F-4600
Inline Ultrasonic Flow Meter

Chilled Water • Hot Water • Domestic Water

ONICON's F-4600 Series is a family of inline flow meters that provide accurate, reliable flow measurement for a variety of applications. F-4600 Series meters range in size from ½ to 2½" in diameter.

ONICON
FLOW AND ENERGY MEASUREMENT

DESCRIPTION

F-4600 Flow Meters provide highly accurate flow measurement in water and water/glycol systems. The compact design can be ordered with or without a local display.

When ordered without the display, the meter is provided with an all-weather conduit ready NEMA4 enclosure. This version of the meter includes a single 4-20 mA output for flow rate and a single scaled pulse output for totalization.

FEATURES

- **Reliable No-Moving-Parts Design -** Wetted ultrasonic transducers sense the flow rate by measuring the differential transit time. Transducer orientation allows for a direct ultrasonic beam path. This significantly enhances both signal strength and long term reliability
- **Highly Accurate Over a Wide Flow Range -** The flow sensor is accurate to within ±1% of reading over the normal (25:1 turndown) operating range and within ±2% of reading over an extended (100:1 turndown) range.
- **User Friendly Backlit Display and User Interface -** The bright, easy-to-read, backlit display uses "smart button technology" to simplify page navigation and programming. This eliminates the need special configuration tools.
- **Detachable Display -** The F-4600 user interface/ display is easily detached from the flow sensor. This allows for remote mount installation up to 5 ft from the sensor body.
- **Built-in Interval Data Logger -** Volume totals are date/time stamped and logged within the meter along other analytical data. This data is available via BACnet® or MODBUS®.

APPLICATIONS

- Domestic/municipal water
- Chilled water, hot water, condenser water & water/ glycol solutions for HVAC
- Steam condensate
- Process application water flow

CALIBRATION

Each F-4600 is wet-calibrated using N.I.S.T.[1] traceable standards. A certificate of calibration is provided with each meter.

Versions of the F-4600 that do not include a display have a NEMA4 conduit ready enclosure. They are provided with a 10ft unterminated cable for field wiring connections.

[1] - National Institute of Standards and Technology

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CONFIGURATION OPTIONS FOR F-4600 WITH DISPLAY

F-4600 flow meters ordered with the local display option are available in a number of different configurations. The flexible platform is available with three factory configurable 2-wire signal connection ports and one RS485 interface.

- **Auxiliary pulse inputs –** All three 2-wire ports can be used as inputs for totalizing pulses from external devices such as water, gas or electric meters. Totals are displayed and transmitted to the network.
- **Programmable pulse outputs –** All three 2-wire ports can be used as contact closure outputs for totalization, alarm status or coil indication (MODBUS® RTU only).
- **Analog output –** One 2-wire port can be provided as an analog output to provide flow rate data.
- **RS485 serial communications –** RS485 can be provided with BACnet® MS/TP or Modbus® RTU to report flow, temperature and operating status data to the network.

BACnet® / MODBUS® Data	
Name	**Description**
Volume	Rate / Total / Y-T-D Total / Prev. Yr. Total / User Resettable Total
Temperature	Supply Temp
Diagnostics	Meter Status / Signal Strength / Signal Quality / Speed of Sound
Trend Data	Volume Total / Meter Status

Meter couplings are provided for meters up to 2” in diameter. 2½” meters are provided with flanged process connections.

Meter Models with Flow Ranges in GPM							
Meter Size	**Process Connection Type**	**Typical Design Flow**	**1% of Rate Range**	**2% of Rate Range**	**Min Flow**	**C_v ***	**Length with Couplings or Flanges**
(Nominal Size)		(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(in)
½”	Male NPT	6.6	0.6 - 15	0.15 - 15	0.03	6.08	11.2
¾”	Male NPT	6.6	0.6 - 15	0.15 - 15	0.03	6.08	11.7
¾” (high flow)	Male NPT	11	1 - 25	0.25 - 25	0.05	8.81	11.7
1”	Male NPT	11	1 - 25	0.25 - 25	0.05	8.81	12.3
1” (high flow)	Male NPT	15.4	1.4 - 35	0.35 - 35	0.07	12.17	15
1¼”	Male NPT	26.4	3 - 60	0.6 - 60	0.12	20.26	15.25
1½”	Male NPT	44	5 - 100	1 - 100	0.2	33.85	17
2”	Male NPT	66	8 - 150	1.5 - 150	0.3	101.2	17.6
2½”	Class 150 Flange	110	12 - 225	2.5 - 250	0.5	156.2	11.81

When provided with a display, the F-4600 features an IP65 enclosure. Field wiring connections are made to internal terminal blocks through the 4 cable glands provided.

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GENERAL SPECIFICATIONS*

ACCURACY
FLOW
± 1% of reading over 25:1 turndown
± 2% of reading over 100:1 turndown
Repeatability: ≤ ± 0.2%

OVERALL FLOW RANGE
500:1 turndown

SENSING METHOD
Direct beam path wetted ultrasonic sensors utilizing differential transit time velocity measurement

METER SIZES (Nominal diameter in inches)
½, ¾, 1, 1¼, 1½, 2 and 2½

PIPING SYSTEM CONNECTIONS
Male NPT threads
2½" meter provided with ANSI Class 150 raised face flanges

FLUID TEMPERATURE RANGE
32° F to 250° F

AMBIENT TEMPERATURE RANGE
-13° F to 131° F

MAXIMUM OPERATING PRESSURE
400 PSI

PRESSURE DROP
Less than 1 PSI at 4 ft/sec, decreasing at lower velocities

POWER SUPPLY REQUIREMENTS
Display version
12-36 VAC, 50/60 Hz, 5 VA maximum
12-42 VDC, 5 W maximum
Non-display version
20-26.5V ac/dc, 50/60 Hz, 5 VA or 60 mA DC

PULSE INPUTS, OUTPUTS, and ANALOG OUTPUT (Display version)
The three 2-wire signal ports can be configured as pulse inputs or outputs. One of the ports can be configured as an analog output.
Isolated totalizing pulse inputs for use with sinking open collector or dry contact outputs
Input rating: 30 VDC, 10 mA maximum
Pulse duration: 50 ms minimum
Isolated totalizing solid state contact closure pulse outputs may be programmed for energy, volume, alarm indication or coil indication (MODBUS RTU only)
Contact ratings: 50 mA, 30 V
Contact pulse duration: 50, 100, 500 or 1000 ms (500ms default)
Analog 4-20 mA, 0-5 V or 0-10 V output for flow rate or temperature

PULSE INPUTS, OUTPUTS, and ANALOG OUTPUT (Non-display version)
Analog output: 4-20 mA (non-isolated)
Scalable pulse output:
Isolated solid state dry contact
Contact rating: 50 mA, 30V dc
Contact duration: 1000ms

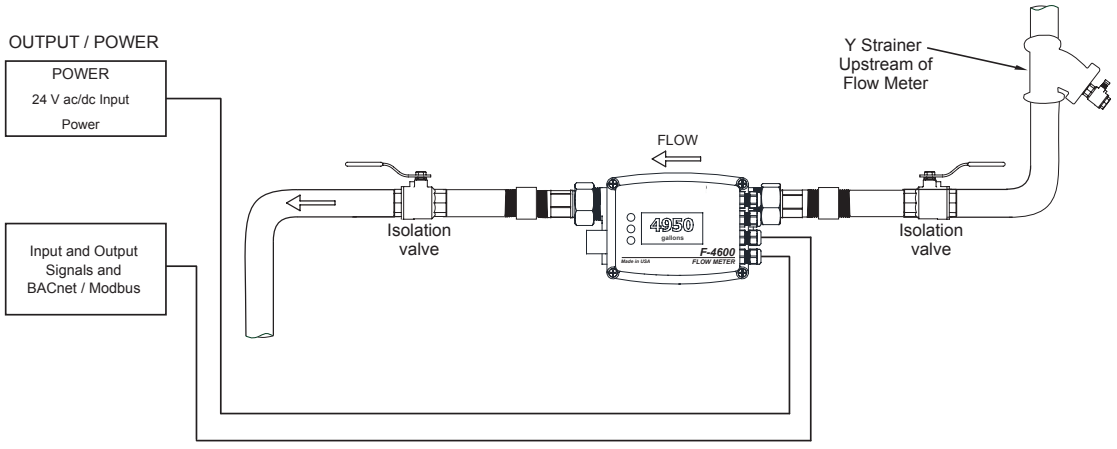
NETWORK CONNECTION (Display version)
Isolated RS485 serial interface
COMMUNICATION PROTOCOLS (Display version)
BACnet MS/TP per ASHRAE Standard 135.1: 2009
MODBUSR RTU

NETWORK CONFIGURATION & ADDRESSING (Display version)
Baud Rates: 4800, 9600, 19200, 38400, 76800, or 115200
Device Address Range: 1 – 255 (1 - 247 MODBUS)
Device Instance Range: 1 – 4,194,303 (BACnet only)
Parity: None, Even, Odd (MODBUS RTU only)

APPROVALS
FCC: Part 15, Subpart B
CE
Conforms to ANSI/NSF 61 & 372 (certification pending)
BTL Certified to ASHRAE 135:2009

*Specifications subject to change without notice

TYPICAL F-4600 INSTALLATION
(Meter may be installed in supply or return.)



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