# PD9000 ConsoliDator+ Multivariable Controller
## Data Sheet



PD9000 Installed in
PDA2909 Enclosure

PD9000 Panel Mount
Multivariable Controller

ConsoliDator+

UL & C-UL Listed for Div 2
Hazardous (nonincendive) and
Ordinary Location Installations.

- **NEMA 4X Panel Mount Multivariable Controller**
- **Convenient Display, Control, & Alarm of Multiple 4-20 mA, Pulse, & Modbus Inputs**
- **Numeric & Bargraph Color Display (320 x 240 pixels) 5.7" (145 mm)**
- **Sunlight Readable Display, White Backlight**
- **Isolated 24 VDC Transmitter Supplies 200 mA / Analog Input: 1,600 mA Max**
- **99 Channels, 32 Totalizers, 30 Timers, & 199 Modbus Inputs**
- **64 High & Low Alarms, Combine Multiple Alarms Into Logic AND & OR Alarms**
- **Simulation & Manual Control Modes for Testing and Setup**
- **Modular Design for Inputs & Outputs Flexibility**
- **Up to (28) 4-20 mA Isolated Inputs or Pulse Inputs**
- **Up to (25) 10 Amp Form C Relays (With Eight Analog or Pulse Inputs)**
- **Up to (25) Isolated 4-20 mA Outputs (With Eight Analog or Pulse Inputs)**
- **Operating Temperature Range: -25°C to 55°C (-13 to 131°F)**
- **Pulse, Analog, & Modbus Input Flow Rate / Total / Grand Total Capability**
- **50-Point Linearization, Square Root, and Exponent for Open Channel Flow**
- **Round Horizontal Tank Volume Calculation; Just Enter Diameter & Length**
- **Open Channel Flow Math Formulas for Weirs & Flumes**
- **Multi-Pump Alternation Control or On / Off Control with Random Varying Set Point**
- **Programmable Displays, Function Keys & Digital Inputs**
- **Math Functions: Sum, Diff, Average, Multiply, Divide, % Efficiency, & More**
- **Modbus Client (Master) & Snooper / Server with 99 Programmable Outputs**
- **Direct Modbus PV Inputs – Snooper / Server Mode**
- **Modbus Spoofer Feature to Replace Servers Removed from Network**
- **RS-485 Serial Communication with Modbus RTU / ASCII & Ethernet TCP/IP**
- **USB Data Logger Feature: Up to 8 Log Files with up to 12 Parameters Each**
- **Input Power Options: 90-264 VAC or 24 VDC**
- **(20) Screens with up to Eight PVs Each**
- **ConsoliDator+ Configuration Software**
- **Type 4X, IP66 Front – Field Enclosures Available**
- **Auto-Tune PID Control for Multiple Control Loops**
- **PID Control with Analog, Digital, or Relay Outputs**
- **Digital Selector Switch (HOA) Function to Route Inputs & Outputs**
- **3-Year Warranty**

## PRECISION DIGITAL CORPORATION

PRECISION DIGITAL

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# OVERVIEW

The ConsoliDator+ is a multivariable controller that is both easy to use and satisfies a wide variety of process display, alarm, and control applications. It accepts 4-20 mA inputs, flow meter pulse inputs, digital inputs, and Modbus inputs and displays them in both numeric and bargraph format on a large, 5.7" color display. It can be equipped with multiple relays with user-definable actions, 4-20 mA outputs, digital outputs, Modbus RTU & ASCII, Modbus Enron, and Ethernet Modbus TCP/IP protocol communication. Additionally, the controller is equipped with up to 30 timers that can be used to control many processes or events.

Two standard new features have been added to the version 2.300 release:

- Auto-Tune PID Control
- Digital Switches (HOA)

The ConsoliDator+ takes full advantage of its color display by allowing the user to customize screen colors for bargraphs, alarm conditions, and input channels.
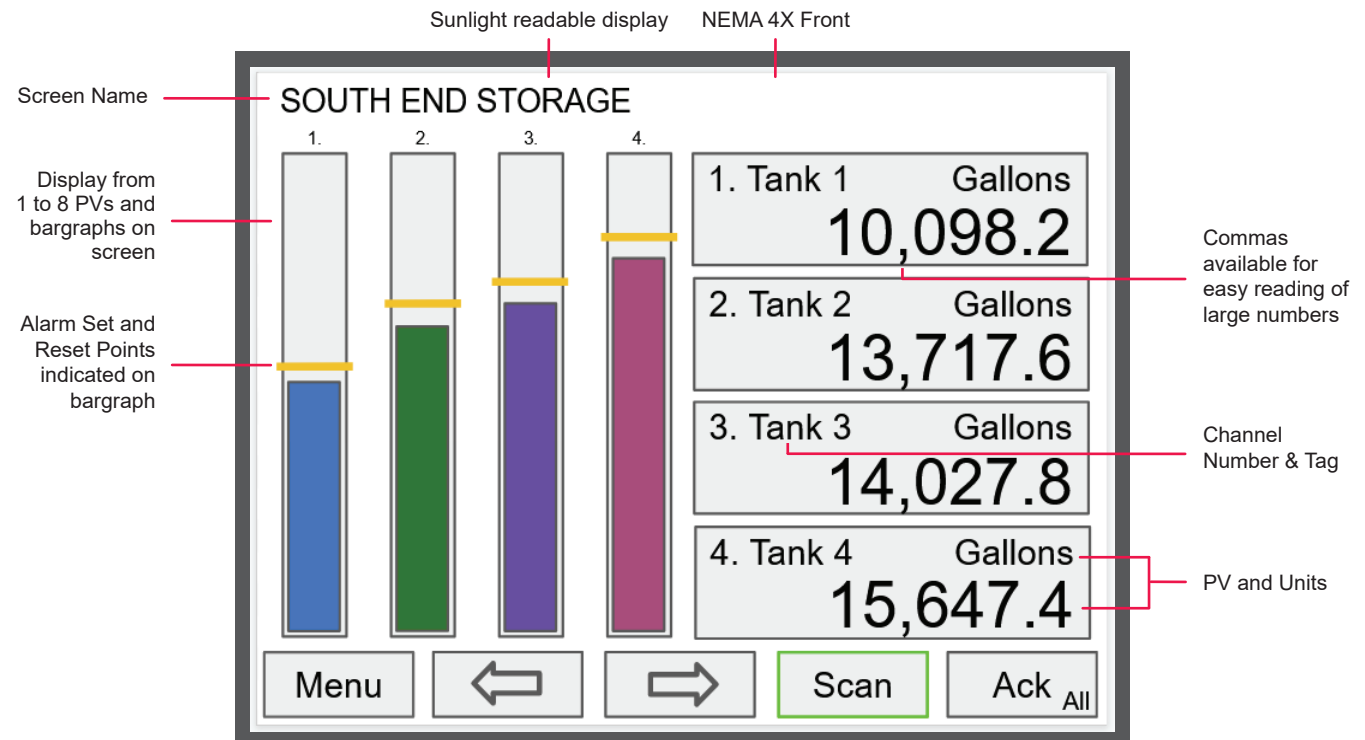
All this functionality is easily programmed using the free software or via the front panel pushbuttons. Choose the model that best suits your application, from monitoring only to fully loaded controllers with an extensive combination of inputs, outputs, and communication protocols. The standard product offering is listed in the ordering guide and other models are available for special order. The Add-On features expand the functionality of the ConsoliDator+, see the next page for details.

The ConsoliDator+ has been Certified by Underwriters Laboratory (UL & C-UL) for use in ordinary locations (electrical safety) and in Div 2 hazardous area locations (nonincendive).
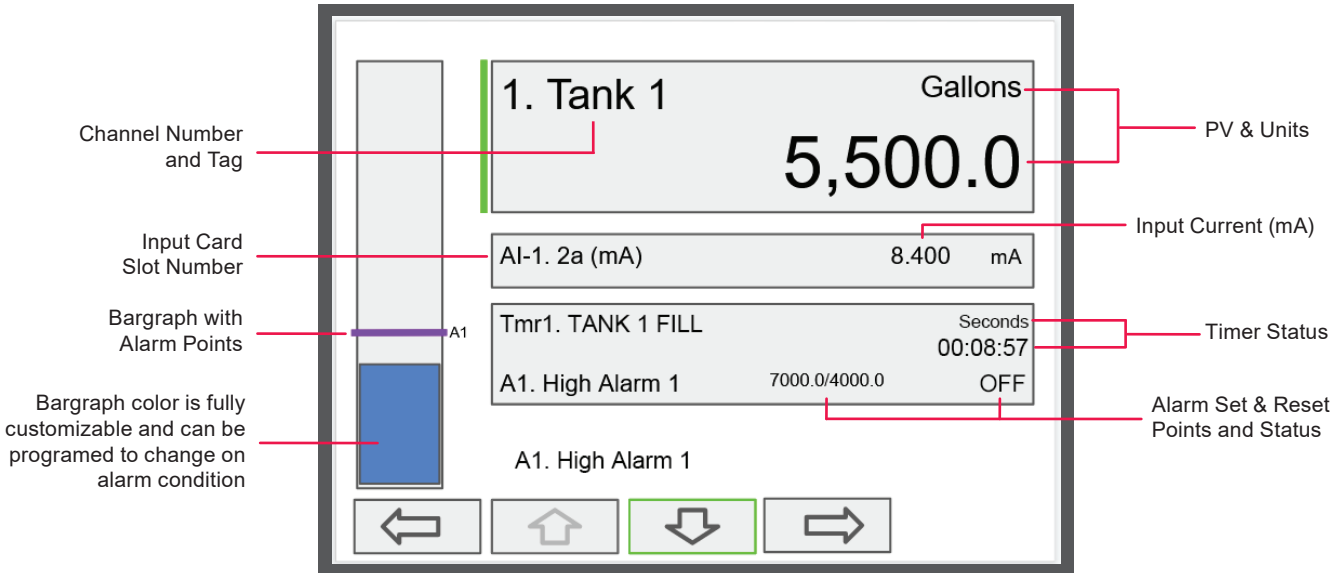
# SCREENS

The ConsoliDator+ can be programmed to display the data on up to 20 different screens in a variety of formats and colors, with and without bargraphs. The following screens show a typical main screen and channel details screen:
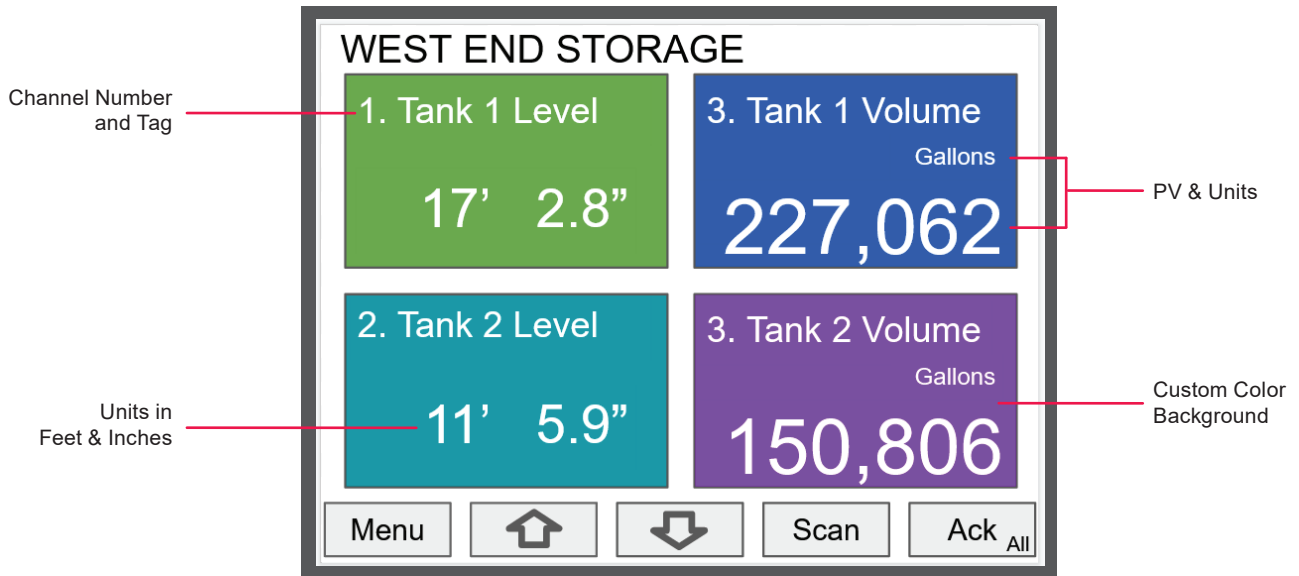
## Main Screen

## Channel Details Screen

1. Tank 1
Gallons
5,500.0

Channel Number and Tag

Input Card Slot Number

Bargraph with Alarm Points

Bargraph color is fully customizable and can be programed to change on alarm condition

AI-1. 2a (mA)          8.400     mA

A1

Tmr1. TANK 1 FILL          Seconds
00:08:57

A1. High Alarm 1     7000.0/4000.0     OFF

A1. High Alarm 1

PV & Units

Input Current (mA)

Timer Status

Alarm Set & Reset Points and Status

## Screen with Feet & Inches Units

WEST END STORAGE

1. Tank 1 Level

17'   2.8"

3. Tank 1 Volume
Gallons
227,062

2. Tank 2 Level

11'   5.9"

3. Tank 2 Volume
Gallons
150,806

Menu

Scan

Ack All

Channel Number and Tag

Units in Feet & Inches

PV & Units

Custom Color Background

## INPUTS & OUTPUTS

The back panel is labeled with the I/O boards that were installed at the factory. The removable connectors are labeled with the connection signal for each terminal. The following diagram shows what the back of the model PD9000-6G-4PI-8AI-10AO-10RY-E looks like. This model is powered from 90-264 VAC, it accepts (4) pulse and (8) analog inputs and has (10) 4-20 mA outputs and (10) relays. (5) digital inputs, (4) digital outputs, RS-485 serial capability and USB connections are standard on all ConsoliDator+ models. Ethernet is an option.

If all Input / Output slots are used exclusively for one function, the ConsoliDator+ can accept up to (28) isolated 4-20 mA inputs, (28) pulse inputs, (25) isolated 4-20 mA outputs, or (25) relays.

If used as a Modbus Client, Snooper, or Server only: It can have (35) 4-20 mA outputs, 30 relays, or (20) 4-20 mA outputs and (15) relays.

Units are powered from AC or DC according to the power option ordered (AC: -6 or DC: -7).
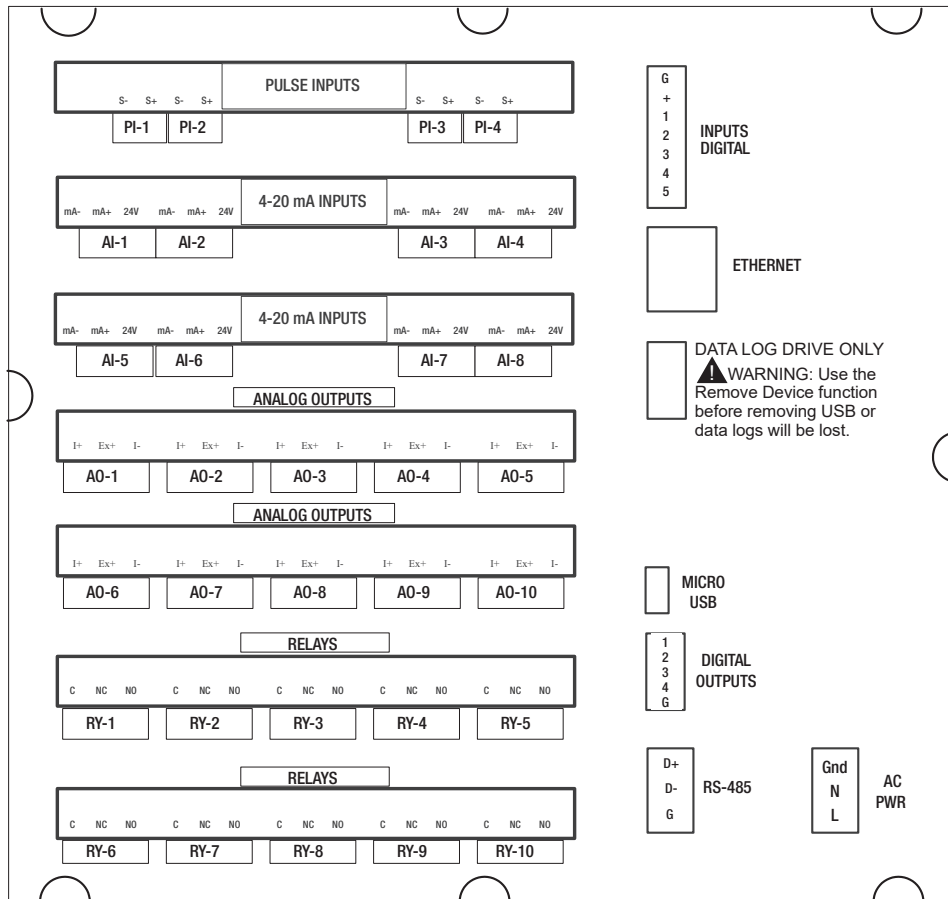


**Connection Terminals for a PD9000-6G-4PI-8AI-10AO-10RY-E**

**Notes:**
1. Each 4-20 mA input has its own isolated 24 VDC power supply to power the transmitter.
2. Each 4-20 mA output has its own isolated 24 VDC power supply to power the output loop.
3. Each relay is Form C and rated at 10 A.
4. Input / output connections are made to removable screw connectors.
5. Every ConsoliDator+ has five digital inputs (additional digital inputs can be obtained by using the Pulse Inputs).
6. Every ConsoliDator+ has four digital outputs.
7. Every ConsoliDator+ has RS-485 with Modbus.
8. Powered from AC or DC, depending on the ordered power option.
9. The Data Log Drive is used for the *Data Logger Add-On* feature.
10. Ethernet with Modbus TCP is an option.
11. Micro USB is used for programming the ConsoliDator+ with Free Software.

### ⚠ CAUTION

- Use copper wire with 60°C or 60/75°C insulation for all line voltage connections. Observe all safety regulations. Electrical wiring should be performed in accordance with all applicable national, state, and local codes to prevent damage to the controller and ensure personnel safety.

## SETTING CHANNEL PARAMETERS

What makes the ConsoliDator+ easy to program is its intuitive setup screens. As shown in the first image below, the setup screen allows you to see all the relevant information you need when creating or editing a channel - all on one screen! When creating a new channel, the channel number is auto-generated for you. All you have to do is populate the appropriate fields such as the channel tag name, function, input, and units. Scaling the inputs and outputs, selecting number of decimals, and turning the bargraph on/off and inputing its values are also programmed from this screen. Multiple colors can also be selected for the text, background and bargraphs to customize the look of the display screens. During programming, the soft keys will change based on the screen in place. For instance, pressing the edit key will bring up the letters/numbers keypad and appropriate navigation keys will appear (Shown in the bottom image). See the PD9000 manual for details on setup and programming.

**Auto-Generated Channel #:** User-editable to re-order channels

**Channel Tag:** User editable

**Color Pattern Select:** Select color for text, background, and bargraph

**Function:** Applied to input source

**Input:** Source for channel

**Units:** Engineering / time or none

**Decimals:** Number of decimals for PV

**Scale:** Enter input and output values

**Cutoff:** PV goes to zero below the cutoff value

**Display Bargraph:** Display on screen

**Bargraph Scale:** Set the 0 and 100% values

**Soft Keys:** Change based on the screen in place

| 13. | Flow #30 |
| Function: | Scale Linear 2-Pt |
| Input: | AI-1. 2a (mA) |
| Units: | Gallons/min |

Colors 1
■ Bargraph
0% : 0
100% : 30000

Decimals: 0

Scale: Input (mA)  Output (Gallons/min)
1. 4.000  0
2. 20.000  30000

■ Cutoff: 0 Gallons

Cancel | ⬆ | ⬇ | Colors | Ok

**Numbers Keypad Button:** pressing this will bring up the numbers keypad

**Text Field Editing Buttons**

**Text / Numbers Input Field**

**Letter and Numbers Keypad:** Used to input text and numbers in text fields

**Soft Keys:** Change based on the screen in place

| 1. | Rate #1 |
| Source: | 2b (mA) |
| Function: | Scale |
| Units: | GAL/ |

Colors 1
■ Bargraph
: 0.0
: 10000.0

Decimals: 2

Rate #1

... A B C D E
F G H I J K L
M N O P Q R S
T U V W X Y Z
_____ Enter x

Scale: Inpu )
1. 0.00
2. 10000.0

■ Cutoff

⬇ | ⇐| | |⇒ | X ⇒ | Enter

# INDIVIDUAL CHANNEL VIEW

To view the details of any channel, press Menu and then press View – Channel. Select the channel of interest. Navigate through the different items using the navigation keys. A green bar indicates the selected item, press the R-key to step into and see more details about the inputs and outputs related to the channel in view.

In the following examples, the screens show all the parameters associated with Channel 1 including analog input, slot number and its current value, setpoints and status of alarms, and analog output and its mA value. The bargraphs in each of these screens examples represent the current value in gallon units.
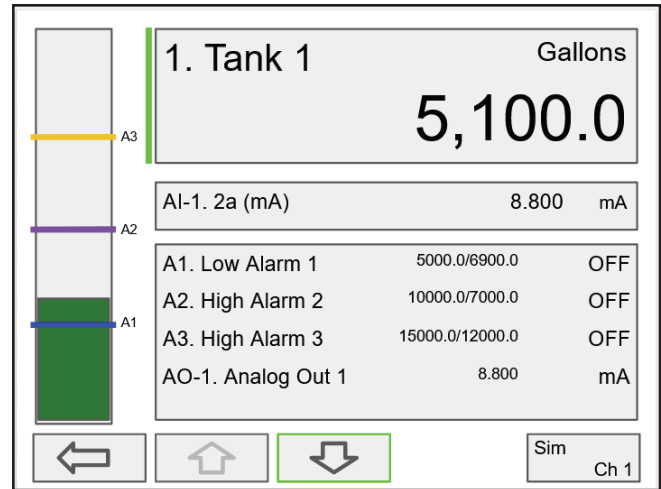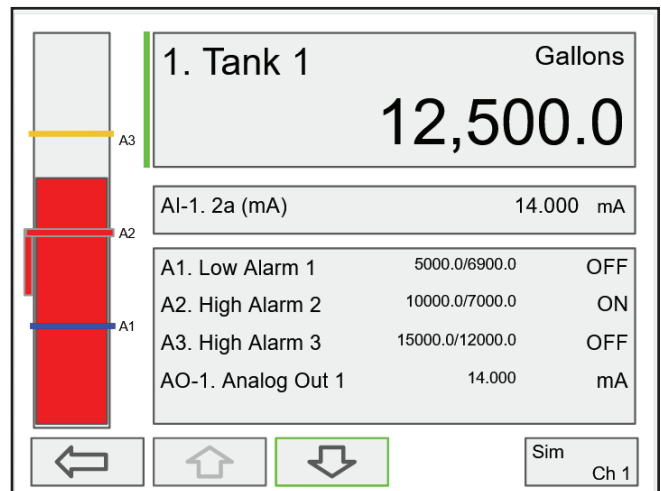


**Alarm set points are indicated by horizontal lines.**

## Low & High Alarm Indication

If applicable, alarms may be acknowledged, and totals may be reset from the channel view screens. The alarm set points are indicated by a line at the corresponding value on the bargraph. Color selection for alarm conditions can be done in the Setup – Alarm menu or in the System – Display menu.
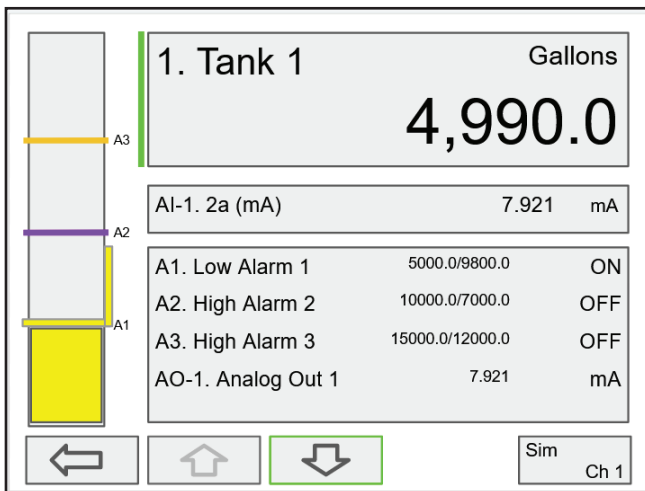


**Active Low Alarm:** Indicated by horizontal and vertical lines. The top of the vertical line is the reset point of the low alarm. The low alarm is indicated on the right side of the bargraph.
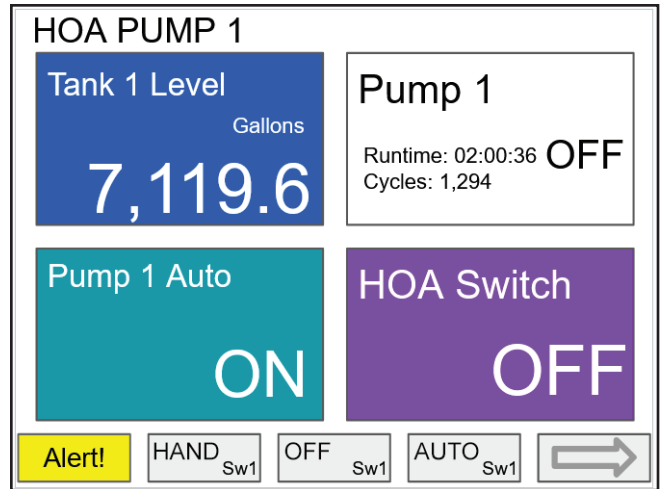


**Active High Alarm:** Indicated by horizontal and vertical lines. The bottom of the vertical line is the reset point of the high alarm. The high alarm is indicated on the left side of the bargraph.
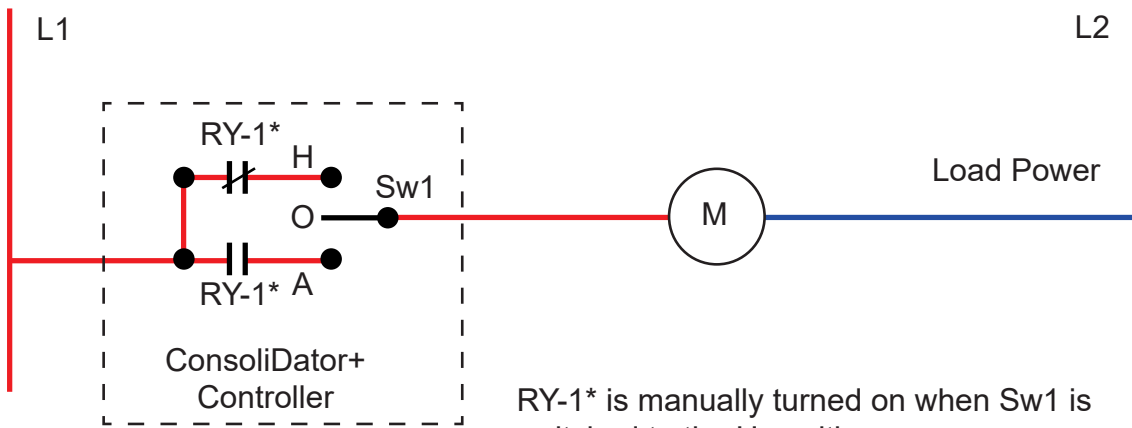
## HOA Screen View

The image on the right shows the screen displaying Tank level in gallons, Alert! message indicating the pump has been turned off manually, HOA switch is the Off position, Pump 1 relay shows the runtime and number of cycles.

The HOA switch can be switched to automatic control by pressing the F4 key (AUTO).

HOA PUMP 1

Tank 1 Level

Gallons

7,119.6

Pump 1

Runtime: 02:00:36 OFF
Cycles: 1,294

Pump 1 Auto

ON

HOA Switch

OFF

Alert!　| HAND Sw1　| OFF Sw1　| AUTO Sw1　| ⇨

## Block Diagram for HOA Switch



L1　　　　　　　　　　　　　　　　　　　　　　L2

RY-1*　H
Sw1
O
RY-1*　A

M　　Load Power

ConsoliDator+
Controller

RY-1* is manually turned on when Sw1 is switched to the H position.

# FREE CONSOLIDATOR+ CONFIGURATION SOFTWARE



The easiest and quickest way to program your ConsoliDator+ multivariable controller is to use the FREE ConsoliDator+ configuration software.

The ConsoliDator+ configuration software is intuitive, and most customers can get their controller programmed as they like without even looking in the manual.

Once your controller is programmed the way you want it, you can wire it up for your application per the instructions in this manual and install it. If you find that you need to adjust the programming after the controller is installed, you can use the front panel soft keys and the instructions in the manual to do so.

> See the PD9000 ConsoliDator+ manual for software installation instructions.
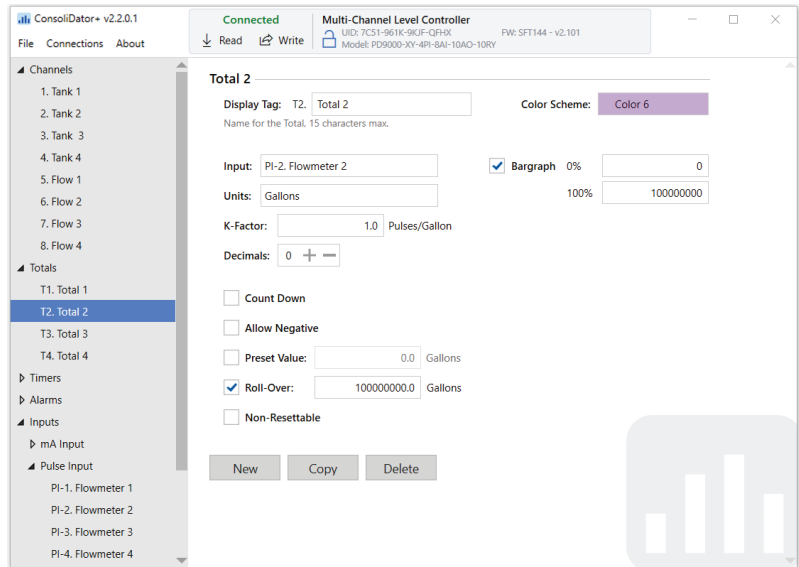
## Channel Settings

- Enter Display Tag Name for Channel
- Select a Function
- Select Input
- Select Units
- Select Decimal Position
- Select Color Scheme for Text, Background, and Bargraph
- Check Box to Display Bargraph
- Enter Scaling for Bargraph
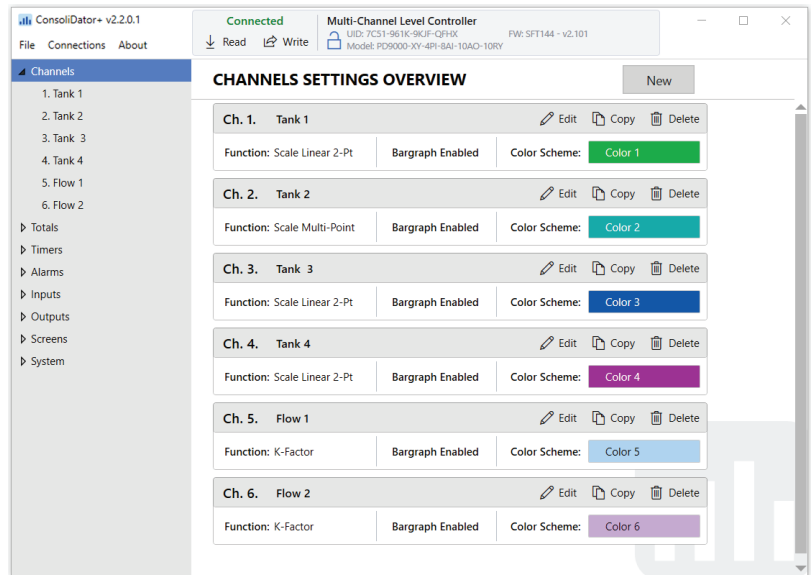
## Totals Settings

- Enter Display Tag Name for Total
- Select Input
- Enter Units
- Enter K-Factor Value
- Set Decimal Point
- Check Box for Countdown, Allow Negative, Preset Value and Enter Value, Roll-Over and Enter Value, and Non-Resettable
- Select a Color Scheme for Text, Background, and Bargraph
- Check Box to Display Bargraph
- Enter Scaling for Bargraph

## Timers Settings

- Enter Display Tag Name for Timer
- Select Input
- Select Power Up Option
- Select Error Option
- Select Reset Option and Enter Value
- Select Start Option and Enter Value
- Select Stop Option and Enter Value
- Set Decimal Point
- Select Color Scheme for Text, Background, and Bargraph
- Check Box to Display Bargraph
- Set Scaling for Bargraph
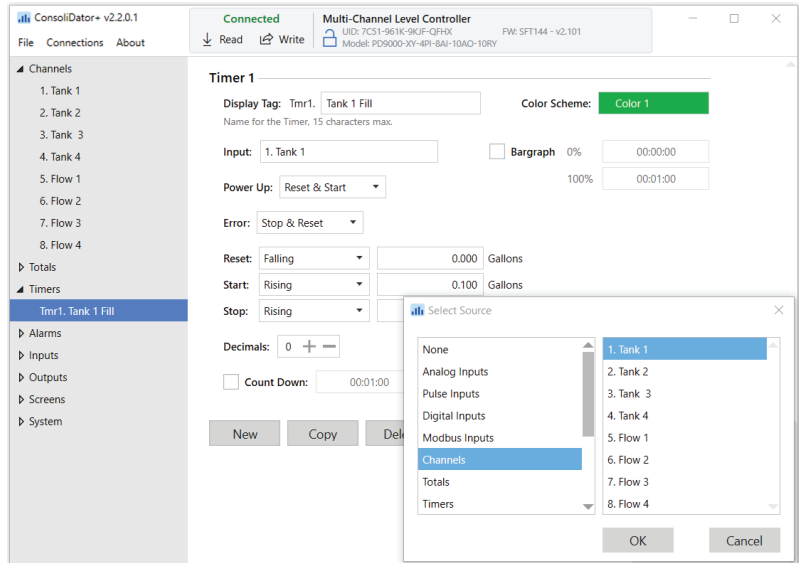
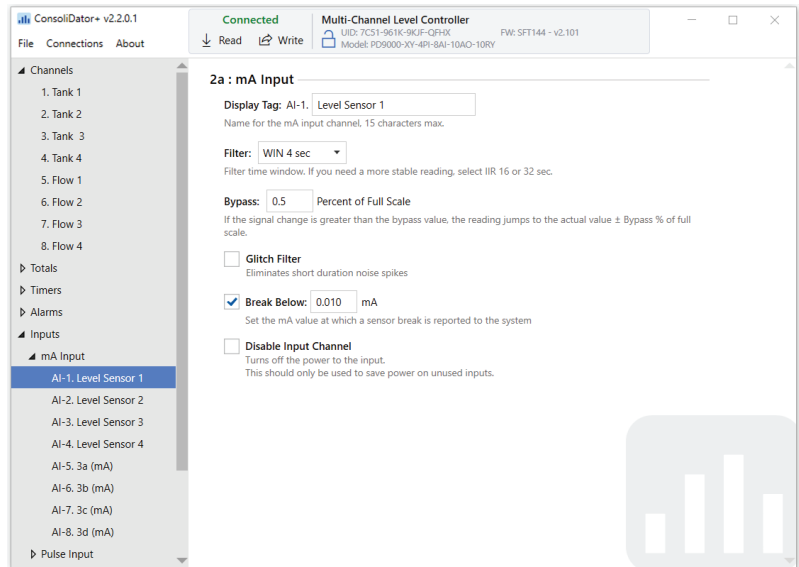## Alarm Settings

- Enter Display Tag Name for Alarm
- Select Alarm Type
- Select Input
- Enter Set and Reset Points
- Select Color Scheme for Text, Background, and Bargraph
- Check Box to turn On/Off Sound Horn, Alert!, Automatic, or Ack Anytime
- Select Break: Alarm Off, Alarm On, Stay As Is
- Enter Value for On Delay and Off Delay
- Enter Name for Alarm Color Profile
- Check Box for Alarm to Flash
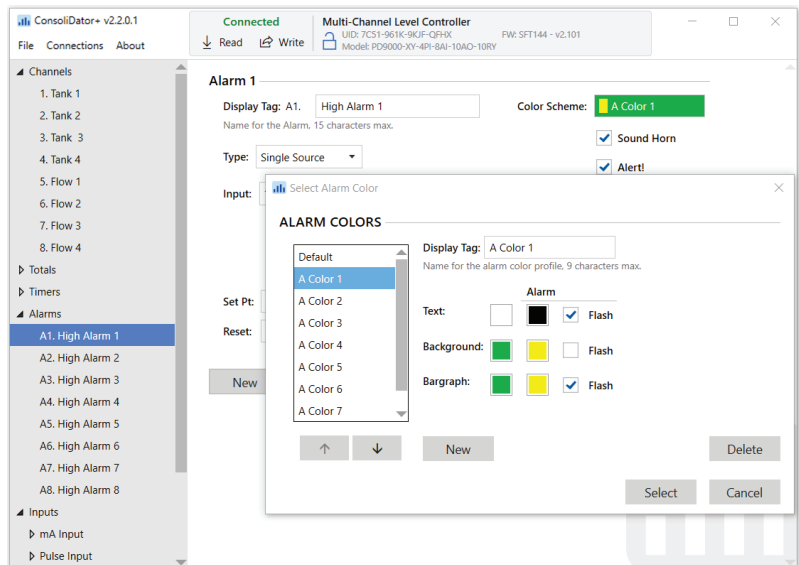
## Inputs Settings

- Enter Display Tag Name for Input Channel
- Select Filter Time
- Enter Bypass Value
- Check Box for Glitch Filter
- Check Box for Break Below and Set mA Value
- Check Box to Disable Input Channel

## Outputs Settings

- Enter Display Tag Name for Output Channel
- Select Input Source
- Check Box for Fail-Safe
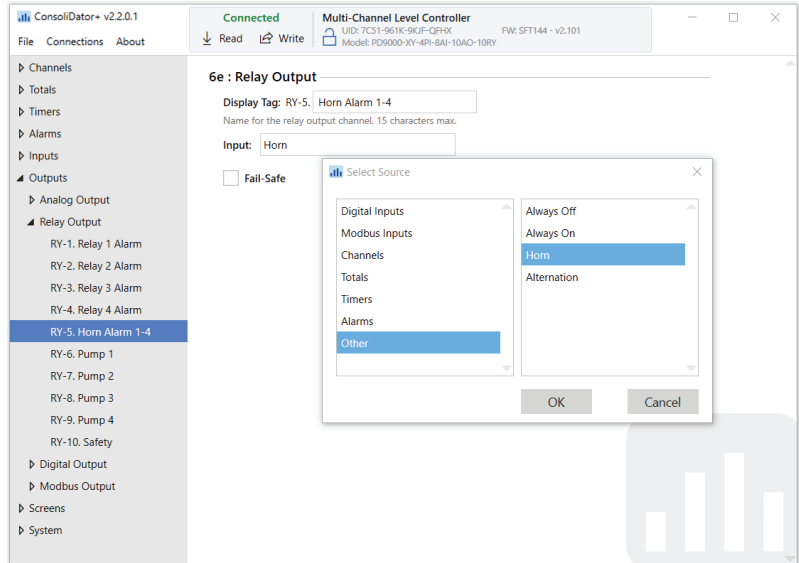
## Screens Settings

- Enter Title Name for Screen
- Check Box to Show Title
- Check Box to Show Channel Number
- Check Box to Display Bargraph and/or Bargraph Only
- Check Box to Auto Scan
- Check Box for Dwell Time and Enter Dwell Time
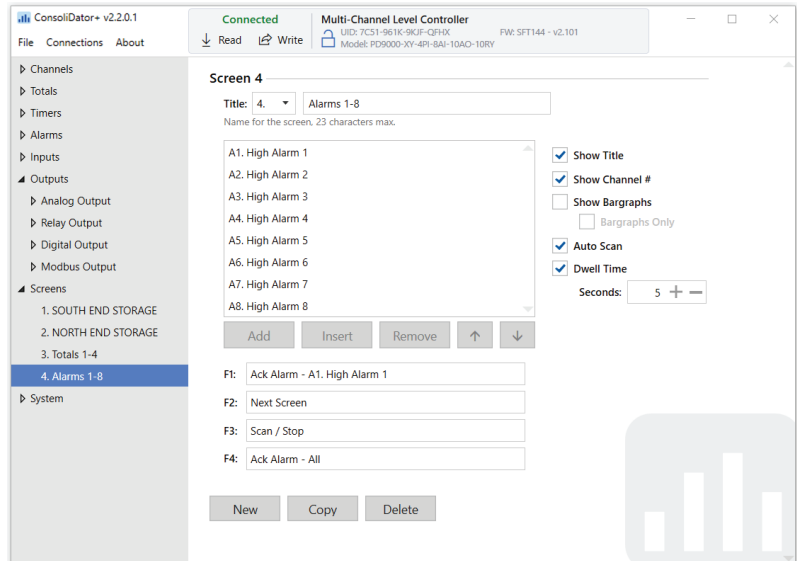
## System Display Settings

- Set Backlight Brightness
- Enter Display Refresh Rate
- Check Box to Show Commas
- Select Color Scheme for Text, Background, and Bargraph
- Check Box to Show Alarm Condition Using Alarm Color Settings
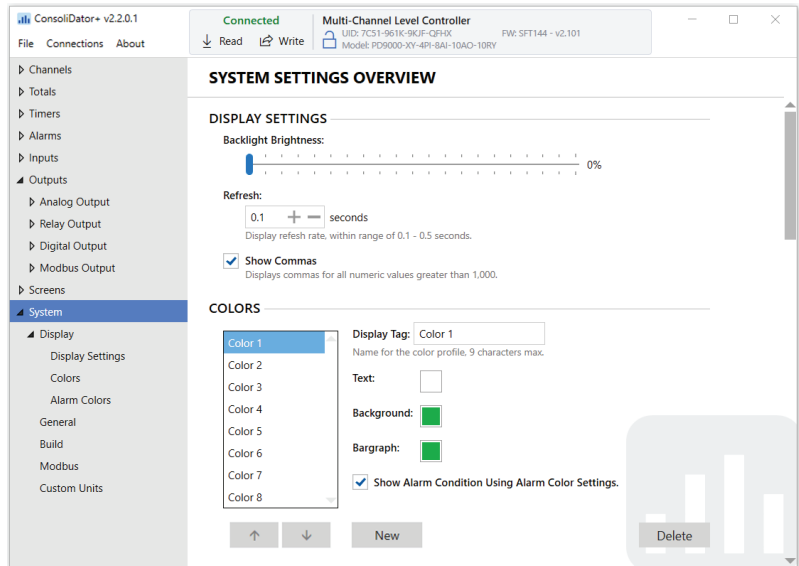


## General / Date & Time Settings

- Enter Device Tag Name
- Check Box for Enable Buzzer and Select Buzzer Sound
- Set Date and Time or Check Box to Use System Date and Time
- Click on the Gray Buttons to Load Defaults, Set Password, or Clear Password
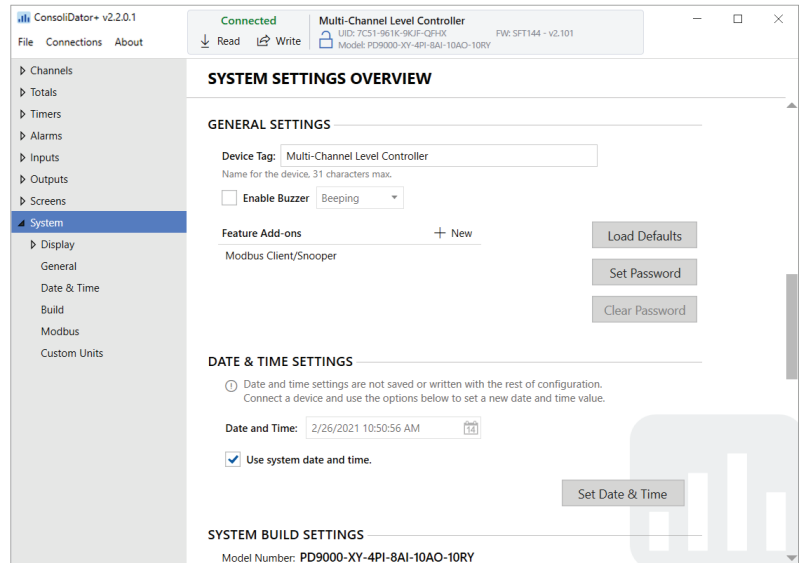


## System Build Settings

- Shows Model Number of the Connected Controller
- Shows Slot Numbers and Input/Output Cards Installed on the Connected Controller
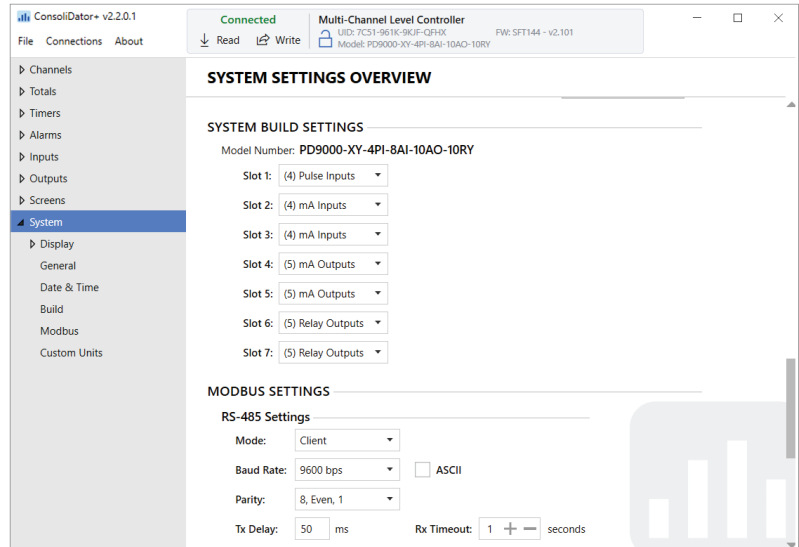
## Modbus Settings

- Select Modbus Mode
- Select Baud Rate
- Select Parity
- Enter a Value in ms for Tx Delay
- Click on the Plus or Minus Symbol to Increase or Decrease Seconds for Rx Timeout
- Check the Box for Passcode and Enter a Number to Protect the Server Settings
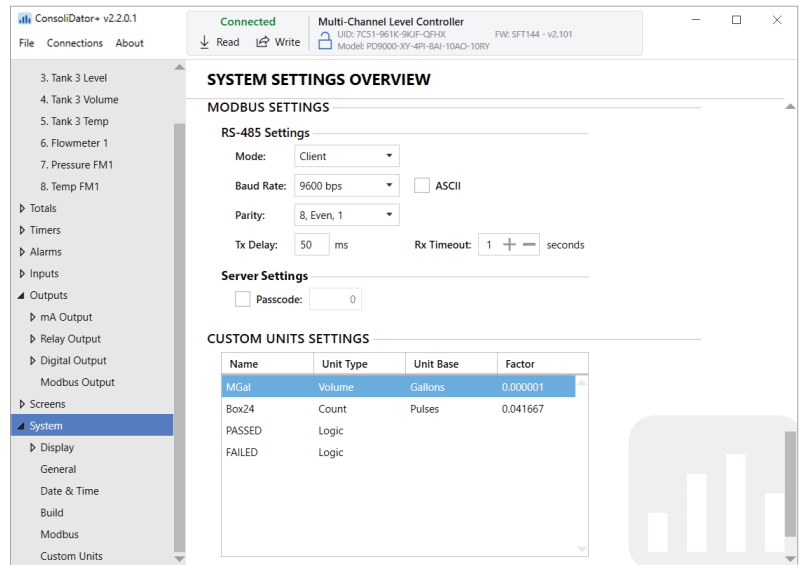


## Custom Units Settings

- View or Add Custom Units
- Enter a Label for Unit
- Select a Unit Type
- Select Unit Base
- Enter a Value for Factor
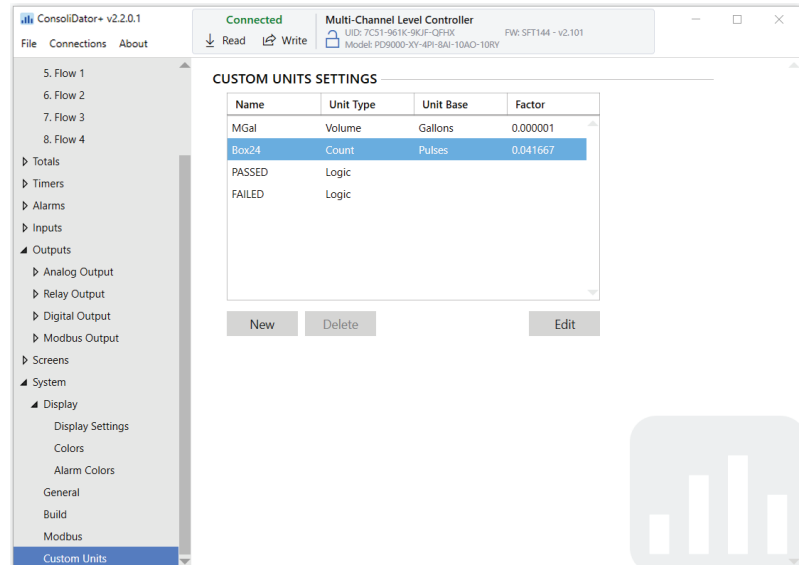


## PID Control Settings

- 4-20 mA Output for SCR Control
- Pulse Width Modulation (PWM) for SSR Control
- Heating & Cooling
- Switch Function to Quickly Change Target Set Point
- Switch Function for Easy Auto/Manual Mode Switching with Softkeys
- Enter New Set Points Easily On-Screen with Set Point Softkey
- Initiate Auto-Tune with Auto-Tune Softkey
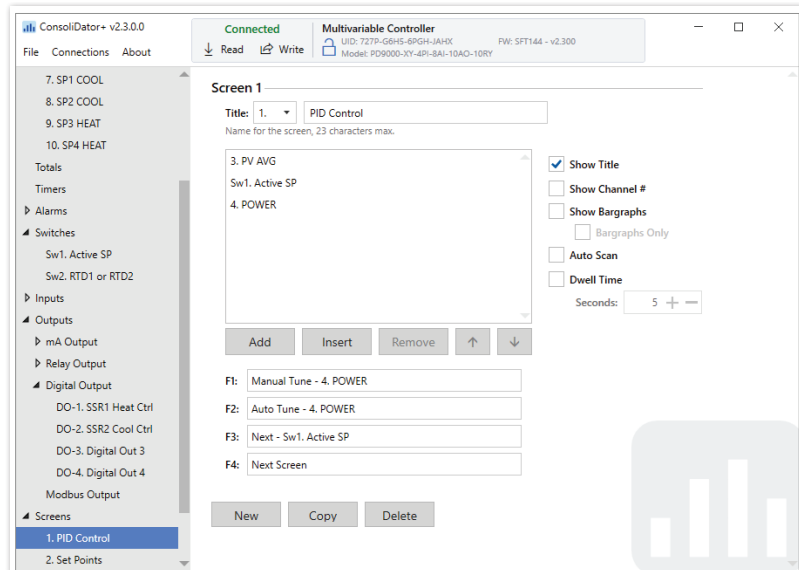
## Digital Switch Settings

- Program for Hand-Off-Auto control or PID Output Auto-Manual Switching
- Two, Three, and Four Way Switching
- Each Position Can Reference Any Channel, Input, Output, Total, Etc.
- Unique Name for Each Digital Switch and Switching Position
- Programmable Actions to Execute a Pushbutton Function in Addition to Changing Switch Position
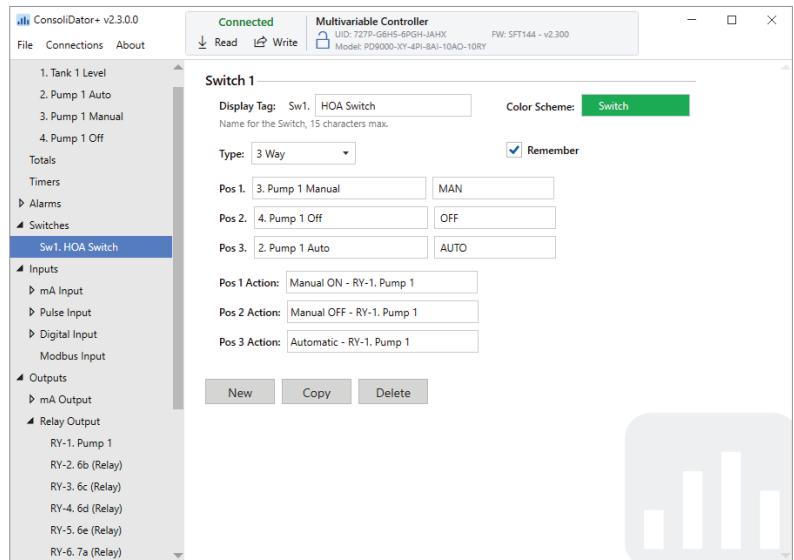
## Set Relays to Outputs for Control by Switches

- Select Switch as the Input for the Output
- Switch Positions Determine Output Operation
- Each Position Can Reference Any Channel
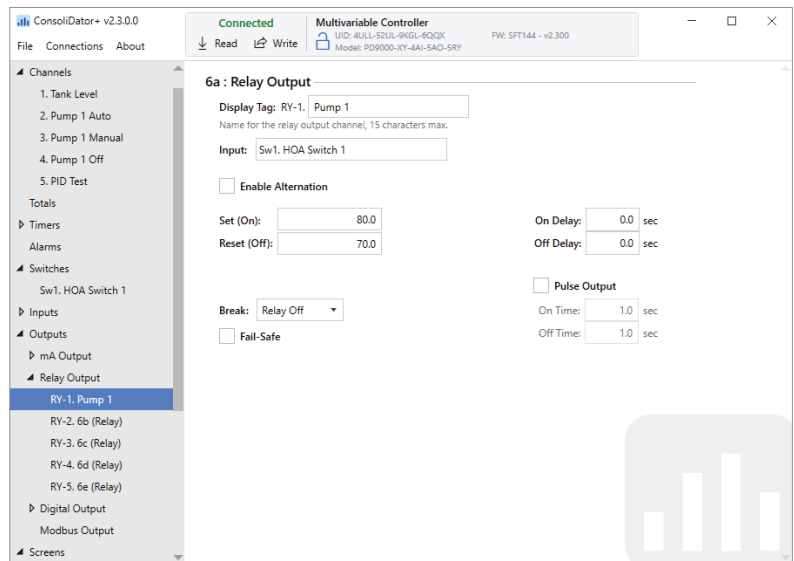
## Setup Screens to Operate Digital Switches

- Uses On-Screen Softkeys, No Panel Switches Required
- Set a Specific Softkey to Select Any Single Position on the Digital Switch
- Set a Softkey to Cycle Next or Previous Position
- Display Switch Status on the Screen
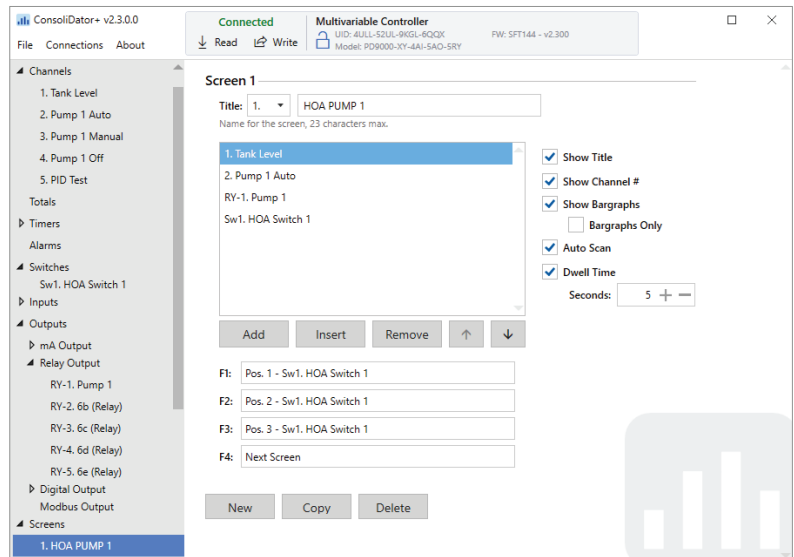
# MODBUS CLIENT, SNOOPER & SPOOFER ADD-ON FEATURES

The ConsoliDator+ Multivariable Controller supports Modbus RTU, Modbus ASCII, Enron Modbus, and Ethernet Modbus TCP/IP. The Server mode is a standard ConsoliDator+ feature; it responds to requests and accepts writes from a Modbus client.

The ConsoliDator+ is now available with Modbus Client, Snooper, and Spoofer capabilities and has the ability to scan and display up to 199 Modbus registers. This feature can be "unlocked" on any ConsoliDator+ purchased after February 15, 2021 by purchasing the PDK9000-M1 Key for $500 and entering the Key value into the ConsoliDator+.

**Local Display with ConsoliDator+ PD9000 Snooper**

**Remote Display with ConsoliDator+ PD9000 Client**

**← Modbus RS-485 →**

| 1 | 2 | 3 | 4 |

**Tanks with Multivariable Level Transmitters**

## Client Mode

The Client mode can request process variables from server devices; the input variables can be scaled, combined with other variables using math functions, and they can be written to other server devices using the Modbus output functions. The controller can request up to 199 Modbus values, as inputs from other Modbus devices. The inputs can be used as the source for channels, math functions, alarms, relay control, etc.

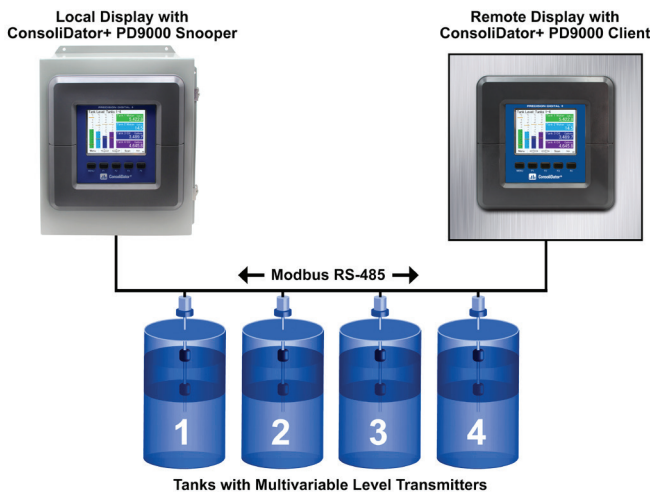| MB-1. | MB Input 1 | | Client |
| --- | --- | --- | --- |
| Server ID: | 247 | Address: 0 | ☐ Enron |
| Function Code: | 03 | | |
| Type: | Float 32 | Reg. No. 40001, 40002 | |
| Byte Order: | ABCD | | |
| Units: | Gallons/min | Decimals: 2 | |
| Break: | Default | Default: 0.00 | Gallons/min |
| ■ Poll Time: | 5.0 | seconds | ■ Timeout: 00:00:10 |
| Input Action: | Add To T1. Total 1 | | |
| Cancel | ⬆ | ⬇ | Edit | Save |

## Snooper Mode

The Snooper mode can listen and read the process variables being transmitted on the RS-485 bus without causing any disruptions to the network. The controller can read up to 199 Modbus values, as inputs from other Modbus devices being polled by a Modbus Client. The inputs can be used as the source for channels, math functions, alarms, relay control, etc.

| MB-3. | MB Input 3 | | Snooper |
| --- | --- | --- | --- |
| Server ID: | 1 | Address: 0 | ☐ Enron |
| Function Code: | 03/06 | | |
| Type: | Float 32 | Reg. No. 40001, 40002 | |
| Byte Order: | ABCD | | |
| Units: | Gallons/min | Decimals: 2 | |
| Break: | Default | Default: 0.00 | Gallons/min |
| ■ Timeout: | 00:00:15 | | |
| Input Action: | None | | |
| Cancel | ⬆ | ⬇ | Edit | Save |

## Spoofer Mode

The Spoofer mode is designed to replace existing Modbus Servers without requiring changes to the Client configuration. Each process value can be assigned a specific Device ID and Register Number to mimic the original server configuration.

| MO-1. | MB Output 1 | | Spoofer |
| --- | --- | --- | --- |
| Input: | Total 1 | | |
| Server ID: | 9 | Address: 0 | ■ Enron |
| Function Code: | 03 | | |
| Type: | Float 64 | | |
| Byte Order: | ABCD | | |
| Units: | Gallons | Decimals: 1 | |
| Output Action: | Reset Total - Total 1 | | |
| Cancel | ⬆ | ⬇ | Edit | Save |

See the PD9000 ConsoliDator+ manual for details on the Modbus Add-On features.

## USB DATA LOGGER ADD-ON FEATURE

The PDK9000-D1 Data Logger Add-On Feature for the PD9000 ConsoliDator+ allows you to log data to an external USB flash drive and create logs that contain the same type of process data or a mix of just about anything you might want to log. Each log can contain up to 12 process variables, inputs, outputs, timers, alarm status, relay status or a combination of parameters such as mA inputs, digital inputs, Modbus inputs, channels, totals, timers, and more. The data logger can be controlled in many ways; the start/stop, enable switch, log trigger, or log interval. See the PD9000 instruction manual for more details.

The PDK9000-D1 Data Logger Add-On feature that is ordered with the ConsoliDator+ will be activated at the factory. This Add-On feature can be ordered for existing ConsoliDator+ units with a firmware version 2.2 or greater, at any time. The user will receive a key they can enter into the ConsoliDator+ to unlock the Add-On feature.

### Setup Data Logs

The *Setup Data Logs* menu is used to configure settings that are used for logging data to an external USB flash drive. Any data parameter can be logged; up to 8 data logs can be created. Each data log can contain from 1 to 12 parameters.

### Setup New Data Log
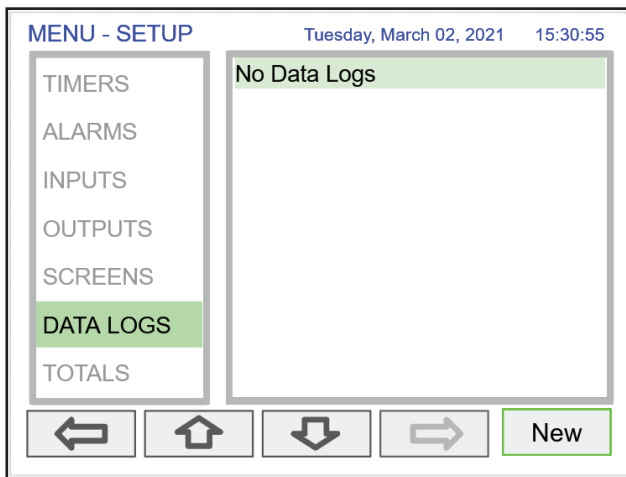


The setup of the data logs is easy, intuitive, and flexible. You can create logs that contain the same type of process data or you can have a mixed of just about anything you might want to log.

- Navigate to the *Data Logs* menu
- Press the *New* key (F4) to create a new log
- An untitled log is created

See the PD9000 ConsoliDator+ manual for details on the Modbus Add-On features.
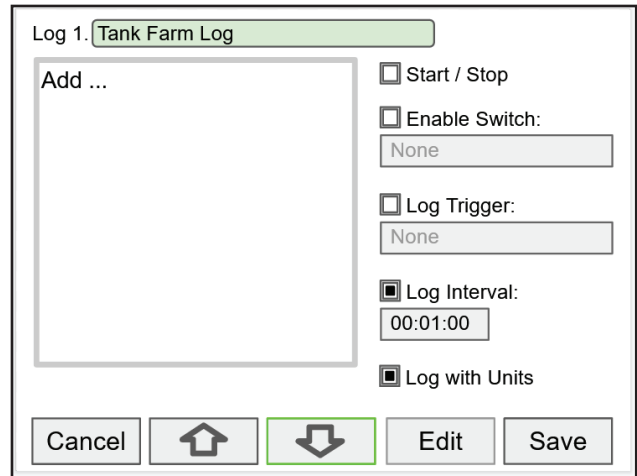


| Log #: | Enter log file name |
|---|---|
| Add: | Add items to be logged |
| Start / Stop: | Control the log start & stop |
| Enable Switch: | Select an additional log control |
| Log Trigger: | Trigger log on a specific event |
| Log Interval: | Log at the specified interval |
| Log with Units: | Each log entry will have the corresponding engineering units |

### ⚠ CAUTION

- Do not change the units for totals, while the data logger is running; the accumulated total will not be converted to the new units and the reflected value will not be accurate.

### Add Items to Be Logged
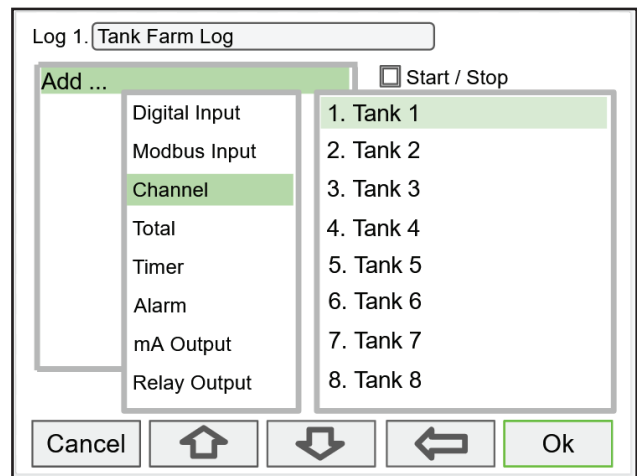


Each log can contain up to 12 process variables, inputs, outputs, timers, alarm status, relay status, or a combination of any of the following parameters:

1. mA Inputs
2. Digital Inputs
3. Modbus Inputs
4. Channels
5. Totals
6. Timers
7. Alarms
8. mA Outputs
9. Relay Outputs
10. Digital Outputs
11. Modbus Outputs

## Setup Log Start / Stop

Log 1. Tank Farm Log

1. Tank 1
2. Tank 2
3. Tank 3
4. Tank 4
Add ...

☑ Start / Stop
☐ Enable Switch:
None
☐ Log Trigger:
None
☑ Log Interval:
00:01:00
☑ Log with Units

Cancel | ⬆ | ⬇ | ☐ | Save

The log *Start / Stop* is used to give the system or the operator control to start and stop the log process.

The *Start / Stop* function is available in the View Log menu via the function keys.

The *Start / Stop* function can be activated with:
- Screen F1-F4 function keys
- Digital inputs
- Modbus inputs
- Modbus outputs
- Channel Control: Schedule, Sampler

## Setup Log Enable Switch

Log 1. Tank Farm Log

1. Tank 1
2. Tank 2
3. Tank 3
4. Tank 4
Add ...

☑ Start / Stop
☑ Enable Switch:
DI-1. Digital Input 1
☐ Log Trigger:
None
☑ Log Interval:
00:01:00
☑ Log with Units

Cancel | ⬆ | ⬇ | Edit | Save

The log *Enable Switch* can be any item with a binary value (on / off, 0 / 1, true / false). Log entries will be made only if the *Enable Switch* is in the on position.

The Enable Switch input can be:
- Digital input
- Modbus input
- Channel
- Alarm
- Relay Output

## Setup Log Trigger

Log 1. Tank Farm Log

1. Tank 1
2. Tank
3. Tank
4. Tank
Add ...

| Digital Input |
| Modbus Input |
| Channel |
| Alarm |
| Relay Output |

☑ Start / Stop
A1. High Alarm
A2. Hi-Hi Alarm
A3. Low Alarm
A4. Lo-Lo Alarm

Cancel | ⬆ | ⬇ | ⬅ | Ok

The *Log Trigger* can be any event from the list below. Log entries will be made every time the input is activated.
The *Log Trigger* input can be:
- Digital input
- Modbus input
- Channel
- Alarm
- Relay Output

The Modbus outputs can be used to trigger log entries.

## Setup Log Interval & Log Units

Log 1. Tank Farm Log

1. Tank 1
2. Tank 2
3. Tank 3
4. Tank 4
Add ...

☑ Start / Stop
☑ Enable Switch:
DI-1. Digital Input 1
☑ Log Trigger:
A1. High Alarm
☑ Log Interval:
00:01:00
☑ Log with Units

Cancel | ⬆ | ⬇ | Edit | Save

The *Log Interval* can be from 1 sec to 99:59:59 hh:mm:ss. Log entries will be made at the selected interval.

In this example the log must be started, and the digital input 1 must be on to log the tanks volume every minute.

To log continuously without the need to start or enable the log, deselect the *Start / Stop* and the *Enable Switch* settings. If engineering units are not needed, deselect the *Log with Units* setting.

### ⚠ CAUTION
- If *Start / Stop* is enabled, the log will stop on a power cycle. Make sure to monitor if the power is turned off and re-start the log when the power is turned on.

## Setup USB Drive

```
System - USB Drive

USB Drive: Ready

Capacity:              15630139392 bytes

Used Space:               22216704 bytes

Free Space:            15607922688 bytes


  ☐ Stop when Full


      Remove Device


   ⬅        ⬆        ⬇        ▣
```
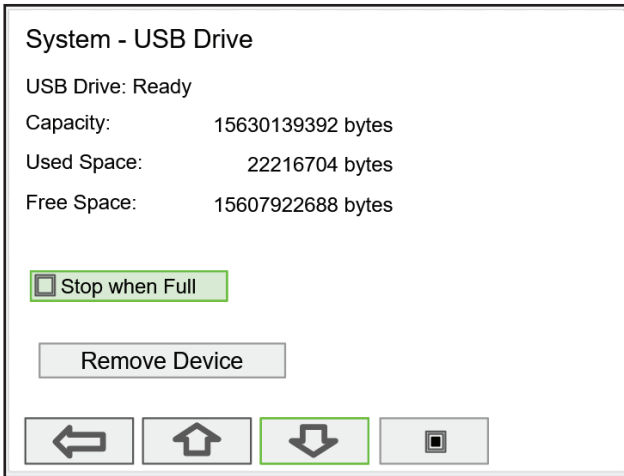
The *System – USB Drive* provides status information about the connected flash drive.

- USB Drive Status
- Capacity
- Used Space
- Free Space

*Stop when Full*: This should be selected, if the oldest logged data is more important than logging new data.

If *Stop when Full* is not selected, the oldest block of data will be deleted to make room for new data.

### ⚠ IMPORTANT

- The USB Drive menu is available only through the front panel.

## Safely Remove Flash Drive

```
System - USB Drive

USB Drive: Ready

Capacity:              15630139392 bytes

Used Space:               22216704 bytes

Free Space:            15607922688 bytes


  ☐ Stop when Full


      Remove Device


   ⬅        ⬆        ⬇    Remove
```
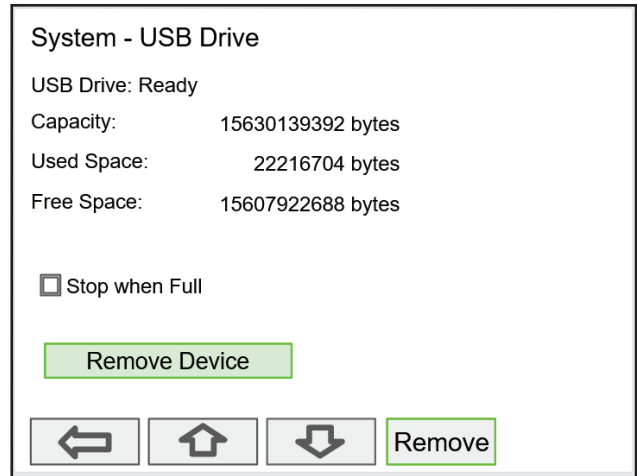
To safely remove the flash drive:

Go to the *System – USB Drive* screen, navigate to the *Remove Device* button using the down arrow key, then press the Remove key.

This procedure allows the USB drive to finish writing any log data in progress and prevent the lost or corruption of data.

## View Data Logs

In the *View Data Logs* menu you can see a list of the active data logs. Press the right arrow key to go to the log list and to see details of any of the logs.
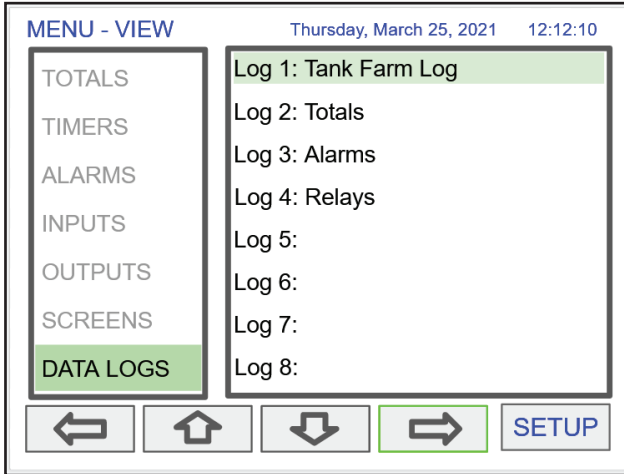


The screen below shows a snapshot of the log in progress. If the log is not running, the screen will only show the log # and name. Press *Start Log* followed by *Log Entry* to capture the first log.
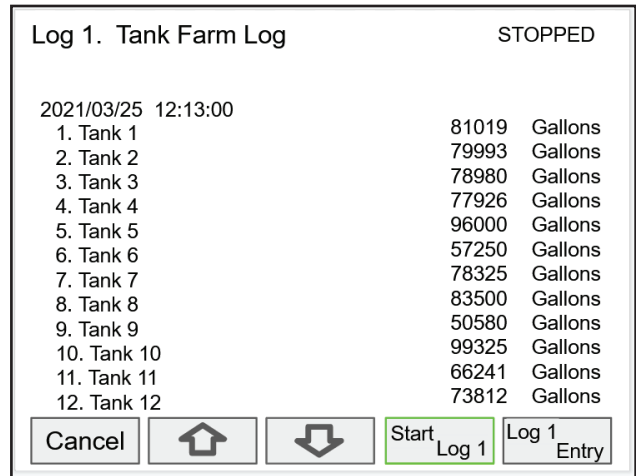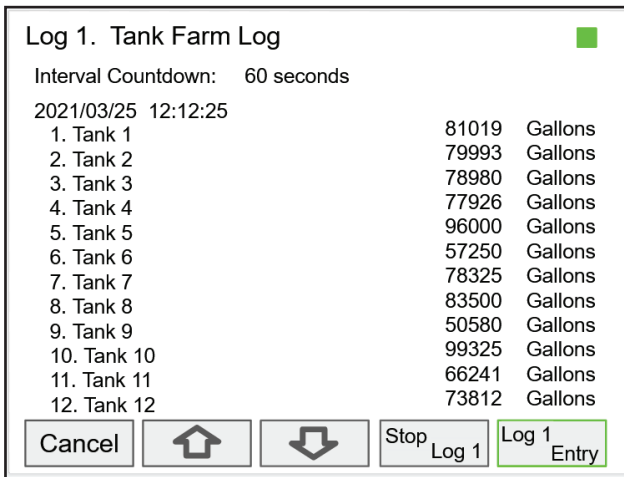




Press the *Stop Log* key to stop logging the selected log.

The *Start / Stop* function can be enabled or disabled during the log setup. This function is independent for each log.

After the log is started, the system will capture the first log according to the log setup selected.

The *Log Entry* key allows the user to capture a snapshot of the process any time.

### ⚠ IMPORTANT

- There is no provision for viewing previous log records on the screen. The flash drive must be removed and connected to a computer to download the saved logs.

# CONNECTIONS

Power connections are made to a three-terminal connector for AC (-6) models and to a two-terminal connector for DC (-7) models.

## 90-264 VAC Power

- Use three-terminal power connector as shown in Figure 1.
- Unit is protected internally with 1.25 A auto-resettable fuse. 2 A max, slow blow, 250 V min UL Recognized external fuse recommended.
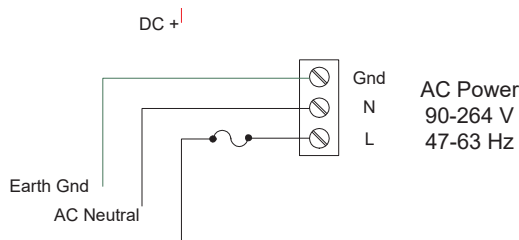


**Figure 1. AC Power Connections**

## 24 VDC Power ± 10%

- Use two-terminal power connector as shown in Figure 2.
- Unit is protected internally with 3.7 A auto-resettable fuse. 4 A max, slow blow, 50 V min UL Recognized external fuse recommended.
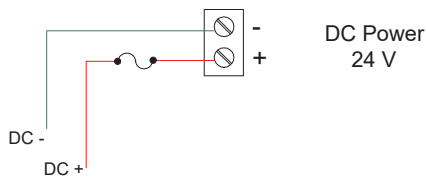


**Figure 2. DC Power Connections**

## Isolated Input Signal Connections

Isolated input signal connections are made to removable screw terminal connectors, which are labeled individually on the back panel of the controller. The back panel shows the type of input card installed in each slot (The top slot is #1 and the bottom is #7). Individual inputs are referenced as PI-1 to PI-4 for pulse inputs and AI-1 to AI-4, AI-5 to AI-8, etc for analog inputs.

## 4-20 mA Analog Input Connections

Analog 4-20 Input connections are made to screw terminal connectors (two inputs per connector). The following figures show examples for typical applications. Each of the 4-20 mA inputs may be connected in any of the modes shown below.
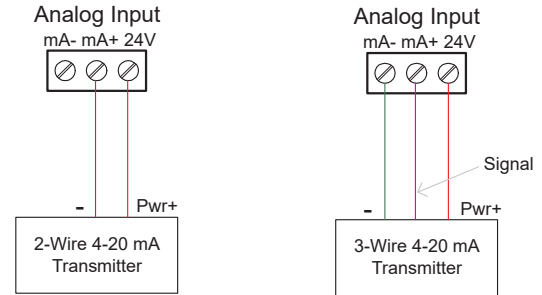


**Figure 3. Transmitters Powered by ConsoliDator+'s Isolated 24 VDC Power Supply**
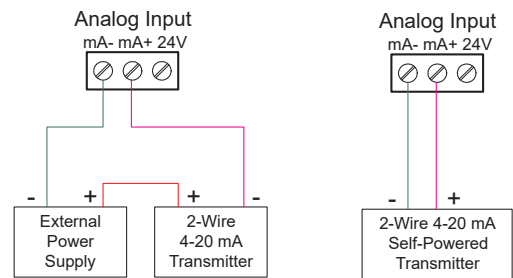


**Figure 4. Transmitter Powered by External Supply or Self-Powered**
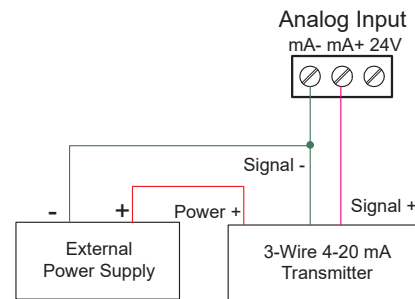


**Figure 5. Three-Wire Transmitters Powered Externally**

## Flow Meter Pulse Input Connections

Flow Meter Pulse Inputs are wired to four-terminal connectors (two inputs per connector). A square waveform is used in the illustration, but the input is capable of reading many other types of signals within the voltage and frequency ranges specified.
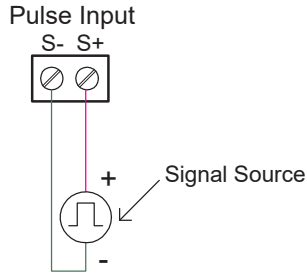


**Figure 6. Flow Meter Pulse Input Connections**

## Digital Input Connections

Inputs are wired between terminals 1-5 of the digital input connector and the G terminal of the 2-position connector above the digital inputs. Normally open switch contacts may be used as shown in Figure 7. The diagram also shows a Digital Input using an NPN open collector transistor output from a live signal. Logic LO or switch closure appearing across the terminals is interpreted as ON. When using an open collector transistor, a logic HI at the base (marked "B" in Figure 7) will be interpreted as ON. The 2-position connector has a +5 V terminal that may be used to provide excitation to some sensors requiring more than the pull-up provided on each digital input terminal.
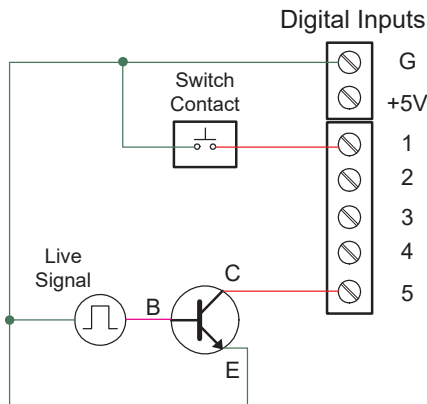


**Figure 7. Digital Input from Switch Closure and Live Signal**

## Analog Output Connections

The following figures show examples for isolated 4-20 mA transmitter output connections. Terminal connectors are labeled individually. The analog outputs are isolated from each other and from the inputs. They are powered internally to provide an active 4-20 mA output loop. The outputs may be powered externally by connecting the positive voltage to the Ex+ terminal.
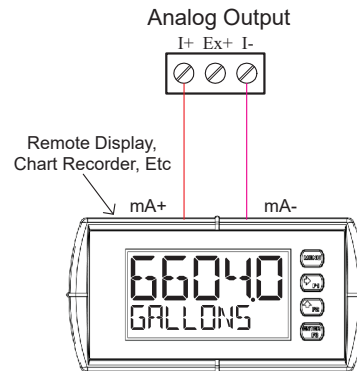


**Figure 8. Active 4-20 mA Output Powered by ConsoliDator+**
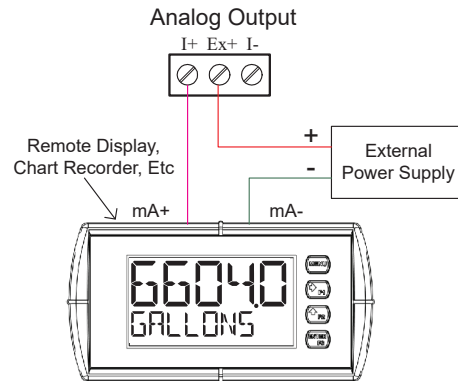


**Figure 9. Passive 4-20 mA Output Powered by External Supply**

**Note:** Analog inputs and outputs are isolated from each other.

## Digital Output Connections

The digital outputs may be used to drive digital inputs, alarm annunciators, or other devices such as solid state relays that can be driven with low voltage signals.
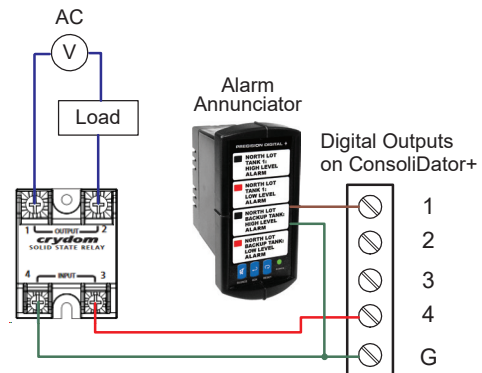


**Figure 10. Digital Outputs Driving 5V Solid State Relay and Alarm Annunciator**

## Connections to Power Gas Detector

Some sensors requiring more than 200 mA of excitation current can be powered by the ConsoliDator+ by connecting two or more power supplies in parallel as shown in the following diagrams.
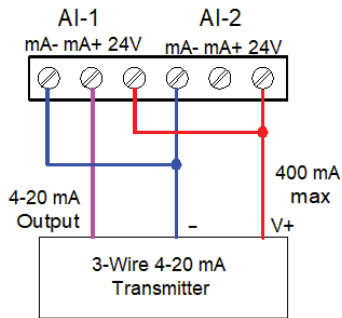


**Figure 11. Two Supplies in Parallel Powering 3-Wire Transmitter**
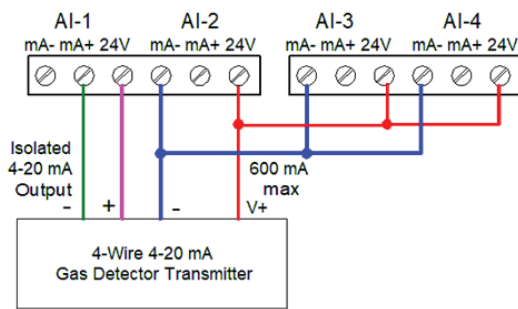


**Figure 12. Powering 4-Wire Gas Detector & Isolated 4-20 mA Output**

## Relay Connections

Relay connections are made to three-terminal connectors labeled individually. There are five relays per card.
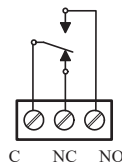


**Figure 13. Relay Connections**

## Switching Inductive Loads

The ConsoliDator+ has internal circuitry to protect the relays from inductive loads, however, the use of suppressors (snubbers) is strongly recommended when switching inductive loads to prevent disrupting the microprocessor's operation. The suppressors also prolong the life of the relay contacts. Suppression can be obtained with resistor-capacitor (RC) networks assembled by the user or purchased as complete assemblies. Refer to the following circuits for RC network assembly and installation.

**Note:** Because of the built-in RC network, there is the potential for leakage current when driving low power devices such as LEDs or piezoelectric alarms. It is recommended to use external relays to drive the low power devices or request a modification to the relay card from the factory.
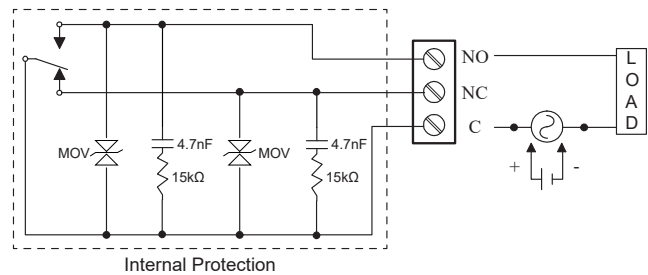


**Figure 14. AC and DC Internal Inductive Load Protection**

For additional external protection choose R and C as follows:

R: 0.5 to 1 Ω for each volt across the contacts
C: 0.5 to 1 µF for each amp through closed contacts

**Notes:**

1. Use capacitors rated for 250 VAC.
2. RC networks may affect load release time of solenoid loads. Check to confirm proper operation.
3. Install the RC network at the instrument's relay screw terminals. An RC network may also be installed across the load. Experiment for best results.



Use diode with a reverse breakdown voltage two to three times the circuit voltage and forward current at least as large as the load current.
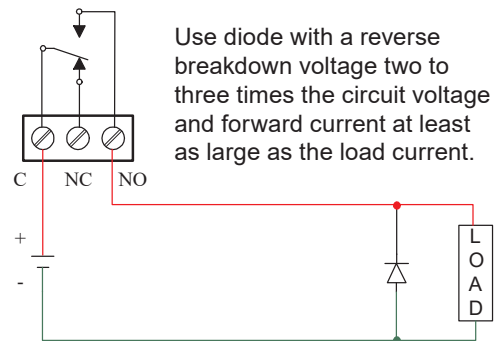
**Figure 15. Low Voltage DC Loads Protection**

### RC Networks Available from Precision Digital

RC networks are available from Precision Digital and should be applied to each relay contact switching an inductive load. Part number: PDX6901.

## Serial Communication Connections

The RS-485 port for serial communication (using Modbus protocol) has three terminals labeled D+, D-, and G. It is strongly recommended to use three-wire shielded cable and to always connect the ground terminal to the other equipment's ground to avoid differential voltage between the systems. Distances up to 4000 feet can be reached with RS-485. Up to 32 Modbus devices may be connected to a single RS-485 bus.
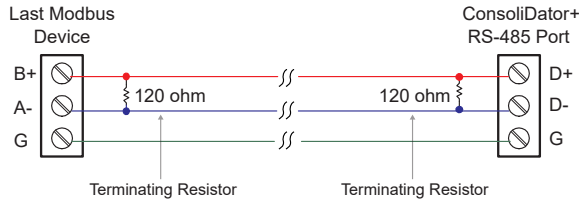


**Figure 16. Serial Connections**

## Ethernet Option

The Ethernet port is available on the RJ45 connector. This allows the ConsoliDator+ to connect to a local area network. The Ethernet port option is configured using the System menu. See the PD9000 ConsoliDator+ manual for ethernet port setup details.

## External Keypad Connections

Normally open pushbuttons may be wired to the digital inputs connector for use when the front panel of the controller is not accessible. The external keys may be assigned to replicate the Menu and F1-F4 function keys.
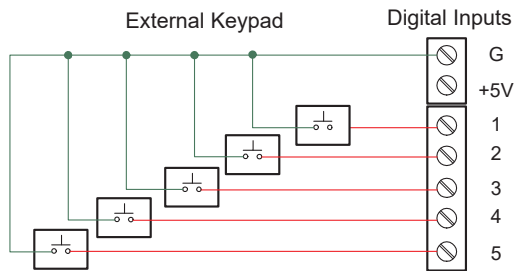


**Figure 17. External Keypad Connections**

# SPECIFICATIONS

Except where noted all specifications apply to operation at +25°C.

## General

| | |
|---|---|
| **Display** | Color; QVGA (320 x 240 pixels),<br>5.7" (145 mm) diagonally, white backlight<br>Bargraph: Twenty divisions<br>Numerical: Up to 15 digits (±999,999,999,999,999)<br>Feet & Inches Format: 99,999' 11.9" |
| **Screen Bargraph** | Enable/disable: Channels, totals, timers<br>Bargraph scale: 0 – 100%, independent of<br>channel scale. Twenty divisions: 5% each.<br>Screen: Select to show bargraph or not. |
| **Color Selection** | 65 colors selection<br>Customize bargraph, panel background, and text<br>for normal and alarm conditions. |
| **Decimal Point** | 0 to 15 decimal places, user selectable |
| **Engineering Units** | User selectable units or custom units<br>Time, Distance, Volume, Pressure, Weight,<br>Temperature, Current, Voltage, Percent, Amps,<br>Volts, Counts, Logic, and Custom, Any unit/unit of<br>time or other units. |
| **Feet & Inches Units** | Data entry format: Decimal (e.g. 50.58 feet)<br>Display format: 50' 6.96" |
| **Units Conversion** | Units' conversion is supported for channels, totals,<br>timers, and any function using those parameters.<br>Channel scaling must be in the intended base<br>units (e.g. Gallons/min) |
| **Boot-Up Time** | Less than 10 seconds<br>All inputs and outputs |
| **Display Update Rate** | User selectable: 0.1 to 0.5 sec<br>(10 updates/sec to 2 updates/sec) |
| **Programming Method** | Front panel buttons, external buttons, or<br>ConsoliDator+ Software |
| **Number of Alarms** | Up to 64 high or low, Logic AND & OR<br>Automatic (non-latching) or latching<br>On & Off time delays<br>Can be assigned to one or more relays.<br>***Note:*** *Alarms are independent from relays.* |
| **Alarm Types** | Single Source: One input<br>Multi-Source: Two or more inputs<br>Interval: Enter time interval and On Time<br>Day & Time: Select day of the week & time<br>Alarm OR: Any active input alarm triggers<br>      the OR alarm<br>Alarm AND: All alarms must be active to trigger<br>      the AND alarm |
| **Alarm Ack & Reset** | Automatic only (Non-latching)<br>Automatic and manual<br>Manual only (Latching)<br>Manual with Ack only after alarm is cleared<br>(Latching with Clear) |
| **Alarm Indication** | 1. Bargraph, panel, and text can be set up to<br>    change color on alarm<br>2. Enable internal buzzer<br>3. Assign external relay to drive a horn |
| **Internal Buzzer** | 60 dBA @ 24 inches (61 cm)<br>Enable/disable in System – General menu<br>Associated with alarm Horn setting |

| | |
|---|---|
| **External Horn (Sold Separately)** | Assign any relay to the Horn function to activate<br>an external horn when alarm condition is detected. |
| **Live Channel Calibration** | Live calibration of channels is independent of the<br>input calibration used for scaling. |
| **Input & Output Cards** | Max Number of I/O Cards: 7<br>Analog Inputs: 4/card<br>Pulse Inputs: 4/card<br>Analog Outputs: 5/card<br>Relays: 5/card |
| **Number of Screens** | Up to 20 screens with 1 to 8 PVs or items per<br>screen<br>Enable or disable screen title, channel #, and<br>bargraph<br>Automatic or manual scanning<br>Scan time: 1 to >1000 sec, independent for each<br>screen<br>F1-F4 keys are assigned per screen |
| **Function Keys** | User programmable (See defaults below)<br>F1 = Previous ←<br>F2 = Next →<br>F3 = Scan/Stop<br>F4 = Ack |
| **Number of Channels** | Up to 99 channels<br>Input Source: 4-20 mA, Pulse, Digital, Modbus,<br>another Channel, Total, Timer, Alarm, Date &<br>Time, mA Output, Relay Output, Digital Output, or<br>Modbus Output |
| **Channel Functions** | There is an extensive number of functions that<br>can be applied to the inputs, see *Channel & Math<br>Functions* in the instruction manual. |
| **Number of PID Control Channels** | Up to (8) PID control loops can be set up with (8)<br>analog inputs and (8) analog outputs.<br>***Note:*** *(2) analog input cards and (2) analog output<br>cards are used. The (3) remaining slots can be<br>used for relays.* |
| **Programmable Switches** | Up to (32) programmable digital switches can<br>be used to route any input, output, or process<br>variable. |
| **Password** | Programmable password restricts modification of<br>programmed settings.<br>View and Setup menus are password protected,<br>function keys and digital inputs are not protected. |
| **Simulation Mode** | Inputs, channels, totals, timers, and alarms can<br>be simulated from the View menu or from a<br>function key.<br>Simulation mode is not saved on power down.<br>Alert! message is provided for simulated items. |
| **Manual Control** | Analog outputs and relays can be controlled<br>manually from the View menu or from a function<br>key.<br>Manual control mode is not saved on power<br>down. Alert! message is provided for outputs in<br>manual control.<br>***Note:*** *If it is necessary to turn relays off and<br>maintain the condition through power cycle,<br>configure the relays to Always Off.* |
| **Non-Volatile Memory** | Settings stored for a minimum of 10 years |

| | |
|---|---|
| **AC Powered Models (-6)** | Three-terminal connector (L, N, GND) 90-264 VAC, 47 to 63 Hz, 60 W max |
| **DC Powered Models (-7)** | Two-terminal connector (G, 24V) 24 VDC ±10%, 60 W max Means of Protection: Class 2 (Reinforced) Overvoltage Category: Class II |
| **Fuse** | Units are protected internally with auto-resettable fuse AC: 1.25 A max DC: 3.7 A max |
| **External Fuse** | Recommended external fuse slow-blow 120 VAC: 2.0 A 240 VAC: 1.0 A 24 VDC: 4 A |
| **Isolation & Grounding** | 1500 V Analog inputs/outputs-to-power line |
| | 500 V Analog input-to-input, input-to-output, analog output-to-output |
| | All analog inputs and analog outputs are isolated from each other. |
| **Environmental** | Operating temperature range: -25 to 55°C (-13 to 131°F)* Storage temperature range: -40 to 60°C (-40 to 140°F) Relative humidity: 0 to 90% non-condensing |
| **Front Sealing** | Type 4X, IP66 |
| **Pollution Degree** | 2 |
| **Maximum Altitude** | 2000 m (6,562 feet) |
| **Internal Fan** | Automatic temperature-controlled fan turns on if the inside temperature reaches 50°C and increases the speed as the temperature rises to 60°C. |
| **Internal Heater** | Automatic temperature-controlled heater located behind the LCD turns on at 0°C, delivering the minimum power. If the temperature drops below -10°C, the heater delivers its maximum power. |
| **Connections** | Removable screw terminal blocks Inputs/Outputs: 12 to 24 AWG wire Digital I/O: 16 to 30 AWG RS-485: 12 to 24 AWG wire RJ45 Ethernet connection USB ports: Micro-USB used for programming; cable included. Data Log Drive: Type A, used with Data Logger Add-On feature. |
| **Tightening Torque** | Screw terminal connectors: Analog I/O & Relays: 0.5 Nm (4.5 lb-in) Digital I/O terminals: 0.23 Nm (2 lb-in) |
| **Enclosure** | Enclosure Body: Thermoplastic Polyester Color: Gray Display Window: Clear Polycarbonate, GE LEXAN HP12W Front Panel Keys: Silicone rubber |

| | |
|---|---|
| **Mounting** | Panel-mounting frame and twelve screws (provided) Cutout: 10.0" x 10.0" ±0.05" (254 mm x 254 mm ±1.3 mm) (H x W) Panel thickness: 0.07" – 0.35" (1.8 mm – 8.9 mm) Clearance behind panel: 6" (152 mm) |
| **Overall Dimensions** | 10.85" x 10.85" x 4.87" (276 mm x 276 mm x 124 mm) (H x W x D) |
| **Weight** | Ex: PD9000-XY-4PI-8AI-10AO-10RY 7.4 lb (3.4 kg) approx. |
| **Field Enclosure** | This device is an open-type controller and is required to be installed in a suitable enclosure that can only be accessed with the use of a tool or key. Panel mounting fasteners shall be tightened to a torque value of 0.8 Nm (7 lb-in). |
| **Warranty** | 3 years parts and labor. See Warranty Information and Terms & Conditions on www.predig.com for complete details. |

## Totalizer

| | |
|---|---|
| **Number of Totalizers** | Up to 32 totalizers<br>15 digits with comma separator |
| **Totalizer Inputs** | Calculates total based on selected rate channel, pulse input, digital input, or triggered event for non-rate channels. Total is stored in non-volatile memory if power is lost. |
| **Maximum Total** | 18 digits<br>999,999,999,999,999,999 |
| **Rate Channel Input** | 4-20 mA input, Pulse input, Modbus input |
| **Rate & Total Decimal Point** | Independent and user selectable from 0 to 15 places |
| **Totalizer Reset** | Via front panel keys or digital inputs |
| **Non-Resettable Total** | Total can be set up to be non-resettable to prevent unintentional reset. This can be changed in the Setup Totals menu. |
| **Total Units Conversion** | Input: Rate channel<br>Total units can be different than rate units.<br>Use the custom units to convert to any unit<br>(e.g. Gallons to Billion gallons<br>BGAL: Factor = 0.000000001) |
| **Pulse Input K-Factor** | K-Factor = pulses/units of measure<br>Calculates total directly from pulse input, Modbus input, channel, total, or Modbus output.<br>Create rate channel by entering K-Factor, units and time base in sec, min, hr, or day.<br>Decimals: 0 to 15 |
| **Count Down** | Total can set up to count down from a predetermined value entered by the user. |
| **Preset Value** | Enter the preset value to count up or down.<br>Reset total sets total to the preset value; to reset to zero uncheck the Preset box. |
| **Roll-Over** | Enter the value for total to roll-over to 0<br>Example: Roll-Over = 1,000,000<br>Total goes to 0 after 1 million |
| **Negative Total** | Allow total value to count below 0 for bi directional flow based on rate channel |
| **Total Bargraph** | Bargraph can be scaled to represent the expected maximum total |
| **Function Keys** | Screen Setup: Assign F1-F4 to Reset Total, Enter Total, Add To, or Remove From Total |
| **Previous Total** | This is the total prior to the last reset. Multiple previous totals can be set up by selecting a previous total as the input to a new total. The date & time is captured with the previous total. |
| **Daily Total** | This is the total for the day, starting at midnight. Daily total can be the input for previous totals to keep a record of a few days. The date is captured with the previous total. |
| **Grand Total** | Uses another total as the input and it is setup as non-resettable |
| **Non-Rate Total** | This total takes the input from a non-rate channel, a trigger causes the total to increment, or decrement based on the settings selected (e.g. Input from weight scale added when digital input is triggered). |

## Real Time Clock

| | |
|---|---|
| **Date Format** | Month, day, year (e.g. July 16, 2020) |
| **Time Format** | 24 hour; 00: Midnight<br>hh:mm:ss |
| **Battery** | 3V, P/N: CR2032 included<br>Battery replacement only with a Panasonic CR2032 Lithium Metal 3V coin cell battery. |
| **Display Date & Time** | Displayed on the top line of Setup and View menus, including day of the week. |
| **Screens** | Date & Time can be added to any screen. |
| **Channels** | Date & Time can be the input to a channel.<br>Display Format: yyyy/mm/dd  hh:mm:ss |

## Channel & Math Functions

| Scale Functions | K-Factor | Converts number of pulses to volume or other units |
|---|---|---|
| | Scale Factor | Apply multiplier to a channel |
| | Scale Linear 2-Pt | Scale a channel |
| | Scale Multi-Point* | Multi-point scaling of a channel |
| | Scale Square Root | Apply square root to a channel – Differential Pressure from two channels |
| | Scale Exponent | Apply exponent for weirs and flumes open channel flow calculation |
| | Round Horizontal Tank | Calculate volume in round horizontal tank with flat ends |
| | Units Conversion | Convert base units to custom units |
| | Percent (Bargraph) | % bargraph of any: 4-20 mA input, channel, total, timer, or mA output |
| | Text (Percent) | Text displayed based on the % input value |
| **Math Functions** | Constant | Assign fixed value |
| | Summation | Add two or more channels |
| | Difference | Subtract any two channels |
| | Abs Difference | Difference always positive |
| | Absolute Value | Convert channel value to positive |
| | Average | Find the average of channels |
| | Weighted Average | Assign % weight to two or more channels |
| | Multiply | Multiply two channels |
| | Divide | Divide two channels |
| | Exponent | Set the base and the exponent; both can be constants or variables |
| | Logarithm | Set the base and the value; both can be constants or variables |
| | Modulo | Set constants or variables for A mod B |
| | Trigonometry | Sine, cosine, tangent, arc sine, arc cosine, arc tangent. Select the input and angle |
| | % Efficiency | Calculate input to output efficiency ((A-B)/A)*100% |

| Open Channel Flow Functions | Parshall Flumes | $Q = K\,H^n$ <br> Enter constant, head variable, exponent, and units |
|---|---|---|
| | V-Notch Weirs | $Q = K\,H^{2.5}$ <br> Enter constant, head variable, and units |
| | Cipolletti Weirs | $Q = K\,L\,H^{1.5}$ <br> Enter constant, crest length, head variable, and units |
| | Rectangular Weirs w/o Contractions | $Q = K\,L\,H^{1.5}$ <br> Enter constant, crest length, head variable, and units |
| | Rectangular Weirs with Contractions | $Q = K\,(L-0.2H)\,H^{1.5}$ <br> Enter constant, crest length, head variable, and units |

**Note:** Enter K value for Q = cuFt/sec; select any flow rate units to be displayed or used as input to a totalizer.

### ⚠ IMPORTANT

*Scale Multi-Point: There is no minimum input span requirement; it is up to the user to make sure the input values are correct.

| Additional Functions | Compare | |
|---|---|---|
| | Greatest | Greatest value in a group of channels |
| | Least | Smallest value in a group of channels |
| | Middle of 3 | Outputs the middle value of three inputs |
| | **Measure** | |
| | Tare | Calculate net value when Tare function is applied via function key |
| | Maximum | Maximum value reached by the process |
| | Minimum | Minimum value reached by the process |
| | Duration | Keep track of time a condition has been present (e.g. high alarm active) |
| | Rate of Change | Calculates how fast a process is changing /sec, /min, /hr, /day |
| | **Filter** | |
| | Window Average | Enter time to calculate the average |
| | IIR (First Order) | Infinite Impulse Response (slow) |
| | Cutoff | PV = 0 below cutoff Flip Side: 0 above (-) |
| | Limits | Sets PV upper & lower limits. |
| | Round | Round (to nearest) Floor (always down) Ceiling (always up) Less (toward zero) More (away from zero) |
| | Hysteresis | Resists a directional change using a time delay, filters change in the trending direction |
| | Delay | Enter the number of seconds to delay the output |
| | Pulse Filter | Use to filter discrete inputs, set minimum and maximum on/off time in seconds |

| Additional Functions Continued | Control | |
|---|---|---|
| | Sampler | Trigger relay sample and select sampling time (e.g. Turn relay on for 30 sec every time total increases by 1,000 Gallons) |
| | On-Off Control | Set on & off control based on PV |
| | On-Off Control with Random Varying On/Off Points | Select Randomizer, enter on/off points +/- random variation |
| | Select A or B | Switch between 2 inputs |
| | Select 1,2,3… | Select 1 from 3 or more inputs, it works as a selector switch |
| | Schedule | Daily or weekly event The available actions depend on the configuration of inputs and outputs. |
| | Capture | Set a trigger event to capture a value in real time |
| | PID Control | Set up channel for PID control |
| | PWM Control | Set up channel for pulse width modulation control to be used with PID control loop |
| | Switch Position | Set up channel to read the digital switch position (0, 1, 2, 3) |
| | **Relays** | |
| | Cycle Count | Number of relay cycles since reset |
| | Runtime | Relay runtime (ON) hh:mm:ss |
| | **Modbus** | |
| | Time Since Read | Time since a Modbus client device read a register |
| | Time Since Write | Time since a Modbus client wrote to a register |

## List of Engineering Units

| | |
|---|---|
| **Time** | seconds, minutes, hours, days & /sec, /min, /hr, /day |
| **Distance (Height)** | cm, m, Inch, Feet, Ft-In, Yard, km, miles, custom |
| **Volume** | Gallons, GAL, L, IGAL, M3, BBL, BUSH, cuYD, cuFt, cuIn, LiBBL, BBBL, HECtL, quarts, pints, fl oz, mL, DT, M/T, MGAL, custom |
| **Pressure** | psi, Pa, bar, hPa, kPa, MPa, GPa, inH2O, cmH2O, inHg, mmHg, atm, kg/cm2, kg/m2, mbar, Mbar, Torr, mTorr, custom |
| **Weight** | grams, Oz, Lb, lb, g, kg, ounces, tons, tonnes, custom |

| | |
|---|---|
| **Temperature** | C, F, K, Ra |
| **Percent** | %, PCT, Percent, custom |
| **Amps** | mA, Amps, custom |
| **Volts** | V, mV, Volts, custom |
| **Counts** | Pulses, Cycles, Counts, custom |
| **Logic** | ON, OFF, OPEN, CLOSED, YES, NO, START, RUNNING, STOP, STOPPED, PUMP ON, PUMP OFF, OK, OKAY, ERROR, WARNING, custom |
| **Custom** | Enter unit's name, type, base unit, and factor. |

## 4-20 mA Analog Inputs

| | |
|---|---|
| **Number of Inputs** | (4) Analog inputs/card<br>(28) Analog inputs max, no other I/O |
| **Typical Input** | 4-20 mA |
| **Input Range** | 0-24 mA |
| **Accuracy** | ±0.03% of full scale ±1 count |
| **4-20 mA Display Value** | Up to six recommended ±999,999<br>More digits can be used, but the stability will be affected. Increase the filter value and lower the display update rate or use rounding to get a more stable reading. |
| **Number of PID Control Loops** | (8) PID control loops can be set up with (8) analog outputs connected to SCRs.<br>***Note:*** *(4) digital outputs can be used to control SSR (Solid State Relays).* |
| **Transmitter Power Supply** | Isolated 24 VDC @ 200 mA/input<br>Max current: 1,600 mA (All inputs)<br>(8) Analog Input @ 200 mA max<br>(28) Analog Input @ 20 mA max<br>Available on AC or DC powered units |
| **Temperature Drift** | Better than 20 ppm/°C from -40 to 60°C ambient |
| **Filter** | Window average: None, 0.5, 1, 2, 4, 8 sec<br>IIR (Infinite Impulse Response): 16, 32 sec<br>Glitch Filter: Discards a single sample caused by high frequency noise |
| **Filter Bypass** | 0 to 100 % of full scale<br>Filter is ignored, if the signal change is greater than bypass value |
| **Channel Input Scale Function** | Scale Linear 2-Point,<br>Scale Multi-Point (2 to 50 points)*<br>Scale Square Root<br>Scale Exponent (Open Channel Flow)<br>Scale Factor<br>Round Horizontal Tank (Volume)<br>Units Conversion (mA Input Reading)<br>Percent Bargraph<br>Text (Percent) |
| **Channel Input Live Calibration** | Each channel can be calibrated using live calibration signal from a sensor or a calibrator. |
| **Input Protection** | Each 4-20 mA input is protected by an auto-resettable fuse, 30 VDC max.<br>The fuse resets automatically after the fault condition is removed. |
| **Input Impedance** | 125 Ω typical, including auto-resettable fuse |
| **Hart Transparency** | The controller does not interfere with existing HART communications; it displays the 4-20 mA primary variable, and it allows the HART communications to pass through without interruption. The controller is not affected if a HART communicator is connected to the loop. The controller does not display secondary HART variables. |
| **Isolation** | 1500 V: Input-to-power line<br>500 V: Input-to-input, input-to-output<br>All analog inputs and analog outputs are isolated from each other. |
| **Normal Mode Rejection** | 100 dB at 50/60 Hz |
| **Common Mode Rejection** | 90 dB at 50/60 Hz |

## Pulse Inputs

| | |
|---|---|
| **Number of Inputs** | (4) Pulse inputs/card<br>(28) Pulse inputs max, no other I/O |
| **Input Type** | Active Square Wave, NPN, PNP, Reed Switch, Coil (Magnetic Pickup)<br>Normal threshold: 1.2 V (0.8 to 3.0 V)<br>High threshold: 2.5 V (2.0 V to 6.0 V)<br>Coil threshold: 20 mV (Low) or 100 mV (High) |
| **Signal Level** | Active Square Wave: 0 to 30 V max<br>Typical: 0 to 5 V<br>Coil: 20 mVp-p to 30 Vp-p (Magnetic Pickup) |
| **Input Impedance** | Active, NPN, Reed: 10 kΩ pull-up to 5 V<br>PNP: 10 kΩ pull-down to (S-)<br>Coil: >2 kΩ (20 mV sensitivity), >10 kΩ (100 mV sensitivity) |
| **Isolation** | Pulse inputs are not isolated, (S-) terminal is connected to system GND |
| **Input Protection** | ±36 V, non-isolated |
| **Frequency Response & Signal Level** | Active Square Wave 5 V: 0 to 100 kHz<br>Coil (Magnetic Pickup): 0 to 50 kHz<br>Frequency – Signal level (Coil: 20 mV) |
| | 20 mVp-p – 100 Hz<br>100 mVp-p – 10 kHz<br>Frequency – Signal level (Coil: 100 mV) |
| | 100 mVp-p – 90 Hz<br>500 mVp-p – 5 kHz<br>20 Vp-p – 50 kHz |
| **Minimum Frequency** | 250 µHz with High Gate = 4,000 sec |
| **Low Gate** | 1 to 99 sec |
| **High Gate** | 2 to 4,000 sec<br>(Must be higher than low gate) |
| **Low Speed** | 100 Hz maximum<br>Used for contact debouncing |
| **Pulse Counter** | 8,388,607 maximum, used for troubleshooting purposes only |
| **Accuracy** | ±1 count for K-Factor > 1 or 30 ppm |
| **K-Factor** | Programmable pulses/unit of measure with up to 14 decimal resolution |
| **Scale Pulse Input** | Scale Linear 2-Point<br>Scale Multi-Point Scaling*: 2 to 50 points<br>Scale Factor<br>Units Conversion |
| **Live Calibration** | Pulse input channel can be calibrated using live calibration signal from a sensor. |

> ⚠ **IMPORTANT**

***Scale Multi-Point:*** There is no minimum input span requirement; it is up to the user to make sure the input values are correct.

## Modbus Inputs - Server

| | |
|---|---|
| **Availability** | Standard feature |
| **Number of Inputs** | 199 Modbus RTU or ASCII |
| **Scale Modbus Input** | Modbus input can be used as the input for creating channels and totals, the same way the 4-20 mA inputs are used. |
| **Data Type** | Bit-Logic<br>Signed/Unsigned:<br>  16 (Short), 32 (Long), 64 (Long-Long)<br>Float 32, Float 64 (Double) |
| **Decimal Point** | User selectable |
| **Comm Break & Timeout** | Specify what value to hold when a communication break occurs and how long to wait for new data before reporting a break condition. |
| **Input Action** | Specify what should happen when new data is written to the input register (e.g. Add to Total 1, Log Entry – All Logs). |

## Digital Inputs & Outputs

| | |
|---|---|
| **Digital Inputs** | 5 Inputs, non-isolated, 30 VDC max<br>Standard feature on all ConsoliDator+ models<br>Low: 0 to 1.2 V<br>High: 2.8 to 30.0 V<br>Internal pull-up: 5 kΩ to 5 V<br>Max pulse frequency: 1 kHz @ 5 Vp-p<br>+5 V terminal: Internal pull-up 100 Ω<br>**Note:** Pulse inputs can be used as digital inputs |
| **Digital Input Types** | Normally open switch: External excitation not required (Current: 1 mA)<br>Open collector: 4.1 V open circuit voltage<br>Logic level: 0 to 30 V |
| **Assignment & Operation** | Active Low or Active High<br>Functions: Remote front panel button, total functions, timer control, alarm functions, screen navigation, horn functions, reset relay information. Digital inputs can be used as input source for channels, totals, and alarms. |
| **Digital Outputs** | 4 Outputs<br>Standard feature on all ConsoliDator+ models<br>Low: 0 V (no load), 1.5 V max @ 10 mA sink (External pull-up)<br>High: 5.0 V (no load), 3.5 V @ 10 mA load<br>Maximum current: 30 mA<br>Output impedance: 100 Ω<br>Output protection: 150 mA auto resettable fuse<br>Max frequency: 5 Hz |
| **Digital Output Assignment** | Digital outputs require logic units as the input. Input sources: Digital input, Modbus input, channel, alarm, horn, always on, or always off |
| **Input / Output Protection** | ±36 V, non-isolated |

## Relays

| | |
|---|---|
| **Number of Relays** | (5) Relays/card<br>(30) Relays max with (4) analog or<br>(4) pulse inputs, no other I/O |
| **Rating** | SPDT (Form C)<br>Resistive load: Rated 10A @ 120/240 VAC or 8A @ 30 VDC<br>Inductive load: NO contacts: 5A, 1/3 HP, 120 VAC; 30,000 cycles<br>NC contacts: 1/8 HP, 120 VAC; 50,000 cycles<br>Minimum load: 100 mA @ 5 VDC |
| **Maximum Current per Relay & Number of Relays** | 11 relays or more: 5A @ 120/240 VAC or 30 VDC. Limited due to heat dissipation inside the enclosure. |
| **Isolation** | 1500 VAC, 50/60 Hz for 1 min between coil and contacts |
| **Deadband** | 0-100% of full scale, user selectable |
| **Electrical Noise Suppression** | TVS diodes & snubbers on all contacts. Recommended additional external snubber: 0.01 µF/470 Ω, 250 VAC<br>(Order: PDX6901) |
| **Assignment & Operation** | Any relay can be assigned to any alarm, channel, total, timer, digital input, Modbus input, pump alternation, horn, always on, or always off. Multiple relays can be assigned to the same alarm or channel. All relays are programmed independently. |
| | High & Low Alarm: Defined by set and reset points in the Alarm menu |
| | High or Low Alarm: Assign relay to any alarm or channel for on/off relay control<br>**Note:** Automatic reset only for channel |
| | Multi-Source High or Low Alarm: Assign relay to multi-source alarm to indicate common high or low condition. |
| | Pulse Action: Set any relay for pulsing on/off timed relay control. Programmable pulse width (on/off time) and on/off delay. |
| | Sampling: Relay must be assigned to channel setup for Sampler function with user-defined total increment and sampling time. |
| | Pump Alternation: Any relay can set up to alternate with any relay in the group. Multiple alternation groups can set up. |
| **Acknowledge** | Front panel **Ack** key or digital input acknowledges individual or all alarms; relays associated with acknowledged alarm are turned off. |
| **Alarm Relay** | Assign any relay to be driven by any alarm; acknowledging the alarm turns off the relay (non-fail-safe mode). |
| **Time Delay** | Programmable on/off delays,<br>0.0 to 999.9 sec<br>Independent for each relay. |
| **Auto Initialization** | When power is applied to the controller, relays will reflect the state of the input to the controller. |
| **Fail-Safe Operation** | The relay coil is energized when the process variable is within safe limits and the relay coil is de-energized when the alarm condition exists. |

## 4-20 mA Transmitter Outputs

| | |
|---|---|
| **Number of Analog Outputs** | (5) Analog outputs/card<br>(35) Analog outputs max with<br>no other I/O cards (Seven I/O slots) |
| **Output Range** | 4.00 to 20.00 mA, nominal |
| **Calibration** | Factory calibrated for 4-20 mA |
| **Scaling Range** | Any process range<br>Reverse scaling allowed |
| **Assignment & Operation** | Assign to any analog or pulse input, digital input, Modbus input, channel, total, timer, alarm, or fixed value (none).<br>**Note:** Multiple 4-20 mA outputs can be assigned to the same input. |
| **Accuracy** | ±0.03% F.S. ±0.005 mA |
| **Temperature Drift** | 20 ppm/°C from -40 to 60°C ambient. (Output & Input drifts are separate) |
| **Output Loop Power** | Powered by controller: 24 VDC @ 24 mA max or powered externally by 12 to 32 VDC |
| **Output Loop Resistance** | Powered by controller: 10 to 600 Ω<br>External 12 VDC: 10 to 200 Ω<br>External 24 VDC: 10 to 600 Ω<br>External 32 VDC: 10 to 1000 Ω |
| **Isolation** | 1500 V: Output-to-power line<br>500 V: Output-to-output, output-to-input<br>All analog inputs and analog outputs are isolated from each other. |

## Timers

| | |
|---|---|
| **Number of Timers** | Up to 30 |
| **Time Format** | hh:mm:ss with 0 decimals selected<br>Seconds with 1 or more decimals |
| **Automatic Actions** | Power Up: Timer action on power up<br>Error: Action when an error is detected<br>Reset: Event causes the timer to reset<br>Start: Event triggers the timer to start<br>Stop: Event causes the timer to stop |
| **Start / Stop Reset** | The function keys and digital inputs can be used to start, stop, and reset the timers, regardless of the automatic actions selected. |
| **Assignment & Operation** | Timers can be triggered, stop, and reset, by rising or falling signals from 4 20 mA input, pulse, digital, Modbus input, channel, total, other timers, alarm, mA output, relay, or Modbus output. |
| **Count Down Timer** | Select count down and enter starting time |
| **Timer Alarm** | Timer can be used to trigger alarms |
| **Bargraph** | Select bargraph during setup and scale the bargraph for 0 – 100% target time |
| **Timer Control** | Access timer control via the *View Timer* menu or assign a function key to timer control in the *Screens* menu |
| **Timer & Relay** | Timer can be assigned to drive relays based on selected set and reset points. |

## Modbus Outputs - Server

| | |
|---|---|
| **Availability** | Standard feature |
| **Data Type** | Bit-Logic<br>Signed/Unsigned: 16 (Short), 32 (Long),<br>                    64 (Long-Long)<br>Float 32, Float 64 (Double) |
| **Register Numbers** | The register numbers are automatically generated based on the Modbus output number and the output's data type.<br>Bit – Logic: 04101 – 04199<br>Signed/Unsigned 16: 44101 – 44199<br>Signed/Unsigned 32: 44201 – 44398<br>Signed/Unsigned 64: 45001 – 45396<br>Float 32: 44401 - 44598<br>Float 64: 44601 - 44996 |
| **Engineering Units** | Select the engineering units for the process variable assigned to the output |
| **Decimal Point** | User selectable. For short and long integers this is a multiplier applied to the input value, but it is not displayed on the server's screen. The Modbus client uses this setting to read the correct value from the server.<br>Example: Ch 1 value = 4,379.26<br>MB Output Data Type: Signed 32<br>Decimals = 0 → Output = 4,379<br>Decimals = 3 → Output = 4,379,260 |
| **Output Action** | Specify what should happen when the output register is read by the client (e.g. Start timer 1, Log Entry – All Logs). |

## Modbus Serial Communications

| | |
|---|---|
| **Compatibility** | RS-485 (EIA-485) |
| **Protocols** | Modbus RTU or Modbus ASCII<br>Modbus Enron is supported by the Client and the Spoofer modes. |
| **Device Address** | 1 to 247 (Server) |
| **Transmit Delay** | 0 to 999 ms |
| **Receive Timeout** | 1 to 9 seconds |
| **Baud Rate** | 1,200 to 115,200 bps |
| **Data** | 8 bit (1 start bit, 1 stop bit) |
| **Parity** | Even, Odd, None with 1 stop bit, or None with 2 stop bits |
| **Modbus Inputs** | 199 for all mode |
| **Modbus Outputs** | 99 for all modes. The outputs can be grouped together to be sent as blocks of registers.<br>These Modbus outputs are in addition to the outputs listed in the Modbus Register Tables, see PD9000 instruction manual. |
| **Communication Break** | Reports a break condition after the response timeout has elapsed. The break condition can be: Zero, a default value, or the text Break.<br>The Client goes into break condition after the server device fails to respond and the timeout has elapsed.<br>The Snooper and Server modes go into break condition after no new data is received within the response timeout window.<br>Alarms can be programmed to go on, off, or stay as is when a break condition is detected. The analog outputs can set up to generate a fixed mA current when a break condition is detected. |

## Modbus Client, Snooper & Spoofer

| | |
|---|---|
| **Add-On Feature PDK9000-M1** | Client, Snooper & Spoofer<br>The Modbus Client is an option in the ConsoliDator+. It can be purchased at the time the order is placed or it can be purchased and enabled at any time.<br>The Modbus Snooper & Spoofer features are part of the Client Add-On feature. |
| **Modes** | **Client:** Requests data from servers and writes data to servers. |
| | **Snooper:** Listens to the RS-485 network communications and reads the selected registers. |
| | **Spoofer:** A channel is configured to pretend being a device that has been removed from the network. The device ID and register number is used. |

## Client & Snooper Settings

| | |
|---|---|
| **Availability** | Order Add-On Feature model PDK9000-M1 at any time. |
| **Number of Output PVs** | 99 process variables can be written by the Client mode to Modbus servers. Modbus server inputs and outputs are available over the Ethernet port, in Client mode also. |
| **Server ID** | Enter the server ID or address containing the process variables to be read or written by the Client or read by the Snooper. |
| **Function Code** | Select which Modbus function code to use for reading the server device or for writing to a server by the ConsoliDator+ Client. |
| **Register Address** | 0-65,533 (Base 0)<br>Reg. No. 30001-39999, 40001-49999<br>Reg. No. 300001-365534 or 400001-465534<br>Specifies which register(s) to read from the server device. |
| **Data Type** | Select the data format used by the server device.<br>Bit – Logic (Coil)<br>Signed/Unsigned: 16 (Short, 2 byte)<br>                 32 (Long, 4 byte)<br>                 64 (Long Long, 8 byte)<br>Float 32 (4 byte), Float 64 (Double, 8 byte) |
| **Byte Order** | ABCD, CDAB, BADC, or DCBA<br>(big-endian, swapped, or little-endian) |
| **Client Poll Time** | 1.0 to 999.9 sec. Time between read commands. |
| **Server Response Timeout** | 99:59:59 hrs.: Time allowed for the server to respond before the Modbus client generates a communication break condition. The timeout should be greater than the poll time.<br>Server/Snooper mode: Time the Modbus input will wait for new data before going into a break condition.<br>If the timeout is disabled, the last value will remain until a new value is received. |

## Spoofer Settings

| | |
|---|---|
| **Availability** | Order Add-On Feature model PDK9000-M1 at any time. |
| **Number of Output PVs** | 99 process variables can be replaced by the ConsoliDator+ Spoofer feature. |
| **Number of Input PVs** | 199 process variables can be written by a client to the Spoofer inputs replacing other Modbus servers. |
| **Server ID** | Enter the server ID or address being replaced by the ConsoliDator+ Spoofer. |
| **Function Code** | Select the Modbus function code used by the server device. |
| **Register Address** | Enter the address 0-65,533 (Base 0) for the process variable of the replaced server. |
| **Data Type** | Select the data format used by the server. |
| **Byte Order** | Select the byte order<br>ABCD, CDAB, BADC, or DCBA<br>(big-endian, swapped, or little-endian) |
| **Engineering Units** | Select the engineering units for the process variable. |
| **Decimals** | Enter the number of decimals required. |
| **Output Action** | Select an action to be performed by the controller, when the Spoofer output is read by a Modbus client or leave as None. |

## Data Logger – USB Drive

| | |
|---|---|
| **USB Data Logger Add-On Feature PDK9000-D1** | The Data Logger is an option in the ConsoliDator+. It can be purchased at the time the order is placed or it can be purchased and enabled at any time. The Data Logger feature is available on ConsoliDator+ units with a firmware version 2.2 or greater. |
| **Storage Device** | External USB flash drive Format: FAT32 (32 GB maximum) Recommended drive: SanDisk 32GB maximum. |
| **Number of Data Logs** | 8, maximum |
| **Number of Variables / Log** | 12, maximum |
| **Number of Log Variables** | 96 variables, maximum (8 logs x 12 variables / log) |
| **Number of Log Records** | The number of records depends on the flash drive size. Examples for 32 GB: 1) 4 logs with 8 variables each 1 min rate: ~160,000,000 records Log time: 60 years 2) 8 logs with 12 variables each 1 min rate: ~70,000,000 records Log time: 16 years |
| **Log File Type** | csv (comma separated value) |
| **Maximum Log File Size** | 100 MB A new file is automatically created when the log file exceeds 100 MB. |
| **Stop when Full** | This should be selected if the oldest logged data is more important than logging new data. If *Stop when Full* is not selected, the oldest block of data will be deleted to make room for new data. |
| **Remove Device** | Use the *Remove Device* button, in the *System – USB Drive*, to safely remove the USB drive and prevent data corruption. |
| **Alert! Message** | An Alert! message is displayed in place of the Menu key if the USB drive is removed. |
| **Start / Stop** | Selecting this feature enables the *Start / Stop* function key in the *View – Data Logs* menu. The *Start / Stop* function can be activated using the digital inputs, F1-F4 function keys in the *Setup – Screens* menu, Channel control schedule, Modbus inputs, and Modbus outputs. |
| **Log Enable Switch** | The *Enable Switch* setting can be used to control the log process using digital inputs, Modbus inputs, Channel control, alarms, or relay outputs. Logs are recorded only if the *Enable Switch* input is in the active (on) condition. |
| **Log Trigger** | The *Log Trigger* setting is used to log data on a specific event; a log can be triggered using digital inputs, Modbus inputs, Channel control, alarms, relays. |
| **Manual Log** | The user can record a log entry at any time by using the F4 key in the *View – Logs* menu or by assigning a function key in the *Setup – Screens* menu. |
| **Log Interval** | 00:00:01 to 23:59:59 hrs:min:sec |

## How to Enable Add-On Features

To enable the Data Logger features, see *Add-On Features* in the PD9000 instruction manual.

> ⚠ **IMPORTANT**
> - The USB Data Logger functions are available only if the Add-On feature has been enabled in the System – General Settings, see *Add-On Features* in the PD9000 instruction manual.

## Sample Data Log File

| Device Tag: | Multivariable Controller | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Log Name: | Tank Farm Log | | | | | | | | | |
| | | | | | | | | | | |
| Date | Time | T1. Tank 1 | T1. Units | T2. Tank 2 | T2. Units | T3. Tank 3 | T3. Units | T4. Tank 4 | T4. Units |
| 4/8/2021 | 7:41:07 | 109690 | Gallons | 99690 | Gallons | 89690 | Gallons | 79690 | Gallons |
| 4/8/2021 | 7:41:10 | 109691 | Gallons | 99691 | Gallons | 89691 | Gallons | 79691 | Gallons |
| 4/8/2021 | 7:41:11 | 109692 | Gallons | 99692 | Gallons | 89692 | Gallons | 79692 | Gallons |
| 4/8/2021 | 7:41:12 | 109693 | Gallons | 99693 | Gallons | 89693 | Gallons | 79693 | Gallons |
| 4/8/2021 | 7:41:13 | 109694 | Gallons | 99694 | Gallons | 89694 | Gallons | 79694 | Gallons |
| 4/8/2021 | 7:41:14 | 109695 | Gallons | 99695 | Gallons | 89695 | Gallons | 79695 | Gallons |
| 4/8/2021 | 7:41:15 | 109696 | Gallons | 99696 | Gallons | 89696 | Gallons | 79696 | Gallons |
| 4/8/2021 | 7:41:16 | 109697 | Gallons | 99697 | Gallons | 89697 | Gallons | 79697 | Gallons |
| 4/8/2021 | 7:41:17 | 109698 | Gallons | 99698 | Gallons | 89698 | Gallons | 79698 | Gallons |
| 4/8/2021 | 7:41:18 | 109699 | Gallons | 99699 | Gallons | 89699 | Gallons | 79699 | Gallons |
| 4/8/2021 | 7:41:19 | 109700 | Gallons | 99700 | Gallons | 89700 | Gallons | 79700 | Gallons |
| 4/8/2021 | 7:41:20 | 109701 | Gallons | 99701 | Gallons | 89701 | Gallons | 79701 | Gallons |
| 4/8/2021 | 7:41:21 | 109702 | Gallons | 99702 | Gallons | 89702 | Gallons | 79702 | Gallons |
| 4/8/2021 | 7:41:22 | 109703 | Gallons | 99703 | Gallons | 89703 | Gallons | 79703 | Gallons |
| 4/8/2021 | 7:41:23 | 109704 | Gallons | 99704 | Gallons | 89704 | Gallons | 79704 | Gallons |
| 4/8/2021 | 7:41:24 | 109705 | Gallons | 99705 | Gallons | 89705 | Gallons | 79705 | Gallons |
| 4/8/2021 | 7:41:25 | 109706 | Gallons | 99706 | Gallons | 89706 | Gallons | 79706 | Gallons |
| 4/8/2021 | 7:41:26 | 109707 | Gallons | 99707 | Gallons | 89707 | Gallons | 79707 | Gallons |
| 4/8/2021 | 7:41:27 | 109708 | Gallons | 99708 | Gallons | 89708 | Gallons | 79708 | Gallons |
| 4/8/2021 | 7:41:28 | 109709 | Gallons | 99709 | Gallons | 89709 | Gallons | 79709 | Gallons |
| 4/8/2021 | 7:41:29 | 109710 | Gallons | 99710 | Gallons | 89710 | Gallons | 79710 | Gallons |
| 4/8/2021 | 7:41:30 | 109711 | Gallons | 99711 | Gallons | 89711 | Gallons | 79711 | Gallons |
| 4/8/2021 | 7:41:31 | 109712 | Gallons | 99712 | Gallons | 89712 | Gallons | 79712 | Gallons |
| 4/8/2021 | 7:41:32 | 109713 | Gallons | 99713 | Gallons | 89713 | Gallons | 79713 | Gallons |
| 4/8/2021 | 7:41:33 | 109714 | Gallons | 99714 | Gallons | 89714 | Gallons | 79714 | Gallons |

## Ethernet Communications

| | |
|---|---|
| **Device** | Lantronix Xport-05 |
| **Protocol** | Modbus TCP/IP (Default)<br>Modbus UDP/IP<br>Modbus RTU Over TCP/IP<br>Modbus RTU Over UDP/IP |
| **Port Settings<br>(Do Not Change)** | Protocol: RS-232<br>Baud Rate: 9600<br>Data Bits: 8<br>Flow Control: None<br>Parity: None, Stop Bits: 1 |
| **Network Stack** | IPv4 |
| **Ethernet<br>Mac/Phy** | 10/100 Mbps |
| **Additional<br>Specifications** | Refer to the Lantronix webpage at<br>https://www.lantronix.com/products/xport. |
| **Ethernet Port<br>Configuration** | Use the *System* menu for basic Ethernet configuration or download the Lantronix Device Installer software to fully configure the Ethernet at port https://www.lantronix.com/products/xport.<br>See *Ethernet Port Setup* in the instruction manual. |

## ConsoliDator+ Software

| | |
|---|---|
| **System<br>Requirements** | Windows® 7, 10 |
| **Compatibility** | The software and firmware versions must be matched. |

### ⚠ CAUTION

- Do not write configuration files created using older versions of the firmware and software to controllers with Add-On features enabled (Ver. 2.1 & up). This can create undesirable results, especially with the function keys F1-F4.

| | |
|---|---|
| **Connection** | Standard USB A to Micro-USB type B (cable included). |
| **Configuration** | Configure inputs and outputs, channels, totals, timers, alarms, etc.<br>Configure bargraph and panel colors for normal operation, and colors for alarm indication. Save controller settings file on PC for programming other controllers or to restore settings. |

**Note:** The ConsoliDator+ software version must be used with the corresponding firmware version (e.g. Software v2.2 & Firmware v2.2)
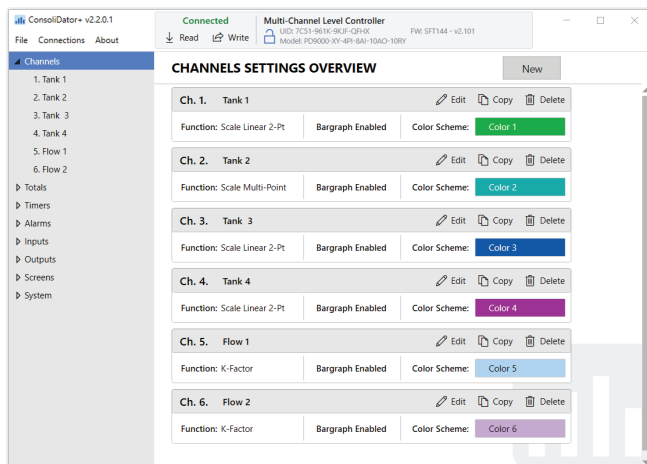


## Compliance Information

### Hazardous Area Location*

| | |
|---|---|
| **UL & C-UL<br>Listed** | For Hazardous Location Installations (US and Canada)<br>Class I Division 2 Groups A, B, C, and D<br>Class II Division 2 Groups F and G<br>Class III<br>Temperature Code: T4A |
| **UL File Number** | E516990 |
| **Front Panel** | UL Type 4X, NEMA 4X, IP66;<br>Panel gasket provided |
| **Low Voltage<br>Directive** | CSA-C22.2 No. 61010-1 and<br>CSA-C22.2 No. 61010-2-201<br>UL 61010-1 and UL 61010-2-201<br>Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use |

### ⚠ WARNINGS

- Explosion Hazard - Batteries must only be changed in an area known to be non-hazardous.
- Explosion Hazard - Do NOT Connect or Disconnect Equipment unless power has been switched off or the area is known to be non-hazardous.

*Hazardous Area Location approvals apply to all PD9000 (H) models. See ordering information.

### Ordinary Location*

| | |
|---|---|
| **UL & C-UL<br>Listed** | USA and Canada<br>UL 508 Industrial Control Equipment |
| **UL File Number** | E160849 |
| **Front Panel** | UL Type 4X, NEMA 4X, IP66;<br>Panel gasket provided |
| **Low Voltage<br>Directive** | CSA-C22.2 No. 61010-1 and<br>CSA-C22.2 No. 61010-2-201<br>UL 61010-1 and UL 61010-2-201<br>Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use |

*Ordinary Location approvals apply to all PD9000 (G) models. See ordering information.

# DIMENSIONS

## Overall Dimensions

**Units:** Inches (mm)
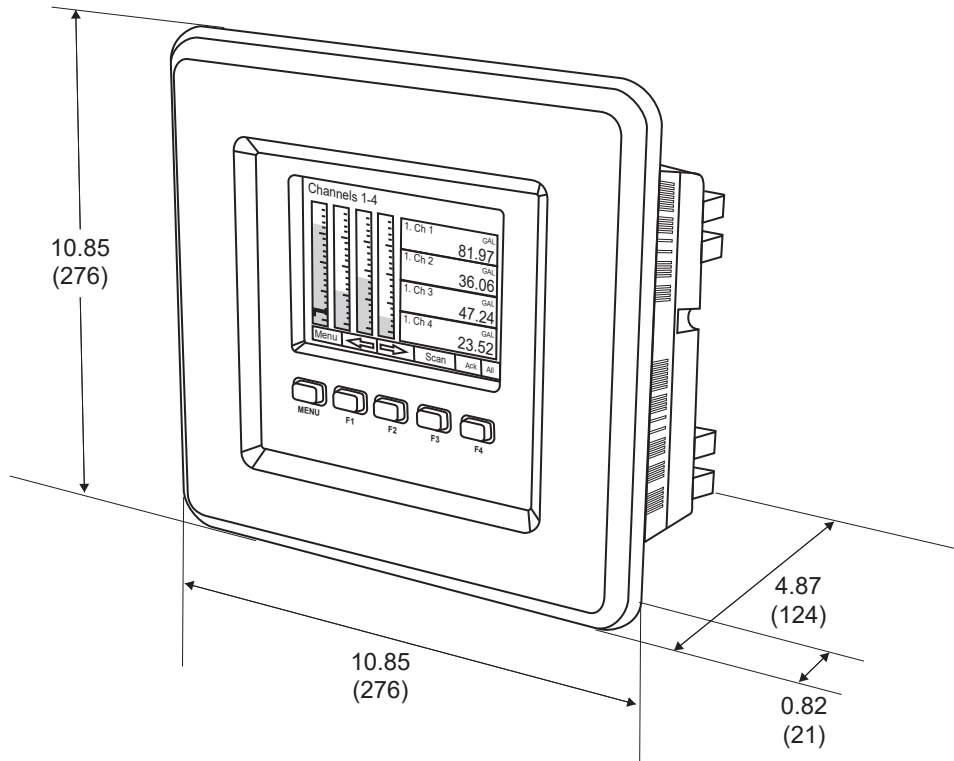


**Panel Mount Controller**

Download free 3-D CAD files of these instruments to simplify your drawings!

**predig.com/documentation-cad**

## Panel Mounting

- Prepare panel cutout per the dimensions provided
- Locate the panel mounting bracket and screws
- Inspect the controller to assure the gasket is securely in place
- Insert controller in the panel cutout, the latches on the top and bottom should hold it in place
- Insert the panel mounting bracket from the back of the panel, observe the orientation of the piece marked TOP
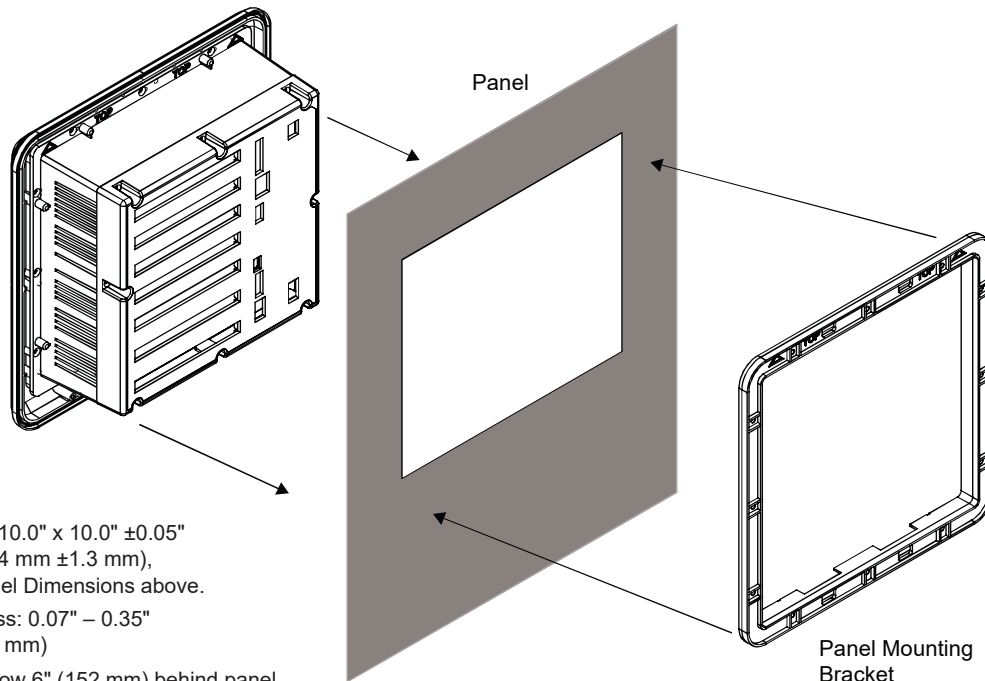- Install the 12 screws provided to a torque value of 0.8 Nm (7 lb-in)

**Units:** Inches (mm)
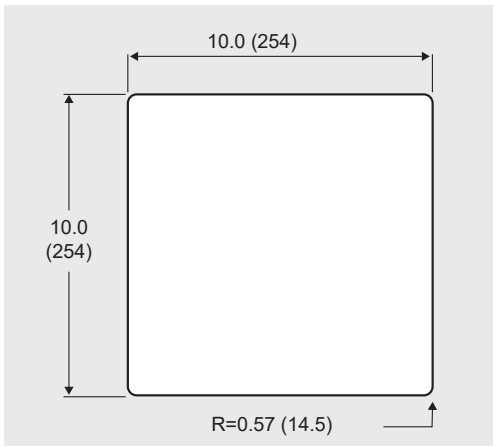


**Panel Cutout Dimensions**
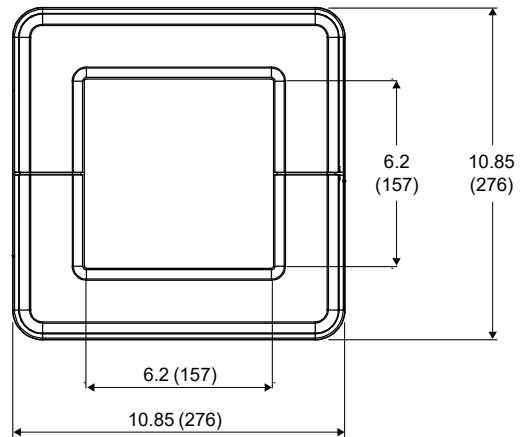


**Front Panel Dimensions**



**Notes:**

1. Panel cutout: 10.0" x 10.0" ±0.05" (254 mm x 254 mm ±1.3 mm), see Front Panel Dimensions above.

2. Panel thickness: 0.07" – 0.35" (1.8 mm – 8.9 mm)

3. Clearance: Allow 6" (152 mm) behind panel

**Panel Mount Installation**

# ACCESSORIES

## PD9000-ENC ConsoliDator+ NEMA 4X Plastic and NEMA 4 Steel Enclosures

The PD9000-ENC enclosures provide a convenient way to mount the PD9000 ConsoliDator+ to walls and other vertical structures. The enclosures are available in painted steel and plastic and come pre-cut with one cutout to mount the PD9000. The enclosures are available in various sizes, with the larger enclosures capable of housing other pieces of equipment, such as the PDA1024-01 power supply.

**Note:** The enclosure and ConsoliDator+ are ordered and packaged separately.

**Features**

- House One ConsoliDator+ PD9000
- Cutout for One ConsoliDator+ Provided
- ConsoliDator+ Mounts in Cover
- ConsoliDator+ Mounts Inside PDA3939 Clear Cover
- Sub-Panels Available
- PDA6909 Pipe Mounting Kit Available
- Light / Horn & Button Available
- UL Listed Plastic Enclosures
- UL Listed, CSA Certified Steel Enclosures

### NEMA 4X Plastic Enclosures



**PDA1909**
Dimensions: 11.8" x 11.8" x 5.9"
(300 mm x 300 mm x 150 mm)
(H x W x D)



**PDA1939**
Dimensions: 17.7" x 13.8" x 7.9"
(450 mm x 350 mm x 200 mm)
(H x W x D)
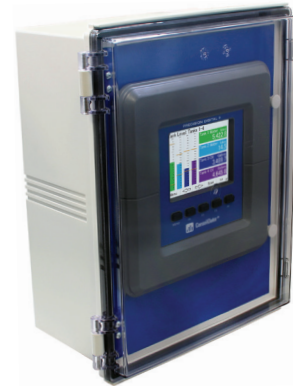


**PDA3939**
Dimensions: 17.7" x 13.8" x 7.9"
(450 mm x 350 mm x 200 mm)
(H x W x D)

### NEMA 4 Steel Enclosures



**PDA2909**
Dimensions: 12.0" x 12.0" x 6.0"
(305 mm x 305 mm x 152 mm)
(H x W x D)



**PDA2919**
Dimensions: 14.0" x 12.0" x 8.0"
(356 mm x 305 mm x 203 mm)
(H x W x D)



**PDA2929**
Dimensions: 16.0" x 14.0" x 10.0"
(406 mm x 355 mm x 254 mm)
(H x W x D)

Download the PD9000-ENC datasheet for more inforamtion.

Download free 3-D CAD files of these enclosures to simplify your drawings!
**predig.com/documentation-cad**

## PDA9000SH Sun Hood



**PDA9000SH Installed on PD9000 ConsoliDator+
mounted in PDA2909 enclosure**
(ConsoliDator+ and enclosure sold separately)

The PDA9000SH ConsoliDator+ Sun Hood provides shade for the ConsoliDator+ when it is mounted in direct sunlight. It is adhered to the ConsoliDator+ enclosure with industrial grade double-sided tape (provided).

## MOD-LH Light / Horn



**ConsoliDator+ Shown in a PDA2919 Enclosure with
MOD-LHRB1 Red Light / Horn and Button**
(ConsoliDator+ and enclosure sold separately. Assembly required.)

Precision Digital conveniently offers the MOD-LH which contains pre-drilled holes on a ConsoliDator+ enclosure for installation of the PDA-LH and PDA-BUTTON accessories.

The Light / Horn is available in three different light configurations and is designed to be mounted in any of the PD9000-ENC ConsoliDator+ enclosures.

The first option is a factory ordered Light / Horn with a color of either red, green, yellow, blue, or white. The second option is a Light / Horn the user determines the light color (red, green, yellow, blue or white) by connecting the appropriate wire. The third option is a Light / Horn with red, yellow, and green layers the user can turn on independently.

The light on the Light / Horn can be wired to flash (not available on PDA-LH5C) or stay steady on and the horn is rated at 85 dB.

The light and horn can be controlled independently of each other via separate relays on the ConsoliDator+; and since the controller's relays can be reset in a variety of ways, there are several ways the Light / Horn can operate. For instance, the horn can be programmed to silence at any time via the soft keys on the front of the ConsoliDator+, and reset the light automatically when the alarm clears.

When MOD-LH is ordered, the accompanying enclosure on the order comes with the holes pre-drilled for the Light / Horn and the Button, and the user performs the mounting and wiring. The ConsoliDator+ and enclosure are sold separately.

The PDA-LH Light / Horn and the PDA-BUTTON Button can also be ordered as separate items and the user performs all hole-drilling, mounting, and wiring as desired.

## ORDERING INFORMATION

| General Purpose Panel-Mount Models (UL 508 Certified for US & Canada) | | | | | |
|---|---|---|---|---|---|
| **90-264 VAC Models** | **24 VDC Models** | **Pulse Inputs** | **4-20 mA Inputs** | **4-20 mA Outputs** | **Relays** |
| PD9000-6G (Modbus Monitor) | PD9000-7G (Modbus Monitor) | 0 | 0 | 0 | 0 |
| PD9000-6G-4AI | PD9000-7G-4AI | 0 | 4 | 0 | 0 |
| PD9000-6G-4AI-10RY | PD9000-7G-4AI-10RY | 0 | 4 | 0 | 10 |
| PD9000-6G-4AI-5AO-10RY | PD9000-7G-4AI-5AO-10RY | 0 | 4 | 5 | 10 |
| PD9000-6G-4AI-20RY | PD9000-7G-4AI-20RY | 0 | 4 | 0 | 20 |
| PD9000-6G-4AI-5AO-20RY | PD9000-7G-4AI-5AO-20RY | 0 | 4 | 5 | 20 |
| PD9000-6G-8AI | PD9000-7G-8AI | 0 | 8 | 0 | 0 |
| PD9000-6G-8AI-10RY | PD9000-7G-8AI-10RY | 0 | 8 | 0 | 10 |
| PD9000-6G-8AI-10AO-10RY | PD9000-7G-8AI-10AO-10RY | 0 | 8 | 10 | 10 |
| PD9000-6G-8AI-20RY | PD9000-7G-8AI-20RY | 0 | 8 | 0 | 20 |
| PD9000-6G-8AI-25RY | PD9000-7G-8AI-25RY | 0 | 8 | 0 | 25 |
| PD9000-6G-12AI | PD9000-7G-12AI | 0 | 12 | 0 | 0 |
| PD9000-6G-12AI-20RY | PD9000-7G-12AI-20RY | 0 | 12 | 0 | 20 |
| PD9000-6G-12AI-10AO-10RY | PD9000-7G-12AI-10AO-10RY | 0 | 12 | 10 | 10 |
| PD9000-6G-16AI | PD9000-7G-16AI | 0 | 16 | 0 | 0 |
| PD9000-6G-16AI-15RY | PD9000-7G-16AI-15RY | 0 | 16 | 0 | 15 |
| PD9000-6G-16AI-15AO | PD9000-7G-16AI-15AO | 0 | 16 | 15 | 0 |
| PD9000-6G-20AI | PD9000-7G-20AI | 0 | 20 | 0 | 0 |
| PD9000-6G-20AI-10RY | PD9000-7G-20AI-10RY | 0 | 20 | 0 | 10 |
| PD9000-6G-20AI-10AO | PD9000-7G-20AI-10AO | 0 | 20 | 10 | 0 |
| PD9000-6G-24AI | PD9000-7G-24AI | 0 | 24 | 0 | 0 |
| PD9000-6G-24AI-5RY | PD9000-7G-24AI-5RY | 0 | 24 | 0 | 5 |
| PD9000-6G-24AI-5AO | PD9000-7G-24AI-5AO | 0 | 24 | 5 | 0 |
| PD9000-6G-28AI | PD9000-7G-28AI | 0 | 28 | 0 | 0 |
| PD9000-6G-4PI | PD9000-7G-4PI | 4 | 0 | 0 | 0 |
| PD9000-6G-4PI-5AO | PD9000-7G-4PI-5AO | 4 | 0 | 5 | 0 |
| PD9000-6G-4PI-5AO-10RY | PD9000-7G-4PI-5AO-10RY | 4 | 0 | 5 | 10 |
| PD9000-6G-4PI-4AI-5AO | PD9000-7G-4PI-4AI-5AO | 4 | 4 | 5 | 0 |
| PD9000-6G-4PI-4AI-5AO-10R | PD9000-7G-4PI-4AI-5AO-10R | 4 | 4 | 5 | 10 |
| PD9000-6G-4PI-8AI-10AO-10RY | PD9000-7G-4PI-8AI-10AO-10RY | 4 | 8 | 10 | 10 |
| PD9000-6G-8PI | PD9000-7G-8PI | 8 | 0 | 0 | 0 |
| PD9000-6G-8PI-10AO | PD9000-7G-8PI-10AO | 8 | 0 | 10 | 0 |
| PD9000-6G-8PI-10AO-10RY | PD9000-7G-8PI-10AO-10RY | 8 | 0 | 10 | 10 |
| PD9000-6G-8PI-8AI-10AO-5RY | PD9000-7G-8PI-8AI-10AO-5RY | 8 | 8 | 10 | 5 |

| Key: | **6** = 90-264 VAC <br> **7** = 24 VDC <br> **G** = General Purpose: Electrical Safety Certification <br> UL & C-UL  (E160849) <br> **H** = Hazardous Area Certification <br> UL & C-UL (E516990) | **AI** = Analog Input <br> **PI** = Pulse Input <br> **AO** = Analog Output <br> **RY** = Relay <br> **E** = Ethernet (Add "**-E**" at the end of the model number) <br> Example: PD9000-GP-4PI-8AI-10AO-10RY**-E** |
|---|---|---|

**Other models are available upon request.**

| Hazardous Area Panel-Mount Models (UL HazLoc Approved) | | | | | |
|---|---|---|---|---|---|
| **90-264 VAC Models** | **24 VDC Models** | **Pulse Inputs** | **4-20 mA Inputs** | **4-20 mA Outputs** | **Relays** |
| PD9000-6H (Modbus Monitor) | PD9000-7H (Modbus Monitor) | 0 | 0 | 0 | 0 |
| PD9000-6H-4AI | PD9000-7H-4AI | 0 | 4 | 0 | 0 |
| PD9000-6H-4AI-10RY | PD9000-7H-4AI-10RY | 0 | 4 | 0 | 10 |
| PD9000-6H-4AI-5AO-10RY | PD9000-7H-4AI-5AO-10RY | 0 | 4 | 5 | 10 |
| PD9000-6H-4AI-20RY | PD9000-7H-4AI-20RY | 0 | 4 | 0 | 20 |
| PD9000-6H-4AI-5AO-20RY | PD9000-7H-4AI-5AO-20RY | 0 | 4 | 5 | 20 |
| PD9000-6H-8AI | PD9000-7H-8AI | 0 | 8 | 0 | 0 |
| PD9000-6H-8AI-10RY | PD9000-7H-8AI-10RY | 0 | 8 | 0 | 10 |
| PD9000-6H-8AI-10AO-10RY | PD9000-7H-8AI-10AO-10RY | 0 | 8 | 10 | 10 |
| PD9000-6H-8AI-20RY | PD9000-7H-8AI-20RY | 0 | 8 | 0 | 20 |
| PD9000-6H-8AI-25RY | PD9000-7H-8AI-25RY | 0 | 8 | 0 | 25 |
| PD9000-6H-12AI | PD9000-7H-12AI | 0 | 12 | 0 | 0 |
| PD9000-6H-12AI-20RY | PD9000-7H-12AI-20RY | 0 | 12 | 0 | 20 |
| PD9000-6H-12AI-10AO-10RY | PD9000-7H-12AI-10AO-10RY | 0 | 12 | 10 | 10 |
| PD9000-6H-16AI | PD9000-7H-16AI | 0 | 16 | 0 | 0 |
| PD9000-6H-16AI-15RY | PD9000-7H-16AI-15RY | 0 | 16 | 0 | 15 |
| PD9000-6H-16AI-15AO | PD9000-7H-16AI-15AO | 0 | 16 | 15 | 0 |
| PD9000-6H-20AI | PD9000-7H-20AI | 0 | 20 | 0 | 0 |
| PD9000-6H-20AI-10RY | PD9000-7H-20AI-10RY | 0 | 20 | 0 | 10 |
| PD9000-6H-20AI-10AO | PD9000-7H-20AI-10AO | 0 | 20 | 10 | 0 |
| PD9000-6H-24AI | PD9000-7H-24AI | 0 | 24 | 0 | 0 |
| PD9000-6H-24AI-5RY | PD9000-7H-24AI-5RY | 0 | 24 | 0 | 5 |
| PD9000-6H-24AI-5AO | PD9000-7H-24AI-5AO | 0 | 24 | 5 | 0 |
| PD9000-6H-28AI | PD9000-7H-28AI | 0 | 28 | 0 | 0 |
| PD9000-6H-4PI | PD9000-7H-4PI | 4 | 0 | 0 | 0 |
| PD9000-6H-4PI-5AO | PD9000-7H-4PI-5AO | 4 | 0 | 5 | 0 |
| PD9000-6H-4PI-5AO-10RY | PD9000-7H-4PI-5AO-10RY | 4 | 0 | 5 | 10 |
| PD9000-6H-4PI-4AI-5AO | PD9000-7H-4PI-4AI-5AO | 4 | 4 | 5 | 0 |
| PD9000-6H-4PI-4AI-5AO-10R | PD9000-7H-4PI-4AI-5AO-10R | 4 | 4 | 5 | 10 |
| PD9000-6H-4PI-8AI-10AO-10RY | PD9000-7H-4PI-8AI-10AO-10RY | 4 | 8 | 10 | 10 |
| PD9000-6H-8PI | PD9000-7H-8PI | 8 | 0 | 0 | 0 |
| PD9000-6H-8PI-10AO | PD9000-7H-8PI-10AO | 8 | 0 | 10 | 0 |
| PD9000-6H-8PI-10AO-10RY | PD9000-7H-8PI-10AO-10RY | 8 | 0 | 10 | 10 |
| PD9000-6H-8PI-8AI-10AO-5RY | PD9000-7H-8PI-8AI-10AO-5RY | 8 | 8 | 10 | 5 |

| Key: | **6** = 90-264 VAC <br> **7** = 24 VDC <br> **G** = General Purpose: Electrical Safety Certification <br> UL & C-UL (E160849) <br> **H** = Hazardous Area Certification <br> UL & C-UL (E516990) | **AI** = Analog Input <br> **PI** = Pulse Input <br> **AO** = Analog Output <br> **RY** = Relay <br> **E** = Ethernet (Add "**-E**" at the end of the model number) <br> Example: PD9000-GP-4PI-8AI-10AO-10RY**-E** |
|---|---|---|

**Other models are available upon request.**

## Add-On Features

| Model | Description |
|-------|-------------|
| PDK9000-M1 | Add-On Feature: ConsoliDator+ Modbus Client/Snooper/Spoofer (Ver. 2.1 & Up) |
| PDK9000-D1 | Add-On Feature: ConsoliDator+ USB Data Logger (Ver. 2.2 & Up) |

**Note:** Add-On features that are ordered with the ConsoliDator+ will be activated at the factory. Add-On features can be ordered for existing ConsoliDator+ units with a firmware version of 2.2 or greater, at any time. The user will receive a key they can enter into the ConsoliDator+ to unlock the Add-On feature. See the PD9000 ConsoliDator+ manual for instructions on how to enable the *Add-On Features*.

### ⚠ CAUTION

- Do not write configuration files created with older versions of the firmware and software to controllers with Add On features enabled (Ver. 2.1 & up). This can create undesirable results, especially with the function keys F1-F4 and the digital inputs.

### ⚠ IMPORTANT

- The Auto-Tune PID Control and the Digital Switch functions are standard on versions 2.3 & up.

## Input / Output Cards

| Model | Description |
|-------|-------------|
| PDA9000-C4AI | (4) Isolated 4-20 mA Inputs Card for ConsoliDator+ |
| PDA9000-C4PI | (4) Pulse Inputs Card for ConsoliDator+ |
| PDA9000-C5AO | (5) Isolated 4-20 mA Outputs Card for ConsoliDator+ |
| PDA9000-C5RY | (5) Relays Card for ConsoliDator+ |

## Setup & Calibration Services

| Part Number | Description |
|-------------|-------------|
| PDN-CALCON+12 | ConsoliDator+ Calibration and Certificate for up to 12 inputs and outputs |
| PDN-CALCON+24 | ConsoliDator+ Calibration and Certificate for up to 24 inputs and outputs |
| PDN-CALCON+36 | ConsoliDator+ Calibration and Certificate for up to 36 inputs and outputs |
| PDN-CALCON+12-DATA | ConsoliDator+ Calibration and Certificate with data for up to 12 inputs and outputs |
| PDN-CALCON+24-DATA | ConsoliDator+ Calibration and Certificate with data for up to 24 inputs and outputs |
| PDN-CALCON+36-DATA | ConsoliDator+ Calibration and Certificate with data for up to 36 inputs and outputs |
| PDN-CSETCON+ | Custom Setup for ConsoliDator+ |

## Enclosures

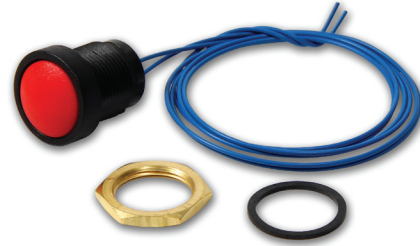| Model | Description |
|-------|-------------|
| PDA1909 | NEMA 4X Plastic Enclosure for One ConsoliDator+<br>Dimensions: 11.8" x 11.8" x 5.9" (300 mm x 300 mm x 150 mm) (H x W x D) |
| PDA1939 | NEMA 4X Plastic Enclosure for One ConsoliDator+<br>Dimensions: 17.7" x 13.8" x 7.9" (450 mm x 350 mm x 200 mm) (H x W x D) |
| PDA2909 | NEMA 4 Steel Enclosure for One ConsoliDator+<br>Dimensions: 12.0" x 12.0" x 6.0" (305 mm x 305 mm x 152 mm) (H x W x D) |
| PDA2919 | NEMA 4 Steel Enclosure for One ConsoliDator+<br>Dimensions: 14.0" x 12.0" x 8.0" (356 mm x 305 mm x 203 mm) (H x W x D) |
| PDA2929 | NEMA 4 Steel Enclosure for One ConsoliDator+<br>Dimensions: 16.0" x 14.0" x 10.0" (406 mm x 355 mm x 254 mm) (H x W x D) |
| PDA3939 | NEMA 4X Plastic Enclosure with Clear Cover for One ConsoliDator+<br>Dimensions: 17.7" x 13.8" x 7.9" (450 mm x 350 mm x 200 mm) (H x W x D) |

## Accessories



### Light / Horn Accessories

| Model | Description |
|---|---|
| MOD-LHRB1 | Red Light / Horn and Button with Holes Drilled in Enclosure[1] |
| MOD-LHGB1 | Green Light / Horn and Button with Holes Drilled in Enclosure[1] |
| MOD-LHYB1 | Yellow Light / Horn and Button with Holes Drilled in Enclosure[1] |
| MOD-LHBB1 | Blue Light / Horn and Button with Holes Drilled in Enclosure[1] |
| MOD-LHWB1 | White Light / Horn and Button with Holes Drilled in Enclosure[1] |
| MOD-LH5CB1 | Light / Horn with User Choice of Red, Green, Yellow, Blue or White Light, Button, and Holes Drilled in Enclosure[1] |
| MOD-LH3LCB1-RYG | Light / Horn with Red, Yellow, Green Light Layers, Button, and Holes Drilled in Enclosure[1] |
| PDA-LHR | Red Light / Horn |
| PDA-LHG | Green Light / Horn |
| PDA-LHY | Yellow Light / Horn |
| PDA-LHB | Blue Light / Horn |
| PDA-LHW | White Light / Horn |
| PDA-LH5C | Light / Horn with User Choice of Red, Green, Yellow, Blue or White Light |
| PDA-LH3LC-RYG | Light / Horn with Red, Yellow, Green Light Layers |

**Note:**

1. This MOD supplies the Light / Horn and Button. The enclosure comes pre-drilled with holes for Light / Horn and Button and the user performs the installation and wiring. ConsoliDator+ and enclosure are sold separately. The Light / Horn hole is located on the top left corner of the enclosure and the Button is located on the bottom left side of the enclosure.



### PDA-BUTTON Momentary Pushbutton

| Model | Description |
|---|---|
| PDA-BUTTON1B | NEMA 4X Black Button |
| PDA-BUTTON1G | NEMA 4X Green Button |
| PDA-BUTTON1R | NEMA 4X Red Button |



### PDA9000SH Sun Hood

| Model | Description |
|---|---|
| PDA9000SH | ConsliDator+ Sun Hood |



### PDA2360 Control Stations

| Model | Description |
|---|---|
| PDA2360-E | Emergency Stop Button |
| PDA2361-A | 1 Black Ack Button |
| PDA2361-Q | 1 Black Silence Button |



### PD9501 Multi-Function Calibrator

| Model | Description |
|---|---|
| PD9501 | Multi-Function Calibrator |

### Signal Splitter & Conditioner Accessories

| Model | Description |
|---|---|
| PD659-1MA-1MA | Signal Isolator with One 4-20 mA Input and One 4-20 mA Output |
| PD659-1MA-2MA | Signal Splitter with One 4-20 mA Input and Two 4-20 mA Outputs |
| PD659-1V-1MA | Signal Conditioner with One 0-10 VDC Input and One 4-20 mA Output |
| PD659-1MA-1V | Signal Conditioner with One 4-20 mA Input and One 0-10 VDC Output |



### PDA1024-01 Power Supply

| Model | Description |
|---|---|
| PDA1024-01 | 24 VDC Power Supply for DIN Rail |



### Split Core AC Current Transducer

| Model | Description |
|---|---|
| PDA6420 | Split Core AC Current Transducer. Input: 30/60/120 AAC; Output 4-20 mA |

## Disclaimer

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### Panel Mount Buzzer and Light

| Model | Description |
|---|---|
| PDA1000 | Panel Mount Buzzer and Light |



### Snubber 0.01μF/470Ω Flexible Leads

| Model | Description |
|---|---|
| PDX6901 | Snubber 0.01μF/470Ω Flexible Leads |



### Low-Cost Signal Generator

| Model | Description |
|---|---|
| PD9502 | 4-20 mA or 0-10 VDC, Low-Cost Signal Generator |

## Your Local Distributor is:

⚠ **WARNING**
Cancer and Reproductive Harm - **www.P65Warnings.ca.gov**