

# Installation Hardware Instructions

## Hot Tap Installation Kit for Welded Steel Pipe

For FB-3500 Series Insertion Electromagnetic Flow Meters



**For Use With Kits: INSTL2, INSTL6, INSTL31**

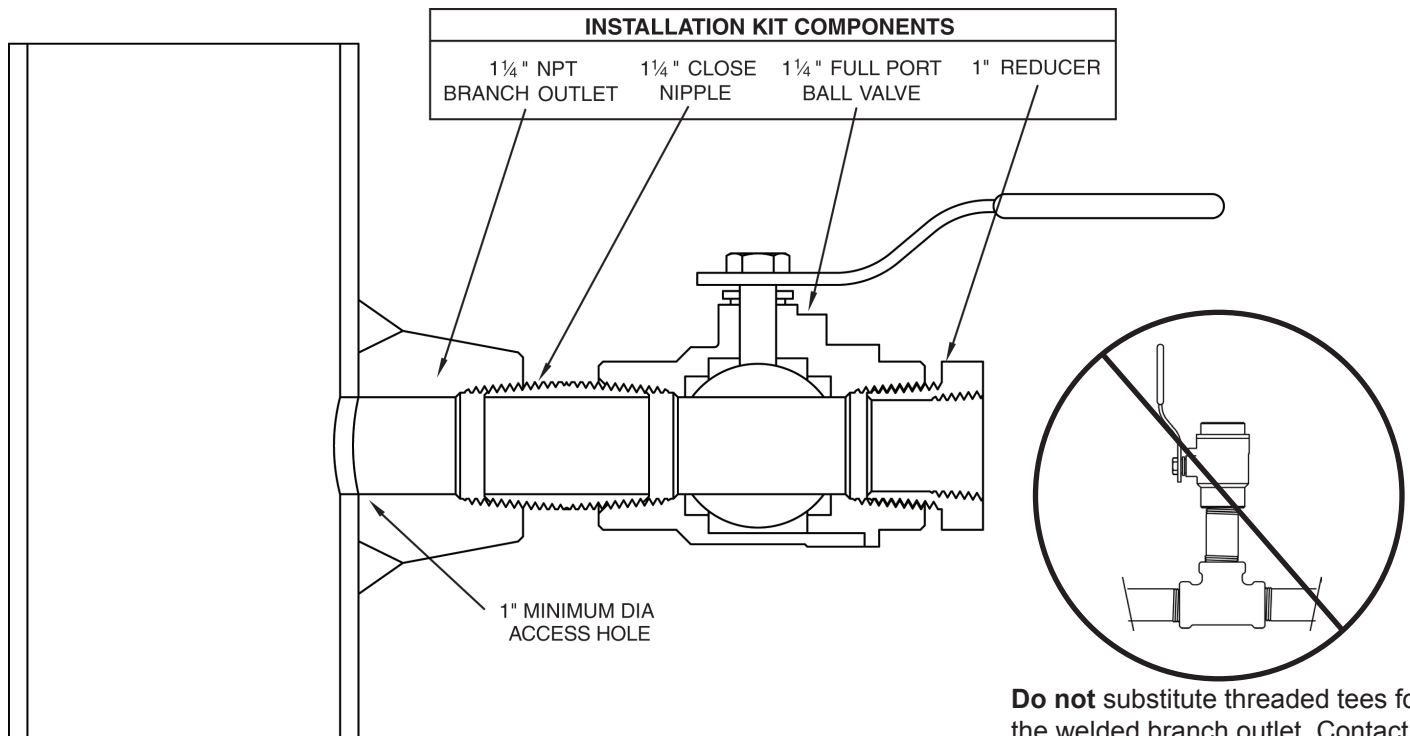
This kit can be installed on a pressurized pipe. A hot tap drilling machine is used to create a one inch opening in the pipe wall. Once installed, this kit allows for insertion and removal of the flow meter without a system shutdown.

### Directions:

1. Identify an appropriate location for the flow meter (see pages 2-3).
2. Weld the branch outlet onto the pipe.
3. Install the close nipple and ball valve as shown below. Use a paste type thread sealant or use Teflon® tape.
4. Use a hot tap drilling machine with a 1" hole saw to drill the access hole.
5. Remove the drill, then flush all debris out of the valve.
6. Use the 1" reducer provided in this kit when installing the flow meter.

**Important Note**  
ONICON insertion flow meters are precision measuring devices that must be installed according to the instructions contained in this document in order to maintain their accuracy and reliability. Failure to follow these instructions will result in erratic operation and reduced accuracy.

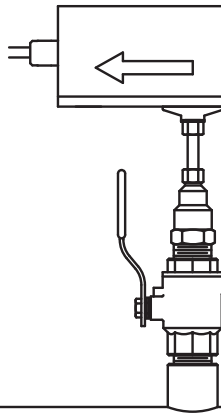
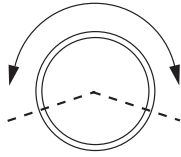
NOTE: Before installing the flow meter, read the entire installation manual.



# FLOW METER SITE SELECTION GENERAL GUIDELINES

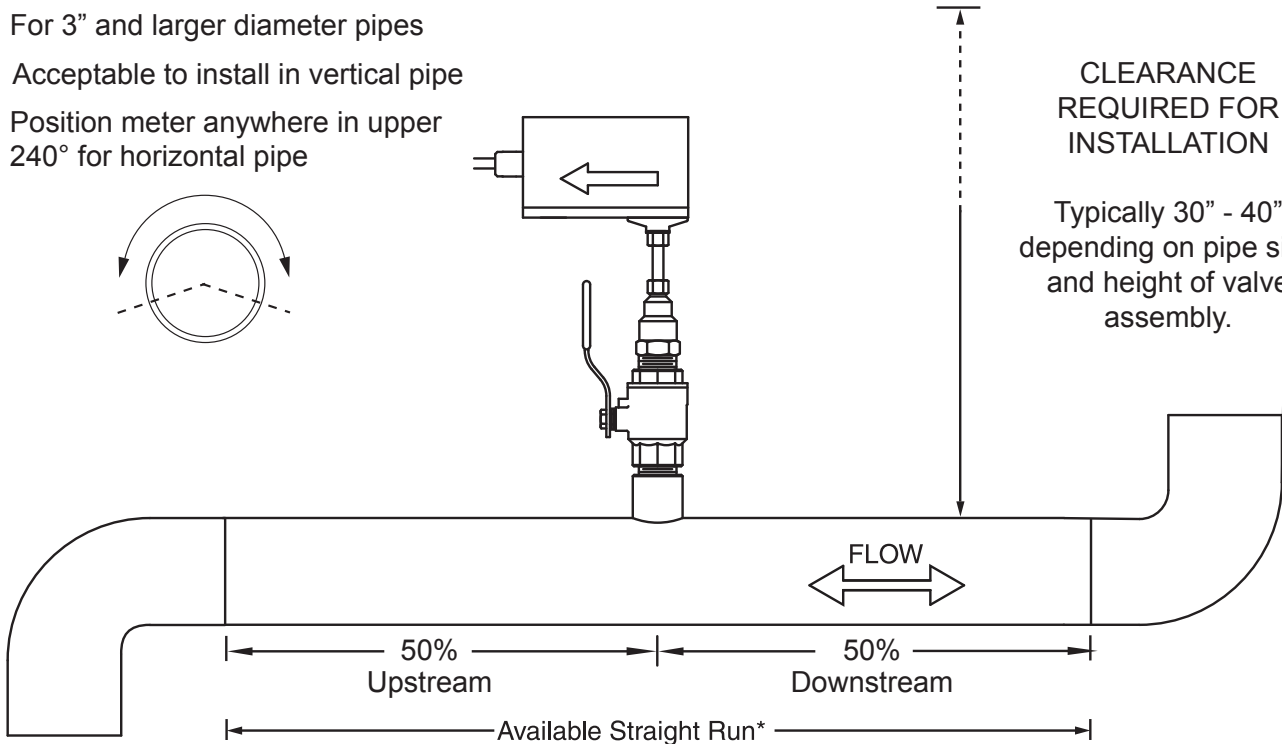


- For 3" and larger diameter pipes
- Acceptable to install in vertical pipe
- Position meter anywhere in upper 240° for horizontal pipe



**CLEARANCE  
REQUIRED FOR  
INSTALLATION**

Typically 30" - 40"  
depending on pipe size  
and height of valve  
assembly.



## GENERAL PRACTICES:

1. For best results, install the flow meter in a straight run of pipe, free of bends, tees, valves, transitions and obstructions.
2. Straight run recommendations vary based on the nature of the upstream obstruction. See the table on page 3 for guidelines in determining upstream straight run recommendations based on the nature of the obstruction. Please note that depending upon specific location details, more or less straight run may be required to produce a satisfactory flow profile.

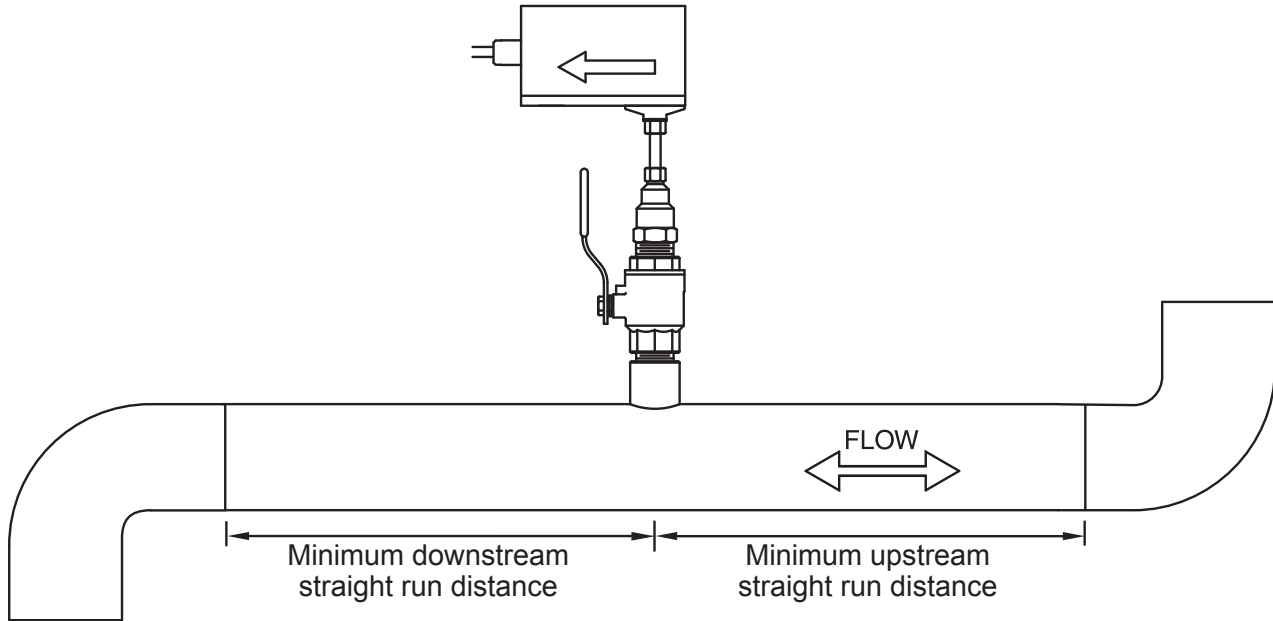
## EVALUATING UPSTREAM PIPING CONDITIONS

|             |                               |
|-------------|-------------------------------|
| Better<br>↑ | Straight Pipe                 |
|             | Single Bend                   |
| ↓<br>Worse  | Pipe Reduction or Enlargement |
|             | Outflowing Tees               |
|             | Multiple Bends in Same Plane  |
|             | Multiple Bends Out of Plane   |
|             | Inflowing Tees                |
|             | Control Valve                 |

### \*How to determine the available straight pipe diameters:

For each application, locate the longest straight, unobstructed section of pipe (no bends, tees, valves, other insertion probes, size transitions). The longest straight pipe run in inches divided by nominal pipe size in inches equals "diameters of straight pipe." For closed loop applications, consider both the supply and return lines as possible locations.

# STRAIGHT RUN REQUIREMENTS FOR INSERTION ELECTROMAGNETIC FLOW METERS



| Obstruction on either side of meter                         | Straight run distance recommended between meter and obstruction |
|---|---|
| Single bend preceded by $\geq 9$ diameters of straight pipe | 10 Diameters  |
| Pipe size reduction / expansion in straight pipe run        | 10 Diameters  |
| Single bend preceded by $\leq 9$ diameters of straight pipe | 15 Diameters  |
| Outflowing tee / pump outflow                               | 20 Diameters  |
| Multiple bends out of plane                                 | 30 Diameters  |
| Inflowing tee   | 30 Diameters  |
| Control / modulating valve                                  | 30 Diameters  |

## Insufficient Straight Run Site Selection Guidelines

If there is insufficient available straight run, allow 50% of the run upstream and 50% of the run downstream. If the total length of straight run is less than 20 diameters, performance may degrade and consideration should be given to changing to the F-3100 or F-3200 In-line Electromagnetic Flow Meters.

Some installations may work better with straight run optimized for flow in one direction. For example, with flow meters installed in the bypass line between de-coupled constant volume primary and variable secondary loops, it may be more important to accurately measure positive flow (from supply to return.) Negative flow measurements (from return to supply) are generally less critical, and it may be enough just to know that any negative flow is present. In this scenario, maximizing straight run for positive flow might be a preferred strategy.

### IMPORTANT NOTE

Always use the maximum available straight run. When more than the minimum required straight run is available, place the meter such that the excess straight run is upstream of the meter location.