OVERVIEW

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

With an onboard microcontroller and digital circuitry, the Model 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 Model 310 is a powerful and competitive transmitter for many of today's demanding applications.
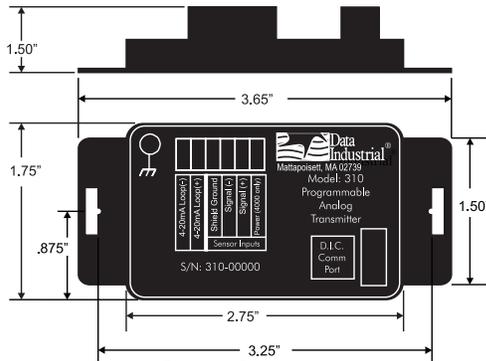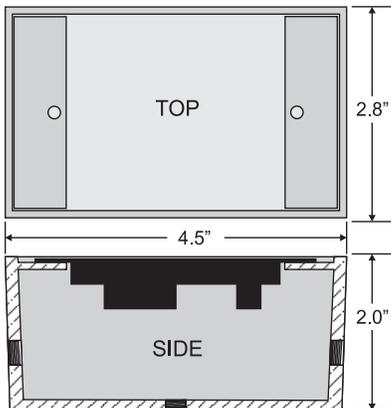

Figure 1: Dimensions

Figure 2: Optional enclosure (Ver. 310-02 and 310-03)

EXAMPLE:	310	-	xx
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

Figure 3: Model 310 ordering matrix

SPECIFICATIONS

Power Requirements	Loop input voltage 9…35V DC
Input Frequency	0.4…10 kHz
Load Resistance	Max 750 Ω at 24V DC
Output Response Time	Varies with filter
Temperature (Operating)	−29…70ºC; −20…158ºF
Temperature (Storage)	−40…85ºC; −40…185ºF
Accuracy	±0.04% of reading over entire span
Linearity	0.1% of full scale

CALIBRATION

Units can be calibrated at our facility or easily programmed in the field. Field calibration requires an A301-20 programming kit (consisting of a custom cable and software) and a computer (PC) running a Windows® 7, XP or Vista operating system. To calibrate, the Model 310 must be connected to the loop for power and the A301-20 programming kit cable must be connected to an available 9-pin port on the computer. If the computer does not have a DB-9 port, a USB-to-COM port adapter can be used.

Badger Meter

Product Data Sheet

Calibration, *continued*

Once the software is loaded and transmitter communication is established, the following parameters are entered on the setup screens:

• Units of measure

• 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

• Flow rate represented by 4mA

• Flow rate represented by 20mA

An added feature is a user selectable filter. Set at 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. Refer to *Figure 4* for terminal connections.

1. Connect loop power supply positive (+) to the terminal marked 4-20mA loop (+).

2. Connect the terminal marked 4-20mA loop (–) of the Model 310 to the positive analog terminal of the input device (Chart Recorder, PLC, etc.).

3. Connect negative analog terminal of the input device to loop power supply negative.

4. If wiring a **200** sensor, connect the red wire (signal) to the Signal (+) terminal, black wire (ground) to the Signal (–) terminal, and the shield to the Shield Ground terminal (disregard shield for the IR sensors).
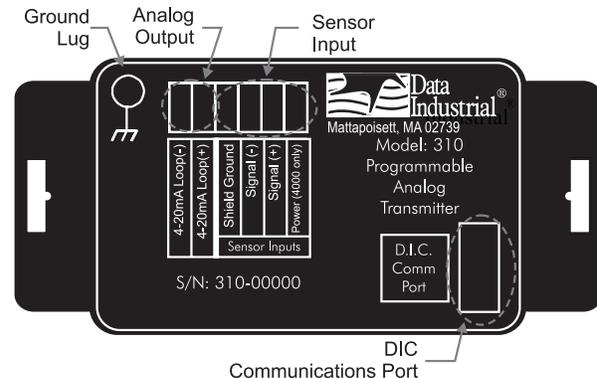
   If wiring a **4000** sensor, connect the clear wire (signal) to the Signal (+) terminal, black wire (ground) to the Signal (–) terminal, shield wire to the Shield Ground terminal, and red wire (power) to the Power (4000 only) terminal.

   If the sensor is not a Badger Meter Data Industrial 200, go to step 6.

5. For maximum EMI protection, connect the Model 310 ground lug to the panel ground.

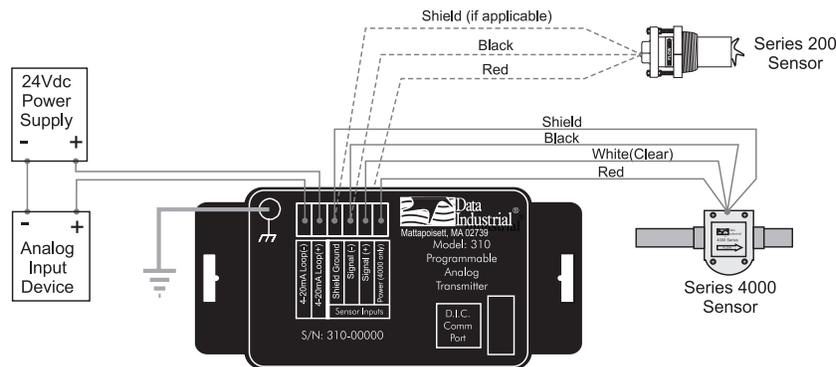6. Make sure all connections are tight. Then plug the connector into the header.

Figure 4: Terminal connections

Figure 5: Typical wiring example

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