

CONSOLIDATOR® 4 & 8

MULTI-CHANNEL CONTROLLERS

ConsoliDator 4 • Model PD940



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



Advantages

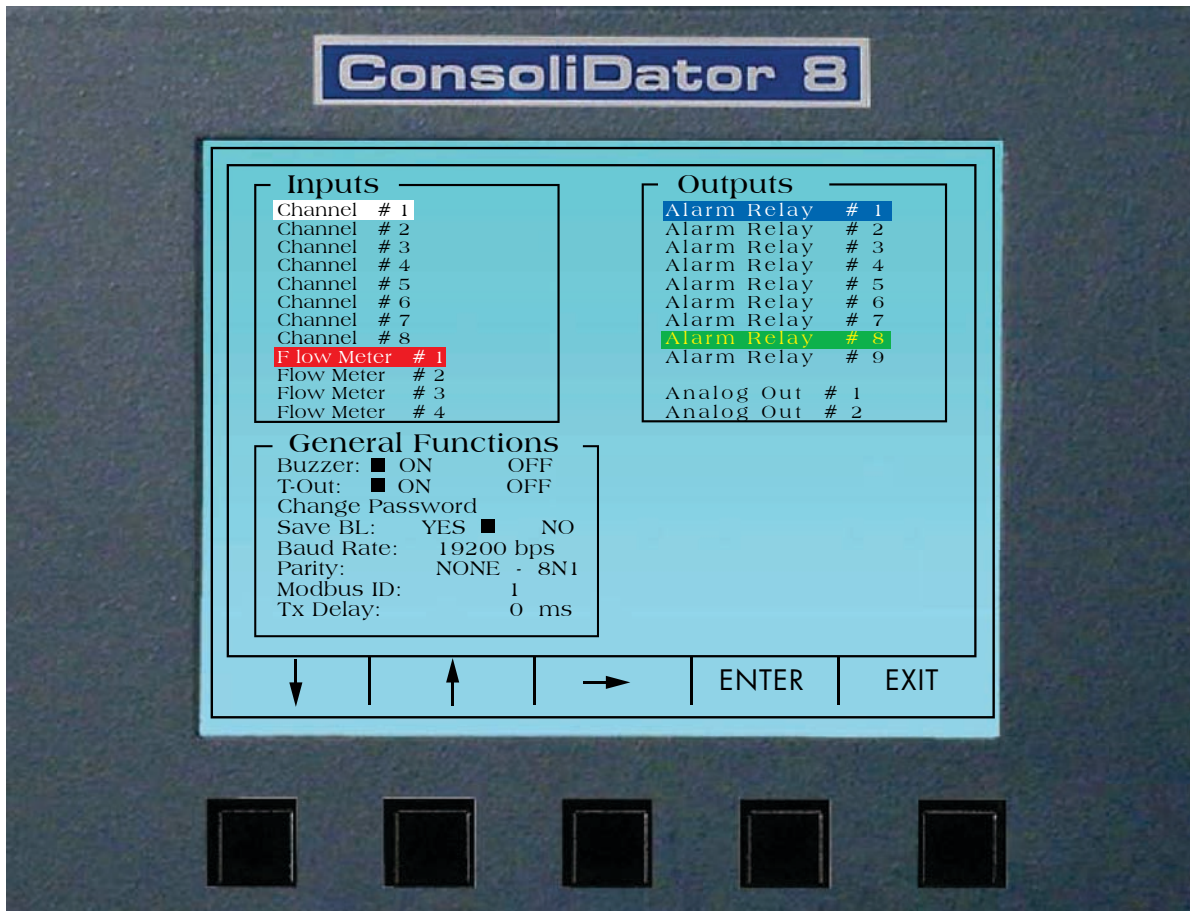
- Easy to Read Backlit LCD
- Readable in Direct Sunlight
- Bargraphs & Numeric Screens
- Easy to Set up & Program
- Set up with Front Panel Keys
- Intuitive Menus
- Detailed Individual Screens
- Input Simulation Feature
- RS-232 Modbus® RTU
- Power from AC or DC
- Wall or Panel Mount
- 32-Point Linearization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

ConsoliDator 8 • Model PD981



PROGRAMMING

MAIN SETUP MENU SCREEN



Inputs

Program Analog Input 1

Analog Input: 1

- ▶ Input Type: 4-20 mA Transmitter
- Function: Linear
- Channel ID: TANK 1
- Configure Display Parameters
- Configure Sensor Input

Sensor: 10.93 mA Value: 3706.3 gal

Navigation: ↓ ↑ → EXIT

Program Flow Meter 1

Flow Meter: 1

- ▶ Channel ID: Flow: 1 State: OFF
- K Factor: 100.00 pls / GAL
- Max Value: 50.00 GPM
- K-Fac Fmt: 9999.99
- Rate Fmt: 9999.99 GPM
- Total Fmt: 9999.99 GAL
- Units: GAL & GPM
- Display: RATE

Navigation: ↓ ↑ → EDIT EXIT

Alarms

Alarm 1: HIGH MODE

Alarm Setup: 1

- ▶ Alarm Mode: HIGH
- Channel: [1] TANK: 1
- High Value: 3000.0 gal
- Low Value: 2000.0 gal
- Delay ON: 5.0 sec
- Delay OFF: 5.0 sec

Navigation: ↓ ↑ → EDIT EXIT

Color shown for illustration only

Alarm 8: LEAD-LAG HIGH MODE

Alarm Setup: 8

- ▶ Alarm Mode: LEAD_LAG: HIGH
- Channel: [5] WEST TANK
- High Value: 18.00 f&i
- Low Value: 6.00 f&i
- Delay ON: 5.0 sec
- Delay OFF: 5.0 sec

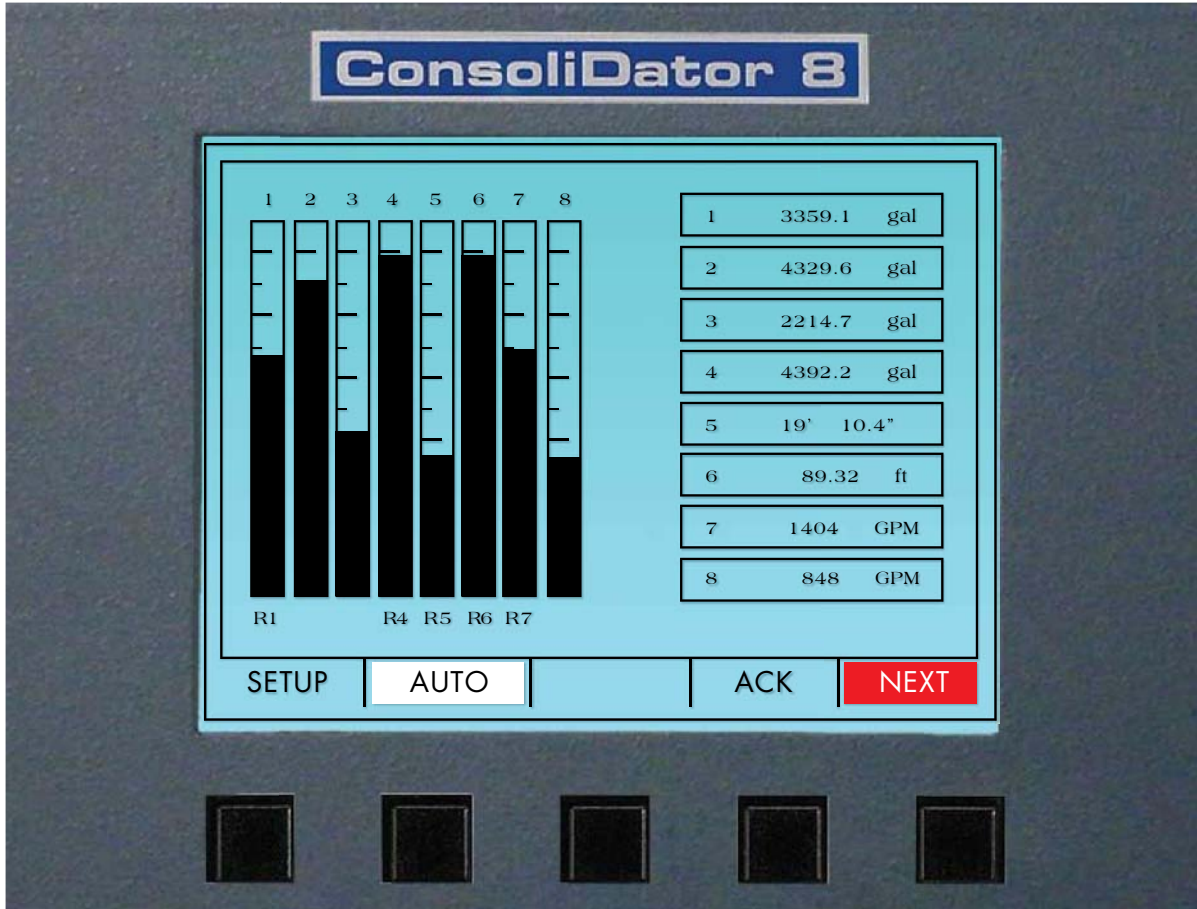
Link Relays: ON: 1 2 3 4 5 6 7 8 9

Navigation: ↓ ↑ → OVER EDIT EXIT

Input & alarm screens shown ½ scale

OPERATION

MASTER INPUT SCREEN



Manual Mode Screen

Manual Mode			
		Hours	Cycles
Relay #1:	ON	5.7	14
Relay #2:	OFF	2.9	15
Relay #3:	OFF	2.4	5
Relay #4:	ON	3.9	16
Relay #5:	ON	3.3	24
Relay #6:	ON	3.5	7
Relay #7:	ON	3.3	9
Relay #8:	OFF	0.7	1
Relay #9:	<input checked="" type="checkbox"/> ON	0.0	2

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

<p>5000 gal</p> <p>0 gal</p>	TANK 1									
	3359.1 gal									
	<input type="button" value="RELAY 1 ACTIVE"/>									
	Sensor In: 6.69 mA									
<p>◀ H1 ↑</p> <p>◀ L1 ↑</p> <p>◀ H3 ↓</p> <p>◀ L3 ↓</p>	<table border="1"> <thead> <tr> <th>Alm:</th> <th>Low:</th> <th>High:</th> </tr> </thead> <tbody> <tr> <td>1:</td> <td>2000.0</td> <td>3000.0 ON</td> </tr> <tr> <td>3:</td> <td>500.0</td> <td>1000.0 OFF</td> </tr> </tbody> </table>	Alm:	Low:	High:	1:	2000.0	3000.0 ON	3:	500.0	1000.0 OFF
Alm:	Low:	High:								
1:	2000.0	3000.0 ON								
3:	500.0	1000.0 OFF								
<input type="button" value="SETUP"/> <input type="button" value="AUTO"/> <input type="button" value="SIM"/> <input type="button" value="ACK"/> <input type="button" value="NEXT"/>										

Color shown for illustration only

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

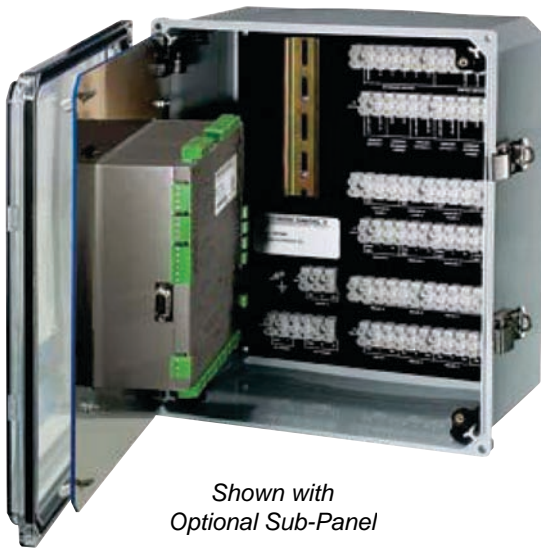
Manual mode & individual screens shown 1/2 scale

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

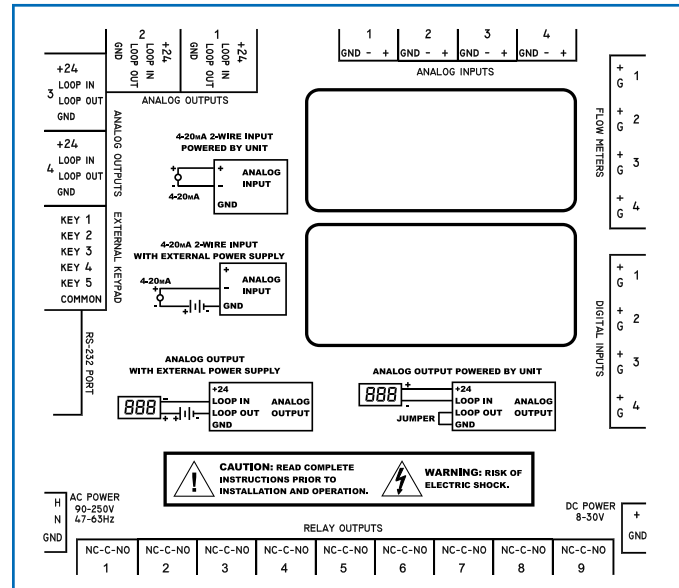
- Hinged front mounting panel
- Extra space for additional components
- PDP2901 panel with terminal strips
- Captive screws

See LDS2901 data sheet for additional details

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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

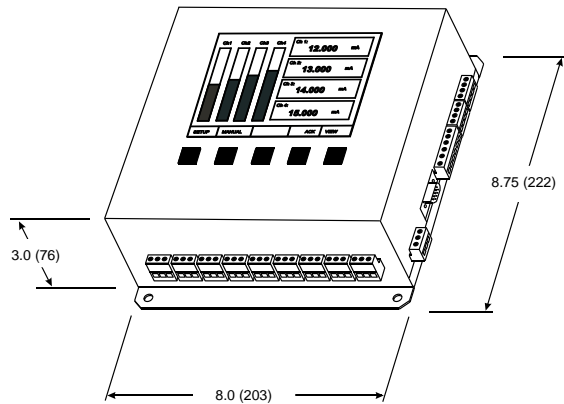
ConsoliDator Software for programming and data logging is included free of charge with your purchase of any ConsoliDator Controller.

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.

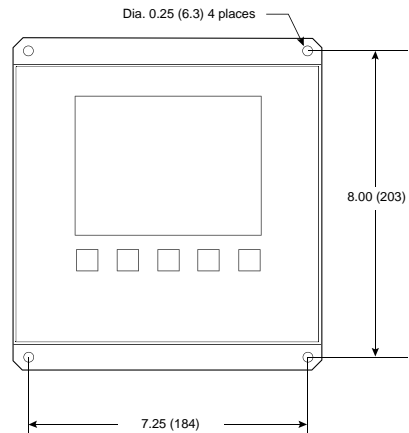
Wall Mount

Overall Dimensions

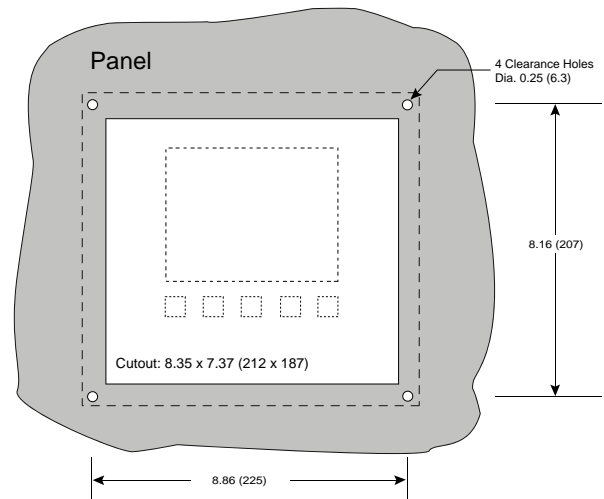
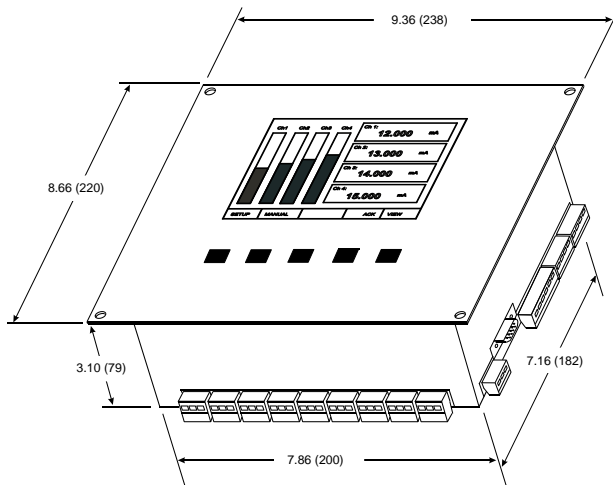


Mounting Dimensions

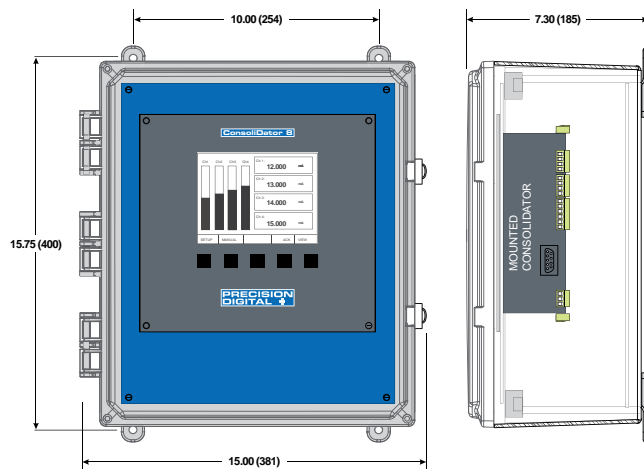
Units: Inch (mm)



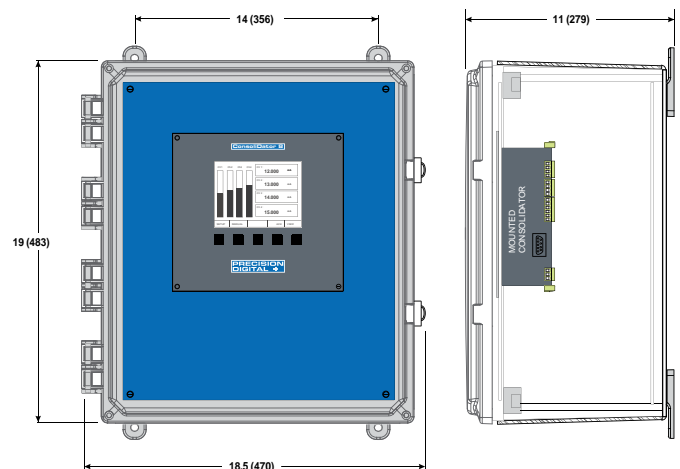
Panel Mount



Enclosures



PDA2901



PDA2904

See LDS2901 data sheet for additional details

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

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: Assign to analog or pulse channel for on/off relay control; 100% adjustable deadband.
Multi-Channel Alarm: Assign two or more analog channels to indicate common high or low condition.
Summary Alarm: Indicates when any relay enters alarm state.
Supervisory Alarm: Indicates CPU failure or analog input loss.
Lead-Lag Alternation (Sequence): Link multiple relays for sequential operation. Programmable override set points to turn on additional relays.
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

ConsoliDator® Software

System Requirements: Windows® 95/98/ME/NT4/2000/XP
Communications: RS-232 using null-modem serial cable
Compatibility: ConsoliDator 4 & ConsoliDator 8, two versions
Configuration: Configure inputs and outputs. Save settings to file for programming other controllers or restoring settings.
Logging Interval: 1 second to 10 minutes
Data Logging Report: Log to comma separated value (.csv) file compatible with spreadsheet applications.