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
- 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

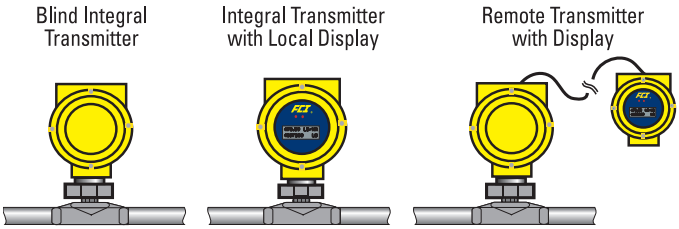
FCI® FLUID COMPONENTS INTERNATIONAL LLC

ST75 Series Features

- **Direct mass, standard volumetric or standard velocity flow measurement**
- **Triple outputs: flow rate, temperature & total flow**
- **Non-clogging, no moving parts**
- **Wireless IR communications**
- **2 line digital display option**
- **Small, compact design**
- **Easy installation**
- **Built-in Vortab® flow conditioning in Model ST75V**


Model ST75


Model ST75V



ST75-1	**ST75-2**	**ST75-4**
ST75V-1	**ST75V-2**	**ST75V-4**
ST75-A	**ST75-B**	**ST75-C**
ST75V-A	**ST75V-B**	**ST75V-C**

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 two base models in the series — Model ST75, and Model ST75V which 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].

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, CO_2, argon and all inert gases, compressed air and more.

Easy to Install, Easy to Use

Model ST75 standard "T" fitting design 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, Model ST75V provides the solution. FCI's Model ST75V includes 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.

To serve a variety of application and installation requirements the ST75 and ST75V are available in three standard configurations as shown at left. (Other display options are described in Accessory Remote Digital Display section.)

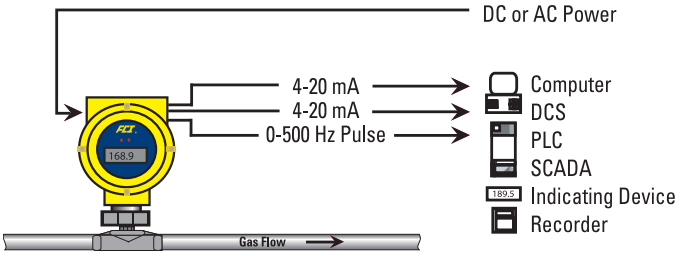
To provide convenient and easy access for wire-up and signal isolation, the instrument's enclosure features dual conduit ports in either NPT or M20 threads, as well as removable front and rear covers. ST75 can be ordered for DC (18 V to 36 V) or AC (85 V to 265 V) power.

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 all standard.

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. Also provided for interface to totalizers is a 0-500 Hz pulse output of flow.

In all models a standard RS232C serial I/O link is provided for instrument configuration, service/troubleshooting data, and measured readings. Also included in all models is a wireless IR sensor to enable wireless connectivity to PDA devices.



Exclusive Wireless Communications

With FCI's unique new IR link, any Palm-OS based PDA can be used to communicate with the ST75 without contact. This wireless IR link features a password protected, easy-to-follow menu driven program to access all its features. Parameters include measured readings and totalizer values, configuration settings, calibration downloads, diagnostic service codes and more. This wireless interface is ideal to save cost and time when the ST75 will be mounted in a hard to reach location. Requires FCI software accessory kit P/N 019819-01 for the PDA.

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, NEMA 4X (IP67) rated enclosure to provide the ruggedness and dust/weather proof protection needed to ensure long-life in industrial and commercial installations.

Accessory Remote Digital Displays

For remote mounted digital readouts of flow, temperature and /or total flow, three types of accessory displays are available:

Model DM10 is an LCD readout meter which can be inserted and located anywhere in the 4-20 mA output loop from the ST75. It requires no separate powering as it derives its power directly from the 4-20 mA loop. The DM10 is user scalable to ±1999 digits and features oversized, 1 inch [25 mm] characters for an easy-to-read display. NEMA 4X rated. FM and CSA certified models optional.

Size: 3.15″ H x 5.51″ W x 2.56″ D [80 mm H x 140 mm W x 65 mm D]
Mounting: Wall. Panel mount or pipe mount kit optional
Wire-Up: Screw terminals via 1/2″ conduit hole at bottom of case

Model DM15 is a high accuracy, 1/8 DIN panel mount, AC line powered meter with a bright red LED readout. It features a user scalable, ±9999 digit display and will accept both the 4-20 mA or 0-10 Vdc signals from the ST75. Optionally available with DM15 is a user programmable alarm setpoint with a Form C relay output.

Size: 1.89″ H x 3.78″ W x 5.35″ D [48 mm H x 96 mm W x 136 mm D]
Mounting: Panel. Standard 1/8 DIN, 45 mm H x 92 mm W cutout
Wire-Up: Screw terminals at rear of instrument

ST75 Series Flow Meter General Specifications

Instrument

- **Media:** Air, compressed air, nitrogen, oxygen, argon, CO_2, ozone, other inert gases, natural gas, other hydrocarbon gases, and hydrogen
- **Pipe/Line Size Compatability:** 1/4″ to 2″ [6 mm to 51 mm]
- **Range** [1]

NPT Line Size:	Min. SCFM	Min. [NCMH]	Max. SCFM	Max. [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:	Min. SCFM	Min. [NCMH]	Max. SCFM	Max. [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
  Standard: ±2% reading, ±0.5% full scale
  Optional: ±1% reading, ±0.5% full scale

  Model ST75V
  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]
- **Agency Approvals**
  FM/CSA: Class 1, Div. 1, Groups B,C,D;
  Class 1, Div. 2, Groups A-D
  ATEX/IECEx: Zone 1, II 2 G Ex d IIC T6…T3;
  II 2 D Ex tD A21, IP67 T90°…T300°
  CPA, CE Mark
- **Warranty:** One year

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. ST75V 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
  T-fitting [NPT female]: 1/4″, 1/2″, 3/4″, 1″, 1 1/2″ or 2″
  Tubing: 1/4″, 1/2″ or 1″

  Model ST75V
  Female NPT, Male NPT, ANSI flanges, DIN flanges

Transmitter

- **Enclosure:** NEMA 4X [IP67], aluminum, dual conduit ports with either 1/2 inch NPT or M20x1.5 entries. Epoxy coated.
- **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
- **Communication Port**
  RS232C standard. Wireless IR to PDA [2]
- **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.

[1] Actual range subject to gas type and specific conditions

[2] Requires user supplied PDA and FCI software P/N 019819-01

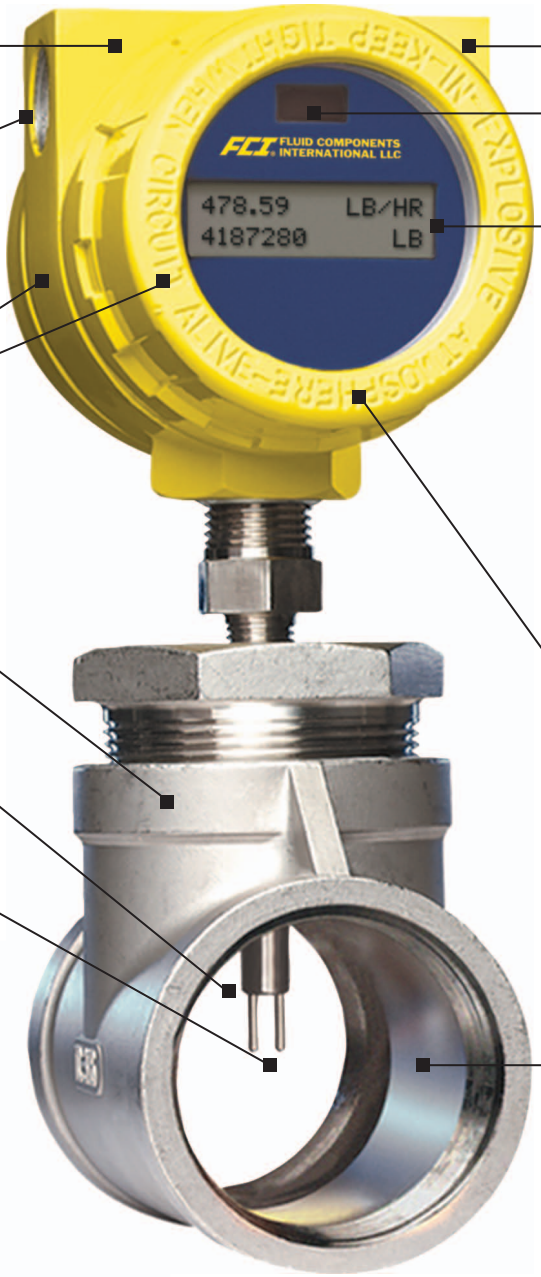
Specifications at reference operating conditions of 70 °F, 14.7 psia [21.1 °C, 1.013 bar(a)] and for Model ST75 straight pipe run 20d upstream, 10d downstream.

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

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

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 to 51 mm] sizes for both pipe and tubing installations

Fully calibrated system includes temperature compensation

Premium Hastelloy-C sensor tips

DC or AC powered

Wireless IR link to PDA

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 (IP67), all metal enclosure and agency approvals for Div. 1, Zone 1 hazardous location installations

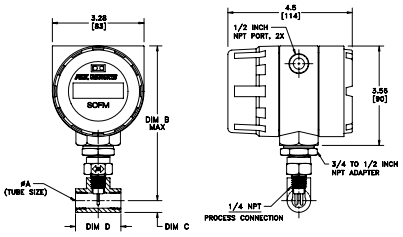
No moving parts technology is

- Non-clogging
- Maintenance free
- Minimal pressure drop

ST75V

Built-in Vortab® flow conditioner in Model ST75V

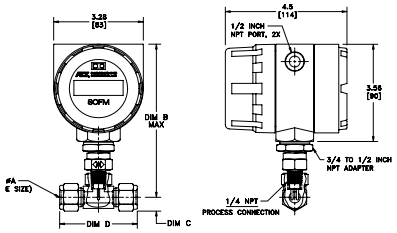
Model ST75 Pipe (NPT) Tee Configuration



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			
Configuration	**DIM A** Pipe Size	**DIM B** Top to Flow CL	**DIM C** Flow CL to Bottom	**DIM D** Tee Length
ST75-XXXAXX	1/4″	6.0 [152,4] Max.	0.38 [9,65]	1.54 [39,12]
ST75-XXXBXX	1/2″	6.5 [165,1] Max.	0.56 [14,22]	2.28 [57,91]
ST75-XXXCXX	3/4″	7.0 [177,8] Max.	0.68 [17,27]	2.56 [65,02]
ST75-XXXDXX	1″	7.3 [185,4] Max.	0.86 [21,84]	2.92 [74,17]
ST75-XXXEXX	1 1/2″	7.8 [198,1] Max.	1.17 [29,72]	3.82 [97,03]
ST75-XXXFXX	2″	8.0 [203,2] Max.	1.42 [36,07]	4.66 [118,40]

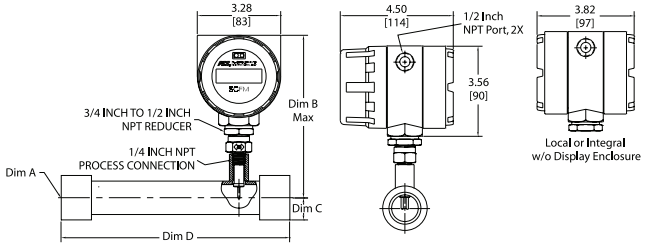
Model ST75 Tube Tee Configuration



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

	Tube Tee Configuration			
Configuration	**DIM A** Pipe Size	**DIM B** Top to Flow CL	**DIM C** Flow CL to Bottom	**DIM D** Tee Length
ST75-XXXGXX	1/4″	5.7 [144,8] Max.	0.33 [8,39]	2.34 [59,44]
ST75-XXXHXX	1/2″	5.9 [149,9] Max.	0.53 [13,46]	2.84 [72,14]
ST75-XXXJXX	3/4″	7.8 [198,1] Max.	0.87 [22,10]	3.86 [98,04]

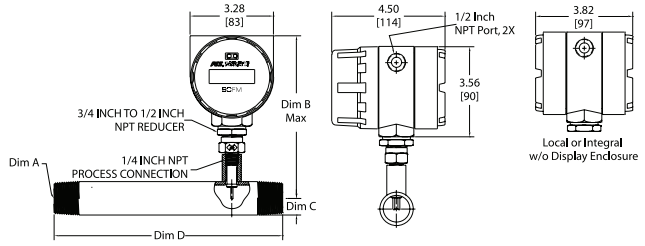
Model ST75V Female NPT



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

	Female NPT Configuration			
Configuration	**DIM A** Pipe Size	**DIM B** Top to Flow CL	**DIM C** Flow CL to Bottom	**DIM D** VMR Length
ST75V-XXXCE	1/4″	5.50 [140]	0.38 [9,5]	5.00 [127]
ST75V-XXXEE	1/2″	5.69 [144,5]	0.57 [14]	7.50 [190,5]
ST75V-XXXFE	3/4″	6.45 [164]	0.69 [17,5]	9.00 [229]
ST75V-XXXGE	1″	6.44 [163,5]	0.88 [22]	9.00 [229]
ST75V-XXXHE	1 1/2″	6.42 [163]	1.25 [32]	13.50 [343]
ST75V-XXXJE	2″	6.43 [163]	1.50 [38]	18.00 [457]

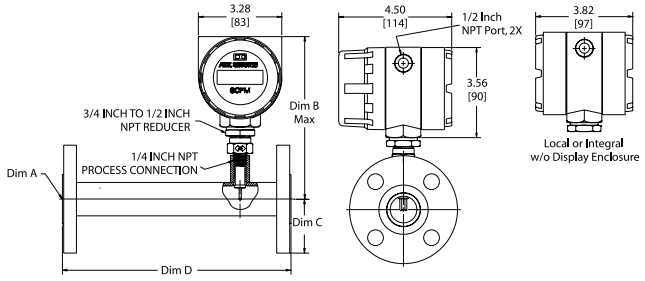
Model ST75V Male NPT



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

	Male NPT Configuration			
Configuration	**DIM A** Pipe Size	**DIM B** Top to Flow CL	**DIM C** Flow CL to Bottom	**DIM D** Tee Length
ST75V-XXXCN	1/4″	5.50 [140]	0.38 [9,5]	5.00 [127]
ST75V-XXXEN	1/2″	5.69 [144,5]	0.42 [10,6]	7.50 [190,5]
ST75V-XXXFN	3/4″	6.45 [164]	0.51 [13]	9.00 [229]
ST75V-XXXGN	1″	6.44 [163,5]	0.65 [16,5]	9.00 [229]
ST75V-XXXHN	1 1/2″	6.42 [163]	.95 [24]	13.50 [343]
ST75V-XXXJN	2″	6.43 [163]	1.19 [30]	18.00 [457]

Model ST75V Flanged



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

	Flanged Configuration			
Configuration	**DIM A** Pipe Size	**DIM B** Top to Flow CL	**DIM C** Flow CL to Bottom	**DIM D** Tee Length
ST75V-XXXCF	1/4"	n/a	n/a	n/a
ST75V-XXXEF	1/2"	5.69 [144,5]	1.75 [45]	7.50 [190,5]
ST75V-XXXFF	3/4"	6.45 [164]	1.94 [49]	9.00 [229]
ST75V-XXXGF	1"	6.44 [163,5]	2.12 [54]	9.00 [229]
ST75V-XXXHF	1 1/2"	6.42 [163]	2.50 [64]	13.50 [343]
ST75V-XXXJF	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) 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.

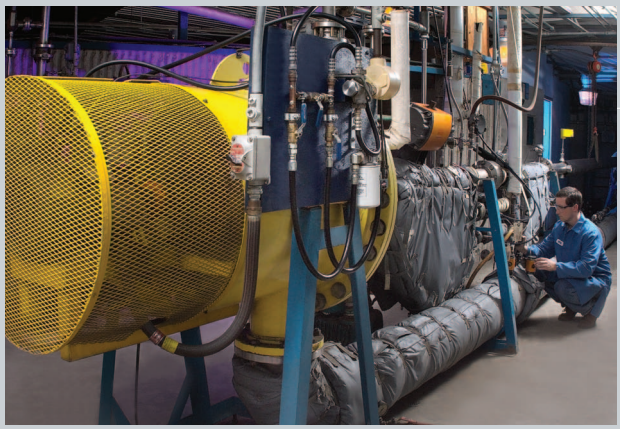
- **MT Series** "multi-point" flow measuring systems can be configured with two (2) to sixteen (16) flow sensing elements to optimize measurements within the largest of pipe and duct sizes.

FCI Calibration Ensures Installed Accuracy

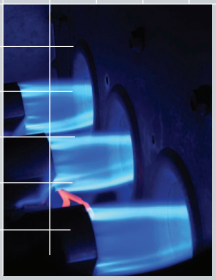
The ST75 Series is tested and calibrated to rigorous standards to ensure you get the instrument that does the job you specified. To design and produce the highest quality flow instrumentation, FCI operates a world-class NIST traceable flow calibration laboratory certified to meet such stringent standards as 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 16 precision flow stands to match fluids, process conditions, flow rates and line sizes specified in your application.



FCI® FLUID COMPONENTS INTERNATIONAL LLC

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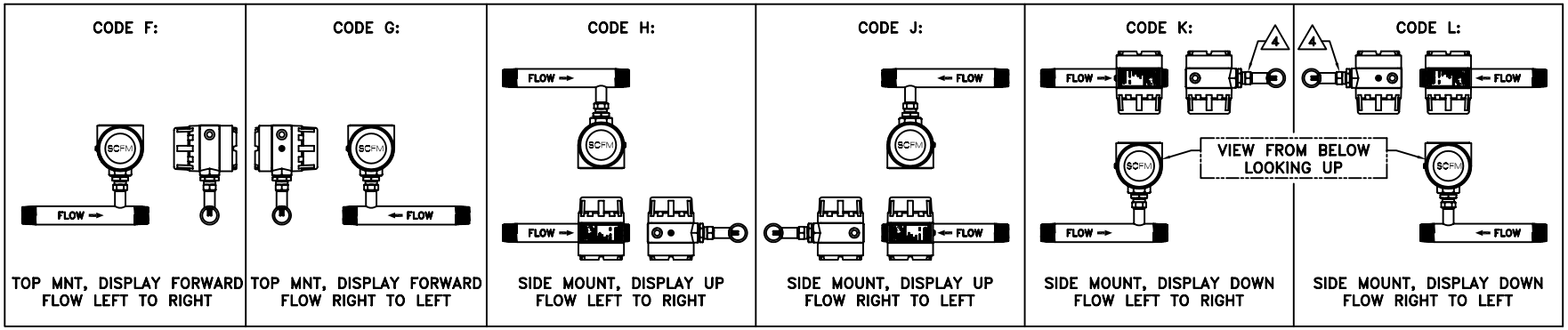
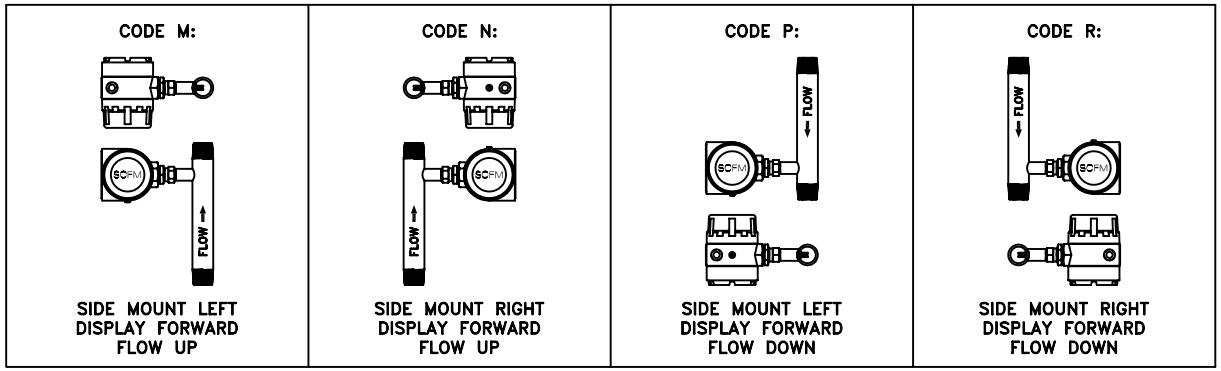
0913 1500 **Doc. No. 02MK011523 K**

REVISIONS		
REV	DESCRIPTION	DATE
A	MAJOR CHANGE, SEE DCN (REVISED AND REDRAWN)	8/22/11

INTEGRAL HORIZONTAL MOUNTINGS



INTEGRAL VERTICAL MOUNTINGS



4. FLOW ARROW ON TOP AS SHOWN
3. THE LCD DISPLAY CAN BE USER ROTATED AND VIEWED AT ANY 90 DEGREE ORIENTATION.
2. IN REMOTE ELECTRONIC CONFIGURATIONS, THE LOCAL ENCLOSURE WILL BE ORIENTED AS SHOWN WITH SOLID COVER ON BOTH SIDES. INTERCONNECTING TERMINALS LOCATED INSIDE.
1. THIS DRAWING IS GENERIC IN NATURE, FOR SPECIFIC MODEL TYPE, ORIENTATION, CUSTOMER PROCESS CONNECTION, ETC, REFER TO IO&M MANUAL.

NOTES: UNLESS OTHERWISE SPECIFIED

NEXT ASSY | USED ON
APPLICATION
THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES
DECIMALS ANGULAR
MATERIAL
FINISH | FINISH RMS
DO NOT SCALE DRAWING
PARTS TO BE FREE OF BURRS & SHARP EDGES

CONTRACT NO.

APPROVALS		APPROVALS	
CONTRACT		DRAWN	L FUSTING 7/19/07
QUAL		CHECK	EW 8/27/08
MFG	S REED 8/28/08	ENGR	E WIBLE 8/27/08
QA	R OGLE 8/21/08		

FCI FLUID COMPONENTS INTERNATIONAL LLC
SAN MARCOS, CA 92078

TITLE: ST75/ST75V, ASSEMBLY ORIENTATION

SIZE	CAGE CODE	DWG NO.	REV
D	64818	020943	A

SCALE NONE | SHEET 1 OF 1