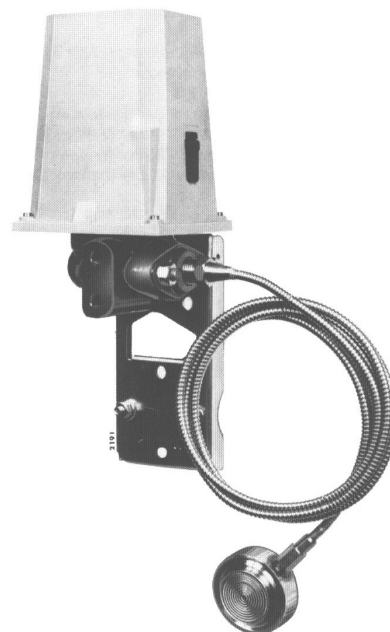


# Model NDD

## Gauge pressure transmitter with remote diaphragm seal

Deltapi N Series  
A complete range of  
pneumatic pressure transmitters



### Introduction

The blind type pressure transmitter mod. NDD is used to measure a gauge pressure and convert it into a proportional pneumatic signal.

## DESCRIPTION

The instrument works on the force-balance principle and consists of two main units.

**The measuring unit** comprises a main body which houses a bellows unit, connected via a capillary pipe through the positive connection port to a separator forming one all-welded system filled with a separating liquid. The negative connection port is open to atmosphere. The bellows unit is clamped in the main body forging by means of a flange and it can withstand the maximum overrange on positive side without damage.

**The transmission unit** converts the differential force applied to the measuring element into a proportional output pneumatic signal.

The output pressure, generated by a flapper nozzle relay, is fed to a feedback bellows with a rising pressure until the bellows force balances that of the measuring element.

**Span value** continuously adjustable by an internal micrometric screw.

**Zero value** adjustable by an external screw.

**Mounting** in a vertical position on 2in diameter pipe by a special bracket.

## OPTIONAL EXTRA FEATURES

**A zero elevation or suppression device** allows to set as a zero of the transmitter a measured variable value different from zero.

Zero suppression value (S) added to the calibrated span must never exceed the upper range limit of measuring element :  $S + \text{span} \leq M$  (see table).

**Air filter regulator** can be directly mounted on the transmitter, with or without pressure gauge, and connected with piping and fittings either in stainless steel or copper.

Special versions of air filter regulator and gauges, in stainless steel, are available on request.

## SPECIFICATIONS

The data were obtained from laboratory tests on standard instruments with: carbon steel or AISI 316L body and flange; AISI 316L bellows unit; silicone oil (DC200) filling; gasket: PTFE; calibration span: 800 kPa - 8 bar (bellows A), 1700 kPa - 17 bar (bellows B), 3500 kPa - 35 bar (bellows C), 7000 kPa - 70 bar (bellows D).

MEASURING BELLOWS	DIAPHRAGM DIAMETER	SPAN LIMITS min. and max.	RANGE LIMITS upper and lower (M)	MAXIMUM ZERO SUPPRESSION (S)	MAXIMUM ZERO ELEVATION	OVERRANGE LIMIT
A	3in	170 and 1700 kPa 1.7 and 17 bar	-100 and 2500 kPa -1 and 25 bar	2330 kPa 23.3 bar	100 kPa 1 bar	3.5 MPa 35 bar
B	2in	350 and 3500 kPa 3.5 and 35 bar	-100 and 5000 kPa -1 and 50 bar	4650 kPa 46.5 bar	100 kPa 1 bar	7 MPa 70 bar
C	2in	700 and 7000 kPa 7 and 70 bar	-100 and 10000 kPa -1 and 100 bar	9300 kPa 93 bar	100 kPa 1 bar	14 MPa 140 bar
D	2in	1400 and 14000 kPa 14 and 140 bar	-100 and 20000 kPa -1 and 200 bar	18600 kPa 186 bar	100 kPa 1 bar	28 MPa 280 bar

### Air supply

nom. 140 kPa (1.4 bar, 20 psi); min. 125 kPa (1.25 bar, 18 psi); max. 175 kPa (1.75 bar, 25 psi)

### Output signal

20 to 100 kPa/0.2 to 1 bar, 3 to 15 psi or 0.2 to 1 kg/cm<sup>2</sup>

### Static air consumption

350 NI/h

### Maximum output flow:

- with rising output pressure: 30 NI/min.
- with falling output pressure: 40 NI/min.

### Accuracy

± 0.5% F.S.D. (typical)

### Degree of protection in accordance with IEC 529

IP55

### Ambient temperature limits

-40 and + 120°C

### Process temperature limits

Same as fill fluid limits. Refer to table A.  
204°C (400°F) with PFA antistick (N6W, N6F, N6E)  
and silicone rubber O-ring (N6U)  
260°C (500°F) with PTFE O-ring (N6U)

**Thermal drift** (for ambient temperature variation between -20° C and + 65° C)

#### Bellows A

- span 170 to 340 kPa (1.7 to 3.4 bar): 1%/10°C
- span 340 to 1700 kPa (3.4 to 17 bar): 0.5%/10°C

#### Bellows B

- span 350 to 700 kPa (3.5 to 7 bar): 0.8%/10°C
- span 700 to 3500 kPa (7 to 35 bar): 0.4%/10°C

#### Bellows C

- span 700 to 1400 kPa (7 to 14 bar): 0.6%/10°C
- span 1400 to 7000 kPa (14 to 70 bar): 0.3%/10°C

#### Bellows D

- span 1400 to 2800 kPa (14 to 28 bar): 0.5%/10°C
- span 2800 to 14000 kPa (28 to 140 bar): 0.2%/10°C

### Body and flange material

Carbon steel, AISI 316

**Seal diaphragm material**

AISI 316L, Hastelloy C 276, Tantalum,  
 AISI 316L or Hastelloy C 276 with PFA anti-stick coating,  
 AISI 316L with PFA coating anti-corrosion and anti-stick

**Seal filling / working temperature range**

See table "A"

**Cover material**

thermoplastic resin

**Surface protections**

- carbon steel body and flange: zinc plating and chrome passivation
- AISI 316 body and flange: none

**Process connections**

- Wafer remote seal:
  - 1 1/2 in, 2 in, 3 in to ASME B16.5;
  - DN40, DN50, DN80 to EN 1092-1
- flush diaphragm flanged seal:
  - 3 in Class 150 to 900 to ASME B16.5;
  - DN80 PN 16 to 100 to EN 1092-1
- extended diaphragm flanged seal:
  - 3 in Class 150-300 to ASME B16.5;
  - DN80 PN 16-40 to EN 1092-1
- Union remote seal:
  - 1 1/2 in with or without weld bushing or with chemical tee flange

**Pneumatic connections**

- Air supply (in figure ref. A): 1/4 in NPT-F
- Output (in figure ref. B): 1/4 in NPT-F

**Pressure gauge**

Brass with stainless steel case (all stainless steel on request)  
 external diameter 51 mm; 0-200 kPa, 0-2 bar and 0-30 psi  
 indication on 82 mm/260° scale.

**Air filter regulator**

with copper or stainless steel piping, as specified.  
 Die cast aluminium alloy with light grey epoxy finish.

**Net weight (maximum)**

8 to 25 kg approx

**Packing**

expanded polythene box

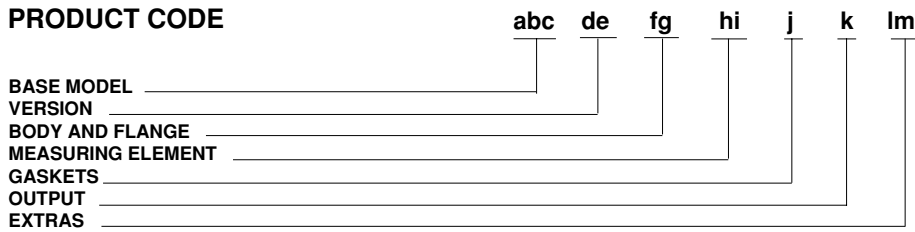
**TABLE 'A' - FILL FLUIDS CHARACTERISTICS**

FILL FLUIDS (APPLICATION)	OPERATING CONDITIONS				SPECIFICATIONS @ 25°C (77°F)		
	Tmax °C (°F) @ P > of	Pmin mbar abs (psia)	Tmax °C (°F) @ P min	Tmin °C (°F)	Specific gravity	Viscosity Kinematic (cSt)	Thermal Expansions x10 <sup>-3</sup> /°C
Silicone oil (General purpose)	250 (480) @ 385 mbar abs	0.7 (0.01)	130 (266)	-40 (-40)	0.934	10	1.08
Silicone oil (High temperature)	375 (707) @ atmosphere	0.7 (0.01)	220 (428)	-10 (14)	1.07	39	0.77
Neobee M-20™ (Food-Sanitary)	200 (390) @ atmosphere	10 (0.15)	20 (68)	-18 (0)	0.92	9.8	1.2
Glycerin Water (70%) (Food-Sanitary)	93 (200) @ atmosphere	1000 (14.5)	93 (200)	-7 (+20)	1.08	2	0.36
Inert (Galden™) Oxygen Service)	160 (320) @ atmosphere	2.1 (0.03)	60 (140)	-20 (-4)	1.82	4.4	1.1

# ORDERING INFORMATION

Select one character or set of characters from each category and specify complete catalog number. In addition quote the required seal model from one of the enclosed N6 ordering information

## PRODUCT CODE



<b>abc</b>	<b>BASE MODEL</b>	<b>Code</b>
	Gauge pressure transmitter with remote diaphragm seal	<b>NDD</b>

<b>de</b>	<b>VERSION</b>	<b>Code</b>
	Standard	<b>W1</b>

<b>fg</b>	<b>BODY AND FLANGE</b>	<b>Code</b>
	Carbon steel	<b>01</b>
	AISI 316	<b>11</b>

<b>ef</b>	<b>SPAN LIMITS (Note 1)</b>	<b>Code</b>
	170 and 1700 kPa / 24.6 and 246 psi	<b>05</b>
	350 and 3500 kPa / 50.7 and 507 psi	<b>06</b>
	700 and 7000 kPa / 101.5 and 1015 psi	<b>07</b>
	1400 and 14000 kPa / 203 and 2030 psi	<b>08</b>

**Note 1:** Multiply by 10 the value in kPa (MPa) to obtain mbar (bar)

<b>j</b>	<b>CONSTRUCTION</b>	<b>Code</b>
	Transmitter with remote diaphragm seal (to be quoted separately as N6W, N6F, N6E or N6U)	<b>2</b>

<b>k</b>	<b>OUTPUT</b>	<b>Code</b>
	3 to 15 psi	<b>1</b>
	3 to 15 psi with zero elevation device	<b>2</b>
	3 to 15 psi with zero suppression device	<b>3</b>
	0.2 to 1.0 kg/cm <sup>2</sup>	<b>4</b>
	0.2 to 1.0 kg/cm <sup>2</sup> with zero elevation device	<b>5</b>
	0.2 to 1.0 kg/cm <sup>2</sup> with zero suppression device	<b>6</b>
	20 to 100 kPa / 0.2 to 1 bar	<b>7</b>
	20 to 100 kPa / 0.2 to 1 bar with zero elevation device	<b>8</b>
	20 to 100 kPa / 0.2 to 1 bar with zero suppression device	<b>9</b>

According to ANSI/ISA S 51.1-1979 standard terminology

## EXTRAS

<b>lm</b>	Identification tag material	Piping material	Air filter regulator	Pressure gauge	<b>Code</b>
	Stainless Steel	--	--	--	<b>02</b>
	Stainless Steel	Stainless Steel	with	--	<b>10</b>
	Stainless Steel	Copper	with	--	<b>11</b>
	Stainless Steel	Stainless Steel	with	with	<b>13</b>
	Stainless Steel	Copper	with	with	<b>14</b>

## N6W WAFER REMOTE SEAL

Select one character or set of characters from each category and specify complete catalog number.

		Code
<b>abc</b>	<b>BASE MODEL</b>	
	Wafer remote seal	<b>N6W</b>
<b>d</b>	<b>NUMBER OF REMOTE SEAL</b>	
	One remote seal	<b>1</b>
<b>ef</b>	<b>MOUNTING CONNECTION</b>	
	1 - 1/2 in ASME	<b>F1</b>
	2 in ASME	<b>F2</b>
	3 in ASME	<b>F3</b>
	DN40 to EN 1092-1 Form B1	<b>D7</b>
	DN80 to EN 1092-1 Form B1	<b>D8</b>
	DN50 to EN 1092-1 Form B1	<b>22</b>
<b>g</b>	<b>OTHER WETTED MATERIAL (Not diaphragm)</b>	
	Same as diaphragm	<b>0</b>
<b>h</b>	<b>DIAPHRAGM MATERIAL</b>	
	AISI 316L serrated seat finish	<b>2</b>
	AISI 316L smooth seat finish	<b>L</b>
	Hastelloy C 276	<b>3</b>
	Tantalum (max temperature 260°C/500°F) - (NOT VACUUM)	<b>5</b>
	AISI 316L ss with PFA anti-stick coating	<b>7</b>
	Hastelloy C 276 with PFA anti-stick coating	<b>8</b>
	AISI 316L ss with PFA coating anti-corrosion and antistick (Note)	<b>A</b>
<b>i</b>	<b>EXTENSION LENGTH</b>	
	None	<b>0</b>
<b>j</b>	<b>CAPILLARY - Fill fluid</b>	
	Silicone oil for standard applications	<b>A</b>
	Silicone oil for high temperature	<b>D</b>
	Glycerin/Water	<b>G</b>
	Inert Fluid Galden	<b>P</b>
	Neobee M-20	<b>N</b>
<b>kl</b>	<b>SYSTEM LENGTH m(feet)</b>	
	1 (3)	<b>03</b>
	1.5 (5)	<b>05</b>
	2 (7)	<b>07</b>
	2.5 (8)	<b>08</b>
	3 (10)	<b>10</b>
	3.5 (12)	<b>12</b>
	4 (13)	<b>13</b>
	4.5 (15)	<b>15</b>
	5 (17)	<b>17</b>
	6 (20)	<b>20</b>
	7.5 (25)	<b>25</b>
	9 (30)	<b>30</b>
	10 (35)	<b>35</b>
<b>m</b>	<b>CERTIFICATION</b>	
	None	<b>0</b>
<b>no</b>	<b>OPTIONS</b>	
	None	<b>00</b>

## N6E FLANGED EXTENDED DIAPHRAGM SEAL

Select one character or set of characters from each category and specify complete catalog number.

		Code
<b>abc</b>	<b>BASE MODEL</b>	
	Flanged extended diaphragm seal	<b>N6E</b>
<b>d</b>	<b>NUMBER OF REMOTE SEAL</b>	
	One remote seal	<b>1</b>
<b>ef</b>	<b>MOUNTING CONNECTION</b>	<b>Material</b>
	3 in ASME CL150	Carbon steel
	3 in ASME CL150	AISI 316 ss
	3 in ASME CL300	Carbon steel
	3 in ASME CL300	AISI 316 ss
	DN80, PN 16	Carbon steel
	DN80, PN 16	AISI 316 ss
	DN80, PN 40	Carbon steel
	DN80, PN 40	AISI 316 ss
		<b>K3</b>
		<b>S3</b>
		<b>L3</b>
		<b>36</b>
		<b>4C</b>
		<b>4M</b>
		<b>4D</b>
		<b>4N</b>
<b>g</b>	<b>OTHER WETTED MATERIAL (Not diaphragm)</b>	
	AISI 316L ss	<b>2</b>
	Hastelloy C (only available with diaphragm material code 3 and 8 at position "h")	<b>3</b>
<b>h</b>	<b>DIAPHRAGM MATERIAL</b>	
	AISI 316L ss	<b>2</b>
	Hastelloy C 276	<b>3</b>
	AISI 316L ss with PFA anti-stick coating	<b>7</b>
	Hastelloy C 276 with PFA anti-stick coating	<b>8</b>
	AISI 316L ss with PFA coating anti-corrosion and antistick	<b>A</b>
<b>i</b>	<b>EXTENSION LENGTH</b>	
	2in	<b>2</b>
	4in	<b>4</b>
	6in	<b>6</b>
<b>j</b>	<b>CAPILLARY - Fill fluid</b>	
	Silicone oil for standard applications	<b>A</b>
	Silicone oil for high temperature	<b>D</b>
	Glycerin/Water	<b>G</b>
	Inert Fluid Galden	<b>P</b>
	Neobee M-20	<b>N</b>
<b>kl</b>	<b>SYSTEM LENGTH m(feet)</b>	
	1 (3)	<b>03</b>
	1.5 (5)	<b>05</b>
	2 (7)	<b>07</b>
	2.5 (8)	<b>08</b>
	3 (10)	<b>10</b>
	3.5 (12)	<b>12</b>
	4 (13)	<b>13</b>
	4.5 (15)	<b>15</b>
	5 (17)	<b>17</b>
	6 (20)	<b>20</b>
	7.5 (25)	<b>25</b>
	9 (30)	<b>30</b>
	10 (35)	<b>35</b>
<b>m</b>	<b>CERTIFICATION</b>	
	None	<b>0</b>
<b>no</b>	<b>OPTIONS</b>	
	None	<b>00</b>

# N6F FLANGED FLUSH DIAPHRAGM SEAL

Select one character or set of characters from each category and specify complete catalog number.

<b>abc</b>	<b>BASE MODEL</b>	<b>Code</b>
	Flanged flush diaphragm seal	<b>N6F</b>
<b>d</b>	<b>NUMBER OF REMOTE SEAL</b>	
	One remote seal	<b>1</b>
<b>ef</b>	<b>MOUNTING CONNECTION</b>	<b>Material</b>
	3 in ASME CL150	Carbon steel
	3 in ASME CL150	AISI 316 ss
	3 in ASME CL300	Carbon steel
	3 in ASME CL300	AISI 316 ss
	3 in ASME CL600	Carbon steel
	3 in ASME CL600	AISI 316 ss
	3 in ASME CL900	Carbon steel
	3 in ASME CL900	AISI 316 ss
	DN80, PN 16	Carbon steel
	DN80, PN 16	AISI 316 ss
	DN80, PN 40	Carbon steel
	DN80, PN 40	AISI 316 ss
	DN80, PN 63	Carbon steel
	DN80, PN 63	AISI 316 ss
	DN80, PN 100	Carbon steel
	DN80, PN 100	AISI 316 ss
		<b>K3</b>
		<b>S3</b>
		<b>L3</b>
		<b>36</b>
		<b>37</b>
		<b>38</b>
		<b>39</b>
		<b>3A</b>
		<b>4C</b>
		<b>4M</b>
		<b>4D</b>
		<b>4N</b>
		<b>4E</b>
		<b>4F</b>
		<b>4H</b>
		<b>4G</b>
<b>g</b>	<b>OTHER WETTED MATERIAL (Not diaphragm)</b>	
	Same as diaphragm	<b>0</b>
<b>h</b>	<b>DIAPHRAGM MATERIAL</b>	
	AISI 316L serrated seat finish	<b>2</b>
	AISI 316L smooth seat finish	<b>L</b>
	Hastelloy C 276	<b>3</b>
	Tantalum (max temperature 260°C/500°F) - (NOT VACUUM)	<b>5</b>
	AISI 316L ss with PFA anti-stick coating	<b>7</b>
	Hastelloy C 276 with PFA anti-stick coating	<b>8</b>
	AISI 316L ss with PFA coating anti-corrosion and antistick	<b>A</b>
<b>i</b>	<b>EXTENSION LENGTH</b>	
	None	<b>0</b>
<b>j</b>	<b>CAPILLARY - Fill fluid</b>	
	Silicone oil for standard applications	<b>A</b>
	Silicone oil for high temperature	<b>D</b>
	Glycerin/Water	<b>G</b>
	Inert Fluid Galden	<b>P</b>
	Neobee M-20	<b>N</b>
<b>kl</b>	<b>SYSTEM LENGTH m(feet)</b>	
	1 (3)	<b>03</b>
	1.5 (5)	<b>05</b>
	2 (7)	<b>07</b>
	2.5 (8)	<b>08</b>
	3 (10)	<b>10</b>
	3.5 (12)	<b>12</b>
	4 (13)	<b>13</b>
	4.5 (15)	<b>15</b>
	5 (17)	<b>17</b>
	6 (20)	<b>20</b>
	7.5 (25)	<b>25</b>
	9 (30)	<b>30</b>
	10 (35)	<b>35</b>
<b>m</b>	<b>CERTIFICATION</b>	
	None	<b>0</b>
<b>no</b>	<b>OPTIONS</b>	
	None	<b>00</b>

## N6U THREADED UNION CONNECTION SEAL

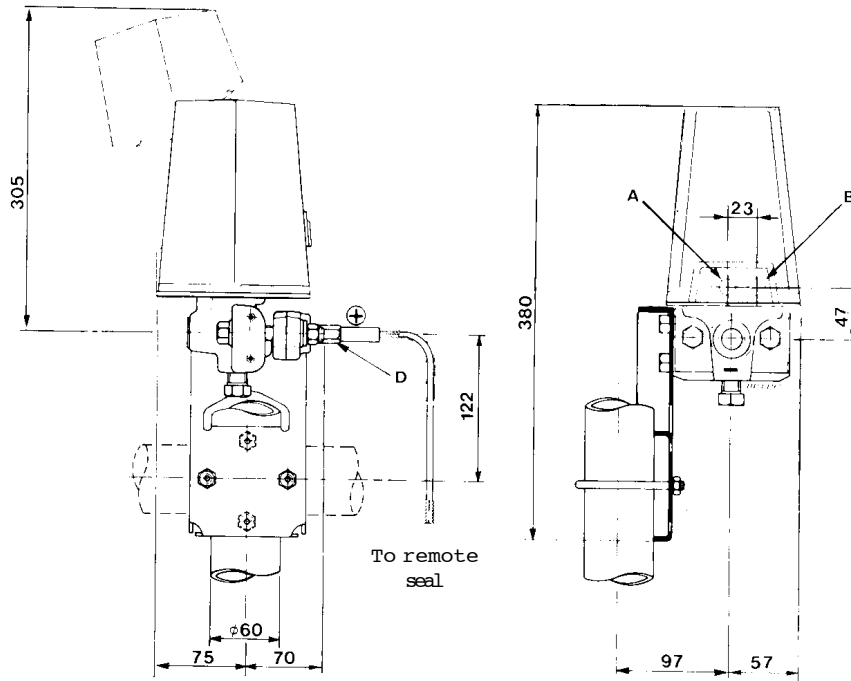
Select one character or set of characters from each category and specify complete catalog number.

		Code
<b>abc</b>	<b>BASE MODEL</b>	
	Threaded union connection seal	<b>N6U</b>
<b>d</b>	<b>NUMBER OF REMOTE SEAL</b>	
	One remote seal	<b>1</b>
<b>ef</b>	<b>MOUNTING CONNECTION</b>	
	Union connection	<b>U1</b>
<b>g</b>	<b>OTHER WETTED MATERIAL (Not diaphragm)</b>	
	Same as diaphragm	<b>0</b>
<b>h</b>	<b>DIAPHRAGM MATERIAL</b>	
	AISI 316L ss	<b>2</b>
	Hastelloy C 276	<b>3</b>
<b>i</b>	<b>EXTENSION LENGTH</b>	
	None	<b>0</b>
<b>j</b>	<b>CAPILLARY - Fill fluid</b>	
	Silicone oil for standard applications	<b>A</b>
	Silicone oil for high temperature	<b>D</b>
	Glycerin/Water	<b>G</b>
	Inert Fluid Galden	<b>P</b>
	Neobee M-20	<b>N</b>
<b>kl</b>	<b>SYSTEM LENGTH m(feet)</b>	
	1 (3)	<b>03</b>
	1.5 (5)	<b>05</b>
	2 (7)	<b>07</b>
	2.5 (8)	<b>08</b>
	3 (10)	<b>10</b>
<b>m</b>	<b>PROCESS O-RING MATERIAL</b>	
	Silicone rubber	<b>3</b>
	PTFE	<b>4</b>
<b>no</b>	<b>OPTIONS</b>	
	No options	<b>00</b>
	AISI 316 ss weld bushing	<b>W1</b>
	Chemical tee flange	<b>W2</b>

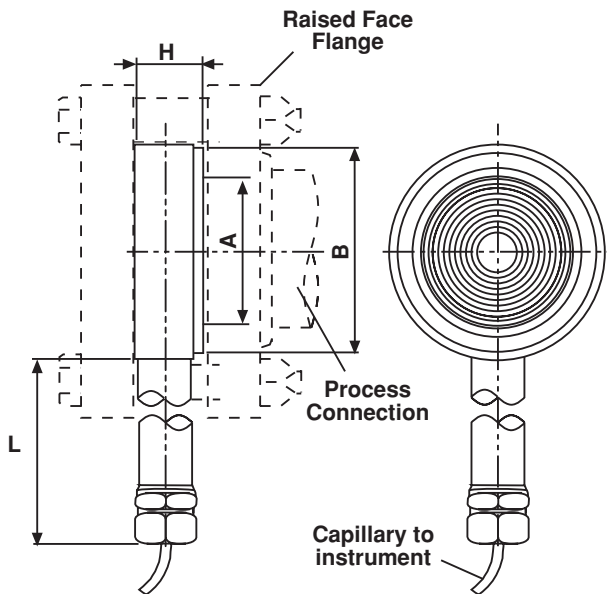
Compliance to NACE class II bolting, according to specification MR0175, latest revision



## MOUNTING DIMENSIONS



• **N6W Remote wafer seal**

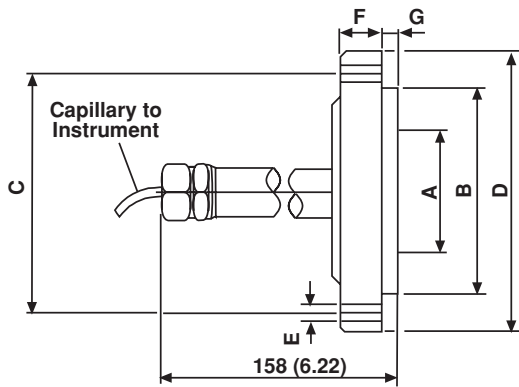


SIZE	DIMENSIONS mm (in)			
	A (dia)	B dia)	H	L
1-1/2 in	47 (1.85)	73 (2.87)	20 (0.78)	134 (5.3)
2 in	60 (2.36)	92 (3.62)	20 (0.78)	134 (5.3)
3 in	89 (3.5)	127 (5)	20 (0.78)	134 (5.3)
DN 40	47 (1.85)	88 (3.46)	20 (0.78)	134 (5.3)
DN 50	60 (2.36)	102 (4.02)	20 (0.78)	134 (5.3)
DN 80	89 (3.5)	138 (5.43)	20 (0.78)	134 (5.3)

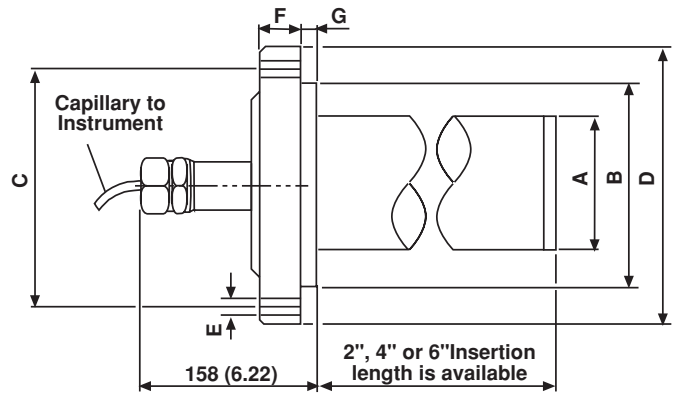
**Wafer seal maximum working pressure:**

41.3 MPa, 413 bar, 6000 psi for 1-1/2 in, 2 in or 3 in ASME  
 40 MPa, 400 bar, 5800 psi for DN40, DN50 or DN80  
 but not greater than the backup flange rating (no supplied)

• N6F Remote flanged flush diaphragm seal



• N6E Remote flanged extended diaphragm seal

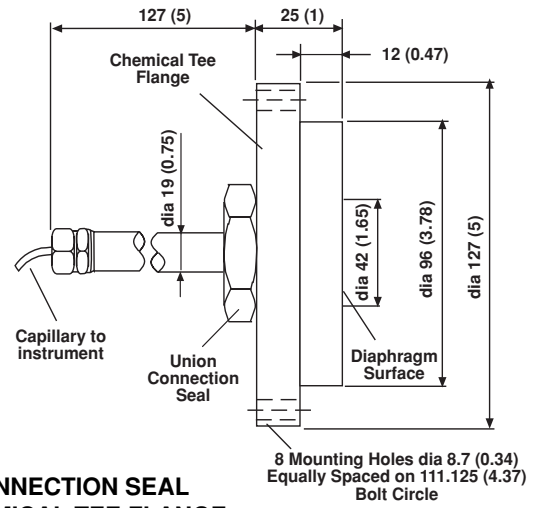
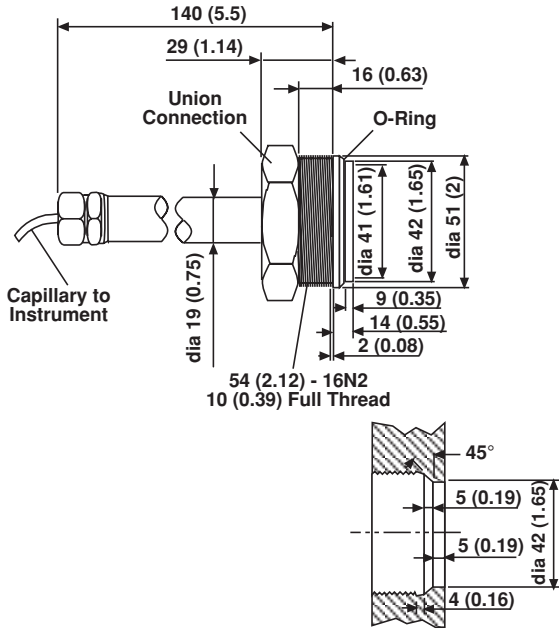


SIZE/RATING	A (dia)		DIMENSIONS mm (in)						N° of holes
	flush	extended	B (dia)	C (dia)	D (dia)	E (dia)	F	G	
3in ASME CL 150	89 (3.5)	72 (2.83)	127 (5)	152.4 (6)	190.5 (7.5)	19.1 (0.79)	22.4 (0.98)	9.5 (0.37)	4
3in ASME CL 300	89 (3.5)	72 (2.83)	127 (5)	168.15 (6.62)	209.6 (8.26)	22.4 (0.88)	26.9 (1.1)	9.5 (0.37)	8
3in ASME CL 600	89 (3.5)		127 (5)	168.15 (6.62)	209.6 (8.26)	22.4 (0.88)	31.8 (1.3)	9.5 (0.37)	8
3in ASME CL 900	89 (3.5)		127 (5)	190.5 (7.5)	241 (9.48)	26 (1.02)	38.1 (1.5)	9.5 (0.37)	8
DN80 PN16	89 (3.5)	72 (2.83)	138 (5.43)	160 (6.3)	200 (7.87)	18 (0.71)	17 (0.67)	9.5 (0.37)	8
DN80 PN40	89 (3.5)	72 (2.83)	138 (5.43)	160 (6.3)	200 (7.87)	18 (0.71)	21 (0.83)	9.5 (0.37)	8
DN80 PN63	89 (3.5)		138 (5.43)	170 (6.7)	215 (8.46)	22 (0.86)	25 (0.98)	9.5 (0.37)	8
DN80 PN100	89 (3.5)		138 (5.43)	180 (7.08)	230 (9.05)	26 (1.02)	33 (1.3)	9.5 (0.37)	8

**Flanged seal maximum working pressure:**

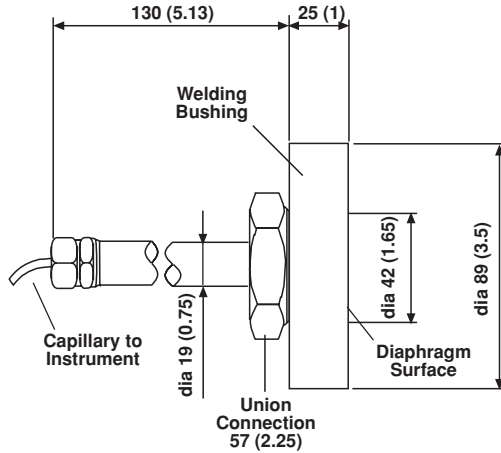
ASME B16.5	Flange in carbon steel at 100 °F (38 °C)	Flange in AISI 316 ss at 100 °F (38 °C)
Class 150	285 psi	275 psi
Class 300	740 psi	720 psi
Class 600	1480 psi	1440psi
Class 900	2220 psi	2160 psi
EN 1092-1	Flange in carbon steel at 120 °C or in AISI 316 ss at 20 °C	
PN 16	16 bar, 230 psi	
PN 40	40 bar, 580 psi	
PN 63	63 bar, 930 psi	
PN 100	100 bar, 1450 psi	

• N6U Remote union connection seal



**UNION CONNECTION SEAL WITH CHEMICAL TEE FLANGE**

**UNION CONNECTION SEAL WITH WELD BUSHING**



**Union seal maximum working pressure**

Union connection: 10.3 MPa, 103 bar, 1500 psi;  
 With chemical tee flange: 2 MPa, 20 bar, 300 psi

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