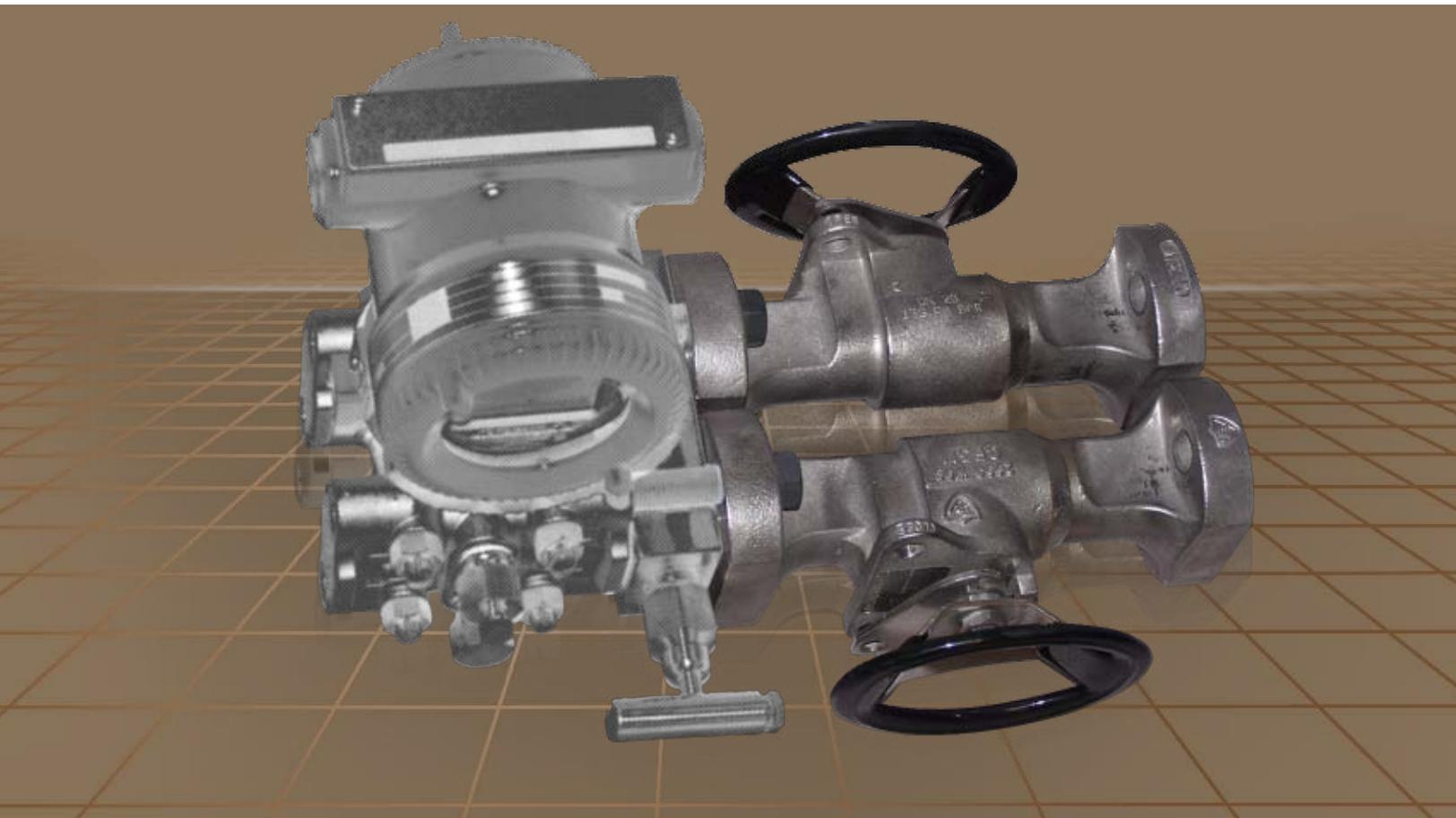


TBV™ Instrument Connection Systems



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TBV™

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Millbury, MA

Cameron's Valves & Measurement (V&M) group is a leading provider of valves and measurement systems to the oil and gas industry. The group's products are primarily used to control, direct and measure the flow of oil and gas as it is moved from individual wellheads through flow lines, gathering lines and transmission systems to refineries, petrochemical plants and industrial centers for processing.

The Engineered & Process Valves division provides a wide range of valves for use in natural gas, LNG, crude oil and refined products transmission lines. The traditional CAMERON® fully-welded ball valve product line has been combined with the GROVE®, RING-O®, TEXSTEAM™, TOM WHEATLEY®, ENTECH™ and TK® product lines. This broad offering has significantly strengthened Cameron's ability to serve as a single source for a wide scope of customer requirements. The division also provides critical service valves for refinery, chemical and petrochemical processing businesses and for associated storage terminal applications, particularly through the ORBIT® and GENERAL VALVE®. These brands are complimented by WKM® and TBV™ valve products and considerably expand the scope of this division's product offerings.

TBV valve products are manufactured and assembled at Cameron's new facility in Millbury, Massachusetts. The TBV facility offers 100,000 ft² of space of which 80,000 ft² is dedicated to manufacturing, assembling, testing, shipping, and quality assurance. The increased manufacturing space has afforded Cameron the opportunity to expand its product offering and size ranges. TBV is now competitive in the LNG, Mining and Petrochemical markets with its ability to offer larger size ranges in its line of products.

Facility Features

- Clean Room for oxygen, chlorine and phosgene applications
- Painting room
- Dedicated cryogenic testing area
- State of the art CNC machining



TBV™ INSTRUMENT CONNECTION SYSTEMS PRODUCT OFFERING

TBV™ Instrument Connection Systems (ICS) come in a variety of measurement system configurations. Over 250 Hook-Ups™ connection system configurations, each with a variety of options, are available for your flow, pressure, or level applications.

Delivered in exceptionally short lead time – In one box per tag item, bagged, tagged, tested and complete with all materials including brackets, bolts, gaskets, stainless steel tags, adapters, flanges and including the root or primary block valve (see Instrumentation Valves brochure, CT-TBV-IV). Ready for installation with customer supplied transmitter.

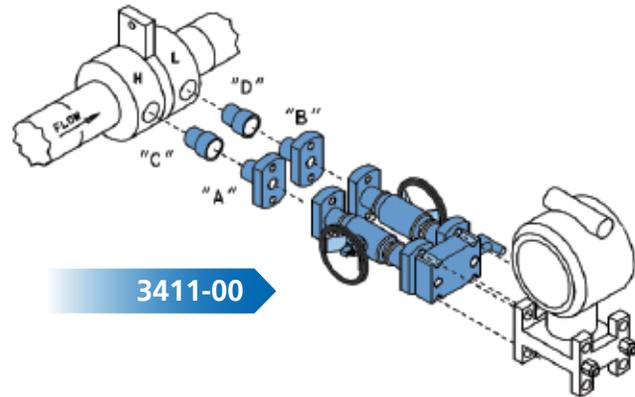
Designed and packaged by instrument engineers, piping specialists and valve engineers who understand the E&C environment and needs. User and project friendly ICS offers a complete turn-key product. We “build the bridge to the process” safely, efficiently and dependably. Packages include root valves, manifolds, support brackets, and impulse line (when needed). ICS components are also available to suit cryogenic applications and are prefabricated and pretested before shipment.

TBV™ INSTRUMENT CONNECTION SYSTEMS

PRODUCT OFFERING

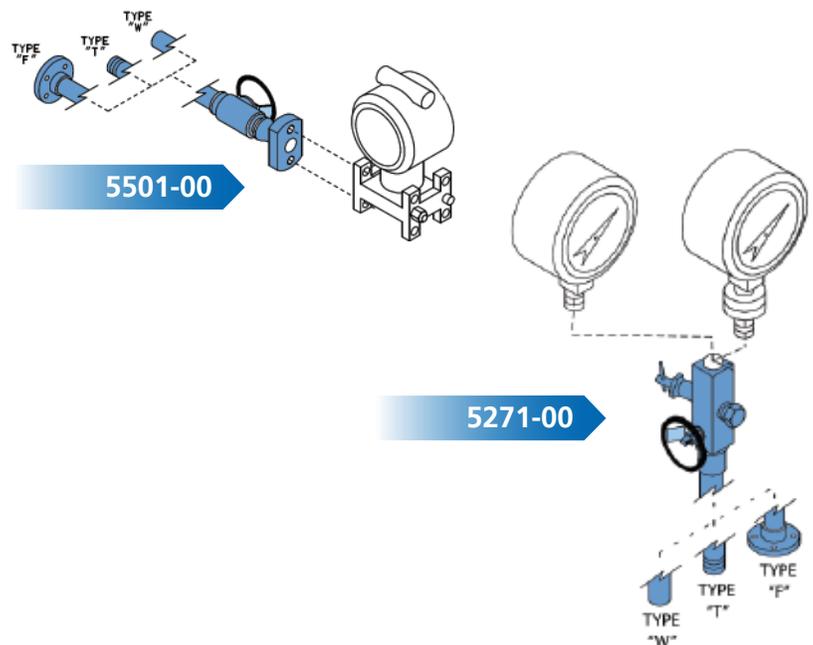
Flow Offerings

- Orifice, wedge or venture meter applications
 - Horizontal/Vertical
 - Retrofits
- Supported or non-supported
- Compact design available
- Pressure compensated DP Flow
- Flanged (as shown) or direct weld



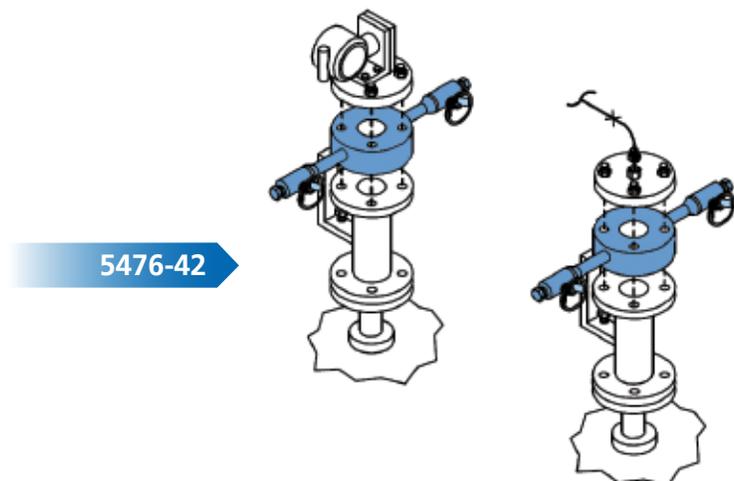
Pressure Offerings

- Pressure transmitters
 - Retrofits
 - Supported or non-supported
 - All process connection types
- Pressure Gauges
- Flush rings for differential and diaphragm seal pressure applications
 - Universal Seal
 - ASME B16.5/DIN
 - Concentric and eccentric configurations available



Level Offerings

- Drilled and tapped from both sides for safety, additional options available
- Flush rings for vacuum, atmospheric, and positive pressure applications
- Vent or flush/drain available
- Available in the following diaphragm seals
 - Universal Seal
 - ASME B16.5/DIN
- Concentric and eccentric configurations meet ASME thickness standards on both process and instrument sides of flush ring
- Reducing flange designs



TBV™ INSTRUMENT CONNECTION SYSTEMS

TBV™ INSTRUMENT INSTALLATION DETAILS

Background

The Process industries are making every effort to reduce the cost of manufacturing and construction of new facilities in order to survive in the fiercely competitive global economy. Cost studies conducted by leading chemical and refining companies indicate a substantial savings potential in the mounting and maintenance of process transmitters.

Sub-optimal installation was identified as a leading source of instrument maintenance – 60% of the maintenance activity consisted of repetitive work orders due to hydrostatic head error, leaks and impulse line related process / maintenance work. The transmitter was performing to its specification, but not in the field. **The deliverables of the transmitters were difficult to achieve due to poor installation.**

Many Standards, Little Standardization

Most end user companies have developed instrument installation standards. Engineering companies have developed installation standards. Projects have developed installation standards. And so we begin to see it is not a lack of installation standards, but a lack of standardized installation technology.

Transmitter Technology

Transmitter technology has advanced significantly over the past ten years. Conventional installation standards have not kept pace with this technology and are, in fact, rooted in the technology of the past. Smart transmitter technology, combined with value-added, economic and technologically based know-how, has produced a paradigm shift in transmitter installation. This is the core of the TBV Instrument Installation Detail System.

Hydrostatic Head—The Number One Source of Error

Although smart transmitters currently delivery high value through increased accuracy (.075% of span), increased mean time between failures; and even measurement performance guarantees of over five years without calibration, transmitter installations which induce a hydrostatic head through the installation practice continue to be a costly and ineffective means of connecting the process to the transmitter in order to achieve the desired results: process control, process optimization, process safety and increasing the profit margin for both end users and contractors.

Eliminate Hydrostatic Error and Reduce Installed Costs Up to 40%

The TBV Instrument Installation Details combine the optimum measurement technology with proven mounting practices (close coupling) and hardware integration to produce not only the specified accuracy and stability, but a low installed cost.

The total performance solution offers a reduction in installation costs, by modularizing, pre-engineering, prefabricating, and locking in the optimum transmitter installation in a tamper proof system that guarantees the rated performance of the transmitter, while lowering the installed cost per instrument loop by 30 to 40% (documentation available from TBV).

TBV™ INSTRUMENT CONNECTION SYSTEMS

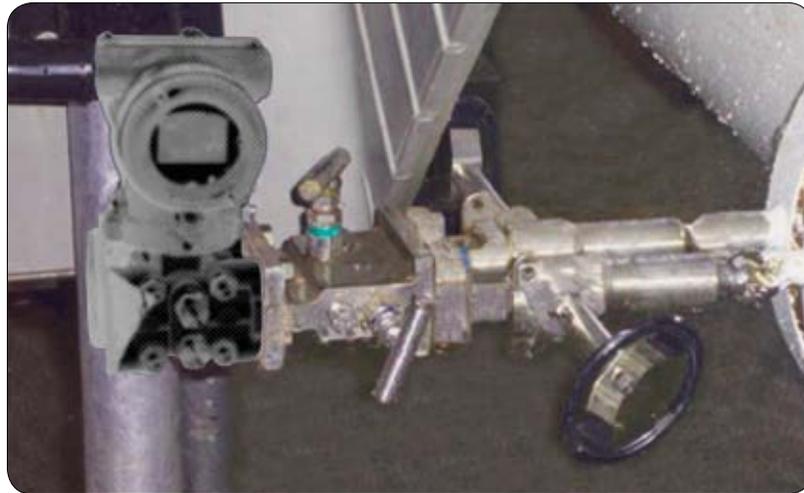
TBV™ INSTRUMENT INSTALLATION DETAILS (cont.)

Benefits of the TBV Total Performance Solution for Process Pressure, D/P Transmitters & Level Measurements

- Elimination of hydrostatic head error and subsequent maintenance
- Elimination of threaded connections and tubing in the process
- Elimination of fugitive emissions from instrument connections
- Reduced variability in the product and Improved yields
- Increased reliability
- Improved safety
- Reduces installed costs up to 40%—**Immediate ROI on material cost!**
- No on-site assembly or testing or calibration—set and forget!
- Reduction of engineering and procurement time and cost. One purchase order for all hardware!
- All welded and modular construction from an ISO9001 company. Complete material traceability. Quality, standardization and safety
- A “cookbook” approach to selection and engineering utilizing TBV’s Category System and “SmartCatalog” programming that handles selection, design, documentation, engineering specifications and CAD drawings for over 250 installations.
- TBV’s Total Performance Package includes contractor construction details. Proven reductions in engineering time: “hook-ups” normally require 15% of the Instrument engineer’s time. This is reduced to 5% allowing time to be used on more productive and higher value tasks, such as process control strategies. “SmartCatalog” is a PC platform, database compatible project

TBV™ INSTRUMENT CONNECTION SYSTEMS

FLEXIBILITY OF DIRECT MOUNTING



Differential pressure or pressure measurements (3411-05).

ROOT VALVES	MATERIALS	PIPING	MANIFOLDS	OPTIONS
<ul style="list-style-type: none"> • ¾" Standard Port – or ½" with .391 bore <ul style="list-style-type: none"> – Hard & Soft Seats – Fire Safe to API 607 – Class VI Shut-Off – Fully Roddable • ¾" and ½" Gate and Globe Valves available 	<ul style="list-style-type: none"> • Carbon Steel • Low Temp CS • Stainless Steel • Monel • Hastelloy C • Alloy 20 • Chrome-Moly 	<ul style="list-style-type: none"> • Sch. 40 • Sch. 80 • Sch. 160 • All standard materials listed in "Materials" column • Die penetrant testing • Full ASME/DIN Spec 	<ul style="list-style-type: none"> • Bypass – 1 Valve • 2-Valve • 3-Valve • 5-Valve • Matched to spec. assemble / transmitter • All standard materials • Hard & Soft Seats • Full porting 	<ul style="list-style-type: none"> • Extended Handles • Fugitive Emissions Bonnet • Orifice Adapters • Flanged to Specification • Direct Weld Connection • Bolting B7, B8M, SS, Monel, A449, etc. • Gaskets, Glass Filled PTFE, TFE, Graphite
Customer Specified Valves	Other material per customer specification	Other material per customer specification	Other material per customer specification	



Transmitter isolation valves for pipeline. Pressure Instruments can be used with a transmitter, pressure gauges or pressure switches. Built in manifold eliminates extra valving (5501-00).



Redundant differential pressure assembly for three phase flow. Complete turn-key units for quick installation (3411-02).

TBV™ INSTRUMENT CONNECTION SYSTEMS

FLOW APPLICATIONS

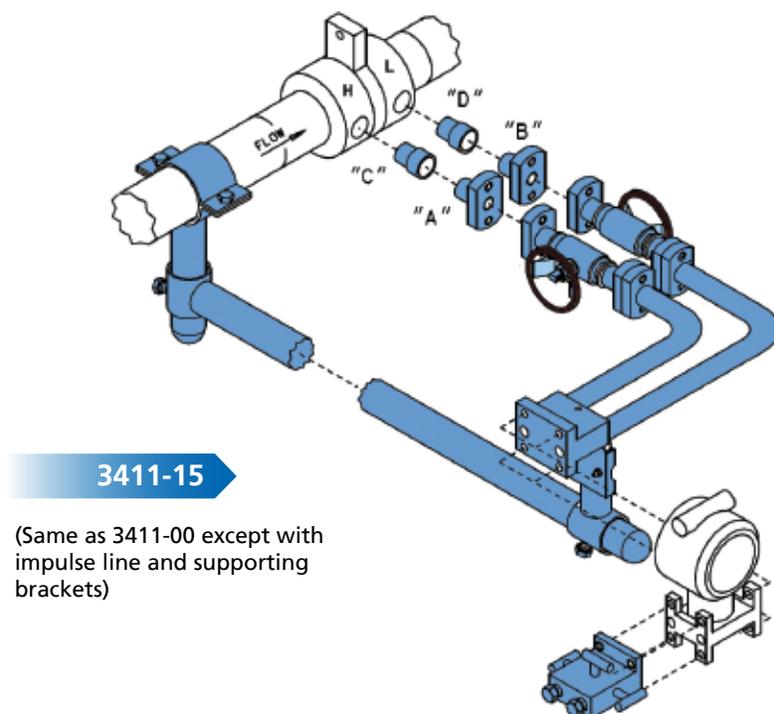
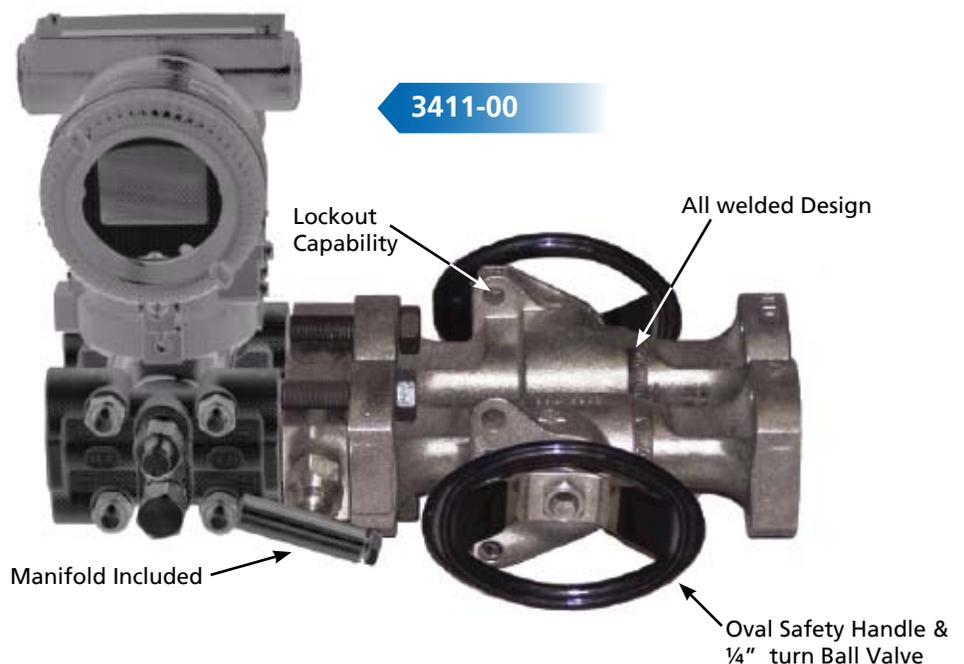
The TBV™ Instrument Connection System is a complete solution for orifice, venturi, code and wedge meter flow measurement. It can be combined with differential pressure (D/P) flow applications where true process isolation is desired.

FEATURES

- Can be used for a single differential pressure transmitters or two transmitters
- Close-coupled mounting
- All welded valves, no leak points
- Large bore ½" pipe, eliminates line plugging
- Manifold included
- True process isolation with ¼ turn ball valves or gate and globe valves
- Fire safe valve meets API 607 4th Edition
- API 551 Compliant (recommended procedures for installation of instruments)
- Fully roddable in-line
- Optimum DP flow measurement performance
- Impulse line to facilitate heat reduction is available

BENEFITS

- Reduces installed costs
- Reduces design and engineering costs
- Improves measurement accuracy
- Reduces procurement costs



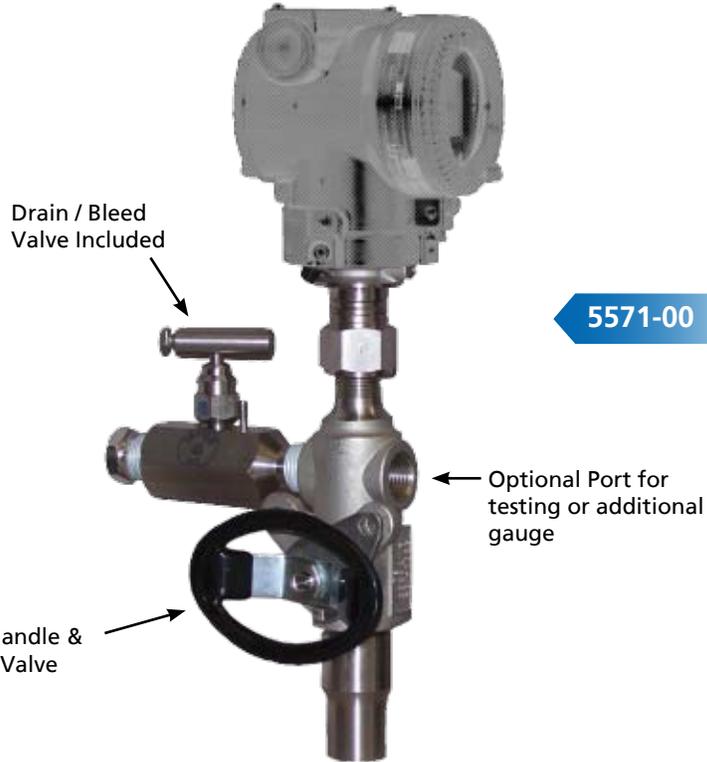
TBV™ INSTRUMENT CONNECTION SYSTEMS

PRESSURE APPLICATIONS

The TBV™ Instrument Connection System is a complete solution for pressure measurement. It can be combined with gauge applications where true process isolation is desired.

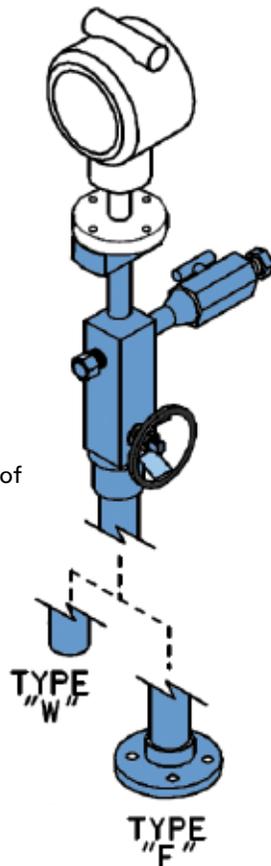
FEATURES

- Close-coupled mounting
- True process isolation with ¼ turn ball valves or gate valves
- Fire-safe valve meets API 607 4th Edition
- Supplied with plug as shown
- Designs up to 315°C (599°F)
- Any type of process connection available
- Transmitter or gauge can be mounted horizontally or vertically



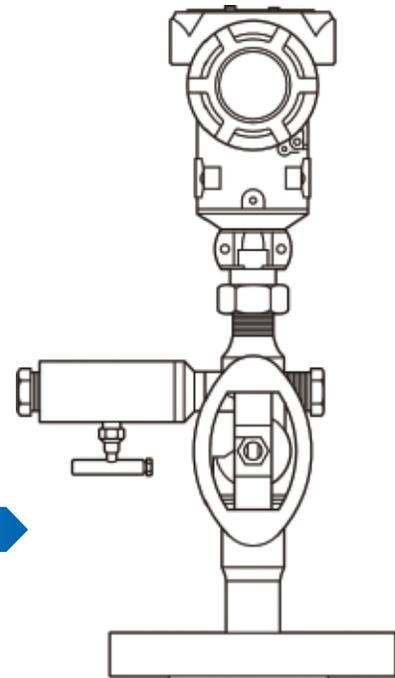
5505-05

I-flange connection (in lieu of threaded connection) for transmitter positioning



5571-00

With flange



TBV™ INSTRUMENT CONNECTION SYSTEMS

PRESSURE APPLICATIONS

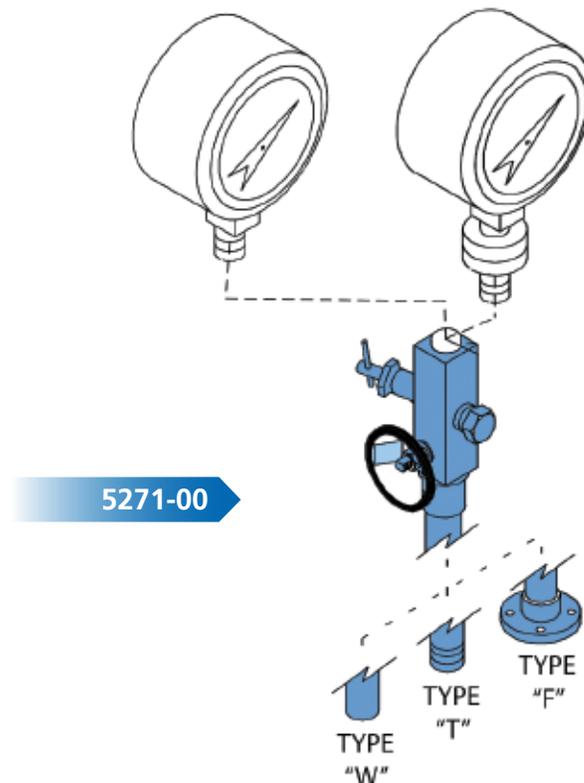
The TBV™ Instrument Connection System is a complete solution for pressure measurement. It can be combined with gauge applications.

FEATURES

- Manifold for drain / bleed / flush requirements included
- Close-coupled mounting
- True process isolation with ¼ turn ball valves
- Fire safe valve meets API 607 4th Edition
- Full port ball valve as block valve has an option port for testing or an additional gauge

BENEFITS

- Reduces installed costs
- Reduces design and engineering costs
- Improves ease of maintenance with streamlined design
- Reduces procurement costs



TBV™ INSTRUMENT CONNECTION SYSTEMS

LEVEL APPLICATIONS

The TBV™ Instrument Connection System is a complete solution for diaphragm seal measurement. It can be combined with diaphragm seals for applications where flushing/drainage of process fluid is desired.

FEATURES

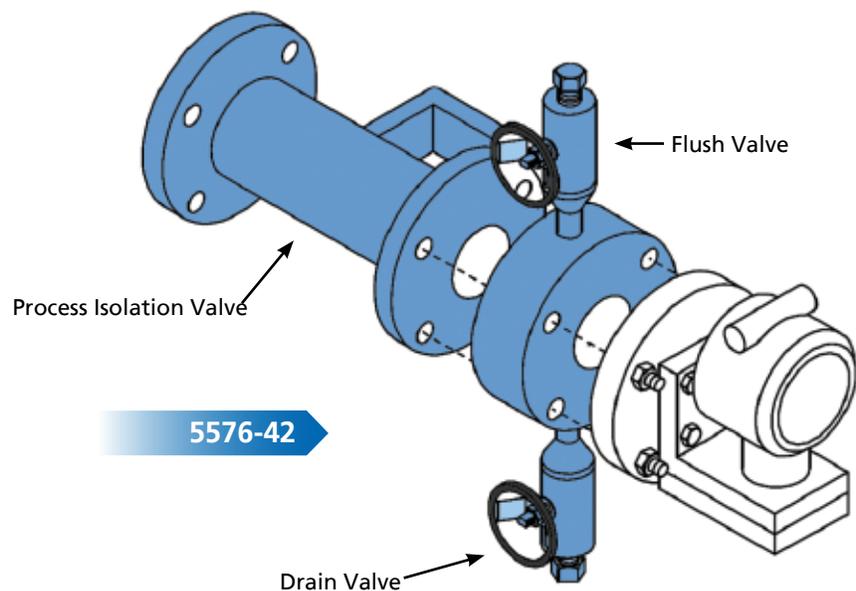
- Concentric or eccentric configurations available
- 1" through 4" ASME 150 -1500 flanges standard. Other options and sizes available
- Close-coupled mounting
- True process isolation with ¼ turn ball valves are available upon request
- Fire safe valve meets API 607 4th Edition
- Vent or flush/drain port standard



5576-42

BENEFITS

- Reduces installed costs
- Reduces design and engineering costs
- Streamlined design improves ease of maintenance
- Reduces procurement costs



5576-42

AFTERMARKET SERVICES



Cameron's Aftermarket Services' goal is to help our customers lower the total cost of valve ownership. To that end we offer a full range of services from over twenty-five Service Centers worldwide and can provide experienced personnel trained to meet the specific service requirements of each valve type.

Aftermarket Services

- Supplies replacement valves and parts:
 - Maintains a full inventory of new and reconditioned valves for immediate delivery
 - Provides factory warranty support for all Cameron OEM brands as well as service for most other valves
- Field Service & Technical Support
 - Field service technicians on call 24 hours a day 7 days a week to handle service issues wherever they arise
 - Provides equipment installation, field repairs, as well as track and perform scheduled maintenance
- Customer Property Repair
 - The Customer Property Repair program allows Cameron valve customers to store assets at our service centers throughout the world
 - Valves tracked in electronic database accessible through the Internet
- Remanufactured Products
 - Offers a broad range of API-compliant reconditioned equipment with fast delivery
- Total Valve Management
 - Supply and service automation and control packages
 - Assist with valve installation, commissioning and start-up



CERTIFICATIONS



TRADEMARK INFORMATION

TBV™ is a registered trademark which is owned by Cameron.

This document contains references to registered trademarks or product designations, which are not owned by Cameron.

Trademark	Owner
HASTELLOY	Haynes International, Inc.
MONEL	INCO Alloys International, Inc.



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