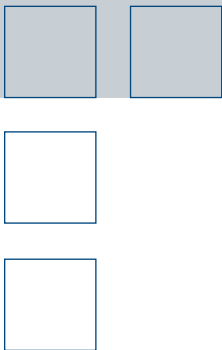


FCI ST75 Series Flow Meters

Small Line, Mass Flow Meters for Industrial and Commercial Process Gases

Low cost, easy installation flow measuring
for 1/4 inch to 2 inch [6 mm to 51 mm] line sizes



- Burner/Boiler Fuel and Air Feed Lines
- Industrial Furnaces, Kilns and Oven Fuel/Air Controls
- Natural Gas Sub-Metering
- Heat Treating Gas Controls
- Air Compressor System Control and Point-of-Use Monitoring
- Chiller Air Flow Measurements
- Co-Gen and Turbine Generator Fuel Flow Measurements
- Dosing and Gas Injection Rate Controls

FCI ST75 FLOW METER

FCI FLUID COMPONENTS
INTERNATIONAL LLC

A PST BRAND

ST75 Series Features

- Direct mass, standard volumetric or standard velocity flow measurement
- Triple outputs: flow rate, temperature and total flow
- HART or Modbus I/O (ST75 A, ST75 AV)
- Non-clogging, no moving parts
- 2 line digital display option
- Small, compact design
- Easy installation
- Built-in Vortab® flow conditioning (ST75V, ST75 AV)
- SIL compliant

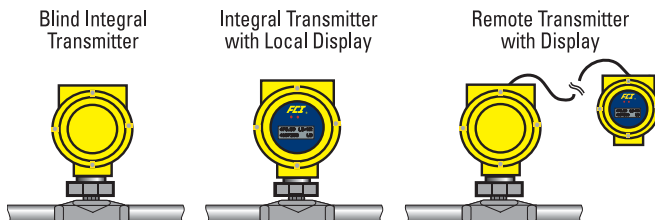


Figure 1: ST75 Series standard configurations

* For pipes larger than 2 inches [51 mm] see FCI insertion style flow meters.

Superior Air and Gas Flow Measurement

ST75 is an accurate, no moving parts, direct mass flow measurement and monitoring solution for fuel gases, air, compressed air, inert and other gas flows within industrial processes. There are four base models in the series: ST75, ST75A, ST75V, and ST75AV. The "A" suffix models provide enhanced features and HART I/O (see chart below); the "V" suffix models include built-in Vortab flow conditioners. They are available in six different sizes for direct, in-line installation in line sizes from 1/4 inch to 2 inch [6 mm to 51 mm].*

Model	ST75	ST75 A	ST75V	ST75 AV
Vortab flow conditioning			■	■
Dual 4-20 mA outputs per NAMUR NE43	■	■	■	■
500 Hz pulse output	■	■	■	■
HART (v7) I/O		■		■
Modbus (485 RTU/ASCII)		■		■
Dual line LCD readout <i>Optional</i>	■	■	■	■
Maximum remote distance <i>Maximum</i>	50' [15 m]	100' [30 m]	50' [15 m]	100' [30 m]
SIL compliance rating		■		■
Ex hazardous location approvals	■	■	■	■
Warranty	1 year	2 years	1 year	2 years

By combining precision lithography structured platinum RTD sensors embedded in FCI's equal mass thermowells with microprocessor electronics and precise actual gas calibration, the ST75 achieves outstanding flow measurement performance. Using FCI's proven thermal dispersion technology, the ST75's direct mass flow measurement eliminates the cost and space of additional sensors required by inferred technologies. With its 100:1 turndown and flow ranges from 0.01 SCFM to 559 SCFM [0,01 NCMH to 950 NCMH], the ST75 measures over a wide flow range, from low to high flow conditions. The ST75 is available in specific calibrations for most gases including natural gas, methane and other hydrocarbon gases, as well as nitrogen, CO₂, argon and all inert gases, compressed air and more.

Easy to Install, Easy to Use

Models ST75 and ST75 A have a standard "T" fitting design that allows for fast, simple in-line installation. Standard NPT line size selections include 1/4 inch, 1/2 inch, 3/4 inch, 1 inch, 1-1/2 inch and 2 inch. For compression fitting tube applications, selections include 1/4 inch, 1/2 inch and 1 inch. For installations with inadequate straight-run or obstructed flows that prevent a fully developed profile for accurate flow measurement with the standard ST75, Models ST75V and ST75 AV provide the solution. FCI's ST75 V and ST75 AV include all of the features and functionality of the ST75 plus built-in Vortab flow conditioning.

Vortab flow conditioners are the flow conditioning technology proven and recommended by flow measurement experts to eliminate both swirl and velocity profile distortions to ensure accurate flow measurement. Vortab flow conditioners also are the lowest pressure loss solution of all flow conditioning techniques. FCI is the exclusive

provider of Vortab flow conditioners for use with thermal mass flow meters such as the ST75V and ST75 AV.

To serve a variety of application and installation requirements, the ST75 Series is available in three standard configurations (see Figure 1 on page 2).

To provide convenient and easy access for wire-up and signal isolation, the instrument's enclosure features dual conduit ports in either NPT or M20 threads, as well as removable front and rear covers. ST75 models can be ordered for DC (18V to 36V) or AC (85V to 265V) power.

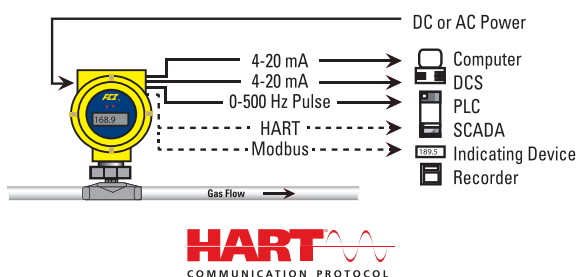
Extensive Outputs Assure Application Compatibility

ST75 provides the most comprehensive selection of outputs in its class. Dual analog outputs, a pulse output and a digital, serial I/O are standard on all models. Models ST75A and ST75 AV include HART.

Dual 4-20mA analog outputs are field assignable to flow rate and/or temperature. These outputs are user scalable to the instrument's full calibrated range or any subset. Flow rate is selectable for reading in mass flow or standard volumetric engineering units. A 0-500 Hz pulse output of flow is provided for interface to totalizers

Models ST75A and ST75AV include a selection of either HART or Modbus I/O. HART is available over output #1, is version 7 compliant and is fully compatible with all versions of HART field communicators and control systems. FCI's HART I/O and its DD file are certified compliant by FieldComm Group. Modbus is RS485 in accordance with EIA/TIA-485 standard and is RTU and ASCII compatible.

In all models a standard RS232C serial I/O link is provided for instrument configuration, service/troubleshooting data, and measured readings.



Designed and Built to Last

ST75 will significantly reduce maintenance costs and time. ST75 is a no moving parts design that virtually eliminates the wear out, clogging and excessive pressure drop associated with other flow metering techniques. The sensor element is all-welded stainless steel with Hastelloy-C tips that provide extra protection against invasive conditions within the pipe. The instrument's electronics are housed in an all-metal, aluminum, or stainless steel NEMA 4X (IP66, IP67) rated enclosure to provide the ruggedness and dust/weather proof protection needed to ensure long-life in industrial and commercial installations.

Find your gas here?

FCI has provided thermal mass flow meter solutions for all of these and more . . .

Acetaldehyde	Ethyl Acrylate	Ketene	Phenol
Acetic Acid	Ethyl Alcohol	Krypton	Phosgene
Acetone	Ethyl Amine	Landfill Gas	Propadiene
Acetonitrile	Ethyl Benzene	M-Cresol	Propane
Acetyl Chloride	Ethyl Bromide	Mercury	Propanol
Air	Ethyl Chloride	Methane	Propyl Chloride
Allyl Chloride	Ethyl Fluoride	Methanol	Propylene
Ammonia	Ethyl Mercaptan	Methyl Acetate	Propylene Oxide
Aniline	Ethylene	Methyl Alcohol	Propyne
Argon	Ethylene Dichloride	Methyl Amine	P-Xylene
Benzene	Ethylene Oxide	Methyl Butane	R-11
Bio-Gas	Flare Gas	Methyl Fluoride	R-12
Boron Trifluoride	Fluorine	Methyl Formate	R-13
Bromine	Fluorobenzene	Methyl Hexane	R-13B1
Bromobenzene	Fluoroform	Methyl Hydrazine	R-14
Butadiene	Freon-11	Methyl	R-21
Butene	Freon-12	Mercaptan	R-22
Butylene Oxide	Freon-13	Methyl Octane	R-23
Butyne	Freon-14	Methyl Pentane	R-112
Carbon Dioxide	Freon-21	Methylal	R-113
Carbon Disulfide	Freon-22	Methylene Chloride	R-114
Carbon Monoxide	Freon-23	Morpholine	R-114B2
Carbon Tetrachloride	Furan	M-Xylene	R-115
Carbonyl Sulfide	Halon	Naphthalene	R-116
Chlorine	Helium	Natural Gas	R-134A
Chlorobenzene	Heptene	N-Butane	R-142B
Chloroethane	Hexanol	N-Butane	R-152A
Chloroform	Hexene	N-Butanol	R-216
Chloromethane	Hydrazine	N-Butyl Alcohol	R-500
Chloroprene	Hydrogen	N-Decane	R-502
Cis-2-Butene	Hydrogen Bromide	N-Dodecane	R-503
Cis-2-Hexene	Hydrogen Chloride	Neon	R-504
Compressed Air	Hydrogen Cyanide	Neopentane	R-C318
Cumene	Hydrogen Deuteride	N-Heptane	Radon
Cyanogen	Hydrogen Fluoride	N-Hexane	Silane
Cyclobutane	Hydrogen Iodide	Nitric Oxide	Silicon Tetrachloride
Cyclohexane	Hydrogen Peroxide	Nitrogen	Styrene
Cyclooctane	Hydrogen Sulfide	Nitrogen Dioxide	Sulfur Dioxide
Cyclopentane	Iodine	Nitromethane	Sulfur Hexafluoride
Cyclopropane	Isobutane	Nitrous Oxide	Sulfur Trioxide
Decene	Isobutene	N-Nonane	Superheated Thiophene
Deuterium	Isobutyl Alcohol	N-Octane	Titanium Tetrachloride
Deuterium Oxide	Isoheptane	Nonene	Toluene
Diethyl Amine	Isohexane	N-Pentane	Trans-2-Butene
Diethyl Ether	Isooctane	N-Propanol	Trimethyl Amine
Diethyl Ketone	Isopentane	N-Propyl Alcohol	Triptane
Digester Gas	Isoprene	N-Propyl Amine	Uranium Hexafluoride
Dimethyl Ether	Isopropyl Alcohol	N-Undecane	Vinyl Acetate
Dimethyl Propane	Isopropyl Amine	Octene	Vinyl Chloride
Dimethyl Sulfide	Iodine	Oxygen	Vinyl Fluoride
Ethane	Isobutane	O-Xylene	Vinyl Formate
Ethanol	Isobutene	Ozone	
Ethyl Acetate	Isobutyl Alcohol	Pentanol	
	Isopropyl Amine	Pentene	

ST75 Series Flow Meter Specifications

Instrument

■ **Media:** Air, compressed air, nitrogen, oxygen, argon, CO₂, ozone, other inert gases, natural gas, other hydrocarbon gases, and hydrogen

■ **Pipe/Line Size Compatibility:** 1/4" to 2" [6 mm to 51 mm]¹

■ **Range**²

NPT Line Size	Minimum SCFM	Minimum [NCMH]	Maximum SCFM	Maximum [NCMH]
1/4"	0.04	[0,07]	17.34	[29,47]
1/2"	0.13	[0,22]	50.64	[86,04]
3/4"	0.22	[0,38]	88.88	[151,00]
1"	0.35	[0,59]	139.95	[237,78]
1-1/2"	0.85	[1,44]	339.31	[576,48]
2"	1.40	[2,38]	559.27	[950,20]

Tubing Line Size	Minimum SCFM	Minimum [NCMH]	Maximum SCFM	Maximum [NCMH]
1/4"	0.01	[0,01]	3.02	[5,14]
1/2"	0.05	[0,09]	21.15	[35,94]
1"	0.25	[0,42]	99.08	[168,33]

■ **Accuracy**

Model ST75, ST75 A

Standard: ±2% reading, ±0.5% full scale
Optional: ±1% reading, ±0.5% full scale

Model ST75V, ST75 AV

Standard: ±1% reading, ±0.5% full scale

■ **Repeatability:** ±0.5% reading

■ **Turndown Ratio:** 3:1 to 100:1

■ **Temperature Compensation**

Standard: 40 °F to 100 °F [4 °C to 38 °C]
Optional: 0 °F to 250 °F [-18 °C to 121 °C]

■ **Warranty**

ST75, ST75V: One year
ST75A, ST75AV: Two years

Flow Element

■ **Installation:** In-line "T," NPT or tube

■ **Type:** Thermal dispersion

■ **Material of Construction**

All-welded 316 stainless steel probe element with Hastelloy-C22 thermowells;
316 stainless steel NPT and tube fittings; ST75 V and ST75 AV flow body is
schedule 40 stainless steel

■ **Operating Temperature (Process)**

0 °F to 250 °F [-18 °C to 121 °C]

■ **Process Connection**

Model ST75, ST75 A

T-fitting [NPT female]: 1/4", 1/2", 3/4", 1", 1 1/2" or 2"

Tubing: 1/4", 1/2" or 1"

Model ST75 V, ST75 AV

Female NPT, Male NPT, ANSI flanges, DIN flanges

■ **Maximum Operating Pressure**

ST75, ST75A	All Except w/CRN	w/CRN
T-fitting (NPT female)	240 psi [16.5 bar(g)]	240 psi [16.5 bar(g)]
Tube Tee	600 psi [41 bar(g)]	600 psi [41 bar(g)]

ST75V, ST75AV	All Except w/CRN	w/CRN
Pipe Tee w/ female NPT (except 1/4")	600 psi [41 bar(g)]	240 psi [16.5 bar(g)]
Pipe Tee w/ female NPT (1/4")	240 psi [16.5 bar(g)]	240 psi [16.5 bar(g)]
Pipe Tee w/ male NPT (except 1/4")	600 psi [41 bar(g)]	240 psi [16.5 bar(g)]
Pipe Tee w/ male NPT (1/4")	240 psi [16.5 bar(g)]	240 psi [16.5 bar(g)]
Pipe Tee w/ Flanges	Per ASME B16.5	Per ASME B16.5

Transmitter

■ **Enclosure**

Rating: NEMA 4X, IP66, IP67

Material

Standard: Aluminum, polyester powder coated

Optional: 316 stainless steel

Conduit/Cable Port: Dual, 1/2" NPT or M20x1.5

■ **Operating Temperature**

0 °F to 140 °F [-18 °C to 60 °C]

■ **Input Power**

DC: 18 Vdc to 36 Vdc (6 watt maximum)

AC: 85 Vac to 265 Vac (12 watt maximum)

(CE Marking approval from 100 Vac to 240 Vac)

■ **Output Signal**

Standard

(2) 4-20 mA, user assignable to flow rate and/or temperature

(1) 0-500 Hz pulse for total flow

Output #1 have fault indication per NAMUR NE43 guidelines; user selectable for high (>21.0 mA) or low (<3.6 mA)

■ **Bus Communications (ST75A/ST75AV)** HART or Modbus

HART: Version 7; FieldComm Group certified; available over output #1;
DD file included

Modbus: RS485 (in accordance with EIA/TIA-485 standard)

Modbus device type: Slave

Address range: 0-255

Supported function codes: 03,04

Supported baud rate: 9600,19200

Transmission mode: RTU and ASCII; standard MS (16 bit),
standard LS (16 bit), Daniel extensions (32 bit)

Response time (delay between polls): 50 ms or greater

Functions

Readings: Flow rate, temperature, totalized flow (single precision),
flow engineering units, temperature engineering units

Other: Enable (activate) totalizer, reset totalizer, change K factor

■ **Communication Port:** RS232C standard

■ **Digital Display (optional):** 2-line x 16 characters LCD. Displays measured value and engineering units. Top line assigned to flow rate. Second line is user assignable to temperature reading, as flow totalizer or alternating. Display can be rotated in 90° increments for optimum viewing orientation.

Agency Approvals

FM, FMC: Explosion-Proof for Class I, Division 1, Groups B, C and D;
Dust-Ignition-proof for Class II/ III, Division 1, Groups E, F and G;
Nonincendive for Class I, Division 2, Groups A, B, C and D
Hazardous (Classified) Locations;
Type 4X, IP66; T4 Ta = 60°C.

ATEX/UKEX: II 2 G Ex db IIC T6...T1 Gb
II 2 D Ex tb IIIC T85°C...T300°C Db; IP66/IP67
Ta = -40°C to +65°C

IECEX: Ex db IIC T6...T1 Gb;
Ex tb IIIC T85°C...T300°C Db; IP66/IP67
Ta = -40°C to +65°C

Other Compliances: EAC/TR CU, NEPSI, EQM ECAS, RoHS
CE Marking, CPA, PED, CRN, UKEX, probe complies with
NEC & CEC code requirements of ANSI / ISA 12.27.01-2011
as a single seal device.

SIL (ST75A, ST75AV): SIL 1 compliant, safe failure fraction (SFF)
78.5% to 81.1%

Specifications at reference operating conditions of 70 °F, 14.7 psia [21.1 °C, 1.013 bar(a)] and for Models ST75, ST75A straight pipe run 20d upstream, 10d downstream.

FCl is a continuous improvement company. Specifications subject to change without notice.

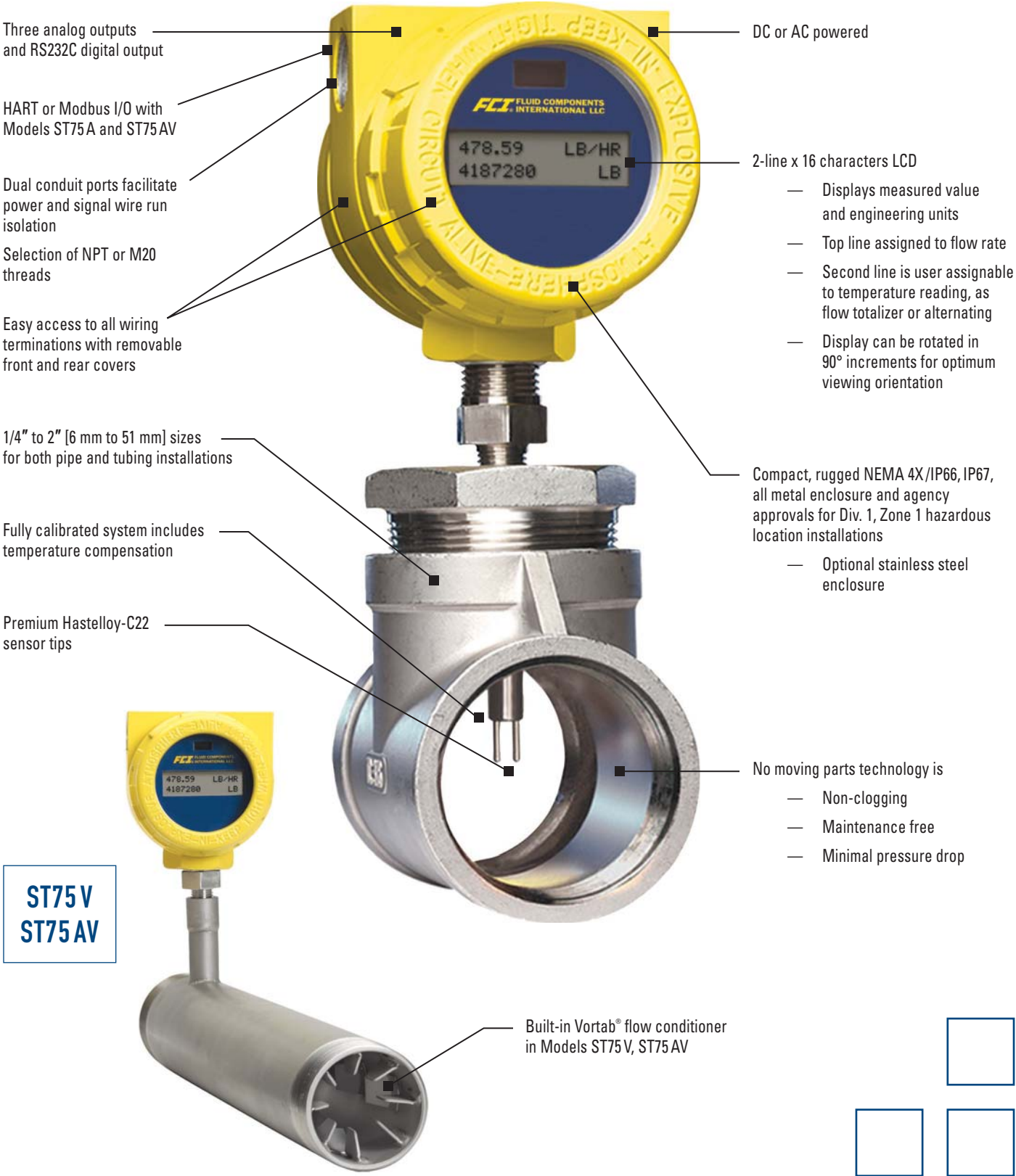
¹ For line sizes > 2 inches [> 51 mm] see FCl insertion-style flow meters

² Actual range subject to gas type and specific conditions

ST75 Series Features

In-line, Mass Flow Measurement

With premium components and attention to detail, FCI's ST75 series provides long-lasting flow meter quality and value. Its features and functions ensure application compatibility, maximum installation convenience, superior industrial durability and lowest maintenance.



Three analog outputs and RS232C digital output

HART or Modbus I/O with Models ST75A and ST75AV

Dual conduit ports facilitate power and signal wire run isolation

Selection of NPT or M20 threads

Easy access to all wiring terminations with removable front and rear covers

1/4" to 2" [6 mm to 51 mm] sizes for both pipe and tubing installations

Fully calibrated system includes temperature compensation

Premium Hastelloy-C22 sensor tips

ST75V
ST75AV

DC or AC powered

2-line x 16 characters LCD

- Displays measured value and engineering units
- Top line assigned to flow rate
- Second line is user assignable to temperature reading, as flow totalizer or alternating
- Display can be rotated in 90° increments for optimum viewing orientation

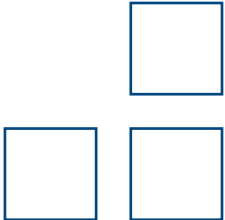
Compact, rugged NEMA 4X/IP66, IP67, all metal enclosure and agency approvals for Div. 1, Zone 1 hazardous location installations

- Optional stainless steel enclosure

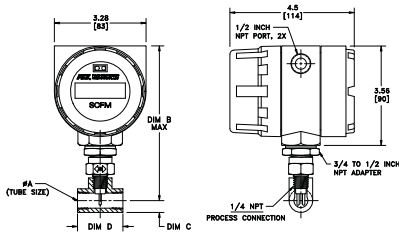
No moving parts technology is

- Non-clogging
- Maintenance free
- Minimal pressure drop

Built-in Vortab® flow conditioner in Models ST75V, ST75AV



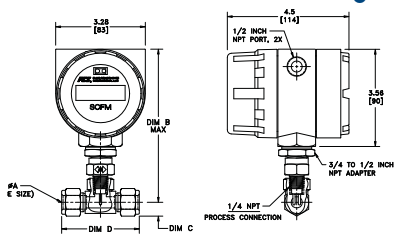
Models ST75/ST75A Pipe (NPT) Tee Configuration



1. DIMENSIONS IN INCHES; BRACKETS [] ARE IN mm.
2. REDUCERS USED ON LARGER PIPE TEES (NOT SHOWN) ALLOW FOR MAX B DIMENSION.
3. PIPE TEES ARE 150 # CLASS.

Pipe (NPT) Tee Configuration			
DIM A Pipe Size	DIM B Top to Flow CL	DIM C Flow CL to Bottom	DIM D Tee Length
1/4"	6.0 [152,4] Max.	0.38 [9,65]	1.54 [39,12]
1/2"	6.5 [165,1] Max.	0.56 [14,22]	2.28 [57,91]
3/4"	7.0 [177,8] Max.	0.68 [17,27]	2.56 [65,02]
1"	7.3 [185,4] Max.	0.86 [21,84]	2.92 [74,17]
1 1/2"	7.8 [198,1] Max.	1.17 [29,72]	3.82 [97,03]
2"	8.0 [203,2] Max.	1.42 [36,07]	4.66 [118,40]

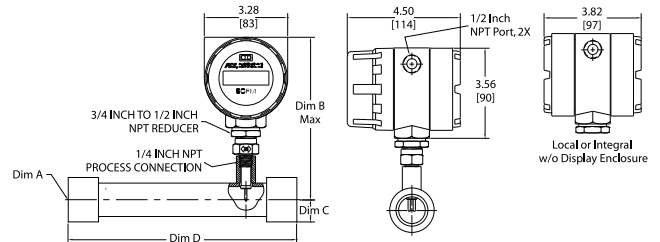
Models ST75/ST75A Tube Tee Configuration



1. DIMENSIONS IN INCHES; BRACKETS [] ARE IN mm.
2. COMPRESSION FITTING FERRULES 316 SST.

Tube Tee Configuration			
DIM A Pipe Size	DIM B Top to Flow CL	DIM C Flow CL to Bottom	DIM D Tee Length
1/4"	5.7 [144,8] Max.	0.33 [8,39]	2.34 [59,44]
1/2"	5.9 [149,9] Max.	0.53 [13,46]	2.84 [72,14]
1"	7.8 [198,1] Max.	0.87 [22,10]	3.86 [98,04]

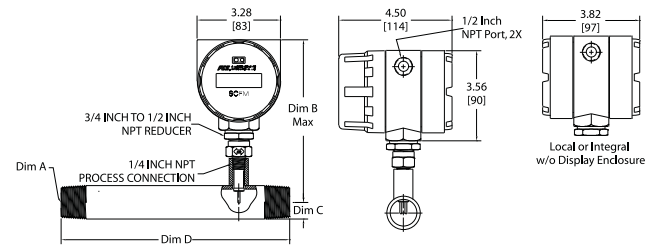
Models ST75V/ST75AV Female NPT



1. Dimensions are in INCHES; brackets [] are in MILLIMETERS.

Female NPT Configuration			
DIM A Pipe Size	DIM B Top to Flow CL	DIM C Flow CL to Bottom	DIM D VMR Length
1/4"	5.50 [140]	0.38 [9,5]	5.00 [127]
1/2"	5.69 [144,5]	0.57 [14]	7.50 [190,5]
3/4"	6.45 [164]	0.69 [17,5]	9.00 [229]
1"	6.44 [163,5]	0.88 [22]	9.00 [229]
1 1/2"	6.42 [163]	1.25 [32]	13.50 [343]
2"	6.43 [163]	1.50 [38]	18.00 [457]

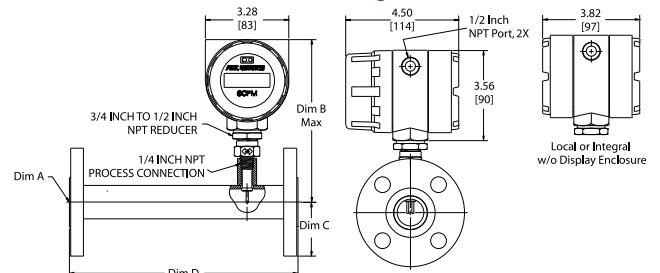
Models ST75V/ST75AV Male NPT



1. Dimensions are in INCHES; brackets [] are in MILLIMETERS.

Male NPT Configuration			
DIM A Pipe Size	DIM B Top to Flow CL	DIM C Flow CL to Bottom	DIM D Tee Length
1/4"	5.50 [140]	0.38 [9,5]	5.00 [127]
1/2"	5.69 [144,5]	0.42 [10,6]	7.50 [190,5]
3/4"	6.45 [164]	0.51 [13]	9.00 [229]
1"	6.44 [163,5]	0.65 [16,5]	9.00 [229]
1 1/2"	6.42 [163]	.95 [24]	13.50 [343]
2"	6.43 [163]	1.19 [30]	18.00 [457]

Models ST75V/ST75AV Flanged



1. Dimensions are in INCHES; brackets [] are in MILLIMETERS.
2. Flanges are 150# Class.

Flanged Configuration			
DIM A Pipe Size	DIM B Top to Flow CL	DIM C Flow CL to Bottom	DIM D Tee Length
1/4"	n/a	n/a	n/a
1/2"	5.69 [144,5]	1.75 [45]	7.50 [190,5]
3/4"	6.45 [164]	1.94 [49]	9.00 [229]
1"	6.44 [163,5]	2.12 [54]	9.00 [229]
1 1/2"	6.42 [163]	2.50 [64]	13.50 [343]
2"	6.43 [163]	3.00 [76]	18.00 [457]

More Air / Gas Mass Flow Meter Solutions

In addition to the ST75 Series, FCI manufactures a broad line of thermal dispersion flow meter products for industrial and plant applications. From general-purpose air flow measurement to special-function, mixed gas flare flows; from small line sizes to the largest stacks and ducts, FCI has the selection to best solve your applications and ensure optimum solutions. Contact your local FCI representative or visit www.FluidComponents.com for detailed product information and specifications on these products.



- **ST50 Series** models are compact and economical, yet full featured air and gas meters designed for air, compressed air, nitrogen (ST50) and biogas, digester gas, natural gas (ST51, ST51 A) applications.



- **ST80 Series** for all gases, combines high-performance, extensive installation options and an array of output choices to meet the needs of the most demanding industrial applications.



- **ST100A Series** is industry's most advanced gas flow meters. All gases, flow, temperature and pressure, multiple outputs, bus communications, graphical display, multiple calibrations, VeriCal, on-board data logger, and more.



- **MT Series** "multi-point" flow measuring systems can be configured with two (2) to eight (8) flow sensing elements to optimize measurements within the largest of pipe and duct sizes.

FCI's World Class Calibration Ensures Installed Accuracy

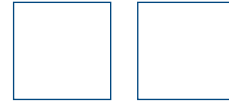
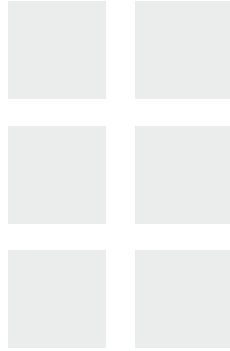
ST75 Series models are tested and calibrated to rigorous standards so that you get the instrument that does the job specified. To design and produce the highest quality flow instrumentation, FCI operates a world-class flow calibration laboratory with calibrations performed on more than 19 different flow stands, using equipment traceable to NIST (US National Institute of Standards and Technology), and ISO/IEC 17025 (International Standards for test lab quality systems).

To achieve the highest possible accuracy in ST75 Series, FCI utilizes these precision flow stands to flow actual gases and reference fluids matched to the temperature and process conditions of your application.

Other suppliers are often limited only to air calibrations and rely on non-field tested or un-validated theoretical equivalencies for other gases and gas mixtures. This procedure can be inadequate and create measurement and output errors well outside published specifications. FCI calibration capabilities are un-matched in the industry, providing you with total confidence that your installation meets its published specifications and your application needs.

More than 19 precision flow stands to match NIST traceable fluids, process conditions, flow rates and line sizes specified in your application.





FCI FLUID COMPONENTS INTERNATIONAL LLC

A PST BRAND

Locally Represented By:

Visit FCI online at www.FluidComponents.com | FCI's Quality Management System is ISO 9001 and AS9100 Certified

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