** The probe must be parallel to the reference ground for a linear output signal. Note: the concentric shield option is inherently linear due to the concentric shield.

4. **Temperature change of the material in the tank**. The amount of measurement error depends on the material. If the temperature change is excessive, temperature correction may be required.

5. **Agitators or moving objects in the tank:** Moving objects in the tank close to the probe such as agitator blades, moving baffles etc. appear as moving ground references to a capacitance probe and can cause measurement errors. In applications where these objects are present, a concentrically shielded probe should be used.

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.

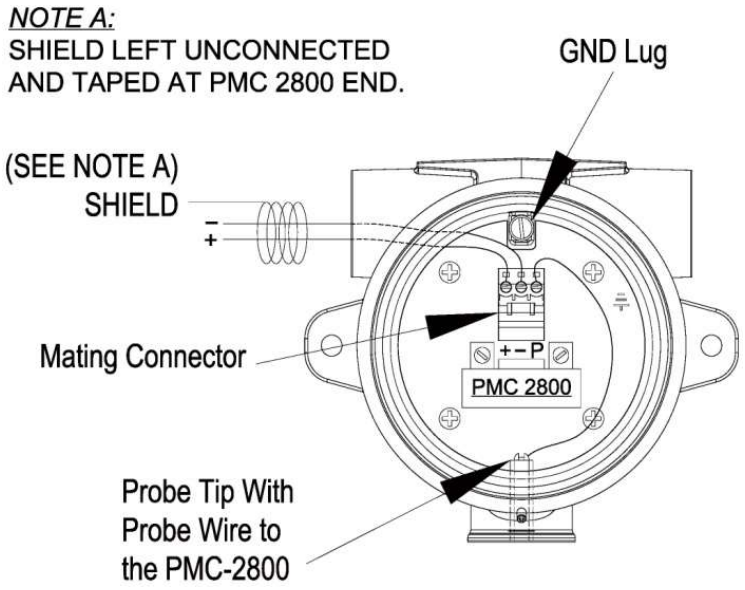


Figure 2 – PMC Installation Overview

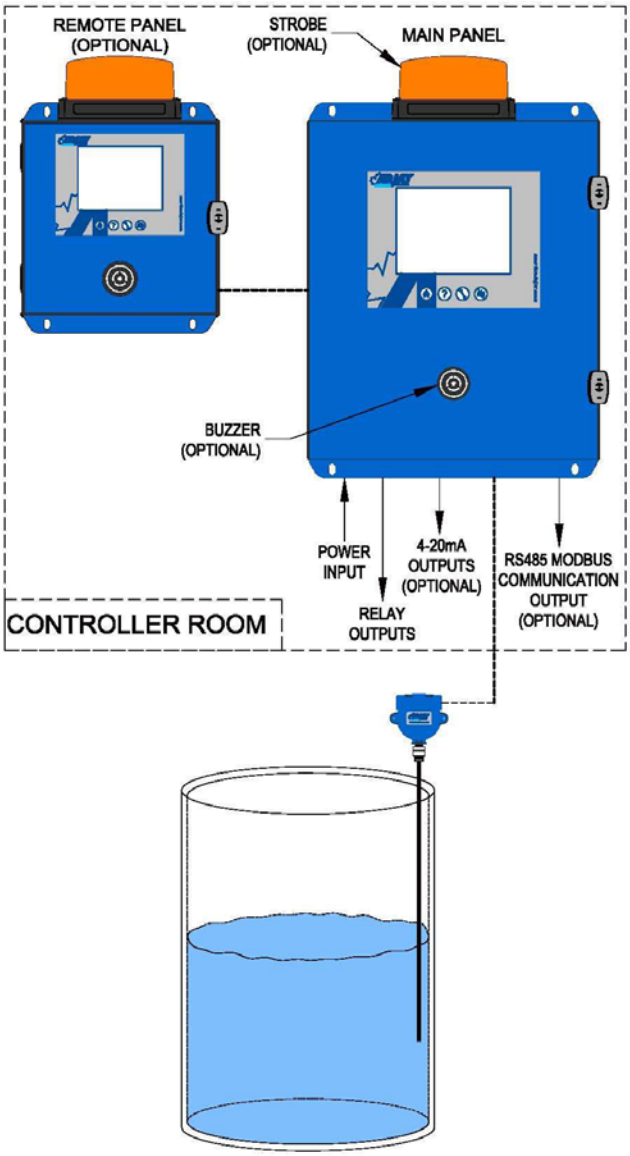


Figure 3 – Typical Level Application Overview

2.3 Electrical Installation

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

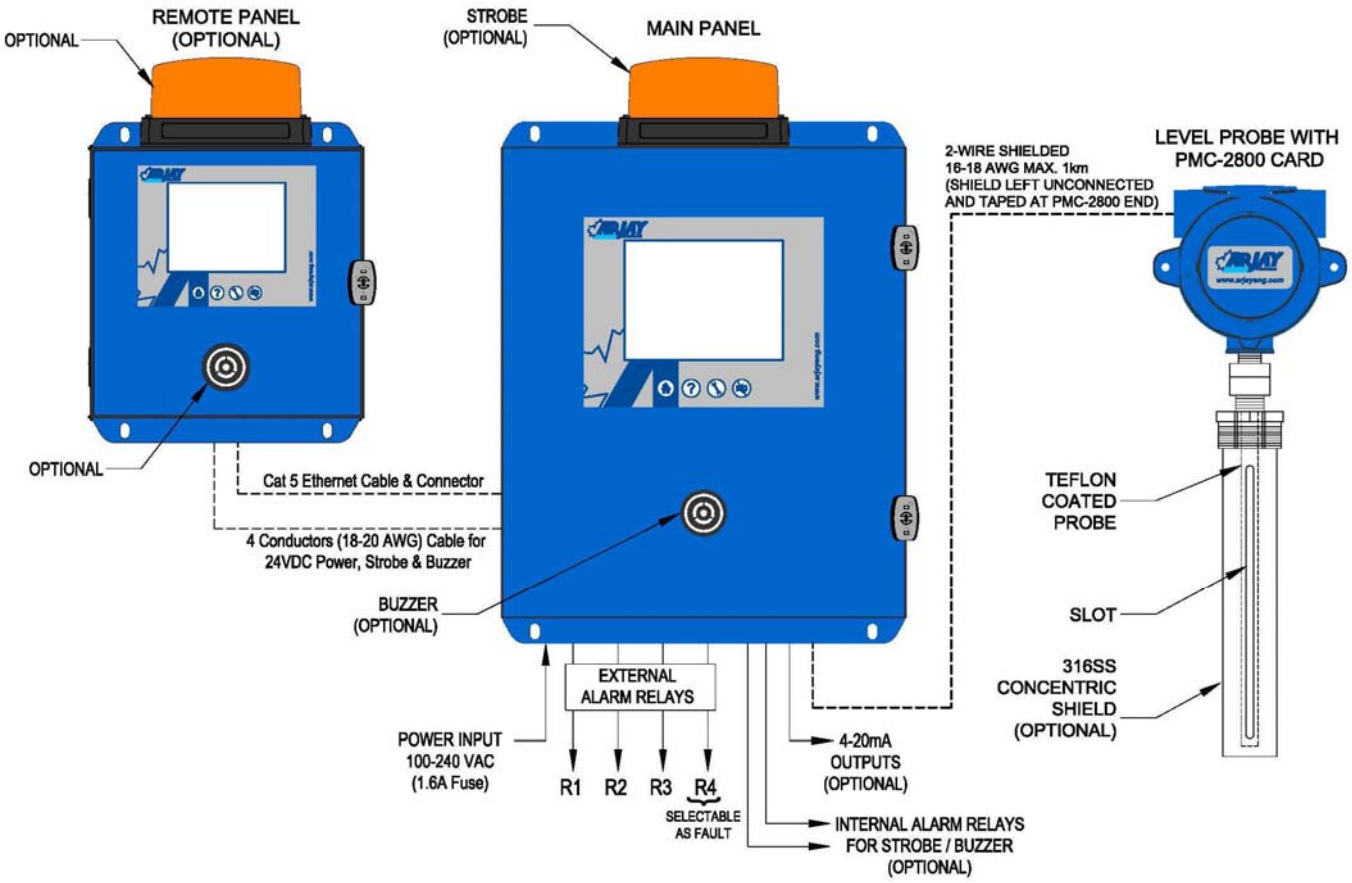


Figure 4 – Electrical Installation Overview

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).

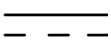
*Shielded wire is required on all installations.
Maximum wire length is 1km between controller & PMC junction box.

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



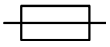
Direct Current (DC)
Courant continu

Normally closed relay contacts
Contacts Repos

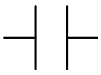
Power on
Marche (mise sous tension)

N

Neutral
Neutre



Fuse
Coupe-circuit; fusible



Normally open relay contacts
Contacts travail

Power off
ArróÕ (mise hors tension)

L

Live
Sous tension

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.

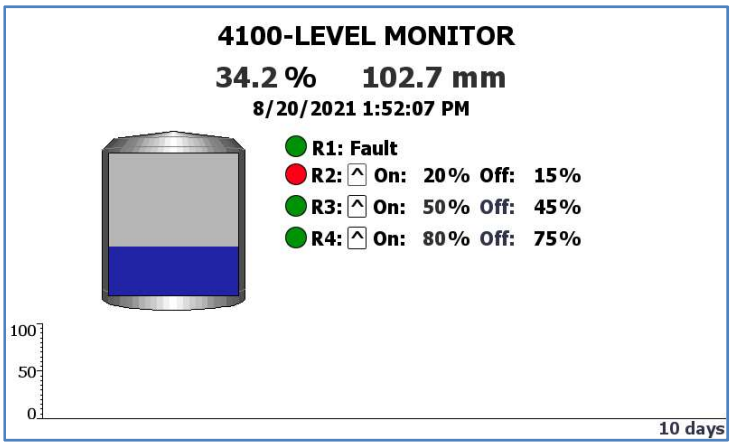


Figure 5 – Main Screen View

3.2 Screen Menu Background Information

The Trend View logs and provides a graphic display of the level readings during the past 10 days.

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 a 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 mm or inch at the determined 100% maximum level will be required to be entered during calibration.

3.2.1 Keypad Main Menu Entry

Below the touch screen are 4 touch keys.

Home

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

Help

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.

Tools

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

Buzzer Silence

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.

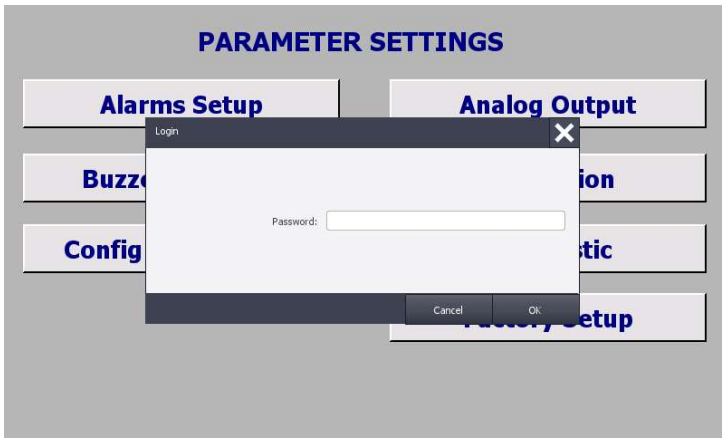


Figure 6 – Password Screen View

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 “  “

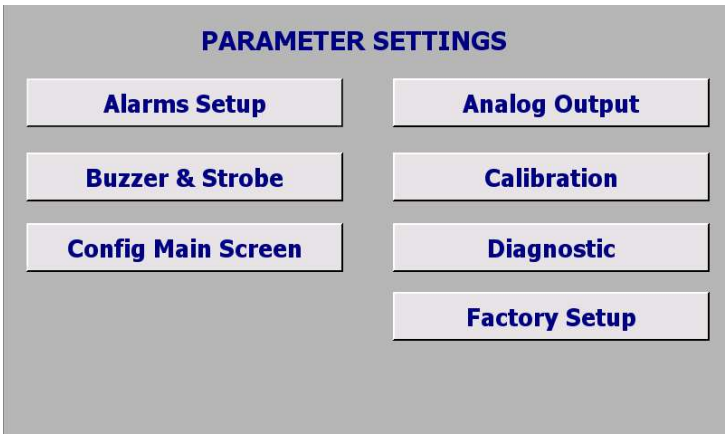


Figure 7 – Parameter Settings Screen View

Enter into the following menu items to configure your monitor.

4.1 Configure Main Screen View

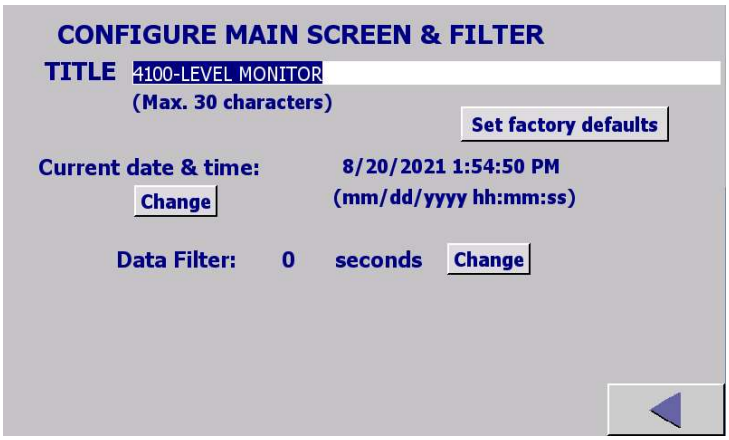


Figure 8 – Configure Main Screen View

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 # (i.e., Separator #6 - LT-4505). Touch the TITLE block and type in your description. The factory default is 4100-LEVEL MONITOR.

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 effect.

4.2 Alarms

The Password 2000 will be required to make changes in this section. There are three Alarm setpoint relays, and one fault relay.

Relay 1 is a Fault relay which can be set as failsafe or non-failsafe. Relays 2, 3 & 4 are for general purpose use for setpoint alarms (low alarm, high alarm and highhigh alarm).

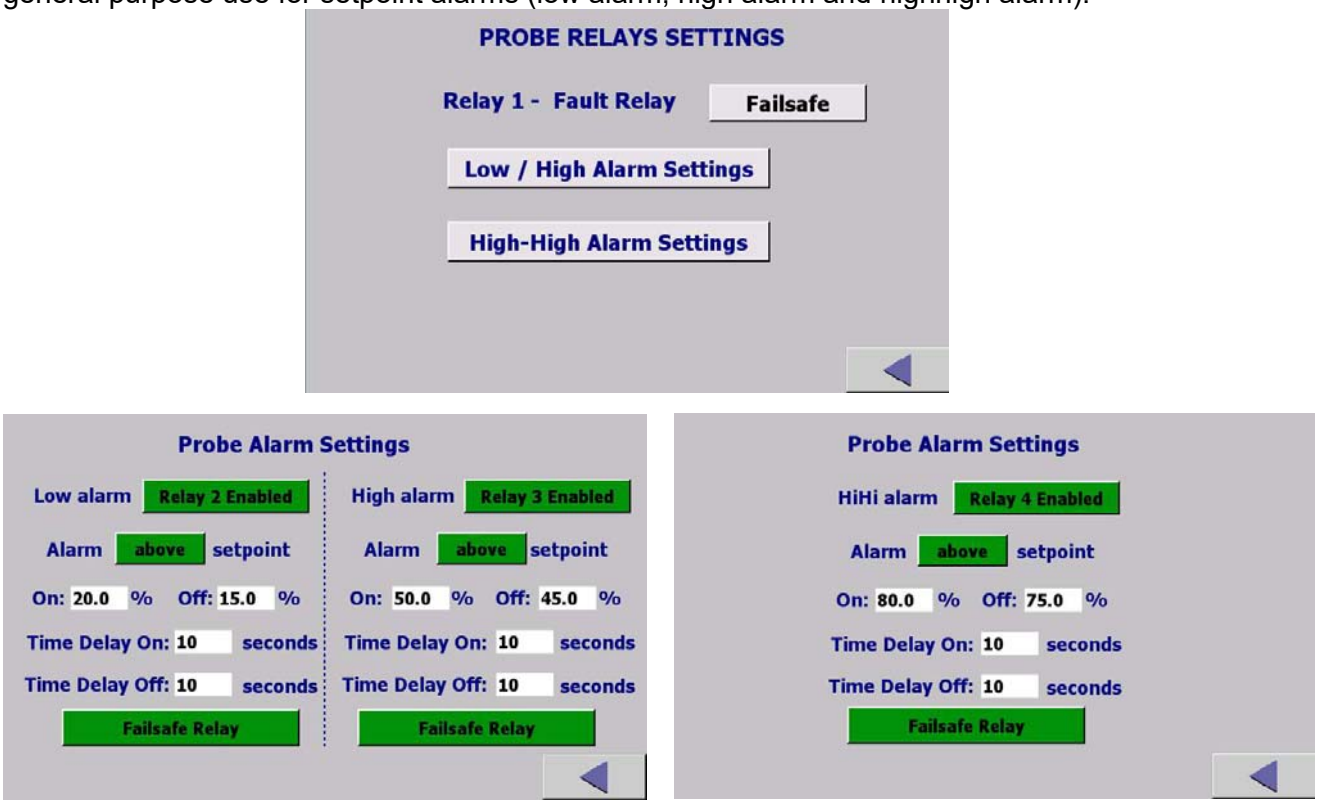


Figure 9 – Alarm Setting Screen Views

To set up Relays 1 and 2, press **"Low / High Alarm Settings"** button. To set up Relay 3, press **"High High Alarm Settings"** button. 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.

Touch Relay 1 icon so that it is green. Enter the values of parameters described below. (See table 1 for Effect of the relay action and failsafe).

Setpoint ON
This will determine the setpoint level in % at which the alarm relay activates.

Setpoint Off
This will determine the setpoint level in % 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. (See Figure 10 for examples of differential for pump applications).

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 % level rises above the setpoint.

Select BELOW if the requirement is for the relay to alarm if the % level 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.

TABLE 1: The following table shows the effect of the Relay Action and Failsafe settings. Under normal conditions, the alarm would show “Green”.

Relay Action	Failsafe Setting	Effect
Above	No	• Alarm condition when process level rises above the On Setpoint for at least the alarm delay period. • Alarm condition remains active until the process level drops below the Off Setpoint. • No action is taken when the process level is between the On and Off differential Setpoint. • In the alarm condition, the corresponding alarm turns Red, and the relay is energized.
Above	Yes	• Alarm condition set and reset as above. • In the alarm condition, the corresponding alarm turns Red, but the relay is de-energized.
Below	No	• Alarm condition when process level drops below the Off Setpoint for at least the alarm delay period. • Alarm condition remains active until the process level rises above the On Setpoint. • No action is taken when the process level is between the On and Off differential Setpoints. • In the alarm condition, the corresponding alarm turns Red, and the relay is energized.
Below	Yes	• Alarm condition set and reset as above. • In the alarm condition, the corresponding alarm turns Red, but the relay is de-energized.

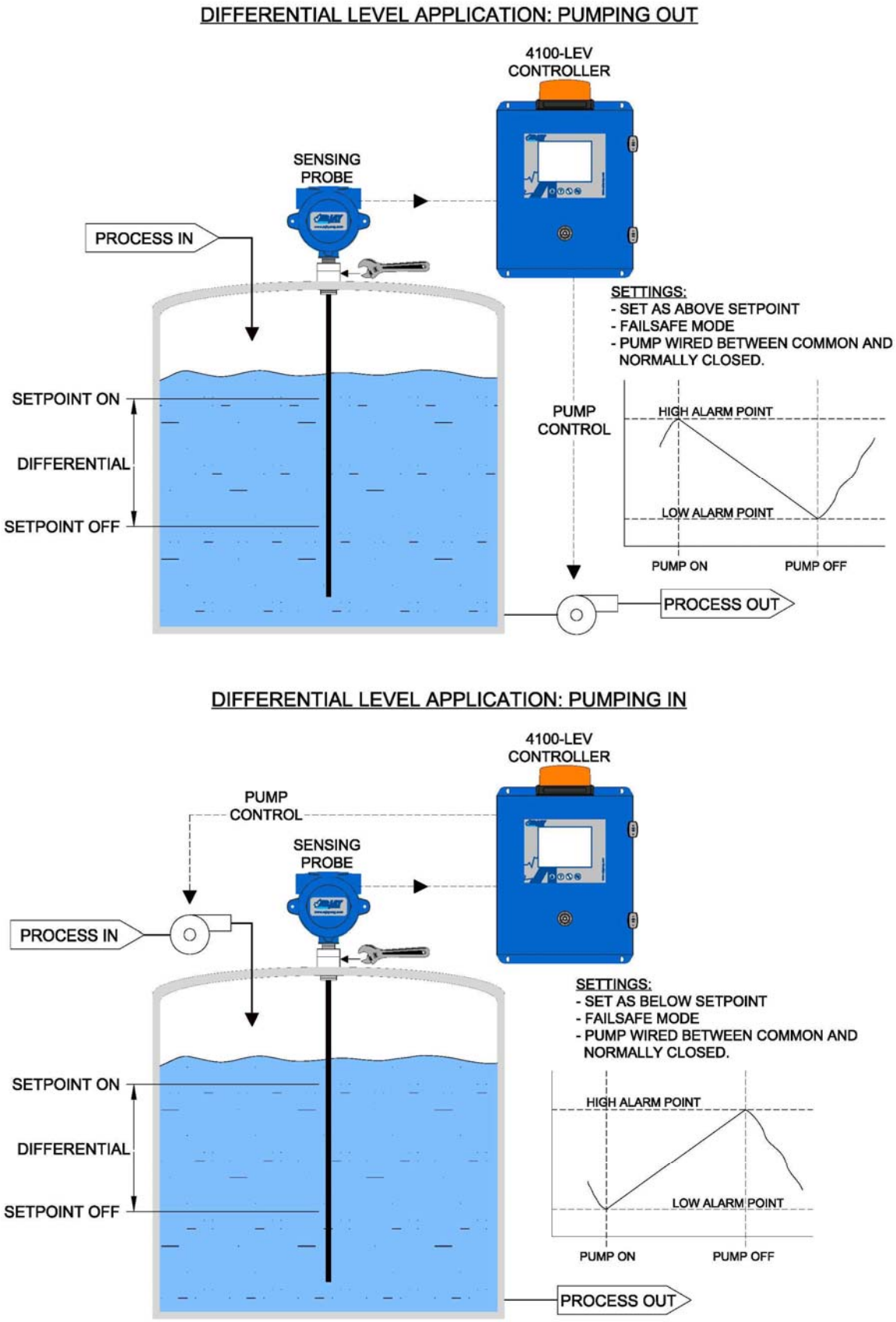


Figure 10 – Examples of differential Level Applications

4.3 Analog Output

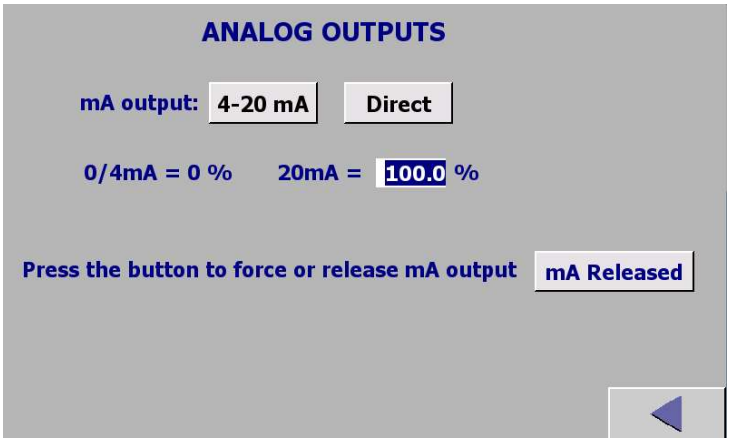


Figure 11 – Analog Output Screen View

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%
The 0 or 4 mA is factory defaulted to 0 % level. The 20 mA may be offset to suit your control requirements and is entered in %. Typically, 20 mA is set to the 100% level of product. 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”.

mA Action
Direct mA output – 0% Level = 4mA, Span Level (e.g. 100%) = 20mA
Indirect mA output – 0% Level = 20mA, Span Level (e.g. 100%) = 4mA

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 4.2.

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.

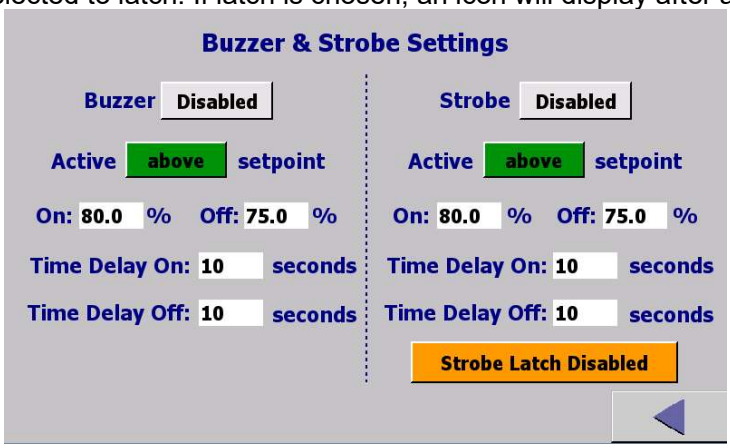


Figure 12 – Buzzer & Strobe Setting Screen View

4.5 Calibration

After the above setup parameters have been entered for the application a calibration is required. Enter the calibration menu. A Pulse Card set up will be 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 “Send”. The screen will indicate “Sent Ok”.

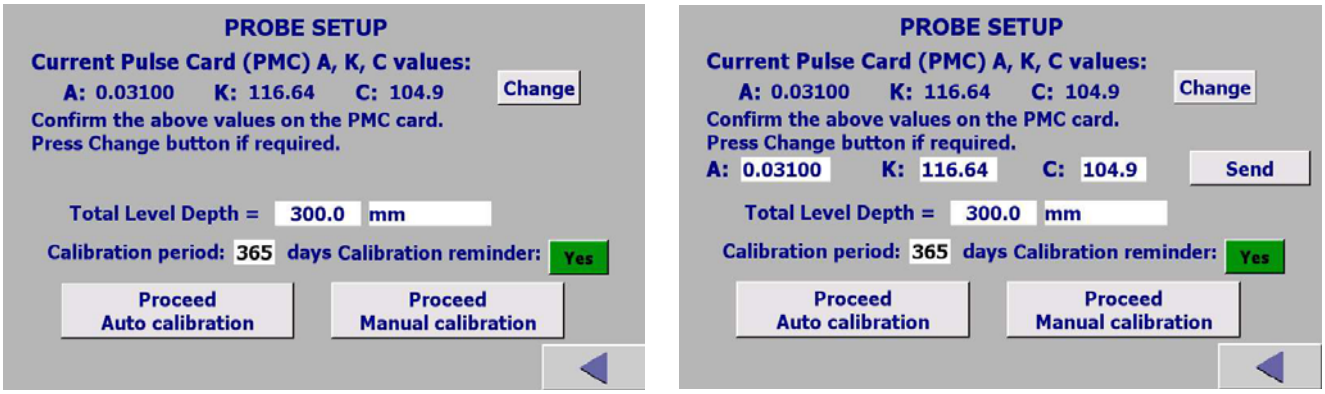


Figure 13 – Pulse Card Set-up Screen View

Total Level Depth (100% Level Depth)
The instrument needs to know what 100% will be. Enter the value that 100% represents in your chosen engineering units. i.e. inches might be 200, mm might be 4520, etc. The factory default is millimeters (mm). You can change this to any units of your choice by touching the engineering unit icon and entering your desired engineering units such as inches, mm, cm, etc. Note: Any change in units will require a change in the value used for 100% depth.

Calibration Reminder
The 4100-LEV has a real time clock. After calibration, the calibration date is recorded in the diagnostics. A calibration reminder can be set for up to 999 days. This feature can be enabled by pressing the “ENABLE CALIBRATION 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

4.5.1 Auto Calibration (Two Points)

After the setup parameters have been entered for the application, a process calibration is required.

Two calibration points will need to be entered. The tank level will need to be changed, up or down, by at least 10% to enter these two points. The actual levels in the tank will need to be determined as accurately as possible.

The greater the change between the two points the better. For example, a 1% error in the entered level value for a 25% change translates to a 4% error at Full Scale.

To Calibrate.
Enter Proceed to Auto Calibration.

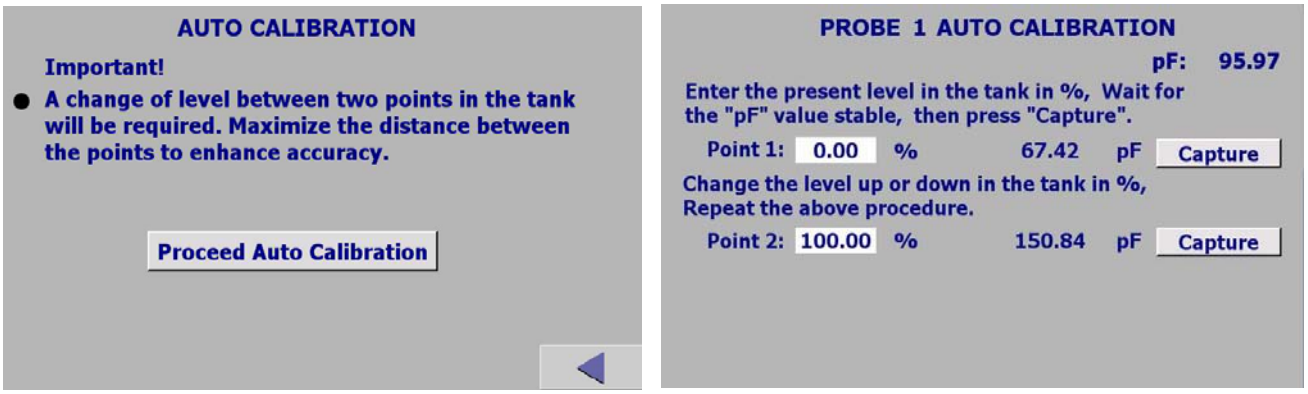


Figure 15 – Auto Calibration Screen View

Note that a capacitance reading in pF is displayed in the upper left of the screen. This is a real-time reading of the tank capacitance. If filtering has been used then the user must wait until capacitance reading has stabilized before capturing.

Enter Point 1
Enter a value, in %, of the level. Use a percentage value that indicates your process operation. For example, a tank may be 3000 mm tall, but for process operations, 100% may be considered as 2800mm. Make sure level is at the specified % level and press “Capture. The new capacitance value in pF and “Captured” will display. If entered properly the new value should be same as capacitance value shown. In upper left of screen.

Enter Point 2
After Point 1 is entered, the actual level in the tank will need to be changed. Change the level up or down. The greater the change, the greater the accuracy. The pF reading in the upper left` screen will rise or lower accordingly to confirm that a change is being registered. Enter a value in % of the second level point. Raise or lower level in tank to the specified % level and press capture to confirm. The new capacitance value in pF and “Captured” will display.

If calibration was not successful an error message will occur. Common problems are either level in tank was not changed or the 2nd level value in % was entered identical to 1st point.

Calibrate
If all points are “Captured” then “Calibrate” icon will display on bottom of screen.

Press the Calibrate Icon. Calibration will be confirmed “Calibration OK!”.

Press the Home Key to return to the main screen.

4.5.2 Manual Calibration

Manual calibration allows a user to override any of the previous calibration values and enter predetermined or observed calibration values. This feature may be used for a number of different reasons. For example.

1. One of the calibration points is desired to be re-calibrated. The user can view the pF reading of the probe in the Diagnostics menu and also record the actual level in the vessel at the same time. These values can then be entered in the Manual Calibration to change either Cal Point 1 or Cal Point 2.
2. If a calibration was done using 20% and 60 % as the two values (for example), but it was determined a future date that the 60% should have been entered as 70%.
3. The process level cannot be altered at the time of calibration so a random pF value and % level value is entered as the second point to allow operations until a proper second point can be entered. See method in 1 above.

To Calibrate.
When you enter to the manual calibration mode, the calibration points from the Auto Calibration will be shown. Change value then Press Enter if any of the 2 points needs to be changed. Press enter to the reading points and Calibrate icon will appear.

Calibrate
Press the Calibrate Icon. Calibration will be confirmed “Calibration OK!”.

If calibration was not successful, an error message will occur. Common problems are either level in tank was not changed or the 2nd level value in % was entered identical to 1st point.

Press the Home Key to return to the main screen.

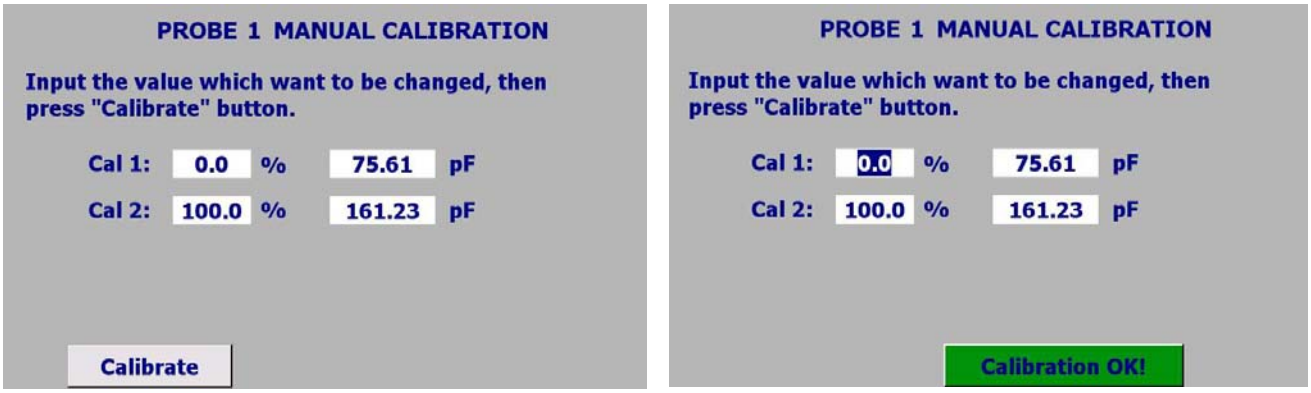


Figure 16 – Manual Calibration Set-up Screen View

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

4.6 Diagnostic Information

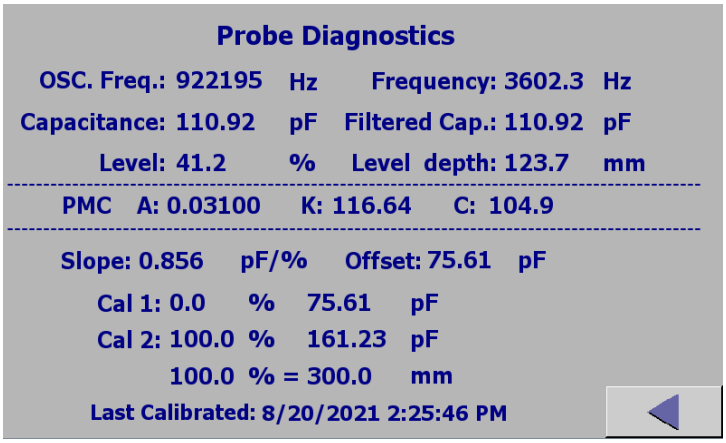


Figure 17 – Diagnostic Information Screen View

It is View Only screen. It provides 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 contact 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, product and tank capacitance reading in picofarads. At 0% level there will be an offset capacitance due to the physical length of probe and alliance to the tank wall. 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.

Level: If a calibration has been done, the % level reading is available here.

Level Depth: If a calibration has been done, the engineering unit reading is available here.

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.

Slope: After calibration, the controller will determine the pf per % change for tank application. This is used internally to extrapolate a zero and span.

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

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

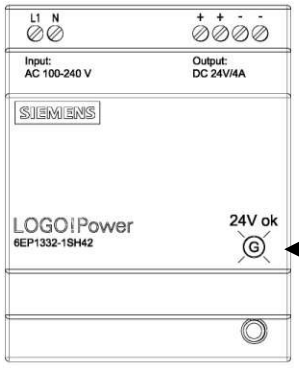
Depth for 100%: During calibration, the operator will be required to enter a value in height OR volume that represents 100%. This is the value that was entered with the selected engineering units.

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

5.0 TROUBLESHOOTING

Main Panel

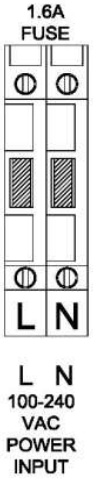
Press “ ? ” for some troubleshooting tips.



Condition: Power Supply Status

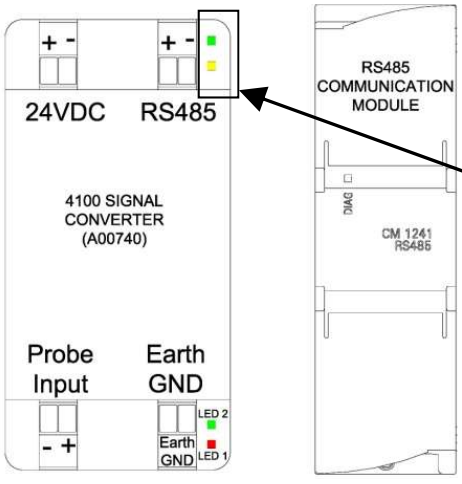
- Confirm the Power Supply LED is active (Green).

GREEN LED



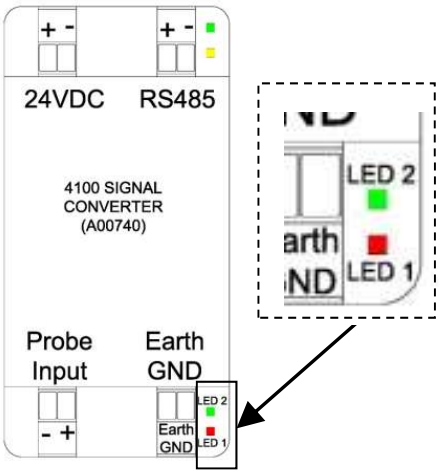
Condition: Power Input Status

- Confirm the Power input is 100-240 VAC using a meter.
- Confirm if input fuse has blown.



Condition: Communication Error

- 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).

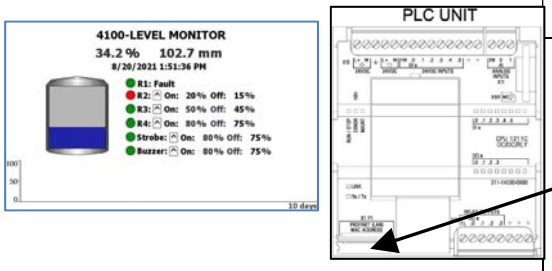


Condition: No Transmitter Signal (Status LED is Red)

- 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.
- The unit is not receiving a frequency signal from the remote PMC-2800 level transmitter in the probe head: Check wiring.
- Disconnect probe from pulse card to ensure that probe is not pulling down the signal. pF reading should be ~ 0.0 pF with no probe hooked up.
- Replace PMC-2800 if suspect water damage OR possible power outage may have damaged the pulse card.
- If wiring checks out: call Arjay Technical Support.

Condition: Signal out of Range

- Check the integrity of the Teflon sheath of the probe. If this has been damaged, water could cause an electrical short circuit between the probe within the Teflon sheath and the ground reference. In this case a very high capacitance is usually registered. Check the capacitance reading in diagnostics menu. To confirm: Open the probe head and disconnect the blue wire from the probe to the PMC-2800. Using a DVM, measure the resistance between the enclosure case and the probe tip. It should read infinite resistance or OL. Make sure that fingers and hands do not touch the metal portion of the probes of the DVM since this could show a lower resistance: 1-10mohms.



Condition: PLC Error

- 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 tight from PLC or HMI terminal.

	Condition: Reading not Accurate
	• For probes without a factory supplied concentric shield, make sure the probe is parallel to its ground reference which may be the tank wall or the inside of a stilling pipe (if probe is installed in a pipe). • May require fine tuning – use manual calibration if changes are required to one of the calibration points.

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 product.	**mm**	
Slope	Capacitance change per % change after successful calibration.		
Offset	Result of a successful Calibration: Calculated capacitance for 0% level.		
Depth for 100%	Full scale engineering units' value in height or volume.	**1000mm**	
Zero	Zero Level value for mA output.	**0.0%**	
Span	Full Scale level value for mA output.	**100%**	
mA Range	0-20mA OR 4-20mA	**4-20mA**	
mA Action	- Direct (20mA when level at span) OR - Indirect (4mA when level at span)	**Direct**	
Relay 1 (Fault)	This relay indicates Instrument Failure.	**Fault**	
Relay 1 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.	**20%**	
Relay 2 off	Alarm Relay 2 differential off value	**15%**	
Relay 2 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 2 Alarm Delay (on & off)	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).	**0 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).	**0 sec**	
Relay 3 Hi Set	Alarm Relay 3 high alarm: alarm condition if level is above this value.	**40%**	
Relay 3 off	Alarm Relay 3 differential off value	**35%**	

Relay 3 Failsafe	Failsafe ON sets the relay as normally energized (no alarm) and de-energized in an alarm condition.	**ON**	
Relay 3 Alarm Action	Alarm action above OR below alarm level	**Above**	
Relay 3 Alarm Delay (on & off)	Amount of time the level must be in an alarm condition (based on Relay 3 alarm value and Action settings) before the relay trips to the alarm condition (condition set by Relay 3 Failsafe setting).	**0 sec**	
Relay 3 Alarm Delay (off)	Amount of time the level must stay in an alarm condition (based on Relay 3 alarm value and Action settings) before the relay trips to the normal condition (condition set by Relay 3 Failsafe setting).	**0 sec**	
Relay 4 Hi Set	Alarm Relay 4 high alarm: alarm condition if level is above this value.	**60%**	
Relay 4 off	Alarm relay 4 differential off value	**55%**	
Relay 4 Failsafe	Failsafe ON sets the relay as normally energized (no alarm) and de-energized in an alarm condition.	**ON**	
Relay 4 Alarm Action	Alarm action above OR below alarm level	**Above**	
Relay 4 Alarm Delay (on)	Amount of time the level must be in an alarm condition (based on Relay 4 alarm value and Action settings) before the relay trips to the alarm condition (condition set by Relay 4 Failsafe setting).	**0 sec**	
Relay 4 Alarm Delay (off)	Amount of time the level must stay in an alarm condition (based on Relay 4 alarm value and Action settings) before the relay trips to the normal condition (condition set by Relay 4 Failsafe setting).	**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**	
Strobe (Optional)	Alarm value for strobe.	**90%** **85%**	
Buzzer (Optional)	Alarm value for buzzer.	**90%** **85%**	

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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