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**

c **UL** us
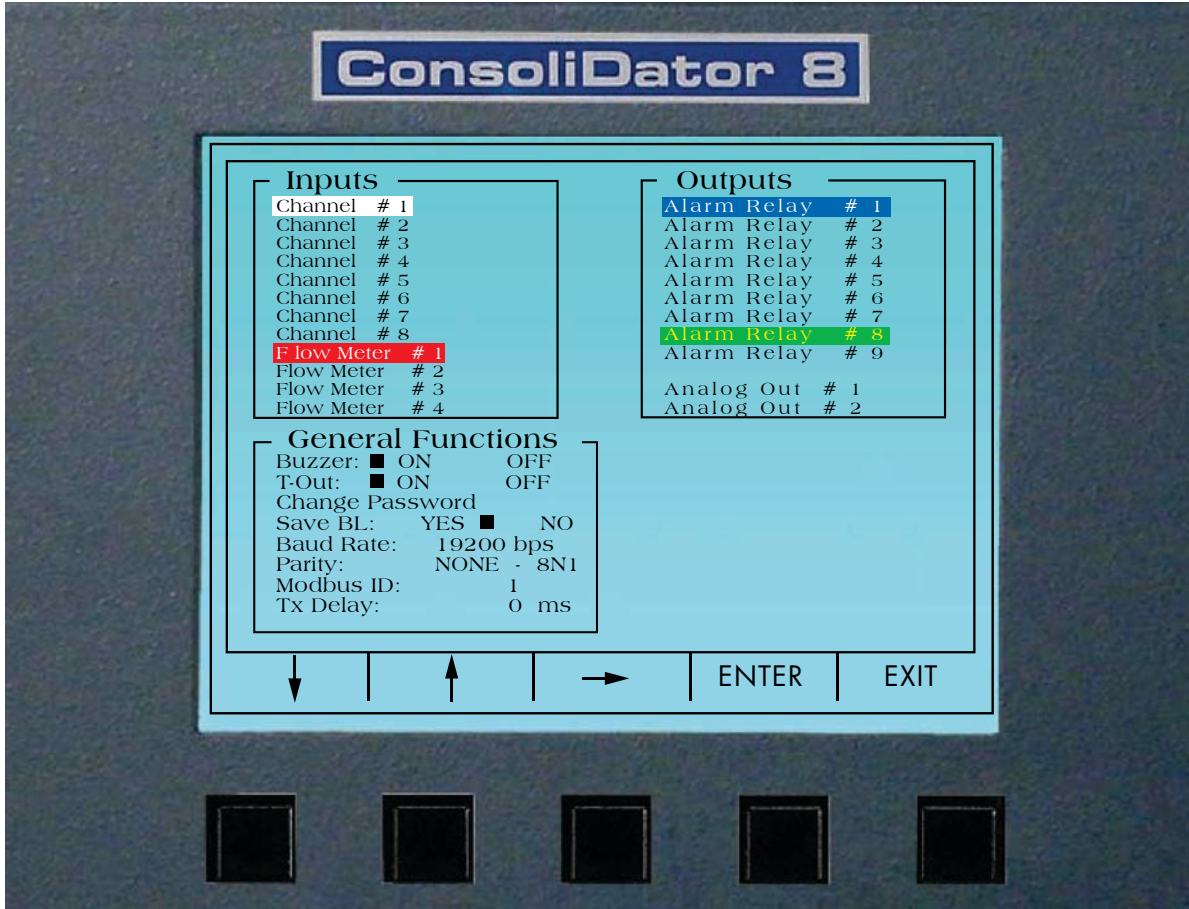LISTED

ConsoliDator 8 • Model PD981

Advantages
- **Easy to Read Backlit LCD**
- **Readable in Direct Sunlight**
- **Bargraphs & Numeric Screens**
- **Easy to Set up & 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**

PRECISION DIGITAL CORPORATION

PRECISION DIGITAL ÷

www.predig.com

PROGRAMMING

ConsoliDator 8

Inputs		Outputs	
Channel # 1		Alarm Relay # 1	
Channel # 2		Alarm Relay # 2	
Channel # 3		Alarm Relay # 3	
Channel # 4		Alarm Relay # 4	
Channel # 5		Alarm Relay # 5	
Channel # 6		Alarm Relay # 6	
Channel # 7		Alarm Relay # 7	
Channel # 8		Alarm Relay # 8	
F low Meter # 1		Alarm Relay # 9	
Flow Meter # 2			
Flow Meter # 3		Analog Out # 1	
Flow Meter # 4		Analog Out # 2	

General Functions
Buzzer: ■ ON   OFF
T-Out: ■ ON   OFF
Change Password
Save BL: YES ■   NO
Baud Rate: 19200 bps
Parity: NONE - 8N1
Modbus ID: 1
Tx Delay: 0 ms

↓   ↑   →   ENTER   EXIT

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: Value:
10.93 mA   3706.3 gal

↓   ↑   EXIT

Program Flow Meter 1

— Flow Meter: 1 —
                                        State:
▶ Channel ID: Flow: 1   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

↓   ↑   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

↓   ↑   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
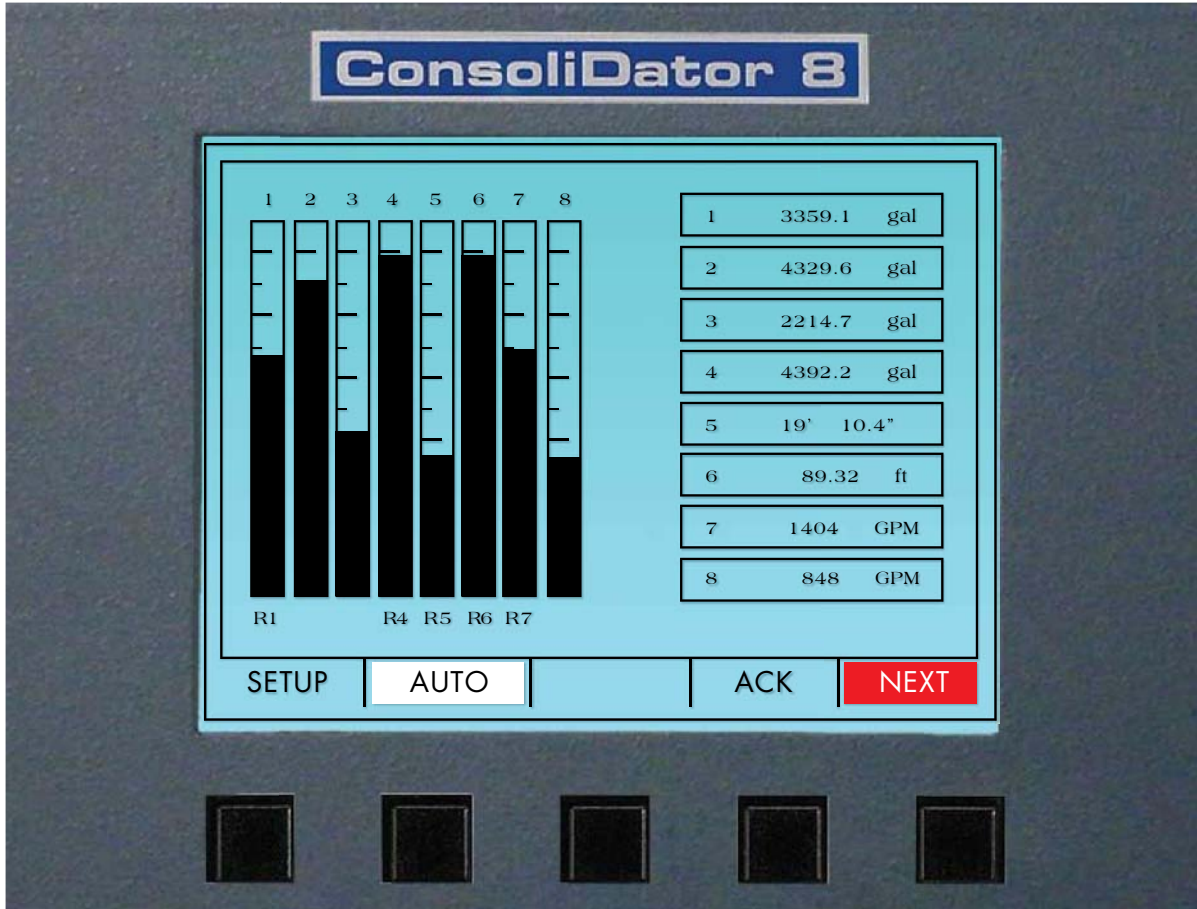   Delay OFF: 5.0   sec

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

↓   ↑   OVER   EDIT   EXIT

Input & alarm screens shown ½ scale

OPERATION

ConsoliDator 8

1	3359.1	gal
2	4329.6	gal
3	2214.7	gal
4	4392.2	gal
5	19' 10.4"	
6	89.32	ft
7	1404	GPM
8	848	GPM

R1   R4 R5 R6 R7

SETUP   AUTO   ACK   NEXT

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:	ON	0.0	2

↓   ↑   ON   RESET   NEXT

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

5000 gal

TANK 1

3359.1 gal

RELAY 1 ACTIVE

◀ H1 ↑

◀ L1 ↑

Sensor In: 6.69 mA

Alm:	Low:	High:
1:	2000.0	3000.0 ON
3:	500.0	1000.0 OFF

◀ H3 ↓

◀ L3 ↓

0 gal

SETUP   AUTO   SIM   ACK   NEXT

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
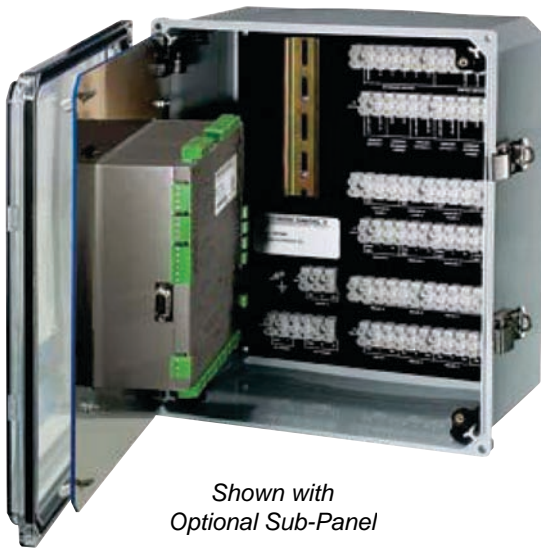- **Input simulation**
  - Test setup without applying an input

ConsoliDator® 4 & 8 Multi-Channel Controllers

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

The information contained in this document is subject to change without notice. Precision Digital Corporation makes no representations or warranties with respect to the contents hereof, and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.

©2008 Precision Digital Corporation. All rights reserved.

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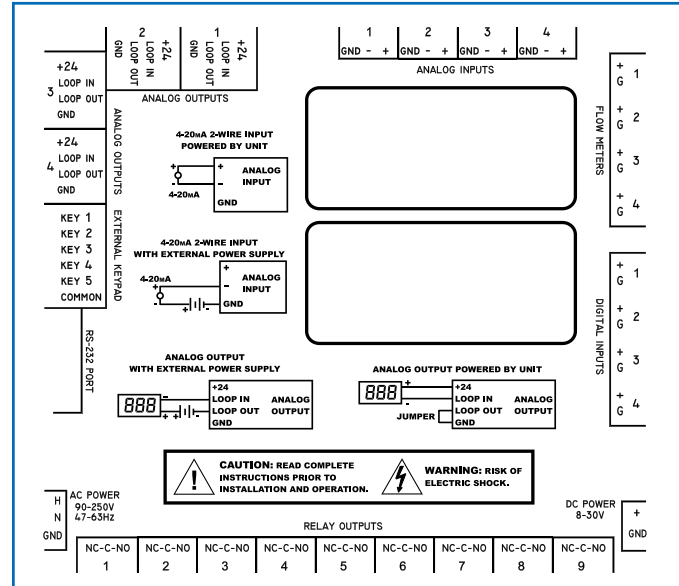
The connectors diagram is silk-screened on the back of all panel mount ConsoliDators (PD941 shown here).

ORDERING INFORMATION

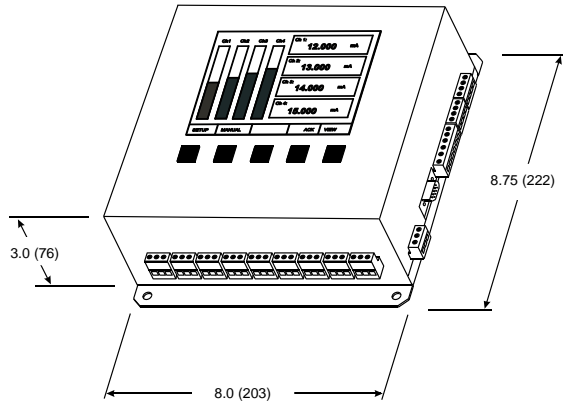| ConsoliDator Controllers					
Model	Mount	4-20 mA Inputs	Pulse Inputs	4-20 mA Outputs	Relays
PD940-8K9-15	Wall	4	4	4	9
PD941-8K9-15*	Panel	4	4	4	9
PD980-8K9-15	Wall	8	4	2	9
PD981-8K9-15*	Panel	8	4	2	9

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

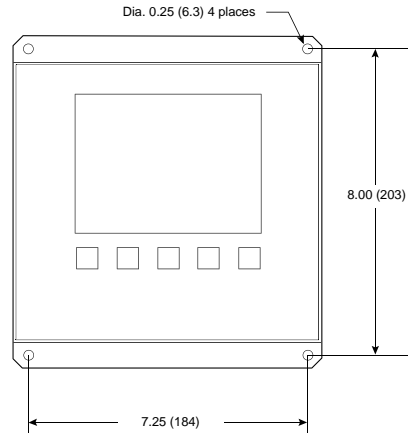* Quick Shipment Program product, typically shipped within 2 working days.
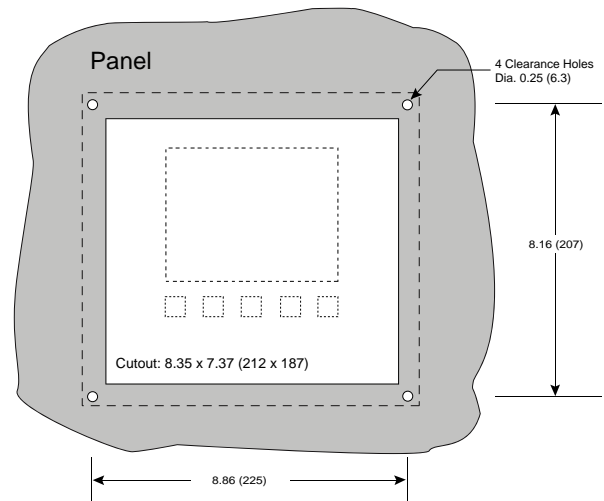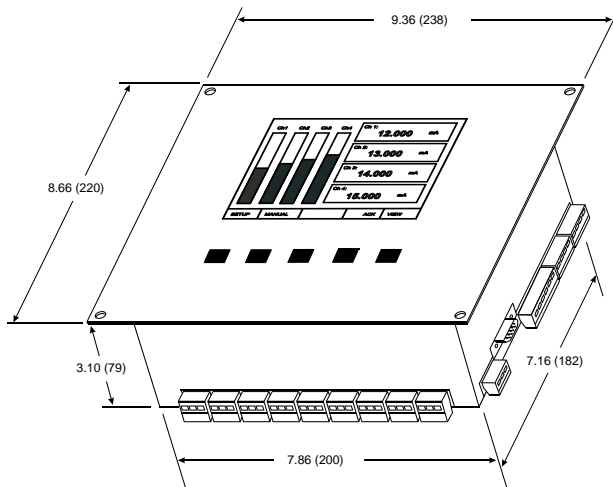
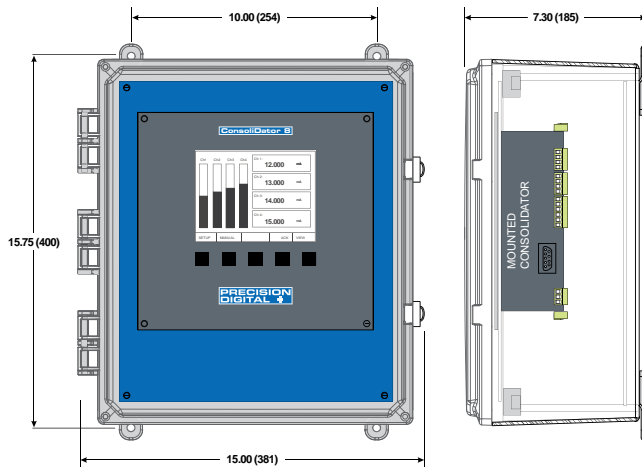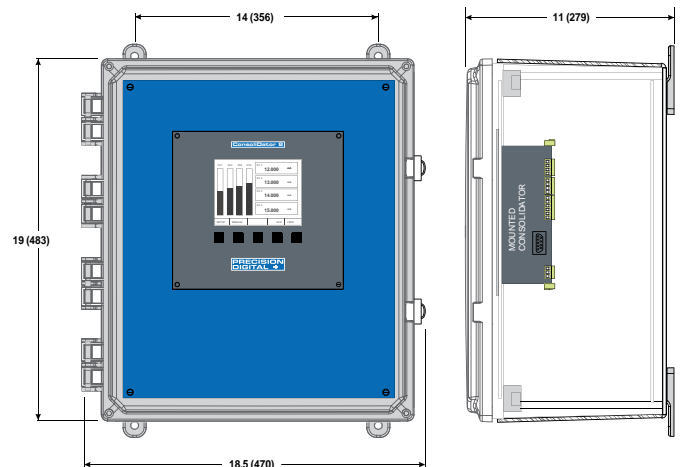## Wall Mount

Overall Dimensions

Mounting Dimensions

Units: Inch (mm)

8.75 (222)

3.0 (76)

8.0 (203)

Dia. 0.25 (6.3) 4 places

8.00 (203)

7.25 (184)

Panel Mount

9.36 (238)

8.66 (220)

3.10 (79)

7.16 (182)

7.86 (200)

Panel

4 Clearance Holes
Dia. 0.25 (6.3)

8.16 (207)

Cutout: 8.35 x 7.37 (212 x 187)

8.86 (225)

Enclosures

10.00 (254)

7.30 (185)

15.75 (400)

15.00 (381)

MOUNTED CONSOLIDATOR

PDA2901

14 (356)

11 (279)

19 (483)

18.5 (470)

MOUNTED CONSOLIDATOR

PDA2904

See LDS2901 data sheet for additional details

5

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.