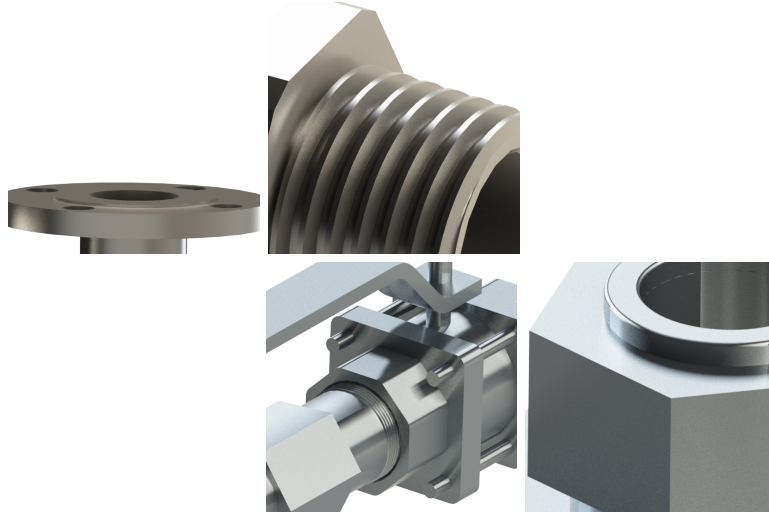


# Single-Point Insertion Flow Meter Installation Options



## Choosing Accessories

Installation hardware options are heavily influenced by process conditions. Process pressure, temperature, line material, line sizes, and process gas composition must be considered when selecting mounting hardware. Connections can be fairly simple with minimal hardware or complex with a number of interconnecting devices.

Before developing the structure for building the necessary flow instrumentation, it is important to identify the installation location, accessibility, the material of the pipe/duct/stack, and the flow rate and pressure. This information helps direct the mounting accessory options for the instrumentation and can further define the instrument feature selections, including:

- Sensor support diameter
- Sensor support length
- Electronics configuration
- Flanged or non-flanged sensor support

In general, there are two types of connections:

- **Non-flanged** — where the instrumentation is supported and sealed into the process by using a compression seal device (typically a compression fitting or a packing gland).
- **Flanged** — where a flange is permanently welded to the sensor assembly and the instrument is then bolted into the process.

The terms “hot-tap” and “valved” are commonly used when referring to a process in which the instrumentation can be removed while the process continues to operate (under manual control). Flanged mounting is not used in hot tap situations.

The minimum sensor support length (L2) for an insertion probe is determined by the insertion depth and the overall length of the mounting accessories in order to ensure that sensors are placed in the optimal location for flow measurement.

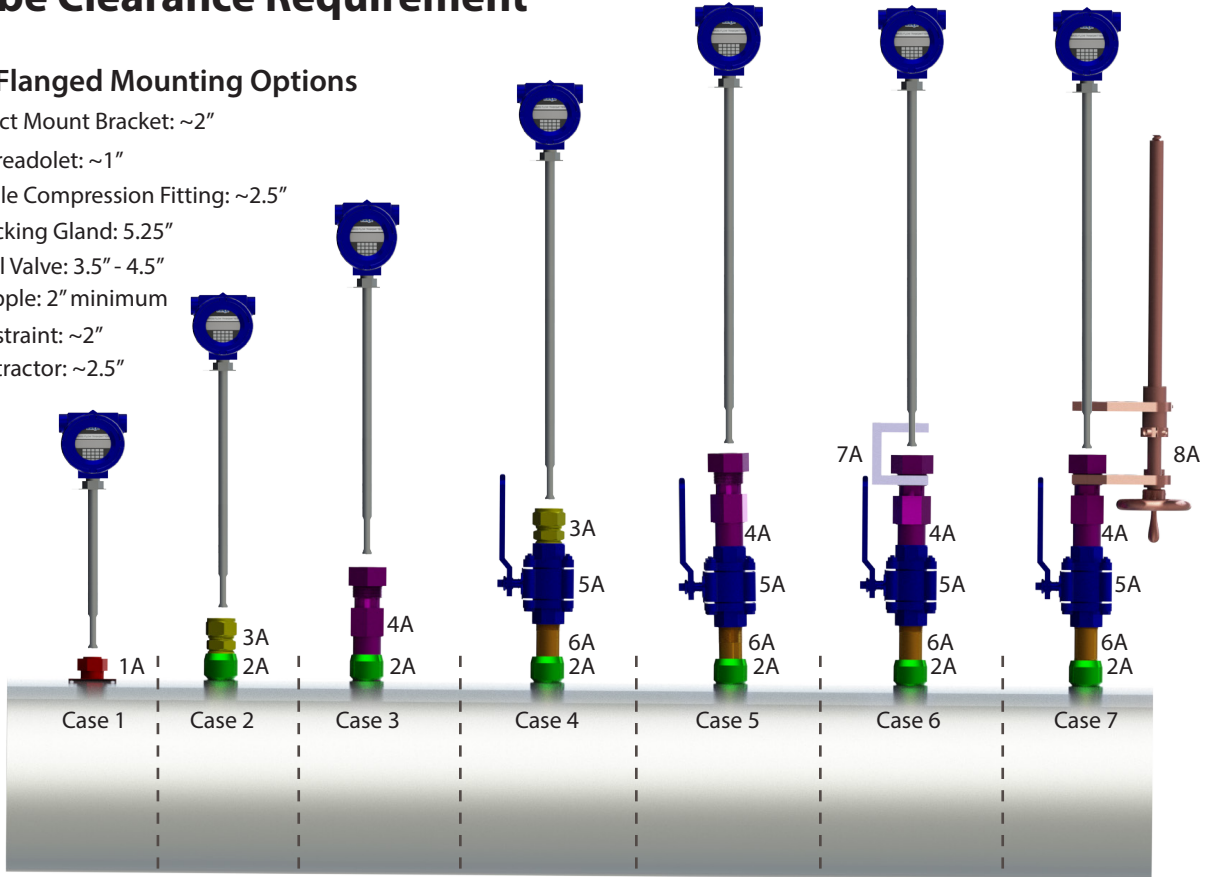
The minimum internal diameter of mounting hardware must be larger than the selected sensor support diameter.

It is important to remember that without a selected or offered mounting solution, the customer will become frustrated while attempting to install and use their device.

# Probe Clearance Requirement

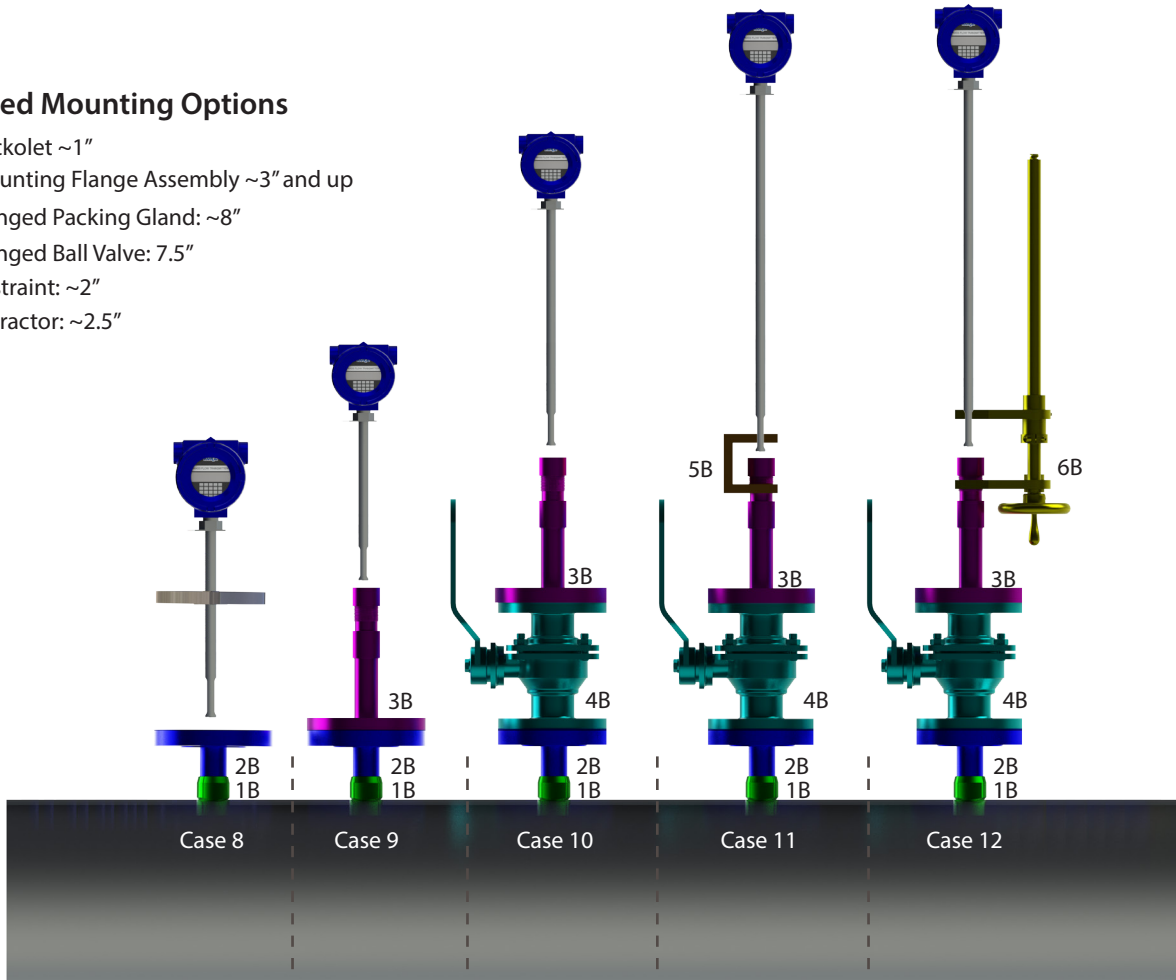
## Non-Flanged Mounting Options

- 1A Duct Mount Bracket: ~2"
- 2A Threadolet: ~1"
- 3A Male Compression Fitting: ~2.5"
- 4A Packing Gland: 5.25"
- 5A Ball Valve: 3.5" - 4.5"
- 6A Nipple: 2" minimum
- 7A Restraint: ~2"
- 8A Retractor: ~2.5"

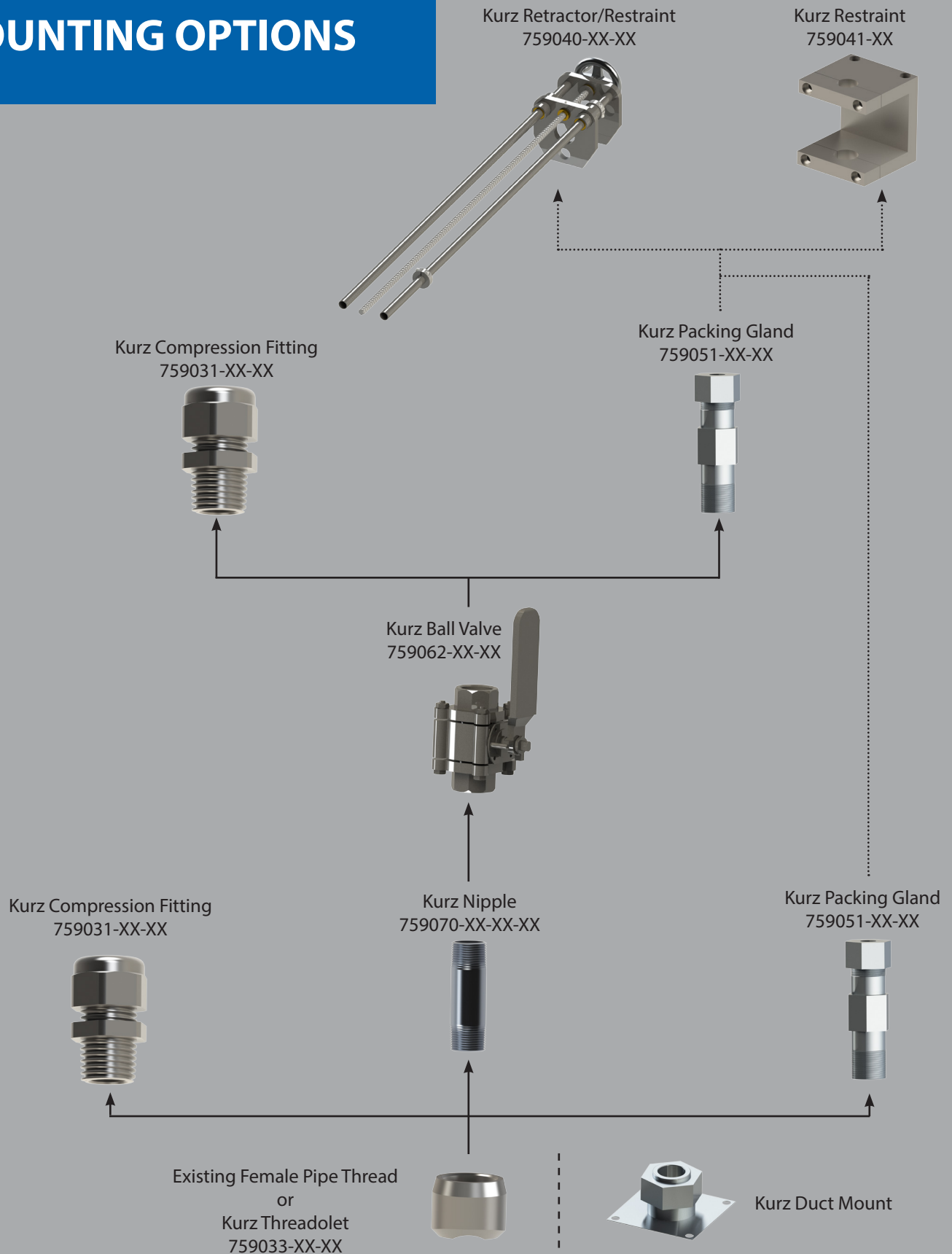


## Flanged Mounting Options

- 1B Sockolet ~1"
- 2B Mounting Flange Assembly ~3" and up
- 3B Flanged Packing Gland: ~8"
- 4B Flanged Ball Valve: 7.5"
- 5B Restraint: ~2"
- 6B Retractor: ~2.5"

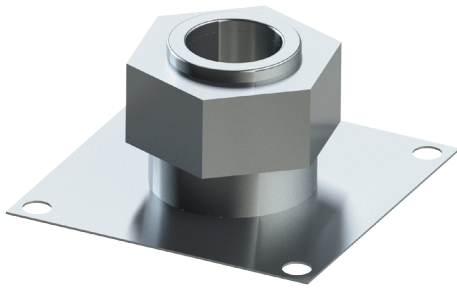


# NON-FLANGED MOUNTING OPTIONS



## DUCT MOUNTING BRACKET

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**Duct mounting brackets** provide mounting access for single-point insertion instrumentation in process lines made from sheet metal, plastic, fiberglass, or other materials that do not allow a welded attachment.

The bracket consists of a 2.5" x 2.5" metal plate that is either flat for rectangular or large, round ducts, or arched to fit the curvature of a specified round process line assembly.

The mounting access functions by compressing a tapered ferrule inward against the smooth sensor support of the insertion instrumentation.

Ferrules can be selected in stainless steel, nylon, or Teflon™.

- Stainless steel ferrules are used in high temperature applications and/or when the instrumentation is seldom removed for cleaning.
- Nylon or Teflon™ ferrules are used in ambient temperature applications and/or when there is an expectation that the instrumentation or process line will require regular cleaning.

Insert the sensor support to the desired depth, hand-tighten the compression cap, and then use a wrench to rotate the compression cap an additional 1-1/4 turn.

The duct mounting bracket accounts for approximately 2" of the sensor support length. This dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

## THREADOLET

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**Threadolets**, commonly called "branch fittings," provide a port location on a metal process line for insertion instrumentation. The base of the threadolet is either flat for rectangular or large, round ducts, or arched to fit the curvature of a specified round process line.

These welded-on hubs provide a Female National Pipe Thread (FNPT) attachment location. These devices provide the proper perpendicular mounting and the strongest possible connection.

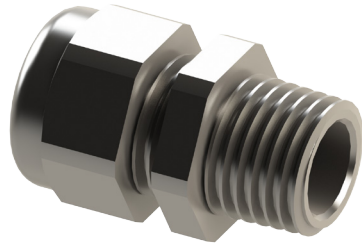
Carbon steel and stainless steel options are designed to match the process line material for ease of welding.

Customers need to drill a mating hole, center the threadolet over the hole, and weld according to appropriate local and national standards.

Considered all related components for sizing measurements to ensure clearance of the selected sensor support diameter. The total threadolet length dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

A threadolet will account for approximately 1" of the sensor support length. This dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

## MALE COMPRESSION FITTING



**Male compression fittings** provide a simple mounting device for single-point insertion instrumentation. They are used with either an existing Female National Pipe Thread (FNPT) or a Kurz threadolet.

Male compression fittings have a stainless steel threaded body, two shaped ferrules, and a compression cap. Compression fittings are a standard plumbing product commonly used to terminate a smooth wall tube with a Male National Pipe Thread (MNPT). For mounting instrumentation, a “bored-through” male compression fitting is used.

The sensor support slides completely through the compression fitting. The compression fitting functions by compressing a tapered ferrule inward against the smooth sensor support of the insertion instrumentation. Depending on the ferrule material, a male compression fitting can be used for any application under pressure.

The male compression fitting accounts for approximately 3” of the sensor support length. This dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

### MALE COMPRESSION FITTINGS

759031-XX-XX

### PACKING GLANDS

759051-XX-XX

## PACKING GLAND



**Packing glands** are used with either an existing Female National Pipe Thread (FNPT) or a Kurz threadolet.

The packing gland uses a square rope packing material for compression instead of a ferrule. A cap nut forces a shaped metal band into the packing material and squeezes it against the sensor support.

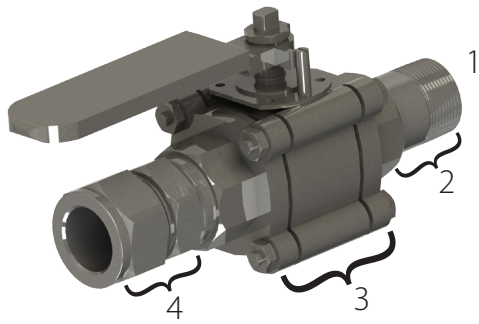
There are three significant benefits with packing glands:

- The packing material can be either Teflon™ or Graph-lock®. Teflon™ is used for applications up to 200°C, and Graph-lock® is used for applications up to 500°C.
- By adjusting the cap nut pressure, instrumentation can hold a process seal while being removed or inserted into the process.
- Additional packing material can be added as needed to ensure a full seal without removing the instrumentation from the process.

A packing gland can be used in applications from vacuum up to 50 PSIG process pressure. When supported by either a restraint or a retractor/restraint, a packing gland has an operational service pressure range up to 300 PSIG.

The packing gland and threadolet accounts for approximately 5” of the sensor support length. This dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

## HOT TAP WITH COMPRESSION FITTING



A **hot tap with a compression fitting** allows for inserting and removing the instrumentation while the process is operational. Using a hot tap with a compression fitting allows some gas blow-by while inserting and removing the instrumentation.

This is typically used when the instrumentation is a temporary installation or the instrumentation requires periodic cleaning because of process conditions.

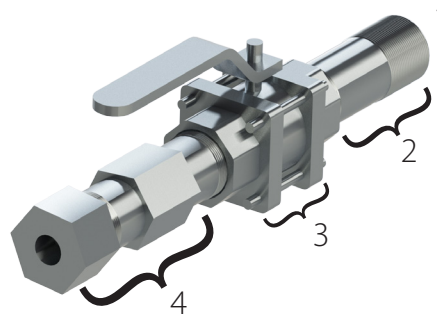
Beginning with a Female National Pipe Thread (FNPT) fitting, the complete assembly can include:

1. Threadolet or existing NPT port
2. Pipe nipple
3. Ball valve
4. Compression fitting

Ball valves must be selected one line size larger than the probe diameter. All other fittings and connections must be sized to the ball valve. For example, a 1/2" sensor support diameter requires a ball valve with a 3/4" FNPT connection.

The total assembly length typically accounts for 7" to 12" or longer. This dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

## HOT TAP WITH PACKING GLAND



A **hot tap with a packing gland** allows for inserting and removing the instrumentation while the process is operational. The packing gland allows the packing pressure to be regulated high enough to preclude escaping gases and low enough to allow removing the instrumentation.

Beginning with a Female National Pipe Thread (FNPT) fitting, the complete assembly can include:

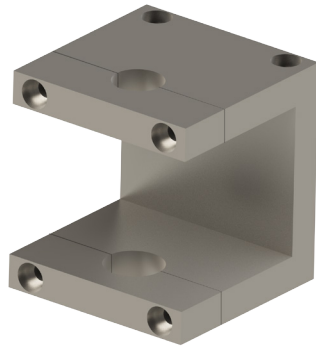
1. Threadolet or existing NPT port
2. Pipe nipple
3. Ball valve
4. Packing gland

Ball valves must be selected one line size larger than the probe diameter. All other fittings and connections must be sized to the ball valve. For example, a 1/2" sensor support diameter requires a ball valve with a 3/4" FNPT connection.

The total assembly length typically accounts for 12" or longer. This dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

**RESTRAINT**

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A **restraint** device consists of a u-shaped bracket designed to be used with a Kurz packing gland. The restraint provides a positive lock to preclude pressure-related instrumentation blowout or an inadvertent blowout caused by a loosened packing nut while the system is pressurized. Process shutdown is typically required should the instrument need to be removed.

The restraint is designed so that one side clamps onto the packing gland and the other side clamps onto the sensor support. A fitted stop collar provides consistent insertion depth.

A packing gland can be used in applications from vacuum up to 50 PSIG process pressure without the use of a restraint device. When supported by a restraint, the packing gland operational service pressure range increases up to 300 PSIG.

The restraint must be sized to fit the instrument sensor support diameter, and can only be used in conjunction with a Kurz packing gland.

The addition of a restraint will require approximately 2" of sensor support for clearance. This dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

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RESTRAINT  
759041-XX

**RETRACTOR/RESTRAINT**

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The **retractor/restraint device** is designed to be used with the Kurz packing gland. The retractor/restraint supports an increase in the allowable process pressure and limits the potential for a blowout. Instrumentation can be retracted and isolated from a process while the process is operating under pressure.

The retractor/restraint consists of a support structure with two clamping plates, two support rods, one threaded rod with wheel handle for adjustment, and two limiting stop collars. The clamping plates affix to a packing gland and to the sensor support.

The stop collars set the retraction and insertion limits to indicate when the sensor support is clear of the valve and the valve can be closed or when the sensor is in the correct location for flow measurement.

The length and diameter of the sensor support is typically sized to the length of the retractor/restraint.

The addition of a restraint will require approximately 2" of sensor support for clearance. This dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

A transmitter-separate configuration is recommended with a retractor/restraint. When specifying transmitter-attached with a retractor/restraint, DC power is recommended.

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RETRACTOR/RESTRAINT  
759040-XX-XX



# FLANGED MOUNTING OPTIONS

\* Non-flanged flow element required



## SOCKOLET

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**Sockolets**, commonly called “branch fittings,” provide a port location on a metal process line for insertion instrumentation. The base of the sockolet is either flat for rectangular or large, round ducts, or arched to fit the curvature of a specified round process line.

These welded-on hubs provide a smooth, recessed attachment location. These devices provide the proper perpendicular mounting and the strongest possible add-on connection.

Carbon steel and stainless steel options are designed to match the process line material for ease of welding.

Customers need to drill a mating hole, center the sockolet over the hole, and weld according to appropriate local and national standards.

A sockolet will account for approximately 1” of sensor support length. The total sockolet length dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

Considered all related components for sizing measurements to ensure clearance of the selected sensor support diameter.

## MOUNTING FLANGE ASSEMBLY

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The **mounting flange adapter** provides a mounting location when there is no mounting location. The mounting flange adapter consists of a pipe stub welded to a preselected flange. The pipe stub length is based on the process location, ease of access to the instrumentation, possible insulation that must be cleared, and any other mitigating factors.

When choosing a mounting flange adapter, you must consider the process line material to facilitate welding/adhesion. The mounting flange adapter is welded to a metal process line, and a sockolet is added to reinforce the connection and ensure a perpendicular insertion. For brick or cement stacks, the mounting flange adapter is cemented into a clearance hole.

Flanges come in different thicknesses to meet planned process strength requirements. The flange size and class must match the size and class flange that is being selected as part of the instrument structure or related valve/packing gland.

The overall length of a mounting flange assembly is controlled by the Probe Support Length feature. All dimensions must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

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SOCKOLET

759034-XX-XX

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FLANGE MOUNTING ASSEMBLY

## FLANGED BALL VALVES

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**Flanged ball valves** are typically combined with a flanged packing gland as a transition to a customer's flanged connection so that instrumentation can be readily inserted or retracted.

Flanged ball valves must be sized one line size larger than the instrument because of necessary clearance through the ball valve.

Flanged ball valves are not generally used with flanged instrumentation because process gases will vent when instrumentation is inserted or retracted.

Flanged ball valves used with single-point insertion devices range from 4.75" to 7.5" for clearance considerations.

## FLANGED PACKING GLANDS

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**Flanged packing glands** are used with either a customer's installed process flange or a flanged ball valve that facilitates the transition from a customer process flange to a retractable instrumentation mounting solution.

The packing gland uses a square rope packing material for compression instead of a ferrule. A cap nut forces a shaped metal band into the packing material and squeezes it against the sensor support.

There are three significant benefits with packing glands:

- The packing material can be either Teflon™ or Graph-lock®. Teflon™ is used for applications up to 200°C, and Graph-lock® is used for applications up to 500°C.
- By adjusting the cap nut pressure, instrumentation can hold a process seal while being removed or inserted into the process.
- Additional packing material can be added as needed to ensure a full seal without removing the instrumentation from the process.

A packing gland can be used in applications from vacuum up to 50 PSIG process pressure. When supported by either a restraint or a retractor/restraint, a packing gland has an operational service pressure range up to 300 PSIG.

The flanged packing gland accounts for approximately 8" of the sensor support length. This dimension must be included when specifying the sensor support length to ensure the instrumentation clears the assembly.

*See page 7 for discussion of restraint and retractor/restraint.*

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FLANGED BALL VALVES

759062-XX-XX

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FLANGED PACKING GLANDS

759051-XX-XX

