

Install and Care of TWD Series Flow Sensors

CAUTION

The tubes described in this document may be at temperatures that can cause injury. The contents of these tubes are extremely corrosive and toxic. Residues of these chemicals may be present on the exterior surface of these tubes. Do not perform any wiring with any of the components or near by equipment energized. These instructions are for reference only. Installation may only be performed by certified personnel, taking full responsibility to follow all local codes, regulations and facility SOP, particularly to permits, training and personal protective equipment (PPE).

WARNING

Improper installation of this equipment can cause damage to KFR transmitter and connected equipment. Please review instructions from other equipment vendors. If there are conflicts, please contact KFR before proceeding. KFR products are not for use in medical or life safety applications. Warranty is limited to value of supplied equipment.

Please read KFR.MN01 CRE1 Wiring and Installation Requirements before proceeding.

OPERATION

The TWD is a mechanical clamping frame for an ultrasonic time-of-flight flow measurement system (Figure 1). It is designed to fit a single standard size PFA tubing. The frame has three functions:

1. Force the tube into an exact, straight cylinder.
2. Press the sensor faces tightly to the surface of the tube.
3. Insulate and protect the tubing.

Once installed, it holds the two ultrasonic transducers firmly against the tube wall so pulses of ultrasound can travel through both the walls and the liquid with minimal loss of sound strength.

The face of the sensor is covered with a soft fluoro-polymer layer. It compresses by 0.1mm conforming to the tube wall. Take care not to damage this layer when handling the TWD.

Locating the Ultrasonic Sensor

Locate on the high pressure side of the process to avoid vapor bubbles and multi-phase (Figure 2).

Avoid return lines as they can have problems with entrained vapors.

Do not install on bypass or dead lines that only flow in emergency or during service.

The sensor can be installed on vertical or horizontal runs. On horizontal installations make sure the sensor face is not located vertically as vapor pockets could block the ultrasonic pulse. Mount as shown in Figure 3.

Please read application note *KFR-APN.01 ETCH/RINSE APPLICATIONS* for more details.

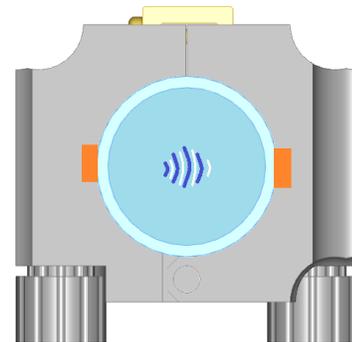


Figure 1 – Operation of TWD Frame.

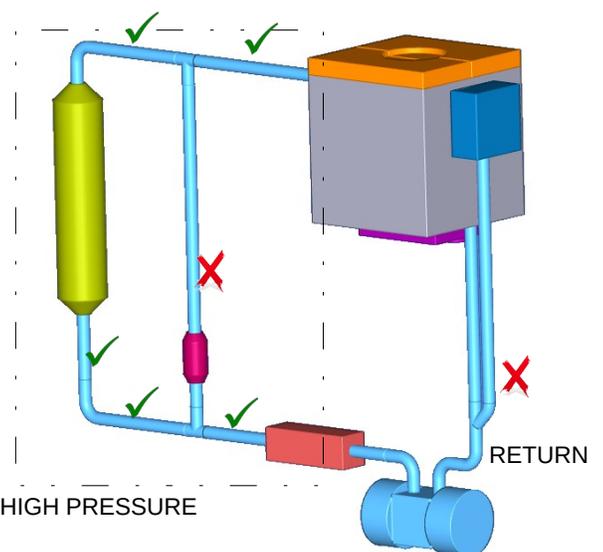


Figure 2 – Locating on Rinse System

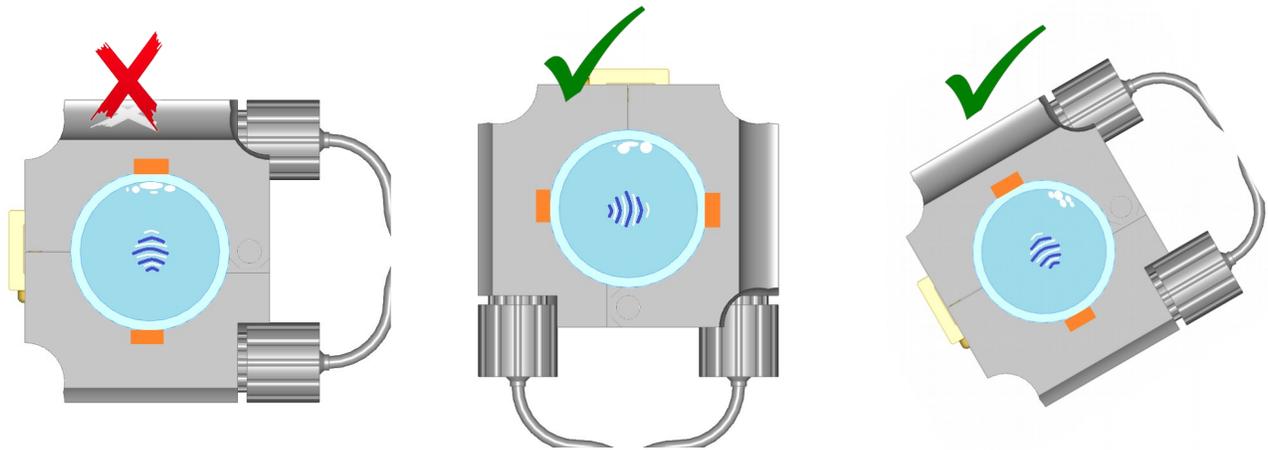


Figure 3 – Correct orientation of frame on horizontal runs.

The TWD frame must be installed on a straight section at least 50 mm long. It must be free of **welds**, surface flaws and debris. The tube should be straight with a minimum bend radius of 50 cm.

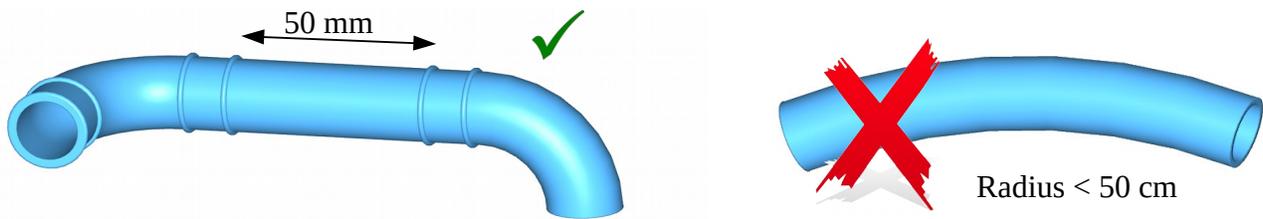


Figure 4 – Space requirements for installing TWD frame.

Tube Size

The TWD series are designed for the common sizes of PFA tubing used in semiconductor and pharmaceutical production. Table 1 contains the correct limits of outside diameter for each model. Please verify that the tube section is within tolerance for the provided frame before proceeding.

	MAX OD	MIN OD
TWD06	6.5 mm	6.2 mm
TWD10	9.7 mm	9.4 mm
TWD13	12.9 mm	12.5 mm
TWD20	19.4 mm	18.9 mm
TWD25A	26.0 mm	25.0 mm

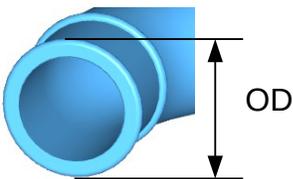


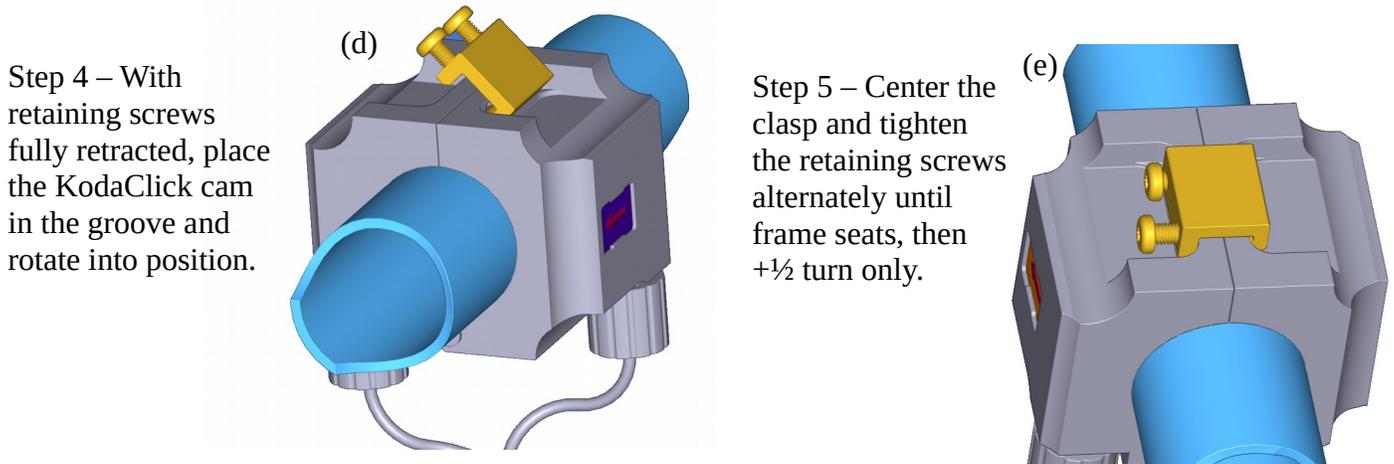
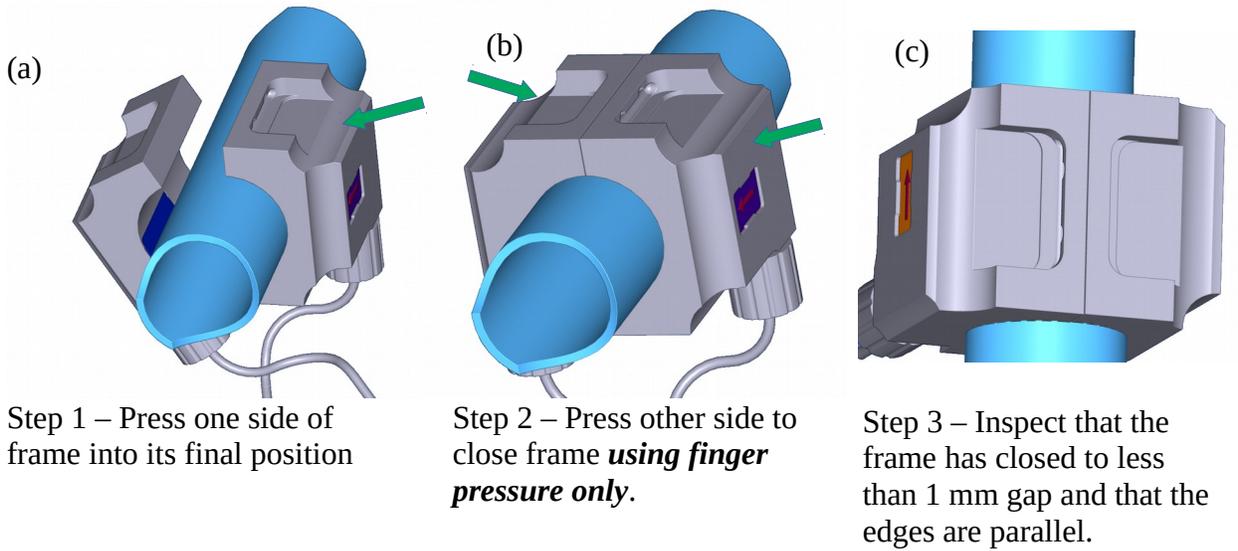
Table 1 – Allowed variation of outside diameter for each model of TWD.

Plan the Cable Run

With the location chosen, plan the path of the cable back to the flow computer/transmitter. Make sure that no obstacles exist and there are points to secure the cable every 50cm. Make sure the work area is free of hazards, and you have room to maintain balance. Do not use tubing or equipment to support your weight while working. Ensure access to approved ladders, scaffolds, or lifts that will be required to hold the installer while attaching the frame and running the cable pair. Ensure the cable will not run against vibrating surfaces. Do not run cable near motors, heaters, or megasonic cleaners.

Installing the Frame

Remove insulation and clean tube of residue. Install in the 5 steps outlined in Figure 5.



Warning :

Do not attempt to force the frame into another position after it is closed. It can damage sensor or tube. Follow removal instructions below.

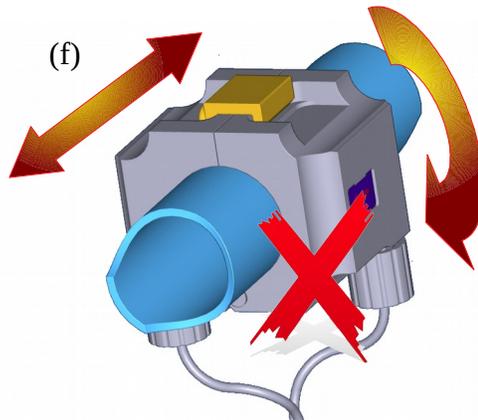


Figure 5(a-f) – Detailed steps to installing TWD sensor frame.

Removing the Frame

If the sensor needs to be relocated, retract the retaining screws on the KodaClick. Press the sides together and remove the clasp. Prevent the frame from falling, but do not force it off the tube immediately. The sensor face will have formed a vacuum seal on the tube surface. Give the frame a few seconds for the suction to dissipate. **Gently** twist the frame to break the seal as shown in Figure 6. Pull the sensor faces away from the tube then remove.

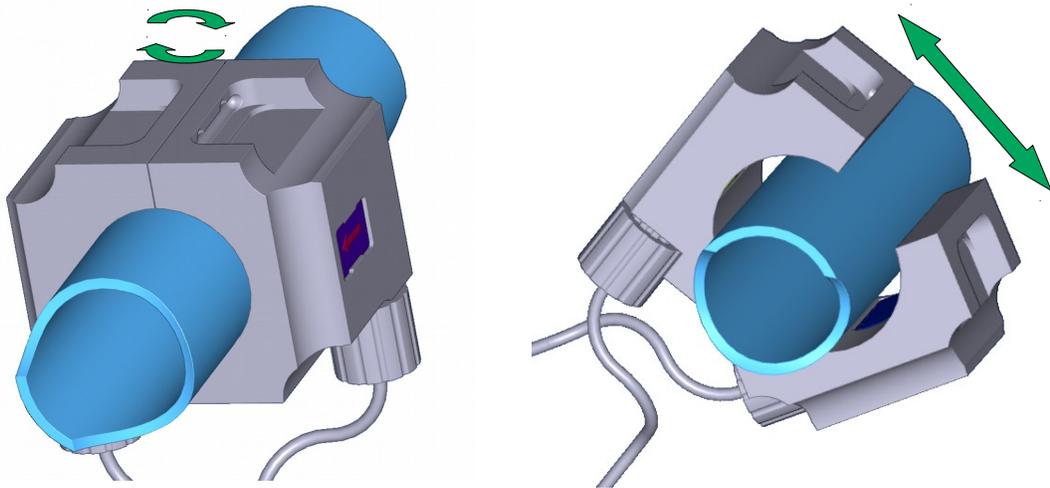


Figure 6 – Remove frame by gently breaking vacuum then pulling sensor faces away from tube.

Bulkhead Seal

The twin cables of the sensors are molded into a flouropolymer node at several points depending on the model. This node is provided to make a vapor seal in a protective bulkhead gland to prevent escape of corrosive fumes from the process area. This node will fit into a standard gland designed for cables with a diameter of 8 mm to 6 mm. Feed the connectors through the fittings one at a time, then place the node in the gland fitting and tighten gland nut as specified in the fittings documentation (Figure 7).

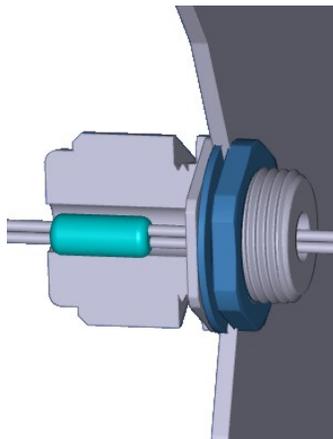


Figure 7 – Seal cable on provided molded nodes.

Extension Cables

For certain applications, extension cables are needed when the flow computer cannot be located within 3 meters of the sensor. ***This is not recommended*** unless there is no alternative.

WARNING: *The extension cables are heavy and can damage the connectors on the transmitter and sensor. Run and secure the extension cable before connecting to sensors or the transmitter.*

DANGER: *The extension cables must be protected from accidental contact by equipment and personnel. Contact with these cables could put stress on process tubing, resulting in injury and possible loss of life.*

