

ULTRASONIC CLAMP-ON FLOW METER

The Series TFXL ultrasonic flow meter clamps onto the outside of a pipe and does not contact the internal liquid. This advanced product provides instantaneous rate and accumulated flows along with 4-20mA and pulse outputs. Inherent advantages over competitive technologies include ease of installation, immunity to suspended solids and gas pockets, and a large, bi-directional measuring range. In addition, the non-contact design eliminates any fluid compatibility issues. The TFXL is housed in an enclosure suitable for outdoor mounting and is available with or without a local display. Compact integral mount systems can accommodate pipes 2 inches (50 mm) and smaller. Remote mount systems are also available for pipe sizes 1/2 inch (12 mm) and higher. A software utility is available for customer configuration and in-field calibration.



BENEFITS

- **Reduced material costs:** clamp-on sensor eliminates the need for in-line flanges, pipe fittings, strainers, and filters.
- **Reduced installation time:** the TFXL may be installed and fully operational within minutes. No need to break into pipelines.
- **Reduced down-time:** installation may be performed on full pipes. No need to shut the process down for installation or maintenance.
- **Reduced maintenance costs:** with no moving parts, there is nothing on the TFXL to wear down – no repair kits or replacement parts are needed.
- **Easy retrofit:** with 3 standard outputs (4-20 mA, TTL pulse, and simulated turbine frequency), the TFXL drops easily into existing DCS and flow monitoring systems.

FEATURES

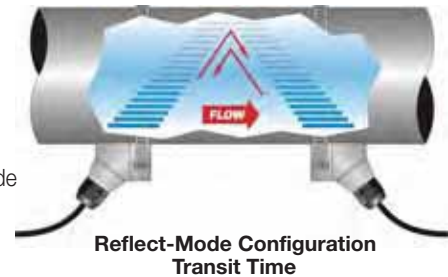
- May be used to measure liquids with moderate amounts of suspended solids or aeration (e.g., well water, raw sewage).
- Bi-directional flow measurement system. Totalizer options include forward, reverse and net total.
- UltraLink software utility (free download) enables in-field flow meter configuration, calibration and troubleshooting, via laptop PC.
- Automatic correction settings for applications where high amounts of entrained gases are present.
- Compact enclosure uses large, easy-to-read digital display.



Series TFXL

OPERATING PRINCIPLE

Transit time flow meters utilize two transducers which function as both ultrasonic transmitters and receivers. The flow meters operate by alternately transmitting and receiving a frequency modulated burst of sound energy between the two transducers. The burst is first transmitted in the direction of fluid flow and then against fluid flow. Since sound energy in a moving liquid is carried faster when it travels in the direction of fluid flow (downstream) than it does when it travels against fluid flow (upstream), a differential in the times of flight will occur. The sound's time of flight is accurately measured in both directions and the difference in time of flight calculated. The liquid velocity (V) inside the pipe can be related to the difference in time of flight (dt) through the following equation: $V = K \cdot D \cdot dt$, where K is a constant and D is the distance between the transducers.



PART NUMBER CONSTRUCTION

Integral System - 1/2" to 2" (12 mm to 50 mm)

DTFXL - **1** - **NN**

Display Options

- 1) No display-ABS enclosure
- 2) Rate & Totalizer display-ABS enclosure
- 3) No display -polycarbonate enclosure
- 4) Rate & Totalizer display-polycarbonate enclosure

Output

- 1) 4-20 mA and Pulse

Connector Options

- N) 1/2 inch Conduit Hole
- A) Water-tight Cable Clamp
- C) Circular MIL-style Connector
- D) 1/2 inch Flexible Conduit Connector

Pipe Size

- | | | | | | |
|-----------------------|-------------------------|--------------------|----------------------|--------------------|----------------------|
| A) 1/2 inch ANSI Pipe | D) 1 1/4 inch ANSI Pipe | G) 1/2 inch Copper | J) 1 1/4 inch Copper | M) 1/2 inch Tubing | Q) 1 1/4 inch Tubing |
| B) 3/4 inch ANSI Pipe | E) 1 1/2 inch ANSI Pipe | H) 3/4 inch Copper | K) 1 1/2 inch Copper | N) 3/4 inch Tubing | R) 1 1/2 inch Tubing |
| C) 1 inch ANSI Pipe | F) 2 inch ANSI Pipe | I) 1 inch Copper | L) 2 inch Copper | P) 1 inch Tubing | S) 2 inch Tubing |



Remote System - 1/2" and higher (12 mm and higher)

(A system consists of one DTFXL part number and a choice of one large or small pipe transducer part number.)



DTFXL - **1** - **NN**

- #### System Size
- X) Large Pipe
 - Y) Small Pipe

Select Options from
Integral System Table above



Large Pipe Transducer -2" and higher (50 mm and higher)

DTTN - - -

Type

- N) Standard (CPVC, Ultem®)

Location

- N) Ordinary Area
- F) Intrinsically Safe (DTTN only)

Cable Length

- 020) 20 feet (6.1 m)
- 050) 50 feet (15 m)
- 100) 100 feet (30 m)

Conduit Length

- 000) 0 feet (0 m)
- 020) 20 feet (6.1 m)
- 050) 50 feet (15 m)
- 100) 100 feet (30 m)

Conduit Type

- N) None - Bare RG59 Cable
- A) Flexible armored

Small Pipe Transducer-1/2" to 2" (12 mm to 50 mm)

DTTS - -

Nominal Pipe Size

- D) 1/2 inch
- F) 3/4 inch
- G) 1 inch
- H) 1 1/4 inch
- J) 1 1/2 inch
- L) 2 inch*

Cable Length

- 020) 20 feet (6.1 m)
- 050) 50 feet (15 m)
- 100) 100 feet (30 m)

Conduit Length

- 000) 0 feet (0 m)
- 020) 20 feet (6.1 m)
- 050) 50 feet (15 m)
- 100) 100 feet (30 m)

Conduit Type

- N) None - Bare RG59 Cable
- A) Flexible armored

Pipe Type

- P) ANSI Pipe
- C) Copper Pipe
- T) Tubing

Accessories

PC Cable w/UltraLink™ software
90-240 VAC Power Supply

Part Number

D010-0204-001
D005-2502-005

* Select "X" Large Pipe" for DTFXL System Size when ordering 2" ANSI or Copper Pipe.

Ultem is a registered trademark of General Electric Company.



Series TFXL

APPLICATION DATA SHEET

Job Name/Reference #: _____ Date: _____

Name: _____ Title: _____

Company: _____ E-Mail: _____

Address: _____

City: _____ State / Province: _____

Zip / Postal: _____ Country: _____

Telephone: _____ Fax: _____

Liquid Type: Water _____ Wastewater _____ Oil _____ Other _____

Liquid Composition (% volume, solids or aeration): _____

Max. Liquid Temp: _____ °F/°C **Viscosity:** _____

Full Pipe During Flow Measurement: Yes No

Pipe O.D. : _____ inches _____ mm **Schedule/Class:** _____ **Material:** _____

Liner (if applicable): Type _____ Thickness _____

Length of Straight Pipe (in pipe diameters): _____ Upstream _____ Downstream

Nearest Obstruction (i.e. elbow, valve): _____

Flow Range: Minimum _____ Maximum _____ Nominal _____

Flow Units: GPM _____ LPM _____ Other _____

Display: None Rate / Total **Power Requirement:** _____ AC/DC

Output Requirements: None 4-20mA Rate pulse

Environment: Indoor Outdoor Submersible Hazardous area

Other Requirements: _____

It is recommended that a Dynasonics application expert review new TFXL applications before ordering. Fill out the information noted above and fax to Dynasonics at 262-639-2267. Please enclose contact information so Dynasonics personnel may contact you regarding any additional questions.



PRODUCT INSTALLATION

Installation Considerations

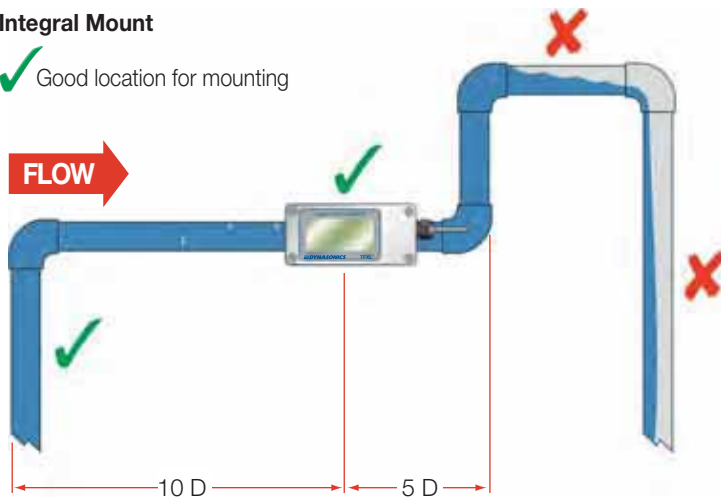
1. Select the optimum mounting location on the piping system – a **full** pipe with at least 10 straight pipe diameters upstream and 5 pipe diameters downstream with no flow disturbances.
2. Apply couplant grease to the two surfaces of the transducers that contact the pipe.
3. Mount the flow meter or remote transducers onto the pipe and secure. On horizontal pipe, transducer mounting location should be approximately 45-degrees on the side of the pipe. On vertical pipes with upward flow, radial orientation does not matter.
4. Connect and apply DC power.
5. Connect the 4-20mA, frequency or both outputs to the monitoring system.

Acoustic Couplant Application

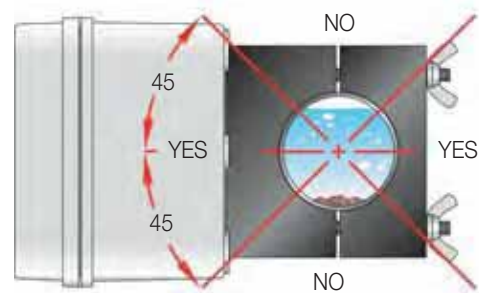


Integral Mount

✓ Good location for mounting

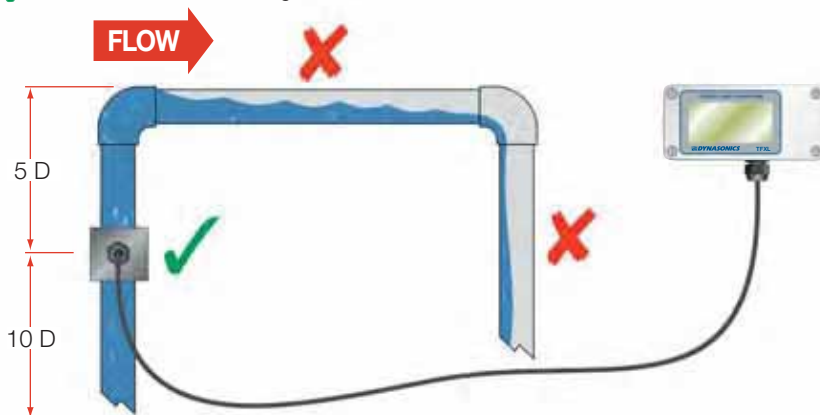


Flow Meter Mounting Orientation



Remote Mount - Small Pipe

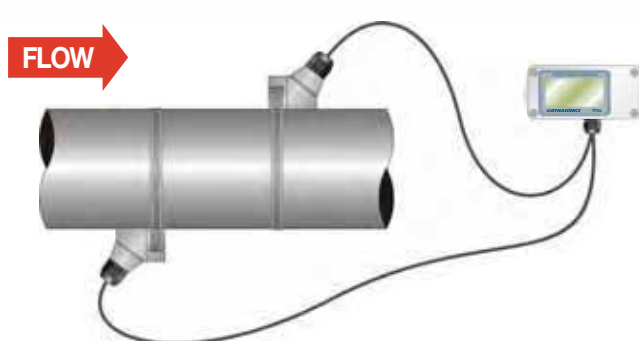
✓ Good location for mounting



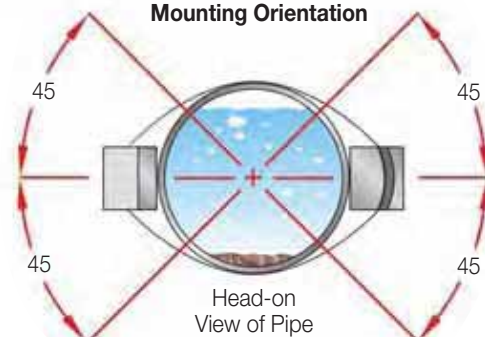
Vertical Pipe Mount

Flow Meter Transducer can be Mounted in any Orientation

Remote Mount - Large Pipe



Remote Large Pipe Transducer Mounting Orientation

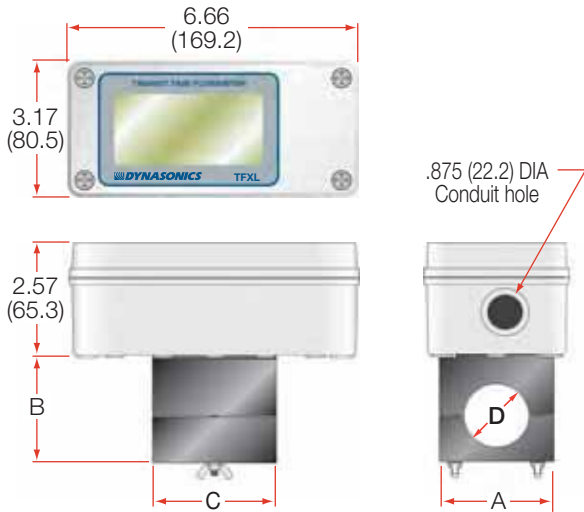


Series TFXL

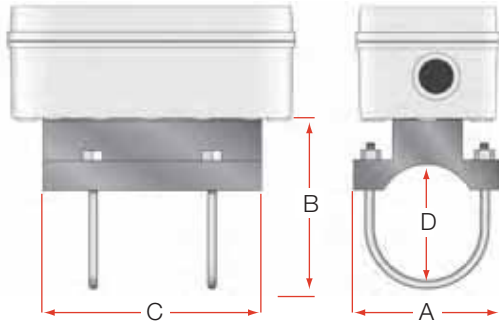
DIMENSIONAL SPECIFICATIONS

MECHANICAL DIMENSIONS: INCHES (MM)

Integral System



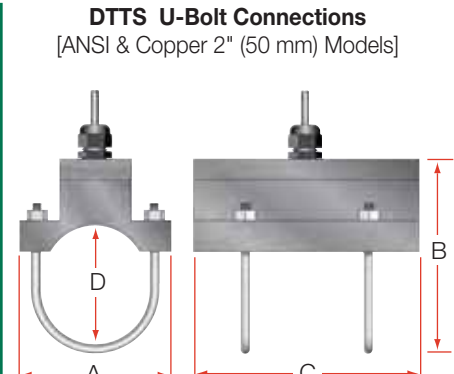
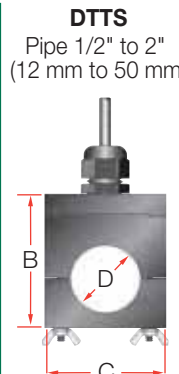
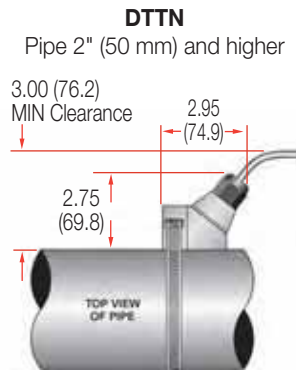
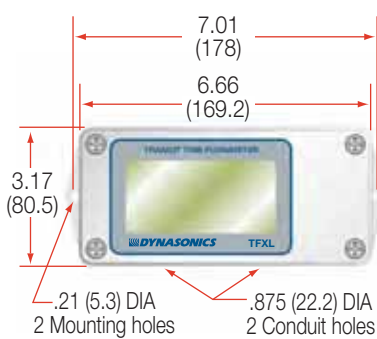
U-Bolt Connections (ANSI & Copper 2 inch Models)



Pipe Size	Pipe Material	A	B	C	D	Measuring Range
1/2"	ANSI	2.46 (62.5)	2.36 (59.9)	2.66 (67.6)	0.84 (21.3)	.5 - 25 GPM 2 - 100 LPM
	Copper	2.46 (62.5)	2.36 (59.9)	3.33 (84.6)	0.63 (15.9)	.5 - 25 GPM 2 - 100 LPM
	Tubing	2.46 (62.5)	2.28 (57.9)	3.72 (94.5)	0.50 (12.7)	.5 - 25 GPM 2 - 100 LPM
3/4"	ANSI	2.46 (62.5)	2.57 (65.3)	2.66 (67.6)	1.05 (26.7)	1 - 55 GPM 4 - 200 LPM
	Copper	2.46 (62.5)	2.50 (63.5)	3.56 (90.4)	0.88 (22.2)	1 - 55 GPM 4 - 200 LPM
	Tubing	2.46 (62.5)	2.50 (63.5)	3.56 (90.4)	0.75 (19.0)	1 - 55 GPM 4 - 200 LPM
1"	ANSI	2.46 (62.5)	2.92 (74.2)	2.86 (72.6)	1.32 (33.4)	2 - 100 GPM 8 - 375 LPM
	Copper	2.46 (62.5)	2.87 (72.9)	3.80 (96.5)	1.13 (28.6)	2 - 100 GPM 8 - 375 LPM
	Tubing	2.46 (62.5)	2.75 (69.9)	3.80 (96.5)	1.00 (25.4)	2 - 100 GPM 8 - 375 LPM
1-1/4"	ANSI	2.80 (71.0)	3.18 (80.8)	3.14 (79.8)	1.66 (42.2)	4 - 150 GPM 15 - 570 LPM
	Copper	2.46 (62.5)	3.00 (76.2)	4.04 (102.6)	1.38 (34.9)	4 - 150 GPM 15 - 570 LPM
	Tubing	2.46 (62.5)	3.00 (76.2)	4.04 (102.6)	1.25 (31.8)	4 - 150 GPM 15 - 570 LPM
1-1/2"	ANSI	3.02 (76.7)	3.42 (86.9)	3.33 (84.6)	1.90 (48.3)	5 - 220 GPM 18 - 830 LPM
	Copper	2.71 (68.8)	2.86 (72.6)	4.28 (108.7)	1.63 (41.3)	5 - 220 GPM 18 - 830 LPM
	Tubing	2.71 (68.8)	3.31 (84.1)	4.28 (108.7)	1.50 (38.1)	5 - 220 GPM 18 - 830 LPM
2"	ANSI	3.70 (94.0)	3.42 (86.9)*	5.50 (139.7)	2.375 (60.3)*	8 - 400 GPM 30 - 1500 LPM
	Copper	3.70 (94.0)	3.38 (85.9)*	5.50 (139.7)	2.125 (54.0)*	8 - 400 GPM 30 - 1500 LPM
	Tubing	3.21 (81.5)	3.85 (98.0)	4.75 (120.7)	2.00 (50.8)	8 - 400 GPM 30 - 1500 LPM

* Varies due to U-bolt configuration

Remote System



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