# • F-5100 SERIES •
## THERMAL MASS FLOW METER

ONICON
FLOW AND ENERGY MEASUREMENT

Made in America

## DESCRIPTION

ONICON's F-5000 series thermal mass flow meters provide accurate mass flow measurement of natural gas, compressed air and other industrial gases. The proprietary sensor design measures mass flow directly and does not require additional pressure or temperature compensation to deliver accurate flow data.

The F-5100 is available as an inline or an insertion style meter. Both are provided with a bright, easy-to-read display and include a 4-20 mA output for flow rate with a separate pulse output for totalizing flow.

## APPLICATIONS

- Natural Gas
- Compressed Air
- Other Combustible Gases
- Industrial Gases

## GENERAL SPECIFICATIONS

**ACCURACY**
Natural Gas / Propane Gas
± 1.0% of reading from 500 – 7000 SFPM
± 2.0% of reading from 100 – 500 SFPM
Compressed Air & other high velocity calibrations
± 1.0% of reading + 0.5% of scale over a 100:1 turndown

**OVERALL FLOW RANGE**
5 to 35,000 SFPM

**SENSING METHOD**
Thermal mass flow utilizing hybrid analog/digital sensing circuitry

**PIPE SIZE RANGE**
Insertion style - 1" through 24" nominal diameter
Inline style - ¼" through 4" nominal diameter

**INPUT POWER OPTIONS**
Standard
24 VDC ±10%, 100 mA maximum current
Optional
90 - 265 VAC 50/60 Hz
12 VDC ±10%, 200 mA maximum current

## CALIBRATION

Every ONICON flow meter is wet calibrated in a flow laboratory against standards that are directly traceable to N.I.S.T. A certificate of calibration accompanies every meter.

## FEATURES

**Excellent Long Term Reliability -**
ONICON thermal mass flow meters employ a low maintenance, non-moving parts technology to sense flow and are generally unaffected by debris in the flow stream.

**Highly Accurate Over a Wide Operating Range -**
Our proprietary hybrid analog/digital sensing circuitry is very stable and yet highly responsive to changes in flow. This stable yet responsive design allows for accurate flow measurement over a very wide operating range (over 1000:1 for the inline version). It also makes the meter ideal for measuring low flow rates.

**Provides for Field Validation of Calibration -**
The F-5100 continuously displays a special calibration value that provides a fast, easy way to confirm that the calibration is valid.

**Inline Meters are Provided with Built-in Flow Conditioners -**
Flow conditioners are built in to all ½" through 4" diameter inline meters. The flow conditioner significantly reduces overall straight run requirements for installation.

**Insertion Meters Can Be Installed Without Interrupting Gas Service* -**
ONICON's hot tap design allows for installation without interruption to the gas service. The meter can also be removed for service without disrupting flow.

**Excellent Value -**
ONICON insertion style meters are accurate, easy-to-use and reliable. They are also priced independently of pipe size. This makes them an excellent value, particularly in larger diameter pipes.

* See note on next page.


*The optional D-100 Flow Display provides a local indication of rate and total and a network interface for BACnet, MODBUS, LonWorks, JCI - N2, or Siemens - P1 FLN networks.*

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## GENERAL SPECIFICATIONS (cont.)

**FLUID TEMPERATURE RANGE**
-40° F to 200° F standard
Note: Temperatures above 150° F require remote mount transmitter
(Consult ONICON for other operating ranges.)

**AMBIENT TEMPERATURE RANGE**
0° F to 150° F

**MAXIMUM OPERATING PRESSURE**
Standard: 500 PSI
Optional: 1,000 PSI

**PRESSURE DROP (@ 2500 SFPM, 70° F and 2 PSIG)**
Insertion Meter - Less than 0.5 IN w.c. ($H_20$) in 1½" diameter pipes, decreasing in larger pipes
Inline Meter - (with built-in flow conditioner)
Less than 0.5 IN w.c. ($H_20$) in 2" and larger diameter meters
Less than 0.9 IN w.c. ($H_20$) in 1" and 1½" diameter meters

**PROGRAMMING / MEMORY**
Factory programmed for specific application
Non-volatile memory retains all program parameters and totalized values in the event of power loss.

**OUTPUT SIGNALS PROVIDED**
Analog output: 4-20 mA
Scalable pulse output: Active 24 VDC pulse, 500 ms duration (Optional pulse isolator available)
Network Interface:
Protocol: MODBUS RTU
Connection: RS485, 2-wire (half-duplex)
Baud Rate: 9600 or 19200

**MATERIAL**
Wetted metal components: 316 Stainless Steel

**ELECTRONICS ENCLOSURE**
Integral mount, weathertight NEMA 4 aluminum enclosure
***Optional*** remote mount version of transmitter available (1000 ft maximum length)

**ELECTRICAL CONNECTIONS**
Enclosed terminal blocks, cable access through two ½" NPT conduit fittings
***Optional*** remote mount version of transmitter available (1000ft maximum length)

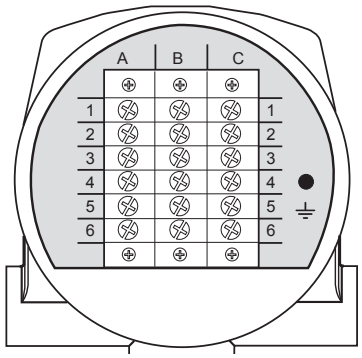
**APPROVALS**
The 24 VDC versions of this product have been tested by Met Laboratories to the following standards:
UL 61010-1/CSA C22.2 No. 61010-1 Electrical Equipment for Measurement, Control and Laboratory Use; Part 1: General Requirements
CAN/CSA-C22.2 No. 157-92 Intrinsically Safe and Non-incendive Equipment for Use in Hazardous (Classified) Locations
CSA C22.2 No. 213-M1987 Non-incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations
ATEX: Ex, nA IIC T4X

***** Installations must comply with federal, state and municipal building codes. Review all proposed combustible gas installations with your local code enforcement officials before attempting any installation.

NOTE: Specifications are subject to change without notice.

## ELECTRICAL CONNECTIONS

Inside Rear Cover




**Terminal Wiring Connections**

| | A | B | C |
|---|---|---|---|
| 1 | NA | AC1 | NA |
| 2 | NA | AC2 | RS 485 (+) |
| 3 | NA | NA | RS 485 (-) |
| 4 | NA | NA | Pulse Out (+) |
| 5 | NA | + 24 VDC | 4-20mA Out (+) |
| 6 | NA | VDC Common | VDC Common |

**OPERATING RANGE FOR COMMON PIPE SIZES**
**5 to 7000 SFPM in schedule 40 pipe**

| Pipe Size (Inches) | Flow Rate (SCFH) Min | Max |
|---|---|---|
| ¼ | 0.2 | 304 |
| ⅜ | 0.4 | 557 |
| ½ | 0.6 | 886 |
| ¾ | 1.1 | 1,560 |
| 1 | 1.8 | 2,521 |
| 1¼ | 3.1 | 4,362 |
| 1½ | 4.2 | 5,938 |
| 2 | 7.0 | 9,740 |
| 2½ | 10 | 13,964 |
| 3 | 15 | 21,562 |
| 4 | 27 | 37,130 |
| 5 | 42 | 58,350 |
| 6 | 60 | 84,263 |
| 8 | 104 | 145,912 |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# F-5100 TYPICAL INSERTION METER INSTALLATION

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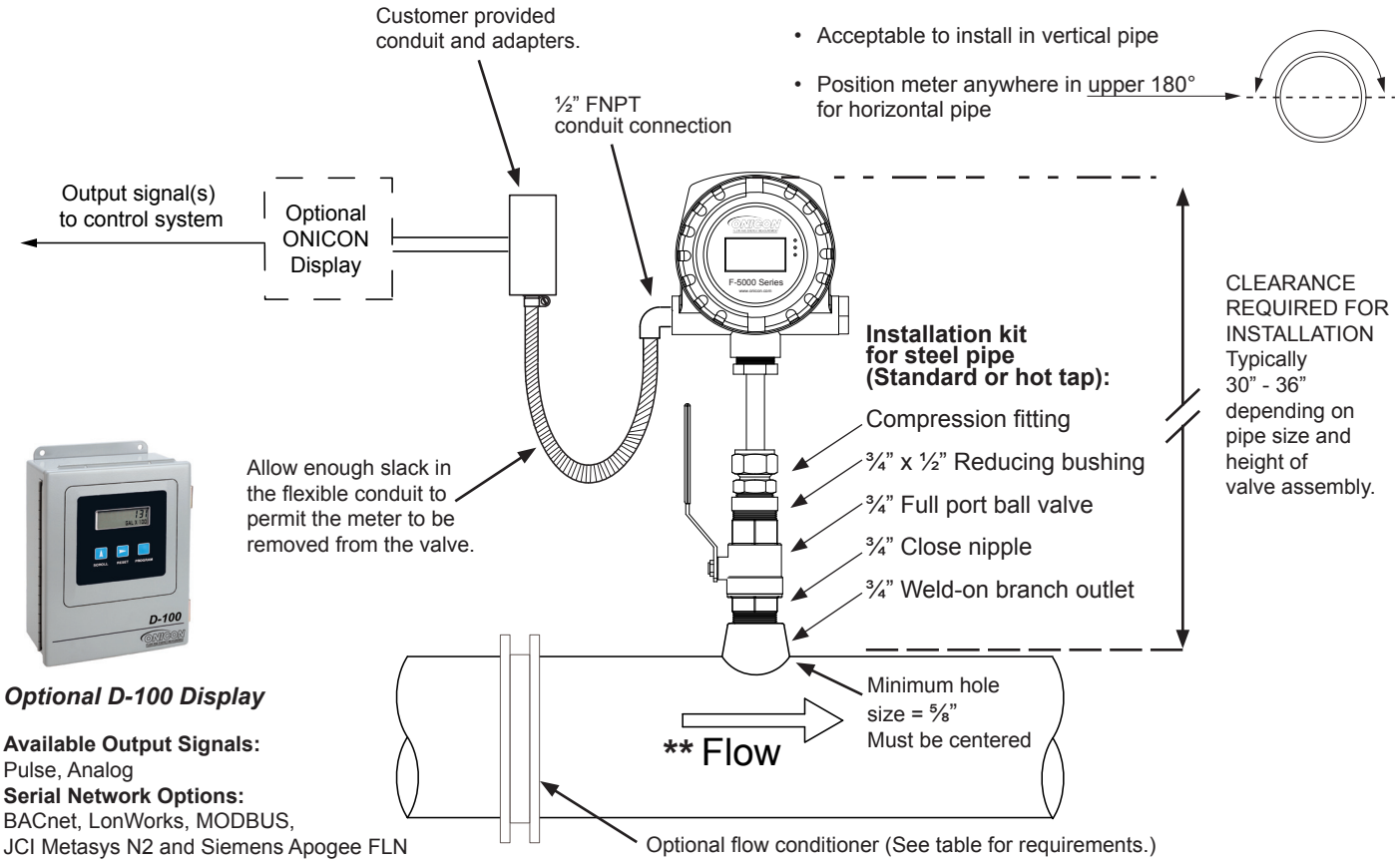


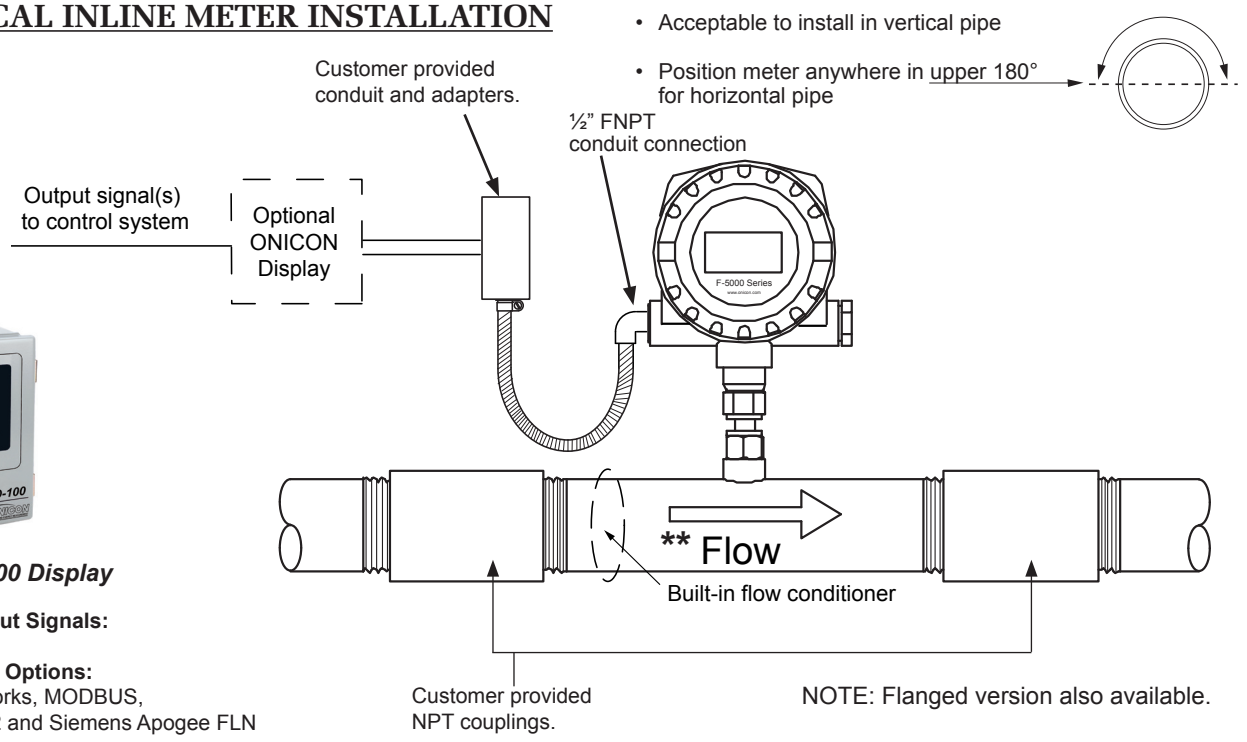




***Optional D-100 Display***

**Available Output Signals:**
Pulse, Analog
**Serial Network Options:**
BACnet, LonWorks, MODBUS,
JCI Metasys N2 and Siemens Apogee FLN

# F-5100 TYPICAL INLINE METER INSTALLATION





***Optional D-100 Display***

**Available Output Signals:**
Pulse, Analog
**Serial Network Options:**
BACnet, LonWorks, MODBUS,
JCI Metasys N2 and Siemens Apogee FLN

** Standard orientation. Contact ONICON for other options.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## ORDERING INFORMATION

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## F-5100 Thermal Mass Model # Codification *F-51AA-1BCD-EFF*

***F-51 = Thermal Mass Flow Meter With Display, 4 - 20 mA & Scaled Pulse Outputs***

***AA = Pipe Diameter***

| | |
|---|---|
| 00 = Insertion | 13 = 1¼" |
| 14 = ¼" | 15 = 1½" |
| 38 = ⅜" | 02 = 2" |
| 12 = ½" | 25 = 2½" |
| 34 = ¾" | 03 = 3" |
| 01 = 1" | 04 = 4" |

***B = Line Voltage***

1 = 24 VDC (standard)
2 = 90 - 265 VAC 50/60 Hz (optional)
3 = 12 VDC (optional)

***C = Integral or Remote Mount***

1 = Integral
2 = Remote

***D = Process Connections***

0 = Insertion
1 = Threaded MNPT Connections
2 = ANSI Class 150 Flange
3 = ANSI Class 300 Flange

**E = Flow Conditioner**

1 = Insertion meter without conditioner
2 = Insertion meter with conditioner
3 = Inline meter

**FF = Gas Type**

| | |
|---|---|
| NG = Natural Gas | O2 = Oxygen Gas |
| ME = Methane Gas | DA = Duct / Flue Air |
| PG = Propane Gas | HE = Helium Gas |
| CA = Compressed Air | N I = Nitrogen Gas |
| CD = Carbon Dioxide | XX = Other Gases |

## F-5100 Thermal Mass Meter Accessory Ordering Information

| Item # | Accessory Item Description |
|---|---|
| **Install kits for carbon steel pipe** | |
| **INSTL64** | Installation kit for welded carbon steel pipe, 50 PSIG, 200° F max |
| **INSTL69** | Stainless steel installation kit for welded carbon steel pipe, 50 PSIG, 200° F max |
| **INSTL70** | Installation kit for welded carbon steel pipe, 500 PSIG, 140° F max |
| **Install kit for stainless steel pipe** | |
| **INSTL82** | Stainless steel installation kit for welded stainless steel pipe, 500 PSIG, 140° F max |
| **Flow meter accessory items** | |
| **INSTL91** | Insertion meter compression fitting w/o installation hardware, 125 PSIG, 140° F max |
| **17350** | 25 ft of additional remote mount cable |
| **17351** | 50 ft of additional remote mount cable |
| **17352** | 100 ft of additional remote mount cable |
| **17920** | Pulse isolator module (converts active pulse output to dry contact) |