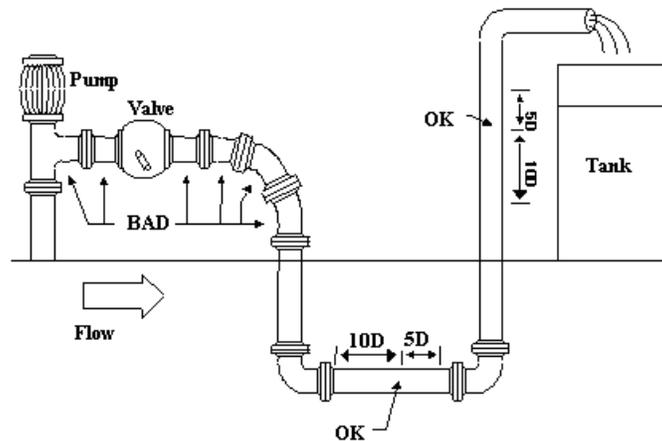


Clamp-on Transducer Installation Guide

A.1. Find the mounting site

- (A) Pipe must be full of liquids at the measurement site.
- (B) No heavy corrosion or deposition inside of the pipe.
- (C) Must be a safe location.
- (D) The straight run of the pipe must not be shorter than $15D$ as a general guideline, where D is the pipe diameter. Insufficient straight pipe length will degrade the accuracy of the results.
- (E) The transducer mounting site should be $10D$ straight run upstream and $5D$ straight run downstream (see the following drawing.)
- (F) If there are flow disturbing parts such as pumps, valves, etc. on the upstream, the straight pipe length should be increased. The disturbance strength of those flow conducting parts will be (low to high):

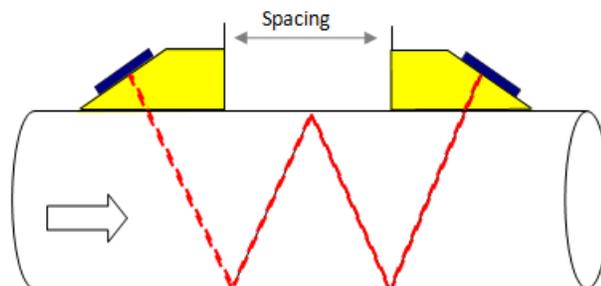
Single Bend -> Pipe Reduction / Enlargement -> Outflow Tee -> Same Plane Multiple Bends -> Inflow Tee -> Out of Plane Multiple Bends -> Valve -> Pump



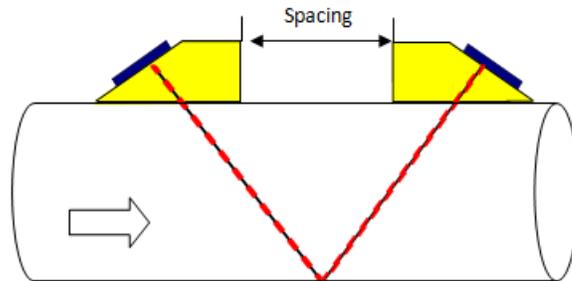
A.2. Transducer Configuration Method

There are three configurations can be used when installing the transducers, W-method, V-method and Z-method.

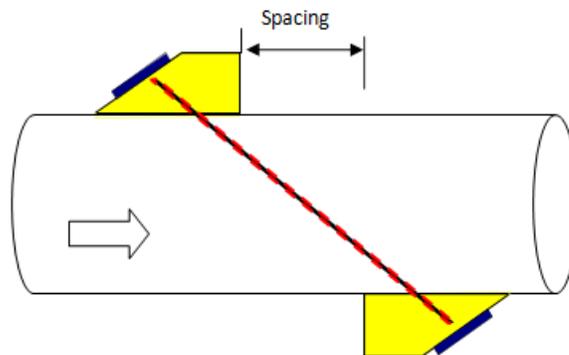
W-method is not commonly used. In some cases it can be used on small pipes, such as pipe size less than 32mm.



V-method is most commonly used configuration. It is applicable for pipes which size is between 25mm and 500mm. However, for old pipes and other difficult pipes, you may try Z-method if V-method does not work.



Z-method is commonly used when the pipe diameter is between 300 millimeters and 5,000 millimeters.



A.3. Configure the Main Unit

Enter the pipe, fluid and transducer information in menus M11-M24. The flowmeter will calculate the transducer installation spacing for you and display the result in M25. This spacing will be used later.

Please note that, if your pipe material is PVC or other plastics, DO NOT select “5. PVC” in M14. Instead, select “9. Others”. Then, enter the shear-wave sound speed of that material in M15. Normally, this sound speed is around 1060m/s (3478ft/s).

A.4. Prepare the Pipe Surface

Clean the pipe surface where the transducers will be mounted. Remove rust and paint. Sand the surface if not smooth. Use wet cloth to wipe off the powder after sanding. Dry up the surface. A dry, clean surface will ensure a good acoustic bond between transducer and pipe.



A.5. Prepare the Transducer

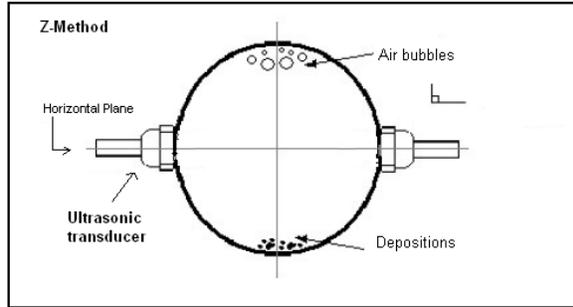
Clean the transducer surface. Keep the surface dry.

Put couplant on transducer surface as shown in the right figure. Do not put couplant more than necessary, especially for small pipe.

A.6. Install the Transducers

Notice: For horizontal pipe line, it is recommended to install the transducers on the side instead of on the top or bottom of the pipe. This is to avoid air bubbles on the top and sediments on the bottom of the pipe.

First, mark the transducer installation location on the pipe surface according to the mounting spacing given in menu M25. You may need to make a paper template to help you accurately and quickly locate the transducer positions as well as to center the transducers, especially if you plan to use Z-method for the installation.



Then, connect the mounting fixture around the pipe. Leave the chain loose so you can slip the transducer underneath.

Apply a small amount of couplant in the prepared area of the pipe where transducers will be in contact.

Slip the transducer under the clamp fixture. Tighten the screw. Do the same thing for the other transducer. Use the figure on the right as a reference.

Please note that, even though the transducers have magnetic components and will automatically attach to your metal pipe, we still recommend you to use a metal strip to clamp the transducer tightly onto the pipe.



V-method clamp-on installation for M1-type transducers



Z-method clamp-on installation for high-temperature transducers (S1HT/M1HT)

A.6. Fine Tune the Installation

Finally, connect the transducer cables to the main unit.

Check the readings of the triplet (signal strength S, signal quality Q and transit-time ratio R) in menu window M90 and then M91. Make sure they are at least in the operational ranges:

Operational Ranges: $S \geq 60, Q \geq 60, 97\% \leq R \leq 103\%.$

Optimal Ranges: $S \geq 80, Q \geq 80, 99\% \leq R \leq 101\%.*$

** Note that when flow velocity is very high, the range for R may extend.*

In ideal case where pipe condition and fluid condition are favorable for sound propagation, the triplet readings could be fine turned into the optimal ranges. If your triplet readings are not close to their optimal ranges, or, even not in their operational ranges, you need to adjust your transducer installation slightly and slowly, until you get the best readings.

If you are unable to get the triplet into their operational ranges, no matter how hard you try, then, you may need to check all the parameters you entered in menu windows M11 to M24. Make sure those values are correct. Whenever you make a change to those parameters, you need to check the transducer spacing reading in menu M25. If the spacing is changed, you need to reinstall the transducers accordingly.

If you still cannot get the right triplet readings, check the following:

Is the pipe too old?

Too much deposition inside of the pipe?

Too much corrosion? Too much air bubble?

Too thick liner? Empty or half-full pipe?

Too close to pump / valve / elbow?

Please refer to section §2.11 for more suggestions. Please also check on our technical support website for more tips, <http://www.shenitech.com/support/stuf300>.

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