

CONSOLIDATOR® 4 & 8

MULTI-CHANNEL CONTROLLERS

Simplified information where and how you want it.

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


PDC
Wireless Ready

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

ConsoliDator 8 • Model PD981



**PRECISION
DIGITAL**

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

Inputs

Channel # 1
Channel # 2
Channel # 3
Channel # 4
Channel # 5
Channel # 6
Channel # 7
Channel # 8
Flow Meter # 1
Flow Meter # 2
Flow Meter # 3
Flow Meter # 4

Outputs

Alarm Relay # 1
Alarm Relay # 2
Alarm Relay # 3
Alarm Relay # 4
Alarm Relay # 5
Alarm Relay # 6
Alarm Relay # 7
Alarm Relay # 8
Alarm Relay # 9
Analog Out # 1
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

Navigation buttons: Down, Up, Right, ENTER, EXIT

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

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 buttons: Down, Up, Right, 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 buttons: Down, Up, Right, 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 buttons: Down, Up, Right, 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

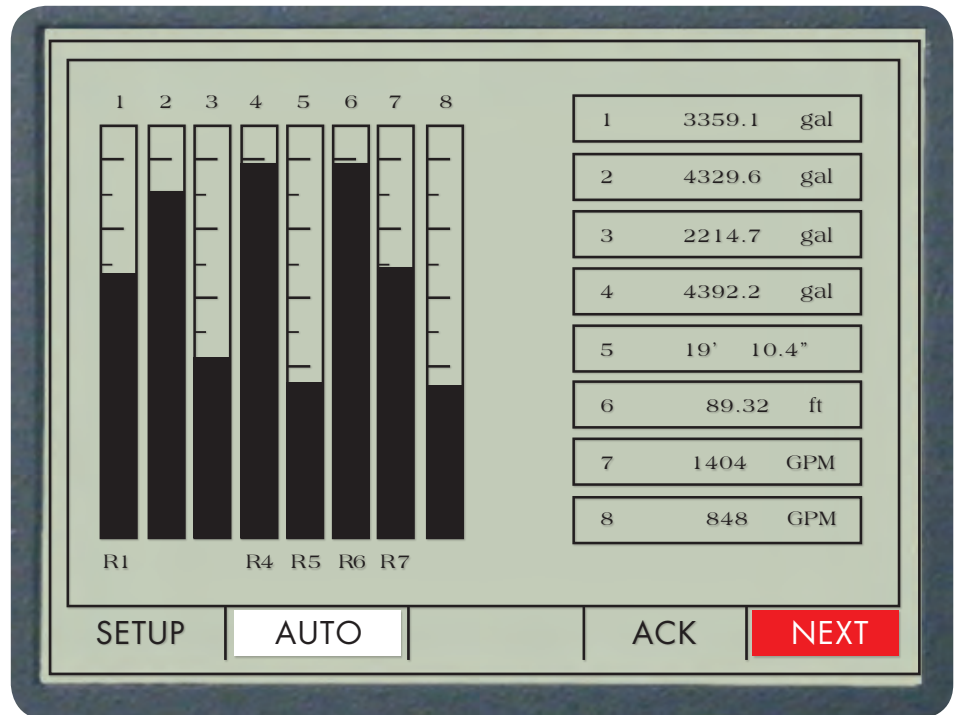
Navigation buttons: Down, Up, Right, OVER, EDIT, EXIT

Input & alarm screens shown ½ scale

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

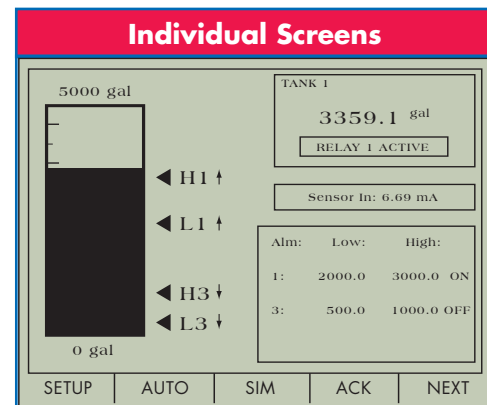
Manual Mode Screen

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

Buttons: DOWN, UP, OFF, 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



Color shown for illustration only

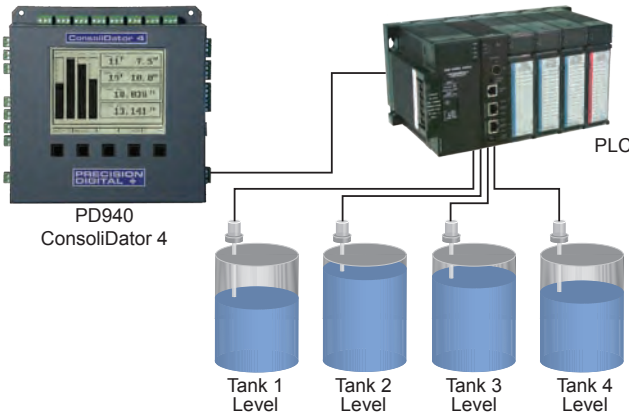
Manual mode & individual screens shown ½ scale

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

MODBUS SERIAL PV INPUTS

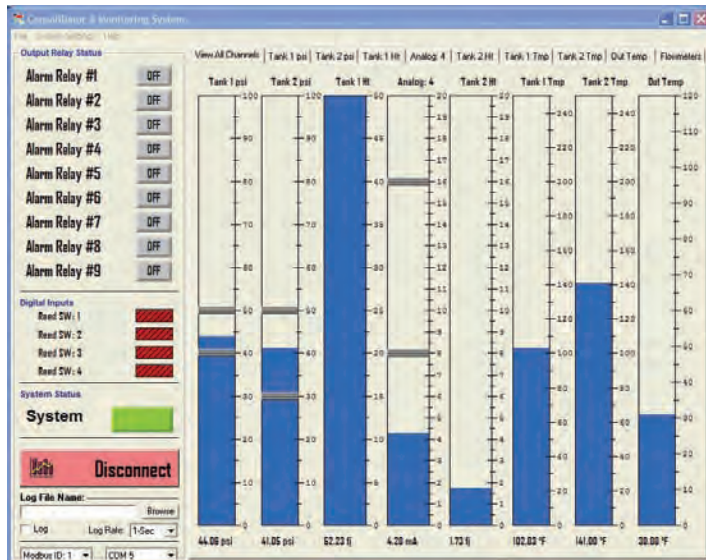
The ConsoliDator's inputs can be a combination of analog inputs and Modbus PV inputs which use the ConsoliDator's built-in RS-232 serial port. For the Modbus inputs, simply configure the input(s) to "Fixed" mode, then write the PV value to the appropriate Modbus register. The ConsoliDator must be the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



CONSOLIDATOR SOFTWARE

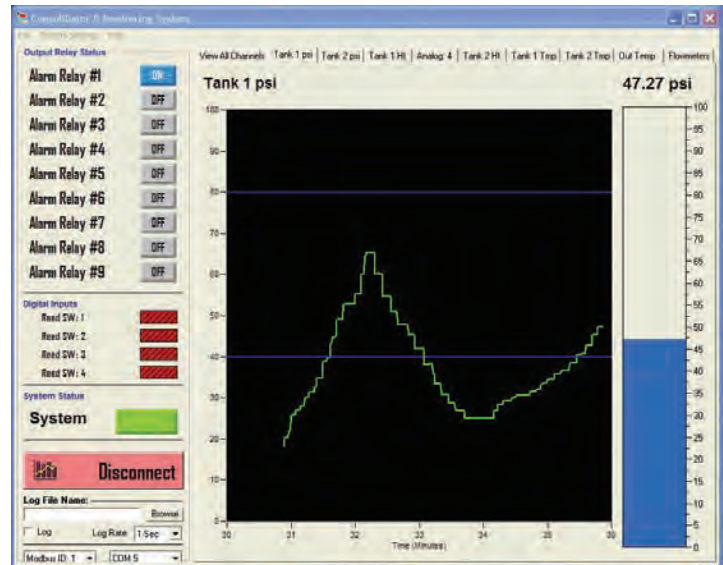
Free PC based software is included with every ConsoliDator. With this software the user can monitor process variables, relay states, alarm states, and switch input states. The software can be used as a datalogger, or to configure the ConsoliDator.

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

Date	Time	Channel 1 Units	Channel 2 Units	Channel 3 Units	Channel 4 Units	Channel 5 Units	Channel 6 Units	Channel 7 Units	Channel 8 Units
4/23/2009	16:32:24	4.96 psi	60.01 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:25	4.97 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:26	4.97 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:27	5.17 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:28	5.17 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:29	5.49 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:30	5.49 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:31	5.49 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:32	6.58 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:33	6.56 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:34	7.76 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:35	7.76 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:36	8.89 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:37	8.89 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:38	10.25 psi	60 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	
4/23/2009	16:32:39	10.25 psi	47.62 psi	52.53 psi	4.3 mA	1.76 psi	103.57 °F	-2099.98 °F	

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 screenshot shows the Configuration window of the ConsoliDator software. It displays settings for Analog Input Channels, Flowmeter Input Channels, Alarm Channels, Analog Output Channels, and Digital Input Channels. The right side of the window shows the configuration for Channel 1 (Tank 1 psi), including High Value (100.000 psi), Low Value (0.000 psi), Channel Function (NONE - Linear), K-Factor, Offset, Graph Maximum (100.000 psi), Graph Minimum (0.000 psi), # of Decimals (####0.0), and Display Units (psi).

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.

FIELD ENCLOSURES



PDA2901

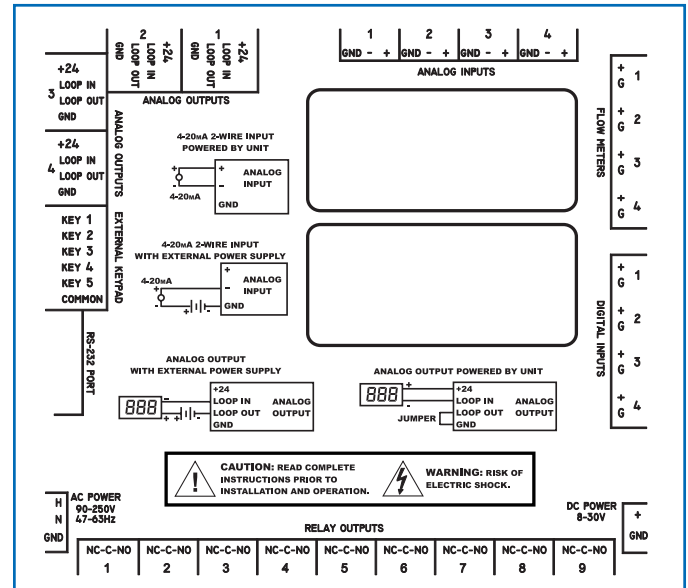
- NEMA 4X
- Hinged clear cover
- Stainless steel quick-release latches
- Easy access to front panel buttons
- Power switch & fuse

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

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 μ F/470 Ω , 250 VAC

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

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)

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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