

Series 340

*Btu transmitter
by Data Industrial*

Owner's Manual

The Data Industrial Series 340 Btu transmitter is an economical, compact device for sub-metering applications.

The 340 calculates thermal energy by measuring liquid flow in a closed pipe system and measuring temperature at inlet and outlet points. The 340 requires two 10 k Ω thermistors for temperature input. The flow input may be provided by any Data Industrial sensor and many other pulse or sine wave signal flow sensors.

The onboard microcontroller and digital circuitry make precise measurements and produce accurate drift-free outputs. The 340 is programmed using Data Industrial's Windows® based software and a Data Industrial A301 programming cable. Calibration information for the flow sensor, units of measurement and output scaling may be downloaded prior to installation or in the field. While the unit is connected to a PC or laptop computer, real-time flow rate, flow total, both temperature readings, energy rate and energy total are available.

The Series 340 transmitter features two LED's to verify input and output signals.

The standard output for the Series 340 is an isolated solid state switch closure that is user programmed for units of energy or flow. The output pulse width is adjustable from 50 mS to 5 sec.

The Series 340 Btu transmitter operates on AC or DC power supplies ranging from 12 to 24 volts.

The compact cast epoxy body measures 3.65"(93mm) x 2.95"(75mm) and can be easily mounted on panels, DIN rails or enclosures.



PN# 72032
REV D 08/22/01

INSTALLATION

Mechanical installation

The series 340 transmitter may be surface mounted onto a panel, attached to DIN rails using adapter clips or wall mounted using two optional enclosures.

Location

Although the 340 device 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.

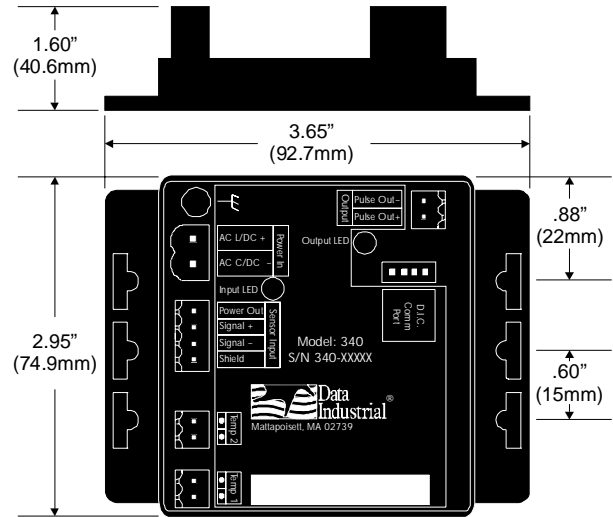
Surface Mount Installation

The 340 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.

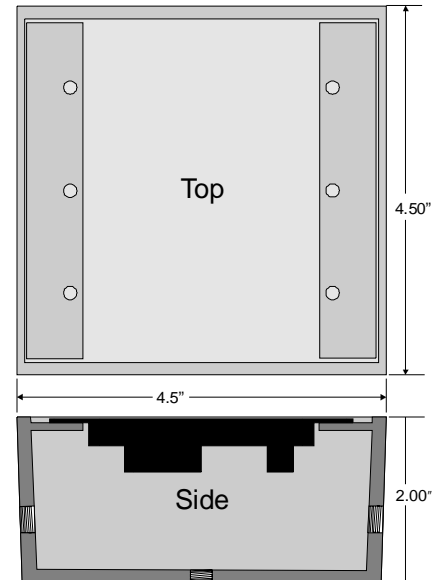
Din rail Mounting

Optional clips snap onto the mounting flanges allowing the 340 to be attached to DIN 15, 32, 35 mm DIN rail systems.

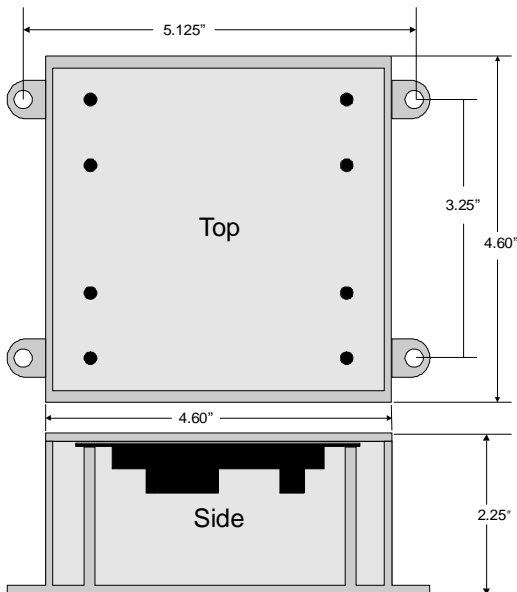
Series 340 Dimensions



340 Metal Box Dimensions



340 Plastic Box Dimensions



Wall Mounting

Optional metal and plastic enclosures are available to mount the 340 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 340 may be fastened to the box cover using double-sided adhesive tape.

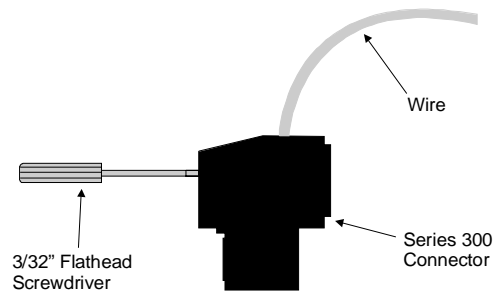
Temperature Sensor Installation

The location of the temperature sensors with regard to the flow sensor is important to the accuracy of the energy calculation. Temperature sensor **T1** must be located closest to the flow sensor. A distance of 5 pipe diameters will give the greatest accuracy. Always install the temperature sensor downstream of the flow sensor.

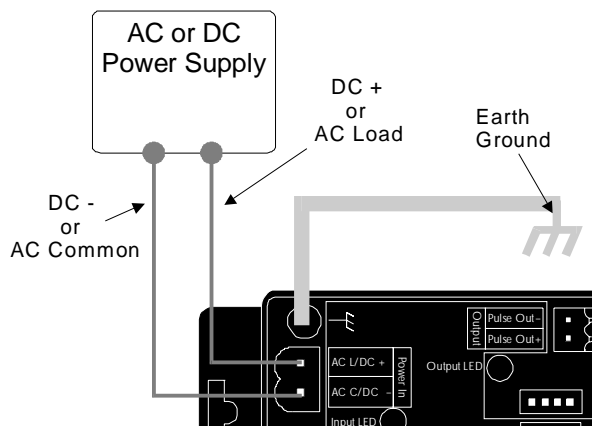
Electrical Installation

All connections to the 340 are made to screw terminals on removable headers.

Side View - Typical 300 Series Removable Connector Wiring



Sample Power Supply Wiring Diagram



Power Supply Wiring

The Series 340 requires 12-24 Volts AC or DC to operate. The power connections are made to the ORANGE header. The connections are labeled beside the header. Observe the polarity shown on the label.

If a Data Industrial plug in type power supply (A-1026 or A-503) is used connect the black/white striped wire to the terminal marked positive (+) and the black wire to the terminal marked negative (-).

Note:

Included with every Series 340 is a 340IK kit containing a screw, lock washer and nut to connect the Series 340 to Earth Ground. Connect the Earth Ground Lug of the Series 340 to a solid Earth

Ground with as short a wire as possible. This will help prevent electrical interference from affecting the Series 340's normal operation.

Sensor Wiring

All flow sensor types connect to the four terminal header labeled "Sensor Input".

200 Series and M Series

Connect the Red wire to Sensor signal (+), Black wire to Sensor signal (-) and the Bare wire to Shield.

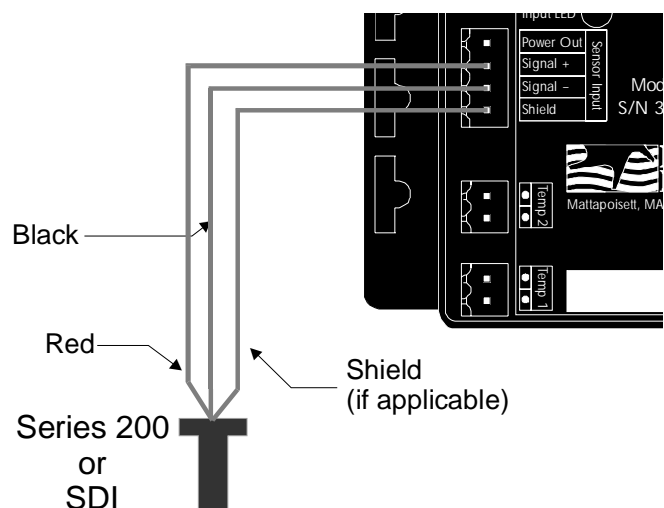
SDI Series

Connect the Plus (+) terminal of the sensor to Sensor signal (+) on the transmitter and the Minus (-) terminal of the sensor to Sensor signal (-) on the transmitter. Connect the shield terminal of the sensor to the shield terminal of the transmitter.

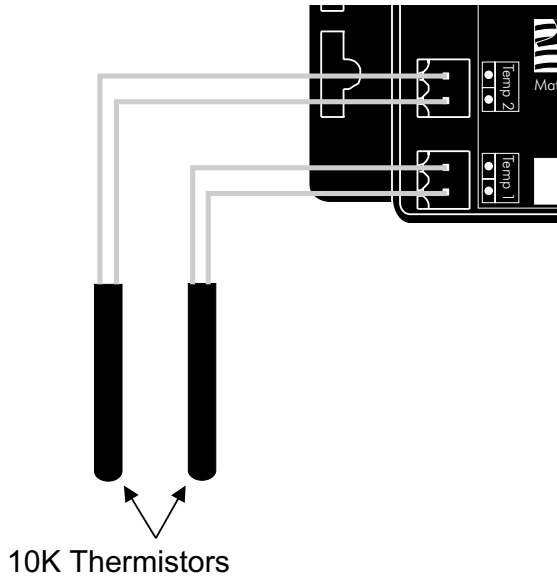
Other Flow Sensors

The Sensor Input **Power Out** terminal supplies nominal 12VDC excitation voltage for 3 wire sensors. Connect sensor **signal +** and sensor **signal -** wires to transmitter terminals.

Sample Sensor Wiring Diagram



Thermistor Wiring Diagram

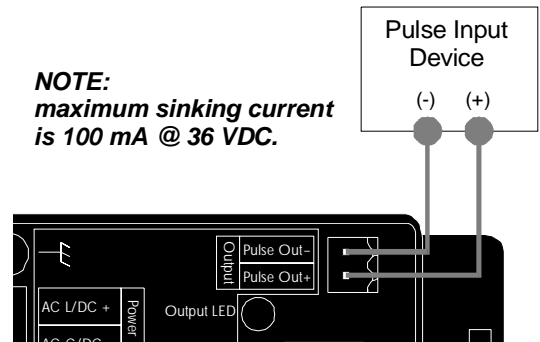


Temperature Element Wiring

The Data Industrial thermistors are not polarity sensitive. Connect thermistor closest to the flow sensor to Series 340 terminal block marked TEMP 1 and the other thermistor wires to Series 340 terminal marked TEMP 2.

Sample Pulse Output wiring Diagram

NOTE:
maximum sinking current
is 100 mA @ 36 VDC.



Pulse Output Wiring

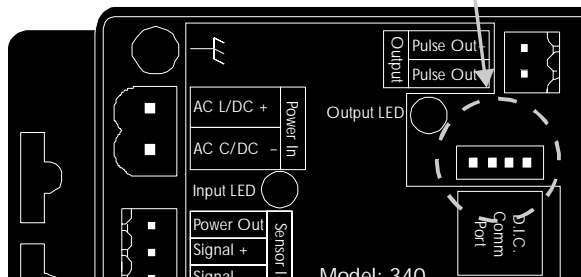
The Series 340 has solid state switch output rated for a maximum sinking current of 100 mA @ 36 VDC. In most cases the pulse out (+) terminal of the 340 will connect to the Input pulse (+) and the pulse out (-) terminal to the Input pulse (-) of the receiving device. These terminals are located on a separate two terminal removable header on the 340 labeled "Output". Observe the electrical polarity of the output.

Communications cable wiring

Field calibration requires a Data Industrial A340 Programming kit (consisting of a custom cable and software) and a PC running Windows® 9x, ME, NT or 2000. In order to calibrate, the Series 340 must be connected to power, and the A301 cable must be connected to the 340 Comm port connector and an available 9-pin COM port on a computer.

Location of the DIC Communication Port

DIC Comm Port
(Plug in A301 Program Cable here to program)



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 Series 340 Transmitters.

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

Programming

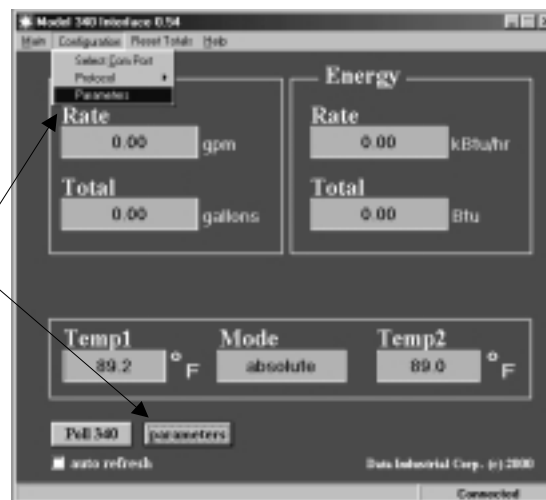
Programming the Series 340 is accomplished by installing the Data Industrial programming software on a computer and entering data on templates of the Windows® based program.

1. Load the interface software into the computer.
2. Connect the computer to the Series 340 transmitter with the Data Industrial A-301 communications 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. Connect the DB9 connector of the Data Industrial A301 communications cable to a PC com port that has the 340 software installed.
3. Connect the Series 340 transmitter to a power supply.
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.

To go to the calibration settings screen select "parameters" from either place shown



6. Program using diagram below as a reference.

Step 1
Select the flow sensor type (sine or pulse) and enter the k and offset - **see note #1**

Step 2
Select the desired temperature sensor units.

Step 3
Select the method of computing the temperature differential. **See Note #2**
Typically:
T1>T2 for Heating
T1<T2 for Cooling

Step 4
Select the desired flow rate and total units here

Step 5
Select the desired energy rate and total units here

Step 6
Select the output units per pulse, and the pulse width.

Step 7
Press send to transmit calibration data to the 340

Step 8
Press to exit parameters screen and to go back to main screen

Press to refresh the parameters screen with the current 430 settings.

See Note #3

Press to restore the factory default settings to the screen.
Note: Must press "send" before values take effect.

Note #1:

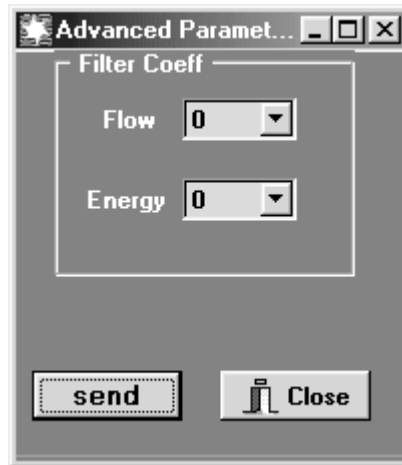
Data Industrial flow sensor "K" and "offset" information is printed in the flow sensor owners manual, and also available on our website. Calibration constants for other sensors must be supplied by the manufacturer.

Note #2

Typically the Temperature measured by T1 will be greater than T2 in a heating application or T1 will be less than T2 in a cooling application. The Selection of one of these choices will determine if energy calculations are made for heating only (T1>T2), cooling only (T1<T2), or both (absolute)

Note #3

The filter coefficient screen allows adjustment of the flow and energy filters. A scale of 0-10 is used with 10 providing the greatest degree of smoothing. See the Dialog Box below.



SPECIFICATIONS

Power

Power supply options:

12-35 VDC +/- 5%

12-24 VAC +/- 10%

Current Draw:

60 mA @ 12 VDC

Flow Sensor Input

All sensors:

Excitation voltage 3 wire sensors:

7.9 – 11.4 VDC 270Ω source

impedance

Pulse type sensors:

Signal amplitude:

2.5 VDC threshold

Signal limits:

Vin < 35V (DC or AC peak)

Frequency:

0-10kHz

Pull-up:

2 kΩ

Sine Wave Sensors:

Signal amplitude:

10 mV p-p threshold

Signal limits:

Vin < 35V (DC or AC peak)

Frequency:

0-10kHz

Temperature Sensor Input

2 required:

10 kΩ thermistor, 2 wire, type II, 10 kΩ @ 25°C

Pulse Output

Pulse Width:

Programmable from 50 mS to 5 Sec in 50mS increments

Pulse frequency:

Max of 10Hz @ 50mS pulse width programmable to scaling requirements of connected device

Opto-isolated solid state switch

Operating Voltage range:

0 - ±60V (DC or AC peak)

Closed (on) state:

Load Current - 700mA max. over

operating temperature range

On-resistance - 700mΩ max. over

operating temperature range

Open (off) state – leakage @ 70°C

<1 A @ 60V (DC or AC peak)

Operating Temperature

-29° C to +70° C

-20° F to +158° F

Storage Temperature

-40° C to +85° C

-40° F to +185° F

Weight

4.8 oz. With headers installed

SENSOR CALIBRATION

Data Industrial

Use “K” and “offset” provided in sensor owner's manual

Other Sensors

Check with factory

UNITS OF MEASURE

Flow measurement

Rate:

gpm, gph, l/sec, l/min, l/hr, ft3/sec, ft3/min, ft3/hr, m3/sec, m3/min, m3/hr

Total:

gallons, liters, cubic feet, cubic meters

Energy measurement

Rate

kBtu/min, kBtu/hr, kW, MW, hp, tons

Total

Btu, kBtu, MBtu, kWh, MWh, kJ, MJ

Temperature Units

Fahrenheit, Centigrade

PROGRAMMING

Requires PC or laptop running Windows® 9x, ME, NT, 2000

Data Industrial A-340 programming kit containing software and A301 programming cable

FACTORY DEFAULTS

	Default Values	Customer Values
Serial Number	n/a	
Version	n/a	
Temperature Units	°F	
Sensor Type	Pulse	
K=	1	
offset=	0	
Flow Rate Units	gpm	
Flow Total Units	gallons	
Energy Rate Units	kBtu/hr	
Energy Total Units	Btu	
Energy Calculation	absolute	
Flow Filter	0	
Energy Filter	0	
Scaled Pulse Output Units	energy	
Scaled Pulse Output Units Per Pulse	1	
Scaled Pulse Output Pulse Width	100	

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.

All rights reserved. No part of this work covered by the copyrights hereon may be reproduced or copied in any form or by any means - graphic, electronic, or mechanical, including photocopying, recording, taping, or information and retrieval systems -- without written permission of Data Industrial.

Copyright © 2001
Data Industrial Corporation
11 Industrial Drive
Mattapoisett, MA 02739
TEL: 508-758-6390
FAX: 508-758-4057
email: sales@dataindustrial.com
service@dataindustrial.com
web site: www.dataindustrial.com