

MODEL

VF3

Insertion Style

Vortex Shedding Flow Meter

HIGHLIGHTS

- Measures gas, liquid, and steam
- Multivariable outputs for five process parameters:
 - Mass flow rate
 - Volumetric flow rate
 - Temperature
 - Pressure
 - Density
 - Energy (BTU)
- Single process connection
- Insertion configurations for pipes > 2-inch
- Available for hot-tap installations
- Other vortex manufacturers are inline-only (no hot-tap option)
- Field-configurable ranges, alarms, outputs, and displays
- Configuration via six push buttons or magnet through explosion-proof window
- Smart DSP electronics extends low-flow range down to a Reynolds number of 5,000
- Rangeability up to 100:1
- Temperature up to 750°F (400°C)
- Pressure up to 1,500 psia (100 bara)
- Mass flow equations for real gas, ideal gas, AGA-8 equations for natural gas, API 2540
- Advanced serial communication options: BACnet/IP, Modbus TCP/IP, BACnet MS/TP, and Modbus RTU
- Ideal for steam applications
 - Energy (BTU) monitoring for real-time measurement of energy consumption; compute and output energy use
 - Easy installation & commission; hot tappable — no process shutdown
 - Loop powered to save on energy costs
- FM, FMC, ATEX, IECEx Approval



VF3 INSERTION

FAST AND FLEXIBLE LIQUID, STEAM, AND GAS FLOW MEASUREMENT

Fox Thermal's unique VF3 insertion vortex shedding flow meter measures the mass flow rate of any gas or liquid and is ideally suited for saturated or superheated steam. The VF3 offers customers one instrument and one process connection, measuring five process parameters simultaneously: mass flow rate, temperature, pressure, volumetric flow rate, and fluid density.

VF3 is a true high performance, rugged, and reliable flow meter. The VF3 offers an optional hot tap version for easy install with no process shutdown. The VF3 is fully field-programmable, configurable, and features HART, Modbus RTU, Modbus TCP/IP, BACnet/IP, BACnet MS/TP protocols, and Power over Ethernet (PoE).

THEORY OF OPERATION

Vortex flow meters measure fluid velocity using a principle of operation referred to as the von Kármán effect. It states that when flow passes by an obstruction in the flow path, vortices are generated in a repeating pattern.

In a Vortex flow meter, this obstruction is often referred to as a bluff body. The bluff body causes the process fluid to separate and form areas of alternating differential pressure known as vortices around the backside of the bluff body. In VF3 vortex flowmeters, a sensitive piezoelectric crystal sensor detects these vortices. The frequency at which the vortices are shed is directly proportional to the flow velocity. With the fluid velocity and area of the pipe known, a volumetric flow rate is calculated.

With optional integrated temperature and pressure sensors, VF3 vortex flowmeters can provide a compensated mass flow

rate. With the energy monitoring option, VF3 meters can also provide a reliable (BTU) energy measurement of water, thermal oils, and steam.

Insertion style vortex flowmeters are a more economical option on large line sizes and can be installed under full process conditions by hot tap.

MODEL VF3-VTP

The Model VF3-VTP offers you flow computer functionality in a compact field device. This multivariable instrument incorporates temperature and pressure sensors to provide an instantaneous reading of the compensated mass flow rate of gases, liquids, and steam. In addition to outputs for totalized mass and alarm settings, the field-configurable electronics deliver up to three analog 4-20 mA outputs of five process measurements, including volumetric flow rate, mass flow rate, pressure, temperature, and density.

MODEL VF3-VT

The Model VF3-VT integrates a precision 1000 Ohm platinum RTD temperature sensor that can be used to calculate and output a compensated mass reading. This device is typically used to measure flow rates of saturated steam.

MODEL VF3-V

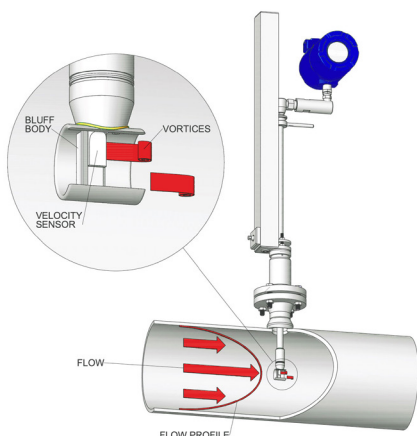
The Model VF3-V delivers a direct reading of volumetric flow rate — generally the most cost-effective solution for liquid flow monitoring — in applications ranging from general water flows to hydrocarbon fuel flow measurement.

MODEL VF3-EM

The Model VF3 Energy Monitoring option permits real-time calculation of energy consumption for a facility or process. The meter can be programmed to measure steam, hot water, or chilled water. The Model VF3-VTP flowmeter monitors one side of the process, either sent or returned, and uses the input from a second separate temperature sensor on the opposite leg of the process to calculate the change in energy. Selectable energy units include BTU, joules, calories, watt-hours, megawatt-hours and horsepower-hours. The local or remote electronics indicate two temperatures, delta-T, mass total, and energy total.

MODEL VF3-VTEP,VETEP

Similar to VF3-VTP but with the option for an external input (T or P) via RTD or 4-20mA or one of each.



VF3 is available in insertion and remote styles. See the VF4 Inline datasheet for information on inline styles. The VF4-R reduced-bore inline style is also available for lower flow rates.

PRODUCT BENEFITS

Multiparameter Mass Flow Meter Benefits

Fewer Process Connections

Expanded Process Diagnostics

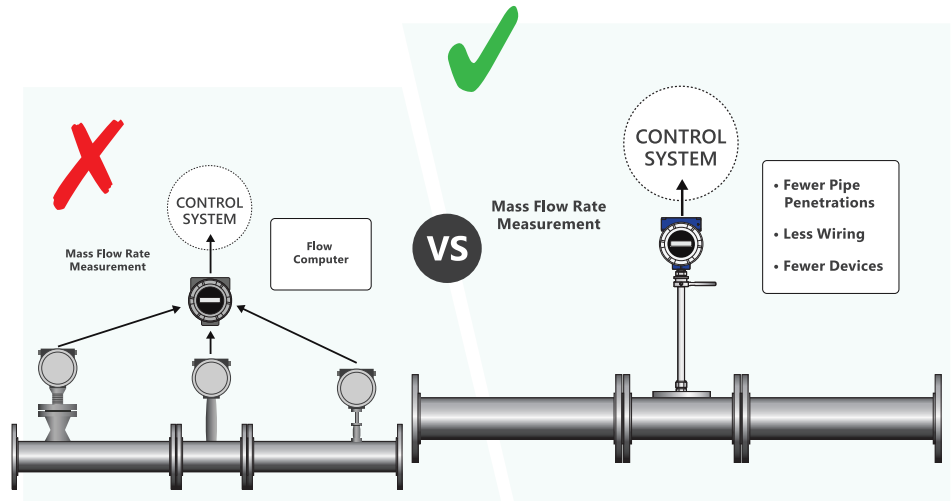
Ability to Compensate

Lower Cost Per Measurement

The Vortex Advantage

VF3 simplifies what's needed for accurate and repeatable measurement.

- Insertion-type configurations with hot-tap option allow installation and maintenance without shutting down the process.
- Built-in flow computer with multiple outputs allows users to replace multiple instruments with a single flow meter.
- Single break in piping for lower cost of installation and ownership.
- Vortex shedding principle is stable and reliable because it has no moving parts.
- Capable of measuring at higher pressures than other technologies.
- High Turndown Ratio.
- Calibration is valid for the life of the meter.



Process Variables & Measurement Outputs

VF3 simplifies what's needed for accurate and repeatable measurement.

Multiparameter measurement:

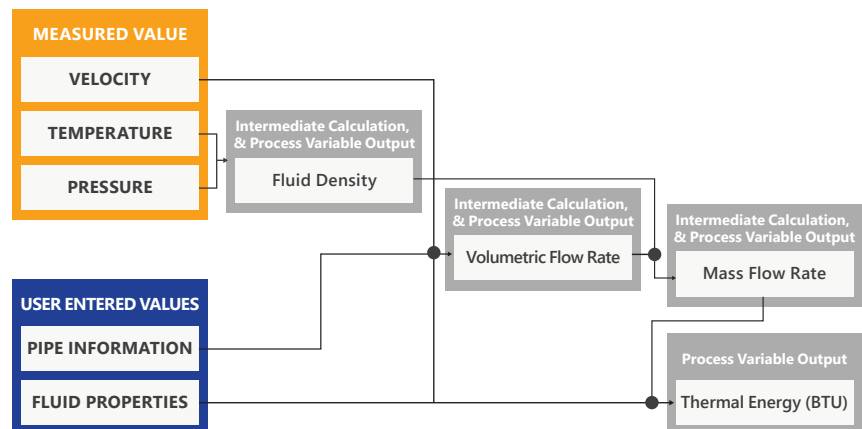
- Flow velocity
- Temperature
- Pressure
- Density
- Volumetric flow
- Mass flow
- Thermal Energy

Measurement outputs:

- 4-20mA (up to 3, simultaneous)
- HART
- Modbus
- BACnet
- IP Comms
- Alarm Contacts

Using a mix of measured and user entered values, a vortex flow meter can provide a variety of process variable outputs.

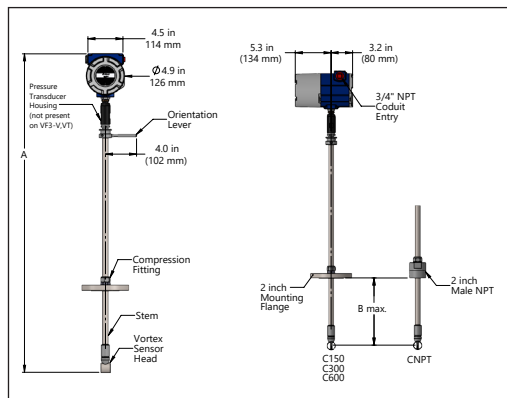
■ MEASURED VALUE + ■ USER ENTERED VALUES = ■ PROCESS VARIABLE OUTPUTS



DIMENSIONS

INSERTION STYLES

VF3 Compression, Flange or Male NPT



VF3 Insertion Meter Weight			
Connection Size	CL	SL	EL
CNPT / Compression / 2-in Male NPT	13 (5.7)	14.0 (6.2)	15.0 (6.7)
C150 / Compression / 150 lb. Flange	15 (6.8)	16.0 (7.3)	17.0 (7.8)
C300 / Compression / 300 lb. Flange	17(7.8)	18.0 (8.3)	19.0 (8.8)
C600 / Compression / 600 lb. Flange	18 (8.2)	19.0 (8.7)	20.0 (9.2)
C900 / Compression / 900 lb. Flange	31.0 (14.1)	32.0 (14.5)	33.0 (15.0)
C16 / Compression / DN50 PN16 Flange	15 (6.8)	16.0 (7.3)	17.0 (7.8)
C40 / Compression / DN50 PN40 Flange	17(7.8)	18.0 (8.3)	19.0 (8.8)
C63 / Compression / DN50 PN63 Flange	18 (8.2)	19.0 (8.7)	20.0 (9.2)

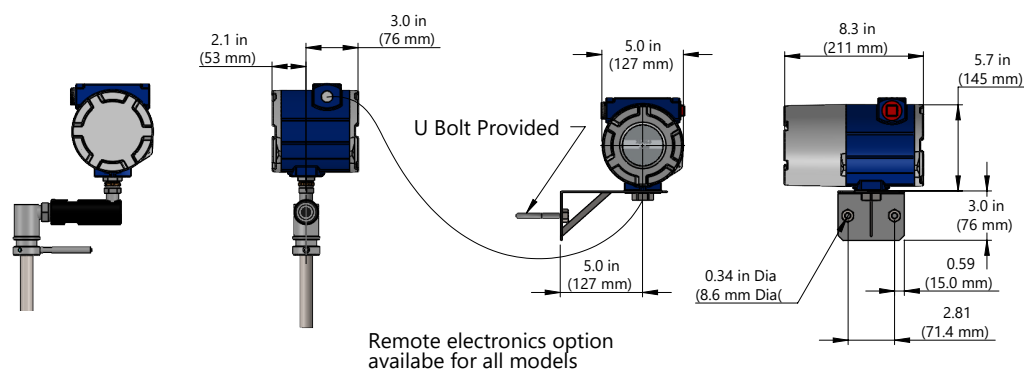
VF3 Insertion Meter Sizes - V, VT, VTEP, VETEP

Model Code / Probe Seal / Process Connection	Compact Probe		Standard Probe		Extended Probe	
	A	B	A	B	A	B
CNPT / Compression / 2-in Male NPT	21.6 (549)	9.8 (249)	38.0 (965)	26.2 (665)	50.0 (1270)	38.2 (970)
C150 / Compression / 150 lb. Flange	21.6 (549)	10.9 (277)	38.0 (965)	27.3 (693)	50.0 (1270)	39.3 (998)
C300 / Compression / 300 lb. Flange	21.6 (549)	10.8 (274)	38.0 (965)	27.2 (691)	50.0 (1270)	39.2 (996)
C600 / Compression / 600 lb. Flange	21.6 (549)	10.4 (264)	38.0 (965)	26.8 (681)	50.0 (1270)	38.8 (986)
C900 / Compression / 900 lb. Flange	21.6 (549)	9.9 (251)	38.0 (965)	26.3 (668)	50.0 (1270)	38.3 (973)
C16 / Compression / DN50 PN16 Flange	21.6 (549)	10.9 (277)	38.0 (965)	27.3 (693)	50.0 (1270)	39.3 (998)
C40 / Compression / DN50 PN40 Flange	21.6 (549)	10.8 (274)	38.0 (965)	27.2 (691)	50.0 (1270)	39.2 (996)
C63 / Compression / DN50 PN63 Flange	21.6 (549)	10.4 (264)	38.0 (965)	26.8 (681)	50.0 (1270)	38.8 (986)

VF3 Insertion Meter Sizes - VTP

Model Code / Probe Seal / Process Connection	Compact Probe		Standard Probe		Extended Probe	
	A	B	A	B	A	B
CNPT / Compression / 2-in Male NPT	24.6 (625)	9.8 (249)	41.0 (1041)	26.2 (665)	53.0 (1346)	38.2 (970)
C150 / Compression / 150 lb. Flange	24.6 (625)	10.9 (277)	41.0 (1041)	27.3 (693)	53.0 (1346)	39.3 (998)
C300 / Compression / 300 lb. Flange	24.6 (625)	10.8 (274)	41.0 (1041)	27.2 (691)	53.0 (1346)	39.2 (996)
C600 / Compression / 600 lb. Flange	24.6 (625)	10.4 (264)	41.0 (1041)	26.8 (681)	53.0 (1346)	38.8 (986)
C900 / Compression / 900 lb. Flange	24.6 (625)	9.9 (251)	41.0 (1041)	26.3 (668)	53.0 (1348)	38.3 (973)
C16 / Compression / DN50 PN16 Flange	24.6 (625)	10.9 (277)	41.0 (1041)	27.3 (693)	53.0 (1348)	39.3 (998)
C40 / Compression / DN50 PN40 Flange	24.6 (625)	10.8 (274)	41.0 (1041)	27.2 (691)	53.0 (1348)	39.2 (996)
C63 / Compression / DN50 PN63 Flange	24.6 (625)	10.4 (264)	41.0 (1041)	26.8 (681)	53.0 (1348)	38.8 (986)

VF3 Remote

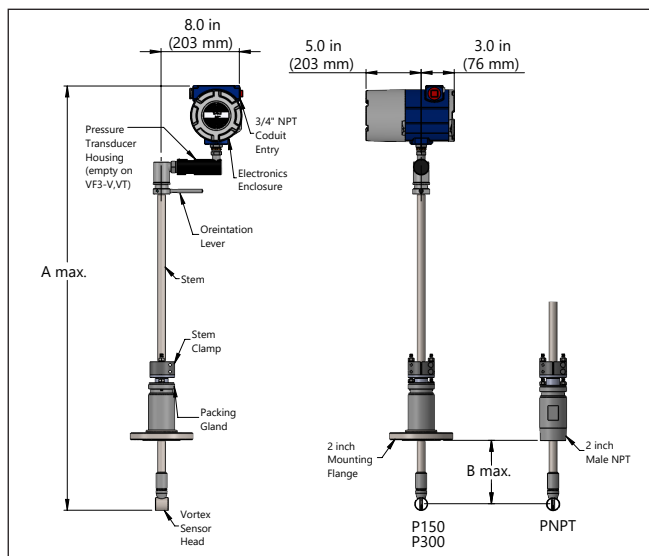


Remote electronics option
available for all models

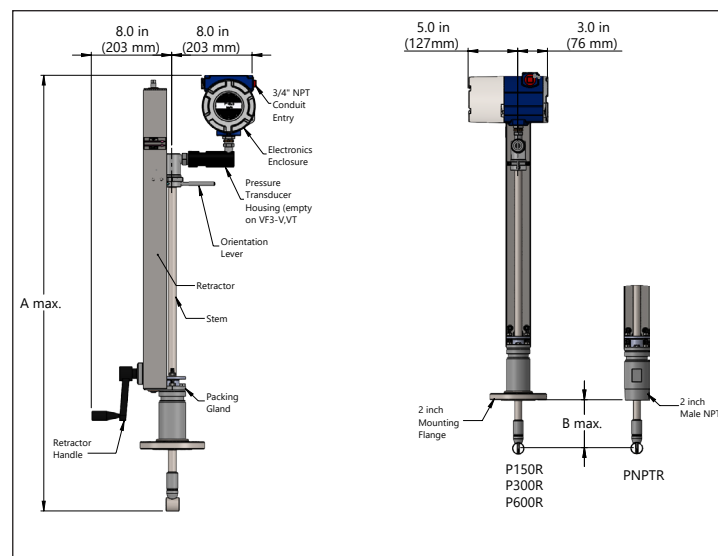
DIMENSIONS

INSERTION STYLES

VF3 Packing Gland, Flange or Male NPT



VF3 Packing Gland, Flange or Male NPT, Retractor



VF3 Insertion Meter Weight in lbs (kg)

Connection Size	SL	EL
PNPT / Packing Gland / 2-in Male NPT	16.0 (7.1)	17.0 (7.8)
P150 / Packing Gland, 150 lb Flange	21.0 (9.4)	22.0 (9.9)
P300 / Packing Gland, 300 lb Flange	25.0 (11.3)	26.0 (11.8)
P16 / Packing Gland / DN50 PN 16 Flange	21.0 (9.4)	22.0 (9.9)
P40 / Packing Gland / DN50 PN40 Flange	25.0 (11.3)	26.0 (11.8)
PNPTR / Packing Gland / 2-in Male NPT w/ Retractor	25.0 (11.5)	32.0 (14.5)
P150R / Packing Gland / 150 lb. Flange w/ Retractor	30.0 (13.7)	37.0 (16.7)
P300R / Packing Gland / 300 lb. Flange w/ Retractor	34.0 (15.5)	41.0 (18.5)
P600R / Packing Gland / 600 lb Flange w/ Retractor	35.0 (16.0)	42.0 (19.0)
P16R / Packing Gland / DN50 PN16 Flange w/ Retractor	30.0 (13.7)	37.0 (16.7)
P40R / Packing Gland / DN50 PN40 Flange w/ Retractor	34.0 (15.5)	41.0 (18.5)
P63R / Packing Gland / DN50 PN63 Flange w/ Retractor	35.0 (16.0)	42.0 (19.0)

VF3 Insertion Meter Sizes

Model Code / Probe Seal / Process Connection	Standard Probe		Extended Probe	
	A	B	A	B
PNPT / Packing Gland / 2-in Male NPT	40.5 (1029)	21.5 (546)	52.5 (1334)	33.5 (851)
P150 / Packing Gland / 150 lb. Flange	40.5 (1029)	21.1 (536)	52.5 (1334)	33.1 (841)
P300 / Packing Gland / 300 lb. Flange	40.5 (1029)	21.1 (536)	52.5 (1334)	33.1 (841)
P16 / Packing Gland / DN50 PN 16 Flange	40.5 (1029)	21.1 (536)	52.5 (1334)	33.1 (841)
P40 / Packing Gland / DN50 PN40 Flange	40.5 (1029)	21.1 (536)	52.5 (1334)	33.1 (841)
PNPTR / Packing Gland / 2-in Male NPT w/ Retractor	40.5 (1029)	21.5 (546)	52.5 (1334)	33.5 (851)
P150R / Packing Gland / 150 lb. Flange w/ Retractor	40.5 (1029)	21.1 (546)	52.5 (1334)	33.1 (841)
P300R / Packing Gland / 300 lb. Flange w/ Retractor	40.5 (1029)	21.1 (546)	52.5 (1334)	33.1 (841)
P600R / Packing Gland / 600 lb Flange w/ Retractor	40.5 (1029)	21.1 (536)	52.5 (1334)	33.1 (841)
P16R / Packing Gland / DN50 PN16 Flange w/ Retractor	40.5 (1029)	21.1 (536)	52.5 (1334)	33.1 (841)
P40R / Packing Gland / DN50 PN40 Flange w/ Retractor	40.5 (1029)	21.1 (536)	52.5 (1334)	33.1 (841)
P63R / Packing Gland / DN50 PN63 Flange w/ Retractor	40.5 (1029)	21.1 (536)	52.5 (1334)	33.1 (841)

PERFORMANCE SPECIFICATIONS

ACCURACY

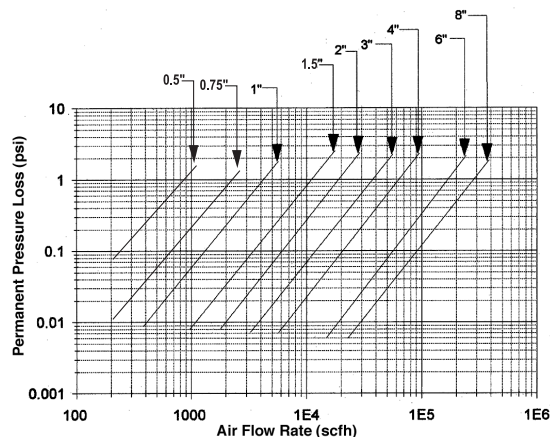
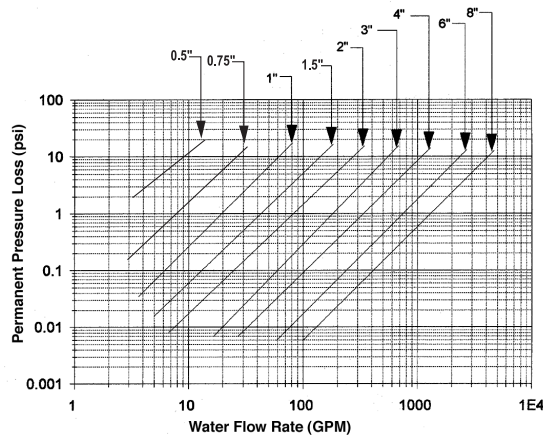
Process Variables	VF3 Insertion Meters ⁽¹⁾	
	Liquids	Gas and Steam
Mass Flow Rate	± 1.5% of rate over a 30:1 range ⁽³⁾	± 2.0% of rate ⁽²⁾ over a 30:1 range ⁽³⁾
Volumetric Flow Rate	± 1.2% of rate over a 30:1 range ⁽³⁾	± 1.5% of rate over a 30:1 range ⁽³⁾
Temperature	± 2°F (± 1°C)	± 2°F (± 1°C)
Pressure	± 0.3% of transducer full scale	± 0.3% of transducer full scale
Density	± 0.3% of reading	± 0.5% of reading ⁽²⁾

Notes: (1) Accuracies stated are for the total mass flow through the pipe. (2) Over 50 to 100% of the pressure transducer's full scale. (3) Nominal rangeability is stated. (4) Precise rangeability depends on fluid and pipe size.

PROCESS TRANSDUCER PRESSURE

Pressure Sensor Ranges ⁽¹⁾ psia (bara)			
Full Scale Operating Pressure		Maximum Over-Range Pressure	
psia	(bara)	psia	(bara)
30	2	60	4
100	7	200	14
300	20	600	40
500	35	1000	70
1500	100	2750	175

Note: (1) To maximize accuracy, specify the lowest full scale operating pressure range for the application. To avoid damage, the flow meter must never be subjected to pressure above the over-range pressure shown above.



REPEATABILITY

Mass Flow Rate ± 0.2% of reading
 Volumetric Flow Rate ± 0.1% of reading
 Temperature ± 0.2° F (± 0.1° C)
 Pressure ± 0.05% of full scale
 Density ± 0.1% of reading

STABILITY OVER 12 MONTHS

Mass Flow Rate ± 0.2% of reading maximum
 Volumetric Flow Rate Negligible error
 Temperature ± 0.9° F (± 0.5° C) maximum
 Pressure ± 0.1% of full scale maximum
 Density ± 0.1% of reading maximum

RESPONSE TIME

Adjustable from 1 to 100 seconds

Differential Pressure Requirements, ΔP

Low permanent pressure drop.

MATERIAL COMPATIBILITY

Any gas, liquid or steam compatible with 316L stainless steel. Not recommended for multi-phase fluids.

VELOCITY RANGE

Smart electronics corrects for lower flow down to a Reynolds number of 5000. The Reynolds number is calculated using the fluid's actual temperature and pressure monitored by the meter. Rangeability depends on the fluid, process connections, and pipe size. Consult factory for your application. Velocity rangeability under ideal conditions is as follows:

Liquids 30:1

1 foot per second velocity minimum
 30 feet per second velocity maximum
 300 feet per second velocity maximum
 Minimum is fluid dependent: range must be calculated using below equations:

$$\frac{5}{\sqrt{\text{density (lb/ft}^3\text{)}}} \quad \frac{6.1}{\sqrt{\text{density (kg/m}^3\text{)}}}$$

PRESSURE DROP EQUATIONS

$\Delta P = 0.00024 \rho V^2$ English Units (ΔP in psi, ρ in lb/ft³, V in ft/sec)

$\Delta P = 0.00011 \rho V^2$ Metric Units (ΔP in bar, ρ in kg/m³, V in m/sec)

INSTALLATION SPECIFICATIONS

Straight Pipe Length Requirements upstream/downstream (in number of internal diameters, D)		
	Up	Down
One 90° elbow before meter	10 D	5 D
Two 90° elbows before meter	15 D	5 D
Two 90° elbows before meter out of plane (If three 90° bends present, double recommended length)	30 D	10 D
Reduction before meter	10 D	5 D
Expansion before meter	20 D	5 D
Regulator or valve partially closed before meter (If valve wide open, base length requirements on fitting directly preceding it.)	30 D	10 D

PERFORMANCE SPECIFICATIONS

WETTED MATERIALS

316L stainless steel
Teflon® packing gland below 500°F (260°C)
Graphite packing gland above 500°F (260°C)
Teflon-based thread sealant on pressure transducer

ENCLOSURE

NEMA 4X/7 (IP66) cast enclosure

ELECTRICAL PORTS

Two 3/4-inch female NPT ports

PROCESS CONNECTIONS

2" MNPT, 150-lb, 300-lb, 600-lb, 900-lb

Note: Refer to Model Codes and Accessories for compatibility of process connections with other features.

MOUNTING CONNECTIONS

Meter must be perpendicular within $\pm 5^\circ$ of the pipe centerline

OPERATING SPECIFICATIONS

Any gas, liquid, or steam compatible with 316L stainless steel, C276 hastelloy, or A105 carbon steel. Not recommended for multi-phase fluids.

POWER REQUIREMENTS

DCL option: 12-36 VDC, 25mA, 1W max, loop powered (single output)

DCH option: 12-36 VDC, 300 mA, 9W max, (multiple outputs)

DCHPOE option: 12-28 VDC or Power over Ethernet, 5W max (multiple outputs)

AC option: 100-240 VAC, 50/60Hz line power, 5W (multiple outputs)

MULTIPARAMETER MASS OPTIONS

Specific power supply and wiring recommendations are dependent on the process requirements and stack type/electronics ordered. Refer to the model codes section for power requirements stated for each stack type.

Use a Class 2 isolated power supply that is grounded, provides DC output, and has no more than 10% output ripple.

Installation (Over-voltage) Category II for transient over-voltages.

AC & DC Mains supply voltage fluctuations are not to exceed $\pm 10\%$ of the rated supply voltage range.

User is responsible for the provision of an external disconnect means, disconnect line 1 and line 2 when 220 / 240 VAC power is used, also provide over-current protection for the equipment (both AC and DC models).

DISPLAY

Alphanumeric 2 line x 16 character LCD digital display.

Six push buttons for full field configuration.

Pushbuttons can be operated with magnetic wand without removal of enclosure covers.

Switches (up, down, right, left, enter, exit).

Display can be mounted in 90° to 180° intervals for better viewing.

APPROVALS

FM, FMC Approval

Explosion proof for Class I, Division 1, Groups B, C & D.

Dust-ignition proof for Class II/III, Division 1, Groups E, F & G.

NEMA Type 4X and IP66

T6 at Tamb = -40°F to 60°C

ATEX Approval

II 2 G Ex d IIB + H2 T6

II 2 D EX tD A21 IP66 T85°C, Ta = -40°F to 60°C

IECEx Approval

Ex d IIB + H2 T6

Ex tD A21 IP66 T85°C, Ta = -40°F to 60°C

CE Approval

Optional Certifications

Construction and inspection (ANSI/ASME B31.3)

Materials (NACE MR-01-75(90))

PROCESS FLUID TEMPERATURE

Process Fluid	Standard Temperature Sensor: -330°F to 500°F (-200°C to 260°C) High Temperature Sensor: Up to 750°F (400°C)
---------------	--

AMBIENT TEMPERATURE

Ambient	Operating: -40°F to 140°F (-40° to 60°C) Storage: -40°F to 185°F (-40° to 85°C) 0-98% relative humidity, noncondensing conditions
---------	---

OUTPUT SIGNALS⁽¹⁾

Analog	One to three field rangeable, simultaneous linear 4-20 mA output signals (1000 ohms maximum loop resistance) selected by user from the six parameters—mass flow rate, volumetric flow rate, temperature, pressure, density, and total/totalizer count.
Pulse	Pulse output for totalization is a 50-millisecond duration pulse operating a solid-state relay capable of switching 40 VDC, 40 mA maximum HART standard, optional MODBUS RTU.
Frequency	Frequency output is used for a remote counter. It can be scaled to output a 1 to 10 kHz signal proportional to mass or volume flow, temperature, pressure, or density.

Note: (1) All outputs are optically isolated and require external power for operation.

OPERATING SPECIFICATIONS

ALARMS

Up to three programmable solid-state relays for high, low, or window alarms capable of switching to 40 VDC, 40 mA maximum

TOTALIZER

Based on user-determined flow units, nine full digits, with rollover at 999,999,999; total stored in non-volatile memory.

VOLUMETRIC OR LOOP POWERED MASS

One analog, one totalizer pulse, HART
HART (with DD)
Modbus
BACnet

TURNDOWN

Turndown is application dependent. Consult Fox Thermal Sizing Program for exact values.
Turndown can exceed 100:1.

FLOW RATES

Typical mass flow ranges are given in the following table. Precise flow ranges depend on the fluid and pipe size. VF3 insertion meters are applicable to pipe sizes from 2 inches and greater. Consult factory for sizing program..

Water Minimum and Maximum Flow Rates						
	3-inch	6-inch	8-inch	12-inch	16-inch	24-inch
gpm	21 618	81 2437	142 4270	317 9501	501 15043	1138 34144
	80 mm	150mm	200mm	300mm	400mm	600mm
m³/hr	5.2 157	20.4 614	35.4 1062	79.2 2337	125 3753	284 8537

Saturated Steam Minimum and Maximum Flow Rates (lb/hr)						
Pressure	3-inch	6-inch	8-inch	12-inch	16-inch	24-inch
5 psig	205 2721	800 10633	1385 18412	3099 41196	4893 65039	11132 147954
100 psig	468 14246	1831 55674	3170 96407	7092 215703	11197 340546	25472 774698
200 psig	632 25948	2471 101405	4278 175595	9572 392880	15111 620268	34377 1411029
300 psig	762 37652	2976 147145	5153 254799	11530 570093	18203 900047	41410 2047489
400 psig	873 49494	3412 193420	5908 334930	13219 749382	20870 1183103	47477 2691404
500 psig	974 61543	3805 240507	6588 416468	14741 931816	23272 1471125	52942 3346615

Saturated Steam Minimum and Maximum Flow Rates (kg/hr)						
Pressure	80 mm	150mm	200mm	300mm	400mm	600mm
0 barg	81 938	316 3667	548 6350	1226 14209	1936 22432	4404 51039
5 barg	187 4986	729 19486	1263 33742	2826 75495	4461 119189	10151 271187
10 barg	249 8859	972 34620	1683 59949	3767 134132	5947 211764	13530 481821
15 barg	298 12700	1164 49629	2016 85939	4510 192283	7120 303570	16200 690705
20 barg	340 16550	1329 64676	2301 111995	5148 250581	8128 395609	18493 900119
30 barg	413 24357	1612 95187	2791 164827	6246 368789	9860 582234	22435 1324739

Air Minimum and Maximum Flow Rates (scfm)						
Air at 70° F and 1 atmosphere.						
Pressure	3-inch	6-inch	8-inch	12-inch	16-inch	24-inch
0 psig	56 924	220 3611	381 6253	852 13991	1345 22089	3059 50250
100 psig	157 7236	615 28379	1065 48696	2383 109564	3763 172977	8560 393500
200 psig	216 13588	843 53101	1460 91950	3266 205732	5156 324804	11729 738886
300 psig	262 19974	1022 78059	1770 135169	3960 302430	6251 477467	14221 1086176
400 psig	301 26391	1175 103136	2034 178593	4551 399588	7186 630859	16346 1435121
500 psig	335 32834	1310 128314	2269 222191	5077 497136	8015 784865	18233 1785464

Air Minimum and Maximum Flow Rates (nm ³ /hr)						
Air at 20° C and 1 atmosphere.						
Pressure	80 mm	150mm	200mm	300mm	400mm	600mm
0 barg	89 1463	347 5716	601 9897	1345 22145	2124 34962	4833 79547
5 barg	217 8702	847 34006	1467 58885	3282 131751	5181 208004	11788 473266
10 barg	294 15975	1148 62430	1987 108105	4446 241878	7020 381870	15972 868857
15 barg	355 23280	1385 90979	2399 157542	5368 352487	8474 556497	19282 1266182
20 barg	407 30615	1589 119642	2751 207175	6156 463539	9718 731823	22112 1665095
30 barg	495 45361	1934 177268	3349 306961	7493 686801	11829 1084302	26915 2467081

PROCESS FLUID PRESSURE

VF3 Sizes				
Probe Seal	Process Connection	Material	Rating	Ordering Code
Compression Fitting	2-inch male NPT	316L SS	ANSI 600 lb	CNPT
	2-inch 150 lb flange	316L SS	ANSI 150 lb	C150
	2-inch 300 lb flange	316L SS	ANSI 300 lb	C300
	2-inch 600 lb flange	316L SS	ANSI 600 lb	C600
	2-inch 900 lb flange	316L SS	ANSI 900 lb	C900
Packing Gland	2-inch male NPT	316L SS	50 psig	PNPT
	2-inch 150 lb flange	316L SS	50 psig	P150
	2-inch 300 lb flange	316L SS	50 psig	P300
Packing Gland & Removable Retractor	2-inch male NPT	316L SS	ANSI 300 lb	PNPT, RR
	2-inch 150 lb flange	316L SS	ANSI 150 lb	P150, RR
	2-inch 300 lb flange	316L SS	ANSI 300 lb	P300, RR
Packing Gland & Permanent Retractor	2-inch male NPT	316L SS	ANSI 600 lb	PNPTR
	2-inch 150 lb flange	316L SS	ANSI 150 lb	P150R
	2-inch 300 lb flange	316L SS	ANSI 300 lb	P300R
	2-inch 600 lb flange	316L SS	ANSI 600 lb	P600R

INSERTION CONFIGURATIONS

Features

VF3

-

-

-

-

-

-

-

-

Parent
1
2
3
4
5
6
7
8
9

Instructions: To order a VF3 please fill in each number block by selecting the codes from the corresponding features below and following pages.

Feature 1: Multivariable Options	
Code	Description
V	Base Velocity Flowmeter for liquid, gas, and steam
VT	Velocity and Temperature Sensors
VTP	Velocity, Temperature, and Pressure Sensors
VTEP	Velocity, Temperature, and External 4-20mA input (T or P)
VETEP	Velocity, External RTD Temperature input, External 4-20mA input (T or P)
VT-EM	Energy output options
VTP-EM	Energy options with Pressure Sensor
VTEP-EM	Velocity, Temperature, and External 4-20mA input (T or P)
VETEP-EM	Velocity, External RTD Temperature input, External 4-20mA input (T or P)

Feature 2: Probe Length	
Code	Description
SL	Standard Length
CL	Compact Length
EL	Extended Length

Feature 3: Electronics Enclosure	
Code	Description
L	NEMA 4X, IP66 Enclosure
R ()	Remote Electronics NEMA 4X, IP66, Specify cable length in parenthesis

Feature 4: Display Options	
Code	Description
DD	Digital Display and Programming Buttons

Feature 5: Input Power	
Code	Description
DCL	12-36 VDC, 25mA, 1W max. required on loop powered meters, 1AHL only
DCH	12-36 VDC, 300mA, 9W max. - use with 1AH, 1AM, 3AH, 3AM
DCHPOE	12-28 VDC or Power over Ethernet, 5 Watts max, required on 1AMIP, 1ABIP, 3AMIP, 3ABIP
AC	100-240 VAC, 50/60 Hz line power, 5W max. - use with 1AH, 1AM, 3AH, 3AM

Feature 6: Output	
Code	Description
1AHL	Loop powered option - one analog output (4-20mA), one scaled frequency, one pulse, HART, DCL input power only
1AH	One analog output (4-20mA), one alarm, one pulse, HART Communication Protocol, DCH or AC option only*
1AM	One analog output (4-20mA), one alarm, one pulse, MODBUS RTU Communication Protocol, DCH or AC option only*
1AMIP	One analog output (4-20mA), one alarm, one pulse, MODBUS TCP/IP Communication Protocol, DCHPOE ONLY*
1AB	One analog output (4-20mA), one alarm, one pulse, BACnet MS/TP Communication Protocol, DCH or AC option only*
1ABIP	One analog output (4-20mA), one alarm, one pulse, BACnet/IP Communication Protocol, DCHPOE ONLY*
3AH	Three analog outputs (4-20mA), three alarms, one pulse, HART (VT,VTP only), DCH or AC option only*
3AM	Three analog outputs (4-20mA), three alarms, one pulse, MODBUS RTU (VT,VTP only), DCH or AC option only*
3AMIP	Three analog outputs (4-20mA), three alarms, one pulse, MODBUS TCP/IP (VT,VTP only), DCHPOE ONLY*
3AB	Three analog outputs (4-20mA), three alarms, one pulse, BACnet MS/TP (VT,VTP only), DCH or AC option only*
3ABIP	Three analog outputs (4-20mA), three alarms, one pulse, BACnet/IP (VT,VTP only), DCHPOE ONLY*

*includes scaled frequency output

INSERTION CONFIGURATIONS

Feature 7: Temperature Options

Code	Description
ST	Standard temperature, Process Temperature - 330 to 500°F (-200 to 260°C)
HT	High temperature, Process Temperature to 750°F (400°C)

Feature 8: Pressure Options

Code	Description
P0	No pressure sensor
P1	Maximum 30 psia (2 bara), Proof 60 psia (4 bara)
P2	Maximum 100 psia (7 bara), Proof 200 psia (14 bara)
P3	Maximum 300 psia (20 bara), Proof 600 psia (41 bara)
P4	Maximum 500 psia (34 bara), Proof 1000 psia (64 bara)
P5	Maximum 1500 psia (100 bara), Proof 2500 psia (175 bara)

Feature 9: Process Connections

Code	Description
CNPT	Compression, 2 inch NPT
C150	Compression, 2 inch 150lb Flange
C16	Compression, DN50 PN16 Flange
C300	Compression, 2 inch 300lb Flange
C40	Compression, DN50 PN40 Flange
C600	Compression, 2 inch 600lb Flange
C63	Compression, DN50 PN63 Flange
C900	Compression, 2 inch 900lb Flange
PNPT	Packing Gland, 2 inch NPT
P150	Packing Gland, 2 inch 150lb Flange
P16	Packing Gland, DN50 PN16 Flange
P300	Packing Gland, 2 inch 300lb Flange
P40	Packing Gland, DN50 PN40 Flange
PNPTR	Packing Gland, 2 inch NPT, Retractor
P150R	Packing Gland, 2 inch 150lb Flange, Retractor
P16R	Packing Gland, DN50 PN16 Flange, Retractor
P300R	Packing Gland, 2 inch 300lb Flange, Retractor
P40R	Packing Gland, DN50 PN40 Flange, Retractor
P600R	Packing Gland, 2 inch 600lb Flange, Retractor
P63R	Packing Gland, DN50 PN63 Flange, Retractor

JIS flanges are available upon request.



Make downtime a thing of the past.

399 Reservation Road | Marina, CA 93933
Email: sales@foxthermal.com | Tel: 831.384.4300
foxthermal.com