

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



FCI ST75 FLOW METER

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 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

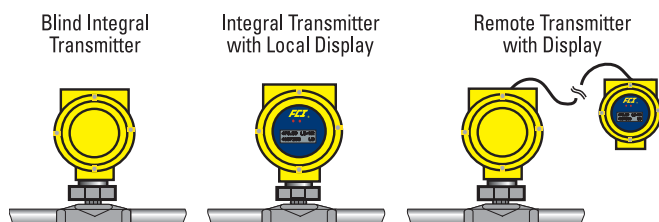


Figure 1: ST75 Series standard configurations

* 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.

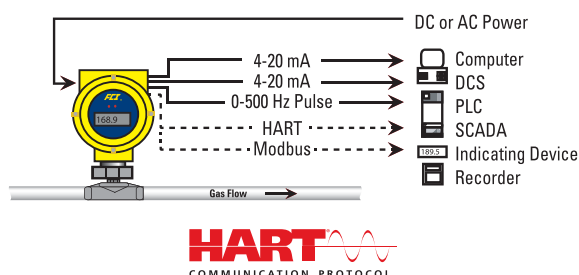
Extensive Outputs Assure Application Compatibility

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 Mercaptan	R-21
Butene	Freon-12	Methyl Octane	R-22
Butylene Oxide	Freon-13	Methyl Pentane	R-23
Butyne	Freon-14	Methylal	R-112
Carbon Dioxide	Freon-21	Methylene Chloride	R-113
Carbon Disulfide	Freon-22	Morpholine	R-114
Carbon Monoxide	Freon-23	M-Xylene	R-115
Carbon 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	N-Butanol	R-216
Chloroform	Hexene	N-Butyl Alcohol	R-500
Chloromethane	Hydrazine	N-Decane	R-502
Chloroprene	Hydrogen	N-Dodecane	R-503
Cis-2-Butene	Hydrogen Bromide	Neon	R-504
Cis-2-Hexene	Hydrogen Chloride	Neopentane	R-C318
Compressed Air	Hydrogen Cyanide	N-Heptane	Radon
Cumene	Hydrogen Deuteride	N-Hexane	Silane
Cyanogen	Hydrogen Fluoride	Nitric Oxide	Silicon Tetrachloride
Cyclobutane	Hydrogen Iodide	Nitrogen	Styrene
Cyclohexane	Hydrogen Peroxide	Nitrogen Dioxide	Sulfur Dioxide
Cyclooctane	Hydrogen Sulfide	Nitromethane	Sulfur Hexafluoride
Cyclopentane	Iodine	Nitrous Oxide	Sulfur Trioxide
Cyclopropane	Isobutane	N-Nonane	Superheated Thiophene
Decene	Isobutene	N-Octane	Titanium Tetrachloride
Deuterium	Isobutyl Alcohol	Nonene	Toluene
Deuterium Oxide	Isoheptane	N-Pentane	Trans-2-Butene
Diethyl Amine	Isohexane	N-Propanol	Trimethyl Amine
Diethyl Ether	Isooctane	N-Propyl Alcohol	Triptane
Diethyl Ketone	Isopentane	N-Propyl Amine	Uranium Hexafluoride
Digester Gas	Isoprene	N-Undecane	Vinyl Acetate
Dimethyl Ether	Isopropyl Alcohol	Octene	Vinyl Chloride
Dimethyl Propane	Isopropyl Amine	Oxygen	Vinyl Fluoride
Dimethyl Sulfide		O-Xylene	Vinyl Formate
Ethane		Ozone	
Ethanol		Pentanol	
Ethyl Acetate		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; ST75V and ST75AV 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.

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

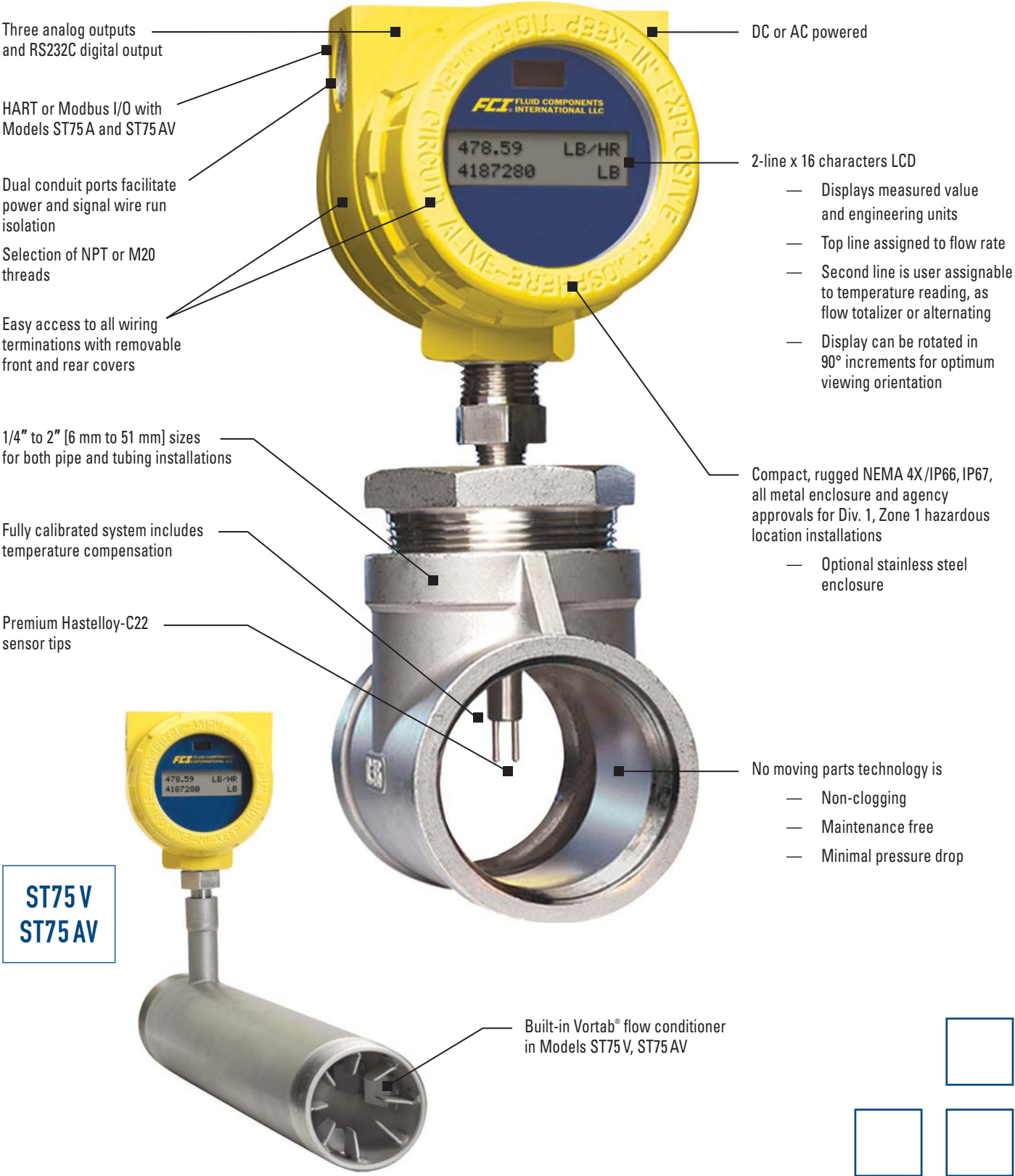
¹ For line sizes > 2 inches [> 51 mm] see FCI insertion-style flow meters

² Actual range subject to gas type and specific conditions

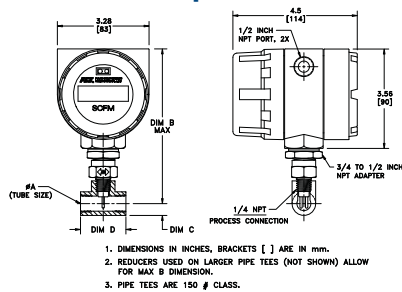
ST75 Series Features

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.

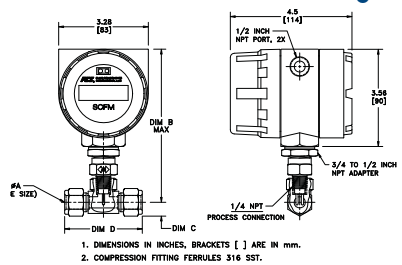


Models ST75/ST75A Pipe (NPT) Tee Configuration



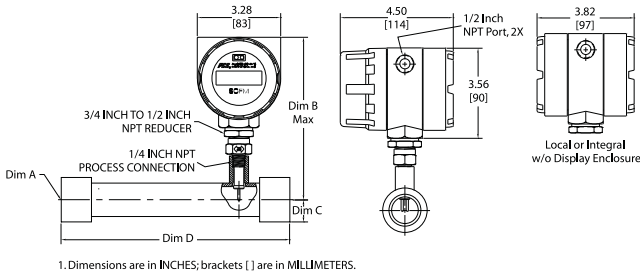
Pipe (NPT) Tee Configuration			
DIM A Pipe Size	DIM B Top to Flow CL	DIM C Flow CL to Bottom	DIM D Tee Length
1/4"	6.0 [152,4] Max.	0.38 [9,65]	1.54 [39,12]
1/2"	6.5 [165,1] Max.	0.56 [14,22]	2.28 [57,91]
3/4"	7.0 [177,8] Max.	0.68 [17,27]	2.56 [65,02]
1"	7.3 [185,4] Max.	0.86 [21,84]	2.92 [74,17]
1 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/ST75A Tube Tee Configuration



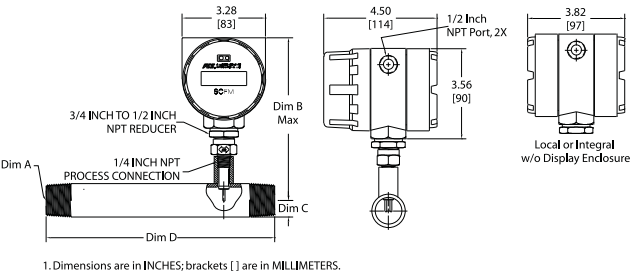
Tube Tee Configuration			
DIM A Pipe Size	DIM B Top to Flow CL	DIM C Flow CL to Bottom	DIM D Tee Length
1/4"	5.7 [144,8] Max.	0.33 [8,39]	2.34 [59,44]
1/2"	5.9 [149,9] Max.	0.53 [13,46]	2.84 [72,14]
1"	7.8 [198,1] Max.	0.87 [22,10]	3.86 [98,04]

Models ST75V/ST75AV Female NPT



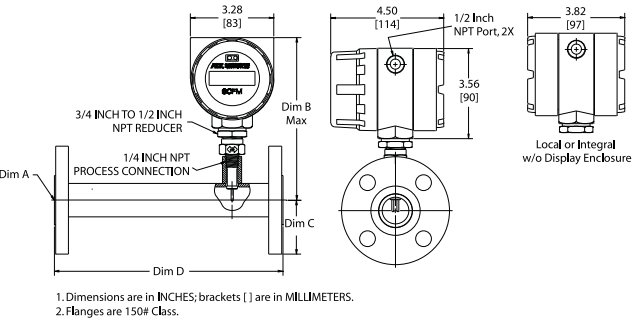
Female NPT Configuration			
DIM A Pipe Size	DIM B Top to Flow CL	DIM C Flow CL to Bottom	DIM D VMR Length
1/4"	5.50 [140]	0.38 [9,5]	5.00 [127]
1/2"	5.69 [144,5]	0.57 [14]	7.50 [190,5]
3/4"	6.45 [164]	0.69 [17,5]	9.00 [229]
1"	6.44 [163,5]	0.88 [22]	9.00 [229]
1 1/2"	6.42 [163]	1.25 [32]	13.50 [343]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

Models ST75V/ST75AV Male NPT



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



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

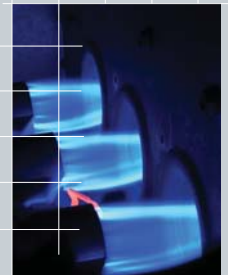
ST75 Series models are tested and calibrated to rigorous standards so that you get the instrument that does the job specified. To design and produce the highest quality flow instrumentation, FCI operates a world-class flow calibration laboratory with calibrations performed on more than 19 different flow 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

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

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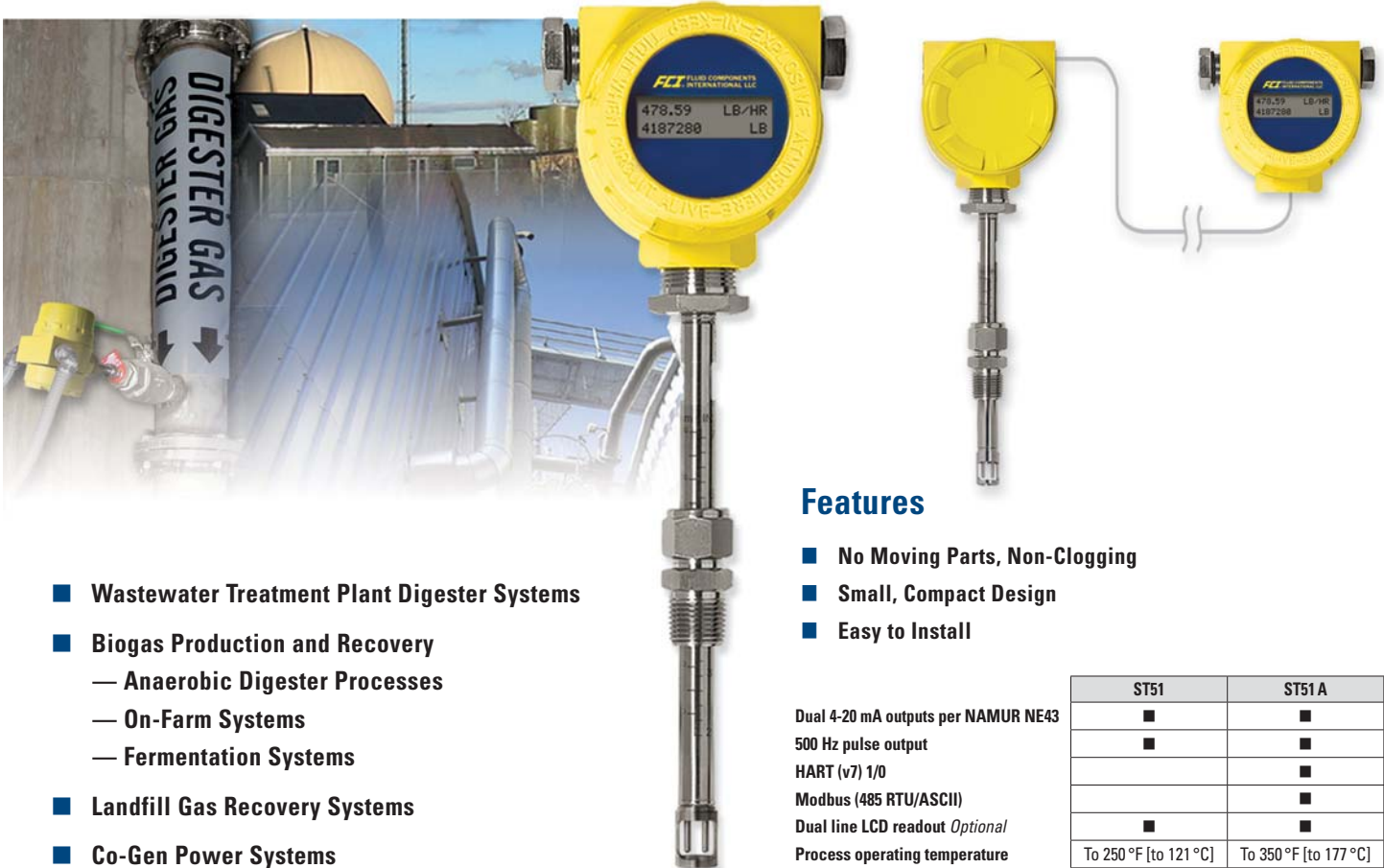


ST51 / ST51 A Mass Flow Meters

FCI FLUID COMPONENTS
INTERNATIONAL LLC

A PST BRAND

For Biogas, Digester Gas, Methane and Natural Gas



- Wastewater Treatment Plant Digester Systems
- Biogas Production and Recovery
 - Anaerobic Digester Processes
 - On-Farm Systems
 - Fermentation Systems
- Landfill Gas Recovery Systems
- Co-Gen Power Systems
- Coal Mine and Coal Bed Methane Recovery

Features

- No Moving Parts, Non-Clogging
- Small, Compact Design
- Easy to Install

Dual 4-20 mA outputs per NAMUR NE43
500 Hz pulse output
HART (v7) 1/0
Modbus (485 RTU/ASCII)
Dual line LCD readout *Optional*
Process operating temperature
Remote distance *Maximum*
SIL compliance rating
Ex hazardous location approvals
Warranty

ST51	ST51 A
■	■
■	■
	■
	■
■	■
To 250 °F [to 121 °C]	To 350 °F [to 177 °C]
50' [15 m]	100' [30 m]
	■
■	■
1 year	2 years

The **ST51 Series Flow Meter** is an accurate, easy to install, no moving parts solution for measuring and controlling biogases, digester gases, methane and natural gas flow. ST51 utilizes FCI proven thermal dispersion technology to provide direct mass flow measurement resulting in higher performance at a lower cost than orifice plates, DP, Vortex shedding and other thermal devices.

Biogas and digester gas applications are challenged by wide flow variations and dirty, wet gas. Flow variation is experienced as these processes move from low production start-up phases to a consistent, sustainable process and by seasonal temperature change, where cold temperatures slow gas production and higher temperature accelerate gas production. While the primary composition of these gases is methane and CO₂, residual H₂S and wet vapor leave deposits and corrode surfaces. ST51 provides the solution to these challenges. It features a wide-turndown ratio, up to 100:1 and is highly sensitive to low flow measurement. To measure correctly in fluctuating temperatures, flow meters must include temperature compensation circuitry and it is standard in ST51. ST51 has no moving parts to foul or clog and is easily pulled from the pipe for occasional cleaning.

ST51 installs in line sizes ranging from 2 1/2 inch to 24 inch [64 mm to 610 mm] with 1/2 inch or 3/4 inch NPT.

The ST51 uses precision, lithography structured platinum RTD sensors embedded in FCI's equal mass small diameter thermowells. Combined with microprocessor electronics and precision calibration, the ST51 achieves excellent accuracy, fast response and virtually maintenance free operation.



Biogas, digester gas and landfill gas compositions are dominated by methane (CH₄) and present a potentially hazardous installation environment. Sound engineering practice and often regulations mandate that instrumentation meet guidelines and have agency

approvals for installation zone safety. Depending on actual installation location, at a minimum the environment will require Class I, Division II and often a more rigorous Class I, Division I [Zone 1] approvals. FCI ST51 meets all of these and has obtained the global agency approvals that ensure your installation is always safe and complies with regulations. And, unlike manufacturers who merely provide their transmitter electronics in an approved OEM enclosure, FCI submits its entire instrument to agency testing. FCI product approvals are different because they are comprehensive system approvals that also take into account the sensor and seal requirements as well the "T" (temperature) ratings. FCI agency approvals are on the total instrument. With ST51 you are assured of the integrity of total instrument approvals that meet or exceed safe engineering practice for your applications.

ST51 Specifications

Instrument

Media Compatibility: Biogas, digester gas, methane, natural gas, air, compressed air, nitrogen

Pipe/Line Size Compatibility: 2 1/2" to 24" [64 mm to 610 mm]¹

Flow Range: 0.3 SFPS to 400 SFPS [0.08 MPS to 122 MPS]

Accuracy: (at ≥ 0.75 SFPS [≥ 0.21 NMPS])²

Standard: $\pm 2\%$ reading $\pm 0.5\%$ full scale

Optional: $\pm 1\%$ reading $\pm 0.5\%$ full scale

Repeatability: $\pm 0.5\%$ reading

Temperature Compensation

Standard: 40 °F to 100 °F [4 °C to 38 °C];

Optional: 0 °F to 350 °F [-18 °C to 177 °C]

Temperature Coefficient

With temperature compensation; valid from 10% to 100% of full scale calibration

Flow: Maximum $\pm 0.015\%$ of reading / °F up to 350 °F [$\pm 0.03\%$ of reading / °C up to 177 °C]

Turndown Ratio: 3:1 to 100:1

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, CE Marking, CRN, EQM ECAS, CPA,
PED, RoHS Compliant
SIL (ST51A): SIL 1 compliant; Safe Failure Fraction (SFF) 78.5% to 81.1%
Probe complies with NEC & CEC code requirement of
ANSI/ISA 12.27.01-2011 as single seal device.

Warranty: ST51 – 1 year; ST51 A – 2 years

¹ For line sizes 2" [51 mm] or smaller, see FCI ST75 Series

² Contact FCI for accuracy below 0.75 SFPS [0.21 NMPS]

Flow Element

Installation: Insertion, variable length with 1/2" or 3/4" MNPT compression fitting

Type: Thermal dispersion

Material of Construction: 316L stainless steel body with Hastelloy-C22 thermowell sensors, 316 stainless steel compression fitting with Teflon or stainless steel ferrule

Pressure (Maximum Operating without Damage)

Stainless steel ferrule: 500 psig [34 bar(g)]

Teflon ferrule: 150 psig [10 bar(g)]

Operating Temperature

Stainless steel ferrule

ST51: -0 °F to 250 °F [-18 °C to 121 °C]

ST51 A: -0 °F to 350 °F [-18 °C to 177 °C]

Teflon ferrule: -0 °F to 200 °F [-18 °C to 93 °C]

Process Connection

Compression Fittings: 1/2" MNPT or 3/4" MNPT with stainless steel or Teflon ferrule

Retractable

Packing Gland: Medium pressure 500 psig [34 bar(g)] with 1/2" MNPT or 3/4" MNPT, and either graphite or Teflon packing

Teflon packing is required if media is ozone, chlorine, or bromine

Insertion Length (Field Adjustable)

1" to 6" [25 mm to 152 mm]

1" to 12" [25 mm to 305 mm]

1" to 18" [25 mm to 457 mm]

Flow Transmitter

Enclosure

Rating: NEMA 4X, IP66/IP67

Material: *Standard* – aluminum, polyester powdered 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 watts max.)

AC: 85 Vac to 265 Vac (12 watts max.; CE Marking approval from 100 Vac to 240 Vac)

Analog Output Signals: Dual 4-20 mA, user assignable to flow rate and/or temperature and a 0-500 Hz pulse output for total flow; output #1 has fault indication per NAMUR NE43 guidelines, user selectable for high (>21.0 mA) or low (<3.6 mA)

Bus Communications (ST51 A): 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

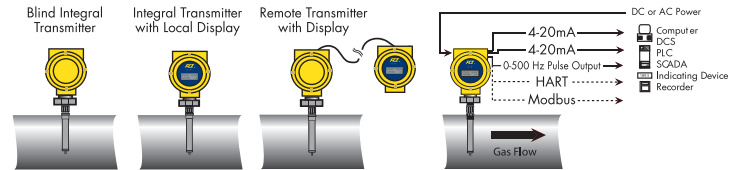
Readings: Flow rate, temperature, totalized flow (single precision),
flow engineering units, temperature engineering units

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

Communication Port: RS-232C

Digital Display (Optional): Two-line x 16 character LCD; displays measured value and engineering units; top line assigned to flow rate, second line user assignable to temperature reading, as flow totalizer or alternating; display can be rotated in 90° increments for optimum viewing orientation

Installation and Mounting: Integral with sensor element or remote mountable up to 50' [15 m] with Model ST51, and up to 100' [30 m] with Model ST51A



Optional Ball Valves

Part Number	Description
025172-09	1/2" ball valve; standard-duty, full port, 2-piece, 1000 psi [70 bar] max, -40 °F to 450 °F [-40 °C to 232 °C] <i>Pressure rating derated above 100 °F [38 °C]</i>
025172-10	3/4" ball valve; standard-duty, full port, 2-piece, 1000 psi [70 bar] max, -40 °F to 450 °F [-40 °C to 232 °C] <i>Pressure rating derated above 100 °F [38 °C]</i>
011144-05	3/4" ball valve; heavy-duty, full port, 3-piece, 1440 psi [99 bar] max, -40 °F to 550 °F [-40 °C to 288 °C]

