



PORTABLE TRANSIT TIME FLOW METER

Series TFXP Portable Transit Time Flow Meters feature the world's most advanced non-invasive flow measurement technology – providing a measuring system with superior accuracy, versatility, ease of installation and dependability. Although designed primarily for cleaner liquids, the flow meter can reliably measure liquids containing moderate amounts of suspended solids. TFXP is designed for long- or short-term flow measurement surveys on full-pipe liquid systems and is ideal for verifying calibration of permanently mounted flow meters of all types.

The flow meter features a tactile keypad, 24-hour battery (rechargeable), removable 200,000-event data logger (optional) and a 128 x 64 pixel, back-lit graphics display – all integrated into a rugged, watertight enclosure. TFXP systems utilize Dynasonics' proprietary dual time-base time expansion algorithm, advanced DSP and digital cross-correlation. TFXP also provides an optical interface that allows operation of the Windows® *ULTRALINK*™ software utility. The software utility allows simple in-field programming, calibration and software upgrades.

The cost-effective and versatile TFXP flow meter comes complete with all accessories necessary for measuring piping systems larger than 2" (50 mm).

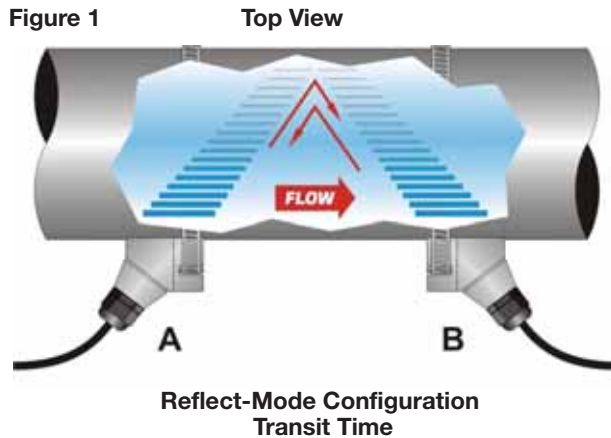
FEATURES

- A removable 200,000-event data logger has an integral DB-9 connection that plugs directly into a PC serial port for very fast 57.6K data uploads.
- Integral 24-hour rechargeable battery allows extended operation when AC power is not available. Both AC and "auto" socket style power adapters (battery chargers) are included.
- Automatic Reynolds Number compensation ensures accurate measurements through the laminar, transition and turbulent system flow regions.
- TFXP has a flow measuring range that exceeds 4000:1. This feature allows the instrument to measure normal process flow rates as well as flows resulting from leaks in piping and valves.
- Non-invasive clamp-on transducers are simple and cost-efficient to install. Since the transducers do not contact the liquid, fouling and maintenance are eliminated.
- User-configurable rate and totalizer units include: feet, gallons, ft³, million-gal, barrels, acre-feet, lbs, meters, liters, m³, million-liters and kg.
- An integral optical interface and optional Windows® software utility provide complete control of system configuration, calibration and diagnostics – without connecting any wires.
- Compartmentalized and padded carrying case keeps the TFXP meter and all of its accessories organized and protected.



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TFXP transit time flow meters utilize two transducers, shown as elements A and B in Figure 1, which function as both ultrasonic transmitters and receivers. The transducers are clamped on the outside of a closed pipe at a specific distance from each other. (The transducers can be mounted in V-mode as shown in Figure 1, W-mode where the sound transverses the pipe four times, or in Z-mode where the transducers are mounted on opposite sides of the pipe. This selection is based on pipe and liquid characteristics.) The flow meter operates 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. If the fluid is not moving, the time of flight difference will be zero and the flow meter will indicate zero flow.

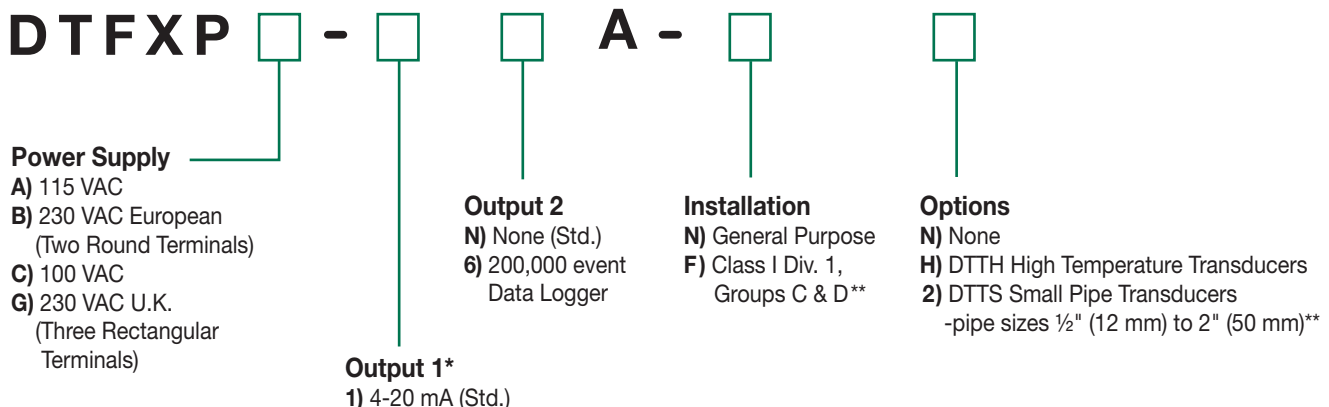


The sound's time of flight is accurately measured in both directions and the difference in time of flight is calculated. The liquid velocity (V) inside the pipe can be related to the difference in time of flight (dt) through the following equation:

$$V = K \cdot D \cdot dt$$

where K is a constant and D is the distance between the transducers.

PART NUMBER CONSTRUCTION



* Additional input/output options are available. Consult the local sales rep or the Dynasonics factory.

** Consult factory when ordering.

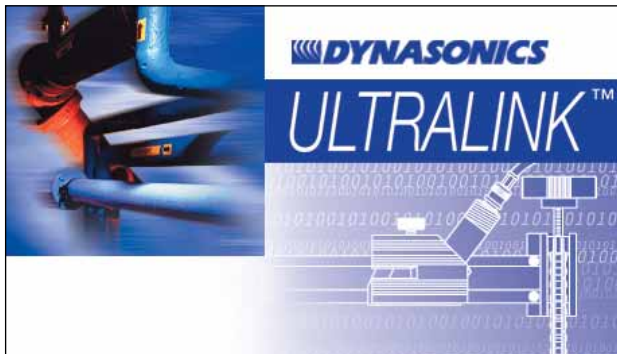
SPECIFICATIONS

TRANSMITTER

DESCRIPTION	SPECIFICATION
Power Requirements	Internal 12 V lead-acid Gel Cell battery provides 24 hrs. of continuous operation @ 20 °C. Charging: Wall mount power converter. 115 or 230 VAC 50/60 Hz ±15% @ 5 VA max.; 12-15 VDC @ 2.5 VA max.
Velocity	-40 to +40 FPS (-12 to +12 MPS)
Inputs/Outputs	All output modules are optically isolated from earth and system grounds. One module and one datalogger may be installed.
Standard Options	4-20 mA 800 Ohms max.; 12-bit resolution; passive or active Data Logger 200,000 event, 16-bit, integral DB-9 RS232C connection, can be removed and installed without disconnecting system power, data transfer rates to 57.6K.
Other Options	Pulse Output MOFSET, 0.21 Ohms, 100 V max., 0-2,500 Hz Relay Two separate Form C relays, 200 VAC max. @ 0.5 A resistive RS232C Data rate to 57.6K RS485 Supports up to 119 drops Heatflow Supports two 1000Ω RTDs, multiplexed, 12-bit resolution
Display	128 × 64 pixel graphics LCD, LED back-lit. Two user selectable font sizes 0.35" (8.9 mm) or 0.2" (5 mm) 8 digit rate, 8 digit totalizer (resettable)
Units	User configured - Feet, gallons, ft ³ , mil-gal, barrels, acre-feet, lbs., meters, liters, m ³ , mil-liters, kg (with Heatflow option: BTUs, calories, Watts, Tons)
Rate	Rate time: sec, min, hr, day
Totalizer	(NET, FWD, REV or BATCH) gallons, ft ³ , barrels, acre-feet, lbs., liters, m ³ , kg (with Heatflow option: BTUs, calories, Watts, Tons)
Ambient Conditions	-40 °F to +185 °F (-40 °C to +85 °C), 0-95% relative humidity, non-condensing
Enclosure	NEMA 4X (IP-66) while open, NEMA 6P (IP-68) while closed, ABS with SS hardware. Electronic enclosure: 14.00W × 6.06H × 10.56D inches (355.6H × 153.9W × 268.2D mm); 14.8 lbs. (6.7 Kg)
Accuracy Flow Rate	±0.5% of reading at rates > 1 FPS for field calibrated systems; ±1% of reading at rates > 1 FPS (0.3 MPS) uncalibrated; 0.1 FPS (0.003 MPS) at rates < 1 FPS (0.3 MPS)
Sensitivity	Flow: 0.001 FPS (0.0003 MPS)
Repeatability	±0.01% of reading
Response Time	Flow: 0.3-30 seconds, user configured, to 100% of value, step change in flow
Security	Keypad lockout, four digit user selected access code
Approvals	Ordinary Area
ULTRALINK™ Utility	IBM compatible, Windows® 95/98/2000/XP operating system

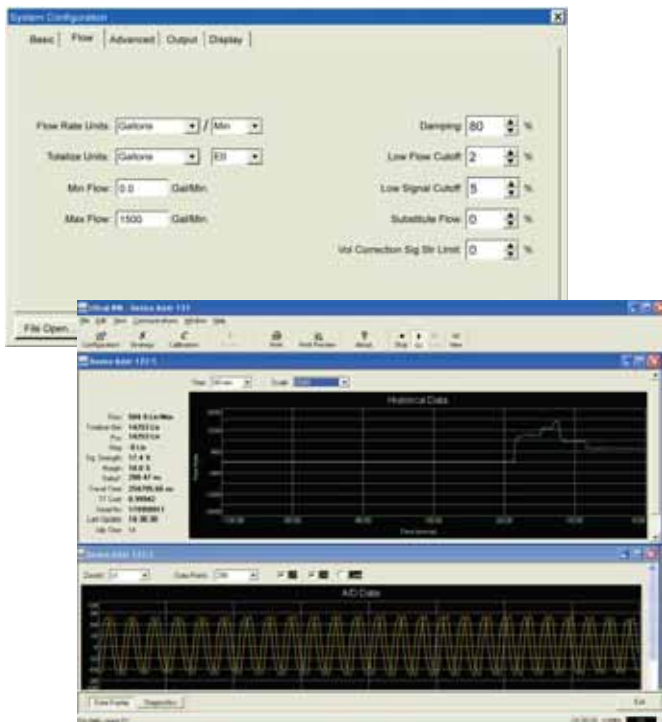
TRANSDUCER

DESCRIPTION	SPECIFICATION
Liquid Types Supported	Virtually all non-aerated liquids
Transducer to Transmitter Distance	(Std.) 20 feet (6 meters); (Opt.) lengths to 990 feet (300 meters)
Pipe Sizes	DTTN: Larger than 2" (50 mm); (Opt.) DTTS: ½" to 2" (12 mm to 50 mm) contact factory
Environment	NEMA 6P (IP-68)
Pipe Surface Temperature	DTTN: -40 °F to +250 °F (-40 °C to +121 °C); (Opt.) DTTH: -40 °F to +350 °F (-40 °C to +176 °C) DTTS: -40 °F to +185 °F (-40 °C to +85 °C)
Ambient Temperature	-40 °F to +185 °F (-40 °C to +85 °C), 0-95% relative humidity, non-condensing
Housing Material	DTTN: CPVC, Ultem® and Nylon; (Opt.) DTTH: PTFE, Vespel®, Nickel-Plated Brass; DTTS: PVC, Ultem® and Nylon
Installation	(Std.) General Purpose; (Opt.) Class I Division 1, Groups C and D



Windows®-based Software Utility. A complete meter configuration, calibration and troubleshooting tool.

- Provides quick access to all configuration parameters with pop-up windows and pull-down menus.
- Assists in selection of proper position and mounting locations of system transducers.
- Selection of Units of Measure and Measuring Range.
- Contains a powerful in-field multi-point calibration routine.
- Displays error codes and logs reset functions.
- Stores meter configurations to a file that can be archived or used to configure additional meters.



User-Friendly Operations

Configuration of the TFXP is provided through a simple menu structure. Selections for units of measure, measuring range, input/output options and configurations storage are available.

Designed with the user/operator in mind, configuration and calibration of portable ultrasonic flow meters have never been as simple and straight-forward as with Series TFXP. Integration of your PC, the TFXP flow meter and ULTRALINK™ provide the ultimate in operator control. ULTRALINK™ is a Windows® 95/98/2000/XP software utility that communicates with TFXP flow meters through a PC serial communications port and infrared serial adapter (Dynasonics P.N. D005-2115-001 shown below). Since the communication link is infrared light, the user need only be within 10 feet (3 meters) of the TFXP meter – interconnection wires are not necessary.

Note: Series TFXP does not require ULTRALINK™ or the use of a computer for configuration. However, the software and a computer are requirements for altering the TFXP factory calibration to match existing in-field flow meters.

The Series TFXP includes one infrared serial adapter. The ULTRALINK™ software is available on the Dynasonics website, www.dynasonics.com



Real-Time Infrared Communications

Configuration and calibration are quick and simple using ULTRALINK™ and your PC. Dynasonics Infrared Serial Adapter (included) allows full programming access.



Infrared Serial Adapter

Dynasonics P.N. D005-2115-001 transmits and receives data from TFXP flow meters from up to 10 feet (3 meters) away. Simply point the front of the adapter at the TFXP and start ULTRALINK™ on your PC.

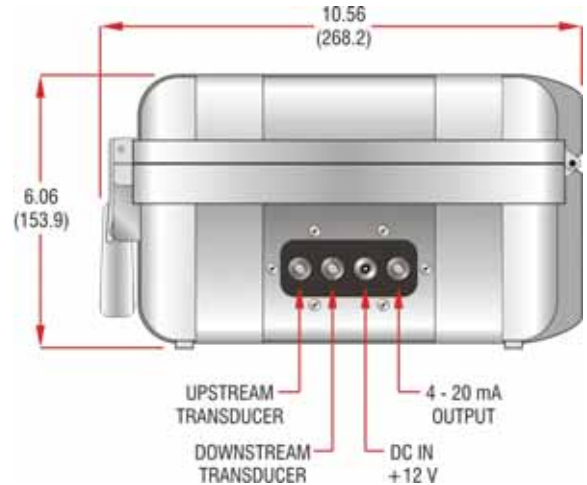
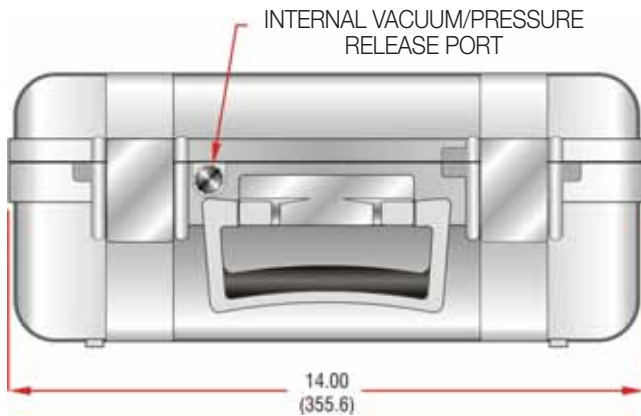
TFXP SYSTEM COMPONENTS

All TFXP flow meter systems come complete with the necessary components to measure flow rates in piping systems larger than 2" (50 mm). All of these parts are stored neatly in a compartmentalized and padded carrying case (see picture at right). Items included with the TFXP system: TFXP meter, ultrasonic transducer set, 20 ft. (6 m) transducer interconnection cable, 1 tube of acoustic couplant, mounting hardware, AC power converter, auto-style 12 VDC converter, infrared adapter, 4-20 mA interface cable and operations manual.



METER DIMENSIONAL SPECIFICATIONS

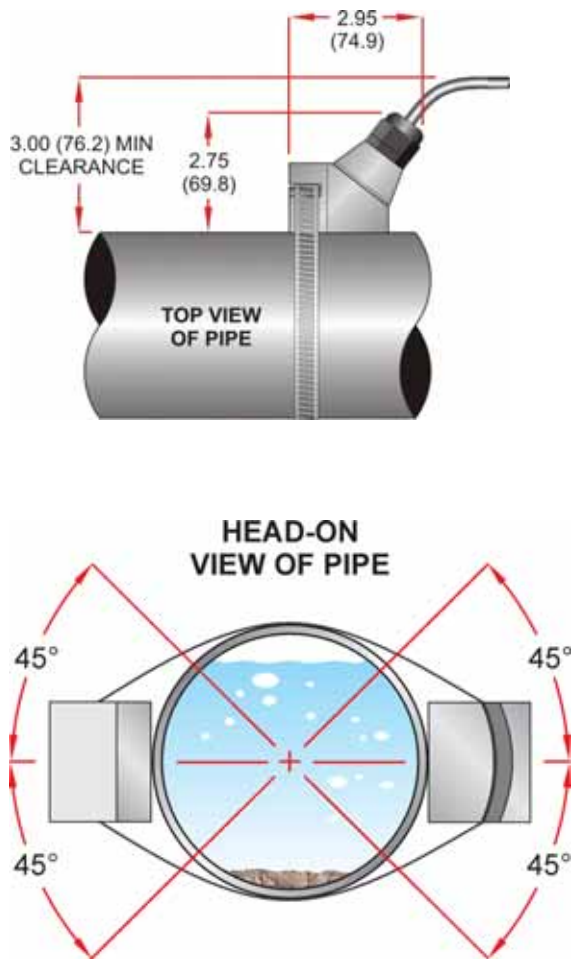
MECHANICAL DIMENSIONS: INCHES (MM)



Series TFXP

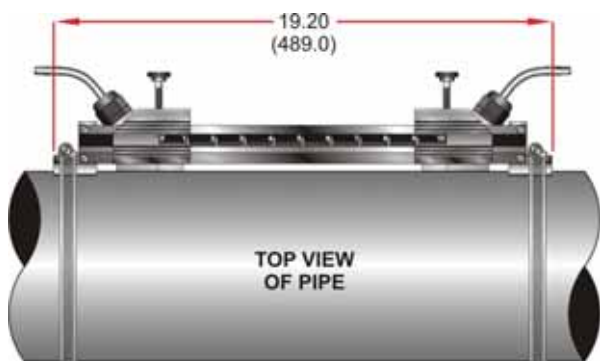
TRANSDUCER DIMENSIONAL SPECIFICATIONS

MECHANICAL DIMENSIONS: INCHES (MM)

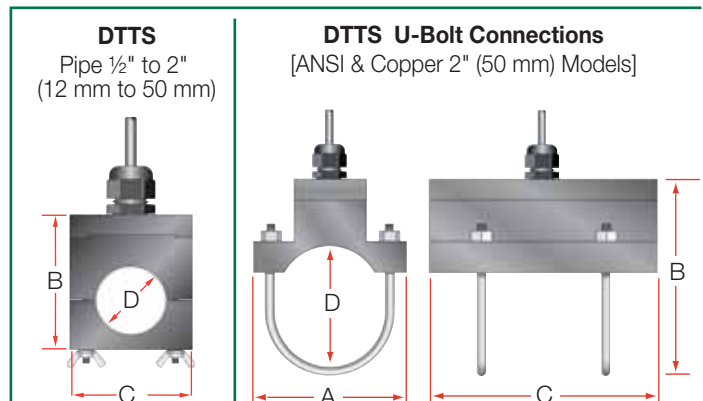


Pipe Size	Pipe Material	A	B	C	D	Measuring Range
½"	ANSI	2.46 (62.5)	2.36 (59.9)	2.66 (67.6)	0.84 (21.3)	.5 - 25 GPM 2 - 100 LPM
	Copper	2.46 (62.5)	2.36 (59.9)	3.33 (84.6)	0.63 (15.9)	.5 - 25 GPM 2 - 100 LPM
	Tubing	2.46 (62.5)	2.28 (57.9)	3.72 (94.5)	0.50 (12.7)	.5 - 25 GPM 2 - 100 LPM
¾"	ANSI	2.46 (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
1-¼"	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
1-½"	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



10" (250 mm) Scaled Mounting Track
[Optional 16" (405 mm) track also available]



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FORM TFXP 9/07

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