

## 2600T Series Pressure Transmitters

Models S264 and S364 Remote Seals  
for Smart Pressure Transmitters

---



## The Company

We are an established world force in the design and manufacture of instrumentation for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

The NAMAS Calibration Laboratory No. 0255(B) is just one of the ten flow calibration plants operated by the Company, and is indicative of our dedication to quality and accuracy.

EN ISO 9001: 1994



Cert. No. Q5907

ISO 9001: 2000



Cert. No. 9/90A



Cert. No. 0255

## Use of Instructions



### Warning.

An instruction that draws attention to the risk of injury or death.



### Note.

Clarification of an instruction or additional information.



### Caution.

An instruction that draws attention to the risk of damage to the product, process or surroundings.



### Information.

Further reference for more detailed information or technical details.

Although **Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it must be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process system performance leading to personal injury or death. Therefore, comply fully with all **Warning** and **Caution** notices.

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of Technical Communications Department, ABB.

### Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning labels on containers and packages must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given. Any deviation from these instructions, will transfer the complete liability to the user.
4. Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

---

# CONTENTS

---

<b>Section</b>	<b>Page</b>
INTRODUCTION .....	4
PRODUCT IDENTIFICATION .....	5
<b>INSTALLATION</b>	
LOCATING THE TRANSMITTER AND REMOTE SEALS .....	6
- FLOW MEASUREMENT .....	6
- LIQUID LEVEL MEASUREMENT .....	7
- INTERFACE LEVEL MEASUREMENT .....	11
- DENSITY MEASUREMENT .....	11
- GAUGE PRESSURE MEASUREMENT .....	12
- ABSOLUTE PRESSURE MEASUREMENT .....	12
MOUNTING THE TRANSMITTER .....	13
CONNECTING THE REMOTE SEALS .....	13
- WAFER REMOTE SEAL (S264W - S364W) .....	13
- CHEMICAL TEE REMOTE SEAL (S264C - S264C) .....	14
- FLANGED REMOTE SEAL - FLUSH AND EXTENDED (S264A/S3264A - S364A/S364E) ....	15
- OFF-LINE FLANGED CONNECTION REMOTE SEAL (S264M - S364M) .....	16
- REMOTE SEAL FOR UREA SERVICE (S264P) .....	17
- BUTTON TYPE REMOTE SEAL (S264P) .....	17
- UNION CONNECTION REMOTE SEAL (S264U - S364U) .....	19
- FLANGED REMOTE SEAL - RING JOINT (S264R - S364R) .....	21
- OFF-LINE THREADED CONNECTION SEAL (S264T - S364T) .....	22
- FOOD AND SANITARY REMOTE SEAL (S264S - S364S) .....	23
INSTALLING SPUDS AND SPECIAL CONNECTIONS .....	27
CONNECTING LOW SIDE COMPENSATING LEG ON A DP WITH ONE SEAL .....	30

## SUPPLEMENTARY DOCUMENTATION

SS/S264x and SS/364x Remote Seal Specifications
SS/264XD and SS/364DD Product Specifications
SS/264XR and SS/364XR Products Specifications
SS/264XG Products Specification
SS/264XP Products Specification
IM/2600T Pressure Transmitter Instruction Manuals
IM/364XS Pressure Transmitter Instruction Manual

# INTRODUCTION

## ABOUT THIS BOOK

This book provides instructions for installing the S264 and S364 diaphragm seals equipped transmitters. Instructions covering all aspects of the transmitters, which are not related to installation of the remote seals, are included in the transmitter instruction books.

## ABOUT REMOTE SEALS

The S264 and S364 Series Seal System is a protective device used to isolate transmitters from the process fluid. When used without diaphragm seals, these transmitters are generally connected to process piping or process vessel by impulse lines. The process fluid leaves its enclosure, fills the impulse lines, and enters the body of the transmitter. For certain applications, it is necessary to prevent the process fluid from leaving its enclosure. The seal system provides a flexible diaphragm seal between the process fluid and a liquid filled capillary tube connected to the body of the transmitter. The diaphragm isolates the process fluid while the filled capillary tube hydraulically transmits the process pressure to the transmitter body. Some reasons why an isolating seal is required are:

- The process fluid is highly corrosive. Remote seals offer a much wider choice of corrosion resistant materials compared to conventional transmitters.
- The process fluid has solids in suspension or is highly viscous and can clog impulse lines.

- The process fluid can solidify in impulse lines or inside the transmitter body.
- The process fluid is too hazardous to enter the control area where the transmitter is located.
- The process temperature exceeds the recommended maximum or minimum limits for the transmitter.
- The application is interface level or density measurement. Remote seals offer the required constant and equal specific gravity of the pressure transfer fluid on the high and low sides of the transmitter.
- The transmitter body must be located away from the process for easier maintenance.

The S264 and S364 series is available in a variety of seal element types. They provide process connection to ANSI or EN pipe flanges, wedge flow elements, chemical tees, and threaded pipe fittings. Extended diaphragm remote seals are suitable for connection to 2-inch, 3-inch or 4-inch flanged tank nozzles or flanged tees permit the seal diaphragm to be located flush with the inside of a tank or pipe. Sanitary and sanitary aseptic type seals meet the stringent requirements of sanitary food, dairy, pharmaceutical, and Biotech applications. All sanitary seals comply with 3A Sanitary Standard No. 74-02. These remote seal systems feature unique all welded construction (see in Figures 1 and 2). This construction assures reliable operation over a wide range of operating temperatures and pressures. It is especially important in preventing air leakages when the system is operating under vacuum conditions.

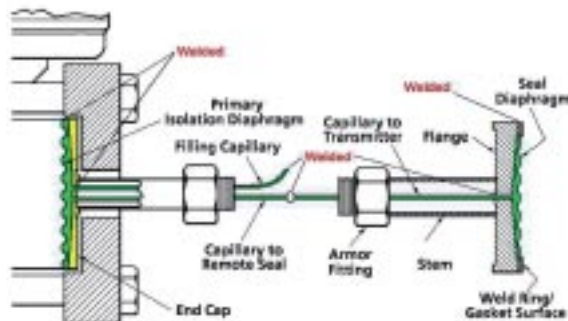


Fig. 1 - Cutaway view of the all welded remote seal system

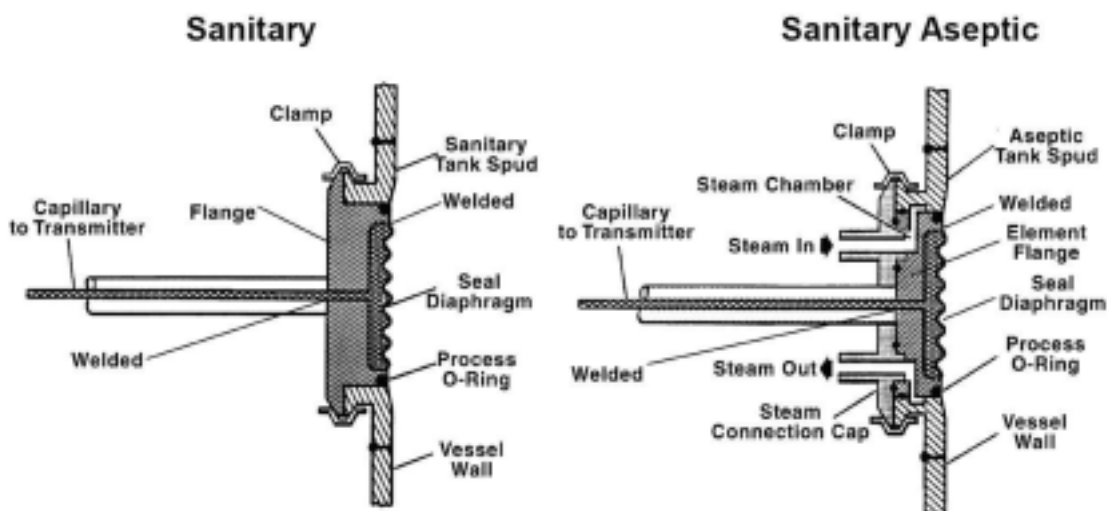


Fig. 2 - Cutaway view of sanitary and sanitary aseptic remote seals

---

## INTRODUCTION

---

### PRODUCT IDENTIFICATION

The S264 and S364 Series Seal Systems are available with a variety of remote seal constructions identified as follows:

- S264A and S364A – Flanged Remote Seals according to ASME
- S264C and S364C – Chemical Tee Remote Seals
- S264E and S364E – Flanged Remote Seals according to EN
- S264R and S364R – Flanged Remote Seals– Ring Joint
- S264S and S364S– Food and Sanitary Remote Seals
- S264T and S364T– Off-Line Threaded Connection Remote Seals
- S264M and S364M– Off-line Flanged Connection Remote Seal
- S264U and S364U – Union Connection Remote Seals
- S264W and S364W– Wafer Remote Seals
- S264P – Remote Seal(s) for Urea Service
- S264B – Button Type Remote Seal

The S264 and S364 Series Seal Systems are used on the following transmitters:

- 264xR / 264xD or 364xR / 364xD  
(where x means “any letter”)

Differential pressure transmitters have one or two remote seals. Single sided differential pressure transmitters have a single remote seal for tank level applications. Gauge and absolute pressure transmitters have a single remote seal. The transmitter and seal system are identified by product code numbers which are stamped on the transmitter nameplate. An example of the product code stamping is as follows:

**364DRGSRR031 / S364WHBCDFSBAS1NNN**  
Transmitter Product Code      Seal System Product Code

The characters which comprise these code numbers identify specific product features. A detailed explanation of the code numbers together with physical and performance specifications for both the transmitter and seal system is provided in the product specification sheets.

# INSTALLATION

## LOCATING THE TRANSMITTER AND REMOTE SEALS

This section provides guidelines for determining where to locate the transmitter and seals for specific applications. Proper location is an important factor in obtaining accurate measurements.

### General

The transmitters with remote seals are suitable for use on the following pressure and differential pressure measurement applications:

- FLOW MEASUREMENT
- LIQUID LEVEL MEASUREMENT
- INTERFACE LEVEL MEASUREMENT
- DENSITY MEASUREMENT
- GAUGE PRESSURE MEASUREMENT
- ABSOLUTE PRESSURE MEASUREMENT

Each application has certain unique requirements which influence the selection of the transmitter and seal locations. In general the flow and gauge pressure applications allow the greatest flexibility in selection of a location. Liquid level applications impose restrictions on the relative elevations of the transmitter and seals when the tank operates under vacuum and absolute pressure applications impose similar restrictions when the lower range value is less than atmospheric pressure (nominally 14.7 psia).

Transmitters with remote seals measure pressure from two sources; (1) the applied process pressure or differential pressure, and (2) the head pressure developed by the weight of the liquid column in the seal system. The head pressures are a function of transmitter and seal locations as follows:

- Two Seals – On a DP transmitter with a seal on both the high and low sides, the transmitter measures the head pressure resulting from any difference in elevation between the seals and the output change is directly proportional to the elevation difference. The head pressure has no effect on transmitter output when both seals are at the same elevation. Changing the elevation of the seals relative to the transmitter has no effect as long as the elevation of one seal relative to the other is not changed.
- One Seal – On a transmitter with one seal, the head pressure from the seal system is measured directly. Any change in the elevation of the seal causes a change in the measured head pressure and the transmitter output changes in direct proportion to the elevation change.

Note: when handling and/or installing the transmitter with remote seal(s), please consider that the minimum bending radius of the capillary system is 10 cm (3.9 in).

For most flow, gauge pressure, and absolute pressure installations the effect of head pressure is relatively minor and can be canceled out by adjusting zero with the transmitter and seals in their installation position while a known process pressure is applied. For liquid level installations, head pressures have a more significant impact on calibration requirements because the nature of the installation requires a substantial difference in elevation between the high and low side seals. See the **Liquid Level Measurement Section** for more information.

## FLOW MEASUREMENT

Differential pressure transmitters with two remote seals can be used for both horizontal and vertical flow measurement installations. By mean of a Wedge Flow Element (see Figure 3). In both horizontal and vertical installations, the transmitter can be placed in any convenient location either above or below the elevation of the seal elements.

The high side seal element must be located on the upstream side of the flow restriction. To ensure accurate measurements on liquid flow applications, the flow restriction must be located in a section of the pipe line which remains full under all flow conditions.

### Horizontal Installation

In a horizontal installation both seal elements are at the same elevation and head pressures resulting from the filling liquid are equal on the high and low side of the transmitter. Thus, the transmitter calibration can be zero based for this installation. If the process contains suspended solids, the seal elements should be located at the top of the pipe to avoid collection of solid material on the seal diaphragm surfaces.

### Vertical installation

In a vertical installation, the elevation difference between the two seals applies a differential pressure when there is no flow. When the pipe is full at no flow the initial differential is a function of the distance between the seals and the difference in density between the process liquid and the fill liquid.



Fig. 3 - Flow measurement

---

## INSTALLATION

---

### LIQUID LEVEL MEASUREMENT

A differential pressure transmitter with either one or two remote seals can be used for liquid level measurement on open tanks, closed tanks operating at pressures above atmospheric and closed tanks operating under vacuum.

#### Measurement Reference

Liquid level measurements are based on the height of a process liquid column with respect to predefined measurement reference points on the transmitter. The transmitter has three datum lines as follows:

- Primary Datum Line – Located at the center of the seal system connection to the transmitter body.
- High Seal Datum Line – Located at the center of the high side seal diaphragm.
- Low Seal Datum line – Located at the center of the low side seal diaphragm.

#### Open Tank Installation

A transmitter with one remote seal can be used for open tank level measurement (see Figure 4).

The seal is on the high side of the transmitter, and the seal element must be located near the bottom of the tank so that the high seal datum line is at or below the minimum level. The transmitter can be located either above or below the seal element. The low side of the transmitter must be vented to atmosphere.

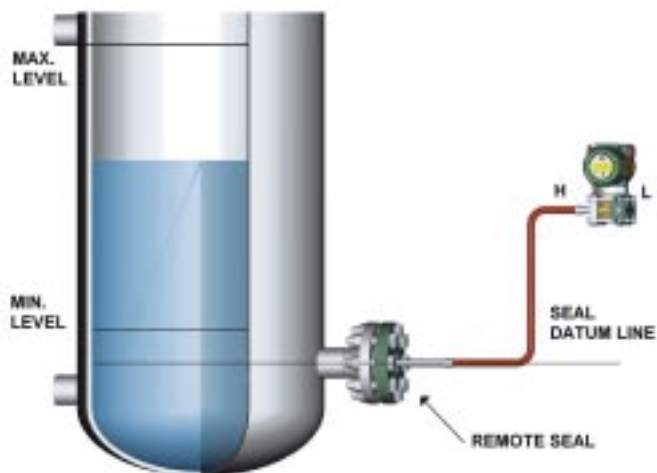


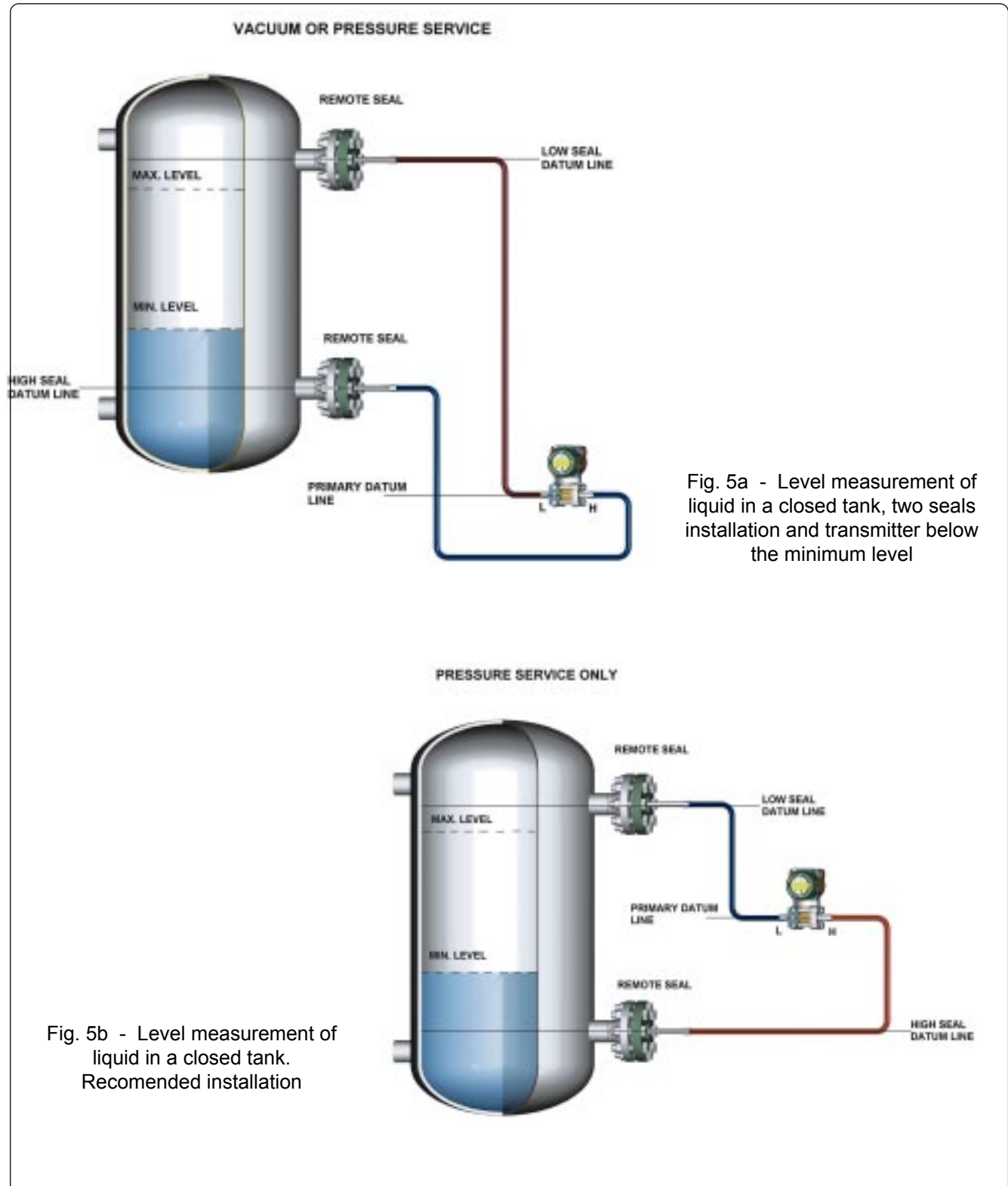
Fig. 4 - Level measurement of a liquid in an open tank

# INSTALLATION

## Closed Tank Installation – Pressure Service

- Double Seal  
When a transmitter with two remote seals is used to measure level in a pressurized tank (see Figure 5a and 5b), the high-pressure side seal element must be located near the bottom of the tank.  
The high seal datum line must be at or below the minimum level. The low side seal must be located near the top of the tank, and the low seal datum line must be at or above the maximum level.

The transmitter can be located between the seals, above both seals or below both seals on a pressure service installation. The preferred location is mid way between the seal elements (see Figure 5b). This location minimizes the required capillary length, and usually provides the most uniform distribution of ambient temperatures across the capillary length.





## INSTALLATION

- Single Seal

When a transmitter with one seal is used to measure level in a pressurized tank, a compensating leg must be connected between the vapor space at the top of the tank and the low side of the transmitter (see Figures 6a, 6b, 7a, 7b and 8). The remote seal is on the high side of the transmitter, and the seal element must be located near the bottom of the tank so that the high seal datum line is at or below the minimum level.

If the process vapor is not readily condensable, or if the compensating leg is at a higher temperature than the tank interior, a dry leg can be used (see Figure 6a and 6b). A trap installed at the bottom of the leg minimizes the possibility of condensate collecting in the transmitter body.

When the process vapor is condensable, a wet leg is recommended. The wet leg is filled with a suitable liquid to maintain a constant pressure on the low side of the transmitter (see Figures 7a and 7b). This approach avoids the problem of process vapor condensing and collecting in the compensating leg resulting in serious measurement error. The leg can be filled with process liquid or any liquid with a low vapor pressure relative to the process. A filling tee is required at the top of the leg. The wet leg can be avoided if the transmitter can be located near the top of the tank (see Figure 8), so that condensate drains back into the tank.

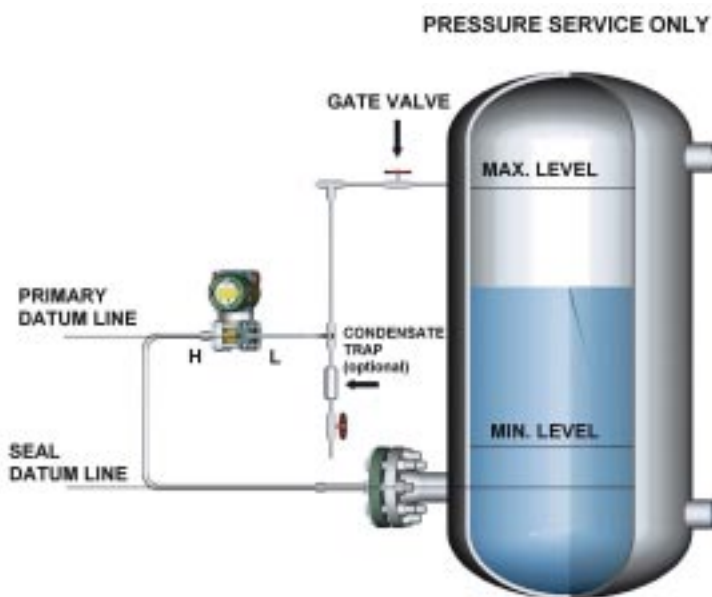


Fig. 6a - Level measurement of liquid in a closed tank. Transmitter installed above the minimum level with one seal and dry leg

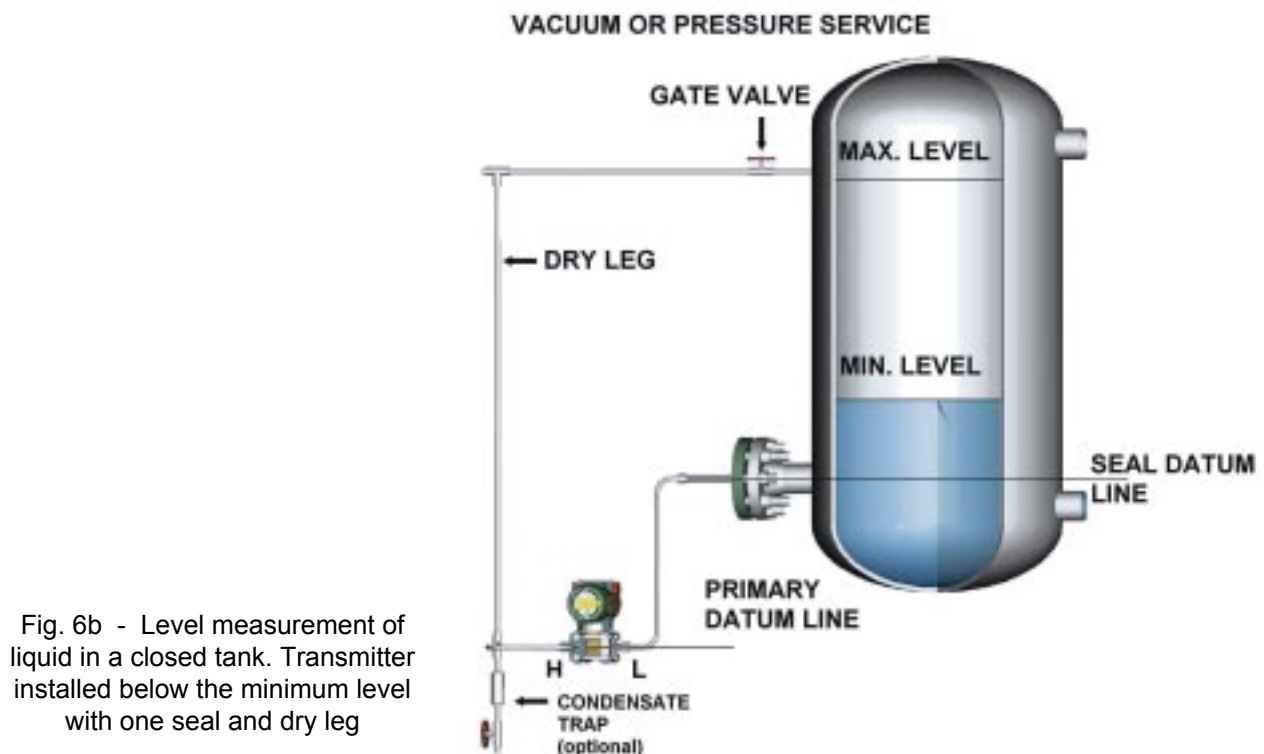
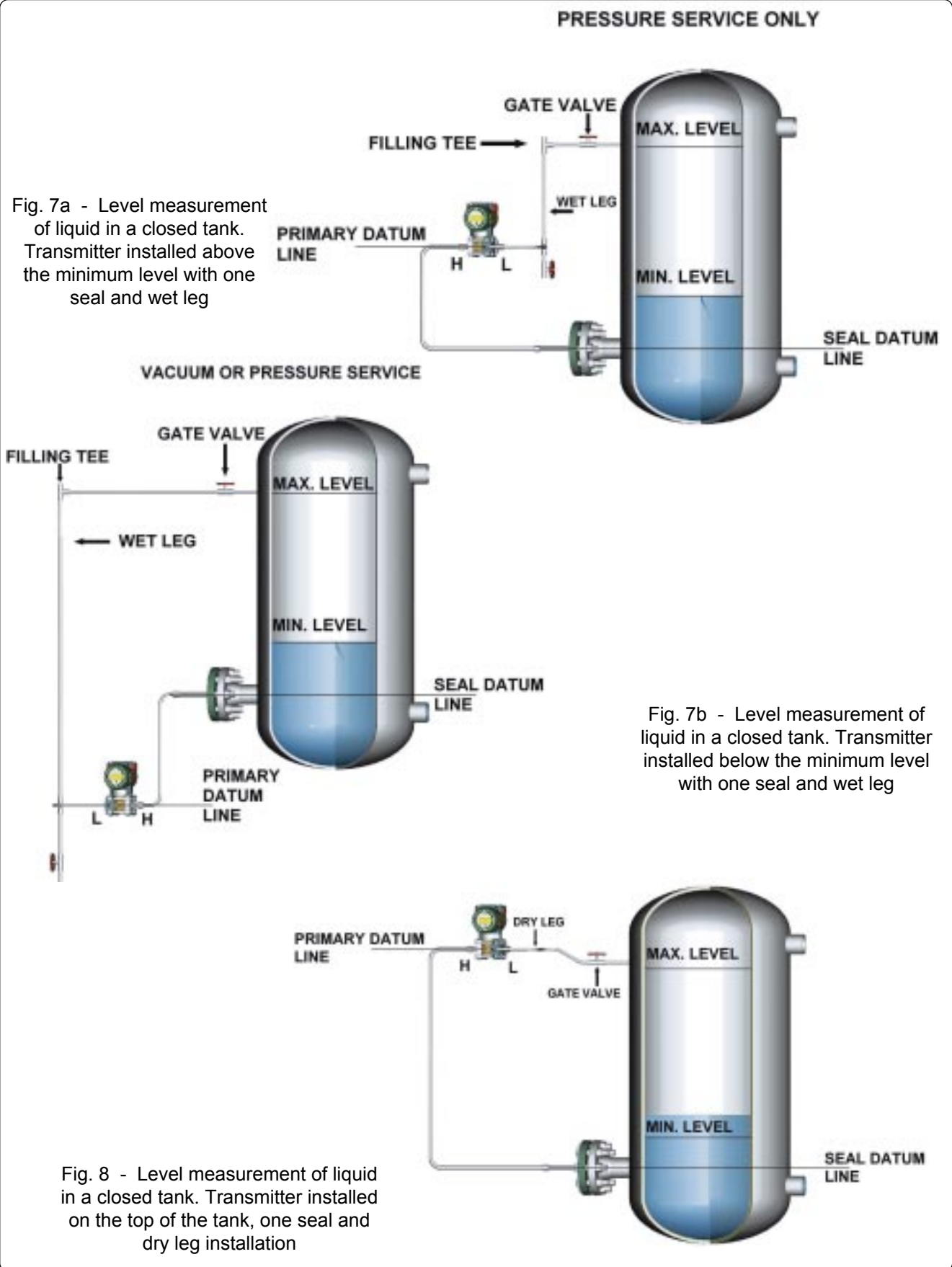


Fig. 6b - Level measurement of liquid in a closed tank. Transmitter installed below the minimum level with one seal and dry leg

# INSTALLATION

## Closed Tank Installation – Vacuum Service

When the transmitter is used on a tank in which the operating pressure range includes pressures below atmospheric, it is essential that the transmitter be located below the high-pressure seal datum line (see Figures 5a and 5b for two seal installations, Figures 6a, 6b, 7a and 7b for one seal installation). The recommended minimum distance between the primary datum line and the high seal datum line is 1ft (0.3m). Seal element location requirements for vacuum service are the same as for pressure service.



## INSTALLATION

### Calibration Requirements

The location of the high side seal near the bottom of the tank and the low seal near the top of the tank provides increasing transmitter output for increasing liquid level. The actual differential pressure applied to the transmitter is maximum when the process level is minimum due to the elevation difference between the seals. As the tank fills, the process liquid tends to cancel the initial seal system head pressure and the measured differential pressure is minimum when the level reaches its maximum value. Note also that the maximum differential is applied from the low side because the low seal has the higher elevation.

To accommodate the head pressure conditions imposed by a liquid level installation, the transmitter zero must be adjusted to elevate the output. This cancels the effect of the low side head pressure and provides zero percent output for the minimum level condition. For example, the range values for a level installation might be -120 to -5 inches of water. This indicates that the level change (span) is 115 inches of water, the differential at minimum level is -120 and at maximum level is -5 inches of water.

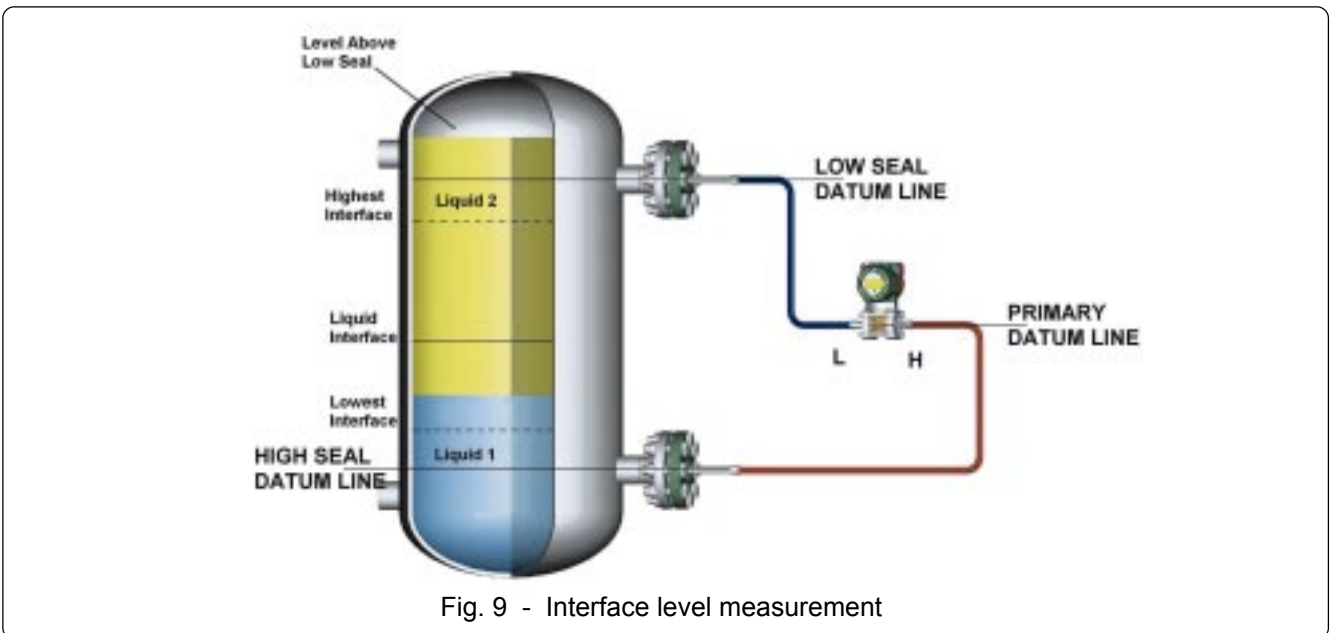
The minus sign indicates positive differential pressures applied to the low side of the transmitter.

Determination of the span and range values for a specific installation must take into account the level change, elevation difference between the seals, height of the process liquid above the high seal datum line at minimum level, and the specific gravity of the process liquid and the fill liquid in the seal system.

### INTERFACE LEVEL MEASUREMENT

A differential pressure transmitter with two remote seals can be used to measure interface level (see Figure 9). The high side seal element must be located near the bottom of the tank. The high seal datum line must be at or below the lowest interface elevation. The low side seal must be located near the top of the tank, and the low seal datum line must be at or above the highest interface elevation. The minimum level of liquid in the tank must be above the low seal element under all interface conditions.

The transmitter can be located between the seals, above both seals or below both seals when the tank is open or operating under positive pressure. The preferred location for 264DL the transmitter is directly mounted on the bottom connection (see Figure 10). This location enables the user to eliminate the capillary and consequently allows a more accurate measurement. If the operating pressure range includes pressures below atmospheric, the transmitter must be located below the high side seal (refer to the vacuum service information in **Liquid Level Measurement Section**).



### DENSITY MEASUREMENT

A differential pressure transmitter with two remote seals can be used to measure liquid density or specific gravity (see Figure 10). The high side seal element must be located near the bottom of the tank, and the low side seal must be located near the top of the tank. The minimum level of liquid in the tank must be above the low seal element under all density conditions.

The transmitter can be located between the seals, above both seals or below both seals when the tank is open or operating under positive pressure. The preferred location is mid way between the seal elements. This location minimizes the required capillary length, and usually provides the most uniform distribution of ambient temperatures across the capillary length. If the operating pressure range includes pressures below atmospheric, the transmitter must be located below the high side seal (refer to the vacuum service information in **Liquid Level Measurement Section**).

## INSTALLATION

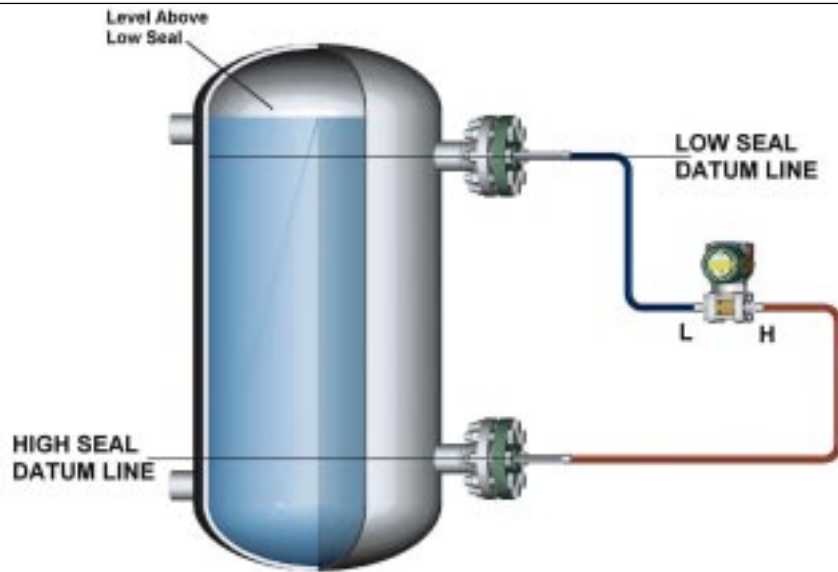


Fig. 10 - Density or specific gravity measurement

### GAUGE PRESSURE MEASUREMENT

A gauge pressure transmitter with a remote seal can be used for measurement of pressure in either a process pipe or tank (see Figure 11).

Locate the remote seal in the side or top of the pipe to avoid collection of sediment on the seal diaphragm.

#### Pressure Service

When the operating pressure range has a minimum value above atmospheric pressure (0 psig), the transmitter can be placed in any convenient location, either at the same elevation as the remote seal, above the seal, or below the seal.

#### Vacuum Service

When the operating process pressure range includes pressures below atmospheric, it is essential that the transmitter be located below the elevation of the seal element to ensure that the pressure in the transmitter body is always greater than 0 psia. The recommended minimum distance between the transmitter datum line and the seal datum line is 1ft (0.3m).

### ABSOLUTE PRESSURE MEASUREMENT

An absolute pressure transmitter with a remote seal can be used for measurement of absolute pressure in either a process pipe or tank (see Figure 11). Locate the seal element in the side or top of the pipe to avoid collection of sediment on the seal diaphragm.

When the operating absolute pressure range has a minimum value above atmospheric pressure (nominally 14.7 psia), the transmitter can be placed in any convenient location, either at the same elevation as the remote seal, above the seal, or below the seal.

When the pressure range includes pressures below atmospheric, the transmitter datum line must be below the elevation of the seal element to ensure that the pressure in the transmitter body is always greater than 0 psia. The recommended minimum distance between the transmitter datum line and the seal datum line is 1ft (0.3m)

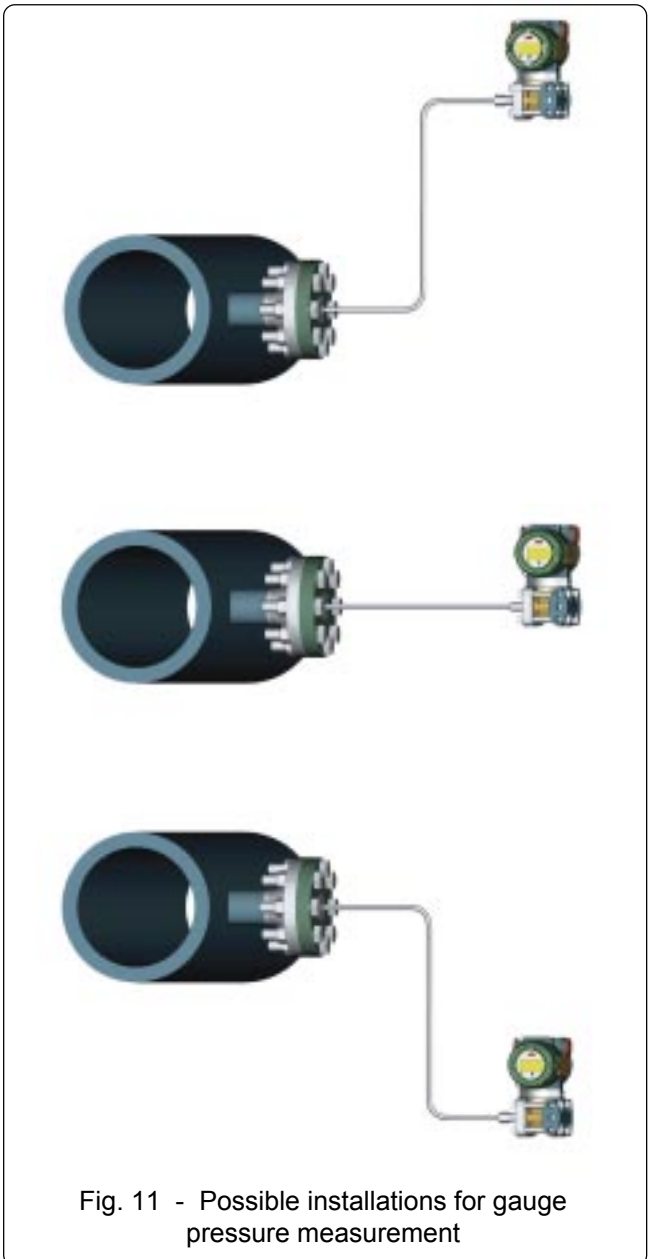


Fig. 11 - Possible installations for gauge pressure measurement

## INSTALLATION

### MOUNTING THE TRANSMITTER

The transmitter with remote seals can be mounted on a 2-inch (60 mm) horizontal or vertical pipe using the optional pipe mounting bracket available with all 2600T series transmitters. Refer to all the documents listed on page 3 "Supplementary documentation" for mounting information.

### CONNECTING THE REMOTE SEALS

#### Wafer Remote Seal (S264W or S364W)

The wafer remote seal is designed to be clamped between two ANSI or EN raised face flanges. The diaphragm side of the seal faces the process flange and a back-up flange is used on the other side of the seal. The S264W or S364W wafer seals can be used with: ANSI CL150, CL300, CL600, CL900 or CL1500 flanges as well as with EN DN 10-40, DN64-160. Mounting dimensions for the wafer remote seal (see Figure 12).

The required back-up flange can be supplied by the user, or it can be obtained as an option with the seal system. Bolts, nuts, and a flange gasket must be supplied by the user.



**Note.** In case of DP style transmitter with one remote seal, please refer to "Liquid Level Measurement" Section.

Connect the seal element as follows:

1. Remove protective covering from seal.
2. Install a gasket between the process flange and the seal element gasket surface.
3. Clamp the seal between two flanges (see Figure 12). Be sure that the gasket is properly positioned between the process flange and the seal element gasket surface.
4. Tighten bolts firmly and uniformly in accordance with standard industrial flange bolting practices.

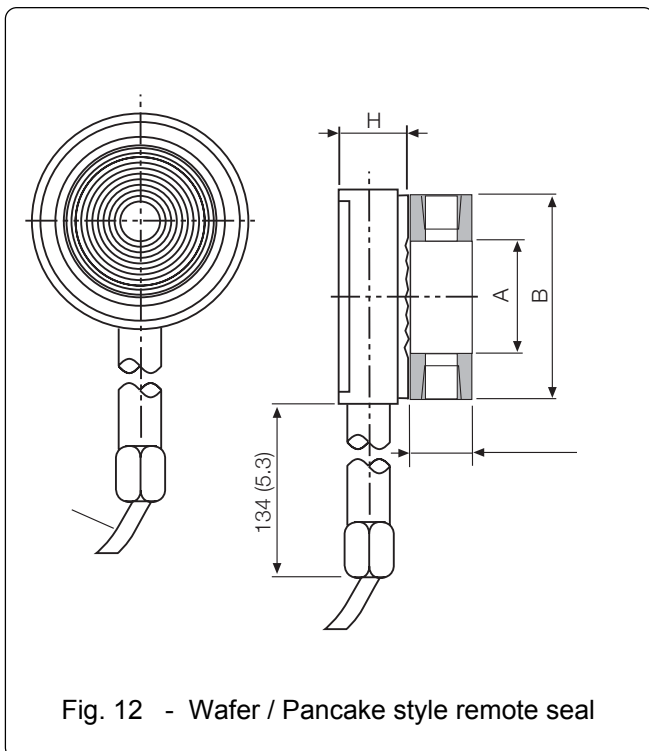


Fig. 12 - Wafer / Pancake style remote seal



Size	DIMENSIONS mm (in)			
	A (dia)	A Flushing ring internal dia	B (dia)	H
1 1/2in	47 (1.85)	52 (2.05)	73 (2.87)	23 (0.9)
2in	60 (2.36)	62 (2.44)	92 (3.62)	23 (0.9)
3in	89 (3.5)	92 (3.62)	127 (5)	23 (0.9)
DN 40	47 (1.85)	52 (2.05)	88 (3.46)	23 (0.9)
DN 50	60 (2.36)	62 (2.44)	102 (4.02)	23 (0.9)
DN 80	89 (3.5)	92 (3.62)	138 (5.43)	23 (0.9)

# INSTALLATION

## Chemical Tee Remote Seal (S264C and S364C)



### Caution.

The pressure limit for a transmitter with this remote seal is determined by the seal flange. Maximum working pressure for the flange is 300 psi (2000 kPa)

The chemical tee remote seal is designed to connect to a 1630L Wedge Flow Element or to any process fitting with appropriate mating surfaces (see Figure 13 for mounting dimensions).

Chemical tee elements cannot be connected to a standard ANSI or DIN pipe flange.

The gaskets required to connect the seal are available with the seal element system. The gasket material can be either PTFE with silica filler which has a maximum operating temperature rating of 400°F (204°C), or Type 316SST which has a maximum rating of 645°F (341°C). Note that the operating temperature limit for the seal can be lower than the gasket temperature limit because of fill fluid limitations (refer to the fill fluid parameter table in the **Specification Sheet**). The eight cap screws required to connect each seal are supplied with the wedge flow element. These gaskets and bolts have been specifically selected to meet the sealing and pressure rating requirements of the chemical tee element. **Substitution of user supplied bolts and gaskets is not recommended.**



**NOTE:** If the transmitter is a DP with one remote seal for liquid level measurement, refer to Section "Connecting the Low Side Compensating". Leg on DP with One Seal before connecting the seal.

Connect the seal as follows:

1. Remove protective covering from seal.
2. Place the gasket on sealing surface and insert seal into connection opening.
3. Insert 8 cap screws and finger tighten each screw.
4. Following a diagonal sequence, tighten each cap screw to a torque of 110 inch-lbs (12.4 Nm).

If you experience a large Zero shift due to temperature change or erratic output:

1. Take the chemical tee seals and mount them face up several feet above the transmitter.
2. Wait an hour.
3. With your thumbs at the "9 o'clock and 3 o'clock" positions on a single diaphragm, lightly apply thumb pressure alternating right thumb/left thumb. As you press with the right, the left side of the diaphragm should rise evenly.
  - If it does not rise then there is a lack of fill. **Replace the seal.**
  - If it rises and then snaps (like an oil can) then the diaphragm has been stressed. **Replace the seal.**
4. Lightly tap the diaphragms with the flat part of your fingernail. A dull thud is heard when fill is behind the diaphragm.
  - If there is air present, the sound will be "Tinny". **Replace the seal.**

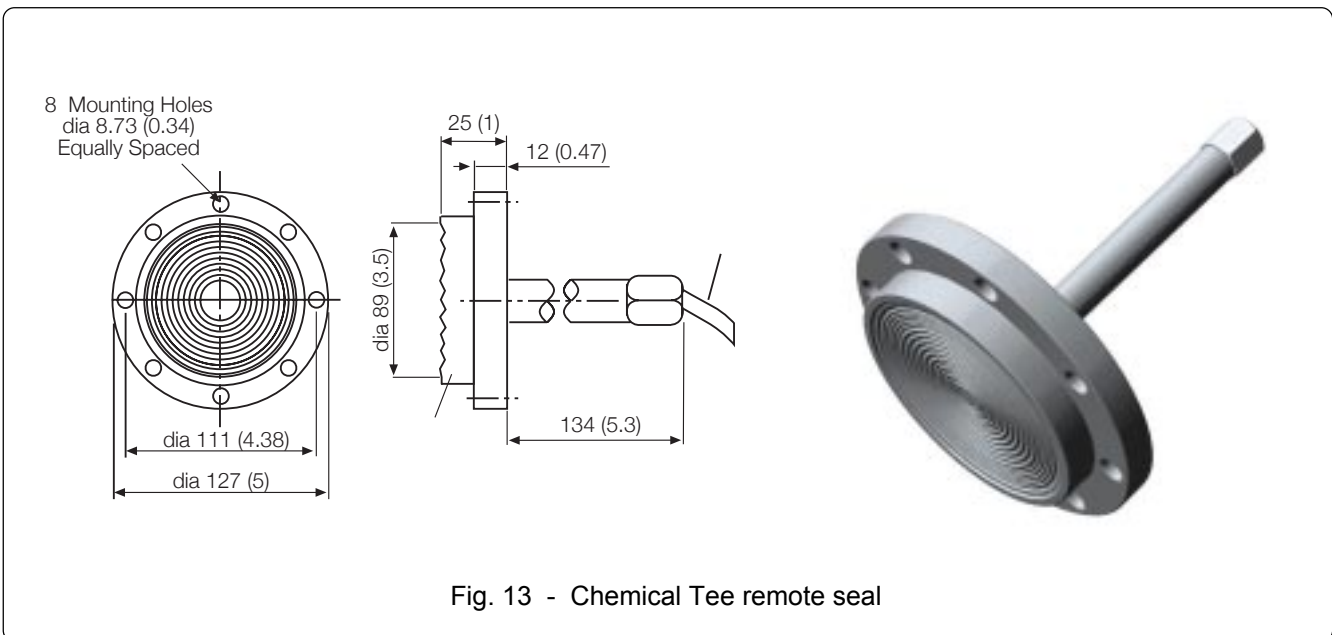


Fig. 13 - Chemical Tee remote seal

# INSTALLATION

## Flanged Remote Seal – Flush and Extended (S264A / S264E or S364A / S364E)

The extended and flush diaphragm remote seal is designed to connect to flanged pipe fitting, according to ASME (modd. S264A or S364A ) or EN 1092 (modd. S264E or S364E). For liquid level measurement installations the seal connects to an ASME or EN flanged tank nozzle. The sealing is provided by a selectable smooth or serrated gasket seat surface finish.

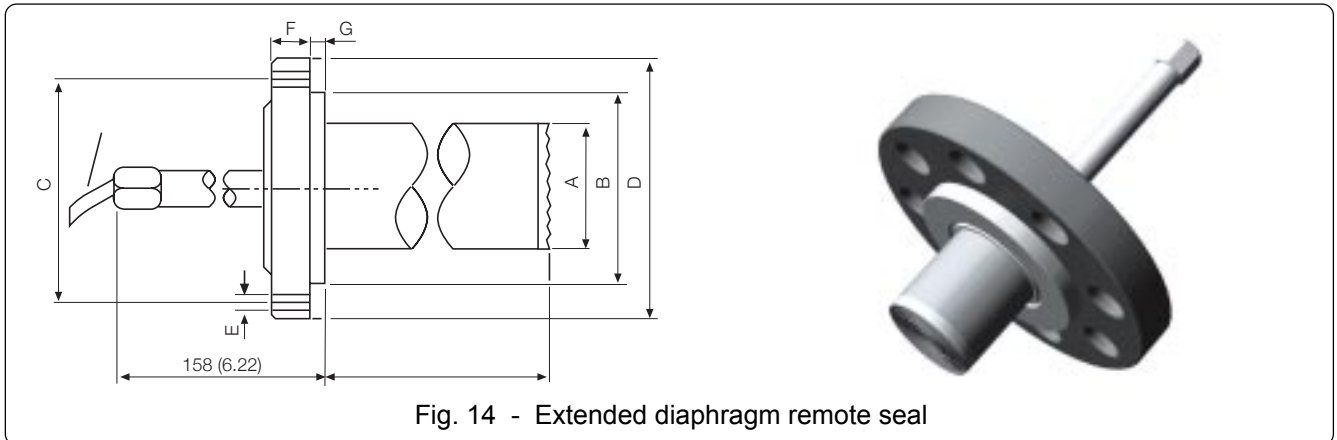


Fig. 14 - Extended diaphragm remote seal

Size/Rating	Dimensions mm (in)									N° of holes
	A (dia)			B (dia)	C (dia)	D (dia)	E (dia)	F	G	
	extended diaphragm	flush diaphragm	flushing ring internal dia							
2in ASME CL 150	48 (1.9)	60 (2.36)	62 (2.44)	92 (3.62)	120.65 (4.75)	152.4 (6)	20 (0.79)	19.05 (0.75)	9.5 (0.37)	4
2in ASME CL 300	48 (1.9)	60 (2.36)	62 (2.44)	92 (3.62)	127 (5)	165.1 (6.5)	20 (0.79)	22.35 (0.88)	9.5 (0.37)	8
2in ASME CL 600	NA	60 (2.36)	62 (2.44)	92 (3.62)	127 (5)	165.1 (6.5)	20 (0.79)	25.4 (1)	9.5 (0.37)	8
2in ASME CL 900	NA	60 (2.36)	62 (2.44)	92 (3.62)	165 (6.5)	215.9 (8.5)	26 (1.02)	38.1 (1.5)	9.5 (0.37)	8
2in ASME CL 1500	NA	60 (2.36)	62 (2.44)	92 (3.62)	165 (6.5)	215.9 (8.5)	26 (1.02)	38.1 (1.5)	9.5 (0.37)	8
3in ASME CL 150	72 (2.83)	89 (3.5)	92 (3.62)	127 (5)	152.4 (6)	190.5 (7.5)	20 (0.79)	23.87 (0.94)	9.5 (0.37)	4
3in ASME CL 300	72 (2.83)	89 (3.5)	92 (3.62)	127 (5)	168.15 (6.62)	209.55 (8.25)	22 (0.86)	28.44 (1.12)	9.5 (0.37)	8
3in ASME CL 600	NA	89 (3.5)	92 (3.62)	127 (5)	168.15 (6.62)	209.55 (8.25)	22 (0.86)	31.75 (1.25)	9.5 (0.37)	8
3in ASME CL 900	NA	89 (3.5)	92 (3.62)	127 (5)	190.5 (7.5)	241 (9.48)	26 (1.02)	38.1 (1.50)	9.5 (0.37)	8
3in ASME CL1500	NA	89 (3.5)	92 (3.62)	127 (5)	203.2 (8)	266.7 (10.5)	31.75 (1.25)	47.8 (1.88)	9.5 (0.37)	8
4in ASME CL 150	94 (3.7)	89 (3.5)	92 (3.62)	157.2 (6.2)	190.5 (7.5)	228.6 (9)	20 (0.79)	24 (0.94)	9.5 (0.37)	8
4in ASME CL 300	94 (3.7)	89 (3.5)	92 (3.62)	157.2 (6.2)	200.2 (7.88)	254 (10)	22 (0.86)	32 (1.26)	9.5 (0.37)	8

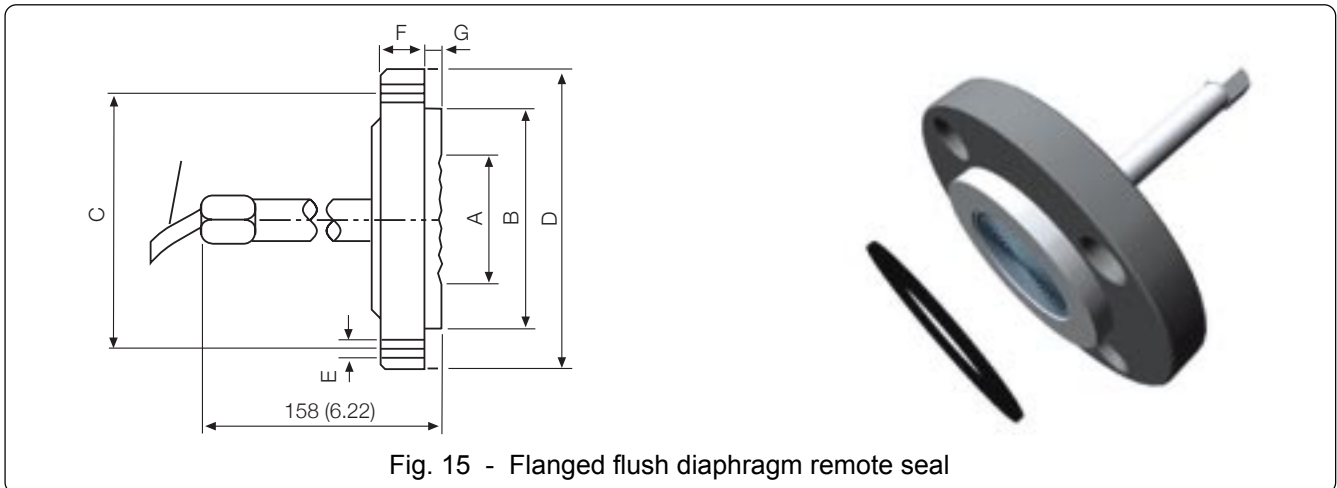


Fig. 15 - Flanged flush diaphragm remote seal

Size/Rating	Dimensions mm (in)									N° of holes
	A (dia)			B (dia)	C (dia)	D (dia)	E (dia)	F	G	
	extended diaphragm	flush diaphragm	flushing ring internal dia							
DN50 EN PN16	48 (1.9)	60 (2.36)	62 (2.44)	102 (4.02)	125 (4.92)	165 (6.5)	18 (0.71)	20 (0.79)	9.5 (0.37)	4
DN50 EN PN40	48 (1.9)	60 (2.36)	62 (2.44)	102 (4.02)	125 (4.92)	165 (6.5)	18 (0.71)	20 (0.79)	9.5 (0.37)	4
DN50 EN PN63	NA	60 (2.36)	62 (2.44)	102 (4.02)	135 (5.31)	180 (7.08)	22 (0.86)	26 (1.02)	9.5 (0.37)	4
DN50 EN PN100	NA	60 (2.36)	62 (2.44)	102 (4.02)	145 (5.71)	195 (7.67)	26 (1.02)	28 (1.1)	9.5 (0.37)	4
DN80 EN PN16	72 (2.83)	89 (3.5)	92 (3.62)	138 (5.43)	160 (6.3)	200 (7.87)	18 (0.71)	20 (0.79)	9.5 (0.37)	8
DN80 EN PN40	72 (2.83)	89 (3.5)	92 (3.62)	138 (5.43)	160 (6.3)	200 (7.87)	18 (0.71)	24 (0.94)	9.5 (0.37)	8
DN80 EN PN63	NA	89 (3.5)	92 (3.62)	138 (5.43)	170 (6.7)	215 (8.46)	22 (0.86)	28 (1.1)	9.5 (0.37)	8
DN80 EN PN100	NA	89 (3.5)	92 (3.62)	138 (5.43)	180 (7.08)	230 (9.05)	26 (1.02)	32 (1.26)	9.5 (0.37)	8
DN100 EN PN16	94 (3.7)	89 (3.5)	92 (3.62)	158 (6.22)	180 (7.08)	220 (8.66)	18 (0.71)	20 (0.79)	9.5 (0.37)	8
DN100 EN PN40	94 (3.7)	89 (3.5)	92 (3.62)	162 (6.38)	190 (7.48)	235 (9.25)	22 (0.86)	24 (0.94)	9.5 (0.37)	8

## INSTALLATION

### Off-Line Flanged Connection Remote Seal (S264M or S364M)

The off-line flanged connection remote seals are designed to connect directly to ASME or EN flanged tank nozzles. These elements are available with a flushing connection in the lower housing, selectable on request.

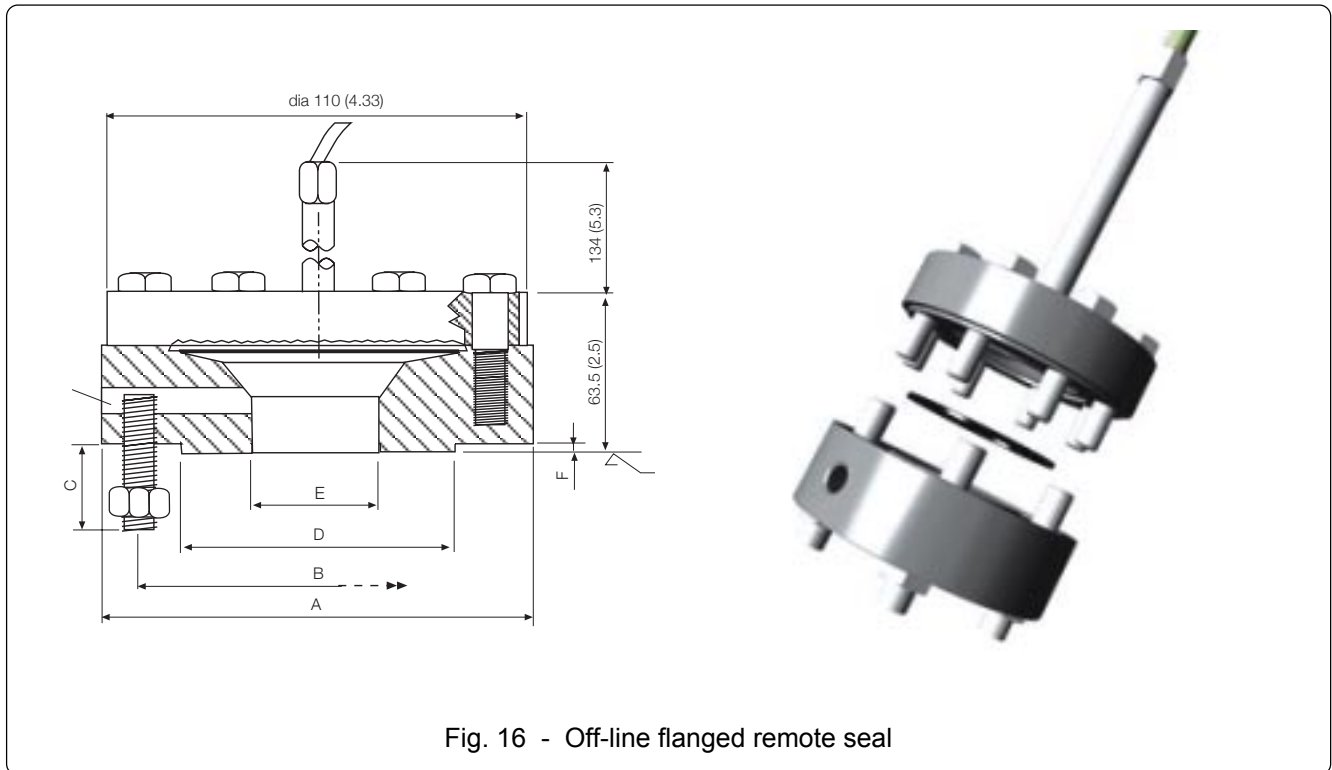


Fig. 16 - Off-line flanged remote seal

Connection		Dimensions mm (in)						
Size	Standard	A (dia)	B (dia)	C (4 studs)		D (dia)	E (dia)	F
				Length	Thread			
1/2in	ASME CL 150	110 (4.33)	60.5 (2.38)	39 (1.53)	1/2in - 13 UNC	35.1 (1.38)	15.8 (0.62)	1.6 (0.06)
	ASME CL 300	110 (4.33)	66.5 (2.62)	39 (1.53)	1/2in - 13 UNC			
1in	ASME CL 150	110 (4.33)	79.4 (3.12)	39 (1.53)	1/2in - 13 UNC	50.8 (2)	26.7 (1.05)	1.6 (0.06)
	ASME CL 300	124 (4.88)	88.9 (3.5)	51 (2)	5/8in - 11 UNC			
1 1/2in	ASME CL 150	127 (5)	98.4 (3.87)	39 (1.53)	1/2in - 13 UNC	73 (2.87)	41 (1.61)	1.6 (0.06)
	ASME CL 300	155 (6.1)	114.3 (4.5)	57 (2.24)	3/4in - 10 UNC			
DN 25	EN PN 16-40	115 (4.52)	85 (3.34)	42 (1.65)	M12	68 (2.67)	28.5 (1.12)	2 (0.07)
DN 40	EN PN 16-40	150 (5.9)	110 (4.33)	48 (1.89)	M16	88 (3.46)	43.1 (1.69)	3 (0.12)



# INSTALLATION

## Remote Seal(s) for Urea Service (S264P)

These remote seals are designed to be connected to some specific kinds of processes involving:

- high pressure rates
- aggressive process liquids (such as ammonia, melamine, urea and other reaction substances).

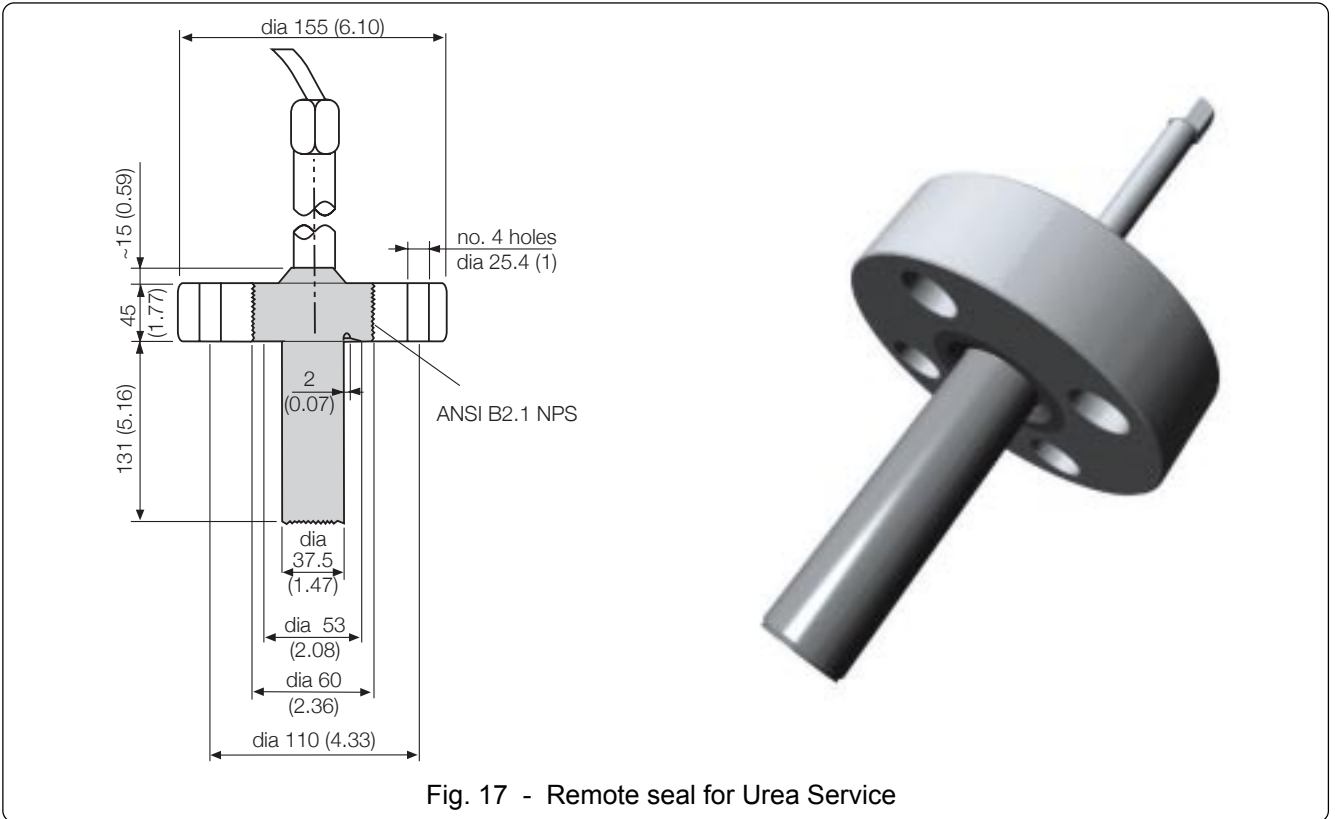


Fig. 17 - Remote seal for Urea Service

## Button Type Remote Seal (S264B)

This remote seal is designed to connect to a process via the NPT threaded connection or to match pipe fitting with an interface suitable for the provided mating flange. The button seals, thanks to their accurate design, are projected to carry out measurements with medium/high calibrated span. The button type remote seal is to be used only for gauge pressure measurement.

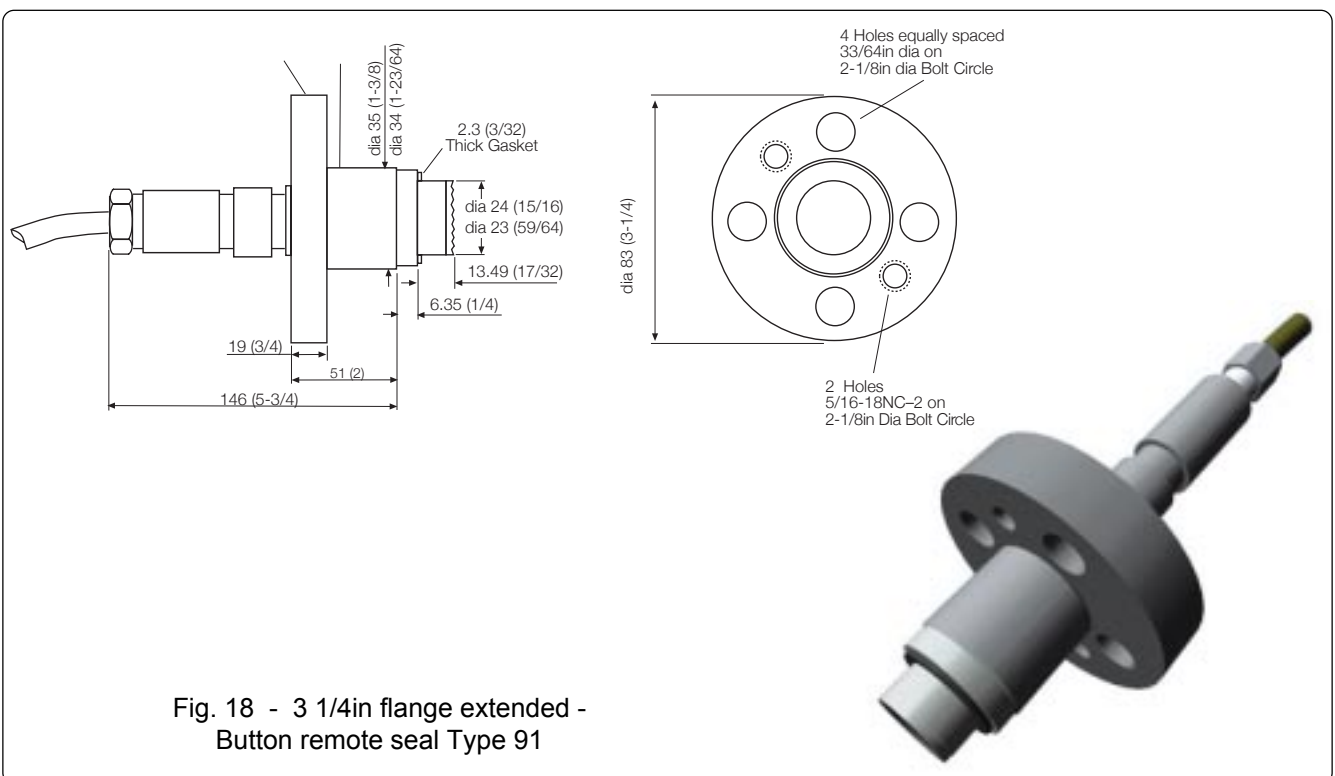
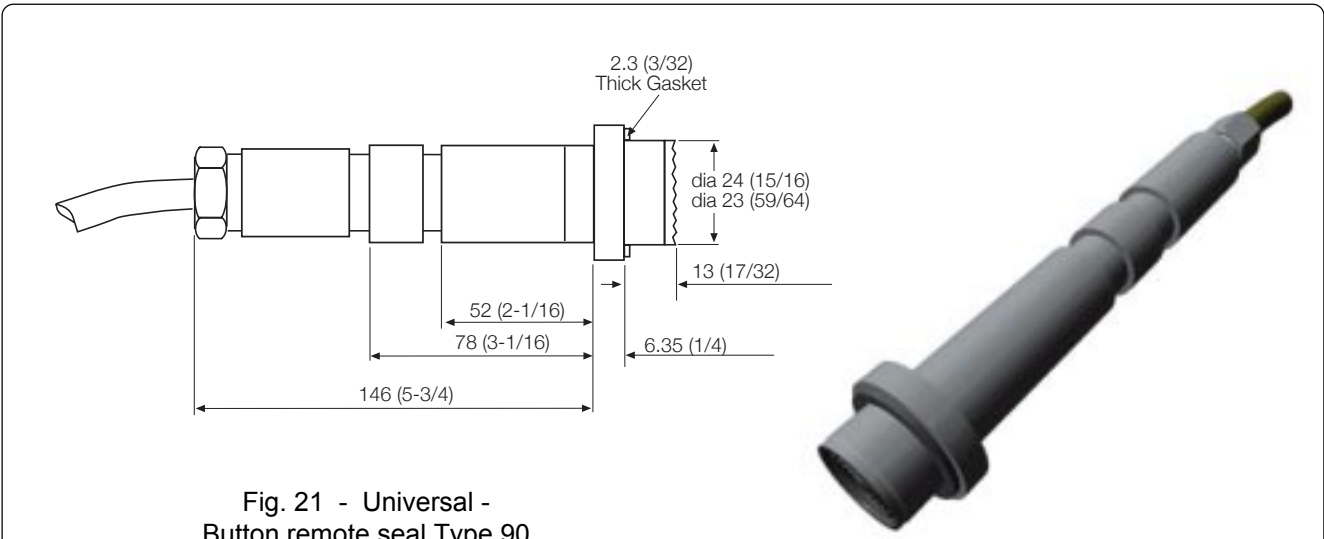
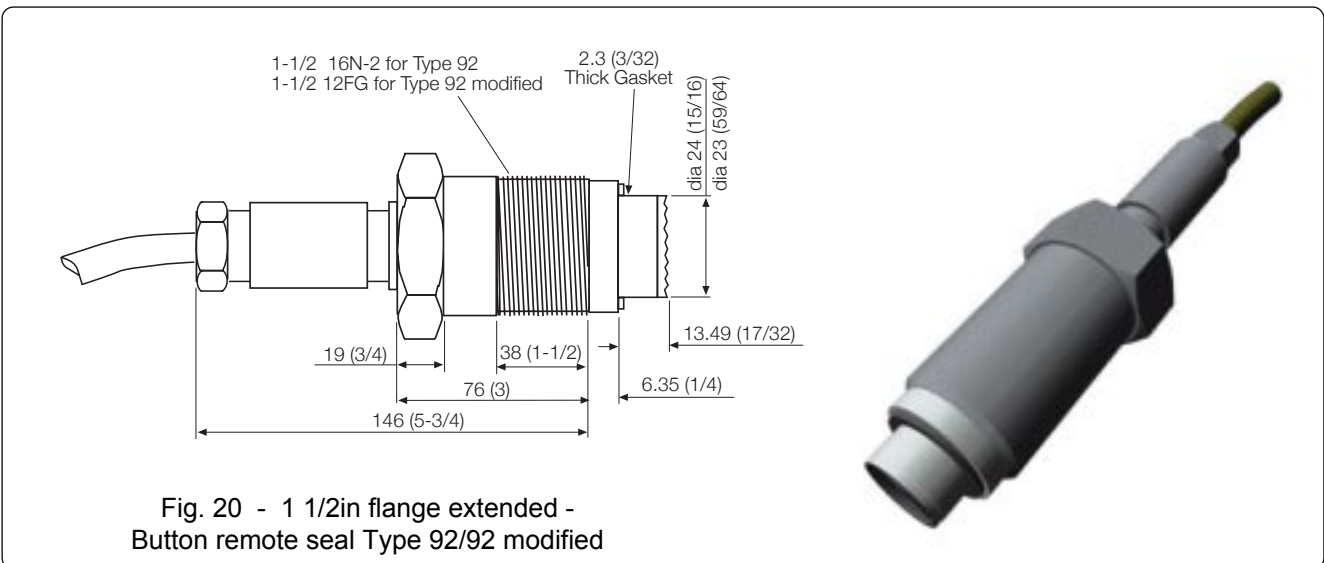
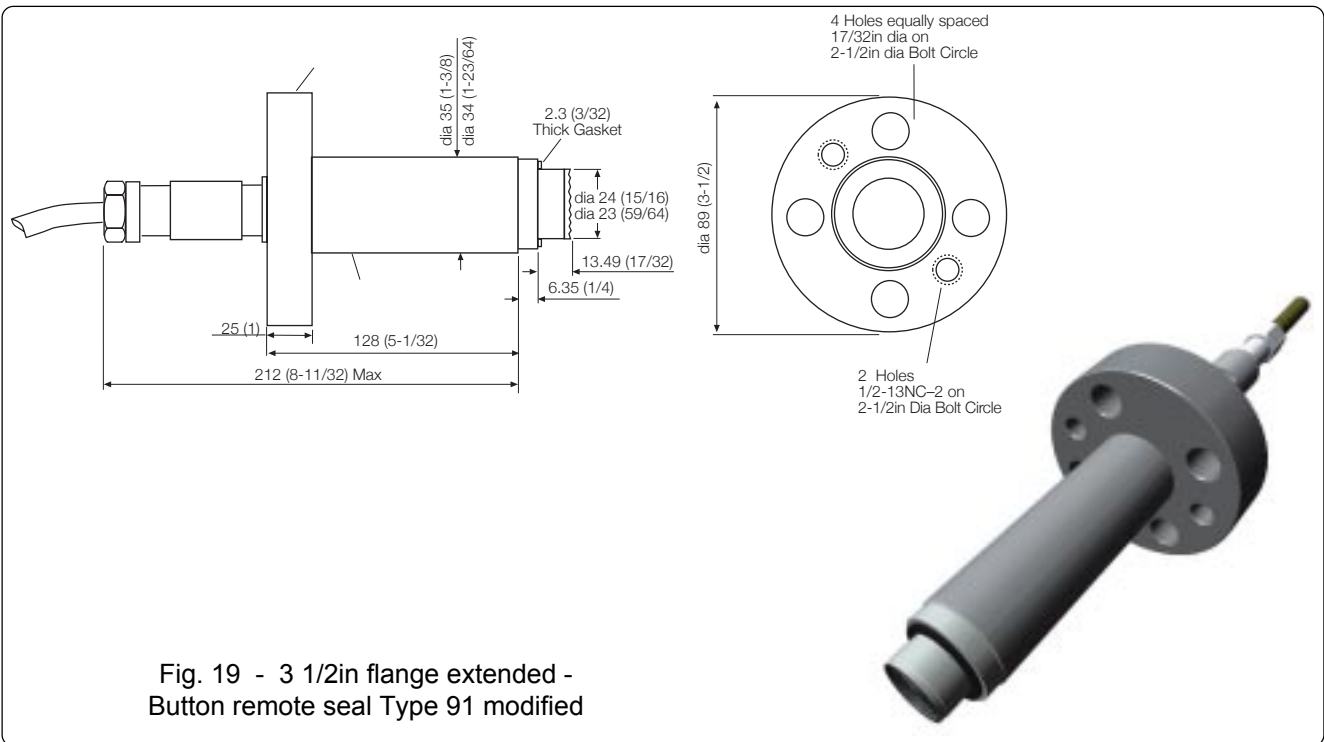
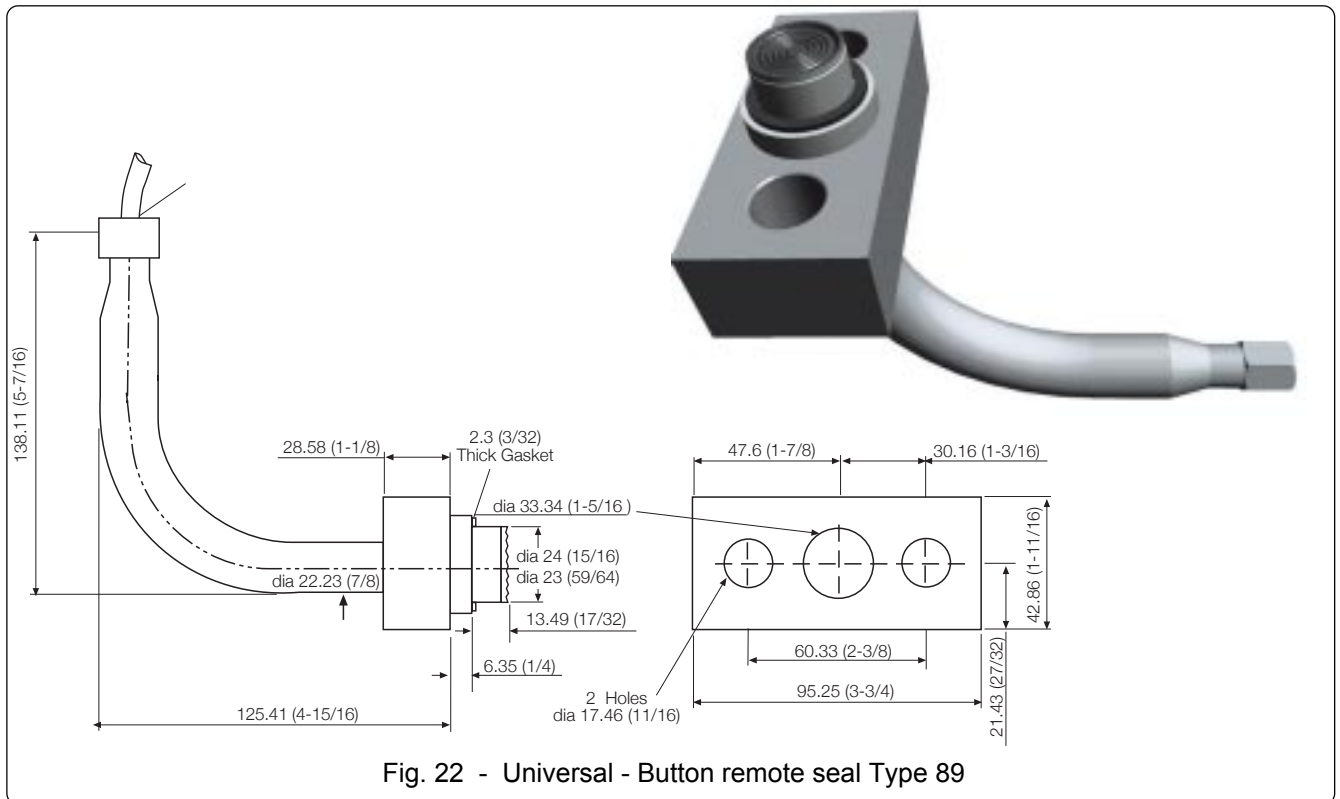


Fig. 18 - 3 1/4in flange extended - Button remote seal Type 91

# INSTALLATION



## INSTALLATION



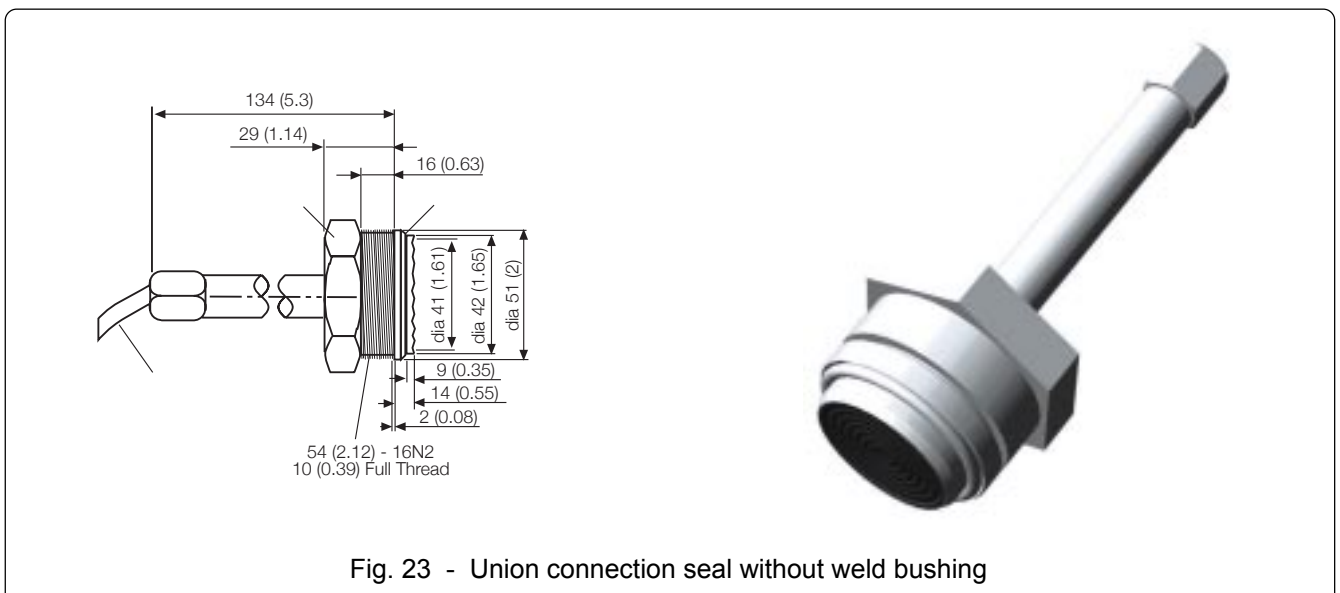
### Union Connection Remote Seals (S264U or S364U)

The union connection remote seals are used exclusively for pressure measurement. The seal is available without a weld bushing, with an optional weld bushing, or with an optional chemical tee flange. An O-ring is used to seal the process connection. The O-ring material can be silicone rubber for temperatures up to 350°F (177°C) or PTFE for temperatures up to 400°F (204°C). Note that the operating temperature limit for the seal can be lower than the O-ring temperature limit because of fill fluid limitations (refer to the fill fluid parameter table in the **Specification Sheet**). Connect the seal as described in the applicable following section.

#### Seal without Weld Bushing

The seal without a weld bushing, see Figure 23, must be connected to a user supplied fitting having mating surface dimensions as shown in the figure. Connect the seal as follows:

1. Lubricate the sealing O-ring with Silicone gasket grease.
2. Mount the O-ring on the end of the seal.
3. Insert seal into mating fitting and tighten the union connection nut to press the O-ring against the fitting surface.



# INSTALLATION

## Seal with Weld Bushing

The remote seal with a weld bushing includes a bushing which provides the mating surface for the seal element. The bushing must be welded to the process piping or vessel before installing the seal. Use the following procedure:

1. Weld bushing to pipe or vessel in accordance with standard industrial practices.
2. Remove protective covering from seal.
3. Lubricate the sealing O-ring with silicone gasket grease.
4. Mount O-ring on the end of the element.
5. Insert element into mating fitting and tighten the union connection nut to press the O-ring against the fitting surface.

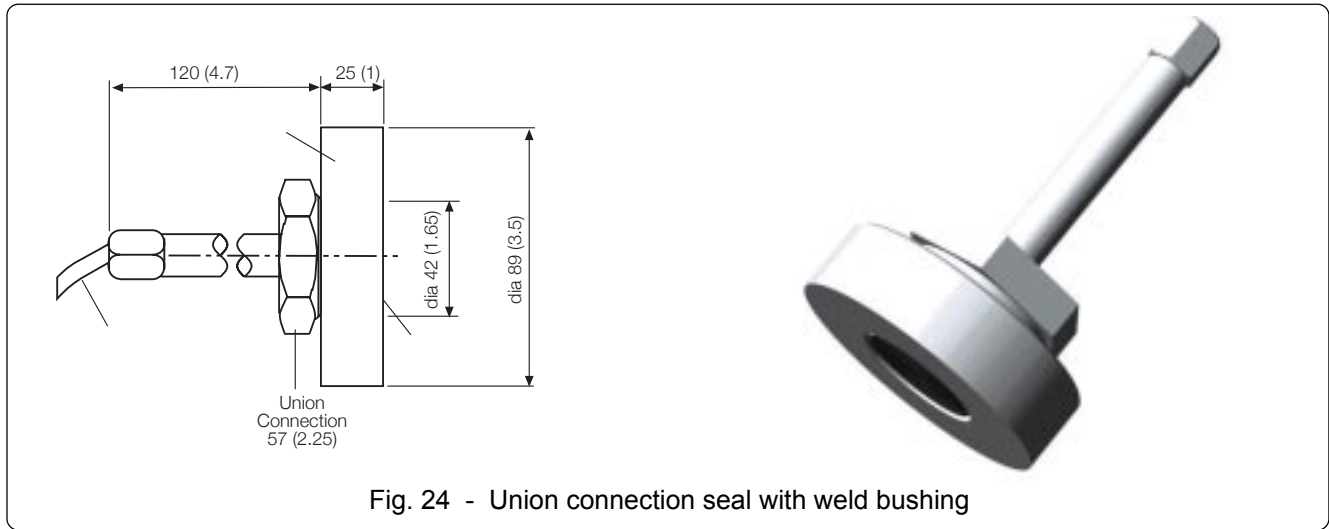


Fig. 24 - Union connection seal with weld bushing

## Seal with Chemical Tee Flange

The union connection seal with a chemical tee flange is designed to connect to any process fitting which accepts a chemical tee seal element (refer to **Chemical Tee Seal** for more information). The union seal connects to the chemical tee flange which serves as an adapter to permit connection of the union seal to a chemical tee type fitting.

In addition to the o-ring required on the remote seal, this option requires a gasket to seal the chemical tee flange at its connection to the process fitting. This gasket is included when the chemical tee flange option is specified. The gasket material is PTFE with silica filler and the maximum operating temperature is 400°F (204°C). Note that the seal operating temperature limit can be lower than this gasket temperature limit if the remote seal o-ring is silicone rubber with a 350°F (177°C) rating, or if the fill fluid has a lower temperature limit (refer to the fill fluid parameter table in the **Specification Sheet**). The eight cap screws required to connect the flange are supplied with the mating process fitting. The gasket and bolts have been specifically selected to meet the sealing and pressure rating requirements of the chemical tee flange. **Substitution of user supplied bolts and gaskets is not recommended.**

**Caution** - The pressure limit for a transmitter with this seal is determined by the chemical tee flange. Maximum working pressure for the flange is 300 psi (2000 kPa)

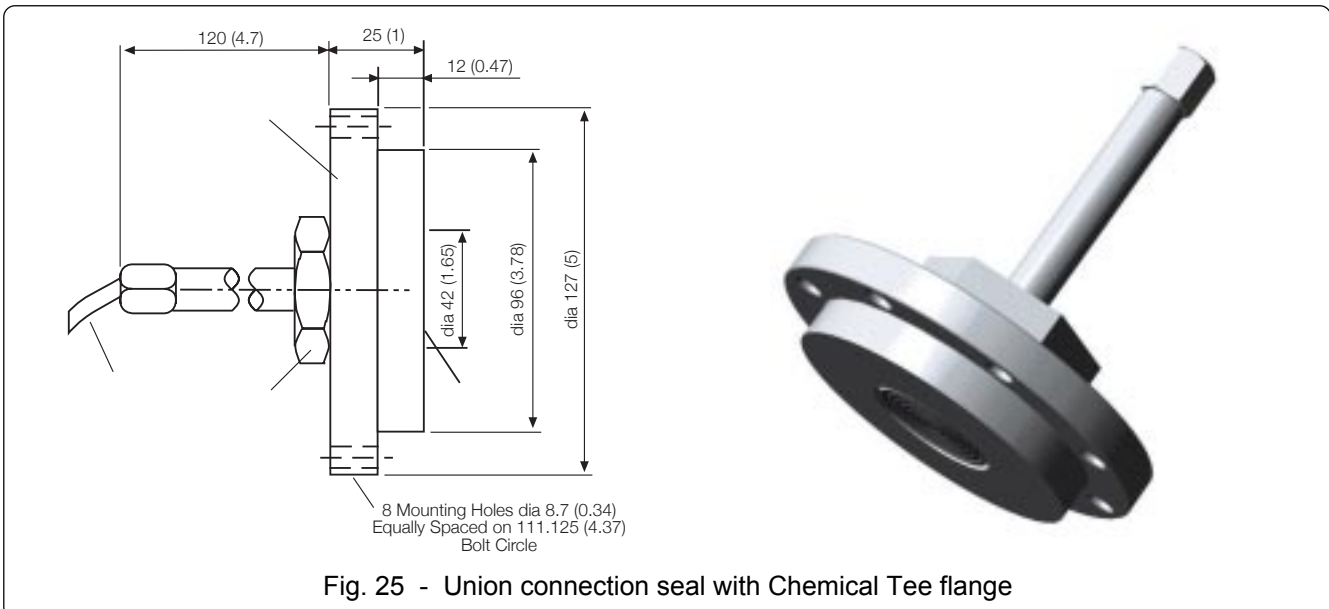


Fig. 25 - Union connection seal with Chemical Tee flange

## INSTALLATION

Connect the seal element using the following procedure:

1. Connect the chemical tee flange as follows:
  - o Place the gasket on the flange sealing surface and insert flange into the process fitting.
  - o Insert 8 cap screws and finger tighten each screw.
  - o Following a diagonal sequence, tighten each cap screw to a torque of 110 inch-lbs (12.4 Nm).
2. Connect the union seal to the chemical tee flange as follows:
  - o Remove protective covering from seal.
  - o Lubricate the sealing O-ring with Silicone gasket grease.
  - o Mount the O-ring on the end of the seal.
  - o Insert the seal into the chemical tee flange and tighten the union connection nut to seal the O-ring against its mating surface.

### Flanged Remote Seal – Ring Joint (S264R or S364R)

The flanged flush diaphragm remote seal – ring joint is designed to connect to ASME flanged pipe fitting. On the 1" seal the process flange and nuts are supplied by the user. On the 1-1/2" and 2" seals the process flange, bolts and nuts are supplied by the user. A user-supplied gasket must be installed between the process pipe flange and the lower housing of each seal.

These seals are available with a flushing connection in the lower housing. The connection provides a 1/4" NPT port into the cavity around the seal diaphragm to permit flushing to remove trapped solids, when necessary. The flushing connection also provides a means of checking calibration without disconnecting the element. A gate or ball valve installed in the process line near the seal connection allows the process to be isolated and calibration pressure can then be applied via the flushing connection. Use of a gate or ball type valve avoids restricting the process line during normal operation.

Connect the seal as follows:

1. Install a gasket between the process flange and the seal element gasket surface.
2. Bolt the seal to the process flange.
3. Tighten bolts (nuts on 1" seal) firmly and uniformly in accordance with standard industrial flange bolting practices.
4. If the seal has a flushing connection, connect a flushing line with appropriate valving to the 1/4" connection.

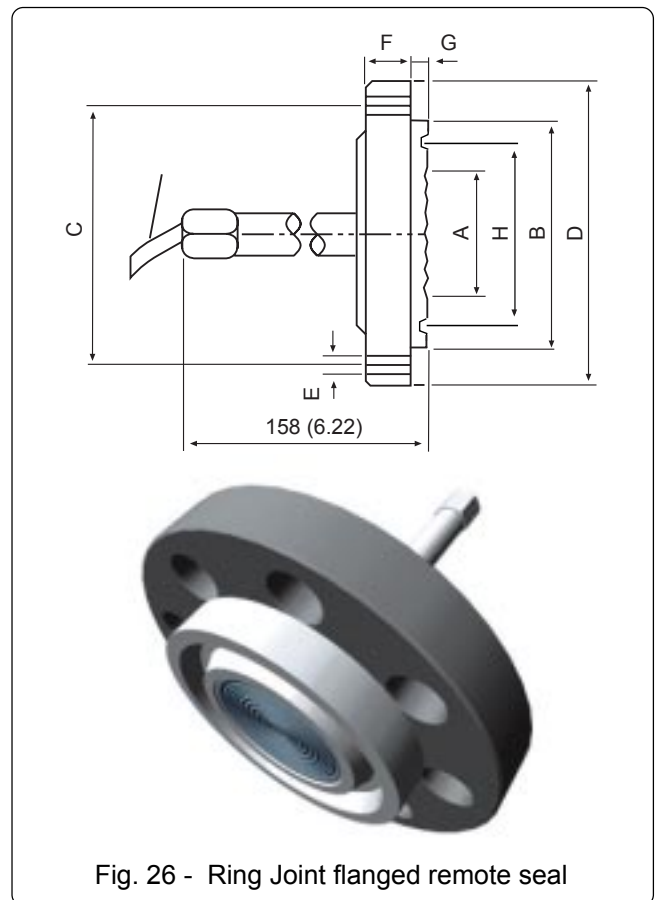


Fig. 26 - Ring Joint flanged remote seal

Size/Rating	Dimensions mm (in)								R	N° of holes
	A (dia)	B (dia)	C (dia)	D (dia)	E (dia)	F	G	H (dia)		
1-1/2in ASME CL 150	48 (1.89)	83 (3.27)	98.6 (3.88)	127 (5)	15.75 (0.62)	17.5 (0.69)	17.3 (0.68)	65.1 (2.56)	R19	4
1-1/2in ASME CL 300	48 (1.89)	90 (3.54)	114.3 (4.5)	155.5 (6.12)	22.35 (0.88)	20.6 (0.81)	17.3 (0.68)	68.3 (2.69)	R20	4
1-1/2in ASME CL 600	48 (1.89)	90 (3.54)	114.3 (4.5)	155.5 (6.12)	22.35 (0.88)	22.4 (0.88)	17.3 (0.68)	68.3 (2.69)	R20	4
1-1/2in ASME CL 900/1500	48 (1.89)	92 (3.62)	124 (4.88)	177.8 (7)	28.45 (1.12)	31.8 (1.25)	20.8 (0.82)	68.3 (2.69)	R20	4
1-1/2in ASME CL 2500	48 (1.89)	114 (4.49)	146.1 (5.75)	203.2 (8)	31.75 (1.25)	44.5 (1.75)	20.8 (0.82)	82.6 (3.25)	R23	4
2in ASME CL 150	60 (2.36)	102 (4.02)	120.65 (4.75)	152.4 (6)	19.05 (0.75)	19.05 (0.75)	17.3 (0.68)	82.6 (3.25)	R22	4
2in ASME CL 300	60 (2.36)	108 (4.25)	127 (5)	165.1 (6.5)	19.05 (0.75)	22.35 (0.88)	17.3 (0.68)	82.6 (3.25)	R23	8
2in ASME CL 600	60 (2.36)	108 (4.25)	127 (5)	165.1 (6.5)	19.05 (0.75)	25.4 (1)	17.3 (0.68)	82.6 (3.25)	R23	8
2in ASME CL 900/1500	60 (2.36)	124 (4.88)	165 (6.5)	215.9 (8.5)	25.4 (1)	38.1 (1.5)	20.8 (0.82)	95.3 (3.75)	R24	8
2in ASME CL 2500	60 (2.36)	133 (5.24)	171.5 (6.75)	235 (9.25)	28.45 (1.12)	50.8 (2)	20.8 (0.82)	101.6 (4)	R26	8
3in ASME CL 150	89 (3.5)	133 (5.24)	152.4 (6)	190.5 (7.5)	19.05 (0.75)	23.87 (0.94)	17.3 (0.68)	114.3 (4.5)	R29	4
3in ASME CL 300	89 (3.5)	146 (5.75)	168.15 (6.62)	209.55 (8.25)	22.35 (0.88)	28.44 (1.12)	17.3 (0.68)	123.8 (4.87)	R31	8
3in ASME CL 600	89 (3.5)	146 (5.75)	168.15 (6.62)	209.55 (8.25)	22.35 (0.88)	31.75 (1.25)	17.3 (0.68)	123.8 (4.87)	R31	8
3in ASME CL 900	89 (3.5)	155 (6.10)	190.5 (7.5)	241.3 (9.5)	25.4 (1)	38.1 (1.50)	20.8 (0.82)	123.8 (4.87)	R31	8
3in ASME CL 1500	89 (3.5)	168 (6.61)	203.2 (8)	266.7 (10.5)	31.75 (1.25)	47.8 (1.88)	20.8 (0.82)	136.5 (5.37)	R35	8
3in ASME CL 2500	89 (3.5)	168 (6.61)	228.6 (9)	304.8 (12)	35.05 (1.38)	66.5 (2.62)	20.8 (0.82)	127 (5)	R32	8

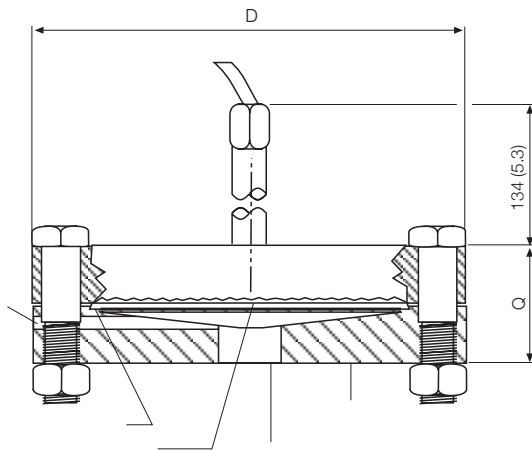
# INSTALLATION

## Off-line Threaded Connection Seal (S264T or S364T)

The off-line threaded remote seal connects directly to a process pipe via the NPT connection in the lower housing. Connections for 1/4, 1/2, 3/4, 1, and 1-1/2 inch process piping are available. In addition to the process connection, mechanical support for the weight of the seal may be required, especially for the 1/4 and 1/2-inch pipe sizes.

These elements are available with a flushing connection in the lower housing. The connection provides a 1/4" NPT port into the cavity around the seal diaphragm to permit flushing to remove trapped solids, when necessary. The flushing connection also provides a means of checking calibration without disconnecting the element. A gate or ball valve installed in the process line near the seal element connection allows the process to be isolated and calibration pressure can then be applied via the flushing connection. Use of a gate or ball type valve avoids restricting the process line during normal operation, not a gasket.

Connect the seal element to the process pipe at the NPT connection in the end of the lower housing. If the element has a flushing connection, connect a flushing line with appropriate valving to the 1/4 " NPT connection in the side of the lower housing.



Size	Dimensions mm (in)	
	D (dia)	Q
1/4in NPT	109.2 (4.3)	53.3 (2.1)
1/2in NPT	109.2 (4.3)	53.3 (2.1)
3/4in NPT	109.2 (4.3)	63.5 (2.5)
1in NPT	109.2 (4.3)	63.5 (2.5)
1 1/2in NPT	109.2 (4.3)	63.5 (2.5)

Fig. 27 - Off-line threaded connection remote seal

# INSTALLATION

## Food and Sanitary Remote Seal (S264S or S364S)

ABB Sanitary remote seals family includes a good variety of models.

Connect the Cherry Burrell seal in accordance with the manufacturers' recommendations. Connect the sanitary aseptic seal to the tank spud or ferrule as follows:

1. Remove protective covering from seal.
2. Install two O-rings on the periphery of the seal and an O-ring under each steam connection fitting as shown in Figure 28.
3. Insert the seal into the tank spud or ferrule and place the steam connection cap against the back of the element.
4. Position the clamp ring as shown and tighten to seal the O-rings against the spud.
5. Connect the inlet and outlet steam lines to the 1/8. NPT steam connections in the cap. Steam temperature must not exceed 300°F (149°C); pressure must not exceed 52 psi (358.5 kPa).

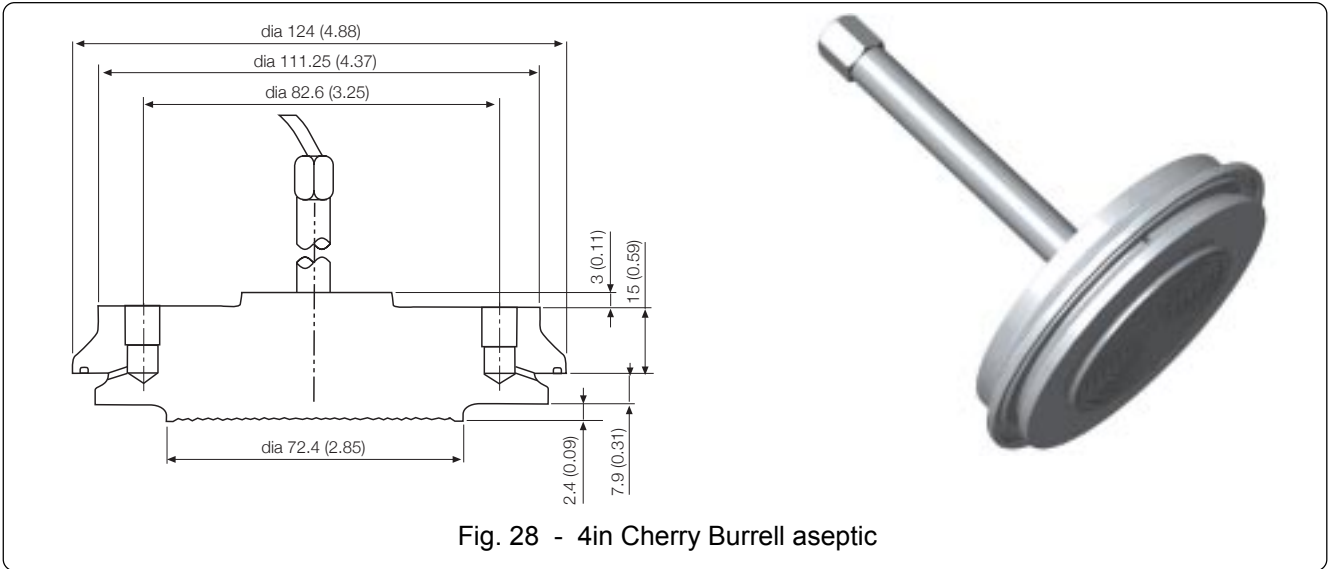


Fig. 28 - 4in Cherry Burrell aseptic

## Sanitary Seal with Flush Diaphragm

The sanitary remote seal with flush diaphragm is designed to connect to a 4-inch sanitary tank spud.

The tank spud and process O-ring, made of Buna or Viton, are available with the seal.

Connect the seal as follows:

1. Remove protective covering from seal.
2. Install the process O-ring on the seal.
3. Insert the seal into the tank spud.
4. Position the clamp ring as shown and tighten to seal the O-ring against the spud.

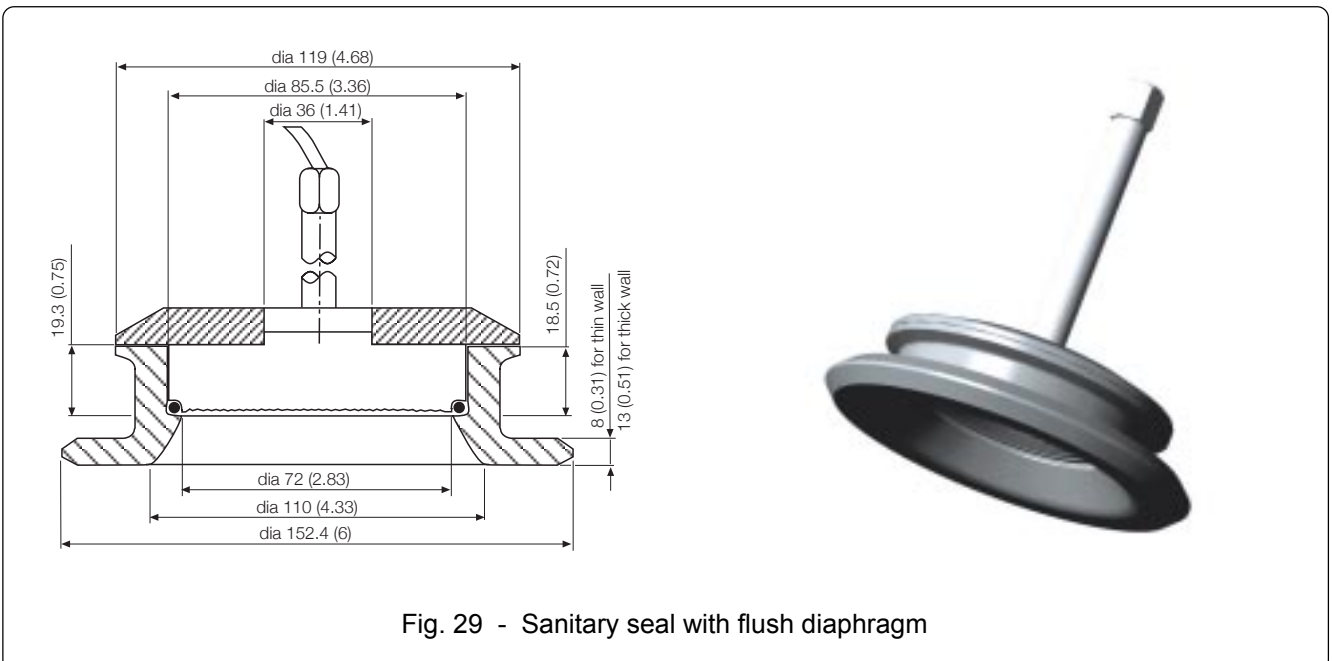


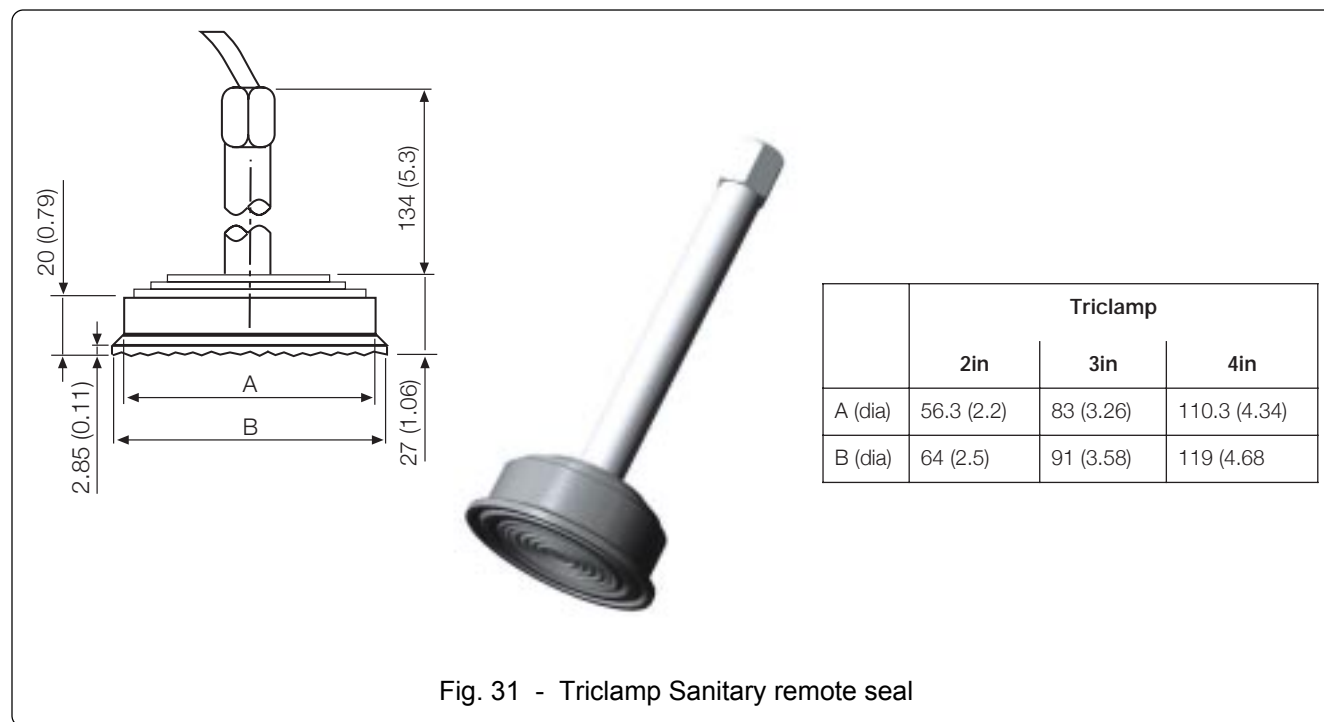
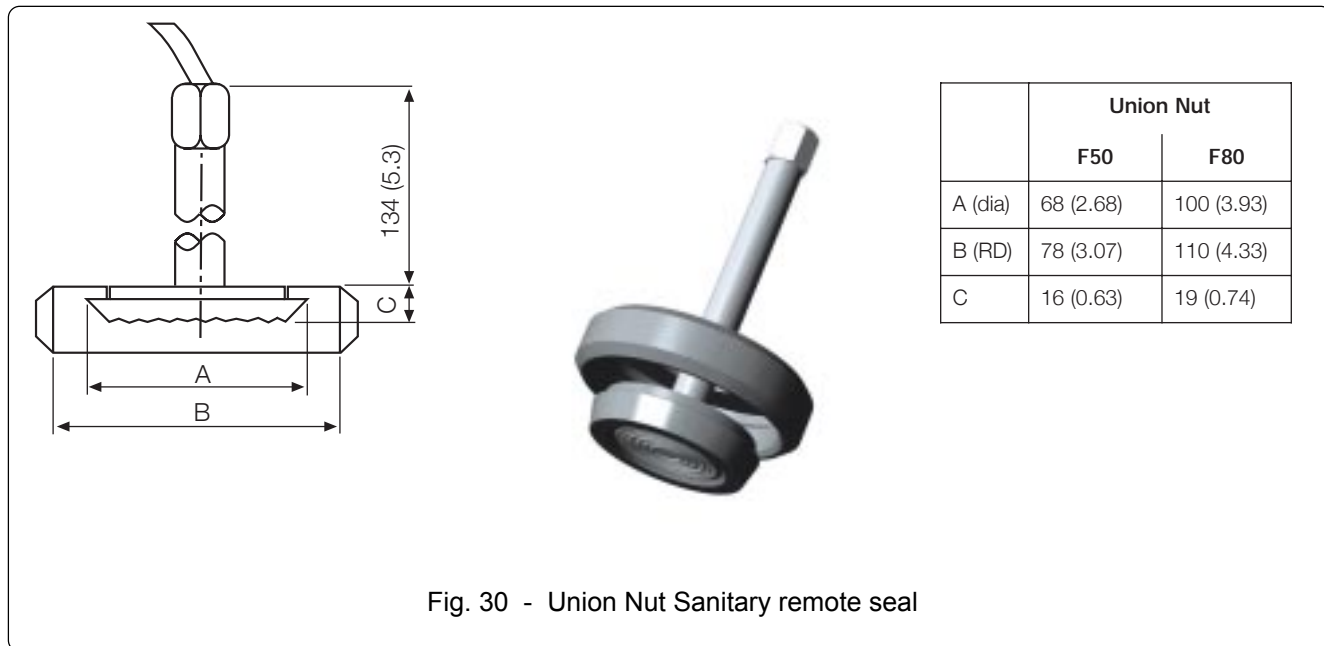
Fig. 29 - Sanitary seal with flush diaphragm

## INSTALLATION

### Union Nut and Triclamp remote seal

These remote seals are designed for connection by Union Nut (according to DIN) and to Triclamp Sanitary fittings. ABB offers a number of gaskets and clamp rings.

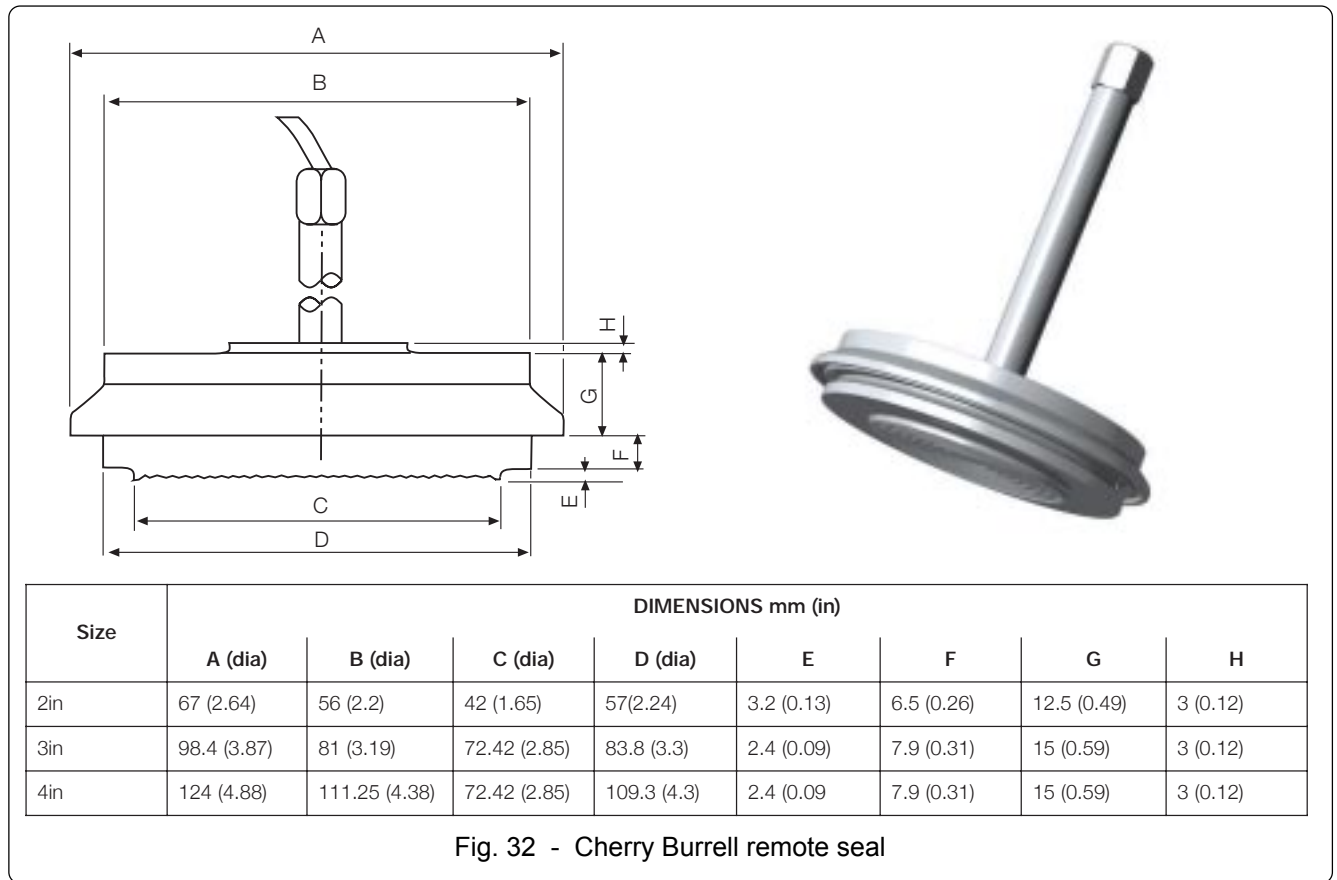
For further details on remote seals connections and optional features, please refer to S264 and S364 datasheets and to the relevant Ordering Information.





## INSTALLATION

The Cherry Burrell remote seals are designed for connection to 2in, 3in or 4in Cherry Burrell I-Line sanitary fittings. A 4in V-band clamp is optionally available for the 4in variant.

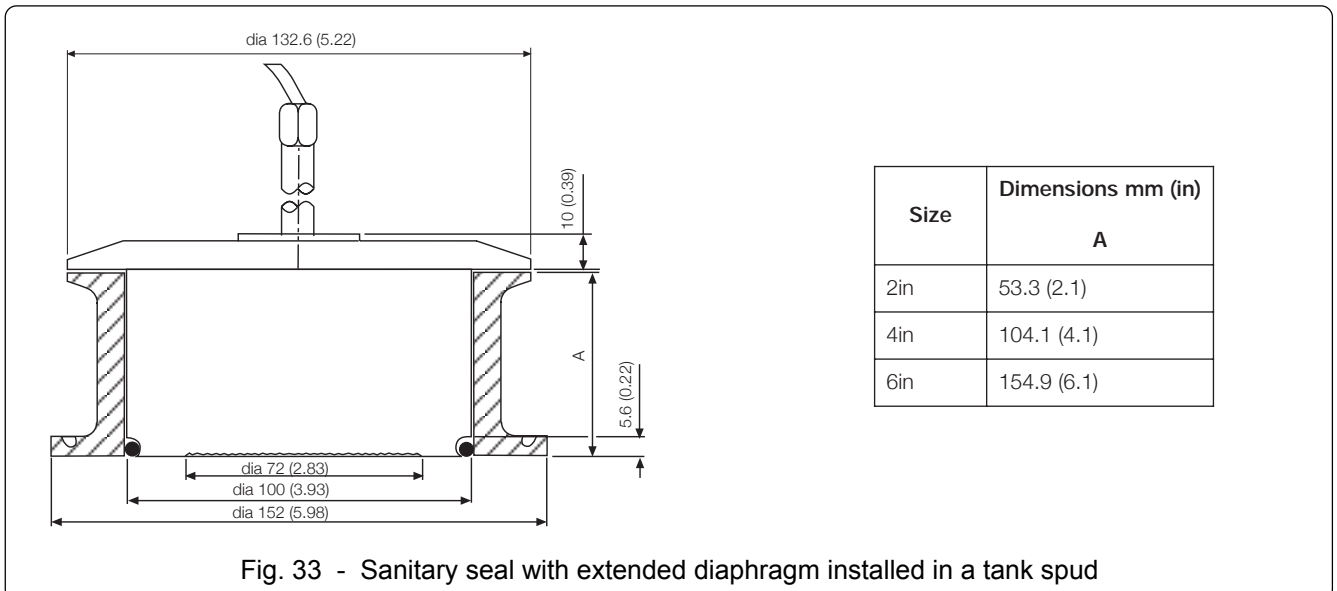


### Sanitary Seal with Extended Diaphragm

The sanitary remote seal with extended diaphragm is designed to connect to a 4-inch sanitary tank spud with an extended neck. The tank spud, an Ethylene Propylene process O-ring and V-Band clamp ring are available with the seal.

Connect the seal as follows:

1. Weld the tank spud into the process vessel. Be sure to orient the spud so that the drain hole is at the lowest point.
2. Remove protective covering from seal.
3. Install the O-ring on the seal.
4. Insert the seal into the tank spud.
5. Position the clamp ring over the joint between the seal and spud and tighten the clamp.



## INSTALLATION

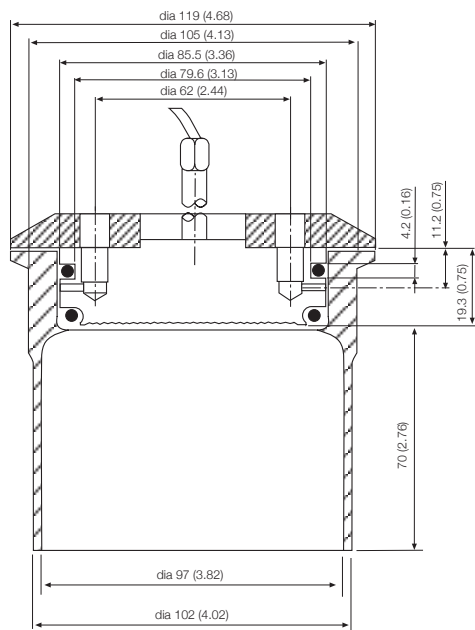


Fig. 34 - 4in Aseptic connection

### NOTE (3-A requirements)

All sanitary S264S remote diaphragm seals and other associated direct mount sanitary diaphragm seals must be mounted in such a way as to allow for drainage of all process fluids.

Tank spud fittings must be mounted with the leak detection hole located at the bottom for proper drainage by gravity.

Sanitary applications must be performed so that all welding surface are smooth in order to prevent dirt from lodging inside surface irregularities. 3-A seals are equipped with a specific label (see below) indicating the temperature range and gasket characteristics.

3-A Sanitary Seal Gasket Temperature Range  
EPDM-3-A 1B-03 (Class II, -40 to 121°C (-40 to 250°F))

### Gaskets

Gaskets are important for some remote seals in order to:

- reduce the possible leakage points;
- make the diaphragm stick to the impulse line;
- save money by allowing less precise mating surfaces on process parts because it can fill irregularities;
- withstand high compressive loads.

Just a few seals are supplied with their own gaskets (SX64T and SX64M) in PTFE, Viton and Graphite.

For all the other models, bolts and gaskets should be supplied by the user.

Stick the gasket as follows:

1. Clean the remote seal surface.
2. Stick the gasket carefully without damaging it.
3. The seal to lower flange bolting torque value is 25 Nm for both kinds of remote seals.
4. Connect the remote seal to the impulse line properly.

Should you need more specification, please refer to "Supplementary documentation".



Fig. 35 - Gasket on SX64M

# INSTALLATION

## Oxygen Service Limitations

If seals are applied to Oxygen application, customers must adopt appropriate safety measures in order to eliminate even the smallest particles of grease that can, as a matter of fact, explode if in contact with Oxygen.

It is customers' responsibility to clean remote seals with the suitable degreasing substance as meeting the local requirements so as to prevent personal injury or plant damage.

The only gasket material that may be used to withstand oxygen processes is PTFE and the appropriate inert fill fluid such as Galden or Halocarbon.

## INSTALLING SPUDS AND SPECIAL CONNECTIONS

Spuds are an essential part of direct-mounted pressure transmitter because they connect the transmitter (or the remote seal) to the process line. It is extremely important to use welding procedures and fixtures that keep spud distortion to a minimum during installation. This ensures proper fit and a leak tight seal when the seal element is connected to the spud. The tendency to distort during welding increases substantially as the thickness of the tank wall increases. All our spuds are made in AISI 316 L.

### Sanitary Spuds (3A recommendation)

Use of proper procedures and fixtures permits the flanges to be welded to the maximum wall thickness.

The recommended minimum radius of curvature of the tank is 3 feet (0.91 m).

The spud has to be welded so that the welding surface remains smooth and without irregularities where dirt can lodge.

The spud leak detection hole has to be positioned at the bottom of the spud.

For sanitary spud welding procedure, please refer to page 29.

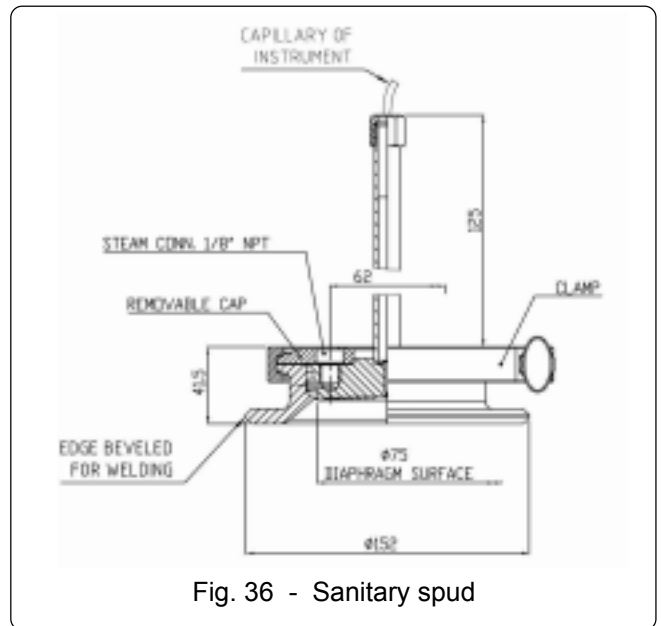


Fig. 36 - Sanitary spud

### Pulp and Paper Spud Application

Models 264HP/NP integrate a direct mount seal on the positive side, having the negative side reference at atmospheric or vacuum pressure, respectively for gauge or absolute measurements.

The integral seal is available in 1in and 1-1/2in diaphragm sizes specifically designed for pulp & paper industry applications, providing a flush diaphragm to the process; this solution ensures the measure reliability avoiding all problems of crystallization/polymerization, typical of pulps having viscosity as in the paper mill.

Use of proper procedures and fixtures avoid the risks of personal injury or plant damage.

The recommended minimum radius of curvature of the tank is 3 feet (0.91 m).

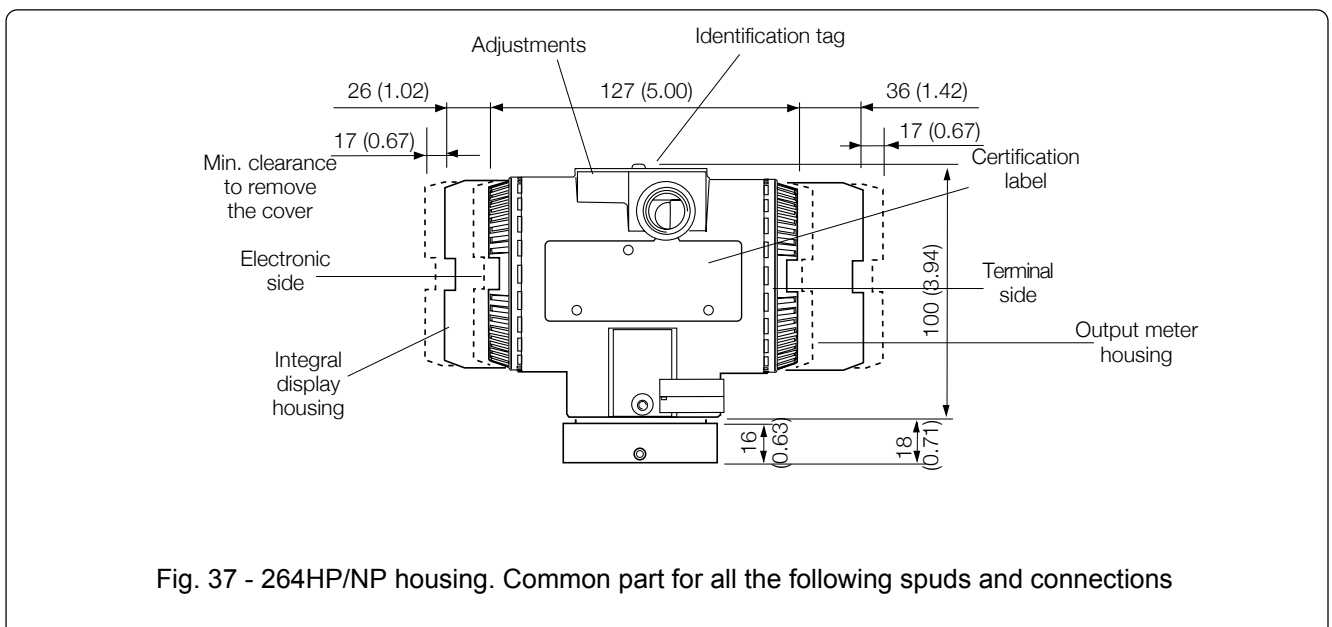


Fig. 37 - 264HP/NP housing. Common part for all the following spuds and connections

## INSTALLATION

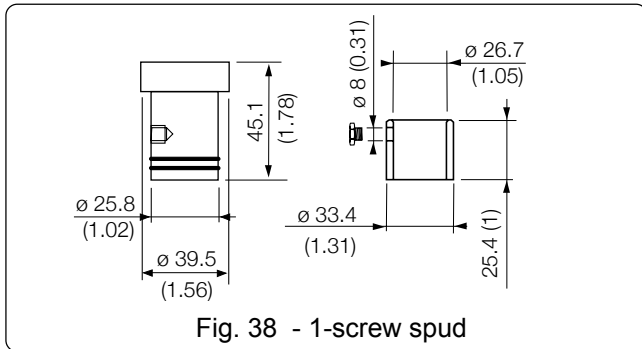


Fig. 38 - 1-screw spud

### 1in size to spud with 1 screw fixing.

Consider that this kind of spud can withstand a maximum working pressure of 30bar (435psi). While installing, please use the appropriate Viton™ gasket. Spud manufactured in AISI 316 L.

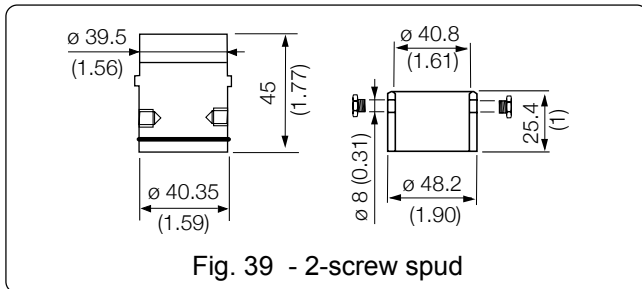


Fig. 39 - 2-screw spud

### 1-1/2in size to spud with 2 screws fixing.

Consider that this kind of spud can withstand a maximum working pressure of 50bar (725psi). While installing, please use the appropriate Viton™ gasket. Spud manufactured in AISI 316 L.

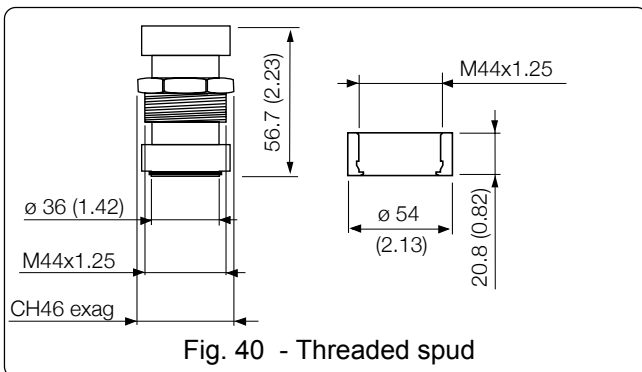


Fig. 40 - Threaded spud

### 1-1/2in size to threaded spud.

Consider that this particular process connection can withstand a maximum working pressure of 210bar (3045psi). While installing, please use the appropriate PTFE gasket. As all the others special process connections, this one is manufactured in AISI 316 L.

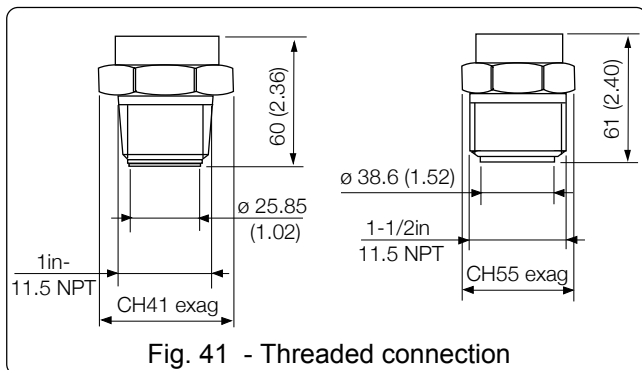


Fig. 41 - Threaded connection

### 1in and 1-1/2in size with 1in and 1-1/2in NPT threaded connection

Consider that this particular process connection can withstand a maximum working pressure of 210bar (3045psi). As all the others special process connections, this one is manufactured in AISI 316 L.

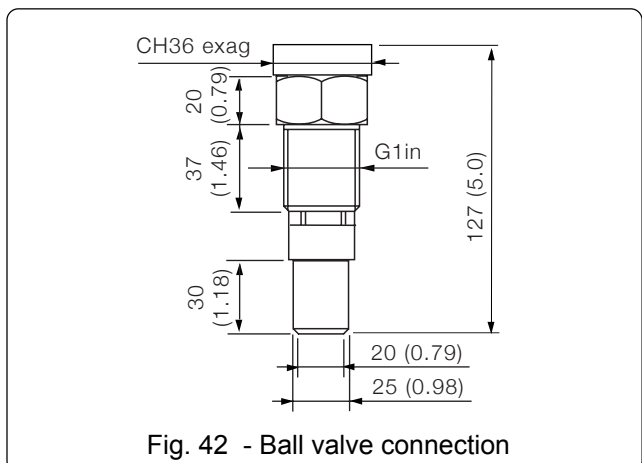


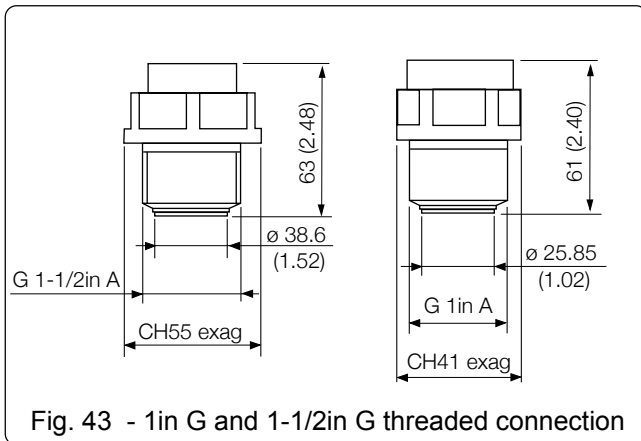
Fig. 42 - Ball valve connection

### 1in with ball valve connection

This special connection allows easy instrument mounting on ball valves which are extensively used in industry since they are easy to install and repair. They offer user the opportunity of avoiding complete plant shutdown.

Consider that this particular process connection can withstand a maximum working pressure of 40bar (580psi). As all the others special process connections, this one is manufactured in AISI 316 L.

## INSTALLATION



### 1in and 1-1/2in size with G 1in A and G 1-1/2in A threaded connection

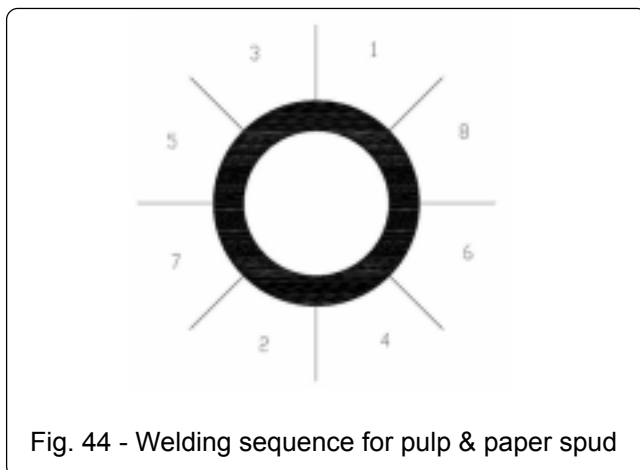
This particular process connection can withstand a maximum working pressure of 210bar (3045psi).  
Manufactured in AISI 316 L.

### AVAILABLE DIAPHRAGM MATERIALS AND FILL FLUIDS FOR PULP & PAPER APPLICATIONS

DIAPHRAGM MATERIALS	FILL FLUIDS
AISI 316 L	Silicone oil DC200™
Hastelloy C276™	Mineral oil MARCOL 82™
Diaflex (Anti-abrasion treatment)	

### Welding Procedure for Sanitary and Pulp&Paper spuds

1. Using appropriate size hole saw, cut a hole in the process vessel to accept the spud. The hole should couple with the spud perfectly.
2. Remove the weld spud from the transmitter and secondly the PTFE gasket from the weld spud (if any).
3. Position the weld spud in the vessel hole and start welding. For this important phase, please look at and follow the welding sequence (Figure 44).
4. Cool each section properly before proceeding to the next section.
5. Use between 100 and 150 amps., and adjust the amperage, if needed, for spud penetration.
6. After the weld spud has cooled, install the PTFE gasket into the weld spud. Ensure the gasket is properly positioned within the weld spud; improper placement can cause a process leak.
7. Position the transmitter into the spud and engage the threads. Rotate the transmitter and thread it completely.
8. Tighten the transmitter or, if in case of pulp and paper cylindrical spud, install the needed bolt(s).



NOTE: users should install spuds carefully.

Please follow the notes below:

- Position inside gasket (if any) perfectly in order to avoid process leaks.
- Improper installation may result in spud distortion.
- Excessive heat will distort the spud.
- Allow adequate cooling between welding and the following operations.
- Weld the spud properly on tank or vessel walls in order to avoid personal injury or plant damage.

---

## INSTALLATION

---

### CONNECTING LOW SIDE COMPENSATING LEG ON A DP WITH ONE SEAL

Differential pressure transmitters with a single remote seal element are used for liquid level installations. The seal element is connected using the procedure applicable to the type of seal element. The connection requirements for the low side depend on whether the tank is open to atmosphere or closed (pressurized or evacuated). Make the low side connection as described below.

#### Open Tank Installation

The low side of the transmitter must be vented to atmosphere for open tank installations. Be sure there are no plastic shipping plugs or other restrictions in the low side flange ports. Connect the seal element using the procedure applicable to the element type. Refer to **the Connecting the Remote Seals** section.

#### Closed Tank Installation

Before connecting the seal element to the tank fitting, determine whether a wet or dry compensating leg is required on the low side of the transmitter. Refer to **the Locating the Transmitter and Remote Seals** section.

The transmitter is shipped with the vent/drain plug located near the top of the low side flange. In this position the valve permits venting of entrapped gas (normally air) when a wet (liquid filled) compensating leg is required. If a dry leg is required, remove the bolts and rotate the low-side flange 180° so that the vent/drain screw is positioned at the bottom of the flange to permit draining of condensate from the primary cavity. Re-tighten the bolts to a torque of 20 ft-lb.

After properly locating the vent/drain screw, connect the low side to the compensating leg, and connect the seal element using the procedure applicable to the element type. Refer to **the Connecting the Remote Seals** section.



## EC DECLARATION OF CONFORMITY

We: ABB S.p.A. – ABB SACE Division  
Business Unit Instrumentation  
Via Statale, 113  
22016 Lenno (Como)  
Italy

declares under our sole responsibility that the products:

*2600T EN Series (Transmitters models 262/264/266/268, Hand Held Terminal, Field Indicator) in all the communication configurations (4-20 mA + HART®, Profibus, Foundation Fieldbus, Safety)*

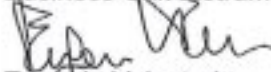
### are in conformity with the following standards:

**EN 61000-6-3 (2001)** Electromagnetic compatibility (EMC) - Generic standards - Emission standard for residential, commercial and light-industrial environments  
*according to:* EN55022 (2001)

**EN 61000-6-2 (2001)** Electromagnetic compatibility (EMC) - Generic standards - Immunity for industrial environments  
*according to:* EN 61000-4-2 (2001)  
EN 61000-4-3 (2002)  
EN 61000-4-4 (2001)  
EN 61000-4-5 (2001)  
EN 61000-4-6 (2001)

following the provisions of the EMC Directives 89/336/EEC and 93/68/EEC.

ABB S.p.A. – ABB SACE Division  
Business Unit Instrumentation

  
Eugenio Volontero  
Technical Manager

Lenno, 14<sup>th</sup> May 2008

ABB S.p.A.  
ABB SACE Division

Una società del Gruppo ABB  
An ABB Group company

Sede Legale  
Registered Office:  
Via Vitor Pisani, 16  
I-20124 Milano - Italy  
Tel.: +39 02 2414.1  
www.abb.it

Direzione e Uffici Amministrativi  
Headquarters and Accounting Services:

20089 Sesto S. Giovanni (MI) - Italy  
Via L. Lama, 33  
Tel.: +39 02 2414.1  
Fax: +39 02 2414.3892  
C.P./P.O. Box: 156 Milano  
e-mail: sace.ssg@it.abb.com

Capitale Sociale  
Share capital:

€ 107.000.000 i.v./fully paid up  
P. IVA/VAT: IT 11563960156  
Codice Fiscale e n° di iscrizione del Registro  
delle Imprese di Milano/Pisical Code and  
Official Company Book: 00736410150  
R.E.A. Milano 1513225

Unità Produttive  
Factories:

Bergamo  
Frosinone  
Garbagnate Monastero (LC)  
Genova  
Lenno (CO)  
Marostica (VI)

Patrica (FR)  
Santa Palomba (Roma)  
S. Martino in Strada (LO)  
Vittuone (MI)

ABB has Sales & Customer Support  
expertise in over 100 countries worldwide

[www.abb.com/instrumentation](http://www.abb.com/instrumentation)

The Company's policy is one of continuous product  
improvement and the right is reserved to modify the  
information contained herein without notice.

Printed in Italy (09.2013)

© ABB 2013

The ABB logo consists of the letters 'A', 'B', and 'B' in a bold, red, sans-serif font. The 'A' is slightly larger than the 'B's, and they are all connected together.

**ABB Ltd**  
Howard Road, St. Neots  
Cambridgeshire, PE19 3EU  
UK  
Tel: +44(0)1480 476321  
Fax: +44(0)1480 217948

**ABB Inc.**  
125 E. County Line Road  
Warminster, PA 18974  
USA  
Tel: +1 215 674 6000  
Fax: +1 215 674 7183

**ABB S.p.A.**  
Via Statale 113  
22018 Lenno (CO)  
Italy  
Tel: +39 0344 58111  
Fax: +39 0344 56278

**ABB Automation Products GmbH**  
Schillerstrasse 72  
D-32425 Minden  
Germany  
Tel: +49 551 905 534  
Fax: +49 551 905 555