

# USER MANUAL

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MODEL NUMBER:

**EPX-DR14**

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**14 Channel Data Recorder**

*English (Original Instructions)*

*Updated: 06/14/2018*



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### **WARNING:**

1. Avoid contact of chemicals with skin and eyes. If contact occurs, see MSDS sheet for further first aid measures.
2. Always wear appropriate PPE
3. Follow safety instructions of chemical manufacturer (MSDS).
4. Always follow plant and OSHA guidelines about the use of equipment.
5. Disconnect power and shut off compressed air and water supply before servicing equipment.

# USER MANUAL: EPX-DR14

READ ALL INSTRUCTIONS BEFORE OPERATING EQUIPMENT



## Overview

The EPX-DR14 Data Recorder is able to read, data log and report values for up to 14 sensors. The unit includes 6 high speed digital inputs for reading pulse output flow meters, as well as 8 analog inputs for a variety of 4-20mA sensors. Reports are able to be obtained via USB or through an online interface to provide increased knowledge and accountability for flow rates and temperature on a daily, weekly or monthly basis.

## Requirements

### Electrical Connection

- 110 VAC, 2.6A, Single Phase, 60 Hz
- GFCI Outlet
- Surge suppression recommended
- NEMA 5-15 plug and 8 ft. cord supplied with unit

### Software and Wiring Inputs

- Maximum number of channels (inputs): 14
  - Analog: 8
  - Pulse: 6
- Acceptable signal input: 4-20mA
- Digital Signal Input:
  - Current sinking (NPN)
  - Current sourcing (PNP)

**NOTE:** A 2.2k Ohm pull-up resistor is pre-installed for each digital input. If using a Current Sourcing (PNP) device, the associated resistor for that channel must be removed!

## Specifications

Flow Ranges, typically, tested with water at 70°F using **Seametrics SPX S-Series** sensors:

Model #	K-Factor* (pulses/gal)		Gal/Min	Liter/Min
	SPT	SPX		
-038	1394	1417	0.07–5	0.27–18.9
-050	634	658	0.1–10	0.38–37.9
-075	476	468	0.2–20	0.75–75
-100	250	254	0.5–40	1.9–150

*\*Nominal K-factors (based on averages) for standard 2-magnet SPT and SPX. High resolution (6-magnet) K-factors are approximately tripled.*

**NOTE:** Flow Ranges for meters other than listed above must be determined via testing and is the responsibility of the end user or system integrator.

### Dimensions

- Width: 17 <sup>3</sup>/<sub>8</sub> in.
- Depth: 10 <sup>23</sup>/<sub>32</sub> in.
- Height: 19 <sup>9</sup>/<sub>16</sub> in.
- Weight: 18 lbs.

### Materials of Construction

- Enclosure: Fiberglass
- Cord Grips: Nylon
- Fasteners: 316ss / 18-8ss

## Mounting Instructions

Select a desired location and mount the DR14. Determine mounting location, with consideration of the following:

- User accessibility
- Distance to electrical outlet
- Distance to flow meters
- Accessibility to Ethernet

1. Attach the included mounting feet to the controller.
2. Securely mount unit to wall using appropriate hardware (not included).
3. Plug power cord into a 115 VAC, GFCI protected receptacle.

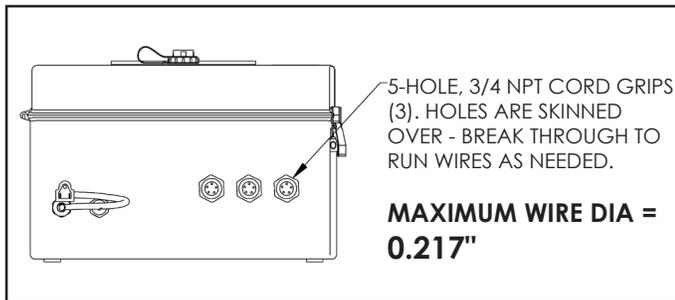


### WARNING:

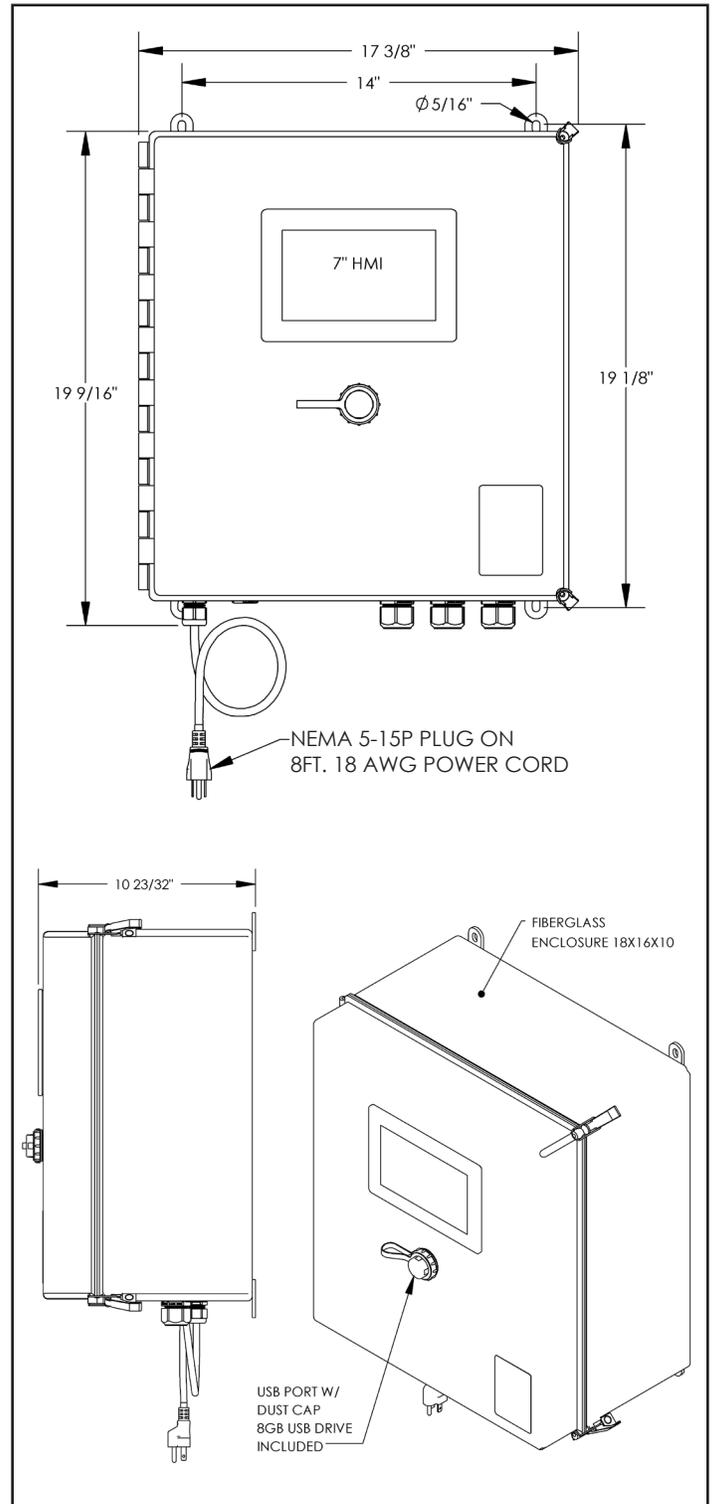
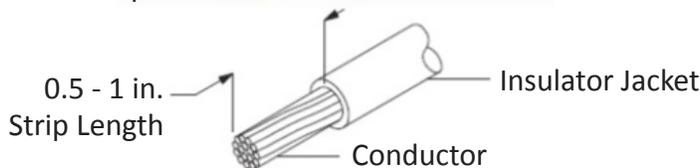
Disconnect from power for wiring procedures!

## Sensor Wiring

1. Pierce the seals in the 5-hole cord grips on the bottom of the enclosure for the amount of sensors to be installed.



2. Strip wires as necessary, providing enough length for each input.



## Sensor Wiring (continued)

- Using the include 2.5mm Screwdriver, open the spring-clamp for each terminal block input and attach the wires as necessary [Figures 5.1 - 5.3]

**NOTE:** Wire inputs and colors may vary depending on the type of flow meter used.

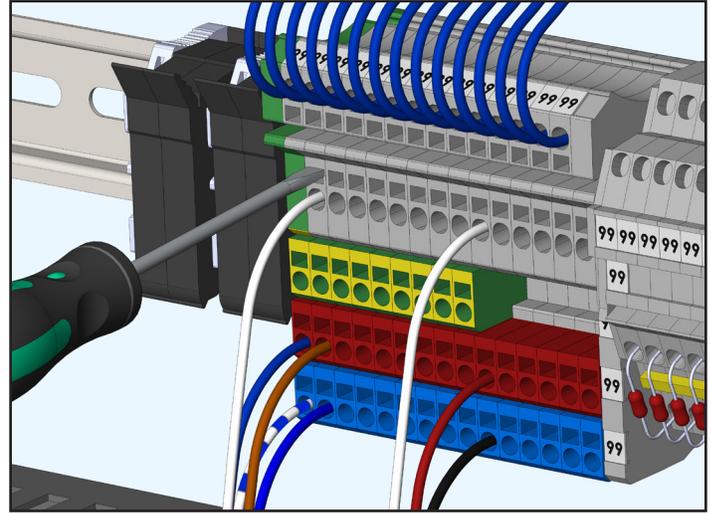


Figure 5.1: DR14 Example Wiring shown with one Analog Sensor (Channel 1, Terminal Block 1) and one Pulse Meter (Channel 1, Terminal Block 9) \*Wire Colors will vary

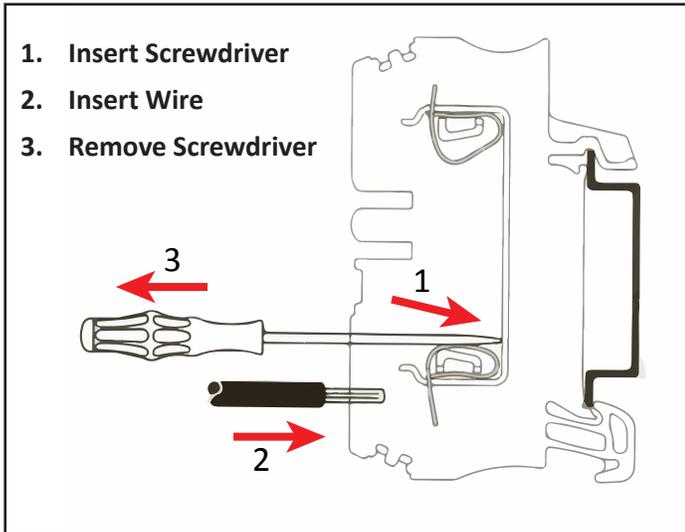


Figure 5.2: Spring-Clamp release using 2.5mm screwdriver

### Wiring Key (Terminal Block Colors):

- |                   |                     |
|-------------------|---------------------|
| 1. GRAY = Signal  | 3. RED = 24 V       |
| 2. GREEN = Ground | 4. BLUE = DC Common |

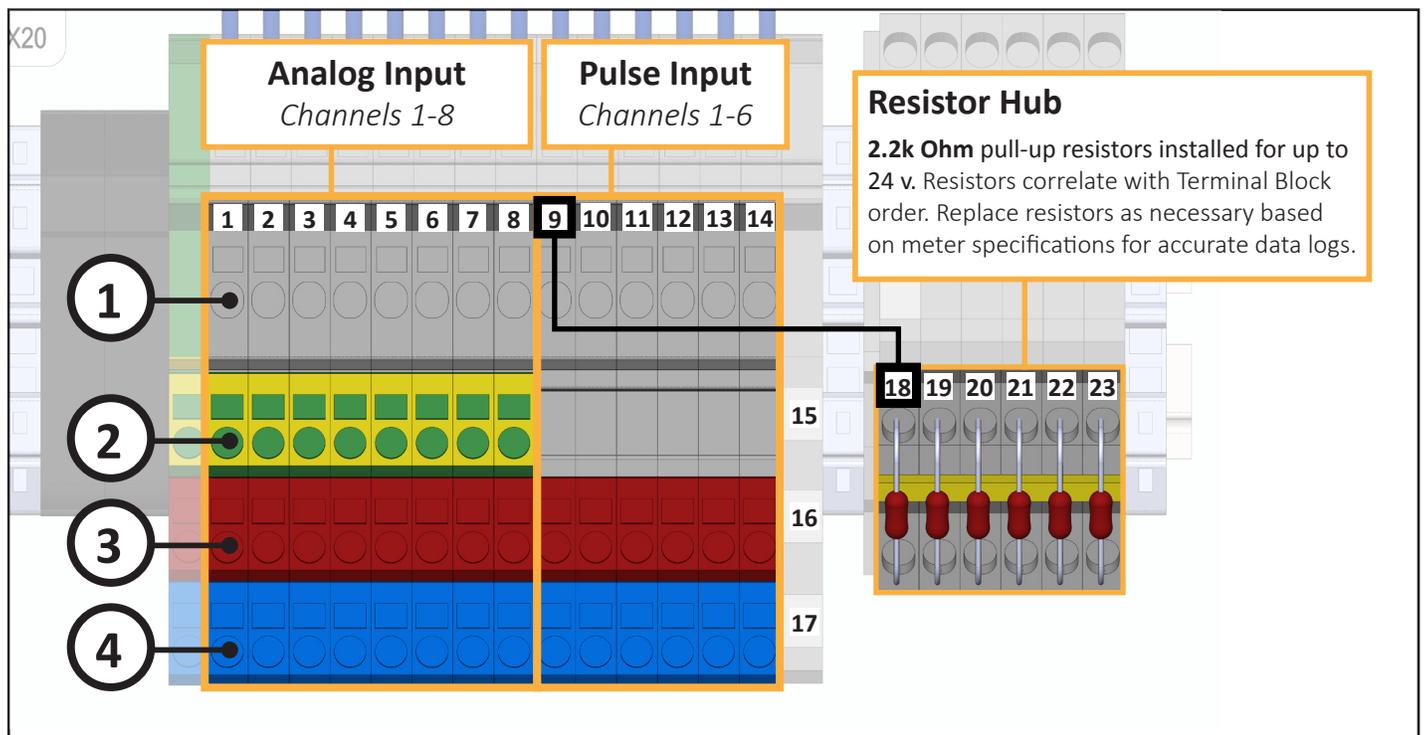


Figure 5.3: Wiring infograph and key for analog and pulse inputs. \*Wire colors and inputs will vary depending on meter being used.

## Users

1. Using the HMI, login to the System using the on-screen keyboard

**NOTE:** Please contact your distributor for administrative login credentials.

2. Navigate to the **MAIN MENU** [Figure 6.1]
3. Select **USERS** [Figure 6.2]
4. Enter information as necessary for the following procedures [Figure 6.3]:



Figure 6.1: DR14 Home Screen

### Add User:

1. Enter **USERNAME**
2. Assign to **GROUP**
3. Set **PASSWORD**
4. Save User

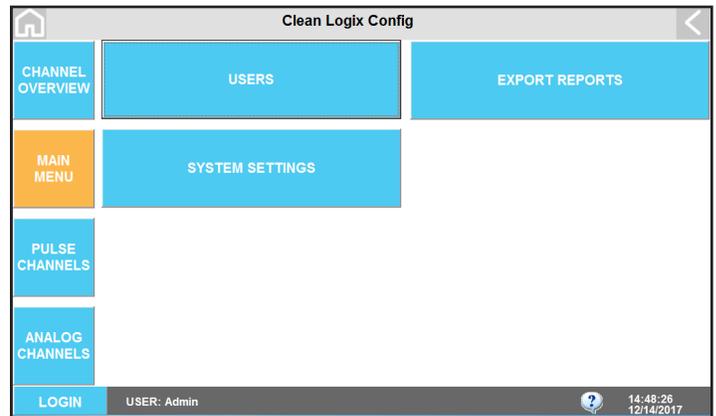


Figure 6.2: DR14 Main Menu

### Change Password:

1. Enter **USERNAME**
2. Enter **CURRENT** Password
3. Enter **NEW** Password and **CONFIRM**
4. **SAVE PASSWORD**

### Delete User:

1. Select **USERNAME** to be deleted from drop down menu
2. Select **DELETE** to confirm

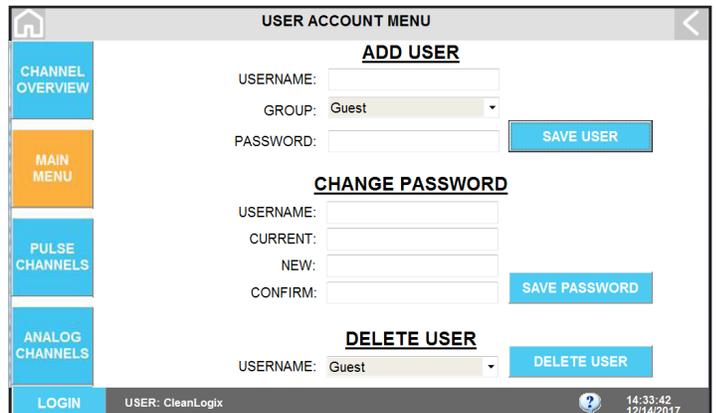


Figure 6.3: User Menu

## Analog Sensor Configuration

1. From the Home Screen select **ANALOG CHANNELS** [Figure 8.1]
  2. Select **CHANNEL CONFIGURATION**
  3. **CHANNEL #:** From the drop down select the channel to be configured (1-6)
  4. **CHANNEL NAME:** Name of the channel for reporting purposes
  5. **CHANNEL UNITS:** unit of measurement for the sensor type (GAL, L, PPM, etc.)
  6. **ACTIVITY SP:** Sensor readings greater than this value will be recorded and totalized (in mA)
  7. **SCALE LOW:** A numerical value, in the units specified by CHANNEL UNITS, which corresponds to a sensor reading of 4mA
  8. **SCALE HIGH:** A numerical value, in the units specified by CHANNEL UNITS, which corresponds to a sensor reading of 20mA
  9. **CAL FACTOR:** (Optional) User set multiplier or scaler for accuracy adjustment
- NOTE:** If no **CAL FACTOR** is required, set to 1.00
10. **FLOW SELECTED:** Select if using a flow meter to record a running total
  11. **CHANNEL ENABLE:** With data entered, select to enable the channel
  12. **LOG DATA:** Select to initiate data logging
  13. **SAVE** to preserve edits
  14. Repeat the process for additional Analog Sensors if applicable



Figure 7.1: DR14 Home Screen

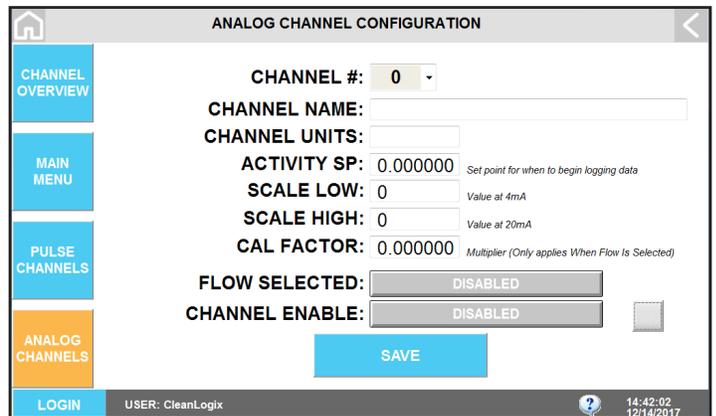


Figure 7.2: Sensor Configuration Screen

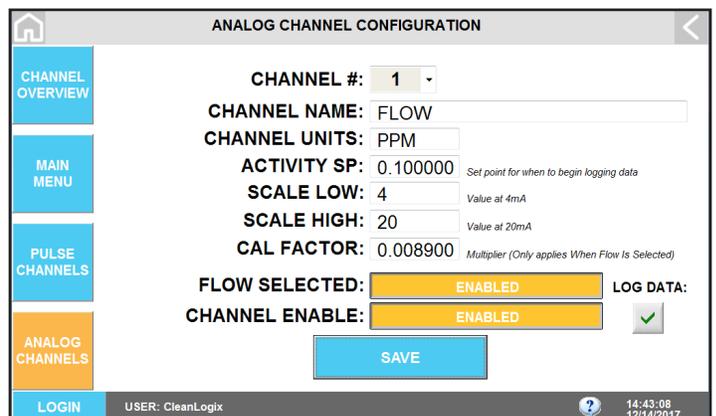


Figure 7.3: Enabling Flow and Channel, Sensor Configuration Screen

## Pulse Channel Configuration

1. From the Home Screen select **PULSE METERS** [Figure 7.1]
2. Select **PULSE CHANNEL CONFIGURATION** [Figure 7.2]
3. **CHANNEL NUMBER:** Select the channel of the pulse meter to be configured from the drop down list (1-8)
4. **CHANNEL NAME:** Name of the channel for reporting purposes
5. **CHANNEL UNITS:** Specify the unit of measurement for the channel (gallons, liters, etc.)
6. **ACTIVITY TIME SP:** Activity timer for when to begin recording pulse counts
7. **ACTIVITY PULSE SP:** The number of pulses within the specified ACTIVITY TIME SP for when to begin logging and totalizing data
8. With data entered, select **CHANNEL ENABLE** to activate data recording for the meter [Figure 7.3]
9. **SAVE** to preserve edits
10. Repeat the process for additional Pulse Meters if applicable



Figure 8.1: DR14 Home Screen

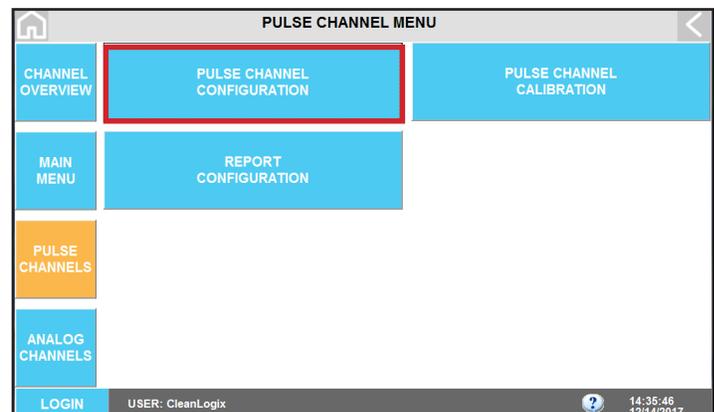


Figure 8.2: Pulse Meter Menu

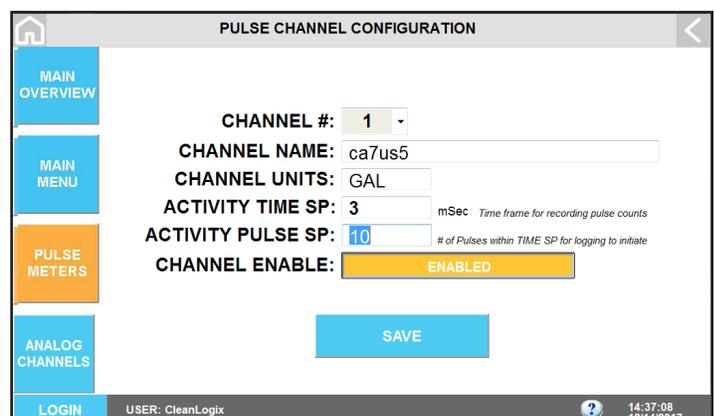


Figure 8.3: Pulse Channel Configuration Screen

## Pulse Flow Calibration

To accurately log and record flow rates the configured pulse meters will have to be calibrated. During the calibration process, users must have the ability to capture a volume measurement of the liquid to be monitored.

**NOTE:** The discharge line *AFTER* the pulse meter must be open and captured in a container with measurement markings to obtain an accurate volume amount.

To calibrate a Pulse Meter:

1. Navigate to the **PULSE CHANNELS** screen and select **PULSE CHANNEL CALIBRATION** [Figure 9.1]
2. From the drop down select the **CHANNEL #** of the pulse meter to be calibrated.
3. Click the **DISABLED/ENABLED** to **ENABLE** the calibration procedure for the selected channel.
4. Select  to begin Recording the pulse counter [Figure 9.2].

**NOTE:** Time is not a factor in the calibration sequence, only the volume amount is necessary.

5. With **RECORDING** initiated, activate the system being monitored and dispense a volume amount.
6. After the dispense has completed enter the **VOLUME AMOUNT CAPTURED** [Figure 9.3].

**NOTE:** The calculated K-FACTOR is displayed at the bottom of the screen in pulses/volume. This number can be changed manually, if desired.

7. Select **SAVE** to preserve the calibration sequence.
8. Repeat as necessary for additional channels.

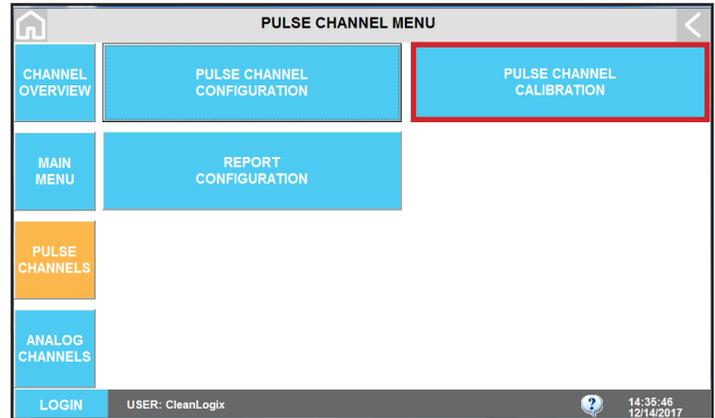


Figure 9.1: Pulse Meter Menu

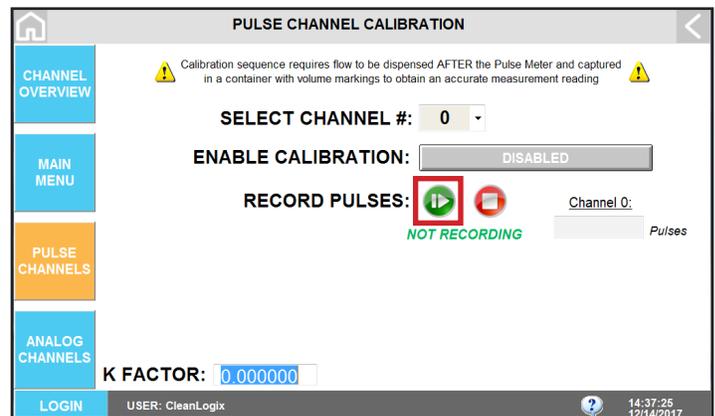


Figure 9.2: Pulse Flow Meter Calibration Screen

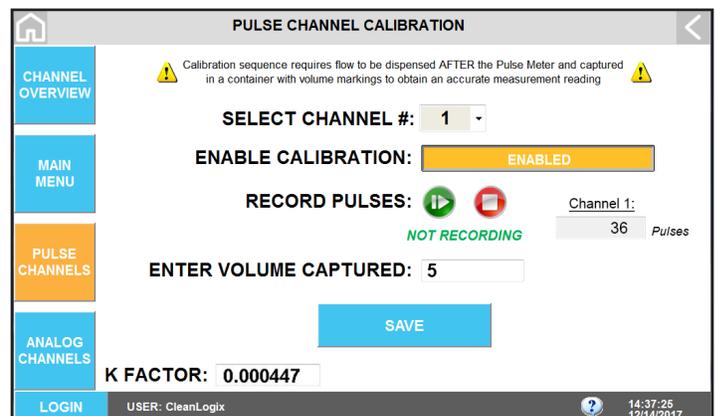


Figure 9.3: Completed Pulse Channel calibration sequence with Volume amount captured

## Reports

### Report Configuration:

1. Navigate to the **HOME** screen and select either **PULSE METERS** or **ANALOG SENSORS**

2. Open the **REPORT CONFIGURATION** menu

**NOTE:** Either section will link to the same reporting page for configuration purposes.

3. To initiate Clean Intel Online reporting select the **ENABLE** button for **EPX REPORTING**
4. Using the drop down menu, identify the frequency for how often a report will be submitted (Daily, Weekly, or Monthly)
5. Once configured, reports can be obtained via **cleanintel.com** under the EPX Client

**NOTE:** Recorded volumes for Totalized logs are based on EPX report configuration intervals (i.e. daily, weekly, or monthly).

### USB Export

1. Navigate to MAIN MENU > **REPORT MENU** - from here reports can be USB exported from the unit.
2. Insert a USB into the front of the unit. To access the USB port, unscrew the port cover.
3. Two option are available to transfer files:

- DRAG AND DROP METHOD:

1. Select **BROWSE FILES** and find the report
2. Physically drag the file (*OR* **press and hold** to perform a "right click" to **Copy** and **Paste**) to the new folder location.

- SELECT SOURCE & DESTINATION:

1. Using the Folder icons, browse for the **SOURCE** and **DESTINATION** file(s) for the transfer
2. Select **COPY FILE** to transfer the report
3. When complete the icon will illuminate green and display **COPY SUCCEEDED**.

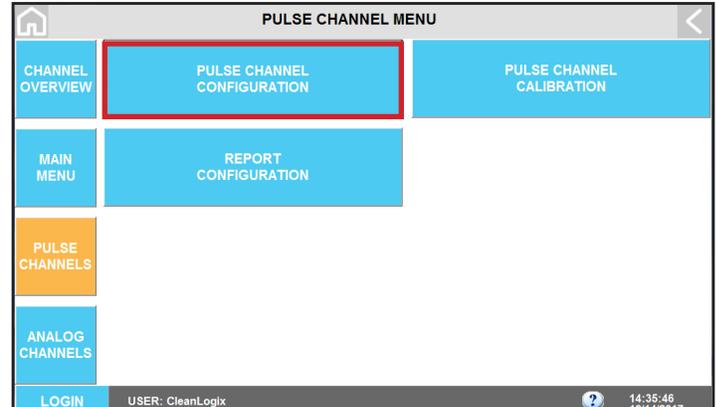


Figure 10.1: Pulse Meter Menu's Report Configuration Tab

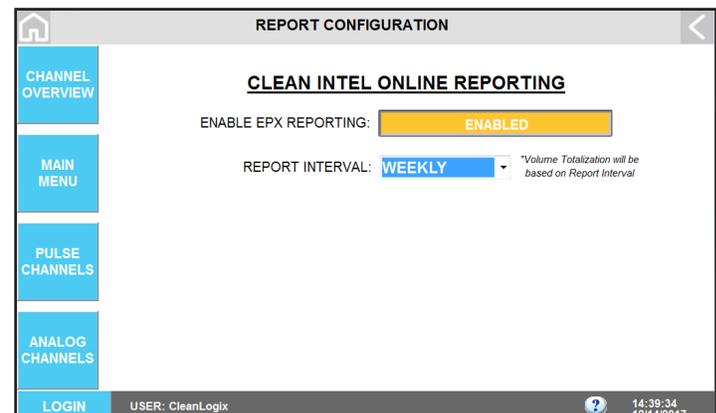


Figure 10.2: Report Configuration Screen



Figure 10.3: DR14 Report Menu for USB

## Reports (continued)

### CleanIntel Online Reporting

1. Open an Internet browser (Google Chrome, etc.)
2. Go to **www.cleanintel.com**
3. Enter login credentials [Figure 11.1]
4. Three system clients of Clean Intel will be available for selection, select **EPX** [Figure 11.2]
5. CSV based reports will be listed chronologically upon login. Click the filename to download a copy to your files. [Figure 11.3]

CSV reports contain date and time stamps for all recorded activity. Flow rates and volume data will be displayed in both individual and totalized amounts.

### Local Database Logs:

1. Navigate to the **CHANNEL OVERVIEW**
2. Two Database logs are available:
  - *CLOUD DATABASE LOG*: view and sort data logged to the cloud based server (Clean Intel)
  - *LOCAL DATABASE LOG*: displays local data stored on the unit. Will reflect Cloud Database, but is accessible if the cloud is disconnected.
3. A list of all dispense activity will be displayed in either log [Figure 11.4].

### Daily Consumption Table:

1. To view a visual table of consumption activity navigate to the **CHANNEL OVERVIEW > DAILY CONSUMPTION** [Figure 11.5]
2. Consumption amounts and units of measurement are displayed at the base for reference.

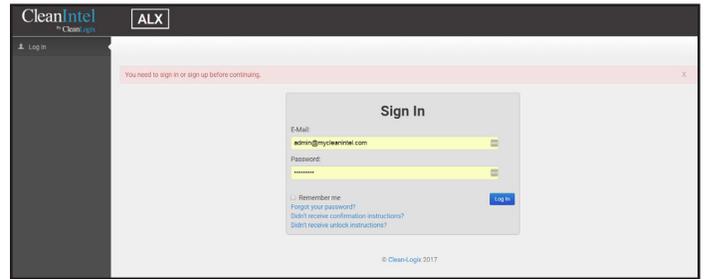


Figure 11.1: Clean Intel login screen (using Google Chrome)



Figure 11.2: Clean Intel system client selection (cropped)



Figure 11.3: EPX Report list (zoomed in)

ID	Site	Site Name	Ev...	Date	Time	Cha...	Chemical	Volume	Units	Elapsed Time	Daily Totaliz...
1	88	CL_Midwest	4	06/09/2018	07:09:59	2PCH	2-ultra evap	1.5	GAL	0.8	1.5
2	88	CL_Midwest	7	06/09/2018	07:12:24	2PCH	2-ultra evap	4.29	GAL	1.97	5.79
3	88	CL_Midwest	8	06/08/2018	10:16:55	2PCH	2-ultra evap	0.96	GAL	0.63	5.12
4	88	CL_Midwest	9	06/08/2018	10:17:25	1ACH	7-chloro cheese	10.28	GAL	1.25	168.42

Figure 11.4: DR14 Local Database Log screen (cropped)

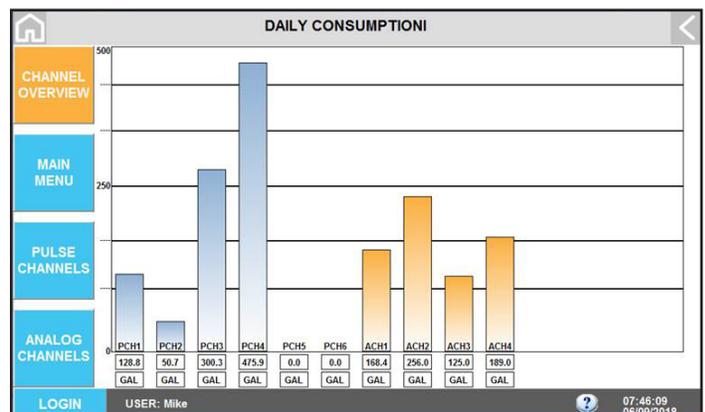


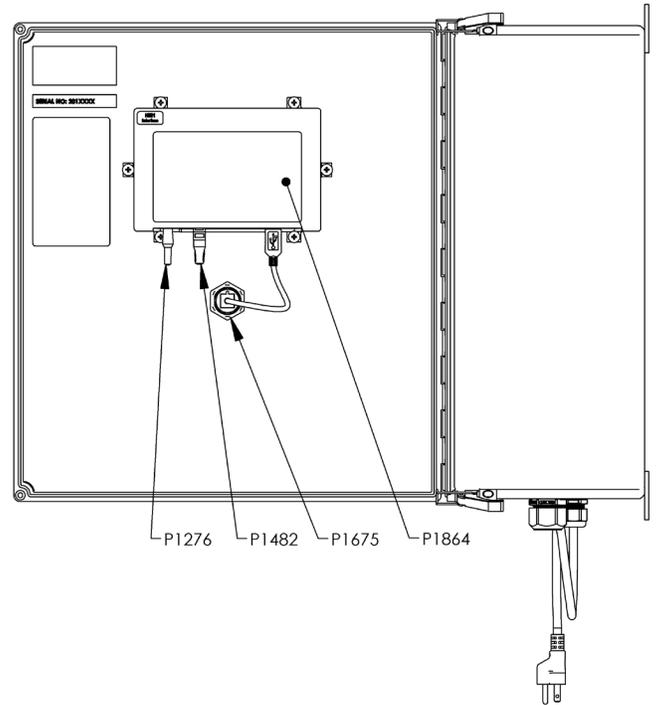
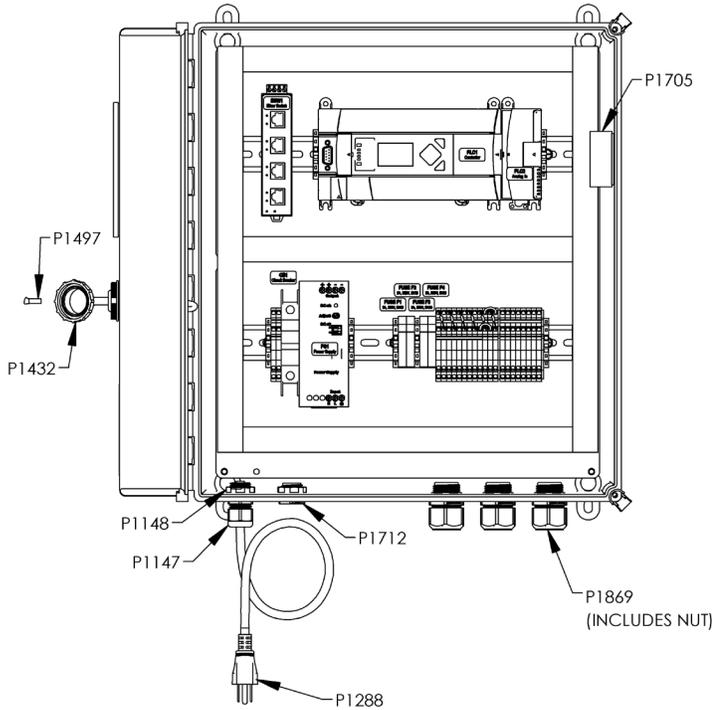
Figure 11.5: DR14 Daily Consumption screen

# USER MANUAL: EPX-DR14

READ ALL INSTRUCTIONS BEFORE OPERATING EQUIPMENT



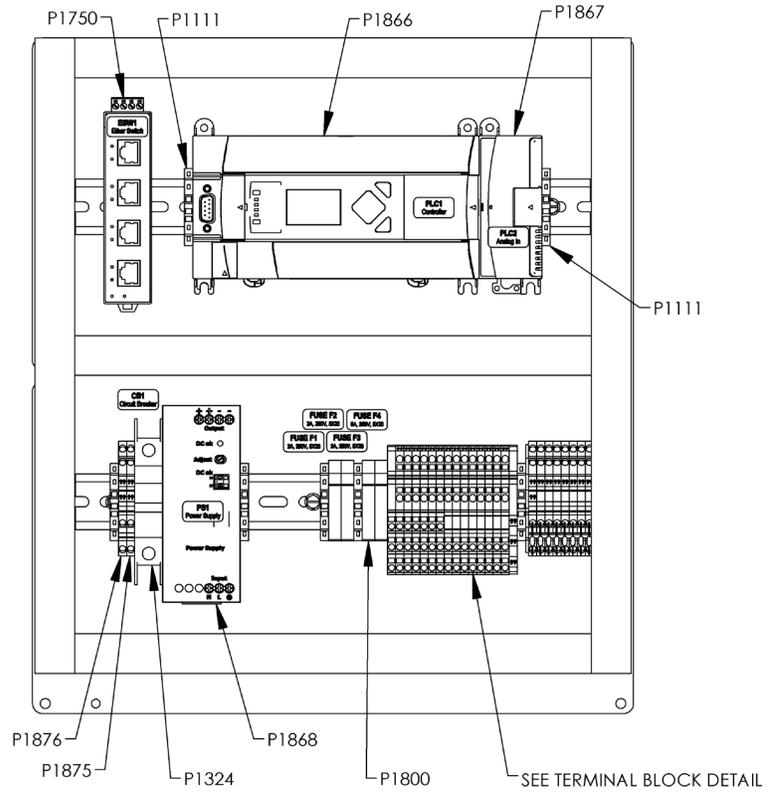
## Appendix A - Parts Callout



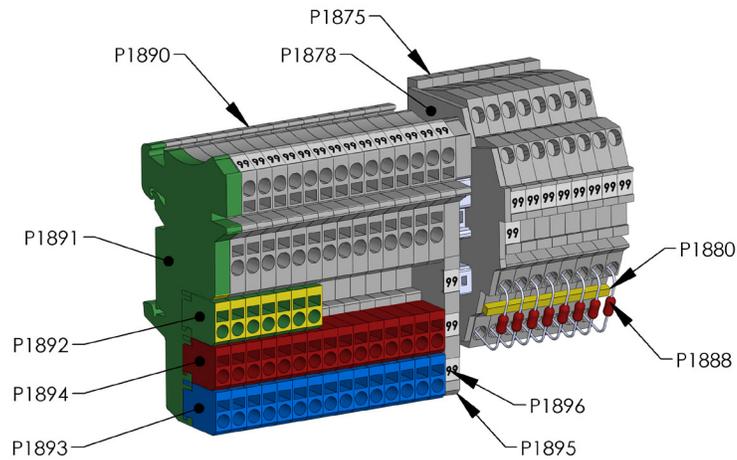
Part No.	Description
F1172	SCREW THREAD FORMING 10-32 X 1/2 HEX WASHER HEAD ZINC
M1871	BACK PANEL 18X16X10 FOR HOFFMAN A181610CHQRFG
P1111	END STOP TERMINAL BLOCK
P1147	CORD GRIP 1/2 NPT X .170 - .450 BLK
P1148	CORD GRIP NUT 1/2 NPS NYL
P1169	DIN RAIL 35mm X 325mm LONG
P1172	WIRE DUCT 25X60X325
P1172	WIRE DUCT 25X60X400
P1246	LABEL DANGER ELECTRICAL
P1276	CABLE ASSY DC POWER 2.5mm X 6' 18AWG
P1288	POWER CORD 18-3 SO 5-15P
P1324	CIRCUIT BREAKER 5A SINGLE POLE
P1432	USB DUST CAP ASSY
P1441	FUSE 250VAC 2A 5X20
P1482	CABLE CAT5e LEFT ANGLE TO STRAIGHT 3.0 ft
P1489	FUSE 250VAC 5A 5X20
P1497	USB FLASH DRIVE 8GB LOW PROFILE
P1675	RECEPTACLE USB-A PANEL MOUNT CIRCULAR SEALED w/0.50m CABLE
P1705	VAPOR CAPSULE FOR ENCLOSURES
P1712	VENT PLUG 1/2" NPT BLK
P1750	ETHERNET SWITCH, INDUSTRIAL 5 PORT
P1800	FUSE HOLDER 5mm DIN RAIL MOUNT W/ INDICATOR
P1864	PANEL PC, 7 INCH, WINDOWS EMBEDDED STANDARD 7

Part No.	Description
P1865	ENCLOSURE CONTINUOUS HINGE FIBERGLASS 18X16X10
P1866	PLC ALLEN BRADLEY 1766-L32BXB
P1867	INPUT MODULE 8-PT ANALOG ALLEN BRADLEY 1762SC-IF8U
P1868	POWER SUPPLY 24VDC, 10A
P1869	CORD GRIP 3/4" NPT X .216" 5-HOLE SKINNED
P1875	TERMINAL BLOCK SPRING CLAMP 5.1mm DUAL-LEVEL GRAY
P1876	TERMINAL BLOCK SPRING CLAMP 5.1mm DUAL-LEVEL GROUND
P1878	TERMINAL BLOCK END BARRIER LD3 DUAL SERIES
P1880	TERMINAL JUMPER 5.1mm - 10 POSITION CUT TO 8
P1888	RESISTOR, 2.2 KOHM 1/2 WATT
P1889	SCREWDRIVER MINIATURE ELECTRONICS 0.4 X 2.5mm REGULAR
P1890	TERMINAL BLOCK SPRING CLAMP 5.1mm GRAY A-B 1492-LS2-4
P1891	TERMINAL BLOCK SPRING CLAMP 5.1mm GROUND A-B 1492-LSG2-4
P1892	TERMINAL BLOCK SPRING CLAMP CONNECTION 5.1mm SENSOR BLOCK GROUND A-B 1492-LSG2
P1893	TERMINAL BLOCK SPRING CLAMP CONNECTION 5.1mm SENSOR BLOCK BLUE A-B 1492-LS2-B
P1894	TERMINAL BLOCK SPRING CLAMP CONNECTION 5.1mm SENSOR BLOCK RED A-B 1492-LS2-BR
P1895	TERMINAL BLOCK END BARRIER LS2 SERIES A-B 1492-EBS2-4
P1896	TERMINAL BLOCK LABEL 5.1mm NUMBERS 1-100, 20 SETS A-B 1492-M5X5H1-100

## Appendix A - Parts Callout (continued)



### TERMINAL BLOCK DETAIL VIEW



## Appendix B - Seametrics S-Series Sensors

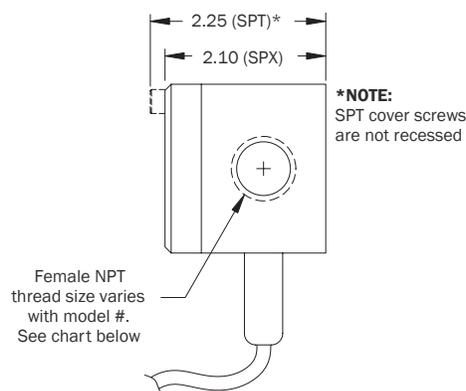
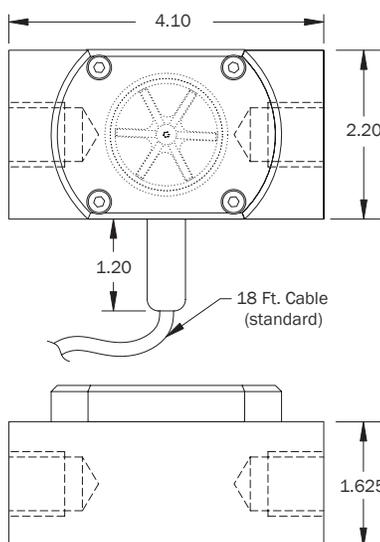
### Specifications\*

		SPX	SPT
<b>Connection Ports</b>		3/8", 1/2", 3/4", 1" —Female NPT thread	3/8", 1/2", 3/4", 1" —Female NPT thread
<b>Sensor Cable</b>		18 ft (6 m) standard—maximum cable run 2000 ft (607 m)	18 ft (6 m) standard—maximum cable run 2000 ft (607 m)
<b>Materials</b>	<b>Body</b>	Polypropylene	TFE Teflon®
	<b>Rotor</b>	PVDF (Kynar®)—2 magnet <i>(6 magnet high resolution optional)</i>	PVDF (Kynar®)—2 magnet <i>(6 magnet high resolution optional)</i>
	<b>Shaft</b>	Nickel tungsten carbide <i>(ceramic or silicon carbide optional)</i>	Zirconia ceramic <i>(silicon carbide optional)</i>
	<b>O-Ring</b>	EDPM (Viton® or Teflon®-coated Viton® optional)	Teflon®-coated Viton® (Viton® or EDPM optional)
	<b>Bearings</b>	Ruby ring and ball	Ruby ring and ball
	<b>Cover</b>	Acrylic with clear lens <i>(polypropylene without clear lens optional)</i>	TFE Teflon®
<b>Maximum Temperature</b>		160° F (70° C)	180° F (82° C)
<b>Maximum Pressure</b>		150 psi (10 bar)	150 psi (10 bar)
<b>Accuracy</b>		±1% of full scale	±1% of full scale
<b>Power</b>	<b>Standard</b>	6–36 Vdc, 2 mA min.	6–36 Vdc, 2 mA min.
	<b>Micropower</b>	3.1–16 Vdc (for use with FT450 and DL76 only)	3.1–16 Vdc (for use with FT450 and DL76 only)
<b>Outputs</b>		Current sinking pulse, 6–24 Vdc	Current sinking pulse, 6–24 Vdc

\* Specifications subject to change. Please consult our website for current data ([seametrics.com](http://seametrics.com))

Kynar is a registered trademark of Arkema, Inc., Teflon and Viton are registered trademarks for DuPont Corporation

### Dimensions



Model #	NPT Thread Size
-038	3/8"
-050	1/2"
-075	3/4"
-100	1"

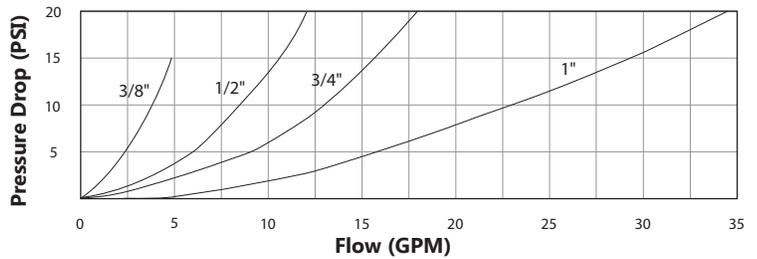
## Appendix B - Seametrics S-Series Sensors (continued)

### Flow Range

Model #	K-Factor* (pulses/gal)		Gal/Min	Liter/Min
	SPT	SPX		
-038	1394	1417	0.07-5	0.27-18.9
-050	634	658	0.1-10	0.38-37.9
-075	476	468	0.2-20	0.75-75
-100	250	254	0.5-40	1.9-150

\*Nominal K-factors (based on averages) for standard 2-magnet SPT and SPX. High resolution (6-magnet) K-factors are approximately tripled.

### Pressure Drop Curves

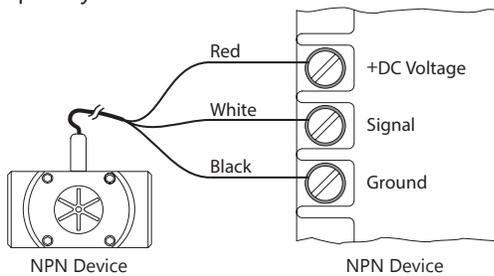


## CONNECTIONS

### Connecting to Non-Seametrics Control Devices

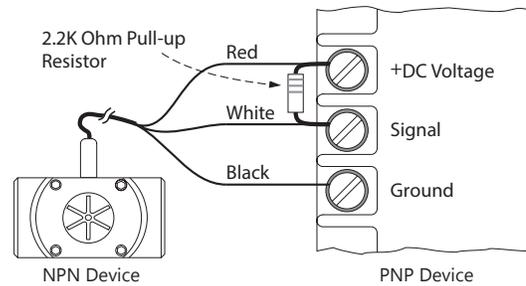
It is often desirable to connect an SPX/SPT flow sensor to a PLC or industrial computer board, and the sensors are well suited for this. Typically it can be connected directly, or with a single resistor added. The pickup sensors are current sinking (NPN) GMR devices that require 6-36 Volts DC and 2 mA current. They can connect directly to a PLC or computer board if:

1. The sensor power supply on the PLC is 6-36 Vdc (24 Vdc is typical).
2. The sensor power supply can provide at least 2 mA (100 mA is typical).
3. The sensor input on the PLC can accept a current sinking device.
4. The PLC frequency response > flow meter output frequency.



\*Input designed for current sinking devices (NPN)

If the PLC input only accepts current sourcing devices, a pull-up resistor must be added. Typically, on a 24 Vdc input a 2.2 K Ohm resistor will be effective.



Input designed for current sourcing (PNP) devices

Since the three-wire pickup sensors are solid state, they do not exhibit switch bounce and can be used at relatively high frequencies.

If the PLC is equipped with a 4-20 mA analog input module, it is necessary to order the S- Series flow sensor with some form of 4-20 mA transmitter. Two options are the AO55 blind transmitter and the FT440 indicating transmitter. Follow the connection diagrams for these products to connect to the analog input.