# CONSOLIDATOR® 4 & 8
## MULTI-CHANNEL CONTROLLERS

*Simplified information where and how you want it.*

## ConsoliDator 4 • Model PD940

ConsoliDator®

### ConsoliDator 4 Features
- Four 4-20 mA Inputs
- Four 4-20 mA Outputs

### ConsoliDator 8 Features
- Eight 4-20 mA Inputs
- Two 4-20 mA Outputs

### Common Features
- Four Pulse Inputs
- Four Digital Inputs
- Nine 10 A Relays
- Process/Rate & Total Display

PDC Wireless Ready

c UL us LISTED

## ConsoliDator 8 • Model PD981

### Advantages
- Easy to Read Backlit LCD
- Readable in Direct Sunlight
- Bargraphs & Numeric Screens
- Easy to Set up & Configure
- Set up with Front Panel Keys
- Intuitive Menus
- Detailed Individual Screens
- Input Simulation Feature
- RS-232 Modbus® RTU
- Direct Modbus PV Inputs
- Power from AC or DC
- Wall or Panel Mount
- 32-Point Linearization
- Sum & Difference Functions
- Free Programming & Data Logging Software
- A Good Match for Wireless

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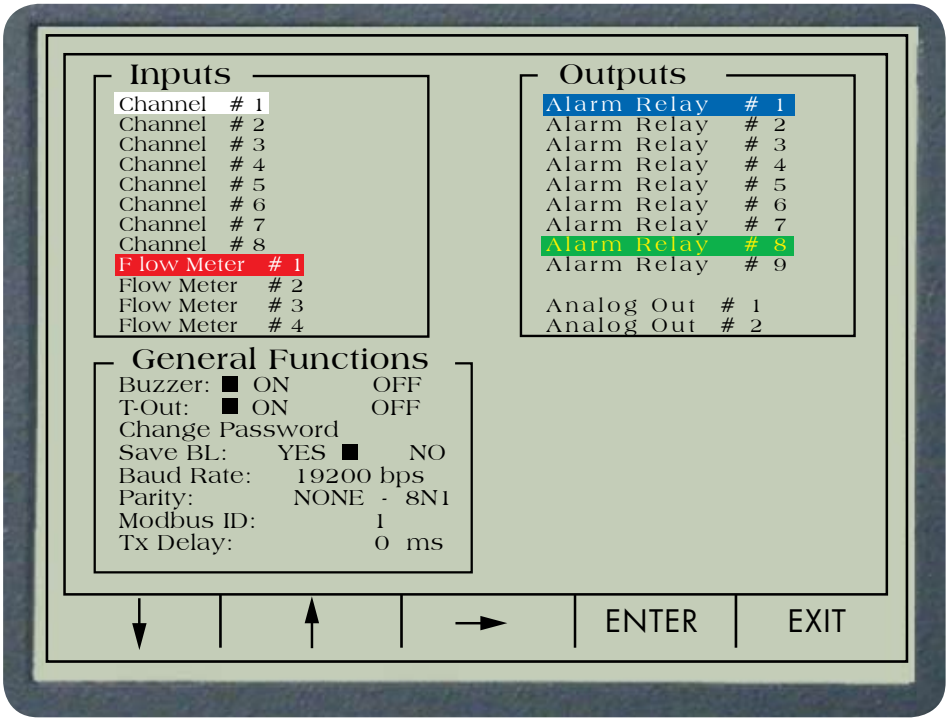
## CONFIGURATION

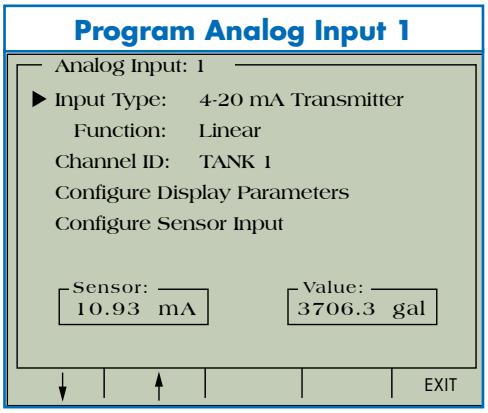
The number one thing our customers like about the ConsoliDator is that it is easy to configure and use. Any other similar display would require complicated programming and still not have a user interface that is this friendly. The full-word prompts and graphical layout are so intuitive, you may have little use for the manual. While configuring the inputs, outputs, and functions the “soft” keys appropriately and clearly relabel the action of the front panel buttons making menu navigation quick and simple. Each configuration screen presents a clear non-cryptic summary of settable parameters and their current values.

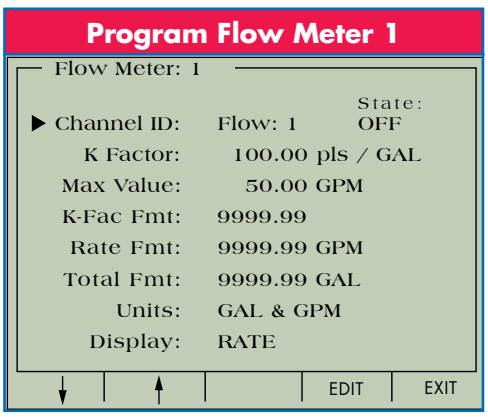
### MAIN SETUP MENU SCREEN



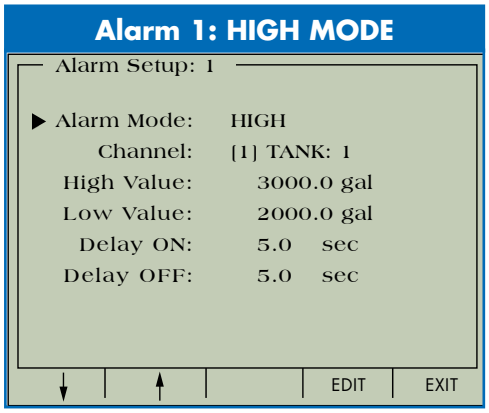

- No ladder logic programming
- PC-based software for configuration
- Front Panel Soft Keys
- Full-word prompts

## Inputs




## Alarms

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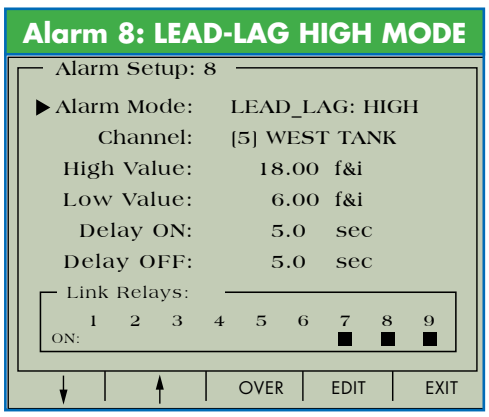


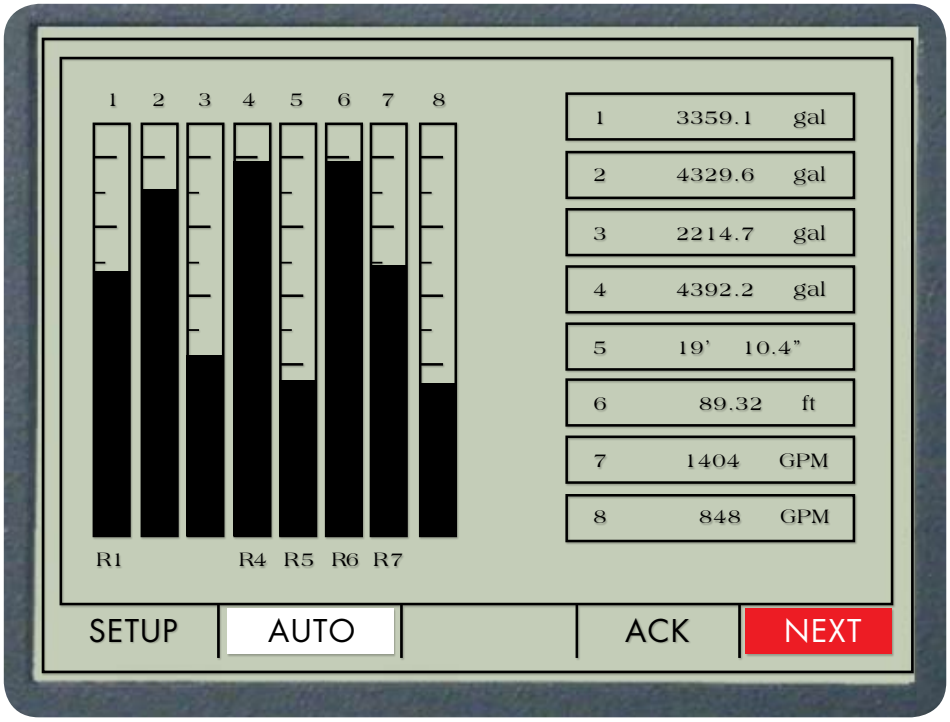

Input & alarm screens shown ½ scale

All screens shown with backlight on

## OPERATION

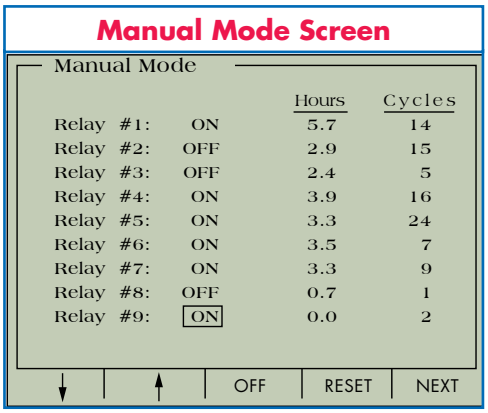
The ConsoliDator has an excellent graphical display and interface, presenting a quick view of the process while providing clearly and logically labeled operating keys.The main operation screen has a large bargraph display to quickly help spot trends or problems. It also indicates the precise numeric values for each PV input. Custom tag names and units of measure make the data more familiar, thus easier to read and understand. In addition to the three operation screens shown below, there are screens showing Digital Input States, Flow Meter Input Values, as well as a detailed numeric screens for each input. Cycle through all these screens with a push of a button. The ConsoliDator offers advanced operations without all the programming required by a PLC.

### MASTER INPUT SCREEN




- Bargraphs and Numeric Data
- Main Screen Shows all Inputs
- Individual Screens Show Detailed Data

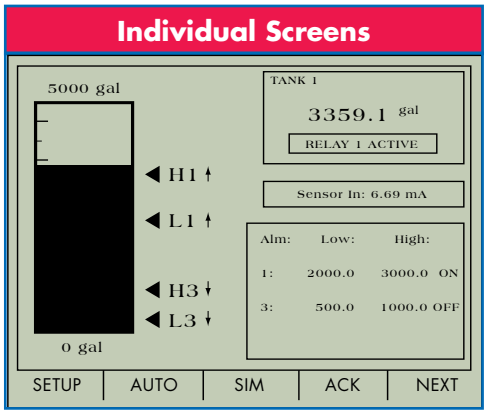
### Manual Mode Screen




## Key Points Shown

- **View relay status**
  - On & off status
  - Hours of operation
  - Operation cycles
- **Control relay operation**
  - Reset hours & cycles
  - Toggle status on & off

### Individual Screens




**Color shown for illustration only**

**Manual mode & individual screens shown ½ scale**

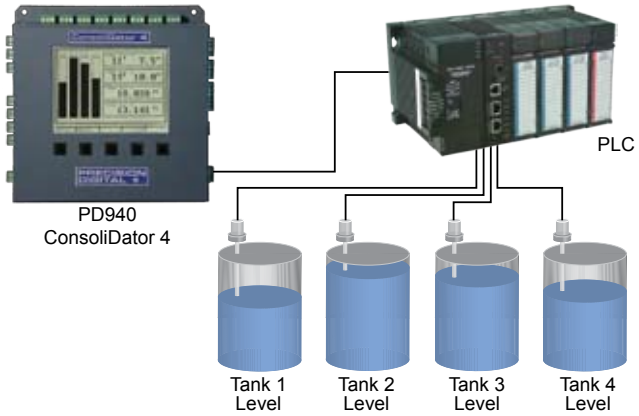
## Key Points Shown

- **Bargraph with set points**
- **Input identification**
- **Engineering units label (gal, ft, GPM)**
- **Alarm status**
  - Assigned alarms 1 & 3
  - Low & high set points
  - On & off status
- **Input simulation**
  - Test setup without applying an input

All screens shown with backlight on

## MODBUS SERIAL PV INPUTS

The ConsoliDator's inputs can be a combination of analog inputs and Modbus PV inputs which use the ConsoliDator's built-in RS-232 serial port. For the Modbus inputs, simply configure the input(s) to "Fixed" mode, then write the PV value to the appropriate Modbus register. The ConsoliDator must be the slave end of the communications. A pair of radio modems could make the communications wireless!



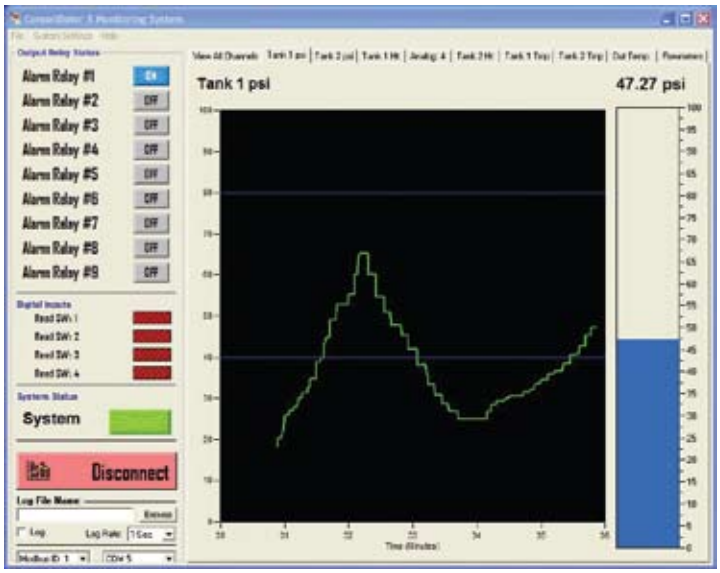

## CONSOLIDATOR SOFTWARE

Free PC based software is included with every ConsoliDator. With this software the user can monitor process variables, relay states, alarm states, and switch input states. The software can be used as a datalogger, or to configure the ConsoliDator.

### Main Display

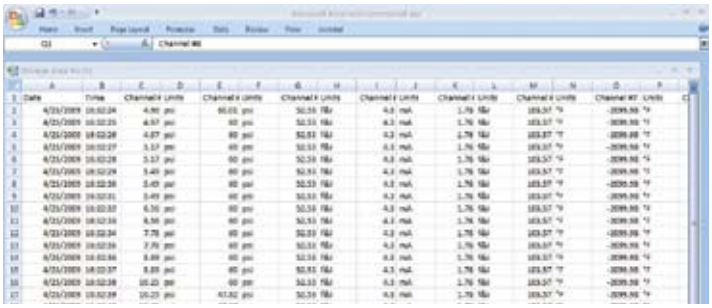
On the main display screen of the software, the bargraph display not only shows the current PV value, it also shows any set and reset alarm points (gray lines on bargraph). On this screen you can also monitor relay and switch input states.

### Recent History Viewer



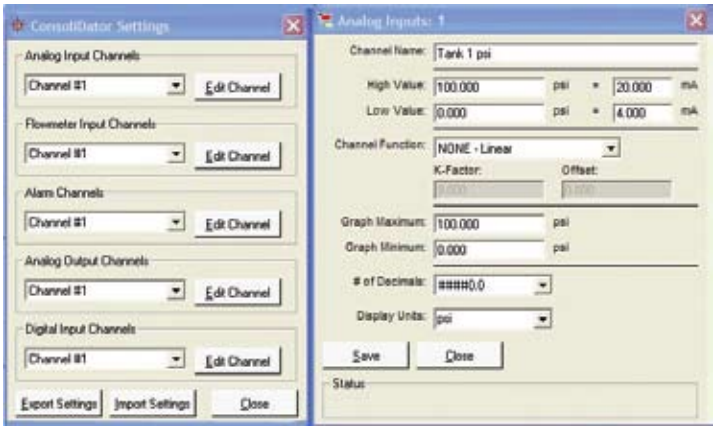

When an input channel is selected on the main display screen, a graph of recent history (last 5-10 minutes) can be viewed. A bargraph of its current value is also present.

### Data Logging



The datalogger allows you to log the PVs over time. A CSV file is created so that the data can be used by a spreadsheet program. Log rate intervals can be set from 1 second to 10 minutes.

### Configuration




The ConsoliDator can be remotely configured with this software by inputting the configuration data directly, or by copying a configuration from another ConsoliDator. Configurations can also be saved to your computer for future use.

# WIRELESS APPLICATIONS

## Remote Level Sensing

Here is an application where the level of 8 tanks are wirelessly monitored at practical and convenient locations without the need for expensive hard-wiring. The NEMA 4X enclosure contains wireless devices that convert the 4-20 mA level signals from the level transmitters into a digital signal that is wirelessly sent to a ConsoliDator (below).

## Remote Monitoring

These four Trident displays receive retransmitted signals wirelessly from a remote ConsoliDator. They can be mounted from hundreds to thousands of feet away from the ConsoliDator depending upon the level of signal interference. Repeaters can be used to extend the range of wireless operation.

## Local Display of Tank Level Data

This wireless ConsoliDator receives up to eight channels of process data and displays it in a practical location for easy monitoring. This same information can be wirelessly retransmitted via wireless serial Modbus to the office (at right), or up to (4) 4-20 mA retransmitted signals can be sent wirelessly to meters at a remote site (upper right) and displayed on any 4-20 mA input device (meter, recorder, datalogger, etc.).

## Remote Office Connection to ConsoliDator

Using the RS-232 Modbus serial output on the ConsoliDator, data can be analyzed and/or data logged remotely on a PC by utilizing a set of wireless radio modems and the free PC based software included with the ConsoliDator. The ConsoliDator can also be remotely configured using this software. Configuration files can be uploaded or downloaded to the PC and stored in the form of a spreadsheet.

***For more information on Wireless ConsoliDator, see our wireless data sheet at www.predig.com/consolidator***

## FIELD ENCLOSURES

*PDA2901*

- NEMA 4X
- Hinged clear cover
- Stainless steel quick-release latches
- Easy access to front panel buttons
- Power switch & fuse

*Shown with Optional Sub-Panel*

- Hinged front mounting panel
- Extra space for additional components
- PDP2901 panel with terminal strips
- Captive screws

*See LDS2901 data sheet for additional details*

### Disclaimer

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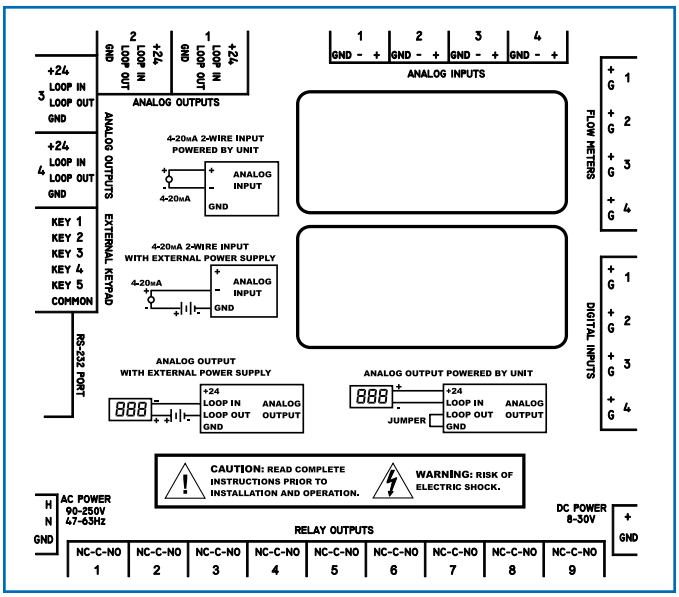
## CONNECTORS DIAGRAM




The connectors diagram is silk-screened on the back of all panel mount ConsoliDators (PD941 shown here).

## ORDERING INFORMATION

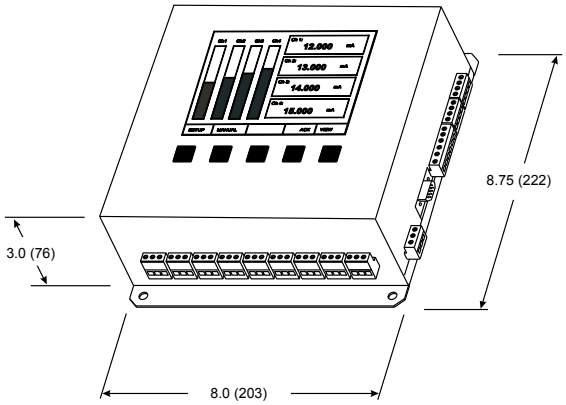
| ConsoliDator Controllers | | | | | |
|---|---|---|---|---|---|
| **Model** | **Mount** | **4-20 mA Inputs** | **Pulse Inputs** | **4-20 mA Outputs** | **Relays** |
| PD940-8K9-15 | Wall | 4 | 4 | 4 | 9 |
| PD941-8K9-15* | Panel | 4 | 4 | 4 | 9 |
| PD980-8K9-15 | Wall | 8 | 4 | 2 | 9 |
| PD981-8K9-15* | Panel | 8 | 4 | 2 | 9 |
| ConsoliDator Software for programming and data logging is included free of charge with your purchase of any ConsoliDator Multi-Channel Controller. | | | | | |

| Accessories | |
|---|---|
| **Model** | **Description** |
| PDA2901* | NEMA 4X Enclosure for PD941 or PD981 |
| PDA2904 | Large NEMA 4X Enclosure for PD941 or PD981 |
| PDP2901* | Sub-Panel with Terminal Strips for PDA2901 Enclosure |
| PDP2902* | Sub-Panel w/o Terminal Strips for PDA2901 Enclosure |
| PDP2904 | Sub-Panel with Terminal Strips for PDA2904 Enclosure |
| PDP2905 | Sub-Panel w/o Terminal Strips for PDA2904 Enclosure |
| PDA6901 | 2" Pipe Mounting Kit for PDA2901 Enclosure |
| PDA6902 | 2" Pipe Mounting Kit for PDA2904 Enclosure |
| PDA7485-I | RS-232 to RS-422/485 Isolated Converter |
| PDA7485-N | RS-232 to RS-422/485 Non-Isolated Converter |
| PDA8232-N | USB to RS-232 Converter |
| PDA8485-I | USB to RS-422/485 Isolated Converter |
| PDA8485-N | USB to RS-422/485 Non-Isolated Converter |
| PDA9232-01 | ConsoliDator Null-Modem Cable |
| PDA9232-02 | RS-232 Computer Cable |
| PDX6901 | Suppressor (snubber): 0.01 µF/470 Ω, 250 VAC |

* Quick Shipment Program product, typically shipped within 2 working days.

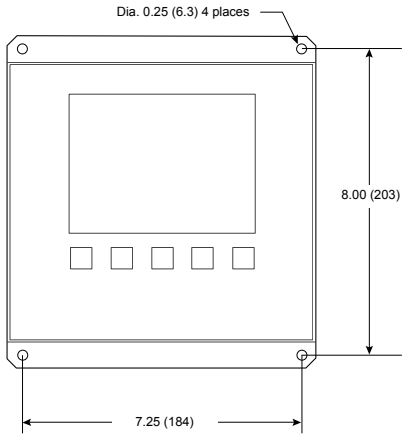
## Wall Mount

**Overall Dimensions**

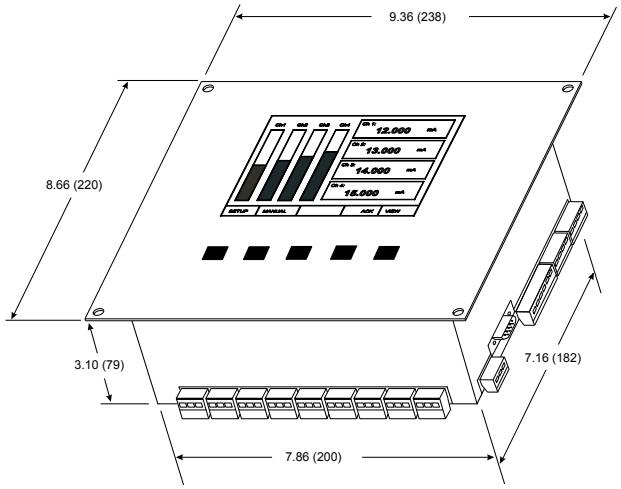


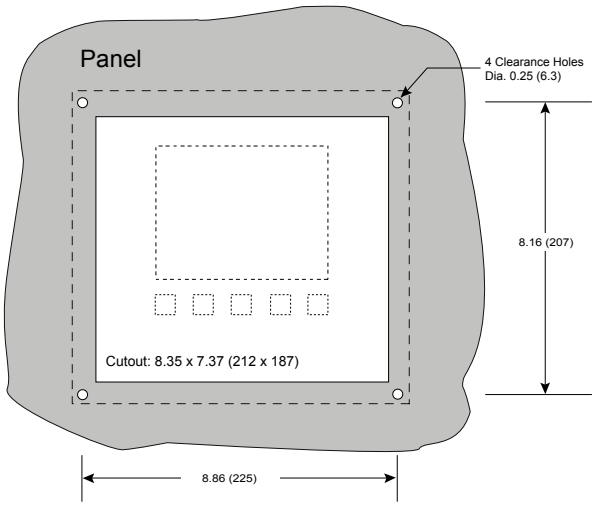

**Mounting Dimensions**

Units: Inch (mm)

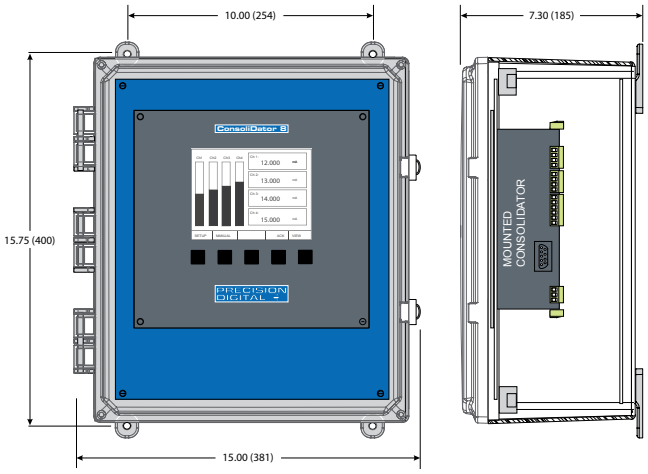



## Panel Mount

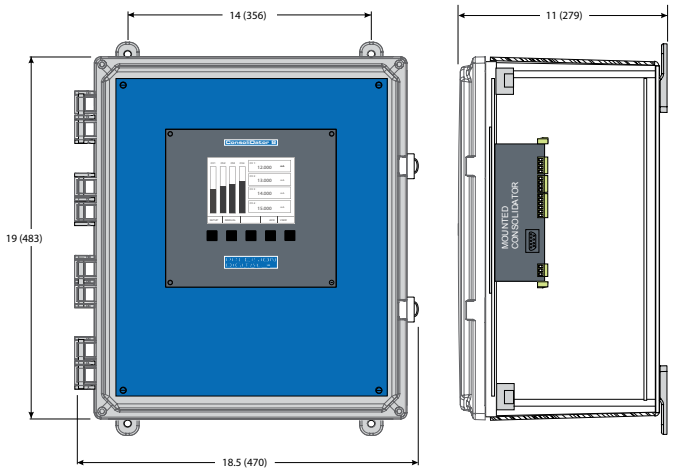



## Enclosures




**PDA2901**




**PDA2904**

*See LDS2901 data sheet for additional details*

# ConsoliDator® 4 & 8 Multi-Channel Controllers

## SPECIFICATIONS

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

### General

**Display:** Backlit LCD; 4.75″ x 3.50″ (121 mm x 89 mm)
**Display Update Rate:** 2 seconds
**Programming Method:** Front panel buttons, external buttons, PC with ConsoliDator software, or Modbus registers.
**Password:** Programmable, restricts modification of settings.
**Non-Volatile Memory:** Settings stored for a minimum of 10 years.
**Power:** 90-264 VAC, 47-63 Hz, 20 VA or 8-30 VDC, 15 W (field)
**Isolation:** AC: 1500 V; signal and output power grounds are connected to earth ground (chassis); DC: not isolated.
**Surge Protection:** Analog inputs have chokes & TVS
**Operating Temperature:** 0 to 50°C
**Relative Humidity:** 0 to 90% non-condensing
**Storage Temperature:** -40 to 60°C
**Connections:** Removable screw terminals and DB9 male
**Enclosure:** NEMA 1, powder-coated steel; color: warm gray
**Mounting:** Panel or wall mount models
**Weight:** 5.5 lb (2.5 kg)
**UL File Number:** E160849; 508 Industrial Control Equipment
**Warranty:** 1 year parts & labor
**Extended Warranty:** 1 or 2 years, refer to Price List for details.

### Screen Displays

**Numeric Display:** Six digits, ±999999 or 99' 11.9" (feet & inches)
**Bargraph:** Twenty divisions
**Engineering Units:** User selectable or definable units (e.g. ppm, gal, m, lb, g/h, psi, ozs, ft, mA, °C, °F, f&i, %)
**Master Input Screen:**
**Numeric Displays:** Eight; process value & engineering units
**Bargraphs:** Eight; process & channel number
**Individual Input Screen:**
**Numeric Displays:** Process and mA input value
**Bargraphs:** High and low set point markings
**Simulation Mode:** Test setup without applying an input

### Analog Inputs

**Number of Inputs:** Four (ConsoliDator 4); Eight (ConsoliDator 8)
**Input:** 4-20 mA; minimum span of 1 mA
**Accuracy:** ±0.03% FS ±1 count
**Input Function:** Linear, square root, programmable exponent, or fixed value
**Programmable Exponent:** From 0.50001 to 2.99999
**Multi-Point Linearization:** 2 to 32 points, accessible through ConsoliDator software or Modbus registers.
**Math Function:** Sum or difference of 2 or more channels
**Totalizer:** Calculates total based on rate and time base of seconds, minutes, hours, or days; stored in non-volatile memory every 5 minutes; supports linear inputs only.
**Totalizer Reset:** Via front panel buttons (password restricted)
**Input Impedance:** 130 Ω
**Transmitter Supply:** 24 VDC @ 20 mA per input; short circuit protection: current limited to 40 mA max per input

### Pulse Inputs

**Number of Inputs:** Four
**Input:** 100 mVp-p to 15 Vp-p; 1 Hz to 10 kHz
**Accuracy:** ±1 count for K-Factor >1
**K-Factor:** 0.00001 to 999999 pulses/unit
**Totalizer:** Calculates total based on rate, stored in non-volatile memory every 5 minutes.
**Totalizer Reset:** Via front panel buttons (password restricted)

### Digital Inputs

**Number:** Four
**Type:** Switch closure, open collector transistor, or logic level
**Input Impedance:** 240 Ω

### Modbus PV Inputs

**Number:** Up to 4 (ConsoliDator 4), and up to 8 (ConsoliDator 8)
**Input:** Modbus via RS-232 serial port

### Relays

**Number of Relays:** Nine
**Relay Type:** Form C (SPDT) with built in MOVs
**Rating:** 10 A @ 120/240 VAC resistive load;
1/3 HP @ 120/240 VAC inductive loads; 5 A @ 28 VDC
**Minimum Load:** 50 mA for AC, 10 mA @ 5 VDC
**Assignment:** Any relay may be assigned to any channel. Multiple relays may be assigned to one channel. All relays are programmed independently.
**Cycle Monitoring:** Controller tracks time relay has been active and number of times relay has cycled on/off.
**Time Delay:** Programmable on/off delays, 0 to 999.9 seconds
**Operation:** (see instruction manual for complete list) High or Low Alarm, Multi-Channel Alarm, Summary Alarm, Supervisory Alarm, and Lead-Lag Alternation (Sequence)
**Manual Override:** Override any relay (password restricted). Relays do not respond to input while in this mode.

### 4-20 mA Analog Output

**Number:** Four (ConsoliDator 4); Two (ConsoliDator 8)
Assign to any process or pulse input
**Accuracy:** ±0.05% FS ±0.01 mA
**Mode:** Linear or manual tuning PID
**Loop Resistance:** 10 to 600 Ω, powered by controller
**External Loop Power Supply:** 12 VDC min (300 Ω max); 32 VDC max (900 Ω max)
**Isolation:** 1500 V output-to-power line; 500 V output-to-input when powered by external supply.

### Modbus® Communications

**Compatibility:** EIA-232
**Protocol:** Modbus RTU
**Address:** Programmable between 1 and 247
**Baud Rate:** 1,200 to 38,400 bps
**Transmit Delay:** Programmable between 0 and 300 ms
**Data:** 8 bits (1 start bit, 1 stop bit)
**Parity:** Even, None with 1 stop bit, or None with 2 stop bits

**Your Local Distributor is:**

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