FCI ST75 FLOW METER

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
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



ST75 Series Features

- Direct mass, standard volumetric or standard velocity flow measurement
- Triple outputs: flow rate, temperature and total flow
- HART 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

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	ST75 V	ST75 AV
Vortab flow conditioning			•	•
Dual 4-20 mA outputs	•		•	
4-20 mA per NAMUR NE43				
HART I/O				
500 Hz pulse output			•	
Maximum remote distance	50'[15 m]	100'[30 m]	50'[15 m]	100'[30 m]
SIL compliance rating				
Warranty Standard	1 year	2 years	1 year	2 years

By combining precision lithography structured platinum RTD sensors embedded in FCl's equal mass thermowells with microprocessor electronics and precise actual gas calibration, the ST75 achieves outstanding flow measurement performance. Using FCl'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, CO_2 , 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 ST75 V and ST75 AV provide the solution. FCl'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

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

provider of Vortab flow conditioners for use with thermal mass flow meters such as the ST75 V 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 (18 V to 36 V) or AC (85 V to 265 V) power.

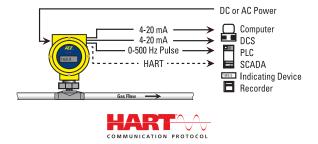
Extensive Outputs Assure Application Compatibility

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 ST75 A and ST75 AV include HART.

Dual 4-20 mA 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

A two-way HART bus over the #1 4-20 mA output is provided with Models ST75A and ST75AV. The HART bus complies with revision level 7 protocol, is fully compatible with all versions of HART field communicators and control systems, and has been certified by the FieldComm organization.

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 (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	Methyl Amine	P-Xylene
Benzene	Dichloride	Methyl Butane	R-11
Bio-Gas	Ethylene Oxide	Methyl Fluoride	R-12
Boron Trifluoride	Flare Gas	Methyl Formate	R-13
Bromine	Fluorine	Methyl Hexane	R-13B1
Bromobenzene	Fluorobenzene	Methyl Hydrazine	R-14
Butadiene	Fluoroform	Methyl	R-21
Butene	Freon-11	Mercaptan	R-22
Butylene Oxide	Freon-12	Methyl Octane	R-23
Butyne	Freon-13	Methyl Pentane	R-112
Carbon Dioxide	Freon-14	Methylal	R-113
Carbon Disulfide	Freon-21	Methylene Chloride	R-114
Carbon Monoxide	Freon-22	Morpholine	R-114B2
Carbon	Freon-23	M-Xylene	R-115
Tetrachloride	Furan	Naphthalene	R-116
Carbonyl Sulfide	Halon	Natural Gas	R-134A
Chlorine	Helium	N-Butane	R-142B
Chlorobenzene	Heptene	N-Butane	R-152A
Chloroethane	Hexanol		R-216
Chloroform	Hexene	N-Butanol N-Butyl Alcohol	R-500
Chloromethane	Hydrazine	N-Decane	R-502
Chloroprene	Hydrogen	N-Decane N-Dodecane	R-503
Cis-2-Butene	Hydrogen Bromide	Neon	R-504
Cis-2-Hexene		Neopentane	R-C318
Compressed Air	Hydrogen Chloride	N-Heptane	Radon
Cumene	Hydrogen	N-Hexane	Silane
Cyanogen	Cyanide	Nitric Oxide	Silicon Tetrachloride
Cyclobutane	Hydrogen	Nitrogen	Styrene
Cyclohexane	Deuteride	Nitrogen Dioxide	Sulfur Dioxide
Cyclooctane	Hydrogen	Nitromethane	Sulfur
Cyclopentane	Fluoride	Nitrous Oxide	Hexafluoride
Cyclopropane	Hydrogen lodide	N-Nonane	Sulfur Trioxide
Decene	Hydrogen Peroxide	N-Octane	Superheated
Deuterium	Hydrogen Sulfide	Nonene	Thiophene
Deuterium Oxide	lodine	N-Pentane	Titanium
Diethyl Amine	Isobutane	N-Propanol	Tetrachloride
Diethyl Ether	Isobutene	N-Propyl Alcohol	Toluene
Diethyl Ketone	Isobutyl Alcohol	N-Propyl Amine	Trans-2-Butene
Digester Gas	Isoheptane	N-Undecane	Trimethyl Amine
Dimethyl Ether	Isohexane	Octene	Triptane
Dimethyl Propane	Isooctane	Oxygen	Uranium Hexafluoride
Dimethyl Sulfide	Isopentane	0-Xylene	Vinyl Acetate
Ethane	Isoprene	Ozone	Vinyl Chloride
Ethanol	Isoprene Isopropyl Alcohol	Pentanol	Vinyl Fluoride
Ethyl Acetate	Isopropyl Amine	Pentene	Vinyl Formate
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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 Compatability: 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]
3/4"	0.25	[0,42]	99.08	[168,33]

Accuracy

Model ST75, ST75 A

Standard: $\pm 2\%$ re^ading, $\pm 0.5\%$ full scale Optional: $\pm 1\%$ reading, $\pm 0.5\%$ full scale

Model ST75V, ST75 AV

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

Repeatability: ± 0.5% readingTurndown 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]

Agency Approvals

FM, FMc: Class I, Division 1, Groups B, C, D; T4 Ta= 60°C

Class II/III, Division 1, Groups E, F, G; T4 Ta= 60°C;

Type 4X, IP66

Class I. Division 2. Groups A. B. C. D: T4 Ta= 60°C

ATEX, IECEx: Zone 1, Zone 21

II 2 G Ex db IIC T6...T1 Gb

II 2 D Ex tb IIIC T85°C...T300°C Db; IP66/IP67

 $Ta = -40^{\circ}C \text{ to } +65^{\circ}C$

Other:

ST75, ST75 V: EAC (TRCU) Russia, CE marking, CPA, PED, CRN ST75 A, ST75 AV: EAC (TRCU) Russia (pending), CE marking, PED,

CRN

SIL: SIL 1 compliant, safe failure fraction (SFF)

78.5% to 81.1%

Warranty

ST75, ST75 V: One year ST75 A, ST75 AV: 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-C thermowells; 316 stainless steel NPT and tube fittings; ST75 V and ST75 AV flow body is schedule 40 stainless steel

■ Maximum Operating Pressure

T-fitting [NPT female]: 240 psi [16.5 barg]

Tube: 600 psi [41 barg]

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

Transmitter

Enclosure

Rating: NEMA 4X, 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 mark 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

ST75 A and ST75 AV output #1 have fault indication per NAMUR NE43 quidelines; user selectable for high (>21.0 mA) or low (<3.6 mA)

Bus Communications

ST75 A, ST75 AV: HART (Version 7); FieldComm Group certified Available over output #1; DD file included

■ 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.

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.

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

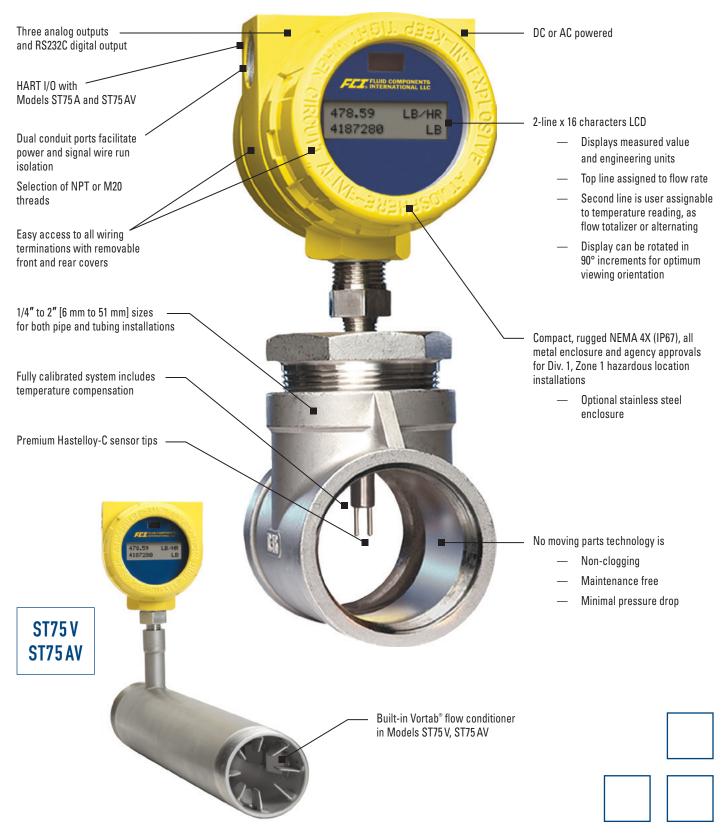
¹ For line sizes > 2 inches [> 51 mm] see FCI insrtion-style flow meters

² Actual range subject to gas type and specific conditions

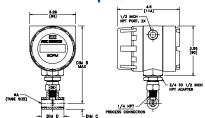
ST75 Series Features

In-line, Mass Flow Measurement

With premium components and attention to detail, FCl'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.

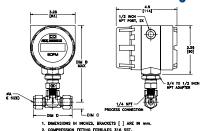


Models ST75/ST75 A Pipe (NPT) Tee Configuration



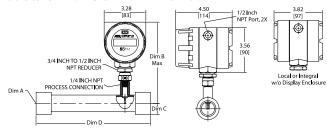
Pipe (NPT) Tee Configuration				
DIM A Pipe Size	DIM B Top to Flow CL	DIM C Flow CL to Bottom	DIM D Tee Length	
1/4"	6.0 [152,4] Max.	0.38 [9,65]	1.54 [39,12]	
1/2"	6.5 [165,1] Max.	0.56 [14,22]	2.28 [57,91]	
3/4"	7.0 [177,8] Max.	0.68 [17,27]	2.56 [65,02]	
1"	7.3 [185,4] Max.	0.86 [21,84]	2.92 [74,17]	
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/ST75 A Tube Tee Configuration



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]	
3/4"	7.8 [198,1] Max.	0.87 [22,10]	3.86 [98,04]	

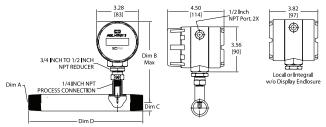
Models ST75 V / ST75 AV Female NPT



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]	

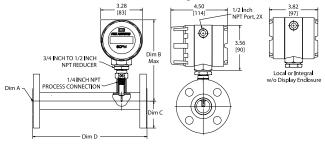
Models ST75 V / ST75 AV Male NPT



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 ST75 V / ST75 AV 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.



■ ST98 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.



ST100 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 sixteen (16) flow sensing elements to optimize measurements within the largest of pipe and duct sizes.

FCI Calibration Ensures Installed Accuracy

The ST75 Series is tested and calibrated to rigorous standards to ensure you get the instrument that does the job you specified. To design and produce the highest quality flow instrumentation, FCI operates a world-class flow calibration laboratory with equipment traceable to NIST, ISO 17025, MIL-STD 45662A, and ANSI/NCSL Z-540.

For most gases, FCI thermal dispersion flow meters are calibrated using the actual gas as well as the actual temperature and process conditions matching your application. Other suppliers are limited to air calibration with un-validated theoretical equivalencies for gases. FCI has demonstrated this procedure to be inferior and subject to installed errors well outside published specifications. For most other suppliers to perform actual gas calibrations equal to FCI, their flow meter must be sent to an outside laboratory resulting in extra costs and shipping delays to you.

FCI's calibration results in a flow meter you can install with total confidence and assurance that it meets 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.









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