



Installation Kit for Transit-Time Ultrasonic Flowmeters

PRODUCT INFORMATION

Introduction. NuSonics' transit-time ultrasonic flowmeters are available with fully-assembled (factory-fabricated) flowtubes or, alternatively, in the form of kits for conversion of ordinary pieces of pipe into flowtubes in the field.

Description of Kits. NuSonics' flowmeter consists of a set of electronics, two transducers, and cables for connecting the transducers to the electronics. When a fully-assembled flowtube is purchased, the transducers are factory-mounted in the flowtube. When a kit is purchased, the transducers are shipped with a pair of mounting bosses which purchaser will install on his own section of pipe and into which the transducers will then be mounted.

Kits are available for flowtubes from 2 to 120 inches in diameter. There are basically two different types of kits: One is based on bosses mounted to gasketed saddles for strapping onto concrete and plastic pipe; the other is based on mounting bosses for welding directly to cast iron and stainless, carbon, and alloy steels. Figure 1 shows the saddle assemblies and Figure 2 shows the weld-on type boss.

When and why to use kits. When purchasing ultrasonic flowmeters, the specifier must choose between fully-assembled flowtubes or kits. Kits almost always are chosen for larger pipe diameters as a means of avoiding the cost of shipping heavy flowtubes. If existing piping in field is used, additional material and installation savings are possible. Obviously, the larger the pipe diameter, the greater is the savings for a field-installed kit compared to a factory-built flowtube.

On the other hand, when the pipe diameters are small and the shipping distance is short, economics favor purchase of fully-assembled flowtubes. The diameter above which kits are favored is usually 24 inches in the U.S. However, in locations outside the U.S., especially overseas, kits may be economically advantageous in all diameters of 2 inches and greater.

Performance. NuSonics' ultrasonic flowmeters have highly predictable operating characteristics in kit form as well as in factory-built flowtubes. Refer to NuSonics application note which describes in detail how flowtube dimensions and flow conditions can be used to predict meter performance.

NuSonics' unique static calibration procedure makes the performance of field-installed kits virtually as predictable as that of factory-built flowtube assemblies. This makes the cost savings of kits achievable without sacrificing performance.

Installation Procedure. Whichever type of mounting boss is employed, it is important that once installed, the transducers face each other at a 45° angle to the axis of flow. The transducer faces must be parallel to each other so that sound transmitted from one

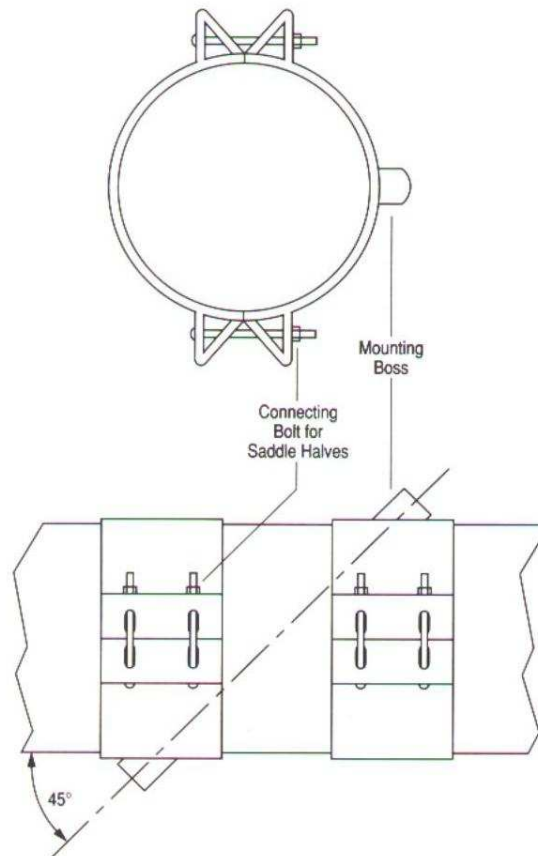


Figure 1 - SADDLE ASSEMBLIES FOR TRANSDUCER INSTALLATION

INSTALLATION KIT FOR TRANSIT-TIME ULTRASONIC FLOWMETERS

transducer will be directed to the opposite transducer.

To achieve the above objectives, it is necessary that holes be drilled in the flowtube wall at the correct locations, and that the centerline axes of the mounting bosses be aligned while the bosses are being welded or strapped into their final permanent position. Along with detailed installation instructions, NuSonics offers drilling and alignment tools that assure an accurate installation every time. Usually, these tools are rented. Purchaser need supply only readily available items such as a portable hand drill, tape measure, metal scribe, welding facilities (if applicable).

This bulletin will summarize the installation procedure. First, lines are scribed onto the outside pipe wall in accordance with NuSonics easy-to-follow, step-by-step, installation instructions. Then a drilling fixture is strapped to the pipe so that the scribe lines on the drilling fixture correspond to the scribe lines on the pipe (Figure 3). This fixture acts as a guide while a pilot hole is drilled through the pipe wall, and then a hole saw is used to complete the procedure. A hole is created on the other side of the pipe in the same manner.

Once the holes in the pipe are completed, the mounting bosses are placed on the pipe and held in position by an alignment tool which passes from one transducer mounting boss through the holes in the pipe to the other transducer mounting boss. The bosses are tack welded or strapped in place,

the alignment tool is removed, welding of the bosses is completed, and the transducers are installed.

Ordering. When ordering a NuSonics flowmeter kit, it is necessary to specify the following:

1. Composition of liquid to be metered.
2. Desired materials of construction of transducers, mounting bosses, and gaskets and seals.
3. Operating temperature and pressure ranges.
4. Complete description of the pipe onto which the transducers are to be mounted, including construction material(s), inside diameter, and outside diameter.
5. Whether the mounting boss installation is to take place in an installed (field environment) or non-installed (machine shop environment) section of pipe.

Other specification details, such as input and output requirements, are the same for kits as for fully-assembled flowtubes. Convenient specification forms are available from NuSonics Division.

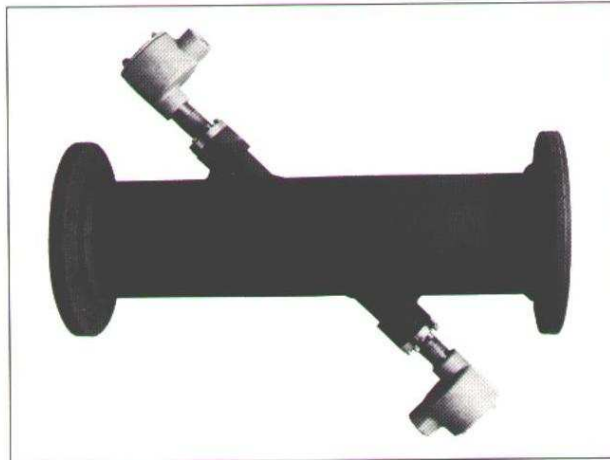


Figure 2 - DIRECT WELD-ON BOSS



Figure 3 - DRILLING FIXTURE