# HEDLAND®

Portable Ultrasonic Flow Meter

hedland.com

HTTP Portable Transit Time Flow Meter
Technology and Specifications

Operating Principle

HTTP 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.

Reflect-Mode Configuration
Transit Time
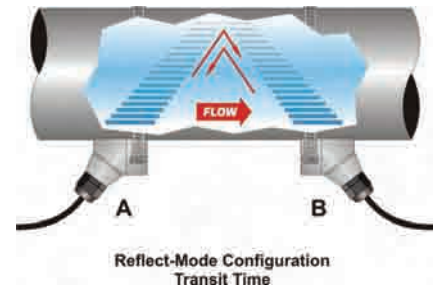
The sound's time of flight is accurately measured in both directions and the difference in time of flight is calculated. The liquid velocity (V) inside the pipe can be related to the difference in time of flight (dt) through the following equation: $V = K*D*dt$, where K is a constant and D is the distance between the transducers.

Specifications

DESCRIPTION	SPECIFICATION
Liquid Types	Virtually all non-aerated liquids
Power	Internal 12 V lead-acid Gel Cell battery provides 24 hours of continuous operation @ 20 °C Charging: Wall mount power converter 115 or 230 VAC 50/60 Hz 15% @ 5 VA maximum; 12-15 VDC @ 2.5 VA maximum
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 data logger may be installed
Standard Options	**4-20 mA:** 800 Ohms maximum, 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 maximum, 0-2,500 Hz **Relay:** Two separate Form C relays, 200 VAC maximum @ 0.5 A resistive **RS232C:** Data rate to 57.6K **RS485:** Supports up to 126 drops
Display	128 x 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, ft³, Mil-gal, barrels, acre-feet, lbs, meters, liters, m³, Mil-liters, kg Rate: Sec, min, hr, day Totalizer: (NET, FWD, REV or BATCH) gallons, ft³, barrels, acre-feet, lbs, liters, m³, kg
Ambient Conditions	-40 °F to +185 °F (-40 °C to +85 °C), 0-95% relative humidity, non-condensing
Temperature (Pipe Surface)	HTTN: -40 °F to +300 °F (-40 °C to +121 °C) HTTH: -40 °F to +400 °F (-40 °C to +200 °C) HTTS: -40 °F to +185 °F (-40 °C to +85 °C)
Enclosure	NEMA 4X (IP 66) while open, NEMA 6 (IP 68) while closed ABS with SS hardware; 14.8 lbs (6.7 kg) 14.00W x 6.06H x 10.56D inches (355.6W x 153.9H x 268.2D mm)
Transducers	HTTN: CPVC, Ultem® and Nylon - NEMA 6 (IP 68) HTTH: PTFE, Vespel® and Nickel-plated Brass - NEMA 6 (IP 68) HTTS: PVC, Ultem®, SS, Zinc-plated Steel and Nylon - NEMA 4X (IP 66)
Line Sizes	2 inches (50 mm) and higher Optional: Small line sizes of less than 2" (50 mm), requires HTTS transducer
Transducer to Transmitter Distance	20 feet (6.09 meters) Optional: Lengths to 990 feet (300 meters), consult factory
Accuracy	±0.5% of reading at rates > 1 FPS (0.3 MPS) for field calibrated systems ±1% of reading rates > 1 FPS (0.3 MPS) uncalibrated 0.1 FPS (0.03 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 configures, to 100% of value, step change in flow
Security	Keypad lockout, four digit user selected access code
Transducer Installation	General Purpose Optional: Class I Division 1, Groups C and D
Approvals	Ordinary Area
***ULTRALINK*™ Utility**	IBM Compatible, Windows® 95/98/2000/XP operating system

HTTP Portable Transit Time Flow Meter

Part Numbering Information

H T T P - ☐ ☐ ☐ A - ☐ ☐

Power Supply
A - 115 VAC
B - 230 VAC
(Two Round Terminals)
C - 100 VAC[2]
G - 230 VAC
(Three Rectangular
Terminals)

Output 1[1]
1 - 4-20 mA (Std.)

Output 2
N - None (Std.)
6 - 200,000 event
Data Logger

Installation
N - General Purpose
F - Class I Div. 1, Groups C & D[2]

Options
N - HTTN Transducer Package
H - HTTH High Temperature Transducer Package
2 - HTTS Small Pipe Transducer Package[3]
-pipe sizes less than 2" (50 mm)

[1] Additional input/output options are available. Consult factory.
[2] Consult factory when ordering.
[3] When ordering this option, the small pipe transducer must be ordered as a separete item.
See below for part number configuration.

All HTTP systems include the following:
- HTTP 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 serial adapter
- 4-20 mA interface cable
- Operations manual

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

H T T S ☐ ☐ - ☐ ☐ ☐ - ☐ ☐ ☐ ☐

Nominal Pipe Size
D - 1/2"
F - 3/4"
G - 1"
H - 1-1/4"
J - 1-1/2"
L - 2"

Pipe Type
P - ANSI Pipe
C - Copper Pipe
T - Rigid Tubing

Cable Length
020 - 20 feet (6.1 m)
050 - 50 feet (15 m)
100 - 100 feet (30 m)
Maximum length:
990 feet (300 m)
in 10 ft. (3 m)
increments

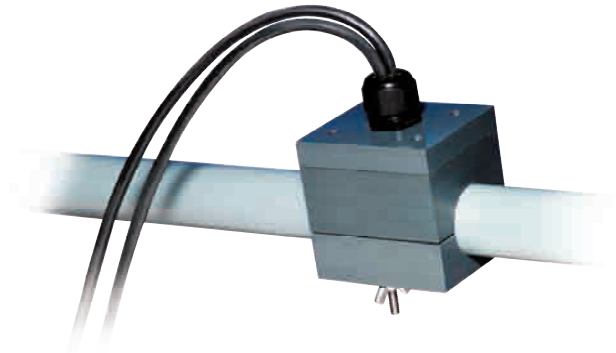**Conduit Type**
P - BNC Connector

Conduit Length
000 - 0 feet (0 m)
020 - 20 feet (6.1 m)
050 - 50 feet (15 m)
100 - 100 feet (30 m)
Maximum length:
990 feet (300 m)
in 10 ft. (3 m)
increments

HTTP Replacement Parts

| PART	PART NO.	PART	PART NO.
Data Logger 200,000-event	HTTP-004	Power converter, 115 V U.S.	HTTP-044
Padded carrying case	HTTP-008	Power converter, 230 V European	HTTP-048
Standard Transducer Set	HTTP-012	Power converter, 230 V U.K.	HTTP-052
High Temperature Transducer Set	HTTP-016	Power cord, 12 V auto-style	HTTP-060
Transducer Cable, 20 ft. (6 m)	HTTP-COAX-20	4-20 mA interconnect cable	HTTP-064
Acoustic Couplant temporary mount	HTTF-CPLNT2	Infrared serial adapter (DB-9)	HTTP-072
Mounting Track, w/measuring scale	HTTF-MTRK	CD WITH *ULTRALINK*™ software	HTTP-086
36 inch SS hose clamp	HTTF-HCLP	Manual, HTTP flow meter	HTTP-MANUAL

HTTP Portable Transit Time Flow Meter
ULTRALINK™ **Software Utility**

ULTRALINK™, a Windows® 95/98/2000/XP software utility, is a complete meter configuration, calibration and troubleshooting tool. Communication with the HTTP meter is achieved via a PC serial communications port and infrared serial adapter allowing the user the convenience of no interconnection wires.

Note: The HTTP does not require *ULTRALINK*™ or the use of a computer for configuration. However, the software and a computer are requirements for altering the factory calibration to match existing in-field flow meters.
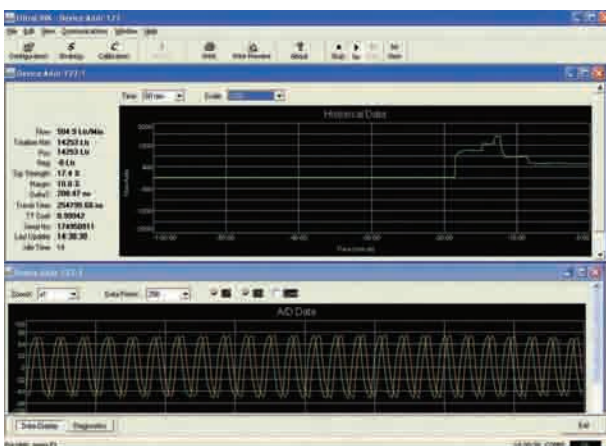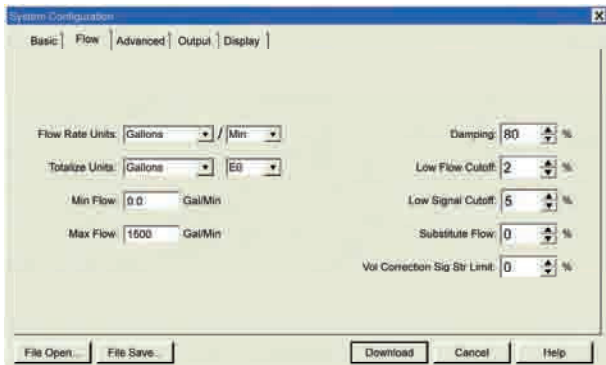
User-Friendly Operations
Configuration of the HTTP is provided through a simple menu structure. Selections for units of measure, measuring range, input/output options and configurations storage are available.

The *ULTRALINK*™ software is available on the Hedland web site, www.hedland.com.

Features and benefits of the software include:
- Quick access to all configuration parameters with pop-up windows and pull down menus
- Assistance in selection of proper position and mounting locations of systems transducers
- Selection of Units of Measure and Measuring Range
- Powerful in-field multi-point calibration routine
- Display of error codes and log of reset functions
- Storage of meter configurations to a file that can be archived or used to configure additional meters

Real-Time Infrared Communications
Configuration and calibration are quick and simple using *ULTRALINK*™ and your PC. Hedland Infrared Serial Adapter (included) allows full programming access.


Infrared Serial Adapter
Hedland Infrared Serial Adapter HTTP-072 transmits and receives data from HTTP flow meters from up to 10 feet (3 meters) away. Simply point the front of the adapter at the HTTP and start *ULTRALINK*™ on your PC.

HTTP Portable Transit Time Flow Meter
Installation Considerations

Select the optimum location on the piping system.

The most critical step in obtaining an accurate flow reading is proper selection of the location to mount the ultrasonic transducers. In general, choose a transducer mounting location that guarantees a full pipe of liquid and contains a minimum of ten pipe diameters (linear distance equal to ten times the pipe internal diameter) of straight pipe located upstream, toward the source of flow, and five diameters downstream. Obtain or measure the pipe outside diameter and wall thickness.
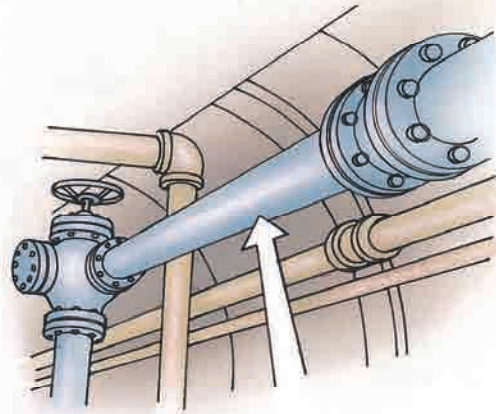
Enter the pipe and liquid information into the flow meter.

The following information is entered into the HTTP flow meter via the keypad or on a PC operating the **ULTRA**LINK™ software utility:

- Pipe Outside Diameter
- Pipe Wall Thickness
- Pipe Material (select from list)
- Pipe Liner Thickness (if present)
- Liner Material (if present)
- Fluid Type (select from list)

After entry, the HTTP will calculate and display the proper distance to place the transducers apart on the pipe.
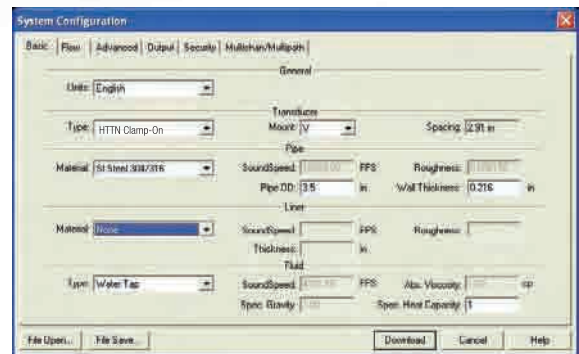

Mount the transducers onto the pipe.

Remove loose paint, rust or scale from the pipe in the two areas where the transducers will be mounted. Attach the transducer mounting hardware to the pipe with the enclosed straps. Apply a bead of acoustic couplant to the face of each transducer and clamp them to the pipe. Connect the transducer cables between the transducers and the HTTP flow meter. Press the ON button and select desired measuring units. The HTTP will begin to measure flow.
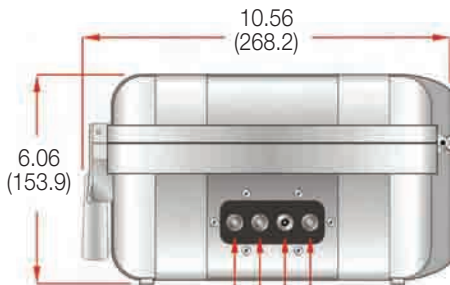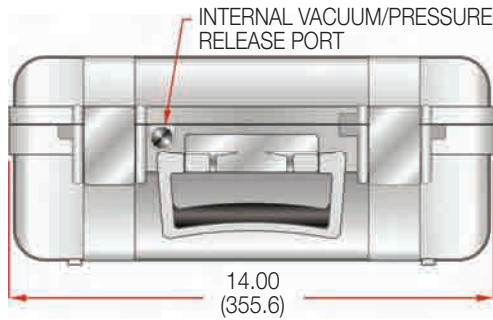

TOP VIEW OF PIPE
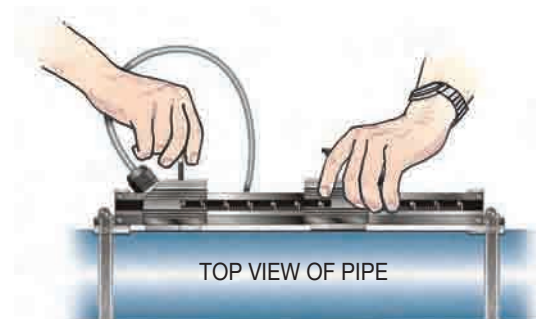
Small Pipe Transducer
Mounting Orientation
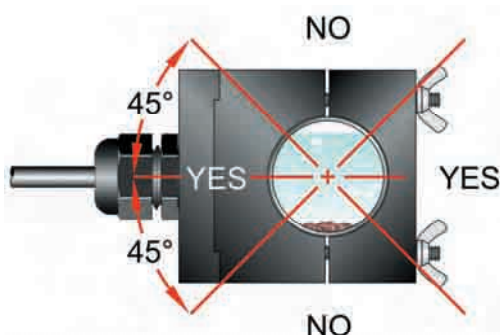
Large Pipe Transducer
Mounting Orientation

Head-On View of pipe
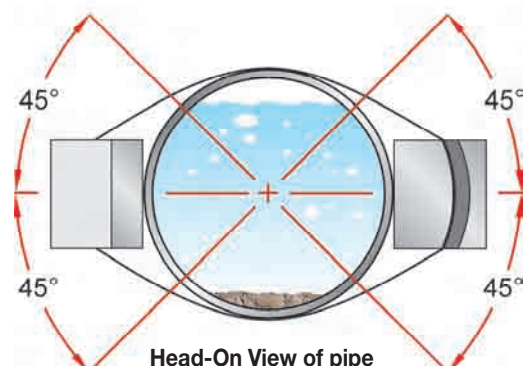
HTTP Portable Transit Time Flow Meter

Dimensional Specifications

Mechanical Dimensions: Inches (mm)

INTERNAL VACUUM/PRESSURE RELEASE PORT

14.00 (355.6)

10.56 (268.2)

6.06 (153.9)

UPSTREAM TRANSDUCER

DOWNSTREAM TRANSDUCER

4-20 mA OUTPUT

DC IN +12 V

Small Pipe Transducer: Inches (mm)

Pipe Size	Pipe Material	A	B	C	D
1/2"	ANSI	2.46 (62.5)	1.83 (46.4)	2.66 (67.6)	0.84 (21.3)
	Copper	2.46 (62.5)	1.82 (46.1)	3.33 (84.6)	0.63 (15.9)
	Tubing	2.46 (62.5)	1.72 (43.6)	3.72 (94.5)	0.50 (12.7)
3/4"	ANSI	2.46 (62.5)	2.04 (51.7)	2.66 (67.6)	1.05 (26.7)
	Copper	2.46 (62.5)	1.94 (49.3)	3.56 (90.4)	0.88 (22.2)
	Tubing	2.46 (62.5)	1.89 (47.9)	3.56 (90.4)	0.75 (19.0)
1"	ANSI	2.46 (62.5)	2.35 (59.6)	2.86 (72.6)	1.32 (33.4)
	Copper	2.46 (62.5)	2.31 (58.7)	3.80 (96.5)	1.13 (28.6)
	Tubing	2.46 (62.5)	2.26 (57.4)	3.80 (96.5)	1.00 (25.4)
1-1/4"	ANSI	2.80 (71.0)	2.64 (67.1)	3.14 (79.8)	1.66 (42.2)
	Copper	2.46 (62.5)	2.43 (61.7)	4.04 (102.6)	1.38 (34.9)
	Tubing	2.46 (62.5)	2.39 (60.6)	4.04 (102.6)	1.25 (31.8)
1-1/2"	ANSI	3.02 (76.7)	2.88 (73.2)	3.33 (84.6)	1.90 (48.3)
	Copper	2.71 (68.8)	2.81 (71.2)	4.28 (108.7)	1.63 (41.3)
	Tubing	2.71 (68.8)	2.76 (70.1)	4.28 (108.7)	1.50 (38.1)
2"	ANSI	3.70 (94.0)	3.80 (96.6)	5.50 (139.7)	*
	Copper	3.70 (94.0)	3.55 (90.2)	5.50 (139.7)	*
	Tubing	3.21 (81.5)	3.33 (84.6)	4.75 (120.7)	2.00 (50.8)

* Varies due to U-bolt configuration

Mounting Track
Standard 10" Scaled Track

19.20 (489.0)

TOP VIEW OF PIPE
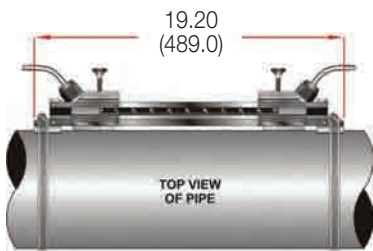
Consult factory for optional 16" scaled mounting track

HTTN

3.00 (76.2) MIN Clearance

2.95 (74.9)

2.75 (69.8)

TOP VIEW OF PIPE

HTTS

1/2" (13.0)

B

D

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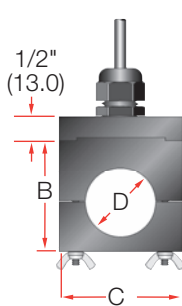
HTTS U-Bolt Connections (ANSI & Copper 2 inch Models)

1/2" (13.0)

D

A

B

C

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