HYGIENIC BY DESIGN
ANDERSON-NEGELE

Modular Pressure Transmitter PF　　CLEANadapt

Range of applications

· Pressure measurement in pipes and vessels
· High Temperature applications up to 177 °C (350 °F) permanent

Application examples

· Sanitary pressure monitoring for breweries, dairies and food & beverage production

Hygienic design/Process connection

· Hygienic process connection with CLEANadapt
· Conforming to 3-A Sanitary Standard for versions with DIRECTadapt
· All wetted materials are FDA-conform
· Sensor completely made of stainless steel
· Complete overview of process connections: see order code
· The Anderson-Negele CLEANadapt system offers a flow-optimized, hygienic and easily sterilizable installation solution for sensors.

Features

· CIP-/ SIP-cleaning up to 177 °C / 350 °F
· Unique design and fully modular components
· Components may be economically purchased and individually integrated
· Lower inventory cost for critical sensors
· Modules may be stocked and interchanged to meet any need
· Extremely durable at continuous temperatures up to 177 °C / 350 °F
· Easy to operate, adjustments without additional tools
· Self diagnostics ensure that sensor is performing optimally
· Available with absolute and relative measuring cell (vacuum proof)
· Developed to excel in the harshest environments
· Air tight sealing eliminates internal condensation (patent pending)

Options/Accessories

· Wide offering of standard pressure ranges
· Customer specified ranges available
· Waterproof prefabricated cable for M12 connector

Measuring principle of the pressure sensor

This unit utilizes an internal piezoelectric transducer to convert the process measurement into a corresponding mV signal. The mV signal then passes through custom linearization and conditioning circuitry. The resulting signal is an industry standard 4...20 mA. This mA signal is factory set over the specified range of the unit.

With relative pressure sensors, the back of the diaphragm is vented, i.e. this sensor measures the gauge pressure and/or vacuum relative to the atmospheric pressure. With an absolute pressure sensor the measurement is relative to a perfect theoretical vacuum. I.e. the signal will vary with the ambient atmospheric air pressure.

Authorizations

FDA　Ⓐ3 74-06

Pressure sensor PF

Pressure sensor PF

Specification		
Measuring range URL [bar]	Relative	0...2 / 3 /4 / 6 /7 / 10 / 20 / 35 / 70
		-1...1 / 2.5 / 3 / 4 / 7
	Absolute	0...2 / 3 / 4 / 6 / 7 /10 / 20 / 35
Measuring range URL [psi]	Relative	0...30 / 50 / 60 / 99 / 100 / 150 / 160 / 200 / 300 / 500 / 1000
		30 mmHg/0, 30 mmHg/0...15 / 30 / 60 / 100 / 200
	Absolute	0...30 / 50 / 60 / 100 / 150 / 160 / 200 / 300 / 500
Turndown	max. 10:1	of upper range value
		(see also measurement accuracy)
Overpressure strength	Factor	1.5 x nominal pressure of measuring element up to 35 bar/500 psi
		1.1 x nominal pressure of measuring element 70 bar / 1000 psi
Measurement accuracy	Turndown to 5:1	≤ 0.10 % in calibrated measuring range
	Turndown over 5:1	≤ 0.15 % in calibrated measuring range
	Repeatability	0.05 %
	Long-term stability	0.2 % URL every 2 years
Temperature effect	Process	< 12.5 mbar /10 °C (0.1 psi / 10 °F) typical
	Ambient	< 12.5 mbar /10 °C (0.1 psi / 10 °F) typical
Temperature range	Process	-18...177 °C (0...350 °F) at ambient temp. up to 60 °C (140 °F)
		-18...165 °C (0...330 °F) at ambient temp. up to 71 °C (160 °F)
	Ambient	0...71 °C (32...169 °F)
Response time		< 0.1 seconds
Sample rate		< 0.05 seconds
Materials	Connection head	Stainless steel, AISI 304 (1.4301), R_a ≤ 0.8 μm (32 microinch)
	Metal cover	Stainless steel, AISI 304 (1.4301), R_a ≤ 0.8 μm (32 microinch)
	Plastic cover	Polycarbonate
	Threaded connector	Stainless steel, AISI 304 (1.4301), R_a ≤ 0.8 μm (32 microinch)
	Wetted parts	Stainless steel, AISI 316L, R_a ≤ 0.64 μm (25 microinch)
	Diaphragm	Stainless steel, AISI 316L, R_a ≤ 0.64 μm (25 microinch)
	Diaphragm seal/oil filling	Medical white oil / mineral oil / paraffin oil
		FDA approval number 21CFR172.878, 21CFR178.3620, 21CFR573.680
		Neobee M20 (optional)
Process connection		G1" hygienic, CPM fitting, IDF 38 mm / 51 mm (female), Tri-Clamp 3/4"...2"
Electric connection	Cable gland	M16x1.5
	Plug-in connection	M12 plug, 5-pin, 1.4305 (option)
Protection class		IP 67 (with cable fitting) / NEMA 4X
		IP 69 K (with plug-in connection)
Auxiliary voltage		18...36 V DC
Output	Current loop	analog 4...20 mA
Burden		see separate graph on page 3
Tightening torque	For assembly all PFS components	27 Nm (20 ft-lbs)
Weight		approx. 780 g

Burden
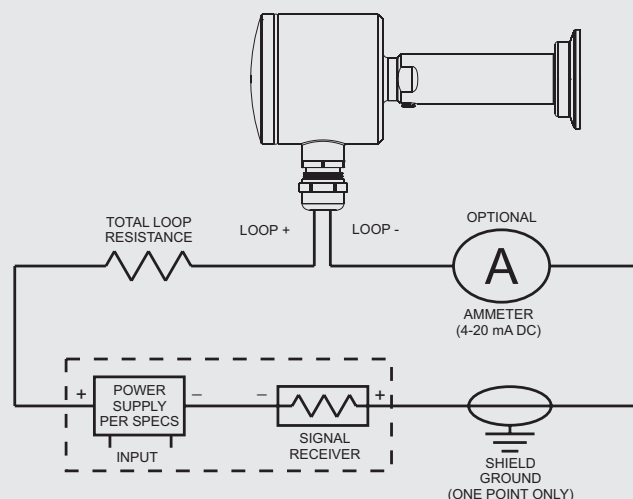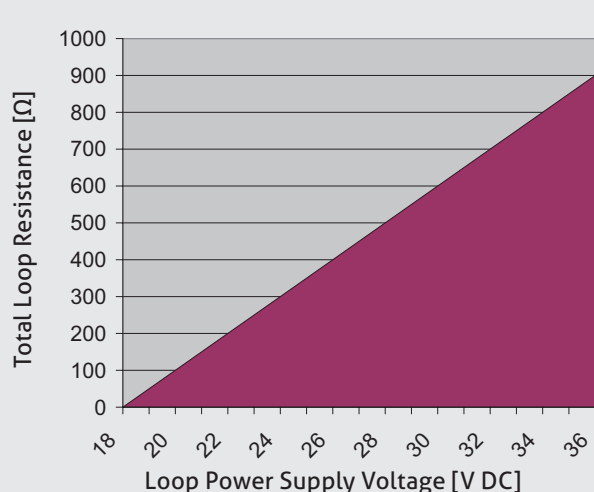
## Conditions for a measuring point according to 3-A Sanitary Standard 74-06

· The PF sonsors with Tri-Clamp fitting conforming to the 3-A Sanitary Standard.

· The sensors are designed for CIP-/ SIP-cleaning. Maximum 177 °C / 120 minutes.

· Only with 3-A conforming Tri-Clamp connection.

· Mounting position, self draining and the position of the leackage hole must be in accordance to current 3-A Sanitary Standard.

Exploded view of functional components

1: Cap (including two O-rings)
2: Puck
3: Enclosure
4: M12 Quick disconnect (including two O-rings)
5: Stem (including two O-rings)
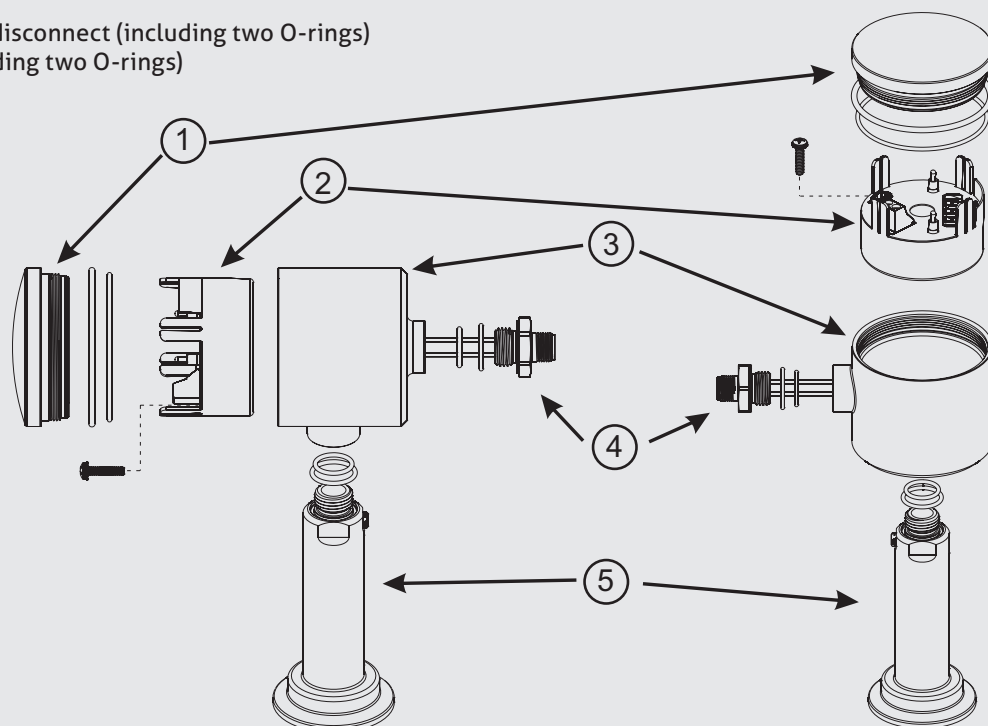
Dimensional drawing horizontal orientation

91 mm
(3.6")

167 mm
(6.6")
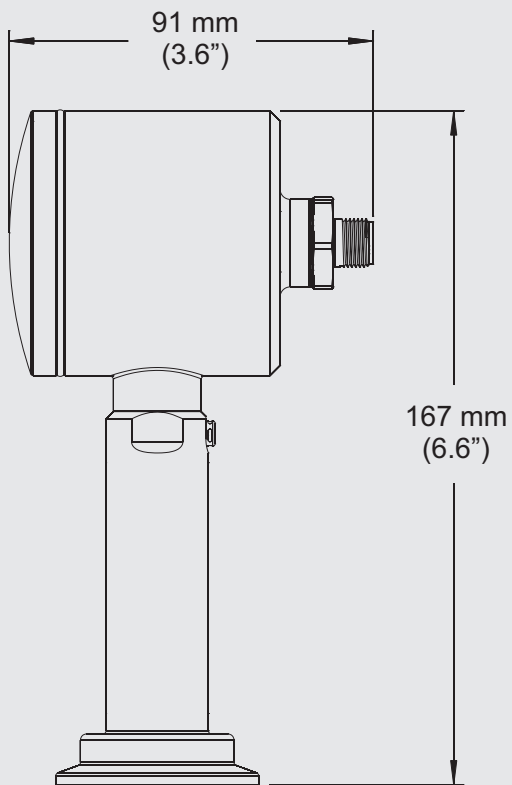
Dimensional drawing vertical orientation

91 mm
(3.6")

167 mm
(6.6")
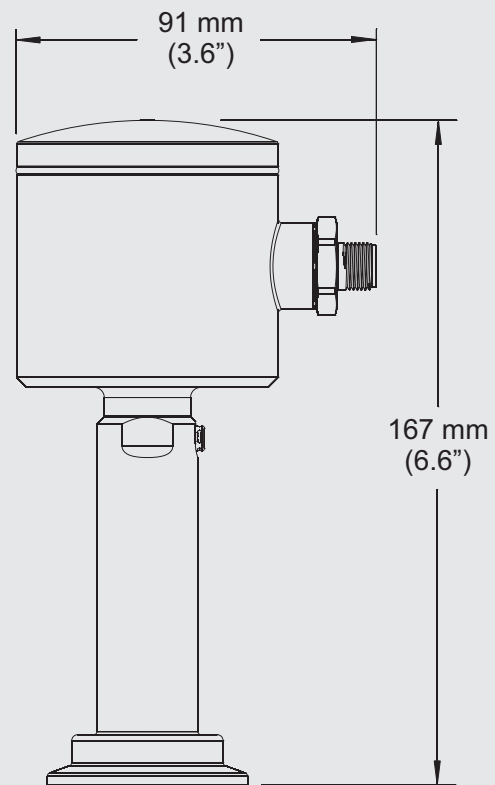
Dimensional drawing CLEANadapt horizontal orientation

91 mm
(3.6")

160 mm
(6.3")
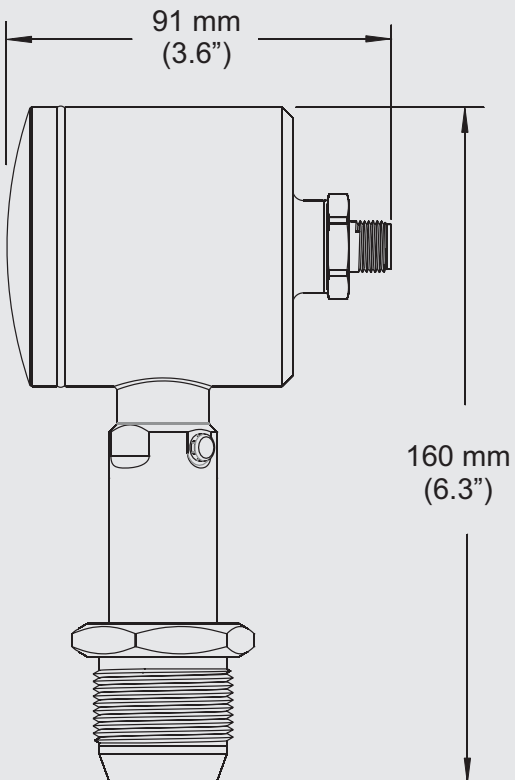
Dimensional drawing CLEANadapt vertical orientation

91 mm
(3.6")

160 mm
(6.3")
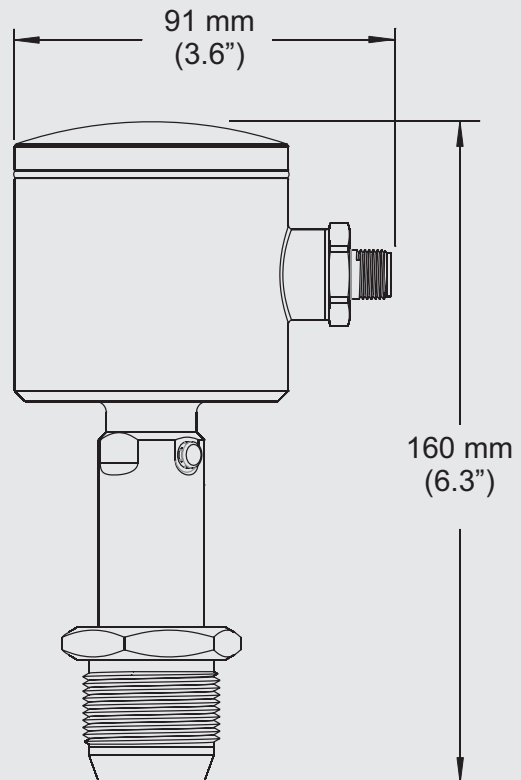
Mechanical connection/installation

Pay attention to the maximum tightening torque of 20 Nm if using Negele CLEANadapt system!

Conventional usage

· Not suitable for applications in explosive areas.
· Not suitable for applications in security-relevant equipments (SIL).

Electrical connection with cable gland

PLC

24V=

AC

4...20 mA
2-wire current loop

Electrical connection with M12-plug

Configuration M12-plug

1: + supply +24 V DC
2: - output 4...20 mA
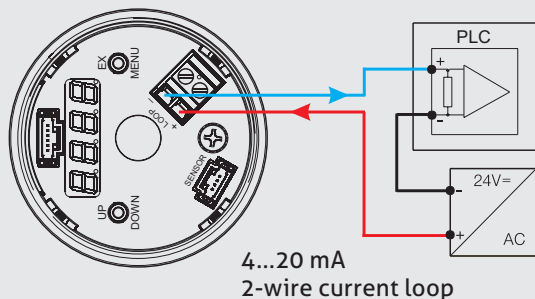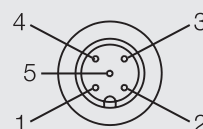3: not connected
4: not connected
5: not connected

Maintenance error codes

| Error code	Category	Customer action
No visible code, 3.8 mA output	Communication	Check Stem ribbon cable connection to puck, power cycle
E100	Incompatible Range	1. Reset Error 2. Reconfigure puck to a range compatible with the stem 3. power cycle
E101	Incompatible Range/ range changed	1. Reset Error 2. Reconfigure puck to a range compatible with the stem 3. power cycle
E300	Stem Data Corruption	Replace Stem
E301	Stem Data Corruption	Replace Stem
E302	Stem Data Corruption	Replace Stem
E304	Stem Data Corruption	Replace Stem
E405	Puck Data Corruption	Replace Puck
E406	Puck Data Corruption	Replace Puck
E407	Puck Data Corruption	Replace Puck
E500	Communication	Check Stem ribbon cable connection to puck, power cycle
E501	Stem Data Corruption	Replace Stem
E502	Stem Data Corruption	Replace Stem
E503	Stem Data Corruption	Replace Stem
E504	Stem Data Corruption	Replace Stem
E505	Insufficient loop voltage	Check if loop voltage is at least 18 V, provide correct voltage then power cycle
E600	Puck Data Corruption	Replace Puck
E602	Stem Configuration Error	Reset Error and power cycle and if error is persistent replace Stem
E603	Stem Configuration Error	Reset Error and power cycle and if error is persistent replace Stem
E700	Internal System Failure	Reset Error and power cycle and if error is persistent replace puck
E701	Internal System Failure	Reset Error and power cycle and if error is persistent replace puck
E702	Internal System Failure	Reset Error and power cycle and if error is persistent replace puck

Modular sensor principle

The "MPF" pressure sensor has a modular design. It can be purchased in separate components and assembled as required by the customer. It is also available as a fully assembled sensor. In both cases, the user can check or change the following settings.

The components and sensors are delivered according to the specifications (ranges and units) stated on the type label. These values can be checked and changed by the user in the following menu. This is accomplished using two operating buttons (with a total of 4 actuation possibilities) and a 4-digit segment display.

View of electronics with open cover
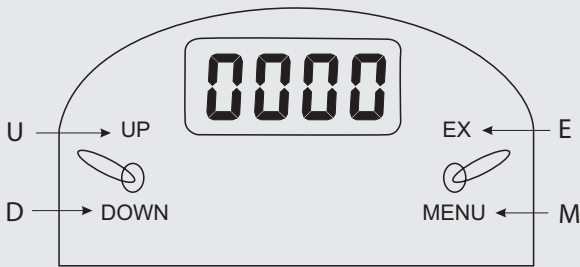
Explenation of symbols used in menu structure

E	Tip on button "E" for short time
E_L	Hold button "E" for minimum 2 seconds
M	Tip on button "M" for short time
M_L	Hold button "M" for minimum 2 seconds
U	Tip on button "U" for short time
U_L	Hold button "U" for minimum 2 seconds
D	Tip on button "D" for short time
D_L	Hold button "D" for minimum 2 seconds

Configuration submenu "damping output"
call up see page 7

Damping	Delay [ms]
0	100
1	1000
2	2000
3	3000
4	4000
5	5000
6	6000
7	7000
8	8000
9	9000
10	10000

Starting sequence

Power on device		
	8.8.8.8.	LED-test all segments and points lighted
	r 600	Revision number is displayed
	8.8.8.8.	
	bAr 9 PSI 9	Pressure unit e. g. BAR or PSI for relative version
	8.8.8.8.	
	12.0	Upper range value e. g. 12.0 BAR
	8.8.8.8.	Self-test, display differs acc. to „Display VALUE"
	Basic menu / RUN MODE	

Display of submenu/settings

Mode / Basic menu	LED Indicator	Button/switch		Submenu operating level	Setting
		Select: **U** or **D**		Select: **U** or **D**	
RUN MODE	Display actual current or pressure value or error code if an error occured			· Clear error · One touch zero (zero adjustment) · Display pressure or current value	

	`12.01`	D_L → `8.8.8.8`	Clear error	
	M	D_L + M_L → `ñ ñ ıı ñ`	"One Touch Zero"	
		U `12.01` D	Display pressure value for 2 seconds (PVAL) if display "current" (CVAL) is selected.	

SENSOR CONFIG MODE	`COnF`	E_L + U_L			
Display VALUE	M	`PūAL` D / U M	Toggle display CVAL / PVAL Actual current value (mA) `CūAL` Actual pressure value BAR / PSI `PūAL`		
Units		M `PSI9` D / U M	Toggle unit `PSI9` PSI relative / `bArg` BAR relative `PSIA` PSI absolute / `bArA` BAR absolute		

Output		M
		`4 20` D / U
		M
			Assignment of current value at output to measuring range
			4...20 -> 4 mA = measuring range min
			         20 mA = max measuring range
			20...4 -> 20 mA = measuring range min
			         4 mA = max measuring range		

PRESSURE RANGE LRV: Lower range value		M `Lrū` E	Display of present setting e.g. "50"	D / U E	Change value, at `ūAC` changing is not possible (vacuum range).
PRESSURE RANGE URV: Upper range value		M `Urū` E	Display of present setting e.g. "50"	D / U E	Change value, use U or D to set desired value. At `SEt` the units BAR / PSI were changed.
Output Damping		M `dñP9` E	Display of present setting e.g. "0...10"	D / U E	Change value, see table on page 6.
Factory configuration reset		M `FrES` E	Display "nO"	D / U E	Change to "YES" -> Reset to factory setting
CALIBRATION MODE	M `CAL`	M			

Cleaning/Maintenance

· In case of using pressure washers, dont't point nozzle
  directly to electrical connections!

Reshipment

· Sensors shall be clean and must not be contaminated
  with dangerous media! Note the advice for cleaning!
· Use suitable transport packaging only to avoid damage
  of the equipment!

Note on CE

· Applicable directives:
  Electromagnetic Compatibility Directive 2014/30/EU
· Compliance with the applicable EU directives is identi-
  fied by the CE label on the product.
· The operating company is responsible for comply-
  ing with the guidelines applicable to the entire
  installation.

Transport/Storage

· No outdoor storage
· Dry and dust free
· Not exposed to corrosive media
· Protected against solar radiation
· Avoiding mechanical shock and vibration
· Storage temperature -55...+90 °C
· Relative humidity max. 98 %

Standards and guidelines

· You have to comply with applicable regulations and
  directives.

Disposal

· Electrical devices should not be disposed of with house-
  hold trash. They must be recycled in accordance with
  national laws and regulations.
· Take the device directly to a specialized recycling com-
  pany and do not use municipal collection points.

Possible presettings of the measurement range

Order number PSI		Suitable for sensor type (see Order number)		Order number BAR		Suitable for sensor type (see Order number)	
		A (absolute)	C (relative)			A (absolute)	C (relative)
025	30Hg/0		x	251	-1...1		x
028	30Hg/0/15		x	286	-1...2.5		x
029	30Hg/0/30		x	217	-1...3		x
031	30Hg/0/60		x	056	-1...4		x
032	30Hg/0/100		x	304	-1...7		x
314	30Hg/0/200		x	057	0...2	x	x
066	0...30	x		235	0...3	x	x
068	0...50	x	x	192	0...4	x	x
069	0...60	x	x	060	0...6	x	x
070	0...99	x	x	309	0...7	x	x
071	0...100	x	x	061	0...10	x	x
073	0...150	x	x	065	0...20	x	x
074	0...160	x	x	224	0...35	x	x
075	0...200	x	x	206	0...70		x
077	0...300	x	x				
081	0...500	x	x				
084	0...1000	x	x				
000	(Field calibration)						
999	(Factory setting acc. to customer specifications)						

Order code of fully assembled sensor

PF   (Modular pressure sensor, food)

  S1   (Sensor neck, food and beverages)

      Maximum upper range value
      966   (30 psi / 2 bar)
      971   (100 psi / 7 bar)
      981   (500 psi / 35 bar)
      984   (1000 psi / 70 bar)

          Sensor type
          A   (Absolute)
          C   (Relative, vacuum-proof)

              Process connection
              160   (Flexible thread G1", hygienic CLEANadapt)
              182   (Fixed thread G1" hygienic CLEANadapt)
              059   (1.5" NPT)
              002   (3/4" Tri-Clamp)
              003   (1" Tri-Clamp)
              004   (1.5" Tri-Clamp)
              005   (2" Tri-Clamp)
              123   (CPM fitting)
              129   (IDF 38 mm female)
              131   (IDF 51 mm female)

                  Actuating fill
                  1   (Medical-grade white oil/FDA-approved)
                  5   (Neobee M20)

                      Material membrane
                      A   (Stainless steel 316L)

                          00   (Fixed character)

                              Certificates
                              A   (No certificate)
                              B   (3.1 Material and 2.1 Certificate)

                                  Enclosure
                                  E2A   (SS head with measuring electronics and plastic cover)
                                  E3A   (SS head with measuring electronics and stainless steel cover)

                                      Unit of measure
                                      P   (PSI)
                                      B   (BAR)

                                          Measuring range
                                          XXX   (See measuring range table, page 8)

                                              0   (Fixed character)

                                                  Electrical connection
                                                  A   (M12 connector)
                                                  C   (Cable fitting M16 x 1.5)

                                                      Enclosure orientation
                                                      1   (Vertical)
                                                      2   (Horizontal)

                                                          Certificates
                                                          A   (No certificate)
                                                          B   (3.1 Material and 2.1 Certificate)
                                                          C   (3.1 Material and accuracy)
                                                          D   (2.1 Certificate)

                                                              64   (Fixed character)

| PF | S1 | 966 | C | 160 | 1 | A | 00 | A | E2A | P | 068 | 0 | A | 1 | A | 64 |

Order number of measuring electronics without stainless steel enclosure

E1A   (Measuring electronics without stainless steel enclosure)

Unit of measure
P   (PSI)
B   (BAR)
0   (Field calibrated)

Measuring range
000   (without preset of measuring range)
XXX   (See measuring range table, page 8)

0   (Fixed character)

Electrical connection
0   (Measuring electronics only)

Enclosure orientation
0   (Measuring electronics only)

Certificates
A   (No certificate)
D   (2.1 Certificate)

64   (Fixed character)

| E1A | P | 066 | 0 | 0 | 0 | A | 64 |

Order number of measuring electronics with stainless steel enclosure

E2A   (Measuring electronics with stainless steel enclosure and plastic cover)
E3A   (Measuring electronics with stainless steel enclosure and stainless steel cover)

Unit of measure
P   (PSI)
B   (BAR)

Measuring range
000   (without preset of measuring range)
XXX   (See measuring range table, page 8)

0   (Fixed character)

Electrical connection
A   (M12 connector)
C   (Cable fitting M16 x 1.5)

Enclosure orientation
1   (Vertical)
2   (Horizontal)

Certificates
A   (No certificate)
D   (2.1 Certificate)

64   (Fixed character)

| E2A | P | 066 | 0 | A | 1 | A | 64 |

Order code of sensor neck

S1   (Sensor neck, food and beverages)

Maximum measuring range end value
966   (30 psi / 2 bar)
971   (100 psi / 7 bar)
981   (500 psi / 35 bar)
984   (1000 psi / 70 bar)

Sensor type
A   (Absolute)
C   (Relative, vacuum-proof)

Process connection
160   (Flexible thread G1", hygienic CLEANadapt)
182   (Fixed thread G1" hygienic CLEANadapt)
059   (1.5" NPT)
002   (3/4" Tri-Clamp)
003   (1" Tri-Clamp)
004   (1.5" Tri-Clamp)
005   (2" Tri-Clamp)
123   (CPM fitting)
129   (IDF 38 mm female)
131   (IDF 51 mm female)

Actuating fill
1   (Medical white oil / mineral oil)
5   (Neobee M20)

Material membrane

A   (Stainless steel 316L)

00   (Fixed character)

Certificates
A   (No certificate)
B   (3.1 Material and 2.1 Certificate)

S1   966   A   160   1   A   00   A

Order number of individual components		
Figure	**Part**	**Order number**
	Electronics	See order number of measuring electronics without a stainless steel housing on page 10
	Wire cover	56741B0064
	Enclosure w/o cap	56327S0064
	Stainless steel cap with seal	5632900001
	Plastic cap with seal	5632800001
	M12 connector	SP56726A0002
	Cable gland M16x1.5	SP5633100000
	O-ring kit (6 rings for complete sensor)	563300001