



# TORFLOW INSTALLATION INSTRUCTIONS

## GENERAL INFORMATION

Each Torflow is supplied to order to be suitable for a particular application. It is identified by a tag plate attached by a short length of chain. The tag plate contains the flow parameters and must therefore not be used for any other application without consulting PSM Instrumentation or their appointed agent.

Prior to commencing with the installation, the information contained on the tag plate should be checked for correctness, should there be any conflict of information please consult PSM.

The following instructions have been provided to give important basic information to ensure correct installation of the Torflow. However, it is the responsibility of the user to ensure that installation is carried out to established and recognised engineering codes of practice by suitably qualified personnel.

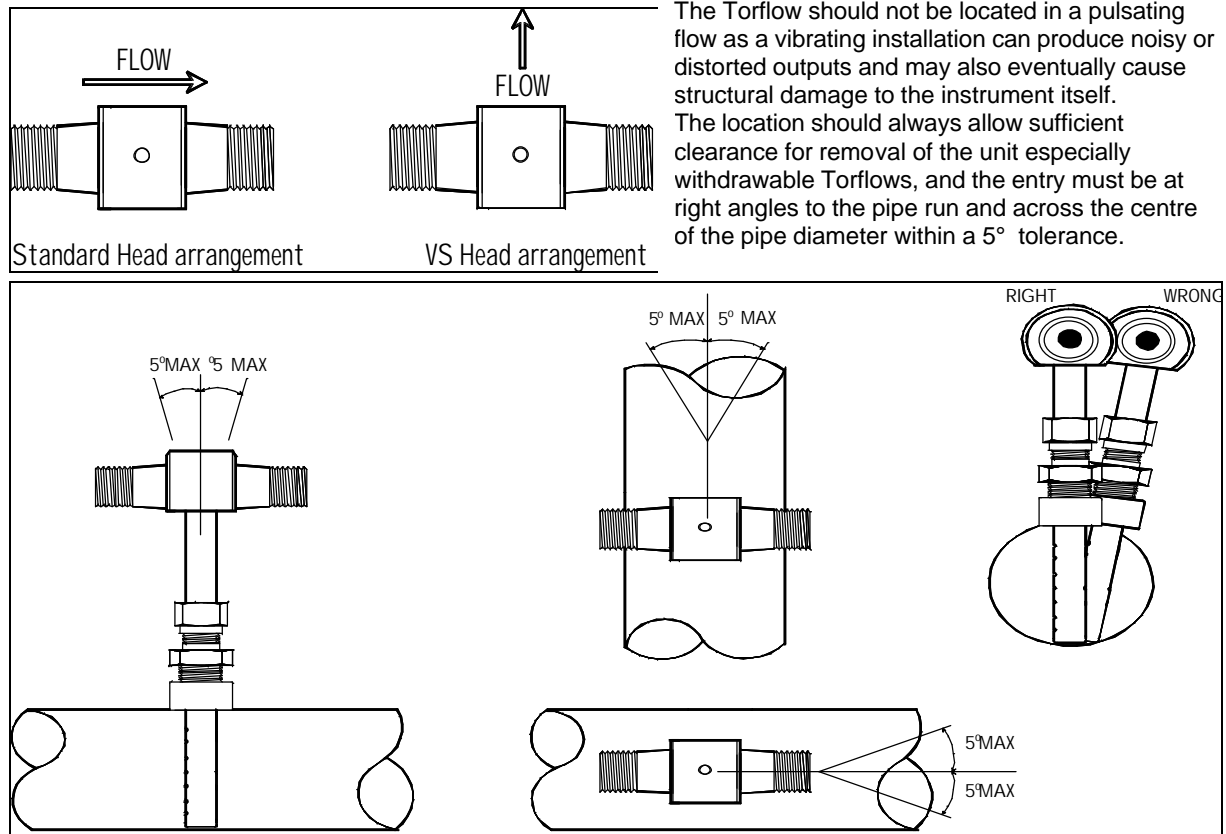
Before any drilling into the process pipe commences, make sure that the pressure in the pipe has been relieved to a safe level and that all potentially dangerous process material has been removed. This instruction does not necessarily apply when installing withdrawable Torflows using the 'hot-tap' method. In these cases ensure that the 'hot-tapping' gear specifications meet the application parameters.

## MOUNTING, LOCATION AND ALIGNMENT.

### General

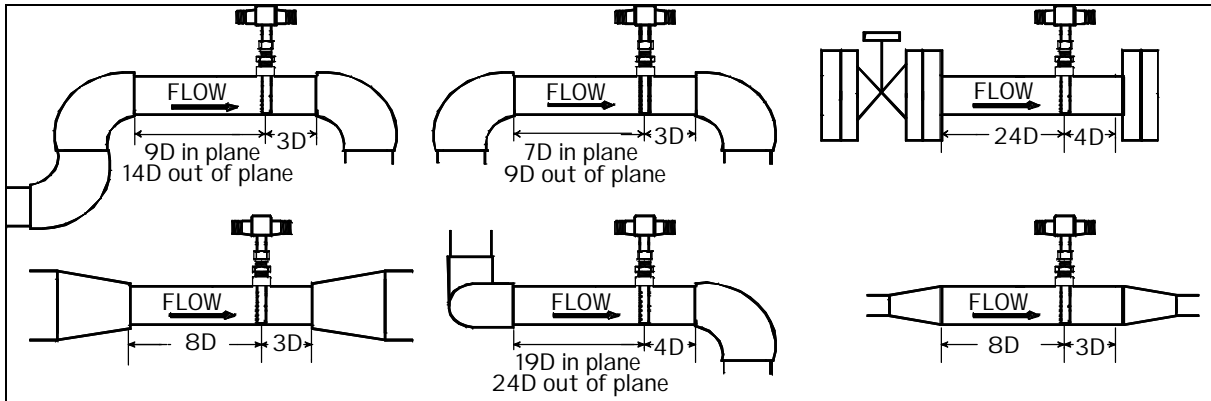
The differential pressure output generated by the Torflow exits via the high and low pressure connections on the head of the device which are marked accordingly except where a direct mounting 'Torflow Transmitter' is supplied. Unless a 'VS'(repositioned head) has been supplied the low pressure output connection must be positioned downstream.

The 'VS' head is rotated through 90° for liquid and vapour measurement in vertical lines to ensure equal head in both legs.



## Upstream and Downstream straight pipe runs

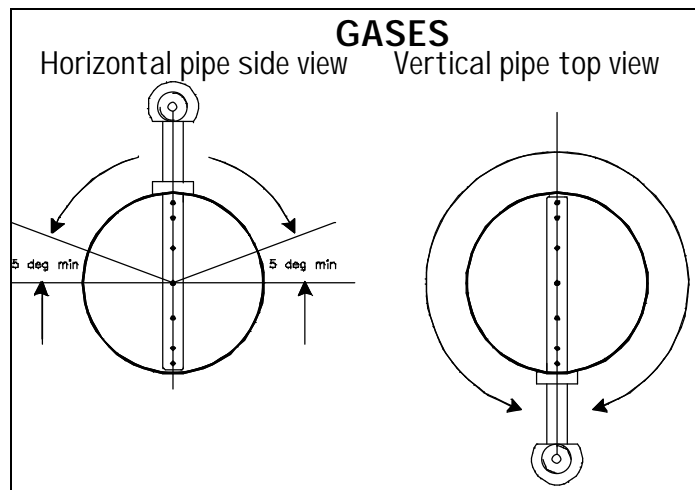
In accordance with BS1042, the Torflow should not be positioned within the stated disturbances in the line in order to meet the quoted accuracy figures. Should this not be possible, absolute accuracy may be downgraded but repeatability will be maintained due to the averaging characteristics.



## Use of Torflow in gases

For installation in a horizontal pipe the orientation should be such that the instrument connections are positioned above the pipe centreline. This positioning prevents any moisture that may be present from entering the impulse lines or transmitter element.

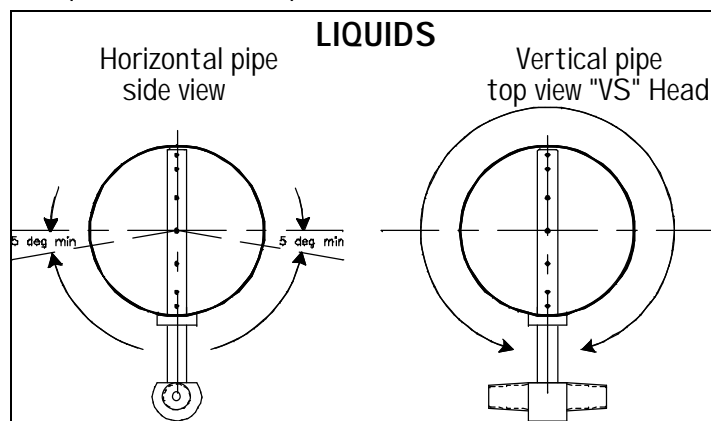
For vertical pipes any lateral angle will be suitable.



## Use of Torflow in liquids

For installation in a horizontal pipe the orientation should be such that the instrument connections are positioned below the pipe centreline. This positioning allows any trapped air to escape back into the pipe.

For vertical pipes any lateral angle will be suitable but the instrument connections should be 'VS' type so that there is an equal head of liquid in each of the impulse lines.



## Use of Torflow

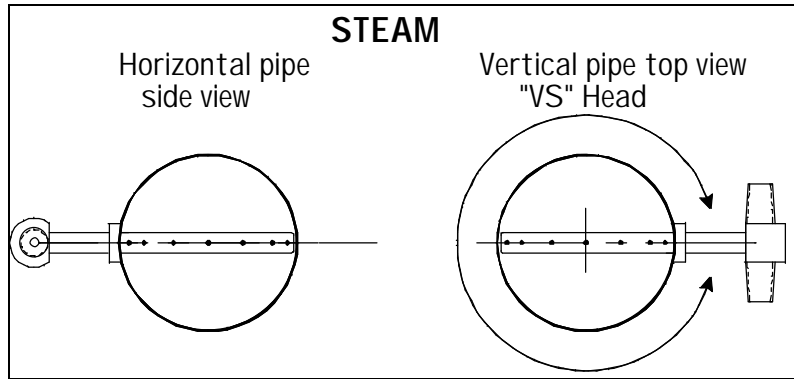
## with steam

For installation in a horizontal pipe the connections should be horizontal with the pipe centreline. For vertical lines any lateral position is suitable, the Torflow must have the 'VS' option head to ensure equal head of condensate in both legs.

For correct functioning it is important that the entire Torflow head and fitting should be well lagged to prevent the formation of condensate. This lagging should extend to the condensate pots, filling tees or valve handles.

## Steam Continuation

Both high and low DP output connections must be at the same vertical height to maintain equal condensate levels above the secondary instrumentation. The filling tees or condensate pots must also maintain the same level, and the secondary instrumentation should be below. The piping connections to the the secondary equipment should be made from the bottom from the filling tees or condensate pots, the slope should be a minimum of 25mm in 300mm and it is recommended that the lines are of similar length and run close together to maintain equal heat.



A 3 or 5 valve manifold should be used to interface the connections between the Torflow fitting and the secondary instrumentation.

## INSTALLATION (All types)

Select the correct position and orientation in accordance with the previous instructions and mark. Cleanly make a clearance hole suitable for the probe diameter.

Tack-weld the threaded weld or flange fitting over the hole and check for alignment.

For Torflows with end supports measure 180° around the pipe and repeat the procedure for the end support. Once satisfied make good the welding.

### THREADED FITTING TYPES (Non withdrawable)

Insert the Torflow through the compression fitting and into the pipe until it touches the opposite wall. For end support versions ensure that the probe is fully seated inside the end cap.

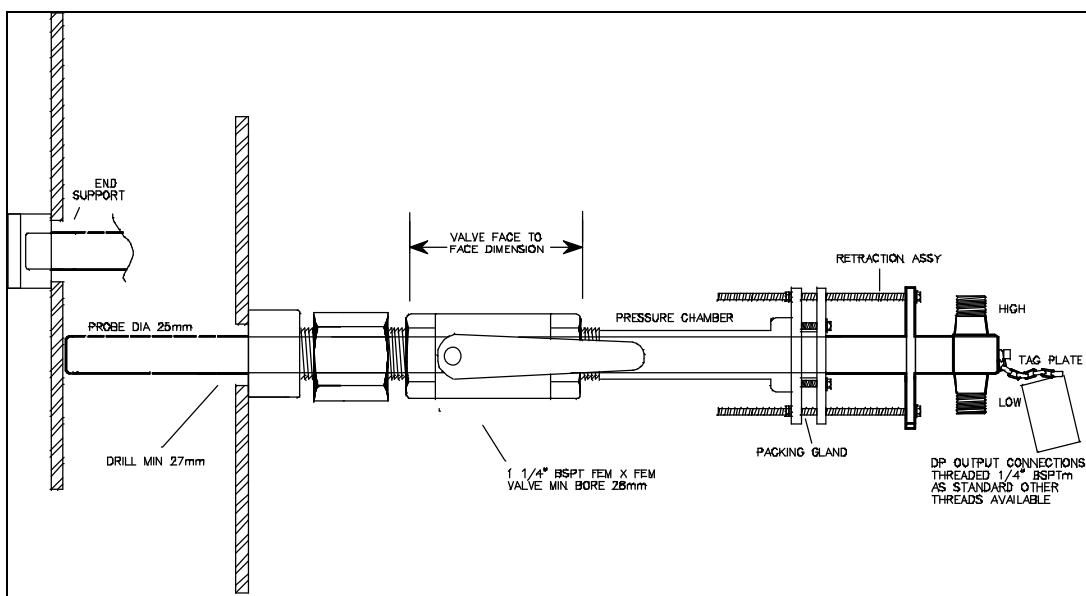
Apply a suitable sealant to the threads of the Torflow compression fitting, turn the head of the Torflow until correct alignment into the flow is achieved, fully tighten the compression fitting ensuring position is maintained.

### FLANGED TYPES(Non withdrawable)

Place a gasket onto the flanged pipe stub and insert the Torflow through the flanged stub until the flanges mate, for end support versions ensure that the probe enters the end support fitting. Check the alignment with the flow and insert the bolts and tighten.

### THREADED WITHDRAWABLE TYPES

Apply a suitable sealant to the close nipple both ends and fully tighten into the weld fitting. Thread the valve tightly into place, apply sealant to the threaded ends of the pressure chamber.



## FLANGED WITHDRAWABLE TYPES

Position the flange gasket and bolt the valve in place.

### Low pressure models (Prefix 'TL')

Attach the pressure chamber to the valve.

Ensure the packing material is in position and insert the Torflow through the packing gland and tighten sufficiently so that the Torflow can slide freely through.

Apply sealant to the thread.

Open the valve fully and insert the probe until it touches the opposite side of the pipe or locates into the end support where supplied.

Slide the packing gland into position and tighten into the top of the pressure chamber.

Ensure correct alignment with the flow and fully tighten the packing gland.

Fix and tighten the safety chain and secure.

### High pressure types(model prefix 'TH')

Ensure the retraction assembly is in the fully retracted position and thread or bolt the pressure chamber in place (dependent on supply), checking alignment with the flow.

Gently tighten the gland bolts to a fully sealed position whilst still allowing the probe to move.

Open the valve fully and insert the Torflow using the drive nuts on the retraction assembly equally and alternately until the probe touches the other side of the pipe or fully locates in the end support where supplied. Tighten locknuts and packing gland bolts.

## MAINTENANCE

### General

The Torflow can successfully be used for flow measurement in clean or dirty fluids for long periods of time without any regular maintenance. However, should periodic purging be necessary, this can be performed simply by connecting pressurised steam or air to the output connections to force out any build up or contamination. The measuring device must be isolated from the purge lines to prevent over-pressuring.

### Withdrawable models

The withdrawable models allow retraction of the probe for inspection or removal while the line is still in use. This is achieved by slackening off the packing gland slightly just to allow movement of the probe, and using the retraction facility to withdraw the probe beyond the valve and closing the valve.

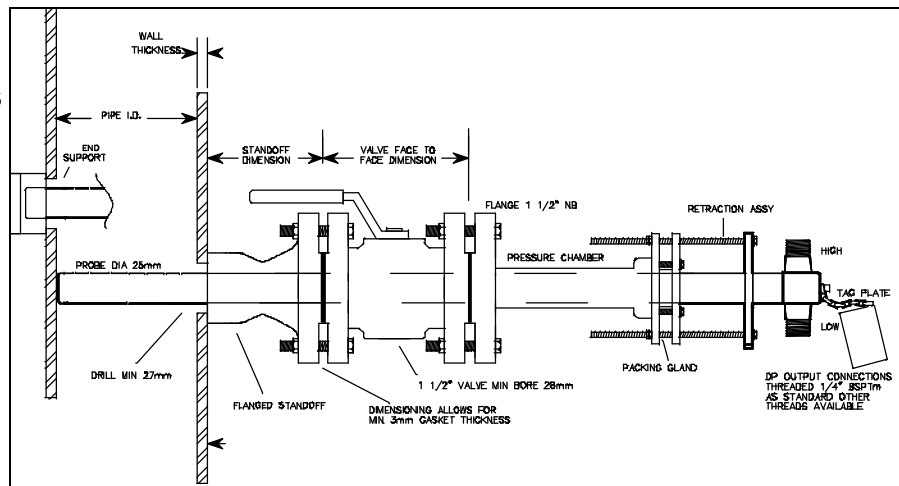
Care should be taken that the exit is controlled.

For the high pressure models the locknuts should be loosened and the drive nuts rotated alternately to avoid binding. Restriction of movement of the probe itself must at all times be controlled by the retraction assembly and should be a gradual process.

For the low pressure models, prior to loosening the packing gland the safety chain should be secured in its lengthened state, this prevents full retraction prior to shutting off of the valve.

Ensure that the exit path of the probe is clear at all times.

Once the valve is fully closed the whole assembly beyond the valve can be removed for inspection.



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