**BadgerMeter, Inc.**

## Mechanical installation
The Model 310 may be surface mounted onto a panel, attached to DIN rails using adapter clips or wall mounted using two optional enclosures.

## Location
Although the Model 310 is encapsulated, all wiring connections are made to exposed terminals. The unit should be protected from weather and moisture in accordance with electrical codes and standard trade practices.

In any mounting arrangement, the primary concerns are ease of wiring and attachment of the programming cable.

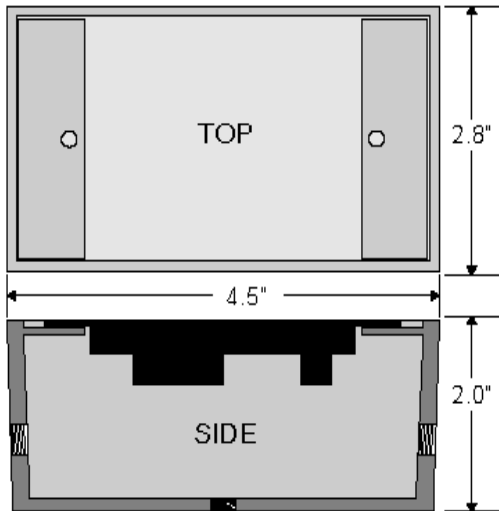The unit generates very little heat so no consideration need be given to cooling or ventilation.



**Figure 2: 310 Optional Enclosure Dimensions**

## Surface Mount Installation
The Model 310 may be mounted to the surface of any panel using double sided adhesive tape or by attaching fasteners through the holes in the mounting flanges of the unit.

## DIN Rail Mounting
Optional clips snap onto the mounting flanges allowing the Model 310 to be attached to DIN 15, 32, 35 mm DIN rail systems.

## Wall Mounting
Optional metal and plastic enclosures are available to mount the Model 310 to a wall when no other enclosure is used. The enclosure is first attached to the wall using fasteners through its mounting holes.

After wiring, the transmitter may be attached to the enclosure with the terminal headers facing in using the slots in the mounting flanges. As an alternate mounting arrangement, the Model 310 may be fastened to the box cover using double-sided adhesive tape.

Model 310 Electrical Installation

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 3 for terminal connections.

2. As shown in figure 4, connect loop power supply positive (+) to Model 310 terminal marked 4-20mA loop (+).

**Figure 3: Model 310 Terminal Locations**

3. Connect terminal marked 4-20mA loop (-) of Model 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. If Wiring a Series 200 sensor, connect the red wire (signal) to Signal (+) terminal, black wire (common) to Signal (-) terminal and the shield to Shield Ground terminal (Disregard shield for the IR sensors).
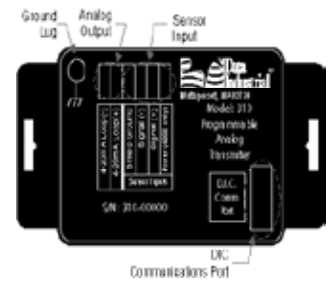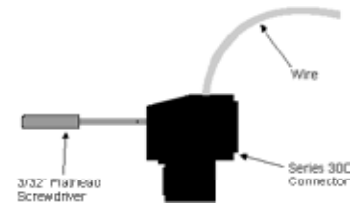


**Side View - Typical 300 Series Removable Connector Wiring**

If Wiring a Series 4000 sensor, connect the clear wire (signal) to Signal (+) terminal, black wire (common) to Signal (-) terminal, shield wire to Shield Ground terminal, and red wire (power) to Power (4000 only) terminal.

If wiring to a sine wave output sensor consult factory.

6. For maximum EMI Protection, connect Model 310 ground lug to panel ground. See Note #1

7. Ensure that all connections are tight, then plug connector into header.

## Note #1:
Included with every Model 310 is a 310IK kit containing a screw, lock washer and ground lead to connect the Model 310 to Earth Ground. This will help prevent electrical interference from affecting the Model 310's normal operation.
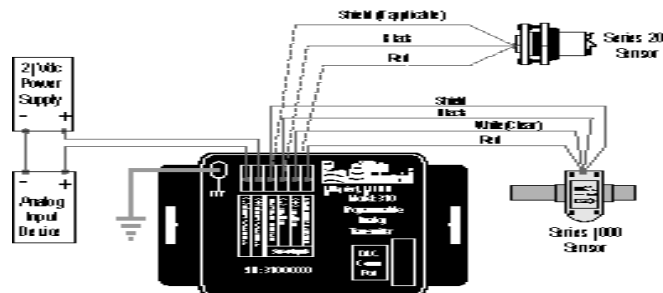


**Figure 4: Model 310 Wiring to Analog Loop and Series 200 or Series 4000**

**Communications cable wiring**
Field calibration requires a Data Industrial A310 Programming kit (consisting of a custom cable and software) and a PC running Windows® 9x, ME, NT, 2000 or XP. In order to program the Model 310 it must be

connected to Loop-Power and the A301 cable must be connected between the Model 310 Comm port connector and an available DB9 COM port on a computer.



**Location of the
DIC Communication Port**

**Note:**
The Data Industrial A301 Cable will work with all 300 Series products. However the older version of the cable (A300) does not have sufficient bandwidth to work with the newer 340 Series Transmitters or SDI Flow Sensors.

Data Industrial provides free programming software updates via the Internet for all of 300 Series devices. Go to www.dataindustrial.com for these updates.

**Programming Software Installation**
**Floppy Installation**
Place the software installation Disk 1 into the floppy drive and run the setup.exe program to install.

**CDROM Installation**
Place the software CD into the CDROM drive and it should autostart. Click programming software, then click the Model 310 and the software installation will begin.

**Web Installation**
The Installation software can be found at the Data Industrial web site (www.dataindustrial.com) in the support section.

**Model 310 Programming**
Programming the Model 310 is accomplished by installing the Data Industrial programming software on a computer and entering data on templates of the Windows® based program.

1.  Install the 310 PC Interface Software into the computer.

2.  Connect the computer to the Model 310 transmitter using the Data Industrial A301 communications cable. Plug A301 cable to the socket labeled "D.I.C Comm Port" taking care to properly align the tab on the plug and socket to maintain polarity then plug the DB9 connector of the Data Industrial A301 communications cable to an avaliable PC com port that has the Model 310 software installed.
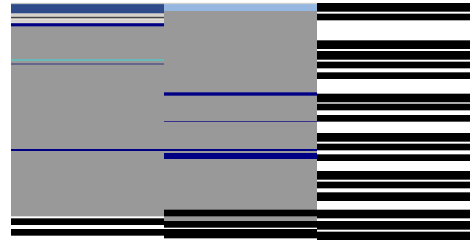
3.  Connect the Model 310 transmitter to a powered 4-20mA loop. (if setting up in the office a 9-24VDC power source can be used to simulate the loop).

4.  Open the interface software and select the appropriate COM PORT as shown in the dialog box below.
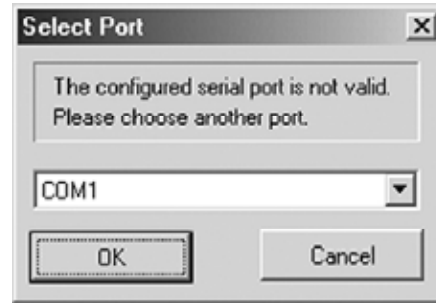


5.  Open the Parameters Screen as shown below.
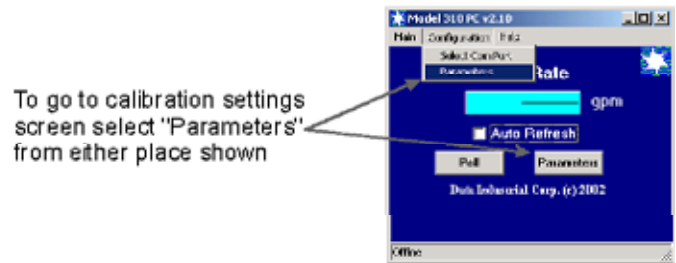


6.  Program using diagram below as a reference.



**Note #1**
Sdi - If the SDI sensor type is selected the required K and offset values can be found the the SDI owners manual.

4000 - If the 4000 sensor type is selected, click the choose button and select the sensor from the pull down box that appears.

Sine - Provided for connection to sensors which have a sine wave output. Please consult sensor manufacturer for the calibration settings.

200 Insert Type - If the 200 Insert Sensor type is selected the required K and offset can be found the the 200 owners manual or if the manual is not handy the calculate button can be pushed and an inside pipe diameter can be entered and once calculate is pressed a K and offset will automatically be entered in.

200 Tee Type - If the 200 tee type is selected, click the choose button and select the sensor from the pull down box that appears.

## Model 310 Specifications

Power Requirements:
    Loop Input Voltage 9-35VDC

Input Frequency:
    0.4 to 10 KHz

Load Resistance
    Max 750Ω@24VDC

Output Response Time
    Varies with filter

Temperature (operating):
    -29°C to 70°C
    -20°F to 158°F

Temperature (storage):
    -40°C to 85°C
    -40°F to 185°F

Accuracy
    ± 0.04% of reading over entire span

Linearity
    0.1% of full scale

## Warranty

Data Industrial Corporation ("Seller") of 11 Industrial Drive, Mattapoisett, Massachusetts 02739-0740, U.S.A., warrants to the original purchaser of its product that such product manufactured by Data Industrial Corporation shall be free from defects in materials or workmanship when installed, serviced and operated according to Data Industrial Corporation instructions or in other such normal use. This warranty is effective for a period of 12 months from the date of installation by the Purchaser or 18 months from the date of shipment by the "Seller" whichever occurs or terminates first. This limited warranty does not cover damage or loss resulting from corrosion or erosion caused by acids or other chemicals or by severe environmental conditions or negligent or improper installation or improper operation, misuse, accident, unauthorized repair or substitution of components other than those provided by the "Seller", and does not cover limited life components such as bearings, shafts, impellers where wear rate is a function of application and environment. Any component not manufactured by the "Seller" but included in its products shall not be covered by this warranty and is sold only under such warranty as the manufacturer may provide.

If Buyer or Purchaser wishes to make a claim hereunder, he shall send written notice of any defect within the warranty period, to "Seller" at the above address. "Seller" may at its sole option instruct Buyer to ship subject part, postage prepaid, to the "Seller" at above address or authorize a representative to inspect the part on site. "Seller" will at its sole option repair or replace any defective product covered by this warranty. If Buyer makes repairs or alterations to any product or part covered by this warranty without "Sellers" prior written approval, this warranty shall be null and void.

The foregoing shall constitute Buyers or Purchasers sole and exclusive remedy against "Seller", and no other remedy, including but not limited to, incidental or consequential damages for personal injury, loss of fluids, gases or other substances or for loss of profits or injury to property or person shall be available to the Buyer or Purchaser. The warranty extended herein shall be in lieu of any other implied warranty of merchantability or fitness for a particular purpose, and seller shall bear no liability for representatives or retail sellers. In no event shall Data Industrial Corporation be liable for any contingent, incidental, or consequential damage or expenses due to partial or complete inoperability of its product.

Please see our website at **www.badgermeter.com**
for specific contacts.

**BadgerMeter, Inc.**
P.O. Box 581390, Tulsa, Oklahoma 74158
(918) 836-8411 / Fax: (918) 832-9962
www.badgermeter.com