



**Badger Meter**

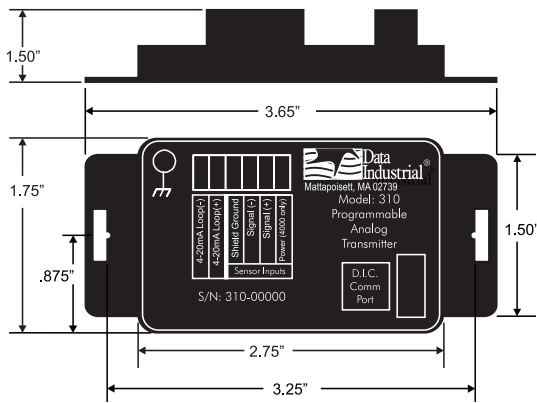
# Data Industrial® Series 310 Programmable Loop-Powered Analog Transmitter

## OVERVIEW

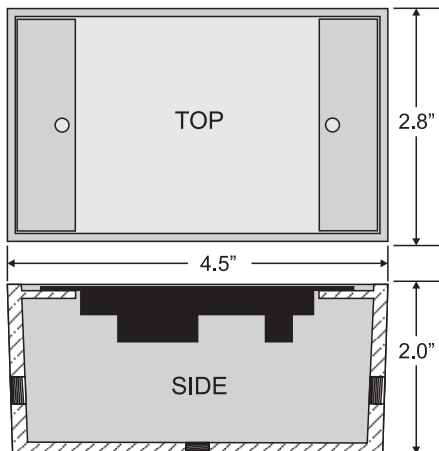
The Data Industrial Series 310 from Badger Meter is a loop-powered, programmable 4-20mA transmitter designed to accept relatively fast, un-scaled raw pulses from devices like flow sensors and then transmit a linear analog signal of desired scaling and units of measure. In addition to standard Data Industrial flow sensors, the Series 310 can also accept a sine wave making it a versatile transmitter for numerous applications.

With an onboard microcontroller and digital circuitry, the Series 310 is programmed from a computer, thereby eliminating the need to adjust potentiometers and produce precise, accurate and drift-free signals. This saves both time and money by lowering overall maintenance times. This model also has an integral filter that the user can specify as values between 0 (to show true sensor readings) and 10 (for maximum dampening).

The compact cast epoxy body measures 1.75 x 2.75 x 1 inches (44 x 70 x 25 mm) and can easily be mounted to panels, DIN rails or enclosures. With field programming, input signal flexibility, ease of use and a variety of enclosures, the Series 310 is a powerful and competitive transmitter for many of today's demanding applications.



**Transmitter Only**



**Optional Enclosure (Ver. 310-02 and 310-03)**



<b>EXAMPLE:</b>		<b>310</b>	<b>-</b>	<b>xx</b>
SERIES	Programmable Analog Transmitter	310		
OPTIONS	Transmitter Only			00
	W / NEMA 4X Enclosure			01
	W / Metal Weathertite Enclosure			02
	W / Plastic Weathertite Enclosure			03
	W / DIN rail Mounting Clips			04

**Series 310 Ordering Matrix**

## SPECIFICATIONS

<b>Power Requirements</b>	Loop input voltage 9-35 VDC
<b>Input Frequency</b>	0.4 to 10 KHz
<b>Load Resistance</b>	Max 750 Ω at 24 VDC
<b>Output Response Time</b>	Varies with filter
<b>Temperature (operating)</b>	-29°C to 70°C -20°F to 158°F
<b>Temperature (storage)</b>	-40°C to 85°C -40°F to 185°F
<b>Accuracy</b>	±0.04% of reading over entire span
<b>Linearity</b>	0.1% of full scale

# Technical Brief

## CALIBRATION

Units can be calibrated at our facility or easily programmed in the field. Field calibration requires a Badger Meter Data Industrial A301-20 Programming Kit (consisting of a custom cable and software) and IBM-compatible computer running a Windows® based operating system. To calibrate, the Series 310 must be connected to the loop for power and the A301-20 Programming Kit cable must be connected to an available 9-pin COM port on the computer. If the computer does not have a DB-9 COM port, a USB-to-COM port adapter can be used.

Once the software is loaded and communications with the transmitter are established, the following parameters are entered in the setup screens:

1. Units of measure.
2. K and offset values - selected from the sensor owners manual or for insert style sensors entering the pipe ID allows the software to calculate the K and offset values.
3. The flow rate represented by 4mA.
4. The flow rate represented by 20mA.

An added feature is a user selectable filter. Set for the minimum (0) the transmitter reacts to actual flow input. Set at the maximum (10) the transmitter provides the greatest dampening possible.

Once the values are set, the “send” command loads the transmitter.

## WIRING

Per standard wiring practices, the loop power must be off before making any wire connections. The terminal strips have removable plug-in connectors to make wiring easier.

1. Refer to Figure 1 for terminal connections.
2. Connect loop power supply positive (+) to terminal marked 4-20mA loop (+).
3. Connect terminal marked 4-20mA loop (-) of the Series 310 to positive analog terminal of input device (Chart Recorder, PLC, etc.).
4. Connect negative analog terminal of input device to loop power supply negative.
5. Wiring a Badger Meter Data Industrial Series 200 sensor, connect the red wire (signal) to Signal (+) terminal, black wire (ground) to Signal (-) terminal, and the shield to Shield Ground terminal (Disregard shield for the IR sensors). If the sensor is not a Badger Meter Data Industrial Series 200, then go to step 6.
6. Wiring a Badger Meter Data Industrial Series 4000 sensor, connect the clear wire (signal) to Signal (+) terminal, black wire (ground) to Signal (-) terminal, shield wire to Shield Ground terminal, and red wire (power) to Power (4000 only) terminal.
7. For maximum EMI Protection, connect Data Industrial Series 310 ground lug to panel ground.
8. Ensure that all connections are tight, then plug connector into header.

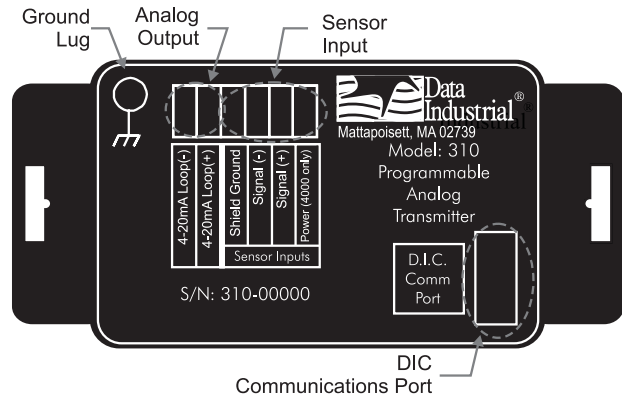


Figure 1: Data Industrial Series 310

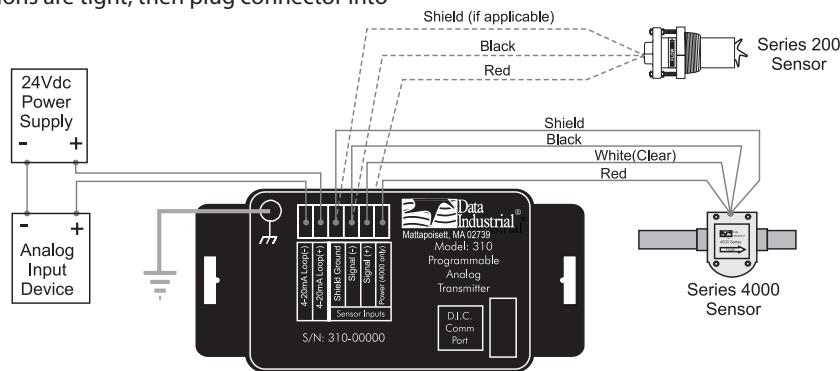


Figure 2: Typical Wiring Example



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