

### INTRODUCTION

This document explains how to install transit time ultrasonic transducers with Easy Rail mounting systems.

The Easy Rail mounting system can be installed on vertical or horizontal pipes. For horizontal applications, install the system on the side of the pipe.

**⚠ WARNING**

**EQUIPMENT SHALL BE PROTECTED FROM UV LIGHT.**

**⚠ WARNING**

**EQUIPMENT TO BE PROTECTED FROM IMPACT.**

**⚠ WARNING**

**THIS EQUIPMENT INCLUDES EXTERNAL NON-METALLIC PARTS. THE USER SHALL THEREFORE ENSURE THAT THE EQUIPMENT IS NOT INSTALLED IN A LOCATION WHERE IT MAY BE SUBJECTED TO EXTERNAL CONDITIONS (SUCH AS HIGH-PRESSURE STEAM) WHICH MIGHT CAUSE A BUILD-UP OF ELECTROSTATIC CHARGES ON NON-CONDUCTING SURFACES. ADDITIONALLY, CLEANING OF THE EQUIPMENT SHOULD BE DONE ONLY WITH A DAMP CLOTH.**

**⚠ WARNING**

**DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED.**

### SPECIFICATIONS

- Voltage: 30V
- Current: 0.375A
- Power: 3.15W

### PRE-INSTALLATION REQUIREMENTS

#### Program the Meter

Before installing the Easy Rail mounting system, you must select the optimum transmission mode, enter the site information, and enter the fluid and pipe properties into the ultrasonic flow meter. For detailed instructions, see the user manual for your flow meter.



### Select a Pipe Location for the Easy Rail Mounting System

Select a location for the Easy Rail mounting system on a section of pipe that has at least 10 pipe diameters upstream of the transducers and 5 pipe diameters downstream. See [“Figure 2: Piping configuration and transducer positioning” on page 2.](#)

For example, if a 3 inch pipe is being measured, the minimum upstream pipe in front of the mounting rail should be 30 in. and the minimum downstream pipe behind the transducers should be at least 15 in.

Pipe runs shorter than the minimums may sometimes be used with reduced accuracy. There is no way to determine how much accuracy is sacrificed without doing in-field testing. For installations where the 10/5 pipe diameters rule cannot be followed, divide the total length of available straight pipe into thirds and mount the rail with 2/3 of the pipe upstream and 1/3 of the pipe downstream.

A full pipe is absolutely essential for making accurate flow measurements. The flow meter cannot determine if the pipe is full or not. If the pipe is partially full, the meter will over-report the amount of flow by the percentage of the pipe that is not filled with liquid or may not detect any flow.

Install the mounting system in an area where the transducers will not be inadvertently bumped or disturbed.  
 Avoid installations on downward flowing pipes unless adequate downstream head pressure is present to overcome partial filling of—or cavitation in—the pipe.

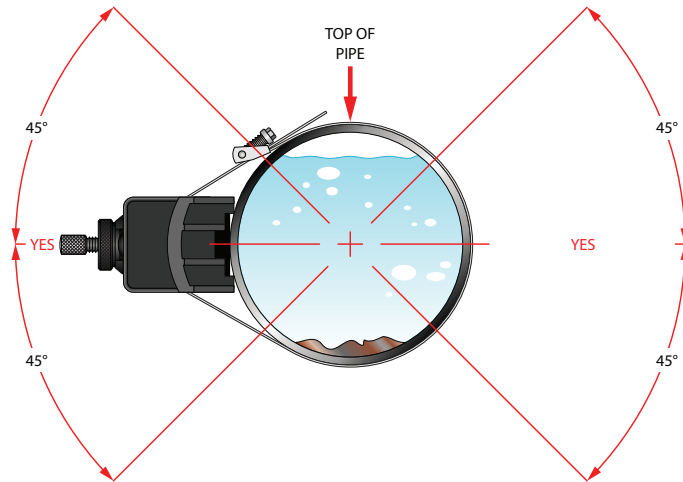


Figure 1: Transducer positioning

## Piping Configurations and Transducer Positioning

Figure 2 shows the number of pipe diameters required downstream and upstream of the transducers for various piping configurations.

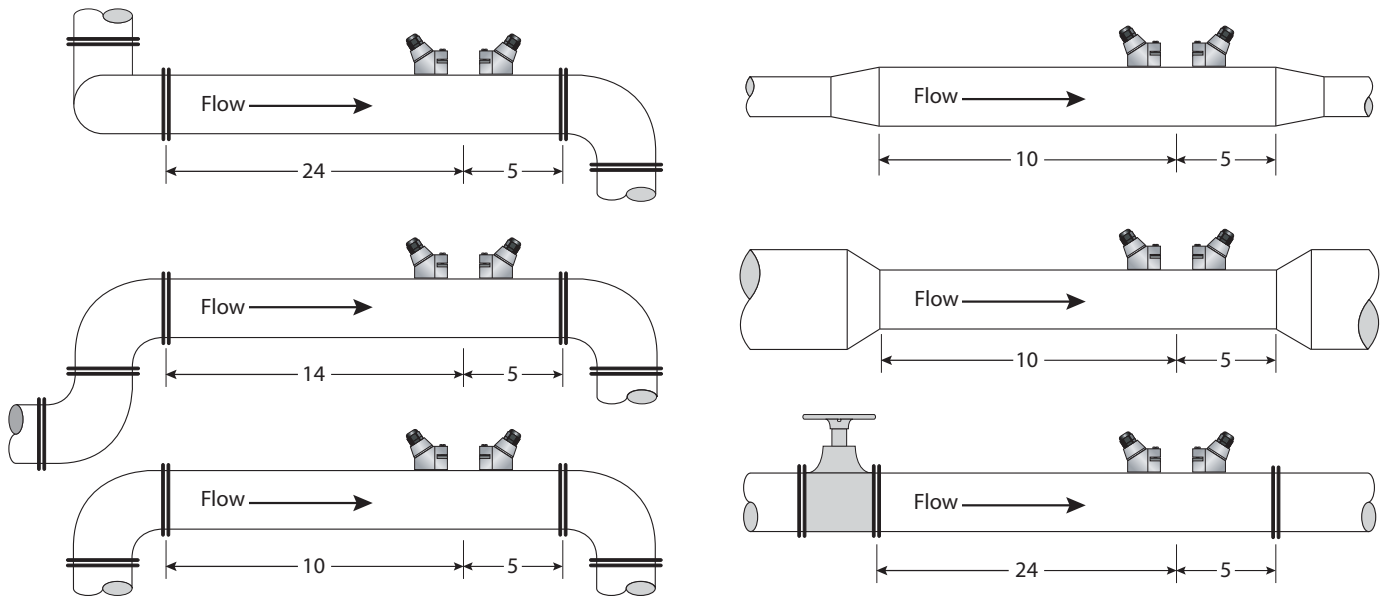


Figure 2: Piping configuration and transducer positioning

The system will provide repeatable measurements on piping systems that do *not* meet these pipe diameter requirements, but the accuracy of the readings may be influenced.

## INSTALLATION PROCEDURE

All moving parts are already mounted on the rail. During installation, make sure the rail is firmly positioned on the pipe and all thumbscrews are hand-tight. See [Figure 3](#).

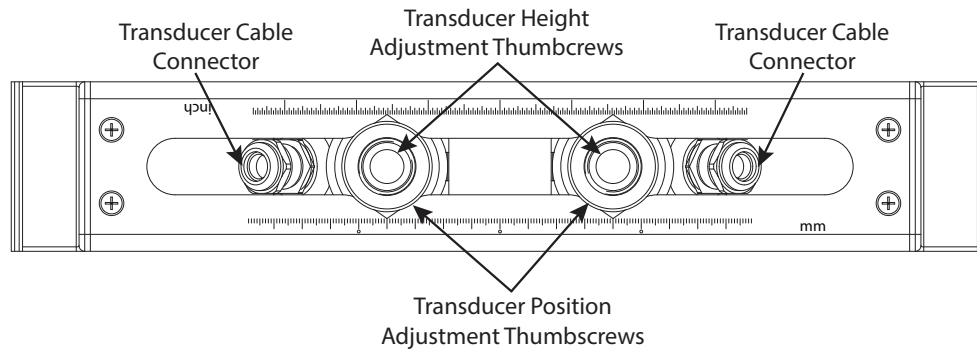


Figure 3: Easy rail top view

1. Clean the surface of the pipe. If the pipe has external corrosion or dirt, wire brush, sand or grind the mounting location until it is smooth and clean. Paint and other coatings, if not flaked or bubbled, need not be removed. Plastic pipes typically do not require surface preparation other than soap and water cleaning.
2. Loosen the position adjustment thumbscrews and slide the transducers along the scale to set the distance between them. The top of the rail shows the distance in millimeters and inches.
3. Tighten the position adjustment thumbscrews hand-tight to lock the transducers in place.
4. Apply contact gel to the underside of the transducers.  
Place a single bead of couplant, approximately 1/2 inch (12 mm) thick, on the flat face of the transducers. See [Figure 4](#). Generally, a silicone-based grease is used as an acoustic couplant, but any good quality grease-like substance that is rated to not flow at the operating temperature of the pipe is acceptable. For pipe surface temperature over 130° F (55° C), use high-temperature paste (P.N. D002-2011-012) or non-silicone paste (P.N. D002-2011-009).

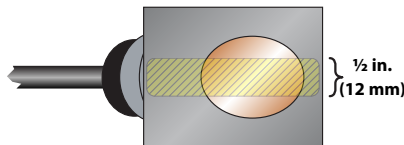


Figure 4: Transducer bottom view

5. Place the mounting rail on the pipe and fasten it with metal banding straps. See [Figure 5](#).
  - a. Slide the strap into the arched groove on the end of the transducer.
  - b. Wrap the strap around the pipe.
  - c. Slide the free end of the strap into the end clip of the strap with the screw at 90 degrees to the strap.
  - d. Pull the strap through until it loosely fits around the pipe.
  - e. Rotate the screw so it is parallel to the strap and tighten the screw slightly to help hold the transducer onto the pipe.

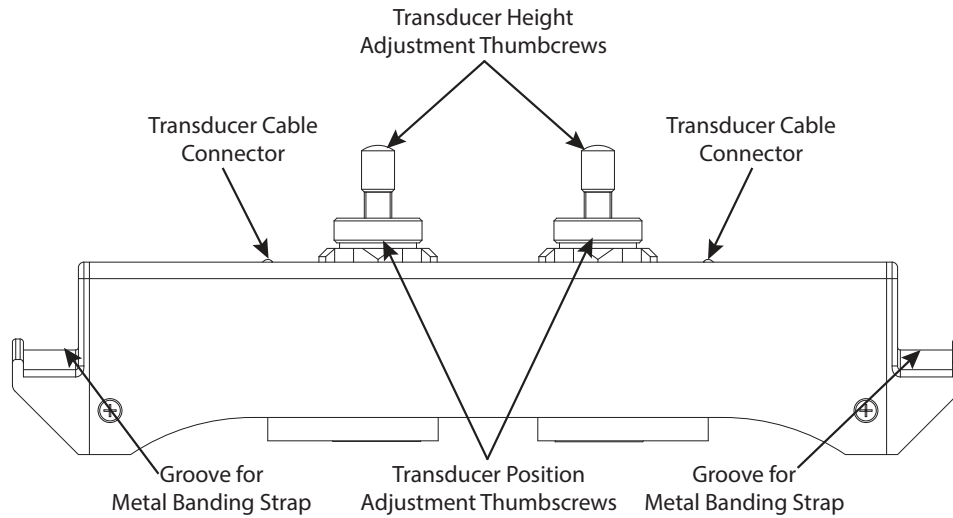


Figure 5: Easy rail side view

6. Turn the transducer height adjustment thumbcrews clockwise to lower the transducers onto the pipe surface.
7. Verify that the transducer is true to the pipe and adjust as necessary.
8. Tighten the metal banding strap screws enough to hold the mounting rail in place, but not so tight that all of the couplant squeezes out of the gap between the transducer faces and the pipe.
9. Route the transducer cables back to the flow meter location, avoiding high voltage cable trays and conduits.

## Transducer Spacing

### Spacing for V-Mount Medium Pipe Transducers on ASME/ANSI Pipes with Potable Water

After the mounting path, fluid and pipe properties are entered into the transmitter, the transmitter calculates the proper transducer spacing. [Table 1](#) lists the transducer spacing for common ASME/ANSI pipe sizes, materials and schedules.

**NOTE:** JZ transducers accommodate only up to 6 in. pipes.

Pipe Size	Pipe Material	Schedule	Spacing
3 in.	CPVC or PVC	Schedule 40, Standard	2.83 in.
		Schedule 80	2.81 in.
	Carbon Steel	Schedule 40, Standard	3.07 in.
		Schedule 80	3.15 in.
	Stainless 316/316L	Schedule 40, Standard	3.10 in.
		Schedule 80	3.18 in.
Stainless 304	Schedule 40, Standard	3.03 in.	
	Schedule 80	3.10 in.	
4 in.	CPVC or PVC	Type K	2.53 in.
		Schedule 40, Standard	3.52 in.
	Carbon Steel	Schedule 80	3.51 in.
		Schedule 40, Standard	3.79 in.
	Stainless 316/316L	Schedule 80	3.89 in.
		Schedule 40, Standard	3.81 in.
Stainless 304	Schedule 40, Standard	3.92 in.	
	Schedule 80	3.74 in.	
6 in.	CPVC or PVC	Schedule 40, Standard	3.83 in.
		Type K	3.22 in.
	Carbon Steel	Schedule 40, Standard	5.19 in.
		Schedule 80	5.17 in.
	Stainless 316/316L	Schedule 40, Standard	5.50 in.
		Schedule 80	5.66 in.
Stainless 304	Schedule 40, Standard	5.53 in.	
	Schedule 80	5.70 in.	
8 in.	CPVC or PVC	Schedule 40, Standard	5.45 in.
		Schedule 80	5.58 in.
	Carbon Steel	Schedule 40, Standard	7.00 in.
		Schedule 80	6.97 in.
	Stainless 316/316L	Schedule 40, Standard	7.37 in.
		Schedule 80	7.54 in.
Stainless 304	Schedule 40, Standard	7.40 in.	
	Schedule 80	7.58 in.	
10 in.	CPVC or PVC	Schedule 40, Standard	7.31 in.
		Schedule 80	7.45 in.
	Carbon Steel	Schedule 40, Standard	8.43 in.
		Schedule 80	8.40 in.
	Stainless 316/316L	Schedule 40, Standard	8.84 in.
		Schedule 80	9.07 in.
Stainless 304	Schedule 40, Standard	8.88 in.	
	Schedule 80	9.13 in.	
12 in.	Carbon Steel	Schedule 40, Standard	8.78 in.
		Schedule 80	8.97 in.
	Stainless 316/316L	Schedule 40, Standard	10.23 in.
		Schedule 80	10.53 in.
	Stainless 304	Schedule 40, Standard	10.27 in.
		Schedule 80	10.59 in.
Stainless 304	Schedule 40, Standard	10.16 in.	
	Schedule 80	10.40 in.	

Table 1: Transducer spacing

**INTENTIONAL BLANK PAGE**

**INTENTIONAL BLANK PAGE**

**Control. Manage. Optimize.**

Dynasonics is a registered trademark of Badger Meter, Inc. Other trademarks appearing in this document are the property of their respective entities. Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists. © 2021 Badger Meter, Inc. All rights reserved.

**[www.badgermeter.com](http://www.badgermeter.com)**