Information Guide

Sierra's QuadraTherm 640i Insertion Thermal Flow Meter offers highly accurate gas mass flow measurements in robust industrial applications. Shown in Figure 1 to your right is the standard highest performance 640i sensor showing standoff for pipe bottom-out protection during installation.

Sierra's DrySense all metal clad temperature and velocity sensors are sturdy and designed for industrial process flow applications, however, during installation, retraction and storage, they can run the risk of damage.

For improved sensor protection, Sierra manufactures a 1-inch (25.4 mm) diameter protective sensor shield shown in Figure 2 below right. Adding this stainless steel welded-on sensor shield to the end of the insertion probe greatly improves sensor protection. The shield protects the sensing elements from damage during storage or when bottoming out inside the pipe during the insertion process or from accidentally closing the isolation valve (if installed) onto the sensor tip.

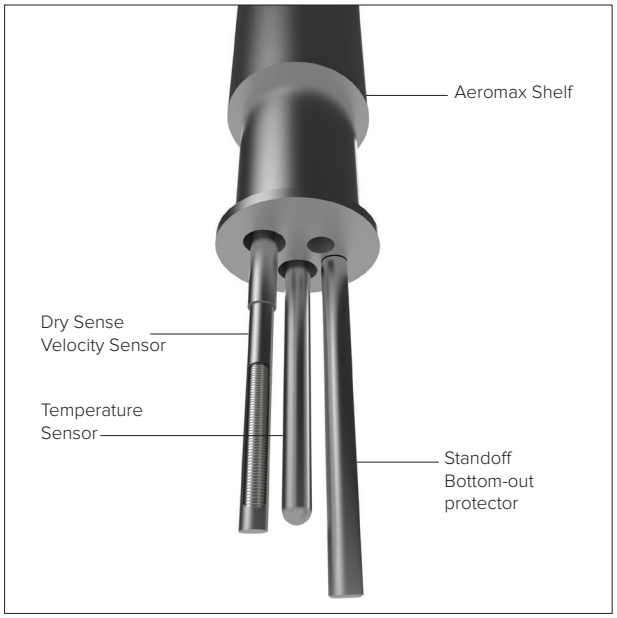


Figure 1. 640i Standard Sensor Design with Standoff

Performance Specifications:

With the optional sensor shield installed on the probe you enjoy the same actual gas calibration accuracy at 0.75% of reading plus 0.5% of full scale.

qTherm and qMix accuracies are slightly derated from 3.0% of full scale to 5.0% of full scale. Slightly lower accuracy occurs because Computational Fluid Dynamics (CFD) modeling shows a shield on the probe directs a portion of the flow away from the V and T elements, which slightly decreases the efficiency of heat transferred from the velocity sensor to the flowing gas.

Figure 2. 640i Protective Sensor Shield and Captive Conax® Fitting

The results of our calibration study in Figure 3 proves that the 640i with the protective shield has mass flow accuracies within the published standard accuracy specification of the 640i, (0.75% of reading plus 0.5% of full scale) for actual gas calibrations.

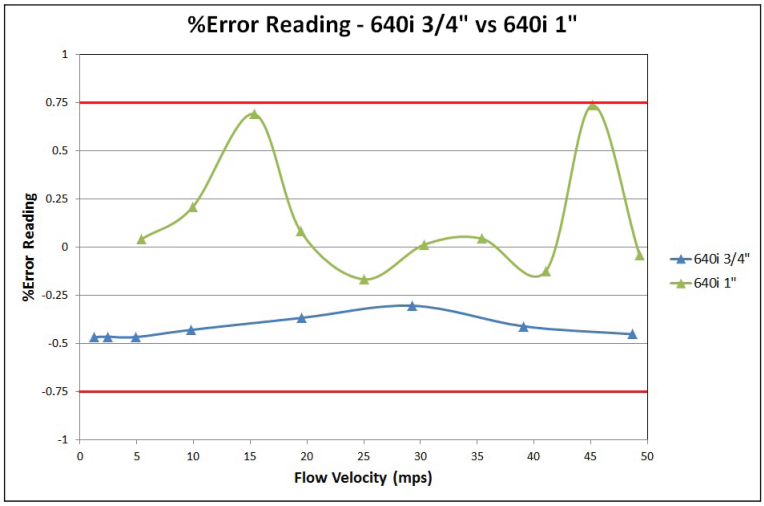


Figure 3. Actual Gas Calibration Study Comparing Standard 640i ¾-inch (19.1mm) with 640i equiped with 1-Inch (25.4mm) Diameter Protective Sensor Shield

Physical Specifications:

Since the diameter of the 640i insertion probe shaft is ¾-inch (19.1 mm) and the diameter of the sensor shield is 1-inch (25.4 mm), a special Conax® fitting is used with a ¾-inch (19.1mm) probe feed through by 1-inch male NPT. The protective sensor shield requires special captive Conax mounting fittings as seen in Figure 4 which can slightly decrease the installation flexibility of the meter.

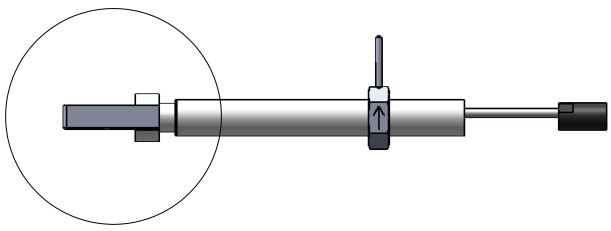
This Conax fitting is rated to 400 psig (27.6 barg) and uses a Viton® packing gland so that the fitting does not become permanently swaged to the probe allowing the meter to be removed if needed.

Sierra offers several probe shield/mounting fitting options to choose from. See Feature 4B in the 640i price list.

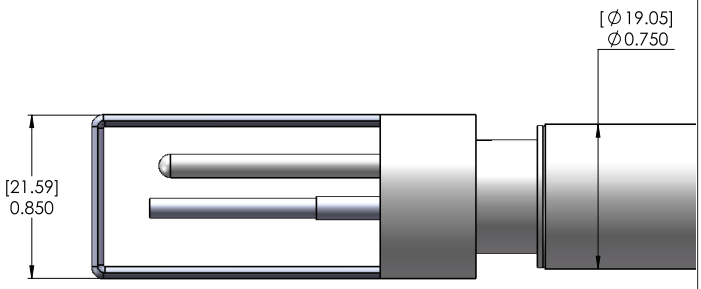
Figure 4. Protective Shield and Captive Conax Mounting Fitting

Protective Shield Dimensional Drawings

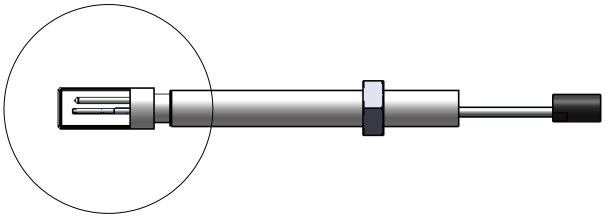
Dimensions of probe in inches (mm in parentheses).



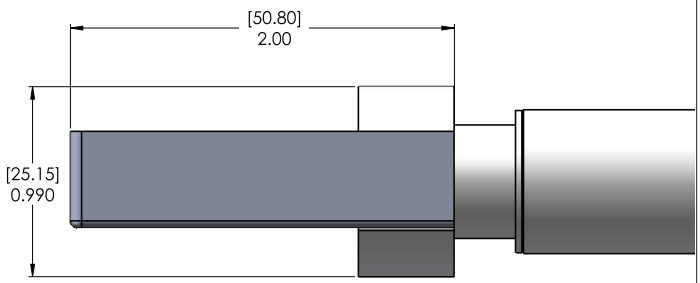
Protective Sensor Shield – Side View



Protective Sensor Shield – Detailed View



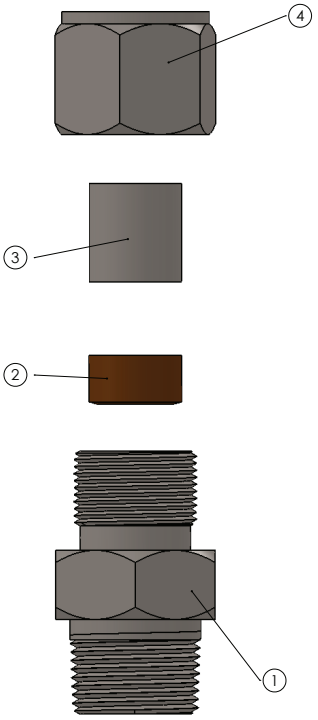
Protective Sensor Shield - Front View

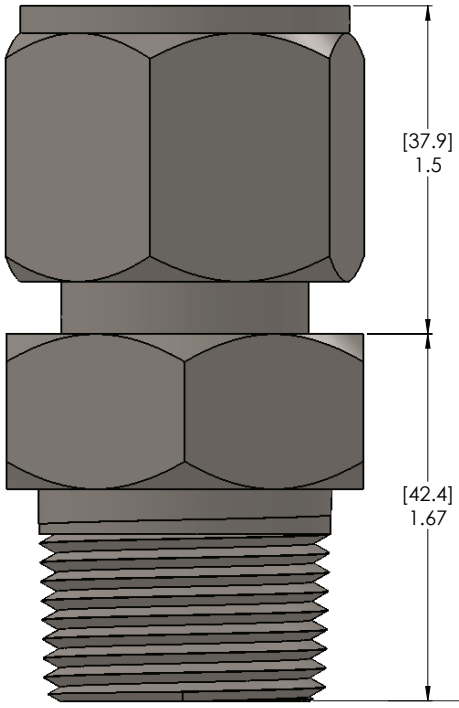


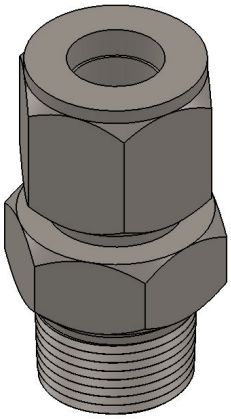
Protective Sensor Shield – Detailed View

Dimensions Drawings of Mounting Fittings

Front View-Captive Conax Fitting (Model Code: S1)

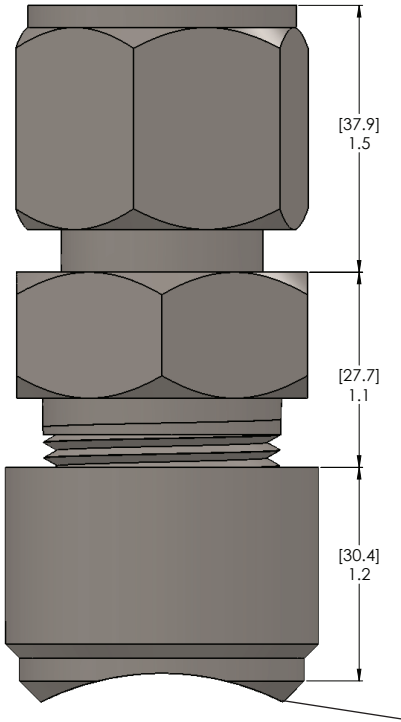


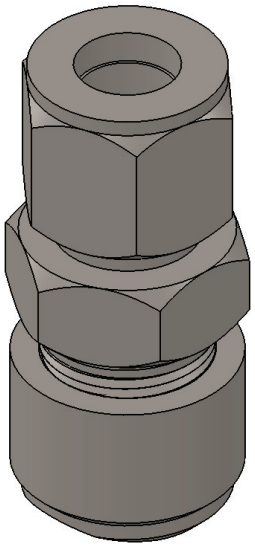




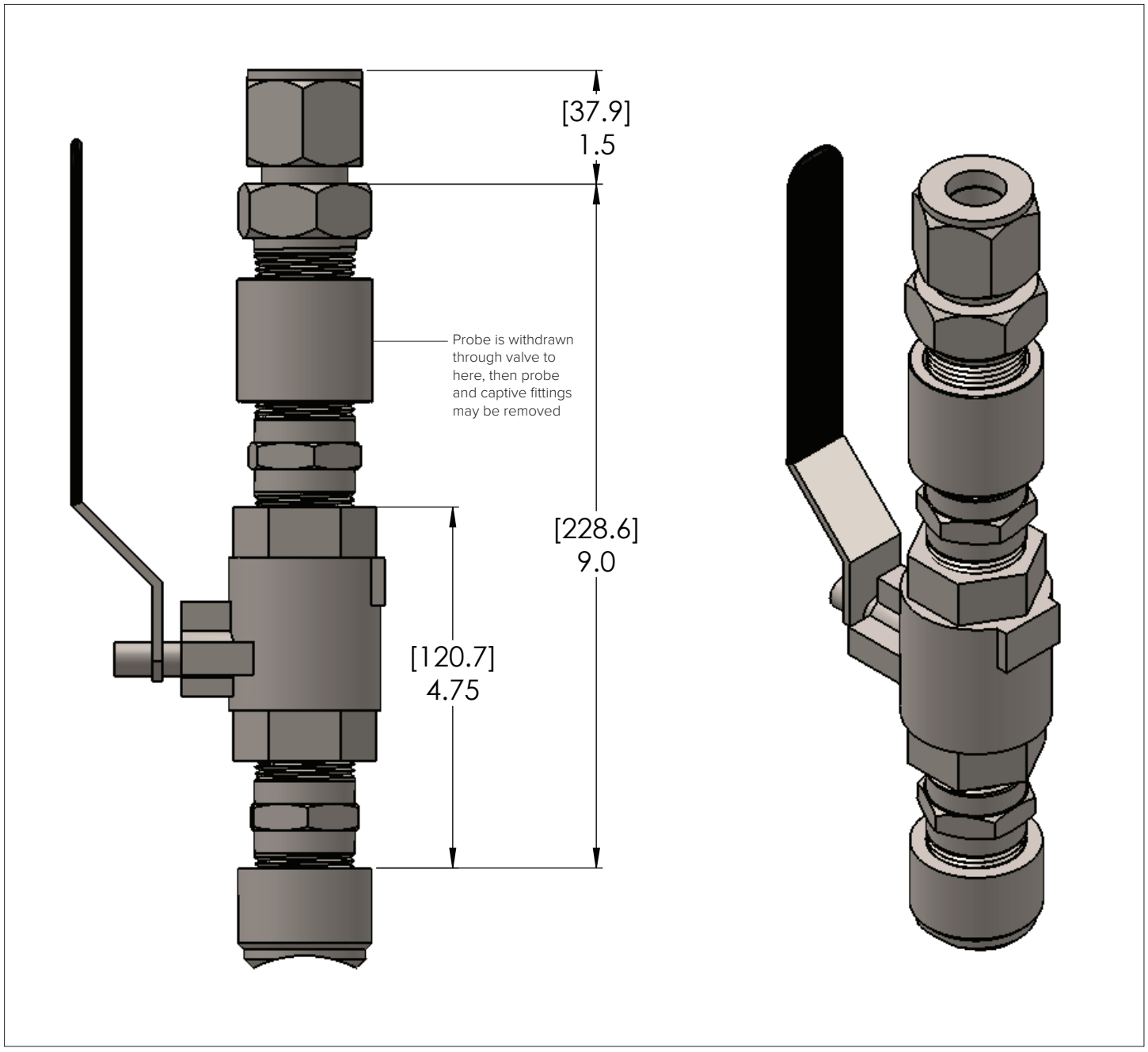
ITEM NO.	PART DESC	QTY.
1	BODY	1
2	PACKING GLAND	1
3	PACKING SLEEVE	1
4	PACKING NUT	1

Front View- Captive Conax Fitting plus Weldolet (Model Code: S1-S2( ))

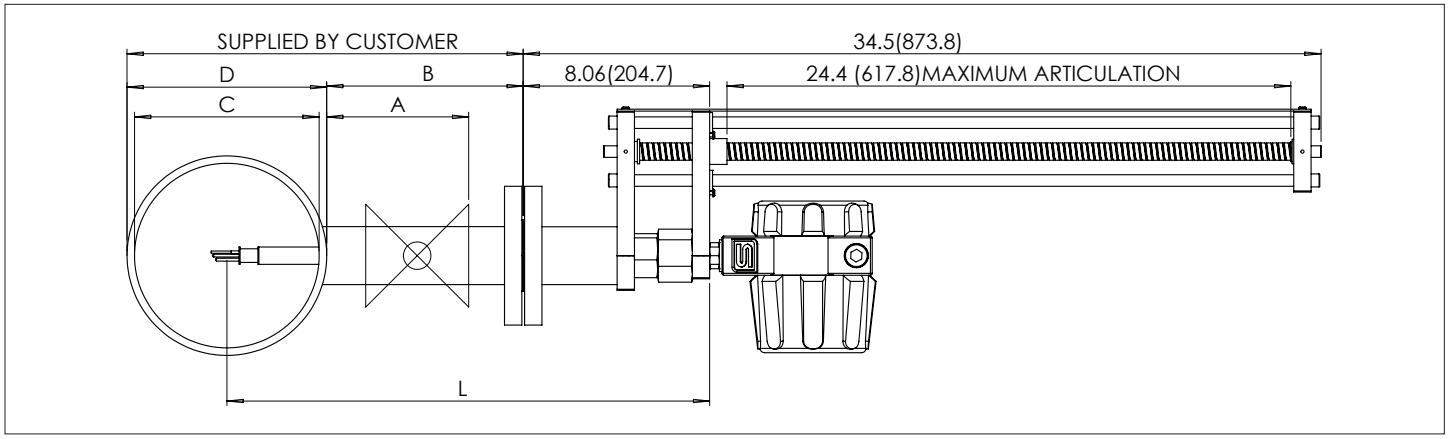




Front View-Low Pressure Hot Tap to 150 psig (10.3 barg) (Model Code: S8( ))



Side View-High Pressure Hot-Tap with Retractor to 400 psig (27.6 barg) (Model Code: L( )S9)



Ordering the Protective Sensor Shield and Mounting Fitting Kits

To order the protective sensor shield refer to the price list and build a model number as always. When you get to Feature 4: Mounting Options for the standard probe, skip to Feature 4B. Feature 4B (shown below) details the various sensor shield mounting options you can choose from. The reason for this, as mentioned before, the mounting fitting is captive.

Ordering Example: 640i-VTP-2-L13-S1-P2-V6-DD-MP2-0-2-8-10

Feature 4B: Sensor Shield & Mounting Option Kits: Add 1-inch (25.4 mm) diameter stainless steel welded-on sensor shield to the end of the insertion probe for improved sensor protection.

S1( )	This assembly includes a sensor shield and a captured Conax fitting 3/4-inch (19.1 mm) with 1-inch (25.4 mm) male NPT. Max pressure 400 psig (27.6 barg). Contact factory for 1000 psig (68.9 barg) option. Specify probe length in parenthesis
S2( )	Assembly is a 1-inch (25.4 mm) Female NPT weldolet, which customer welds to the pipe. Commonly used with S1, Specify pipe O.D. in Parenthesis for S2. Max pressure 400 psig (27.6 barg). Contact factory for 1000 psig (68.9 barg) option.
S1( )-S2( )	This assembly includes a sensor shield and a captured Conax fitting plus weldolet. 3/4-inch (19.1 mm) probe with 1-inch (25.4 mm) male NPT.. Threads into 1-inch (25.4 mm) Female NPT weldolet, which customer welds to the pipe. Specify probe lenth in parenthesis for S1 and Specify pipe O.D. in Parenthesis for S2. Max pressure 400 psig (27.6 barg). Contact factory for 1000 psig (68.9 barg) option.
S1( )-S8( )	**Low pressure hot tap** assembly includes a sensor shield , a ball valve and packing gland with Conax fitting plus weldolet. Maximum 150 psig (10.3 barg). Retractor is required for greater than >150 psig(10.3 barg) if hot tapping (see S9 ( )). Specify probe length in parenthesis for S1 and Specify pipe O.D. in Parenthesis for S8.
S9( )	**High pressure hot-tap with removable retractor kit** assembly includes a sensor shield, removable retractor assembly, packing gland probe seal with a 2-inch ANSI class 150 process connection (other classes available, contact factory), and Conax fitting. Specify probe length in parentheses, MINIMUM length is process connection dependent. Max pressure flange dependent or 400 psig (27.6 barg). Contact factory for 1000 psig (68.9 barg) option.

Note: Accuracy for actual gas is 0.75% of reading plus 0.5% full scale. Accuracy for qTherm or qMix gases is derated from 3.0% to 5.0% of full scale with sensor shield option.